Proceedings of
the 30th International Business Information Management Association Conference

(IBIMA)

8-9 November 2017
Madrid Spain

ISBN: 978-0-9860419-9-0

Vision 2020:

Sustainable Economic development, Innovation Management, and Global Growth

Editor

Khalid S. Soliman

International Business Information Management Association (IBIMA)

Copyright 2017

Conference Chair

Khalid S. Soliman
International Business Information Management Association, USA

Local Chair

Susana de Juana Espinosa
Universidad de Alicante, Spain

Special Session Chair

Olga Lvova
Lomonosov Moscow State University, Russia

Conference Advisory Committee

John F. Affisco, Hofstra University, USA
Abdul Rahman Ahmad, Universiti Tun Hussein Onn Malaysia, Malaysia
Omar Al-Azzam, University of Minnesota Crookston, USA
Hesham H. Ali, University of Nebraska at Omaha, USA
Ahmed Azam, DeVry University, USA
Najiba Benabess, Millikin University, USA
Az-Eddine Bennani, Reims Management School, France
Emil Boasson, Central Michigan University, USA
Regina Connolly, Dublin City University, Ireland
Rene Leveaux, University of Technology, Sydney, Australia
Susana de Juana Espinosa, Universidad de Alicante, Spain
Xiuzhen Feng, Beijing University of Technology, China
Mohammad Ayub Khan, Technologico de Monterrey, Mexico
Sherif Kamel, The American University in Cairo, Egypt
Najib Saylani, Florida State College at Jacksonville, USA
Magdy Serour, InContext Solutions, Australia
Amine Nehari Talet, King Fahd University of Petroleum & Mineral, KSA
Abraham G. van der Vyver, Monash University, South Africa

Program Committee

Alena Levina, South Ural State University (National Research University), Russia
Alfred Paszek, Opole University of Technology, Poland
Ali Ahmadi, Faculty of Economics and Management of Sfax, Tunisia
Antonello Cammarano, University of Salerno, Italy
Antonina Ukhova, South Ural State University, Russia
Pilasluck Choomta, The Bucharest University of Economic Studies, Romania

Lamyaa El Bassiti, Mohammed V University in Rabat, Morocco
Bogdan Oancea, University of Bucharest, Romania
Nawaz Ahmad, IoBM, Pakistan
Lahsen Abouenour, Mohamed V Rabat University, Morocco
Mohammad Mohammad, University of Western Sydney, Australia
Mihai Parean, West University of Timisoara, Romania
Fabrizio Amarilli, University Politecnico di Milano, Italy
Monica Fait, University of Salento, Italy
Camelia Delcea, Bucharest University of Economic Studies, Romania
Teresa Torres Coronas, Universitat Rovira i Virgili, Catalonia
Elena Lacatus, Polytechnic University of Bucharest, Romania
Sanaullah Ansari, Shaheed Zulfikar Ali Bhutto Institute of Science and Technology (SZABIST), Pakistan
Jana Školudová, University of Pardubice, Czech Republic
Dana – Corina Deselnicu, University Politehnica of Bucharest, Romania
Marek-Kolodziej Katarzyna, Opole University of Technology, Poland
Younès Bahou, Hail University, KSA
Egbide Ben-Caleb, Covenant Univeristy, Nigeria
Tove Engvall, Mid Sweden University, Sweden
Haifa Mezni, International Technical Female College at Buraydah, KSA
Cristina Petronela Simion, University "Politehnica" of Bucharest, Romania
Shamim Hossain, Hajee Mohammad Danesh Science and Technology University, Bangladesh Benedicta Drobota, SC Phyto Expert SRL, Romania
Irina Severin, Politehnica University of Bucharest, Romania
Sabrina O. Sihombing, Universitas Pelita Harapan, Indonesia
Simona Buta, Stefan Cel Mare of Suceava, Romania
Roziah Mohd Rasdi, Universiti Putra Malaysia, Malaysia
Cristina Santandreu Mascarell, Universitat Politècnica de València, Spain
Doha Abdelkhaleq, ESKADENIA, Jordan
Christophe Storaï, Université de Corse, France
Ilya V. Rozhkov, Financial University under the Government of the Russian Federation, Russia
Boris I. Sokolov, Saint Petersburg State University, Russia
Natalia V. Pokrovskaia, Saint Petersburg State University, Russia
Olga A. Lvova, Lomonosov Moscow State University, Russia
Adel Al-Alawi, University of Bahrain, Kingdom of Bahrain
Aida Matri Ben Jemaa, High Institute of Management (ISG – Tunis), Tunisia
Mihail Busu, The Bucharest University of Economic Studies, Romania
Elewechi Okike, AFEXED, UK
Doina I. Popescu, Bucharest University of Economic Studies, Romania
Constantin Ilie, Ovidius University of Constanta, Romania
Darina Saxunova, Comenius University, Bratislava, Slovakia
Adrian Nicolae Branga, Lucian Blaga University of Sibiu, Romania
Banu Baybars Hawks, Kadir Has University, Turkey
Milena Botlíková, Silesian University in Opava, School of Business Administration in Karvina, Czech Republic
Lucian-Ionel Cioca, Lucian Blaga University of Sibiu, Romania
Ali Ahmad Alawneh, Philadelphia University, Jordan
Anca Vasilescu, University Transilvania of Brasov, Romania
Wided Ragmoun, CBE – Qassim University, KSA
Ebo Tawiah Quartey, Mendel University, Brno, Czech Republic
Bilel Bellaj, Sfax School of Business, Tunisia
Kamal Abou El Jaouad, National School of Commerce and Management of Casablanca - University Hassan II, Morocco
Radka Vaníčková, The Institute of Technology and Business, Czech Republic
Safiah Sidek, University Teknikal Malaysia, Malaysia
Silviu Beciu, University of Agronomic Sciences and Veterinary Medicine of Bucharest, Romania

Dhafer Thabet, Mannouba University, Tunisia
Alina Marcuta, University of Agricultural Sciences and Veterinary Medicine, Bucharest, Romania
Faezah Binti Othman, Multimedia University, Malaysia
Irina V. Melik-Gaykazyan, Tomsk State Pedagogical University, Russia
Rodica Rohan, University Politehnica of Bucharest, Romania
Yves Roy, Université de Poitiers, France
Lucie Severová, CULS in Prague, Czech Republic
Silvia Treľová, Faculty of Management Comenius University, Slovakia
Mohd Noah A. Rahman, Universiti Teknologi Brunei, Brunei
Blajina Ovidiu, University Politehnica of Bucharest, Romania
Romanus A. Osabohien, Covenant University, Nigeria
Besma Hkiri, College of Business, KSA
Yehia Alzoubi, University of Technology Sydney, Australia
Abd Rahman Ahmad, Universiti Tun Hussein Onn Malaysia, Malaysia
Marisa Roriz Ferreira, Instituto Politécnico do Porto, Escola Superior de Tecnologia e Gestão, CIICESI, Portugal
Ewa Stańczyk-Hugiet, Wroclaw University of Economics, Poland
Kateryna Tiulkina, Odessa State Academy of Civil Engineering and Architecture, Odessa State Environmental University, Ukraine
Pavel Juřica, Brno University of Technology, Czech Republic
Ding Hooi Ting, Universiti Teknologi PETRONAS, Malaysia
Cerasela Adriana Pirvu, University of Craiova, Romania
Corina Pelau, Bucharest University of Economic Studies, Romania
Dawuda Alhassan, University of Warsaw, Poland
Akhmetshin Elvir Munirovich, Kazan Federal University, Elabuga Institute of KFU, Russia
Aliza Ramli, Universiti Teknologi MARA, Malaysia
Alena Oulehlova, University of Defence, Czech Republic
Dagmar Weberova, Tomas Bata University in Zlin, Czech Republic
Ioana Laura Tibulca, Bucharest University of Economic Studies, Romania
Mohamed Hussain Thowfeek, South Eastern University of Sri Lanka, Sri Lanka
Alina Irina Balan, Sociatatea Romana de Analiza Economico-Financiara, Romania
Maria-Cristiana Munthiu, Conservatoire National des Arts et des Métiers, France
Aleksandra Krajnović, University of Zadar, Croatia
Cristina Burghelea, Hyperion University, Romania
Băcanu Șerban Constanța, "Dunarea de Jos" University of Galati, Romania
Najeh Aissaoui, Faculté des Sciences Economiques et de Gestion de Sfax, Tunisia
Oana Coca, "Alexandru Ioan Cuza" University from Iasi, Romania
Skhvediani Angi Erastievich, Peter the Great St. Petersburg Polytechnic University, Russia
Brian D. Janz, The University of Memphis, USA
Maria Magdalena Roșu, Politehnica University of Bucharest, Romania
Radek Doskočil, Brno University of Technology, Faculty of Business and Management, Czech Republic
Ameni Yengui, University of Sfax, Tunisia
Jaishree Asarpota, Higher Colleges of Technology, UAE
David O. Omole, Covenant University, Nigeria
Rene Leveaux, University of Technology Sydney, Australia
Elspeth McKay, RMIT University, Australia
Chiraz El Hog, University of Sousse, Tunisia
Daniela Livia Trasca, Bucharest Academy of Economic Studies, Romania
Mohammad Faisal, Integral University, India
Woo Kok Hoong, UTAR, Malaysia
Davor Zoricic, University of Zagreb, Croatia
Adelaida Cristina Honțuș, niversity of Agronomic Sciences and Veterinary Medicine of Bucharest, Romania
Anna Małgorzata Deptuła, Opole University of Technology, Poland

Oleg Nikolaevich Petukhov, National Research Tomsk Polytechnic University, Tomsk State University of Control Systems and Radioelectronics, Russia
Zelenskaya Jeanne, South Ural State University, Russia
Ekaterina D. Malevskaia-Malevich, Peter The Great SPb Polytechnic University, Russia
Simona Činčalová, University of Pardubice, Czech Republic
Alen Stojanović, Faculty of Economics and Business Zagreb, Croatia
Eva Kotlánová, SU in Opava, Czech Republic
Ioana-Alexandra Bradea, Bucharest University of Economic Studies, Romania
Jolanta Baran, Silesian University of Technology, Poland
Eva Lukášková, Tomas Bata University in Zlin, Czech Republic
R. Gy Hashim, Universiti Teknologi MARA, Malaysia
Silvius Stanciu, University "Dunărea de Jos" of Galati, Romania
Mounir Kehal, American University in the Emirates, UAE
Laura Mariana Cismas, West University of Timișoara, Romania
Choo-Kim Tan, Multimedia University, Malaysia
Angela Roman, "Alexandru Ioan Cuza" University of Iasi, Romania
Ștefăniță Șușu, "Ștefan cel Mare" University of Suceava, Romania
Corina – Ionela Dumitrescu, University Politehnica of Bucharest, Romania
Dora Cristina Moreira Martins, ISCAP - Polytechnic Institute of Porto, Portugal
Eva Svirakova, Tomas Bata University in Zlín, Czech Republic
Rita Yi Man Li, Hong Kong Shue Yan University, Hong Kong
Zijiang Yang, York University, Canada
Aw Yoke Cheng, iCOOP College, Malaysia
Nooraslinda Abdul Aris, Universiti Teknologi MARA (UiTM) Shah Alam, Malaysia
Klara Antlova, Technical University of Liberec, Czech Republic
Anushia Chelvarayan, Multimedia University, Malaysia
Margareta Ilie, Ovidius from Constanta, Romania
Diana-Eugenia Ioncică, Bucharest University of Economic Studies, Romania
Mireia Tintoré, Universitat Internacional de Catalunya, Spain
Natalia Sokolova, Saint-Petersburg State University, Russia
Bogdan Cîmpan, Bucharest University of Economic Studies, Romania
Rozalia Kicsi, "Ștefan cel Mare" University of Suceava, Romania
Maja Pušnik, University of Maribor, Slovenia
Adina Dornean, Alexandru Ioan Cuza University of Iasi, Romania
Fethi Saidi, Qatar University, Qatar
Dean Učkar, Juraj Dobrila University of Pula, Faculty of Economics and Tourism "Dr. Mijo Mirković", Croatia
Norizan Mohd Kassim, University of Nizwa, Oman
Petr Doucek, University of Economics, Prague, Czech Republic
Ali Al-Badi, Sultan Qaboos University, Muscat, Sultanate of Oman
Gratiela Dana Boca, Technical University Cluj Napoca, Romania
Agnieszka Tarnowska, Wroclaw University of Economics, Poland
Peong Kwee Kim, Multimedia University, Malaysia
Erin Olayinka Adedayo, Covenant University, Nigeria
Srimannarayana Grandhi, Central Queensland University, Australia
Nicoleta Ignat, University Politehnica of Bucharest, Romania
Zoya Krinitcyna, Tomsk Polytechnic University, Russia
Mylnikov Leonid, Perm National Research University, Russia
Nadezhda A. Lvova, Saint Petersburg State University, Russia
Amit Mittal, Chitkara University, India
Kalaiselvee Rethinam, AIMST University, Malaysia
Marina Ryzhkova, Tomsk State University of Control Systems and Radioelectronics, Russia
Vladislav Spitsin, Tomsk Polytechnic University, Russia
Citra Sukmadilaga, Universitas Padjadjaran, Indonesia
Loiko Olga Timofeevna, National Research Tomsk Polytechnic University, Russia

Ugochukwu Moses Urim, Covenant University, Nigeria
Olga Yudakhina, Tomsk Polytechnic University, Russia
Vladimir Plotnikov, St. Petersburg State University of Economics, Russia
Eva Jurickova, Tomas Bata University in Zlín, Czech Republic
Lubov Spitsina, Tomsk Polytechnic University, Russia
Noor'ain Mohamad Yunus, Universiti Teknologi MARA, Malaysia
Azza Bchir, Télécom Ecole de Management, Paris, France
Vaisman Elena Davidovna, South Ural State University, Russia
Boštjan Žvanut, University of Primorska, Slovenia
Maxim Vladimirovich Ivanov, Peter the Great St. Petersburg Polytechnic University, Russia
Maria Klevtsova, South-west State University, Russia
Aniela Raluca Danciu, Academy of Economic Studies Bucharest, Romania
Isibor Areghan, Covenant University, Nigeria
Zdeněk Šafařík, UTB in Zlin, Czech Republic
Isaiah Oluranti Olurinola, Covenant University, Nigeria
Naffisah Mohd Hassan, Universiti Teknologi MARA, Malaysia
Yulia Astashova, South Ural State University, Russia
Maria Augusta Soares, IbmecRJ, Brazil
Vera S. Fedotova, Pushkin Leningrad State University, Russia
Arkadiusz Kowalski, Wroclaw University of Science and Technology, Poland
Tatiana Olegovna Dyukina, St. Petersburg State University, Russia
Cristina Leovaridis, National University of Political Studies and Public Administration, RomaniaAdegboye
Folasade Bosede, Covenant University, Nigeria
Puja Chhabra Sharma, Ansal University, Gurgaon, India
Violeta Sima, Petroleum-Gas University of Ploiesti, Romania
Ivan Strugar, University of Zagreb, Croatia
Nermin Khalifa, Arab Academy for Science & Technology, Egypt
Oluwole Iyiola, Covenant University, Nigeria
Robert Jeyakumar Nathan, Multimedia University, Malaysia
Siti Noorsuriani Maon, Universiti Teknologi MARA (UiTM), Malaysia
Adeel Hassan, COMSATS Institute of Information Technology, Pakistan
Miroslaw Moroz, Wroclaw University of Economics, Poland
Diana Elisabeta Matica, University of Oradea, Romania
Duncan Momanyi Nyang'ara, Chuka University, Kenya
Imen Turki, FSEGS, Tunisia
Carl Osunde, Onitsha Business School, Nigeria
Mirela Ionela Aceleanu, The Bucharest University of Economic Studies, Romania
Nacim Yanes, Manouba University, Tunisia
Andreea Claudia Serban, Bucharest University of Economic Studies, Romania
Nikiforova Natalia Sergeevna, South Ural State University, Russia
Sergei Aliukov, South Ural State University, Russia
Nasina Mat Desa, Universiti Sains Malaysia, Malaysia
Ari Warokka, Universidad Autonoma de Madrid, Spain
Hassan Younies, NYIT, USA
Syuhaida Ismail, Universiti Teknologi Malaysia Kuala Lumpur, Malaysia
Umara Noreen, Prince Sultan University, KSA
Ching Sock Lee, University Science Malaysia, Malaysia
Elizaveta Gromova, Peter the Great St.Petersburg Polytechnic University, Russia
Norli Ali, Universiti Teknologi MARA, Malaysia
Akram El-Tannir, Beirut Arab University, Lebanon
Tereza Semerádová, Technical University of Liberec, Czech Republic
Yulia Vertakova, SouthWest State University, Russia
Ekaterina D. Malevskaia-Malevich, Peter the Great Saint-Petersburg Polytechnic, Russia
Igor Ilin, SPPU, Russia
Kamarulzaman Ab. Aziz, Multimedia University, Malaysia

Larisa Ivascu, Politehnica University of Timisoara, Romania
Nagwa Nicola, The American University in Cairo, Egypt
Rodionova Valentina Nikolaevna, Voronezh State Technical University, Russia
Sergey I. Shanygin, Saint-Petersburg State University, Russia
Suganthi Ramasamy, Multimedia University, Melaka, Malaysia
Azah Anir Norman, University of Malaya, Malaysia
Ramona Ștefania Igreț, Bucharest University of Economic Studies, Romania
Ivona Stoica, "Dimitrie Cantemir" Christian University, Romania
Liudmila A. Guzikova, St-Petersburg Polytechnic University, Russia
Samina Riaz, Iqra University, Pakistan
Armenia Androniceanu, The Bucharest University of Economic Studies, Romania
Ondrej Zizlavský, Brno University of Technology, Czech Republic
Inna Babenko, Southwest State University, Russia
Ionela Mituko Vlad, UASVM Bucharest, Romania
Tatiana Jurievna Kudryavtseva, Peter the Great St. Petersburg Polytechnic University, Russia
Marina Faďoš, Comenius University in Bratislava, Slovakia
Anna Kowalska, Wroclaw University of Economics, Poland
Osebor O. Isibor, Lagos City Polytechnic, Ikeja, Nigeria
Norol Hamiza Zamzuri, Universiti Teknologi MARA, Malaysia, Malaysia
Piotr Bebenek, Opole University of Technology, Poland
H. Hosney Zurub, The Bucharest University of Economic Studies, Romania
Katarzyna Marek-Kolodziej, Opole University of Technology, Poland
Iwona Pisz, Opole University, Poland
Thouraya Daouas, Institute of Higher Commercial Studies of Carthage (IHEC), Tunisia
Piotr Wittbrodt, Opole University of Technology, Poland
Julian Jakubowski, University of Zielona Gora, Poland
Alina Ginghină, University of Bucharest, Romania
Russayani Ismail, Universiti Utara Malaysia, Malaysia
Corina Michaela Radulescu, Technical University of Cluj Napoca, Romania
Alaa Abdul Salam Al Yamani, Mosul University, Iraq
Olga Vitalievna Zaborovskaia, The State Institute of Economic, Finance, Law and Technology, Russia
Cristina Mohora, University Politehnica of Bucharest, Romania
Jarmila Straková, Institute of Technology and Business in České Budějovice, Czech Republic
Alexandru Costin Cirstea, Bucharest University of Economic Studies, Romania
Eduard- Gabriel Ceptureanu, The Bucharest University of Economic Studies, Romania
Olivia Fachrunnisa, Universitas Islam Sultan Agung, Indonesia
Tatiana Maximova, ITMO University, Russia
Dragos Smedescu, USAMV Bucharest, Romania
Mária Bohdalová, Comenius University, Faculty of Management, Slovakia
Zuzana Kirchmayer, Comenius University in Bratislava, Slovakia
Natalia Manea, University Politehnica of Bucharest, Romania
Mohammad Ayub Khan, University Tecnologico de Monterrey, Mexico
Adam Ryszko, Silesian University of Technology, Poland
Jaroslava Gburová, University of Prešov, Slovakia
Suzaida Bakar, University Tenaga Nasional, Malaysia
Anna Dolinskaia, South Ural State University, Russia
Samuel Kimnyak Partoip, Maasai Mara University, Kenya
Khalifa Ahsina, Ibn Tofail University, Morocco
Filofteia Repez, National Defence University Carol I, Bucharest, Romania
Tatiana Danescu, Petru Maior University of Târgu Mureș, Romania
T. Ramayah, Universiti Sains Malaysia, Malaysia
Tomislav Rozman, DOBA Faculty of Applied Business and Social studies, Maribor, Slovenia
Muhammad Hasmi Abu Hassan, Universiti Sains Malaysia, Malaysia
Tan Booi Chen, Multimedia University, Malaysia
Claudia Diana Sabău-Popa, University of Oradea, Romania

Aleksandr Mikhalchuk, Tomsk Polytechnic University, Russia
Cristina Raluca Gh. Popescu, University of Bucharest and The Bucharest University of Economic Studies, Bucharest, Romania
Meral (Ibraim) Kagitci, The Bucharest University of Economic Studies, Romania
Daniela Majerčáková, Comenius University, Faculty of Management, Slovakia
Mircea Georgescu, "Al. I. Cuza" Iasi University, Romania
Martina Rašticová, Mendel University in Brno, Czech Republic
Anna Lašáková, Comenius University in Bratislava, Slovakia
Anita Romanová, University of Economics in Bratislava, Slovakia
Dalia Susniene, Kaunas University of Technology, Lithuania
Elena Stanislavovna Kiseleva, Tomsk Polytechnic University, Russia
Jana Matošková, Tomas Bata University in Zlín, Czech Republic
Nasrine Shah-Abushakra, Lehigh University, US & UAE
Syed Ahmed Salman, International Islamic University Malaysia, Malaysia
Georgiana Marin, Bucharest University of Economic Studies, Romania
Anna Zarkada, Athens University of Economics and Business, Greece
Alžbeta Kucharčíková, University of Žilina, Slovakia
Muna Sultan Al Ebri, UAEU, UAE
Irina Rudskaia, Peter the Great Saint-Petersburg Polytechnic University, Russia
Ana Iolanda Voda, Alexandru Ioan Cuza University, Romania
Sofia Elena Colesca, Academia De Studii Economice Bucuresti, Romania
Ravindra Hewa Kuruppuge, Tomas Bata University in Zlin, Czech Republic
Blanka Bazsová, VŠB- Technical University of Ostrava, Czech Republic
Irina Zaychenko, Peter the Great Saint-Petersburg Polytechnic University, Russia
Paula Fernández González, University of Oviedo, Spain
Viktorija Šipilova, Daugavpils University, Latvia
Radu Alin Păunescu, Bucharest University of Economic Studies, Romania
Hotti Virpi, University of Eastern Finland, Finland
Julius Golej, Slovak University of Technology in Bratislava, Slovakia
František Milichovský, Faculty of Business and management, Brno University of Technology, Czech Republic
Gheorghe Orzan, Bucharest University of Economic Studies, Romania
Zdeněk Caha, Institute of Technology and Business in České Budějovice, Czech Republic
Olga Bucovetchi, University "Politehnica" of Bucharest, Romania
Valery Maslennikov, Plekhanov Russian University of Economics, Russia
Vladimír Chalupský, Brno University of Technology, Czech Republic
Egle Vaiciukynaite, Kaunas University of Technology, Lithuania
Natalia V. Pokrovskaia, Saint Petersburg State University, Russia
Hatem Ben Sta, University of Tunis El Manar, Tunisia
Marinela Vrîncianu, Bucharest University of Economic Studies, Romania
Ioan Bogdan Robu, Alexandru Ioan Cuza University of Iasi, Romania
Natalia G. Fersman, Peter the Great St. Petersburg Polytechnic University, Russia
Ekaterina Galanina, National Research Tomsk Polytechnic University, Russia
Dorin Maier, Technical University of Cluj-Napoca, Romania
Mariana Man, University of Petroșani, Romania
Maria Ciurea, University of Petrosani, Romania
Malika Haoucha, University Hassan II, Casablanca, Morocco
Elena Stanislavovna Kiseleva, Tomsk Polytechnic University, Russia
Jolanta Maj, Opole University of Technology, Poland
Ahed Abugabah, College of Technological Innovation, UAE
Armand Kasztelan, University of Life Sciences in Lublin, Poland
Gina Fintineru, University of Agronomic Sciences and Veterinary Medicine Bucharest, Romania
Karim Gassemi, ENCG, Morocco
Alina Zaharia, Bucharest University of Economic Studies, Romania
Joanna Radomska, Wrocław University of Economics, Poland

Polyanin Andrey Vitalyevich, Central Russian Institute of Management, Branch of RANEPA, Russia
Florin Stoica, Lucian Blaga University of Sibiu, Romania
Alexandra Borremans, Peter the Great St. Petersburg Polytechnic University, Russia
Ruxandra Bejinaru, "Stefan cel Mare" University of Suceava, Romania
Stanislav Martinát, Silesian University, Czech Republic
Noor Hazlina Ahmad, Universiti Sains Malaysia, Malaysia
Tey Lian Seng, University of Malaya, Malaysia
Ramona Dobre, The Bucharest University of Economic Studies, Romania
Orlando Lima Rua, University Polytechnic of Porto, Portugal
Barbara Scozzi, Polytechnic University of Bari, Italy
Francesca Michelino, University of Salerno, Italy
Sergey V. Kurochkin, Higher School of Economics – National Research University, Russia
Kozolova Nadezda Pavlovna, Financial University under the Government of the Russia Federation, Russia
Tatiana V. Sokolova, Higher School of Economics – National Research University, Russia
Bella Bataeva, Financial University under the Government of the Russia Federation, Russia
Elena Y. Prokhina, Lomonosov Moscow State University, Russia
Nadezhda V. Makogonova, Lomonosov Moscow State University, Russia
Evgeny E. Khoroshilov, Insitute for the US and Canada Studies of the Russia Academy of Sciences, Russia
Sergey Volodin, Higher School of Economics – National Research University, Russia
Athanasios Podaras, Technical University of Liberec, Czech Republic
Susan Tee Suan Chin, Multimedia University, Malaysia
Sabina Irimie, University of Petrosani, Romania
Adrian Turek- Rahoveanu, University of Agricultural Sciences and Veterinary Medicine Bucharest, Romania
Tatyana Bylkova, National Research Tomsk Polytechnic University, Tomsk University of Control System and Radioelectronics, Russia
Tengku Adil Tengku Izhar, Universiti Teknologi MARA, Malaysia
Muhammad Hafidz Fazli Bin Md Fauadi, Universiti Teknikal Malaysia Melaka, Malaysia
Elizaveta Baranova, Transbaikal State University, Russia
Lenka Ližbetinová, The Institute of Technology and Business in České Budějovice, Czech Republic
Abiola A. Babajide, Covenant University, Nigeria
Catalina Mihaela Badoiu,The Bucharest University of Economic Studies, Romania
Kanwar Adeel Waheed Khan, University of Bradford, UK
Karol Dabrowski, University of Zielona Gora, Poland
Yuliya Kuzmenko, South Ural State University, Chelyabinsk, Russia
Maja Pervan, University of Split, Faculty of Economics, Croatia
Olga V. Kalimullina, ITMO University, Russia
Amal Hayati Ishak, Universiti Tenologi MARA, Malaysia
Muhammad Abaidullah Anwar, Al Ghurair University, UAE
Natalya Alexandrovna Sokolitsyna, Peter the Great St.Petersburg Polytechnic University, Russia
Alexander Sergeevich Sokolitsyn, Peter the Great St.Petersburg Polytechnic University, Russia
Davydova Olesia, Plekhanov Russian University of Economics, Russia
Valentina V. Kravchenko, St.Petersburg Peter the Great Polytechnic University, Russia
Elena Druică, University of Bucharest, Romania
Gabriela – Mariana Ionescu, The Rumanian Agency for Quality Assurance in Higher Education, Romania
Afshan Rauf, Institute of Business Management, Pakistan
Andrea Valachová, University of Economics in Bratislava, Faculty of National Economy, Slovakia Petr Čech, Institute of Hospitality Management in Prague, Czech Republic
Lai Kim Piew, Multimedia University, Malaysia
Beatrice Leuștean, Politehnica University of Bucharest, Romania
Saadiah @ Juliana Saadun, Universiti Teknologi MARA, Malaysia
Alexa Lidia, "Gheorghe Asachi" Technical University of Iasi, Romania
Souhir Amri Amamou, Tunis Higher Institute of Management, Tunisia

Kateřina Bočková, DTI University, Slovakia
Marius Bulearca, Romanian Academy, Bucharest, Romania
Natalia Goncharova, Peter the Great St. Petersburg Polytechnic University, Russia
Poorna Prabhat Sunkara, Andhra Loyola College, India
Radu D. Stanciu, University "Politehnica" of Bucharest, Romania
Carmen Nadia Ciocoiu, Bucharest University of Economic Studies, Romania
TGK Vasista, J N T University Kakinada, Affiliated College, India
Viviana Andrade Meirinhos, Oporto Polytechnic Institute, Portugal
Braham Ait Atmane, University of Bejaia, Algeria
Ivan Darushin, St. Petersburg State University, Russia
Maher Toukabri, Northern Border University, KSA
Olga S. Nadezhina, Peter the Great Saint-Petersburg Polytechnic University, Russia
Yong Chen-Chen, University of Malaya, Malaysia
Mumtaz Bte Ahmad, Universiti Teknologi MARA, Malaysia
Abdul Ghani Norjihan, University of Malaya, Malaysia
Irina Kalinina, Plekhanov Russian University of Economics (PRUE), Russia
Lourdes Canós-Darós, Universitat Politècnica de València, Spain
Noraizah Abu Bakar, UiTM Cawangan Johor Segamat Johor, Malaysia
Adela Coman, University of Bucharest, Romania
Marek Bureš, University of West Bohemia, Czech Republic
Ali Saleh Alarussi, University Utara Malaysia, Malaysia
Anastasiia Timofeeva, Novosibirsk State Technical University, Russia
Aslina Baharum, Universiti Malaysia Sabah, Malaysia
Amirrudin Kamsin, University of Malaya, Malaysia
Eluyela Damilola Felix, Covenant University, Nigeria
Małgorzata Okręglicka, Czestochowa University of Technology, Poland
Gavril Stefan, University of Agricultural Sciences and Veterinary Medicine „Ion Ionescu de la Brad" Iasi, Romania
Iwona Gorzeń-Mitka, Czestochowa University of Technology, Faculty of Management, Poland
Constanta-Nicoleta Bodea, The Bucharest University of Economic Studies, Romania
Tatiana Maximova, ITMO University, Russia
Abdul Kadir Othman, University Teknologi MARA, Malaysia
Ainon Ramli, Universiti Malaysia Kelantan, Malaysia
Fathyah Hashim, Graduate School of Business, Universiti Sains Malaysia, Malaysia
Hana Klcova, Brno University of Technology, Czech Republic
Mabel Komunda, Makerere University Business School, Uganda
Adebanji W. Ayeni, Elizade University, Nigeria
Irina Chesnokova, Tomsk Polytechnic University, Russia
Oleg Nikolaevich Petukhov, National Research Tomsk Polytechnic University, Tomsk State University of Control Systems and Radioelectronics, Russia
Dumitru-Cristian Oanea, The Bucharest University of Economic Studies, Romania
Turovets Oskar Grigorevich, Voronezh State Technical University, Russia
Tatyana Khudyakova, South Ural State University, Russia
Yosra Essid Hamas, Effat University, KSA
Haslinda Husaini, Universiti Teknologi MARA, Malaysia
Orlova Ekaterina Vladimirovna, Ufa State Aviation Technical University, Russia
Noraina Mazuin Sapuan, The National Energy University, Malaysia
Georgeta Soava, University of Craiova, Romania
Igor Lyukevich, Peter the Great Saint-Petersburg Polytechnic University, Russia
Luis Silva Rodrigues, University Politécnico do Porto, Portugal
Dana Egerová, University of West Bohemia, Czech Republic
Shaikh Khalique, Sultan Qaboos University, Oman
Agatha Popescu, University of Agricultural Sciences and Veterinary Medicine Bucharest, Romania
Elena – Mădălina Vătămănescu, National University of Political Studies and Public Administration, Romania

Susana Silva, School of Hospitality and Tourism, Polytechnic of Porto, Portugal
Otilia Manta, Romanian Academy - „Victor Slavescu" Financial and Monetary Research Centre of the National Institute of Economic Research, Romania
Arkadiusz Piwowar, Wrocław University of Economics, Poland
Amara Tijani, University of GAFSA, Tunisia
Liudmila Nikolova, Peter the Great St.Petersburg Polytechnic University, Russia
Waldemar Woźniak, University of Zielona Góra, Poland
Svetlana Gutman, Peter the Great Saint-Petersburg Polytechnic University, Russia
Adina Moise-Titei, Ovidius University of Constanta, Faculty of Economic Science, Romania
Nimra Sharif, Institute OF Business Management (IOBM), Pakistan
Anna Olszańska, Wrocław University of Economics, Poland
Samali V. Mlay, Makerere University Business School, Uganda
Razvan Catalin Dobrea, Bucharest University of Economic Studies, Romania
Justyna Zygmunt, Opole University of Technology, Poland
Ecaterina Daniela Zeca, "Dunarea de Jos" University of Galati, Romania
Janusz Wielki, Opole University of Technology, Poland
Olga Kalinina, Peter the Great St.Petersburg Polytechnic University (SPbPU), Russia
Omneya Mokhtar Yacout, Alexandria University, Egypt
Petr Rehacek, VSB-Technical University of Ostrava, Czech Republic
Natalia Appalonova, University of Management TISBI, Russia
Lucia Morosan-Danila, University "Stefan Cel Mare" from Suceava, Romania
Iuliana Ciochina, "Constantin Brancoveanu" University, Romania
Costin Octavian Sorici, OVIDIUS University of Constanta, Romania
Shamima Raihan Manzoor, Multimedia University, Malaysia
Ana Ursu, Research Institute for Agricultural Economics and Rural Development, Romania
Mihaela-Carmen Muntean, "Dunarea de Jos" University of Galati, Romania
Claudia-Georgeta Carstea, Transilvania University of Brasov, Romania
Abdullah Al Mahmud, Linton University College, Malaysia
Irina Avdeeva, Central Russian Institute of Management, Branch of RANEPA, Russia
Tatyana Golovina, Central Russian Institute of Management, Branch of RANEPA, Russia
Aleksandr Lepekhin, Peter the Great St.Petersburg Polytechnic University, Russia
Ozgur Dogerlioglu, Bogazici University, Turkey
Adedamola O. Oluwunmi, Covenant University, Nigeria
Evelina Gulbovaitė, Vytautas Magnus University, Kaunas, Lithuania
Elena Dobre, Ovidius University of Constanta, Romania
Andrea Székely, Université de Szeged, Hungary
Fatimah Alwi, UiTM Perak Branch, Malaysia
Mirela Panait, Petroleum-Gas University of Ploiesti, Romania
Tomáš Sadílek, University of Economics, Czech Republic
Ana Cláudia Rodrigues, ISCAP – Porto Polytechnic, Portugal
Phaik Kin Cheah, Universiti Tunku Abdul Rahman, Malaysia
Tatiana Dauxert, Pantheon-Sorbonne University, France
Marium Mateen Khan, Institute of Business Management (IoBM), Pakistan
Balázs Kotosz, University of Szeged, Hungary
Agnieszka Janik, Silesian University of Technology, Poland
Ahmed Azam, DeVry University, USA
Cristian Bucur, Petroleu Gas University, Ploiesti, Romania
Simona Cătălina Ștefan, The Bucharest University of Economic Studies, Romania
Constantin-Marius Apostoaie, Alexandru Ioan Cuza University of Iaşi, Romania
Aymen Ammari, University of Manouba, Tunisia
Paula Odete Fernandes, Polytechnic Institute of Bragança, Portugal
Jan Chromy, The Institute of Hospitality Management in Prague, Czech Republic
Dumitru Alexandru Bodislav, Bucharest University of Economic Studies, Romania
Ili Salsabila Abd-Razak, Universiti Utara Malaysia, Malaysia
Norshimah Abdul Rahman, University Technology MARA, Malaysia

Marina.V. Verkhovskaya, National Research Tomsk Polytechnic University, Russia
Vladimír Bureš, University of Hradec Králové, Czech Republic
Siti Rohaida Binti Mohamed Zainal, Universiti Sains Malaysia, Malaysia
Georgiana Armenita Arghiroiu, University of Agronomic Sciences and Veterinary Medicine of Bucharest, Romania
Rodica Ianole, University of Bucharest, Romania
Daniela-Luminita Constantin, Bucharest University of Economic Studies, Romania
Andreea - Emanuela Drăgoi, Institute for World Economy, Romania
Sanja Broz Tominac, University of Zagreb, Faculty of Economics and Business, Croatia
Mihaela-Elena Ulmeanu, University Politehnica of Bucharest, Romania
Carmen Costea, The Bucharest University of Economic Studies, Romania
Pasquale Del Vecchio, University of Salento, Italy
Dinara Sadykhanova, Al Farabi Kazakh National University, Kazakhstan
Abeer Hmoud Ali Al-Faouri, Al-Balqa Applied University, Jordan
Lucian-Ionel Cioca, Lucian Blaga University of Sibiu, Romania
Viorela Beatrice Iacovoiu, Oil and Gas University of Ploiesti, Romania
Simona Nicolae, Politehnica of Bucharest, Romania
Katarina Rentkova, Comenius University in Bratislava, Faculty of Management, Slovakia
Cornelia Neagu, Centre for Industry and Services' Economics, Romanian Academy, Bucharest, Romania
Sebastian Ion Ceptureanu, The Bucharest University of Economic Studies, Romania
Ingars Erins, Riga Technical University, Latvia
Sławomir Dorocki, Pedagogical University of Cracow, Poland
Feriha Özdemir, Siegen University, Germany
Ahmad Nizan Mat Noor, Universiti Teknologi MARA, Malaysia
Angela Lee Siew Hoong, Sunway University, Malaysia
Rossazana Ab-Rahim, Universiti Malaysia Sarawak, Malaysia
Muhammad Usman, University of International Business & Economics, Beijing, China
Ana Aleksic, Faculty of Economics and Business, University of Zagreb, Croatia
Otilia – Maria Bordeianu, Ștefan cel Mare University, Suceava, Romania
Catalin Popescu, Petroleum-Gas University from Ploiesti, Romania
Georgiana-Raluca Lădaru, Bucharest University Economic Studies, Romania
Noorul Azwin Md Nasir, Universiti Malaysia Kelantan, Malaysia
Jurii J. Kuporov, Peter the Great Saint-Petersburg Polytechnic University, Russia
Aura Emanuela Domil, West University of Timisoara, Romania
Nicoleta Sîrghi, West University of Timişoara, Romania
Alin Emanuel Artene, Politehnica University Timisoara, Romania
Elvira Taipova, South Ural State University, Russia
Nicoleta Acomi, Constanta Maritime University, Romania
Saoussen kouki, Faculty of Economics Sciences and Management, Tunisia
Sri Fatiany Abdul Kader Jailani, Universiti Teknologi MARA, Malaysia
Aurelia Ioana Chereji, University of Oradea, Faculty of Environmental Protection, Romania
Abir Zouari, Sfax University, Tunisia
Svetlana N. Karelskaia, Saint-Petersburg State University, Russia
R.D.M. Kalubi, Peter the Great, St. Petersburg Polytechnic University, Russia
Monika Hodinková, Sting Academy, Czech Republic
Aleksandra Zygmunt, Opole University of Technology, Poland
Libuše Svobodová, University of Hradec Králové, Czech Republic
Camelia Slave, University of Agronomic Sciences and Veterinary Medicine, Bucharest, Romania
Yong Jing Yi, Universiti Sains Malaysia, Malaysia
Yusliza Mohd Yusoff, Universiti Malaysia Terengganu, Malaysia
Anastasiya V. Zhavoronok, Tomsk Polytechnic University, Russia
Petr Sodomka, Brno University of Technology, Czech Republic
Chantal Souaid Mchantaf, Notre Dame University, Lebanon
Haslindar Ibrahim, Universiti Sains Malaysia (USM), Malaysia

Tamara V. Mescheryakova, Tomsk State Pedagogical University, Siberian State Medical University, Russia
Vladimir Bartosek, Brno University of Technology, Czech Republic
Monica Boldea, West University in Timisoara, Romania

It is IBIMA policy to make reasonable effort to send complete papers to two members of the program committee for full blind peer review and to send a summary of review back to the author(s)

Copyright @ 2017 International Business Information Management Association
Individual authors retain copyright on their authored papers. Please contact the authors directly for reprint permission

Table of Content

The Nature of Modern Money: Base Concepts and Genesis of Theories..... 1
Igor Lyukevich and Olga S. Nadezhina

Cultural Sector Personnel Management (Based on the Example of Music Department of Perm Children and Youth Art Center (Russia))…… 11
Anatoly M. Redko

Corporate Management of the Value of Business Units: Discrepancies and Ways to Overcome Them..... 23
Oksana V. Askanova and Aleksandr V. Karpenko

Scientific Research Management Developed via 2016 ERA Fellowship and Horizon 2020 ENHANCE Project……... 38
Suzana Carmen Cismas

The Scenario of Waqf in Malaysian Higher Education Institutions…….. 50
Abd Rahman Ahmad, Azizah Baharudin, Ng Kim Soon, Khairunesa Isa and Rosman Md. Yusoff

A Comparative Study on Technology Acceptance Models and the Application to Non-Existent Innovations..... 56
Wiebke Geldmacher, Katrin Marquardt, Vanessa Just and Nina Golowko

Selection and Justification of Priorities of Innovative Development of an Industrial Region 68
Lidiya A. Galkina, Igor A. Baev and Sergei V. Aliukov

Contemporary Approaches to Advancement of the Banking Sector – Virtual Credit Organizations……... 77
Alexey V. Bataev

Questions of Safety of Mobile Banking in Russian Financial Institutions…… 89
Alexey V. Bataev

Quality Management of Logistics Processes in the Context of Methodology of the TQM System……. 100
Irina Vladimirovna Kablashova, Valentina Nikolaevna Rodionova, Oskar Grigoryevich Turovets and Marina Sergeevna Lutsenko

Development of an Integrated Framework for Successful Adoption and Implementation of Mobile Collaboration Technology in Indonesian Healthcare..... 108
Faisal Syafar and Halimah Husain

Management Participation Programmes for German Target Companies—Current Developments of Fiscal Treatment in Germany…… 115
Tobias Stiegler, Klaus Singer, Axel Ulrich Wiesener, Aykut Bussian and Marc Sommer

Economic Discomfort Trend – Where Do The European Union Countries Stand?..... 125
Iustina Alina Boitan and Ionela Costică

The Synergy Mirage in Russian Industry: The Study of the Effectiveness of the Biggest M&A With Acquired Goodwill…… 134
Aleksey Ivanov, Irina Prosvirina, Elena Melnikova and Sergei V. Aliukov

Assessment of Institutions in Russian SME Development System …… 140
Elena D. Vaisman, Mariya V. Podshivalova and Sergei V. Aliukov

Towards a Platform for Clinical Big Data Analysis……. 151
Mădălina Zamfir, Ştefan Preda, Vladimir Florian, Gheorghe Militaru and Bogdan Ţigănoaia

Modern Technology and Internet Use in Learning in the Czech Population…… 160
Jitka Vaculíková

Assessment of Competitiveness of Russian Companies in the Field of Information Technology…… 173
Darya A. Baeva, Elena V. Kuchina, Pavel P. Lutovinov and Sergei V. Aliukov

Benchmarking to Adopt an Asap-Based Methodological Guideline for Software Systems Deployment… 183
Dante Carrizo and Liliana Sanchez

A Case Study Regarding the Career Management Skills in the Romanian Context……. 194
Paulina Spânu

Impact of Ethics upon Business Success…….. 203
Ruxandra-Gabriela Albu, Lidia Mandru and Titus Suciu

The Phenomenon of Ad-blocking in the Light of Research Involving Individual Internet Users ……... 212
Janusz Wielki

The Prerequisites for the Accounting Harmonization…….. 224
Ionela Ivan and Mihaela-Nicoleta Băcanu

Experimental Plans of Risk Avoiding Manager…… 232
Niculae V. Mihaita

Dichotomic Alternatives and Informational Statistics For Risk taking Manager……. 233
Niculae V. Mihaita

Change Management Business Strategy of Volkswagen in the connection of the Emission Scandal based on the current Cartel agreements…….. 234
Michael Studeny, Andreas Bartels, Manfred Rauch, Mathias Scheiblich and Melanie Buchmüller

Outsourcing Vendor IT Governance Practices and Service Quality in Selected Malaysian Organisations From Client's Perspective……. 252
Mohd Kamil Lob Ahmad Kasri and Norshidah Mohamed

The Effect of Corporate Social Responsibility on The Profitability of Nigerian Banks (A Comparative Study of First Bank and Eco Bank)…….. 269
Kehinde Olaide O., Worlu Rowland E.K., Motilewa Bolanle Deborah and Oguntoyinbo Charles Abayomi

An Efficient 3D Point Cloud Coarse Registration based on Convex Hull…….. 281
Mouna Attia and Yosr Slama

Project Management Implementation for Telecommunication Networks in Lebanon……. 292
Joseph Issa and Mira Thoumy

Microfinance Services Effect on Socio-Economic Welfare of Urban Vulnerable Households in Malaysia…… 304
Koh Her Loke, Solarin Sakiru Adebola, Suganthi A/P Ramasamy, Yuen Yee Yen, Jauhari Bin Dahalan and Goh Guan Gan

Factors determining housing price: case of St. Petersburg…… 317
Liudmila A. Guzikova and Ekaterina V. Plotnikova

The Effectiveness of Funding the Activity of Russian Universities Project 5-100-2020……. 326
Liudmila A. Guzikova and Ekaterina V. Plotnikova

Moderation of problem-focused teams…….. 338
Barbara Wasilewska

Proposing a Metaphor Perspective as a Way Forward For Sustainable Supply Chain Scholarship..... 348
Victoria Stephens and Hefin Rowlands

Public Catering Trends in Russia: The Case of a Megalopolis…… 359
Elena Ivanovna Sherbakova, Abduvali Djabarovich Toshev and Anastasia Andreevna Rushchitc

The 5 P of the 21st Century People, Planet, Prosperity, Peace and Partnership…….. 364
Otilia Manta

Are Institutions a Driver or an Obstacle to Development of Local Currency Corporate Bond Markets? 380
Teplova Tamara Viktorovna, Sokolova Tatiana Vladimirovna, Teplov Andrey Sergeevich and Volgina Natalia Anatolievna

The Economic Benefit of Fans of Luxury Fashion Brand Pages on Facebook…… 394
Jitka Novotová and Lubica Cinkánová

Liquidity Constraint and the Efficiency of Innovative Activities: The Results of Empirical Analysis of Industrial Companies……. 405
Arkady Trachuk and Nataliya Linder

Sustainability of the Business in the Conditions of Globalization…… 417
Nikolova L.V, Rodionov D.G and Litvinenko A.N.

Impact of Regional Conditions on Innovativeness of Enterprises in Poland…… 422
Alfreda Kamińska

Comparison of the Motivation Level of Manufacturing Enterprises Employees in V4 Countries……... 436
Miloš Hitka, Dagmar Weberová, Lenka Ližbetinová and Milota Vertáková

The Relationship between GDP And It's Resources in Romania's Economy ……. 449
Agatha Popescu and Livia David

An Econometric Analysis between Tourism Income and Romania's GDP ……. 469
Agatha Popescu and Daniela Plesoianu

Qualitative and Quantitative Verification of The Reasons for Modularization…… 486
Melanie Buchmüller, Bastian Heinemann, Steffen Lange, Wiebke Geldmacher, Vanessa Just and Michael Studeny

Future Development of Cooperation between Russia and Iraq in the Sphere of Investment and Construction……. 499
Natalia Vasilievna Gorodnova and Anastasiya Alekseevna Peshkova

Public Procurement: World Experience and Russian Practice…….. 507
Natalia Vasilievna Gorodnova and Anastasiya Alekseevna Peshkova

The Economic Results of a Company with a Code of Ethics…… 519
Zdeněk Caha

Seasonal Adjustment – Consensus between Direct and Indirect Method. Case Study: Seasonal Adjustment of Romanian National Accounts Using Jdemetra+ 2.1……. 526
Mirică Andreea, Toma Iulia Elena and Begu Liviu Stelian

A Regional Innovation System: Formation Features and Growth Areas (Case Study: St. Petersburg)…… 541
Irina Rudskaia

CSR in the Logistics Sector and Its Analyses……. 548
Simona Činčalová

Crisis Management in Retail Sector. Cases of Russian Retail Chains……. 556
Veronika Panyukova

Improving Liquidity by Supply Chain Finance – Implementing Tools…… 563
Axel Ulrich Wiesener, Tobias Stiegler and Marc Sommer

Determining Project Management Practices for Enterprise Resource Planning System Projects……. 573
Tatjana Vasiljeva and Elena Berezkina

Preincubation as an instrument for increasing the entrepreneurship of young people- the case of Poland.. 585
Sławomir Jankiewicz

The Energy Sector as a Barrier to Economic Development in Poland……. 594
Sławomir Jankiewicz and Mirosław Kowalik

Marketing in Higher Education in the Czech Republic with a Focus on the Utilization of Websites and Social Media……. 598
Karolína Ptáčková

Principles of Managerial Work in the Hotel Industry…….. 613
Petr Cech, Jan Chromy and Marek Tomastik

Selected Determinants of Educational Communication in a Multicultural Society……. 623
Jan Chromy, Dagmar Lanska and Petr Cech

Economical Evolution of Additive Laser Manufacturing (ALM) Technologies in Romanian Dental Industry…… 635
Băilă Diana-Irinel

Quality of Population Nutrition Reflected by Reference Budgets…… 639
Eva Abramuszkinová Pavlíková and Marcela Basovníková

Regional Interbudgetary Relations: Problems and Solutions…… 649
Yuliya Viktorovna Karaulova

Supply Side Competitiveness on the Polish Tomato Market Against The Rest of the Visegrad Group Countries…… 659
Agnieszka Tarnowska and Anna Kowalska

Data-Driven Decision Making Matters: Preparing HBCU Students for Life after Graduation…… 667
Wang C. P. and Simmons, T.

Dealing with Consent and Privacy Trade-Offs in Health and Fitness Apps: Balancing the Conflicting 669

Perspectives of Users and App Developers…….
Kanwar Adeel Waheed Khan and Bushra Waheed

Business Aptitude of University Students and Its Analysis……. 683
Iveta Kmecová and Dana Smetanová

Mortgage Affordability for Young People in Russia…… 691
Viktoriia Koretskaia-Garmash

Synergetic Approach for the Coordinated Control in Production and Economic System…… 704
Orlova E.V.

The AI model for Identification the Impact of Irrational Factors on the Investor's Risk Propensity……... 713
Orlova E. V.

La Gestion Economique Entre Le Développement Du Hydro-Tourisme Et Les Problèmes Ecologiques Des Lacs D'accumulation Dans Le Bassin Du Riviére Olt, Roumanie…… 722
Elena Bogan, Tamara Simon, Dana Maria (Oprea) Constantin, Elena Grigore, Irina-Adriana Chiurciu and Elena Soare

Investigating the Dependencies of Business Potential of University Students…… 733
Iveta Kmecová and Dana Smetanová

Changes in the Energy Balance in the Context of Sources of Risk for Polish Mining Production…….. 740
Izabela Jonek-Kowalska

The Extension of Education and Development for Company Managers in the Czech Republic……. 750
Zdeněk Caha

Maintaining the Costs of Quality under Control in an Organization…… 759
Lazăr Livia-Veronica, Ionescu Nicolae, Băilă Diana-Irinel and Bucur Diana-Mihaela

Quality of E-government Services in Oman: A Perspective of E-government Services Providers…….. 763
Taiseera Hazeem Al Balushi

An Ontology Based Learning Objectives Development for Mobile Learning Domain……... 771
Rahma Al-Ghafri and Taiseera Al Balushi

The Participatory Process Approach Using and Building Open Education Resources. The Case of Learning University Network at UNAM, Mexico…… 784
Alcantara-Concepcion Tamara

Poland: immigration instead of emigration. Transformation of the mobility model…… 797
Brygida Solga and Sabina Kubiciel

Technology for Control An Efficiency in Production and Economic System…….. 811
Orlova E.V.

Classification of Risks Associated With Operation of Special Economic Zones……. 819
Olga Sinenko and Igor Mayburov

Mechanism for Credit Risk Management……. 827
Orlova E.V.

Transformation of Logistical Processes in Digital Economy…….. 838
Irina Karapetyants, Yrii Kostuhin, Tatyana Tolstykh, Elena Shkarupeta and Elena Syshhikova

Establishment of research competencies in The context of Russian digitalization…….. 845
Irina Karapetyants, Yrii Kostuhin, Tatyana Tolstykh, Elena Shkarupeta and Anna Krasnikova

Cross-Border Merger among Nordic Banks – A Longitudinal Study…….. 855
Akmal S. Hyder and Aihie Osarenkhoe

Typology of Lean Construction Management Tools and Implementation Frameworks…….. 858
Mira Thoumy and Claudette Hajj

Wages of ICT Managers – Czech Republic Case…… 873
Petr Doucek and Luboš Marek

Quality Management of Selected Tourism Activities…….. 883
Zdeněk Málek, Eva Lukášková, Kateřina Pitrová and Tomáš Jeřábek

Regional Innovation Foresights: Drivers and Barriers for Development……. 889
Irina Rudskaia

The Role of Workforce Planning and HRM Improvement in Ensuring the Recruitment of Competitive Civil Service……. 904
Zoltán Hazafi

Intermodal transport strategy for logistics center On the example of "Euroterminal Sławków" Sp. z o.o... 917
Katarzyna Świerszcz and Bogdan Ćwik

E-Learning and the World University Rankings as the Modern Ways of Attractiveness Enchancement for the Russian Universities…….. 927
Nataliia G. Fersman, Tatyana Ye. Zemlinskaya and Larysa Novak-Kalyayeva

Improvement of Public Administration Based On Human Rights: Theoretical Approaches and Practical Implementation……. 945
Nataliia G. Fersman, Larysa Novak-Kalyayeva and Tatyana Ye. Zemlinskaya

Capabilities of Microsoft SharePoint Online to boost New Zealand SMEs Productivity…… 953
Marco Polo de Jesus Cetina Abreu and Nagateja Kothamasu

Socially Responsible Investing as a Tool to Achieve Sustainable Development Goals…….. 958
Stanislav A. Strizhov and Sergei Y. Abramovich

Application for Human Resource Training and Cost Reduction by Prescribing Product Precision Based On Size Dependent Geometric Tolerances……... 966
Ionuţ Ghionea, Aurelian Vişan, Paulina Spânu and Cătălin Ionescu

Incentives in Strategy Implementation Projects: A Normative Analysis……. 974
Jan Kiehne, Ann-Kathrin Arp and Timm Schüler

Regional Economic Resilience: An Entropic Analysis of the 2008 Economic Crisis…….. 987
Martin Ibl, Ondřej Svoboda and Michael Siegert

Labor Stimulation in Systemically Important Russian Banks within the Conditions of Economic Crisis and Sanctions…… 1001
Olga Osipova and Alexander Artamonov

Public private projects as an instrument for sustainable economic growth in Russia: risks and opportunities…… 1009
Aleksandr Pastukhanov

Financial Distress and Corporate Restructuring. Sell Off Decisions on BRICS Markets..... 1021
Andrey Teplov and Tatiana M. Rogulenko

Performance Management of Innovation Program at an Industrial Enterprise: An Optimisation Model… 1033
Nikolova L.V., Malinin A.M., Rodionov D.G. and Velikova M.D.

Statistic Modeling Industrial Enterprises Production Process Parameters..... 1041
Alexander Sergeevich Sokolitsyn, Maxim Vladimirovich Ivanov and Natalya Alexandrovna Sokolitsyna

Forming Optimal Enterprise Development Strategies…….. 1053
Mikhail Dmitrievich Mednikov, Alexander Sergeevich Sokolitsyn, Maxim Vladimirovich Ivanov and Natalya Alexandrovna Sokolitsyna

Use of Cloud Computing in SMEs of Baltic Countries……. 1064
Karlis Kreslins, Darya Novik and Tatjana Vasiljeva

Bank Deals with Liquidity: The Micro and Macroeconomic Determinants Approach evidence from Pakistan……. 1073
Shakira Fareed, Tazeen Arsalan and Sharique Ayubi

Occupational Health maturity by combined AHP and Fuzzy comprehensive evaluation methods…….. 1087
Latifa Fertat and Abdelghani Cherkaoui

Phenomenological Study on the Governance of "Social Welfare Institutions" in Special Region of Yogyakarta…… 1097
Sugiyanto, Heru Kurnianto Tjahjono, Arief Hartono, Lathiful Khuluq

Effects of Social Rights and Environmental Issues in International Market; The African Experience…… 1109
Abiola Esther Ogunmokun

Importance of Systematic and First Mover Approach in Startups…… 1117
Branislav Zagoršek, Katarína Procházková and Richard Bednár

Some Considerations about Text Classification Systems Using Weka……. 1129
Livia Sangeorzan, Nicoleta Enache-David, George-Alex Stelea, Streitferdt Detlef and Elena Rozova

An Analysis of Direct Leadership in the Army of the Czech Republic 1135
Kozáková Eva and Radomír Saliger

Risk Management in Agriculture…….. 1145
Iulia Gradinaru (Cristea) and Dorina Mocuta

E-Government and Corruption in East European Countries Bernard Neuwirth, Veronika Novotna, Stanislav Skapa……. 1151
Lanre Amodu, Dominic Azuh, Akunna Ebere Azuh and Toluwalope Oresanya

The Dynamic Model of System Development in the area of E-government……. 1157
Jan Luhan, Veronika Novotna and Vaclav Olesovsky

Application of Neuro-Fuzzy Approach in Predicting the Number of Bankruptcies of Legal Persons in the Czech Republic…… 1166
Monika Šebestová

Expansive Use of Planning and Finance Mechanisms as a Factor Increasing the Living Standard of Elderly People……... 1175
Natalia Goncharova and Viktoriia Degtereva

Problems and Directions for Improving Labor Rating…….. 1184
Ludmila Nadreeva and Vladimir Abramov

The Self-Internationalization Model (SIM) versus Conventional Internationalization Models (CIMs) of the Institutions of Higher Education: A Preliminary Insight from Management Perspectives……. 1191
Mohammad Ayub Khan and Noam Ebner

Improving the critical infrastructure protection system…… 1204
Bogdan Grenda, Edyta Ślachcińska and Paweł Majdan

Social Loafing in Group Activities of Manufacturing Companies……... 1214
Jolita Vveinhardt, Justina Banikonyte and Rizwan Raheem Ahmed

Development and Validation of the Semi-Structured Interview Questionnaire of Congruence of Personal and Organizational Values…… 1225
Jolita Vveinhardt, Evelina Gulbovaitė and Rizwan Raheem Ahmed

Interpersonal relationship in the process of educating on The example of University of the Defence in Brno…….. 1239
Edyta Ślachcińska, Ilona Ziemkiewicz-Gawlik and Radomir Saliger

Social-Cultural and Marketing Aspects of The Charity and Fundraising Development in Russia…….. 1251
Irina Lychagina, Victor Katochkov, Tatyana Konovalova and Denis Stukalov

Determinants of External Debt Accumulation in Turkey: Evidence from an ARDL Bound Test Approach…….. 1261
Erkan Özata

Ex ante and ex post regulatory impact assessment in Russia: framework and practice…… 1262
Marina Ivanova, Victoria Degtereva and Alexander Gorovoy

Management System of Migration Processes In the Modern Global World……. 1267
Minakova Irina Vyacheslavna and Bukreeva Tatyana Nikolayevna

Forecasting Sub-Sovereign Credit Ratings Using Machine Learning Methods…… 1271
Toseafa Evelyn

Changes in Relation between University and Company Regarding Human Resources Management……. 1280
Antonin Max, Jakub Jirasko and Martin Hynek

Customer Retention, Behavior and Emotions……... 1283
Mihai Dragnea and Niculae Mihaiță

Customer Retention Strategies and Organizational Adaptability……. 1291
Mihai Dragnea and Niculae Mihaiță

Influence of the Meso-environment and the Macro-environment on the Success of Enterprises in the Czech Republic……. 1300
Jarmila Straková

Reaction of Share Prices on Financial Decisions in Russia……. 1310
Kristina V. Galenskaya

Leadership, Situational and Systemic Critical Thinking…….. 1323
David Ullrich, Vratislav Pokorný and Eva Ambrozová

Simulating Electronic Records Management System (ERMS) Functionality via Hypertext Preprocessor Scripting…… 1333
Ap-Azli Bunawan, Sharifalillah Nordin, Haryani Haron and Ahmad Zam Hariro Samsudin

Value, attitude, and intention to quit as an entrepreneur: An empirical study on Indonesian youth……. 1338
Sabrina O. Sihombing

Analysis of Innovations and Advantages of Human Computer Interaction……. 1350
Anwar M. A. and Sayed Sayeed Ahmad

Theoretical and Methodological Approaches to Improving Management of Integration Processes of Potentials of Balanced Enterprise Development…….. 1359
Anatoly A, Alabugin, Kirill V. Kardapoltsev and Sergei V. Aliukov

Willingness to Accept for Municipal Waste Recycling: A Case Study from Lima, Peru…… 1366
R. Oliver Castañeda Limas, J. Fernando Larios Meoño and Benoit Mougenot

Free Cash Flow Potential in Assessing Financial Stability of Nonfinancial Businesses (the Case of Russia)……. 1376
Neli R. Abramishvili, Nadezhda A. Lvova, Natalya S. Voronova and Alexander V. Kazansky

Crisis management for public sector during the European financial crisis: Lessons of Estonia in 2008-2011…….. 1386
Raul Markus, Viljar Veebel and Olga Lvova

Nexus Generation Job Creators: A Review of Generational Attributes and Opportunities……. 1394
Nur Afiqah Binti Mohammad Ishak, Nurazariah Binti Abidin, Jegatheesan Rajadurai

Leveraging Big Data to Improve Customer Experience…… 1405
Rdouan Faizi, Sanaa El Fkihi and Abdellatif El Afia

MOOCs: An Upcoming Trend for Corporate Training and Development…… 1410
Rdouan Faizi and Sanaa El Fkihi

Preparation for Providing Crisis Communication During Blackout Occurrence……. 1416
Alena Oulehlová and Štěpán Kavan

Theory and Practice of Design Thinking: Systems Approach……. 1426
Eva Svirakova

Effect of Green Supply Chain Practices on Environmental Development: Insights from ISO14001 Certified Manufacturing Companies in Malaysia……. 1437
Marini Nurbanum Mohamad and Charis Samuel Solomon Koilpillai

Development of Agricultural Location Theory…… 1447
Artem Golovin, Alexey Golovin and Marina Parkhomchuk

An analysis of innovation framework conditions between Poland and the other Moderate Innovators countries…….. 1455
Aleksandra Zygmunt

Evaluation of the Effectiveness of Marketing Communications in Russian Business Using the Example of St. Petersburg Enterprises……. 1465
Anastasii I. Klimin, Dmitrii V. Tikhonov and Aleksei M. Efimov

Regional Dimension of Entrepreneurship in a Developing Economy An Analysis of Polish Północno-Zachodni Region..... 1483
Justyna Zygmunt

Analysis of the Influence of the External Environment on the Development of Water Distribution System Exploitation Strategy - Case Study……. 1492
Malgorzata Jasiulewicz-Kaczmarek, Ryszard Wyczółkowski and Violetta Gładysiak

Analysing the Correlation between the Quality of Visual Processing Of Marketing Information Carriers and the Perceived Quality of Services When Searching For SMES……. 1504
Radovan Bačík, Richard Fedorko, Jakub Horváth and Ján Mihál

Analysis of the Perceived Usefulness of Classic Communication Tools When Searching For SMES..... 1513
Radovan Bačík, Richard Fedorko, Jakub Horváth and Ján Mihál

Agglomeration and Network Effects in the Spatial Development of Production…… 1522
Elena Vyacheslavovna Zhogova, Olga Vitalievna Zaborovskaia and Tatiana Vasilievna Mokeeva

IT Governance Inhibitors: An Empirical Study in Slovak Republic…… 1529
Anita Romanová, Vladimír Bolek and Michal Zelina

Impact of the CO2 Emissions Cost On Electricity Production Profitability……. 1537
Anna Hnydiuk-Stefan

Financial Knowledge of Youth in Latvia: Pilot Survey Results…….. 1545
Jelena Titko, Zane Veidenberga and Inga Shina

Corporate Social Responsibility Perceived by Latvian Enterprises……. 1557
Tatjana Tambovceva, Jelena Titko and Agnese Alksne

Hysteresis of Gender Inequality in the Duration of Unemployment: Evidence from the European Union, Spain and Switzerland…….. 1569
Marina Faďoš and Mária Bohdalová

Comparison of Using Social Networks for Seeking Employment in Italy and Slovakia……. 1579
Miloš Hitka, Silvia Lorincová and Lenka Ližbetinová

Generation Y in Parent´s Business – Their Motivation…… 1587
Ondřej Hradský and Tomáš Sadílek

Is Growth In The European Union Countries Green?..... 1593
Armand Kasztelan

Takaful vs. Conventional Insurance from the Risk and Solidarity Perspective…….. 1604
Rusni Hassan and Syed Ahmed Salman

The Acceptability and Possibility of Takaful in a Conventional Environment: A Case Study in Non-Muslim Countries……. 1608
Rusni Hassan and Syed Ahmed Salman

An Analysis of Local Search Engines in Europe with a Focus on the Czech Market……. 1613
David Prantl

A Framework for Parallel Boyer-Moore-Quick Search Algorithm (P-BM-QS)……. 1623
Khalid Mohammad Jaber, Dyala R. Ibrahim, Asma H. Al-Sanhani and Nesreen A. Hamad

Management of Meso-, Micro- and Nano-Level Entities on Criteria for Providing Sustainability of Development…… 1629
Olga V. Artyomova, Olga V. Zubkova, Svetlana V. Voronina and Sergei V. Aliukov

Sectoral Factors of Formation of Tax Revenues in Subsidized Regions of Russia …… 1643
Elena Dzhurbina, Irina Prosvirina, Sergei Aliukov, Dmitry Fateev and Lyudmila Shirshikova

Integrated Organizational Management Model In Overcoming Challenges of Sustainability ……. 1650
Dalia Susnienė and Daiva Žostautienė

Development of Organizational-Economic Relations as a Condition of Enterprise Viability …… 1662
T.A. Korkina, S.I. Zakharov, E.V. Golovanov and S.V. Aliukov

Key Data and Information Quality Requirements for Asset Management in Higher Education: A case Study…… 1670
Faisal Syafar, Halimah Husain, Ridwansyah, Sabran Harun and Saharuddin Sokku

Life-cycle Risk Management Methodology of European-Funded Projects……. 1678
Nicoleta Daniela Ignat

New Method of Monitoring a Creative Project and its Use in Practice…… 1683
Eva Svirakova

Assessment of the Suitability of the Use of Foreign Exchange Interventions by the Czech National Bank for the Fulfillment of Monetary Policy Objectives…….. 1694
Martin Pernica and Helena Hanušová

The Importance of Information Security Management System in Slovak E-business……. 1705
František Korček, Mojmír Kokles and Anita Romanová

Financial Analysis of Distressed Companies in Emerging Countries: Methodological Approaches……... 1717
Olga Lvova

Preferred Stocks as Instrument for Sustainable Development: Valuation Aspects…….. 1728
Tamara V. Teplova and Pavel G. Shabalin

The Effect of Oil Taxation on Investment Activity of Companies and Economic Growth in Russia…….. 1738
Alla Bobyleva

Russian Foreign Energy Policy within The Conditions of Credibility Gap……. 1741
Igbal Guliyev

Legal Aspects of Corporate Management within the Pre-Bankruptcy Period in the Context of Russian Bankruptcy Legislation Reforms…… 1751
Elena Pirogova and Yulia Zhukova

Mitigating Energy Poverty at Emerging Markets: Review of Policies and Institutional Frameworks..... 1759
Igbal Guliyev and Igor Litvinyuk

Capstone - Experience with Experiential Learning Project Course at Institute of Business Management (IoBM)……. 1768
Marium Mateen Khan and Mohammad Ekhlaque Ahmed

Digital Strategy of Telecommunications Development: Concept and Implementation Phases…… 1792
Andrey Polyanin, Tatyana Golovina, Irina Avdeeva, Irina Dokukina and Yulia Vertakova

A Solution to Combat Cyber security Threats Involving Big Data Analytics in the Hadoop Ecosystem… 1804
Martin Lněnička, Jan Čapek, Jitka Komárková, Renáta Máchová and Ivana Čermáková

Identity Management Maintenance for Ex-Ante and Ex-Post Governmental Policy Analysis…… 1813
Madalina Ecaterina Popescu, Ion-Petru Popescu and Catalin Alexandru Barbu

Consumer Perception of Online Grocery Shopping in Karachi, Pakistan……. 1820
Mariam Saleem, Marium Mateen Khan, Mohammad Ekhlaque Ahmed, Sanober Ali, Neha Shah and Saad Rafiq Surti

Integrated Assessment of Socio-Economic Differentiation: Cross-Country Comparison…… 1834
Yulia Vertakova, Yulia Polozhentseva, Maria Klevtsova and Irina Ershova

The Main Approaches to the Implementation of Technical Re-Equipment of the Industrial Enterprises during Realization of State Economic Policy……. 1844
Yulia Vertakova and Tatyana Babich

Approaches to the Implementation of Strategic Innovation and Investment Projects for Development Industry of the Territory…… 1851
Yulia Vertakova, Artur Kurbanov and Vladimir Plotnikov

Characterization of Software Development Methodologies in the Telecommunication Industry of South Africa…… 1859
Olebogeng Helen Nojila, Nehemiah Mavetera and Chipo Getrude Mavetera

Investigation of the Opportunities of Business Differencation and Economic Development of the Territories Implementing Franchise……. 1873
Yulia Polozhentseva, Maria Klevtsova, Irina Ershova and Sergey Klevtsov

Reengineering In the System of Process Management of the Enterprise: Practice of Use in the Russian Industry…… 1881
Sergey Emelianov, Maria Plakhotnikova and Yulia Vertakova

The Use of Public Private Partnership for The Development of Transport and Housing Infrastructure….. 1892
Olga Lebedenko, Elena Agamagomedova, Ekaterina Charochkina and Anastasia Vertakova

Assessing Economic Freedom: DEA-PCA Approach..... 1897
Eduard Nežinský, Elena Fifeková and Andrea Valachová

GP Organize: A Prototype for Final Year Project Archive Management and Student Guidance..... 1908
Saadia Malik, Shaima Abdulla Al-youbi, Shaima Bandar Al-youbi, Ramlah Hussein, Ghadeer Dweik and Shereena Arif

The Study Project on Employees Creativity Effect on Innovation in a Manufacturing Company……. 1918
Kamila Tomczak-Horyń and Ryszard Knosala

Cluster Model: Knowledge Management in the Integrated System "University – School" (the article was prepared with the support of the Russian Foundation of Basic Research. Grant №16-06-00201)…….. 1927
Surina Olga Petrovna, Pavlova Nataliia Anatolievna and Aleshina Ekaterina Yuryevna

The Contribution of Territorial Marketing to Reginal Developemnt: What Role of Tourism Secteur? The Case of Tangier Tetouan Region ……. 1936
Mostafa Abakouy and Majda Khatib

The Significance of Small Businesses in the Township Economy: A South African Perspective …….. 1945
Caswell M. Maloka and Mduduzi S. Dlamini

The Challenges and Opportunities of the Sharing Economy: The Case of a Developing Economy 1952
Léonel Matar and Georges Aoun

A Framework for Innovation Management Practices among Women Entrepreneurs of Small Medium Enterprise (SMES) In Malaysia…… 1959
Norliza Ghazali, Wan Fauziah Wan Yusoff and Raudah Adnan

FINFLEX-CBMC: A Cost-Benefit Model Addressed to Solution Architectures Considering Uncertainty. 1975
Yeimi Peña, Eduardo Miranda and Dario Correal

The Influence of Business Strategy and Top Management Support on the Effective of Management Accounting Information System and its Impact on Corporate Performance: Evidence from Indonesia….. 2000
Sri Mulyani, Sudrajat and Erlynda Kasim

Linking Absorptive Capabilities and Competitive Advantage: Empirical Study of the Portuguese Textile SMES…….. 2011
Orlando Lima Rua, Alexandra França And Ruben Fernandez Ortiz

Financial Reporting Quality and Public Accountability in Regional Government: Analysis for the impact of Competence, Internal Control and Information Technology; Indonesia Evidence ……. 2023
Sri Mulyani, Erlynda Kasim and Sudrajat

The Role of the EU and EMU Membership in FDI Inflow to the Slovak Republic……. 2033
Ľubomír Darmo

Online Marketing as Part of the Internationalization Strategy An Analysis over Website Communication 2043
Lidia Alexa and Silvia Avasilcăi

Comparison of the Methods of Rating Universities ……. 2057
Velichenkova D.S., Rodionov D.G. and Skhvediani A. E.

Managing the Architecture of Life-Cycle Processes Of Unique Technical Objects……. 2062
Valery Maslennikov and Irina Kalinina

Knowledge Based Design of Mechanical Engineering Products……. 2069
Jakub Jirasko, Antonin Max and Tomas Keckstein

Perception of Working Conditions on the Quality of Working Life: Employees Linked To Health Companies in Barranquilla, Colombia……. 2076
Laura Martínez-Buelvas, Olga Jaramillo-Naranjo, Osvaldo Gamarra-Amarís, Andrea Llinás-Herrera and Fernando Jiménez-Pérez

Regional Analysis of Hotel Infrastructure at Russia Federation For 2016…….. 2090
Skhvediani A.E., Kudryavtseva T.J. and Kravchenko V. V.

Analysis of Tariff Policy in Urban Transport in St. Petersburg…… 2096
Kulachinskaya Anastasia Yuryevna, Kravchenko Valentina Vitalyevna and Kuporov Yury Yurievich

A Study on the Impact of Taxation on the Business Environment in the EU…….. 2107
Ţibulcă Ioana Laura

Experimental Studies of Taxpayers Behavior in Russia: Taking Into Account Regional Differences in the Level of Shadow Economy……. 2123
Dmitrii Y. Fedotov and Natalia V. Pokrovskaia

Innovative Financial Tools Used for Hedging Russian Banks' Investment Risks under the Conditions of Unstable Economy……. 2133
Sergeev D.A., Marikhina V.V. and Velichenkova D.S.

Using Business Intelligence Technologies for Evaluation of Road Network Organization…….. 2144
Oksana Yu. Iliashenko, Anastasia I. Levina and Alissa Dubgorn

Impact of Online Reviews on Customers' Dining Decision: an Empirical Study…… 2156
Nawaz Ahmad, Nimra Sharif, H.M Faizan Usmani, Shaeyma Hafeez

Increasing the Involvement of Staff in the Activity of the Company as a Factor Influencing its Efficiency……. 2170
Elena Kolesnichenko, Yana Radyukova and Mikhail Bespalov

Regularities of the Cyclical Development of the Modern World Economy: Theory and Facts…… 2179
Vladislav Sutyagin, Elena Kolesnichenko and Yana Radyukova

Evaluation of the Feasibility of Applying Reduced Social Contribution Rates in Special Economic Zones in Russia……. 2187
Elena Iadrennikova and B.N. Yeltsin

Integration of Soldiers to the Labour Market in Visegrad Group Countries…… 2198
Kristýna Binková and Miroslav Krč

Analysis of Scale Economies in a Manufacturing Company…… 2209
Martha Rodríguez, Josué García and Raúl Mata

The Rural Area, Land Fund and Restitution of Agricultural Land Property In Romania After 1990…….. 2224
Tiberiu Iancu and Silvius Stanciu

Moving Towards Social Entrepreneurship In South East Europe: Can We Rate Academic Contribution,? 2236
Ivana Bilić and Marina Lovrinčević

Research on the Assessment of the Consumer Profile of Fishery Products in Cahul, the Republic of Moldova…… 2248
Mihaela Munteanu (Pila) and Silvius Stanciu

Knowledge Management Based on Expert Systems…… 2258
Cezar Braicu, Radu Bucea-Manea-Tonis and Rocsana Bucea-Manea-Tonis

Legal Provision of the Quality of the Results of Construction Works: Theoretical and Practical Problems 2266
Vorontsova Elena Vladimirovna and Vorontsov Andrey Leonidovich

Barriers to start-up a Social Enterprise…….. 2271
Maria Constança de Barbosa Mendonça de Morais Sarmento, Diego Henrique Galego, Marta Ferreira Dias and Marlene Paula Castro Amorim

Resource Productivity in a Circular Economy…….. 2287
Luminta Pisto and Rocsana Bucea-Manea-Tonis

Developing Entrepreneurship Education within Universities: The Italian "Contamination Lab" case…… 2294
Giustina Secundo, Giuseppina Passiante, Maria Andriulo

Accounting Information – The Indispensable Support of the Analysis of Fiscal Deficit of the Romanian State Budget…….. 2299
Oana Bogdan, Aura Domil, Dorel Mateş and Maria Moraru

Semantic Pattern-based Automatic Annotation Process of Images Shared on Social Networks…….. 2307
Mariam Bouchakwa, Yassine Ayadi and Ikram Amous

Réflexion Sur La Logique De L'évaluation De La Performance Individuelle Des Enseignants – Chercheurs Dans Le Système Universitaire Marocain……. 2327
Marso Mohamed and Boujettou Hassane

Social and Environmental Impacts Assessment in the Economy for the Common Good…… 2335
Amparo Maset-Llaudes, David Cabedo, Iluminada Fuertes and José Miguel Tirado

Using Scorecards and Benchmarking in Management and Development of Cities and Regions……. 2348
Peter Rafaj, Lubomira Strazovska and Rozalia Sulikova

Takaful Rules and Regulations for ASEAN Countries: Takaful player Perspectives…….. 2363
Wan Norhayate Wan Daud, Fakhrul Anwar Zainol, Fauzilah Salleh, Ahmad Shukri Yazid, Suraya Ismail, Ruzian Markom and Nur Dalila Mukhtar

Computer Information Systems Persistent Struggles for Humanism: An Antithesis. Position and Reflective Paper…… 2370
Nehemiah Mavetera

Exploring the Relationship between the Learning Capabilities of Organization and Its Impact on Performance…….. 2384
Shagufta Ghauri, Aamir Firoz Shamsi and Farheen Khalid

A Review of the Importance on the Need of Micro Medical and Health Takaful……... 2398
Fauzilah Salleh, Nahidah Mustafa, Wan Norhayate Wan Daud, Ahmad Shukri Yazid, Puspa Liza Ghazali, Norizan Remli and Nik Ahmad Sufian Burhan

Preliminary Research Concerning the Fisheries Sector Potential of the Republic of Moldova…… 2405
Mihaela Munteanu (Pila) and Silvius Stanciu

The Production of Medicinal and Aromatic Plants – A Niche Business for the Romanian Agriculture..... 2416
Tiberiu Iancu and Silvius Stanciu

Drivers of Effective Corporate Tax Rate in the Baltic Countries…….. 2429
Radu Alin Păunescu and Georgeta Vintilă

The Process of Improving Recruitment for University Studies……. 2449
Petra Hollá Bachanová and Miriam Garbárová

The Influence of Culture toward Saudi's Healthcare Sector Performance…… 2460
Namshan A Algarni, McLaughlin Patrick, Al-Ashaab Ahmed and Rashid Hamad

Information Approach to the Risk Evaluation of the Intellectual Assets Portfolio…….. 2473
Victor S. Voronov, Alexander V. Kazansky and Ivan A. Darushin

The Importance of Human Resources Management in Business Practice in Slovakia……. 2481
Milota Vetráková, Lukáš Smerek and Mária Seková

Disruptive Innovation and Knowledge-intensive Entrepreneurship: A neo-schumpeterian view on the role of Key Enabling Technologies…….. 2488
Pasquale Del Vecchio, Giustina Secundo, Valentina Ndou, Giuseppina Passiante

Analyzing the Relationship between Open Innovation Adoption and Innovation Performance…….. 2499
Antonello Cammarano, Mauro Caputo and Francesca Michelino

Economic and Legal Instruments of Labour Integration of Unemployed Persons in Slovakia…… 2504
Gabriela Beresova and Daniela Novackova

Leveraging organizational performance and innovation Via knowledge management strategies in Turkey: Evidence from the İstanbul Stock Market…… 2513
Yakup Akgül

Differences in the Organization and Planning of Corporate Education in Medium-Sized and Large Companies in the Czech Republic……. 2526
Zdeněk Caha and Michal Ruschak

The Antecedents and Consequences of Consumer Engagement in Social Networking Sites……... 2534
F.Zeynep Özata and Abubakar Lujja

Determinants of Capital Structure - Evidence from Karachi Stock Exchange 30-Index…….. 2536
Farheen Khalid, Bilal Ali Zafar and Syed Aqeel Ahmed

Some Aspects Of System Dynamics Application In Czech Defence Strategic Management…….. 2544
Antonín Novotný and Dalibor Procházka

Impact of Brownfields on the Real Estate Prices: A Case Study From Three Locations in The Moravian Silesian Region (Czech Republic)…… 2560
Kamila Turečková, Stanislav Martinát, Jan Nevima, Jaroslav Škrabal and Petra Chmielová

Perception of Influence of the Brownfields on the Value Property: Case Study of Town Orlova, Czech Republic…… 2569
Petra Chmielová, Kamila Turečková, Stanislav Martinát, Jan Nevima and Jaroslav Škrabal

The Complexity of Requirements Engineering Approach as a Potential Critical-Success Factor of Software Project…… 2578
Igor V. Ilin, Anastasia I. Levina and Aleksandr A. Lepekhin

The Quality of University Teachers as One Of the Tools of Image Building 2591
Josef Kocourek and Romana Čočková

Design for Manufacturing of a Hip Endo-prosthesis Stem, using Additive Technologies…….. 2597
Ulmeanu Mihaela-Elena, Doicin Cristian-Vasile, Semenescu Augustin, Costoiu Mihnea-Cosmin and Motorga Roxana

New Tracheostomy Device Concept: An Additive Manufacturing Challenge in Reducing Late Clinical Complications…… 2611
Ulmeanu Mihaela-Elena, Ulmeanu Liviu, Doicin Cristian-Vasile, Rennie Allan E.W. and Lupeanu Elena

Agricultural land prices development in the Czech Republic and the latest legal development……... 2624
Ivan Soukal and Agnieszka Tarnowska

Customer Service Standards In Authorized Dealer Stores - Blueprinting Technique…….. 2632
Katarzyna Hys

Cluster Analysis of the Motivating Factors…….. 2645
Graţiela Dana Boca, Diana-Cezara Toader, Diana Ighian and Cezar Toader

Institutional Structures Influence on the Technological Development of the Economic System……. 2658
Sergey Bodrunov and Vladimir Plotnikov

Technological Development as a Factor of Ensuring the National Security……. 2666
Sergey Bodrunov, Vladimir Plotnikov and Yulia Vertakova

Fostering Community Engagement through Crowd sourcing: Case Studies from the Czech Republic…... 2675
Barbora Haltofová

Enhancing Economic Growth through Innovation in Russia: Identifying Key Incentives for Innovation... 2684
Gamidullaeva Leyla Ayvarovna, Chernetsov Michael Vladimirovich, Vasin Sergey Mikhailovich and Taktarova Svetlana Viktorovna

Characterization, Classification and Assessment of Non-Energy Benefits of Energy Efficiency Measures…….. 2697
Michael C. Krutwig and Kejo D. Starosta

Concept of Creating Innovative Mechanism of Human Resource Development in Russia……. 2708
Olga V. Kalinina, Irina M. Zaychenko and Svetlana S. Gutman

Brownfields in Context of Property, House and Real Estate Price in Dětmarovice (Czech Republic)……. 2720
Jaroslav Škrabal, Kamila Turečková, Stanislav Martinát, Jan Nevima and Petra Chmielová

Analysis of Cloud-Based Tools Adaptation Possibility within the Software Development Projects……... 2729
Igor V. Ilin, Oksana Yu. Iliashenko and Alexandra D. Borremans

Improvement of Employee Engagement through Interaction Between Distributive Justice, Procedural Justice and Islamic Work Ethics…… 2740
Halimah Tusa'diah, Heru Kurnianto Tjahjono, Fauziyah and Majang Palupi

Interaction Between Social Capital And Organizational Justice In Explaining Employee Engagement….. 2746
Syarifah Fira Novianti, Heru Kurnianto Tjahjono, Fauziyah and Majang Palupi

Evaluating Marginal Excess Burden of Taxation in Russia and the USA…… 2752
Chernogorskiy S., Kuporov Ju. And Shvetsov K.

The Adoption of e-Procurement within the Moroccan Health Sector …… 2758
Yousra Elbelkacemi, Wafa ElGarah and Ibrahimi Azzedine

University Attitude to the Applicability and Solution of the Society-wide Problem of Water Management…….. 2764
Martina Juříková

Theoretical Approach Regarding Corporate Entrepreneurship……. 2771
Sebastian- Ion Ceptureanu

Models of Corporate Entrepreneurship……. 2784
Eduard- Gabriel Ceptureanu

A Model of Motivational Factors Influence On the Motivation Degree……... 2797
Diana-Cezara Toader, Graţiela Dana Boca, Cezar Toader, Diana Ighian and Rita Toader

Factor Mapping and Modeling for Production Planning…….. 2809
Pavel Kábele, Michal Bochinský and Josef Babor

Click Activists of the New Era, Slacktivists: An Exploratory Research to Define Slacktivist Typologies.. 2817
Hatice Ozbas and F. Zeynep Ozata

The Impact of Monetary Policy on Bank Lending Rate in Kenya…… 2818
Wairimu Wanjaiya

Analysis of the Education Structure of the Population of the Slovak Republic In Relation To Buying Behavior……. 2833
Jaroslava Gburová and Martina Marchevská

Effectiveness of Investment on the Example of Selected Woodworking Plant…… 2840
Kornelia Polek-Duraj

LAGs as a Way to Rural Area Development in the Region of South Bohemia…… 2849
Petra Pártlová

Priorities of diversification in forest complex……... 2856
Morkovina Svetlana, Drapalyuk Michael, Sibiryatkina Irina and Torzhkov Ivan

Dividend Policy of Russian Companies at the Present Stage…… 2863
Lukasevich Igor and Sukhorukova Daria

The Effects of Digital Technology on Organizational Behavior …….. 2871
Ulrike Stefanie Foerster-Metz (Foerster-Pastor), Katrin Marquardt, Nina Golowko, Andreas Kompalla and Christian Hell

A Study on the Influence of Final Consumption Expenditure of Households and Foreign Trade on the Gross Domestic Product – Case of Romania and Five European Union Countries with Highest GDP….. 2884
Mihai Păunică, Alexandru Manole and Cătălina Motofei

A New Classification of the Risks of the Quality Processes……. 2892
Daniel S. Demidenko, Alexander M. Malinin and Alexander N. Litvinenko

Peculiarities of Quality Management Methodology for Innovation Projects of Industrial Enterprises…… 2898
Alexander M. Kolesnikov, Ekaterina D. Malevskaia-Malevich and Yulia A. Dubolazova

Economic Effectiveness Criteria of Natural Monopolies……. 2902
Alexander M. Kolesnikov, Ekaterina D. Malevskaia-Malevich and Yulia A. Dubolazova

Exploring the Determinants of the Effectiveness of Fraud Prevention Mechanisms in Malaysia's Local Authorities: A Research Proposal ……. 2908
Safawi Abdul Rahman, Rohana Othman, Intan Salwani Mohamad, Nooraslinda Abdul Aris, Mohd Ridwan Seman @ Kamarulzaman and Razif Rosli

Segmentation Analysis on Borrowing Usage Behaviour of Digital Library Services…….. 2920
Mohd Razilan Abdul Kadir, Irwan Kamaruddin Abd. Kadir, Ap-Azli Bunawan, Mohd Zailan Endin and Zairul Nizam Zainol

The Relationship of the Social and Economic Progress: A Case of European Cohesion Regions…… 2933
Tetiana Korovchenko, Ondřej Svoboda and Martin Ibl

Peculiarities in Convergence of Slovak Capital Stock to Western Countries……... 2941
Karol Morvay and Martin Hudcovský

Spatial Manifestation of Inflation in Terms of the Territorial Heterogeneity of the Russian Economy…. 2953
I.V. Danilova, A.V. Karpushkina, A.V. Rezepin and S.V. Aliukov

Planning of Electrical Installation Execution Project Using the Module Methodology of Large Project Management Based On Critical Chain Concept ……... 2960
Katarzyna Marek-Kolodziej, Iwona Lapunka and Dominika Jagoda-Sobalak

Financial and Economic Aspects of IT Project Management…… 2972
Alexander R. Bril, Olga V. Kalinina and Igor V. Ilin

Social Supermarkets in the Czech Republic – an empirical study…… 2981
Alexandr Asmalovskij and Tomáš Sadílek

Business Model of Industrial Enterprise: Sustainability Assessment…… 2988
Elena Viktorovna Melnikova and Yuliya Aleksandrovna Bezrukikh

MAESTRO: Towards a collaborative AAL market quality assurance platform for monitoring devices, systems and services…….. 3002
Karen Coan and Rodd Bond

Optimization of the Enterprise Value On The Basis of Value Added……... 3017
Daniel S. Demidenko, Alexander M. Malinin and Alexander N. Litvinenko

Cluster´S Internationalisation Platform as a Springboard for Internationalisation of Firms in the Age of Digitalisation…….. 3022
Aihie Osarenkhoe and Daniella Fjellström

Yields and Land Use for Wheat Production in Romanian Agriculture……. 3033
Silvius Stanciu

Patent Applications in Romania: Romanian Innovation in the European Context…….. 3041
Cezar Ionut Bichescu, Mariana Madalina Chivu and Silvius Stanciu

Study on the Production of Wheat Seeds in Braila County……... 3052
Băcanu (Serban) Constanța, Dinca Cristina, Ion Iuliana Manuela and Stanciu Silvius

Risk Management Methods in Construction Projects……... 3060
Petr Řeháček and Blanka Bazsova

Problematic Mobile Phone Use among Employees in Lebanon …….. 3070
Souha Fahed and Rita Kmeid

Promotion Techniques for A New Romanian Brand of Wine……... 3076
Dospinescu Nicoleta and Stoica Bianca Maria

Implementation of “14 Quality Principles for Value Streams” In the Company from the Automotive Industry…….. 3088
Arkadiusz Kowalski, Paulina Nowacka, Piotr Szafer and Robert Waszkowski

Gestion RSE et Création De La Valeur Partagée…….. 3098
Cherqaoui Mohamed Jawad and Boukhima Asmaa

Management of Sustainable Development in Small and Medium-Sized Companies: Driver and Network Approach…… 3106
Valery M. Anshin and Ekaterina Skripka

Practical Framework for the Implementation of A Resource Sustainable Intellectual Property Rights Due Diligence in Mergers & Acquisitions…… 3115
Adrian Bercovici, Mihaela Maftei and Elisa Gotesman

Selected Possibilities of using Online Marketing and Online Advertising on the Slovak and Foreign Markets…….. 3127
Radovan Bačík and Jaroslava Gburová

Analysis of the Use of Marketing and Promotion in a Non-Profit Area Operating on the Slovak Market…… 3134
Jaroslava Gburová and Radovan Bačík

Animal Welfare Organizations in Russia: Analysis of Structure, Typology of Volunteering Base and Functional Problems…….. 3143
Maria S. Gorbuleva

Methodological Problems of NPS Index Application for Measuring Customer Relationship in B2B……. 3149
Anastasii I. Klimin, Dmitrii V. Tikhonov and Aleksei V. Trykov

The Impact of Social Media on Tourism: A Comparison between Germany and Romania……. 3161
Sonia Budz, Kejo D. Starosta and Bastian L. Kurth

Providing Security in Objects of Critical Infrastructure 3178
Hana Malachová and Kamil Bednář

Can Different Professionals Talk and not Talk to Each Other at Once? Provisional Relations as Boundary Spanning Strategies between Management Academics and Practitioners…… 3189
Paula Ungureanu and Fabiola Bertolotti

Romanian certified seed production. Evolution and characteristics in the international context…….. 3198
Cristina Dinca, Constanța Băcanu (Serban), Iuliana Manuela Ion and Silvius Stanciu

Bratislava et le désert slovaque…….. 3208
Frédéric Delaneuville

Classification of the Russian Arctic zone territories according to the level of small business development……... 3218
Elena V. Rytova, Svetlana S. Gutman and Irina M. Zaychenko

Effectiveness of Public Spending on Tertiary Education: The Case of the Slovak Republic……... 3224
Ľudomír Šlahor, Mária Barteková and Janka Gasperová

Semiotic Approach to Pedagogical Bioethics…… 3232
Nina A. Pervushina

The Role of Intellectual Capital in the Intrapreneurship Process and Its Effects on the Innovation Radicalness ……... 3239
José Carlos Curiel Franco and Miriam Delgado Verde

Systèmes Décisionnels et Management: Approche Sectorielle par les Modèles de Maturité……... 3247
Ines Ben Tarbout and Adel Escheikh

BPMN as a Quality Tool for the Efficient Functioning of the Company…….. 3257
Jan Nisler and Hana Tomaskova

Identifying Smart Cities Challenges: A Literature Review……... 3264
Shamsaa Al Riyami, Afra Al Mandhari, Rasha Al Abdali and Zahran Al Salti

Assessing the Impact of E-Service Quality on Customer Retention for E-Retailing in Malaysia…….. 3273
Abdullah Sarwar, Nurazlin Mohd. Fauzi, David Yong Gun Fie and Adedapo Oluwaseyi Ojo

L'impact Des Conditions Climatiques Et Bioclimatiques Sur L'efficience De La Culture De La Vigne Et La Production Des Raisins Dans La Région Des Collines Des Subcarpates De Vrancea, Roumanie……. 3283
Elena Grigore, Dana Maria (Oprea) Constantin, Elena Bogan, Tamara Simon, Irina-Adriana Chiurciu, Elena Soare and Dan Vasile Ardelian

Strategy for Investing in the Modernization of Existing Coal Power Plants……. 3295
Ryszard Bartnik and Anna Hnydiuk-Stefan

The Research of Language Competency of Subjects of Bilingual Environment and Modern Educational Internet-Resources……. 3319
Svetlana N. Fedorova, Irina N. Andreeva, Ksenia Y. Vavilova, Elena V. Alekseeva and Elvira M. Vorontsova

Influence of Individual Psychological Characteristics of Senior High School Students over Professional Direction…… 3326
Maria L. Blinova, Igor A. Zagaynov, Anna D. Burlachenko, Nadezhda I. Palagina and Dmitriy A.Evdokimov

Neuropsychological Correction in Support of Preschool Children with Disabilities Living in the Multicultural Region…….. 3329
Elena Y. Borisova and Irina B. Kozina

State Support of Small Forms of Economy in the APK of the Republic of Mariy El as the Condition of Improving their Investment Activity …… 3333
Firdaus Z. Gumarova, Elena N. Potekhina and Marina V. Kazakovtseva

Assessment of finance and investment potential of companies……. 3340
Taipova Elvira, Zelenskaya Jeanne and Kolegova Irina

Inter-Organisational Networks and Innovation Intermediation in the Digital Age……... 3354
Gamidullaeva Leyla Ayvarovna, Chernetsov Michael Vladimirovich and Chistilina Elena Valeryevna

Study and Assessment of the University's Integration Level into the National Innovation System: Case of Russia…… 3364
Silakova Liubov Vladimirovna and Laskina Liubov Yurievna

Employer Branding: The importance of retention……. 3377
Susana Silva and Inês Calisto

Sustainability of Family Owned Business: An Empirical Evidence from Family Owned Businesses……. 3389
Babar Ansari, Kanwal Gul, Nawaz Ahmed and Syed Irfan Hyder

Unethical Leader's Identity: A Simple Model and Its Methodological Application…… 3397
Mgr. Marian Stančík

Determinants of Organizational Commitment: A Study on Teaching Staff at a Public University in Vietnam…….. 3405
Pham Thi Bich Ngoc and Le Hieu Hoc

Research of the Region Industrial Sphere in the Branch Section: Statistical Aspect…… 3417
Tatyana A. Ignasheva

Tasks of Academic Training in Conditions of Contemporary Challenges…… 3423
Julia S. Obidina, Tatiana V. Smyshlyaeva, Nadezhda V. Malkova and Vladimir I. Aktanaev

The Role of Management Accounting Methodology in the Forecasting of Regional Economy Development…….. 3429
Yuliya B. Rzhavina and Mariya V. Sayranova

Priorities and Risks of Innovatization in Managing the Economy of Russian Regions…… 3433
Evgeny I. Tsaregorodtsev, Michail P. Postaljuk and Taras V. Postaljuk

Testing Different Particle Swarm Optimization Strategies……... 3444
Pavel Raska and Zdenek Ulrych

Social and Environmental Engineering done through Globalization…… 3466
Victor Adrian Troacă, Alexandru Postolache, Marcela Mitriță, Constantin Constantinescu and Raluca Georgescu

A Global Perspective on Human Development and Climate Change……... 3472
Marcela Mitriță, Raluca Georgescu, Alexandru Postolache, Constantin Constantinescu and Victor Adrian Troacă

Employees' Training and Development System by Utilizing Competency Model and Wings Method….. 3477
Katerina Kashi

Econometric Models for the Production of Oil Deposits…….. 3484
Marius Bulearcă, Cornelia Neagu and Cristian Sima

Levels of Business Process Modeling……... 3495
Hana Tomaskova

Aimprove E-Learning System by Enriching the Learner Knowledge Model……... 3499
Amal Trifa, Aroua Hedhili Sbai and Wided Lejouad Chaari

Box-ing Happiness…… 3512
Feyza Aglargoz and Feyyaz Kaya

Innovation of the Economies of European Union Countries in 2009-2016…….. 3514
Anna Kowalska

Why Banks Adopt Mobile Banking?..... 3524
Ceylan Onay and Yasemin Ezgi Öztaş

Significance of the Analytical Procedures in the Earnings Quality Assessment……... 3531
Boris Tušek, Ana Ježovita and Ana Novak

Comparative analysis of Business Process Management frameworks……. 3542
Robert Waszkowski and Arkadiusz Kowalski

Ensuring Stability of the Territorial Subject of the Russian Federation in the Conditions of Unstable Economy…… 3554
Marina V. Kazakovtseva, Firdaus Z. Gumarova and Elena Y. Yuricheva

Formation of the Practical Platform For Decision Making in Management Accounting at Investment Risks…….. 3561
Maria Stafievskaya, Rose A. Vanyukova, Ramziya K. Shakirova, Virinia E. Mamaeva and Albert E. Mamaev

Management of Preparation of Pedagogical Shots for Realization of Inclusive Education at Elementary School…… 3567
Nadezhda N. Golovina, Svetlana V. Bakhtina, Olga A. Petukhova and LarisaVacilyevna Basova

Adaptive System of Mathematical Training of Students: Structure and Comparative Analysis……. 3574
Vera I. Toktarova

The Value of Library Services Depending On Individual Determinants…….. 3580
Simona Pichová and Denisa Chlebounová

Work Reform in Indonesia: An agenda for greater efficiency…….. 3586
Laurencia S. Krismadewi

Examining the Impact of Digital Media on Promoting Process in Small Businesses. Evidence from Romania……. 3607
Cristina Petronela Simion, Gheorghe Militaru, Mirona Popescu and Andrei Niculescu

Examining Students' Acceptance of Internet of Things Technology in Higher Education……. 3615
Gheorghe Militaru, Cristina Petronela Simion, Dana Deselnicu, Alexandra Ioanid and Cristian Niculescu

Data Collection for Smart Cities using Intelligent Sensors……... 3624
Oldřich Horák, Jan Linhart and Lukáš Petr

Analysis of the Stability of Clustering Structures Based on the MCDM Methods……... 3629
Roman Guliak

Challenges for Industry 4.0 in Management Area……. 3638
Piotr Wittbrodt, Iwona Lapunka and Katarzyna Marek-Kolodziej

Ways of Modern Agriculture in Specifics and State Support…….. 3646
Zhahov Nikolay Vladimirivich, Krivoshlykov Vladimir Sergeyevich and Shatokhin Mikhail Viktorovich

Unethical Leader's Identity: A Simple Model and its Methodological Application……. 3653
Marian Stančík

Well-Being or Well-Appearing? A Multi-case Analysis of Employees' Perceptions of Organizational Well-being Initiatives…… 3661
Paula Ungureanu, Fabiola Bertolotti and Massimo Pilati

A Review of Bitcoin Literature……. 3671
Ceylan Onay and Serhat Serhatlı

Social Sustainable Supply Chain Practices and Impacts on Companies Performance: an Exploratory Study on Portuguese Manufacturing Industries……. 3677
Luisa Alexandra Pinto

Career Advancement Challenges of Single Women: An Examination of Indian Women Experiences…... 3697
Jolly Sahni

Debates on Needs vs. Resources: The Limited Character of Natural Resources ……. 3707
Cornelia Neagu, Marius Bulearcă and Cristian Sima

The Evolution of Sport and Tourism Policies In Romania before and after 1989…… 3723
Katalin Gál and Tünde Gál

Analysis of the Solvency of Airport Industry Companies Based on Cash Flow…….. 3731
L*askina Liubov Yurievna, Silakova Liubov Vladimirovna and Smirnova Anastasiya Talibzhanovna*

Bait & Switch: Corporate Makeover or Destroyer…… 3741
Benson Nwaorgu

Drivers and Specificity of Eco-Innovation in Poland – The Latest Research Results…….. 3749
Adam Ryszko

Measuring International Students' Satisfaction in Malaysian Private Universities…….. 3763
Abdullah Sarwar, S. M. Ferdous Azam, Melissa Wendy Migin, Murali Raman and Vincent Oh Kim Seng

Possibilities of Stakeholders in a Harmony Game to Increase Ethical Behavior shown on basis of Expanded Game Theory…… 3770
Thomas Kronberger

Characteristics of Audit Market in the Function of Audit Quality…… 3782
Sanja Sever Mališ, Katarina Žager and Mateja Brozović

An Overview of Human Resources in the Romanian Rdi System…… 3793
Cezar Ionut Bichescu, Mariana Madalina Chivu and Silvius Stanciu

Frameworks used in IT Governance…….. 3803
Matej Černý, Mgr. Miloš Bodiš and Anikó Töröková

Determinants of Pro-Environmental Behavior at Work: State-Of-The-Art Review and Integrative Research Framework……. 3814
Adam Ryszko

Patent Applications in Romania Romanian Innovation in the European Context……. 3829
Cezar Ionut Bichescu, Mariana Madalina Chivu and Silvius Stanciu

Improving Students' Self-directed Learning Outcomes on Mechanics Subject by Using E-Learning……. 3840
Vina Serevina

Combatting Tax Evasions ……. 3847
Darina Saxunova and Rita Szarkova

Disclosure Practice and Perspectives of Notes to Financial Statements in Croatian Tourism Companies... 3859
Ivana Mamić Sačer, Ivana Pavić and Ana Rep

The Influence of Changes in the Notes on Evaluation of Indebtedness and Other Performance Measures – The Analysis of Lease Financing …….. 3872
Ivana Pavić, Nikolina Dečman and Ivana Mamić Sačer

Attributes of Employee Engagement Best Practices: A Guideline of Widely Used Engagement Models.. 3882
Kanwal Gul and Ghazanfar Bozai

Electronic Platforms and Transparency in Public Procurement…… 3898
Isabel Ferreira, Pedro J. Camões, Sandra Cunha and Luís A. Amaral

How To Measure And Predict Degree Of Circularity Thinking in Construction Sector? – Modern Way to Build Competitive Advantage……... 3907
Pedro Núñez-Cacho, Jarosław Górecki, Valentín Molina and Francisco Antonio Corpas-Iglesias

Development of Web Extended Massive Open Online Course (xMOOCs) on Thermodynamics Subject to Increase High Order Thinking Skill of Students……... 3921
Vina Serevina and Ruly Lasrina Octavia

Comparison of the Concepts of "Flow" And "Flow Process" In Logistics……... 3931
Georgiy Greyz, Yuliya Kuzmenko, Irina Okolnishnikova and Irina Saveleva

Can Employers and Educational Institutions Learn More about Their Candidates Through Analyzing Their Heroes?..... 3937
Helena Šajgalíková and Lukáš Copuš

Theoretical Model Application: Advantages vs. Disadvantages……... 3945
Ap-Azli Bunawan, Mohd Razilan Abdul Kadir, Mohd Zailan Endin, Jannatul Iza Ahmad Kamal, Ezza Rafedziawati Kamal Rafedzi, Mohd Yusof Mustaffar and Nurhidayah Hashim

The Hybrid Model of Multivariate Index Analysis of Current Assets…….. 3949
Tsatsulin Alexander Nickolaevich and Evreinov Oleg Borisovich

Study on the relationship types of non-governmental organizations with the government…….. 3961
Elisa Gotesman (Bercovici), Rodica Pamfilie, Ioana Ceauşu and Adrian Bercovici

Securing Smart Cities with Monitors…… 3972
Orhio Mark Creado and Phu Dung Le

Voluntary Simplicity in Consumer Behaviour – Necessity, Challenge or Utopia…… 3992
Katarína Gubíniová, Silvia Treľová and Juliana Mruškovičová

Current Problems of Unemployment in Slovakia…….. 3998
Peter Bajzík

The Financial Sector and Economic Development……... 4004
Katarína Rentková and Darko Panevski

Analysis of the Evolution and Influence of Final Energy Consumption on Gdp in Eu Countries…… 4018
Georgeta Soava and Anca Mehedintu

Balacing Between Comprehensibilty and Accuracy for Credit Risk Assessment Using GP…… 4030
Ines Gasmi, Salima Smiti, Makram Soui, Khaled Ghedira

Analysis of International Trade between Latin America and Germany using gravity models……. 4043
Lourdes Gabriela Daza Aramayo and Marek Vokoun

Creating organizational culture under the influence of leadership and training – a CA approach…… 4051
Agnieszka Kowalska-Styczeń and Tomasz Owczarek

Teaching Aids, Their Creation and Use in Vocational Training……... 4059
Daniel Kučerka, Roman Hrmo, Mária Vargová and Monika Kučerková

What Drive Bank Performance Overtime? A Dynamic Panel Analysis on Islamic Vs Conventional……. 4069
Banks
Cedrix Ngandop Djeutcheua and Luc Matabaro Borauzima

Comparing the Brand Personality of Nike in Slovakia and Czech Republic…… 4083
Lucia Vilčeková

Stylized Facts About The Mortgage Market In The Czech Republic: A Cross-Correlation Approach….. 4089
Mgr. Vlastimil Reichel and Bc. Jana Gajdošová

Structural Analysis of Factors Affecting the Effectiveness of Complex Technical Systems…… 4096
Katarzyna Szwedzka, Piotr Szafer and Ryszard Wyczółkowski

Relationship between Corporate Default Risk and Macroeconomic Indicators in Czech Republic……. 4106
Mgr. Tomáš Jeřábek, Vladimír Šefčík and Zdeněk Málek

Financial Perspectives of Big Data…… 4117
Sigova Maria V., Vasiliev Sergey A., Klyuchnikov Igor K. and Zatevakhina Anna V.

Employees' Retention: A Systematic Literature Review…….. 4126
Viviana Meirinhos, Sara Abrunhosa and Dora Martins

Implication of Global Competition on Innovation Performance of Organizations…….. 4135
Maier Dorin, Jörg Bothe, Wafeed Mansour and Maier Andreea

Are Phones Still Used as a Distribution Channel of Services in the Age of The Internet? An Empirical Study…….. 4143
Marcin Lipowski and Marek Angowski

Key Issues In Relation To Leading and Managing Educational Change: Professional Development in Secondary School…….. 4152
Ziyadin Sayabek, Maiya Arzayeva, Mediyeva Gulbazar, Akmaral Mustafina and Tlemissov Ulan

Transaction Costs, Institutions and Regional Innovation Development: the Case of Russia…… 4161
Gamidullaeva Leyla Ayvarovna and Tolstykh Tatyana Olegovna

The Impact of Critical Success Factors of Enterprise Resources Planning System on Organizational Performance in Islamic International Arab Bank…….. 4173
Maha Alkhaffaf

Comparison of Motivational Preferences of University Students and Employees…… 4184
Dagmar Weberová, Peter Štarchoň and Lenka Ližbetinová

The Effect of Trust, Compatibility, Transparency and Affinity on the Acceptability of HIT by the Physicians and Nurses Practicing In Mohammed VI Hospital in Marrakech…….. 4194
Az-Eddine Bennani, Youness.Lafraxo and Wissam.Akhezzane

State Support Programs and Its Role in the Sustainable Development of Small Business…….. 4201
Khlutkov Andrey D., Vlasova Marina S., Kruglova Inna A. and Nazarov Pavel V.

The Effect of Transformational Leadership and Organizational Culture in Organizational Innovation Attending to the Organization Size…….. 4211
Eva Petiz Lousã and Lisete dos Santos Mendes Mónico

An Example of Exploratory Analysis for Predictive Business Process Monitoring……. 4224
Tomasz Owczarek

Strategic Management Accounting: Bibliometric Analysis and Ideas for Future Research……. 4229
Petr Petera

Globalization as the Engine of Economic and Social Evolution……... 4241
Brăileanu Artur Lucian and Abbasov Rashad

The pre-EU Democratic Enlargement Process – a Chronological Review……... 4245
Brăileanu Artur Lucian and Abbasov Rashad

L'inertie Organisationnelle, Force Conservatrice Contre L'innovation…… 4250
Azzaz Fatima Ezzahra and Salahddine Abdelouhab

Bioethical Dialogue as a Method of Scientific Research Management……. 4262
Tamara V. Mescheryakova and Olga V. Gerasimova

Development of the Educational System and the Priorities of the Knowledge Economy…… 4270
A.V. Kharlamov, T.L. Kharlamova and O.S. Koroteeva

Auditing for Risk Assessment Based on the Principle of Business Continuity Applied to Hotels and other Accommodation Services……. 4278
Cristina Iovu

Development of Human Capital in the Context of Digital Transformation……. 4297
Inna Gunina, Galina Zenina, Tatyana Narolina, Yulia Pahomova and Olga Dudareva

Integrated Model for Information Systems and Agriculture Sector: A Perspective of Developing Nations in Asia…… 4304
Mohammad Falahat, Murali Raman and Melissa W. Migin

Business Process Management and Reducing Costs……. 4310
Peter Stuchlý and Anna Látečková

Comprehensive Overview of the Most Significant Notions Related to Unethical Work Behavior in Organizations……. 4321
Zuzana Kotuliaková

SMEs Marketing Strategy Clusters: A Case of Indonesian SMEs…… 4332
Rifelly Dewi Astuti, Adi Zakaria Afiff and Tengku Ezni Balqiah

The Audit Records and Risk Assessment Related To Significant Denaturation in the Inventory Auditing Activity…….. 4342
Cristina Iovu

Multicriteria methods in evaluation of city logistics projects……... 4357
Agnieszka Tłuczak and Sabina Kauf

Innovation Fournisseurs Un Levier De Performance Pour Les Achats : Cas Du Secteur De Location Automobile…… 4367
Fatiha Naoui-Outini and Nabil El Hilali

The Strategy of Universities: Are They Increasing Their Competitiveness?..... 4376
Valery Maslennikov, Olga Grishina, Yuri Lyandau and Irina Kalinina

Corruption, Political Instability and the Informal Sector in Latin America: Efficiency Analysis of Latin American Companies using DEA model……. 4385
Lourdes Gabriela Daza Aramayo and Marek Vokoun

A Bird's-eye View of Services Industry's Self-Regulation…….. 4399
Junainah Mahdee, Normazalila Abu Bakar @ Harun, Maznah Mohd. Taib, Vincent Oh Kim Seng and Bahma Sivasubramanian

Determinants of Students' Perceived E-Learning Satisfaction…….. 4405
Ajitha Angusamy, Jayanty Kuppusamy, R.N. Anantharaman and Tee Shea Ching

Using Asymmetric Copulas in Risk Management……. 4413
Mgr. Tomáš Jeřábek

Evaluation of Debt Elimination Benefits of Slovak Hospitals in 2011……. 4424
Andrea Masařová, Marcela Basovníková and Jan Vavřina

The Importance of Creativity in the Business World…… 4433
Dominika Jagoda-Sobalak, Iwona Łapuńka and Katarzyna Marek-Kołodziej

The Use of Vegetal Wastes – Sustainable Alternative for Energy…… 4443
Ştefania-Daniela Bran, Cristian Teodor, Irina-Elena Petrescu and Mariana Bran

Information Requirements Related to Project Portfolio Management in Enterprise……. 4460
Dominika Jagoda-Sobalak, Iwona Lapunka and Katarzyna Marek-Kolodziej

Profitability of Selected Visegrad 4 Group Food Processing Industries in the Context of EU Food Quality Logos in the Period of Economic Recovery after the Recent World Financial Crisis……. 4469
Andrea Masařová, Alice Fajtová and Jan Vavřina

Energy Sanctions against Russia: Analysis and Dualistic Effect…….. 4477
Larisa Ismagilova, Tatiana Gileva and Elena Budnik

Challenges of Digital Transformation in Higher Education Institutions: A brief discussion…….. 4490
Luis Silva Rodrigues

Significance Level of a Query for Enterprise Data…… 4494
Loan Thi Ngoc Dinh, Gour Karmakar, Joarder Kamruzzaman, Andrew Stranieri and Rajkumar Das

Entrepreneurship Caught Between Creativity And Bureaucracy: Education and Social Innovation for Creativity in Spain……. 4505
David Borge-Diez, Enrique Rosales-Asensio, Clara Pérez-Molina, Enrique González-Cabrera and Antonio Colmenar-Santos

The Fundamentals of Values-Based Leadership……... 4512
Mgr. Ivana Blahunková

Czech Cybersecurity Security measures and actual situation…… 4519
Lubomir Almer

Analysis of the Eccentricity Detection Error in Iris Recognition……. 4524
C.M. Noaica

University Education and Knowledge Management: An Application to the Spanish Case……. 4538
David Borge-Diez, Enrique Rosales-Asensio, Clara Pérez-Molina, Enrique González-Cabrera and Antonio Colmenar-Santos

A Rule Based Inference Model to Establish Strategy-Process Relationship……. 4544
Loan Thi Ngoc Dinh, Gour Karmakar, Joarder Kamruzzaman and Andrew Stranieri

Smart Organization: Improving Innovation Performance through Recommendation ……. 4557
Maria El Haiba, Lamyaa Elbassiti and Rachida Ajhoun

Critical Success Factors for Quality Implementation in the Manufacturing Industry…….. 4568
Syed Talib Haider, Hiyam Al-Kilidar and Rene Leveaux

Transitioning the Classroom: The Shift Towards Blended and Flipped Learning…… 4581
Sandra Gallagher, Alan Sixsmith, Rene Leveaux and Helen Simpson

Greedy Genetic Data Mining Algorithm for Multidimensional Data of Electronic Components for Space Industry…….. 4593
Kazakovtsev Lev Aleksandrovich, Stashkov Dmitry Viktorovich and Savelyeva Marina Viktorovna

State Regulation of Exports: Foreign Experience and Kazakhstan Practice…… 4598
Tovma N.A.

Restructuring of the Agricultural Sector in Romania ……... 4610
Adrian Turek Rahoveanu

Analysis of Agricultural Chains in Romania Case Study: Cereals and Oilseeds 4617
Adrian Turek Rahoveanu

Methodological Difficulties and Peculiarities of Development of Adaptive System of Stock Management under Conditions of Unsteady Market……. 4623
Natalya Dzenzeliuk and Anna Dolinskaia

Loan Assets and Their Importance for Banking Sector – BRD Case Study……. 4634
Oana Bogdan, Aura Domil, Dorel Mateş, Alin Emanuel Artene, Moise Domil and Eduard Ajtay

Methodological Support for Risk Analysis during the Whole Life Cycle When Designing Technical Products..... 4642
Dvořák Josef

Assessment of eGovernment Policies: Reflections on Applied Frameworks 4651
Demetrios Sarantis

Case Study on Strategic Innovation Management Through Organizational Change..... 4662
Takács Ildikó-Csilla

De L'alternance A La Formation Professionnelle Continue Dans l'Enseignement Supérieur: Un Nouveau Modèle De Formation Tout Au Long De La Vie Au Service Du Développement Et De La Structuration Du Territoire Corse..... 4673
Christophe Storaï and Laetita Rinieri

An Insight on Cloud Computing and the Small and Medium Size Enterprises ("Smes") In KSA: Issues and Challenges…….. 4681
Emna Chikhaoui

Work-Family Conflict and the Intention to Quit with Psychological Strain as a Mediator and Social Capital as a Moderator…….. 4694
Sri Sundari, Heru Kurnianto Tjahjono, Arif Hartono and Wisnu Prajogo

Workplace Sprituality in Enhancing Organization Commitment that Leads to Improvement in Employee Retention of Generation Y…… 4701
Vincent Oh Kim Seng, David Yong Gun Fie, Abdullah Sarwar, Low Jing Hong, Junainah Mahdee and Gowrie Vinayan

Prospects of the Development of the "Green Economy" At the Global Level..... 4712
Tovma N.A.

The Role of Employee Engagement As a Mediator for Organization Justice, Individual Performance and Organization Performance..... 4720
Trisninawati, Heru Kurnianto Tjahjono, Arif Hartono, Wisnu Prajogo and Majang Palupi

Financing the Companies in Insolvency. International Aspects…… 4730
Simona Petrina Gavrila and Florin Tudor

Public Interest and Public Good In the Romanian Public Administration..... 4740
Ştefania-Cristina Mirică, Andreea Elena Matic, Simona Petrina Gavrilă and George Cristian Schin

Technical and Economic Analysis of Investment Projects in the Field of Renewable Energy Production 4749
Popescu Catalin

Economic Effects of Tourism Development In South Sumatra on The Communities Around Tourism Regions..... 4758
Sri Rahayu

DFM – with features in milling processes..... 4766
Julian Jakubowski, Waldemar Woźniak and Roman Stryjski

Identification and Reduction of Product Defects in Mass Production at Toyota Motor Manufacturing, Poland 4774
Waldemar Woźniak, Witold Nawrocki, Roman Stryjski and Julian Jakubowski

Knowledge and Skills Required in Accounting Education: A Comparative Study..... 4783
Rim Khemiri

Formation of the Hop-growing Cluster in the Chuvash Republic..... 4802
Anatoly Zakharov, Andrey Makushev, Oleg Evgrafov, Evgeny Tsaregorodtsev and Dmitry Zakharov

Differential Change Management in small, medium and large enterprises..... 4811
Liviu Tudor

Logistics Supply Control in Conditions of Customs Relations Development..... 4824
Elena Potekhina and O. Mironova

Forecasting the Logistics System of the Region..... 4829
Evgeny I. Tsaregorodtsev, I. Shcheglova, Yu. Markina, A. Loginova, L. Sageeva, E. Skvortsova and A. Efimova

Input–Output Energy Analysis of Honey Production in Iaşi County, Romania 4835
Dan Bodescu, Radu-Adrian Moraru, Oana Coca, Sebastian Brumă and Marius Gheorghe Doliş

The short-term impact of the European Structural Funds on the tourism services in the Romanian rural area..... 4846
Dan Bodescu, Oana Coca, Sebastian Brumă, Radu Lucian Pânzaru and Radu-Adrian Moraru

Les Administratifs et le Sens de la Performance Universitaire Publique..... 4854
Mohammed Lamchaouat, Nabil Bouayad Amine and Khalid Rouggani

A Network Approach for Smart Tourism Destination: evidences from a digital local experience..... 4863
Mele Gioconda, Del Vecchio Pasquale, Passiante Giuseppina and Ingrosso Elisa

Globalization in the Case of Automobile Industry in Slovakia..... 4879
Lubica Bajzikova, Daniela Novackova and Darina Saxunova

Level of Foreign Direct Investment in Slovakia in Relation to Euro Adoption and Comparison to Czech Republic..... 4894
Lucia Kočišová, Lenka Chorvatovičová and Zuzana Stoličná

The Impact of a New Foreign Investor on Economic Growth in the Slovak Republic..... 4903
Lucia Kočišová and Zuzana Stoličná

Identification of the Main Actors of Innovation Performance Evaluation Process and the Definition of Their Responsibilities..... 4908
Viliam Lendel, Juraj Čerňanský and Martin Latka

Muslim Consumers' Knowledge and Preference for the Islamic Banking Window or the Full-Fledged Islamic Bank..... 4915
Sri Rahayu Hijrah Hati and Umda Nafia Yasin

The Actors Involved in the Development of Rural Tourism in Romania..... 4922
Maria Cristina Paiu

Determinants of Customers' Choice and Continuance Intentions with Mobile Data Service Provider: The Role of Past Experience..... 4926
Obinna C. Ojiaku and Aihie Osarenkhoe

Self-Evaluated Teaching Skills for Students in the Technical Domain: A Hands-On Approach from the Teacher Certification Program..... 4940
George Florian Macarie, Ana Voichiţa Tebeanu and Maria Magdalena Roşu

Public Policy of the Social Science and Humanities Education in the Model of Sustainable Development..... 4947
Marianna Kudina

Approximate Reasoning with Linguistic Modifier of Translation..... 4953
Nourchen Zaghden Dammak and Moncef Tagina

Commerce Électronique Et Création De Valeur : Question De Technologie, Leadership Et/ou Alignement Stratégique !..... 4966
Karima Bouzguenda and Olfa Aloulou

Patrimonial Liability of the Managers Who Caused the Bankruptcy of a Football Club - A Case Study.... 4976
Sandra Gradinaru

The possibilities of Microfinancing in Slovakia..... 4983
Daniela Majerčáková

A Qualitative Study of Islamic Bank Patronage..... 4996
Sri Rahayu Hijrah Hati and Tasya Aldiary Dayana

Study of the Evaluation Criteria for the Implementation of Optimization Measures in the Field of Energy Efficiency..... 5000
Bastian L. Kurth, Sonia Budz and Ana-Maria Verjel

Influence of RAILQUAL on Passenger Satisfaction: Study of Indonesian Intercity Trains..... 5006
Kenji Bisma Wibawa Junardy and Sri Rahayu Hijrah Hati

Models for Forming the Long-Term Forecast of the Need for Labor Resources…….. 5016
Stupina Alena, Karaseva Margarita, Bagdasarian Irina and Zhukov Evgeniy

The Nature of Modern Money: Base Concepts and Genesis of Theories

Igor Lyukevich, Graduate School of Public Administration and Financial Management, Peter the Great Saint-Petersburg Polytechnic University, Saint-Petersburg, Russia, lyukevich_in@spbstu.ru

Olga S. Nadezhina, Graduate School of Public Administration and Financial Management, Peter the Great Saint-Petersburg Polytechnic University, Saint-Petersburg, Russia, nadezhina_os@spbstu.ru

Abstract

This paper explores some of the major categories of monetary theories and theories of money. It defines the essence, the origin, and, to a large extent, the nature of money, classifies monetary theories, substantiates some concepts of classical quantity, cash balance, liquidity preference, pure monetary theories. It introduces the notions of monetary chartalism, monetary commoditizatonalism and monetary constitutionalism into the scientific use. It proves fiat essence of modern money. It applies praxiological approach to money research. Debatableness of money itself is shown.

Keywords: money, monetary theories, praxiological approach

Introduction

The universe sets a problem of searching for a matter that should prove, on the one hand, that economy is the only base for humanity, and, on the other hand, to ensure order and eliminate chaos in economic exchanges of society. Such a foundation, saving the human race, is money, one of the most important institution. Money is still not fully comprehensible. Furthermore, it is, perhaps, unknowable at all. In economic research such metaphorical representations of money as "fat", "blood" or "language" of economy are known. Money is also identified with "water", "time", "evil", "happiness" or other substances. Possibly, the characteristic of money as energy phenomenon of human actions is true (Lyukevich, 2011).

Money is a way of thinking. The ability to comprehend money in its historical evolution is related to our ability to reinstate conceptual horizons and discourses which have encompassed, defined and described money again and again. Hence, it is impossible to distinguish monetary history from the history of thought. (Nenovsky, 2009).

Quantitative aspects of the impact of money demand and supply on the economy, though debatable, are adequate. The problem of money research is mostly connected not only with disquisition of new quantitative, but also that of qualitative regularities. Qualitative characteristics of money are even more mysterious. Despite various and versatile research, in essence, the origin and nature of money does not seem to be a common notion, the same as differentiations and explanations of these concepts. In addition, various characteristics of modern monetary system as symbol, notal, representative, fiduciary, fiat, etc. are there.

Literature Review

There are a lot of works concerning quantity monetary theories, as well as monetarism and Keynesianism. The following ones should be noted among the papers of the Russian researchers: search for the causes of inflation in the debate of the XVIII - XIX centuries between currency and banking schools (Moiseev, 2014); works devoted to inflation targeting (Glazev, 2015), transmission mechanism of monetary policy (Ershov, 2016).

Economists speak about the shortcomings of the modern monetary system (Rodionov et al, 2014). All of them are connected, from our point of view, to one factor – today national banks do not have at their disposal any effective tools or techniques for direct effects on economic growth. (Naumenkova S., Mischenko V., 2015).

Researchers emphasize transcendence of money, calling it "the highest form of abstraction" (Abramova, 2013), "anthropo-cosmological substance" (Bazulin, 2008), "special information resource" (Krolivetskaja, 2013), "energy phenomenon" (Lyukevich, 2011).

There are some papers, close to the subject of the present research, which are devoted to modern chartalism (Dubjansky, 2015), K. Marx's monetary theory (Tronev, 2007), search for the essence of money (Gogohija, 2012), research of communication between the concepts of the origin of money and judgment of problems of the modern banking system (Portnoy, 2015). Qualitative characteristics of money have practical importance, for example, in constructing world rankings (Rodionov etc , 2015), formation of tax scale (Kalinina, 2016), assessing not only economic, but also social efficiency investments (Kudryavtseva, 2015).

Problem Statement

Changes in the economic structure lead to changes in the theory of money and economic theory in general. The aims of our survey are to search for qualitative regularities in the monetary system. It appears that correct understanding of the nature of money can argue theoretical conclusions about stability of the monetary system, or, on the contrary, be the basis for judgments about the problem of the current monetary standard, imbalances between social and economic relations, impossibility of one or another currency to be the basis of the international financial order or to carry out money functions in full.

Methodology

This study uses systematic approach to the analysis of monetary theories, as well as praxiology and phenomenology as a concept of money phenomena learning. A unity of the historical and logical method, methods of comparison, scientific modeling, classification and grouping techniques are applied.

Base Concepts: Theories of Money and Monetary Theories

When exploring the money, scientists from ancient to our days are trying to answer the question: how, with the development of culture, metals and paper in the form of coins and banknotes have become willingly accepted in exchange for goods; why the forms and standard of currency change; what determines the value of money; what the reasons for and patterns of changes in the purchasing power of money are and so on.

Some researchers believe that the essence of money can only be determined through religious and cultural cognition. People will never be able to know what money is. Their knowledge about money is not broader than the knowledge of God: namely, that God is in the spiritual world. Money is not endless, but uncertain and generates an astounding complex of all kinds of psychological reactions, as well as material ones. (Skidelsky, 1992). Secondly, many scholars believe that money is primarily a social rather than economic product. And thirdly, most economists consider the nature and essence of money through the need to find an equivalent for material exchange and obtain essential benefits.

So we can see a system of views about the essence, origin and nature of money, calling them the *theory of money*. Analysis of this system suggests a possibility of three directions for the above-mentioned views, which are correspondingly named "transcendental", "socioeconomic" and "economic" theory of money.

On the other hand, in order to understand the economic mechanisms, scientists are trying to formulate a view about the influence of money on the economy.
There is a unique economic idea that the price level is directly proportional to the quantity of money, and the purchasing power of money is inversely proportional to the quantity of money. This concept was formulated in the XVI century (Bodin, 1568). The mathematical ratio between the money supply and prices was formulated by Newcomb (Newcomb, 1885) and developed by Fisher (Fisher, 1911). There is direct proportion between money supply and money demand if the velocity of circulating money (V) and the total quantity of purchased goods (total number of transaction in economy over the period in question) (Q) are constant, the average selling price (p) will be influenced directly by increase or decrease in the money in circulation (M). Changes in the money supply (M) cause changes in prices (p) - the total circulation of money in the sense of money expended is equal to the total money in circulation multiplied by its velocity of circulation or turnover: $MV = \Sigma pQ$ – "equation of exchange".

Wherein, there is a quite different view that the key element of money circulation is not the price of things in terms of money, but the price of money in terms of things, or, in other words, exchange value of a unit of money. Therefore, the price level is secondary in relation to the demand for legal tender money, which depends on the choice of the society to keep resources in the form of legal tender-coins, bank notes and bank demand deposits. Based on these trends, the equation of exchange is as follows: $P = kR / M$. In this formula P is the real price of money as the quantity of goods that a unit of legal tender can purchase, instead of p in the equation of exchange above there is nominal price of money as the quantity of legal tender that a unit of goods can purchase ($P = 1/p$); k is the proportion of real resources that the community holds as titles to legal tender; it is the inverse of the velocity of circulation ($k \sim 1/V$). R is total resources, enjoyed by the community (other than banks). M- the number of units of legal tender. In terms of Fisher's equation this approach could be expressed as $M = kpY$. Where Y –Gross national income in real price; p - price index; pY - nominal gross national income; k - the factor to make the ratio of the money supply and national income identity; it is part of the national income which people want to keep in the form of cash. Thus, the demand for money is directly proportional to the nominal income. (Pigou, 1917. P.53)
A popular enough "paradox of thrift": the more one saves for a rainy day, the faster it comes. It bases on liquidity preference views. Monetary liquidity, in common, the same as legal tender is assets in the form of cash or near-cash (coins, bank notes, current bank account). Liquidity preference, the same as the demand for money, refers to the preference for holding on to savings as money (i.a. in liquid form) rather than investing them. People will need money to satisfy the transaction motive and precautionary motive regardless of the level of interest. So, there is only one, namely speculative, motive to change the demand for money. Liquidity preference (i.e. demand for money) will be high if interest rates are low and people expect them to rise and hold money to satisfy the speculative motive for the future, and vice versa.

Then Keynes (Keynes, 1936) notes that economic development implies active investment by means of households' lending money through buying bonds. Rise in investment is followed by increase in the money supply. But with the increase in the money supply the cost of money (interest rate) reduces. Lower interest rates diminish the speculative motive and increase liquidity preference and the demand for money. Thus, you can get into a "liquidity trap", when an increase in the money supply does not result in more investment to ease economic depression. The cost of money (interest rate) decreases and people hold cash and wait for better investment opportunities.

Finally, there seems to be a view which switches the monetary analyses from a long-term to a short-term focus: the primary determinant of the state of macroeconomic aggregate demand - whether there will be unemployment, whether there will be inflation - is money, M1 or M2, and more specifically, perhaps, its various rates of change (Samuelson, 1969). The conclusion that an increase in the money supply leads to a similar increase in inflation and short-term fluctuations in real GDP are directly connected with the supply of money, was first made in

papers by Warburton (Warburton, 1945-1953). Later Friedman and Schwartz argued that money is not an asset which is held for its own sake. It is a "temporary abode of purchasing power" waiting to be spent on other types of financial or physical asset. (Friedman and Schwartz, 1970) Sooner or later an increase in the supply of money would find its way onto the goods and cause price to rise. The demand for money is a function of the yield on money and the yield on other forms of holding wealth.

Thus, we select four basic systems of views about the influence of money on economic processes, which we call "classical quantity monetary theory", "cash balance monetary theory", "liquidity preference monetary theory" and "pure monetary theory".

In quantity theory the most important is that money is the velocity of circulation; in cash balance it is that it is kept hold of. That is, the first one is focused on how prices depend on the money supply and the second one on what the demand for money is, what people and businesses will want to have to maintain the purchasing power. Pure monetarists believe that the price of money (interest rates) are the result of interaction between the money supply and demand for money. Keynesians do not believe in the impotance of money. A change in the money supply may lead to lower interest rates but does not necessarily affect the level of national income or result in increase in the general level of prices. Whereas monetarists argue that changes in the money supply will lead directly and quickly to changes in the national income, Keynes argued that an increase in the money supply would merely result in lower interest rates, with no immediate effect on the national income. We will illustrate the differences between Keynesianism and Monetarism in conclusion, the figure 1 are below.

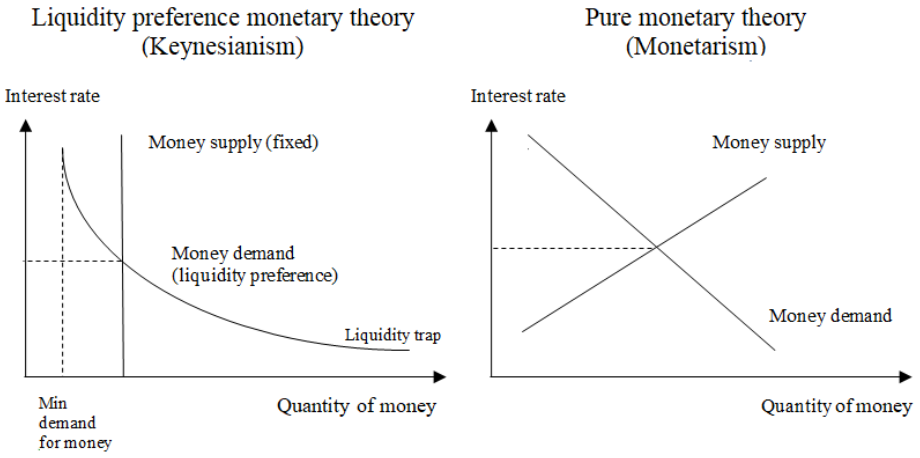


Fig. I – Cost of money (interest rate) in Keynesianism and Monetarism – summary

Nature of Money

Now let us regard the system views on the nature of money and introduce the genesis of these theories. So we need to distinguish between the categories of *the essence, origin and nature* of money.

It seems that the essence of money is in its own value. The understanding of the essence of money gives an answer to the question about the role of money in society, culture, economy, civilization in general.

Let us call emergence and being of money in society as their origin. The origin of money is not quite known: it does not disappear and does not come to an end. The life of money reminds the existence of time, but time with a various standard.

The nature of money, in our view, - an underlying cause of capability of one or another matter to carry out monetary functions at a historical moment - is the changing form of money. The nature of money is, possibly, connected with economics, but, more probably, with social relationships, with human spiritual, physiological and psychological activities. The nature of money is similar to that of language, information. But it is "secured" rather than simple information, and any matter can act as security if only the habit and practice of its use confirm its moneyness.

The analysis of concepts from Ancient Greece to the present day allows saying that all the views of the nature of money are anyway about to understand the reason: why is money value? Why are economic participants ready to exchange their goods for small slices of metal, cut paper or bank promises (information) for possible payments? It seems that explanations of it are finally reduced to one of three concepts.

On the one hand, many researchers consider that the nature of money is statutable. That is, the value of money is stated by that who establishes it. In turn, it is caused by multiple factors including subjective views, economic difficulties, wars, etc.

Another opinion which many scientists stick to is that the nature of money is in the general value of one kind of the good for all people. This value is not statutable, but is defined by supply and demand of the most significant goods. The value of these goods depends on circumstances, but indirectly, through free market relations.

And, at last, the third concept: the nature of money is social. Emergence of money is the same organic process as emergence of language, law, customs. It is not the result of an agreement, contract, special idea, value of goods, but the result of satisfaction of individual interests. Acting on the assumption of economic reasonability, economic actors change one goods for others, not valuable on their own, but possessing the greatest ability to be exchanged for other goods. The value of money is only in the functions which it carries.

Thus, the concepts of Monetary Chartalism, Monetary Commoditizatonalism and Monetary Constitutionalism were introduced into scientific use.

Chartalism (from lat. charta - a sheet of paper, here means a symbol or ticket) is a construct according to which money has a status and symbolical nature. The state (in early doctrines - people) chooses some symbol and legislatively allocates its face value. This matter is not valuable as such, and acts as a means of exchange, unit of account, standard of deferred payment. But the main function of this monetary substance is to store value, i.e. accumulate wealth and divide society into estates. It is necessary, jn as much as public relations dealing with exchange are supported by fairness, which means proportionality, but not equality as society relies on the principle that everyone is awarded in proportion to their activity If proportion is not observed, exchange is impossible, and social relations are impossible too.
This concept seems to have begun as early as in works by antique thinkers. In this case, the analysis of primary sources suggests that the term *charta* in reference to monetary circulation was first used by Knapp, who called money “chartale zahlungsmittel” (Knapp, 1905. P.21). Subsequently, Keynes characterized modern monetary circulation as the “age of chartalist”. (Keynes, 1930. P.4).

In the 18th century a concept was formulated, which causes a commodity and evolutionary nature of money we call commoditizationalism (from eng. commodity). According to amonetary commoditizationalism, money is the matter which nobody will refuse to take in exchange for others because of its own value, usefulness of its consumer properties. The nature of money is based on exchange of market surplus of products (unlike the antique thinkers’ view who found the nature of money in exchanging for satisfaction of one’s own needs). The process of commoditization is a loss of exclusiveness, uniqueness by goods (for

example, at the expense of a brand) and their transformation into goods of mass demand. A popular similar term commodification bears some negative sense. It is used to characterize the process during which an increasing number of various goods, services, human activity, initially not intended for sale, acquire cost and are bought and sold in the market. One can speak about commodification of science, culture, education, family values, etc. It is possible to argue with Marxists, but they consider what exactly was called commodification, but not commoditization by K.Marx as «Fetischcharakter der Ware». (Marx, 1972. S.47).

The third frame of reference is monetary constitutionalism (from fr. constitutionnalisme). That is the way we call a group of beliefs which explain the organic (democratic) nature of money - similar to emergence of language, customs of law, etc. The nature of money is in its functions. In sociology constitutionalism is a concept about formation of personality genetic and biological factors. Also constitutionalism is understood as ideals of social democracy in a wide sense. In the monetary theory, the word constitutionalism, can be used to refer to the views according to which money is a product of human action. In the concept of those individuals without any enforcement, special agreement, state regulation but only on the basis of economic foresight for economic purposes goods with a lower ability for exchange are exchanged for the goods though not valuable as such but with a higher ability for exchange. The constitutional concept of the nature of money is the most modern. Its ideas were formulated in the 19th century by Menger. Now it is the official views of the origin, nature and essence of money in the western economic school.

Modern Money: Different Opinions

Modern money is nothing more than faith obligations of the national bank to accept something (even not material) as a means of payment issued by it. Belief in the value of these substances is based on practice and habit of using them in economic exchanges. The state also uses in payment only what is issued by its National bank. So the essence of modern money is that they are property (asset) just because of this obligation (liability) of the National Bank. Thus, the present monetary system can really be described as a fiat one («let it be money») - which would never occur according to what they believed in the 19th century; at the beginning of the 20th century it was called temporal, inferior, degenerate money, but in the middle of 20th century, it appeared as permanent.

Why is modern money fiat? Let us try to answer this question, tracing the genesis of monetary theories.

According to the chartable concept, ancient thinkers believed that people, as participants of economic exchange, introduced silver or gold as a currency symbol in the role of medium of exchange. (Платон), (Аристотель). Scholars of the Middle Ages timidly objected to the role of the State in regulating monetary circulation in part of the replacement specie of specie money for notal money.

Later economists still believed in the real value of currency, but spoke about the need to support its value by the State. (Locke, 1689), (Barbon, 1690). Physiocrats had already noticed that money did not have a real but symbolic value. (Quesnay, 1766). Knapp justified the crucial role of the State, not people in money circulation, and pointed to the right of the State to determine the status and value of the currency symbol. (Knapp, 1905). Keynes finally formulated an attitude to money only as a unit of account, having certain properties, which should have the matter so that it could be used as currency (Keynes, 1930).

Once people agreed to make payments by weighing metal. Soon coins appeared that contained a certain amount of metal money. After some time, for easy transportation coins were left in the custody of moneychangers, and replaced with their note or description of differed payment - thus money of account appeared. Coinage becomes the State prerogative. The State reduces the weight of the specie, money became Representative, Token (Notal, para-typic). Then the

State renounces the use of metal in monetary circulation. Payment is made by piece-of-paper. Money has become a symbol: first Managed, and then Fiat.
Supporters of the commoditizational concept disagree with the ancient and medieval thinkers. Smith argues that the nature of money is not about people finding a tool to facilitate exchange or about surplus of labor products. (Smith, 1776). Say said that the State could not set the value for money: because goods are exchanged for money, to the extent that the value of money also determined by demand on the part of goods and by supply them on the part of the holders of money. (Say, 1803). Ricardo believed that the State could not set the value for money also because it did not have a monopoly on the creation of money, because of the need to meet the demand for banks. (Ricardo, 1817). Marx develops Smith's idea that with the advent of banknotes the true value of goods was not money, but work. (Marx, 1959). In view of the fact that money was not a commodity, but just a promise to deliver goods, Hicks called money the most perfect type of security. (Hicks, 1939). Friedman, using the terminology of the 19th century, called modern money not a "promise to deliver the goods" (Fiduciary), but Fiat - in general not provided with anything, except for discretion of the monetary (Friedman, 1960).

In the early stages a product appeared valuable for everybody in the community, therefore it was easily exchanged for any other products. The amount of this particular product was easily to value with another because everyone wanted them – a product was commoditized. This is commodity money. Metals won the competition among other commoditized goods. To facilitate the exchange, the State had to put a mark on these special goods, so coins appeared. Commodity money has an indigenous disadvantage: to multiply the amount of cash money real resources are to be used. Therefore, to comply with its monetary obligations the State "cheats" - reduces the weight of the coin, then replaces the coin with a promise to deliver the precious metal (bills, devises, bank liabilities). There are public securities - fiduciary money. At the end of the 20th century the authorities ceased to connect monetary security with the obligation to deliver the goods (coins), so money became Fiat.

In our view, the most truly the nature of money can be explained by monetary constitutionalism. Menger, Mises, and Hayek build a theory about effective operation of free individuals as the basis of society. Menger formulates an idea that economic expediency (influenced by practices and habits) stimulates people to exchange their goods for others with a greater potential for exchange, and despite immediate consumption they do not need them. (Menger, 1871). Mises stresses that this process is only possible on the basis of people's free behavior. (Mises, 1949). Hayek proves that what we call "money" is only the most liquid medium of exchange at this time and in this place. To explain this phenomenon it would do more good if the word "money" would describe the property which various objects have to a various, yet changing degree, for example "moneyness" and «near-moneyness». (Hayek, 1976). According to the constitutional monetary concept, something which is commonly called money is certain objects, emerged under the practices and habits in the form of the most liquid asset which has no other value, but function as generally accepted medium in exchanges. In a broader sense, money is the continuum of these objects at all times and in all territories.

Initially, producers trade their goods for the units with utility value (for example, wine for bread), then for the units that do not meet its needs, but are notable for a great potential for exchange (it could be cattle, salt, furs or stones). The economic interest of this trade is based on personal preference, without coercion, only on the basis of practices and habits. This free people's behavior turns one of the medium of exchange substance to which we used to call "money:. When the economy becomes more complex and rich, they begin to use precious metals as an intermediary in exchange. The most popular medium of exchange (the so-called "money") starts to acquire other functions. With the development of turnover, according to the needs of society, the most liquid exchange tool at this stage, in this time, in this place (in the form of pieces of metal, sheets of paper, disembodied information or otherwise) gets authorized by the State so that all payments can only be made by using this substance.

Conclusion and direction for further investigation

There are different views of money – monetary theories and theories of money.
Monetary theories explain the influence money on the economy. Classical quantity monetary theory considers the primary function of money as a means of exchange, cash balance monetary theory as a unit of account, liquidity preference monetary theory as a store of value, and pure monetary theory as a standard for deferred payment (Table 1).

Table 1: Concepts of money impact to economy (monetary theories)

Theories	Classical quantity	Cash balance	Liquidity preference	Pure monetary
Beginning and founders	16th cen, (Bodin, Newcomb, later – Fisher)	Beg.20th cen. (Pigou)	Mid 20th cen. (Keynes)	Enid 20th cen (Warburton, Friedman)
Primary determinant	Quantity of money	Exchange value of a unit of money	Money demand	Money supply
Key feature of money circulation	Price level is directly proportional to the quantity of money	Price level is secondary in relation to the demand for money	"Paradox of thrift": the more money is saved for a rainy day, the faster it will come	Change in money supply will lead directly and quickly to changes in national income

Each theory of money differently systematizes and generalizes the monetary factors - its beginning, evolution, the role of the State and others (Table 2).

Table 2: Beliefs about the nature of money (theories of money)

Views	Chartalism	Commoditizatonalism	Constitutionalism
Beginning	Antiquity	17th cen.	19th cen.
Nature of money	Division of society into estates for justice	Consumer value the goods	Free human behavior
Origin of money	Activities of the State	Economic exchanges	Social interaction
Role of State	No State - no money	Prevents illegal (incl. counterfeit) currency	Authorizes **the appearance and** form of **currency selected by society**
Significant contribution	Barbon, Locke, Quesnay, Knapp, Keynes	Smith, Say, Ricardo, Marx, Hicks, Friedman	Menger, Mises, Hayek

The genesis of monetary theories, described above, can be used for modelling and forecast of the international monetary system. It should be ubstantiated whether crypto-environment (cryptocurrency) will be the framework for future money or whether the transformation of the modern monetary system will follow some other suit.

References

1. Barbon, Nicholas (1690). A discourse of trade.- Baltimore : The Lord Baltimore Press, 1903
2. Bodin, Jean Reponse aux Paradoxes de M. de Malestroit (1568) English Bristol, England ; Dulles, Va.: Thoemmes Press, 1997.
3. Fisher, Irving The Purchasing Power of Money, its Determination and Relation to Credit, Interest and Crises (1911). New York, The Macmillan company, 1922.
4. Friedman, Milton (1960). A Program for Monetary Stability.- New York, Fordham University Press, 1992
5. Friedman, Milton and Schwartz, Anna Jacobson (1970) Monetary Statistics of the United States: Estimates, Sources, Methods: National Bureau of Economic Research, New York, 1970 Distributed by Columbia University Press New York and London
6. Hayek Friedrich August von (1976). Denationalization of Money - The Argument Refined. An Analysis of the Theory and Practice of Concurrent Currencies. London: IEA, 1990
7. Hicks, John Richard (1939). Value and Capital: An Inquiry into some Fundamental Principles of Economic Theory. Second ed.- Oxford University Press, 1946.
8. Kalinina O.V. (2016). Universal approach to building the progressive scale for income taxation, *Actual Problems of Economics*, vol. 2 387-400.
9. Keynes, John Maynard (1936) The Theory of Prices *The General theory of employment interest and money. Macmillan Cambridge University Press, for Royal Economic Society,*
10. Keynes, John Mayrand (1930). A Treatise on Money.- London: Macmillan & Co Ltd., 1965.
11. Knapp, Georg Friedrich Staatliche (1905). Theorie des Geldes.- Leipzig 1905. 396s.
12. Kudryavtseva T.J., Kuporov J.J. (2015) Evaluation of Social and Economic Efficiency of Investments in Public Utility Services, *Asian Social Science*; Vol. 11, No. 19, 151-158.
13. Locke, John (1689) Two Treatises of Government / The Works of John Locke. A New Edition, Corrected. In Ten Volumes. Vol. V.- London, Glasgow, Dublin. 1823. P. 115-125.
14. Marx, Karl (1859) Zur Kritik der politischen Ökonomie. Erstes Heft. Franz Duncker (W. Besser's Verlagshandlung), Berlin 1859. 170s.
15. Marx, Karl (1972) Der Fetischcharakter der Ware und sein Geheimnis // Das Kapital. Kritik der politischen Oekonomie.- Erster Band. Buch l: Der Produktionsprocess des Kapitals.- Hambugr, 1872. 830s. S.47-61
16. Menger, Carl (1871) Grundsätze der Volkswirtschaftslehre.- Wien, 1871.
17. Mises, Ludwig von (1949) Human action: A treatise on Economics.- Alabama: Ludwig von Mises Institute, 1998.- 912p.
18. Nenovsky, Nikolay, On Money as an Institution (2009). ICER Working Paper No. 12/2009. Available at SSRN: http://ssrn.com/abstract=1436890 or http://dx.doi.org/10.2139/ssrn.1436890
19. Newcomb, Simon Equation of societary circulation (1885), *Principles of Political Economy.* New York, Harper & Brothers, Franklin Square, 1885.
20. Pigou A.C. (1917) The Value of Money. *The Quarterly Journal of Economics*, vol. 32 (1)
21. Quesnay, Francois (1766) Observations sur l'interet de l'argent, *Oeuvres economiques et philosophiques de F. Quesnay,...* / publiees avec une introduction et des notes par Auguste Oncken.- Paris.: J. Baer (Francfort s. M.), 1888. P.399-406.
22. Ricardo, David (1817). On The Principles of Political Economy and Taxation London, John Murray, 1817. 579p. P.502.
23. Rodionov, D.G., Nikolova, L.V., Mokeeva, T.V. (2014) The Formation of the Conflicts Management Models of the Strategic Alliances under the Conditions of the Globalization, *Asian Social Science*, Vol 10, No 19
24. Rodionov, D.G., Nikolova, L.V.,. Kuporov, J.J. (2015) Risk management of innovation projects in the context of globalization, *International Journal of Economics and Financial*

Issues, Vol 5, No 3S: Special Issue
25. Samuelson Pole (1969). The Role of Money in National Economic Policy / Controlling Monetary Aggregates/. Boston: FRB of Boston, 1969.
26. Say, Jean Baptiste (1803) Traité d'économie politique ou simple exposition de la manière dont se forment, se distribuent et se consomment les richesses / Tome I.- Paris, 1803. 527s.
27. Skidelsky, Robert John Maynard Keynes: The Economist as Savior 1920-1937 (1992) N.Y., 1994. Vol. III.
28. Smith, Adam. (1776) An Inquiry into the Nature and Causes of the Wealth of Nations.- Edinburg: Adam and Charles Black, MDCCCLXIII.
29. Warburton, Clark Depression, Inflation, and Monetary Policy: Selected Papers, 1945-1953. Baltimore: Jons Hopkins Press, 1966.
30. Abramova M.A. (2013) Discussion questions categorical characteristics of modern money and its reflection in the basic elements of the monetary system, *Finance, money, investment,* vol 2. P. 16-21.
31. Aristotle. Policy (Politica)– M.: Publishing house "AST", 2006..
32. Bazulin Y. (2008) the Origin and nature of money / V. Y. Bazulin.- SPb. : Izd-vo S.-peterb. University press
33. Glazyev S. Y. (2015) On the inflation targeting, *Questions of economy*. Vol. 9. P. 124-135.
34. Gogohija, D. S. (2012) Money and the market, *Questions of economy,* .vol. 1, P. 127-141.
35. Dubyanskiy A. N. (2015) The State theory of money Knapp, G.: history and modern perspectives, *Issues of economy,vol* 3. P. 109-125.
36. Ershov M. V. (2016) Monetary policy: there are still many questions, T*he Bulletin of the Financial University.* vol 1 (91). P. 15-19.
37. Krolevetskaja V. E. (2013) Money and the money supply in the formation of a new development model of the Russian economy. .: Abstract. dis. d-RA Ekon. Sciences. SPb.
38. Lyukevich I. N. (2011) The Essence and nature of money: controversial aspects*, Scientific journal ITMO.* Series: Economics and environmental management. Vol. 1. P. 79-96.
39. Moiseev S. R. (2014) A Modern interpretation of controversy money and banking schools: competition, convertibility and economic policy, *Money and credit*. vol. 6. , p. 60-64.
40. Naumenkova S. V., Mischenko V. I. (2015) Influence of monetary policy of the Central Bank to stimulate economic growth, *Problems of modern economy*, vol. 2 (54), p. 168-175.
41. Plato. State . (Republic) Vol. 2. SPb., 2007.
42. Portnoy M. A. (2015) Modern money. Clarification of concepts. *US and Canada: economy, politics, culture*. Vol. 11 (551). p. 45-61.
43. Troev K. P. (2007). About the subject and content of the first division volume I of "Capital" Karl Marx, *Russian economic journal*, vol. 9-10,p. 62-97.

Cultural Sector Personnel Management (Based on the Example of Music Department of Perm Children and Youth Art Center (Russia))

Anatoly M. Redko, Head of Music Department of Perm Children and Youth Art Center, Perm, Russia, redko.anatoly@mail.ru

Abstract

The article is concerned with the issues of managing the groups of creative people. The objective of the article is to review a personnel management system based on the example of Music Department of Perm Children and Youth Art Center (Russia). The most difficult key process in the management of any organization is human resource management. Effective personnel administration is a correctly and accurately built system using human resources in the organization. Provided the organization has an optimum number of qualified employees, such a system makes it possible for the organization to achieve set goals within the shortest possible time period and at minimum expense. The issues of personnel administration improvement under the conditions of increasing requirements to the quality of public administration seem to be especially critical; thus, the given aspect has determined the timeliness of the research topic. Based on the results of the music department personnel analysis on such criteria as education, qualification, and teaching experience, a project of activities targeted at the development of personnel management has been worked out and its efficiency has been evaluated. The main advantage of the cultural sector personnel management system proposed by the author of the article includes thoroughly developed recommendations for the personnel department with regard to recruiting candidates, as well as a performance reward system for the music department employees.

Keywords: supplementary educational institution for children and youth; management; personnel; music; culture; educational system; performance reward; motivation.

Introduction

A personnel management system is vital for any company, even if there are only a few employees involved in the work process. Personnel management is the domain of senior personnel, executives and HR specialists and is targeted at the increase in work efficiency and productivity of the organization due to the increase in efficiency of its employees by means of psychological, legal and economical methods. Cultural sector personnel management is quite specific because people working in this sphere are talented and gifted and require a special attitude on the part of their superiors and administrative staff. Thus, the urgent nature of this research work proves to be of global importance, for there is a great many of talented people all over the world. As a rule, they tend to be drawn together forming creative teams which have their own management system, where managers are well aware of artistic people's peculiarities and, as a rule, are creative themselves. Perm Children and Youth Art Center (PCYAC) is a municipal interdisciplinary supplementary educational institution for children. It implements educational activities and bears signs of a complicated multilevel system. Annually more than six thousand children come to the Art Center to study technology, tourism, regional history, physical training, sport, art, science, sociology and pedagogy. In regards to the education sector a multilevel system determines the methodology of program field formation, form and technology of educational activities' content implementation, as well as form and content of various types of educational programs integration. As of

January 1, 2016, a hundred and forty children's clubs and associations had been functioning successfully at the premises of the Art Center welcoming 6,771 children from all the areas of the city of Perm. The classes were held on a budgetary and non-budgetary basis. As of January 1, 2016, 5,550 students had been provided budgetary services within the scope of a municipal order. Disabled children have a right to receive two educational services. 1,078 children attend the Art Center on a fee paid basis, 554 of them are preschoolers. Due to the availability of technically-equipped classrooms and a concert hall fitted with up-to-date sound and light systems, the largest number of children attend art clubs and associations (57%), such as choir, theater and choreography classes. A maximum number of students per class in every club testifies to the quality of educational services which meet the requirements of the service consumers represented by club members and their parents. As a result of the personnel management analysis carried out at the Art Center, a number of problems have been determined. They can be classified into several categories: adjustment process of new employees, personnel training, succession pool formation and individual growth programs implementation. The main problems in the area of new employees' adjustment include a high rate of staff turnover, a small share of young professionals, and an undeveloped system of discipleship. Managers from many other countries beside ours face problems of this sort. Such problems have to be solved, and the search for proper solutions has stirred a global interest. In this context the given article presented to the world scientific community involves new concepts and practical significance. As for the matter of personnel training, the main problem lies in the lack of adequate professional training: only a small share of the employees have obtained a professional education. When it comes to the issue of a succession pool formation and implementation of individual growth programs, the main problem lies in the fact that if given an opportunity the most promising personnel leave the organization. Thus, it can be concluded that the personnel management system does not clearly assign functional duties and the process of personnel recruitment is too intense. The personnel training and development system, as well as the system of work motivation require a lot of improvement. These conclusions are based on the analytical and statistical data on Perm Children and Youth Art Center obtained during the years 2013 – 2015. The practical significance of the research involves the implementation of the developed project activities as an effective means of improvement of personnel management system. The results of the research can be used in any similar organization independently of the country of origin. Practical experience which has been obtained as a result of statistical research, questionnaire surveys and implemented methods of personnel management in the city of Perm have led to the students' excellent results and, therefore, may serve as a valuable contribution to the world science. This research was carried out at the Music Department of Perm Children and Youth Art Center with the consent of its authorities and every individual teacher involved in surveys and questionnaires. No grants or financial support was offered to the participants. The research was carried out at the author's account.

Methods

In order to carry out the research the following general scientific methods were used: analysis and synthesis, methods of comparative statistical and economical analysis, comparison and matching, content analysis. Sports and art clubs and associations are in the maximum demand among the younger generation. Out of the total number of club members 40% of boys attend sport and technical study clubs. Training and education activities at the Art Center are conducted through 174 supplementary education programs with the timeline equal to 1 to 10 years and 1 professional development program (fencing).

Literature Review

A lot of research works in the world science have been focused on personnel management. Thus, exhaustive solutions have been found in order to achieve and implement core principles of leadership and personnel management in the context of organizational ethical culture development (Information Resources Management Association USA, 2016). Differences of opinions of employers and employees are elaborately illustrated in the book "Public Personnel Administration. Situations and Strategies" (Klingner et al, 2009). Traditional models of human resources management from the point of view of such factors as service supply, purposeful nature of the communicative model, a type of feedback, value orientation, the role of the personnel, the role of a human resource manager, perception of the human resource management profession and the focus on education for personnel management are thoroughly described in the books by Stephen E. Condrey (2010), Zehra Alakos Burma (2014) and N. Nayab (2011), as well as by Russian Scientists A.K. Aykazyan, S.V. Andreyev (2014), I.A. Gerchikova (2014), and A.P. Yegorshin (2014). Problems of music education and other educational programs have been considered and researched by many modern scientists. Thus, for example, P. Miktsa, M. Rider and D. Biggz conducted a survey among orchestra directors. As a result, it was confirmed that management personnel strive for measuring up to high professional standards, motivate perseverance and patience of the personnel. Besides, professional recommendations for the students who aspire to become music teachers have been worked out (Miksza et al, 2010). According to the classification proposed by M.I. Magura, the following programs have been determined: adapted programs, modified programs (Magura, 2015:85) and authorial programs. As a result of Carlos A. Abril and Julie K. Bannerman it was determined that teachers perceive micro level factors (school) to have a substantial impact on their programs. Teachers' actions are mostly focused on a micro level, although some teachers consider meso-level (school district) engagement to be vital for maintaining and improving music programs in a given school (Abril and Bannerman, 2015). A comparative study of music programs in traditional and charter schools systems carried out by Jamie Kelly and Steven M. Demorest (2016) showed a high level of test results and a high level of attendance, which gives us a solid foundation for developing our own testing system. Pedagogical principles of children's supplementary education system development have been studied by V.A. Gorsky and A.Y. Zhurkina (2014). The research work by O.E. Lebedeva (2015), L.V. Yershova (2014) and L.N. Buylova (2014) is also focused on the problems of children's supplementary education. The fact that music education profession requires the best and brightest students with a great potential was studied by Linda C. Thornton (2015). Young people and children's motivation to choose musical-pedagogical education as their future career is described in the research work by Michelle L. Henry (2015). The research of vacancy market, its analysis and music teachers' preferences carried out by Nicole R. Robinson, pointed to the administrative support in the matters of employment (Robinson, 2012). Comparative analysis of personnel management in several countries was conducted by Fang Lee Cook, Debby C. Saint, Joe Vong (2014) Ecrem Tatoglu, Ellison J. Glaster, Mehmet Demirbag (2016). Our research is concerned with a special field of work, a specific sphere which requires managing creative, talented employees. A similar problem was studied in the research conducted by Maria Christine Meyers and Marianna Van Woerkom (2014). The study of the problem and strategic opportunities in the area of global management is touched upon in the research carried out by David G. Collins (2014). New perspectives in human resource management under the conditions of globalization considering a so-called "brain-drain" problem were studied in the research by Rosalia L. Tang (2016). L.E. Yershova notes that all the activities of a supplementary educational institution are carried out in a competitive educational environment of the city of Perm and are influenced by the growth of the market of private services and depend on per capita financing of the municipal order – permanent changes in the system of personalized electronic accounting of educational services (Yershova, 2014:27). Innovation-related risks are always inevitable. According to the provision of Perm city administration from 09.11.2010, #758 and provision from 17.12.2015, #1076, every child has a right to receive one free service. When a service has been received, it has to be confirmed in the personalized accounting system by means of

an electronic card check-out. Supplementary education is necessary in order to support and develop gifted children. The more we encourage and teach talented children today, the more successful the society of a particular country and of the whole world will become. Intelligent, educated children of the future will be able to use art in order to stop tragic bloodsheds, because every creative, artistic person desires to perfect their personal qualities. Such growing talents will create beauty inside themselves and in the surrounding world. In order to bring up such a unique generation it is vital to have an appropriate teaching staff which will function under the conditions of equal financial support.

Results

An analysis of the music department personnel was carried out by the author of the research. Human resources were analyzed according to such characteristics as education, qualification and work experience. As a result of the analysis some changes of the teaching staff have been detected. A number of young specialists has increased by 5 teachers, a number of the first rank and top-rank specialists has decreased. On the whole it can be said that the Art Center is not fully staffed – a factual number of staff members is 4 % (8 teachers) less than planned. A lack of teaching personnel has been detected in all personnel categories.

According to the research work conducted by a Russian Scientist E.V. Maslov, the personnel is represented both by in-service-teachers and by secondary job employees. (Maslov, 2015:26). In our case the largest part of the personnel has higher pedagogical education, there are several teachers with a post-graduate degree. It should be noted that during the period of this research the number of employees of supplementary education with higher pedagogical education has decreased by 21. The number of secondary job teachers has increased by 4 specialists. When taken on staff teachers are aware of their duties and requirements related to their professional and personal qualities. When considering a matter of promotion, not only the teacher's professional experience, superiors' opinion and achieved results are taken into account, but the teacher's self-assessment in the area of potential professional growth, as well. The author of the article analyzed the effectiveness of the educational process, expressed in the students' participation in various contests and festivals. The ratio of winners and runners-up of contests and festivals to the total number of students demonstrates the service consumers' degree of satisfaction and their ability to apply obtained knowledge and creative skills practically. When studying the ratio of the students' participation in festivals, contests and competitions to the total number of prize-winners (Table 1) it can be observed that their number decreased by 8% between the years 2014 – 2015.

Table 1: Statistics of performance ensembles' participation in contests, festivals and competitions

Level of festivals and contests	Academic year 2014-2015, number of times	Academic year 2015-2016, number of times	Rate of increase/decrease, %
Municipal	172	140	81
Republican	120	101	84
Regional	26	23	88
All-Russian	34	54	159
International	16	10	63
Total number	368	328	89

The number of prize-winners increased by 24% compared to the results of the last year. Thus, the ratio coefficient of the total number of students to the number of prize-winners of different contests and festivals in 2015 was 13/100, i.e. there are 13 laureates, runners-up and diploma winners to a hundred students of the Art Center. Thus, compared to the year 2014 the performance indicator and the level of evaluation and self-evaluation of the students have increased, which testifies to a highly-qualified and proficient education offered by the staff at Perm Children's Art Center. Such showings are possible only when the teachers' staff is well-qualified. Nevertheless, considering the personnel problems mentioned above it seems necessary to implement innovations into the management process. The goal of this research is to work up strategies of improvement and development of the personnel management system at the Art Center. In order to reach the set goals the following objectives have been defined:

1. To perform an analysis of the current personnel management system at Perm Children and Youth Art Center.

2. To give ground to the necessity of improving the current personnel management system.

3. To work up strategies of improving the current personnel management system.

4. To assess the effectiveness of suggested strategies.

The Object of Research: a Municipal institution for supplementary education "Perm Children and Youth Art Center". The subject of research: a system of personnel management. The novelty of this research lies in the development of practical recommendations for chief HR officers on hiring and retention of highly qualified staff, which may prevent an organization from employee attrition caused by strong competition in the job market. Culture sector personnel is especially subject to such changes. Our methods may be used by music departments both in state and private institutions of supplementary education worldwide. The analysis of statistic data indicates that most teachers in the field of supplementary education are middle-aged. The largest share of teachers belong to a senior group (43.86%), the share of young specialists is quite small. It is necessary to attract young professionals in order to start the process of a natural company renewal. The teachers whose work experience equals to 10-20 years make up 32% of the total number of teaching staff. The number of teachers whose work experience exceeds 20% comes to 33%. It should be noted that in the year 2015 the number of young specialists whose work experience was less than 5 years came up to 9%; along with the group of teachers whose work experience was 5 to 10 years, they made up 35% of the total number of the teaching staff. Thus, a gradual staff changeover at the Art Center is taking place. The length of teaching experience makes it possible to determine that the personnel is highly proficient, but a tendency for the aging of the teaching staff can be clearly observed. The structure of personnel formation fully conforms to the legislative acts, all the specialists have appropriate education which allows them to participate in educational activities; most of the teachers have higher pedagogical education (65%). The analysis of staff rotation indicated an abnormally high level of personnel turnover in 2015 (10%), even though in 2013 a significant staff renewal had taken place. Such natural staff rotation has an adverse effect on the quality of education, which can be confirmed by the decrease of quality indicators. Even though the older teachers retired and were replaced by their younger colleagues, it did not produce the desired effect – the students' performance rating decreased; some of the young specialists who had come on staff in 2014 left after having worked for only one year, which led to a 10% increase of the turnover coefficient. A social survey was conducted among the teachers of the music department in order to determine the typology of work motivation and to indicate the staff's value orientation, forces of motivation and the direction of further improvement of the personnel management system. Using a questionnaire the type, the force and the direction of the teachers' motivation were determined. After the survey, the staff was divided into four groups based on similar views and opinions. As a result of the survey, the teachers demonstrated a high level of motivation. Based on the conducted

analysis the author of the research carried out a comparative analysis of the answers on the left and on the right sides of the questionnaire ranked by the level of importance for employees and a graph built on its basis (Figure 1).

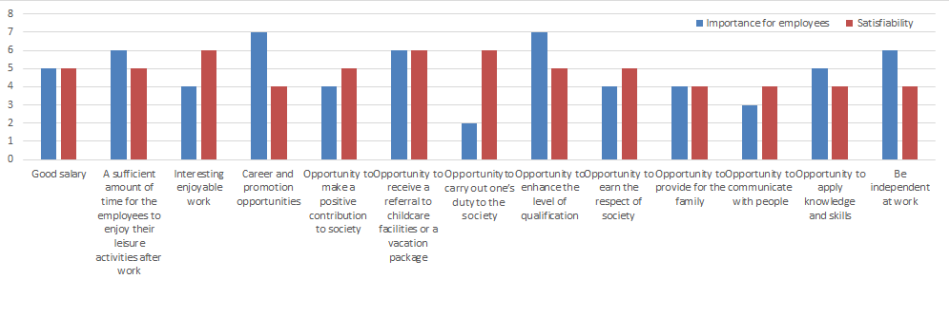


Fig 1. Determination of work aspects related to work motivation

All the collected data and image 4 showed a high level of the teachers' motivation. It was confirmed that the teachers have an advanced level of intelligence and regularly participate in creative events which allows them to unlock their pedagogical potential and achieve excellent professional results. Perm Children and Youth Art Center demonstrates both hygiene motivation factors (rewards and benefits) and motives (advanced vocational training and promotion perspectives). The main attention of the Art Center's administration is focused on hygiene motivation factors; in other words, the implemented bureaucratic value system implies traditional approaches to work stimulation. The human resource analysis makes it possible to conclude that on the whole, the teaching staff is rather qualified and efficient both age and ability-wise. The teaching staff is not stable, a gradual renewal of the personnel is taking place due to the lack of clear personnel management policy which does not give young professionals a chance to gain a stable position in the organization. As a result of the analysis of the current personnel management system, it can be concluded that professional competence of the personnel that has an ability to analyze, and design their professional activities and chooses the most effective and optimal ways to organize the academic process should be regarded as the main means of organizational quality changes. The analysis of the personnel management system of Perm Children and Youth Art Center indicated a need for the improvement of the personnel management system, which allowed to solve problems of personnel requirements, recruitment criteria development and selection of optimal means and methods. The supplementary children's educational institution does not possess its own regulations for personnel selection and recruitment. As for the numerical composition of the personnel, it can be noted that in spite of being quite low the Center's personnel turnover coefficient has increased compared to the previous time period. It brings us to a conclusion that the current level of the personnel turnover gives cause for concern. As for the organizational level, it must be mentioned that on the average a number of employees is compliant with a standard function span. In order to justify the need for the improvement of the personnel management system, a questionnaire was designed and distributed among the teaching staff. The music department was selected for the survey. The results of a general satisfaction questionnaire conducted at the music department showed a low satisfaction rate related to the size of salary and moral incentives. A survey was also carried out in order to evaluate the teachers' inner motivation. As a result, a low level of motivation was observed among the personnel of the given department. Thus, a current system of stimulation, officially defined as a system of labor and pay organization, can be considered satisfactory but requires some improvements. The author of this research has defined the measures that have to be taken in order to improve the personnel management system. The main problem area has been pointed out: personnel turnover, especially among young professionals. At the same time, the analysis of personnel motivation according to the results of the questionnaire has demonstrated a high strength of motivation among the teachers - most of them have an achievable motivation. The teachers are scrupulous about their job and do it efficiently. They

like performing difficult and interesting tasks which allow them to reveal their abilities and skills. At the same time, the analysis demonstrated an insufficient clarity and comprehensibility for some employees of the personnel development system. It is noteworthy that this area showed the most significant deviations as for the opportunity to fulfill one's potential within the organization and its importance for some particular employees. A program for Perm Children and Youth Art Center personnel stimulation has been elaborated with the consideration of the current crisis situation in the country and in the world (Figure 2).

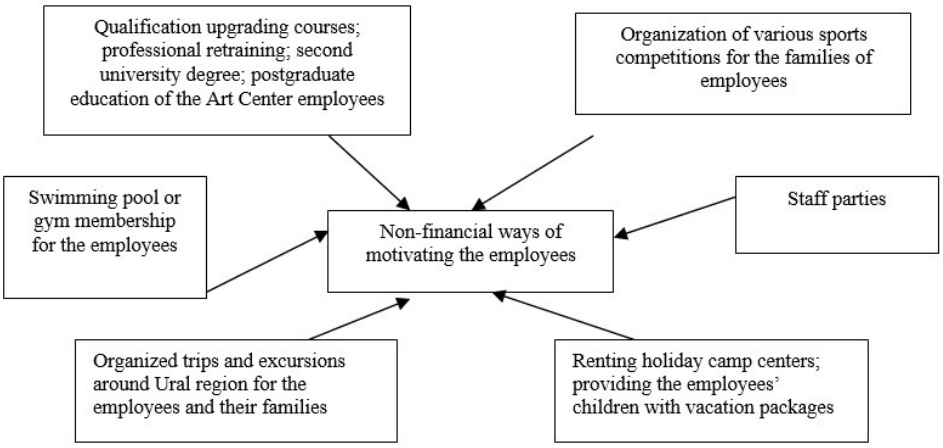


Fig 2. Non-financial ways of motivating the employees

As a result, it has been determined that the main share of expenses falls to the personnel's professional training. The recruitment procedure includes a number of relatively independent blocks set in a sequence; each block has a goal, a task, an action plan, tools and methods and a responsible party. The hiring process is handled through the interaction of the personnel department, the psychologist, the chief HR officer and other executives interested in having particular vacancies filled. Various globally recognized methods are applied: the WAIS test in order to determine the level of intellectual development and Lusher and Szondi tests for emotional and neuropsychic resilience evaluation. HR specialists are responsible for general supervision over the observance of recruiting, selection and hiring procedures.

Discussions

The main blocks (stages) of the employee recruitment process include the evaluation of recruitment needs; developing a set of requirements for a job candidate; announcing a competition to fill the vacancy; looking for candidates; hiring. The main techniques used at Perm Children and Youth Art Center in order to increase the efficiency of personnel recruitment and selection include the following:

1. A position requisition form.

A standard position requisition form has been developed and ought to be filled out by department managers once every quarter or half-yearly, and in the case of a position with a high turnover rate – monthly. A position description has been developed, as well. Internal candidates are considered according to the same procedure as the external ones with only one exception: one can gather more information about an internal candidate's abilities and skills. Sometimes it is useful to ask candidates to fill in an application form, where they should describe their qualifications and experience, explain why they are interested in this particular position, and why they regard themselves as a suitable candidate. It gives them an opportunity to introduce themselves and helps HR officers to obtain information about a candidate in a

standard form. This form also helps to understand the motivation and, if necessary, find out the candidate's ability to commit their thoughts to paper.

2. The development of an application form for candidates which may help HR officers to discover some well-kept facts that a candidate wants to keep private. These might include facts from the candidate's biography and professional experience, or it can help to obtain important information about the candidate's professional suitability for a vacant position and his or her personality traits.

3. The development of the text which can be used during a job interview in order to select a suitable candidate.

A job interview for the candidates that desire to take a teaching position comes down to several basic questions and appropriate replies. All the key elements and specific features of the requirements applied to candidates had been taken into consideration before a standard job interview form for every single position was developed. Time expenditures for every selection method have been considered and it has been determined that on the average every candidate takes approximately 7 to 20 minutes; only the length of the interview and the time spent on test evaluation are included into the time expenditure calculations because an HR specialist can fulfill other functional duties while the candidate is filling out an application form. After the interview has been completed and tests have been evaluated, a decision concerning the candidate's suitability, the start of a probation period and professional adjustment should be made. As a result of the analysis of the current personnel selection system and the new system developed according to professional recommendations, it has been decided that the use of the system offered by the author of this research would be more efficient. Being of preventive nature this system will be used for recruiting and selecting candidates. A personnel planning system will be introduced. A prognosis for personnel requirements will be made and a search for candidates will be initiated reasonably in advance.

4. The development and implementation of a standard vacancy request form for all departments. When recruiting candidates it is necessary to implement a competitive selection practice and to attract external sources. It is equally important to develop a candidate application form for a job vacancy post, to make up a plan of an interview with a candidate, carry out an economic assessment of expenditures for a job interview and develop a standard text for a job interview (which has already been done). Development of a hiring plan will make it possible to regulate and standardize the whole process, will make the process simpler, will decrease time expenditures on the personnel selection procedure and will determine the responsible party. The procedure of personnel adjustment is supposed to make the adaptation of new specialists to the pedagogical process of the institution smoother. As a rule, newcomers face a number of difficulties caused by the lack of information about the work process, location, and colleagues' peculiarities. The practice of inviting a professional psychologist on staff of an educational institution is widely used abroad, which is confirmed in the works by R.T. Marle and T.A. Schmidt (2015), and in our country according to the research works by L.V. Ivanovskaya (2014), V.D. Patrushev, I.A. Kolmakin (2014), and B.M. Smirnov. A psychologist staffing position is necessary for the music department in our case, as well. The introduction of a mentoring or discipleship system, when mentors receive a monetary reward for helping newcomers adjust, may defuse conflicts and improve psychological climate among the staff. The project measures consist of the development of the following documents: personnel adjustment program, mentoring regulations, a duty description for the psychologist responsible for personnel development organization, selection and hiring personnel, and newcomers' adjustment. The program of new specialists' adjustment consists of two basic parts: general and individual and is designed to cover the whole probation period. Every newcomer who does not have a proper work experience (or no work experience at all) should have a designated mentor who plans, accompanies and evaluates the work of the new employee during his or her probation period. The mentor evaluates the work and passes the report to the head of the department. We have developed a

post adjustment form. During the process of career management, it is necessary to consider the fact that employees' interests and needs change as they proceed from one step of the career ladder to another, as well as the qualification requirements that they have to meet. Therefore, it is necessary for the Art Center to implement differentiated career management systems at the initial, intermediary and final stages of the professional growth. Thus, a suggested adjustment program for new specialists consists of two main parts – general and individual. A duty description for the HR specialist responsible for personnel adjustment has been developed. One of the key directions of the personnel management policy at the Art Center is providing a sufficient amount of the personnel reserve for taking managerial positions at different levels. The evaluation of the economic efficiency of the project has been carried out. As a result, it has been determined that complicating the selection process, using a preliminary telephone interview may allow HR specialists to eliminate some candidates at the initial stage and decrease time expenditures of HR specialists by approximately 40 – 25 minutes. Using an effective and well thought-out form of a "vacancy advertisement" and a more "targeted" advertisement positioning might narrow down the number of candidates by 10%. The quality of targeting the audience by means of advertisement will increase by 50%. The analysis of vacancy advertisement placement has indicated that using proper means of advertising and changing the sources of advertisement placing might help the organization save up to 50% of its advertisement budget. In order to evaluate economic damage related to the personnel turnover and conditioned by a lack of motivation, appropriate calculations have been made. Implemented initiatives will significantly reduce the rate of personnel turnover. The administration of the Art Center paid close attention to the employees and their creative approach to work and has made a decision that the personnel's creativity has to be rewarded, which is especially important in the sphere of supplementary education.

Conclusions

Personnel is a strategic factor which determines the future of any organization. Qualified employees distinguished by a high level of motivation represent the main source of competitive advantages of the organization. Recently a number of problems related to personnel management in organizations has been on rise. The system of personnel management has to be tightly connected with the principles of organization management restructuring. The following problems are peculiar to Perm Child and Youth Art Center: absence of incentive for the employees' career development, low level of motivation and, as a consequence, an insufficient inflow of qualified specialists, a high level of personnel turnover, and a decrease of service quality. As a result of the survey, statistical data processing, questionnaires, observations and economic calculations conducted by the author, a need for improvement of the current management system in the culture sector institution was substantiated, which made it possible to work out new measures of improvement. As a result, the efficiency of the institution has been assessed and the following recommendations which can be applied worldwide have been developed. In our opinion, when teachers are hired to take a position at a supplementary educational institution it is very important to pay extra attention not only to the assessment of their professionalism but to find out their reason for choosing this job, seriousness of candidates' intentions to work in the culture and art sector; find out what position the candidates would like to take. If the candidate does not have a clear picture of his or her future job or career aspirations, it indicates an insufficient qualification of the candidate. From the author's point of view, only the best professionals should be able to work in the educational sphere. They should have a lot of opportunities for professional and personal development. Their level of motivation should be considered, as well. All these measures will increase the level of provided educational services. In order to manage personnel at a supplementary educational institution, one should: understand the peculiarities of the current HR system; determine and periodically follow the personnel's motivation concerning their career. In order to increase the effectiveness of operations, to comply with the inner motivations of the personnel, to form an internal personnel reserve the following measures have been proposed: implementation of a new personnel motivation system which considers the motivational profile of the employees; implementation of an adjustment program for new specialists, which will allow newcomers to blend into the team and create positive

social and psychological atmosphere among the staff; implementation of the personnel reserve restructuring program, which will make it possible to not only effectively plan the employees' career development, but will also increase the efficiency of management in general; implementation of a clear hiring and selection program will allow HR specialists to use the funds allocated for the work of the personnel department. This may lead to an opportunity to fill vacant positions on a competitive basis with the best professionals in the field; the teacher who is hired after a competition will be valued by the chief of the department who has been directly involved in the selection procedure. Besides, it will boost the confidence of the teachers who were hired by the organization after a competition.

References

Aykazyan, AK and Nisevich, YP. (2016), 'Looking for management excellence,' *Voprosy ekonomiki* 2, 150-156.

Andreev, S V. (2014) Human resources: the retention, use, development (Extended abstract of dissertation), Moscow State University, Moscow.

Bizyukova, I V. (2014) Personnel management: the selection and evaluation, Ekonomika, Moscow.

Borzov, T P. (2014) 'Personnel Management,' *Upravlenie personalom* №7, 60-66.

Buylova, L N. (2014) 'The development of social and educational functions of establishment of an additional education of children,' *Obshchestvo i ekonomika* 1, P. 38.

Gorskiy, VA. and Zhurkina, AYa. (2014), 'Pedagogical principles of development of additional education system,' *Dopolnitelnoe obrazovanie* 2.

Gerchikova, I A. (2014) Management, Biznes i birzhy, Moscow.

Lebedeva, O Ye. (Eds.) (2015) Additional education of children, Humanitariam Publishing Center VLADOS, Moscow.

Yegorshin, A P. (2014) 'How to manage the staff,' *Chelovek i trud* 2, 32-39.

Yershova, L V. (2014) Organizational-pedagogical conditions of child's socialization in the temporary non-school activities (extended abstract of dissertation), Moscow.

Ivanovskaya, LV and Svistunov, VM. (2014) Maintenance of personnel management system in the enterprise, GAU, Moscow.

Ignateva, AV and Maksimtsov, MM. (2000), Research of management systems, YuNITI-DANA, Moscow.

Kasatkin, I A. (2016) Features of administrative work, Problemy menedzhmenta i statistiki firm. Collection of scientific works, Dialog-MGU, Moskow.

Magura, M I. (2015) 'Creation of personnel management system,' *Upravlenie kadrami* 7, 14-20.

Malin, AS and Mukhin, VI. (2016), Research of management systems, GU VShYe, Moscow.

Marr, RT and Shmidt, GA. (2015), Personnel management in a social market economy, Moscow State University, Moscow.

Maslov, Ye V. (2015) Personnel management of companies, INFRA-M, Moscow.

Rumyantseva, ZP., Salomatin, NA., Akberdin, RZ, et al (2016), Organisation Management, INFRA-M, Moscow.

Maksimtsova, MM and Ignatevoy, AV. (Eds.) (2015), Management, Banki i birzhi, Moscow.

Meskon, M., Albert, M., and Khedouri, F. (2016), Basics of management, Delo, Moscow.

Morgunov, Ye. (2014) 'Personnel Management Problems,' *Upravlenie personalom* 1, 46-50.

Patrushev, VD and Kolmakin, IA. (2014), Work satisfaction: the socio-economic aspects, Nauka, Moscow.

Rumyantsev, V N. (2014) 'Organization of staff training,' *Upravlenie personalom* 1, 56-63.

Smirnov, B M. (2016) Human innovations in personnel management system, GAU, Moscow.

Abril, CR and Bannerman, JK. (2015), 'Perceived Factors Impacting School Music Programs. The Teacher's Perspective,' *Journal of Research in Music Education* 62 (4), 344-361.

Collings, D G. (2014) 'Integrating global mobility and global talent management: Exploring the challenges and strategic opportunities,' *Journal of World Business* 49 (2), 253-261.

Klingner, D E, Nalbandian, J. and Llonens, J. (2009), Public Personnel Management. Contexts and Strategies, Routledge Taylor & Francis Group, London and New York.

Tatoglu, E., Glaister, AJ. and Demirbag, M. (2016), 'Talent management motives and practices in an emerging market: A comparison between MNEs and local firms,' *Journal of World Business* 51 (2), 278-293.

Cooke, FL., Saint, DS. and Wang J. (2014), 'Talent management in China and India: A comparison of management perceptions and human resource practices,' *Journal of World Business* 49 (2), 225-235.

Condrey, S E. (Ed.) (2010) Handbook of Human Resources Management in Government, Jossey-Bass A Willy Imprint.

Kelley, J. and Demorest, SM. (2016), 'Music Programs in Charter and Traditional Schools: A Comparative Study of Chicago Elementary Schools,' *Journal of Research in Music Education* 64 (1), 88-107.

Infermation Resources Management Association USA (2016) Leadership and Personnel Management: Concepts, Methodologies, Tools, and Applicatoins, Busiess Science Reference, Hershey, PA.

Thornton, L C. (2015) 'Important Others Music Teachers' Perceived Roles in Music Teacher Recruitment,' *Journal of Music Teacher Education* 24 (3), 97-107.

Meyers, MC. and Woerkom, M van. (2014), 'The influence of underlying philosophies on talent management: Theory, implications for practice, and research agenda,' *Journal of World Business* 49 (2), 192-203.

Henry, M L. (2015) 'The Musical Experiences, Career Aspirations, and Attitudes Toward the Music Education Profession of All-State Musicians,' *Journal of Music Teacher Education* 24 (2), 40-53.

Nayab, N. (2011) Exploring Different Perspectives of HR Management. [Online], [Retrieved December 12, 2016], http://www.brighthubpm.com/resource-management/76151-exploring-different-perspectives-of-hr-management/

Robinson, N R. (2012) 'Preservice Music Teachers' Employment Preferences: Consideration Factors,' *Journal of Research in Music Education* 60 (3), 294-309.

Miksza, P., Roeder, M. and Biggs, D. (2010), 'Surveying Colorado Band Directors' Opinions of Skills and Characteristics Important to Successful Music Teaching,' *Journal of Research in Music Education* 57 (4), 364-338.

Tang, R L. (2016) 'New perspectives on human resource management in a global context,' *Journal of World Business* 51 (1), 142-152.

Burma, Z A. (2014) 'Human Resource Management and Its Importance for Today's Organizations,' *International Journal of Education and Social Science* 1 (2). [Online], [Retrieved December 12, 2016], http://www.ijessnet.com/wp-content/uploads/2014/09/9.pdf

Corporate Management of the Value of Business Units: Discrepancies and Ways to Overcome Them

Oksana V. Askanova, Doctor of Economic Sciences, Associate Professor, Head of the Finance and Credit Department, Rubtsovsk Industrial Institute, Rubtsovsk, Russia, oaskanova@bk.ru

Aleksandr V. Karpenko, Candidate of Economic Sciences, Associate Professor, Finance and Credit Department, Rubtsovsk Industrial Institute, Rubtsovsk, Russia, mr.aleksandr.viktorovich@inbox.ru

This study has been conducted with financial support from the Rubtsovsk Industrial Institute (as a branch) of the federal state budgetary educational institution of higher education I.I. Polzunov Altai State Technical University (Grant No. 1522 of December 19, 2016).

Abstract

Object: Ensuring the successful operation of a conglomerate corporation and attaining the efficiency of its activity requires not just the development and implementation of a general corporate strategy but also the efficient management of the company's business portfolio and adequate distribution of resources across its major business areas and divisions – with a view to developing existing and cultivating new competitive advantages for it. A key precondition for the proper interaction between the corporate and business levels is the ability to properly assess the prospects for growth in the value of particular businesses based on the corporation's "parent abilities" matching the needs of business units that make it up. ***Methods:*** This study is grounded in the fundamental tenets of the parenting advantage concept, which describes the process of managerial interactions, as well as the tenets of the systemic-resource and target models for efficiency. ***Results:*** Based on an analysis of the specificity of the interaction between the corporate centre and the business unit, the authors have identified the key discrepancies between them in the context of managing the value of the company and business. The study points up the equivocal role of the corporate centre in implementing the strategy for growth in the value of business units. It provides a rationale for the need to differentiate business units and proposes a conceptual approach to managing the value of business units based on strategic fit across resources, knowledge, competences, business process elements, and the role of the strategic apex in ensuring growth in their value. ***Conclusions:*** The research reported in this paper is expected to open up wider vistas of opportunity for further research related to the corporate management of the business units portfolio and make a considerable contribution to understanding corporate strategy.

Keywords: corporate management; strategic management; business portfolio; business unit; synergism

Introduction

Coordinating and integrating the key competences and business processes become possible thanks to the theory and methodology of strategic management as the fundamental basis of managing the development and the companies' growth under conditions of turbulence in the environment. In a climate of continual changes in the scale and boundaries of activity, it is worth ensuring that the company is highly adaptable with respect to various dynamic external and internal factors (Adizes, 2014; Ansoff, 1979). The promptness of reacting to changes in the conditions ought to be ensured within the framework of a corporate strategy adopted, while it also pays to make timely reactive or proactive changes to the strategy. The latter is needed in corporate management not just when there are cardinal changes taking place in the macro-environment, the 'business – state – society' system, but also when there are significant innovative solutions generated within the company – in its business units.

A company's business units may differ in a great deal of characteristics (the product turned out, technical-technological parameters, key competences, stages in the lifecycle of a business unit and the market it operates in, etc.). However, the key criteria for making managerial decisions in the

corporate management of business units' portfolio are the prospects for the creation of a unit's added value and its effect on the value (capitalization) of the company as a whole. To carry this objective into effect, the corporate centre ought to possess relevant competences, skills, and resources, which should align with the key factors for the success of its business units. In other words, the strategic apex (Mintzberg, 1983) ought to create such conditions for the actualization of business units' potential and capabilities, which will ensure boosts in the efficiency of their activity and help maximize their value.

A strategic approach, predicated on transforming the business unit's intra-corporate strategic fit into a whole new competitive advantage, which cannot be attained by each and every business unit under conditions of independent operation, was a genuine breakthrough in strategic theory in the early 1990s. Over the last 20 years, there has been conducted plenty of research into the integrative interaction between entities within corporate associations which has facilitated further enriching the theory and enhancing the practice of strategic management. It has laid down the conceptual, methodological, and procedural foundations of this type of management and provided the basis for the company's configuring and coordinating its multi-field activity. Yet, at the same time, there remain a whole array of key issues related to strategic theory that need to be given a clear-cut form and resolved once and for all. In particular, the theory of root competences has never been employed for the purposes of developing an intrinsically sustainable typology of discrepancies arising out of the 'strategic apex – business unit' interrelationship. Most of the existing research is focused on the causes of conflicts acting as a concentrated expression of a particular discrepancy: the inhomogeneity of organizational culture (Merchant et al, 2012; Roth and Nigh, 1992), the diversity of stakeholder interests amid a lack of resources (Zietsma and Winn, 2008), institutional context (Kostova et al, 2008), etc. This being said, the methodological basis for that research is, normally, a narrowly directed approach – from the perspective of psychology, sociology, economics, and the theory of organizational conflicts.

In addition, the basis for the authors' conduct of this study has been the insufficient insight into the issue of managing eventual business units, which, based on the parameters of their economic status and strategic compatibility, constitute a maximum risk area for the corporate centre. Due to this circumstance, the subject to further theoretical substantiation is the issue of assessing the potential for growth in the value of these business units, as well as the analysis of the efficiency of alternative strategic solutions in the process of putting together a corporate strategy.

Thus, this paper is intended to help fill the gaps and ensure the further development of the corporate management theory and provide a rationale for the interaction of the strategic apex with business units in the process of putting together business strategies based on managing their value. The paper identifies the major discrepancies between the company's strategic apex and business units and provides a rationale for taking a conceptual approach to managing the value of business units based on the principles of harmonization of interests and strategic fit across resources, competences, and parameters representing the activity of the above entities, as well as the principles of synergy and portfolio management. To note, certain tenets brought forward and substantiated as part of this study have been taken on board and used in the activity of certain large integrated establishments – more specifically:

- the authors have gained an insight into the mechanism underlying the management of the value of the TAREKS company group (the city of Novosibirsk) within the system of corporate management and determined the major discrepancies between the interests of the head centre and the management of the subsidiary companies;

- the authors' model for the interaction of the corporate centre with business units, which is designed to ensure strategic fit among the above entities in terms of resources, knowledge, and skills, has been employed for the purposes of cultivating an organizational-economic relationship between AO Rubtsovsk Machine-Building Plant (the Rubtsovsk branch of AO NPK Uralvagonzavod) and the managing company.

Materials and Methods

The theoretical basis for the programme for the interrelationship between the corporate centre and its business units is the concept of "parenting advantage", developed in the 1990s by M. Goold, A. Campbell, and M. Alexander (Goold et al, 1994) based on M. Porter's (1985) competitive advantage theory and A. Chandler's (1962) theoretical speculations on the role played by the corporate centre. According to the original concept, the strategic apex ought to ensure the maximization of the value of business units that form part of its portfolio or the redistribution of corporate assets through their merger or sale to a more preferential owner. The role of the strategic centre consists in not just ensuring growth in the value of business units but also offering guarantees for this value to be a lot higher than the costs associated with its upkeep, while the positive synergy of their interaction is the greatest of all possible boons. Otherwise, the corporate strategy will be inefficient and may ruin the value.

To put together an integral picture of existing scholarly knowledge on the activity of the corporate centre and its actual participation in creating the group's value, the authors employed an integrated approach to search for relevant literature. First, in their search for scholarly papers published in top academic and practice-oriented journals, the authors drew upon Scopus, the world's largest universal abstract database, as well as the Russian Science Citation Index, which currently contains over 9 million publications by Russian authors. Second, of considerable interest to the authors were publications reflecting the domestic and foreign experience of managing integrated corporate establishments. The authors' theoretical analysis of the literature helped identify some of the fundamental tenets and prevalent focus areas related to the development of economic thought with respect to the issue under exploration, identify some of the common features and some of the differences in the nature, character, and specificity of the interrelationship between the corporate centre and business units, identify the latest trends in constructing corporation's divisional structure, and more.

The authors' development of a conceptual approach to managing the value of business units is grounded in the experience of Russia's largest integrated corporate establishment AO NPK Uralvagonzavod, which comprises around 40 industrial enterprises, research-and-development institutes, and design bureaus across Russia and Europe and is engaged in the design and manufacture of automotive and agricultural machinery, road construction machinery, railroad cars, as well as products for the military-industrial complex.

The elements of the authors' conceptual approach incorporate the tenets of the systemic-resource and target theories of management. More specifically, the use of the systemic-resource model (Yuchtman and Seashore, 1967) helped the authors assess, in the context of the objective of ensuring the efficiency of the operation of the company and its business units, the congruence of the required strategic resources of the business unit and those of the corporate centre (the key criterion being the optimum use of favorable opportunities and relevant resources available in the environment). The use of the target model (Holl, 2001) under conditions when the hierarchy's different levels work within different timeframes ensures a proper interlinkage between strategic, tactical, and operational objectives across the company's hierarchical levels, cooptation (the process of absorption of new elements into the corporate centre, the company's policy-determining establishment, as a means of preventing its instability), as well as a coalition of business units with a view to creating sustainable competitive advantage. Thus, the target model helped determine the degree of coordination of multiple and discrepant objectives and limitations at the corporate and business levels factoring in the interests of external interested parties.

Literature Review

There has been plenty of empirical research into strategic and corporate management attesting to the substantial role and significance of the corporate centre in managing a conglomerate corporation. More specifically, a study by D. Collis and C. Montgomery (1998) suggests that the corporate centre acts as an intermediary in the internal and external environment wherein the corporation operates and

plays a decisive role in creating its value – thus, justifying economically its own existence. In the view of R. Adner, C. Helfat, and E. Bowman (Adner and Helfat, 2003; Bowman and Helfat, 2001), the strategic apex, may, by facilitating boosts in the efficiency of strategic decisions made, ensure greater gains in the added value for its business units as a component of the organizational system than their activity can under the conditions of progressing factorization.

It is worth pointing up several key focus areas in terms of exploring the functions of the strategic apex as the organizational-economic centre of management and its role in the overall system of managing the organization.

The first focus area develops the original concept proposed by M. Goold et al. and focuses on certain corporate functions and objectives, including corporate planning, investment analysis, risk management, organizational design, etc. (Campbell et al, 2012; Goold et al, 1998). Without question, this research facilitates our better understanding of the nature, mechanisms, and resulting role of the corporate centre in creating value – however, its narrow focus on certain aspects of the corporation's activity is resulting in somewhat fragmentary knowledge in the area.

The second area of focus is research into the role and functions of the corporate centre, which it performs outside the internal market (Bartlett and Ghoshal, 1989; Mudambi et al, 2014; Nell and Ambos, 2013). It offers empirical testimony to the fact that active corporate centres facilitate the realization of synergetic advantage from multinational coordination, which surpasses behavioural costs associated with interference with the business of subsidiary companies. However, in the authors' view, a dominant role in this research is played by the potential and limitations of international divisions and their significance in the value creation chain. That being said, what is being ignored is the prospects of the actual corporate centres, which, in effectuating the objective of achieving gains in added value, get to face significant difficulties – their subsidiary companies being geographically distanced and scattered and all kinds of cultural (e.g., the characteristics of interaction with the management team and colleagues, an attitude toward resolving non-standard objectives, an attitude toward failure), regulatory (e.g., difficulties associated with formalizing the document flow system; mismatches regarding the requirements for accounting policy), and other discrepancies.

There is another area of scholarly search that has been in wide use in research into the potential and resources of the corporate centre and has found reflection in the development of the concept of resource-oriented strategic management of an organization. The focus here is on the structure of the corporation's resources, which are distributed unevenly among the businesses that make it up (Grant, 1991; Peteraf, 1993; Wernefelt, 1984), and the specific potential and competences of the strategic apex as a source of added value expected to ensure their best use (Evans and Schulman, 1992; Prahalad and Hamel, 1990). Summarizing the findings of research in this area may lead to the conclusion that there is a certain degree of differentiation in viewpoints voiced by various authors at the terminological and conceptual levels, as well as an insufficient degree of development of applied methodological solutions.

Overall, it may be stated that the ideas of the Western founders of scientific management have given a powerful impetus to the process of making and development of the theory of management all across the globe. The theory of a firm's behaviour, which is closely linked with the practice of the operation of conglomerate corporations, has helped develop a virtually flawless strategy for the interaction of the corporate centre with its business units. A detailed insight has been gained into issues related to managing the business portfolio and making investment-related decisions on the purchase/sale of particular businesses, the types of the organizational structuring of the corporate centre, etc. Yet, at the same time, there still remain a number of key issues which require further thorough investigating, including the characteristics of interaction between participants in corporate relations in transitive economies, the organization of the system of intra-group cooperation between business units making up the corporate portfolio, etc.

The issues related to the theory and practice of strategic management and ensuring gains in value have been examined in works by Russian scholars as well – as applied to Russian reality. However,

considering the fact that on the whole the domestic system of corporate management is still not perfect and is continually undergoing reform. A major portion of this research is devoted to reconceiving the role of the corporate centre and its functions in Russian holdings (Zietsma and Winn, 2008; Ponomarenko and Korotky, 2015; Sokolov, 2014; Chitipahovyan, 2012; Shtefan and Lutchenko, 2013), the characteristics of the cross-functional interaction between business units (Nakonechnikova, 2014; Tarasova, 2014; Tsevelev, 2016), issues related to managing the value of integrated establishments within the system of corporate management (Burenina and Yakushina, 2012; Karpenko and Askanova, 2015; Orehov, 2014; Reshetko and Sokolov, 2014; Jurkovska and Agafonov, 2015), etc.

Worthy of separate mention are a series of research studies devoted to focus areas for the development of Russian divisions of international corporations and their engagement in the system of intra-corporate social relationships (Gurkov, 2015, 2016). The authors of these studies are pointing out a high degree of dependence of Russian businesses on support from their foreign head centre, as well as the dualistic nature of the processes of cooperation between the "sister divisions" located in different countries.

No less interesting, in the authors' view, is research (Kochugueva, 2012) devoted to assessing the activity of natural monopolies within the Russian economy. An analysis of the strategic status of the portfolio of the business units of one of the world's largest network companies indicates that a total lack of competition may significantly detract from the ability of corporate centres to develop their root competences, which may lead to the inefficient distribution of resources and greater expenditure on the upkeep of non-core businesses.

Summarizing what has been said above, it may be concluded that, on the whole, the development of management thought in Russia is proceeding along the path of domesticating the Western theory of management and adapting it to Russian reality. Right now, there is just a limited number of publications attesting clearly to the practical orientation of the concept of parenting advantage and notions of the root competences of conglomerate corporations. Research having a limited empirical base and scholarly works being excessively theoretized makes it hard to get a detailed picture of and assess the combined effect from the interaction of all participants in the corporate system. It pays to convert separate, scrappy theoretical findings into a finished theory of corporate management, which should help not just identify and explain corporate processes taking place in the country but also make it possible to forecast them.

Based on the aforesaid, the object of this study is to develop a conceptual approach to managing value as applied to eventual business units with a potential for generating additional value for other business units and producing a synergetic effect via strategic fit across resources, competences, and business process elements. This objective was attained through resolving the following objectives:

- exploring the forms of interaction between the strategic apex and the business unit, discrepancies between them, as well as ways to harmonize their interests aimed at ensuring the maximization of market value and a synergetic effect;

- summarizing the types of business units depending on the degree of strategic fit across their resources, competences, and business process elements and identifying the ones that are most attractive for the corporate centre from the perspective of the objectives set;

- providing a rationale for the use of a conceptual approach to managing the value of the eventual business unit.

Results and Discussion

The strategic potential of business units varies: some are capable of influencing the outcomes of operation thanks to a high degree of centralization of management (note that these outcomes will be better than those they would exhibit if the units were independent), while for other business units the

key function of the corporate centre is facilitating the exchange of knowledge, competences, and technology, which would not occur among autonomous units.

At the stage of the divisional establishment growing and developing, what becomes a crucial issue is increased bureaucracy and escalating discrepancies between the strategic apex and the business unit, caused by poor control and coordination. These discrepancies are grounded in the issue of harmonizing the interests of the above entities. This antagonism shows itself especially acutely in the goal-setting process, as objectives and limitations for each business unit are normally determined without factoring in the interests of a particular business unit. As a consequence, the activity of the business unit aimed at achieving its own goals may run afoul of the interests of the entire company.

Based on the authors' analysis and summary of the outcomes of research conducted by a number of scholars specializing in the area of corporate management (Johnson et al, 2014; Gurkov, 2008), as well as by reference to the real practice of corporate management in the TAREKS company group, the authors identified some of the key discrepancies in the 'strategic apex – business unit' interrelationship known to have a negative impact on value management processes, such as:

- *structural* discrepancies – the blurring of the boundaries of areas of responsibility between the corporate centre and business units. A branched hierarchical company structure will not let the corporate centre efficiently control the situation in its business units, which leads to greater timeframes for making and coordinating decisions and, consequently, to slower reacting to changes in the needs of the market on the part of the company;

- *organizational* discrepancies – the strategic apex of a multi-field company determines the key factors of success and competitive advantage mainly within the political and social areas, whereas the key factors for the success and competitive advantage of each business unit and their sustainability belong to the competence of the executive team of business units; to note, it oftentimes is virtually impossible to integrate them at the corporate level;

- *personal-psychological* discrepancies – managers at business units view the company's strategic apex as a means of realizing their claims for success and career growth, ignoring their chief role – creating value at the level of the business unit. This leads to the need for the corporate centre to tighten up control over their activity and requires developing relevant stimulating mechanisms (including negative motivation) that would urge senior management to act in the interests of the entire company;

- *regulatory* discrepancies – in a climate of non-related diversification in the process of interaction between the corporate centre and business units, there is a need to factor in the specific characteristics of the operation of each of these units. This kind of differentiation has a negative effect on the processes of implementing uniform corporate standards. Furthermore, it is worth understanding that each business unit is unique in its own way and has its own system of regulations, which enable taking account of not just the specificity of the business unit's activity and the strategy for its development but also the objectives which the corporate centre effectuates in implementing the system of corporate standards;

- *cultural* discrepancies – corporate culture and the subcultures of business units influence each other and there may arise certain discrepancies between them, which may be reflected in the differences in value systems (declines in costs or increases in and differentiation of output), ethical norms (the openness degree of business units), the types of management (mechanistic or organic), interpersonal relations, etc.

As we can see, the role of the corporate centre in effectuating the strategy for growth in the value of business units is multi-faceted: the strategic apex directly participates in creating the value of business units through managing interrelationships with entities operating in the external environment, ensuring the diffusion of knowledge and competences, optimization of the use of strategic resources by several business units, etc. However, limitations imposed on business units in

terms of decision-making by the corporate strategy, their inability to participate efficiently in managing and enhancing business-processes, etc., may facilitate ruining the value of business units and encourage their aspiration for isolation and even total autonomy (business units rely more on market mechanisms for self-regulation than on administrative forms of management).

There can be both absolute and relative assessments of the match between the competences of the corporate centre and business units under its management (Goold et al, 1998). In the first case, the strategic apex ought to ensure growth in the value of business units, while business units ought to demonstrate a return on the investment. In the second case, the strategic apex compares, based on the principles of benchmarking, its activity with that of other corporate centres, which also shows in a mediated fashion in the competition between the business units. In addition, the strategic apex assesses:

- the type of competitive advantage which it will ensure the business units;
- the extent of its negative impact on the business units;
- the advisability of retaining the right of ownership in respect of the entire portfolio of business units or sale of business units to a corporate centre under whose management they will create greater value.

It is worth noting here that the complexity and multi-facetedness of the issue of intra-corporate interaction, the eclecticism of economic and administrative mechanisms underpinning management provide a rationale for the need to coordinate the interests of the organization as a whole with internal management processes taking place at the various levels of managing the corporation. It is how neatly and competently the distribution of powers and responsibilities between the head centre and the management team of business units is constructed along the entire hierarchical chain of management and the degree to which one is able to achieve coherence between multiple and discrepant objectives and limitations at the corporate and business levels that the adequacy of managing the value of subjects of corporate relations will largely depend on. Otherwise, as evidence from practice indicates, there is no avoiding a conflict of interests within the corporation (Homayoun and Homayoun, 2015; Berezinets et al, 2014; Kuruzov, 2014). In addition, in a climate of quick technological changes and political and social-economic instability, issues related to putting together and practically implementing corporate and business-strategies appear to be indissolubly bound up with those related to interrelationships between various groups of stakeholders (Bonnafous-Boucher and Rendtorff, 2016; Magill et al, 2015; Pletnyov, 2014).

Thus, the above makes it possible to bring forward a set of key principles on which the interaction of strategic apex with its business units may be expected to be built:

- *the company's integrity for external interested parties* – stakeholders ought to have a clear idea of the boundaries of the company's activity and its vision of common objectives. Otherwise, investors may develop a misunderstanding as to the advisability of certain types of business and ways for the corporate centre to create value for its business units, which may immediately reflect on the price of the company's shares;
- *the participation of the strategic apex in managing business units based on strategic fit across top competences* – the corporate centre's primary objective is to ensure that the value of the business unit as a component of the organizational system is greater than its value in a climate of progressing factorization. That being said, the corporate centre can make use of its competences, skills, and power to interfere, to some degree or another, with the work of business units and administer control over their activity;
- *the degree of interest by the senior management of the business unit in the strategic apex* – managers at business units ought to be motivated to work with the corporate centre, failing which

they may start looking on it as a source of additional expenditure, which may have a negative impact on the overall efficiency of the company's activity;

- *boosts in the strategic potential of a business unit based on the potential of other business units*, which is reflected in declines in costs, entry to new sales markets, development of new types of products, etc.;

- *rotation of managerial personnel within the company and boosts in management potential* – moving business unit executives consistently along the horizontal makes it possible for them to gain the necessary knowledge and skills and cultivate exceptional competence;

- *synergy,* which is created in integrating the various types of resources, which ensure the development of existing and cultivation of new competitive advantages (entry to new markets; implementation of large projects).

Based on the above, the authors suggest construing *managing the value of a business unit in the system of corporate management* as a set of goals, objectives, principles, functions, means, methods, and instruments that can ensure boosts in the value of a business unit and gains in added value via synergetic interaction with other business units through the strategic apex, which acts concurrently as both the administrator of the unit's portfolio and its owner.

The strategic apex provides business units with centralized services and resources (investment-related and infrastructural), which ensure economies of scale, intermediary services (the interaction of business units with the external community), and "movable management potential" (rotating top managers between different business units), with unique key competences being cultivated along the way, which may ensure high rates of growth for business units.

By focusing on ensuring well-balanced growth and development for business units (e.g., in alignment with the BCG matrix), the strategic apex supports their strategic initiatives aligned with the corporate strategy. Nonetheless, during the process of developing its potential, key competences, and interrelationships with stakeholders, etc., the level of strategic fit between the company (the corporate centre) and the business unit (in terms of resources, knowledge, competences, business process elements, and the management system) diminishes. In this regard, it is worth pointing up the following types of business units:

- *leading* business units, which form the company's strategic core. In relation to these, the corporate centre has a wide range of strategic capabilities and competences, which form the basis of the corporate strategy and make it possible to boost value without any negative consequences for the actual business units;

- *autonomous* business units, which are self-sufficient units whose efficient operation outside the company (as independent organizations) will not change, despite the fact that the corporate centre possesses the necessary competences in the area of managing them;

- *encumbering* – business units incapable of making a substantial contribution to the cause of achieving corporate objectives, since their strategic resources, competences, and processes do not match the corporate strategy; the corporate centre, in turn, does not possess the resources and competences needed for boosting their value. It pays for the strategic apex to resort to the strategy of restructuring the corporate portfolio with respect to these business units and keeping them out;

- *eventual* – business units that are of value to the strategic apex thanks to their potential for producing strategic fit between the potential of the business unit itself and the resources, competences, and other characteristics of the corporate centre and top business units. Having said that, there is likelihood that the efforts of the strategic apex aimed at transforming eventual business units into "leading" ones and ensuring gains in the company's value through a synergetic effect will not result in desired outcomes; what is more, decisions made by the strategic apex may lead in this

case to some of the value getting ruined. Consequently, the corporate centre's top competences ought to be in line with the corporate portfolio and market potential specific for each, including eventual, business unit.

There are various interaction mechanisms (including financial-economic ones) known to ensure growth in the company's value (e.g., in terms of managing non-core assets) that have been developed in the theory and practice of corporate management with respect to the first three types of business units. The specificity of managing eventual business units and their value has been discussed in the literature in quite a scrappy manner (Johnson et al, 2014; Gurkov, 2008), which may require developing a proper organizational-methodological instrumentarium for assessing and managing the value of eventual business units. Its basis ought to be grounded in a mechanism for harmonizing the interests of subjects of corporate relations, which could be implemented based on the integration of the systemic-resource and target models for efficiency.

The author's conceptual approach to managing the value of business units in the system of corporate management is illustrated in Figure 1.

Under the approach, the strategic apex assesses the match across key factors for the success of each business unit, its business processes and competitive landscape on the one hand, and the strategic resources, strategic influence groups, top competences, and other parameters for the activity of the corporate centre on the other. What is more, the business unit itself must be interested in the strategic apex as a source of additional competitive advantage. Here, one should expect a match between the business unit being interested in help on the part of the corporate centre and the latter's strategic capacity to provide it. As a consequence of this strategic fit, there can be created the necessary and sufficient conditions for the sustainable development and growth of the company, its competitive positions getting bolstered, and gains in the value of business units and the company as a whole.

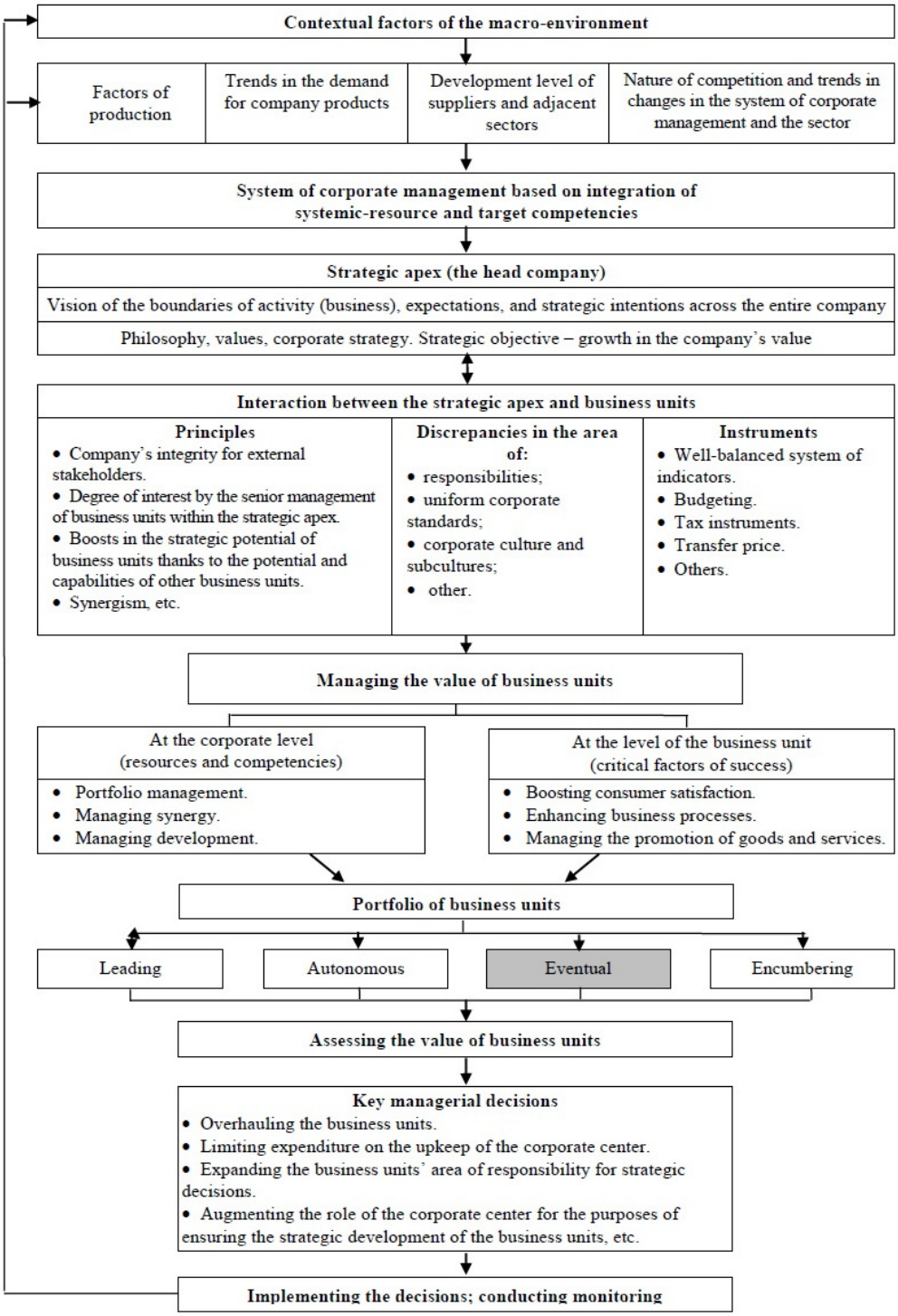


Fig 1. A conceptual approach to managing the value of business units within the system of corporate management

The approach proposed by the authors was tested on a number of Russian corporate units. More specifically, an assessment of the existing businesses of the machine-building holding Uralvagonzavod on the parameters of their economic status and strategic compatibility with the key competences of the head centre (cutting-edge production technology, design of products with the needs of individual clients in mind, and the inter-organizational level of integration of product components) helped the authors single out the Rubtsovsk branch of AO NPK Uralvagonzavod as an eventual business unit. This business division is largely autonomous financially in terms of both its current turnover and long-term prospects – a significant portion of its production volume is associated with defence procurement contracts on the manufacture and maintenance of military equipment, as well as contracts on modernizing custom machinery designed and manufactured in Russia. At the same time, there are a number of issues preventing ensuring strategic compatibility in full measure, like:

1) a time lag between the development and assimilation of cutting-edge production technologies in the head company and their implementation in this particular business division, which is due to the elements of the corporate system being largely scattered and distanced territorially;

2) an incomplete match between the technological and scientific potential of the corporate centre and the eventual business unit under examination, which does not always permit ensuring the fulfilment of the head company's objectives on the design of products with the needs of individual clients in mind;

3) the impossibility of meeting in full measure all the needs of the business unit under examination for parts to execute special orders through the inter-organizational integration of product components.

The eventual business unit in terms of income approach was valuated. It was done in order to determine the head centre's potential strategy against eventual business unit taking into account different combinations of factors.

The valuation was based on:

- Economic Value Added (EVA) model;
- Edwards-Bell-Ohlson (EBO) model.

The Rubtsovsk branch of AO NPK Uralvagonzavod total assessed value under current market volatility conditions exceeded net asset value by 7.8%. Such index is acceptable in terms of current conditions. This particular business generates significant funds flow that ensures its high worthiness.

Due to high management effectiveness and growing financial autonomy of the branch the authors suggested the reasonable change strategy. The strategy included expansion of eventual business unit liability in terms of policy decisions. That means liability transfer to business level and, as a result, the use of inhouse references for competitive tactics development. Monitoring of changes mentioned above implementation demonstrated company's market value increase. Market value was calculated by the use of different valuation models (Table 1).

Table 1: Eventual business unit valuation (total result), in thousands of USD

Information dynamics parameter	Under current conditions	In terms of eventual business unit liability of policy decisions expansion	Deviation %
Company's valuation by EVA model including useful life of Goodwill	68,965	76,068	+10.3
Company's valuation by EBO modified model	47,074	50,887	+8.1
Company's total valuation including adjustment factors	58,020	63,478	+9.4

High level of management decentralization against successful business units provides market value increase by 9.4%. This conclusion is supported by empirical data of other corporate entities. A nice example of a company with a high degree of management decentralization in relation to successful business units is AutoVAZ. In particular, these units have the right to bring in external orders, the ability to make independent decisions regarding the use of their extra-plan profit, etc. The managing company is only responsible for overall financial and tax planning (Smykov, 2003).

Conclusion

Within the framework of the theories of corporate management and strategic management in a climate of turbulence in the external environment and constant changes in the scale and boundaries of a company's activity, particular significance is getting attached to the coordination and integration of key competences and business processes within the company's various lines of activity. That being said, priority significance is getting assigned to the strategic management of the company's business units, while the key criterion for decision-making in the area of managing the portfolio of business units is the indicator of value. The strategic apex ought to have an idea of key factors for the success of its business units and make use of relevant knowledge, skills, and competences at the corporate level so as to be able to add value to each business in its portfolio.

Overall, the study has helped achieve the following significant results:

1. The authors have fine-tuned the concept of 'managing the value of business units within the system of corporate management', which they have done through integrating the company's systemic-resource and target concepts, identifying specific contextual factors of the macro-environment, and determining the major discrepancies between the company's strategic apex and business units.

2. The authors have identified several types of business units, differing in the degree of strategic fit across their resources, competences, and business process elements, as well as the role of the corporate centre in ensuring growth in their value. It has been substantiated that eventual business units are the most attractive for the corporate centre in terms of strategic fit. This, however, requires that the strategic apex develop its top competences, resources, and characteristics.

3. The authors have developed and tested a conceptual approach to managing the value of business units, which is predicated on the principles of harmonization of interests, strategic fit across resources, competences, and parameters representing the activity of the above entities, as well as the principles of synergy and portfolio management.

The authors associate the prospects for further research with extending the focus to multinational corporations with eventual business units across Russia. There is a need to elaborate on the issue of the possible extent of strategic relationships between the corporate centre and similar business divisions of the international corporation and the intensity of financial flows between them. In the authors' view, this topic is worthy of separate, independent research. In addition, future research into the area may significantly expand the ken of the scientific community, if the focus is centred on

enhancing mechanisms underlying corporate interaction factoring in the interrelationship with other crucial aspects of strategic management – the exchange of knowledge and information, getting access to production technology, tapping into new sales channels, etc. A combination of quantitative and qualitative research methods will facilitate enriching scholarly knowledge and secure a considerable contribution to the development of corporate strategy theory.

References

Adizes, I. (2014) Managing Corporate Lifecycles. How Organizations Grow, Age, and Die, Embassy Books.

Adner, R. and Helfat, CE. (2003), 'Corporate Effects and Dynamic Managerial Capabilities,' *Strategic Management Journal* 24, 1011-1025.

Ansoff, I. (1979) Strategic Management, Wiley, New York.

Bartlett, CA and Ghoshal, S. (1989) Managing Across Borders: The Transnational Solution, Harvard Business School Press, Boston, MA.

Berezinets, IV., Ilyina, JuB. and Fahritdinova, DN. (2014) 'Corporate conflicts and financial performance of companies,' *St. Petersburg University Bulletin. Series. Management* 2, 100-135.

Bogatina, EM. (2012) Management of corporate centre and business units interaction in integrated structures (dissertation), Moscow.

Bonnafous-Boucher, M and Rendtorff, JD. (2016) Stakeholder Theory: A Model for Strategic Management, Springer International Publishing.

Bowman, EH and Helfat, CE. (2001), 'Does Corporate Strategy Matter?' *Strategic Management Journal* 22 (1), 1-23.

Burenina, IV and Yakushina, JuG. (2012), 'Development of the model of market value formation in vertically integrated oil companies', *Neftegazovoe delo* 6, 566-575.

Campbell, A., Kunisch, S. and Müller-Stewens, G. (2012), 'Are CEOs getting the best from corporate functions?' *MIT Sloan Management Review* 53(3), 12-14.

Chandler, AD. (1962) Strategy and Structure, MIT Press, Cambridge, MA.

Chitipahovyan, PS. (2012) 'Functions of corporate centres in strategic management systems,' *Management and Business Administration* 1, 183-187.

Collis, DJ and Montgomery, CA. (1998), 'Creating Corporate Advantage,' *Harvard Business Review* 76(3), 70-84.

Evans, P and Schulman, LE. (1992), 'Competing on Capabilities: The New Rules of Corporate Strategy,' *Harvard Business Review* 70(2), 57–69.

Goold, M., Campbell, A and Alexander, M. (1994) Corporate-level Strategy: Creating Value in the Multibusiness Firm, Wiley, London.

Goold, M., Campbell, A. and Alexander M. (1998), 'Corporate Strategy and Parenting Theory,' *Long Range Planning* 31(2), 308–314.

Grant, RM. (1991) 'The Resource-Based Theory of Competitive Advantage: Implications for Strategy Formation,' *California Management Review* 33(3), 119–145.

Gurkov, IB. (2008) Strategy and structure of corporation: guidebook (2nd edition, revised), Publishing house «Delo» ANH, Moscow.

Gurkov, IB. (2015) 'Corporate Parenting Style of the Multinational Corporation - A Subsidiary View,' *Progress in International Business Research* 10, 57-78.

Gurkov, IB. (2016) 'Against the Wind – New Factories of Russian Manufacturing Subsidiaries of Western Multinational Corporations,' *Eurasian Geography and Economics* 57 (2), 161-179.

Holl, RH. (2001) R.H. Hall. Organizations: Structures, processes and outcomes, Piter, Saint Petersburg.

Homayoun, S and Homayoun, S. (2015), 'Agency Theory and Corporate Governance,' *International Business Management* 9 (5), 805-815.

Johnson, G., Whittington, R., Scholes, K., Angwin, D and Regner, P. (2014) Exploring Strategy, Pearson Education.

Jurkovska, ZV and Agafonov, AA. (2015) 'Company value management (through the example of X5 Retail Group),' *Scientific notes of the International Bank Institute* 12, 111-125.

Karpenko, AV and Askanova, OV. (2015) Cost estimation within the system of business unit corporate management, Publishing House «Science & Innovation Center», Saint Louis, MO, USA.

Kochugueva, MN. (2012) 'Conceptual analysis of strategic position of business units of Russian diversified company (using Marakon Associates profitability matrix,' Corporate Finances 1 (21), 84-96.

Kostova, T., Roth, K. and Dacin, MT (2008), 'Institutional Theory in the Study of Multinational Corporations: A Critique and New Directions,' *Academy of Management Review*, 33, 994-1006.

Kuruzov, MV. (2014) Development of financial management tool in the solution of corporate agent conflicts (dissertation), Krasnodar.

Magill, M., Quinzii, M. and Rochet, JC. (2015), 'A Theory of the Stakeholder Corporation,' *Econometrica* 83 (5), 1685-1725.

Merchant, H., Tung, RL. and Verbeke, A. (2012) The tenuous link between cultural distance and international strategy: Navigating the assumptions of cross-cultural research, Handbook of research on international strategic management, Edward Elgar, 310-327.

Mintzberg, H. (1983) Structure in Fives: Designing Effective Organizations, Prentice-Hall, Englewood Cliffs.
Mudambi, R., Pedersen, T. and Andersson, U. (2014), 'How subsidiaries gain power in multinational corporations,' *Journal of World Business* 49 (1), 101–113.

Nakonechnikova, LA. (2014) 'Business unit interaction management in modern economic conditions,' Vestnik Prikaspiya 3 (6), 51-53.

Nell, PC and Ambos, B. (2013), 'Parenting advantage in the MNC: An embeddedness perspective on the value added by headquarters,' *Strategic Management Journal* 34 (9), 1086-1103.

Orekhov, AA. (2014) 'Financial guarantee of the growth of business market value,' *Nauchny rukovoditel* 2 (3), 60-68.

Peteraf, M A. (1993) 'The Cornerstones of Competitive Advantage: A Resource-Based View,' *Strategic Management Journal* 14, 179–191.

Pletnyov, DA. (2014) 'Residual rules of control and income of corporate subjects,' *Stakeholder approach development* 1 (29), 48–63.

Ponomarenko, TV and Korotky, SV. (2015), 'Management of value of mineral resources companies: functions and influence of corporate centre,' *Bulletin of Corporate law, management and venture investment research centre of Syktyvkar state university* 3, 1-14.

Porter, M. (1985) Competitive Advantage: Creating and Sustaining Superior Performance, The Free Press, New York, NY.

Prahalad, CK and Hamel, H. (1990), 'The Core Competence of the Corporation,' *Harvard Business Review* 68 (3), 79–91.

Reshetko, NI and Sokolov, MA. (2014), 'Increasing competitiveness of a differentiated enterprise through the estimation of possibilities to create and increase the efficiency of synergetic interconnections between business units,' *Naukovedenie*, 6 (25), 81.

Roth, K and Nigh, D. (1992), 'The Effectiveness of Headquarters-Subsidiary Relationships: The Role of Coordination, Control, and Conflict,' *Journal of Business Research* 25, 277-301.

Shtefan, VI and Lutchenko TV. (2013), 'The role of corporate centre (block) in ensuring effective work of affiliates, *Innovative vestnik region* 1, 20-23.

Smykov, VV. (2003) 'New trends in corporation development,' *Issues of modern economics*, 3/4 (7/8), 95- 99.

Sokolov, LA. (2014) 'On the role of corporate centre in the management system,' *Vestnik MGUU* 1, 14-18.

Tarasova, IA. (2014) 'Methodological aspects of optimisation of business units within integrated structure,' *Vestnik OrelGIET*, 4 (30), 8-12.

Tsevelev, SA. (2016) 'Cross-functional interaction of holding business units,' *Green Cities Economy* 3, 47-53.

Wernefelt, B. (1984) 'A Resource-Based View of the Firm,' *Strategic Management Journal* 5, 171–180.

Yuchtman, E and Seashore, S. (1967), 'A System Resource Approach to Organizational Effectiveness,' *American Sociological Review* 32, 891-903.

Zietsma, C. and Winn, MI. (2008), 'Building Chains and Directing Flows: Strategies and Tactics of Mutual Influence in Stakeholder Conflicts,' *Business & Society*, 47 (1), 68-101.

Scientific Research Management Developed via 2016 ERA Fellowship and Horizon 2020 ENHANCE Project

Suzana Carmen Cismas PhD, The University of Agronomic Sciences and Veterinary Medicine, The Faculty of Management and Economics Engineering in Agriculture and Rural Development, Bucharest, Romania, suzanacismas@yahoo.com

Abstract

Universities increasingly resemble companies in their competition for learners and resources. To facilitate students and knowledge circulation for mutual benefits of educational systems, science managers spot opportunities and assist in capitalising them. The job profile of the newly-emerged position of science manager in EU academic environments requires advanced skills in identifying and facilitating access to funding and research opportunities. Science managers should not only cater for prestigious researchers with confirmed results, but also for doctoral candidates of visible potential and aptitudes, capable to confirm the investment in perspective. The teaching focus shifts towards modern research and project work, thus enabling the enhancement of dedicated facilities. Science managers closely cooperate with technology consultants, so as to implement all acquired results; in order to do it, proficiently consistent background in international organization is needed, as well as extensive partnering experience with industry networks and SMEs.

Keywords: scientific research management, 2016 ERA Fellowship, H2020 ENHANCE Project

Introduction

Scientific Research Management Fitting H2020 Proposal Evaluations

In accordance with the job profile of the science manager in EU research and academia, which requires advanced skills in identifying and facilitating access to funding & research opportunities, close cooperations with international organisations/associations multiply success odds. Research bases may target topics like safety and security research, advanced computing, resource & energy efficiency, autonomous systems with ambient assisted living, applied science institutes, centres for entrepreneurship, innovation and SMEs management.

Science managers hold a central position in matching resources with opportunities, valuable and available researchers with the key infrastructure they need, funding with adequate projects, ideas with implementation solutions, all meant to comply with the excellence & ethics criteria in H2020 Proposal Evaluations.

Horizon 2020 is an EU R&I Program with more emphasis on innovation and cross-cutting issues. Independent experts play a key role, hence specific measures for granting confidentiality and for avoiding conflicts of interest. In practice, the evaluation procedure follows these steps: individual evaluation, including evaluation criteria and proposal scoring; reaching consensus; panel review and ranking, including proposals with identical total scores.

Calls/Proposals are challenge-based and open to innovative approaches. Calls are less prescriptive as they do not outline the expected solutions to the problem, nor the approach to be taken to solve it. Additionally, topics descriptions allow large scope for applicants to give innovative solutions of their own choice. Greater emphasis is on impact, via expected impact statements: applicants are asked to explain

how work will generate the described impacts and, during the assessment, the evaluator is required to estimate this potential contribution. Critical focus is on innovation: H2020 supports all stages in the research & innovation chain including activities closer to the market and non-technological, social innovation. Proposals may bring together different disciplines, sectors and actors to tackle specific challenges (scientists, industry, SMEs, society partners, stakeholders, and, last but not least, end-users).

Science managers should see that the proposals they assemble and manage obtain marks of 4 or 5, to stand chances in the competition, complying with the following EU interpretation of the scores, seen in http://docplayer.net/23811214-Training-workshop-on-proposal-writing-introduction.html:

- 0 The proposal fails to meet the criterion or cannot be assessed due to missing/incomplete info.
- 1 Poor. The criterion is inadequately addressed, or there are serious inherent weaknesses.
- 2 Fair. The proposal broadly addresses the criterion, but there are significant weaknesses.
- 3 Good. The proposal addresses the criterion well, but a number of shortcomings are present.
- 4 Very Good. It addresses the criterion very well but few shortcomings are present.
- 5 Excellent. It successfully addresses all relevant aspects and any shortcomings are minor.

There is a balanced approach to research and innovation, not limited to developing new products and services on basis of scientific & technological breakthroughs. The use of existing technologies is incorporated in novel applications and constant upgrades/updates, with activities close to market that emphasise the widest possible use of know-how generated by supported activities all trough the commercial exploitation. The spotlight is on activities operating close to the end-users and the market, e.g. demonstration, piloting or proof-of-concept, that include support to social innovation, and support to demand side approaches (standardisation, innovation procurement, user-centred measures) to accelerate the deployment and diffusion of innovative products/services on markets.

Cross-cutting issues are integrated in the work program fusing social sciences, humanities, gender dimensions, strategic approaches to international cooperation, responsible research and innovation including science education, open access to science publications, ethics, standardisation climate change and sustainable development.

2016 ERA Fellowship Training on Scientific Research Management

ERA Fellowship is a German Federal Government Grant for science managers in EU-13 member states. The objective is improving national research systems and their inter-cooperation through providing state of the art training and enhancing networking actions among partner countries. It is awarded by competition and the author's application was filed by IAMO to Leibniz Association as collateral action of H2020 Project ENHANCE, grant agreement 691681, cf. Acknowledgement. The activities in the program target managing scientific research so as to gain fast and wide visibility and to improve the infrastructure of science management capacities in post-communist academic and research organizations. The program is designed for science managers (middle administrative management) from research organisations, research funding organisations or higher education institutions in EU13 area and German counter-parts as host organisations interested in sharing knowledge, and in establishing or expanding networks. In the German science institution the EU13 fellow gets practical experience in science management at expert levels.

As the application stipulated, (www.era-fellowships.de retrieved March 14, 2017, also containing ERA Fellowship Application Materials by IAMO Professor Thomas Herzfeld PhD), ERA Fellow-ship objectives for the IAMO stay aimed at training and using the fellow, author of this article reporting on the project actions, 'as a multiplier in supporting professionalisation of scientific management in the Faculty of Management, Economics Engineering in Agriculture and Rural Development, University of Agronomic Sciences and Veterinary Medicine Bucharest'. She shared viewpoints with colleagues 'on

topics like third-party funding acquisition, administration of third-party funds, public relations, graduate school organisation and scientific events management. She also got the opportunity to learn about the structures and functioning of the German scientific sector while meeting staff members of International Office of Martin-Luther-University Halle-Wittenberg, Leopoldina – Nationale Akademie der Wissenschaften and Nationale Kontaktstelle Lebenswissenschaften. Besides gaining personal practical insights the stay enabled the fellow to broaden her international network with respect to IAMO as well as with respect to other fellows during the campus weeks'. With the support of a reflection report she was able to identify possible innovations for her home institute. The mentor was ENHANCE Project Team Leader Professor Thomas Herzfeld PhD, and all IAMO colleagues working closely with the fellow assisted and provided feedback and reflection so as to reach the best training results. To them all I am indebted and truly grateful as this has proved an extremely effective learning chance.

Overview of the Evaluation Process Presented in 2016 ERA Fellowship

The impact of grant preparation on evaluation is decisive. The time from proposal submission to grant evaluation and signature is set to maximum 8 months. Each proposal is assessed on its merits without grant negotiation phases. Science managers also prevent shortcomings in project drafting that might generate a lower score for the relevant criterion assessment. Evaluators explain short-comings, but do not make recommendations i.e. do not suggest additional partners, additional work packages, or cutting resources. Proposals with significant weaknesses that prevent the project from achieving its objectives or with resources being seriously overestimated never receive above-threshold scores. Any proposal with scores above thresholds and where there is sufficient budget will be selected and successful applicants are invited to address shortcomings.

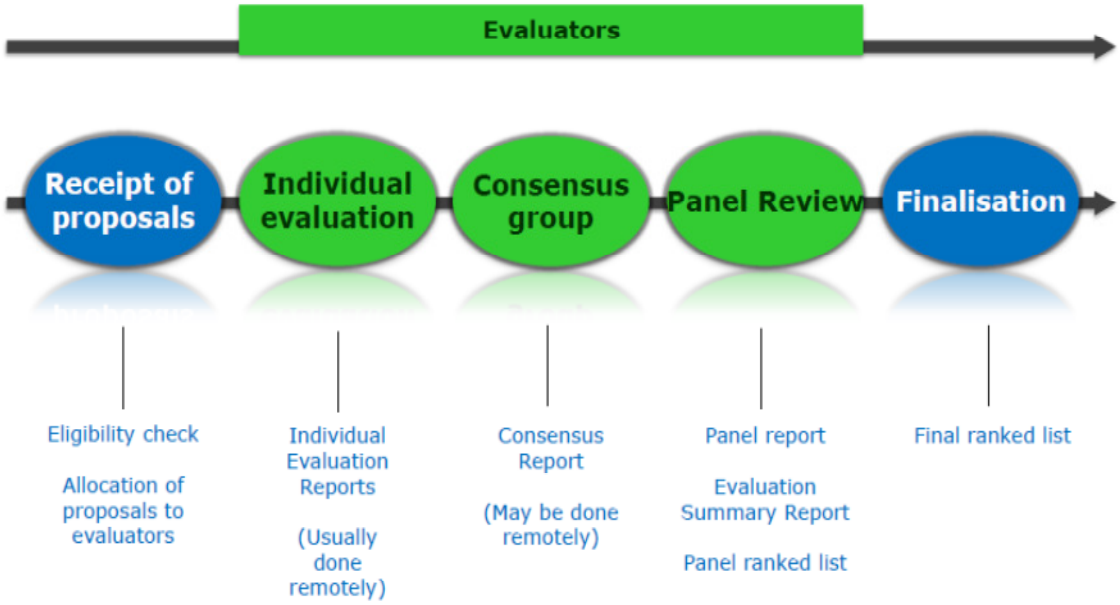


Fig.1. Overview of the evaluation process in EU H2020 Projects, cf. 2016 ERA Fellowship course https://www.slideshare.net/empresaenxarxa/aspectes-clau-sobre-el-mecanisme-davaluaci-de-projectes

The role of independent experts is to evaluate proposals submitted in response to a given call, and they are responsible for carrying out proposals assessments without delegating the work to another person. Reports are closed in the electronic system within a given deadline, as part of the experts' contractual obligations. As significant funding decisions are made on basis of such assessments, experts must report any form of misconduct (e.g. plagiarism, double funding) to EC/Agency staff.

The principles for project assessment are (according with http://docplayer.net/15164429-H2020-rules-for-participation-new-instruments-evaluation-criteria.html):

- Independence (experts assess in a personal capacity, not representing their employer or country)
- Impartiality (proposals are treated equally and evaluated impartially on their merits, irrespective of their origin or the identity of the applicants)
- Objectivity (each proposal is evaluated as submitted: meaning on its own merit, not its potential if certain changes were to be made)
- Accuracy (assessment exclusively on the official evaluation criteria and the call or topic the proposal addresses; nothing else)
- Consistency (the same standard of judgment applied to all proposals).

Confidentiality is kept. Experts must not discuss evaluation matters (proposal content, assessment results, fellow experts' opinions) with anyone, be they other experts or staff in the Commission or Agencies, colleagues or students not directly involved in the proposal grading. The sole exception concerns fellow experts evaluating the same proposal in a consensus group/panel review. Experts must not contact consortium partners, sub-contractors or any third parties.
Experts never disclose names of fellow experts. No link can be made between an expert and a certain proposal since the Commission publishes the experts' names annually, as a group. Paper or electronic documents confidentiality must be maintained at all times and wherever the evaluation work occurs (on-site or remotely).

Pertinent Evaluation Criteria

There are three evaluation criteria for full proposals: excellence (relevant to the description of the call or topic), impact (quality and efficiency of the implementation), and implementation (work plan effectiveness, including the extent to which resources assigned in work packages are in line with objectives and deliverables). The criteria are adapted to each action type as specified in WP.

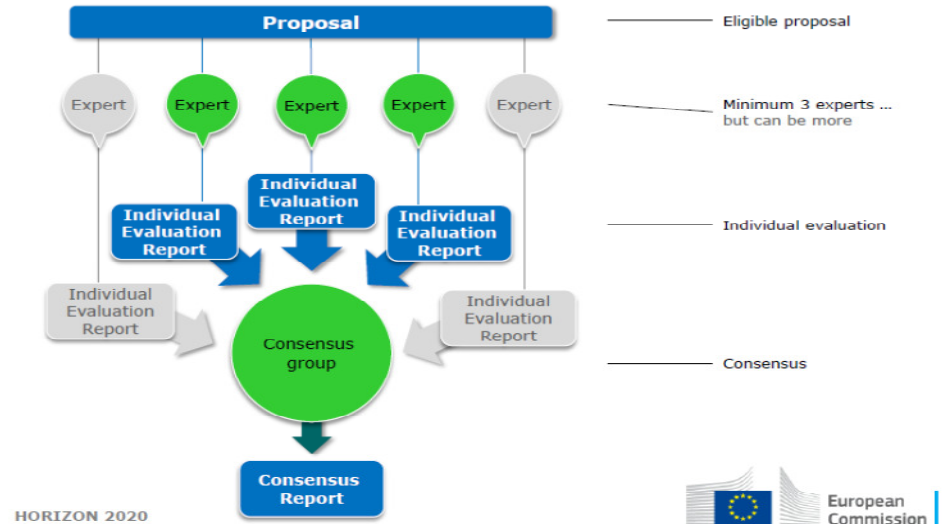


Fig. 2. Diagram of assessment steps in EU H2020 Projects, cf. the European Commission
http://docplayer.net/47255378-Horizon-2020-proposal-evaluation-standard-briefing.html

Admissibility, eligibility checks & additional requirements should be readily accessible; proposal completeness and the presence of all required forms are verified, as well as the inclusion of a plan for results exploitation and dissemination. Eligibility is checked by the Commission/Agency, who focus on the minimum number of partners, as set out in the call conditions, and on other criteria that may apply on a call-by-call basis as delineated in the call conditions.

Excellence is the first criterion hereby analysed. It reveals the extent to which the proposed work corresponds to the topic description in the work programme: clarity and pertinence of objectives; concept soundness and credibility of proposed methodology; the proposal being beyond the state of the art, and demonstrating innovation potential (e.g. ground-breaking objectives, novel concepts and approaches, new products, services or business and organisational models); appropriate consideration of interdisciplinary approaches and, where relevant, use of stakeholder knowledge.

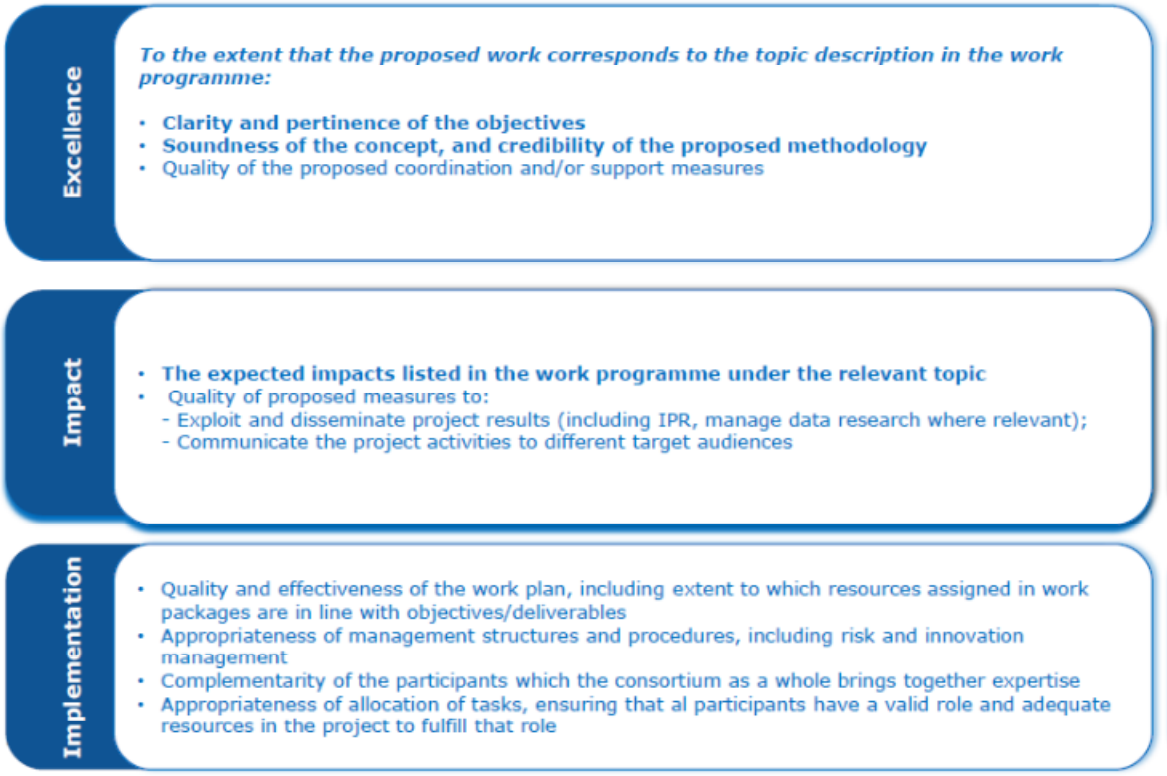


Fig. 3. The excellence criterion within the framework of evaluation criteria in EU H2020 Projects

cf http://docplayer.net/11573603-Sesar-2020-exploratory-research-info-day-proposals-submission-evaluation-programme-management-requirements.html

Impact shows the expected consequences listed in the work program under a certain relevant topic. It includes any substantial outcomes not mentioned in the WP that would enhance the innovation capacity, create new market opportunities, strengthen competitiveness and growth of companies, address issues related to climate change/environment and bring further relevant benefits to society.
The quality of proposed measures to communicate project activities to various target audiences and to exploit &disseminate project results including data research management is highly relevant.

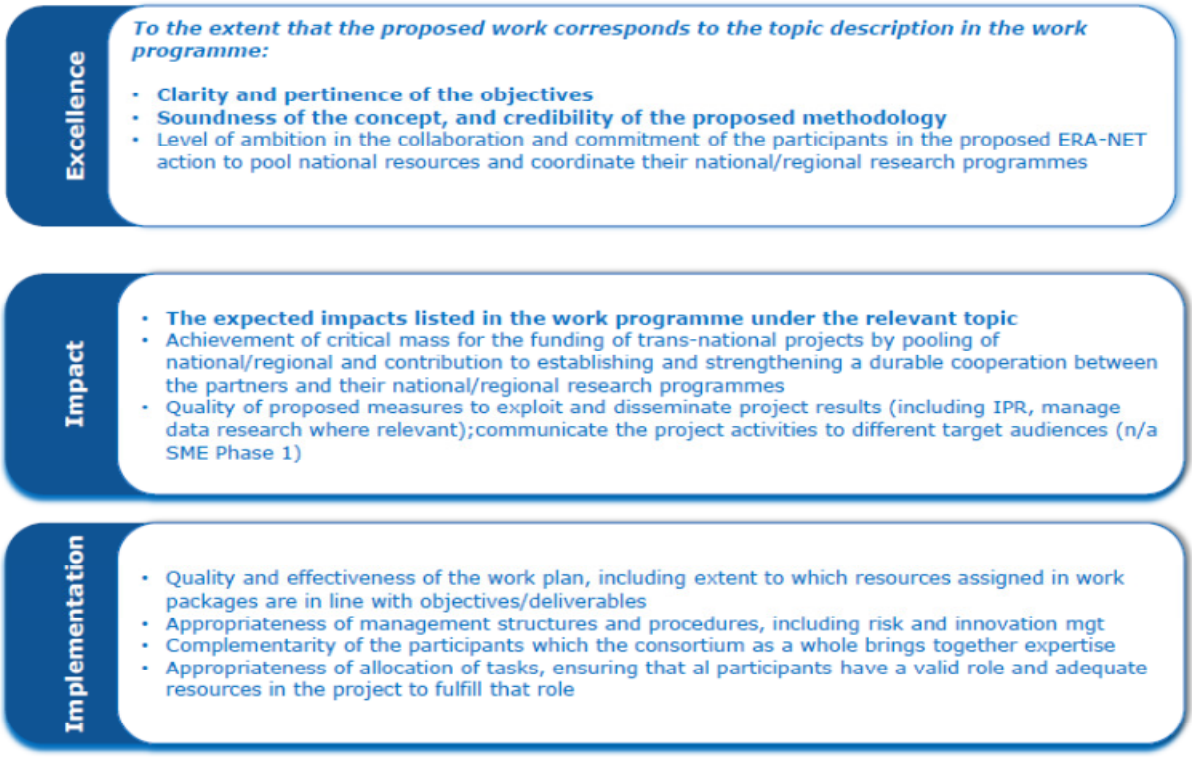


Fig. 4: The impact criterion within the framework of evaluation criteria in EU H2020 Projects
cf. http://docplayer.net/14960201-Guide-for-applicants.html

Implementation focuses on quality & effectiveness in the work plan, including the extent to which resources assigned in work packages are in line with objectives and deliverables. It deals with the appropriateness of management structures and procedures, including the management of risk and innovation. Complementarity of the participants' expertise which the consortium as a whole brings together is a factor of interest. Last but not least, appropriateness of tasks allocation ensuring that all participants have a valid role and resources in the project to fulfil that given role is assessed.

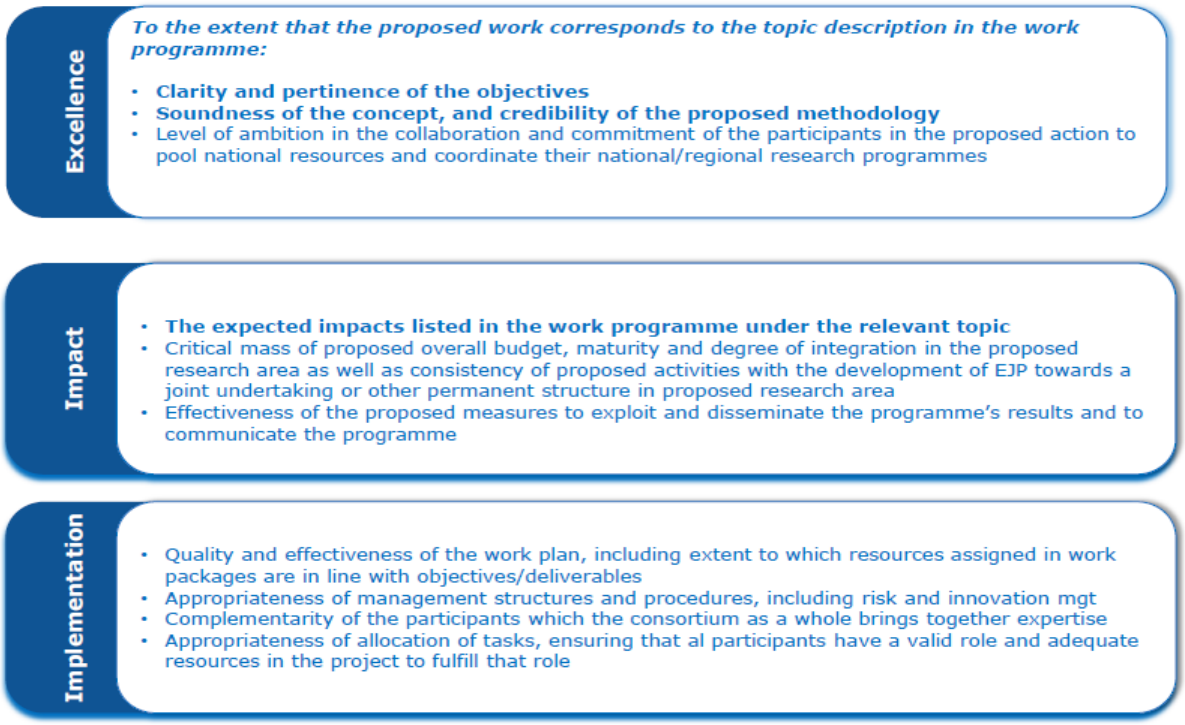


Fig. 5: The implementation criterion in the framework of evaluation criteria in EU H2020 Projects

cf. http://docplayer.net/23946515-Participant-portal-and-practicalities-from-idea-to-bbi-project.html

The operational capacity is assessed as part of the individual evaluation where the expert expresses views on whether each applicant possesses the necessary basic operational capacity to carry out their proposed activities based on the information provided. At the consensus group, experts consider whether applicants lack basic operational capacity. Proposal scoring is assigning marks of between 0 and 5 to each criterion based on expert's comments; the whole range of scores must be used with steps of 0.5; scores must pass thresholds if a proposal is to be considered for funding. Thresholds apply to individual criteria. The default threshold is 3 and the default overall threshold is 10 (unless specified otherwise in the WP). For Innovation actions and the SME instrument, the criterion Impact is given a weight of 1.5 to determine the ranking.

Individual evaluation concerns the substance: some proposals might be handicapped by language difficulties, others deceptively well written, so read the proposal&evaluate it against the evaluation criteria and check to what degree the proposal is relevant to the call or topic. If a proposal does not significantly contribute to the expected impacts as specified in the WP for the call/topic, the expert reflects it in a lower score. If cross-cutting issues are explicitly mentioned in the scope of the call and not properly addressed (or their non-relevance justified), it will reflect in a low score for the relevant criterion. A successful proposal is expected to address them, or convincingly explain why they are not relevant in a particular case. Proposals addressing cross-cutting issues which are not explicitly mentioned in the scope of the call or topic can also be evaluated positively.

Achieving consensus usually involves a discussion on basis of the individual evaluations. For full proposals, it is most effective if experts do not immediately converse it on the average score. For first stage proposals, the average is a starting point. The aim is to find agreement on comments and scores, and

agreement on comments should precede scores. Outlying opinions need to be explored as they may be just as valid as others, so experts need to be open-minded.

Consensus is moderated by Commission/Agency staff (or by an expert in certain cases), as they are neutral and manage the evaluation, protect confidentiality and ensure fairness, alongside with objectivity and accuracy, with all voices heard and points discussed, not to mention the fact that a moderator helps the group keep to time and reach consensus.

The consensus report is drafted by the rapporteur who, in some cases, may not take part in the discussion. The document provides clear proposal assessment based on its merit, with justification and clear feedback on its weaknesses & strengths, with explanations of shortcomings, but without making recommendations. In a consensus-targeting debate certain approaches are ineffective and they should be avoided: comments not related to the criterion in question; comments too long, or too short and inappropriate language; categorical statements that have not been properly verified; scores that do not match the comments; marking down a proposal for the same critical aspect under two different criteria. Applicants will read these comments and, on this basis, they can challenge the evaluation through the evaluation review procedures.

The panel review consists of experts from the consensus groups and/or new experts. It ensures the consistency of comments and scores given at the consensus stage and resolves any cases where a minority view is recorded. The panel review endorses final scores&comments for each proposal and any new ones, if necessary, must be clearly justified before being noted. Then it recommends a list in priority order, prioritises proposals with identical total scores, and may hold hearings at which applicants are invited to present their proposal. The panel orders them according to their score for Excellence and then the score for Impact.

If there are ties, the panel takes into account the following factors: first, the absolute EU budget allocated to SMEs, second, the gender balance of personnel doing research and innovation activities; if there are still ties, the panel agrees further factors to consider, e.g. synergies between projects or contributions to the objectives H2020. The same method is then applied to proposals that address topics that are already covered by more highly-ranked proposals.

Observers appointed by the Commission/Agency may attend any meetings or monitor remote evaluation, to ensure high quality assessment; they check overall process functioning and advise, in their report, on the conduct & fairness of the evaluation sessions (1st stage or 2-stage processes) and, if necessary, suggest possible improvement. They do not assess proposals, so do not express any opinion on their quality but they may raise questions and full support should be given to them.

The ethics review is important as only proposals complying with the ethical principles&legislation may receive funding. For proposals above threshold and considered for funding, ethics screening and, if necessary, ethics assessment is performed by independent ethics experts/qualified internal staff in parallel with the scientific evaluation or soon afterwards. Proposals involving the use of human embryonic stems cells automatically undergo an ethics assessment. For those proposals in which one or more ethical issues have been identified, the experts will assess whether the ethics issues are adequately addressed. The ethics experts produce an ethics report and give an opinion on the proposal, granting ethics clearance, recommending the inclusion of ethics requirements in the grant agreement, or recommending a further Ethics Assessment and/or an Ethics Check/Audit.

Types of Actions

The Research and Innovation Action primarily consists of activities to establish new knowledge and/or explore feasibility of new or improved technology, product, process, service or solution. It may include

basic and applied research, technology development and integration, testing and validation on small-scale prototypes in laboratory or simulated environment. Projects may contain closely connected but limited demonstration or pilot activities to show technical feasibility in a near to operational environment.

The Innovation Action consists of activities that produce plans&arrangements or designs for new, altered or improved products, processes or services. It could include prototyping, demonstrating, testing, piloting, large-scale product validation and market replication, as it aims to validate the technical & economic viability in a (near) operational environment or support the first application on the market of an innovation that has already been demonstrated but not yet deployed on the market due to market failures/barriers to uptake. Such projects include limited research activities.

SME Instrument phase 1 deals with feasibility studies verifying the technological/practical as well as economic viability of innovation idea/concept with considerable novelty to the industry sector in which it is presented (new products, processes, design, services and technologies or new market applications of existing technologies). Activities target risk assessment, user involvement, market study, intellectual property management, innovation strategy development, partner search, concept feasibility to establish a solid high-potential innovation project aligned to enterprise strategy and having a European dimension. Bottlenecks in increasing enterprise profitability by innovation shall be detected and analysed during phase 1 and addressed during phase 2 to increase the return in investment in innovation activities.

SME Instrument phase 2 envisages innovation projects that address a specific challenge and demonstrate high potential in terms of company competitiveness and growth underpinned by a strategic business plan. All activities focus on innovation such as demonstration, prototyping, piloting, scaling-up, miniaturisation, design, and market replication, aiming to bring an innovative idea (product, process, service) to industrial readiness and maturity for market introduction; it may also include some research. Under exceptional circumstances, duly justified by the character of an area, a topic may provide for actions where the research component is strongly present, as an alternative to the innovation actions above. SMEs can subcontract work and knowledge that is essential for their innovation project in the spirit of the innovation voucher concept. Proposals should be based on a strategic business plan developed through phase 1.

Coordination & Support Actions consist in accompanying measures: standardisation, awareness-raising and communication, dissemination, networking, coordination or support services, policy dialogues , mutual learning exercises and studies, including design studies for new infrastructure; they may also include complementary activities of strategic planning, networking and coordination between programmes in different countries

ERA-NET Co-fund supports public-public partnerships, including joint programming initiatives between member states, establish networking structures, design, implement and coordinate joint activities as well as EU topping-up of trans-national call for proposals. The main activity is the implementation of the co-funded joint call for proposals that leads to the funding of transnational research and/or innovation projects. In addition, consortia may implement other joint activities e.g. joint calls without EU co-funding. Depending on the research area and the underlying national programmes and their governing principles, they target governmental research organisations. The co-funded call will be based on contributions from their institutional funding and the beneficiaries carry out the transnational projects resulting from their call fully or partially themselves.

Pre-Commercial Procurement Actions encourage public procurement of research, development and validation of new solutions that can bring significant quality and efficiency improvements in areas of public interest, while opening market opportunities for industry and researchers. It gives EU co-funding for groups of procurers to undertake together one joint PCP procurement, so that there is one joint call for tender, one joint evaluation of offers, and a lead procurer awarding the R&D service contracts on behalf

of the group. Cross-border PCP cooperation must address issues of common EU interest where interoperability & coherence of solutions across borders is required.

Public Procurement of Innovative Solutions Actions enable groups of procurers to share the risks of acting as early adopters of innovative solutions in opening market opportunities for industry. Each action targets a concrete need shared by all participants and requires the innovative solution deployment to a significant extent similar across countries hence proposed to be procured jointly. It means that the innovative solutions got by all in the group must have the same core functionality and performance characteristics, but may have additional 'local' functionality due to differences in the local context of each individual procurer.

Conclusions

Wide-ranging decisions at EU level envisaging institutions and organizations influence creativity in scientific research. At team level, creative accomplishments occur in small groups, in contexts with sufficient access to complementary technical skills, under stable research sponsorship terms, with timely obtained resources and outsourced skills, in the framework of facilitating leadership. A potential institutional threat to creative science is the increase in competitive research funding at the expense of flexible institutional sponsorship. Implications may become dramatic for research management and for national research policies.

Creative scientific outcomes followed by fast implementation for enhanced societal change, as H2020 outlines, are influential in shaping new, cutting-edge research environments. EU research policymakers need to know more about the factors contributing to scientific progress in step with the substantial changes seen in the last decades in the conditions of conducting research. Public research funding is now increasingly allocated via competitive processes rather than long-term institutional block grants; enhanced research collaboration is encouraged in a variety of measures including organized research centres, networks, excellence centres, and inter-disciplinary teams, to address the diverse challenges we currently face (complexity, convergence, knowledge exchange, scale, scope, and internationalization in contemporary science). Research performance assessment systems are implemented as a supplement to peer review.

In the context of heightened competitive pressures to foster science-driven business development and the rise of new global locations for research, policymakers in developed economies hope that adjustments to research organizations and broadened institutional environments for science will promote efficiency as well as scientific excellence and creativity. Research groups conduct work according to team features like size, members' careers and levels, organizational variables and environment where they operate with typical leadership, funding structures, competitive pressures.

H2020 facilitates organizational and institutional influences on scientific creativity including work group factors, like research group size or communication patterns, and organizational issues such as sponsorship or inter-disciplinary variety. Research management and research policies enhance creative knowledge environments.

The scientific community is aware of the fact that novel ideas of value need validation in time and by other scientists. Creative processes, including the selection of problems, methods, partners and knowledge sources, are key areas of inquiry. Innate individual traits spur creative processes which are facilitated by opportunity structures in collaboration networks that enable the generation and diffusion of new ideas. Networking favours people placed at the intersection of heterogeneous social groups with increased likelihood of drawing upon multiple knowledge sources, leading to the generation of new concepts; hence managers who occupy brokerage positions are more often than others the source of good ideas. Cohesive collaborative networks provide the benefits of trust, shared risk taking, and easy

mobilization in facilitating information and knowledge transfer. Therefore individuals with cohesive social ties are more likely to be involved in innovations. The network structure itself has to be suitable for diffusing ideas and this is what H2020 Projects strive to achieve: network structures that enhance novelty generation, also able to increase propagation.

Considerations of research environments add further elements of organizational and institutional nature to the examination of scientific creativity. Research environments influence opportunities for collaboration and multi-disciplinary approaches, which in turn affect processes of knowledge discovery. Organizational and institutional issues stimulate creative research situations: autonomy for researchers, adequate facilities and funding, development of complementary disciplines and fields, staff selection, management structures, and leadership. Obstacles include: insufficient basic funding, limited time for research, bureaucratic management, narrow range of subject expertise, and excessive evaluation and accountability pressures. Research productivity is correlated with the high frequency of intra-organizational communication, across disciplinary and thematic lines, with strategies for integrating scientific diversity with rigorous standards of scientific excellence.

Further strategies for intellectual integration within the limits of an organization are mobility of researchers and inter-department teamwork. Problems in productive research climates stem from human resources, instrumentation and funding. Effective dialogues with other groups that have complementary knowledge and expertise lead to accomplishing more numerous creative events. Effective group leaders bridge seemingly unrelated knowledge areas, carefully select new group members for their merits and attributes, have the flexibility to address new problems or ideas that arise, and help post-docs with good ideas to attract funds so they can become self-sustaining. Team Leaders prove good intuition about the right measure of risk to take on with their new idea, and provide a protected area under which group members conduct their research. The variables at the organizational and institutional level must be understood as interrelated contributing influences rather than as independent, cumulative factors.

Acknowledgment

This article is a dissemination report on development steps and outcomes of two projects: H 2020 Project ENHANCE, grant agreement no. 691681, and 2016 ERA Fellowship, whose overall aims it reflects and accomplishes. For H2020 Project ENHANCE deep appreciation goes to Project Team Leader Professor Gina Fintineru PhD, USAMV Research Vice-Rector. For 2016 ERA Fellowship the mentor was IAMO Project Team Leader Professor Thomas Herzfeld PhD, a role model for academic competence and performance.

References

www.agroscope.admin.ch retrieved January 22, 2017
www.bmbf.de retrieved February 2, 2017
www.boku.ac.at retrieved February 17, 2017
www.cost.eu retrieved March 9, 2017
www.era-fellowships.de retrieved March 14, 2017, also containing ERA Fellowship Application Materials by Professor Thomas Herzfeld PhD & Associate Professor Suzana Carmen Cismas PhD
www.enhance-project.ro retrieved April 10, 2017
www.europa.eu retrieved January 28, 2017
www.iamo.de/en retrieved April 19, 2017
www.summerschoolsineurope.eu retrieved May 7, 2017
Blau, J., 2005. Europe seeks greater creativity in basic research. Research Technology Management May–June, 2–3.
Bourke, P., 1999. The efficacy of different modes of funding research. Research Policy 28, 489-99

Chesbrough, H., 2003. Open innovation, new imperative for creating&profiting from technology. Harvard Business School Press, Boston.
Corley, E., Boardman, P.C., Bozeman, B., 2006. Design and the management of multi-institutional research collaborations. Research Policy 35 (7), 975–993.
Etzkowitz, H., 2003. Research groups as 'quasi-firms': invention of the entrepreneurial university. Research Policy 32 (1), 109–121.
Fleming, L, Mingo, S, Chen, D., 2007. Collaborative brokerage, generative creativity, and creative success. Administrative Science Quarterly 52, 443–475.
Heinze, T., 2008. How to sponsor ground-breaking research: a comparison of funding schemes. Science & Public Policy 35, 302–318.
Heinze, T, Kuhlmann, S, 2008. Across institutional boundaries? Research collaboration in German public sector. Research Policy 37, 888–899.
Hemlin, S., Allwood, C., Martin, B., 2004. Creative knowledge environments, the influences on creativity in research and innovation. Edward Elgar, Cheltenham, UK.
Jansen, D. (Ed.), 2007. New forms of governance in research organizations, from disciplinary theories towards interfaces and integration. Springer, Dordrecht.
Langfeldt, L., 2001. The decision-making constraints and processes of grant peer review, and their effects on the review outcome. Social Studies of Science 31, 820–841.
Laudel, G., 2006. The art of getting funded: how scientists adapt to their funding conditions. Science and Public Policy 33, 489–504.
Lepori, B., Besselaar, P, Dinges, M, Potì, B, Reale, E, Slipersæter, S, Thèves, J, Meulen, B., 2007. Comparing the evolution of national research policies and patterns of change. Science and Public Policy 34, 372–388.
March, J, 1991 Exploration&exploitation in organizational learning Organization Science 2, 71-87
Mumford, M.D., Scott, G., Gaddis, B., Strange, J.M., 2002. Leading creative people: orchestrating expertise and relationships. The Leadership Quarterly 13, 705–750.
Owen-Smith, J., 2003. From separate systems to a hybrid order: accumulative advantage across public and private science at research one universities. Research Policy 32 (6), 1081–1104.
Rodan, S, Galunic, C, 2004 More than network structure: how knowledge heterogeneity impacts managerial performance and innovativeness. Strategic Management Journal 25, 541–562.
Schimank, U., 2005. New public management and the academic professions: reflections on the German situation. Minerva 43, 361–376.
Thèves, J., Lepori, B., Larédo, P., 2007. Changing patterns of public research funding in France. Science and Public Policy 34, 389–399
Van Leeuwen, T., Tijssen, R., 2000. Interdisciplinary dynamics of modern science: analysis of cross-disciplinary citation flows. Research Evaluation 9 (3), 183–187
Windolf, P., 1997 Expansion&structural change: higher education in Germany, the US, and Japan, 1870–1990. Westview Press, Boulder

The Scenario of Waqf in Malaysian Higher Education Institutions

Abd Rahman Ahmad
Faculty of Technology Management and Business
Universiti Tun Hussein Onn Malaysia
Parit Raja, Batu Pahat, Johor
arahman@uthm.edu.my

Azizah Baharudin
Faculty of Technology Management and Business
Universiti Tun Hussein Onn Malaysia
Parit Raja, Batu Pahat, Johor
mankuittho@yahoo.com

Ng Kim Soon
Faculty of Technology Management and Business
Universiti Tun Hussein Onn Malaysia
Parit Raja, Batu Pahat, Johor
ksng@uthm.edu.my

Khairunesa Isa
Centre for General Studies and Co-Curricular
Universiti Tun Hussein Onn Malaysia
Parit Raja, Batu Pahat, Johor
nesa@uthm.edu.my

Rosman Md. Yusoff
Centre for General Studies and Co-Curricular
Universiti Tun Hussein Onn Malaysia
Parit Raja, Batu Pahat, Johor
rosmanmy@uthm.edu.my

Abstract

Waqf in the education sector is no stranger because its implementation has been implemented starting from establishment of traditional educational religious-oriented such as *Sekolah Agama Rakyat* (SAR), *Sekolah Agama Negeri* (SAN) and madrasah or *Sekolah Pondok.* However, implementation of these waqf at the higher education institution level is still new. There are only few of university that have been running these waqf activities currently include Universiti Putra Malaysia (UPM), Universiti Sains Islam Malaysia (USIM), Universiti Teknology Mara (UiTM), Universiti Kebangsaan Malaysia (UKM), Universiti Teknikal Malaysia Melaka (UTeM) and Universiti Islam Antarabangsa (UIAM). This study will used mixed method include qualitative and quantitative to get the detail information. This study purposed to find out more detail about the waqf activities at Malaysian public university.

Keywords: Waqf, Public Universities, Endowment, Funding, Education Waqf

1. Introduction

Waqf in the education sector has started from the establishment of traditional education institutions based on Islamic religion school such as Sekolah Agama Rakyat (SAR), the School of Religious Affairs (SAN), madrasah and cottages (Asmak, 2009; Mustaffa & Muda, 2014). In addition,

Muslims are encouraged to give the land for development of Muslim community through the education and to help other Muslim in need. The types of waqf for education is usually in a form of asset such as land, houses, buildings, books, mosques and other that give fully benefit for the purpose of studying (Hisham Sabri, 2007; Mustaffa & Muda, 2014). According to Mohd Jelani (1998) and Mustaffa and Muda (2014), the beginning of waqf activities for education is started in Johor Bahru where the request of waqf is to meet the requirements of religious schools integrated.

The passage of time shows the development of waqf activities in education no longer focused on religious education but growing to the general education sector (Utusan Malaysia, 2012). The development of waqf activities in education sector already consist of the higher education in public and private institutions. An example of successful in implementation of waqf in education is Al-Azhar University where it can cover university expenses using the waqf funds. Another example is Pondok Modern Darussalam Gontor (PMDSG) in Indonesia and Al-Fateh University in Turkey (Raja Ramli & Abd Hamid, 2014). All these universities use the waqf fund in finance their education sector. According to Ali and Wahid (2014), the research about waqf is less explored in the context of higher education institutions. The waqf focused studied in the field of religious institutions including in the school level (Mujani et al., 2014). Here, this research difference with other research because it further explores more to the current scenario of waqf implementation at Malaysian higher education institutions nowadays; that least discussed in the previous research.

2. Literature Review

In Malaysia, Waqf started from traditional endowments, including land, buildings, schools, mosques and consists of fixed assets. However, the development of the endowment has grown along with the development of the country in which the changes in waqf activities that are more focused on cash waqf are more effectively (Alhabshi & Abdul Razak, 2012).The difficulties to get property caused an innovation of waqf from the property to cash. Cash waqf is refer to the endowment based on money or certificate that usually be used in the finance to do charitable and welfare such as investment (Aziz et al., 2013; Ismail et al., 2014; Johari & Haji Alias, 2013; Nurrachmi, 2012). According to Ismail et al. (2014), the concept of cash waqf is the collection cash money and can be converted to a permanent property that can be used for welfare and also community.

In education institution in Malaysia, there are five public university that has been implemented the waqf activities and the others universities that committed to the future application of this waqf. Among them is the University Putra Malaysia (UPM), which was established a “Dana Wakaf Ilmu”, Universiti Kebangsaan Malaysia (UKM) has establish the UKM Endowment fund, Universiti Teknologi Malaysia (UTM) set up the UTM Endowment fund, Universiti Sains Islam Malaysia (USIM) with Al-Abrar USIM Waqf Fund, and Universiti Islam Antarabangsa Malaysia (UIAM) with IIUM Endowment Fund (Noor Inayah, 2014; Najibah Mustafa, 2014; Siti Zakiah, 2014; MoE, 2015). However, there are two university that are committed and already implement the waqf activities that are University Teknology Mara (UiTM) and University Teknikal Malaysia Melaka (UTeM).

Wakaf Ilmu UPM involve in the cash waqf where the cash received than will be allocated to Dana Wakaf Ilmu UPM fund. The objective of “Wakaf Ilmu UPM” department is to be an organizer for the sadakah and development of knowledge through the contribution and waqf activities, encourage the community to do the charity, and play a role as a facilitators in the practice of charity include the waqf. Besides that, the university can raise fund through the contribution of waqf and gift for university facilities. Furthermore, at Universiti Kebangsaan Malaysia (UKM) and Universiti Teknologi Malaysia (UTM) waqf activities have been managed under its owned Endowment Fund. University Technical Malaysia Melaka (UTeM) has compiled a strategic plan in mobilizing

university generating income activities through the establishment of an endowment fund to raise funds based on the donations from corporate, alumni, staff and the public. The function of this fund is as alternative to UTeM citizens and alumni also the general public in contributing a sum of money or financial aid to cover the various activities or programs which could give benefit for all based on the concept of charity. UiTM is the first university in Malaysia to be allowed to carry out the collection and distribution of zakat, and only collection for charity and waqf. This operation was conducted by the Center for Zakat, Sadaqah and Waqf (PZWS), the Academy of Contemporary Islamic Studies (ACIS).

However, based on the previous scholars, these studies faced the same problem in order to further explore in depth about the waqf model and it concept in higher education institutions. There are some challenges or issues that need highlight in this research based on the waqf implementation. The first is the term of management system. The management of waqf is important factors that influence the waqf implementation. However, the lack of management the waqf fund generated inefficiently (Ali & Wahid, 2014). Second is in financial terms. The weak in financial system caused the waqf property or cash waqf not develop and rise (Azha et al., 2013). The strong fund helps the institutions to do a lot of research and also promotion for fundraising campaign. Third is in the term of specialist unit (Azha et al., 2013). Not have any specialist unit for waqf can caused the week in planning the sources, manage the fund, and make decision to generate income. Fourth is in the term of marketing. Marketing is help to spread information about waqf in community. Lack in marketing activities affects the number of contributors involved in activities (Ali & Wahid, 2014). Fifth challenge is in the term understanding and knowledge of society. The knowledge of community about waqf in education is low and mostly not really understands the concept of waqf for education (Mustaffa & Muda, 2014)

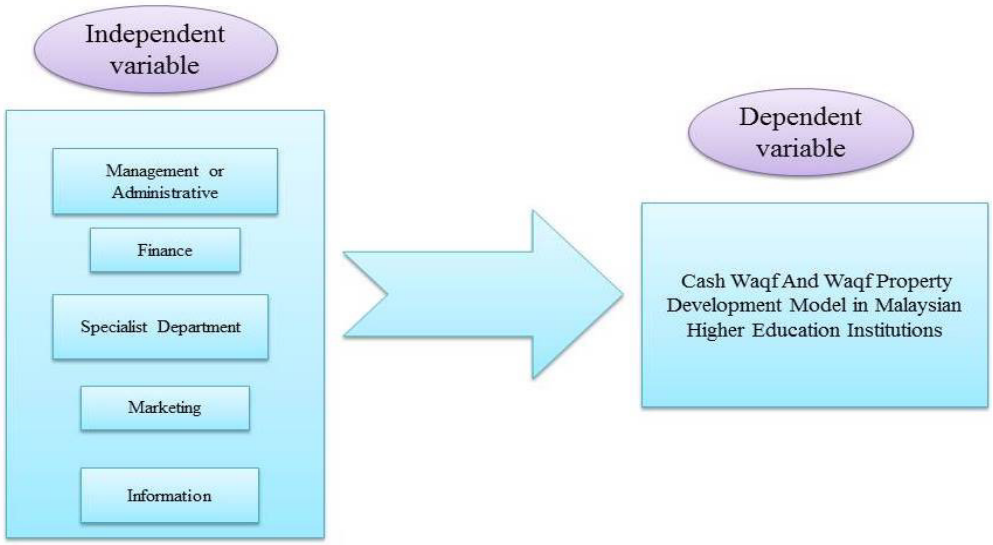


Figure 1: Conceptual Framework of Study

According to Ahmad Zaki (2006) there are five factors that influence the waqf activities will became the independent variables. The independent variables that be analyse are: (1) Management and administrative, (2) finance, (3) specialist in department, (4) marketing and (5) information. These factors will lead the Cash waqf and Waqf Propety development model in Malaysian Higher Education Institutions (HEIs). These Cash waqf and Waqf Propety Development Model in Malaysian Higher Education Institutions (HEIs) became the variables in this research.

3. Methodology

This research will be using mixed method approaches which are qualitative and quantitative method. In the qualitative method, information is gained from semi-structured interview among the respondents. This approach supposed to give a detail understanding about the topic. While, in the quantitative method, information are gained from the questionnaire survey given to the targeted respondents which are from the public universities that are new to the waqf implementation. These approaches help in understanding and collecting information or problem that happen before its implementation of waqf.

4. Results

The implementation of waqf in Malaysian Public University can be described as the beginning or first stage in the waqf activity where the university still focused on searching the information about the waqf implementation from the other country that already successful. However, it has some barriers in the waqf implementation caused difficulty to implement it in all the public universities. The waqf development still tied with the basic concept where the community thought that the waqf is only for mosque, the site for primary school and secondary school and cemetery. In addition, the contributions from outside education sector such as corporate and private company still not have any response. If had, they just want something such as reward, a good name and others that can give benefit them.

The management systems for the waqf activities in higher education institutions are still not strong where institutions are still looking for a waqf system that is suitable to be implemented in higher education institutions. They also still combined with the bursary department to collect, find the sources and distribution of waqf fund. They still not move by themselves yet for this the waqf activity. The financial are important in ensuring the success and failure in this waqf activity. Strong financial helps the higher education institutions to do a lot of research and also promotion on the waqf implementation for fundraising campaign. In addition, the waqf activities should focus on activities itself in terms of the sources of waqf fund, fund accumulation and distribution of the fund. In the sources of fund, communities still not involved in waqf activities in contribute the fund under the term of waqf fund. While, students and university management is a major of receiver for waqf fund in higher education institutions.

The organisational structure plays an important role in conducting waqf activities productively to ensure it can be developed. Moreover, a special body should be set up to manage the waqf fund and control all waqf activities. However, the lack of staff is not a major problem but most of the universities lack the skilled staff and had to search for information from foreign countries. The purposed of marketing is help to spread of information for waqf activities in community. Marketing activities can help to expand the collection of waqf funds from community, universities staff and corporate company. The promotion activities also play a role to improve the collection of waqf funds other than to providing information to the public. However, the promotion in all the universities is still low and focused only internal staff. It will influence the amount of wakaf fund obtained by each university.

The understanding and knowledge of society towards the waqf implementation in higher education slightly increase. They start understand the benefit of this waqf activities for university and also student. Many efforts are suggested to increase the understanding of the community to be more active to get involved in these waqf activities. Each university that has been implemented waqf have different modus operandi or waqf activity proses but still follow the real concept of waqf. Most public universities have started the waqf activities with implemented cash waqf and just a few of universities beginning with the waqf property. Most of the universities get their fund from the universitiy alumni, staff, community, corporate company and other contributor. Then the fund will manage by the unit waqf in each of university and the bursary will collect all existing waqf fund. The staff and university management a major recipient of waqf fund other than the local community in need.

5. Conclusions

The implementation of Waqf in education sector becomes very important nowadays because it help the universities to cover the additional coast while reducing reliance on government funding. The history has shown that the practice of waqf in education institutions has grown over the years among Muslims in Malaysia where it has been started since the arrival of Islam in the Malay world but regarded as a positive tradition that should be expanded (Yaacob, 2013). In addition, the waqf implementation in Malaysian Higher Education Institution gives the good impact in term of funding where the universities no need reliance to the government fund. However, there are some factors that should be considered by institutions before implement the waqf because the concept is still new in higher education institution.

Acknowledgments

This work was supported by Universiti Tun Hussein Onn Malaysia (UTHM) under MDR Grant No U096.

References

[1] Ab Aziz, M. R., Yusof, M. A., Johari, F., Ramli, A., & Sabri, H. (2014). The Relief of Higher Education Loan through Islamic Waqf Bank. Asian Social Science, 10(22), p175.

[2] Alhabshi, S. O., & Abdul Razak, S. H. (2012). Wealth Planning and Management (M. T. Md Ibrahim Ed. 2012 ed.). International Center For Education in Islamic Finance (INCEIF).

[3] Ali, S. Z., & Wahid, H. (2014). Peranan dan Kepentingan Dana Wakaf Institusi Pendidikan Tinggi di Malaysia. PROSIDING PERKEM ke-9 (2014) 216 - 225(ISSN: 2231-962X).

[4] Azha, L., Baharuddin, S., Salahuddin, S., & Afandi, M. R. (2013). The Practice and Management of Waqf Education in Malaysia. Procedia-Social and Behavioral Sciences, 90, 22-30.

[5] Hilmiyah, N., & Mohd Shafiai, M. H. (2013). Wakaf Produktif dalam Pembangunan Pendidikan: Kajian di Pondok Moden Darussalam Gontor, Indonesia Waqf Productive in Development Education: A Case Study at Pondok Modern Darussalam Gontor, Indonesia. PROSIDING PERKEM VIII, JILID 3 (2013) 1302 - 1314, ISSN: 2231-962X.

[6] Johari, F., & Haji Alias, M. (2013). Potential Of Waqf Funds and Instruments in Contemporary Economic System. Paper Proceeding of the 5th Islamic Economics System Conference

(iECONS 2013), "Sustainable Development Through The Islamic Economics System", Organized By Faculty Economics And Muamalat, Universiti Sains Islam Malaysia, Berjaya Times Square Hotel, Kuala lumpur.

[7] Mohd Puad, N. A., Jamlus Rafdi, N., & Shahar, W. S. S. (2014). Issues and Challenges Of Waqf Instruments: A Case Study In MAIS.

[8] Mohd Ramli, A., & Mohamad, M. O. (2013). An Overview of Public Funding for Higher Learning Education in Malaysia and the Prospect of Waqf Funding.

[9] Mujani, W. K., Taib, M. S. M., & Yaakub, N. I. (2014). Educational Waqf (Islamic Endowment) in Malaysia. Lecture Notes in Management Science Volume 31, 117.

[10] UKM. Endowment Fund. Web Page. Fromhttp://www.ukm.my/ptsl/dana-endowmen

[11] UPM. Dana Wakaf Ilmu UPM. Web Page. From http://www.fund4knowledge.upm.edu.my/ezakatputra/index.php?option=com_content&view=article&id=72&Itemid=175

[12] UTM. UTM Endowment Fund. From http://ebendahari.utm.my/bendahari/index.php?option=com_content&view=article&id=150&Itemid=868

[13] Yaacob, H. (2013). Waqf History and Legislation in Malaysia: A Contemporary Perspective Journal of Islamic and Human Advanced Research, Vol. 3(Issue 6).

[14] Yaakub, N. I. (2014). Mencorakkan kejayaan wakaf pendidikan. From utusan.com.my/utusan/Rencana/20140613/re_03/Mencorakkan-kejayaan-wakaf-pendidikan

[15] Zuki, M. S. M. (2012). Waqf and Its Role in Socio-Economic Development. ISRA International Journal of Islamic Finance, 4(2).

[16] Utusan Malaysia. (2014). Mencorakkan kejayaan wakaf pendidikan. from utusan.com.my/utusan/Rencana/20140613/re_03/Mencorakkan-kejayaan-wakaf-pendidikan

[17] Utusan Malaysia. (2015). Merencana Pelan Pendidikan Tinggi. from http://www.utusan.com.my/pendidikan/merencana-pelan-pendidikan-tinggi-1.61746

[18] Yalawae, A., Tahir, I. M., UDM, U. D. I. M., & Campus, K. (2003). The Role of Islamic Institution in Achieving Equality and Human Development: Waqf or Endowment. Universiti Darul Iman Malaysia (UDM).

[19] alleh, M., & Abdul Rahman, N. S. (2014). Wakaf Pendidikan di Malaysia: Satu Tinjauan. International Research Management and Innovation Conference 2014 (IRMIC2014).

[20] Ahmad , S., & Muhamed, N. D. (2011). Institusi Wakaf dan Pembangunan Ekonomi Negara: Kes Pembangunan Tanah Wakaf di Malaysia. PROSIDING PERKEM VI, JILID 1 (2011) 138 – 147, ISSN: 2231-962X.

[21] Aziz, M. R. A., Johari, F., & Yusof, M. A. (2013). Cash Waqf models for financing in education. Paper presented at the The 5th Islamic Economic System Conference (iECONS2013

A Comparative Study on Technology Acceptance Models and the Application to Non-Existent Innovations

Wiebke Geldmacher, The Bucharest University of Economic Studies, Bucharest, Romania, Wiebke.geldmacher@gmail.com
Katrin Marquardt, The Bucharest University of Economic Studies, Bucharest, Romania, muellerka@hotmail.de
Vanessa Just, The Bucharest University of Economic Studies, Bucharest, Romania, Vanessa-Just@web.de
Nina Golowko, The Bucharest University of Economic Studies, Bucharest, Romania, golowko@ninagolowko.de

Abstract

Innovations affect our actions by improving or facilitating processes for both the business world and the daily life. While the biggest recent technical innovations include smartphones, 3D-printing and cloud computing, also non-existent innovations – innovations that are announced but not yet released - are under discussion and in the process of development. Autonomous vehicles for example that can operate in every possible circumstance are not yet developed, prototypes with limitations are however already being tested and marketed. This development phase is characterized by mass media communication that allows for the process of opinion formation on the customer side. The continuous information stream with stressing the advantages of such innovations shall consequently lead to acceptance on the customer side.

Technology acceptance models and theories in the literature aim at explaining the variables in the process of acceptance forming on the customer side for existing innovations (e.g. information systems). These models and theories cannot be transferred to non-existent innovations to the full extent, but are applicable with minor adjustments according to the carried out comparative analysis and the combination with models from the field of marketing.

The results of this paper can be used by researchers aiming at developing modified acceptance models as well as companies trying to evaluate acceptance of innovations in the development process.

Keywords: Technology acceptance, innovations, comparative analysis, non-existent innovations

Introduction

The last centuries were characterized by different streams of disruptive innovations, influencing not only the economy, but also the daily life of the people. Starting with the industrial revolution in the 18th century and coming to the 4th industrial revolution (or digital transformation), all disruptive innovations are characterized by a breathtaking or new improvement which disturbs an existing environment or even destroys and reshapes it (Marquardt et al. 2017). While the influence of the innovation depends on its level of impact, the impact of an innovation also relies on the acceptance of the people. Steve Jobs once phrased the innovation cycle in the following way "you've got to start with the customer experience and work backwards to the technology" (Forbes 2013).

The significance and impact of innovations on the one hand and the acceptance of new technologies on the other hand demonstrate the correlation on both the customer and the market (provider) side. The correlation of the innovation development phase and the customer acceptance forming process can occur in two different ways according to the authors:

1. Consumer requirements push the market to create an idea for improvement. While the development process of an innovation can take longer, acceptance towards the final product is already established on the customer side regardless of the outstanding realization. The customer acceptance then further pushes the development phase and leads to the creation of an innovation. The ultimate stage for the success of an innovation is the acceptance towards the new product. This process usually occurs with high-impact innovations with a long development phase (e.g. internet).
2. The second option starts with the innovation itself that then leads to acceptance on the customer side in case of success. This shortened innovation acceptance process usually applies to innovations that are created without broad and long-term public notice on the development. This shortened process is supported by a quotation of Steve Jobs "A lot of times, people don't know what they want until you show it to them" and holds true for the publication of the first iPhone (Forbes 2011).

The following illustration demonstrates the correlation of the market and the customer regarding innovation development and acceptance.

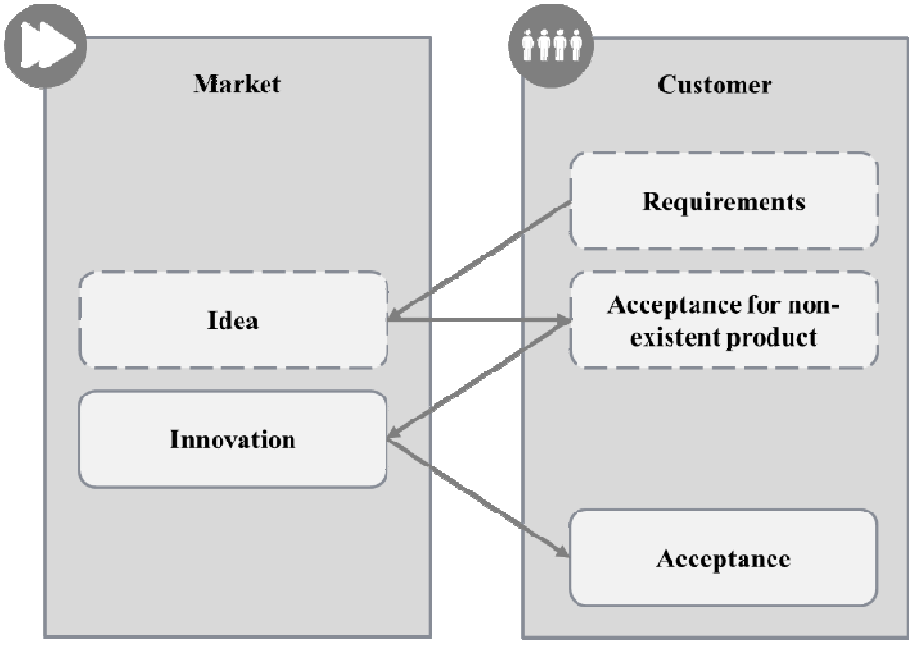


Figure 1: Correlation of market and customer (own figure)

While the acceptance forming process for existing technologies has been scientifically analyzed numerous times in the literature, the forming process and measurement of new and non-existent innovations and technology is mostly unexplored. The importance of acceptance towards non-existent products or technologies is however huge, as major developments are based on the continuous input from customers for the creation of a final product.

The following paper is a comparative study of technology acceptance models that is used for explaining the acceptance forming process for existing innovations. In a second step, the strengths of these models are compiled with additional insights for the application to new innovations. The results set the basis for future modification of technology acceptance models.

Technology and technology acceptance

Technology has been defined in various ways throughout the last centuries, as its meaning has evolved over the course and according to the changes technology has brought to the people. Technology in today's meaning is predominantly characterized by Gibert (2004):

- Increase of productivity
- Essential in various fields for further development (e.g. business, health care, education)
- Positive change for the daily life

The use of technology eventually leads to technology acceptance that is described as a psychological process starting with interest and leading to the daily use of an innovation (Kollmann, 1998; Jockisch, 2010). Technology acceptance describes a construct of evaluation and affect (Fishbein and Ajzen 1975) that is influenced by the subject, the object and the context (Lucke 1995).

As technology acceptance requires a regular use of the innovation or the intended use as well as a positive attitude towards it, technology acceptance describes a prerequisite for a successful innovation. Per above definitions of technology and innovations, a new technology describes an innovation, as long as the resulting improvement is considered as breathtaking and environment-changing. Due to the similarity of the definitions, both terms technology and innovations are to the greatest possible extent mutually used in this paper. It is recalled that acceptance describes a phenomenon of social science (psychology), but is strongly related to the fields of marketing and thereby to economic sciences.

Technology acceptance theories and models

Technology acceptance theories and models are used for the analysis of acceptance and the consideration of various influencing factors. While many different technology acceptance models have been established in the history, the following research focuses on the fundamental and mostly used technology acceptance models. Although many of the selected models reach back as far as 1975, they are still in use and form the basis for recently modified and further developed models and theories. The following presented models and theories all aim at predicting the phenomenon of establishing acceptance, but follow nonetheless a different approach. Models and theories that are presented and further elaborated include:

- Theory of reasoned action (TRA) by Fishbein and Ajzen, 1975
- Theory of planned behavior (TPB) by Fishbein and Ajzen, 1975
- Technology acceptance model (TAM) by Davis, 1989
- Technology acceptance model 2 (TAM 2) by Davis and Venkatesh, 1996
- Technology acceptance model 3 (TAM 3) by Davis and Bala, 2008
- Technology acceptance model by Degenhardt, 1986
- Technology acceptance model by Schlag, 1997
- Technology acceptance model by Kollmann, 1998
- Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh et al., 2003
- Unified Theory of Acceptance and Use of Technology 2 (UTAUT 2) Venkatesh et al., 2012)

The "Theory of reasoned action" (TRA) by Fishbein and Ajzen (1975) is one of the first established models and displays both influence and trigger factors of a particular behavior. A revised and extended version of the TRA was generated shortly after the publication in 1975 and is described as the "Theory of planned behavior" (TPB). This model is characterized by the inclusion of three main influencing factors: attitude, subjective norm and perceived behavioral control (Fishbein and Ajzen 1975).

In 1989 the so-called "Technology acceptance model" was established by Davis (1989), based on the TPB. In Davis' model, the user himself plays a predominant role as the factors of perceived usefulness and the perceived ease of use are incorporated. A further extension of the TAM has been suggested by Davis along with Venkatesh in 1996 and is known as TAM 2. TAM 2, in contrast to TAM, additionally considers external influences on the perceived usefulness and the perceived ease of use. TAM 3, developed by Venkatesh and Bala (2008), further breaks down the influencing factors on the perceived ease of use: confidence, perception of external control, system anxiety, playful use of the system, perceived enjoyment and usability.

Along on the time scale with the TAM, Degenhardt proposed a model in 1986 that was originally set up for explaining the acceptance of the utility of screen texts. Nonetheless, the general idea of the model can be applied to other innovations alike, as Degenhardt (1986) limits acceptance to three main elements: system configuration (form, function and utility of the innovation), task characteristics (importance and frequency in use) and user characteristics (skills or motivation).

A rather infamous, but specific heuristic model was developed by Schlag (1997) to measure acceptance of the implementation of road charges in urban areas. In addition to influencing factors (problem awareness, objective, responsibility attribution, subjective knowledge, perceived effectiveness, perceived fairness, social norm, income) the correlation of mobility and acceptance is incorporated in the model.
A very complex model that considers acceptance as a dynamic process with different stages was set up in 1998 by Kollmann and includes peripheral influences on a macroeconomic, socio-cultural, technological and political-legal level. Kollmann's model was created for explaining the acceptance forming process of innovative goods and systems.

A recent and famous technology acceptance model, called "Unified Theory of Acceptance and Use of Technology" (UTAUT) by Venkatesh et al. (2003), combines the strengths of various previous models, including TAM, TRA and TPB, and is based on four latent variables: performance expectancy, effort expectancy, social influence and facilitating conditions. A moderating effect of gender, age, experience and voluntariness of use was incorporated as well for the application on information technology. In a further extension of the model in 2012 (UTAUT 2) the variables hedonic motivation, price value, and habit were added to the previous model (Venkatesh et al. 2012).

The literature research has not revealed significant developments in the field of technology acceptance in the recent years. Instead, the models by Venkatesh et al. as well as Davis have been applied to current business cases.

Comparison of Technology Acceptance Theories And Models

Three key elements can be derived from the explored models or theories and include (Geldmacher et al. 2017):

- external influencing factors, e.g. macro-economic influences
- individual influencing factors, e.g. subjective knowledge, and
- stages of use (e.g. trial).

For a more detailed analysis, the elements of each model or theory are allocated to one of the three above mentioned elements. This allocation allows for a more detailed comparison to the latest UTAUT 2 model that aims at combining existing models. Similar wording of model components of different models is aggregated (cf. table 1).

Table 1: Allocation of variables to elaborated acceptance models and theories (own table)

		TRA	TPB	TAM	TAM 2	TAM 3	Degenhardt	Schlag	Kollmann
External influencing factors	Voluntariness				●	●			
	Image				●	●			
	Output quality				●				
	Usability					●			
	Objective				●	●		●	●
	System configuration						●		
	Political-legal influences								●
	Macro-economic influences								●
	Social-cultural influences							●	●
	Technological influences								●
Individual influencing factors	Attitude	●	●						
	Subjective Norm	●	●		●	●			
	Confidence					●			
	Job relevance				●	●			
	System anxiety					●			
	Perceived effectiveness						●	●	
	Perceived enjoyment					●			
	Perceived usefulness			●	●	●	●		●
	Perceived ease of use			●	●	●			●
	Perception of external control					●			
	Perceived behavioral control		●						
	Perceived fairness							●	
	Income							●	

	Individual/user characteristics						●		
	Subjective knowledge							●	
	Responsibility attribution							●	
Stages of process	Problem awareness							●	
	Interest								●
	Trial								●
	Experience				●	●			
	Behavioral intention	●	●	●	●	●			
	Use/behavior	●	●	●	●	●	●		●

While TRA, TPB and TAM do not include external influencing factors, all other explored models include both external and individual influencing factors. Especially the individual influencing factors are of high importance in the explored models. Most models and theories distinguish different stages of use, however the model by Kollmann incorporates most process stages of the explored models and is comparable to a famous marketing model by Lewis: AIDA model (Lewis 1903). The importance of incorporating the different stages from attention to interest, desire and action into technology acceptance models has been highlighted by Geldmacher et al (2017).

Comparing the different components (variables and influencing factors) of each model and its origin, the UTAUT model clearly is a combination of existing models with below explained origins, illustrated in figure 2 (Venkatesh et al. 2003):

- Performance expectancy: perceived usefulness (TAM, TAM 2, TAM 3)
- Effort expectancy: perceived ease of use (TAM, TAM 2, TAM 3)
- Social influence: subjective norm (TPB)
- Facilitating conditions (playful use of the system, system anxiety, perceived enjoyment, perception of external control (TAM 3)
- Experience (TAM 3)
- Voluntariness of use (TAM 3)

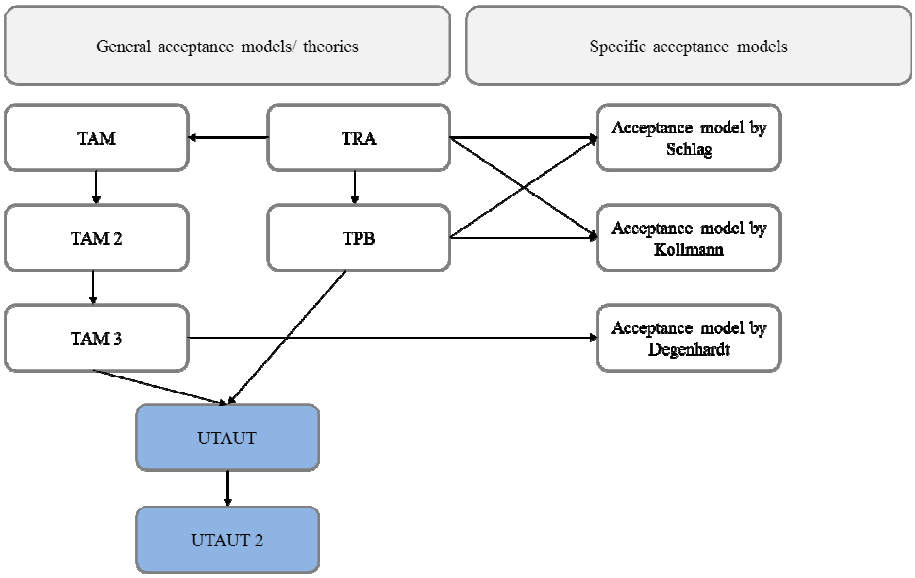


Figure 2: Relation of elaborated acceptance models and theories (own figure)

Derived from the above analyzed models, two types of theories can be distinguished, based on internal and external influencing factors: generally applicable acceptance models and theme-specific acceptance models.

While the presented models all refer to existing innovations that are analyzed and measured in regard to the level of acceptance, new innovation that are not yet released are not considered in the first place with these models (e.g. experience is expected). Nevertheless, the hypothesis is made that most of the models are still applicable to a certain extent for non-existent innovations with minor adaptions that are further outlined below. However, it is expected that UTAUT is the most applicable model for non-existent innovations. This hypothesis is further verified below.

The Application of Technology Acceptance Models To Non-Existent Innovations

Before the explored models are evaluated based on their content and methodology, the degree to which these models are applicable to non-existent innovations has to be explored. Research on the acceptance of innovations is an essential step in the product development cycle, as resistance to the product or service offered can be easily detected and adjusted accordingly to fit the customer requirements, even before the production and selling process starts (Arnold & Klee 2016).

For the purpose of model and theory evaluation, the different variables and components in the respective models and theories are investigated regarding their transfer for non-existing innovations. The variables of UTAUT are incorporated in this examination. While some variables and components of the models are fully transferable to non-existing innovations, others require an adjustment or different interpretation than to the original meaning (cf. table 2).

Table 2: Transferability of different technology acceptance models and theories (own table)

	Full transferability to non-existing innovations	Part-transferability to non-existing innovations	No transferability given	Required adjustment/ interpretation/ comment
Voluntariness	●			Assumption
Image		●		Only partly applicable, e.g. companies with a good image develop new innovations (e.g. Tesla)
Output quality		●		Only partly predictable from a customer perspective
Usability		●		Predictable to a certain extent before the release of a new innovation.
Objective	●			
System configuration		●		System configuration can only be assumed by customers
Political-legal influences	●			
Macro-economic influences	●			
Social-cultural influences	●			
Technological influences	●			
Price value		●		The price value can only be partly evaluated in advance.
Attitude		●		Attitude is formed with the development process of the innovation, based on the released information
Subjective Norm		●		Subjective norm as social pressure is only to a certain extent predictable.
Confidence		●		Confidence towards a non-existent innovation can be only party-predicted when compared to similar innovations or systems.
Job relevance	●			
System anxiety		●		Expected anxiety
Perceived effectiveness		●		Expected effectiveness from customer perspective
Perceived enjoyment		●		Expected enjoyment from customer perspective

Perceived usefulness		●		Expected usefulness from customer perspective
Perceived ease of use		●		Expected ease of use from customer perspective
Perception of external control			●	Not assessable before release of innovation
Perceived behavioral control			●	Not assessable before release of innovation
Perceived fairness	●			Assumption
Income	●			Influence on prospective potential use of innovation
Individual/user characteristics	●			
Subjective knowledge	●			Information and knowledge increase the level of acceptance (Geldmacher et al. 2017)
Responsibility attribution			●	Not assessable before release of innovation
Problem awareness	●			Cf. AIDA-model (attention)
Interest	●			Cf. AIDA-model (interest)
Trial	●			
Experience		●		Partly applicable, e.g. testing of self-driving vehicles in designated areas
Behavioral intention	●			
Use/behavior			●	Not applicable, but replaceable with "acceptance" as this term does not presume the use/behavior/affect
Gender	●			
Age	●			
Hedonic motivation	●			
Habit			●	Habit is not predictable with non-existent innovations as habits cannot develop before release.

For further evaluation of the presented models in regard to the application for non-existent innovations, three requirements were formulated that relate to both the content (C) and the methodology (M):

- C1 Acceptance modeling: extent of describing the complex process of acceptance building including the influencing factors

- C2 Transferability: the model is applicable or transferable to both existing and non-existing innovations, based on the transferability matrix above (cf. table 2)
- M Evaluation: the model allows a more detailed measurement of correlation for the acceptance forming process (e.g. structural equation modeling)

The above outlined models are evaluated by the authors with respect to the proposed requirements. The score is based on a five-point scale with high numbers implying a good evaluation. The three defined requirements (C1, C2 and M) are all equally evaluated and added to compose a sum (with 15 points being the maximum possible number). It shall be noted that the following scoring is based on a subjective evaluation that is recommended to be further examined by e.g. expert interviews:

Table 3: Evaluation of acceptance models

	C1	**C2**	**M**	**Sum**
TRA	1	3	1	5
TPB	2	3	2	7
TAM	2	3	2	7
TAM 2	3	3	3	9
TAM 3	3	4	3	10
Degenhardt	2	2	3	7
Schlag	3	3	3	9
Kollmann	4	3	4	11
UTAUT	4	4	4	12
UTAUT 2	**5**	**4**	**5**	**14**

The high evaluation of UTAUT and UTAUT 2 were expected and are explainable through the fact that this theory can be described as a compilation of the other models and the fact that they are more complex and include variables for internal and external influencing factors as well as different stages of use.

Although many of the explored models were created for theme-specific purposes, the general idea of the models is mostly transferable to all existing innovations. The transferability to non-existing innovations is however limited for some of the explore models and theories, as many of the variables require full knowledge or even trial of the innovation.

Based on this evaluation, a modification of UTAUT or UTAUT 2 is recommended to further explore the acceptance of non-existent innovations. A modification of these models shall consider various following aspects according to the authors. Customer statistics for example reveal relevant purchase decisions and user requirements for a comparable product or service (Geldmacher et al. 2017) that can be aggregated to a variable that influences the acceptance process. In addition to statistics, also models from the field of marketing, including the AIDA model in combination with the diffusion theory by Rogers (1962), shall be considered when modifying acceptance models and theories.

Conclusions

The acceptance of innovations is measurable with technology acceptance models and theories. Only non-existent innovations that raise awareness through a long development process are legible for acceptance measuring with existent models and theories. These models and theories however require minor adjustments in case of application to innovations.

The authors suggest the modification of existing models and theories, in particular based on UTAUT, per above outlined factors to allow for an application and verification for non-existent innovations. Model verifications can be conducted by operationalization of the respective variables and evaluation of correlations through structural equation modeling. In addition, it is recommended to verify the author's subjective evaluation on the elaborated models and theories by qualitative research (e.g. expert interviews).

References

Arnold, C.; Klee, C. (2015): Akzeptanz von Produktinnovationen: Eine Einführung: Springer Fachmedien Wiesbaden. Available at: https://books.google.de/books?id=NZ4vCwAAQBAJ.

Davis, F.D., Bagozzi, P.; Warshaw, P. (1989): User acceptance of computer technology - a comparison of two theoretical models. Management Science 35(8). pp. 982–1003.

Degenhardt, W. (1986): Akzeptanzforschung zu Bildschirmtext: Methoden und Ergebnisse. München: Reinhard Fischer.

Fishbein, M.; Ajzen, I. (1975): Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research. Reading, MA: Addison-Wesley.

Forbes (Ed.) (2011): Five Dangerous Lessons to Learn From Steve Jobs, in: https://www.forbes.com/sites/chunkamui/2011/10/17/five-dangerous-lessons-to-learn-from-steve-jobs/#70adaf093a95.

Forbes (Ed.) (2013): Myth Busted - Steve Jobs Did Listen To Customers; in: https://www.forbes.com/sites/drewhansen/2013/12/19/myth-busted-steve-jobs-did-listen-to-customers/#78c5aeac87f3.

Geldmacher, W.; Just, V.; Kopia, J.; Kompalla, A. (2017): "Development of a modified technology acceptance model for an innovative car sharing concept with self-driving cars" in BASIQ International Conference: New Trends in Sustainable Business and Consumption - 2017, edited by Rodica Pamfilie, Vasile Dinu, Laurențiu Tăchiciu, Doru Pleșea, Cristinel Vasiliu, Proceedings of BASIQ Vol. 01.

Gibert, M. G. (2004): The Meaning of Technology. Selected Readings from American Sources, 2004.
Jockisch, M., 2010. Das Technologieakzeptanzmodell. In: Das ist gar kein Modell, Bandow/Holzmüller. Wiesbaden: Springer.

Kollmann, T. (1998): Akzeptanz innovativer Nutzungsgüter und Nutzungssysteme Konsequenzen für die Einführung von Telekommunikations- und Multimediasystemen. Wiesbaden: Springer.

Lewis, E. St. Elmo (1903): Catch-Line and Argument. In: The Book-Keeper, Vol. 15, Februar 1903.
Lucke, D. (1995): Akzeptanz. Legitimität in der "Abstimmungsgesellschaft". Wiesbaden: Springer Fachmedien.

Marquardt, K..; Just, V.; Geldmacher, W.; Sommer, M. (2017): "Disruptive innovations, their characteristics and implications on economy and people" in BASIQ International Conference: New Trends in Sustainable Business and Consumption - 2017, edited by Rodica Pamfilie, Vasile Dinu, Laurențiu Tăchiciu, Doru Pleșea, Cristinel Vasiliu, Proceedings of BASIQ Vol. 01.

Rogers, E. M. (1962): Diffusion of innovations (1st ed.). New York: Free Press of Glencoe.

Schlag, B. (1997): Road pricing-Maßnahmen und ihre Akzeptanz. In: Berhard Schlag (Hg.): Fortschritte der Verkehrspsychologie. 36. BDP-Kongreß für Verkehrspsychologie. Bonn: Deutscher Psychologen Verlag, S. 217–224.

Venkatesh, V.; Bala, H. (2008): Technology Acceptance Model 3 and a Research Agenda on Interventions. In: Viswanath, V. and Hillol, B. (Ed.) Decision Sciences 39(2), pp.273–315.

Venkatesh, V.; Morris, M.G.; Davis, F.D.; Gordon, B. (2003): User Acceptance of Information Technology: Toward a Unified View. MIS Quarterly 23(3), pp.425–478.

Venkatesh, V.; Thong, J. Y. L.; Xu, X. (2012): Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology
VuMA. (n.d.): Bevölkerung in Deutschland nach Einstellung zur Aussage "Bei den meisten Produkten kommt es mir eher auf die Qualität als auf den Preis an" von 2013 bis 2016 (in Millionen). Statista. Accessed on 5th June 2017. Available at: https://de-1statista-1com-1ny53hpo51373.han.sub.uni-goettingen.de/statistik/ daten/studie/172177/ umfrage/einstellung-qualitaet-wichtiger-als-preis/.Ackoff, R L. (1961) 'Management Misinformation Systems,' *Management Science*, 14 (4), 147-156.

Selection and Justification of Priorities of Innovative Development of an Industrial Region

Lidiya A. Galkina, South Ural State University, Chelyabinsk, Russia, baevia@susu.ru
Igor A. Baev, South Ural State University, Chelyabinsk, Russia, baev@econom.susu.ac.ru
Sergei V. Aliukov, South Ural State University, Chelyabinsk, Russia, alysergey@gmail.com

Abstract

The relevance of the problem is related to the need to resolve the contradictions between increasing investment in formation of innovation infrastructure and the results achieved. The low level of competitiveness of a larger share of domestic products does not allow them to compete not only on external, but often in the domestic market. The aim of the research is to develop approaches to selection of priorities for innovative development from the point of view of the regional economy, a special emphasis is placed on the fact that for sustainable regional development it is necessary to "complicate" the economy and increase the level of its diversification. The paper employed the statistical methods of research, optimization methods, and production functions. Results: there had been developed the models, according to which the priorities of innovative development in the Chelyabinsk region were calculated. Key conclusions: for the successful development of innovation in industrial regions, it is necessary to create a regional register of industrial technologies, when choosing priorities for innovative development, it is reasonable to proceed from the criterion of economic complexity of the region.

Keywords: innovation development, import substitution, priorities, complexity of the economy, investments, network economy.

Introduction

Possible ways to stimulate innovation in the Russian economy began to be actively developed in the early eighties, even before the collapse of the Soviet Union. Even then it became obvious that the current mechanisms for "introducing" the results of research and development are not effective, the innovative activity of enterprises is low, the competitiveness of products is insufficient, the average age of production equipment is constantly increasing, and the technologies used are rapidly becoming obsolete.
Since then, a number of state concepts for regulating and stimulating innovation have been adopted, the national innovation system has been announced, a number of mechanisms for public financing of innovation have been created, including the creation of a highly developed innovation infrastructure, and state and regional innovative development programs are periodically adopted. However, at present one has to state a low level of almost all indicators of the innovation activity of the Russian economy.

The level of innovation activity of large and medium-sized industrial production organizations, calculated as the share of organizations that carry out technological innovation, varies little. The dynamics of this indicator, for example, in the Chelyabinsk region is as follows: 9.8% in 2012, 7.6% in 2014 and then growth to 11.5% in 2016 (Federal, 2016).

During the period from 2005 to 2012, the innovative development programs showed low efficiency, the planned targets were achieved less than a third of the planned indicators. In addition, most of the indicators were even lower than those foreseen by the inertial scenario, and some showed clearly negative dynamics (Kilina, 2013).

There is a clear contradiction between the attention of the authorities and state investments in the innovation sphere and the results of innovation activities achieved (Rodrik, 2005)

Production function of the regional economy

The identification of priorities for economic development in general and innovation, in particular, is an important research task. The impact of public investment on regional growth and convergence has been analyzed by different authors and from different perspectives (De la Fuente, 2008; Garrido, 2007; De La Fuente, 2008; Lichtenberg, 1995). Criteria for choosing priorities can be different even in theory, moreover they differ in practice. As an approbation of a new approach to the selection of development priorities, we used the apparatus of production functions and the index of the complexity of the economy. According to the statistical reporting for 2000-2015, the production function for a large industrial area was calculated in the work. As a result, the following expression was obtained

$$\hat{Y} = 56.302K^{1.252056}L^{-1.135628}, \quad (1)$$

where $\hat{Y}$ - gross regional product, billion rubles;

K - cost of fixed production assets, million rubles;
L - number of economically active population, thousand people.

The resulting production function indicates the narrowing of the regional labor market, a lack of supply and demand in this market. This is confirmed by the data in Table 1. As it can be seen, the region has a low proportion of employees working in organizations and employed on a regular basis. If in 2011 of 1.882 million people of the labor resources, 1,123.1 million people worked in organizations, that is, less than 62.8%, in 2015 it was already 61.7%. In total, in the sphere that produces products or services at market prices, only slightly more than 1 million people were employed in 2015, of which more than 30 thousand people (3%) - workers in agriculture, hunting and fishing, who are characterized, as a rule, by part-time employment. Where are the remaining 39.3% of people of working age employed? Approximately half of them are engaged in entrepreneurial activities without the formation of a legal entity and in the production of products for their own needs, that is, in personal subsidiary plots and/or in the criminal-shadow sector. This situation substantially distorts the structural proportions and the assessment of the influence of capital and labor factors on the gross regional product. However, calculations are based on the official statistics.

Table 1: dynamics of the number of economically active population of the Chelyabinsk region, thousand people *

z	2011	2012	2013	2014	2015
Number of economically active population	1882,3	1879,3	1876,6	1859,9	1856,9
Number of employees in the economy	1758	1759,1	1763,3	1743,8	1727,5
Number of the unemployed	31,7	28,2	26,1	27,5	34,6
Number of employees in organizations	1123,1	1119,5	1121,9	1121,7	1088,5
Share of employees in organizations in the number of employed people,%	62,8	62,6	62,6	63,3	61,7

* According to the data of Chelyabinskstat (Federal, 2016) and the authors' calculations

Analyzing the received function, it can be stated that, despite the increasing output of production, there are significant disparities in the region between production factors. The elasticity of the gross regional

product of the Chelyabinsk region is higher in capital than in labor. Consequently, with the existing capital-labor ratio and technical equipment in various industries, the economy of the region is labor-surplus. The increase in the value of fixed assets by 1% leads to an increase in output by 1.252%. At the same time, an increase in the number of employed by 1% entails a decrease in output by 1.136%. Consequently, to increase the volume of gross regional product, on the one hand, there is a significant increase in the funds-for-production of enterprises, and on the other, intensive creation of high-productivity jobs. As it can be seen from the table, almost no new jobs are created or there are more retiring places than newly created ones. At the same time, the low unemployment in the region is indicative not so much of a favorable situation in the labor market as of low productivity of workers. All are employed, but the effectiveness of this activity is low. Moreover, most of the employed are performing simple jobs that do not require special knowledge, employees are trained to cope with routine tasks and do not demonstrate demand for complex jobs. Those who are able to perform difficult work, but do not have it, either leave the region or the country. The replacement of skilled labor by routine one leads to the replacement of complex tasks with simpler ones. In the corporate sector, there is a slow degradation, which is intended to be solved financially. The worst thing is that this happens in high-tech industries. It is necessary to reverse this trend and achieve a more adequate balance between the array of regional jobs and the array of proposed qualifications. Only in this case the labor market of the Chelyabinsk region will pass from the primitive to the complex, that is, the developing one. Only in this case the proportions between the elasticity coefficients of the production function of the region will change. This, of course, will lead to an increase in the efficiency of the regional economy and the growth of its impact. However, it is not possible to solve such a problem without increasing the innovative activity of enterprises. It should be noted that the analyzed area has a fairly serious but not enough realized innovative potential that can be used in this approach.

Problems of Innovative Development of Industrial Regions

The analyzed area is a region with a predominance of medium-technology high-level productions. However, the small number of successful innovative enterprises of the new economy and, most importantly, the slow pace of their creation, are a significant challenge for the development of the region and predetermine the probability of its transition from a group of high-tech industrial regions to the periphery of the Russian economy.

The new economy is characterized by relationships built on direct equitable relationships between enterprises, a small need for formal organizational structures, a high decision-making speed, as well as a maximally dispersed, flexible and innovation-dependent production. At the same time, the main issue in the networked economy is not "how to do the job best?", but "what kind of work is more correct?". In the modern conditions, it is much more important to understand what work to do next than to continue to intensively carry out the former one. When problems are solved, time and effort are invested in existing weaknesses, and when searching for opportunities, investing in development.

From this point of view, an important problem constraining the development of innovations in the field is the excessive vertical integration of large businesses. At the enterprises of the region in the engineering industry and in the defense industry, the competitive market of components within the framework of large vertically integrated companies (VINC) is not sufficiently developed. Moreover, the management companies of the most industry-based VINCs are located outside the region and make decisions that are optimal from the point of view of the company as a whole, but these decisions are far from optimal from the point of view of regional enterprises or from the point of view of the development of the region as a whole. Within the framework of vertically integrated holdings, competencies are collected for the organization of full cycle production, which leads to an almost complete absence of subcontracting. The experience of the development of the world's largest companies, for example Bombardier, which produces medium-haul aircraft, demonstrates the opposite trends: large companies concentrate only key

functions, for example conceptual design, and the remaining production stages are outsourced. In Canada, only tail empennage and general assembly are made, wings are made in Japan, fuselage in Ireland, engines in the USA. At the same time Bombardier concludes a contract for the whole batch of aircraft, and its partners in other countries, with this contract they go to banks, take loans, organize production and supply their parts. Increasing competition among suppliers encourages them to continually improve their products and continuously seek and implement innovations. Our machine-building plants, as a rule, take for everything, the level of specialization of production is extremely low, the output volumes of production do not adapt to mass production, not to mention the mass production, which significantly increases the cost of production and lowers the competitiveness of products. The machine-building plants of the region are forced to buy stainless steel in China, despite the fact that the Mechel metallurgical plant is located in the region. The problem with most enterprises is that they can produce everything, but they cannot do it massively. But in order to produce a competitive product, it is necessary to be included in the world cooperation (Knobel, 2016). However, it is clear that this cannot be done quickly, all countries are already there, but Russia is not. At the same time, taking into account the proportions and the scale of the domestic market, and the market of all Russian exports (household consumption is 54% of GDP, and the entire Russian export is 18% of GDP), in our opinion, it is necessary to orient ourselves, first of all, to the domestic market . In addition, the experience of most countries also shows that the development of new technologies and their scaling is faster and more efficient in the domestic market (Knobel, 2016).

Criterion of Economic Complexity

Harvard professor Ricardo Hausmann and his colleague from the Massachusetts Institute of Technology, Caesar Hidalgo, proposed an approach to the characterization of national economies, based on the fact that the key factors reflecting the degree of intensive development of the economy are its complexity and diversification. The central concept of this paradigm is that the economy naturally develops around existing technologies and existing competencies, gradually joining the close positions of the multidimensional space of industries with their own values of the economic product complexity index (PCI) (Hausmann, 2004; Hausmann, 2011; Product, 2015).

We tried to apply this approach to the regional economy. The practical application of the approach is realized by calculating two interrelated indices - the ECI index (economic complexity index) and PCI (product complexity index). The application of the PCI index allows combining different products into groups, ranking the existing technologies in terms of complexity and development of regional register of production technologies. On the basis of such a register, it is possible to create a regional network of industrial cooperation and subcontracting. Naturally, such a register should be open for including other regions. This will not only increase the number of products with high added value, but also get a "network effect." In physics and chemistry there are so-called "second-order reactions". They are understood as such processes in which the speed of the process depends not on the number of participants, but on the number of interactions between them, and the result of such a process is proportional not to the number of participants, but to the square of this number. At the same time, it is clear that the result, proportional to "en-square", is a collective phenomenon, and in the economy it can be achieved only thanks to the efforts of human capital. Therefore, for innovative development of the region, there is not enough interaction between business entities, and in the current level of informatization it is not such a difficult task. It is difficult to organize the process. At present, purely administrative methods of influence have little effect on the innovation process. The main impact is on the market. However, the state retains the functions of coordination, regulation and stimulation of the innovation process. For the implementation of industrial policy, a limited set of tools is available to local authorities, some of which create incentives, while others impose restrictions. The creation of a regional register of production technologies and stimulation of promising forms of production cooperation in individual sectors and in the economy of the region, as a whole, refers to stimulating tools. The limiting tools, in this case, include

reducing the use of government support measures that distort normal market proportions, and ultimately hampering the creation and development of innovative production chains. In business, in this case, two multipliers will work: on the one hand, the sales multiplier, which is formed using common distribution channels, and on the other hand, the multiplier of production, which will arise due to intraregional initiation of demand for production resources, taking into account the need for development of industry and interindustry production in the territory of the Region. All these actions should lead to an increase in the economic complexity index of the regional economy (ECI), and this will already serve as the basis for intensive innovation development, growth of the gross regional product and sustainable regional development [14].

Principles of choosing criteria for innovative development

The work is based on the following methodological principles for the formation of innovation activity priorities:

1. The principle of accounting for the diversity of economic competences in the region. This principle presupposes that a map of the existing competencies is drawn up using the competence cards of enterprises located on the territory of the region. On the basis of such a scheme, those competencies are singled out whose development will lead to the complication of the region's economy and the manufacture of products with higher added value. This will allow, firstly, to find those activities that are provided with the existing competencies, and secondly, are in demand, at least, by the national and regional markets.

2. The principle of complementing by related competences. Each type of product, allotted at the previous stage, has certain connections with other industries and sectors. Therefore, it is necessary on the basis of the regional register of production technologies, to identify key points for the development of cooperative ties, and to build a network of cooperative enterprises. On the one hand, this will allow increasing regional diversification of production, and on the other hand, it will allow building long production chains of added value.

3. The principle of ranking the allocated competences from the point of view of resource and financial provision. Ranking is the tool by which it is possible to prioritize in order of importance, significance and need for implementation. Considering the restrictions existing in each period of time for all types of resources, it is necessary to rank the types of products identified in the previous stages of production according to the most important criteria at that time (preferably on the criteria of sustainable development of the region).

Methods for solving the problem

As part of the study, a methodology was proposed to identify the optimal structure of investment in innovative projects related to different industries, according to the criterion of achieving the maximum complexity of the economic system in which these projects are implemented. The problem is solved with a limited investment budget.

At the first stage, an assessment was made of the extent to which each ruble spent to invest innovative projects in a particular industry increases the ECI.

At the second stage, the optimization task was solved. The target function was the indicator of the complexity of the region's economy

$$M = D_1 \cdot PCI_1 + D_2 \cdot PCI_2 + \cdots + D_N \cdot PCI_N,$$
$$M \to max; \quad (2)$$

where *M* - indicator of the complexity of the economy (the desired utility maximization function);
D_1 – share of the product (project) in the total output;
PCI_1 – level of complexity of the *i*-th product from the table of specific technologies (2014) [7].

As a constraint, the budget constraints of the system were taken:

$$V = D_1 \cdot C_1 + D_2 \cdot C_2 + \cdots + D_N \cdot C_N; \quad (3)$$

$$\begin{cases} 0 \le D_1 \le M_{ARCTEA,1} \\ 0 \le D_2 \le M_{ARCTEA,2} \\ \cdots \\ 0 \le D_N \le M_{ARCTEA,N} \end{cases} \quad (4)$$

where *V* - projected investment budget where V - projected investment budget;

C_1 – investment costs for increasing the share of innovative products 1 or project N in GRP or in the volume of output by 1%, provided that the increase occurred from 0. The indicators $C_1 \ldots C_N$, are calculated according to a certain methodology, and ultimately, have been adjusted by the method of expert assessments, depending on the availability and capabilities of related technologies in the region; *MARCTEA, N* – maximum amount of investments of the industry N in the corresponding commodity item of the All-Russian Classifier of Types of Economic Activities (ARCTEA).

The constraint system (4) allows to obtain non-negative values of the parameter D when solving the optimization problem, and not to go beyond the maximum possibilities of the regional budget.

As a result of solving this optimization problem, we obtained a maximized function, as well as the indicators D1…DN, which provide an opportunity to draw up an approximate plan of innovative projects in the region.

At the third stage, calculating the coefficients C1…CN was made by establishing a correlation between the changes in the volume of production of innovative products from investments in the fixed assets.

This algorithm was calculated based on the data of Chelyabinskstat and the Customs Service of the Chelyabinsk Region. When analyzing the statistical data, a correlation of the presented indices with a lag of 2 years was established. (5) Thus, the calculation of the coefficient C for the analyzed period is performed as follows:

$$C_t = \frac{INV_t}{V_{(t+1,t+2)}}, \quad (5)$$

where C_t – required coefficient of the *t* period;

INV_t – investment for the reporting *t* period, in million rubles investment for the reporting t period, in million rubles;

$V_{(t+1,\ t=2)}$ – change in the volume of production for the *t*+1 and *t*+2 period, that is:

$$V_{(t+1,\ t=2)} = V_{t+2} - V_{t+1} \quad (6)$$

The nominal value of the coefficient C is calculated as the arithmetic mean as a result of processing the statistical data of investments and production volumes by branches of the economy of the Chelyabinsk region from 2009 to 2015 (Hausmann, 2011):

$$C = \frac{C_t + C_{t+1} + \cdots + C_{t+N}}{N} \quad (7)$$

As a result of processing the results of statistical data, according to formulas 5-7, the values of investment cost coefficients were obtained, three positions of which, for example, are presented in Table 2.

Table 2: values of output elasticity coefficients

ARCTEA code	Decoding of the ARCTEA code	C
C	Extraction of minerals	1,258
D	Manufacturing	0,406
DA	Manufacture of food products, including drinks and tobacco	0,1694

To obtain the final values, these coefficients were corrected with the help of the kH coefficient, reflecting the current level of development of the specialization of the enterprises of the Chelyabinsk region in the production of the corresponding types of products. The values of the kH coefficients were set in accordance with the scale obtained by the expert method. The value of the coefficient varies discretely in steps of 0.1 in the range from -0.5 to +0.5. The economic meaning of these coefficients reflects one or another level of specialization of production in the region.

As a result of the solution of the optimization task, 70 non-negative values of D1...DN were obtained, that is, priority industries and the commodity nomenclature of innovation activity were identified, and the corresponding C*D values reflect the amount of investments for the production of this product. Table 3 shows the first 3 positions of the results obtained.

Table 3: the first 3 results of solving the optimization problem with the given constraints values of output elasticity coefficients

Description of commodity position	PCI	D*C, million rubles	D, million rubles
1. Instruments and apparatus for physical or chemical analysis	2,110	4413	4456
2. Internal combustion piston engines with compression ignition (diesel engines or semi-diesel engines)	1,546	4130,23	4093,9
3. Lathe machines (including multi-purpose lathes), metal cutting	1,629	4041	4054,73

In the course of analyzing the results obtained, it was concluded that the main positions of the investment budget for the development of innovative products, proposed on the basis of the solution of the optimization task, are based in the field of machinery and equipment (DK). Thus, for the analyzed area, the branches corresponding to the ARCTEA positions "production of machines and equipment" have a developed potential. Therefore, when investing in this area, one can expect an increase in the index of the

region's economic complexity, and in the future, stable dynamics of improving the structure of the gross regional product.

Conclusion

Thus, it can be argued that in order to resolve the contradiction between the growth of public investment in the formation of an innovation infrastructure and the results achieved, it is necessary to change approaches to the selection of priorities for the innovative development of industrial enterprises. It is expedient to provide business with systematized and structured information on the basis of the regional register of production technologies. This will significantly increase the number of interactions of the regional business entities on the basis of regional initiation of demand and the regional economy of production includes the sales and production multipliers. All this should lead to an increase in the economic complexity of the region, improving the structure of the gross regional product and the sustainable development of the regional economy.

Acknowledgment

The work was supported by Act 211 Government of the Russian Federation, contract № 02.A03.21.

References

Anderson, T.W., and Cheng Hsiao. (1982). "Formulation and Estimation of Dynamic Models Using Panel Data," Journal of Econometrics, 18, 47-82.

Black, S.E. and Lynch, L.M. (2001). “How to Compete: The Impact of Workplace Practices and Information Technology on Productivity,” Review of Economics and Statistics, 83(3), pp. 434–445.

De la Fuente, A. (2008): “Dinámica regional de la renta y la población” en Velarde Fuentes and J. Serrano Sanz, J.Ma (dirs): La España del siglo XXI, volumen III: La economía, Editorial Biblioteca Nueva, Madrid, 679-719.

De La Fuente, A. (2008): "Inversión en infraestructuras, crecimiento y convergencia regional,” Economic Reports 20-08, FEDEA.

Federal Service of State Statistics. (2016). http://regions.extech.ru/regions/region_info2.php?id=74.

Galkina, L. and A. Sharipov. (2011). Algorithm for setting priorities in the formation of portfolio of import substitution, Economics, SUSU, pp.123-129.

Garrido, R., Mancha, T. and J.R. Cuadrado (2007): “La Política Regional y de Cohesión en la Unión Europea: veinte años de avance y un futuro nuevo”, Investigaciones Regionales, n. 10, 2007, 239-266.

Hausmann, R. (2011). The Atlas of economic complexity /R. Hausmann, C.A. Hidalgo et al., New Hampshire: Puritan Press, 362 p.

Hausmann, R., L. Pritchett, et al. (2004). Growth Accelerations. NBER Working Paper. Cambridge, MA.

International Regional Science Review. (2017). http://journals.sagepub.com/doi/abs/10.1177/016001769301500201 [Accessed 23/04/17].

Kilina I.P., Lyaskovskaya E.A. (2013). [Rating System of Innovation Regional Development]. Ekonomika, upravlenie i investitsii: elektronnyy nauchnyy zhurnal [Economics, Management and Investments: Electronic Scientific Journal], no. 1. Available at: http://euii-journal.ru/pdf/2013/173.pdf.

Knobel' A., Firanchuk A. (2016). Rossiiskii eksport v ES: obshchee snizhenie pri raznoplanovykh trendakh [Russian exports to the EU: a general decline with diverse trends]. Operativnyi monitoring ekonomicheskoi situatsii v Rossii [Real-time monitoring of the economic situation in Russia], 10 (28). Available at: http://www.ranepa.ru/images/docs/ monitoring/2016_10-28_ june.pdf [Accessed 23/11/16].

Lichtenberg, F. (1995). "The Output Contributions of Computer Equipment and Personnel: A Firm-Level Analysis," Economics of Innovation and New Technology, 3, pp. 201–217.

Ministry of Economic Development of the Chelyabinsk region (2009). http://minprom.soft74.ru/files/123/konzepz_innovaz.

Product Connections. (2015). http://atlas.media.mit.edu/en/profile /hs92/7502# Product Connections.

Raiting the economic complexity index. (2016). http://atlas.media.mit.edu/en/rankings/hs92/

Rodrik, Dani (2005). "Why We Learn Nothing from Regressing Economic Growth on Policies." Reproduced, Harvard University. 315 p.

Contemporary Approaches to Advancement of the Banking Sector – Virtual Credit Organizations

Alexey V. Bataev, Associate professor of Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russian Federation, bat_a68@mail.ru

Abstract

The development of information and communication technologies has reformatted all spheres of the economy. The fast introduction of computer networks, the Internet progress promoted to the creation of a new kind of economy – information one. Credit organizations after telecommunications companies are on the second place on the information technology usage. The presented article touches upon virtual credit organizations - the contemporary model of organization in banking sector. Classification of virtual banking institutions, in a form of the organization of financial institution is represented. In the paper, the interaction models offered by virtual credit organizations for customers are investigated. The estimation of its advantages and disadvantages in comparison with traditional financial institutions is given. Economic data of virtual credit organizations implementation are analyzed. On its basis, the perspectives for advancement and adoption of virtual credit organizations in crisis in the Russian Federation and in the world are studied.

Keywords: full-fledged global economic crisis, banking sector, virtual credit organizations.

Introduction

The development of world economy happens in difficult conditions. However, from the banking sector, the crisis spread to the industrial sectors of economy and grew into a full-fledged global economic crisis that caused a prolonged recession. At the same time, the current global economic crisis is L-shaped, characterized by a protracted economic recovery and it is hard to predict the exit time from the crisis for sustainable economic development.

In today's environment, when the growth rate of world GDP tends to decrease: it consisted 3,2% in 2014, 3% in 2015, 2,9% in 2016, all sectors of economy have to look for new forms of existence in crisis conditions, defined by a decline in manufacturing department, a decrease in funding and an increase in unemployment. (The free trade crisis; The IMF downgraded the outlook for the global economy due to Brexit; The IMF worsened the forecast of the fall of the Russian economy in 2016; The World Bank reduces the forecast for world economic growth to 2.4 percent in 2016; The world economy faces a new global crisis) The banking sector, which one of the first has got into influence of the global economic crisis, is no exception. Many financial institutions went bankrupt; others had to reduce its branch network and staff. Meanwhile, the measures of financial state support that having been provided to banks in many countries are virtually phased out now, and therefore financial institutions have to seek innovative ways of development in these conditions in order to ensure lower costs for running business.

In such circumstances, more widespread adoption of information and communication technologies for significantly cost cutting can come for aid to the financial sector. In particular, the wider introduction of virtual financial institutions, allows ensuring full interaction of customers with the bank in a virtual environment.

The main sources that reveal the theoretical and methodological aspects of the development of virtual financial institutions are the works of Russian and foreign authors: Alehin, Davidow, Mowshowitz and many others.

In these studies, the prospects for introduction and development of virtual banks are examined. The main forms of interplay with clients are analyzed. The models of the organization of virtual credit

organizations existing for today are explored. The estimation of financial justification for the implementation of these financial institutions is given.

Meantime, this area is completely new and dynamically developing, and therefore many aspects are not considered sufficiently deep or did not have time to get due assessment, despite a large number of studies. (Klochkov, Klochkova, Antipova, Kiyatkina, Vasilieva, Knyazkina, 2016; Kočović, Antić, Jovović, 2011; Ma, 2011; Sivakumar, Krishnaswami, 2011)

Key research findings

In the middle of the last century with development of information technology the foundation of a new type of the economy, which received the name of information was laid.

The next step in the development of the information economy was the introduction of global computer networks that contribute to the creation of a single digital space.

Virtual corporation

Other types of industrial cooperation has developed from the emergence of the World Wide Web. The conception "virtual corporation" were made known by Davidow and Malone in their book "Virtual Corporation", written in 1992. (Davidow and Malone, 1992)

A virtual enterprise is the most advanced and effective form of organization of an enterprise from a number of "mentally possible", the best from the point of view of the available technical and economic conditions. Thus, a virtual corporation can be defined as a dynamic open business system representing a combination of temporarily unified on the principles of cooperation within single information (virtual) space of technological resources of autonomous economic agents capable on the basis of their coordination and operational distribution to make the final product or service.

The main feature of a virtual enterprise is shown available sets of alternative ways of creation of the final product with a possibility of operational management of resources of all independent agents (enterprises) on the basis of modern information technology. The making of a virtual corporation enables enterprises to significantly increase the number of orders and improve the use of production potential, while minimizing the duration of the cycle "demand-production-sales". This is achieved through essential growth in efficiency at response to market changes (changes in the timing and volumes of supplies, price fluctuations, etc.), the optimal allocation of resources, coordination, and shortening the duration of pre- and post-production stages of the product life cycle. (Alasas, Ishkildina, Zvonov, Antipov, Ushanova, Demidenko, 2017; Bataev, 2015)

The virtual bank definition similarly emerged with conception of the virtual enterprise. The creation of the first fully virtual bank was preceded by the introduction of remote customer service systems. In particular, Internet banking (On-line banking, e-banking) - the provision of banking services through electronic channels of information transmission, including the Internet, has become widespread in the world. At the present time Internet banking is an integral part of any banking institution. On-line banking opened new opportunities for the bank's clients: to obtain information on the status of their account and to make certain transactions; now it became possible without visiting the office. And sms-messages help to quickly track every action on the account. Bank customers are less using off-line services and visit bank offices only when absolutely necessary.

In such circumstances, the idea of creating a credit organization, which has only website and registered office is shown up: clients will be able to obtain banking services, monitor their bank accounts and get help online if needed. Everybody wins: a bank saves on creation and development of a regional network, and clients receive faster and more convenient service.

Net-only bank (virtual bank) – a bank that operates exclusively through the Internet, not having actual representative offices, with the exception of the legal address.

Virtual Bank entirely works in the world wide web. There are two categories of such a system: passive and active. The first involves all data on the current account, and the active one enables to remotely manipulate finances.

The occurrence of the first virtual credit organizations

In 1995, the prime virtual bank - "Security 1st Network Bank" started its activity in the U.S.A. Over the first 18 months of its existence, the average capital gains of "Security 1st Network Bank" was 20% per month, assets reached $ 40 million, and the number of client accounts - 10 thousand. At present, it has the lead place among virtual credit organizations in the world. (Bataev, 2015; Burgess and McGrath, 2010; Chorafas and Steinmann, 1995; Mowshowitz, 1994)

In the Western Europe, the prime virtual credit organization began operations in 1996. It was Advance Bank, a subsidiary structure of the Dresden Banking Group.

One of the first virtual banks in Germany was Consors-Bank. From the beginning of the work it specialized only in securities trading and gave preference to such distribution channel of services as the Internet. In addition, such banks as BankDirect (founded in 1999), CoinpuBank (1998), E-bank (1999) and some other can be examples of virtual banks. Corporation "Sony" established its own virtual bank in 2002, trying to oppose itself to traditional banks. The popularity of the new virtual financial enterprise was beyond comparison. Only for the first hour the page was visited by 13 570 people, 340 of them started their own account at the bank and during the first month of the Internet bank opened 21 thousand accounts. (Burgess and McGrath, 2010; Stewart, 2008)

Currently some reasons take place not to allow a wide distribution of the virtual credit institutions. Primarily, classical credit organizations are actively promoting Internet banking, which performs almost the majority of functions provided by banks. In addition, clients have psychological reasons not to believe financial organizations without physical offices.

Nevertheless, it should be noted that in the global financial crisis, such a form, the provision of financial services, as a virtual bank, has every chance of development. Primarily, this is due to a significant decrease in costs for the maintenance of the bank's branch network, which takes a large share of the costs of any financial institution.

Classification of virtual credit organizations by type of its formations

Today there exists a few sorts of banks that fit the conception of a virtual bank with some allowances. In the first place, it can be called typical virtual financial institutions as defined previously: banks that completely carry out its activities via the World Wide Web, with no offices and representations. In the modern world such banks is several hundred, its development is not widely adopted enough yet (Figure 1). (Demirer, 2016; Farah, 2011; Gloukhov, Ilin, Koposov, Levina, 2014; Klochkov, Gazizulina, Ostapenko, Eskina, Vlasova, 2016) There exists simple instance of such financial institutions - "Security 1st Network Bank", which has established in the end of 1995 in Pineville, Kentucky.

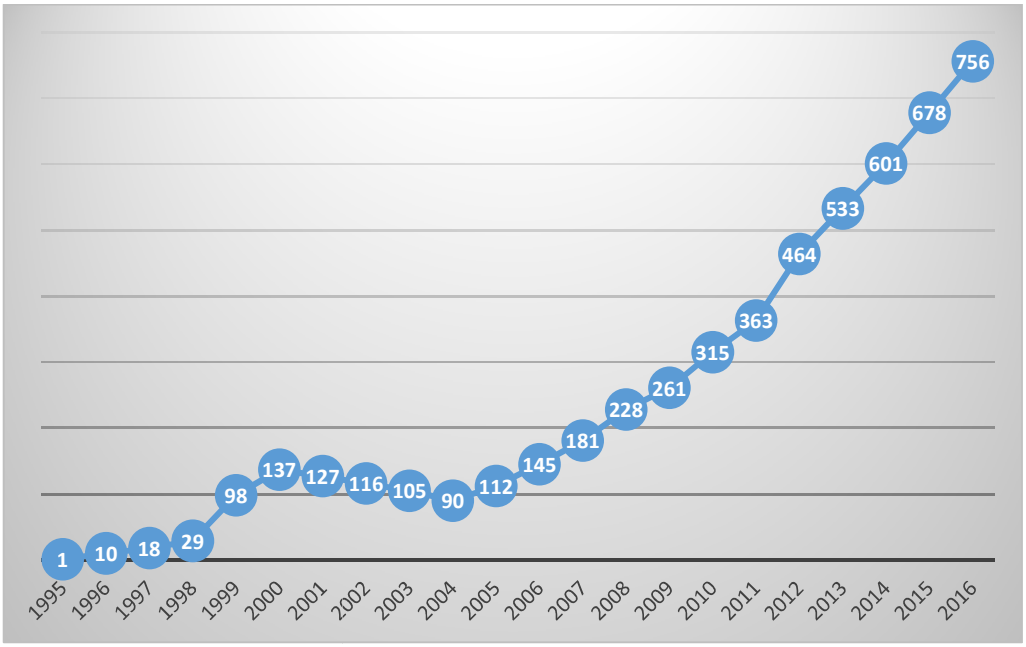


Fig 1: Changing in quantity of typical virtual financial institutions in the globe (units)

Source: compiled by the author

Secondly, it can be told virtual credit organizations formed by traditional banking institutions. Its fundamental difference lies in the fact that, having all the attributes of a virtual credit organization, they are not an independent banking institution. Clients of such banks can obtain all the necessary information in the real office of the credit institution that created the virtual bank. In Russia "Instabank" whose partner bank is the Military Industrial Bank is an instance of virtual banks.

In 2016, according to various estimates, there were 6890 virtual credit organizations of all forms of creation around the world (Figure 2).

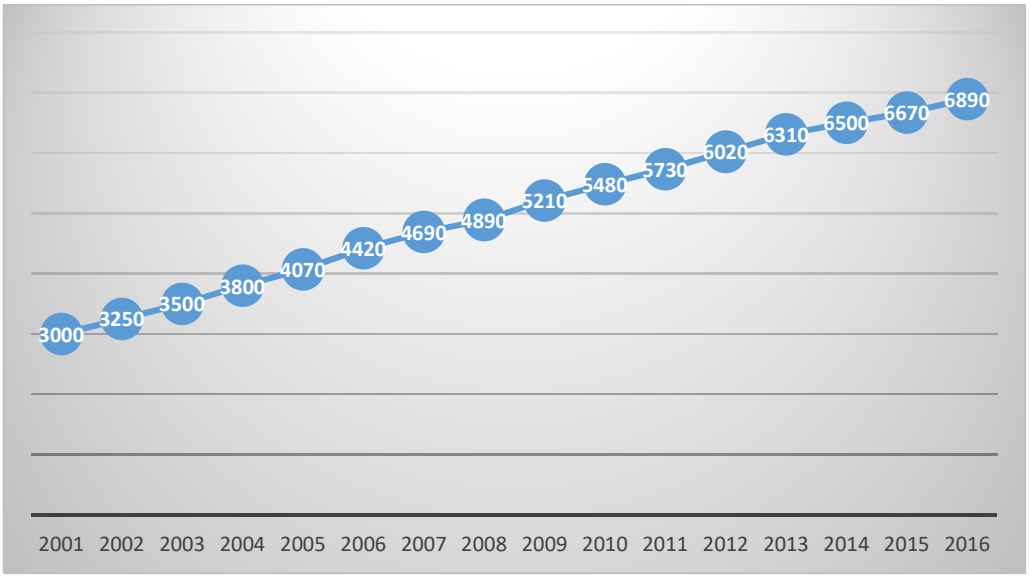


Fig 2: Changing in quantity of all virtual credit organizations in the globe (units)
Source: compiled by the author

Appraisal of the dynamics of the advancement of American virtual credit organizations

At present, the largest number of virtual financial institutions are in the United States, which are founders in this area. Now more than two hundred virtual banks carries out its activity in the U.S.A. (Figure 3) (Glukhov, Balashova, 2015; Klochkov, Odinokov, Klochkova, Ostapenko, Volgina, 2016; Li, Vierheilig, Helms, Bayrak, Vogel-Heuser, Shea, 2011; Virtual Bank: real money).

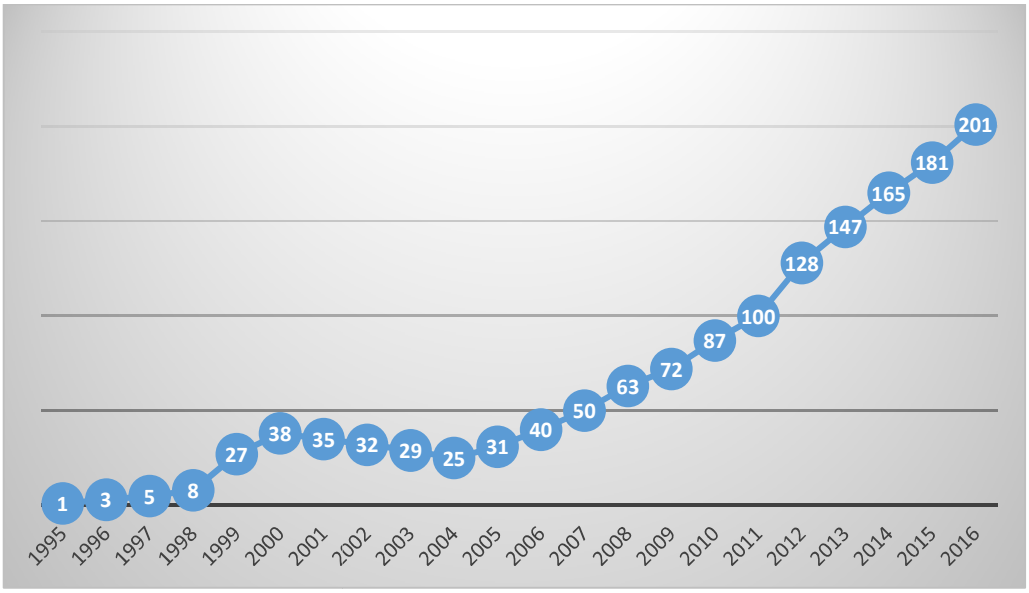


Fig 3. Changing in the number of virtual credit organizations in the United States (units)
Source: compiled by the author

In the United States, virtual financial institutions were progressing from 1996 to 2000: nearly 40 such banks was established at that time. Opposite in 2002-2005 there observed a decrease in the number of virtual banks with the advancement of Internet banking systems. However, since 2006 a steady rise of quantity of the virtual banks with average annual gain in 20% is watched.

Quite a large financial results were shown by American banks from 2004 to 2016: its profit grew by more than eight times (Figure 4). (Klochkov, Klochkova, Volgina, Dementiev, 2016; Virtual Bank: real money).

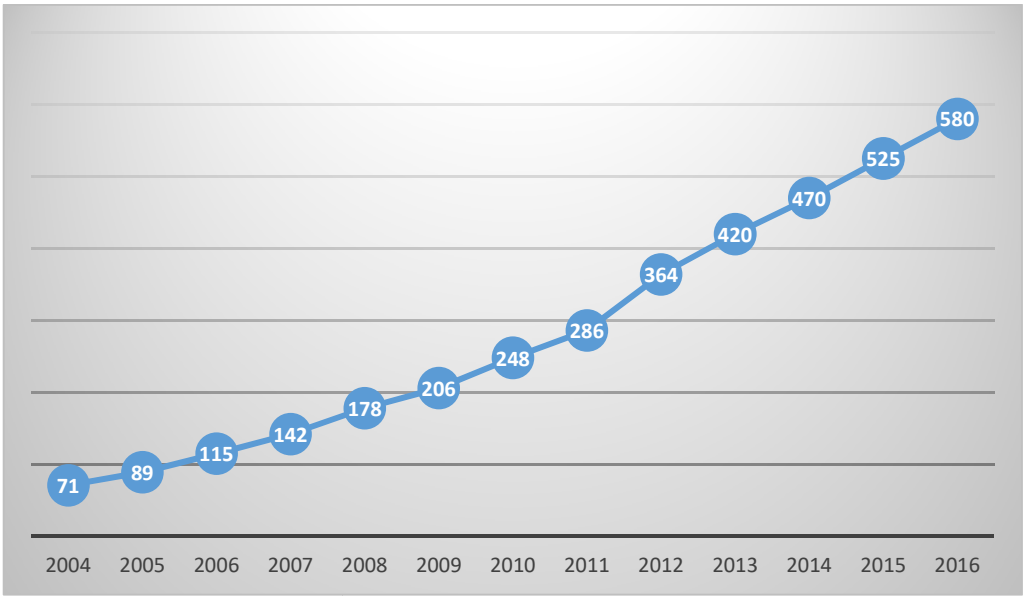


Fig 4: Changing of virtual banks' profits in the U.S., billions of dollars

Source: compiled by the author

Ways of interplay of clients with virtual credit organizations

The role of network banks began to increase in the period of the global economic crisis. Due to an increase of a role of network banks, various models of interplay of clients with virtual financial organizations were offered.

There exists different models of interplay of clients with virtual banks, depending on their segment. (Alehin, 2013; Goo, Kishore, Rao, Nam, 2009; Klochkov, Gazizulina, Golovin, 2016) Consider the standard model in Table 1.

Table 1: Forms of interplay between clients and network banks by sections

Section	Mass	Upper Mass	Privileged
Videoconsulting	Call Center workers	A worker of the specialized line in call center (CC)	Personal account manager
Help Services	Maintenance service inquiries	Maintenance service inquiries	Maintenance service inquiries
Dissatisfactions and pretensions	Solvable online complaints and claims	Solvable online complaints and claims	Solvable online complaints and claims
Sales	On-line registration of applications for banking products (credit and debit cards, loans, mortgages)	On-line registration of applications for banking products (credit and debit cards, loans, mortgages) On-line advisory on financial management	On-line registration of applications for banking products (credit and debit cards, loans, mortgages) On-line performing complicate operations without visiting the bank Online advisory on financial management and complicated products Online service: concierge service, competent parties
Contact point	Smartphone, tablet, BIG PAD, Automatic Teller Machine, call from a site	Smartphone, tablet, BIG PAD, Automatic Teller Machine, call from a site	Smartphone, tablet, BIG PAD, Automatic Teller Machine, call from a site, Bank on TV

Source: Alehin, 2013

The principal benefits of these models for banks are:
- the favorable circumstances to supply services of superior quality from any access point to the bank;
- shortening queues;
- achieving the highest effectiveness of costs: personnel management, hiring of skilled employees, lease of premises and so on.
- expenditure cutting for traffic payment;
- providing mobility (terminals can be moved, it is possible to definite a maximum suitable locations of sales outlets);
- rising up customer loyalty;
- promoting increase in a number of clients and growth of sales;
- forming the Bank's image – innovative, cares about improving the quality of service

From the client side:
- 24-hour assistance and counseling is available anywhere in the world;
- provides effective planning of working time: no necessity to stand in lines to search for the right people, to dial, many times to fill out documents, etc;
- network banks' presence in molls, at the enterprises, on transport, etc;

- the ability to apply to an advisory service of bank experts;
- files a complaint without having to visit the office;
- enables to study bank documents.

Estimation of the possibilities of introducing virtual credit institutions in the Russian banking sector
The Russia's financial system has fairly big prospects to move virtual banks forward. The Russian banking sector on that are imposed Western sanctions have to find new ways of development under the global economic crisis. Lowering expenditures is the important aim for the Russian Federation's banks. In this regard, the Russian Federation's banking institutions raises the need for transition to virtual banks.

The advancement of virtual banks has been happening last five years in Russia. The first network bank appeared in the Russian banking system in the end of 2010. This bank was Tinkoff Credit Systems (TCS). Currently there exists more than 30 virtual credit organizations in Russia (Figure 5). (Klochkov, Gazizulina, Golovin, 2016).

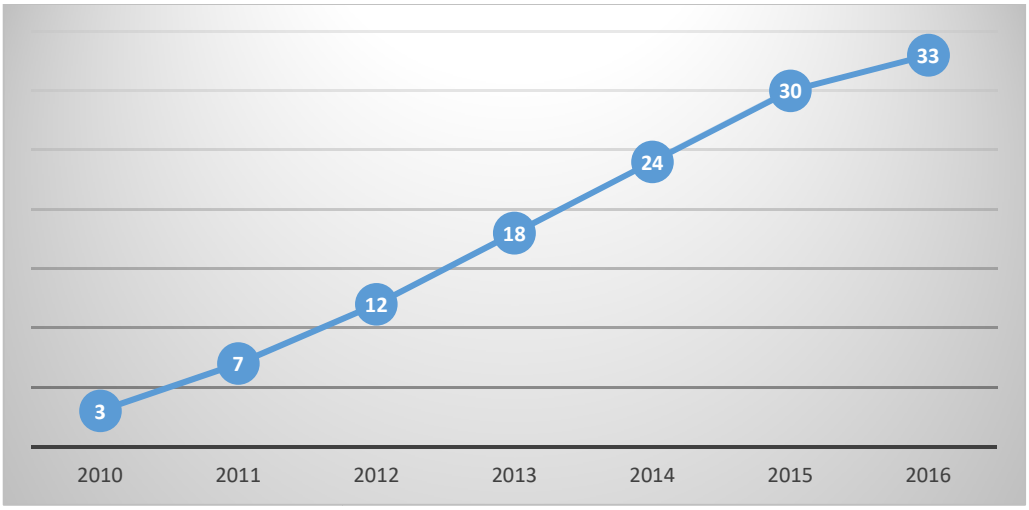


Fig 5: The amount of the Russian network banks (units)
Source: compiled by the author

The average annual growth of Russian network banks is 56 percent (Figure 6), which is much higher than the world growth rate of typical virtual banks (12.9 percent), and the pace of growth of all virtual credit organizations that make up 5.7 percent per year (Figure 7). Such advancing rate of gain is caused by the establishment of the market of Russian network financial institutions, for which even opening of one virtual credit organization considerably rises dynamics of growth. Presently 3 typical network banks 2T Bank, Bank24.ru and TCS carry out activities in Russia. All other network banks operate under the jurisdiction of traditional financial institutions. (Russian network banks)

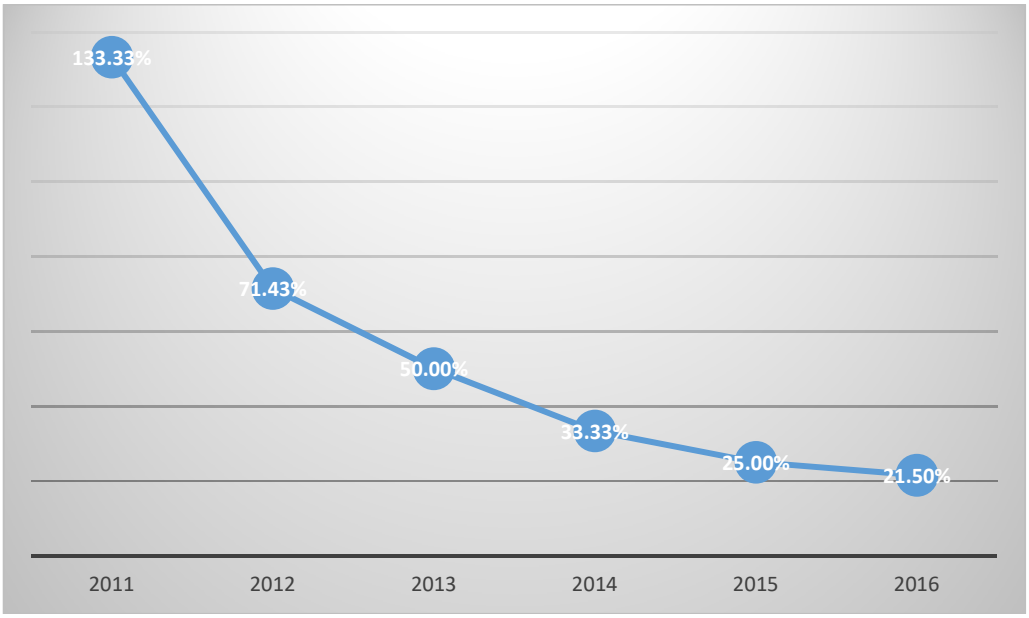


Fig 6: Growth rate of the quantity of the Russian Federation's virtual banks, percent
Source: compiled by the author

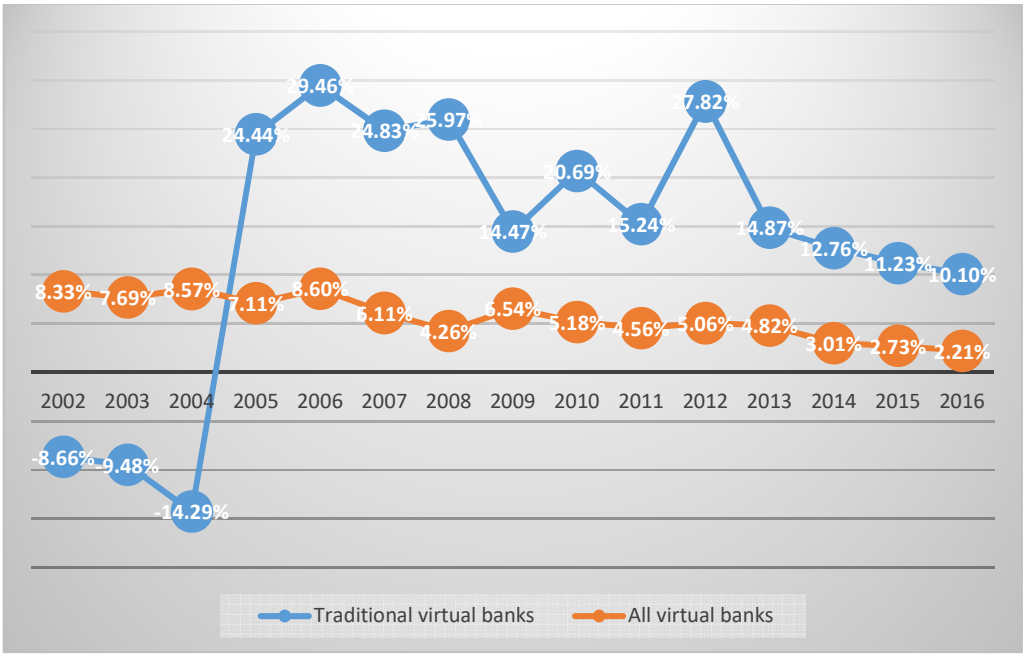
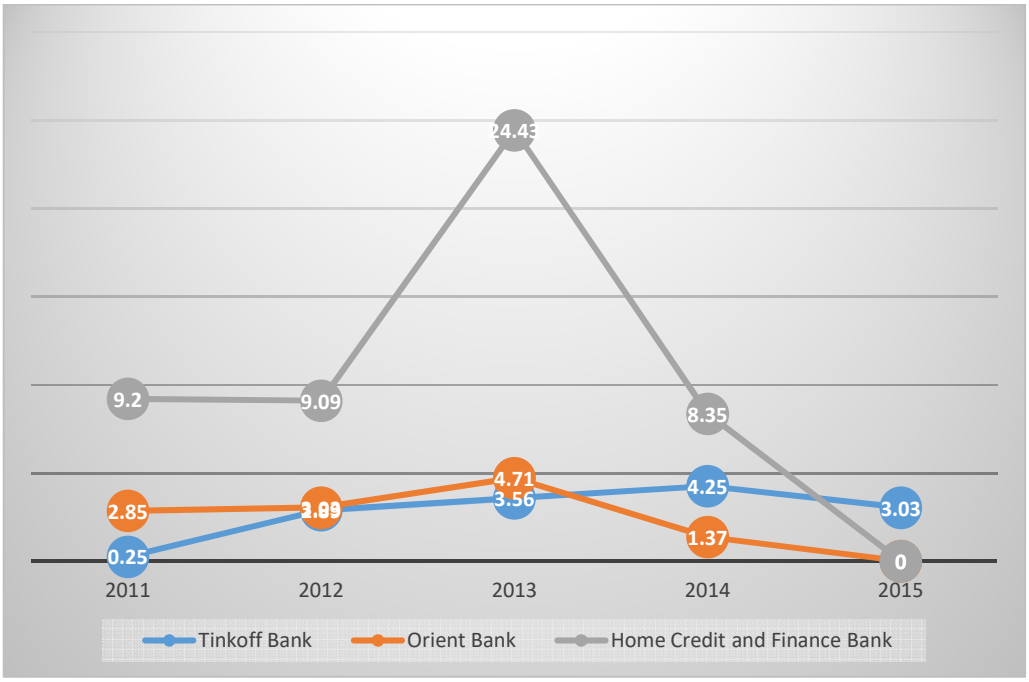


Fig 7: Rate of gain of the quantity of typical network banks and network banking organizations in the globe, percent
Source: compiled by the author

The most promising network bank in Russia has become TCS, which for 6 years of its development reached essential financial outcomes. It takes 62nd place in the Bank's ranking by benefits, 47th on

the loan book, 52nd on the household deposits. TCS occupies 2.7% of the total Russian market in terms of retail deposits, while loans - 1.7%.

When comparing the network bank TCS with traditional financial institutions in the segment of consumer lending, it can be noted that it has achieved substantial profits in crisis conditions and the regime of Western sanctions (Figure 8). (Information of financial institutions)



Source: compiled by the author

Fig 8: The income of financial institutions carrying out its activities in lending to individuals, billion rubles

TCS gained 3.03 billion rubles in 2015, profit of other banks constituted zero. Accordingly, we can say that the traditional financial institutions could not show sufficient flexibility to overcome the crisis.

Conclusions

The following findings can be drawn from the study:

- Over the past decade, the number of network credit organizations in the world has gone up more than 6 times;
- Classical banks establish its virtual financial institutions with great force that enable to significantly extend the horizons of providing banking services;
- The amount of typical network banks rose 4.2 times during the last ten years, indicating the demand for this financial institution in crisis conditions;
- The quantity of all credit organizations in the globe went up more than 2.15 times over the past fifteen years;
- The growing role of network credit organizations in the banking sphere leads to the necessity of developing various models of interaction with customers of virtual banks, especially providing an individual approach to each client;
- The possibility of cutting financial costs enables the network bank model to remain operational in crisis economic environments. Thanks to its flexibility, impressive financial

performance can be attained. For example, the TCS network bank made a profit of 3.03 billion rubles, when competitors from the same banking segment had not come out on positive figures.

References

Alasas B.M., Ishkildina S., Zvonov S., Antipov D., Ushanova N., Demidenko E. (2017) Evaluation of the quality of the process by measuring the index of opportunities, International Journal for Quality Research, 11(2), 457- 468

Alehin I. Virtual banking - retail banking development strategy [Online], [Retrieved May 25, 2017], http:// www.cnews.ru/reviews/ppt/2013_09_17/7_Alehin.pdf

Bataev A.V. (2015) Analysis of cloud technologies use in financial institutions, Actual Problems of Economics, 166 (4), 404-413

Bataev A.V. (2015) Economic efficiency estimation for automated banking systems outsourcing, Actual Problems of Economics, 172 (10), 419-426

Burgess S., McGrath G.M. (2010) Using research techniques to teach management of IT concepts to postgraduate business students, Interdisciplinary Journal of Information, Knowledge, and Management, 5, 49-59

Davidow, W. H., & Malone, M. S. (1992). The virtual organization. HarperCollins, New York, NY. Applying empowerment: organizational model Career Development International, 3(2), p. 1998.

Demirer V. (2016). Information and Communication Technologies. In Instructional Process and Concepts in Theory and Practice, Springer Singapore, 493-523

Farah B. (2011) A maturity model for the management of information technology risk, International Journal of Technology, Knowledge and Society, 7(1), 13-25

Gloukhov V.V., Ilin I.V., Koposov V.I., Levina A.I. (2014) Market risk neutral strategies: modeling and algorithmization, Asian Social Science, 10 (24), 209-216

Glukhov V.V., Balashova E. (2015) Operations strategies in info-communication companies, Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), 9247, 554-558

Goo J., Kishore R., Rao H.R., Nam K. (2009) The role of service level agreements in relational management of information technology outsourcing: An empirical study, MIS Quarterly: Management Information Systems, 33(1), 119-146

Information of financial institutions [Online], [Retrieved April 30, 2017], http:// www.cbr.ru
Klochkov Y., Gazizulina A., Golovin N. (2016) Assessment of organization development speed based on the analysis of standards efficiency. Proceedings - 2nd International Symposium on Stochastic Models in Reliability Engineering, Life Science, and Operations Management, SMRLO 2016, 7433168, 530-532

Klochkov Y., Gazizulina A., Ostapenko M., Eskina E., Vlasova N. (2016) Classifiers of nonconformities in norms and requirements. 5th International Conference on Reliability, Infocom Technologies and Optimization, ICRITO 2016: Trends and Future Directions, 7784933, 96-99

Klochkov Y., Klochkova E., Antipova O., Kiyatkina E., Vasilieva I., Knyazkina E. (2016) Model of database design in the conditions of limited resources. 5th International Conference on Reliability, Infocom Technologies and Optimization, ICRITO 2016: Trends and Future Directions, 7784927, 64-66

Klochkov Y., Klochkova E., Volgina A., Dementiev S. (2016) Human factor in quality function deployment. Proceedings - 2nd International Symposium on Stochastic Models in Reliability Engineering, Life Science, and Operations Management, SMRLO 2016, 7433156, 466-468

Klochkov Y., Odinokov S., Klochkova E., Ostapenko M., Volgina A. (2016). Development of certification model. 5th International Conference on Reliability, Infocom Technologies and Optimization, ICRITO 2016: Trends and Future Directions, 7784937, 120-122

Kočović J., Antić T.R., Jovović M. (2011) The impact of the global financial crisis on the structure of investment port folios of insurance companies, Economic Annals, 56(191), 143-161

Li F., Vierheilig J., Helms B., Bayrak G., Vogel-Heuser B., Shea K. (2011) Towards management of Information Technology-cycles in transdisciplinary innovation processes, IECON Proceedings (Industrial Electronics Conference), 6119663, 2273-2278

Ma J. (2011) Analysis and countermeasures of college English majors' employment difficulties – under the context of global financial crisis, Asian Social Science, 7(1), 186-188

Mowshowitz A. (1994). Virtual organization: A vision of management in the information age. The information society, 10(4), 267-288.

Russian network banks [Online], [Retrieved May 21, 2017], http://www.absonline.ru/phparticles/show_news_one.php?n_id=368
Sivakumar N., Krishnaswami S.R. (2011) Global financial crisis: Dharmic transgressions and solutions, International Journal of Social Economics, 39(1), 39-54

Stewart R.A. (2008) A framework for the life cycle management of information technology projects: ProjectIT, International Journal of Project Management, 26(2), 203-212

The free trade crisis [Online], [Retrieved April 26, 2017], https://www.gazeta.ru/business/2016/09/27/10218119.shtml#page1

The IMF downgraded the outlook for the global economy due to Brexit [Online], [Retrieved April 26, 2017], http://www.rbc.ru/economics/19/07/2016/578e3a509a7947245129ad70

The IMF worsened the forecast of the fall of the Russian economy in 2016 [Online], [Retrieved April 26, 2017], http://www.profile.ru/avtomobili/item/103176-mvf-ukhudshil-prognoz-padeniya-ekonomiki-rossii-v-2016-godu

The World Bank reduces the forecast for world economic growth to 2.4 percent in 2016 [Online], [Retrieved April 26, 2017], http://www.vsemirnyjbank.org/ru/news/press-release/2016/06/07/world-bank-cuts-2016-global-growth-forecast

The world economy faces a new global crisis [Online], [Retrieved April 26, 2017], https://www.vz.ru/economy/2016/3/15/799451.html
Virtual Bank: real money [Online], [Retrieved April 28, 2017], http:// www.rusfinance.com/stati/poleznie-stati/virtualnyy-bank-realnye-dengi.html

Questions of Safety of Mobile Banking In Russian Financial Institutions

Alexey V. Bataev, Associate professor of Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russian Federation, bat_a68@mail.ru

Abstract

The development and realization of information technology contributed to the formation of a new type of economy – informational one. New channels of interaction between clients and organizations were caused the introduction and expansion of information and communication technologies; such as Internet banking and mobile banking have appeared in the bank sphere. The development of appropriate hardware and software in the field of mobile communications has led to a sharp increase in clients in the sphere of mobile banking. This paper discusses the basic tendencies of advancement of remote banking in the Russian Federation's financial institutions. The assessment of criteria on the basis of which mobile banking applications are programed is carried out, the hierarchy of criteria to which mobile applications have to satisfy is created. The analysis of the existing mobile banking applications in the Russian financial institutions is conducted. The most common operating systems for mobile applications are considered. The research results of volumes of thievery through mobile banking applications are given. The main forms of hacking of mobile banking applications are considered. Based on the carried-out analysis, a conclusion was drawn about the necessity of revision the concept of designing mobile banking applications in the direction of providing greater security.

Keywords: information technology management, credit organizations, mobile banking, the amount of stolen funds, safety

Introduction

The twenty-first century was marked by the rapid growth of information and communication technologies, which have firmly entered in all spheres of economy. Development of computer networks and the Internet promoted the emergence of new forms of interplay between various subjects of economic interaction.

Banking institutes are one of the most active consumers of information technology, taking the second place on investments in this sphere after the telecommunication companies.

The use of information and communication technologies in the banking sector resulted in the creation of innovative channels for interaction between clients and financial organizations: Internet banking and mobile banking.

The development of mobile banking has greatly expanded the possibilities of remote banking services for customers, allowing secure an access from virtually anywhere in the world.

In recent years, the development of hardware and software in the field of mobile communication has made possible to move from mobile banking applications, which have the ability to view the balance of accounts, to full-fledged banking applications that support enough wide range of banking operations through mobile banking.

Despite the widespread adoption of mobile banking services and expanding the range of banking operations, the developers of modern mobile banking applications primarily pay attention to the convenience of the interface for customers, to increase in high-speed performance and less to safety, which causes the growth in the amount of stolen money from customers who use mobile applications.

(Bataev, 2015; Dewan S.M., Low G., Land L., Dewan A.M., 2009; Shaikh A. A., Hanafizadeh P. and Karjaluoto H., 2017)

The main sources that reveal the theoretical and methodological aspects of the development of mobile banking are the works of foreign and Russian authors: Barnes, Dewan, Donner and many others.

In these studies the prospects for the introduction and development of mobile banking are examined, the main forms of interaction with customers are analyzed. The architecture of mobile banking systems existing today is viewed and investigated. An evaluation of financial justification for implementation of mobile banking applications is made. (Bataev, 2015; Klochkov, Gazizulina, 2016; Klochkov, Klochkova, Antipova, Kiyatkina, Vasilieva, Knyazkina 2016)

At the same time, this direction is completely new and dynamically developing and therefore many aspects are not considered rather deeply or have not managed to receive a due assessment, despite a large number of researches.

The Research Objective and Methodology

The research objective is mobile applications used in the banking sector. A comprehensive study of the perspectives for the implementation and development of mobile banking applications is conducted. The analysis of existing on the market mobile banking applications on the parameters: operating systems, the convenience of the interface, speed and security is carried out. According to the conducted research, priority directions in the development of mobile applications for financial institutions are offered.

Key Research Findings

The advancement of information technology, which began in the second half of the 20th century, resulted in the creation of a new kind of economy – informational one. In the 21st century the computer networks growth enabled users to carry out any operation, without leaving home.

The information and communication technologies has introduced in all sectors of economy, particularly, the implementation of computer technology is quickly occurring in the banking sector. Credit organizations after IT companies take the second place on realization of information technology.

In recent years, owing to the advancement of computer technology in the world and Russia new forms of remote customer service using mobile banking applications have begun to develop, such form of servicing received the name – Mobile Banking.

Mobile banking is management of the bank account by means of the tablet computer (iPad, HTC Flyer, Samsung Galaxy Tab and so on), the smartphone or cell phones. Generally, for this purpose it is necessary to load a special application on the mobile devices.

According to estimates of various experts, the number mobile banking users constituted more than 25 million people in Russia in 2015, and in concordance with prognosis the number of users can exceed 89 million people by the year 2020 (Figure 1). (Bataev, 2015; Nikolova, Kuporov, Rodionov, 2015; Klochkov, Odinokov, Klochkova, Ostapenko, Volgina, 2016)

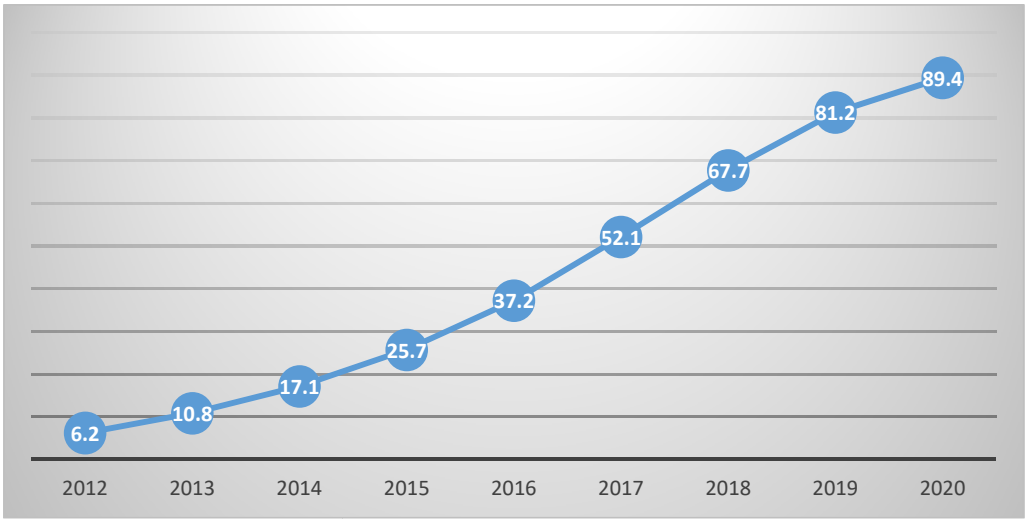


Fig 1: Changing of mobile banking users in Russia, million people
Source: compiled by the author

According to estimates of J'son & Partners Consulting, turnover of payments with usage of mobile banking totaled 15, 2 billion rubles in 2014, and it rose by 30% and reached 19, 8 billion rubles in 2015. The volume of payments through mobile banking is expected to be more than 41 billion rubles by 2018, while the average annual growth rate from 2016 to 2018 is 28% (Figure 2). (Klochkov, Klochkova, Volgina, Dementiev, 2016; Nikolova, Rodionov, Afanasyeva, 2017; Shaikh, Hanafizadeh and Karjaluoto, 2017)

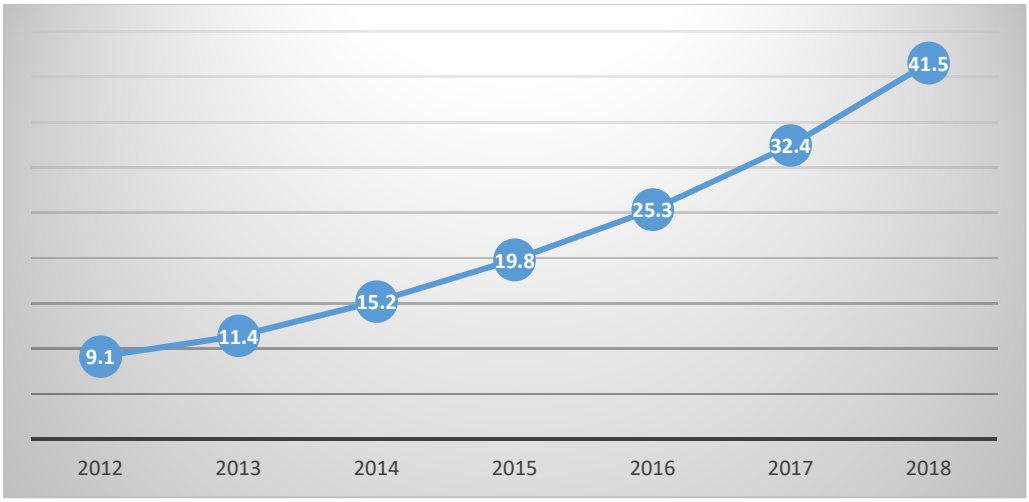


Fig 2: Changing of the volume of payments through mobile banking, billion rubles
Source: compiled by the author

Today more than 54% of Russian banks offer mobile banking services. A large share of customers using mobile banking applications has PJSC «Sberbank» - 48%. It is told about the huge client base and considerable financial investments in advanced information products. PJSC Svyaznoy bank occupies the next place - 37% of all client base, the share of other banks together accounts for about 15% (Figure 3). The share of customers using mobile banking applications hesitates from 10% to

20% for most Russian financial institutions. (Gloukhov, Ilin, Koposov, Levina, 2014; Klochkov, Gazizulina, Golovin, 2016)

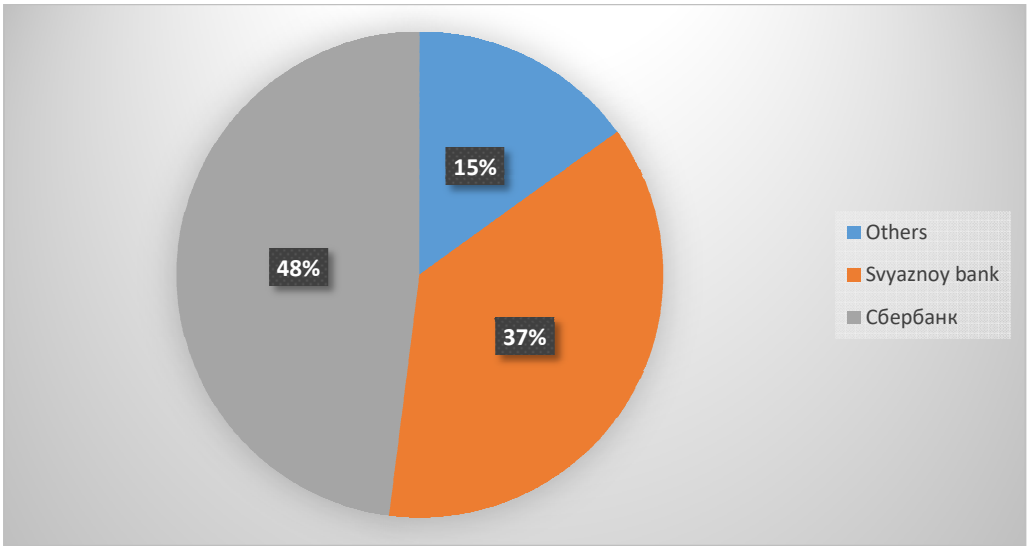


Fig 3: Allocation of clients who use of banking institutions' applications for mobile gadgets
Source: compiled by the author

The analytical agency J'son & Partners Consulting carried out the comparative analysis of mobile banking applications of thirty financial institutions having the most developed mobile banking. The study according to forty parameters, such as: functionality, interaction experience, the design and evaluation of applications stores and others was conducted (Table 1). (Bataev, 2015; Klochkov, Gazizulina, Ostapenko, Eskina, Vlasova, 2016; Nikolova, Rodionov, Bahauovna, 2016)

Table 1: The highest rank of mobile banking applications

№	Application	Credit Organization	Rating, %
1	Tinkoff	Tinkoff Bank	92%
2	Roketbank	Roketbank	87%
3	Instabank	Instabank	85%
4	Online Sberbank	Sberbank	74%
5	BSPB Mobile	Bank «Saint-Petersburg»	74%
6	Home Credit	Home Credit Bank	73%
7	MTS Bank	MTS Bank	72%
8	MInB	Moscow Industrial Bank	71%
9	UBRaD Mobile banking	Ural Bank for Reconstruction and Development	70%
10	Qbank	Svyaznoy Bank	67%
11	Layf-Mobile	Layf (Probusinessbank)	66%
12	Otkritie Bank	FC Otkritie	66%
13	Alpha-Bank5	Alpha-Bank	64%
14	PSB-Mobile	Promsvyazbank	63%
15	ROSBANK Online	ROSBANK	62%
16	OTPdirekt	OTP Bank	61%
17	R-Mobile	Raiffeisenbank	59%
18	MCB Mobile	Credit Bank of Moscow	56%

19	Mobile bank VTB24	VTB24	53%
20	Mobile.UniCredit	UniCredit Bank	51%
21	Avangard Bank	Avangard	50%
22	Mobile bank URALSIB	Uralsib	49%
23	SKB-Bank	SKB-Bank	47%
24	Mobile bank Russian Standart	Russian Standart	43%
25	Vozrozhdenie Bank	Vozrozhdenie Bank	43%
26	Telecard	Gazprombank Group	36%
27	Handybank	Renaissance Credit (HandyBank)	36%
28	Citibank RU	Citibank	34%
29	Orient Mobile	Orient Bank	26%
30	Mobile bank Russian Agricultural Bank	Russian Agricultural Bank	25%

Source: compiled by the author

As we can see in Table 1, just mobile application Sberbank entered the top five applications, while mobile banking system from Svyaznoy Bank takes only the 10th place.

The range of operations for clients using mobile banking application is wide enough, but the operations of accounts overview are on the first place (Figure 4). (Barnes and Corbitt, 2003; Dewan, Low, Land, Dewan, 2009; Donner and Tellez, 2008; Klochkov, Its, Vasilieva, 2016)

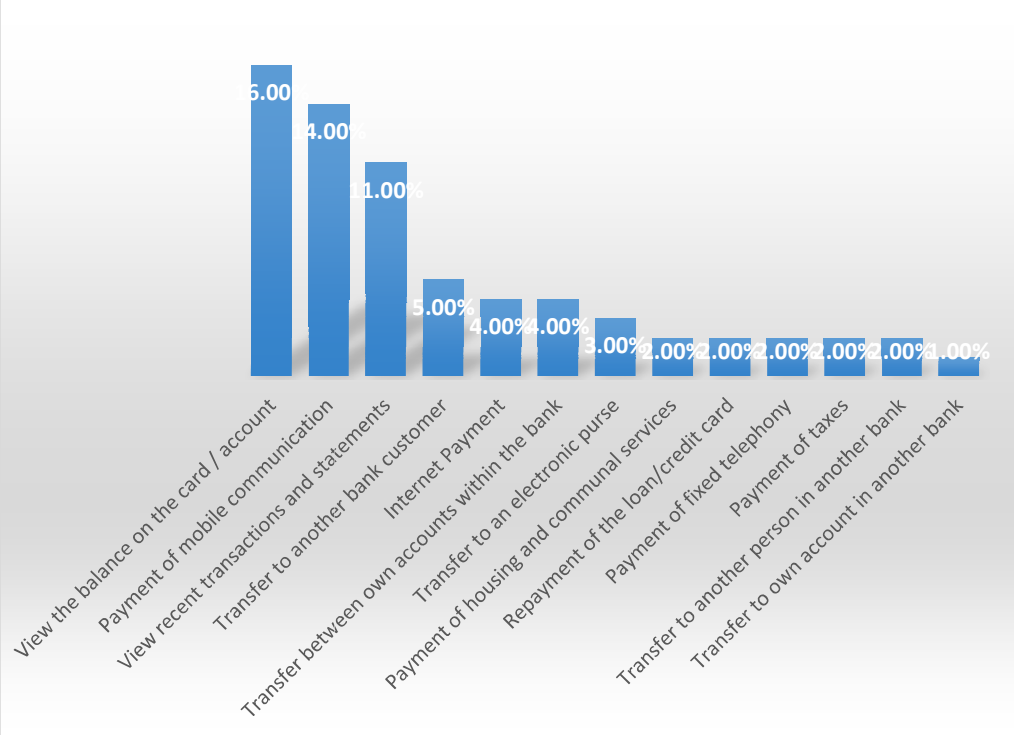


Fig. 4: Allocation of operations employing mobile banking, percent

Source: compiled by the author

Android and iPhone apps, which seize 25% of the market, hold the leading position to implement mobile banking in the Russian banking institutions (Figure 5). (Chen and Wu, 2011; Cristea, Zugravu, Moga, Cristea, Maftei, Oprea, 2011; Klochkov, Klochkova, Vasilieva, 2016)

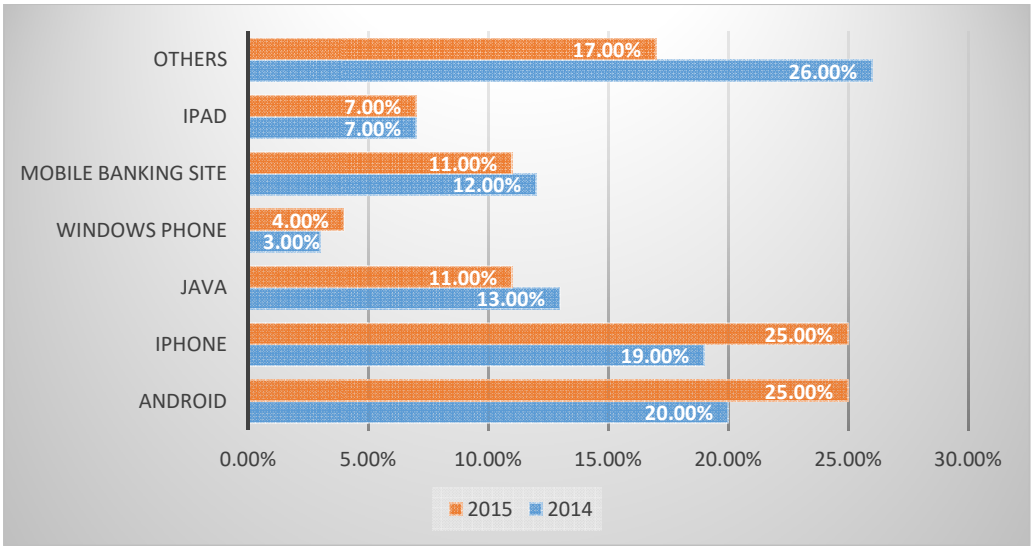


Fig 5: High-priority software applications for the implementation of mobile banking

Source: compiled by the author

The next main directions is possible to define for mobile gadgets: primarily – an ease to use application, secondly - the speed, and on the third place - safety of the used applications under designing of banking applications.

None of the applications you use does not give 100% protection of data from electronic thievery. The range of vulnerability makes from 14% to 25% depending on the used software application. Recently more attention begins to be paid to security issues and according to experts' estimates; it can come out on top on the importance. (Bataev, 2015; Dass, Muttukrishnan, 2011; De Mello Benzi, De Sousa Júnior, Bidan, Mé, 2008; Siriram, 2011)

Kinds of mobile banking brittleness

Today the attacks through mobile banking divided into three types. (Dass, Muttukrishnan, 2011; Yang, 2009; Zhou, 2012)

Physical access to the client's gadgets

A criminal can get admission to the file system having a physically access to the client's gadgets. If the application stores the identification data or other sensitive data in clear text, or data "flow away" in the clear, it is easy for an attacker to obtain this information and steal money.

Threat when a person is between the server and the gadget

This attack is directly to communication link: during the classical attack, data between the device of the client and the server are intercepted. For this purpose, one has to be in the same network with the victim, for example in public Wi-Fi network, or use a fake wireless access points. Brittleness in a mobile application, incorrect work with enciphering of transmitted data or total absence of data

enciphering is necessary for the attack's realization. As a consequence, the cybercriminal can obtain and replace the transmitted data that leads to thievery of money from the customer account in the end.

Download a malicious program to the client's gadget in various ways

An attacker can lift their privileges in the system after the installation of malicious applications on the gadget and get remote access with full access rights. It resulted in an entire compromise of the gadget: a criminal is able to steal sensitive data of mobile banking user or substitute data of payment transactions. (Dass, Muttukrishnan, 2011; Laukkanen, 2016)

There exists own ways of protection for every kind of attacks. Thus, for protection against directly physical access to the gadget it is necessary to use cryptographic opportunities of the gadget, encrypt data and if it is needed remotely reset data, and exercise constant control of security of the application that will help to reveal possible brittleness.

Threat when a person is between the server and the gadget requires proper realization of the work with the SSL cryptographic protocol that provides secure data transfer. It is also recommended confide only SSL-certificate of the bank in a mobile application in case of connection to the server.

To protect against malicious applications it is necessary to update permanently the software on the gadget, to use security software and that is important to increase user awareness of information security issues.

Therefore, the security of mobile banking application is a whole range of measures, beginning with the architecture of the application, development, taking all possible brittleness into consideration, and also continuous control of its work and regular updating and modification. (Liu, Min, Ji, 2009; Ravendran, MacColl, Docherty, 2011; Saeed, 2011).

In spite of the constant improvement in both hardware and software components of mobile banking, the volume of theft through mobile banking applications only increase.

For 2014, owners of mobile banking have been attacked by cybercriminals 942 thousand times (Figure 6). If we consider that about 15 thousand rubles is stolen on average for one time through the mobile application, the damage amounted more than 14, 13 billion rubles a year (Figure 7). (Nikolova, Kuporov, Rodionov, 2015)

In 2015, according to different forecasts, the volume of electronic thievery through mobile banking exceeded 21 billion rubles (Figure 7). The changing of electronic thievery was 1.5 times less in comparison with the period 2013/2014 year. It is a good tendency, caused by coming out to the first place to aspect of the security of mobile banking applications.

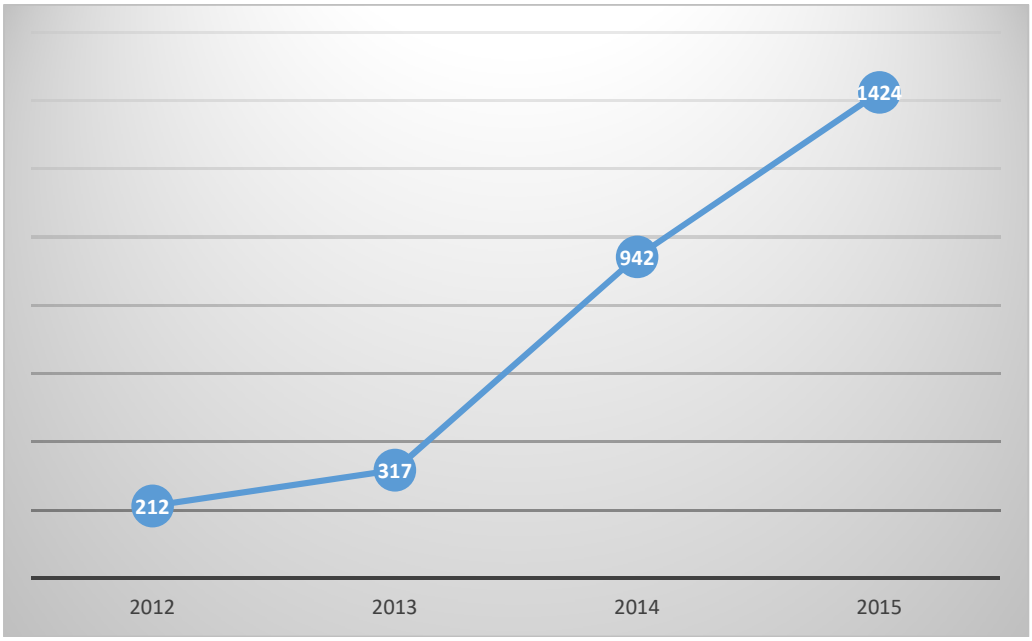


Fig. 6: Changing of the growth in the number of thefts through mobile banking, thousand units
Source: compiled by the author

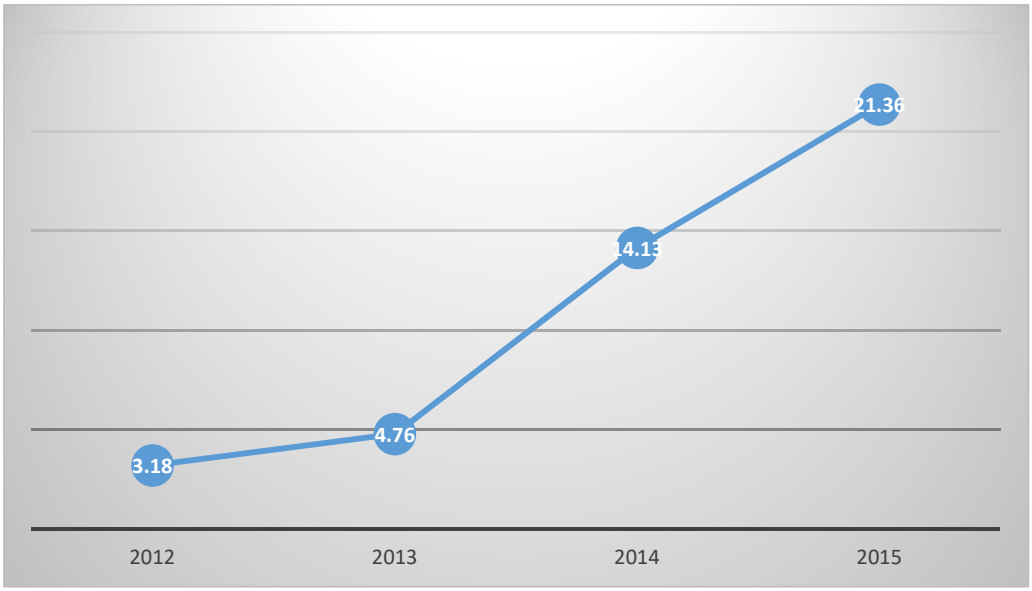


Fig. 7: Changing of theft through mobile banking applications, billion dollars

Source: compiled by the author

Conclusions

In the final, the next findings are drawn:

- the advancement of mobile banking in Russia goes rapidly, the quantity of clients using mobile banking applications is supposed to exceed 89 million people by 2020, and the amount of payments using mobile banking would exceed 41 billion rubles by 2018;

- today the convenience of application takes the first place, the speed is on the second one and the safety of mobile banking - only on the third one under designing of mobile banking applications;
- the volume of the stolen means through mobile banking applications increased by 6,72 times from 2012 to 2015 and amounted to 21,36 billion rubles;

- the volume of thievery through the channels of mobile banking was more than 21,36 billion rubles in 2015, the conducted research in the field of stolen funds shows that designers of mobile banking applications have to put the safety on the first place in the near future.

References

Barnes S. J. and Corbitt B. (2003) Mobile banking: concept and potential. International Journal of Mobile Communications, 1(3), 273-288.

Bataev A.V. (2015) Cost-effectiveness evaluation of smart cards introduction in financial institutions, Actual Problems of Economics, 170(8), 395-401

Bataev A.V. (2015) Economic efficiency estimation for automated banking systems outsourcing, Actual Problems of Economics, 172(10), 419-426

Chen Y.-C., Wu J.-H. (2011) IT management capability and its impact on the performance of a CIO, Information and Management, 48(4-5), 145-156

Cristea V., Zugravu A., Moga L., Cristea D., Maftei C.O., Oprea R.A. (2011) Impact of information technology management processes on fish farming, Journal of Environmental Protection and Ecology, 12(4), 1893-1897

Dass R., Muttukrishnan R. (2011) Security framework for addressing the issues of trust on mobile financial services, Proceedings of the 2011 7th International Conference on Next Generation Web Services Practices, NWeSP 2011, 6088160, 99-104

De Mello Benzi D., De Sousa Júnior R.T., Bidan C., Mé L. (2008) Model for trust within information technology management, ICEIS 2008 - Proceedings of the 10th International Conference on Enterprise Information Systems, AIDSS, 513-518

Dewan S.M., Low G., Land L., Dewan A.M. (2009) Consumer choice model of mobile banking, ACIS 2009 Proceedings - 20th Australasian Conference on Information Systems, 25-35

Donner J. and Tellez C. A. (2008). Mobile banking and economic development: Linking adoption, impact, and use. Asian journal of communication, 18(4), 318-332.

Gloukhov V.V., Ilin I.V., Koposov V.I., Levina A.I. (2014) Market risk neutral strategies: modeling and algorithmization, Asian Social Science, 10(24), 209-216

Klochkov Y., Gazizulina A. (2016) Improvement of methodology of evaluation of efficiency of the etallurgical complex procebes development, Key Engineering Materials, 684, 453-460.

Klochkov Y., Gazizulina A., Golovin N. (2016) Assessment of organization development speed based on the analysis of standards efficiency. Proceedings - 2nd International Symposium on Stochastic Models in Reliability Engineering, Life Science, and Operations Management, SMRLO 2016, 7433168, 530-532

Klochkov Y., Gazizulina A., Ostapenko M., Eskina E., Vlasova N. (2016) Classifiers of nonconformities in norms and requirements. 5th International Conference on Reliability, Infocom Technologies and Optimization, ICRITO 2016: Trends and Future Directions, 7784933, 96-99

Klochkov Y., Its A., Vasilieva I. (2016) Development of FMEA method with the purpose of quality abebment of can stock production. Key Engineering Materials, 684, 473-476

Klochkov Y., Klochkova E., Antipova O., Kiyatkina E., Vasilieva I., Knyazkina E. (2016) Model of database design in the conditions of limited resources. 5th International Conference on Reliability, Infocom Technologies and Optimization, ICRITO 2016: Trends and Future Directions, 7784927, 64-66

Klochkov Y., Klochkova E., Vasilieva I. (2016) Forecasting of staff resistance level in the process of introduction of new standards. Proceedings - 2nd International Symposium on Stochastic Models in Reliability Engineering, Life Science, and Operations Management, SMRLO 2016, 7433169, 533-535

Klochkov Y., Klochkova E., Volgina A., Dementiev S. (2016) Human factor in quality function deployment. Proceedings - 2nd International Symposium on Stochastic Models in Reliability Engineering, Life Science, and Operations Management, SMRLO 2016, 7433156, 466-468

Klochkov Y., Odinokov S., Klochkova E., Ostapenko M., Volgina A. (2016). Development of certification model. 5th International Conference on Reliability, Infocom Technologies and Optimization, ICRITO 2016: Trends and Future Directions, 7784937, 120-122

Laukkanen, T. (2016). Consumer adoption versus rejection decisions in seemingly similar service innovations: The case of the Internet and mobile banking. Journal of Business Research, 69(7), 2432-2439.

Liu Z., Min Q., Ji S. (2009) An empirical study on mobile banking adoption: The role of trust, 2nd International Symposium on Electronic Commerce and Security, ISECS 2009, 2,5209660, 7-13

Nikolova L.V., Kuporov J.J., Rodionov D.G. (2015) Risk management of innovation projects in the context of globalization, International Journal of Economics and Financial Issues, 5 (3S), 68-72

Nikolova L.V., Rodionov D.G., Afanasyeva N.V. (2017) Impact of globalization on innovation project risks estimation, European Research Studies Journal, 20 (2), 396-410

Nikolova L.V., Rodionov D.G., Bahauovna M.A. (2016) Securitization of bank assets as a source of financing the innovation activity, International Journal of Economics and Financial Issues, 6(2), 246-252

Ravendran R., MacColl I., Docherty M. (2011) Mobile banking customization via user-defined tags, Proceedings of the 23rd Australian Computer-Human Interaction Conference, OzCHI 2011, 261-264

Saeed K.A. (2011) Understanding the adoption of mobile banking services: An empirical assessment, 17th Americas Conference on Information Systems 2011, AMCIS 2011, 1, 39-47

Shaikh A. A., Hanafizadeh P. and Karjaluoto H. (2017). Mobile Banking and Payment System: A Conceptual Standpoint. International Journal of E-Business Research (IJEBR), 13(2), 14-27.

Siriram R. (2011) Pitfalls of information technology management systems, IEEE International Conference on Industrial Engineering and Engineering Management, 6118069, 1016-1023

Yang A.S. (2009) Exploring Adoption difficulties in mobile banking services, Canadian Journal of Administrative Sciences, 26(2), 136-149

Zhou T. (2012). Understanding users' initial trust in mobile banking: An elaboration likelihood perspective. Computers in Human Behavior, 28(4), 1518-1525.

Quality Management of Logistics Processes in the Context of Methodology of the TQM System

Irina Vladimirovna Kablashova, Voronezh, Russia, kablashowa@yandex.ru

Valentina Nikolaevna Rodionova Voronezh, Russia, rodionovavn2011@yandex.ru

Oskar Grigoryevich Turovets, Voronezh, Russia, oskar-turovets@yandex.ru

Marina Sergeevna Lutsenko Voronezh, Russia, Luchiksan@rambler.ru

Abstract

Purpose: The goal is to study the activities for managing the quality of logistics processes in the context of universal responsibility for quality, taking into account the content of logistics processes and the components of the logistics system of an enterprise, as well as the principles, functions and methods of implementing the activities for quality management of logistics processes.
Design/methodology/approach: In compliance with the concept of processual approach, which determines the need for managing the chains of interrelated processes, the paper formulates the main provisions for quality management of logistics processes and specifies the concept of logistics process quality, the provision of which permits the creation and maintenance of conditions for organization of industrial processes. **Findings:** The need for developing the methods and tools of functioning determines the formation of the mechanism of logistics process quality management as a component of the quality management system, including: 1) the procedures and processes of monitoring the conditions of the industrial environment, diagnostics of current parameters of logistic processes and preventing the causes of deviations; 2) the identification of reciprocal responsibility for the quality of logistics and industrial processes between all workers of an enterprise. **Originality/value:** The developed algorithm of the quality management of logistics processes makes it possible to streamline the implementation of logistic activities by setting a clear sequence of management actions in consideration of production stages, which implies the need for constant enhancement of logistics processes and improvement of their quality.

Keywords*:* quality of processes, quality management of logistics processes, principles of quality management, methodology of the TQM system, functions of quality management of logistics processes

1. Introduction

The currently implemented system of quality management is characterized by continuous development and improvement of processes, in consideration of rationality of design and techno-logical solutions, the components of industrial capacity of enterprises.

Therefore, the identification of relationships within the industrial system and between the processes must be carried out without time loss, which allows for timely detection and elimination of possible deviations in timelines of implementing the production processes, interrelated with those of logistics. Any recurring deviation may be interpreted as a malfunction in the management system, which leads to deterioration in the quality of all processes [2, 4].

The purpose of the present theoretical study is to disclose the essence of managing the quality of logistics processes, with account of methodology of the TQM system. The subject of the study includes the principles, functions, processes and conditions of implementing the activities for managing logistics processes.

2. Theory

In accordance with recommendations of the contemporary international organization of quality management, the basic principle of the system is the process approach, the application of which stipulates the necessity for categorization of processes into three groups, namely, primary, supporting and management processes [6, 12].

The processes of logistics, focused at creating conditions for the flow of primary processes, must be regarded as supporting ones. In accordance with the concept of the process approach, all processes, occurring at an enterprise are interlinked in inputs and outputs, therefore, the quality of industrial (primary) processes directly depends on the quality of logistic (procurement) processes.

The given assumption makes it necessary to clarify the essence and content of the quality of logistics processes and quality management. In a narrow sense, the quality of logistics processes must be viewed as an aggregate indicator, characterizing the degree of correspondence between the logistics process parameters and those of industrial processes, which impacts their regularity and proportionality. In a broad sense, the quality of logistics processes characterizes the ability of the process to timely provide the industrial processes with necessary resources and ensure their quality during storage and allocation to different stages of product lifecycle [10, 11]. Consequently, the quality of logistics processes may be viewed as conditions for implementing industrial processes at an enterprise. In this case, the activities related to quality management of logistics processes are a subsystem of the process quality management system at an enterprise [5].

In our opinion, the quality management of a logistics process should be viewed as a set of organizational and technological procedures, directed at creation and maintenance of conditions for implementing the production processes, in consideration of the parameters of production environment (both internal and external), which, in their turn, determine the quality of production processes.

The main procedures for managing the quality of logistics processes are: the identification of processes, the testing of current parameters and continuous monitoring of causes of logistics process deviations, affecting the stability and regularity of industrial processes [3, 7].

The process quality management in a logistic system must be implemented, taking the following principles into account:

- the identification of the subsystem of logistics process quality assurance in the management system;
- the application of the process approach to formation of logistics process chains;
- ensuring the quality of the final result of each process in relationship with the requirements for the quality of the outcome of the logistics process chain, and in accordance with the requirements for the quality of serviced industrial processes;
- the continuous monitoring of industrial conditions, focused at timely introduction of relevant changes in logistics processes, and continuous improvement in current parameters of certain processes and the overall quality of logistics process chains;
- ensuring the sustainability and stability of logistics processes, as well as the reliability of logistics process chains;
- the formation of the infrastructure for implementing the logistics activities with account of the requirements for the quality of interrelated logistics processes;
- ensuring the involvement of all stakeholders of logistics processes and the coordination of their actions by cross-functional (integrated) management of logistics process chains;
- managing the quality of logistics processes and the attainment of the goal of logistics activity, on condition of minimizing the costs and resources used.

3. Quality Management of Logistics Processes

The research undertaken made it possible to disclose the content of the activities related to quality management of logistics processes (table 1).

Table 1: The Content Of Quality Management Of Logistics Processes

Components of the logistic system	Content of logistics processes	Content of quality management of logistics processes
Customer servicing	Classification of customers; standartization of work and the analysis of requirements for the quality of supplies; setting standards of service and warranty maintenance of customers;	The development of the customer servicing system, the analysis of requirements for the quality of service and warranty maintenance, the identification of customers' responsibility for quality, setting the criteria of the customer servicing quality
Procurement logistics	The formalization of procedures for procurement and supply management, the evaluation and selection of suppliers, the analysis of delivery contract implementation.	The standartization of work with suppliers, the elaboration of the mechanism for managing the procurement quality, setting the criteria of supply quality assessment, identification of responsibility for the quality of supply.
Warehousing logistics	Setting the requirements for conditions of product storage, the formalization of business processes in a warehouse, the formation of the order size and packaging, the forecasting in stock management.	The development of the stockpiling management system, the analysis of implementing the requirements for stockpiling conditions; the monitoring and evaluation of input and output quality, the claim work with suppliers.
Transport logistics	The elaboration of the procedure of distributing semi-finished and finished products; the creation of the system of transport process management; the optimization of transport plan implementation	The standartization of transport operations, the identification of responsibility for the quality of cargo during transportation, encouraging the responsibility of transport workers for preservation of cargo quality, improving the quality of transport means.
Industrial logistics	The elaboration of the procedure of submitting the application from the planning department, the coordination of sales, production and procurement plans, the development of the technology for recycling and sales of production waste	The analysis of sales, production and procurement plans, process losses and product quality, the monitoring of the causes of process deviations and quality flaws; the standartization of procedures for managing the logistics processes and the identification of responsibility for the quality
Distribution logistics	The establishment of relationships with sellers, software sup-	The identification of responsibility for the quality of fin-

	port of marketing process organization, the analysis of product demand, the selection of channels for product distribution, drafting schedules of product shipment	ished product supply, the analysis of customer's satisfaction with the quality of supply, the development of the system of staff motivation, the analysis of risks for customer groups, associated with quality flaws
Overall management	The development of the system for managing the logistics processes, the formation of the integral information system, the development of key professional competencies for logistics service workers, the organization of cross-cutting coordination of logistics departments, the development of the system of staff motivation	The identification of responsibility for the quality of processes and plotting the matrix of responsibility for logistics service workers, the SWOT-analysis of factors ensuring the quality of logistics processes, the standartization of workflow, the elaboration of the mechanism of process quality management in the logistics system of an enterprise.

In view of the above-mentioned provisions, the algorithm of managing the quality of logistics processes includes the following steps:

1 Setting the requirements for the quality of logistics processes, the identification of evaluation criteria and drafting the quality assurance programme.

2 The identification of the initial information on current parameters of logistics process quality, taking account of the requirements for the quality of industrial processes.

3 The continuous monitoring and statistical analysis of logistics processes and conditions of the production environment with the purpose of timely detection of causes of logistics process deviations.

4 The development of corrective and preventive measures for eliminating the identified causes of deviations in logistics processes and reducing the risk of loss in the event of their reappearance.

5 The establishment of continuous communication between the agents of logistics process chains to organize the team activity focused at quality improvement.

The proposed approach to quality management assumes the necessity for constant improvement of logistics processes on the basis of monitoring the conditions of the production environment, testing current parameters of logistics processes, preventing the causes of deviations (instead of quality control), and identifying the mutual responsibility for the quality of logistics and industrial processes, shared by all enterprise workers.

4. The mechanism of managing the quality of logistics processes

The table 2 presents the results of investigating the possibility of applying the modern principles of the TQM system for disclosing the content of functions of logistics process quality management.

Table 2: The content of functions of logistics process quality management in the context of TQM methodology

Name of the principle	Content of principles [3]	Functions of logistics process quality management
1 Client (customer, buyer) orientation (focusing)	Quality management is focused at implementation of customer requirements and the desire to surpass their expectations.	The development of logistics processes, associated with customers' assessment of supply quality with the purpose of timely identification of the possibility of satisfying customer requirements.
2 Leadership (responsibility of management)	Leaders at all organizational levels ensure the unity of goal and the trends of organization activities, creating conditions for interaction of employees to achieve the goals of an organization in terms of quality	Setting the goals of logistics activity and the analysis of their attainment by managers must be carried out on the regular basis. The plans for product (service) quality are part of the enterprise development strategy assurance
3 The interaction between all employees of an enterprise	It is extremely important for an enterprise that all employees must be competent, empowered and involved in creating wealth.	The employees must possess the knowledge of teamwork methods, which ensures the synergistic effect in selecting and implementing the solutions for improving the logistics processes
4 Process approach	The consistent and predictable results are achieved in a more effective and efficient way, when the activity is perceived and managed as interrelated processes, functioning as a coherent system	The creation of process chains makes it possible to identify the interaction between the production and logistics processes, which determines the control over the use of each type of resource and reduces the production costs
5 Improvement	The improvement is necessary for preserving and maintaining the level of process quality, as well as for timely reaction to changes in internal and external conditions of process implementation.	The improvement of logistics processes must be carried out with the involvement of administration, responsible for providing all resources, necessary for attaining the goals set
6 Relationship management	To achieve sustainable success, enterprises manage their relationships with relevant stakeholders, such are suppliers.	The management of relationships with suppliers determines the bilateral relations and permits to optimize their impact upon the results of logistics activities.
7 Evidence-based decision-making	The decisions, based upon data analysis and assessment are more likely to produce the desirable results.	The analysis of proposals, aimed at improvement of quality, productivity and cost reduction, must be carried out by united teams including the industrial and logistic service workers

8 The establishment of mutually beneficial relationships between stake-holders	The establishment of documented procedures, compulsory for a supplier at all stages of relationship with a customer	Determines the necessity for establishment and permanent analysis of feedback from suppliers and consumers of communication, which promotes the enhancement of logistics process quality

Let us consider the content of the main functions of logistics process quality management in the context of the overall quality management system. The key function is the support of activities, aimed at reducing risks of quality flaws when identifying the logistics process deviations, and the achievement of sustainable success through the development of corporate culture and social responsibility of an enterprise. The implementation of this function contributes to the progress of risk-oriented thinking in elaboration and implementation of management decisions [8].

The next function is to standardize the activity of logistics process quality management through the development and ensuring the functioning of the relevant mechanism, governing the procedures, methods and processes of logistics quality management. This function provides the implementation of the principle of systematic approach to quality management.

Equally important functions are the establishment and maintenance of mutually beneficial relations in an informal group (quality assurance team), as well as overall management, regarded as a structured process of establishing the interaction between the board and the staff, involved in logistics activities of an enterprise. The implementation of functions mentioned is in line with the content of the principle of personnel involvement in process quality management.

The following functions of logistics process quality management is the promotion of innovations and staff motivation, ensuring the continuous innovative development of methods and processes, as well as supporting personnel initiatives to improve the logistics processes. The implementation of these functions corresponds to the principle of continuous improvement of process quality.

The general function of logistics process quality management is delineation of powers, duties and responsibilities of the staff for the quality of logistics processes, taking into consideration the competence approach to management, which is in line with the content of the principle of management leadership, inherent in the TQM system.

The implementation of the above-mentioned functions is an important condition for effective functioning of the mechanism of logistics process quality management, complying with the system-wide principle of universal responsibility for quality [10].

The scheme below presents the structure of the mechanism for managing the quality of processes, implemented in the logistics system of an enterprise.

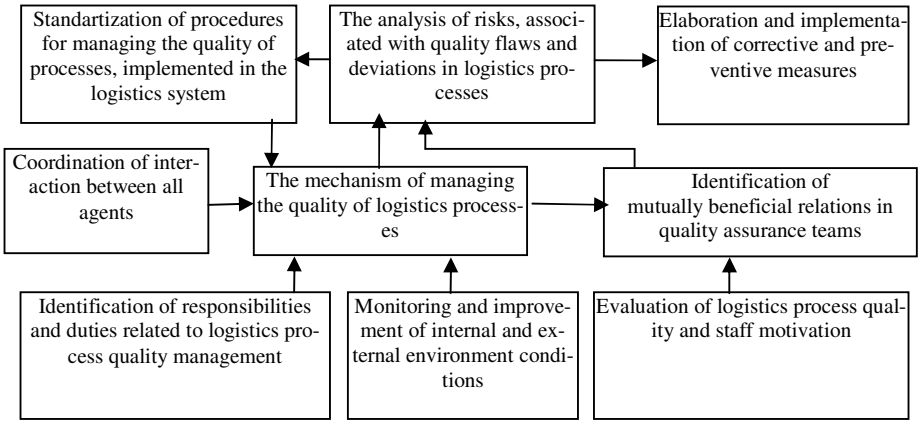


Fig. 1: The Functional Structure of the Mechanism of Logistics Process Quality Management

5. Conclusion

The development and maintenance of the proposed mechanism of logistics process quality management contributes to the solution of the following tasks, implemented as part of logistics activities of an enterprise:

- raising the degree of customer satisfaction with the quality of products and services;
- improving the competitiveness of an enterprise;
- increasing the productivity and labour efficiency;
- ensuring the economic sustainability of an enterprise, and the rational use of all types of resources;
- improving the quality of management decisions;
- implementing the latest achievements in engineering and technology;

It must be noted, that the quality of logistics processes is determined by such factors, as staff, equipment, materials, methods and components of the internal and external environment of an enterprise.

The conducted research has made it possible to reveal the basic components of activities related to logistics process quality management. One of the main components of such activities is the staff, involved in the logistics activity of an enterprise. The second component, ensuring high quality of logistics processes, is related to technical support of logistics processes, i.e. the appropriate equipment, devices and tools.

The important component of logistics process quality management is the effective use of management tools, including the principles and methods of management, the style of administration and the implementation of effective management solutions for improving the technology of logistics processes.

The next, equally important component is associated with creating the required moral climate, based on mutual interest and responsibility of each worker and the logistic service team of an enterprise as a whole.

Finally, the systematic component of activities, related to quality management, is the process approach, which is an effective tool for managing the quality of logistics processes, including the following procedures:

- identification, verification and validation;
- internal audit;

- the management of current records on the quality of processes, including the assessment and analysis of audit results;
- corrective and preventive measures;
- the solutions, aimed at improving the quality of logistics processes;
- continuous training of the personnel and identification of competences in the area of logistics process quality management.

Thus, the conducted investigation allows us to conclude that the quality of logistics processes and the content of functions, related to logistics process quality management in the con-text of main provisions of the TQM system, complies with the content of activities focused at industrial process quality management. This conclusion determines the necessity for restructuring the overall logistic activity, the coordinated work of all structural departments of the logistic service, and optimal identification of responsibility for quality shared between workers of logistics and industrial departments of an enterprise

References

[1] Lapidus, V.A. (2008) General quality management in Russian companies (2 nd ed.), LLC CMC "Priority", N. Novgorod.

[2] Kablashova, I.V. (2016) 'Realization of key provisions of the modern concept of quality management in the enterprise management system,' International scientific research. 4 (29), 198-204.

[3] Powell, T.C. (2002) 'Total quality management as competitive advantage - a review and empirical-study,' Strategic management journal, 16(1), 15-37.

[4] Krasnova, V.M. (2000) 'Methodology of the process approach in ISO 9000: 2000,' Standards and quality, 3, 45-54.

[5] Kaynak, H. (2016) 'The relationship between total quality management practices and their effects on firm performance, ' Journal of operations management, 21(4), 405-435.

[6] Kachalov, V.A. (2015) QMS processes: selection, description, classification, monitoring, measurement, validation, Standards and quality, Moscow.

[7] George, S. and Weimerskirch, A. (2002) General quality management: strategy and technology (TQM), Victoria Plus, St. Petersburg.

[8] Kachalov, V.A. (2017)Management systems based on ISO 9001: 2015 and ISO 14001: 2015. Comments, recommendations, implementation practices "in 4 volumes.

[9] Henry, R. Niv, Trans. with English. Yu.P. Adler (2003) The space of Dr. Deming: In 2 books, Standards and quality, Moscow.

[10] Chaika, N.I. and Vasilevskaya, S.V. (2005) 'TQM - the basis of the integrated quality system,' Methods of quality management, 6, 33-39.

[11] Lapidus, V.A. (2008) Total quality management (TQM) in the Russian companies, INFRA-M, Moscow.

[12] Adler, Yu. P. (2002) 'Process description of business - the basis of the basis for the quality economy system,' Standards and quality, 2, 66-69.

Development of an Integrated Framework for Successful Adoption and Implementation of Mobile Collaboration Technology in Indonesian Healthcare

Faisal Syafar, Computing and Information Systems Research Centre, Universitas Negeri Makassar, Makassar, Indonesia, email: faisal.syafar@unm.ac.id

Halimah Husain, Department of Chemistry, Faculty of Mathematical and Sciences, Universitas Negeri Makassar, Makassar, Indonesia, email: halimah.husain@unm.ac.id

Abstract

Mobile collaboration healthcare system is one of the most widely accepted choices to support medical routine in healthcare organisations. These organisations are well known as having a high degree of communication, coordination and collaborative works, mobility and data and information access from many devices or tools. Although the benefits associated with mobile collaboration technology have been recognised as offering great potential in the healthcare sector, its successful adoption and implementation rate is low and many hospitals did not achieve intended goals in Indonesia. This study, therefore aims to develop a mobile collaborative healthcare implementation success framework by adapting the DeLone and McLean's IS success model to identify both critical success factors and success measures. In order to meet the study objectives, this study will employs a quantitative approach to identify the influence of various information quality, service quality, system quality and mobile collaborative healthcare implementation-related variables on Indonesian healthcare institutions' performance impacts.

Keywords: Integrated framework, Mobile collaboration, Healthcare

Introduction

Physicians and nurses are highly mobile in their daily hospital routine, moving frequently between wards, outpatient clinics, diagnostic and therapeutic departments, conference rooms and operating theatres. Their manifold information and communication needs at any number of locations and at all times of day and night are difficult to satisfy. Costly clinical workstations, which require additional allotment of valuable space, though often used, are not always accessible (Ammenwerth et.al, 1999).

Mobile technology is enabling an organization to work collaboratively or separately on a global basis while maintaining its collaborative information sharing capabilities. It has led to significant innovations in the healthcare organization, which can improve services to patients (Siau, 2003). Mobile collaboration has progressively become a significant concern in computer supported collaborative work (CSCW). Some researchers have been conducted by (Syafar et al. 2013a, 2015); (Herskovic et al. (2009), Hislop (2008), and Milrad and Spikol (2007) in efforts to recognize the implications of mobile work and mobile collaboration on collaborative applications design. Researches on application areas of mobile collaboration such as healthcare (Tentori and Favela, 2008), (Zeng, 2016) and many more have also been studied. Mobile collaborative healthcare is helping professionals provide patients with a higher standard of care-to move healthcare back into the community, reducing the pressure on hospitals and medical centers while reducing the costs of delivering services.

According to Ammenwerth (2000), mobile work in healthcare can cover several of tasks as follows:

- Routine use, everyday activities for healthcare professionals, for example: obtaining regular updates for patients.

- Mobile communications, the possibility to reach the healthcare worker anytime and anywhere.
- Mobile information access, possibility to access patient's medical record from healthcare's mobile devices.
- Mobile documentation, such as the possibility to avoid double documentation and ability to update/access through mobile devices.
- Nurses and general practitioner's assessment, outpatient care nurses and general practitioners need to use mobile communication in order to provide all relevant patient and medical information on the move.

It is indeed that the roles of mobile healthcare are significantly important. Zeng (2016) implied that an enterprise information system including mobile healthcare is an array of information technologies that will affect data, workflow, and the people in an organization. Professionals with different roles need to work as a group in order to successfully implement the systems. Jakab (2016) report, eHealth involves a broad group of activities that use electronic means to deliver health-relatedinformation, resources and services: it is the use of information and communication technologies (ICT) for health. eHealth foundation actions build an enabling environment for the use of ICT for health. However the literature series remain very limited (Fichers et al., 2003). According to Guerrero et al. (2004) and Sconavvacca et al,. (2006); a review of the literature in relation to mobile work in general has been under-researched, and research in mobile collaborative work in particular has been under-researching (Syafar and Gao, 2013a). Moreover, some research show that nearly 83.33% of companies from Indonesia (Dantes and Hasibaun, 2011), 50%-75% of US firms (Hawari and Heeks, 2010), approximately 90% China firms failed in ERP Implementations in healthcare. In addition mobile collaboration technologies adoption and use in healthcare sectors have not been popular yet in Indonesia.

Therefore the objectives of the research are:

- Investigating and Identifying the critical success factors (CSFs) for adopting and implementation of mobile collaborative in healthcare organisations
- Measuring the performance impacts of mobile collaborative in healthcare organisations
- Examining the relationship between CSFs for adoption and implementation mobile collaborative and their performance impacts.
- Developing an integrated framework for successful adoption and implementation of mobile collaborative in healthcare institutions.

This study aims to contribute into the body of knowledge on mobile collaborative, such as:

- Providing integrated understanding of the mobile collaborative adoption and implementation process by investigating and identifying the CSFs.
- Providing knowledge transfer to mobile collaborative tools vendor. The research finding will bring better understand the need of potential mobile collaborative system to the vendors.
- Formulating an integrated model for successful adoption of mobile collaborative that will contribute as a guideline of decision making process for healthcare stakeholders and other relevant organisations in adopting and implementing mobile collaborative projects.

In developing theoretical and research model, we get inspiration from Delone and Mclean (1992) with their IS success model (six dimensions of IS success, such as System quality, information quality, service quality, use (adoption), user satisfaction (collaborator satisfaction, net benefit (performance impacts). By adapting Delone and Mclean's (1992) model for IS factors, we create a theoretical model that presents a consolidated view of the literature in the area of mobile collaborative healthcare.

The rest of the paper is structured as follows: First, we present literature review, followed by proposed framework and research methodology, and the last section outlines a conclusion.

Literature Review

Mobile Collaboration Technology (MCT)

A mobile user or mobile worker is often regarded as a person performing tasks anywhere and anytime, using mobile computing devices with wireless communication capabilities. Typically they require functionalities for data synchronization and on-demand collaboration with other people (Syafar & Gao, 2013b, Messeguer et al., 2008).
Mobile workers in this research are Physicians and nurses who have to work within and or out of hospitals, move around locally or remotely. Their tasks must be performed on the site within a specific timeframe or they have to work at different locations with a carried "portable office" with limited resources. They often work based on an irregular schedule with narrow time windows for action. They have to cope with great uncertainty and interference. Moreover, they are not possible to ensure the availability of communication media when they decide to collaborate.

Mobile healthcare: adoption and implementation problems

The emerging growth of mobile technology has the potential to greatly improve sharing information and communicate with each other in healthcare routine. According to Standing and Standing (2008) the adoption of mobile technology in the healthcare sector has some problems as follows:

Need for integration of systems. Healthcare information systems are too large, complex systems and not well integrated. This means that the application of mobile in relation to data access and integration are not easily realised because the core applications of the system are not fully integrated.

Centralised systems. Healthcare administration and management has been developed along centralised lines with larger hospitals being developed to improve economies of scale. These systems have been supported by centralised IT systems. However, this type of architecture does not reflect the distributed nature of work or patient needs.

Security and privacy issues. The use of mobile technology in the healthcare sector generates anxieties related to security and privacy. As mobile healthcare professionals often store confidential patient data the loss of such a device or unauthorised access to it can be highly problematic (Fitch and Adams, 2006).

Factors Influencing MCT in Healthcare Adoption and Implementation

Information Quality

The quality of information related to successful healthcare management, according to Lehmann et al., (2008) more relevant to the dimensions of accuracy, output timeliness, consistent, complete and relevant information and selected mobile devices. Information quality refers to the quality of outputs the information system produces (DeLone and McLean, 1992), which can be in the form of reports or online screens.

System Quality

Mobile collaboration systems have particular features that are positively impact to the adoption and implementation in healthcare organisations and these are explained as follows:

- *Portability.* The physical characteristics of mobile devices that enable users to employ them more easily. Such features also allow users to collaborate with others anytime and anywhere (Syafar & Gao, 2013b, Syafar et al., 2014a, Syafar et al., 2015; Sarker et al., 2010).
- *Reachability.* With such technology, a person can be in touch and reached by other people at any time (Syafar & Gao, 2013b, Syafar et al., 2014b, Syafar et al., 2015; Sarker et al., 2003; Junglas, 2003).

- *Localization.* The ability of MCT to track the geographical position of a mobile user (Sarker et al., 2003; Junglas, 2003).
- *Identification.* The ability of a device to confirm a user's identity (Syafar & Gao, 2013b, Syafar et al., 2014a, Syafar et al., 2015; Sarker et al., 2003; Junglas, 2003).
- *Accessibility.* The extent to which an individual is able to get access to a mobile network at a given time and geographical location (Syafar & Gao, 2013b, Syafar et al., 2014a, Syafar et al., 2015; Sarker et al., 2003; Junglas, 2003).

System quality represents the quality of the information system processing itself, which includes software and data components, and it is a measure of the extent to which the system is technically sound.

Service Quality

According to Chatterjee et al. (2009), in the healthcare industry system reliability and system support use will positively affect within the healthcare context. *System reliability*: The extent to which the system can be depended upon to complete a task without problems and breakdowns. *System support*: The extent to which there is commercial software and hardware support available for the mobile device. Quality is a product which is achieved through services to attain customer satisfaction and managerially it can be defined as an excellence achieved in providing a service (Besterfield, 2006). Service quality has gained importance as it is a source for distinguishing between services and provides competitive advantage. The construct service quality has been defined as the degree of discrepancy between customers' normative expectations for service and their perceptions of service performance.

Performance Impact

Organizational performance impact is accumulated end results of all the organization's work processes and activities. The extent to which there is a reduction in the delay of healthcare service provided to patients, increase in the accuracy and efficiency of healthcare service, reduction in errors in medical records, improved security of medical records, increase in the ability to continuously monitor critical patients, etc (Chatterjee et al., 2009).

Campbel, Sarker and Valacich (2006) assume that the above capabilities of MCTs are very much required by high expertise mobile workers (e.q. in healthcare organisations). In line with the systems quality regarding MCTs, Kent (2016) and Syafar et al., (2014b) claims that with MCTs' capabilities make it possible for mobile tools to be employed by mobile workers. It has a positive business impact in that employees are supported to be more productive and more responsive to customers' requirements and collaboration in their organization.

Proposed Framework

In order to develop the mobile collaboration healthcare framework, we adapt the D&M IS success Model as presented in Figure 1. In order to develop the framework, the research questions need to be answered. The major question is: How can mobile collaboration technologies assist healthcare organization for successful adoption and implementation?

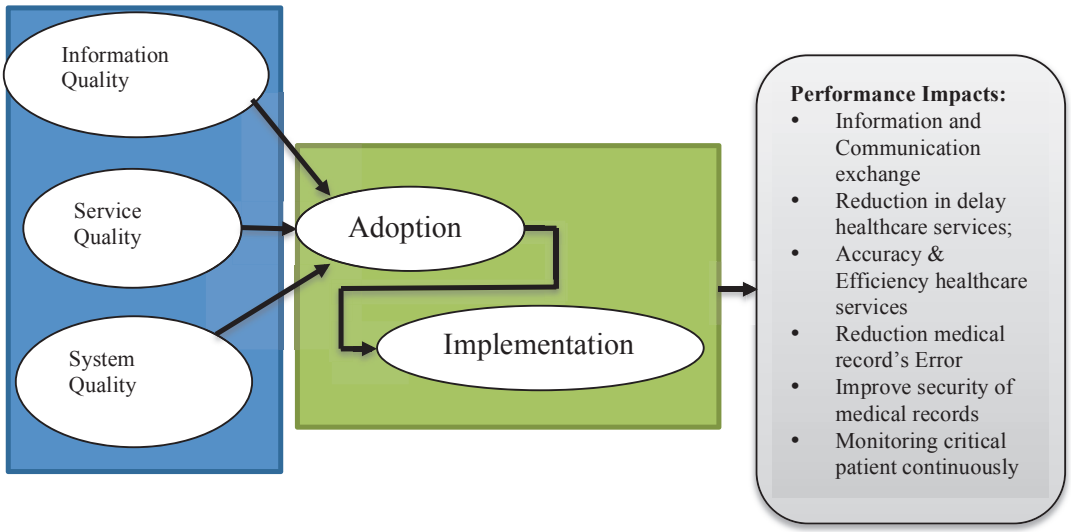


Fig 1. Proposed Research Model (adapted from DeLone and McLean IS success model (1992)

Research Methodology

The study will employ a quantitative approach to identify the influence of various information quality, service quality, system quality and mobile collaborative healthcare implementation-related variables on performance impacts.

Structural Equation Model (SEM) software program will be used to confirm the various hypotheses relationship or testing the relationship between multiple latent and measured variables.

The data will be collected through questionnaires. The respondents will be Indonesian healthcare organisations which have successfully adopted mobile collaborative systems.
Target respondent groups will be:

- Senior IS manager (who involving in the adopting process)
- Healthcare workers (physicians, nurses)

Data analysis will be conducted within two steps: assessing the measurement model, and then the structural model for adequacy of data representation. The measurement model will be tested for validity and reliability properties. Construct validity will be assessed by convergent and discriminant validity, using confirmatory factor analysis (CFA).

The proposed research model presented in Figure 1 will be tested with the related hypotheses, drawn from theoretical background of this paper. Hypotheses will be proposed for each variables relationship. These hypotheses will be drowned from theoretical synthesis from some relevant references.

Conclusion

It is expected that the research finding will build an integrated framework that meet all requirements for successful adoption and implementation. In addition, it can enhance healthcare planning and implementation as well as continuously improved, and automatically adapts to the new and changing mobile technologies. By implementing mobile collaborative healthcare routine, mobile information and communication systems will have the potential to increase quality of patient care in the long run such as: greatly improve communication, facilitate information access, decrease in the delay of

healthcare service provided to patients, increase in the accuracy and efficiency of healthcare service, reduction in errors in medical records, improved security of medical records, increase in the ability to continuously monitor critical patients in Indonesian healthcare institutions.

References

Ammenwerth, E., Buchauer, A., Bludau, B. and Haux, R. (2010),'Mobile information and communication tools in the hospital', *International Journal of Medical Informatics*, 57, 21-40.

Besterfield, D.H. (2006) Total Quality Management, 3rd ed., Pearson Prentice Hall, Upper Saddle River, NJ.

Campbell, D.E., Sarker, S. and Valacich, J.S. (2006), 'Collaboration using mobile technologies (MCTs): when is it essential?', *Proceedings presented at The International Conference on Mobile Business (ICMB),* 12-19.

Chatterjee, S., Chakraborty, S., Sarker, S. and Lau, F.Y. (2009),' Examining the success factors for mobile work in healthcare: A deductive study', *Decision Support Systems*, 46, 620–633.

Chatterje, S. and Sarker, S. (2007), 'Revisiting 'collaboration' under condition of 'mobility', *Proceedings of the 40th Hawaii International Conference on System Sciences*.

Dantes, G.R. and Hasibuan, Z.A. (2011) 'The Impact of Enterprise Resource Planning (ERP) System Implementation on Organization: Case Study ERP Implementation in Indonesia'. IBIMA Business Review. http://www.ibimapublishing.com/journals/IBIMABR/ibimabr.html, Article ID 210664, 10 pages DOI: 10.5171/2011.210664. 2011.

DeLone, W.H., and McLean, E.R. (1992),'Information system success: the quest for the dependent variable,' *Information systems Research*, 3 (1), 60-95.

Hawari, A., and Heeks, R., (2010). 'Explaining ERP Failure in a Developing Country: A Jordanian Case Study', *Journal of Enterprise Information Management*, 23(2),135-160.

Jakab, Z. (2016) From Innovation to Implementation: eHealth in the WHO European Region, Retrieved fro http://www.eoru.who.int/en/ehealth

Junglas, I. (2003), 'U-commerce: an experimental investigation of ubiquity and uniqueness', *ICIS Proceeding.* Paper No. 35.

Kent, S. (2016), Greater choice for mobile technologies, SNOW. Retrieved on June 2017, from https://www.snowsoftware.com/int/blog/2016/10/28/greater-choice-businesses-adopting-enterprise-mobility-management

Lehnmann, H., Prasad, M. and Scornavacca, E. (2008),'Adapting IS success model for mobile technology and health-a New Zealand example', Proceedings of the 10th international conference on Electronic commerce, Article no. 22.

Sarker, S., Campbell, D.E., Ondrus, J. and Valacich, J.S. (2010), 'Mapping the need for mobile collaboration technologies: a fit perspective', *International Journal of e-Collaboration,* 6 (4), 32-53.

Sarker, S. and Wells, J. (2003),'Understanding Mobile Handheld Device Use and Adoption',*Communications of the ACM*, 46 (12), 35–40.

Sconnavacca, E., Prasad, M. and Lehman, H. (2006),' Exploring the organizational impact and perceived benefits of wireless personal digital assistants in restaurant', International Journal of Mobile Communications, 4 (5), 558-567.

Siau, K. (2003),'Health care informatics', *IEEE Transactions on Information Technology in Biomedicine*, 7 (1), 1-7.

Syafar, F., Gao, J. and Du, JT (2015), 'Mobile Collaboration Technology to support Maintenance Enterprise Systems in Large Industry: A Delphy Study' Paper presented at the 2015, 21th Americas Conference in Information Systems, Puerto Rico, US, 27-29 June.

Syafar, F., Gao, J. and Du, JT (2014a),'Current Mobile Technology Roles to support Collaborative' Proceedings of the 23rd International Business Information Management Association (IBIMA) Conference - Crafting Global Competitive Economies: 2020 Vision Strategic Planning and Smart Implementation, 13-14 May 2014, Valencia, Spain.

Syafar, F., Gao, J., & Du, T. (2014b), Refereed proceedings of the 18th Pacific Asia Conference on Information Systems (PACIS). 'Mobile-Enabled Collaborative Maintenance'. Chengdu, China.

Syafar, F., and Gao, J. (2013a), 'Mobile Collaboration Technology In Engineering Asset Maintenance: A Delphy Study' Paper presented at the 2013 IEEE 17th International Conference on CSCWD, Whistler, BC, Canada, 27-29 June.

Syafar, F., Gao, J., & Du, T. (2013b), Refereed proceedings of the 17th Pacific Asia Conference on Information Systems (PACIS), 'Applying The International Delphi Technique In A Study Of Mobile Collaborative Maintenance Requirements' Jeju Island, Korea.

Zeng, X. (2016). The Impacts of Electronic Health Record Implementation on the Health Care Workforce. The North Carolina Institute of Medicine and The Duke Endowment, Department of Health, East Carolina University, Greenville, NC 27858.

Management Participation Programmes for German Target Companies—Current Developments of Fiscal Treatment in Germany

Tobias Stiegler, Bucharest University of Economic Studies, Bucharest, Romania,
tobias.stiegler@gmx.net
Klaus Singer, Bucharest University of Economic Studies, Bucharest, Romania,
Klaus.Singer@mazars.de
Axel Ulrich Wiesener, Bucharest University of Economic Studies, Bucharest, Romania,
axel.wiesener@web.de
Aykut Bussian, Bucharest University of Economic Studies, Bucharest, Romania,
aykut.Bussian@bakertilly.de
Marc Sommer, Bucharest University of Economic Studies, Bucharest, Romania,
M.Sommer@outlook.com

Abstract

The participation of the leading management (Top-line-and Second-Line Managers) in the business development of a parent company or a group company is a popular way to incentivise the managers. In private equity transactions, managers fairly regularly get the opportunity to purchase shares in order to (indirectly) participate in the future business developments of the target company. These co-investment programmes, in which managers participate, are currently challenged by the tax authorities. In co-investment structures, there is a tussle between the tax authorities and the participating managers — often in times of disposal of the co-investment — over whether reimbursements out of the co-investment programme to the managers represent wage or capital income/capital gain. The type of income is a crucial factor for all managers resident in Germany and especially abroad. The tax risks of these co-investment models have to be borne by the managers. A careful implementation of the management participation programme is necessary in order to structure these co-investments as a capital investment for the managers. That leads to low taxation for German residents or possibly even no taxation for non-German residents. The article wants to highlight the current developments in this context and to carve out solutions for management participation programmes for international managers in Germany.

Keywords: Private Equity Transaction, Co-Investment Programme, Management Participation, Capital Investment

1. Introduction

In response to global and domestic competition, Cooke (1994) pointed out more than twenty years ago, that (here: American) companies try to improve their business performance through a more effective use of their available work forces with the implementation of employee participation programmes. For this reason, it is a popular practice among shareholders and investors to appropriately involve executive employees in target corporate success (Poenicke and Buenning 2014). These days, there is, in the private equity context, hardly any transaction without the participation of the management in a purchased target company (Hohaus and Inhester, 2003). Furthermore, family-equity investments, i.e. the participation of family offices in successful companies, also regularly use such instruments (Schulte, 2016).

The reasons for the implementation of management participation programmes in typical Leveraged-Buy-Out Transactions are diverse, but boil down to a sustained increase in corporate value. The managers participate in the chances and risks of the current business activities as an incentive for better work performance. For these reasons, managers often get the chance to purchase shares of amounts equal to one or two gross annual salaries.

The legal form of the management participation or co-investment programmes can be very diverse, e.g. stock options, preferred shares, rights embodied in a participation certificate, indirect participations etc.

Such (indirect) participation in the target companies needs to be efficiently designed for both parties. For this reason, in medium-sized or large buy outs, the management participation would typically be bundled into a separate investment vehicle (see Section 3). By way of an equity contribution to the investment vehicle, the managers receive shares in the investment vehicle, representing an indirect participation in the target company. The investment through a vehicle also facilitates the administration, when many managers from several countries are to participate in the target company. In this article, such programmes will be reviewed with regard to their prominent position in practice (Thiele, 2017).

In the context of the purchase of the participation in an investment vehicle, all parties enter into a co-investor and shareholders' agreement with respect to their holding of shares in the target company. In such agreements, the terms and conditions are codified, especially with respect to exit clauses, leaver schemes, drag-along-right, tag-along-right, anti-dilution-protection, and other aspects like admission of further co-investors.

The terms and conditions of these agreements especially are regularly scrutinized by the tax authorities. Most frequently, the central question in this context is whether a co-investment/equity participation of a manager in the target company (directly or indirectly) represents an *additional* source of income apart from the person's employment relationship in the target organization. And, in case of an exit, whether the capital gains out of the disposal of the shares held by managers in an investment vehicle, represents capital income at the level of the manager. In some cases, the tax authorities consider capital gains to be wages because of a close connection between employment in the target and capital investment. The huge tax impacts of these re-qualifications of capital gain in work income will be shown in Section 4.

2. Review of Scientific Journals, Views of Fiscal Authorities, and Federal Fiscal Court Decisions

Within the usual tax audits done by the fiscal authorities, management participation programmes have been focused on for many years (Poenicke and Buenning, 2014). In management participation programmes, the main tussle between the fiscal authorities and the managers results in a fiscal treatment of these programmes and the revenues earned from them (e.g. profit distributions, capital gains).

It is necessary for all parties to differentiate between the employment contract of the manager and the special right resulting in the capital participation of the managers (indirectly) in the target company, where they also happen to be employed. Such an agreement is generally accepted by the German Federal Fiscal Court as a separate privity of contract, which is independent of the employment contract (BFH, 2005; BFH, 2006; BFH, 2008; BFH, 2009; BFH, 2014; BFH, 2016a, BFH, 2016b). For this reason, the capital contribution needs to be concluded in an independent agreement next to the employment contract (BFH, 2016b).

Questions and uncertainties arise in cases where the employment contract and capital participation are closely connected. That might be in cases where the benefits of profiting from a separate capital contribution are induced by the employment relationship as a kind of remuneration for work (BFH, 2009). It is a kind of sweet equity contribution, which means a manager receives capital contribution in the target company freely or at a cheap rate, overlapping the special right, resulting in a capital participation through the employment contract (von Braunschweig, 1998; Hohaus and Inhester, 2003; Poenicke and Buenning, 2014). So, such an agreement would totally qualify as wage, which would include (i) the non-cash benefit arising from the reduced or free purchase price of capital contribution, (ii) revenues from this participation, and (iii) the capital gain at the time of disposal of the participation represents wage according to German Income Tax Act (ITA 2009). In contrast, no

action under the German tax law would be evoked, if the target company or the investor would grant a loan to the managers in order to enable them to finance the capital participation in the target (BFH, 2010). In this case, it would be necessary to determine the loan conditions in accordance with the arm's length principle (Hohaus and Inhester, 2003).

Another big issue in the management participation programmes, which has been challenged for many years in the tax audits, is the leaver scheme in the co-investment programmes. In practice, the management participation programmes differentiate between managers who leave the company as "Good-Leavers", "Bad-Leavers" and, where appropriate, as "Bad-Bad-Leavers". As a general rule (Koch-Schulte, 2015), the leaver-types can be characterized as follows: (i) a Good-Leaver is manager who is unable to work anymore or dies or the employment contract is terminated by the target company, (ii) a Bad-Leaver is a manager who terminated the programme or the employment contract, or becomes insolvent, and (iii) a Bad-Bad-Leaver is a manager who breaches the manager's duty and/or is dismissed for that (an important) reason.

With regard to such leaver schemes, the tax authorities argue in favour of an overlapping of the employment contract and the separate capital participation through the management participation programmes (Koch-Schulte 2015, FG Cologne 2015). This is based on a very special decision of the fiscal court in which a bad-leaver arrangement in a co-investment programme led to an overlapping of the parallel contracts of employment and capital participation (BFH 2013). Basically, other underlying aspects of these decisions must be taken into account. However, the tax authorities have come to consider this decision to be universally valid. This leads, in practice, to the conclusion that the tax authorities assumed an overlapping of the employment and the capital investment solely based on a bad-leaver scheme in a management participation programme (Roedding, 2017).

In this context, another senate of the German Federal Fiscal Court has contradicted the authorities' interpretation by a decision published in 2017 (BFH, 2016b). According to the Federal Fiscal Court, there is, on the one hand, no overlapping of the employment contract in cases where the management participation programme is solely offered to a closed group of employees. On the other hand, leaver schemes, as described at the level of the management participation programme, are a consequence of these programmes, independent of the employment contract (BFH, 2010; BFH, 2016b).

Consequently, a leaver scheme on its own is not harmful from the tax point of view. The management programme must be considered with an overall view, if there is a close connection between the employment contract and the capital investment of a manager. Moreover, it is important, that managers drawn to participation bear the chances and risks involved in capital investment. Comparable to a capital investment, the sale and purchase price of the managers' co-investment should be at fair value. Tauser (2017) criticises this norm set by the fiscal court.

Furthermore, according to the current decision, typical vesting-clauses, which represent sales restrictions on co-investment participation by a manager, are acceptable as well. Such clauses are generally not contrary to the beneficial ownership of the managers in the interests in the co-investment vehicle (Tauser, 2017).

Hence, such programmes need not be completely compliant with the arm's length principle (Poenicke and Buenning 2014). However, a careful implementation of the co-investment programme is necessary in order to avoid tax risks (see Section 4).

3. Typical Structure of Management Participation Programmes

Financial investors, who invest in (here: German) target companies, typically have a multi-level acquisition structure (Bussian et. al., 2016). Such an acquisition structures can be simplified to look like the following structure, which will be especially helpful in understanding the next chart.

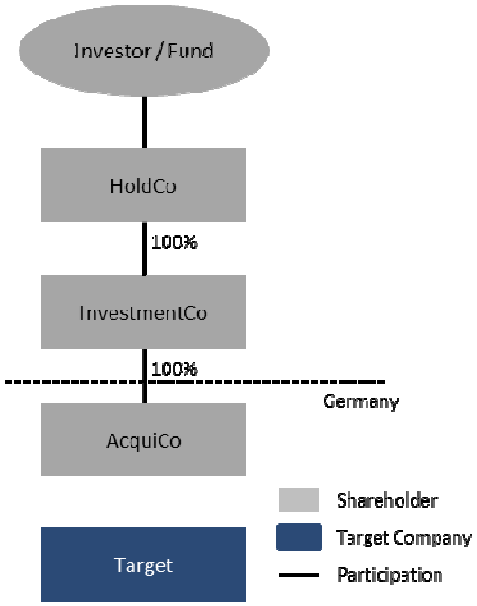


Fig. 1: Acquisition Structure of a Financial Investor with a future German Target Company (prior to signing the sale and purchase contract)

The participation by co-investors is typically bundled via a tax-transparent German (limited) partnership. The managers can participate in these investment vehicles, which are often organized in a BGB company ('Gesellschaft buergerlichen Rechts'), a partnership organized under the German Civil Code, or in a limited partnership with a limited liability company as a general partner ('GmbH & Co. KG'—descriptions of company types that follow 'Co-Invest Partnerships'). Later, a legal form is given under the current practice. Furthermore, it will ensure that these vehicles will not qualify as commercial units, according to the German Trade Tax Act. This can be met by engaging a limited partner, who is entitled to be a managing limited partner of a Co-Invest Partnership (ITA, 2009).

These co-investments aim at indirect equity participation by co-investors in the target company employing top-line and second-line managers. These managers, who are also co-investors, will become limited partners in the Co-Invest Partnership. The managers generally acquire (indirectly) 5–15% of the share capital in the target (Roedding, 2017). The structure can be simplified and illustrated as follows:

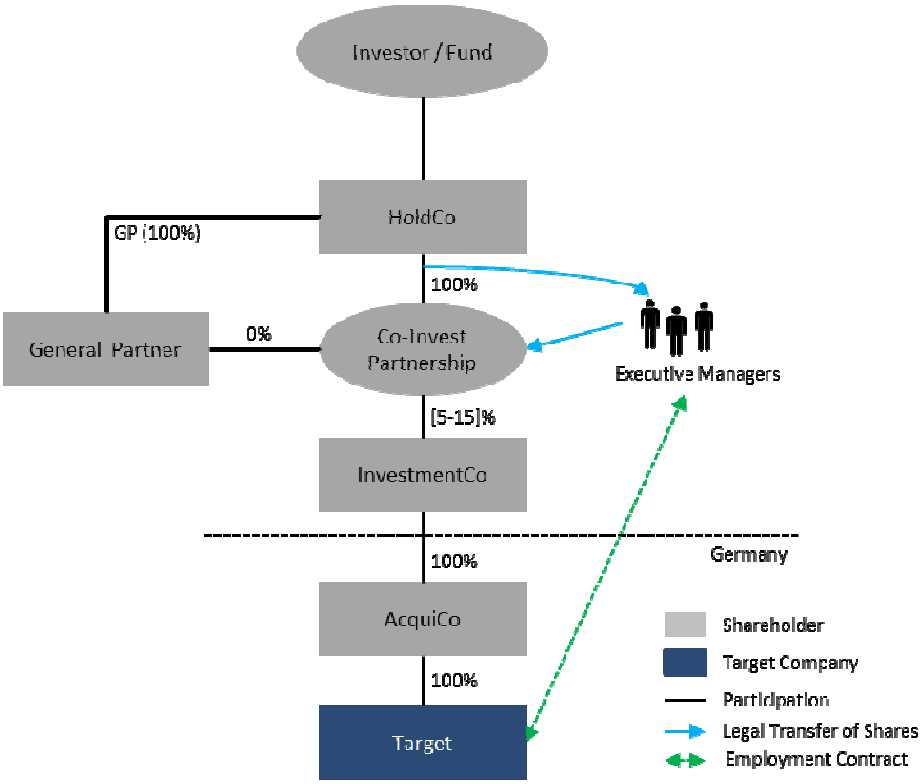


Fig. 2: Typical Structure of Management Participation in a Co-Investment Vehicle (post signing the sale and purchase contract)

In this case, HoldCo has established the co-investment structure. Thus, HoldCo sells limited partnership interests in Co-Invest Partnership to the selected managers in consideration of cash. After the payment of the purchase prices, the managers will indirectly hold shares in the InvestmentCo.

Along with the signing of the sale and purchase agreement between a separate acquisition vehicle ('AcquiCo') and the seller, the HoldCo, InvestmentCo, the Co-Invest Partnership, enters into a co-investors' and shareholders' agreement with respect to their holding of shares in InvestmentCo. Such an agreement regulates the rights and obligations of all parties and helps to avoid future conflicts, for example, over the direction of business activities.

Such a structure links the executive managers in two respects to Target, which is also the primary interest of the investor. On the one hand, the managers enter into capital participation by way of contributing their own money to the investment vehicle, and, on the other, such equity participation leverages the managers' participation in a partially credit-financed purchase by AcquiCo (Table. 1). For these reasons, the managers are incentivized to develop the business of Target in order to increase the refund value of their capital in the case of an exit by the investor.

Regarding the restrictions of the German Holding Companies Act (UBGG, 1998), the acquisition of Target in private equity transactions can be financed maximum with 3 portions (shareholder) loan and 1 portion equity (Bussian et. al., 2016). Such a finance structure leads to fact that managers will only bear (here) 2.5% of the total equity, while holding 10% of share capital in InvestmentCo and indirectly in Target (Eilers et al., 2016).

Tab. 1: Incentive System by Debt-Financed Purchase—Consolidated Sources and Uses

Equity Funding by Investor					Debt and Equity Funding by Investor			
Sources	*mEUR*	Uses	*mEUR*		Sources	*mEUR*	Uses	*mEUR*
Purchase Price Target	95	Investor Equity	90		Purchase Price Target	95	Investor Equity	25
							Shareholder Loan	72.5
Transaction Cost	5	Managers Equity	**10**		Transaction Cost	5	Managers Equity	**2.5**
Total	*100*	*Total*	*100*		*Total*	*100*	*Total*	*100*

The table illustrates that managers indirectly participating with 10% of the shares in Target, need only to contribute one quarter to reach this ownership in case of debt-financing by the investor (see also Table 2).

4. Tax Considerations and Calculations

Based on the review, a careful structuring is required of the co-investment, especially the leaver scheme. The tax risks arising from an inappropriate structure has to be borne solely by the managers with regard to the transparent structure.

Tax risks can arise at three stages within the holding period—first, at the time of acquiring the interest in the investment vehicle; second, during the holding period; and, third, at the time of the disposal of the shares in the partnership. These three periods shall be considered from a German international tax perspective.

Preamble

Co-investors who are tax-resident in Germany are subject to unlimited German tax liability with their worldwide income, e.g. dividend income, interest income from loans, and capital gains. Investors who are tax-resident in Germany can be subjected to limited German tax liability with income earned in Germany such as capital income, depending on the type of financial instrument and other conditions.

(a) Tax considerations during the purchase of indirect interest in the Co-Invest Partnership

The sale and the transfer of limited partnership interests in the partnership by HoldCo to the managers should be tax neutral provided the transaction is based on fair market value. In case of a sweet equity contribution, taxation would arise at the level of a manager. According to the German comprehension, the sweet equity contribution would qualify as wage in the amount of the difference between the purchase price and the fair market value of these interests. The tax rate of wages can rise to 45% plus a solidarity surcharge.

In case of managers living abroad, the German target can be made liable to pay wage taxes as an indemnitor. The tax authorities qualify such wages as “wage by third parties”, based on Sec. 38 of the Income Tax Act (ITA, 2009). In tax audits, expenses towards the implementation of the co-investment structure (e.g. notary services, tax, and legal advice regarding statutes and the shareholder’s agreements, inter alia) are qualified as “wage by third parties” by the tax authorities. This currently causes considerable frictions in practice.

As a result, it is not necessary to check a double taxation treaty in this case. The target probably would have repayment claims.

(b) Tax considerations in the holding period of the interests in the Co-Invest Partnership

In this scenario, the managers can profit from their investment by way of dividend distribution along the shareholding chain. In this period, it is not common to partially realise capital gains from the disposal of shares because of vesting clauses. Bad leavers, too, touch their capital contribution only after the total sale of the shares.

Depending on the legal design of the programme, dividend distribution to the managers could also qualify as wages. This can have bad impacts on the manager, as it will be shown in the tax calculations at the time of exit.

(c) Tax considerations at the time of disposal of the interests in the Co-Invest Partnership

The most relevant taxable event is the sale of Target shares. Based on the typical drag-along-right in the agreement, managers are also obliged to sell their interests in case the investor wishes to realize the investment by way of an exit.

There are two levels at which the capital gain can be realized in case of a resale of the target.

The capital gains can be realized at the level of InvestmentCo, which is typically not resident in Germany. That means, from a German tax perspective, these capital gains upon disposal of at least 1% of the shares in AcquiCo would be subject to a limited German tax liability, according to the German Income Tax Act (ITA, 2009). However, Germany would not be entitled to tax such capital gains pursuant to Article 13, para. 5, of the OECD Model Tax Convention (OECD, 2014).

If, in contrast, AcquiCo sold all shares Target, 5% of any capital gain would be subject to German CIT and TT, resulting in an effective tax rate of approximately 1.5%. In addition, the capital gain would have to be distributed as dividend to its shareholders, inviting the German withholding tax.

Against this background, InvestmentCo should sell shares in AcquiCo in order to mitigate the exit tax burden because there is typically a participation exemption regime in the state of domicile of InvestmentCo that should be applicable at the level of InvestmentCo.

Capital gains from the disposal of shares in InvestmentCo realized by investors resident in Germany for tax purposes are:

- Subject to the final flat tax at a rate of 26.375%, if the investor holds its shares among its private assets and has a participation quota of less than 1%;
- Subject to the so-called part-income taxation regime, 40% of the capital gain is tax exempt, and the remainder is subject to progressive rates of up to 47.48%, if the investor has a participation quota of 1% or more;
- 95% tax exemption for CIT and TT purposes, if the investor is a German corporation.

According to the national law, this tax burden has also to be borne by non-German resident investors. If there is a double taxation treaty, comparable to the OECD Model Tax Convention (OECD, 2014), between Germany and the country of the manager's residence, Germany will not have the right to tax these capital gains.

In that case, these capital gains will be treated as wage, where Article 15, para. 1 and 2, of the OECD Model Tax Convention (OECD, 2014) can be relevant. Non-German resident managers employed by Target and stationed periodically at its headquarters would be subject to German taxation only to the extent Target has borne the wages. That means the capital gains realized by non-resident managers would be subject to limited taxation according to a German international tax convention. As a consequence, these capital gains will be taxed as wages with the proportional tax rates up to 47.48% (taxable income in the amount of EUR 256,000).

The following table will illustrate the tax impacts for managers, whose capital gains qualify to be (i) capital gain and (ii) as wage. In this example, Target is sold at a multiple of three and the manager, who is not resident in Germany, holds participation to the extent of 10% of the interests in the Co-Invest Partnership.

Tab. 2: Profit Determination and Taxation Depending on Qualification of Income from Co-Investment Programme

	mEUR	**mEUR**
Sales Proceeds of Target	300	300
Book Value at Level of InvestmentCo	./. 100	./. 100
Transaction Cost	5	5
Capital Gain at Level of InvestmentCo	195	195
Repayment of Shareholder Loan	0	72.5
Profit Distribution (and Capital Repayment)	*195*	*122.5*
Investor	175.5	110.3
Co-Investors (90%)	17.5	11
Co-Investor (10%)	**2**	**1.2**
German Tax Burden (Capital Gains)	0	0
German Tax Burden (Wage)	0.95	0.57
Capital Repayment	*1*	*0.25*
Total Net Return (incl. capital contribution)	***3 vs. 2.05***	***1.45 vs. 0.88***

Within this realistic scenario, a manager, who has participated with 10% in a managing participation programme, will have a total net return to the amount of EUR 3 million (scenario: equity funding by investor) and EUR 1.45 million (scenario: debt and equity funding by investor) in case the capital gain is qualified as a capital income. Germany would not tax this capital gain in case the investor is resident in a contracting state. In contrast, if the co-investment programme is closely linked to employment relationship of the relevant manager, the total net return of these investments amounts to EUR 2.05 million (scenario: equity funding by investor) respectively EUR 0.88 million(scenario: debt and equity funding by investor) . Thus, the capital gain is considered as wage from the German tax perspective. That would reduce the capital return compared to the initial investments about almost 100% (scenario: equity funding by investor) and 160% (scenario: debt and equity funding by investor).

Incidentally, this example also shows the leverage effect in case of a partially debt-financed purchase of Target (see also Tab. 1).

5. Conclusions

Co-Investment Programmes are a common vehicle in transactions to keep relevant managers on board. As part of their incentive, these managers can profit from a separate capital contribution to the investment vehicle, where they indirectly participate in the company's business success. In case of a debt-finance purchase of Target company, the managers can extraordinarily profit by participating in such a programme.

According to the current decision of the Federal Fiscal Court (BFH, 2016b), leaver schedules can be agreed without endanger tax treatment of a programme. It is to be hoped that the fiscal authorities will accept that decision and apply that principle beyond the individual case of the decision. Nonetheless, the fiscal authorities have—especially in tax audits—a critical view on such programmes (Roedding, 2017). Leaver schedules are an important aspect of such programmes for the designing of fair conditions. From the economic perspective of an investor, a bad leaver should not profit from corporate development in the same way as a good leaver does. So, co-investment programmes are basically no tax-driven considerations of the investor (Thiele, 2017).

In case of fiscal treatment of the management participation programme, the consolidated overview of the individual agreed conditions in the programme is significant. For this reason, co-investment programmes need to be implemented very carefully with regard to the strict attitude of the tax authorities. It should be ensured that the following fundamentals will be met in management participation programmes:

First, the management participation programme must be a special contract next to the employment contract. Moreover, it is necessary that the co-investment is purchased at a fair value by all managers who participate. In addition, the managers should also bear all risks and chances resulting from that investment. That means they will have to hold the beneficial ownership of the interests by way of voting and profit participation rights. In case the Target is hit by economic difficulties, managers must implement restructuring measures compared to shareholders.

In contrast, besides leaver schemes, it is also not directly harmful from a German tax perspective, if only a special group of managers are able to participate in such a programme and there are restrictions on the disposal of the interests through the managers.

In case of implementing co-investment programmes without considering tax restrictions, the employment contract can overlap the co-investment capital investment. Consequently, all distributions to the managers (e.g. dividends, capital gains) will be considered as wages. Managers, irrespective of whether they are German or non-German-residents, will be subject to (un) limited tax liability in Germany. In case of double taxation treaties, German authorities would carry out their right to taxation based on Article 15 of the OECD Model Tax Convention (OECD, 2014). If there is no double taxation treaty between Germany and the state of manager's residence, Germany would execute its right to taxation based on the national income tax law (ITA, 2009). Therefore, in case of a requalification of capital gain to wage, a manager would bear a German tax burden of up to 47.48% compared to a tax burden of 0%. On behalf of the relevant managers, the investors should carefully implement a co-investment structure with target assets based on the tax restrictions.

6. References

Bundesfinanzhof (BFH)/ Federal Fiscal Court Decision of 23 June 2005, Reference VI R 10/03, BStBl. 2005 II, p. 770.

Bundesfinanzhof (BFH)/ Federal Fiscal Court Decision of 4 May 2006, Reference VI R 28/05, BStBl. 2006 II, p. 781.

Bundesfinanzhof (BFH)/ Federal Fiscal Court Decision of 19 June 2008, Reference VI R 4/05, BStBl II 2008, p 826.

Bundesfinanzhof (BFH)/ Federal Fiscal Court Decision of 17 June 2009, Reference VI R 69/06, BStBl. 2010 II, p 69.

Bundesfinanzhof (BFH)/ Federal Fiscal Court Decision of 20 May 2010, Reference VI R 12/08, BStBl II 2010, p. 1069.

Bundesfinanzhof (BFH)/ Federal Fiscal Court Decision of 5 November 2013, Reference VIII R 20/11, BStBl II 2014, p. 275.

Bundesfinanzhof (BFH)/ Federal Fiscal Court Decision of 21 October 2014, Reference VIII R 44/11, BStBl. 2015 II, p. 593.

Bundesfinanzhof (BFH)/ Federal Fiscal Court Decision of 1 September 2016 (2016a), Reference VI R 67/14, BStBl II 2017, p. 69.

Bundesfinanzhof (BFH)/ Federal Fiscal Court Decision of 4 October 2016 (2016b), Reference IX R 43/15, ZIP 2017, p. 609.

Bussian, A.; Stiegler, T.; Schmid, J. (2016), 'Implications of Regulations and Taxes on Inbound Invetments in Alternative Asset Classes in Germany,'*Proceedings of the 28th International Business Information Management Association (IBIMA)*, ISBN: 978-0-9860419-8-3, 9-10 November 2016, Seville, Spain, pp. 1262-1273.

Cooke, W.N. (1994), 'Employee Participation Programs, Group-Based Incentives, and Company Performance: a Union-Nonunion Comparsion,' *Industrial and Labor Relations Review*, 47 (4), pp. 594-609.

Eilers, S.; Roedding, A.; Schmalenbach, D. (2016), Unternehmensfinanzierung, 2nd edition, C.H.BECK, Munich.

Finanzgericht (FG)/ Fiscal Court of Cologne of 20 May 2015, Reference 3 K 3253/11, ECLI:DE:FGK:2015:0520.3K3253.11.00.

Koch-Schulte, B. (2015), 'Steuergünstige Gestaltung von Mitarbeiterbeteiligungen im Management-Buy-Out Strukturen,' *Der Betrieb*, 2015 (38), pp. 2166-2170.

Hohaus, B. and Inhester, M. (2003), 'Rahmenbedingungen von Management-Beteiligungen,' *Deutsches Steuerrecht*, 41 (41), pp. 1765-1768.

Income Tax Act/ Einkommensteuergesetz of 8 October 2009, BGBl. I p. 3366, 3862, last amended by law of 23 December 2016, BGBl. I p. 3191.

OECD Model Tax Convention (2014) of 30 October 2015 on Income and on Capital.

Poenicke, A. and Buenning, M. (2014), 'Aktuelles zu Managementbeteiligungen – insbesondere in der Form von Unterbeteiligungen,' *Betriebsberater*, 2014 (45), pp. 2717-2721..

Roedding, A. (2017), 'Endlich: „Leaver-Regelungen" bei Management-Beteiligungsprogrammen führen nicht zu Einkünften aus nichtselbstaendiger Arbeit,' *Deutsches Steuerrecht*, 2017 (08), pp. 437-439.

Schulte, N. (2016), 'Vermögenssicherung durch Diversifizierung,' *Zeitschrift für Familienunternehmen und Stiftungen*, 2016 (05), pp. 154-158.

Thiele, P. (2017), 'Aktuelle Entwicklungen bei der steuerlichen Behandlung von Managementbeteiligungen,' *Betriebsberater*, 2017 (18), pp. 983-986.

UBGG/ Gesetz ueber Unternehmensbeteiligungen, Bundesgesetzblatt Teil I as of 09.09.1998, p. 2765, last amended by Act of 28.08.2013, Bundesgesetzblatt Teil 1, p. 3395.

Von Braunschweig, P. (1998), 'Steuergünstige Gestaltung von Mitarbeiterbeteiligungen im Management-Buy-Out Strukturen,' *Der Betrieb*, 1998 (37), pp. 1831-1837.

Economic Discomfort Trend – Where Do The European Union Countries Stand?

Assoc.prof. Ph.D. Iustina Alina Boitan, Faculty of Finance and Banking, the Bucharest University of Economic Studies, Bucharest, Romania, iustinaboitan@yahoo.com

Assoc.prof. Ph.D. Ionela Costică, Faculty of Finance and Banking, the Bucharest University of Economic Studies, Bucharest, Romania, ionela.costica@fin.ase.ro

Abstract

The economic discomfort felt by households is a matter of great interest for policy makers and economic agents. Increasingly more misery indices and economic sentiment indicators are considered reliable measures of the economic satisfaction. The paper has several qualitative and empirical objectives, namely: *i)* a comprehensive review and comparison between the existing misery indices; *ii)* the assessment of the degree of economic discomfort felt by European Union households during 2001-2016 by relying on a comprehensive range of misery indices and sentiment indicators; *iii)* performing an exploratory statistical analysis, called Cluster Analysis, to identify the presence of similar economic discomfort patterns, from both a temporal and regional perspective. Direct results consist in gathering into homogeneous, meaningful groups the most resembling countries, and respectively time periods from the viewpoint of several objective and subjective indices that reveal the public perception on contemporary economic developments. The clustering solution obtained indicates that some countries are synchronized in terms of macroeconomic fundamentals that lie at the origin of the computed misery indices. Indirectly, the results of the cluster analysis depict the current state of economic convergence in the region.

Keywords: misery indices, economic convergence, correlation, cluster analysis.
JEL codes: C40, G01, O52

1. Introduction

European Union (EU) member states' economies are still confronted with major distortions and imbalances in terms of the volatility of currency exchange, unemployment, inflation rate, the share of public debt in GDP, the fiscal deficit, the current account deficit, the different pace of GDP growth contraction, changes in direct and indirect tax rates etc. All these dimensions of the macroeconomic framework are reflected in people's expectations relative to their standard of living.

Finding an appropriate measure of the consumer's satisfaction regarding macroeconomic performance is a matter of great importance for policy makers and economic agents as people base their decisions also on subjective expectations regarding the future evolution of the economy.

Traditionally, to assess the macroeconomic performance of a country, researchers rely on fundamental variables as GDP growth, government deficit, current account deficit, unemployment rate or inflation rate. Nevertheless, economic literature outlines the incomplete nature of this type of analyses. Cherchye (1998) stresses the need to create synthetic measures, in order to gather several macroeconomic indicators in one variable, able to preserve the informational content of the initial dataset and to allow the hierarchy of countries. Rothschild (1999) remarks the predilection of assessing the success or failure of certain macroeconomic policies in relation to the real GDP growth rate. Navarro et al. (2014) agree that, although GDP is a basic variable in many research studies, it is not the unique tool for assessing the economic

development of a country. It has to be complemented by several other intangible variables, such as human development, country image, employment conditions, environment, innovation or public sector efficiency. A noteworthy contribution to the debates related to finding appropriate and comprehensive measures of economic development is provided in the report written by Stiglitz et al. (2009). Their purpose is to identify reliable alternative indicators for measuring a country's economic performance and social progress, in addition to broadly used standard indicators such as GDP, unemployment rate, inflation. Moreover, they state that GDP might be wrongly used as a measure of societal wellbeing.

A complementary way to assess the macroeconomic performance of a country is to resort on public perception. Over time, economic literature has developed a number of alternatives represented by the construction of several composite indices, whose central focus is the determination of the level of discomfort (known as Misery Indices) or the degree of satisfaction felt by the population and the private sector (known as sentiment indicators). In this respect, the United Nations Economic Commission for Europe (2014) provides a classification of the indicators that explain a country's macroeconomic performance in three typologies, namely leading, composite and sentiment indicators. After an in-depth review of main indicators developed over time by different countries around the world, the conclusion is that analytical and empirical research on issues related to misery indices is extremely limited in the existing literature.

The aim of our paper is to bring together, in a comprehensive and topical approach, the entire typology of Misery indices developed over the years, as proxy indicators of an economy's performance. It is a singular analytical and empirical initiative in the existing literature, meant to unify all the Misery indices' meanings. Based on the original formulas proposed by economists, financial institutions or rating agencies for calculating the indices, we compute their values in order to obtain a dynamic picture of their evolution over time and to identify whether there is a concentration of the state of economic discomfort in some EU countries.

The novelty of our research is given by several features: a) the analysis of a broad range of Misery indices; b) the large time frame considered, covering the years 2001-2016; c) the high frequency of data, consisting in quarterly data series; d) the methodology employed, represented by an exploratory technique, to depict whether there is a concentration of the economic discomfort felt by households in EU member countries and how this pattern of resemblance has evolved over a time period of sixteen years; e) the granular, country level analysis for each EU member state, to provide a comprehensive and individualized snapshot of the changes in the degree of economic discomfort over the time period considered. The results of this empirical approach might be of great interest for policy makers at national and European level, as they can get a picture on the effectiveness of funding facilities (provided to several EU countries after the onset of the financial crisis) in alleviating national vulnerabilities.

The paper has been structured as follows: section 2 depicts the different alternative public perception indices launched until present. We propose delineation between two categories of indices: a) official indicators developed by prestigious institutions based on surveys conducted among households and economic agents; b) indices that gather different dimensions of the macroeconomic performance of a country, developed by professionals and known as Misery Indices. Section 3 illustrates the state of art in this research field. The fourth section employs the cluster analysis method to identify similarities in the Misery Indices levels, and hence the presence of concentration, from two perspectives: a) a temporal one, which accounts for the magnitude of the economic state of discomfort felt in the EU; b) a regional perspective, to account for the state of economic discomfort perceived in each of the 28 EU member states, at key moments in time. The last section concludes.

2. Typology of Economic Discomfort Indicators

In practice, the composite indicators for quantifying the public perception on a country's macroeconomic prospects are classified into two main categories:

a) *Sentiment indices* - official indicators built by prestigious institutions based on surveys conducted among households and economic agents. An increase in the indicators' value provides a positive signal, by depicting respondents' confidence in a favorable economic and financial climate.

The concept of economic sentiment was attributed mostly intuitive meanings, being a variable difficult to accurately observe and quantify. Keynes was among the first economists who noticed the correlation between the business cycle fluctuations and economic perception changes. In his work *The General Theory of Employment, Interest and Money*, Keynes defines the psychological expectation as anticipation on a long-term horizon, on which individual decisions are founded. Therefore, the evolutions of the economic discomfort or the state of mistrust represent a signal concerning the future path of the economy. When the degree of trust in economic prospects staggers, the first adjustment economic agents make is reducing expenses and moving from holding or investing in risky assets to more liquid ones. Hiring and investment in machinery and buildings freeze, production falls and unemployment rises. As economic agents become more aware of the economic downturn and the negative dynamics of unemployment, even if not directly affected they will worsen their own economic expectations, thereby prolonging the state of economic downturn.

Among the most representative indicators included in this category are the Consumer Sentiment Index, calculated and published monthly by the Michigan Survey Research Center, the ZEW Economic Sentiment computed by the Centre of European Economic Research in Germany and the Economic Sentiment Indicator, calculated by the Directorate-General for Economic and Financial Affairs (DG ECFIN) within the European Commission.

These indicators are known for their ability to provide additional information to official statistics, being used in economic analyses, monitoring and short-term forecasts, but also in quantitative or qualitative analyses made by financial institutions, research centers or academia. According to the United Nations Economic Commission for Europe (2014, p.4), the economic sentiment indicators are able to provide valuable information, which might be a useful source for developing macroeconomic policies. It is argued that sentiment indicators try to estimate future macroeconomic behavior, by taking into account different impact factors, such as unemployment, inflation, macroeconomic conditions or politics.

Drozdowicz-Biec (2012) states that there are three economic fundamentals which influence most the consumer confidence levels, namely: the inflation rate, employment and income. Consequently, the values attributed to various consumer confidence indicators, measured through surveys, might vary widely as a result of people's perception and sensitivity to changes in economic fundamentals' level.

b) *Misery Indices* - gather the different dimensions of a country's macroeconomic performance, being developed by economists, rating agencies or financial institutions.

This second category has seen an evolution over time regarding the variables included in the index base. Nevertheless, the signal provided by the level of the index maintained its substance: a high level indicates a high degree of discomfort/dissatisfaction. A common feature of all the indices to be presented below is the computation methodology: they all involve the mere summation or deduction of certain equally weighted macroeconomic variables. The variables included in the formulas are meant to depict the presence of potential imbalances and weaknesses of the national economy in terms of price stability, employment, share of fiscal or current account deficit in GDP and real GDP growth rate. It should be mentioned that these variables are closely monitored by European institutions in order to assess the process of economic convergence in the region. Therefore, indirectly the misery indices signal the amplification or mitigation of disparities between EU countries, in terms of fulfillment of economic convergence criteria.

Economic literature recognizes the contribution of the economist Arthur Okun in the development, in the '70s, of the first dissatisfaction index known as the original Misery Index. It is determined by simply

adding the inflation rate and unemployment rate. It is assumed that both a higher rate of unemployment and inflation increase the economic and social costs of a country.

Relying on the basic Okun's index, Calmfors and Driffill proposed the interpretation of a country's macroeconomic performance by adding the unemployment rate to the current account deficit as a percentage of GDP (called the Calmfors-Driffill index) while Barro (1999) amended Okun's index by including in its structure two additional variables, namely the real GDP growth rate and long-term interest rates, represented by 30-year government bond yield (the Barro Misery Index).

In 2008, Carsten Hoegh, director at Credit Suisse, suggested expanding the Okun's Misery Index formula by adding a new component, so as to capture the evolution in the value of real assets held by households, namely the annual change of house prices. This variable enters the formula with negative sign, because it was considered that a decrease in homes value contributes to increasing economic discomfort. The new index had been called Enhanced Misery Index.

In parallel, we found evidences of three similar attempts. Hufbauer et al. (2008) have proposed, too, the inclusion of the housing price variable into the basic formula of Okun's index and named it the Augmented Misery Index, while Dye and Sutherland (2009) called it the Household Economic Stress Index (HESI). In 2011 the Center for Economic Development and Business Research has begun to compute a Misery Index for three geographic areas (USA, Kansas and Wichita), based on the same three variables: consumer price index, unemployment rate and housing price index.

Moody's (2009) adapted the Okun's original formula for calculating the Misery Index to the economic context characterized by excessive deficits. As a measure of the challenges some countries will face over the next ten years, it has been proposed the New Misery Index, which includes unemployment rate and public fiscal balance.

3. Literature Review

In the following we have summarized the findings of other papers that have previously contributed to this strand of the economic literature.

Starting from the four variables that compose the Barro Misery Index, namely the long-term interest rate, the unemployment rate, inflation rate and growth rate, Welsch (2007) tries to reconsider the relationship between macroeconomics and subjective well-being, by including them as additional variables in life satisfaction regressions. Using annual data for 12 EU countries, covering the period 1992-2002, he finds that unemployment, inflation and the growth rate hold the highest influence in a macroeconomic life satisfaction regression.

Lechman (2009) tests the ability of two Misery Indices (Okun's and Barro's) to be used as a tool for measuring a country's degree of poverty. The empirical results indicate that Misery Indices are not a reliable measure of poverty, but their changes over time and across different countries definitely reflect changes in society`s economic performance. Consequently, they are most suited for being used as proxies of economic and social welfare.

Another empirical approach has been proposed by Iqbal and Nawaz (2010) who investigate the effect of fiscal decentralization on macroeconomic stability by using Okun's Misery Index as a proxy for the state of macroeconomic stability. The findings indicate fiscal decentralization has a significant positive impact on macroeconomic stability.

Gaddo (2011) performs a comparative analysis of two Misery Indices (namely the Okun and Barro's indices) across 10 countries during 1970-2010 to investigate if there is a link between their evolution and international trends or type of government, measured by the political party in power.

The paper of Nordin and Said (2011) points that the macroeconomic performance of a country has to be periodically monitored, and indicates the use of Okun index for this purpose.

Grabia (2012) analyzes the various measures of the economic system's efficiency, both widely accepted such as the GDP per capita and subjective indicators such as the Okun Misery Index, the rationale being that the level of poverty might be a determinant of an economy's efficiency.

The study developed by Marvasti et al. (2014) found that an increase of Okun's index more than its threshold value is associated with a high income inequality. In a comprehensive study covering over 35 years Grant (2014) reveals that American households' macroeconomic perception has a multifaceted nature, being based mostly on genuine, individual perceptions of economic conditions, not media reports of economic statistics.

4. Regional and Temporal Distribution of the State of Economic Distress

Before proceeding to the computation of Misery indices, the time series of the macroeconomic variables had been seasonally adjusted because we want to capture those characteristics that seasonal movements tend to hide, especially changes in the direction of the series. Also, as a proxy for the EU households' economic sentiment we opt for the Economic Sentiment Indicator as it acts as a barometer of an economy's soundness and welfare. As the paper focuses on households' perception, we keep only one component of the ESI, namely the consumer confidence indicator, which measures the level of optimism that households have about the economy, in terms of current economic and financial situation, savings intention and expected developments regarding: consumer price indexes, general economic situation and major purchases of durable goods.

The time horizon covers the time frame 2001 to 2016. We rely on quarterly data collected from Eurostat so as to have a balanced sample of observations, not to lose valuable information and have an as accurate as possible picture on indices changes over time.

To test the ability of various Misery Indices of being a relevant, adequate and comprehensive measure of the state of economic discomfort, we computed the correlation matrix between each Misery index and the official EU indicator published by the European Commission, namely the consumer confidence indicator (CCI). A high statistical significance of the correlation coefficients between New Misery Index and respectively between Barro Index and the other indices suggests that these indices are likely to measure a similar dimension of the economic discomfort and hence, their simultaneous use in further empirical analyses might be redundant. The low levels of correlation recorded by the Okun and the Calmfors-Driffill Index indicate that they depict the state of economic discomfort by looking at different macroeconomic dimensions, and hence they will be further used in the cluster analyses, complementary with the Consumer Confidence Indicator, to give a more comprehensive picture of the level of distress dynamics.

In the following we performed a cluster analysis to identify similarities in the indices levels, and hence the presence of economic discomfort's concentration, from two perspectives:

a) *a temporal one*, which accounts for the magnitude of the economic state of discomfort felt in the entire EU, by using quarterly data series covering the period 2001-2016;

b) *a regional, spatial perspective*, to account for the granular state of economic discomfort perceived in each of the 28 EU member states, at key moments of time: 2007 - the year preceding the financial crisis; 2008 - the crisis onset; 2009 and 2010 – the years immediately after the crisis and the years 2011, 2012, 2013, 2014 and 2015 for depicting a more recent dynamics.

In our study, cluster analysis is used as a tool for data reduction, with the purpose of diminishing the large set of observations into a few, meaningful groups sharing common characteristics. The technique of clustering is an exploratory analysis, which reveals how the different time periods or countries cluster into groups, relying on the values recorded by the two indices mentioned above.

The group membership is established by identifying a set of homogenous time periods (in our case quarters), respectively countries. Entities that belong to the same group are characterized by the highest degree of similitude (in statistical terms minimum within-group variation) and maximum between-group variation. It is not a typical statistical procedure, as it doesn't aim at validating a pre-established research hypothesis but at discovering the intrinsic structure within the considered variables and aggregating the information on temporal or regional data (Yasodha and Ponmuthuramalingam, 2012).

We have applied the agglomerative hierarchical cluster analysis method, which starts by placing each entity in its own cluster, followed by successive mergers of resembling clusters until the obtaining of a single, large and heterogeneous cluster. The basic steps for performing a cluster analysis have been summarized below.

The first step is to measure the resemblance or similarity between the intrinsic characteristics of the indices considered. We employ the Squared Euclidean distance as it is best suited for continuous variables and it is able to accurately identify the outliers in the sample considered, by putting greater emphasis on entities depicting highly varying features. A high value of the Squared Euclidean coefficient indicates a low resemblance. Put in other words, it highlights the presence of pronounced discrepancies between the entities analyzed and hence greater heterogeneity across the time period or countries considered. On the other hand, the lower its value, the more resembling the entities included in a given cluster.

Secondly, one has to define a clustering algorithm, in the form of a linkage rule to determine when two clusters are enough similar to be linked together into a bigger group. We employed Ward's method, which uses the sum of squares for each entity in a cluster to find the grouping with the least sum of squares. Ward's minimum variance algorithm computes the sum-of-squares variance for each cluster and will merge only those two clusters that show the smallest increase in the value of the sum-of-squares variance (Liao, 2005).

The third step, comprising the final output of cluster analysis can be synthesized in the form of the hierarchical tree or dendrogram, which is the starting point for identifying the time frames or countries that show similar patterns of the economic discomfort. It helps indicating sudden, large jumps in the level of similarity as more dissimilar time frames or countries are merged.

The results of the first Cluster analysis, developed on a temporal perspective, revealed the presence of three clusters. The first cluster gathers most time periods, its specificity lying in that the quarters considered depict values around the mean for both Misery indices. The second cluster groups those quarters characterized by the lowest values of the two Misery indices or by values below their mean. Most part of the 2001 and 2002, the years 2006 and 2007 and the recent time period during 1st quarter of 2014 – 2nd quarter of 2016 correspond to the lowest levels of the economic discomfort measured for households in European Union countries. Overall, these are good signs for people's wellbeing, as the macroeconomic environment is improving. Looking at fundamentals we observe a persistent decline in inflation rate, relatively high unemployment rate (around 8%) and a current account deficit, as a share in GDP, of about 1.2%.

The third cluster gathers the time periods (years 2008, 2009, 2012 and the first 2 quarters of 2013) that recorded the highest values, well above the mean, of the two indices. Hence, these particular quarters that lastly join the group are characterized by distinctive patterns of misery relative to the other quarters in the sample, mostly driven by a high and persistent unemployment rate.

The output of the second Cluster analysis, based on a regional perspective to count for country-specific fluctuations of the discomfort indicators, provides valuable insights as we are able to detect how the financial crisis has accentuated the disparities between the EU member states.

The main two conclusions are:

1) there is a constant pattern of ressemblance between several countries, and consequently they persistently join into the same cluster for each and every year considered. It is the case of: Belgium, France and Italy; Greece and Spain in 7 out of 9 years considered; Austria, Denmark, Germany, Luxembourg, Netherlands and Sweden; Romania and Hungary in 8 out of 9 years. We might also argue that these countries depict a similar stage of economic convergence, at least in terms of inflation rate, unemployment rate and current account as a share in GDP.

2) related to clusters' number and composition, the years 2009 and 2015 witnessed the highest heterogeneity between countries, which have been clustered in four groups. Prior to 2009, the two Misery indices provided mixed signals of economic discomfort. For a given country, one of them point a low level of distress, in terms of inflation rate and unemployment while the other show a current account deficit, or viceversa. After 2009 and onwards, the two Misery indices evolved in the same direction. Starting with 2010, the clusters composition became highly unbalanced, the first cluster gathering most EU countries. In 2012 and 2013 it has appeared a cluster comprising two outlier countries, namely Greece and Spain, suggesting that they depict particular features, unressemblant to the ones of the majority of EU countries. By analysing the values recorded by the two Misery indices for the countries included in the first cluster, for each of the years 2010-2015, we noticed they always fluctuated around or slightly exceeded their average. Consequently, these countries record moderate levels of the economic discomfort. The clusters comprising Greece and Spain always faced the highest values for both economic discomfort indices. The remaining cluster constantly gathers the countries recording the lowest levels of both Misery indices.

To sum up, in 2007 and 2008 the analysis delineates between three main groups consisting roughly of: i) the core euro area members around Germany; ii) Western European countries and iii) Eastern European countries. During and after the financial crisis onset, only the core euro area group around Germany remained stable, being included in the same group composition, whereas the composition of the other two groups rearranged significantly into a crisis group and the group of less affected EU-members.

6. Conclusions

The paper aimed at assessing the degree of economic discomfort felt by EU consumers, as indicated by various forms of Misery indices and household confidence measures. The empirical findings summarized above have to be connected with the various ranges of monetary, fiscal policy measures or structural reforms adopted by these countries or at European level, in order to gain an insight on whether they have been efficient for improving the economic prospects and people's perception of wellbeing, which translates in a country's shift from one cluster to another. Several European and international bodies have stepped in and provided complementary financing tools and facilities, namely the European Central Bank provided liquidity support under various conventional and unconventional monetary operations, the European Commission has diversified its range of financial instruments meant to provide loans, equity and guarantees to end users, while the IMF has designed several financing facilities and instruments for addressing a country's balance of payments needs. Thus, this multifaceted array of financing tools has had the purpose of addressing the financial and economic challenges that have put pressure on people's standard of living. Specifically, they have been meant to alleviating the quality of financial sector and private sector's impaired balance sheets, to address the market failures and defreeze lending, investment and growth, and to lower the public debt deficits.

Therefore, by reconciling the spatial clustering of EU countries during the nine years considered with the policy measures adopted by EC and IMF, several reasons for the persistent positioning of Greece as an outlier country emerge. Greece was the first euro area country that requested financing from the IMF, in 2010. In addition, it is the EU country that has obtained the largest financing from European Commission's financial assistance mechanisms and this safety net is still active.

The results have shown that the global financial crisis indeed marked a turning point in the degree of economic discomfort felt by European population. In 2012 and 2013 two countries (Spain and Greece) clearly detached themselves from the other EU members, as their macroeconomic imbalances increased, becoming highly non-resembling with the majority, while for the end-2015 data Greece appears to be the only country depicting high values of economic discomfort.

Acknowledgment

This paper was co-financed from the European Social Fund, through the Sectoral Operational Programme Human Resources Development 2007-2013, project number POSDRU/159/1.5/S/138907 "Excellence in scientific interdisciplinary research, doctoral and postdoctoral, in the economic, social and medical fields -EXCELIS", coordinator The Bucharest University of Economic Studies.

References

Barro, R. (1999). 'Reagan vs. Clinton: Who's the Economic Champ? ', *Business Week*: February 22, 1999.

Calmfors, L. and Driffill, J. (1988). 'Bargaining structure, corporatism and macroeconomic performance', *Economic Policy* 6, 13-61.

Cherchye, L. (1998). 'The measurement of macroeconomic performance: comparison of DEA based alternatives', *Center for Economic Studies, Discussion paper* series DPS 98.29

Drozdowicz-Biec, M. (2012). 'Psychological Factors Influencing Consumer Sentiments. Proposal of an Alternative Measurement Method', 31st CIRET Conference, Vienna, September 2012

Dye, R.A., Sutherland, C. (2009). 'A New Metric to Gauge Household Economic Stress: Improving on the Misery Index', *Business Economics* 44, 109–113, doi:10.1057/be.2009.3

European Commission Directorate-General for Economic and Financial Affairs. (2007). The Joint Harmonised EU Programme of Business and Consumer Surveys user guide, updated 4 July 2007.

Gaddo, F. (2011). 'An international analysis of the Misery Index', Fondazione Magna Carta Londra

Garson, G. D. (2014). Cluster analysis, http://faculty.chass.ncsu.edu/garson/PA765/cluster.htm

Grabia, T. (2012). 'The Okun Misery Index in the European Union Countries from 2000 to 2009', *Comparative Economic Research*. Volume 14, Issue 4, Pages 97–115, ISSN (Print) 1508-2008, DOI: 10.2478/v10103-011-0029-8, May 2012

Grant P. D. (2014). 'What Makes a Good Economy? Evidence from Public Opinion Surveys' (July 2014). *Economic Inquiry*, Vol. 52, Issue 3, pp. 1120-1136, 2014. Available at SSRN: http://ssrn.com/abstract=2434893 or http://dx.doi.org/10.1111/ecin.12085

Hufbauer, G.C., Kim J., and Rosen H. (2008). 'The Augmented Misery Index', Peterson Institute for International Economics

IMF. (2008). IMF Survey: IMF, EU, and World Bank Line Up $25 Billion for Hungary, available at https://www.imf.org/external/pubs/ft/survey/so/2008/car102808b.htm

IMF. (2016). 'The IMF and the Crises in Greece, Ireland, and Portugal: an Evaluation by the Independent Evaluation Office', the Independent Evaluation Office of the IMF, July 8, 2016

Iqbal N. and Nawaz S. (2010). 'Fiscal Decentralization and Macroeconomic Stability: Theory and Evidence from Pakistan', MPRA Paper No. 27184

Lechman, E. (2009). 'Okun`s and Barro`s Misery Index as an alternative poverty assessment tool. Recent estimations for European countries'. MPRA Paper No. 37493, http://mpra.ub.uni-muenchen.de/37493/

Liao, T.W. (2005). 'Clustering of time series data—a survey', *Pattern Recognition*, 38 (2005) 1857 – 1874.

Lovell, M.C. and Tien P.L. (2000). 'Economic discomfort and consumer sentiment', *Eastern Economic Journal*, vol. 26, no. 1, winter 2000.

Moody's. (2009). 'Sovereign risk: review 2009 and outlook 2010', December 2009.

Navarro, J-L. A., Ruiz V-R L., Peña D.N. (2014). 'Economic Growth and Intangible Capitals: Europe versus Asia', *Panoeconomicus* Volume 61, Issue 3, Pages: 261-274, doi: 10.2298/PAN1403261N

Nordin, H.M., Said F.B. (2011). 'Comparing Macroeconomic Performance of OIC Member Countries', *International Journal of Economics and Management Sciences* Vol. 1, No. 3, 2011, Pp. 90-104

Rothschild, W. K. (1999). 'Maximising, Satisficing, Weights and the Evaluation of Macroeconomic Comparisons', *International Review of Applied Econom*ics, 13: 2, 207-217.

Sadeghi S.K., Marvasti, M.B., Karbor R. (2014). 'New evidence on the link between income inequality and misery index: a nonlinear time series analysis', *International Journal of Sustainable Development & World Policy*, 2014, 3(1): 25-30.

Stiglitz, J., Sen, A., Fitoussi, J.-P. (2009). Report by the Commission on the Measurement of Economic and Social Progress, Commission on the Measurement of Economic and Social Progress, Paris, 2009, http://www.stiglitz-sen-fitoussi.fr/en/index.htm.

United Nations Economic Commission for Europe. (2014). 'In-depth review of leading, composite and sentiment indicators', ECE/CES/2014/10.

Welsch, H. (2007). 'Macroeconomics and Life Satisfaction: Revisiting the Misery Index', *Journal of Applied Economics*. Vol X, No. 2 (Nov 2007), 237-251

Wyplosz, C., Sgherri S. (2016). 'The IMF's Role in Greece in the Context of the 2010 Stand-By Arrangement', IEO Background Paper, Independent Evaluation Office of the International Monetary Fund, July 2016

Yasodha, M., P. Ponmuthuramalingam. (2012). 'A Survey on Temporal Data Clustering', *International Journal of Advanced Research in Computer and Communication Engineering*, vol. 1, Issue 9, November 2012

The Synergy Mirage in Russian Industry: The Study of the Effectiveness of the Biggest M&A With Acquired Goodwill

Aleksey Ivanov, South Ural State University, Chelyabinsk, Russia, ivanov.chel@list.ru
Irina Prosvirina, South Ural State University, Chelyabinsk, Russia, iprosvirina@mail.ru
Elena Melnikova, South Ural State University, Chelyabinsk, Russia, melnikova_ei@mail.ru
Sergei V. Aliukov, South Ural State University, Chelyabinsk, Russia, alysergey@gmail.com

Abstract

In this article we present the results of the study of the financial statements of the participants of the biggest M&A in the Russian industry. The aim of the research is to determine the declared reasons of the buyer to pay the price which exceeds the fair cost of the purchased company and to evaluate the degree of validity of buyer's decisions about such overpayment. The main hypothesis of the study is that usually goodwill in the Russian industry is recognized because of the buyer's expectations of the synergy effect from business combinations, which most likely will not be achieved later. For the analysis we have chosen financial statements of the acquiring companies that have made the biggest M&A deals in the Russian industry in 2008-2013. The selection condition is the recognition of the goodwill in their financial statement after the deal. In the next step we analyzed the financial statements for the 2009-2015 in order to reveal the occurrence of the goodwill impairment. For the companies that have not recognized the devaluation of the goodwill we have calculated indicators of assets payback for the end of each year and compared them with the identical indicators before the M&A. This allowed us to evaluate the changes in the effectiveness of the combined business. Results of the study confirmed the hypothesis that the most frequent reason of the acquired goodwill is the synergy effect which is expected by the M&A participants. However, the results of the yearly tests for the goodwill impairment and the analysis of the merged company assets payback show that such expectations are mostly unfounded. Practical implication of the study is the revealing of the low efficiency of the methods which are used to predict the M&A results. Every year it leads to the millions of losses from the goodwill impairment and decline in the merged company efficiency. This situation creates a threat to the development of the Russian industry. We have concluded that in order to decrease this threat a new synergy effect evaluation methodology is needed. Such methodology will take into consideration the probabilistic nature of the synergy effect. The novelty of the paper is the subject of the research: obtaining of the synergy effect in the M&A deals in the Russian industry. Goodwill here is considered an indicator of the deal efficiency.

Keywords: mergers and acquisitions, Russian industry, synergy, goodwill, impairment.

Introduction

Mergers and acquisitions (M&A) is one of the most popular strategies for business development. Strategies connected with expansion of an existing business by an established business are usually viewed as less risky as opposed to creation of a new business. At the same time, M. Bradley, A. Desai and E.H. Kim have confirmed that only 7% of M&A deals lead to an increase of value of a merged business (Bradley et al., 1988). A more recent research of M.A. Hitt, J.S. Harrison and R. Ireland showed similar results: most M&A don't produce any additional value, or produce it in very small amounts (Hitt et al, 2001). J.W. Hunt has decided that almost half of all the M&A does not generate synergetic effects (Hunt, 1990). M.L. Sirower has proved that 70% of M&A brings fewer profits, than a premium, paid for an acquired business (Sirower, 1997). A. Agrawal and J. Jaffe have stated that within the first years after conducting the M&A the income of the merged business gets lower or stays the same (Agrawal & Jaffe, 2000). Despite the unfavourable statistics, while conducting the M&A, the buyer often pays for acquired

business the price that exceeds the fair value of its net assets. The central issue of this research is to determine the justification of such overpayment, which is recognized as goodwill in financial reporting of Russian manufacturing enterprises.

In the 2000s the obligatory annual goodwill impairment test was implemented in International Financial Reporting Standards. Starting from that point researchers have got the opportunity to study the justification of goodwill in M&A on the basis of the information containing the volume of recognized goodwill impairment. An economic nature of goodwill must reflect expectations of buyers concerning the possible synergetic effects, that can be implemented as a result of M&A procedure and would lead to an increase in profits of business and capability of the acquired company to generate an excess profit. However, in practice goodwill can sometimes be acknowledged due to some mistakes in fair value measurement of assets of an acquired company, tender overpricing and other "waste" components (Johnson & Petrone. 1998).

Theoretically speaking, only the entrepreneur knows his or her own state of affairs best, and so, acknowledging the goodwill impairment losses can be a signal that says the following:

1) potential synergies haven't been implemented;
2) acquired company has stopped making excess profits;
3) goodwill consist wholly or partially of "waste" components.

In practice multiple researches showed the high degree of subjectiveness in goodwill evaluation while conducting the impairment test (Generalova et al., 2016). This fact doesn't allow to fully trust the financial reporting in this question. Sometimes there is a high possibility that the goodwill has been impaired, but the losses from its impairment were not acknowledged.

Such researches have never been conducted in Russia despite the more than 25 year experience of market relations. The key branch of the Russian economy is an industrial sector, that's why the subjects of this research are groups of companies in partnership with Russian industrial enterprises. Authors have formed and tested the hypothesis of the research: acquiring of the synergetic benefits for manufacturing industry in Russia is the main declared reason for buying a company at price, exceeding the fair value of its assets (such exceed is often considered to be a significant one). This being said there is a high possibility that potential synergetic effect would not be achieved, and more than that, effectiveness of buyer's resources exploitation would be lowered.

Data and Methodology

We have continued the research of A.E. Ivanov and used his selection of companies (Ivanov, 2016). He summarized the results of annual overviews of mergers and acquisitions of the "Mergers and acquisitions in Russia" project of KPMG group, "Mergermarket" analytical agency, "Mergers and acquisitions" journal and AK&M news agency. The results showed the biggest M&A deals in 2008-2013, where Russian industrial enterprises were either buyers or sellers. Then the deals, where the buyer was a non-public corporation, were excluded from the list due to the fact that financial reporting of such companies is not publicly available and therefore is not subjected to a mandatory audit. This fact doesn't guarantee its credibility. In order to provide the compatibility of financial reporting data of industrial groups and consistency of the following deductions, deals where buyers were groups that don't disclose their financial reporting in IFRS (or US GAAP), were cast out. As the result of the following analysis of financial reports of the members of the deals that remained in the research, the acquisitions, where the goodwill wasn't acknowledged, were also crossed out. The readings of the reports were re-counted in USD millions at the official conversion rate of Russian Central Bank at the date of the deal conclusion. If the exact date of the deal conclusion was unknown, then the recalculation was made by the end of the month in which the deal was closed. If the month of deal closure was also unknown, then the recalculation was conducted by the end of the report year. Hence, the selection was formed and it now

includes 60 largest M&A with involvement of Russian industrial companies (10 deals for each year) that ended with the recognition of goodwill in financial reporting of the buyer.

We have used the improved methodology, originally developed by A. E. Ivanov (Ivanov, 2016). Unlike the original research project, we've studied the financial reports of the selected industrial groups over the two years that followed the year of performing the M&A. The choice of the two-year period is due to the fact that the greatest risk of goodwill impairment arises in the first two years after the implementation of M&A (Ramanna & Watts, 2012, Ivanov, 2015). We've defined the exact volumes of dealings, the amount of goodwill, acknowledged in financial reports, and justification of its appearance. Then we have analyzed the stated financial reports over two years that followed the year of performing the M&A, in order to unravel the facts of writing-off the acquired goodwill as the result of impairment. If the group wouldn't agree to disclose the information on goodwill impairment, acknowledged in a certain deal, we then would analyze the goodwill fluctuations according to the reporting segments. If the information on segments was not disclosed in financial reports, we would analyze the fluctuations of goodwill in its entirety. If there were no signs of goodwill impairment in the segments or in the whole group, then we would make a conclusion that the goodwill was preserved in the original amount. If some of these patterns could be detected, then we would stop tracing the following fluctuations of goodwill because of the impossibility to ascertain which goodwill exactly was impaired. To preserve the compatibility of the data we've recalculated the goodwill balance-sheet value, acknowledged in roubles or in other national currency, into the USD at the official conversion rate, determined by the Bank of Russia at the end of the corresponding year. Therefore, we've specified the M&A, ended in acknowledging of the goodwill impairment two years after the deal closure.

We have calculated and compared the ROA indices over the year that preceded the year of M&A, and over the year in which the impairment losses were registered for companies which have registered the goodwill impairment. We've increased the financial result of the company by the impairment sum in order to rule out the influence of the recognized goodwill impairment losses on ROA index. Comparing the above mentioned indices allowed us to detect the connection between the decrease of ROA and impairment losses acknowledgement. Then we've calculated the ROA of buyers, who haven't acknowledged the goodwill impairment in financial reports in the year, preceding the conduction of M&A and in the first two years that followed the year of M&A conduction. The ROA index characterizes the effectiveness of group assets' effectiveness. In the works of (Li & Sloan, 2009, Jordan et al., 2011) the strong positive correspondence between the decrease of ROA and goodwill impairment losses acknowledgement was proved. Therefore, the decrease of ROA is an important indicator of the fact that potential synergetic effect was, possibly, not achieved, despite the goodwill impairment losses were not acknowledged.

Results and Discussion

Analysis of the reports of financial groups that made it to the selection allowed us to prove the part of the hypothesis that explained the motives for buying a company at a price, exceeding the fair value of its assets. In financial reports of some buyers there were no justification of goodwill (it is a characteristic feature of reports made in 2008-2009, later reports of Russian industrial groups disclose more information). Sometimes the financial reports of buyers would explain certain motives. The most frequent one: in 33% of cases the recognition of goodwill was explained by the expectation of synergetic effects appearance from interaction with the acquired company. A range of buyers described the synergetic effects in a more specific way: it's the increase in sales of the group due to entering the new markets, the use of intellectual capital to increase the labor productivity in a merged business, the cost savings while implementing the economy of scale etc. In practice, the only motive that wasn't connected with synergy, was the pay for assuming control over the acquired company – such motive was declared in 7% of cases, but it always neighbored with the expected synergy. From there, we've stated that the expected synergy

for Russian industrial sector is the main declared motive for acquiring a company at a price, exceeding the fair cost of its assets.

The part of hypothesis about the relevance of goodwill amount in the cost of acquired companies has also been proven. The average relation of the amount of acknowledged goodwill to the refurbishment for the acquired company amounted to 44%. The similar results (40-50%) were shown in the previous research of T. Laamanen (Laamanen, 2007).

Table 1 provides the data, concerning M&A that ended in recognition of goodwill impairment in financial reports of the buyer.

Table 1: the data on the deals ended in recognition of goodwill impairment in the first 2 years after conducting the M&A deal

Factor	The year of the deal						Total
	2008	2009	2010	2011	2012	2013	
The amount of deals ander analysis	10	10	10	10	10	10	60
The amount of deals that ended in recognition of goodwill impairment	7	1	1	5	3	0	17
The amount of deals that ended in recognition of goodwill impairment, and in the ROA index decreasing in respect to ROA of the year, preceding the M&A year	7	1	0	5	3	0	16
The average reduction value of ROA in the year of recognition of goodwill impairment in respect to the ROA of the year, preceding the M&A year	91%	32%	-	149 %	76%	-	103%

Source: financial reportings, authors' calculations

The main reason for goodwill impairment that was stated in financial reportings of the analysed groups became the reducing of the prognosed cashflow rate of the acquired company. The ROA of the year, in which the impairment losses were recognized, have decreased in relation to the year that preceded the year of conducting the M&A in 94% of cases and this fact proves the conclusions of the previous research material on the strong positive correlation between the decrease in ROA and goodwill impairment (Li & Sloan, 2009, Jordan et al., 2011).

Table 2 gives the data on M&A which didn't end in goodwill impairment recognition during the first two years after the closure of the deal.

Table 2: The Data On M&A, Which Didn't End In Goodwill Impairment Recognition, During The First Two Years After The M&A Conduction

Factors	The year of the deal						Total
	2008	2009	2010	2011	2012	2013	
The amount of deals under analysis	10	10	10	10	10	10	60
The amount of deals in which the acquired company either was sold within the stated period, or it was impossible to identify whether the goodwill lost value.	1	3	2	1	1	5	13
The amount of deals in which in the first 2	2	6	7	4	6	5	30

years after the M&A, the impairment of goodwill wasn't recognized							
The amount of deals in which the goodwill impairment wasn't recognized in the first 2 years after the M&A, and the average ROA index kept decreasing in the first 2 years after conducting the M&A in relation to the ROA of the year that preceded the M&A year	2	1	3	4	6	3	19
The average value of the decrease of the average ROA in the first 2 years after conducting the M&A in relation to the ROA of the year that preceded the M&A year	29%	117%	74%	34%	76%	54%	61%

Source: financial reporting, authors' calculations

We have stated that 36% of the largest M&A with involvement of the Russian industrial enterprises in which the goodwill was recognized have ended with its impairment within the first 2 years after the closure of the deal. This leads to the acknowledgement of the aggregate loss over 4,5 billion USD. What is more, in 40% of cases the average ROA was lowered significantly within the first two years after conducting the M&A as opposed to the ROA of the year that preceded the year of M&A. It is impossible to derive that such decrease is directly connected with the M&A, however, these results justify the more close and detailed study of the segmental reporting of the stated groups and also the individual accounts of the acquired companies. Unfortunately, financial accounts under IFRS in Russia are made not by all industrial groups and enterprises, and the rules for preparation of Russian financial statements differ significantly from IFRS requirements. This complicates the conduction of the massive research projects, involving econometric modelling of the correlation between the acknowledged goodwill in M&A, its share in assets of the group, and the decrease of ROA index after the closure of the deal that ended with the goodwill impairment. The following continuation of our research of the whole market of M&A can be made possible by the expansion of the selection with groups that belong to other fields.

Conclusion

The results of the conducted research proved our hypothesis: the expected synergy in M&A with the participation of Russian companies will most likely be a mirage. We think that the evaluation of the target company shouldn't be based on the assumption that the synergy will definitely be achieved, but rather it should make allowance for its achievement. Insufficient judgement while preparing for an M&A deal leads to an increase in entrepreneurial risk rate. However, methods of assessment of the target companies utilized in practice in Russia are usually based on the evaluation of its discounted cash flows after the merging due to the lack of sufficient data necessary for applying the market-based approach. Such evaluation is characterized by a high degree of subjectiveness and, as the research showed, it often leads to overestimating the deal price. Therefore, we came to a conclusion that the effectiveness of implementation of M&A as an entrepreneurial strategy in Russian industrial sector suffers from the insufficient level of development of synergetic effects evaluation tools.

Acknowledgment

The work was supported by Act 211 Government of the Russian Federation, contract № 02.A03.21.

References

Agrawal, A., & Jaffe, J.F. (2000). The post-merger performance puzzle. Advances in Mergers & Acquisitions, 1, 7-41.

Bradley, M., Desai, A., & Kim, E. (1988). Synergistic gains from corporate acquisitions and their division between the stockholders of target and acquiring firms. Journal of Financial Economics, 21(1), 3-40.

Generalova, N., Sokolova, N., & Popova, E. (2016). Goodwill impairment versus amortization: Research of practice and the theoretical basis. Paper presented at the Proceedings of the 27th International Business Information Management Association Conference - Innovation Management and Education Excellence Vision 2020: From Regional Development Sustainability to Global Economic Growth, IBIMA 2016, 1549-1559.

Hitt, M.A., Ireland, D.R., & Harrison, J.S. (2001). Mergers and acquisitions: a guide to creating value for stakeholders. Oxford: Oxford University Press.

Hunt, J.W. (1990). Changing pattern of acquisition behaviour in takeovers and the consequences for acquisition processes. Strategic Management Journal, 11(1), 69-77.

Ivanov, A.E. (2015). The extent to which the investors' synergetic optimism is justified: findings on impairment of goodwill recognized in major M&A deals over 2008-2012 involving Russian companies. Economic Analysis: Theory and Practice, 41, 35-59.

Ivanov, A.E. (2016). The synergetic optimism of investors in the Russian industry: the extent of its feasibility. Economic Analysis: Theory and Practice, 11, 143-166.

Johnson, L.T. & Petrone, K.R. (1998). Is goodwill an asset? Accounting horizons, 1998, 12(3), 293-303.

Jordan, C.E., Clark, S.J., & Vann, C.E. (2011). Using Goodwill Impairment To Effect Earnings Management During SFAS No. 142s Year Of Adoption And Later. Journal of Business & Economics Research (JBER), 5(1), 23-30.

Laamanen, T. (2007). On the role of acquisition premium in acquisition research. Strategic Management Journal, 28(13), 1359-1369.

Li, K.K., & Sloan, R.G. (2009). Has Goodwill Accounting Gone Bad? [ONLINE] Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1466271. [Accessed 17 March 17].

Ramanna, K., & Watts, R.L. (2012). Evidence on the use of unverifiable estimates in required goodwill impairment. Review of Accounting Studies, 17(4), 749-780.

Sirower, M.L. (2007). The synergy trap: how companies lose the acquisition game. New York: The Free Press.

Assessment of Institutions in Russian SME Development System

Elena D. Vaisman, South Ural State University, Chelyabinsk, Russia, vaisman_elena@mail.ru
Mariya V. Podshivalova, South Ural State University, Chelyabinsk, Russia, pods-mariya@yandex.ru
Sergei V. Aliukov, South Ural State University, Chelyabinsk, Russia, alysergey@gmail.com

Abstract

The relevance of the quality of institutions evaluation increased after the recognition a slogan – "important institutions" by a scientific community. The article is based on the review of scientific publications carried out a classification of existing approaches to the assessment of institutions. Exclusive conceptual approaches (social, entropy, dysfunctional, costly, effective, and pragmatic) and approaches implemented at the empirical level (comparative, legal, regulatory, and behavioral) were dedicated. A new key drawback of the popular method for institutional assessment – method ratings – was found. Modern methodological problems of assessing the quality of institutions regardless of the level of study were defined in this article. According to these problems the most popular are abstraction from the internal structure of the institutional system and the complementarity of its elements and concentration of estimates at the output of the system. For correcting actions of this key disadvantage the concept of the institutional option described on the example of small enterprises of the Russian industry was proposed. In conclusion part, practical importance of the concept in the assessment of the quality of institutions at all levels of study was presented.

Keywords: mergers and acquisitions, Russian industry, synergy, goodwill, impairment.

Introduction

Institutionalists argue that any institutional environment forms a certain level of transaction costs, the structure of which determines the forms and mechanisms of doing business. However, the low quality of the institutional environment, and therefore an excessive burden of transaction costs sharply affect the interests of small enterprises (SME). This is due not only to the specifics of these forms of entrepreneurship, but also to the high volatility of the macroeconomic conditions in recent years.

In Russia the industrial enterprises are in the worst situation from all industries. Excessive burden of transaction costs on these businesses impose costs of formation of demand for products, search of the investor, the excess tax burden under the standard tax system. The survival of small producers in conditions of chronic scarcity of resources and low quality of institutions leads to the formation of such informal institutions as “salaries in envelopes", “encashment", "one-day firms", "kickbacks" and so forth. In such circumstances a number of methodological issues adequate assessments of the quality of institutions for SME are revealed.

In this article, firstly, the role of institutional factors, depending on the volatility of macroeconomic conditions for the development of SME was assessed. Further, systematization of accumulated knowledge in the field of quality assessment of institutions, both in Russian and world scientific literature was proposed. Main drawbacks of the existing approaches and methods of evaluation were presented, after that the author's concept of the institutional option was proposed as a contribution to the solution of methodological problems of assessing the quality of institutions on the example of small enterprises of the industry. In conclusion the possible applications of the concept of institutional option were shown.

The importance of institution quality for development of SME in Russia

We assessed the significance of institutional environment for development of SME in Russia, using the following source limitations.

1. As indicators of SME development two types of indicators were selected: absolute indicators: number of small enterprises in Russia, number of small enterprises in industry; and relative indicators: number of small firms per 10 000 population (density, MP), the number of small enterprises per 10 000 population (density, WFP).

2. The time period of analysis is divided into two: 2003-2007 and 2008-2014. This is necessary to ensure the comparability of SME development indicators before and after 2008, in which criteria for attributing to SME entities in Russia was expanded. In addition, in 2008 the first wave of the global financial crisis took place, therefore, these two periods can be designated as pre-crisis and post-crisis.

3. As is customary, key international ratings were used to assess the quality of institutions: "Perception of corruption", "Government Effectiveness", "Business", "Quality of legislation", subscript in the rating of "Global competitiveness" – the "Quality of institutions", within the ranking of "Economic freedom" – "Fiscal freedom" and "Property Rights".

As shown (Table 1), during the pre-crisis period the SME developed in the context of stable growth of oil prices and GDP prices against to the low quality of institutions.

Table 1: dynamics of indicators in the pre-crisis period

Indicators	2003	2004	2005	2006	2007
The business place, place	–	–	79	96	106
Property rights, scores	30	30	30	30	30
Fiscal freedom, scores	90,6	91,6	91,5	90,8	79,5
Perception of corruption index	2,7	2,8	2,4	2,5	2,3
Quality of institutions, scores	–	–	3,0	3,1	3,3
Government effectiveness, rank	40	44	38	40	43
Quality of legislation, rank	48	50	50	39	42
Economic Sentiment Indicator (Index HSE)	101,2	101,8	101,6	107,9	115
The index of business confidence in the industry	1,25	0,25	-1,5	0,25	1,25
The price of oil, $ per barrel	28,9	33,3	54,4	65,4	72,7
GDP growth rate, %	107,3	107,2	106,4	108,2	108,5
Number of MP, thousand units	882	891	979	1032	1137
Number of WFP, thousand units	119,0	128,1	126,5	131,6	138,0
Density of MP, units per 10 000 population	60,8	61,7	68,1	72,1	79,6
Density of WFP, units per 10 000 population	8,2	8,9	8,8	9,2	9,7

Source: compiled by the authors on open data of Rosstat, the HSE, the World Bank, World Economic Forum, Transparency International, The Heritage Foundation.

This means that the presence of relatively stable and effective demand in terms of economic growth leveled the lack of qualitative institutions for entrepreneurship.

In the post-crisis period extensive development of the SME continued background of weak post-crisis economic recovery (Table 2).

Table 2: Dynamics of Indicators In The Post-Crisis Period

Indicators	2008	2009	2010	2011	2012	2013	2014
The business place, place	118	120	124	120	112	92	62
Property rights, scores	30	25	25	25	25	25	25
Fiscal freedom, scores	79,2	78,9	82,3	82,7	82,5	86,9	85,6
Perception of corruption index	2,1	2,2	2,1	2,4	2,8	2,8	2,7
Quality of institutions, scores	3,2	3,2	3,1	3,1	3,3	3,5	3,5
Government effectiveness, rank	45	43	40	41	41	43	51
Quality of legislation, rank	39	39	40	39	39	38	37
Economic Sentiment Indicator (Index HSE)	105,7	81,3	101,5	104,5	105,6	100,1	97,9
The index of business confidence in the industry	–2,5	–13	–3,5	–0,25	–0,25	–1	–4,75
The price of oil, $ per barrel	97,7	61,9	79,6	111,0	121,4	108,8	98,9
GDP growth rate, %	105,2	92,2	104,5	104,3	103,4	101,3	100,6
Number of MP, thousand units	1347,7	1575	1644	1836	2003	2063	2352
Number of WFP, thousand units	156,6	180,1	181,3	188,9	211,4	215,9	224,1
Density of MP, units per 10 000 population	94,4	110,4	115,1	128,5	140,1	144,0	163,7
Density of WFP, units per 10 000 population	11,0	12,6	12,7	13,2	14,8	15,1	15,6

Source: compiled by the authors on open data of Rosstat, the HSE, the World Bank, World Economic Forum, Transparency International, The Heritage Foundation, The Wall Street Journal.

It can be seen that the average annual rate of growth significantly accelerated from 6% to 11% for the whole economy and from 3.8% to 7% for the MP industry. We believe that this was facilitated by several types of institutional changes, namely:

1) a significant reduction of transaction costs of opening a new enterprise, which is reflected in the improvement of Russia's positions in the rating "doing business";
2) a slight decrease in the total tax burden at the macro-level;
3) a change of the criteria for small businesses, which expanded this sector.

Thus, the importance of the institutional factor increases during periods of stagnation and recession of economy. During the same periods, entrepreneurs are most sensitive to the quality of the institutional environment.

Modern Approaches to the Assessment of Institutions

Due to the existing variety of methods and the parameters for assessing the quality of institutions authors attempted the systematization of the accumulated experience in assessing of institutions, based on a set of initial constraints.

1. For the selection of scientific papers, we used the concept of "evaluation of institutions/institutional environment", "quality assessment of institutions/ institutional environment", "evaluating the effectiveness of institutions/ institutional environment".

2. The concept of "efficient institutions" and "institutional quality" we considered as synonyms. In a modern institutional economics, both these terms are mentioned when talking about the results of institutional functions.

3. The whole range of possible approaches to the assessment of the institutional environment regardless of the level of research and carrier was considered.

4. We divided the approaches to evaluation into two types - implemented in practice and developed exclusively conceptually. In determining the names of approaches, we focused on the essence of the approach in the author's presentation.

Among the exclusively conceptual, from our point of view, we can distinguish the following approaches:
- Social (Authors: V.V. Volchik and I.V. Berezhnoy [2007]),
- Entropy (Authors: S.A. Dyatlov [2015], E.V. Balatsky [2007]),
- Dysfunctional (Authors: O.S. Sukharev [2013], V. M. Polterovich [1999]),
- Cost method (Authors: E.V. Popov, A.Y. Veretennikova, M.V. Vlasov [2011]),
- Effective (Author: E.V. Balatsky [2007]).

Approaches implemented at the empirical level include:

- Comparative / competitive (Authors: Rodric D. Subramanian A., Trebbi F. [Rodric, 2004], A. Baranov, E. Malkov, L. Polishchuk, M. Rohlin, G. Syunyaev [Baranov, 2015], V. Polterovich and V. Popov [Polterovich, 2006], Kunčič A. [2014], LiPuma, J.A., S.L. Newbert, J.P. Doh [LiPuma, 2013], T.P. Loginova, I.N. Polushkina [Loginova, 2012], E.A. Panfilova [2013], K.I. Nikitina [2013], J.A. Alonso, C. Garcimartín [Alonso, 2009], A.V. Gorshkov, E.S. Silova [Gorshkov, 2006]).
- Legal (Authors: S.G. Kirdina, I. Kirilyuk, A. Rubinstein, I. Tolmacheva [Kirdina, 2010], La Porta R., Lopez-de-Silanes F., Shleifer A., Vishny R. [La Porta, 1997; 1998], Buchanan J. [2014]),
- Standard (Authors: Voigt S. [2013], L. Feld and S. Voigt [Feld, 2003]),
- Behavioral (Authors: T.V. Morozova, G.B. Kozyreva [2015]).

As it can be seen, the most commonly used is a comparative approach, based on the rating and index methods. Today generally accepted metrics of quality of institutions are such well-known international indexes, like the Worldwide Governance Indicator Doing business, The Global Competitiveness Index, Index of Economic Freedom, Corruption Perception Index Rule of Law Index, Investment Climate Index and institutional index project BEEPS.

However, criticism of the rating evaluation in the scientific literature circulated not less than the method itself. Disadvantages of the ranking method were described by Knack St., [2006]; Thomas M., [2010]; Kurtz, M., A. Schrank [2007], Kurtz M., A. Schrank [2007], P. Bardhan [2002].

The concept of institutional matrices, which is developing today in the Russian institutional school, complements this criticism with a new observation: the vast majority of international ratings assess the

institutional changes in the economies of different countries in terms of their compliance with the market development paradigm. In the context of the theory of institutional matrices it is, in fact, tantamount to the evaluation of the level of development of institutions specifically to national economy compared to countries-carriers of the Y-matrix. But, according to research by S.G. Kirdina [Kirdina, 2016] many countries are carriers of the X-matrix. In addition to Russia they are China, North Korea, Nepal, Republic of Korea, Japan, Brazil, Egypt, Cuba, Laos, Mexico, Myanmar, Peru, India etc. Is this existing standard Y-matrices applicable to the institutional systems of these countries? If the answer is yes, so to what extent and if the answer is negative, what should be the standard of quality of institutions for the X-matrix? These questions do not even appear in the world scientific community.

In general, there are a number of key methodological problems of assessing the quality of institutions regardless of the level of research:

1. The deficit of the concepts brought to empirical testing with respect to a specific carrier of the institutional environment.
2. The absence of an universal method of evaluation.
3. The market paradigm of assessment, incorporated in the most popular method of ratings, does not allow to fully trust the obtained results.
4. Abstracting from the internal structure of the institutional system and the complementarity of its elements.
5. The concentration of evaluations at the "output" as a result of the "work" of institutions.

The Concept of an Institutional Option

In the process of scientific research of decision-making processes by an individual / group of decision-makers it is possible to precede from institute – specific tasks which it can solve, a kind of "specialization" of the Institute; and from task – search the institutional technologies through which it can be solved. In the first case, there is a problem option of the institute, in the second case - an institutional option for solving the problem.

However, the institute is only one of the possible solutions of tasks facing the firm/individual. Along with the institute, there is also the opposite technology – non-institutional behavior. Consequently, the solutions of the problems have institutional and non-institutional nature. In the case of institutional option we are talking only about the first type.

Institutional option is the set of alternative options of institutional solving the problem, which are available to economic agents and used to coordinate their actions. We offer the term bunch of institutions – a set of interrelated formal and informal institutions used by economic agents for solving a particular problem, achieving a particular goal. In other words, institutional option describes a choice made by economic agent from the set of options for institutional linkages.

Theoretically, the number of possible bunches tends to infinity, but in reality, due to the cognitive limitations of the person, as well as the asymmetry of information, the individual / decision maker is not able to consider all possible institutional connections (like all possible solutions to the problem). This means that the institutional option at the individual / decision-maker level is always limited to a small number of options. So, a management of the company, when developing a strategy, business plan or justification of other management decisions, chooses, as a rule, 3 scenarios of events.

The term “bunch of institutions” allows the researcher due to the limitations of structure and disorder of the institutional environment to "work" not with a single element or a whole set of institutions at once, but with the part of the institutional system, which can be conditionally classified as a relatively independent object of study.

Let us formulate the basic properties of the institutional option as a separate category.

1. Hierarchy – institutional option may be selected at several levels of study – of an individual (employee) level, individual firm level and at the macro level as a whole. At the level of the whole society institutional option will be a combination of all the types of institutional solutions to the problem used by the actors.

2. Breadth of the option (differentiation) – number of bunches. As already noted, at the level of individual actors institutional option has got a limited number of institutional bunches, at the macro level the number is unlimited, while the number of possible combinations of institutions tends to infinity. The wider institutional option is, the higher the differentiation of behaviors (solutions for problems) becomes. According to the ideas of V.M. Polterovich, one of the fundamental principles of institutional reforms is "maintaining the diversity of institutional forms. The richer "institutional life" is, the more opportunities to exit from institutional traps appear" [1999]. G. Haken, in the framework of synergetics claimed that in case of conflict situations when one decision fundamentally excludes the other, the only solution is to increase differentiation [Haken, 1988]. However, we believe that in relation to the latitude of the option measure is very important, since an increase in the latitude of option reduces the predictability of the behavior of actors, increasing the entropy and the probability of transition of the whole economic system into chaos.

3. Coordinating property – institutional option implements the choice of actors within the institutional technologies of the solution. The starting point is the availability of some problems of development in individual / individual firm. Awareness of the problem allows formulating the problem for next solving. It is human nature firstly to appeal to existing patterns of behavior – social experience as it saves resources and time required for decision-making. After reviewing a set of institutional solutions "proposed" by legal system and current business practice – institutional option, the individual/group decision maker selects and implements it. The choice in favor of a particular bunches of institution is influenced by many factors, among which motives of decision-making, asymmetry of information and cognitive limitations of decision makers can be highlighted as the main. If, a necessary institutional solution is not found because of different reasons (ignorance, the lack of templates, the motives and incentives), the individual / group decision-makers are forced to use non-institutional solution based on their own intuition and experience.

4. Relevance (sufficiency) of an option is determined by the actual behavior of the actors, whether they choose those bunches that are represented in it, and with what frequency. In our opinion, the relevance of institutional linkage can be recognized when it is used by more than 0.5% of actors (more than 5 cases out of 1000). If there are an increasing number of the most popular bunches with the specified limit in the total number of ligaments, the higher the demand for the option will be. Accordingly, the previous property and the adequacy of the option are not interdependent. The option may be differentiated (a wide variety) but it is not required (most of bunches are not used by the actors) and vice versa.

5. Semantics of option is the semantic content of its elements. Evaluating the quality of an option, it is impossible to abstract from the semantics of institutions, since it allows characterizing the institutional mapping in the option as a destructive or constructive. An important thing is the perspective from the position of whose interests we evaluate the option. For example, the destructive bunches are viewed from the point of view of the authorities; the institutions of the shadow economy for entrepreneurs can be quite rational choice, allowing to reduce transaction costs. In addition, semantics helps to determine the coherence of institutions – options for their combination among themselves and, consequently, affect the breadth of the institutional option.

6. Institutional option as well as many institutional changes, depend on technological progress. Such influence extends to all stages of the life cycle as individual institutions and institutional option in

general. In modern science, the relationship has not been properly studied yet. In our opinion, this effect is easy to find out on the example of information transfer technologies. The development of Internet technology leads to the fact that open access has an extensive knowledge base, data sets, ready analytical solutions and algorithms. Nowadays there are various forums for specialists, Internet community, social networking, online consultation of experts, the database of normative and technical documents, database of reviews of various type, etc. on the Internet. All this increases the availability of collective experience in solving a variety of problems. As a result, the speed of information dissemination increases, which generally reduces the level of transaction costs of acquiring knowledge and data. So, the development of Internet technology leads to the fact that new institutions arise and propagate much faster than before. Thus, the individual can address to his collective (social) experience – the institutional solution of the problem - at any time with little transaction costs to solve his specific task. In this case, the influence of the Internet on the breadth of the institutional option of the individual / firm is obvious, compared with the situation of the absence of such technologies (search through books, the press and acquaintances).

These speculative arguments about the institutional properties of the option let us assume that it is the main mechanism of self-organization of institutional systems.

We will describe the institutional option on the example of one of the main problems of the development of the small industrial enterprises according to surveys – a high level of the tax burden. The figure 1 shows the logical scheme of institutional option in a macro-level for this case. As shown, the social experience (the country's legal system and informal institutions, the business community) is the original base of the institutions, which small companies use to generate various institutional bunches. At the level of each individual small firm institutional option is determined by the group decision maker or owner themselves. It is obvious that institutional option will contain significantly fewer valid, from the perspective of the decision maker, bunches of institution, than institutional option on macro levels, where the entire set of potential bunches is presented.

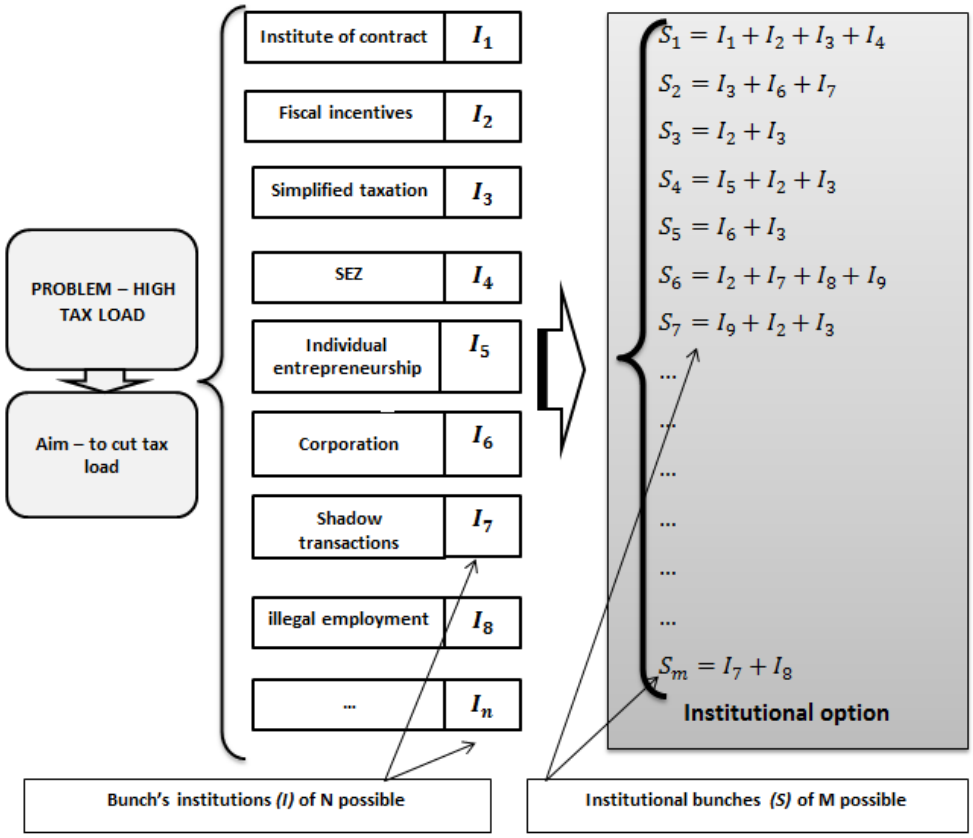


Fig.1: The logical scheme of institutional option for the problem field MPP-high taxes (macro-level).

Based on the practice of existing methods of tax optimization for small enterprises, we selected the following institutions as the initial elements of ligament fillers:

1) Formal – Simplified Tax System; benefits provided by general tax regime, including tax accounting rules, using which a taxpayer can reduce the tax base; taxation for residents of special economic zones, including offshore ones; the institution of the contract, in particular, the lease of real estate; institute of the individual entrepreneur, for which since 2017 "tax holidays" are available; institute of the economic society, including both options for creating new firms, "friendly", subsidiaries and affiliates, one-day firms, and business reorganization in order to optimize taxation (separation, allocation);

2) Informal institutions – shadow turnover and shadow employment.

Small industrial enterprises form bunches, combining in different variants the listed institutions (on the graph this is reflected through the addition of the institutes- elements I), and thereby solve the problem of excessive tax burden each within their own targets.

Conclusion

In conclusion, the concept of institutional option is useful for evaluating the quality of institutions, including small industrial enterprises. The main advantage of an institutional option is that it is empirically studied with respect to specific problems of enterprise development.

The category of institutional option can be applied to the extent of its practical suitability, being aware of the instrumental and conditional nature inherent in all scientific concepts. In particular, the empirical value of the proposed approach is expressed in the fact that it allows:

a) assess the degree of differentiation of institutional support for specific problem fields actor;

b) identify institutional ligament competitors, existing as institutional support for the solution of a particular problem of a small firm;

c) improve the quality of analysis of institutions at any level of study: macro, meso, micro, mini;

d) take into account the structural complexity, complementarity and semantic content of institutions in the quantitative assessment of the quality of institutions;

e) identify the mechanism of action of such institutional environment phenomena as the stability of individual institutions and ligaments in time, including the phenomenon of "institutional traps", the neglect of institutions, the immutability of institutional matrices;

f) usage of a "problematic" paradigm in the formation of an option allows a quantitative assessment of the quality of the institutional environment in dynamics, since binding to a particular "problem field" of the environment enables to compare options in terms of semantics and latitude in time.

Acknowledgment

The work was supported by Act 211 Government of the Russian Federation, contract № 02.A03.21.

References

Alonso J.A., Garcimartín C. (2009). The Determinants of Institutional Quality. More on the Debate, Available at: http://www.nottingham.ac.uk/credit/documents/papers/09-04.pdf

Balatsky E.V. (2007). Nechetkie instituty, kul'tura naselenija i institucional'naja jentropija [Fuzzy institutions, population culture and institutional entropy] // Society and economy, No. 5, pp. 36-53. (In Russian).

Baranov A. (2015). Measuring institutions in Russian regions: methodology, data sources, analysis [Izmerenie institutov v rossijskih regionah: metodologija, istochniki dannyh, analiz] / A. Baranov, E. Malkov, L. Polishhuk, M. Rohlin, G. Sjunjaev // Voprosy jekonomiki. № 2, pp. 69-103. (In Russian).

Bardhan P. (2002). Decentralization of Governance and Development // Journal of Economic Perspectives. Vol.16, No 4, pp. 185-205.

Buchanan J. (2014). Empirical analysis of legal institutions and institutional change: multiple-methods approaches and their application to corporate governance research / J. Buchanan, D. H. Chai, S. Deakin // Journal of Institutional Economics. Volume 10. Issue 01. March, pp. 1-20.

Dyatlov S.A. (2015). Jentropija institucional'nyh sistem v uslovijah global'noj giperkonkurencii [The entropy of the institutional systems in the face of global hypercompetition] // Institutional transformation of the economy: the Russian vector of new industrialization. Proceedings of the IV international scientific conference. Omsk, pp. 53-64. (In Russian).

Feld L., Voigt S. (2003). Economic Growth and Judicial Independence: Cross Country Evidence Using a New Set of Indicators // European Journal of Political Economy, 19 (3), pp. 497-527.

Gorshkov A.V. Silova E.S. (2006). The quality of the institutional environment as a factor of economic growth [Kachestvo institucional'noj sredy kak faktor jekonomicheskogo rosta] // Izvestija Ural'skogo gosudarstvennogo jekonomicheskogo universiteta, №4 (16), pp. 9-16. (In Russian).

Haken H. (1988). Information and self-organization: a macroscopic approach to complex systems / Berlin.: 240 p.

Kirdina S.G. (2016). “Geography vs institutions” or "geography ergo institutions" [Geografija versus instituty» ili «geografija ergo instituty»: novye jempiricheskie argumenty v teoreticheskoj diskussii (na osnove statisticheskogo modelirovanija)], zasedanie Sekcii jekonomiki OON RAN // (Available at :http://inecon.org/docs/Kirdina_paper_20160406.pdf) (In Russian).

Kirdina, S.G. (2010). Russian model of institutional change: empirical-statistical research [Rossijskaja model' institucional'nyh izmenenij: opyt jempiriko-statisticheskogo issledovanija]/ Kirdina, S.G., Kiriljuk, I., Rubenshtejn, A., Tolmacheva, I.// Voprosy jekonomiki. № 11, pp. 97-114. (In Russian).

Knack St. (2006). Measuring Corruption in Eastern Europe and Central Asia: A Critique of the Cross-Country Indicators, World Bank Policy Research Working Paper 3968. 2006.

Kunčič A. (2014). Institutional quality dataset // Journal of Institutional Economics. Volume 10. Issue 01. March, pp. 135-161.

Kurtz M., Schrank A. (2007). Growth and Governance: Models, Measures, and Mechanisms, Journal of Politics 69(2): pp. 538-554.

Kurtz M., Schrank A. (2007). Conceptualizing and Measuring Institutions: A View from Political Science, mimeo prepared for 2nd workshop on Measuring Law & Institutions held in Paris Dec. 14 and 15.

La Porta R., Lopez de Silanes, F. Shleifer, A., Vishny R. (1998). Law and Finance // Journal of Political Economy, 106 (6), pp. 1113-1155.

La Porta R., Lopez-de-Silanes, F., Shleifer, A., Vishny R. (1997). Legal Determinants of External Finance // Journal of Finance, 52(3), pp. 1131-1150.

LiPuma J.A., Newbert S.L., Doh J.P. (2013). The effect of institutional quality on firm export performance in emerging economies: a contingency model of firm age and size // Small Business Economics, May 2013. Volume 40. Issue 4, pp. 817-841.

Loginova T.P., Polushkina I.N. (2012). The effect of quality of institutions for innovative development of the Russian economy [Vlijanie kachestva institutov na innovacionnoe razvitie rossijskoj jekonomiki] // Vestnik Nizhegorodskogo universiteta im. N.I. Lobachevskogo. 2012. № 2–2, pp. 172–176. (In Russian).

Morozova T.V., Kozyreva G.B.(2015). The quality of the institutional environment of the rural areas of Russia [Kachestvo institucional'noj sredy sel'skih territorij Rossii] // Sever i rynok: formirovanie jekonomicheskogo porjadka. 2015. T. 1. № 1 (44), pp. 83–93. (In Russian).

Nikitina K.I. (2013). The impact of institutional quality on human development [Vlijanie kachestva institucional'noj sredy na razvitie chelovecheskogo potenciala] // Jekonomika i upravlenie v XXI veke: tendencii razvitija. 2013. № 12, pp. 23–28. (In Russian).

Panfilova E.A. (2013). Comparative assessment of the quality of local institutional environment [Komparativnaja ocenka kachestva rossijskoj institucional'noj sredy] // Molodoj uchenyj. 2013. № 4, pp. 271–275. (In Russian).

Polterovich V.M. (1999). Institutional traps and economic reforms. // (http://mathecon.cemi.rssi.ru/vm_polterovich/files/ep99001.pdf) (In Russian).

Polterovich V., Popov V. (2006). Democracy, quality of institutions and economic growth [Demokratija, kachestvo institutov i jekonomicheskij rost] / Seminar «Demokratizacija, kachestvo institutov i jekonomicheskij rost» 07 oktjabrja 2006. (Available at: http://fir.nes.ru/~vpopov/documents/Democracy-2006DEC-Russian.pdf). (In Russian).

Popov E.V., Vlasov M.V., Veretennikova A.Ju. (2011). About Economic Institute [Ob jekonomicheskom institute] // Vestnik UrFU. Serija jekonomika i upravlenie. №6, pp. 4-21. (In Russian).

Rodric, D., Subramanian A., Trebbi F. (2004). Institutions Rule: The primacy of Institutions over geography and Integration in Economic Development // Journal of Economic Growth, Vol. 9.2, pp. 131-165.

Suharev O.S. (2013). The methodological basis of institutional analysis: old, new schools and mainstream [Metodologicheskie osnovy institucional'nogo analiza: staraja, novaja shkoly i mejnstrim] // Finansovaja analitika: problemy i reshenija. №41(179), pp. 7-24. (In Russian).

Thomas M. (2010). What Do the Worldwide Governance Indicators Measure? Mimeo // European Journal of Development Research. 2010. Vol. 22, No 1, pp. 31-54.

Voigt S. (2013). How (Not) to Measure Institutions // Journal of Institutional Economics. Vol.9. No1, pp. 1-26.

Vol'chik V.V., Berezhnoj I.V. (2007). Interest groups and the quality of economic institutions [Gruppy interesov i kachestvo jekonomicheskih institutov] // Jekonomicheskij vestnik Rostovskogo gosudarstvennogo universiteta, №2. Tom 5, pp. 57- 66. (In Russian).

Towards a Platform for Clinical Big Data Analysis

Mădălina Zamfir, National Institute for Research and Development in Informatics, Bucharest, Romania, madalina@ici.ro
Ștefan Preda, National Institute for Research and Development in Informatics, Bucharest, Romania, stefanalex@ici.ro
Vladimir Florian, National Institute for Research and Development in Informatics, Bucharest, Romania, vladimir@ici.ro
Gheorghe Militaru, University Politehnica of Bucharest, Bucharest, Romania, gheorghe.militaru@upb.ro
Bogdan Țigănoaia, University Politehnica of Bucharest, Bucharest, Romania, bogdantiganoaia@gmail.com

Abstract

The emergence of massive amount of data in clinical and healthcare fields leads to the need to implement a Big Data Analytics platform in medical area, due to the advantages of scalability and efficiency of these proven architectures and platforms in the processing and management of large datasets. Big Data Analytics is the process of analyzing huge amounts of data from different sources of data and different formats, like electronic health records, prescriptions, medical imaging or genomic data in order to deliver useful information used to take decisions in real time. Software tools and applications for predictive analytics or data mining enable those implied in healthcare industry to improve the quality of clinical services or an early diagnosis of diseases. Big Data Analytics can generate revenues by providing insights for third parties, such as payers (patients, health insurance companies), or pharmaceutical. In the paper we will present issues and how we intend to solve them with an open source platform for clinical Big Data processing. The objective is to facilitate development of more efficient clinical and healthcare applications and improve accuracy of predictions.

Keywords: Clinical data, EHR, Big Data Analytics, architecture

1 Introduction

Continuously generating massive amounts of large data in fields such as financial, IoT, transportation, healthcare, marketing, agriculture and retail, has prompted the emergence of technologies dedicated to the acquisition, storage, management and analysis of Big Data. In recent years, Bahga and Madisetti (2016) reported that an explosion of clinical data has been observed and both data collection from distributed health information systems and clinical data processing and analysis have become critical problems.

We can speak of a healthcare ecosystem as Bahga and Madisetti (2016) mentioned, consisting of patients, payers (government, health insurance companies, employers), suppliers (doctors, medical institutions), pharmaceutical companies and other medical service companies and medical devices companies. Clinical patient information is aggregated with ecosystem information (laboratory results, diagnostics, treatments, demographics) and is found in EHR (Electronic Health Record) systems.

Data generated in real time, as in Balladini et al (2015), by medical equipment from patient-connected sensors for measuring physiological parameters (heart rate, respiration rate, body temperature, blood oxygen saturation, blood pressure), established diagnostics, laboratory tests, data generated by evaluation equipment of patients continuously, the data collected from the critical patient monitoring systems (vital signs), reported by Poucke et al (2015), are considered clinical data. Clinical data along with physicians, written prescriptions, pharmacy, insurance, social media posts,

blogs, web pages, publications about health form Big Data in healthcare. Because daily, millions of records can be collected just of the ECK parameter (1000 samples per second) for a single patient, as in Balladini et al (2015) and the clinical data comes from different sources, has different formats and is generated with different speeds, we may consider that we are experiencing a Big Data problem in healthcare.

Thanks to digitization, Big Data Analytics has grown in the healthcare sector, which promises benefits both for the patients in the healthcare institutions and the quality of clinical services, as well as for the stakeholders to reduce the cost and to a rapid improvement of quality in healthcare reported by Poucke et al (2015), Raghupathi and Raghupathi (2014). Analytics refers to processes, technologies, frameworks, and algorithms as Bahga and Madisetti (2016) mentioned, that extract fruitful information from rough data. There are four types of analytics - descriptive analytics, diagnostic analytics, predictive analytics and prescriptive analytics. Descriptive analytics wishes to answer the question, "What happened?" and refers to analyzing past data in an easy-to-read form. Diagnostic Analytics wishes to answer the question "Why has it happened?" and refers to analyzing past data to diagnose the reasons some events happened. Predictive Analytics refers to predicting the occurrence of an event, the probable outcome of an event, or predicting future values using prediction patterns, and wishes to answer the question, "What can happen? ". Prescriptive Analytics uses multiple prediction models to predict different outcomes and the best mode of action for each result. It wants to answer the question, "What can we do to accomplish this?", as reported by Bahga and Madisetti (2016).

The objective of this research is to present an architecture for a clinical big data platform that offers the capabilities to acquire, store, analyze, and visualize real-time clinical data in order to make the best medical decisions regarding the health of patients. The remaining of the paper is organized as follows: Section 2 briefly describes the potential and benefits of the Big Data clinical analysis, Section 3 reviews the challenges and requirements for a Big Data Analytics platform, Section 4 shows the architecture of the platform and emphasizes its features, Section 5 formulates conclusions about the reported results and shows further research work aiming to demonstrate the benefits of the implemented platform by several significant use cases.

2 Big Data Promise and Potential for Clinical Data Analysis

The features offered by Big Data Analytics, as referred to in Wang et al (2016), such as analytical capability for patterns of care, unstructured data analytical capability, decision support capability, predictive capability and traceability that can be used in the information technology infrastructure, operational, organizational, managerial and strategic domains, can save lives by improving healthcare services, reducing patient care costs based on previously unidentified models, and improving the organization's financial performance with descriptive analytics and mining/predictive analytics techniques used in medical documents and unstructured clinical data analysis. By processing large volumes of data, of different formats, with different data generation types (batch, streaming), can be identified new markets of interest for hospitals.

Costly healthcare services or laboratory tests and unnecessary treatments can be identified through unstructured data analytical processing, as mentioned in Wang et al (2016).

The benefits of Big Data Analytics are reflected at IT infrastructure level by sharing resources and thus avoiding additional IT costs. Operational benefits are obtained by improving the quality and precision of medical decisions, efficiently processing a large number of health records, reducing patient's travel time, reducing diagnostic time, and reducing the length of hospitalization. Managerial benefits are obtained from the allocation and control of resources, operations monitoring and, improving strategic business decisions. Strategic benefits are obtained from strategic activities on long-term decision-making, as described by Wang et al (2016).

Decision support capability highlights the ability to generate daily reports on health care, which helps in setting actions and decisions at the management level.

For predictive capability, complex statistical tools are used to develop models and estimates of what will be done in the future. Reports, alerts, hospital performance indicators, and interactive views are harnessed, resulting in improved medical risk, identifying best clinical practice, understanding future healthcare trends based on knowledge of patient habits.

Traceability is the ability to track output data from all IT components of the system within a healthcare facility, so hospitals can improve the rate of use of medication, reducing patient flow delays, as reported by Wang et al (2016).

The potential of Big Data Analytics is also reflected in the epidemiological surveillance, patient-based decision-making, adverse drug prediction as described by Bahga and Madisetti (2016), non-invasive and continuous monitoring of physiological parameters according with Simpao et al (2015), decreasing the risk of illness as in Simpao et al (2015), monitoring of elderly, people with dementia or with Parkinson's disease as in Simpao et al (2015) with the help of wearable devices, detection of abuse or errors following the analysis of complaints from health insurances (detecting claim anomalies) as mentioned in Bahga and Madisetti (2016), Raghupathi and Raghupathi (2014), Balladini et al (2015).

Real-time health monitoring can lead to the discovery of new vital sign patterns that help detect early clinical pathologies and plan early treatments or stop the progress of a condition, reducing mortality and the cost of caring for patients as reported by Wang et al (2016).

The potential of Big Data in Healthcare has led to the collection of data from the EHR into national data sets as in Simpao et al (2015), the development of national projects for Health Data (http://www.ahrq.gov), (http://www.hscic.gov.uk) and the creation of anesthesiology-specific databases such as the Multicenter Perioperative Outcomes Group (MPOG) conform with Kheterpal et al (2013), the National Anesthesia Clinical Outcomes Registry (NACOR) as in Dutton R.P. (2014), the Society for Ambulatory Anesthesia Database And the Pediatric Regional Anesthesia Network in accordance with Kheterpal (2014), Simpao et al (2015). Improved clinical outcomes have been observed in intensive care units for children, where appropriate decisions are made for each patient in real time as referred to by Simpao et al (2015).

The term Visual Analytics (VA) as in Zamfir et al (2016) describes a new multidisciplinary field that combines different areas of research, including: data mining, data management, data fusion, cognitive science and statistics among others as mentioned in Simpao et al (2015).

In biology and medicine, computerized tomography and ultrasound imaging for 3-D digital reconstruction and visualization produce gigabytes of medical data according with Zamfir et al (2016).

Likewise, the use of VA tools for anesthesia and the installation of AIMS (Anesthesia Information Management Systems) as reported by Simpao et al (2015) will become a real source of Big Data, especially as it aims to combine electronic anesthesia records with hospital data and ambulatory surgery centers with EHR data. Increasing efficiency in patient care, optimizing resource allocation and utilization, improving decision-making at both clinical and organizational levels are pursued when using VA tools and complex analysis methods. Anesthesia is another area in which Big Data collection and the results Big Data Analytics can support predictive risk assessment and resource use as mentioned in Simpao et al (2015). VA techniques are used in clinical operations in pediatric hospitals for exploring clinical data in accordance with Simpao et al (2015). The field of bioinformatics uses Visual Analytics techniques to analyze large amounts of biological data. Researchers in this field are experiencing unprecedented increased of data volumes, such as in the

human genome project, with 3 billion base pairs per individual as observed by Zamfir et al (2016), Simpao et al (2015).

Visual Analytics (VA) tools mitigate the deficiencies of data analysis tools that do not provide cognitive activities and work with large, complex and heterogeneous datasets. It also combines interactive visual representations with advanced analysis techniques to synthesize, analyze, and facilitate visual-analytical reasoning with other data-engaging activities as described by Ola and Sedig (2014).

3 Challenges and Requirements

Management and processing of large data sets as in Peek et al (2014) in the biomedical and health domains generate methodological and technical challenges related to data sources, infrastructure and analytics.

Data sources consist of health care records, administrative data, web search logs and social media. Health care records are data collected for patient care but used for other purposes such as research or quality assurance, and contain a wide range of data such as demographics, lab values, distributed medications, imaging, other diagnostic data, clinical interventions, clinical notes in text format. Health care records pose challenges for researchers, related to data quality and diversity, confidentiality of providers and patients, inaccuracy or lack of data. Administrative data is insurance data or payment claims, diagnoses, procedures, and access to these data is important for the research part but also for the patient's safety improvement. The challenge of working with administrative data consist in the fact that data are heterogeneous and multivariate and difficult to collect (many data for a patient, hard to create a single analysis file from the multitude of data with many attributes, lack of clinical details) and therefore the solution is to link them to clinical data or to other healthcare data. Web searches logs are also useful for detecting side effects associated with pharmaceuticals. Searching and mining social media raise challenges related to nonstandard languages and representations used on social networks and related to, extracting significant information from these data sources. The volume of large data sets is a challenge along with the speed at which data is collected and their diversity. In the biomedical domain, batch processing and real-time data processing technologies are used. Structured data (electronic health records) and unstructured data (clinical images) are stored in databases as mentioned in Wang et al (2016). Storage can be done using file systems or database systems. In the case of file system storage, one option takes into account the data storage and calculation performed on the same machine, such as Hadoop. HDFS (Hadoop Distributed File System) from Hadoop has been used to store biomedical data. Data is stored for data analysis, backup or archiving. Alternatively, storage with database systems provides interrogation and recovery capabilities. For large volumes of heterogeneous data sets, non-relational databases (NoSQL databases) are preferred, providing efficient and flexible interrogation mechanisms.

Data acquisition is an important challenge for the platform as reported by Augustine (2014), so a requirement is low latency in capturing data and using simple queries for data processing. Apache Hadoop offers data processing technology in a distributed and data storage environment at the original location. In the case of clinical data, their analysis requires statistical and exploratory approaches. In order for the clinical data analysis platform to quickly deliver the expected results (cost savings, time reduction, optimized results for different research, smarter diagnostics leading to precise decision-making) it must provide reliability and scalability for data storage and processing according with Augustine (2014). Another challenge in the healthcare industry is to protect patients' data. In biomedical applications also, data security and confidentiality must be taken into account, whether applications are hosted in cloud or traditional environments. When processing large batch data sets, the Hadoop ecosystem is the most widely used architecture. Systems that process a large number of predictive modeling clinical methods use Hadoop to simplify the implementation of

complex activities. The processing of medical images from different sources is a challenge in the healthcare industry as described by Augustine (2014), and Hadoop offers solutions for medical imaging analysis and extracting important diagnostic data.

In all these cases of large data sets analysis, statistical methods, machine learning, NLP (natural language processing) and semantic methods in accordance with Peek et al (2014) should be used. Mainly, these are based on three components of data analysis conform with Wang et al (2016): Hadoop Map / Reduce, stream computing and in-database analytics. Mapreduce is a programming model for processing in batch form and analyzing data in a parallel processing environment. Stream processing supports stream data processing in real time with very useful prediction capability. In-database analytics is a data mining approach which offers parallel processing, scalability and optimization futures for big data analytics as observed by Wang et al (2016). It is a challenge according with Ola and Sedig (2014) for the public health workforce to efficiently use data with different formats that are available for limited periods of time and in transformation. In order to perform operations such as health records, filtering data to eliminate irrelevant data, identifying the relationships between different environmental factors in order to make the best decisions for citizens, there is a need for tools to support them, such as packets for data acquisition, data analysis, data monitoring, and data viewing, and which can be installed on a platform for clinical data analysis as reported by Ola and Sedig (2014).

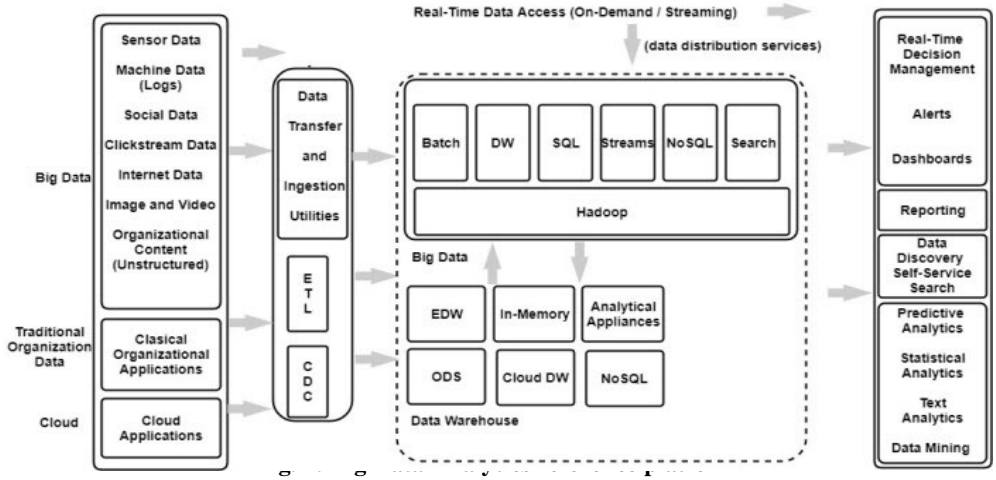
4 Architecture for Big Data Visualization and Analytics

Currently there are clinical decision support systems (CDSS) that assist healthcare professionals in clinical activities, but most do not work with data generated continuously as observed by Balladini et al (2015). Storage space is required to store patient archived data in order to extract knowledge from them and to develop personalized predictive algorithms as mentioned in Balladini et al (2015). The tools used in Big Data Analytics make it easier to store and analyze clinical data.

4.1 The Reference Platform

We selected as a reference the Big Data Analytics Platform presented in Fig 1. The data managed by the platform can be classified in three major categories: Big Data (massive heterogeneous data coming from a large number of devices and/or external sources), Organizational Data (data collected from the applications running in the organization environment) and Cloud Data (data collected from cloud applications outputs). The data transfer to the Big Data platform can be done with specific data ingestion components, ETL (Extract Transfer Load) tools which are used for transforming the data into the format required by the data warehouse, and CDC (Change Data Capture) tools, used for tracking data transfer activities into the warehouse. The Big Data storage system will consist in a Hadoop ecosystem accompanied by a warehouse composed of NoSQL and SQL databases. This warehouse will provide the data for the Mapreduce specific processing and also for different tools like analytical appliances, search engines, data stream engines, batch processing, etc. These tools and utilities support predictive analytics, text analytics, data mining, statistical analytics and data discovery, and will generate reports and alerts for the end users.

In the next sections, we will present our adaptation of a Big Data Analytics Platform for the healthcare domain, along with the tools we consider important for clinical analytics.



(Source: Alberto (2016))

4.2 SQL and NoSQL data integration

Our proposed platform for clinical data analytics features a big data platform capable of storing SQL and NoSQL data, a data analysis tool, a web interface used for visualization of the analyzed data and tools for data acquisition from various medical data sources. The healthcare data used to be acquisitioned by this platform will come from medical equipment, healthcare staff and EHR data of a patient. Medical equipment and the equipment used by the healthcare staff for transferring the data to the platform will connect to an internal gateway which will then send the data to the platform. The EHR data should be stored in real time in the platform. The SQL database will store any SQL type of medical data of the patients and also will include information regarding the caretakers of those patients. The SQL database will be linked to the NoSQL database in order to understand which patient belongs the NoSQL data.

The platform will be connected to a web interface that healthcare staff and patients can access to visualize their reports. The reports will be generated by a data analysis tool that will be used by doctors or data analysts.

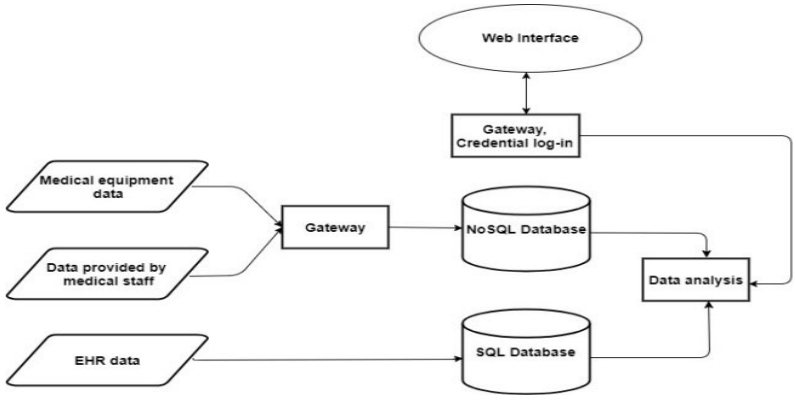


Fig. 2: The proposed architecture for a clinical Big Data platform

As seen in the Fig 2, the medical data sources are: EHR data, which are the patient data from their healthcare state records (such as clinical card), healthcare staff records: the data that the healthcare staff (such as nurses or doctors) will manually introduce based on their observation on a specific patient, and the medical equipment data: gathered directly from medical equipment such as MRI (Magnetic Resonance Imaging) or other clinical equipment used for investigation or measurement of different patient clinical parameters. The EHR data will be send directly to the SQL database because of its structure, while the medical equipment and healthcare staff data will be send to NoSQL database. The gateway is used for connecting the medical equipment in order to store the data provided by them.

The user interface that will permit the visualization of the results of data analysis performed on the proposed platform will be a web interface that permits two types of log-ins (one for the clinical staff and one for patients). This interface will permit patients to review their healthcare records, and permit the healthcare staff/data analysts to review their patients records and various statistics or recommendations that resulted from data analysis performed on the platform. The healthcare staff will also have an option to use the data analysis tool (for example RapidMiner or KNIME).

The data analysis on the platform will be possible to be made across multiple patient records and not only on those of which are patient to a specific doctor. For example, a doctor can choose to analyze the data of his patient against all the patient data of a specific age range, a specific sex type or with some specific diseases. Based on that analysis, the doctor will have the results of all the treatments that had success on a specific disease or will have statistics of future evolution of the specific disease.

4.3 Data analytics in the proposed platform

In the next figure we will present the data analytics flow process in our proposed clinical platform.

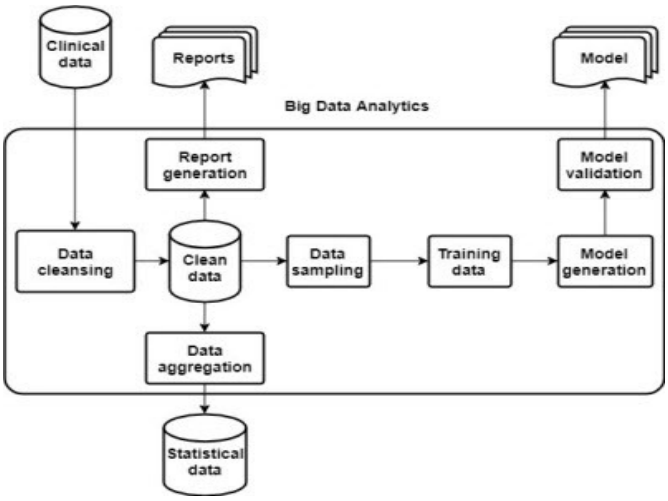


Fig. 3: Data analytics flow process

As we see in Fig 3, the start process of data analytics is the clinical data warehouse. The first step in data analytics is data cleansing. Data cleansing is a process in which the data entered is altered in order to making sure it is correct by amending or removing the incomplete, incorrect or duplicate data. After data cleansing process, the resulted data will be stored in a separate warehouse, that will only contain clean data and reports will be generated stating what data was altered or removed. Using the clean data warehouse, the data aggregation process can sort the clean data for the purpose of obtaining statistical data about patient based on specific variables such as age, profession, sex, type of illness, etc.

Data sampling process refers to the selection of the types of data that needs to be analyzed. For example, a data analyst can select a representative subset of data for further analysis.

The training data process informs the model on how it should work and how it should make decisions, while the model validation will be made by testing the generated model against the testing data. After the validation, a model will be generated for the user review.

5 Conclusions and Future Research

Taking into account the current healthcare situation where the interest in investing in Big Data Analytics and the experience in using analytics is low, the architectural considerations, challenges and key requirements for a Big Data clinical analysis platform have been addressed, to emphasize the benefits that modern technology implementation can bring to health organizations and third parties. Reducing mortality among patients, better quality of life, lowering costs and improving healthcare services are goals that both data scientists and physicians, and government must take into account in day-to-day work.

An analysis of open source components dedicated to such a platform in the form of an experiment will be the subject of further research.

Acknowledgments

This work was supported by the institutional research programme PN 0201, "Systems, technologies, methods and models for knowledge development in ICT/COGNOTIC domains", 2016.

References

Alberto, P. (2016), 'Logical Architectures for Big Data Analytics', <*dv*> *BLOG*, June 23[Blog], Available at: http://www.datavirtualizationblog.com/logical-architectures-big-data-analytics/ (Accessed: 2017-03-13).

Augustine D. P. (2014), 'Leveraging Big Data Analytics and Hadoop in Developing India's Healthcare Services', *International Journal of Computer Applications*, Vol. 89, No 16, pp. 44-50, [Online]. Available at **Error! Hyperlink reference not valid.** (Accessed: 2017-03-13).

Bahga, A. and Madisetti, V. (2016), *Big Data Science & Analytics, A Hands-On Approach*, Arshdeep Bahga & Vijay Madisetti, San Bernardino, CA.

Balladini, J., Rozas, C., Frati, F.E., Vicente, N. and Orlandi, C., (2015), 'Big Data Analytics in Intensive Care Units: challenges and applicability in an Argentinian Hospital', *Journal of Computer Science & Technology*, Vol. 15, No. 2, pp. 61-67, [Online], Available at http://journal.info.unlp.edu.ar/wp-content/uploads/JCST41-Paper-3.pdf (Accessed: 2017-03-13).

Dutton R.P. (2014), 'Registries of the anesthesia quality institute', *International Anesthesiology Clinics*, Vol. 52 No. 1, pp. 1–14.

Kheterpal S. (2014), 'In the land of the blind, the one-eyed man is king', *Anesthesiology*, Vol. 120, No. 3 pp. 523-525, [Online], Available at: **Error! Hyperlink reference not valid.** (Accessed: 2017-03-13).

Kheterpal S. et al. (2013), 'Incidence, predictors, and outcome of difficult mask ventilation combined with difficult laryngoscopy: a report from the multicenter perioperative outcomes group', *Anesthesiology*, Vol. 119, No. 6, pp. 1360–1369, [Online], Available at: http://anesthesiology.pubs.asahq.org/data/journals/jasa/930987/20131200.000022.pdf (Accessed: 2017-03-13).

Ola, O. and Sedig, K. (2014), 'The Challenge of Big Data in Public Health: An Opportunity for Visual Analytics', *Online Journal of Public Health Informatics*, Vol. 5, No. 3, pp. 1-21. [Online], Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3959916/pdf/ojphi-05-e223.pdf (Accessed: 2017-03-13).

Peek, N. Holmes, J. H., and Sun J. (2014), 'Technical Challenges for Big Data in Biomedicine and Health: Data Sources, Infrastructure, and Analytics', *IMIA Yearbook of Medical Informatics*, Vol. 9, No. 1, pp. 42-47. [Online], Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4287098/pdf/ymi-09-0042.pdf (Accessed: 2017-03-13).

Poucke, S.V. et al. (2015), 'Scalable Predictive Analysis in Critically Ill Patients Using a Visual Open Data Analysis Platform', *PLoS ONE* 11(1), [Online], Available at: **Error! Hyperlink reference not valid.**, (Accessed: 2017-03-13).

Raghupathi, W. and Raghupathi, V. (2014), 'Big data analytics in healthcare: promise and potential', *Health Information Science and System*, Vol. 2, No. 3, pp. 1-10. [Online], Available at: https://www.biomedcentral.com/track/pdf/10.1186/2047-2501-2-3?site= hissjournal.biomedcentral.com. (Accessed: 2017-03-13).

Simpao A.F. et al. (2015), 'Big data and visual analytics in anaesthesia and health care', *BJA: British Journal of Anaesthesia*, Vol. 115, No. 3, pp. 350-356. [Online], Available at: https://oup.silverchair-cdn.com/oup/backfile/Content_public/Journal/bja/115/3/10.1093/bja /aeu552 /2/aeu552.pdf (Accessed: 2017-03-13).

Zamfir M. et al (2016): 'Research regarding the use of advanced software tools for analysis and visualization of large datasets', Technical Report (in Romanian), PN16090201 project, ICI Bucharest.
Wang Y. et al. (2016), 'Big data analytics: Understanding its capabilities and potential benefits for healthcare organizations', *Technological Forecasting & Social Change*, [Online], Available at: http://dx.doi.org/10.1016/j.techfore.2015.12.019, (Accessed: 2017-03-13).

Modern Technology and Internet Use In Learning in the Czech Population

Jitka Vaculíková, Research Centre, Tomas Bata University, Zlín, Czech Republic, vaculikova@utb.cz

Abstract

The objective of the current study was to investigate the use of modern technology (i.e., computer, laptop, or tablet) and the internet (i.e., Moodle, Elportal, e-learning and online interactive programs, YouTube, Google or Seznam, etc.) in learning in the Czech population. The research instrument consisted of a self-rate questionnaire developed by the author. The sample consisted of 1,008 participants selected according to gender, age, education, and region of residence to represent the Czech population. The sample scored average in terms of modern technology and internet use while learning. This trend was considerably lower the higher the age, regardless education level. Moreover, females used printed study materials more often than males. The relationship between the use of modern technology, internet, and preferred form of study materials were further examined with selected variables, i.e., gender, age, education level achieved, size of place of residence, region, and economic activity.

Keywords: technology, internet, learning, ICT, Czech Republic

1 Introduction

Modern technologies are one of the basic elements characterizing today's society that are not only products of contemporary time and culture, but also factors that make a significant contribution to society and everyday life. Their ongoing rapid development has allowed their use in all areas of human activity. Younger populations in particular use these technologies extensively during their leisure, work, or learning time. Furthermore, the use of modern technology has become a natural environment for today's youth born into the era of digital life. Today's youth are often referred to as digital learners (Gallardo-Echenique et al., 2005), digital natives (Gottwaldová, 2015), digital youth (McPherson, 2008), or youth of the net generations (Oblinger & Oblinger, 2005).

Although the older generation also uses modern technologies in their lives, the position of these technologies is different. Their social maturation, including the integration of different tools, media, and technologies into behavior patterns and lifestyles took place before those technologies emerged. On this basis, modern technologies are becoming incorporated into existing models of life. As a result, the range of activities such as leisure or working time that are accessible through modern technologies varies by generation. Findings showing the extent that this era of modern technology is reflected in learning for the entire society (from adolescence to old age populations) in the Czech sociocultural environment remain uncertain. Moreover, use of internet not only for social connection and entertainment, but also for academic studies and lifelong learning, has become the aim of presented research studies on the use of modern technology and internet in learning.

The term “modern technology” is defined as the use of a computer, laptop, or tablet during learning activities in various environments, i.e., at home, at school, or in other institutions and environments. The concept of modern technology was chosen for its colloquial meaning, which is generally understood by the whole population and was perceived as a synonym for information and communication technologies (ICT) commonly used in the literature. Furthermore, use of the internet while learning was defined as the use of Moodle – a learning platform designed to provide learners with a single robust, secure, and integrated system creating personalized learning environments (Moodle, 2016), Elportal (an e-learning

portal of courses and all other forms of e-learning), online interactive programs, YouTube, Google, or Seznam, which is a well-known Czech catalog search server.

The process of learning investigated in this research was conceived in congruence with Zimmerman and Schunk (2011) as self-regulatory oriented learning processes, whereby learners personally activate and express cognitions, effects, and behaviors that are systematically oriented toward the attainment of personal goals not strictly tied only to the school environment or formal institutional activities. Moreover, learning in this perspective was considered an intentional process in which an individual had to decide what to learn, when, how, with what tools, and where, i.e., at home, school, online, or offline.

1.1 Implementation of modern technology and internet in the Czech society

Modern technology (ICT) began its integration into the Czech education system in the 1990s. Infrastructure equipment and its use in education, as well as its financing, was at the initiative of individual schools. There was no national program or project at that time to coordinate or methodically manage schools in the integration of digital technologies into their lives. The issue of modern technologies was reflected in public and educational policy only after the creation of documents for the National Education Development Program in the Czech Republic entitled White Paper (MŠMT, 2001), State Information Policy (VČR, 1999), and Concept of State Information Policy in Education (MŠMT, 2000).

Whilst the declarations of the White Paper were very general, the key strategic areas were outlined in the remaining documents. The first area was to ensure the availability of digital technologies (infrastructure) to all learners involved in education (schools, continuing education, or lifelong learning). The second wave of ICT development consisted of the creation of a basic framework for integrating ICT into education at all levels of schooling with a focus on the importance of teacher preparation. An additional document approved by the Ministry of Education, Digital Education Strategy by 2020 (MŠMT, 2014), anticipated the gradual involvement of modern technologies in the formal education. It was in this document that the full incorporation of modern technologies into the teaching of all subjects was seen by the state as a necessary shift within education systems, from the simple memorization of facts to an emphasis on digital literacy, communication skills, and computational and logical thinking (Jelínek, 2015).

The year 1992 is considered to be the beginning of the "internet era" in the Czech Republic (Kasík, 2012). The largest increase in the proportion of households connected to the internet and owning a computer is dated to the year 2008. 67% of households owned a computer and only two percent fewer households were connected to the internet (CSO, 2014b). At the forefront of internet use was the age category of 15 to 30 years, which spent an average of 17 hours a week on the internet (Koledárová & Tomek, 2012). In terms of number of internet users, the population with higher education, i.e. university graduates, were the second most numerous group. Most users (96%) used email, with almost two thirds using it daily. The second most widespread online activity was searching for information. Social networking quickly struggled from the outset to become one of the most popular online activities, however, only 5% of online users used social networks during most of their time spent online (ibid).

The social profile of computer users has changed with advanced ICT implementation. The turning point for the development of computer literacy was the "Internet to Schools" project. The project equipped elementary schools with computers and internet access. This period was also known for "generation inversion," where children taught their parents and grandparents to work on and with computers (Sak, 2000; Arnesh, Erstad, Jahaňák, & Zounek, 2016). Computer literacy and the general availability of technologies were indirectly influenced by age and directly dependent on education and family income. However, with the considerable shift from fixed to mobile internet use (Fišerová & Horáček, 2015) the

absence of a computer or internet connection in the household is nowadays more of an exception. More specifically, mobile internet is preferred by three quarters of connected Czechs (ibid).

1.2 Research on Modern Technology and Internet Use in Education

The attitudes of Czech, Polish, and Slovak university students (n = 260) towards the personal computer and its role in lifelong learning and leisure were compared by Chráska (2014). The findings indicated that the concept of the PC was perceived in a similar way among Czech and Polish students as an irreplaceable means of work, lifelong learning, communication, and leisure time. Moreover, Czech students achieved the highest frequency of use of the PC for educational purposes. The authors attributed this finding to the most extensive use of an online learning management system (LMS) and computer-aided teaching by the Czech university.

Kolesárová (2014) extended the context of use of ICT to include the identification of typical characteristics of lifestyles within the Czech population. A representative sample of the Czech population over 15 years old (N = 1,818) was used. The author identified a cyber-developmental lifestyle that most strongly demonstrated a computerized character, i.e. predominant computer activity while studying. The cyber-developmental lifestyle was associated with life beyond marriage in younger generations (the average age = 23 years) as reflected by female students or university graduates.

The field of ICT research in education has a wide platform of application (Milková, Pekarková, & Salem, 2016) covering the areas of computer-aided personalized and collaborative learning (Mamat & Yusof. 2013), seamless learning systems (Ogata et al., 2015), and online game-based learning in school education (Jong, 2015). Moreover, students benefited from the application of ICT in the learning of foreign languages (Klimová Frydrychová & Poulová, 2014). Also, combining mobile devices (laptops, tablets) and social networks (Facebook, Instagram) was seen as an attractive refreshment of education in schools, increasing pupils' motivation to learn (Maněna, Dostál, Hubálovský, & Hubálovská, 2016).

Moreover, Zounek and Tůma (2014) mapped the representation of ICT in education covered by Czech scientific journals between 1990 and 2012. In twenty-two years, only nine empirical studies and only thirteen survey studies were published. However, these lacked a focus on the learning processes of individuals, their relation to modern technologies, and offered no information as to whether learners used computer skills and knowledge acquired from the school environment outside school and vice versa.

According to the findings of a systematic review of international literature on emerging technology (ET) in education between 2006 and 2016, all studies aimed to improve and transform the different educational processes through the incorporation of ET (Neira, Salinas, & Crosetti, 2017). Out of 288 selected studies the most affected population were students in higher education contexts with the objective of improving critical thinking, followed by problem solving, collaborative work, creative thinking, and decision-making. Qualitative research was the most commonly used methodological approach with Web 2.0 technologies.

Dogruer, Eyyam, and Menevis (2011) concentrated on students' use of internet in their academic studies. The participants (n = 100) were international students who studied at different levels in English Preparatory School. Students believed that they could easily use the internet as an educational tool, an online search engine, or a resource of knowledge and discussion about shared school subjects. However, more sophisticated activities such as the use of educational journals and databases, wikis, and e-learning portals were more problematic.

Since coherent information describing the use of modern technology and internet in studying in a representative sample of the Czech population is still lacking, the primary focus of this research study has been set at the descriptive level. Three main objectives are being investigated. First, to find out to what

extent modern technology (e.g. PC, laptop, tablet, etc.) is used during the learning process by the Czech population, and what characterizes those respondents who never use modern technology while studying. Second, to find out to what extent the internet (e.g., Moodle, e-learning, online interactive programs, YouTube, Google or Seznam, etc.) is used during the learning process by the Czech population and the discipline most commonly studied by respondents online. And lastly, to find out the preferred format of study materials.

2 Methodology

Nowadays the use of modern technology (ICT) and the internet is an integral part of every mature society. As work with computer, laptop, or tablet reaches almost all disciplines, it is finding its way to becoming a mediator in the process of learning. However, the extent to which the Czech population uses modern technology during learning and how this usage is influenced by gender, age, region, education and other socio-demographic variables has not been fully explored. Therefore, the purpose of this study is to fill this gap and bring the following information across a representative sample of the Czech population. More specifically, the research answered the following questions:

(1) To what extent is modern technology (e.g., PC, laptop, tablet, etc.) used for studying within the Czech population? The fact that a number of citizens or groups do not use modern technology is significant in terms of social cohesion and exclusion. Therefore, respondents who never use modern technology while studying were described further.

(2) To what extent is the internet (e.g., Moodle, e-learning, online interactive programs, YouTube, Google or Seznam, etc.) used in studying within the Czech population and what is the most common discipline that respondents study online?

(3) What is the preferred form of study materials?

We also investigated whether there was relationship between use of modern technology, use of internet, and preferred form of study materials against selected variables, i.e. gender, age, education level achieved, size of place of residence, region, and economic activity.

2.1 Research and Data Collection Methods

Given the nature of the research questions the research was based on a quantitative methodological approach using exploratory methods. To gather the data, a survey including selected items developed by the author was part of a wider Omnibus random data collection using a CAPI (Computer Assisted Personal Interviewing) method facilitated by trained interviewers implemented in Autumn 2016.

The survey included socio-demographic items covering gender, age (in years and also expressed in age categories: 15-29 years; 30-44 years; 45-59 years; 60 and up), education (basic; secondary without leaving examination (vocational); secondary with leaving examination; university level education), size of place of residence (up to 4,999 inhabitants; 5,000–19,999; 20,000–99,999; 100,000 and up), region (Prague; Bohemia; Moravia), economic activity (economically inactive vs. active), and professional career specialization (e.g., economics and administration, pedagogy, building construction, etc.).

Specific items were designed to be used in analyses as single items of nominal or interval nature. These variables were considered manifest variables that can be observed directly. More specifically, respondents answered the question concerning the usage of modern technology (e.g., PC, laptop, tablet, etc.) and the use of the internet (e.g., Moodle, e-learning, online interactive programs, YouTube, Google or Seznam, etc.) during their learning process on a seven-point Likert's scale ranging from 0 (*never*) to 6

(*very often*). The findings on internet use during learning have been expanded to identify the field in which respondents most often engaged in their study online. The International Standard Classification of Education (ISCED 1997) was used to select the field of study (i.e., foreign language, computer science, general education programs, etc.). Lastly, preferred form of study materials was investigated (printed study materials; electronic study materials; no preference).

2.2 Data Preparation and Statistical Analysis

Influential multivariate outliers and the possible occurrence of missing values were checked. First, descriptive statistics of the individual socio-demographic variables were calculated. Second, the general assumptions (i.e., level of measurement, random sampling, independence of observation, normal distribution, and homogeneity of variance) that apply to parametric techniques were investigated. The Kolmogorov-Smirnov test and the Shapiro-Wilk test were used to confirm ($p < .05$) the application of nonparametric statistics (U test, K-W ANOVA, Chi-squared test, and Spearman correlation). Effect size for all tests was calculated (η^2, Cramer's V, r^2). The null hypothesis was rejected given the significance level of .05. However, multiple comparisons were checked using Bonferroni correction to reduce the likelihood of incorrect rejection of the null hypothesis (Type I error). SPSS v. 24 was used for all presented analysis.

2.3 Participants

The research sample included a representative sample of the Czech population (N = 1,008). The sample was randomly selected based on quota for gender, age, education, and region of residence. The mean age of the sample reached 45.3 years (SD = 17.05) ranging from 15 to 89 years. The gender distribution was quite even with 482 (47.8%) males with an average age of 44.3 years (age ranged from 15 to 89 years, SD = 17.52) and 526 (52.2%) females with an average age of 46.3 years (age ranged from 15 to 85 years, SD = 16.56). The distribution presented also corresponded to the general gender distribution of the Czech population (CZSO, 2014a).

Most respondents had acquired secondary education either without a leaving examination (37.6%) or with a leaving examination (33%), followed by university (16.2%) and elementary school graduates (13.2%). Almost two-fifths of respondents (37.1%) lived in a place of residence with up to 4,999 inhabitants. More than half of respondents (63.4%) were economically active, with the region of the capital city Prague most represented (12.6%). As far as the professional career specialization of the respondents was concerned, mechanical engineering (117, 11.6%), economics and administration (84, 8.3%), business (66, 6.5%), pedagogy (61, 6.1%), building construction (58, 5.8%), and healthcare (52, 5.2%) were the most frequently profiled professions in the sample. The socio-demographic distribution of the sample is shown in Table 1.

Table 1: Socio-demographic distribution of the sample

Socio-demographic characteristics		Frequency		Socio-demographic characteristics		Frequency	
		N	%			*N*	%
Gender	Male	482	48	Size of place of residence	up to 4,999 inhabitants	374	37
	Female	526	52		5,000–19,999	183	18
Age	15-29 years	224	22		20,000–99,999	239	24
	30-44 years	268	27		100,000 up	212	21
	45-59 years	263	26	Region	Prague	127	13
	60 up	253	25		Bohemia	480	48
Education	Elementary	133	13		Moravia	401	40
	Secondary without leaving examination	379	38	Economic activity	active inactive	639 369	63 37
	Secondary with leaving examination	333	33				
	University	163	16				

Note: For a general overview, relative percentages are presented here and after without decimal places.

3 Results

The level of use of modern technology during learning processes is important information for the future planning of both national and international forms of education. The results of the aforementioned research questions are presented chronologically below.

3.1 To what extent is modern technology (e.g., PC, laptop, tablet, etc.) used during the learning process?

The central values (M = 3.3, SD = 2.44) of the seven-point scale used in the survey ranging from never (point 0) to very often (point 6) lie just above the midpoint of the scale. The results suggest that on average respondents used modern technology while studying. However, two main groups of respondents stood out compared to other respondents included in the survey: (1) those who never used modern technology while studying (276, 27%), and (2) those who on the contrary used PC, laptop, or tablet very often while studying (318, 32%). Apart from these two opposite trends, the middle point three was the point reached most frequently (12%) followed by a high frequency (11%) of answers on the right side of the scale (point five of the seven-point scale).

Age of respondents had a high statistical and interpretive influence on the level of modern technology use while studying. The use of state-of-the-art technology (i.e., PC, laptop, or tablet) was considerably lower the higher the age, regardless of **education level**. This trend was found in all age categories. University graduates, while reaching the highest level of modern technology involvement in their learning, used less modern technology while studying at younger ages.

276 (27%) of the sample size (1,008) **never used modern technology while learning.** More specifically, 47% (129) males and 53% (147) females were represented by the oldest age group (60 years and older). Out of these respondents, 52% (144) of respondents reached secondary education without leaving examination (vocational), followed by 74 respondents (27%) who obtained a diploma from secondary school with leaving examination, 41 (15%) of respondents who completed elementary education, and 17 (6%) university graduates. Based on a comparison of the absence of use of modern technology by region, 22 (8%) lived in Prague, 100 (36%) lived in Bohemia, and 154 (56%) in Moravia. Slightly lower use of

modern technology was shown by economically inactive respondents (153, 55%) vs. economically active (123, 45%).

3.1.1 What is the influence of the selected variables on the level of modern technology use?

The proportion of use of modern technology by **males** (Md = 4, n = 482) was not significantly different from the proportion of **females** (Md = 4, n = 526), U = 126150, z = -.14, p = .891, r = .004. The **age** of respondents reached a statistically significant difference, $x^2(3, n = 1{,}008) = 173.36$, $p < .001$, $\eta^2 = .18$. The youngest age group (15-29 years) recorded the highest use of modern technology while studying. The effect size calculated using Eta^2 showed the percentage of variability in the dependent variable explained by the test variable. It was found that quite high proportions (18%) of the change in modern technology usage could be accounted for by the age of the respondents.

Studying across four different **education** groups also significantly influenced use of modern technology while studying, $x^2(3, n = 1{,}008) = 76.51$, $p < .001$, $\eta^2 = .08$. Higher level of education achieved was associated with higher use of modern technology. Moreover, a larger **size of respondent's place of residence** was associated with higher use of modern technology, $x^2(3, n = 1{,}008) = 12.60$, $p < .01$, $\eta^2 = .01$, with the largest use of modern technology in the **region** of Prague, $x^2(2, n = 1{,}008) = 21.66$, $p < .001$, $\eta^2 = .02$. Lastly, there was a small negative correlation between **economic activity** and use of modern technology while studying (r_{rho} = -.20, $p < .001$, r^2 = 4%). Use of modern technology decreased with economic inactivity.

We also wondered whether the use of modern technology while studying went hand in hand with studying online, and how this usage differed across the age categories of the respondents (see Table 2). The findings showed a large negative correlation between age and use of modern technology while studying (r_{rho} = -.48, $p < .001$, r^2 = 18%) and use of internet (r_{rho} = -.43, $p < .001$, r^2 = 18%). High levels of use of modern technology and online studying were associated with lower age of respondents. A perfect correlation was found between the use of modern technology and use of internet (r_{rho} =.90, $p < .001$, r^2 = 81%). These results were not surprising since the internet can only be used together with modern technology. However, modern technologies such as PC, laptop, or tablet could be used for studying purposes in general without necessarily surfing the internet, i.e. studying online.

Table 2: Average values and intercorrelations between selected variables

Variables	Average values (SD)	Age	Modern technology
Age	45.3 (17.05)	1.000	
Modern technology	3.3 (2.44)	**-.418****	1.000
Internet	3.2 (2.47)	**-.433****	**.901****

** = p < .01.

Moreover, a partial correlation was used to explore the relationship between use of modern technology and internet, while controlling for the most influential variable, i.e. age of respondents. On this basis, the significant partial correlation between use of modern technology and internet, controlling for age, r = .89, n = 1.005, $p < .001$, remained almost unchanged. High levels of modern technology use were associated with high levels of studying online, suggesting that controlling for age had no significant effect on the strength of the relationship between these two variables. Where modern technology was used, the internet was concurrently used by the interviewed respondents as well.

3.2 To what extent is the internet (e.g., Moodle, e-learning, online interactive programs, YouTube, Google or Seznam, etc.) used during the learning process and what is the discipline that respondents most commonly study online?

Respondents used the internet on average (M = 3.2, SD = 2.47) as a learning tool. Likewise, as presented above in relation to use of modern technology, there were two main groups of respondents: (1) those who never used the internet while studying (294, 29%), and (2) those who used it very often (317, 31%). The age of the respondents had a high interpretive influence on the level of the internet use while studying. The youngest age category (15-29 years) used the most internet on average while learning (e.g., Moodle, e-learning, online interactive programs, YouTube, Google or Seznam, etc.).

Most of the respondents **devoted their online studying** to developing personal skills (213, 10%), studying foreign languages (192, 9%), using computers (101, 5%), and (98, 5%) to trade, management, and administration (finance, banking, insurance, accounting and taxation, etc.).

3.2.1 What is the influence of the selected variables on level of internet use?

There were no significant differences in the use of internet between **males** and **females**, U = 124391, z = -.53, p = .60, r = .02. However, statistically significant differences in use of internet were detected across four different **age** groups, $x^2(3, n = 1{,}008) = 179.63$, $p < .001$, $\eta^2 = .18$, with greater use of internet associated with younger age (see Table 3).

Table 3: Examining use of internet according to gender and age

	Gender		Age							
Variable	male	female	15-29	30-44	45-59	60+	r	p	x^2	p
Internet	3.2	3.2	4.5	3.9	2.9	1.7	.02	.596	179.63	**.000*****

*** = $p < .001$.

Education level achieved also influenced the use of internet, $x^2(3, n = 1{,}008) = 67.16$, $p < .001$, $\eta^2 = .07$. Respondents with a university degree used internet to the greatest extent. **Size of respondents' place of residence** was not associated with a difference in the internet use, $x^2(3, n = 1{,}008) = 7.02$, $p = .071$, $\eta^2 = .01$. Furthermore, the findings revealed a statistically significant difference in use of internet while studying across three different groups of the **region**, $x^2(2, n = 1{,}008) = 12.26$, $p < .01$, $\eta^2 = .01$. Those respondents who lived in Prague reached the highest level of internet use for studying. Moreover, there was a small negative correlation between **economic activity** and use of internet while studying ($r_{rho} = -.18$, $p < .001$, $r^2 = 3\%$), with high levels of internet use associated with economically active respondents.

3.3 What is the preferred form of study materials?

The area of modern technologies and internet is also related to preference for type of study materials (i.e., printed or electronic). Therefore, it was tested whether (1) respondents have a preference and, if so, whether (2) this preference was influenced by the gender, age, or education level achieved of the respondents.

3.3.1 What is the influence of the selected variables on the preferred form of study materials?

In general, a quarter of respondents (257, 25%) had **no preference** for study materials. Half of the respondents (525, 52%) **preferred printed** study materials and the last quarter of respondents (226, 22%) **preferred electronic** study materials. The proportion of **males** was significantly different from the proportion of **females** in their preference of type of study materials, $x^2(2, n = 1{,}008) = 12.24$, $p < .01$,

Cramer's V = .11. Females used traditional printed materials more often than males and vice versa (see Figure 1). Also, the **oldest** respondents (60+ years) preferred printed study materials, which were on the other hand the least preferred form by the youngest respondents. The opposite trend can be seen in electronic study materials (see Figure 2). These differences were statistically significant, $x^2(6, n = 1{,}008) = 53.78$, $p < .001$, Cramer's V = .16. Although both differences were statistically significant, the strength of the relationship (a post-test Cramer's V = .11 and .16) indicated that the relationship was weak. Knowing the independent variable (i.e. gender and age) did not help in predicting the dependent variable (i.e. preferred form of study materials).

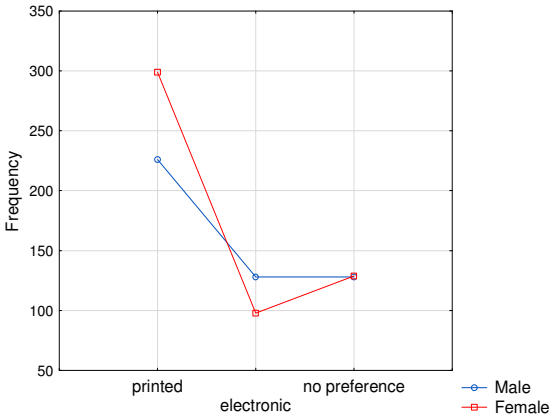


Fig 1. Absolute values of preference of study materials by gender

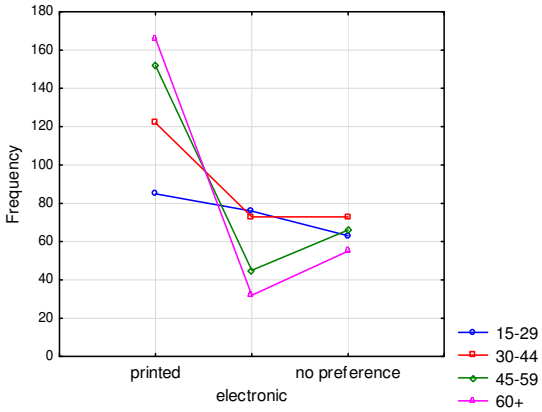


Fig 2. Absolute values of preference of study materials by age

Surprisingly, there were no significant differences between **education** groups and respondents' preference of form of study materials, $x^2(6, n = 1{,}008) = .86$, $p = .99$, Cramer's V = .02. However, in general printed materials were the most preferred from of study materials across all levels of education.

3.4 Research summary

The data revealed the following basic findings. On average, the Czech population (N = 1,008) uses modern technology and the internet while studying. However, there were two main groups of respondents. The first consists of those who never use modern technology or the internet while studying. The second consists of those who, on the contrary, use PC, laptop, tablet, and internet very often. The use of state-of-the-art technology (i.e., PC, laptop, or tablet) and the internet was considerably lower the higher the age, regardless of education level. Such a trend was found in all age categories. University graduates, although reaching the highest level of the modern technology and internet involvement, used less modern technology and internet sources while studying at younger ages. This finding highlights the fact that respondents born around the year 1957 and older most likely missed the era of rapid development of modern technology and are unable to catch up to this trend.

A third of the research sample never used modern technology while studying. Respondents aged 60 years and older represented the most frequent age category opting not to use PC, laptop, or tablet while studying. Surprisingly, respondents who never used modern technology while studying had most often achieved higher than elementary education, however, with just a few university graduates. Half of the respondents who did not use PC, laptop, tablet, or other modern technology while studying lived in Moravia, followed by respondents from Bohemia, with the lowest proportion of respondents from the capital city Prague. According to our data, the economic activity of the respondents did not have a

significant impact on those who never used modern technology while studying, indicating the financial accessibility of modern technology.

Out of the selected variables, age of respondents most strongly influenced the use of modern technology and internet while studying. Correspondingly, belonging to an age category helped explain 18% of the variance in modern technology and internet use while studying (see Table 4). Moreover, education, region, and economic activity significantly varied the level of use of modern technology and the internet. Size of respondent's place of residence also influenced the use of modern technology. The largest use of modern technology was detected among respondents with the largest size of place of residence (100,000 up). In contrast, gender did not vary the use of modern technology and internet as learning tool. However, in the case of preferred from of study materials, females used traditional printed materials more often than males and vice versa. Also, the oldest respondents (60 and up) preferred printed study materials, which in contrast were the form least preferred by the youngest respondents (up to 29 years). Although the differences in preferred form of study materials were statistically significant, the strength of the relationship indicated that the relationship was weak.

Table 4: Summary of test criteria and effect of size of tested variables on modern technology and internet use

Variables	Gender		Age		Education		Size of place of residence		Region		Economic activity	
	p	*r*	*p*	η^2	p	η^2	p	η^2	p	η^2	p	r^2
technology	.891	.01	**.000**	.18	**.000**	.08	**.006**	.01	**.000**	.02	**.000**	4
internet	.596	.02	**.000**	.18	**.000**	.07	.071	.01	**.002**	.01	**.000**	3

Furthermore, most of the respondents used internet while studying to develop personal skills, pick up a foreign language, learn how to use computers, or for future development in the fields of finance, banking, insurance, and accounting.

The research presented has several potential limitations. The first concerns the selected research technique. The questionnaires used measured probable statements by the respondents instead of real study activity. However, a general disadvantage of such an approach is the loss of control over the reliability of the data. This deficiency was balanced by the selection of a representative sample. The second limitation can be seen while working with nominal data in the form of comparison of frequencies (Chi-squared test). The results will always copy the proportion of the frequencies of nominal categories by gender, age, and other selected variables. However, the proportions in the data correspond to the proportions existing in the population. Lastly, it should be noted that in large data sets even small differences show high statistical significance. However, the post-tests were checked and interpreted. Despite all the limitations mentioned the presented findings represent unique information in the field of modern technology, internet, and type of study materials use in the Czech environment.

Conclusion

The current young generation is the first generation that is growing up and socially maturing through new technologies and social networking. Such a development creates differences across generations and makes a significant difference between those who have become familiar with new technologies in a later stage of life. This trend was also reflected by the predominance of the younger generation in the most affected age category by technology development (Kolesárová, 2014).

The competencies needed for the successful self-realization of each individual are different, and the ways in which these competencies can be achieved and developed nowadays differ considerably. Without a doubt, modern technology plays a crucial role and creates the need to re-evaluate educational goals and change practices in the education system. The Vision of the Digital Education Strategy by 2020 (MŠMT,

2014) is that the education system will ensure that every individual without discrimination will achieve the highest possible competencies that will enable him or her to succeed in the present and future information society through the option to use open education in the context of lifelong learning. Despite this effort, the current centralized education system has not responded with sufficient flexibility to information development.

The aim of this study was to find out how the Czech population uses modern technologies and the internet in learning. The results broaden the knowledge in an area still affected by new challenges and untapped opportunities. Hence, new initiatives are emerging (Arnesh, Erstad, Jahaňák, & Zounek, 2016) calling for increased attention to this area and motivating further theoretical and research activity in the area of ICT in Czech education.

References

Czech Statistical Office. (2014a). *Population by sex, age and marital status.* [online]. Prague: CZSO. [1. 6. 2017]. Retrieved from https://www.czso.cz/documents/10180/20541835/30000414k01.pdf/1a3310e8-ed0f-43f6-a0c7-f5871b963cb2?version=1.1

Czech Statistical Office. (2014b). *The Czech Republic since 1989 in numbers. Tab. 08.03 Computer and internet in Czech households.* [online]. Prague: CZSO. [22. 6. 2017]. Retrieved from https://www.czso.cz/documents/10180/36785880/32018115_0803.pdf/e47bfcbe-43fc-4509-897a-5c9da280d5ca?version=1.1

Dogruer, N., Eyyam, R. and Menevis, I. (2011), 'The use of the internet for educational purposes,' *Procedia - Social and Behavioral Sciences,* 28 (1), 606-611. doi:10.1016/j.sbspro.2011.11.115

Fišerová, M. and Horáček, J. (2015), 'Mobilní internet využívají už tři čtvrtiny "připojených" Čechů, říká šéf unikátního průzkumu,' *Ekonom*, 59 (46), 12-18.

Gallardo-Echenique, EE., Marqués-Molías, L., Bullen, M. and Strijbos, J. (2005), 'Let's talk about digital learners in the digital era,' *The International Review of Research in Open and Distributed Learning,* 16 (3). Available at: http://www.irrodl.org/index.php/irrodl/article/view/2196/3337

Gottwaldová, R. (2015) 'Digitální domorodci,' *Psychologie dnes,* 21 (11), 32-33.

Government of the Czech Republic. (1999). *State Information Policy*. Prague: VČR. [23. 6. 2017]. Retrieved from https://www.vlada.cz/cz/clenove-vlady/historie-minulych-vlad/statni-informacni-politika---cesta-k-informacni-spolecnosti---dokument-2089/

Chráska, M. (2016) 'The Personal Computer and its Position in Lifelong Learning and Leisure of University Students in the Czech Republic, Slovakia and Poland,' *Anthropologist,* 24 (1), 284-291.

Jelínek, I. (2015) 'Digital Education Strategy for the Czech Republic,' *IT Professional,* 17 (5), 8-11. doi:10.1109/MITP.2015.85

Jong, M S Y. (2015) 'Does online game-based learning work in formal education at school? A case study of VISOLE,' *The Curriculum Journal,* 26 (2), 249-267. doi:10.1080/09585176.2015.1018915

Kasík, P. (2012) '*Český internet slaví 20. narozeniny, vzpomíná na skromné začátky* [Czech Internet celebrates 20th birthday, recalls humble beginnings],'. [22. 6. 2017]. Retrieved from http://technet.idnes.cz/cesky-internet-slavi-20-narozeniny-vzpominana-skromne-zacatky-p7u-/sw_internet.aspx?c=A120213_000221_sw_internet_pka

Klimová Frydrychová, B and Poulová, P. (2014), 'ICT as a motivational tool in the learning of foreign languages,' *Proceedings of the 2014 International Conference on Educational Technologies and Education*, 53-56. Retrieved from http://www.inase.org/library/2014/interlaken/bypaper/EDU/EDU-06.pdf

Koledárová, K and Tomek, I. (2012), '*Využití počítače a internetu. Zpráva z výzkumu,*' [online]. Prague: ČSÚ. [23. 6. 2017]. Retrieved from https://www.slideshare.net/Lupacz/zprava-vyzkum-digitalizacexvlna2012internetfin-18068470

Kolesárová, K. (2014) Information and Communication Technologies in the Lifestyle of the Czech Population, Charles University, Prague.

Mamat, N and Yusof, N. (2013), 'Learning Style in a Personalized Collaborative Learning Framework,' *Procedia - Social and Behavioral Sciences,* 103 (26), 586-594. doi: 10.1016/j.sbspro.2013.10.376

Maněna, V., Dostál, R., Hubálovský, Š. and Hubálovská, M. (2016), 'Increasing Pupils' Motivation on Elementary School with Help of Social Networks and Mobile Technologies,' In K. Verbert, M. Sharples, T. Klobučar (eds), *Adaptive and Adaptable Learning. EC-TEL 2016*, pp. 610–613. Cham: Springer.

McPherson, T. (2008) Digital Youth, Innovation, and the Unexpected, The MIT Press, Cambridge.
Milková, E., Pekarková, S. and Salem, Abdel-Badeeh M. (2016), 'Information and Communication Technology in Education – Current Trends,' *MATEC Web of Conferences*, 76, 1-7. doi:10.1051/matecconf/20167604022

Ministry of Education, Youth and Sports of the Czech Republic. (2001). *White Paper.* [online]. Prague: MŠMT. [23. 6. 2017]. Retrieved from http://www.nuv.cz/uploads/nuv/strategicke/Bila_kniha_2001.pdf

Ministry of Education, Youth and Sports of the Czech Republic. (2000). *Concept of State Information Policy in Education*. [online]. Prague: MŠMT. [23. 6. 2017]. Retrieved from http://www.fi.muni.cz/~smid/sipvevz1.html

Ministry of Education, Youth and Sports of the Czech Republic. (2014*). Digital Education Strategy by 2020*. [online]. Prague: MŠMT. [23. 6. 2017]. Retrieved from http://www.vzdelavani2020.cz/images_obsah/dokumenty/strategie/digistrategie.pdf

Moodle (2016). *About Moodle*. [online]. Retrieved from https://docs.moodle.org/33/en/About_Moodle
Neira, E. A. S., Salinas, J. and Crosetti, B. de B. (2017), 'Emerging Technologies (ETs) in Education: A Systematic Review of the Literature Published between 2006 and 2016,' *International Journal of Emerging Technologies in Learning,* 12 (5), 128-149. doi: 10.3991/ijet.v12i05.6939

Oblinger, GD and Oblinger, J. L. (2005), '*Educating the Net Generation*. Boulder,' CO: EDUCAUSE. Available at https://net.educause.edu/ir/library/pdf/pub7101.pdf

Ogata, H., Uosaki, N., Li, M., Hou, B. and Mouri, M. (2015), 'Supporting Seamless Learning Using Ubiquitous Learning Log System,' In L-H. Wong, M. Milrad, & M. Specht, *Seamless Learning in the Age of Mobile Connectivity* (pp. 159–179). Singapore: Springer.

Sak, P. (2000) Changes of Czech Youth: Czech Youth in the View of Sociological Research, Petrklíč, Prague.

Zimmerman, BJ and Schunk, D. H. (2011), 'Self-Regulated Learning and Performance. An Introduction and on Overview,' In B. J. Zimmerman & D. H. Schunk (Eds.), *Handbook of Self-Regulation of Learning and Performance* (pp. 1-12). New York: Routledge.

Zounek, J and Tůma, F. (2014), 'Problematika ICT ve vzdělávání v českých pedagogických časopisech (1990–2012),' *Studia paedagogica,* 19 (3), 65-87.

Assessment of Competitiveness of Russian Companies In the Field of Information Technology

Darya A. Baeva, South Ural State University, Chelyabinsk, Russia, baevada@susu.ru
Elena V. Kuchina, South Ural State University, Chelyabinsk, Russia, kuchinaev@susu.ru
Pavel P. Lutovinov, Ural Socio-Economic Institute Branch of Academy of labor and social relations, Chelyabinsk, Russia, kuchinaev@susu.ru
Sergei V. Aliukov, South Ural State University, Chelyabinsk, Russia, alysergey@gmail.com

Abstract

The development of the service sector is an outstanding feature of the world economy. In the non-favorable economic environment and increasing competition the main goal of Russian companies in the sphere of services is to increase their competitiveness. The solution of this problem requires the formation of a methodical approach to assessing and analyzing the real state of the competitiveness of enterprises. The article describes main features of the IT-service sector (the most promising and dynamically developing sectors of the Russian economy) and main problems of IT companies' activity. Practical methods for assessing the competitiveness of service enterprises are analyzed, and the disadvantages of these methods are revealed. A methodical approach to assess the competitiveness of IT companies is proposed, which takes into account the features of companies' functioning and includes an objective and labor-saving procedure of evaluation. At the first stage of the study factors determining the competitiveness of an IT company are defined: current efficiency and adaptability. The main characteristics of the factors are considered and their impact on competitiveness is analyzed. The key role of an adaptive component, used in evaluation of the competitiveness of IT companies in a rapidly changing external environment is proved. The adaptability of the enterprise is analyzed using the example of the 20 most successful Russian IT companies in terms of market share dynamics, and a graphic interpretation of the assessment is pro-vided by building a competitive field. The position of each company in the competitive field is revealed, a map of strategic groups is drawn up for quantifying the competitive position of competing enterprises. Analyzed enterprises are divided into the following groups: leaders, unstable leaders, persecutors and laggards. Based on the results of the competitiveness assessment, it was suggested to develop measures for further developing or changing the competitive position of a particular company in accordance with identified challenges.

Keywords: service sector, IT-sector, IT-industry, assessment of competitiveness, current efficiency.

Introduction

The service industry is one of the most promising and rapidly developing sectors of the economy. Analysis of international trends indicates an increasing role of services in the economies of many countries (for example, such countries account for more than 70% of GDP of the European Union (Growth, 2017)). The most rapidly developing sector is business services sector, which is presented by the following types: audit, research, logistics, information, marketing, advertising, consulting, etc. A significant growth in business services sectors is determined during last decade due to the growth of the transactional sector of the economy.

For its sustainable development service providers must promptly and adequately respond to all of the changes in the external and internal environment. A special role belongs to the companies operating in one of the most dynamically developing sectors of modern economy – the information technology sector (IT services).

In a rapidly changing external environment the importance of efficiency management mechanisms for such companies is significantly increased. These circumstances lead to the strengthening of the role of research and development aimed at improving the competitiveness of enterprises operating in the field of information technology as the most important for ensuring innovating development and growth of the Russian economy. Ensuring the competitiveness of enterprises in the sphere of IT-services is a challenging, dynamic and complex process requiring the adoption of rational management decisions. These decisions should be based on an assessment of the real state of the enterprise's competitiveness, which allows identifying the main problems of activity and outlining the ways of their solutions. The determination of the evaluation method of competitiveness of such enterprises should be specific to their activities, associated with the need for rapid reaction to changes in the external environment. The relevance of this study is determined by insufficient knowledge of practical and theoretical aspects of ensuring the competitiveness of enterprises in the information sector, as well as problems for effective implementation of the necessary tools of competitiveness.

The State of the Sector of Information Technologies

At present, the volume of the world information technology market is estimated at more than 1.7 trillion. US dollars, it is included in 25% of the fastest growing large markets in the world economy (Strategy, 2013). Information technologies increasingly penetrate into every industrial sector; their consumers are both end customers and corporate clients. Prospects for the development of the IT services sphere are connected not only with the expansion and involvement of an increasing number of industries and companies, but also with the constant need of existing users in support, updating and modernizing of used informational solutions.

IT industry has experienced two fundamental changes in the paradigm of its development, which is reflected in the theory of the three platforms (Jackson, 2014), the features of each of which are presented in Table 1, over relatively short time of IT sector existence. The transition from one platform to another is accompanied by a significant reversal both in technology development and in the user's new demand for certain types of equipment and information solutions provoked by new technologies.

Table 1: stages of IT industry development

Number of platform	Main characteristic	Amount of users
The first platform	Using mainframe and terminals	Thousands of users
The second platform	Usage of personal computers, Internet, client-server architecture	Millions of users
The third platform	Widespread use of mobile devices, big data, cloud services and social technologies	Billions of users

Such variability of demand and the market dependence on the introduction of new technologies is one of the main features of the IT industry, defining the direction of competition and the basic competitive advantage of existing companies. In conditions of a sharp change in the paradigm of the industry development some companies, with relatively high inertia and without ability to adapt to changes in the environment, leave the market. Another part of companies for continuing its development has to change after the market or, more preferably, to form changes of the market by itself. In the case of the company's adaptation, serious changes await all areas of its activity, up to a change of mission as the essence of the strategic vision. So, one of the most striking examples is the change in the mission of Microsoft in the transition of the industry to the third development platform.

It should be noted that for the information technology industry changes in a very high level are becoming routine, while in traditional industries cardinal breaking is extremely rare and takes a long time. An example is the change in the technological order during the industrial revolution. Change of players in the market also has been quite slow and sometimes fall into complete life cycle of the company. Today the IT industry that seemed to "tectonic shift" on a planetary scale is in everyday reality, so companies can't justify their failures critical scale and nature of the changes, and must be prepared to manage their competitiveness in a rapidly and significantly changing environment. For Russian IT companies (figure 1) the situation is complicated by the fact that they operate in adverse economic conditions. Medium - and short-term forecasts of development of Russian IT-market is far from optimistic. It is expected significant reduction of effectiveness, including by reducing the presence of foreign companies (TAdviser.ru, 2016). This is explained, on the one hand, the continuing decline of the Russian economy that makes consumers reduce their budgets, but on the other hand, competitive pressure from global IT companies (figure 1).

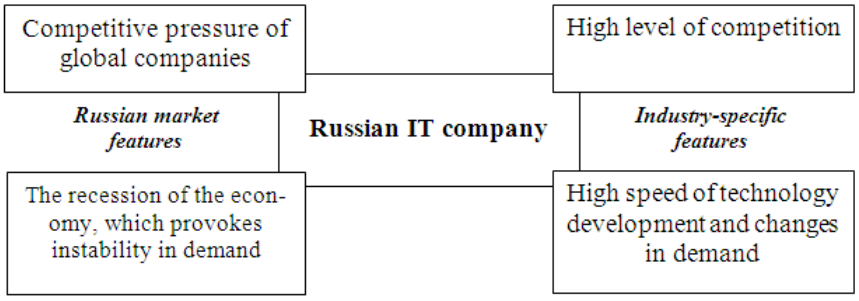


Fig.1. External factors influencing the activities of Russian IT companies

Domestic IT industry satisfies the requirements of the Russian market by less than a quarter, and largely due to service provision segment. Approximately 25% of all the software and about 80% of all IT services are produced in the domestic market, but all of domestic demand in the segment of providing equipment is fulfilled by imports.

In Russia, service companies are widely represented, which operate not only in the domestic market, but also in the markets of Europe, the United States and other countries.

Due to the high degree of variability of technology and demand for IT companies it is extremely important to be at the forefront in terms of technology, which is quite possible in the conditions of a constant inflow of financing and high rates of development of the industry. In this sense, the decline in demand in the Russian market amid growing global market is extremely unfavorable for Russian companies, since companies lose existing and potential competitive advantages due to falling volumes of financing of promising developments. In addition, we should note a higher initial level of development of the global companies (registered primarily in the US), which initially puts Russian firms in the position of "catch-up", and as practice shows, from the position of “catch-up” it is easy enough to move to the position of "laggards."

An objective assessment of Russian companies’ level of competitiveness for competent management should be provided in each specific period of time.

Methodological approach of evaluating of competitiveness of Russian IT companies

Based on the analysis of the conceptual framework, given in the publications of Russian researchers (Metelev, 2009; Pogonev, 2010), under the competitiveness of the organizations in business services sector we understand the superiority over competitors on a selected market segments in specific period of time determined by the range and quality of services, as well as the share of a particular market segment and competitive potential.

Studies show that currently in Russia there is no generally accepted methodology for assessing the competitiveness of enterprises in the sphere of business services. In general, the assessment is based on the same parameters as for industrial enterprises (Kuchina, 2016). Existing approaches can be divided into two large groups:

1. Approaches that assess the competitiveness of an enterprise on the basis of its financial performance;
2. Approaches based on the assessment of the competitive advantages of the enterprise with the help of expert assessments.

The authors believe that financial indicators reflect the current position of the enterprise in the existing environment, and competitiveness is defined as a dynamic concept. Therefore, only financial indicators are clearly insufficient for evaluating and forecasting the competitiveness of companies. Evaluation and calculation methods based on expert (ballroom) assessment allow you to compare competitors; however, these methods require the use of mathematical methods, which are quite complicated and expensive.

In this context, a methodical approach is proposed, which includes an objective and not-time-consuming procedure for assessing the competitiveness of IT companies using a small amount of initial information.

At the first stage of the study, which based on the previously noted features of the functioning of Russian IT companies, factors of companies' competitiveness are determined (figure 2).

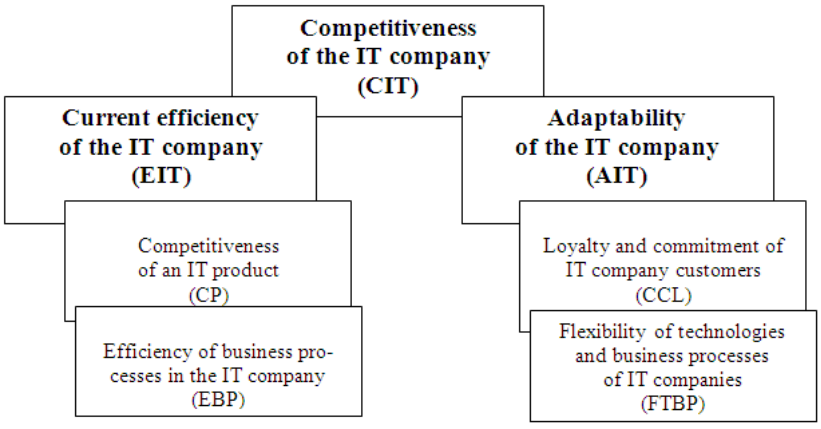


Fig.2: Factors determining the competitiveness of IT company

Current efficiency of IT companies is determined by the competitiveness of the IT product and the efficiency of business processes. To assess the competitiveness of the product there are indicators reflecting the performance characteristics of the product (usability, speed, productivity, reliability, etc.), product perception characteristics (design, image, etc.), infrastructure characteristics (support conditions, service level, availability modifications, etc.). The price of consumption of the product is formed under the influence of the following indicators: the price of its acquisition, the cost of operation and support, the cost of refusing to use it.

Evaluation of the effectiveness of business processes is conducted in three areas:

1. Efficiency of the use of resources (indicators of profitability and asset turnover, labor productivity, etc.);
2. Organization of flows and processes (coefficients of the rhythm of processes, indicators of supply and sales reliability, indicators of progressiveness of applied technologies, etc.);
3. Satisfaction of counterparties (the share of constant suppliers, the density of receipt of complaints, the turnover rate of staff, the characteristics of the credit history of the enterprise, etc.).

The current efficiency is related to the transformation of the strategic business process of competitiveness management into the operational one (Agilemanifesto.org., 2017).

The most important criterion of competitiveness is the ability to respond quickly to changes in the dynamically developing external environment. Therefore, the next important phase of evaluation of competitiveness of an enterprise is the analysis of the potential component of the competitiveness, namely, the adaptability of the enterprise. This indicator determines the ability of the enterprise to maintain its sustainability and the main development strategy in the conditions of changing the external environment and use the opportunities provided by these changes.

Adaptability of the IT company is a basic element of competitiveness. It consists of two characteristics: 1) the loyalty and commitment of customers; 2) the flexibility of the technology and business processes. The first characteristic of adaptability can be attributed to ways to ensure the company's sustainability to certain barriers that hinder the negative impact of global market changes on the performance of the company. Such braking in conditions of high speed and the likelihood of changes may not be so critical for the enterprise, since it gives time for adaptation and integration into new conditions without losing the main part of the client base. One of the most powerful tools for retaining and attracting clients strategically is definitely the strong brand of the company.

The second characteristic of adaptability demonstrates the company's ability to promote technology and business processes that are most attractive to its business in a changing environment. It should be noted there are several main areas of flexibility:

1) Diversification of the product portfolio as sold products and products under development.
2) Innovative products which give a good chance to be in the forefront of the market in a situation of the emergence of new technologies shaping the changing demand of users.
3) Daily use of flexible business processes that are focused on:
- constant monitoring of trends in technology and changes in consumer demand;
- simplification of procedures and speeding up the adoption and passing of managerial decisions related to the adaptation of the company to environmental changes;
- maintenance of technical, technological and organizational capabilities of the company's adaptation to environmental changes.

Authors believe that it is advisable to analyze the adaptive component of competitive-ness, using the indicator of market share dynamics for an objective assessment of the competitiveness of IT companies. The main advantage of this assessment is the high speed and ease of information collection.

The assessment of competitiveness based on the rating of Russian IT companies, included in the first twenty by the end of 2016 should be considered firstly (Ranking TAdviser100, 2017). The main indicator of the rating is revenue and its dynamics over the past few years. The set of the first 20 companies is made due to the fact that they own more than 83% of total revenue of one hundred the largest Russian IT companies. Table 2 presents the results of calculations of the relative market share of these companies in dynamics, and figure 3 shows its graphical interpretation.

Table 2: stages of IT industry development

Name of company	2016 year	2015 year	2014 year	Name of company	2016 year	2015 year	2014 year
1. Rosteh	19,27	21,73	21,62	11. RRC Group	2,71	3,57	3,14
2. NKK	15,72	14,53	16,09	12. SAP CIS	2,53	2,49	2,23
3. Lanit	10,98	10,60	10,80	13. Compulink	2,16	2,01	2,23
4. Softline	5,49	4,90	4,49	14. Asteros	2,05	1,97	2,38
5. TechnoServ	5,03	5,34	5,34	15. Sbertech	1,95	1,57	1,22
6. Kaspersky Laboratory	4,14	3,89	3,09	16. Infosystems Jet	1,84	1,69	1,70
7. 1S	3,58	3,71	3,81	17.Optima	1,51	1,25	1,32
8. ITG	3,50	3,67	3,93	18. Envision Group	1,26	1,33	3,31
9. I-Techo	2,85	2,95	2,81	19. Satel	1,24	1,20	0,00
10. Krok	2,73	2,84	3,12	20. AT Consulting	1,14	1,27	1,22

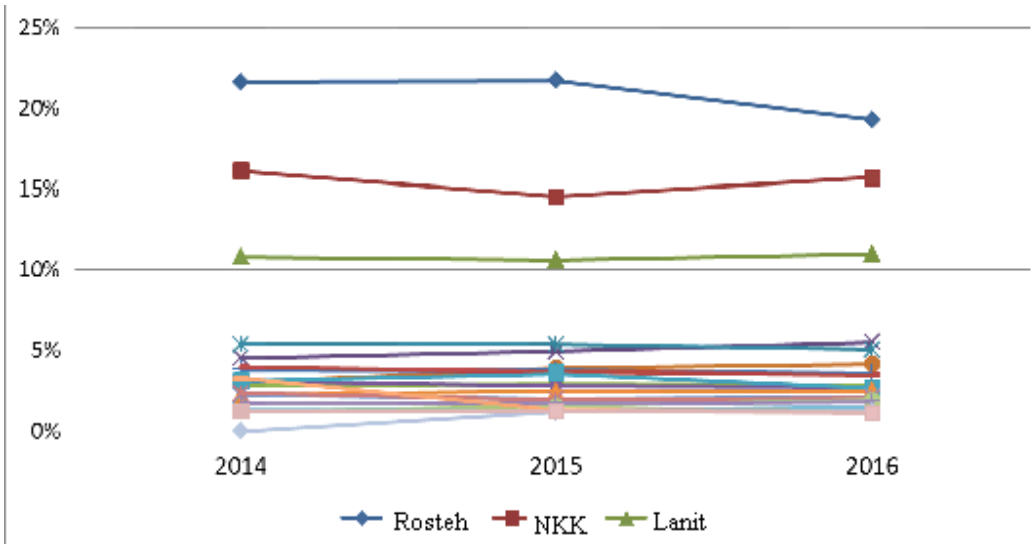


Fig.3: Dynamics of the relative market share of IT companies (top-20)

The presented data indicate the presence of three permanent leaders (Rosteh, NKK, Lanit), whose positions remain unattainable for the nearest competitors during the time being investigated. The dynamics of the relative market share of the remaining seventeen companies (positions 4-20 in the rating) is shown in figure 4. The majority of the companies has unstable dynamics, which indicates their insufficient adaptability.

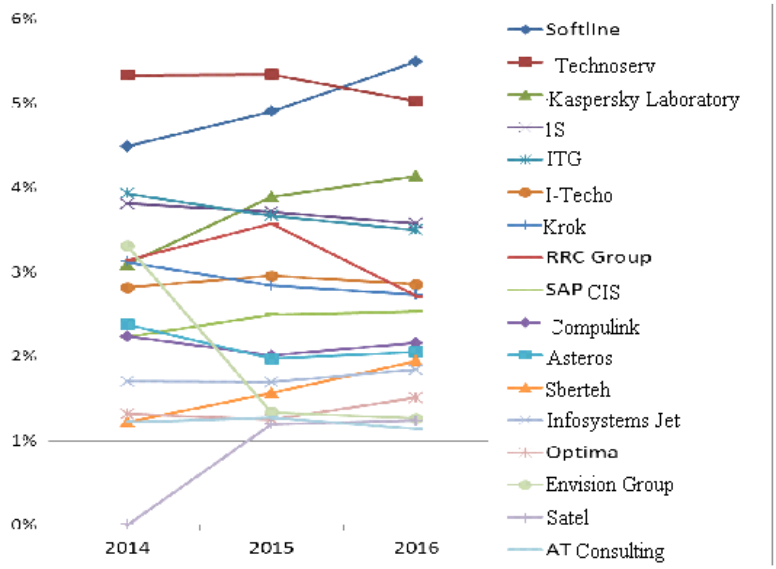


Fig.4: Dynamics of the relative market share of IT companies (positions from 4 to 20)

According to the calculated values of chain growth fractions (Table 3), we can distinguish:

- a group of relatively prosperous companies that demonstrate growth of up-market (1 - 5);
- a group of companies with a stable negative dynamics of market share change (17-20);
- a group of unstable companies, where all of the leaders are (6-16).

Table 3: Chain Growth of Relative Market Share, Points

Name of company	2016 year	2015 year	Name of company	2016 year	2015 year
1. Softline	0,59	0,41	11. Optima	0,26	-0,07
2. Kaspersky Laboratory	0,25	0,80	12. Rosteh	-2,46	0,11
3. SAP CIS	0,04	0,26	13. TechnoServ	-0,31	0,01
4. Sbertech	0,38	0,35	14. I-Techo	-0,10	0,14
5. Satel	0,04	1,20	15. RRC Group	-0,86	0,43
6. NKK	1,18	-1,56	16. AT Consulting	-0,13	0,05
7. Lanit	0,38	-0,19	17. 1S	-0,14	-0,10
8. Compulink	0,15	-0,22	18. ITG	-0,17	-0,26
9. Asteros	0,08	-0,41	19. Krok	-0,10	-0,28
10. Infosystems Jet	0,14	-0,01	20. Envision Group	-0,07	-1,97

To analyze the competitive situation in the IT market, we will assess the demonstrated competitiveness of the company based on comparison of market share and its dynamics (Baeva, 2010). Competitiveness assessment is carried out by a graphic method based on the construction of a competitiveness field consisting of four quadrants: in the quadrant "unstable leaders" there are companies with a high market share (vertical axis), but demonstrating its negative dynamics (horizontal axis); quadrant "leaders" should include companies with both high market share and positive growth; "laggards" are market participants with a declining small share; "catch-up" are companies that currently have a minor, but growing, share of the market, making them contenders for the leadership (figure 5).

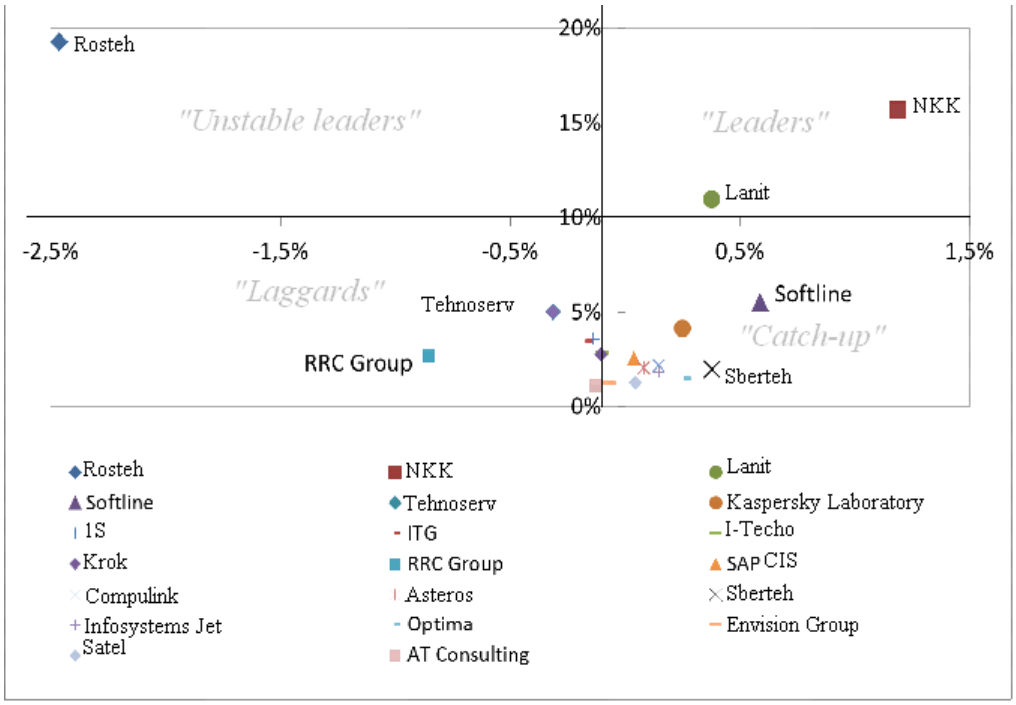


Fig.5: Distribution of IT-companies by the level of competitiveness in 2016

In the presented field of competitiveness there are three leaders of the industry: the NKK, Lanit and Rosteh. The first two companies show positive growth, the third one – negative. Despite the fact that the decline in market share of Rosteh is the maximum, this company remains the largest company in the whole market, and it allows taking her to the group of "unstable leaders". Most companies with insignificant market share are concentrated near the vertical axis, showing an increase close to zero. The affiliation of such companies to the group of "pursuers" or "laggards" is very conditional. In the group of "laggard" RRC Group can be identified; in the group of "laggards" there are Softline, Sberteh and Kaspersky Laboratory.

The result of a complex estimation of competitiveness of the enterprise in IT-sphere should be the development of a system of measures for further development or change in competitive position of the company in accordance with the identified problems and shortcomings of the existing system on the basis of the mechanism of ensuring competitiveness of the enterprise.

Conclusion

In conclusion, the proposed method for assessing the competitiveness of companies operating in the field of information technology allows a comprehensive assessment of competitiveness based on:

1. Current efficiency (IT product competitiveness and efficiency of business processes).
2. Adaptability (customer loyalty and commitment; and the flexibility of technology and business processes).

The proposed method is universal, quite simple to use, also it relies on a statistical basis, does not require complicated calculations, it can be used as a management tool at both the strategic and operational level. Using this method it is possible to carry out continuous monitoring of the activities of an IT company,

identifying its weak points, and to make informed decisions on the management of competitiveness. The advantage of this method is the possibility to determine not only the degree of the current competitiveness of enterprises, but also its real and potential willingness to participate in the competition.

Acknowledgment

The work was supported by Act 211 Government of the Russian Federation, contract № 02.A03.21.

References

Agilemanifesto.org. (2017). Manifesto for Agile Software Development. [online] Available at: http://agilemanifesto.org/ [Accessed 30 Jun. 2017].

Baeva, D. and Chernov, V. (2010). Management of the competitiveness of an industrial enterprise. Chelyabinsk: Abris-Press.1.

Growth. (2017). Single Market for Services - Growth - European Commission. [online] Available at: http://ec.europa.eu/growth/single-market/services/index_en.htm [Accessed 30.04.2016].

Jackson, J. and Crook, S. (2014). IT and Business Strategy Functions: The Case for Alignment in the 3rd Platform Era. [online] www.idc.com. Available at: http://www.idc.com/prodserv/prodserv.jsp [Accessed 30 Jun. 2017].

Kuchina, E. and Baeva, D. (2016). Methodical bases of an estimation of com-petitiveness of the enterprise in the conditions of an astable economic environment. Bulletin of Perm National Research Polytechnic University. Series "Socio-economic sciences", 4, pp.149-159.

Metelev, S., Kosmin, A. and Svintitskii, N. (2009). Vectors of development of functional management of the organization. Moscow: Economics.

Pogonev, S. and Shendo, M. (2010). Formation and implementation of the en-terprise competitiveness management mechanism. Bulletin of the Astrakhan State Technical University. Ser. Economy, 2, pp.81-88.

Ranking TAdviser100: The largest IT-companies in Russia 2017. [online] Available at: http://www.tadviser.ru [Accessed 30 Jun. 2017].

Strategy for the development of the information technology industry in the Russian Federation for 2014-2020 and for the future until 2025 (Approved by the order of the Government of the Russian Federation dated 01 November 2013 No. 2036-r).

TAdviser.ru. (2016). Russian IT-market. [online] Available at: http://www.tadviser.ru [Accessed 30 Jun. 2016].

Benchmarking to Adopt an Asap-Based Methodological Guideline for Software Systems Deployment

Dante Carrizo, Computer Science Department, University of Atacama, Copiapó, Chile, dante.carrizo@uda.cl
Liliana Sanchez, ICT Department, University of Atacama, Copiapó, Chile, liliana.sanchez@uda.cl

Abstract

Software-intensive information systems deployment is an activity informally carried out in most companies. However, many of the problems that show up during the operation of the software systems are due to lack of accuracy in this process. This work intends to enhance the importance of adopting formal practices of information systems deployment. To this aim, an ASAP-based methodological guideline is adapted for the deployment of any type of software system, and the gap between this proposal and the ones used before is established. The results of this benchmarking show that the deployments have been made complying with only some of the methodological guideline activities. This work has made possible to convince the organization of the need to formally adopt this methodology, and can help other people in charge of ICTs in this job.

Keywords*:* software systems deployment; methodology, ASAP, benchmarking

INTRODUCTION

From the beginning of software engineering, there have been many information systems development projects which have fallen out of use, and many others have extended their life, reaching high costs, not considered initially, as stated by Bohem (1981) and Davis (1993). The CHAOS report (2015) comprised a study of 50,000 projects all over the world, from little improvements to great projects. The results of this report showed that there is a lot of work to be done in order to have successful information systems development.

In the search to optimize its functionality, many organizations choose to buy packages of processes and procedures, thinking of a rapid computer solution, without a deeper analysis of their real needs. The purchase of an information system is a strategic decision which implies to evaluate the capacity of the company for its deployment. For this, critical factors concerning people, processes, and structure and resources must be taken into account, as Esteves and Pastor (2001)

With respect to People: choice of the project leader, high management support throughout the project, effective communication among all the actors, integration with the technical teams.

With respect to the Processes: to declare the vision and plan of the organization, revision of processes and adaptations to join up the system to the processes and vice versa, software validation, testing and solution of problems, monitoring and evaluating of results. Finally, about Structure and resources: change of plans and organizational culture.

Due to the high complexity and great impact of the information systems in the organizational environment, there arises the need to possess tools or guidelines that allow to assure the success in the deployment of a software-intensive system (hereinafter software systems).

This work is carried out in the context of the Atacama University, where many software have been acquired and developed but without following any formal process for its implementation. In some cases, such type of software operates with some difficulties which are overcome during their operation. But, in

some other cases, the difficulties are often so serious that lead to the removal of the software. These difficulties deal with the environment where they are distributed or simply due to the organizational culture, as declared by Cyrus and Nejad (2014).

These types of software systems are generally very promptly required and this means they must start operating without following any protocol. Nevertheless, the ICT Department is sure that the adoption of formal practices of deployment of software is a priority. To obtain convincing arguments to be presented to the organizational authorities, this work adapts a methodological guideline for software systems deployment, and carries out a benchmarking of the information systems deployments informally carried out.

The rest of the paper continues with the presentation of the work related to this research in section II. In section III, the authors' methodological guide proposal is described. In section IV, the evaluation of some deployments carried out in an educational institution is carried out to validate the necessity of the proposal. Finally, the conclusions of the paper are presented.

RELATED WORK

In Gutierrez et al (2013), there is an analysis of ERP deployment methodologies. In this work, an analysis of several deployment methodologies using a unified model is carried out. A summary of this study is shown on Table 1. The work presented in this paper is based on ASAP. Jithin (2013) work was relevant to understand the phases of this methodology. Another work by Tomé (2009) offers a global vision on the life cycle of a SAP solution based on the theoretical principles of the ERP methodologies, finding support on the ASAP standard methodology, but adapting it to the concrete needs of a certain deployment. This work made possible to analyze how the ASAP methodology was applied to a determined deployment going through all the phases mentioned in the methodology and the usefulness of the application of these methods and tools makes the project successful.

In Nagpal et al (2015) there is a new classification approach based on the ERP implementation strategy that can be categorized as custom-made, vendor-specific or consultant-specific. This research paper also conducts a comparative study of leading vendor-specific ERP implementation methodologies along-with their example cases. It then discusses how the principles of Agile Methodology as laid down in the Agile Manifesto are being incorporated in ERP implementations.

Table 1: Comparison of Methodologies According To Elements of a Unified Model

	Ernst & Young LLP	Consultancy Deloite & Touche	SAP	ORACLE	Microsoft	Open source	Open source
Methodology	**Total Solution**	**FastTrack**	**ASAP**	**AIM**	**SureStep**	**Open ERP**	**Open BRavo**
Project Management	X	X	X	X	X	X	X
Change Management	X	X	X				
Training		X	X	X	X	X	X
Strategic Deployment Level	X	X	X	X			
Tactical Deployment Level		X					
Operating Deployment Level		X	X	X	X	X	X

PROPOSAL OF A METHODOLOGICAL GUIDELINE

A. Accelerated SAP

The methodology for the deployment of ASAP software (Accelerated SAP), on which this proposal will be based, is the solution developed by SAP to make quick and efficient deployments. It was presented for the first time in the United States in 1966 and then was launched at a global level. Its aim is to coordinate all the necessary elements to guarantee the quick development and success of the SAP projects. SAP is an international German Company in charge of supplying ERPs to companies at an international scale and proposes its own methodology of ASAP deployment.

The ASAP methodology, shown on Fig. 1, comprises 5 phases of deployment and the main objective is to minimize time of the project, maximizing the resources and allowing to generate a model of procedures, as seen in Gullegde and Simon (2005). The first stage of this roadmap is the preparation of the project, in which the work plan is prepared, making sure that there is a common vision to reach the objectives of the deployment project. At this point, the scope of the project must be clearly defined, together with the setting up of the work teams, the assignment of roles and responsibilities and the setting of deliverables of each project phases. All of this is laid out in a document known as Project Charter. Finally, in this phase it is important to define the chronology of the activities, progress and application of corrective measures, a phase where all the consultants must have an active participation.

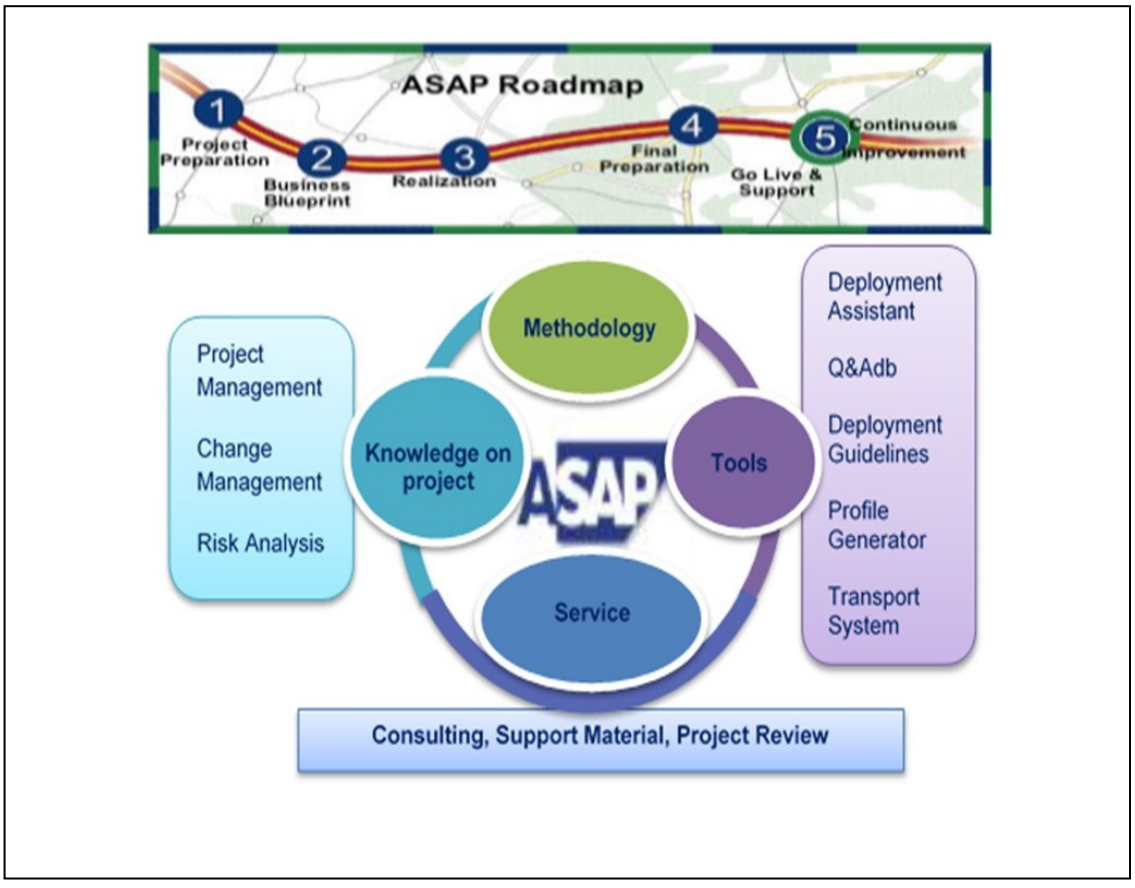


Fig. 1: ASAP Methodology (Accelerated SAP)

The second stage is Business Blueprint. At this stage of the project, the business objectives must be understood and the processes required to achieve the deployment of the system must be documented. Documentation and analysis of the information become the most delicate part of the Project. The way to document must be done at four levels, at least: Validation of the scope of the project, Organizational structure, Definition of the functional requirements, and Detail of system configuration. At this stage, the document known as Blueprint is created, which contains detailed documentation of the business processes, and defines the scope in detail and refines the objectives and work chronology. This document will be the base for the deployment of the system and its test.

In the Realization stage, everything which has been planned before is carried out, since at this point the following aspects become crucial: parametrization of the system and the development of interphases and programs, all of this based on the business model and technical models already designed.

Parametrization is the responsibility of the consultants, who will use, as a starting point, the designs already made in the previous stage, which must be validated by the user. At this point, minimal indispensable developments must be made in order for the deployment to be safe. The interphases must be developed, together with the programs of initial load, taking into account that it is necessary to have programmers with knowledge of the programming language of the older system as well as of the new system to deploy. It is at this point when a new training program is carried out to teach the technical user the parametrization of the system. Besides, the plans of the unitary and integral tests of the business processes must be conducted, and the documentation and training material for the final user must be constructed. Also, the roles and profiles of who will be the final users of the system are defined, and finally the cutover plan is described in detail.

The Final Preparation phase is prior to the production output. It is necessary to document the parametrization manuals, the users' manuals, the procedures manuals, and these must be accepted by stakeholders. Besides this, the technical user must be trained in all the models implemented of the system.

In the Go Live and Support phase, the training of the final users must be carried out, plus the unitary and integral tests to be performed in each of the processes. This will facilitate the user´s acceptance, or the correction of the errors that may appear. Finally, stress tests are necessary, of vital relevance since they will show whether the system is prepared for the operation in production. The massive load of data in the productive environment is carried out, and this information must be checked and accepted by the user, and previously purged. This step is essential for the output and must be previously planned since the loading of data usually takes some time. The users must be qualified in the operation of the system.

This phase has two immediate objectives, which will provide support for the operation and optimization of the system. The project team, at all levels, must be prepared to start helping the user to become an expert in handling the operation of the system and the new management procedures. This way, there has come the moment to make real the project and to start evaluating the benefits to the business as well as monitoring the satisfaction of the users' community. With the optimization of the system, producing and getting the results expected in the planning phase, successful deployment is reached.

B. Software Deployment Methodological Guideline

This Software Deployment Methodological Guideline (SDMG) is a basic tool for the deployment of any computer system, and in this way to successfully reach the objectives of any project of this kind in all organization. Therefore, this basic guideline will be useful to: reach clarity about the information collected during the deployment of the project; provide basic material for management and assessment; improve the way the deployment of systems is carried out; and document progress during a deployment project.

SDMG is not intended as a guideline for ERP deployments, as ASAP is, but as a guideline for every kind of software developed or purchased by an organization (ERP, Management Software, and Academicals Software, among others). The guideline will be standard and will have key points to be used as reference for any deployment (See Figure 2).

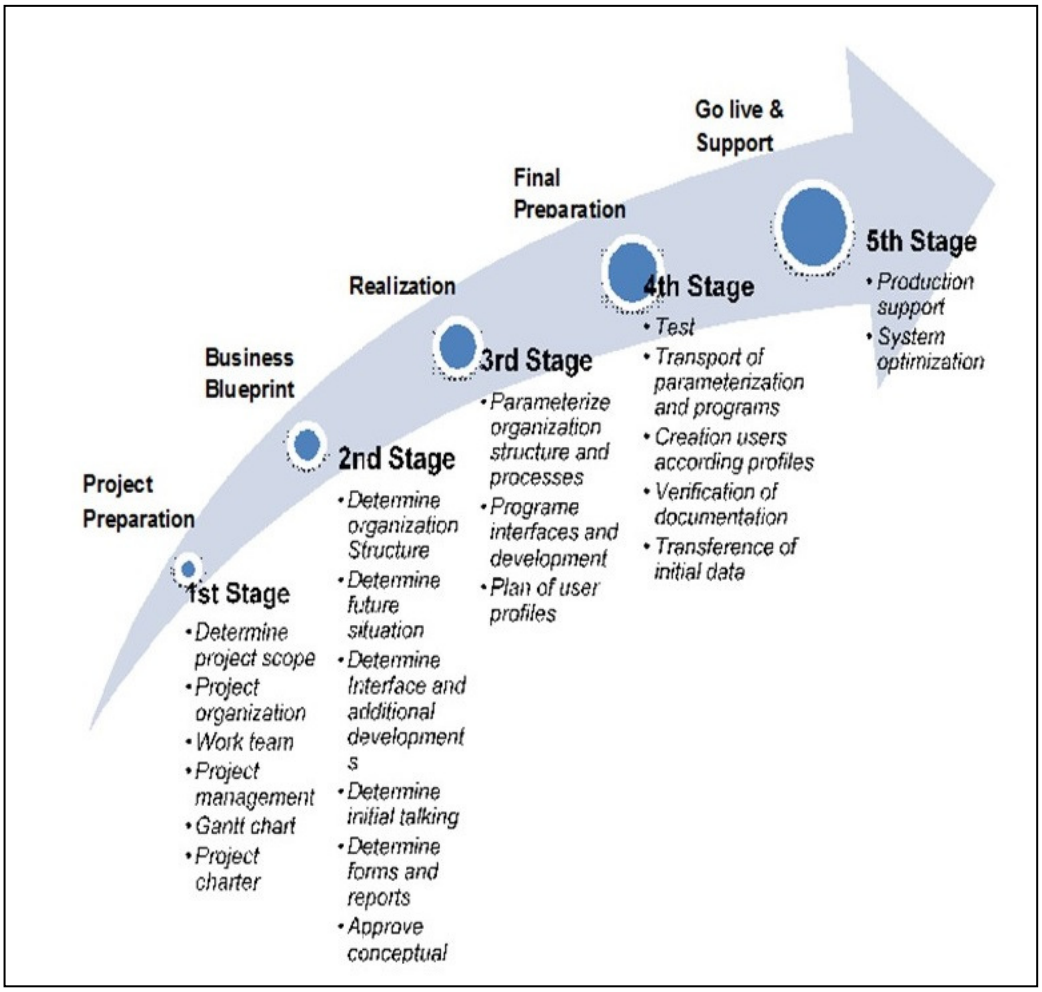


Fig. 2: SDMG phases and activities

Table 2 shows the deliverables at the different phases of SDMG, making it possible to keep a register and control of the activities performed during the deployment.

Table 2: SDMG deliverables

Stage	Deliverable
	Initial preparation
1	Project chart
	Gantt chart
	Set up of Development and Solution System, in place
	Training of the Project Team about software deployed
	Initial meeting, done
	Conceptual Framework
2	Data Conversion Plan
	Interphases Map
	Cut Plan, designed
	Document of the Conceptual Framework Stage

	Realization
3	Plan of Unitary Tests
	Plan of Integration Test, completed
	Roles and Profiles of the System Users
	Training Plans for the Final User, confirmed
	Final Preparation
4	CutoverPlan, approved
	Final Users' Trainning, done
	Manuals, done and approved
	Production System, configured
	Production Systems, proved
	Formal Announcement of Start Date of Production.
	Go Live and Support
5	Live Productive System
	Services of Users' Support
	Project closed

EVALUATING SDMG

To justify the adoption of SDMG, the authors conducted two types of expost evaluations of deployments of systems in the University of Atacama:

- Validation list to compare the deployment made with three software systems, as compared to SDMG, and
- Survey to deployers of other two software systems

C. Software Systems Evaluated

The five systems used for the evaluation of SDMG are described on Table 3.

Table 3: software systems used in benchmarking

Code	Name	Function	Year
S1	SIGA	Registration, Academic Register	2013
S2	ACREDITA FULL	Accreditation	2007
S3	SPDE	Prediction of Drop-Out Students	2015
S4	U+	Financial and Academic Management	2014
S5	POA	Control of Development Plan	2016

D. Validation List

This evaluation was made applying a validation list with three activities and deliverables of each of the phases of the SDMG guideline. The validation list, which can be seen in Table 4, shows whether the SDMG activities or deliverables were undertaken or not in the deployments of S1, S2, S3 softwares (W/I stands for "without information").

Of the three systems evaluated, System 1, "SIGA (System of Academic Management)" has 82% of the activities fulfilled, according to the validation list applied. In order to implement this system, a survey of the requirements and business processes of the University was carried out, as a first step, and from this point, there appeared the development to be implemented. Builder House Engineers, the firm in charge, provided the design documentation, users' manuals, process manuals, data dictionaries, and data models of

the project. As a company, they were in charge of controlling the changes of the project and held meetings with the people in charge of the project registering incidents and observations.

In relation to testing systems and loading historical information, they were made by Decom. This unit conducted validations information and system functionality, reporting all incidents encountered, for the company to make the corresponding changes to the deployment. We can say that this system meets a good percentage of the activities mentioned in this guide.

Regarding the S2 system "Acredita Full", developed by the Decom Unit, it emerged as a pressing need for the Undergraduate Unit, all this because of the lack of a system to register everything related to the tracking of cohorts of students that entered the university, information was needed from only one source to feed the Ministry of Education.

As can be seen, the evaluation of this implementation is 48% of all the validated activities. It can be said that this system was developed as was needed, so it was functionally deployed and then around this other features were added to have the system that is used until today.

This deployment in the first phase shows that the activities at this stage were not performed as part of the deployment. This is so because this system was designed between a user and a developer, emphasizing the product and not to the documentation, meetings, test plans and monitoring of deployment.

Table 4: results of validation list

PHASE	Name of Activity/deliverable	S1	S2	S3
Initial Preparation	Definition of the project team	Y	N	N
	Specification of the roles of the Project Team	N	N	N
	Technical requirements	Y	Y	Y
	Configuration standards of the software system	Y	Y	Y
	Knowledge transfer to the Project Team	Y	N	N
	Gantt chart of the project	Y	N	N
	Project chart	N	N	N
	Meeting of initial phase	Y	N	Y
	Communication plan	N	N	N
Conceptual Design	Identify and define business processes	Y	Y	Y
	Work meeting by modules	Y	Y	N
	Complete the conceptual design document, check it and get approval	Y	N	N
	Establish the schedule of users' training	N	N	N
	Determine the initial data conversions	Y	Y	Y
	Identifiy the reports requirements	Y	Y	N
	Identify the interphases requirements	Y	Y	N
	Identify developments	Y	Y	N
	Define forms and reports	Y	Y	N
	Identify the load requirements	Y	Y	N
	Design of cutover plan and change	Y	N	N
	Conceptual design document, submitted	N	N	N
Realization	Initial parametrization of the system	Y	Y	Y
	Document of users' profiles	Y	N	Y
	Definition of unitary tests plans	Y	N	Y
	Definition of integral tests plans	Y	N	N
	Aprove users' trainning plan	N	N	N
	Development of programs of retrieval and initial loads	Y	Y	N
	Data Preparation	Y	Y	Y
	Establish the functions of the system manager	Y	Y	Y
	Trainning on parametrization	N	N	N
Final Preparation	Interphase tests	Y	Y	N
	Making unitary tests	Y	Y	Y
	Making integrated tests	Y	N	Y
	Stress and volume tests	Y	N	W/I
	Dates for system shut down, approved	Y	N	N

	Formation of final users, done	Y	Y	W/I
	Assignment of users to profiles of the system	Y	Y	Y
	Users' manual	Y	Y	Y
	Procedures manual	Y	N	Y
	Final users' acceptation tests	Y	N	Y
	Load of initial data to the productive system	Y	Y	Y
	Productive system	Y	Y	Y
	Productive system, approved	Y	Y	Y
	Checklist for go live, verified	Y	N	N
Go live	Go live productive system	Y	Y	Y
	Support services for users	Y	Y	W/I
	Project, closed	Y	N	N
Control	Management of cost control	Y	N	N
	Management of risk control	N	N	N
	Training plan	N	N	N

The S3 "Early Warning System Retention" system displays 40% in activities validated from the list designed. IN this system developed by FORIS, the software encapsulates the predictive drop-out model. The deployment allows to make an advanced analysis of student desertion, as well as to take action on retention measures to apply to students with a high risk of dropping out.

A summary of the results can be seen on Table 5 and Figure 3.

Table 5: Evaluation Summary

	S1		S2		S3	
Stage 1	6	67%	2	22%	3	33%
Stage 2	10	83%	8	67%	2	17%
Stage 3	7	78%	4	44%	5	56%
Stage 4	14	100%	8	57%	9	64%
Stage 5	3	100%	2	67%	1	33%
Control	1	33%	0	0%	0	0%
	41		**24**		**20**	

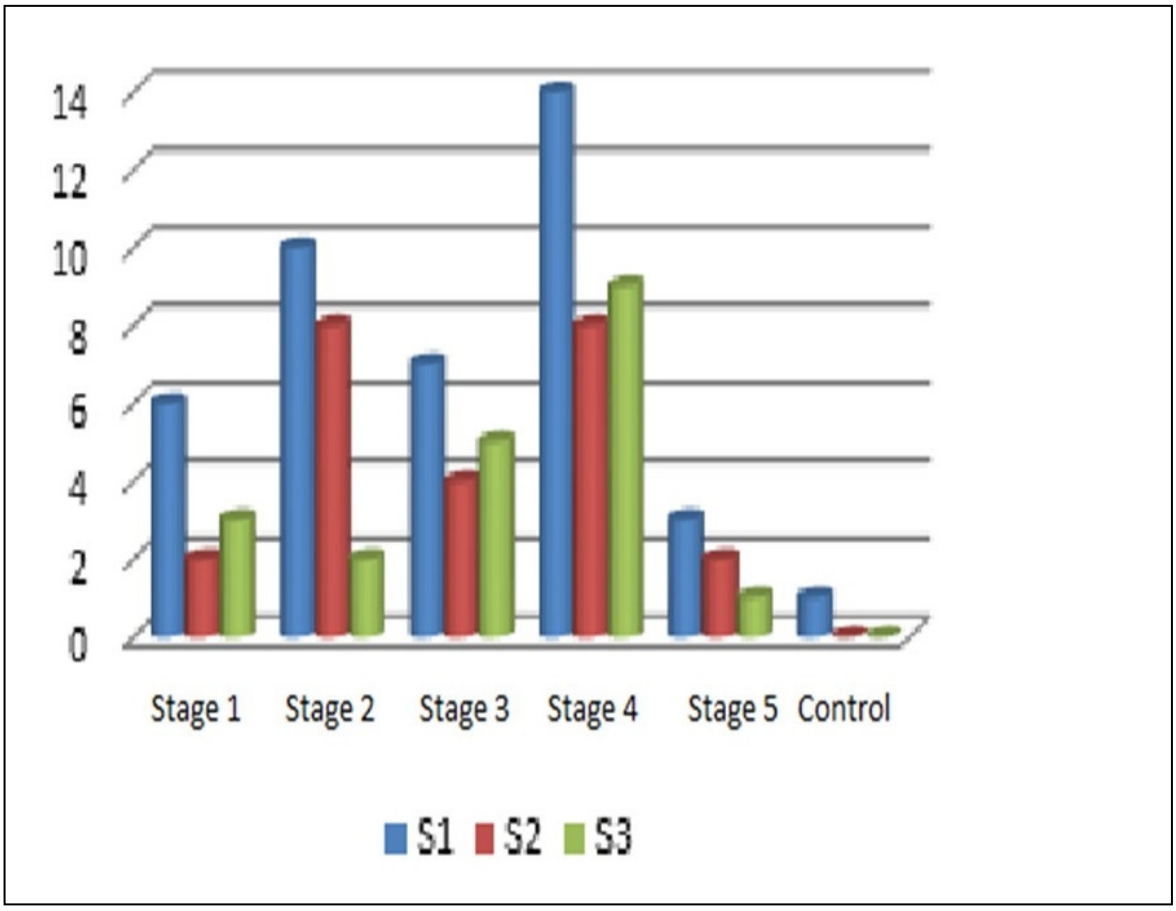


Fig. 3: Evaluation Summary

E. Survey

For systems S4 and S5, which were deployed by external personnel, a survey was conducted. This survey was divided into several items or dimensions containing questions related to deployment activities, proposed by the SDMG methodological guide. This survey is expected to have a vision of how the deployments of these new systems were handled in the institution.

The dimensions the survey consider aspects related to:

1) *The project initial preparation*
2) *The definition of business processes to implement.*
3) *The parametrization of the system, development of interphases and programs.*
4) *The final preparation of the deployment, previous tasks before the operation.*
5) *The deployment of the system.*
6) *The type of control taken during the deployment of the system.*
7) *The types of documents handled in the deployment process.*

Figure 4 summarizes the survey applied to the person in charge of the U+ system. It can be seen that 74% of the answers marked “fairly satisfied”.

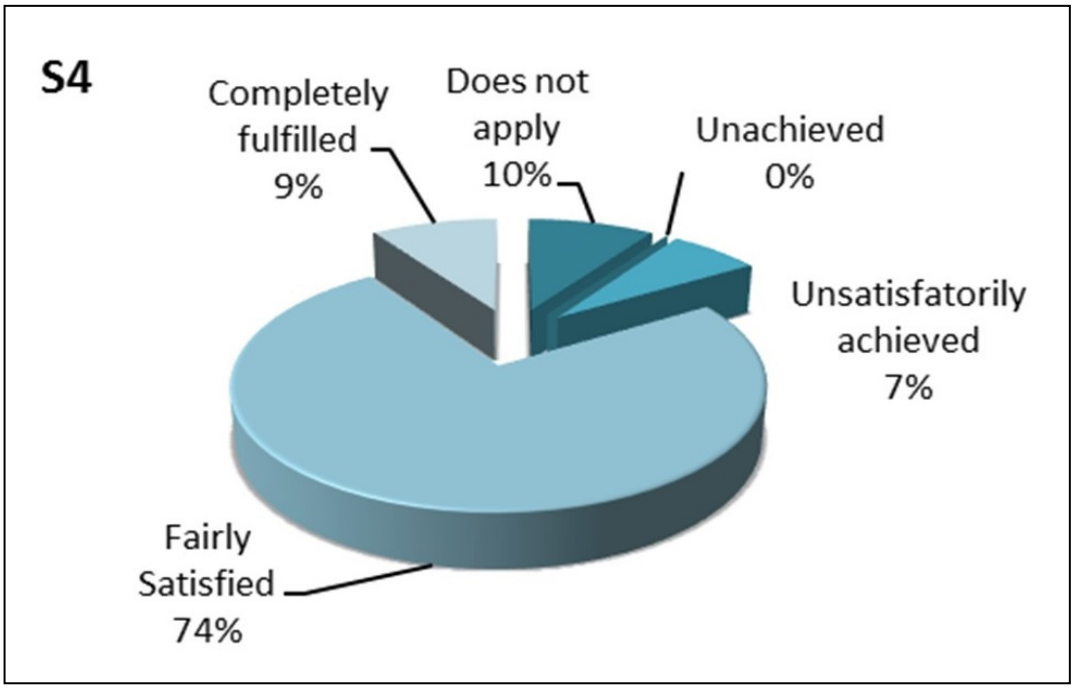


Fig. 4: Results of survey on system S4

Figure 5 shows the trend of the responses in the survey of the ERP system. It can be seen that most of the answers correspond to the criterion "Completely fulfilled" with a total of 47%; and 19% of the responses to the criterion "Fairly satisfied".

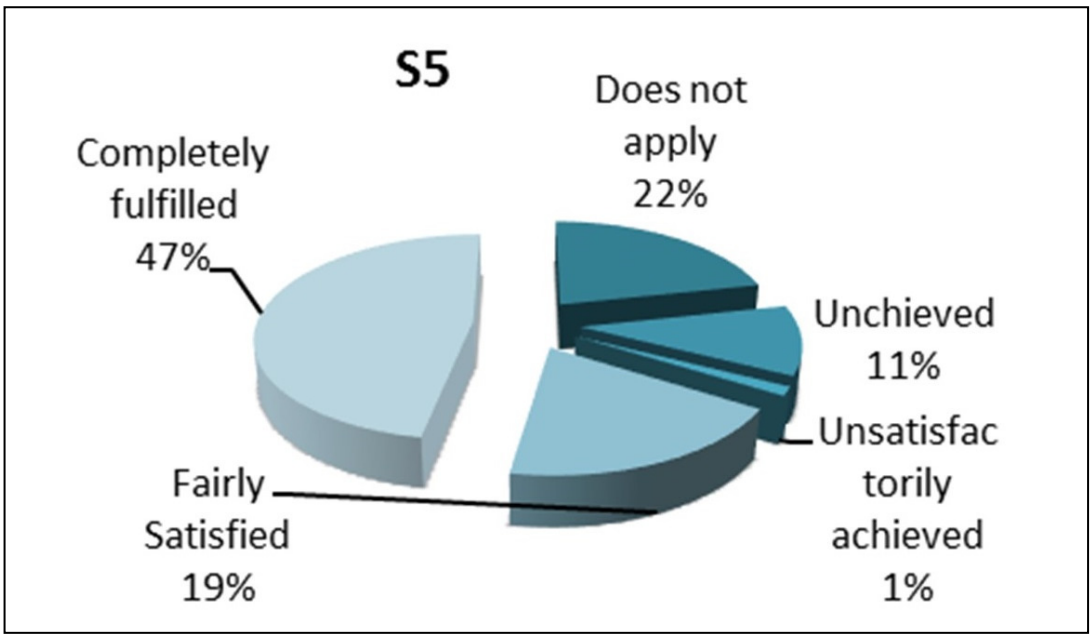


Fig. 5: Results of survey system S5

CONCLUSIONS

As there is no basic procedure for implementing software implementations, either ERP, management, or process support, in Atacama University, it is of paramount importance to lay the groundwork for this first guide to the deployment of software systems for the Institution. Therefore, some guidelines in this guide called SDMG were proposed in order to establish a way of working to successfully perform these types of implementation projects.

The ex post evaluation of information systems deployments carried out, showed that there were aspects not enough considered and that this can have an impact on the operation of software systems. In the first evaluation, it was observed that in the three systems deployed was not given much importance to the project communication plan, risk management and the process of change, which are relevant activities for a sound deployment.

The proposed methodology presented several advantages: it allows maximum utilization of resources, it incorporates a process-oriented scheme of work, it involves and ensures prompt acceptance of the system by users and the community in general, and it proposes a communication plan so that users feel part of the project and do not feel that they are at risk.

With this guide, the time of deployment of the systems can be reduced, as compared to the time initially defined. The way these deployments have been executed has exceeded the dates initially stated for them to be operative, leading to higher costs in time, personnel and resources, while the information for decision-making is not available when required.

REFERENCES

Bohem, B. (1981) Software Engineering Economics. Englewood Cliffs, N.J.: Prentice-Hall.

Cyrus, K.M. and Nejad, A.V. (2014) “The impact of national culture on the different phases of ERP implementation,” Proceedings of 44th International Conference on Computers and Industrial Engineering and IMSS 2014 - 9th International Symposium on Intelligent Manufacturing and Service Systems, Joint International Symposium on "The Social Impacts of Developments in Information, Manufacturing and Service Systems", pp. 1662-1671.

Davis, A.M. (1993) Software Requirements: Objects, Functions and States. Prentice-Hall.

Esteves, J. and Pastor, J. (2001) “Establishing the importance of ERP implementation critical success factors along ASAP methodology processes,” Proceedings of the 3rd International Conference on Enterprise Information Systems, pp. 182-187.

Gulledge, T. and Simon, G. (2995) “The evolution of SAP implementation environments: A case study from a complex public sector project,” Industrial Management and Data Systems, vol. 105 (6), pp. 714-736.

Gutierrez, M., Piñon, L. and Sapién, A. (2013) “Análisis de metodologías de implementación de ERP,” Actas XVIII Congreso Internacional de contaduría, administración e informática, México D.F.

Jithin, R.B. (2013) ASAP Methodology for Enterprise Portal. Business process expert community.

Nagpal, S., Khatri, S.K. and Kumar, A. (2015) “Comparative study of ERP implementation strategies,” IEEE Long Island Systems, Applications and Technology Conference, LISAT.

Standish group (2015) CHAOS Report ., url:http://www.infoq.com/articles/standish-chaos-2015, Date: 14-10-2015.

Tomé, F. (2009) “Implantación de soluciones SAP para el mercado de telecomunicaciones siguiendo la metodología ASAP,” tesis U. Carlos III, url: http://e-archivo.uc3m.es/bitstream/handle/10016/6250/FTC_PFC_Final.pdf?sequence=1.

A Case Study Regarding the Career Management Skills in the Romanian Context

Paulina Spânu[1], University POLITEHNICA of Bucharest, Bucharest, Romania,
pauspa16@yahoo.com

Abstract

The concept of „*Career management skills*" (CMS) has different meanings across European Union states. This paper presents an analysis of the concept of „Career management skills" (CMS) in different contexts and details a new proposal for a career management framework which can be used by the counselors or practitioners or can be adapted according to their needs. A lot of resources and tools for the new proposal of CSM framework were developed and some of them were made as Virtual Instruments using the LabView software. The virtual instrument described in this paper is a part of a more complex project that aims to provide applications for a lot of situations which the citizen could come across.

Keywords: career management skills, framework, LabVIEW,

Introduction

The concept of „*Career management skills*" (CMS) has different meanings across European Union states. The European Lifelong Guidance Policy Network (ELGPN) regards career management skills as competencies which help individuals identify their existing skills and necessary learning goals to improve their employability and social inclusion.

In Romania, the counselling and career guidance concept is regulated by the National Education Law no. 1/2011, at the Art. 350 - (1) „*Counselling and career guidance throughout the life refers to all services and activities that assist individuals of any age and at any moment of their existence to make choices in education, training or employment and manage their careers*".

Analyzing the actual context of CMS at European and national levels, a new proposal for definition of the CMS concept will be presented in this paper.

The European framework of key competencies for lifelong learning brought forward the idea that each citizen needs a wide range of key competencies for adapting flexibly to a rapidly changing world. At European level, CMS framework contains skills that are relevant throughout life and are pertinent at any stage of career development. In Romania, the need to define the methodological framework with specific theories and models for career guidance must be take into account as a priority. In this country there is no tradition in applying career counseling processes, which is an essential component of modern education and training. A new proposal for the career management framework described in this paper will meet some important needs of young people such as: ensuring access to educational provision, socio-professional integration of individuals, developing skills and competences required to make future changes personally and professionally. A lot of resources and instruments were necessary for the new proposal of CSM framework. Starting from this idea, a Virtual Instrument for obtaining the individuals` dominant personality type was developed using the Lab View software. The content of the personality test presented in this paper was adapted by Lana Bateman from Personality Patterns and published by Huntington House, Inc. Lafayette, LA. This content was only transposed into the Virtual instrument to help individuals to calculate rapidly and easier their dominant personality type.

The research on CMS in European and national contexts presented in this paper has been carried out within the project LEarning and Decision making Resources (LEADER), *project no* 2014-1-IT02-KA200-004105, funded with support from the European Commission, in the Erasmus+ programme.

Current state

European approach to Career Management Skills

The concept of „*Career management skills*" (CMS) has different meanings across European Union states, but in the European approach, many countries consider the following definition of the CMS available, according to research study by Sultana (2011): „*CMS refer to a whole range of competences which provide structured ways for individuals and groups to gather, analyze, synthesize and organize self, educational and occasional information, as well as the skills to make and implement decisions and transitions*". It is important to note that CMS aims to develop resources and key competencies for lifelong learning so that people manage better their life and career.

The European Lifelong Guidance Policy Network (ELGPN) regards career management skills as competencies which help individuals identify their existing skills and necessary learning goals to improve their employability and social inclusion. As a result of the researches undertaken within the LEADER project, the ELGPN definition of career management skills was adapted to the following definition: „*Career management skills (CMS) are competencies which help individuals to identify their existing skills, develop career learning goals and take action to enhance their careers"* (Neary, 2015).

In the research study by Sultana (2011) the career learning lends itself to formative types of assessment because career learning is arguably a different kind of area of knowledge than 'mainstream' curricular subjects, which tend to be more tightly 'framed' in terms of disciplinary content. A CMS programme is typically multi-disciplinary, drawing its knowledge and skills based on such areas as personal psychology, economics, sociology, ethics, and so on. CMS provision, by definition, tends to be tightly linked to the pragmatic consideration of helping unemployed persons finding jobs, and in some cases career learning is recorded and assessed in ways that facilitate recruitment. In such cases, assessment can become more goals oriented, and more summative in nature.

The European framework of key competencies for lifelong learning brought forward the idea each citizen needs a wide range of key competencies for adapting flexibly to a rapidly changing world. Since 2007, the EU Member States have been working on the theme of career management skills (CMS). At European level, CMS framework contains skills that are relevant throughout life and are pertinent at any stage of career development. Career management skills build on a range of pre-existing ideas and abilities of an individual, and intersect with other experiences.

Romanian approach to Career Management Skills

In Romania, the counselling and career guidance concept is regulated by the National Education Law no. 1/2011, at the Art. 350 - (1) „*Counselling and career guidance throughout the life refers to all services and activities that assist individuals of any age and at any moment of their existence to make choices in education, training or employment and manage their careers*".

The Romanian guidance and counselling system is mainly based on two networks:
- education;
- labor market.

Under the Law no. 1/2011, the Guidance System in Romania is focused on the following type of guidance service:

- **General education**. In this system, the counselling is provided by the School counselors and the clients are the pupils, parents and teachers. In Romania, the responsibility and administrative control of this service is assumed by the Ministry of Education, Research

and Youth, School inspectorates and Institute of Education Sciences. All of these institutions are funded by the state budget.

- **Higher Education.** In this system, the counselling is provided by the Guidance counselors and the clients are undergraduate students. In Romania, the responsibility and administrative control of this service is assumed by the Ministry of Education, Research and Youth.
- **Labor offices.** In this system, the counselling is provided by the Information officers and the clients are unemployed people or people searching for another job. In Romania, the responsibility and administrative control of this service is assumed by the National/County/Local Agency for Employment.
- **Civic Counselling.** In this system, the counselling is provided by the Information officers, civic counselor, juridical councilor and the clients are citizens. In Romania, the responsibility and administrative control of this service is assumed by the City Hall. There are many offices throughout the country. They provide information on employment opportunities, health services, child care, real estate, European integration, etc.

In Romania, there are also associations and centers which are interested in CMS:

- *National Resource Centre for Vocational Guidance.* The centre serves as link between the official sources of information (both European and national) and the beneficiaries of guidance and counselling activities (both individuals and organizations) www.euroguidance.ise.ro/
- *National Association for Educational and Vocational Guidance.* The association dealing in the field of Educational and Vocational Guidance and Counselling.
- *National Association of School Psychologists* - Training in educational and vocational guidance www.anps.ro/
- *Psychologists' Association of Romania* - Training in educational and vocational guidance www.apsi.ro/
- *Counsellors Association of Romania.*

Moreover, the law no. 1/2011specifies the types of activities that should be included in counselling and career guidance:

- *information about career*, which refers to all the information needed to plan, obtain and retain a certain job;
- *career education*, that takes place in schools through curricular area "advice and guidance". There are included , information about labor market, it is formed skills how to make choices about education, training, work and life in general, opportunities to experience different roles in community life or professional life, career planning tools;
- *career counselling* that helps people to clarify their aims and aspirations, understand their own educational profile, make informed decisions, be responsible for their own actions, to manage their career and transition process at different times;
- *employment counselling* that helps people to clarify their immediate goals on employment, learn about the skills needed to search and get a job;
- *placing at work*, which that helps people in finding a job.

In the national context, counselling and guidance are part of the national curriculum, starting with primary school. In the book by Mihai Iacob (2011), the national curriculum has the following content: self-awareness, communication and social competences, the management of the learning process, career management and development, life style.

A CMS framework is useful for individuals at any point in their lives, to identify their capacities, competences and interests to make educational, training and occupational decisions and to manage their individual life paths in learning, work and other settings in which those capacities and competences are learned and/or used. Guidance covers a range of individual and collective activities

relating to information-giving, counselling, competence assessment, support, and the teaching of decision-making and career management skills.

In Romania, career management is a focal point for both the employee and employer. Career management framework must include planning and career development. Career planning is a way to increase the overall level of performance and align business strategies with human capital present in the organization. There is therefore a need to establish appropriate educational and developmental programs for each employee to further develop the skills necessary to meet the short and long term career in line with the strategies of the organization.

In the case of CMS, the choice of assessment strategies presents specific challenges and issues given by the process of career planning and outcomes. Career planning is an important process of setting career goals, development and implementation of strategies, self-assessment and analysis of opportunities, and evaluating the results. The planning process engages both organization and individual responsibility. The individual can identify their aspirations, abilities and capabilities and, by evaluation and counseling, to understand which are the needed requirements.

The individuals can acquire career management skills in different ways and at different rates. Although career management skills can be learned, individuals need to learn in different contexts. The career management skills framework must be designed to support the development of carrier services in different context, for different people, for different groups, with different personalities and different needs. Therefore, the CMS framework should be adapted to the particular needs of specific individuals or groups (such as persons with disabilities, refugees, and early school-leavers, individuals with different religion, age and gender or minority status).

The study and research made in Romania has highlighted the fact that the following skills of the CMS framework are more relevant especially for the young people:

- realistic self evaluation of personal and professional potential;
- the efficient use of resources to identify, evaluate and select information about professional training, work and career;
- assuming lifelong learning;
- communication and social integration skills;
- skills necessary to achieve realistic career plans and adapting to labor market requirements;
- assuming realistic, achievable goals;
- stress management skills in case of job loss.

Therefore, at the national level, it is necessary to develop a CMS framework well organized and structured according to the needs of the people, adapted to the current national and European context to ensure a global approach of the individual, related to the dynamics of socio-economic development at local, regional, national and European level and to the changing demand of the labor market. Moreover, a CMS framework should be focused on the individuals` needs, developed according to their interests, preferences or aspirations.

Case study

The studies and results presented in this article are based on the researches made by LEADER partners from six countries in Europa: Romania (Politehnica University of Bucharest) Italy (University of Camerino and Centro Studi Pluriversum), Greece (Athens University of Economics and Business and Institute of Entrepreneurship Development), United Kingdom (CASCAiD and University of Derby), Spain (DEP Institut) Turkey (Cukurova University). Analyzing the current state of the CMS approach at European and national level in each country, it was developed the LEADER Framework for Careers with five main areas**:**

- ✓ personal effectiveness;
- ✓ managing relationships;
- ✓ finding and accessing work;
- ✓ managing life and career;
- ✓ understanding the world.

Under each of these five areas, the LEADER framework has a series of career management skills for which resources and tools were identified and implemented to support individuals in managing their careers according with their needs (http://www.leaderproject.eu):

- **Personal effectiveness**

- I know who I am and what I am good at.
- I'm able to reflect on my strengths and address my weaknesses.
- I make effective decisions relating to my life, learning and work.
- I remain positive when facing setbacks and I keep a positive orientation to the future.
- I make use of appropriate technologies to develop my career.
- I generate ideas that help me to achieve my goals.
- I am able to set SMART goals (Strategic, Measurable, Achievable, Relevant and Time bound).
- I can match my skills to labour market needs.

- **Managing relationships**

- I assess the pros and cons of formal and informal sources of information.
- I interact confidently and effectively with others.
- I build professional relationships and networks to support my career.
- I maintain my professional relationships and networks.
- I use social media networks to support my professional networking and my career.

- **Finding and accessing work**

- I learn throughout life.
- I can find work and successfully manage selection processes.
- I create opportunities and alternative career perspectives to build my career.
- I find and utilise information and the support of others.
- I know how to negotiate a job or collaboration.
- I can cope and negotiate successfully with changes and transitions in the world of work.

- **Managing life and career**

- I can decide on and set my career/life goals within appropriate timescales.
- I manage my goals, my time and personal finances in a way that supports my career building.
- I am innovative and creative in my thinking about work, learning and life.
- I maintain a balance in life, learning and work that is right for me.
- I can cope with adversities and changes which take place in life and career exactly at the moment they occur.

- **Understanding the world**

- I understand how changes in society, politics and the economy relate to my life, learning and work.
- I understand how life, learning and work change over time.
- I can act effectively as a part of society as a whole.
- I identify, create and capitalize on fortuitous/unforeseen situations, either positive or negative ones.
- I can act at an international level for issues relating to my life learning and work.

This new proposal for a career management framework was tested in Romania and the people involved in the testing activities made the following recommendations:

- They have considered the CSM model suitable to the actual needs of the young people. They appreciate the content and structure of the CMS considering that it is adequately and useful for their career guidance activities.

- The practitioners would like to re-design their guidance activities using the resources and tools developed according with CSM model tested. They appreciate especially the personality tests and the assessment methods.
- The resources and tools for counselling services relative to the dynamic changes of the labor market as well as the development of the available resources is imposed for decreasing the rate of university dropout and raising the rate of employment and professional integration of students and graduates.
- The career management skills framework must be improved to support the development of carrier services in different contexts, for different people, for different groups, with different personalities and needs.
- The LEADER Framework for Careers can be used in the European context because it has an innovative approach of the career counseling concept that will contribute to the development of career guidance skills for practitioners, consolers and teachers.

A lot of resources and instruments for the new proposal of CSM framework were designed and one of the most used and appreciated one by the users was made in LabView. The virtual instrument made in LabView is a part of a more complex project that aims to provide applications for a lot of situations the citizen could come across. Figure 1 shows the front panel of the Virtual Instrument for the personality tests developed using the Lab View software. The personality test presented in this paper was adapted by Lana Bateman from Personality Patterns and published by Huntington House, Inc. Lafayette, LA. The personality test has 40 items, each item being attributed to one of the dominant personality type: the popular sanguine, the strong choleric, the perfect melancholic, the phlegmatic calm.

The dominant personality type is obtained by assigning points for each personality trait grouped in the four dominant types and then by calculating the sum of the awarded points. The dominant personality type is the one that obtained the highest score.

Description of the virtual instrument functioning

The Virtual Instrument has two parts: one for the STRENGTHS" used for selecting sequentially or randomly the right answers for a certain personality feature and the other one for the Weaknesses.

To use the virtual instrument, the following steps must be followed:

- STEP 1 - Press the *RUN* button from the buttons toolbar.
- STEP 2 - From *"STRENGTHS*" select one option from the four available, pressing the R1,R2, etc tabs.
- STEP 3 - From „*WEAKNESSES*" select one option from the four available, pressing the R1, R2, etc tabs.
- STEP 4 - Click the "*Press for result"* button.
- STEP 5 - After the result is showed press the "*STOP*" button for stopping the application.

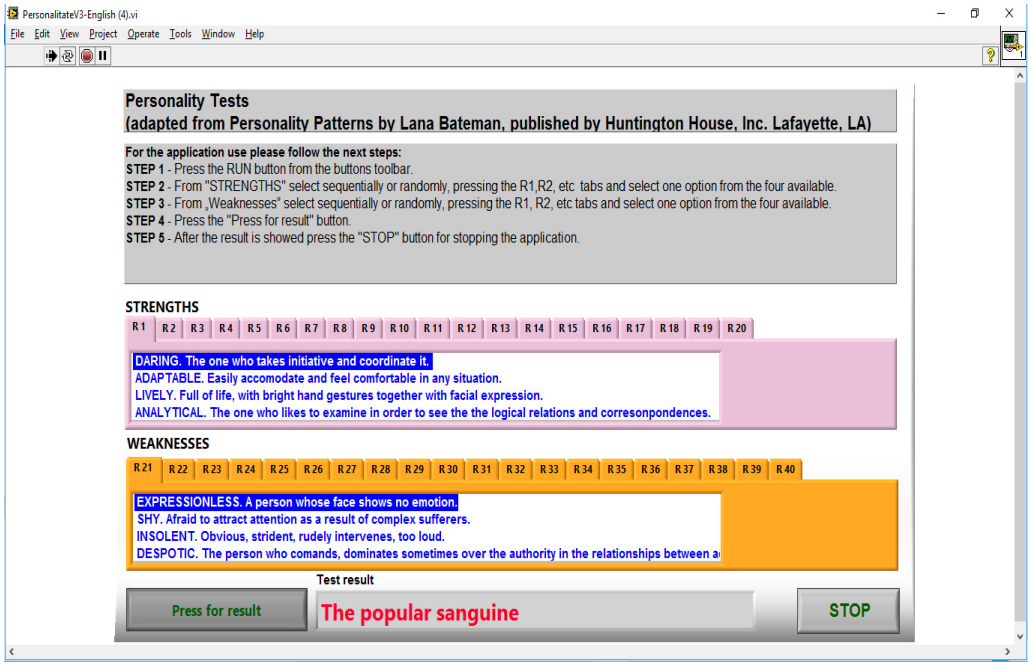


Fig. 1: The front panel of the Virtual Instrument

The application will run until the user will press the STOP button. This means, all functions from the block diagram are displayed into a While structure. The While structure repeats the subdiagram inside it until the conditional terminal receives the Boolean value from the STOP button. In order to select an option for the *STRENGTHS*" or for the „*WEAKNESSES*" the CASE structures were added inside of the While structure. The Case structures have four subdiagrams, one of which executes when the structure executes according to the numerical value wired to the selector terminal.

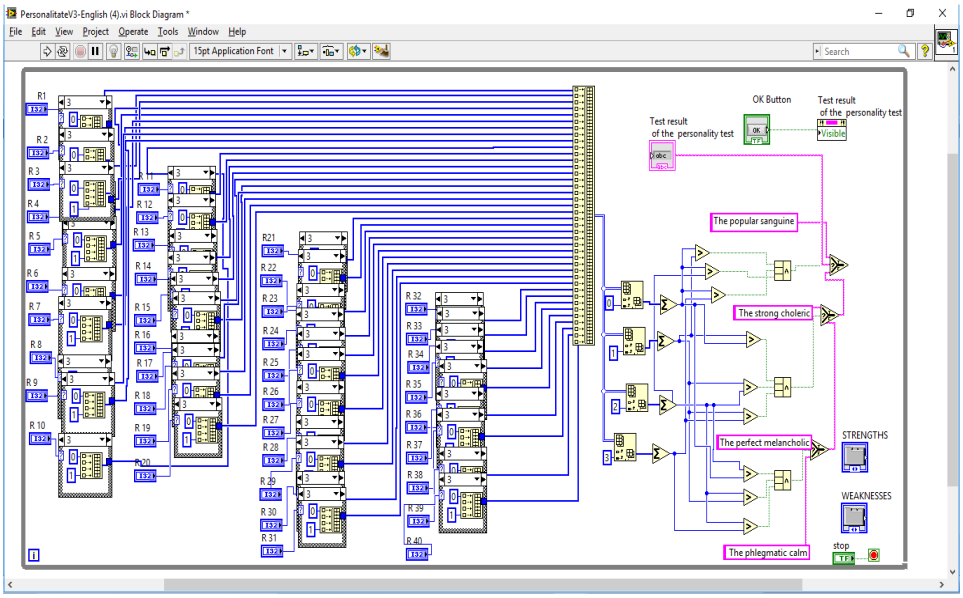


Fig. 2: the block diagram of the Virtual Instrument

The numerical value represents the number of the option selected by the user on the front panel. The application groups the numerical values into 2D Array using Build Array function. The Index Array functions were added on the block diagram of the virtual instrument to extract the numerical values only for one trait specifying the index of array. The sum of the numerical values from each array was calculated using Add Array Elements and then the results are compared between them to calculate the highest value. The dominant personality type with the highest score will be displayed into a String Indicator element when the application runs.

Conclusions

Based on the facts presented in this work, one can synthesize the following:

- The following definition of the concept of CMS could be available in the Romanian context „*Career management skills (CMS) are competencies which help individuals to identify their existing skills, develop career learning goals and take action to enhance their careers"*.
- The CMS framework is useful for individuals at any point in their lives, to identify their capacities, competences and interests to make educational, training and occupational decisions and to manage their individual life paths in learning, work and other settings in which those capacities and competences are learned and/or used.
- The new proposal of CMS framework is well organized and structured according to the specific and the needs of the people and is adapted to the current national and European context.
- The LEADER Framework for Careers can be used in the European context because it has an innovative approach of the career counseling concept that will contribute to the development of career guidance skills for practitioners, consolers and teachers.
- The Virtual Instrument for obtaining the individuals` dominant personality type has a simply interface that can be used by the individual as an executable file without Lab View software installed on their computers.
- The Virtual instrument helps individuals to calculate rapidly and with high accuracy their dominant personality type.
- The virtual instrument is a part of a more complex project that aims to provide applications for career guidance system.

Acknowledgement

The research work was performed under the project entitled "LEarning and Decision making Resources ", Project no 2014-1-IT02-KA200-004105, funded with support from the European Commission, in the Erasmus+ programme.

References

Abaza B., Savu T., Spânu P., (2014), Algoritmi – îndrumar de laborator, Editura PRINTEH, Bucureşti.

Genner S., Traducator: Dragomir C (2010), Ghidul carierei pentru absolventii universitari, Editura Curtea Veche, ISBN: 978-973-669-951-1

Iacob M. (2011), Guidance and counselling in Romania, NCP-VET-CO, Bucharest, March 24th

Ibarra H., (2011), Identitatea profesionala, Editura Curtea Veche, ISBN: 978-606-588-194-5,

Janda L., (2003) Teste pentru alegerea carierei, Editura Busine Tech

Jigau M., (2007) „Consilierea carierei. Compendiu de metode si tehnici, Editura Sigma, ISBN: 978-973-649-340-9

Jansen J. (2007), Managementul carierei. Ghid practic , Editura Polirom, ISBN: 978-973-46-0552-1

Neary, S., Dodd, V. and Hooley, T, (2015) Understanding Career Management Skills: Findings From the First Phase of the CMS Leader Project. Derby: International Centre for Guidance Studies, University of Derby, ISBN: 978-1-910755-02-0

Savu, T., Abaza, B., Spânu, P., Reprezentări grafice – îndrumar de laborator, Editura PRINTECH, Bucureşti, 2014

Silagy A.M. A. (2008) Manualului consultantului in carieră, Editura Institutul European, , ISBN: 978-973-611-514-1

Sultana R. (2011), Learning career management skills in Europe: a critical review, Journal of Education and Work.

Sultana R. (2011), Career Management Skills: assessing for learning" , 14-15 November

http://euroguidance.eu/guidance-systems/guidance-system-in-romania-overview/

http://www.euroguidance.ise.ro/

http://www.consilium.europa.eu/

http://frumos.ccib.ro/content/managementul-carierei

Impact of Ethics upon Business Success

Ruxandra-Gabriela Albu, Department of Management and Economic Informatics, Faculty of Economic Sciences and Business Administration, Transilvania University of Brasov, Romania
ruxandra.albu@unitbv.ro

Lidia Mandru, Department of Management and Economic Informatics, Faculty of Economic Sciences and Business Administration, Transilvania University of Brasov, Romania
lidia.mandru@unitbv.ro

Titus Suciu, Department of Finance, Accounting and Economic Theory, Faculty of Economic Sciences and Business Administration, Transilvania University of Brasov, Romania
titus.suciu@unitbv.ro

Abstract

This paper aims to study the way ethics influences business success. It is well known that many companies may go bankrupt because of lack of a well established overall strategy, poor quality of products, lack of innovation, focus on gaining immediate profit etc but is seems that nowadays ethics is strongly influencing business success. The study conducted reveals that implications of ethics in business are reaching a high level and they are more complex than presumed, ethical behaviour bringing significant benefits to a business.

Keywords: ethics, business success, qualitative research.

Introduction

Since ancient times, companies are searching for business success but it seems that, nowadays, more than ever, having success is not easy. Business success does not come unexpectedly in a company, it presumes efforts, wise strategies, risk assuming and sometimes failure provides the lesson for success. Many factors are implied in gaining business success (such as employees, processes, management, strategies, etc) and it seems that there is a strong connection between ethics and business success. Furthermore, code of ethics is seen as a pillar for business success, companies without ethics being not able to exactly determine what is right and fair within their business, therefore, ethical practices may lead a company to failure or success. We shall see in the following comments what ethics is, and what does business success means; we will explore the importance of ethics and closely study the way it influences business success.

Literature Review

What is Ethics?

Longman Business Dictionary (2017) defines ethics as "moral rules or principles of behaviour that should guide members of a profession or organization and make them deal honestly and fairly with each other and with their customers". Likewise, a company should apply ethics also when dealing with its stakeholders, in addition to its customers or employees (Cleveland, 2002). Moreover, some authors, Ferrel et al (2011) and Pauna et al (2014) have shown in their paperworks that fairness and honesty represent the heart of a moral business and there should be no discrimination when it comes about applying the rules within an organization. A code of ethics may help companies to improve their business activities, reducing ambiguities and communicating the ethical vision of the company to all interested parties. But what is a code of ethics? After reviewing several definitions of code of ethics, Schwartz (2004) issued that "a code of ethics is a written, distinct and formal document which consists of moral standards used to guide employee and/or corporate behaviour". Firms who operate at international level are more likely to have a written code of ethics; a study upon this was conducted

by McKinney & Moore in 2007. In the specialty literature, Kaptein (2004) and Kaptein & Schwartz (2008) clarified that for code of ethics there have been used other various names such as code of conduct, integrity code, business code, corporate credo, code of practice, business principles, corporate philosophy, corporate ethics statement.

What is Business Success?

There are many points of view about business success which shall be discussed below but what we know for sure is that success always brings an award for those who hold it. In fact this award is the one who triggers people for gaining success. But an exact recipe that would lead a company to success can not be set as success does not mean same thing to everyone: for some people, being successful means to reach a top position and have enough money to leave happy, without worries and fears regarding the future.

For others, having success may consists of being a top seller on the market. But business success is not only about selling products that suites the market. This is the result of having success and it starts with the leadership of the company. In his book, Baggett (2000) has shown that within a company, leaders should be the firsts who strive for companie's success and the best leader is the one who serves the others, thinks that finding a solution represents a higher priority than placing blame, understands the power of synergy, is flexible, open minded, fully accepts responsibility, shares knowledge, knows that employees want to be heard and understood, learns from failure, listens with his ears as well as with his heart, place effectiveness ahead of efficiency.

For other authors like Gagliardi (2006), business success means to be better than the competitors on the market and in its opinion the key of success is to develope dominating competitive positions that can not be attacked by competitors. In his book, Gagliardi presented nine formulas that describe how to build dominant positions and have business success.

Techniques for eliminating barriers to profitable growth, change management, business process improvement represents the basis of business success says Peter Cleveland (2002), senior vice-president at Ernst&Young. Case studies and methods that lead businesses to success can be found in Carstea (2016), Carstea et al (2014), David (2011).

As we can see, there are many points of view of approaching business success but one thing is clear: any company is searching for success and the way it reaches it, may differ from one to another.

Link between Ethics and Business Success

According to Ethisphere Institute, the global leader in defining and advancing the standards of ethical business practices, among 2016 world's most ethical companies list there are: Dell, Ford Motor Company, Intel Corporation, Levi Strauss & Company, L'Oreal, ManPower Group, Marriott International, Marks&Spencer, Royal Carribean Cruises, Starbucks, Xerox (the list includes 131 companies spanning 21 countries and 45 industries). All these companies are business successful thus showing us an implicit connection between ethics and business success.

In his article published by Forbes, Strauss (2016) mentioned that the goal of Ethisphere's ranking is to offer a model on how corporate entitities should manage themselves, improving their own activities and have business success. He said that this list "represents some of the best the international business world has to offer". Ethisphere (2017) evaluates firms upon 5 criteria considered as core for ethics, namely: ethics and compliance program; corporate citizenship and responsibility; culture of ethics; governance; leadership, innovation and reputation.

For this survey, there were also taken into account companies' size, geographic location, activity domain (industry), history of litigation, reputation, ethical track record, and other factors like risks exposure, sustainability, etc. Ethisphere does not take into account firms that deal in alcohol, tobacco or firearms (Strauss, 2016).

Another study conducted by Ethics&Compliance Initiative (2016) is Global Business Ethics Survey, a research project performed through online panels from 13 countries. This survey provides reliable insights about organizational ethics in global economies that are critical to business success on the basis of four key metrics: pressure to compromise organizational standards, observed misconduct, reporting of misconduct when observed and retaliation against reporters. Thus, ECI identified some principles common to High-Quality Ethics and Compliance Programs that may help company to reach business success, among which we mention: ethics and compliance are central to business strategy and leaders at all levels across the organization have to build and sustain a culture of integrity that prizes ethical decision-making.

Methodological Aspects of the Qualitative Research

In his book, Malhotra (2007) shows that qualitative research provides insights and understanding the problem setting, while quantitative research seeks to quantify the data.

Qualitative research aims to provide a deep understanding of people's contextualized behaviour. It aims to explain how and why people behave as they do, therefore there are examined beliefs, perceptions, motives, attitudes and opinions as mentionned by Bowie and Buttle (2004).

Survey Method. A survey consists of gathering data by interviewing people. The advantage of a survey is that information comes directly from the people you are interested in. The main limitation of a survey is that are opportunities for error in the construction of the survey questionnaire.

As stated by Etzel et al (1997), personal interviews are more flexible than phone or mails because more information can be obtained by personal interview and interviewers can probe more deeply if an answer is incomplete.

The purpose of this study was to determine the connection between ethical behaviour and business success, the general objective of the research being to learn about the concept of ethics in business.
In order to reach the above-stated aim, the following specific objectives were established:

1. *To identify individuals representing ethical models for the interviewed subjects;*
2. *To identify the factors influencing the unethical behaviour;*
3. *To identify the way in which breaking the principles of ethics affects the quality of work and products/services provided.*

In order to achieve the objectives listed above, a qualitative research was conducted, using the in-depth, semi-structured interview method. The sample was made of 20 subjects and the structure of the interviewed people is presented in Table 1.

Table 1: The Structure of Research Sample

Participant	Demographics					
	Seniority [years]	**Field of Work**	**Type of Company**	**Age**	**Gender**	**Studies**
S1	28	State public service	National	54	Female	Higher education
S2	27	Management, supply chain, import, distribution	National	47	Male	Post-graduate
S3	8	Furniture design	National	27	Male	Student
S4	20	Automotive, financial field	National	42	Female	Higher education
S5	20	Economics	National	40	Female	Higher education

S6	10	Non-profit, social, humanitarian and educational activities	National	38	Male	Higher education
S7	20	Services	National	44	Male	Post-secondary education
S8	20	Sales	National	42	Male	Higher education
S9	20	Culture	National	47	Male	Higher education
S10	5	Trade	National	25	Male	Student
S11	15	Technical	Multinational	33	Male	Higher education
S12	21	Industry	National	39	Female	Higher education
S13	21	Economics	Multinational	47	Male	Higher education
S14	5 months	Nutrition	Multinational	22	Male	Higher education
S15	1.5 years	Trade	Multinational	21	Female	Student
S16	6 months	Services	Multinational	22	Male	Higher education
S17	19	Automotive	Multinational	40	Female	High School
S18	2.5 years	Services	Multinational	28	Female	Higher education
S19	20	Services	Multinational	49	Female	Higher education
S20	1.5 years	SPA	National	20	Male	Student

The subjects interviewed were chosen taken into account their education and training but also their work experience (either students or graduates of economics faculties who studied subjects that dealt with concepts related to business ethics, or practitioners who were able to express an opinion from their own experience). The structure of the interviewed subjects by gender, type of organization they work for and their seniority is presented in figures no. 1, 2 and 3.

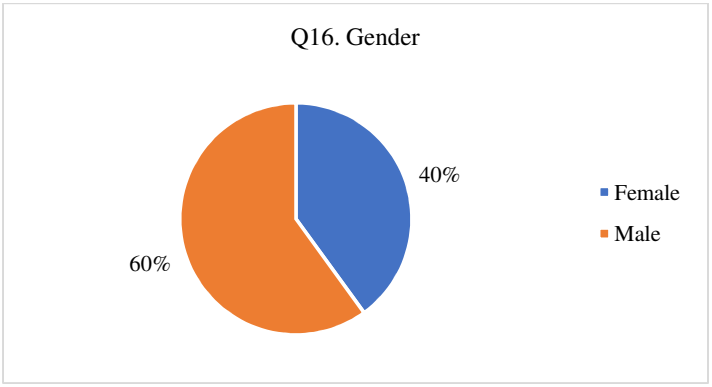


Fig. 1: Subjects Gender

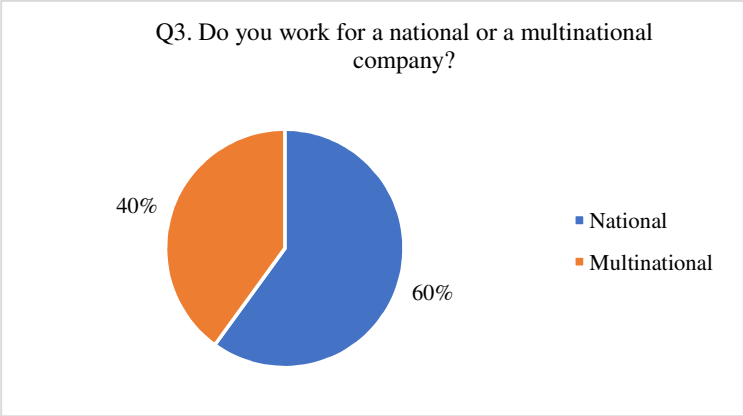


Fig. 2: Subjects Division by the Type of Organization They Work for

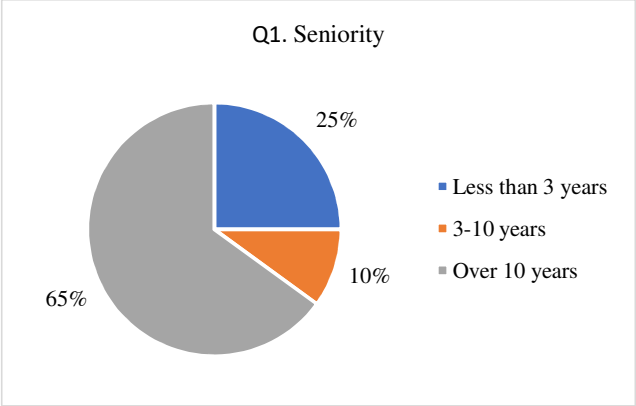


Fig. 3: Seniority of Interviewed Subjects

The interview guide, which included 18 questions, had both questions covering the general aspects under research, such as the awareness of the concept of business ethics and business success definition, and questions aimed to identify level of importance subjects give when it comes to complying with ethics and the potential correlation between business success, ethical behaviour and quality of provided work.

The qualitative research method used was the exploratory one, respectively exploratory investigation and as Constantin and Tecău (2013) mentionned, this kind of method is often used in order to investigate new and complex fields, collect information where secondary data is hard to get and when provision of a theory is intended.

In his book, Lefter (2004) stated that marketing qualitative research may rely on several investigation techniques such as direct communication techniques – which may be individual (structured, semi-structured or unstructured) or in group (debate group, focus group etc.) - or indirect communication techniques (projective techniques). In this case, we went for a direct individual communication technique namely semi-directive (semi-structured) in-depth interview.

The interviews were conducted between March 2017 and May 2017 and were afterwards transcribed in order to conduct a content analysis.

Content Analysis

In the content analysis, the questions of the semi-structured interview were correlated with the previously mentioned objectives.

For the first specific objective of the research correlated with the general objective (*"To learn about the concept of ethics in business"* and *"To identify individuals representing ethical models"),* all interviewed subjects asserted they knew what this concept meant and 45% of them considered they could identify individuals representing business ethical models (see figure 4). For instance, *S10* mentioned *Warren Buffet* as model of ethical behaviour, while *S13* went for *Mehran Tavakoli Keshe*.

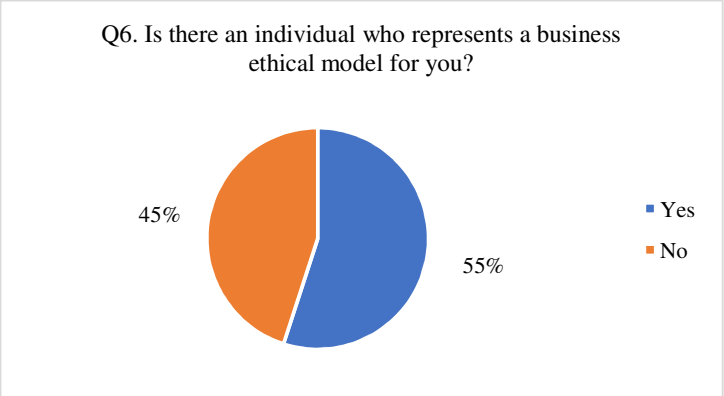


Fig 4: Share of Subjects Who Have an Individual as a Business Ethical Model

When it comes about defining the concept of ethics in business, we mention some opinions: S1 considers that business ethics is " *…a set of moral principles, methods and tools without which a business cannot develop ...*", S4 asserts that business ethics is correlated with "*adherence to moral norms",* and S19 defines the concept as *"promoting and implementing the moral principles within the company, in the relations from the internal and external environment (shareholders, employees, customers, suppliers, partners, authorities)".*

We also found interesting the subjects' answers to the question related to success definition *(What does success means to you?): S1 "the effort and abnegation towards achieving a goal", S15 "the capacity to succeed regardless of the situation" and S16 "to succeed in achieving all intended goals".*

Among the factors ensuring business success mentioned by our subjects, there are: *perseverance, profit, respect for competition, integrity, courage, seriousness, talent, profit reinvestment, quality, staying true to commitments, competent and moral people, professional training, correctness, honest partners, consistency, permanent adaptation to market needs, instinct, political stability, luck, notoriety, providing high quality products/services for competitive prices, money, work expertise, strategy, entrepreneurial spirit, trust in yourself and in what you do etc.*

In respect to the second specific objective *"To identify the factors influencing the unethical behaviour",* 51% out of respondents mentioned desire for gain, 16% the strong competition, 14% personality and 19% other reasons.

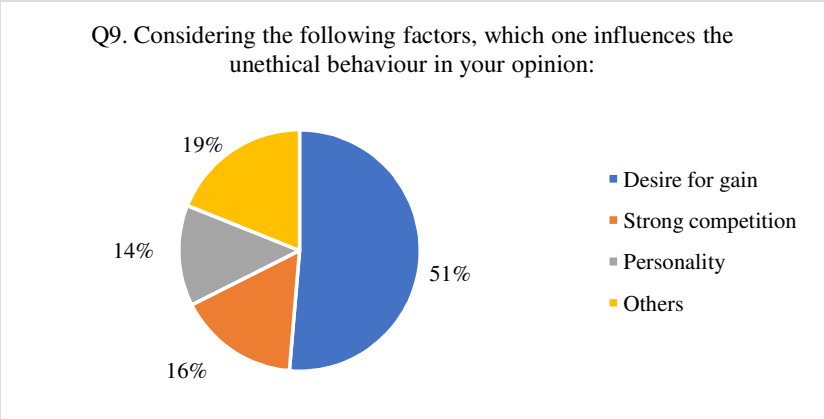


Fig. 5: Share of Factors that Influences Unethical Behaviour

The most interesting answers the subjects gave to question no. 10 ("*Which are in your opinion the consequences of an unethical behaviour?*") were: *maximum material profit for short period of time, achieved by breaking the ethical principles; corporate divergences; bankruptcy; corrupted company; personal benefits; legal and financial repercussions from authorities; perpetuation of negative values affecting the behaviour as well; customer dissatisfaction; image impairment, etc.*

Among the companies that subjects consider having an ethical behaviour we mention: *ICCO Clinics, Private Healthcare Network Queen Mary, Saint Constantin Hospital, Ina Schaeffler, Ikea, Apple, Emag, Vodafone, Orange, OMV, Telekom, Maurer Imob, Dacia Plant, Transilvania University of Brasov, Interbrands, Marketing&Distribution - P&G, Keshe Foundation, Albalact, Sergiana, Bit Software Brasov, Hutchinson, Gelu Bagel Shop etc.*

The elements that distinguish ethical companies from others were indicated by the answers to question no. 12 ("*Which elements distinguish in your opinion ethical companies from the unethical ones?*"). The elements mentioned by respondents were: *professionalism, correctness, management, care for customers, care for people/humanity, investment in employees, respect for partners, profit, compliance with law, social responsibility activities etc.*

The third specific objective - *"To identify the way in which breaking the principles of ethics affected the quality of work and products/services provided"* - got two of the 18 questions of the interview guide, namely questions 13 and 14.

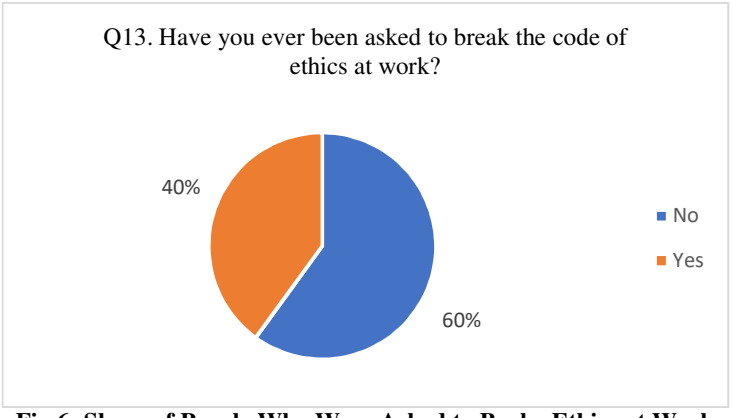


Fig 6: Share of People Who Were Asked to Brake Ethics at Work

As a result of our survey, 40% of the interviewed people answered that they were asked to brake ethics at workplace and among them 75% accepted it thus showing us that some employees do not

betrade companies own values. People at work were asked to offer bribery, sexual favors, imposing some people on certain job positions, omission of some items in the financial statements so that company may get included in a lower risk class by the bank, violation of government laws, delivery of a component made of material other than that requested by the customer, without informing him. Those who broke the rules said that this affected the quality of their work generating additional work effort (preparation of extra statements), stress affecting the personal well-being so as employees were tempted to look for another job.

Conclusions

The most important conclusions of the qualitative research are:

- all subjects interviewed stated that they knew what the concept of business ethics dealt with;
- 45% of the respondents stated that they could identify individuals representing models of ethics in business and they gave several examples in this respect;
- in respect to determining the factors influencing the unethical behaviour, 51% of respondents mentioned desire for gain, 16% the strong competition, 14% personality and 19% other reasons.
- in subjects 'opinion, there is a multitude of elements that distinguish the ethical companies from the unethical ones (*professionalism, correctness, care for customers, legal compliance, management, respect for partners, social responsibility activities etc.*).
- 40% of the subjects stated they had faced situations of breaking the ethics within the organizations they work/worked for. Those who broke the rules said that this affected the quality of their work generating additional work effort, and stress.

Therefore, culture of ethics should be embedded within a company from top down and all employees should be aware of it and apply it. Lack of ethics may cause serious problems in a business affecting employee performance, employee work relations, company's image and credibility.

References

Baggett, B. (2000). "The Complete Book of Business Success", Rutledge Hill Press, Tennessee, USA, ISBN 1-55853-810-0, 2000

Bowie, D. and Buttle F. (2004). "Hospitality Marketing. An Introduction", Elsevier, Amsterdam, pp.44

Carstea, C.G. (2016). "Object Oriented Dynamic Model for a Human Resource System – Based on Components", 15th Conference on Applied Mathematics, Institute of Mathematics and Physics Faculty of Mechanical Engineering, Slovak University of Technology, Bratislava, Slovakia, ISBN 978-80-227-4531-4.

Carstea C.G., Enache-David N. and Sangeorzan L. (2014). "Fractal Model for Simulation and Inflation Control", *Bulletin of the Transilvania University of Brasov*, 7(56)(2), Series III: Mathematics, Informatics, Physics, ISSN 2065-2151, pp. 161-168.

Cleveland, P.M. (2002). "50 Steps to Business Success: Entrepreneurial Leadership in Manageable Bites". ECW Press, Ontario, Canada, ISBN 1-55022-518-9.

Constantin, C. and Tecău, A. (2013). "Introduction in Marketing Research", Universitară Publishing House, Bucharest, ISBN 978-606-591-618-0, pp. 31.

David N. (2011). "Informational Systems and Informatic Applications in Businesses", Lambert Academic Publishing, Saarbrücken, Germany, ISBN 978-3-8454-1265-8.

Ethics&Compliance Initiative (2016). "Global Business Ethics Survey". USA, ISBN 978-0-916152-28-4.

Ethisphere Institute (2017). "2016 World's Most Ethical Companies List", Scottsdale, Arizona, USA, Available at http://worldsmostethicalcompanies.ethisphere.com/, accessed on the 12th of June, 2017.
Etzel, M.J., Walker, B.J. and Stanton, W.J. (1997). "Marketing", 11-th ed, Irwin McGraw-Hill Company, Boston, Massachusetts, pp.85

Ferrell, O.C., Hirt, G. and Ferrell, L. (2011). "Business: A Changing World". 8th Edition. New York, McGraw-Hill Irwin, ISBN 978-0-073511-757.

Kaptein, M. (2004). "Business Codes of Multinational Firms: What Do They Say?" *Journal of Business Ethics*, Springer, pp.13-31.

Kaptein, M. and Schwartz, M.S. (2008). "The Effectiveness of Business Codes: A Critical Examination of Existing Studies and the Development of an Integrated Research Model", *Journal of Business Ethics*, Springer, pp.111-127.
Gagliardi, G. (2006). "Nine Formulas for Competitive Business Success: The Science of Strategy". Clearbridge Publishing, Science of Strategy Institute, Seattle, USA, ISBN (10) 1-929194-404, ISBN (13) 978-1-929194-407.

Lefter, C. (2004). "Marketing Research", Infomarket Publishing House, Brasov, pp. 43.
Longman Business Dictionary (2017). Pearson, London, UK. Available at http://www.ldoceonline.com/dictionary, accessed on 15th of June, 2017.

Malhotra, N.K. (2007). "Marketing Research. An Applied Orientation", Pearson Prentice Hall, New Jersey, pp.145

Pauna, D., Dila, D. and Tureac, C. (2014). "Ethics in the Institution of Consumers' Protection". Acta Universitatis Danubius, *Oeconomica Journal*, 10 (2), ISSN 2065-0175, pp.5-18

Strauss, K. (2016). "The World's Most Ethical Companies 2016", Forbes, New Jersey, USA.
Schwartz, M.S. (2004). "Effective Corporate Codes of Ethics: Perceptions of Code Users", *Journal of Business Ethics*, 55 (4), Springer, pp. 321-341.

The Phenomenon of Ad-blocking in the Light of Research Involving Individual Internet Users

Janusz Wielki, Opole University of Technology, Opole, Poland, Janusz@Wielki.pl

Abstract

This paper concerns a phenomenon with significant economic effects known as ad-blocking that has been rapidly growing for several years. The paper analyzes the causes and the scale of this phenomenon and its economic effects. In addition to the analysis of reports on ad-blocking, the survey conducted on a targeted group of individual Internet users was an important part of this project. It enabled to discover their motivations for using ad-block type solutions, the scale of their use on various devices, and the conditions on which they would be willing to give up their use. This made it possible to formulate some preliminary recommendations on the necessary directions of action.

Keywords: ad-filtering, on-line advertising, advertising model, electronic economy.

Introduction

Dynamically developing digital technologies cause profound changes in virtually all areas of the contemporary economy and its organizations (Wielki, 2015), and advertising was one of the first to experience this (Wielki, 2007). Since the advent of the first Internet banner in 1993, the digital advertising market has grown at an extremely fast pace (Jupiter, 2016). Its value was expected to reach $66 billion at the end of 2016 in the United States alone (IAB, 2016). The global value of revenue from digital advertising was estimated at $160 billion at the end of last year and to reach $285 billion in 2020 according to Jupiter Research estimates. This increase is primarily at the cost of traditional media, and ads related to mobile devices and so-called wearables will be the main contributor to its rapid growth in the coming years. In their case, spending on advertising will grow at a rate of 22% per year (Jupiter, 2016a).

Simultaneously with the dynamic growth of the organizations' spending on various forms of digital advertising, there has been a rapid growth of the phenomenon of blocking of advertising by targeted recipients, termed ad-blocking, over the past few years. It was already noticeable at the beginning of the second decade of this millennium, but its rapid growth became a fact in 2013 and intensified in subsequent years (Ryan et al., 2017). This phenomenon is beginning to raise the concerns of both advertisers and the entire advertising industry, hitting every entity in the digital advertising ecosystem and causing a rapid increase in economic costs in billions of dollars (Cookson, 2015; eMarketer, 2015; eMarketer, 2016; Manjoo, 2015; PageFair and Adobe, 2015; Searls, 2015).

Hence, given the importance of ad-blocking in the context of its impact on digital economy and its development, the main goal of this publication is to analyze the causes, scale, and dynamics of this phenomenon. In this context two basic research questions have been formulated:

- What are the main reasons for using ad-block solutions by individual Internet users?
- What are the conditions under which individual Internet users would be willing to stop using ad-block solutions?

The paper is based on data from reports on ad-blocking and own research conducted on individual Internet users.

Ad-Blocking: The Notion, Scale, Causes of Development, and Economic Consequences

The concept of ad-blocking and the historical aspects of the development of the phenomenon

Ad-blocking, also referred to as ad-filtering is, in the simplest terms, the blocking of Web advertisements. Various types of software are used to remove or alter the content of advertisements appearing on webpages and websites or in mobile applications. There are a variety of solutions used for this purpose (such as ad-blocking extensions, browsers, VPNs or DNS) that act as a firewall between the web browser and any known ad servers. In most cases, advertisements are blocked by end users using open-source web browser extensions (PageFair and Adobe, 2015).

As already mentioned, the phenomenon of ad-blocking began to be clearly visible in 2013. Figure 1 shows the dynamics of its growth. And so, the number of desktop devices blocking ads was 54 million in January 2013, and it already increased to 236 million in January 2017.

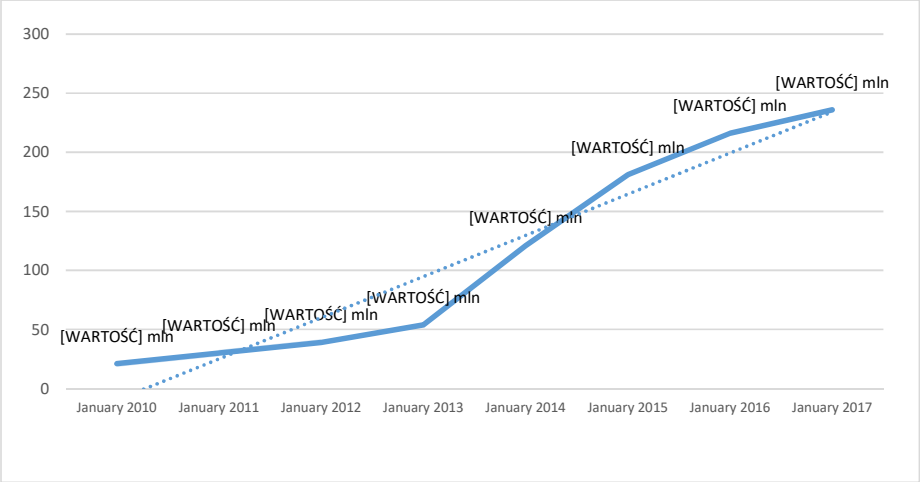


Fig. 1: Increase in the number of desktop devices blocking ads in 2010-2017

(source: PageFair, 2017)

At the same time, the number of mobile devices which block ads has also grown very rapidly. It was 145 million devices in January 2015, and 380 million two years later (PageFair, 2017– see Fig. 2).

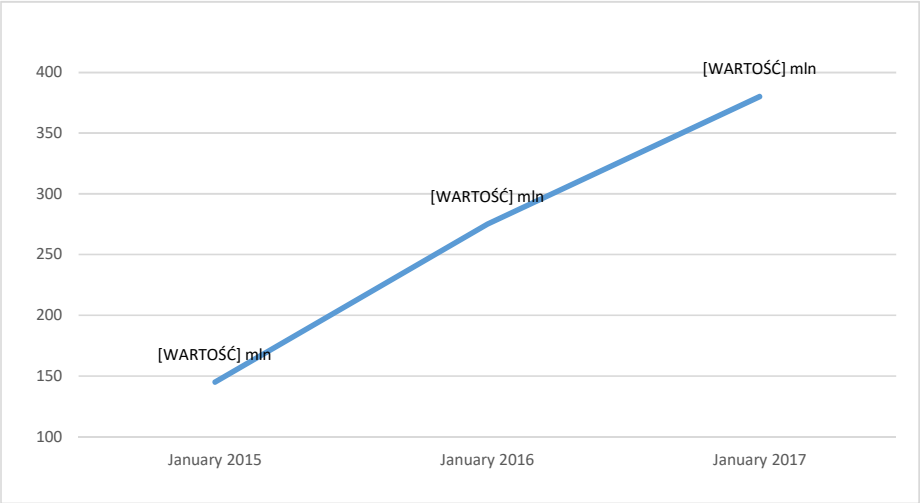


Fig. 2: The dynamics of growth in the number of mobile devices blocking ads in 2015-2017 (source: PageFair, 2017)

In the case of mobile devices, Asia-Pacific users definitely dominate, as 94% of global mobile adblock usage is in this region (PageFair, 2017. Data from November 2016 show that the majority of users are from three countries (Fig. 3).

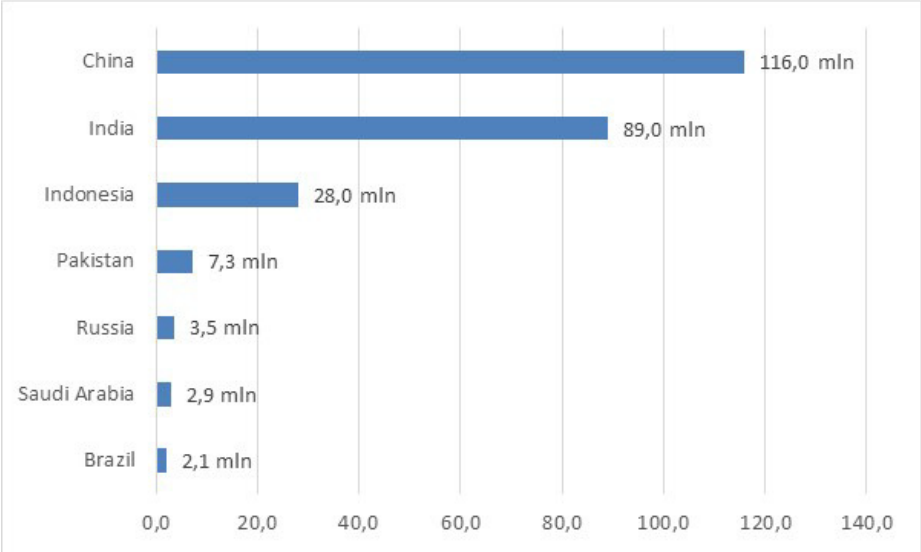


Fig. 3: Countries with the highest number of active mobile ad-blocking browser users in November 2016 (source: PageFair, 2016)

On the other hand, desktop adblock usage is dominated by Internet users in Europe and North America (68%). In Europe the majority are from Greece and Ireland (39%) and Poland (33%) (Fig. 4).

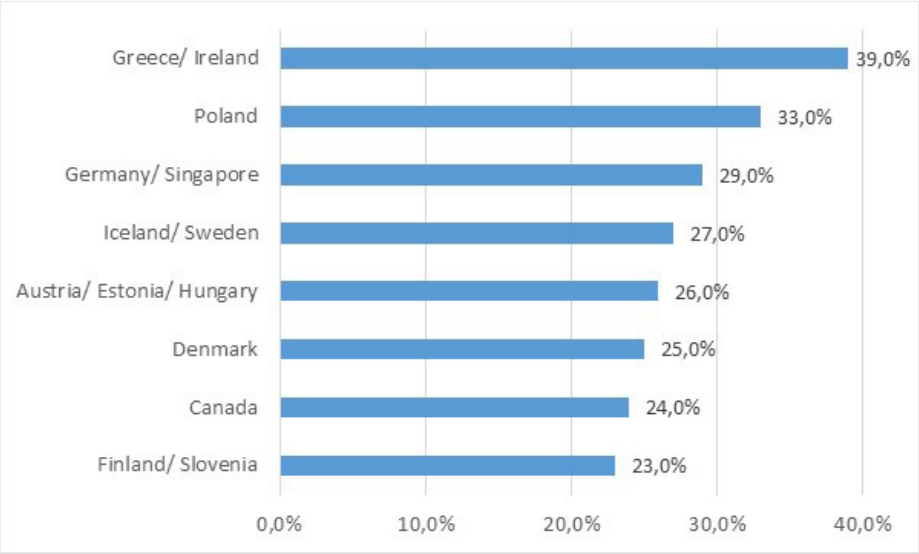


Fig. 4: Desktop adblock penetration per on-line capita % (source: PageFair, 2017)

The rate of growth of US ad-blocking users (% of Internet users) presents Fig. 5.

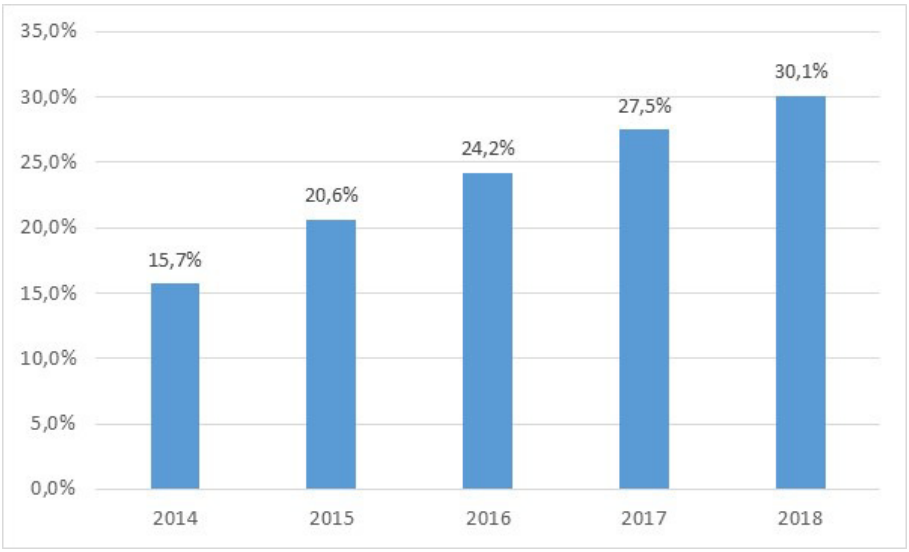


Fig. 5: US ad-blocking user penetration, 2014-2018 (source: eMarketer, 2017)

Main reasons for the growth of the ad-blocking phenomenon

There are a whole host of causes of the growth of ad-blocking in the world. Certain elements are common regardless of who did the study, however, some differences show up between them. According to the "2017 Global Adblock Report: The state of the blocked web" by PageFair, one of the most important factors that motivate users to use ad blocking solutions include (PageFair, 2017):

- Security (exposure to viruses and malware) – 30%.
- Interruption – 29%.

- Speed (slow website loading) – 16%.
- Too many ads on webpages – 14%.
- Privacy and tracking by unknown parties – 6%.

In contrast, the results of the survey among UK Internet users by AudienceProject in the third quarter of 2016 show the following reasons for blocking of ads by respondents (eMarketer, 2017):

- Websites are more manageable without banners – 31%.
- I want to avoid offensive or irrelevant messages – 31%.
- I don't want my behavior to be tracked – 23%.
- Websites load more slowly – 23%.
- I want to limit my data usage – 10%.

In turn, the results of the research conducted among the users of adblock-type solutions in Poland conducted in April 2016 show the following reasons for their use (eMarketer, 2016a):

- I'm annoyed by ads on the Internet – 74%.
- I can't see the page content because of the ads – 55%.
- It takes too long for pages to load because of the ads – 23%.
- I wasn't interested in the products presented in the ads – 15%.
- Ad blockers provide more privacy on the Internet – 19%.

The economic impact of the ad-blocking phenomenon

There are a whole host of causes of the growth of ad-blocking in the world. Certain elements are common regardless of who did the study, however, some differences show up between them. According to the "2017 Global Adblock Report: The state of the blocked web" by PageFair, one of the most important factors that motivate users to use ad blocking solutions include (PageFair, 2017):

- Direct costs.
- Hidden costs.

The first type of costs is those associated with "blocking" of revenues from advertisements (reduction of publisher revenue from advertising). In the United States alone, these costs amounted to $3.5 billion in 2013, and $20.3 billion in 2016 with advertising spending of $42.8 billion (2013) and $68 billion (2015), respectively. At the same time, global ad blocking costs were $7.2 billion in 2013 and were forecast at $41.4 billion in 2016 (PageFair and Adobe, 2015).

As far as the second type of costs is concerned, they primarily apply to small and medium publishers, and the mechanism for their creation is as follows. Blocking of ads results in a decrease in revenue from advertising for all publishers. This in turn reduces the chances of them investing in the content presented on the website. As a result, they become less attractive to recipients. As a result, traffic on a website decreases, resulting in reduced advertising revenue (PageFair, 2017; Ryan et al., 2017).

The Phenomenon of Ad-Blocking in the Light of Author's Own Research

With knowledge based on the analysis of reports on ad blocking and general trends related to it, it was decided to conduct in-depth research on a targeted group of individual Internet users. By choosing it, the following premises were followed:

1. Age of users.
2. Education.
3. Country of origin.

As for the first criterion, it was decided to choose a sample of people in the 19-25 age range assuming that they intensively or very intensively use the Internet. At the same time, as data from reports shows, people using ad-block type solutions are of a higher education (a bachelor's degree or higher) (see PageFair, 2017). Hence, the first, second, and third degree students were selected for the tests.

At the same time, the country of origin of Internet users was an important criterion. It was important that they came from a country where ad blocking is widely spread among Internet users. In this context, users from Poland, as the population which is the third most intensively using ad-block type solutions, were quite an obvious choice (see Fig. 4).

The study was conducted in the period of 01.02.2017–19.05.2017. These were surveys using Google Forms. 178 students of the Opole University of Technology and the University of Opole took part in the study (the majority of participants were students of the former – 176 people). The largest group of people who completed the survey were the students of the first (50%) and the second year (39.9%) of first degree studies in economics (51.7%), management (36%), and administration (10.7%). The majority of the respondents were women (77%).

There were the following subjects of interest in the study:

1. Internet access tools used.
2. Intensity of using the Internet.
3. The level of ad-block type solutions deployment across devices.
4. Reasons for using ad-block type solutions.
5. The conditions under which respondents would be willing to stop using ad-block solutions.

As for the first aspect, laptops and smartphones are definitely the two most popular tools for accessing the Internet (Fig. 6).

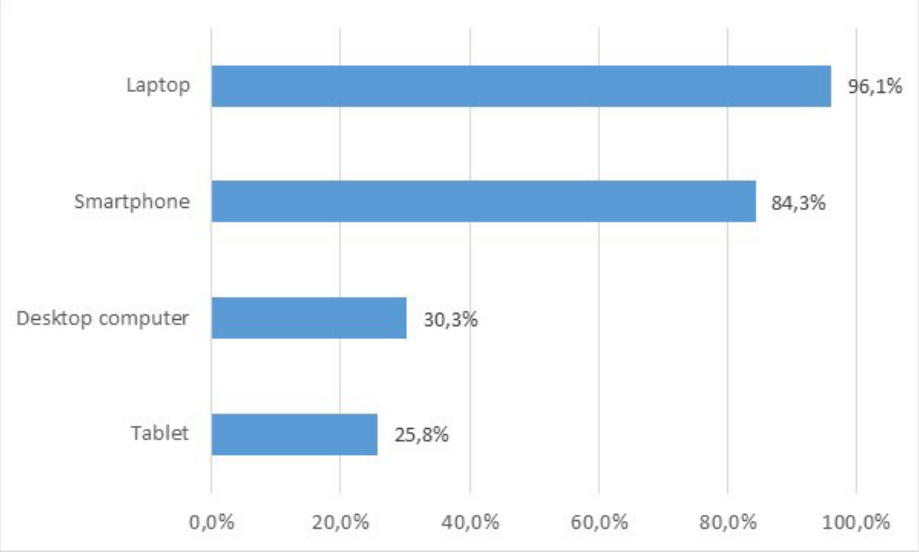


Fig. 6: Internet access tools used (source: own source)

The assumption regarding the time the respondents spent using the Internet proved to be accurate. The majority of the surveyed group uses the Internet intensely. It is over five hours in the case of nearly 40% of respondents and three to five hours in the case of 27% (see Fig. 7). At the same time, 54.5% of the respondents declare that they are connected to the Internet all the time (*always-on*).

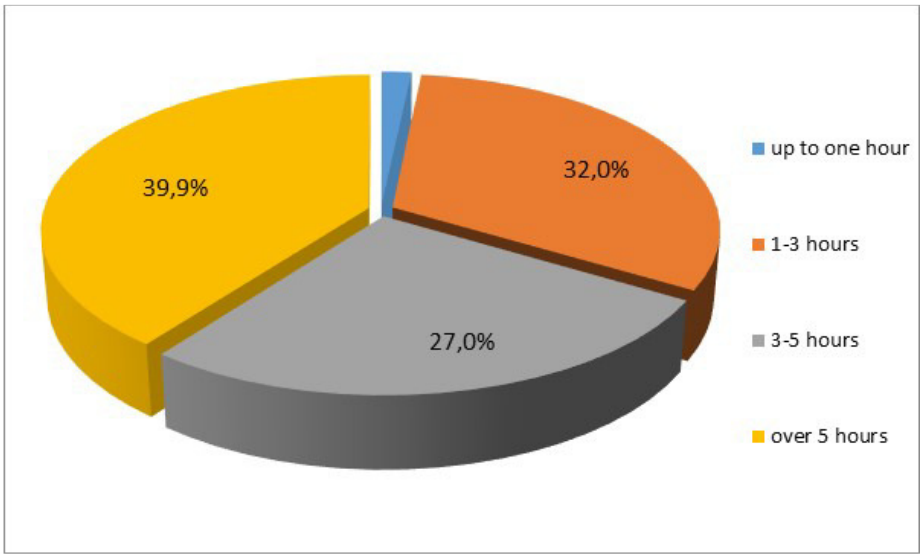


Fig .7: Intensity of using the Internet (source: own source)

Regarding the use of ad-block type solutions by respondents, it turned out that the majority (61.8%) uses them (see Fig. 8). This is almost double the average value for Internet users in Poland (33% – see Fig. 4).

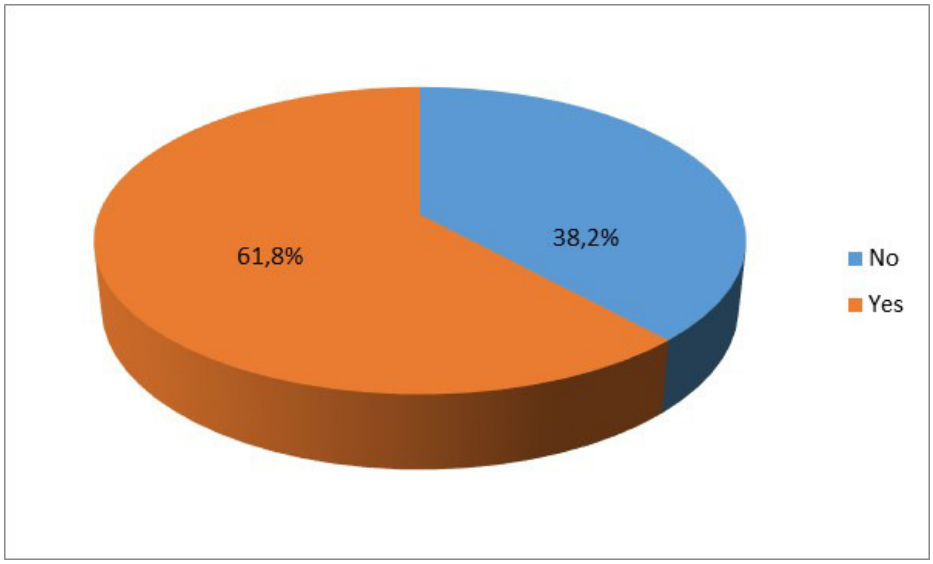


Fig. 8: Intensity of using the Internet (source: own source)

Another aspect of interest in the study was the question of which device(s) the respondents use ad-block type solutions on (see Fig. 9). It turned out that they are by far the most widespread in the case of laptops (90.3%). For smartphones, the second most popular Internet access tool, this percentage is low (less than 13%). However, this is not surprising in the context of the global trends shown above. We could even say that this is a relatively high level given the data regarding Poland shown in the report by PageFair (see PageFair, 2017).

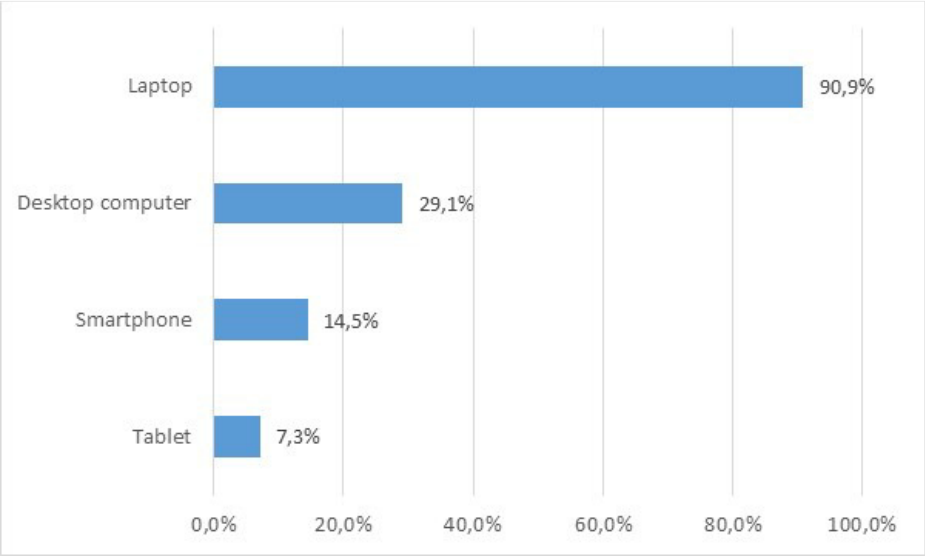


Fig. 9: Devices on which ad-block type solutions are used (source: own source)

It is remarkably important to know the motivations of Internet users to block ads in the context of the growth of ad-blocking (Fig. 10)

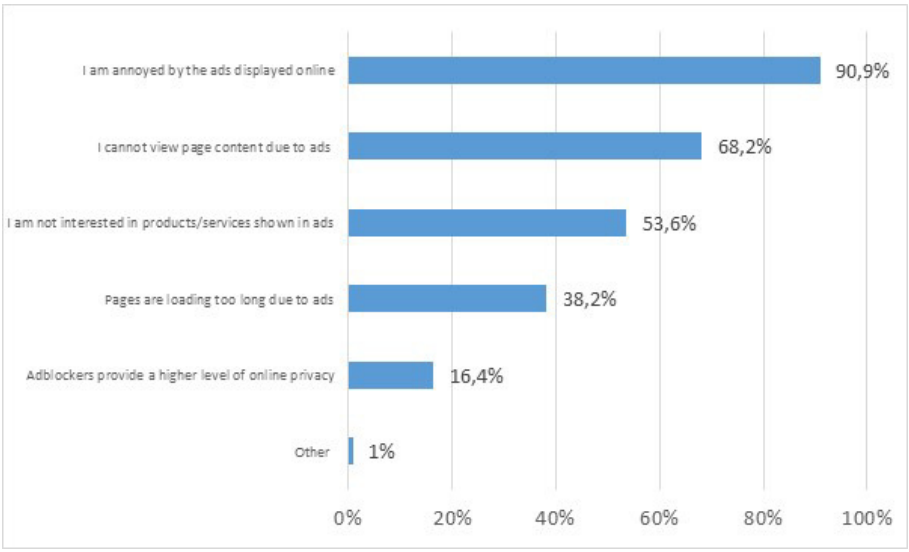


Fig. 10: User motivations in the context of using of ad-block type solutions (source: own source)

Definitely, the most important issue in this context has been the fact that online ads are annoying to Internet users (90.9%). Also, a significant percentage of the respondents (68.2%) indicated hindering the access to the content by the displayed ads. Both of these issues are undoubtedly directly related to aggressiveness of online advertising indicated by the Internet users in various studies. The third indicated issue (53.6%) concerns the lack of interest of Internet users in advertised products or services, which clearly indicates the lack of proper personalization of the presented advertising content. At the same time, it should be pointed out that the issue of online privacy was relatively minor (16.4%).

At the same time, knowing the reasons for blocking ads, it was also important to gain knowledge about in what services available online they are particularly annoying for respondents taking part in the study. It turned out that this was primarily the case for browsing Web content (68.2%). Also social media were highly ranked (66.4%). This is not particularly surprising since the respondents belong to a group of people who are particularly engaged in these media. However, a relatively low rank in online games or streaming is surprising (Fig. 11).

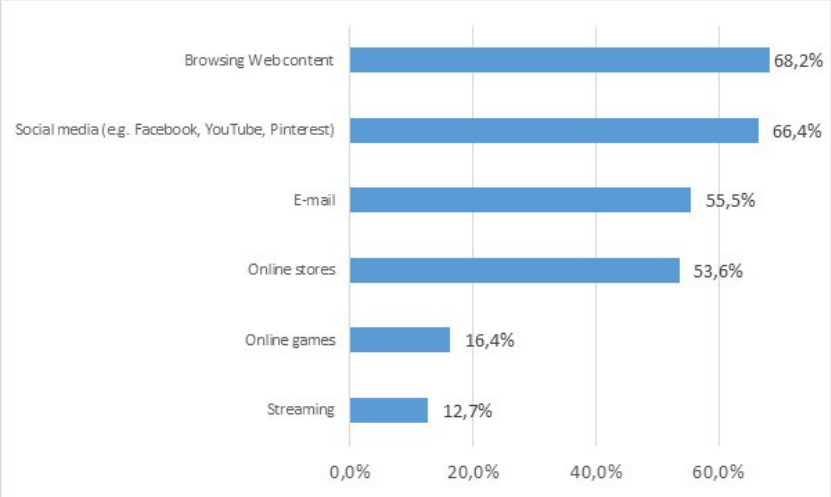


Fig. 11: On-line services where ads are particularly annoying (source: own source)

In the context of the results on the degree of use of ad-block type solutions by the respondents taking part in the survey, it was vitally important to know the situations in which they would be willing to give up their use (Fig. 12). The most important issues are lower invasiveness of online advertising (60.9%) and decrease in the number of Internet advertisements (54.5%). The following situations are also a strong incentive to uninstall ad-block type solutions: when payments are required for getting access to specific content (43.6%) and where blocking restricts access to certain content (37.3%).

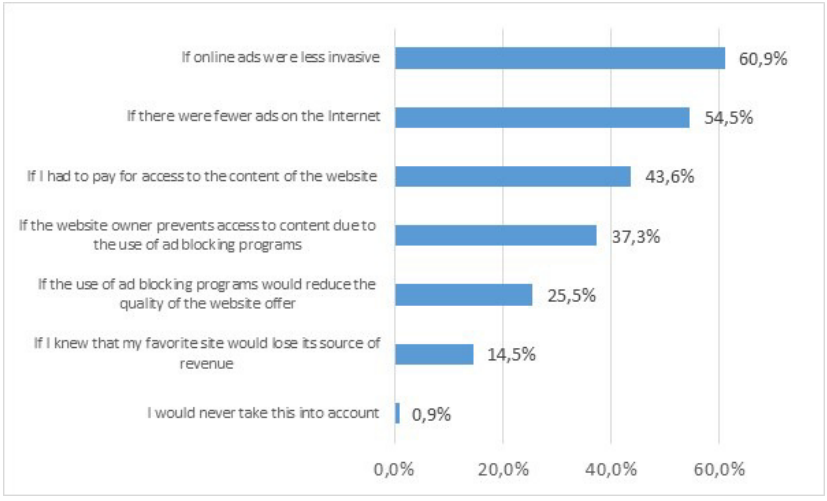


Fig. 12: Situations where it would be possible to uninstall ad-block type solutions

(Source: own source)

Respondents were also asked about their behavior when disabling ad-blocking programs was required to access certain content (Fig. 13). When analyzing the answer to this question, it seems surprising that only 32.7% of respondents in such a group are looking for alternative sites offering similar content or services. The vast majority (71.8%) decides to disable blocking programs.

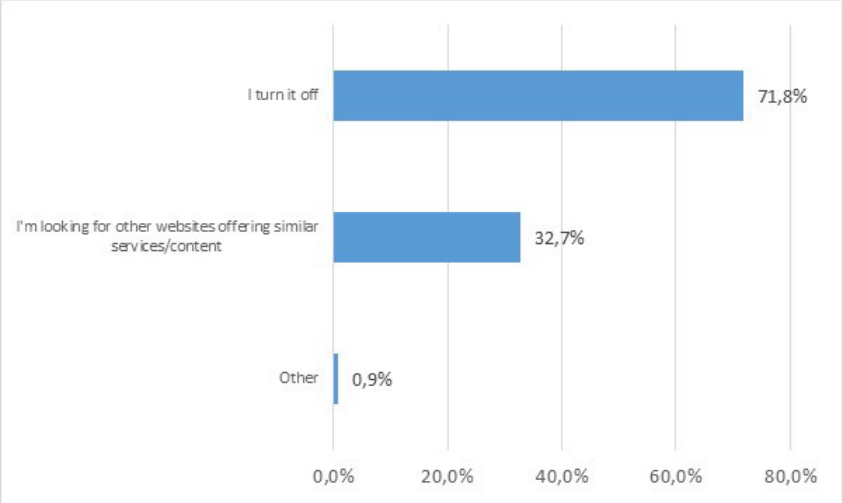


Fig. 13: User behavior when posed with the requirement to disable ad-blocking as a condition of accessing the content (source: own source)

Strategies of Organizations' Reactions to Ad-Blocking Phenomenon

As the presented analyses of secondary data and results of conducted own research show, ad-blocking phenomenon is the real challenge for organizations functioning in the ecosystem of digital advertising. On the other hand trends related to mobile devices indicate that the problem will escalate in the following years. Organizations take miscellaneous actions to counteract or reduce the phenomenon scale and its effects. Generally four strategies, observable in the market, can be distinguished. First three are reactive strategies, while the fourth is proactive.

Taking under the consideration the first strategy, it bases on persuading the users to cease using blocking solutions. This strategy is based on using by publishers different kind of technological solutions which allow them to discover whether consumer is using ad-block application. Then messages are sent to the users with argumentation that is meant to convince consumers to stop using ad-blocking solutions. Matter of effectiveness of such attitude is difficult to measure due to small number of available data (eMarketer, 2017).

The second strategy is to set up ad-block walls in the situation of using by consumers ad-blocking solutions. The effectiveness of this approach is shown by results of available research. It occurs that consumers when encounter the ad-block walls usually look for alternative content sources. Almost 74% of US ad-blocking users, surveyed in November 2016, left web pages when encountered ad-block walls. It is interesting that this kind of behavior was rare among younger consumers (eMarketer, 2017). This fact is confirmed by presented above results of own research.

The third of used strategies is based on presenting ads that cannot be blocked by the ad-block companies. Such strategy started to be used by many publishers including Facebook (ARF et al., 2017).

The last strategy is based on developing systemic solutions that considered both publishers and consumers interests. The result is creation of new model of functioning in digital advertising

ecosystem in which method, form and scale of advertising would be accepted by users. Coalition for Better Ads initiative, that associates the most significant entities in the market of on-line advertising, has made an attempt toward that direction. Within this association preliminary standards of new type of on-line ads have been created, which are being tested on more than 25 000 consumers (Coalition, 2017).

Conclusion

Ad-blocking phenomenon is rapidly becoming an increasingly challenging and economical problem in terms of the functioning and development of the electronic economy and business models used in it. This mainly applies to those where user access to specific on-line content depends on displaying of advertising material (the so-called ad-supported content delivered on-line). The problem becomes more significant when online advertising provides publishers more revenue than the access fees when using a paywalls based business model (Ryan et al., 2017). At the same time, the phenomenon of ad-blocking is rapidly expanding onto mobile devices where the dynamics of its growth is even greater than in the case of desktop devices. In fact it becomes the new form of the impact of elements of electronic space on organizations (see Wielki, 2007)).

In this situation, where publishers and other entities involved in digital advertising bear real and increasing economic costs, it is extremely important that stakeholders develop solutions which limit the scale of the ad-blocking phenomenon as much as possible. At present, publishers generally use three reactive strategies and the most common solution is to block access to content when users use ad-block type solutions.

Undoubtedly, besides this type of immediate activity, there is a real need to work out systemic solutions that take into account the interests of both publishers and consumers of digital advertising. The result should be the creation of a new digital advertising ecosystem based on ad-supported content delivered on-line, where the manner, form, and scale of displaying the advertisements will be acceptable to users. This particularly applies to the number of advertisements, their aggressiveness and the relevancy to individual interests of the recipients and the initiative undertaken by Coalition for Better Ads is such type of attempt.

At the same time, it is necessary to continuously monitor the ad-blocking phenomenon and further research on the subject as a very important issue for the e-economy. This also applies to the studies, whose results are shown in this article, which will continue in a broader scope and scale.

References

ARF, ISBA and PageFair (2017), Brand safety and the unblocked web. [Online], [Retrieved June 12, 2017], https://pagefair.com/wp-content/uploads/2017/06/Brand-safety-study-5.pdf.

Coalition for Better Ads (2017), Initial Better Ads Standards. [Online], [Retrieved June 20, 2017], https://www.betterads.org/ standards/.

Cookson, R. (2015), Publishers and adblockers are in a battle for online advertising, *Financial Times*. [Online], [Retrieved March 29, 2015], https://www.ft.com/content/c84a647e-d3af-11e4-99bd-00144 feab7de.

eMarketer (2016), Ad Blocking Moves into the Mainstream in the UK. [Online], [Retrieved April 20, 2016], http://www.emarketer.com/Articles/Print.aspx?R=1013842.

eMarketer (2017), As Ad Blocker Use Grows, Publishers Face New Challenges. [Online], [Retrieved June 26, 2017], https://www.emarketer.com/Articles/Print.aspx?R=1016076.

eMarketer (2017), Education Key to Re-Engaging Ad Blockers in the UK. [Online], [Retrieved February 24, 2017], https://www.emarketer.com/Articles/Print.aspx?R=1015302.

eMarketer (2016), In Poland, Ad Blocking Users Complain of Too Many Ads. [Online], [Retrieved September 16, 2016], https://www.emarketer.com/Articles/Print.aspx?R=1014488.

eMarketer (2015), UK Publishers Feel Threatened by Ad Blocking. [Online], [Retrieved October 14, 2015], http://www.emarketer.com/Articles/Print.aspx?R=1013091.

IAB (2016), IAB Internet Advertising Revenue Report 2016: First six months results. [Online], [Retrieved December 06, 2016], http://www.iab.com/wpcontent/uploads/2016/04/IAB_Internet_ Advertising_Revenue_Report_HY_2016___.pdf.

Jupiter (2016), Digital Advertisers vs the Ad Blockers. [Online], [Retrieved June 22, 2016], https://www.juniperresearch.com/document-library/white-papers/digital-advertisers-vs-the-ad-blockers.

Jupiter (2016), Digital Advertising Revenues to Double by 2020, Rising to $285Bn. [Online], [Retrieved June 21, 2016], https://www.juniperresearch.com/press/press-releases/ digital-advertising-revenues-to-double-by-2020.

Manjoo, F. (2015), Ad Blockers and the Nuisance at the Heart of the Modern Web, *The New York Times*. [Online], [Retrieved August 19, 2015], http://www.nytimes.com/2015/08/20/technology/ personaltecad-blockers-and-the-nuisance-at-the-heart-of-the-modern-web.html?r=0.

PageFair and Adobe (2015), The cost of ad blocking: PageFair and Adobe 2015 Ad Blocking Report, [Online], [Retrieved October 16, 2015], http://downloads.pagefair.com/reports/2015_report-the_cost_of_ad_blocking.pdf.

PageFair (2016), Adblocking Goes Mobile: PageFair 2016 Mobile Adblocking Report, revised November 2016. [Online], [Retrieved December 12, 2016], https://pagefair.com/downloads/2016/ 05/Adblocking-Goes-Mobile.pdf.

PageFair (2017), The Hidden Cost of Adblocking: Adblock's impact on website traffic. [Online], [Retrieved March 06, 2017], https://pagefair.com/downloads/2017/04/White-paper-on-the-hidden-cost-of-adblock.pdf.

PageFair (2017), The state of the blocked web: 2017 Global Adblock Report. [Online], [Retrieved February 09, 2017], https://pagefair.com/downloads/2017/01/PageFair-2017-Adblock-Report.pdf.

Ryan, J., Shiller, B., and Waldfogel, J. (2017), Will Ad Blocking Break the Internet?, *Working Paper 23058*. [Online], [Retrieved February 01, 2017], http://www.nber.org/papers/w23058.

Searls, D. (2015), The End of Internet Advertising as We've Known It, *MIT Technology Review*. [Online], [Retrieved December 11, 2015], https://www.technologyreview.com/s/544371/the-end-of-internet-advertising-as-weve-known-it/.

Wielki, J. (2007), Marketing elektroniczny, Strategie i modele gospodarki elektronicznej, Olszak, C and Ziemba, E. (eds), Wydawnictwo Naukowe PWN, Warszawa.

Wielki, J. (2007), 'Social and ethical aspects connected with e-space development (revised version),' *Journal of Information, Communication and Ethics in Society*, 5(4), 321-333.

Wielki, J. (2015), 'The social and ethical challenges connected with the big data phenomenon,' *Polish Journal of Management Studies*, 11(2), 192-202.

The Prerequisites for the Accounting Harmonization

Ionela Ivan, Accounting, The Bucharest University of Economic Studies, Bucharest, ROMANIA, ivan_v_ionela@yahoo.com;
Mihaela-Nicoleta Băcanu, Accounting, The Bucharest University of Economic Studies, ROMANIA, bacanu_mihaela90@yahoo.com

Abstract

Defining accounting harmonization is a good point to start and the perspective suggests an implementation of a unitary and uniform legislation according to the requirements and provisions of International Accounting Standards and European Directives. As a golden rule, before proceeding to harmonization there is important to assess the company's implementation capacity. In order for the information to be accurate, it is important to make it easily verifiable in terms of accuracy. Therefore, finding ways to present information so that it is easy to check and facilitate the checks implies having sufficient and appropriate evidence to support the accuracy and precision used in the context of measurement. The main purpose of the performed work is to answer to the question of the degree with which the accounting harmonization will enhance the credibility of the financial statements and add value to the company's business operations. In order to do this, we have performed a qualitative research by analyzing the responses of a group of 20 professionals - 10 auditors and 10 accountants, given in the distributed questionnaires during March-May 2017 within four companies, located in Bucharest. The results proved that the harmonization process is useful and brings multiple benefits to the professional's day-to-day activities and also every professional plays a very significant role in the process of harmonization by actively presenting various comparative analyses.

Keywords: - accounting, harmonization, standardization, taxation.

Introduction and Literature Review

Generally, the application of IAS/IFRS is a very complex process that can be due to the mandatory accounting regulations, the management's initiative, the request of the shareholders or the need to have comparative information.

Accounting harmonization is tightly connected to the international accounting standardization and standards can be written in clear language and have the required documentation for the implementation with proper training.

Among the advantages of the international financial harmonization there is the trust inspired by the financial statements prepared according to the International Accounting Standards.

The international harmonization of accounting principles is a topic of rapidly increasing importance as the jet age brings the financial centres of the world within a few hours of each other and improved means of data processing and of communication make the exchange of information almost instantaneous. Accountancy as the common language of business must keep up with this accelerated pace in order to maintain meaningful financial reporting (1967).

According to Nobes and Parker (2008), 'Harmonization' is a process of increasing the compatibility of accounting practices by setting bounds to their degree of variation. 'Harmony' is the state where compatibility has been achieved. 'Standardization' appears to imply working towards a more rigid and narrow set of rules. 'Harmonization' and 'standardization' have often been used interchangeably. However, standardization implies a narrowing down to one policy for any accounting topic, whereas harmonization implies that differences could be allowed to remain as long as the users of financial statements have a means of getting similar information from different statements. Harmonization is most useful when it concerns similar users who receive information from companies in different

countries. However there are some obstacles to harmonization such as the size of the present differences between the accounting practices of different countries, the lack of an international regulatory agency, the nationalism, the effect of 'economic consequences' on accounting standards.

Deegan (2009) provides theoretical explanations as to why, in the absence of efforts to globally harmonize or standardize accounting practices, accounting regulations and practices could be expected to vary between different countries. So, between countries are various differences, such as differences in culture, religions as a subset of culture, legal systems, financing systems, taxation systems, the strength of the accounting profession and accidents of history, which will also influence the accounting systems.

On the other hand, Beke (2010) describes and summarizes how the harmonized international accounting system can promote business decisions and influence economic environment. According to this, the unified, harmonized accounting system will lead to new types of analysis and data, furthermore with the possible integration of new indicators from the business management of certain countries. He classified the accounting systems, and in his opinion this classification should contribute to an improved understanding of: the extent to which national accounting systems are similar to or different from each other, the pattern of development of individual national systems with respect to each other and their potential for change, the reasons why some national systems have a dominant influence while others do not. The reason for differences in accounting principles between certain nations could be that they vary in the level of economic development, in the legal system, in the taxation system, in the intensity of capital market, so as in the level of inflation, in the typical methods of financing an enterprise, in the shareholder background, finally in the political and cultural traits, factors that are influencing accounting harmonization. Accounting diversity causes a series of problems such as the preparation of consolidated financial statements by companies with foreign operations, assessing to foreign capital markets, comparability of financial statements, the lack of high-quality accounting information in some parts of the world.

There are several studies analyzing the harmonization in different countries. The commitment by the European Union to mandate the use of IFRS for certain EU entities has generated a series of changes in global accounting that according to Gielen and Hegarty (2007) can only be described as revolutionary. They have shown, studying the case of nine EU Member States: Belgium, Denmark, Estonia, France, Germany, Luxembourg, Poland, The Netherlands, United Kingdom that strong statutory relationship between financial and tax accounting may have negative consequences, resulting in financial and/or tax accounting systems failing to achieve their objectives. However, a few additional considerations may help policymakers in evaluating the appropriate degree of relationship between tax and financial accounting given the circumstance of their Member State: the Member State's current situation (historical/tradition and economic); the case for associating tax and financial accounting.

Vallisova and Dvorakova (2011) detected the main differences between the Czech accounting system and IAS/IFRS and recovered further way of Czech accounting harmonization according to accounting global trends. The System of IAS/IFRS is from the beginning the purely accounting system and a range of financial and tax accounting are strictly separated. That is no longer in the Czech Republic, where financial profit is used as the basis for tax calculating and Czech accounting law is closely linked to the tax system.

Wysłocka (2008) presents the progress of harmonization of regulations concerning accounting, especially in Poland and describes functions performed by the accounting in market economy: reporting, evidential, optimizing, control, analytical. A relevant obstacle on this way is a high level of severity of Polish tax law.

Albu et al (2011) investigates the inter-play between institutions, routines and politics in the Romanian context and highlights the complexity of accounting change in an emerging country. According to them differences in the way IFRS will be applied in Romania and in other countries will remain, because of the environmental factors affecting the accounting system such as the

characteristics of a code-law country, a dominant position of the State and a reduced importance of the accounting profession.

The Benefits of Harmonization

The harmony is desired since it brings in more benefits and this mystery has shown all its clues. Each regulatory change had an important role in this process. The professional accountant has a dual role to play in relation to the set of alternatives that resulted after a number of changes to both accounting regulations and accounting standards.

The decision of adopting the IAS/IFRS should be based on a thorough investigation regarding related costs and benefits and whether this decision was justified from a cost-benefit point of view.

It is important to ensure that investors or managers take the proper decisions? Of course it is and factors in the situation that may trigger biases that the decision makers have need to be thoroughly analyzed.

The auditors rely only to a certain extent on the honesty of directors and no amount of regulation necessarily is going to ensure that dishonest people are going to be honest.

The application of IAS/IFRS can be due to the mandatory accounting regulations, the management's initiative, the request of the shareholders or the need to have comparative information.

Switching to IAS/IFRS can also generate costs related to training of personnel, double reporting, consulting services or even adjustment of computer information system, but the advantages of harmonization are multiple.

These costs should have been budgeted for even though the change of the relevant legislation would have been made fast.

All in all, the implementation of IAS/IFRS reporting offers a number of advantages:

-it offers relevant information to investors and therefore is an appropriate accounting system for listed companies

-it permits the access to the foreign financing market

-when in the process of decision making, the managers are offered a good information resource.

It is important to look at accounting harmonization as improvement and assess the accounting benefits in terms of whether new accounting practices satisfy better the interests of the users of economic information, and present the information in an understandable and fair way.

Different people may have different views regarding international accounting, which depend on the accounting practices used in the past and the construction of the concept of professionalism. Investigating the evolution and history of accounting brings into our attention the limits of harmonization.

In order to demonstrate the importance of harmonization, but also its limits we have distributed a questionnaire to a sample of professionals, which determines their position regarding the benefits of harmonization. The respondents completed and returned 20 surveys, based on which we performed an analysis of results using a scale from 1 to 5 (1 – totally disagree, 2 – disagree, 3 – neither agree nor disagree, 4 – agree, 5 – totally agree). The primary purpose of the study was to determine the degree of importance associated with the process of harmonization.

The questions based on which the results were analyzed are the following:

A. Does the new projects related to the changes in the accounting policies have a contribution to the enhancement of accounting harmonization?

B. Does the consistent application of accounting policies contribute to the true and fair view of the financial position and the performance results of an entity?

C. Can the process of harmonization lead to a development of the techniques and practices of creative accounting?

D. Are the needs of regulators limiting the process of harmonization?

E. Can the accountants improve the process of harmonization by actively presenting comparative analysis between the situation before and after harmonization?

The results of the questionnaire are presented below:

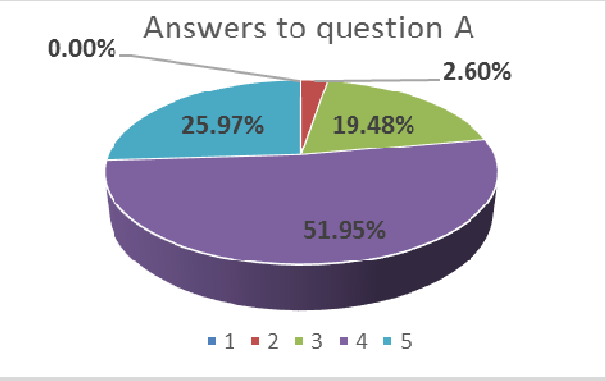


Fig.1: The results for question A (based on the answers received related to the changes in the accounting policies); Source: own analysis

51.95% of the interviewed professionals believe that new projects related to the changes in the accounting policies have a contribution to the enhancement of accounting harmonization, while only 2.6% are reluctant to these due to the flexibility involved in and the chances of making the wrong decision.

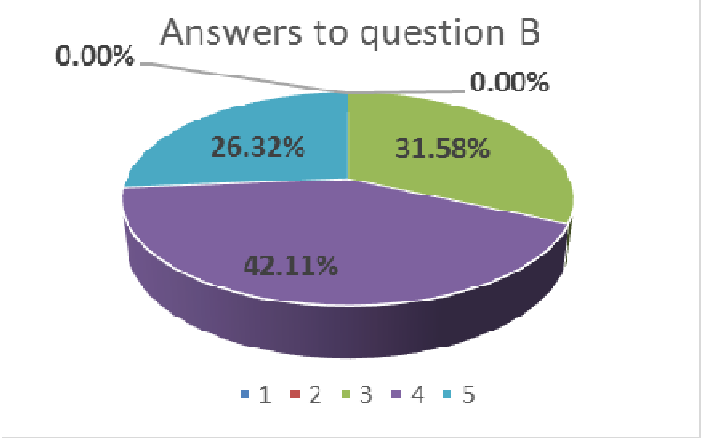


Fig.2: The results for question B (based on the answers received related to the consistent application of accounting policies); Source: own analysis

68.42% of the subjects agree the consistent application of accounting policies contributes to the true and fair view of the financial position and the performance results of an entity. This result might have a positive impact, since it can contribute to building proper measures to manage the suitable accounting policies in order to reflect the true achieved performance and not a fictional one.

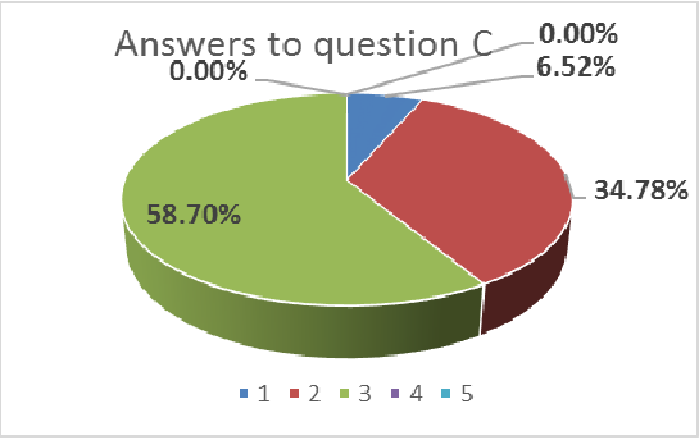


Fig.3: The results for question C (based on the answers received related to the process of harmonization); Source: own analysis

58.7% of the questioned professionals neither agree nor disagree with the fact that the process of harmonization could lead to a development of the techniques and practices of creative accounting, while 34.78% of the subjects disagree with this fact since the financial statements prepared in accordance with the local generally accepted accounting rules modified after harmonization proved to reflect the true and fair view of the financial statements.

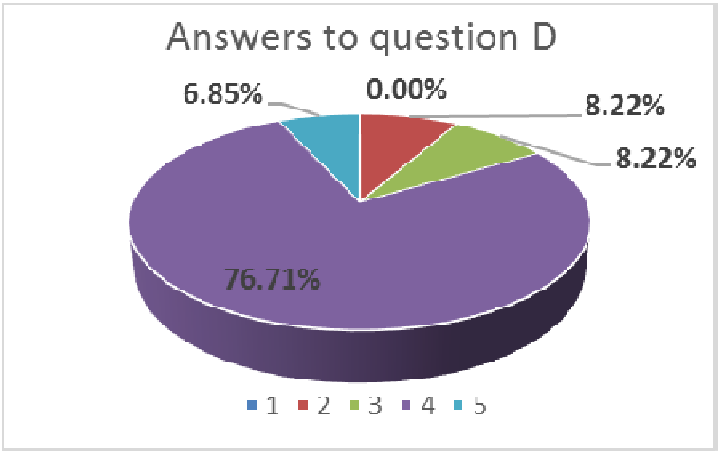


Fig.4 : The results for question D (based on the answers received related to the limits of the process of harmonization); Source: own analysis

84.56% of the subjects agree with the fact that the needs of regulators are limiting the process of harmonization since the primary needs to be satisfied are those of the financial information users.

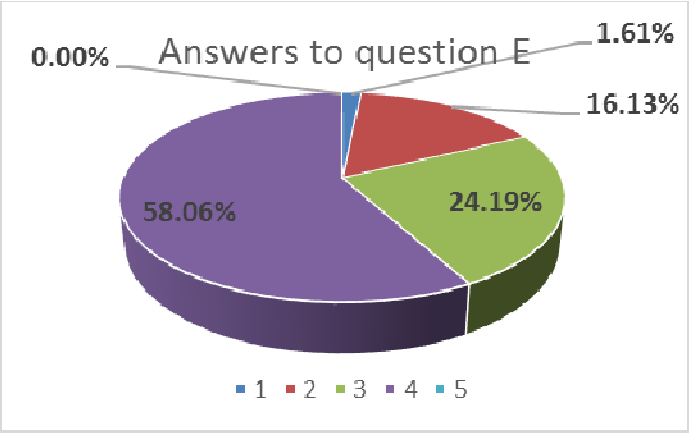


Fig.5: The results for question E (based on the answers received related to the improvements of the process of harmonization); Source: own analysis

From the answers received from the respondents, most of the professionals believe that they play a very significant role in the process of harmonization by actively presenting comparative analysis between the situation before and after harmonization.

58.06% of the questioned people believe that these analysis have a contribution to the enhancement of accounting harmonization, while 24.19% neither agree nor disagree to this statement.

Tax Implications upon the Process of Harmonization

The accounting harmonization process begins to reduce the differences between the accounting information provided by the companies from different countries. A cause for the differences between the countries is the tax system, and the degree of connection between the accounting and taxation.

There are countries that apply an Anglo-Saxon system for the accounting practices, which is characterised by a high degree of disconnection between the accounting and taxation and countries that apply a European-Continental Systems which is characterised by a closely connection between accounting and taxation.

Keeping separate tax and accounting records is in accordance with the financial needs of the companies and the link between tax and financial reporting rules can be used in favour of the company in order to create book-tax conformity.

Our research is concentrated on the impact of accounting harmonization and since taxation refers to fiscal policies in different context, situation and sector, its implications have to be measured accordingly.

It is impossible to split accounting from taxation because each one has an influence over the other and the interconnection has to be maintained.

The context in which the impact will be measured is Romanian legislation, which according to its accounting history, it started from European-Continental influences and finished at the moment by applying for a part of the companies the Anglo-Saxon influences.

The professional judgment is important in applying the accounting and taxation rules.

Conclusion

The process of harmonization can help in the construction of a better quality financial reporting system. The main findings focus on the important role each professional can have by following the opportunity to apply the stable, suitable accounting policies and by performing a thorough analysis that could assist investors and decision makers. The results reveal the fact that more than a half of the professionals questioned agree that the true and fair view of the financial position of a company is influenced by the consistent application of accounting policies, therefore this is a proof that the professionals are aware that they have an important role in building and manage the suitable accounting policies. Also, more than a half of the subjects believe that by presenting comparative analysis between the situation before and after harmonization, this will improve the process of harmonization. In this way their role in the process of harmonization is also important. The fact that the majority of the subjects believe that the needs of regulators are limiting the process of harmonization shows that they are aware that besides the fact that their role is important in the process of harmonization, this role is limited by the regulators. This limitation can influence the accounting policies, if we are looking from the point of view of the techniques and practices of creative accounting, which can be developed by some professionals. Therefore, more than a half of the questioned professionals neither agree nor disagree with the fact that the process of harmonization could lead to a development of the techniques and practices of creative accounting.

We can conclude that the increase in the relevance of the financial information will be more consistent after the harmonization process is complete and the IFRS adoption is realized worldwide.
If the accounting harmonization is successfully completed, there is a need to be analyzed what the taxation harmonization will imply in the future. We will further analyze the answers separately between auditors and accountants, by increasing the sample and aiming to obtain sufficient and appropriate evidence in order to sustain that the harmonization process will be complete once all the related parties act accordingly and work together in accomplishing this.

References

Albu, N., Albu, C.N., Bunea, S., Calu, D.A., Gîrbină, M.M. (2011) A story about IAS/IFRS implementation in Romania: An institutional and structuration theory perspective, Journal of Accounting in Emerging Economies, Vol. 1, No.1, 76-100

Barr A. (1967) The international Harmonization of Accounting Principles, Ninth international congress of accountants from Paris, 1-21

Beke J. (2010) International Accounting Harmonization: Evidence from Europe, International Business and Management, Vol. 1, No. 1, 48-61

Deegan C. (2009) Financial Accounting Theory, McGraw-Hill Education (Australia) Pty Ltd

Gielen F., Hegarty J. (2007) An accounting and taxation conundrum - A pan-european perspective on tax accounting implications of IFRS adoption, The World Bank Centre for Financial Reporting Reform.Available:http://siteresources.worldbank.org/EXTCENFINREPREF/Resources/Taxation_Conundrum.pdf

Nobes C., Parker R. (2008) Comparative international accounting, 10th edition, Prentice Hall, London

Vallisova L., Dvorakova L. (2011) Development and evaluation of accounting harmonization processes in the Czech Republic with international accounting standards/international financial reporting standards, Annals of DAAAM for 2011 & Proceedings of the 22nd International DAAAM Symposium, Vol. 22, No. 1, 951-952

Wysłocka E. (2008) Harmonization and standardization of the accounting and its functions, Ann. Univ. Apulensis Ser. Oeconomica, vol. 1, no. 10

Experimental Plans of Risk Avoiding Manager

Dr. Niculae V. Mihaita, Phd candidate Andrei Pericle NEGESCU Cybernetics, Statistics and Economic Informatics Faculty at the University of Economics of the Academy of Economic Studies in Bucharest, ROMANIA
E-mail: Niculae.Mihaita@csie.ase.ro; niculae_mihaita@yahoo.com

Abstract

Using the title that was chosen above, it is a very ambitious project and I am aware that needs a lot of work to justice it. This paper will highlight analogies between second order cybernetics and Pierce's semiotics concepts applied to management techniques using quantitative methods under the umbrella of Informational Statistics.If we understand the Business Environment as a Semiotic Space, it looks like a multi-attribute living system revealing the life of existing or new developed signs, perceiving interpretation to accommodate yourself in this living (viable) space. As a Semiotic Space, the Business Room' noise, clamor like a sign, so easily to identify if you were there as visitor only one time. **Defining noise**: anything from the environment that does not exceed the everyday level of clamor and do not alert any single or multiple sensation requesting recognition as sign. **Defining Sign**: anything that can be recognized, calls, signals, shapes, drawings, *human beings as "signs for ourselves"*. Is used to map out systematised opinions or real life situations, reports, other marketing management documents. Here we follow his concepts and procedures. Just to see what outcomes one gets.

Keywords: Neg-entropy, Informational Statistics of Onicescu, Second-order Cybernetics, Semiotics

Dichotomic Alternatives and Informational Statistics For Risk taking Manager

Dr. Niculae V. Mihaita, Phd candidate Andrei Pericle NEGESCU Cybernetics, Statistics and Economic Informatics Faculty at the University of Economics of the Academy of Economic Studies in Bucharest, ROMANIA
E-mail: Niculae.Mihaita@csie.ase.ro; niculae_mihaita@yahoo.com

Abstract

The purpose of this paper is to illustrate some simple algebraic and Informational Statistics techniques gives knowledge from different meetings and situation emerging from the process of Decision-Making. The first part is shaped as a more personal or colloquial approach using the Second-Order Cybernetic concept of Observer INSIDE the black/grey BOX of the process he studied. The component shows that the uncertainties created by the mystery of the decision-making depend by the doubts created by those chosen to decide and no-one else. It illustrates how combination of simple quantitative methods reveals hidden scenarios and deals with true and false money assignments. It is written like a play, and like a mathematical riddle. Utility for this approach is made for better understanding of what is next to come in the second part of the paper. The paper content also has results and comments of an original algorithm of factorial experiments and Informational Statistics combination, adding more information to find States Reference Indexes System.

Keywords: Neg-entropy, Informational Statistics of Onicescu, Second-order Cybernetics, Semiotics

Change Management

Business Strategy of Volkswagen in the connection of the Emission Scandal based on the current Cartel agreements

Michael Studeny, The Bucharest University of Economic Studies, Romania,
michael.studeny@gmail.com
Andreas Bartels, The Bucharest University of Economic Studies, Romania,
andie.bartels@gmail.com
Manfred Rauch, The Bucharest University of Economic Studies, Romania,
manfred.rauch@gmx.at
Dr. Mathias Scheiblich, The Bucharest University of Economic Studies, Romania,
mathias.scheiblich@gmx.at
Melanie Buchmüller, The Bucharest University of Economic Studies, Romania,
melaniebuchmueller@web.de

Abstract

This study seeks to clarify the interrelations between Volkswagen's innovation management, environmental sustainability, and market positioning as components of its corporate strategy in recent years. In 2015, Volkswagen became embroiled in an emissions scandal in the US and globally. The cornerstone of the diesel-scandal could be the fact that the german automobile industry has agreed on exhaust gas purification and technical standards. In the meanwhile, it is not just Volkswagen who circumvents the US Environmental Protection Agency's emissions guidelines by equipping its vehicles with devices that interfered with the operation of their emission control systems, especially for diesel under various brands.[1] This scandal may follow from there initial failure to develop an economically and environmentally sustainable business model. Both the backlash to this scandal and Volkswagen´s, Daimlers, Audi, Porsche and BMW´s recovery of its market share can be expected to be closely related to the market importance of sustainable consumption. While technological innovation already forms an important part of their business strategy, its market competitiveness has primarily rested on premium-brand car sales. This case study indicates that a successful repositioning of Volkswagen in the global marketplace will demand both a targeted, ecological sustainability-oriented deployment of VW´s technological assets and a reframing of VW's corporate image in environmentally friendly terms as a basis for the long-term economic sustainability of the firm.

Keywords: Volkswagen, Environmental Sustainability, Competitiveness, Corporate Strategy, Innovation.

JEL Classification: C18 Methodological Issues: General; D22 Firm Behavior: Empirical Analysis; D73 Bureaucracy; Administrative Processes in Public Organizations; Corruption

* Corresponding author, **Michael Studeny** – michael.studeny@gmail.com

Introduction

In year 2015 Volkswagen became involved in an emissions scandal in the United States in the course of which over 500,000 diesel passenger cars under its own brand and that of Audi have been recalled, while leading to a fall of over USD $16.9 billion in its market value. Since all of its diesel vehicles have dissimulated their diesel-exhaust emissions results, 11 million of these cars have been subject to recalls worldwide, while further depressing its sales and financial performance.[2] The cornerstone of the diesel-

scandal could be the fact that the german automobile industry has agreed on exhaust gas purification and technical standards. In the meanwhile, it is not just Volkswagen who circumvents the US Environmental Protection Agency's emissions guidelines by equipping its vehicles with devices that interfered with the operation of their emission control systems, especially for diesel under various brands.[3] Also Audi, Porsche, Daimler and BMW have used this method. The table below shos the revenues of Volkswagen group, Daimler and BMW group in billion euros of 2015.

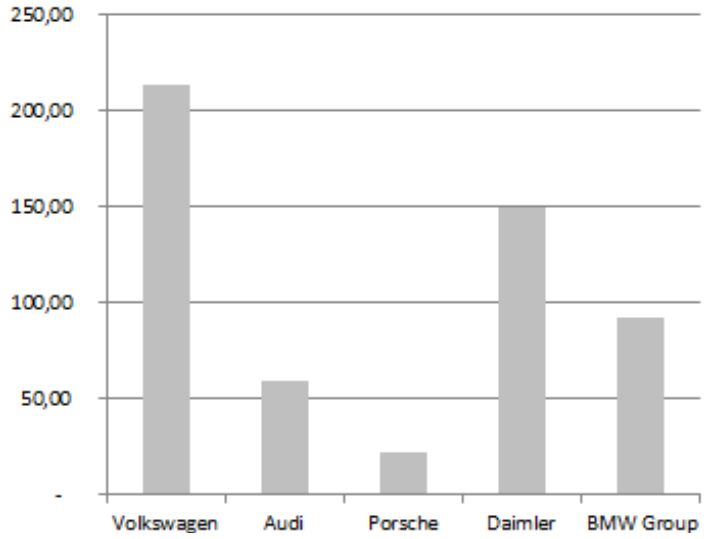


Chart. 1 Revenue comparison of Volkswagen, BMW and Daimler in FY 2016 (in million euros)

Source: Own presentation.
Basic Data: Statista database.[4]

At once, this case demonstrates not only the failure of the US and European emissions legislation regimes to increase the environmental performance standards of large-scale automakers but also the necessity to further inquire into company behavior in the automotive sector, especially on the firm level. Rather than responding to the influence of policy instruments or economic incentives, private firms can be expected to exploit the weaknesses of regulatory frameworks to secure their market position.[5] Moreover, this incident may spur the whole german automobile industry to further evolve its ecological innovation strategies by changing their direction toward the adoption of industry-wide environmental protection practices, such as an aggressive deployment of fuel cells technologies as engines of future innovation-based growth and profitability.[6] Also the whole german automotive sector is affected by the changing mobility-related consumer preferences and new market entrants, such as Tesla Motors, whose digitization-based innovations disrupt established business models. This is likely to call for a reorientation of firm-level innovation strategies.[7] In this respect, in the automobile industry, the adoption of environmental sustainability standards is increasingly considered by corporate decision makers and stakeholders not only as a means of avoiding public backlash and government-administered fines for ecological damage caused but also as a strategic approach for stimulating consumer demand, increasing market share and maintaining firm-level competitiveness, such as through the optimization of cost structures, the reduction of production-related waste and ensuring long term firm viability.[8] On the company level, strategic innovation and strategic behavior can be expected to be weakly interconnected and poorly understood in both theoretical and practical terms as drivers of company growth. This demands further research into the interrelations between corporate strategies, innovation practices and

organizational renewal.[9] In other words, the emissions-related scandal into which Volkswagen, Audi, Porsche, BMW and Daimler has become embroiled may follow from its initial failure to develop an economically and environmentally sustainable business model in view of the transformations that the automotive industry undergoes.

More specifically, emerging industry trends, such as car sharing, pose significant challenges for traditional business models in the automotive sector that have been slow to change in response to the arrival of new technologies, e.g., electric and hydrogen-powered vehicles. This may undermine the future sustainability amongst other of for instance Volkswagen's business strategies in rapidly changing market conditions. By contrast, emerging technologies can also provide the german automobile industry with opportunities for developing successful innovation-based business models that will eventually serve as the basis of its sustainable growth and competitive advantage.[10] Thus, this paper presents a case study analysis of Volkswagen's corporate management, marketing strategies, such as in relation to its various brands, and their interrelations in the context of its emission performance fraud scandal. This scandal also provides a background for this assessment of the crisis management strategies of Daimler and Volkswagen, Audi and Porsche on the basis of empirical data on Volkswagen's research and development budgets, economic performance and other indicators.[11]

Literature Review

The Audi, BMW, Daimler, Porsche and Volkswagen 2017 diesel emissions and syndicate scandal can primarily be considered a consequence of its failed innovation strategy. In this context it is demonstrated that the whole german automotive industry (particularly Daimler, BMW, Audi, Volkswagen and Porsche) used common arrangements about technology standards and emission regulation. It seems like that it is almost impossible to achieve the high emission guidelines within the predetermied time. Agreements are not forbidden. But it has to be prooven when they are against the law. Right now the European Commission is investigating syndicate suspicion. The cornerstone of the diesel-exhaust-scandal could be the fact that the german automobile industry has agreed on exhaust gas purification and technical standards. In the meanwhile, it is not just Volkswagen who circumvents the US Environmental Protection Agency's emissions guidelines by equipping its vehicles with devices that interfered with the operation of their emission control systems, especially for diesel cars produced between 2009 and 2011 under various brands. In the US and the global automotive market, this has proved a major competitive disadvantage, as during the Obama administration environmental regulations had become increasingly strict. By contrast, Volkswagen's competitors, such as Toyota, Opel, Ford, FiatChrysler or even Tesla, have successfully carved out a niche in the environmentally friendly automobile sector, while Daimler, BMW, Volkswagen (incl. Porsche and Audi) have primarily concentrated on refining its existing technologies.[12]

Especially since state-level environmental standards and consumer protection laws in the US are likely to increase their stringency, Volkswagen needs to reorient its business strategy rather than solely concentrating on damage control through compensation settlements.[13] In other words, the pre-crisis focus of Volkswagen's management on vehicle sales growth and branding-oriented product development may need to be expanded to include environmental sustainability.[14] The innovation strategy of Volkswagen, Audi and Porsche will need to be adjusted accordingly, even though it is already one of the more innovative automakers globally, as Volkswagen already vends plug-in and electric vehicles, implements lightweight material solutions for car body-shells and establishes joint ventures in emerging markets, such as China and South Africa.[15] While technological innovation already forms an important part of Volkswagen's business strategy, such as the introduction of modular automobile construction across its different brands in 2012, Volkswagen's market competitiveness has primarily rested on premium-brand car sales (e. g. the latest model 'Arteon'), such as those of Porsche and Audi, that has driven its profits based on new, innovative automotive products.[16] The Volkswagen group has largely failed to

capitalize on the potential of novel technologies related to ecological sustainability, such as electricity-powered vehicles.[17]

The import of this trend cannot be overestimated, as sustainable mobility defined as the societal ability to meet transportation and mobility needs without causing long-term ecological damage to the natural environment is increasingly incorporated into national and international policy frameworks.[18] Technological innovation alone may fall short of ensuring the achievement of these goals, especially since large corporations, such as Volkswagen, remain directly dependent on their market performance for their competitive positioning, rather than being influenced by ecological policy objectives. In addition, in the European Union (EU), efforts to prevent the clash of interests between policy makers and industry players such as Daimler, BMW and the big Volkswagen group have led to the creation of lax regional and national environmental environments that have acted as disincentives for ecological technological innovation.[19] Notwithstanding, these regulatory pressures have exerted a growing influence on Volkswagen's technological innovation strategy in recent decades, especially in relation to hybrid and electric propulsion motors.[20] Now, the emissions scandal has demonstrated the risks of failing to integrate environmental friendliness into corporate strategy, as in 2016 Volkswagen saw both its Moody's rating reduced and its market capitalization fall by 40% as a consequence of penalties and compensations, which has contributed to the competitive advantage of ecologically sustainable car makers, such as Tesla.[21] Anymore, in the course of the exhaust and syndicate scandal, Volkswagen's stock price fell from the recent years' record price of EUR 253 in 2015 to around EUR 128 in year 2017, Daimler´s stock price fell from EUR 93 to around EUR 60 in year 2017 and BMW´s stock price fell from around EUR 119 to around EUR 80 in year 2017. As already previous studies indicate, prior to 2015 Volkswagen consistently failed to integrate environmental sustainability priorities into its corporate strategy in the run-up to this scandal, since already in 2004 its diesel vehicles had become prohibited for retail in Maine, US, due to their low environmental performance.[22] This indicates that the pre-crisis innovation strategy of Volkswagen had been defined in relatively narrow technological terms rather than conceived of more broadly.[23]

Case Study Analysis

To assess germans car automotive industry management of the emissions scandal, it is important to assess its innovation management. As the below table demonstrates the passanger car production and registration in 2015.

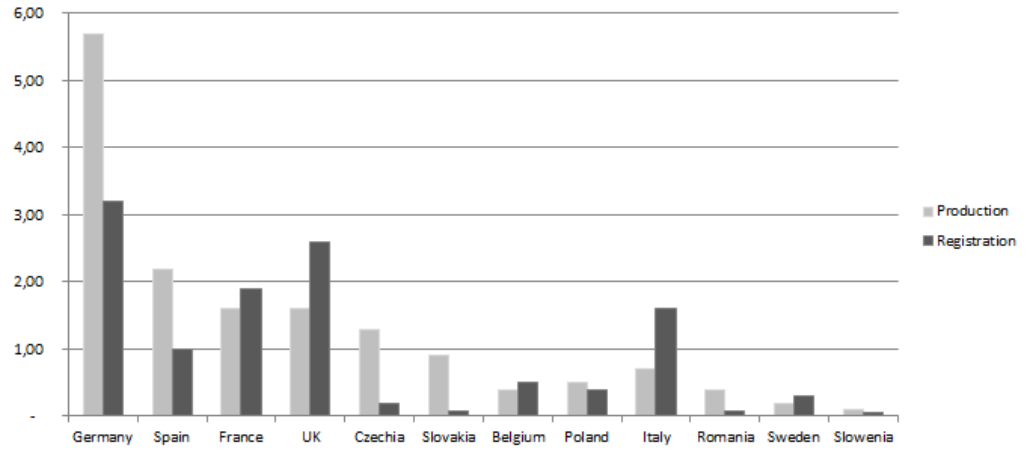


Chart. 2 : European passanger car production and registration 2015 (in Million)

Source: Own presentation.
Basic Data: Statista database.[24]

German products and the 'Made in Germany' label are associated with positive attributes such as quality, reliability, durability, efficiency, and safety. Now the exhaust and syndicate scandal is the maximum credible accident for the plausibility of the german automotive industry. Even as automobile manufacturer have to focus on upgrading the mobility and transportion features of their craft, stricter fuel economy regulations are closing in. By 2025, for instance, automobile manufacturer fleets in Europe and the United States will have to average upward of 60 miles per gallon, an ambition that becomes more difficult if oil prices remain low, stoking consumer interest in popular larger, less-efficient cars like sport-utility vehicles (SUV) or Pickups. Meeting these standards will need step-change amendments, not incremental ones. German vehicles continue to enjoy a globally positive image and are in high demand across the world.

A survey of Ernst & Young about 300 firms active in the European automobile industry finds Germany to be the most innovative automomile center in international comparison. The table below shows the assessment of the innovation power of Germany in 2013.

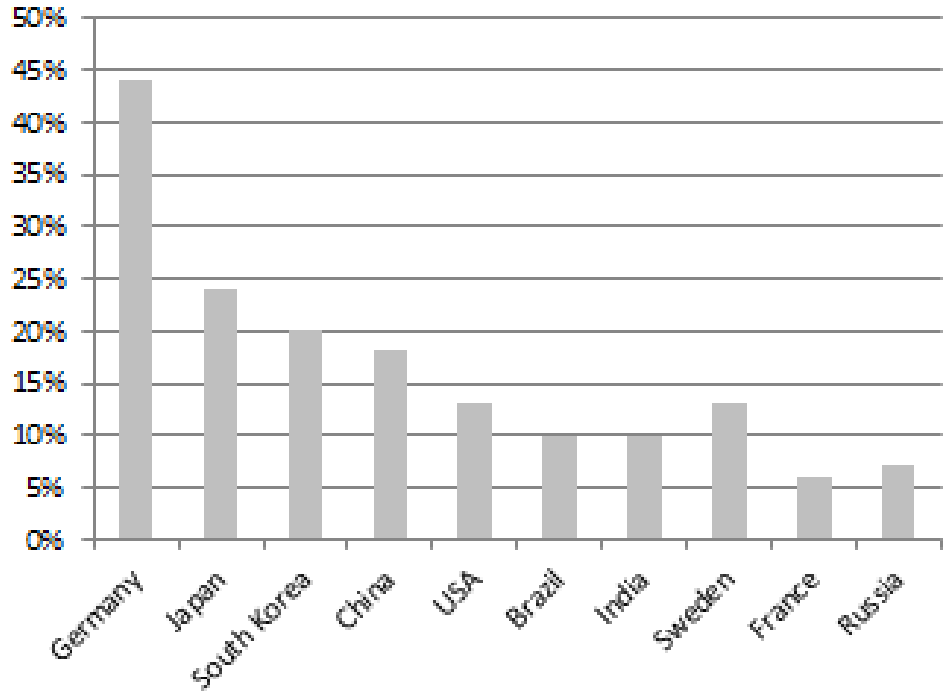


Chart. 3: Assessment of innovation power Germany 2013 (in %)

Source: Own presentation.
Basic Data: Statista database.

The table below shows the leading companies in the car industry in Germany in 2014, based on innovation capacity.

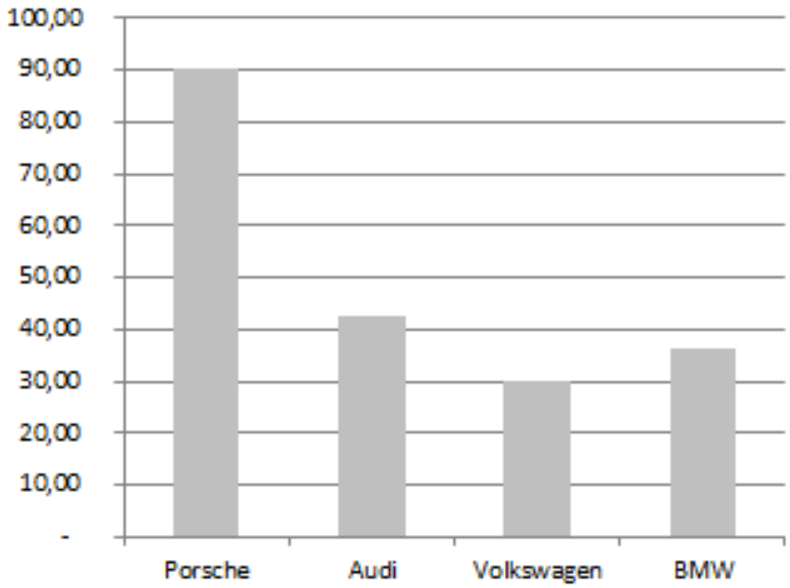


Chart. 4: Leading companies in the car industry in Germany in 2014, based on innovation capacity

Source: Own presentation.
Basic Data: Statista database.[25]

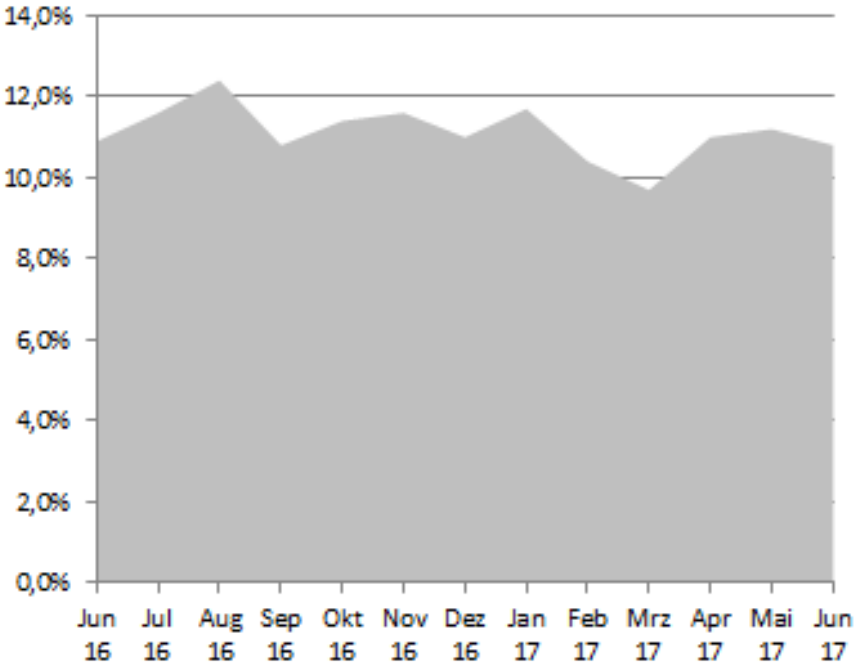


Chart. 5: Volkswagen´s share of new vehicle registrations in the EU from June 2016 to June 2017

Source: Own presentation.
Basic Data: Statista database.[26]

This data corresponds to the status of the Volkswagen group as the globally leading company in terms of research and development spending with a significant innovation-related advantage over Toyota as the nearest-ranking global automotive market competitor. As the table below shows, in the year in which the emissions scandal hit the headlines, the Volkswagen had significant innovation-related organizational resources with the help of which it could reorient its corporate strategy toward a greater degree of environmental sustainability.

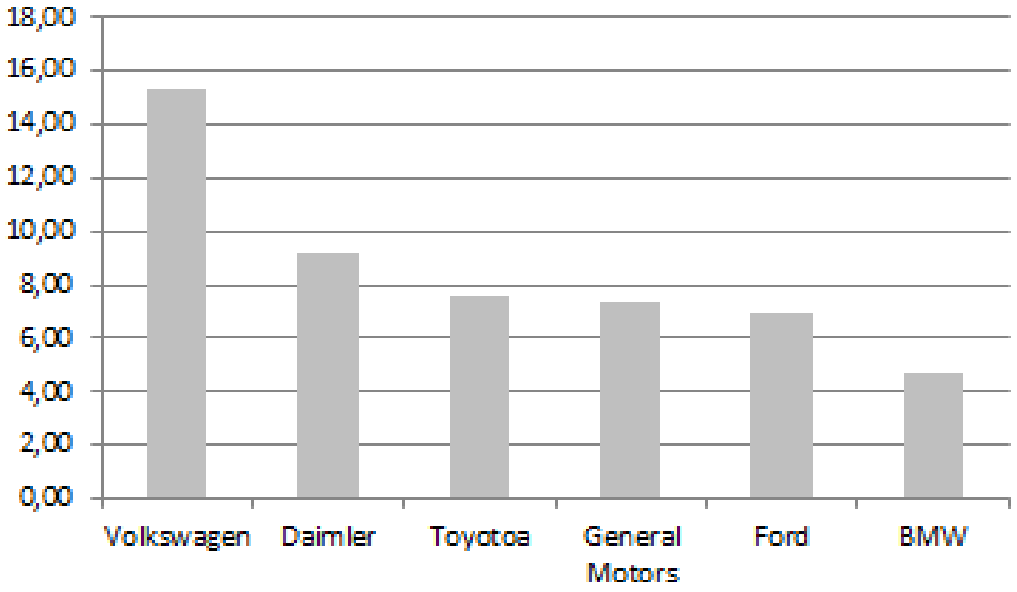


Chart 6 : Leading automotive firms by research and development spending worldwide in 2015 (in billion U.S. dollars)

Source: Own presentation.
Basic Data: Statista database.[27]

The new global market entrants, by way as example Tesla Motors, threaten the market positioning of the Volkswagen group, Daimler and BMW through their superior innovative capacity, as the below chart demonstrates. In other words, based on 2015 data, the research and development intensity of Volkswagen has been more than 2.5 times less than that of Tesla that has sought to position itself in the emergent sector of electric cars with a significant appeal to consumer conscious of environmental sustainability concerns.

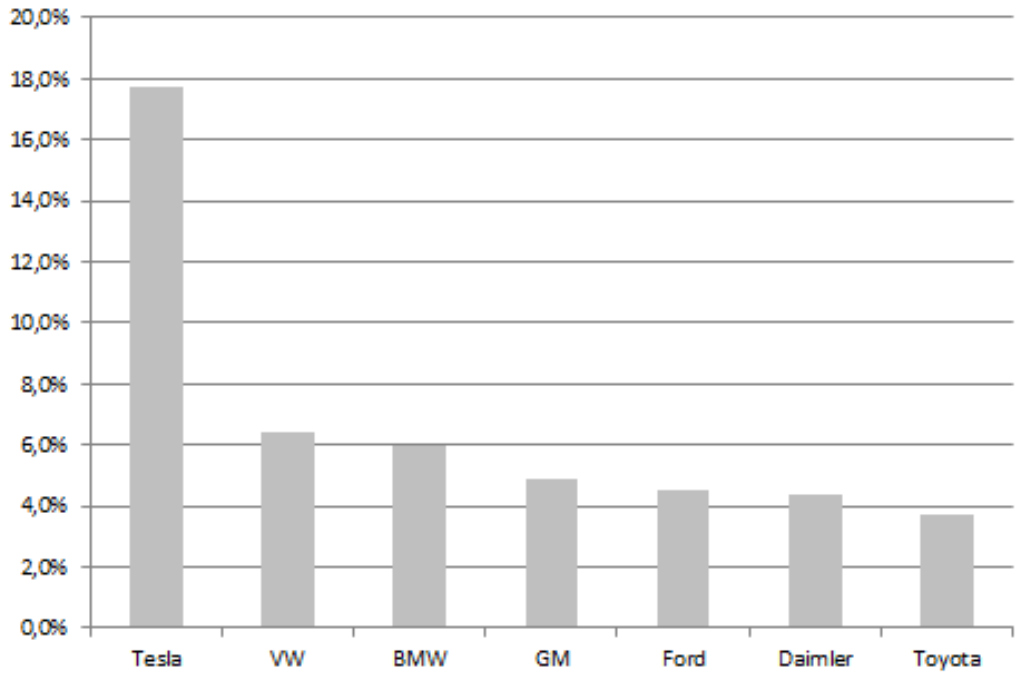


Chart 7 : Research and development intensity of german car manufacturers in 2015

Source: Own presentation.
Source: Statista database.[28]

None the less, VW, Audi, Porsche, Daimler and BMW consistently tops global research and development spending rankings across all consumer market segments, as the below table based on 2016 fiscal year figures demonstrates. This has likely contributed to the economic resilience of VW in the wake of the emissions scandal. Furthermore, immediately before the scandal broke out VW demonstrated one of the lowest ratios of research and development expenses to global yearly sales in the automotive sector, while Tesla has exhibited the highest ratio for 2014. Thus, as the below table shows, in this period Volkswagen enjoyed a significant advantage over its competitors in terms of sales performance. This can be expected to have assisted VW to cope with the financial consequences of the emissions scandal.

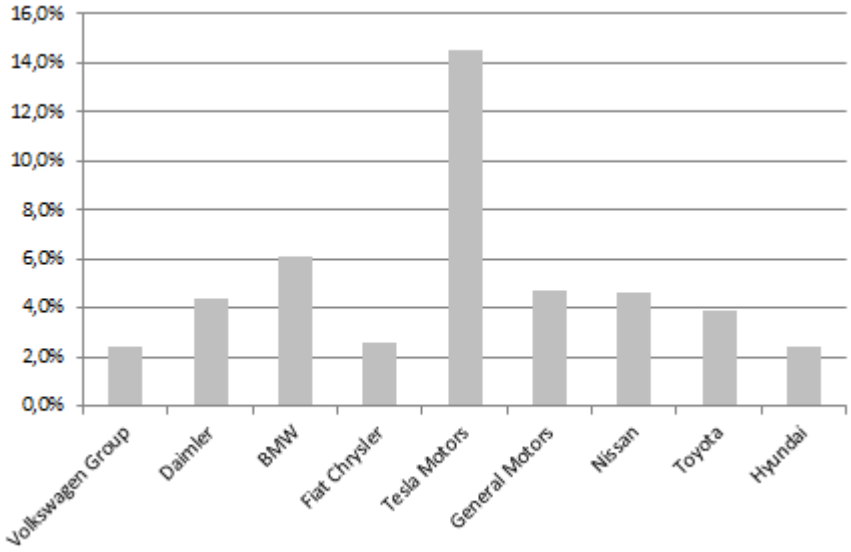


Chart. : 8 Selected automakers' R&D to sales ratio worldwide in 2014

Source: Own presentation.
Basic Data: Statista database.[29]

As well Volkswagen has one of the strongest intellectual property portfolios across all economy sectors worldwide. As the table below shows, Volkswagen belonged to the top 4 companies with the highest number of patent applications in the sphere of industrial design internationally in 2015. These intangible assets can be expected to have provided Volkswagen with technological resources for the reorientation of its business strategy toward a higher level of ecological sustainability in response to scandal-related governmental fines and company value reduction. According to 2017 data, in the US Volkswagen has to pay civil penalties related to its violation of the U.S. Clean Air Act to the amount of USD $1,450 billion dollars, which is far in excess of any penalties imposed on either domestic or foreign car manufacturers before or since 2015 in this country, as the table below indicates.

This penalty is disproportionate to the amount of vehicles affected, since only 584,000 diesel cars have violated the US environmental regulations. This is significantly less than 1,600,000 passenger cars of Honda's American division and 500,000 passenger vehicles of General Motors that were found to be in violation of the U.S. Clean Air Act in 1998 and 1995 respectively, as the below table shows. Notwithstanding, the impact of this emissions scandal on the market positioning of Volkswagen can be expected to be limited, since, based on global rankings, in 2016 two of the 12 most environmentally friendly vehicles were Volkswagen -made car brands. As the following table demonstrates, Volkswagen's E-Golf is considered to be fifth most ecologically sustainable car worldwide.

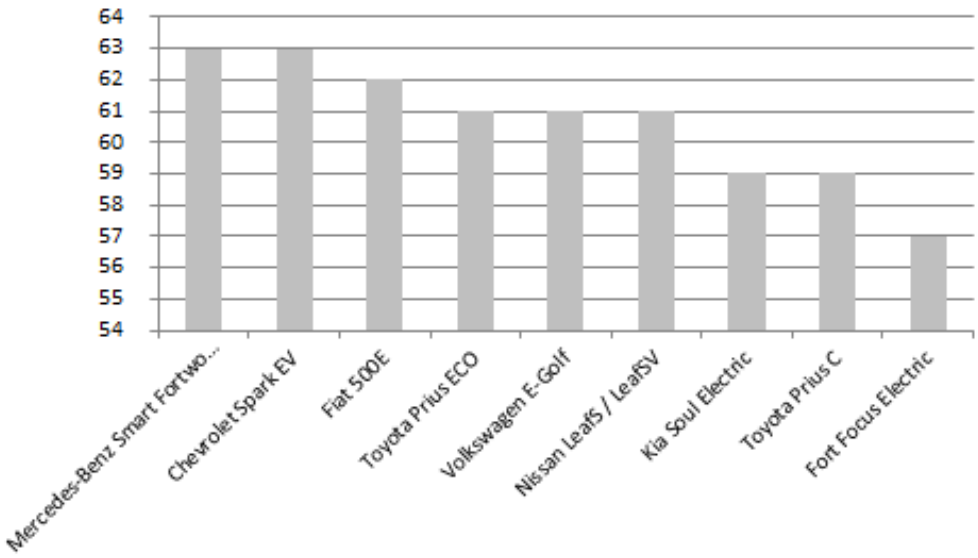


Chart. 9: Most environmentally friendly cars worldwide in 2016, based on index score

Source: Own presentation.
Basic Data: Statista database.[30]

As well, in the same year as the emissions scandal broke out, Volkswagen's E-Golf ranked among the top 5 best-selling electric vehicles in the US automotive market. At the same time, in 2015 with 25,700 units sold Tesla's Model S was the clear electric car market leader, while Volkswagen's E-Golf's sales constituted less than a fifth of this amount, as the table below shows.

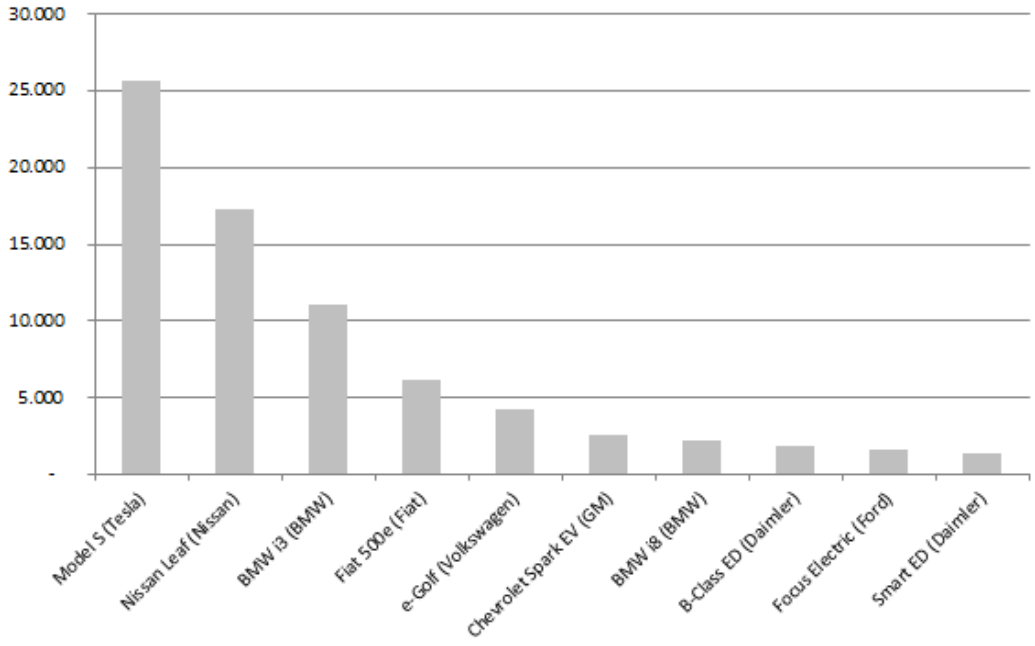


Chart. 10: Best-selling all-electric cars in the United States in 2015, based on sales (in units)

Source: Own presentation.
Basic Data: Statista database.[31]

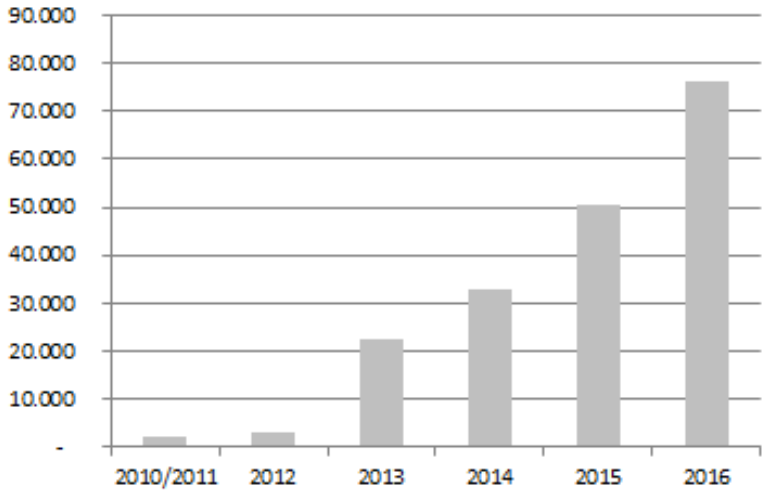


Chart.11 : Count of Tesla Motos abaout sold cars from 2010 to 2016

Source: Own presentation.
Basic Data: Statista database.[32]

Moreover, in 2015 Volkswagen was the third largest carmaker worldwide with 10.7% of the global automotive market share.

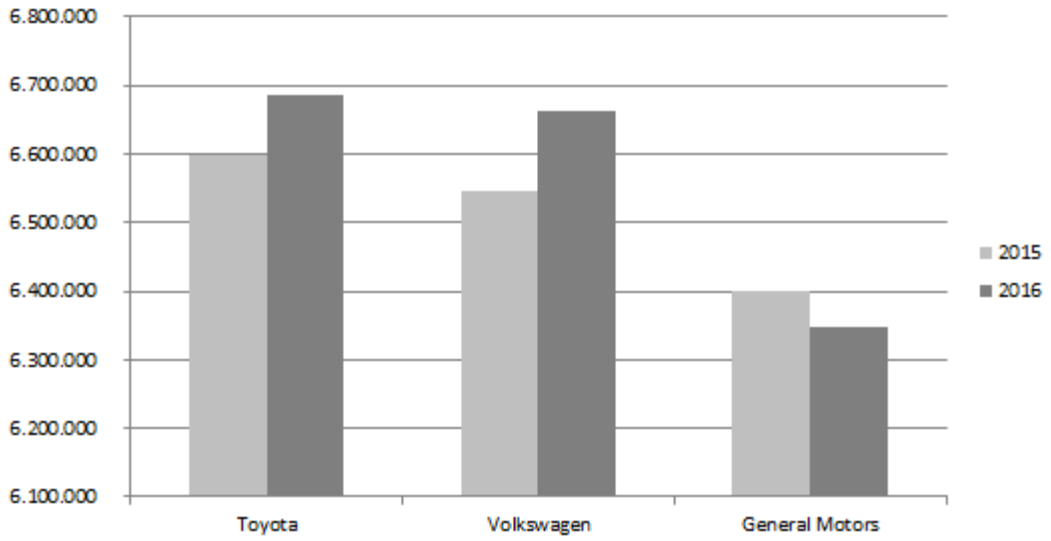


Chart. 12: Global car market share of the world's largest automobile OEMs in 2015

Source: Own presentation.
Basic Data: Statista database.[33]

At the same time, the official average CO2 emission levels for newly sold Volkswagen cars indicate that it has been consistently trailing behind the environmental friendliness of competing European and Asian automotive brands. While between 2012 and 2015, Volkswagen's CO2 gram per kilometer emissions performance improved significantly, the data for this period may fail to factor in the effect of the emissions fraud on the figures presented below. Moreover, the pace of the improvement in Volkswagen's cars' environmental performance does not appear to match that of its key competitors, such as Toyota. This is likely to be compensated by the global competitiveness of Volkswagen, especially in emerging markets, such as China for instance. In 2014, Volkswagen was perceived as the leading automotive brand among Chinese consumers. Presently, Volkswagen appears to have absorbed the majority of the costs that the emissions scandal has caused the corporation, as the following table demonstrates. Starting from 2018, Volkswagen will have mostly overcome the effects of this debacle, since the projected scandal-associated costs will fall from 62.79 billion in 2017 to 0.5 billion in 2018 (see the chart below).

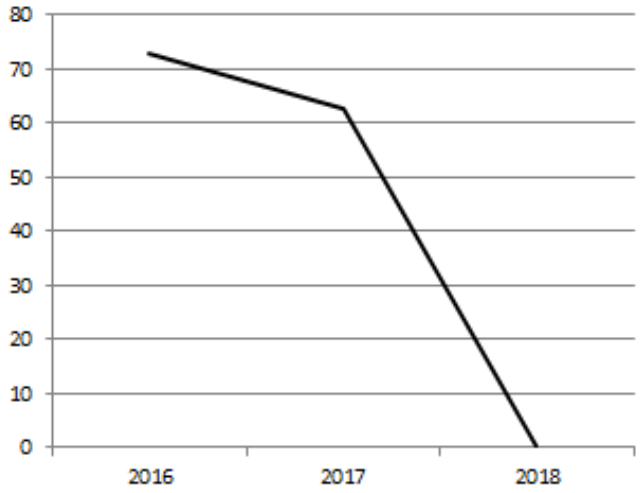


Chart. 13: Volkswagen's costs resulting from the diesel emissions scandal between 2016 and 2018 (in billion U.S. dollars)

Source: Own presentation.
Basic Data: Statista database.[34]

In its immediate impact, the emissions scandal has caused Volkswagen not only to sustain high litigation costs but also a significant decrease in its brand value, as except for Porsche it had not been listed among the top 10 most valuable automotive brands globally in 2017. The table below shows the most valuable brands within the automobile industry in 2017.

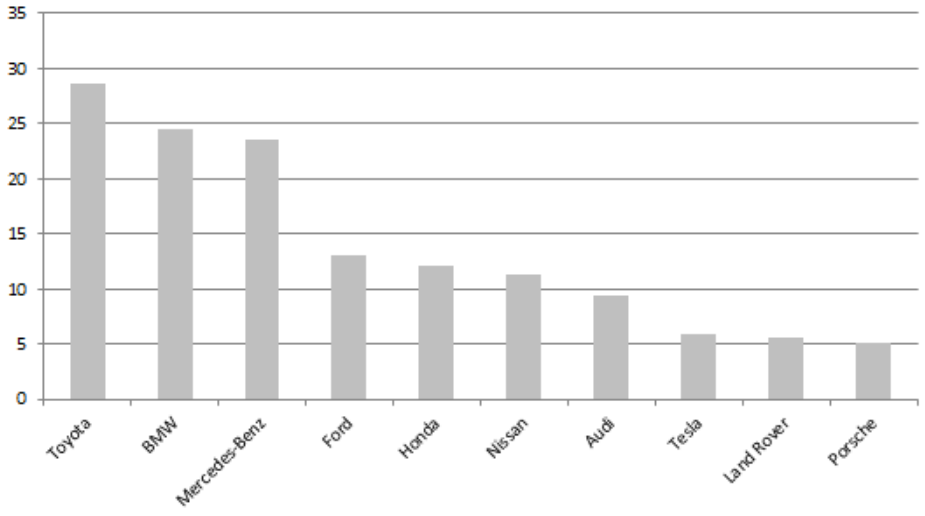


Chart. 14 : Most valuable brands within the automotive sector worldwide as of 2017, by brand value (in billion U.S. dollars)

Source: Own presentation.
Basic Data: Statista database.[35]

Nevertheless, in the same year Volkswagen remained the leading car manufacturer in the European market. Thus, in 2016 Volkswagen's European market share of 23.9% exceeded by over 10 percentage points that of its nearest competitor. In this market, Volkswagen enjoys a significant competitive advantage vis-à-vis international carmakers whose market shares range from 3.6% such as for Nissan to 7% such as for Ford.

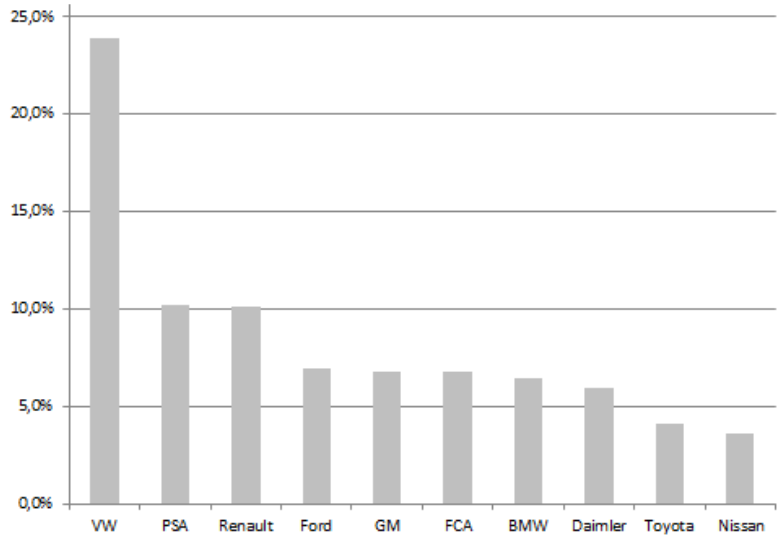


Chart 15: Selected passenger car manufacturers' European market share from January 2016 to August 2016, based on new registrations

Source: Own presentation.
Basic Data: Statista database.[36]

By opposite, presently in the US market Volkswagen only has the ninth largest market share of 3.6% as opposed to General Motors that as the local market leader holds 17.2% of the domestic automotive market, as the following table declares.

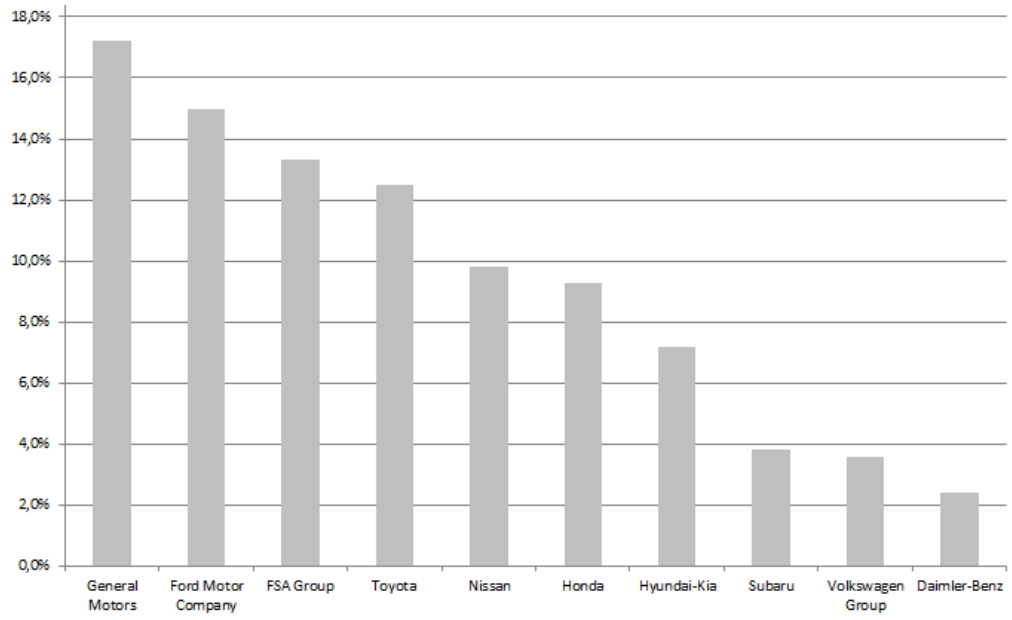


Chart 16: Market share held by selected automobile manufacturers in the United States in January 2017

Source: Own presentation.
Basic Data: Statista database.[37]

Discussion and Conclusions

Based on this case study, it is possible to argue that, as the 2015 emissions scandal recedes into the past, a successful repositioning of Volkswagen in the global marketplace will demand both a targeted, ecological sustainability-oriented deployment of Volkswagen's technological assets and a reframing of Volkswagen's corporate image in environmentally friendly terms as a basis for the long-term economic sustainability of this company.[38] Heretofore, the Volkswagen's primary aim has been sustainable financial performance defined in terms of car sales, whereas this scandal also highlights the importance of corporate social responsibility, especially as it applies to the compliance with environmental regulations, for its market positioning.[39] Thus, Volkswagen appears to be well positioned for the reorientation of its technological innovation toward the development of zero-emission electric drive engines announced in 2016, especially for its premium brands, such as Audi.[40] At the same time, branding alone may fail to restore the position of the global automotive market leader if it does not incorporate ecological friendliness imperatives into its long-term corporate strategy.[41] This is likely to be especially important for the market positioning of Volkswagen's luxury brands, such as Porsche and Audi.[42]

References

1 Blackwelder, B., Coleman, K., Colunga-Santoyo, S., Harrison, J. S., and Wozniak, D. (2016). *The Volkswagen Scandal.* Case Study. Richmond: University of Richmond: Robins School of Business, p. 1.

2 Jung, J. C. (2017). Case Study: Volkswagen's Diesel Emissions Scandal. *Thunderbird International Business Review*, *59*(1), p. 127.

3 Blackwelder, B., Coleman, K., Colunga-Santoyo, S., Harrison, J. S., and Wozniak, D. (2016). *The Volkswagen Scandal.* Case Study. Richmond: University of Richmond: Robins School of Business, p. 1.

4 Website (Statistica.com) (2015). Volkswagen automotive division's research and development spending from FY 2011 to FY 2015 (in million euros). In *Statista - The Statistics Portal*. Retrieved August 09, 2017, from https://www.statista.com/statistics/274013/revenue-comparison-of-volkswagen-bmw-and-daimler/.

5 Skeete, J. P. (2017). Examining the role of policy design and policy interaction in EU automotive emissions performance gaps. *Energy Policy*, *104*, p. 373.

6 Faria, L. G. D., and Andersen, M. M. (2016). Sectoral patterns versus firm-level heterogeneity-The dynamics of eco-innovation strategies in the automotive sector. *Technological Forecasting and Social Change,* in press, p. 1.

7 Wittmann, J. (2017). Electrification and Digitalization as Disruptive Trends: New Perspectives for the Automotive Industry?. In Khare, A., Stewart, B., and Schatz, R. (Eds.). *Phantom Ex Machina: Digital Disruptions Role in Business Model Transformation*. Cham: Springer International Publishing, p. 137.

8 Iberg, A. E. (2015). Creating Competitive Advantage in the Premium Market Segment through a Sustainability Strategy. *University of Tennessee Honors Thesis Projects*. Knoxville: University of Tennessee, p. 1.

9 van Someren, T. C., and van Someren-Wang, S. (2017). The Instrument: Strategic Innovation as a New Foundation for Russian Innovation System. In Someren, T. C. R., and Someren-Wang, S. . (Eds.). *Strategic innovation in Russia: Towards a sustainable and profitable national innovation system*. Switzerland: Springer International Publishing, pp. 81.

10 Sivertsen, C. G., and Lunden, J. (2016). *Mobility 2.0: Sustainable Business Models for the Automotive Industry: Identifying sustainable sale-of-service mobility business models, utilizing alternative powertrains and autonomous technology* .Master's thesis. Agder: Universitetet i Agder; University of Agder, p. i.

11 Nicolai, F. G. (2016). Bad reputation, customer attrition and marketing of the future: can the management of a company save it from a scandal? Doctoral Disseration. Marketing Department. Rome, Italy: LUISS Guido Carli: Libera Universita Internazionale degli studi sociali, p. 4.

12 Jung, J. C. (2017). Case Study: Volkswagen's Diesel Emissions Scandal. *Thunderbird International Business Review*, *59*(1), p. 130.

13 Jung, J. C. (2017). Case Study: Volkswagen's Diesel Emissions Scandal. *Thunderbird International Business Review*, *59*(1), p. 133.

14 Jung, J. C. (2017). Case Study: Volkswagen's Diesel Emissions Scandal. *Thunderbird International Business Review*, *59*(1), p. 131.

15 Blackwelder, B., Coleman, K., Colunga-Santoyo, S., Harrison, J. S., and Wozniak, D. (2016). *The Volkswagen Scandal.* Case Study. Richmond: University of Richmond: Robins School of Business, p. 3.

16 Blackwelder, B., Coleman, K., Colunga-Santoyo, S., Harrison, J. S., and Wozniak, D. (2016). *The Volkswagen Scandal.* Case Study. Richmond: University of Richmond: Robins School of Business, pp. 5-7.

17 Blackwelder, B., Coleman, K., Colunga-Santoyo, S., Harrison, J. S., and Wozniak, D. (2016). *The Volkswagen Scandal.* Case Study. Richmond: University of Richmond: Robins School of Business, p. 9.

18 Nykvist, B., and Whitmarsh, L. (2008). A multi-level analysis of sustainable mobility transitions: Niche development in the UK and Sweden. *Technological forecasting and social change*, 75(9), p. 1373.

19 Skeete, J. P. (2017). Examining the role of policy design and policy interaction in EU automotive emissions performance gaps. *Energy Policy*, *104*, pp. 374-375.

20 Faria, L. G. D., and Andersen, M. M. (2016). Sectoral patterns versus firm-level heterogeneity-The dynamics of eco-innovation strategies in the automotive sector. *Technological Forecasting and Social Change,* in press, p. 10.

21 Faria, L. G. D., and Andersen, M. M. (2016). Sectoral patterns versus firm-level heterogeneity-The dynamics of eco-innovation strategies in the automotive sector. *Technological Forecasting and Social Change,* in press, pp. 14-15.

22 van Someren, T. C., and van Someren-Wang, S. (2017). The Instrument: Strategic Innovation as a New Foundation for Russian Innovation System. In Someren, T. C. R., and Someren-Wang, S. . (Eds.). *Strategic innovation in Russia: Towards a sustainable and profitable national innovation system*. Switzerland: Springer International Publishing, p. 128.

23 Sivertsen, C. G., and Lunden, J. (2016). *Mobility 2.0: Sustainable Business Models for the Automotive Industry: Identifying sustainable sale-of-service mobility business models, utilizing alternative powertrains and autonomous technology*. Master's thesis. Agder: Universitetet i Agder; University of Agder, p. 22.

24 Volkswagen. (2017). Volkswagen automotive division's research and development spending from FY 2011 to FY 2015 (in million euros). In *Statista - The Statistics Portal*. Retrieved February 26, 2017, from https://www.statista.com/statistics/566234/volkswagen-automotive-division-research-development-spending/.

25 Euro (Zeitschrift). (2014). Leading companies in the car industry in Germany in 2014, based on innovation capacity. In *Statista - The Statistics Portal*. Retrieved February 26, 2017, from https://www.statista.com/statistics/589475/leading-companies-car-industry-germany-innovation-capacity/.

26 Euro (Zeitschrift). (2014). Leading companies in the car industry in Germany in 2014, based on innovation capacity. In *Statista - The Statistics Portal*. Retrieved February 26, 2017, from https://www.statista.com/statistics/589475/leading-companies-car-industry-germany-innovation-capacity/.

27 PwC, Strategy, and Bloomberg. (2015). Leading automotive firms by research and development spending worldwide in 2015 (in billion U.S. dollars). In *Statista - The Statistics Portal*. Retrieved February 26, 2017, from https://www.statista.com/statistics/566060/automotve-firms-by-research-development-spending/.

28 Richter, F. (2016). How Tesla Out-Innovates Traditional Carmakers. In *Statista - The Statistics Portal*. Retrieved February 26, 2017, from https://www.statista.com/chart/6312/r-d-spending-tesla-vs-carmakers/.

29 Fung Business Intelligence Centre, and Fung Business Intelligence Centre . (2014). Selected automakers' R&D to sales ratio worldwide in 2014. In Statista - The Statistics Portal. Retrieved February 26, 2017, from https://www.statista.com/statistics/574012/research-and-development-to-sales-ratio-of-automakers/.

30 Website (greenercars.org). (2017). Most environmentally friendly cars worldwide in MY 2016, based on index score. In *Statista - The Statistics Portal*. Retrieved February 26, 2017, from https://www.statista.com/statistics/506988/most-environmentally-friendly-car-models-worldwide/.

31 Website (evannex.com). (2017). Best-selling all-electric cars in the United States in 2015, based on sales (in units). In *Statista - The Statistics Portal*. Retrieved February 26, 2017, from https://www.statista.com/statistics/257966/best-selling-electric-cars-in-the-united-states/.

32 Website (evannex.com). (2017). https://de.statista.com/statistik/daten/studie/277932/umfrage/automobil-absatz-von-tesla/ (in units). In *Statista - The Statistics Portal*. Retrieved August, 2017, from https://de.statista.com/statistik/daten/studie/277932/umfrage/automobil-absatz-von-tesla//.

33 Market Realist. (2015). Global car market share of the world's largest automobile OEMs in 2015. In *Statista - The Statistics Portal*. Retrieved February 26, 2017, from https://www.statista.com/statistics/316786/global-market-share-of-the-leading-automakers/.

34 Website (statistica.com). (2017). Volkswagen's costs resulting from the diesel emissions scandal between 2016 and 2018 (in billion U.S. dollars). In *Statista - The Statistics Portal*. Retrieved August 10, 2017, from https://www.statista.com/statistics/665397/costs-resulting-from-volkswagen-diesel-emission-scandal/.

35 Website (statistica.com). (2017). Most valuable brands within the automotive sector worldwide as of 2017, by brand value (in billion U.S. dollars). In *Statista - The Statistics Portal*. Retrieved August 10, 2017, from https://www.statista.com/statistics/267830/brand-values-of-the-top-10-most-valuable-car-brands/.

36 ACEA. (2017). Selected passenger car manufacturers' European market share from January 2016 to August 2016, based on new registrations. In Statista - The Statistics Portal. Retrieved February 27, 2017, from https://www.statista.com/statistics/263421/market-share-of-selected-car-maunfacturers-in-europe/.

37 GoodCarBadCar.net. (2017). Market share held by selected automobile manufacturers in the United States in January 2017. In Statista - The Statistics Portal. Retrieved February 27, 2017, from https://www.statista.com/statistics/249375/us-market-share-of-selected-automobile-manufacturers/.

38 Jung, J. C. (2017). Case Study: Volkswagen's Diesel Emissions Scandal. *Thunderbird International Business Review*, *59*(1), p. 135.

39 Blackwelder, B., Coleman, K., Colunga-Santoyo, S., Harrison, J. S., and Wozniak, D. (2016). *The Volkswagen Scandal.* Case Study. Richmond: University of Richmond: Robins School of Business, pp. 2-3, 5.

40 Wittmann, J. (2017). Electrification and Digitalization as Disruptive Trends: New Perspectives for the Automotive Industry?. In Khare, A., Stewart, B., and Schatz, R. (Eds.). *Phantom Ex Machina: Digital Disruptions Role in Business Model Transformation*. Cham: Springer International Publishing, p. 139.

41 Nicolai, F. G. (2016). Bad reputation, customer attrition and marketing of the future: can the management of a company save it from a scandal? Doctoral Disseration. Marketing Department. Rome, Italy: LUISS Guido Carli: Libera Universita Internazionale degli studi sociali, p. 22.

42 Amatulli, C., Costabile, M., De Angelis, M., and Guido, G. (2017). Sustainability Across Industries. In Amatulli, C., De, A. M., Costabile, M., and Guido, G. (Eds.). *Sustainable Luxury Brands: Evidence from Research and Implications for Managers*. London, UK: Palgrave Macmillan, p. 180.

Outsourcing Vendor IT Governance Practices and Service Quality in Selected Malaysian Organisations From Client's Perspective

Mohd Kamil Lob Ahmad Kasri[2]
kamil.mklak@gmail.com

Norshidah Mohamed[1,2]
norshidah.mohamed@gmail.com

[1]College of Business Administration
Prince Sultan University
Saudi Arabia

[2]International Business School
Universiti Teknologi Malaysia
Malaysia

Abstract

The research investigates the client's perspective of outsourcing vendor information technology (IT) governance practices and service quality. The research uses a cross-sectional survey approach. A total of 100 survey questionnaires were distributed to employees at six client organisations in Malaysia that outsource selected IT functions to a local IT vendor. A total of 92 survey questionnaires were used for analysis. There is evidence to suggest that from client's perspective, vendor IT governance practices impact on service quality in IT outsourcing environment.

Keywords: IT outsourcing, IT governance, IT service quality, survey research, structural equation modelling

Introduction

The future of an organisation relies heavily on the quality of information services being used. Attempts to achieve sustainable competitiveness through information technology (IT), however, have placed a considerable burden on organisations as the scope and complexity of IT expands. Increasingly, organisations rely on outsourcing to focus on core competencies (Grover et al., 1996; Gupta and Gupta, 1992) and to manage their cost better (Ang and Straub, 1998; Claver et. al., 2002).

IT outsourcing is not a new concept for business.[1] Generally, IT outsourcing is the practice of contracting with a third party service provider (or vendor) for some or all of an organisation's IT functions. IT outsourcing has been practiced, notably in the United States of America (USA) since the late eighties. Significant examples of IT outsourcing are Kodak's outsourcing its IT functions to IBM[2] and General Motors' (GM) outsourcing its IT functions to EDS.[3] In the current global IT services environment, IT outsourcing practices are evolving as many organisations continue to identify opportunities and benefits.

Gartner forecasted global spending for IT outsourcing services would be $251.7 billion in 2012. This was a growth of 2.1% over 2011 and a projected compound annual growth rate of 5.9% from

2012 through 2016.[4] More recently, it was reported that the global IT outsourcing market could expect Compound Annual Growth Rate (CAGR) of 5.84% by 2019.[5]

With IT outsourcing, organisations are challenged to manage a large spending on IT outsourcing and intricacies of outsourcing relationships. Organisations equally face risks of business frauds and natural disasters. The last two decades witness continuous debates amongst practitioners and researchers on best practices in IT governance as organisations face these challenges. Accordingly, regulatory frameworks are instituted in assuring sound business systems and adequate internal controls. Sarbanes-Oxley Act (SOX) 2002, in particular, was enacted to enhance corporate governance, foster organisational responsibilities, strengthen internal controls and increase accountabilities (Damianides, 2004). Concurrently, the industry and academia saw the emergence and participate in the development and adoption of IT governance principles, standards and framework (e.g. COBIT, ITIL, PMBOK, ISO 27001). Each framework addresses specific objectives. Each framework defines specific top management level responsibilities and requires that they exercise due diligence in their roles. This governance development is largely driven by the need for transparency in managing organisational risks and safeguarding of shareholder value. The general concern of IT governance framework in implementation and monitoring of performance of IT investments includes IT control structure, protection of IT investment, security and control of IT, assurance of information integrity and quality of IT service delivery (Mohamed and Kaur, 2012).

IT vendors recognise the need to position themselves in responding to such challenging trend. Concurrently, client organisations need to consider how their vendor fits into the mix including areas outsourced. This challenge is further heightened by the popularity of selective outsourcing or multi outsourcing procurement models. The need for effective governance increases dramatically and the success of outsourcing contracts is critically dependent on the quality of the governance framework between the service recipient (client) and vendor. Increasingly, vendors are expected to demonstrate that their services align with IT governance best practices.

Prior literature shows a growing discussion among researchers on the impact of IT governance on organisational performance (Mohamed and Kaur, 2012; Mangalaraj et al. 2014; Lunardi et al. 2014; Pang, 2014; Tsai et al. 2015). While financial performance, balanced scorecard and strategic alignment are among the most common measure for organisational performance in IT governance impact research, outsourcing does not appear to be a key research context. In a recent literature, Tsai et al. (2015) investigated the mediating effects of IT governance on service quality and Enterprise Resource Planning (ERP) performance. While the research considered vendor service quality and consultant service quality, the research, however, confined to the implementation of ERP system. Further and more recently, there is a call for IT governance research to connect to information systems effectiveness as IT governance research in the past appears to place a greater emphasis on internal control and compliance (Mangalaraj et al. 2014).

Therefore, this paper aims at presenting empirical findings in encouraging additional research in IT governance. IT service quality is chosen as an impact of IT governance in the context of IT outsourcing in responding to identified gaps in prior research and to this recent call. The research aspires to advance understanding of the impacts of outsourcing vendor IT governance practices on service quality.

Hence, the research question (RQ) is:

RQ: Do extensive outsourcing vendor's IT governance practices impact on client's perceived IT service quality?

The objective of the research is to develop and test a theoretical model on vendor IT governance practices and IT service quality from client's perspective. The research aims at gaining insights into client's perspective of vendor IT governance practices and IT service quality in an IT outsourcing arrangement.

Literature Review

This section reviews the literature on IT governance and IT service quality.

IT Governance

The word governance is derived from the Greek verb *kubernao* meaning to steer. According to the IT Governance Institute (2005), IT governance is the responsibility of the board of directors and executive management. This is an integral part of enterprise governance. Van Grembergen (2000) refers to IT governance as the ability of organisations to achieve specified goals or organisational capacity, exercised by the board, executive management and IT management to control the formulation and implementation of IT strategy and to ensure the fusion of business and IT. Essentially, IT governance consists of leadership and organisational structures and processes that ensure the organisation's IT sustains and extends the organisation's strategies and objectives (De Haes and Van Grembergen, 2004; 2005).

Symons et al. (2005) defined IT governance as the process by which decisions are made around IT investments. IT governance covers the practice of how decisions are made, who makes the decisions, who is accountable for the decisions and how the results of decisions are measured and monitored. Executive commitment is vital in ensuring the role that IT plays in enabling and executing the enterprise's strategy. IT governance does not exist in isolation; IT governance is a subset of enterprise governance (Korac – Kakabadse and Kakabadse, 2001). It is the responsibility of not just of the IT management but of the board of directors and executive management (Peterson, 2004). Concurrently, Weill and Ross (2004) support the notion by requiring senior levels to specify decisions rights and an accountability framework to encourage desirable behaviour in the use of IT. The activity of governance itself improves the understanding and thus the working relationship between IT and the rest of the business. As a result, organisations that institute best practices in IT governance could expect business value and benefits (Kan, 2003) that are readily identified and that include increased revenues, profits and a balance struck between value creation (i.e. risk taking) and security (i.e. risk managing) (IT Governance Institute, 2000; Symons et al. 2005). Research indicates that board-level IT governance influence organisational performance regardless of IT needs (Turel and Bart, 2014) and that firms adopting IT governance practices improve their profitability (Lunardi et al., 2014).

Extant literature indicates poor governance and management of outsourcing relationships as the primary reason for the failure of outsourcing ventures (McFarlan and Nolan, 1995; Kern and Willcocks, 2000). A good structure of governance in an IT outsourcing relationship refers to the development of a good contract (Barthélemy, 2003). The outsourcing contract provides a detailed specification of "the exchanges of services and products, financial matters, assets and staff transfers, communication and information exchanges, service enforcements and monitoring methods, key personnel, dispute resolution procedures and other formal issues" (Kern and Willcocks, 2000).

Perceived It Service Quality

Service quality refers to the overall support delivered by a service provider. This is regardless whether such support is handled by the IT department, a new organisational unit or outsourced to an Internet service provider (DeLone and McLean, 2003). The quality of service is thought to be the core criterion for overall customer service (Parasuraman et al., 1991). Service quality has been reported to be significantly related to costs, profitability, customer satisfaction, customer retention, behavior intention and positive word of mouth communications (Cronin and Taylor, 1992). Over the years, the SERVQUAL instrument (Zeithaml et al., 1990) has been used to measure five elements of service quality:

Tangibles – appearance of physical facilities, equipment, personnel and communication materials.
Reliability – the ability to perform the promised service dependably and accurately.
Responsiveness – the willingness to help customers and provide prompt service.
Assurance – the knowledge and courtesy of employees and their ability to convey trust and confidence.
Empathy – caring, individualised attention which the organization provides to its customers.

Research Hypotheses and Research Model

The objective of the research is to investigate the client's perspective of outsourcing vendor IT governance practices and service quality. Accordingly, the research aims at answering the research question of whether outsourcing vendor IT governance practices impact on its IT service quality. Figure 1 shows the conceptual research framework.

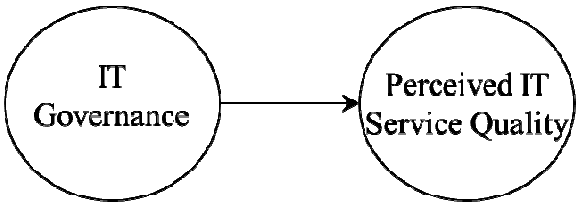


Fig 1: Conceptual research framework

Based on the aforementioned review, the research aims at developing a research model and testing a set of hypotheses. This is in seeking out an evidence for the relationship between IT governance and perceived IT service quality in an IT outsourcing arrangement. IT governance in the research comprises vendor's involvement at the top level in IT planning with the client, IT governance processes to ensure smooth execution of plans and adequate monitoring, and vendor-client outsourcing relationship. In this research, perceived IT service quality comprises soft issues that cover responsiveness, assurance, empathy and reliability. Accordingly, the hypotheses are listed below:

H1a: Vendor's IT governance structure is positively associated with its IT governance processes.

H1b: Vendor's IT governance structure is positively associated with its IT governance relational mechanism.

H2a: Vendor's IT governance processes are positively associated with its responsiveness to the client.

H2b: Vendor's IT governance processes are positively associated with its assurance to the client.

H2c: Vendor's IT governance processes are positively associated with its empathy to the client.

H2d: Vendor's IT governance processes are positively associated with its reliability to the client.

H3a: Vendor's IT governance relational mechanism is positively associated with its responsiveness to the client.

H3b: Vendor's IT governance relational mechanism is positively associated with its assurance to the client.

H3c: Vendor's IT governance relational mechanism is positively associated with its empathy to the client.

H3d: Vendor's IT governance relational mechanism is positively associated with its reliability to the client.

The research model is in Figure 2.

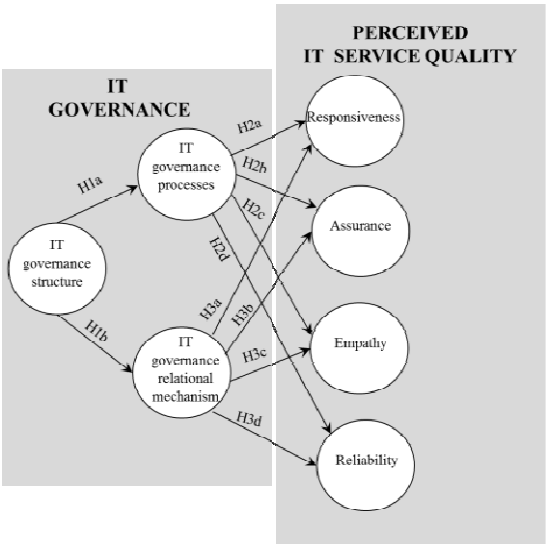


Fig 2: Research model

Methodology

This section discusses the research context, data collection and instrument, and data analysis approach for the research.

Research context

The research aims at finding empirical evidence on the relationship between vendor IT governance practices and IT service quality from client's (end user's) perspective. A total of six client organisations were selected for the research. All client organisations are based in Malaysia. The outsourcing vendor is a leading public listed company who has been providing IT outsourcing services since the 1980s. Malaysia was selected as the research context due to its potential to

further expand its IT service offerings within the Southeast Asia region. A recent newspaper report indicates that the IT outsourcing industry in Malaysia was set to double in growth by 2017 with a CAGR of 15% from its current 2012 revenue of US$1.7billion.[6]

Data Collection and Instrument

The research used a survey questionnaire as data collection approach. The survey questionnaire is in English and is divided into three parts: Section A, Section B and Section C. Section A of the questionnaire seeks to gain information about the profile of the respondents. This section covers personal information such as age, gender, education and job level, duration of work experience and whether respondent is from the IT unit of the organisation. Section B of the questionnaire contains questions about respondent's perceived IT service quality of the vendor. For this section, a five point Likert scale was used. A five-point represents "strongly agree" while a one-point represents "strongly disagree". Section C of the questionnaire contains questions about respondent's perception of vendor IT governance practices. A five point Likert scale was also used for this section. A one-point represents "not at all", a two-point represents "a little", a three point represents "moderately", a four-point represents "extensively" and a five-point represents "very extensively". Survey items using Likert scale were based on prior studies. IT governance measures were adapted from De Haes and Van Grembergen (2008a, b). Perceived IT service quality measures were adapted from Pitt et al. (1995) and Sherman (1997).

In line with the research context, only those from the supervisory, middle management and senior management in the client organisation were selected as respondents to the survey questionnaire. Target respondents should have regular interaction with staffs representing the outsourcing vendor. Respondents were from either the IT unit of their organisations or other non IT units. IT outsourcing services rendered by the vendor include helpdesk and desktop management services, and IT back end infrastructure services which cover servers, applications and network operations management.

A pilot test of the survey questionnaire was conducted among 40 respondents. Cronbach's Alpha coefficient is used to determine reliability of measures. A coefficient above 0.70 indicates internal consistency (Hair et al. 1998; Nunnally 1978). The result of reliability analysis indicates that all items were reliable (Table 1).

Table 1: Pilot test reliability analysis

Constructs	No. of items	Cronbach's Alpha
Perceived IT service quality	9	0.916
IT governance	11	0.901

A total of 100 survey questionnaires were distributed to respondents of six targeted client organisations. All six organisations are large in size having more than 500 employees. Each organisation has different business focus. The research used convenience sampling in view of fulfilling the criteria as set out to be in line with the research context as discussed earlier.

Each respondent was briefed about the purpose of the research, and was given a week to provide responses to the questionnaire and to return it to the researchers. A total of 92 questionnaires were received and used for data analysis.

Data analysis

Data collected from the respondents were first entered, coded, cleaned and analysed using SPSS Statistics 17.0. Analysis at this stage covers gaining insights into respondent's profile (descriptive statistics), profile of variables (descriptive statistics) and checking for group differences (due to the participation of respondents from several organisations). Descriptive statistics will be discussed in the subsequent section. Using Kruskal Wallis test (each sample within an organisation is fewer than 30), all except two items show no significant difference among the cases. The two items ($p<0.05$) were (i) the outsourcing vendor gives prompt services (measures responsiveness) (ii) corporate internal communication addressing general IT issues (measures IT governance relational mechanism). As these two items constitute only 10% of total items, the researchers considered all cases as one sample. Subsequently, data were analysed using Smart PLS Version 3 to determine the relationship among variables in answering the research question.

Results

This section presents and discusses the results of data analysis. Data analysis covers descriptive statistics and assessment of measurement and structural model.

Profile of Respondents

Table 2 shows the profile of respondents.

Table 2: Profile of respondents

Characteristics	Item	Frequency	Percentage (%)
Age	20 - 29	25	27.2
	30 – 39	45	48.9
	40 – 49	20	21.7
	50 – 59	2	2.2
	Total	92	100.0
Gender	Male	40	43.5
	Female	52	56.5
	Total	92	100.0
Years / current job	1 – 5	55	59.8
	6 – 10	23	25.0
	11 – 15	10	10.8
	16 – 20	2	2.2
	More than 20	2	2.2
	Total	92	100.0
Job level	Non-Executive	24	26.1
	Executive	41	44.6
	Supervisor	6	6.5
	Manager	16	17.4
	Senior Manager	5	5.4
	Total	92	100.0
Highest education	Up to equivalent	36	39.2

	grade 12 education		
	Bachelor's degree	50	54.3
	Master's degree	6	6.5
	Total	92	100.0

In terms of age group, 25 respondents (27.2 %) were between the age of 20 and 29. The remaining (72.8 %) are 30 years and above. In terms of gender, there were more female respondents (56.5%) with male respondents being the remaining (43.5 %) proportion.

The number of respondents in the range from 1 to 5 years in their current job is 55 (59.8 %). This represents the majority in work duration. Only four (4.4 %) of the total respondents have been in the current job for 16 years or more. The remaining proportion (35.8 %) has served in their current job between 6 and 15 years.

A majority of the respondents (73.9 %) are in management positions ranging from supervisory to middle management and/or senior management. Out of the total respondents, 5.4% represent the senior management.

A high proportion of the respondents (60.8 %) were educated at the Bachelor's degree or higher. The rest (39.2%) of the sample had at least an equivalent of grade 12 education. Based on the predominant age group that is above 30 years of age, educational background, job level and experience in the current job, the respondents would be generally familiar with management evaluation process.

Profile of variables

Table 3 shows the profile of perceived IT service quality variables.

Table 3: Profile of perceived IT service quality variables

Code	Item	SD	D	N	A	SA	Mean
	The outsourcing vendor:						
OV 11	gives prompt services *(measures responsiveness)*	0	3 (3.3%)	23 (25%)	50 (54.3%)	16 (17.4%)	3.86
OV 12	is always willing to help *(measures responsiveness)*	0	2 (2.2%)	13 (14.1%)	56 (60.9%)	21 (22.8%)	4.04
OV 13	is consistently courteous to me *(measures assurance)*	0	0	19 (20.7%)	55 (59.7%)	18 (19.6%)	3.99
OV 14	has knowledge to answer clients questions *(measures assurance)*	0	2 (2.2%)	27 (29.3%)	53 (57.6%)	10 (10.9%)	3.77
OV 15	gives me personal attention *(measures empathy)*	0	6 (6.5%)	29 (31.5%)	46 (50%)	11 (12%)	3.67
OV 16	understand my needs and those of my work group *(measures*	0	4 (4.3%)	29 (31.5%)	42 (45.7%)	17 (18.5%)	3.78

	empathy)						
OV 17	delivers when promises to do something *(measures reliability)*	0	5 (5.4%)	25 (27.2%)	46 (50%)	16 (17.4%)	3.79
OV 18	show sincere interest in solving problems encountered by myself or others in my work group *(measures reliability)*	0	8 (8.7%)	21 (22.8%)	49 (53.3%)	14 (15.2%)	3.75
OV 19	performs services right the first time *(measures reliability)*	0	6 (6.5%)	36 (39.2%)	37 (40.2%)	13 (14.1%)	3.62

Overall, majority of respondents were inclined towards agreeing with each measure of IT service quality. The mean ranges from 3.62 (the outsourcing vendor performs services right first time – measures reliability) to 4.04 (the outsourcing is always willing to help – measures responsiveness).

Table 4 shows the profile of IT governance variables.

Table 4: Profile of IT governance variables

Code	Item	NAA	AL	M	E	VE	Mean
	The IT outsourcing vendor practices:						
VP20	documentation of business and IT governance alignment tasks *(measures structure)*	0	7 (7.6%)	47 (51.1%)	30 (32.6%)	8 (8.7%)	3.42
VP21	involvement of their senior members in our organization at the IT steering committee/executive/senior management level for evaluation/prioritization of IT investment *(measures structure)*	1 (1.1%)	11 (12%)	42 (45.6%)	34 (37%)	4 (4.3%)	3.32
VP22	making available security/compliance function *(measures structure)*	0	3 (3.3%)	33 (35.9%)	50 (54.3%)	6 (6.5%)	3.64
VP23	working jointly with us in development and execution of our strategic information systems planning blueprint *(measures structure)*	1 (1.1%)	10 (10.9%)	41 (44.5%)	32 (34.8%)	8 (8.7%)	3.39
VP24	IT performance measurement (e.g. IT Balance Scorecard) in their service delivery *(measures process)*	0	8 (8.7%)	40 (43.5%)	33 (35.8%)	11 (12%)	3.51
VP25	conformity to Service Level Agreement (SLA) delivery *(measures process)*	2 (2.2)	3 (3.3%)	39 (42.4%)	34 (36.9%)	14 (15.2%)	3.60

VP26	project governance management methodologies for managing IT projects delivery *(measures process)*	2 (2.2%)	4 (4.3%)	48 (52.2%)	28 (30.4%)	10 (10.9%)	3.43
VP27	IT budget control/reporting in their performance reporting delivery *(measures process)*	3 (3.3%)	13 (14.1%)	46 (50%)	24 (26.1%)	6 (6.5%)	3.18
VP28	IT governance control framework (e.g. COBIT/ITIL) delivery *(measures process)*	2 (2.2%)	3 (3.3%)	46 (50%)	32 (34.7%)	9 (9.8%)	3.47
VP 29	Knowledge management (on IT governance) delivery *(measures relational mechanism)*	2 (2.2%)	4 (4.3%)	41 (44.6%)	33 (35.9%)	12 (13%)	3.53
VP 30	Corporate internal communication addressing general IT issues on a regular basis *(measures relational mechanism)*	1 (1.1%)	1 (1.1%)	37 (40.2%)	43 (46.7%)	10 (10.9%)	3.65

The mean score for IT governance measures ranges from 3.18 (IT budget control/reporting in their performance reporting delivery – measures process) to 3.65 (Corporate internal communication addressing general IT issues on a regular basis – measures relational mechanism). Findings indicate that respondents evaluated the vendor IT governance practices as moderate in line with the use of scale around the mid-point (as defined in earlier section of the paper). There is evidence to suggest that the vendor, from client's perspective does not yet reach extensiveness in IT governance practices.

Measurement Model and Structural Model

The subsequent step was to analyse the convergent validity. Convergent validity is achieved when loadings of the measures to respective constructs are at least 0.60 (Bagozzi and Yi, 1988; Kline, 2005), composite reliability (CR) of all constructs are above 0.6 (Bagozzi and Yi, 1988; Kline, 2005) and average variance extracted (AVE) are above 0.5 (Fornell and Larcker, 1981). Table 5 shows the loadings, composite reliability and average variance extracted.

Table 5: Loadings, Composite Reliability and Average Variance Extracted

Construct		Item	Loading	CR	AVE
Perceived IT service quality	Responsiveness	OV11	0.893	0.891	0.804
	Responsiveness	OV12	0.90		
	Assurance	OV13	0.847	0.844	0.73
	Assurance	OV14	0.863		
	Empathy	OV15	0.868	0.877	0.781
	Empathy	OV16	0.899		
	Reliability	OV17	0.898	0.90	0.751
	Reliability	OV18	0.851		
	Reliability	OV19	0.85		
IT governance	Structure	VP20	0.83	0.848	0.651

	Structure	VP21	***0.418***		
	Structure	VP22	0.788		
	Structure	VP23	0.792		
	Process	VP24	0.806	0.876	0.587
	Process	VP25	0.791		
	Process	VP26	0.835		
	Process	VP27	0.698		
	Process	VP28	0.689		
	Relational mechanism	VP29	0.871	0.848	0.736
	Relational mechanism	VP30	0.845		

Item VP21 highlighted in italic and bold (involvement of their senior members in our organisation at the IT steering committee/executive/senior management level for evaluation/prioritisation of IT investment) that measures structure in IT governance does not meet the cut-off loading. Therefore, the item is dropped from further analysis. The rest of the items meet the cut-off loading. The inter-variable correlations (Table 6) were then examined.

Table 6: Inter-variable correlations

	Structure	Process	Relational	Responsiveness	Assurance	Empathy	Reliability
Structure	**0.807**						
Process	0.795	**0.766**					
Relational	0.618	0.753	**0.858**				
Responsiveness	0.46	0.586	0.614	**0.897**			
Assurance	0.559	0.608	0.592	0.686	**0.854**		
Empathy	0.606	0.606	0.587	0.63	0.726	**0.884**	
Reliability	0.635	0.615	0.654	0.696	0.733	0.757	**0.867**

The correlation among IT governance structure, process and relational mechanism ranges from 0.618 to 0.795. This provides empirical evidence that IT governance measures correlate among each other. The correlation among perceived IT service quality ranges from 0.63 to 0.757. This provides empirical evidence that the measures for perceived IT service quality correlate among each other. The square-root AVE (highlighted in bold) were higher than correlations suggesting that the construct was more closely related to its own measures thus supporting discriminant validity (Kline, 2005).

The researchers then proceeded with bootstrapping to determine support for hypotheses (Table 7).

Table 7: Support for hypotheses

Hypotheses	Path	ß	Standard deviation	t-Statistic	Support?
H1a	Structure -> process	0.80	0.033	24.242	Yes
H1b	Structure -> relational	0.621	0.075	8.287	Yes
H2a	Process -> responsiveness	0.289	0.147	1.966	Yes

H2b	Process -> assurance	0.374	0.134	2.795	Yes
H2c	Process -> empathy	0.371	0.134	2.776	Yes
H2d	Process -> reliability	0.287	0.135	2.129	Yes
H3a	Relational -> responsiveness	0.397	0.137	2.892	Yes
H3b	Relational -> assurance	0.311	0.141	2.2	Yes
H3c	Relational -> empathy	0.314	0.134	2.339	Yes
H3d	Relational -> reliability	0.438	0.142	3.081	Yes

H1a suggests that vendor's IT governance structure is positively associated with its IT governance processes. Support was found for this relationship (ß=0.80; t-stat=24.242).
H1b indicates that vendor's IT governance structure is positively associated with its IT governance relational mechanism. Support was found for this relationship (ß=0.621; t-stat=8.287).
H2a proposes that vendor's IT governance processes are positively associated with its responsiveness to the client. There was support for this relationship (ß=0.289; t-stat=1.966).
H2b proposes that vendor's IT governance processes are positively associated with its assurance to the client. There was support for this relationship (ß=0.374; t-stat=2.795).
H2c suggests that vendor's IT governance processes are positively associated with its empathy to the client. Support was found for this relationship (ß=0.371; t-stat=2.776).
H2d proposes that vendor's IT governance processes are positively associated with its reliability to the client. Support was found for this relationship (ß=0.287; t-stat=2.129).
H3a suggests that vendor's IT governance relational mechanism is positively associated with its responsiveness to the client. There was support for this relationship (ß=0.397; t-stat=2.892).
H3b proposes that vendor's IT governance relational mechanism is positively associated with its assurance to the client. There was support for this relationship (ß=0.311; t-stat=2.2).
H3c suggests that vendor's IT governance relational mechanism is positively associated with its empathy to the client. Support was found for this relationship (ß=0.314; t-stat=2.339).
H3d indicates that vendor's IT governance relational mechanism is positively associated with its reliability to the client. There was support for this relationship (ß=0.438; t-stat=3.081).

Figure 3 shows the theoretical path results.

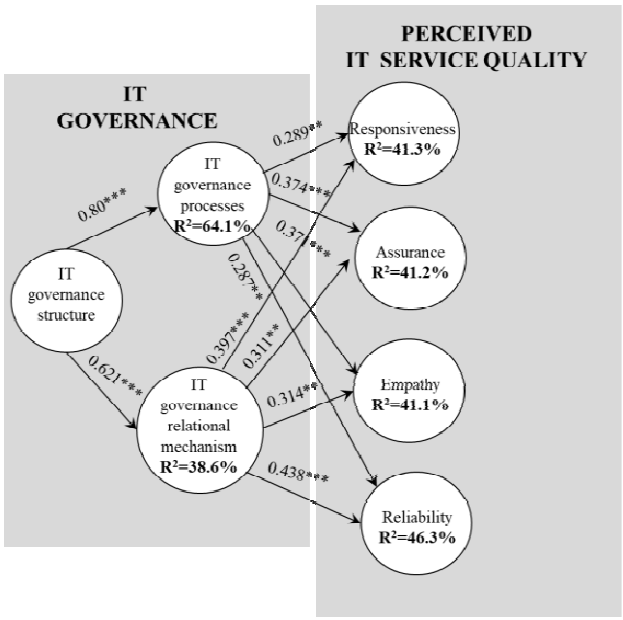


Fig 3: Theoretical path results

Note: -> significant path. **, *** Path is significant at p<0.05 and at p<0.01 respectively.

A total of 64.1% variation in IT governance processes is contributed by IT governance structure alone. IT governance relational mechanism is explained through 38.6% variation contributed by IT governance structure. A total of 41.3% variation in responsiveness is jointly contributed by IT governance process and relational mechanism. Assurance is explained through 41.2% jointly contributed by IT governance process and relational mechanism. A total of 41.1% variation in empathy is jointly contributed by IT governance process and relational mechanism. Reliability is explained through 46.3% variation jointly contributed by IT governance process and relational mechanism.

Discussion and Conclusion

IT outsourcing is a strategy for organisations who strive to manage IT costs and focus on core competencies. Equally, organisations nowadays struggle to manage risks and safeguard shareholder value as they engage into IT outsourcing relationship. Organisations are continuously challenged with outsourcing relationship intricacies while striving to attain organisational performance. The research sets out at gaining insights into client's perspective of vendor IT governance practices and IT service quality in an IT outsourcing arrangement. At the onset, the researchers formulated the following research question (RQ): ***Do extensive outsourcing vendor's IT governance practices impact on client's perceived IT service quality?***

The objective of the research was set out to develop and test a theoretical model on vendor IT governance practices and IT service quality from client's perspective. The research used survey approach. A total of 100 survey questionnaires were distributed to employees at six client organisations in Malaysia that outsource selected IT functions to a local IT vendor. A total of 92 survey questionnaires were used for analysis. The research has fulfilled the objective. The subsequent section discusses the major findings, research contributions and limitations and suggestions for future research.

Summary of Major Findings

The research reaffirms that vendor IT governance practices comprise governance structure, process and relational mechanism in IT outsourcing context. IT governance and IT service quality measures used in the research indicate reliability across time in outsourcing environment. The research provides evidence on the importance of vendor's having in place IT governance structure. This assures the client that vendor is capable to support client in development of IT planning blueprint, in providing secure and compliant function, and in catering to relevant documentation needs. In outsourcing context, IT governance structure requires joint involvement of vendor's senior management with the client in leading and managing critical IT function for the client.

Vendors who have more extensive IT governance structure (through top management's involvement and assurance of compliance) would experience greater drive in promoting appropriate internal control framework (reporting, service level etc.) and better relationship with clients (through meetings and communications). Clients could expect better control of their own performance and vendor's performance when vendor practices appropriate IT governance structure. This includes establishing standards for vendor performance and implementing relevant performance measurement tools when outsourcing. Regular communication and knowledge sharing between client and vendor about IT governance and issues arising in outsourcing are essential. This finding resonates McFarlan and Nolan, (1995), Kern and Willcocks (2000) and Barthélemy (2003).

In this research, perceived IT service quality was conceptualised as the impact of IT governance. IT service quality is measured through client's assessment of vendor. There is evidence to suggest that vendor extensive IT governance process and IT governance relational mechanism contribute to higher IT service quality from client's perspective. Client would experience greater responsiveness from vendor (in terms of willingness to provide prompt services and assistance) for vendor that practice more extensive IT governance. Further, there is indication that vendor practicing more extensive IT governance is more courteous to client and is better able to demonstrate knowledge on client's outsourcing concerns. Besides, client could expect vendor that practice more extensive IT governance to pay greater attention to client, to better fulfill promises and to deliver services right the first time. In sum, this finding is in support of Turel and Bart (2014) and Lunardi et al. (2014).

Research contributions

From a theoretical perspective, the research identified perceived IT service quality as impacts of IT governance. The research has developed a theoretical model that explains IT governance and perceived IT service quality from client's perspective in IT outsourcing context. Notably, the research lends support for the role of IT governance in explaining perceived IT service quality. As the measures demonstrate internal consistency, IT vendors could adopt the measures. This contributes to practice. The use of structural equation modelling is demonstrated for IT governance research thereby adding to methodological contribution.

Limitations and suggestions for future research

The first limitation of the research is the small sample size of 92 respondents. The small sample was a limiting factor in determining group differences for IT governance practice and perceived IT service quality. Secondly, a convenience sampling was used for the research. Thirdly, data was collected at a point of time. Future research could consider higher number of respondents, other client and vendor organisations and a longitudinal approach.

Endnotes

[1]https://www.technavio.com/report/global-ito-and-bpo-it-outsourcing-market (accessed on August 8, 2017)
[2]http://www.computerweekly.com/feature/CW50-A-history-of-IT-outsourcing (accessed on July 29, 2017)
[3]http://www.theregister.co.uk/2006/02/03/gm_outsourcing/ (accessed on July 29, 2017)
[4]https://www.gartner.com/doc/2092915/forecast-analysis-it-outsourcing-worldwide (accessed on August 8, 2017)
[5]http://www.prnewswire.com/news-releases/global-it-outsourcing-market-cagr-growth-of-584-by-2019---trends-technologies--opportunities-report-2015-2019---key-vendors-hp-ibm-infosys-571658261.html (accessed on August 8, 2017)
[6]http://www.thestar.com.my/business/sme/2013/10/23/outsourcing-industry-set-to-double-in-growth-by-2017/#wwHWcEddX7aSIOEd.99 (accessed on August 8, 2017)

References

Ang, S. and Straub, D. W. (1998), 'Production and transaction economies and IS outsourcing: a study of the US banking industry,' *MIS Quarterly*, 535-552.

Bagozzi, RP. and Yi, Y. (1988), 'On the evaluation of structural equation models,' *Journal of the Academy of Marketing Science*, 16(1), 74-94.

Barthélemy, J. (2003). 'The hard and soft sides of IT outsourcing management,' *European Management Journal*, 21(5), 539-548.

Claver, E., González, R., Gascó, J and Llopis, J. (2002), 'Information systems outsourcing: reasons, reservations and success factors,' *Logistics Information Management*, 15(4), 294-308.

Cronin Jr, JJ., and Taylor, S. A. (1992), 'Measuring service quality: a reexamination and extension,' *Journal of Marketing*, 55-68.

De Haes, S. and Van Grembergen, W. (2004), 'IT governance and its mechanisms,' *Information Systems Control Journal*, 1, 27-33.

De Haes, S., and Van Grembergen, W. (2005, January), 'IT governance structures, processes and relational mechanisms: achieving IT/business alignment in a major Belgian financial group,' In System Sciences, 2005. HICSS'05. Proceedings of the 38th Annual Hawaii International Conference on Systems Sciences (HICSS).

De Haes, S. and Van Grembergen, W. (2008a), 'Analysing the relationship between IT governance and business/IT alignment maturity,' In System Sciences, 2008. HICSS'08. Proceedings of the 41st Hawaii International Conference on Systems Sciences (HICSS).

De Haes, S., and van Grembergen, W. (2008b), 'Practices in IT governance and business/IT alignment,' *Information Systems Control Journal*, 2, 1-6.

DeLone, WH., and McLean, E. R. (2003), 'The DeLone and McLean model of information systems success: a ten-year update,' *Journal of Management Information Systems*, 19(4), 9-30.

Fornell, CR. and Larcker, D.F. (1981), 'Evaluating structural equation models with unobserved variables and measurement error,' *Journal of Marketing Research*, 18(1), 39-50.

Grover, V., Cheon, MJ. and Teng, J.T.C. (1996), 'The effect of service quality and partnership on the outsourcing of information systems functions,' *Journal of Management Information Systems*, 12(4), 89-116.

Gupta, UG. and Gupta, A. (1992), 'Outsourcing the IS function: Is it necessary for your organization?,' *Information Systems Management*, 9(3), 44-47.

Hair, JF, Tatham, RL, Anderson, RE and Black, W. (1998), Multivariate Data Analysis, 5th ed., Prentice-Hall, NY.

IT Governance Institute (2005), 'The Governance Institute Home Page,' accessed on August 8, 2017, available at: www.governanceinstitute.com/

Kan, AR. (2003), 'Managing a multi billion dollar IT budget,' *Software Maintenance*, September 2003, 2.

Kern, T. and Willcocks, L. (2000), 'Exploring information technology outsourcing relationships: theory and practice,' *Journal of Strategic Information Systems*, 9(4), 321-350.

Kline, RB. (2005), Principles and Practice of Structural Equation Modelling, Guilford Press, New York, NY.

Korac-Kakabadse, N. and Kakabadse, A. (2001), 'IS/IT governance: need for an integrated model,' *Corporate Governance*, 1(4), 9-11.

Liang, T-P., Chiu, Y-C, Wu, SPJ. and Straub, D. (2011), 'The impact of IT governance on organizational performance,' In AMCIS 2011 proceedings - all submissions, 268, accessed on September 7, 2017, available at: http://aisel.aisnet.org/amcis2011_submissions/268

Lunardi GL., Becker, JL., Maçada, ACG., Dolci, P. C. (2014), 'The impact of adopting IT governance on financial performance: An empirical analysis among Brazilian firms,' *International Journal of Accounting Information Systems*, 15(1), 66-81, accessed on August 8, 2017, available at: http://dx.doi.org/10.1016/j.accinf.2013.02.001

Mangalaraj, G., Singh, A. and Taneja, A. (2014), 'IT Governance Frameworks and COBIT – A Literature Review,' In Twentieth Americas Conference on Information Systems (AMCIS) proceedings, Savannah, 2014 accessed on September 8, 2017, available at: http://aisel.aisnet.org/cgi/viewcontent.cgi?article=1262&context=amcis2014

McFarlan, F. and Nolan, R. L. (1995), 'How to manage an IT outsourcing alliance,' *Sloan Management Review*, 36, 9-22.

Mohamed, N. and Kaur, J. (2012), 'A conceptual framework for information technology governance effectiveness in private organizations,' *Information Management & Computer Security*, 20(2), pp. 88 – 106.

Nunnally, J. C. (1978), Psychometric Theory, 2nd ed., McGraw-Hill, New York.

Pang, M-S. (2014), 'IT governance and business value in the public sector organizations — The role of elected representatives in IT governance and its impact on IT value in U.S. state governments,' *Decision Support Systems*, 59, 274–285.

Parasuraman, A, Berry, LL. and Zeithaml, V. A. (1991), 'Refinement and reassessment of the SERVQUAL scale,' *Journal of Retailing*, 67(4), 420-450.

Peterson, R. (2004), 'Crafting information technology governance,' *Information Systems Management*, 21(4), 7-22.

Pitt, LF., Watson, RT. and Kavan, C. B. (1995), 'Service quality: a measure of information systems effectiveness,' MIS Quarterly, 19(2), 173-187.

Sherman, BA. (1997). Operationalization of information systems technology assessment. Unpublished doctoral dissertation, State University of New York at Buffalo.

Symons, C. (2005), 'IT governance framework: structures, processes and communication,' accessed on August 8, 2017, available at: www.cba.co.nz/download/Forr051103656300.pdf

Tsai, W-H, Chou, Y-W, Leu, J-D, Chen DC. and Tsaur, T-S. (2015), 'Investigation of the mediating effects of IT governance-value delivery on service quality and ERP performance, *Enterprise Information Systems*, 9(2), 139-160, DOI: 10.1080/17517575.2013.804952.

Turel, O. and Bart, C. (2014), 'Board-level IT governance and organizational performance,' *European Journal of Information Systems*, 23, 223–239.

Van Grembergen, W. (2000, May). The balanced scorecard and IT governance, in IRMA Conference, 1123-1124.

Weill, P. and Ross, JW. (2004), IT governance: how top performers manage IT decision rights for superior results, Harvard Business School Publishing, Boston, MA.

Weill, P. and Woodham, P. (2002), 'Don't just lead, govern: implementing effective IT governance,' accessed on August 8, 2017, available at: http://ssrn.com/abstract_id¼317319

Zeithaml, V., Parasuraman, A., and Berry, LL. (1990), Delivering Quality Service: Balancing Customers Perceptions and Expectations, The Free Press, NY.

The Effect of Corporate Social Responsibility on The Profitability of Nigerian Banks (A Comparative Study of First Bank and Eco Bank)

Kehinde Olaide O.,
Business Management, Covenant University, Nigeria, oluwafeyikemikehinde7@gmail.com

Worlu Rowland E.K.,
Associate Professor of Marketing, Covenant University, Nigeria,
rowland.worlu@covenantuniversity.edu.ng

Motilewa Bolanle Deborah,
Business and Society Lecturer, Covenant University, Nigeria, deborah.motilewa@cu.edu.ng

Oguntoyinbo Charles Abayomi
Lecturer, Business Management Department, Covenant University, Nigeria,
deborah.motilewa@cu.edu.ng

Abstract

This study critically examined the effect of corporate social responsibility on the profitability of Nigerian banks using the ECOWAS bank (popularly known as ECO Bank) and First Bank of Nigeria as case studies. The objectives of the study were to: examine the relationship between environmental concerns and return on investment; investigate how corporate governance affects the gross margin of consumer banks; ascertain whether suppliers' reward improves return on equity of Nigerian consumer banks. The questionnaire was adopted as the instrument for data collection, and the responses derived from the questionnaire were analyzed using simple frequency tables, Pearson correlation, regression analysis and ANOVA test statistics using the Statistical Package for Social Sciences (SPSS) version 23. Findings from this study indicate that corporate social responsibility has a positive influence on the profitability of banks operating in Nigeria, given the institutional deficiencies in the country. It is concluded that an investment into social responsibility positively influences the bank's reputation and image, thereby leading to stronger customer loyalty. It is therefore recommended that banks operating in especially developing countries like Nigeria look beyond financial profit to social profit derived from social responsibility.

Keywords: Corporate social responsibility, profitability, consumer banks, environmental concerns.

1.0 Introduction

The focus of Corporate Social Responsibility in several industries, such as the banking sector has moved from an effort to be solely ethical to ensuring an ethical performance orientation in all aspects of business operations. Banks have found the need to contribute to the environment of their operations by merging social responsibility to their profitability strategies (Dhaka & Ullah, 2012). The concept of Corporate Social Responsibility (CSR) is one of moral and ethics, which entails maintaining principled leadership and conduct that create solution to societal issues (Mohammed, Hassan & Kazi, 2009). Although the major purpose of all commercial banks and generally any business organization is to make

profit, there has become a rising recognition of the impact of banking operations on the employees, customers, government, competitors, partners, investors and environment. It is posited that commercial banks should concentrate their consideration on both expanding its main concern and being a decent corporate citizen (Pacific Continental May, 2013; Nurn & Tang, 2010).

Objectives of the Study

The broad objective of this study was to explore the effect of Corporate Social Responsibility on the Profitability of the Nigerian banking industry. However, the specific objectives were to;

i. Investigate how corporate governance affects the gross margin of the banks.
ii. Examine the relationship between environmental concerns and return on investments.
iii. Ascertain whether suppliers reward improves the return on equity of a bank.

Research Hypothesis

Hypothesis one

$H_{01:}$ corporate governance practices do not influence banks gross margin.

H_{a1}: corporate governance practices influences banks gross margin.

Hypothesis two

$H_{02:}$ there is no relationship between environmental concerns and return on investments.

H_{a2}: there is a relationship between environmental concerns and return on investments.

Hypothesis three

H_{03}: suppliers reward does not influence return on equity of a bank in any way.

H_{a3}: suppliers reward influences return on equity of a bank in various ways.

Like all business organizations, consumer banks profit by having revenues in excess of their expenses. The major portion of the bank's profit comes from the fees that it charges for its services and the interest that it earns on its assets, while its major liabilities accrue from the interest paid on its liability (Johansson, Karlsson & Hagberg, 2015). The issue of corporate social responsibility and its effect to bank profitability is crucial, as it is hypothesized that a successful Corporate Social Responsibility endeavor enhances an organization's reputation, leads to higher productivity and innovation among employees, boosts sales revenue through improved customer goodwill, attracts new customers and balances power with responsibility (Asemah, Okpanachi & Edegoh, 2013). Based on the above, this study attempts to create a relationship between CSR and profitability in commercial banks by studying the impact of Corporate Social Responsibility (measured using community development, corporate governance, environmental concerns and suppliers rewards) on profitability (measured by sales growth, gross margin, return on investment and equity).

2.0 Literature Review

White (2012) observed that the awareness for CSR is becoming a major cause of concern worldwide, and while several organizations are finding it difficult to deal with this concern, several other organizations are benefiting from the CSR wave. Commercial banks play an important role in the shaping of any economy – developing and developed. In the Nigerian economy, given the direct link between the

prosperity of the banking sector and the development of the economy, Nigerian banks are now under more pressure to exhibit responsibility and sustainability (Johansson, Karlsson & Hagberg, 2015).

Since the establishment of the idea of CSR, there has been a distinctive assessment in the matter of what CSR is proposed to fulfill for a firm. According to Cheng (2014), CSR has the capacity to strengthen the connection between a business organization and it's respective stakeholders. It is posited that as an act of being socially responsible, commercial banks can lower their loan constraints through better access to bank credits for small and medium enterprises, thereby contributing to the growth of the economy. In return, the bank is perceived to have the interest of the general populace at heart (Hanke & Stark, 2009).

The Case Study

The study reviewed the CSR practices of two consumer banks in Nigeria: First bank of Nigeria and Ecobank. The choice of both banks is as a result of the noticeable CSR practices engaged by both banks in their various branches in the country.

2.1 Empirical Framework

Corporate Social Responsibility Dimensions

The expansiveness of the concept of corporate social responsibility has created the need to break down the term into sizeable chunks to ensure business organizations are able to fully engage in social responsibility. The triple bottom line concept creates an easy to adopt approach to engaging CSR. It indicates that the concern of the business organization is mainly financial (costs versus pay), such that the business organization is concerned about how it can create value as regards three different entities: profit, people and planet, commonly referred to as the 3Ps (Dyllick & Hockerts, 2002). Profit explains how the business organizations (commercial banks in this case) produce economic benefits to the society, in terms of finance. The people aspect of the triple bottom line explains the bank's relationship with its employees, while planet refers to the commercial bank's responsibility to the environment.

In recent literature, the 3Ps have been alluded to as the social, environmental and financial scopes of an organization's CSR execution (Slaper & Hall, 2011).

Environmental Dimension

The environmental dimension of the triple bottom line approach to CSR is referred to as the business organization's commitment to reducing the negative environmental impact of its operations. This is usually achieved through appropriately disposing of outflows and waste, accomplishing energy effectiveness and efficiency, and generally diminishing practices that may adversely influence the sustainability of natural resources (Yeung, 2011). Rodriquez, Fernandez and Simonetti (2015) highlight the following as the main elements of environmental responsibility:

i. Adopting environmental performance measures and guidelines that are subjected to international environmental protection standards.
ii. Aiding nation-wide environmental development goals and initiatives
iii. Promoting environmental mindfulness
iv. Initiating community-focused discourse on environmental issues.

Social Dimension

The social dimension views the business organization's relationship with its various stakeholders – consisting dominantly of the shareholders, customers, employees, government bodies and community members. There is a rising pressure for business organisations, especially key entities such as the

commercial banks, to give more attention and resources to its relationship with its stakeholders, especially community members, as stakeholders have become more aware of their social rights and do not hesitate in anyway to push their social demands on the bank (Dylick & Hockerts, 2002). It is posited that the bank's main areas of portraying social responsibility from the social dimension perspective, is by ensuring fair employment and labour practices, and by proffering solutions to community challenges, thus creating better social relationship with its stakeholders.

Economic Dimension

The economic dimension of CSR deals with understanding the economic influences of the bank or company's operations, which entails understanding the firm's impact on the economy, as regards finances. It indicates how resources for the generation of merchandise and enterprises are conveyed inside the social framework. Several CSR authors such as Carroll (1991) in the pyramid of CSR, have inferred that of all dimensions of corporate social responsibility, the economic dimension is the most important. In the case of consumer banks, the economic dimension of CSR goes beyond the banks recording employment figures and debts in their CSR report, but entails core economic issues such as the multiplier effect of the firms' operations, it's contributions to the economy through taxes and very importantly, avoiding actions that damage trust (Jucan & Sabina, 2010).

The Consumer Banks' Cost and Benefits Evaluation of Corporate Social Responsibility

In the present world system, where consumers place more emphasis on the reputation of a firm than the perception of their products and services, consumer banks have not been left out from this system, as bank managers have begun to incorporate sustainable business practices into their daily operations, to fully benefit from good corporate citizenship (Dhaka & Ullah, 2012).

Investment in corporate social responsibility portrays the bank as one that is interested in people, planet and profit, and not solely its monetary bottom line. This reputation can be very attractive, not just to customers or clients, but also to investors, suppliers, vendors, employees and government. In situations where the employees and other key stakeholders align to this shared values and vision of positive impact, it can lead to better working relationships and increased loyalty, which often results in increased financial gain (Pacific Continental May, 2013). CSR prompts more noteworthy corporate budgetary execution and furthermore encourages the unmistakable benefits of pulling in improved representatives, diminished turnover rate, more significant profitability and decreased working costs. Summarily, the benefits of CSR to the banks include:

i. Higher productivity and innovation among employees
ii. Increased sales revenue
iii. Improved customer goodwill
iv. Ability to attract new customers
v. Improved balance of power with responsibility
vi. Enhanced reputation in the workplace (Asemah, Okpanachi & Edegoh, 2013; Nurn & Tang, 2010).

2.2 Theoretical Framework of Corporate Social Responsibility

The Stakeholders' Theory: Supporting the firm's engagement in CSR practices that encompasses the business organisation's relationship with its various stakeholders is the stakeholders' theory, which has for the most part been utilized while examining corporate social responsibility and its effect on the firm's stakeholders. The stakeholders' theory basically engages the concept of how stakeholders should be engaged in the running of the business organisations' operations, such that every decision made in the organization as regards corporate social responsibility outlines the impact (positive and negative) on the

firm's various stakeholders, which usually constitutes of any body that is affected by the firm's operations, such as the suppliers, customers, employees, government amongst others (Mitchell, Agle & wood, 1997).

3.0 Methodology

The descriptive and survey methods of research were adopted in this study. The survey research method was chosen to determine the factors influencing the profitability of Nigerian banks that are engaged in corporate social responsibility. The survey instrument; the questionnaire, was designed using likert categorical scale to measure respondents' attitude towards the important factors of the study. The **Sample Size** for this study includes all the employees of First Bank and Eco bank in Nigeria.

The **sample frame** used for this data would be based on convenience sampling. Using the formula postulated by awokemi (2003), we are able to get the sample frame in which the questionnaires would be administered because not everybody in the organization would be reached. The sample frame for this study is Eco bank and First Bank. Since all the population cannot be met the questionnaires were distributed to the customers and the community.

Due to inadequate records keeping, the exact number of these employees are not known, but are estimated to be above 10,000. Primary data for this study was collected using the questionnaire, while secondary data was gotten from the Internet, journals and articles. Data gathered from the questionnaire were analysed using correlation and regression tools of the statistical package for social sciences (SPSS). The Pearson correlation tool was utilized to investigate the quality of connection between two continuous variables and the regression analysis was used to determine the effect of the independent variable on the dependent variable.

The **Research validity**, questionnaires included a variety of questions on the knowledge of corporate social responsibility and its impact on the profitability of Nigerian banks. The questionnaire is designed in such a way that information gained would provide answers to the research questions and hypothesis. The questions were formulated in simple language for clarity and ease understanding. Clear instructions were given to the respondents. The questionnaires were shared to the employees in Ecobank transactional incorporated and they were all filled in the presence of the researcher.

Reliability of Research Instruments

Table 3.1 Reliability Statistics

Cronbach's Alpha	N of Items
.727	16

A coefficient of 0.727 indicates the research instrument is reliable, as it is above 0.7, which is the benchmark for testing reliability.

3.1 Corporate Social Responsibility practices of First Bank of Nigeria

First bank of Nigeria is acclaimed to be one of the leading banks with strong corporate social responsibility practices in Nigeria. Of their numerous community engagements the following are the most natable ones:

i. The creation of the First bank foundation: The first bank foundation is the unit of the bank that is concerned with the strategising of the bank's corporate social responsibility practices. The aim of creating the foundation was to ensure careful and well thought out engagement between the bank and their customers.
ii. Partnership with several organisations: First bank partners with several organisations to ensure a better societal reach. Such organisations as Cadbury Bournvita, Alexander Forbes amomg others for several projects. In recent times, they partnered with these organisations to sponsor the 'God's Children Got Talent' program, a talent show for young children, in collaboration with the Redeeemed Christian Church of God province 4
iii. Investment in educational growth opportunities such as the e-registration forms initiative for the November/December 2014 West African Senior School Certificate Examination (WASSCE).
iv. Partnership with health care initiatives such as the Sebeccly Cancer Care and Support Centre, to build awareness about cancer, pledge action amongst women to get screened and give access to quality cancer care. FirstBank is also supporting the Centre's Light Lagos Pink Campaign, an annual statewide fundraising campaign to promote breast cancer awareness and raise funds to support breast cancer treatment (First bank foundation, 2017).

3.2 Corporate Social Responsibility Practices of Eco Bank

Just like First Bank of Nigeria, The Ecowas bank (commonly known as Ecobank) is top on the lst of business organisations in Nigeria that have CSR at the fore-front of tehir operations. Some of the Ecobank's CSR initiatives include:

i. Support for the promotion of education in the country through several initiatives, such as the build of over a 100 seater ultra-modern lecture theatre at the Chukwuemeka Odumegwu Ojukwu University (formerly Anambra State University), as part of its corporate social responsibility (CSR) initiatives in 2016. In line with its main startegy of promoting education, Ecobank also committed resources to building classroom blocks for three schools across the country; namely, C&S primary school, ikorodu Lagos; Government secondary school, Kubwa; Abuja and Eastern academy onistsha, anambra state in 2013.
ii. Ecobank has an Environmental and Sustainability unit within its Group Risk Management department. This unit has the primary responsibility for all environmental and sustainability management, including environmental and social risks, sustainability business development, adoption of green initiatives, energy conservation and carbon footprint management (Ecobank, 2017).

4.0 Presentation of Result and Analysis

The data used here were gotten from the hypotheses tested, which were derived from the research hypotheses listed in the introduction. This study made use of three sets of hypotheses as seen below:

4.1 Test of Hypotheses

4.1.1 Hypothesis one: The influence of corporate governance practices on banks gross margin

Table 4.1.1.1 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.234[a]	.055	.044	.60552

a. Predictors: (Constant), Corporate governance has a positive effect on the bank's gross margin

Table 4.1.1.2 ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.925	1	1.925	5.251	.024[b]
	Residual	33.365	91	.367		
	Total	35.290	92			

a. Dependent Variable: There is a relationship with the bank and its customers

a. Predictors: (Constant), Corporate governance has a positive effect on your banks gross margin

Table 4.1.1.3 Coefficients

Model	B	Std.Error	Beta	t	Sig
(constant)	3.782	.382		9.909	.000
Corporate governance has a positive effect on your banks gross margin	.200	.087	.234	2.291	.024

a.Dependent Variable; There is a relationship with the bank and its customers

Source: Field Survey 2017

Interpretation: At a significance level, which is less than 0.5, the result shows that corporate governance practices does influence the bank's gross margin. Therefore, the null hypothesis was therefore rejected. The model of the influence of corporate governance explained the extent to which it influences the gross margin of banks as 5.5% at 0.024 level of significance where the null hypothesis was rejected.

4.1.2 Hypothesis two: The relationship between environmental concern and return on investment

Table 4.1.2.1 Correlations

		Has your banks involvement with the environment improved their returns	Banks that are highly involved in their environment tend to have more return on their investment
Has your banks involvement with the environment improved their returns	Pearson Correlation	1	.206*
	Sig. (2-tailed)		.048
	N	93	93
Banks that are highly involved in their environment tend to have more return on their investment	Pearson Correlation	.206*	1
	Sig. (2-tailed)	.048	
	N	93	93

*. Correlation is significant at the 0.05 level (2-tailed).

Source: Field Survey 2017

Interpretation: The relationship between the variables (Banks' involvement with the environment and return on their investment) was examined using Pearson correlation. The result from the test of the relationship between environmental concerns and return on investment shows that (Beta=0.206, p<0.01). This means that environmental concern has a .206 or 20.6% relationship with return on investment. The R-square was 0.0424 which amounted to 4.24% of the variation between environmental concerns and return on investment. It indicates a high relationship between environmental concerns and return on investments. Therefore, the null hypothesis was rejected.

4.1.3 Hypothesis three: The influence of suppliers reward on return on equity

Table 4.1.3.1 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.438[a]	.192	.183	.44012

a. Predictors: (Constant), An efficient suppliers reward can help a bank increase its ROE

Table 4.1.3.2. ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.179	1	4.179	21.576	.000[b]
	Residual	17.627	91	.194		
	Total	21.806	92			

a. Dependent Variable: A rising ROE suggest that a bank is increasing its ability to generate profit

b. Predictors: (Constant), An efficient suppliers reward can help a bank increase its ROE

Table 4.1.3.3 Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.712	.336		8.071	.000
	An efficient suppliers reward can help a bank increase its ROE	.356	.077	.438	4.645	.000

a. Dependent Variable: A rising ROE suggest that a bank is increasing its ability to generate profit

Source: Fieid Survey 2017

Interpretation: The result from the test of hypothesis three, showed that suppliers reward influences return on equity. The model disclosed that supplier's reward significantly influences the return on investments of banks at 19.2% and with a 0.000 level of significance. Therefore, the null hypothesis was rejected.

4.2. Sustainable Solution Practice Index for First bank and Eco bank

This section reveals the results of the SSP index of each bank and the results of statistical procedures performed**.** The sustainable practice index (SSPI) result was derived from each bank and was gotten as follows; SSPI = Total score gotten from the individual banks x 100/ Total score obtainable.

Table 4.2.1 sustainable solution practice index for First bank and Eco bank

S/N	Bank	Economic	Social	Environmental	General	SSP Score	SSPI index	Interpretation	ranking
1	**First bank**	**5**	**8**	**0**	**3**	**16**	**80**	**substantial**	**1st**
2	**Eco bank**	**2**	**2**	**3**	**2**	**10**	**50**	**High**	**2nd**

Source: Published accounts of the selected banks based on their CSR practices 2014

Interpretation: - The results above show that First Bank had the highest SSP score index of 80, which is considered to be substantial. Eco bank had a high SSP score as well because they are presently no accounting principles in Nigeria on sustainability reports. The result shows that the banks were mostly involved in social responsibility with a score of 12 over the total score 31 representing (39%). The economic responsibility amounted to a score of 9 over the total 31 representing (29%). The general responsibility amounted to a score of 5 over the total 31 representing (16%) and the environmental responsibility amounted to a score of 4 over the total 31 representing (13%). Overall the four sustainability practices were well represented.

Table 4.2.2 Corporate Social Responsibility expenditure of First bank and Eco bank

First Bank of Nigeria Plc			EcoBank Nigeria Plc	
Year	CSR N' 000	PAT N' 000	CSR N' 000	PAT N' 000
2006	119,887,000	3,2164,000	4,147,000	9710000
2007	315,883,000	36,679,000	6,102,000	10096000
2008	438,729,000	12,569,000	7,193,000	(8980000)
2009	1,229,513.816	3,622,000	4,812,000	(5944000)
2010	887,743.640	29,170,000	6,123,000	2120000
2011	904,136.120	44,785,000	6,380,000	(4249000)
2012	924,613.810	46,124,000	5,907,000	3,165,000
2013	552,700,000	31,238,627	5,510,000	11,658,000
2014	849,256,000	11,940,000	6,623,000	29,733,000
2015	59,460,000	43,175,435	4,719,000	11,304,000
2016	734,654,400	55,735,220	6,671,000	26,45373

Source: Published Annual Reports of the Selected banks from 2006-2016

Interpretation: - This research study showed that First Bank Plc has the highest corporate social responsibility expenditure of N1,229,513,816 in year 2009 while Eco Bank has the lowest CSR expenditure of N4,147,000 in year 2006. This means that first bank is the leading commercial bank when it comes to CSR and it reveals that there is a significant relationship between corporate social responsibility on expenditure and profitability. First bank has always been contributing large donations to their CSR practices and it shows in their profitability, as they make bigger profits each year. Eco bank puts in smaller amount of money or donations to their CSR practices and it also shows that the bank does not make profit all the time, as they were making loss in the year 2008-2011. Although CSR brings about a decline in the profit after tax, it also encourages more involvement which leads to profit. Therefore, contributing to CSR improves the sustainability part of the banks financial statement which includes social responsibility. It should be noted that the banks have responsibility to several group of a company's investors both internal and external.

5.0. Summary of Findings

The research findings are divided into two; namely theoretical findings and empirical findings.

Theoretical Findings

The stakeholder theory identifies the business actions and decisions that must be taken into consideration towards the shareholders, managers, community, customers and employees. Shareholders and investors are one of the major stakeholders in the business and they are directly affected by decisions taken by the business. CSR is a reflection of stakeholders' theory as regards the business actions and how it affects their profitability. In order for a business to be sustainable in the long run they need to consider the environment as a major decision making point. Newton (2014) said that the key to CSR is trust and an economic driver of a business is its corporate image, which is what investors and shareholders look at, and maintaining it should be an ethical priority.

Empirical Findings

The empirical findings which was based on the analyzed objectives, specifies the following:

The role of community development in enhancing the sales growth of the bank

The empirical findings based on this objective are stated as follows

i. Banks involvement in community development can enhance their sales growth.
ii. Banks non- involvement in community development can affect their sales growth positively.
iii. Most banks are involved in community development.
iv. Banks have gained more customers through community development.

Corporate governance practices affect the gross margin of the bank

The empirical findings based on this objective are stated as follows

i. Corporate governance has appositive effect on their banks gross margin.
ii. Banks have a relationship with their customers.
iii. The principles and regulations put in place by the bank has improved the gross margin ratio.
iv. The policies in the bank are in the favour of the customers.

The relationship between environmental concern and return on investment

The empirical findings based on this objective are stated as follows

i. The banks involvement with the environment improves their returns.
ii. In the long run the bank gains more customer loyalty because of their involvement with the environment.
iii. The banks that are highly involved in their environment tend to have more return on their investment.
iv. The banks have improved the welfare and environment in which they are located in.

Suppliers' reward improves the return on equity

The empirical findings based on this objective are stated as follows

i. An efficient supplier's reward can help a bank increase its return on equity.
ii. A rising return on equity suggests that a bank is increasing its ability to generate profit.
iii. The growth and profitability of banks are better optimized through information, financial and physical suppliers reward.
iv. A banks return on assets can increase if their supply chain is as good as the relationship with suppliers.

6.0 Conclusion and Recommendations

This research concludes that corporate social responsibility has a strong positive effect on the profitability of consumer banks in Nigeria. It was observed that banks in Nigeria gain such benefits as improved reputation and image, enhanced customer loyalty and ultimately improved profitability when they align their operations with social responsibility in the aspect of their relationship with their various stakeholders. Based on the above conclusion, it is recommended that commercial banks engage active CSR practices with their various stakeholders, banks should also make it a priority to include their stakeholders in their decision making. Also banks should be prompt in handling ethical issues involving their transactions and activities, and should be very transparent in their dealings with the public, if they

intend to be sustainable. On the part of the government, policies and duties concerning CSR practices for commercial banks should be clearly outlined and enforced. Summarily, the relationship between corporate social responsibility and organisational profitability cannot be over emphasized, as such managers, scholars, government and other stakeholders should invest resources into unravelling the concept.

References

Harward & Upton (1961), "Introduction to Business Finance", Mc Graw Hill, New York.

IM. Pandey (2002), Financial Management, New Delhi, Vikas Publishing House Pvt. Ltd.

Johansson, S., Karlsson, A. & Hagberg C., (2015), "The relationship between CSR and financial performance; A quantitative study examining Swedish publicly traded companies". Sweden, Linnaeus University.

Jucan, C.N., and Jucan, M.S. (2010): "Dimensions and Challenges of Social Research", Annales Universitatis Apulensis series Oeconomica, 12(1).

Mipur, D., & MD Shadid, U. (2012). Banks play a leading role in CSR, vol. 20, no. 235, http://www.printthefinancialexpress.bd.com

Mitchell, R., Agle, B. and Wood, D. 1997. Toward a Theory of Stakeholder Identification and Salience: Defining the Principle of Who and What Really Counts. *The Academy of Management Review*, 22 (4), pp. 853-886.

Mohammed, B.U., Md. Hassan, R. & Kazi, Md. T. (2008) "Three dimensional aspects of corporate social responsibility", *international universal journal of business and economics,* vol. 3, no. 1, pp. 200-212
Nurn, C.W., and Tan, G. (2010): Obtaining intangible and tangible benefits from corporate social responsibility. *International Review of Business Research Papers.* Vol. 6(4), Pp. 360 – 371.

Pacific Continental (2013), "White paper importance of corporate social responsibility".

Shirley Yeung (2011). The Role of Banks in Corporate Social Responsibility, Hang Seng School of Management, China. *Journal of applied economics and business research,* JABER 1(2), pp. 103-115.

Thomas Dyllick and Kai Hockerts (2002). "Beyond the business face for corporate sustainability", *business strategy and the environment,* vol. 11, pp. 130-141, doi:10:1002/bse.323

Van Marrewijk, K., & Verre. (2003), "Concepts and definition of CSR and corporate sustainability: Between agency and communion, *Journal of business ethics,* 44(2-3): 95-105.

William Bentum (2012), "The determinants of profitability of the commercial banks in Ghana during the recent years of global financial crisis", Aarhus school of business, Aarhus University

An Efficient 3D Point Cloud Coarse Registration based on Convex Hull

Mouna Attia, Université de Tunis El Manar -Faculté des Sciences de Tunis -Labotory: URAPOP- 2092, Tunis, Tunisie, Email: mounaattia.info@gmail.com

Yosr Slama, Université de Tunis El Manar-Faculté des Sciences de Tunis-Labotory: URAPOP-2092, Tunis, Tunisie, Email: yosr.slama@gmail.com

Abstract

Non-rigid registration is a crucial step for many computer vision applications such as dimensional control in manufacturing, pattern recognition, etc. Generally, such application accuracy depends strongly on that of the registration step. In this paper, we propose a new method to determine an efficient Coarse Registration that can be refined using Iterative Closest Point (ICP) algorithm. Firstly, two projection planes corresponding to the model and reference point clouds are determined using point dispersions. Secondly, all the points of each cloud are projected onto the corresponding planes. Then, two convex hulls are extracted from the two projected point sets and then matched optimally. Next, the non-rigid transformation from the reference to the model is robustly estimated through minimizing the distance between the matched points pairs of the two convex hulls. Finally, this transformation estimation is refined using ICP algorithm. The experimental results based on synthetic data show that the proposed algorithm outperforms standard ICP in terms of execution time and precision whether with a normal or a large transformation.

KeyWords: 3D point cloud, Convex Hull, Iterative Closest Point (ICP), Principal Component Analysis PCA, Non rigid registration

I. Introduction

Non-rigid 3D point cloud registration is an active research area in computer vision. It consists in finding the best transformation to align two clouds. 3D point cloud registration is widely used for reverse engineering, manufacturing process, virtual reality and map building in robotics. So far, nonrigid registration has been regarded as an on-line process. Therefore, we need to find an accurate transformation in a short time. In the literature, there exist many algorithms capable of aligning 3D point clouds such as Iterative Closest Point (ICP) [Besl and McKay, 1992], Normal Distribution Transform (NDT) [Magnusson, 2009], Ransac [Fischler and Bolles, 1981] and Softassign [Gold et al., 1998]. The execution time of these methods increases proportionally to the treated cloud points number. Moreover, all of the methods are iterative and their convergence quickness depends on the efficiency of the initial transformation estimation they use. For these reasons, a two-stage registration strategy is recommended: coarse and fine.The Coarse registration (CR) stage aims to compute an initial estimation used by the fine one to obtain, as possible, the most accurate solution.

Several studies are interested in finding a good method for coarse registration and improving the fine registration. In this context, Ma et al. [Ma et al., 2009] improve the step of coarse registration using the convex hull. In fact, they extract feature points by Harris corner detector. Then, they use a correlation method to match convex hull points of the pairing sets to establish the transformation parameters.

Carlos et al. [Torre-Ferrero et al., 2012] introduce a novel approach to find a rigid transformation that coarsely aligns two 3D point clouds. The algorithm proposed by Carlos determines 2D descriptors. The latter represents an ordered cloud of radial contours that are extracted around an interest-point within the point cloud. Then, a similarity measure correspondence between descriptors is determined. The search for correspondences is done iteratively following a cell distribution that allows the algorithm to converge to a candidate point. Burlacu et al. [Burlacu et al., 2016] propose a tensorial method to choose the initial guess of the ICP algorithm. This method is strongly connected to the parameters that can be used to describe the displacement of rigid bodies.

Fan et al. [Fan et al., 2013] introduce a robust approach based on convex hull for medical images registration. First, point sets on the medical image surface are extracted. Then, a 3D convex hull is constructed. After that, triangle patches on the surface of convex hulls are specified by predefining their normal vectors. Each edge of the referenced triangle is compared with all the triangle edges in the other point set to find the congruent pair set. Thereafter, the transformation parameters of each triangle pair are optimized by minimizing the Euclidian distance between the corresponding vertex pairs. The transformation is obtained iteratively by measuring the similarity between triangles. Global optimization is achieved through RANSAC. This method is improved in [Fan et al., 2016]. In fact, Fan et al. propose a novel convex hull aided registration method (CHARM) to match two point sets subject to a non-rigid transformation. Firstly, two convex hulls are extracted: the first from the model and the second from reference point cloud. Then, all points of the clouds are projected onto the reference plane through each triangular facet of the hulls to extract invariant features. The latter is matched optimally and a transformation is robustly estimated by the random sample consensus (RANSAC) scheme through minimizing the distance between the matched feature point pairs.

Other researchers implement non-rigid registration by minimizing the difference between the descriptors and invariant features among the potential correspondences between 3D surfaces [Chen and Koltun, 2015].

At present, the research on non-rigid registration techniques focuses mainly on feature extraction using the convex hull in 3D space but none among the proposed techniques shows interest in the shape topological structure. The use of a convex hull in 2D space is another point not taken into consideration in literature even if it may facilitate the search of correspondences.

In this context, we propose a new method to find an accurate transformation in a short time. It consists in applying first a coarse registration to find an initial transformation, and second a refinement method to improve the accuracy. The main contribution in this paper is the transformation of the 3D point cloud registration problem into a registration between two plane objects. The algorithm steps can be summarized as follows: (i) Projection of each point cloud onto a convenient plane, (ii) Determination of the convex hull for each projected point cloud, (iii) Matching between the two projected point clouds, (iv) Computation of the transformation estimation and (v) Refinement of the transformation using ICP algorithm. Our method is highly robust particularly with large transformation since it is based on a two-step procedure: coarse registration in the first step and fine registration in the second. Furthermore, the proposed method is computationally efficient because the number of points on the convex hull is significantly smaller than that in the original point cloud.

The remainder of this paper is organized as follows. In Section 2, we detail our registration method. In Section 3, we validate our proposed algorithm through different criteria and metrics. Finally, we conclude our work and suggest future works in Section IV.

Ii. Method

In this section, a detailed description of our method will be presented. First, we give an overview of the 3D point cloud registration. Let suppose that we have two point clouds to be registered.
Let $U = \{u_j | j = 1..n\}$ be the model data where $u_j \in IR^3$ and $V = \{v_i | i = 1..m\}$ be the reference data where $v_i \in IR^3$. n and m are the points number of U and V respectively. The $3D$ point clouds registration is the process of finding the transformation Trans that aligns two sets of data in the same coordinate. Trans is the matrix that matches V to U. It depends on six parameters, namely a translation vector $T = (tx,ty,tz)^T$ and a rotation vector $R = (\alpha,\beta,\gamma)^T$. α denotes the rotation angle relatively to the x axis whereas β and γ are the rotation angles relatively to the y and z axes. Therefore, the registration problem can be seen as the minimization of the objective function in eq. 1.

$$\sum_j \left\| \overrightarrow{V_j} - R\overrightarrow{U_i} + T \right\| \quad (1)$$

To have an overview of our approach, Fig. 1 shows the flowchart of the proposed method which is divided into coarse and fine registration. The coarse registration is determined through four steps:

- Projection plane determination: This step is the core of our algorithm. It consists of defining a plane in which the point cloud projections preserve the topological structure of the object.
- Point clouds projection: A set of new point clouds of the model (resp of reference) is then generated by projecting the entire model (respectively the entire reference) onto each projection plane.
- Convex hull determination: the convex hull of the projection points is created by extracting the smallest convex set that contains the entire model.
- Convex hull Matching: Points of the two convex hulls are matched and non-rigid transformations between these two clouds are estimated.
- Transformation Estimation: Estimate the transformation between the pairing matched in the previous step.

The fine registration is obtained by applying the iterative closest point (ICP). Our method is very sensitive to noise and outliers. Hence, the accuracy and precision of our method risk to be affected. For this reason, it is necessary to apply a smoothing module and a filter to eliminate the noise before any processing. Another condition is also applied to reduce the impact of noise when defining the convex hull: If the distance between two closing points is considerably larger than an epsilon value, the neighboring point is deemed as an outlier and removed.

A. Projection plane determination

The most important step in our approach consists in searching a two-dimensional plane which preserves the 3D point cloud shape when projected onto plane. Hence, in order to take into account the points dispersion, we use Principal Component Analysis (PCA) to define a plane. PCA is a statistical method widely used in image registration and pattern recognition. To compute the principal components, PCA operates according to the following three steps:

- Compute the mean of Point cloud U: The mean of each dimension is computed as follows:

$$\bar{u} = \frac{1}{n}\sum_{i=1}^{n} u_i \quad (2)$$

- Compute the covariance matrix: The covariance matrix, denoted $CovU$, is a square matrix of size n computed as follows :

$$CovU = \frac{1}{n}\sum_{i=1}^{n}(u_i - \bar{u})(u_i - \bar{u})^T \quad (3)$$

- Compute the eigenvectors and eigenvalues of the covariance matrix: To compute the eigenvectors and eigenvalues of the covariance matrix CovU, we compute A the diagonal matrix of the CovU eigenvalues. Then, we determine the matrix E of eigenvectors which diagonalizes matrix CovU i.e.

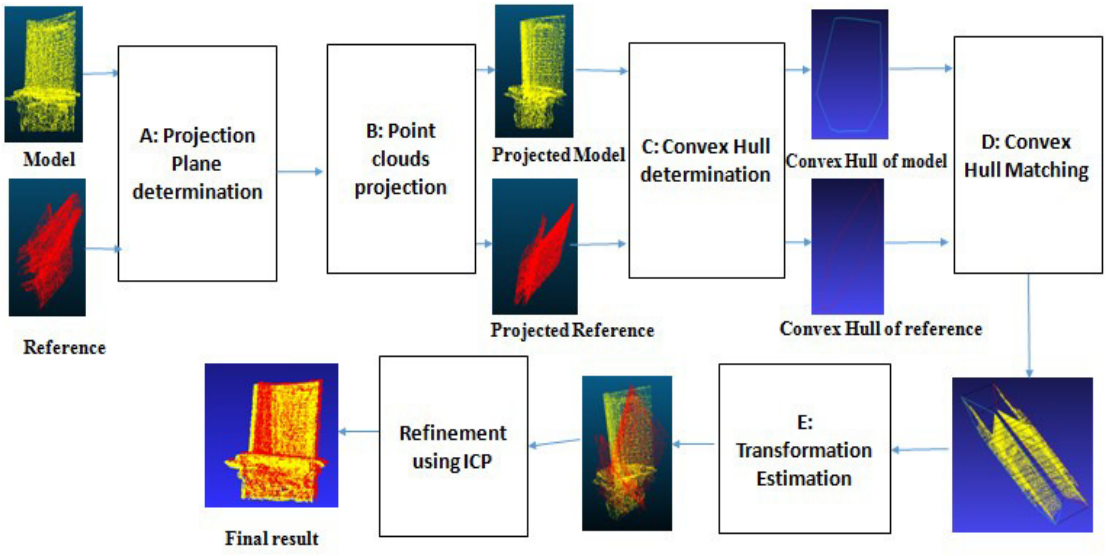


Fig. 1: The flow-chart of the proposed method for the 3D point cloud registration

$$E^{-1}CovUE = A \qquad (4)$$

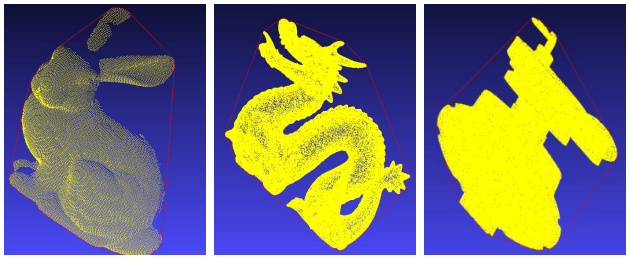
The eigenvectors E of matrix CovU are the principal components of the point cloud U. In our case, this method gives three eigenvectors which represent the principal components of our data. In fact, it turns out that the eigenvector having the largest eigenvalue is the main component of the point cloud. The eigenvectors are ordered according to their correspondent eigenvalues and sorted in increasing order. This gives us the components ordered according to their significance in relation to points dispersion. We decide to ignore the less significant components and consider the plane defined by the two first largest components. In fact, we may lose some information, but if the eigenvalues are small, we wont lose a lot. The measure of the data representation quality set by the two first principal components is given by the percentage of the total inertia contained in the corresponding space.

B. Point cloud projection

The principle of the point projection is to project all the points onto a plane. The projected clouds preserve the real cloud topology and the distribution of the entire model. This projection process is similar to observe a 3D point cloud from a certain viewing direction. This step is achieved in shorter time. The point cloud projected has the same original point cloud intensity distributions but in the plane. Matching between projection views can significantly improve registration effectiveness since processing with shapes in plane is always easier and generates lower noise.

C. Convex hull determination

The convex hull of 3D point cloud is the minimum convex combination that contains all points. These points are commonly used to represent the global structure of the point clouds. In fact, the geometric structure of the entire model can be represented by a limited number of points on the convex hull. The convex hull is unique for a point cloud and its structure is invariant. It can be achieved effectively by using numerous iterative algorithms [Berg et al., 2008]. The computational complexity of the convex hull is $O(nlog(h))$, where h denotes the number of vertices on the corresponding convex hull. The topological structure of convex hull can be affected by outliers. For this reason, we need a preventive condition to have a consistent and uniform convex hull. A point is considered as outlier if the distance between this point and its neighbors is considerably larger than an epsilon value. Fig. 2 shows the convex hull (represented by the red color line) of some point clouds used in experimental study.



(a) (b) (c)

Fig. 2: Convex hull and projected point of bunny, dragoon and E Piece

D. Convex hull Matching

Once the convex hull is obtained, it can be used to determine the corresponding point pairs between different models. Hence, the transformation parameters between the two convex hulls can be effectively estimated by detecting and matching the pairs. In fact, a set of the best-matching candidates is determined by minimizing the Euclidean distance between the two convex hulls.

E. Transformation estimation

Once the matching step is finished, a transformation between pairing is estimated. In this step, many optimization methods can be used. In our model, we use the Singular Value Decompostion to estimate the transformation.

F. Algorithm

Algorithm 1 describes formally the five steps of the proposed method.

Algorithm 1: Coarse and Fine registration
Data: U, V : two clouds
Result: T and R :final Transformation
begin

1 Compute $CovU$ the covariance of U and $CovV$ the covariance of V :

$$CovU = \frac{1}{n}\sum_{i=1}^{n}(u_i - \bar{u})(u_i - \bar{u})^T$$

$$CovV = \frac{1}{m}\sum_{i=1}^{m}(v_i - \bar{v})(u_i - \bar{v})^T$$

2 Compute λ :eigenvalues of $CovU$
3 Compute eigenvectors:

$$EU = [E_{\lambda_1}; E_{\lambda_2}; E_{\lambda_3}]$$

4 Compute : eigenvalues of $CovV$
5 Compute eigenvectors:

$$EV = [E_{\gamma_1}; E_{\gamma_2}; E_{\gamma_3}]$$

6 Compute the plane normal N_u and N_v

$$N_u = E_{\lambda_1} \wedge E_{\lambda_2}$$
$$N_v = E_{\gamma_1} \wedge E_{\gamma_2}$$

7 Project Points onto planes
8 Compute the two convex hull
9 Match convex hull
10 Estimate Tansformation trans
11 Apply ICP for refinement using trans as initialization
end

Iii. Experimental Study

To evaluate the performance of the proposed algorithm, a set of experiments is designed based on real models acquired using 3D scanner device from 3D scanner repository [link, a]. The proposed method is compared to original ICP implemented in libICP [link, b], for non-rigid registration and applied to a large rotation, translation and normal case. The synthetic transformation is generated using the parameters selected randomly as follows: α, β, and γ over the range of [0,180], *tx*, *ty*, and *tz* over the range of $[0,10 * D]$, where *D* is the largest dimension of the object. The algorithm is implemented in C++ under Windows 7 using Visual Studio 2010. All the experiments are conducted on a relatively lowcost PC with 4 GB RAM and intel core i3.

The registration accuracy is evaluated by the standard deviation (stdv) error. This latter is computed as the sum average of the Euclidian distances of every corresponding point pair between the model and reference point clouds. The computation time is measured by milliseconds. A successful registration is defined as the registration having the stdv error closest to 0. To represent the experimental result in histogram, we use a semi-cologarithmic scale (i.e. the abscissa is unchanged and the ordinate is replaced by its cologarithm e.g. 10E03 is represented by 3 to represent the standard deviation in the histogram). Moreover, we use a semi logarithmic to represent the execution time. The algorithm having the highest

value in the histogram of accuracy (Precision) is the best one whereas the algorithm having the lowest value in the histogram of execution time is the best one.We applied our algorithm and the standard ICP algorithm on 50 clouds. Due to space limitation, we restrict to excerpts from the experimental results. We have chosen five clouds which are blade, nm, E, bunny and dragon. These latter may be considered as representative of the whole. We have to add that the used the blade benchmark for a detailed analysis.

A. Projection plane choice evaluation

To evaluate the perfection for each projected plane choice, a mathematical score is computed for each projected plane. In fact, our algorithm uses the two first principal components (PC) determined by PCA method. Each PC is associated with a score value which is the eigenvalue. The similarity measure between the real shape and the shape projected onto plane is computed by the ratio between the sums of the two first eigenvalues and the sum of all eigenvalues (see eq. 5). If the ratio is equal to 1, we have the same shape in projection and in reality. The success of our approach returns to the fact that in most cases, we choose the best projection plane that represents the shape. Table 1 summarizes the obtained results. For bunny, blade and dragon, the ratio value is upper than 90%. The eigenvalue of the third component is in general very low. Thereafter, it has a negligible impact on the obtained transformation estimation.

$$(PC1 + PC2)/(PC1 + PC2 + PC3) \qquad (5)$$

Table 1: Principal components for five point clouds

Clouds	PC1	PC2	PC3	ratio
blade	0.913	0.0503	0.0363	96.37%
bun	0.632	0.307	0.0612	93.88%
dragon	0.639	0.294	0.0672	93.28%
E	0.474	0.31	0.216	78.38%
nm	0.5474	0.31	0.1426	85.74%

B. Computational time execution evaluation

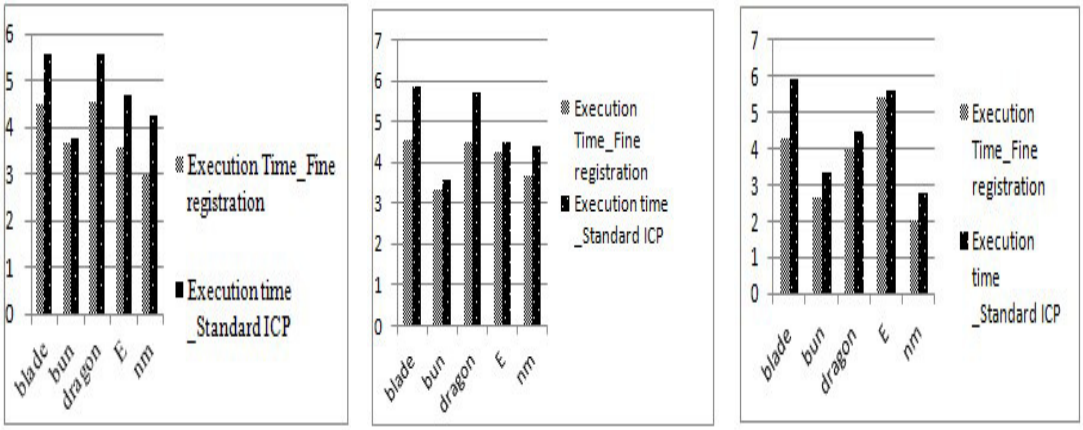
The execution time is very important for application in real time. For this reason, it is very important to accommodate this aspect. Fig. 3 shows the computational time of standard ICP and the proposed method applied on point clouds in the case of large translation, large rotation and in the normal case. It can be clearly seen that the proposed method requires less computational time than standard ICP in all cases. This returns to the fact that ICP searches iteratively the correspondences and updates the estimation in many iterations for a large amount of points. In contrast, the proposed method establishes a small set of point matches between the convex hulls of the two point clouds. Then, it estimates an initial transformation (see table 2). The latter is refined by ICP which iterates in fewer time to get a search result. Therefore, the proposed method exhibits higher computational efficiency and reduce the number of iterations. For the coarse registration, the execution time is very reduced to around 0.2 second for 400000 points. Table 2 gives an overview of the number of points and the execution time for the coarse registration (Computation time of the convex hull, projection points and computation of the PCA). The number of points used to compute the coarse registration is about 150 points for a blade shape (with 400000 points).

Table 2: Execution time of coarse registration(cr)

Clouds	Nb points	Nb points of CH	CR Execution time
blade	403624	155	281
bun	40256	46	30
dragon	79423	27	46
E	437645	84	328
nm	392941	102	345

C. Precision Evaluation

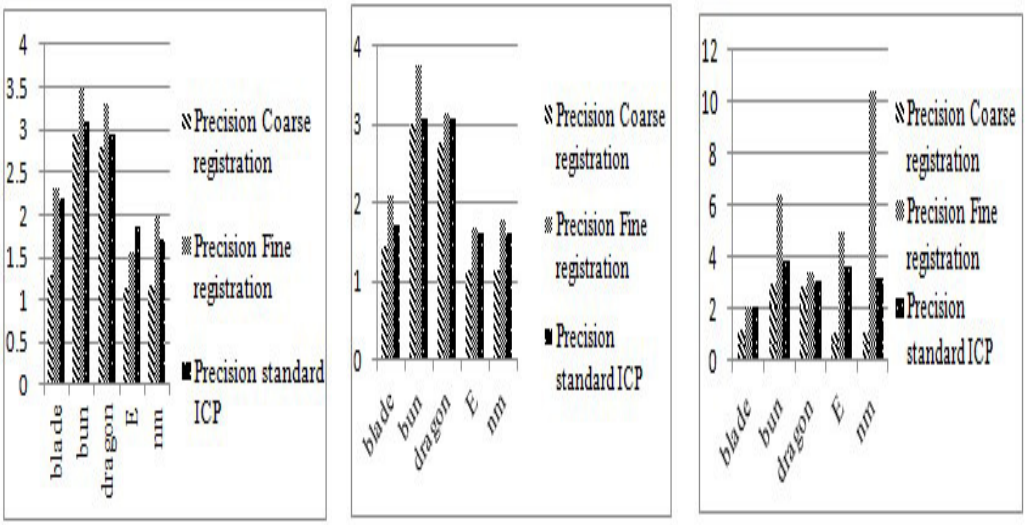
The point clouds registration is usually challenging due to a number of factors: large translation and large rotation. Hence, in this section, we investigate the convergence and robustness of the proposed method to these factors. Fig. 4 shows the precision comparison of coarse registration, fine registration and standard ICP applied to the point clouds subject to different transformations(large translation, large rotation and normal case). In most cases, fine registration gives the best precision. Thus, the proposed method is highly stable for the point clouds registration subject to random transformations with large translation, large rotations and in normal case. This proves that the proposed method is effective for the registration of point clouds in most cases.



(a) (b) (c)

Fig. 3: Execution time of Fine Registration and Standard ICP in (a)case of large translation, (b) large rotation and (c) normal case

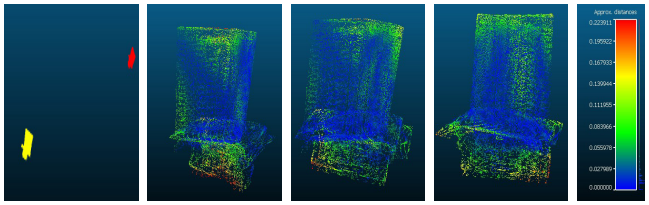
Fig. 5 shows the registration results of blade subject to large translation. The yellow blade in (a) is the model, whereas the red blade is the transformation of the model with the specified translation between 0 and 10*D. Fig. 6.b ,Fig. 6.c and Fig. 6.d show the mean error using coarse registration, fine registration



(a) (b) (c)

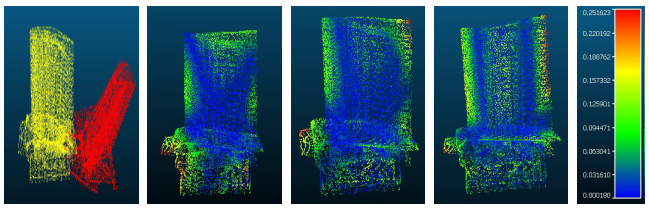
Fig. 4: Precision of Coarse Registration, Fine Registration and Standard ICP in (a)case of large translation, (b) large rotation and (c) normal case

and standard ICP, respectively. The points in blue show the mean error that is limited to zero. The errors increase as the point approaches to the red color. The mean registration errors of all the point matches in fine registration are between 0.001 and 0.027. For standard ICP, the number of blue points is approximately the same that green points. Thus, the proposed method is more stable for the data sets registration subject to random transformations with large translation. By comparing Fig. 6.b to Fig. 6.d, we remark that the error is nearly the same. Fig. 7 represents the registration results of blade subject to large rotation. It can be seen clearly that for fine registration, most points are colored in blue and the number of green and red points is greater in Fig. 6.d (standard ICP) than in Fig. 6.c (fine registration). In Fig. 7 which is the registration results of blade in the normal case, the blade is perfectly aligned (see Fig. 7.c) using fine registration. In order to have an overall view on the whole tests (in the 50 clouds), we give in Fig. 8 the number of times (in%) where fine registration gives the best precision among all tested point clouds. The obtained results are 89%, 95% and 82% in the cases of large translation, large rotation and normal case, respectively. We conclude that with the most point clouds, fine registration gives approximately 90% of the best results.



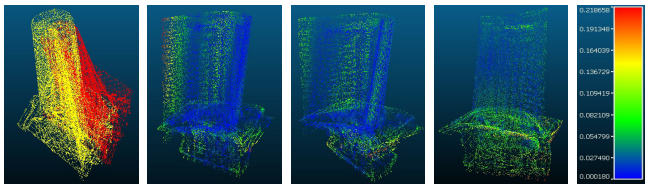
(a) (b) (c) (d) (e)

Fig. 5: Results of the proposed method for the registration of blade in large rotation. (a) The model and reference blade, (b) Error maps result of coarse registration, (c) Error maps of fine registration and (d) Error maps of standard ICP



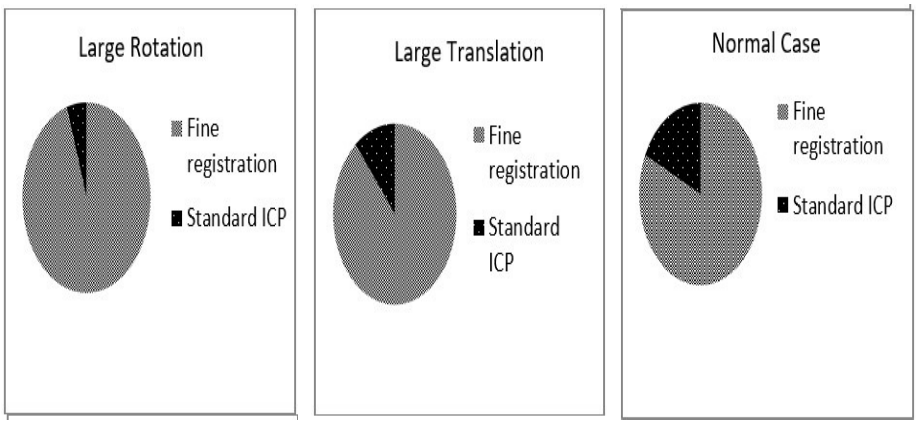
(a) (b) (c) (d) (e)

Fig. 6: Results of the proposed method for the registration of blade in the case of large rotation. (a) The model and reference blade, (b) Error maps result of coarse registration, (c) Error maps of fine registration and (d) Error maps of standard ICP



(a) (b) (c) (d) (e)

Fig. 7: Results of the proposed method for the registration of blade in normal case. (a) The model and reference blade, (b) Error maps result of coarse registration, (c) Error maps of fine registration and (d) Error maps of standard ICP



(a) (b) (c)

Fig. 8: Precision comparison algorithms for 50 clouds

Iv. Conclusion

In this paper, a novel two-step 3D point cloud registration algorithm is proposed. In the first step, a coarse matching is performed to quickly detect the correspondences, giving thus an initial transformation. The latter is used by ICP point to point, in a second step, to refine the matching result and accurately find

the transformation. The proposed coarse registration step consists first in projecting the 3D clouds on convenient planes determined using PCA, second in computing the convex hulls (CHs) of the two projected clouds, and then in matching the obtained CHs which generally represent appropriately the cloud shapes.This new method is more accurate than standard ICP in most cases, especially when the transformation between clouds is large. Moreover, the time computation is very reduced thanks to the fact that the coarse registration is applied to a match smaller points number (convex hull points) than that of the original 3D cloud. The result of coarse registration is very close to that obtained using standard ICP, yet.

Two directions are subjects of future works. First, we plan to test similarity between edges of the convex Hull. To do this, we must test the length of edges and the boundary angles. Second, we aim at performing the step of noise elimination.

References

[link, a] 3d repository scanner. https://graphics.stanford.edu/data/3Dscanrep/.

[link, b] libicp. http://www.cvlibs.net/software/libicp/.

Berg, M., Cheong, O., van Kreveld, M., and Overmars, M. (2008). *Computational Geometry*. Springer Berlin Heidelberg.

Besl, P. J. and McKay, N. D. (1992). Method for registration of 3-d shapes. In *Robotics-DL tentative*, pages 586–606. International Society for Optics and Photonics.

Burlacu, A., Cohal, A., Caraiman, S., and Condurache, D. (2016). Iterative closest point problem: A tensorial approach to finding the initial guess. In *System Theory, Control and Computing (ICSTCC), 2016 20th International Conference on*, pages 508–513. IEEE.

Chen, Q. and Koltun, V. (2015). Robust nonrigid registration by convex optimization. In *Proceedings of the IEEE International Conference on Computer Vision*, pages 2039–2047.

Fan, J., Yang, J., Goyal, M., and Wang, Y. (2013). Rigid registration of 3-d medical image using convex hull matching. In *Bioinformatics and Biomedicine (BIBM), 2013 IEEE International Conference on*, pages 338–341. IEEE.

Fan, J., Yang, J., Zhao, Y., Ai, D., Liu, Y., Wang, G., and Wang, Y. (2016). Convex hull aided registration method (charm). *IEEE Transactions on Visualization and Computer Graphics*.

Fischler, M. A. and Bolles, R. C. (1981). Random sample consensus: a paradigm for model fitting with applications to image analysis and automated cartography. *Communications of the ACM*, 24(6):381–395.

Gold, S., Rangarajan, A., Lu, C.-P., Pappu, S., and Mjolsness, E. (1998). New algorithms for 2d and 3d point matching: Pose estimation and correspondence. *Pattern recognition*, 31(8):1019–1031.

Ma, L., Zhao, R., and Yang, D. (2009). Image registration based on convex hull ransac-like. In *Computer Network and Multimedia Technology, 2009. CNMT 2009. International Symposium on*, pages 1–4. IEEE.
Magnusson, M. (2009). *The three-dimensional normaldistributions transform: an efficient representation for registration, surface analysis, and loop detection*. PhD thesis, Orebro universitet.¨

Torre-Ferrero, C., Llata, J. R., Alonso, L., Robla, S., and Sarabia, E. G. (2012). 3d point cloud registration based on a purpose-designed similarity measure. *EURASIP Journal on Advances in Signal Processing*, 2012(1):57.

Project Management Implementation for Telecommunication Networks in Lebanon

Joseph Issa, Notre Dame University, Zouk Mosbeh, Lebanon.
joseph.issa@ndu.edu.lb
Mira Thoumy, Notre Dame University, Zouk Mosbeh, Lebanon.
mthoumy@ndu.edu.lb

Abstract

This study aims at identifying Project Management (PM) techniques to increase productivity, quality, efficiency and customer satisfaction in telecommunication services in Lebanon. The study ranges from high-level approaches for improving project management techniques, to more detailed approaches for improving PM practices in the telecommunication industry. A set of questionnaires was conducted with the different quality and performance project managers at one of the leading telecommunication companies in Lebanon. The limitation of this study is that the set of recommendation may not be applicable for other companies. The results of this study can help telecommunication companies to improve their project management techniques for a specific project. It will help telecommunication business to have a leading edge over the competition by focusing on managing projects and adapt to changes more efficiently. This will result in improving service delivery and customer satisfaction. At the end, this will result in gaining market shares over competition and improve overall business conditions.

Keywords: project management, telecommunication management, network management, lean, Lebanon

Background to Research

A project is a temporary endeavor that has a definite beginning and end, that is carefully divided into several phases to give a unique output (Moder & Phillips, 1970). Projects are temporary that creates unique products (Cicmil, S., Williams, T., Thomas, J., & Hodgson, D, 2006) and are closed after attaining their objectives. Several million projects were developed and much more are planned according to ("PMI report", 2013). However, when projects are implemented in small to medium size companies, there is a clear lack of well-established project management methods (Ilincuta & Jergeas ,2003). This is often since small to large size companies lack the number of resources required so projects and resources might be given low prioritization in the organization (Rowe, 2007). The PMBOK (Project Management Book Of Knowledge) is viewed by such organization as complex and complicated to implement due to lack of budget in some cases and a low number of resource available. The objective of this research is to investigate the status of project management techniques used by telecommunication industry in Lebanon especially network implementation projects and evaluate different project management techniques (Klastorin, 2003) by providing a set of recommendations that can assist with implementing projects successfully.

Literature Review

Several research papers have been published on project management methods using different implementations approach. It is important that the project is delivered on time, within budget and with acceptable Quality of Service (QoS). Usually smaller teams are leaner and more efficient in terms of performance as discussed by (Terenghi, F., Kristensen, K., Cassina, J., & Terzi, S. 2014). In any telecommunication project management (Fazlović, S., dd Sarajevo, B. T., & Tuzla, R. D, 2012), timely delivery is important which requires telecommunication project managers to be highly skilled leaders with good communication skills across different teams that will lead to a successful project deployment. Project management methods look great on paper, but usually, fail when implemented due to different human-related factors. Usually, the human factor is not taken into consideration which will lead to failure like any economic factor (Brady, 2006). Research on project management was initially focused on adoption methods (Boehm, 2002; Nerur et al., 2005) and the use of having pair individuals for software development (Nawrocki and Wojciechowski, 2001; Williams et al., 2000). Later on, more research was focused on team dynamics (Moe et al., 2009) and the consequences of test-driven development (Erdogmus et al., 2005; Janzen and Saiedian, 2005) which includes adoption and post-adoption settings (B. Ramesh, L.A.N. Cao, K. Mohan, X.U., 2006).

Project Management Approaches

In project management methodologies (Kliem et al, 1997), there are several methodologies that we briefly discuss. The two most extreme approaches are the Waterfall and Agile project management methods, other methods are Kanban, Adaptive, Scrum and Lean.

The Kanban (Abdul-Nour, et al, 1998) focuses on minimizing the work in progress at any given moment because many activities are being performed at once which impacts the quality of each of them. Kanban also visualizes the work so each employee knows exactly what is needed and foresee issues before they start scaling.

In the adaptive methodology (Lévárdy, V., & Browning, T. R., 2009), the project scope is a variable and adjusted in order to get the maximum business value from the project within the given timeframe for the project.

The waterfall method (Hass, K. B., 2007), the requirement is that we need to complete each stage 100% before moving on to the next stage. For example, in network infrastructure deployment design, in the concept phase, we need to define what we want to make, and what all the features are. Also, we need to figure out the constraints, what are the budget, resources and time. In the design and concept phases, we make several assumptions that will be tested in the pre-production phase (Boehm, BW, 1988). When we get most of the features programmed, we go into the alpha phase. In the alpha phase, a small testing can be implemented to make sure some of the main features are working. Once we have all the features in, we go into the Beta phase in which we bring in more testers, then we go into the deployment phase. The issue with the waterfall model is that all the testing is done in the beta phase. It will be too late to change any design at this point in the beta release if we encounter a major issue during testing. Even if some testing is done in the alpha phase, the testing is still small and people involved in product testing is limited as compared to testing in the beta phase (Larman, C., & Basili, V. R., 2003). In many ways, the waterfall model is doomed to fail in production projects.

Project management (Duncan, W. R., 1996) consists of several phases such as planning, organizing, securing, motivating and controlling the resources to a successful product. This can define the "success" of a project. It may be hard to control a lot of things, but as a project manager (Rowe, SF, 2007), what can be done is to make some estimates and prediction plan accordingly and deal with them. It's basically predicting what needs to be done and how to do it. For a large customer project services releases, it's hard to manage to come out with a product on time, many projects come out late, over budget and maybe under delivering the shiny things that were originally mentioned and planned for. For example, in software games, they usually come out late as compared to what was planned for a release production date.

The mission of any telecommunication company is to increase its market share by anticipating market's needs and providing the best telecommunication service (Engwall, M., & Jerbrant, A., 2003). First, it is necessary to establish a product strategy that planned product will satisfy the market demand. The product plan should ensure customer need and satisfaction with both desirable and acceptable behavior. If no consumption is envisaged, there is no point in proceeding with product design. The demand for the service (4G and later the 5G internet) in the market may already exist (Adachi, F.,2001), and its volume can then be assessed by consumer research and sales figures for identical or similar commodities. In practice, the organization marketing department works by focusing on the product design while compromising between infinite variety on one side and the designer's concept of ideal design on another side. The strategy of the organization as represented by the Commercial and Marketing department focus on one main objective of advertising to expand the market (Moorman, C., Zaltman, G., & Deshpande, R.,1992). Expanding the market is normally achieved by:

- Providing general information about the existence of the product or service
- Providing technical information about its functional characteristics or utilitarian purposes
- Drawing the customer's attention to those attributes of the product that best suits them
- Winning undecided customers by exhibiting possible attractions to persuade their preference to the product in comparison with competitors
- Creating demand among a passive population of customers
- Educating customers by spreading the message of what they need
- Focusing on continuous product development and innovative designs

Lean development methods (Karim, A., & Nekoufar, S., 2011, Stevenson, W. J., & Hojati, M., 2007) focuses on delivering more value with less waste in the project environment. The focus on empowering people and creates an environment of self-accountability. It relies more on process compared to other methodologies especially in standardization and work breakdown structure, which helps streamline team workloads.

Lean project management focuses on delivering value to customers. Lean was originated by the book "The Machine That Changed the World" by MIT (James Womack, 2007). Two of the authors (James P. Womack, Daniel T. Jones) went on writing another book called "Lean Thinking", in which they emphasized that Lean thinking can be used by and implemented in any organization. Lean project management consists of five main points:

- Value Definition
- Identify and Map the Value Stream

- Control flow while eliminating waste
- Response to customer pull
- Perceive Perfection

The trend continues the moves toward the convergence of information content, delivery, and entertainment. This requires significant capital investment, cost-cutting initiatives, partnering with innovative solution providers for creating and delivering contents. In addition to building long-lasting loyalty through effective customer service interrupted into superior value to the end consumers. Telecommunication companies that can manage this effectively and intelligently will not just compete but out-compete. The popular misconception about Lean (Ballard, G., & Howell, G., 2003) is that it is suited only for manufacturing. It is not a tactic or a cost reduction program, but a way of thinking and acting for an entire organization. The word transformation or lean transformation is often used to characterize a company moving from an old way of thinking (Waterfall project management approach) to a lean thinking. It requires a complete transformation on how a company conducts business. This takes a long-term perspective and perseverance. The term "lean" was coined to describe Toyota's business during the late 1980s by a research team headed by Jim Womack, Ph.D. (James Womack, Lean Enterprise Institute), at MIT's International Motor Vehicle Program. The characteristics of a lean organization and supply chain are described in *Lean Thinking*, by Womack and Dan Jones, founders of the Lean Enterprise Institute and the Lean Enterprise Academy (UK), respectively. While there are many very good books about lean techniques, Lean Thinking remains one of the best resources for understanding "what is lean" because it describes the thought process, the key principles that must guide actions when applying lean techniques and tools (Cicmil, S., et al , 2006). Even in the most structured organizations, many workplace processes are chaotic and disorganized. This is an opportunity for process improvement using lean principles. Eventually, cost savings are realized due to efficient processes and workflows leading to profitable business results. Implementing lean process improvement can become quite detailed. However, the basic principles (Karim, A., & Nekoufar, S., 2011) are simple and straightforward:

1. Focus on customer values: Ultimately, what all customers want is value. Value creation occurs when the quality of services received is perceived as high compared to their cost. What does the customer want and how to provide it better, faster, and cheaper? The type of network hardware required to achieve high customer satisfaction with minimum cost.

2. Figure out how the work gets done in a given period of time: There is a lot of assumptions about how work get done that don't mirror exactly what happens. After all, during the daily grind, the company doesn't think about how the work is done, given that they often do it.

3. Remove inefficiencies and waste: waste is defined by anything the customers are not willing to pay for and anything that doesn't add up to customer values (Ronald Mascitelli, 2012). Once it is known what the workflow looks like, take a second look at any step in the process that doesn't directly create value for customers. Manage, improve, and smooth the process flow to eliminate non-valued-added activity.

4. Track numbers and manage by evidence: Sometimes we need to examine the processes, collect data on how well it is working, highlight and eliminate errors, and seek continuous improvements in value.

5. Empower the people operating the process: The best person to improve a process is the person who carries out the process. Utilize employee's full skill sets by doing more. If the process is improved, employees will likely have time to take on a higher level of work.

6. Improve in a systematic way: The process is not perfect and it won't last forever without changes. Changes will occur in any process. Being able to replicate the steps of process improvements is the key to delivering long-term and sustained value.

It's clear that Lean approach emerges due to limited resources, time and capital investment. Using the Lean method approach which is implemented for network infrastructure deployment focuses on building customer values, eliminate waste, integrity, build a learning experience, localize responsibility, delay commitment, and deliver fast and optimized products.

Project Management in Telecommunication Network

Project Management (Meredith J.R. and Mantel S.J.Jr., 1995) has been used for many years before it became a profession to be taught in universities. For example, a construction project in middle centuries was oriented around project management skills. Building the pyramids in Egypt was also organized and synchronized in a way like implementing project management skills nowadays. Large engineering projects (Cicmil, S, 2006) introduced to project management to enable the start and completion of any project within expected time frame and expected deliverables. One of the most popular tools introduce in project management for engineering project was the Gantt chart which was introduced by Henry Gantt in 1910. His argument was people were more focused on execution and making quick profits instead of focusing on the production of end goods. More tools were developed later such as the Performance Evaluation and Review Technique (PERT, found in most GUI-based PM software) tool and Critical Path Method (CPM) (Fondahl, John W., 1961) where it shows the start and end of the project with different tasks and sub-tasks involved. The PERT chart is used to draw all activities involved in the project and their sequence. A PERT chart is only as good as the assumptions inherent in the critical path represented on the chart. PERT is closer to a lean approach (Sutherland, J., 2001). Each task must have a weight such as duration of each task as shown in Figure 1.

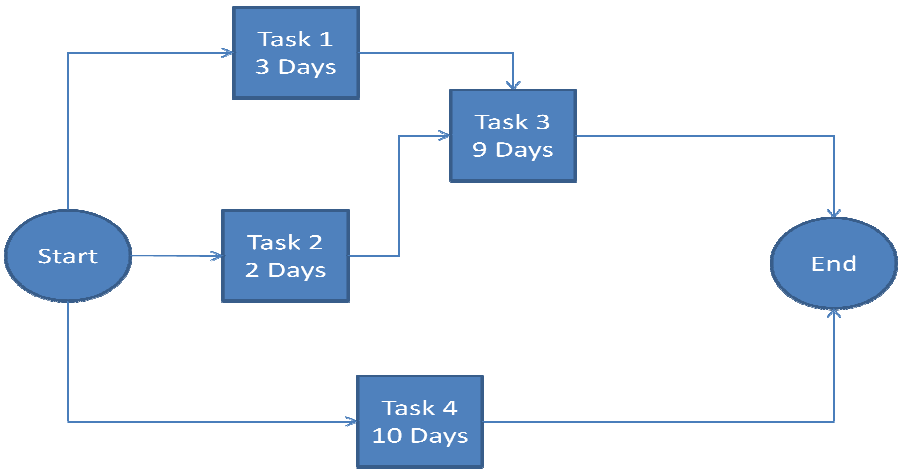


Figure 1: PERT Chart Example

Any project has a specific beginning and ending time frame. Telecommunication project (Sherif, Mostafa Hashem, 2009) consists of three categories, the first category is the business part which is the objectives and deliverables being generated for the project, the second is the Product and Service part and the third is the project management deliverables. Telecommunication project consists of different software and hardware components such as firmware, website, content, databases, underline infrastructure (routers, switches, bridges, and cables). Also, it requires network infrastructure (wireless and wired), security and storage and disaster recovery as shown in Figure 2.

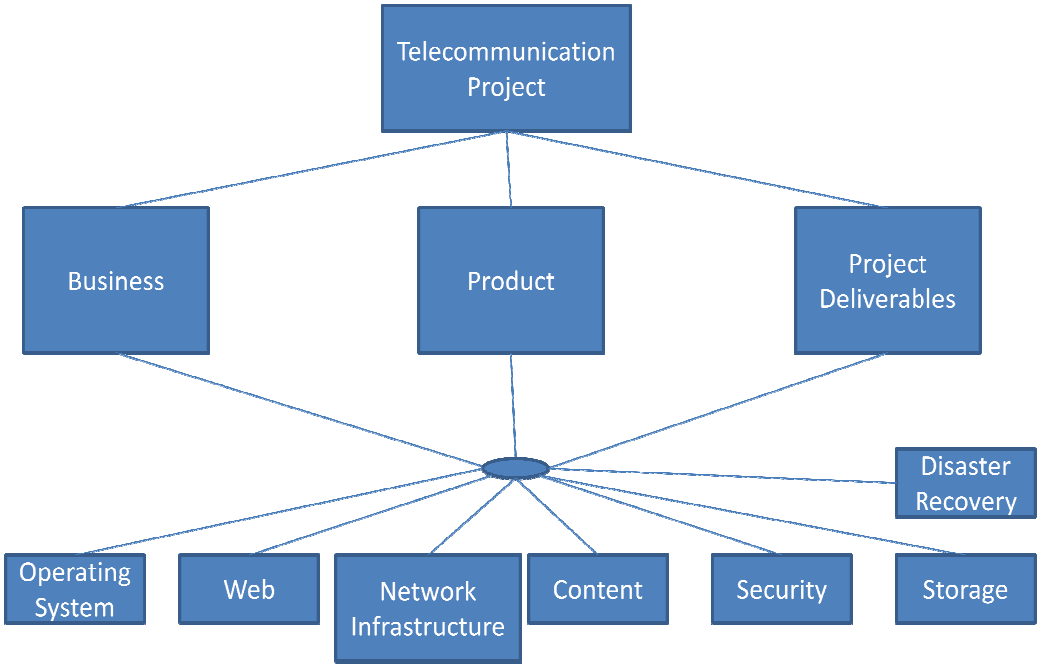


Figure 2: Typical Telecommunication Project Components

Each of these components is a project by itself. Project management, in general, is the aspect of applying good practices in any telecommunication project (Alfred Sankara, 2010). If requires the understanding of different essential elements such as leadership role for the project manager, project planning, control and risk management. The telecommunication project manager is required to balance between getting the maximum performance possible versus an acceptable reality performance metric. There are several requirements to start with telecommunication project; the first step is to acquire all information needed about the project requirement. The implementation part of telecommunication project requires the knowledge of what is the project, who will get affected in terms of the number of users, time frame requirements to complete the project and the hours of operations for people involved in implementing the project as well as hours of operations for users who are impacted by this change. Next step is to figure out who will be part of the project team.

In any telecommunication project (Alfred Sankara, 2010); there are common issues that must be addressed. The number of suppliers, partners, and vendors for hardware and software components is a common issue. Each supplier has his own expectation, constraints, and assumptions. This should be included in the overall project plan. In telecommunication, the change in software requirement is more dynamic and frequent, so changes in software versions.

Telecommunications in Lebanon

In June 1994, the Lebanese government launched an international public auction for a tender of two contracts knows as Build Operate and Transfer (BoT) contracts signed with France Telecom and Telecom Finland to develop the mobile network industry. In August 2002, the Lebanese government terminated the BoT contracts before the expiration date and transferred the network owner to its custody. In June 2004, the Minister of Telecommunications (MoT) awarded two new management agreements for operating the two networks. On the expiration of the agreements, the Lebanese Ministry of Telecommunications signed in January 2009 another two new management contracts between Orascom Telecom Holding S.A.E. and Mobile Telecommunications Company KSC. The Lebanese government owns the current two mobile telecommunication networks with outsourcing management agreements. A monthly variable management fees as stated in contracts represent the share in return to management operations for both contracts.

Telecommunication in Lebanon (Telecom in Lebanon- Fact book, 2015) has been driven by massive investments (estimated $500 Million in 2016) due to the increasing demand in mobility and number of mobile subscribers in the past several years. The objective of both major mobile network companies in Lebanon Touch and Alpha as well as OGERO is to make fiber optics as well as 5G available throughout the country by 2020 (Telecom in Lebanon- Fact book, 2015).

Project Management for the Telecommunication Industry in Lebanon

The process of change in the telecommunication industry in Lebanon and abroad is difficult to implement given the data and voice downtown associated with any change during the production phase. Even in the pre-production phase, any change will have a negative impact on service delivery date to customers and stakeholders. Project manager's plan is to avoid any disruption to business operations or delays in scheduled to release a product. There is a history of project delays for all telecommunication providers in Lebanon in which these providers failed several times to deliver competently and on time seems to be in worst shape in recent memory. One of the most factors contributing to not being able to deliver on time is the industry high pace of change. One factor contributing to this is the high turnover rate which leads to inadequately trained sales and technical people who lead to poorly delivered projects that will require time extensions to bring the project up to expectations.

Research Method

There are two main research requirements that need to be addressed in the method. First, we need to determine the population covered for people using and affected by network deployment. Second the interview questions and the type of people we are going to interview. For the first requirement, we covered about 50% of the telecommunication population in Lebanon given that there are only two telecommunication companies operating. Second, we decided to interview with several people (employees and managers) from the quality and performance department that can provide meaningful data for this research.

Results and Analysis

In this section, we discuss and analyze the results of two major types for project management, the Lean project management for network deployment. During the initial phase of this research, we found it beneficial to investigate the environment from more than one point of view. The interview was focused on understanding existing methods using in project management for different products and how do they adapt to any change whether demand or technological changes. The focus of this section is to investigate the primary research question:

> *What is your approach for schedule development and project management methodology used for network infrastructure deployment and service projects?*

To investigate this question properly, a comprehensive understanding of the company's different network infrastructure and service products need to be undertaken. This is an important step because the work will not be a repetition of work that has already been conducted and completed and to ensure the discussion is oriented around this key question.

This gave a rise to another key research question:

> *How are the changes in the market place incorporated in the company's products and features?*

This will give an idea which PM approach they use when the changes in market place (4G and 5G) additional to changes in customer service packages (i.e. student, family, lawyer's plans) are currently being adapted by the company.

The objective of this research is to identify the underlying principles and components that make up project management for telecommunication industry in Lebanon. This consists of Research and Development (R&D) activities and methods, PM methods and related discipline (Burke, R., 2013), and the importance to an application to R&D projects such as measurements, risk management and facilitating creative team activities. The 4G LTE rollout requires certain hardware enabling with carrier aggregation. This also requires transmission, antennas, routers, and power. Like any software and hardware products, it also requires tools upgrades for hardware and software. The company installed and enabled several new 3G sites including transmission, power, and antennas. This requires software and hardware licenses upgrade. Network infrastructure enhancement includes the Point-of-Service (PS) core upgrade. This also includes capacity and licenses, hardware upgrades licenses for new PS, software upgrade, features for commercial products. Core optimization requires improved redundancy, reduce utilization and enhance user experience.

In the year 2018, public safety 4G/5G LTE technology will reach the mainstream markets as trials and deployments gain momentum across the world. This expectation is based on the latest global market study by ABI Research (ABI Research 2016 Report). Hardware revenue is expected to grow by 30% annually reaching $540 million in 2025.The United States, UK, and South Korea markets will host the world's first three operational public safety LTE wireless networks by the end of 2017 or early 2018. The 5G infrastructure research and development targets lower latency far than 4G equipment and it also targets lower battery consumption for better implementation, but there is currently no standard for 5G

deployments. However, the Next Generation Mobile Networks Alliance (Alliance 5G Network Report, 2017) defines the following requirements that a 5G infrastructure standard should fulfill:

- Data rates of tens of megabits per second for tens of thousands of users
- Data rates of 100 megabits per second for metropolitan areas
- 1 Gbit per second simultaneously to many workers on the same office floor
- Several hundreds of thousands of simultaneous connections for wireless sensors
- Spectral efficiency significantly enhanced compared to 4G
- Coverage improved
- Signaling efficiency enhanced
- Latency reduced significantly compared to LTE

Recommendations for Network Deployment

The Next Generation Mobile Networks Alliance says that 5G should be rolled out by 2018 to meet business and consumer demands. In addition to providing speedy connection, researchers predict that 5G networks will cater for new use cases such as the Internet of Things (internet connected devices), as well as broadcast-like services and lifeline communication in times of natural disaster. Carriers, chipmakers, Original Requirement Manufacture (OEMs) and OSATs such as Advanced Semiconductor Engineering (ASE) and Amkor Technology Inc. are simultaneously preparing for the next-generation (5G) wireless standard. The network structure requires mobile systems and base stations with innovative and faster application processors, basebands and RF devices. Although updated standards that define capabilities beyond those defined in the current 4G standards are under consideration, those new capabilities have been grouped under the current ITU-T 4G standards. The U.S. Federal Communications Commission (FCC) approved the spectrum for 5G (Julius Knapp, 2016), including the 28 Gigahertz, 37 GHz and 39 GHz bands, on July 14, 2016, for vertical Industries:

- Connected Car
- Connected Robotics
- Connected Drone
- Mobile VR/AR
- Smart Manufacture
- Smart Home

The company is highly recommended to start preparing tender requirements for optimization of 5G network and expansion plan with the widest coverage across Lebanese territories. The company will bring together a coherent plan that effectively utilizes materials, capacity, resources, and knowledge available in the production facility. The project management study for the implementation of the 5G Network across all Lebanon shall maintain fast Internet to increase the profitability of the company. The company's project management system work must be well scheduled and controlled to produce the desired services.

Conclusion

In different telecommunication companies in Lebanon, lean project management methods are implemented for almost all types of projects, software, hardware, and services. However, when service projects are implemented in the telecommunication environment, these organizations often lack the rapid change in the service market due to different customer needs and competition. In this paper, we attempt to demonstrate that network infrastructure deployment project management can be conducted using the lean system approach which seems to be a fit for the network infrastructure deployment. In tough economic situation like in Lebanon where most companies are required to achieve great results with fewer resources, a lean project management approach can assist with reduction in expenses and project failures.

References

ABI Research (2016) Study Shows In-Building Wireless Market to top $9 Billion in 2020, - https://www.abiresearch.com/press/abi-research-study-shows-building-wireless-market-/

Abdul-Nour, G., Lambert, S., & Drolet, J. (1998). Adaptation of jit phylosophy and kanban technique to a small-sized manufacturing firm; a project management approach. *Computers & industrial engineering*, *35*(3-4), 419-422.

Adachi, F. (2001). Wireless Past and Future--Evolving Mobile Communications Systems--. *IEICE transactions on fundamentals of electronics, communications and computer sciences*, *84*(1), 55-60.

Alliance 5G Network Report (2017) - http://www.5gworldalliance.org/

Alfred Sankara, (2010) 'Application of Standard Project Management Processes in Fiber Optic Cable Plant Project Management'

Ballard, G., & Howell, G. (2003). Lean project management. *Building Research & Information*, *31*(2), 119-133.

Boehm and Turner, B. Boehm, R. Turner (2004), Balancing Agility and Discipline: A Guide to the Perplexed Addison-Wesley, Boston, MA

Boehm, BW (1988), 'A spiral model of software development and enhancement', *Computer*, vol. 21, no. 5, pp. 61-72.

Burke, R. (2013). 'Project management: planning and control techniques'. New Jersey, USA.

Cicmil, S., Williams, T., Thomas, J., & Hodgson, D. (2006). 'Rethinking project management: researching the actuality of projects'. *International Journal of Project Management*, *24*(8), 675-686.

Engwall, M., & Jerbrant, A. (2003). 'The resource allocation syndrome: the prime challenge of multi-project management'. *International journal of project management*, *21*(6), 403-409.

Erdogmus et al., H. Erdogmus, M. Morisio, M. Torchiano (2005) 'On the effectiveness of the test-first approach to programming' *IEEE Transactions on Software Engineering*, 31 (2005), pp. 226-237

Fazlović, S., dd Sarajevo, B. T., & Tuzla, R. D (2012). Quality Management of Assembled Service on Telecommunication Market of Bosnia and Herzegovina.

Fondahl, John W. (1961), "Non-Computer Approach to the Critical Path Method for the Construction Industry", Report #9, Stanford University

Hass, K. B. (2007). The blending of traditional and agile project management. *PM world today*, *9*(5), 1-8.

Ilincuta, A & Jergeas, GF(2003), 'A practical approach to managing multiple small projects', *AACE International Transactions,* pp. PM.13.1-PM..6.

James Womack, (2007) "The Machine that Changed the World" , https://en.wikipedia.org/wiki/The_Machine_That_Changed_the_World_(book)

James Womack , Lean Enterprise Institute - https://www.lean.org/WhoWeAre/LeanPerson.cfm?LeanPersonId=1

Julius Knapp (2016), "FCC Actions to Make Spectrum available for 5G"

Karim, A., & Nekoufar, S. (2011). Lean Project Management. *Faculty of Built Environment and Engineering, Queensland University of Technology*.

Klastorin, T (2003), *Project management: tools and trade-offs*, John Wiley & Sons, Inc., Hoboken, New Jersey.

Larman, C., & Basili, V. R. (2003). Iterative and incremental developments. a brief history. *Computer*, *36*(6), 47-56.

Lévárdy, V., & Browning, T. R. (2009). An adaptive process model to support product development project management. *IEEE Transactions on Engineering Management*, *56*(4), 600-620.

Meredith J.R. and Mantel S.J.Jr., (1995) Project Management, , J. Wiley & Sons

Moe et al., N.B. Moe, T. Dingsoyr, T. Dyba (2009), 'Overcoming barriers to self-management in software teams' *IEEE Software*, 26, pp. 20-26

Moder, JJ & Phillips, CR (1970), 'Project management with CPM and PERT', 2nd edn., Van Nostrand Reinhold Company, New York.

Moorman, C., Zaltman, G., & Deshpande, R. (1992). Relationships between providers and users of market research: The dynamics of trust within and between organizations. *Journal of marketing research*, *29*(3), 314.

Nawrocki and Wojciechowski, J. Nawrocki, A. Wojciechowski (2001), 'Experimental evaluation of pair programming', *12th European Software Control and Metrics Conference*, ESCOM, London, UK. 269-276

Project Management Institute 2013 Annual Report. (2013). Retrieved from http://www.pmi.org/~/media/PDF/Publictions/PMI-2013-Annual-Report-Web.ashx

PMBOK https://www.pmi.org/pmbok-guide-standards

B. Ramesh, L.A.N. Cao, K. Mohan, X.U., Peng(2006) 'Can distributed software development be agile?' *Communications of the ACM.* 41-46

Ralph L. Kliem, Irwin S. Ludin, Ken L. Robertson(1997), 'Project Management Methodology: A Practical Guide for the Next Millennium' - Hardcover -Published

Ronald Mascitelli,(2012) "Lean Product Development online course",https://www.youtube.com/watch?v=E4vQMwiNCBk&list=PLce8uhwYy2hn0dbCifAV65OUGWZf_UHvV

Rowe, SF,(2007) 'Project management for small projects, Management Concepts' Vienna,Virginia

Sherif, Mostafa Hashem.(2009) 'Telecommunication Project Management', telecommunication systems and technologies -Volume II 5 299.

Sutherland, J., Viktorov, A., Blount, J., & Puntikov, N. (2007). Distributed scrum: Agile project management with outsourced development teams. In *System Sciences, HICSS 2007. 40th Annual Hawaii International Conference on* (pp. 274a-274a).

Telecommunication Law in Lebanon, TRA, (2002) http://www.tra.gov.lb/Library/Files/Uploaded%20files/TelecomLaws-Lebanon2002English.pdf

Telecommunication in Lebanon – Fact Book (2015): http://www.databank.com.lb/docs/Telecom%20Fact%20Book%202015.pdf

Terenghi, F., Kristensen, K., Cassina, J., & Terzi, S. (2014). Virtual obeya: A new collaborative web application for running lean management workshops. In *Engineering, Technology and Innovation (ICE), 2014 International ICE Conference* 1-7

Duncan, W. R. (1996) . 'A guide to the project management body of knowledge'.

Microfinance Services Effect On Socio-Economic Welfare Of Urban Vulnerable Households In Malaysia

Koh Her Loke, Multimedia University, Melaka, Malaysia.
herlokekoh@gmail.com

Solarin Sakiru Adebola, Multimedia University, Melaka, Malaysia.
sasolarin@mmu.edu.my

Suganthi A/P Ramasamy, Multimedia University, Melaka, Malaysia.
suganthi.ramasamy@mmu.edu.my

Yuen Yee Yen, Multimedia University, Melaka, Malaysia.
yyyuen@mmu.edu.my

Jauhari Bin Dahalan, University Kuala Lumpur Business School, Kuala Lumpur, Malaysia.
jdahalan@gmail.com

Goh Guan Gan, Faculty of Business, Multimedia University, Melaka, Malaysia.
gggoh@mmu.edu.my

Abstract

The main objective of this study is to examine the microfinance services that improve the socio-economic welfare of urban households in Malaysia. We distribute questionnaires to 400 respondents across three different urban geographic areas in Malaysia in order to collect the relevant data for this study. Stratified random sampling is employed in the process of collecting the data. The results show that most of the services provided by the microfinance institutions including microcredit, micro insurance, training and social intermediation services have assisted the urban households to earn more income and enhance their socio-economic welfare. The recommendation of this study is detailed in the body of the paper.

Keywords: Microfinance; Socio-Economic Welfare; Financial Services; Non-Financial Services

Introduction

Malaysia is a middle-income country and covers two main regions: Peninsular Malaysia and East Malaysia (states of Sabah and Sarawak). The government of Malaysia embraced export-oriented industrialisation model in developing the country since the year 1970. The model, which emphasised on the manufacturing sector and has also successfully transformed the Malaysia's economy into an export-oriented one (Ministry of Finance, 2007). The government of Malaysia has set a long-term goal of becoming a developed nation by the year 2020. Thus, the government of Malaysia has formulated several policies and strategies to support the nation's economic growth. Those core policies are – New Economic Policy (1970), National Development Policy (1991), Vision 2020 (1991), National Economic Recovery Plan (1998), and Malaysia Plan (1971-2020). A special group of households namely B40 households was introduced by the Eleventh Malaysia Plan (2016-2020). B40 households represent the bottom 40 group with an estimated 11.7 million memberships or 40% of the population in Malaysia that live with a household income of up to RM 3,855 per month (Economic Planning Unit, 2015).

The economic development is essential to accomplish more equal income distribution among the different sections of the society. Nevertheless, there are still considerable concerns on the issue of income distribution in

Malaysia. The Department of Statistics Malaysia (2015) highlighted the general economic instability and the increasing gap between the rich and the poor. Inequality specifically poses a real challenge for Malaysia. The World Bank (2015) shows the income growth especially for the top 20% of Malaysian income earners has been strong for many years. However, the B40 of households has encountered the slowest income growth. According to Economic Planning Unit (2015), the top 20 urban households accounted for 45.9% of the total income, while the bottom 40 urban households accounted for only 17.1%.

Bank Negara Malaysia (2013) revealed that savings among the lower income households were insufficient due to lack of planning and saving for their post-retirement expenses. The B40 households are affected by high indebtedness as most of them always applied for personal loans to support their daily expenses. The people who earned RM 3,000 or below have debts that are about 700% of their earnings in 2013 (Bank Negara Malaysia, 2013). Moreover, B40 households face the issue of increment in living cost. It was reported that the B40 experienced 10.1% annual increase in the cost of living between 2009 and 2014 (Economic Planning Unit, 2015). The rising cost of living in urban areas is usually caused by the fact that they need to spend more on their daily consumption such as food, transportation and housing. The implementation of Goods and Services Tax (GST) throughout Malaysia has increased living costs in the country, especially on those who live in urban cities. Urban households need more income than rural households to stay away from poverty. In addition, they also need more resources to access basic amenities, healthcare, childcare and children's education. In particular, house rental in the urban areas account for half of the monthly salary earned by the poor urban households (Kaur, 2016).

Despite the implementation of many policies and programs by the Malaysia government to assist low income households, poverty is still visible in urban areas. Enhancing the socio-economic welfare among low income households requires microfinance services. Microfinance has been a part of poverty alleviation plans in helping the poor who usually would be disqualified from the mainstream credit sector. There are many poor households everywhere in the world which are already getting benefits and financial services from microfinance institutions (Morduch and Haley, 2002). Microfinance services are considered to be part of the tools in alleviating poverty in Malaysia. There are a total of three leading organisations working towards poverty alleviation, namely: (i) Amanah Ikthiar Malaysia (AIM); (ii) Yayasan Usaha Maju (YUM); (iii) Tabung Ekonomi Kumpulan Usahawan National (TEKUN, or The Economic Fund for National Entrepreneurs Group).

The first institution in Malaysia that provides micro finance services is Amanah Ikthiar Malaysia (AIM). AIM which was established in 17 September 1987 mainly emphasises on the provisions of loans to the poor in order to develop their business. AIM implements the Grameen Bank framework where the main objectives are to provide financing, guidance and training to the poor. AIM and YUM are institutions which only give loans to those people who are at or below the country's poverty line compared to TEKUN which does not only cover poor but also those above poverty line. AIM provides three types of economic loans for income-generating activities, namely: I-Mesra; I-Srikandi; and I-Wibawa. In addition, the organization provides: a recovery loan (I-Penyayang); an education loan (I-Bistari); and a housing/multipurpose loan (I-Sejahtera). The implementation of this program is based on the idea of 'trust' to monitor all members. AIM monitors the members, who are expected to attend weekly meeting organised by the institution. The meeting has promoted the capability of the participants to pay back the loans as the default rate was only 0.92% in year 2009. AIM provides free interest credits to the borrowers, which form themselves into groups of five and sequentially pledges against each other loans, in line with the model of the Grameen Bank. The total members of AIM as at April 2016 were 382,178 in Malaysia (Amanah Ikthiar Malaysia, 2016). AIM was chosen in this study to measure the effect of microfinance services in enhancing the socio-economic welfare among vulnerable households in urban Peninsular Malaysia because of its wide coverage.

The main objective of this study is to identify the effect of microfinance services on the socio-economic welfare of urban vulnerable households in Malaysia. There are total of five microfinance services provided by the microfinance institution, AIM which is microcredit, micro insurance, savings, training and social intermediation service. Likewise, this study would like to detect which microfinance services have the effect on socio-economic welfare on urban vulnerable households. Hence, there are two academic contributions in this study. Firstly, majority of the previous study only focus the socio-economic welfare on rural households.

Secondly, as income is part of the sources in enhancing households' socio-economic welfare. Also, it is evidenced that there is no previous research using income as mediating variable in their study. Thus, the focus of this paper is to investigate the how well the microfinance services effect on socio-economic welfare among urban vulnerable households in Malaysia and also using income as mediator in this study.

The following part of this paper is organised into few sections. First, this paper reviews the extant from previous literatures and discusses the relationship among independent, dependent and mediating variables. The empirical approach is presented next, followed by results and bootstrapping tests. Finally, this paper concludes by discussing the implications of the findings and acknowledging the limitations of this study

Literature Review

This section covers the empirical evidence on the linkage between microfinance services, income and socio-economic welfare in literature. Socio-economic welfare is defined as a condition whereby a person or groups is doing well or somewhat emphasises on a person's wellbeing or good (Frijerts and Van Prag, 1999). The low income households are likely to have low purchasing power, low expenditure, and low quality of life. Thus, there is a need for special assistance in improving the welfare of the low income households. Microfinance programs are the potential platforms in enhancing the socio-economic welfare in society. Microfinance services play a vital platform in alleviating poverty, eradicating poverty and creating wealth among poor people. These are among the objectives established by several microfinance institutions. The positive impact of microfinance services on poverty had been highlighted by Alam (1988). The financial services provided by the microfinance programs were crucial input to enhance productivity at household level. However, it has been claimed that the microfinance services had the ability to improve income levels and enhance employment of household members (Okurut et al. 2004). Also, Mahjabeen (2008) stated that microfinance institutions enhanced income and consumption stream of the households, lessened income imbalanced and welfare improvement. According to Mwewa (2013) and Mungai (2015), microfinance services could assist the poor in the creation of jobs because it provided the necessary capital for small scale enterprises.

There are studies that have considered the impacts of microfinance services on socio-economic welfare. One of the services that have been the focal point in the literature is microcredit. For instance, Wahid (1994) had stated that credit services were the crucial sources for the poor in assisting them to increase their capital in improving their standards of living through income investments. It was also agreed that credit is an essential tool in assisting borrowers from avoiding the poverty trap (Hermes et al. 2011; Mwangi, 2015; Owuor 2015). The credit from microfinance programs also assisted poor households to overcome their liquidity issue and fund investments in agriculture, trades and business, increase income, construct and improve employment among households. Microfinance services are effective developmental tools in poverty reduction, income distribution and achievement of millennium development goals. Salia (2014) analysed the effects of microcredit schemes on welfare in Tanzania, Africa. The findings revealed that participation in microcredit schemes could lead to poverty eradication among women clients and also financed children's education and health services.

Besides, Kireti and Sakwa, (2014) demonstrated that microcredit provided more income stream for the poor and liberated them from poverty circumstances. Microcredit improves the welfare of low income households as they lead to creation of jobs and generation income as well as increase in the household assets (Mokhtar, 2011; Nawai and Shariff, 2011; Hamdan and Hussin, 2012).

Few studies have also considered the role of micro insurance including Beattie (2000) that argued that micro insurance is a social protection tool, which assisted low income households in escaping from poverty circumstances. Besides, Matul (2005) also stated that the affordability to own insurance for low income households was not only linked to their income but also to the appropriate supervision of their financial sources which had a significant impact on their access to micro insurance. Similarly, Collins et al. (2009) also mentioned that micro insurance was gradually acknowledged to be similarly significant to microcredit as low income households must ensure a smooth flow of their daily cash and control their daily consumption in improving their future economic plan. Therefore, micro insurance is regarded as a powerful tool for low income households in enhancing their welfare.

Savings (micro savings) is increasingly recognised as equally important to microcredit because low income households must balance their cash flows in smoothening their daily consumption and future economic plan (Collins et al. 2009). Brannen (2010) conducted a study on the impact of micro savings on the welfare of the poor. The results showed that micro savings improved the welfare of the poor in Tanzania. Besides, Babajide et al. (2015) studied the influence of innovative micro savings service on welfare and business enterprise progress among low-income earners in Nigeria. The findings revealed that savings has a significant impact on welfare and also micro savings leads to poverty alleviation among low income households.

Training has also been considered in the literature. For instance, Hamdan and Hussin (2012) stated that the incorporation of entrepreneurial trainings had been considered as a powerful tool that can improve micro and small enterprises in South Africa and Malaysia. Previous studies also agreed with the fact that specific skills, and training will assist most of the recipients of microfinance in overcoming different obstacles (Karnani, 2007; Paul, Nyaga and Karoki, 2013). For instance, Saad (2010) conducted a survey of 1,800 members from AIM which were from the rural states of Kelantan and Perak only. The findings indicated that microcredit and training activities from AIM lessens poverty, develops the education level of their children and enhances the health status of its members. However, the study only focused on rural states in Malaysia and did not cover the urban states or entire nation of Malaysia. Furthermore, Al-Shami et al. (2014) consented to the point that AIM delivered a variety of training activities in enhancing their customer's talent to explore new income-generating activities, choosing suitable income-generating activities and enhancing their money management skills.

The perception of group lending from microfinance is a pressing need nowadays in supporting the poor to find jobs and increase their standard of living. The group lending assist the poor to access microfinance services to better off their expenditure, gain access to market information and boost the activities of entrepreneurship (Attanasio et al. 2011). The loan from social intermediation service could generate more income to lenders compared to the individual liability (Al-Shami, 2014). The study of Kireti and Sakwa (2014) examined the socioeconomic effects associated with the participation of women in the microfinance programs in Kenya. The findings revealed that the non-financial service of social intermediation service was able to smooth their income level and improve their socioeconomic welfare.

From the literature review, it is observed that a gap existed as most of the previous papers focus on the impact of microfinance institutions on the rural poor. Hence, it finds that income can also be part of the essential element for the research framework. This can be evidenced from the experts' feedbacks as the variable income can add value to academic contribution. Moreover, there is none of the previous study using income as mediating variable in such a related study. Hence, the variable of income was introduced as a mediating variable to the research framework. The study wants to detect the existence of income between microfinance services and socio-economic welfare came to be effective or not.

Methodology

The target respondents of this study are the household recipient of AIM's services in Penang, Kuala Lumpur and Johor Bahru. According to report from Department Statistics Malaysia (2010), Penang, Kuala Lumpur and Johor Bahru are considered as the 0top three urbanised states in Malaysia. Hence, total 400 respondents are equally selected from these three different geographic areas in Peninsular Malaysia. Primary data collection approach is used in this study. The data was collected via well-designed questionnaires in selected study areas. The approach of survey questionnaires was applied in this study as this approach provided an efficient way in collecting data. Patten (2016) indicated that the construction of questionnaire is superior to interview method because using questionnaire enables the researcher to collect data from several respondents simultaneously. Many of the previous studies such as Nawai (2011), Omar et al. (2012), Al Mamum et al. (2014) and others also used the survey questionnaire approach for data collection.

The stratified random sampling approach was used in this study. This is similar to the study of Al-Mamun (2012). Questionnaires were distributed to microfinance recipients. Furthermore, those qualified respondents from microfinance would be gathered by the administrators at the centers correspondingly. Questionnaires were then distributed to each respondent. They were given sufficient time to answer the questionnaire. Statistical Package for Social Science (SPSS) was used to measure the descriptive analysis

while structural equation modeling (SEM), Partial Least Squares in SmartPLS 3.0 was used to determine the path correlation between the variables. Figure 3.1 shows the research framework.

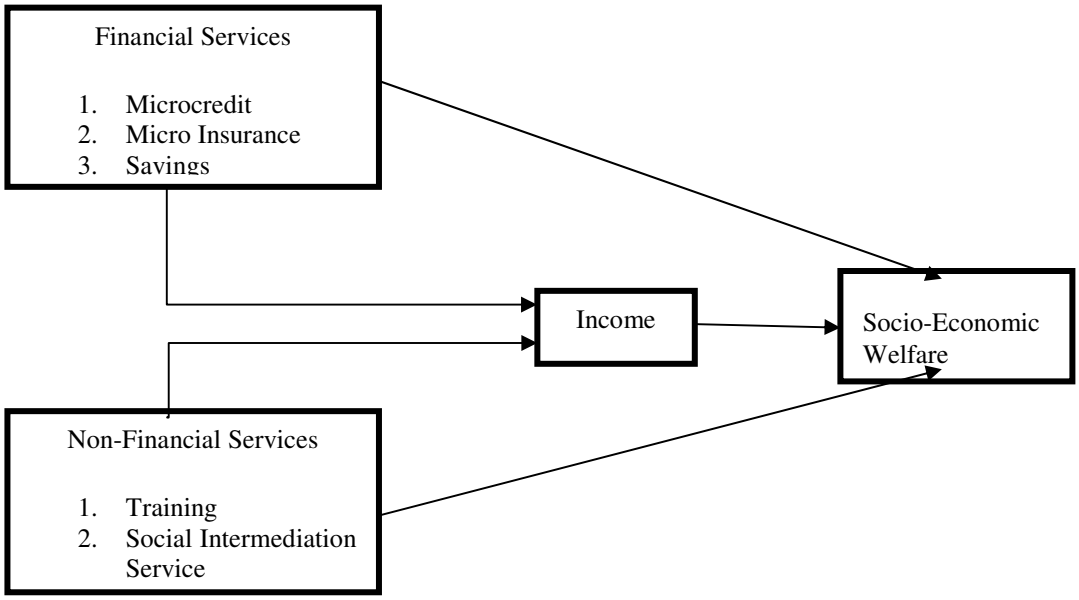


Figure 1: Research Framework

Data Analysis

The results in Table 1 reveal that about 75% of the respondents are between the age of 26 and 50 years. This indicates that majority of these household receivers' category are in need of the financial assistance. Nevertheless, only 2.4% of the respondents associating to the age group 61 and above were recorded. The percentage in age group 25 or below and 51 – 60 years are 5.3% and 17.8%.

Table 1: Distribution of Respondents by Age Group

Age Group	Frequency (N)	Percentage (%)
25 or below	21	5.3
26 - 35	84	21.0
36 - 50	214	53.5
51 – 60	71	17.8
61 and above	10	2.4

The results in Table 2 implies that almost two third of the total respondents have achieved secondary education and below as at the time of this study. This is followed by vocational and college diploma with 15.3% and primary education at 6.3%. The rest of the respondents with bachelor degree and above are up to 4.4% only.

Table 2: Distribution of Respondents by Education

Education	Frequency (N)	Percentage (%)
Primary Education	25	6.3
Secondary Education	296	74.0
Vocational / College Diploma	61	15.3
Bachelor's and above	18	4.4

Table 3 shows that majority (about 80%) of the respondents are self-employed while those that are unemployed and labourer are 7.5% and 13.3% respectively. For the terms of marital status, almost 84% of the respondents were married at the time of study. Only 6.0% are single while divorced and widowed are 3.8% and 6.2% respectively.

Table 3: Distribution of Respondents by Employment Status

Employment	Frequency (N)	Percentage (%)
Unemployed	30	7.5
Labourer	53	13.3
Self-employed	317	79.2

The results in Table 4 indicate that almost 85% of the respondents earn an income between RM 1,500 to RM 6,000. Only 10.8% of the respondents have earned less than RM 1,500 while 3.3% of the respondents earned between RM 6,000 to RM 10,000 during collection period. This is followed by those respondents with income of more than RM 10,000 with only 0.7%.

Table 4: Household Current Gross Monthly Income of the Respondents

Household Current Gross Monthly Income	Frequency (N)	Percentage (%)
Less than RM 1,500	43	10.8
RM 1,500 to < RM 2,500	120	30.0
RM 2,500 to < RM 4,000	157	39.2
RM 4,000 to < RM 6,000	64	16.0
RM 6,000 to < RM 10,000	13	3.3
More than RM 10,000	3	0.7

(a) Measurement Model

SmartPLS 3.0 was used to determine the measurement model of this study. The composite reliability and internal consistency assessed the reliability of construct measurement. The reliability of each construct was evaluated by the composite reliability with the cutoff value of 0.7 (Fornell and Larcker, 1981; Hair et al. 2016). On the other hand, the convergent validity was tested by Average Variance Extracted (AVE) with the recommended cutoff value of 0.5 and also each item loadings with the recommended cutoff value of more than 0.7 (Fornell and Larcker, 1981; Hair et al. 2016). This indicates adequate convergent validity as all items fulfill the requirements. Table 5 shows the results for items loading, average variance extracted (AVE)

and construct composite reliability (CR) on this study. The results reveal that all constructs' items loading, reliability and AVE are above the recommended levels.

Table 5: Items Loading, Average Variance Extracted (AVE) and Composite Reliability (CR)

Constructs	Measurement Items	Items Loading	AVE	Composite Reliability
Welfare	W2	0.724	0.560	0.836
	W3	0.732		
	W4	0.754		
	W5	0.783		
Microcredit	MC1	0.797	0.640	0.842
	MC2	0.848		
	MC3	0.754		
Micro insurance	MI2	0.726	0.551	0.830
	MI3	0.771		
	MI4	0.721		
	MI5	0.749		
Social Intermediation Service	SIS1	0.758	0.540	0.824
	SIS2	0.718		
	SIS3	0.739		
	SIS5	0.723		
Savings	SV2	0.729	0.566	0.839
	SV3	0.764		
	SV4	0.791		
	SV5	0.723		
Training	TR3	0.785	0.621	0.831
	TR4	0.794		
	TR5	0.785		
Income	IC3	0.779	0.628	0.835
	IC4	0.786		
	IC5	0.812		

Discriminate validity is a test to ensure that the value of AVE at least must be above the threshold value of 0.50 and the square root of the AVE also should higher than all other cross correlations (Fornell and Larcker, 1981; Chin, 1998; Chin 2010). Table 6 depicted the diagonal values (bold) are greater than the corresponding correlation values for each rows and columns. Thus, the discriminate validity was assured.

Table 6: Discriminant Validity Analysis

No.	Variables	Income	Microcredit	Micro insurance	Savings	Social Intermediation Service	Training	Welfare
1.	Income	**0.792**						
2.	Microcredit	0.517	**0.800**					
3.	Micro insurance	0.517	0.584	**0.742**				
4.	Savings	0.439	0.484	0.533	**0.752**			
5.	Social Intermediation Service	0.541	0.515	0.515	0.529	**0.735**		
6.	Training	0.457	0.405	0.445	0.507	0.501	**0.788**	
7.	Welfare	0.428	0.603	0.608	0.591	0.592	0.479	**0.749**
Diagonals (in bold) represent the squared root of Average Variance Extracted (AVE) while other entries represent correlations.								

(b) Structural Model

The structural model stipulates the information about the coefficients of sizes (R^2), predictive relevance (Q^2) and path coefficients of all variables. The results of Table 7 reveal that R^2 for dependent variable (welfare) and mediating variable (income) are 0.558 and 0.368, respectively. Hence, the research explained 55.8% of total variance of all predictors to welfare. Also, income was 36.8% determined by all independent variables. Q^2 represents a measure of how well-observed values are reformulated by the model and its parameter estimates. $Q^2 > 0$ shows that the model has predictive relevance (Chin, 2010). The results of this study implied that both variables are 0.247 (income) and 0.295 (welfare) which were more than 0. Hence, this model has predictive relevance.

Table 7: Coefficients of Sizes and Predictive Relevance Analysis

Variables	Coefficients of Sizes, R^2	Predictive Relevance, Q^2
Income	36.8%	0.247
Welfare	55.8%	0.295

The results in Table 8 illustrate the significance of direct path coefficients. The values of relationship as shown in t-statistics revealed that two relationships (TR->Income and SIS->Welfare) are lower than t-table value of 1.96 (p-value of 0.05) while remaining relationships are all positive relationship and higher than t-table value of 1.96 with p-value of less than 0.05. Also, the table indicates that Income->Welfare (β=0.439; p<0.001), MC->Income (β=0.191; p=0.001), MC->Welfare (β=0.276; p<0.001), MI->Income (β=0.194; p=0.001), MI->Welfare (β=0.204; p<0.001), SV->Income (β=0.241; p<0.001), SV->Welfare (β=0.187; p<0.001), TR->Welfare (β=0.195; p<0.001) and SIS->Income (β=0.145; p=0.007) were the only significant path coefficients. The relationship TR->Income and SIS->Welfare were not significant predictors to relevant variables. Thus, most of the direct path coefficients of this study were significant (p<0.001).

Table 8: Significance of Direct Path Coefficients

	Standardised Beta	t-statistics	p-values	Decision
Income -> Welfare	0.439	9.848	< 0.001	Supported
MC -> Income	0.191	3.465	0.001	Supported
MC -> Welfare	0.276	5.387	< 0.001	Supported
MI -> Income	0.194	3.368	0.001	Supported
MI -> Welfare	0.204	3.608	< 0.001	Supported
SV -> Income	0.241	4.327	< 0.001	Supported
SV -> Welfare	0.187	3.690	< 0.001	Supported
TR -> Income	0.05	0.879	0.380	Not supported
TR -> Welfare	0.195	3.508	< 0.001	Supported
SIS -> Income	0.145	2.686	0.007	Supported
SIS -> Welfare	0.041	0.866	0.387	Not supported

The results in Table 9 indicate the significance of indirect path coefficients. The mediating variable of income was added to five relevant paths of coefficients. It was found that income has a positive and significant impact on microfinance services towards welfare except for savings only. Despite the savings is not significant with $p>0.05$, the relationship between the remaining predictors (microcredit, micro insurance, training and social intermediation service) was intensely reduced with significant path coefficient (0.084, 0.085 0.063 and 0.106) ($p<0.05$) respectively.

Table 9: Significance of Indirect Path Coefficients

	Standardised Beta	t-statistics	p-values	Decision
MC -> Income -> Welfare	0.084	3.112	0.002	Supported
MI -> Income -> Welfare	0.085	3.234	0.001	Supported
SV -> Income -> Welfare	0.022	0.848	0.397	Not supported
TR -> Income -> Welfare	0.063	2.572	0.010	Supported
SIS -> Income -> Welfare	0.106	3.787	< 0.001	Supported

Conclusion and Recommendation

In a nutshell, microfinance institutions are required to be promoted to all low income households, persistently to extend its microfinance services. The microfinance services help to increase their source of income thus enhancing their socio-economic welfare and also reduce their level of poverty with the presence of microfinance institutions to develop national economic growth in line with the objectives of the New Economic Model Malaysia.

The main objective of this study was to examine the ideal microfinance services which enhance the socio-economic welfare of urban households in Malaysia. The results of this study confirmed the effect of microcredit, micro insurance, social intermediation service and training on socio-economic welfare. These results supported the hypothesis of the study by affirming the importance of microfinance services in enhancing the socio-economic welfare of urban households' poverty.

The study found out that majority of the households receivers are between the age group of 36 to 50. Most of them have at least secondary education with only minority having post-secondary education. In addition, this study found out that many of the urban households were engaged in self-employed businesses by starting up their own small businesses. This resulted in their gross monthly income to be between the ranges of RM 1,500 to RM 4,000 only.

The study also confirmed that most of the microfinance services provided by AIM are very significant in increasing their sources of income as well as enhancing their socio-economic welfare except for savings services. The fact shows that the amount of savings by the households for the microfinance programs is less than 1% out of the total loan amount (AIM, 2016). Hence, the amount of the savings does not really cater for the needs of the households.

This study is important as it assists to detect the most influential microfinance services in enhancing the socio-economic welfare on the urban vulnerable households in Malaysia. Microfinance services should not be treated as the only remedy to counter poverty in universal, but rather as an essential platform in eradicating poverty and subsequently, enhancing welfare of society too. Thus, the introduction of few policies by government of Malaysia such as National Urbanisation Policy, National Key Results Areas and Government Transformation Programme needs to be fully achieved in order to create developed country. Thus, this study is

able to assist government in achieving part of the goals of New Economic Model for Malaysia in which to be a high income economy which are both inclusive and sustainable. The government of Malaysia through AIM should extend promoting microfinance programmes in enhancing the wellbeing for the urban households in Malaysia. The government and relevant authorities have the responsibility in generating sustainable and favourable policy on microfinance institutions operations. The policy will assist them to inspire more urban households in participating microfinance programmes. This can indirectly have multiple effects on households' socio-economic welfare. Microfinance will perhaps likely to empower people by providing them with more confidence and assisting them financially in their businesses.

However, this study was limited only to the collection of selected states in Peninsular Malaysia only. There should be more geographic areas to be covered in future studies. Moreover, microfinance institutions should always strive to promote more on the quality of products and services to the extent of different needs of the borrowers. Hence, this may help to enhance the participation rate in their programmes in order to achieve poverty alleviation. Nevertheless, government should also be continuously funding the microfinance institutions in order to assist their operational maintenance. This will indirectly enhance the standard of living for the society too.

References

Al Mamun, A., Abdul Wahab, S., and Malarvizhi, C. A. (2010). Impact of Amanah Ikhtiar Malaysia's Microcredit Schemes on Microenterprise Assets in Malaysia. *International Research Journal of Finance and Economics*, (60), 144-154.

Al Mamun, A., Abdul Wahab, S., Malarvizhi, C. A., and Mariapun, S. (2011). Examining The Critical Factors Affecting The Repayment of Microcredit Provided by Amanah Ikhtiar Malaysia. *International Business Research*, 4(2), 93-102.

Alam, J. (1988). Rural Poor Program in Bangladesh. UNDP, Dhaka.

Al-Mamun, A., Mohiuddin, M., and Mariapun, S. (2014). Investigating The Effects of Amanah Ikhtiar Malaysia's Microcredit Programmes on Employment in Rural Malaysia. *Journal of Southeast Asian Economies (JSEAE), 31(3)*, 471-483.

Al-Shami, S. S. A., Majid, I. B. A., Rashid, N. A., and Hamid, M. S. R. B. A. (2014). Conceptual Framework: The Role of Microfinance on The Wellbeing of Poor People Cases Studies from Malaysia and Yemen. *Asian Social Science,* 10(1), 230.

Amanah Ikthiar Malaysia. (2016). Amanah Ikhtiar Malaysia: [Retrieved May 8, 2017] http://aim.gov.my/

Armendariz, B., and Morduch, J. (2005). The economics of microfinance. MIT Press.

Attanasio, O., Augsburg, B., De Haas, R., Fitzsimons, E., and Harmgart, H. (2011). Group lending or individual lending. Evidence from A Randomised Field Experiment in Mongolia. Pub ref: MPRA Paper, (35439).

Babajide, A. A., Taiwo, J. N., and Isibor, J. A. (2015). Microsavings Mobilization Innovations and Poverty Alleviation in Nigeria. *Mediterranean Journal of Social Sciences*, 6(4), 375.

Bank Negara Malaysia. (2013). The Marginal Propensity to Consume Across. Bank Negara Malaysia Working Paper Series, 2-20. [Retrieved April 17, 2017].
https://www.bnm.gov.my/files/working_papers/dhruva_et_al_final_JKK.pdf

Beattie, R. (2000). Social Protection for All: But How?. *International Labour Review*, 139(2), 129-148.

Brannen, C. (2010). An Impact Study of The Village Savings and Loan Association (VSLA) Program in Zanzibar, Tanzania (Doctoral dissertation, Wesleyan University).

Chin, W. W. (1998). Commentary: Issues and Opinion on Structural Equation Modeling.

Chin, W. W. (2010). How to Write Up and Report PLS Analyses. In Handbook of Partial Least Squares (pp. 655-690). Springer Berlin Heidelberg.

Collins, D., Morduch, J., Rutherford, S., and Ruthven, O. (2009). Portfolios of the Poor: How The World's Poor Live on $2 A Day. Princeton University Press.

Debnath, S. C., and Mahmud, K. T. (2014). The Myth of Microcredit in Poverty Alleviation: Perspective from The Grameen Bank in Bangladesh. *World Applied Sciences Journal*, 31(6), 1025-1032.

Department of Statistics Malaysia. (2011). Population Distribution and Basic Demographic Characteristic Report 2010. Department of Statistics Malaysia. [Retrieved Jun 7, 2017], https://www.statistics.gov.my/

Economic Planning Unit (2015). The Eleventh Malaysian Plan (2016-2020). Malaysia

Fornell, C., and Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of marketing research*, 39-50.

Frijters, P., and Van Praag, B. (1999). The Measurement of Welfare and Well-being: The Leyden approach. Foundations of Hedonic Psychology, Scientific Perspectives on Enjoyment and Suffering, New York: Russel Sage Foundation.

Hair Jr, J. F., Hult, G. T. M., Ringle, C., and Sarstedt, M. (2016). A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM). Sage Publications.

Hamdan, H., and Hussin, W. S. W. (2012). The Importance of Monitoring and Entrepreneurship Concept as Future Direction of Microfinance in Malaysia: Case Study in The State of Selangor. *Journal of Global Entrepreneurship*, 3(1), 1-25.

Hermes, N., Lensink, R., and Meesters, A. (2011). Outreach and Efficiency of Microfinance Institutions. *World Development*, 39(6), 938-948.

Karnani, A. (2007). Microfinance Misses its Mark. [Retrieved February 18, 2017]. http://www.conflictrecovery.org/bin/2007SU_feature_karnani.pdf

Kaur, M. (2016). Urban Middle Class Now 40% Poorer. MToday News Sdn Bhd. [Retrieved July 22, 2017]. http://www.freemalaysiatoday.com/category/nation/2016/12/27/urban-middle-class-now-40-poorer/

Kireti, G. W., and Sakwa, M. (2014). Socio-Economic Effects of Microfinance Services on Women: The Case of Rosewo Microfinance, Nakuru County, Kenya. *International Journal of Academic Research in Economics and Management Sciences*, 3(3), 43.

Mahjabeen, R. (2008). Microfinancing in Bangladesh: Impact on Households, Consumption and Welfare. *Journal of Policy modeling*, 30(6), 1083-1092.

Matul, M. (2005). Demand for Micro Insurance in Georgia: Quantitative Study Results. In *8th Annual Conference on Microfinance Institution, Bucharest*.

Md Saad, N. (2010). Achieving Human Development Objectives through Microfinance Institution: The Case of Amanah Ikhtiar Malaysia. *Journal of Islamic Economics, Banking and Finance*, 6(2), 65-78.

Ministry of Finance (2007). Economic Report 2007/2008. Putrajaya: Jabatan Perangkaan Malaysia.

Mizanur Rahman, M., and Ahmad, F. (2010). Impact of Microfinance of IBBL on The Rural Poor's Livelihood in Bangladesh: An Empirical Study. *International journal of Islamic and Middle Eastern finance and management*, 3(2), 168-190.

Mokhtar, S. H. (2011). Microfinance performance in Malaysia (Doctoral dissertation, Lincoln University).

Morduch, J., and Haley, B. (2002). Analysis of the Effects of Microfinance on Poverty Reduction. *New York: NYU Wagner Working Paper*, 1014.

Mungai, D. W. (2015). The Effect of Microfinance Service on The Growth of Small and Medium Enterprises in Kajiado County (Doctoral dissertation, University of Nairobi).

Mwangi, R. N. (2015). The Effect of Microfinance Services on Economic Empowerment of Small Scale Farmers in Kiambu County (Doctoral dissertation, University of Nairobi).

Mwewa, N. M. (2013). The Effects of Microfinance Services on The Growth of Small and Medium Enterprises in Machakos County (Doctoral dissertation, University of Nairobi).

Nawai, N., and Shariff, M. N. M. (2011). The Importance of Micro Financing to The Microenterprises Development in Malaysia's Experience. *Asian Social Science*, 7(12), 226.

Okurut, F. N., Banga, M., and Mukungu, A. (2004). Microfinance and Poverty Reduction in Uganda: Achievements and Challenges. *Kampala, Uganda: Economic Policy Research Centre*.

Omar, M. Z., Noor, C. S. M., and Dahalan, N. (2012). The Economic Performance of the Amanah Ikhtiar Malaysia Rural Microcredit Programme: A Case Study in Kedah. *World*, 2(5).

Owuor, M. A. (2015). Effect of Microfinance Services on The Growth of Women Owned Small and Medium Enterprises in Ruiru Sub-county (Doctoral dissertation, University of Nairobi).

Patten, M. L. (2016). Questionnaire Research: A Practical Guide. Routledge.

Paul, K. N., Nyaga, J., and Karoki, J. M. (2013). An Evaluation of Legal, Legislative and Financial Factors Affecting Performance of Women Micro Entrepreneurs in Kenya. *European Journal of Business and Management*, 5(8), 16-26.

Wahid, A. (1994). The Grameen Bank and Poverty Alleviation in Bangladesh. American *Journal of Economics and Sociology,* 53(1), 1-15.

World Bank. (2016). The World Bank Statistics: Malaysia. Malaysia: The World Bank.

Factors determining housing price: case of St. Petersburg

Liudmila A. Guzikova, Professor of Peter the Great St. Petersburg Polytechnic University,
St. Petersburg, Russian Federation, guzikova@mail.ru

Ekaterina V. Plotnikova, Associate professor of Peter the Great St. Petersburg Polytechnic University,
St. Petersburg, Russian Federation, e-plotnikova@fido-polytech.ru

Abstract

In the framework of this study, the authors of the paper analyzed the construction sphere by the example of St. Petersburg. As a result, the main problems of housing construction financing were identified, an algorithm for financing construction sector was developed, correlation and regression analysis of the market value of housing was carried out and the main factors influencing its formation were identified.

Keywords: housing construction, housing, construction financing, housing prices, price factors

Introduction

Housing construction belongs to one of the most priority sectors of the national economy due to the fact that housing security is the most important indicator characterizing the citizens' level of well-being and the quality of life in general. There are two types of strategies for financial incentives for the development of priority industries: 1) strategies based on the stimulation of supply; 2) strategies based on the stimulation of demand.

Strategies of the first type go back to the historical period, when the production development level did not allow fully meeting the needs of society in every-day goods. During this period, the main task was to expand production, and a limited range of potential solvent buyers competed for the products in the market. The task of manufacturers was to ensure the production of the goods with minimal costs, which allowed expanding the range of customers due to lower prices.

With the development of production and the fierce competition in markets, a new type of incentive strategy has emerged. In the process of competition, manufacturers constantly increase production volumes, improve the quality of their products and expand its range, but the consumer, despite the desire to unlimited increase of the comfort level, is unable to pay the entire volume of output. Stimulation of demand becomes a reaction to the threat of a overproduction crisis.

In today's Russia the provision of affordable and comfortable housing for citizens is extremely acute issue, which forces to use a combination of the elements of strategies both the first and the second types in order to balance supply and demand. On the one hand, the increase in the volume of housing construction should be carried out by increasing the efficiency of the housing financing system and developing bank lending to developers and other incentive measures for producers. On the other hand, it is necessary to support the demand for housing, by means including, in particular, mortgage lending.
In connection with the mentioned above, the issues of financial support for housing construction as part of a set of measures aimed at housing problem solving are of high relevance and have priority from the standpoint of strategic socio-economic development.

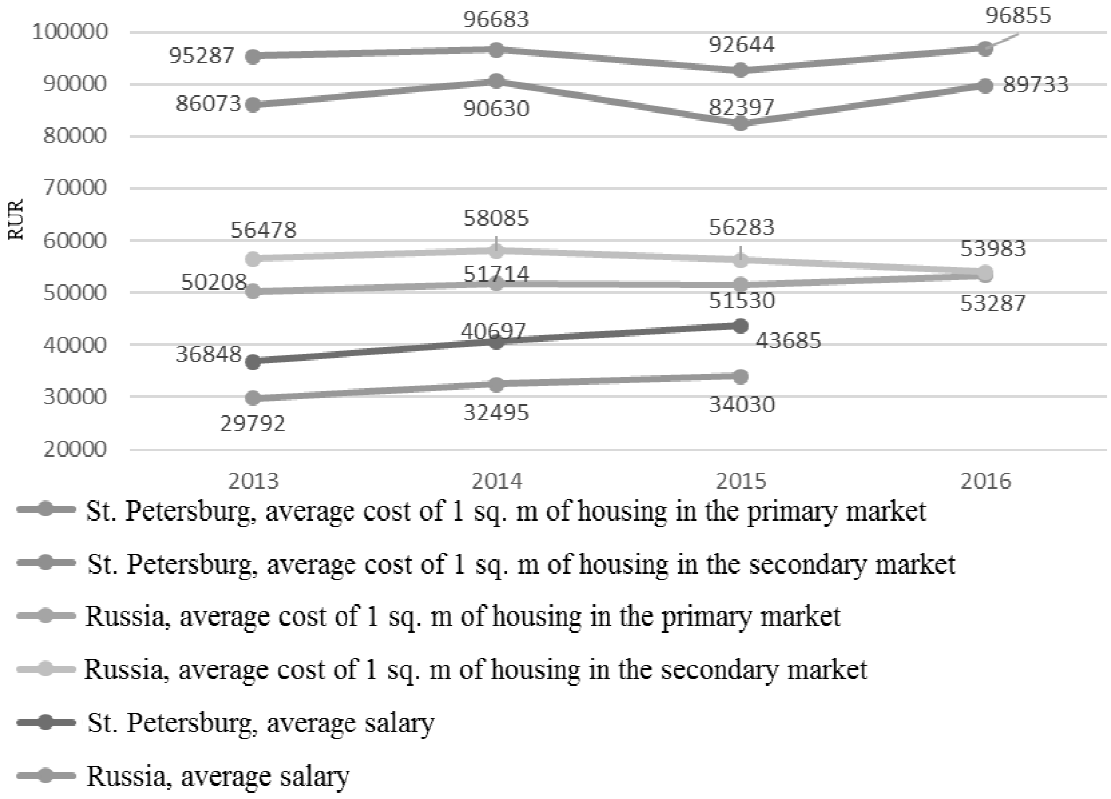
The objective of the study is to identify the factors that have the greatest impact on the value of a square meter of housing in St. Petersburg which is analyzed divided by districts of the city. To achieve the goal, the following tasks were set and solved: 1) analysis of the situation in the housing market of St. Petersburg in order to determine the range of factors; 2) carrying out correlation-regression analysis in

order to reveal the dependence between the price of the housing as productive factor and the revealed factors.

It is supposed that the market price of the housing constitutes of two components - fundamental and conjunctural, and the first is dependent of the inalienable properties of the housing which stay unchanged for a long time.

Data and method

Analysis of the current situation in the housing market of St. Petersburg allows characterizing the state and identification the prospects for of housing construction. The most important factor determining the affordability of housing is the housing prices in the primary and secondary market in comparison with the level of the average salary in the investigated region (Fig. 1).



Source: compiled by the authors on the basis of the Regions of Russia (2016).

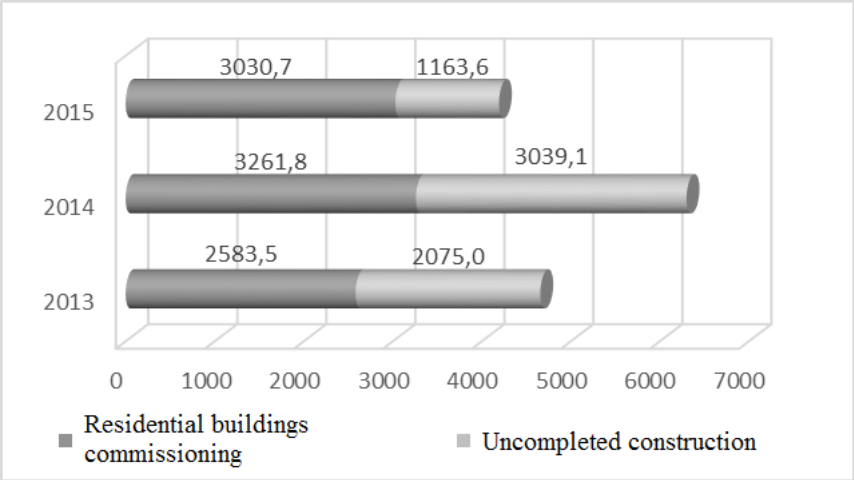
Fig. 1. The ratio of the average cost of 1 sq. m of housing to an average salary

According to the data published by the state statistics bodies, during the analyzed period the cost of housing in the primary market of St. Petersburg exceeds the cost in the secondary market by an average of 8 thousand rubles per square meter of the total area. As a rule, the cost of housing in the secondary market is higher than in the primary market, which is confirmed by the situation on average in the country. This is explained by a number of factors: 1) the category of secondary real estate includes high cost apartments in houses built during the last five years; 2) buying a property in a house under

construction is perceived as a significant risk; 3) when buying a secondary real estate buyer can enter the house immediately; 4) mortgage rates on the constructed housing is lower by an average of 1% (Real Estate. "Secondary" vs new buildings: what and why is more expensive?, 2017).
The reverse situation prevailing in St. Petersburg can be explained by the saturation of demand for expensive housing in the secondary market and, as a consequence, the dominance of demand for mass housing of economy class.

Analyzing the dynamics of changes in the average monthly salary, shown in Fig. 1, we can conclude that the average salary does not match the cost of one square meter of housing, which significantly reduces the affordability – citizens' ability to purchase housing. So, in 2016, the average resident of St. Petersburg, having spent the entire amount of his/her monthly salary, could purchase 0.47 meters of housing in the primary market (0.53 meters - in the secondary market).

In 2016, the construction cost of a square meter of housing in St. Petersburg amounted to 59,294.8 rubles. (Housing in Russia, 2016), while the market value - 96 855 rubles. Thus, the cost of housing when it enters the market increases by an average of 63.34%. By the gap between the cost per square meter of housing and its market value St. Petersburg ranks second in Russia after Moscow.
Comparative dynamics of residential buildings commissioning and uncompleted construction in St. Petersburg for 2013-2015 is presented in Fig. 2.



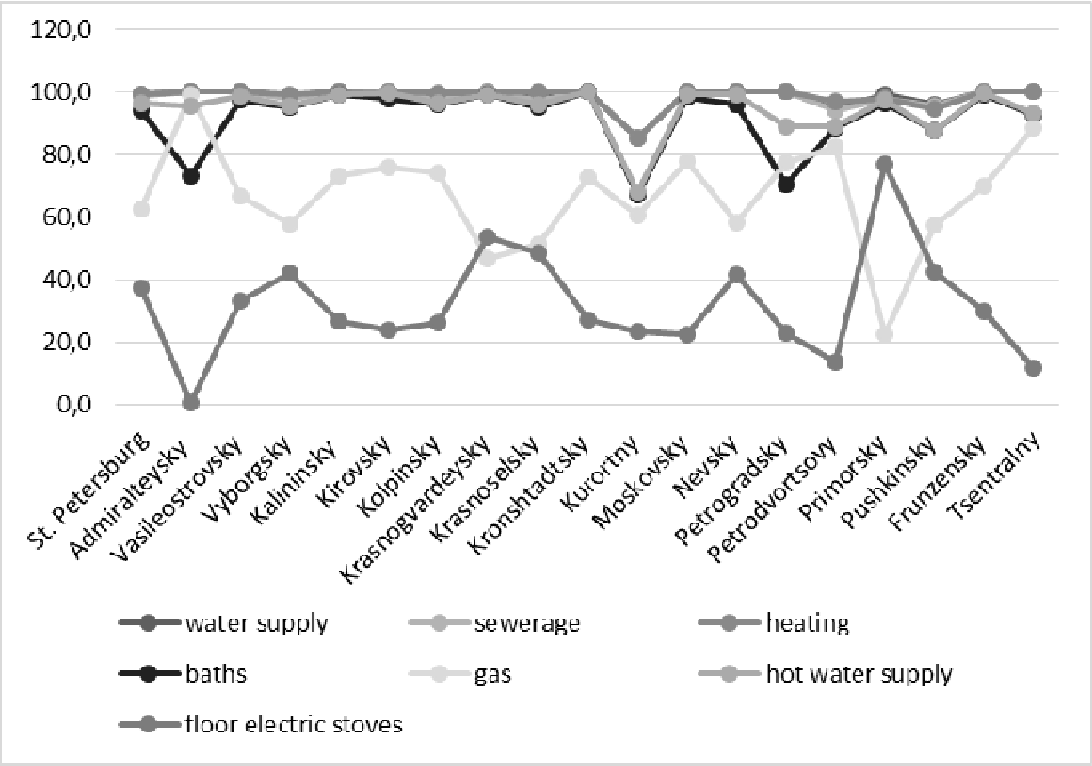
Source: compiled by the authors on the basis of the Regions of Russia (2016).

Fig. 2. Comparative dynamics of residential buildings commissioning and uncompleted construction (thousand sq. m)

An analysis of uncompleted construction of residential buildings in St. Petersburg shows that its volume is big and sufficient to significantly affect the economic development of certain territories of St. Petersburg and the Russian Federation as a whole.

The uncompleted construction of residential buildings is associated with a lack of money, changes in legislation, a currency crisis and other negative circumstances. In 2013 and in 2014, the volume of uncompleted construction was comparable to the volume of residential space commissioned and reached a huge size due to the deteriorated economic situation in the country. In 2015, construction in progress has reduced almost thrice. This is explained by the fact that along with the scheduled delivery of construction projects, a number of projects frozen during the crisis were completed.

Comfortable living conditions and accessibility of utilities are ensured by the equipment of residential buildings. To assess the trends in the residential buildings equipment, we will analyze proportions of the total area equipped with water supply, sewerage, heating, baths, gas, hot water supply, floor electric stoves in the districts of St. Petersburg in 2016 (Fig. 3).



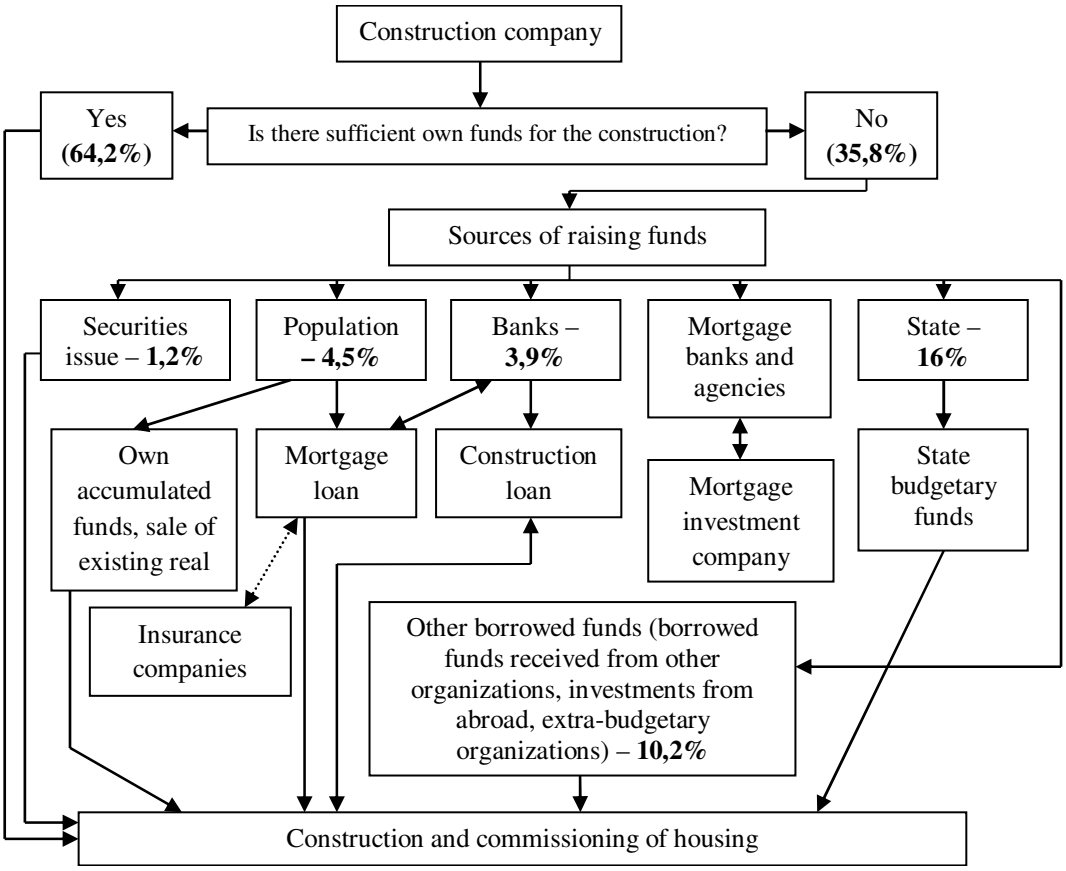
Source: compiled by the authors on the basis of Housing in Russia (2016).

Fig. 3. Equipment of housing stock in 2016 (%)

In the districts of St. Petersburg the equipment of residential buildings as a whole is in the quite high level. However, the Kurortny district has quite low indicators of residential buildings' equipment: only 68% of the total area is equipped with hot water supply, and 67.3% of the total area is equipped with baths (shower).

The analysis of the current state of the housing stock in St. Petersburg allowed revealing the following:
- huge gap between the construction costs and the market value of the housing stock;
- significant gap between the market value of housing and the average salary;
- positive trends in uncompleted construction, which made it possible to reduce its volume by almost three times in 2015;
- relatively high level of equipment of the housing stock.

Data representing investments in construction in St. Petersburg are shown in Fig. 4 by sources of financing.

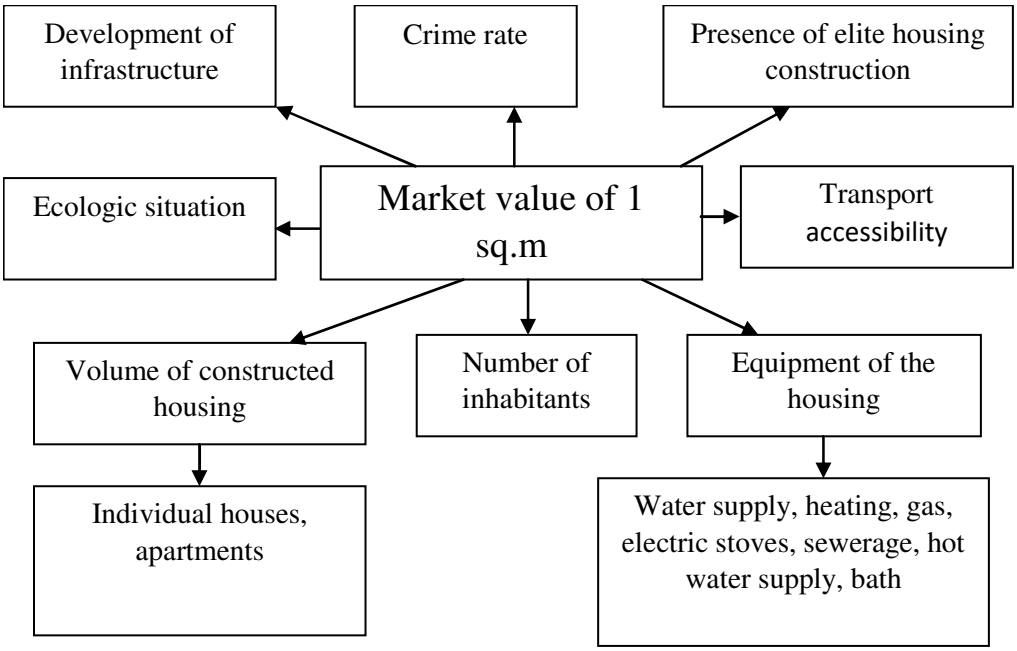


Source: compiled by the authors on the basis of Badyranov (2009), Konkin et al (2016), Mataibaeva (2003), Sternik (2000).

Fig. 4. Structure of investments in construction by sources of financing (% of total)

Today the construction companies prefer to reduce potential risks, so 64.2% of construction financing is from own funds. This situation, in our opinion, has formed due to unstable situation in the economy. In the case of shared financing, construction companies lose part of the profit, selling the housing at a lower cost, so investments in construction through mortgage constitute only 3.9%. Another source of financing is budgetary funds (16%), which, as a rule, are being received on an irrevocable basis and are intended to build social housing. 4.5% of financing is carried out from the funds of organizations and participants of shared construction. The issue of securities constitutes 1.2%. 10.2% of financing is provided through other borrowed funds, including borrowed funds received from other organizations, investments from abroad, extra-budgetary funds, funds of superordinate organizations.

As a result of examining analytical reviews, statistical data and the current state of the housing market, a number of factors were identified which, in the opinion of the authors, should influence the formation of the resultant factor - the market value of square meter (Fig. 5).



Source: compiled by the authors.

Fig. 5. Factors of the market value included in consideration

Thus, the following indicators will be considered as factors affecting the market value of 1 square m of housing:

- equipment of housing (water supply, heating, gas, electric stoves, sewerage, bath, hot water supply);
- transport accessibility (presented in the form of an index which reflects how many times to travel from this or that region longer to center of city than from the Central District);
- volume of commissioned housing (the number of apartments in residential buildings and the area of individual houses);
- infrastructure development (determined by the availability of schools, hospitals, kindergartens, food stores within walking distance);
- crime rate (number of committed crimes);
- population (number);
- presence of elite housing construction (ranking position);
- ecologic situation (rating of the ecological situation in the districts of the city).

Analysis and results

Now let's investigate the factors that determine the market value of a square meter in the primary and secondary housing market in St. Petersburg. The market value of 1 square meter of housing in the primary and secondary markets of St. Petersburg will considered as resultant factors. Several indicators, reflecting the level of livability of housing, the number of built housing, the ecological situation of the area, transport accessibility, development of infrastructure, the availability of elite construction and number of inhabitants, were determined as attributive factors.

Correlation-regression analysis was carried out according to data published in public on various information portals, including websites of state statistics bodies (Regions of Russia, 2016), and reflecting

the situation in different districts of St. Petersburg in 2016. The results of the pair correlation analysis are presented in Table 1.

Table 1. Results of pair correlation analysis between the market value of 1 square m in the primary market and value factors

Factor	Correlation coefficient
Water supply	-0,058
Sewerage	-0,035
Central heating	-0,154
Bath (shower)	-0,409
Gas supply	0,117
Hot water supply	-0,304
Electric stoves	-0,151
Number of completed apartment	-0,059
Area of individual houses	0,428
Ecologic situation	-0,040
Crime rate	-0,127
Transport accessibility	-0,241
Development of infrastructure	0,591
Presence of elite housing	0,419
Number of inhabitants	-0,155

An attempt was made to construct multiple linear regression equation for the primary market price, based on the same factors. However, the results obtained are statistically insignificant. Table 2 presents the results of pair correlation analysis for the secondary market.

Table 2. Results of pair correlation analysis between the market value of 1 square m in the secondary market and value factors

Factor	Correlation coefficient
Water supply	0,046
Sewerage	0,070
Central heating	-0,029
Bath (shower)	-0,653
Gas supply	0,382
Hot water supply	-0,255
Electric stoves	-0,404
Number of completed apartment	-0,208
Area of individual houses	0,392
Ecologic situation	0,450
Crime rate	-0,228
Transport accessibility	-0,710
Development of infrastructure	0,713
Presence of elite housing	0,769
Number of inhabitants	-0,374

Based on the pair correlation analysis, four factors were identified that are most closely related to the market value of 1 sq. m on the secondary market:
- bathroom or shower room (x1);
- transport accessibility index (x2);
- infrastructure development (x3);
- ratio of elite and non-elite housing (x4).

On the basis of these indicators, the multiple regression equation was constructed showing how, in aggregate, the factors under investigation affect the market value of 1 sq. m. (Table 3-4). Note that during the analysis two variables (transport accessibility index and infrastructure development) were excluded as statistically insignificant.

Table 3. Regression statistics

Regression statistics	
Multiple R	0,983119282
R-square	0,966523522
Adjusted R-square	0,959084305
Standard error	4771,864717
Observations	12

The coefficient of determination is equal to 0.9665, therefore, the factors considered is determine the market value by almost 97%. The elimination of two indicators from multiple regression equation reduced the determination coefficient by 1%, which is acceptable.
The calculated value of F is 0.00000023. The calculated level is less than the selected significance level α = 0.05, therefore, this dependence is statistically significant.
Table 4 shows the P-values for the parameters of the regression equation. All P values are less than the selected significance level α = 0.05, which confirms the statistical significance of all parameters.

Table 4. P-value

	P-value
Y-intercept	0,000001
X 1	0,000013
X 2	0,000046

Thus, it was revealed that the availability of bath (shower) and the share of elite housing in the region by 97% determine the market value of housing in the secondary market.
As a result, in order to predict market value changes in the districts of Saint-Petersburg, the following equation was constructed: Y= -1416.14 * X1 + 3097.12 * X2 + 209699.53. This equation allows predicting the level of market prices for housing in the area based on two main indicators.

Discussion

Providing the population with housing is the most important socio-political and economic problem. The scale and pace of housing construction, the real well-being of people, their moral and physical well-being, political assessments and behavioral motivation largely depend on the approaches chosen to solve this problem. The results obtained in the paper can be used to predict the level of market prices for housing in the territory on the basis of factors determining housing quality in the wide sense, but they refer rather to the fundamental component of the market value than to its conjunctural component. So the latter should become the subject of further investigation.

Summary

At present, there is a huge gap between the market value of housing and the financial capabilities of population. In this regard, the tendency of construction growth is becoming dangerous, making newly constructed housing increasingly less affordable to the population and resulting the decrease of demand, and, consequently, the decrease of the construction volume. In the end, this can create a crisis of a systemic nature, markedly strengthening in the deteriorating economic situation in the country as a whole. In order to diversify the sources and mechanisms of financing, an algorithm for financing housing construction was proposed and the current distribution of financial flows in the construction industry was analyzed. As a result, it was revealed that construction organizations prefer to finance activities at their own expense, which provides them with financial stability and the maximum possible profit.

Correlation-regression analysis made it possible to identify factors that have a significant effect on the market value of a square meter in the secondary market. Such factors are the presence of a bath / shower - the inverse relationship, the ratio of elite and non-elite housing - a direct dependence. The fact of the inverse relationship between the presence of a bath / shower and the market value of a square meter in the secondary market can be explained by the fact that the most expensive apartments are located in the historical center of Saint-Petersburg, where the largest percentage of apartments was built in the end of 19th beginning of 20th century, and does not satisfy the modern requirements to equipment.

The scale of the problems of the housing construction development and construction financing, require the fastest possible measures to resolve them, to identify and make full use of the world experience and best practices of the Russian regions.

References:

Badyrkhanov, A.M. Development of the mortgage lending mechanism as a factor in maintaining stability in the banking sector [Text] // Audit and financial analysis. 2009. № 1. P. 385-386.

Housing in Russia // gks.ru: the federal service of state statistics. 2016. URL: http: //www.gks.ru/free_doc/doc_2016/jil-hoz16.pdf (circulation date is 27/03/2017).

Konkin, A.N., Ruzaeva, A.A, Comparative analysis of the sources of financing the activities of construction organizations / / Modern scientific research and innovation. 2016. № 11. [Electronic resource]. URL: http://web.snauka.ru/issues/2016/11/72925 (reference date: 06/04/2017).

Mataibaeva G.Zh., Basic Models of Housing Financing // Economic Sciences / 2. Finance and Banking. [Electronic resource]. URL: http://www.rusnauka.com/4_SND_2012/Economics/3_99826.doc.htm (circulation date April 23, 2017).

Real Estate. "Secondary" vs new buildings: what and why is more expensive? [Electronic resource]. URL: http://nedv.info/articles/7473.html (circulation date April 23, 2017).

Sternik, G.M. Russian Real Estate Market as a Sector of Market Economy [Text] / G.M. Sternik - in the book "The Federal Directory, July-December 1999, vol. 6. ed. - Moscow: Rodina-PRO, 2000. 415-452 p.

Regions of Russia. Socio-economic indicators [Electronic resource]. URL: http://www.gks.ru/ (circulation date 05/05/2017).

The Effectiveness of Funding the Activity of Russian Universities Project 5-100-2020

Liudmila A. Guzikova, Professor of Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russian Federation, guzikova@mail.ru

Ekaterina V. Plotnikova, Associate professor of Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russian Federation, e-plotnikova@fido-polytech.ru

Abstract

In the situation of the soaring demand for higher education, the topicality of global university rankings grows. Independently on the goals declared by their compilers, the rankings are recognized in academic society and beyond it as a comparative assessment of the educational institutions quality. Project 5-100-2020 was designed to provide financial support to Russian universities striving to maximize their competitive positions at the international level. The paper analyzes the effectiveness of Project 5-100-2020 financing in order to develop the most appropriate measures to achieve the goals. The effectivenessis evaluated with application of several criteria: necessity, performance to plan, costs, comparative characteristics. As the result it was found out that regulative provision of the project implementation is insufficient, the number of Russian universities participating in the project was projected up to the year 2020, recommendations are given to develop key indicators of Russian universities based on their comparison with the leading universities of QS rankings, inefficient use of financial means in the implementation of the project was identified.

Keywords: funding of education, effectiveness assessment, competitiveness, ranking of universities.

Introduction

Today education in its continual, organic interrelation with science is becoming one of the most important factors contributing to economic growth of the country.

It should be noted that by the beginning of the 21st century, the prestige of the Russian educational system and university science turned out to be seriously disrupted. Socioeconomic and state political transformations of the late 1980s - early 1990s made a considerable impact on education in Russia, allowing making higher educational institutions academically autonomous, ensuring diversity of educational institutions and educational programs, developing the multinational Russian school and non-government sector of education. As a result of those transformations the influence of the state on the sphere of education decreased a lot, which doomed education to exist in the position of internal confinement and isolation from solving topical problems of the country's socioeconomic life.

Today Russia pays a lot of attention to the problems of training engineering, managerial and scientific cadres of higher qualification, which has been reflected in a number of official documents that set specific objectives and stipulate concrete actions aimed at improving the prestige of the Russian higher school at the international level. Now the attention of the state to the problems of the higher school is preconditioned by the fact that the prospects and dynamics of socioeconomic development of the country depend on the level of its intellectual potential while advancement in rankings is an indicator of progress, confirmation of the level of Russian education at the international level.

Development features and tendencies of modern education, its quality, as well as the criteria that influence the formation of ranking scores, were studied in detail in the papers by Russian researchers

(Rodionov et al, 2014-2016; Vorobyeva et al, 2017; Davidyuk et al, 2017; Efimova et al, 2017; Guzikova et al, 2014) and foreign scientists (Zahid et al, 2017; Shin et al, 2011; Dobrota, 2016).

According to the Presidential Decree in March 2013 the RF Government initiated a project with a working title 5–100–2020. Project 5–100-2020 is a state university support program aimed to promote and improve the prestige of Russian education. According to the Presidential Decree "On the measures for pursuit of state policy in the field of education and science" (No. 599, dated 7.05.2012), by 2020 five Russian universities must get into the top-100 best universities of the world according to the version of the leading international ranking called QS World University Rankings.

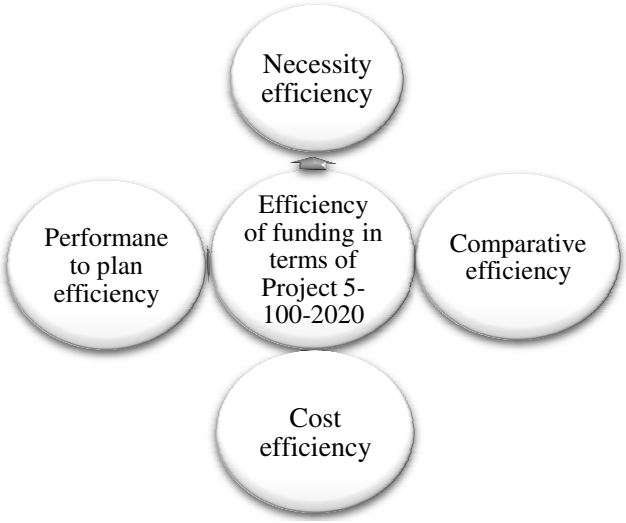
It has been 5 years since the project was started, which makes it possible to summarize the first outcomes, analyze the achieved results and evaluate how efficiently the goal of the project is implemented in terms of funding - maximization of the competitive position of leading Russian universities on the international market. Thus, the purpose of this paper is to evaluate the effectiveness of funding of Russian universities which obtain subsidies in the context of Project 5-100-2020.

In the first part a set of criteria is demonstrated. It has been used to assess the effectiveness of funding of Project 5-100-2020. The second part contains the results of effectiveness assessment and identifies problems and prospects related to the implementation of Project 5-100-2020.

The information basis for the research includes the RF Government laws and decrees, regulatory acts and materials of specialized, issue-related Internet resources, materials of the official and financial statements of project office 5-100-2020, statistic data.

Data and method

In order to assess the effectiveness of educational activity funding in terms of Project 5-100-2020 we will be using a complex of criteria which characterize program implementation from different angles. This complex of criteria shows to which extent the program implementation meets the goals and objectives that have been set. It can be used as a landmark for the project initiators in managerial activity, which directs this activity in the channel of substantiation, necessity, justifiability and sufficiency. Figure 1 presents a complex of criteria that will be used to assess the effectiveness of Project 5-100-2020 funding.



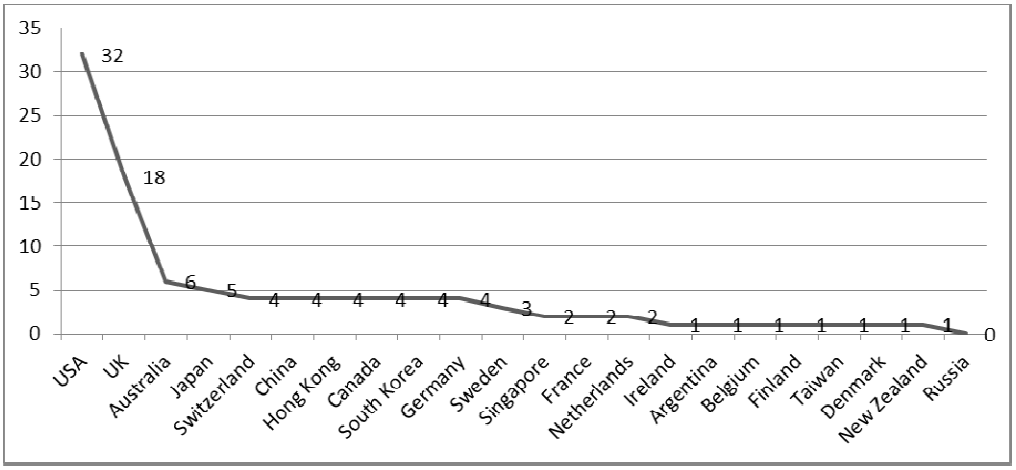
.**Figure 1 - Approaches to assessing the effectiveness of educational activity funding in terms of Project 5-100-2020. (***Composed by the authors)*

The above approaches supplement each other, so for a full-fledged assessment of the effectiveness of educational activity funding it is necessary to implement them as a single package. The complex of effectiveness evaluation criteria of educational activity funding includes the following approaches: necessity effectiveness, comparative effectiveness, cost-effectiveness, performance to plan effectiveness. Let us present each approach in more detail.

1. Necessity effectiveness. First of all, a logical criterion or common sense check-up should be noted as an effectiveness criterion. In terms of necessity, one should evaluate the feasibility of taking an action as a whole to see if it is reasonable to carry it out and to define the utility from taking it. In the context of this approach it is necessary to obtain an answer to the question: "what does it bring?" and "who stands to gain from it?". Despite the triviality of this criterion, a failure to comply with it can result in unprecedented consequences in practice. In terms of this research, the logical criterion implies calculation of an indicator which reflects the amount of money spent to improve a university's status by one position in the QS rankings for the period from 2013 to 2016.

2. Performance-to-plan-effectiveness. In order to assess the performance, such indicators are applied which characterize the degree of compliance with the planned and projected values, i.e. the "fact/plan" ratio, estimated on the basis of planned and accounting documents and statistical data. In this research we are going to use the goal of Project 5-100-2020 as a planned indicator, which prescribes entrance of five Russian universities to the ranking of 100 best universities in the world by 2020. On the basis of the actual data and identified trends, the position of universities in the rankings by 2020 has been forecast. This forecast in terms of the applied approach will be recognized as an actually achievable indicator.

3. Comparative effectiveness. The indicator is applied in the selection of the best option for solving an economic problem. The utility of comparative assessments depends on the objectives of a comparison and the soundness of the selection for comparison. A comparison will be useful only if consistent characteristics are compared, for example, indicators calculated by using the same methodology. Comparative analysis of effectiveness is made both as a whole and by individual directions and factors. Comparisons to foreign countries can make conclusions inaccurate because of differences in the registered and published indicators, methodologies for estimating indicators and unavailability of data for cross-over application of methodologies. As noted above, the goal of the program is that Russian universities will enter the number of 100 best universities in the world by the year 2020. Due to the above, the basis for comparison will include the countries whose universities have different positions in the top-100 of the QS rankings.
Application of the comparative effectiveness criterion is eased by the fact that usage of the data presented in the QS rankings implies a single methodology for acquisition, processing and analysis of information and presents comparable characteristics and factors.
Figure 2 presents the distribution of the participating universities which entered the top-100 of the QS rankings by countries in 2017.



Composed by the authors based on the QS World University Rankings.

Figure 2 – Distribution of the participating universities which entered the top-100 of the QS ranking by countries in 2017.

In order to estimate the comparative effectiveness, some countries have been chosen given the following logic:
1) the country which has the biggest number of universities in the top-100 of the QS ranking;
2) the country whose number of universities is a median value in the top-100of the QS ranking;
3) countries which have the smallest number of universities in the top-100 of the QS ranking;
Since there are as many as 7 countries which have only 1 university in the top-100 of the ranking, 2 countries, whose universities have the highest amplitude of the expected values of the criteria, have been chosen. Thus, comparison will be made by the following countries: the USA, Sweden, New Zealand and Taiwan.
The top-100 universities and the Russian universities participating in Project 5-100-2020 will be compared by such indicators as: academic reputation, employer reputation, faculty/student ratio, citations per faculty, international faculty ratio, international student ratio.
4. Cost-effectiveness. Achievement of the maximum result with constant costs. Calculation of cost-effectiveness is a mandatory condition for substantiating every action in terms of scientific research, project and production activity. In the research the estimation has been made in various forms and with a different degree of detailing. In this research we analyze the structure of costs on Project 5-100-2020 in Russia and make an assessment of their rational usage.

Analysis and results

Below we present the results of the applied complex of criteria reflecting various approaches to assessing the effectiveness of funding in relation to the Project 5-100-2020.

1) Necessity effectiveness.

Project 5-100-2020 is financed from the funds of the RF federal budget. A project office was set up in order to organize analytical, methodological, informational, organizational and technical activity of Project 5-100-2020. The money is distributed between project participants and the project office through the Ministry of Education and Science of the RF. Every year, based on the RF Government executive orders, the amount of subsidies to participating universities is established. The specification of the total

amounts of funding granted to the universities participating in Project 5-100-2020 and the change in their general position in the QS ranking are presented in Table 1.

Table 1 – Specification of the size of funding granted to participating universities and change in their general position in the QS rankings.

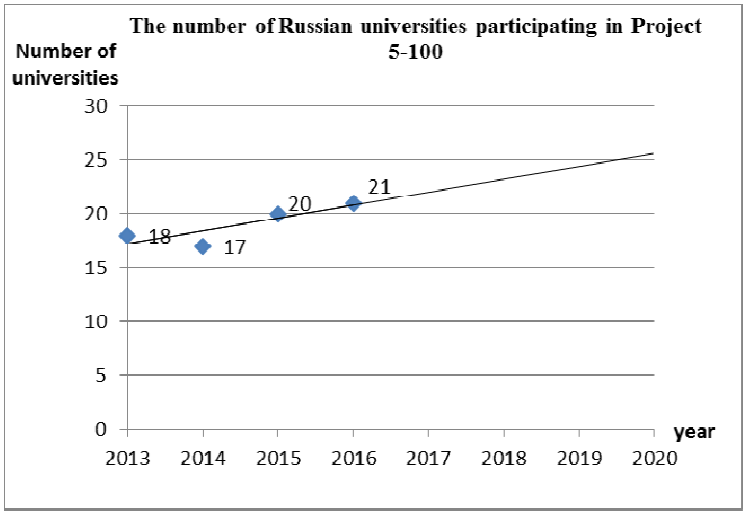
Indicator	Year			Total
	2014	2015	2016	
Change in the number of positions in the Russian QS rankings	-	615	170	785
The amount of subsidies, m rubles.	8,700	10,150	10,140	28,990
Number of m rubles/ position	-	17	60	37

In the period from 2014 to 2016 the cumulative advancement of Russian universities in the QS rankings included 785 positions. The amount of subsidization for the same period was 28,990 m rubles. On average, the costs from the federal budget amounted to 37 m rubles in the context of Project 5-100 for improving the position of a university by one point in the international university QS rankings for the years 2014 - 2016.

The results of the effectiveness analysis in terms of necessity showed that:
1. The analyzed distribution of financial flows between participating universities sent by the Ministry of Education and Science in order to increase the competitiveness of universities shows that the regulatory support received for implementation of the project is not sufficient. For example, in 2014 the subsidy was too high for five universities and too low for 9 other universities. This fact bears evidence that there is no typical form of agreement on providing universities with a subsidy.
2. On average, in order to move by one position higher in the QS rankings a university needs 37 m rubles. Correspondingly, it can be assumed that universities which spend more money use it inefficiently. The following ones can be referred to as such universities: Moscow Institute of Physics and Technology (287.9 m rubles); National Research University "Higher School of Economics" (2 472.4 m rubles); Novosibirsk State University (60.8 m rubles).
The stipulated results bear evidence of inefficient implementation of Project 5-100-2020 in terms of necessity.

2) Performance-to-plan effectiveness.

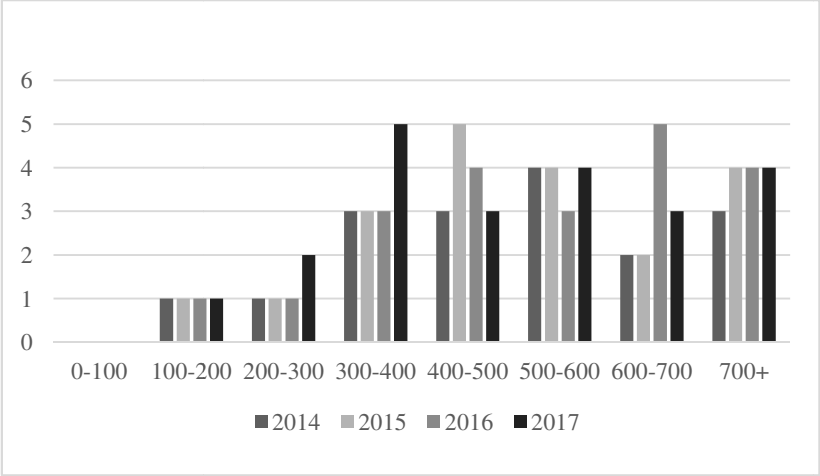
Figure 3 shows the dynamics in the number of Russian universities in the QS rankings.



Composed by the authors based on the QS World University Rankings.

Figure 3 – The number of Russian universities participating in Project 5-100

The analysis showed that by 2020 26 participating universities will be included in the QS rankings. Note that in the context of Project 5-100-2020 a goal has been set that 5 universities of Russia are to be introduced in the top-100 of the QS rankings. In order to see if Russian universities can enter the top-100, let us look into the distribution of Russian universities in the rankings for the period of 2014-2017 (Figure 4).



Composed by the authors based on the QS World University Rankings.

Figure 4 – Distribution of Russian universities in the QS rankings in the period form 2014 to 2017.

One university – Lomonosov Moscow State University – entered group "100-200" in the period from 2014 to 2017. It demonstrated consequent approaching of its positions to the top-100 of the rankings. In group "200-300", the number of universities remained the same throughout the examined period (1 university). The year 2017 became an exception: two Russian universities got into this group. In 2014-2016 there were three universities in group "300-400" and in 2017 the number reached five. Group "500-600" included 4 Russian universities. In 2016 there was a reduction in the group by one Russian

university, but as early as in 2017, the situation recovered. Group "600-700" included 2 universities in the period 2014-2015. In 2016 the number of universities increased to 5. However, as early as in 2017, the number of universities reduced to three. In group "700+" the number of universities was 3 in 2014. In the period 2015-2017, the number increased up to four universities. On the basis of the carried out analysis, it can be concluded that according to the revealed dynamics 1 university, at most, can get into the top-10 of the best universities of the world in the QS rankings.

The results of the effectiveness analysis in terms of performance to plan showed that:
1. The number of Russian universities in the top-100 of the QS rankings is equal to zero as of today. By looking into the dynamics of change in the positions of Russian universities in the rankings, it can be concluded that the goals and objectives of Project 5-100-2020 are not achievable in case the other conditions remain the same.
2. The projection of the number of universities in the period until 2020 showed that by this period about 26 universities will be included in the QS rankings.
Thus, the conducted analysis demonstrates the inadequacy of the planned indicators and, correspondingly, that of the goals and objectives set as part of Project 5-100-2020.

3) Comparative effectiveness.

In order to conduct a comparative analysis in the context of this research, it is necessary to compare the current position of Russian universities in the QS rankings to the universities which have positions in the top-100. The comparison results of universities by key indicators of the QS rankings are presented in Figure 5.

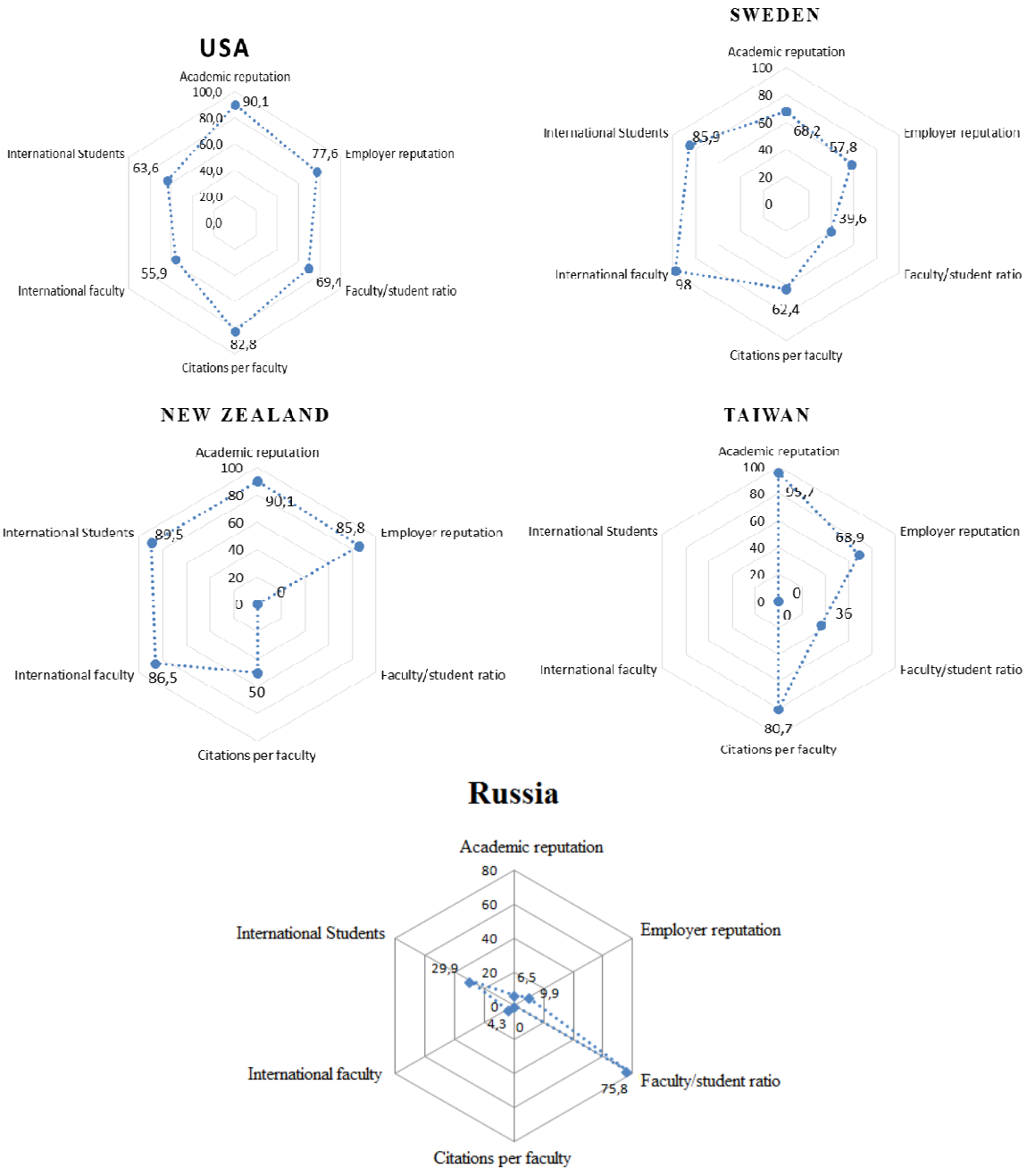
It is seen from the analyzed data that the biggest value in the rankings of Russian universities falls at "faculty/student ratio", which is 75.8 (the calculation methodology is presented in detail on the QS World University Rankings website. The lowest value was achieved by Russian universities by the value of such indicators as "citations by faculty" and "international faculty ratio". The "faculty/student ratio" is the main indicator for Russia allowing being included in the QS rankings. In 2015 the RF Government passed a Decree regulating the faculty/student ratio in educational institutions. According to the Decree one teacher must be accounted for 6 full-time students, or eight part-time students, or twelve students of a correspondence course. As a result of this Decree universities will have to reduce the number of teaching staff. Consequently, in the QS rankings Russian universities will lose their only advantage which has been obtained thanks to a high value of the key indicator "faculty/student ratio".

The results of the comparative effectiveness analysis showed that:

1. The universities in the top-100 of the rankings develop evenly and consistently each of the directions considered in estimation of their competitiveness. For example, for the US universities the lowest value of the criterion is 55.9 and the highest is 90.1. At the same time, for the Russian universities a high value is achieved only by one indicator – "Faculty/student ratio" (75.8).

2. As a result of the policy pursued in the sphere of education, Russian universities have to reduce the number of teaching staff. So, they risk losing the only indicator that has helped them occupy positions in the QS rankings.

Thus, the carried out analysis shows the imbalanced development of Russian universities by such indicators as citation, employer reputation, international faculty, international students and academic reputation. It is because of this imbalanced development that Russian universities cannot achieve the f top-100 of the QS rankings.



Composed by the authors based on the QS World University Rankings.

Figure 5 – Distribution of the key indicators of the universities included in top 100 QS in 2017, by countries

4. Cost-effectiveness.

Let us analyze the cost items in Project 5-100-2020 and make an assessment of their rational usage in order to achieve the best result.
The amount of project funding in 2013-2015 is presented in Table 2.

Table 2 – The amount of Project 5-100 funding (m rubles) in 2014-2016

Year	Participating universities	Project Office	Total
2016	10,140	349.913	10,489.913
2015	10,150	370.474	10,520.474
2014	8,700	220.771	8,920.771
Total	28,990	941.158	29,931.158

According to the data from the table, it can be concluded that from 2014 to 2016 the total amount of Project 5-100-2020 financing was almost 30 billion rubles from the funds of the federal budget.
The number of purchases of Project 5-100-2020 in 2015-2017 (until 31.05.2017) is presented in Table 3.

Table 3 – The number of purchases of Project Office 5-100-2020 in 2015-2017 (until 31.05.2017)

Item	Year					
	2015		2016		2017 (until 31.05.2017)	
	Number of purchases (pcs.)	Total amount of purchases (rubles)	Number of purchases (pcs.)	Total amount of purchases (rubles)	Number of purchases (pcs.)	Total amount of purchases (rubles)
Purchase from a single supplier	86	103,843,899	27	56,806,652	17	9,888,386
Price request in electronic format	-	-	-	-	5	1,345,630
Price request	6	4,407,763	18	13,330,009	-	-
Open tender	5	56,120,000	3	29,630,000	1	4,950,000

According to the State Purchase Portal, in the period from the year 2015 to 2017 (until 31.05.2017) Project Office 5-100-2020 held 9 open tenders. As a result of the tenders, contracts were made for the amount of 90,700,000 rubles. From 2015 – 2017 (until 31.05.2017) Project Office 5-100-2020 made a direct purchase (purchase from a single supplier). Following this purchase, contracts were made for the amount of 170,538,938 rubles. Within the years 2015 - 2016, the operator of Project Office announced price request 24 times. As a result of this procedure, contracts were made for the total amount of 17,737,772 rubles, and price request was carried in electronic format for the total amount of 1,345,630 rubles.

During analysis of the funds spent by Project Office 5-100-2020, it was registered that there were cases of inefficient and wasteful purchase operations. For example, the purchase of "Consulting the Customer on the matters of (budget) accountancy and tax book-keeping, application of tax legislation" (purchase register number No.31502592994, 31603349200). After studying the documentation, it was found out that the enterprise paid 1,100,000 rubles for the services that are already part of the chief accountant's responsibilities. The doubtful state purchases of Project Office 5-100-2020 include expensive flights, increased prices, double payments to contractors and contractors' employees - these facts suggest inefficient usage of the budget funds.

Thus, the carried out cost analysis gives evidence of the ineffectiveness and wastefulness of Project Office 5-100-2020.

Discussion

The obtained results can be used as a tool to assess educational activity funding. It can be applied in a complex effectiveness assessment, namely: in terms of necessity, in terms of performance to plan, in terms of costs, comparative assessment. The conducted assessments make it possible to define the range of problems in the sphere of education which prevent universities from developing at the international level.

Summary

When analyzing the effectiveness of the project a number of problems have been revealed. They do not allow the project to achieve the goal which was set earlier, namely:

1) regulative and legislative provision insufficiency of the Project 5-100.
It is necessary to draw up a standard form "Agreement on subsidy provision to universities for a certain period". Thanks to such a form it will be possible to make the Project 5-100-2020 university funding mechanism consistent and substantiate the given distribution of resources. It should be noted that this agreement for the universities which participated in obtaining subsidies as part of Project 5-100-2020 should consider previous outcomes of their financing. Given this aspect, for example, it can be found out that in the period 2013-2015, NRU "Higher School of Economics" was given subsidies in the amount of 2472.4 m rubles, but only rose in the QS ranking by 1 position. This fact gives evidence that the allocated funds are used inefficiently;

2) Insufficient substantiation of costs at the level of universities and weak mechanisms for cost control, no reference to results. So that a university could climb one position in the QS rankings, it needs 37 m rubles on average. It is suggested that costs should be strictly controlled and depositing mechanisms should be foreseen.

2) inconsistent and unrealistic goal-setting in the context of Project 5-100-2020
In case the QS ranking method and other conditions remain the same, about 26 universities will be included in the ranking by 2020. It has been more than 4 years since 2013 and so far no Russian university occupies a position in the top-100 of the rankings. Moscow State University, having the 108th position, is the best in the rankings. In terms of the revealed problem, some measures can be proposed to revise the set goals and objectives for this program. This aspect is related to the fact that on the basis of the forecast it is virtually impossible for Russian universities to achieve the top-100 in the rankings. So it is suggested not concentrating on funding the advancement of Russian universities in the rankings but instead on obtaining the so-called "QS stars", which reflect the degree of students' satisfaction with the quality of educational services, in particular, the quality of teaching.

4) comparative analysis revealed imbalance in the development of Russian universities by key indicators.
Actually Russian universities get into the QS rankings thanks to only one indicator – "Faculty/student ratio". This criterion has 20% share in calculation of the ranking. The criterion "Academic reputation", which accounts for 40% in the QS rankings, is 6.5 for Russian universities on average. Such criteria as "Citations per faculty" and "International faculty", which altogether amount to a quarter of the specific weight in the rankings, equal to 0.

5) inefficient and wasteful purchasing activity of Project Office 5-100-2020.
In order to exclude doubtful purchases, the following restrictions can be suggested:
– purchases made by Project Office 5-100-2020 should be correlated with the targets of the Project;

– the control process over purchases made by the Project Office must be toughened.

Thus, implementation of these measures will allow the best Russian universities to grow in the international rankings. However, it should be noted that the problem of university competitiveness on the international market is important not only for Russia, but also for the majority of European countries. This fact makes it possible to conclude that every year competition on the educational market will become fiercer, which will further complicate the advancement of Russian universities to the leading positions in the international rankings.

References:

1. Davidyuk, S.F., Davidyuk, E.P. (2017), The Russian universities in the world rankings: competition's problems, Digital economy and Industry 4.0: problems and prospects, 671-676

2. Dobrota, M., Bulajic, M., Bornmann, L., & Jeremic, V. (2016). A new approach to the QS University ranking using the composite I-distance indicator: Uncertainty and sensitivity analyses. Journal of the Association for Information Science and Technology, 67(1), 200-211.

3. Efimova, I.N., Makoveychuk, A.V. (2013), Analysis of the influence of university rankings on the motivation of prospective students in 2012: the regional aspect, Vestnik of Nizhny Novgorodsky university. N.I Lobachevskogo, 6-1, 27-34.

4. Guzikova, L.A., Plotnikova, E.V. (2014), The Positions and Prospects of the 5-100-2020 Project Participants in the International University Rankings, Teaching Methodology in Higher Education, 3, 15-27.

5. Rodionov, D.G., Rudskaia, I.A., Kushneva, O.A. (2014), The Importance of the University World Rankings in the Context of Globalization, Life Science Journal, 11 (10 SPEC. ISSUE), 442-446.

6. Rodionov, D.G., Yaluner, E.V., Kushneva, O.A. (2015), Drag Race 5-100-2020 National Program, European Journal Science and Theology, 11 (4), 199-212.

7. Rodionov D.G, Fersman, N.G., Kushneva, O.A. (2016), Russian Universities: Towards ambitious goals, International Journal of Environmental and Science Education, 11 (8), 2207-2222

8. Shin, J. C., & Toutkoushian, R. K. (2011). The past, present, and future of university rankings. In University Rankings (pp. 1-16). Springer Netherlands.

9. Vorobyeva, E.S., Krakovetskaya, I.V. (2017), Promotion of Russian universities in world competitiveness rankings: is the target close?, Creative Economy, 5 (11), 521-552.

10. Zahid, M., Ghazali, Z., & Rahman, H. U. (2017). A Step towards Sustainable University: A Case of Universiti Teknologi PETRONAS (UTP) Malaysia. Global Business and Management Research, 9(1s), 492.

11. The RF Presidential Decree as of May 7, 2012 No. 599 "On the measures for pursuit of state policy in the field of education and science"

12. QS World University Ranking. [Electronic resource]. URL: http://www.topuniversities.com/ (date of visit: 09.04.2017).

13. The RF Government Resolution as of March 17, 2015 N 234 (wording 29.06.2015) "On the faculty/student ratio in educational organizations of higher education"

14. Official website of the Single Information Purchase-Related System. [Electronic resource]. URL: http://zakupki.gov.ru/epz/main/public/home.html/ (date of visit: 09.04.2017).

Moderation of problem-focused teams

Barbara Wasilewska, Opole University of Technology, Poland, b.wasilewska@po.opole.pl

Abstract

The aim of this article is to introduce the reader to the subject of moderating employee meetings in companies. The key rules for conducting such meetings are provided. The article also gives an example of the moderation of a problem-based team dealing with industrial practices. This case study is based on a number of methods that stimulate creativity.

Keywords: moderating, team, creativity, case study.

Introduction

The effective moderation of a team is beneficial to all the cooperating parties. An appropriate moderation can encourage innovative solutions, motivate the employees to undertake actions and develop their skills, and allow the team's work to be planned. A moderator should therefore be carefully selected to suit a given problem within a company. Moderators are frequently experts (advisers) in their fields. Their main tasks include:

- Directing the discussion;
- Ensuring that the meeting progresses correctly;
- Using creative competences (knowledge, skills and attitudes);
- Providing the necessary tools, methods, techniques and procedures.

Whether or not the moderator will be selected from within the company or hired externally depends on the additional requirements and needs related to the problem at hand, i.e. the complexity of the problem, the need for objectivity, duration of the meeting, particular talents, etc. A creative session that is conducted with a team that has a changing composition should be moderated by an externally-hired moderator; whereas a team with a permanent composition should usually be moderated by an internal employee.

A problem-focused team generally consists of 5–12 employees from the same department who meet for a few hours every week in order to discuss ways to increase the quality and efficiency of their work and improve their working conditions (Mulvey, Veiga, Elsass, 1996; Shonk, 1992; Verespej, 1992). Problem-based teams are one of the five most common types of working teams in companies (Robbins, DeCenzo, 2002). Figure 1 shows a problem-focused team in which all the members are asked to address a problem by sharing ideas and suggesting improvements.

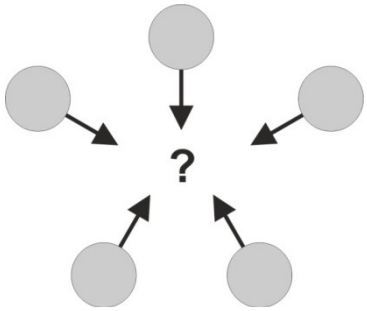


Fig. 1. Problem-focused team

To a large extent, the moderation can be planned in advance. However, the proceedings that occur prior to the actual moderation are vitally important. Before the planned meeting, its procedures should be agreed upon. The moderator should take into account all the reported expectations related to the problem and the arrangements regarding his or her role, and then adjust his or her own tools and methods accordingly. This will position the moderator within the dimensions of the problem in such a way that the team can focus on addressing the crux of the problem, while the moderator takes care of the meeting procedures. In a similar vein, in a study (Chybicka, 2006) that addressed the issue of directing the team-thinking process, the author translated exercises that would prepare the employees for creative work, group norms and creative thinking techniques into theoretical constructs, and described the effect of these constructs on a person's cognitive structure. Appropriately selected working techniques will frequently determine the successfulness of a team meeting, strategic workshop, decision-making session and a problem-solving session (Heidtman, Piasecki, 2017). The case study presented in this article was conducted by an external moderator who specialises in communication tools and methods for creative problem solving. The types of teams that have been moderated to date include (Karlińska, Knosala, 2013; Wasilewska, Knosala, 2014a; Wasilewska, Knosala, 2014b):

- Mixed teams composed of the representatives of different departments that were affected by the problem;
- Project-focused teams;
- Synectics teams.

It has been established that every type of team mentioned above requires different skills, knowledge and methods. This shows that the task of the moderator is specific to each case; although on the other hand, the basic stages of the employee meetings remain unchanged.

1. Stages of the moderation of a problem-focused team

Every process of the moderation can be divided into several common stages (CEO, 2012):
Starting phase (a discussion is initiated):

- The subject and schedule of the meeting is explained;
- Conditions are created for the participants to become familiar with one another (getting to know one another's role in the company);
- A method that will motivate the team to undertake an action is proposed.

Discussion development phase consisting of:

- Displays of interest;
- Free exchanges of opinions;
- Monitoring of the schedule and main subject;
- Paraphrasing of tasks and questions.

Ending phase (summary):

- A decision to conclude the discussion is made;
- Feedback is provided;
- Thanking one's fellow participants and goodbyes.

At every stage of the moderation, communication tools are used to motivate silent or unengaged persons to speak up. The questions should sometimes be directed to a specific person, and at other times to the entire group. The moderator can also use his or her tone of voice and gestures to direct the group's attention to key information and subjects.

The basic stages of the moderation involve the moderator's communication skills. Next, the tools and methods to be used for working with the team should be established. This comes before the main stage of the moderation. For example, in the studied moderation, the company had the following expectations in this regard:

- Workshops should be conducted that would improve the team's effectiveness (i.e. their cooperation and mutual expectations), and that would establish the roles within the team (each employee's role and the relationship between the employee and his/her department);
- Responsibilities should be established with respect to three ongoing projects, including: the owner of the recipe, the team's participation in the manufacturing tests (requiring at least three inspections), and the scope of the duties and their effectiveness;
- Support in determining the manufacturing capacity of the company with regard to the market and in determining the employees' attitudes toward the client;
- A formal framework for cooperation within the new team should be established.

The company and the moderator agreed that the moderator would:

- Organise a meeting and define its aim and working style;
- Prepare methods for stimulating the team's creativity;
- Initiate the discussion (control the group dynamics);
- Ensure the correct interactions;
- Provide further motivation during any impasse;
- Conduct an analysis and summary.

2. Example of a team moderation

The example provided in this article concerns the moderation of a team built up from two departments: the Product Development Department (PD) and the Manufacturing Department (C2). Previously, both departments worked independently from each other, and the moderated meeting was to constitute the first stage of building a permanent team. The tasks were undertaken during a meeting between the employees of a company that was responsible for manufacturing baby and child foods, and involved determining the capacity of the production line and developing a method for the cooperation between the departments. Methods that would support the moderation were suggested alongside these tasks. The representatives of each department were informed about the structure of the meeting, and a total of 11 persons worked on the tasks.

2.1. Task 1: Determine the possibilities of the production line

The moderator divided this task into three parts: overview of the production line structure; overview of its possibilities; and suggestions for changes. Table 1 describes the methods applied in the context of the problem.

Who: The Product Development Department (PD) and Manufacturing Department (C2).
Task 1: Determine the possibilities of the production line.

Suggested methods:

1. Establishing the structure of the production line: Terminology base (terminology map) (Buzan, 2005).

***2. Possibilities*:**

- Semantic analysis (Antoszkiewicz, 1992),
- Six Thinking Hats (de Bono, 1990),
- Crushing (Antoszkiewicz, 1992).

3. Changes:

- Creative assessment (Proctor, 2010),
- Generative Metaphor (Nęcka, 1994).

Table 1. Stages of the moderation and the methods applied

Stage of the moderation	Methods applied
Establishing the production line structure	Terminology base (terminology map): Do all members of the double-department team understand the problem in the same way? Is the terminology related to the process comprehensible?
Possibilities	Semantic analysis: The meanings of words are analysed to deepen the understanding of many complex problems or to discover a surprising relationship between the objects and problems or sub-problems. Six Thinking Hats method: The method involves using six different modes of thinking, which allows everyone to become familiar with various points of view and changes the team's outlook. Crushing: The team looks for disadvantages and solutions to each problem. This allows the team to establish what they know, what information they are missing, and who to ask for support (e.g. an expert or a layperson).
Changes	Creative assessment: The ideas are assessed according to the two criteria of finances and time. Generative Metaphor: A metaphor is established that will motivate the team to search for solutions.

Suggestions for solutions and the course of those solutions

Thanks to the application of the terminology base, the team was able to delineate the structure of the production line, define the most important terms and determine the crucial relationships

between those terms. This knowledge was shared by the workers in C2 and was complemented by the PD with an inventory overview. Next, the meaning of the word *possibility* was considered through a semantic analysis. The following synonyms were proposed: perspective, eventuality, opportunity, ability and permissibility. Thus, *possibility* was found to have many different meanings. However, exploring these meanings enabled a discussion about what eventualities the team could expect, whether the team was looking for innovations or minor improvements, what would be permissible and what the team was capable of. The team evaluated the production possibilities as extensive, which allowed for a greater degree of experimentation. Some of the team members suggested minor improvements, such as cleaning the machines in the middle of the week rather than once a week. Other team members suggested innovations, such as removing the mesh from a roller which would allow the facility to be used for the manufacturing of fragile products. In the terms of the permissibility, the team indicated an increase in the microbiological requirements as an issue to be addressed.

Subsequently, the Six Thinking Hats method was used to explore the different perspectives among the team. The team considered how the facility's manufacturing potential could be used to create benefits for the clients. The order in which the hats were 'put on' was not pre-established: anyone who wanted to speak up could choose any hat they wanted. The red hat, which was designated as the emotional hat that involved a dominance of feelings and moods, was the most popular one. The team shared their feelings, as well as anecdotes from their friends and clients, to indicate the needs that the products should satisfy. New ideas included:

- Quick meals for two (a mother and child);
- Anti-colic baby grits with a maximally simple composition;
- A stage-based line for women (pregnancy – breastfeeding – return to pre-pregnancy condition);
- A fitness series for adults who are engaged in sport and intense training.

In addition, the team drew attention to the choice of product packaging (small size, quick to open), the additions (spices) and the colouring (themed after the seasons of the year). The team moved on to the Crushing method without any major setbacks. Flaws in the products' quality, technology and design were analysed. The aim of this analysis was to adjust the focus of the team to the ideas that would potentially be implemented. The last method, a creative assessment, allowed the team to evaluate their ideas in terms of the financial and time requirements. Figure 2 shows the agreed-upon courses of action. It was decided that the company would forgo simple, quick solutions in favour of those ideas that are time-consuming and expensive but that have greater potential and a better chance to stand out against the competition. This decision agreed with the existing trends for health-promoting products and the increased client expectations and knowledge.

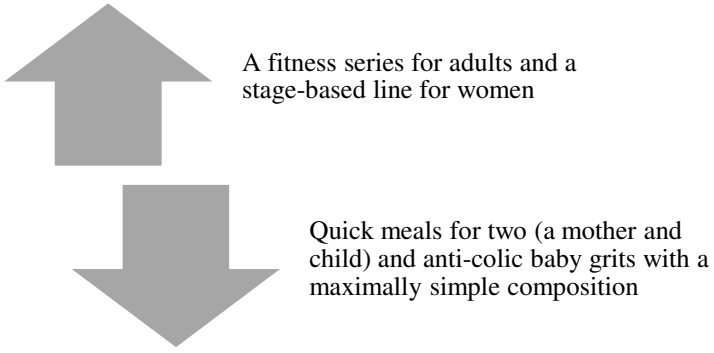


Fig. 2. Choosing ideas using the creative assessment method

The Generative Metaphor method used the metaphors of the military, education and health to promote the ideas for changes. The team indicated a number of aspects that were important for the company. The team also confirmed that the metaphors coincided with their corporate culture in terms of its rigorous procedures (military), its promotion of health education among the clients (education) and its selection of suppliers based on the company's quality policy (health).

2.2. Task 2: Determine the mode of cooperation between the two departments

The second part of the moderated creative session was divided into three parts: the mode; the actions to be undertaken; and the additional support tools. Table 2 shows an overview of the methods applied in the context of the analysed problem.
Who: PD and C2.
Task 2: Determine the mode of the cooperation between PD and C2.

Suggested methods:

1. ***Mode:***
   - Semantic analysis (Antoszkiewicz, 1992),
   - Purge (Nęcka, 1994),
   - Disney method (Noelke, 2008),
   - ALoU (Gawlik, 2001).

2. ***Actions:*** Six Shoes (de Bono, 1991).

3. ***Additional support tools:***
   - Provocation (de Bono, 2014).
   - Identification with an object (Nęcka, 1994): creative roles, i.e. the artist, the scholar and the jester;
   - Re-establishment technique (Kaufmann, Fustier and Drevet, 1975).

Table 2. Stages of the moderation and the methods applied in Task 2

Stage of moderation	Methods applied
Mode	Semantic analysis: Do all members of the double-department team understand the problem in the same way? Is the terminology related to the process comprehensible?
	Purge: Immediate ideas are discarded and the atmosphere among the employees is 'purged'.
	Disney method: Playing three different roles according to your own expectations.
	ALoU: Focus is put on the unique features of the team.
Actions	Six Shoes: Actions are chosen that are dominant in terms of the task at hand.
Additional support tools	Provocation: Theories are disputed on purpose, and situations are created that force the team to re-think the problem.
	Identification with an object: A particular role is assumed and the feelings related to it are expressed.
	Re-establishment technique: Familiar elements are reorganised without inducing changes to the functioning of the system.

Suggestions for solutions and the course of those solutions

The repeated use of a semantic analysis motivated the team to think about the meaning of the word *mode*. The following synonyms were suggested: method, algorithm, tactics and strategy. The team concluded that they needed something that would resemble an algorithm for their future course of action, i.e. they needed some permanent aspects of their cooperation. At the same time, they needed to establish different tactics so that the two departments could perform their roles together. The Purge method was used in order to allow the cooperation to begin *de novo*. Every team member criticised the previous, imperfect, relationship between the two departments and talked about ideas that could harm the cooperation. The aim of the method was to purify the atmosphere and to allow the team to be built afresh.

Next, the Disney method was used: every team member took turns assuming the role of a dreamer, a realist and a critic in order to find a mode of cooperation on their own. In this way, every participant was able to think about what they expected from the team. The Disney method helped to establish that the team members had similar needs, which was met with a great deal of surprise, as the employees had expected an argument or conflict between parties. Following this stage, the team was able to focus on three issues: the advantages of a team; the limitations of a

team and the methods for overcoming them; and the unique features (ALoU). The strengths of the cooperation were determined, where the advantages included the fact that every team member possessed different types of knowledge. However, the limitations included the time that needed to be dedicated for such meetings. The unique features (i.e. the features that made this particular team stand out among other teams) included the idea of combining departments that, at the time, had been working independently from each other, and that had viewed the same products manufactured by their company differently.

The discussion about the modes of cooperation allowed the team to develop a joint plan of action. Out of the types of shoes available in the Six Shoes method, the team chose grey sneakers and pink slippers, which helped them to establish particular guidelines. The team decided to show caring and understanding towards the members of the other department (indicated by the pink slippers), and to support each other, especially when one party lacks the knowledge about a particular scope of duties; but also to require the immediate execution of tasks, respect for each other's time and to avoid being overly demanding. Furthermore, the team decided that they would all come to the meetings prepared and (in accordance with the grey sneakers) they would gather objective information, hypotheses and theories as a preamble for their joint work.

These arrangements were complemented with additional support tools that the moderator found to be worthwhile for the completion of the task at hand. The Provocation method involved a team member who volunteered to assume the role of a provoker, i.e. someone who stimulates the team to view problems from an unusual perspective. From this point on, the same person would continue to play the provoker in any future meetings. The second support tool involved the identification with an object. The team members were asked to assume the following creative roles: an artist, a scholar or a jester. Every team member tried to establish which role suited them the most. The method was also practised through the identification of a client with a particular role. For instance, the moderator asked the team how they would interact with a client who was an artist, and what such a client would pay most attention to when buying the company's products, etc. The team suggested that the artist would not care about the price of the product, but would be more concerned about the design of the packaging. In turn, the scholar would be an educated client who makes informed decisions when buying products; while the jester would expect entertainment, gadgets and the joy that comes from having particular products. The final support tool was the re-establishment technique, which constituted a summary of the meeting. The arrangements from the meeting were written on a flip chart where both departments had to agree with every point that was written, and afterwards, each individual team member signed the flip chart. As a result, the team decided that the following re-organisation measures were required:

- A full understanding between both departments (with respect and no attempts at manipulation);
- Future 'trips' of the PD to the production hall to see the production process with their own eyes, and future trips of the C2 to the PD's design office to become familiar with their working methodology;
- Mandatory, systematic training covering the remit of the other department (to the extent required to complete a given task);
- Regular meetings;
- Coming to meetings prepared.

Thus, the problem-based team also became an interdisciplinary team. All that was left to do at this point before the arrangements for the cooperation could be implemented was to arrange the next meeting.

3. Summary

The aim of this article was to show how moderation works in practice. The moderating of employee meetings in companies requires both information and organisation. The tasks that were undertaken during the meeting used as an example concerned the possibilities of developing the company's production line and the development of a mode of cooperation between two departments. In this case, all of the parties found the moderated meeting to be satisfactory. In order to assess such a meeting, it worth considering the perspective of both the moderator and the participants. Other important considerations include the atmosphere among the employees and how the employees handle unexpected situations. Seifert (2009) lists three limitations that will affect the final results of a meeting: physical constraints, the group's efficiency, and the traits of the participants. The results may also be determined by a moderator who is equipped with the means to activate the group, such as asking the appropriate questions, applying reinforcements and signalling the transitions between the different stages (Łasiński, 2007). As various authors have pointed out (Seifert, 2009; Lenzen, 1999), skilful moderation over teams allows for the building of self-learning organisations. This indicates that moderation is a highly valuable process and is one that is needed in companies.

References

Antoszkiewicz, J. (1990) Heuristic methods. Creative problem solving, Państwowe Wydawnictwo Ekonomiczne, Warszawa.

Buzan, T. (2006) The Ultimate Book of Mind Maps. Thorsons Publishers, UK.

Centrum Edukacji Obywatelskiej (2012) 'How to effectively moderate the debate?,' [Retrieved August 17, 2017], http://www.ceo.org.pl/pl/sejmmlodziezy/news/jak-skutecznie-moderowac-debate

Chybicka, A. (2006) Psychology of group work. How to modernize creative and task teams, Oficyna Wydawnicza Impuls, Kraków.

De Bono, E. (2014) Lateral thinking, Vermilion, London.

De Bono, E. (1991) Six Action Shoes, Longman, UK.

Gawlik, W. (2001) Innovation Workshops, Unpublished material., Gliwice.

Heidtman, J., Piasecki, P. (2017) 'Workshops and moderations,' [Retrieved August 15, 2017], http://businessdoctors.pl/zespoly-wysokiej-efektywnosci/warsztaty-i-moderowanie

Karlińska, B., Knosala, R. (2013) Application of imaginative techniques to create innovative processes, Łebkowski P. (ed.), Management and production engineering, Wydawnictwo AGH, Kraków, 13–20.

Kaufmann, A., Fustier, N. and Drevet, A. (1975) Inwentyka. Methods of searching for creative solutions, Wydawnictwo Naukowo-Techniczne, Warszawa.

Łasiński, G. (2007) Solving problems in the organization. Moderation in practice, PWE, Warszawa.

Lenzen, A. (1999) Das professionelle 1 x 1 - bisherige Fachbuchausgabe: Präsentieren – Moderieren, Cornelsen Lehrbuch.

Mulvey, PW, Veiga, JF. and Elsass, PM. (1996) 'When Teammates Raise a White Flag,' *Academy of Management Executive*, 1, 40-49.

Nęcka, E. (1994) Creative Problem Solving, Oficyna Wydawnicza Impuls, Kraków.

Noelke, M. (2008) Techniques of creativity. How to come up with better ideas, Flashbook, Warszawa.

Proctor, T. (2010) Creative Problem Solving for Managers Developing Skills for Decision Making and Innovation. Routledge, London and New York.

Robbins, SP., DeCenzo, DA. (2002) Management basics, PWE, Warszawa.

Seifert, JW. (2009) Moderation und Konfliktklärung: Leitfaden zur Konfliktmoderation. Gabal Verlag, Offenbach.

Shonk, JH. (1992) Team-based organizations: developing a successful team environment, Homewood, Business One Irwin, Illinois.

Verespej, MA. (1992), 'When Workers Get New Roles,' *Industry Week*. 3 Febuary 2002, 11.

Wasilewska, B., Knosala, R. (2004a) 'Methods for stimulating creativity in production engineering,' *Management and Production Engineering Review*, 5(4), 76–84.

Wasilewska, B., Knosala, R. (2014b) Implementation of creative stimulation methods into industrial practice, Łebkowski P. (ed.), Management in the enterprise. Theory and practice. Wydawnictwo AGH, Kraków, 356–363.

Proposing a Metaphor Perspective as a Way Forward For Sustainable Supply Chain Scholarship

Victoria Stephens, University of South Wales, Treforest, U.K.,
Victoria.stephens@southwales.ac.uk

Professor Hefin Rowlands, University of South Wales, Treforest, U.K.,
hefin.rowlands@southwales.ac.uk

Abstract.

Thirty years since the Brundtland Report put sustainable development firmly on the global political agenda, three of the nine planetary boundaries which represent a safe operating space for humanity have been transgressed through anthropogenic activity (Rockstrom, 2009). While today's global supply chains represent key arenas for environmental degradation, they also represent a field of opportunity for the achievement of sustainability. Thus, it is encouraging to see that a field of 'sustainable supply chain' (SSC) scholarship is experiencing geometric growth (Fahimnia et al, 2015). However, some have recently suggested that dominant assumptions within SSC scholarship have led to the prioritisation of economic goals over environmental or social protection, leading to a focus on managing supply chains to do 'less bad', rather than do 'more good' (Markman and Krause, 2016). Considering the reality of ecological transgressions and its social implications, this is no longer sufficient. Calls are therefore being heard for the need to 'think differently' about supply chains so that they may effectively contribute to the pressing goals of sustainable development. This working paper responds to those calls. It aims to propose the value of the metaphor perspective for: 1) helping to further explicate the problem, and 2) addressing the problem.

Keywords: Sustainability, Sustainable supply chain, Metaphor.

Introduction.

'It is difficult…to walk by a newsstand without seeing at least one magazine cover featuring alternative sources of energy, climate change issues or the iconic polar bear floating on a thin sheet of ice' (Carter and Easton, 2011, p.46).

The words of Carter and Easton (2011, above) paint a vivid picture of the place of 'sustainability' in twenty-first century society. Popular statements of anthropogenic impacts on the natural environment – such as global warming caused by industrial pollution or the destruction of natural habitats due to intense timber logging (Lele, 2013) - underpin a call for environmental protection that few now dispute.

Sustainability has therefore become an almost ubiquitous concept that permeates aspects of social, political and economic life (Redclift, 2005). It is most often characterised by reference to the 1987 report of the World Commission on Environment and Development, colloquially known as the Brundtland Report (WCED, 1987), which remains the most often cited source on the topic (Quental, 2011)[i]. It defined sustainable development as 'development which meets the needs of the present without compromising the ability of future generations to meet their needs' (WCED, 1987, p.8) and has been praised for having placed recognition of the dependencies between environmental and socio-economic issues on the global political agenda (Sneddon et al, 2008).

However, 2017 marks the 30th anniversary of the Brundtland Report's publication and despite widespread acceptance of the issues, alongside profound advancement regarding knowledge and technological capabilities (Lele, 2013), natural scientists have suggested that the environmental crisis is actually worsening (Rockstrom, 2009). A Swedish study has suggested that the safe operating limits of three of nine key environmental systems – relating to carbon dioxide, biodiversity loss and the nitrogen cycle - have already been transgressed (Rockstrom, 2009). The challenge of sustainable development therefore remains firmly atop the academic research agenda across multiple disciplines, from the natural to the social sciences.

Sustainable supply chain management (SSCM) has thus emerged as an important field of research. The effects of globalisation have interacted with management trends towards vertical disintegration leading to long and complex inter-organisational chains of supply and demand (Chen and Paulraj, 2004). Matthews et al (2016) have articulated the important place of supply chain management in sustainable development research highlighting that while supply chains. On the one hand they play a significant role in environmental degradation due to for example, the impact on carbon emissions of transport or network design decisions (Carter and Rogers, 2008). On the other hand, they also represent great opportunity for achieving the change required for sustainable development, for example by the responsible exploitation of power by supply chain leaders to instigate change within expansive and globe-spanning networks of organisations. However, the authors also suggest that dominant trends within sustainable supply chain scholarship have failed to provide adequate theoretical explanation for how supply chains can contribute to the challenge of 'returning the political-economic system from a state of ecological overshoot' (Matthews et al, 2016, p.83).

In this context, the present working paper sits at the juncture of sustainable supply chain scholarship and the metaphor perspective. It aims to propose the value of the metaphor perspective as a means by which to firstly, explicate and secondly, address the problems recently identified by SSCM scholars – a proposition, which to the author's knowledge has not previously been offered. In order to achieve the aim of this paper, the paper will first articulate the broad 'problem' in terms of key, reflexive SSCM literature through which issues have been highlighted. Secondly, it will introduce and defend the relevance of the metaphor perspective as a source of explication of the problem through exposing metaphoric enablers, as well as a potential solution through its facilitation of 'disciplined imagination' (Weick, 1989) for a new theory of sustainable supply chain.

The 'problem'.

The notion that environmental and social imperatives are not at odds with traditional economic goals of the firm has arguably been an important driver in the acceptance and continued pursuit of sustainable supply chain management (SSCM) practices (Walker and Jones, 2012). The logic of cost reductions associated with environmentally and socially responsible behaviour (such as reduced waste or reduced number of employee sick days) is longstanding in nineteenth and twentieth century industrial discourse (Desrochers, 2009). Porter and van der Linde (1995) suggested that the productive use of resources (physical or human) is essential for competitiveness in the modern context of globalisation and for environmental progress in a world of rapidly expanding population. Porter and Kramer (2011) have promoted a concept of 'shared value', contending that corporations should not consider sustainability issues an add-on to day-to-day business pursuits, but rather as a strategic opportunity for building business models around essential solutions to society's problems thus assuring competitive advantage. Illustrating this perspective in SSCM literature, Carter and Rogers (2008) used Elkington's (1994) triple bottom line conceptualisation of corporate sustainability as the foundation for their conceptual framework for SSCM. In their framework, sustainable supply chain activities sit at the intersection of three equally sized circles (representing each of the three dimensions) on the assumption that sustainability in the supply chain similarly constitutes win-win-win[ii] solutions (FIG 1). Shrivastava (2007, p.54) perhaps

crystallised the argument in declaring that sustainability 'is not just about being environmentally friendly; it is about good business sense and higher profits.'

Criticism of such win-win framing of sustainability in supply chain management however is beginning to emerge. While such framing assumes a theoretical balance between each of the three dimensions of sustainability, the practical reality of essential trade-offs between environmental, social and economic performance has been seen to have led to the prioritisation of economic over the environmental or social dimensions (Montabon et al, 2016; Markman and Krause, 2016). This suggestion may be seen reflected in wider observations of trends within SSC research output, such as the predominant concern with the question of whether or not sustainability 'pays' (Golicic and Smith, 2013), the proportional attention given to researching the environmental dimension (which may be seen as presenting more measurable economic benefits) over the social dimension of sustainable supply chain (Ashby et al, 2012), alongside Carter and Rogers' (2008) explicit questioning of the value of activities which do not explicitly address economic supply chain goals. The three ring model which intersects three circles representing the three dimensions offers a diagrammatic depiction of this win-win framing has thus received much criticism (Giddings et al, 2002; Griggs, 2013; Montabon et al, 2016) (FIG 1)

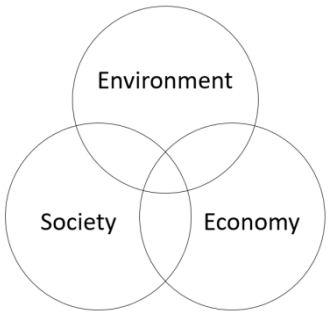


FIG 1. Common three ring model of sustainability.

To some minds, such win-win framing have led scholars and practitioners to seek mere amendments to supply chain management so as to do less harm (to be less unsustainable) rather than to do good (to be truly sustainable) (Pagell and Wu, 2009; Markman and Krause, 2016). This is reflected in Pagell and Wu's (2009) observation of a tendency to explore how existing supply chain 'best practice' can serve sustainability requirements. For example, studies have suggested that existing practises such as lean and total quality management (TQM) are congruent with the aims of sustainability because they endorse orientations towards more effective use of natural resources through the elimination of waste in supply chain processes (Simpson and Power, 2005; Dues et al, 2013). While this may be pragmatically considered as 'better than nothing', Pagell and Wu (2009) ultimately concur with Markman and Krause (2016) in suggesting that it does not prioritise the sustainability goal of environmental improvement to the extent of reversing significant ecological transgressions which currently risk the safety of future generations (Matthews et al, 2016). Pagell and Wu (2009, p.39) even suggest that such efforts towards win-win activity promote incremental improvement which may actually delay or prevent the more radical change that is required to become 'truly' sustainable. Indeed, Pagell et al (2010) have explored the suggestion that truly sustainable supply chain practise requires a fundamental reconceptualization of traditional supply chain practises. They showed that Kraljic's well-known portfolio matrix may in fact need re-thinking in a sustainability context. Reflecting wider disciplinary perspectives (e.g. Barbier, 1987) there is thus a growing acceptance within SSC discourse that trade-offs are an inevitable and essential feature of sustainability and therefore must be accommodated within supply chain management theory.

Common amongst these authors' reflections on the suitability of existing supply chain management practices and assumptions is the need to think differently about supply chains and their management (Pagell et al, 2010; Pagell and Shevchenko, 2014) in a way which puts ecological performance front and centre in supply chain scholarship (Markman and Krause, 2016; Matthews et al, 2016). Reflecting longstanding observations in organisational management and sustainable development research (Shrivastava, 1994, 1998; Gladwin et al, 1995; Daly 1996), Montabon et al (2016) have called for the replacement of the economically dominant logic in supply chain research with an ecologically dominant logic which prioritises ecological health over what is good for the firm or chain. Markman and Krause (2016, p.4) similarly conceptualised a new definition of 'sustainable practices' to prioritise the three dimensions 'whereby the environment comes first, society second, and economics third.' Montabon et al (2016) provided an example of a lighting fixture manufacturer which made the decision to source a particular component of their product – basic metal stampings which required low skill and simple equipment and thus could be sourced cheaply from overseas – in the high wage setting of the United States supply market because they prioritised the risk to the environment over the cost of their production. Such an approach has therefore been reflected in an alternative diagram of three nested circles which foregounds the environment by embedding the economic dimension within society, which is subsequently embedded within, and ultimately dependent upon, the natural environment (Giddings et al, 2002; Montabon et al, 2016) (FIG 2).

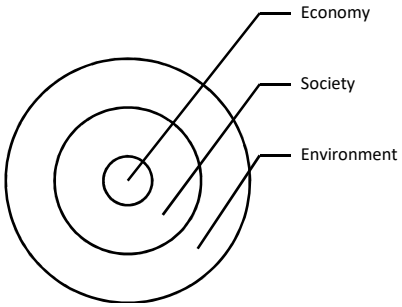


FIG 2. Nested model of sustainability.

Taking the words of Gladwin et al (1995, p.899), recent SSC literature seems to suggest that the problem for future SSC scholarship is the achievement of a 'new mind' among supply chain scholars and practitioners which is 'appropriate for a sustainable world': a new mind which accepts SSCM as more than simply a sub-set of SCM (Pagell and Shevchenko, 2014); which puts the natural environment at the top of the list of stakeholders (Montabon et al, 2016; Markman and Krause, 2016) and which seeks an answer for how supply chains can protect the environment for future generations (Matthews et al, 2016). Suggestions for achieving the change required have included calls for the adoption of alternative theoretical lenses (Touboulic and Walker, 2015) beyond the traditional sites of theoretical adoption such as economics. Matthews et al (2016) therefore proposes paradox theory as a means by which to address the tensions and complexity that are inherent within the essentially contested concept of sustainability (Connelly, 2007). However, the present author proposes that the achievement of a 'new mind' for SSC scholars must recognise the fundamentally constitutive nature of language in social construction, and therefore supply chain thought and action (Alvesson and Karremann, 2000).

A 'solution'? Proposing the metaphor perspective.

Popularly understood as stylistic devices, metaphors are more commonly associated with the work of Shakespeare than of scientists. Pinder and Bourgeois (1982) argued that if 'science' is about developing an accurate and literal description of physical reality, then what place is there for such figurative language

as metaphor (Grant and Oswick, 1996)? For educationalists, such a place for metaphor has been secured in terms of metaphor's ability to aid understanding of a relatively unfamiliar concept (in metaphoric terms, the target domain) through its comparison with a more familiar one (the source domain) - to compare an atom to a solar system is a classic example of the enlightening function of metaphor for students who are new to the field of physical sciences (Inns, 2002). 'Supply chain' and 'sustainability' may similarly be considered complex, intangible concepts which have benefitted from metaphorical explanation. In supply chain literature, the drum-and-rope buffer metaphor has been used to illustrate the abstract theory of constraints (Goldratt and Cox, 1984) and Earth as a greenhouse is a popular metaphor which illustrates the scientific principles of global warming (Romaine, 1996).

However, in recent decades, organisational and management studies' adoption of metaphor has reflected a theoretical perspective on the metaphorical nature of the human conceptual system (Lakoff and Johnson, 1980; Lakoff, 1993). In their seminal work, Lakoff and Johnson (1980) argued that our everyday behaviour reflects our metaphorical understanding of experience. More than simply a useful tool for education or a literary flutter, metaphors in fact shape and frame our thoughts and action (Lakoff and Johnson, 1980). Adopted within organisational studies by Gareth Morgan (1980, 1986), Morgan (1986) highlighted the paradoxical, liberating and dangerous nature of metaphor in organisational studies: offering a way of both 'seeing' and 'not seeing', they have the effect of both constraining and liberating new perspectives on organisational management (Jermier and Forbes, 2012).

In light of the multi-faceted nature of metaphor and the challenges in SSC scholarship outlined above, the author therefore proposes a metaphor perspective to firstly, further explicate the 'problem' through investigating the metaphoric enablers of such dominant SSC assumptions, and secondly, addressing the problem in terms of its potential for liberating new theoretical perspectives through new metaphors for sustainable supply chains. These propositions will be elaborated upon in turn.

Metaphors we die by.

Schoeneborn et al (2012) observe the irony of metaphor: it is the utility and success of metaphor in aiding comprehension of complex concepts that leads to their status as 'metaphors we live by' (Lakoff and Johnson, 1980), that is, metaphors which have become taken-for-granted as literal descriptions of concrete things. Organisational concepts such as 'customer' and 'market', 'teams' and 'strategy' have themselves become terms that are now used literally with little (if any) conscious recognition of their metaphorical origins (Peattie, 2004, Tsoukas, 1991) – they have become 'dead' metaphors. While some authors see dead metaphors simply as irrelevant, having lost their heuristic value (Black, 1979; Schoeneborn et al, 2016), others interpret deadness as dangerous normalisation that leads to false consciousness and the legitimation of certain actions over others (Tietze et al, 2003). The pervasiveness of the 'organisation as machine' and 'organisation as organism' metaphors are important examples in this regard. Despite Morgan (1986) famously proposing six alternative metaphors for organisation, Cornelissen (2005) found that organism and machine remain the dominant root metaphors in organisational science. Morgan (2006, p.13) thus decried the tenacity and familiarity of these metaphors as having now become taken for granted as second nature.

For the prospects of sustainability, this has been a cause for concern. A number of studies have suggested that such metaphors are incongruent with the requirements of sustainable development (Barter and Russell, 2013; Audebrand, 2010). Barter and Russell (2013) argue organism and machine metaphors for organisation have had the effect of de-humanising the biological creatures (humans) of which organisations are composed. Through these metaphors, humans have become mere functional components of the organisation, perpetuating an orgocentric view which, they argue, is fundamentally at odds with the interweaving of nature and humanity represented by sustainable development. Similarly, in the context of strategic management education, Audebrand (2010) argued that the requirements of sustainable development necessitated a re-appraisal of the root metaphor of 'strategy is war'. As a source

domain through which students reason about strategy, war prioritises adversarial relationships that undermine the collaboration required for sustainability.

Given the simultaneously damaging and protecting potential of global supply chains, there is considered value in critically reflecting on the metaphors that are currently used to reason about supply chains, supply chain management and sustainability. This is considered congruent with recent empirical and conceptual work which has suggested that traditional notions of power in supply chains are increasingly unsustainable (e.g. Pagell and Wu, 2009; Pagell et al 2010; New, 2015). The metaphor perspective may therefore help to further deconstruct embedded assumptions and expose metaphoric enablers of such assumptions (Inns, 2002). It is considered valuable to ask, what are the key metaphors through which scholars reason about supply chains and sustainability? And, what effect do such metaphors have on supply chain approaches to sustainable development? SSC scholars have suggested existing supply chain theory based on dominant win-win assumptions have failed to explain how sustainable SCM leads to the environmental improvement required for sustainable development. On the basis of the metaphor perspective therefore, it may be argued that if we don't change the supply chain metaphors we live by, they may well become the metaphors we die by (Norgaard, 1995; Romaine, 1996).

Metaphors we live by.

If the metaphor perspective supports a critical evaluation of the metaphors that are currently used to reason about supply chain in the context of sustainable development, it paradoxically also offers potential for liberating new perspectives on supply chain that may be more appropriate for the task of achieving sustainability. Through applying novel source domains to established target domains (such as supply chain), live metaphors are tools for what Morgan (1986) calls imaginization– creative thinking that can lead to theory-building. For example, since the publication of Morgan's seminal work, an extensive list of suggestions of alternative metaphors for organisation have been proposed within multivariate efforts at theory building. Organisations have been explored as spider plants, clouds and songs, and theatre (Tietze et al, 2003). More recently, Schoeneborn et al (2012) proposed the metaphor of insomnia to better explain inadequacies in organisational learning.

Akin to their educational value in making an unfamiliar concept more familiar to a student new to the field, so too can a new metaphor help a seasoned supply chain researcher see the supply chain from a 'different angle' (Inns, 2002). In this regard, organisational science has emphasised the potential of metaphor for facilitating 'disciplined imagination' (Weick, 1989) for the purposes of theory development (Cornelissen, 2005, 2006). Therefore according to Grant and Oswick (1996), the perspective of Pinder and Bourgeois (1982) which argued the need to 'purge' metaphor from scientific discourse simply reflect a non-constructivist perspective which prioritises theory testing over theory development. Weick's (1989) perspective meanwhile asserts that there is a greater chance of higher quality theory to emerge from a theorising process which begins with greater variety.

Foropon and McLachlin (2016) and Chen et al (2013) support the potential of theory-constitutive metaphors within the supply chain field, however, it has not yet been suggested in the context of SSC scholarship. Matthews et al (2016) have called for a conscious process-approach to theorising in SSC scholarship to develop normative as well as explanatory theory. It is proposed that the experimentation potential offered by metaphor (albeit accompanied by rigorous expectations of robustness that have been well discussed elsewhere e.g. Cornelissen, 2006) supports the charge for creatively considering how supply chains *should be* managed, instead of simply reflecting (and potentially artificially legitimating) ways in which supply chains currently are managed for sustainability (Matthews et al, 2016). This may be considered particularly pertinent in light of critical perspectives which emphasise corporate misappropriation of sustainability concepts for corporate gain (Springett, 2013; Milne et al, 2016). The challenge of achieving sustainable development may be encouraged by the opportunity to search for new

metaphors for supply chains which protect the environment for present and future generations and not just the economic performance of the chain – that is, metaphors we can in fact live by (Romaine, 1996).

Conclusion

The aim of the paper was to propose the value of the metaphor perspective as a means by which to explicate and address the problems recently identified in SSC scholarship. These problems relate to the dominance of particular economically dominant assumptions about supply chain and sustainability which are considered inadequate for the requirements of sustainable development. On the basis of the metaphorical nature of reasoning, it has been proposed that systematic analysis of the metaphors through which scholars reason about supply chain might help to deconstruct embedded assumptions in SSC scholarship by exposing their metaphoric enablers. Secondly, it has also been proposed that alongside its use in organisational and supply chain literature, the metaphor perspective constitutes a valuable approach to experimenting with new metaphors as a precursor to new theory for sustainable supply chains and their management.

[i] There are protracted debates on the relative uses and critical implications of the terms 'sustainability' and 'sustainable development' (see for example, Banerjee, 2003) however this is considered secondary for present purposes and the terms are therefore here used synonymously.

[ii] 'Win-win-win' solutions will henceforth be referred to as 'win-win' for brevity.

References.

Alvesson, M. and Karreman, D. (2000), 'Varieties of discourse: On the study of organizations through discourse analysis', *Human Relations*, 53(9), pp.1125-1149

Ashby, A., Leat, M. and Hudson-Smith, M. (2012), 'Making connections: a review of supply chain management and sustainability literature', *Supply Chain Management: An International Journal,* 17(5), pp.497-516.

Audebrand, L.K. (2010), 'Sustainability in Strategic Management Education: The Quest for New Root Metaphors', *Academy of Management Learning and Education*, 9(3), pp.413-428

Banerjee, S. B. (2003), 'Who Sustains Whose Development? Sustainable Development and the Reinvention of Nature', *Organization Studies*, 24(1), pp.143–80.

Barbier. E. B. (1987), 'The Concept of Sustainable Economic Development', *Environmental Conservation*, 14, pp.101–110.

Barter, N. and Russell, S. (2013), 'Organisational metaphors and sustainable development: enabling or inhibiting?', *Sustainability Accounting, Management and Policy Journal*, 4(2), pp.145-162

Black, M. (1979), 'More about Metaphor', in Ortony, A. (1979) (ed.) *Metaphor and Thought*, Cambridge: Cambridge University Press, pp.19-45

Carter, C, and Rogers, D. (2008), 'A framework of sustainable supply chain management: moving toward new theory', *International Journal of Physical Distribution and Logistics Management*, 38(5), pp. 360-387.

Carter, C. and Easton, L. (2011), 'Sustainable supply chain management: evolution and future directions', *International Journal Of Physical Distribution & Logistics Management*, 41(1), pp. 46-62.

Chen, I.J. and Paulraj, A. (2004), 'Understanding supply chain management: critical research and a theoretical framework', *International Journal of Production Research,* 42(1), pp.131–163.

Chen, Y.S., Rungtusanatham, M.J. Goldstein, S.M. and Koerner, A.F. (2013), 'Theorizing through metaphorical transfer in OM/SCM research: Divorce as a metaphor for strategic buyer-supplier relationship', *Journal of Operations Management*, 31, pp.579-586

Connelly, S. (2007), 'Mapping Sustainable Development as a Contested Concept', *Local Environment*, 12(3), pp.259-278

Cornelissen, J.P. (2005), 'Beyond Compare: Metaphor in Organisation Theory', *Academy of Management Review*, 30(4), pp.751-764

Cornelissen, J.P. (2006), 'Making sense of theory construction: metaphor and disciplined imagination', *Organisation Studies*, 27(11), pp.1579-1597

Daly, H.E. (1996), 'Toward some operational principles of sustainable development', *Ecological Economics*, 2, pp.1-6

Desrochers, P. (2009), 'Victoria Pioneers of Corporate Sustainability', *Business History Review*, 83, p.703-729

Dues, C.M., Tan, K.H. and Lim, M.K. (2013), 'Green as the new Lean: How to use Lean practices as a catalyst to greening your supply chain', *Journal of Cleaner Production*, 40, pp.93-100

Elkington, J. (1994), 'Towards the Sustainable Corporation: Win-Win-Win Business Strategies for Sustainable Development', *California Management Review*, pp.90-100

Fahimnia, B., Sarkis, J. and Davarzani, H. (2015), 'Green supply chain management: A review and bibliometric analysis', *International Journal of Production Economics*, 162, pp.101-114

Foropon,C. and McLachlin, R. (2013), 'Metaphors in operations management theory building', *International Journal of Operations and Production Management*, 33(2), pp.181-196

Giddings, B., Hopwood, B. and O'Brien, G. (2002), 'Environment, Economy and Society: Fitting Them Together into Sustainable Development', *Sustainable Development*, 10, pp.187-196

Gladwin, T.N., Krause, T., Kennelly, J.J. (1995), 'Beyond eco-efficiency: Towards Socially Sustainable Business', *Sustainable Development*, 3, pp.35-43.

Goldratt, E.M. and Cox, J. (1984), *The Goal: An Ongoing Improvement Process*, Gower, Aldershot.

Golicic, S. and Smith, C. (2013), 'A Meta-Analysis of Environmentally Sustainable Supply Chain Management Practices and Firm Performance', *Journal of Supply Chain Management*, 49(2) pp. 78-95.

Grant, D. and Oswick, C. (ed.) (1996), *Metaphor and Organizations,* London: Sage Publications.

Griggs, D. (2013), 'Sustainable development goals for people and planet', *Nature*, 495, pp.305-307

Inns, D. (2002), 'Metaphor in the Literature of Organizational Analysis: A Preliminary Taxonomy and a Glimpse at a Humanities-based Perspective', *Organization Articles*, 9(2), pp.305-330

Jermier, J.M. and Forbes, L.C. (2012), 'Metaphor as the Foundation of Organizational Studies: Images of Organization and Beyond', *Organization and Environment*, 24(4), pp.444-458.

Lakoff, G. (1993) 'Contemporary theory of metaphor' in Ortony, A. (ed.) *Metaphor and Thought*, Cambridge: Cambridge University Press, (2nd ed)

Lakoff, G. and Johnson, M. (1980), *Metaphors We Live By*, Chicago: University of Chicago Press

Lele, S. (2013), 'Rethinking Sustainable Development', *Current History*, p.311-316

Markman, G.D. and Krause, D. (2016), 'Theory building surrounding sustainable supply chain management: assessing what we know, exploring where to go', *Journal of Supply Chain Management*, 52(2), pp.3-10

Matthews, L., Power, D., Touboulic, A. and Marques, L. (2016), 'Building Bridges: Toward Alternative Theory of Sustainable Supply Chain Management', *Journal of Supply Chain Management,* 52, pp.82–94.

Milne, M.J., Kearins, K and Walton, S. (2016) 'Creating Adventures in Wonderland: The Journey Metaphor and Environmental Sustainability', *Organization Articles*, 13(6), pp.801-839.

Montabon, F., Pagell, M. and Wu, Z (2016), 'Making sustainability sustainable', *Journal of Supply Chain Management*, 52(2), pp.11-27

Morgan, G. (1980), 'Paradigms, Metaphors and Puzzle Solving in Organisation Theory', *Administrative Science Quarterly*, 25(4), pp.605-622

Morgan, G. (1986) *Images of Organization*, Sage: London

Morgan, G. (1993), *Imagination. The Art of Creative Management*, London: Sage

New, S.J. (2015), 'Modern slavery and the supply chain: the limits of corporate social responsibility?', *Supply Chain Management: An International Journal*, 20(6), pp.697-707

Norgaard, R.B. (1995), 'Metaphors we might survive by', *Ecological Economics*, 15(2), pp.129-131.

Pagell, M. and Shevchenko, A. (2014), 'Why Research In Sustainable Supply Chain Management Should Have No Future', *Journal Of Supply Chain Management*, 50(1), pp.44-55.

Pagell, M. and Wu, Z. (2009), 'Building a more complete theory of sustainable supply chain management using case studies of 10 exemplars', *Journal of Supply Chain Management*, 45(2), pp.37-56

Pagell, M., Wu, Z. and Wasserman, M.E. (2010), 'Thinking differently about purchasing portfolios: an assessment of sustainable sourcing', *Journal of Supply Chain Management,* 46(1), pp.57-73

Peattie, K. J. (2004), 'In search of ethical business leadership: Time to mix our metaphors?', Working paper. *Cardiff: The Centre For Business Relationships, Accountability, Sustainability and Society* (BRASS)

Pinder, C. C. and Bourgeois, V. W. (1982), 'Controlling tropes in administrative science', *Administrative Science Quarterly*, 27, pp. 641-652.

Porter, M.E. and Kramer, M.R. (2011), 'Creating shared value', *Harvard Business Review*, 89(1), pp.62-77

Porter, M.E. and van der Linde, C. (1995), 'Green and Competitive: Ending the Stalemate', *Harvard Business Review*, Sept-Oct, pp.120-134

Quental, N., Lourenco, J.M. and Nunes da Silva, F. (2011), 'Sustainability and scientific roots', *Environment, Development and Sustainability*, 13, pp.257-276

Redclift, M. (2005), 'Sustainable development (1987–2005): an oxymoron comes of age', *Sustainable Development*, 13(4), pp. 212–227.

Rockstrom, J., Steffen, W., Noone, K., Persson, A., Chapin, F. S. III, Lambin, E., ... and Foley, J. (2009), 'Planetary boundaries: Exploring the safe operating space for humanity', *Nature,* 461(24), pp.472-475

Romaine, S. (1996), 'War and peace in the global greenhouse: Metaphor we die by', *Metaphor and Symbolic Activity*, 11(3), pp.175–194.

Schoeneborn, D., Blaschke, S. and Kaufmann, I.M. (2012), 'Recontextualizing Anthropomorphic Metaphors in Organization Studies: The Pathology of Organizational Insomnia', *Journal of Management Inquiry*, 22(4), pp.435-450

Shrivastava, P. (1994) 'CASTRATED Environment: GREENING Organizational Studies', *Organization Studies*,15(5), pp.705–26.

Shrivastava, P. (1994), 'Ecocentric Management for a Risk Society', *Academy of Management Review*, 20(11), pp.118-137

Sneddon, C., Howarth, R.B. and Norgaard, R.B. (2006), 'Sustainable development in a post-Brundtland world', *Ecological Economics*, 57, pp.253-268

Simpson, D.C. and Power, D.J. (2005),"Use the supply relationship to develop lean and green suppliers", Supply Chain Management: An International Journal, Vol. 10 Iss 1 pp. 60 – 68

Springett, D. (2013), 'Editorial: Critical Perspectives on Sustainable Development', Sustainable Development, 21, pp.73-82

Tietze, S., Cohen, L. and Musson, G. (2003), *Understanding Organisations Through Language*, London: Sage Publications

Touboulic, A. and Walker, H. (2015), 'Theories in sustainable supply chain management: a structured literature review', *International Journal Of Physical Distribution & Logistics Management*, 45(1/2), pp.16-42.

Tsoukas, H. (1991), 'The Missing Link: A Transformational View of Metaphors in Organisational Science', *Academy of Management Review*, 16(3), pp.566-585

Walker, H. and Jones, N. (2012), 'Sustainable supply chain management across the UK private sector', *Supply Chain Management: An International Journal*, 17(1), pp.15-28.

World Commission on Environment and Development (1987), *Our common future,* Oxford, England: Oxford University Press.

Weick, K.E. (1989), 'Theory Construction as Disciplined Imagination', *The Academy of Management Review*, 14(4), pp.516-531.

Public Catering Trends in Russia: The Case of a Megalopolis

Elena Ivanovna Sherbakova, South Ural State University, Chelyabinsk, Russian Federation, steklelena74@gmail.com

Abduvali Djabarovich Toshev, South Ural State University, Chelyabinsk, Russian Federation, toshevad@susu.ru

Anastasia Andreevna Rushchitc, South Ural State University, Chelyabinsk, Russian Federation, asuta80@gmail.com

Abstract

The article aims to review and analyze the state of public catering market as illustrated by the example of Chelyabinsk. Our study was based on the following methods: data gathering and analysis of secondary data; system analysis, statistical method, and method of comparison.We presented data on the development of the public catering network from 2012 to 2016. We analyzed changes in number of different types of establishments for the indicated period. We gave information on the closed and operating establishments of Chelyabinsk for 2016. Basing on the research, we formulated the main modern catering trends in Russia.

Key words: public catering establishments, services market, proportion, consumers.

Introduction

Public catering is an integral part of a consumer market and a socially significant sector of economic activity. Public catering services are formed to a greater extent by business initiative oriented towards the purchasing power. More and more people prefer to eat out. Public catering contributes to the solution of many social and economic problems: it helps to better use the country's food resources and provides the population with high-quality nutrition, which maintains good health, increases labor productivity and improves the education quality; it allows an effective use of free time, which is an important factor. One of the functions of public catering is to manage leisure time and social activities of the population [9].

State of the public catering market in Chelyabinsk

Nowadays, the organization of public catering is undergoing cardinal changes, namely, the period of work with imported products, which has lasted for more than twenty years, is finishing. An increase in the use of domestic raw materials after the food embargo has led to a change in tastes and cooking technologies.

From the standpoint of the development of mass catering market, large cities are of a particular interest. We propose to consider the state and prospects for the development of this market by the example of Chelyabinsk.

Chelyabinsk is a city with over a million dwellers and the administrative center of the Chelyabinsk region; it forms part of the Ural Federal District of the Russian Federation. The population of

Chelyabinsk, as of 01.01.2017, was 1198858 people, which is the second largest in the Ural Federal District and the seventh in Russia [3].

Modern Chelyabinsk is a large industrial megalopolis, and business, scientific and cultural center of Southern Ural. It is among the top five industrial cities of the country. It is also the largest transport hub connected with the entire Eurasian continent. The capital of Southern Ural has the international airport "Balandino", which provides aviation communication with the largest Russian cities and near-abroad and far-abroad countries. The Chelyabinsk railway branch is the largest transport hub of the Trans-Siberian Railway.
76 public catering establishments were opened in the city in 2016. The catering industry is constantly changing under the conditions of market transformations and is characterized by the following data (Table 1).

Table 1: Development of catering networks in Chelyabinsk

Type of establishment	year 2012		year 2013		year 2014		year 2015		year 2016	
	total number	seating capacity	total number	seating capacity	total number	seating capacity	total number	seating capacity	total number	seating capacity
restaurants	94	8810	98	9798	108	11196	106	11427	107	11324
cafés	219	11818	241	14243	266	15130	270	14998	271	15464
snack bars	170	5949	155	5592	154	5543	152	5498	142	5094
others (bars, lunchrooms, cafeterias, coffee houses, cake shops)	211	6072	210	6612	231	6925	234	6898	228	6642
canteens	40	2147	46	2335	48	2419	53	2446	67	3010
Total for open networks	734	34796	750	38580	807	41213	815	41267	815	41534

As of 01.01.2017, in Chelyabinsk there were 1175 public catering establishments with seating capacity of 81492 places, including 815 (69,4%) open network establishments with seating capacity of 41534 places [10].

Comparing the data of the following years with that of the previous ones, we established that the number of restaurants in 2013 and 2014 increased by 4% and 10% respectively, in 2015 it decreased by 2%, and in 2016 there were no changes; in 2014 the number of cafes increased by 10%, in 2015 by 1,5%, and in 2016 there were no changes; The number of snack bars decreased by 9% in 2013, by 1% in 2014, by 1,3% in 2015, and by 6.6% in 2016; the number of canteens increased by 15% in 2013, by 4% in 2014, by 10% in 2015, and by 26% in 2016; the number of other types of establishments increased by 10% in 2014, by 1% in 2015, and decreased by 3% in 2016 (Figure 1).

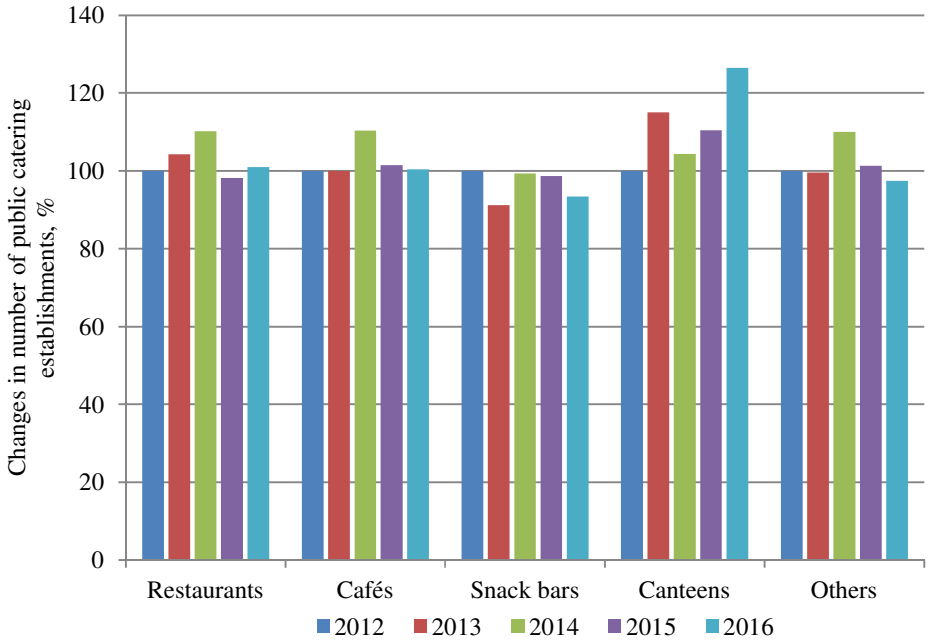


Figure 1. Changes in number of public catering establishments in Chelyabinsk

The turnover of public catering increased in 2016; it amounted to 2,535.0 million rubles, which equals 107,6% (in comparable prices) of the turnover by the corresponding period in 2015 [10].

About 70 public catering establishments closed last year in Chelyabinsk. Veranda restaurant, MixPizza, PizzaHouse, and LikePizzaGut pizzerias, and Lunnny svet bar are among others. The Megapolis Holding Company partially cut its network and namely, Dzedo sushi bars, which were located in the city (outside shopping malls).

At the same time, new restaurants, bars, and cafes (more than 40) opened in Chelyabinsk in 2016; these are Oliver, Ryobryshkovaya, Rodnya, Double L, and GraftBeerHous restaurants, and Nasha komanda pizzeria. The network of street food, mini-cafes, and bakeries expanded and 8 cake shops opened. The level of service rises every year, the range of options expands, promising forms and techniques of service are introduced. Heads of enterprises and sole traders, who provide public catering services, take measures to maintain and increase the volume and quality of the services provided.

Chelyabinsk restaurateurs continue to actively develop the segment of national cuisine. Caucasian, Ukrainian, Georgian and other cuisines are widely spread in the city, and the sector of oriental cuisine is expanding. This trend is of current importance, because such establishments are easier to supply with raw materials due to the food embargo [4]. In addition, public catering establishments of Azerbaijani cuisine are becoming very popular, as nowadays there are more than ten thousand Azerbaijanis living in Southern Ural [2, 7, 8].

Every year there are summer cafes and summer halls which open and operate in the city's territory. They are arranged in conformity with the functional system that provides for the network formation according to the main directions of population flow, pedestrian and transport systems of

the city, that is, in parks, recreation areas and crowded places. For example, in the summer of 2016 there were more than 50 seasonal establishments in the city.

Retail customer service continues to develop in trade networks of Chelyabinsk as they sell catering products from the counter (Teorema, Spar, Magnit, Prospekt and other hypermarkets) [5, 6].

To sum up the foregoing we can conclude that the catering industry keeps on gaining ground in Chelyabinsk.

Thus, there have been significant changes in the public catering market lately. The level of service is growing, the range of options is expanding, and promising service forms and techniques, such as off-premise catering, are being introduced. New catering establishments are distinguished by a wide range of services and modern high-performance equipment.

Trends in the development of the Russian public catering market

At the same time, the influence of the economic crisis on the development of this sphere cannot be left unmentioned. The profitability of restaurant business under these conditions ranges between 0 and 15% [9]. Restaurateurs' main task during crises is to keep the business. Practically all enterprises have investment plans and ideas for development (this is also facilitated by the appearance of a large number of vacant premises at low prices).

Basing on our research, we have formulated the main trends in the development of the modern Russian catering market:

1. Presently, there are more affordable establishments which have simple interior and service, but offer good and delicious food at low prices.
2. Newly opened establishments are most often based on a so-called monoconcept, i.e., their menu is formed with the use of a single product (mostly with some kind of meat). Monoconcept is a kind of fashion, although it is not devoid of a serious economic sense, because it allows the reduction of costs by purchasing one product in large quantities and working with one supplier, the reduction of menu making costs, etc.
3. Regeneration of Russian cuisine. Nowadays there are many different interpretations of Russian cuisine, such as classical, old, modern, and boyar variety. This is a natural development of the process of market's switching to Russian products, the result of reducing the distance between the place where the raw materials are grown and the place of their use.

It is noteworthy that restaurants of European cuisine, especially Italian ones, experience considerable difficulties under modern economic conditions due to the switch of food enterprises to domestic products, since it is impossible to engage in national cuisine without proper national products. According to market experts, the released niche of national cuisine is getting occupied by new food enterprises with Pan-Asian cuisine of different Asian countries of the world.

Conclusions

Thus, catering services are of specific importance and scale. They are an integral part of the sectoral consumer services market, form an effective mechanism to meet the population's individual and personalized needs not only in catering services, but also in leisure activities. Some services are integrating into the life and becoming traditional at one stage or another of our country's economic

development, while others are only emerging. Catering services represent a historically developing and changing phenomenon of a consumer services market.

Acknowledgements

The work was supported by Act 211 Government of the Russian Federation, contract № 02.A03.21.0011

References:

1. Alekseeva, D. (2016) State and development trends of public catering in Russia, *Nauchno-metodicheskiy elektronnyy zhurnal «Kontsept».* [Online], URL: http://e-koncept.ru/2016/56066.htm.

2. Chen, C. and Chen, Y. (2017), The impacts of different types of cuisines and restaurants on gratuities, *Journal of Revenue and Pricing Management*, 16(2), 154–173.

3. City administration of Chelyabinsk [Online], Available at: http://cheladmin.ru.

4. Filimonau, V., Lemmer, C., Marshall, D., Bejjani, G. (2017), Nudging' as an architect of more responsible consumer choice in food service provision: The role of restaurant menu design, *Journal of Cleaner Production* 144, 161-170

5. Hwang, G.-S., Kim, H.-S., Park, D.-S. (2017) The analysis on causal relationship between business startup education and entrepreneurial intention, *Journal of Distribution Science*, 15(3), 27–37.

6. James, P., Seward, M.W., James O'Malley, A., Subramanian, S.V., Block, J.P. (2017), Changes in the food environment over time: Examining 40 years of data in the Framingham Heart Study *International Journal of Behavioral Nutrition and Physical Activity,* 14(1), 84

7. Jogaratnam, G. (2017), How organizational culture influences market orientation and business performance in the restaurant industry, *Journal of Hospitality and Tourism Management*, 31, 211–219

8. Naidoo, N.,van Dam, R.M., Chew, L. (2017), Determinants of eating at local and western fast-food venues in an urban Asian population: A mixed methods approach *International Journal of Behavioral Nutrition and Physical Activity*, 14(1), 69

9. Neganova, V., Chirkov, A., (2014) State and development trends of the public catering market in the region, *Ekonomika regiona*, 1, 132-146.

10. Russian Federal State Statistics Service [Electronic source]. – Available at: http://www.gks.ru.

The 5 P of the 21st Century

People, Planet, Prosperity, Peace and Partnership

PhD(c) Otilia Manta- scientific researcher, Romanian Academy- "Victor Slăvescu" Centre for Financial and Monetary Research, Bucharest, Romania, otilia.manta@rgic.ro

Abstract

Development is the process that gradually progresses to a different stage, usually more advanced and more mature, through gradual changes and expansions. The old developmental paradigm, focusing on prosperity and economic growth, has often neglected the other aspects of life and society, such as the subjective aspects of human and social well-being, crucial to human happiness and social quality, the latter being not significantly correlated with income levels and economic welfare. In this context, certain clarifications are required, such as: delimitation between economic development and economic growth; the distinction between different types of economic development indicators; the assessment of economic development must take into account the spatial, social and temporal context; the existence of key development indicators for different areas, sectors, countries and regions; the existence of differences in the interpretation of development and life standards, and last but not least the delimitation of current values of nonvalues as mentioned at the UN General Assembly on 12 August 2015: People, Planet, Prosperity and Peace. Based on these considerations and correlating with the overall objective of the EU and FAO to reposition the family farming on the outskirts of agricultural, environmental and social national agendas, we can say that now on a global scale we are in a position to promote a shift to a more equal and balanced development. Worldwide, it is intended to promote the directions to: generate discussion and cooperation at local, national, regional and global level; raising the awareness and understanding of the challenges faced by small farmers; contributes to identifying effective ways to support small farmers such as microfinance.

A question that is put in and we are trying in the limelars of knowledge to answer is if there are real chances for mankind to identify those solutions both for the limited resources of the Planet and for the aceler growth of the population but especially solutions for peace in the context of the current wars, all in an experiment of partnership and prosperity.

Keywords: Globalization, People, Planet, Prosperity, Peace and Partnership

Introduction

On 7-8 June 2017 , Europe's leading forum on international cooperation and development launch its eleventh edition. A large and influential group of speakers, stakeholders and participants took part in the multi-faceted programme. In 2017, the activities are based around three main themes: Investing in ***People*** and ***Planet***, Investing in ***Prosperity*** and Investing in ***Peace*** and ***Partnership.*** The three themes are directly linked to the 2030 Agenda for Sustainable Development and the diferent topics highlighted during each session provide insights into the most pressing issues facing the global development community and the various approaches to dealing with these. As we know, ***The 2030 Agenda for Sustainable***[i] it is about transforming our world. This Agenda is a plan of action for people, planet and prosperity. It also seeks to strengthen universal peace in larger freedom. It recognise that eradicating poverty in all its forms and dimensions, including extreme poverty, is the greatest global challenge and an indispensable requirement for sustainable development. All countries and all stakeholders, acting in collaborative partnership, will implement this plan.

The 17 Sustainable Development Goals and 169 targets which announced demonstrate the scale and ambition of this new universal Agenda. They seek to build on the Millennium Development Goals and complete what these did not achieve. They seek to realize the human rights of all and to

achieve gender equality and the empowerment of all women and girls. They are integrated and indivisible and balance the three dimensions of sustainable development: the economic, social and environmental.

Materials and Methods

Regarding the methodology of research on financial environment, complexity and diversity of the issues addressed have required the use of methods, techniques, tools, and procedures of scientific investigation and interpretation to which it's attached particular importance:

- ✓ Documentation, namly, accessing and studying general and specialized bibliography, domestic and foreign, state approach to knowledge issues investigated financial environment and scientific substantiation of the research;
- ✓ Rational method, used as an instrument of knowledge, reflection, analysis, organization, and ongoing scientific research approach;
- ✓ Integration of forms, methods, and logic operations research carried out through the use of analysis and synthesis, abstraction and concretization, comparison, generalization, and systematization;
- ✓ Statistical methods, through the use of descriptive statistics and statistical analysis;
- ✓ Observation method, carried out systematically and analytically;
- ✓ Discussions with experts from institutions and national and international institutions, but also the beneficiaries of financial products and services;
- ✓ Data analysis and interpretation, using graphs, tables, and figures to highlight various developments in financial environment.

Using the classic instruments of scientific research, based on analysis and synthesis, induction and deduction, general and particular, and adding modern methods, authors achieved substantial and pertinent analyses and studies on financial environment main ways, both internationally and especially national. Contributions of authors on investigated issue are highlighted during the research work and theoretical and applicative significance value resulting from the conclusions and proposals that they have formulated and promoted.

The research results are presented using formulas, tables, figures, and graphs. The theoretical information needed for the research was taken from literature and specialized works in the field of financial environment investigated, from home and abroad. Statistical information and concrete data on how financial environment works were taken from reports and statistics of institutes involved in financial environment in the country and abroad as well as to public bodies and private specialist.

This method of analysis provides a more rigorous substantiation of the decision-making process and also maximum reduction in uncertainty.

The primary data and information sources have been correlated with the secondary information resources, regards: economic analysis, reports of the local, regional, national and international level, institutions websites, and report analysis.

The research strategy of the researcher based on the use of a mix of information resources in accprding with the reports and analysis: "the action researcher does not become an independent observer, but becomes a participant, and the process of change becomes the subject of research".

Results and Discussions

The goals and targets will stimulate action over the next fifteen years in areas of critical importance for humanity and the planet:

People. Determination to end poverty and hunger, in all their forms and dimensions, and to ensure that all human beings can fulfil their potential in dignity and equality and in a healthy environment. The Earth Globe population has experienced a steady growth, often accelerated, reaching 6.1 billion inhabitants in 2000, and currently at 7 billion inhabitants, the living standard has also risen corroborated with the average life expectancy of the population.

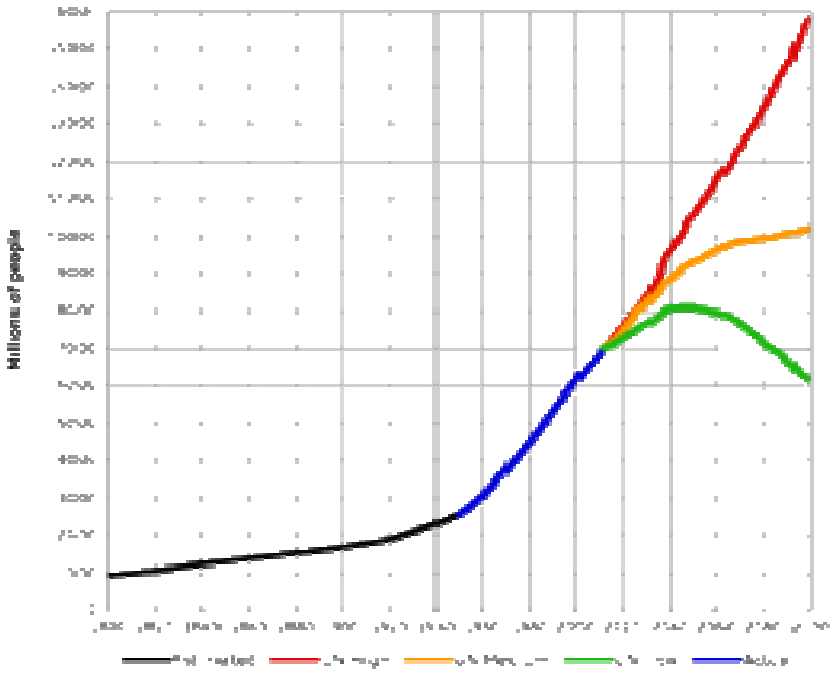
Table no.1 Average population estimates in 2012 from United Nations (millions)

An	Total (mlrd.)	Asia	Africa	Europa	America latină + Caraibe	America de Nord	Australia + Oceania
2010	6.916	4.165 (60,2%)	1.031 (14,9%)	740 (10,7%)	596 (8,6%)	347 (5,0%)	37 (0,5%)
2015	7.324	4.385 (59,9%)	1.166 (15,9%)	743 (10,1%)	630 (8,6%)	361 (4,9%)	39 (0,5%)
2020	7.717	4.582 (59,4%)	1.312 (17,0%)	744 (9,6%)	662 (8,6%)	376 (4,9%)	42 (0,5%)
2025	8.083	4.749 (58,8%)	1.468 (18,2%)	741 (9,2%)	691 (8,5%)	390 (4,8%)	45 (0,6%)
2030	8.425	4.887 (58,0%)	1.634 (19,4%)	736 (8,7%)	717 (8,5%)	403 (4,8%)	47 (0,6%)
2035	8.743	4.997 (57,2%)	1.812 (20,7%)	730 (8,3%)	739 (8,5%)	415 (4,8%)	50 (0,6%)
2040	9.039	5.080 (56,2%)	1.999 (22,1%)	724 (8,0%)	757 (8,4%)	426 (4,8%)	52 (0,6%)
2045	9.308	5.136 (55,2%)	2.194 (23,6%)	717 (7,7%)	771 (8,3%)	436 (4,7%)	55 (0,6%)
2050	9.551	5.164 (54,1%)	2.393 (25,1%)	709 (7,4%)	782 (8,2%)	446 (4,7%)	57 (0,6%)

2055	9.766	5.168 (52,9%)	2.595 (26,6%)	700 (7,2%)	788 (8,1%)	456 (4,7%)	59 (0,6%)
2060	9.957	5.152 (51,7%)	2.797 (28,1%)	691 (6,9%)	791 (7,9%)	465 (4,7%)	61 (0,6%)
2065	10.127	5.120 (50,6%)	2.998 (29,6%)	681 (6,7%)	791 (7,8%)	474 (4,7%)	63 (0,6%)
2070	10.277	5.075 (49,4%)	3.195 (31,1%)	673 (6,5%)	788 (7,6%)	482 (4,7%)	64 (0,6%)
2075	10.409	5.019 (48,2%)	3.387 (32,5%)	665 (6,4%)	783 (7,5%)	490 (4,7%)	66 (0,6%)
2080	10.524	4.957 (47,1%)	3.570 (33,9%)	659 (6,3%)	776 (7,4%)	496 (4,7%)	67 (0,6%)
2085	10.626	4.894 (46,1%)	3.742 (35,2%)	653 (6,1%)	767 (7,2%)	502 (4,7%)	68 (0,6%)
2090	10.717	4.833 (45,1%)	3.903 (36,4%)	649 (6,1%)	757 (7,1%)	506 (4,7%)	69 (0,6%)
2095	10.794	4.773 (44,2%)	4.051 (37,6%)	644 (6,0%)	747 (6,9%)	510 (4,7%)	69 (0,6%)
2100	10.854	4.712 (43,4%)	4.185 (38,6%)	639 (5,9%)	736 (6,8%)	513 (4,7%)	70 (0,6%)

Source: Wikipedia (https://ro.wikipedia.org/wiki/Popula%C8%9Bia_P%C4%83m%C3%A2ntului)

Graph no.1. Estimates / projections of the Earth's population by the year 2100



Source: The population of the planet over the years 1800 - 2100 according to several statistics established by UN 2004 projections.

Moreover, the indicator of growth of the population of the Globe is interdependent with the indicator of the increase in the average life expectancy, ie if in 1900 the average life expectancy was 30 years, in the year 2000 due to the increase of the living standard (food at higher costs Accessible, and three times cheaper the cost of food than in 1957 and the more developed drug industry, respectively, to prevent and combat certain diseases), the global average life of the population has reached 65 years.

Planet. Determination to protect the planet from degradation, including through sustainable consumption and production, sustainably managing its natural resources and taking urgent action on climate change, so that it can support the needs of the present and future generations.

As a result of global industrialization, Earth resources have become increasingly limited, their balance being the primary objective of supporting living organisms on Earth. This balance has to be between the main resources, namely air, water, soil, forests and radiation. The evolution of the urban population has seen a growing dynamism over time, reaching in 2000 the urban poll to be about 50%. The World Health Organization's Air Quality Studies have shown in 1988 that about 1.8 billion people in the urban area were affected by air quality, inspiring toxic substances harmful to the human body (sulfur dioxide, fungicides, dust and other chemicals).

We are currently witnessing many scientific debates on global warming, with temperatures rising by 1-5 degrees Celsius, with the consequences we are currently witnessing: increasing sea levels, spreading tropical epidemics, flooding and droughts, failing Flora and fauna species, melting glaciers and slowing down the Golf Stream (North Atlantic Ocean). The main purpose of scientists is to significantly reduce carbon emissions, emissions that have a direct effect on climate change.

Reducing forest areas has a direct impact on the ecosystem as well as on Terra life ", according to estimates, over the past ten thousand years the total area of forests in the world has been reduced by 15 to 50%. In Africa and Asian monsoon, there are only a third of the wooded areas ten thousand years ago; Two thirds of the Russian forests remain, and three continents of the American continents. Half of the deforestation of the last ten thousand years has been achieved only in the 20th century, and half of them have only affected tropical areas since 1960. At present there are no more than three large wooded areas in the world: in northern Eurasia, From Sweden to Sahalin, North America, Alaska to Labrador, and South America, in the Amazon and Orinoco rivers. If the actual deforestation rate is kept, a quarter of the existing forests will disappear within the next fifty years."

The soil was, is and will remain an active landmass of the Earth, and the impact of industrial chemicals (fertilizers) with a direct impact on food production (pro-active factor) and soil erosion (negative factor).

At present, the wealthiest states are those that have fresh water sources (clean water). This aspect has been known since 1920 when the wealthiest cities of the lime were those that provided the inhabitants with drinking water. Excessive water consumption as a result of industrialization, increasing the level of comfort of residents, and massive pollution of water sources, draws attention to specialists in reducing fresh water sources on Terra, which implies identifying technological solutions to optimize sources existing so as to avoid certain constraints on people.

With regard to the impact of radiation on Earth at the beginning of the 21st century, scientists' efforts are focused on finding a process by which to fuse two hydrogen atoms into a helium atom to use the resulting energy. Fuel would be seawater, and the secondary effect would be scattering small amounts of radioactive emissions. Despite twenty billion dollars of investment, only 10% of the huge temperatures needed to get energy through hydrogen fusion failed. "

As a result of the richness between rich and poor countries worldwide, the wealthy countries do not feel safe and secure compared to the poor population living in the subsistence (survival).

Prosperity. Determination to ensure that all human beings can enjoy prosperous and fulfilling lives and that economic, social and technological progress occurs in harmony with nature.

Several scientists' scenarios show us that new scientific and technological discoveries lead us to the hypothesis that a first solution would be that of a "viable global society" that would ensure the balance of resource use on Earth. Three great specialists of the moment (Donella Meadows, Jorgen Randers and Dennis Meadows) point out to us that in order to create global society "mankind should act immediately and simultaneously in three directions: it should limit the population, reduce industrial production, Improve technologies ".

Peace. Determination to foster peaceful, just and inclusive societies which are free from fear and violence. There can be no sustainable development without peace and no peace without sustainable development.

At global level, we are currently witnessing a great many military conflicts that often result in resource losses. Therefore, the G20 coutries members, since the economic crisis with the objective of making decisions on peace, economic stability in the world, and implicitly regulating financial markets. Different opinions have emerged globally about group members, one of which was Joseph Stiglitz, the winner of the Nobel Prize for Economics, who has been calling for a "G192" for a long time, including all UN member states. Another opinion of Poland, Was like the EU executive, representing the EU at the G20. At present, the European Union is officially represented at the G20 meetings of the country holding the EU presidency at the time and by the European Central Bank (ECB). To put global order, global stability and global welfare, world leaders should unite on the 5Ps' goal: "Yes, we can".

Partnership. Determination to mobilize the means required to implement this Agenda through a revitalised Global Partnership for Sustainable Development, based on a spirit of

strengthened global solidarity, focussed in particular on the needs of the poorest and most vulnerable and with the participation of all countries, all stakeholders and all people.

As noted in "Peace", cooperation must exist globally between strong and less powerful (even poor) countries through group decisions transposed into international co-operation agreements, integrated stability programs, integrated programs Sustainable development in financial regulation packages, as well as government policies implemented at the level of each state, having as its primary objective the balance of the universe.

So, here are the ***Sustainable Development goals:***

1. End poverty in all its forms everywhere;

2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture,

3. Ensure healthy lives and promote well-being for all at all ages;

4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all;

5. Achieve gender equality and empower all women and girls;

6. Ensure availability and sustainable management of water and sanitation for all;

7. Ensure access to affordable, reliable, sustainable and modern energy for all;

8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all;

9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation;

10. Reduce inequality within and among countries;

11. Make cities and human settlements inclusive, safe, resilient and sustainable;

12. Ensure sustainable consumption and production patterns;

13. Take urgent action to combat climate change and its impacts;

14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development;

15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss;

16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels;

17. Strengthen the means of implementation and revitalize the global partnership for sustainable development.

In Europe, the family farmers manage 63 percent of all farmland and guard the agro-biodiversity of soils, water, forests and fish stocks—resources that future generations will need in order to survive. Despite the differences among the countries in Europe, there are issues that are common to all of us, and this includes the challenges of strengthening sustainable family farming and small-scale production.

Romania is part of a growing international movement to recognize the economic, environmental and cultural value of family farms. Very important for food security acoording with

5Ps is to have technical and financial solution for small farms (including family farms) and small entrepreneur. Romania has already taken clear and concrete steps to support its estimated 700,000 smallholders. But there is always more to be done:

- ✓ Supporting and invigorating smallholder agriculture requires a comprehensive platform of policy and development initiatives that are tailored to the unique and diverse needs of family farmers.
- ✓ To preserve the long-standing tradition of family farming, favourable policy and regulatory environments are needed.
- ✓ Improving access to land, water, markets and credit – as well as standardizing land use and property laws – creates a sound foundation for productivity, solid ground on which farmers can and will invest in the future of their farms.
- ✓ Public investment in rural infrastructure, public services, training and education can give smallholders the help they need to be competitive in an increasingly globalized marketplace.
- ✓ Empowering women and young people to participate in agriculture will guarantee the long-term viability of family farming.

The family farming includes all agricultural activities family and is related to many areas of rural development. Family agriculture is a means of organizing forestry, fishing, agricultural production, pastoral and aquaculture, which is managed and operated by a family and work predominantly dependent family, including both women and men. Both in developing countries and developed countries, agriculture is the predominant form of family agriculture in the production of food. Family agriculture is the most common operational model of agriculture in Europe and therefore of great importance in the EU. Most of the 12 million EU farms are family farms passed from one generation to another, and contribute to sustainable socio-economic and environmental development of rural areas. There are a variety of family farms in the EU in terms of their size, the activities they engage in, resource availability, the degree of market integration, competitiveness etc. They operate in different economic contexts, agro-ecological and social ensuring food security while meeting the growing expectations of society for food safety, quality, value, origin and diversity of food, and thus contribute to smart, sustainable and inclusive. In developing countries, most poor people live in rural areas. Social studies and statistics show that today almost 40% of rural inhabitants are exposed to ongoing famine. Apart from projections issued by some analysts, specialists in rural areas continues to support the need for a true national development strategies for agriculture, who should have as a starting point thee causes of involution investment process in rural areas and especially those that put farmers unable to accumulate financial resources or access to microcredit/microfinance.

Finalizing a strategy for economic development of rural areas must be based on the truth that, under the circumstances, a great chance to ensure food security of the nation lies in restoring production and trade in the area of family farms. In the context of the reality of activities in rural areas, desideratum is a kin to help the development of models of microfinance to respond to these realities and to contribute to the current phenomenon of social inclusion and financial, as well as sustainable development of farms and support non-agricultural activities.

The financial development of the financial sector has a relevant influence on the long-term performance and growth of the economy, measured by factors such as the size, depth, access, efficiency and stability of the non-banking financial institutions sector (IFN), the financial system as a whole. The higher the degree of development of the sector, the more extensive the availability of the financial services offered, which allows diversification of the risks. Financial development is a process of strengthening and diversifying the provision by IFN of those services that meet the requirements of economic subjects in an efficient and real way.

Moreover, the financial development of IFN can be systematic, with the outflow or the continuous entry, without great variation, of various institutions on the market, ensuring the

uninterrupted and unlimited service provision. The development of IFN depends on the following factors: institutional environment, business environment, financial stability, financial markets, availability and access to capital.

The access to safe financial services is a component of financial inclusion that has proven vitally important for economic and social development and of critical importance in reducing extreme poverty, fostering common prosperity and supporting inclusive development. The lack of availability of affordable and adequate financial products is, however, a global barrier to full financial inclusion. The young generation faces more challenges in accessing affordable and affordable financial services than adults because of their social status due to regulatory issues and other intermediaries in flexible financial services. Several countries have already adopted flexible measures on their financial regulations for financial institutions. These new elements have been fundamental in the development and implementation of favorable national policies for financial inclusion and financial education for children and young people.

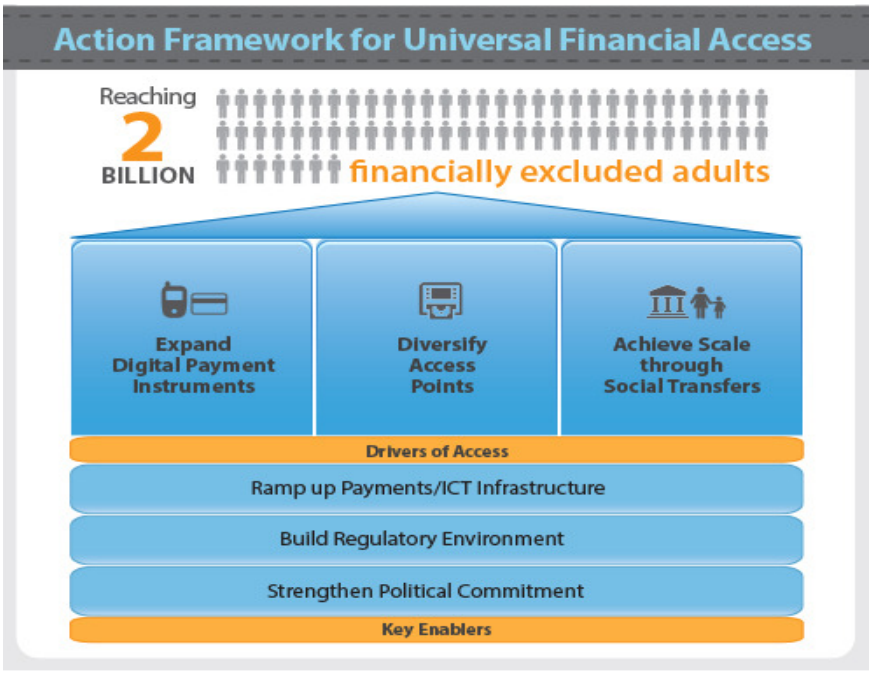
Therefore, a first attempt to analyze the innovative offers of available savings products and deposit accounts for children and young people, as well as the financial education programs provided by financial institutions in connection with such accounts in Armenia, Belarus, Croatia , The Czech Republic, and Moldova. In these case studies, with the exception of the Czech Republic and Croatia, the regulation allows those under the age of 18 to open and operate independently. However, banks still generally do not have adequate products available for young people. Despite these efforts, the development of adequate financial products for the needs of the most vulnerable consumers category are key strategic objectives for young people's integration. However, the subject of financial inclusion should be directly linked to the policy of guarantee and protection measures for disadvantaged groups. Guidelines, principles and rules should be created and respected, especially when working with vulnerable groups such as children and young people. The most appropriate economic instruments should be used to promote market transparency and prices that reflect the real economic, social and environmental costs of products and services (fair pricing). Their potential to reconcile environmental protection and smart growth and exploit win-win opportunities should be recognized.

Financing and economic instruments - The EU will seek to use the full range of fiscal policy instruments in implementing its policies. The most appropriate economic instruments should be used to promote market transparency and prices that reflect the real economic, social and environmental actual products and services (getting prices right). Their potential to reconcile environmental protection and smart economic growth and exploit win-win opportunities should be recognized. In addition, suitability should be evaluated against a set of criteria, including their impact on competitiveness and productivity. Member States should consider further steps to shift taxation from labour to resource and energy consumption and/or pollution, to contribute to the EU goals of increasing employment and reducing environmental impact in a cost-effective manner. The Commission should present a roadmap for reform, sector by sector, of subsidies that have considerable negative effects on the environment and are incompatible with sustainable development, with a view to gradually eliminating them. To ensure that EU funding should be used in an optimum way to promote sustainable development, Member States and the Commission should coordinate to enhance complementarities and synergies between various strands of Community and other mechanisms for co-financing, as such as cohesion policy, rural development, Life + program for research and technological development (RTD), the competitiveness and innovation Programme (CIP) and the European fisheries Fund (EFF).

Related to the access of poor people to financing sources it is good to recall the recent *UFA2020 Overview: Universal Financial Access by 2020 Report. A*ccording to this study the IFC estimates that more than 200 million formal and informal micro, small and medium enterprises (MSMEs) in developing economies are either unserved or underserved in terms of their financing needs. In some cases, the lack of access is because banking outlets are too few, too far or unwilling to serve the poor, but more often it’s because many with meager incomes think they’re too poor to be able to benefit from financial services. There is progress toward financial access.

Between 2011 and 2014, 700 million people became account holders at banks, other financial institutions or mobile money services providers, decreasing the number of financially excluded individuals by 20%, from 2.5 billion to 2 billion adults. Extending access to financial services is necessary to reduce world's poverty and increase prosperity.

Figure no. 1. Action Framework for Universal Financial Access



Source: UFA2020 Overview: Universal Financial Access by 2020, The World Bank Report

Microcredit, as defined by by the EC, is under € 25,000 loan given to support the development of microenterprises and self-employability. It has a double impact: the economic one, as a means of creating income generating activities and social one, as a means of social inclusion and therefore financial inclusion. 91.8% of businesses in the EU are micro level, comprising over 2/3 of the workforce. Micro and small enterprises are the engine of the European economy. However, creation and development of micro businesses in Europe is a cumbersome process. People from disadvantaged groups such as long-term unemployed, economically inactive young people, single parents (usually women), immigrants, the elderly (seniors) or disabled face difficulties for starting a small business or become self-employed (self-employed). In addition to administrative barriers, another major problem for them is access to finance. Commercial banks are reluctant to grant small loans because the administration costs are large while the profit margins are small. This discourages banks to provide loans under € 25,000. Also, the self-employed and micro-entrepreneurs are considered too risky by banks, using the scoring method based on credit history and provide safeguards for securing the loan. Most times people from disadvantaged groups have no collateral and no business track record. Moreover, the financial crisis and economic downturn became more expensive for financing debts and the wave of regulations (especially Basel II reform) have made more difficult the access to financing. Banks are gradually retiring from local and mutual economy as a result of increasingly stringent banking regulations. Therefore, the EU has made a priority of small and micro enterprises, through its internal policies, regional and employment. Europe 2020 Strategy with ***2008 Small Business Act*** aims to improve regulation and access to finance for small firms by Single Market Act and the new Structural Funds programs. Micro crediting is operational by 2007 JASMINE technical assistance program followed the European Progress Microfinance Facility 2009, providing 200 million euro to European microfinance institutions in the form of loans, guarantees and equity. A global definition presents the microfinance as providing basic financial services to low-

income people who traditionally have lack access to banking services definition (CGAP), including: credit, micro-savings, micro-insurance and micro leasing. In EU the focus is on micro crediting, defined as loans under € 25,000 which addressed to two groups:

- ✓ Microenterprises, defined as companies with fewer than 10 employees;
- ✓ Disadvantaged persons (unemployed and other inactive persons, social assistance, immigrants, etc.) who wish to become self- employed but don't have access to traditional banking services.

Thus, a distinction is made between micro lending and inclusive lending. The crediting of microenterprises is targeting the clients almost bankable (start-ups or existing companies) by amounts close to the maximum limit of 25,000 euro. On the contrast, the inclusive crediting is targeting the non-bankable clients, people who most likely will remain excluded from the banking system in the medium and long term. In fact, the unemployed and economically inactive people who want to take the first step in winning an independent income often seek loans under 5,000. So, there are those people who want to make the transition with small financial steps from the informal economy or jobs with small income to self-employment. Since the cost of administering of small loans is high and target groups often need additional counselling and support services for their businesses, the European microfinance programs are hardly sustainable, requiring government support. Even itself the microcredit operations that could be financially sustainable requires pre- and post-counselling subsidizing lending. Entrepreneurship and self-employment are activation instruments of the labour market. Many people, especially the ESF target groups (unemployed, immigrants, women, people over 50 years, youth) are hard to find a job, but could be very good entrepreneurs. Helping them to start a business or conversion into self-employed, in addition to reducing unemployment period is a way to develop creativity and innovative potential of a person who generates a sense of trust and usefulness. Well-designed, the entrepreneurship policies improves the economic and social inclusion. There is a very interesting problem: lending of micro-enterprise versus the social inclusive crediting.

The definition of European Commission Recommendation 2003/361 / EC of 6 May 2003 is: "A micro-enterprise is any enterprise with fewer than 10 employees and a turnover under 2 million euro." Lending the micro-enterprise target the top level of the micro financing market, by providing loans for bankable or nearly bankable microenterprises. The inclusive social lending are turning to self-employed individuals without access to banking services because of their economic and social status. These accesses loans in significantly lower. These two types of Micro financing are not mutually exclusive. About 63% of European organizations can be classified as "social inclusion lenders". Their work includes promoting business start-ups, job creation, and social support for persons excluded, reduce poverty. We have to say also something about Social Return on Investment (SROI). This indicator for entrepreneurship and microfinance programs shows that the amount of public funds granted for the scheme is part of the amounts saved in terms of social benefits which have not been granted those persons, as they became self -employed or have found employment through microfinance program in question. Such assessments show the economic and social usefulness of microfinance schemes. SROI analysis is a process of understanding, measuring and reporting the value of social, economic and environmental created in an organization. SROI shows how is translated the social and environmental results in tangible monetary value, supporting organizations and investors to see the full picture of the benefits of spending their time, money and other resources. This investment can be further seen in terms of value created for individuals, communities, society and the environment. SROI indicator allows a comparison of the value generated by intervention and investment required to achieve that impact. SROI = *net present value of benefits / net present value of the investment.* At European level, there are different models of micro crediting, sector which began to develop in 2000 in the western part and in the 1990's in the central and eastern. In the western part of Europe because of strict regulatory framework that allows banks to grant credit only prevail the linkage model: support organizations accompany clients and cooperate with banks for pulling credit. Although the linkage model often generates longer procedures for granting and firing longer, have some clear advantages: while banks obtain specific information on customer segment and may outsource part of certain operating costs, the nonprofits organisations support the target group with a broad of products alongside with learning the techniques

of scoring and evaluation of bank customers. In the countries from Central and Eastern Europe, the microfinance operations began in the 90s as a private initiative supported by international donors. In Romania and Bulgaria the microfinance organizations have a specific status of non-bank financial intermediaries and have the right to lend. Credit unions provide microfinance, savings and insurance.

In the UK, the community development financial institution (CDFIs) credits small businesses and individuals from disadvantaged areas. Types of micro crediting organizations in Europe:

- ✓ Non-governmental organizations specialized in microfinance (integrated non-financial services);
- ✓ Microcredit banks (converted from non-governmental organizations and foundations);
- ✓ Non-governmental organizations focused on specific groups (acts at small scale);
- ✓ Credit cooperatives (with special legal status);
- ✓ Non-banking financial institutions (microfinance institutions);
- ✓ Institutional support programs (part of the existing programs of development banks);
- ✓ Community development financial institution (CDFI - UK only).

The European Microfinance market is heterogeneous, immature and fragmented. There is not a common business model. The microloans value ranges between 220 - 30.000 euro, the largest being granted by banks, non-banking institutions and government organizations. The most pressing problem of such institutions is the lack long-term funding sources. It is however noted a trend of professionalization, efficient and self-sustaining. A growing number of unemployed people represents a source of demand for micro credits. Anyway, without access to stable funding, the growth perspectives are limited. It is expected that during the next period, European commercial banks to further reduce lending for financially excluded people, small and micro start-up enterprise. Microfinance is an important tool to combat the financial crisis and to sustain an inclusive growth. The legal framework for microfinance in Romania exists since 1993, currently being over-legalized.

The Romanian microfinance sector is competitive, being the 5th largest in the European Union with experience in accessing decentralized programs. On the other hand, in Romania there is no coordination between training programs in entrepreneurship and access to microfinance programs.

Beneficiaries, They are micro-businesses, including freelancers, sole proprietorships, family associations, small, new companies (start-up) companies, innovative enterprises, farmers.

Institutions, involved are: donors (EU, European Investment Fund), the fund manager, non-bank financial institutions, experts, consulting firms, microfinance institutions, and guarantee funds.

The benefits of the activity of microfinance for Romania mainly consist of: improving access to finance for all recipients listed above, improving the quality of financial services and support for business development offered by participating institutions, SME development and the creation / maintenance of jobs, revenue growth business of the beneficiary companies, while increasing the value of micro-credits granted. Thus, microcredit can be a breeding ground for the interbank market to creditworthy customers.

Conclusions

What should be done to promote access to microfinance in rural areas in the context of sustainable development? The issue of interventions with the objective of building sustainable access to microfinance in rural areas has been taken in the direction of development research in a comprehensive and systematic way and outlined what matters in rural areas and microfinance.

First of all: the customer experience - Clients who have experience in credit-donor projects can become poorer or richer: starting with large and short-term financial loans, as initially supported by projects supported by donors and who ultimately failed; only short-term short-term loans could allow investment to be made at a reasonable risk; to test their ability to borrow, invest, restitute and save; to move on to more profitable investments; to grow rapidly with increasing internal and external resources. Once they are successful, they need a banking partner that responds to their growing financial needs. This allows them not only to move beyond the poverty line, but also to create jobs for the poor. People in disadvantaged groups face particular difficulties in setting up a small business or becoming self-employed as long-term unemployed, economically inactive people, young people, single parents (usually women), immigrants, the elderly Seniors) or with disabilities. Besides administrative barriers, another major problem for them is access to finance. As a final conclusion it is considered that the microfinance in the complexity of the financed activities must achieve an optimal combination of the presented sources of financing and their destination, having as final objective the socio-economic development of the small entrepreneur.

Following the 5Ps on macroeconomics, microeconomics is of equal importance. How are business cycles related? Why are there periods of growth and decline? Which way function, operate and collaborate monetary policies, financial institutions, and markets?

Adam Smith's scarcity of resources is at the heart of microeconomics. How do organisations and individuals make decisions to invest or spend their resources and which effects do these decisions have on the economy? These are decisive questions and it is very obvious, how important this is, latest when news report about reducing consumer trust, spending cuts or low investments by companies. Each of them impacts, but also there is an interdependence leading to specific cycles of economic development and welfare.

Frequently called Theory of Prices, microeconomics also and additionally deals with price developments, inflation rates or employment. While much of it is national level, the global stream of money, goods, and services is of significant influence as well.

Much recent solution for sustainable local developments use on online banking services. While underlying reasons are understandable for both sides of the market, retail banking remains an important aspect. That not only for economic, but also societal reasons. In addition, it should not be forgotten that online banking is retail banking as well, only in a different form and through an alternative channel. Banking is part of the service industry, but the important instrument for sustainable development. Frequently banks speak about their products, but there is a decisive difference between 'real' products and services called products. That difference is not only about customer experiences, it also has a very different theoretical underpinning and it is about a different set of operations influencing, how retail banking works and what its servicing staff needs to understand.

What to do next?

Creation of a mechanism accordint with 5Ps (***People, Planet, Prosperity, Peace and Partnership***) is to help stimulate the creation of a value-added manufacturing chain more higher, so turnover is to ensure both current manufacturing costs and pay old debts.

The funding mechanism structure is adapted to the specific needs of SME's financing in agriculture (seasonal production, risk of natural disasters and other unforeseen events, mixt of the financial instruments, minimum guarantees, etc.).

In the "History of the World from Big Bang to the Present," by Cynthia Stokes Brown, there are mentioned questions to which so far scientists, implicitly new investigators, have not yet found an answer:

- "Will they generate current policies, a viable future or a collapse?

- Do new technologies have the power to influence the long-term trends of global systems so as to either increase or collapse?
- Is the free market capable of distributing resources so as to ensure a viable future?
- The market seems to allocate the riches of the rich and to accentuate the poverty of the poor. What changes this component of the global system, without which it seems impossible to stabilize the population growth?
- Can people in industrialized societies learn to live in harmony with nature?
- Can I share my wealth with the population of less industrialized countries? "

References:

Brinckerhoff, P., C. (2000): Social Entrepreneurship: The Art of Mission-Based Venture Development. Wiley Pub., US.

Brown, L. (1996): Global Problems of Humankind. Technical Publishing House, Bucharest.

Brown, C. S. (): History of the World from Big Bang to the present, Technical Publishing House, Bucharest.

Boscia V., Carretta A. and Schwizer P. (2010): Cooperative Banking in Europe: Case studies (Palgrave Macmillan Studies in Banking and Financial Institutions), Palgrave Macmillan.

Bucătaru, I. (1997): The Management of the Romanian Agricultural Enterprise in the Transition to the Market Economy. The University Publishing House "Al.I. Cuza ", Iaşi.

Cerna, S., Donath, L., Şeulean, V., Barglozan, D., Albulescu, C., Boldea, B. (2008): Financial Stability. West University Publishing House, Timişoara.

Davide, F. (2013): European Green Microfinance. A first look. European Microfinance Network aisbl, Brussels.

Dobrescu, E.M., Coman, C. (coord.) (2009): Social Policies and Sustainable Development, ed. III, Academic School of Sociology. Eurolobby Publishing House, Bucharest.

Dobrescu, E.M. (2009): Renewable energies - economic, social and ecological efficiency. Sigma Publishing House, Bucharest.

Dobrescu, E.M. (2008): Structural Funds. Eurolobby Publishing House, Bucharest.

Dragotă, M. (2005): Analysis of the determinants of the financing policy of listed companies on the capital market. Publisher. A.S.E., Bucharest.

Gabele, E., Kroll, M. (1992): Leasing als Finanzierunginstrument, Gabler, Weisbaden. Germany.

Gabrian, C.F. (2010): Environmental Protection in the European Union - a Challenge for the Sustainable Development of Economic Activities. Editura Tipo Moldova, Iaşi.

Galbraith, J.K. (1982): Economics in Public Interest. Political Publishing House, Bucharest.

Gavrilescu, D, Davidovici, I., Giurca, D. (coord) (2001): Lessons of the transition. Rural area and the Romanian agri-food sector. Expert Publishing House, Bucharest.

Gary Dymski, Gerald Epstein, Robert Pollin (1993): Transforming the U.S. Financial System: An Equitable and Efficient Structure for the 21st Century (Economic Policy Institute). Routledge, US.

Hansmann, H. (2000): The Ownership of Enterprise. Harvard University Press, US.

Hada, T., Achim, I.M. (2007): Business Management and Financing. Risoprint Publishing House, Cluj-Napoca.

Halpern, P., Weston, J.F., Brigham, E.F. (1998): Managerial Finance. The Canadian Model. Economic Publishing House, Bucharest.

Nicolescu, M. (2003): Global Strategic Diagnosis. Economic Publishing House, Bucharest.

Nicolescu, Ov. (coord.) (1998): Company management strategy. Economic Publishing House, Bucharest.

Otiman, I.P. (2002): Agriculture of Romania. Agroprint Publishing House, Timişoara.

Ozkan, A. (2001): Determinants of capital structure and adjustment to long run target: Evidence from UK company data panel. Journal of Business Finance & Accounting, vol. 28: 175-198.

Pană, V. (1995): Economics and Rural Policy. Craiova University Publishing House, Craiova.

Taşcă, G. (1926): Romanian Capitalism and Co-operation. The conference held by Professor G. Taşcă on January 31, 11 am. In the Carol I Amphitheater
Taşcă, G. (1927): Economic and Financial Issues. A. Th. Doicescu, Bucharest.

Titman, S. Wessels, R. (1988): The determinants of capital structure choice. Journal of Finance, vol 43: 1-19.

Zaman, Gh. Gherasim, Z. (2007): Criteria and principles of sustainable development from the point of view of its resources. AGIR bulletin no. 1.

Yunus, M. (2010): Development of social enterprises. The new form of capitalism, designed to respond to the most pressing needs of mankind. Curtea Veche Publishing House, Bucharest.

***, (2013): *Social economy and social entrepreneurship*, European Commission.

***, (2012): Microfinance as a support to senior entrepreneurship and the transfer of competences, European Microfinance Network aisbl, Brussels.

***, (2012): EMN study for Youth entrepreneurship, European Microfinance Network aisbl, Brussels.

***, (2011): Microfinance and business. What can we learn from the outh? European Microfinance Network aisbl, Brussels.

***, (2010,2011,2012,2013,2014,2015) National Bank of Romania, Financial Stability Report http://www.bnr.ro/PublicationDocuments.aspx?icid=6711.

***, www.bvb.ro. - Bucharest Stock Exchange.

***, www.bnr.ro. - The National Bank of Romania.

***, (2001): Economics Dictionary, 2nd Edition, Economic Publishing House, Bucharest.

***, http://amadeus.bvdinfo.com/ - Amadeus Database. Bureau van Dijk.

***, www.eurostat.europa.eu.

***, http: //epp.eurostat.ec.europa.eu/portal/page/portal/national_accounts/data/main_tables - Eurostat - Annual Accounts. European Commission

***, www.kmarket.ro - Financial Information www.ktd.ro - Financial Information.

***, (2014): Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the implementation of the European Progress Microfinance Facility 2013. Brussels.

***, (2011): The State Aid Guide, Department for Business, Innovation and Skills. Government of the United Kingdom.

***, (2015): Annual report of the Goldman Sachs Group, INC., ISBN 978-92-79-25964-7 doi: 10.2776 /

***, (2015): European Code of Good Conduct for Microcredit, Version 2.0 European Commission, Directorate-General for Regional Policy Unit B.1 - Communication, Information and Relations with Third Countries, http: //eur-lex.europa .eu / legalcontent / RO, http://ec.europa.eu/social.

***, (2017): The Global Risks Report 2017, 12th Edition is published by the World Economic Forum within the framework of the Global Competitiveness and Risks Team, http://wef.ch/risks2017.

***, (2017): The Inclusive Growth and Development Report 2017 is published by the World Economic Forum, http://wef.ch/igd17, of the World Economic Forum (www.weforum.org) and the Global Alliance for Trade Facilitation (www.tradefacilitation.org). http://wef.ch/getr16

***, (2016): The future of financial infrastructure An ambitious look at how blockchain can reshape financial services, An Industry Project of Financial Services Community | Prepared in collaboration with Deloitte, part of the Future of Financial Services Series.

***, (2016): Sustainable development in the European Union, and statistical view from the point of view of sustainable development goals, Eurostat, http://ec.europa.eu/eurostat/about/policies.

***, (2016): Survey on access to finance for non-financial companies in Romania and their ability to cope with unfavorable financial conditions, National Bank of Romania.

***, (2016): Financial Stability Review. European Central Bank.

***, (2010): Innovations in Rural and Agriculture Finance, edited by RenateKloeppinger-ToddandManoharSharma, IFPRI, US.

***, (2016): Digital dividends, World Development Report. www.worldbank.org.

***, (2017): Reducing Poverty and Sustaining Growth: A Microfinance Approach, Nabila Nisha North South University, Bangladesh and Afrin Rifat North South University, Bangladesh.

***, (2016): Financial Stability Report, National Bank of Romania.

[i] https://sustainabledevelopment.un.org/post2015/transformingourworld

Are Institutions a Driver or an Obstacle to Development of Local Currency Corporate Bond Markets?

Teplova Tamara Viktorovna, PhD, Professor, School of Finance, Faculty of Economic Sciences; Head of Research and Training Laboratory of Financial Markets Analysis. National Research University Higher School of Economics. Moscow, Russia. tteplova@hse.ru

Sokolova Tatiana Vladimirovna, PhD, Senior Lecturer, School of Finance, Faculty of Economic Sciences; Analyst of Research and Training Laboratory of Financial Markets Analysis. National Research University Higher School of Economics. Moscow, Russia. tv.sokolova@hse.ru

Teplov Andrey Sergeevich, Administrator of Federal Methodical Center for Financial Literacy, National Research University Higher School of Economics. Moscow, Russia. andyteplov@yandex.ru

Volgina Natalia Anatolievna, PhD, Professor, Faculty of Economics, Peoples' Friendship University. Moscow, Russia. nat_volgina@yahoo.com

Abstract

We analyze institutional determinants of the development of local currency (LCY) corporate bond markets in the period from 2010 to 2016. We consider a wide range of indicators of the quality of institutional environment: the Heritage Foundation's Index of Economic Freedom, the Worldwide governance indicators, the World Economic Forum's indicators of corporate culture, development and regulation of financial markets. Unlike most previous studies, we test not only static regression models (multifactor linear regressions), but also dynamic models based on the generalized method of moments, which allows to solve the problem of endogeneity of variables.

The results show that low quality of institutional environment, macroeconomic and financial instability stimulate growth of the share of LCY corporate bonds in the total issuance volume. In the periods of instability LCY corporate bonds become less attractive for foreign investors, and issuers are forced to raise capital in the domestic market. The most significant factors in both static and dynamic model specifications are the World Bank's indicators of regulatory quality and rule of law. A decline in sovereign credit ratings also gives impetus to the development of LCY corporate bond markets.

An original result is that more developed stock markets suppress the growth of LCY corporate bond markets: equity and corporate bonds are competing financing sources for companies from developing countries. A developed banking sector contributes to the growth of the LCY corporate bond market: banks act as dealers and market makers. Devaluation of the national currency has a significant positive influence on the explained variable.

Keywords: corporate bonds; quality of institutions; developing countries; local currency bond markets

JEL: E02, G10, G20

Introduction

In the period from 2006 to 2015 the volume of the world bond market doubled (reaching $126.2 trillion), while the volume of local currency (LCY) corporate bond markets of developing countries grew 4.4 times (reaching $ 6.4 trillion; source: authors' estimates based on the Bloomberg database). One of topical issues is the analysis of determinants of LCY corporate bond markets.

Results of previous works on the role of institutional factors in development of local currency corporate markets are mixed. On one hand,Eichengreen and Luengnaruemitchai (2004), Burger and Warnock (2006), Bhattacharyay (2013) showed that a higher quality of institutional environment and protection of creditors' rights stimulate development of LCY corporate bond markets (the volume of LCY corporate bonds outstanding to GDP increases).

On the other hand, Teplova and Sokolova (2016), Claessens et al (2007), Park (2016) revealed a negative impact of institutional factors on the share of LCY corporate bonds in the total volume of corporate bonds. In our opinion, a decrease in quality of institutions and setting restrictions on international capital flows may be favorable for LCY corporate bond markets. As an example, let us consider the market of ruble corporate bonds. In 2014, the USA and the EU imposed sanctions limiting the opportunities for key Russian companies to raise funding abroad. This gave an impetus to development of the domestic corporate bond market: the volume of ruble corporate bonds outstanding increased from 7.1% of GDP (December 2013) to 12.3% of GDP (December 2016, source: Bloomberg). Thus, the impact of institutional factors on LCY corporate bond markets is not unambiguous.

The aim of our research is to identify institutional determinants of development of LCY corporate bond markets on a cross-country sample. We have chosen the period from 2010 to 2016 characterized by macroeconomic and financial shocks: the debt crisis in the EU in 2010-2011 and instability in the world commodity markets in 2014-2016, which negatively affected economic situation of oil-exporting countries. We analyze a balanced panel on 15 emerging markets that were the leaders by issue volumes of corporate bonds in the pre-crisis year 2013. By means of econometric analysis, we examine the impact on the share of LCY corporate bonds of a wide range of factors - quality of development of political, legal and economic institutions, indicators of corporate culture and governance, quality of regulation of stock exchanges.

In most previous studies (Burger and Warnock (2006); Claessens et al (2007); Bhattacharyay (2013); Berensmann et al (2015)) there are applied only linear multifactor regressions. Thus, they do not take into account the fact that bond market development indicators, macroeconomic and institutional variables can be endogenous. Unlike previous works, we construct both static and dynamic (generalized method of moments, GMM) models, which allows us to solve the problem of potential endogenous variables.

Static methods and models (for example, the method of least squares, OLS) require the fulfillment of a number of conditions (for example, Gauss-Markov's). Similar assumptions are required when constructing models with fixed or random effects. GMM was proposed by Hansen (1982) and is a generalization of the methods of moments and of least squares. GMM is widely used in econometrics. The main advantage of GMM is that many econometric assumptions and requirements (about homoskedasticity, normality of distribution and absence of autocorrelation) are not obligatory.

Review of earlier research

Analysis of determinants of development of LCY government and corporate bond markets is performed by two main directions. The first direction is the analysis of influence of macroeconomic factors (Eichengreen and Luengnaruemitchai (2004); Eichengreen et al (2006); Burger and Warnock (2006); Fidora et al (2007); Batten et al (2012); Bhattacharyay (2013)). Eichengreen and Luengnaruemitchai (2004) revealed significance of the size of an economy, volatility of the exchange rate, competitiveness of the banking sector for development of LCY government and corporate bond markets. Burger and Warnock (2006) showed that countries with lower inflation and a larger size of the economy have larger domestic corporate bond markets. Fidora et al (2007) proved that countries with more stable inflation have larger corporate and government bond markets. Bhattacharyay (2013) revealed that the size of the economy, the level of economic development, the openness of the economy (in the sphere of international trade), the volatility of interest rates are significant factors determining the size of bond markets in Asian countries. In our study, the mentioned above and additional factors will be considered as control variables.

The second direction of research is the analysis of influence of institutional factors (Eichengreen and Luengnaruemitchai (2004); Burger and Warnock (2006); Claessens et al (2007); Berensmann et al (2015); Park (2016)). Conclusions of previous studies on the impact of institutional factors on the development of LCY bond markets are not unambiguous. On one hand, most researchers (Eichengreen and Luengnaruemitchai (2004); Burger and Warnock (2006); Park (2016)) conclude that institutional factors positively influence the volume of LCY bond outstanding (in % of GDP). On the other hand, Claessens et al (2007) and Park (2016) reveal that institutional factors can negatively affect the ratio of volumes of LCY and FCY bond markets. Berensmann et al (2015) conclude that the presence of foreign investors in the domestic bond market contributes to growth of LCY corporate bond markets, but may increase the volatility of international capital flows. In this regard, liberalization of capital markets in developing countries should be conducted in parallel with institutional development and strengthening of domestic financial markets.

The contribution of our study to the empirical literature is the analysis of a wide range of institutional variables, including Heritage Foundation's Index of Economic Freedom, indicators of the quality of development of political, legal and economic institutions (Worldwide Governance Indicators), indicators of corporate governance and culture (ethical behavior of firms, quality of auditing and reporting standards), indicators of ease of access to financing in the stock market and the banking sector, quality of regulation of stock exchanges by World Economic Forum (Global Competitiveness Reports).

As indirect factors of institutional development, we choose indicators of development of the stock market and the banking sector. In our opinion, a less protected equity capital in a country leads to a less developed stock market and a lower market capitalization to GDP. In the absence of incentives for entrepreneurship and growth of public equity, companies will choose debt financing. The more the concentration of business, the higher is the volume of publicly traded corporate debt (bonds). In the case of prevalence of small and medium-sized businesses and lack of strong regulation in the banking sector, the publicly traded debt will be replaced by bank loans. Thus, both the stock market capitalization and the level of development of the banking sector can be indicators of the quality of property protection institutions.

On the basis of previous works (Teplova and Sokolova (2016); Claessens et al (2007); Eichengreen and Luengnaruemitchai (2004)) we choose the following control variables: dynamics of the exchange

rate, economic growth, inflation (CPI and PPI), changes in sovereign credit ratings of leading agencies (Standard and Poor's, Moody's and Fitch). A detailed description of variables is presented in Table 1.

An originality of our study is in the applied methodology: unlike most previous works, we test not only static regression models, but also dynamic models based on the system generalized moment method (GMM), which allows us to solve the problem of a potential endogeneity of variables.

Methodology of our research

Based on previous works, we test the following research hypothesis:

(alternative) H1: Institutional factors have a significant impact on the share of LCY corporate bonds (in the total issue volume of corporate bonds).

Description of the dependent and explanatory variables (institutional factors and control variables) and the expected direction of influence are given in Table. 1.

Our analysis is performed on the basis of linear multifactor regressions and GMM models. We use quarterly data on corporate bond issues, macroeconomic and institutional factors in the period from 2010 to 2016. This allowed us to increase the number of observations in the sample in comparison with previous works (Bhattacharya (2013); Burger and Warnock (2006)).

Table 1: Description of variables

Variable	**Description**	**Expected direction of influence (+/-)**	**Source**
Dependent variable			
dom_cur_ bonds	Share of LCY corporate bonds in the total issue volume (%)		Bloomberg database, authors' calculations
Explanatory variables – institutional factors			
lnIEF	Logarithm of Heritage Foundation's Index of Economic Freedom (0 - minimum, 100 - maximum)	+/-	Heritage Foundation, http://www.heritage.org/
Political	World Bank's Indicator of political stability and absence of violence / terrorism (-2.5 - minimum, 2.5 - maximum)		World Bank database (Worldwide Governance Indicators)
Government	World Bank's Indicator of government effectiveness (-2.5 - minimum, 2.5 - maximum)		
Regulatory	World Bank's Indicator of regulatory quality (-2.5 - minimum, 2.5 - maximum)		
Rule	World Bank's Indicator of rule of law (-2.5 - minimum, 2.5 - maximum)		
Corruption	World Bank's Indicator of control of corruption (-2.5 - minimum, 2.5- maximum)		
Ethical	Index of ethical behavior of firms (1 - minimum, 7 - maximum)		Global Competitiveness Reports of World Economic Forum
Auditing	Index of quality of auditing and reporting		

Variable	Description	Expected direction of influence (+/-)	Source
	standards (1 - minimum, 7 - maximum)		
Financing	Index of financing on the domestic stock market (1 - minimum, 7 - maximum)		
Ease	Index of ease of access to bank loans (1 - minimum, 7 - maximum)		
Regul_ Secur	Index of quality of regulation of stock exchanges (1 - minimum, 7 - maximum)		
Indirect institutional factors			
lnCredit	Logarithm of domestic credit to the private sector (in % of GDP)	+	World Bank database
ln_MC	Logarithm of market capitalization (in $ mln)	-	World Federation of Exchanges
Control explanatory variables			
cur_usd	Change in the exchange rate of national currency (USD / unit of national currency) for the current quarter, %	-	Bloomberg database
GDP	Annual growth rate of real GDP in the current quarter (to the same quarter of the previous year)	+	Trading Economics, http://www.tradingeconomics.com/
inflation	Annual inflation rate (based on CPI), the average value for three months of a given quarter (%)	+/-	
PPI	Annual growth rate of the producer price index (PPI), the average value for three months of a given quarter (%)		
rating_SP	Change in S&P long-term sovereign credit rating: 0 - no change, +1 - rating upgraded, -1 - rating downgraded	+/-	Bloomberg database
rating_ Fitch	Change in Fitch long-term sovereign credit rating: 0 - no change, +1 - rating upgraded, -1 - rating downgraded		
rating_ Moodys	Change in Moody's long-term sovereign credit rating: 0 - no change, +1 - rating upgraded, -1 - rating downgraded		
rating	Change in one of long-term sovereign credit ratings (S&P, Moody's or Fitch): 0 - no change, +1 - rating upgraded, -1 - rating downgraded		
dAsian	Dummy variable of Asian countries	+/-	

In order to solve the problem of multicollinearity, institutional factors were included in the regression models separately. In addition, this construction of models allows us to rank institutional factors by significance of their impact on the dependent variable. A similar principle is chosen for variables of sovereign credit ratings: they are included in models separately.

We consider a balanced panel including 15 countries and 28 quarterly periods. At the first stage, we test static regression models with fixed effects:

$$dom\_cur\_bonds = \alpha + \beta_1 \cdot cur\_usd + \beta_2 \cdot GDP + \beta_3 \cdot lnCredit + \\ + \beta_4 \cdot inflation + \beta_5 \cdot PPI + \beta_6 \cdot ln\_MC + \beta_{7,k} \cdot rating_k + \beta_8 \cdot dAsian + \\ + \beta_{9,l} \cdot Institution_l + \sum \beta_{10,m} \cdot c_m + \varepsilon \quad (1)$$

where α - a constant, $\beta_1,..,\beta_{10}$ - beta coefficients, $rating_k$ *(k=1,…,4)* – one of variables characterizing changes in sovereign credit ratings, $Institution_l$ *(l=1,…,11)* – one of direct institutional factors, c_m *(m=2,…,15)* – country effects (dummies in models with fixed effects, *m=1* - Russia), other variables are described in Table 1.

At the second stage we test GMM-models allowing us to solve the problem of potential endogeneity between indicators of development of corporate bond markets and macroeconomic and institutional factors. We apply the system generalized method of moments (GMM-Sys model), proposed by Holtz-Eakin et al (1990), Arellano and Bond (1991), Arellano and Bover (1995), Blundell and Bond (1998):

$$dom\_cur\_bonds_{i,t} = \alpha \cdot dom\_cur\_bonds_{i,t-1} + \beta_0 \cdot X_{i,t} + \mu_i + \varepsilon_{i,t} \quad (2)$$

$$dom\_cur\_bonds_{i,t} - dom\_cur\_bonds_{i,t-1} = \\ = \alpha \cdot (dom\_cur\_bonds_{i,t-1} - dom\_cur\_bonds_{i,t-2}) + \\ + \beta_0 \cdot (X_{i,t} - X_{i,t-1}) + \varepsilon_{i,t} - \varepsilon_{i,t-1} \quad (3)$$

with additional conditions of the moment:

$$E[(dom\_cur\_bonds_{i.,t=s} - dom\_cur\_bonds_{i,t-s-1})(\mu_i + \varepsilon_{i,t})] = 0, \ \ s = 1 \\ E[(X_{i,t-s} - X_{i,t-s-1})(\mu_i + \varepsilon_{i,t})] = 0, \ for\ s = 1 \quad (4)$$

where *i* and *t* – a country and a quarter respectively, $X_{i,t}$ - the vector of independent variables (Table 1, model (1)), μ_i - country effects, $\varepsilon_{i,t}$ - the error.

Descriptive statistics on the sample

Initially, we chose for consideration the BRICS countries which are large economies with relatively large bond markets. In December 2016, the volume of LCY corporate bonds outstanding was 12.3% of GDP in Russia, 25.6% of GDP in Brazil, 43.8% of GDP in China, and 16.9% of GDP in India. It should be noted that the BRICS countries are characterized by different macroeconomic indicators but similar institutional indicators. For example, in 2010-2016 the average annual growth of real GDP was 1.4% in Russia, 1.4% in Brazil, 8.1% in China, and 7.4% in India. The average value of Heritage Foundation's Index of Economic Freedom in 2010-2016 was 51 in Russia, 57 in Brazil, 52 in China, 55 in India (the scale is from 0 (minimum) to 100 (maximum)). In order to identify institutional determinants of development of LCY corporate bond markets, we expanded the sample including both fast-growing bond markets of developing countries and bond markets of countries with a higher level of economic development (S. Korea, Hong Kong and Singapore) as benchmarks. So, we considered the top-15 developing countries by issue volume of corporate bonds (in LCY and FCY) in the pre-crisis 2013 (Fig. 1). Instability in world commodity markets in 2014-2016 had a

negative impact on GDP growth and stability of the local currencies of oil-exporting countries. In addition, we did not include the UAE in the sample due to an exceptionally low share of LCY corporate bonds (about 0.3%). Instead of the UAE, we chose Poland as one of the major emerging markets of corporate bonds in Eastern Europe. All the countries under consideration are characterized by certain difficulties in development of political and economic institutions and by elements of authoritarian rule.

So, we use a balanced panel data for 15 countries (Brazil, Hong Kong, India, Indonesia, China, Malaysia, Mexico, Poland, Russia, Singapore, Thailand, Turkey, Chile, S. Africa, S. Korea) from 2010 to 2016. The sample includes 420 observations.

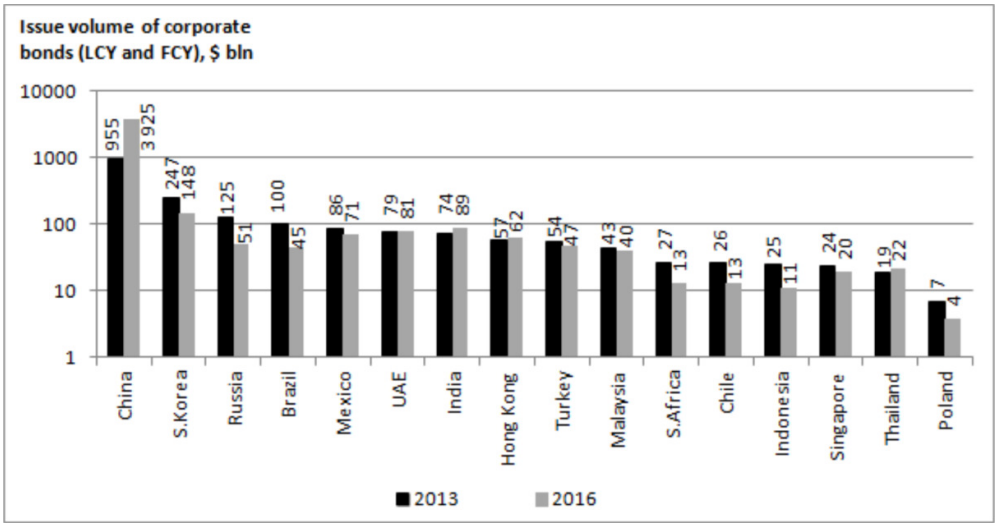


Fig. 1. Top-16 developing countries by the issue volume of corporate bonds in 2013 and 2016
Source: Bloomberg, authors' calculations

The countries under consideration vary significantly in terms of institutional indicators(Fig. 2-4).

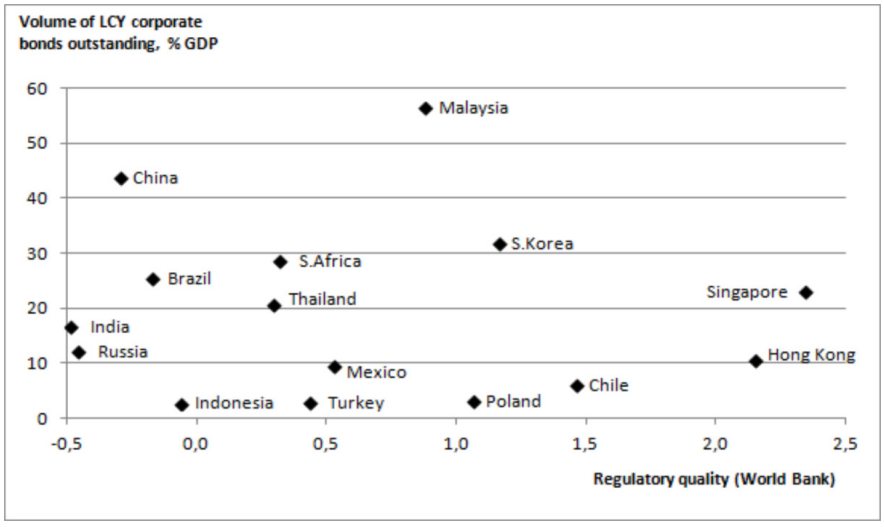


Fig. 2. Volume of LCY corporate bonds outstanding and Regulatory quality, 2016
Source: World Bank, Bloomberg, authors' calculations

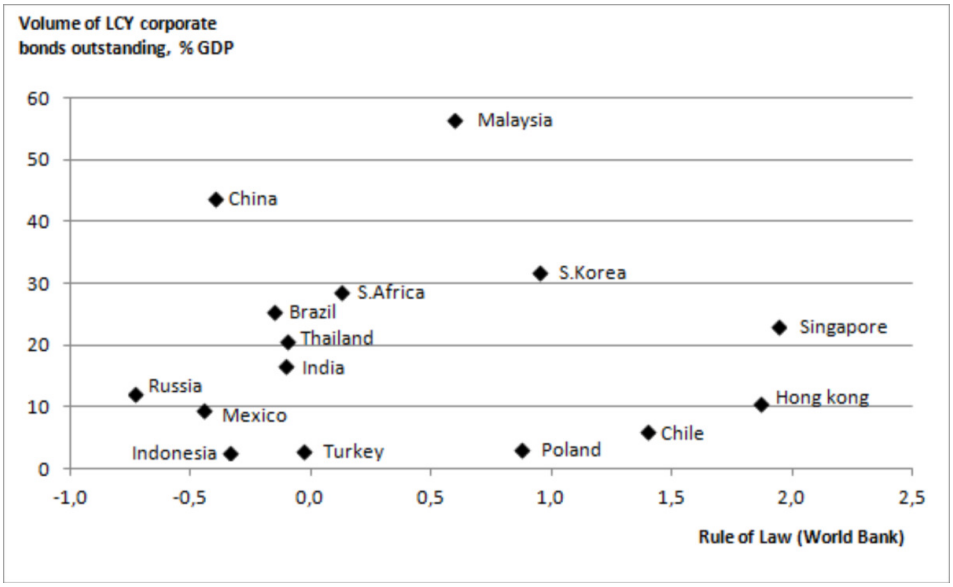


Fig. 3. Volume of LCY corporate bonds outstanding and Rule of law, 2016

Source: World Bank, Bloomberg, authors' calculations

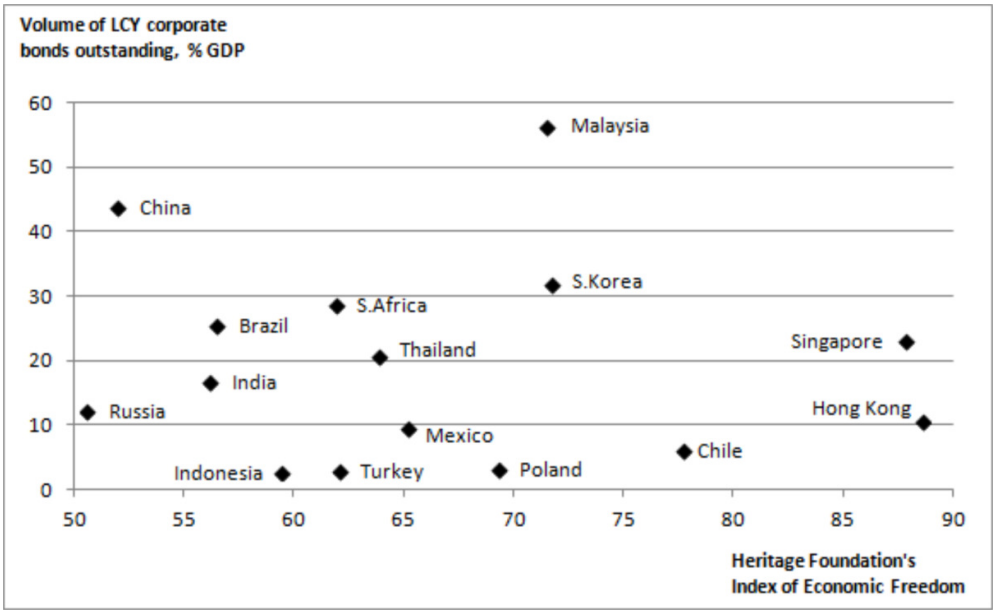


Fig. 4. Volume of LCY corporate bonds outstanding and Index of Economic Freedom, 2016

Source: Heritage Foundation, Bloomberg, authors' calculations

Descriptive statistics on the sample is presented in Table 2.

Table 2: Descriptive statistics on the sample

Variable	Mean	Median	Standard deviation
Dom_cur_bonds	0.585	0.613	0.302
Political	-0.161	-0.131	0.787
Government	0.588	0.352	0.725
Regulatory	0.533	0.390	0.782
Rule	0.317	0.057	0.797
Corruption	0.204	-0.066	0.900
Ethical	4.331	4.100	0.847
Auditing	5.080	5.000	0.725
Financing	4.295	4.300	0.726
Ease	3.458	3.500	0.767
Regulsecur	4.893	4.838	0.799
lnIEF	4.173	4.157	0.167
Cur_usd	-0.010	-0.001	0.053
lnCredit	4.254	4.197	0.640
GDP	0.042	0.038	0.032
Inflation	0.043	0.040	0.030
PPI	0.027	0.036	0.084
Ln_MC	13.367	13.252	0.856
Rating	-0.005	0.000	0.345

Sources: World Bank database, Heritage Foundation, Bloomberg, World Federation of Exchanges

Results of Empirical Research

The results of our empirical research demonstrate a stable negative impact of all institutional factors on the dependent variable in static and dynamic model specifications (Tables 3, 4). In static models (Table 3), all institutional variables are significant at the 1% level. Heritage Foundation's Index of Economic Freedom, regulatory quality, corruption control and rule of law have the most significant impact on the share of LCY corporate bonds.

In dynamic models, the significance level of variables is different (Table 4). Regulatory quality and rule of law are significant at the 1% level. Index of Economic Freedom, corruption control, the indices of quality of auditing and reporting standards, the quality of regulation of stock exchanges are significant at the 5% level. Government effectiveness is significant at the 10% level, and other factors are not significant.

Our results coincide with conclusions by Teplova and Sokolova (2016) regarding the Index of Economic Freedom and by Park (2016) regarding rule of law, but contradict results of other previous papers (Burger and Warnock (2006); Eichengreen and Luengnaruemitchai (2004); Claessens et al (2007)). It should be noted that Claessens et al (2007) revealed a positive, but statistically insingnificant influence of democratic institutions on the share of FCY government bonds. Burger and Warnock (2006) and Eichengreen and Luengnaruemitchai (2004) chose the volume of outstanding LCY government and corporate bonds (in % of GDP) as the dependent variable, whereas we consider the relative share of LCY corporate bonds in the total issue volume.

We explain the negative impact of the quality of institutions on the share of LCY corporate bonds by the fact that holders of corporate bonds in the domestic market are less sensitive to changes in institutional factors than global investors. The latter have wider opportunities for diversification of investments. In case of an increase in the level of institutional development, the FCY corporate bond segment develops at a faster rate than the LCY bond segment, because investment attractiveness of corporate bonds increases for global investors. In addition, higher quality of institutions stimulates issuers of corporate bonds to attract loans in foreign markets demonstrating lower rates and longer maturity. On the contrary, in cases of a decline in the quality of institutions, an emergence of barriers to the movement of international capital, a deterioration of the macroeconomic situation, national companies become less attractive for foreign investors and are forced to raise capital on the domestic market. As a result, the share of LCY corporate bonds increases.

In all considered model specifications market capitalization has a stable significant negative influence on the dependent variable. More developed stock markets suppress development of LCY corporate bond markets, because they are competing sources of financing for companies in emerging countries. This coincides with results of Teplova and Sokolova (2016). Unlike the stock market, a developed banking sector has a positive effect on the LCY corporate bond market. If companies prefer debt financing, larger ones issue bonds, and smaller ones attract bank lending. The variable *lnCredit* retains a positive sign in all model specifications, but it is significant only in static models (Tables 3, 4). Thus, conclusions of some previous works are confirmed (Eichengreen and Luengnaruemitchai (2004); Teplova and Sokolova (2016)), but this result contradicts to the work by Bhattacharyay (2013).

Table 3: The results of regression analysis for static models (regression coefficients and their significance)

Variable	**FGLS**	**FGLS**	**FGLS**	**FGLS**	**FGLS**	**FGLS**	**FGLS**	**FGLS**	**FGLS**	**FGLS**	**FGLS**
Cur_usd	-0.610***	-0.544**	-0.597***	-0.574***	-0.575***	-0.539***	-0.636***	-0.664***	-0.706***	-0.757***	-0.701***
lnCredit	0.190***	0.152***	0.221***	0.236***	0.272***	0.267***	0.195***	0.114***	0.142***	0.125***	0.096***
GDP	0.583	0.724*	1.137***	0.703*	1.110***	1.490***	1.762***	1.073**	1.307***	1.126***	1.115**
Inflation	-0.101	0.023	0.118	-0.644	0.481	0.334	1.285***	1.552***	2.207***	2.120***	2.080***
PPI	-0.223	-0.139	-0.225	-0.208	-0.198	-0.222	-0.241	-0.272	-0.357**	-0.259	-0.288
Ln_MC	-0.114***	-0.064***	-0.099***	-0.109***	-0.110***	-0.105***	-0.086***	-0.063***	-0.075***	-0.099***	-0.063***
Rating_ Fitch	-0.123**	-0.145**	-0.135**	-0.110**	-0.116**	-0.100*	-0.131**	-0.179***	-0.172***	-0.207***	-0.178***
lnIEF	-1.177***										
political		-0.169***									
govern-ment			-0.247***								

Variable	FGLS	FGLS	FGLS	FGLS	FGLS	FGLS	FGLS	FGLS	FGLS	FGLS	FGLS
regulatory				-0.269 ***							
rule					-0.246 ***						
corruption						-0.229 ***					
ethical							-0.189 ***				
auditing								-0.121 ***			
financing									-0.169 ***		
ease										-0.179 ***	
regulsecur											-0.081 ***
dAsian	0.208 ***	0.151 ***	0.208 ***	0.136 ***	0.163 ***	0.134 ***	0.216 ***	0.187 ***	0.269 ***	0.338 ***	0.209 ***
Const	6.075 ***	0.647 ***	0.954 ***	1.106 ***	0.818 ***	0.750 ***	1.477 ***	1.336 ***	1.416 ***	1.675 ***	1.161 ***
Number of observa-tions	420										
Wald statistics	369.2 ***	183.2 ***	246.6 ***	361.7 ***	290.2 ***	358.4 ***	249.8 ***	142,7 ***	179.1 ***	203.9 ***	121.5 ***

Notes. The significance level: *** — 1%, ** — 5%, * — 10%.

Table 4: The results of regression analysis for dynamic models (regression coefficients and their significance)

Variable	GMM -SYS	GMM -SYS	GMM -SYS	GMM -SYS	GMM -SYS	GMM -SYS	GMM -SYS	GMM -SYS	GMM -SYS	GMM -SYS	GMM -SYS
L1. Dom_cur_bonds	0.142 ***	0.152 ***	0.150 ***	0.128 ***	0.136 ***	0.147 ***	0.154 ***	0.146 ***	0.153 ***	0.154 ***	0.149 ***
Cur_usd	-0.564 ***	-0.563 ***	-0.560 ***	-0.556 ***	-0.548 ***	-0.538 ***	-0.570 ***	-0.591 ***	-0.574 ***	-0.568 ***	-0.585 ***
lnCredit	0.031	0.011	0.043	0.101	0.115	0.053	-0.007	0.037	0.024	0.005	0.010
GDP	-0.208	-0.284	-0.146	-0.120	-0.097	-0.054	-0.201	-0.142	-0.184	-0.341	-0.257
Inflation	0.848	1.067 *	1.022 *	0.325	0.801	1.074 *	1.301 **	1.240 **	1.274 **	1.205 **	1.365 **
PPI	-0.040	0.002	-0.020	-0.055	0.001	-0.022	-0.017	-0.035	-0.043	0.001	-0.037
Ln_MC	-0.111 **	-0.098 **	-0.104 **	-0.120 ***	-0.116 ***	-0.098 **	-0.092 **	-0.107 **	-0.089 **	-0.088 **	-0.097 **
Rating_ Fitch	-0.018	-0.013	-0.014	-0.008	-0.007	-0.009	-0.019	-0.008	-0.017	-0.026	-0.005

Variable	**GMM-SYS**	**GMM-SYS**	**GMM-SYS**	**GMM-SYS**	**GMM-SYS**	**GMM-SYS**	**GMM-SYS**	**GMM-SYS**	**GMM-SYS**	**GMM-SYS**	**GMM-SYS**
lnIEF	-0.613**										
political		-0.055									
government			-0.099*								
regulatory				-0.217***							
rule					-0.181***						
corruption						-0.100**					
ethical							-0.013				
auditing								-0.088**			
financing									-0.071		
ease										-0.028	
regulsecur											-0.064**
dAsian	0.158**	0.119	0.139**	0.081	0.091	0.113	0.160**	0.108	0.175***	0.176***	0.133*
Const	4.296***	1.642***	1.640***	1.743***	1.529***	1.488***	1.663***	2.099***	1.739***	1.611***	1.939***
Number of observations	420										

Notes. The significance level: *** — 1%, ** — 5%, * — 10%.

In all models (linear regressions and GMM), the change in the exchange rate has a stable negative impact (significant at the 1% level) on the dependent variable. Devaluation of the local currency stimulates development of LCY corporate bond markets, as debt denominated in FCY becomes more expensive. Changes in sovereign credit ratings significantly negatively affect the share of LCY corporate bond markets, and their impact is stable in both dynamic and static models. We explain this by the fact that an increase in sovereign credit ratings raises the country's investment attractiveness and facilitates attraction of FCY loans on the global market, but it is depressing for the LCY debt market.

In most model specifications, the dummy variable of Asian countries demonstrates a significant positive effect on the dependent variable, i.e. in Asian countries there is a tendency to issue a larger share of LCY corporate bonds.

In dynamic models, there is a significant positive effect of the lagged dependent variable *L1_dom_cur_bonds* (Table 4).

For other control variables, the results are not stable. In most of static and dynamic models, inflation (based on PPI) has a negative impact on the share of LCY corporate bonds, but this impact is not significant. This result coincides with conclusions of Burger and Warnock (2006), Claessens et al (2007), Teplova and Sokolova (2016). In static models, GDP growth rate significantly positively (at the 5% level) affects the dependent variable. On the contrary, in dynamic models, the direction of influence of GDP growth rate changes to be negative, and the factor is not significant. Burger and Warnock (2006), Teplova and Sokolova (2016) applied linear multifactor regressions and revealed a positive relationship between GDP growth and the size of LCY corporate bond markets.

Conclusions

We reveal institutional determinants of development of LCY corporate bond markets. We apply static (multifactor linear regression) and dynamic (GMM) models in order to solve the problem of potential endogeneity of variables (indicators of development of LCY corporate bond markets, macroeconomic and institutional variables).

In static models, all direct institutional variables, as well as an indirect factor of the development of the stock market, significantly negatively affect the share of LCY corporate bonds. The most significant factors are Heritage Foundation's Index of Economic Freedom, Worldwide indicators of regulatory quality, control of corruption and rule of law. In dynamic models, the influence of quality of institutional development is also negative, but the significance level of factors is different. Indicators of regulatory quality and rule of law are significant at the 1% level. Variables of sovereign credit ratings also negatively affect the share of LCY corporate bonds, but they are statistically significant only in linear regressions.

We explain the negative impact of the quality of institutions o by the fact that holders of corporate bonds in the domestic market are less sensitive to changes in institutional factors than global investors. The latter have wider opportunities for diversification of investments. In the case of an increase in the quality of institutions, the investment attractiveness of FCY corporate bonds grows, and this segment develops at a faster rate than LCY corporate bond segment. Openness of the economy contributes to the choice of issuers in global capital markets. A developed stock market limits growth of LCY corporate bond market, because in developing countries, stock and bond markets are competing sources of funding for national companies.

Financial and macroeconomic instability also stimulates development of LCY corporate bond markets. Devaluation of the local currency influences positively the share of LCY corporate bonds due to the rise in the cost of debt denominated in FCY.

References

Arellano, M. and Bond, S. (1991), 'Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations,' *Review of Economic Studies,* 58, 277-297.

Arellano, M. and Bover, O. (1995), 'Another look at the instrumental-variable estimation of error-components,' *Journal of Econometrics,* 68, 29-52.

Batten, J.A., Hogan, W. and Szilagyi, P. (2012), 'Foreign bond markets and financial market development: international perspectives', In *Implications of the Global Financial Crisis for Financial Reform and Regulation in Asia*. Ed. M. Kawai, D.G. Mayes and P. Morgan, 248-269, Edward Elgar Publishing, Cheltenham UK.

Berensmann, K., Dafe, F. and Volz, U. (2015), 'Developing local currency bond markets for long-term development financing in Sub-Saharan Africa,' *Oxford Review of Economic Policy*, 31 (3-4), 350-378.

Bhattacharyay, B.N. (2013), 'Determinants of bond market development in Asia,' *Journal of Asian Economics*, 24, 124-137.

Blundell, R.W. and Bond, S.R. (1998), 'Initial conditions and moment restrictions in dynamic panel data models,' *Journal of Econometrics*, 87, 115-143.

Burger, J. and Warnock, F. (2006), 'Local currency bond markets,' IMF Staff Papers, 53, 133-146. Washington, D.C.: International Monetary Fund.

Claessens, S., Klingebiel, D. and Schmukler, S.L. (2007), 'Government bonds in domestic and foreign currency: the role of institutional and macroeconomic factors,' *Review of International Economics*, 15(2), 370-413.

Eichengreen, B. and Luengnaruemitchai, P. (2004), 'Why doesn't Asia have bigger bond markets?' NBER Working Paper, 10576, Cambridge, MA, National Bureau of Economic Research.

Eichengreen, B., Borensztein, E. and Panizza, U. (2006), 'A tale of two markets: bond market development in East Asia and Latin America,' Hong Kong Institute for Monetary Research Occasional Paper, 3.

Fidora, M., Fratzscher, M. and Thimann, C. (2007), 'Home bias in global bond and equity markets: the role of real exchange rate volatility,' *Journal of International Money and Finance*, 26(4), 631–655.

Fink, G., Haiss, P. and Hristoforova, S. (2003), 'Bond markets and economic growth,' Working Paper, 49, Research Institute for European Affairs.

Hansen, L. (1982), 'Large sample properties of generalized method of moments estimators', *Econometrica*, 50(4), 1029–1054.

Holtz-Eakin, D., Newey, W. and Rosen, H. (1990), 'Estimating vector autoregressions with panel data,' *Econometrica*, 56, 1371-1395.

Park, C.-Y. (2016), 'Developing local currency bond markets in Asia,' ADB Economics Working Paper Series, 495.

Rose, A.K. and Spiegel, M.M. (2012), 'Dollar illiquidity and central bank swap arrangements during the global financial crisis,' *Journal of International Economics,* 88(2), 326-340.

Teplova, T.V. and Sokolova, T.V. (2016), 'The Determinants of development of local currency corporate bond markets', In: *The Bond Market: Analysis of tendencies and perspectives. Collective monograph*, Ed.: Teplova, T.V., Chapter 3, Moscow, INFRA-M, 65-94. In Rus.

The Economic Benefit of Fans of Luxury Fashion Brand Pages on Facebook

Jitka Novotová, Faculty of Economic, Technical university of Liberec, Liberec, Czech republic, jitka.novotova1@tul.cz

Lubica Cinkánová, Faculty of Economic, Technical university of Liberec, Liberec, Czech republic, lubica.cinkanova@tul.cz

Abstract

This article focuses on Facebook, specifically on the company pages of luxury fashion brands. The aim of the article is to find out why the users of this social network add luxury company pages and whether the fans of these pages constitute an economic benefit for companies. A quantitative survey was conducted using an online questionnaire sent via Facebook. Five hundred fifty-four Facebook users from the Czech Republic participated in the survey. The data obtained were analysed using exploratory factor analysis, ANOVY and the verbal variability independence test. The results showed that up to 70 % of luxury brand customers with Facebook accounts added company pages. The reason for adding the pages is, in particular, the opportunity to become a part of the luxury brand community and also to get the latest information on brands and upcoming collections. Additionally, it was found that fans of company pages are more likely to buy and spend more money than customers who have not added a company page. Thanks to this information, we can recommend that companies set up a company Facebook page and regularly communicate with their fans.

Key words: Facebook, luxury fashion brand, marketing communication, brand community

Introduction

For most people, luxury brands are an unattainable but fascinating world of expensive cars, handbags and clothing. Even though the luxury market is relatively small, it has exceptional economic results. In 2014, global sales of luxury goods and services amounted to EUR 850 billion, with the largest growth being in the luxury car (10 %) and luxury holiday (9 %) segments (D'arpizio, 2014). In 2016, it was already EUR 1.08 trillion (D'arpizio, et al., 2016). The growing group of so-called "High Earning, Not Rich Yet" people with high incomes but who are not yet wealthy is the main force behind this growth. There are ten times more customers in this category than truly rich people. These people want to at least occasionally enjoy something luxurious (Mediaguru, 2013). In the personal luxury goods segment (watches, cosmetics, shoes, handbags and clothing), revenues of EUR 223 billion were achieved in 2014, three times more than 20 years ago. The latest global economic crisis has slowed down sales growth, but unlike other segments, it has not recorded negative values (D'arpizio, 2014). Luxury goods are therefore a very promising segment, which is also addressed by a number of marketing experts. In this article I will focus on luxury clothing brands and on the Czech customers of these brands.

New channels of communication over the internet have become increasingly important for marketers in recent years, among which we can include social networks (Ungerman, 2016). The largest social network today is Facebook (Kopřiva, 2015). Facebook was founded by Harvard student Mark Zuckerberg on 1 February 2004. At the beginning, it was used by Harvard students to get to know each other. Once half of all Harvard students had created a profile on Facebook, it spread to other prestigious universities and high schools as well as leading corporations. In 2006, Facebook was opened to the general public (Treadaway and Smithová, 2011). Since 2007, many fan pages have been set up on Facebook to enable companies to promote their products or brands. Facebook users can add these pages to their favourites to show their friends what businesses and brands they are interested in (Kudeshia et al., 2016).

The purpose of this article is to find out what percentage of Facebook users add company pages of luxury clothing brands and whether communication on these pages affects purchase frequency and how much money customers spend on one purchase.

Based on this research objective we identified four research questions:

1) What percentage of Facebook users has added company pages of luxury fashion brands?
2) Why do fans add pages of luxury fashion brands?
3) Are there different reasons for adding company pages based on different demographic characteristics of fans?
4) Do company pages on Facebook have an economic benefit for companies?

The answers to these research questions were identified using a quantitative questionnaire survey, which will be presented in detail in the methodological part of this article. The theoretical part of this article will first familiarize readers with the generic term "brand", with the definition of "luxury brand" from the perspective of Czech customers, and will focus on Facebook as a marketing communication tool.

Theories

Brand

Brands have been used for centuries to distinguish the goods of individual manufacturers. The word *"brand"* originates from the word "*brandr*", which means *"burn",* because a brand or tag was used to mark and identify animals in a herd (Keller, 2007). In his definition, Keller compares brands to products: "*A brand is a product, but a product that delivers other dimensions that distinguish the brand from other products created to meet the same need"* (Keller, 2007, p. 34). Nowadays, the brand is a complex concept. The brand exists primarily in the consciousness of consumers and very often coincides with reputation. In other words, a specific brand is what the customer thinks of it (Healey, 2008). As Walter Landor, the pioneer of branding, memorably said: *"Products are made in the factory, but brands are shaped in the mind"* (Landor in Posner, 2011, p. 128).

The brand is thus a means of creating and changing the position of the product in the mind of the consumer (Vysekalová and Mikeš, 2009). For example, branded clothing is better rated by the consumer and reinforces the willingness to buy clothes. Brands generally provide a guarantee of unmistakability, especially in the sectors of very similar products such as clothing or electronics (Bristow and Mowen, 1998). The key element of branding is therefore that consumers perceive the differences between brands in the product category. The differences between brands often relate to the properties or benefits of the product itself. Other times, however, they can be guided by the less easily perceptible criteria of image. Whenever consumers decide between alternatives, brand plays an important role. For this reason, companies benefit from brands whenever consumers face the question of choice (Keller, 2007). Today, when there is a plethora of products and substitutes on the market, everyone can choose what product to buy. In this competitive struggle, therefore, each manufacturer strives to provide the customer with some added value, and this may be a brand (Dědková, 2014).

Luxury fashion brands

"Fashion is not just about clothing. Fashion is in the clouds, on the streets. Fashion is an idea, lifestyle and a current event." (Chanel in Brogi et al., 2013). This credo guided world-renowned fashion designer Coco Chanel, who set the tone for the world fashion industry until the mid-20th century and introduced one of the most luxurious brands in the world.

What is luxury fashion? There is no clear cut answer to this question. Luxuries are perceived differently not only by individual customers but also by residents of different countries. Research from the Czech Republic has shown that Czechs have a somewhat simplified view of the luxury

goods market. In their opinion, luxury above all demonstrates social status and satisfies the desire for recognition. Three-quarters of respondents perceive cars, jewellery and watches as symbols of luxury (Obruk, 2010). Among luxury fashion brands, Czech customers most often include Louis Vuitton, Prada, Versace and Dior. On the other hand, some of them perceive Guess, Lacoste or Michael Kors as luxury brands. These brands, however, are considered premium brands in countries such as the USA, Germany or France, which are characterized by lower quality and price (Novotová, 2016). The 2010 research also looked at the attributes of luxury brands. The most frequently mentioned attributes are exceptional quality, the social status that the brand brings to the user, global renown or high price (Obruk, 2010).

These results are practically identical with those from other countries. For example, Phau and Prendegast (2000) found that a luxury brand is a subjective notion that consists of exclusivity, expected quality, brand awareness and renown. According to Fionda and Moore, luxury brands can be divided into two levels from a customer perspective. The first is the material level, which includes brand history, quality and unique know-how. The second level is psychological and includes the exclusivity and prestige of the brand which affects the carrier's position in society (Fionda and Moore, 2009).

For the purposes of our research, these attributes of luxury fashion brands were used as the starting point, which were introduced to the respondents before filling in the questionnaire itself, as well as examples of brands that can be clearly considered luxurious. These measures ensured that the respondents had a good idea of what a luxury brand was and could correctly fill in a questionnaire dealing with the marketing communications of luxury brands on Facebook.

Facebook

Facebook is currently used not only for communication between friends, but also for communication between customers and companies (Gamboa and Goncalves, 2014). Companies can communicate with existing and potential customers on Facebook via company pages, news, events or paid ads (Janouch, 2011). Company pages bring businesses a number of benefits. Facebook users can add these pages to their favourites to show their friends what businesses and brands they are interested in (Kudeshia et al., 2016). Through these pages it is possible to build two-way communication between the company and a potential or existing customer (Janouch, 2011). Businesses should try to establish user-friendly relationships using the current page, responding quickly to customer inquiries, and listening to what users are saying. In other words, a company page must be a place where the customer likes to communicate and feels part of a wider community of fans (Gamboa and Goncalves, 2014). The advantage of company pages on Facebook is the ease with which fans of these pages are identified and the ability to create a strong customer bond with the brand (Shih, 2010). Whether this positive relationship also affects customer buying behaviour is the subject of much research. For example, Kang et al. (2013) claim that communication on company pages does not have an impact on product purchases. On the other hand, research in the Czech Republic has shown that communication on company pages motivates customers to buy (Novotová, 2017). It is also important for businesses to know what motivates Facebook users to add company pages. Rohm et al. (2013) identified five motivations. These include: entertainment, affiliation to a popular brand, access to customer services and content, the ability to get product information, and marketing communication which encourages them to add the page.

The motivations for adding the company pages of luxury clothing brands as well as the relationship between adding a page and purchasing goods will be dealt with in the practical part of this article.

Methodology

As was already mentioned in the introduction, the purpose of this article is to find out what percentage of Facebook users add company pages of luxury clothing brands and whether the communication on these pages affects purchase frequency and how much money the customer spends on one purchase.

Based on this objective, a quantitative research method was selected using an electronic questionnaire survey. The questionnaire was created through Google – Disk and distributed via Facebook. The main group of respondents were citizens of the Czech Republic who are over 18 years of age, have a Facebook profile and have bought a luxury clothing brand at least once. In this research luxury brands are defined as worldwide renowned brands such as Gucci, Prada or Versace. The sample was determined using the snowball nonprobability sampling method. This method was selected because of the narrowly and specifically defined sample base, which is poorly accessible. Individuals in the sample base have a higher family income and a specific lifestyle that leads them to purchase luxury goods. Due to the limited number and especially the poor availability of such respondents, the snowball sampling method was judged the only one possible. The research team selected suitable respondents who met all the criteria for the sample base. These respondents were sent an online questionnaire with a request to forward it to other suitable respondents.

The questionnaire contained closed selective questions and scaled questions. The results were evaluated using the statistical method of exploratory factor analysis, variance analysis (ANOVA), and the verbal variability independence test. These methods are briefly presented below.

1) Exploratory factor analysis

Factor analysis focuses on creating new variables and reducing the extent of data with minimal loss of information. For factor analysis to be performed, the Bartlett's sphericity test (P-value < 0.05) and the Kaiser-Meyer-Olkin (KMO) condition must be met. Under this condition, certain bands are defined to show the extent to which the use of factor analysis is appropriate. KMO ≥ 0.9 excellent, KMO ≥ 0.8 good, KMO ≥ 0.7 average, KMO ≥ 0.6 less suitable and KMO ≥ 0.5 borderline use (Meloun and Militký, 2006). For better interpretation of results, Varimax Rotation was performed in this article. It is a method that minimizes the number of variables that have high burdens with each common factor (Hendl, 2004).

2) ANOVA

The aim of the ANOVA analysis is to determine which of the qualitative or quantitative factors significantly affect the monitored quantities. ANOVA was used in this article after exploratory factor analysis. For this reason, and due to the large number of units in each selection, the normality of data was not verified (Churchill, 1987). A two-choice t-test was performed for two-value factors (Budíková, et al., 2010; Meloun and Militký, 2002). For both statistical methods, the H0 hypotheses of variance consistency and H1 hypothesis were determined by difference; the assertion was tested at a 95% significance level. If H0 was rejected and therefore H1 was accepted, it was further investigated which pairs of mean values were different at a given level of significance. To determine significant differences, Fisher's LSD post-hoc test was used (Šimonová, 2006).

3) Verbal variability independence test

It is used especially for verifying the dependencies of two verbal variables. The test assumes that data on two variables are a selection from an infinite two-dimensional set. The H0 hypothesis is tested on the independence of both variables against the alternative hypothesis H1, that these variables are dependent (Meloun and Militký, 2006).

Sample of respondents

A total of 554 respondents participated in the survey. Their demographic characteristics, including gender, age and highest level of attained education, are shown in Table 1. The vast majority of participants in the research were women (403), who buy luxury fashion more often. Men often did not know which clothing brands were considered luxurious, and therefore did not fill in the questionnaire properly. For this reason, a number of their erroneously filled in questionnaires were eliminated.

Tab. 1: Demographic characteristics of respondents (Source: the author)

Cathegory	Frequency	%
Gender		
women	403	72,7
men	151	27,3
Age		
Less than 20 years	18	3,3
20 to 29 years	357	64,4
30 to 39 years	101	18,2
40 to 49 years	51	9,2
50 to 59 years	19	3,4
60 to 69 years	8	1,4
Education		
primary	6	1,1
secondary without diploma	15	2,7
secondary with diploma	230	41,5
colledge	303	54,7

Respondents aged 20 to 29 and 30 to 39 were the most represented in the survey. People over the age of 50 often do not have a Facebook account and therefore cannot participate in the research. Most of the people involved in the research had a high school diploma or higher education.

Table 2 below shows the purchase frequency of luxury fashion goods and the amount of money that the average respondent spends on one luxury fashion purchase.

Tab. 2: Purchase frequency and money spent on one purchase (Source: the author)

Category	Frequency	%
Purchase frequency		
Only occasionally	143	25.8
1x per year	52	9.4
2x–3x per year	123	22.2
Once per quarter year	118	21.3
Once per month	80	14.4
Several times per month	38	6.9
Amount spent on one purchase		
up to CZK 10,000	227	42
CZK 10,001–30,000	227	42
CZK 30,001–50,000	54	10
CZK 50,001–70,000	18	3.3
CZK 70,001–90,000	12	2.2
CZK 110,000 and more	2	0.4

Table 2 shows that most respondents shop only occasionally. On the other hand, a relatively large group of respondents make a purchase once per quarter year or two to three times a year. Thus, we can say that both occasional customers and regular luxury brand customers are represented in the research. Most respondents spend a maximum of CZK 30,000 for one purchase (approximately EUR 1,154), and only two respondents spent more than CZK 100,000 (EUR 3,846).

Results

In the practical part we will first answer the first research question, which is:

1) What percentage of Facebook users has added company pages of luxury fashion brands?

Of all 552 respondents who are Facebook users, 389 or 70 % have accepted at least one luxury fashion brand page. This number is relatively high. It is important to note that all respondents who participated in the survey are customers of luxury fashion houses. Thus, we can state that up to 70 % of luxury brand customers have accepted at least one luxury fashion company page on Facebook.

The second research question asked about the reason for adding company pages.
2) Why do fans add pages of luxury fashion brands?

Based on the research team's deliberations, six reasons were identified that can cause Facebook users to decide to add a fashion page. The respondents assessed their agreement or disagreement with the reasons in the questionnaire using a seven-point scale where 1 = I totally agree and 7 = I totally disagree. The results were first evaluated using descriptive statistics. In the following Table 3, the reasons are ranked according to the averages reached from the lowest (largest agreement) to the highest. The most common reason is the need to keep up-to-date about one's favourite brand. The second reason is that people want to be inspired by the latest fashion trends. The third reason was simply that people want to be "in", and therefore add trendy fashion pages. People also add company pages because they want to be part of a group of fans of the brand that is created on the company page. Another reason is the ability to communicate on the page, i.e. to comment on posts or send queries to company representatives via chat. Lastly, people add a company page simply so that their friends can see that they have added it.

Tab. 3: Reasons for adding company pages – descriptive statistics (Source: the author)

	Brand information	Inspiration	To be IN	Fan community	Communi-cation	Friends
Average	1,6	1,9	3,4	4,1	5,1	5,3
Median	1	1	3	4	6	6
Modus	1	1	2	3	6	6
Standard dev.	0,87	1,22	2	1,93	1,8	1,81

For better clarity, the individual reasons for adding luxury fashion pages are presented in a box fence (Figure 1).

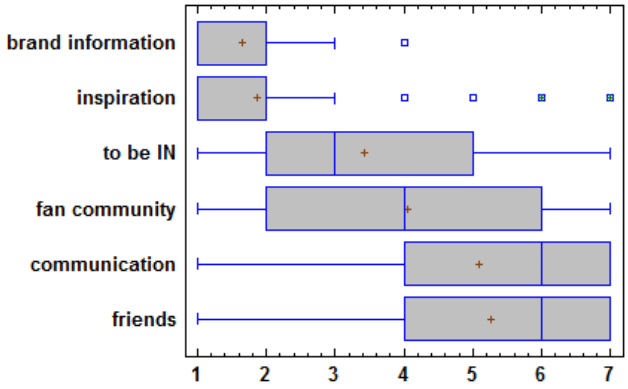


Fig. 1. Reasons for adding company pages – box fence

These six reasons were further tested using exploratory factor analysis. The aim of factor analysis was to summarize the information contained in a larger number of variables and reduce them to a few factors (Table 4).

Tab. 4: Reasons for adding company pages – factor analysis results (Source: the author)

KMO	0.744
Bartlett's test	0.000
Number of variables entering the FA	6
Number of factors	2
Cronbach's alpha	0.743

**Extraction method: main component analysis*
***Rotation method: varimax*

Kaiser-Meyer-Olkin's criterion was 0.744. This means that the use of factor analysis is good. Bartlett's test also came out (p-value < 0.05), so factor analysis could be performed. Cronbach's alpha was 0.743 for all variables, indicating the high consistency and reliability of the data. Table 5 summarizes the information about the overall explained variability and the numbers of the correlation matrix. The number of factors was chosen according to Kaiser's rule. This criterion is met by two factors, which together account for 66.8% of the overall variability.

Tab. 5: Reasons for adding company pages – results of main component analysis (Source: the author)

Faktor number	Eigenvalue	Percent of Variance	Cumulative Percentage
1	2,636	43,932	43,932
2	1,372	22,876	66,808

Table 6 shows the results of factor analysis. The table rows correspond to input items, columns represent factors. In order to better interpret the results, rotation was performed using the varimax method.

Tab. 6: Reasons for adding company pages – Factor Loading Matrix After Varimax Rotation (Source: the author)

	Factors	
	Brand community	**Information**
Brand community	0,861	0,023
Friends	0,832	-0,059
To be IN	0,731	0,259
Communication	0,724	0,126
Brand information	0,043	0,843
Inspiration	0,113	0,839

Table 6 shows that the first factor called the Brand Community consists of four reasons for adding pages, which are the possibility to be part of a brand community, the fact that my friends see that I have added a page, trying to be "in", and the ability to communicate on the page. The second factor called Information includes the ability to get up-to-date information about a favourite brand on the company page, and the opportunity to get inspiration about the latest fashion trends.

The third research question dealt with the possibility of different views on these two identified factors among different demographic groups of respondents.

3) Are there different reasons for adding company pages based on different demographic characteristics of fans?

This question was answered by means of a one-factor analysis of ANOVA variance, or the t-test, which examined the differences between the average response values of different demographic groups of respondents. Differences of gender, age and education were tested. Table 7 shows all the tests performed and shows both the F-Ratio / t statistic and the P-value.

Tab. 7: Reasons for adding company pages – ANOVA and t-test (Source: the author)

Factor	Characteristics	F-Ratio/t statistic	P-value
Brand community	gender	3,368	0,067
	education	7,646	**0,000**
	age	3,167	**0,024**
Information	gender	29,776	**0,000**
	education	0,992	0,397
	age	3,715	**0,012**

For the Brand Community factor, statistically significant differences were found in the characteristics of education and age. This factor was reported more frequently by people of lower age (under 30) and people with a high school diploma or university education. For the Information factor, a statistically significant difference was found for gender and age of respondents. More women and people under the age of 30 add the pages for this purpose.

The last research question focused on the economic benefits of company pages on Facebook. The research question was formulated as follows:

4) Do company pages on Facebook have an economic benefit for companies?

The economic benefit for companies was evaluated on the basis of two questions in the questionnaire. The first question related to the amount of money that customers spend on one luxury brand purchase, and the second asked how often customers buy luxury fashion. The economic benefit was therefore assessed on the basis of information provided by customers. The analysis was performed using the verbal variability test. First, it was tested whether there is a relationship between adding company page on Facebook and the amount of money spent on one luxury fashion purchase. The results of this test are presented in Table 8 below. The results show that there is a statistically significant relationship between the added page and the purchase amount.

Table 8: Tests of Independence (Source: the author)

Added page –	**Statistic**	**Df**	**P-Value**
Amount spent on purchase	60.778	4	0.000

The second test investigated the relationship between adding a company fashion page on Facebook and the frequency of purchasing luxury brands (Table 9). Here again, a statistically significant relationship between the two variables was demonstrated. So we can say that people who add the company pages of luxury brands are more likely to buy these brands.

Table 9: Tests of Independence (Source: the author)

Added page –	**Statistic**	**Df**	**P-Value**
Purchase frequency	42.411	5	0.000

Discussion and conclusion

This article dealt with the social network Facebook, specifically the pages that luxury fashion companies set up on Facebook. The first question asked what percentage of luxury brand customers has added at least one company page of these brands on Facebook. We have found that up to 70 % of respondents have added a company page. We discovered that this number is surprisingly large. It can be seen that customers are accustomed to adding company pages. There are many reasons why people add company pages. In this work, we defined six reasons that we reduced through exploratory factor analysis to two factors, namely Brand Community and Information. The Brand Community factor includes reasons such as the opportunity to be involved in a community of fans of the favourite brand, communications on the page, and the desire to be associated with a luxury brand. These reasons are especially important for the younger generation of Facebook users up to 30 years of age and for people with higher education (high school diploma, university degree). Therefore, companies should strive to create an appropriate environment for discussion amongst their fans. In addition, it is advisable to encourage brand awareness by means of appropriate communication. The second identified factor is Information. Fans want to get information on the latest fashion collections on the company's page and to peer behind the scenes of their favourite brands. Fans also expect the page to offer the latest fashion trends and tips on how to work with fashion. Fashion companies should focus on both identified factors if they wish to continue to expand their fan base.

In the last part of the research, we responded to research question number 4, which asked about the economic benefits of company pages. The results have shown that people who have added a company page typically spend more money on one purchase. Similarly, the purchase frequency is higher for fans of a company page than for people who have not added any pages. It cannot be clearly determined from the results whether page fans are so influenced by company communications that they are more likely to buy and spend more, or whether company pages tend to attract people who are loyal customers. Based on the results, we can only say that fans of company pages bring more revenue for companies than customers who have not added these pages. Whether the company page is the cause of larger and more frequent research is needed in further research. Based on our results,

we can state that company pages on Facebook have a large percentage of users today. The most common reasons for adding a company page are to be part of the brand community and the availability of brand information. Another important finding is that company pages cluster together customers who bring the largest revenue to companies. Based on these findings, we can recommend that companies establish a company page on Facebook and create a loyal customer base.

Acknowledgment

This article was created as part of a project to support excellent research teams at the Faculty of Economics of the Technical University of Liberec (EF TUL), which is funded by institutional support for the long-term conceptual development of EF TUL.

Sources

Bristow, DN and Mowen, JC. (1998), „The consumer resource exchange model: theoretical development and empirical investigation," *Marketing Intelligence & Planning* 16 (2,3), 90-99.

Brogi, C., et al. (2013), „The Effects of Online Brand Communities on Brand Equity in the Luxury Fashion Industry," *International Journal of Engineering Business Management* 5 (32).

Budíková, M., Králová, M. and Maroš, B. (2010), Průvodce základními statistickými metodami, Grada, Praha.

Churchill, G A. (1987). Marketing research: Methodological Foundations, 4 ed. Dryden, Chcago.

D'Arpizio, C., et al. „Luxury Goods Worldwide Market Study", *Bain & company*, [online] 2016 [Retrieved July 17, 2017], www.bain.com/publications/articles/luxury-goods-worldwide-market-study-fall-winter-2016.aspx

D´arpizio, C., et al. „Luxury Goods Worldwide Market Study Fall-Winter 2014: The rise of the borderless consumer", *Bain & company*. [online]. 2014. [Retrieved September 20, 2015], www.bain.com/publications/articles/luxury-goods-worldwide-market-study-december-2014.aspx

Dědková, J. (2014), „The Importance of Regional Products in Promoting Tourism in the Czech Republic." Proceedings of the International Multidisciplinary scientific conferences on social sciences and arts. ISBN 978-619-7105-27-8, ISSN 2367-5659, 2014, Sofia, Bulgaria, 645 – 652.

Fionda, AM and Moore, CM. (2009), „The Anatomy of the Luxury Fashion Brand," *Journal of Brand Management* 16 (5/6), 347-363.

Gamboa, AM and Goncalves. HM. (2014). „Customer loyalty through social networks: Lessons from Zara on Facebook," *Business horizons* 57 (5).

Healey, M. (2008), Co je branding? Slovart, Praha.

Hendl, J. (2004), Přehled statistických metod zpracování dat, Portál, Praha.

Janouch, V. (2011), Internetový marketing: Prosaďte se na webu a sociálních sítích. Computer Press, Brno.

Kang, J., Tang, L. and Fiore, AM. (2013), „Enhancing consumer–brand relationships on restaurant Facebook fan pages: Maximizing consumer benefits and increasing active participation," *International Journal of Hospitality Management* 36, 145-155.

Keller, KL. (2007), Strategické řízení značky. Grada Publishing, Praha.

Kudeshia, Ch., Sikdar, P. and Mittal, A. (2016), Spreading love through fan page liking: A perspective on small scale entrepreneurs, *Computers in Human Behavior* 54 (2016), 257-270.

Meloun, M and Militký, M. (2002), Kompendium statistického zpracování dat: metody a řešené úlohy. Academia, Praha, [Online], [Retrieved May 05, 2017], https://meloun.upce.cz/docs/books/kompendium.pdf

Novotová, J. (2016), Determining the Categories of Fashion by Price and Quality from a Consumer Point of View. *Ad Alta: Journal of Interdisciplinary Research* 6 (2), 70 – 77.

Novotová, J. (2017). Exploring Customer Loyalty to Fashion Brands on Facebook Fan Pages, *E+M Ekonomika a management,* in progress

Obruk, O. Češi a luxusní značky, *skupina Mather*. [Online], 2010 [Retrieved October 20, 2014], http://www.ogilvy.cz/data/files/study/1827_studie_mather_luxusni%20znacky_fin.pdf

Phau, P. (2000), Consuming luxury brands: the relevance of the 'Rarity Principle, *Journal of Brand Management* 8 (2), 122–138.

Posner, H. (2011), *Marketing Fashion*. Laurence King Publishing Ltd, London.

Rohm, A., Kaltcheva, VD. and Milne, GR. (2013), A mixed-method approach to examining brand-consumer interactions driven by social media, *Journal of Research in Interactive Marketing* 7 (4), 295-311.

Shih, C., (2010). Vydělávejte na Facebooku: Jak vytvořit sociální sítě k oslovení nových zákazníků, vytvoření lepších produktů a zvýšení prodejů. Computer Press, Brno.

Šimonová, L. (2006), *Průvodce k programu Statgraphics*, [Online], 2017 [Retrieved May 20, 2017] homel.vsb.cz.

Ungerman, O. (2016), Use of Social Networks in Personnel Marketing in Liberec Region. Proceedings of the ISCOBEMM, ISBN 978-80-210-8348-5. 2016. Brno, Czech Republic., 73 - 83.

Vysekalová, J. and Mikeš, J. (2009), Reklama: Jak dělat reklamu, Grada, Praha.

Liquidity Constraint and the Efficiency of Innovative Activities: The Results of Empirical Analysis of Industrial Companies

Dr. Arkady Trachuk, Doctor of Economics, Professor, the Financial University under the Government of the Russian Federation, Head of the Department of Management, Russia, Trachuk_A_V@goznak.ru;

Dr. Nataliya Linder: Candidate of Economics, Professor, the Financial University under the Government of the Russian Federation, Deputy Head of the Department of Management, Russia, NVLinder@fa.ru

Abstract

Research and development of new technology (R&D) is generally more beneficial for society than simply the profits made by an innovator, meaning that it produces a positive externality. Therefore, the key feature of an innovation analysis is consideration of the effects of floating: an enterprise does not receive the whole profit from the R&D completed, since other firms also obtain access to the developed technology (possibly with a time lag). For this reason, many firms tend to underinvest in R&D - particularly when a company experiences a liquidity constraint.

This paper highlights the results of research into the influence of liquidity constraint on corporate decisions on investment in research and development (R&D), and the efficiency of their innovative activities. The purpose of this research is to analyse the influence of liquidity constraint, expressed both in a tough version in which a company has no access to capital markets (for instance, due to a financial crisis or lack of property to secure collateral for credit) or in a softer version in which a company can raise credit, but the price of borrowed funds is higher than profitability of its activities - on the decision of companies to invest in R&D, the intensity of their investments in R&D and anticipated efficiency of innovative activities. This analysis uses a direct indicator of limiting credits and an econometric model defining a relation between a decision of companies to invest in R&D, intensity of those investments and efficiency of innovative activities. The results show that constraining financial indicators have a positive significant interrelation with the decision of firms to invest in R&D and has no influence on the intensity of those investments in case of a positive decision. Therefore, the liquidity constraint reduces the number of industrial companies deciding to invest in R&D, but does not influence the amounts of such investments. This can be explained by the fact that when companies decide to invest in R&D, availability of their own funds is more important than the possibility of raising credit.

There is also a cash effect: the effect of availability of extensive available funds at a large company facilitate its financing of R&D and innovation, and thus an inverse U-dependency between competition and innovation is confirmed.

It is concluded that small companies and companies in low-tech industries do not need to boost their R&D intensity, but need investment which facilitate the imitation of ready-to-use technology from the developed markets.

Key words: costs of research and development, innovation, liquidity constraint, result-driven innovative activities, financial status, two-dimensional probit-model.

Introduction

Given today's fast-developing situations and growing globalization, companies must regularly upgrade their production technology, create new products and form new sources of competitive advantages associated with the creation of intangible assets in order to keep their competitive positions and create new competitive advantages. All these things require huge research and development costs alongside generally financing innovative activities (Trachuk, Linder, 2016).

At the same time, most Russian industrial companies currently experience liquidity constraints due to the sanctions imposed on Russia by Europe and the USA after the RF reunified with Crimea. For instance, sanctions against the financial sector affect 60% of assets of the RF banking system and seriously limit the country's development. More expensive funding for Russian banks and organizations has resulted in an increase in interest rates and has made borrowing more expensive - which, in its turn, has had an inevitable impact on companies' investments in their current operations, including in investments in research and development.

Sanctions have a most deleterious impact on industrial companies since - , firstly - they reduce the options for cheap investments. In such cases, the State cannot provide such financing or meet the demands for all companies. Secondly, sanctions restrict access to new technologies, which cannot be substituted by either Chinese or Russian products over the short term. A ban on importing dual-purpose products, along with limitations on non-military higher technology imports may make Russia's technological inferiority to the world's leading countries even worse.

For this reason, research of the impacts of liquidity constraint - expressed both in a soft form where the rate of return on a company's operations is lower than the interest rate on loans or a tough form implying that a company has no access to the market of crediting - on companies' investment decisions in research & development, as well as the amounts of such investments and efficiency of innovative activities of Russian industrial companies, is highly topical.

Liquidity constraint impact on investments in R&D and innovation: overview of research

The results of such research of liquidity constraint on investments in R&D are ambiguous and contradictory. Most studies proved a negative effect of the liquidity constraint on investments in R&D (for instance, Aghion et al., 2012; Mancusi and Vezzulli, 2012; Bellone F. et al., 2013) and innovation (Savignac, 2008). However, a study (Czarnitzki and Hottenrott, 2011) shows that availability of in-house sources of funding is more important for a company deciding on investments in R&D; therefore, such decisions are not sensitive to liquidity constraint; a study by Mulkay et al., 2001, shows that decisions to invest in R&D are sensitive toliquidity constraint, but no more than decisions to invest in current operations. A study by Bond (Bond et al., 2003) argues that investments in research and development do not depend on cash flows and therefore financial constraints have no serious impact on decisions of firms to invest in R&D.

This article uses, for analytical purposes, the methodology chosen in studies (M. L. Mancusi, A. Vezzulli, 2010 and C. Altomonte, S. Gamba, M.L. Mancusi, A. Vezzull, 2013), which consists in using an index proposed by Whited and Wu (2006) considered below.

Study selection and analysed data

This study uses data on Russian industrial companies over the period of 2013-2016. The analysis encompasses industrial manufacturing companies, which were divided into high-tech, medium-tech, and low-tech ones. The study covered companies experiencing liquidity constraint:

- *due to a high cost of borrowings.* This group includes companies, whose rate of return on invested capital[1] was lower than the average interest rate on credits, in which case companies are divided into two groups: small and medium-sized ones employing up to 500 people and large ones with headcounts of over 500 people, which is due to a different cost of credits for these categories of companies. The RF Central Bank's statistics show that the average interest rate on credits in 2016 was as follows: 12.8% for large companies, 15.73% for small and medium-sized companies; in 2013 – 11.4% and 14.2%, respectively[2];
- *due to the poor financial condition of companies* and, for this reason, without access to the capital market. In order to select companies for this category, we selected a normative approach to determine the level of financial standing by comparing the estimated financial indicator with the normative value approved by laws.

Sources of information used: databases SPARK, Ruslana, Rosstat, in addition to information from the websites of industrial companies, indicators reflected in innovative development programs, statistical reporting form 4 "Innovation", supplemented by audit data. Small and medium-sized firms with unavailable financial indicators were not considered in the study.

970 industrial companies were analysed in total, 198 of which were selected (Table 1).

Table 1. Number of selected companies distributed by headcount

Companies with a headcount of	Total companies considered	Companies experiencing liquidity constraints		Total companies selected
		Companies whose rate of return is lower than the average rate on credits	Companies with an unstable financial position	
Up to 250	183	26	17	43
250 - 499	194	31	14	45
500 – 999	198	26	12	38
1,000 – 4,999	127	17	11	28
5,000 – 9,999	196	23	9	32
10,000 and more	72	14	5	19
Total	970	130	68	198

Table 2. Number of selected companies distributed by industry sectors

Sectors of manufacturing industry	Companies whose rate of return is lower than the average rate on credits	Companies with an unstable financial position	Total
High-tech sector	44	18	62
Medium-tech sector of a high level	31	9	40
Medium-tech sector of a low level	34	15	49
Low-tech sector	28	19	47
Total	137	61	198

The variables of analysis included: the size of a company, sphere of activity, investments in R&D and parameters of export operations. In order to reflect the liquidity constraint impact on innovation, we introduced the variable Rdint corresponding to the amount of innovation costs interrelated with total sales revenues in 2016. This permitted analysis of the impact of innovation costs on the level of demand for capital; companies' decisions to invest in R&D; and efficiency of innovative activities. Table 3 presents descriptive statistics of the

studied companies.

Table 3. Descriptive statistics of distribution of the studied companies

Industry Sector	R$D = 1 (% of companies)	EXP = 1 (%of companies)	Expint (average weighted value)	Standard deviation	RDint (average weighted value)	Standard deviation
Up to 250 people (43 companies)						
High-tech sector	37	8	0.04	0.0031	0.0012	0.00054
Medium-tech sector of a high level	48	7	0.043	0.0025	0.0013	0.00038
Medium-tech sector of a low level	31	6	0.026	0.0038	0.0015	0.00041
Low-tech sector	34	4	0.019	0.0024	0.00039	0.000071
250 – 499 people (45 companies)						
High-tech sector	41	19	0.064	0.0028	0.00112	0.00054
Medium-tech sector of a high level	54	16	0.058	0.0036	0.00124	0.00038
Medium-tech sector of a low level	28	14	0.076	0.0071	0.00105	0.00041
Low-tech sector	31	11	0.019	0.0063	0.00009	0.000071
500 – 999 people (38 companies)						
High-tech sector	43	32	0.123	0.0027	0.001092	0.000302
Medium-tech sector of a high level	37	19	0.143	0.0034	0.00213	0.00008
Medium-tech sector of a low level	18	9	0.226	0.0027	0.00109	0.00021
Low-tech sector	13	14	0.311	0.0032	0.00113	0.000107
1,000 – 4,999 people (28 companies)						
High-tech sector	53	38	0.19	0.00118	0.00209	0.00023
Medium-tech sector of a high level	44	24	0.21	0.00217	0.00103	0.000108
Medium-tech sector of a low level	35	16	0.18	0.00318	0.00215	0.000411
Low-tech sector	11	17	0.11	0.00204	0.000107	0.0000173
5,000 – 9,999 people (32 companies)						
High-tech sector	51	41	0.214	0.0031	0.00117	0.00052
Medium-tech sector of a high level	64	32	0.243	0.0027	0.00114	0.00083
Medium-tech sector of a low level	23	11	0.216	0.00232	0.00119	0.000191
Low-tech sector	12	15	0.119	0.00114	0.000139	0.0000012
10,000 and more people (19 companies)						
High-tech sector	67	75	0.344	0.0041	0.00217	0.000126

Medium-tech sector of a high level	69	64	0.343	0.0015	0.00176	0.000153
Medium-tech sector of a low level	61	52	0.226	0.0028	0.00195	0.000815
Low-tech sector	37	38	0.219	0.0014	0.00139	0.0000237

Table 4 summarises all indicators used in the study.

Table 4. Variables used for the analysis purposes

Indicator	Interpretation
R$D	Fictitious variable equal to 1, if a company invests in R&D, and 0 if otherwise
EXP	Fictitious variable equal to 1, if a company has sales revenues on foreign markets, and 0 if otherwise
Capital investment (CI)	Equity investments (current and capital expenses), (RUB'000)
Expint	Share of revenues from export operations in the total sales revenue
RDint	Share of sales revenues aimed at innovation
LTF_2016	Total factorial output calculated for 2016
size	Company size measured by the average headcount
	Index measuring the company's demand for external funding

Research methodology

In order to analyse the liquidity constraint impact on companies' decisions concerning investment in R&D, and the intensity of those investments and efficiency of innovative activities, we used a system of simultaneous econometric equations - the technique of which implies that each independent variable y is considered as the function of the same set of factors x. Traditional indicators proposed in the studies of this subject were considered as independent factors: firm size, sales revenues from export operations (Expint), share of sales revenues used to invest in innovation (RDint), full factorial output of companies (LTF_2016), capital investments (CI).

The company size determinant was proposed by Cohen W. M., Klepper S. (1996), and this is explained by the fact that investments in R&D require quite extensive funding, which can be distributed by large firms for a large scope of products and, therefore, are unlikely to choose to reject participation in R&D. Furthermore large firms have better relationships with investors, and this additionally facilitates their access to financing. The full factorial output impact on investments in R&D and innovation is described in a study by Blundell et al., (2009), proving an important interrelation between the factorial output of a firm and a decision to invest in R&D. A study by C. Altomonte, S. Gamba, M.L. Mancusi, A. Vezzull, (2013) points out to a positive interrelation between export operations and investments in R&D; in order to analyse the effect of export operations, we introduced the variable Expint showing the share of revenues from exports in the total sales revenues.

Building an econometric model

The econometric model consists of three components. The first equation of the model evaluates a firm's demand for external funding. The second part consists of two equations explaining a company's decision to invest in R&D and amounts of such investments. The third component shows the interrelation between the efficiency of innovative activities and the amounts of investment costs.

Mathematically, the model appears as follows:

$$\begin{cases} \mathcal{WW}_i = \beta_{10} + \beta_{11}RD_\iota + \beta_{12}EXP_\iota + \beta_{13}LTF_{2014_i} + \beta_{14}size_\iota + \beta_{15}\mathrm{CI}_\iota + \upsilon_{1\iota} \\ Y_i = \beta_{20} + \beta_{21}WW_\iota + \beta_{22}EXP_\iota + \beta_{23}LTF_{2014_i} + \beta_{24}size_\iota + \beta_{25}\mathrm{CI}_\iota + \upsilon_{2\iota} \\ \omega_i = \beta_{20} + \beta_{21}WW_\iota + \beta_{22}EXP_\iota + \beta_{23}LTF_{2014_i} + \beta_{24}size_\iota + \beta_{25}\mathrm{CI}_\iota + \upsilon_{2\iota} \\ \mathrm{g}i = \beta_{30} + \beta_{31}WW_\iota + \beta_{32}RD_\iota + \beta_{33}LTF_{2014_i} + \beta_{34}size_\iota + \beta_{35}\mathrm{CI}_\iota + \upsilon_{3\iota} \end{cases} \quad (1)$$

Index of a firm's demand for external funding

In order to evaluate the liquidity constraint impact, we use an index proposed by Whited & Wu (2006) – WW, which measures a firm's demand for external funding. The WW index is obtained as a function of maximizing the structural investment model, and appears as follows:

$$\mathrm{WW} = -0{,}087 * \mathrm{CF} - 0{,}058 * \mathrm{DIVPOS} + 0{,}034 * \mathrm{TLTD} - 0{,}042 * \mathrm{LNTA} + 0{,}117 * \mathrm{ISG} - 0{,}028 * \mathrm{SG} \quad (2)$$

where,

CF = relation of the cash flow to the total value of property;
DIVPOS = a fictitious variable equal to one if the company pays dividend and zero if otherwise;
TLTD = relation of long-term debt to own resources;
LNTA: book value of the company's property;
ISG: growth of sales revenues;
SG: sales revenues.
The index was calculated based on data presented in Table 5.

Table 5. Descriptive statistics of variables used to calculate the index.

	Average weighted value[3]	Standard deviation	Minimum value	Maximum value
CF	0.3553	0.01637	0.1645	0.7644
DIVPOS	1 \0	-	0	1
TLTD	0.5302	0.02139	0.2332	0.7828
LNTA	8.1274	1.2576	3.7301	16.0951
ISG	0.0493	0.002596	0.03078	0.07134
SG	1.408	0.02174	0.1222	1.7444

Investment in innovation

The second component of the model evaluates the impact of factors on the decision to invest in R&D and - in case of a positive decision - the amount of investment in R&D per employee involved in research and development. The Hackman Censored Regression model was used for the purpose of analysis, enabling the evaluation of both the company's disposition to invest in innovation, and the definition of the amounts of such investments. The model consists of two components: the first one – a binary choice model determining whether "to invest/not to invest"; the second one – a linear model evaluating the amount of investments in R&D.

Therefore, the Hackman model has two latent variables explaining a decision of firms to invest in R&D:

$$\mathrm{y_i} = \begin{cases} 1 \quad if \quad y_\iota^* = \beta_{20} + \beta_{21}WW_\iota + \beta_{22}EXP_\iota + \beta_{23}LTF_{2014_i} + \beta_{24}size_\iota + \beta_{25}\mathrm{CI}_\iota + \upsilon_{2\iota} \quad > \tau \\ 0 \quad if \quad Y_\iota^* = \beta_{20} + \beta_{21}WW_\iota + \beta_{22}EXP_\iota + \beta_{23}LTF_{2014_i} + \beta_{24}size_\iota + \beta_{25}\mathrm{CI}_\iota + \upsilon_{2\iota} \quad \leq \tau \end{cases} \quad (3),$$

where $\mathrm{y_i}$ = an observable binary variable equal to one, if companies decide to invest in innovation, and zero for other companies;

y^*_i = latent (non-observed) endogenous variable measuring factors that affect a company's decision to invest in R&D. The latent variable may be interpreted as a choice criterion; in our case: the anticipated amount of the firm's profit from innovative activities;
= vectors of parameters;
$_i$ = residual member.

Accidental errors of the model are assumed to be normally distributed.

Companies decide to invest in research and development, if = the non-observed endogenous variable is higher than the defined threshold = anticipated amount of the firm's profit from innovative products.

The second equation of the Hackman model shows the amounts of innovation costs in case a decision is made to "invest", which is expressed as an amount of investments in R&D per employee involved in research and development:

$$w_\iota = \begin{cases} w_\iota^* = \beta_{20} + \beta_{21} WW_\iota + \beta_{22} EXP_\iota + \beta_{23} LTF_{2014_i} + \beta_{24} size_\iota + \beta_{25} \mathrm{CI}_\iota + \upsilon_{2\iota} \ , \\ if\ \gamma_\iota = 1 \\ 0,\ if\ \ \gamma_\iota = 0 \end{cases} \quad (4)$$

where = the non-observed variable evaluating the amount of investments in R&D per employee involved in research and development;
= vector showing the trend direction;
$_i$ = residual member.
If the option "not to invest" is chosen in the first equation, is considered equal to zero.

Results of innovative activities

The third component of the model shows a dependence of the results of innovative activities in the form of the following production function of innovation:

$$\mathrm{g}_\iota = \beta_{30} + \beta_{31} WW_\iota + \beta_{32} RD_\iota + \beta_{33} LTF_{2014_i} + \beta_{34} size_\iota + \beta_{35} \mathrm{CI}_\iota + \upsilon_{3\iota} \quad (5)$$

where g_i = results of innovative activities expressed in the scope of released innovative products;
= vectors of parameters;
and $_i$ = residual member.

Research results

Tables 6, 7, 8 show the results of calculations of the liquidity constraint impact on a company's decision to invest in R&D, amounts of such investments, and efficiency of companies' innovative activities.

Table 6. Determinants of the index of demand for financing

Regression equation (dependent variable – demand for external financing)				
Manufacturing industry	High-tech sector	Medium-tech sector of a high level	Medium-tech sector of a low level	Low-tech sector
Analysis method (LSM – least squares method)	LSM	LSM	LSM	LSM

RDint	-0.00893*** (0.00159)	-0.00857*** (0.00161)	-0.00422*** (0.00157)	-0.00267* (0.00158)
Expint	- 0.000521 (0.00100)	- 0.000851 (0.00100)	- 0.000592 (0.00100)	- 0.00805*** (0.00162)
	0.0213 (0.0113)	0.0445 (0.0097)	0.0347 (0.0202)	0.0211*** (0.0146)
LTF_2014	- 0.0466*** (0.00227)	-0.0456*** (0.00237)	-0.0464*** (0.00236)	-0.0455*** (0.00236)
size	-0.0412*** (0.00105)	-0.0406*** (0.00105)	-0.0407*** (0.00106)	-0.0403*** (0.00106)
Constant	0.110*** (0.00610)	0.109*** (0.00606)	0.110*** (0.00609)	0.110*** (0.00606)
Number of observations	62	40	49	47
Model quality evaluation – pseudo determination ratio (R^2_{pseudo})	0.446	0.449	0.447	0.449

Notes: 1) The numbers presented have marginal effect values

2) Statistical significance of ratios: ***- p0.001; **- p0.01; * - p0.05

3) robust standard errors are shown in brackets.

According to calculations, the company's size, export activities, and investments in innovation negatively correlate with the size of its demand for external financing, i.e., the larger the company's size, the lower the likelihood of liquidity constraints will be for a firm; this can be explained by the possibility large companies have to use available accumulations and established relationships with banks. Banks also prefer providing credit to larger firms due to a lower asymmetry in information. Smaller firms have more financial limits. Export operations also reduce the liquidity constraint impact of companies because exporters may be credited on both domestic and foreign markets.

Table 7. Marginal effects for the Hackman Binary Choice model (results of calculations of the second component of the model)

Manufacturing industry characteristics	High-tech industries		Medium-tech industries of a high level		Medium-tech industries of a low level		Low-tech industries	
Dependent variables	Decision to invest in innovation	Amount of investments in R&D per employee	Decision to invest in innovation	Amount of investments in R&D per employee	Decision to invest in innovation	Amount of investments in R&D per employee	Decision to invest in innovation	Amount of investments in R&D per employee
Analysis method	Censored regression – Hackman model, first equation	Censored regression – Hackman model, second equation	Censored regression – Hackman model, first equation	Censored regression – Hackman model, second equation	Censored regression – Hackman model, first equation	Censored regression – Hackman model, second equation	Censored regression – Hackman model, first equation	Censored regression – Hackman model, second equation
	-0.299*** (0.111)	- 0.0013* (0.108)	-0.548 (0.124)	-0.0029*** (0.111)	-0.492* (0.108)	-0.0098 (0.124)	-0.149*** (0.111)	-0.0024* (0.108)

Expint	0.193*** (0.041)	0.119 (0.139)	0.298** (0.030)	0.116*** (0.122)	- 0.183*** (0.071)	- 0.174** (0.298)	- 0.158* (0.030)	- 0.076*** (0.122)
	0.311** (0.055)	0.271** (0.117)	0.392** (0.123)	0.2142** (0.144)	0.255** (0.172)	0.308*** (0.132)	0.259*** (0.145)	0.273*** (0.115)
LTF_2016	0.350*** (0.034)	0.405 (0.111)	0.148*** (0.025)	0.224*** (0.078)	0.281*** (0.051)	0.438* (0.246)	0.261*** (0.019)	0.401*** (0.096)
size	0.186*** (0.012)	0.001*** (0.037)	0.063*** (0.044)	0.078*** (0.062)	0.175*** (0.021)	0.092*** (0.043)	0.257*** (0.032)	0.014*** (0.022)
Constant	0.471*** (0.0179)	0.457*** (0.012)	0.371** (0.286)	0.261** (0.112)	0.493** (0.115)	0.467** (0.107)	0.398** (0.134)	0.331** (0.017)
Number of observations	62		40		49		47	
Model quality evaluation - Hackman lambda	0.167 (0.103)		0.7319** (0.2741)		0.9674** (0.3986)		0.5012*** (0.108)	
The correlation coefficient for the aggregate, rho	0.263** (0.082)		0.328** (0.079)		0.2271*** (0.2104)		0.309*** (0.065)	
Wald test for Ho, rho = 0	2.42		1.98**		6.77**		21.78***	

Notes: 1) The numbers presented have marginal effect values

2) Statistical significance of ratios: ***- p0.001; **- p0.01; * - p0.05

3) robust standard errors are shown in brackets.

These calculations show that liquidity constraints have a negative impact on companies' decisions to invest in R&D, and this dependence is most acute for companies operating in medium-tech industries of a high level (0.548) and low level (0.492). At the same time, this dependence is less typical of companies in high-tech and low-tech industries. At the same time, and for all industrial sectors. liquidity constraints more greatly influence a company's decision to invest in R&D than the "intensity" of a company's investments in R&D expressed as R&D costs per employee involved in innovative activities. Across all sectors, liquidity constraint has a minor impact on the intensity of investments in R&D - which can be explained by the fact that the availability of in-house funds is more important for the decision-making process. This is also confirmed by indicators of elasticity of an impact of investments in equity (0.311; 0.392; 0.255; 0.259, respectively).

All of this confirms the inverse U-dependence between competition and innovation. For instance, exporting firms are more likely to invest in R&D due to a higher levels of competition to which such companies are exposed. Besides, a sectoral analysis shows that in high-tech industries with a small number of players competition targets quality (creating good grounds for innovation) and a competition increase has a positive impact on the output; in the market of low-tech sectors with a large number of players competition targets prices and we can see an inverse trend where a company refuses to invest in R&D, substituting them with imitation.

Table 8. Determinantors of results of innovative activities of industrial companies, 2016 (results of calculations of the third component of the model)

Regression equation (dependent variable – efficiency of innovative activities)				
Manufacturing industry sector	High-tech sector	Medium-tech sector of a high level	Medium-tech sector of a low level	Low-tech sector
Analysis method (LSM – least squares method)	LSM	LSM	LSM	LSM

RDint	0.567** (0.00781)	0.439 (0.00780)	0.368** (0.00757)	0.215 (0.00863)
	-0.772*** (0.00173)	-0.857*** (0.00161)	-0.422*** (0.00157)	-0.267* (0.00158)
Expint	0.472*** (0.00120)	0.441** (0.00110)	0.315*** (0.00120)	0.201*** (0.00182)
	0.114 (0.081)	0.162 (0.093)	0.119 (0.041)	0.121*** (0.0229)
LTF_2016	0.0703*** (0.0234)	0.0276 (0.0173)	0.0371** (0.0171)	0.0312 (0.0196
size	0.0217*** (0.00205)	0.0308*** (0.00105)	0.1403*** (0.00226)	0.0503*** (0.00291)
Constant	0.209*** (0.00610)	0.221*** (0.00606)	0.142*** (0.00609)	0.1670*** (0.00606)
Number of observations	62	40	49	47
Model quality evaluation – pseudo determination ratio (R^2_{pseudo})	0,114	0,147	0,115	0,147

Notes: 1) The numbers presented have marginal effect values

2) Statistical significance of ratios: ***- p0.001; **- p0.01; * - p0.05

3) robust standard errors are shown in brackets.

As was anticipated, liquidity constraints have a negative impact on the results of innovative activities expressed by sales of innovative products. However, the highest impact of liquidity constraints is observed in high-tech and medium-tech sectors of a high level (0.772 and 0.857, respectively).

A positive correlation between competition of markets and efficiency of innovative activities is proved. Exporting companies are characterized by higher efficiency of innovative activities even in a situation of liquidity constraints. This dependence is expressed more strongly in high-tech and medium-tech sectors (0.472; 0.441; 0.315, respectively) and more feebly in the low-tech sector (0.201). Neither a large headcount, nor full factorial output have significant effect on the efficiency of innovative activities.

Conclusions and further research

Research and development of new technology (R&D) is generally more useful for society than profits gained by an innovator, i.e. it brings a positive externality. Therefore, the key feature of an innovation analysis is the consideration of an effect of floating: an enterprise does not receivethe entire benefit fromR&D carried out, as other firms get access to the developed technology as well (possibly with a time lag). For this reason, many firms tend to underinvest in R&D, particularly when a company experiences a liquidity constraint.

Our empirical model makes it possible to arrive at several conclusions concerning the interrelation of liquidity constraints, a company's decision to invest in R&D, and efficiency of innovative activities.

Firstly, we showed the cash effect: the effect of availability of substantial available funds at a large company, which facilitate its financing of R&D and innovation. The empirical results of research show that companies of a large size, which actively invest in current operations, are more likely to invest in R&D - even against a background of liquidity constraints. Smaller firms are more sensitive to liquidity constraints when investing in R&D than large firms, whose investments in R&D are not so sensitive.

Small companies most often cannot use their own in-house funds to finance R&D and experience such constraints. In this case, the infrastructure development by the state for supporting the financing of start-up projects and small businesses plays a large role in this case: business angels, venture funds, etc.

Another important conclusion is a more decisive role of own in-house funds for financing R&D. Thus, the higher the amount of current investments in operations of a firm, the higher the likelihood that it will invest in R&D.

Our analysis showed that liquidity constraints reduce the number of companies deciding to invest in R&D, particularly in medium-tech industries, and have a minor impact on a company's R&D costs per employee involved in innovative activities. This dependence is typical of all the considered sectors of the industry.

One further result is a confirmation of the inverse U-dependence between competition and innovation. For instance, exporting firms are more likely to invest in R&D due to the higher level of competition to which such companies are exposed. Besides, sectoral analysis shows that in high-tech industries with a small number of players, competition targets quality (creating good grounds for innovation) and a competition increase has a positive impact on the output; in the market of low-tech sectors with a large number of players competition targets prices and we can see an inverse trend where a company refuses to invest in R&D, substituting them with imitation.

It can also be concluded that small companies and companies in low-tech industries do not need to increase the intensity of their R&D, but need investments simplifying the imitation of ready-to-use technologies from developed markets.

At the same time, our research has a number of limitations. For our analysis purposes, we used a direct limiting factor of liquidity, which only indirectly identifies liquidity constraints (see an analysis of Kaplan-Zingales) because we have no deeper data on availability of credits for the subject companies and the actual extent of demand for external funding. For this reason, analysis should be subsequently focused on surveying companies of the industrial sector with more accurate evaluation of investment models - based on the Eiler equation, accelerator model or error elimination model, which enable definition of an "optimal model" of debt-to-equity ratio.

References

Trachuk A.V., Linder N.V. (2016), "Liquidity limitation influence on industrial companies' investments in investisations and development and effectiveness of innovative activity", Effective Crisis Management (the ECM-journal), 2016. № 1. C. 80-89.

Aghion P., Askenazy P., Berman N. et al. (2012)CreditConstraintandtheCyclicalityof R&D Investment: EvidencefromFrance//JoumaloftheEuropeanEconomicAssociation. Vol. 10, N 5. P. 1001-1024.

Altomonte C., Gamba S., Mancusi M. L. et al.(2013) R&D investments, Financial Constraints and Export//KITeS Working Papers 030, KITeS, Centre for Knowledge, Internationalization and Technology Studies/Universita' Bocconi. Milano. P. 377-395.

Bellone F., Musso, P., Nesta L. et al. (2013)Financial ConstraintsandFirm ExportBehaviour//WorldEconomy. Vol. 33, N 3. P. 347-373.

Blundell R., Griffith R., Van Reenen J.(2009)MarketShare, Market value and Innovation in a Panel of British Manufacturing Firms//Review of Economic Studies. Vol. 66. P. 529-554.

Bond S., Harhoff D., Van Reenen J. (2005) Investment, R&D and Financial Constraints in Britain and Germany//Annales d'Economie et de Statistique. N79/80. P. 1-28.

Canepa A., Stoneman P. (2013) DoFinancialFactorsConstrainInnovation?: AEuropeancross country study, forthcoming//Competition, Monopoly and Corporate Governance: Essays in Honour of Keith Cowling/Ed. M. Waterson. London: Edward Elgar.

Cohen W. M., Klepper S. (1996) A Reprise of Size and R&D//The Economic Journal. Vol. 106, N 437. P. 925-951.

Czamitzki D., Hottenrott H. (2011) R&D investment and financing constraints of small and medium sized firms//Small Business Economics. Vol. 36,N1.P. 65-83.

Greenaway D., Guariglia A., Kneller R. (2007) Financial factors and exporting decisions//Journal of International Economics. Vol. 73, № 2. P. 377-395.

Hajivassiliou V., Savignac F. (2011) Novel Approaches to Coherency Conditions in LDV Models with an Application to Interactions between Financing Constraints and a Firms Decision and Ability to Innovate, mimeo//The London School of Economics and Politicfl Science. URL: https://econ.lse.ac.uk/stafF/vassilis/pub/papers/pdf/financing_constraints_innovation.pdf.

Kaplan S., Zingales L. (2007) Do Investment-Cash Flow Sensitivities Provide Useful Measures of Financing Constraints?//Quarterly Journal of Economics. Vol. 112,N l.P 169-215.

Mancusi M L., Vezzulli A. (2010)R&D, innovation and liquidity constraints//KITeS Working Papers 030, KITeS, Centre for Knowledge, Internationalization and Technology Studies/Universita' Bocconi. Milano. P 108-123.

Mancusi M.L., Vezzulli A. (2012) R&D, innovation and liquidity constraints//KITeS Working Papers 030, KITeS, Centre for Knowledge, Internationalization and Technology Studies/Universita' Bocconi, Milano, Italy.
MulkayB., Hall B.H., Mairesse J. (2001) Investment and R&D in France and in the United States//Investing Today for the World of Tomorrow/Deutsche Bundesbank. Berlin; Heidelberg; New York: Springer. P. 227-251.

Savignac F. (2008) Impact of Financial Constraints on Innovation: What Can Be Learned from a Direct Measure?//Economics of Innovation and New Technology. Vol. 17, N6. P 553-569.

Tiwari A. K., Mohnen P., Palm F.C. et ai. (2007) Financial Constraints and R&D Investment: Evidence from CIS//UNU-MERIT Working Paper. N 11. P. 337-349.

Whited T. M., Wu G. (2006) Financial Constraints Risk//Review of Financial Studies. Vol. 19, № 2. P 531-559.

[1] Rate of return on invested capital (ROIC) means a ratio of net operating profits to the period's average own and long-term borrowed capital.
ROIC = EBIT*(100%-profit tax rate)/Invested capital. In this case, we assume that the invested capital of borrowings ROIC = (EBIT*(100%-profit tax rate) – % on borrowed capital)/(equity + borrowed capital).
[2] http://www.cbr.ru/statistics/?PrtId=int_rat
[3] The parameter of the company's headcount was used as a weight.

Sustainability of the Business in the Conditions of Globalization

Nikolova L.V: Peter the Great St.Petersburg Polytechnic University,
Russia, 195251, St. Petersburg, Politekhnicheskaya street, 29, E-mail: nikalvsk@yandex.ru

Rodionov D.G: Peter the Great St.Petersburg Polytechnic University,
Russia, 195251, St. Petersburg, Politekhnicheskaya street, 29, E-mail: rodion_dm@mail.ru

Litvinenko A.N.: St-Petersburg University of the Ministry of Internal Affairs of Russia,
Department of economic security and management of socio-economic processes.
Russia, 198206, St-Petersburg, Lyotchika Pilyutova, 1.
E-mail: Lanfk@mail.ru

Abstract

Integrity and cyclical development of the world community allows to consider globalization, on the one hand as a process, on the other hand as the system located at a certain stage of development. Assuming that the world community - it is a system, so it can be told that it has properties of the system. This, in turn, allows authors to highlight in this system a subsystem - business. For management of resistance of subsystem, business authors propose to use the Solow growth model and its concept of economic evolutionary process: " ... the nonlinearity, instability, bifurcation and chaos in dynamical economic systems." Subsystem of business is in continuous harmonic oscillations, it means that the subsystem is unstable, because it does not return to its initial steady state, and therefore it has synergistic properties.

Based on the above, as a result of the study, the authors constructed a mathematical - economic dynamic model of stability of the subsystem business, considering inflation component. Entering in a formula particular data of the subsystem business, specific business model will be obtained, representing area of stability of the subsystem business in the context of globalization. In conclusion, it can be said that obtained economic-mathematical model with dynamic inflation component allows to control the stability of the subsystem business in the context of globalization.

Keywords: business sustainability, globalization, mathematical economic model, Solow model, Samuelson–Hicks model.

Introduction

Business in a globalized world represents a qualitatively new socioeconomic system. Today's global business community is now in the transition stage from multinational to global corporations. Multinational corporations produce and sell their products in different countries using different business strategies and tactics. Global corporations produce and sell their products in different countries using uniform strategy and tactics in all markets (e.g. Procter & Gamble, Nestle, Toyota, Coca-Cola and so on).In recent years, rapidly developing technology allowed scientists to address the problem of basis for sustainable development of our civilization and, as one of its components, the basis for sustainable economic development. The latter depends on the sustainable development of business, which represents different types of socioeconomic systems.

Literature review

To questions of a sustainable development of economy have devoted the works prominent Russian and foreign scientists - A. Marshall (1890), Y.A. Shumpeter (1911), J.M. Keynes (1936), R. Dofman, P.Samuelson and R.Solov (1958), L.I. Abalkin (1987), V.B. Zang (1999) ,V.V., R.A. Brazhe. (2002-2003), Martina K. Linnenluecke (2010), I. Rudskaia, L. Guzikova (2014), A.J. Silviusa, etc (2015), L.Nikolova, D.Rodionov & J. Kuporov (2015), O. Kalinina (2016), T. Kudryavtseva (2016), T. Shabunina, S. Shchelkina (2017), N. Afanasyeva (2017) and many others.

Harlem Brundtland (1993), who coined the term "sustainable development", explains it as follows: "Humankind is surely capable of making its development sustainable, i.e. ensuring that this development can fulfill the needs of the present and never puts at risk the capability of future generations to fulfill their future needs."

While analysing this problem, A.V. Pozdniakov (2002) showed that the essential possibility for sustainable development of socioeconomic process exists because this process has a range of features, as listed below:

1. "Development is an irreversible spacial-temporal direction of changes in the states of systems (including socioeconomic ones) where some of the elements of previous states are being denied in the posterior structure... If external conditions (including the environment created by the total of socioeconomic systems) alter, then alters the very structure of a socioeconomic system".
2. "Socioeconomic system growth rate is a number of times its structural elements are substituted per a unit of time. And growth intensity is defined by the growth rate and mass of the system (amount of systems involved in the process, amount of people, resources, etc.)".
3. "Sustainability of development is defined by the length and amplitude of oscillations, e.g. GNP, counted from the trend..."
4. "Social system develops sustainably if the wave amplitude (oscillation about the equilibrium point, trend line) reduces and the wavelength increases which is, for sure, possible only if the development (movement) rate is high..."

Further Pozdniakov says that sustainable development can only be possible due to unsustainabilities: "Unsustainability actuates, induces the tendency of the system toward a dynamically equilibrated state – dynamic sustainability..."

Thus, the sustainable development of economy, and business in particular, should not be regarded as something balanced and monotone, without oscillations and jerks, but as dynamically sustainable development with a positive trend which is overlapped by stochastic (i.e. probabilistic) oscillations related to changes in the system and its environs.

Methodology

Systemic approach is a basis for methodology, its key principles are used in the application of the dynamical systems theory (in most cases – theory of automatic regulation), methods of mathematical economic modelling, decision theory and methods, economic and financial analysis theory and methods, forecasting.

The theory of growth poles or growth centers serves as a basis for modern economic theory of business development in different countries. This theory represents an aggregate of three concepts – "dominant economy", "harmonized growth" and "universal economy". However, the growth poles theory remains raw, a range of important problems are still unsolved, in particular, the problem of population size in the growth centers, the problem of population functional hierarchy concerning the level of business development and its policy objectives. Issues of the poles theory are often eliminated by means of application of the evolutionary systems theory, which consists in the fact that the result of work of any system could be reduced to assessment of some integrated index – a value showing the reaction of a system to changes in various local values in the environment.

Here, the Gross National Product (GNP) is this value characterizing the reaction of a system to the changes in various local values in the environment.

When forming the mathematical economic model (the Model) of business sustainability in a globalized world we applied the synergetic approach to study this model.

In the study, we assume that the model of business sustainability is composed of two main subsystems: a scientific production system and a financial credit system. Each of the subsystems is self-organizing and developing which allows to consider any of their element as a feedback loop consisting of a controlled object and a controller. Elements, which form the scientific production subsystem and the financial credit subsystem, may be strategic or dynamic.

Conclusions

In the study undertaken in order to form mathematical economic model we used Robert Solow's Neoclassical Growth Model (Fig. 1) where business is considered as a closed unified unstructured entity producing a single universal product, which may be consumed or invested. This statement may be interpreted as a representation of business as one complex dynamic element.

Solow in his model uses the Cobb-Douglas Production Function in order to describe business.

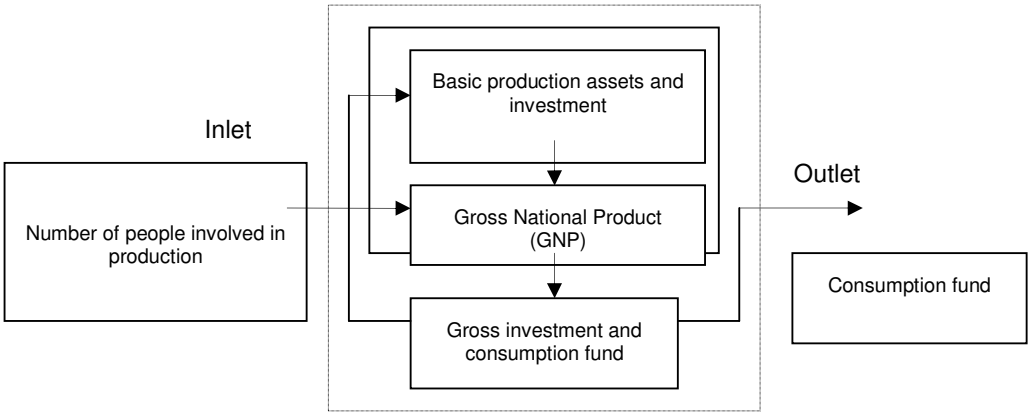


Fig. 1. Solow Business Description Model

This model considers five macroeconomic indicators (endogenous variables): Gross National Product (GNP); Gross Investment; Consumption Fund; Basic Production Assets (BPA; number of people involved in production.

Business system presented in the form of Solow Model is an unstructured dynamical system because it contains dynamical elements. In business management, the most significant thing is distribution of GNP between savings (gross investment) and consumption. Our analysis made it possible to conclude that business is a dynamical system. Also, it was stated that business economics is non-linear because the relation between output and resource spend is shown as a non-linear production function.

Among the most important aspects of economic evolution process the authors name "... non-linearity, unsustainability, bifurcations and chaos in dynamical economic systems".

As a result, the study outlined the variant of analysis where all GNP growth for the year is entirely used for investment, business development. Dynamics of this process is shown in business mathematical economic model, the ideology of which was developed by Samuelson-Hicks (1).

Samuelson-Hicks's approach allowed to present the business system model as a system in simple harmonic motion (at r=1), i.e. the system is unsustainable because it doesn't return to the initial sustainable state and, therefore, is synergetic.

In the plane (η, u) of phase variables, the system track will look like a canonical ellipse (Fig. 2):

$$\frac{\eta^2}{a^2} + \frac{u^2}{b^2} = 1, \qquad (1)$$

where

a – share of gross investment in GNP;
b – changes in the share of gross investment in GNP considering the time factor;
r – growth of demand for investment when GNP is increased by one;
η – change in GNP value at given amount of investment;
u – GNP growth speed.

As a result, we have got that GNP will range between $y^E \pm \rho,$ (gross investment plus-minus share of investment), consumption will stay constant and equal to the stationary value $y^E - 1,$ and investment will be experiencing non-damping self-oscillations according to the equation $I_{(t)} = I + \eta(t)$ - (investment plus changes in GNP value at given amount of investment at a time).

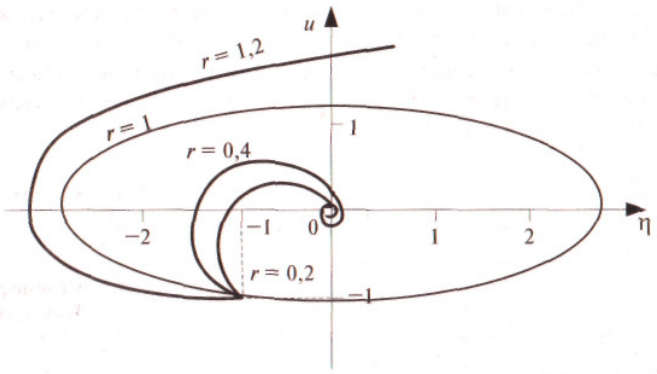


Fig.2. Dynamics of changes in the state of business economics

Therefore, the study found that the business system model has synergetic properties.

Following the study, we concluded that in order to create a 3D dynamical mathematical economic model of business sustainability in a globalized world, it is necessary to introduce the inflationary component (P) into the Samuelson-Hicks Model (1).

$$\frac{\eta^2}{a^2}+\frac{u^2}{b^2}-\frac{P^2}{c^2}=1, \qquad (2)$$

where P – inflationary component;

c – the calculation step.

Upon introduction of inflationary component, the mathematical economic model of business system will represent a one-sheeted hyperboloid.

Economic interpretation of the model: the lower part of the hyperboloid is the area of sustainable development of a business system model (inside a truncated cone), while the upper part of it is the area of stability (outside of the cone).

Application of scientific achievements of recent years allowed the authors to find basis for sustainable business in globalized world and build a mathematical economic model of its development.

Acknowledgements

The research was carried out with the support of the Ministry of Science and Education of the Russian Federation (project No. 26.6446.2017/БЧ).

References

Abalkin L.I. (1987) «A new type of economic thinking», *M.: Economics*, 189.

Brazhe R.A. (2002) «Dynamics of development: stochastic fluctuations and forecast of a trend», Problem of a sustainable development: illusions, reality, forecast materials for the sixth regular workshop "Self-organization of sustainable entities in nature and society", 90-95.

Brazhe R.A. (2003) «Synergetrics and economy», Concepts of modern natural sciences. Workshop materials. Part 2: Education guidance, Ulyanovsk: Ulyanovsk state university, 105-112.

Brutland H. (1993) «Action program: The agenda for the 21st century» *Geneva: "For Our Common Future center"* , 70.

Dorfman R., Samuelson P. and Solov R.. (1958) «Linear Programming and Economic Analysis» *New York: Mc Graw-Hill* , 342.

Kalinina O.V. 2016 «Universal approach to building the progressive scale for income taxation» *Actual Problems of Economics* 2 (176), 387-400.

Keynes John M. (1936) General theory of employment, interest and money, 472.

Linnenluecke Martina K. (2010) «Corporate sustainability and organizational culture», *Journal of World Business, Sustainable Business*, V.45, Issue 4, 357–366.

Marshall Alfred. (1890) Principles of Economics, 627.

Nikolova L., Kuporov J., and Rodionov D. (2015) «Risk Management of Innovation Projects in the Context of Globalization», *International Journal of Economics and Financial,* Issues 5 (Special Issue), 73-79.

Nikolova, L. V., Rodionov, D. G., and Afanasyeva, N. V. (2017) «Impact of Globalization on Innovation project Risks Estimation. European Research Studies», Issue 20(2), 396-410.

Pozdnyakov A.V. (2002) «Good intentions pave the road to hell», Problem of a sustainable development: illusions, reality, forecast. Materials for the sixth regular workshop "Self-organization of sustainable entities in nature and society", Tomsk state university, 3-17.

Rodionov, D.G. and Kudryavtseva, T.J. (2016) «Factors of the effective development of the St. Petersburg instrument engineering cluster», *International Journal of Economics and Financial,* Issues 6 (2), 298-306.

Rodionov D.G., Rudskaia I.A. and Guzikova L.A. (2014) «Innovation potential of regions as a factor of national economy competitiveness», *Actual Problems of Economics*, Volume 158, Issue 8., 215-223.

Schumpeter J.A. (1911) Theorie der wirtschaftlichen Entwicklung, 5-59.

Shabunina, T.V., Shchelkina, S.P. and Rodionov, D.G. (2017) «An innovative approach to the transformation of eco-economic space of a region based on the green economy principles», 16 (Special issue1), 176-185.

Silviusa A.J. Gilbert and Schipperb Ron.(2015) «A Conceptual Model for Exploring the Relationship between Sustainability and Project Success», Procedia Computer Science, V.64, 334–342.

Zang V.B.(1999) Synergetic economy, M.: Mir, 335.

Impact of Regional Conditions on Innovativeness Of Enterprises in Poland

Alfreda Kamińska
Warsaw Management University, Warsaw, Poland,
alfreda.kaminska@wsm.warszawa.pl

Abstract

The dynamics of the processes of innovation and of various factors that condition them imply the need for systematic research to identify the factors that determine the innovativeness of enterprises. Aside from the micro- and macroenvironmental factors, mesoenvironmental regional conditions, largely dependent on local authorities, are becoming ever more prominent. This paper seeks to systematise regional factors and present the severity of their impact on innovativeness of enterprises. The conclusions are drawn from a survey performed in Poland on a sample of 265 small, medium, and large enterprises from the Kuyavian-Pomeranian voivodeship and 259 small, medium, and large enterprises from the Silesian voivodeship.

Keywords: innovativeness of enterprises, regional conditions of innovativeness

Introduction

Knowledge and innovativeness are the foundation of any modern, competitive, and growing economy. Innovativeness has had the full attention of business and science and has been perceived as the driving force of development of economies and societies for many years now (Schumpeter 1961), but the innovativeness level of Polish economy and enterprises is still unsatisfactory. In global and European rankings, Poland scores low on innovativeness and like other Visegrád countries (Czech Republic, Hungary, Slovakia) is listed among "moderate innovators" (European Innovation Scoreboard, 2017).
Europe's regions are grouped into four innovation performance groups according to their performance on the Regional Innovation Index relative to that of the EU:

• The first group of "innovation leaders" includes 53 regions with performance more than 20% above the EU average.
• The second group of "strong innovators" includes 60 regions with performance between 90% and 120% of the EU average.
• The third group of "moderate innovators" includes 85 regions with performance between 50% and 90% of the EU average.
• The fourth group of "modest innovators" includes 22 regions with performance below 50% of the EU average.
Poland includes 16 regions: Mazowieckie, the capital region, is the most innovative region and the only "moderate innovator"; seven regions are "moderate" and nine regions are "modest innovators" (Regional Innovation Scoreboard, 2017). One of the causes of low innovativeness of regions is the low

innovativeness of enterprises. Research conducted as part of the Community Innovation Survey (CIS) points to a persistent low level of innovativeness in Polish enterprises (EIS, 2017).

Within this paper, innovativeness of enterprises means the capacity of companies to pursue innovation in order to introduce new products, processes, marketing ideas and organisational concepts (Hult, Hurley & Knight, 2004; OECD & Eurostat, 2005).

The matter of conditions of innovativeness of enterprises is one of the most frequently analysed issues in the study of innovativeness, however, the literature on it usually only considers microeconomic and macroeconomic circumstances. Meanwhile, we can see at present that the mesoeconomic context, understood as a collection of factors that come into play at a regional level and create conditions that are more or less conducive to innovative activity by organisations within a given region (voivodeship in our case), is becoming ever more important.

The interdisciplinary nature of research into regional impact on innovativeness of enterprises generates interest from geographers, economists, management researchers, sociologists. The literature mostly features the regional context of conditions of innovativeness as seen from the level of a city, an urban area, or a metropolis, that is, from a local level. Urban centres, particularly metropolises, are considered the most important locations for innovation, as they offer a large potential for it in a small area. Polish and global literature has relatively few overviews of the regional context of the processes of innovation (Porter, 2001; Nowakowska, 2009, 2011; Jewtuchowicz, 2005; Bellman et al., 2013). In particular, many works deal with the impact of innovativeness on economic development within a given region and analyse regional innovativeness systems (Strahl, 2010; Stawasz, 2006; Świadek, 2007, 2011 and others).

This paper considers the impact of regional conditions on innovativeness of enterprises in Poland. As the Oslo Manual notes, "identifying the main characteristics and factors that promote innovation activity and the development of specific sectors at regional level can help in understanding innovation processes and be valuable for the elaboration of policy" (OECD & Eurostat, 2005).
The chief purpose of the paper is to attempt to answer the following questions: how large is the impact of regional conditions on innovativeness of enterprises and what is the relationship between innovativeness in enterprises and the assessment of the importance of regional factors. The main goal is the attempt to systematise and determine the role of regional factors that impact innovativeness in enterprises.

Regional conditions of innovativeness of enterprises: overview of literature

There are a great number of diverse types of factors impacting innovativeness of enterprises. The literature on it usually divides them into two major groups: endogenous and exogenous. Endogenous factors are a result of material and non-material resources available to the company, while exogenous factors are related to the broadly-understood environment – which is a part of the microenvironment, mesoenvironment, and macroenvironment, as well as the global environment. At a time of increasing globalisation, the role of regions is, contrary to expectations, increasing, while the economists outline a new and independent field of study called the mesoeconomics (Gorynia, 2008), which researches economic phenomena that occur at the level of sections, branches, economic sectors and regions. This paper analyses mesoenvironmental factors in a regional context, and a region is understood to be a given voivodeship.

One of the first scholars to notice the impact of outside environment on enterprise creation and innovativeness of enterprises was Aydalot (1986), who declared in the 1980s that the source of innovation is the environment (*innovative milieu*) that the company operates in. As Guinet (1995) and other scholars of innovation accurately pointed out, innovative activity is interactive, a result of relationships within the enterprises and between it and outside agents such as clients, suppliers, research and development units, local authorities, financial institutions and any and all other supporting companies.

Sternberg and Arndt (2000) believe that the most important regional determinants of innovativeness of enterprises include local availability of qualified personnel, research and development facilities, technology transfer, appropriate economic structures, and soft factors (facilities etc.), institutional support, and innovative policy factors in the macro- and mesoenvironment (including support for operations growth and R&D cooperation). The list of regional factors impacting innovativeness of enterprises was expanded with local and central government initiatives, macroeconomic trends, financial support, education, economic structure, knowledge and technology transfer, infrastructure, values, and norms (Sternberg & Litzenberg, 2004).

Porter (2002) lists four main groups of regional determinants: 1) factor (input) conditions: high quality specialised inputs such as human and capital resources, knowledge and technology, physical, administrative, and information infrastructure, natural resources; 2) demand conditions: sophisticated and demanding regional customers, local demand in specialised segments; 3) related and supporting industries: access to capable, locally based suppliers and firms in related fields, inter-industry cooperation (clusters); 4) context for firm strategy and rivalry: local context that encourages investment and sustained upgrading (including protection of intellectual property), competition among locally based rivals.

Sosnowska, Poznańska, Łobejko, Brdulak, Chinowska (2003) point to factors resulting from the location of the enterprise, such as the economic situation of the region, market access, collaborative connections to other firms, cooperation with local authorities, contacts with higher education facilities and R&D facilities, infrastructure layout, environmental protection restrictions.

Innovativeness of enterprises is shaped by regional politics, actions of institutions from the business environment, and technological, social, and economic structure of the region (Jasiński & Wiatrak, 2010).

Meanwhile, Broekel and Brenner (2011) researched an astounding 70 variables describing the socio-economic situation of a region, divided into 12 groups of factors influencing innovativeness in a region.

Kosała and Wach (2011) have projected the innovative potential of a region based on a number of metrics, including research and development spending and its sources, research and science workers per 1 000 employed, gross value of research tools, the number of R&D units, reported inventions and patents granted, foreign trade balance in cutting edge technology products, share of innovative enterprises in the overall number of companies.

In Nowakowska's (2011) view, innovative processes are determined by the potential of the R&D sector, academic potential, activity of institutions supporting the innovation processes, technology transfer and presence of clusters.

Meanwhile, Świadek (2011) has analysed the impact of the following factors: distance from urban areas, distance from and relations with the competition, suppliers, buyers, the number of suppliers and buyers, interactions between and within sectors, access to capital, employee skills. Bellmann, Crimmann, Evers and Hujer (2013) have pointed out the importance of human resources – namely, STEM graduates – as well as the distance from research and technology centres and tertiary education facilities, and the unemployment rate in the region.

The review of the subject literature and own experiences and observations give reason to name five main, codependent groups of regional conditions, which have been assigned 27 factors determining innovativeness of enterprises. They are listed in Table 3.

Inasmuch as the list cannot be considered complete or exhaustive of the all the possibilities of a region's impact on innovativeness in enterprises, it does provide a toolkit for the identification of the most important conditions and for an assessment of the extent of their influence.

Research methodology

The aim of the research was to determine the impact regional conditions of innovativeness of enterprises have and the links between the level of innovativeness in companies and the assessment of the importance of those factors. The research was conducted in Poland, in enterprises located in two Voivodeships of different innovativeness level and different economic situation, namely, Silesian and Kuyavian-Pomeranian.

Silesian Voivodeship was ranked fourth in the country in innovativeness, while Kuyavian-Pomeranian came fourteenth (RIS 2017). RIS values position the latter in the weakest EU regional innovation bracket (i.e. *regional modest innovators*), while Silesian is ranked among *regional moderate innovators*. In terms of economic development measured by GDP per capita, the Silesian Voivodeship is fourth in the country, while Kuyavian-Pomeranian is tenth (GUS, 2016).

Empirical research has been performed by survey augmented with extended interviews with the management of the enterprises. The research tool for the survey stage was a questionnaire prepared by the author, while the research was conducted by the Centrum Badania Opinii Społecznej (*Centre for Public Opinion Research*, CBOS). The interviews were conducted according to the CATI (Computer Assisted Telephone Interview) method – a quantitative research method. Like in Eurostat research, company size was accepted as a criterion for assigning the companies in question to groups (of small, medium, or large enterprises). The sample was selected according to the recommendations of the Oslo Manual "that the stratification of random sample innovation surveys should be based on the size and principal activity of the units" (OECD & Eurostat, 2005). Ultimately, empirical research was conducted on a sample that was representative both in terms of size (due to the number of employees) and in terms of sectional activity (as per the Polish Activity Classification – PKD), which included 265 small, medium, and large enterprises in the Kuyavian-Pomeranian Voivodeship and 259 small, medium, and large enterprises in the Silesian Voivodeship. The structure of enterprises analysed as part of the research is proportional to the structure of all enterprises in the regions (Table 1). The number of research samples and their structure allow an assumption that the conclusions drawn from the work presented in the paper on the impact and

importance of regional conditions on innovativeness in enterprises are very likely to be representative for the entire populations of enterprises in the Kuyavian-Pomeranian and Silesian Voivodeships, aside from any micro-scale units.

Table 1: Structure of surveyed companies

Criterion	Kuyavian-Pomeranian Voivodeship		Silesian Voivodeship	
	No. of enterprises	% of N=265	No. of enterprises	% of N=259
Number of employees:				
10-49	223	84.0	222	85.5
50-249	37	14.0	32	12.3
250 and more	5	2.1	6	2.2
Activity type:				
Manufacturing	113	42.7	108	41.7
Services	76	28.8	84	32.4
Commerce	42	15.8	58	22.4
Mixed	34	12.8	9	3.4

The general research was performed between October and December 2016. When preparing the survey questionnaire, the author drew from subject matter literature and her own experience from years of work at various enterprises. Moreover, in order to better understand the problems that fell within the scope of the research and to capture the elements most important to entrepreneurs and the economy, she interviewed managers about the regional conditions of innovativeness of enterprises. As per procedure for surveys, it started with a pilot study, which allowed for a test of the research tools, clarification of any ambiguities and an assessment of the time needed to conduct the survey.

Results and discussion

Assessment of innovativeness in surveyed enterprises

In order to achieve the main goal of determining the importance of regional conditions of innovativeness in enterprises and their influence its level, it was necessary to assess the level of innovativeness in the surveyed subjects in both Voivodeships.

Based on the subject literature quoted earlier, several crucial markers of the innovativeness process in enterprises were named. These included: the number of innovativenesss in product, in process, in marketing, and in organisation over the past three full years (i.e. 2013, 2014, and 2015), the degree of novelty of the innovation (on a five-step scale: novel for the enterprise, locally novel, regionally novel,

novel for the country, novel internationally), and a subjective assessment of the innovativeness level of the enterprise by the survey respondent.

Depending on the number and novelty of the innovations introduced between 2013 and 2015, every enterprise was assigned to one of six groups based on their level of innovativeness: "very high," "high," "average," "low," "very low" or "non-innovative." To measure the appropriateness of the accepted criteria for the assessment, the results were cross-referenced with the resulting enterprise structure and the self-assessment of the level of innovativeness of enterprises performed by the respondents.

Table 2 presents the innovativeness structure of the entire surveyed sample. The analysis shows that both voivodeships have a similar innovativeness structure in enterprises. Non-innovative companies, which had not introduced any innovation in product, process, marketing, or organisation in the period surveyed, represent more than 50% of the firms in the survey. Around one in five enterprises (20.1%, 21.2%) introduced between one and three enterprise-level innovations, putting them in the group of companies with a very low innovativeness level. Higher levels of innovativeness show insignificant differences between the two voivodeships. The Silesian Voivodeship has a 2.1 percentage point lower share of medium innovativeness firms (4-10 company, local, regional innovations, 1-10 national innovations) and a 1.9 percentage point higher share of very high innovativeness firms (more than 10 national or sub-national innovations). It also has a 5.6 percentage points higher share of low innovativeness firms (1-3 local or regional innovations). The very high percentage of companies that had introduced no innovations in the researched timespan and of those at a very low level of innovativeness testifies to a low general level of innovativeness in enterprises in both voivodeships in question.

Table 2: Innovativeness structure of companies in the research sample (N=265, N=259)

Innovativeness level	**Kuyavian-Pomeranian Voivodeship**		**Silesian Voivodeship**	
	No. of enterprises	**As % of N=265**	**No. of enterprises**	**As % of N=259**
Non-innovative	156	58.8%	145	56.1%
Very low	53	20.1%	55	21.2%
Low	22	8.3%	36	13.9%
Average	25	9.4%	19	7.3%
High and very high	9	3.4%	4	1.5%
Total	265	100.0%	259	100.0%

Impact of regional conditions on innovativeness of enterprises

To determine the importance and impact of regional conditions on innovativeness of enterprises, the respondents were asked to evaluate 27 regional variables divided into five groups. They were asked to evaluate their importance on a five-step scale: very large (5), large (4), average (3), small (2), unimportant (1). These factors were then ranked based on the average evaluation score, as shown in Table 3.

Table 3: Impact of regional conditions on innovativeness in enterprises – average scores

	Kuyavian-Pomeranian Voivodeship	Silesian Voivodeship
FINANCIAL SUPPORT OF REGIONAL AGENTS BY LOCAL GOVERNMENT		
Financial aid for investment in permanent assets	3,28	3,22
Subsidising and development of financial institutions, facilitating access of enterprises to capital	2,95	2,93
Financial aid for autonomous R&D activities in enterprises	2,72	2,65
Financial aid for purchase of consulting services, licenses, patents and so forth	2,71	2,73
Financial aid for cooperation with scientific research institutions	2,63	2,72
Financing for creation and development of special economic zones	2,50	2,52
Financial support for creation and development of scientific research institutions and innovation centres	2,35	2,29
ORGANISATIONAL AND ADVISORY SUPPORT OF REGIONAL ECONOMIC AGENTS BY LOCAL GOVERNMENT		
Organisational and advisory aid for enterprises (including them in projects, organising conferences and training)	3,36	3,34
Engaging innovation centres in pro-innovative activity	2,87	2,79
Public procurement of innovative goods and services by local authorities	2,64	2,48
Investment in public-private partnership	2,43	2,30
PROMOTING COOPERATION BETWEEN REGIONAL AGENTS BY LOCAL GOVERNMENT		
Price of services offered by institutions supporting innovation	3,53	3,66
Local government aid for interregional and international cooperation (organising fairs, meetings, study visits etc.)	3,34	3,45
Facilitating cooperation with training and consultancy centres	3,25	3,33
Tailoring the offer of business environment institutions to the needs of companies	3,00	3,05
Location of institutions supporting innovativeness	2,98	3,08
Facilitating cooperation between enterprises and science	2,87	3,03
Facilitating cooperation between enterprises and innovation centres	2,86	2,99
Facilitating access to services of research institutions and laboratories	2,76	2,82

Local government aid in the functioning of connection networks between enterprises and pro-innovation institutions, including clusters	`2,71	2,52
CREATION AND AUGMENTATION OF OTHER NON-MATERIAL RESOURCES OF THE REGION		
Local government aid for development of human capital	3,45	3,60
Creation of knowledge centres within the region and providing free access to market analyses, databases, information sources etc.	3,24	3,38
Promoting entrepreneurial and innovative attitudes in the region	3,22	3,29
Increasing the capability of public administration to handle innovation and improvement of functioning of local administration	3,01	3,23
CREATION AND AUGMENTATION OF OTHER MATERIAL RESOURCES OF THE REGION		
Development of transport infrastructure	3,88	3,91
Development of communications and computing infrastructure	3,65	3,71
Making the region more attractive for foreign investment	3,18	3,40

Financial conditions are an important group of factors determining innovative activity of enterprises. Research shows that financial limitations are one of the most important barriers to introducing innovation (Kamińska 2016). According to the answers from both voivodeships, the most important financial factor for the realisation of innovative processes is financial aid for investment in permanent assets. This factor was given an average score of 3.28 in the Kuyavian-Pomeranian Voivodeship and 3.22 in the Silesian Voivodeship. The second most important factor – per the answers – is the financing and development of financial institutions (including lenders and guarantors, high-risk capital) and facilitating access to capital. This factor was rated at 2.95 and 2.93, respectively – a lot lower than financing enterprises.

The assessment of the following factors shows little difference between the voivodeships. The Kuyavian-Pomeranian Voivodeship respondents place financial aid for autonomous in-house R&D to be the third most important condition (average grade of 2.72), while those in Silesian greatly prefer cooperating on R&D with outside institutions (same grade). The surveyed find financial aid for the purchase of consulting services, licenses, patents to be less important, as it was rated respectively at 2.71 and 2.73. Respondents in both voivodeships are largely in agreement on the least important factors of this group. They put financing the creation and development of special economic zones as second to last, with an impact score of 2.50 and 2.52, while – in their opinion – the least important boost for innovativeness of enterprises is financial support for the development and creation of scientific research institutions and innovation centres (2.35, 2.29).

Analysis shows a notable correlation in the Kuyavian-Pomeranian Voivodeship between financial factors and innovativeness level of specific enterprises when evaluating the importance of capital aid for

permanent investments. This type of financial aid is more important for companies at a higher level of innovativeness, with Spearman's rank correlation coefficient (r_S) of 0.216 at probability value (p) of 0.001. Meanwhile, according to more innovative enterprises, subsidising and development of financial institutions such as loan funds, which is understandable, as these companies tend to have a better access to bank loans. In the Silesian Voivodeship, important correlations between the innovativeness level and the assessment of importance of financial factors are more frequent. Enterprises with a higher innovativeness level placed more importance on six out of seven surveyed financial factors, with the correlations being absent only on the subject of subsidies for special economic zones.

The respondents from both voivodeships have returned an identical ranking of factors in the organisational and advisory support group. They consider direct aid for enterprises, including enlisting them in innovative undertakings and passing on necessary knowledge and information in conferences and training seminars, to be the most important element for increasing innovativeness, with a rating average of 3.36 in Kuyavian-Pomeranian and 3.34 in Silesian. Many enterprises believe that a broad engagement of innovation centres in pro-innovative tasks translates into a higher level of innovativeness in firms, and therefore they place that factor in second place, with a respective rating average of 2.87 and 2.79. According to the respondents, public bids from local government have little impact on innovativeness, thus the average rates of 2.64 and 2.48. The last of the surveyed factors – development of investments in public-private partnership (PPP) – has been listed as the least relevant (2.43 and 2.30), which is appropriate considering the current situation in Poland in this regard, with one in five answers stating that is has no impact on innovativeness of enterprises. It is not a surprise that organisational and advisory aid for enterprises, including bringing them onboard in innovative projects and providing training, has been rated the highest. The dynamics of the changes in the current business environment imply the need for a constant refreshing of knowledge and new, up-to-date information, and research indicates that entrepreneurs are aware of this fact.

The assessment of the importance of organisation and advisory factors varies based on the level of innovativeness of a given enterprise. Those at a higher level of innovativeness see involving innovation centres with pro-innovative activities and local government procurement of innovative products to be more important. This occurs in both voivodeships.

As for the promoting of cooperation of regional agents group, the respondents from both voivodeships decided that the three most important factors for increasing innovation were: the price level of services rendered by innovation-supporting institutions (ratings in voivodeships respectively 3.53, 3.66), local government aid for interregional and international cooperation of enterprises (3.34, 3.45) and facilitating access to training and consulting support (3.25, 3.33). The results of a lot of research conducted in Poland indicate that a high price of services from business environment institutions is one of the principal barriers to innovativeness and development of enterprises (Kamińska, 2016a, 2016b).

Today, when costs are constantly being cut and price is seen as a major element of competitive advantage, the price factor is unsurprisingly rated highly. What is interesting, however, is that the entrepreneurs surveyed – even though the range of their activity is currently very limited (mostly to local and regional market), think in the long term and want to find new markets in other regions and countries, which is why organising fairs, study visits, and other meetings that contribute to establishing new contacts is so

important to them. Noticing the need for training and new knowledge (third-highest-rated factor in the group) is also a good trait of the surveyed managers.

The other factors are ranked similarly in both voivodeships – the entrepreneurs see similar value in facilitating collaboration with the science sector and innovation centres. In the last place comes the help of local governments for clusters and other forms of cooperation.

When considering the differences in evaluation of different factors in this group and their correlation with the innovativeness level in enterprises, it appears that in both voivodeships companies with a higher level of innovativeness place a much greater focus on facilitating access to research institutions (r_S in the Kuyavian-Pomeranian of 0,307 with *p* below 0,0005, in Silesian, 0,299 with *p* below 0,0005).

Another investigated group of regional conditions were the various activities related to the creation and augmentation of non-material resources of the region. The analysis of answers from both voivodeships points that out of this group, the largest importance is attributed to local government actions for the development of human capital, rated in both voivodeships at 3.45 and 3.60, respectively. That these activities placed this high testifies to the entrepreneurs' understanding that knowledge and skills of employees are key to inspiring innovativeness. Companies are aware of the need for broad knowledge and information in order to introduce innovation, and of their own lacks in that regard, which is why they rank the need for knowledge centres in their regions and free access to any and all analyses and data helpful for innovative undertakings as the second most important factor in this group. In the view of the respondents, promoting entrepreneurial and innovative attitudes in a region is more important than increasing the capabilities of public administration in innovation and improving its functioning. It is worth highlighting that projects accomplished as part of efforts to promote innovativeness and entrepreneurship are not costly and their introduction frequently depends solely on the will and activity of the local authorities. Of note are the high average notes of the factors in this group (average above 3.0) compared to other sets of conditions.

Referencing the evaluations with the innovativeness level of enterprises brings important conclusions. It appears that the relatively high rating of these factors is independent of the actual level of innovativeness a given company exhibits.

According to the answers, all the listed material assets of a region are very important to innovativeness of enterprises. In this section, the highest rank went to the development of transport infrastructure, rated, respectively, at 3.88 and 3.91. Second place went to the development of communications and computing infrastructure, where average grades were also high, standing at 3.65 and 3.71. Therefore, entrepreneurs believe that the development of innovative economic activity is very tightly connected to transport and information network, which allow for either face-to-face or computer-mediated communication with other agents, including suppliers and clients. Respondents from both voivodeships give a high mark to actions intended to make a region more attractive to foreign investments (average ratings 3.18 and 3.40). This shows they are not afraid of competition from abroad, while remaining aware that foreign investment may contribute to the development of their enterprises and regions. We also do not notice any correlation between the assessment of specific factors and the level of innovativeness in a given company.

Conclusions

The changing nature of the business environment and the low level of innovativeness in Polish enterprises give cause for systematic research to identify the factors that determine the innovativeness of enterprises with a view to regional factors. The results produced by the research are congruent with the findings of RIS 2017 and point to a low level of innovativeness of enterprises in the regions in question. The research presented here has identified the relatively most important factors influencing innovativeness in each of five groups of region-level conditions:

1. In the group of factors related to financial support from the local government, both the respondents from the Kuyavian-Pomeranian Voivodeship and from the Silesian Voivodeship declared that the most important element is financial aid for investment in permanent assets as well as subsidising and development of financial institutions so as to facilitate access of enterprises to capital.

2. As for the local government organisational and advisory support, the most important factor was involving the enterprises in projects, organising conferences and training, and engaging innovation centres with pro-innovative activity. The assessment of the two most important factors in this group varies greatly, as enterprises in general prefer aid that is offered directly to them and not other institutions. For this reason, involving companies in innovative projects directly and allowing them to obtain necessary knowledge and information is considered by the survey respondents to be the most important condition of innovativeness.

3. Among the factors serving to inspire cooperation between various subjects in a region, the most important ones included the prices of services rendered by institutions supporting innovativeness and local government aid for companies in interregional and international cooperation.

4. Among the factors creating and reinforcing non-material resources of a region, involving the local government in developing the human capital (by handing out grants, stipends, organising training, promoting talent, tailoring education to fit the needs of the region and so forth) was deemed the most important. Another factor of great relevance of this group is the creation of knowledge centres in regions and free access to market analyses, databases, information sources necessary to bring about innovation processes.

5. In both voivodeships, development of transport and telecommunications infrastructure was named the most important factors in the creation and augmentation of a region's material resources group. Of note are high ratings given to this group of factors underpinning effective operations of enterprises.

When comparing the importance of the five groups of regional conditions, entrepreneurs place the creation of material and non-material resources in the first place. In turn, they attribute the least importance to financial support of regional agents, aside from subsidising investment in permanent assets of enterprises. Considering the high importance placed on financial factors on the micro- and macroeconomic level, it is a piece of information of both interest and importance for local governments who seek to conduct a policy of supporting innovativeness. At the same time, none of the factors reviewed in the survey received an average note of less than 2.0, which would mean that it is of very little importance.

In both voivodeships, the more innovative companies find the following factors more important than the less innovative companies do:

- financial aid for investment in permanent assets,
- financial aid for cooperation with scientific research institutions,
- Subsidising and development of financial institutions, facilitating access of enterprises to capital,
- Engaging innovation centres in pro-innovative activity,
- Public procurement of innovative goods and services by local authorities,
- Facilitating access to services of research institutions and laboratories,
- Facilitating cooperation with training and consultancy centres.

Therefore, more innovative companies are more open to their environment and willing to cooperate with it. They appreciate the need to use knowledge and services of research, training, and consulting institutions. These correlations are present in both voivodeships. Although the two regions differ in their level of social and economic development, only in 3 out of 27 cases do their assessments conflict, pointing to a more or less universal nature of the factors in question and the need to take them into account while designing and pursuing regional innovativeness policies, while at the same time noting the specifics of any given area.

The research has allowed a systematisation of the most important regional factors and an assessment of their impact on innovativeness in the regions in question. It is, however, limited by the subjective nature of the responses when evaluating the importance of regional conditions of innovativeness of enterprises, although attempts were made to minimise any potential errors in replies by a number of measures, including selecting respondents among the management. The impossibility of taking into account all regional factors and the overlap of factors from various levels of business environment as well as applying a scale for the level of innovativeness of given enterprises are the further limiting factors of the study. An important research question for the future is the diagnosis of the impact of regional conditions on the effectiveness of companies.

References

Aydalot, Ph. (1986), L'aptitude des milieux locaux à promouvoir l'innovation, Technologie nouvelle et ruptures régionales, Economica, Paris [in:] Nowakowska, A. (ed.) (2009), Budowanie zdolności innowacyjnych regionów, Wydawnictwo Uniwersytetu Łódzkiego, Łódź.

Bellmann, L., Crimmann, A., Evers, K. and Hujer, R. (2013), '*Regional Determinants of Establishments' Innovation Activities: A Multi-Level Approach'*, IZA DP No. 7572. [Online], [Retrieved May 18, 2017], https://www.econstor.eu/bitstream/10419/89797/1/dp7572.pdf.

Broekel, T. and Brenner, T. (2011), 'Regional factors and innovativeness: an empirical analysis of four German industries', *The Annals of Regional Science*, 47 (1), 169-194.

European Commission (2017), *European Innovation Scoreboard 2017,* [Online], [Retrieved July 28, 2017], *http://ec.europa.eu/DocsRoom/documents/24829*.

European Commission (2017), *Regional Innovation Scoreboard 2017,* [Online], [Retrieved July 28, 2017], http://ec.europa.eu/docsroom/documents/23881.

Gorynia, M. (2007), Studia nad transformacją i internacjonalizacją gospodarki polskiej, Wydawnictwo Difin, Warszawa.

Guinet, J. (1995), National Systems for Financing Innovation, OECD, Paris.

GUS (2016), Wstępne szacunki produktu krajowego brutto według województw w 2015 r., Urząd Statystyczny w Katowicach, Warszawa 30.12.2016 r. [Online], [Retrieved May 28, 2017], www.stat.gov.pl.

Hult, G.T.M., Hurley, R.F. and Knight, G.A. (2004), 'Innovativeness: It's antecedents and impact on business performance', *Industrial Marketing Management*, 33(5), 429-438.

Jasiński, A.H. (ed.) (2010), Innowacyjność polskiej gospodarki w okresie transformacji, Wydawnictwo Naukowe Wydziału Zarządzania Uniwersytetu Warszawskiego, Warszawa.

Kamińska, A. (2016a), 'Uwarunkowania aktywności innowacyjnej przedsiębiorstw przemysłowych', *Nauki o Zarządzaniu*, 1(26), 77-90, [Online], [Retrieved May 8, 2017], https://www.ceeol.com/search/article-detail?id=343201.

Kamińska, A. (2016b), 'Conditions of Innovativeness Growth of Enterprises in Poland', *Central European Review Of Economics & Finance*, 14(4), 25–34, [Online], [Retrieved May 8, 2017], http://yadda.icm.edu.pl/yadda/element/bwmeta1.element.ekon-element-000171452787.

Kamińska, A. (2017), Uwarunkowania regionalne innowacyjności przedsiębiorstw w Polsce, Wydawnictwo CeDeWu, Warszawa.

Kosała, M., Wach, K. (2011), 'Regionalne determinanty rozwoju innowacyjności przedsiębiorstw', *Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie*, 866, 19-36.

Nowakowska, A. (2011), Regionalny wymiar procesów innowacji, Wydawnictwo Uniwersytetu Łódzkiego, Łódź.

OECD, Eurostat (2005), Oslo Manual 2005. Guidelines for Collecting and Interpreting Innovation Data, Third Edition, Paris. [Online], [Retrieved May 8, 2017], http://www.oecd.org/science/inno/2367580.pdf.

Porter, M.E. (2001), 'Research Triangle. Clusters of Innovation Initiative.', Harvard University, Washington. [Online], [Retrieved May 18, 2017], http://www.hbs.edu/faculty/Publication%20Files/COI_ResearchTriangle_cfb27f08-1329-4637-b6b0-d185d9f418ee.pdf.

Schumpeter, J.A. (1961), The theory of economic development: An inquiry into profits, capital, credit, interest and the business cycle, USA, Harvard University Press.

Sosnowska, A., Poznańska, K., Łobejko, S., Brdulak, J. and Chinowska, K. (2003), Systemy wspierania innowacji i transferu technologii w krajach Unii Europejskiej i w Polsce, PARP, Warszawa.

Sternberg, R. and Arndt O. (2001), 'Source The Firm or the Region: What Determines the Innovation Behavior of European Firms?', *Economic Geography*, 77(4), 364-382.

Sternberg, R. and Litzenberg, T. (2004), *'Regional Clusters in Germany – Their Geography and Their Relevance for Entrepreneurship Activities'*, European Planning Studies, 12(6), 767-790, [Online], [Retrieved May 8, 2017], http://www.tandfonline.com/doi/abs/10.1080/0965431042000251855.

Strahl, D. (ed.), (2010), Innowacyjność europejskiej przestrzeni regionalnej a dynamika rozwoju gospodarczego, Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu, Wrocław.

Świadek, A. (2011), Regionalne systemy innowacji w Polsce, Wydawnictwo Difin, Warszawa.

Comparison of the Motivation Level of Manufacturing Enterprises Employees in V4 Countries

Miloš Hitka, Faculty of Wood Sciences and Technology, Technical University in Zvolen, Slovak Republic, e-mail: hitka@tuzvo.sk

Dagmar Weberová, Faculty of Multimedia Communications, Tomas Bata University in Zlín, Czech Republic, e-mail: weberova@fmk.utb.cz

Lenka Ližbetinová, Faculty of Business Strategy, The Institute of Technology and Business in České Budějovice, Czech Republic, e-mail: lizbetinova@mail.vstecb.cz

Milota Vertáková, Faculty of Economics, Matej Bel University, Banská Bystrica, Slovakia, e-mail: milota.vetrakova@umb.sk

Abstract

The Member States of the European Union are affected by the same or very similar factors influencing employee motivation. In the article, we analyse the level of employee motivation in V4 countries. We assume that the level of economy of these states is similar and efficient, after 27 years of labour market development and accession to the European Union. Our research was conducted in 2016 and 2017. In sociological research 2183 respondents from manufacturing companies were involved in the questionnaire by the correspondence method. Respondents are made up of 898 men and 1295 women of different age and education, with different practices and different job positions. In the tests, we examined the significance of the difference in arithmetic mean and the standard deviation of the motivation factors of the observed samples at significance level = 0.05. Subsequently, we tested the samples by the Tukey's HSD test. Based on the research results, we have defined four most important motivational factors in the analysed countries. We conclude that the requirements for motivating employees in industrial enterprises are highly similar in the V4 countries. The most important factors are basic salary, good working team, work atmosphere and job security. Other factors include manager access, fair employee evaluation, additional financial evaluation, and workplace communication. Despite the similarity between countries, there are statistically significant differences. The biggest difference can be observed between Hungary and other countries when looking at motivational factors such as workplace atmosphere and good working team. Between the Czech Republic and the other countries, there are also differences in the basic salary factor. In the case of job security factor, we observe statistically significant differences between the Slovak Republic and Poland.

Keywords: motivation of employees, Republic of Poland, Czech Republic, Republic of Hungary, Slovak Republic, Tukey's HSD test.

Introduction

The Visegrad Group (known as V4) represents an informal grouping of four Central European countries - The Slovak Republic, the Czech Republic, the Republic of Hungary and the Republic of Poland. It is a lively and informal regional structure of four EU and NATO member states that claim the same values, have a common history, culture and geography. V4 is a dynamic regional grouping of EU member states that provides scope for strengthening the coordination and consultation mechanism to find common positions and opinions on topical issues of foreign and European policy, regional development, economic and cultural cooperation. The Visegrad Group is an expression of the Central European countries' efforts to cooperate on a number of areas of common interest within the framework of pan-European integration. The Czech Republic, Hungary, Poland and Slovakia have always been part of the same civilization based on the same cultural and intellectual values and the common roots of religious traditions that they wish to preserve and further strengthen. The Visegrad Group was formed on 15 February 1991 when the cooperation between the four nations (after the break-up of Czechoslovakia also the states) was renewed in order to support the process of European integration and the transformation of economies. The regional cooperation of V4 has been successfully developing for more than 20 years in the sector / interdepartmental area, economy, infrastructure, energy, cross - border cooperation, cultural - scholarship exchanges, coordination of foreign policy positions and the promotion of common interests both in the EU and in relation to third countries / regions. V4 co-operation is coordinated by the Ministries of Foreign Affairs and National Co-ordinators of Visegrad. The program is based on the program of the presidency, which is approved by the country's presidents at V4 Summits.

The integration of the Slovak Republic, the Czech Republic, the Republic of Hungary and the Republic of Poland into the European Community has led to the integration of their labour market into Europe (Virglerová et al., 2017). Member State markets should be affected by the same or very similar factors influencing staff motivation (Felsead et al., 2015). This is supported by the facts such as similar levels of gross domestic product growth per person, cost of living, and average wage (www.etrend.sk/ekonomika).

Literature Review

Work satisfaction is one of the most accurate indicators of work motivation (Lorincová, Schmidtová, Javorčíková, 2016). The lack of work motivation still does not lead to dissatisfaction, but only to a lack of satisfaction (Sacchetti, Tortia, 2013). Satisfaction with work is supposed to encourage and motivate a person to perform better (Dugguh & Ayaga, 2014, Roos & Van Eeden, 2008).

Both current and potential employees are the subject of human resources management. It is necessary to constantly invest in their development (Drábek, Lorincová, Javorčíková, 2017, Kucharčíková, 2014, Semann and Farkašová, 2015). Each managerial decision is original and specific and it is also its information support (Potkány, Krajčírová, 2015). Employees are the source of the transformation process, and the principle of efficiency should be respected (Vetráková, Smerek, 2016). Motivation (as a force that strengthens behaviour and gives way to behaviour) triggers a tendency to continue. This explanation proves that individuals need to be sufficiently energetic and clear about their goals in order to achieve their goals. These are internal units to satisfy unmet needs and the will to achieve them (Lorincová, 2015). Motivation is a procedure that stimulates goal-oriented performance through physiological or psychological stimuli. The principle is to close two interface products, namely personality behaviour and

organizational uniqueness. This symbolizes those psychological procedures that stimulate the steps and determine deliberate goal-oriented action (Shukla, 2012). Motivation is also supportive target behaviour. It is the inner strength that causes personal and organizational activity. For an enterprise, motivation of employees is the most important in terms of the employment of employees. It can be defined as human behaviour targeted and based on the claim that motivation is the inner force of a being shifting individual behaviour in different directions (Mura, Horvath, 2015). Employee motivation becomes a competitive advantage in many successful businesses (Remeň, Sujová, 2017). When the company's goal is to improve employees' engagement, this should necessarily motivate its working groups because motivated groups makes efforts, work is finished faster, co-operation increases with greater intensity and has a positive impact on business productivity (Lorincová, Potkány, 2016). The relationship between employee motivation and employee engagement is bi-directional. If an enterprise wants to improve employee motivation, employee engagement should be improved, too (Evangeline, 2016, Gopal, 2016). Also, according authors Urbancova and Urbanec, the performance depends largely on many factors related to motivation. These factors include assessment of employee performance motivation, employee satisfaction, reward, education and development of occupational safety, organizational structure and more. The field of study is focused only on employee motivation, with this attribute greatly affecting the performance of employees (Urbancová, Urbanec, 2016). Employee motivation is one of the policies leading to the improvement of quality and employability in the performance of employee obligations in enterprises. A motivated employee is usually perceived according to the ultimate goals he has to achieve and therefore directs his efforts in this direction (Teplická, 2004). Providing the best and most appropriate work even in tedious conditions is one of the most stable challenges for employees, and it may be the object of their motivation (Nedeliaková, Sekulová, Nedeliak, 2015). Motivation is also one of the major issues in behavioural sciences, therefore, by virtue of its essential role, it plays an important role in managing human resources to achieve the goals of society (Barzokiet et al., 2008, Stacho, Stachová, 2015). Highly motivated employees will have a higher level of organizational commitment as their attitudes, related to work and behaviour, are developed positively. Employees believe that their work is important, and this faith leads them to work harder. These workers tend to create higher work as well as organizational performance. Therefore, it is less likely that they will leave their job but enjoy more job satisfaction (Smerek, 2017). Trying to understand and explain job satisfaction is motivated by calculated reasons as well as humanitarian interests. Satisfied employees tend to engage in altruistic behaviour that exceeds the formal requirements. On the contrary, unhappy employees have a high tendency to counter-productive behaviour. Academics and managers have defined the conditions for motivation and job satisfaction. Specifically Chatzopolou (2015) defines motivation as a predisposition to behave purposefully to achieve specific, unmet needs. According to Luthans (1998), motivation can be defined as a process that stimulates, delivers energy, manages and maintains the behaviour and characteristics of employees. On the other hand, he argues that motivation can be defined as "an internal force that activates individuals to achieve personal and organizational goals". Job satisfaction is the emotional response of an individual to the current state of work, while motivation is a driving force to seek and meet some needs (Chatzopoulou, 2015).

Materials and Methods

At the beginning of the 1990s, the analysed countries had a similar starting level in transforming into democratic landscapes. After 27 years of developing labour markets and after joining the European Union, we assume that they have very similarly performing economies even today. The accession of the

V4 member countries to the European Union, agreed in referendums in these countries, took place on 1 May 2004. The only organization within the V4 platform is the International Visegrad Fund based in Bratislava and established in 1999. All activities of the Visegrad Group are aimed at strengthening stability in the Central European region. Member States understand their mutual cooperation as a challenge for themselves and their success as the best proof of their ability to integrate into structures such as the European Union (www.visegradgroup.eu).

Since the V4 countries have had a long-term common history, they are intensively cooperating in the economic area; they have had a common starting transformation position. The aim of the paper is to evaluate two working hypotheses:

WH1: The importance of motivation factors is similarly high in the Czech Republic, the Slovak Republic, Hungary and Poland.
WH2: Statistical differences in the level of motivational factors in the Czech Republic, the Slovak Republic, Hungary and Poland are statistically insignificant.

We used the questionnaire method to determine the level of motivation and to analyse the motivation factors in the monitored enterprises. The questionnaire consisted of closed questions (Hitka, 2009). The first part of the questionnaire examined socio-demographic characteristics and qualifications of employees in enterprises compared. In this way, we have obtained basic data on respondents about their age, gender, work-life in the company, completed education and employment. The second part of the questionnaire included questions about motivational factors that can be used to find out about the characteristics of the work environment, the working conditions, the system of assessment and remuneration in the company, the personal work in the company itself, the social care system and the employee benefits as well as information about employee satisfaction or dissatisfaction, value orientation, relationship to work, colleagues and the enterprise as a whole.

We analysed the motivation factors in terms of financial evaluation (basic salary, additional financial evaluation, fair evaluation of the employee), social security (social benefits, company vision, prestige of the company name, development of the region, the relationship of the enterprise to the environment, free time); working conditions (physical labour demand, workplace safety, job security, content and type of work performed, work performance report, working time, work environment, work performance, psychological burden), career development (work experience, skills, prestige, self-decision, self-realization, education and personal growth, work recognition) and interpersonal relations (workplace atmosphere, good working team, workplace communication, The individual motivation factors were arranged according to the alphabet for reasons of not influencing the respondents. Employees could assign one of five grades to the scale of the Likert scale, where 5 was the maximum and 1 minimum, for each question.

In the years 2016 and 2017, 2193 respondents from V4 manufacturing companies (Slovakia - 763, Czech Republic - 633, Hungary - 366, Poland - 431) participated in the research by the correspondence method. Respondents (898 men, 1295 women) were of different age and education, with different practice and different job positions. The data were obtained by the simple random selection method from the entire territory of the monitored countries. The detailed characteristics of the respondents are in Table 1.

Table 1: Characteristics of respondents

Country	Slovak Republic		Czech Republic		Hungary		The Republic of Poland		The total percentage of respondents
Gender	**Number**	**Percentage**	**Number**	**Percentage**	**Number**	**Percentage**	**Number**	**Percentage**	
Men	346	45.35	294	46.45	64	17.49	194	45.01	40.95
Women	417	54.65	339	53.55	302	82.51	237	54.99	59.05
Age	**Number**	**Percentage**	**Number**	**Percentage**	**Number**	**Percentage**	**Number**	**Percentage**	**100**
up to 30 years	184	24.12	224	35.39	214	58.47	69	16.01	31.51
31 - 40	234	30.67	172	27.17	124	33.88	114	26.45	29.37
41 - 50	217	28.44	148	23.38	18	4.92	133	30.86	23.53
51 and older	128	16.78	89	14.06	10	2.73	115	26.68	15.60
Completed education	**Number**	**Percentage**	**Number**	**Percentage**	**Number**	**Percentage**	**Number**	**Percentage**	**100**
Primary education	21	2.75	16	2.53	6	1.64	0	0.00	1.96
Secondary education without graduation exam (A-levels)	100	13.11	138	21.80	2	0.55	0	0.00	10.94
Secondary education with graduation exam (A-levels)	427	55.96	322	50.87	60	16.39	0	0.00	36.89
University graduates	215	28.18	157	24.80	298	81.42	431	100	50.21
Seniority	**Number**	**Percentage**	**Number**	**Percentage**	**Number**	**Percentage**	**Number**	**Percentage**	**100**
less than 1 year	65	8.52	87	13.74	60	16.39	30	6.96	11.04
1 - 3 years	160	20.97	158	24.96	114	31.15	57	13.23	22.30
4 - 6 years	164	21.49	114	18.01	108	29.51	97	22.51	22.02
7 - 9 years	133	17.43	81	12.80	42	11.48	118	27.38	17.05
10 and more years	241	31.59	193	30.49	42	11.48	129	29.93	27.59
Position	**Number**	**Percentage**	**Number**	**Percentage**	**Number**	**Percentage**	**Number**	**Percentage**	**100**
supervisor	75	9.83	172	27.17	78	21.31	8	1.86	15.18
blue-collar worker	371	48.62	223	35.23	174	47.54	0	0.00	35.02
white-collar worker	317	41.55	238	37.60	114	31.15	423	98.14	49.79

Source: own processing

Further, we processed the data obtained by evaluating the questionnaires using statistical software STATISTICA 12 (StatSoft Inc., 2014). Descriptive statistics have been used to characterize sample files. Given the selective nature of the data, we tested the differences between the arithmetic mean values of the motivation factors' importance in selected countries using the Tuke's HSD (honest significant difference) method at the significance level =5% . Tukey's HSD test is a single-step multiple comparison procedure,

which is also adapted for different numbers of observations in each group. The assumption is the independence between the levels of factors, the variance of consistency and the normality. It can be used on raw data or in conjunction with an ANOVA (Post-hoc analysis) to find means that are significantly different from each other.

Results and discussion

We have defined the motivational factors assessed in all the countries surveyed as most important using descriptive statistics. This group of factors consists of a workplace atmosphere, a good work team, job security and a basic salary (Table 2). These factors are among the top ten most important factors in all four countries.

Table 2: Average values of the most important motivating factors in the monitored countries

Slovak Republic	Ø	**Czech Republic**	Ø	**Hungary**	Ø	**Republic of Poland**	Ø
Basic salary	4.595	Supervisor's approach	4.542	**Atmosphere at the workplace**	4.727	**Basic salary**	4.703
Good working team	4.591	**Atmosphere at the workplace**	4.509	**Basic salary**	4.634	**Good working team**	4.638
Atmosphere at the workplace	4.565	**Good working team**	4.491	Supervisor's approach	4.628	**Atmosphere at the workplace**	4.615
Supervisor's approach	4.515	Fair appraisal system	4.469	Education and personal growth	4.618	Communication in the workplace	4.483
Fair appraisal system	4.509	**Basic salary**	4.464	**Job security**	4.612	**Job security**	4.316
Job security	4.477	Further financial reward	4.381	Social benefits	4.568	Individual decision making	4.311
Further financial reward	4.477	**Job security**	4.355	Moving up corporate ladder	4.552	Fair appraisal system	4.299
Communication in the workplace	4.393	Communication in the workplace	4.354	Opportunity to apply one's own ability	4.541	Competences	4.295
Working time	4.356	Workplace safety	4.319	**Good working team**	4.541	Free time	4.290
Recognition (working)	4.282	Free time	4.186	Further financial reward	4.508	Supervisor's approach	4.281

The same motivational factors in the observed countries are highlighted roughly.
Source: Own data processing

a) Analysis of the motivational factor - atmosphere at the workplace

"Atmosphere at the workplace“ as a motivational factor was most often rated by importance level 5 (very important) where up to 65.8% of all respondents identified this option (Table 3).

Table 3: Frequency of motivational factor - the atmosphere at the workplace

Country	Atmosphere at the workplace					Total
Scale	**1**	**2**	**3**	**4**	**5**	
Slovak Republic	**1**	**4**	**43**	**230**	**485**	**763**
Total percentage	0.13%	0.52%	5.64%	30.14%	63.56%	100.00%
Percentage in country	0.05%	0.18%	1.96%	10.49%	22.12%	34.79%
Czech Republic	**7**	**11**	**32**	**182**	**401**	**633**
Total percentage	1.11%	1.74%	5.06%	28.75%	63.35%	100.00%
Percentage in country	0.32%	0.50%	1.46%	8.30%	18.29%	28.86%
Hungary	**2**	**2**	**4**	**78**	**280**	**366**
Total percentage	0.55%	0.55%	1.09%	21.31%	76.50%	100.00%
Percentage in country	0.09%	0.09%	0.18%	3.56%	12.77%	16.69%
The Republic of Poland	**0**	**0**	**12**	**142**	**277**	**431**
Total percentage	0.00%	0.00%	2.78%	32.95%	64.27%	100.00%
Percentage in country	0.00%	0.00%	0.55%	6.48%	12.63%	19.65%
Total number	**10**	**17**	**91**	**632**	**1443**	**2193**
Total percentage	0.46%	0.78%	4.15%	28.82%	65.80%	100.00%

Source: own processing

Table 4: Tukey's HSD test results for the motivational factor of the workplace atmosphere

	Slovak Republic	Czech Republic	Hungary	The Republic of Poland
Slovak Republic		0.482145	**0.000539**	0.578112
Czech Republic	0.482145		**0.000012**	0.066300
Hungary	**0.000539**	**0.000012**		0.072765
The Republic of Poland	0.578112	0.066300	0.072765	

Note: significantly important values are shown in bold

Source: own processing

b) Analysis of the motivational factor – good working team

Motivational factor "good working team" is rated as very important by respondents (60% of respondents) (Table 5). This factor was most positively evaluated in Poland (70.53%) and at least in HU (34.97%).

Table 5: Frequency of motivational factor - good working team

Country	Good working team					Total
Scale	**1**	**2**	**3**	**4**	**5**	
Slovak Republic	**1**	**4**	**34**	**228**	**496**	**763**
Total percentage	0.13%	0.52%	4.46%	29.88%	65.01%	100.00%
Percentage in country	0.05%	0.18%	1.55%	10.40%	22.62%	34.79%
Czech Republic	**3**	**14**	**43**	**174**	**399**	**633**
Total percentage	0.47%	2.21%	6.79%	27.49%	63.03%	100.00%
Percentage in country	0.14%	0.64%	1.96%	7.93%	18.19%	28.86%
Hungary	**4**	**14**	**100**	**120**	**128**	**366**
Total percentage	1.09%	3.83%	27.32%	32.79%	34.97%	100.00%
Percentage in country	0.18%	0.64%	4.56%	5.47%	5.84%	16.69%
The Republic of Poland	**4**	**0**	**17**	**106**	**304**	**431**
Total percentage	0.93%	0.00%	3.94%	24.59%	70.53%	100.00%
Percentage in country	0.18%	0.00%	0.78%	4.83%	13.86%	19.65%
Total number	**12**	**32**	**194**	**628**	**1327**	**2193**
Total percentage	0.55%	1.46%	8.85%	28.64%	60.51%	100.00%

Source: own processing

Table 6: Tukey's HSD test results for the motivational factor - good working team

	Slovak Republic	Czech Republic	Hungary	The Republic of Poland
Slovak Republic		0.114520	**0.000008**	0.705721
Czech Republic	0.114520		**0.000008**	0.016376
Hungary	**0.000008**	**0.000008**		**0.000008**
The Republic of Poland	0.705721	0.016376	**0.000008**	

Note: significantly important values are shown in bold

Source: own processing

c) Analysis of the motivational factor – job security

A group of 55.22% of respondents rated the motivational factor "job security" as very important (Table 7).

Table 7: Frequency of motivation factor - job security

Country	Job security					Total
Scale	**1**	**2**	**3**	**4**	**5**	
Slovak Republic	**4**	**10**	**61**	**231**	**457**	**763**
Total percentage	0.52%	1.31%	7.99%	30.28%	59.90%	100.00%
Percentage in country	0.18%	0.46%	2.78%	10.53%	20.84%	34.79%
Czech Republic	**4**	**9**	**60**	**210**	**350**	**633**
Total percentage	0.63%	1.42%	9.48%	33.18%	55.29%	100.00%
Percentage in country	0.18%	0.41%	2.74%	9.58%	15.96%	28.86%
Hungary	**0**	**8**	**34**	**116**	**208**	**366**
Total percentage	0.00%	2.19%	9.29%	31.69%	56.83%	100.00%
Percentage in country	0.00%	0.36%	1.55%	5.29%	9.48%	16.69%
The Republic of Poland	**0**	**8**	**44**	**183**	**196**	**431**
Total percentage	0.00%	1.86%	10.21%	42.46%	45.48%	100.00%
Percentage in country	0.00%	0.36%	2.01%	8.34%	8.94%	19.65%
Total number	**8**	**35**	**199**	**740**	**1211**	**2193**
Total percentage	0.36%	1.60%	9.07%	33.74%	55.22%	100.00%

Source: own processing

Table 8: Tukey's HSD results for motivational factor - job security

	Slovak Republic	Czech Republic	Hungary	The Republic of Poland
Slovak Republic		0.353091	0.776785	**0.001997**
Czech Republic	0.353091		0.974128	0.175758
Hungary	0.776785	0.974128		0.128920
The Republic of Poland	**0.001997**	0.175758	0.128920	

Note: significantly important values are shown in bold

Source: own processing

d) Analysis of the motivational factor – basic salary

The motivational factor "basic salary" is the most important of the analysed factors. It is more than 68.58% of the respondents for whom this factor is highly (Table 9).

Table 9: Frequency of motivational factor - the basic salary

Country	Basic salary					Total
Scale	**1**	**2**	**3**	**4**	**5**	
Slovak Republic	**4**	**7**	**50**	**172**	**530**	**763**
Total percentage	0.52%	0.92%	6.55%	22.54%	69.46%	100.00%
Percentage in country	0.18%	0.32%	2.28%	7.84%	24.17%	34.79%
Czech Republic	**8**	**11**	**49**	**176**	**389**	**633**
Total percentage	1.26%	1.74%	7.74%	27.80%	61.45%	100.00%
Percentage in country	0.36%	0.50%	2.23%	8.03%	17.74%	28.86%
Hungary	**0**	**2**	**22**	**84**	**258**	**366**
Total percentage	0.00%	0.55%	6.01%	22.95%	70.49%	100.00%
Percentage in country	0.00%	0.09%	1.00%	3.83%	11.76%	16.69%
The Republic of Poland	**0**	**4**	**16**	**84**	**327**	**431**
Total percentage	0.00%	0.93%	3.71%	19.49%	75.87%	100.00%
Percentage in country	0.00%	0.18%	0.73%	3.83%	14.91%	19.65%
Total number	**12**	**24**	**137**	**516**	**1504**	**2193**
Total percentage	0.55%	1.09%	6.25%	23.53%	68.58%	100.00%

Source: own processing

Table 10: Tukey's HSD test results for motivational factor - basic salary

	Slovak Republic	Czech Republic	Hungary	The Republic of Poland
Slovak Republic		**0.003041**	0.819967	0.052071
Czech Republic	**0.003041**		**0.001368**	**0.000008**
Hungary	0.819967	**0.001368**		0.508209
The Republic of Poland	0.052071	**0.000008**	0.508209	

Note: significantly important values are shown in bold
Source: own processing

Within the achieved results, a high similarity in the level of motivation of employees in the V4 countries can be seen. Basic salary, good workforce, workplace atmosphere and job security are among the most important factors. Other factors include supervisor's approach, fair appraisal system, further financial reward, and workplace communication. Despite the similarity among these countries, there are statistically significant differences. The greatest differences exist between Hungary and the other countries, in the case of motivational factors - workplace atmosphere and good working team. We see other differences among the Czech Republic and other countries, these differences consider the basic salary. Looking at the "job security" factor, there are statistically significant differences between the

Slovak Republic and the Republic of Poland. We can partly attribute these differences to the structure of respondents in terms of age, education and practice. In Hungary, 59% of respondents are under the age of 30. This causes a different perception of the atmosphere in the workplace than in other countries. We can claim that this is caused by the generation Y and its perception of the surrounding world. From the perspective of Polish respondents, we can say that most of them work in enterprises for more than 10 years. In Poland, there are a high proportion of white-collar workers. In Tables 3, 5, 7, and 9, the absolute and relative abundance of the respondents in the V4 countries are described according to motivational factors and their preferences in the area of importance. Using Tukey's HSD test, the tatistically significant differences within the analysed motivational factors among countries, is defined in Tables 4, 6, 8, and 10. Statistically significant differences among the monitored countries are observed in the motivational factor of "atmosphere in the workplace" between Hungary and the Czech Republic, and Hungary and the Slovak Republic (Table4). Statistically significant differences can be observed between the Slovak Republic - Hungary, the Czech Republic – Hungary, and the Republic of Poland - Hungary (Table 6), for the motivational factor called "good working team". Within the factor "job security", we see a statistically significant difference between the Slovak Republic and the Republic of Poland (Table 8). In the case of the "basic salary" motivational factor, there are statistically significant differences between the Slovak Republic – the Czech Republic, the Czech Republic - Hungary, the Czech Republic – the Republic of Poland (Table 10). This means that despite the high similarity of the analysed factors in the V4 countries, the respondents in particular countries attribute these factors different, statistically significant level. Paradoxically, the statistically significant difference is observed in the basic salary among the Czech Republic and other countries. The Czech Republic has the highest level of average salary from the monitored countries.

Conclusion

Based on the comparison of the most important motivating factors of the analysed countries, we conclude that there are very similar requirements of employees of the production enterprises for the motivation in the V4 countries. Based on the descriptive statistics, it can be stated that in all V4 countries, employees demand the same motivation areas from their employers. Thus WH1 was confirmed. Looking at the results in more detail, it can be concluded that despite the high similarity of the analysed motivation factors in the V4 countries, respondents attributed them different, statistically significant importance in particular countries. So WH2 was not confirmed.

For this reason, we recommend further investigation. Creating an incentive program is a demanding and costly activity for all businesses in these countries. Its effectiveness is based on a thorough and targeted analysis of employees. Based on our analysis, the following conclusions can be stated: In the V4 countries, employees are similar in terms of satisfying their motivational needs. However, the level of importance varies between these countries. For this reason, it can be said that there are differences in the level of motivation among employees in the V4 countries. At present, it is very important for employers to ensure their employees job security and to create trustworthy relationships among them – this can be achieved through efficient communication processes. Employers, however, have not paid careful attention to this need yet. Research shows that employers rarely allow their employees to satisfy their needs and this can have a significant demotivating effect.

Acknowledgement

This research was supported by VEGA 1/0024/17.

References

Barzokiet, AS., Attafar, A. and Jannati, AR. (2012), 'An Analysis of factors affecting the employees Motivation based on Herzberg's Hygiene Factors Theory,' *Australian Journal of Basic and Applied Sciences*, 6 (8), 115-123.

Drábek, J., Lorincová, S. and Javorčíková, J. (2017), 'Investing in Human Capital as a Key Factor for the Development of Enterprises,' *Issues of Human Resource Management. InTech,* 113-136.

Dugguh, S and Ayaga, D. (2014), 'Job satisfaction theories: Traceability to employee performance in orfanisations,' *IOSR - Journal of bussiness an management,* 16 (5). [Online]. [Retrieved September 5, 2017]. Available: http://iosrjournals.org/iosr-jbm/papers/Vol16-issue5/Version-1/C016511118.pdf

Evangeline, ET. and Gopal, VP. (2016), 'Organisational Culture and Motivationas Instigators for Employee Engagement, '*Indian Journal of Science and Technology*, 2016 9 (2), 1-4

Hitka, M. (2009), Organisational Culture and Motivationas Instigators for Employee Engagement, ES TU Zvolen.

Kucharčíková, A. (2014), 'The importance of identification and analysis of educational needs for investment in human capital. ' *Communication,* 16 (3), 86-92.

Lorincová, S. (2015). 'Improvement of the Effectiveness in the Recruitment Process in the Slovak Public Administration,' *Procedia Economics and Finance* vol. 34, Business Economics and Management 2015 Conference, BEM 2015. Doi:10.1016/S2212-5671(15)01644-5, 382 – 389.

Lorincová, S. and Potkány, M. (2016). 'The proposal of innovation support in small and medium-sized enterprises' Production Management and Engineering Sciences – Scientific Publication of the International Conference on Engineering Science and Production Management, ESPM 2015, ISBN 9781138028562 16th-17th April 2015, Tatranska Strba, High Tatras Mountains, Slovak Republic, 157-162.

Lorincová, S., Schmidtová, J. and Javorčíková, J. (2016), 'Employee job satisfaction in furniture manufacturing companies in the Slovak Republic,' *Drvna Industrija,* 67(4) 351–362.

Mura, L. and Horvath, P. (2015). 'Some aspects of human resource management' 2nd International Multidisciplinary Scientific Conference on Social Sciences and Arts (SGEM 2015) Albena, BULGARIA, 863-870.

Nedeliaková, E., Sekulová and J., Nedeliak, I. (2015). 'Application of dynamic models as a new trend in

quality management' 9th International Scientific Conference on Business Economics and Management (BEM): Procedia Economics and Finance, Volume: 34, 180-186.

Potkány, M. and Krajčírová, L. (2015). 'Quantification of the Volume of Products to Achieve the Break-Even Point and Desired Profit in Non-Homogeneous Production' 4th World Conference on Business, Economics and Management (WCBEM) Location: Ephesus, TURKEY. Book Series: Procedia Economics and Finance, Volume 26, 194-201.

Roos, W. and Van Eeden, R. (2008), 'The relationship between employee motivation, job satisfaction and corporate culture, ' *SA Journal of Industrial Psychology*, 34(1), 54-63.

Sacchetti, S. and Tortia, CE. (2013), 'Satisfaction with Creativity: A Study of Organizational Characteristics and Individual Motivation,' *J Happiness Stud,* 14, 1789-1811.

Seemann, P. and Farkašová, V. (2015). 'Coaching as a tool for improving the quality of managerial work' Globalization and its socio-economic consequences: 15th international scientific conference: proceedings Part II., ISBN 978-80-8154-145-2 7th-8th October 2015 Rajecke Teplice, Slovak republic, 661-669.

Shukla, NK. (2012), 'How motivation factor affect the organizational effectiveness,' *International Journal of management research*, 2 (3), 430-435.

Smerek, L. (2017), 'Changing the Corporate Culture Towards the Human Resources Development, ' *Issues of Human Resource Management. InTech,* 3-20.

Stacho, Z. and Stachová, K. (2015). 'Outplacement as Part of Human Resource Management' 9th International Scientific Conference on Business Economics and Management (BEM) Volume: 34 Tech Univ Zvolen, Izmir, TURKEY, 19-26.

Teplická, K. (2004), 'Progressive Management Trends in Manufacturing Enterprises,' *Ekonomie a management*, 7(4), 26-31.

Urbancová, H. and Urbanec, J. (2012), 'Internal factors influencing the knowledge continuity ensuring, ' *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 60(4), 387-396.

Virglerová, Z., Homolka, L., Smrčka, L., Lazányi, K. and Klieštik, T. (2017), 'Key determinants of the quality of business environment of smes in the Czech Republic,' *E a M: Ekonomie a Management*, 20 (2), 87-101.

The Relationship between GDP And It's Resources in Romania's Economy

Agatha Popescu, University of Agricultural Sciences and Veterinary Medicine, Bucharest, Romania, E-mail address: agatha_popescu@yahoo.com
Livia David, University of Agricultural Sciences and Veterinary Medicine, Bucharest, Romania, E-mail address: livia_david@hotmail.com

Abstract

The paper analyzed the dynamics of GDP and its structure by category of resources in Romania in the period 2007-2016 pointing out the relationships existing between GDP and its components based on the simple linear regression and multiple linear regression econometric models, correlation coefficients, and coefficients of determination, the validity of the model being checked by Fisher's test. In the analyzed period, GDP increased by 82 % grace to the contribution of all the economic branches. The main contributors to GDP are Other services (31.8 %), Industry (23 %), Trade (18 %), and Financial intermediation and communication (17%), which all together totalize about 90 % of the resource supply. The simple linear regression equations and also the multiple linear regression equation showed the strong influence of various economic branches on GDP. This aspect was also confirmed by the determination coefficient, R^2= 0.999, meaning that 99.9 % of GDP variation is explained by the variation of the independent variables, and also by the high positive coefficient of multiple correlation, r = 0.999. H1 hypothesis was accepted as long as Fisher's calculated value was higher than its tabled value, reflecting that the regression model was correctly computed. The development of Romania's GDP should be supported by ***services*** (professional, scientific, technical, administrative activities, public administration and defense, social insurance, education, health, social assistance, shows, culture and recreation activities), ***industry*** (mining and quarring, manufacturing, electricity, gas, steamed and air conditioning, waste management), as well as trade, transport, and tourism.

Keywords: dynamics, GDP, resources, linear regression, multiple regression, Romania

Introduction

GDP is a macroeconomic aggregate that measures the value of the goods and services produced by a country in a specific period, adjusted for inflation and is calculated based on the value of all products achieved in an economy using average prices in a specific year.
GDP is used by Governments as a comparison tool to analyze the purchasing power of the economy over time to describe the economic health of a country which is a guarantee of the living standard. It is also commonly used to compare the productivity of various countries with a high precision. In order to compare GDP level from a year or a quarter to another, GDP is adjusted for inflation. It reflects whether an economy is expanding or contracting, reflecting either economic growth or decline (Investopedia, 2017).

According to Eurostat, six sectors forms the condensed economic structure of the EU since 2010 as follows: *Agriculture:* Products of agriculture, forestry, fisheries and aquaculture; *Manufacturing:* Products of mining and quarrying, manufactured products and energy products; *Construction:* Constructions and construction works; *Trade:* Wholesale and retail trade, repair services, hotel and restaurant services, transport and communication services; *Business services*: Financial intermediation services, real estate, renting and business services; Other services (Eurostat, 2011).

This condensed structure of the economic sectors supplying GDP was adopted by National institute of Statistics of Romania and is presented in its methodology SEC 2010, CAEN Rev2.

According to National Institute of Statistics in Romania, GDP is defined as the main macroeconomic aggregate of national accounting, representing the final result of the production activity of resident producer units. GDP is approached in three ways as follows: *(i)Production approach*: GDP = GVA + TP + D - SP, where: GDP = Gross domestic product (market prices), GVA = Gross value added, (basic prices), TP = Taxes on products, D = Import duties, SP = Subsidies on products; *(ii) Expenditure approach:* GDP = FC + GFCF + CS + (E - I), where: FC = Final consumption, GFCF = Gross fixed capital formation, CS = Change in inventories, E = Exports of goods and services, I = Imports of goods and services; *(iii)Income approach:* GDP = C+ GOS + OTP - OSP+TP + D - SP, where: C = Compensation of employees, GOS = Gross operating surplus, OTP = Other taxes on production, OSP = Other subsidies on production, TP = Taxes on products, D = Import duties, SP = Subsidies on products (National Accounts, Romania, 2013; Romanian Statistical Yearbook, 2012).

In 2015, Romania's GDP was Euro Billion 160 and in 2016 it reached Euro Billion 169.07, (+ 4.8%), placing the Romanian economy on the 17th position in the EU. At present, Romania's economy is almost similar to the economies of Czech Republic, Greece and Portugal, (Eurostat, 2017).

The growth of GDP was determined by the important contributions of all the economic sector, less agriculture, forestry and fishing. In 2016, compared to 2015, the growth rate of various sectors in the economy was as follows: wholesale and retail trade, repairs of vehicles and motorcycles, transportation and storage, hotels and restaurants (+1,8%), information and telecommunication (+0.7%), professional, scientific and technical activities, administrative services and support services (+0.6%), industry (+0.4%), and net taxes on product (+0.5%)(Tilica and Arustei, 2017).
In 2016, the lowest share in GDP was achieved by agriculture, just 3.9%, industry contributed by 23.1%, constructions by 6%, trade by 18.1%, information and communications by 5.6%, real estate by 8.2%, and public administration and defense by 10.2%, the remaining representing the share of other sectors (Tudor, 2017).

According to the World Bank, Romania's GDP/capita, adjusted at the purchasing power parity increased 4 times in the period 1998-2015 placing the country on the 8th position in the world. From this point of view, Romania is on the top position in the EU, increasing its GDP/inhabitant 3.5 times in the last 18 years (Amariei, 2016).

Romania is a member of the EU-28, and considered a fast developing, upper-middle income mixed economy with a very high human development index (HDI) and a skilled labor force, the 16th largest in the EU by total nominal GDP and the 13th largest based on PPP (purchasing power parity)(World Economic Outlook Database October, 2009) .

Taking into account the current economic growth it is expected as Romania's GDP to reach 1 trillion of USD PPP before 2035. Among the CEECs, Romania continues to be one of the leading nations attracting foreign direct investment, only FDI totalizing more than $170 billion since 1989. Romania is on the top among the CEECs for electronics manufacturing, and has become a major centre for mobile technology and information security, and automobiles and its economic growth is 3 times higher than the EU average.

Romania has various natural resources such as: iron, ore, oil, salt, uranium, copper, natural gas. IT and motor and vehicle production make this country a leader at regional level. Vehicles, machineries, chemical goods, electronic products, electrical equipments, pharmaceuticals, transport equipments, basic metals, food products, and rubber and plastics are the top 10 products exported by Romania. While exports increased by 7.6 %, imports increased by 9.3% in 2016 compared to 2015 (Economy of Romania, Wikipedia).

The relationship between GDP and its factors has been studied by many authors using regression models.

In the CEECs, labor quantity and quality, information and communication technology capital services, total factor productivity, foreign direct investment inflow, investment on research and development, have a positive impact on GDP growth (Pokrivčák *et al*., 2016).

In Lithuania, the increase of fixed capital consumption could explain the changes of GDP. (Bobinaite *et al.*, 2011).

In India, financial development has a stronger role in the growth of GDP (Ray, 2013). Also, in India, FDI, Net FII equity and Import have a positive impact on GDP development. (Jain *et al*, 2015).

In Pakistan, GDP is deeply and positively influenced by national expenditures, goods exports, gross saving and final consumption expenditure, and in Bangladesh, national expenditures, external debts stock total, goods imports and exports have positive effect on the GDP. (Mehmood, 2012). Also, in Bangladesh, population, imports of goods and services, agriculture value added, manufacturing value added and labor force have positive effects on GDP (Hasan *et al*., 2016).

In Romania, final consumption and the turnover of companies in retail trade have a positive influence on GDP increase (Anghelache *et al*., 2017). Also, privatization has an important role both in the contribution of administrations and various economic branches to GDP (Anghelache *et al*., 2013). The increase of unemployment could led to a decline of real GDP (Dumitrescu *et al*., 2009).

In this context, the paper aimed to analyze the evolution of GDP and the dynamics of its structural components, the degree of determination of GDP by all the economic sectors, using linear and multiple regression models.

The paper objectives are:
(a)Analysis of the dynamics of GDP and its categories of resources in Romania's economy the period 2007-2016;
(b)To study the relationships existing between GDP and its supplying resources by means of linear regression analysis and correlation coefficients;
(c)To study the relationship existing between GDP and its categories of resources by means of multiple regression analysis.

The structure of this paper is the following one: *Introduction* which presents the empirical literature on GDP and its structural components in the vision of the EU Commission and National Institute of Statistics in Romania, *Materials and methods* present the source of the data collection, the selected economic variables taken into consideration, the mathematical models, the methodology used in this research, *Results and Discussions* which mention the results of the calculations based on the utilized econometric models and the corresponding comments and interpretations, and finally *Conclusions*, where the main ideas resulting from this research are briefly exposed.

Materials and Methods

Data collection. The study is based on the empirical data provided by the National Institute of Statistics, Tempo-online Database, National Accounts for the period 2007-2016.

The data refer to the following indicators: GDP at Romania's level, considered the dependent variable Y, and GDP created by various categories of resources, considered the independent variables: X1, X2, ..., X7, whose significance is the following one: X1- *Agriculture*, forestry and fishing; X2-*Industry*, including: mining and quarring; manufacturing; electricity; gas; steamed and air conditioning production and supply; waste management and decontamination activities, X3-*Construction*, X4- *Trade,* including: whole sale and retail trade; repair of motor vehicles and motorcycles; transport and storage; hotel and restaurants; information and communication; X5-*Financial intermediation* and insurance; real estate activities; X6-*Other services:* professional, scientific and technical activities; activities of administrative and support services; public administration and defense; social insurance of public sector; education; health and social assistance; shows, culture and recreation activities; repair of household goods and other taxes on product; import duties; X7- Subsidies on product.

Methodology. The study is based on the general mathematical model for GDP, Y, the dependent variable:

$$Y= f (X_1, X_2, X_3, X_4,X_5,X_6,X_7, \varepsilon) \quad (1)$$

whose meaning has been already explained above. These values are in Lei Billion, the national currency, presented according to *SEC 2010 Methodology of production, in current prices, CAEN*

Rev2 by category of resources, used by National Institute of Statistics (National Institute of Statistics, 2017).
GDP and its components by resource category were studied as follows:

(a)Dynamics across the period of reference, establishing the growth rate. The comparison between the value of the variables in the last year and the value in the first year of study was made based on *Index Method,* calculating the index with fixed basis (I_{FB}), according to the formula:

$$I_{FB} = (X_n / X_1)*100 \quad (2)$$

where X is the analyzed indicator and n = 1,2,3.....i the number of years in the chronological series of data.
The evolution was studied graphically both for GDP and its components.
(b)Descriptive statistics was set up for each indicator: Mean, Standard error, Median, Standard deviation, Minimum and Maximum values, and coefficient of variation.
(c)Trend analysis both for GDP and its categories of resources.
(d)GDP structure by category of resources pointing out the share of each resource in GDP.
(e)Linear Regression *Analysis* of GDP, Y, depending on each category of resource, X1, X2, ...X7, according to the formula:

$$Y = a + bX + \varepsilon \quad (3)$$

where, a and b are the estimators of the regression parameters, whose values were determined solving the linear system of equations by means of Least Square Method, and ε is a variable, reflecting the error.
The significance of the regression model was verified by Fisher's test.
(f)Pearson correlation coefficient was used to identify the links existing between pairs of indicators, divided into two categories: (i) $GDP*X_1$, $GDP*X_2$, ...$GDP*X_7$, and (ii) X_1*X_2, X_1*X_3,..... X_6*X_7, i.e. all the possible combinations between resources.

$$r = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{\sum (x - \bar{x})^2 \sum (y - \bar{y})^2}} \quad (4)$$

The values of the correlation coefficients were interpreted according to Evans (1996).
(g)Multiple Regression Analysis was used to identify the relationships between all the categories of resources and GDP. The only difference between simple linear regression and multiple regression analysis is the number of predictors, " X" variables.
The formula of multiple regression is:

$$Y = b_0 + b_1 X_1 + b_2 X_2 + \ldots\ldots\ldots\ldots\ldots\ldots + b_i X_i \quad (5)$$

where b_0 is the intercept, the control, i.e. the value of the dependent variable Y without the influence of the independent variables X1, X2, ...X7, b_1, b_2, b_3, …, b_i are the regression coefficients analogous to the slope in linear regression equation, and i=1,2,3,...n, the number of variables in the chronological series.
The interpretation of regression coefficients is given by the value b_i, which shows the expected increase of the dependent variable Y if X_i increased by 1 unit.
Multiple regression analysis involves other parameters such as:
-***Multiple correlation coefficient***, which reflects the relationship between the dependent variable and the independent variables:

$$r = \frac{n(\sum_{i=1}^{n} x_i y_i) - (\sum_{i=1}^{n} x_i)(\sum_{i=1}^{n} y_i)}{\sqrt{[n(\sum_{i=1}^{n} x_i^2) - (\sum_{i=1}^{n} x_i)^2][n(\sum_{i=1}^{n} y_i^2) - (\sum_{i=1}^{n} y_i)^2]}} \quad (6)$$

-***R squared (coefficient of determination)*** shows in what measure the variation of the dependent value Y depends on the variation of the independent values, Xi.

$$R^2 = 1 - \frac{\sum_{i=1}^{n}(y_i - \hat{y}_{icalc})^2}{\sum_{i=1}^{n}(y_i - \bar{y})^2} \in [0,1] \quad (7)$$

-***Adjusted R-squared*** indicates how well the terms fit a curve or line, but adjusted for the number of terms in a model. When more useless variables are in the model, adjusted r-squared will decrease. When more useful variables are added in the model, adjusted r-squared will increase.
Its formula is:

$$R^2_{adj} = 1 - \frac{(1-R^2)(n-1)}{n-k-1} \quad (8)$$

where: n is the number of points in the data sample, and k is the number of independent regressors, i.e. the number of variables in the model, excluding the constant.

- *Standard error(SE)* is very similar to standard deviation, reflecting the spread of the data.

$$S_{est} = \sqrt{\frac{\sum (Y_i - Y_{icalc})^2}{N-2}} \quad (9)$$

-ANOVA table includes:

-DF= degrees of freedom, in our case k=7 for Regression, n-k-1=10-7-1=2 for residual, and n-1= 10-1=9 for Total.

-SS=Sum squared, which represents the value of the variation for each of the three items: total, factor explained by regression, and random factor (unexplained by regression).

-MS-Mean squared, which represents the dispersion value corrected by the number of degrees of freedom, respectively MS(i)/df(i), where i is the variation source: Regression, Residual, and Total.

-SS***regression*** is the sum of the squares of regression deviation, i.e. variation explained by regression.

$$SSregression = \sum_{i=1}^{n}(\hat{y}_i - \bar{y})^2 \quad (10)$$

-SS***residual*** is the sum of the squares of the errors, i.e. the variation unexplained by regression.

$$SSresidual = \sum_{i=1}^{n}(y_i - \hat{y}_i)^2 \quad (11)$$

-**SS*total*** is the sum of the individual deviations from the mean, i.e. total variation.

$$SStotal = \sum_{i=1}^{n}(y_i - \bar{y})^2 \quad (12)$$

SS***total*** **=** SS***regression*** **+** SS***residual*** equivalent to the formula:

$$\sum_{i=1}^{n}(y_i - \bar{y})^2 = \sum_{i=1}^{n}(\hat{y}_i - \bar{y})^2 + \sum_{i=1}^{n}(y_i - \hat{y}_i)^2 \quad (13)$$

F = the calculated value of Fisher's Test = MS (*Regression*)/ MS (*Residual*). The calculated F value should be compared to the tabled value of F (α, df1, df2), where α is the level of confidence (0.05), df1= k=7, and df2=n-k-1=2.

Significance F is the risk that allows to accept the H1 hypothesis, that is the model is good.

If SignF is smaller than α, this means that the risk to accept the H1 hypothesis is smaller than the proposed risk, and as a consequence the model is good.

P-value represents the risk calculated to accept H1, and if P-value < α, therefore the calculated risk is smaller than the assumed risk, considered acceptable, we may accept H1, meaning that the parameters are different than 0.

Results and Discussions

Dynamics of Romania's GDP. In the analyzed period, GDP increased by 82 %, from Lei Billion 418.2 in the year 2007 to Lei Billion 761.5 in 2016, reflecting a continuous development of the economy (Fig.1.)

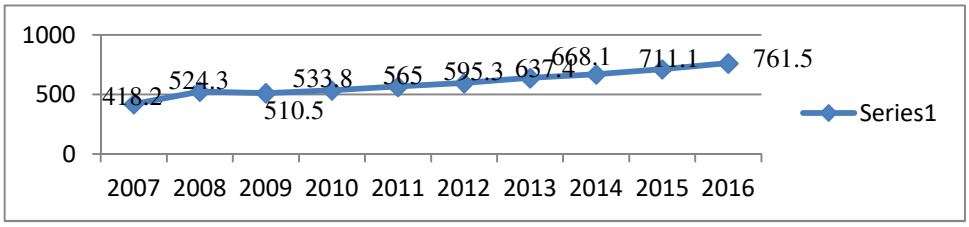


Fig.1.The dynamics of Romania's GDP, 2007-2016 (Lei Billion)

Source: Own design based on National Institute of Statistics, Tempo on line Data Base.

GDP trend analysis reflects the evolution of this indicator too (Fig2.).

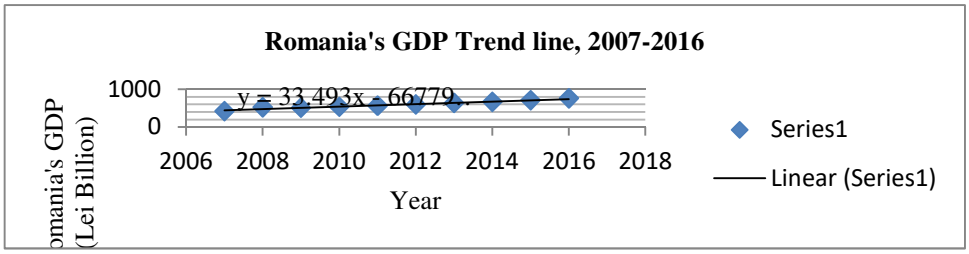


Fig.2.GDP trend analysis, 2007-2016

Source: Own design based on National Institute of Statistics, Tempo on line Data Base.

Dynamics of GDP created by various resources. The positive dynamics of GDP was influenced by the contribution of each of its resources as shown in Table 1 and Fig.3.

Table 1: GDP by category of resources, Romania, 2007-2016 (Lei Billion)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2016/2007 %
X_1	20.2	30.7	27.8	29.9	36.4	27.8	34.4	31.5	29.6	29.6	146.5
X_2	96.7	118	120.9	149.2	160.9	149.3	160.6	168.9	169.2	175.5	181.4
X_3	38.9	58.5	52.2	47.9	44.9	44.4	44.9	41.6	41.2	45.7	117.4
X_4	102	125.6	117.2	96.2	88.6	125.9	124.9	132.3	155.6	180.3	176.7
X_5	44	46.9	53.4	58	61.4	65.5	75.8	78.3	87.9	90.7	206.1
X_6	117.3	146.1	140.3	155.3	173.8	184.9	198.8	217.9	230.4	242.5	206.7
X_7	-1.6	-1.5	-1.3	-2.7	-1.0	-2.5	-2.0	-2.4	-2.8	-2.8	175.0

Source: Own calculation based on National Institute of Statistics, Tempo on line Data Base.

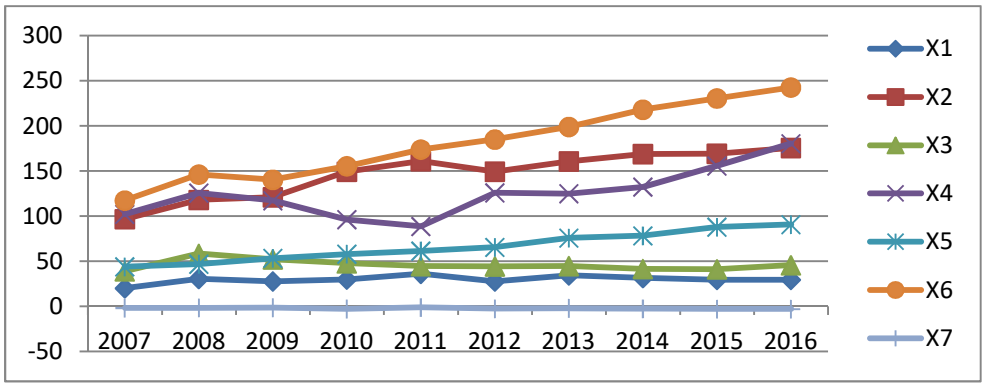


Fig.3.GDP by category of resources, 2007-2016 (Lei Billion)

Source: Own design based on National Institute of Statistics, Tempo on line Data Base.

Agriculture, forestry and fishery (X1) contribution to GDP increased by 46.5 % from Lei Billion 20.2 in 2007 to Lei Billion 29.6 in the year 2016.(Fig.4).

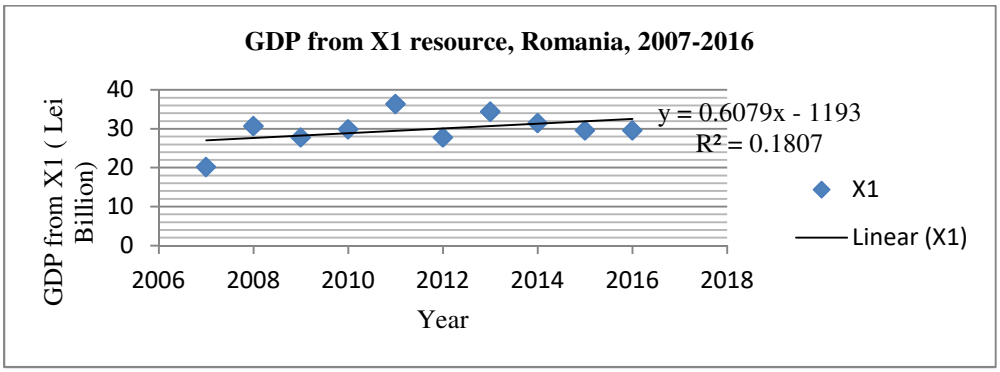


Fig.4.Trend analysis of GDP created in agriculture, forestry and fishing, Romania, 2007-2016 (Lei Billion)

Source: Own design based on National Institute of Statistics, Tempo on line Data Base.

Industry (X2)'s contribution to GDP grew up by 81.4 % from Lei Billion 96.7 in 2007 to Lei Billion 175.5 in 2016, taking into account the development of mining, manufacturing, electricity, gas, water supply, sewerage and waste management (Fig.5).

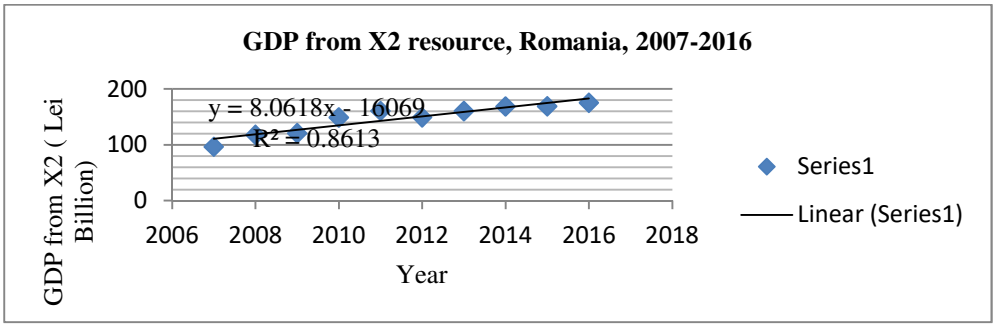


Fig.5.Trend analysis of GDP created in industry, Romania, 2007-2016 (Lei Billion)

Source: Own design based on National Institute of Statistics, Tempo on line Data Base.

Constructions (X3)'s contribution to GDP recorded a variable growth across the whole period, but with a general trend of decline. However, in the year 2016 the value of GDP produced in the field of construction was by only 17.4 % higher, accounting for Lei Billion 45.7 compared to Lei Billion 38.9 in 2007 (Fig.6).

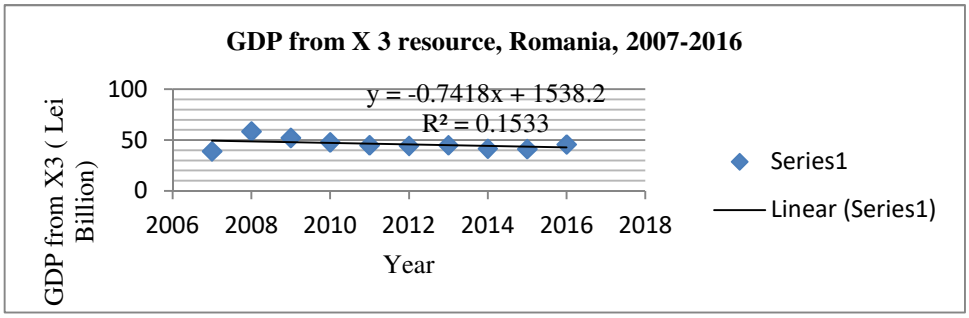


Fig.6.Trend analysis of GDP created in constructions, Romania, 2007-2016 (Lei Billion)

Source: Own design based on National Institute of Statistics, Tempo on line Data Base.

Trade (X4)'s contribution to GDP was by 70.5 % higher in 2016, reaching Lei Billion 138.3 compared to 2007 when it accounted only for Lei Billion 81.1. This growth was determined by the development of wholesale and retail transactions, the activity of repairs of vehicles and motorcycles, and tourism in hotels and restaurants (Fig.7).

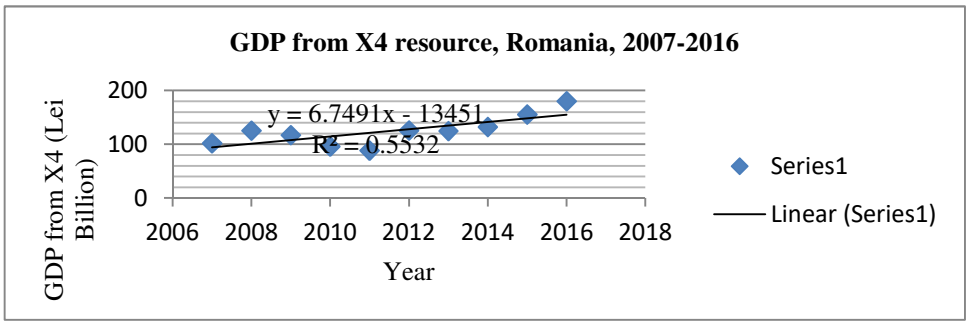


Fig.7.Trend analysis of GDP created in the field of trade, Romania, 2007-2016 (Lei Billion)

Source: Own design based on National Institute of Statistics, Tempo on line Data Base.

Financial intermediation and IT (X5) increased their contribution to GDP by 104.4 %, from Lei Billion 64.9 in 2007 to Lei Billion 132.7 in 2016. This growth was stimulated by the development of activities of financial intermediation and insurance, and real estate, but also due to the development of information and communication (Fig.8).

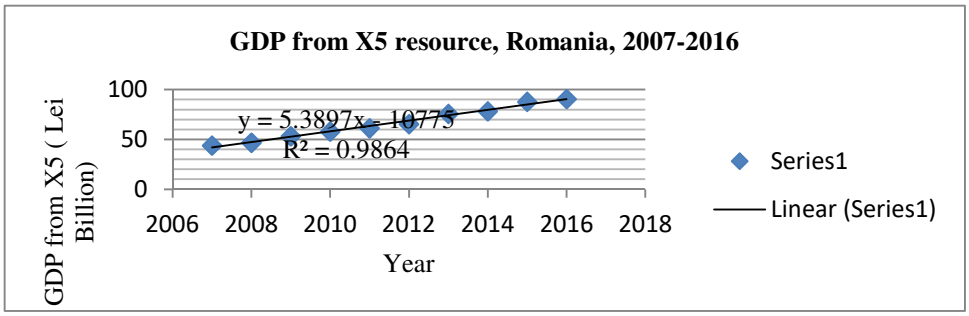


Fig.8.Trend analysis of GDP created in the field of financial intermediation, real estate and information and communication, Romania, 2007-2016 (Lei Billion)

Source: Own design based on National Institute of Statistics, Tempo on line Data Base.

Other services, including administrative and support services, research services, public administration, social insurance, education, health and social assistance, shows, culture and recreation activities, taxes on product and import duties, carried out 106.7 % increase in the analyzed period from Lei Billion 117.3 in 2007 to Lei Billion 242.5 in 2016 (Fig.9).

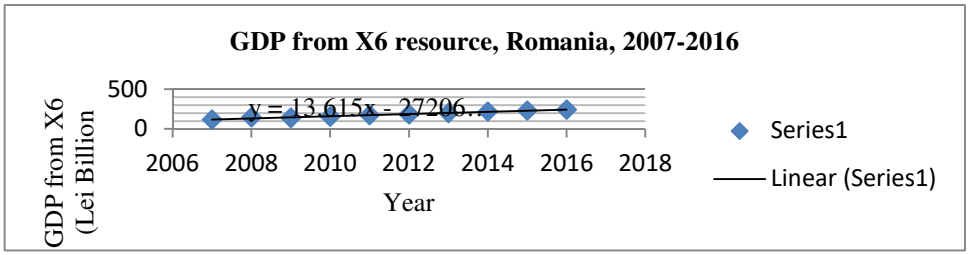


Fig.9.Trend analysis of GDP created by other services, Romania, 2007-2016 (Lei Billion)

Source: Own design based on National Institute of Statistics, Tempo on line Data Base.

Subsidies on product (X7) have brought a weak and negative contribution to GDP, but their value increased by 75 % in 2016, reaching Lei Billion 2.8 compared to Lei Billion 1.6 in the year 2007 (Fig.10).

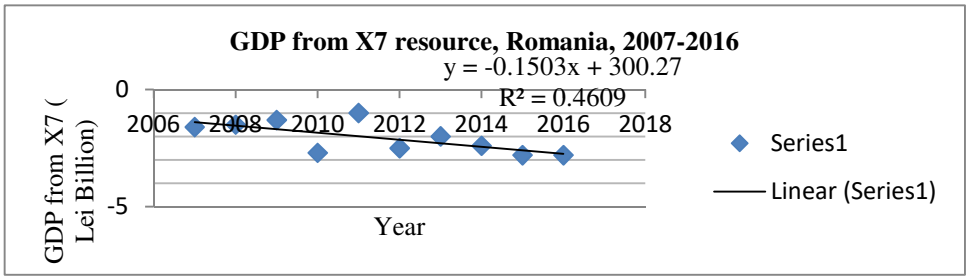


Fig.10.Trend analysis of GDP created by subsidies on product, Romania, 2007-2016 (Lei Billion)

Source: Own design based on National Institute of Statistics, Tempo on line Data Base.

Descriptive statistics in terms of mean, standard error, median, standard deviation, minimum and maximum values and coefficient of variation for GDP and its resources is presented in Table 2.

Table 2: Descriptive statistics for GDP and its resources, Romania, 2007-2016 (Lei Billion)

	Mean	St. Error	Median	St. Dev.	Min.	Max.	Coeff. of var. (%)
GDP	592.52	32.71	580.15	103.45	418.2	761.5	17.45
X1	29.79	1.36	29.75	4.32	20.2	36.4	14.50
X2	146.92	8.31	154.95	26.30	96.7	175.5	17.90
X3	46.02	1.81	44.90	5.73	38.9	58.5	12.45
X4	124.86	8.68	125.25	27.47	88.6	180.3	22.00
X5	66.19	5.19	63.45	16.43	44	90.7	24.82
X6	180.73	13.14	179.35	41.57	117.3	242.5	23.00
X7	-2.06	0.21	-2.2	0.67	-2.8	-1.0	32.52

Source: Own calculation based on National Institute of Statistics, Tempo on line Data Base.

The values of the variation coefficients have been $v \leq 35\%$, reflecting that the series of data are homogenous, the variations are relatively small and the mean is enough representative.

GDP structure by category of resources reflects the shares of various resources in GDP. In 2016, the share of each resource in GDP in the decreasing order was the following one: 31.8 % X6, 23 % X2, 18 % X4, 17.4 % X5, 6 % X3, 3.8 % X1, and a insignificant contribution X7 (Table 3).

Table 3: The structure of GDP by category of resources, Romania, 2007-2016 (%)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
GDP	100	100	100	100	100	100	100	100	100	100
X1	4.8	5.8	5.4	5.6	6.4	4.6	5.4	4.7	4.1	3.8
X2	23.1	22.5	23.6	27.8	28.4	25.0	25.1	25.2	23.7	23.0
X3	9.3	11.1	10.2	8.9	7.5	7.3	7.0	6.2	5.7	6.0
X4	19.3	18.9	18.4	13.5	11.5	17.1	14.6	14.8	16.7	18.0
X5	15.5	13.9	14.9	15.2	15.0	15.0	16.8	16.5	17.4	17.4
X6	28.0	27.8	27.4	29.0	30.7	31.0	31.1	32.6	32.4	31.8
X7	0	0	0.1	0	0.5	0	0	0	0	0

Source: Own calculation based on National Institute of Statistics, Tempo on line Data Base.

In the analyzed period, it was noticed a decreasing share in GDP in case of agriculture (X1), constructions (X3) and trade (X4), a relatively constant share in case of industry (X2), and a continuous increase of the weight of financial intermediate and communication (X5) and other services (X6) to GDP.

Linear regression of GDP depending on each resource category is presented in Figures 11, 12,13,14,15,16, and 17 which are given below. The graphics illustrate that in the analyzed period, GDP was positively influenced by X1-Agriculture, X2-Industry, X4-Trade, X5-Financial intermediation and communication, and X6-Other services, but it was negatively influenced by X3- Constructions and X7-Subsidies on product.

The coefficients of determination reflected that GDP variation was determined in a small amount by the variation of X3- Constructions 5.10 %, and X1-Agriculture 21.3 %, in a moderate amount by X7-Subsidies on product 43 %, and in a high amount by the variation of X6-Other services 98.2 %, X5- Financial intermediation and communication 94.9 %, X2- Industry 81.4 %, and X4-Trade 66.2 %.

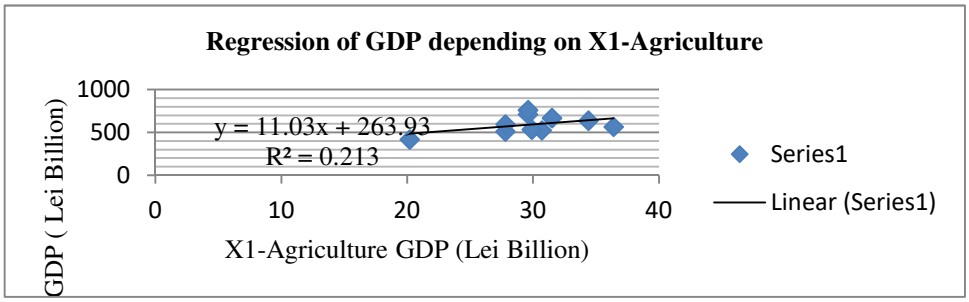


Fig.11.Linear regression of GDP depending on X1-Agriculture

Source: Own design based on National Institute of Statistics, Tempo on line Data Base.

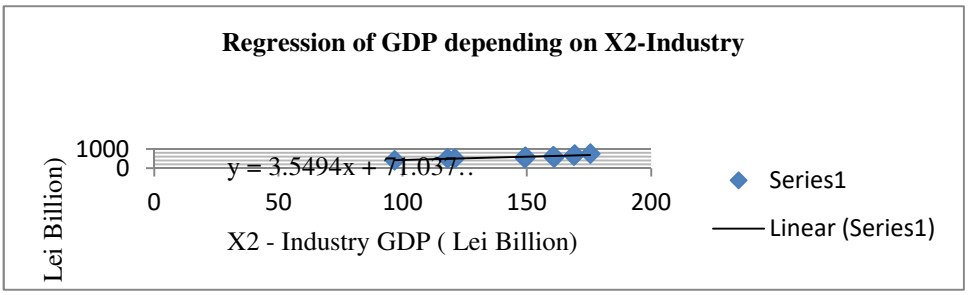


Fig.12.Linear regression of GDP depending on X2-Industry

Source: Own design based on National Institute of Statistics, Tempo on line Data Base.

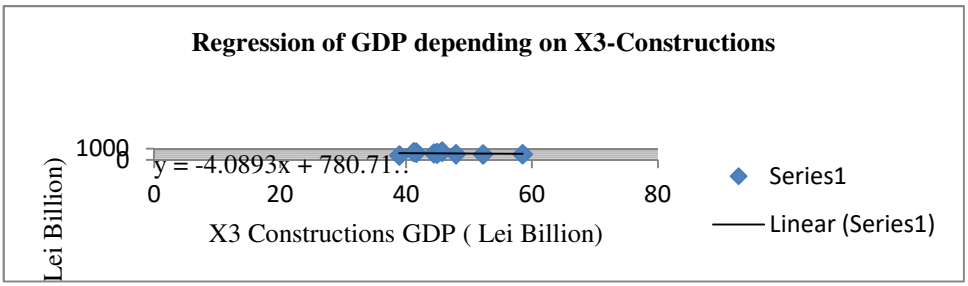


Fig.13.Linear regression of GDP depending on X3-Constructions

Source: Own design based on National Institute of Statistics, Tempo on line Data Base.

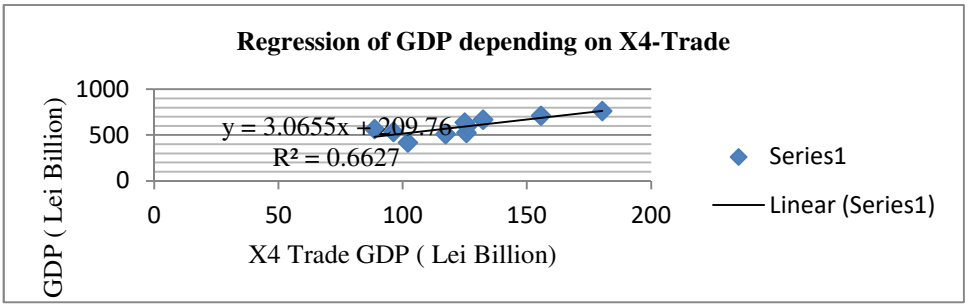


Fig.14.Linear regression of GDP depending on X4-Trade

Source: Own design based on National Institute of Statistics, Tempo on line Data Base.

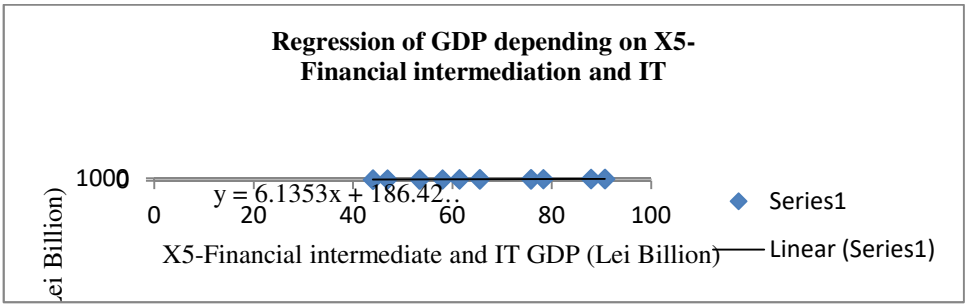


Fig.15.Linear regression of GDP depending on X5- Financial intermediation and communication

Source: Own design based on National Institute of Statistics, Tempo on line Data Base.

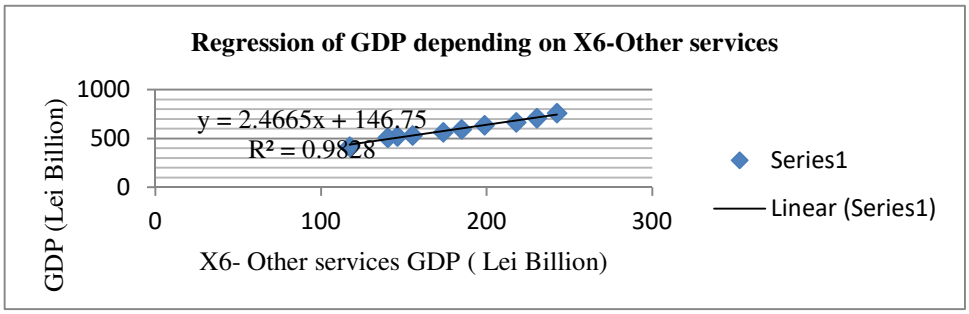


Fig.16.Linear regression of GDP depending on X6-Other services

Source: Own design based on National Institute of Statistics, Tempo on line Data Base.

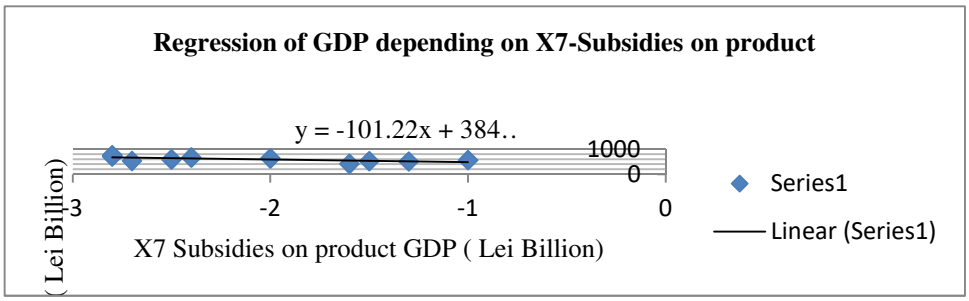


Fig.17.Linear regression of GDP depending on X7-Subsidies on product

Source: Own design based on National Institute of Statistics, Tempo on line Data Base.

The main parameters characterizing linear regression of GDP depending on its categories of resources are presented in Table 4.

Table 4: Main aspects in linear regression analysis of GDP depending on its resources

	Regression function, Y	R^2	St. Err.	F	Sign. F.
$Y=F(X_1)$	$Y=11.03\ X_1+263.92$	0.213	97.34	2.16	0.179
$Y=F(X_2)$	$Y= 3.54\ X_2 + 71.03$	0.814	47.29	35.06	0.00035
$Y=F(X_3)$	$Y= - 4.089\ X_3 + 780.7$	0.051	106.87	0.433	0.528
$Y=F(X_4)$	$Y= 3.065\ X_4 + 209.75$	0.662	63.72	15.71	0.0041
$Y=F(X_5)$	$Y= 6.135\ X_5 + 186.42$	0.949	24.66	150.32	0
$Y=F(X_6)$	$Y= 2.46\ X_6 + 146.7$	0.982	14.40	456.0	0
$Y=F(X_7)$	$Y= - 101.22\ X + 384$	0.430	82.83	6.038	0.039

Source: Own calculation based on National Institute of Statistics, Tempo on line Data Base.

Taking into account the linear regression function between GDP and its resources, the interpretation of the results is the following one: $Y=F(X_1)$ regression function shows that for 1 unit increase of X_1-Agriculture, GDP will go up by 11.03 monetary units; $Y=F(X_2)$ regression function shows that for 1 unit increase of X_2-Industry, GDP will grow by 3.54 monetary units; $Y=F(X_3)$ regression function shows that for 1 unit increase of X_3-Constructions, GDP will decline

by - 4.089 monetary units; $Y=F(X_4)$ regression function shows that for 1 unit increase of X_4-Trade, GDP will grow up by 3.065 monetary units; $Y=F(X_5)$ regression function shows that for 1 unit increase of X_5-Financial intermediation and IT, GDP will grow up by 6.135 monetary units; $Y=F(X_6)$ regression function shows that for 1 unit increase of X_6-Other services, GDP will grow up by 0.246 monetary units; $Y=F(X_7)$ regression function shows that for 1 unit increase of X_7-Subsidies on product, GDP will decrease by - 101.22 monetary units.
Fisher's test and significance F have confirmed that the linear regression models are valid (Table 4).
The Pearson coefficients of correlation for all the combinations between GDP and its resources X1, X2, ...X7, and between all the pairs of resources are presented in Table 5.

Table 5: Pearson coefficients of correlation between GDP and its resources and between all the pairs of resources

	GDP	X1	X2	X3	X4	X5	X6	X7
GDP	1							
X1	0.480	1						
X2	0.902***	0.669**	1					
X3	0.225	0.230	0.300	1				
X4	0.841***	0.012	0.490	0.062	1			
X5	0.974***	0.383	0.899***	0.409	0.766**	1		
X6	0.990***	0.447	0.917***	0.334	0.772**	0.983***	1	
X7	0.655**	0.089	0.573	0.344	0.620**	0.686**	0.662**	1

Source: Own calculation based on National Institute of Statistics, Tempo on line Data Base.
***Significance for 5 %.

The values of the correlation coefficients reflected a positive correlation between GDP and all its categories of resources. However, the intensity of correlation differs among various pairs of indicators as follows: *a very strong positive correlation*, $r > 0.8$ was found between (GDP, X2), (GDP, X4), (GDP, X5), (GDP, X6), (X2, X5), (X2, X6), and (X5, X6); *a strong positive correlation*, $0.6 < r < 0.79$ was found between (GDP, X7), (X1, X2), (X4, X5), (X4, X6), (X4, X7), (X5, X7) and (X6, X7); *a moderate positive correlation*, $0.4 < r < 0.59$ was found between (GDP, X1), (X1, X6), (X2, X4), (X2, X7), and (X3, X5); *a weak positive correlation*, $0.2 < r < 0.39$ was found between (GDP, X3), (X1, X3), (X1, X5), (X2, X3), (X3, X6), and (X3, X7); *a very weak correlation*, $0 < r < 0.19$ was found between (X1, X4), (X1, X7), and (X3, X4).
Multiple regression analysis. The results regarding multiple regression analysis are presented in Table 6.

Table 6: Results of multiple regression analysis between GDP (Y) and its resources (Xi)

Regression Statistics						
Multiple R	1.0000					
R Square	1.0000					
Adj. R Square	1.0000					
St. Error	0.0771					
Observ.	10.0000					
ANOVA						
	Df	SS	MS	F	Sign. F	
Regression	7.0000	96323.8241	13760.5463	2316119.5629	0.0000	
Residual	2.0000	0.0119	0.0059			
Total	9.0000	96323.8360				
	Coefficients	St. Error	t Stat	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	2.2513	0.333	6.7545	0.0212	0.8172	3.6853
X1	1.0771	0.0407	26.4441	0.0014	0.9019	1.2524
X2	1.0067	0.0095	105.9510	0.0001	0.9658	1.0476
X3	0.9169	0.0264	34.7938	0.0008	0.8035	1.0303
X4	1.0247	0.0112	91.3031	0.0001	0.9765	1.0730
X5	0.9743	0.0147	66.1495	0.0002	0.9109	1.0376
X6	0.9819	0.0101	97.6234	0.0001	0.9387	1.0252
X7	0.8852	0.1033	8.5693	0.0133	0.4407	1.3296

Source: Own calculation based on National Institute of Statistics, Tempo on line Data Base.

Table 7: Residual Output

Observation Predicted	Y=GDP	Residuals
1.000	418.1830	0.0170
2.000	524.2852	0.0148
3.000	510.5109	-0.0109
4.000	533.7717	0.0283
5.000	564.9960	0.0040
6.000	595.3858	-0.0858
7.000	637.4309	-0.0309
8.000	668.0569	0.0431
9.000	711.0953	0.0047
10.000	761.4843	0.0157

Source: Own calculation based on National Institute of Statistics, Tempo on line Data Base.

The equation of the multiple regression is:
Y= 2.2512 + 1.0771 X1+ 1.0066 X2+ 0.9169X3 + 1.0247 X4 +0.9742X5 + 0.9819X6 +0.8851X7, where:

2.2512 = b_0, the value of the dependent variable, Y=GDP; b_1= 1.0771 which shows the expected GDP growth for the increase of X_1 by 1 unit; b_2= 1.0066 which shows the expected GDP growth for the increase of X_2 by 1 unit.... b_7= 0.8851 which shows the expected GDP growth for the increase of X_2 by 1 unit.

The coefficient of multiple correlation, r = 0.9999 shows a strong positive and direct relationship between the dependent variable Y= GDP and the independent variables, GDP resources, X_i.

The coefficient of determination R^2= 0.999 shows that 99.9 % of GDP variation is explained by the variation of the variables X_i.

F calculated value was 2316119 which was compared with the tabled F value (0.05,7,2) in Fishers' distribution, which was equal to 6.094. Because, F calculated value >F tabled value, H1 hypothesis is accepted, that is the regression model is correctly determined, as the variance explained by the regression model variables is higher than the variance unexplained by the model.

Significance F: 0<0.05, therefore the risk to accept H1 is smaller than the proposed risk, and as a consequence the regression model is good. In our case, we accepted H1, and the model is correctly determined.

P-value < α, therefore the calculated risk is smaller than the assumed risk, considered acceptable, and in this case we accepted H1, that is the parameters are different than zero (Table 8).

Table 8: P-value

	P-value
Intercept	0.021223107
X1	0.00142696
X2	0.00000000
X3	0.000825009
X4	0.000119936
X5	0.000228453
X6	0.000104912
X7	0.013345924

As P-value is smaller than 0.05 for all the variables X_i, we may accept H1 hypothesis, that is all the coefficients of the regression model are different than zero. Therefore, there is a significant relationship between the dependent variable Y=GDP and the independent variables X_i, GDP' s categories of resources, $i=1,\ldots,7$.

Conclusions

In the analyzed period, Romania's GDP increased by 82 % due to the contribution of all the economic branches. In 2016, the highest contribution to GDP was given by Other services (31.8 %), Industry (23 %), Trade (18 %), and Financial intermediation and communication (17%). The lowest contribution to GDP have the following sectors: Subsidies on product, Agriculture (3.8 %) and Constructions (6%).

Between GDP and its resources it is an important relationship confirmed both by the simple linear regression equations and also by the multiple linear regression equation, as well as by the determination coefficient whose value was R^2= 0.999 reflecting that 99.9 % of GDP variation is explained by the variation of the variables X_i and by the coefficient of multiple correlation, r = 0.9999 which shows a strong positive and direct relationship between GDP and its components.
A very strong positive correlation r >0.8 was found between GDP and Industry, Trade, Financial intermediation and communication, and Other services, a strong positive correlation 0.6 < r < 0.79 was found between GDP and subsidies on product, a moderate correlation was noticed between GDP and Agriculture, and a weak correlation 0.2 < r < 0.39 was noticed between GDP and constructions.

The equation of the multiple regression showed that for an increase of GDP created in Agriculture by 1 unit, GDP will grow by 1.0771, for an increase by 1 unit of GDP created in industry, GDP will increase 1.0066, for an increased of GDP by 1 unit in the field of constructions, GDP will grow by 0.9169, for an increase of 1 unit in case of trade, GDP will grow by 1.0247, for an increase by 1 unit in the field of financial intermediation and communication, GDP will grow by 0.9742, an increase by 1 unit in case of other services will led to a growth of GDP by 0.9819 and an increase by 1 unit in case of subsidies on product, GDP will increase by 0.8851.

The F calculated value was higher than F tabled value, which allowed to accept H1 hypothesis that the regression model is correctly determined and that GDP.

As a conclusion, the economic growth of Romania should be based on the development of services, industry and trade, which are the most important economic branches which could supply more than 73 % of GDP.

References

Amariei, R. (2016), 'The supersonic economy: Romania's GDP increased by 300 % in 18 years', [Online] [Retrieved June 2, 2017], http://www.capital.ro/economia-supersonica-pib-ul-romaniei-a-crescut.html

Anghelache, C., and Dumitrescu, C. (2013), 'The evolution of Romania's GDP', *Romanian Statistical Review,* no. 1 / 2013, pp.94-102

Anghelache, C., Manole, A., and Anghel, M.G. (2017), 'Macroeconomic models used in structural analysis of GDP', *Theoretical and Applied Economics*, Volume XXIV (2017), No. 1(610), Spring, pp. 197-206.

Bobinaite, V., Juozapaviciene, A., and Konstantinaviciute, I. (2011), 'Regression analysis of GDP and its factors in Lithuania', *Economics & Management*. 2011, Vol. 16, p116-126. 11p. 1 Chart, 7 Graphs.

Dumitrescu, B.A., Dedu, V., and Enciu, A. (2009), 'The correlation between unemployment and Real GDP growth. A study case on Romania', *Annals of the University of Oradea*, Economic Science Series, 18(2).

Eurostat. (2017), 'Romania remains the 17th economy in the EU, gets closer to Greece', *Romania insider*, 8 March 2017.

Eurostat. (2011), 'Technical Documentation eeSUIOT project: Creating consolidated and aggregated EU27 Supply, Use and Input Output Tables, adding environmental extensions (air emissions), and conducting Leontief-type modelling to approximate carbon and other 'footprints' of EU27 consumption for 2000 to 2006', 23 March 2011, [Online] [Retrieved June 25, 2017], http://ec.europa.eu/eurostat/cache/metadata/Annexes/naio_esms_an1.pdf,

Evans, J. D. (1996), 'Straightforward statistics for the behavioral sciences'. *Pacific Grove*, CA: Brooks/Cole Publishing.

Hasan, M.N., Rana, S., Malek, M.B., Das, K.R. and Sultana, N. (2016), 'Modeling Bangladesh's Gross Domestic Product Using Regression Approach', *Malaysian Journal of Mathematical Sciences* 10(2): 233–246

Jain, D., Nair, K. S. and Jain, V. (2015), 'Factors Affecting GDP (Manufacturing, Services, Industry): An Indian Perspective', *Annual Research Journal of SCMS, Pune, Vol. 3, April 2015,* 38-56

Mehmood, S. (2012), 'Effect of Different Factors on Gross Domestic Product: A Comparative Study of Pakistan and Bangladesh', *Academy of Contemporary Research Journal*, V I (I), 11-22

National Institute of Statistics. (2017), 'Romania, Tempo-Online Data base, National Accounts'

Pokrivčák, J., and Záhorský, T. (2016), 'Economic growth and its determinants across CEE countries', *Proceedings of MVD 2016*, pp. 956-963, [Online] [Retrieved June 20, 2017], http://spu.fem.uniag.sk/mvd2016/proceedings/en/articles/s12/pokrivcak_zahorsky.pdf

Ray, S. (2013), 'Does Financial Development Promote Economic Growth in India?', *International Journal of Economic Practices and Theories*, Vol. 3, No. 3, 2013, pp.110-151

Real Gross Domestic Product (GDP), [Online] [Retrieved June 26, 2017], http://www.investopedia.com/terms/r/realgdp.asp

Romanian Statistical Yearbook. (2012), National Institute of Statistics, Romania

The National Accounts, Methodological notes, Romanian Review of Statistics no. 4 / 2013

The 8.2 percent growth in Romania's economy in the first three months of 2008 was more than three times higher than the EU average, [Online] [Retrieved June 18,

2017], http://www.balkaninsight.com/en/main/news/10691/,
https://en.wikipedia.org/wiki/Economy_of_Romania

Tilica, O., and Arustei, S. (2017), 'Romania's economic growth was 4.8 % in 2015. The estimated GDP reached Lei Billion 759.2', [Online] [Retrieved June 30, 2017], https://www.agerpres.ro/economie/2017/03/07/cresterea-economica-a-romaniei-a-fost-de-4-8-in-2016-pib-ul-estimat-a-ajuns-la-759-228-miliarde-de-lei-09-34-19,
Tudor, R. (2017), 'Radiography of the Romanian economy in 2016. GDP was Euro 169 Billion'. 7 March 2017, [Online] [Retrieved June 2, 2017], https://radu-tudor.ro/radiografia-economiei-romanesti-in-2016-pib-de-169-miliarde-euro,

World Economic Outlook Database, October (2009), 'WEO Groups and Aggregates Information'. [Online][Retrieved May 16, 2017],
https://www.imf.org/external/pubs/ft/weo/2009/02/weodata/index.aspx

An Econometric Analysis between Tourism Income and Romania's GDP

Agatha Popescu, University of Agricultural Sciences and Veterinary Medicine, Bucharest, Romania, E-mail address: agatha_popescu@yahoo.com
Daniela Plesoianu, "Ovidius" University, Constanta, Romania
Email address: plesoianudaniela@hotmail.com

Abstract

The paper analyzed the dynamics of GDP, Tourism GDP, and tourist arrivals in Romania in the period 2007-2016 in order to determine the relationship between these indicators using a linear regression econometric model and correlation coefficients. Tourism GDP reached Lei Billion 39.3 in 2016, being by 100.5 % higher than in 2007. Tourism total contribution to Romania's GDP increased from 4.6 % in 2007 to 5.2 % in 2016. In 2016, total arrivals in tourist accommodation structures was 11 million, by 57.8 % higher than in 2007. About, 22.6 % of total arrivals belonged to foreigners. The regression model, Y = 11.617 X + 304.41, reflected that 1 unit increase in Tourism GDP will determine Romania's GDP to grow by 11.617 units. The regression function Y = 4.279 X - 8.7238 showed that 1 unit increase in Total Arrivals will increase Tourism GDP by 4.279 units, and the regression function Y = 17.041 X - 4.3905 reflected that 1 unit growth in foreign tourists' arrivals will increase Tourism GDP by 17.041 units. All these regression models were valid, as confirmed by Fcalc > 6.094 F value (0.05,7,2), and Sign F <0.05, and H1 hypothesis was accepted, meaning that Tourism GDP has a positive influence on GDP and tourist arrivals have a good impact on Tourism GDP. The determination coefficients and correlations confirmed the strong links between these indicators. As a conclusion, macroeconomic policies should promote tourism to increase arrivals, receipts and tourism contribution to GDP, employment, and investment, its benefic impact on economic growth.

Keywords: dynamics, travel and tourism income, GDP, regression analysis, Romania

Introduction

From the "art of travel for your own pleasure" as defined by M. Peyromarre Debord to "an activity run in the free time with the purpose to travel or live far away from the residence place for entertainment, relaxation, getting experience and knowledge about new cultures and civilizations as defined by Jan Medecin, nowadays, tourism is a mean destined to satisfy people's need to change the environment, to recover the status of health, to cultivate the feeling of admiration and respect for the beauty of nature, and all this is allowed by the development of trade and transportation means as affirmed Guy Freuler" (Negoescu *et al*., 1998).

Across the time, tourism has been continuously developed both as inbound tourism and outbound tourism. Today, tourism is the most dynamic sub-branch of international trade and the most dynamic branch of the world economy (Popescu Agatha, 2014a).

In 2015, the number of international arrivals reached 1,186 million and tourism receipts accounted for USD Billion 1,136 (UNWTO, Tourism Highlights, 2016).

Tourism is a complex phenomenon with a deep economic and social impact. In 2015, the direct contribution of Travel & Tourism to GDP was USD Billion 2,229.8, representing 3 % of GDP. This reflects that tertiary industry including hotels, travel agents, airlines and other passenger

transportation services as well as restaurant and leisure have given a direct support to the world economy. The total contribution of Travel & Tourism to GDP accounted for USD Billion 7,170.3, representing 9.8 % of the world economy (Travel & Tourism Economic Impact 2016, World).

Tourism has a deep impact on economic growth and social development by means of investments, employment, income, exports, infrastructure, local communities and cultural values. Tourism is an important driver in the EU economy, which is placed on the top position in the world regarding tourism attractions, number of arrivals and receipts (Athanasopoulou, 2013; Popescu Agatha, 2014b).

Various studies proved a close relationship between tourism indicators such as arrivals and receipts and GDP. Most of these studies utilize econometric models to demonstrate the link between tourism and economic growth in the EU, Latin America, Asia Pacific, and Arabian countries (Ajvaz, 2015; Mello-Sampayo, 2012; Eugenio-Martin *et al*, 2004; Kreishan, 2010; Skerritt *et al*., 2005).

In the developing countries, tourism revenue has a positive contribution to economic growth and as a consequence governments should develop economic policies to promote tourism which looks to be an important source of economic growth (Ekanayake *et al*., 2012).

A study on the empirical data for the period 1980-2005 belonging to 150 countries concluded that the countries specialized on tourism have not a higher growth rate than non-tourism based countries, with one exception for the period 1980-1990, when the data were not fully available (Figini et al., 2010).

In 85 countries with a high share of tourism receipts in their exports it was noticed that they are facing large fluctuations in tourism arrivals and consequently in the volatility in the annual GDP rate (Brakke, 2005). A similar conclusion was drawn for Greece, where the volatility of tourism income is 8 times higher than GDP volatility (Eeckels, *et al*., 2012). Bayramoğlu *et al*., (2011) found that foreign tourists' expenditures have a deep impact on the economic growth of Greece.

In India, tourism has a benefic impact on economic growth, even though the contribution of tourism to GDP, employment, visitor export, internal consumption, capital investment, foreign exchange earnings and government expenditure is still far away from the country potential (Anson *et al*., 2016; Bandekar *et al*., 2014).

In Nepal tourism has a bi-directional impact on GDP, and on GNI, exports, private consumption, imports, being therefore an important factor of economic growth (Paudyal, 2012).

In Iran, the use of the Johansen-Juseliusco integration test suggested a long-run positive relationship between the studied variables and tourism receipts, and Granger and Hsiao causality tests proved that between tourism income and GDP is a close link in the both directions. (Assadzadeh *et al*., 2012).

In China, it was found a positive relationship between tourist income and GDP, with a benefic impact on people's living standard in Guizhou Province (Wang *et al*., 2015).

A study on a panel of 135 countries pointed out that in Europe it is a bi-directional causality between tourism revenue and GDP compared to an unidirectional causality in America, Latin America & Caribbean and World. In case of East Asia, South Asia and Oceania, it was noticed a reverse direction of causality from tourism revenue to GDP, while in Asia, Middle East and North

Africa, Central Asia and Sub Saharan Africa, it was not found any causal relationship between these indicators (Çağlayan *et al*., 2012).

A study upon the causal relationships between tourism spending and economic growth in 10 transition countries in the period 1988–2011 affirmed that there is a direct causality between these two indicators in Cyprus, Latvia and Slovakia, a reverse relationship in the Czech Republic and Poland and neutral causality in case of Bulgaria, Romania and Slovenia (Chou, 2013).

Using regression models, the hypothesis that tourism development has a deep impact on economic growth was verified. Capital investment, labor and tourism contribute to economic growth for the Mediterranean countries (Gökovali *et al*., 2006).

In the Balkan countries, the impact of tourism on GDP differs from a country to another due to the national practices and legal framework. Tourism has not only a direct impact on GDP but also an indirect impact on a large range of socio economic categories, causing difficulties in their correct estimation (Gramatnikovski *et al*., 2016).

In Romania, based on an Input-Output model, it was found that there are close relationships between hotels, restaurants and travel agencies and other economic sectors. The development of tourism generates an increased demand of inputs from other sectors and also an increased supply to other economic sectors, proving that tourism supports economic growth (Surugiu *et al*, 2009).

In this context, the paper aimed to analyze the evolution of GDP created in tourism industry comparatively with GDP at country level and to identify the relationship between tourist arrivals and tourism receipts and contribution of tourism to GDP in Romania in the period 2007-2016, using a regression model.

The paper objectives are:
(a)To set up a comparative analysis of the dynamics of tourism GDP and Romania's GDP;
(b)To establish the evolution of tourism contribution to GDP;
(c)To analyze the dynamics of arrivals in tourism accommodation structures (total, of which foreigners and Romanians);
(d)To study the relationships existing between Romania's GDP and tourism GDP, and between tourism GDP and arrivals by means of linear regression analysis and correlation coefficients.

The paper is structured as follows: *Introduction* including the empirical literature regarding the impact of tourism on GDP and economic growth, *Materials and methods* presenting: the study area, the data collection, the selected economic variables taken into consideration, the econometrical model used in this research, *Results and Discussions* including the main results and their interpretation, and *Conclusions*, presenting the main ideas drawn from this research.

Materials and Methods

The studied area

Romania is situated in Southeastern Europe in the Balkan Peninsula. Romania is the 12th largest country in Europe as its surface accounts for 238,391 km^2, of which 231,231 km^2 land. The length of its frontiers accounts for 3,195 km and its border countries are: Bulgaria, Hungary, Republic of Moldova, Serbia and Ukraine. It also has a coastline of 245 km length at the Black Sea.
Romania looks like an "amphitheater" divided three parts: 31 % mountains, 33 % plains and 36 % hills. The highest elevation is over 2,500 meters while the lowest area is in the Danube Delta (Geography of Romania, Wikipedia).

Romania has a high tourism potential grace to its beautiful landscapes and old and rich history. The tourism patrimony includes: (a) the components of the natural heritage characterized by a various relief with high mountains with beautiful sceneries, glacial lakes, rich plains, attractive seashore at the Black Sea, the Danube Delta-the paradise of birds and fishes, a mild temperate-continental climate, a rich net of rivers and lakes, a diversified flora consisting of old forests, meadows, natural parks, dendrological parks, scientific reservations and a large variety of species forming its fauna, (b) the components of the anthropogenic heritage determined by the cultural-historical past including archeological sites of the Dacian and Roman cities, medieval fortresses and peasant fortified cities, historical and art monuments characterizing the local culture and civilization such as monasteries, castles, palaces, folk architecture, handicrafts, ceramics, wood processing, egg painting, carpet weaving, traditional folk music, dances, and suits, cultural and artistic institutions like concert halls, opera houses, museums, memorial houses of various personalities in the field of science, literature, art, music, libraries, touristic villages, roads crossing the mountains at high altitude, bridges, old medieval cities with a specific architecture and attractions.

Also, Romania is rich in natural factors suitable for spa tourism based on its mineral and thermal waters, mud and gases with therapeutic properties, salt mines used in the treatment of various diseases, and medicinal plants.

The large variety of seashore resorts offer a diversified program for tourists such as: seashore tours, cruises, nautic sports, fishing, swimming, scuba diving, yachting, helio-marine cure.

Touristic attractive itineraries offer the tourists the chance to climb the mountains, to practice winter sports, to discover caves, to enjoy tasting good wines, to enjoy visiting the cities and villages etc.

Therefore, Romania offers a large variety of tourism forms such as: entertainment tourism, leisure tourism, cultural and historical tourism, mountain tourism, coastal tourism, spa tourism, medical tourism, religious tourism with pilgrimage to important monasteries and churches, agrotourism, hunting, fishing, and chances to participate to important scientific, cultural and sport events, folk traditions etc (Matei, *et al*., 2001; Cocean, 2004; Popescu Agatha, 2014b).

Data collection

The empirical data used in this study are provided by the National Institute of Statistics, Tempo-online Database, for the period 2007-2016.

The data refer to the following indicators: GDP at Romania's level, GDP achieved in tourism including hotels and restaurants and agencies of tourisms activities, tourist arrivals: total arrivals, of which foreigners' arrivals and Romanians' arrivals.

Methodology

-*The graph method* was used to illustrate the dynamics of each indicator in the period of reference and identify the trend line.
-*The descriptive statistics* was determined for each indicator using Excel Data Analysis. In this purpose, there were determined: Mean, Standard error, Median, Standard deviation, Minimum and Maximum values, and coefficient of variation.
-*The linear regression* was the econometric model used in this study in order to identify the impact of tourism GDP, considered the independent variable X, on Romania's GDP, considered

the dependent variable Y. Also, linear regression was used to evaluate the impact of total tourist arrivals, X, independent variable on tourism GDP, considered the dependent variable Y.
The linear regression was determined using the formula:

$$Y = a + bX + \varepsilon \quad (1)$$

where, a and b are regression parameters, whose values are obtained using the Least Square Method to solve the linear system of equations, and ε is the error.
-*The Least Square Method and the following system of normal equations* were used:

$$\sum y = a\sum x + nb \quad (2)$$
$$\sum xy = a\sum x^2 + b\sum x$$

The parameters a and b from the normal equations system were calculated using the formulas:

$$a = \frac{\sum x \sum y - n\sum xy}{(\sum x)^2 - n\sum x^2} \quad \text{and} \quad b = \frac{\sum x \sum xy - \sum y \sum x^2}{(\sum x)^2 - n\sum x^2} \quad (3)$$

-*The standard error*, Sest, of the linear regression was determined using the formula:

$$S_{est} = \sqrt{\frac{\sum (Y_i - Y_{icalc})^2}{N-2}} \quad (4)$$

-*R squared (coefficient of determination)* was utilized to evaluate in what measure the variation of the dependent value Y depends on the variation of the independent values, X.
-*ANOVA* represents the analysis of the variance of Y, the dependent variable, due to X, the independent variable, Regression of Y due to X, residual variance due to the other factors, Residuals and Total variance due to all the factors.

In the ANOVA, we may find:
-*df (degrees of freedom*), k – number of variables X, for simple regression K=1, n-k-1 for residuals (10-1-1= 8 df and n-1 for total variation (10-1=9).
-*Sum for Regression and Residual* is equal to df per Total: k + (n – k – 1) = n – 1.
-*MS-Mean squared* represents the value of variance corrected by the number of degrees of freedom, respectively MS(i)/df(i), where i is the variation source: Regression, Residual, and Total.
-SS*regression* is the sum of the squares of regression deviation, that is the variation explained by regression, having the formula:

$$SSregression = \sum_{i=1}^{n} (\hat{y}_i - \bar{y})^2 \quad (5)$$

-SS*residual* is the sum of the squares of the errors, representing the variation unexplained by regression, according to the formula:

$$SSresidual = \sum_{i=1}^{n} (y_i - \hat{y}_i)^2 \quad (6)$$

-SS*total* is the sum of the individual deviations from the mean, that is total variation, having the formula:

$$SStotal = \sum_{i=1}^{n} (y_i - \bar{y})^2 \quad (7)$$

Finally, SS*total* = SS*regression* + SS*residual,* having the formula:

$$\sum_{i=1}^{n} (y_i - \bar{y})^2 = \sum_{i=1}^{n} (\hat{y}_i - \bar{y})^2 + \sum_{i=1}^{n} (y_i - \hat{y}_i)^2 \quad (8)$$

-*Fisher's Test* was used to verify the significance of the obtained regression model. F = the calculated value of Fisher's Test = MS (*Regression*)/ MS (*Residual*). The calculated F was

compared to the tabled value of F (α, df1, df2), where α is the level of confidence (0.05), df 1= k=7, and df 2=n-k-1=2.
-*Significance F* is the risk that allows to accept the H1 hypothesis, that is the model is good. If SignF < α, this means that the risk to accept the H1 hypothesis is smaller than the proposed risk, and as a consequence the model is good.

-*P-value* represents the risk calculated to accept H1, and if P-value < α, therefore the calculated risk is smaller than the assumed risk, considered acceptable, we may accept H1, meaning that the parameters are different than 0.
-The Bravais-Pearson coefficient of correlation was used to evaluate the relationship and its intensity between variables. It was calculated based on the formula:

$$r = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{\sum (x - \bar{x})^2 \sum (y - \bar{y})^2}} \quad (9)$$

The Ho (null hypothesis) is that the two indicators Y and X are not linked between them, they are independent variables.
The H1 hypothesis (the alternative hypothesis) is that the two indicators Y and X are connected among them, GDP at country level is influenced by tourism GDP, which in its turn it is influenced by total arrivals.

Results and Discussions

The comparative analysis between the dynamics of Tourism GDP and GDP.

Romania has a dynamic economy as confirmed by the evolution of GDP in the analyzed period. From a GDP accounting for Lei Billion 418.2 in the year 2007, Romania reached Lei Billion 761.5 in 2016, reflecting an increase by 82 % compared to the level of the first year of the time series (Fig.1.)

Tourism GDP registered a variable evolution from a year to another in the analyzed period, but the general trend is an increasing one. GDP coming from travel and tourism increased by 100.5 %, in the year 2016 accounting for Lei Billion 39.3 compared to Lei Billion 19.6 in the year 2007 (Fig.1.).

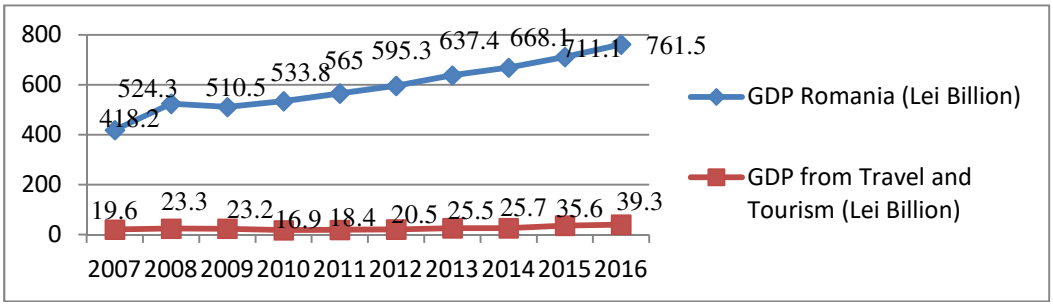


Fig.1.Dynamics of GDP and GDP from tourism, Romania, 2017-2016 (Lei Billion)
Source: Own design based on National Institute of Statistics, Tempo on line Data Base.

The evolution of tourism GDP is more dynamic compared to Romania's GDP as atested by the values of indices with variable basis shown in Fig.2. The growth rates from a year to another have been much higher in case of Tourism GDP compared with the growth rates recorded by Romania's GDP in the years 2009, 2011, 2013, 2015 and 2016. In the other years, tourism GDP growth rates

have been lower but not too much compared to Romania's GDP growth rates, except the year 2010. The most significant increase was achieved in the year 2016, (+10.4), compared to 2015.

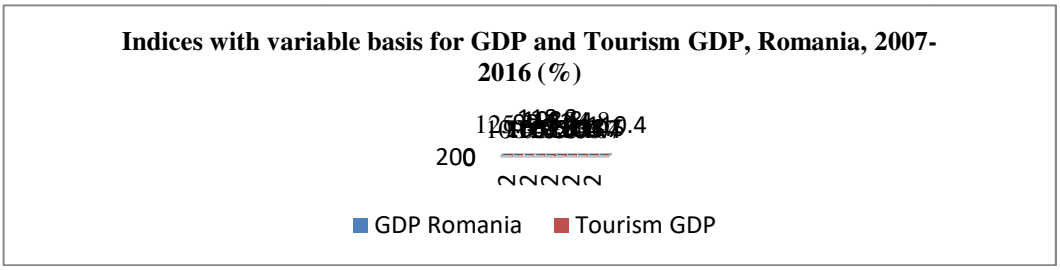


Fig.2.Indices with variable basis for GDP and Tourism GDP, Romania, 2007-2016 (%)
Source: Own calculations and design based on National Institute of Statistics,
Tempo on line Data Base.

The contribution of Tourism GDP to Romania's GDP has varied from a year to another, but the general trend was an ascending one. Thus, from 4.6 % in the year 2007, tourism contributed by 5.2 % to GDP in the year 2016. In the year 2010, it was noticed a slight decline to 3.2 %, but in the coming years the share of Tourism GDP has slowly recovered year by year increasing by 0.1 % till the year 2012 when it reached 4 %. In 2014, it was recorded a decline to 3.8 % again but in the next two years the weight of tourism GDP reached the highest level of 5.1 % and respectively 5.2 % (Fig.3).

In 2016, the direct contribution of tourism to GDP accounted for Lei Billion 10.1 (USD Billion 2.5), representing only 1.3 % of Romania's GDP.
In the same year, the total contribution of Travel & Tourism to GDP was Lei Billion 39.3 (USD Billion 9.7). The forecast for 2017 is Lei Billion 53.7 (USD Billion 13.3), representing 5.8 % of GDP in 2017.

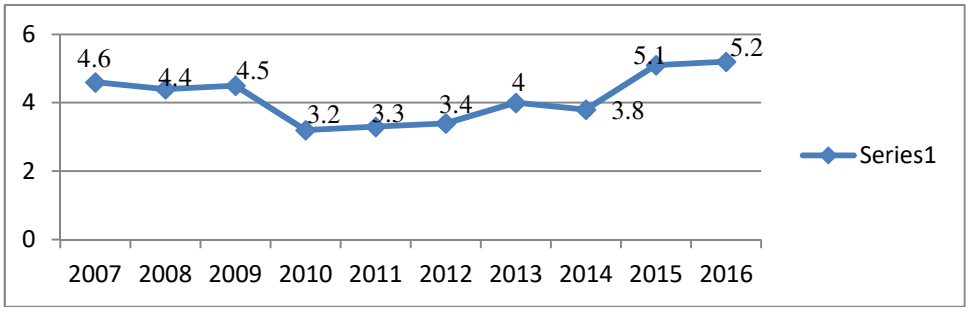


Fig.3.The share of tourism GDP in Romania's GDP, 2007-2016 (%)
Source: Own computation and design based on National Institute of Statistics,
Tempo on line Data Base.

For total absolute contribution to GDP (USD Billion 9.8), in the year 2016, travel and tourism places Romania on the 63rd position in the world. The total contribution to GDP is far away from the world average which accounts for USD Billion 57.3 and the EU average which accounts for USD Billion 60.1. (Travel &Tourism Economic Impact 2017, Romania, World Travel& Tourism Council).

Other contributions of Travel and Tourism in Romania's economy.

In 2016, tourism assured directly 197,500 *jobs* representing 2.4 % of total employment. For the year 2027, it is expected as tourism to support 219,000 jobs (2.6 % of employment). The total contribution to employment, including indirectly support was 513,500 jobs (6.2 %) and in 2017 it is expected to raise to 574,000 jobs (6.9 % of total).

In 2016, ***visitors exports*** assured Lei Billion 8.8 (USD Million 177.5), representing 2.8 % of total exports and in 2017, it is expected to reach Lei Billion 13.6 (USD Million 3,364.9), representing 2.9 % of total.

In 2016, tourism *investment* accounted for Lei Billion 14.7, representing 8.1 % of total investment and in 2017 it is expected to grow at Lei Billion 19.8 (USD Billion 4.9), meaning 8.4 % of total.
For these absolute contributions in the economy, Romania comes on the 63th position for employment, on 77th position for visitors exports and on the 35th position for investments. (Travel &Tourism Economic Impact 2017, Romania, World Travel& Tourism Council).

The dynamics of arrivals in tourist accommodation structures. The number of total arrivals increased by 57.81 % from 5.97 Million in the year 2007 to 11 Million in the year 2016.

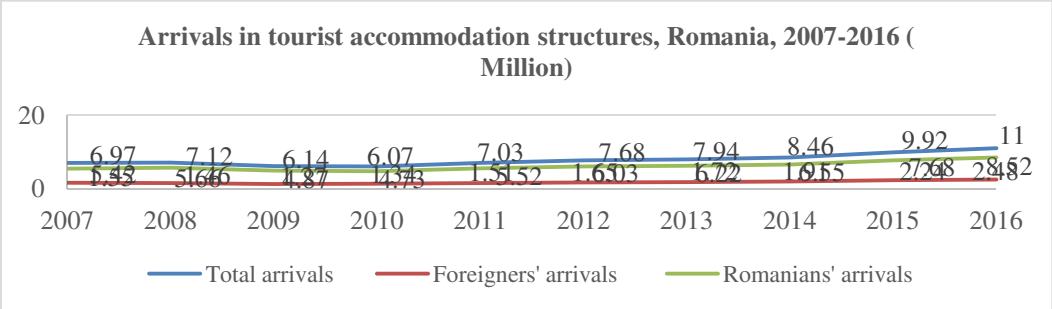


Fig.4.The evolution of arrivals in tourist accommodation structures, Romania, 2007-2016 (Million)

Source: Own design based on National Institute of Statistics, Tempo on line Data Base.

The number of foreigners' arrivals registered also a positive trend line, increasing by 60 % from 1.55 Million in the year 2007 to 2.48 Million in the year 2016. A similar remark is available in case of Romanians' arrivals which increased by 57.1 % from 5.41 Million in 2007 to 8.52 Million in 2016. Therefore, the arrivals of foreign tourists looks to be a little more dynamic than Romanians' arrivals (Fig.4).

As a result, the foreigners' share in total arrivals remained relatively constant about 22 %, but with a slight growth from 22.2 % in the year 2007 to 22.6 % in the year 2016. Romanians keep the highest share in total arrivals, 77.8 % in 2007 and 77.4 % in 2016, and also in 2008 and 2009, 79.5 % and respectively 79.3 % (Fig.4).

Descriptive statistics for the studied indicators in terms of mean, standard error, median, standard deviation, minimum and maximum values and coefficient of variation for GDP and its resources is presented in Table 1.

Table 1: Descriptive statistics for the analyzed indicators

	GDP	Tourism GDP	Arrivals-total	Foreigners' arrivals	Romanians' arrivals
Mean	592.52	24.8	7.83	1.71	6.12
St. Error	32.71	2.31	0.50	0.12	0.37
Median	580.15	23.25	7.4	1.6	5.84
St. Deviation	103.45	7.31	1.58	0.39	1.19
Min.	418.2	16.9	6.07	1.27	4.73
Max.	761.5	39.3	11	2.48	8.52
Variation coeffic. (%)	17.45	29.5	20.1	22.8	19.4

Source: Own calculation based on National Institute of Statistics, Tempo on line Data Base.

The series of data have been homogenous and the values of the coefficients of variations have been v ≤ 35%, reflecting small differences and that the calculated mean is representative.

Linear regression of Romania's GDP depending on Travel and Tourism GDP.

Taking into account the linear regression function between GDP and Tourism GDP, Y = 11.617 X + 304.41, we may conclude that 1 unit increase in Tourism GDP will determine Romania's GDP to grow by 11.617 units. The linear regression model is valid as confirmed by Fisher's test and significance F (Fig.5, Table 2).

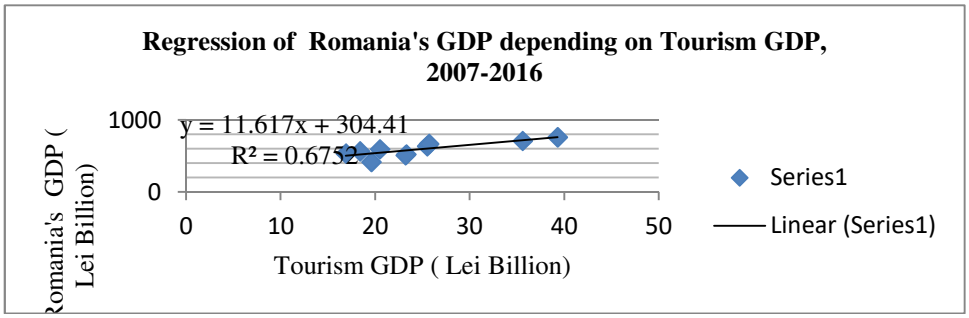


Fig.5.Regression of Romania's GDP depending on Tourism GDP, 2007-2016

Source: Own design based on National Institute of Statistics, Tempo on line Data Base.

The coefficient of determination R^2=0.675 reflected that 67.52 % of GDP variation was determined by the variation of GDP created in Tourism. The difference of variation is determined by other factors.

F calculated value was 16.6311 > 6.094 the tabled F value (0.05,7,2) in Fishers' distribution, therefore H1 hypothesis could be accepted, meaning that the regression model is valid because the variance explained by the regression model variables is higher than the unexplained variance.

As long as the Significance F = 0.003543 <0.05, the risk to accept H1 is smaller than the proposed risk, and this reflects that the regression model is good.

P-value is also < α, meaning that the calculated risk is smaller than the assumed risk. Therefore, H1 is accepted as the parameters are different than zero.

Table 2: Linear regression of Romania's GDP depending on Tourism GDP

Regression statistics						
Multiple R	0.821710009					
R Square	0.675207339					
Adjusted R Square	0.634608257					
Standard Error	62.53526502					
Observations	10					
ANOVA						
	df	*SS*	*MS*	*F*	*Significance F*	
Regression	1	65038.56	65038.56	16.6311	0.003543	
Residual	8	31285.27	3910.659			
Total	9	96323.84				
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	304.4097697	73.36326	4.149349	0.003212	135.2338	473.5857
X Variable 1	11.617348	2.848699	4.078124	0.003543	5.048237	18.18646

Source: Own computation based on National Institute of Statistics, Tempo on line Data Base.

Table 3:Residual output for GDP Romania depending on Tourism GDP

Observation	*Predicted Y*	*Residuals*
1	532.1097904	-113.91
2	575.093978	-50.794
3	573.9322432	-63.4322
4	500.7429508	33.05705
5	518.1689728	46.83103
6	542.5654036	52.7346
7	600.6521436	36.74786
8	602.9756132	65.12439
9	717.9873584	-6.88736
10	760.971546	0.528454

Source: Own computation based on National Institute of Statistics, Tempo on line Data Base.

Linear regression of Tourism GDP depending on Arrivals Total. Taking into account the linear regression function between Tourism GDP and Arrivals total, Y = 4.279 X - 8.7238, we may conclude that 1 unit increase in Total Arrivals will determine a growth of Tourism GDP by 4.279 units. The linear regression model is valid as confirmed by Fisher's test and significance F (Fig.6, Table 4).

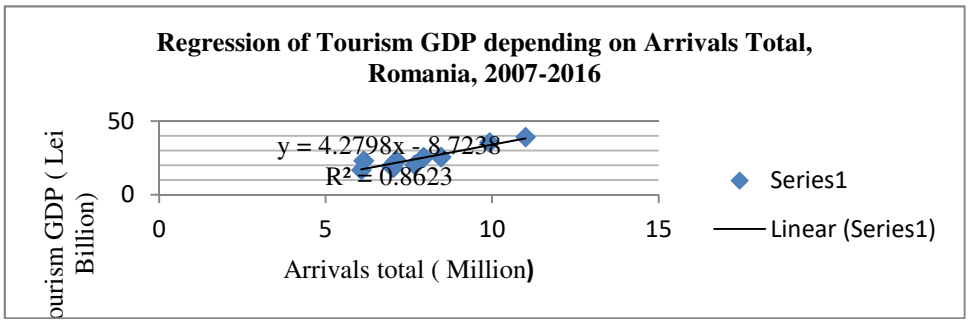


Fig.6.Regression of Tourism GDP depending on Arrivals Total, 2007-2016

Source: Own design based on National Institute of Statistics, Tempo on line Data Base.

The coefficient of determination R^2=0.862 showed that 86.2 % of Tourism GDP variation was determined by the variation of Total Arrivals.

F calculated value was 50.08755165 > 6.094 than the tabled F value (0.05,7,2) in Fishers' distribution, therefore H1 hypothesis is accepted and the regression model is valid.

Because the Significance F = 0.000104 <0.05, we may accept H1as its risk is smaller than the proposed risk. Therefore, the regression model is good.

P-value is also < α, meaning that the calculated risk is smaller than the assumed risk. Therefore, H1 is accepted as the parameters are different than zero.

Table 4: Linear regression of Tourism GDP depending on Total arrivals

Regression statistics						
Multiple R	0.928588639					
R Square	0.86227686					
Adjusted R Square	0.845061468					
Standard Error	2.880294714					
Observations	10					
ANOVA						
	Df	*SS*	*MS*	*F*	*Significance F*	
Regression	1	415.5312189	415.5312	50.08755165	0.000104	
Residual	8	66.3687811	8.296098			
Total	9	481.9				
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-8.723766751	4.823606491	-1.80856	0.108129045	-19.847	2.39949
X Variable 1	4.279811918	0.604727588	7.077256	0.000104312	2.885308	5.674316

Source: Own computation based on National Institute of Statistics, Tempo on line Data Base.

Table 5: Residual output for Tourism GDP depending on Arrivals total

Observation	*Predicted Y*	*Residuals*
1	21.10652232	-1.506522315
2	21.7484941	1.551505897
3	17.55427842	5.645721577
4	17.25469159	-0.354691589
5	21.36331103	-2.96331103
6	24.14518878	-3.645188777
7	25.25793988	0.242060125
8	27.48344207	-1.783442072
9	33.73196747	1.868032528
10	38.35416434	0.945835657

Source: Own computation based on National Institute of Statistics, Tempo on line Data Base.

Linear regression of Tourism GDP depending on International Arrivals.

The linear regression function, reflecting the relationship between Tourism GDP and International Arrivals, Y = 17.041 X - 4.3905 reflects that 1 unit increase in foreign tourists' arrivals will determine an increase Tourism GDP by 17.041 units. The linear regression model is valid as confirmed by Fisher's test and significance F (Fig.7, Table 6).

The coefficient of determination R^2=0.829 reflects that Tourism GDP variation was determined in a proportion of 82.91 % by the variation of foreign tourists' arrivals.

F calculated value was 38.8246945 > 6.094 the tabled F value (0.05,7,2) in Fishers' distribution, therefore H1 hypothesis is accepted and the regression model is valid.

Because the Significance F = 0.000250841 <0.05, we may accept H1 as its risk is smaller than the proposed risk. Therefore, the regression model is good.

P-value is also < α, meaning that the calculated risk is smaller than the assumed risk. Therefore, H1 is accepted as the parameters are different than zero.

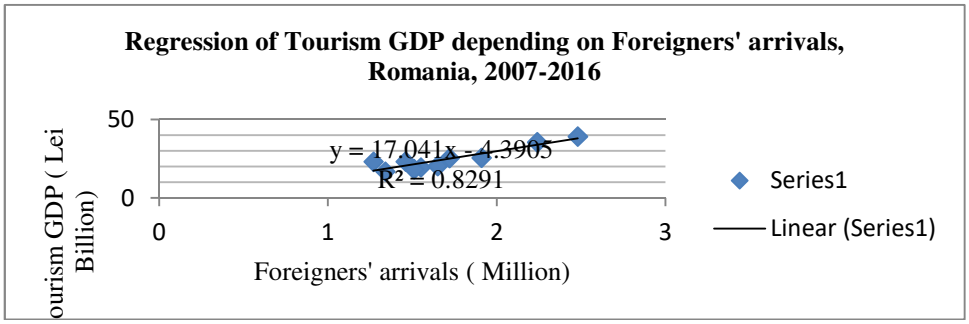


Fig.7.Regression of Tourism GDP depending on Foreign tourists' Arrivals, 2007-2016

Source: Own design based on National Institute of Statistics, Tempo on line Data Base.

Table 6: Linear regression of Tourism GDP depending on Foreign tourists' arrivals

Regression statistics						
Multiple R	0.910576729					
R Square	0.82914998					
Adjusted R Square	0.807793727					
Standard Error	3.208048955					
Observations	10					
ANOVA						
	Df	*SS*	*MS*	*F*	*Significance F*	
Regression	1	399.567375	399.567375	38.8246945	0.000250841	
Residual	8	82.3326248	10.2915781			
Total	9	481.9				
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-4.390502976	4.79334487	-0.91595808	0.38646641	-15.4439761	6.66297012
X Variable 1	17.04057383	2.7348291	6.23094652	0.00025084	10.73404663	23.347101

Source: Own computation based on National Institute of Statistics, Tempo on line Data Base.

Table 7: Residual output for Tourism GDP depending on Foreign tourists' arrivals

Observation	*Predicted Y*	*Residuals*
1	22.02238647	-2.4223865
2	20.48873482	2.81126518
3	17.25102579	5.94897421
4	18.44386596	-1.543866
5	21.34076351	-2.9407635
6	23.72644385	-3.2264438
7	24.91928402	0.58071598
8	28.15699305	-2.456993
9	33.78038241	1.81961759
10	37.87012013	1.42987987

Source: Own computation based on National Institute of Statistics, Tempo on line Data Base.

The Bravais- Pearson coefficients of correlation.

The values of the correlation coefficients reflected a positive correlation between GDP and Tourism GDP, r = 0.821.
Also, between Tourism GDP and Arrivals total it was found a positive and very strong relationship, r = 0.928.
Finally, between GDP created in Tourism and International arrivals is also a positive and strong correlation, r = 0.910.
All the coefficients of correlations have a high significance for 5 % confirming the strong position connection between the analyzed pairs of tourism indicators as presented in Table 8.

Table 8: Bravais-Pearson Coefficients of correlation

GDP, Tourism GDP	Tourism GDP, Arrivals total	Tourism GDP, International Arrivals
0.821	0.928	0.910
***	***	***

Source: Own calculation based on National Institute of Statistics, Tempo on line Data Base.
***Significance for 5 %.

Conclusions

The paper made a comparative analysis of the evolution of Tourism GDP and GDP in Romania proving that travel and tourism is an economic branch with a high dynamics in the period 2007-2016. Also, the study presented the evolution of tourist arrivals (total, arrivals of foreign tourists and arrivals of residents) in tourist accommodation units. The relationship between these indicators was studied using linear regression econometric model and Bravais-Pearson correlation coefficients.

The hypothesis of the paper was that tourism GDP has a positive influence on GDP, and the number of tourist arrivals has an important impact on Tourism GDP.

While Romania's GDP increased in the analyzed period by 82 %, tourism GDP increased by 100.5 %. In the year 2016 Tourism GDP accounted for Lei Billion 39.3 compared to Lei Billion 19.6 in the year 2007.

The Tourism total contribution to Romania's GDP had a general ascending trend, with some variations from a year to another. From 4.6 % share in GDP in the year 2007, tourism contributed by 5.2 % in the year 2016. The direct contribution of tourism to GDP was Lei Billion 10.1, representing only 1.3 % of Romania's GDP.

Tourism development was stimulated by the increased number of tourists visiting the country. In 2016, the number of total arrivals in tourist accommodation structures was by 57.8 % higher than in 2007, accounting for 11 Million, of which 22.6 % belonged to foreigners and 77.4 % to residents. The international arrivals increased by 60 % reaching 2.48 million in 2016, while Romanians' arrivals raised by 57.1 % accounting for 8.52 million.

The regression function of GDP, considered the dependent variable Y, and Tourism GDP, considered the independent variable X, was Y = 11.617 X + 304.41, which could be interpreted that 1 unit increase in Tourism GDP will determine Romania's GDP to grow by 11.617 units.

Fisher's test proved that F calculated value was 16.6311 > 6.094 the tabled F value (0.05,7,2) in Fishers' distribution, and significance F confirmed that the linear regression model is valid, therefore the H1 hypothesis was accepted, meaning that between Romania's GDP and GDP created in Tourism is an important positive relationship. This was also attested by the coefficient of determination which reflected that GDP variation was determined only in a proportion of 67.52 % by the variation of Tourism GDP.

The regression function reflecting the relationship between Tourism GDP and Total Arrivals was Y = 4.279 X - 8.7238, meaning that 1 unit increase in Total Arrivals will determine an increased Tourism GDP by 4.279 units. F calculated value was 50.08755165 > 6.094 the tabled F value (0.05,7,2) in Fishers' distribution, and Significance F = 0.000104 <0.05, therefore, the regression

model was good and H1 hypothesis was accepted. More than this, the coefficient of determination proved that 86.2 % of the variation in Tourism GDP was determined the variation of Total Arrivals.

The regression function characterizing the relationship between Tourism GDP and International Arrivals was Y = 17.041 X - 4.3905 reflecting that 1 unit increase in foreign tourists' arrivals will lead to increased Tourism GDP by 17.041 units. F calculated value was 38.8246945 > 6.094 the tabled F value (0.05,7,2) in Fishers' distribution, and Significance F = 0.000250841 <0.05, reasons to consider the regression model a valid one, and to accept the H1 hypothesis. About 82.91 % of the variation of Tourism GDP was caused by the variation of foreign tourists' arrivals. Very strong positive correlations were found between GDP and Tourism GDP, r = 0.821, between Tourism GDP and Total Arrivals, r = 0.928, and between Tourism GDP and International arrivals, r = 0.910.

As a conclusion, in Romania, tourism has been continuously developing in terms of tourist arrivals and GDP, having a positive impact on GDP at country level.

The economic growth of Romania should be based on macroeconomic policies which have to promote tourism expansion, besides other services components of trade, as tourism is a dynamic economic branch.

The large variety of tourist attractions and high quality services of accommodation, transportation, entertainment offered by Romania could increase the number of arrivals, overnight stays, and income coming from travel and tourism, as well as the contribution of tourism to GDP, employment, visitors exports and investment.

References

Ajvaz, V. (2015), 'The contribution of tourism development to economic growth of Sweden: A panel data approach', *Master Thesis*, [Online] [Retrieved July 3, 2017], www.ehl.elu.se

Anson, K.J., and Thaliath, A. (2016), 'A Study on Changes in GDP due to its Relative Dependence on Tourism Receipts', *Atna, J Tour Stud,* 11, 1 (2016), 17-30

Assadzadeh, A., and Najafi Nasab, M.H. (2012), 'Investigating the Relationship between Tourism Industry and GDP in the Islamic Republic of Iran', *International Review of Business Research Papers,* Vol. 8. No.2. March 2012. Pp. 85 - 95

Athanasopoulou, A. (2013), 'Tourism as a driver of economic growth and development in the EU-27 and ASEAN regions', The EU Center in Singapore.

Bandekar, B. N., and Sankaranarayanan, K.G. (2014), 'Contribution of tourism sector to India's GDP', *Radix International Journal of Research in Social Science*, Vol. 3, Issue 10, pp.1-11

Bayramoğlu, T., and Onur Ari, Y. (2011), 'The relationship between tourism and economic growth in Greece economy: a time series analysis', *Computational Methods in Social Sciences,* 89-94.

Brakke, M. (2005), 'International Tourism, Demand, and GDP Implications: A Background and Empirical Analysis', *Undergraduate Economic Review*: Vol. 1: Iss. 1, Article 2, 40 pp.

Çağlayan, E., Şak, N., and Karymshakov, K. (2012), 'Relationship between tourism and economic growth: A panel Granger causality approach', *Asian Economic and Financial Review,* 2(5):591-602

Chou, M.C. (2013), 'Does Tourism Development Promote Economic Growth in Transition Countries? A Panel Data Analysis', *Economic Modelling*, 33, 226-232.

Eeckels, B., Filis, G., and Leon, C. (2012), 'Tourism income and economic growth in Greece: empirical evidence from their cyclical components', *Tourism Economics*, 2012, 18 (4), 817–834

Ekanayake, E. M., and Long, A., E. (2012), 'Tourism development and economic growth in the developing countries', *The International Journal of Business and Finance Research*, Vol. 6, No.1, pp.51-64

Eugenio-Martin, J. L., Martin Morales, N., and Scarpa, R. (2004), 'Tourism and economic growth in Latin American countries: A panel data approach', *Social Science Research Network Electronic Paper*. No. 26, [Online] [Retrieved July 1, 2017], http://www.feem.it/userfiles/attach/Publication/NDL2004/NDL2004-026.pdf

Figini, P., and Vici, L. (2010), 'Tourism and growth in a cross-section of countries', *The Rimini Center for Economic Analysis,* 17 pp.

Geography of Romania, (2017), Wikipedia, [Online] [Retrieved July 10, 2017], https://en.wikipedia.org/wiki/Geography_of_Romania

Gökovali, U., and Bahar, O. (2006), 'Contribution of Tourism to Economic Growth: A Panel Data Approach', *Anatolia: An International Journal of Tourism and Hospitality Research,* Volume 17, Number 2, pp. 5-18.

Gramatnikovski, S., Milenkovski, A., and Blazheska, D. (2016), 'The Impact of the International Tourism Receipts on GDP: The Case of Republic of Macedonia', *International Journal of Academic Research in Accounting, Finance and Management Sciences*, Vol. 6, No. 4, October 2016, pp. 220–225

Kreishan, F. M.M. (2010), 'Tourism and economic growth: The case of Jordan', *European Journal of Social Sciences*, 15 (2), 229 - 234

Mello -Sampayo, F.S. S.V. (2012), 'Tourism and Growth in European Countries: An Application of Likelihood-Based Panel Cointegration', *School of Economics and Management*, Technical University of Lisbon, Working Paper 17

Negoescu, B., and Vlasceanu, G. (1998), '*Terra Economic Georgraphy'*, Teora Publishing House.

Paudyal, S. (2012), 'Does Tourism Really Matter for Economic Growth? Evidence from Nepal', *NRB Economic Review*, pp.48-66

Cocean, P. (2004), 'Tourism Geography', Focul Viu Press House.

Matei, H.C., Nicolae, I., Neguț, S., and Radu, C. (2001), '*Enciclopedia of the world states'*, 7th edition, Bucharest, Meronia Press House

National Institute of Statistics, Tempo-online Database, (2017), [Online] [Retrieved July 1, 2017], www.insse.ro,

Popescu Agatha, (2014a), '*International tourism'*, Eikon Publishing Houes, Cluj-Napoca, RawexComs Publishing House, Bucharest, 221 pp.

Popescu Agatha, (2014b), '*Tourism and rural tourism in the EU-28'*, Eikon Publishing House, Cluj-Napoca, RawexComs Publishing House, Bucharest, 229 pp.

Skerritt, D., and Huybers, T. (2005), 'The effect of international tourism: An empirical analysis', *Asia Pacific of Tourism Research*, Vol.10, Issue 1, 23-43

Surugiu, C., Frent, C., and Surugiu, M. (2009), 'Tourism and its impact upon the Romanian economy: An input-output approach', *Scientific Annals of "Alexandru Ioan Cuza" University*, Iasi, Vol.LVI, Economic Sciences, pp.355-377
Travel &Tourism Economic Impact 2017, Romania, World Travel& Tourism Council), [Online] [Retrieved on July 15, 2017], https://www.wttc.org/-/media/files/reports/economic-impact-research/countries-2017/romania2017.pdf

Travel & Tourism Economic Impact 2016, World. [Online] [Retrieved on July 15, 2017], https://www.wttc.org/-/media/files/reports/economic%20impact%20research/regions%202016/world2016.pdf

UNWTO, Tourism Highlights, (2016), [Online] [Retrieved on July 20, 2017], http://mkt.unwto.org/publication/unwto-tourism-highlights-2016-edition

Wang, W., Ma, H. (2015), 'An Econometric Analysis of the Relationship between GDP and Tourism Income in Guizhou, China', *International Journal of Business Administration*, Vol.6, (4), 41-47

Qualitative and Quantitative Verification of The Reasons for Modularization

Melanie Buchmüller, The Bucharest University of Economic Studies, Romania,
melaniebuchmueller@web.de
Bastian Heinemann, The Bucharest University of Economic Studies, Romania,
Bastian.heinemanns@ghk-management.com
Steffen Lange, The Bucharest University of Economic Studies, Romania,
steffen.s.lange@googlemail.com
Wiebke Geldmacher, The Bucharest University of Economic Studies, Romania,
wiebke.geldmacher@gmail.com
Vanessa Just, The Bucharest University of Economic Studies, Romania,
Vanessa-Just@web.de
Michael Studeny, The Bucharest University of Economic Studies, Romania,
michael.studeny@gmail.com
* Corresponding author, **Melanie Buchmüller** – melaniebuchmueller@web.de

Abstract

The terminology of modularization is to be found in many branches of industry as an integral part. This fact will continue to rise in the future. This can be inferred from some market trends which reinforce the causes of modularization. For this reason, the motives for the use of modularization also play an increasingly important role in the industry.

Thus, the objective of this research is to review the reasons for the most significant motif for modularization which are complexity and diversity of variants that support the use of modularization strategy. Besides the literature research of external and internal reasons for complexity and diversity of variants, 100 questionnaires on the same subject have been taken into account These questionnaires have been completed by 60 professional buyers, 20 experts from the strategy department and 20 persons working in the field of modularization. Furthermore, 50 experts in modularization and professional buyers have been interviewed separately.

As a result of the research, cost pressure, complexity and organizational effort were stated as the three most important reasons for the complexity and diversity of variants. In addition, a comparison of the primary data and the literature showed that the results were consistent. The authors therefore emphasize the findings from literature research. Moreover, the two surveys highlight that the topic of modularization has gained more and more importance due to the causes of complexity and diversity of variants throughout the past five years. This means that applied science provides additional input and results for the business analyses in the future.

Keywords: Modularization Strategy, Complexity, Variant diversity, Reasons for Modularization

JEL Classification
M10 Business Administration: General; D22 Firm Behavior: Empirical Analysis

I. Introduction

The terminology of modularization is to be found in many branches of industry as an integral part. This fact will continue to increase in the future (Wildemann 2014b). The reason for this is the fact that a target conflict between individual products, which is demanded, for example, by the personal wishes of the customers and the required standardization. This standardization is to be strived for by the company (Wildemann, 2012, 2014a; Wildemann, 2017b). The latter point mentioned leads to cost savings by purchasing many identical parts, which can be purchased more favorably from the respective supplier due to larger order quantities and thus to offer favorable sales prices for customers. The described conflict has played an increasingly important role for several years (Buchmüller et al., 2017). This forecast is based on market trends, on the one hand. Here, the increase of the customers' individual requirements (Stang, Hesse and Warnecke, 2002), the decrease of innovation and shortening of the product lifecycles (Waltl and Wildemann, 2014; Wildemann, 2014a; 2014b, Krampf, 2012), the continuous increase in vehicle models and vehicle derivatives within the past ten years (Daimler AG, 2013; Volkswagen AG, 2013; CAR Uni Duisburg-Essen, 2012; Waltl and Wildemann, 2014) and the transformation from a seller's market to a buyer's market (Waltl and Wildemann, 2014; Wildemann, 2014a; 2014b; Baum and Hüttenrauch, 2008) need to be taken into account Also, the stagnant or even declining demand in the triad markets (industrial East Asia, NAFTA and EU) are to be mentioned in this context. Instead, growth continues to be reported in the ASEAN and BRIC markets (Waltl and Wildemann, 2014; Hab and Wagner, 2012; Baum and Hüttenrauch, 2008). Another two market trends are the increasing environmental consciousness in society (Baum and Hüttenrauch, 2008), which have been prevalent since the mid-1990s, as well as the decreasing brand loyalty in the automotive sector (Wolters, 2012). Finally, reference should be made to the exponential increase in complexity in the context of the expanded range of products, the increasing importance of corporate services (Wildemann, 2014a; 2014b) and the need for more cooperation caused by great, monetary or non-monetary synergy effects that are not being used (Wildemann, 2014a; Hab and Wagner, 2012).

On the other hand, a global extension of the production network (Wildemann, 2014a; 2014b) and the existence of high cost pressure through competitors (Baum and Hüttenrauch, 2008) need to be taken into consideration, too.

Based on these presented trends and developments, the following research investigate the exponential increase in the complexity of the increasing number of product offerings and its causes because it has been a continuous increase of vehicle models and derivatives in the automotive sector within the last ten years (Car Uni Duisburg-Essen, 2012). In addition, an almost explosive increase of variant diversity has been observed (Wildemann, 2014b). Using the example of the model series or variants, respectively, of the German passenger car market, this development is depicted in the two charts below.

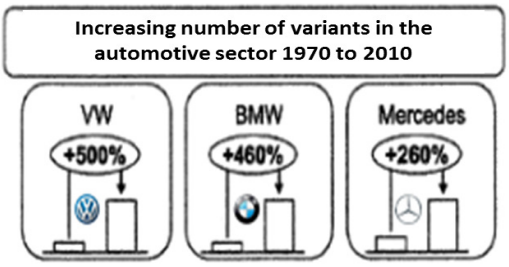


Fig. 1. Variant development of 1970 compared to 2010
Source: Adapted to Wildemann, 2014b, p. 14

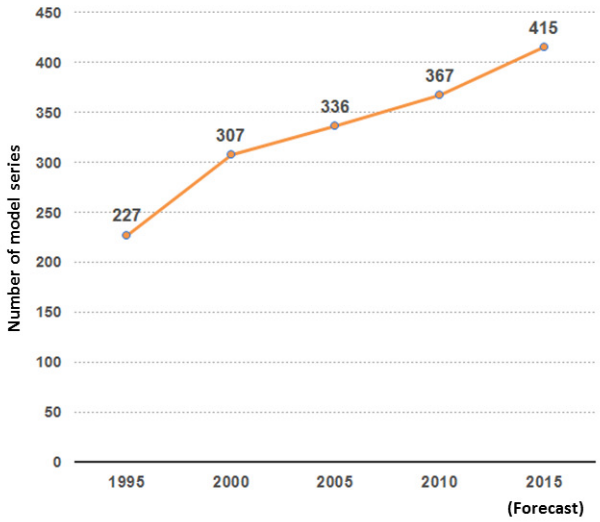


Fig. 2. Number of model series in the German passenger car market
Source: Car Uni Duisburg-Essen, 2012

Apart from the automotive sector, a continuous increase of the number of variants can also be observed in other industries. Here, examples are plant engineering (Schuh and Schwenk, 2017), the manufacturers of mobile phones which differ from each other only marginally (Renner, 2007), as well manufacturers of sneakers or contacts lenses (Baum and Hüttenrauch, 2008).

In addition Schuh and Schwenk (2017), for many corporates, the degree of complexity has come to a point where coordination and control costs get out of hand (Schuh and Schwenk, 2017). This latter fact strongly supports the following investigation of the causes

II. Literature Research

Definition of Modularization

Modularization is a method for structuring products based on defined aspects. Modularization ensures the independence of the individual elements by diminishing their interdependence and decreases the amount of interfaces (Göpfert, 2009; Canales Salacerry, 2006; Buchmüller et al., 2017). The method can be compared to the construction of a Lego vehicle. The method indicates that the construction process requires a certain amount of components (Buchmüller et al., 2017).

Definition of complexity and variant diversity

Since the terms 'complexity' and 'complexity control' often are used in the same context as 'variants', 'variant diversity' and 'variant control' (Wildemann, 2017a), the definitions of 'variant diversity' and 'complexity' will be given below.

According to Firchau et al. (2002), variant diversity describes the number and diversity of different variants of a component, a product, and an assembly group (Firchau et al., 2002; Renner, 2007). Heina (1999), on the contrary, focuses on diversity on the level of the end product and establishes a classification of the term. The external diversity is equivalent to the variety at product level, whereas internal diversity is given within a corporate's production sector at the level of components and assembly groups. Due to the prevalent interdependency between the different levels, the expansion of product diversity leads to more variance at subordinate levels. Conversely, this means that modifications and innovations entail an increase of product variety at the component level (Heina, 1999). In addition, the following definition should be mentioned as well. Variant diversity corresponds the number of variants of a specific type but it ignores largely their differences because it is difficult to clearly determine them anyways (Renner, 2007).

In contrast to 'variant diversity', there is no generally accepted definition of the term 'complexity'. However, the term is used in many different ways and highly specific definitions can be found (Renner. 2007). The term 'complexity' is derived from Latin describes the total of all measures and features or multidimensional nature (Duden, 2010).

Lindemann defines complexity as non-transparency, i.e. condition of a system that is hard to understand (Lindemann, 2005). Precisely, this non-transparency is caused by the features relations, element and dynamic, and is increased by a lack of clarity concerning both the current specification and the distinction of single elements and relations as well as through a lack of knowledge (Lindemann, 2005).
In addition, the production-technical point of view of Adam (2004) should be taken into consideration as well. They understand complexity as the multidimensional nature of all features of a production concept (Adam, 2004).

The two terms of complexity and diversity are very closely linked. Complexity reflects a feature of the system, and diversity is the corresponding measuring unit (Schuh and Schwenk, 2017). Due to this connection, the two terms cannot be considered separately, and therefore will be dealt with together in the following (Renner, 2007).

External reasons of complexity and variant diversity

A company that aims at generating revenues by selling and offering products, finds itself in an area of conflict that consists of different factors. Each of these factors has an impact on variance at product level in the corporate (Renner, 2007). These factors can be divided into four areas.

- Market and customer complexity (Wildemann, 2014a; 2014b; Baum and Hüttenrauch, 2008; Krampf, 2012)
- Globalization and internationalization (Renner, 2007; Wildemann, 2014a; 2014b; Baum and Hüttenrauch, 2008; Wiesener et al., 2016; Ehret, 2008)
- Standards, regulations, ergonomic requirements, laws and guidelines (Renner, 2007; Wildemann, 2014a; 2014b)
- Technological progress (Renner, 2007; Wildemann, 2014b)

A continuous increase of market complexity poses a new challenge for each and every corporate. On the part of the market, there is only a stagnant demand for standard products, whereas the demand for individual products continues to increase (Stang, Hesse and Warnecke, 2002). This means that on globally saturated markets (Wildemann, 2005b) only those corporates will remain on the market in the middle turn that continuously meet the needs of the customer – which tend to become more and more complex (Wildemann, 2014a; 2014b; Krampf, 2012; Renner, 2007). However, if this customer focus is not properly understood, this can lead to an explosive increase of the number of variants and therefore cause numerous economic problems. Another factor that needs to be mentioned in connection with the market is the lack of possibilities of streamlining product ranges (e.g. through discontinuing of earlier models). Because this could have a negative impact on the image or spare parts stock required by the customer (Renner, 2007).

The ongoing globalization and internationalization of the markets leads to country-specific product requirements and, thus, causes variances. These country specifications are changing values in terms of design, equipment, quality, handling or costs and political and social structures of the individual countries as well. Furthermore, globalization and deregulation leads to rising competitive intensity and dynamic which, in turn, leads to shorter development cycles in combination with a sharp increase of product quantity in order to remain competitive (Renner, 2007, Wildemann, 2014a).

Apart from market complexity and globalization or internationalization, the different ergonomic requirements on a product also play an important role for the number of variants. There is a number of differences in connection with different climate conditions (e.g. lubrication and cooling), and also in terms of differing regulations, standards, laws and guidelines, e.g. voltage and hertz of the power supply system (Renner, 2007), country-specific certification (Görbert, 2014), labeling of measuring units, languages, and left-hand or right-hand traffic (Renner, 2007)). Moreover, there often are different “de facto standards” (Renner, 2007, p. 25) and habits which require modified variants. The cup holder is one example. The habits differ very strongly. Whereas Europeans usually do not require a cup holder, most Americans want to have one in their car. Or, the majority of vehicle owners require a cup holder that is round and provide a filling capacity of up to 1,5 liters, whereas square formats with a filling capacity of 0,2 liters are required in Japan (Renner, 2007).

The last external reason is the fast, technological progress (Wildemann. 2014a). It is necessary to remain competitive. As a consequence, the variant diversity keeps increasing which can be seen very clearly in the sector of computers and mobile phones (Renner, 2007).

Apart from these aforementioned external reasons for the prevalent variant diversity, there are internal reasons, too, which will be looked upon in the following.

Internal reasons

Reasons for unnecessary variant diversity emerging from the internal area are a result of existing deficits in organizational and technical framework conditions within the company (Renner, 2007; Wildemann, 2014b).

In detail, the increase of diversity can be explained by the following factors (Baum and Hüttenrauch, 2008; Wildemann, 2005a; Wildemann, 2005b; Wildemann, 2014a; Wildemann, 2014b).

- Non-use of existing experience
- Existing diversity of variants
- Existing process variety
- Non-transparency of the existing organization
- Lack of awareness of the employees
- Very slow generation of variants in the work progress
- Lack of access to relevant information
- Lack of interconnectivity and integration of experts
- Communication deficits in the areas of development and construction
- Description of product structure is not sufficient
- No superordinate strategy for continuous improvement processes
- Standardization of components is conducted too late
- The change management in many parts of the corporate is disorganized
- IT-technical and construction-methodical tools to ensure effective and fast development or component parts are missing
- The prevalent dominance of sales over the areas of production and construction

This means that development and construction have a crucial share in the number of variants (Renner, 2007).

III Research design and methodology

This research is based on one hand on literature research of the causes for the most important reason for modularization – the complexity and variety of variants. These identified reasons are subsequently evaluated by a quantitative survey and also checked by qualitative interviews. Both results include

reasons for the complexity and eventually for the implementation of the modularization method. The results of both research works will be compared in the end.

For quantitative research, a questionnaire was sent out and completed by 100 persons. 60 participants work in the procurement department, 20 in the strategic department, and another 20 persons are experts in the field of modularization. The questionnaire consists of five questions. The questions include some demographic and general questions concerning modularization strategy and also a specific question about the reasons for modularization or the complexity and diversity of variants (Table 1).

Table 1: Questionnaire for the quantitative research

Question	
1	How old are you?
2	What is your profession?
3	How long are you working on the field of the modularization strategy?
4	How did the importance of the modularization strategy for companies during the last 5 years? (Characteristics: decreasing; equally; increasing)
5	Please evaluate the following reasons if they are crucial for the implementation of the module strategy (Characteristics: certainly not (1); probably not (2); maybe (3); probably yes (4); certainly yes (5))
5.1	Complexity (in market or customers segment)
5.2	Globalization and Industrialization
5.3	Laws, standardize and regulations
5.4	Organizational and technical conditions
5.5	Technological progress
5.6	Cost pressures

Source: Own presentation

In parallel with the quantitative research described above, short interviews were conducted. For this qualitative research, 50 persons were interviewed. 25 of the participants are experts in the field of modularization and 25 are professional buyers who are well versed in the topic of modularization strategies. Like the questionnaire introduced above, these interviews include five questions. For the main part, the questions are basically the same one which were asked in the quantitative research as well. However, the last question is different, as shown in the table below (Table 2)

Table 2: Questionnaire for the qualitative research

Question	
1	How old are you?
2	What is your profession?
3	How long are you working on the field of the modularization strategy?
4	How did the importance of the modularization strategy for companies during the last 5 years? (Characteristics: decreasing; equally; increasing)
5	Which reasons are crucial for the implementation of the module strategy

Source: Own presentation

Over the course of the period of May 2017 to July 2017 the authors have examined a global company with multiple production facilities and subsidiaries. The activities of the company are aiming for profitable growth and a sustainable increase in value in order to ensure the long-term success. The customers, suppliers, and society recognize the company as a competent and reliable partner regarding the entire, common value chain.

IV. Results

The research revealed that the persons consulted in both research strands were of an average age of 32,9 years (questionnaire-based research) and 31,4 years (interview-based research). Furthermore, it was discovered that all participants have been working for more than 2 years in the field of modularization strategies; which is an average of 4,7 or 3,9 years.
Moreover, the two research strands provide a point of reference in terms of the development of the importance of the modularization strategy because the majority of the persons interviewed found this topic to be increasingly important (see chart 3).

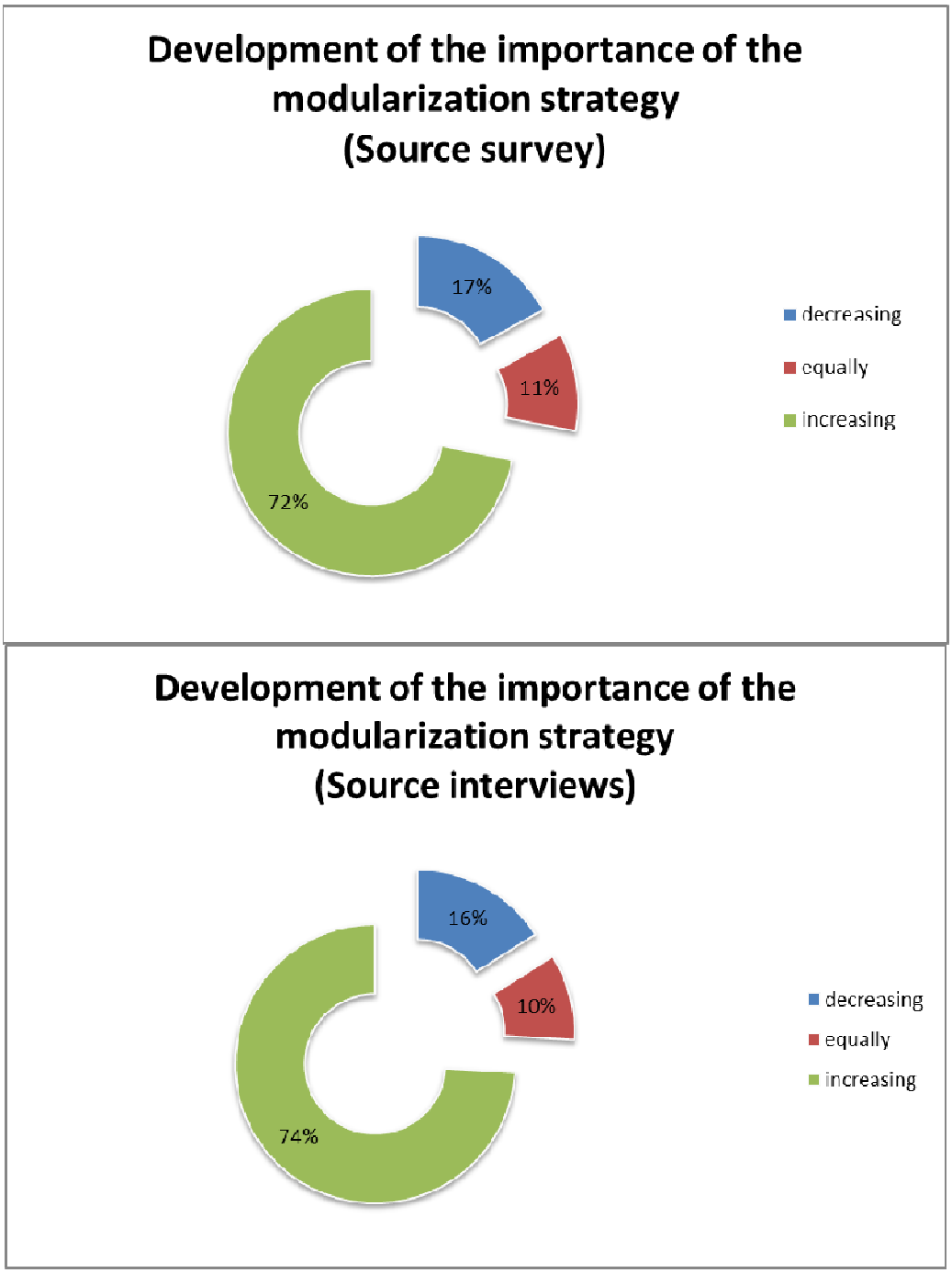


Fig. 3. Development of the importance of the modularization strategy

Source: Own presentation

In order to obtain a significant result for the last question, the weighting of the reasons derived from literature are reported first. Here, it is obvious that complexity, cost pressure and organizational and technical requirements are the highest-rated reasons (rating >4 points). This is followed by the aspects of

technological progress and laws, standards and regulations with a rating of >3,2 points. Then comes globalization and industrialization with a rating of >2,8 points (chart 4)

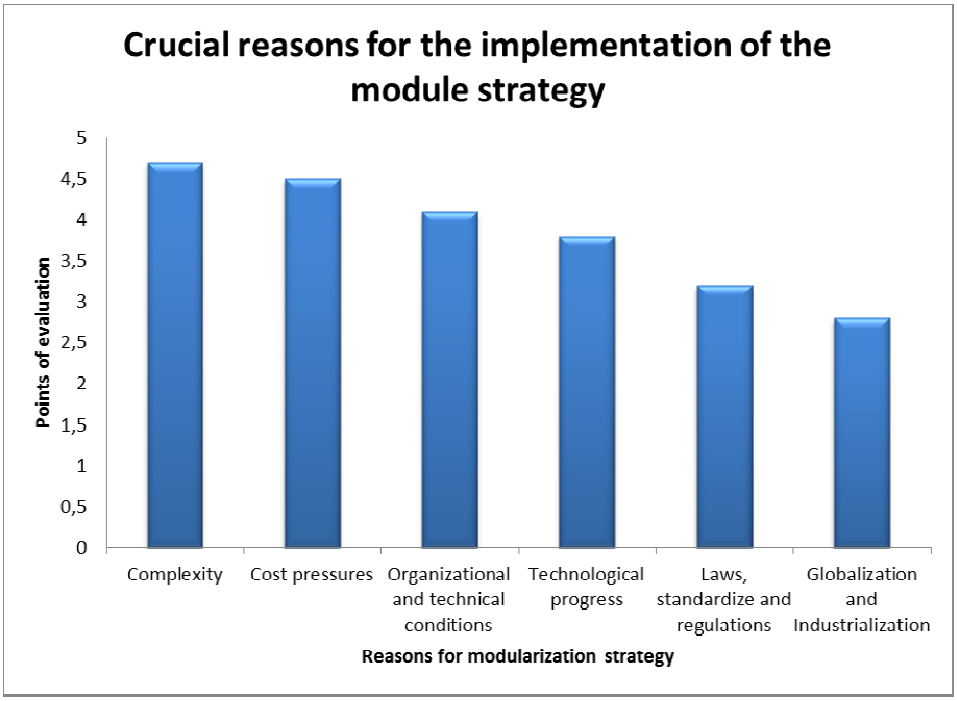


Fig. 4 Crucial reasons for the implementation of the modularization strategy

Source: Own presentation

After the reasons given in the questionnaire had been analyzed, the different reasons given in the interviews could be taken into consideration. At this point, the following six crucial reasons have been stated (sorted by frequency of mention):

- Cost pressure (36)
- Reduction of complexity (30)
- Organizational effort (27)
- Quality (25)
- Technical aspects (24)
- Competitive pressure (21)

Integrating both results, it is obvious that in both surveys the factors cost pressure, complexity and organizational effort can be identified as the most important reasons. At the same time, the factors technical aspects as well as standards, regulations and quality are present in both surveys.

V Discussion

When the literary findings are compared to the results of qualitative and quantitative research, it can be seen that the primary research results confirm and complement the literary findings. The complementt corresponds with the factors of quality and competitive pressure. All these results are shown more clearly in the following table under the column "Results of the comparison".

Table 3: Comparison of theoretical aspects and results of primary research

Theoretical Aspects	Quantitative Research Results (Average value)	Qualitative Research Results (mentions)	Results of the comparison
Complexity (in market or customers segment)	Complexity (4,7 → certainly yes)	Complexity reduction(30/50)	✓
Globalization and Industrialization	Globalization and Industrialization (2,8 → maybe)	X	(✓) Consistency not qualitative
Laws, standardize and regulations	Laws, standardize and regulations (3,2 → maybe)	X	(✓) Consistency not qualitative
Organizational and technical conditions	Organizational and technical conditions (4,1 → probably yes)	Organizational conditions (27/50)	✓
Technological progress	Technological progress (3,8 → probably yes)	Technical Aspects (24/50)	✓
Cost pressures	Cost pressures (4,5 → certainly yes)	Cost pressures (36/50)	✓
X	X	Quality (25/50)	Additional aspects from primary research
X	X	Competitive pressure (21/50)	Additional aspects from primary research

Source: Own presentation

VI. Conclusions

Based on the two research strands conducted, it can be reported that the importance of individual reasons for the implementation of a modularization strategy can be reviewed and its value determined. The results of this study confirm and complement the reasons and findings already published in literature.

Hence, this paper emphasizes the importance of specific aspects which have an impact on corporation and therefore can lead to the implementation of modularization. Moreover, this study can support further research in this field.

References

Adam, D. (2004), Controlling bei Komplexität, Bensberg, F., Brocke, J. and Schulz, M.B. (ed.), Trendberichte zum Controlling, Springer Verlag, Berlin, 17-32.

Baum, M. and Hüttenrauch, M. (2008), Effiziente Vielfalt – Die dritte Revolution in der Automobilindustrie, Springer-Verlag, Heidelberg.

Buchmüller, M., Heinemann, B., Studeny, M. and Lange, S. (2017), ´Research on the modularization strategy as a key factor for the sustainability in a global company.´ Proceedings of the 3rd International Conference BASIQ- New Trends in Sustainable Business and Consumption" - The Association for Innovation and Quality in Sustainable Business, University College for Teacher EducationStyria, ISSN 2457-483X, 31st March- 3rd June 2017, Graz, Austria, 122-128.

CAR Uni Duisburg-Essen (2012), ´Anzahl der Modellreihen im deutschen PKW-Markt in den Jahren 1995 bis 2015,´ *Handelsblatt*, 02nd April 2012, 18.

Daimler AG (2013), ´Our Products.´ [Online] [Retrieved August 2nd 2013], http://www.daimler.com/brands-and-products/our-products.

Duden (2010), Duden - das Fremdwörterbuch 10. Auflage. 10th ed., Dudenverlag, Mannheim.

Ehret, M. (2008), Geschäftsbeziehungen als Wachstumstreiber (Enterpreneurial Customer Relationship Management), Freiling, J. and Kollmann, T. (ed.), Entrepreneurial Marketing-Besonderheiten, Aufgaben und Lösungsansätze für Gründungsunternehmen, Springer Gabler, Wiesbaden, 425-443.

Firchau, N.L., Franke, H.-J., Huch, B. and Menge, M. (2002), Variantenmanagement: Variantenvielfalt in Produkten und Prozessen erfolgreich beherrschen. Franke, H.-J., Hesselbach. J., Huch, B. and Firchau, N.L. (ed.), Variantenmanagement in der Einzel- und Kleinserienfertigung, Hanser, Munich, 1-25.

Goerbert, J. (2014), China CCC Certification. The Full Guide to Independent Self- Certification, Joachim Goerbert, Hofheim am Taunus.

Hab, G. and Wagner, R. (2012), Projektmanagement in der Automobilindustrie. Effizientes Management von Fahrzeugprojekten entlang der Wertschöpfungskette. 4th ed., Springer Gabler, Wiesbaden.

Heina, J. (1999), Variantenmanagement. Kosten-Nutzen-Bewertung zur Optimierung der Variantenvielfalt, Gabler, Wiesbaden, Zugl. Dissertation, Technical University Brandenburgische.

Krampf, P. (2012), Beschaffungsmanagement. Eine praxisorientierte Einführung in Einkauf und Materialwirtschaft, Franz Vahlen GmbH, Munich.

Lindemann, U (2009), Methodische Entwicklung technischer Produkte. Methoden flexibel und situationsgerecht anwenden, 3rd ed. Springer, Heidelberg.

Lindemann, U. (2005), Methodische Entwicklung technischer Produkte. Methoden flexibel und situationsgerecht anwenden, Springer, Berlin.

Renner, I. (2007), Methodische Unterstützung funktionsorientierter Baukastenentwicklung am Beispiel Automobil. Dissertation. Technical University Munich.

Schuh, G. and Schwenk, U. (2017), Produktkomplexität managen. Strategien, Methoden, Tools, 3rd ed, Carl HanserVerlag GmbH & Co KG, Munich.

Stang, S.; Hesse, L. and Warnecke, G. (2002), ´Eine strategische Gratwanderung zwischen Standardisierung und Individualität – Plattformkonzepte,´ *Zeitschrift für wirtschaftlichen Fabrikbetrieb*, 2002(03), 110-115.

Volkswagen AG (2013), ´Our Models,´ Volkswagen AG. [Online], [Retrieved July 7th 2013], http://en.volkswagen.com/en/ models.html.

Waltl, H. and Wildemann, H. (2014), Modularisierung der Produktion in der Automobilindustrie, TCW Transfer-Centrum GmbH & Co. KG, Munich.

Wiesener, A. U., Stiegler, T., Buchmüller, M. and Floricel, T. (2016), ´Customer orientation through combined CRM and entrepreneurial marketing among SMEs.´ Proceedings of the 2nd International Conference BASIQ- New Trends in Sustainable Business and Consumption" - The Association for Innovation and Quality in Sustainable Business, The Faculty of Business and Tourism and The Allensbach University, ISSN 2457-483X, 2nd – 3rd June 2016, Konstanz, Deutschland, 336-343.

Wildemann, H. (2005a), ´Teure Vielfalt. Wie Komplexitätsmanagement auch Qualitätskosten reduziert,´ *QZ Qualität und Zuverlässigkeit 50*, (2005) 11, 33-36.

Wildemann, H. (2005b). Variantenmanagement. Leitfaden zur Komplexitätsreduzierung, -beherrschung und -vermeidung in Produkt und Prozess. 13. Vol, TCW Transfer-Centrum, Munich.

Wildemann, H. (2014a), Modularisierung 4.0. Leitfaden zur Gestaltung von Organisation, Produkten, Produktion und Service, TCW Transfer-Centrum, Munich.

Wildemann, H. (2014b), Modularisierung in Organisation, Produkten, Produktion und Service, TCW Transfer-Centrum GmbH & Co. KG, Munich

Wildemann, H. (2017a), Variantenmanagement – Leitfaden zur Komplexitätsreduzierung, Komplexitätsbeherrschung und Komplexitätsvermeidung, 25. Aufl., TCW Transfer-Centrum GmbH & Co. KG, Munich.

Wildemann, H. (2017b), Komplexitätsmanagement – Komplexitätsmanagement in Vertrieb, Beschaffung, Produkt, Entwicklung und Produktion, 18. Aufl., TCW Transfer-Centrum GmbH & Co. KG, Munich

Wolters, H. (2012), Die Zukunft der Automobilindustrie: Herausforderungen und Lösungsansätze für das 21. Jahrhundert, Gabler Verlag, Wiesbaden.

Future Development of Cooperation between Russia and Iraq in the Sphere of Investment and Construction

Natalia Vasilievna Gorodnova, Ural Federal University, Ekaterinburg, Russia,
n.v.gorodnova@urfu.ru
Anastasiya Alekseevna Peshkova, Ural Federal University, Ekaterinburg, Russia,
np91@list.ru

Abstract

This article deals with prospects of cooperation between Russia and Iraq in different spheres of economics. The focus is made on the investment and construction sphere. The article shows main criteria of building socially-oriented economic in Iraq. Also, it presents an analysis of current social and economic conditions and assesses significance of implementation of social projects on integrated territory development in Baghdad. The conclusion is made that attracting foreign investments, including those from Russia, may become an important factor facilitating successful implementation of major infrastructural projects.

Keywords: cooperation, Russia and Iraq, investment and construction projects.

Introduction

Trade and economic relationships between Russia and Iraq have a long history and started from 1958 (The Ministry of Economic Development of the Russian Federation, 2003). Since then, the countries signed several bilateral treaties, including the Agreement of June 13, 1986, under which the most-favored-nation treatment was granted. Up to 1990, Iraq was the biggest trade partner of Russian in the Middle East. In 1989, the goods turnover exceeded 2 bln US dollars. In the early 1990s, cooperation between the countries experienced difficulties due to the international sanctions regime imposed on Iraq by the United Nations Organization because it occupied Kuwait. It gave rise to a problem of financing major joint projects, mainly, in the oil and gas industry as well as the power industry. For example, implementation of the contract signed in March 1997 for development of the West Qurna 2, the biggest Iraqi oil field, in cooperation with Lukoil was actually stopped (The Ministry of Economic Development of the Russian Federation, 2003). According to current assessment of Iraq, this oil field is the second in the world in terms of oil stock, and its oil reserve is measured at 14 bln barrels (Kable Intelligence Limited, 2014). Notwithstanding problems in relationships, there were negotiations on the issues of trade and economic cooperation between two countries held in August 1993 in Baghdad, the capital of Iraq; during those negotiations, the Agreement on Establishment of Russian and Iraqi Committee for Trade, Economic and Scientific and Technical Cooperation was signed. In recent years, a political dialogue between Russia and Iraq becomes especially active.

Future development of relationships between Russia and Iraq is mainly determined by their cooperation in the oil and gas industry. In 2009, after a long break, development of the West Qurna 2 oil field was resumed by a consortium within Lukoil, a Russian corporation, together with Statoil, a Norwegian company (Kable Intelligence Limited, 2014). In January 2013, an additional agreement to the contract was signed; it provides for extension of the contract duration for up to 25 years. It is expected what the estimated project capacity of 1.2 mln barrels will be achieved by 2022.

Besides Lukoil, Rosneft and Gazpromneft, both Russian companies, also operate in Iraq. Gazpromneft, in its turn, develops the Badra oil field in the Eastern Iraq as well as holds exploration works within a

consortium together with a Korean, Malaysian, and Turkish companies in the Kurdistan Region. The share of the project participation of Gazpromneft comprises 30% (Gazprom Neft Badra, 2017). Commercial oil export started on September 1, 2014.

From January to November 2015, after a long decrease, the goods turnover between the two countries got back to the point of 2 bln US dollars (The Federal Customs Service of Russia, 2015). Presently, as one of the main tasks of relationships development is the trade diversification. The major share in the goods turnover comprises Russian export; it its structure, the main share of supplies is presented by machines, equipment, and vehicles; metals and metal products; wood, cellulose and paper products; food products and agricultural raw materials (The Federal Customs Service of Russia, 2017). In Iraq export to Russia, the main share of supplies is presented by chemical products, machines, equipment, vehicles, and mineral products (The Federal Customs Service of Russia, 2017).

Representatives of the Ministry of Economic Development of the Russian Federation believe that trade and economic relations between Russia and Iraq have a significant potential for growth not only in the oil and gas industry but also in the agricultural industry, education, social and cultural sphere. In particular the matter of participation of Russian companies as general contractors or sub-contractors in major infrastructural projects implementation was considered; it will facilitate development of Iraq as the whole country (Tsybulskiy A., 2016).

Future development of cooperation between Russia and Iraq in the sphere of construction

Presently, there is an acute lack of the basic infrastructure units in Iraq, including that in the sphere of water supply, water waste disposal and electric power generation. Mainly, implementation of the infrastructural projects is restrained by a low level of economic and political security. An institutional transformation of Iraq domestic economy is needed, including development of mechanisms to engage the private sector to implementation of prioritized national projects and programs. This article's authors developed the main criteria for building socially-oriented economics in Iraq (table 1).

Table 1: main milestones to build socially-oriented economics in Iraq

No.	Main quantitative standards/indicators	Indicators' values	
		As at 2017	Forecast (2030)
1.	Monthly income of a household (USD)	1000-2500	1500-5500
2.	Social standard of total floor space per a person (m^2)	19	35
3.	Age of retirement in years (males/females)	65 / 65	65 / 65
4.	Children per a woman (number)	3.5	≥ 4.5
5.	Housing growth per 1000 persons per year (m^2 / year)	700	1200
6.	Price of acceptable housing for 1 m^2 (USD)	550	600
7.	Average mortgage rate, %	11.3	7
8.	Index of the state social responsibility (ratio of constructed (financed) by the state ready housing that was purchased to the socially-required volume)	0.021	0.097
9.	Index of social responsibility of the private sector (ratio of housing financed by the private sector to the socially-required volume)	0.151	0.49

Recently, power infrastructure units in Iraq were significantly damaged. In many localities, it is still difficult to get to electric power supplies. Recovery of large electric power plants requires significant investment. The Iraq Development Program adopted in 2011 for 10 years provides for construction of several power plants with capacity of about 300 MW. For this purpose, the financing facility from 3 to 4 bln US dollars per year was provided. It should be noted that the Iraqi Government uses foreign investments as on of the financing sources. Thus, the cumulative amount of Russian investment on a number of projects in the sphere of power supplies, transportation, and machinery engineering of the Iraqi Republic is about 1.5 bln US dollars (Baliyev A., 2013).

The exchange rate of Iraqi dinar (ID) to US dollar in recent years was rather stable due to high oil proceeds and foreign investments. However, from 2013 we may observe non-stable conditions of US dollars selling. The Central Bank of Iraq (CBI) played an important role in keeping control over the situation by trading in the market and setting US dollar exchange rate on daily trading held by CBI. Currently, the exchange rate is about ID 1 to USD 1.2.

In Baghdad, one of the main trends is the integrated development of urban infrastructure carried out within the framework of the Global Strategy of Baghdad Development Until 2030 that provides for completion of the following tasks: development of a transport network subject to future growth of the city; maintenance of historical districts, agricultural lands; formation of a network of green, cultural and touristic units. As presented by the analysis of current social and economic city environment, the main share of population still faces the following problems:

1. Acute security issue. About 61% of households faced this issue.

2. Underdevelopment of the infrastructure. Many households experience insufficiency or lack of the main infrastructure (there are no water waste disposal facilities in 47% of residential buildings; also, there is no electricity in 33% of residential buildings).

3. Low income of households. Presently, Baghdad is characterized by a lack of high professional/managerial employment of inhabitants because the state-controlled economic system is at the stage of transition to the market basics. An average salary rate in Baghdad does not exceed that in other countries of the Persian Gulf. Income of 54% of households is lower that the minimum subsistence income that is 673 US dollars per month. To mitigate the situation, the state provides 99% of households with state subsidies for basic food products and materials.

4. High level of unemployment in Baghdad that is about 23% for males and 35% for females.

5. High level of prices on food products and good of first priority (79% of the total family income); only 21% are spent on other things (education, healthcare, and recreation).

6. A car is still a luxury for most of Baghdad households. Only 16% of households have cars that is much less that an average rate in the country.

According to the Central Statistical Organization in Iraq, Baghdad population at the moment is about 6.5 mln. As forecasted, by 2030, its population will exceed 11.5 mln that will require construction of large housing buildings. Presently, the integrated development of Baghdad territory has been started. The article's authors together with Iraqi scientists developed two investment and construction projects one of which is focused on construction of housing clusters in Iraqi capital center, and another one is the project of integrated development of the territory in the Western Baghdad.

Presently, implementation of housing clusters construction involves construction of housing and commercial property as well as construction of necessary infrastructure, including, educational, healthcare, and recreational units. Total area of development is 1 mln sq. m, it includes 28 city clusters. According to preliminary evaluation, implementation of this project will provide from 3 to 4 mln people with housing with the city identity and unique structure reserved.

The total capital investment is calculated in a simplified form according to the engineering and economic characteristics of the project, it amounted to 3 bln US dollars, including costs of transport corridors, parking lots and garages comprising 80 mln US dollars. Basing on an expert's opinion, it is forecasted that by the twentieth year of the project implementation, the operating expenses will amount to 0.03 bln US dollars, including expenses on technical maintenance of the housing complex, and other expenses (incidental expenses, advertising costs, and unexpected costs).

During the project implementation, to finance the project, a loan of 3 bln US dollars will be required. Bank interest rate on a long-term loan (in US dollar equivalents) in average amounts to 11.3%. The loan term is 20 years. It is supposed that profit taxation at 27.8% will be applied.

It is expected that the full capacity of the whole project will comprise 19,964 apartments with an average floor space of 140-200 m^2 and the price of 600 US dollars for 1 m^2, 24,668 parking lots and garages. According to the expert's opinion, it is forecasted that in the current conditions, by the twentieth year of the project implementation, profit will comprise 80% of the full load of residential and commercial spaces, parking lots and garages, private child day-care centers, water pools, and other infrastructural units subject to an optimal plan of development.

For the optimal plan of operation development, a discount rate of 13% was taken. As a basis of the discount rate calculation, the forecasted inflation rate of 4% was used. Besides, the risk of decline in demand (1%), risk of an error in calculations (0.5%), risk of error in forecasted purchase prices of goods, work and services (0.5%), unexpected risks (1%), risk of aggravation of the global financial and economic crisis, and change in the economic environment (6%) were taken into account.

Basing on the calculations made, the financial project profile subject to the optimal plan was developed (fig. 1).

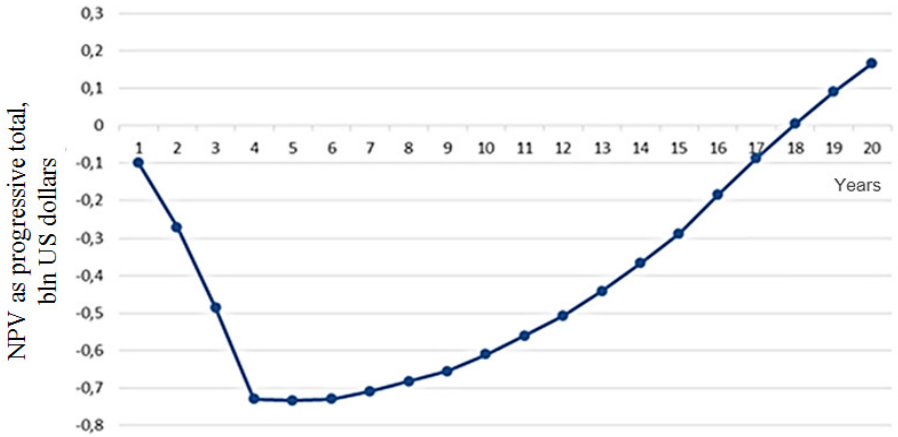


Fig.1. Financial profile of housing clusters construction project subject to optimal plan of development

Indicators of efficiency of the investment and construction project are shown in table 2.

Table 2: indicators of efficiency of a project of housing clusters construction subject to the optimal plan of development

No.	Indicator description	Value
1.	Net present value (billion US dollars)	0.167
1.1.	compliance with assessment criterion	+
2.	Internal standard of profitability, %	2.66
2.1.	compliance with the assessment criterion	-
3.	Profitability ratio	1.06
3.1.	compliance with the assessment criterion	+
4.	Repayment period (years)	17.9
4.1.	compliance with the assessment criterion	+

Mainly, the values presented in table 2 comply with the criteria figures that is a favorable factor and draws us to the conclusion that the investment and construction project is efficient.

As compared to the project under consideration, the project of integrated territory development is not so large-scaled. Development of the housing complex will be carried out over the area of 170 acres; it will comprise 120 buildings each of those contains 43 apartments.

The project will be implemented in 3 years and require 413 mln US dollars of capital investment, the average current costs will comprise 1.294 mln US dollars per annum. According to an expert's opinion, it is expected that by the fourth year of the project implementation, the complete load of the spaces will be achieved, and the proceeds of sale will comprise 576 US dollars.

For an optimistic plan of development, the discount rate of 3.5% was taken. As the discount rate basis the forecasted inflation rate of 2% is used. Besides, the risk of error in calculations (0.5%) and unexpected costs (0.5%) are taken into account.

Figure 2 contains the graph of the financial profile of the project based on the net present value as progressive total in millions US dollars.

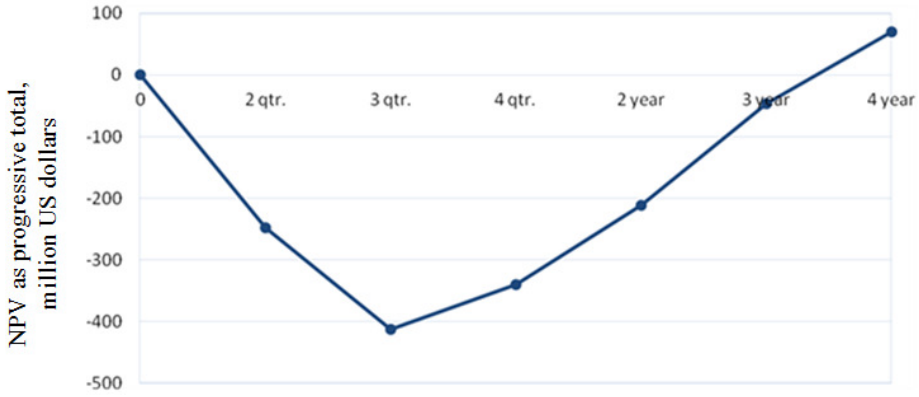


Fig. 2. Schedule of the project financial profile, an optimistic plan

To assess efficiency of the project, table 3 is prepared.

Table 3: schedule of economic efficiency values of the project of the integrated territory development

No.	Value description	Optimistic plan
1.	Net present value (million US dollars)	69.809
1.1.	Compliance with the assessment criterion	+
2.	Profitability ratio	1.17
2.1.	Compliance with the assessment criterion	+
3.	Period of return (years)	3.5
3.1.	Compliance with the assessment criterion	+

Therefore, subject to the optimistic plan of operation development, the project is efficient because its main values comply with the criteria values.

Due to implementation of the projects presented, it will be possible to reach the balance between the social and economic needs of the society and interests of the private sector subject to available support of the state and its participation in regulation of necessary processes. In the area of investment and construction, Iraq takes a number of measures to raise private investment: it improves laws, provides benefits and land plots. In future, the modern Iraqi economy may feel the need for mechanisms that could be based on the principles of partnership between the state and private sector.

Conclusion

One of reliable ways to form sustainable economic relations between Russia and Iraq is mutual investments. Long-term cooperation between the countries is formed in the oil and gas industry, in particular in the sphere of Iraqi fields' development. In the mid-term prospects, Russian companies may enter such spheres and housing construction, transportation, and modernization of Iraqi industry. In his interview for RIA Novosti, Russian Information Agency, Mazhar Mohammed Saleh, an economic adviser to Iraq's Prime Minister explained that Russian companies may enjoy significant benefits and advantageous law on investments (RIA Novosti, 2017).

The basis of cooperation between Russia and Iraq in various branches of economy may be a united scientific and engineering potential by means of arranging education and training of personnel in the sphere of science and engineering as well as active scientific cooperation in implementation of program and taking measures of interdisciplinary character which results may be used in the course of implementing joint projects.

Research held by this article's authors together with Iraqi scientists in the sphere of assessing efficiency of investment projects on integrated development of Baghdad territory confirm their social and economic significance for population of Iraqi capital that is one of the factors of increasing economic security in the country and the society in general. Construction of housing complexes will significantly improve living and operation conditions of urban inhabitants. Provision of large cities inhabitants with available and comfortable housing becomes one of the main trends of Iraq state economic policy. The raising of foreign investments, including those from Russia, may become an important factor that facilitate successful implementation of the large infrastructural projects.

Acknowledgment

My research was supported by the Ural Federal University during preparation of the manuscript.

References

Baliyev, A., (2013), "Russia and Iraq develop partnership in oil production", *Innovative portal of the Ural Federal District*, [Online], [Retrieved August 18, 2017], http://www.invur.ru/index.php?page=news&id=95121

Gazprom Neft Badra, (2017), "Gazprom Neft Badra: about the project", *Gazprom Neft Badra*, [Online], [Retrieved July 14, 2017], http://www.gazpromneft-badra.com/about/

RIA Novosti, (2017), "Iraq is open for Russian investments", *The Russian Agency for International Information "RIA Novosti"*, [Online], [Retrieved July 14, 2017], https://ria.ru/economy/20170207/1487347509.html

The Federal Customs Service of Russia, (2015), "Russian foreign trade statistics' (Country: Iraq, Mode: export, Period: 2015) ", [Online], [Retrieved August 20, 2017], http://en.russian-trade.com/statistics/by-country/iraq/export/2015/

The Federal Customs Service of Russia, (2015), "Russian foreign trade statistics (Country: Iraq, Mode: import, Period: 2015)", [Online], [Retrieved August 20, 2017], http://en.russian-trade.com/statistics/by-country/iraq/import/2015/

The Federal Customs Service of Russia, (2017), "Russian trade in goods with Iraq in Q2 2017", [Online], [Retrieved August 21, 2017], http://en.russian-trade.com/reports-and-reviews/2017-08/russian-trade-in-goods-with-iraq-in-q2-2017/

The Ministry of Economic Development of the Russian Federation, (2003), "Trade and economic cooperation between Russia and Iraq", *The Ministry of Economic Development of the Russian Federation*, [Online], [Retrieved August 25, 2017], http://economy.gov.ru/minec/activity/sections/foreigneconomicactivity/cooperation/doc1071669417781

Tsybulskiy, A., (2016), "Trade and economic relations between Russia and Iraq have a good development potential", *The Ministry of Economic Development of the Russian Federation*, [Online], [Retrieved July 13, 2017], http://economy.gov.ru/minec/press/news/2016120202

Kable Intelligence Limited, (2014), "West Qurna-2 Field, Basra Province, Iraq", [Online], [Retrieved August 23, 2017], http://www.hydrocarbons-technology.com/projects/west-qurna-2-field-basra-province/

Public Procurement: World Experience and Russian Practice

Natalia Vasilievna Gorodnova, Ural Federal University, Ekaterinburg, Russia, n.v.gorodnova@urfu.ru
Anastasiya Alekseevna Peshkova, Ural Federal University, Ekaterinburg, Russia, np91@list.ru

Abstract

This article describes the world experience and Russian practice of implementing state procurement. We held a comparative analysis of certain aspects of the public procurement system used in different countries. The focus was made on the protection level for domestic producers. We highlighted positive as well as negative characteristics of the public procurement system and main problems that impede to increase its efficiency in Russia.

Keywords: public procurement, world experience, Russian practice, public-private-partnership.

Introduction

The continuing functioning of economics branches depends on many external and internal factors. The defining significance for national economy development is vested in the state economic politics that is based on objectives principles and categories, takes into account the existing trends and interests of social groups, and the approaches used differ country to country.

Balanced regulation of economy in the market economic management is a difficult task for the state. The role of the state in distributing resources for the public production is significant and may be expressed by the use of fiscal tools to influence or exploit the money impacts.

In emerging markets, the transition to the efficient production process that ensures the products that are competitive in the world scale requires that the state implement consistent structural transformations in the economy. The development vector shifts to creation of technologies related to production of information products as well as scientific and technical innovations.

To keep competitive, basic branches of industry, especially, high-tech industries, significant state funding is required. One of the main mechanisms to spend budgetary funds is a public contract. Mainly, this mechanism is applied in the sphere of fundamental scientific research, production for the military industrial sector, and social services. Financing of projects through the public procurement system significantly influences on the functioning and development of companies, especially those of them that operate in the branches where the state is the only customer.

In many countries, public procurement constitutes a significant share in percentage correlation to the volume of the gross domestic product. In average, this figure varies from 10 to 15%; in developed countries, it may comprise 30% or more. In Russia, this figure comprises 25% (more than 30 trn rubles) (OECD, 2015). The Ministry of Economic Development of the Russian Federation notes that in 2015 the most budgetary funds were spent on procurement of construction work (2.07 trn rubles) and medical

products and pharmaceuticals (486.6 bln rubles). Considering significant volume of the public procurement, it is important to build an efficient system of procurement activities regulation (Artemyev I., 2016).

World experience and Russian practice in the sphere of public procurement

In many countries, in the sphere of public procurement a certain institutional environment is created that is formed by administrative regulation through legislative system as well as by economic regulators. In this matter, a great role is given to financial institutions that establish certain rules of the procurement procedure using the funds issued by them as loans. For instance, the world practice shows a wide use of procedures that are set by the World Bank.

The building of an efficient system of public procurement must be accompanied by formation of a regular competitive environment and guarantee that the state is impartial in selecting an organization as a service provider. As the world practice shows, a competitive procurement mechanism annually saves from 10 to 25% of budget funds intended to be spent (Zakharov A. N., 2011). A subject of competitive procurement may be orders to deliver (complete or render) various products (work or service), from unique to bulk goods. As we can observe, the subject matters of international bids may include delivery of several packs of nails as well as construction of ready-to-operate greatest industrial and civil buildings (Zakharov A. N., 2011).

In Russia, the public procurement system was introduced relatively not so much time ago; it is mainly regulated by federal laws. Presently, the legal framework for public procurement in the country is Federal Law No. 44-FZ On the Contract System in the Sphere of Goods, Work, and Services Procurement for Federal and Municipal Needs dated April 5, 2013, that commenced on January 1, 2014. This law replaced a previous law that was not so efficient; it is focused on detailed regulation of procurement among federal and municipal institutions.

Besides, no less important in this sphere is Federal Law No. 223-FZ On Procurement of Goods, Work, and Service by Certain Types of Legal Entities dated July 18, 2011, that sets rules for: organizations in which the Russian Federation holds more than 50% interest; companies engaged in controlled types of activities (water supply, power industry, etc.); natural monopoly holders (railways, oil companies, gas companies, etc.); budgetary organizations that hold procurement procedure using extra-budgetary funds (owned funds, funds from subcontracting, grants awarded, etc.). This law regulates general principles of the procurement procedure. The mentioned customers must independently develop regulations on procurement activities applicable to their organization that sets requirements to suppliers and possible ways to determine the winner of procurement bids.

Systems of legal regulation of public procurement used in various countries are similar in a combination of their principles on which they are based: openness and transparency of the process, faithfulness and equality of rights of all members to the procurement, equality of conditions for all candidates (OECD, 2015). However, there are some differences in the public procurement process itself.

For example, ways to publish the information on public procurement differ. In the Russian Federation, there is the website (zakupki.gov.ru) where notices of forthcoming procedures must be published. In

many other countries, law requires that publications are made in several sources at a time: Internet, newspapers, printed media (Vedeneev G. M., Goncharov E. Yu. and Kobzev G. N., 2005). Besides, it should be noted that there is a variety of procurement procedure means in Russia (fig. 1): electronic auction, request for proposals, request for quotes, open bids, closed auction, restrictive tendering, multi-staged competition, closed competition, closed competition with restricted participation, procurement from a sole supplier. For foreign systems, as a rule, the only procedure is open bids (Vedeneev G. M., Goncharov E. Yu. and Kobzev G. N., 2005).

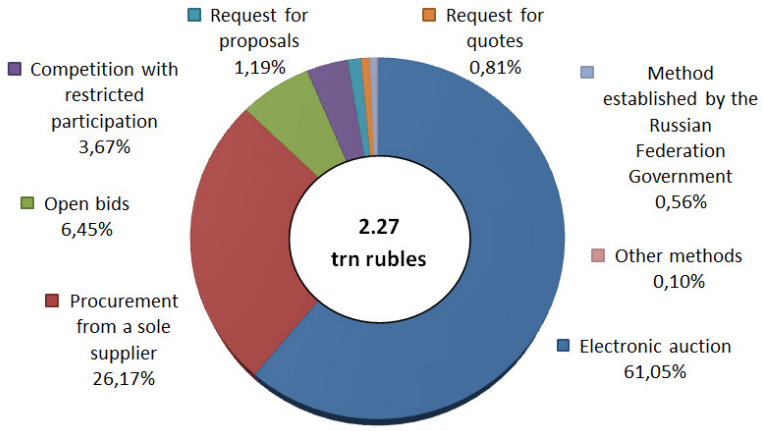


Fig. 1. Total volume of contracts concluded in the 1st half-year period of 2017 broken down by methods of determining suppliers (Russia) (Ministry of Finance of the Russian Federation, 2017)

We suggest that the main difference in the public procurement systems is the level of protection of a domestic producer. Many countries take efforts in this sphere mainly as a reaction to the foreign trade liberalization and large-scaled markets opening. Thus, the People's Republic of Chine, after it was admitted to WTO in 2001, introduced preferences for local producers under the Law on Public Procurement.

In this paper, a comparative analysis of main principles of protecting domestic producers in the USA, Great Britain, China and Brazil was held (Table 1).

Table 1: main principles to protect domestic producers in various countries (Lucky J., 2012; Frizzo H., Oliveira P., 2016)

Country	Main principles to protect domestic producers	WTO membership	Accession to the Government Procurement Agreement
USA	If offerings of a domestic producer and foreign supplier are equal, the domestic producer is preferred. The foreign producer may become a winner in a tender if imported goods have prominent advantages to compare with the US products.	WTO member from January 1, 1995	January 1, 1996
Great Britain	No restrictions are imposed on foreign suppliers from members of the European Union and the World Trade Organization who signed the Government Procurement Agreement. In case of other countries, it depends on specific features of each individual situation and relationships between the member countries.	WTO member from January 1, 1995	January 1, 1996
China	Significant restriction of foreign companies' operation in the public procurement market. A foreign producer may become a winner provided that the products may not be purchased in China; domestic product may not be purchased on reasonable commercial conditions (its price exceeds 20% of a comparable import goods); the purchased goods are intended to be used abroad.	WTO member from December 11, 2001	Accession in progress
Brazil	When choosing from two equivalent goods, the priority is given to a local producer. A foreign producer may be admitted to the competition provided that it has a branch, representative office of a legal entity inside the country, or a joint venture company in which a domestic partner has the leading role.	WTO member from January 1, 1995	-

Russian law shows the striving for applying the unified regime to the goods of both local and foreign origin in cases and on conditions provided by international treaties of the Russian Federation. At the same

time, Russia as well as many other countries provides for relatively large number of preferences for local producers and sets certain restrictions on participation of foreign companies.

In particular Russian experience shows some restrictions in the sphere of public procurement of certain goods which substitutes are produced within the country, including foreign medications and medical equipment, goods for national defense and security, consumer goods industry and mechanical engineering. This includes about 132 items, from helicopters, column cranes, baggage elevators, foundry machines, automatic cranes, to tires, limestone, plaster, sand, clay, insulating glass units, cement, lime, plaster, asphalt products, and other products.

Price preferences are widely used in the sphere of public procurement of developing countries (Ssennoga F., 2006). Thus, they comprise up to 20% in China (European Chamber, 2011), 25% in Brazil (European Commission, 2014), 15% in Mexico (World Trade Organozation, 2013). In Russia, price preferences may vary. Within the terms of operation as provided by Federal Law No. 223, offerings for delivery of Russian products are considered by the customer with a decreasing coefficient of 15% for the price criterion. In terms of procurement of medications for companies that carry out the complete cycle of medications production in the member countries of the Eurasian Economic Union, this figure comprises up to 25%.

The mentioned scope of preferences and restrictions applicable in Russia significantly facilitated achievement of a share up to 31% (to compare with 2015) of domestic products in the public procurement segment in 2016.

Russian law in the sphere of public procurement is aimed at creation of favorable conditions of operation not only for large corporations who may satisfy federal or municipal needs for procurement to a larger extent but also for small businesses. Thus, according to Federal Law No. 44, customers must purchase at least 15% of goods and services of the total annual purchases from small businesses. A small business may participate in any procurement provided that it complies with the customer's requirements and is able to fulfill the contract. Initial price of such procurement may not exceed 20 mil rubles.

Notwithstanding the intention of Russian legislative bodies to ensure favorable conditions for procurement activities, there is strict control of relationships between service providers and customers, and its violation is subject to a system of penalties developed. Thus, if a public customer violates requirements of Federal Law No. 44, its procurement will be annulled and it will be imposed a fine, and participants' organization may be recorded in the Register of Bad-Faith Suppliers.

Basing on the research held a number of advantages and disadvantages of the public procurement system in Russia (table 2).

Table 2: advantages and disadvantages of the public procurement system in the Russian Federation for participants

Advantages	**Disadvantages**
1. An opportunity to find any procurement interested and obtain any required document for it. 2. All participants of the procurement procedure enjoy equal rights and obligations. 3. No hindrances for participation in procurement in any region of the Russian Federation as well as no restrictions on their number. 4. Clear legal governing of bids procedure provides for an opportunity to track the procedure and further actions up to the completion and execution of the contract.	1. Corruption and "kick-back schemes" in the sphere of public procurement. A customer may prepare documents specific to a supplier in which it is interested. 2. Indirect restriction of competition in some competitive procedures, especially in terms of a request for quotes. Often, customers set inappropriate deadlines for executing contracts that is almost impossible to appeal in a regulatory body. 3. Great risk of being included in the Register of Bad-Faith Suppliers that bans a company and its founder for two years to participate in any public procurement.

In developed and developing countries, there is one more serious problem in the sphere of public procurement, namely, signs of corruption (The Commission To The Council And The European Parliament, 2014). As assessed by the Transparency International (Campos E., Pradhan S., 2007), at least $400 bln are annually lost in the world as a result of bribery and corruption in the sphere of public procurement; it increases public expenses to 20-25%. Experts say that up to 1 trn rubles are annually stolen in Russia out of budgetary funds allocated for public procurement (The First Anti-corruption Media, 2012). This results in a number of accompanying problems for competitors who have to spend extra resources and time on participation in the bids that are knowingly losing to them.

Besides, there is a problem of strengthening the presence of cartels in the bids; total damage of their activities (in commodities markets, public procurement and government-owned companies' procurements, bids for alienation of state property and titles, etc.) may amount in Russia up to 1.5-2% of GDP. Activities of these anti-competitive entities threaten the national economic security and significantly damage the state budget; they shake the foundations of the market economy. Russian Federal Antimonopoly Service stated that foreign companies more often engage in cartel activities, they illegally penetrate, among other things, strategically important branches of economy (Federal Antimonopoly Service of the Russian Federation, 2017).

To increase efficiency of their operation, Russian companies that are potential candidates for completion of public contracts try to improve the internal system of procurement management. They take measures to improve the organizational structure of the company, acceleration of the process of managerial decision making, increase in labor productivity, development of the quality management system, and search for reserves to decrease costs of procurement processes, including by means of decreasing transaction costs. Efficiency of the measures taken may be assessed using the following system of indicators calculated for a given period:

1) Total share of terminated contracts:

$$S = {}^{C_t}/_{C_c} \cdot 100\%, \quad (1)$$

where Ct – number of terminated contracts;

Cc – number of concluded contracts.

2) Losses resulting from termination of contracts:

$$L = C_t \cdot V_{av} + F, \quad (2)$$

where Ct – number of terminated contracts;

Vav – average value of contracts;

F – amount of a fine.

3) Potential profit of measures:

$$P_p = L_0 - L_1, \quad (3)$$

where L0 – level of losses before the measures were taken;

L1 – level of losses after the measures were taken.

4) Cost effectiveness of the measures:

$$E = {}^{(P_p - C)}/_{P_p} \cdot 100\% \quad (4)$$

where Pp – potential profit;

C – all costs.

5) Lost profit:

$$P_l = N_{p.l.} \cdot V_{av}, \quad (5)$$

where Np.l. – number of procedures lost;

Vav – average value of contract.

Interaction between the state and private sector in the sphere of investments and construction in Russia may be ensured by means of applying law on public procurement as well as by applying public-private partnership (P3) that has gained popular recently and is considered an important tool of financing infrastructure projects. According to data of the Center for Private-Public Partnership Development (Center for Public-Private Partnership Development, 2017) at the beginning of 2017, there are about 2,000 P3 projects underway in Russia; the most significant of them are150 projects the cumulative investment in which amounts to 1.5 trn rubles. Mainly, the projects are implemented in the sphere of transportation (584.6 bln rubles) and public power supply (387 bln rubles).

Under Russian law, establishment of rights and obligations between P3 parties may be effected by means of conclusion of an agreement on P3 or a concessionary agreement. The structure of an agreement on P3 was introduced not so much time ago, from January 1, 2016, compared to concessionary agreements which are in use for a relatively long period of time. The amount of investments under concessionary agreements concluded in 2016 comprises about 67.6 bln rubles out of which 62.4 bln rubles are private partners' funds (Center for Public-Private Partnership Development, 2017).

One of important specific features of concessionary regulations as compared to the public procurement system is that financial contribution of the state may be only partial that is directly regulated by Federal Law No. 115-FZ On Concessionary Agreements dated July 21, 2005. However, authorities sometimes abuse their right to co-finance concessionary projects (Federal Antimonopoly Service of the Russian Federation, 2017) and undertake to provide funds using only budgetary funds; it constitutes a violation of P3 laws and results in non-efficient spending of budgetary funds as well as unreasonable increase of costs of the infrastructural projects. In this case, such agreements must be classified in compliance with contracting procurement system laws.

While it is necessary to increase efficiency of state financial administration, it is important to spend those funds rationally, especially subject to forecasted deficit of GDP of 3.2% (2.753 trn rubles) in 2017. One of the recent analyses held by Russian Ministry of Economic Development states that the budgetary funds saved due to procedures provided by contractual procurement laws in quarters 1-3 of 2016 amounted to 290 bln rubles (gain of 21% to compare with the same period in 2015). Also, the average increase in price of procurement amounted to 8.4% (The Ministry of Economic Development of the Russian Federation, 2016).

The saved amount is determined as a sum of all placed procurements in the Unified Information System (that is the amount of starting (maximum) contract prices, or SMCP) less the final contract price. Assessment of justification of the saved amount that was stated is largely dependent on the SMCP calculation method as set by Federal Law No. 44:

- comparable uncontrolled price method (market analysis);

- standard cost method;

- tariff method;

- design and estimate method;

- cost method.

Subject to article 22 of Federal Law No. 44, the comparable uncontrolled price method is a preferred one from the mentioned methods; according to it SMCP is calculated using the following formula:

$$SMCP = \frac{v}{n} \cdot \sum_{i=1}^{n} P_i \,, \qquad (6)$$

where v – quantity (volume) of the purchased goods (work or service);

n – number of values used in calculations;

i – number of the price information source;

Pi – price of the goods, work or service per unit as provided in the source under no. i as adjusted for coefficients (indices) used to re-calculate prices subject to differences in characteristics and/or financial conditions.

Figure 2 shows statistics under an average quantity of applications filed depending on the procurement volume.

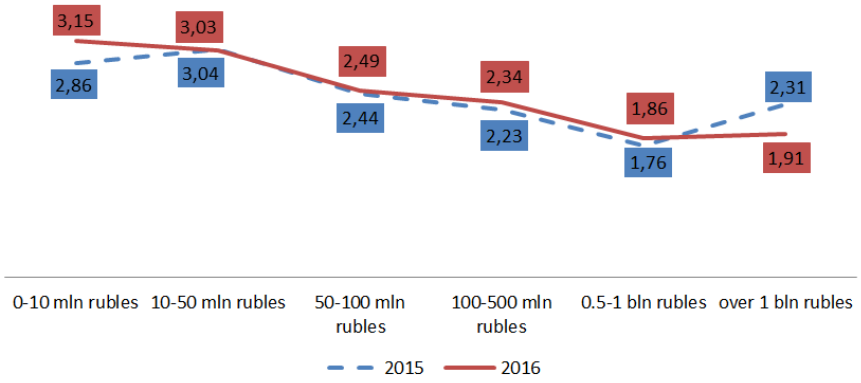


Fig. 2 – Average number of applications filed depending on the procurement volume as per results of quarters I-III in 2015-2016 (Russia) (The Ministry of Economic Development of the Russian Federation, 2016)

The figure allows us to conclude that the most competitive procurement exists at the stage below 50 mln rubles; participants usually decrease the price to the real market price. The least competitive procurement is presented in the segment from 500 mln to 1 bln rubles; as a rule, suppliers here may win the contract at an increased price because they may be sole suppliers. Taking into account that the share of procurement from a sole supplier comprises a significant portion in the total volume (26% as at the 1st half-year period in 2017), it is unlikely to ensure much savings in budgetary funds.

In one of its more recent reports, the Ministry of Economic Development of the Russian Federation demonstrated the following offers to improve current law on public procurement (The Ministry of Economic Development of the Russian Federation, 2016):

Implementation of a catalogue of goods, work and service for procurement of federal and municipal needs;

Bringing the Unified Information System in compliance with technical standards for an information and analytical system of monitoring and control in the sphere of medications procurement;

Introduction of liability for unreasonably increased or decreased SMCP or incorrect procedure of its calculation;

Centralization of procurement and justification of SMCP to specialized organizations.

We expect that the mentioned measures will improve transparency of the public procurement system, increase corruption risks and customers' costs, and increase the level of competition in the market.

Conclusion

Within a framework of the research, we concluded that one of the prioritized tasks in the current context must be an increased efficiency of the public procurement system. Budgetary funds must be spent subject to the balance between interests of the state, society, and private sector with simultaneous assurance of financial saving and maintenance of quality of the procured goods, work and service. Mainly, it depends on creation of a regular competitive environment in the country.

As it was demonstrated by the world practice analysis, in different countries the systems of legal regulation of public procurement are similar in a combination of their principles on which they are based. At the same time, there are many differences in the process of procurement activities itself, starting from common methods of procurement procedures and ending with ways of publishing information about public procurement. One of the most prominent difference is the level of protection of a domestic producer that is expressed in volumes of preferences granted or restrictions imposed on participation in procurement in respect of foreign companies.

Major systemic issues that impede promotion of competition in public procurement in Russia include:

- cartelized economy and corrupt practices threatening the country's economic security and damaging the state budget;

- loss of quality of goods purchased for state and municipal needs and increase in their value for the consumer.

Things went from bad to worse for the legislative imperfections in Russia in public procurement, poor demonstration of the strategic function, formalism and various conflicts of a number of laws.

A way out of the existing situation was the public procurement reform and entry into force on January 1, 2014 of the new federal law, the content of which attracted increased attention from the professional community. However, the new law did not throw light on the validity of limits of legal regulation over procurement, contracting, planning, monitoring and auditing. In our view, it shows the redundancy of legal regulation and the complexity of some legal rules, which may hinder law enforcement practice and increase transaction costs.

The implementation of a systematic approach to the making, allocation and performance of public (municipal) contracts will establish the basis for a new and novel institutional environment. The most comprehensive assessment of positive effect of the new law can only be given in the medium-term perspective.

Bibliography

Artemyev, I. (2016), "The volume of the state procurement market In Russia reached 25% of GDP in the crisis time period", *Interfax Group*. [Online]. [Retrieved July 22, 2017], http://www.interfax.ru/business/499881

Campos, E., Pradhan, S. (2007) The Many Faces of Corruption: Tracking Vulnerabilities at the Sector Level, World Bank Publications, Washington

Center for Public-Private Partnership Development (2017), "Public-Private Partnerships in Russia 2016-2017: Current Status and Trends, Rating Regions", *Center for Public-Private Partnership Development*. [Online]. [Retrieved July 28, 2017], http://pppcenter.ru/assets/docs/raytingREG2017_B5_Block_31-03-2017-web.pdf

European Chamber (2011), "Public Procurement in China: European Business Experiences Competing for Public Contracts in China", *European Chamber*. [Online]. [Retrieved July 22, 2017], URL: http://cbi.typepad.com/files/euccc-public-procurement-in-china-april-2011.pdf

European Commission (2014), "Government Procurement in Brazil", *European Commission*. [Online]. [Retrieved July 23, 2017], http://madb.europa.eu/madb/barriers_details.htm?isSps=false&barrier_id=10982

Federal Antimonopoly Service of the Russian Federation (2017), "The Report on the competition level in the Russian Federation for 2016", *Federal Antimonopoly Service of the Russian Federation*. [Online]. [Retrieved July 27, 2017], http://fas.gov.ru/about/list-of-reports/report.html?id=1720

Frizzo, H., Oliveira, P. (2016), "Public procurement in Brazil: overview", *Thomson Reuters*. [Online]. [Retrieved July 27, 2017], https://uk.practicallaw.thomsonreuters.com/6-521-4700?transitionType=Default&contextData=(sc.Default)&firstPage=true&bhcp=1

Lucky, J. (2012) Domestic Content Legislation: The Buy American Act and Complementary Little Buy American Provisions, DC: Congressional Research Service, Washington

Ministry of Finance of the Russian Federation (2017), "Report on the results of monitoring the application of Federal Law No. 44-FL of April 5, 2013 "On the Contract System in the Sphere of Procurement of Goods, Works and Services for Provision of State and Municipal Needs" for the first half of 2017", *Ministry of Finance of the Russian Federation*. [Online]. [Retrieved July 24, 2017], https://www.minfin.ru/common/upload/library/2017/07/main/1_Monitori_44.pdf

OECD (2015), "Government at a Glance 2015", *OECD Publishing*. [Online]. [Retrieved July 22, 2017], http://dx.doi.org/10.1787/gov_glance-2015-en

Ssennoga, F. (2006), 'Examining discriminatory procurement practices in developing countries,' *Journal of Public Procurement*, 6(3), 218-249

The Commission To The Council And The European Parliament (2014),"EU Anti-corruption Report", *The Commission To The Council And The European Parliament*. [Online]. [Retrieved July 25, 2017], http://ec.europa.eu/dgs/home-affairs/e-library/documents/policies/organized-crime-and-human-trafficking/corruption/docs/acr_2014_en.pdf

The First Anti-corruption Media (2012),"The tenth part of public procurement is a corruption component", *The first anti-corruption media*. [Online]. [Retrieved July 27, 2017], https://pasmi.ru/archive/45287/

The Ministry of Economic Development of the Russian Federation (2016), "Report on the results of monitoring the application of Federal Law No. 44-FZ of 5.04.2013 "On the Contract System in the Sphere of Procurement of Goods, Works, Services for Ensuring State and Municipal Needs" for the I-III quarters of 2016", *The Ministry of Economic Development of the Russian Federation*. [Online]. [Retrieved July 28, 2017], http://www.fko.msk.ru/upload/iblock/65a/%D0%9C%D0%BE%D0%BD%D0%B8%D1%82%D0%BE%D1%80%D0%B8%D0%BD%D0%B3%209%D0%BC%202016.pdf

Vedeneev, G. M., Goncharov, E. Yu. and Kobzev, G. N. (2005), Competitive bidding in Russia: historical experience, Publishing house MEI, Moscow

World Trade Organozation (2013), "WTO Trade Policy Review. Mexico", *World Trade Organozation*. [Online]. [Retrieved July 23, 2017], https://www.wto.org/english/tratop_e/tpr_e/s279_e.pdf

Zakharov, A. N. (2011) International Competitive Bidding, MGIMO- University, Moscow

The Economic Results of a Company with a Code of Ethics

Zdeněk Caha, Mgr., MBA, PhD., Department of Management, Institute of Technology and Business, České Budějovice, Czech Republic,
E-mail address: caha@mail.vstecb.cz

Abstract

The aim of this paper is to verify the possibility of a connection between a company's code of ethics and its economic results using a sample of 607 companies in the Czech Republic. There are two contradictory opinions on the influence of a code of ethics on a company's economic results, and these opinions incline either towards the positive influence of a code of ethics on business results, or a negative influence, in particular in the short term. However, it is our belief that the presence of a code of ethics has no influence on the economic results of a company (Caha & Vokoun, 2017). The following hypothesis was set and subsequently confirmed: The presence of a code of ethics has no influence on the economic results of a company. The statistical tests performed on the basis of the results of the questionnaire survey showed that the presence or absence of a code of ethics has no demonstrable influence on the economic results of a company, irrespective of its size.

Key words: code of ethics, economic results, company

Introduction

The purpose of a code of ethics and similar guidance is to cultivate a particular company environment and culture. A code of ethics defines in detail the moral principles of a company and their application to company practice. According to Remišová (2011), a code of ethics should not be perceived as a legal document and should be comprehensible, communicable, specific, up-to-date and enforceable. Singh (2011), for example, recommends that codes of ethics should be evaluated and revised every two years, whereby all company employees should be informed of any changes through training sessions. New employees should also be familiarized with the code of ethics, namely prior to the commencement of their employment.

According to Ho (2010), a code of ethics only has a positive influence on the ethical behaviour of employees if it is presented in an appropriate way.

Codes of ethics are also subject to criticism. Their poor efficacy, poor enforceability, formalism and high level of generality are particularly reproached, as is the fact that the behaviour of individuals is more or less determined by the values they acquire during childhood (Putnová and Seknička, 2007). The question as to what extent a code of ethics is useful for small companies and small entrepreneurs with a fixed organizational culture that works mainly on the basis of informal relations, is also disputable (Čaník and Čaníková, 2006). A code of ethics is also not necessarily accompanied by an improvement in company ethics. Several empirical studies have revealed that codes of ethics give companies a negligible advantage, if any advantage at all. Research conducted by McKendall, DeMarr and Jones-Rikkers (2002) is an example of one of these studies. In their research, Kaptein and Schwartz (2007) also concluded that the efficacy of codes of ethics was relatively low. A global survey conducted by KPMG (2008) points to the worldwide trend for increasing numbers of companies to define and implement a code of ethics. The research showed that in 2008 the proportion of companies with a code of ethics stood at 86%. It is clear from the above that in recent years a code of ethics has become a standard basic tool for ethics programmes within large and renowned companies. This is also backed up by an informal survey conducted by IBE in 2012, which showed that a code of ethics was implemented by 92% of those companies with the highest market capitalization based in Great Britain whose shares are traded on the London Stock Exchange (IBE, 2012). The IBE survey (2012) also reported that in 2012, 73% of all companies had a code of ethics. In 2016, according to a worldwide survey conducted by PwC, the largest of its kind, in which 6,337

companies from 115 countries participated (including 79 prominent companies from the Czech Republic), on average 82% of companies had a formally established code of ethics (PricewaterhouseCoopers, 2016). One of the latest surveys was conducted in 2016 by Dow Jones and Metricstream (2016) and showed that 96% of the 330 questioned companies had a code of ethics. The aforementioned surveys indicate the growing trend towards the introduction of codes of ethics in business practice. However, it is important to highlight the fact that not all these surveys are compatible. In actuality, the results depend on numerous factors, in particular on the structure of the respondents. Whilst a higher proportion of large US based companies have codes of ethics, this proportion is smaller for small and medium-sized companies and those operating in Asia. It is therefore clear that only global surveys with large numbers of respondents from all business sectors and companies of different sizes will provide the relevant information required. Unfortunately, such surveys are difficult to perform.

According to a survey conducted by the Association of Chartered Certified Accountants (ACCA), one in five managers or accountants in the Czech Republic has had to deal with a serious ethical dilemma in their work. This only confirms the necessity of the introduction of effective ethical management tools (Transparency International – Czech Republic, 2015). Džbánková (2003) concluded, on the basis of her smaller, less representative survey conducted in 2002, in which 60 representatives participated from middle and top management in companies operating in Prague and Central Bohemia, that 35% of the questioned companies had a code of ethics in place and 22% were considering drafting and implementing one. In contrast, Transparency International – Czech Republic in conjunction with the Economic University in Prague, conducted a very representative survey in 2005, which was repeated in 2006. The surveys sought to determine the degree to which codes of ethics were applied in companies that operated on the Czech market. The conclusion was that in the second half of 2005 only 59 companies (i.e. 10.3%) of the 574 questioned had a code of ethics in place. This situation was similar when the survey was repeated in the first half of 2006, whereby only 104 companies (i.e. 8.4%) of the 1,240 in the sample set had a code of ethics in place. The survey also proved that the larger the company the greater the chance a code of ethics existed. Dytrt et al. (2011) state that in 2011, less than 15% of domestic companies had a code of ethics in place. In a more recent survey conducted by Transparency International in 2013, the results showed that this percentage had increased to 46% of domestic companies. In the Czech Republic, the presence of a code of ethics tends to be limited to larger companies and public institutions. Smaller companies are still only at the stage of exploring their options with regards to this ethical management tool.

Methodology

In cooperation with the Czech Statistical Office, a sample set of companies was selected from all size categories in compliance with EU nomenclature. The emphasis was placed on selecting companies that were representative of the basic spheres of the national economy. In total, 1,420 companies were included in the sample set. The empirical research, in the form of a questionnaire survey, was conducted in the second half of 2016 among the heads of personnel departments. In addition to acquiring basic information about the respondents (company name; contact data; area of business activity; economic results), the questionnaire contained eight items with respect to codes of ethics. All the respondents were guaranteed anonymity with regards to the presentation of the research results. The questionnaire survey was conducted by students and academic staff. The majority of respondents replied in electronic form by means of an electronic reference within the Google – disc web platform. The paper form was used to a minimum extent. The targeting of heads of personnel departments resulted in 607 completed and returned questionnaires i.e. a return rate of 42.75%. For the analysis, four categories of companies were identified, namely large companies ($\geq$ 250 employees), medium-sized companies (50 – 249 employees), small companies (10 – 50 employees) and micro-companies ($<$ 10 employees). The purpose of the analysis was to determine the relationship between the presence of a code of ethics in Czech companies and their positive economic results for the last three years, and to determine how widespread the presence of a code of ethics is. Within the sample dataset of 607 companies, there were several companies that gave no response to the question “Does your company have a code of ethics?” It was decided to assign the answer “No, we do not miss it” to these cases on the basis of the assumption that omitting to answer the question automatically showed that the company did not have a code of ethics. In addition, our interest was

only in whether a company did or did not have a code of ethics. As a result, it was decided, for this analysis, to combine the number of responses for "No, we do not miss it" and "No, we miss it" into one group "No". As part of the analysis of the relationship between the presence of a code of ethics and a company´s profit or loss, it was necessary to exclude companies which failed to declare whether their economic results were positive, balanced or negative. In these cases it was impossible to automatically assign any other option. In this work we focus on profitability, so we were only interested in the companies which are profitable, rather than those which are breaking even or making losses.

Tables and charts of the absolute and relative frequencies were created to illustrate the results of the questionnaire survey for the monitored areas. A two-selection test was subsequently carried out on the identity or difference between the two proportions and the interval estimates calculated. MS Excel was used for the preparation of the tables and charts. R statistical software was used for the relationship tests and the calculation of the interval estimates. All the statistical tests and calculations of interval estimates were performed at a confidence level of 95% (i.e. at a significance level of 0.05).The hypothesis was tested separately for each category of company size. A table was put together of numbers in which the companies were divided according to size, whether they have a code of ethics, and whether they make a profit/loss. The number of profitable companies with a code of ethics was calculated as a proportion of all the companies with a code of ethics. This process was repeated for those companies that do not have a code of ethics. The proportion of profitable companies is highlighted in bold in the tables below. A two-selection test was subsequently performed to show whether the difference in the proportions for the profitable companies is dependent on the existence or non-existence of a code of ethics, and whether this is statistically significant. If the difference was not statistically significant, then this would mean that the existence of a code of ethics does not influence the economic results of a company. From the point of view of the formulation of the hypotheses, it was necessary to test whether the proportions in both groups were the same against the alternative that the proportions were significantly different. The proportions were tabulated as decimal numbers rather than in percentages because the R statistical software works with decimal numbers. The results of the statistical test were evaluated on the basis of the determined p-value and from the interval estimations for the differences in the proportions. If the p-value was higher than the chosen significance level (in this case 0.05), or if the interval estimation contained zero, the difference in the proportions is statistically insignificant. This means that the existence of a code of ethics does not significantly influence profitability.

Confirmation of the hypothesis

The presence of a code of ethics has no influence on the economic results of a company.

a) Micro companies

Table 1: Frequencies

Presence of a code of ethics	Economic results			
	Break-even	Positive	Negative	Total
No	32	83	7	122
Yes	3	13	1	17

Source: authors

Table 2: Proportions

Presence of a code of ethics	Economic results		
	Break-even	Positive	Negative
No	0.262	0.680	0.057
Yes	0.176	0.765	0.059

Source: authors

Table 3: Results of the two-selection test

Z - test	0.7588
p - value	0.448
Interval estimation of the difference in proportions	(-0.134; 0.302)

Source: authors

As the p-value is higher than the significance level of 0.05 and the interval estimation contains zero, the statistical test proves that the presence of a code of ethics has no influence on the economic results of micro-companies.

b) Small companies

Table 4: Frequencies

Presence of a code of ethics	**Economic results**			
	Break-even	**Positive**	**Negative**	**Total**
No	30	101	5	136
Yes	8	30	3	41

Source: authors

Table 5: Proportions

Presence of a code of ethics	**Economic results**		
	Break-even	**Positive**	**Negative**
No	0.221	0.743	0.037
Yes	0.195	0.732	0.073

Source: authors

Table 6: Results of the two-selection test

Z – test	-0.139
p – value	0.889
Interval estimation of the difference in proportions	(-0.165; 0.143)

Source: authors

In small companies, the situation is similar to that in micro-companies. The p-value is substantially higher than the significance level and in the interval estimation there is a zero near its centre. The test results also therefore prove that the existence of a code of ethics has no influence on the economic results of small companies.

c) Medium-sized companies

Table 7: Frequencies

Presence of a code of ethics	**Economic results**			
	Break-even	**Positive**	**Negative**	**Total**
No	17	73	10	100
Yes	14	44	1	59

Source: authors

Table 8: Proportions

Presence of a code of ethics	Economic results		
	Break-even	Positive	Negative
No	0.170	0.730	0.100
Yes	0.237	0.746	0.017

Source: authors

Table 9: Results of the two-selection test

Z – test	0.219
p - value	0.827
Interval estimation of the difference in proportions	(-0.125; 0.157)

Source: authors

The numerical characteristics of the statistical tests show that the situation among medium-sized companies is almost identical to that found in small companies. The p-value, as well as the interval estimation, clearly show that even in this case the existence of a code of ethics has no influence on the economic results of medium-sized companies.

d) Large companies

Table 10: Frequencies

Presence of a code of ethics	Economic results			
	Break-even	Positive	Negative	Total
No	4	36	0	40
Yes	14	64	4	82

Source: authors

Table 11: Proportions

Presence of a code of ethics	Economic results		
	Break-even	Positive	Negative
No	0.100	0.900	0.000
Yes	0.171	0.780	0.049

Source: authors

Table 12: Results of the two-selection test

Z – test	-1.814
p – value	0.0696
Interval estimation of the difference in proportions	(-0.249; 0.0095)

Source: authors

Although the p-value and the interval estimation at the significance level of 95% show that the existence of a code of ethics in large companies has no influence on their economic results, the conclusion is borderline. The p-value is 0.0696, which is very close to the critical value of 0.05. It is visible on the interval estimation that zero, which represents a negligible difference in the proportions of profitable companies with a code of ethics and those without one, is at the very edge of the interval, as the upper limit of the estimation is 0.0095, which is nearly zero. The lower limit of the estimation suggests that the difference may be up to 0.249, which is almost 25%. The conclusion is therefore on the edge of the given liability. The values show that the hypothesis is not confirmed as

definitively as in the previous cases. If the difference were to be considered as significant, the results of the research would show that there is a higher proportion of profitable companies without a code of ethics.

Conclusion and discussion

The statistical tests performed on the basis of the results of the questionnaire survey show that the presence or non-existence of a code of ethics has no demonstrable influence on the economic results of a company, irrespective of its size. Nevertheless, the conclusion drawn for large companies was based on borderline results. If the difference for this category of companies were to be considered significant, the conclusion would have to be drawn that the proportion of profitable companies without a code of ethics is higher than for those without.

In our opinion, further research should focus on the differences between groups of companies based on technical efficiency, labour productivity, research and development expenditures, and profitability. MANOVA would also shed some light on the odds of a relationship using interactions of economic results, the size of the company and the existence of a code of ethics. Non-financial performance variables like employee satisfaction should also be taken into consideration. These variables can contribute to the better understanding of the total performance evaluation of an ethical culture within companies.

References

Caha, Z. and Vokoun, M. (2017). The Impact of the Presence of a Code of Ethics on the Economic Prosperity of a Company. *Proceedings of the 5th International Conference IMES 2017*. [Online], [Retrieved June 15, 2017], http://imes.vse.cz/wp-content/uploads/2015/08/Conference_Proceedings_IMES_2017.pdf

Čaník, P. and Čaníková, P. (2006). *Aplikace metod a nástrojů podnikatelské etiky v českém podnikatelském prostředí.* [Online], [Retrieved January 16, 2016], http://docplayer.cz/2009855-Aplikace-metod-a-nastroju-podnikatelske-etiky-v-ceskem-podnikatelskem-prostredi.html.

Deloitte (2004). *Business Ethics and Compliance in the Sarbanes-Oxley Era*. [Online], [Retrieved January 25, 2016], https://www.whistleblowing.com.au/information/BusinessEthicsComplianceinSOXEra.pdf.

Dow, J. and Metricstream. (2016). *Global anti-corruption survey results 2016*. [Online], [Retrieved January 25, 2016], http://info.metricstream.com/Dow-Jones-MetricStream-anti-corruption-survey-report.html.

Džbánková, Z. (2003). Etické aspekty ekonomického prostředí v ČR v procesu připojování k EU. *Marathon*, 49(6), 3-19.

Ethics Resource Center. (2005). National business ethics survey: How employees view ethics in their organizations (1994-2005), Arlington: Ethics Resource Center.

Harman, L. B. (2001). Ethical challenges in the management of health information, New York: Aspen Publishers.

Ho, C. M. F. (2010). A critique of corporate ethics codes in Hong Kong construction. *Building Research*, 38(4), 411-427.

Ibe. (2012). Employee Views of Ethics at Work. Institute of Business Ethics. British Survey.

Kaptein, M. and Schwartz, M. S. (2007). The Effectiveness of Business Codes: A Critical Examination of Existing Studies and the Development of an Integrated Research Model. *Journal of Business Ethics*, 77(2), 111-127.

Kpmg. (2002). *Ethics Survey – 2001: Ethics in Practice.* [Online], [Retrieved January 28, 2016], http://www.gov.za/sites/www.gov.za/files/ethics_0.pdf.

Kpmg. (2008). *Business Codes of the Global 200: Their Prevalence, Content and Embedding.* [Online], [Retrieved January 28. 2016], http://www.ethicsmanagement.info/content/Business%20codes%20Fortune%20200.pdf.

Lrn. (2006). *The impact of codes of conduct on corporate culture: Measuring the immeasurable.* [Online], [Retrieved January 28, 2016], http://www.acc.com/_cs_upload/vl/membersonly/Article/1327042_1.pdf.

Mckendall, M., Demarr, B. and Jones-Rikkers, C. (2002). Ethical Compliance Programs and Corporate Illegality: Testing the Assumptions of Corporate Sentencing Guidelines. *Journal of Business Ethics*, 37(4), 367-383.

PricewaterhouseCoopers. (2016). *Celosvětový průzkum hospodářské kriminality - zpráva za Českou republiku.* [Online], [Retrieved January 16, 2016], https://www.pwc.com/cz/cs/hospodarska-kriminalita/assets/pdf/global-economic-crime-survey-2016-cz.pdf.

Remišová, A. (2011). Etika a ekonomika. Bratislava: Kalligram.

Putnová, A. and Seknička, P. (2007). Etické řízení ve firmě: nástroje a metody: etický a sociální audit. Praha: Grada Publishing a. s.

Rogers, P. S. and Swales, J. M. (1990). We the People? An Analysis of the Dana Corporation Policies Document. *The Journal of Business Communication*, 27(3), 293-313.

Rolný, I. (2007). Etika v podnikové strategii. Metodologické postupy integrace etiky do podnikové strategie. Ostrava: KEY Publishing.

Seknička, P. and Putnová, A. (2016). Etika v podnikání a hodnoty trhu. Praha: Grada Publishing.

Singh, J. B. (2011). Determinants of the Effectiveness of Corporate Codes of Ethics: An Empirical Study. *Journal of Business Ethics*, 101(3), 385-395.

Transparency International – Czech Republic. (2006). *Průzkum aplikace etických kodexů.* [Online], [Retrieved December 9, 2016], http://transint.xred.cz/doc/ve_pruzkum_aplikace_etickych_kodexu.pdf.

Transparency International – Czech Republic. (2008). *Korupce a protikorupční politika ve veřejné správě.* [Online], [Retrieved December 9, 2016], http://www.prevencekorupce.cz/files/files/korupce_a_protikorupcni_politika.pdf.

Transparency International – Czech Republic. (2015). *Každý pátý finanční manažer v česku řešil v zaměstnání etické dilema.* [Online], [Retrieved January 28, 2016], https://www.transparency.cz/kazdy-paty-financni-manazer-v-cesku-resil-v-zamestnani-eticke-dilema/.

Seasonal Adjustment – Consensus between Direct And Indirect Method. Case Study: Seasonal Adjustment of Romanian National Accounts Using Jdemetra+ 2.1

Mirică Andreea
The Bucharest University of Economic Studies, Bucharest, Romania
miricaandreea89@gmail.com

Toma Iulia Elena
The Bucharest University of Economic Studies, Bucharest, Romania
iulia.toma92@gmail.com

Begu Liviu Stelian
The Bucharest University of Economic Studies, Bucharest, Romania
liviu.begu@csie.ase.ro

Abstract:

Regarding the seasonal adjustment of Romanian GDP, there are some inconsistencies between the GDP growth rates computed based on the sum of seasonally adjusted components and the one computed based on the direct seasonal adjustment of the GDP. This paper provides a better understanding of the differences between the direct and indirect method of seasonal adjustment of economic time series and illustrates a possible solution to the problem encountered. Moreover, the seasonal adjustment procedure for TRAMO-SEATS and X13 will be tested using JDemetra+ 2.1. The choice between direct and indirect approach is made taking into account the quality of the seasonally adjusted data, the magnitude of revisions and consistency between the aggregates and the overall GDP. Although both methods provided satisfactory results, TRAMO-SEATS gave better results with regard to quality and revisions. Some key benefits of choosing the right method are the possibility of comparing economic series from month to month and making accurate predictions.

Keywords: seasonal adjustment, direct/indirect approach, JDemetra, TRAMO-SEATS, X13

Introduction

With regard to seasonal adjustment of macroeconomic aggregates, two approaches emerged: direct method (adjusting the aggregates independently) and indirect method (adjusting the subcomponents of an aggregate and sum up to obtain the seasonally adjusted aggregate). Yet, as Hood and Findley (2001) point out, the direct and indirect seasonal adjustment results for an aggregate are usually different.

The problem of choosing direct or indirect adjustment appears when users take into account the consistency of disaggregated and aggregated data. According to the theoretical evidence one cannot say that a method is better than another, *a more detailed analysis of the data being required* (Eurostat, 2015, p. 33).

From a practical point of view, a mix of the two methods is usually used: according to Foldesi et al. (2007), 21 out of 31 European countries use the direct method for more than 50% of the series and 7 countries use the indirect method. According to the same source, 8 countries apply exclusively the direct method and 2 countries the indirect one.

Strictly considering national accounts, the direct method is preferable among European countries. This approach is used by countries such as Albania (Institute of Statistics of Albania, 2015), Austria (Scheiblecker, Steindl and Wüger, 2007), Bosnia and Herzegovina (Agency for Statistics of Bosnia and Herzegovina, 2013), Bulgaria (National Statistical Institute of Republic of Bulgaria, 2017), Czech Republic (Czech Statistical Office, 2008),

Estonia (Statistics Estonia, 2009), Latvia (OECD, 2001), Lithuania (Statistics Lithuania, 2008), Ireland (Central Statistical Office, 2016), Luxembourg (Haas et al., 2009), Hungary (Hungarian Central Statistical Office, 2012), Malta (National Statistics Office Malta, 2008), Poland (Central Statistical Office of Poland, 2016), Sweden (Statistics Sweden, 2010), Netherlands (Statistics Netherlands, 2006), Romania (The National Institute of Statistics Romania, 2017), Slovenia (Statistical Office of the Republic of Slovenia, 2017). The indirect method is used in the following countries: Andorra (Department of Statistics of Andorra, 2017), Denmark (Graversen et al., 2008), Germany (Federal Statistical Office Germany, 2006), France (National Institute of Statistics and Economic Studies France, 2012), Republic of Serbia (Statistical Office of The Republic of Serbia, 2011), Greece (Hellenic Statistical Authority, 2016), Italy (Italian National Institute of Statistics, 2008), Cyprus (Statistical Service of Cyprus, 2008), Portugal (Statistics Portugal, 2007), Finland (Statistics Finland, 2014), Norway (Statistics Norway, 2014), Iceland (Central Bank of Iceland, 2012), Croatia (Croatian Bureau of Statistics, 2014), Switzerland (Swiss Federal Statistical Office, 2016), Turkey (Turkish Statistical Institute, 2009).

There are different factors which influence the choice between one method or the other (Foldesi et al., 2007). Firstly, according to the authors, user requests and data characteristics must be taken into account. Secondly, the indirect method is used when the seasonal patterns of the component series are different from each other or when the seasonal adjustment can be performed on each series. Moreover, one can use this method to preserve consistency in data. Last, the direct method is usually used when the components cannot be adjusted individually.

Maravall (2005) emphasizes the importance of using the direct adjustment, explaining that the dynamic composition of the series modifies through aggregation. Moreover, he points out that the constraints between the series will not be the same after the seasonal adjustment, which is a non-linear process. Rodriguez and Brathaug (2012) affirm that the direct approach is more efficient than the indirect method for seasonal adjustment of GDP, as it does not require many revisions. On the contrary, Central Bank of Iceland (2012) points out that the indirect method is more accessible to the users as it provides the same additive relationship between seasonally adjusted components as the raw series.

In the case of Romanian National Accounts, seasonal adjustment of the GDP is performed using the direct approach and the GDP components are seasonally adjusted indirectly. This article proposes a framework in order to find a consensus between the two approaches.

Assessing consistency among growth rates for seasonally adjusted data

Data and formulas for the Romanian GDP and its components can be found at http://www.insse.ro/cms/en/content/gross-domestic-product (accessed February 09, 2017), as follows:

- GDP production aggregates = Total gross value added + Taxes on products – Subsidies on products.
- GDP consumption aggregates = Final consumption + Gross Fixed Capital Formation + Changes in Inventory + Exports of goods and services – Imports of goods and services.

For the purpose of this paper, data for all aggregates and subcomponents in millions of lei average prices of 2000 were considered.

As one can observe from the data available at this link, major seasonally adjusted aggregates are computed as a sum of smaller aggregates, thus using the indirect method. According to Eurostat (2016), a major drawback of this method is the presence of residual seasonality, therefore before proceeding to consistency assessment, a test with regard to this issue will be performed. After performing seasonality tests on these aggregates, one can observe that no residual seasonality is present. Therefore, there is no concern about the quality of seasonally adjusted data.

Table 1: Seasonally adjusted GDP major components – autocorrelation at seasonal lags test; Source: designed by the authors using Seasonality tests in JDemetra+ 2.1

Aggregate	Autocorrelation at seasonal lags p-value, 2011q1 – 2016 q3	Autocorrelation at seasonal lags p-value, all data available
Total gross value added	0.4544	0.5
Taxes less subsidies on products	0.8166	1
Final consumption	0.4526	0.1405
Actual individual consumption of households	0.4069	0.7051
External balance of goods and services	1	0.9802
Exports of goods and services	1	1
Imports of goods and services	1	1

Astolfi et al. (2003) point out that when comparing the direct and indirect seasonal adjustment methods the aggregate and the components should deliver the same message in terms of the sign of the growth rate. Therefore, consistency between GDP growth rate (direct seasonal adjustment) and GDP growth rate using the sum of the aggregates is analysed, based on data and formulas available at http://www.insse.ro/cms/en/content/gross-domestic-product (accessed February 09, 2017).
The growth rate for the third quarter 2016 compared to the second quarter 2016 was analysed. For the consumption side, there is a major inconsistency between the GDP growth rates computed based on the sum of seasonally adjusted components (-4%) and the one computed based on the direct seasonal adjustment of the GDP (0.6%). With regard to the production side, the two growth rates deliver a fairly similar message (1% compared to 0.6%).

Choosing the time span, decomposition method, package and ARIMA model

Romanian National Accounts quarterly data are available since 1995. UNECE (2012) points out that a time series should be at least 3 years long for monthly data and 4 years long for quarterly data, warning that a too long time series can be inconsistent. Moreover, according to UNSD (2010), the most suitable length for seasonal adjustment of quarterly time series is 5 years. Thus, for the purpose of this article, time series will be considered since the first quarter of 2011.

The decomposition method can be assessed using graphical inspection following the instructions provided by UNSD (2010): a pure additive model should be used when the seasonal component is not affected by the series level, while a multiplicative (log additive) model should be used when the seasonal component evolves with the series level. Graphs in annex 1 are used in order to assess what decomposition method should be used for each series.

- The log-additive model should be used for the following series:
  - Total gross value added;
  - Agriculture, forestry and fishing;
  - Construction;
  - Wholesale and retail; repair of motor vehicles and motorcycles; transport and storage; hotels and restaurants;
  - Financial intermediation and insurance;
  - Real estate activities;
  - Professional, scientific and technical activities; activities of administrative services and support services;
  - Public administration and defence; social insurance of public sector; education; health and social assistance;
  - Taxes less subsidies on products;

  - Taxes on products, Final consumption expenditure of households;
  - Final consumption expenditure of Non-profit institutions serving households;
  - Individual final consumption expenditure of General government;
  - Collective final consumption expenditure of General government;
  - Exports of goods and services;
  - Exports of goods.
- The additive model should be used for the following series:
  - Mining and Quarrying; manufacturing; electricity, gas, steam and air conditioning production and supply; water supply; sewerage, waste management and decontamination activities;
  - Information and communication;
  - Shows, culture and recreation activities; repair of households goods and other services;
  - Subsidies on products;
  - Final consumption;
  - Actual individual consumption of households;
  - Gross fixed capital formation;
  - Change in inventories;
  - External balance of goods and services;
  - Exports of services;
  - Imports of goods and services;
  - Imports of goods;
  - Imports of services.

Astolfi et al. (2003) again point out three issues that should be addressed when comparing different seasonal adjustment approaches:

- the necessity of working with cleaned time series (without calendar effect and outliers);
- defining seasonal adjustment policy criteria;
- finding a common set of quality indicators for X13 and TRAMO-SEATS.

With regard to the first issue, according to Grudkowska (2015), JDemetra+ 2.1 TRAMO-SEATS and X13 packages incorporate tools for both calendar adjustment (Easter effect, Leap year, trading days, working days) and outlier detection and adjustment. For the purpose of this article a specific calendar for Romania has been defined comprising of all legal holidays in this country.

Considering the second issue, Mirică et al. (2016) point out that seasonally adjusted series should be as stable as possible, namely with very small revisions for growth rates. In order to assess the magnitude of varying revisions, two criteria will be used, according to Grudkowska (2015): root mean square error, an indicator that measures the magnitude of revision and number of revision points for which the relative differences between the initial and the final estimation are larger (in the absolute terms) than 2 times the root mean squared error of the revisions (red revision points). Moreover, Scheiblecker (2014) points out that inconsistency between components and the aggregate may not be acceptable for the users.

The third issue can be easily addressed as JDemetra+ 2.1 offers a vast majority of common diagnostic tools for TRAMO-SEATS and X13 including a summary tool that incorporates all diagnostics, so it would not be any problem in comparing the results of X13 and TRAMO-SEATS. Nevertheless, there may be situations where one must decide between models with similar general diagnostics, a choice that can be based on various criteria (Kadane and Lazar, 2004). If that is the case, one can use the Out-of-sample Mean Squared Error test and the AIC criterion. As Pena (2001) points out, one of the main features of any model is to provide forecasts as accurate as possible, therefore the Mean Squared of forecasts errors must be assumed closed to the Mean

Squared of in sample residuals. Moreover, the AIC criterion is successfully used when we need to select a model that best fits an unknown reality (see for example, Olofsen and Dahan (2013), Dziak (2012)).

The automatic procedure for both TRAMO-SEATS and X-13 will be tested with regard to the three issues defined above. Moreover, we will apply the seasonal adjustment procedure to all major aggregates and check for consistency between the GDP growth rates computed based on the sum of seasonally adjusted components and the one computed based on the direct seasonal adjustment of the GDP. Also, consistency will be checked among the growth rates of the major aggregates computed based on the sum of the seasonally adjusted subcomponents and the one computed based on their direct seasonal adjustment. If the obtained results are unsatisfactory, one should manually set the ARIMA Model parameters and decomposition method.

Why the automatic procedure in JDemetra+?

According to the Eurostat and European Central Bank joint letter, issued in 2014, JDemetra+ is recommended as the official software for conducting seasonal adjustment of official statistics within ESS and ESCB (Eurostat and ECB, 2014).

Although, the program offers a wide range of options that can be set manually, the automatic procedure may be preferred in practice, due to several reasons. First, as Eurostat (2007) points out, seasonal adjustment is very time consuming and usually seasonally adjusted series must be submitted in a very short amount of time. Second, the major features of the automatic procedure in JDemetra+ both TRAMO-SEATS and X13 include automatic choice of decomposition method, outliers, ARIMA model and calendar detection.

Results

Tables 2 and 3 present the results of the X13 automatic procedure with regard to the three issues stated above and tables 4 and 5 present the results of the TRAMO-SEATS automatic procedure. 29 series were decomposed. Quality indicators as well as growth rates are presented.

From a technical point of view, one can observe that both procedures produced satisfying results for the seasonal adjustment process. The overall quality is good for both methods, with only two exceptions for X13 (one uncertain result and one severe result). The decomposition method is generally the same as the one chosen manually for TRAMO-SEATS (with one exception). For X13, it is different in 8 cases. The AIC looks better for TRAMO-SEATS in most of the cases. Also, the Out of Sample Mean test produced only one severe result in the case of TRAMO-SEATS and 2 in the case of X13.

The root mean-square root revision history for SA series is better with TRAMO-SEATS for Total gross value added and Final consumption, approximately the same for Taxes on products, Subsidies on products, Gross fixed capital formation, Exports of goods and services, Imports of goods and services and better for X13 for Change in inventories. This suggests that revisions would be smaller if TRAMO-SEATS would be used for Total gross value added and Final consumption and X13 for Change in inventories. No red revision points appeared, thus suggesting no major model instability.

Considering consistency between growth rates at the aggregates level, the results look much better for TRAMO-SEATS. Yet, for X13 growth rates are slightly more consistent between the GDP as sum of production aggregates and GDP directly seasonally adjusted as well as the GDP as sum of consumption aggregates and GDP directly seasonally adjusted. As one can observe, growth rates computed using the sum of production aggregates are 0.3 for X13 and 0.2 for TRAMO-SEATS, while growth rates computed using the sum of consumption aggregates are 1.3 for X13 and 1.8 for TRAMO-SEATS.

Table 2: Romanian Quarterly GDP components – seasonal adjustment quality indicators (2011 q1 to 2016 q3), source: designed by the authors using X13 Automatic procedure implemented in JDemetra+ 2.1

	Seasonal Adjustment Quality	AIC	Out of sample MSE test P-[illegible]	Root mean square error Revision history SA	Red revision points	Decomposition method	Trading day effect	Easter effect	Ouliers
Total gross value added	good	295.89	0.4199	0.3389	none	log	no	no	no
Agriculture, forestry and fishing	good	276.22	0.9282	1.8761	none	log	no	no	no
Mining and Quarrying; manufacturing; electricity, gas, steam and air conditioning production and supply; water supply; sewerage, waste management and decontamination activities	uncertain	244.82	0.0027	0.2036	none		no	no	1
Construction	good	220.44	0.2753	1.301	none	log	no	no	2
Wholesale and retail; repair of motor vehicles and motorcycles; transport and storage; hotels and restaurants	good	255.09	0.4344	1.0861	none	log	1	no	2
Information and communication	good	255.9	0.1463	0.8413	none		no	no	no
Financial intermediation and insurance	good	173.4	0.1645	0.0821	none	log	no	no	2
Real estate activities	good	200.07	0.6855	0.794	none	log	1	no	no
Professional, scientific and technical activities; activities of administrative services and support services	severe	198.98	0.8949	0.4631	none	log	no	no	1
Public administration and defence; social insurance of public sector; education; health and social assistance	good	199.97	0.8085	0.4953	none	log	no	no	2
Shows, culture and recreation activities; repair of households goods and other services	good	189.52	0.6336	0.2287	none	log	no	no	1
Taxes less subsidies on products	good	235.28	0.2953	0.5855	none	log	no	no	no
Taxes on products	good	234.13	0.2934	0.3356	none	log	no	no	no
Subsidies on products	good	144.2	0.8846	1.0919	none		no	no	2
Final consumption	good	227.46	0.1928	0.4596	none	log	no	no	no
Actual individual consumption of households	good	281.36	0.4832	0.4389	none	log	no	no	no
Final consumption expenditure of households	good	268.07	0.0074	0.0907	none		no	no	no
Final consumption expenditure of Non-profit institutions serving households	good	113.62	0.2	1.1319	none	log	no	no	2
Individual final consumption expenditure of General government	good	216.1	0.4497	0.4799	none	log	no	no	1
Collective final consumption expenditure of General government	good	298.11	0.8503	0.5127	none	log	no	8	no
Gross fixed capital formation	good	286.19	0.2425	0.7619	none	log	no	no	no

Change in inventories	good	314.15	0.8313	2.0216	none		no	no	no
External balance of goods and services	good	288.49	0.3464	0.157	none		no	no	no
Exports of goods and services	good	295.75	0.4422	0.1777	none	log	no	no	no
Exports of goods	good	304.89	0.6092	0.1534	none	log	no	no	no
Exports of services	good	292.03	0.7698	1.5889	none	log	no	no	no
Imports of goods and services	good	308.21	0.0316	0.4562	none		no	no	no
Imports of goods	good	328.05	0.5229	0.4858	none	log	no	no	no
Imports of services	good	311.41	0.8057	0.3584	none	log	no	no	1

Table 3: Romanian Quarterly GDP components – Q3/Q2 2016 Growth rate (%), source: designed by the authors using X13 Automatic procedure implemented in JDemetra+.2.1

Total gross value added (growth rate directly adjusted using X13 Automatic procedure)	0.0
Total gross value added (growth rate computed indirectly using the sum of the seasonally adjusted components)	0.8
Taxes less subsidies on products (growth rate directly adjusted using X13 Automatic procedure)	2.5
Taxes less subsidies on products(growth rate computed indirectly using the sum of the seasonally adjusted components)	2.8
Final consumption (growth rate directly adjusted using X13 Automatic procedure)	0.0
Final consumption(growth rate computed indirectly using the sum of the seasonally adjusted components)	0.1
Actual individual consumption of households (growth rate directly adjusted using X13 Automatic procedure)	0.1
Actual individual consumption of households (growth rate computed indirectly using the sum of the seasonally adjusted components)	1.2
Gross fixed capital formation (growth rate directly adjusted using X13 Automatic procedure)	-7.2
Change in inventories (growth rate directly adjusted using X13 Automatic procedure)	3.3
External balance of goods and services (growth rate directly adjusted using X13 Automatic procedure)	-4.6
External balance of goods and services (growth rate computed indirectly using the sum of the seasonally adjusted components)	-7.3
Exports of goods and services (growth rate directly adjusted using X13 Automatic procedure)	0.1
Exports of goods and services (growth rate computed indirectly using the sum of the seasonally adjusted components)	0.3
Imports of goods and services (growth rate directly adjusted using X13 Automatic procedure)	-2.6
Imports of goods and services (growth rate computed indirectly using the sum of the seasonally adjusted components)	-1.4
Growth rate GDP Directly seasonally adjusted data for q3 2016 (NIS Website)	0.6
Growth rate GDP Directly seasonally adjusted data for q3 2016 (production side computed indirectly)	0.3
Growth rate GDP Directly seasonally adjusted data for q3 2016 (consumption side computed indirectly)	1.3

Table 4: Romanian Quarterly GDP components – seasonal adjustment quality indicators (2011 q1 to 2016 q3), source: designed by the authors using TRAMO SEATS Automatic procedure implemented in JDemetra+.2.1

	Seasonal Adjustment Quality	AIC	Out of sample MSE test P-	Root mean square error Revision history SA	Red revision points	Decomposition method	Trading day effect	Easter effect	Outliers
Total gross value added	good	276.06	0.0486	0.1028	none	log	no	no	no
Agriculture, forestry and fishing	good	266.13	0.7881	1.8862	none	log	no	no	no
Mining and Quarrying; manufacturing; electricity, gas, steam and air conditioning production and supply; water supply; sewerage, waste management and decontamination activities	good	256.9	0.9478	0.3956	none		no	no	no
Construction	good	229.58	0.4282	2.2026	none	log	2	no	no
Wholesale and retail; repair of motor vehicles and motorcycles; transport and storage; hotels and restaurants	good	271.39	0.9612	1.498	none	log	1	no	1
Information and communication	good	218.06	0.0445	0.8303	none		no	no	1
Financial intermediation and insurance	good	165.16	0.4666	0.0298	none	log	no	no	2
Real estate activities	good	197.5	0.6474	1.276	none	log	1	no	no
Professional, scientific and technical activities; activities of administrative services and support services	good	208.27	0.8969	1.0554	none	log	no	no	1
Public administration and defence; social insurance of public sector; education; health and social assistance	good	199.33	0.8279	0.8272	none	log	no	no	2
Shows, culture and recreation activities; repair of households goods and other services	good	189.28	0.8273	0.8801	none		no	no	no
Taxes less subsidies on products	good	226.8	0.3599	0.6715	none	log	no	no	no
Taxes on products	good	227.53	0.4323	0.3812	none	log	no	no	no
Subsidies on products	good	113.94	0.8315	1.0629	none		no	no	2
Final consumption	good	273.42	0.2502	0.4121	none		no	no	no
Actual individual consumption of households	good	272.27	0.0044	0.442	none		no	no	1
Final consumption expenditure of households	good	271.26	0.036	0.5271	none	log	no	no	no

Final consumption expenditure of Non-profit institutions serving households	good	113.62	0.2	1.7895	none	log	no	no	2
Individual final consumption expenditure of General government	good	207.07	0.464	0.3893	none	log	no	no	1
Collective final consumption expenditure of General government	good	219.68	0.2052	0.6032	none	log	no	no	1
Gross fixed capital formation	good	277.17	0.1315	0.6711	none		no	no	no
Change in inventories	good	307.78	0.2443	3.7945	none		no	no	no
External balance of goods and services	good	288.49	0.3464	0.6146	none		no	no	no
Exports of goods and services	good	295.75	0.4422	0.0943	none	log	no	no	no
Exports of goods	good	293.77	0.6484	0.4393	none	log	no	no	no
Exports of services	good	238.96	0.3732	0.7961	none		no	no	2
Imports of goods and services	good	308.21	0.0316	0.4594	none		no	no	no
Imports of goods	good	308.42	0.5389	0.1255	none		no	no	no
Imports of services	good	274.59	0.9477	0.312	none	log	no	no	no

Table 5: Romanian Quarterly GDP components – Q3/Q2 2016 Growth rate (%), source: designed by the authors using TRAMO SEATS Automatic procedure implemented in JDemetra+ 2.1

Total gross value added (growth rate directly adjusted using TRAMO SEATS Automatic procedure)	0.1
Total gross value added (growth rate computed indirectly using the sum of the seasonally adjusted components)	0.8
Taxes less subsidies on products (growth rate directly adjusted using TRAMO SEATS Automatic procedure)	1.3
Taxes less subsidies on products(growth rate computed indirectly using the sum of the seasonally adjusted components)	0.8
Final consumption (growth rate directly adjusted using TRAMO SEATS Automatic procedure)	1.7
Final consumption(growth rate computed indirectly using the sum of the seasonally adjusted components)	1.9
Actual individual consumption of households (growth rate directly adjusted using TRAMO SEATS Automatic procedure)	1.9
Actual individual consumption of households (growth rate computed indirectly using the sum of the seasonally adjusted components)	0.0
Gross fixed capital formation (growth rate directly adjusted using TRAMO SEATS Automatic procedure)	-5.3
Change in inventories (growth rate directly adjusted using TRAMO SEATS Automatic procedure)	3.3

External balance of goods and services (growth rate directly adjusted using TRAMO SEATS Automatic procedure)	-2.7
External balance of goods and services (growth rate computed indirectly using the sum of the seasonally adjusted components)	-3.0
Exports of goods and services (growth rate directly adjusted using TRAMO SEATS Automatic procedure)	0.4
Exports of goods and services (growth rate computed indirectly using the sum of the seasonally adjusted components)	2.1
Imports of goods and services (growth rate directly adjusted using TRAMO SEATS Automatic procedure)	-0.8
Imports of goods and services (growth rate computed indirectly using the sum of the seasonally adjusted components)	-0.9
Growth rate GDP Directly seasonally adjusted data for q3 2016 (NIS Website)	0.6
Growth rate GDP Directly seasonally adjusted data for q3 2016 (production side computed indirectly)	0.2
Growth rate GDP Directly seasonally adjusted data for q3 2016 (consumption side computed indirectly)	1.8

Conclusions

Eurostat (2015) highly recommends that the choice between direct and indirect approach should be based on statistical considerations with regard to quality and users' needs. In this paper we proposed a framework that addresses these two issues. First, we set up most important diagnosis criteria that can be used to assess the quality of the seasonal adjustment process (Overall quality, AIC and Out-of-sample MSE test). Second, we identified the criteria that seasonal adjustment of national accounts should comply with in order to address users' needs: consistency between seasonally adjusted aggregates, subcomponents and GDP. Third, we proved that all these can be addressed using an easy, fast, open-source tool: the automatic procedure in JDemetra+ 2.1. 29 series comprising quarterly GDP components of Romania were seasonally adjusted using this procedure with satisfactory results in respect to users' needs: good quality of the seasonally adjusted data, small revisions and consistency between the aggregates and the overall GDP.

TRAMO SEATS gave better results with regard to quality. Considering revisions, prospects are better for TRAMO-SEATS. If there is high demand of very small revisions from the users, the ARIMA model can be set manually using a set of simulations as described by Mirică et al. (2016). With regard to consistency, results are slightly better for X13 at GDP level but better for TRAMO-SEATS at aggregate level. A satisfactory level of consistency is observed between the aggregates and the GDP if the aggregates are directly seasonally adjusted and not computed as the sum of seasonally adjusted subcomponents.

References

Agency for Statistics of Bosnia and Herzegovina, (2013), 'Quarterly National Accounts Inventory'. [Online], [Retrieved August 16, 2017], http://www.bhas.ba/metodoloskidokumenti/Inventory%20QNA%20BiH%20-%20May%202014.pdf

Astolfi, R., Ladiray, D. and Mazzi, G.L. (2003), 'Seasonal Adjustment of European Aggregates: Direct vs. Indirect Approach', *Office for Official Publications of the European Communities*, Luxembourg.

Central Bank of Iceland, (2012), 'Monetary Bulletin', 14. [Online], [Retrieved August 14, 2017], https://www.cb.is/default.aspx?pageid=e69f1cd0-2dbb-11e2-af0e-001ec9ed78b2

Central Statistical Office of Ireland, (2016), 'Quarterly National Accounts'. [Online], [Retrieved February 13, 2017], http://www.cso.ie/en/releasesandpublications/er/na/quarterlynationalaccountsquarter32016/

Central Statistical Office of Poland, (2016), 'Quarterly National Accounts of Gross Domestic Product 2010 – 2015'. [Online], [Retrieved August 14, 2017], http://stat.gov.pl/en/topics/national-accounts/quarterly-national-accounts/quarterly-national-accounts-2010-2015-of-gross-domestic-product,4,8.html

Croatian Bureau of Statistics, (2014), 'Quarterly National Accounts Inventory Croatia'. [Online], [Retrieved August 14, 2017], http://ec.europa.eu/eurostat/documents/24987/4253464/HR-QNA-Inventory-ESA95.pdf/fdfa4396-3b5d-4813-993d-275dedf0e7d4

Czech Statistical Office, (2008), 'Quarterly National Accounts Inventories'. [Online], [Retrieved August 16, 2017], http://ec.europa.eu/eurostat/documents/24987/4253464/CZ-QNA-Inventory-ESA95.pdf/1e3ef1fe-0b03-4d79-a87c-8d10734fd8cb

Department of Statistics of Andorra, (2017), 'Andorra'. [Online], [Retrieved August 16, 2017], http://www.estadistica.ad/serveiestudis/publicacions/Documentacio/Metodologia%20de%20c%C3%A0lcul%20del%20PIB.pdf

Dziak, J. J., Coffman, D. L., Lanza, S. T. and Li, R. (2012), 'Sensitivity and specificity of information criteria', *The Methodology Center and Department of Statistics*, Penn State, The Pennsylvania State University, 16(30), 140.

Eurostat, (2007), 'Seasonal adjustment: benefits and costs'. [Online], [Retrieved August 14, 2017], https://ec.europa.eu/eurostat/sa-elearning/sites/default/files/Seasonal%20Adjustment%20-%20benefits%20and%20costs.pdf

Eurostat and European Central Bank, (2014), 'Note to the Attention of the Members of the ESS nad ESCB'. [Online], [Retrieved March 05, 2017], http://ec.europa.eu/eurostat/cros/system/files/Jdemetra_%20release.pdf

Eurostat, (2015), 'ESS guidelines on seasonal adjustment'. [Online], [Retrieved August 14, 2017], http://ec.europa.eu/eurostat/documents/3859598/6830795/KS-GQ-15-001-EN-N.pdf

Eurostat, (2016), 'Short-term business statistics - seasonal adjustment methods'. [Online] [Retrieved March 15, 2017], http://ec.europa.eu/eurostat/statistics-explained/index.php/Short-term_business_statistics_-_seasonal_adjustment_methods

Federal Statistical Office Germany, (2006), 'The BV4.1 Procedure for Decomposing and Seasonally Adjusting Economic Time Series'. [Online], [Retrieved August 14, 2017], https://www.destatis.de/EN/Methods/MethodologicalPapers/Download/BV41Procedure.pdf?__blob=publicationFile

Foldesi, E., Bauer, P., Horvath, B. and Urr, B., (2007), 'Seasonal Adjustment Methods and Practices'. [Online], [Retrieved August 14, 2017], https://www.ksh.hu/docs/files/527167.PDF

Graversen, T. R., Südel, B., Haugaard, J. and Petersen, J. D., (2008), 'Quarterly National Accounts Inventory. Sources and methods of the Quarterly National Accounts for Denmark'. *Statistics Denmark*. [Online], [Retrieved August 14, 2017], http://ec.europa.eu/eurostat/documents/24987/4253464/DK-QNA-Inventory-ESA95.pdf/2befb3fb-a661-41db-8245-2e3bbb6ea1dd

Grudkowska, S., (2015), 'JDemetra+ Reference Manual Version 1', Warszawa: Narodowy Bank Polski

Haas, J., Hermes, J., Wiltgen, R., Kafaï, M. and Elter, V., (2009), 'Inventory of Sources and Methods. Quarterly National Accounts of Luxembourg', *Économie et Statistiques. Statec*. [Online], [Retrieved February 13, 2017], http://www.statistiques.public.lu/catalogue-publications/economie-statistiques/2009/28-2009.pdf

Hellenic Statistical Authority, (2016), 'QNA inventory based on ESA 2010 methodology'. [Online], [Retrieved August 14, 2017], http://ec.europa.eu/eurostat/documents/24987/4253464/GR-QNA-Inventory-ESA2010.pdf

Hood, C. C. and Findley, D. F., (2003), 'Comparing direct and indirect seasonal adjustments of aggregate series', *Seasonal Adjustment*, 9.

Hungarian Central Statistical Office, (2012), 'About seasonal adjustment'. [Online], [Retrieved February 13, 2017], http://www.ksh.hu/docs/eng/xftp/modsz/eszezonalis_kiigazitas.pdf

Institute of Statistics of Albania, (2015), 'National Accounts Methodology. Description of Sources and Methods. Part C, Quarterly National Accounts'. [Online], [Retrieved February 13, 2017], http://www.instat.gov.al/media/333401/part_c-qna_compilation_albania.pdf

Italian National Institute of Statistics, (2008), 'Quarterly National Accounts Inventory. Sources and methods of Italian Quarterly National Accounts'. [Online], [Retrieved February 13, 2017], http://ec.europa.eu/eurostat/documents/24987/4253464/IT-QNA-Inventory-ESA95.pdf/5f7d98d8-2734-448c-9c5f-75845e648bc1

Kadane, J. B. and Lazar, N. A. (2004), 'Methods and criteria for model selection', *Journal of the American statistical Association*, 99(465), 279-290.

Maravall, A., (2005), 'An Application of The TRAMO-SEATS Automatic Procedure; Direct versus Indirect Adjustment'. Madrid: Banco de Espana.

Mirică, A., Andrei, T., Dascălu, E.D., Mincu Radulescu, G.I. and Glăvan, I.R., (2016), 'REVISION POLICY OF SEASONALLY ADJUSTED SERIES – CASE STUDY ON ROMANIAN QUARTERLY GDP', *Economic Computation and Economic Cybernetics Studies and Research*, 50(3), 45-59.

National Institute of Statistics and Economic Studies France, (2012), 'Methodology of quarterly national accounts'. [Online], [Retrieved August 14, 2017], https://www.insee.fr/en/metadonnees/source/s1023

National Institute of Statistics Romania, (2017), [Online], [Retrieved August 16, 2017], http://www.insse.ro/cms/en/content/gross-domestic-product

National Statistical Institute of Republic of Bulgaria, (2017), 'Quarterly seasonally adjusted data'. [Online], [Retrieved February 12, 2017], http://www.nsi.bg/en/content/12710/%D0%BC%D0%B5%D1%82%D0%B0%D0%B4%D0%B0%D0%BD%D0%BD%D0%B8/gdp-production-methods-final-expenditure-income-basic-and-detailed-data-%E2%80%93

National Statistics Office Malta, (2008), 'Quarterly National Accounts Inventory. Sources and Methods for the Quarterly Compilation of the National Accounts for the Maltese Islands'. [Online], [Retrieved August 14, 2017], http://ec.europa.eu/eurostat/documents/24987/4253464/MT-QNA-Inventory-ESA95.pdf/c33e7083-bcbb-4c7e-bbb1-d71ea69c752d

OECD, (2001), 'Quarterly National Accounts in the Baltic States. Sources and Methods of Estimation'. [Online], [Retrieved 14 August 2017], http://www.oecd.org/std/na/1851010.pdf

Olofsen, E. and Dahan, A., (2013), 'Using Akaike's information theoretic criterion in mixed-effects modeling of pharmacokinetic data: a simulation study'. *F1000Research*, 2.

PEÑA, D., (2001), 'Prediction and Model Selection', in 'A Course in Time Series Analysis', PEÑA, D., TIAO, G.C. and TSAY, R. (eds.), *Wiley and Sons*, New York, 111-136.

Rodriguez, J. and Brathaug, A., (2012), 'Seasonal adjustment: Direct versus indirect approach: Two cases from the Norwegian quarterly national accounts', *OECD*, STD/CSTAT/WPNA (2012), 23.

Scheiblecker, M., Steindl, S. and Wüger, M., (2007), 'Quarterly National Accounts Inventory of Austria. Description of Applied Methods and Data Sources', *Austrian Institute of Economic Research*. [Online], [Retrieved August 16, 2017], http://ec.europa.eu/eurostat/documents/24987/4253464/AT-QNA-Inventory-ESA95.pdf/ca25929b-333e-4f79-a806-6cef2510e1d2

Scheiblecker, M., (2014), 'Direct Versus Indirect Approach in Seasonal Adjustment', *WIFO Working Papers*, No. 460.

Statistics Estonia, (2009), 'Quarterly National Accounts Inventory Estonia'. [Online], [Retrieved August 14, 2017], https://www.stat.ee/dokumendid/37409

Statistics Finland, (2014,) 'Finnish Quarterly National Accounts - methodological description'. [Online], [Retrieved August 14, 2017], http://ec.europa.eu/eurostat/documents/24987/4253464/FI-QNA-Inventory-ESA2010.pdf

Statistics Lithuania, (2008), 'Lithuanian Quarterly National Accounts Inventory'. [Online], [Retrieved August 14, 2017], http://ec.europa.eu/eurostat/documents/24987/4253464/LT-QNA-Inventory-ESA95.pdf/7a55a9b0-8bd8-4690-b28e-c86bf97c82c1

Statistics Netherlands, (2006), 'QNA Inventory - The Netherlands'. [Online], [Retrieved February 13, 2017], http://ec.europa.eu/eurostat/documents/24987/4253464/NL-QNA-Inventory-ESA95.pdf/f1157307-cd09-4608-9760-eac4c925a8d6

Statistics Norway, (2014). 'Quarterly National Accounts. Methods and sources of the quarterly national accounts compilations for Norway'. [Online], [Retrieved August 14, 2017], http://www.ssb.no/en/nasjonalregnskap-og-konjunkturer/artikler-og publikasjoner/_attachment/158725?_ts=1439f024250

Statistical Office of The Republic of Serbia, (2011), 'Quarterly National Accounts Inventory'. [Online], [Retrieved February 13, 2017], http://ec.europa.eu/eurostat/documents/24987/4253464/RS-QNA-Inventory-ESA2010.PDF/29fc334f-e06b-4c2a-84c1-6781330cd674

Statistical Office of the Republic of Slovenia, (2017), 'The Summary Methodology Statement. Ljubljana'. [Online], [Retrieved August 16, 2017], http://dsbb.imf.org/pages/sdds/BaseSMReport.aspx?ctycode=SVN&catcode=NAG00&ctyType=SDDS

Statistics Portugal, (2007), 'Quarterly National Accounts (Base 2000). Sources and Methods'. [Online], [Retrieved February 13, 2017], http://ec.europa.eu/eurostat/documents/24987/4253464/PT-QNA-Inventory-ESA95.pdf/43888445-a08a-44e1-be1a-e04c98ef81a6

Statistical Service of Cyprus, (2008), 'Quarterly National Accounts Inventory Cyprus'. [Online], [Retrieved August 14, 2017], http://ec.europa.eu/eurostat/documents/24987/4253464/CY-QNA-Inventory-ESA95.pdf/ccd5ffa3-ba37-447a-bd20-58e328802c6a

Statistics Sweden (2010), 'Quarterly National Accounts Inventory. Sources and methods for the Swedish National Accounts'. [Online], [Retrieved August 14, 2017] https://www.scb.se/contentassets/767986f40d23499facc8e6f6e5234a06/qna-inventories-sweden.pdf

Swiss Federal Statistical Office, (2014), 'Swiss Quarterly National Accounts'. [Online], [Retrieved August 16, 2017], https://www.seco.admin.ch/seco/en/home/wirtschaftslage---wirtschaftspolitik/Wirtschaftslage/bip-quartalsschaetzungen-/concepts--en--.html

Turkish Statistical Institute, (2009). 'Quarterly Accounts'. [Online], [Retrieved August 16, 2017], http://www.turkstat.gov.tr/PreTablo.do?alt_id=1105

UNECE, (2012), 'Practical Guide to Seasonal Adjustment With Demetra+', United Nations.

UNSD, (2010), 'Seasonal Adjustment and Time Series Issues'. *Workshop on Manufacturing Statististics for ECLAC member states*, Santiago.

A Regional Innovation System: Formation Features and Growth Areas (Case Study: St. Petersburg)[1]

Irina Rudskaia
Peter the Great Saint-Petersburg Polytechnic University, Institute of Industrial Management, Economics and Trade, Finance and Monetary Economics Department
iarudskaya@mail.ru
Russia, 195251, St.Petersburg, Polytechnicheskaya, 29

This document illustrates the required style to prepare Camera Ready format for 14th IBIMA, in Microsoft Word document and Rich text format forms.

Abstract

The article discusses the outcomes of the existing innovation rankings for evaluating the level of the innovation system in St. Petersburg. It has been concluded that the principles of general innovation management should be applied in order to develop the regional innovation system (RIS) of St. Petersburg. The need for applying the procedure of regional innovation foresight is substantiated. The author has managed to define the key areas for enhancing the efficiency of RIS operation for the city of St. Petersburg.

Keywords: region, innovation systems, foresight, general innovation management, principle.

Introduction

Today the innovation way of developing the country and some of its regions is one of the most important priorities in the socioeconomic policies of the Russian Federation. It is the regional innovation system that is the factor of long-term competitive growth both for a region and for the entire country. An efficient innovation mechanism can be created regionally only in case there are cleverly determined trends for the RIS development. The paper looks into the RIS of the city of St. Petersburg.

St. Petersburg is one of the leading regions in the innovation system of Russia. This conclusion can be made on the basis of the ranking of complex socioeconomic and innovation development of cities called "AT Kearney Global Cities", 2016 [13], specialized ranking of innovation cities "Innovation Cities Index 2015: Global", and the ranking of innovation regions of Russia "AIRR" [7]. It is also proven by various national and international investigations.

According to the findings of the research study conducted by the author [8,9], as well as the statistics [10, 11] and data from other investigations, it can be generally concluded that the regional innovation system exists in St. Petersburg (i.e. there is a quite wide range of research institutions, universities and there are many industries where enterprises implement innovations, and innovation infrastructure organizations; the contributors to innovation activities interact a lot). The system has been operating efficiently in a short term. However, by some parameters of its

[1] The paper has been written under support of the Ministry of Science and Education of the RF (project No. 26.6446.2017/BCH).

operation one can judge about regression trends and shrinking innovation activities. In the long run (in the projection "R&D – R&D results – results of innovation activities"), the regional innovation system of St. Petersburg is inefficient, i.e. it can be stated that bigger investments in the initial phase of the innovation process - research and development - do not entail equivalently growing efficiency in the last phase - the share of innovative products in the GDP and innovation-based growth of the GDP.

The strategic development of St. Petersburg RIS

The sustainability of St. Petersburg regional innovation system is related to a wide basis for innovation development. However, fast developing new technologies, including biotechnology, artificial intelligence, big data processing technology, can change the situation in favor of new sectors, if no effective cooperation is ensured between the actors of the regional innovation system.

The strategic development of St. Petersburg RIS must rely on the principles of general innovation management. These principles include:

1-st principle Long-term horizon of RIS development strategy.

The tools of regional innovation foresight must be used to form the list of technologies which determine the region's competitive advantages for a long period of time (30-50 years), and to design regional innovation policies given the foresight outcomes. Fast development and competitiveness in the sphere of technology is only possible in case there is certain scientific and technological capacity, created by the region. In addition, favorable investment climate is needed to attract finances into perspective technologies.

Our investigations show that St. Petersburg is a leader of innovation development in Russia and the activity of region's enterprises in the field of innovation technology development is high. However, according to the results of technical efficiency simulation based on a two-phased envelopment analysis model[2], St. Petersburg is losing the signs of technical efficiency in both phases - in the first one, related to transformation of R&D outcomes suitable for commercialization and further utilization, and in the second one, related to commercialization of these outcomes. The inefficiency of the first phase can be eliminated if long-term technology priorities are formed and supported in the innovation policies of the region.

The entire scope of regional innovation foresight procedures is shown in Fig. 1.
As substantiated, it might be reasonable if a university (or a consortium of universities) is responsible for setting up a foresight project, since the third mission governs the active role of universities as an integrator in the regional innovation system.

[2] These investigations were made by the author in previous papers with application of Data Envelopment Analysis (DEA).

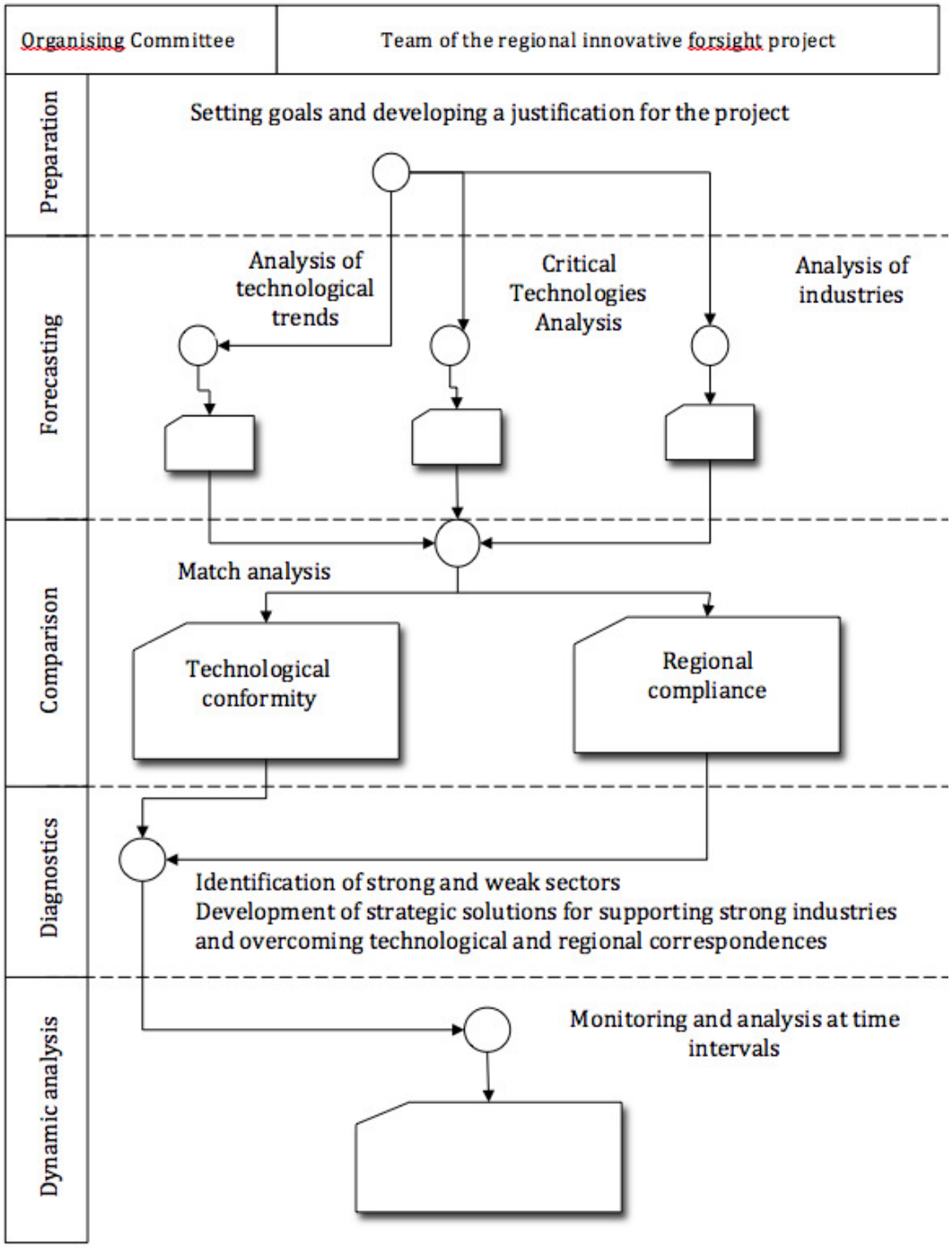


Fig. 1. The scope of regional innovation foresight procedures

The 2-nd the key role of technological innovations based in the interdisciplinary approach as the main source of sustainable competitive advantages.

As substantiated, it might be reasonable if a university (or a consortium of universities) is responsible for setting up a foresight project, since the third mission governs the active role of

universities as an integrator in the regional innovation system.
In case of St. Petersburg, it is reasonable if the role of project organizer is played by one of the leading universities, which have strong competences in the field of modern research in natural, technical and social sciences. The interdisciplinary requirement is mandatory, since convergence, which is one of technological development trends, is impossible without involving various branches of knowledge. Experts in social sciences should be involved for two reasons: firstly, the society have to accept new priorities, secondly, convergence of social studies and natural ones (such as bio-informatics, social informatics, artificial intelligence) is one of the key factors for the future development. Since no university in St. Petersburg is a sole holder of all the necessary competences (they develop in many universities, but leaders are needed to implement foresight), it is proposed that a consortium of universities should be set up, including St. Petersburg State University and universities that are members of the "5-100" project or have the status of a national research university. Before setting up the consortium, the competences of universities must be audited. It should be done by the project team of regional innovation foresight. In order to increase manageability, the team must be made up of representatives from one university and engage experts from other universities and research institutes for audit. St. Petersburg Polytechnic University can be a good choice as the base for setting up the project team. According to the recent QS ranking, St. Petersburg State University has the leading position (240 position) among St. Petersburg universities. However, since it is a federal university, SPbSU is not involved in the regional environment a lot. The next related to St. Petersburg university in the ranking is the Higher School of Economics. It is especially strong in sociology and among young universities of the world (51 position in the ranking of young universities). However there is only a branch of this university in St. Petersburg, whereas the head university has a federal and international focus in its research. Obviously, these universities have to be engaged and their expert competences must be used. However, a university involved in the regional environment must become the base. St. Petersburg Polytechnic University has the first positions in the ranking in the fifth hundred (401-410),with strong positions in physics and astronomy. This is the best result among St. Petersburg universities. This approach allows applying the second principle of general innovation management in reference to St. Petersburg RIS.

The organizational committee of the project should include, apart from representatives of SPbPU, members of other leading universities and non-profit-making organizations, which would convey the positions of the regional community and executive government bodies. The general structure of the organizational committee and consortium, as well as the key objectives are shown in Fig. 2.

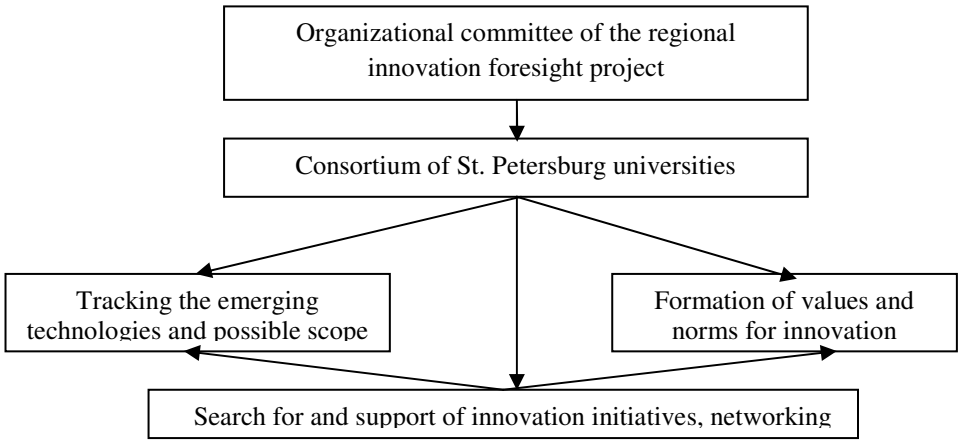


Fig. 2. University consortium as the basis for the project of regional innovation foresight of St. Petersburg

The 3-rd principle: introduction of innovation management as a tool of not only strategic but also operational management.

The organization of the regional innovation foresight project must embrace the time horizon relevant for managing the project. Since it is the issue of working out the guidelines for regional innovation policies, and investment in technology has a long-term nature, following the examples of other regions, it is reasonable that the time of the project should be limited by three years, given the results of regular monitoring over its implementation. The frequency of monitoring must be no less than once per 2 years, since today the life cycle of technology development is reducing and a two year period is the time proposed by many researchers.

In parallel with the regional innovation foresight project, other innovation initiatives should develop, as well as the legislation stimulating and regulating innovation activities. The most important statutes of St. Petersburg, regulating innovation project financing, are:
1. St. Petersburg Government Decree No. 355 as of 13.05.2014 "On the Economic and Social Development Strategy of St. Petersburg for the period until 2030".
2. St. Petersburg Government Decree No. 835 as of 28.06.2011 "On Complex Program "Science. Industry. Innovations" in St. Petersburg for the years 2012-2015". The total volume of finance for the program is 3.6 bil. RUR.

3. St. Petersburg Government Decree No. 495 as of 23.06.2014 "On St. Petersburg state program "Development of industry, innovation activities and agro-industrial complex in St. Petersburg" for the years 2015-2020". The total volume of finance for the program is 875.6 mil. RUR.

4. St. Petersburg Government Decree No. 496 as of 23.06.2014 "On the state program of St. Petersburg "Economic development and knowledge economy in St. Petersburg" for the years 2015-2020". The total volume of finance for the program is 4.5 bil. RUR.

At the same time St. Petersburg lacks the legislation which directly regulates innovation activities.
The fourth principle is *compliance of the innovation policies with the innovation culture in the region*. Since regional innovation foresight and regional innovation policies are the products of a wide consensus concerning the issues of St. Petersburg strategic development and given the strong science, technology and innovation potential, this issue calls for addressing the creation and enhancement of a culture contributing to the growth in innovation activities and acceptance of key development trends. Since the innovation policies of the strong region should contribute to expanding the base of competitive advantages, innovation culture must be focused on facilitating innovation activities in various sectors, revealing and setting up new clusters or other modes of interaction between agents of innovation activities.

An important principle is *market orientation*. Since the issue is about prospective areas of regional innovation development, the market for innovations should be not only monitored but also created and stimulated.

Conclusion

The findings of St. Petersburg regional innovation system monitoring, discussed by the author in previous publications [5], show that now the support given to innovation enterprises is low and does not stimulate innovation activities.
It should be taken into account that the financial infrastructure of innovation activities should be fostered so that innovation enterprises could enter the market. The region and the state do not provide innovation enterprises with sufficient finances to develop new key technologies and form a strong innovation system in the region.

Venture investors, together with the state, traditionally work as financing sources. However, the statistics from Russian and foreign venture funds prove that investing in large projects in new sectors, accompanied by a high risk, is not common for venture business. Investors are much more likely to invest in industries which are demonstrating a dynamic growth today. Thus, venture investors in Russia are mostly willing to invest in software engineering, e-commerce, new services, advertising and marketing, as well as new transport and logistics technologies [12]. Thus, the issue of searching for promising technologies by venture investors to invest funds remains to be one of the most acute. One of the tools to tackle the problem is the system of technology brokering in the region.

Thus, this research study of St. Petersburg innovation system allows marking out the key areas for improving the efficiency of the system. They include enhancing the quality of innovation policies, making interaction between the actors of innovation activities more intense, improving the efficiency of investments made into innovation resources, developing the innovation infrastructure and overcoming the existing disproportions. The key areas are substantiated for strategic development of St. Petersburg regional innovation system based on the implementation of a regional innovation foresight project. The project uses the principles of general innovation management and is implemented by a consortium of universities, whose objective is not only to define the technologies which drive regional development, but also to determine to what extent the community of the city is ready to accept and introduce these technologies.

References

1. Decree of the Government of St. Petersburg No. 355 of May 13, 2014 "On the Strategy for Economic and Social Development of St. Petersburg for the period until 2030".

2. Decree of the Government of St. Petersburg No. 835 of 28.06.2011 "On the Comprehensive Program" Science. Industry. Innovations "in St. Petersburg for 2012-2015".

3. Decree of the Government of St. Petersburg No. 495 dated June 23, 2014 "On the State Program of St. Petersburg" Development of Industry, Innovation and the Agro-Industrial Complex in St. Petersburg "for 2015-2020."

4. Decree of the Government of St. Petersburg No. 496 of June 23, 2014 "On the state program of St. Petersburg" Economic development and knowledge economy in St. Petersburg "for 2015-2020."

5. Balashov A.I., Rogova E.M., Rudskaya I.A. (2015) Forming a regional innovation system in St. Petersburg. The economic revival of Russia. No. 1 (43). pp. 96-114.

6. Zhilyaeva I.A., Rodionov D.G. (2016) Forecasts and plans for the development of the consumer market for mass consumption services in St. Petersburg until 2020. Economics and Entrepreneurship. No. 9 (74). pp. 192-200.

7. Rating of innovation regions for monitoring and management purposes in 2015 (version 2.0). [Online], http://www.i-regions.org/files/file_103.pdf.

8. Rudskaya I.A. (2015) On the issue of solving the problem of innovative development of the region (by the example of St. Petersburg), In the collection: Engineering Innovations and the Economy of Industry, the proceedings of a scientific and practical conference with international participation. pp. 81-90.

9. Rudskaya I.A., (2015) Analysis of the competitive advantages of innovative projects in St. Petersburg as part of the innovation system, Economics and Entrepreneurship. No. 8-2 (61-2). pp. 289-297.

10. Federal Service of State Statistics. [Online], www.gks.ru/free_doc/new_site/business/invest/inv16.xls.

11. Office of the Federal Service for State Statistics for St. Petersburg and the Leningrad region. [Online], http://petrostat.gks.ru/wps/wcm/connect/rosstat_ts/petrostat/resources/ba7526804a659f2885bfed758571d025/SBOR14.pdf.

12. Internet resource Rusbase. [Online], https://rb.ru/deals/, access database 11.06.2017.

13. ATKearney Global Cities 2016. [Online], https://www.atkearney.com/documents/10192/8178456/Global+Cities+2016.pdf/.
14. Innovation Cities Index 2015: Global. [Online], http://www.innovation-cities.com/innovation-cities-index-2015-global/9609.

15. Innovation Cities ™ Index 2016-2017: Global. [Online], http://www.innovation-cities.com/innovation-cities-index-2016-2017-global/9774.

CSR in the Logistics Sector and Its Analyses

Ing. Simona Činčalová
University of Pardubice, Faculty of economics and administration, Czech Republic
simona.cincalova@student.upce.cz

Abstract

This paper deals with one of the topical issues of each company, corporate social responsibility. CSR is a voluntary concept beyond the statutory obligations of an enterprise that encompasses the economic, social and environmental spheres and fulfills the goals of stakeholders. The history of CSR dates back to the early 1950s and it consist of three pillars – economic, social and environmental. As in any industry, it is important in the logistics sector of CSR. Logistics is analyzed using PESTLE analysis and Porter's five competitive forces model. Finally, the trends in CSR are defined.

Keywords: CSR, logistics, analysis

Introduction

At present, Corporate Social Responsibility (CSR) is becoming a topic that is increasingly being discussed. The public and the competitors are more aware of how the business behaves towards consumers, the social and the environment, the employees and the social needs of society. Successful companies are no longer enough to focus on making profits. Also, the popularity of social responsibility is growing in the Czech Republic, and the number of organizations involved in this concept is increasing. There are competitions of companies where social responsibility is the main measure, looking at how the enterprise is perceived by the public.

According to Jirásek (2007), "be good" is a sought after characteristic of a business - to be a good supplier, to be a good employer, to be a good neighbor, etc. It turned out that it may not be the biggest companies at all to take a significant place on this scale. Social responsibility not only does not stand against economic success but, on the contrary, belongs to it and acts as a motivating and reinforcing factor.

Corporate Social Responsibility

The notion of "Corporate Social Responsibility" (CSR), although discussed over half a century ago, currently has no globally valid and consistent global definition. According to Kašparová and Kunz (2013) this may be due to the fact that CSR is based on volunteering, it does not have strict boundaries, thus giving scope both for a broad discussion and for a very wide understanding and interpretation of this complex concept by individual interest groups. Mura (2011) even takes the view that if there is a certain unified and universally accepted consensus in understanding the concept of CSR, this is because the term CSR has different meanings for different stakeholders.

Trnková (2004) states that an interested party (group, individual) is any person or organization that has direct or indirect influence, whether positive or negative, to the functioning of the company or, on the contrary, the company influences it. Stakeholder analysis is a very important part of

strategic management in this time (Slabá and Fiala, 2014). These are the following groups of stakeholders (Mádlová, 2010; Trnková, 2004; Dědina and Malý, 2005):

- customers,
- employees,
- suppliers and business partners,
- owners and investors,
- managers,
- local community.

These groups always vary by organization. However, depending on the type, it is possible to estimate what their interest is and what they are trying to do. Customers can be expected to be interested in the quality of the product or service, the reasonable price of the product and after-sales service. Employees assess working conditions in the organization, reasonable wages and non-financial benefits, reconciliation of work and personal life. Owners and investors are interested in the profit, growth and prosperity of the organization. Business partners expect quality contracts and negotiations as well as timely performance of commitments. The local community assesses the impact of the company's business on the environment, and the goal of managers is above all to harmonize the legitimate interests of each of these major groups. (Steiner, 2008)

History of CSR

The history of CSR dates back to the early 1950s. The roots of this concept can be found in the United States, when Howard Bowen first used the term CSR in its Social Responsibility of Businessman (1953) to demand social management considerations.

In the 1970s, the United Nations took the first debates and formed the foundations for CSR content. The concept gained importance in the 1990s, when the European Union became interested in it. In 1996, CSR Europe, the most important European headquarters dedicated to CSR, was established. Its aim is to provide a Europe-wide promotion of CSR, to provide education and advice in this area.

Another milestone was the Lisbon Summit in 2000, where top EU officials agreed that CSR development across Europe needs to be strategically promoted and promoted.

One of the most important documents in the area of social responsibility is the so-called Green Paper issued in 2001 by the European Commission. The Green Paper contains the basic principles, tools and approaches to CSR, as well as the first official definition of CSR from the European Union, which is based on three pillars of socially responsible behavior. The Kunz Green Paper (2012) unleashed a wide-ranging debate amongst representatives of companies, non-profit organizations and the general public. It points out that CSR is not only a matter for large firms, but must also become an integral part of small and medium-sized enterprises (SMEs), because they also depend on the competitiveness of the future Europe. There is important finding from most studies focused on the link between firm growth and size that smaller firms grow faster than their larger counterparts (Fiala and Hedija, 2015).

In the following years, two important organizations - Multistakeholder Forum (2002) and European Alliance for CSR (2006) - have been formed that bring together European businesses to help develop CSR (exchange of experience, monitoring existing CSR tools, creating new jobs, etc.).

As part of the Economic 2020 Strategy, the European Commission issued a Communication on a renewed EU CSR strategy for 2011-2014. (Tetreva, 2017; Kunz, 2012)

Three pillars of CSR

According to some authors (Kunz, 2012; Zu, 2009; Mullerat and Brennan, 2011; Henriques and Richardson, 2004), CSR is built on three basic pillars (so called triple-bottom-line):

- economic (profit),
- social (people),
- environmental (planets).



Fig. 1: Three pillars of CSR. Source: Kunz (2012)

Within the economic sphere (see Table 1), attention is paid to the main goals - continued profitability, which subsequently enables the company to finance CSR activities such as management and control of the organization, the fight against information and corruption, money laundering. Furthermore, organizations focus on fulfilling commitments, payment morals, consumer protection and data, compliance with contracts, transparency, credibility, establishing ethical codes, including marketing and advertising ethics, and respecting the rules of fair competition. The social sphere includes the development of human capital, the reconciliation of the personal and working life of employees, as well as outplacement and health and safety at work. Environmental issues include, for example, eco-friendly production, ISO standards and waste management.

Tab. 1: Examples of CSR activities within individual pillars

Pillar	Examples
Economic Area	Ethics and Avoiding Corruption
	Way of corporate governance
	Credibility and transparency
	Relationships with customers and suppliers
	Behavior towards owners, shareholders
	Respecting the protection of intellectual property
	Innovation and sustainability
	Respecting the rules of fair competition
Social area	Creating the conditions for employees to reconcile their personal and working life
	Development of human capital
	Outplacement
	Employee policy
	Respecting equal opportunities
	Occupational health and safety
	Open and friendly business climate
Environmental area	Reducing negative environmental impacts
	Environmentally friendly production, products and services
	Environmental Management (ISO Standards)
	Investing in green technologies
	Waste management
	Creating conditions to minimize traffic load
	Protecting natural resources, reducing energy and water consumption

Source: own processing according to Kunz, 2012

Analysis of the logistics sector

According to Štůsek (2007), logistics is a common concept, which is understood as the doctrine of solution of supply and security problems in various branches of social life. In fact, it is a solution to all circulatory processes, regardless of the form of organization. The concept of logistics is closely linked to the supply chain. Logistics greatly influences and facilitates the creation of values between companies, in the form of electronic information and physical goods.

Tomek and Vávrová (2007) states that this term was used and applied originallyin the military, but since the 1960s it has become a very popular slogan, which has many meanings in it. The goal of logistics is to optimize material flow and thus logistics performance based on individual technical components, logistics services and logistics costs. Logistics management itself includes three dimensions:

- functions - buying, production, sales and associated activities,
- institutions - building a network of entities inside and outside the business organization,
- information processing - planning, management, implementation, control.

Logistics companies must strictly stick to "time is money" because they need it quickly and efficiently process a large amount of information to deliver the right goods to the right place at the right time. Key success factors are economy, fast response and flexibility.

To analyze the logistics industry, the author chose PESTLE analysis and Porter's model. Macro-environment analyzes focus on assessing the effects of the environment. PEST analysis is called by the initial letters of influence: political (political), economic (economic), social (social), and technological (technological). Johnson et al. (2006) suggests that variations such as PESTE, PESTEL, SLEPT, SLEPTE, STEEP or STEP are created by rearranging the letters and adding other (ecological, legislative) influences. The logistics industry, as well as all sectors, is affected by the factors (see Table 2) that cannot be affected.

Tab. 2: PESTLE Analysis for the Logistics Sector

Factors	Specific examples in logistics
Political	Current political situation Position and stability of the government Support for foreign trade
Economic	Trend of GDP, Unemployment, Inflation The amount of money in circulation The emergence of new companies Trend of international trade
Social and cultural	Level of education People's lifestyle - eating habits, attitudes to work and leisure, to ecology
Technological	Transport and Information Infrastructure needed to develop logistics Speed of fleet obsolescence Government support for research New discoveries, results in R & D
Legislative	Legislation, Tax Policy Antitrust laws Environmental policy of the state State regulation
Environmental	Waste Management Access to environmental protection

Source: own processing

Of great importance for the development of the strategy is the analysis of the company itself. Needed to realize the position it occupies in the business environment. Michael Porter identified five forces that decide on their own long-term attractiveness of the market or market segment: competitors in the industry, potential new entrants, substitutes, customers and suppliers. (Kotler, 2007)

The goal of the model is to understand the forces that work in the business environment and to identify what is of the greatest importance for the company and which can be influenced by strategic decisions. For an enterprise that wants to achieve success, it is necessary to recognize these forces, to cope with them, to respond to them and, if possible, to change their actions for their own benefit. Specific examples that businesses encounter in the logistics sector are illustrated in Figure 2. Industry's current competitors are the most powerful in the model. There is a large

number of logistics companies and it is difficult for them to increase their market share. Often they conclude contract contracts for a short time, also because they offer similar services and compete mainly with the price. Potential newcomers have easy access to distribution channels, and as there is more and more opportunities and no high starting capital, there are almost no entry barriers to the industry.

Negotiating power of suppliers depends on fuel prices, politics, taxes, land prices and others. Entrance prices have a large share of how profitable the business is. The negotiating power of buyers is related to the number of current competitors in the industry - there is a large selection of them, customers can easily compare the prices of the services provided and in some cases vertical integration with the manufacturers. Availability of substitutes is high (eg rail, air), but does it depend on the nature of the goods transported (bricks or frozen debris?).

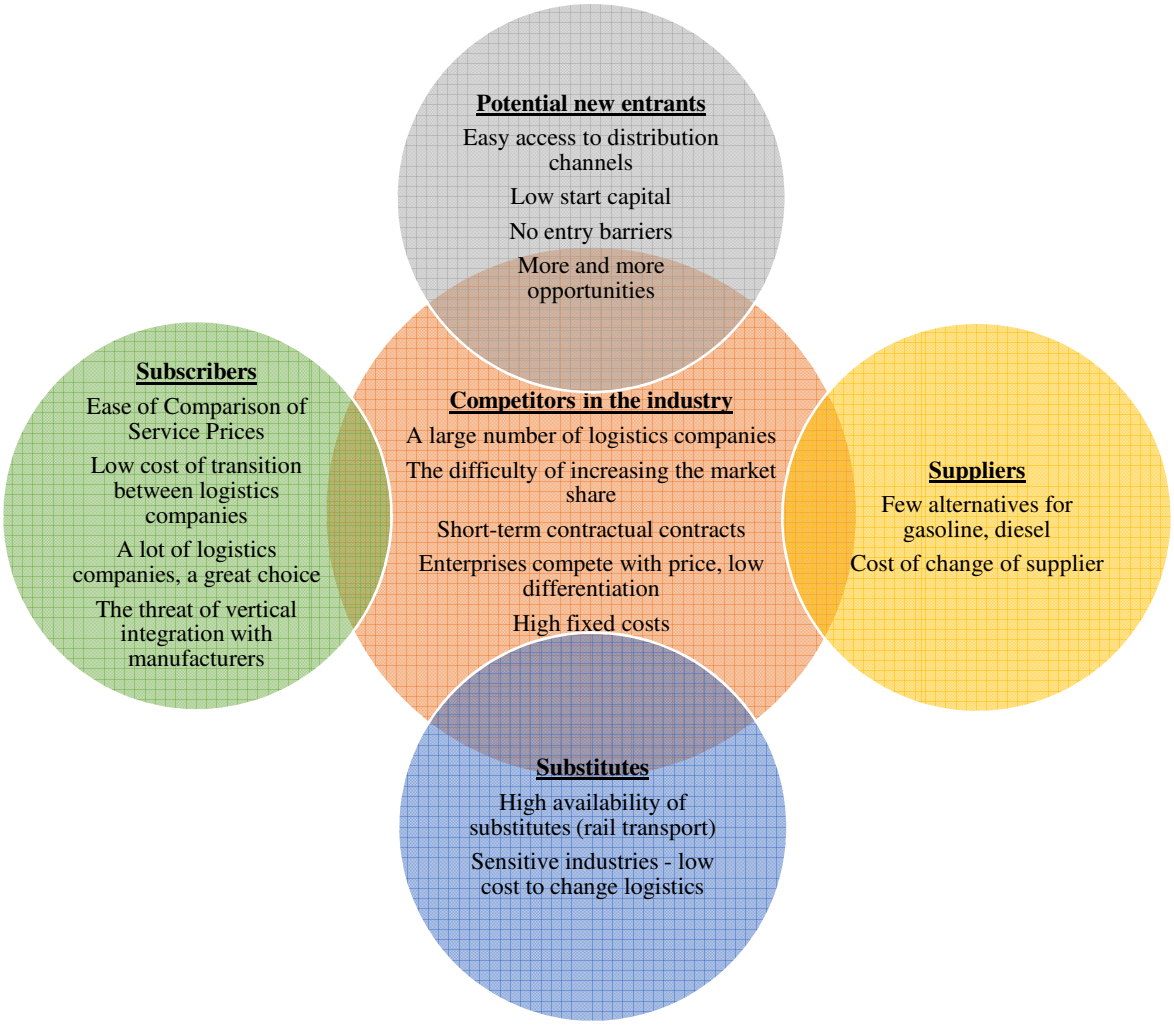


Fig. 2: Porter model for the logistics industry. Source: own processing

Conclusions

Corporate Social Responsibility (CSR) is among the appreciated features of an advanced society. The balance between profit and social responsibility becomes a strong link between business leadership and employees. And if the business wants to succeed in competitive struggle, it will gradually be forced to reconcile its economic interests with social and environmental issues, because it can only maintain its profitability in the long term and become competitive.

The long-term financial success of businesses is increasingly linked to corporate social responsibility and reporting. In the future, we can assume:

- the rapid development of modern technologies, which are increasingly demanding transparency (disclosure increases not only due to regulations, but also to better access to information and greater public interest);
- building consumer confidence through CSR activities,
- involving businesses in global challenges (education, environmental protection, health)
- employee involvement in decision making as they are the working capital of each enterprise.

Further research by the author will continue with a more detailed breakdown of CSR in the logistics sector and comparing the CSR activities of individual logistics businesses.

Acknowledgment

This contribution was made with the support of SGS_2017_022.

References

DĚDINA, J., MALÝ, M. Moderní organizační architektura. Praha: Alfa Publishing, 2005. 176 s. ISBN 80-86851-11-7.

FIALA, R., HEDIJA, V. (2015). Gibrat's law and empirical studies. In M. Čulík (Ed.), *10th International Scientific Conference Financial management of Firms and Financial Institutions Conference Proceedings.* Ostrava: VŠB - Technical University of Ostrava, 254–262. ISBN 978-80-248-3865-6.

HENRIQUES, A., RICHARDSON, J. *The triple bottom line, does it all add up?: assessing the sustainability of business and CSR*. Sterling, VA: Earthscan, 2004. ISBN 1-84407-015-8.

JIRÁSEK, J. *Benchmarking a konkurenční zpravodajství: souměření pro soupeření*. Praha: Profess Consulting, 2007. ISBN 978-80-7259-051-3.

KAŠPAROVÁ, K., KUNZ, V. Moderní přístupy ke společenské odpovědnosti firem a CSR reportování. Praha: Grada, 2013. Management (Grada). ISBN 978-80-247-4480-3.

KOTLER, P., LEE, N. *Corporate social responsibility: doing the most good for your company and your cause*. Hoboken, N.J.: Wiley, 2005. ISBN 0-471-47611-0.

KUNZ, V. *Společenská odpovědnost firem*. Praha: Grada, 2012. Expert (Grada). ISBN 978-80-247-3983-0.

MÁDLOVÁ, L. Společenská odpovědnost firem: etické podnikání a sociální odpovědnost v praxi. 1. vyd. OPS, 2010, 189 s. ISBN 978-80-87269-12-1.

MULLERAT, R., BRENNAN, D. *Corporate social responsibility: the corporate governance of the 21st century*. 2nd ed. Frederick, MD: Sold and distributed in North, Central and South America by Aspen Publishers, 2011. ISBN 978-90-411-3252-9.

SLABÁ, M., FIALA, R. (2014). Application of Power-interest Matrix and Influence-attitude Matrix in Stakeholder Mapping of Universities. In M. Špalková and Matějová, L. (Eds.), *Proceedings of the 18th International Conference Current Trends in Public Sector Research*. Brno: Masaryk University, 318–326. ISBN 978-80-210-6611-3.

STEINEROVÁ, M. a kol. Společenská odpovědnost firem: Průvodce nejen pro malé a střední podniky [online]. Praha: Business Leaders Forum, 2008, 27 s. [cit. 2017-06-06]. Dostupné z: http://www.csr-online.cz/wpcontent/uploads/2012/11/BLF_Pruvodce_CSR.pdf

ŠTŮSEK, Jaromír. *Řízení provozu v logistických řetězcích*. V Praze: C.H. Beck, 2007. C.H. Beck pro praxi. ISBN 978-80-7179-534-6.

TETŘEVOVÁ, L. *Společenská odpovědnost firem společensky citlivých odvětví*. Praha: Grada Publishing, 2017. Expert (Grada). ISBN 978-80-271-0285-3.

TOMEK, G., VÁVROVÁ, V. *Řízení výroby a nákupu*. Praha: Grada, 2007. Expert (Grada). ISBN 978-80-247-1479-0.

TRNKOVÁ, J. Společenská odpovědnost firem. Business Leaders Forum, 2004.

ZU, Liangrong. *Corporate social responsibility, corporate restructuring and firm's performance: empirical evidence from Chinese enterprises*. Berlin: Springer, 2009. ISBN 9783540708957.

Crisis Management in Retail Sector. Cases of Russian Retail Chains

Veronika Panyukova, Associate Professor, Department of Management, Financial University under the Government of the Russian Federation, Moscow, Russian Federation, email: vpanukova@ya.ru

Abstract

Research in the field of crisis management in the retail sector is an interdisciplinary endeavour at the intersection of crisis management, marketing, logistics and finance. The current study is aimed at identifying an optimal set of anti-crisis measures allowing retailers to weather crisis and develop sustainably in difficult market conditions. Presently, chains are increasing their share of retail market in Russia. It is forecasted that they will account for 30% of total retail turnover by 2018. The paper provides analysis of anti-crisis measures carried out by Russian retail chains in 2014-2017. In crisis conditions all leading Russian retailers implemented organic growth and multi-format development strategies, and at the same time developed long-term partnership programs with manufacturers, financial institutions, etc. Such partnerships are instrumental in decreasing operational risks and overcoming downturn. The study outlines the types of synergies which retailers can achieve by concluding long-term partnerships with players from other sectors. Operational, financial, investment, communication and innovation synergies are being discussed. Synergies in supply chain are considered using the example of private labels programs. The paper also analyses vertical integration strategy aimed at securing reliable procurement of products. The current research project provides for subsequent efforts to assess how implementation of partnership programs influences retailers' effectiveness and performance in crisis environment.

Keywords: Crisis management, retail chain, strategic partnership

Introduction

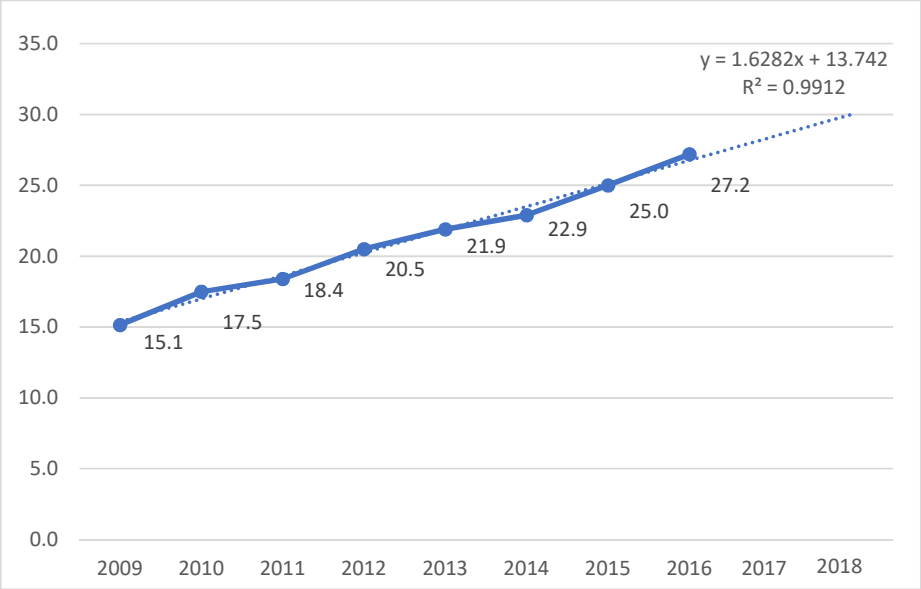
Presently, retail sector executives and scholars are showing an increasing interest in development and implementation of anti-crisis programs.

During the last three years, Russian retailers have faced a number of major challenges:
- Fall in real disposable incomes and lower purchasing power of consumers (according to the Federal State Statistics Service of the Russian Federation, real disposable incomes were down by 0.7% year-on-year in 2014, 3.2% in 2015, and 5.9% in 2016);
- Decrease of working capital due to tightening of domestic fiscal policy and restricted access to international capital markets (Antipin P.A., 2015);
- Growing legislative pressure, such as amendments to the Federal Law Nr. 381-FZ "On Trade" regulating relations with suppliers;
- Disruption of procurement chains due to embargo on imports of certain products from a number of countries and government import replacement policy (Panyukova V.V., 2015).

The objects of the current study are leading Russian retail chains. Among domestic retailers they were the first to develop and implement anti-crisis policies.
By constructing a linear trend function based on the 2009-2016 data (reliability of approximation being 0.9912), it can be concluded that the share of chains in Russian total retail trade turnover will reach 30% by 2018 (fig. 1).

It is asserted that there is a steady growth of the chains' share in Russia's total retail trade turnover. The market power of leading federal retail chains is constantly growing as well.

This study seeks to identify optimal anti-crisis measures which could be instrumental for retailers as well as to assess effectiveness of retailers' partnership programs in challenging market conditions.



Source: based on Rosstat data for 2009 – 2016

Fig. 1. The share of chains in Russian total retail trade turnover, 2009-2018

The current research comes up with the following hypotheses:

1. Strategic partnership programs with manufacturers, financial institutions etc. are a powerful tool which retail chains can use to prevent and overcome crisis developments.
2. Strategic partnership programs within the retail sector are aimed at bringing operational, financial, communication and innovation synergies.

Literature review

Russian and foreign academic literature thoroughly analyses current trends in retail trade. Development and specific problems of retail chains are being addressed in the first place.

Foreign scholars discuss anti-crisis policies in retail trade based on evidence from certain regions or chains. For example, an interesting analysis of how crisis management influenced corporate reputation of Maxima retail chain, the largest in Latvia and Lithuania, was carried out in 2014. A conclusion was made that the organizations regardless of their type and size should pay significant attention to setting up crisis management systems, as well as obtain at least basic knowledge in this field as crisis significantly affects corporate reputation (Miglė Šontaitė-Petkevičienė, 2014).

Human resources management is one of the crucial elements of crisis management in retail chains. Foreign researches underline that in crisis conditions it is necessary to implement a time management policy as well as to form a special anti-crisis team with clear responsibilities defined for each of its members (Pelin Vardarlıer, 2016).

It is also pointed out that managing relations with suppliers and adapting supply chain play decisive role in development of anti-crisis programs (Stavros T. Ponis, Athanasia Ntalla, 2016). Choosing the right communication strategy has a noticeable influence on successful realization of anti-crisis programs as well.

Russian retail chains attempted to overcome the effects of the 2014-2015 crisis by realizing the following strategies: the strategy of growth, the strategy of achieving cost leadership, the strategy of developing multichannel sales, and the strategy of building customer equity (Bakharev V.V., 2016).

Our research shows that the problem of development and implementation of anti-crisis strategies by Russian retailers has not been comprehensively analysed. Moreover, strategic partnership programs and fields of their implementation have not been assessed in the framework of retailers' anti-crisis policies.
For this research, we assume that a strategic partnership "is a long-term partnership in the field of business and projects that have a strategic importance, which is formed by a limited number of participants and set up in practically any legal form" (Zobov A.M., 2012).

Research design and methodology

Russian (Ilkevich S.V., Shlapak V.S., 2014) and foreign (Dominic Elliott, Kim Harris, Steve Baron, 2005) scholars argue for using integrated, cross-disciplinary approach for drafting a long-term and sustainable business development strategy. We believe that within the services sector such strategy should include marketing activities, anti-crisis measures and supply chain management. The current paper is based on this approach.

The case study method was used in this research with an aim to identify crucial elements of Russian federal retail chains' anti-crisis programs and these programs' specific aspects. Case studies were conducted based on data available on official websites of the retailers (X5 Retail Group, Magnit, and Dixy Group), as well as information obtained from sector reports published by consulting companies and via monitoring of Russian and foreign media sources.

Results

X5 Retail Group, Magnit and Dixy Group are the largest players on the Russian FMCG retail market in terms of revenues and number of stores. An overview of these companies' operations and financials is presented in the table 1.

Table 1: Russian largest FMCG retailers in 2016

	X5 Retail Group	Magnit	Dixy Group
Market share	7,4%	8%	2,4%
Number of stores	9187	14059	2802
Retail space, thousand square meters	4301	5 068	952,5
Retail revenues, RUR billion	1025,6	1069,3	309,1
LFL change	7,7%	0,26%	4,4 %
LFL average check, %.	5%	0,9%	3,5%
Deloitte Global rank	71	61	198

**Source: compiled by the author based on data available at companies' official websites*

Russia's largest retailers reacted to crisis conditions (after the year 2014) in a different way compared to regional and local retail chains. Smaller retailers had to concentrate on survival and resisting downturn. At the same time, the leading players focused on development, achieving long-term competitive advantages and adjusted their anti-crisis strategies in these directions.

Table 2 presents main features of largest retailers' anti-crisis policies.

In response to the crisis, the three leading Russian retailers have chosen the organic growth strategy, which allowed achieving competitive advantages thanks to the economies of scale. Economically

viable opportunities for large-scale mergers and acquisitions in the sector did not emerge. According to Russian investment bank Aton, all the companies mentioned will demonstrate growth of retail space in 2017. It is expected that X5 Retail Group will expand its retail space by 21%, Magnit – by 15%, and Dixy Group – by 6%.

Table 2: Main features of largest Russian retailers' anti-crisis policies

	X5 Retail Group	Magnit	Dixy Group
Organic growth strategy	Aggressive organic growth strategy. Regional expansion.	Development of existing business model. Regional expansion and boosting retail space.	Plans regional expansion and boosting retail space. Closing down unprofitable stores.
Multi-format development strategy	Pyaterochka discounters, Perekrestok convenience stores and supermarkets, Karusel hypermarkets	Magnit convenience stores and hypermarkets, Magnit Family, Magnit Cosmetics, Magnit Wholesale (pilot project), Magnit pharmacy (pilot project).	Dixy convenience stores, Victoria supermarkets, CASH cash-and-carry store, Megamart and Minimart hypermarkets.
Private label management policies	Increasing the share of private label products to 20% of turnover at Pyaterochka.	Cutting down the number of private labels, optimising the range of goods. Increasing the share of private labels to 20% of turnover	In 2017, it is planned to increase the share of private label products in total turnover from 15,5% to 25%. Development of new private labels under umbrella brands.
Vertical integration	Abandoning the vertical integration strategy. Development of strategic partnerships.	In 2016, agreed to build an industrial park in the Krasnodar region. In 2017, acquired a Lipetsk region-based vegetables producer.	Integrating procurement of wholesaler Megapolis and retailer Dixy Group.

Source: compiled by the author based on data available at open sources

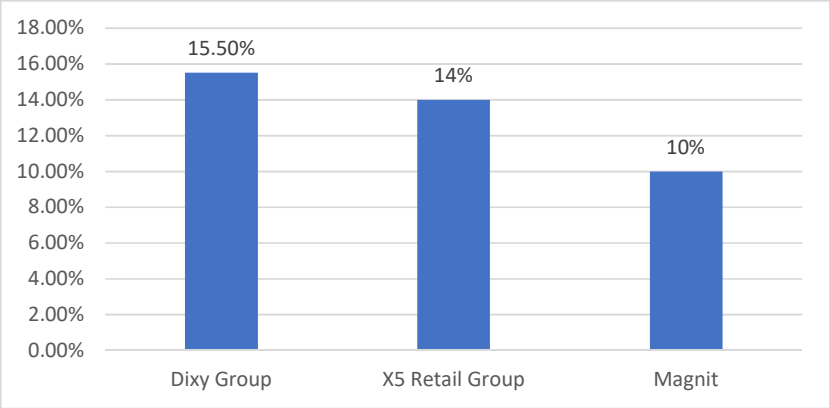
In environment characterized by changing state regulations and general economic difficulties, all the above mentioned retail chains revised approaches to procurement and terms of relations with suppliers. Entering into direct contracts with suppliers is now prioritized. For example, X5 Retail Group signed in 950 new suppliers in 2016.

In 2015-2016, as part of its anti-crisis strategy Dixy Group reconsidered its supplier lists and dropped a number of well-known brands. In an effort to optimize its range of products the company moved from shelves products with low turnover. However, such anti-crisis policy proved to be ineffective and disrupted operations. It should be underlined that Russian discounters and convenience stores traditionally carry a wider and deeper range of goods than foreign counterparts.

Synergy in the field of procurement can be achieved by developing and selling private label products. Private label programs play an increasingly important role in anti-crisis programs of the leading retail chains (information on share of private label products in leading retailers' total turnover is presented in fig. 2).

Due to falling purchasing power and changing terms of relations with suppliers, the share of private label products will have a tendency to increase. At the same time, it is necessary to carry out

continuing monitoring of demand for private label products and optimize the product range. Our analysis shows that Russian retail chains face a number of problems when realizing anti-crisis private label strategies: disbalance of private label offerings in specific product categories; inadequate pricing policy; lack of feedback from consumers; absence of quality control systems.



Source: compiled by the author on the basis of companies' official data

Fig. 2. Share of private label products in leading retailers' total turnover in 2016

In this connection, retail chains' managers should concentrate on the following main elements of private label development and promotion: distribution strength, pricing, communications system (Carmen Abril, Belén Rodriguez-Cánovas, 2016). Stability of relation between producers and retailers cooperating on private label products is usually higher compared to traditional supply agreements.

One of the approaches to achieving financial and investment synergy could be private-public partnerships. For example, the Russian Prime Minister, the Governor of the Krasnodar region and the General Director of Magnit signed a trilateral agreement in 2016. According to the agreement, the retailer will invest RUR 9 billion in developing an industrial park on a 146-hectare land plot located in the region. In the framework of the project, Magnit will build 14 production facilities, including a confectionary plant, a bakery, a tea and coffee packaging plant, an ice-cream plant, etc. In total, the company plans to build 40 new food production plants during the next 10 years.Such a business model allows the retailer to control and optimize its supply chain.

Synergy in the purchasing field can be also achieved by carrying out joint promotion activities. For example, in September 2016 Magnit organized in Volgograd a purchasing seminar for local suppliers, during which the retailer presented itself and its terms of cooperation, and at the same time provided a platform for local companies to promote their own products.

Synergy in operating activity can be achieved by implementing a vertical integration strategy. Cooperation between retailer Dixy Group and wholesaler Megapolis, which developed a joint project to deliver consumer products to non-chain stores, can be a good example. The synergy is expected to arise from merging procurement, logistics and distributions platforms of the two companies.

In its turn, marketing synergy can be attained by launching co-branding initiatives, such as offering joint banking products (debit and credit cards, etc.). One of the examples is a partnership between X5 Retail Group's Pyaterochka chain and Pochta Bank. Another example is presented by Dixy Group and Qiwi Bank which launched a joint project promoting usage of the bank's interest-free instalment plan cards Sovest in the retailer's stores.

Synergy in the communications field is achieved by implementing both multi-format development strategy and multi-channel marketing and sales. Agreeing with Chaplygin Yu.V., we consider multi-

channel marketing and sales as one of the options to achieve sales channels synergy and communications synergy (Chaplygin Yu.V., 2015).

In unstable market conditions, Magnit is implementing the diversification strategy introducing additional store formats. In 2017, the company launched pilot stores in two new formats – pharmacy and wholesale (Magnit-Opt).
This kind of synergy can be achieved both by the chain's autonomous development and by participation in partnership programs.

Marketing synergy can be attained by forming partnerships between retail chains and other service establishments. Such partnerships increase traffic, number of purchases, average check, and sales in general, which leads to financial and investment synergies. In 2017, X5 Retail Group announced a trilateral partnership agreement with private equity fund Acmero Capital and investment company Marathon Group to develop retail and services centres at transportation hubs (Passenger Service Centres). Each centre will include a Pyaterochka discounter, a pharmacy operated by Marathon Group, a food court operated by Acmero Capital, a ticket office, a parcel automat, an ABM, a payments terminal, etc.

Another example of marketing synergy could be a shop-in-shop arrangement. By 2021, The Central Union of Consumer Cooperatives of Russia plans to open on sublease conditions 5000 shops-in-shops to sell farmers' produce in X5 Retail Group's Pyaterochka stores. In addition, during the next two years the parties could open around 1000 stores under a joint brand, COOP-Pyaterochka. Besides marketing synergies, such cooperation will decrease risks connected to agricultural products deliveries and allow optimizing the supply chain.

Earlier, in 2015, Dixy Group signed a termless partnership agreement with Pharmacy Chain 36,6 giving the latter a priority right to open shop-in-shop pharmacies in Dixy stores.

The strategy of achieving innovation synergy via forming partnerships can be assessed using the example of cooperation program, which was agreed upon by X5 Retail Group and Internet Initiatives Development Fund accelerator in 2017. The Fund will be responsible for organizational and financial issues while X5 Retail Group will provide informational support, advice and a platform for approbation of the best innovation projects within the retail and services field. However, achieving innovation synergies in the retail sector requires size and market power, and could face obstacles such as low employee qualification.

Also in 2017, Dixy Group launched an accelerator for retail sector start-ups offering investments of up to RUR 1 million for projects, which promise to breakeven in less than half a year. The company is ready to consider projects aimed at improving effectiveness of sales process and customer service, as well as initiatives in the field of logistics optimization and new product delivery channels.

Innovation projects developed in the framework of partnership can be aimed at:
- introducing innovations into production processes (for private label products and at retailers' own production facilities, such as farms, etc.);
- procurement and supply chain optimization;
- improving customer service and increasing sales conversion;
- modernizing distribution centres, automating technological processes (for example, cooperation between retail chains and logistic operators);
- developing up-to-date business models for managing retail chains;
- optimizing retailers' business processes.

Conclusion

Partnership programs play an increasingly important role in retailers' crisis management systems. Such programs are aimed at strengthening market position, and at the same time are performing communication and marketing functions.

Case studies testify that strategies of the three leading Russian retailers rely on multi-format and multichannel development, organic growth and expansion of private label offerings.

This approach helps to achieve closer contact with consumers, identify clients' needs, and develop customer-focused offerings, i.e. greatly contributes to positive consumer experience, which is of strategic importance for all retailers.

Anti-crisis partnership programs being presently implemented by Russian retailers are targeted at procurement, operational, financial, investment, and innovation synergies.

During the subsequent research, it is planned to carry out a questionnaire survey and in-depth interviews with retail chains' executives to assess effectiveness of anti-crisis programs. Financial accounts of public retail companies will be used to evaluate the results of anti-crisis measures. Additional studies will be required to analyse vertical integration as an element of anti-crisis strategies in the retail sector.

References

Antipin P.A. (2015) 'Mnogoformatnaya roznichnaya torgovlya: tendentsii razvitiya i strategicheskiye zadachi' [Multi - format retail trade: development trends and strategic tasks], *Rossiyskoye predprinimatelstvo [Russian Journal of Entrepreneurship]*, Volume 16 -11, 1689 – 1698.

Bakharev V.V. (2016) 'Antikrizisnyye strategii roznichnoy torgovli' [Retail anti-crisis strategies], *Nauka Krasnoyaria [Krasnoyarsk science]*, Volume 5(28), 97 – 110.

Carmen Abril and Belén Rodriguez-Cánovas, 'Marketing mix effects on private labels brand equity', *European Journal of Management and Business Economics*, Volume 25, Issue 3, 168-175.

Chaplygin Yu.V. (2015) 'Faktornyy analiz reklamnykh kampaniy multikanalnoy roznichnoy seti' [The factor analysis of advertising campaigns of a multichannel retail chain], *Ekonomicheskiy analiz: teoriya i praktika [Economic Analysis: theory and practice]*, Volume 5 (404), 15-30.

Ilkevich S.V. and Shlapak V.S. (2014), 'Mezhdistsiplinarnyy podkhod k antikrizisnomu upravleniyu: posledniye tendentsii v zarubezhnykh issledovaniyakh' [The interdisciplinary approach to crisis management: recent trends in international studies], *Servis plus [Service Plus]*, Volume 1, 51-65

Investment group ATON. Investment strategy. 31.01.2017,
http://data.investfunds.ru/comments/stocks/file/2017-01/ATON_Strategy_310117_70605.pdf

Dominic Elliott, Kim Harris and Steve Baron (2005) 'Crisis management and services marketing', *Journal of Services Marketing*, Vol. 19 Issue: 5, 336-345

Federal State Statistics Service, Russian Federation,
http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/en/main/

Global Powers of Retailing 2017. The art and science of customers, https://www.r-trends.ru/netcat_files/526/459/gx_cip_2017_global_powers_of_retailing_deloitte.pdf

Miglė Šontaitė-Petkevičienė (2014) 'Crisis Management to Avoid Damage for Corporate Reputation: The Case of Retail Chain Crisis in the Baltic Countries', Procedia, *Social and Behavioral Sciences*, Volume 156, 452-457

Panyukova V.V. (2015) 'Otsenka osnovnykh pokazateley razvitiya torgovli. Itogi 2014 goda' [Assessment of the main performance indices of trade The results in 2014], *Torgovo-ekonomicheskiy zhurnal [Russian Journal of Retail Management],* 2(1), 2015, 7 - 18.

Pelin Vardarlıer (2016) 'Strategic Approach to Human Resources Management During Crisis', *Procedia*, *Social and Behavioral Sciences*, Volume 235, 463-47.

Stavros T. Ponis and Athanasia Ntalla (2016), 'Crisis Management Practices and Approaches: Insights from Major Supply Chain Crises', *Procedia Economics and Finance*, Volume 39, 668-673.

Zobov A.M. (2012) 'Strategicheskiye aliansy v marketingovykh strategiyakh rossiyskikh kompaniy' [Strategic alliances in the marketing strategies of the Russian companies], *Marketing,* Volume 1 (122), 48 – 53.

Improving Liquidity by Supply Chain Finance – Implementing Tools

Axel Ulrich Wiesener, Bucharest University of Economic Studies, Bucharest, Romania,
axel.wiesener@web.de
Tobias Stiegler, Bucharest University of Economic Studies, Bucharest, Romania,
tobias.stiegler@gmx.net
Marc Sommer, Bucharest University of Economic Studies, Bucharest, Romania,
M.Sommer@outlook.com

Abstract

The entrepreneurial environment has been changing for years. The quality, cost and time requirements for companies have constantly increased and are still subject to the pressure, to adapt to the fast-paced and modified market demands. Shortened product life cycles as well as increased pressure for innovation due to increased and globally occurring competition are causing financial difficulties for suppliers Metze (2010). Through this described pressure for innovation, manufacturers and first-time suppliers, often referred to as the OEM (Original Equipment Manufacturer) in the automotive industry, and their suppliers, also called tier 1 and 2 suppliers, are moving closer together to optimize research, development and other costs, while improving adaptability to market needs in order to identify competitive advantages - www.vda.de (2016). As a solution, to reduce the financial difficulties, often companies install Supply Chain Finance as a tool to save their liquidity and restructure their financial structure. They install individual trade financing procedures and get more and more independend from their bank partner. This work is based primarily on expert opinions, which mostly come from press reports. It presents the positive effects that can arise, both for suppliers as well as for recipients of goods, with the optimization of supply chain finance by means of selected instruments and their mode of action or the optimization of the financial flow within the chain.

Keywords: Supply Chain Finance, Working Capital, Liquidity,

1 Introduction

To be able to cope with this challenge, companies see themselves compelled to adapt their financial flows to their value creation and to optimize their transactions in line with their needs - Huch / Fache (2015). This is where the Supply Chain Finance approach developed in North America and in Europe is taking place. The market volume which is to be used alone in France, the United Kingdom, and Germany, is about 470 billion euros, with Germany having the largest market potential of about 230 billion euros - Huch / Fache (2015). The global market for supply chain finance is subject to steady growth, whose market volume has increased in the past two years from 30 to about 40 percent. This can be attributed, among other things, to the very distinctive and capital-intensive automotive industry in Germany. The focus of this paper will be on how the various options will enable a better utilization of working capital. Furthermore, the work formulates that further positive effects, e.g. increased liquidity outside of traditional credit lines, are released and which leads to a stabilisation effect of the suppliers – Klüwer (2016).

2 Basics of Supply Chain Management and Its Content and Thematic Delineation

2.1 Definitions of the supply chain

In the literature, there are numerous interpretations and representation of the term supply chain. The Supply Chain (German supply chain) is a chain of successively connected suppliers that work

together within the value chain and work together in a coordinated manner until the final acceptance - Kortus-Schultes and Ferfer (2005).

> "The supply chain ... of a company consists of several departments, which can include purchasing and customer service. In this way, activities in a supply chain are associated with the organization of storage (material), the storage process itself, the supply and delivery of materials to the distribution of final products to end users - Kortus-Schultes, Ferfer (2005)."

Lukatsch formulates the concept supply chain as follows: It goes beyond the already mentioned interaction of a company and its suppliers and supplements these by the interaction with the customer, as so-called demand chain - Lukatsch (2010). The supply chain can be viewed as a link or integrated enterprise-wide organization in the value-added process, for the coordination of the entire value-added chain. The application fields of the supply chain generate the primary value added of a company and therefore represent a significant component in a company, regardless of location, size or industry.

2.2 Definitions of Supply Chain Management

The concept of supply chain management is not also clearly defined – Fettke (2007). However, the following consensus can be derived. Supply chain management emphasizes both the goal of increasing customer satisfaction as well as the cross-company perspective, which not only looks at its own company, but rather takes the entire value-added supply chain into focus. The coordination of the individual actors is decisive for a successful supply chain management. In addition, the goods, information and financial flows must also be taken into consideration - Metze (2010). Kümmer, Grün und Jammernegg interpreted this process as follows:

- "Strategic, collaboration-oriented and cross-company management concept
- The planning and control of the majority of the activities is demand-oriented (pull principle)
- It uses inter-organizational coordination mechanisms with the aim of integrating all value-added processes - Kummer / Grün / Jammernegg (2006).

2.3 Financial Supply Chain Management

In the case of working capital management, the management of financial resources in relation to transactions in procurement and sales is of paramount importance and this role is played by the so-called financial supply chain. In the Financial Supply Chain Management, two processes can be distinguished, the Trade Enablement and Trade Settlement. In trade enablement, the process steps of qualification, financing and pricing are focused on the business initiation between two partners in order to generate a successful completion. In the case of trade settlement however, the corresponding sub-processes such as invoicing, examination, complaint and payment, are taken into account – Lukatsch (2010). The financial supply chain management serves as an umbrella term for financial considerations within the supply chain. It enables the optimization of information and cash flow within the company and beyond. It leads to better use of working capital and helps to reduce the financing costs - www.jnm.com (2016.).

2.4 Supply Chain Finance

The term supply chain finance is not yet clearly defined - Huch / Fache (2015). The financial supply chain management is considered as a superordinate term of supply chain finance but supply chain finance is a sub-item, see Figure 1 - Metz (2010).

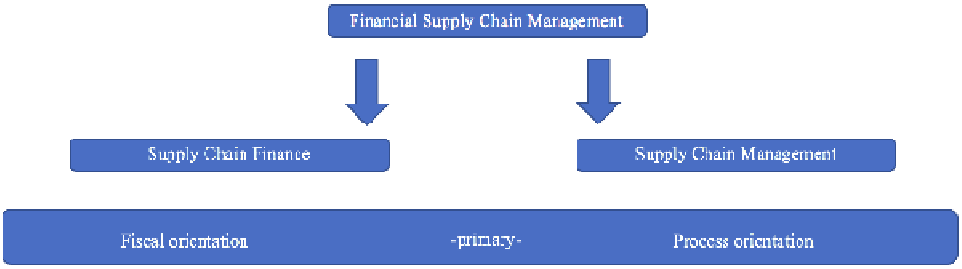


Figure 1: Structure of the supply chain finance (own graphic) .

Huch and Fache have defined the Supply Chain Finance (SCF) with respect to other notions as follows.

> "One way to fundamentally explain the concept of supply chain finance lies in the understanding that the SCF can be seen as a complement to the classical supply chain management (SCM). While the SCM is characterised by the optimization of logistical processes, supply chain finance focuses on the financial aspect of the supply chain and its optimization. At the core of the SCF is thus the question of which actor (e.g. supplier) in the supply chain finances what (e.g. stocks) and how (e.g. factoring) - Huch / Fache (2015)."

Even financial service providers are using the concept of supply chain finance to market different products in different versions - Huch / Fache (2015). The goal of supply chain finance is clearly to optimise working capital (net current assets) in order to increase profitability and ensure liquidity in the long run - Neuthinger (2016). The situation is different with suppliers and customers, on one hand, successful companies with enormous cash reserves achieve virtually no interest or even punitive interest rates in the current low interest rate environment while on the other hand, suppliers with structural liquidity fluctuations and high financing costs often act abstruse - N.N. I (2016.). The flow of payments and deliveries that occur within the value chain is often characterized by a strong divergence of the respective maturities. The supplier, standing at the beginning of the chain, makes his goods available and in return only refers after a previously agreed time (payment target) His consideration, the money for the goods or services. The supplier standing at the beginning of the chain makes his goods available and in return receives his reward, the money for the goods or services, only after a previously agreed time (payment goal). In the meantime, the recipient can in turn act on the market with the goods/services obtained. There often exists long payment terms between companies and in many cases even up to more than 60 days. Within this period, the producer's liquidity is created on one hand with a current negative interest rate of -0.318% in the short term (current money market interest rate – 3 months Euribor) - www.kurse.banking.co.at from (28.11.2016), on the other hand, the necessary funds for interim financing of the supplier are financed from 4% to over 10% p.a. via credit lines (overdraft loans) - N.N. I (2016). Managing payment targets and stocks has always been of great importance in working capital management. If the required liquidity is lacking, the entire supply chain comes to a halt or even to a standstill - Henke / Schulte (2016.).

The supply chain finance intervenes in order to ensure the liquidity of all actors during the entire process. Purchasing companies are interested in optimizing their liquidity, minimizing their financing costs, so as to benefit from optimal purchasing conditions in addition to the sold product. Long

payment targets and the associated high pre-financing costs are generally known to suppliers as a fundamental problem. With rebates and discounts, suppliers try to fight against them, but this usually has just a one-time effect - Henke / Schulte (2016). The approach of supply chain finance takes into account the interests of all players within the supply chain and creates a win-win situation for all parties involved - N.N.II (2016). The supply chain finance approach is owed to the entrepreneurial orientation of capital flows across the entire supply chain and synchronizes the physical and monetary transactions along the supply and value chain. Cooperative action between financial intermediaries (banks, factoring and similar financial service providers), suppliers and manufacturers, significantly reduces financing costs - Huch / Fache (2015). The various ways in which supply chain finance can be realized are presented in the following chapter; selected financing instruments and their effects.

3 Instruments for Optimizing Working Capital in Supply Chain Finance

3.1 Reverse Factoring

The supply chain finance concept is based on factoring or the reverse factoring approach, which is the reason why it is important to understand the basic system - Henke / Schulte (2016.). Reverse factoring is a special type of factoring. In classic factoring, a supplier sells his trade receivables to his end customer at a factor which in turn triggers a direct payment and in principle immediately becomes liquid. There is only a contractual relationship between a factor and its customer - Moonen I (2015). Figure 2 shows the interaction of the sequences. In the case of a so-called silent factoring, the end customer is not informed that the claim made to him is sold to a third party -Moonen II (2015).

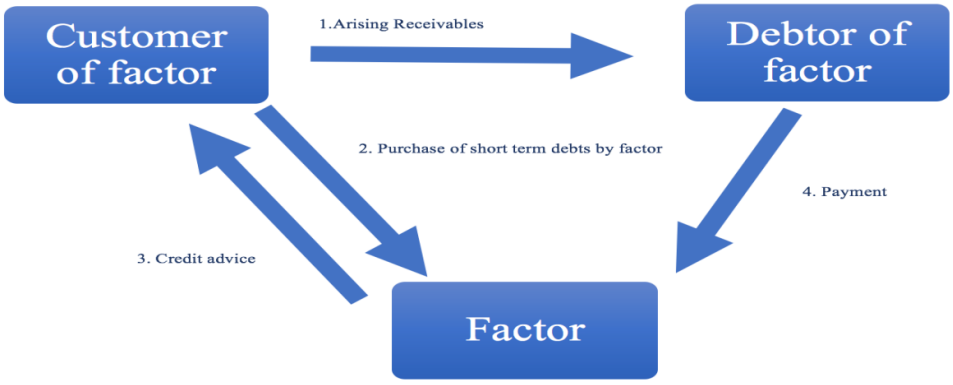


Figure 2: The factoring triangle (own graphic).

In return, Reverse Factoring is not aimed at the end customer but at the manufacturer's supplier. It is not considered the demand for the respective end customers, but rather the only concern is the sustainable connection between supplier and manufacturer. As can be seen in Figure 3, a joint framework contract is concluded with all three contracting parties. The supplier, the manufacturer (customer) and the factor are thus aware of the configuration and are aware of this. Reverse Factoring is also referred to as supplier or purchasing financing by the reverse function – Schaaf (2016.). In the case of reverse factoring, the bank assumes a form of interim financing of the supplier's claim. Thus the supplier receives his money directly within the agreed discount period and the buyer (manufacturer) has to pay only at the original maturity –Huch / Fache (2015).

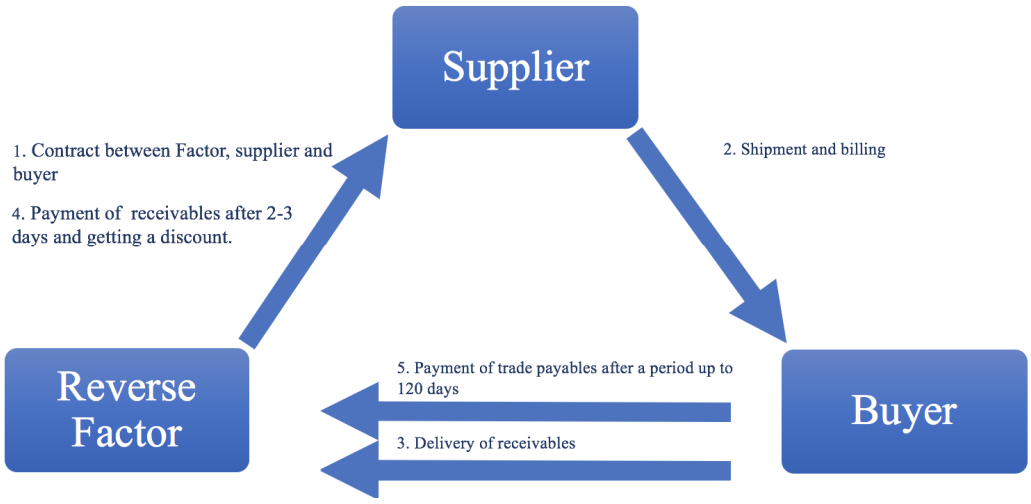


Figure 3: The Three Contracting Party Triangle for Reverse Factoring (own graphic)

The reverse factoring process consists of five stages. In the first stage, a basic contract is concluded between the three contracting parties, in which the most important components such as delivery and payment conditions are regulated. Then the delivery between the supplier and the manufacturer (customer) takes place. Third, after receipt and inspection of the goods, the delivery is released by the manufacturer and transferred to the factor by the supplier. In the fourth stage, the factor assigns the amount to the supplier within the discount directly after the request has been paid. After expiry of the previously agreed regular payment period, the manufacturer assigns the open amount to the factor. Reverse factoring programs are often directly used by original equipment manufacturers (OEMs) to facilitate customer retention and capital procurement for smaller suppliers - Henke / Schulte (2016). Factoring in all its facets, however, also has disadvantages or legal peculiarities to contend with. In the case of factoring transactions, the disadvantage of the industry-standard extended property is usually reserved - Klüwer, (2016). The extended retention of title refers not only to the delivered item, but also to the product in which the item was received. Thus, a possible resale of the product or the downfall of the item is also excluded in a new one - www.welt-der-bwl.de (2016.). For example, if raw materials or semi-finished products into a finished product, which has already been sold to a third party, the supplier's right of recourse (in the case of the factor) expires on the final product due to the good faith of the third party.

3.2 Finetrading or Reverse Factoring

Finetrading represents a further development of the reverse factoring. As a decisive difference, the lack of receivables is to be mentioned, unlike factoring. Here the Finetrader buys the goods directly from the supplier after the establishment of an intermediray trading company. In the end, the seller then supplies the goods directly to the client and not to the intermediary trading company. The established intermediary trading company acts only as a link between suppliers and manufacturers and does not influence the actual transformation process – Klüwer (2016.). The aforementioned problem of extended reservation of property may not be caused by the sale of the real merchandise which the Finetrader does. The Revers-Factoringpartner i.e. the intermediary company, can thus agree with the buyer on individual payment targets of up to 120 days - www.stenn.com (2016.). Figure 4 shows the detailed procedure of the process.

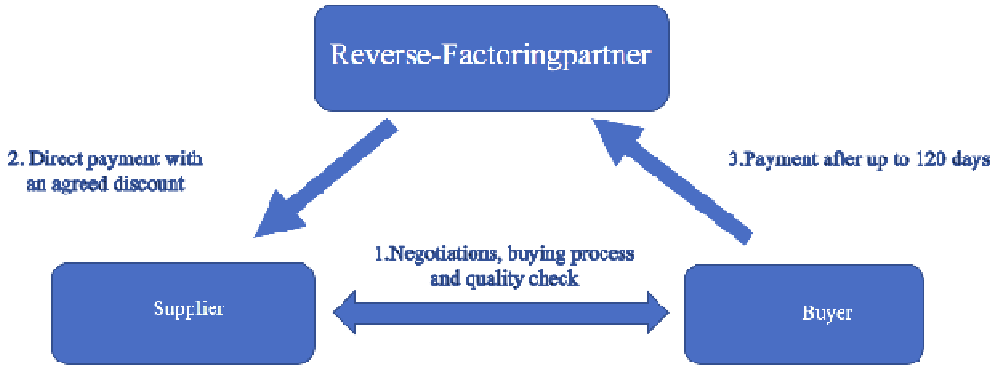


Figure 4: Reverse factoring procedure (own graphic).

Similar to reverse factoring, the Finetrading must have at least three parties with corresponding contractual relations and they must agree on the process as well as the corresponding conditions. This also necessitates a basic contract between all actors similar to that reverse factoring. The first step involves the negotiation between the customer and the supplier. Subsequently, the order as well as quality inspection and delivery are done out directly to the customer. However, the billing document about the delivery is not transferred directly to the client but rather to the Finetrader who appears to be the new owner after direct payment. Finally, the Finetrader invoices the same amount plus fees.

The 100% financing rate and the resulting flexibility with regard to the handling of the deliveries are often advantageous to different factoring forms. Another advantage of this is that elimination, which often occurs in factoring, crystallizes out in terms of sector and financing quotas - www.stenn.com (2016). Lastly, it should be noted that the collateralisation of volume in Finetrading is easier and more risk-free than factoring. Whilst finetrading is to be viewed as a classic commodity loan, factoring is used exclusively as collateral. The risk of bad debts has been passed on to the Factorer or its insurer.

Syndicated loans - www.bayernlb.de (2016) usually require a debt assignment to the financing banks. However, once such a factoring program has been issued, the factoring programs are usually no longer possible or only very limited and are possible with a high level of coordination with the bank holding the assignment - Klüwer (2016). Installing a Finetrading can also be useful if the supplier of the goods already uses classical factoring for liquidity reasons. The conflict of interest resulting from the already existing assignment of a claim assignment is circumvented by the concrete purchase of the Finetraders - Klüwer (2016.)

3.3 Working capital optimization through credit card financing

As one of the oldest forms of financing, the classic B2B credit card business can be included in the various supply chain finance options. Again, as in the previous cases, liquidity is quickly generated or a deferred payment is guaranteed. Similarly, as with the aforementioned possibilities, the user of the credit card generates classic credit. Again, there is a triangle relationship between the supplier, the recipient of the goods, as a classic borrower and the financer. The latter assigns his money to the supplier within a few days, while the buyer of the goods receives a longer payment target from his financer. In this way, intermediary-purchase financing also takes place in the credit card business which is both advantageous to the supplier and the buyer of the goods. One example is the classical Hamburger forwarding agency. This has annual toll fees of 350 T €, which of course severely limits the urgently needed liquidity. By using credit card financing, the forwarding agency is more flexible and can make the respective payments more flexible by deferred payments. Various kickback actions,

in the form of points and bonuses allows the company to refinance the fees incurred - Hülsbömer (2015). American Express for example, allows deferred of payments of up to 58 days. Depending on the sector, the type and extent of use of this form of financing may also result in a non-underestimated additional credit volume whose balance does not have a negative effect - www.business.americanexpress.com (2016)

3.4 CRX-Markets

The CRX markets are conceptually part of the FinTech approaches.

> "The term FinTech is composed of Financial Services and Technology and relates to technologies, financial services or their provision. This in addition to payment services includes technologies for the systematic analysis of large amounts of data (big data)." - www.wirtschaftslexikon.gabler.de (2016)

Even before supply chain finance, the introduction of digitisation has not stopped. In the USA, technology-based markets have already established themselves for the optimization of working capital - N.N. I (2016). In Germany, the conventional factoring have serious competition in the form of the CRX markets. The innovative instrument makes supplier financing more flexible than with the classic models, which leads to some advantages for the actors - N.N. I (2016). In principle, companies can use the digital supplier financing through market-based premature payments of invoices against additional rebates or discounts - N.N. II (2016). The market place creates a win-win situation for the successful transaction, both for the supplier and for the customer. As already discussed, there are currently hardly any lucrative investment opportunities for short-term surplus liquidity. The marketplace allows the stakeholders to enter into joint exchange in the sense of a bidding process after successful IT connection. The example in Figure 5 is intended to illustrate the procedure of the bidding process.

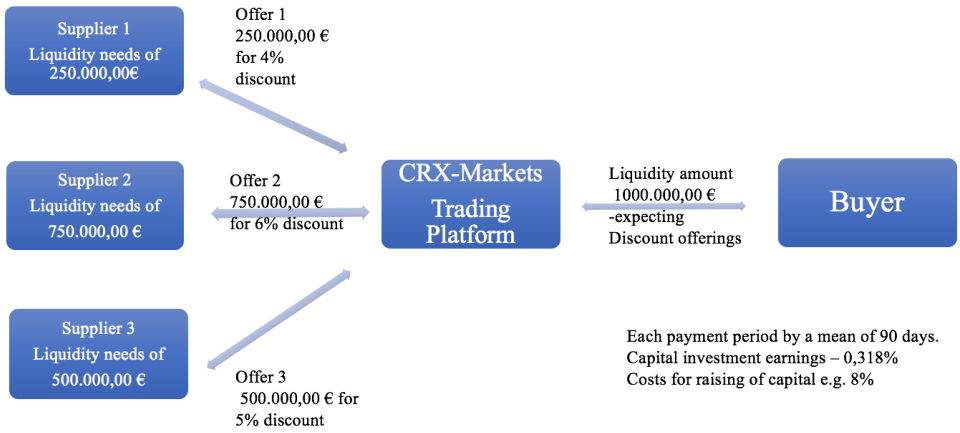


Figure 5: Functional example of a CRX market (own graphic).

The originally agreed payment terms between all stakeholders remain unchanged and the goods and services go as usual directly from the supplier to the customer. The purchasing company defines once a week how much free liquidity it can provide for the early payment of its suppliers. Each supplier gets a list of open items and can thus individually determine its worth for premature payments. The individual suppliers thus submit bids in the form of discounts to get their invoices prematurely paid by the customer. Since the different bids and the available liquidity are limited, it results in a market - N.N. II, (2016). In the above example, the available 1,000,000 euros would be distributed to Supplier II for an additional 6% discount to 750,000 euros and Supplier III would get prematurely paid for an additional discount of 5% to a pro rata amount 250,000. The prerequisite is that the individual invoice

items make this allocation possible. Vendor I, who only offered an additional discount of 4% for the invoice payment shown would not be awarded. The example demonstrates that the parties involved are subject to a win-win situation due to the bidding process. The suppliers reduce their credit costs, as all discounts granted are less than 8% of the capital intake costs no additional credits have to be included in the invoice payment shown. The customer obtains revenue from the additional discounts granted by the suppliers instead of creating the free liquidity at current negative interest rates. The IT bidding market is currently being used and extensively tested by companies such as Lufthansa and Vattenfall in order to optimize their working capital. In the event of insolvency, the stakeholders are not worse off than without the trading platform, since the platform has a non-committal payment promise by the debtor which can be transferred. This does not result in any additional risk for the participants - N.N. II (2016). The financing of the platform is generated by the brokerage fees incurred for transactions. At the moment, the system is still in its early stages because communication with suppliers is predetermined and everyone needs to implement the tool or the IT interface. The circle of users is still manageable, but is expected to grow in the future. Disadvantages of the new technology lie in the high cost of it interfaces and the long start-up times - N.N. II (2016).

4 Analysis of financial instruments and their impact

4.1 Balance sheet and financing effect of modern supply chain finance products

Liquidity and its exchange play the central role in supply chain finance. The ability to meet his claims at an early stage enables the vendor to compensate for his own rebate concessions by pulling cash discounts to his suppliers within the supply chain. For this purpose, an example account is created for the effectivity calculation.

- An invoice over 100,000 euros
- Payment term 90 days
- 3% cash discount for payment within 10 days

A credit of 8% would otherwise be required for the use of the cash account. A borrowing for the 80 days is worthwhile because the supplier's loan has a higher interest rate. If the supplier like in example 3.4 is lower, the effect will be even greater.

Cash discount-effectiveness calculation

1. Determenation of cash disc.amount	2. Determination of interest rate
z = Invoice amount-discount	p = (z * 100 * 360) / (K * t)
z = 100.000 EUR - 3.000 EUR	p = (3.000 *100 * 360) / (97.000 * 80 Days)
z = 97.000 EUR	p = 13,92 %

This is possible for the supplier in supply chain finance through the additional liquidity, even without additional bank financing in the case of a CRX market solution. Furthermore, all the instruments presented have the effect of debt reduction and thus the reduction of the balance sheet, provided that the new liquidity is used to reduce existing bank debt or supplier liabilities - Wöhe / Bilstein / Ernst / Häcker (2009.).

In the example of reverse factoring, receivables are taken from the balance sheet since the non-regressed purchase of receivables is a "true sale".. Due to the reduction in the balance sheet, the equity ratio is significantly increased, as shown in Example 7.

Balance sheet without factoring

A	Supplier balance sheet for... in Euro 1,000		P
Div. Assets	4.000	Equity capital	500
Recieveables from L&L	1.800	Miscellaneous liabilities	3.500
Bank	200	Liabilities	2.000
Sum	6.000	Sum	6.000

In the example, 90% of the receivables are purchased. The following balance sheet effect results from the purchase, coupled with the assumption that debts are settled in the form of liabilities with the additional liquidity.:

With a 90% sale of the receivables from 1.8 million euros, 180,000 euros still remains in the balance sheet (remaining 10%) afterthe sales -with the new liquid assets worth EUR 1.62 million, the liabilities of EUR 2 million were reduced to 380,000. The equity ratio thus improved from originally 8.3% to 14.16% (equity ratio).

Actual effect of the balance sheet redcution based on debt reduction

A	Supplier balance sheet for... in Euro 1,000		P
Div. Assets	4.000	Equity capital	500
Recieveables from L&L	180	Miscellaneous liabilities	3.500
Bank	200	Liabilities	380
Sum	4.380	Sum	4.380

Finetrading has a very similar balance sheet effect. The difference lies in the actual purchase of the goods by the intermediary company as a result of which no claim is made in the balance sheet (or only for a very short period due to the direct payment of the finetraders) of the supplier- The claim shall be payable in the accounts of the intermediary trading company. In the case of financing via CRX markets, the supplier balance sheets are also relieved by direct premature debt payments. All have one thing in common, the creation of additional liquidity or, in the case of the CRX market, through efficient use of the financial flows of suppliers and manufacturers, distribution of liquidity in favor of suppliers within the entire supply chain.

4.2 Win-win situation through professional supply chain finance

As the described instruments show, supply chain finance is essentially about creating a win-win situation in the process chain or at least optimizing working capital. For this purpose, the financial flows are being adjusted to supply flows or exchanged liquidity positions between the individual players. On average, buyers only pay their invoices after 30 to 90 days. The long-term payment targets lead to liquidity bottlenecks, especially for small and medium-sized enterprises (SMEs), and can have an effect on their existence. In most cases a low rating is accompanied by SMEs, which leads to poorer financing conditions - Henke / Schulte (2016). In addition, SMEs have a difficult access to capital markets, which highlights the importance of optimizing financial flows - Henke / Schulte (2016) Through targeted supply chain finance, the existing liquidity within the supply chains is released and thus provides an advantage over the value chain. The supplier benefits from the additional liquidity, the manufacturer from improved purchasing conditions and thus the material and payment flows can be approached in time - Henke / Schulte (2016). The coming together of the suppliers and the manufacturers creates, in addition to the financial competitive advantage, a closer

relationship with manufacturers, which strengthens the cooperation and reduces the risk of default on the part of the suppliers - Huch / Fache (2015). Final is aimed at reducing the total capital cost within the supply chain - Huch / Fache (2015).

5 Conclusion and Preview

The work discussed how supply chain finance is trying to present a win-win situation for the financial equipment of the entire supply chain. The fundamentals of the idea of trying to support the cost of capital throughout the cycle through both innovative new financing models, as well as the fair exchange of free liquidity reserves will benefit all stakeholders. In particular, the IT solutions and IT-based market platforms which are still in the early stages, still offer ample optimization and further savings potential. If, for example, the same approach is undertaken by competitors within an industry, the winner is the one whose supply chain finance has the best optimization. The old merchant's wisdom, "the profit is in purchasing" - Klopp (2016) also applies fully to the procurement of liquidity. Because of lower financing costs, sales prices can get reduced or higher profits with consistent selling prices generated.

Determining Project Management Practices for Enterprise Resource Planning System Projects

Tatjana Vasiljeva, RISEBA University, Riga, Latvia, Tatjana.Vasiljeva@riseba.lv
Elena Berezkina, RISEBA University, Riga, Latvia, Elena.Berezkina@riseba.lv

Abstract

The given research focuses on the study of enterprise resource planning (ERP) project management practice application in the context of choosing the most appropriate practice and improving an enterprise's business results. Organizations worldwide are dependent on ERP systems for their day-to-day operations, as this software allows enterprises to integrate a wide range of business processes throughout different functional areas to increase productivity, efficiency and their competitive advantage (Ramburn, Seymour and Gopaul, 2013). Grabot et al. (2008) outline the importance of ERP for any company and call it the 'backbone' of the information system.

Research methods applied: review of the literature; analysis of secondary data and primary data collected by interviews with industry experts. Through qualitative data and interviews with experts, project management (PM) practice was examined to determine the most relevant practice in ERP-related projects.

The findings of the empirical part include a list of five methodologies which are used or highly recommended for ERP projects; a classification of ERP projects types, which have different characteristics, work scope and duration; and a list of twenty factors important for PM practice determination. Recommendations from IT and ERP industry experts regarding the qualification of a project's internal and external factors are provided and an example of a matrix for PM practice determination is described.

The findings provide a basis for further studies in the PM field regarding the introduction of contemporary information technology and modern ERP to a business environment.

Keywords: project management, information technology, enterprise resource planning system

Introduction

ERP is a class of IT systems which has been developing rapidly since the beginning of the 1990s; Ray (2011) explains that 'enterprise' means any organization with a set of common goals. Hossein (2004) specifies that the system integrates and automates processes within the entire organization regardless of what kind of organization it is: a private company or a public or state organization. Successful implementation, support, maintenance and further development of ERP is vitally important for the existence of any organization. Elimination of problems related to the ERP system is essential for the secured functioning and development of the enterprise. The authors assume ERP projects have the same nature as any other software projects, acquiring the same signs of failure, success, risk and challenges. Ineffective project management techniques could be recognised as the intrinsic risk factors while accurate project management (PM) practice determination is definitely one of the key influencers of success. But the dilemma is how to improve the PM approach.

A wide range of literature sources recommend using Waterfall-based PM methodologies, which imply cascading, step-by-step realisation, a long planning period and delivering results at the end of the project. But the Waterfall-based approach should not be considered as the only valid methodology in a rapidly changing business environment as enterprises need to adopt and exploit flexible and dynamic methods and procedures of business process reengineering, bringing agility to ERP projects to ensure necessary changes in an acceptable timeframe.

Theoretical Basis of the Research

Hossein (2004) defines ERP as "an integrated computer-based system, which manages internal and external organizational resources". Ray (2011) offers a definition which is pretty much the same: "ERP is an integrated informational system built on a centralized database and having a common computing platform that helps in effective usage of an enterprise's resources and facilitates the flow of information between all business functions of the enterprise and external stakeholders". Both Ray (2011) and Hossein (2004) maintain that ERP-class software is not only about planning and that this term doesn't reflect the actual meaning and capabilities of the ERP system – the software helps run business functions throughout the whole organization.

Eckartz et al. (2009) recognizes three groups of ERP benefits: operational benefits, which include improved business processes, cost reduction, productivity and quality customer service improvement, and revenue increase; managerial benefits, which include improved decision-making and organizational performance; and strategic benefits, which include support of business growth, building business innovations, and cost leadership. Bradford (2015) added some other important advantages for organizations adopting ERP: data integration, real-time access to information, and standardization of business processes throughout the enterprise, including branches and subsidiaries. According to the Panorama consulting solutions report (2017), 17% of organizations would like to improve business performance by implementing ERP for better customer service (8%), preparing a company for growth (9%) and ensuring proper and timely reporting (14%).

Researchers mention the following project types:

- Initial implementation of an ERP system at an enterprise;
- Rollout, which is needed at large multinational companies for common business process support at branches and subsidiaries (Aloini et al., 2011);
- ERP upgrading (Munkelt and Volker, 2013; Bradford, 2015; Kalaimani, 2015) – regular ERP software version updates that could turn into a separate project as they may include not just technical but also functional updates. Ray (2011) named it a 'booming business' as the company regularly has to pay the vendor for software version updates that must be run by functional and technical consultants to ensure smooth day-to-day business activities;
- External maintenance and system support – to help users in the post-implementation stage for systematic monitoring of software performance and continuous improvements (Aloini et al., 2011, Ray, 2011) – is becoming a major source of revenue for vendors and consulting companies.

Large companies that have been using ERP for many years could still ask for constant enhancements, which are required due to fast-paced business development. ERP-related activities such as "data migration activity" and "consolidation and harmonization" might be considered as a separate project, but more often these tasks belong to the implementation project type. The concept "harmonization" could be data realized as "data harmonization" (Bradford, 2015) or harmonization of the ERP system with organizational business processes (Hurbean and Fotache, 2010) as well as harmonization of various software applications and data sources. If so, it can't be combined with consolidation projects as they have a different aim and include the opposite activities. Munkelt and Volker (2013)

acknowledge that implementation projects include different types of customization of ERP systems. They categorize sub-types of implementation project types, maintaining that there are codeless configurations, application development configurations and customized report configurations. If an organization has some specific business processes and there are some gaps in ERP software, it might be necessary to develop specific applications.

The authors completely agree with Hossein (2004), who pointed out the challenges of every ERP project: product complexity, which could require special consultancy; considerable time consumption; high implementation costs. The next common problem mentioned in many sources (Tarhini et al., 2015, Ray, 2011, Kimberling, 2012, etc.) which essentially impacts an ERP project is change resistance in the customer's organization. But there may also be other important aspects of ERP introduction: quality of business process design, establishing key performance indicators, measurement of performance, employee training, etc. Insufficient evaluation of these factors could lead the project to failure. According to Ray (2011), there have been several cases where implementation projects were not successful, but this seems to be an understatement. From many other sources, it is clear that ERP implementation is a real test for an organization. The International Project Management Association (2016) acknowledged such project failure criteria as going over the budget or deadline and lack of required quality delivered. Finishing the project within the budget is one of the main factors of success (Murray, 2009). For the success of every project, it is necessary to show the project's positive effect at the earliest stage, so the authors assume that splitting the project into smaller parts, which could be delivered to stakeholders as soon as they are implemented, might have a positive influence on the success of the whole project. Most ERP projects employ the old-school Waterfall-based project management approach that is recommended by a wide range of literature sources and vendors' methodologies (Ray, 2011, Capgemini, 2012, Harmon, 2016). This means that the company has to freeze its business processes for 17-25 months while the ERP project is executed, which is not possible in real life and could negatively impact business results, even dramatically deteriorate market shares and the satisfaction of customers. Responding to market demands, companies need to change their business processes regularly, and ERP projects have to be aligned to this strategy. The traditional Waterfall approach, with its long planning and realization cycles, can't be used as the only approach in such a sensitive area as business process automation. Companies should also employ new methodologies, which bring agility to ERP projects and support a flexible and dynamic attitude in strategy realization (Capgemini, 2012).

We completely accept the statement that in case an organization is changing the scope of business requirements during the lifecycle of the project, this could be the cause of ERP implementation project failure (Ray, 2011). Robson (2013) emphasizes that requirements identified at the gathering stage should be revised at the realization stage and the reason is usually the time difference between requirement elicitation, modelling and delivering. Users are unable to define their requirements precisely due to their lack of understanding of ERP system capability. Using a cascading, step-by-step ERP project execution framework inevitably leads to time and cost overrun, customer dissatisfaction, and lack of planned benefits. It is well outlined that organizations should have an effective PM approach to control all stages of realization (Al-Fawaz et al., 2008). Previous studies emphasize the role of PM among the critical success factors required for successful ERP implementation (Ramburn et al., 2013), stressing that poor PM is a main reason for ERP implementation failures.

Despite various previous studies in the ERP field, a clear procedure for PM practice determination related to ERP introduction at an enterprise has not yet been formulated. Many related questions appear when a company is facing the challenge of introducing new ERP or is trying to enhance the existing one: how to determine PM practice? What might be the consequences? How should they be treated? Which PM practice should be chosen considering the project's characteristics and conditions?

Research Design

In Figure 1, the conceptual model of the research is given.

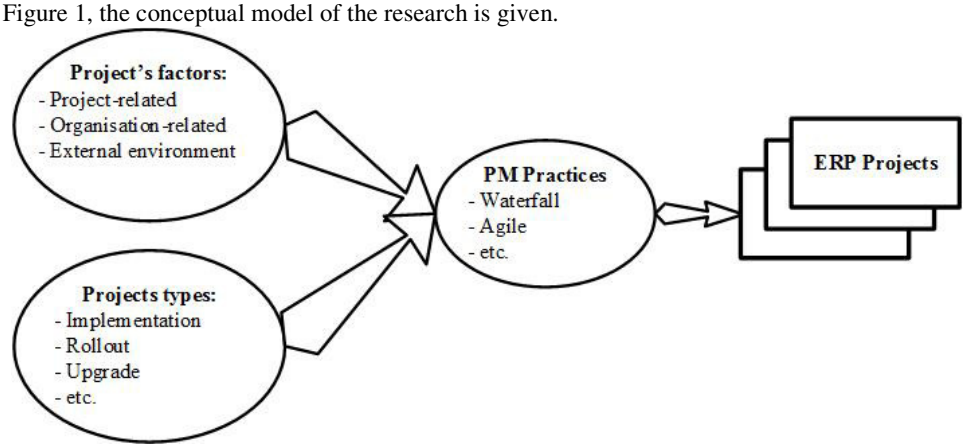


Figure 1: The conceptual model of the research: interaction of the dependent and independent variables for PM practice determination in an ERP project (created by the authors)

Three research questions (RQ) have been formulated.

RQ1: Which contemporary PM practices are applied for different types of ERP projects?
RQ2: What factors influence PM practice determination for different types of ERP projects?
RQ3: What ERP project types are performed on the ERP systems market?

This is an exploratory study; the empirical data were gathered in March-April 2017 during two series of interviews with experts in the project management and ERP system fields. Sixteen experts participated in the research; the respondents were considered as experts according to the following criteria:

- significant work experience in the field related to the research;
- a leading position and role at their companies;
- certification in the field of PM;
- experience in participating in international projects at leading international IT companies.

The research design is shown in Figure 2.

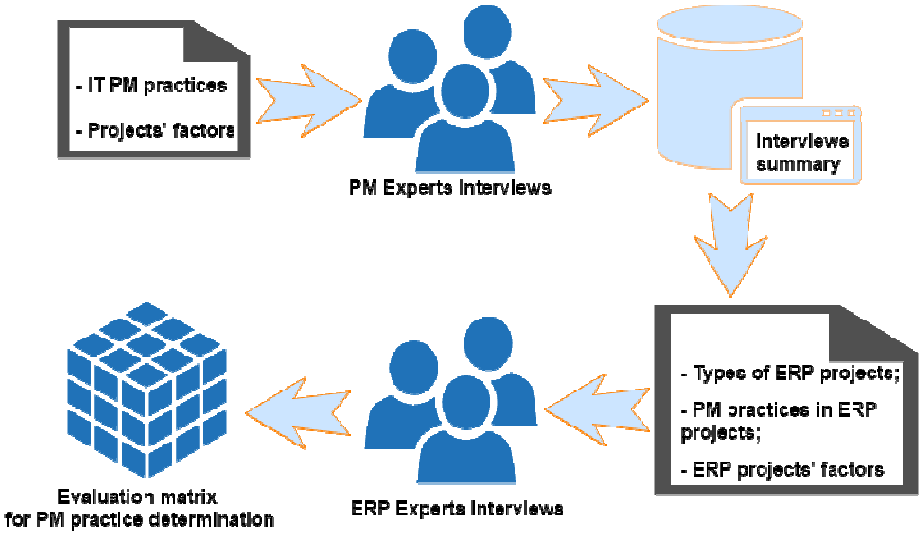


Figure 2: Research Design (created by the authors)

Two phases of research were conducted. In the first phase, the experts in the project management field were interviewed. The objective was to identify the main contemporary PM practices applied in IT projects and evaluate the factors influencing PM practice determination for IT projects. In the second phase, the experts in the ERP project field were interviewed. The objective was to identify ERP project types and factors influencing PM practice determination for application in ERP projects. All interviews were conducted directly by the authors in face-to-face meetings or Skype meetings. Semi-structured interviews with similar sets of basic questions for every set of respondents were accomplished, with some specific questions which were raised during every interview depending on experts' answers. The answers were documented in a specially designed template.

Research Results and Discussion

In this part, the authors state the main results of the empirical study, comparing it with theoretical literature sources for clarification as to what extent the results coincide with or differ from fundamental studies conducted by other authors.

RQ1: Which contemporary PM practices are applied for different types of ERP projects?

Cockburn (2005, 2007), Singhal (2013), Cobb (2016), Mills (2016), McLaughlin (2016), and Murray (2009) mention the main contemporary PM methodologies which companies use. They comprise the Agile project management philosophy and certain methods and methodologies in the Agile family, e.g. Scrum, Lean, Kanban, Extreme Programming XP, Crystal, the Dynamic Systems Development Method (DSDM), and Feature-Driven Development (FDD). The expert interviews conducted by the given research supplied the basis for defining a list of five methodologies which are highly recommended for use in ERP projects: Waterfall-based, Scrum, Kanban, Scaled Agile Framework (SAFe) / Enterprise Scrum, and a mixed Agile-Waterfall-based methodology. The experts defined two main PM approaches, Waterfall and Agile, emphasizing that the Waterfall concept is still in place in various cases. As a result, the empirical part of the research was devoted to the investigation of these two basic concepts.

Traditional PM practice is called Waterfall because of its cascade-like structure. In Waterfall methodologies, the project development process goes through several sequential phases from the

beginning till the end, and the customer can evaluate the work results at the very end of every phase, when it is already late to adopt changes. (Mills, 2016) Traditional plan-driven development according to Cobb (2016) is totally planned in advance, so there is a low level of uncertainty. Business users approve the well-defined requirements before the actual start of the project, the team meets the requirements within the schedule and budget, and any project scope changes are not welcome, making the project inflexible and very constant. Munkelt and Volker (2013) and Chow et al. (2016) maintain that project models for ERP system introduction resemble the traditional Waterfall approach to software development.

The main idea of the Agile ideology is the priority of high customer satisfaction, frequent software delivery for competitive advantage, and high motivation of the customer's representatives and developers who provide sustainable development of working software (Beck et al., 2001). Within Agile, practitioners outline the main Agile methodologies, also mentioned in fundamental literature: Scrum, Lean, Kanban, Extreme Programming XP, Crystal, DSDM, and FDD. All of them follow the same philosophy and practices, but "from an implementation standpoint, each methodology has its own recipe of practices, terminology, and tactics" (McLaughlin, 2016).

Most PM methodologies, frameworks and approaches described in the literature were also cited by the experts. They were encouraged to mention any number of relevant PM practices, and some experts were keen to give as wide a picture as possible. A list consisting of 17 methodologies, frameworks and approaches was obtained. The practitioners also mentioned that in some cases they employed their own, in-house-developed methodologies.

The most frequently used contemporary PM practices in software development projects in the international IT landscape according to the experts are given in Figure 3.

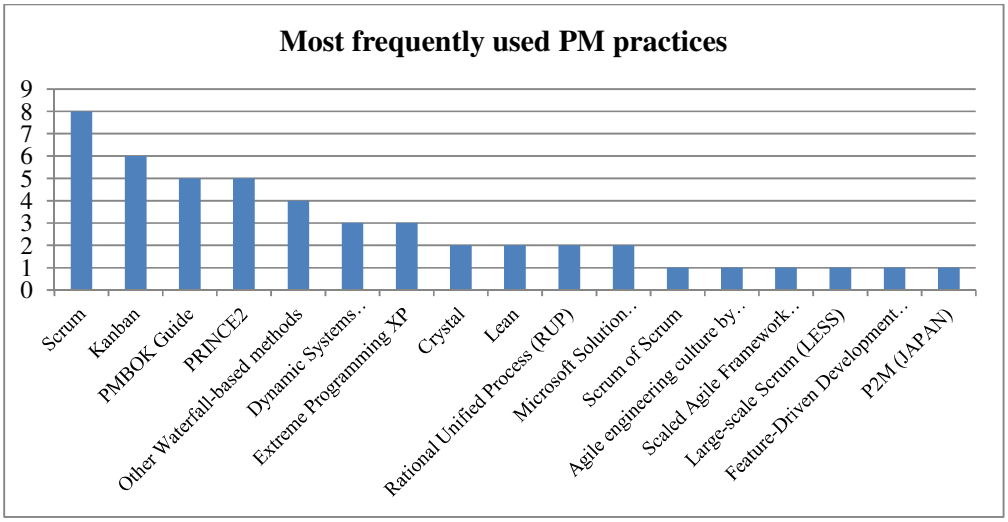


Figure 3: Most frequently used PM practices for IT projects (created by the authors)

RQ2: What factors influence PM practice determination for different types of ERP projects?

The project environment and various internal and external organizational factors have an impact on how projects are conducted. Major factors influencing the outcome of a project include the project's characteristics, environmental factors of the company and external factors (Murray, 2009). PMBOK

Guide, PRINCE2, and IPMA PEB have underlined environmental factors that may influence the project's performance and success.
All factors are categorized according to the following groups.

Project factor group:
- Stakeholders' level of engagement;
- Stakeholders' risk tolerances;
- Geographic distribution of facilities and resources, etc.

Organization factor group:
- Organizational culture (shared visions, mission, values, expectations);
- Organizational structure;
- Organizational governance, etc.

External factor group:
- Government or industry standards;
- Authorities' regulations;
- Quality standards.

Conducting the practical research, the authors found out which particular factors truly influence PM practice determination in an ERP project. The list of factors was offered to PM experts for discussion, evaluation and supplementation with other factors which are important for determining a methodology. The experts have extended the list with several factors related to the project, the customer's company and the external environment. The experts were asked to evaluate the factors on a scale of 1 to 10, where 1 = no influence on PM practice determination and 10 = significant influence. 0 means that this factor wasn't mentioned by the respondent at all. For the purpose of further research, it was decided to use only those factors which were evaluated with a score of 6 or more by at least three experts or evaluated with any score by the majority of experts. This theoretical statement was fully confirmed by the interviews' results, allowing the authors to compile a list of 20 factors influencing PM methodology determination in projects. These 20 factors were taken to the next step of the research for evaluation. The prioritized list of influential factors is given in Table 1.

Table 1: Factors influencing PM practice determination

Group of factors	Factor name	Average score
Project level	Level of project uncertainty	8.63
Organizational level	Flexible attitude to changes in tactics and priorities, readiness to adjust	8.00
Organizational level	Level of bureaucracy	7.88
Organizational level	Knowledge accessibility	7.75
Project level	Quality of definition of requirements	7.50
Project level	Team size	7.25
External environment	Market competition	7.25
Project level	Project planning perspective	7.13
Project level	Project risk level	7.13
Project level	Level of involvement of customer's team	6.75
Organizational level	Quality of the project's definition of objectives	6.38
Project level	Project stakeholders' geographical distribution	6.25
Organizational level	Stakeholders' risk tolerance	5.63
Organizational level	Resource availability / limitation	5.50

Group of factors	Factor name	Average score
Project level	Stakeholders' cultural differences	5.38
External environment	Government regulations	5.38
Organizational level	Alignment of project's objectives with company strategy	4.88
External environment	Product quality standards	4.75

For the clarity of the research, the expert's name and particular evaluation of every factor was excluded and only the average score of the factor was shown in Table 1. All factors in the list were arranged by average evaluation score. The factor "Level of project uncertainty" was evaluated with a score of 9 or 10 by the majority of the experts; the average score is 8.63. This means that most of the PM experts participating in the research recognized this factor as significant. The factor "Product quality standards" was evaluated with scores ranging from 1 to 9, and its average score is 4.75. This means that the importance of this factor for PM practice determination is not significant according to the experts.

RQ3: What ERP project types are performed on the ERP systems market?

The following types of ERP projects are mentioned in the literature: initial implementation, rollout, upgrading (software version updates), maintenance and support, and consolidation and harmonisation. This list is based on Ray (2011), Aloini, Dulmin, and Mininno (2011), Munkelt and Völker (2013), Vaman (2007), Bradford (2015), and Hurbean and Fotache (2010). But there was no clear, structured classification of ERP projects in the theoretical sources. Due to inconsistencies and contradictions in ERP projects type definitions, the authors found a research gap which this study aims to fill. Based on the expert interviews, the classification of ERP projects types was updated, each type having different characteristics, work scope and duration.

Implementation – Initial implementation of an ERP system at a company which did not have one before. SAP experts use the term 'greenfield'; Oracle experts qualify this type of project as a 'fresh' implementation. Both characteristics mean that there wasn't any serious level of business process automatization beforehand and an initial configuration of business processes in ERP is required. Customization of an ERP system may become part of initial implementation if the company's business processes differ significantly from standard ERP system business processes.

Rollout – In case an enterprise has branches / subsidiaries, all of them should have the same basis for communication, smooth business processes and document flow. Global corporations are keen on using the same software everywhere, supporting their business processes in all units by rollout of business processes installed at the headquarters. Consolidation projects may be considered as a subtype of rollout projects; they may happen if a company's branches and subsidiaries already had some ERP systems historically.

Maintenance and support – When an ERP implementation project is finished, the next stage is system monitoring, fixing bugs, change requests and realizing small ERP module enhancements. From the PM point of view, this type of project is the most flexible, enabling diversity in PM practices.

Upgrading (software version updates) – all experts included this type of ERP project in the list as ERP vendors constantly improve their software to increase productivity for better business outcomes, encouraging customers to move their business processes from obsolete software to new versions.

Consolidation, integration via harmonization – Ray (2011) proposed consolidation and harmonization integration as a type of ERP project, but the experts explicitly distinguished these two types of integration. The experts insisted that integration via consolidation of different applications on a single ERP platform is in fact a type of rollout project. As for integration-via-harmonization projects, most of the experts acknowledged that this constitutes an independent project type. Its purpose is the integration of systems built on different ERP platforms or on different versions of the

same ERP software. The aim is the harmonization and constant exchange of data originating from different sources.

Ray (2011) mentioned migration projects as one of the projects types; however, not all experts who participated in the research acknowledged this view. If a company transfers its business processes from one ERP system to another due to its natural growth or the need to move from a legacy ERP system, the consultant has to create all the settings in a new system. From the new ERP system team's point of view, this is initial or "greenfield" implementation. Data migration from an external source to the target system may be part of any project type above.

Based on the findings of the first phase of the research, ERP experts were asked which PM practices are applied in different types of ERP projects. Their answers demonstrated the very high level of conservativism in the ERP market and extremely slow pace of new trends and experience adoption. Of the great variety of PM practices, the experts mentioned just five, though every expert was permitted to give multiple answers – see Figure 4.

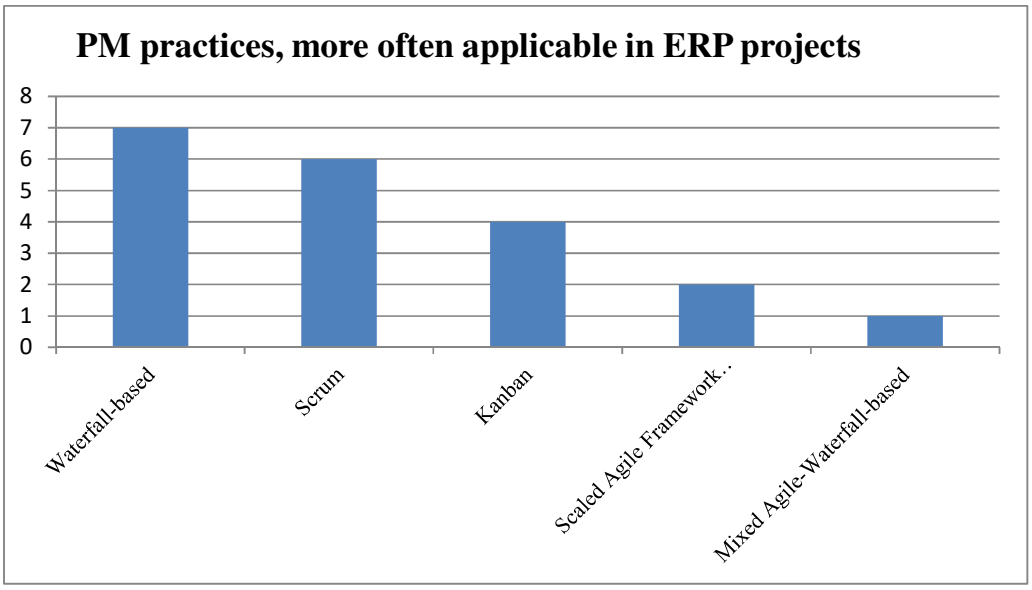


Figure 4: The most frequently applied PM practices in ERP projects according to experts' opinions (created by the authors).

As the next step, the authors compiled a list of factors influencing PM practice determination in IT projects. ERP systems experts indicated the possible values of these factors and identified the most appropriate methodology for each of the ERP project types. As a result, it was possible to find out the impact of every factor and every factor's values on PM practice determination and to construct a matrix for assessing project parameters (conditions) and project environments for PM practice determination. Some factors were evaluated as not applicable for particular projects types and were excluded from the summary tables. This means these factors have no influence on PM practice selection. For example, the factor 'Stakeholders' geographical distribution' doesn't have any effect on PM practice determination in implementation projects. A list of non-applicable factors for projects is given below:

- Stakeholders' geographical distribution;
- Stakeholders' cultural differences;
- Market competition in the project-related area;
- Alignment of a project's objectives with company strategy;
- Product quality standards;

- Quality of the project's definition of objectives;
- Stakeholders' risk tolerance;

The final step of the research was constructing a matrix for assessing project conditions and environments and for determining which PM practices are most suitable for a particular project. An example of a factor evaluation matrix for the implementation project type is given in Table 2 below.

Table 2: Example of a factor evaluation matrix for determining PM practice for implementation projects

Factor name	**Factor's value**	**Evaluation matrix**		
		Water-fall	**Scrum**	**Kanban**
Project planning perspective	Short-term (3-6 months)			
	Medium-term (up to 18 months)			
	Long-term	x		
Level of project uncertainty	High level		x	
	Medium level			
	Low level			
Quality of definition of requirements	Well defined	x		
	Poorly defined			
Level of involvement of customer's team	High level			
	Medium level	x		
	Low level			
Geographical distribution of stakeholders	Co-located			
	Located nearby (< 3000 km)			
	Located far away > 3000km)			
Total		**3**	**1**	**0**

The highest score is '3', for the Waterfall-based methodology that is recommended by the majority of experts for the chosen project type with appropriate conditions.

Conclusions

The significance of the given research lies in the investigation of arranging and managing ERP-related projects in the most appropriate way and increasing the effectiveness of relevant information technology use for competitive advantage. The comparison of empirical information with the theoretical background as well as the overall results the research obtained could assist an enterprise in choosing relevant PM practices for a particular project, achieving better business indicators and delivering an effective IT environment for business users and stakeholders.

Further research

The authors intend to continue research on the "Matrix for PM practice determination for ERP projects", test the matrix in different types of real projects, analyse the results and adjust the main parameters of the matrix to improve the PM practice determination process.

Acknowledgements

The authors would like to express gratitude to the PM and ERP experts who participated in the interviews. The results would not have been achieved without their passionate participation and input and valuable conversations and discussions during the interviews.

References

Al-Fawaz, K., Al-Salti, Z. and Eldabi, T. (2008). Critical Success Factors in ERP Implementation: a review. European and Mediterranean Conference on Information Systems. May 25-26 2008, Dubai.

Allied Market Research. (2015). ERP Software Market by Deployment (On-premise deployment and Cloud deployment) and Function (Finance, Human resource, Supply chain and others) – Global Opportunity Analysis and Industry Forecast, 2013-2020. [Online], [Retrieved March 8, 2017], https://www.alliedmarketresearch.com/ERP-market.

Aloini, D., Dulmin, R. and Mininno, V. (2011). Risk assessment in ERP projects. *Information Systems*, Volume 37, Issue 3, May 2012, 183-199.

Beck, K., Beedle, M., Bennekum, A., Cockburn, A., Cunningham, W., Fowler, M., Grenning, J., Highsmith, J., Hunt, A., Jeffries, R., Kern, J., Marick, B., Martin, R. C., Mellor, S., Schwaber, K., Sutherland, J. and Thomas, D. (2001). Agile Manifesto. [Online], [Retrieved April 23, 2017], http://agilemanifesto.org/principles.html

Bradford, M. (2015). Modern ERP: Select, Implement, and Use Today's Advanced Business Systems. Cary: SAS Institute Inc.

Capgemini. (2012). Global Business Process Management Report. [Online], [Retrieved February 20, 2017], https://www.capgemini.com/resources/global-business-process-management-report

Chow, A. (2016). Implementing Microsoft Dynamics NAV. Birmingham: Packt Publishing Ltd.

Cobb, C. (2016). The Project Manager's Guide to Mastering Agile: Principles and Practices for an Adaptive Approach. Hoboken: John Wiley & Sons.

Cockburn, A. (2005). Crystal Clear. A Human-Powered Methodology for Small Teams. New York: Addison-Wesley.

Cockburn, A. (2007). Agile Software Development. The cooperative game. Second Edition. New York: Addison-Wesley.

Eckartz, S., Daneva, M., Wieringa, R. and Hillegersberg, J. (2009). A Conceptual Framework for ERP Benefit Classification: A Literature Review. [Online], [Retrieved February 13, 2017], http://doc.utwente.nl/65396/

Goff, S. (2013). What is a PM Methodology? A Search for Efficiency, Consistency, and Performance. [Online], [Retrieved January 10, 2017], http://www.ipma.world/assets/PMMethods.pdf

Grabot, B., Mayere, A. and Bazet, I. (2008). ERP Systems and Organisational Change: A Socio-technical Insight. London: Springer.

Harmon, P. (2016). The State of Business Process Management. [Online], [Retrieved March 9, 2017], http://www.bptrends.com/bptrends-surveys

Hossein, B. (2004). The Internet Encyclopedia, Volume 1. Bakersfield: John Wiley & Sons, Inc.

Hurbean, J. and Fotache, D. (2010). The Challenge of Enterprise Systems: Harmonization of ERP Systems with Business Processes. [Online], [Retrieved March 13, 2017], https://www.researchgate.net/publication/228271163_The_Challenge_of_Enterprise_Systems_Harmonization_of_ERP_Systems_with_Business_Processes

International Project Management Association. (2017). What is IPMA? [Online], [Retrieved April 17, 2017], http://www.ipma.world/about/answers/

Kalaimani, J. (2015). SAP Project Management Pitfalls: How to Avoid the Most Common Pitfalls of an SAP Solution. California: Apress.

Kim, G., Humble, J., Debois, P. and Willis, J. (2016). The DevOps Handbook. How to create world-class agility, reliability & security in technology organizations. Portland: IT Revolution press.

Kimberling, E. (2012). An Expert's Guide to ERP Success [e-book]. Panorama Consulting Solutions. [Online], [Retrieved February 19, 2017], http://panorama-consulting.com/services/erp-software-selection/

McLaughlin, M. (2016). What Is Agile Methodology? [Online], [Retrieved February 9, 2017], https://www.versionone.com/agile-101/agile-methodologies/

Mills, J. (2016). Agile vs. Waterfall: Which Is Best for Your Business? Smartsheet Blog [Business media]. https://www.smartsheet.com/blog/agile-vs-Waterfall-which-best-your-business

Munkelt, T. and Volker, S. (2013). ERP systems: aspects of selection, implementation and sustainable operations. *International Journal of Information Systems and Project Management*. [Online], [Retrieved February 25, 2017], http://www.sciencesphere.org/ijispm/archive/ijispm-010202.pdf

Murray, A. (2009). Managing Successful Projects with PRINCE2. London. TSO.

Panorama Consulting Solutions. (2017). Clash of the Titans 2017. An Independent Comparison of SAP, Oracle, Microsoft Dynamics and Infor. [Online], [Retrieved February 1, 2017], http://panorama-consulting.com/resource-center/erp-industry-reports/clash-titans-2017-sap-vs-oracle-vs-microsoft-dynamics-vs-infor/

Ramburn, A., Seymour, L.F. and Gopaul, A. (2013). Learning from a failed ERP implementation: The Case of a Large South African Organization. [Online], [Retrieved February 10, 2017], https://www.researchgate.net/publication/269928636

Ray, R. (2011). Enterprise Resource Planning. Text and Cases. New Delhi: Tata McGraw-Hill Educational Private Limited.

Robson, S. (2013). Agile SAP: Introducing Flexibility, Transparency and Speed to SAP Implementations. Cambridgeshire: IT Governance Ltd.

Schwaber, K. (2004). Agile Project Management with Scrum. Microsoft Press.

Singhal, A. (2013). Scrum Guide – Your Guide to the Most Popular Agile Methodology. Agiliants Incorporated.

Tarhini, A., Ammar, H. and Tarhini T. (2015). Analysis of the Critical Success Factors for Enterprise Resource Planning Implementation from Stakeholders' Perspective: A Systematic Review. *International Business Research*. [Online], [Retrieved February 5, 2017], http://dx.doi.org/10.5539/ibr.v8n4p25

Vaman, J.N. (2007). ERP in Practice: ERP Strategies for Steering Organizational Competence and Competitive Advantage. New Delhi: Tata McGraw-Hill Publishing Company Limited.

Preincubation as an instrument for increasing the entrepreneurship of young people- the case of Poland

Sławomir Jankiewicz, Faculty of Finance and Banking WSB University in Poznan, Poznan, Poland,
e-mail: slawomir.jankiewicz@wsb.poznan.pl

Abstract

One of the primary objectives of the economic policy in Poland is to generate a strong GDP growth rate. In order to maintain a long-term economic growth, it is necessary not only to secure capital for investments and introduce appropriate legal regulations. Another prerequisite is to prepare the society for challenges underlying the "informational revolution". State that the knowledge they gained in the course of their studies may not be sufficient to effectively manage in the current ever-changing economic environment. Nevertheless, such knowledge is a good foundation for development of entrepreneurship. Therefore, it is necessary to improve the practical skills and qualifications by promoting entrepreneurship among schoolboys. This is vital as graduates should learn how to independently operate on the market. This study provides an overview of an instrument which is to help to achieve the aforementioned objectives. The instrument comprises pre-incubators operating at school. With implementation of this project, the graduates of most peoples in the country will become more creative and prone to innovative ways of thinking, and that should make Poland more competitive.

Keywords: economic policy, entrepreneurship, preincubation.

Introduction

In the twenty first century there were structural changes in the functioning of the economies of the most developed countries. The result of which was economic growth, which was not accompanied by a correspondingly high increase in employment (Romer 2000, p. 476-513, 522-523; Kwiatkowski 2020, p. 7-8). Therefore, unemployment is a problem for many countries (including those in the EU), regardless of their political, economic or social policies (Uramova, Pala 2007). They differ only in terms of different character, scale and policy in this regard (Acoccella 2002, p. 15-158). However, the common point is that the highest impact has on youth. The difficulties finding a job by young people adversely affect the economy, especially local.

In Poland 28% of people (the most among OECD countries) are unemployed, including more than 71% of workers aged between 15 and 24 (ed. Jankiewicz, Pająk 2014). Which is not conducive to the social and economic development of the country. From a social point of view it is a threat to democracy and cohesion of society. It leads to poverty and its related negative effects (e.g. increase in crime, deterioration of health, etc.). Unemployment also causes "the violation" of human dignity and - in principle- limitation of its freedom (Jan Paweł II 1991). Looking for a job outside the country (as is the case in Poland) results in weakening of social and family ties (Jan Pawel II 1979).

The solution to this problem may be in the increasing of society. Therefore, the purpose of this article is to present the pre-incubation system as a tool for increasing the entrepreneurship of young people. It allows to shape entrepreneurial attitudes even at the level of the lower secondary school.

The article is descriptive and analytical, and is based on observation the functioning of two experimental pre-incubators operating in Poznan (whose author of this article was a co-author), critical analysis of literature and pre-incubator activities in practice. For its completion were used results of surveys conducted on entrepreneurship.

A survey of business support institutions was conducted to assess the potential of these organizations, the scope of support provided, and the forms of cooperation between organizations. The study covered more than 70 organizations supporting small business from the Poznan agglomeration. The point of reference for the verification of the assistance provided by these institutions was the information received from entrepreneurs about their preferences and expectations in terms of development support and the service available in this area. Data were also obtained through questionnaire survey on a randomly selected group of 90 SMEs. The largest group of surveyed companies were small enterprises employing up to 10 employees.

Further data were obtained throuh a study carried out under the project "Adjustment of training needs and qualifications of inhabitants from poviats: ostrowski, krotoszyński, pleszewski and jarocinski to the requirements of the regional labor market". In the aforementioned poviats, the study included entrepreneurs, labor office employees, post-gymnasium directors, guild leaders, and district office workers who were responsible for constructing educational offerings in schools (ed. Bondyra 2006). The aim was to assess the innovation potential in education, adjust the needs of education to the labor market, the scope of cooperation between the economy and education, and the impact of upper secondary education on the creative attitudes of young people.

Recent research made possible to determine the level of entrepreneurship among students and whether the process of teaching at higher education stimulates entrepreneurial attitudes. The survey was conducted among students of economics from the following universities: Poznań University of Economics and Business, Adam Mickiewicz University in Poznań, School of Communication and Management in Poznan, SGH in Warsaw, Wrocław University of Economics, PWSZ in Piła and PWSZ in Leszno. In the case of the five-year studies, the survey was conducted on fourth- and fifth-year students, while in the bachelor-level studies, students were asked to fill in a questionnaire for students in the last year of study. A total obtained 700 correctly completed questionnaires, which have been analyzed.

In addition, research was used:

- OECD - the analysis was conducted on the economic behavior of the inhabitants and the approach to economics. Poland took the last place and was overtaken by countries such as Thailand, Jordan, Albania, British Virgin Islands (OECD 2016a);
- NBP - conducted by Pracownia Badań i Innowacji Społecznych „Stocznia" and the IQS Group. Poles believe that they have a low level of knowledge about entrepreneurship and running their own businesses (as much as 69%), a market economy (63% think so) of financial institutions (64% of responses) and the use of investment vehicles (67% of indications). At the same time, 67% believe that they need the knowledge of economics, finance and economy (NBP 2015).

Unemployment of Young People as an Important Issue of Economic Development

Unemployment among young people is long-lasting and global. According to statistical data on the OECD countries, a dozen percent of young people find it difficult to get a job (e.g. 16.7% in 2009 and 15% in 2015) (OECD 2016b) which resulted in reducing the gross income (estimated in 2014) about 360-605 billion dollars a year, equivalent to 0.9-1.5% of GDP of the entire OECD area (OECD 2016c). This phenomenon was named - NEETs (not in employment, education and training), and includes all young people who are not working (because they cannot find a job matching their skills or expectations) or are afraid to start their own business (because of inability to make independent decisions, risk aversion and lack of passion and ideas for life) (Bynner, Parsons 2002, p. 289-309; Wilkinson 1995; York Consulting Ltd 2005; Harries, Roberts 2006; Akister, Mutty 2012; Sadler, Akister, Burch 2015, p. 508–520; Furlong 2006, p. 553–569). However, in different countries it covers a different age category of youth. At the EU level it is assumed that it affects people aged 15-24, although Eurostat statistics also include a group of people aged 15-29. Outside the European continent (e.g. in Japan and Korea) the NEET category covers a much wider group of young people, e.g. people between the ages of 15 and 34 (Furlong 2007, p. 101–121; OECD 2010, p. 45; OECD 2008, p. 40).

Due to the social problem that this group creates, synonyms for NEETs are eloquent (Quintini, Martin, Martin 2007; Bynner 1998, p. 29–54; ed. Bynner, Ferri, Shepherd 1997, p.10; Nudzor 2010, p. 16–17; e-journal of the British Education Studies Association 2016; ed. Strzelecki, Potrykowska 2012; Szcześniak, Rondon 2011, p. 241–251):

- going nowhere,
- Generation X,
- unregistered,
- omitted by statistics,
- lost youth,
- dismissed, discouraged, disappearing young people,
- uncommitted,
- "anti-anti" generation.

In Poland youth unemployment is one of the major problems. Reducing the activity of this social group on the labor market has the effect of not using the potential of labor resources and generating negative social, economic and demographic effects. They are due to:

- postponing the decision to become independent, start a family and run a household (EC 2012, p. 7);
- poverty, marginalization and, in extreme cases, even social exclusion;
- increase of social pathologies, such as crime, alcoholism, drug addiction, prostitution, etc.;
- economic emigration (often talented and educated people) (Work Service, Wrocław 2014);
- occurrence of disorders such as: insomnia, taking a lot of sedatives, apathy, nervous breakdown, suicide Plante 2010);
- disintegration of social bonds and social alienation;

- to adjust, after prolonged periods of inefficient searching, to live on benefits and supported by parents.

The first effects of the above described phenomena can already be observed in Poland. This happens because among the young long-term unemployed the lifestyle and work attitude are changing.

Employers also affected by this phenomenon, by losing potential employees. It has a major impact on the pace of economic development (for example, getting a job opportunity in the so-called The Old Union caused the emigration of young Poles at the level of about 2-3 million people). The unemployed young person does not earn (which has a negative impact on state budget revenue) and contributes to increasing central and local expenses (including social benefits, labor offices and other institutions dealing with this problem, vocational rehabilitation programs, social reintegration and, in the longer term, also payments to the pension system). Secondly, it does not contribute to the GDP. The costs incurred by EU countries for this (the lost benefits of young people due to unemployment and the increase in public finances due to NETTs) were estimated on average in 2011 at 1.2% of the GDP of the Community as a whole. The highest were in Bulgaria and Greece (over 3% of their GDP), and the lowest in Luxembourg, Sweden, Germany and Denmark (0.2% - 0.6% of GDP). In Poland it is estimated at 2.0% of GDP. Return to the labor market 10% of people in this group in the EU will be able to save about 10 billion euro a year (Europejska Fundacja na rzecz Poprawy Warunków Życia i Pracy 2012).

Therefore at the Community level are being taken actions to counteract this. One of them is the "European Job Mobility Bulletin", published since November 2010, which aim was bringing European citizens closer to the professional opportunities they face in different countries (about the impact of the EU on the labor market – Uramová 2007). The bulletin provides information on employers' needs for qualified workers and illustrates trends in labor demand and supply in individual EU countries. Further steps are based on the priorities set out in the 2020 Strategy. They involve the promotion of learning beyond the formal, which includes the development of entrepreneurial skills and the promotion of young entrepreneurship etc.

Efforts to reduce the size of the youth unemployment in Poland, already exist (MPiPS, MIiR 2014). However, there is no system in which the institutions of state and local government, as well as non-governmental organizations and responsible business within the framework, could operate together. Legal forms of cooperation exist, but they are limited to analysis and recommendations and do not create instruments. The pre-incubation – an instrument important for promoting entrepreneurship among young people, is marginalized. System allows with a small financial and organizational investment "to make" entrepreneurship. It was confirmed by surveys on entrepreneurship conducted among students of economic studies in Poland. They have shown that a large proportion of graduates do not have the appropriate qualifications and skills. Knowledge acquired during the studies does not match the requirements and expectations of the modern labor market. Low level problem and incompatibility with the needs of the market also applies to other levels of education. Education in the country does not shape entrepreneurial attitudes, despite - what should be highlighted - existing potential among young people and their needs in this area (Brdulak, Godlewska, Matłachowski 2004, p.27–34). Graduates often cannot "find" themselves after graduation and fall into passivity. It is also a result of lack of prospects, because young people are offered only free internships, so-called junk contracts and work below expectations, which is associated with low wages and lack of career prospects. On the other hand, this is a consequence of the young man's ambition and lack of self-reliance.

Basic Assumptions of Pre-Incubation Supporting Youth Entrepreneurship

In the classic approach, incubation supports companies that are already established, often with the launching of cooperation. However, it is often the case that a person perceives the opportunity to launch the products or services on the market, but he does not do it. It concerns also to technologically advanced or innovative products developed by academics. This is due to the lack of entrepreneurial skills and characteristics typical of entrepreneurial attitudes, also with little economic knowledge or lack of practical skills in this field and lack of knowledge of legal issues (e.g. how to obtain licenses or permits, protection of intellectual property issues, which are important for undertaking high-tech business activities).

Incubator is needed to help to "get" entrepreneurial characteristics before starting a business, preparing for market practice, and helping to refine business. Therefore, to distinguish this support organizations from the "traditional" incubation, the name pre-incubation was introduced.
The participation of young people in the pre-incubation program will allow for the addition of knowledge and will increase the number of established companies (mostly micro-enterprises) and the development of skills affecting entrepreneurship, e.g.:

- creative, analytical and synthetic thinking
- innovation,
- creativity,
- perseverance, responsibility and ability to make decisions,
- independence with the ability to cooperate in a group,
- negotiation capacity and effective communication,
- ability to draw conclusions from mistakes,
- resource management,
- planning and implementation of the project.

The pre-incubation system should provide support in identifying the market for the product or service through surveys, search for business partners and customers, and lead to the first sale of a service or product offered by a person acting in that institution. The "first sale test" is important in terms of knowing customer expectations and determining the demand for the offer. This is important for a future entrepreneur when deciding on the establishment of an enterprise. It should also prepare to have contact with people or institutions offering capital (e.g. venture capital) or even establish a permanent relationship with them in order to facilitate the raising of capital.

Another benefit which results from the operation of pre-incubation is the awareness of the advantages and disadvantages associated with running a business and obtaining professional care in the relevant fields (e.g. management, marketing, finance, etc.).

The most important factors influencing the success of the future company, and guaranteed by the functioning of the pre-incubation, are:

- The process of moving from ideas to business start-ups taking place in friendly environment,
- providing access to research facilities and highly qualified staff,
- help develop a product or service,
- providing access to research facilities and highly qualified staff,

- assistance in product or service development,
- opportunity to assess market potential
- improving the competence and knowledge through training, workshops and case studies,
- limitation of individual risk.

In general, it should create entrepreneurial behaviors in different sectors (the participants themselves decide on the type of activity). It is also possible to set up more specialized units (for example, universities may set up technology pre-integrators bringing together researchers or people who are thinking of running a modern technology or social company that brings together people who are socially excluded) (Aernoudt 2004).

Theoretical classes (lectures, etc.) should be conducted in a group of people with similar features (e.g. education, experience), because it makes it easy to prepare the participants properly. In the case of practical classes (cooperation with companies, problem solving, case study), it gains better results in terms of knowledge, competence and age. When pre-incubation activities are addressed to students, it is essential to focus on providing them with practical knowledge and good examples. At school they receive theoretical knowledge, but practical they must acquire themselves.

Because aid should be limited in time, it seems reasonable to adopt a time limit a person's activities in pre-incubation, just as is the case in the incubator. The co-operation of the person concerned with the pre-incubation, for students of one to two years, should be sufficient to raise the skill level to make the right decision. For people who already have professional experience this period can be shortened to 6 months.

For concept verification, tested pre-incubation systems were launched in 2006. First in one of the universities in Poland and the other in the institution which provides help to the long-term unemployed. Their activity was completed in 2010. The effects of pre-incubation system activity were very positive. Participants who had a business idea could evaluate its probability and refine this idea with the help of experts. People, who did not know how to precise what should be the subject of their business activity, could (with expert support) look for free markets niches and develop a business plan.

An example might be the plan to open an internet cafe by a student in a small town. In the case of noticing the existence of market demand, but lack of the own know how, the participants looked for similar companies in other countries and on a franchising basis they transferred them to Poland.

During the pre-incubation system functioning, participation in it allowed to set up an economic activity of 70% of participants aged up to 24 and 80% over the age of 50 years. The business that was undertaken was concerned to different industries. From the standard, e.g. already existing activities (e.g. the establishment and maintenance of greenery, ceramics, care for the elderly and children, or the manufacture of soaps or candles), to rarely found in Poland (e.g. electronic translation agency, social image, selling works of art).

The market evaluation and the first sale test, not just expert opinions, turned out to be very important. In a few cases, their evaluations were wrong. For example the idea of opening an electronic translation agency. The business was based on the fact that, after signing the framework contract, the company could send the translated text and receive the translated work the same way. Because of the number of translation agencies, experts rejected the project as unsuitable for implementation. Attempts by the participants led to the execution of questionnaires and consequently to creation of such activities with

positive effect (companies participating in the survey declared the signing of the contract with the company after its establishment).

Several dozen percent of the participants did not decide to start a business. This was not often due to the lack of ideas, but the risk aversion and little confidence in one's own skills.

Conclusions

The survey conducted by the author on institutions supporting SMEs, entrepreneurs and students as well as surveys of other institutions (among others NBP) showed that entrepreneurship is of great importance for employing young people. However, education in the country focuses on theory rather than on the transfer of practical skills. It does not create entrepreneurial behavior. Upper secondary schools (despite the entrepreneurship lessons) or universities do not provide knowledge about how to run their own businesses, they do not emphasize the value of individualism and innovation. The educational offer should therefore be enriched with actions that will promote the development of entrepreneurial attitudes. Helpful in this action can be pre-incubators. The 3-year-old test incubators (which were created by the author's concept) have shown that they are an effective instrument for promoting entrepreneurship.

For maximum effect, they should not take participants for a few months (as was the case during the test) and a longer period (1-2 years). It would be best if the participation of young people in the pre-incubator was guaranteed at the level of post-gymnasium. At this level of education attainment, or at this education level a subject entitled entrepreneurship was introduced in Poland. Its aim was to achieve the same goals as the pre-incubation (e.g. to increase youth entrepreneurship). It turned out that didn’t fulfil the requirements. Teachers treat entrepreneurship lessons like any other school subject (e.g. boring and theoretically). Learning definitions and rules does not affect the growth of the society's entrepreneurship and even discourages self-reliance.

The state rightly pointed out that there is a need to increase the entrepreneurial spirit of the society, but the lessons should be exchanged for youth participation in the pre-incubator. Such exchanges will bring both financial and social benefits.

References

Aernoudt R. (2004), Incubators: Tool for Entrepreneurship?, Small Business Economy, no. 23.

Bynner J. (1998), Education and family components of identity in the transition from school to work, International Journal of Behavioral Development, no. 22.

Bynner J., Parsons S. (2002), Social Exclusion and the Transition from School to Work. The Case of Young People Not in Education, Employment, or Training NEET, Journal of Vocational Behavior, no. 60.

Furlong A. (2006), Not a Very NEET Solution, Work, Employment & Society, no. 20(3).

Furlong A. (2007), The zone of precarity and discourses of vulnerability: NEET in the UK, Journal of Social Sciences and Humanities, no. 381.

Nudzor H. (2010), Depicting young people by what they are not: conceptualization and usage of NEET as a deficit label, Educational futures, no. 2/2.

Quintini G., Martin J.P., Martin S. (2007), The Changing Nature of the Schooltowork Transition Process in OECD Countries, IZA DP, no. 2582.

Sadler K., Akister J., Burch S. (2015), Who are the young people who are not in education, employment or training? An application of the risk factors to a rural area in the UK, International Social Work, no. 58(4).

Szcześniak M., Rondon G. (2011), Pokolenie ani-ani: o młodzieży, która nie uczy się, nie pracuje i nie dba o samokształcenie, Psychologia Społeczna, no. 63.

Online Journals and websites

OECD data from different years, [Online], [Retrieved June 20, 2016b], www. http://stats.oecd.org/#.

e-journal of the British Education Studies Association, [Online], [Retrieved October 12, 2016], http://www.educationstudies.org.uk/materials/nudzorf3.pdf.

Books

Acoccella N. (2002), Zasady polityki gospodarczej, WN PWN, Warszawa.

Akister J., Mutty S. (2012), The Emotional Wellbeing of Children Identified as in Need of Additional Support in the Transition from Primary to Secondary School. Report for Cambridgeshire Children's Trust, Ruskin University, Cambridge.

Bondyra K. (ed) (2006), Pracodawcy kontra nauczyciele? Dostosowanie potrzeb szkoleniowych i kwalifikacji mieszkańców powiatów ostrowskiego, krotoszyńskiego, pleszewskiego i jarocińskiego do wymogów regionalnego rynku pracy, WSB w Poznaniu, Poznań.

Brdulak J., Godlewska H., Matłachowski J. (2004), The role of economic education in overcoming development disproportions – outline of research conception, w: Economic development in Central&East Europe, red. M. Kulikowski, The Knowledge Institute, Warsaw.

Bynner J., Ferri E., Shepherd P. (1997), Twenty something in the 1990s. Getting on, getting by, getting nowhere, , Ashgate Pub Ltd, Basingstoke.

EC (2012), EU Youth Report. Commission staff working document. Status of the situation of young people in the European Union, European Commission, Brussels.

Europejska Fundacja na rzecz Poprawy Warunków Życia i Pracy (2012), Młodzi ludzie i młodzież bierna społecznie (tzw. Grupa NEET) w Europie: podstawowe ustalenia, Dublin.

Harries B. (2006), T. Roberts, Regional and sub-regional variation in NEETs– reasons, remedies and impact, LSDA.

Jankiewicz S., Pająk K. (red.) (2014), Bilans Otwarcia z obszaru „Rynek Pracy", NSZZ Solidarność, Gdańsk.

Jan Paweł II (1991), Encyklika: Centesimus annus, Rzym.

Jan Paweł II (1979), Encyklika: Redemptor hominis, Rzym.

Kwiatkowski E. (2002), Bezrobocie. Podstawy teoretyczne, WN PWN, Warszawa.

MPiPS, MIiR (2014), Plan realizacji gwarancji dla młodzieży, MPiPS, MIiR, Warszawa.

NBP (2015), Stan wiedzy i świadomości ekonomicznej Polaków 2015, NBP, Warszawa.

OECD (2016b), International Survey of Adult Financial Literacy Competencies, OECD.

OECD (2016c), Society at a Glance 2016. OECD Social Indicators, OECD.

OECD (2010), Jobs for Youth/Des emplois pour les jeunes: Japan 2009, OECD.

OECD (2008), Jobs for Youth/Des emplois pour les jeunes: Korea 2007, OECD.

Plante C. (2010), Zdrowie psychiczne młodych bezrobotnych, Centrum Badań nad Nierównościami Społecznymi i Dyskryminacją, Montreal.

D. Romer, Makroekonomia dla zaawansowanych, WN PWN, Warszawa 2000, s. 476-513 i 522-523,

Strzelecki Z., Potrykowska A. (ed) (2012), Polska w Europie – przyszłość demograficzna. Sesja inauguracyjna (2012), , Rządowa Rada Ludnościowa, Warszawa.

C. Wilkinson, The Drop Out Society. Young People on the Margin, Youth Work Press, Leicester 1995;

Work Service (2014), Migracje zarobkowe Polaków, Wrocław.

Uramová M. (2007), Konvergentné procesy a trh prace, w: Ekonomické a sociálne dôsledky konvergenčných procesov vyplývajúcich z členstva Slovenskej republiky v EÚ, zborník príspevkov k výskumnému projektu VEGA 1/2619/05, Ekonomická fakulta UMB, Katedra ekonómie a humanitných vied, Banská Bystrica.

York Consulting Ltd (2005), Literature Review of the NEET Group, Scottish Executive or Darshan Sachdev, Edinburgh.

Conference Paper

Uramová M., Paľa J. (2007), Aspekty postavenia politiky zamestnanosti v systéme hospodárskej politiky s akcentom na verejnú správu, w: Hospodárska a sociálna politika EÚ - aktuálne otázky: elektronický zborník príspevkov z medzinárodnej vedeckej konferencie 19.04. 2007, Ekonomická univerzita, Národohospodárska fakulta, Bratislava.

The Energy Sector as a Barrier to Economic Development in Poland

Sławomir Jankiewicz, Wyższa Szkoła Bankowa w Poznaniu, Poznań, Poland,
slawomir.jankiewicz@wsb.poznan.pl
Mirosław Kowalik, ENEA S.A., Poznań, Poland, miroslaw.kowalik@enea.pl

Abstract

Poland has the ambition to maintain a high rate of economic growth over the next several years. However, to do this we must meet many conditions. One of them is to ensure that the supply and quality of electricity in relation to needs. Article synthetically analysis the basic barriers to energy development in Poland, which cause that the development of capacity and electricity transmission can be less than demand. As a result, it may cause a significant reduction in the pace of economic development.

Keywords: economic policy, energy policy, energy development barriers.

Introduction

The task facing Poland is to increase the dynamics of economic development, which will require the supply of electricity in a sufficient quantity and at a relatively low price to economy.

The aim of this article was to present of the basic barriers to energy development in Poland, which should be overcome if we want to ensure the proper supply of electricity to the economy, which is a prerequisite for increasing the pace of economic development.

Power Distribution Network as a Barrier to Economic Growth

One of the problems with national networks is age. The level of the transmission grid decapitalisation is above 70% (Including 110 kV lines of about 75% and 220 kV lines of up to 80%) (AZ-SYSTEM 2009). This causes us to have frequent failures (the SAIDI indicator is even several hundred minutes long) (URE 2016) and significant transmission losses (it is estimated that in 2011 they amounted to 7.3% of total energy introduced into the system and cost PLN 2.1 billion) (Rudźko 2012). In addition, the density of electricity networks in Poland is twice lower than in our western neighbors. Modernization and construction of power grids is limited due to the lack of adequate financial means for the sector to engage or lend, as well as bad legal regulations that causes the investment process to be extended even to several years.

Supply of Electricity as a Barrier to Economic Development

Many experts (Jankiewicz 2014a, p . 341-351) and institutions (Bil et al. 2010, p. 23) warn that Poland needs to prepare for possible energy supply disruptions. This is because the power plants have a heavily exploited estate. More than 60% of installed power is in units that are over 30 years old (of which 1/3 is nearly 40 years old) and only 20% is younger than 20 years. Old units will have to be excluded from exploitation (estimated to be over 16,000 MW by 2030) (Ministerstwo Gospodarki 2009; Pricewaterhouse Coopers, ING Bank Śląski 2011). Investments accepted for implementation have less power (about 8.5

thousand MW) (ARE 2016), rather we will expect increase in demand for electricity in the future. It is forecasted that by 2030 there will be an increase in electricity consumption per capita of about 3000 kWh and thus will be about 7500 kWh (ie the current average for EU countries) (Jankiewicz 2013, p. 27-38). More demand is also expected by economic operators, which will be connected with the increase in production and services and the increase in the innovativeness of the economy. It is estimated that by 2030 the installed capacity in national production units should increase to minimum 46500 MW from the current 38000 MW (MAiC 2013).

The lack of coherent and consistently implemented government policy in the energy sector is not conducive to Increasing supply of production sources. Increasing investment, apart from the technical aspect, require seek new sources of financing, which is very difficult. In the case of the largest electricity producers, the majority owner is state that has serious problems with the sustainability of public finances. So the state is trying to maximize revenue to the budget, and for this reason the priority is to make dividends from companies in which it has shares, but not their development. Banks, on the other hand, will not lend more than acceptable risk (ie up to 4-5 times EBITDA).

Human Factor as a Barrier to the Development of the Energy Industry

Currently, in Poland, on the energy market there is a situation of dominance of large state-owned corporations, which have a privileged position. This stops the process of introducing market mechanisms and restructuring in the sector. When we analyze the costs and effectiveness of operations in the Polish power industry, we note that there is potential to reduce employment. Production companies employ up to four times as many employees (in conversion on 1 MWh) as compared to the West European level. In production companies there are not only over-employment, but also extensive so-called social packages. Industry growth requires an increase in labor productivity, which in turn forces a change in personnel management. The development of the energy sector will be determined by changes in the structure of energy production, causing reducing employment in large enterprises based energy coal, for small RES. It will also affect the labor market. There will be an increase in demand for distributed energy specialists and infrastructure security (Matusiak et al. 2009; Jankiewicz 2014b, p.113-116). Currently in Poland there is a deficit in terms of personnel for the modern economy, including for the modern energy industry. This is reflected in numerous reports, discussions and studies undertaken by both government agencies (Poland 2030 - Development challenges. Report of Strategic Advisors to the Prime Minister), scientific bodies (National Foresight Program Poland 2020), as well as the business community and employers' organizations (including project the Qualifications for employers, carried out by the Labor Market Council PKPP Lewiatan). Utilizing the opportunity that the energy industry can develop for the economy, requires a proper education policy. It is necessary to create appropriate courses and specializations in vocational and technical schools and also in universities. Bearing in mind that the education of an employee and the acquisition of his competence takes time.

Conclusions

The above-described synthesis of basic problems in the energy sector shows that we have difficulties in achieving the efficiency (including cost) and innovation of the Polish power industry and ensuring a stable investment and regulatory environment. Legal considerations have a negative impact on the development of the energy market in Poland, inter alia by increasing the risk of the industry, causing preference for selected fuels from which electricity is generated, and reducing the company's creditworthiness and thus

the ability to finance new investments. Thus, they create significant restrictions on the supply of electricity in Poland.

The alignment of distribution entities, resulting from the separation, caused transmission companies to focus on legal and organizational changes rather than on development.

As a result, despite the decapitalised transmission network, there are no adequate modernization programs implemented, and due to the lack of restructuring, there is also lack of funds for the necessary investments. A positive development scenario requires a stable legal framework and predictable conditions for investment in the power industry. The regulations governing the operation of renewable energy must be modified. It is necessary to develop and consistently implement development plans for energy sector. The education system needs to be adapted so that the industry receives the employees needed.

References

Online Journals and websites

ARE, [Online], [Retrieved April 10, 2016], http://www.rynek-energii-elektrycznej.cire.pl/st,33,335,tr,145,0,0,0,0,0,budowane-i-planowane-elektrownie.html.

URE, Jakość dostaw i obsługa odbiorców energii lepsze o 50% - Prezes URE wprowadza nowy model regulacji dużych dystrybutorów energii, [Online], [Retrieved April 25, 2016], http://www.ure.gov.pl/pl/urzad/informacje-ogolne/aktualnosci/6286,Jakosc-dostaw-i-obsluga-odbiorcow-energii-lepsze-o-50-Prezes-URE-wprowadza-nowy-.html?search=860482205.

Books

AZ-SYSTEM, Izba Gospodarcza Gazownictwa, PTPiREE, PSE Operator SA, Towarzystwo Rozwoju Infrastruktury Prolinea, IGCP, PERN (2009), Raport o wpływie uregulowań prawnych na warunki eksploatacji i rozwoju infrastruktury technicznej liniowej sektora paliwowo–energetycznego decydującej o bezpieczeństwie energetycznym kraju, Warszawa.

Bil J., Gąsiorowska E., Graczyk W., Guzik R., Maciuk-Grochowska A., Malec A., Smoleń P. (2010), Analiza trendów rozwoju branży energetycznej, ZPPE, Warszawa.

Jankiewicz S. (2014a), Energetyka rozproszona jako czynnik rozwoju regionu, [in:] Rozwój regionalny i lokalny w Europie Środkowo-Wschodniej w warunkach kryzysu i reformy, red. M. Czupich, A. Ignasiak-Szulc, M. Kola-Bezka, Toruń.

Jankiewicz S. (2014b), Znaczenie rozwoju gospodarki niskoemisyjnej dla rynku pracy w Polsce, [in:] Gospodarka niskoemisyjna. Uwarunkowania i wyzwania, red. J. Mazurkiewicz, K. Pająk, Adam Marszałek, Toruń 2014.

Jankiewicz S. (2013), Wpływ budowy elektrowni atomowej w Polsce na rynek energii elektrycznej, [in:] Ekonomia i zarządzanie energią a rozwój gospodarczy, red. K. Pająk, A. Ziomek, S. Zwierzchlewski, Adam Marszałek, Toruń.

MAiC (2013), Polska 2030. Trzecia fala nowoczesności. Długookresowa Strategia Rozwoju Kraju, , Warszawa.

Matusiak K., Kuciński J., Gryzik A., Foresight kadr nowoczesnej gospodarki PARP, Warszawa.

Ministerstwo Gospodarki (2009), Polityka energetyczna Polski do 2030 roku, Warszawa

Pricewaterhouse Coopers, ING Bank Śląski (2011), Raport Finansowanie inwestycji energetycznych w Polsce, Warszawa.

Rudźko R. (2012), Analiza nt. wielkości strat w przesyle energii elektrycznej w Polsce, BBN, Warszawa.

Marketing in Higher Education in the Czech Republic with a Focus on the Utilization of Websites and Social Media

Ing. Karolína Ptáčková, University of West Bohemia, Pilsen, Czech Republic, ptackovk@kmo.zcu.cz

Abstract

This research study focuses on a comparison of selected universities in terms of their communication with the public through the Internet. The research subjects include 23 Czech higher education institutions offering economics-related majors. The comparison was carried out from the point of view of the use of websites and social media outlets (YouTube and Facebook) for the purpose of marketing communication. The objective of the research is to define, using the Spearman correlation coefficient, the rank-order of individual subjects in the two areas and to determine whether there is a correlation between the level of website utilization and that of social media utilization by the subjects of the research. The theoretical part of this research study deals with the development of tertiary education in the Czech Republic and emphasizes the reasons why marketing is so important for Czech colleges and universities. Furthermore, it contains a detailed description of marketing communication and its possible implementation through the Internet, i.e., the most commonly used hypermedium among the young generation.

Keywords: marketing in education, websites, social media sites, the Spearman coefficient

Introduction

In recent years, there has been a decline in the number of university students in the Czech Republic. The reasons behind this include the population decline as well as pressure on funding higher education institution (HEIs), where in 2009 there was a dramatic decrease in the appropriations per student, which was nominally leveled only in 2016. This led to increased interest in marketing among universities. The main target group of HEIs are young people between the ages of roughly 18 and 23. This group is closely associated with communication over the Internet, including using mobile devices. That is why marketing that targets this group significantly utilizes online communication. The presented study starts with a theoretical introduction, which on the one hand deals with the development of marketing in the area of Czech tertiary education, and utilization of the Internet by HEIs for the purpose of communication with the target group on the other. The empirical part of the study deals with the research conducted, the goal of which is to compare selected universities in terms of website and social media utilization and to determine whether there is a correlation between the level of utilization of these two media types for the purpose of communication.

1 Theoretical introduction to the development of marketing in the area of education in the Czech Republic The main body of the paper

The tradition of Czech higher education dates backmore than 600 years ago, to when Charles University was established by Emperor Charles IV (ICEF Monitor, 2014). The past 25 years have been a period of reforms for theschool system in Czech Republic. The educational reform has been influenced not only by democratization in this country after the collapse of communism, but also by a more open approach to the world, globalization and the need for competitiveness (Eger, Egerová, 2016).

Universities now refer to Higher Education as a market, because there is considerable competition for students. This is the reason why they are aware of the importance of their reputations (Rutter, Roper,

Lettice, 2016). More and more universities apply common marketing techniques to compete effectively. It is necessary to understand, manage, and leverage a strong brand position, because a university's brand represents the totality of perceptions and feelings that stakeholders associate with that particular university (Luque-Martínez, Del Barrio-García, 2009, Rauschnabel, Krey, Babin, Ivens, 2015). It means that universities are no longer just institutions of higher learning but also a business. They spend a lot of money burnishing their image (Azoury, Daou, Khoury, 2014).

After 1989, university education was in high demand in the Czech Republic, as its capacity was limited during socialism. The democratization of higher education went hand in hand with the establishment of new regional universities, which replaced the higher education institutions in the regions. Marketing in the area of tertiary education did not seem to be necessary, as there was a much greaterdemand for education compared to its supply, and the institutions were only just learning to communicate with the public and handle public relations. Major changes in higher education came with Act No. 111/1998 Coll. on Higher Education. Very important was the accession of the Czech Republic to the European Union in 2004 andthe more intensive involvement of HEIs in EU programs. Important was also the gradual establishment of private institutions of higher education after 1999. As has already been said, higher education in the Czech Republic has seen a decrease in the number of young people. The statistics fromthe Ministry of Education indicate that while in 2009 there were 110 thousand newly enrolled students at Czech colleges and universities, in 2016 it was only 82 thousand. The biggest decrease instudents occurred at private HEIs, where in 2009 there were 18,597 new students, while seven years later there were only 8,592 newly enrolled students. Colleges and universities struggle to attract new students and thushave no other choice but to use effective marketing. The times when schools presented themselves only in specialized periodicals dedicated to education and at fairs organized by universities are long gone.

Although most colleges and universities handle their marketing themselves, there is an increasing number of cases where these activities are consulted with experts. Sometimes,we encounterthe problem that commonly used marketing principles are not applied to the area of education. For example, little attention is devoted to the school's mission and shared values. Extensive marketing is mainly the domain of private colleges and universities, which depend on tuition fees and thus must build up their brand and prestige.

The established schools (public ones with a long history) have the advantage of being well-known by people; however, that is only the first step. Another important step is to communicate issues related to the study program and target the right students. As a result of the lack of college applicants, universities also focus on attracting students from abroad – marketing of universities thus takes on an international dimension (Kartous, 2014, Křížová, 2017).

The absence of each student means the lossof a substantial amount of money for schools (according to the Ministry of Education, it is about CZK 36,000 per student/year), so there is an effort to accept as many applicants as possible and let them study as long as possible. This obviously can have a negative effect on the schools' output in terms of the quality of academic results (Kartous, 2014).

Experts agree that there is no reason for universities not to use marketing, quitethe opposite. At present, the primary goal of marketing is to communicate the portfolio of study programs to applicants in an attractive way and convince them that studyingthe majors taught at the school makes sense and there is a future in it (Kartous, 2014, Mocková, 2016). A significant topic for universities is brand building (Jurášková, Juříková& Kocourek, 2015).

The development of higher education in the Czech Republic, described above, the increase in competition and the demographic decline in the category of 18-to-23-year-olds, combined with the advancement of ICT, has resulted in university marketing significantly focusing on utilizing the Internet.

2 Use Of The Internet By Universities To Communicate With Their Target Group

Utilizing the Internet to communicate with the appropriate target group, i.e., young people between the ages of 18 and 25, makes perfect sense. Online communication is natural for young people – this group has very high computer literacy. Moreover, the importance of the Internet continues to grow in the Czech Republic. At the end of 2015, Internet penetration in the +10 age category was 76%, and for the generation of people aged 10-24 it was 96% (NetMonitor, 2016). This target group falls into a demographic group often referred to as generation Y, also known as the Millennials, which includes people born between 1976 and 1995 (some sources, e.g., Šimáková, 2017, define its range as 1985–2000) and it needs to be said that this generation has brought a number of changes to marketing and marketing communication. One of the basic characteristics of this group is their almost constant online presence, which is reflected in interpersonal communication as well as consumer behavior and expectations. Young people share information and experiences (both private and consumer-related) and they are also better equipped for this than the older generation (they are more likely to have a mobile Internet connection, etc.) (Flodrová, Šilerová, 2011).

The results of the adMeter project conducted by the MEDIAN Company indicate that when it comes to websites, the young generation spends most of their time on YouTube and Facebook. According to the survey, young people aged 15–24 spend more than 19 minutes a day using mobile apps and more than 110 minutes browsingwebsites. When consuming website content, young people at the age of 15–24 spend most of their time watching YouTube videos, which on average takes up more than 32 minutes a day, and using the social media site Facebook, where the young generation spends an average of 31 minutes a day. These two social media outlets are followed by other websites and mobile apps, among which social media sites like Instagram, Twitter and LinkedIn are gaining traction (Mediaguru, 2017).

Another communication channel covered by this research study is websites. This channel was selected primarily based on qualitative research conducted at the Faculty of Economics of the University of West Bohemia in the spring of 2017. The research was carried out in the form of four discussion groups, and the research results clearly indicate that websites are the primary channel where students look for information about colleges and universities.

3 Evaluating selected universities in terms of their use of websites, Facebook and YouTube

The deductive approach according to Punch (2008) was used in defining the research problem and setting the research goals. Also defined were the research area, research topic and the general as well as specific research questions. The research area was defined as marketing in the education sector in the Czech Republic. The research topic is the utilization of websites and social media sites by universities for the purpose of communication with the public. The research focused on 23 subjects – HEIs, which included faculties at public universities (16 = A), independent public colleges (2 = B) and private university and colleges (5 = C), all operating in the Czech Republic:

- A - Masaryk University – Faculty of Economics and Administration,
- A - Czech University of Life Sciences Prague - Faculty of Economics and Management,
- A - Faculty of Economics - University of West Bohemia,
- A - Faculty of Business and Management - Brno University of Technology,
- A - Faculty of Economics - University of South Bohemia,
- A - University of Hradec Králové - Faculty of Informatics and Management,
- A - Faculty of International Relations - University of Economics in Prague,

- A - Faculty of Business Administration - University of Economics in Prague,
- A - Faculty of Management - University of Economics in Prague in Jindřichův Hradec,
- A - Tomas Bata University in Zlín - Faculty of Management and Economics,
- A - Faculty of Economics and Administration - University of Pardubice,
- A - Faculty of Social and Economics Studies - University of J. E. Purkyně,
- A - Faculty of Economics - University of Ostrava,
- A - Faculty of Business and Economics, Mendel University in Brno,
- A - Technical University of Liberec - Faculty of Economics,
- A - School of Business Administration in Karviná,
- B - College of Polytechnics Jihlava,
- B - The Institute of Technology and Business in České Budějovice,
- C - University of Business in Prague,
- C -The Institute of Hospitality Management in Prague,
- C -Karel Engliš College in Brno,
- C -Unicorn College in Prague,
- C -Moravian University College Olomouc.

The following general research questions were formulated:

- What is the level of utilization of websites by individual subjects?
- What is the level of utilization of social media sites, specifically Facebook and YouTube, by individual subjects?
- What is the correlation between the level of utilization of websites and the level of utilization of social media sites in the selected subjects?

The specific research questions are defined by the individual criteria that were chosen for the evaluation of each of the selected communication channels.

The specific questions aimed atassessing the level of utilization of websites were defined as follows:

- Is the design of the particular website responsive?
- Is there a direct link from the homepage to the section for applicants?
- Does the homepage also address other relevant groups (students, graduates, employees and partners)?
- Is there a direct link from the homepage to the selection and admission policy?
- Does the homepage provide information about the major fields of study?
- Does the news section on the homepage provide information about the school's cooperation with industry, international cooperation or lectures given by experts?
- Does the design of the website reflect the specific target group (evaluated using the five criteria listed below)?

The specific questions aimed at assessing the level of utilization of the social media sites Facebook and YouTube were formulated as follows:

- Can the school's videos posted to YouTube be accessed directly from the website's homepage?
- Does the institution have its own YouTube channel?
- How many videos does the university channel contain?
- What is the average number of views of the videos in 1 year?
- What is the average number of "likes" in 1 year?

- Can the institution's Facebook page be accessed directly from the website's homepage?
- How many posts does each Facebook page contain?
- How many fans does each Facebook page have?

The specific question related to assessing the correlation between the level of utilization of websites and the level of utilization of social media sites (YouTube and Facebook) is identical to the third general research question. The association was assessedbased on selected features and evaluated using the Spearman coefficient (Chráska, 2016). Based on a theoretical input, we defined the following hypothesis:

We suppose that if a university utilizes its website at a high level (according to the selected criteria), it will most likely also utilize social media sites at a high level.

The following subchapters present in detail the methodology of the evaluation of individual criteria.

3.1 The Characteristics of the Criteria for the Evaluation of Websites

The first criterion for the evaluation of websites is their responsive design. A responsive design is based on several rules, the most important of which is the width and layout of elements on the particular website, the size of images and the use of the website (Responzivní design, 2016).

The responsiveness of the design was evaluated according to the Google Search Console. If the website of the selected university had a responsive design, it received 1 point, otherwise, it received 0 points.

Other criteria for the evaluation of the selected universities' websites relate to the accessibility of important information primarily with regard to the choice of the given university. The said criteria were evaluated as follows:

- the homepage contains a link to the admissions office = 1 point (otherwise, 0 points),
- it is possible to access information about the selection and admission process on the website's homepage = 1 point (otherwise, 0 points),
- the news section contains information about a lecture by an expert, cooperation with companies for the purpose of gaining practical experience, and international cooperation = 3 points (for each criterion which is not met, subtract one point; the absence of all three criteria = 0 points),
- and lastly, are there links to all of the aforementioned stakeholders = 1 point (if at least three of them = 0.5 point, none of them = 0 points).

These criteria were selected based on the opinion of experts on the heuristic evaluation of websites (Strauss, Frost, 2012) for the particular purpose and also based on the output of four discussion sessions with university students, which among other things showed the students' deep interest in information regarding the possibility of studying abroad and gaining practical experience during their studies. These criteria were evaluated by two Internet marketing experts by way of heuristic analysis (E1 and E2). Table 1a and 1b contain the average values.

If the rating of the set criteria differed by more than 1 point, the evaluators consulted their results by way of a conciliation procedure.

The last criterion for the evaluation of websites was their design. The following criterionpresents specific principles of creating an attractive design forawebsite's homepage, according to HubSpot, Inc., which are further supplemented byother specific principles for the age group of young people aged 18 to 25,

according to the American company Nielsen Norman Group, which for a number of years has specialized in website evaluation from the users' point of view.For the last criterion, two students were chosen (and trained) as evaluators (Hubspot, 2017), (Nielsen Norman Group, 2016):

1. If the homepage was clearly organized, it received 1 point (otherwise, 0 points, though it was also possible to assign 0.5 points).
2. If the selected university appropriately addressed their target group, it received 1 point (otherwise, 0 points).
3. If the homepage reflected the specifics of the particular faculty and referred to the added value of studying at that particular school(mentioned specific advantages connected with their study programs, e.g., the possibility of studying abroad, cooperation with specific companies during the studies, etc.), it received 1 point, otherwise, 0 points.
4. If the homepage contained a call-to-action, e.g., "I want to study", "I want to learn more", etc., the university received 1 point (otherwise, 0 points).
5. If the homepage featured dynamic content, e.g., the option to watch a video directly on this page, it received 1 point (otherwise, 0 points).

The tables below (Table 1a and Table 1b) show the evaluation results of the individual universities' websites.

Table 1a: Evaluation of the level of utilization of websites by individual subjects according to the first five criteria

The university	Responsive design		Applicant		Relevant Groups		Admission		Field of Study	
	E1	E2	E1	E2	E1	E2	E1	E2	E1	E2
Masaryk University – Faculty of Economics and Administration	1	1	1	1	1	1	1	1	1	0
Czech University of Life Sciences Prague - Faculty of economics and Management	1	1	0	1	0,5	1	1	1	1	0
Faculty of Economics - University of West Bohemia	0	0	1	1	0,5	0,5	1	1	1	1
Faculty of Business and Management - Brno University of Technology	0	0	1	1	0,5	1	1	1	1	0
Faculty of Economics - University of South Bohemia	1	1	1	1	1	1	1	1	1	0
University of Hradec Králové - Faculty of Informatics and Management	1	1	1	1	0	0,5	1	1	1	0
Faculty of International Relations - University of Economics in Prague	0	0	1	1	0,5	0,5	1	1	1	0
Faculty of Business Administration - University of Economics in Prague	0	0	1	1	0,5	0,5	1	0	1	0
Faculty of Management - University of Economics in Prague in Jindřichův Hradec	0	0	1	1	0,5	0,5	1	1	1	0
Tomas Bata university in Zlín - Faculty of Management and Economics	0	0	1	0	0	0	1	0	0	0
Faculty of Economics and Administration - University of Pardubice	1	1	1	1	1	1	1	0	1	0
Faculty of Social and Economics Studies - University of J. E. Purkyně	1	1	1	1	1	1	1	1	1	1
Faculty of Economics - University of Ostrava	0	0	1	1	1	1	1	0	1	1
Faculty of Business and Economics, Mendel University in Brno	1	1	1	1	1	1	1	1	1	0
Technical university of Liberec - Faculty of Economics	1	1	1	1	0,5	0,5	1	1	1	0
School of Business Administration in Karviná	0	0	1	1	0,5	1	1	1	1	0
College of Polytechnics Jihlava	0	0	1	1	0,5	0,5	1	0	1	0
The Institute of Technology and Business in České Budějovice	0	0	1	1	0,5	1	1	0	0	0
University of Business in Prag	1	1	1	1	0,5	1	1	0	1	1
The Institute of Hospitality Management in Prague	1	1	1	1	0	0,5	1	0	1	1
Karel Engliš College in Brno	1	1	1	1	0	0	1	0	1	1
Unicorn College in Prague	1	1	0	0	0	0,5	1	0	1	1
Moravian University College Olomouc	0	0	1	1	1	1	1	0	1	0

Sources: Author's own elaboration, 2017

Table 1b: Evaluation of the level of utilization of websites by individual subjects according to the last two criteria, including the overall results

The university	News		Design		Total E1, E2		Total evaluation
	E1	E2	E1	E2	E1	E2	
Masaryk University – Faculty of Economics and Administration	3	3	5	5	8	12	**10**
Czech University of Life Sciences Prague - Faculty of economics and Management	2	3	5	5	8,5	12	**10,25**
Faculty of Economics - University of West Bohemia	0	0	4,5	2,5	8	6	**7**
Faculty of Business and Management - Brno University of Technology	1	1	2,5	1,5	9,5	5,5	**7,5**
Faculty of Economics - University of South Bohemia	3	3	3	3	13	10	**11,5**
University of Hradec Králové - Faculty of Informatics and Management	3	3	5	4,5	11,5	11	**11,25**
Faculty of International Relations - University of Economics in Prague	2	3	2	0	8	5,5	**6,75**
Faculty of Business Administration - University of Economics in Prague	3	3	2	0	9,5	4,5	**7**
Faculty of Management - University of Economics in Prague in Jindřichův Hradec	2	2	2	1,5	10,5	6	**8,25**
Tomas Bata university in Zlín - Faculty of Management and Economics	2	2	5	3	6	5	**5,5**
Faculty of Economics and Administration - University of Pardubice	2	3	5	3	9	9	**9**
Faculty of Social and Economics Studies - University of J. E. Purkyně	2	3	5	4,5	9	12,5	**10,75**
Faculty of Economics - University of Ostrava	1	2	5	2,5	10	7,5	**8,75**
Faculty of Business and Economics, Mendel University in Brno	3	2	5	3	13	9	**11**
Technical university of Liberec - Faculty of Economics	1	2	3,5	2,5	10,5	8	**9,25**
School of Business Administration in Karviná	3	2	3,5	2,5	11,5	7,5	**9,5**
College of Polytechnics Jihlava	2	3	3	1,5	10,5	6	**8,25**
The Institute of Technology and Business in České Budějovice	1	0	5	5	7	7	**7**
University of Business in Prag	2	1	5	3,5	9,5	8,5	**9**
The Institute of Hospitality Management in Prague	2	1	5	3	11	7,5	**9,25**
Karel Engliš College in Brno	1	2	5	5	10	10	**10**
Unicorn College in Prague	2	1	5	5	10	8,5	**9,25**
Moravian University College Olomouc	1	2	3	2,5	8	6,5	**7,25**

Source: Author's own elaboration, 2017

The data in the table above answer the individual specific questions connected with the general question "What is the level of utilization of websites by individual subjects?", and thus also answers this general question.

3.2 The Characteristics Of The Criteria For The Evaluation Of Social Networks (Youtube And Facebook)

YouTube

The first assessment criterion in terms of the level of utilization of YouTube by the particular university was the fact whether it was possible to watch some of the videos uploaded to YouTube directly on the school's website. Subject to evaluation was also the existence of the university's own YouTube channel. If these two criteria were met, the university could get 1 point for each criterion, otherwise, they received 0 points for each criterion.

Another set of criteria dealt with the number of uploaded videos, the average number of views of the university's videos on its YouTube channel, and the number of "likes" the university's videos receive in a year. The annual averages were used due to the factor of time (a video uploaded to YouTube five years ago obviously has a different potential to get "likes" than a video posted in the past year). The specific figures for the given criteria are shown in Table 2.

Table 2: The specific number of videos, average number of views and average number of "likes"

The university	Video on YouTube	Average of video viewed/year	Average of "Like"/year
Masaryk University – Faculty of Economics and Administration	4	318	0
Czech University of Life Sciences Prague - Faculty of economics and Management	19	534	1,3
Faculty of Economics - University of West Bohemia	43	207	0,8
Faculty of Business and Management - Brno University of Technology	3	1285	1,7
Faculty of Economics - University of South Bohemia	68	169	0,4
University of Hradec Králové - Faculty of Informatics and Management	23	1194	8,2
Faculty of International Relations - University of Economics in Prague	30	394	1,9
Faculty of Business Administration - University of Economics in Prague	3	48	1
Faculty of Management - University of Economics in Prague in Jindřichův Hradec	*3*	435	1,2
Tomas Bata university in Zlín - Faculty of Management and Economics	6	199	0,4
Faculty of Economics and Administration - University of Pardubice	4	319	0
Faculty of Social and Economics Studies - University of J. E. Purkyně	21	253	1,1
Faculty of Economics - University of Ostrava	18	219	0,2
Faculty of Business and Economics, Mendel University in Brno	15	18391	57,9
Technical university of Liberec - Faculty of Economics	6	177	1,3
School of Business Administration in Karviná	7	149	1,5
College of Polytechnics Jihlava	4	423	2,8
The Institute of Technology and Business in České Budějovice	36	238	1
University of Business in Prag	34	174	0,5
The Institute of Hospitality Management in Prague	7	1023	2
Karel Engliš College in Brno	16	200	1,3
Unicorn College in Prague	110	236	1,1
Moravian University College Olomouc	73	835,4	1,5

Source: Author's own elaboration, 2017

The evaluation of the criteria listed in Table 2 was carried out as follows. If a university did not have a single video on YouTube, it received 0 points (which was not the case in any of the research subjects). For 1-25 videos, the university received 0.5 points, for 26-50 videos it received 1 point, for 51-75 videos it was 1.5 points, for 76-100 videos it received 2 points, and for 101 or more videos it got 2.5 points.

The evaluation of the average number of views was carried out as follows. If the videos of the particular university had an average of 0 views, it received 0 points (again, this was not the case of any of the research subjects). For 1-250 views, the university received 0.5 points, for 251-500 views it was 1 point, for 501-750 views 1.5 points, for 751-1,000 views 2 points, and for 1,001 or more views 2.5 points.

In terms of the average number of "likes", again, the absence of any "likes" meant 0 points assigned (this was the case of two research subjects). For the average number of "likes" 0.1-2.5 the university received 0.5 points, for 2.6-5 "likes" 1 point, for 5.1-7.5 "likes" 1.5 points, for 7.6-10 "likes" 2 points, and for more than 10 "likes" it was 2.5 points. These criteria were evaluated using the MS Excel tool.

It's important to note the fact that one subject, specifically the Faculty of Management in Jindřichův Hradec, does not have its own YouTube channel. In this case, the subject of the evaluation was three random users' videos that were related to the Faculty.

Facebook

The first evaluation criterion in terms of Facebook utilization was also the fact whether the university's Facebook page was accessible directly from its website. If that was the case, the institution received 1 point (otherwise, it received 0 points).

Microsoft Power BI was used to quantify the other selected criteria, i.e., the number of Facebook posts and the number of fans of the university's Facebook page.The total number of posts consisted of the number of events, photographs, videos, links and statuses. The specific values are shown in Table 3.

Table 3: The number of posts and fans of selected universities' Facebook pages

The university	Events	Links	Photos	Status	Video	Total of contributions on FB	FB fans
Masaryk University – Faculty of Economics and Administration	137	977	431	92	31	**1668**	**4673**
Czech University of Life Sciences Prague - Faculty of economics and Management	191	859	548	503	38	**2139**	**10977**
Faculty of Economics - University of West Bohemia	133	304	414	53	53	**957**	**1409**
Faculty of Business and Management - Brno University of Technology	5	61	111	23	11	**211**	**1475**
Faculty of Economics - University of South Bohemia	107	88	284	40	35	**554**	**2461**
University of Hradec Králové - Faculty of Informatics and Management	121	295	157	17	56	**646**	**3432**
Faculty of International Relations - University of Economics in Prague	114	1284	539	89	31	**2057**	**5003**
Faculty of Business Administration - University of Economics in Prague	51	231	126	144	8	**560**	**1955**
Faculty of Management - University of Economics in Prague in Jindřichův Hradec	2	74	268	29	1	**374**	**1361**
Tomas Bata university in Zlín - Faculty of Management and Economics	81	267	511	151	48	**1058**	**3061**
Faculty of Economics and Administration - University of Pardubice	74	257	579	49	39	**998**	**1885**
Faculty of Social and Economics Studies - University of J. E. Purkyně	75	87	276	34	12	**484**	**1339**
Faculty of Economics - University of Ostrava	84	143	497	18	26	**768**	**2676**
Faculty of Business and Economics, Mendel University in Brno	142	272	330	36	29	**809**	**4754**
Technical university of Liberec - Faculty of Economics	124	218	523	360	12	**1237**	**2154**
School of Business Administration in Karviná	60	567	963	266	105	**1961**	**3677**
College of Polytechnics Jihlava	118	141	188	134	13	**594**	**4069**
The Institute of Technology and Business in České Budějovice	52	244	422	39	187	**944**	**9106**
University of Business in Prag	53	128	216	61	44	**502**	**5696**
The Institute of Hospitality Management in Prague	49	244	203	54	7	**557**	**3544**
Karel Engliš College in Brno	53	261	262	103	52	**731**	**1048**
Unicorn College in Prague	30	223	313	78	23	**667**	**3901**
Moravian University College Olomouc	28	230	815	79	40	**1192**	**1104**

Source: Author's own elaboration, 2017

The number of posts and fans were evaluated as follows:

- 0-500 posts = 0 points,
- 501-1,000 posts = 0.5 points,
- 1,001 – 1,500 posts = 1 point,
- 1,501 – 2,000 posts = 1.5 points,
- 2,001 and more posts = 2 points,
- 1-1,500 fans = 0.5 points,
- 1,501 – 3,000 fans = 1 point
- and 3,001 and more fans = 1.5 points.

The tables below (Table 4a and Table 4b) show the overall evaluation results for social media utilization (YouTube and Facebook).

Table 4a: The level of utilization of YouTube by individual subjects

The university	Link for YouTube on websides	YouTube channel	Video on YouTube	Average of video viewed/year	Average of "Like"/year
Masaryk University – Faculty of Economics and Administration	0	1	0,5	1	0
Czech University of Life Sciences Prague - Faculty of economics and Management	1	1	0,5	1,5	0,5
Faculty of Economics - University of West Bohemia	0	1	1	0,5	0,5
Faculty of Business and Management - Brno University of Technology	0	1	0,5	2,5	0,5
Faculty of Economics - University of South Bohemia	1	1	1,5	0,5	0,5
University of Hradec Králové - Faculty of Informatics and Management	0	1	0,5	2,5	2
Faculty of International Relations - University of Economics in Prague	0	1	1	1	0,5
Faculty of Business Administration - University of Economics in Prague	0	1	0,5	0,5	0,5
Faculty of Management - University of Economics in Prague in Jindřichův Hradec	0	0	0,5	1	0,5
Tomas Bata university in Zlín - Faculty of Management and Economics	0	1	0,5	0,5	0,5
Faculty of Economics and Administration - University of Pardubice	0	1	0,5	1	0
Faculty of Social and Economics Studies - University of J. E. Purkyně	1	1	0,5	1	0,5
Faculty of Economics - University of Ostrava	0	1	0,5	0,5	0,5
Faculty of Business and Economics, Mendel University in Brno	0	1	0,5	2,5	2,5
Technical university of Liberec - Faculty of Economics	0	1	0,5	0,5	0,5
School of Business Administration in Karviná	0	1	0,5	0,5	0,5
College of Polytechnics Jihlava	0	1	0,5	1	1
The Institute of Technology and Business in České Budějovice	0	1	1	0,5	0,5
University of Business in Prag	1	1	1	0,5	0,5
The Institute of Hospitality Management in Prague	1	1	0,5	2,5	0,5
Karel Engliš College in Brno	1	1	0,5	0,5	0,5
Unicorn College in Prague	0	1	2,5	0,5	0,5
Moravian University College Olomouc	0	1	1,5	2	0,5

Source: Author's own elaboration, 2017

Table 4b: The level of utilization of Facebook by individual subjects, including overall evaluation

The university	Link for FB on websides	Contributions on FB	FB fans	Total evaluation
Masaryk University – Faculty of Economics and Administration	1	1,5	1,5	**6,5**
Czech University of Life Sciences Prague - Faculty of economics and Management	1	1,5	2	**9**
Faculty of Economics - University of West Bohemia	1	0,5	0,5	**5**
Faculty of Business and Management - Brno University of Technology	1	0,5	0	**6**
Faculty of Economics - University of South Bohemia	1	1	0,5	**7**
University of Hradec Králové - Faculty of Informatics and Management	1	1,5	0,5	**9**
Faculty of International Relations - University of Economics in Prague	1	1,5	2	**8**
Faculty of Business Administration - University of Economics in Prague	1	0,5	0,5	**4,5**
Faculty of Management - University of Economics in Prague in Jindřichův Hradec	1	0,5	0	**3,5**
Tomas Bata university in Zlín - Faculty of Management and Economics	1	1,5	1	**6**
Faculty of Economics and Administration - University of Pardubice	1	0,5	1	**5**
Faculty of Social and Economics Studies - University of J. E. Purkyně	1	0	0,5	**5,5**
Faculty of Economics - University of Ostrava	1	1	0,5	**5**
Faculty of Business and Economics, Mendel University in Brno	1	1,5	0,5	**9,5**
Technical university of Liberec - Faculty of Economics	1	1	1	**5,5**
School of Business Administration in Karviná	1	1,5	1,5	**6,5**
College of Polytechnics Jihlava	1	1,5	0,5	**6,5**
The Institute of Technology and Business in České Budějovice	1	1,5	0,5	**6**
University of Business in Prag	1	1,5	1	**7,5**
The Institute of Hospitality Management in Prague	1	1,5	1	**9**
Karel Engliš College in Brno	1	0,5	0,5	**5,5**
Unicorn College in Prague	1	1,5	0,5	**7,5**
Moravian University College Olomouc	1	0,5	1	**7,5**

Source: Author's own elaboration, 2017

The table above answers the specific questions related to the second general question: "What is the level of utilization of social media sites, specifically Facebook and YouTube, by individual subjects?", and thus also answers the general question itself.

3.3 Assessment Of The Correlation Between The Level Of Utilization Of Websites And The Level Of Utilization Of Social Media Sites

The important objective of this research was to determine the correlation between the rank-order of the individual variants using the Spearman coefficient, with which one can determine the correlation, or agreement, between the rank-orders of individual variants, that is, the level of utilization of websites and the level of utilization of social media sites (YouTube and Facebook) by the selected subjects – see the third general question. We suppose that if an institution is engaged in promotion through its website, it will also promote its activities, at a similar level, using social media outlets. Therefore, if the university's promotion on its website is evaluated, using assessment criteria, as very effective, we assume its utilization of YouTube and Facebook will also be highly effective.

To calculate the Spearman coefficient, the order of individual subjects based on their overall evaluation needs to be determined(see Table 1b, Table 4b).

The table below (Table 5) shows the rank-order of individual subjects based on the evaluation in the selected criteria. As can be seen, the subject with the highest rating (i.e., that which received the most points) was assigned rank "1", etc. If more than one subject received the same evaluation, they were assigned average rank-order numbers (e.g., in terms of their evaluation of website use, two subjects received 10 points, which would have put them at 6th and 7th place – therefore, they were both assigned the value of 6.5) (cf. Šubrt, T. et al, 2015)

Table 5: The rank-order of individual variants based on their evaluation

Total Evaluation (websides)	Rank Order (websides) = pi	Total Evaluation (social networks)	Rank Order (social networks) = qi
10	6,5	6,5	11
10,25	5	9	3
7	20	5	20
7,5	17	6	14
11,5	1	7	9
11,25	2	9	3
6,75	22	8	5
7	20	4,5	22
8,25	15,5	3,5	23
5,5	23	6	14
9	12,5	5	20
10,75	4	5,5	17
8,75	14	5	20
11	3	9,5	1
9,25	10	5,5	17
9,5	8	6,5	11
8,25	15,5	6,5	11
7	20	6	14
9	12,5	7,5	7
9,25	10	9	3
10	6,5	5,5	17
9,25	10	7,5	7
7,25	18	7,5	7

Source: Author's own elaboration, 2017

The formula for the calculation of the Spearman coefficient is shown below (Figure No. 1). The value of the Spearman coefficient ranges within the interval <-1; 1>, where the value 1 means complete agreement of the rank-orders; the value 0 indicates zero correlation of the rank-orders, and the value -1 shows complete negative, that is indirect, correlation between the rank-orders.

$$\rho = 1 - \frac{6\sum_i (p_i - q_i)^2}{n(n^2 - 1)}$$

Fig. 1: Formula for the calculation of the Spearman coefficient

Source: Hendl 2009 and Synek et al. 2009

The values p_i and $q_i$are the rank-order indices in Table No. 5. The letter "n" indicates the number of subjects, of which, in our case, there were 23.

Table No. 6 shows the process of calculation of the Spearman correlation coefficient, including its result.

Table 6: The calculation of the Spearman correlation coefficient

The university	pi	qi	(pi-qi)	(pi-qi)2	∑ (pi-qi)2	n	Spearman's coefficient
Masaryk University – Faculty of Economics and Administration	6,5	11	-4,5	20,25	1227,5	23	**0,3935**
Czech University of Life Sciences Prague - Faculty of economics and Management	5	3	2	4			
Faculty of Economics - University of West Bohemia	20	20	0	0			
Faculty of Business and Management - Brno University of Technology	17	14	3	9			
Faculty of Economics - University of South Bohemia	1	9	-8	64			
University of Hradec Králové - Faculty of Informatics and Management	2	3	-1	1			
Faculty of International Relations - University of Economics in Prague	22	5	17	289			
Faculty of Business Administration - University of Economics in Prague	20	22	-2	4			
Faculty of Management - University of Economics in Prague in Jindřichův Hradec	15,5	23	-7,5	56,25			
Tomas Bata university in Zlín - Faculty of Management and Economics	23	14	9	81			
Faculty of Economics and Administration - University of Pardubice	12,5	20	-7,5	56,25			
Faculty of Social and Economics Studies - University of J. E. Purkyně	4	17	-13	169			
Faculty of Economics - University of Ostrava	14	20	-6	36			
Faculty of Business and Economics, Mendel University in Brno	3	1	2	4			
Technical university of Liberec - Faculty of Economics	10	17	-7	49			
School of Business Administration in Karviná	8	11	-3	9			
College of Polytechnics Jihlava	15,5	11	4,5	20,25			
The Institute of Technology and Business in České Budějovice	20	14	6	36			
University of Business in Prag	12,5	7	5,5	30,25			
The Institute of Hospitality Management in Prague	10	3	7	49			
Karel Engliš College in Brno	6,5	17	-10,5	110,25			
Unicorn College in Prague	10	7	3	9			
Moravian University College Olomouc	18	7	11	121			

Source: Author's own elaboration, 2017, based on the aforementioned sources

The table above clearly shows that the value of the Spearman correlation coefficient is 0.394. Therefore, it indicates a low correlation between the selected values. In this case, it means a low level of agreement between the degree to which subjects utilize websites and social media sites. Therefore, we cannot assume that the level of utilization of websites by universities correlates to the level of utilization of social media sites (as per the evaluation using the selected criteria), which answers the third and last general question: "What is the correlation between the level of utilization of websites and the level of utilization of social media sites in the selected subjects?" and the stated hypothesis. The level of correlation is low.

Conclusion

This research paper presents the output of asurvey research focusing on the comparison of Czech colleges and universities that offer their target group mainly economic majors. The aim of the research was to determine how the individual subjects fare in terms of marketing communication through websites and social media sites, and also to establish whether a correlation between the level of utilization of these two communication channels can be expected (i.e., whether it can be assumed that institutions that utilize their websites at a certain level will also engage, at a similar level, in promotion using social media sites). Following the calculation of the Spearman correlation coefficient, it was determined that the agreement between the level of utilization of websites and social media sites by the selected institutions is low.

This research study is part of the output of an empirical survey that contributes to the development of the application of marketing in the area of higher education, and is a specific follow-up to, for example, creating university brands.

The limitation of the study lies in the fact that it was conducted among economic universities. Another limitation can be using of heuristic evaluation - research results seem to be subjective, but it made instructed experts. The research may be further expanded to include other universities or their major

fields of study and their online communication with the target group.

References

Journal Articles

Azoury, N., Lindos, D. and Khoury, Ch., E. (2014),'University image and its relationship to student satisfaction – case of the Middle Eastern private business schools,' *International Strategic Management Review*, 2, 1-8.

Eger, L. and Egerová, D. (2016),'Project risk management in educational organizations: a case from the Czech Republic', *Educational Management Administration & Leadership*, 44,(4), 578–598.

Jurášková, O., Juříková,M. and Kocourek, J. (2015),'Brand building of a University as an integral part of the educational proces,'*Turkish Online Journal of Educational Technology*, 100-105

Luque-Martínez, T and Del Barrio-García, S. (2009),'Modelling university image: The teaching staff viewpoint,'*Public Relations Review*, 34, 325-327.

Rauschnabel, P. A., Krey, N., Babin, B. J. and Ivens, B. S. (2016),'Brand management in higher education: The University Brand Personality Scale,'*Journal of Business Research*, 69,3077-3086.

Rutter, R., Roper, S. and Lettice, F. (2016),'Social media interation, the university brand and recruitment performance,'*Journal of Business Research*, 69, 3096-3104.

Online Journals and websites

Flodrová, T., Šilerová, L., (2011),'Generace Y jiná cílová skupina,' [Online]. *E15.cz.* [Retrieved July 07, 2017]. Available: http://media.e15.cz/zurnal/generace-y-jina-cilova-skupina-712003

ICEF Monitor, (2014),'Signs of growing interest in study abroad as Czech Republic aims to stabilise education sector,' [Online]. *ICEF Monitor.* [Retrieved July 07, 2017]. Available: http://monitor.icef.com/2014/04/after-recent-uncertainty-czech-republic-aims-to-stabilise-education-sector/

Kartous, B., (2014),'Prezentace některých českých VŠ: arogance a peníze,' [Online]. *Britské Listy.* [Retrieved July 16, 2017]. Available: https://blisty.cz/art/75581.html

Kolowich, L., (2017),'20 of the Best Website Homepage Design Examples,' [Online]. *Hubspot.* [Retrieved July 08, 2017]. Available: https://blog.hubspot.com/blog/tabid/6307/bid/34006/15-examples-of-brilliant-homepage-design.aspx

Křížová, I., (2017),'Vysoké školy sázejí na marketing,' [Online]. *E15.cz.* [Retrieved July 16, 2017]. Available: http://www.e15.cz/temata-z-priloh/vzdelavani/vysoke-skoly-sazeji-na-marketing-1332026

Mediaguru (2017),'Nejdelší čas z webů věnují mladí lidé Youtube a Facebooku,' [Online]. *Mediaguru.* [Retrieved July 18, 2017]. Available: https://www.mediaguru.cz/2017/07/nejdelsi-cas-z-webu-venuji-mladi-youtube-a-facebooku/

Meyer, K., (2016),'Young Adults/Millennials as Web Users (Ages 18–25),' [Online]. *Nielsen Norman Group.* [Retrieved July 08, 2017]. Available: https://www.nngroup.com/articles/young-adults-ux/

Mocková, Z., (2016),'Vysoké školy lákají studenty svéráznými klipy,' [Online]. *Aktuálně.cz.* [Retrieved July 16, 2017]. Available: https://magazin.aktualne.cz/naborove-klipy-vysokych-skol-zaplavuji-internet-vliv-na-pote/r~0a6c0d86c35a11e593630025900fea04/?redirected=1497546194

Nations, D., (2017),'What Is Facebook,' [Online]. *Lifewire.* [Retrieved July 17, 2017]. Available: https://www.lifewire.com/what-is-facebook-3486391

Netmonitor, (2016),'Ročenka 2015,' [Online]. *NetMonitor*. [Retrieved July 18, 2017]. Available: http://www.netmonitor.cz/rocenky-netmonitor

Šimáková, M., (2017), : iDNES.cz [Online]. [Retrieved July 18, 2017]. Available: http://finance.idnes.cz/zamestnani-generace-y-digitalni-revoluce-f1p-/podnikani.aspx?c=A170328_112137_podnikani_kho

Websites, (2016),'Responzivní design' [Online]. 2016 *Websites.cz.* [Retrieved July 08, 2017]. Available: https://www.websites.cz/blog/responzivni-design-co-je-a-jak-funguje/

Books

Hendl J. (2009) Přehled statistických metod: analýza a metaanalýza dat, 3. Vyd, Portál, Praha.

Chráska, M. (2016) Metody pedagogického výzkumu, Grada, Praha.

Punch, K., Hendl, J. (2008) Úspěšný návrh výzkumu, Portál, Praha.

Strauss, J., Frost, R. (2012) E-marketing, Pearson Education, New Jersey.

Synek M., Kopkáně H., Kubálková, M. (2009) Manažérské výpočty a ekonomická analýza, C. H. Beck, Praha.

Šubrt, T. a kol. (2015) Ekonomicko-matematické metody, Aleš Čeněk, Praha.

Principles of Managerial Work in the Hotel Industry

Petr Cech, Institute of Hospitality Management in Prague, Prague, Czech Republic, chromy@vsh.cz
Jan Chromy, Institute of Hospitality Management in Prague, Prague, Czech Republic, chromy@vsh.cz
Marek Tomastik, Tomas Bata University in Zlin, Czech Republic, mtomastik@flkr.utb.cz

Abstract

Making use of quality human resources, including managers at all levels of management, is one way to gain a competitive advantage for a hotel or a hotel chain regarding its competitors. The authors of this article surveyed views on selected management principles that influence the quality of their work in meeting the organization's goals. The method of research was a questionnaire survey conducted between hotel and hotel chain managers. The research dealt with the assessment of their opinions on the importance of selected management principles. In the cases of key variables, statistical methods of dependency testing have been applied to allow validation or disproving of the established hypotheses.

The research results show that hotel and hotel chain managers in the Czech Republic determined "customer orientation" and "result orientation" as the most important managerial principles. The "fairness and commitment to ethical values" and the "commitment to a company " were considered as the least important principles. The research confirmed that good relationships and loyalty of customers, alternatively loyalty to a hotel or hotel chain, bring results indirectly. The "dependence of assessment the significance of managerial principles on management level, age, and expertise of managers" was confirmed. No dependence was proven in the "gender and attained education attainment of managers, as well as in the "classification and size" of the hotel or hotel chain in which the managers work.

Keywords: hotel, management, manager, managerial principles

Introduction

The success or failure of a particular hotel or hotel chain depends, among other things, on the quality of the people who manage them. We can assume that their role will be further enhanced in near future. The determination of strategic goals and objectives, the creation of an efficient organizational structure, the selection of quality staff, or the ways of managing co-workers, will depend on their quality. Therefore, it is necessary to deal with the issue of principles that managers of the hotel industry considered to be the most significant in their work. Adherence and application of selected principles should help managers to meet established goals of the entire organization or its organizational units. The evaluation of selected principles of managerial work (focus on performance, focus on results, customer orientation, team orientation, commitment to the company, honesty and commitment to ethical values) provides further insight into a comprehensive view of the issue of managerial work in the hotel industry.

Principles of Managerial Work

For the purposes of this article, the authors proceeded from understanding the principles of managerial work by Veber et al. (2014). Veber points out that the principles may vary to a certain extent depending on the level at which the manager works, the nature of the managerial position, the size of the organization, sphere of its activity etc. Although it is not possible to clearly define universal common principles and features of managerial work for all levels of management, it is possible to summarize them with a certain level of simplification. Managers should be able to use in their work the following principles: replenishing and developing their knowledge and skills, increasing the performance of managed staff, result orientation, customer orientation, ability work with people, including the ability to

manage teamwork, loyalty to the organization, adherence of ethical standards as a part of social responsibility, managing the classical managerial functions, emphasis on conceptual thinking, paying attention to prevention, proactively acting, managing quality changes and risks, setting priorities, ability to formulate visions, missions and business strategies, as well as applying new approaches, methods and techniques in management.

The research of this issue is based on previous research concerning the replenishment and development of knowledge and skills of managers in the hotel industry (Cech, Koklarova and Cechova, 2015). It has been found that the most beneficial methods to acquire the professional skills of managers are the following methods: "thinking about my work"; "learning from your own mistakes" "learning at the workplace". The least beneficial were the methods of "trying to imitate my professional model" and "extra-work life “.

The contemporary advanced world is representative of the increased interest in continuing professional education. The environment in which today’s specialists work and continue their education is ever more volatile, more demanding, and more critical of possible mistakes; therefore, specialists are constantly forced to expand their knowledge and improve their occupational skills.

The issue of acquiring the desirable skills of managers is being addressed by more and more authors in their research activities. For the purposes of this article, the authors focused primarily on the economic education of managers (Asztalos 2016, Krpalek, 2015) and on the principles of managerial work (Cech, Beranek, Koklarova, 2015). The authors of this article focused on six selected principles of managerial work in their research:

- performance orientation;
- result orientation;
- customer orientation;
- team orientation;
- commitment to a company;
- honesty and commitment to ethical values.

Within fulfilling the principle "performance orientation" managers should realize that the staff’s performance is a set of their characteristics and dispositions that determine how they perform their assigned tasks (Krpalkova Krelova, 2016). In the course of time, the performance of workers changes and is influenced, among other things, by assigning and organization their work, by work with people in a company, by the quality of managing people or quality of interpersonal relationships at work (Dolezal, 2012).

Result orientation is intended to focus on key objectives so that the results meet all stakeholders while adhering to ethical, legal and environmental issues. At the same time, it is necessary to realize that the manager is not paid for the hard work, nor for the plans or reports he produces, or the hard work of all his subordinates. He or she is paid for the results of the organization or a part of the organization (Pitaš, 2012). As the Sveiby's model of intellectual capital show, the following principles "good relationships" and "loyalty of customers" (customer orientation), or "loyalty to the hotel or hotel chain" can be included under the customer's capital of the hotel or hotel chain (Sveiby, 1988). Hammer (2012), out of the nine recommendations for the success of an enterprise in the 21st century, dedicates two customer-orientated recommendations, specifically to make it easier for customers to collaborate with the company and offer to the customer added value.

Fulfilling the "team orientation" principle corresponds to the current developmental tendencies in organizational architecture of companies (Berkova, 2016). As a team, we can consider both the grouping of people who are associated to fulfil certain tasks, as well as an ad hoc workgroup designed for the creative solution or the realization of a specific task. The purpose of promoting teamwork is to persuade

workers that each of them contributes to the final results of the group and that cooperation and assistance are the right way to achieve their goals. The modern corporate environment and the trends in its development in relation to the skills required by professional managers (Ambrožová Ullrich) significantly influence team work and help the "team orientation" principle.

For any company in every field, including the hotel industry, loyal employees are a benefit (the principle of commitment to the company). Those who do not feel any sense of belonging to the company can do a lot of harm to the company. The advantage if an employee accepts positive goals and identifies with them, is that he or she then solves problems actively and initiatively. From the company management point of view, such a worker is ideal. There are many ways in which the employee's relationship to society can be directly influenced. Managers should primarily fulfil their promises and measure each one by the same metric, take an interest in both occupational and personal problems of the subordinates and ask questions about their opinion (Kralova, 2016).

Observance of ethical values is understood as a part of the corporate responsibility of a managed organization. For example, Philip and Milton Kotler (2013) consider corporate social responsibility as one of the possible strategies that will enable the company to make long-term and profitable growth. Indirectly, it will affect the achievement of results, i.e. the management principle of "result orientation". The possibilities of achieving the outstanding reputation of the company in the field of its social responsibility in the hotel industry in the Czech Republic were described in the article by Cech and Dohnalova (2015). Hotels and hotel chains in the Czech Republic, concurrently with promoting their professional interests, aim at ensuring that all business activities comply with generally accepted ethical principles of business activity and interpersonal relationships in a democratic society. Emphasis is put on customer health protection. It is also necessary to strictly observe hygiene standards and regulations in both the catering and accommodation areas.

Methodology

The aim of the research was to find out which principles of managerial work are considered by managers in the hotel industry to be the most important in their work. The core set included top-level, middle and first-line managers working in independent hotels or hotel chains in the Czech Republic. The authors examined whether there is a dependency between the assessment of the significance of the chosen principles and managers´ gender, level of management, age, achieved education, expertise, and classification and size of the hotel in which the managers work. For this article, a questionnaire survey method was chosen. Out of 900 questionnaires, respondents completed 435 of them. A total of 228 women and 207 men participated in the questionnaire survey. The gender ratio testifies in favour of an adequate and random selection from a point of view of respondents´ gender. These respondents form a sample set of managers. The return rate of the questionnaires was 48.3 %. The obtained data was arranged to groups to distinguish the characteristics of the monitored phenomena. To test the key variables, the statistical methods of dependency testing have been applied to allow validation or disproving of the established hypotheses. Neubauer claims that: "Statistical data analysis without computers is hardly imaginable nowadays" (Neubauer, 2011), and the results of this work have enabled the authors to select a suitable program to evaluate the data obtained.

Research includes a large area of management, which is a reason why only a part of the outcomes was chosen for the purposes of the article. The research outcomes are described in the following chapter in graphs.

Research Outcomes: Questionnaire Survey Assessment

The research outcomes were evaluated according to the six previously mentioned principles of managerial work whose appellations were shortened in the figures in the following way: - performance,

result, customer, team, firm and ethics. The respondents in the questionnaire ordered the selected principles according to importance for their managerial work (1 - the most important, 6 - the least important).
In the article, there is graphically presented a part of outcomes that documents respondents' opinions, including their ranking according to established criteria. For the data graphical presentation, the weighted means of significance order were used.

Fig 1 presents an assessment of the importance that respondents have assigned to the individual principles of their managerial work.



Fig 1: Assessment of managerial principles significance

From the obtained data assessment, it is possible to generalize that respondents selected as the most important principle the following management principles: "customer orientation" and "result orientation". As the least important principles they considered: "honesty and commitment to ethical values", and "commitment to the company".

Fig 2 shows the importance of gender from a point of view of managerial principles.

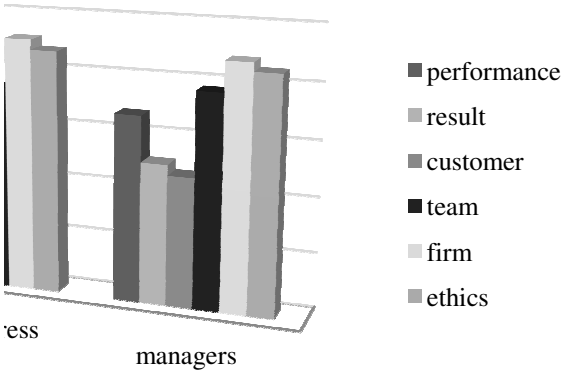


Fig 2: Assessment according to gender

The authors then examined whether there is a dependence between gender and the importance of selected principles of managerial work. The following hypotheses were formulated to assess the first principle of managerial work. H_0 hypothesis: "There is no statistically significant difference between gender of managers and their assessment of performance orientation" and H_1 hypothesis: "There is a statistically significant difference between gender and performance-oriented assessment." All other hypotheses dealing with managerial work were tested identically. Based on the Independence Test of 5 % significance level, the zero hypothesis (H_0) on the independence of individual characters was not rejected. This means that it has not been possible to prove that there is any dependence between gender and the assessment of selected principles.

Fig 3 gives an assessment of the importance of managers´ work principles with respect to the levels of management they are working on.

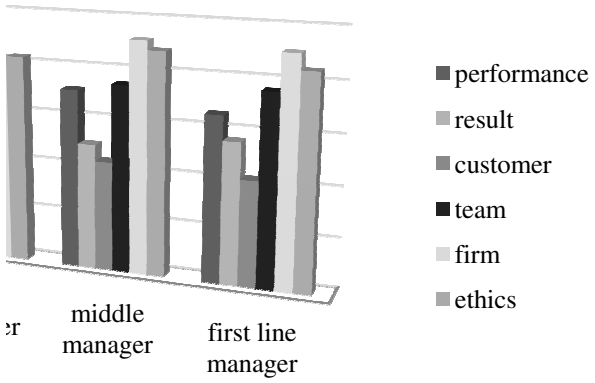


Fig 3: Assessment of importance according to a level of management

Respondents at all three levels of management assessed "customer orientation" as the most important managerial work principle. The test of 5 % significance level enabled to reject the zero hypothesis (H_0) dealing with the independence of individual characters and to accept an alternative hypothesis (H_1), which tested the "performance orientation" and the "team orientation" principles. This means that there is a certain dependence between assessment of these principles importance and levels of management on which managers work. All top managers attributed the greatest importance to the "performance orientation" principle, on the other hand, the principle of "team orientation" was the most important among managers at middle levels.

The Fig 4 shows the importance of selected managerial work principles in groups of respondents according to their age (15-24, 25-34, 35-44, 45-54, 55-64).

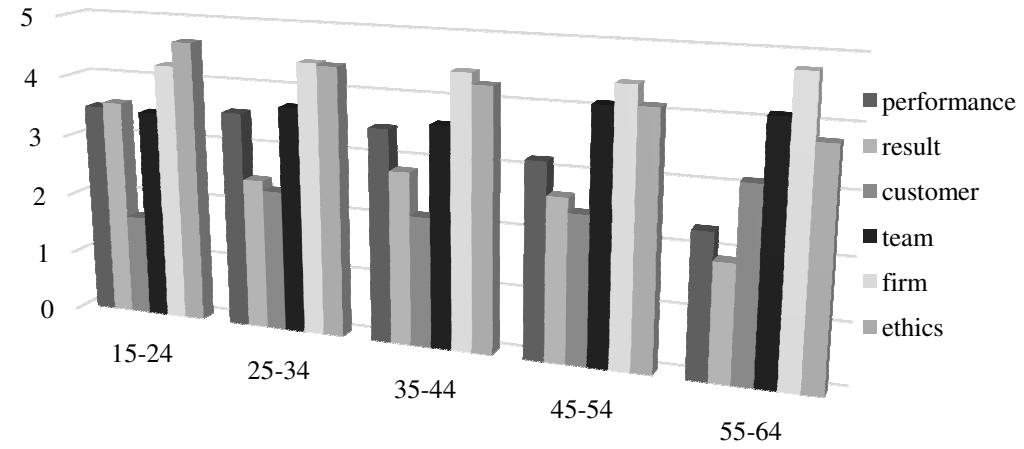


Fig. 4: Assessment according to managers´ age

The Test of Independence confirms at the level of 5 % significance that there is a certain dependence between the managers' age and their assessment of the following principles' importance: "result orientation" and "commitment to a company". The "result orientation" was assessed as the most important principle by respondents at the age of 55-64. The least emphasis on this principle was put by respondents at the age of 15-24. "Commitment to a company" was assessed as the least important managerial principle by all managers excluding the age category up to 24. The smallest importance was assigned to this principle by respondents at the age 55-64.

The Fig 5 demonstrates importance of selected principles of managerial work according to education of respondents. Legend to Fig 5: B-Apprenticeship with secondary school-leaving exam, C-secondary education with secondary school-leaving exam, D-higher technical, E-bachelor degree, F-master degree.

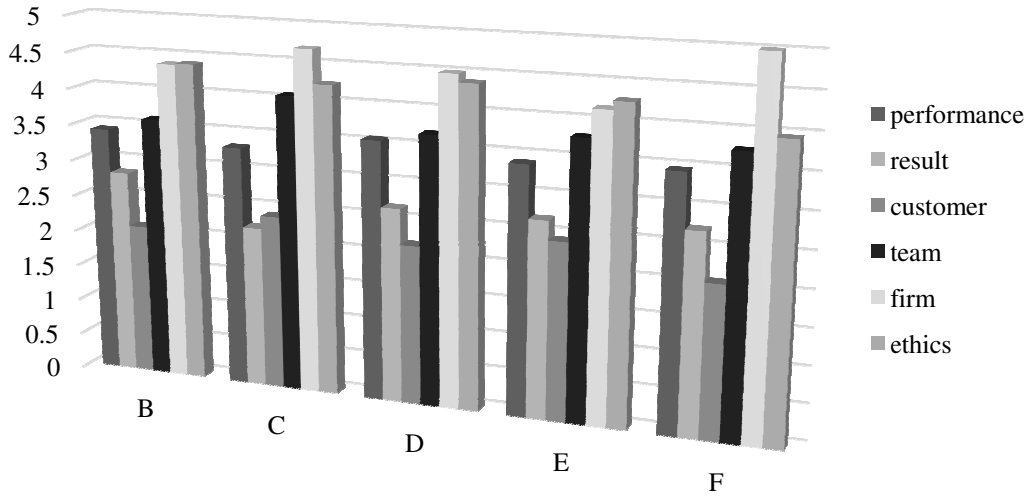


Fig. 5: Assessment of importance according to education

Based on the Test of Independence at the 5 % significance level, the zero hypothesis (H_0) dealing with the independence of individual characters was not rejected. This means that it has not been possible to prove that there is any dependence between the managers´ education and the assessment of selected principles of managerial work.

Fig 6 illustrates the importance of selected principles of managerial work according to their expertise and the related section in which the respondents work.

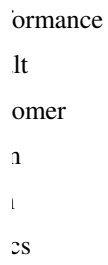


Fig. 6: Assessment of importance according to expertise (section)

The Test of Independence at the 5 % significance level enabled to reject the zero hypothesis (H_0) dealing with the independence of individual characteristics and to accept an alternative hypothesis (H_1) dealing with the principles of "performance orientation", "customer orientation", and "team orientation". This means that there is some dependence between the evaluation of the importance of these principles and the expertise (hotel section) of the respondents.

The work in a particular hotel section influenced the point of view at the importance of the individual managerial work principles. The "performance orientation" was assessed as more important by respondents from the economic section. The least importance was given to this principle by respondents from the catering section. "Customer orientation" was important for the respondents from the accommodation section, while on the contrary, workers in the technical department assessed it as the least important. It corresponds to the content of their work, as the duties of technicians are related to customer service indirectly only. "Team orientation" was significantly evaluated in the catering sector, but the least importance was given to this principle by respondents in the economic section. On the contrary, for the respondents working in the economic section, the "commitment to a company" was considered as more important than for the respondents from other hotel sections.

Fig 7 demonstrates the importance of selected managerial principles according to the hotel classification (number of stars) in which respondents' work.

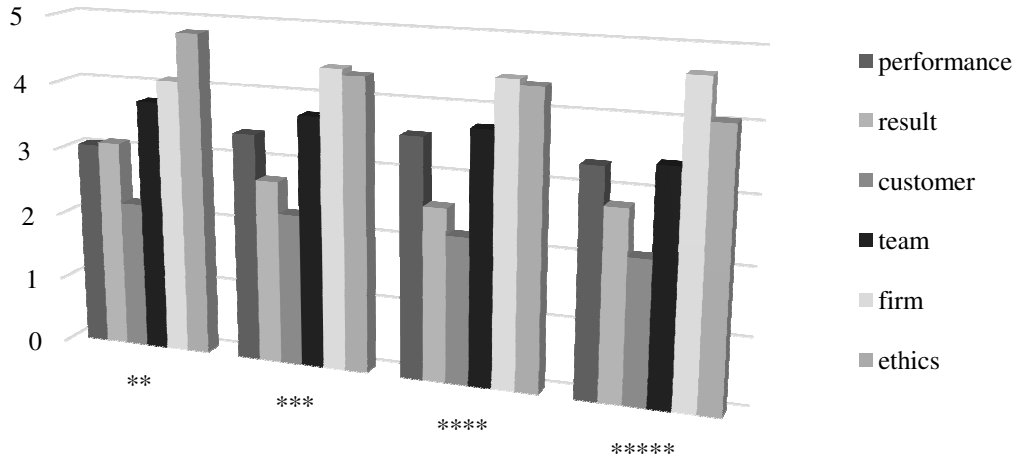


Fig.7: Assessment of importance according to a hotel classification

The Test of Independence at the 5 % significance level enabled the authors not to reject the zero hypothesis (H_0) dealing with the independence of individual characteristics. This means that it has not been possible to prove that there is dependence between the classification of the hotel and the assessment of selected principles of managerial work.

Fig 8 illustrates the importance of selected management principles according to the size of the hotel in which the respondents work.

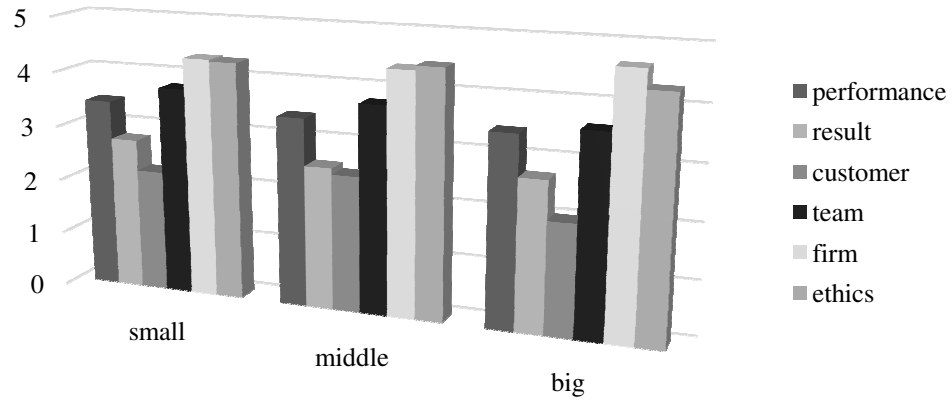


Fig. 8: Assessment of importance according to a hotel size

The Test of Independence at the 5 % significance level enabled the authors not to reject the zero hypothesis (H_0) dealing with the independence of individual characteristics. This means that it has not been possible to prove that there is dependence between the size of the hotel and the assessment of selected principles of managerial work.

Conclusion

The article deals with selected principles of the work of managers working in hotels and hotel chains. Within the framework of their research, the authors tested selected principles of managerial work according to the established criteria. From the assessment of the obtained data it is possible to generalize that respondents evaluated as the most important of the listed managerial principles the following: "customer orientation" and "result orientation". As the least important principle they chose "honesty and commitment to ethical values" and especially "commitment to the company".

The opinion of today's management that emphasizes the need to produce and deliver to customers a production that gives them a value have been confirmed. If managers in hotels and hotel chains can provide their customers with valuable services, it gives the business a competitive advantage. Good relationships and customers´ loyalty, alternatively loyalty to the hotel or hotel chain, brings indirectly appropriate results.

As the second most important managerial principle, the respondents chose “outcome orientation". Managers realize that all resources and efforts should be oriented towards achieving the objectives of the hotel or its part. This point of view requires an ability to set specific goals that ultimately lead to the fulfilment of the organization's mission and vision.

On the other hand, the respondents chose as the second least most important management principle “honesty and commitment to ethical values". Although the authors foresaw the possibility of this result, it gives us food for thought as to whether it should be evaluated in this way. Respect for ethical values should be understood by managers as a part of corporate responsibility.

The assessment of "commitment to the company" corresponds to the current situation in the hotel industry, where many workers at a particular job work only briefly, or after some time they leave the current employer and go to another one in the field.

The authors found that the assessment of the significance of management principles in the hotel industry does not depend on gender and the respondents´ education, nor does it depend on the classification and size of the hotel in which they work.

Certain dependency exists, if the managers´ responses were organized according to the respondent´s level of management, age and expertise. For example, respondents under the age of 24 put the slightest emphasis on "result orientation"; on the contrary, they set more emphasis than older respondents to the principle of "commitment to the company", which is a very interesting finding. "Output orientation" is related to channelling resources and to efforts to achieve the given goals. As respondents under the age of 24 work mainly at lower levels of management, it can be deduced that these positions do not put as much emphasis on planning and the associated goal setting.

The results were the opposite for the group of managers aged 55-64. It can be assumed that the respondents at this age group usually hold higher managerial positions, have a lot of experience from previous practice, and thus put greater emphasis on key objectives which satisfy all stakeholders. The least emphasis was put by these respondents on the principle of "commitment to the company". This may be related to the situation where these managers want to evaluate their knowledge and skills as much as possible and therefore are willing to change their job before retirement.

References

Ambrozova, E., Kolenak, J., Ullrich, D, et al. (2015), 'Corporate environment and the abilities required of professional managers.' Proceedings of the 25th International-Business-Information-Management-Association Conference. ISBN: 978-0-9860419-4-5, 7-8 May 2015, Amsterdam, Netherlands, VOL I-VI, 753-769.

Asztalos, O. (2016). 'Economic education in occupational stratification.' [Online]. *Media4u Magazine*. [Retrieved September 27, 2017]. Available: http://www.media4u.cz/mm022016.pdf.

Berkova, K. (2016). 'The Leveling of Students' Knowledge in the Subject Accounting at Faculties of Economics.' [Online]. *Media4u Magazine.* [Retrieved September 22, 2017]. Available: http://www.media4u.cz/mm032016.pdf.

Čech, P., Beránek, M. a Koklarová, B. (2015). "Hodnocení důležitosti vybraných principů manažerské práce v hotelnictví." Sborník Mezinárodní vědecká konference Hotelnictví, turismus a vzdělávání. ISBN: 978-80-87411-70-4. 21. října 2015, Praha, Česká republika, 50-57.

Cech, P. and Dohnalova, M. (2015). 'How Corporate Social Responsibility Can Contribute to Growth Strategy.' Proceedings of the 21st International Scientific Conference on The Knowledge-Based Organization (KBO). ISSN: 1843-6722, 11-13 Jun 2015, Sibiu, Romania, 160-164.

Cech, P., Koklarova, B and Cechova, I. (2015). 'Professional Education in Different Specializations.' Proceedings of the 8th International Conference of Education, Research and Innovation (ICERI2015). ISBN: 978-84-608-2657-6, ISSN: 2340-1095, 16-20 November 2015, Seville, Spain, 6771-6780.

Doležal, J. a kolektiv. (2012) Projektový management podle IMPA. 2. aktualizované a doplněné vydání, Grada, Praha.

Hammer, M. (2012) Agenda 21. Co musí každý podnik udělat pro úspěch v 21. století, Management Press, Praha.

Kotler, P. a Kotler, M. (2013) 8 strategií růstu Jak ovládnout trh, BizBooks, Brno.

Kralova, A. (2016). 'Didactic Approches in Education of Economics.' [Online]. *Media4u Magazine.* [Retrieved September 22, 2017]. Available: http://www.media4u.cz/mm042016.pdf.

Krpalek, P. (2015). 'Support for the Development of Entrepreneurship in the Education Business Economics.' [Online]. *Media4u Magazine.* [Retrieved September 22, 2017]. Available: http://www.media4u.cz/mm042015.pdf.

Krpalkova Krelova, K. (2016). 'Evaluation and Self-Evaluation of the Quality Management System at the University.' [Online]. *Media4u Magazine.* [Retrieved September 23, 2017]. Available: http://www.media4u.cz/mm032016.pdf.

Neubauer, J. (2011). 'Selected Statistical Methods in R.' Proceedings of the 29th International Colloquium on the Management of Educational Process. ISBN: 978-80-7231-779-0, 19 May 2011, Brno, Czech Republic, 239-249.

Pitaš, J. a kolektiv. (2012) Národní standard kompetencí projektového řízení, verze 3.2. [Online]. SPŘ, Brno, [Retrieved September 23, 2017]. Available: http://old.ipma.cz/web/files/narodni-standard-kompentenci-projektoveho-rizeni.pdf.

Sveiby, K. E. (1988) The Invisible Balance Sheet. [Online]. [Retrieved September 22, 2017]. Available: http://www.sveiby.com/books/DenOsynligaEng.pdf.

Veber, J. et al. (2014) Management. Základy, moderní manažerské přístupy, výkonnost a prosperita. Management Press. Praha.

Selected Determinants of Educational Communication in a Multicultural Society

Jan Chromy, Institute of Hospitality Management in Prague, Prague, Czech Republic, chromy@vsh.cz

Dagmar Lanska, Institute of Hospitality Management in Prague, Prague, Czech Republic, lanska@vsh.cz

Petr Cech, Institute of Hospitality Management in Prague, Prague, Czech Republic, chromy@vsh.cz

Abstract

The paper focuses on determinants of educational communication in a multicultural society. For an overview, the paper analyzes the entire components of Laswell's communication model, putting the emphasis on the side of the recipient of the message. This area is fragmented and the most problematic in a multicultural society. It is also related to the recipients are equipped with tangible didactic tools differently in various parts of the world, and, logically, have consequent different skills at handling them.

Moreover, in some parts of the world, there is a digital divide, which not only restricts the use of modern forms of electronic communication, but even prevents directly their use in education. Some forms of education are, in fact, impracticable in those areas, e.g. E-learning.

Existent cultural differences can also cause problems in everyday communication and thereby hamper the optimal progress of educational processes. Together, these determinants impede the work of teachers, placing high demands not only on their expert knowledge, but especially on their orientation in a multicultural environment, their suitable communication and their best control of the latter.

Keywords: digital divide, education, communication, people, determinants

Introduction

Laswell´s communication model, which was originally intended for mass communication, can also be used for educational communication in a multicultural society. Basically, it is defined in one sentence "Who - Says What - To Whom - In Which Channel –- With what effect?", see Chromy, Semeniuk, Drtina (2011). Specialists in the field can study in a detailed and comprehensive way each of the separate parts of the sentence.

As far as the present article is concerned:

Who - is the message transmitter (source). Anything that relates to teachers, organizations, quality of schools, etc. is open to analysis.
Says What – represents the content and form of transmitted data, information and knowledge.
To Whom - is the recipient of the message that has certain personal individual characteristics, and cultural and social environment in which they live. In this article, the authors suggest a necessary content analysis of the communication recipient which should be done by the transmitter when planning the course content and development of educational processes.
In Which Channel - a means associated with the transmitted content and its form. In this article, we will deal exclusively with electronic environment, represented by the Internet. This can be understood as a specific analysis of the electronic environment planned to be used in education in a multicultural environment unrestricted by national borders.

With what effect? - represents the effect of the educational process, in this case it is the communication transmitter's impact on the recipient via communication channels; a specific form transmitting the required content.

In this article, the authors indicate a necessary analysis of the recipients at one hand, and they deal with the Internet as a communication channel between the recipients and the transmitters. The aim is to analyze the main determinants of educational communication in a multicultural society and to consider their possible removal, or uniqueness of a solution, and its time limits.

The preparation of modern education should be based on the assumptions which are analogous to normal operating communications in a multicultural society in a global environment, these being taken as a starting point. According to Charbonneau-Gowdy education is a social process in which communication is of crucial importance and she emphasizes that communication methods have dominated approaches to teaching and learning for over three decades, see Charbonneau, Gowdy, Cechova, Barry (2012).

Methodology

Based on Laswell's communication model, individual areas for future research were determined. Subsequently, all particular areas were analyzed. The article focuses primarily on the digital divide, i.e. communication recipient's area. In this case, the communication recipient's topic is very closely related to transmission channels (tools) that may not be available to communication recipients, or they are available in a limited extent.

The recipient group was geographically bounded according to the possibility of obtaining relevant data. Firstly, the recipient area with their particular specific properties that significantly differ according to the different areas in which they live, was analyzed. The need for a comparative analysis of cultural differences in these areas was stated.

Subsequently, based on a synthesis of several statistical researches, the ability (or, as the case may be, facility) of using the Internet use was investigated.

This is related to the subsequent analysis of the capability to maintain standards in terms of information and communication technologies. Google Analytics data were used, as they make possible to obtain geographically linked data about users and their use of information and communication technologies in different parts of the world. These data are associated to visits to specific Websites.

The research questions were set:
- Whether the communication and business negotiations are based on the culture of the monitored territories.
- Whether the use of the Internet is the same in different parts of the world.
- Whether a quick and relatively easy removal of determinants of communication in a multicultural society may be presupposed.

The synthesis of all the data collected resulted in determinants that, by analogy, are directly related to educational processes and their management in a multicultural society.

Results

It is globalization that accounts most for emergence and development of a multicultural society. Its biggest advantage is the growth of technological progress, the development of means of communication, dissemination of know-how or other knowledge and skills, job increase, investments and the overall

economy growth, and a better understanding of the different cultures by people from all over the world, etc, see Safe (2005).

Communication Recipients

At present, not everyone is in favour of the benefits of globalization. This is primarily caused by misunderstanding and fear of losing power on the side of individual governments, and fear of the growing power of international companies. With the ongoing globalization, traditional knowledge is not being transmitted and there is a fear of losing their own identity and uniqueness due to copying the behaviour which is common in Western countries. The disappearance of local products and their replacement by standardized products represent other threats. A major global problem is the spread of diseases and viruses, increased threat of terrorist attacks and the current civil war, especially in Africa.

Specific process of interaction and communication that takes place in different types of situations, when people from differing cultural backgrounds (with different languages, nationalities and religions) communicate in similar or different ways among themselves, and how they endeavour to communicate across cultures, is known as intercultural communication, see Prucha (2010). Every communication is based on a society´s culture.

Culture can be defined as an integrated pattern of human knowledge, belief, art, morals, law and any other capabilities and habits acquired by man as a member of society, see Tylor (2013). Humankind participate in the cultural development through their traditions, ways of communication, appearance, clothing, way of thinking, behaviour, beliefs, symbols and similarities or differences from other beings, see Berkova (2016).

Culture affects the daily lives of people. It is the basis for our living, getting dressed, eating, acting toward others. As a follow–up to these there are certain standards in human relationships in family life, social and labour spheres. Culture is closely linked with ethics - determines what behaviour is acceptable, and vice versa, in cultures known as universal, ethnic, racial, national, regional, industrial, professional and other entities, see Reisinger (2009).

Anthropologists divide culture into superficial and deep ones. Superficial culture includes anything that is visible at first glance. Deep culture is the one that is not directly visible, e.g. the language, habits, relationships, or other daily activities that make this group different from other, see Guirdham (1999).

Geert Hofstede identified four cultural dimensions that express the most basic level of cultural differences between societies and he highlights those that lead to a different conception of the basic parameters of people's lives and affect labour and management, see Simonova (2015):

Power Distance Index (PDI) - the extent to which the less powerful members of organizations and institutions (like the family) accept and expect that power is distributed unequally. For countries with a higher index is typical preference of formal relations. Employees are governed by the rules and instructions of their superiors and are fully dependent on authority (China and others). Low power index means that employees have limited dependence on their superiors and are asked for their feedback and suggestions (Australia etc.).

Uncertainty Avoidance Index (UAI) - expresses how members of different cultures deal with unfamiliar situations and risks. Societies that score a high degree in this index opt for stiff codes of behaviour, guidelines, laws, avoiding any innovations or new thinking (Greece, Japan etc.). Employees are loyal to their employer and do not like to change their jobs. In terms of communication these societies are supposed to show greater suspicion. Societies that have a low level of uncertainty avoidance, act calmly. A lower degree in this index shows more acceptances of differing thoughts/ideas. Society accepts threats,

is willing to trade without fear, and tends to impose fewer regulations and is more flexible (USA, Australia etc.).

Individualism vs. collectivism (IDV) - shows the degree to which people in a society are integrated into groups and the degree of an individual´s freedom to their own initiative. In individualistic society there is an emphasis on free expression and the independence of the individual. There is more decision-making freedom of the individuals in their jobs (USA, UK, etc.). Collective culture prefers overall cooperation within the group.

Masculinity vs. femininity (MAS) - determines the influence of sex within society. Masculine society is defined by assertiveness, competitiveness, the acquisition of material goods, self-esteem and high work enthusiasm. Emphasis is placed on success and job growth, consequently there is work stress and women are considered unequal (Japan, Venezuela and others.). Its counterpart represents a preference for cooperation, modesty, caring for the weak and quality of life, interpersonal relationships. Significant values are represented by solidarity, tolerance and respect, there is a greater focus on social relationships. Male and female roles are of equal value, so these values are expected from both sexes (Norway, the Netherlands etc.).

Promoting diverse elements in a group of two or more interconnected cultures leads to cultural conflicts. At the same time, there may be different motives: achieving one´ s own goals, confrontations, elimination of another culture members or of the whole culture, gaining power, etc. Differences between cultures and cultural conflicts arise primarily because of religious issues, see Reisinger (2009). Religion has an inherent impact on communication, as different cultural practices may be incomprehensible to Europeans and common behaviour may cause many misunderstandings and complications. A typical example is Islam, the followers of which pray under any circumstances, regardless of whether there is ongoing work meeting or alike. Huntington identified seven cultures - Western (USA, Europe, Australia), the Arab-Islamic (Arab countries etc.), Confucian (China, Thailand), Hindu (India), Japanese, Latin American and African. Each area and region has defined its own culture and religion. Therefore, each culture is viewed differently by the other culture. What may be civilized cultured and in accordance with the religion of the western culture may not apply to Islamic culture and vice versa, see Huntington (2001).

According to research carried out by an internationally active major bank, there are obvious shortcomings especially in African countries. Language barrier is one of the most serious causes of communication interference. When the participants of the educational projects have a problem to communicate and understand each other, problems arise on several fronts. When the trainer urges proper handling of communication technologies and the recipient pretends everything is fine, although they do not understand what this is about, this creates a large technical and communication barrier. Teaching single language (English) is unrealistic given the economic situation in most African states. Using the Internet, e.g. E-learning program, is also unrealistic.

The particular bank faced other problematic issues that are also important and, which by analogy, would impact education in a multicultural environment negatively. These include ignorance of ICT standards, disregard for ICT operation safety as well as the safety of the entire local bank. In addition to the absolutely fundamental security breach, e.g. during working with money, the report gives an example of a common electrical cabinet located outside the bank and accessible to anyone. ICT hardware, which banks received as a gift, was in many cases placed in storage without visible effort of putting it into use, see Brozova (2016). The above mentioned can be considered as significant determinants of educational communication in a multicultural environment.

Communication Channels

The process of globalization and its impact on the technical development of the areas that are more or less behind the times is also affected by the quality of used information and communication technologies. According to the above, cultural, social and other levels of a given area influence the dynamics of technological development.

Fig. 1 shows the dynamics of the growth of Internet users in comparison with the development of people in the world from 2000 to 2016. In 2016, approximately 46% of the population worldwide used the Internet.

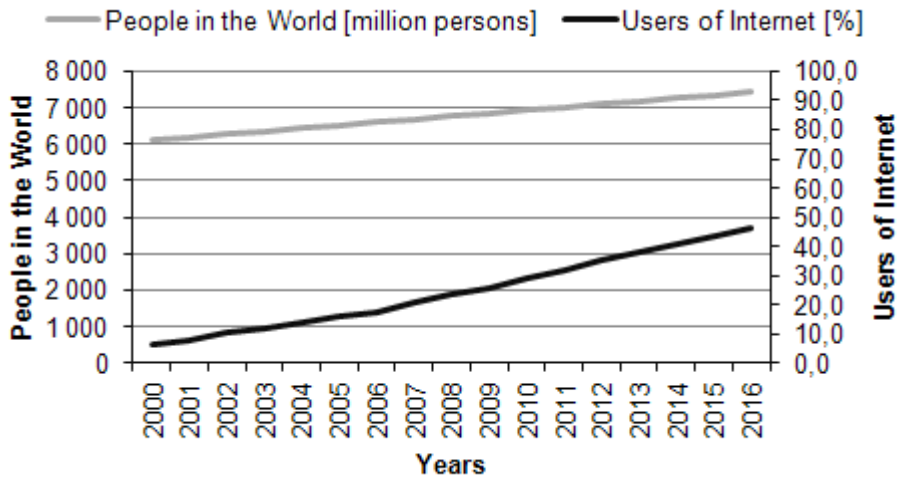


Fig. 1: Comparison of users of the Internet with people in the world, in accordance with IBRD-IDA (2016)

The number of Internet users varies in different regions and within them in individual states. Fig. 2. provides the number of Internet users by regions, valid for the year 2015.

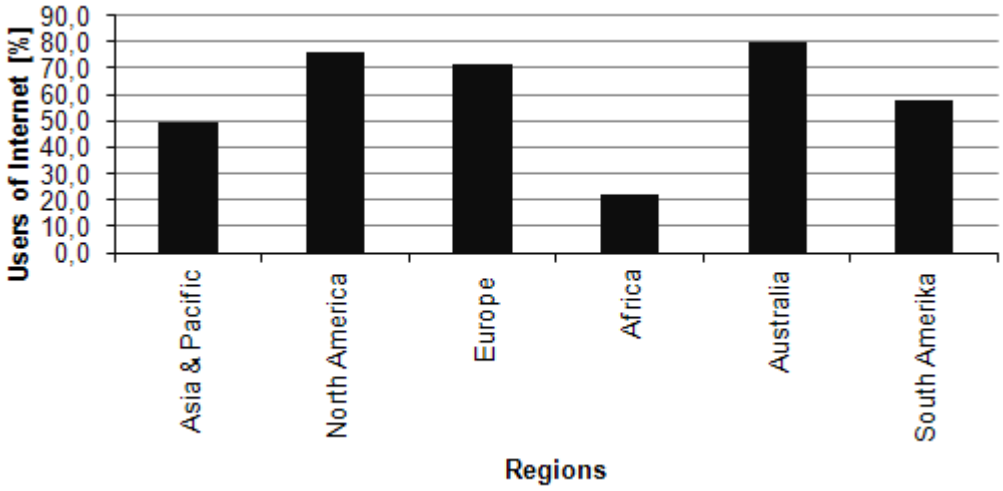


Fig. 2: Users of Internet [% of all people] - regions, in accordance with IBRD-IDA (2016)

The worst situation of all the regions is clearly in Africa, where only 22.39 % of the total population used the Internet in 2015. Comparing the growth rate of Internet users brings interesting information (Fig. 3). It provides charts comparing the growing percentage of Internet users of all residents in different regions.

Fig. 3 shows that Africa falls behind the most, there are almost 2x more users in Asia and the Pacific, which together with South America also rate among the weakest regions in the number of users. The growth dynamics of the number of users is highest in these regions.

In the remaining regions of Europe, North America and Australia the dynamic growth in the number of users is significantly smaller and it can be estimated that it is going to stagnate in the long term in the near future.

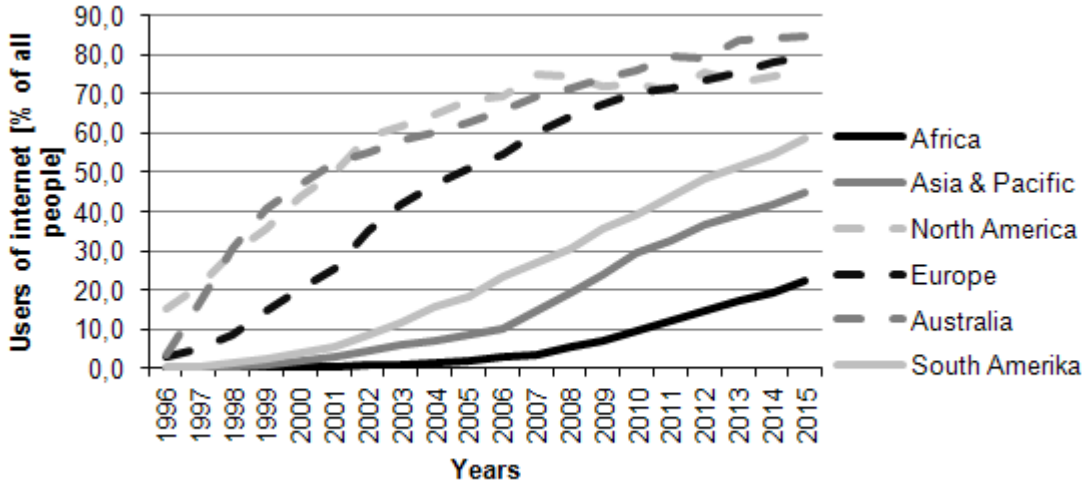


Fig. 3: Dynamics of growth users of Internet [% of all people] in years 1996 – 2015, in accordance with IBRD-IDA (2016, Internet live stats (2015).

In the world, there is quite a high number of people without access to the Internet. The reasons are various, e.g. social, demographic, etc., see OECD (2001). According to the statistics the situation in most African states is very bad. The average number of Internet users across Africa is 22.4% of the whole population. In Europe, Ukraine with 49.3% of users from the whole population ranks among the last, see Internet live stats (2014). It is comparable with the most developed countries in Africa. For example, Nigeria 47.4% of users, Tunisia 48.5%, South Africa 51.9%. The vast majority of other states rank below the African average, i.e. 22.4 %.

3.3. Quality of IT Equipment

The authors evaluated the quality of IT equipment according to the data obtained from website visits through Google Analytics. The source was a significant site for tourism where the total number of visits ranges in the millions per year and it includes data about visitors from all regions, as well. The data on the IT equipment gained through Google Analytics can be analyzed according to selected criteria. One of them is, e.g. the type of device. Other criteria can be, e.g., used CPUs, monitors (pixels, colours), operating system, etc. It is possible to obtain data not only for the region but also for individual states and even cities.

In this article, the authors chose monitor resolution as an indicator. This is an absolutely clear, unproblematic indicator which does not require more profound knowledge, as, e.g. that of processor types or operating systems, etc. Moreover, the latter can be comparable as far as the capacity is concerned, but labelled differently by their manufacturers, etc.

Monitor resolution is a manufacturer declared standard parameter, which determines the quality of the display unambiguously. Resolution is normally recorded as an aspect ratio (width x height of the monitor). There are different standards, which are based directly on the exact number of points of the sides, e.g. for full HD 1920 x 1080, for the low numbers then QVGA 320: 240. The total overall numbers characterize the grid display and the quality of the screen, respectively of the user´s needs. Furthermore, there are standards, which are based on the reduced number of points, e.g. 16: 9, 4: 3 etc. These reduced numbers only determine the proportions, and therefore aspect ratio.

To facilitate the research, the authors recalculated all points of the stated ratios of the monitors to obtain the product given by the sides.
This product represents the total number of screen points and it is an easily comparable parameter for display quality. Reduced aspect ratio does not play a role at all. It is possible to get Google Analytics number of visitors to specific websites for the sake of individual, completely individual aspect ratios in the point total numbers. Based on these numbers of visitors and their precise total number of points shown on monitors the authors calculated a weighted average, which represents the average of the given region. For greater clarity, it is stated by the authors in millions of displayed points, i.e. in megapixels. The same figure is cited as the main parameter of camcorders.

Google Analytics data include two different numbers of visitors. One number is given as a total one. That is not applicable for this research because it might contain the same information due to the repeated number of visits by individual persons. Therefore, the authors used the latter figure, which indicates the number of new visitors eliminating repeated visits of the same person. A little confounding may be the fact that the same person could visit the site once via PC, for the second time via tablet and again via smart Mobil. The authors did not exclude this possibility, because the research deals with quality of once connected equipment, not with numbers of persons. Similarly, the authors did not deal with the location of the internet access of the same person: e.g. at home and on other occasions at work, at an internet cafe, etc. They worked at the assumption that the total number of displayed points on an average monitor should be approximately the same for all regions. Given the fact the authors determined the number of points each month, it can be assumed that the number of displayed points will grow in relation to the use of more efficient equipment, or at least will not be lower. Fig. 4 demonstrates the average number of points displayed on a monitor for Africa in each month from January 2015 to August 2016.

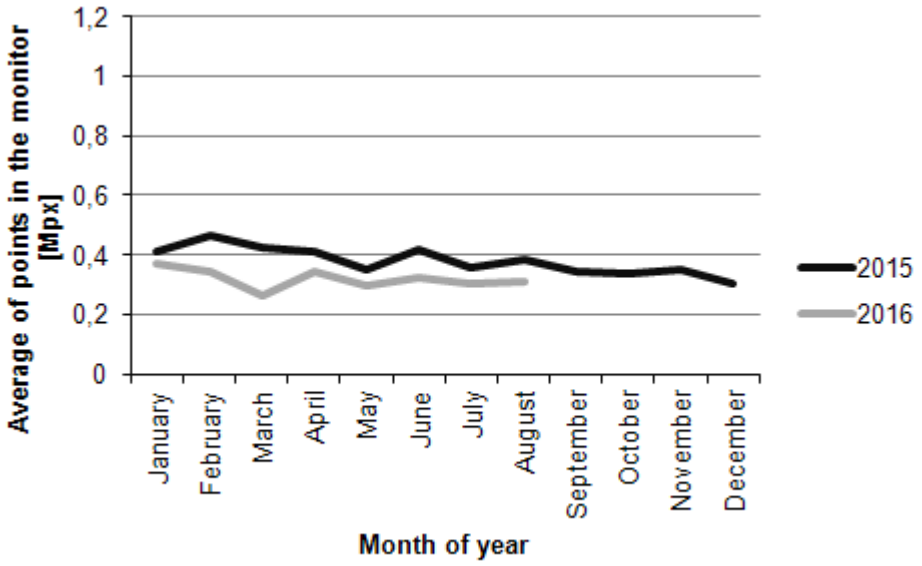


Fig. 4: Average number of points for Africa in each month from January 2015 to August 2016, in accordance with Soukup (2016)

From Fig. 4 it is evident that overall quality resolution of average used equipment decreased in 2016. If the average point resolution were shown continuously in individual years and conceived as a single time, the discovery would be very surprising. The authors´ surmise was not corroborated. On the contrary, the total number of points displayed on the average monitor is almost continuously decreasing in the entire region of Africa. This is can be seen in Fig. 5, showing the indicated trend line by 2016. Regression equation and the value of reliability R. are demonstrated, too.

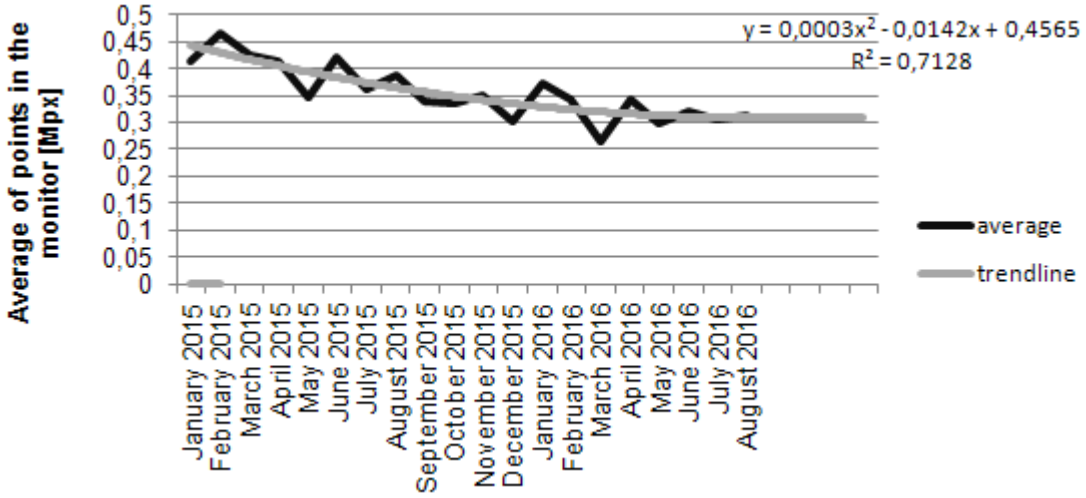


Fig. 5 : Average number of points in the monitor in each month time period January 2015 - August 2016, and the trend line by the end of 2016 for Africa, , in accordance with Soukup (2016)

Regression equation is y = 0,0003x2 - 0,0142x + 0.4565. The value of reliability equals R 2 = 0.7128, suggesting that the regression equation is not very reliable. Trend average of points in the monitor is definitely downward, as well as a trend line.

Using Fig. 6, we can assess the accuracy of the authors´ research presumption provided that the total number of points displayed on an average monitor should be about the same for all regions, and the number of displayed points will grow in relation to the use of more efficient equipment.

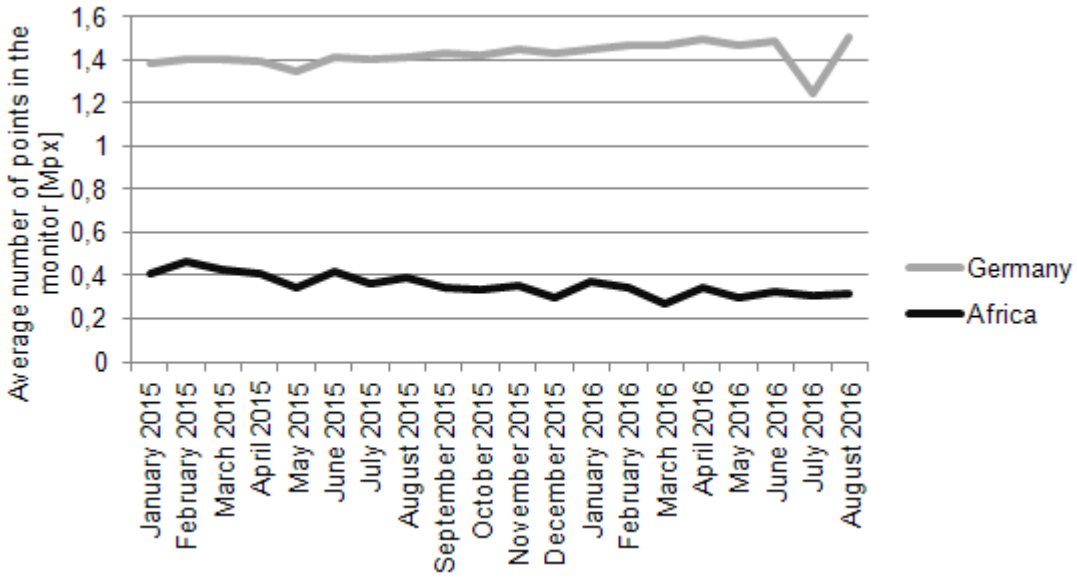


Fig. 6 Comparison of average number of pixels in the monitor in each month from January 2015 to August 2016 for Africa and Germany, in accordance with Soukup (2016)

It is absolutely obvious that in generally advanced Germany equipment with an average score of about 1 megapixel higher than in Africa is used. That is quite a huge difference. Additionally, the trend line in Germany, according to the chart, is basically growing, the only exception being July 2016, when the average score dropped. Nevertheless, the decline is very low, about 0.2 megapixels. To some extent it can be explained by website visitors enjoying vacation and holidays or giving preference to mobile devices with a smaller resolution on their journeys. Conversely, the trend line in Arica is downward in the long term, which is very surprising.

Conclusion

Cultural differences and the status of compliance with standards for information and communication technologies significantly affect the level of education in a multicultural society and affect the quality and efficiency of educational processes. Nowadays people are very afraid of Islamic culture. This fear is accelerated by a huge influx of immigrants from Muslim countries. Mosques and minarets are being built in European cities, Muslim communities residents gather in "their" neighbourhoods and protest against the ban on wearing Muslim headscarves in schools. They promote their culture and religion in Europe, which has a completely different values, customs and religion.

This is confirmed, too, by studies of a major bank carried out in various countries in Africa and Eastern Europe. Due to fear, mistrust and xenophobia, Europe today has to deal with terrorist attacks and unrest in many European capitals. The islamization of Europe results in tendencies to build barricades, to tighten immigration policy and eliminate the terrorist threat. Willingness to tolerate other groups´ points of view and interests is disappearing and thus almost all communities act accordingly.

European civilization is rapidly aging and the influence of Western civilization weakens, while Asian civilizations are expanding due to their economic, political or military capabilities. Islamic civilization demography is increasing. Europe is heading for a period when several different civilizations are adapting and competing with each other.

These phenomena can, unfortunately, be classified as significant determinants of educational communication in a multicultural society. They cannot simply be ignored or regarded as being clear, simple and quick The Internet Live Stats processes the data of the International Telecommunication Union (ITU) and the UN Population Division. The data can be regarded as credible. Internet user is defined as a natural person who has access to the Internet through a computer or mobile device in the house where they live at any time without restriction. Age, computer or mobile device ownership is not integral to the statistics. Therefore, it is strictly a person who can connect anytime at home without any further restrictions. The results of other organizations may vary, depending on the used method. For example, the United Nations Statistics Division recommends to enlarge data collection including the access to the Internet outside the home, as well, see Internet live stats (2013, 2014, 2015). The World Bank (IBRD-IDA) states data in Internet users (per 100 people), which are collected for several income groups. These are e.g. high income, upper middle income, lower middle income, euro area aggregate, low income. High income regions have an income greater than $ 12,476. Low income regions have less than $ 1,025, lower middle-income regions have between $ 1,026- $ 4,035, upper middle income regions have incomes of $ 4,035- $ 12,475, middle income countries have incomes between $ 1,026- $ 12,475, see IBRD-IDA (2016).

The synthesis of these different data is rather difficult, recalculations are necessary, in particular through various weighted averages, taking in account, as well, the total population of the regions, etc. In some cases, the authors could use the data of all residents directly regardless of their income. In some cases, the data of The World Bank (IBRD-IDA) vary very little considering different income groups in the same regions. We assume that the authors did not commit significant statistical errors basing on the total population figures data. Above all, they intended to determine the development trends and to predict future development. All this makes possible to identify the determinants of educational communication in a multicultural society, which are evident from the carried-out research.
Research questions were answered:

- Whether the communication and business negotiations are based on the culture of the monitored territories: all used sources answered the research question positively. Significant problems arise in a multicultural environment communication.

- Whether the use of the Internet is the same in different parts of the world: the research question was answered in the negative on the basis of the statistics listed in the text. The results are evident on all the graphs. Existing differences are abysmal.

- Whether a quick and relatively easy removal of determinants of communication in a multicultural society may be presupposed: the research question was answered in the negative. Removing determinants of communication in education in a multicultural environment requires high costs and long time in terms of communication channels and standards, willingness and ability to work with them. Determinants of common multicultural communications are a long-term issue that is difficult to solve even in states that had long been trying to solve it, and devote considerable funds to it, etc., see Kmecova (2016).

Standards of information and communication technologies are observed in all the areas - this presumption was rebutted. Fig. 6 shows a comparison of the quality of the average number of points in the monitor in individual months from January 2015 to August 2016 for Africa and Germany. There is a very distinct difference in the shown average number of points amounting more than triple. Unfortunately, Fig. 5 disproves the expectation that the situation will get better. It shows a declining average number of points in the monitor in each month from January 2015 to August 2016, and the trend line by the end of 2016 for Africa. The authors obtained the data of the research using Google Analytics. The source was a significant site for tourism, the total number of visits ranging in the millions per year and including data about visitors from all regions, see Soukup (2016).

Unfortunately, based on the research, we cannot expect significant improvements in the coming periods. There are truly abysmal barriers in education in a global multicultural environment with the use of electronic means, e.g. through e-learning, see Krpalkova Krelova (2016). The situation, however, may be different in a local multicultural environment where there may not be huge differences, mainly in hardware, but more in quality of human resources.

The authors would like to thank Petr Soukup for providing statistical data from a significant site for tourism, the total number of visits of which ranging in the millions annually.

References

BERKOVA, K. (2016) Význam komunikačních a prezentačních dovedností učitelů pro vzdělávání dnešních žáků [online] *Media4u Magazine*, vol.13 (No.1.) Available: http://www.media4u.cz. ISSN 1214-9187.

BROZOVA, K. (2016) Intercultural communication in profit sector banking, as an integral part of tourism (Master´s thesis) VSH, Praha.

CHARBONNEAU-GOWDY, P.; CECHOVA, I.; BARRY, E. (2012) Web 2.0 Technologies for 21st Century Learning: Creating Conditions for Sustaining Change in Institutions of Higher Education. *Proceedings of the 7th International Conference on eLearning***.** ISBN 978-1-908272-44-7. The Chinese University of Hong Kong: The Chinese University of Hong Kong, 18-26

CHROMY J.-SEMENIUK P.-DRTINA R. (2011) Studium publika na základě Lasswellova modelu. [online] *Media4u Magazine*, vol.8 (No.1). Available: http://www.media4u.cz. ISSN 1214-9187.

GUIRDHAM, M. (1999) *Communicating across Cultures.* Macmillan Press Ltd., London.

HUNTINGTON, S. P. (2001) Střet civilizací: boj kultur a proměna světového řádu. Rybka Publishers, Praha.

Internet live stats (2014) Internet users by country [online] *Internet live stats.* [Retrieved May, 6, 2017]. Available: http://www.internetlivestats.com/internet-users-by-country/

Internet live stats (2015) Internet users. [online] *Internet live stats* [Retrieved May, 1, 2017]. Available: http://www.internetlivestats.com/internet-users/

Internet live stats (2013) Internet users by region. [online] *Internet live stats* [Retrieved May, 1, 2017]. Available: <http://www.internetlivestats.com/internet-users/>.

KLEMENT, M. (2016) Možnosti využití virtualizačních technologií ve vzdělávání [online] *Media4u Magazine*, vol.13(No.4) Available: http://www.media4u.cz. ISSN 1214-9187.

KMECOVA, I. (2016) Srovnávací analýza efektivnosti managementu na Severní Čínské Technické Univerzitě v Pekingu [online] *Media4u Magazine,* vol.13, (No.4) Available: http://www.media4u.cz ISSN 1214-9187.

KRPALKOVA KRELOVA, K (2016) Development of communication and presentation skills with using modern didactics tools. Proceedings of the 10th International Conference Media a vzdelavani - Media and Education 2017. ISBN 978–80–87570–35-7, 20 November, Prague, Czech Republic, 80-83

OECD (2001) Understanding the Digital Divide, [online] *OECD.* [Retrieved March, 16, 2017]. Available: https://www.oecd.org/sti/1888451.pdf

PRUCHA, J. (2010) Interkulturní komunikace. Grada, Praha

REISINGER, Y. (2009) International tourism: cultures and behavior. Butterworth-Heinemann, Amsterdam.

SAEE, J. (2005) Managing organizations in a global economy: an intercultural perspective. Thomson/South-Western, Ohio.

SIMONOVA, I. (2015) Mobilní elektronická zařízení ve výuce odborného anglického jazyka [online] *Media4u Magazine*, vol.12 (No.4). Available: http://www.media4u.cz. ISSN 1214-9187.

SOUKUP, P. (2016) Analýza profilu návštěvníků hl. města Prahy s využitím online nástrojů. (Bachelor´s thesis). VSH, Praha.

The World Bank (IBRD-IDA) (2016) Internet users [online] *IBRD-IDA*. . [Retrieved March, 16, 2017]. Available: http://data.worldbank.org/indicator/IT.NET.USER.P2?page=6&cid=GPD_44

TYLOR, E. B. (2013) Primitive culture: researches into the development of mythology, philosophy, religion, language, art, and custom HardPress, London.

Economical Evolution of Additive Laser Manufacturing (ALM) Technologies in Romanian Dental Industry

Băilă Diana-Irinel[1], University Politechnica of Bucharest, 313, Splaiul Independenței Street, Bucharest 060042, Romania, baila_d@yahoo.com

Lazăr Livia-Veronica[2], University Politechnica of Bucharest, 313, Splaiul Independenței Street, Bucharest 060042, Romania, livia_veronica_lazar@yahoo.com

Abstract

Additive Laser Manufacturing (ALM) is a set of processes which enable the manufacture of layer by layer by adding a metal powder, achieving a physical 3D model from a numerical model, using the sintering by laser power. Today, in the dental field had an industrial revolution concerning the manufacture of personalized dental implants and crowns, reducing process time, product weight and use of raw materials. This technology permits to obtain the products, using less energy, less landfill waste.
Additive Laser Manufacturing processes of metallic powder are achieved by SLS, DMLS, SLM, EBM, DMD, LM, Lens, DLF and used pure metal powders, yielding pieces which can be functional immediately, not always being necessary a sintering post-treatment. [1-5]
Each Additive Laser Manufacturing method has advantages and disadvantages because of appearance of residual stresses in the material after sintering / melting process.
The ALM technology for dental industry arrive to a great maturity degree TRL 9- TRL 10, because can be used in large series production. ALM technologies are used in different domains like dental, tooling, aerospace fields.
The SLM and DMLS processes are frequently used in Romanian medical industry for realized dental implants using Ti alloys (35%) and for dental crowns using Co-Cr alloys (65%).
The Additive Laser Manufacturing systems sold for Romanian stomatology field are Phenix Systems-PXS & PXM dental and EOSINT M270. The ALM systems are very performing and can creating up 450 dental units per day.
Concerning the Additive Laser Manufacturing (ALM) systems remarked that only 8% of sell of Romanian 3D printing companies are intended for dental field.

Keywords: Economical evolution, Additive Laser Manufacturing, metallic powder, innovation

Introduction

Additive Laser Manufacturing is a rapid prototyping technology using a laser power for sintered the metallic powders, layer by layer. Using this technology can realize dental crowns, bridges, dental implants, chapels and surgical instruments.

The metallic powders used in the Additive Laser Manufacturing technologies depending on the industrial domains (medical, aerospace, tooling, jewelry, automotive, etc.), where are used and classified as: tool and maraging steels (304L-ST2709B), stainless steels (316L-ST4404D), aluminum alloys (AlSi10Mg), cobalt-chromium superalloys (ST2724G, F75, F90), Ni based superalloys (Ni-Cr), commercially pure titanium (TiCP grade2), titanium alloys (Ti6Al4V, TiAl6Nb7), copper alloys (Cu10Sn) and precious metals (gold, platinum, palladium, silver).

The ALM systems manufacturers (Phenix Systems, EOS, ARCAM, Concept Laser, etc) realize and approve the material powders, but exist some clients who want used personalized metallic powders with special composition and different percentage of chemical elements and for these metallic powders, the cost is greater than if is buy the traditional powders of manufacturers. [1-5]

In figure 1 is presented the graph of metallic powders percentages used in Additive Laser Manufacturing technology in Romanian dentistry.

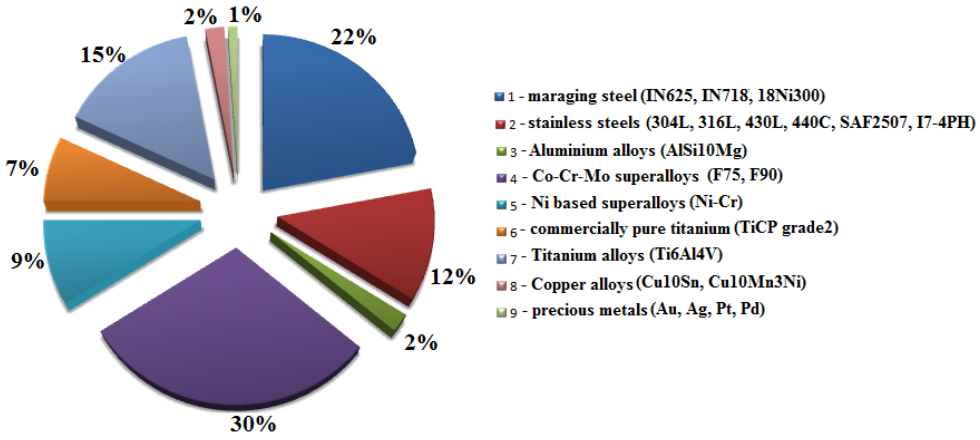


Fig 1: Metallic powders percentages used in Additive Laser Manufacturing in Romanian dentistry

Economical Evolution of ALM Systems in Romanian Dentistry

Companies selling ALM systems in Romania are frequently found in cities like Bucharest, Cluj-Napoca, Timisoara. In the last five years, some companies buy ALM systems in Brasov and Sibiu to be used in dentistry domain.
In figure 2 is presented the percentage of the dental companies that bought ALM systems in Romania distributed by cities.

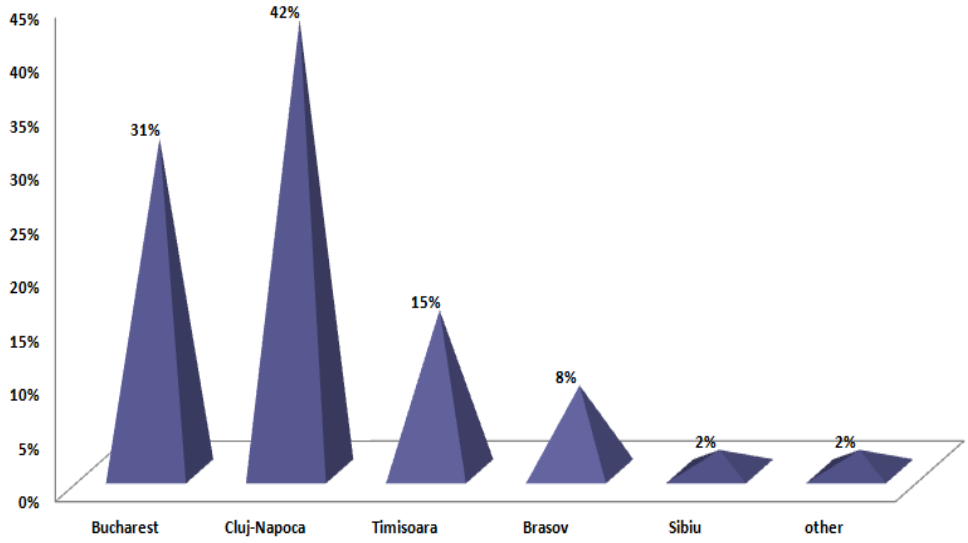


Fig. 2: Percentage of the dental companies that bought ALM systems in Romania distributed by cities

The marketing of additive manufacturing systems in the world notice that 10% of sales are for additive laser manufacturing systems – ALM, approximate 1.7 euros billions.

The powder costs vary, for stainless steel is 90 euros/kg and in the case of the titanium alloy is 200 euros/kg. Costs parts manufactured by ALM does not depend on the complexity of forms parts, unlike other manufacturing methods.
The cost of ALM sintered parts takes into account the cost per kg of metallic powder, the depreciation cost of the machine, the laser scanning speed, etc.
Cheapest ALM systems are using SLS method by indirect sintering of metal powder, but always, the pieces will must supported a post-sintering treatment.
In dentistry, the ALM systems are sold from the company EOS, Phenix Systems, ARCAM, etc. In general, a dental SLM (Selective Laser Melting) system cost around 200 000 – 500 000 euros.
Concerning SLM manufacturing of a cm^3 stainless steel 316L (90 euros/kg), 26% represent direct costs (metallic powder) and 74% represent indirect costs (3% energy, 22% labor, 42% machining, 7% overhead). The price of a cm^3 stainless steel can arrive to 3.20 euros/cm^3.
In figure 3 are presented the most sell SLM systems in Romania, SLM 250, Phenix Systems PXS & PXM dental, EOSINT M270 and other.
In Transylvania, the most sell SLM systems are SLM 250, SLM 280 in Cluj and in Brasov. In Bucharest, the most sell SLM systems are Phenix Systems PXS & PXM dental and EOSINT M270.
In Cluj, the SLM systems are used in general in automotive industry and in medicine. In Brasov, the SLM systems are used in medicine and in aerospace industry.
In the Romanian dental clinics, the cost of Co-Cr/Ti dental element SLM manufactured by a STL file varies from 6 euros to 45 euros.
The cost of Co-Cr/Ti dental element achieved by milling varies between 18 euros to 50 euros. So the cost using conventional technologies (milling process) is higher than SLM technology.

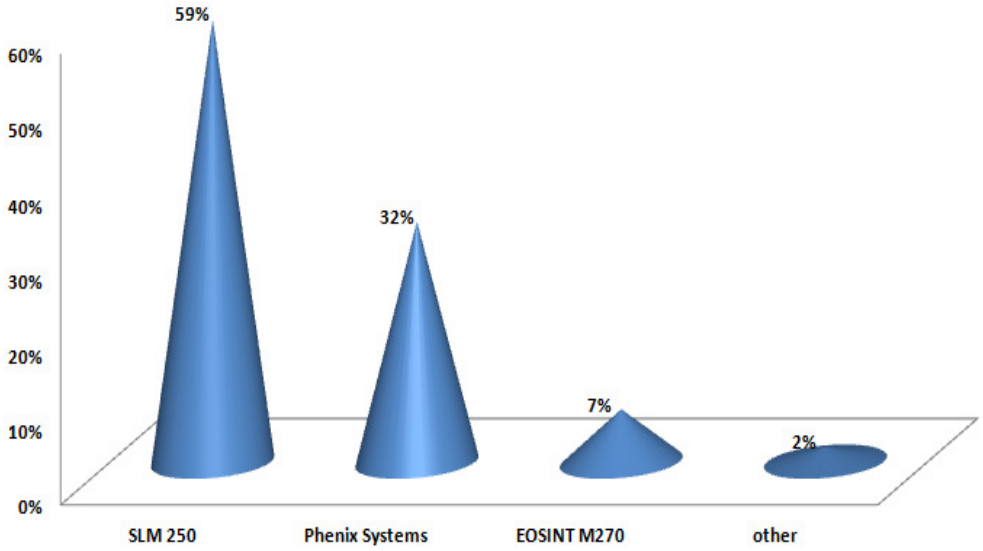


Fig. 3: Marketing of SLM systems in Romania

The SLM systems work with an accuracy of +/– 20 μm and can produce around 450 units at low cost within 24 hrs. This corresponds to an average construction time approximate of 3 minutes per unit.
The metallic prosthesis realized by SLM/DMLS manufacturing present a constantly high quality of crowns and bridges manufacturing. DMLS (Direct Metal Laser Sintering) process is similarly with SLM technology, differ the sintering temperature and power laser.

Actually, the Additive Laser Manufacturing of metallic prosthesis is an industrial production process, thanks of high productivity of the systems., the production cost fall whilst the quality of the final products result consistently high.

Conclusions

The advantages of ALM technologies are: cheaper than precision casting and milling processes; homogeneous metallic structure, high precision, good fit, constant quality, consistent tolerances, reproducible product properties, exact margin fit, good milling properties (particularly for crowns), flexible choice of veneer ceramics, permit a better adherence to ceramics (grace of porosity), production parameters are documented and can monitoring the parts production.

The dental parts realized by ALM methods present mechanical properties (density, elasticity and mechanical resistance) like the dental conventional technology.
Due to numerous advantages of ALM processes noted a sales increase of ALM systems in Romanian dentistry.

The price of SLM/DMLS systems is very important for dental clinic, but in the same times the quality and precision of dental works to satisfy the clients is a real reason to use these technologies.
In Romania, the dental industry has undergone a revolution in the ten last years, concerning the equipments performance and the materials used.

In the dental field in Romania 30% of the production of crowns are made by SLM/DMLS technologies and 70% by conventional technologies.
In Romania, in the future is expected an exponential sales growth of SLM systems in different industry like automotive, aerospace, aeronautic, medicine, mechanical, tooling and other.

Acknowledgment

This work is supported by the Sectorial Operational Programme Human Resources Development (SOP HRD), financed from the European Social Fund and the Romanian Government, under the contract number POSDRU/159/1.5/S/138963 – PERFORM.

References

Barnatt C. (2013), 3D Printing: The next industrial revolution, ExplainingTheFuture.com, ISBN-10: 1-484-18176-X

2. *Metal powders – the raw materials*, [Online], [Retrieved August 21, 2017], http://www.metal-am.com/introduction-to-metal-additive-manufacturing-and-3d-printing/metal-powders-the-raw-materials/.

3. Lipson H. and Kurman M. (2013), Fabricated: The new world of 3D Printing, John Wiley&Sons, ISBN: 978-1-118-35063-8.

4. Berce P., Ancau M., Balc N., Caizer C., Comsa S, Chezan H. (2000), Rapid Prototyping Manufacturing, Tehnical Publishing, Bucharest.

5. Ratner B.D., Hoffman A.S., Schoen F.J., Lemons J.E. (2013), Biomaterials Science – An introduction to materials in medicine, 3-rd Edition, ISBN 9780123746269, Academic Press.

Quality of Population Nutrition Reflected by Reference Budgets

Eva Abramuszkinová Pavlíková, Department of Law and Social Sciences, Faculty of Business and Economics, Mendel University in Brno, Brno 613 00, Czech Republic, email: eva.pavlikova@mendelu.cz

Marcela Basovníková, Department of Business Economics, Faculty of Business and Economics, Mendel University in Brno, Brno 613 00, Czech Republic, email: marcela.basovnikova@mendelu.cz

Abstract

This contribution deals with the economics of the population nutrition in relation to Reference budgets across EU. Current developments are analysed while combining a sociological interpretation to economic data and focus groups investigation. Reference budgets are perceived as guidelines which enable people to fulfil their differing social roles to be accepted by others. Various countries in Europe have different approaches to this concept, in the Czech Republic it is a new phenomenon. Authors present original comparative results for the Czech Republic based on focus groups discussions.

Keywords: reference budgets, nutrition, focus groups, Czech Republic

Introduction

The importance of active inclusion policies and adequate minimum income support for ensuring a decent life to all citizens have been emphasised by many official authorities including the Council, the European Commission and the European Parliament (e.g. Council of the European Communities, 1992a, 1992b; European Commission, 2008; European Parliament, 2009; European Council, 2010; European Parliament, 2010, 2011; European Commission, 2013; European Economic and Social Committee (2013). The European Commission (2013) proposed the development of comparable reference budgets as an instrument to help Member States design efficient and adequate income support and to facilitate the Commission's task of monitoring the adequacy of income support in Europe. Reference budgets are illustrative priced baskets of goods and services that represent a given living standard (Bradshaw, 1993). They can show the impact of publicly provided goods and services on the living conditions of households. Reference budgets are widely used in Europe, and serve many purposes (Storms et al., 2014, Goedemé, T., Storms, B., Van den Bosch, K., 2015).

Research Design and Methodology

This paper presents the Czech Food basket which was developed in the framework of the European pilot project on the development of a common methodology for the construction of cross-nationally comparable food baskets in the EU. The research activities which were conducted during 2 years consisted of the following steps. The first milestone was completed by detailed description of Czech food based dietary guidelines. The second step was to draw up a healthy food basket, based on typical Czech dietary guidelines, starting from a common base for comparative reasons. The third milestone included focus group discussions followed by the next step which allowed to draw up a total food basket fulfilling essential physical and social needs. The last milestone included pricing of the food basket.

Results and Discussion

Reference budgets propose a minimal financial resources which people need for adequate social participation in given society taking into account the specificity of respondents. This results which are presented are proposed for the target population which consists of children, persons of working age, in good health, without disabilities and living in the capital city, Prague. It is obvious that the social context as well as the price level of the capital city does not have to be the same as in other parts of the country. The reference budgets were developed for three model families: a single-person household (male/female), a single parent household with two children, a couple with two children. The adults are about 40 years old, children are about 10 years old in case of a boy who is at primary school and girl who is about 14 years old at secondary school. These households are hypothetical ones and representativeness in this case was not the main goal as it would be very difficult for cross-national comparison. We are aware of the fact that household structure vary widely across the European Union. The model families which we introduce in this study were chosen as a test case to see if the reference budgets methodology could be applicable on the level of European Union. They do not have represent the most typical situation and the household composition of the model families does not have to reflect the situation of the majority of the target population.

Eating habits and food guidelines

In the period 2000-2011, the total food consumption in Czech society consumption in Czech society increased by 6.7%, especially the consumption of plant products by 12%. Significant decrease in consumption occurred only in beef, bread and spirits. In contrast, the highest increase in consumption occurred in soft drinks (+39.3%), bread wheat (+33.6%), other dairy products (+30%), cheese (+23.8%), butter (+22%), wine (+20.5%), tropical fruit (+19.3%) and cereal products in total (+13.4%). There is notable demand to buy cheaper commodities (such as plant products, meat or dairy products) which results in a positive trend of increasing fruits and vegetables consumption as well as dairy products, and thus increase of Vitamin C intake and Calcium. On the other hand, the increasing consumption of butter, sugar and sugar products is a negative trend in Czech society. (Štiková, 2013)

Eating patterns are different for various European countries. In all EU member states, food has an important share in total household expenditures, often most important after housing, but situation varies a lot. As Goedemé, T., Storms, B., Van den Bosch, K. (2015b:67) explain, it confirms the findings already from the 19th century that poorer households spend proportionally a larger share of their income on food than richer households, later studies confirm that food expenditure is the highest in low income countries and poor countries spend generally more on low-valued staple foods such as cereals while richer countries spend more on diary and meat products. In the Netherlands, the third income quintile (with median income) spends about 10% of its total expenses on food, while the situation in Romania declares 33%. It can be observed that in most countries the first income quintiles spend more on food than the third income quintiles, except for Netherlands, Ireland, United Kingdom and France. Situation in Cyprus, Malta, Bulgaria and Romania shows quite large difference reaching almost 10 percentage points.

”Given that people in poorer countries and households lower down the income scale tent to spend relatively more on food, one might believe that in absolute terms differences in spending on food and non-alcoholic beverages are relatively limited. This, however, is not the case. In Europe, on average, households in the third income quintile spend about 70% more on food than households in the first income quintile, in absolute terms. Similarly, even though households in the third income quintile in the Netherland spend only 10 % of their expenditures on food, in Euros they spend 85% more than households in the third income quintile in Romania who spend 34% of their household expenditures on food. If we take account of price differences of food and non-alcoholic beverages (which were in 2010 43% higher in the Netherlands than in Romania), households in the Netherlands still consume 29% more food and non-alcoholic beverages than households in the third income quintile in Romania.” (Goedemé, T., Storms, B., Van den Bosch, K., 2015b:67) It is evident that food prices are

different in various European states but is not always true that the higher food prices are, the more households spend on food (in EUR or volumes). There is a positive correlation between the amount spent on food in PPS (purchasing power standards) in the third income quintile and average total household expenditures (in PPS), with some exceptions. It can be noted that Southern European countries are among top spenders on food, whereas the Czech Republic is in the opposite situation.

It is not only the amount of food and expenses but there are different eating habits across Europe which are explained in national dietary surveys. There is a general distinction between the North and the South of Europe. Southern European countries declare higher consumption of cereals, nuts, fish, seafood, fresh fruit and vegetables, legume and vegetable oils (mainly olive oil). Northern and Central European countries use more vegetable fats, animal lipids and soft drinks. The dietary studies in the Czech Republic show that "the eating habits in these countries are generally not meeting the recommendations. The high levels of saturated fats and sugar that are prevalent in overall dietary patterns in Eastern Europe are of great concern and are accompanied with insufficient intake of important vitamins, calcium and magnesium." (Goedemé, T., Storms, B., Van den Bosch, K., 2015b:70)

The first dietary recommendations for the Czech Republic were suggested by the Society for Nutrition in 1986, later updated form in 1989. In 1994, the Council for Nutrition of the Ministry of Health of the Czech Republic made recommendations on nutrition of healthy population, in 2004, the Society for Nutrition published a report "Nutrition recommendations for the Czech Republic" followed in 2005 by a report done by the Ministry of Health of the Czech Republic entitled "Nutrition recommendations for the population of the Czech Republic." In 2012, the Society for Nutrition presented an innovative nutrition recommendations for the population of the Czech Republic in a document for professionals who deal with the nutrition prevention of mass non-infectious diseases and promote good eating habits. These recommendations were done in relation to the children's age, nutrition of pregnant and lactating women and the elderly nutrition, based on the EU document: The Strategy for Europe related to health problems connected to nutrition, overweight and obesity (a white book) from 2007 and inspired by WHO. (Society for Nutrition, 2012) For the Czech Republic, it was decided to take as a reference framework the information provided by the Societies for Nutrition in countries, also known as "DACH" (Germany, Austria, Switzerland) which are based on professional and scientific studies and regarded as conclusive. (Society for Nutrition, 2014)

In 2013, the Czech "food pyramid" was suggested the Forum for Healthy Nutrition. It is a graphic simple explanation of recommended nutrition guidelines specifically set for the Czech population. It gives basic recommendations for the content of a food basket. The goal of these recommendations is the prevention of health risks which are rooted in the nutrition traditions of Czech population. (FZV, 2013)

The table 1 shows Food-based dietary guidelines for different age groups in the Czech Republic which were inspired by DACH guidelines and taken as official recommendations for the Czech Republic. We used this items to ask the nutrition specialist to suggest the menu for Czech population. The guidelines which she is using given by a software are related to DACH guidelines and allowed her to construct the menu which was discussed in focus groups.

Table 1: Food-based dietary guidelines for different age groups in the Czech Republic

	Age group							
Food group	Childre n 0-6	Children 7-9	Childre n 10-14	Student s 15-18	Women 19-64	Men 19-64	Men over 65 nonwor king	Women over 65 nonwor king
	Kg/per year	Kg/per year	Kg/per year	Kg/per year	Kg/per year	Kg/per year	Kg/per year	Kg/per year
Meat - beef	1.8	5.8	8.7	5.8	4.4	4.2	5.4	5.1
Meat - pork	1.8	4.2	7.4	4.3	4.2	6	4	8.7
Meat - poultry	1.9	2.9	3.9	4.9	3.9	4.4	4.5	4.5
Fish and fish products	0.4	2.6	2.9	3	2.4	5.1	4	4
Milk: semi-skimmed	35.3	45.3	64	75.2	53.6	46.4	38.2	41.8
Cheese, including cottege cheese	5.5	12.9	17.4	17.2	16.2	17	16.1	18.6
Diary, fermented products	8.2	31.9	42.1	43.6	34.6	36.1	46.5	45.4
Eggs	1	1	1	5.9	5.8	3.1	7.2	7.1
Butter	3.1	5.2	3.9	3.9	3.9	6.7	2.5	2
Suggar	11.3	22.3	33.5	37.1	24.3	40.5	31.4	25.6
Potatoes	10.3	30.9	58.2	72.1	52.9	53.4	53.8	51.3
Pulses	1.9	2.2	2.9	1.9	1.6	2.2	1.6	3.1
Flour, groats, oatmeal	7.7	7.7	2.9	15.5	23.5	25.2	10.1	9.6
Rice	1	1.9	1	1.9	1	0.5	0.9	1.7

Bread	20.6	36.1	50	47.9	46.4	42.7	22.8	29.5
Bread,cookies total	6.7	15.5	11.6	34.8	32.9	41.7	51.7	22.7
Pasta	3.1	4.1	4.9	5.8	5.8	4.9	9.1	3.9
Vegetables fresh, total	50.8	73.6	73.7	63.6	56.5	64	70.6	67.3
Fruit fresh of temperate zone	44.3	62.3	59.2	45.9	34.5	21.7	24	23.8
Southern fruit	35	42.2	39.8	40.7	35.1	42.7	33.2	32.1
Yeast	1	0.8	0.7	0.5	0.3	0.7	0.5	0.5

Source: ÚZEI, 2014

Focus groups have taken place in Prague, the group number 1 on Thursday 12.2.2015, group number 2 and 3 on Friday 13.2.2015. In total there were 23 respondents. This focus group took about 3 hours with one break. The group number 2 and 3 took place also in the Prague centre, the timing was 3.30 hours and 3.45 hours with 2 brakes. All documents were translated into Czech language and the process was done according to rules given by the team of reference budgets coordinated from Belgium. During the focus groups 3 experts were present: a moderator, an assistant and a reporter.

Social Participation and Social Needs

The first set of questions within focus groups was dedicated to the topic of Social participation and social position of respondents in Czech society. The opening question ask them which social positions as adults do they have and consider them as important. The most frequent answers were: a parent, a husband, a wife, an employee, an employer, a son, a daughter, a child in general - also in the case of adults which always stay children of their parents and have roles related to this social position. Furthermore, a consumer, a buyer, a member of a housing association, a member of community, a neighbour, a member of political party or church, a friend, a colleague at work, a receiver of social services, a member of church choir, parents as users of pre-school activities, a member of informal community where people live, a member of some collectives, movements, some positions which allows people to fulfil the capacity to earn money; a citizen; a student given the opportunity to learn, a long-life learner, a citizen as a person who is " not indifferent about the municipality, is in permanent participation, organiser of social and cultural event", an organiser of activities done at voluntary basis, interest groups.

The same question was repeated with the focus on social position of children. They consider as important to be for example a member of scouting organisation or any other organization which builds strong relations among children or in a community of the same minded people. An interesting comment occurred when we discussed a social position of parents explaining that nowadays a social position of employee sometimes substitutes to some extent the function of a parent as people are very busy and have lack of time for their own children.

The template which was given to stimulate the discussion about social positions included other items which were not preferred by Czech respondents. There were social roles of a voter or a member of

trade union. There were not fully recognised by our participants as important for social positions in Czech society. Trade union membership is not so common. There was one person who was member of trade union, but in general this position was found as not the most typical one. In another words, in a typical Czech family, in our case in the reference family, it is not probable that somebody would be a member of the trade union. As one respondent mentioned: "Trade unions are less important. Friends are more important. Neighbour and interaction with the environment is important".

The above mentioned social positions were suggested in a template based on Belgian experience. When we asked for other social positions specific for the experience of our respondents, the answers included the following: a member of community social position, such as people who create their own coffee shops, centres for kids, centres for mothers or fathers, community of parents where they do activities together like cooking, organizing Santa Claus evening or going with their families for trips. In villages, the social role of a citizen in the village becomes important which includes activities where interaction with society is needed and also citizenship related to voter position. It was interesting that other set of positions were connected with ownership of means which actually give a certain position to people in their surroundings such as an ownership of a smart phone, especially for kids and teenagers, of a tablet or a computer, eventually also access to internet depending on the age of children. Another ownership was mentioned in case of animals, especially a dog, as one respondent noted: "even if there is a new couple, they buy a new dog to take care of…dog is a mark of social status". Going with dog outside is important for social interaction, even more for singles or pensioners.

Human Needs and Satisfiers

Another set of question was related to human needs and satisfiers. Based on the answers from our respondents we can conclude that they found as very important the following: relationships with colleagues at work, friendly relationships outside of work, going out, as one respondent noted: "good relations are part of the job, it is important for good quality of life and regardless of advantages…". Followed by good relations with grandparents, primary relations in family, at home, security in general and security for the kids, economic security given by a job, good quality shoes for kids and cloth, shoes for sport, accessories, active live at community level, in the place where people live. It is important that cities have sport, social and cultural centres as well as freely accessible parks, playgrounds and drop-in centres. They mentioned also centres for handicapped people and accessible social services.

Having a bike or/and a car can be also important satisfier and a need which in some cases becomes a must. As one respondent noted noted: "when living in the periphery of the city, a small simple car should be a standard, car is a basic need for a family - depends on location in Prague". Bike is good to have for a free time activity in the city or outside, for everyday transport around the city the public transport is better option and the costs related to the monthly public transport should be calculated into the budget. Some respondents agreed that sharing economy is rising, bikes and cars can be used on rental basis as well as rental of sport equipment. Other standard activities are related to culture, going to theatre several times per year, going for skiing and children going to ski courses, schools in nature provided by school or going on summer and winter holiday should belong to a standard, does not have to be abroad.

For financial safety it is important to own a bank account. Large part of the budget is spent on housing which is in the capital city quite expensive. Good quality of schools and kinder gardens as well as public spaces was mentioned also. It was confirmed that secondary relations at work and outside of family relations are also very important, not only primary ones in a family. All basic needs for standard participation in society were confirmed including good food, health care, personal care, possibilities for relaxing and leisure, general security and security for kids, good primary relations, home, cloths and education. Although the respondents were of productive age, they realize that seniors in Prague make about 25% of population with special needs for services, communication or engagement in community. Based on the Czech dietary guidelines inspired by DACH countries, the

items for the healthy food basket were modified into categories which were inspired (for comparative reasons) by the Belgian example.

The Healthy Food Basket

Based on the Czech national food guidelines and the menu which was suggested by a nutritionist, we have discussed within the focus groups the acceptability of this healthy menu and healthy food basket. In general, comments given by focus group participants were minor. Majority of them was dedicated to the style of cooking and eating habit, not to ingredients. The comments and suggestions were more of individual nature than a general agreement of the focus group.

Other functions of food which respondents consider as important for adequate participation in society and keeping good relationships with friends include eating out, inviting friends for a meal, organising a birthday party or family celebrations. General agreement was on the fact that sometimes, such as during holidays or trips, it is needed to eat out. As one respondent mentioned: "I make sometimes a dinner to say thank you to somebody who helped me, for example when moving a furniture. Other functions of food are explained by its social meaning and relaxing function. We noted a trend among respondents of organising locally produced food events with friends or neighbours. Of course, there are people who have specific needs when food becomes a life style or the focus is on organic food or local food or ethnic food. Teenagers can be influences by preference in a peer group such as McDonalds or Hello Kitty Marks. The suggested conclusion for frequencies which we used for calculation of prices was based on Belgian example.

In the next step, the basket was a subject of pricing. The month of pricing was March 2015 and the procedure corresponds to guidelines given project partners with the aim to make it comparable across countries. The respondents in focused groups in Prague mentioned as the most common shop for their food shopping Tesco. This was the main reason for using Tesco for pricing the basket. We looked at the comparability of shops regarding the price and it can be stated that Tesco has more or less average price, it is not the top cheapest shop for all goods. The comparison is not easy, it depends on items which you compare. We did not face any particular difficulties in pricing while following the pricing procedure given in advance by Belgian coordinators. IKEA mainly was used as a reference point for pricing the kitchen equipment. It was mentioned by respondents as a shop which is widely used.

Table 2: The Czech food budget, monthly amounts in euro, March 2015

	WOMAN	MAN	COUPLE	SINGLE WOMAN + 2 CHILDREN (boy 10y-old & girl 14y-old)	SINGLE MAN + 2 CHILDREN (boy 10y-old & girl 14y-old)	COUPLE + 2 CHILDREN (boy 10y-old & girl 14y-old)
Healthy food basket						
Liquids	1,34	1,34	2,68	1,57	1,57	2,91
Grain	11,33	12,12	23,45	30,54	31,34	42,67

Vegetables	11,34	13,02	24,34	37,57	39,24	50,57
Fruit	20,19	18,98	39,17	83,65	82,43	102,62
Diary	17,28	17,98	35,26	57,99	58,69	75,97
Meat, fish & eggs	10,42	11,50	21,92	36,69	37,77	48,19
Fat	3,37	5,60	8,97	12,95	15,19	18,56
Rest	6,93	9,65	16,58	17,84	20,57	27,49
Total healthy food	82,21	90,20	172,38	278,79	286,79	368,98
Kitchen equipment	11,55	11,55	14,70	16,60	16,60	18,14
Physical activity (if applicable)	0	0	0	0	0	0
Total healthy food basket	93,76	101,75	187,08	295,39	303,39	387,12
Other functions of food						
Take away food	1,24	1,18	2,42	2,70	2,63	3,88
Eating out	1,97	1,91	3,88	4,59	4,53	6,50
Invite people at home	23,45	23,45	23,47	23,53	23,53	23,55
Food on day trip or holiday	0,59	0,61	1,20	2,42	2,42	3,32
Food for celebrations	0,90	0,99	2,36	5,35	5,50	8,09
Total budget other functions of food	28,16	28,13	33,34	38,59	38,61	45,34
Total food budget	121,9	129,9	220,4	334,0	342,0	432,5

Source: own caluculations

As for purchasing patterns, there was an opinion mentioned in FG that when people have less money, they buy less quality food or they eat less vegetables. As a product which is not acceptable for choosing the lowest price they mentioned meat, salami and ham. Other comments were the following: our respondents shop mainly in supermarkets, namely Tesco, sometimes in small local shops or fruit/vegetable markets, some people shop on internet; Lidl is popular for cloths, Ikea and Kika for furniture, Tesco, Billa, Kaufland and big shopping malls are popular for combination of shopping and entertainment. For shopping in supermarkets it is good to have a car. Some people focus on the country of origin mark.

When we compare budgets for healthy eating, there are substantial variations between countries. The highest budget is in Denmark with 312 EUR and the lowest is in the Czech Republic with 82 EUR. This is result of a combination of differences in dietary guidelines and price differences. As the budget, according to different food groups, for a single woman shows, there are differences between countries in the share of the different food groups in the total budget. For example the Czech Republic has the smallest share of liquids. (Goedemé, T., Storms, B., Van den Bosch, K., 2015b:93) Comparable results show, that for vegetables, fruit, meat, fish and cheese the weighted pricing procedure declares the difference between member states in the number of low-priced items for each category. There are large variations across countries, ranging between 39 priced products in Sweden

up to 382 products in Belgium or 100 in the case of Czech Republic. The interpretation for Sweden explains that people choose seasonal products in the given time of the year and exclude expensive items. (Goedemé, T., Storms, B., Van den Bosch, K., 2015b:112) As the given explanation makes sense for Sweden, it also shows limitations to such comparative studies where clear instructions and detail methodological notes are urgently needed. The investigation in the Czech Republic makes a good basis for analysis how the reference households in comparison with other EU countries deal with healthy food guidelines and budget. It also stresses the variety of opinions, country guidelines, habits, amounts of food and expenses which were experienced by respondents in focus groups in different European countries.

Acknowledgment

This paper was supported by The Ministry of Education, Youth and Sports, Prague, Czech Republic: LD – COST CZ, project: LD15065 titled Gender dimension of active ageing implementation in the Czech private and public sector in comparison with western countries.

References

Bradshaw, J. (1993): Budget Standards for the United Kingdom, Aldershot: Avebury, 249p.

Council of the European Communities (1992a): Council Recommendation of 24 June 1992 on common criteria concerning sufficient resources and social assistance in social protection systems, 92/441/EEC, OJ L 245, 26/08/1992, 46-48p.

Council of the European Communities (1992b): Council Recommendation of 27 July 1992 on the convergence of social protection objectives and policies, 92/442/EEC, OJ No L 245, 49-52p.

European Commission (2013): Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Towards Social Investment for Growth and Cohesion including implementing the European Social Fund 2014-2020, COM(2013) 83 final, Brussels: European Commission, 23p.

European Commission. (2008): Commission Recommendation of 3 October 2008 on the active inclusion of people excluded from the labour market (notified under document number C(2008) 5737) in OJ L 307, 18.11.2008, 2008/867/EC: 11-14.

European Council (2010): European Council 17 June 2010 Conclusions, Brussels: European Council, 15p.

European Economic and Social Committee (2013): Opinion of the European Economic and Social Committee on European minimum income and poverty indicators SOC/482, Brussels: EESC, 10p.

European Parliament (2009): European Parliament resolution of 6 May 2009 on the active inclusion of people excluded from the labour market (2008/2335(INI)), T6-0371/2009, Brussels: European Parliament.

European Parliament (2010): European Parliament resolution of 20 October 2010 on the role of minimum income in combating poverty and promoting an inclusive society in Europe (2010/2039(INI)), TA(2010)0375, Brussels: European Parliament

European Parliament (2011): Resolution of 15 November 2011 on the European Platform against poverty and social exclusion (2011/2052(INI)), Strasbourg: European Parliament.

FZV. Fórum zdravé výživy. Potravinová pyramida 2013. Available at http://www.fzv.cz/pyramida-fzv/

Goedemé, T., Storms, B., Van den Bosch, K. (2015a): Proposal for a method for comparable reference budgets in Europe, Pilot project: developing a common methodology on reference budgets in Europe, contract no VC/2013/0554, Brussels: European Commission, 104p

Goedemé, T., Storms, B., Penne, T., Van den Bosch, K. (2015b): Pilot project for the development of a common methodology on reference budgets in Europe. The development of a methodology for comparable reference budgets in Europe - Final report of the pilot project. Universiteit Antwerpen

Society for Nutrition (2012): Výživová doporučení pro obyvatelstvo České republiky. Available at http://www.vyzivaspol.cz/rubrika-dokumenty/konecne-zneni-vyzivovych-doporuceni.html

Society for Nutrition (2014): Výživové doporučené dávky referenční hodnoty pro příjem živin. Available at http://www.vyzivaspol.cz/rubrika-nabidka-publikaci/Publikace-vyzivove-doporucene-davky.html

Storms, B., Goedemé, T., Van den Bosch, K., Penne, T., Schuerman, N., and Stockman, S. (2014): Review of current state of play on reference budget practices at national, regional, and local level, Pilot project for the development of a common methodology on reference budgets in Europe, Contract no. VC/2013/0554, Brussels: European Commission, 150p.

Štiková, O. (2013): Vývoj spotřeby potravin a nápojů v ČR. Výživa a potraviny, No. 4. Available at http://www.vyzivaspol.cz/clanky-casopis/vyvoj-spotreby-potravin-a-napoju-v-cr.html

ÚZEI. Ústav zemědělské ekonomiky a informací (2014). Available at http://www.uzei.cz

Regional Interbudgetary Relations: Problems and Solutions

Yuliya Viktorovna Karaulova, Postgraduate Student, Samara State University of Economics, Russia, spiel-fin@mail.ru

Abstract

The article examines theoretical aspects of public finance management. The author reveals some problems of interrelations among public-law entities in terms of budget process. The article analyses the issues of interbudgetary relations at the federal subject level in Russian Federation and, in particular, those of the financial dependence of most Russian regions and municipal entities; the redistribution relations among budgets at various levels; the issues regarding the lack of impetus for regions (municipal entities) to accelerate their local revenue potential. The author proposes some measures aimed at enhancing the interbudgetary regulation quality that, if taken, will boost the financial resources capacity of a federal subject of the Russian Federation, which, eventually, will affect the increase in the public finance efficiency.

Keywords: consolidated budget; interbudgetary relations; fiscal capacity; revenue potential; interbudgetary regulation instruments; public finance efficiency.

Introduction

Interbudgeraty relations are the most essential element of regulating the budgetary interrelations among various authority levels. This element assumes particular significance in a country like Russia that shows considerable difference in socio-economic development of not only federal subjects but also municipal entities within regions (Kostenkova, 2017).

There is a critical gap in the regional development of Russia deepened by gradual reduction in the reliance on local revenues. For example, in 1996, 59 federal subjects had positive balance of the interbudgetary relations with federal budget while, currently, the number is smaller and, by various estimates, ranges from 13 to 35. Besides, these regions produce about 52% of gross domestic product (GDP), with the other 10 federal subjects, which lag behind, accounting for less than 1% (Valentey, 2012).

Thus, substantial problems, which have their peculiar features in every region, are typical of Russian budgetary system. This fact determines the relevance of the research into the problems of interbudgetary relations at a regional level, the search for their most efficient solutions, as well as the development of directions for enhancing the instruments of interbudgetary relations.

The objective of the current study is to develop a theoretical framework for the interbudgetary relations at a regional level and a set of measures for enhancing the budget process efficiency in a federal subject of Russia.

The objective can be achieved through fulfilling the following tasks:

- to study the theoretical aspects of public finance management;
- to reveal the problems of the interbudgetary relations at a subfederal level;
- to propose measure that will allow to enhance the budget process quality, which, in its turn, will increase the financial resources capacity of local budgets of Russian federal subjects.

Material and Methods

The theoretical framework embraces the works by Russian and foreign economists specializing in public finance. The research is conducted based on the data obtained from The Ministry of Finance of Russian Federation, Samara Oblast Government and both Russian and foreign periodicals.

The system method is chosen as a leading approach to study the problem, with a range of general scientific methods applied. These methods are empirical, theoretical, logical and dialectic ones, analysis, synthesis, and that of visual presentation.

Results

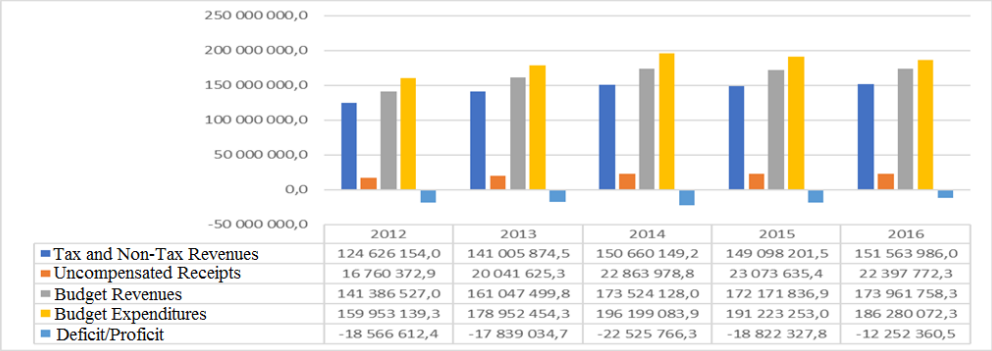
It is fair to say that, currently, there is no single approach to the conceptual construct, evaluation and analysis of budget regulation in science. According to the majority of researchers, interbudgetary relations are a budget regulation of the redistribution among local budgets for ensuring the horizontal and vertical balance (Solomko, 2015; Shirobokova, 2014). This view does not seem comprehensive enough as it fails to take social processes and sector development proportions into consideration.

The author feels a need for more comprehensive consideration of the issue. In this regard, the author proposes a clarification of the essence definition of *interbudgetary relations*, which are one of the key elements of budget regulation for making the redistribution more even. The redistribution within the budget system is conducted through various mechanisms, with interbudgetary transfers, governmental grants, subsidies, grants-in-aid, public budget loans, revenue allocation standards being among the main ones. Thus, interbudgetary regulation is a basic element of budget process. This results from the fact that rational and equitable state budget distribution among local budgets can be referred to as one of the most crucial condition for balanced socio-economic development, economic efficiency and social justice, which let the population access the public goods equally and the economic entities get different kinds of state support, the right to which is guaranteed by law (Volokhina, Malysheva, 2015).

The drawbacks of the interbudgetary relations require effective measures to overcome or minimize their consequences. The balanced proportion of budget redistribution becomes possible due to interbudgetary regulation provided that an extensive analysis of current situation is conducted in order to ensure the correct process. “Consequently, finding justified, transparent, scientifically substantiated methods of interbudgetary relations regulation that contribute to the balance of the budget system is of primary importance” (Karaulova, 2017).

This article considers the case of the interbudgetary relations in Samara Oblast. It should be noted that this region takes top positions in Volga Federal District based on budget process indicators. This means that the region’s budget policy ensures certain balance and stability of the budget system, provides social support and stimulates investment activity. The cooperation among municipal entities and the government of Samara Oblast ensured the increase in tax and non-tax revenues of the regional consolidated budget (Figure 1).

For example, the budget revenues increased by 13% in 2016 compared to 2015 and now amount to 151.6 billion rubles. There is also an increase in uncompensated receipts. The Figure 2 presents the revenue structure from the perspective of the revenue types of the Samara Oblast consolidated budget in 2016.



	2012	2013	2014	2015	2016
Tax and Non-Tax Revenues	124 626 154,0	141 005 874,5	150 660 149,2	149 098 201,5	151 563 986,0
Uncompensated Receipts	16 760 372,9	20 041 625,3	22 863 978,8	23 073 635,4	22 397 772,3
Budget Revenues	141 386 527,0	161 047 499,8	173 524 128,0	172 171 836,9	173 961 758,3
Budget Expenditures	159 953 139,3	178 952 454,3	196 199 083,9	191 223 253,0	186 280 072,3
Deficit/Proficit	-18 566 612,4	-17 839 034,7	-22 525 766,3	-18 822 327,8	-12 252 360,5

Fig. 1: The consolidated budget execution in Samara Oblast (Kravchenko, Urman, 2015)

Source: http://samara.ifinmon.ru/analiticheskie-otcheti/analiz-ispolneniya-konsolidirovannogo-budgeta/ispolnenie-budgeta/

Based on the data analysis, it can be concluded that the two main sources for budget revenues are corporate income tax (31%) and personal income tax (31%) followed by excise duties (11%) and uncompensated receipts (6%). It should be highlighted that the structure of budget revenue part in Samara Oblast has been unchanged over the last 5 years.

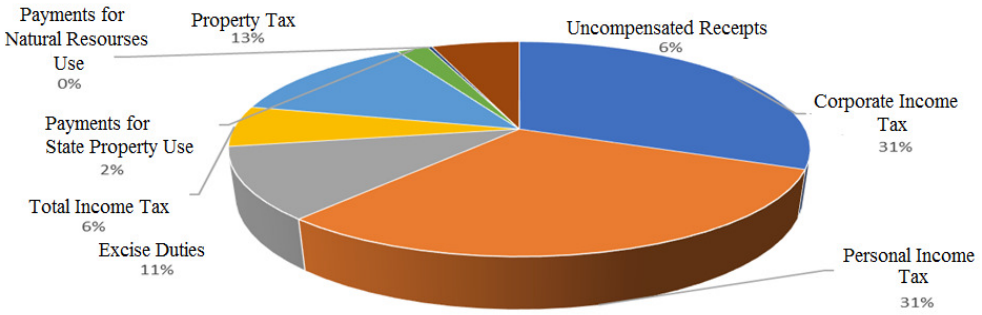


Fig. 2: The revenues structure from the perspective of the Samara Oblast consolidated budget revenues in 2016, % %

Source: http://samara.ifinmon.ru/analiticheskie-otcheti/analiz-ispolneniya-konsolidirovannogo-budgeta/ispolnenie-budgeta/

However, there is a slight reduction in the budget share of districts, settlements and municipalities concerning the revenues structure from the perspective of budget levels (Figure 3).

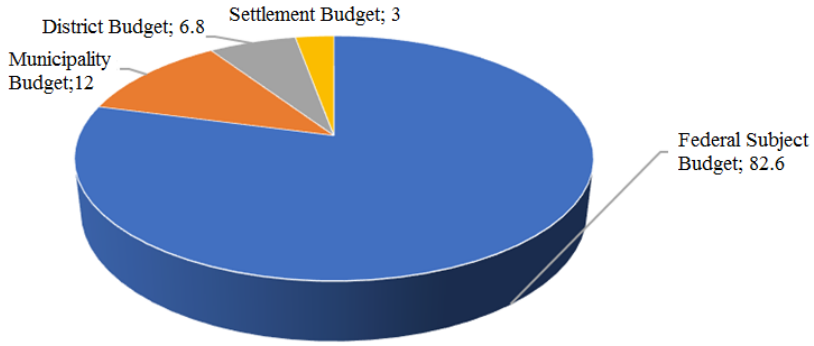


Fig. 3: The structure of the Samara Oblast consolidated budget revenues in 2016, % %

Source: http://samara.ifinmon.ru/analiticheskie-otcheti/analiz-ispolneniya-konsolidirovannogo-budgeta/strukturnaya-dinamika-fakt-postupleniya-dohodov-po-urovnyam-budgeta/

The analysis of receipts at various budget levels showed that the federal subject budget (82.6%) then municipality (12%) constitute its largest part and districts (6.8%) follow. The system dynamics seems negative as local income of municipalities goes down.

For example, while the federal subject budget increased by 3.6% in 2016 compared to 2012, the municipality budget decreased by 1.4%, the district budget – by 2.3% and the settlement budget – by 0.2%. In order to boost the receipts of non-tax and tax revenues, there were various measures based on the 2014-2016 regional state programme 'Public Finance Management and Interbudgetary Relations Development'. They aimed at enhancing the business process quality and the efficiency of budget expenditures as well as improving the interbudgetary relations and ensuring long-term balance and sustainability of the budget system of Samara Oblast.

The expenditures structure of the Samara Oblast consolidated Budget in 2016 is plotted on Figure 4.

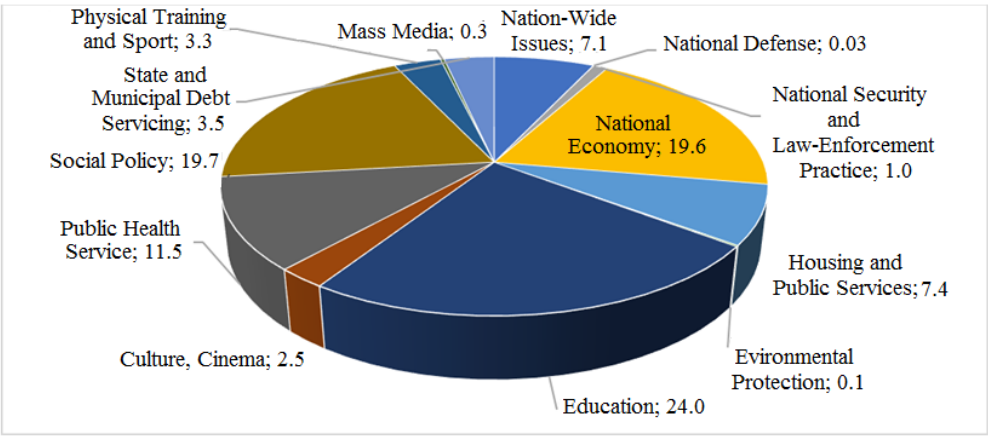


Fig. 4: The expenditures structure of the Samara Oblast consolidated Budget in 2016, % %

Source: http://samara.ifinmon.ru/analiticheskie-otcheti/analiz-ispolneniya-konsolidirovannogo-budgeta/ispolnenie-budgeta/

As seen, the expenditures were allocated to education (24%), social policy (19.7%), national economy (19.6%), housing and public services (7.4%), nation-wide issues (7.1%). It should be

stressed that no significant changes took place compared to the previous period, the order of expenditure categories remained the same, however, there is a decrease in social and education expenditures.

The statistics for 2015 show the interbudgetary relations efficiency in Samara Oblast is slight as there is a lack of balanced local budgets in the region while a number of deficit budgets is rather large (73% in municipal regions and 27% in municipality). The budget deficit accounts for 18.5% of total deficit for municipal districts and 81.4% of that for municipality.

The analysis shows that the main problem of interbudgetary relations at subfederal level is critical difference in fiscal capacities of municipal entities, which often show itself in unfair distribution of uncompensated receipts. It is rather common for wealthy municipal entities to shift to the category of less wealthy municipalities based on the budget revenues per capita upon the redistribution (Kravchenko, Urman, 2015).

The author believes that the prime thing that is necessary to do when approaching this task is to boost the regional and local tax revenues. Nowadays, the received revenues share in the budget structure of most municipal entities in Samara Oblast does not exceed 20%, which reveals the high dependence of local budgets on various interbudgetary transfers from the higher-level authority (Local branch of Federal Service for Statistics in Samara Oblast, 2017).

According to T. M. Kovaleva and I. A. Boyko (2017), an efficient measure to enhance interbudgetary relations would be to change governmental grants for leveling off fiscal capacities by additional standards of the revenue allocation of the personal income tax. However, the current standards of revenue allocation of personal income tax were set in 2005 and never changed since then.

The conducted study of the tendencies and peculiarities of Samara Oblast budget process makes it possible to conclude that, despite certain positive aspects related to rather high level of the regional development, the budgetary relations still suffer from a number of unsolved problems, among which one can mention:

- the efficiency indicators of budget leveling-off (a balance of local budgets) reveals rather considerable horizontal disbalance;
- the decrease in receipts of municipality, district and settlement budgets demonstrates the drawbacks of the approaches to subsidies granting and the public management quality ensuring in a region;
- insufficient increase in expenditure budget and its deficit shows low efficiency of the state financial support measures in recent years;
- large difference in the development of rural and urban territories in Samara Oblast.

The revealed problems of interbudgetary relations in Samara Oblast point at the insufficiency of monitoring, which highlights the need for enhancing the instruments of interbudgetary relations (hereinafter, IBR). The main directions of this process are presented on Figure 5.

It is possible to agree with many economists who think that the current methodology applied by The Ministry of Finance of the Russian Federation does not ensure certainty concerning the evaluation of interbudgetary relations as it has little indicators (Kadochnikov, 2016; Karaulova, 2017).

In this regard, there is a lack of sufficient analysis of particular spheres of regulating impact. Besides, particular indicators and ways of their interpretations are controversial, for example, those of the correlation between the subsidies for local budgets and transfers and the leveling off the fiscal capacity. Consequently, the existing technique requires enhancement.

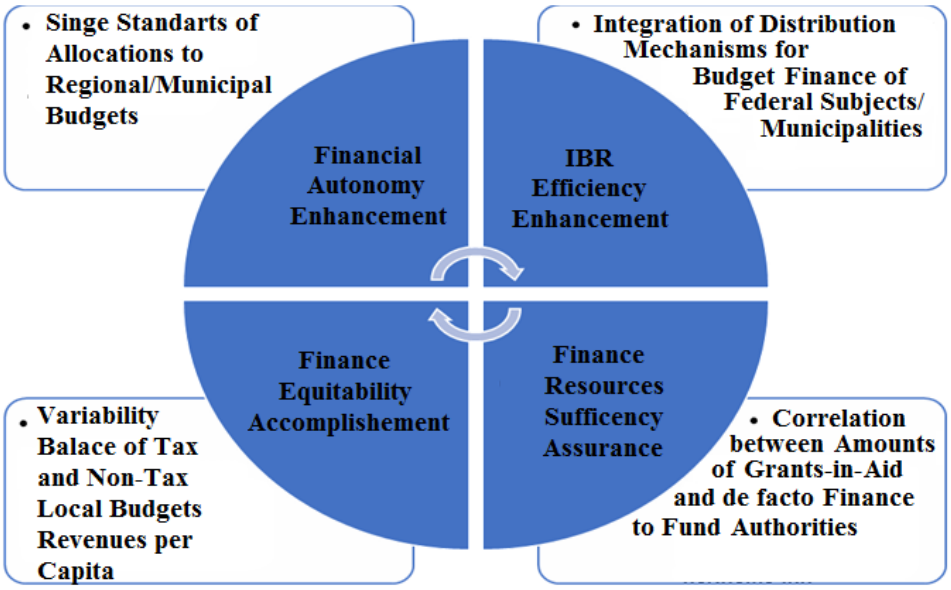


Fig. 5: The directions for enhancing the interbudgetary relations instruments
Source: Author

In addition, it is necessary to make a note of the considerable scale of redistributive relations determined by the amount of finance contributing to the federal budget from Samara Oblast that is almost equal to that of the interbudgetary transfers from the centre, i.e. one can see the finance flow from a regional to the federal budget and back. Such centralization of interbudgetary relations result in the largest part of regional budget system revenues going into to the federal budget first and finance in the form of interbudgetary transfers returning to the regions then (Syatchikhin, 2016). Along with this, the insufficient objectivity and explicability of these transfers distribution create the exposed environment that is also inclined to corruption. In other words, current state of affairs is characterized by the low dependence of regional fiscal capacity level in Russia on socio-economic environment, which, in its turn, prevent the development of impetus for regional authorities to enhance local revenues.

Discussion

Overall, the results allow to conclude that the most important task of efficient state governance and local self-governance is its adequate financial assurance and efficient interbudgetary relations (Solomko, 2015). Despite some positive shifts in interbudgetary relations conduct in Samara Oblast, the majority of municipalities does not practice the integration of result-oriented budgeting principles. The emphasis should also be laid on the insufficient level of the measurement system for interbudgetary relations efficiency.

In this regards, it seems relevant to consider the essence of an optimal structure for interbudgetary transfers. D. Bergvall, C. Charbit, D.-J. Kraan and O. Merk (2006) think that the transfers use efficiency is defined by the degree of their relevance to the social and economic regulation objectives. The explanation derives from the fact that the regulation based on purpose transfer allocation will be more efficient rather than non-purpose transfer in the conditions of the low quality of state and/or municipal finance management. It makes an interbudgetary transfers structure dominated by subsidies the most optimal (Sumskaya, 2017).

The author thinks that it is important to observe certain conditions. Above all, it is essential to set priorities for state financing with the account of certain aspects. The aspects under consideration are the socio-economic state of affairs in regions/municipalities, the competitive advantages peculiar to those territories that, if used, will ensure accumulation and intensive development of tax and economy potential. Besides, it is necessary to provide the transparency of the subsidies distribution techniques and ways that should be worked out based on the combination of competitive and non-competitive distribution mechanisms. The non-competitive mechanisms will bring the opportunities for regions with low economic development to receive additional finance. The competitive mechanisms will allow to heighten the authorities' economic interest in receiving subsidies. On this basis, it is possible to draw a conclusion that the integration of the budget redistribution mechanisms with municipal and state programmes should be obligatory.

The author thinks that the efficiency of interbudgetary relations should be evaluated based on, firstly, the quality and, secondly, the budget process effects. The quality evaluation of interbudgetary relations should derive from the grouping and systematizing of the indicators based on the tasks. As one of the basic objectives of interbudgetary regulation is to level off the territories (both vertical and horizontal) as well as economic stimulation, the following aspects are proposed to be considered as the indicators of interbudgetary relations quality assessment:

The first evaluation unit of horizontal leveling-off consists of:

1) the indicators of local fiscal capacities variability before and after governmental grants aimed at equitability and balance of budgets;

2) the alteration of the first indicator.

The second evaluation unit of vertical leveling-off consists of:

1) the level of sufficient budget revenues at all levels for fulfilling the expenditure obligations;

2) that caused by receiving an interbudgetary transfer;

3) the degree of revenue decentralization reached on the account of setting allocation standards by regional law.

The third evaluation unit of economic stimulation consists of:

1) the share of interbudgetary transfers distributed on the competitive basis;

2) the level of state financial support for one economic entity.

It can also be proposed to define a common indicator of interbudgetary relations efficiency using the score technique providing a preliminary calculation of standard figures and their compulsory legislative consolidation. However, the assessment based on the proposed scheme is complicated, above all, due to the currently existing time lag between the implementation of budget regulation measures and their effects.

The interbudgetary relation effects can be the following:

- budgetary effects related to the reduction in regional and/or municipal needs for interbudgetary transfers, to the increase in their fiscal capacity and balance.

- economic effects related to the positive dynamics of socio-economic regional and/or municipal development, to the decrease in interterritorial difference.

Thus, the proposed directions of interbudgetary relations enhancement based on their efficiency evaluation allow to assess these processes considering the existing drawback of budget process as well as the opportunity to detect actual regulation results. The permanent monitoring of the indicators will contribute to efficient managerial decisions and their timely correction.

Besides, the author proposes the following key directions for efficiency enhancement of the interbudgetary relations instruments. Regarding the governmental grants aimed at fiscal capacity equitability, it should be mentioned that the existing distribution system does not allow to solve the problems of the municipalities characterized by highly tense budget execution. Taking the financial insecurity of alike municipal entities in the contemporary crisis conditions into account, it seems relevant to use a Fund of Local Budgets Balance formed for a limited period and loaded by transferring a part of finance aimed at leveling off municipal fiscal capacity. It is necessary to define a precise goal of their use and introduce compulsory publication of the reports on these expenditures.

Since the share of special-purpose interbudgetary transfers has been increasing lately in Samara Oblast, the planned efficiency of granting subsidies to local budgets should be preliminary assessed and then one should control the set plan accomplishment.

The mentioned measures are relevant when subsidies are:

- connected with uneven distribution of municipal/states services consumers in municipal entities of Samara Oblast;
- oriented towards the reduction in a number of current differences among various municipal entities within the region in the process of providing municipal/state services;
- aimed at boosting the quantity and quality of municipal/state services in municipal entities of Samara Oblast (the quality and amount indicators of services per capita are compared).

Moreover, the emphasis should also be laid on consolidating the responsibility of the main holders of the Samara Oblast consolidated budget for taking decisions on the subsidies distribution among local budgets and controlling. In this regard, quite an efficient measure can be outlining the requirements for the rules and principles of subsidizing, which prohibit to provide several subsidies to one municipality on one direction, and monitoring and controlling the purpose accomplishment within the set period.

Nowadays, the existing practice of providing local budgets with grants-in-aid from regional budget seems to be an instrument of responsibility redistribution rather than optimization of administrative decisions. Therefore, it makes sense to boost the responsibility level of the main spending units of regional budgets that have power to vest local self-governance bodies of Samara Oblast with certain authorities.

In order to tackle the low efficiency of the measures controlling the performance quality of the transferred authorities, one should work out the rules that make it possible to coordinate the amount of grants-in-aid and the quality of exercising the state authorities. Besides, it seems necessary to make the results of these processes public in press, which will allow to enhance the efficiency of the transferred authorities as well as their relevance to the provided financial services due to publicity and transparency.

It is vital for the balanced interbudgetary regulation to ensure that regional and federal budgets give rational budget loans to local budgets. In the difficult current conditions, it is important to fulfill the obligations of returning credit means and prevent past-due debts. Besides, it seems relevant to strengthen control over the intended use of granted credits.

Conclusion

To sum up, it should be said that searching for efficient instruments and mechanisms of interbudgetary relations and developing the directions of interbudgetary relations enhancement are becoming rather topical in the contemporary conditions of large difference in regions and municipal entities within. A well-designed system of interbudgetary relations is of great economic, political and social significance for successful public development of Russia. Therefore, every region takes various measures aimed to ensuring the balance of budgets at different levels.

However, the efficiency of the undertaken measures remains slight. The conducted analysis revealed a number of interbudgetary regulation problems in Samara Oblast. The first problem is a lack of local budgets balance and the financial dependence of many municipalities that are characterized by budget deficit. Another problem is excessive redistribution relations among budgets. One more problem is a lack of impetus for building local revenue potential at regional and local level. Furthermore, the interbudgetary relations between Samara Oblast and the center and among the region and its municipal entities are unstable. Besides, this region as well as the majority of other federal subjects is characterized by the increasing tendency to centralize the local budgets revenues accompanied by the growing share of uncompensated transfers in the regional consolidated budget.

In order to solve these problems, it is primarily necessary to conduct the efficiency assessment of the undertaken budget policy measures to introduce the corrections timely. One should also understand that the main effort made by the state governance and local self-governance bodies shall be focused on accelerating the local tax basis at all level and searching for the reserves to form it. Additionally, the consolidation and balance of the interbudgetary relations depends on a more equitable finance distribution among budgets; an opportunity to transfer some tax revenues to municipalities; the taxation system enhancement; the restriction of finance centralization at the subfederal level.

References

Bergvall, D., Charbit, C., Kraan, D.-J., Merk, O. (2006) Intergovernmental Transfers and Decentralized Public Spending. *OECD Journal on Budgeting*, 5 (4): 111–158.

Boyko, I. A., Kovaleva, T. M. (2017) The efficiency of public finance and interbudgetary relations in the region. *Ekonomika i predprinimatel'stvo*, 4-1(81-1): 267-270.

Iordanidi, M. Kh. (2016) One of the local self-governance body financing related to the interbudgetary relations. Proceedings of the X international scientific conference "Akademicheskaya Nauka – Problems and Achievements". Scientific publishing house "Akademicheskiy". CreateSpace, 194-195.

Kadochnikov, D. V. (2016) Budget decentralization and interbudgetary relations: Chinese reform practice and its relevance to Russia. Prostranstvo ekonomoki, 2: 109-126.

Karaulova, Y. V. (2017) Budget system of the Russian Federation and its functioning peculiarities in the region. *Ekonomika i predprinimatel'stvo*, 5-2(88-2): 309-316.

Kostenkova, V. G. (2017) Problems of budget federalism in modern Russia. *Vestnik Udmurtskogo universiteta. Seriya "Ekonomika i pravo"*, 2: 15-19.

Kravchenko, P. V., Urman, N. A. (2015) Efficiency of governmental grants for fiscal capacity equitability in the Russian Federation. Vestnik Tomskogo Universiteta. Ekonomika, 3(31): 103-111.

Local branch of Federal Service for Statistics in Samara Oblast (2017). Retrieved from http://samarastat.gks.ru/wps/wcm/connect/rosstat_ts/samarastat/ru/statistics/finance/

Ministry of Finance of Samara Oblast (2017) Consolidated budget execution. Retrieved from http://samara.ifinmon.ru/analiticheskie-otcheti/analiz-ispolneniya-konsolidirovannogo-budgeta/ispolnenie-budgeta/

Shirobokova, V. A. (2014) New approach to interbudgetary relations system enhancement. *Vestnik PGU. Seriya: Ekonomika*, 1: 116-123.

Solomko, M. N. (2015) Approaches to interbudgetary regulation assessment. *Upravlenets*, 3(55): 4-11.

Sumskaya, T. V. (2017) Methodology to analyze regional and local budgets: essence and application based on the Novosibirsk Oblast case. *Vestnik NGU. Seriya: Sotsial'no-ekonomicheskie nauki*, 2: 72-85.

Syatchikhin, S. V. (2016) Local budgets management based on the finance interests coordination: theoretical aspect. *Finance and credit*, 7(679): 15-26.

The main directions of budget policy in Samara Oblast for 2017-2019. Retrieved from http://minfin-samara.ru/main-directions-of-tax-policy/

Valentey, S. D. (Eds.), (2012) *Symmetry and asymmetry of Russian federal relations model*. Institut ekonomiki RAN, Moscow.

Volokhina, V. A., Malysheva, V. V. (2015) Revisiting interbudgetary relations regulation in the contemporary conditions. *Vestnik OGU*, 8(183):15-22.

Supply Side Competitiveness on the Polish Tomato Market Against The Rest of the Visegrad Group Countries

PhD Agnieszka Tarnowska, Wroclaw University of Economics, Wroclaw, Poland,
agnieszka.tarnowska@ue.wroc.pl
PhD Anna Kowalska, Wroclaw University of Economics, Wroclaw, Poland,
anna.kowalska@ue.wroc.pl

Abstract

This article deals with the competitiveness of the Polish vegetable industry, exactly the tomato producers and their competitiveness on the Visegrad Group market. The purpose of the study was to examine whether the supply side of the Polish tomato market was competitive with other Visegrad countries. The area and volume of tomato production was the subject of the study. The analysis was based on statistical data mainly from the FAOSTAT databases. The subject area was taken by 4 Visegrad Group countries (V-4), i.e. Czech Republic, Slovakia, Hungary and Poland as well as groups of countries belonging to EU-27, EU-12 and EU-15. The time span generally closes from 2004 to 2014. The calculated Gini and HHI coefficients have shown a strong concentration in the V-4 tomato market. They point out that Poland's position as a leader is still strengthening. The rest of the V-4 countries are hard to compete with Poland on this market. These countries are increasingly leaving the market and losing their customers. This makes the tomato producers in these countries often give up the production of tomatoes, which contributes to increasing the Polish market share in this market. The great challenge for Polish tomato producers is the need to invest in cultivation of tomato under cover, application of new cultivation technologies, search and production of new varieties of tomatoes.

Keywords: vegetables, tomatoes, supply competitiveness, production volume, productivity

Introduction

Competitiveness is the ability of entities to compete in open markets. Initially, these are usually native markets. It can be seen from supply and demand side. Supply competitiveness is encountered among the producers most often in the situation of abundance of offered goods, characteristic of developed market economies [Gorynia, Łaźniewska (ed.) 2009]. This abundance is often forced manufacturers to lower prices. According to Kowalska [2016] the quality criteria of products offered are increasingly important determinants of the competitiveness of entities than the price criteria themselves.

According to Porter [1990], building competitive advantage is based on the value of resources used, but maintaining it often requires going beyond the home market and taking strategic action internationally. The world economy is increasingly open and increasingly international. Poland belonging to the OECD, the European Union and the Visegrad Group is currently part of the market of countries that do not use barriers to the flow of goods, capital and labor. Free market is the foundation for building the international competitiveness of the participating countries.

A review of the competitiveness theory presented by Bednarz [2013] demonstrates the absence of one universally binding definition of "competitiveness". However, it emphasizes, for example, that in the definitions developed by the OECD or the World Economic Forum, the competitiveness of national economies is shaped by internal factors and that the right measure of competitiveness is productivity. In the 1980s and 1990s, a new trend of competitive advantage was developing. This trend referred to the so-called resource school. Its representatives, however, stressed that available capital, personal and financial resources, without appropriate opportunities, good management or communication system, would not guarantee market success [Juchniewicz (ed.) 2006]. In the economic literature more and more is said about the sustainable competitiveness of the national economy. However, there is a problem with its measurement [Popescu et al. 2017].

Market rivalry of entities takes place on three levels: enterprises (microscale), branches (mesoscale) and national economies (macroscale). Firlej et al. [2017] list other levels: enterprises and branches as well as regions and states. This paper focuses on the competitiveness of the Polish vegetable industry, and more precisely on tomato producers and their competitiveness on the Visegrad Group market. From an economic point of view, the branch is a sector of the economy (production, trade), which includes goods of the same kind, produced using the same technology [Gorynia, Łaźniewska (ed.) 2010].

It is believed that the vegetable market, regardless of socio-economic order, is one of the best suited to market rules. It is a highly autonomous, self-regulating and competitive market [Szwacka-Salmonowicz 1991]. The EU vegetable market has seen that tomatoes are one of the most important products in this market and at the same time are the least competitive. Their production is heavily concentrated in the south of Europe. The largest tomato producers in the European Union were in 2010-2012 respectively: Italy (35.5% of the EU market) and Spain (25.3%). These countries are export oriented [Valenciano, Perez Mesa 2004]. In Poland 4.2% of EU tomatoes were produced, which gave it 7th place. It is impossible for Poland to compete with Italian or Spanish producers of heat-loving tomatoes, because of the climate, which is very favorable to southern countries. In the top ten EU producers of this vegetable was also, from the Visegrad Group countries, Hungary (0.8% of production volume) [Tarnowska 2014b].

The main objective of the study was to investigate whether the supply side of the Polish tomato market, which has specific production resources, is competitive with other Visegrad countries operating in this branch in the common European market. The area and volume of tomato production was the subject of the study. The analysis was based on statistical data mainly from the FAOSTAT databases. The subject area was taken by 4 Visegrad Group countries (V-4), i.e. Czech Republic, Slovakia, Hungary and Poland as well as groups of states belonging to the EU-27, EU-12 and EU-15. The time span generally closes from 2004 to 2014.

Vegetables production in the European Union and in the Visegrad Group

Vegetables occupy an important position in the diet of Europeans and their market is changing. In 2015, the EU-27 produced 63.2 million tonnes of vegetables and compared to 2004 it was less about 5.9%. There is a downward trend in the European market for this crop, both in fifteen old union countries (UE-15) and in the new Member States (EU-12). The changing demand for vegetables means that more and more wealthy Europeans choose more quality vegetables to replace cheaper volumetric vegetables. This translates into lower total volume of vegetable production.

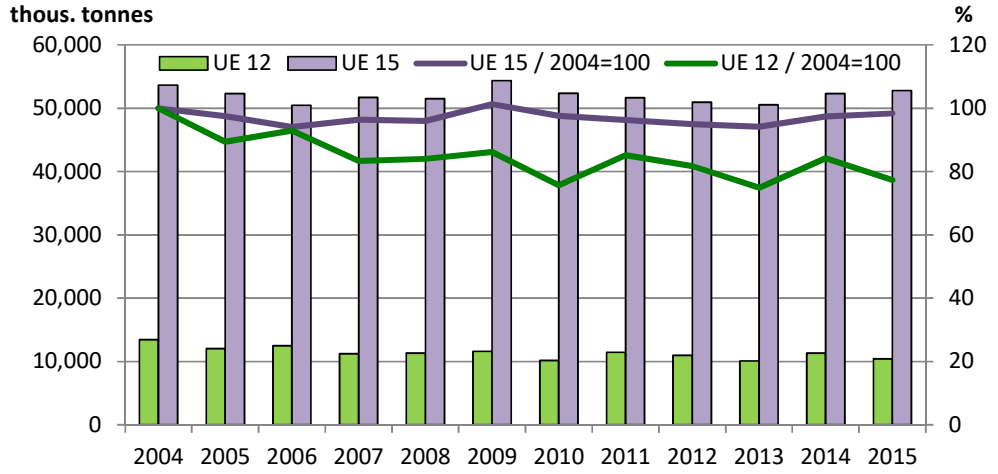


Fig. 1: Vegetable production (in thous. tonnes) and its change in constant basis (2004 = 100) in % in EU (EU-27), broken down by old and new Member States

Source: own study based on FAOSTAT

In Fig. 1, it can be seen that in the period 2004-2015 much more vegetables were produced in the EU-15 than in the EU-12. Average yearly production was accordingly: 52.1 million tonnes and 11.4 million tonnes. In the EU-15 countries this production was less volatile than in the EU-12. The standard deviation of the dynamics index was 2.1 vs. 6.9 in the EU-12. In both groups of countries, vegetable production remained below the baseline year (2004) during the period considered. The only exception for the EU-15 was the year 2009, in which it was produced 54.4 million tonnes of vegetables, i.e. 1.3% more than in 2004. In all other considered years, growth rates were below 100%. Higher supply fluctuations was observed in the new Member States of the Community. Compared with the EU-15, this indicates a greater instability of the vegetable market in EU-12. On the one hand the subsequent impact of the economic crisis on the vegetable market was noticeable in the EU-12 (2010) than in the EU-15 (2009). On the other hand, the crisis has rebounded stronger on the producers of these crops in the new Member States. This again shows greater instability on this market and uncertainty prevailing among producers of vegetables from the EU-12.

Preliminary research confirms that the EU-15 are unrivaled in the EU vegetable market. This is evidenced by the volume of production of these crops. Poland, however, has a chance to compete in the nearer markets, which are the Visegrad Group countries. These are states that have undergone a systemic transformation a quarter of a century ago. They rejected the centrally planned economy and geopolitical dependence. The market economy of these countries is not yet developed enough for them to compete on a par with countries of the rich west. This is mostly due to lack of capital. Visegrad Group countries are characterized by relatively low levels of [Bieńkowski, Stoykova 2016]:

- GDP per capita,
- technological advancement,
- innovation.

It was mentioned in the introduction to the study that the competitiveness of national economies depends on the abundance of the factors of production. The V-4 countries do not have as much capital as the EU-15 states. It is worth noting, however, that the Visegrad Group includes two countries with large agricultural production potential across the EU, i.e. Poland and Hungary. By the term 'potential' it should be understood here primarily big resources of land and labor in agriculture.

In 2012, Poland had 14.5 million hectares of agricultural land, which constituted 8.1% of UR in EU-27 and 28.8% of UR in EU-12. In turn in Hungary, there were 5.3 million hectares of UR, i.e. 3.0% of UR in EU-27 and 10.6% of UR in EU-12. In the same year the number of full-time agricultural workers was 2101 thous. AWU in Poland and in Hungary – 426 thous. AWU, which together accounted for 25.1% of employed in EU agriculture and 50.3% of labor force in agriculture of new member countries of the Community [Tarnowska 2014a].

Growing vegetables is labor intensive. Thus, this direction of agricultural production may be an opportunity to use excessive labor resources in agriculture. Such an excess is observed in the less developed new EU Member States, such as Poland and Hungary.

The total area of vegetable cultivation in V-4 was 284 thous. ha in 2014. The dominant crop area was in Poland (65.9%), followed by Hungary (28.1%), Czech Republic (3.5%) and Slovakia (2.5%). The area under vegetable cultivation in the countries concerned has decreased by 23% compared to 2004. However, thanks to the increasing productivity of their crops – the volume of production of these crops in V-4 decreased only by 9% in the analogous period. The increase in production was recorded in Poland (by 2.2%), the largest reduction – in Slovakia (by 68.4%) [FAOSTAT, 2017].

The share of tomatoes in vegetable production in the European Union (EU-27) and in the Visegrad Group (V-4)

Tomatoes, like peppers, belongs to nightshade vegetables. It is a thermophiles plant of great economic and culinary importance in Europe. Tomatoes came to this continent from South America

when it was discovered by Columbus. Tomatoes definitely dominate the vegetable market in terms of area, size and value of the crop. In 2010-2012, the share of tomatoes in total EU-27 grown vegetables was [Tarnowska 2014b]:

- 11.9% of the area,
- 26.5% of production volume,
- 25.8% of production value.

Tomatoes are therefore one quarter of all vegetables produced in the Community. FAOSTAT data show a large difference in this share in EU-27 and V-4 (Fig. 2). It follows from the above mentioned domination of the Mediterranean countries on this market.

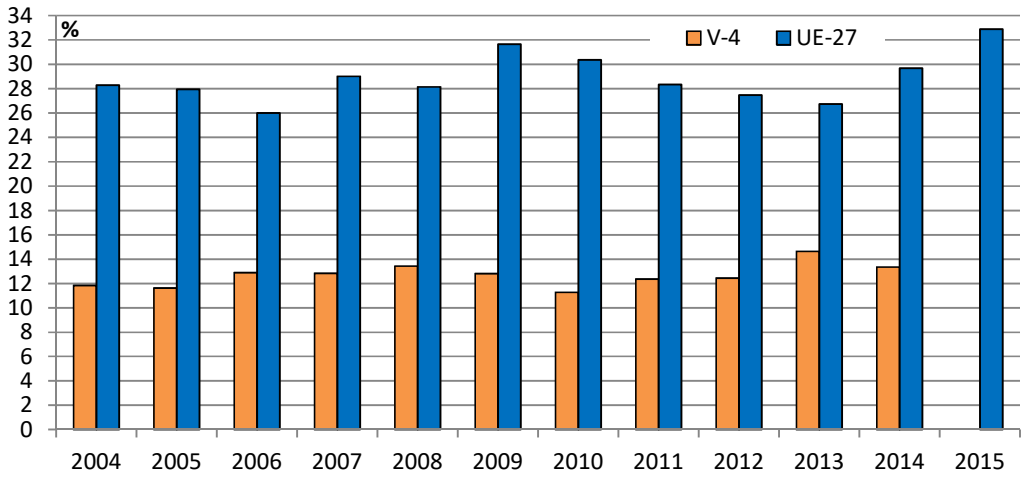


Fig. 2: Share of tomatoes in vegetable production in EU-27 and V-4 in 2004-2015 (%)
Source: own study based on FAOSTAT

In the Visegrad Group, tomatoes accounted for about 14% of all vegetable production in recent years. Differences in this share of individual countries from the group V-4 were relatively small. The exception was the Slovak vegetable market, which in 2007 was 85% dominated by tomato production and supply (fig. 3). This was a result of the drastic drop in total vegetable production in Slovakia due to the drought. This production amounted to only 65 thous. tonnes against 109 thous. tonnes of average annual production in 2004-2014. Tomatoes were more common than other vegetables grown under cover. Thanks to that most of their productions have been saved. From 2007 to 2013 there was seen in Slovakia a steady decrease in the share of tomatoes in the size of the vegetables harvest. The change in the unfavorable trend was brought only in 2014, when tomatoes accounted for nearly 20% of the country's vegetable production.

The fluctuations in the supply of vegetables in Slovakia have no significant impact on the market of these crops in the Visegrad Group. In 2014, their production in Slovakia accounted for only 1.5% of the total vegetable production in V-4. The biggest player of this market in the discussed group of countries is Poland. This country produced over 5.5 million tons of vegetables in the years 2004-2014. Poland's share in V-4 vegetable market was 77.1% in 2015 and increased by 9.2 pp in 2004. This demonstrates the growing position of Poland in the discussed market and the better use of the country's productive resources in agriculture.

In the Visegrad Group, Hungary is also an important vegetable producer. In the analyzed period, they produced an average of 1.5 million tons of these crops per year. That accounted for 20.3% of this market in the V-4. However, after the economic crisis, it was possible to observe the declining vegetable production in Hungary (fig. 3). This country is slowly getting out of the vegetable market. The attention of Hungarian farmers is increasingly focused on the production of, for example, wine or sunflower oil.

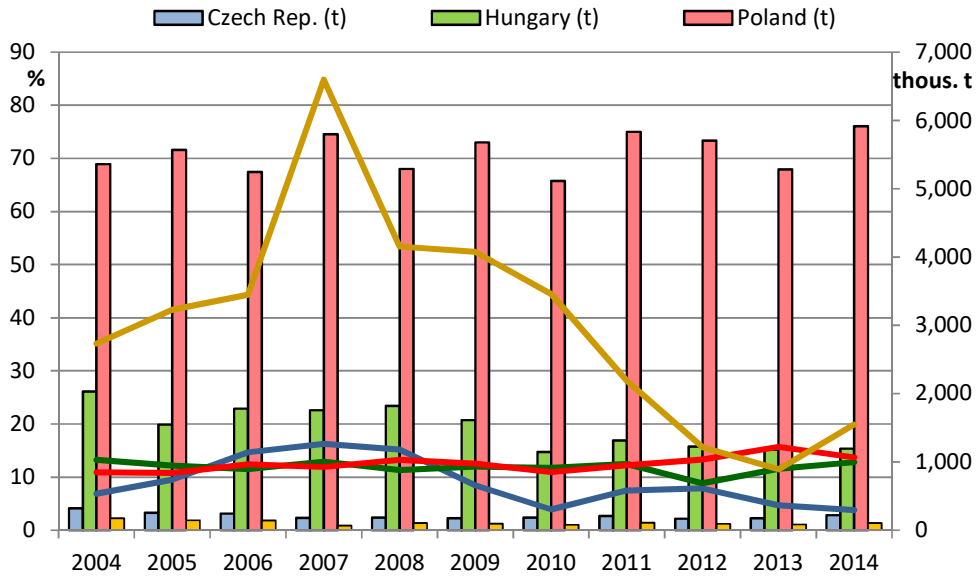


Fig. 3: Vegetable production volume (in thous. tonnes) and share of tomatoes in vegetable production (in%) in the individual countries of the Visegrad Group in years 2004-2014

Source: own study based on FAOSTAT

Poland as a significant producer of tomatoes in the Visegrad Group

Poland is the largest producer of tomatoes in the Visegrad Group. In 2004, the crops of these vegetables in Poland amounted to 14.5 thous. ha (fig 4). It was 2.5 times larger than in Hungary, more than 4 times bigger than in Slovakia and 18 times bigger than in Czech Rep. This year in Poland 582 thous. tonnes of tomato was collected, in Hungary by more than half less. The Czechs and Slovaks together produced only 14.3% of what Poles did.

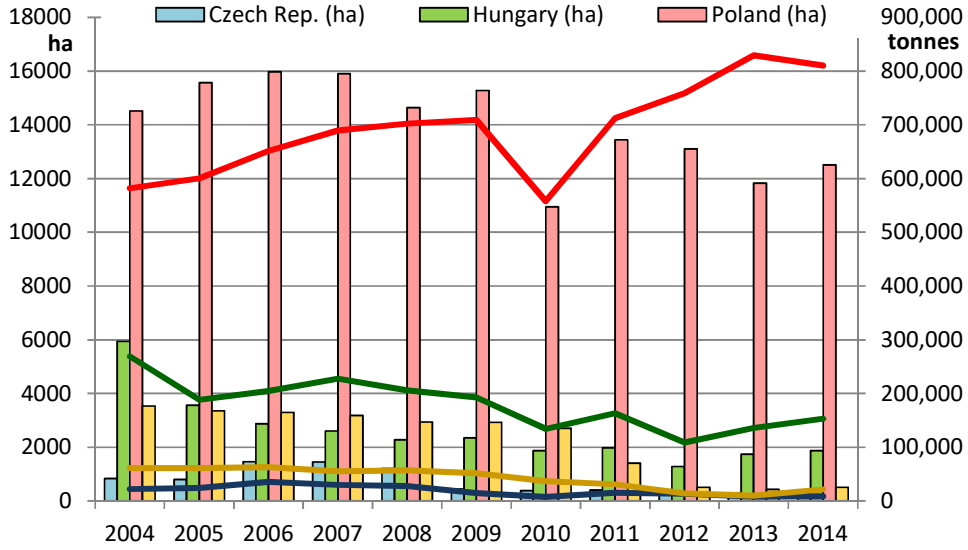


Fig. 4: Area of crops (in ha) and volume of production of tomatoes (in tonnes) in the Visegrad Group countries in 2004-2014

Source: own study based on FAOSTAT

The production of tomatoes in Poland was growing until 2009 at an average rate of 21 thous. tonnes per year. The world economic crisis, which appeared in Polish agriculture late, i.e. in 2010, caused a drastic drop in production. The crop area decreased by ¼ and the production volume fell by 4.1%. This year was significant for tomato producers. Survived the strongest, best organized. The crop area has not been reproduced yet, but production has continued to grow. Its braking occurred only in 2013.

In the remaining V-4 countries, since the time of their accession to the EU, there has been a tendency to reduce the area of tomato crops and the size of their production. These countries have failed to resist the competition of more developed southern producers. Poland as the only one of the V-4 countries handle the tomato market better and better.

It was mentioned in the introduction that the competitiveness of national markets, besides internal resources, determines the efficiency of production. The highest yields of tomatoes in the V-4 group distinguished Hungary (fig. 5). It is the southernmost country in this group of states. It has the most favorable climate for the cultivation of thermophilic tomatoes. The productivity of tomato production in Hungary increased most in the period 2004-2008, reaching over 90 tonnes per hectare in the last year of mentioned times. The results of Polish producers of this vegetable were almost half lower (48 t / ha). Czechs and Slovaks in 2008 achieved a yield of no more than 24 t / ha.

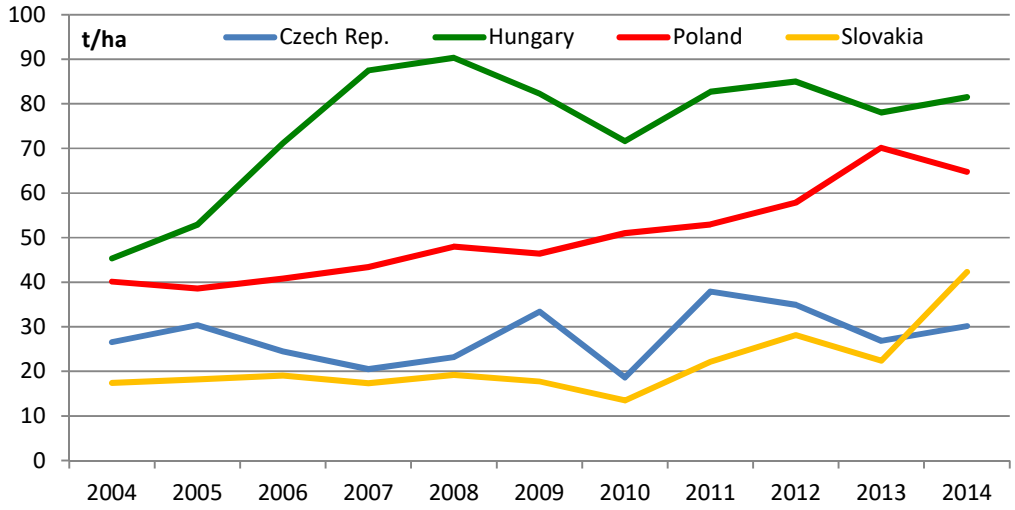


Fig. 5: Yield of tomato production (in tonnes of ha) in each Visegrad Group countrie in 2004-2014

Source: own study based on FAOSTAT

The next period of efficiency analysis close the years 2009-2014. In Poland, constant growth of tomato yields was observed at that time. Although these yields have not yet reached the value recorded in Hungary, but it can be expected in a few years. What is more, the Polish production efficiency was more stable than in the other smaller V-4 countries. The graphs in fig. 5 show much more fluctuations in yields in the Hungarian, Czech and Slovakian crops.

In Poland, after the economic crisis, the largest and most modern manufacturers remained. They mostly grow tomatoes in greenhouses. This, in spite of the cost of production, alleviates the risk of loss of crops caused by natural disasters and the impact of unfavorable weather conditions.

The paper focuses on the tomato market, which is attended by four Visegrad Group countries. For the defined market, the Gini-K [Pułaska-Turin 2011] concentration factor was calculated and, alternatively, the Herfindahl-Hirschman Index - HHI [Czarny, Rapacki 2002] determining the degree of monopolisation of this market (tab. 1).

Tab. 1: Gini coefficient (K) and Herfindahl-Hirschman Index (HHI) for tomatoes in the Visegrad Group (V-4)

Index	2004-2006	2012-2014
K	0,769	0,899
HHI	5832,8	7171,3

Source: FAOSTAT, own calculation.

The calculations in Table 1 show a strong concentration on the tomato market in the V-4 group (values above 0.75). In the years 2012-2014 this concentration increased to 0.899. It is easy to imagine that the country, in which is located the largest part of tomato production in the V-4 group, is Poland. This country dominated the tomato market in the Visegrad Group. What is more, Poland's position on this market is constantly strengthening and for the rest of the V-4 countries it becomes a state with which it is difficult to compete. Poland has undoubtedly the largest resource of land and labor in agriculture. This country can therefore use the effects of scale. In addition, Polish farmers make great use of the available production resources thus increasing the productivity of the crop. This makes it the most important producer of tomatoes on the V-4 and EU-12 markets. Its share in the production volume of tomatoes in V-4 increased in the three-year studied period from 66.4% to 83.5%.

Increased concentration of production in one country makes the tomato market in group V-4 is becoming less competitive. This is evidenced by the large increase in HHI's competitiveness index. Here again, it is noted that Poland's position as a leader is strengthening. The rest of the V-4 countries are hard to compete with Poland on tomatoes market. These countries have increasingly barriers to entry to this market and they gradually lose their customers. This makes the tomato producers in these countries often give up their cultivation. So they give the field of activity to the largest player on the market, which is Poland.

Conclusion

Poland has large production resources in agriculture in Europe's scale. In addition to the huge areas of agricultural land, it has above average and unused labor resources in agriculture. Vegetable farming is a branch of agricultural production that requires many hands to work. Poland should use this potential. This country is a significant producer of vegetables in the European market. Analyzes show the country's growing role in the tomato market as well. It would seem that the climate of Poland is not very favorable for growing these thermophilic vegetables. The European tomato market dominated southern countries (Italy, Spain, Portugal, Greece). In the European Union, these countries are essentially unrivaled in the tomato market.

Poland as an agricultural country should not abandon cultivation of these vegetables. It has huge production potential and it is itself a big market for vegetables, including tomatoes. Research has shown that Poland should look for markets for tomatoes in Europe particularly in the nearer and smaller countries. It will be easier for Poland to compete with them. This is mainly the other countries in the group V-4. After analyses it is clear that these countries are gradually abandoning the industrial cultivation of tomatoes. This is a great opportunity for Poland. It can successfully master these markets. Geographic proximity has the additional advantage of lower transport costs.

The great challenge for Polish tomato producers is the need to invest in crops under cover, in new crop technologies, in the cultivation of new varieties of tomatoes. Polish agricultural producers are characterized by lower farming culture than partners from richer western countries. The failure of a large part of the Polish vegetable sector is the lack of modern vaults and warehouses equipped with devices for making tomatoes for sale. There is also no modern tomato marketing.

References

Bednarz J. (2013). *Konkurencyjność polskich przedsiębiorstw na rynkach europejskich*, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk, pp. 28-40

Bieńkowski W., Stoykova O. (2016). 'Analyzing changes in international competitiveness position of Visegrad Group vis-avis EU-15 after the crisis 2007 as measured by RCA index', *Central European Review of Economics & Finance*, Vol. 13, No. 3, p. 10

Czarny B., Rapacki R. (2002). *Podstawy ekonomii*, PWE, Warszawa, p. 211

FAOSTAT, [20.07.2017]. Available: http://faostat3.fao.org/faostat-gateway/go/to/download/Q/QC/E
Firlej K., Kowalska A., Piwowar A. (2017). 'Competitiveness and innovation of the Polish food industry', *Agricultural Economics* (AGRICECON), No. 63, pp. 1-8

Gorynia M., Łaźniewska E. (ed.), (2009). *Kompendium wiedzy o konkurencyjności*, Wydawnictwo Naukowe PWN, Warszawa, p. 59 and 106

Juchniewicz M. (red.), (2006). *Zarządzanie przedsiębiorstwem w warunkach konkurencyjności. Determinanty konkurencyjności przedsiębiorstw*, Vol. I, Wydawnictwo Uniwersytetu Warmińsko-Mazurskiego, Olsztyn, p. 23

Kowalska A. (2016). 'International Competitiveness of Polish Fruit Sector Following the Accession to the European Union', *Problems of World Agriculture,* No. 16 (XXXI), Vol. 2, pp. 176-185

Popescu G. H., Sima V., Nica E., Gheorghe I. G. (2017). 'Measuring Sustainable Competitiveness in Contemporary Economies – Insights from European Economy', *Sustainability* 9 (7), p. 2

Porter M.E. (1990). *The Competitive Advantage of Nations*, MacMillan, London, pp. 45-56

Pułaska-Turyna B. (2011). *Statystyka dla ekonomistów*, Difin, Warszawa, pp. 105-109

Szwacka-Salmonowicz J. (1991). *Społeczno-ekonomiczne uwarunkowania popytu na owoce i warzywa w Polsce*, PAN Instytut Rozwoju Wsi i Rolnictwa, Warszawa, p. 8

Tarnowska A. (2014a). 'Changes in agriculture production resources of the EU in 2005-2012' in: *Agribusiness in Theory and Practice*, Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu, Wrocław, pp. 148

Tarnowska A. (2014b). 'Supply side competitiveness of Polish vegetable sector in the European Union', *Economics of the 21st Century*, No. 3 (3), pp. 23-34

Valenciano J. P., Perez Mesa J. C. (2004). 'The competitiveness of Spanish tomato export in the European Union', *Spanish Journal of Agricultural Research* 2 (2), p. 178

Data-Driven Decision Making Matters: Preparing HBCU Students for Life after Graduation

Wang, C. P., Albany State University, Albany, Georgia, United States, cpwang@asurams.edu

Simmons, T., Albany State University, Albany, Georgia, United States, tsimmo13@Studentsasuramsedu77864.onmicrosoft.com

Abstract

The Higher Education Act of 1965 defined Historically Black College and University (HBCUs) as "a school of higher learning that was accredited and established before 1964, and whose principal mission was the education of African Americans." (Congressional Record Service, 2014) It is the responsibility for HBCUs to honor the fulfillment of its principal mission by not only "offering culture, a rich history and rigorous academic programs but also prepare students for leadership and life after graduation." There are 100 HBCUs enlisted in the most recent Digest of Education Statistics 2015. (NCES, 2016) The percentage of African-American college students educated at HBCUs dropped dramatically from 17.3% in 1980 to the 8.5% in 2015. (PEW, 2017) However, according to PEW, in 2015 HBCUs conferred 15% of bachelor's degrees to the blacks. Beside the percentage decline of degrees conferred by HBCUs to black minorities, HBCUs are still recognized to have successfully educated black Americans, especially low-income and the underprepared. (Gasman 2010) HBCUs' contribution in educating blacks does not stop questions regarding the educational quality and value of HBCUs since the 1992 U.S. Supreme Court Case of United States v. Fordice. Earning a college degree for blacks is not only an indicator of academic success but also a vehicle to fulfill their career life after graduation. (Kim and Conrad, 2006) The reality indicates the unemployment rate for age 22-27 recent college graduates was less than half compared to the same age range of black college graduates. (Janelle Jones and John Schemitt, 2014) Such a big unemployment gap fails many HBCUs graduates for a successful career life after graduation. How do HBCUs prepare students differently to have a successful and productive career life after graduation? Research has studied graduates' majors and careers. However, these research studies do not tell us if HBCU students choose their majors based on data of employability. From the researchers' perspective, a student's choice of major can affect his/her employability; good entry-level employment normally is an indicator of a job of satisfactory earnings. The aforementioned gap in employment of HBCU graduates versus all graduates could likely be the result of choosing majors of low employability. Thus, the goal of this pilot study is to prepare students for a productive career life after graduation by making data-driven decisions. In spring 2017, we assessed how the data of employability was used by students at ASU in choosing their majors by conducting a pre- and post-survey and a data-driven decision-making workshop for both ASU1201 and MGMT 4205 classes. This study found: All the surveyed 2010 and 2015 College of Business Alumni and undergraduate students did not use the employability data to choose their majors; Eighty-two percent of the surveyed undergraduate students highly valued the training they received from data-driven decision-making workshop. These two major findings support our two hypotheses of this research: 1) Most students at ASU do not make their decisions on choosing a major based on widely available data. And 2) a majority of students at ASU value the practice of the data-driven decision-making process once they have been taught to practice such kind of decision making. In this study, we also found that among those surveyed, students who changed their major at least once, fifty percent are

influenced by potential job characteristics in making this decision.

Keywords: data-driven decision making, HBCUs, higher education, life after graduation, choosing major.

Acknowledgment

This study was supported by the Center for Undergraduate Research at Albany State University.

References

Congressional Record Service (2014): Higher Education Act of 1965, retrieved from http://legcounsel.house.gov/Comps/HEA65_CMD.pdf on August 21, 2016

EuroStat (2016), retrieved from http://ec.europa.eu/eurostat/statistics-explained/index.php/Quality_of_life_indicators_-_economic_and_physical_safety on August 22, 2016.

Foster Provost and Tom Fawcett (2013), "Data Science and Its Relationship to Big Data and Data-Driven Decision Making", MARY ANN LIEBERT, INC. VOL. 1 NO. 1 MARCH 2013 BIG DATA B.

Gasman, M. (2010). *Comprehensive funding approaches for HBCUs*. Philadelphia: The Trustees of the University of Pennsylvania.

Ikemoto, Gina Schuyler and Marsh, Julie A., "Cutting Through the "Data-Driven" Mantra: Different Conceptions of Data-Driven Desion Making.", Chapter 5, RAND reprints.

Janelle Jones and John Schmitt (2014), "A College Degree is No Guarantee", CEPR May 2014.

Kim, M. M. and Conrad, C. F., "The impact of Historically Black Colleges and Universities on the Academic Success of African American Students.", Research in Higher Education 47 (June 2006) pp. 399-427.

Light, Richard J., "How to live wisely", The New York Times, August 2, 2015.

Minor, J. T. (2008). *Contemporary HBCUs: Considering institutional capacity and state priorities.* East Lansing: Michigan State University, College of Education, Department of Educational Administration.

NCES (2016) Fast Facts on HBCUs (http://nces.ed.gov/fastfacts/display.asp?id=667)

NCES (2016) Digest of Education Statistics 2015, Table 303.10.

NCES (1984) The Traditionally Black Institutions of Higher Education 1860 to 1982

PEW (2017), "A look at historically black colleges and universities as Howard turns 150", accessed on Sep. 4, 2017 at http://www.pewresearch.org/fact-tank/2017/02/28/a-look-at-historically-black-colleges-and-universities-as-howard-turns-150/

Tiffany Jones, SEF Presentation at PNPI's MSI Seminar in Atlanta, GA (October 2014).

Table 313.10. Fall enrollment, degrees conferred, and expenditures in degree-granting historically Black colleges and universities, by institution: 2012, 2013, and 2012-13 (https://nces.ed.gov/programs/digest/d14/tables/dt14_313.10.asp?current=yes)

University Systems of Georgia (2015). Degrees and Awards Conferred retrieved from http://www.usg.edu/research/degrees_conferred on 8/14/2016.

United State Department of Labor. (2016) Occupation Outlook Handbook. Retrieved from http://www.bls.gov/ooh/ on August 14, 2016.

Wladawsky-Berger, Irving, "Data-Driven Decision Making Promises and Limits", The Wall Street Journal September 27, 2013.

Dealing with Consent and Privacy Trade-Offs In Health and Fitness Apps: Balancing the Conflicting Perspectives of Users and App Developers.

Kanwar Adeel Waheed Khan, University of Bradford, Bradford, UK adeelwaheed@gmail.com

Bushra Waheed, Institute of Management Sciences, Peshawar, Pakistan durranibushra@gmail.com

Abstract

Health and fitness app proliferation has been increasingly significantly over the last five years. Previous research suggests that privacy of the app user is often violated as users do not understand the consequences of agreeing to privacy policies when adopting and using health and fitness apps. This research uses a mixed methods approach, focusing on survey from 153 health and fitness users, followed by in-depth interviews with 12 app users, and 6 interviews with app developers. This study suggests that the level of experience of user has a direct influence on their ability to understand the privacy risks when using health and fitness apps. Users who are more experienced in the use of health apps are also more likely to have less privacy and consent concerns. This research also suggest that in order to undertake a fair trade-off between privacy and app facilitation, developers need to increase their interaction with users facilitating the design of health and fitness apps. The developers also need to undertake self-regulation in order to facilitate a simple way of gaining consent from user to ensure that app development is not hindered by future restrictive government regulation.

Keywords: *privacy, health, fitness, apps*

Introduction

The advent of information technologies has revolutionized the way services are provided to the health and fitness users. Increasingly mobile phone based apps are used to facilitate the user to collect routine data about themselves, which they can use for self-help and fitness improvements. Research has established many of the benefits of the more traditional Electronic Health Records, which include ease of use, as well as easy access to patient records in order to facilitate treatment. This has now transcended to the use of smart phone apps facilitating users. The shift in direction is also critically important, as the users are often looking a better trade-off between the options that they are provided by the app and to safeguard privacy. The safeguarding of privacy of the user is an important issue, but for most designers the urgency to get the app out there in the market is often seems to be more important. This often leads to a lack of understanding of privacy concerns for the user when new apps are designed and implemented by app developers. The literature has continually highlighted that by having a better concern of privacy issues for users, app developers can alleviate privacy concerns as well as facilities a higher uptake of health and fitness apps. This research aims to understand ways in which trade-offs between privacy and the use of health apps can be established.

Moreover, one of the issues which are present is the gap between the user needs and ways in which app development takes place. Increasingly, app development is undertaken at rapid speeds in order to stay competitive in the market. This leads to privacy polices being used as an instrument to shift the burden of privacy to the user. Long and winding privacy policies are often not even read by the user, leading to

blanket consent by the user without even reading the lengthy privacy and consent policy. On the other hand, research has shown that privacy trade-offs are often possible between user and app developers, as some users are often willing to share their personal information against use of free apps. This research aims to understand the ways in which this balance is and can be achieved in future, while focusing on ways in which health and fitness app developers can improve this process.

Literature Review

Rapid Proliferation of Health and Fitness App and Privacy Concerns

The rapid proliferation of health and fitness apps has been astounding, and this has continued to bring in new challenges for users and designers when dealing with ways in which privacy is handled by these apps. The use of mHelath apps is often associated with trade-offs that consumers are willing to undertake in relation to their privacy and security concerns (Kotz et al. 2016). Research suggests that the perceived benefits of an app is that it allows a better management of the control over personal data, but in reality this is often not possible due to lack of clarity of privacy policies of these apps (Nicholas et al. 2015). The desire to 'control' who receives and views the personal health information can in practice be often futile (Atienza et al. 2015). The trade-off between the privacy concerns and the potential benefits of health and fitness apps are based on the sensitivity of the information which is being communicated by the participant (Atienza et al. 2015). The concern of participants is often that while they had little concern when receiving general health tips or reminders over a mobile device, however they often show more concern when stigmatized diagnosis or 'bad news' (Atienza et al. 2015) is given over a mobile device or app. It appears that the more personal the data, the less likely a patient is willing to share it over a mobile device (Martinez-Perez et al. 2015; Paglialonga et al. 2015; Kotz et al. 2016; Kao and Liebovitz 2017). However, if the benefit of using a particular mobile based app or application are in the favor of a user, then they may give up on privacy protection policies to a large extent (Nicholas et al. 2015). In many cases, the privacy policies are neither read nor understood, and therefore as long as the patient has a meaningful benefit from the app, they could forgo many of their privacy concerns (Atienza et al. 2015).

Shifting the Privacy Burden towards the User

While the importance of privacy notices in the adoption of the mobile based mHelath apps has been seen as highly significant, they also have a number of issues (Liu 2014). Research has shown that if the privacy policies are too inconvenient to read, people are more likely to ignore them, and therefore this means most burdens is on users to safeguard their privacy in certain cases, when the patients feel that they have less benefit from reading the policies as compared to their perceived costs. A recent research undertaken by researchers at Carnegie Mellon has noted that the cost of reading the privacy policies could amount to $781 billion a year if there were read by every person (Liu 2014). The burden of giving informed consent is often also put on the user, as they must understand all the intricacies of the data sharing and use practice, which can often lead to significant changes in the way the user views consent and privacy policies. The main issue here is that a simple 'Yes I agree' button can have many different implications, and often the law assumes that the user will be able to understand the intricacies of sharing of data between a large number of stakeholders (Liu 2014). The increase in complexities and responsibilities which are assumed by the sharing of data through apps can also increase the burden of responsibility on the user. The same is often true in clinical organizations, which often do not have the capability or expertise to secure patient data in a sufficient manner (Kotz et al. 2016), and therefore this can further increase the burden on the patient.

Dealing With Regulation Of Health And Fitness Apps

Health and fitness apps often include reminder for pills as well as other fitness data that users may share, including location. The regulation of these health apps is often a grey area, as regulations are not clear. For example, in Canada the medical devices are subject to Medical Devices Regulation and the Food and Drugs Act (Grindrod et al. 2017). One of the main problems identified in the regulation of mobile health apps is the lack of regulatory control, which can ensure its reliability, accuracy and performance (Kao and Liebovitz 2017). Powell et al. (2014) are of the view that a bewildering variety of mobile health apps make it difficult to discern the good apps from the bad ones, especially when dealing with privacy requirements, making regulation difficult. The mobile health apps which are created by governmental agencies and third party developers have been working to come up with standards and evaluation techniques to certify the health apps (Stoyanov et al. 2016), but this is largely hindered due to fast changing app development environment. A number of online tools have been developed which provide users with ways to validate and use apps based on editorial reviews, such as the iMedicalApps (Kao and Liebovitz 2017), however there is no consensus within the literature on using a best approach (Martinez-Perez et al. 2015; Kao and Liebovitz 2017).

Within the United States, the Food and Drugs Administration (FDA) has over time shown a tailored and risk based approach to only apps which are intended to be used as an accessory to a regulated medical device. However, FDA has chosen to leave much of the regulation of health apps to the marketplace (Martinez-Perez et al. 2015; Kao and Liebovitz 2017). Attempts by companies such as Happtique to launch certified health apps have largely been unsuccessful due to a number of reasons. The pay per health app model only had 19 apps when it was launched in 2013, and the service was closed down only two weeks after its launch (Kao and Liebovitz 2017). Several of the apps were hacked, and consumer data was compromised, which also led to the sudden demise of the services. Similarly, in UK, the National Health Service (NHS) also launched its Health Apps library as an attempt to guide patients and health professionals towards safe and effective health apps. However, research on the NHS Health Apps Library has shown that none of the 79 NHS endorsed health apps stored encrypted personal data (Huckvale et al. 2015). Another study on the NHS health apps library shows that out of the 14 health apps listed in the NHS health apps library which were related to management of depression and anxiety, only 4 provided any patient reported outcomes of claims of effectiveness (Leigh and Flatt 2015). The NHS Health Apps Library was finally shut down in 2015. The main problem with the regulation of health apps remains the resource intensive process of vetting the apps (Huckvale et al. 2015). Researchers have suggested that one possible solution may be to use crown sourced app validation system, which is based on a set of standards (Kao and Liebovitz 2017). Validated health professionals may be able to use such a system in order to examine the clinical content, so that the usability of the systems could be examined.

Different Developer Concerns on Privacy and Consent

Another issue is that the developer's understanding of environment often has an impact on the privacy perception of the user. The more open Android platform, seems to have an image in the mind of the user as having less privacy protection polices (Gu et al. 2017), where developers are looking to turn out apps at a fast pace. The open nature of Android systems means that new app development has been highly robust, but often at the cost of privacy implications for users, as developers want to be competitive in the market place. On the other hand, the Apple based iOS is often perceived by users to be more reliable, and therefore allows users to have more confidence in the privacy settings. The permission to request is a demand form the app to access the control to a mobile app device, such as access to GPS settings, microphone and camera of the device as well as the ability to control the other access requirements of the device. The different stages (either at download or later use) of the mobile app can also change the privacy perceptions of the end users. During the download stage, android users are more likely to provide privacy invasive permissions, due to the nature of the operating systems. This can have a direct negative impact on the users with regards to the privacy invasion that may be taking place (Gu et al. 2017).

Despite a number of advantages of the health and fitness apps, many different issues of privacy and security have been established within the literature, which continue to be a problem due to lack of planning/clarity by developers (Martinez-Perez et al. 2015; Paglialonga et al. 2015; Kotz et al. 2016). Mobile apps are a new area of attack for hackers and attackers, and therefore increases the vulnerability of the personal data within the android environment (Gu et al. 2017) Keeping patient healthy and not just caring for them when they are ill, makes sense for the health care providers, and a more efficient way of dealing with patient needs (Kotz et al. 2016).

Research Questions

The following research questions have been generated based on the initial review of literature:

- How do users of health and fitness apps deal with the trade do-off between ease of use and privacy?
- What can app designers do to ensure that a balance between privacy and the need for a marketable health and fitness app be struck?

Research Design and Methodology

Philosophical approach

This research uses an inductive methodology to examine the issues of privacy and trade-offs by the users and developers (Creswell et al. 2004; Curry et al. 2009). Inductive methodology is often used to draw out theory, emerging from data (Patton 2002)

Research Approach

This research undertakes a mixed methods research approach, using interviews as well as a survey with users of health and fitness apps. Qualitative research methods were used as they have a high degree of iteration possible, and are exploratory in nature (Bazeley 2013; Miles et al. 2013). This not only allows the researcher to understand the wider context, but also to develop the research as new issue come up. However, qualitative methods are not without its limitations (Sharlene 2010; Silverman 2010). One of the main limitations of qualitative research methods is that the bias of the researcher in interpreting results can be highly problematic (Barnett-Page and Thomas 2009; Curry et al. 2009). Secondly, the small number of respondents present in the qualitative research can be highly problematic, and therefore a quantitative method was also used to supplement the qualitative method. A short survey, which was closed ended in nature, was chosen (Morris 2008; Bryman and Cramer 2011; Oakshott 2011). The survey was kept to within only 5 questions to ensure that a large number of respondents would take part, and that the attention span of respondents was not reduced. One of the main limitations of long surveys is that respondents lose interest, and start ticking boxes only to complete a survey (John 2008; Morris 2008; Oakshott 2011). However, by keeping a very small and focused survey, this limitation was countered, as suggested in literature (Waters 2001; Wisniewski 2005; Davies 2007).

Sample Framework

User recruitment was undertaken through a self-selecting mechanism through the use of social media. Recruitment was undertaken from a number of health and fitness groups active on social media platforms such as Facebook and Instagram in 2014-15.

Sample size and data collection

A short closed ended survey was undertaken from 153 respondents, who filled in an online survey. All surveys were complete, as respondents could not fill an incomplete survey. Respondents were also asked if they were willing to undertake a 20 min short in-depth interview over Skype. A total of 18 respondents agreed to take part in interviews, and a further 12 were able to actually undertake interviews. This was followed up with 6 interviews with app developers. App developers were approached through email/social media messaging as well. All interviews were conducted in March –July 2015 period and data analysis was undertaken in August -September 2015.

Data Analysis

Data analysis was undertaken in two phases. In the first phase, quantitative data analysis was undertaken through the use of SPSS. The main focus was to examine the linkages between the different variables, using cross tabulation. This was followed by a thematic analysis of the key areas of concern which were highlighted by the app users and developers. Thematic analysis was undertaken through coding of data into relevant themes, using the approach suggested by Miles et al. (2013).

Results

The first section outlines the quantitative results from the survey. A total of 253 respondents filled in a short questionnaire. The first question was regarding the level of expertise of the respondents. Here, a significant number were average users, while 34 percent were experienced users.

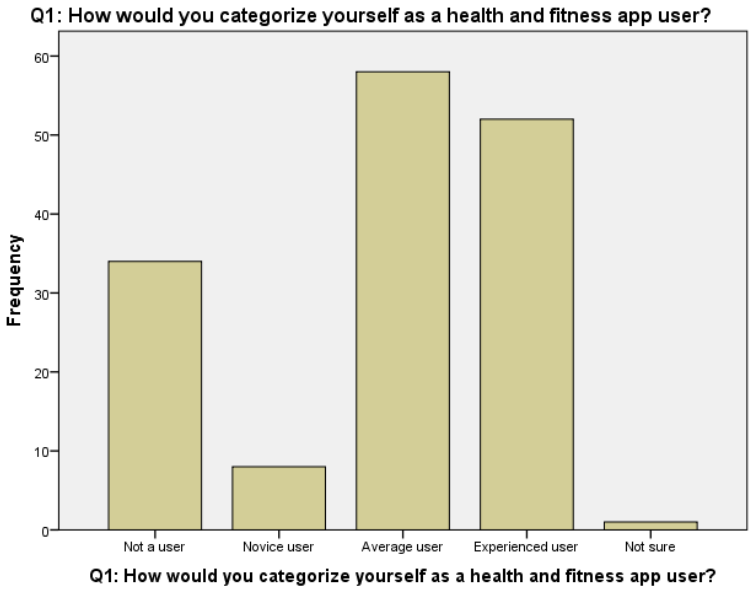


Figure 1

The second question was regarding the selling and sharing of data of paid apps. This result gave a mixed response from respondents, as clear from figure 2 below. In order to see what the individual type of respondent was thinking, a cross tabulation between Q1 and Q2 was undertaken (see figure 3 below). This shows a clear result as users who had never used a health and fitness app or were low frequency

users, were less likely to agree to sharing and selling of their data from a paid app. On the other hand, experienced users tend to disagree, and are more open to selling of personal information even when they have paid for an app.

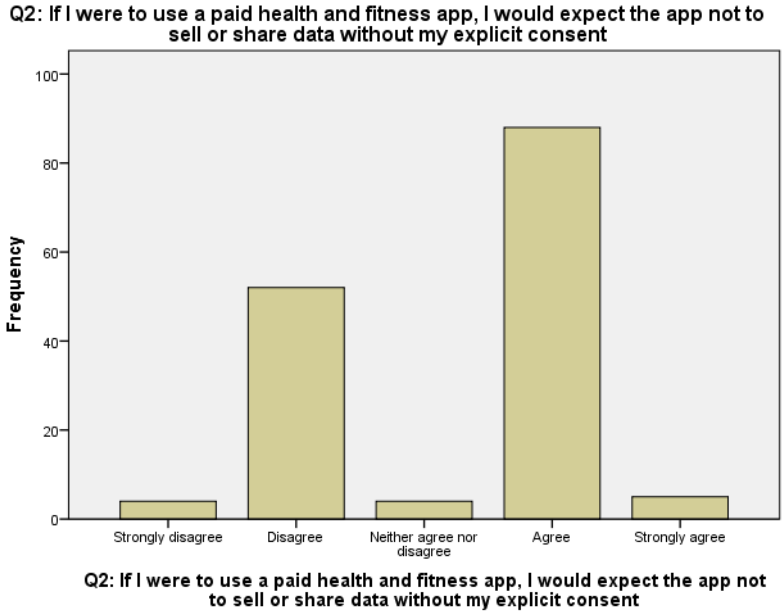


Figure 2

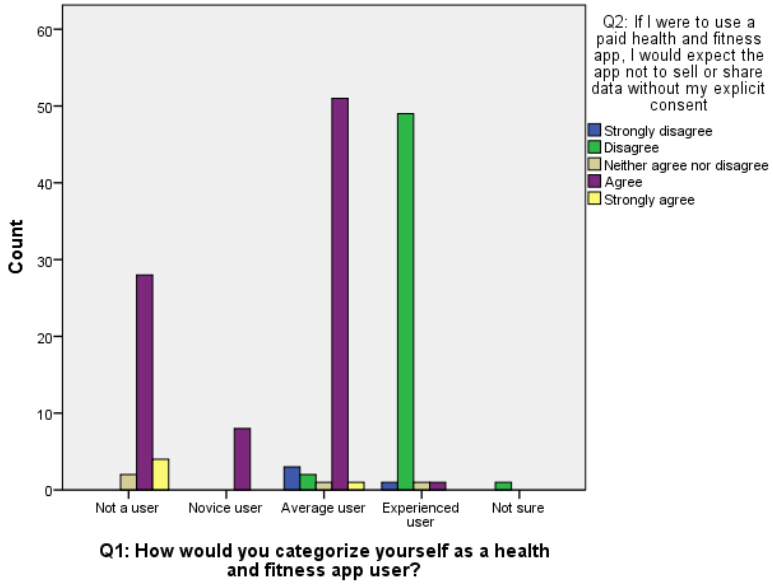


Figure 3

The third question was regarding the attitudes when using a free app. Here again, a contrasting result was found (see figure 4). While experiences users agree or strongly agree to statement in Q3, average users or non-users are more likely to disagree or strongly disagree with this statement. This highlights that the level of use and experience of using health and fitness apps is likely to change the perceptions and expectations regarding expected privacy of users.

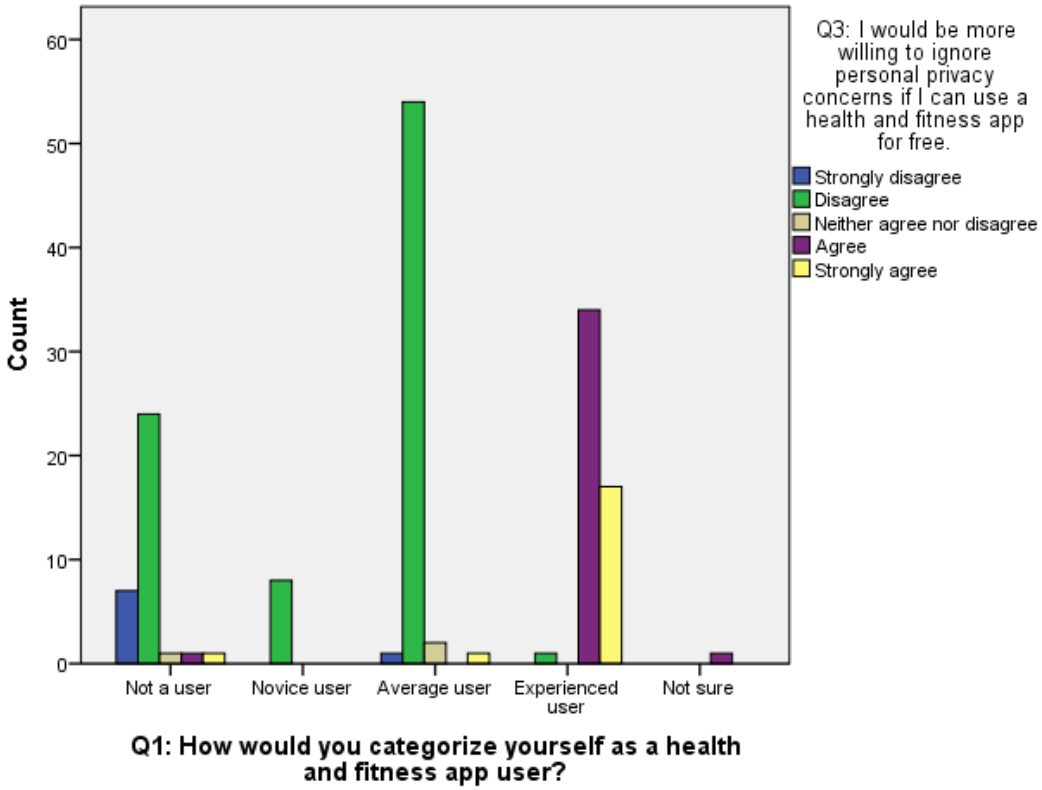


Figure 4

The next question was regarding the likelihood to read a brief privacy policy summary. Here, as is evident from figure 5 below, the vast majority of users are likely to read a simple privacy policy document. The implies that developers must emphasize the privacy document which is simple to read, as long and winding legal type documents may be too difficult to use for all types of users.

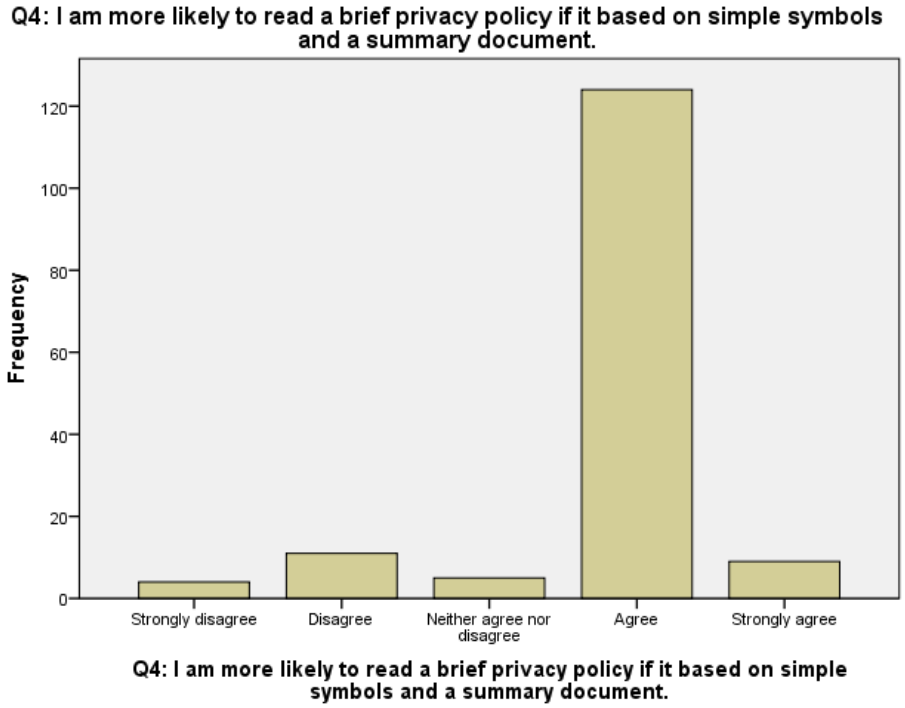


Figure 5

The final question was regarding the perceptions of location sharing and implications for users (see figure 6 below). Location sharing through a social network was a more comfortable notion for an experienced user as compared to a novice user. Often, the novice or inexperienced users are not sure about the way in which information about them is being shared, and this leads to resentment and concerns of privacy. On the other hand, more experienced users who are likely to be used to sharing of locations, seem to be much more comfortable about sharing of location through a social network by a health and fitness app. These changes in attitudes may be due to the level of experience, or past experiences of users, which tend to influence the way in which they perceive the threats and issues of privacy when apps are given intimate details about their lifestyles.

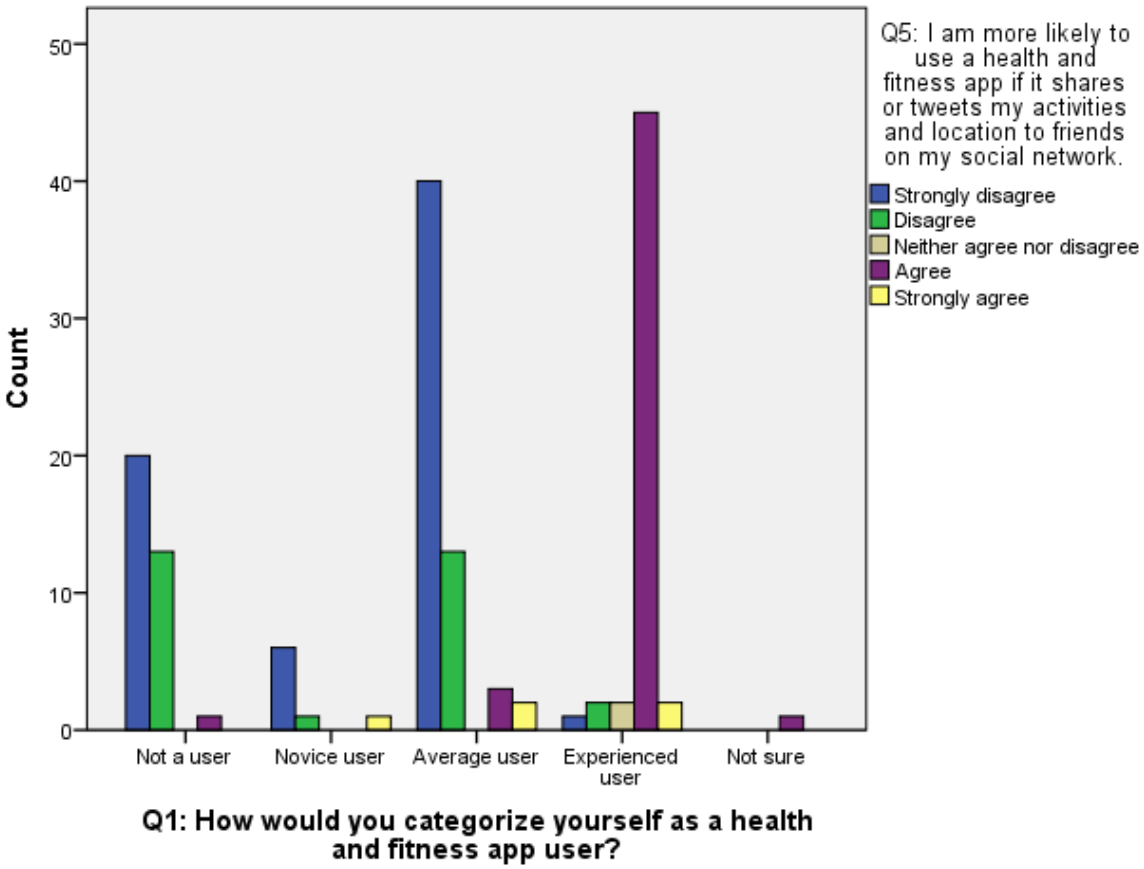


Figure 6

A thematic analysis of the interviews highlighted a number of cross cutting arguments. These have been highlighted in this section.

Impact of User Experience on Privacy Perceptions

There was a clear impact on the level of experiences and previous knowhow of the user on their privacy concerns. Many of the respondents were more concerned if they had not used health and fitness apps. This could be due to their lack of understanding of privacy settings which are associated with the use of health and fitness apps. Conversely, as users adopted more apps, it could be possible that they were more relaxed about the amount of information which was being made available and shared about them through these apps. For example, one of the experienced users was of the view:

> *'I really think I have no worries of privacy. If I have not done anything wrong, why would I want to hide behind anything?'*

On the other hand, the inexperienced users tend to be more careful about their privacy settings. Many of the interviewees were of the view that they had not used a health app as they were unsure about the way in which it shared their personal data across the internet, which led to lack of adoption of health and fitness apps. In many instances, information which was good to give out today may not be so in the

future. Most of the inexperienced users also felt that without clear privacy policies, their data would be shared beyond its original remit, and therefore would expose them to all sorts of problems in later life. The concerns of inexperienced users were not unfounded, and appear to focus on their inability to have control over the way in which data travels across cyberspace with limited control of the actual user. For example, one of the inexperienced app users was of the view:

> *'How can I be sure that my data would not end up hurting me one day in future? Just having no control over my own data is unacceptable [to me]'*

Trade-Off Possibilities and Ethical Dilemmas

The trade-off arrangements are often balanced by the users based on the benefits that they draw from an app. While experienced users felt that the use of free app was a significant advantage in facilitating their health and fitness needs, and the privacy risks were minimal. However, this was not always the case with newer users. The lack of concern by the more experienced users was often based on their experiences of not having any particular problem due to data sharing. Most felt that it was already an acceptable compromise that we share personal data such as location, demographics and other key indicators for free services from a host of other apps. A number of the experienced users gave the example of Facebook, Google and other social media sites providing them with excellent services for free. This contract was based on an implicit understanding that personal data may be used for advertising, targeted data mining to fund the free services. This seems like an acceptable risk to many of the experienced users, and most tend to hypothesize that health and fitness apps are not dissimilar.

However, concerns of in-experienced users often centered on their perceptions of inability to understanding ways in which their data was shared. Most of the new app users felt that once they agreed, the app company will be able to track them continuously, and use this information which may not always in their best interests. This could be one of the reasons in the first place for their lack of adoption of the health and fitness apps. Some of the novice users were however completely impervious to the problems of privacy, and were surprised to know that most apps shared their locations or sold their data to third party. The perspectives of these users changed significantly as they came to know that their privacy was often not protected.

Lack of Interaction between App Developers and End Users

Another area of concern with interviews with app developers was the lack of communication and interaction between the developer and the app user. This often meant that developers were not sensitive to many of the concerns of the users. Most of the developers felt that if they were to contact users, it would jeopardize their projects. The overarching view was that app development was often too fast paced to consult users about privacy, and most developers felt that that by having a complete (established) privacy policy they were doing their job. There seems to be a focus of the developer community to get the app across to the user, and any perceived hindrance in this regard was seen as having a negative influence. For example, one of the experienced health and fitness app developers was of the view:

> *'I would get fired if I spent too much time 'flaffing' about. My clients need an app often at a weeks' notice! How can you expect me to consult the user about privacy policies? We just have a standard consent and privacy policy, which we 'copy paste' to each app. Never had a problem with it?'*

This attitude of app developers seems to be a significant hindrance in changing the way privacy and consent are handled by the community, and often leads to problems. However, in discussion, some of the

app developers were open to ideas of facilitating privacy and informed consent, especially if it would mean increased user adoption. App developers were of the view that if a simpler system of privacy protection was adopted through a system of simple privacy policies, they would welcome it. Other developers were of the view that in a highly competitive marketplace, any new systems should not hinder their development speed, and therefore not be a hindrance. A common set of protocols could be a way forward, where an acceptable consent process could be adopted which was easier for the user to understand.

Possibilities of Self-Regulation of Developers

Another significant issue with developers was the possibilities of regulation of consent and privacy. Most developers felt that regulation was not needed as users were provided with full documentation. However, most developers admitted that in their view hardly any user ever read these long worded privacy policies. In such circumstances, develops were open to ideas of developing a model of consent, which would be acceptable to the user, and would ensure that regulation did not hinder the pace of app development. The main issue with increase in government privacy regulation which could improve the way in which user information is safeguarded is that it would seriously hinder the speed of app development. Most developers were of the view that any hindrance in the development process would hurt their business models, as they operated on highly competitive time frames. These issues often led to problems when more regulation was brought in. An alternative model suggested by a number of developers was that a benchmark was created which would bring in an acceptable code of practice among new apps, informing the user of the ways in which data sharing and selling was taking place. This increase in the level of transparency would be acceptable to user, as nothing would be 'hidden', and lead to an increase in transparency. It would then be up to the user of the app if they could accept the risks which were associated with the adoption of these apps. Such light touch regulation would ensure that the fast changing market of health and fitness apps could continue to develop and improve, while providing some benchmark for dealing privacy concerns which users may have.

Conclusions

A number of conclusions can be drawn from this research. Privacy trade-offs are often dependent on the level of experience that a user has with using a health and fitness app. The user's ability to understand the risk which is associated with the sharing of personal information in an app can have a dramatic impact on their willingness to use the app. This research suggests that the more information and knowledge about the benefits about an app a user has, the more they are willing to sacrifice the use of their personal data. This trade-off is often based on their past experiences of other similar apps, and can influence the way in which they adopt the app. The balance between the needs of the user and the developer was another area which was explored. One of the conclusions is also that the developers need a more convenient and transparent system which can enable them to focus on new app development while also safeguarding the privacy of the user.

. The limited interaction between the developer and the user means that the developers are not well versed in the privacy and consent needs of the users, and therefore there was a need to increase the level of interactions the co-design and user participation in app development. The main focus of developers remains on the commercial focus of getting the app out in the market. However, the developers also need to understand that privacy issues for customers can lead to a lack of uptake in health and fitness apps. An increased awareness of privacy concerns of the user would lead to satisfied customer, leading to higher sales of the apps. Therefore, simpler version of the privacy policy could be one of the ways forward. This would ensure that the use has a better understanding of data selling to third party entities, and manage these risks according to their needs and perceived facilitation through an app. This research has shown

that different levels of experiences of users has an influence on the way they deal with privacy risks when adopting a health and fitness app, and therefore it would be a possibility for the developer to develop a system of trade-off of using personal data against free benefits provided by an app. A clear and transparent system of trade-offs between users and developers would ensure that the exchange of free benefits against sharing of personal data which is collected in a transparent manner, which cannot lead to one party crying foul at a later stage. However, the ethical concerns of any trade-off would also need to be clarified in order to ensure that the user's privacy is protected to an acceptable level for the users.

A better understanding of the user's perspectives on privacy is also needed by developers to facilitate the design of health and fitness apps. Developing a model of trade-offs may be the way forward, where a clear exchange takes place. This would allow users to enter a fair relationship when using a health and fitness app, with consent to user personal data given against free services in a transparent and clear manner, rather than through implied and secretive processes. A transparent model of consent is already used (to some extent) by a number of large organizations such as Facebook and Google, which use a person's personal data for advertising and marketing, and provide free services in return. However, in the case of health and fitness apps, this relationship is not formalized, and perhaps a model which formalizes this relationship is the way forward. Such a clear relationship would also mean that any strict regulation would not need to be enacted from regulators and governments. A self-regulation approach, which is transparent and allows the user to clearly understand the different types of risks can lead to informed trade-offs of privacy while providing users with benefits of using free services facilitated through health and fitness apps.

References

Atienza, A. A., Zarcadoolas, C., Vaughon, W., Hughes, P., Patel, V., Chou, W. Y. S. and Pritts, J. (2015) Consumer Attitudes and Perceptions on mHealth Privacy and Security: Findings From a Mixed-Methods Study. *Journal of Health Communication* 20 (6), 673-679.

Barnett-Page, E. and Thomas, J. (2009) Methods for the synthesis of qualitative research: a critical review. *Bmc Medical Research Methodology* 9.

Bazeley, P. (2013) *Qualitative Data Analysis: Practical Strategies.* London: Sage.

Bryman, A. and Cramer, D. (2011) *Quantitative Data Analysis with IBM SPSS 17, 18 & 19: A Guide for Social Scientists.* London: Routledge.

Creswell, J. W., Fetters, M. D. and Ivankova, N. V. (2004) Designing a mixed methods study in primary care. *Annals of Family Medicine* 2 (1), 7-12.

Curry, L. A., Nembhard, I. M. and Bradley, E. H. (2009) Qualitative and Mixed Methods Provide Unique Contributions to Outcomes Research. *Circulation* 119 (10), 1442-1452.

Davies, M. (2007) *Doing a Successful Research Project: Using Qualitative or Quantitative Methods.* London: Palgrave Macmillan.

Grindrod, K., Boersema, J., Waked, K., Smith, V., Yang, J. L. and Gebotys, C. (2017) Locking it down: The privacy and security of mobile medication apps. *Canadian Pharmacists Journal* 150 (1), 60-66.

Gu, J., Xu, Y., Xu, H., Zhang, C. and Ling, H. (2017) Privacy concerns for mobile app download: An elaboration likelihood model perspective. *Decision Support Systems* 94, 19-28.

Huckvale, K., Prieto, J. T., Tilney, M., Benghozi, P.-J. and Car, J. (2015) Unaddressed privacy risks in accredited health and wellness apps: a cross-sectional systematic assessment. *Bmc Medicine* 13.

John, W. (2008) *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches.* London: Sage Publications.

Kao, C. K. and Liebovitz, D. M. (2017) Consumer Mobile Health Apps: Current State, Barriers, and Future Directions. *Pm&R* 9 (5), S106-S115.

Kotz, D., Gunter, C. A., Kumar, S. and Weiner, J. P. (2016) Privacy and Security in Mobile Health: A Research Agenda. *Computer (Long Beach Calif)* 49 (6), 22-30.

Leigh, S. and Flatt, S. (2015) App-based psychological interventions: friend or foe? *Evidence Based Mental Health*.

Liu, Y. (2014) User control of personal information concerning mobile-app: Notice and consent? *Computer Law & Security Review* 30 (5), 521-529.

Martinez-Perez, B., de la Torre-Diez, I. and Lopez-Coronado, M. (2015) Privacy and Security in Mobile Health Apps: A Review and Recommendations. *Journal of Medical Systems* 39 (1).

Miles, M., Huberman, A. and Saldana, J. (2013) *Qualitative Data Analysis: A Methods Sourcebook.* London: Sage.

Morris, D. C. (2008) *Quantitative Approaches in Business Studies.* London: Financial Times/ Prentice Hall.

Nicholas, J., Larsen, M. E., Proudfoot, J. and Christensen, H. (2015) Mobile Apps for Bipolar Disorder: A Systematic Review of Features and Content Quality. *Journal of Medical Internet Research* 17 (8), e198.

Oakshott, L. A. (2011) *Essential Quantitative Methods for Business, Management and Finance.* London: Palgrave Macmillan.

Paglialonga, A., Tognola, G. and Pinciroli, F. (2015) Apps for hearing healthcare. *Studies in health technology and informatics* 210, 666-8.

Patton, M. (2002) *Qualitative Research & Evaluation Methods.* Thrird edition. London: Sage Publications.

Powell, A. C., Landman, A. B. and Bates, D. W. (2014) In search of a few good apps. *JAMA* 311 (18), 1851-1852.

Sharlene, N. H. B. (2010) *Mixed Methods Research.* London: Guilford Press.

Silverman, D. (2010) *Doing Qualitative Research.* Second edition. London: Sage.

Stoyanov, S. R., Hides, L., Kavanagh, D. J. and Wilson, H. (2016) Development and Validation of the User Version of the Mobile Application Rating Scale (uMARS). *Jmir Mhealth and Uhealth* 4 (2), 589-593.

Waters, D. (2001) *Quantitative Methods for Business.* 3rd edition. London: Financial Times/ Prentice Hall.

Wisniewski, M. (2005) *Quantitative Methods for Decision Makers.* London: Prentice Hall.

Business Aptitude of University Students and Its Analysis

Iveta Kmecová, Ing., PhD., Department of Management, The Institute of Technology and Business, České Budějovice, Czech Republic, E-mail address: kmecova@mail.vstecb.cz
Dana Smetanová, RNDr., Ph.D., Department of Informatics and Natural Sciences, The Institute of Technology and Business, České Budějovice, Czech Republic, e-mail address: smetanova@mail.vstecb.cz

Abstract

The paper is concerned with the business aptitude issue. It is a follow-up to our paper dealing with the entrepreneurial potential. The paper is aimed to highlight the importance of education towards entrepreneurship at schools and shaping of positive attitudes to entrepreneurship. The goal of the education should be to provide the theoretical and practical rationale to develop the entrepreneurship spirit and entrepreneurial skills. The practical part of the paper examines the data concerning the business preconditions of university students which are evaluated by means of the independence test.

Keywords: Business precondition, entrepreneurship, χ^2- independence test, Cramer coefficient.

Introduction

Entrepreneurship is understood as a key competence for lifelong learning and as such it is addressed in the framework educational programmes at the primary, secondary and tertiary education levels. A man with an entrepreneurial attitude actively seeks for opportunities and is able to make use of them. Especially entrepreneurship as a key competence provides a good basis for developing education leading to entrepreneurship throughout the school education and majority of subjects of study at secondary schools and universities. The pupils should be presented to entrepreneurship as a full alternative to the employee´s career as early as during their primary and secondary education. Apart from the theoretical knowledge concerning starting of the trade or a company and its management, the pupils should have a practical option to test doing business, for example, in a virtual company or when implementing the school projects. (http://www.nuv.cz/p-kap/vychova-k-podnikavosti-2). We think that the study (Deepali et al. 2017) will be a good inspiration for many pupils. The goal of the study was to provide the knowledge basis of mentors when selecting them to involve them in the education within the project called "Potential entrepreneurs". Efficiency and knowledge of teachers in the field of business was examined. The study also provides practical advice and suggestions towards the development of business and establishing the student´s own company.

The effectiveness of a code of ethics as a management tool for an organization´s external and internal relations is, however, not a matter of course. It is based on certain assumptions related to its content and the method behind its creation, use, application and enforcement. This not only includes its correct orientation and clear and unambiguous formulations, but also the tools by which the principles of the code are enforced within an organization (c.f. Caha and Urban, 2017).

According to Štúr et al. (2014, p. 254), entrepreneurship contributes to creating jobs now, economic growth and development, increase in the living standard of population and supporting of the technological progress. The process of doing business and entrepreneurship critically determines the increase in competitiveness of companies. For the reasons stated above, it is absolutely necessary to shape entrepreneurship of pupils and students of all types and grades of

schools as well as in the lifelong education process. The development of entrepreneurial education at the secondary schools and universities should help remove psychological and professional barriers and promote the development of business and the innovation potential growth.

A large number of authors have addressed and still address the field of doing business, the education leading to entrepreneurship and the development of entrepreneurial skills. Brandstätter (2011), for instance, pays attention to the personality aspects of entrepreneurship, which are focused on the characteristics of a manager – entrepreneur as a person and their abilities and motivation. We also make reference to the study by Staniewski et al. (2016), in which authors describe the sources of entrepreneurship in establishing an enterprise. The results of this study can be beneficial for reviewing the European Union´s procedures for providing the financial non-repayable aid to the entities that want to start their own business. We were impressed by the study by Isles (2011) dealing with the good work organisation. The study can help the starting business entities by presenting the examples how to make the work organisation more effective in order to increase the performance and productivity. The study by Jayawarna et al. (2014) deals with the research of creative potential of children as an important determinant of their career possibilities. The authors claim that the children´s development capital is affected by the ability of their parents to support the potential of their children by giving them sufficient resources and by supporting the direct education and indirect transfers into the human capital which build the ability to pursue the entrepreneurial career in the future.

The research of business preconditions was addressed by the author Jiaoa et al. (2016), who found out that the business preconditions showed the positive correlation with the technological innovation. The innovation is a crucial determinant of success in business and competitiveness of the company. We can also highlight the study by Kozubíková et al. (2016) which investigates autonomy as an element of doing business in the segment of small and medium-sized enterprises. In her research, she evaluated three criteria: sex of the entrepreneur, age of the entrepreneur and duration of business activity (starting entrepreneur – experienced entrepreneur). Every business entity deals with, among others, the human resources management. This issue is addressed in the paper by Merenda (2016) which describes the options of managing the talents that are set in the enterprise management within its strategy. The study presents the methods of talent management and the steps towards the innovation of entrepreneurial activities. Innovation and creativity contribute to profitability and increase the company´s competitiveness.

In relation to the above, it is essential to realize the need to learn the pupils and students to become creative and to develop their innovative, managerial and entrepreneurial capabilities. The path towards that may include the newly designed business subjects, modern methods of teaching and updated study programmes which will develop the entrepreneurial skills. The current goal of the teachers and lecturers should, therefore, be to help develop the entrepreneurial competences and to try to consistently link theory and practice. The current topic should be education of the young in their entrepreneurship.

The application part of this paper makes an analysis of the business preconditions. This is a follow-up to the joint paper in which we focused on the entrepreneurial potential analysis.

Methodology of research and objective

Respondents to the survey were the randomly chosen students of the Institute of Technology and Business (VSTE) and the University of South Bohemia in České Budějovice (JCU). These students study the full-time and part-time forms of the bachelor study, namely the study

programmes: Mechanical Engineering, Building, Technology of Transportation (VSTE – 54 students), Enterprise Economy (VSTE – 82 students) and Economy and Management (JCU – 38 students).

A total number of respondents was 174 women and men of different age categories. Given the number of students, we do not distinguish any groups (women – men, students of individual fields of study, full-time – part-time study, etc.).

In accordance with the pedagogical research principles (see Gavora, 2010, Chráska, 2007), an anonymous questionnaire (of own construction) with 8 questions concerning the entrepreneurial potential of respondents was chosen as a research method. To ensure a good informative value, the survey was anonymous (it was conducted between April and May 2017).

The full text of the questionnaire is available from the authors. The research still continues to ensure a bigger and more diverse statistical sample.

The partial outcomes are presented in the paper. The authors of this paper focused only on three questions and their independences.

The goal of the research is to prove of statistical independence among the following questions of the survey.

1) I can make an easy and rational decision at any situation.

2) I can handle greater amounts of money in an easy and responsible manner.

3) In case of a failure, I can gather strength quickly and look for more efficient solutions.

Only one of three types of answers, namely I AGREE, I PARTIALLY AGREE or I DISAGREE, could be chosen for all questions.

The statistical independence was supposed among these pairs of questions. The following three hypotheses were set on the basis of research questions:

H_{12}: An ability to make an easy and rational decision at any situation is not related to easy and responsible handling of greater amounts of money.
(We suppose the statistical independence between the question 1) and the question 2).

H_{13}: An ability to make an easy and rational decision at any situation is not related to an ability to quickly gather strength and look for more efficient solutions.
(We suppose the statistical independence between the question 1) and the question 3).

H_{23}: An ability to handle greater amounts of money in an easy and responsible manner is not related to an ability to quickly gather strength and look for more efficient solutions.
(We suppose the statistical independence between the question 2) and the question 3).

Whether our hypotheses are true will be evaluated in the next chapter.

The survey was evaluated using the chi square independence test. This test will help us reveal independences between two statistical characters which have a lexical value. We will calculate the test criterion χ^2 and compare it with a critical value $\chi^2_{1-p}(f)$, where p is a selected level of significance and f is a degree of freedom. If χ^2 is less than the critical value, we accept the independence hypothesis. If it is greater, we reject statistical independence between the questions.

If there is dependence between the questions, the degree of dependence can be identified using the Cramer coefficient V, in which case $0 \leq V \leq 1$, *0* is the weakest dependence and *1* is the strongest dependence. More details on the calculations of relevant values can be found in, e.g., Chráska (2007) or Gaur and Gaur (2009).

In this particular case, we will always have the tables of frequencies 3x3 with a degree of freedom $f = 4$ and the number of respondents is $n = 174$. We use the usual level of significance $p = 0{,}05$. The critical value is $\chi^2_{0,95}(4) = 9{,}488$ (see the statistical tables, e.g.. Chráska, 2007, Gaur and Gaur, 2009). We always test the relevance of the H_0 hypothesis: Independence of statistical characters.

The prerequisite for the test use is the sufficiently high expected counts. For the 3x3 table, we require at least 80% of the counts 2 and more.

Results

Now, we will evaluate individual hypotheses using the chi square independence test.

The hypothesis of the statistical characters independence will be identified. If the independence hypothesis is rejected, the questions are statistically dependent and it is possible to identify the degree of their statistical dependence. If the number of respondents is greater than 40 (this is met), the degree of dependence can be calculated using the Cramer coefficient.

The tables contains the real (Table 1) and theoretical counts for questions 1) and 2).

Table 1: Real counts of questions 1) and 2)

1/2	I agree	I partially agree	I disagree	n_{*j}
I agree	34	21	1	**56**
I partially agree	67	33	5	**105**
I disagree	4	8	1	**13**
n_{i*}	**105**	**62**	**7**	**174**

The numbers n_{i*} are the totals of empirically found counts in the column and the numbers n_{*j} are the totals of empirically found counts in the row. In all tables, theoretical counts are rounded to two decimal places.

Table 2: Theoretical counts of questions 1) and 2)

1/2	I agree	I partially agree	I disagree
I agree	33.79	19.95	2.25
I partially agree	63.36	37.41	4.22
I disagree	7.84	4.63	0.52

The test criterion is 6.401 and is less than the critical value of 9.488. The questions 1) and 2) are independent. **The hypothesis H_{12} is acceptable.**

An ability to make an easy and rational decision at any situation is not related to easy and responsible handling of greater amounts of money.

This part deals with the questions 1) and 3).

Table 3: Real counts of questions 1) and 3)

1/3	I agree	I partially agree	I disagree	n_{*j}
I agree	32	20	4	**56**
I partially agree	36	54	15	**105**
I disagree	0	10	3	**13**
n_{i*}	**68**	**84**	**22**	**174**

Table 4: Theoretical counts of questions 1) and 3)

1/3	I agree	I partially agree	I disagree
I agree	21.89	27.03	7.08
I partially agree	41.03	50.69	13.28
I disagree	5.08	6.28	1.64

The test criterion is 17.305 and is greater than the critical value of 9.488. The questions 1) and 3) are independent. **The hypothesis H_{13} is rejected.**

As there is dependence between the questions, we can determine its degree. In case of *r*x*s* of empirical counts, it is calculated from the formula for the Cramer coefficient as follows:

$$V = \sqrt{\frac{\chi^2}{n \cdot (min(r,s)-1)}},$$

where χ^2 is a test criterion, n is a number of respondents, $r = s = 1$. In our case, the Cramer coefficient is 0.22. Dependence is, therefore, weak.

An ability to make an easy and rational decision at any situation slightly depends on an ability to quickly gather strength and look for more efficient solutions.

Table 5: Real counts of questions 2) and 3)

2/3	I agree	I partially agree	I disagree	n_{*j}
I agree	44	50	11	**105**
I partially agree	22	31	9	**62**
I disagree	2	3	2	**7**
n_{i*}	**68**	**84**	**22**	**174**

The numbers n_{i*} are the totals of empirically found counts in the column and the numbers n_{*j} are the totals of empirically found counts in the row. In all tables, theoretical counts are rounded to two decimal places.

Table 5: Theoretical counts of questions 2) and 3)

2/3	I agree	I partially agree	I disagree
I agree	41.03	50.69	13.28
I partially agree	24.23	29.93	7.84
I disagree	2.74	3.38	0.89

The test criterion is 2.658 and is less than the critical value of 9.488. The questions 3) and 3) are independent. **The hypothesis H_{23} is acceptable.**

An ability to handle greater amounts of money in an easy and responsible manner is not related to an ability to quickly gather strength and look for more efficient solutions.¨

Conclusion

A man with an entrepreneurial attitude actively seeks for opportunities and is able to make use of them. The entrepreneurship as a full alternative to the employee´s career should be presented to the pupils as early as during their primary and secondary education. Entrepreneurship should be developed throughout the process of education as it is crucial competence for the lifelong learning.

In relation to the above, it is important to identify the degree of business preconditions of the pupils and to develop them. It is necessary to learn the pupils and students to be creative and to develop their innovative, managerial and entrepreneurial capabilities. The path towards that may include the newly designed business subjects, modern methods of teaching and updated study programmes which will develop the entrepreneurial skills. The current goal of the teachers and lecturers should, therefore, be to help develop the entrepreneurial competences and try to consistently link theory and practice. The current topic should be education of the young in their entrepreneurship.

This paper analyses the part of results obtained by means of an anonymous survey conducted among the students of two universities (namely VSTE and JCU) in the South Bohemia Region of the Czech Republic. The questionnaire focused on examining the business preconditions.

The paper also investigates the independences among three questions taken from the questionnaire. It was proved that there is independence between the questions 1) and 2). The hypothesis H_{12} is acceptable. *An ability to make an easy and rational decision at any situation is not related to easy and responsible handling of greater amounts of money.* The statistical dependence between the questions cannot be proved.

A weak dependence was found at the questions 1) and 3). The hypothesis H_{13} is rejected. *An ability to make an easy and rational decision at any situation is related to an ability to quickly gather strength and look for more efficient solutions.* We cannot prove that these questions are independent of each other.

In case of the questions 2) and 3), there was proved independence. The hypothesis H_{23} is acceptable. The willingness to borrow money to start own business is related to the willingness to work without sufficient sleeping. *An ability to handle greater amounts of money in an easy and responsible manner is not related to an ability to quickly gather strength and look for more efficient solutions.*

References

Brandstätter, H. (2011) Personality aspects of entrepreneurship: A look at five meta-analyses. *Personality and Individual Differences*. Vol. 51, No. 3, 222-230. ISSN 0191-8869.

Caha, Z., Urban, J. (2017) A Code of Ethics as an Organizational Management Tool and its Use in the Czech Republic. Lüdenscheid, Germany: RAM-Verlag. p. 112 ISBN 978-3-942303-50-7

Deepali, Sudhir, K. Jain, Harish Chaundhary (2017) Quest for Effective Mentors: A Way of Mentoring Potential Entrepreneurs successfully, *Global Journal of Flexible Systems Management* (June 2017) 18 (2): 99-109 DOI 10.1007/s 40171-016-0141-5.

Chráska, M. (2007) Methods of Pedagogical Research: Fundamentals of Quantitative Research (Metody pedagogického výzkumu: základy kvantitativního výzkumu). Prague. Grada. ISBN 978-80-247-1369-4.

Gaur, A.S, Gaur, S.S. (2009) Statistical methods for practise and research: A guide to data analysis usin SPSS, Sage Publications India PVT LTD, ISBN: 9788132101000

Gavora, P. (2010) Introduction to the Pedagogical Research (Úvod do pedagogického výzkumu). Brno. Paido. ISBN 978-80-7315-185-0.

Isles, N. (2011) The Good Work Guide: How to Make Organizations Fairer and More Effective. *Human Resource Management International Digest.* Vol. 19, No. 3. ISSN 0967-0734.

Jiaoa, H., Yanga, D. et al. (2016) Entrepreneurial ability and technological innovation: Evidence from publicly listed companies in an emerging economy. In: *Technological Forecasting and Social Change*. Vol. 112, pp. 164-170. ISSN 0040-1625.

Jayawarna, D. et al. (2014) Entrepreneurial potential: The role of human and cultural capitals. In: *International Small Business Journal*. Vol. 32, No. 8, pp. 918-943. ISSN 0266-2426.

Methodical Support of KAP (Metodická podpora KAP) (2017) Education towards entrepreneurship Prague: National Institute for Education (Národní ústav pro vzdělávání). http://www.nuv.cz/p-kap/vychova-k-podnikavosti-2.

Kozubíková, L., Vojtovič, S., Rahman, A., Smrčka, L. (2016). The Role of Entrepreneur´s Gender, Age and Firm´s Age in Autonomy. The Case Study from the Czech Republic. *Economics and Sociology*. Vol. 9, No. 2, pp. 168-182. DOI: 10.14254/2071-789X.2016/9-2/12.

Merenda, M. (2016) Managing of Talents as Innovation of Business Activities (Manažerování talentů jako inovace podnikatelských aktivit). *„Edukacja-Technika-Informatyka"* nr 2/16/2016 www.eti.rze:zow.pl DOI:10.15584/eti.2016.2.38.ISSN 2450-9221 online

Staniewski, M. W., Szopinski, T., Awruk, K. (2016) Setting up a business and funding sources. *Journal of Business Research*. Year 69, No. 6, pp. 2108-2112. ISSN 0148-2963.

Štúr, M., Vaníčková, R., Kmecová, I. (2014) Business Potential and Preconditions for Doing Business at Pupils and University Students (Podnikatelský potenciál a vlohy pre podnikanie u žiakov a študentov vysokých škol). Proccedings of 6th annual international scientific conference COMPETITION. Jihlava: College of Polytechnics Jihlava, Department of economic studies, pp. 254-263. ISBN 978-80-87035-91-7.

Mortgage Affordability for Young People in Russia

Viktoriia Koretskaia-Garmash Ural Federal University named after the first President of Russia B.N. Yeltsin, Yekaterinburg, Russia, e-mail:vkoretskaia-garmash@urfu.ru

Abstract

Affordability of housing for young people can serve both as an economic and social indicator. It demonstrates the region's level of development; opportunities for young adults to realize their potential on the labour market; the demand/supply balance on the real estate market; the expenditure-to-income ratio of households; mortgage conditions; and the effective demand for housing. This research aims to investigate mortgage lending and its affordability for young people in Russia, one of the most vulnerable social groups. We also estimated housing affordability by using the ratio of the average income to housing prices in the primary (newly built property) and secondary (resale property) markets. These data were compared to the level of housing provision in developed countries such as the USA, France, Germany and Poland. To ensure the validity of our results, we used official reports of the Federal State Statistics Service and the Bank of Russia. We applied Russian and international methodology to measure the affordability of housing for young people in Ekaterinburg: we identified the time that first-time buyers need to save enough money to buy property in the primary and secondary market. This time depends on their average income; the class of property ('economy', 'business', 'premium'); and consumption expenditures. Further research can expand its focus to mortgage lending to pensioners.

Keywords: young people, housing conditions, mortgage lenders, affordability of housing

Introduction

Young people constitute an important part of the economically active population, which makes it crucial for the state to retain them in the country by offering them equal opportunities for self-realization. States strive to create decent living standards for young people, give them access to high quality education, provide them with good career opportunities or opportunities to start their own business, and housing, which is essential to start a family. Thus, housing policy is one of the cornerstones for ensuring young people's well-being.

Unlike the Soviet period, when the state housing was free and was allocated on the basis of waiting lists, nowadays a house or a flat has to be bought, which influences young people's career plans and their decisions to migrate from the country to the city or vice versa.

Young people can choose from a range of options: rent a room or a flat, build their own home, continue living with parents if possible, use dormitories or other similar types of public accommodation, join one of the federal housing programs for families with children, buy property in the primary (newly built) or secondary (resale) markets. If young adults decide to get a home of their own, however, this will require some initial capital, a down payment and documents confirming their borrowing capacity, which can be problematic.

The housing problem is a complex phenomenon involving the country's population, government and participants in the mortgage market. The research literature includes social, legal and economic studies, risk management studies, household finance studies, and so on.
Social studies focus on the condition of the housing market and the affordability of housing (Tikhonova, Akatnova, and Sedova, 2007; Nozdrina and Schneiderman, 2012), which includes the affordability of housing for young families (Gurevich and Radilovskaya, 2007); the living conditions of households (Guzanova, 2012); the relationship between people's income, effective demand, and housing in small

towns (Luchsheva, 2012); risks in the mortgage market and ways of their minimization (Rasskazov, 2012 and Zuckerman, 2010); and the legal aspects of property ownership (Analysis Report, 2005).

The statistical data give us the official picture of the housing situation in the country and the analysis of the indicators used by state statistical agencies does not reveal any serious problems in this sphere: on paper each Russian citizen is provided with 24.4 square meters of residential space (Housing in Russia, 2016). For comparison, in the USA this figure is 70 square meters per person; in France and Germany – 39 square meters (1.6 times more than in Russia); in Poland – 25 square meters (Social Studies, 2016). These figures, however, fail to tell us the full story because they 'leave out' these countries' differences in the population, traditions, and standards of living. What is more, these figures do not reflect the qualitative characteristics of housing and the level of comfort such as a separate bathroom or kitchen.

The Russian government has set the 'optimal' residential space per person at the level of 35 square meters, which means that the available housing stock has to be expanded by half. Taking into account dwellings in various states of disrepair or those that are not equipped for comfortable living, the volume of necessary construction should be increased to 70-80% of the currently available housing.

1 Methods

By applying the logical method, we analyzed the age structure of young people as a group, their territorial distribution and the affordability of housing for young people.

We compared housing in Russia and developed countries such as the USA, France, Germany and Poland, which included comparing residential space standards.

The statistical method was used in the analysis of the official statistical data from reports and compilations published by the Federal State Statistics Service about the age structure of young Russian people, their territorial distribution and the average income in different Russian regions. Another source was the information provided by the Bank of Russia about the mortgage market and the cost of housing in the primary and secondary markets.

2 Research

The results of the research (Tikhonova, Akatnova, and Sedova, 2007) point out that 15% of the country's population (about 22 million people) are in fact confined to dwellings that are totally unsuited for living. According to Rosstat (Housing in Russia, 2016), in 2014 6.2% of families were dissatisfied with their living conditions and about a third of them (or 31.6%) were planning to make improvements on their accommodation. Only 23.8 thousand (5.4%) of young families in the country were lucky enough to move into new dwellings in 2015. The majority of those who aspire to improve their living conditions have low or middle income: for example, in 2016, only 251 thousand flats were constructed by using the population's funds (own or borrowed), which is less than in 2014 and 2015. Similarly, the floor area of these flats decreased from 78.4 sq.m. in 2012 to 68.7 sq.m. in 2016 (Statistical publication of the Bank of Russia, 2017).

Most renters are looking to purchase a property, which is not only a necessity but is often an economically justified step (Starikova, 2014). One of the obvious solutions is to take out a mortgage: there are mortgage programs offered by lending institutions and a housing allowance scheme available within the framework of the federal housing program, which was transformed into the 'Young Family' program in 2016.

According to the Rosstat (Statistical information: Population by sex and age), in 2016, the age structure of the young population in Russia was as follows: the upper age group, that is, young people aged 28-30

accounted for 24.6%; 23-27-year-olds, 35.1%; 18-22-year-olds, 23.2%; and the youngest age group or those aged 14-17, 17.1% (Fig.1).

In the period between 2006 and 2016 the share of young people in the Russian population declined from 27.3% to 21.5%. In absolute figures in this decade the young population decreased from 39 to 31.5 million, which shows that the country is facing serious problems in its social sphere (Statistical information: Young population in Russia in 2006-2016).

Figure 1 illustrates that the distribution of young people is uneven across different federal districts of Russia (Statistical information: Russian Regions, 2016; The center for economic and political reforms, 2016).

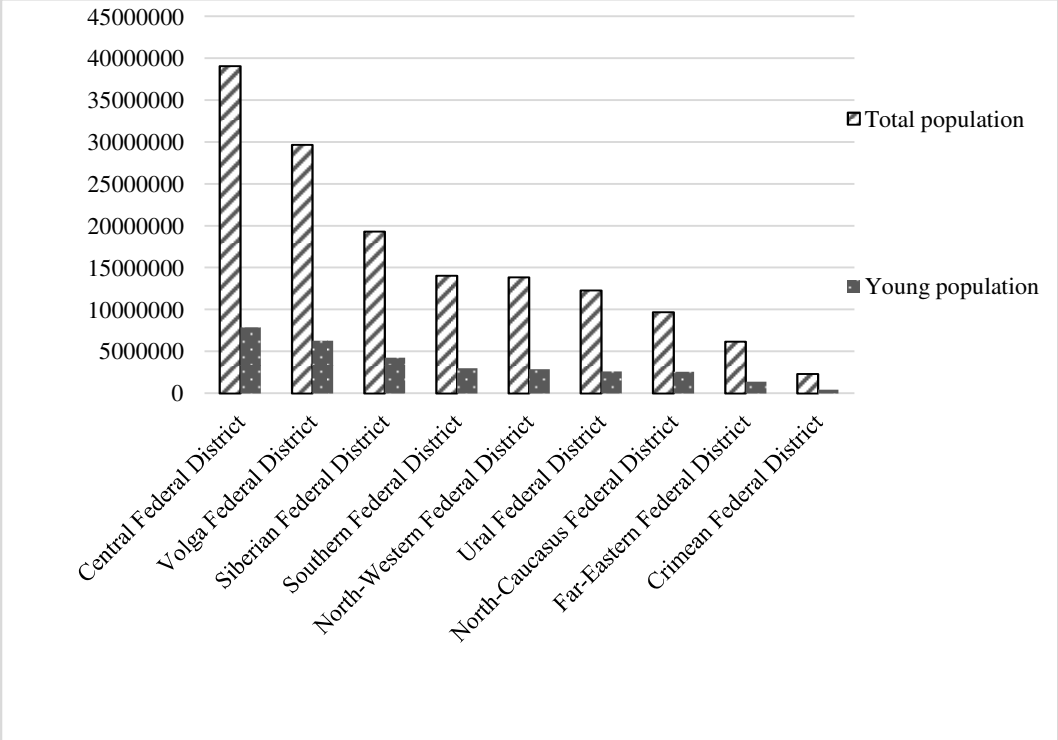


Fig. 1. Distribution of young people aged 14-30 across Russian regions in 2016

As Figure 1 shows, the North Caucasus (26.8%), Far East (22.9%), and Siberia (22.0%) have the highest proportion of young people in their population.

Faced with complex economic and social circumstances of modern Russia, young people seek to improve their prospects by moving from rural to urban areas or from small provincial towns to million-plus cities. Sometimes they resort to the assistance of their parents, who can buy them a flat but not all parents have the income or savings to do so and, therefore, the younger generation has to live under the same roof with their parents and leave home after reaching the age of 23-25 (Young people have started to leave parental homes later, 2015) if this happens at all, otherwise there can be three or more generations living together. Many young people have insufficient means to buy a property, so they opt for renting or taking out mortgage loans.

A specific type of saving for young people is the usage of their 'maternity capital', which is paid after the birth of the second child, regardless of the parents' age and can be used to improve the family's housing conditions.

High affordability of housing does not necessarily signify a high level of development of the region's housing market but, on the contrary, can show its socio-economic decline: when the property prices are low, people cannot sell their flats and abandon them due to the lack of effective demand. Thus, the municipal authorities are left to take care of the housing stock that has fallen into disrepair.

To find out whether a young adult is ready to become a first-time home buyer we can use the coefficient of housing affordability. There is vast research literature, both Russian and international, exploring the methods for calculating the housing affordability coefficient. In Russia, this question has attracted much scholarly interest due to the implementation of the national housing program for specific categories of socially disadvantaged groups, including young people. The research group led by Professor Sternik (2014) achieved particularly interesting results. They propose a model for calculating the coefficient of housing affordability, which enables us to calculate the time a household with a certain income needs to save to buy a flat, on the condition that their income is sufficient to cover their everyday expenses and to make loan payments. All the existing methods, however, focus on determining the minimal number of years that would take a family to save enough money to buy a property (Ovsyannikova, Prazukin, 2001; Kosareva, Tumanov, 2007); Sternik, Sternik, Apalkov, 2014).

3 Results

The lack of official statistical data on incomes and expenditures of young adults and their needs, in particular their housing need, has led us to conduct our own survey among university students aged 18-30 in Ekaterinburg. Our survey covered 150 respondents and our aim was to find accurate information on the effective demand for housing as of September 2017. We also sought to develop guidelines for choosing sources of funds for first-time buyers. The range of strategies includes selling one's old property, using maternity capital, and taking up a mortgage. The survey questions included the following:
a) the number of family members;
b) the average income;
c) available options for improving the family's housing conditions (room; economy-class flat; one-, two- and three-room flat; the property’s living area);
d) sources of funds for purchasing property and improving housing conditions (own; borrowed; raised);
e) readiness to use one's old property to improve the family's living conditions. The survey results are presented in Table 1.

Table 1: Survey results

Household composition, people	Number of respondents	Share of respondents, %	Income range, rbs				
			10 000	10 001-20 000	20 001-30 000	30 001-40 000	40 001-50 000
			Share of households, %				
one	59	39,3	10,2	67,8	16,9	5,1	0
two	45	30,0	28,9	15,6	35,6	17,8	2,2
three (one child under 18)	31	20,7	6,5	29,0	16,1	35,5	12,9
four (two children under 18)	15	10,0	0	6,7	26,7	46,7	20,0
Average household income, ths rbs	-	-	5,0	15,0	25,0	35,0	45,0
Total	150	100	14,0	38,0	23,3	19,4	5,3

According to Table 1, the largest share of respondents belong to single-person households (39.3%). The majority of households have incomes between 10,001 and 30,000 rbs, which is lower than the average income in Sverdlovsk region – 35,403.3 rbs. This means, however, that young people can find employment even without qualification documents, which stimulates them to become more independent and to start a family. Only 5.3% of respondents have a high level of income – between 40,000 and 50,000 roubles – and can consider themselves fairly well-off.

'Affordability of housing' means that people from disadvantaged groups and low-income households can purchase a property (Nikitenko). The United Nations use the housing price to income ratio to estimate housing affordability, which is defined as the ratio between median housing price and median annual household income (Urban Indicators Guidelines. UN Human Settlements Programme, Habitat, 2004). The value of this indicator corresponds to years of income it takes a family to buy their own housing.
We calculated the housing affordability coefficient according to the UN-Habitat methodology. The results are shown in Table 3 (we calculated the students' median income by using the data in Table 1).

Table 2: Results of calculations of the coefficient of housing affordability in Ekaterinburg's housing market (UN-Habitat methodology)

Indicators	Estate real classes quality				
	apartment	apartment-studio	one room apartment	of two rooms apartment	of three rooms apartment
Number object	1	2	3	4	5
The average area, sq. m	18,0	28,0	35,0	60,0	70,0
The median housing price in the primary market, ths rbs	1184,2	1766,3	2111,4	3162,0	3548,2
The median housing price in the secondary market, ths rbs	1194,1	1878,3	2386,4	3718,3	4168,6
The median annual household income, ths rbs	18,9	18,9	18,9	18,9	18,9
The coefficient of housing affordability in the primary market, years	5,2	7,8	9,3	13,9	15,6
The coefficient of housing affordability on the secondary market, years	5,3	8,3	10,5	16,4	18,3

To evaluate these results, we applied the criteria set by the federal program 'Housing' (see Table 3) (Government of the Russian Federation, 2014).

Table 3: The criteria of housing affordability in accordance with the federal program 'Housing'

Estate real classes quality	Results of calculations of the coefficient of housing affordability
affordable	Up to 3 years
moderately unaffordable	3-4 years
seriously unaffordable	4-5 years
severely unaffordable	More than 5 years

If we look at the classification of housing markets (Table 3), we can draw a conclusion that young adults cannot afford to buy property since the values of the indicator exceed the threshold value of 5 years.

(1)

Since the American methodology does not allow for the specifically Russian realia, in 2000 the Foundation of the Institute for Urban Economics (Kosareva, Tumanov, 2007) adjusted this tool to take into account the annual family expenditures in the form of the annual minimum subsistence (1):

$$k_d(V, I, ПМ) = \frac{V}{(I - ПМ)x12xK} = \frac{S \times P}{(I - ПМ)x12xK}$$

k_d – results of calculations of the coefficient of housing affordability, years;
V – the average cost of apartments, ths rbs;
I – the total family income, ths rbs;
S – the total area of housing, sq. m
P – the housing price average of 1 sq. m, ths rbs;
ПМ – the size of the subsistence minimum, the size of the subsistence minimum for an adult for the Sverdlovsk region ПМ=9972 rbs;, and for a child under the age of 18 ПМ=10492 rbs;
12 – the months in a year;
K – the number of employed and receiving income.

Table 4 shows the results of our calculations of the housing affordability coefficient which took into account a household's minimum subsistence requirements.

Table 4: Results of calculations of the housing affordability coefficient in Ekaterinburg's housing market which take into account the minimum subsistence, the class of property purchased, the household income and composition

The location of the property	Household composition, people	Estate real classes quality					The best housing option for family
		room	studio flat	one-room flat	of two rooms flat	of three rooms flat	
		Results of calculations of the coefficient of housing affordability, year / the average size per income working in the family, ths rbs					
The primary housing market	one	2,8/45,0	not	not	not	not	room 2,8/45,0
The secondary housing market	one	2,8/45,0	not	not	not	not	room 2,8/45,0
The primary housing market	Two	1,9/35,0 1,4/45,0	2,9/35,0 2,1/45,0	not 2,5/45,0	not not	not not	studio flat 2,9/35,0 one-room flat 2,5/45,0
The secondary housing market	two	2,0/35,0 1,4/45,0	not 2,3/45,0	not 2,9/45,0	not not	not not	room 2,0/35,0 one-room flat 2,9/45,0
The primary housing	three (one child	2,5/35,0	not	not	not	not	room 2,5/35,0

market	under 18)	1,7/45,0	2,5/45,0	2,9/45,0	not	not	one-room flat 2,9/45,0
The secondary housing market	three (one child under 18)	2,5/35 1,7/45,0	not 2,6/45,0	not not	not not	not not	room 2,5/35,0 studio flat 2,6/45,0
The primary housing market	four (two children under 18)	2,0/45,0	3,0/45,0	not	not	not	studio flat 3,0/45,0
The secondary housing market	four (two children under 18)	2,0/45,0	not	not	not	not	room 2,0/45,0
The income per each working person	-	35,0-45,0	35,0-45,0	45,0	more than 50	more than 50	-

As a result of our calculations (see Table 4), we found that young families with the income between 5,000 and 34,900 roubles per working family member cannot afford to buy a flat. Those with income 35,000 and more can improve their housing conditions by purchasing a room, a studio flat or a one-room flat but buying a two- or three-room flat is well beyond their means. Therefore, the best option for single-person households with the average income of 45,000 roubles is buying a room of 18 square meters, which is the minimum floor area per person, according to the standard sanitary requirements. Under these conditions, all other options remain unattainable.

If a family has one child, they will be able to buy a room only if each of the parents has an income of 35,000 roubles or more. In this case, the value of the affordability coefficient will be 2.5 years provided that during this period the family keep their expenditures low – at the level of minimum subsistence.

Families with two or more children have to have an income of 45,000 roubles or more in order to afford a newly-built 28-30 sq.m. studio flat in three years' time. In this context, we can hardly talk of affordable housing for disadvantaged groups. For them, purchasing real estate seems to be out of the question and they will have to settle for renting rather than ownership unless their average income increases. Another option is to use maternity capital for the mortgage down payment. Table 5 shows the results of our calculations of the housing affordability coefficient for households with two children and thus entitled to maternity capital.

Table 5: Results of the calculations of the housing affordability coefficient for Ekaterinburg households with two children entitled to maternity capital.

The location of the property	Household composition, people	Estate real classes quality					The best housing option for family
		room	studio flat	one-room flat	of two rooms flat	of three rooms flat	
		Results of calculations of the coefficient of housing affordability, year / the average size per income working in the family, ths rbs					
The primary housing market	four (two children under 18)	2,0/35,0 1,2/45,0	not 2,2/45,0	not 2,7/45,0	not not	not not	room (2,0/35,0) one room flat (2,7/45,0)
The secondary housing market	four (two children under 18)	2,0/35,0 1,2/45,0	not 2,4/45,0	not not	not not	not not	room (2,0/35,0) studio flat (2,4/45,0)
The income per each working person	-	35,0-45,0	45,0	45,0	more than 50,0	more than 50,0	-

The calculations were made by applying the basic formula but using the maternity capital as a source of funding:

$$k_d(V, I, ПМ, МК) = \frac{V - МК}{(I - ПМ)x12xК} = \frac{(S \times P) - МК}{(I - ПМ)x12xК} \quad (2)$$

МК - maternity capital; МК=492 348,0 rbs

Maternity capital allows families to improve their housing conditions and to buy a room, provided that the average income per each working family member is 35,000 roubles while a household with one child under 18 and thus not entitled to maternity capital will have to have an income of 45,000 roubles per each working member. For families with income of 45,000 roubles per each working family member it will take 2.7 years to save up enough money to buy a one-room flat in the primary market. Therefore, it is necessary for the government to reconsider and adjust the amount of maternity capital depending on the family's financial status and housing conditions.

Mortgage lending, which is gaining popularity in Russia, could provide an alternative to maternity capital. The eligibility criteria for joining the state mortgage scheme for young families included the age of spouses and the size of the family. There are also requirements concerning the loan period and the down payment. Moreover, under this scheme, young people cannot buy resale property. Thus, the share of those 'lucky' young families who were able to take out such mortgages and improve their living conditions was quite low - 23.8 thousand families (or 5.4%) in 2015 (Statistical information: Key Characteristics of Russian Regions, 2016).

Therefore, most young families do not rely much on state support and apply for mortgages available outside the federal program.

It should be noted that 'Sberbank' has undoubtedly been the leader in the mortgage market, with the average loan of 1.52 million in 2016. The slump in the banking sector in 2014, however, reduced the amount of mortgage lending of 'Sberbank' by 21.6%. After the 2014 crisis, bank 'VTB24' increased its amount of lending up to 293,7 million roubles. This bank issues a rather high number of mortgage loans with the average loan of 522 thousand roubles.

Table 6 illustrates housing affordability for various groups of households, including mortgage options. One of the main requirements for obtaining a mortgage loan is the down payment, which depends on mortgage conditions and usually ranges from 10 to 30% of the loan. For their down payment, families use funds from different sources, supplementing their own money with borrowed funds, with the ratio of 30%/70%. This means that a family might have savings worth 30% of the property cost while borrowed funds may constitute 70%. Apart from making their loan payments, however, young people also need to earn enough to satisfy their minimal needs (subsistence minimum).

Table 6: Results of calculations of the housing affordability coefficient in Ekaterinburg's housing market when using a mortgage loan which take into account the minimum subsistence, the class of property purchased, the household income and composition.

The location of the property	Household composition, people	Estate real classes quality					The best housing option for family
		room	studio flat	one-room flat	of two rooms flat	of three rooms flat	
		Results of calculations of the coefficient of housing affordability, year / the average size per income working in the family, ths rbs					
The primary housing market	one	∞	∞	∞	∞	∞	not
The secondary housing market	one	∞	∞	∞	∞	∞	not
The primary housing market	two	2,3/45,0	not	not	not	not	room (2,3/45,0)
The secondary housing market	two	2,3/45,0	not	not	not	not	room (2,3/45,0)
The primary housing market	three (one child under 18)	3,0/45,0	not	not	not	not	room (3,0/45,0)
The secondary housing market	three (one child under 18)	not	not	not	not	not	not
The primary housing market	four (two children under 18)	not	not	not	not	not	not
The secondary housing market	four (two children under 18)	not	not	not	not	not	not
The income per each working person	-	45,0	50,0	more than 50,0	more than 50,0	more than 50,0	-

A single-person household with an average income of 5,000 roubles is incapable of saving up a for down payment to buy a property of their own. Even if the average income of this person reaches 15,000 roubles, it will take them one hundred years to save the required sum. With the average income of 25,000-35,000 roubles, buying a flat will still remain an unattainable dream since the affordability coefficient in this case will be from 7 to 25 years. According to the given criteria (up to three years), only families with the average income of 45,000 roubles are able to get a mortgage loan, provide the down payment and make regular loan payments. A similar situation applies to households composed of two working young adults.

Mortgage lending does not help the Russian government address the demographic issues and boost birth rates. Families with two or more children can use their maternity capital as a down payment but afterwards they would find themselves stuck in a 'no-win' situation since, apart from the mortgage payments, they would have to struggle to cover their basic subsistence needs and will risk staying behind on their mortgage and losing both their flat and their money.

4 Discussion and conclusion

Our most relevant conclusions include the following:

1. The method of calculating the affordability index by taking into consideration the income level enables us to filter out a whole group of young people whose income is below the subsistence minimum, which means that these people will never be able to buy a flat and improve their housing conditions.

2. Those young adults whose average income ranges between 15,000 and 35,000 roubles and who have to rent rooms or flats are generally unable to buy property at their own expense.

3. Only for those young people who have an income from 35,000 to 45,000 roubles per person the affordability coefficient value approaches 2.9 years set by the federal program 'Housing'. This income level enables young families to consider buying economy-class property options at their own expense or by using the maternity capital for families with two or more children.

4. Young families with an income of 45,000 roubles per each working family member can become proud owners of a one-room flat in a newly built block in 2.7 years. For more comfortable housing conditions (two- and three-room flats), the required income level should be over 50,000 roubles a month per each working family member.

5. Housing will be affordable only for those young adults whose monthly income is 45,000 roubles, since to get a mortgage they need to make a down payment, which banks use at the first stage of the lending procedure to exclude those who do not have personal savings or whose savings are inadequate in order to avoid problems with mortgage arrears at later stages. Further research can expand its focus to mortgage lending to another socially vulnerable group – pensioners.

References

Decree of the Supreme Council of the Russian Federation 'Main Objectives of the State Youth Policy in the Russian Federation' 03.06.1993 № 5090-1

Dudochkina, L.A., Savinov, L.I. (2016) ‘Affordability of Housing for Young Families in Russia’. [Online], [Retrieved August 6, 2017], https://cyberleninka.ru/article/n/dostupnost-zhilya-dlya-molodoy-semi-v-rossii

Federal state statistics service (2016) ‘Population by sex and age (1 January 2016)’. [Online], [Retrieved August 6, 2017], http://www.gks.ru/bgd/regl/b16_111/Main.htm

Federal state statistics service (2016) ‘Russian Regions. Key Characteristics of Russian Regions. 2016’. [Online], [Retrieved August 10, 2017], https://nangs.org/analytics/rosstat-regiony-rossii-osnovnye-kharakteristiki-sub-ektov-rossijskoj-federatsii-2016-pdf

Federal state statistics service (2017). 'The average per capita income in Russian regions in the period between 2010 and 2016'. [Online], [Retrieved August 4, 2017], http://www.gks.ru/free_doc/new_site/population/urov/urov_11sub.htm

Federal state statistics service (2017). 'Key Characteristics of Russian Regions'. [Online], [Retrieved August 10, 2017], http://www.gks.ru/free_doc/doc_2016/jil-hoz16.pdf

Federal state statistics service (2016). 'Housing in Russia. 2016'. - Moscow: Rosstat. [Online], [Retrieved July 28, 2017], http://www.gks.ru/free_doc/doc_2016/jil-hoz16.pdf

Government of the Russian Federation 'Strategy of development of mortgage housing crediting in the Russian Federation until 2020' (2014). [Online], [Retrieved July 30, 2017], http://www.ipomama.ru/common/img/uploaded/files/agency/Strategiya_2020_2242_08.11.2014.pdf

Gurevich, MA. and Radilovskaya, T. (2007) 'Young Families' Housing Problems in Chelyabinsk' *Social Studies,* 8, 85-89.

Guzanova, A K. (2012) 'Housing Conditions and Strategies of Russian Households: Territorial and Social Differences' *Sociology and Society:* Global Challenges and Regional Development: Papers of the Fourth Regular Russian Sociological Congress. Moscow: ROS. [Online], [Retrieved July 30, 2017], http://www.ssa-rss.ru/files/File/congress2012/part19.pdf

Kosareva, NB. and Tumanov, A. (2007) 'On the assessment of housing affordability in Russia' *Problems of Economics*, 7 [Online], [Retrieved August 18, 2017], http://www.demoscope.ru/weekly/2007/0307/tema03.php

Luchsheva, V V. (2012) 'Effective Demand and Housing Costs' *Journal of the Russian Humanities Research Foundation*, 3(68), 62-69.

Nikitenko, E V. 'Analysis of the level of housing affordability' [Online], [Retrieved July 30, 2017], http:// xn--80aqkg7cua.ivdon.ru

Nozdrina, NN. and Schneiderman, I. (2012) 'Social and Economic Issues of Housing' *Population*, 3, 52-61.

Ovsyannikova, T. and Prazukin, D. (2001) 'The Investment potential of the population on the regional housing market' *Economy Questions,* 5, 107 – 112

Property in the Lives of Russian People: Myths and Reality (2005). *Analysis Report Social Studies,* 11, 3-18.

Rasskazov, S V. (2012) 'Housing as a Source of Morgage Risks (the Case of the USA)' *Social Studies,* 2, 54-62.

Social Studies (2016) 'In Russia, the level of affordable housing provision is estimated as 24 square meters of residential area per person'. [Online], [Retrieved July 28, 2017], http://www.gdeetotdom.ru/news/2038763-2016-04-01-obespechennost-zhilem-v-rossii-dostiglo-24-kv-m-na-cheloveka/

Starikova, M M. (2014) 'The practice of solving the housing problem in a modern city (on the example of Kirov)' *Sociology of the city,* 3, 48-65. [Online], [Retrieved July 30, 2017], https://elibrary.ru/download/elibrary_22414194_21165902.pdf

Statistical publication of the Bank of Russia (2017). 'Data on the mortgage market in Russia (2012-2016)', 4. - [Online], [Retrieved August 11, 2017], http://www.cbr.ru/statistics/b_sector/stat/Stat_digest_mortgage_04.pdf

Sternik, GM., Sternik, S. and Apalkov, A. (2014) 'New method of assessing housing affordability for the population' *Urban studies and the real estate market,* 2, 31-49.

Tikhonova, NE., Akatnova, A. and Sedova, NN. (2007) 'Housing and Housing Policy in Contemporary Russia' *Social Studies,* 1, 71-81

Urban Indicators Guidelines. UN Human Settlements Programme, Habitat (2004)

Vydrina, I I. (2014) 'Modern Youth Policy and Legislation in Russia' *Journal of the Ural Institute of Economics, Management and Law,* 4(29), 64-69.

Young population in Russia in 2006-2016 (2017) *Demoskop Weekly*. [Online], [Retrieved August 7, 2017], http://demoscope.ru/weekly/ssp/rus_pop_age.php?reg=2015

Young people have started to leave parental homes later. [Online], [Retrieved August 10, 2017], https://iq.hse.ru/news/177665223.html

Zuckerman, M B. (2010) 'The American Dream of Home Ownership Has Become a Nightmare' *U.S. News & World Report*. September 23. [Online], [Retrieved July 29, 2017], https://www.usnews.com/opinion/mzuckerman/articles/2010/09/23/the-american-dream-of-home-ownership-has-become-a-nightmare

Synergetic Approach for the Coordinated Control in Production and Economic System

Orlova E.V., Ufa State Aviation Technical University, Ufa, Russia, ekorl@mail.ru

Abstract

The aim of the study is to improve the efficiency of production and economic system control through the development and implementation of control mechanisms and models based on the synergetic approach that ensures the coordination of subsystems' interests. The production and economic system is characterized by features like complexity, non-linearity, stochasticity, subsystems interests contradiction. The mechanisms and models of interests coordinated control are proposed. Numerical experiments of developed models are given.

Keywords: coordinated control; synergetic approach; nonlinear models; production and economic system.

Introduction

Modern information systems and controlled objects are characterized by increasing complexity, stochasticity and spatial distribution. Production and economic systems (PES) in past decades are one of the most important objects of analysis, modeling, management and application of information technology. In the modeling of economic processes and systems there are used both methods of operations analysis that imply rigid subordination of individual economic objects to the center [1, 3, 4], as well as decentralized models that take into account the multidimensionality of the interests of economic information systems and objects and their individual behavior [2, 8, 9]. Therefore, the problem of theoretical justification of the effectiveness of such models and assessing the adequacy of their behavior is urgent and determines the necessarity for further development of approaches and methods that justify the effectiveness of existing control systems, create systems with pre-defined properties that reflect the features of the production and economic system as a controlled object.

To investigate the system with negative feedback and to ensuring the stability of complex systems, which is identified by linear deterministic or stochastic differential equations methods of system analysis are traditionally used. The PES is a complex nonlinear, dynamic system with elements with strong non-stationarity and stochastic parameters, it can be characterized by non-equilibrium, instability, bifurcations and chaos. For development the mechanisms for management of such system, it is advisable to use an approach that takes into account the ability to self-organizing and allows to consider the natural object properties and unifying the unified the processes of self-organization and control in complex systems [6, 7]. Therefore, for effective synthesis of mechanisms for PES control the system-synergetic approach is used that ensures that complex nonlinear interactions of PES elements are taken into account its ability to self-organize, activity and deciding the problems of interests conflicting. At the basic of the system-synergetic approach to the PES control there is the mechanism of coordinated actions, which makes the system rather sensitive to control actions and resonates with the internal systems properties. Such resonant interaction of PES elements is determined not by the intensity of the controlled action, but by its coherence with the systems' internal properties.

1. Production and economic system: the identification

The production and economic system (PES) is the socio-economic system that consist of several interacting subsystems - enterprises, market and tax systems, whose joint activity is aimed to the growth and development of the economy. Conflicts may appear in PES since the utility (interests) of

subsystems can be contradictory. The paper considers the type of conflict between subsystems, connected with the presence of contradictory goals (interests).

Interests are the essence of the needs of the subjects of the economic system, which manifest themselves in a subjective behavioral function. The objective needs of individuals and public institutions are within the framework of rigid objective resource constraints (opportunities) to meet them. Each subsystem of the production and economic system is characterized by specific patterns that are not reducible to each other. When economic subsystems interact, inter-system contradictions arise between objective needs and subjective opportunities to meet these needs. The methodology for investigating such contradictions must be based on methods and tools of system analysis, involves the identification of cause and effect relationships, analysis of external conditions and factors affecting the behavior of agents of subsystems and internal conditions that ensure their adaptive capabilities.

There are a number of different levels and types contradictions in production and economic activity: enterprise - tax system, enterprise - competitors, enterprise - consumers. Such contradictions include the following.

1. The financial and economic stability and effectiveness of an enterprise depend, in part, on reducing tax payments, and the stability of the economy, which in its turn depends on the growth of tax revenues into the budget. To smooth this contradiction of interests can be at the expense of harmonizing the tax burden on enterprises and the level of tax rates that provide for the simultaneous enterprises development and the necessary budget revenues.

2. In realization of its product in the market enterprises strive to maximize their income at expense of the highest possible market price. Consumers choose those product which with equal quality have a minimum price. Resolution of this contradiction of interest between enterprice-producers is possible due to using adaptive pricing management system that ensures the coordination of utility functions of the competitors and consumers of products.

3. In implementing their strategic goals aimed at long-term growth and development enterprises should monitor solvency and liquidity in order to avoid risks associated with a decrease in the level of sustainability and solvency in the short term. This requires a set of measures aimed at managing financial resources and cash flows and payments and providing coordinated management at the strategic and operational levels of the enterprise.

4. The management of the enterprise stability by the criteria of profitability and profit can be realized by balancing: resource flows, output and the prices.

These contradictions are formed with the synergetic interaction of economic systems - the enterprise, the market system and the tax system and can be resolved through the development of models, methods and mechanisms for managing the interaction of these systems on a single methodological platform. In order to solve the problem of reconciling the multidirectional interests of the PES subsystems - the enterprise, the market and tax systems at different management levels, it is necessary to create a decision support toolkit under uncertainty which will ensure an increase the PES efficiency and the economy as a whole.

PES is interconnected subsystems - an enterprise (PS), a market system (MS), and a tax system (TS):

$$PES = \{PS, MS, TS\} \quad (1)$$

Each subsystem is described by a set of characteristics. For PS there is the cost C, the variable C_v and fixed C_f costs for product, the product price p, the product value q, the income X, the profit Π, the profitability α, the total tax burden on the PS θ, the tax rates θ_i by type, the minimum level of financial stability of the PES $R_{\min}$, parameters of Cash flow in the process of operational financial management L, out, u, in, s, c, where L - financial losses associated with underfunding of expenditures, out - the value financing expenditure on the each items of expenses; u - total financing

of all items of expenses; in - value of financial resources received; s - the minimum balance of funds by the end of the planning period; c - coefficient of penalties for underfunding of expenditure items:

$$PS = \{ C, C_V, C_f, X, \Pi, p, q, \theta, \theta_i, \alpha, L, R_{\min}, out, u, in, s, c \}. \quad (2)$$

For the MS these are the parameters of the price and volume of sales of the PS $p,\ q$ and competitors $p_K,\ q_K$, demand for this product Q, the Nash equilibrium price p^{NE}, changes in market prices to achieve an equilibrium price p^*, p_k^*:

$$MS = \{ p,\ q, p_K,\ q_K, Q, p^*\left(p^{NE}\right), p_k^*\left(p^{NE}\right), p^{NE}(p,\ q, p_K,\ q_K, Q) \}. \quad (3)$$

For the TS the main parameters are: the level of actually taxes paid into the budget T, the level of tax charges required for budget $T_{\min}$, PS income, the level of tax burden and tax rates for the PS:

$$TS = \{ T, T_{\min}, X, \theta, \theta_i \}. \quad (4)$$

The relationship between the parameters of the PS, MS and TS can be defined as a system that determines the complex nonlinear connections of the PES subsystem and their parameters:

$$\begin{aligned} p^* &= f\left(p,\ q, C(q), p_K,\ q_K, Q, p^{NE}(p,\ q, p_K,\ q_K, Q)\right), \\ \theta &= g\left(p,\ q, \alpha, T_{\min}, R_{\min}(\theta), X(C(q), q, p, \alpha)\right), \\ u &= h(out, in, s(L, \alpha), c). \end{aligned} \quad (5)$$

Features of the PES management system are:

a) the need to take into account the properties of a complex controlled object;

b) the need to take into account the synergistic interconnection of factors and uncertainty of the PES functioning;

c) the need to PES management system effectiveness growth taking into account its specificity and for the purpose of ensuring sustainability;

d) the need to reconcile the diverse interests of the PES subsystems to ensure economic growth.

Therefore, the problem of harmonizing the conflicting interests of the enterprise, market and tax systems at different management, and tools development for supporting decision-making under conditions of uncertainty is urgent, which depends on the enterprises efficiency and the economic efficiency. In this regard, the development of models and mechanisms for managing PES that ensure the reconciliation of conflicting interests of economic systems at different economic levels is rather relevant.

The PES management system should include management at the enterprise level, at the level of market agents and at the government (state) level. At the enterprise level, the management system should be unified in terms of functional and managerial verticals. At the level of market agents, the processes of creating and implementing strategic plans must take into account the interests of all market participants and become mechanisms for the consolidation and balanced management of the enterprise. Budgetary and fiscal policy as the most active component of economic and industrial policy should be oriented towards the modernization of enterprises.

2. Coordinated control in production and economic system: the conceptual basic

Models for PES process control based on complex interactions of diverse subsystems, ensuring consistency of economic interests of participants of the economic, financial and market processes. The control system structure is defined in the form of three blocks: 1 – block for providing an effective enterprise resource management system, aimed at harmonizing the strategic and operational levels of management (project management, processes); 2 – block for adaptation of market management mechanism that supports the interests of consistency of producers and consumers (control pricing processes); 2 – block for tax burden and tax rates regulation as an instrument of fiscal policy, aimed at improving economic growth in general (management of the institutional environment). Solution of these problems is based on simulation of a system having a hierarchical structure which includes the components listed below.

a) simulation of the tax burden and tax rates, taking into account conflicting interests of industrial and economic systems (tax subjects) and the economy as a tool of fiscal policy, aimed to the development of the PES;

b) simulation of market interactions of producers and consumers. This section is important because it leads to the formation of market prices, which are among the most important characteristics of the PES effectiveness;

c) simulation of resource component for production and economic system. At this level, it is considered the conversion of resources into results and the aim is to ensure the most efficient allocation of resources for production and to ensure the effective development of the PES.

The coordinated control mechanism for the PES consists of inter-related technologies: the balanced efficiency; the financial planning; the prices control; the technology of synthesis of optimal tax rates. First two technologies are united in subsystem for the PES resources control. Functional diagram of coordinated control mechanism for the PES is shown in Fig. 1.

The hierarchical simulation system is constructed as follows. First level is modeling of optimal tax system [10], includes the model for determining the effective tax burden and the model for determining the optimal level of tax rates on taxes and tax homogeneous groups of subjects [11]. Simulation results at this level area are allowed tax burden in groups of similar taxation objects and the optimal tax rates that satisfy the interests of the taxation objects and the economy as a whole.

The second simulation level is the dynamic model of market pricing, designed for the PES control in conditions of nonstationarity of environment parameters and dependence spheres of production and consumption on the basis of the adaptive pricing mechanism. Prices level formation and changing are coordinated both with the strategic objectives of the manufacturers and the changing preferences of consumers [12, 13]. The result of the modeling of market processes are Nash equilibrium prices for manufactured products that achieve the maximum efficiency for PES.

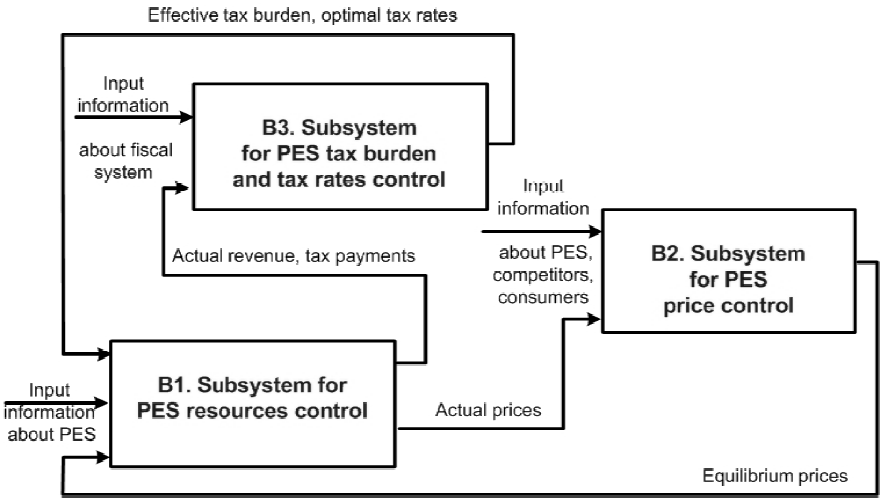


Fig. 1. Functional model for the PES coordinated control

The third simulation level based on production and economic system control models, designed for the optimal combinations of production resources within the constraints generated by the first and second levels of modeling [14]. Modeling results are the resources costs, production quantity and prices for production and economic system.

3. Models for the production and economic system control

The model of economic efficiency of production is formed as the ratio of profit and production costs: $\alpha = \Pi / C$, where the profit is $\Pi = pq - \left(C_{\text{f}} + q \cdot C_{\text{v}} \right)$. Total production cost is defined as the sum of variable and fixed costs $C = C_{\text{f}} + q \cdot C_{\text{v}}$, where α is the profitability of goods production in q quantity, Π is the gross profit generated on the sale of goods in q quantity and p price, C is the total cost, including a constant part C_f and a variable part qC_v. The profit tax payable to the budget is defined as $T_{\text{PT}} = t_{\text{PT}} \cdot \Pi$, where T_{PT} is the profit tax, t_{PT} is the profit tax rate.

The basis of tax burden simulation is the Laffer assumption about the nonlinear connection of output X and the level of tax burden θ. For each group of similar taxation objects we design the dependences as the follow $\theta = T / X$, where θ is the tax burden, T are the tax revenues.

We assume that the production also has non-linear relation with the tax burden. The production function is approximated by a quadratic polynomial:

$$X(\theta) = a\theta^2 + b\theta \tag{6}$$

and the tax function $T(\theta)$ has the form:

$$T(\theta) = a\theta^3 + b\theta^2, \tag{7}$$

where a and b are function parameters. Identification of production function $X(\theta)$ and tax function $T(\theta)$ allow to find the first and second Laffer points in which the production and tax functions has their maximum respectively.

Harmonization of the operational financial planning system and the strategic financial planning system is provided due to coordination of special indicators of operational and strategic control levels. At the operational enterprise level it is ensured the products competitiveness, the overall status

of PES and its financial and operating efficiency, at the strategic control level it is conducted the enterprise investment attractiveness, the growth of its value in the long term. Interconnection of these indicators is based on a multifactor model

$$ROE = \frac{\Pi - T_{PT}}{E} = \frac{\Pi}{A} \cdot \frac{A}{E} \cdot \frac{NI}{EBIT} = ROA \cdot LR \cdot B, \tag{8}$$

where *ROE* is the return on equity; *NI* is the net income; *E* is the equity capital; *EBIT* are the earnings before interest on loans and income tax; A is assets; *ROA* is return on assets; *LR* is the coefficient that determines the effect of financial leverage; *B* is the coefficient reflecting the decrease in profitability of the enterprise in the payment of interest on the capital employed and tax deductions.

The model of competitive interaction of the enterprises (in the case of a duopoly) is represented as mapping:

$$\begin{cases} p_1(t+1) = p_1(t) + k_1 \dfrac{\left(-p_1^2(t)p_2(t) + 2c_1 p_1(t)p_2(t) + c_1 p_2^2(t)\right)}{\left(p_1^2(t) + p_1(t)p_2(t)\right)^2}, \\ p_2(t+1) = p_2(t) + k_2 \dfrac{\left(-p_1(t)p_2^2(t) + 2c_2 p_1(t)p_2(t) + c_2 p_1^2(t)\right)}{\left(p_2^2(t) + p_1(t)p_2(t)\right)^2}. \end{cases} \tag{9}$$

where $p_1(t), p_2(t)$ are the prices of products of the first and second firms, taken at discrete intervals of time *t*; second terms in both equations show how the change in prices in period *t*, and how this change will affect the price in the next period. Parameters k_1 and k_2 represents the increase in prices due to changes in the pricing policy. Variables c_1 and c_2 represents production cost of the first and second firms respectively.

4. Numerical experiments

We consider the computational experiment implemented the designed harmonized mechanism for the tax burden and tax rates. Modeling is based on the statistical data for several years about taxable bases for individual taxes, tax revenue for five classes of PES - large enterprises, providing about 50 % of tax revenue into the region budget. Further we give modeling results for the aggregate tax burden and the tax becoming the first group of taxpayers. The first taxpayers can be described as the largest taxpayer, which has the following structure of taxable bases: the share of value-added tax is 0.576; profit taxes - 0,125; the unified social tax - 0,098; property tax - 0.08; other taxes - 0,121.

Production and tax functions, as well as their extremes are:

$$X_1(\theta) = -141.5 \cdot 10^7 \theta^2 + 4001 \cdot 10^6 \theta, T_1(\theta) = -141.5 \cdot 10^7 \theta^3 + 4001 \cdot 10^6 \theta^2, \quad \theta^* = 0.13, \theta^{**} = 0.19. \tag{1}$$

Analysis of the actual total tax burden for the first group of taxation objects shows that in periods *t* and *t*-1, its value is more than two points Laffer θ^* and θ^{**} and is equal to 0.23 and 0.25 respectively. The insensitive area for the tax burden is from 0 to 0.09 (θ_h), Fig. 2.

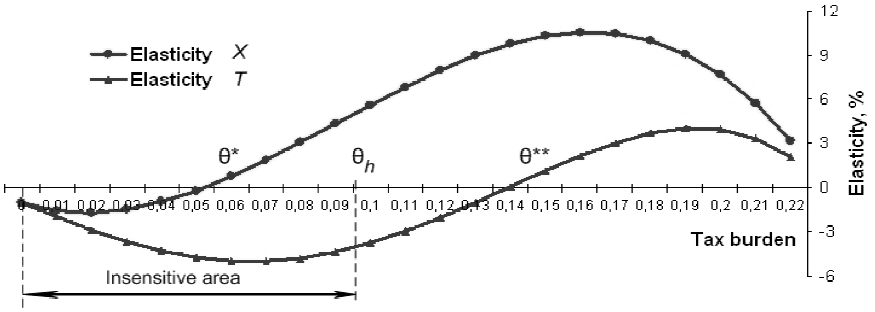


Fig. 2. Elasticity function for the production and tax revenue

Detailed analysis of the production and tax functions for the first group of enterprises showed that the current tax burden is such that there is in the third zone. This corresponds to a situation in which the tax burden is the right of both the Laffer points. This means that fiscal policy stimulates the fall of the production function, while dissatisfaction fiscal interests. Therefore it is a great necessarily for reduce the overall tax burden, which will increase the value of production and tax functions simultaneously, table 1.

Table 1: Growth rates for the production and tax functions

Tax burden changing Δθ	New tax burden θ	Growth rate for function *X*	Growth rate for function *T*
-	0,23	-	-
0,01	0,22	0,138	0,089
0,02	0,21	0,260	0,150
0,03	0,2	0,365	0,187
0,04	0,19	0,454	0,201
0,05	0,18	0,526	0,194
0,06	0,17	0,581	0,169
0,07	0,16	0,620	0,127
0,08	0,15	0,643	0,071
0,09	0,14	0,649	0,004
0,1	0,13	0,639	-0,074
0,11	0,12	0,612	-0,159
0,12	0,11	0,568	-0,250
0,13	0,1	0,508	-0,344
0,14	0,09	0,432	-0,440
0,15	0,08	0,339	-0,534
0,16	0,07	0,229	-0,626
0,17	0,06	0,103	-0,712
0,18	0,05	-0,040	-0,791
0,19	0,04	-0,199	-0,861
0,2	0,03	-0,374	-0,918
0,21	0,02	-0,566	-0,962
0,22	0,01	-0,775	-0,990
0,23	0	-1,000	-1,000

Consider the several cases to change (decrease) in the overall tax burden for first group objects of the. The most significant increase in the production function is achieved at the tax burden level of 13-14 %, but further reduction in the tax rate will not give further effect in the tax revenues growth. Elasticity's analysis of the production and tax functions showed that the area of insensitivity can be determined as [0; 0.09], since this segment is the growth of the tax burden leads to a greater reduction in tax revenue than that achieved for a given load in output growth. Therefore the recommended decision is to reduce the overall tax burden up to 14 % or 9 %.

Changing the overall tax burden is possible by changing tax rates. Moreover, the conceptual analysis of the types of taxes remains within the Laffer theory that maintains the unity of methodological research. Therefore, for qualitative and quantitative analysis of the need to build on each group of objects depending on tax bases of each taxes: value added, income, profit, property. For the first taxpayers group tax production functions for each type of tax as well as the extreme points of these functions, and the actual tax burden value are as follows (for value-added tax, for profit tax, for income tax, for property tax correspondingly):

$$X_{11}(\theta) = -107.3 \cdot 10^6 \theta^2 + 548.5 \cdot 10^5 \theta, T_{11}(\theta) = -107.3 \cdot 10^6 \theta^3 + 548.5 \cdot 10^5 \theta^2,$$
$$\theta^* = 0.28; \theta^{**} = 0.35, \theta = 0.37,$$

$$X_{12}(\theta) = -273.2 \cdot 10^8 \theta^2 + 715.8 \cdot 10^7 \theta, T_{12}(\theta) = -273.2 \cdot 10^8 \theta^3 + 715.8 \cdot 10^7 \theta^2,$$
$$\theta^* = 0.23; \theta^{**} = 0.34, \theta = 0.15$$

$$X_{13}(\theta) = -368.7 \cdot 10^6 \theta^2 + 479.3 \cdot 10^5 \theta, T_{13}(\theta) = -368.7 \cdot 10^6 \theta^3 + 479.3 \cdot 10^5 \theta^2,$$
$$\theta^* = 0.07; \theta^{**} = 0.09, \theta = 0.08,$$

$$X_{14}(\theta) = -273.2 \cdot 10^8 \theta^2 + 715.8 \cdot 10^6 \theta, T_{14}(\theta) = -273.2 \cdot 10^8 \theta^3 + 715.8 \cdot 10^6 \theta^2,$$
$$\theta^* = 0.009; \theta^{**} = 0.016, \theta = 0.02. \quad (11)$$

Many tax rates combinations that implements the single changing in total tax burden can be represented in the form of the matrix. For the analyzed companies there have been determined the particular solution, and presented in the form of a matrix A. The elements of this matrix reflects the need to transform the specific tax rates in the form of an increase / decrease in implementing the first option - reducing the overall tax burden in 1% lead to the increase in the production function in 14 % and the growth of the tax function in 9 %:

$$A = \begin{Vmatrix} -0.02 & 0.05 & -0.01 & -0.01 & 0 \\ 0.07 & 0.11 & 0.05 & 0.23 & 0 \\ 0.02 & 0.33 & -0.08 & -0.53 & 0 \end{Vmatrix}. \quad (12)$$

It should be noted that the proposed change in tax rates implements only one of the possible options for fiscal policy, which allows to increase the efficiency of the fiscal system. Modeling of competitive tax system and finding the optimal tax rates on different PES groups is presented in [9].

Results and conclusions

The proposed approach for PES modeling and control is differ from similar ones in that takes into account PES properties, complex nonlinear relationships between PES subsystems, internal and external environment. This allow to simulate the processes of PES functioning in conjunction with the economic agents, agreeing in control their conflicting interests.

The conceptual model for the PES control defines a single system-methodological position for control structure in three blocks: PES control system that ensures the coordination of strategic and operational management processes in the PES; pricing system for the PES as a market mechanism for strategic cooperation with competitors and consumers; tax burden and tax rates system as an instrument of fiscal policy, aimed to stimulating the PES development and economic growth. Conceptual model is the basis of the methodology and aims to improve the decisions making effectiveness at the expense of a coherent decision-making in PES control system.

The supposed PES control system unites disparate economic and mathematical methods and models, reflects the heterogeneous properties of PES and provides a synthesis of efficient control algorithms. Developed decision support tools for the PES control in the form of control mechanisms, methods and models has been implemented as an integrated software package.

References

[1] Prangishvili, I.V. (2000) The systems approach and system-wide patterns, Publishing House "SINTEG", Moscow.

[2] Burkov, V.N. (2012) "Theory of control of organizational systems and other management science organizations", *Control Problems*, 4, 2-10.

[3] Novikov, D.A. (2012) Control theory in the organizational systems, Publishing House "FIZMATLIT ", Moscow.

[4] Kleiner, G.B. (2013) "The system platform for the development of the economy of modern economic theory", *Problems of economy*, 6, 4-12.

[5] Livshits, V.N. (2014) "On Unsteady Russian transition economy", *Control Problems in theory and practice*, 2, 8-13.

[6] Zang, W.B. (2005) Differential Equations, Bifurcations, and Chaos in Economics, World Scientific Publishing Company, New York.

[7] Evstigneeva, L.P. (2010) Economics as a synergetic system, Publishing House "Lenard", Moscow.

[8] Stachurski, D. (2009) Economic dynamics: theory and computation, MIT Press, Cambridge.

[9] Ferguson, B. S. and Lim, G.C. (2005) Dynamic economic models in discrete time: theory and empirical applications, Taylor & Francis e-Library.

[10] Orlova, E.V. (2016) "Concept for Industrial and Economic Systems Management Based on Criteria Coordination of Interested Agents', *Program Engineering*, 2, 86-96.

[11] Orlova, E.V. (2013) "Tools for Management of Efficiency Tax System", *Economic analysis: theory and practice*, 43, 59-70.

[12] Orlova, E.V. (2016) "Modeling and Decision Support for the Firms' Pricing Policy under a Chaotic Dynamic of Market Prices", *Proceedings of the Workshop on Computer Modeling in Decision Making (CMDM 2016)*, 1726, 81-88.

[13] Orlova, E.V. (2017) "Control over chaotic price dynamics in a price competition model", *Automation and Remote Control,* 1, 16-28.

[14] Orlova, E.V. (2016) "Simulation Model for the Firms' Financial Resource Management", *Proceedings of the 28th International Business Information Management Association Conference on Vision 2020: Innovation Management, Development Sustainability, and Competitive Economic Growth, IBIMA*, 1317-1321.

The AI model for Identification the Impact of Irrational Factors On the Investor's Risk Propensity

Orlova E. V., Ufa State Aviation Technical University, Ufa, Russia, ekorl@mail.ru

Abstract

One of the most important problem related to understanding the investor's behavior is to study the ways he selects, analyzes and interprets the available information and then uses it to make investment decisions. It is necessary to find out how an investor forms a certain opinion and comes to his own behavior strategy. The investor's behavioral model is variable since the financial market is volatile. The behavior of the investor is determined by a combination of rational (objective) and irrational (subjective) factors. To describe the influence of a combination of factors on the investor's behavior, a model describing this influence is needed. A formal description of interaction is complicated since a number of factors are of a qualitative nature, and the factors are also interrelated. The paper identifies the main causes and factors of irrationality in investor behavior which is the basis for its analyze and control. The fuzzy model, which allows to link a lot of behavioral factors with the utility (efficiency) of the solution is developed. Simulation results can be used for the investor's utility functions designing that is required to decisions making justification.

Keywords: investor behavior, irrational factors, utility function, AI model.

Introduction

It was shown [1-7] that under conditions of uncertainty and risk investors are being influenced a lot of irrational factors. The majority of financial theories [8-10] are based on the assumption of rational investor behavior. A number of researches show that many economic systems cannot be described with a sufficient degree of reliability by classical financial theories. Actually, the investor behavior is not strong rational and the majority of classical theories erroneously describe real systems [7, 9, 11].

Investigations of investor behavior in conditions of uncertainty and risk allow revealing a number of laws that have influencing to one of fundamental factors - "propensity to risk". The understanding of the factor "propensity to risk", studying the characteristics that influencing it, will enable to design mechanisms which will allow to consider the investor behavior.

For the decision of this problem it is necessary, firstly, to reveal principal causes of irrational behavior to analyze and supervise similar situations and as a result to avoid negative consequences of the "incorrect behavior". Secondly, it is necessary to predict in time and to estimate objectively other agents actions, using any deviations from a "rational" behavior.

In the paper the problem of irrational factors detecting has been decided. A set of investor's subjective factors has been revealed and their impact to investor behavior with using developed artificial intelligent model has been revealed.

1. Factors of investor irrational behavior: the identification

One of the major problem associated with understanding of investor behavior is to study the way in which he selects, analyzes and interprets the available information and then uses it to form some principles and beliefs. In other words, one must determine how the investor understands and comes to a definite decision.

As a result of the analysis of psychological factors [13-16], the violation from the rationality, these factors are grouped in accordance with the structure of the decision-making process, as well as the preconditions for the manifestation of these factors. It should be noted that there are a lot of ways to

classify these factors - by the degree of perception of information for decision-making, by the specifics of the subject area, etc. However, it seems more constructive to model and more adequately assess the influence of subjective factors on the quality, timeliness and efficiency of decisions taken Structuring of the behavioral factors of the decision-maker in the enlarged stages of the decision-making process: 1 – purpose identification; 2 – information collection and alternatives and criteria forming; 3 – alternatives preference relation forming; 4 - alternative choosing.

The first group includes factors of deviation from rational choice associated with the staging process - a problem situation description and the purpose forming. The definition of a goal requires significant, not always motivated costs and resources from the decision-maker, the impossibility, the difficulty of understanding and expressing an adequately informative goal that is the basis for decision-making, inconsistency:

- The factor of information representation consists in the difference in problem situation perception in case of its description in different formulations ("negative" or "positive"), and, consequently, in different preferences of alternatives corresponding to these two statements, which contradicts the rationality of the choice in making decisions;
- The factor of re-investment. When implementing investment projects, there is a periodic situation when the investor, investing a certain amount of financial, temporary resources, decides to continue financing to maintain its primary investments, even if the prospects for the project have deteriorated significantly. The probability of irrational investment of the project is directly proportional to the amount of invested money;
- Biased assessment of assets. The tendency of the subjects to attach greater importance to their own assets and to assign to them a higher cost, in comparison with the valuation of another's property. This effect is quite clearly manifested in the example of selling your own business, the value of which is estimated based on the effort and money spent on creating a business, without taking into account the economic indicators and the value of similar assets.

The second group includes factors and personality traits caused by difficulties in the formation of objective constraints in the choice of the analysis of possible options and the allocation among them is feasible. Personality traits that contribute to these deviations from rationality are dreaminess, impossibility or unwillingness to distinguish desired and real.

- Information flow factor. The decision-maker is often influenced by a large number of heterogeneous information, often unreliable and the opinions of other people, often incompetent in the problem at hand;
- The factor of conservatism. Delayed change by the decision-maker of established beliefs and principles under the influence of a new information flow;
- Use of incomplete and inaccurate information. In certain situations, limited information is perceived as exhaustive and sufficient. This leads to its misinterpretation and, as a result, to irrational decision-making;
- The tendency to subjectively perceive the situation. A biased evaluation of existing information forms a subjective, often erroneous, opinion and, as a result, erroneous decisions;
- incorrect use of instrumental methods of information evaluation. In the conditions of existence of necessary and sufficient information, individuals can use incorrect methods to assess it;
- The factor determinism. It manifests itself in a tendency to see patterns in situations in which there is in fact an accident. The desire to predict certain events inclines the decision-maker to describe situations with deterministic characteristics. A similar situation occurs when several similar events create a belief in the occurrence of a phenomenon;
- Propensity to simplification. If the complexity and uncertainty of the situation increases, the subject loses rationality and begins to use simplifications. In connection with the difficulties of processing a large amount of complex information, some of this information can be lost, which leads to a simplification of the task. However, unrecorded information often has a high degree of

significance. This explains why fairly simple approaches work well on the market, and complex decision-making systems, even if applied, are not always adequate;

- The factor of simple access. The economic agent attaches too much importance to information to which there is simple access, so the frequent repeated use of such information can be perceived as an irrefutable truth;
- Subjective assessment of probability. There is a difference between the actual probability of an event and the way an individual evaluates this probability;
- The factor of "slow" changes. Greater weight is given to general, not absolute changes. Individuals may not take into account the non-standard behavior of the system, if it occurs gradually, at certain intervals in time;
- The factor of the greatest significance of recent events. The most recent events tend to be given much more weight. The entity may feel that the business is no longer working after a sequence of unprofitable trades, although in fact it continues to function within the computed profit-and-loss relationships;
- Low propensity to change target goals. The essence of this effect is that in the subconscious of the individual there can be a conflict between his beliefs (assumptions) and the real reality. To avoid this, the subconscious tries to resolve this contradiction by "adjusting" historical facts to the existing beliefs. In other words, the human subconscious often "writes off" emerging problems on the "minor" shortcomings of the applied method, instead of pointing out the need for its modernization;
- Difficulties in choosing criteria and alternatives. Often such difficulties arise in individuals who are not prone to self-restraint or who are painfully related to external restrictions. In this case, virtual alternatives are formed, which can lead to undesirable consequences.

The third group integrates factors of personality traits leading to irrationality, and is associated with problems of evaluating the preferences of alternatives on a variety of criteria. On the subjective formation of transitive relations, the following factors influence the preferences of alternatives:

- Accounting for differences, not similarities. In order to simplify the choice between different alternatives, individuals do not notice (ignore) the common features of phenomena, focusing on their differences. This can lead to different preferences for the same alternatives in the same situations;
- Nonlinearity of preferences. This effect is manifested in situations of comparison of possible amounts of profits or losses, at which the significance of the difference in absolute value between them is smoothed as the values increase;
- Giving more importance to growth than to absolute change. The individual perceives not so much the absolute value of his wealth as his change, and the losses always seem more significant than the equivalent income. Individuals are more likely to take a greater risk to avoid losses than to obtain additional profits.

The fourth group of irrational behavior factors is associated with the decision-making stage and is connected with such personality traits as caution, indecisiveness, radicalism, impulsiveness:

- Rejection of losses. The negative emotions experienced in connection with losses are much stronger than the positive emotions associated with making a profit. The investor gives twice the value of losses than profits. In reality, an investment project with the same probability of profit and loss will not be of interest to the investor, even if the profit is one and a half times more than the loss;
- The factor of risk - competence. Most decision-makers tend to take more risks in areas in which they are more competent, no matter how this competence and professionalism can influence the likelihood of a decision;

- Subjective control factor. The propensity of the subject to a greater risk in situations in which, in the opinion of this subject, there are real opportunities to influence the results of events. A similar situation develops if the subject needs to take a set of decisions that do not directly affect the future result;
- Propensity to take risk depending on previous financial results. The degree of risk aversion largely depends on previous results (for example, investment decisions). If they were positive, then the risk aversion may temporarily decrease, and vice versa, after a succession of failures it only aggravates, leads to the appearance of "fear of mistakes";
- Increased risk for net profit. The individual is inclined to take a much greater risk when investing the funds of previous financial transactions. The propensity to risk the profit received from investing is increasing;
- The factor of choice of alternatives is manifested in the fact that when all alternatives are presented simultaneously, the subject chooses certain of them on some principle, and if the alternative is sequentially provided, he concentrates his choice on one of them.

The diagram of the cause-effect relationship of the factors of the investor's irrational behavior reflects the most significant factors and is presented in fig. 1.

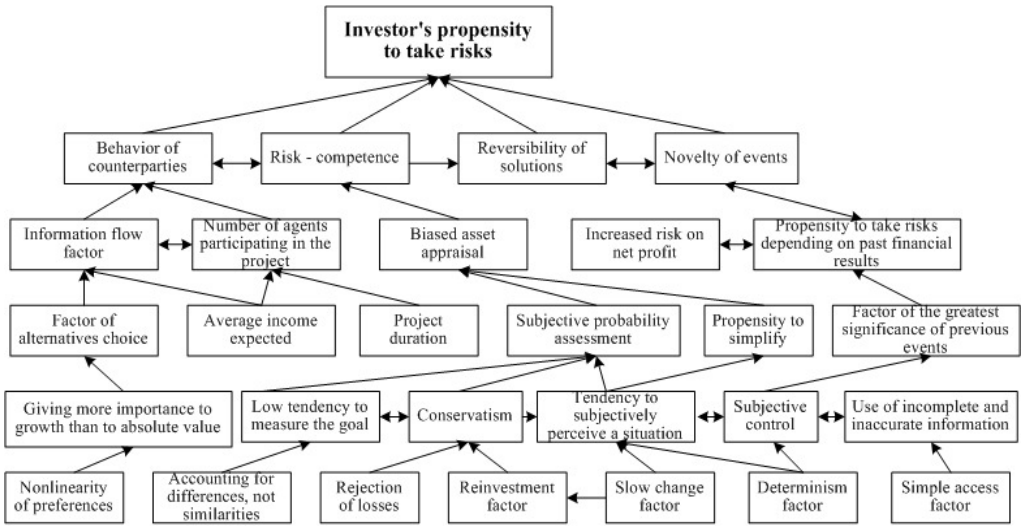


Fig. 1. Cause-effect relationship of subjective factors of the investor's propensity to take risk

Thus, there is a significant set of personal, psychological characteristics of economic agents that cause significant deviations from rationality in the choice of solutions. The individual, in whose behavior the listed features are clearly expressed, does not take into account the whole set of available information about the problem, in fact making the boundaries of the objective function, decision criteria, limited many alternatives, or unreasonably exposing them as the best part of them.

The revealed effects and patterns of behavior of economic agents in conditions of uncertainty and risk allow to explain many facts of economic agents irrational behavior. Especially brightly, irrational behavior manifests itself under uncertainty and risk in entrepreneurial, investment, innovation, and financial activities. Risk propensity is one of the most significant factors in the implementation of investment activities of innovative projects. The studying of factors influencing propensity to risk, determining the degree of their significance, provides certain possibilities for using this knowledge to influence the behavior of the economic agent (decision-maker).

In order to model the agents' behavior and take into account the consequences of irrational decisions arising from the occurrence of these deviations (errors), it is necessary that the modeling scheme include the following independent models: the model for controlled object, the model for decision-

maker, the model for generate alternatives. In microeconomic modeling, the enterprise acts as an object if a decision is made to implement an investment project for the modernization of fixed assets, the release of new products, optimization of the structure of output, etc. The model of the object reflects the influence of the decisions made on the controlled object. The model of the subject (decision maker) reflects the existing psychological, cognitive features of the subject and the structure of the factors of the decisions made. The model of alternatives presents a description of attributes and alternatives and reflects the evaluation of options from the perspective of goals and selection criteria and the structure of their set. An example of the application of decision-maker model is shown below.

2. Impact of irrational factors on investor's risk propensity: The model

The propensity to take some decision differs for each decision maker. It coordinates by objective external and internal constraints which include:

- Objective environment factors;
- Internal research object factors;
- Demand, pressure of economic partners, competitors, consumers;
- Legislative regulatory restrictions that determine the liability (administrative, financial) for the management functions and regulatory between participants in the economic process;
- Social and moral obligations as determined goal that is implementation of the event will be successful.

The decision to choose is influenced by the relationship to decision maker to the described factors. One of the major unsolved problems of decision-making process modeling is the problem of subjectivity, which is not described by classical mathematical methods. To solve these problems a utility functions are used. In analyzing a decision in finance on the investor behavior the rational choice theory is usually used. It is based on the approach generated optimization model. Rational behavior is behavior which provides the best decision in terms of a particular purpose. As shown above a number of decisions based not only on rational considerations, but also in social traditions, subconscious reactions, moral installations scattered facts of personal experience in some field, and are the result of irrational behavior. Under high degree of uncertainty economic agents are not able to analyze the whole complex of factors and goals, and often apply special fragmentary discourse.

Classical analytical approach does not involve consideration of subjectivity in the decisions making, not investigate reasons and methods of mutual influence in the construction of economic evaluations. To solve the problem of decisions selection about investment strategy we take into account the different risk propensity of potential investors and use tools based on the utility function of Neumann-Morgenstern [12]. To construct a utility function it is necessary to determine the nature of the behavioral study of alternatives influences on the functions type, as well as consider the impact of subjective factors to the risk propensity.

Practical application of utility theory in assessing of investment projects attractiveness identifies the following advantages of utility curve:

- as the expression of individual investor (expert) preferences utility curve once being built can make investment decisions in the future, taking into account their preferences, but without any consultation with expert;
- in general utility function can be used to delegate the decision making. It is logical to use a utility function of top management as to ensure its position in the decision it seeks to take into account the conflicting interests of all contractors. The utility function may change over time, reflecting the financial terms. Thus, utility theory can be formalized approach to risk and thus research to justify decisions taken under uncertainty and risk.

Because of the complex cause-effect relationship of subjective factors, irrational behavior, and risk propensity to determine the impact of factors it is appropriate to use artificial intelligence (AI)

methods. With the help of fuzzy set theory the AI model was developed which allows to analyze and evaluate the impact of subjective factors for investors' risk propensity.

The implementation of fuzzy model is carried out in Matlab environment using the module Fuzzy Logic Toolbox [13, 14]. The simulation results are used in construction the utility functions of investment projects and demonstrated in fig. 2-5. The input data serves 25 parameters - subjective factors. Initial data processed by the system and generates an output variable is the risk propensity. All variables in the model are normalized in the interval from 0 to 1. The membership function for the resulting parameters "risk propensity" and "counterparty behavior" are shown in fig. 2, 3. A rules base consist of 100 rules and has a form of "if-to" records and reflects different combinations of interconnection all input factors (irrational factors) and output (result) indicator "risk propensity", fig. 4. As shown above subjective factors of the investor's risk propensity have a complex relationship. Therefore, the input variables are in turn the resulting parameters for the factors of the lower hierarchical level which is clearly shown in fig. 5.

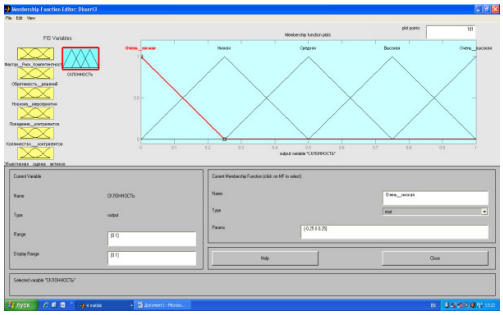


Fig. 2. The membership function for the resulting parameter "risk propensity"

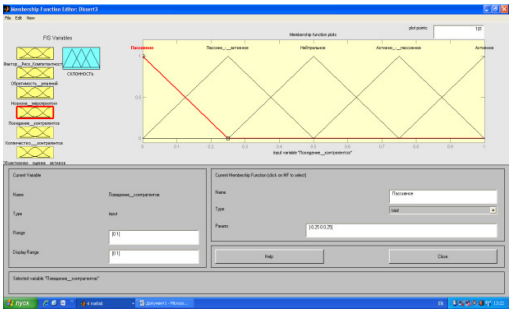


Fig. 3. The membership function for the parameter "behavior of counterparties"

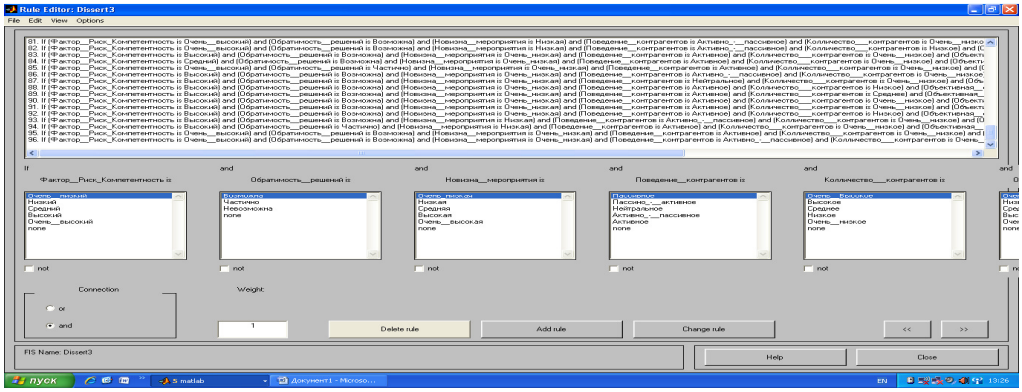


Fig. 4. The rules base

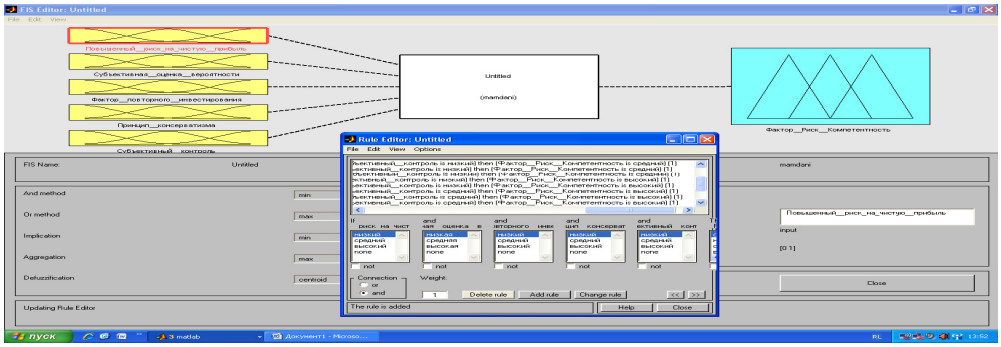


Fig. 5. Impact estimation of irrational factors on the risk propensity

The simulation result is represented as the vector of values of variation of subjective factors (input variables) and assessing of parameter "risk propensity" (output variable), table 1.

Table 1: Simulation results

Experiment No.	Risk – Competence	Reversibility of solutions	Novelty of events	Behavior of counter parties	Number of counterparties	Biased asset appraisal	Profit	Risk propensity
1	0,055	0,095	0,985	0,145	0,975	0,115	0,155	**0,147**
2	0,185	0,095	0,965	0,145	0,955	0,115	0,155	**0,202**
3	0,205	0,175	0,925	0,195	0,935	0,145	0,225	**0,341**
4	0,205	0,185	0,925	0,225	0,915	0,145	0,225	**0,359**
5	0,245	0,205	0,855	0,245	0,875	0,225	0,245	**0,403**
6	0,285	0,245	0,835	0,285	0,835	0,265	0,275	**0,434**
7	0,325	0,305	0,775	0,315	0,785	0,315	0,315	**0,464**
8	0,355	0,325	0,775	0,345	0,785	0,335	0,335	**0,476**
9	0,385	0,355	0,765	0,385	0,765	0,375	0,365	**0,494**
10	0,425	0,365	0,625	0,395	0,625	0,415	0,385	**0,532**
11	0,425	0,395	0,475	0,415	0,485	0,455	0,435	**0,585**
12	0,455	0,435	0,415	0,445	0,455	0,475	0,465	**0,605**
13	0,505	0,475	0,395	0,495	0,435	0,515	0,495	**0,645**
14	0,625	0,615	0,375	0,615	0,405	0,635	0,635	**0,655**
15	0,735	0,745	0,345	0,775	0,385	0,745	0,705	**0,685**
16	0,755	0,795	0,315	0,805	0,345	0,775	0,725	**0,717**
17	0,795	0,795	0,295	0,805	0,325	0,775	0,765	**0,723**
18	0,835	0,815	0,285	0,835	0,285	0,825	0,815	**0,792**
19	0,885	0,845	0,255	0,865	0,255	0,875	0,855	**0,881**
20	0,915	0,885	0,235	0,925	0,235	0,915	0,895	**0,961**
21	0,915	0,915	0,195	0,955	0,195	0,925	0,925	**0,965**
22	0,935	0,925	0,135	0,975	0,165	0,955	0,955	**0,985**
23	0,975	0,965	0,135	0,985	0,135	0,975	0,995	**0,995**

As shown in fig. 6 the curve that determines the dependence of the variable “profit” and investors' “risk propensity”, has three different areas.

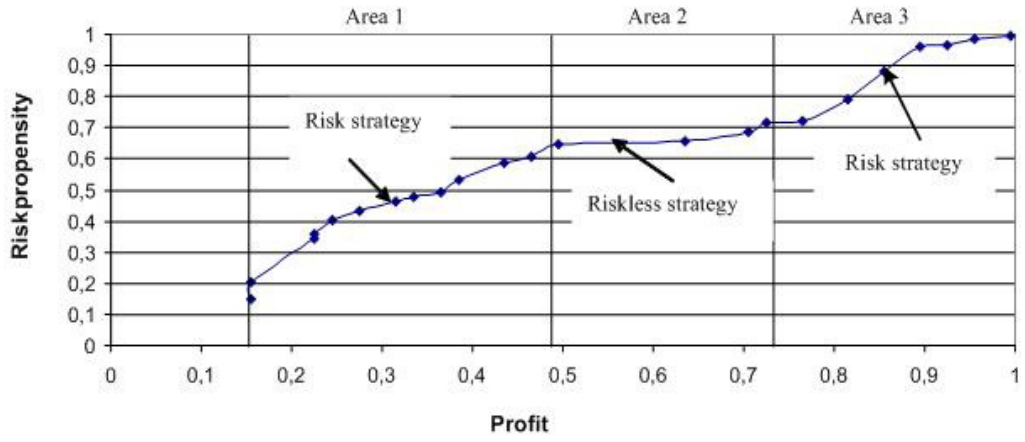


Fig. 6. Utility function

Area 1: Strategy of risky investment. Under the profit increasing the risk propensity has the tendency of significantly growth. Changing the low profits significantly affect the decision.

Area 2: Strategy of risk-free investment. Under the profit increasing the parameter "risk propensity" is practically unchanged. The mean change in income has weak effect on the decision.

Area 3: Strategy of risky investment. Under profit increasing the risk propensity has the tendency of significantly growth. The profit growth significantly affects the decisions.

Thus, based on AI model the impact of subjective factors on the risk propensity were determined. The results can be used in construction of utility functions of investment projects, taking into account the influence of subjective factors on the tendency of decision-makers to take risks.

Due to the application of AI model the problem of impact of subjective factors on the investor's risk propensity was solved. With the help of fuzzy modeling of the expert system, a fuzzy model was developed that makes it possible to analyze and evaluate the influence of subjective factors of the investor's propensity to take risks for the final decision adoption. The obtained results can be applied for constructing the utility functions of innovative projects that take into account the influence of subjective factors of the propensity of the decision maker to risk.

Results and conclusions

The transformation of methodological approaches in the decision-making theory in the study of the economic agents behavior is considered. The impossibility of an isolated using of rational choice theory as an adequate description of economic activity due to the objective existence of a multitude of causes of the irrationality of the decision-maker is shown. The main factors of the individual's irrational behavior, structured according to the stages of the decision-making process, based on the economic agent's personality-stable psychological features are selected and systematized. The AI approach for taking these effects in the decision making is proposed.

Given the complex causal relationship of irrational factors and to determine the degree of their influence on the investor's risk propensity, the fuzzy model is proposed. This model is used to construct the utility function, which is an objective basis for selecting behavioral alternatives. The practical use of the utility function can be found in the problems of economic decisions selecting. This will improve the quality and effectiveness of management decisions.

References

[1] Hausman D. (2012) Philosophy of the economy, Publishing House "Anthology", Moscow.

[2] Hands U. (2012) "Regulatory rational choice theory: past, present and future", *Problems of Economics*, 10.

[3] Friedman M. (2003), Freedom, Moscow.

[4] James C. Van Horne (2000) Finance management, Moscow.

[5] Rusavin G.I. (2005) "Theory of rational choice and its limitations", *Issues of philosophy*, 6.

[6] Rudic N.B. (2009) Behavioral finance in economy, Moscow.

[7] Blaug M. (2004) The methodology of economics or how economists explain, Moscow.

[8] Kahneman D., Tversky A. (2003) "Rational choice, values and frames", *Journal of Psychology*, 4.

[9] Piskunov L.P. (2012) "Transformation of theoretical approaches to the study of consumer behavior", *Science and Business: the ways of development*, 9.

[10] Glukhov B. (2010) "Household finances: structure and management", *Problems of the theory and practice of management*, 1.

[11] Kleiner G.B. (2003) "Modeling methodology of decision-making by economic agents", *Economics and Mathematical Methods*, 2.

[12] Neumann D., Morgenstern O. (1970) Theory of games and economic behavior, Moscow.

[13] Orlova E.V. (2012) "Modeling of utility function with using irrational factors", *St. Petersburg state polytechnical university journal. Economics*, 3, 24-30.

[14] Orlova E.V. (2014) "Modeling of utility function with using irrational factors", *Problems Of Theory And Practice in Management*, 3, 127-136

[15] Orlova, E.V. (2016) "Modeling and Decision Support for the Firms' Pricing Policy under a Chaotic Dynamic of Market Prices", *Proceedings of the Workshop on Computer Modeling in Decision Making (CMDM 2016)*, 1726, 81-88.

[16] Orlova, E.V. (2016) "Simulation Model for the Firms' Financial Resource Management", *Proceedings of the 28th International Business Information Management Association Conference on Vision 2020: Innovation Management, Development Sustainability, and Competitive Economic Growth, IBIMA*, 1317-1321.

La Gestion Economique Entre Le Développement Du Hydro-Tourisme Et Les Problèmes Ecologiques Des Lacs D'accumulation Dans Le Bassin Du Riviére Olt, Roumanie

Elena Bogan, Université de Bucarest, Faculté de Géographie, Roumanie, elena.bogan@yahoo.com;
Tamara Simon, l'Institute National de Recherche-Developpement en Tourisme, Bucharest, Roumanie, tami_simon2003@yahoo.com
Dana Maria (Oprea) Constantin, Université de Bucarest, Faculté de Géographie, Roumanie, danamartines@yahoo.com;
Elena Grigore, Université de Bucarest, Faculté de Géographie, Roumanie, ela_zigzag@hotmail.com
Irina-Adriana Chiurciu, Université de Sciences Agronomiques et de Médecine Vétérinaire de Bucarest, Roumanie, irina.chiurciu@yahoo.ro;
Elena Soare, Université de Sciences Agronomiques et de Médecine Vétérinaire de Bucarest, Roumanie, soare.elenausamv@gmail.com

Resumé

L'espace aménagé représente l'adaptation mutuelle d'un territoire donné et des besoins résultés des activités socio-économiques menées dans les limites du territoire pour répondre aux besoins de vie de la population. Dans ce contexte, les aménagements hydroélectriques ont été achevés ayant en vue le désir d'exploiter le potentiel hydroélectrique des eaux de surface. La plupart de ces aménagements visaient d'obtenir de l'électricité, de l'eau potable pour les localités, la réduction des inondations et des déluges.

Les questions liées à l'environnement n'ont pas été une priorité pendant la mise en œuvre des premières unités hydroélectriques, mais progressivement ils ont prouvé que ces aspects peuvent produire des changements importants dans l'existence et la stabilité des écosystèmes naturels. Dans les dernières trois-quatre décennies, les spécialistes ont fait des recherches approfondies qui ont montré qu'il y a aussi un impact négatif sur l'environnement, à la fois de la part des grandes centrales hydroélectriques mais aussi de la part des micro-hydro-électriques.

Mais en mêmes temps, les unités de barrages hydroélectriques sont en mesure a maintenir un équilibre écologique de l'écosystème environnant, en raison de leurs surfaces de l'eau. Dans ce contexte, ils peuvent devenir un support dans le développement d'un tourisme de niche représenté par hydro-tourisme.

Celui-ci essaie de mettre en valeur les barrages et leurs annexes de fonctionnement comme partie technique et opportunité de valoriser l'eau des lacs, toutes comme support pour des multiples activités touristiques.

Mots-clé: hydrocentrales, tourism, environnememt, Olt, Roumanie.

1. Introduction

L'hydro-ingénierie implique généralement plus de travaux. Le volume des travaux de terrassement et des excavations représente des centaines de milliers ou des millions de mètres cubes, aussi comme ceux de béton qui sont coulés dans les barrages. Les excavations et les bétonnages des galeries et des puits souterrains ou pour les cavernes des centrales hydro-électriques couvrent des dizaines de kilomètres et impliquent des centaines de milliers de mètres cubes.

Les travaux de forage et injection pour les terrains de fondation avec des suspensions de ciment afin de les renforcer et les étancher, totalisent des dizaines de milliers de mètres linéaires pour une seule activité d'aménagement paysager. En ce qui concerne les travaux d'aménagement des bassins

torrentiels, l'emplacement des travaux hydrotechniques transversales est une question de premier ordre et, en même temps, très complexe (Hutte, 1996).

Celle-ci dérive des caractéristiques géomorphologiques, climatiques, morpho-métriques et hydrologiques spécifiques pour chaque bassin hydrographique torrentiel et de la fonctionnalité et l'efficacité de ce travail. Puis, une autre chose très importante - le nombre de localités et le nombre d'habitants déplacés doit être le plus petit possible. Enfin, les effets sur la biodiversité doivent être minimisés.

Avec la réalisation de ces plans, l'eau est destinée à l'utilisation pour des objectifs tels:

- pour l'alimentation avec d'eau potable et des eaux industrielles;
- la production d'électricité;
- alimenter les systèmes d'irrigation;
- la diminution des inondations et des déluges;
- travaux de drainage et la protection des rives;
- le développement du transport fluvial, de la pisciculture;
- soutenir le hydro-tourisme avec diverses activités touristiques.

Tous ces aspects techniques sont importants, parce que les opportunités d'investissements dans le tourisme dépendent de la manière dont les barrages et les lacs d'accumulation ont été construits. Avec une durée de vie moyenne de 50 à 100 ans, les centrales hydroélectriques sont des investissements à long terme dont différentes générations peuvent bénéficier. Ils peuvent être facilement mises à jour pour intégrer les nouvelles technologies et ont des coûts d'exploitation et de maintenance très bas.

Pour le bassin de la rivière Olt, environ 50 mini-centrales hydroélectriques sont en phase de projet (Le Plan national d'aménagement les bassins fluviaux de la Roumanie, 2013). Les mini-centrales hydroélectriques ont des effets nocifs sur l'environnement aquatique naturel, de cinq à huit fois plus élevés par rapport aux centrales hydroélectriques moyennes et grandes, par unité d'énergie produite (effet spécifique par kWh produit). Ainsi, en termes de la surface d'impact, la zone riveraine touchée est énorme: environ 200 m de rivière touchés pour une unité GWh par, an pour les petites centrales, par rapport à env. 17m par unité GWh/an pour les grandes centrales avec des lacs d'accumulation.

2. Méthodologie

La base de cet article est une étude de recherche sur «La diagnose des effets directs et indirects des installations hydroélectriques sur le tourisme en Roumanie», réalisée entre mars 2014 - mars 2015 avec le programme «Nucleu», financé par l'Autorité Nationale pour Recherche Scientifique de Roumanie.

L'accent a été mis sur la situation en Roumanie considérant que presque toutes les unités hydroélectriques majeures ont été construites au cours des années 1970-1989, quand on ne donnait pas beaucoup d'attention aux questions environnementales. Dans ce sens, on a réalisé une analyse des principales unités hydroélectriques sur les rivières Olt et Argeș, importantes artères hydrographiques qui coulent directement dans le Danube. Dans cet article, la présentation est appliquée seulement pour la rivière Olt, parce qu'elle détient la plus grande et complexe unité hydroélectrique établie sur les rivières intérieures qui sont des affluents directes du fleuve Danube.

Cette méthode de documentation bibliographique a été complétée avec une sur le terrain afin d'obtenir des données et des informations de SC. Hidroelectrica SA Olt, de l'Administration nationale «Apele Române» (Eaux Roumaines), à travers les filiales départementales Sibiu et Vâlcea, de l'Agence de

protection de l'environnement de Sibiu et Vâlcea qui gère une grande partie de l'énergie hydroélectrique du bassin de la rivière Olt (figure no. 1).

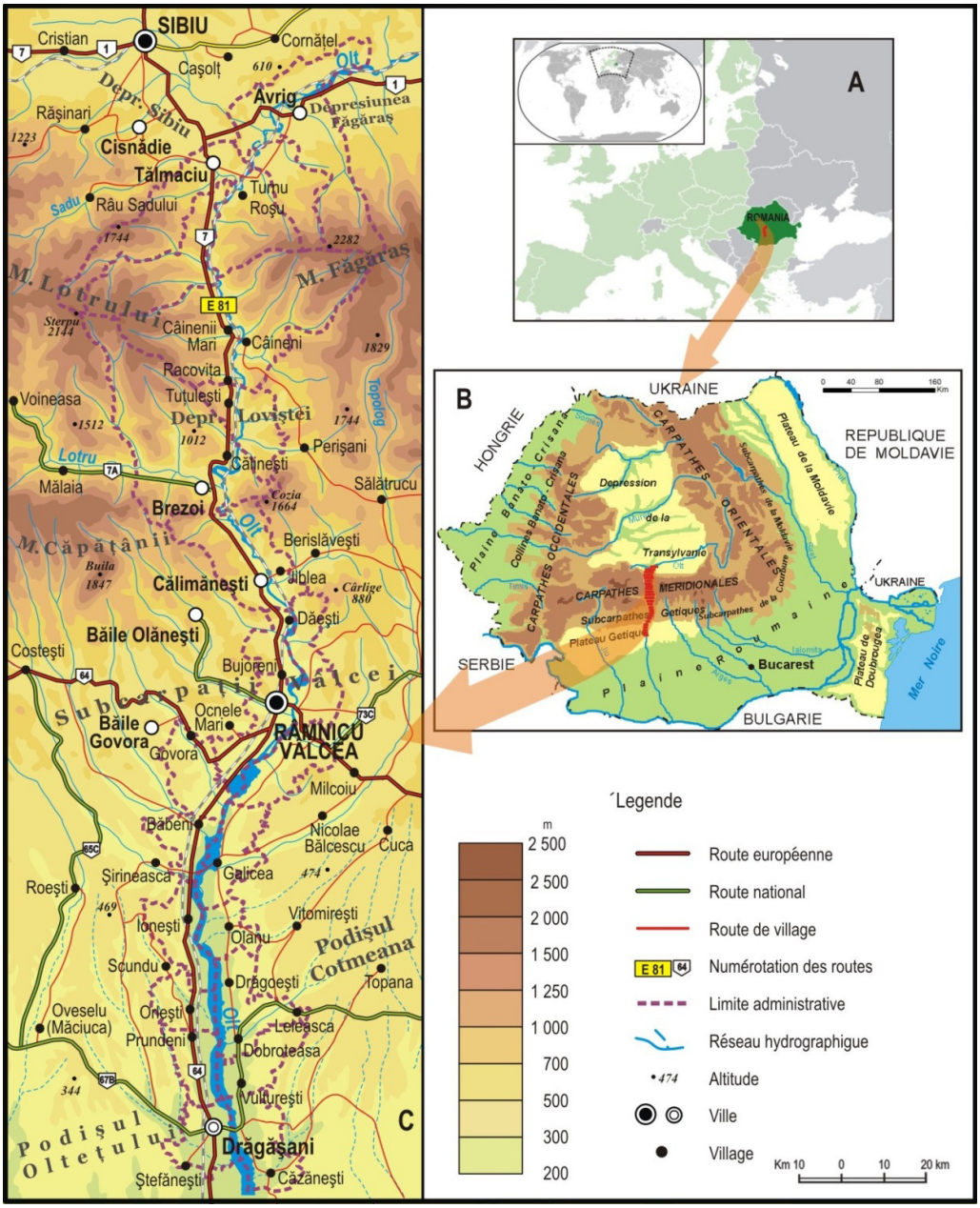


Figure no. 1. Zone d'étude

Source : les auteurs

La documentation est fondée sur des projets et des rapports de WWF en Roumanie (Hidroelectrica du département Vâlcea, 2014) et aussi des études sur des questions environnementales, sur l'hydrologie, avec des chapitres se référant au même bassin. En outre, en usant la méthode morphographique de la rivière, on a fait l'interprétation de l'ancienne carte topographique, avant de la construction et ensuite

combinée avec des observations directes du terrain. Ainsi, on a analysé les différents types d'inter-fleuves, vallées et pentes se situant de chaque côté de la rivière Olt.

Les municipalités des localités visitées ont fournis des détails importants, aussi comme les commentaires offerts par la population locale. Plus précisément, des études récentes sur l'impact de ces unités hydrotechniques ont été utiles, en termes de formes de pollution présentes dans les bassins hydrographiques. On a mis l'accent sur la perception des habitants concernant les avantages et les désavantages que ces aménagements hydro-énergétiques ont apportés. Tous ces aménagements hydro-énergétiques ont affecté spécialement l'économie et la vie de certaines localités situées prés de ces unités. Du dialogue directe avec les autorités et la population locale, on a vu que les grandes unités hydro-énergétiques ont eu et ont encore un impact considérable sur la biodiversité naturelle et le topo-climat local, avec des effets négatives aussi sur les activités agricoles et forestières.

Toutes ces dates et informations ont démontré qu'il existe un impact majeur provoqué des grands aménagements hydrotechniques sur la vie sauvage, terrestre et aquatique, mais aussi sur les agglomérations humaines des zones voisines. On a mis l'accent dans cet étude sur la recherché appliquée – on a étudié le développement du tourisme tout autour des lacs d'accumulation sans produire des impacts nouveaux sur la qualité actuelle de l'environnement, sauf ceux parus après la création des aménagements hydrotechniques.

3. L'analyse effectuée sur quelques aménagements hydrotechniques sur le corridor de la rivière Olt

La création de ces unités hydrotechniques a nécessité le déplacement artificiel du lit afin de construire les barrages, ensuite - la finalisation de ces derniers et des digues, le replacement des eaux dans le lit initial, la création des lacs d'accumulation. La dernière étape a compris la dotation technique avec des équipements pour obtenir l'énergie électrique et le transport de celle-ci.

Apres 1990, ils ont commencé la construction de micro-hydroélectriques dans le bassin hydrographique de la rivière Olt**.** Pendant les derniers 25 ans, la sélection des locations des futures micro-hydroélectriques sur les rivières moyennes et petites en Roumanie a été une priorité (Administration du Bassin Eau OLT- ABA Olt).

Dans l'étude finalisée, on a analysé les localités voisines et les lacs d'accumulation Avrig, Vișlea, Turnu, Călimănești, Drăgășani sur la rivière Olt. Pour chaque localité hébergeant un lac d'accumulation, une fiche d'analyse avec des détails a été réalisée, comprenant: la position géographique et territoriale administrative, les voies de communication pour accessibilité, dates démographiques essentielles, informations sur l'économie locale, les équipements pour infrastructure édilitaire, informations sur le climat et l'hydrographie, la flore et la faune (tableau no. 1).

Aussi, on a ajouté dans le texte du document des détails sur les zones protégées (parcs nationaux, parcs naturels, réserves et aires protégées du Réseau Natura 2000). Les équipements touristiques ont été présentés (unités pour logement, alimentation publique, recréation) et ils ont fait des propositions pour le développement du tourisme.

En addition, on a présenté en bref les monuments historiques classifiés, les musées, les collections ethnographiques et les maisons mémorielles; on a complété ceux-ci avec des informations sur les caractéristiques ethnographiques, sur des événements culturels traditionnels et artistiques modernes.

Ces données sont utiles pour soutenir le développement de plusieurs formes de tourisme dans toutes ces localités. On n'a pas omis les données sur la qualité de l'environnement et sur l'impact causé par l'existence de grands lacs d'accumulation, en particulier par la collection d'informations sur le terrain.

L'accent a été mis sur la façon dont la valeur d'une unité hydrologique peut être une base pour le développement du tourisme et de l'économie locale. Les aménagements hydrotechniques devraient

évaluer plus attentivement leurs problèmes d'impact et devenir une nouvelle opportunité pour le développement d'un tourisme de niche, appelé hydro-tourisme.

Tableau no.1: Les dates importantes pour les localités situées autour des barrages

Hydroélectrique Premier an de fonctionnement	Surface du lac	Haute. barrage	Ville/localité	Surface/ no. Habitants (2016)*	Activités économiques	Objectifs naturels et culturels**	Unités de logement (2016)*
Avrig - capacité installée de 14,2 MW, mise en service en 1989	330ha	18m	La ville Avrig à une altitude de 400 m. Inclut les villages Bradu, Săcădate, Mârşa Glâmboaca. Située à 20 km de Sibiu	S=1336 ha P=15590 habitants	micro-activités industrielles pour façonner le bois, matières premières agricoles, commerce, services publics et privés	3 aires naturelles protégées, 2 églises, 1 château nobiliaire, 1 monument d'art commémorative. Elle fait partie de la zone ethnographique Ţara Făgăraşului	8 unités de logement dont 1 hôtel et 2 pensions touristiques, 4 motels/ et 1 chalet
Viştea-capacité installée de 14,2 MW, mise en service en 1989	172ha	20m	La localité Viştea avec les villages Viştea de Jos, Viştea de Sus, Viştişoara, Olteţ et Rucăr. Distance à Sibiu - 55 km, 30 km jusqu'à Avrig	S=9014 ha P=2215 habitants	professions agricoles de base: façonner du bois, des scieries, commerce local, services publiques de santé	2 aires protégées, 3 églises, 1 auberge-monument historique. Elle fait partie de la zone ethnographique Ţara Făgăraşului	1 pension touristique „Elena" avec 24 lits.
Turnu-capacité installée de 70 MW, mise en service en 1982	154ha	44m	Ville Călimăneşti-comprend Jiblea Veche, Jiblea Nouă, Păuşa, Seaca. Station balnéaire d'intérêt national, à18 km au nord de Râmnicu Vâlcea, 19 km de Brezoi, 81 km sud de Sibiu	S= 10450 ha P=8821 habitants	les activités économiques de base - l'industrie du tourisme, commerce local, façonnage du bois, fabrication du papier, du carton et emballages, constructions, services agricoles secondaires, services publics et privés	castrum romain, 3 monastères, 1 ermitage orthodoxe, 3 églises, 1 ensemble urbain, 1 gare datant de 1899, 4 vieilles maisons, 8 croix de pierre-tous sont monuments historiques; la zone ethnographique Vâlcea	51 unités de logement, dont 9 hôtels, 14 villas, 17 pensions touristiques, 4 motels, 2 haltes touristiques, etc. avec 3359 lits
Călimăneşti-capacité installée de 38 MW, mise en service en 1981	88,2ha	28,5m					
Drăgăşani-capacité installée de 45 MW, mise en service en 1981	950 ha	32m	la municipalité Drăgăşani comprend les villages Capul Dealului, Valea Caselor, Zămeni, Zlătărei. La ville est située à 192 km de Bucharest, 72 km de Craiova, 64 km nord de Ramnicu Vâlcea	S= 4491 ha P= 20698 habitants	production de roues de voiture/ (SC Magnetto Wells), production de matières plastiques; fabrique de chaussures; le vignoble Drăgăşani, fameux en Roumanie pour la production du vin et des barils; unités de production pour légumes et fruits (SC Lefrucom SA et SC Vitivinicola). Il y a un institut de recherches viticoles.	les ruines romaines 'Russidava' (ou forteresse „Domnului de Rouă") découvertes dans le quartier Momoteşti, près de la route nationale; 4 églises dont 3 sont monuments historiques, 3 édifices civiles, monuments historiques; la maison mémorielle de l'écrivain Gib Mihăescu; le Musée du Vin au centre-ville	7 unités de logement (4 hotels, 1 motel, 2 pensions touristiques)

* l'Institut National de la Statistique (2016)
** ces objetifs culturels sont des monuments historiques et sont enregistrés sur la Liste du Patrimoine National
Source : les auteurs

Avant de faire des propositions pour le développement du tourisme, l'accent a été mis d'abord sur la connaissance des changements majeurs que les aménagements hydrographiques apportent à l'environnement. Ceci est important parce que le tourisme aussi peut avoir ses influences négatives. Dans ce contexte, on a pris en compte les exigences du développement durable et le soutien d'un tourisme à petite échelle en ce qui concerne les équipements et les capacités de fonctionnement, de la réalisation des services touristiques.

4. Les principales caractéristiques des localités avec des équipements hydrographiques sur la rivière Olt

La rivière se forme au contact entre le massif calcaire de Hăşmaşu Mare (1793 m) avec le massif Şipoş (1566 m) à une altitude de 1280 m. Dans la zone des montagnes, elle forme deux très beaux défilés - des paysages naturels uniques: Tuşnad et Turnu Roşu - Cozia. La rivière reçoit environ 270 affluents grands et petits sur toute sa surface de bassin.

Une particularité du bassin Olt est donnée par l'existence de champs d'eaux hypo- et méso-thermiques, eaux sulfureuses et en particulier les carbo-gaseuses, étant renommées à cet égard celles situées à l'est de la rivière Olt (Bicsad, Sancrăieni, Tuşnad) aussi comme les zones Bodoc, Biborţeni, Malnaş, Covasna, Vâlcele et Zizin qui concentrent des ressources naturelles importantes avec un très grand potentiel en Roumanie. La population compte environ 2.110.507 habitants du bassin dont environ 56,2% en milieu urbain et 43,8% dans les zones rurales.

Sauf Călimăneşti, la population est légèrement en baisse. La densité moyenne de la population est d'environ 88 habitants/km². Dans le bassin de la rivière Olt, il y a 42 villes dont six capitales départementales et 314 – communes/localités. En outre, le long de la vallée, les Romains ont construit une ligne de fortifications - Limes Alutanus - qui comprenait les anciens forts: Romula, Acidava, Buridava, Castrum Traiana, Alutela (Arutela). La rivière traverse les villes Miercurea Ciuc, Sfântu Gheorghe, Făgăraş, Râmnicu Vâlcea et Slatina.

Pour l'analyse effectuée, seulement 6 des unités hydroélectriques ont été prises en considération – cinq du secteur médian et une du cours inférieur du fleuve. Les agglomérations administratives sur le territoire desquelles ces barrages et lacs d'accumulation fonctionnent comprennent une municipalité, deux villes et une localité/commune. Dans la ville et station balnéo-climatérique Călimăneşti il y a deux centrales hydroélectriques (détails dans le tableau no. 1).

Au fil du temps il n'y pas eu des préoccupations particulières pour développer le tourisme en connexion avec ces lacs d'accumulation. Les barrages non plus, avec leurs équipements techniques ne sont pas devenus des attractions touristiques pour être ensuite promus à travers des visites, avec d'autres objectifs naturels et culturels ayant une plus grande attractivité.

5. Les types d'impacts environnementaux causés par les unités hydroélectriques analysées

Les unités hydroélectriques analysées font partie de la catégorie des grandes – ils ont travaillé pendant de nombreuses années pour leur mise en service. Considérant ce point de vue, la recherche sur le terrain a offert des commentaires exprimant autant d'impacts sur l'environnement.

Les facteurs naturels et anthropiques qui conditionnent la dynamique du bassin hydrographique agissent comme un système complexe. Un facteur ou un complexe de facteurs avec rôle actif d'entre ceux-ci se remarque, caractérisant l'évolution du bassin d'eau. Le degré d'artificialité des systèmes fluviaux se réfère aux principaux aspects de la location géographique, aux particularités du relief, eaux, climat et bio-pédologie qui sont spécifiques de ce secteur.

L'impact geomorphologique et erosionnel

- Des changements sur le lit de la rivière comme pente, avec un dépôt plus rapide de sédiments, érosion modifiée, la vitesse lente de l'écoulement de l'eau;

- L'apparition, en temps, dans les zones ou certains affluents se versent dans le lac, des cônes de déjection formés des alluvions qui peuvent provoquer des inondations latérales pendant les pluies torrentielles;

- La création d'alluvions sous forme des barres là où des petits affluents se versent dans le lac, fait qui conduit à la production de rejets/d'eau par-dessus les côtés/bords dans sa partie supérieure/amont d'entre eux;

- La formation des alluvions au fond des lacs – la rate rapide des alluvions s'accumulant conduit à un colmatage plus rapide des lacs;

- Les processus torrentielles se produisent aux sources de tous les bassins fluviaux/affluents de la rivière Olt, dans des zones à forte infiltration de l'eau météorique, dans les vallées étroites inférieurs, forte modélisées lors de pluies fortes;

- Les procès gravitationnels les plus courantes sont les glissements de terrain, suivis par effondrements/et glissement de terrain;

- Les déforestations des grandes fonds forestiers des montagnes Lotrului, Căpăţânei, Făgăraş conduiront à l'érosion des pentes et les pluies torrentielles causeront/un envasement rapide des lacs d'accumulation;

- La diminution de la capacité naturelle d'autoépuration des eaux de la rivière a cause de la création du lac d'accumulation.

Les changements climatiques se manifestent à travers un processus de hausse des températures pendant la saison chaude ce qui diminue le volume d'eau par évaporation dans les lacs d'accumulation. En outre, l'augmentation des périodes de sécheresse provoque le même phénomène. Les amplitudes thermiques plus élevées entre la saison chaude et froide accentuent les processus d'érosion sur les pentes, principalement vers les affluents dont les eaux sont débouchées vers les lacs d'accumulation.

L'impact climatique crée par les lacs d'accumulation

- pour le système hidroélectrique d'Olt, on a constate des elements qui represente déjà des petitis modifications du climat local;

- la différence entre le mode de chauffage et de refroidissement de l'eau face aux zones de terre frontalières conduit à ces changements microclimatiques;

- les milieux aquatiques moyens et grands des lacs d'accumulation du riviére Olt par évapotranspiration provoquent une augmentation des jours nuageux, surtout pendant le printemps et pendant l'automne;

- le printemps et l'automne, le phénomène du brouillard local se produit plus souvent, sur l'eau et dans les environs, on augmente l'humidité locale;

- la zone située entre 1-50 m, comprenant les rives et les pentes au-dessus des lacs d'accumulation, sont caractérisées par une humidité plus élevée et des dépôts plus abondants de rosée;

- pendant la saison froide, la température est plus élevée, à cause de l'eau qui cède plus lentement la chaleur stockée - phénomène particulièrement visible pendant l'automne et au début de l'hiver;

- les amplitudes thermiques entre les températures diurnes et nocturnes augmentent; ainsi se produisent les brises de lac (phénomène spécifique de la saison chaude);

- les vents ne sont plus concentrés sur le couloir de la rivière et frappent les rives opposées des lacs d'accumulation, ainsi accentuant l'érosion des berges.

Des observations météorologiques pour les lacs d'accumulations grands et moyens ne sont pas expressément faites en Roumanie. De telles études ont été menées au Canada, aux Etats-Unis et en France. Dans cette étude, les observations empiriques provenant des Agences d'Environnement et celles des habitants, qui ont été souvent plus attentifs à ces phénomènes influençant leurs activités agricoles, forestières et de pêche, ont été les plus importantes.

L'impact sur la flore et sur la faune

La construction d'une centrale hydroélectrique provoque des modifications pour l'habitat de nombreuses espèces de flore et de faune terrestres et aquatiques. Certains habitats sont fragmentés, des autres sont détruits par les inondations. Après la fermeture du chantier, certains habitats se régénèrent partiellement mais ils ne peuvent pas inclure la variété des espèces d'avant. Dans de nombreux cas, on fait des reboisements pour le renforcement des pentes, mais ceux-ci comprennent seulement 1-2 espèces d'arbres. L'impact se traduit par:

- le bétonnage des lits des rivières sur la section des lacs d'accumulation signifie destruction des paysages et des ecosystèmes;
- la disparition de la diversité des espèces herbacées, dont certaines sont endémiques; beaucoup de ces espèces ne peuvent être déplacés dans d'autres régions;
- le manque de sédiments et les basses températures ne favorisent pas la formation des sols fertiles pour la végétation naturelle et pour les cultures agricoles;
- les variations fréquentes du niveau provoquent un effet négatif supplémentaire pour la végétation aquatique et pour celle limitrophe;
- à cause d'une surélévation des niveaux qui se produisent en amont de lacs, le risque d'inondation des zones environnantes augmente et les remblais d'ici peuvent être affectés;
- la diminution de la dynamique naturelle de l'eau induit une diminution de la flore et la faune aquatiques; la dynamique est imposée par la consommation d'énergie;
- la diminution du nombre d'invertébrés existants dans le passe au niveau des couches de terre fertile et la restauration déficiente du nombre d'espèces et d'individus par espèce;
- la réduction de la stratification naturelle de l'eau dans le lac du barrage avec un impact sur les formes de vie dans l'eau;
- la vitesse de fuite plus reduite dans l'amont du barrage influence la glace formée dans l'hiver qui va se fondre plus difficilement et qui fond plus rapidement an aval, avec un impact négatif sur la faune ichtyologique.

«Les montages en cascade», tels que ceux de la rivière Olt et du Danube, ont des effets négatifs sur les écosystèmes aquatiques, parce qu'ils y ont construit plusieures centrales hydroélectriques successives le long des cours d'eau. La rivière Olt, avec toutes ces unités hydrotechniques a perdu beaucoup de ses caractéristiques et ses fonctions multiples.

La végétation existante dans des prairies riveraines, composée de plantes ligneuses et herbacées est disparue, maintenant cette zone étant occupé par des lacs d'accumulation. Les espèces d'amphibiens et de reptiles de cette zone ont beaucoup décliné, en raison des inondations des bras morts des rivières, en ruinant leurs lieux de nidification.

Impacts sur les agglomerations urbaines et ruraux

- des changements pour les régions extérieures des villages et des localités, qui ont été inclues par les plans hydrotechniques;
- la destruction des formes de sol existentes, avec élimination jusqu'au substrat de la roche; leur reprise peut durer des dizaines de décennies;
- l'apparition de la poussière qui se dépose vers les localités limitrophes, produite par l'érosion éolienne des alluvions déposées ou sur-soulevées vers le fond du lac, zone qui est soumise au séchage pendant la diminution de l'eau pendant l'accumulation;
- la réalisation des routes d'accès au chantier et des routes vers les unites hydroélectriques conduit à des changements majeurs des paysages naturels;
- la section des pentes par les routes d'accès remet en question leur stabilité et le développement des torrents sur les pentes plus abruptes;
- les actions anthropiques simples appliquées aux paysages, avec un aspect plus simple et monotone du point de vue esthétique et environnemental;
- les lacs d'accumulation empêchent un transport de substances fertiles pour l'agriculture, qui se déposent principalement dans les embouchures des rivières, dans les deltas;
- des changements pour l'utilisation des terres agricoles du voisinage des lacs d'accumulation, pour réduire l'impact de la pollution des eaux souterraines et de surface avec des produits chimiques;
- la croissance des potentiels menaces d'inondations extrêmes dues à des pluies torrentielles qui ne peuvent être gérées rapidement par le barrage et le lac d'accumulation;
- en aval du barrage, le débit d'eau est réduit et les alluvions se déposent plus rapidement, le bas du lit de la rivière monte, fait qui pourrait conduire à des inondations;
- à cause des colmatages au fond du lac, les conditions locales pour pratiquer la voile peuvent se déteriorer et la formation de dégel peut se produire;
- la réduction du nombre d'espèces précieuses de poissons, spécifiques des rivières et la réduction des activités de pêche;
- un phénomène d'élevation de la nappe phréatique avec des effets significatifs sur les agglomérations humaines et industrielles, sur les installations de collecte de l'eau et de canalisation des eaux usées et sur la faune et la flore locales;
- les surfaces grandes d'eau avec caractere stagnant, causées par les lacs d'accumulation provoquent le développement des colonies de moustiques;

De plus, l'image globale d'une unité hydrologique est celle d'un environnement aquatique très anthropique, qui devient très pollué. Les sources de pollution diffuse sont représentées en particulier par: le stockage et l'utilisation d'engrais organiques et chimiques; l'élevage des animaux de ferme; l'utilisation des pesticides pour détruire les parasites.

Conclusions

En Roumanie SC. Hidroelectrica SA et A.N. «Apele Romane/Eaux Roumannes» sont les administrateurs des barrages les plus importants du pays. En conséquence, SC Hidroelectrica et A.N. Apele Române ont l'obligation d'assurer l'exploitation dans des conditions de sûreté et la maintenance des travaux complexes en conformité avec les réglementations d'exploitation en vigueur. Chaque année, pendant les mois avril-mai, le Ministère de l'Environnement et des Changements Climatiques par l'intermède du Département pour Eaux, Forêts et Pisciculture organise dans chaque département, avec les Comités Départementaux pour Situations d'Urgence des actions pour vérifier la manière dont les gens ont nettoyé les cours d'eaux et ont fait les travaux d'entretien pour les fossés et les rigoles dans les localités, pour assurer le fonctionnement des sections de coulissement des eaux grandes.

La première unité hydroélectrique à réserve avec pompage en Roumanie, qui comprend les unités hydroélectriques sur la rivière Olt de Drăgăneşti, Ipoteşti, Frunzaru, Rusăneşti et Izbiceni appartenant à Hidroelectrica, a été mise en service au début de mai 2014. Le bassin Olt, par le potentiel hydroélectrique important et la nécessité pour les services publics d'approvisionnement en eau, a subi des interventions humaines intensifiées, qui ont influencé beaucoup les érosions et les accumulations de la rivière. En ensemble, on considère que l'influence des installations hydrotechniques a été plus positive que négative, parce que les inondations ont été réduites et des sources d'eau pour l'irrigation ont été créées, mais la perte de biodiversité est bien négligée.

Mais les unités hydroélectriques apportent des bénéfices économiques régionaux réduits et isolés, parce qu'elles ont un cycle de durée de vie limitée. Quand même, le soutient des investissements dans la croissance mondiale de l'efficacité énergétique et dans l'application des mesures pour économiser l'énergie stimule des multiples industries et génère des effets économiques plus importants à long terme, toutefois sans détruire la nature.

La difficulté des procédures pour louer les terrains entourant les lacs d'accumulation, l'accord difficile des documents environnementaux diminue beaucoup l'utilisation de ces unités hydroélectriques dans le tourisme, en Roumanie. Très rarement, les zones près des anciens sites de travail impliquant des infrastructures urbaines, des cabanes et des villas ont été exploitées ensuite pour le tourisme;

Sur les pentes des montagnes et des collines, localisées près des lacs d'accumulation du secteur médian de l'Olt, il y a une zone avec un microclimat favorable aux activités touristiques et climatériques, étendue verticalement, depuis la surface du lac jusqu'à une altitude d'environ 750-800m. L'activité touristique la plus fréquente est la pêche sportive, seulement avec permis de pêche.

Meme si l'hydro-tourisme a des chances réales de développement, SC Hidroelectrica SA et AN Apele Române sont moins intéressés de ce domaine. La modernisation des villes adjacentes en élargissant et en créant un réseau de services publics pourra ensuite conduire au développement de la région en renforçant le potentiel touristique naturel et anthropique.

Contributions des auteurs: Tous les auteurs ont une contribution égale à la préparation de cet article scientifique.

Bibliographie

Brezeanu, G. et Gruiţă, S.A. (2002), Limnologie generală, Editura H.G.A., Bucureşti.

Diaconu, C. et Şerban, P. (1994), Sinteze şi regionalizări hidrologice, Editura Tehnică, Bucureşti.

Gâştescu, P., Driga, B. et Sandu, M. (2003), Lacurile de baraj antropic – între necesitate şi modificări ale mediului, *Riscuri şi Catastrofe*, vol. II, Editura Casa Cărţii de Ştiinţă, Cluj-Napoca, p. 160-173.

Horvath, C. (2008), Analiza SWOT a efectelor lacurilor de acumulare asupra mediului. Model: amenajarea „Dragan-Iad" din bazinul superior al Crisului Repede, *Geographia Napocensis*, Anul II, Nr. 2, Cluj.

Hutte, A. (1996), Manualul inginerului - Fundamente, Editura Tehnică, Bucureşti.

Ichim, I. et Rădoane, M. (1986), Efectele barajelor în dinamica reliefului, Editura Academiei Române.

Ionescu, Ş. (2001), Impactul amenajărilor hidrotehnice asupra mediului, Editura H.G.A., Bucureşti.

Pop, P. Gr. (1996), România - geografie hidroenergetică, Editura Presa Universitară Clujeană, Cluj-Napoca.

Rădoane, M. et Rădoane, N. (2003), Impactul construcţiilor hidrotehnice asupra dinamicii reliefului, *Riscuri şi Catastrofe*, vol. II, Editor Sorocovschi, Editura Casa Cărţii de Ştiinţă, Cluj-Napoca, p. 174-185.

Savin, C. (2001), Hidrologia Râurilor, Editura Reprograf, Craiova.

Touchart, L. (2002), Limnologie physique et dynamique. Une geographie des lacs et des etangs. Editure De L'Harmattan, Paris, France.

Administration du Bassin Eau OLT-ABA Olt/Le plan pour la prevention, protection, diminuation des effects des innondations dansl le bassin hydrographique, proiect POS Mediu, pdf.

Anuarele hidrologice, A.N. Apele Române, 1947 – 2009.

Atlasul cadastrului apelor din România, 1992.

Râurile României, Monografie hidrologică INMH Bucureşti, 1971.

ROSPA0106 - La valle d'Olt Inferieur, entre le Podisul Getic et Câmpia Română, jusqu' au le debouche dans le fleuve du Danbue.

Planul National de Amenajare a Bazinelor Hidrografice din Romania, Administratia Nationala "Apele Romane"/ Le Plan national d'aménagement les bassins fluviaux de la Roumanie, 2013.

http://www.notre-planete.info/ecologie/energie/hydroelectricite.php.

Investigating the Dependencies of Business Potential Of University Students

Iveta Kmecová, Ing., PhD., Department of Management, The Institute of Technology and Business, České Budějovice, Czech Republic, E-mail address: kmecova@mail.vstecb.cz
Dana Smetanová, RNDr., Ph.D., Department of Informatics and Natural Sciences, The Institute of Technology and Business, České Budějovice, Czech Republic, e-mail address: smetanova@mail.vstecb.cz

Abstract

The paper is focused on the issue of business potential. The objective is to point out the need of investigating business talent and business potential, which are prerequisites for successful business activities. In the article there is presented results of researching statistical independencies between selected questions of the questionnaire investigation. The practical part of the paper examines the data concerning the business potencial of university students which are evaluated by means of the independence test.

Keywords: Business potencial, entrepreneurship, university students.

Introduction

Currently, educating young people to be more business savvy is becoming increasingly more popular. Raising young people to be more business savvy is without a doubt a current topic that many people research not only from the scientific-research aspect but from the aspect of gradually increasing unemployment as well, which leads to schools more often practically implementing the concept (Kmecová 2016). For example Ostaeyen's (2014) contribution caught our attention. The author focuses on analyzing business potential. The study by Zupan et al. (2015) is aimed at the issue of securing business potential of students. We also mention the expert scientific study (Caha 2011) in which the author stresses the need for business education, and the development of competences needed for practice. The studies (Chen 2011; Wenhua, Xia 2012) are beneficial for the reader as well focusing on business talents.

Due to the increasing level of unemployment in the member states of the European Union, significant attention in this area is being paid to business education. Changes aimed at developing business skills are being implemented in the education process, and in education and study programs. Although gained knowledge does not guarantee success in business, they are prerequisite for finding the most fitting ways to success in business and also help with dealing with potential issues that can occur in business. Educational institutions need to realize the need of implementing subjects for furthering business competences and the necessity of cooperating with the business community. Novák et al. (2016) state that the quality of education is currently a pressing issue that influences the labor market. This does not only apply to the Region of South Bohemia (Novák et al. 2016) but to the entire European Union as well.

The skills associated with successful businesses should start be taught in elementary schools. The realization should transpire that business competences are important not only in business but in personal life and practice as well (Marešová et al. 2014). Business education should be the target of interest of the entire education system (Kmecová 2015). Another beneficial study (Kulakovskyi, Kulakovska 2016) presents case studies of solving problematic situations that hinder the

development of business. The study claims that small and medium-sized enterprises (SMEs) play a significant role in developing business. They are a suitable environment for business. The authors of Vochozka et al. (2016) state that the rapidly developing small and medium-sized enterprises contribute to creating new work opportunities; they are effective, which positively influences their competitiveness. In SMEs, a number of innovative activities takes place, which contributes to economic development (Vokoun 2015). There is no doubt that small and medium-sized enterprises positively affect (Kmecová 2015) regions. That is why it is important to realize that enough attention needs to be aimed at business education in primary, secondary, and tertiary education. Jayawarna et al. present an interesting opinion according to which the development of human capital starts in childhood and is influenced by the ability of parents to support the potential of their children by directly supporting their education and indirect transfers to human capital that further the abilities to focus on a career in business in the future.

The effectiveness of a code of ethics as a management tool for an organization´s external and internal relations is, however, not a matter of course. It is based on certain assumptions related to its content and the method behind its creation, use, application and enforcement. This not only includes its correct orientation and clear and unambiguous formulations, but also the tools by which the principles of the code are enforced within an organization (see Caha and Urban, 2017).

For our entry, we chose current topics such as investigating business potential and the dependencies of selected questions of the questionnaire in the area of business potential

Description of the Research Sample

The respondents of the questionnaire survey were randomly selected students of the Institute of Technology And Business and the University of South Bohemia in České Budějovice. They were full-time and part-time Bachelor's students studying Mechanical Engineering, Civil Engineering, Transport and Transportation Technologies (VŠTE – 54 individuals), Business Administration (VŠTE – 82 individuals), and Management and Business Economics (JČU – 38 individuals).

There were in total 174 respondents of different ages (both women and men). Due to the number of students, we do not divide them into any type of group (women – men, students of individual study fields, full-time or part-time students, etc.).

According to the principles of educational research (see Gavora 2010, Chráska 2007), an anonymous questionnaire (of own construction) featuring seven questions about the business potential of the respondents was chosen as the research method. The research was conducted anonymously in order to secure the stated values. The full text of the questionnaire is available from the authors. The research continues to secure a larger and more diverse statistical sample.

The entry presents partial results. The authors of the entry focused only on three of the questions and their mutual independencies.

Objective

The objective of the research is to investigate the statistical independence between the following questions of the questionnaire survey:

A) Was the change of your daily routine a strong motivation for founding a business?

B) Would you be willing if needed to work for as long as necessary without getting enough sleep?

C) Would you be willing to take on a loan to start your own business?

All of the questions were only allowed to be answered with YES or NO.

We expected there to be statistical independence between pairs of these questions. Based on the research questions, three hypotheses were established:

H_{AB}*: The change of routine as strong motivation for starting your own business is in correlation with the willingness to work without sufficient sleep if needed. (*We expect statistical dependence between questions A) and B).)

H_{AC}*: If changing the daily routine is a strong motivation for starting a business, we expect the willingness to take on a loan to start the business to be present.* (We reject statistical independence between questions A) and C).)

H_{BC}*: Willingness to take on a loan to start the business is in correlation with the willingness to work without sufficient sleep.* (We reject statistical independence between questions B) and C).)

If our hypotheses are right will be assessed in the last chapter.

Methodology

To evaluate the questionnaire survey, the chi-square test of independence was used. This test helps investigating the independence of two statistical categorical variables.

The empirically acquired number n_{ij} in individual groups is noted in a contingency table. The featured test compares these numbers to calculated theoretical numbers m_{ij}, meaning numbers that could be expect in the case of the independence of the statistical variables. The expected theoretical numbers are calculated in the equation

$$m_{ij} = \frac{n_{i*} \cdot n_{*j}}{n},$$

where n_{i*} a $n_{*j}$are marginal numbers (meaning sums of the numbers in the rows or columns) and are noted in a table that has the same dimensions as the contingency table, n is the number of respondents or answers.

The value of the tested criteria is given by the relation

$$\chi^2 = \sum_{\substack{i \le r, \\ j \le s}} \frac{\left(n_{ij} - m_{ij}\right)^2}{m_{ij}},$$

where *r, s* are the number of rows or columns of the table. We reject the hypothesis about the independence of the valuables every time when the χ^2 value of the tested criteria is higher than the critical value of distribution with a number of degrees of freedom $f = (r-1)(s-1)$. We chose the 0.05 level of the test of significant; it is one of the most commonly used levels. The critical value $\chi^2_{0.95}(f)$ can be found in statistical tables and in Chráska (2007) and Gaur and Gaur (2009).

Sufficiently high expected numbers are prerequisite for using the test. For a four-field 2x2 table, it is at least 5. For larger tables, it is customary to require at least 80 percent of 5 (or 2) and higher numbers.

In the case that the phenomenon rejects independence, it is then possible to determine its level. For more than 40 respondents, we can use the Cramer coefficient

$$V = \sqrt{\frac{\chi^2}{n \cdot (min(r,s)-1)}},$$

where $0 \leq V \leq 1$; *0* is the weakest dependency, and *1* is the strongest dependence.

In our concrete case, there will always be four-field tables ($r = s = 2$) with the degree of freedom 1, n = 174, the level of significance 0.05, and the critical value $\chi^2_{0.95}(1) = 3.841$. We always test the validity of the hypothesis *H_0: Independence of statistical variables.*

Results

1) The verification of the hypothesis H_{AB} using the chi-square test of independence will be carried out first.

Table 1: Actual numbers of the questions A), B).

A/B	B) yes	B) no	n_{*j}
A) yes	85	33	**118**
A) no	28	28	**56**
n_{i*}	**113**	**61**	**174**

Table 2: Expected number of the questions A), B).

A/B	B) yes	B) no
A) yes	76.63	41.37
A) no	36.37	19.63

The value of the tested criteria is $\chi^2 = 8.103$ and is higher than the critical value $\chi^2_{0.95}(1) = 3.841$. There independence between questions A) and B) is rejected. The hypothesis H_{AB} is accetable.

The level of dependence is calculated using the Cramer coefficient $V = 0.216$. The dependence is low.

2) Actual and theoretical numbers for verifying the hypothesis H_{AC} using the chi-square test of independence are featured in the following tables.

Table 3: Actual numbers for questions A), C).

A/C	C) yes	C) no	n_{*j}
A) yes	75	43	**118**
A) no	30	26	**56**
n_{i*}	**105**	**69**	**174**

Table 4: Expected numbers for questions A), C).

A/C	C) yes	C) no
A) yes	71.21	46.79
A) no	33.79	22.21

The value of the tested criteria is $\chi^2 = 1.581$ and is lower than the critical value $\chi^2_{0.95}(1) = 3.841$. There is acceptable independence between questions A) and C). The hypothesis H_{AC} is rejected.

3) To verify the hypothesis H_{BC} using the chi-square test of independence, we used the following number tables.

Table 5: Actual numbers for the questions B), C).

B/C	C) yes	C) no	n_{*j}
B) yes	76	37	**113**
B) no	29	32	**61**
n_{i*}	**105**	**69**	**174**

Table 6: Expected numbers for the questions B), C).

B/C	C) yes	C) no
B) yes	68.19	44.81
B) no	36.81	24.19

The value of the tested criteria is $\chi^2 = 6.434$ and is higher than the critical value $\chi^2_{0.95}(1) = 3.841$. There is dependence between questions B) and C). The hypothesis H_{BC} is acceptable.

The level of dependence is calculated using the Cramer coefficient $V = 0.192$. The dependence is low.

Conclusion

The skills connected to business can be taught and teaching them can start as soon as elementary school (Marešová et al. 2014). Educating not only young people to be more business savvy is a very current topic. Business competences are crucial for conducting business but also for personal life and practice. That is why it is important to analyze existing business potential and support its development in young people but also in employed and unemployed individuals.

This entry is aimed at analyzing a part of the results that were collected during an anonymous questionnaire survey among the students of two universities (VŠTE and JČU) in České Budějovice. The questionnaire focused on investigating business potential.

In this paper there are investigated the dependencies of three questions of the questionnaire. It was accepted that there is a dependence between questions A) and B). The hypothesis H_{AB} is acceptable. There is a low level of dependence between changing the daily routine as a strong motive for starting a business and the willingness to work without sufficient sleep.

There is independence between questions A) and C). The hypothesis H_{AC} is rejected. There is no connection between the motivation to start a business based on the change of the daily routine and the willingness to take on a loan to start a business.

There is a low level of dependence between questions B) and C). The hypothesis H_{BC} is acceptable. The willingness to take on a loan to start a business is in connection with the willingness to work without sufficient sleep.

References

Caha, Z. (2017) Podnikové vzdělávání v České republice. *Mladá veda (Young Science)*, Prešov, Slovensko: Vydavatelstvo UNIVERSUM, 2017, roč. 5, č. 1, s. 10 -18. ISSN 1339 -3189.

Caha, Z., Urban, J. (2017) A Code of Ethics as an Organizational Management Tool and its Use in the Czech Republic. Lüdenscheid, Germany: RAM-Verlag. p. 112 ISBN 978-3-942303-50-7

Chráska, M. (2007) Methods of Pedagogical Research: Fundamentals of Quantitative Research (Metody pedagogického výzkumu: základy kvantitativního výzkumu). Prague. Grada. ISBN 978-80-247-1369-4.

Gaur, A.S, Gaur, S.S. (2009) Statistical methods for practise and research: A guide to data analysis usin SPSS, Sage Publications India PVT LTD, ISBN: 9788132101000

Gavora, P. (2010) Introduction to the Pedagogical Research (Úvod do pedagogického výzkumu). Brno. Paido. ISBN 978-80-7315-185-0.

Chen, Y. (2011) A Study of Innovative Entrepreneurial Talents of Business and Management: Knowledge, Ability and Quality Structure. *Higher Education Studies*. Roč. 1, č. 1. ISSN 1925-475X.

Jayawarna, D. et al. (2014) Entrepreneurial potential: The role of human and cultural capitals. *International Small Business Journal*. Vol. 32, No. 8, pp. 918-943. ISSN 0266-2426.

Kmecová, I. (2015) Business and intergration of entrepreneurship education in the educational process. In *Innovative Economic Symposium 2015*. 1 vyd. České Budějovice. Vysoká škola technická a ekonomická v Českých Budějovicích, 2015, s. 1-9, 10 s. ISSN 2464-6369.

Kmecová, I. (2016) Survey analysis of business potencial and aptitude for business. *Forum Scientiae Oeconomia.* Roč. 4, č. 3, s. 151-162. ISSN 2300-5947.

Kulakovskyi, T., Kulakovska, O. (2016) Entrepreneurial intentions as a precondition for entrepreneurial aktivity. *Science and Ecucation*, 2016 (5), 194-200. ISSN 2311-8466.

Malach, J. (2008) Výchova k podnikavosti a vysoké školy. *Aula časopis pro vysokoškolskou a vědní politiku*, Vol. 16, 02/2008. Praha. ISSN 1210-6658.

Marešová, H., Rudorf, J., Hladík, T. (2014). Výchova k podnikavosti. 1.vyd. Olomouc: Univerzita Palackého v Olomouci, 2014. ISBN 978-80-244-4436-9.

Ostaeyen, J.V. (2014). Analysis of the business potential of product-service systems for investment goods. Belgium. Dissertation. Leuven Arenberg Doctoral School. Faculty of Engineering Science. ISBN 978-94-6018-805-3.

Novák, V., Vokoun, M., Stellner, F., Vochozka, M. (2016). Institutional analysis of the contemporary regional labour market in the Czech Republic. *E a M: Ekonomie.* 19 (3), 4-19. ISSN 12123609.

Vokoun, M. (2015) Innovation activities and growth of SMEs- the case of the Czech manufacturing industry. *Innovative Economic Symposium 2015*. 1 vyd. České Budějovice. Vysoká škola technická a ekonomická v Českých Budějovicích, 2015, 17-32, 16 s. ISSN 2464-6369.

Vochozka, M., Váchal, J., Straková, J. (2016) Malé a střední podniky. In Jihočeský kraj v globální ekonomice. 1 vydání. Praha: SETOUTBOOKS.CZ, 2016. 40-55, ISBN 978-80-86277-82-0.

Wenhua, W., Xia, D. (2012) Research of Accounting Talent Cultivation Model Based on the Strategic Alliance of Industry, University and Research Institute, Asian Social Science Vol. 8, No. 8; July 2012

Zupan, N., Kaše, R., Raškovič, M., Yao, K., Wang, C. (2015). Getting ready for the young generation to join the workforce: A comparative analysis of the work values of Chinese and Slovenian business sudents. *Journal of East European Management Studies*. Vol. 20, 2, 174-201. ISSN 0949-6181.

Changes in the Energy Balance in the Context of Sources of Risk for Polish Mining Production

Izabela Jonek-Kowalska, Silesian University of Technology, Faculty of Organization and Management, Zabrze, Poland, izabela.jonek-kowalska@polsl.pl

Abstract:

Maintaining the energy security is one of the key economic priorities, in which long-term monitoring and shaping of the energy structure takes a leading role. Such monitoring should be accompanied by forecasting the energy needs of the economy and determining the sources of their coverage. Bearing in mind the above circumstances, the main aim of this article is to carry out a long-term analysis of the Poland's energy balance in the context of current and future conditions of the European climate policy and the sources of risk generated by changes observed for Polish mining production. The research period covers the years 1965-2015, and the research was conducted using basic statistical risk measures, including structural ratios, trend analyzes, standard deviations and coefficients of variation, additionally using a risk checklist based on literature studies on European legal and economic conditions in the field of energy and environmental protection policy. Undoubtedly, it can be stated on the basis of the conducted research that the changes in the Poland's energy balance, caused largely by the European Union's anti-coal policy, pose a serious threat to hard coal extraction and consumption, however, due to their evolutionary and slow nature, they are not a source of risk that would contribute to immediate collapse of demand and complete liquidation of mining production.

Keywords: energy balance, mining production, energy risk, hard coal mining industry in Poland.

Introduction

The determinants of much diversified character play a vital role in planning the coverage of electricity demand. In the process of their identification it is helpful to analyze historical trends in terms of sources of covering the current demand and changes taking place in the energy balance, as well as in-depth studies on the current and planned implementation of provisions of the regional and local energy policy. At the same time, it is worth emphasizing that these changes are usually very slow due to the time-consuming and capital-intensive nature of the modernization of energy infrastructure, therefore the process of adapting the energy to the new energy and environmental requirements usually covers from a dozen or so to a few dozen years (Turek, 2015). Consequently, the effective and efficient planning of the energy balance structure should take into consideration the current trends in electricity demand and the structure of coverage of this demand, the type and size of the energy infrastructure, access to specific energy carriers and costs of their acquisition, as well as the legal and environmental conditions (Michlak & Nawrocki, 2015).

In addition to identifying and considering the above mentioned conditions, their prioritization in the planning process is also important, which will decide the direction of national energy development for many years to come. On the one hand, we have a choice of priority of the energy security as regards which focus should be on the available national energy sources, regardless of their economy or adverse environmental effect, and, on the other hand, the environmental priority, in which abandoning own energy carriers in favor of imported raw materials less harmful to the environment is possible. The priority in the process of shaping the energy policy may also be minimizing the costs of electricity production, which frequently moves the environmental and energy security objectives into the background (Bluszcz, 2016). For this reason, balancing the objectives of the energy policy in practice is a very difficult task to implement and depends not only on economic decisions (Kowalska-Styczeń & Sznajd-Weron, 2016), but also on a number of objective circumstances, such as the availability and sufficiency of energy sources, the price of energy carriers or the provisions of law. It is also worth mentioning that social factors, including the perception and the level of social acceptance for individual energy carriers, play a major role in shaping the energy policy, which often

render impossible, in part or in whole, the realization of the assumptions of national energy strategies (Spałek, 2014).
In the Polish economy, hard coal has been the dominant energy carrier for many years. Poland also remains one of the world's ten largest hard coal producers (Burchart-Korol et al., 2016). Nonetheless, the Polish hard coal mining industry has been struggling with serious financial problems since the beginning of economic transformation (Sierpińska & Bąk, 2013; Olkuski, 2013) and is still undergoing a profound repair restructuring (Jonek-Kowalska, 2015; Karbownik & Bijańska, 2000), particularly intensive in the last five years (Bąk, 2007). One of the main causes of the systematic financial collapse and the liquidation of mining production in Poland is the European Union's anti-coal policy forcing the diversification of energy sources and a significant increase in the share of renewable raw materials in the national energy balances. Therefore, the author of this article attempts to assess the validity of such a thesis, considering initially the changes in the energy balance as one of the many sources of risk for the Polish mining production (Bijańska & Wodarski, 2014; Brodny et al., 2017).

Bearing in mind the above arguments, the main aim of this article is to carry out a long-term analysis of the Poland's energy balance in the context of current and future conditions of the European climate policy and the sources of risk generated by the changes observed for Polish mining production. In order to accomplish this task, the following were conducted during the research: the identification and analysis of changes in the Poland's energy balance in 1965-2015, the assessment of risk related to the change of the share of individual energy carriers in the energy balance and the assessment of the financial results of the Polish hard coal mining industry in the context of identified changes in the energy balance.

Methodology

The research part of this article is divided into two subsections, for which the research methodology was individually adjusted. The first one concerns the long-term analysis of changes in the energy balance and uses statistical data on the consumption of individual energy carriers in Poland in 1965-2015. This analysis refers to renewable and non-renewable resources using the trend functions adjusted to data and using the medium-term rate of changes to assess the intensity of research processes (1).

$$T_n = \left(i_g - 1\right) \times 100\% \tag{1}$$

where:

$$i_g = \sqrt[n-1]{in_{/n-1} \times i_{n-1/n-2} \times i_{2/1}} \tag{2}$$

i – chain dynamics index,
n – the number of observations.

The second subsection refers to the risk identification and assessment that was carried out using typical measures of variation in the form of the standard deviation (3) and the coefficient of variation (4):

$$s = \sqrt{\frac{\sum_{i=1}^{n}(x - \bar{x})^2}{n - 1}} \tag{3}$$

where:

$\bar{x}$ – the arithmetic mean,
x – another variable in the sample,
n – the number of observations in the sample.

$$v = \frac{s}{\bar{x}} \times 100\% \tag{4}$$

where:

$\bar{x}$ – the arithmetic mean,

s – the standard deviation.

In addition, the Pearson correlation coefficient for assessing the linear correlation strength (5) between the analyzed variables was used to assess the relations between the electricity consumption and the hard coal share in the Poland's energy balance and the results of the Polish hard coal mining industry.

$$r_{xy} = \frac{cov(x,y)}{s_x \times s_y} \tag{5}$$

where:

$cov\ (x,y)$– the covariance of x and y variables,

s_x, s_y – standard deviations of variables x and y.

In addition to the quantitative risk assessment carried out using the above parameters in the context of the Poland's energy balance, a descriptive analysis of the sources of risk in the Polish hard coal mining industry was presented in the research section, which was conducted using a risk checklist containing the most important factors affecting the functioning of the analyzed sector.

Research results

Structure of the energy balance in Poland and its changes

In the structure of the Polish energy balance, hard coal has been dominating for many years, which is largely due to the availability and abundance of this raw material that is located in the Upper Silesian and Lublin Coal Basins (Chart 1). Nevertheless, over the past fifty years of analysis, the share of this raw material in primary energy consumption has systematically decreased from 88% in 1965 to 52% in 2015. Coal is being replaced by natural gas and crude oil. The share of natural gas is rising in the analyzed period from 3% to almost 16%, and the share of crude oil is rising from 9% to over 26%. Thus, the diversification of energy sources is observed primarily as regards non-renewable carriers. The share of renewable energy sources in the Polish energy balance is growing very slowly and, by 1997, it did not exceed 1%. Among these sources, Poland uses mainly biomass, wind energy and hydropower. As a result, despite the changes noted, coal has remained a key energy resource in the Polish economy for many years.

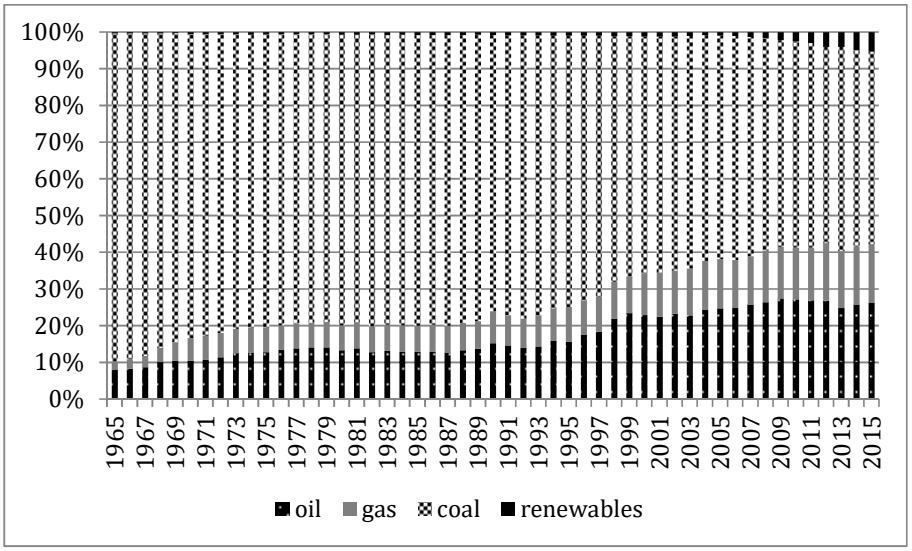


Chart 1. Structure of the energy balance in Poland in 1965-2015 [%]

Source: own work on the basis of data of BP Statistical Review of World Energy 2016.

The reduction in the share of hard coal in the Polish energy balance is strongly correlated with the changes in total primary energy consumption (Chart 2), which was mainly accompanied by a decrease in hard coal consumption as the most important energy carrier. This is clearly confirmed by trend functions (quite well matched to actual data) illustrating the changes in energy and hard coal consumption in 1965-2015, in the form of a parabola of very similar values of polynomial coefficients. The greatest energy and hard coal consumption was therefore in 1975-1989, when the Polish economy was developing mainly due to energy-intensive heavy industry. Since 1990, after the economic and systemic transformation, the consumption of primary energy and hard coal has been steadily decreasing, as a result of changes in the structure of the Polish economy, including the liquidation of a significant part of heavy industry and the shift of economic activity towards less energy-intensive industries as well as services and trade. The reduction in electricity consumption also increases the efficiency and efficacy of power plants and combined heating plants, achieved through the modernization and replacement of technical infrastructure into a more modern and innovative one (Kmieciak et al., 2012). The above conclusions also clearly confirm the reduction of the energy-intensity of the Gross Domestic Product (GDP), which shows the change in the manner of Poland's economic development from extensive to intensive. These circumstances were not and are not conducive to the maintenance or growth of mining production, which was even more evident in 2001-2015, when electricity consumption was characterized by a slow upward trend, despite which the hard coal consumption continued to decline. During that period, hard coal was systematically replaced by crude oil and natural gas. It should be noted here that, despite less harmful impact on the environment, these raw materials – like hard coal – are not renewable. It is therefore difficult to say that a significant reduction in both consumption and hard coal share in the Poland's energy balance is the result of only the European Union's anti-coal policy.

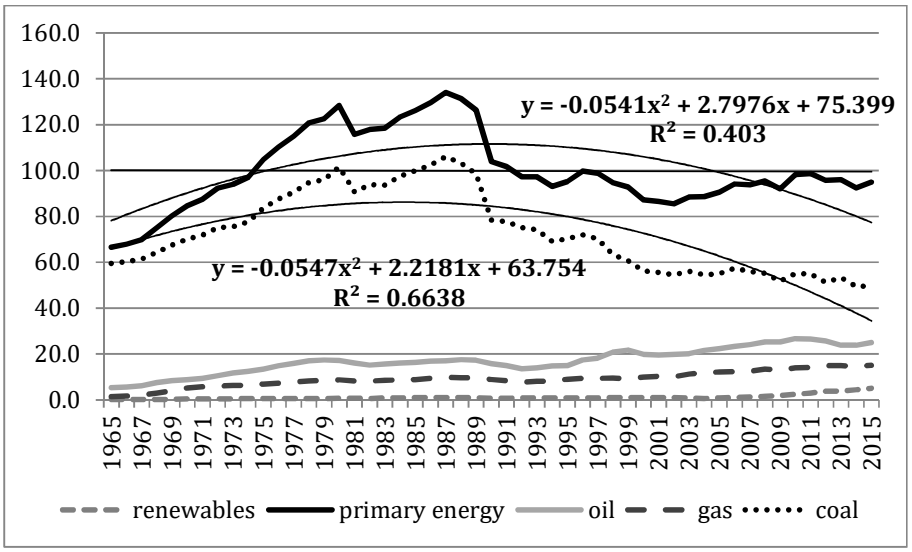


Chart 2. Consumption of primary energy and non-renewable energy sources in Poland in 1965-2015 [Mtoe]

Source: own work on the basis of data of BP Statistical Review of World Energy 2016.

The above argument also supports the very slow increase in the use of renewable resources (Chart 3) and their share in the Polish energy balance, which by 2003, in terms of value, did not exceed 1 Mtoe (compared to the total consumption of 88.5 Mtoe) and, in percentage terms, was not more than 1%. It is only since 2005 that a significant increase in the use of renewable energy sources has been observed, whereby in 2015 their share in the structure of meeting the energy demand was slightly more than 5%. Whereby, since 1965, the Polish economy has been using only hydropower and, to a very limited extent, wind energy from renewable resources. The increase in the latter has been observed since 2003, as has been the increase in the use of biomass as a new renewable energy source.

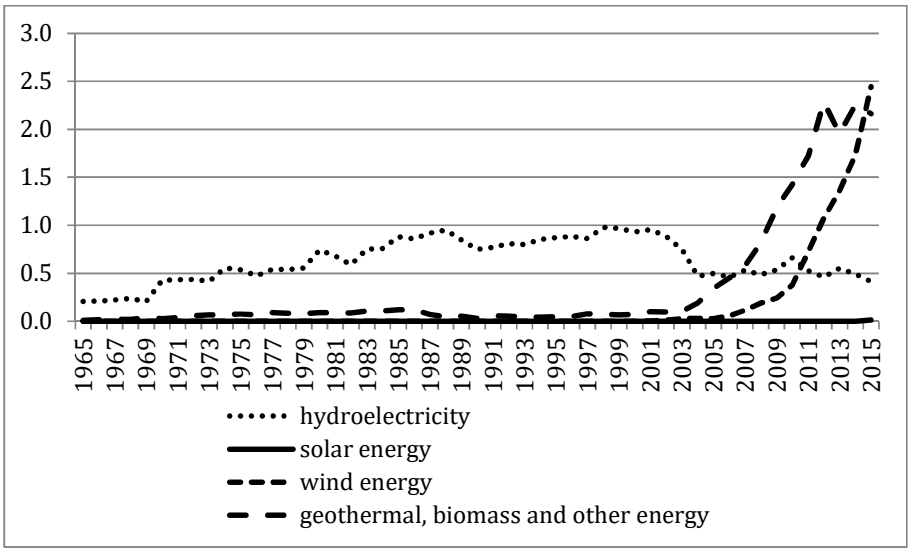


Chart 3. Consumption of renewable energy sources in Poland in 1965-2015 [Mtoe]
Source: own work on the basis of data of BP Statistical Review of World Energy 2016.

At this point, it is worth mentioning the objective limitations related to the possibilities of using renewable energy sources in Poland. Thus, the use of water energy would require significant investment outlays and long-term development of technical infrastructure. The development of hydropower sector is not an easy and short-term task. Poland – due to geographical location and the resulting climatic conditions – cannot also use the potential of solar energy. It is also not rich in geothermal energy sources. In connection with the above, by 2017, primarily wind energy and energy from biomass combustion have been used from available renewable energy sources. In this respect, Poland has favorable geographic, climatic, and agricultural conditions, in the form of possibilities of growing energy crops, including willow, straw, poplar, and miscanthus. In addition, the wind energy development was supported by the investment subsidy system, which unfortunately was seriously reduced in 2016. The value of the so-called green certificates used to subsidize the production of wind energy, was significantly reduced. New more stringent regulations on wind power plants have been introduced, which state that such a facility should be located at a distance of at least ten times the height of the wind turbine (i.e. about 1.5-2 km) from the buildings, which significantly hinders and increases the development costs of infrastructure. In addition, since 2017, wind farms will not be able to sell energy at a regulated price that will adversely affect their financial results and the development of the entire industry, as more than half of wind power companies suffered financial losses in 2016.

Energy balance and sources of risk for Polish mining production

In the light of the above, it can be stated that the changes in the Poland's energy balance, including the decrease in the use and share of hard coal in total electricity production, pose a threat for the possibility of selling this raw material by Polish mining enterprises. Limiting the possibilities of selling negatively affects the revenue side of the financial result and it is a source of market risk for entities operating in the Polish coal mining industry. Nevertheless, the changes observed are evolutionary in nature and allow for the adaptation to changing market conditions. This is confirmed by the risk intensity assessment in the form of changes in the Poland's energy balance, the results of which are presented in Table 1.

Table 1. Measures of risk of mining production in Poland

Specification	Arithmetic mean	Standard deviation	Coefficient of variation
Primary energy [Mtoe]	99.9	16.7	17%
Crude oil [Mtoe]	17.1	5.6	33%
Natural gas [Mtoe]	9.1	3.3	37%
Coal [Mtoe]	72.6	17.4	24%
Hydropower [Mtoe]	0.6	0.2	36%
Solar energy [Mtoe]	0.0003	0.0018	612%
Wind energy [Mtoe]	0.2	0.5	288%
Geothermal energy, biomass, and other renewable resources [Mtoe]	0.4	0.6	181%

Source: own work.

According to the data presented in Table 1, the electricity consumption in Poland in the over 50-year analysis period was characterized by low variation expressed in the form of a coefficient of variation of 17%. As regards raw materials with the highest share in the energy balance, it was crude oil and natural gas, whose share and use increased steadily, that were characterized by the average level of risk. The variability of hard coal consumption can also be found average. Renewable resources – except for hydropower – are characterized by high variability in time, which is the result of the low value of their use, increasing several times in recent years of the conducted analysis. It can therefore be stated that the intensity of risk related to pushing hard coal out of the energy balance is at an average level and does not constitute a sudden and violent threat to the functioning of mining enterprises in Poland. This is also confirmed by the annual average rate of change presented in Table 2, which is about 3-5% per year for non-renewable energy sources substituting coal . In turn, the annual average hard coal consumption itself decreases only by 0.36%.

Table 2. Average annual rate of changes in the Poland's energy balance in 1965-2015

Specification	Average annual rate of changes [%]
Primary energy	0.71%
Crude oil	3.12%
Natural gas	4.76%
Coal	-0.36%
Hydropower	1.39%
Solar energy	310.88%
Wind energy	61.20%
Geothermal energy, biomass, and other renewable resources	11.17%

Source: own work.

Given that the risk is analyzed and assessed in the context of deviations from the assumed financial result, it is worth looking closer at the results of the Polish hard coal mining industry (Chart 3). Hence, the Polish hard coal mining industry was profitable only in the years 2003-2005 and 2010-2012. In other periods, it was a loss-making industry. Taking into account the systematic downward trend in hard coal consumption observed since the beginning of the 1990s, it is hard to see the reasons for the improvement of the financial result in increasing the volume of sales. Thus, in 2003-2005, positive financial results followed from effective restructuring and reduction of mining production costs (Gumiński et al., 2008) and, in 2010-2012, the increase in revenues corresponded to an increase in the price of hard coal on the world and domestic markets. It is worth pointing out that Polish hard coal is characterized by low price competitiveness resulting – especially in recent years – from high and ever increasing unit production costs, which, together with the deteriorating quality, are the main cause of problems with the sale of this raw material.

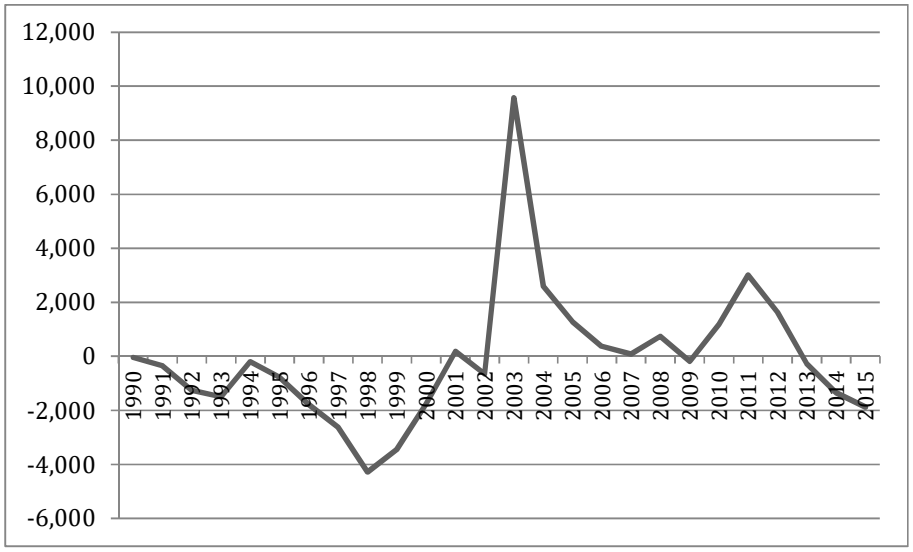


Chart 3. Financial result of the Polish hard coal mining industry in 1990-2015[1] [in PLN mln]
Source: own work on the basis of data from the Ministry of Energy.

The Pearson correlation coefficients were calculated to complete the analysis and assessment of the relations between the financial results of the Polish hard coal mining industry and the consumption of primary energy and its individual carriers. The calculation results are shown in Table 3.

Table 3. Pearson correlation coefficients for the relations between the financial results of the Polish hard coal mining industry and the consumption of primary energy and its carriers

Specification	Correlation coefficient
financial results – primary energy	-0.2183
financial results – crude oil	0.2229
financial results – natural gas	0.3056
financial results – renewable resources	-0.0104

Source: own work.

According to the results in Table 3, there are weak positive relations between financial results and the crude oil and gas consumption, but they are statistically insignificant, as are the two other negative relations between the results and the consumption of primary energy and renewable resources. It can therefore be concluded that no significant and linear relations between the results of mining production and the level of consumption of primary energy and its carriers have been observed.

Checklist of significant sources of risk in the Polish hard coal mining industry

In the situation of evolutionary changes in the Poland's energy balance, it is hard to recognize them as the main cause of the crisis in the mining industry and the decommissioning of a large part of unprofitable hard coal mines in 2016, especially that in 2008-2016 a record value of hard coal imports to Poland was recorded, which is confirmed by the existence of a significant and absorptive market for this raw material in the Polish power sector. At the end of research it is worth to draw attention to the other sources of risk, which in recent years have accompanied and intensified their impact on the mining production in Poland. Thus, the significant sources of internal risk include:

[1] The financial result statistics are available from the post-transformation period, hence the limited research period.

- the growing unit cost of production (Magda, 2013; Gawlik, 2008; Gawlik & Ksztelewicz, 2005),
- a decrease in productivity,
- the lack of financial liquidity,
- the lack of funds for investments (Michalak & Turek, 2012).

The first two sources of risk are the consequence of a significant decrease in production at less significant decrease in employment, which, with a high share of fixed costs, results in increased unit costs and lower overall productivity. What makes the situation worse is the high – about 25% – share of administrative workers, thus non-productive, in total employment. In turn, losses in mines result in a reduction in internal financing, which, together with the reluctance of investors to lend to indebted enterprises, results in a loss of financial liquidity. Moreover, the lack of financial resources negatively affects current and development investment opportunities, thus jeopardizing the further functioning of the entire sector.

External factors complicating the situation in the Polish extractive industry include:

- the fluctuations in coal prices on the international market with a high level of globalization of the raw materials market,
- the influx of cheaper hard coal from imports,
- prohibition of financial support for the hard coal mining industry in the European Union.

Since 2008, Poland has been a net coal importer, which, taking into account its mining traditions, resource reserves, and production capacities, is remarkable. Nonetheless, imported coal – mainly from Russia and Kazakhstan – is cheaper and meets the requirements of Polish energy producers to a greater extent. The situation is further aggravated by fluctuations in the hard coal prices on the world market, which in the period of declines transfer very quickly to the globalized domestic market and contribute to deepening the losses of Polish mining enterprises. Meanwhile, the possibilities of financing a declining industry has been significantly reduced by the European Union's directive on banning public aid for the hard coal mining industry, leaving the possibility of subsidizing hard coal mines only in the event of their permanent decommissioning.

Conclusion

Summing up the considerations in this article, it must be stated that changes in the Poland's energy balance are a source of risk for mining production, as they signify a reduction in the demand for hard coal, which limits the market for this raw material. Nevertheless, these changes are taking place slowly, which makes it possible for the mining enterprises to adapt to the changing economic environment and it should no longer present a threat to the further functioning of the sector, because even if the rate of reduction of coal consumption rises to 1% per year, this raw material will disappear from the Poland's energy balance not sooner than in over 50 years. A serious threat, however, is the coupling of all the sources mentioned in the article, which when cumulated, intensely and permanently negatively affect both the revenue and cost side of the result, contributing to deepening of losses of Polish mining enterprises.

On the basis of the presented analysis it can also be stated that in the Polish energy policy priority is given to energy security supporting maintaining coal as a leading energy raw material due to its national availability. It is also accompanied by a social priority in the form of a postulate of maintaining jobs in the region and the economy. Now and in the future, however, it can significantly impede the implementation of environmental priorities resulting from the European Union regulations, since Poland will find it difficult to achieve almost 20% share of renewable raw materials in the energy balance by 2020. It will also be impossible to realize the economic priorities, due to the lack of price competitiveness of the Polish raw material and the high costs of its acquisition. In such circumstances, it seems reasonable to try to balance the presented priorities by improving the price competitiveness of Polish mining production and to take greater account of renewable energy sources in energy policy, which will allow all raw materials markets to be equally and rationally developed.

Bibliography

1. Bąk, P. (2007), 'Characteristic of the capital gaining sources and financing the activity of coal mine enterprises. Part 1: Sources of the own capital', *Mineral Resources Management*, 23, 93–108.

2. Bijańska, J. and Wodarski, K. (2014), 'Risk management in the planning of development projects in the industrial enterprises. Three-level mass-transfer model for the heterogeneous polymerization of olefins', *Metalurgija*, 53, 276–278.

3. Bluszcz, A. (2016), 'European economies in terms of energy dependence', *Quality and Quantity* 5, 1531–1548.

4. Brodny, J., Alszer, S., Krystek, J. and Tutak M. (2017), 'Availability analysis of selected mining machinery', *Archive of Control Science* 27, 197–209.

5. Burchart-Korol, D., Fugiel, A., Czaplicka-Kolarz, K. and Turek M., 'Model of environmental life cycle assessment for coal mining operations', *Science of The Total Environment* 562, 61-72.

6. Gawlik, L. (2008), 'Budowa i weryfikacja modelu ekonometrycznego dla określenia liniowej zależności pomiędzy kosztami wydobycia a wielkością wydobycia', *Mineral Resources Management* 24, 27-44.

7. Gawlik, L. and Kasztelewicz, Z. (2005), 'Zależność kosztów produkcji węgla w kopalni węgla brunatnego „Konin" od poziomu jego sprzedaży', *Prace Naukowe Instytutu Górnictwa Politechniki Wrocławskiej* 112, 231- 242.

8. Gumiński A., Karbownik A., Wodarski K. and Jędrychowski S. (2008), 'Restrukturyzacja zatrudnienia w polskim górnictwie węgla kamiennego w latach 1998-2006', *Wiadomości Górnicze* 59, 166-174.

9. Jonek-Kowalska I. (2015), 'Challenges for long-term industry restructuring in the Upper Silesian Coal Basin What has Polish coal mining achieved and failed from a twenty-year perspective?', *Resources Policy* 44, 135–149.

10. Karbownik A. and Bijańska J. (2000), Restrukturyzacja polskiego górnictwa węgla kamiennego w latach 1990-1999. Politechnika Śląska, Gliwice.

11. Kmieciak R., Michna A. and Męczyńska A. (2012), 'Innovativeness, empowerment and IT capability: evidence from SMEs', *Industrial Management and Data Systems* 112, 707–728.

12. Kowalska-Styczeń A. and Sznajd-Weron K., 'From consumer decision to market share - unanimity of majority?', *JASSS Journal of Artificial Societies and Social Simulation* 19, 1–13.
13. Magda, R. (2013), 'Ocena wpływu ograniczenia stopnia wykorzystania zdolności produkcyjnej w ścianach wydobywczych na jednostkowy koszt własny', *Przegląd Górniczy*, 9, 110-113.

14. Michalak, A. and Turek, M. (2012), 'A method of pricing an asset lost in a mining catastrophe', *Archives of Mining Sciences* 57, 799–814.

15. Michlak A. and Nawrocki T. L. (2015), 'Comparative analysis of the cost of equity of hard coal mining enterprises - an international perspective', *Mineral Resources Management* 31, 49–72.

16. Nawrocki T. and Jonek-Kowalska I. (2016), 'Assessing operational risk in coal mining enterprises - internal, industrial and international perspectives', *Resources Policy* 48, 50–67.
17. Olkuski T. (2013), 'Zależność Polski w zakresie importu węgla kamiennego', *Mineral Resources Policy* 29, 141–155.

18. Sierpińska M. and Bąk P. (2013), 'The role of corporate bonds in financing mining sector companies during an economic downturn', *Mineral Resources Policy* 29, 141–155.

19. Spałek S. (2014), 'The influence of country of origin on project management: an international empirical study', Proceedings of 19th International Scientific Conference on Economics and Management 2014. ICEM 2014, 23-25 April 2014, Riga, Latvia. Ed. by: E. Gimzauskiene. Amsterdam: Elsevier Science, 4-7.

20. Turek M. (2015), 'Technical-organizational aspects of underground coal gasification in an active coal mine on an example of experiment carried out in Wieczorek coal mine', Przemysł Chemiczny 94, 1012-1017.

The Extension of Education and Development for Company Managers in the Czech Republic

Zdeněk Caha, Mgr., MBA, PhD., Department of Management, Institute of Technology and Business, České Budějovice, Czech Republic, E-mail address: caha@mail.vstecb.cz

Abstract

Managers face constant changes to the external as well as the internal environment of the company which, in order to be mitigated, require their continuous education. The aim of this article was therefore to find out from a sample set of 607 companies in the Czech Republic as to whether educational courses for managers are organized through in-company educational schemes and if so, whether they are provided as one-day or multiple-day courses and on a one-shot or periodical basis. We are convinced that educational courses should be multiple-day and periodic in order to be effective in meeting their aims. We have divided the surveyed companies into four categories according to company size, and set the hypothesis that in more than 50% of the companies, educational courses for managers are a part of in-company training, taking place over a number of days and occurring periodically. The hypothesis was not confirmed, but the results of the statistical assessment of the questionnaire survey showed that educational courses for managers in the CR are organised in a statistically significantly higher proportion than 50% of companies (except for medium sized companies). The proportion is the highest amongst large companies, where it can be significantly statistically estimated at more than 80 %. The results also show that educational courses are usually organized on a one-shot and one-day basis. Only the large companies category saw a majority organizing multiple-day educational programmes. The share of companies organizing periodic educational programmes represents a substantial minority.

Keywords: education, development, manager, extension, Czech Republic

Introduction

Managers face more and more responsibility for a continuously growing range of activities to which must apply their professional and managerial skills. They are therefore not only responsible for the development of the competences of their subordinates, but also - and chiefly - their own competences (Tyler, Dymock and Henderson, 2016) so that they can respond efficiently to the changes of the external as well as the internal business environment. There are numerous studies of the importance of education for managers. Farahani (2011) stresses the necessity of further education for managers by claiming that what managers learn at universities may incorrect in a couple of years, and that managerial qualifications are not only developed through "school attendance", but require the complex, continual development of a manager in all areas of their personality. Aragon and Valle (2013) examined the importance of the education of managers for organizational performance. These authors point out the fact that although managers play a key role in a company's success, most of the education and training budget is spent on lower order employees, rather than managers. They nevertheless admit that the precise contribution of a manager's education to the company is usually hard to quantify, as the finance performance of a company is affected by numerous other factors. Akrofi (2016) also deals with the relation between the development and education of managers and company performance in his work. The study is based on an analysis of empiric data obtained from 222 managers from various regions. The research proved an overall positive impact of the development and education of managers on organizational performance, and implies important consequences for the effective development of managerial skills as a tool for the improvement of the effectiveness of an organization. Čech, Chromý and Skupinová (2015), amongst others, are convinced that if managers develop their competences and skills they not only improve their own potential but also the potential of the company as a whole.

Managers have started to realize the importance of education, and their responsibility for it, although they continue to prefer short-term one-shot courses. As an example of this Notman (2016) states that an interest in short-term one-shot courses is growing amongst managers. On the other hand, long-term education for managers has the opposite trend, which contradicts the fact that the long-term education of managers is the driving force of the economy. Gwiazdzinska-Goraj a Rudnicki (2016) published a study, which was carried out in 2002 – 2010 and dealt with managers in agricultural companies, in which they showed that 50% of managers participated in some form of education. Moreover, the research proved the benefits of continuous education for managers, which results in a higher success rate when applying for UE funds. A study carried out by Grovo, U.S., in which 500 middle managers from various industry sectors participated, shows that no less than 98% of managers feel the need for more courses, particularly in the fields of professional development, conflict solving, time management and project management. The study also shows that two out of five managers are not prepared for company management and less than a half of managers are highly effective in their positions. However, 76% of the respondents claim that even inefficient managers are often very well remunerated and supported. The study also contains the interesting fact that up to 80% of managers temporarily change their behaviour and attitudes immediately after an education course, but return to old habits within half a year. 98% of the respondents had the opinion that regular educational courses for managers have a positive effect which enables companies to retain employees and maintain morale at the workplace alongside an overall satisfaction with income (Schimel, 2016). Among research carried out in the Czech Republic, we can mention one piece based on a questionnaire survey carried out among 419 Czech managers in middle and top management which produced some interesting findings. According to this research 65% of managers were satisfied with the courses they had taken part in. Other findings dealt with a lack of educational courses, the absence of practically oriented courses, insufficient links to practice, lack of qualified trainers (and trainer incompetence often affected not only the results of the courses but also the motivation for further participation in educational courses amongst managers) or the fact that the price/effectiveness ratio of the courses is often unbalanced (Kressová, 2010). Folwarczná (2010) also dealt with the development and education of managers in her research on managers and personnel. Through this, she mapped the methods of education for managers in the Czech Republic and compared them with the methods applied in more developed countries, and also the ways in which the evaluation of the effectiveness of education programmes was made. The problems with managerial training sessions and courses are actually often based on the fact that they lack specific measurable goals, as Schimel (2016) points out. He also claims that no more than 28% of training sessions and courses for managers have specific and measurable goals. On the other hand, he points out the importance of education for managers in the example of fast growing companies recruiting new managers from amongst the best consultants and sales representatives. These, however, do not automatically become successful managers and in order for this to happen it is often necessary for them to take part in suitable training. Plakhotnik (2017) also agrees with this, stating that organizations should support managers through educational courses even before they are promoted to managerial positions.

The methods and frequency of education for managers differs depending on the company size and nature of business. Bager et al. (2015) stress the importance of educational methods based on experience. Experience is transformed into knowledge and skills through reflection and interaction. However, they point out that managers from small and medium companies use such educational programmes to a demonstrably smaller extent than those of large companies due to limited time and the fact that these managers do not deal with the development of the company and the development of themselves on a long-term basis. There are also some studies indicating that a lot of managers from small and medium companies have already realized this fact, which is also backed by a study by Wang and Zhou (2009), who emphasise a need for the development of managers, mainly in the areas of company strategy, management, finance and law, as seen from the results of interviews with managers from small and medium companies in China.

Education programmes for managers may have various concepts which contain the individual components of education for managers. Nguyen and Hansen, (2016) point out that education programmes for managers should be complex, and should distinguish and stress the difference between managing (doing things correctly) and leading (doing the right things, being proactive with a

vision of permanent development), which is crucial from the point of view of company development, particularly for top management. Elmuti, Minnis and Abebe (2005) propose a simple three-component structure of programmes for education for managers, so that a manager masters all of the skills necessary to lead and manage employees. The third component, which contains action-based trainings (simulation and case studies), is key according to the authors. Managers can actually only achieve the necessary experience and perfect their abilities through practice. New educational technologies will play a more and more important role in education for managers. Wankel (2016) points out the advantages and the unique opportunities of this kind of education particularly in the field of intercultural know-how.

Methodology

The aim of this study is to examine from a sample set of 607 companies whether educational courses for managers are organized through in-company educational schemes and, if so, whether they are provided as one-day or multiple-day courses and on a one-shot or periodical basis. We are convinced that educational courses should be multiple-day and periodic in order to be effective. We assumed that there are significant differences with regard to the company size, which is why we divided the sample set into four categories according to company size. We set the following hypothesis.

In more than 50% of companies, education for managers forms a part of in-company education and takes more than one day; in the majority of companies this is periodic.

Hypothesis verification
We used the results of a questionnaire survey of 607 companies of different sizes and specializations in order to exam the hypothesis. Our task was to examine whether the percentage of companies where in-company education also involves managers is higher than 50%, and whether such education occurs periodically and lasts more than one day. To refine the analysis, we divided the companies into four groups according to their sizes, namely micro companies (with less than 10 employees), small companies (10-49 employees), medium companies (50-249 employees) and large companies (250 or more employees).

In phase 1 of processing we dealt with the question of whether the percentage of companies running educational courses for managers exceeds 50%. The first problem was that the questionnaire was incomplete in some cases. Example: the fact that a company ran education for managers was not ticked but the fact that it performed this on a one-time basis or that it took one day was ticked, and so on. In order not to discard such data completely, we included companies that mentioned the education of managers of any type (duration or frequency) among the companies that run educational courses for managers. Companies for whom nothing was filled in for questions relating to education for managers were included among the companies not providing education for managers. The data, classified in this manner, was processed in a table of absolute frequencies and relative frequencies in percentage, in relation to company size, then a one sided one selection test on proportion was performed. From the point of view of statistical analysis, we therefore examined the hypothesis that the proportion of the companies that provide education for managers is a maximum of 0.5 against the alternative that the proportion is significantly higher than 0.5. As the output from the statistical tests, we present the values of the test statistics, the p-values and the lower limit of the one-sided interval estimation from the proportion of the companies providing education for managers. All the tests and calculations of the interval estimations are performed with the confidence of 95%, i.e. at a significance level of 0.05.

In phase 2, from the 607 companies we selected those that ran education for managers (there were 399 companies). In these companies we then looked at whether the education was organized on a one-day or multiple-day basis, and whether it was one-shot or periodic. As the question relating to the duration had multiple options we counted the answers “14 days and less”, “more than 14 days”, “one month or less” and “long-term (longer than a month)” as one answer: “multiple-day”. All 399 companies replied to the frequency question (single-shot/periodic). Only 278 companies responded to the duration question (one-day/multiple-day), the remaining 121 companies did not mention the duration of their educational programme. We therefore divided the processing into two parts. We

examined separately the proportion of the companies that perform one-day and multiple-day training for those that replied to this answer in the questionnaire, and the proportion of the companies that organize single-shot or periodic trainings. We made tables for absolute and relative frequencies again, including graphs, and performed one-sided one-selection tests on this proportion at the confidence level of 95%, as well as a calculation of the interval estimations. In the first part we tested whether the proportion of the companies that performed multiple-day trainings was less than 0.5 (50%), against the alternative that this proportion is statistically significantly higher than 0.5. In the second part we tested whether the proportion of the companies that performed periodic (cyclic) trainings was less than 0.5 (50%), against the alternative that this proportion was statistically significantly higher. As the outputs of the statistical tests we present the values of the test statistics, the p-values and the lower limits of the interval estimates for the proportion. We performed all the tests for the purpose of more detailed analysis, dependent on the company size, at the confidence level of 95%.

The frequency tables and graphs are in MS Excel and the statistical tests and calculations of the interval estimations in the **R** statistical software.

The results of the statistical processing

Education of managers forms a part of in-company education in more than 50% of companies

Table 1: Education of managers forms a part of in-company education – absolute frequencies

Company size	Education for managers		
	In place	Not in place	Total
Micro company	48	93	141
Small company	84	95	179
Medium company	59	105	164
Large company	17	106	123

Source: authors

Table 2: Education of managers forms a part of in-company education – relative frequencies

Company size	Education for managers	
	In place	Not in place
Micro company	34.0%	66.0%
Small company	46.9%	53.1%
Medium company	36.0%	64.0%
Large company	13.8%	86.2%

Source: authors

The Results of the Statistical Tests

The statistical test proves at the confidence level of 95% that the proportion of the companies that run educational courses for managers is statistically significantly higher than 50% if the p-value is lower than the significance level of 0.05 and therefore if the lower limit of the interval estimation is higher than 0.5. The results are shown in the following table, the statistically significant values are in bold:

Table 3: The results of the statistical tests

Company size	Testing statistic Z	P-value	Interval estimation limit
Micro company	**3.789**	**7.542·10-05**	**0.591 (59.1%)**
Small company	0.822	0.2055	0.469 (46.9%)
Medium company	**3.592**	**0.0002**	**0.577 (57.7%)**
Large company	**8.024**	**5.082·10-16**	**0.803 (80.3%)**

Source: authors

As the results of the statistical tests show, with the exception of the small companies group, the proportion of the companies that run educational courses for managers has proven statistically significantly higher than 50%. The proportion of 53.1% was ascertained in the small companies through the questionnaire survey, but with regard to the data distribution it was impossible to prove reliably and at the chosen significance level that the real proportion exceeds 50% in this group. The lower limit of the interval estimation is 46.9%. The hypothesis was confirmed in the remaining groups. The lower limit of the interval estimation fluctuates slightly below 60% in the micro and medium companies while the estimation for large companies reaches as high as 80%. This is a very significant difference. As the results show, higher emphasis is put on the education of managers in large companies than in the micro, small and medium ones.

Education of managers is multiple-day in most companies and is usually run periodically

Table 4: Education of managers – duration, absolute frequencies

Company size	Education type – duration			
	One-day	Multiple-day	Not mentioned	Total sum
Micro company	**23**	**15**	**55**	**93**
Small company	**33**	**19**	**43**	**95**
Medium company	**39**	**49**	**17**	**105**
Large company	**30**	**70**	**6**	**106**

Source: authors

Table 5: Education of managers – duration, relative frequencies

Company size	Education type – duration		
	One-day	Multiple-day	Not mentioned
Micro company	24.7%	16.1%	59.1%
Small company	34.7%	20.0%	45.3%
Medium company	37.1%	46.7%	16.2%
Large company	28.3%	66.0%	5.7%

Source: authors

After the removal of the companies not mentioning the duration of the educational programmes we observed the following frequencies:

Table 6: Education of managers – duration, without "not mentioned", absolute frequencies

Company size	Education type – duration		
	One-day	Multiple-day	Total
Micro company	23	15	38
Small company	33	19	52
Medium company	39	49	88
Large company	30	70	100

Source: authors

Table 7: Education of managers – duration, without "not mentioned", relative frequencies

Company size	Education type – duration	
	One-day	Multiple-day
Micro company	60.5%	39.5%
Small company	63.5%	36.5%
Medium company	44.3%	55.7%
Large company	30.0%	70.0%

Source: authors

The Results of the Statistical Tests

As in the previous case, the statistical test proves at the confidence level of 95% that the proportion of the companies that run the multiple-day education for managers is statistically significantly higher than 50% if the p-value is lower than the significance level of 0.05 and therefore if the lower limit of the interval estimation is higher than 0.5. The results are shown in the following table, the statistically significant values are in bold:

Table 8: The results of the statistical tests

Company size	Testing statistic Z	P-value	Interval estimation limit
Micro company	-1.298	0.903	0.276 (27.6%)
Small company	-1.941	0.974	0.265 (26.5%)
Medium company	1.066	0.143	0.469 (46.9%)
Large company	**4.000**	**3.17·10-5**	**0.620 (62%)**

Source: authors

The results of the statistical tests show that multiple-day educational courses for managers are only run in a majority of the proportion of large companies. In the medium companies this proportion fluctuates near to this value, while the interval estimation points to the lower limit of the proportion of 46.9%. This proportion is much lower than 50% in micro companies and small companies, which means that one-day educational programmes are run in a much higher proportion in both these groups.

Education of Managers Is Periodic (Cyclic) In Most Companies

Table 9: Education of Managers – Frequency, Absolute Frequencies

Company size	Education type – Frequency		
	One-shot	Periodic (cyclic)	Total
Micro company	73	20	93
Small company	76	19	95
Medium company	67	38	105
Large company	52	54	106

Source: authors

Table 10: Education of Managers – Duration, Frequency, Relative Frequencies

Company size	Education type – Frequency	
	One-shot	Periodic (cyclic)
Micro company	78.5%	21.5%
Small company	80.0%	20.0%
Medium company	63.8%	36.2%
Large company	49.1%	50.9%

Source: authors

The Results of the Statistical Tests

Again, as in the previous case, the statistical test proves at the confidence level of 95% that the proportion of the companies that run periodic educational courses for managers is statistically significantly higher than 50% if the p-value is lower than the significance level of 0.05 and therefore if the lower limit of the interval estimation is higher than 0.5. The results are shown in the following table:

Table 11: The Results of the Statistical Tests

Company size	Testing statistic Z	P-value	Interval estimation limit
Micro company	-5.496	0.999	0.154 (15.4%)
Small company	-5.848	0.999	0.141 (14.1%)
Medium company	-2.830	0.998	0.289 (28.9%)
Large company	0.194	0.423	0.430 (43%)

Source: authors

The test results show that educational courses for managers are not run periodically in more than a half of the companies, irrespective of the company size. In the small and large companies the statistical test estimates the lower limit of about 15%, in medium companies below 30% and in large companies slightly above 40%.

Conclusion

It follows from the results of the statistical evaluation of the questionnaire survey that, irrespective of the company's size, education for managers is applied in a statistically significantly higher proportion than 50% (with the exception of medium-sized companies, which only approaches the limit

according to the test results, but does not exceed it significantly). The highest extent of education for managers is seen in large companies. The proportion can be statistically significantly estimated at more than 80%. Nevertheless, the fact has emerged that education is more likely organized on a one-shot basis and courses are usually no longer than one day. Multiple day educational programmes are only run in large companies in the majority proportion. Companies run periodic (cyclic) educational programmes in a substantial minority proportion. Only the large companies category approaches the value of 50% in this area, although the statistical test did not prove that the proportion is statistically significantly higher than 50%.

Although the hypothesis was not confirmed we can say that companies in the Czech Republic are aware of the importance of education for managers to a significant extent, especially the large, medium and micro-companies. Small companies in particular should concentrate much more on implementing education for managers. In terms of the duration of educational courses, the results showed that large and medium companies organize education for managers over a longer period to a much higher extent. The amount of multiple-day education events should be increased in micro-companies and small companies. According to the research results, companies of all size categories should include periodic education programmes of a long-term character for managers.

We recommend that further research activities should concentrate on the other important factors that influence the effectiveness of education for managers, such as the models and methods of education for managers, the application of cutting-edge technologies and motivational tools.

References

Akrofi, S. (2016). Evaluating the effects of executive learning and development on organisational performance: implications for developing senior manager and executive capabilities. *International Journal of Training and Development*, 20(3), 177–199.

Aragon, I. B. and Valle, R. S. (2013). Does training managers pay off? *The International Journal Of Human Resource Management*, 24(8), 1671-1684.

Bager, T. E., Jensen, K. W., Nielsen, P. S. and Larsen, T. A. (2015). Enrollment of SME managers to growth-oriented training programs. *International Journal Of Entrepreneurial Behavior*, 21(4), 578-599.

Čech, P., Chromý, J. and Skupinová, S. (2015). Company training of managers as a part of the human resource management in the hotel industry. *Proceedings of the International Multidisciplinary Scientific Conference on Social Sciences and Arts*. Albena: STEF92 Technology Ltd, 189-196.

Elmuti, Minnis, W. and Abebe, M. (2005). Does education have a role in developing leadership skills? *Management Decision*, 43(7/8), 1018-1031.

Farahani, A. F. (2011). Theory of training and development of manager's practical approach. *Proceedings of the 2nd IEEE International Conference on Emergency Management and Management Sciences*, Beijing: IEEE, 533-542.

Folwarczná, I. (2010). *Rozvoj a vzdělávání manažerů*. Praha: Grada.

Gwiazdzinska-Goraj, M. and Rudnicki, R. (2016). Agricultural education of managers of agricultural holdings in Poland in 2002-2010. *Proceedings of the International Scientific Conference on Economic Science for Rural Development*. Jelgava, 69-76.

Kressová, P. (2012). The experience of the Czech managers with training and development courses for managers. *International Journal Of Knowledge, Culture And Change Management*, 11(4), 283-294.

Nguyen, N. and Hansen, J. Ø. (2016). Becoming a leader-manager: a matter of training and education. *Development And Learning In Organizations: An International Journal*, 30(6), 10-12.

Notman, O. (2016). The value of short-term training for Russian managers in the context of the economic crisis. *Proceedings of the 10th International Days of Statistics and Economics*. Prague: University of Economics 1344-1352.

Plakhotnik, M.S. (2017). First-time managers: increasing chances of their success before the promotion. *Industrial and Commercial Training,* 49(3), 132-138.

Schimel, E. (2016). *Ninety-Eight Percent of U.S. Managers Want Better Management Training, Grovo Study Reveals*. [Online], [Retrieved May 20, 2017], http://www.prweb.com/releases/2016/09/prweb13719059.htm.

Tyler, M., Dymock, D. and Henderson, A. (2016). The Critical Role of Workplace Managers in Continuing Education and Training. [Online], [Retrieved May 17, 2017], https://www.researchgate.net/publication/303045780_The_Critical_Role_of_Workplace_Managers_in_Continuing_Education_and_Training.

Wang, Y.-H. and Zhou, S.-B. (2009). Research on Managers' Training Needs of Small Medium-sized Enterprises in Mainland - A Case Study of Chongqing. *Proceedings of the International Conference on Human Resource, Organizational Behavior and Leadership*. Beijing, 157-160.

Wankel, Ch. (2016). Developing cross-cultural managerial skills through social media. *Journal of Organizational Change Management,* 29(1), 116-124.

Maintaining the Costs of Quality under Control in an Organization

Lazăr Livia-Veronica[1], University Politechnica of Bucharest, 313, Splaiul Independenței Street, Bucharest 060042, Romania, livia_veronica_lazar@yahoo.com

Ionescu Nicolae[2], University Politechnica of Bucharest, 313, Splaiul Independenței Street, Bucharest 060042, Romania, ionescu_upd@yahoo.com

Băilă Diana-Irinel[3], University Politechnica of Bucharest, 313, Splaiul Independenței Street, Bucharest 060042, Romania, baila_d@yahoo.com

Bucur Diana-Mihaela[4], University Politechnica of Bucharest, 313, Splaiul Independenței Street, Bucharest 060042, Romania, dianabucurm@yahoo.com

Abstract

The relationship between the quality of the products and services provided by an organization and the costs involved in ensuring it, is a matter of concern for specialists from different fields.
According to Philip Crosby's approach, the primary responsibility for quality lies with the management, namely non-quality costs are equal to the effects of implementing of wrong decisions and ignoring the real causes that lead to nonconformities in organization processes. A real help for organizations is the implementation of the quality management system, that facilitates an appropriate framework for setting the policies, objectives and processes necessary for its operation and development.

Keywords: Cost of quality, quality management system, cost control, correction, corrective action, actions to address risks and opportunities

Introduction

Different specialists have been concerned about the issue of quality costs, due to the 5-15 % or more of these costs in the production cost, that could reach more in some cases. Furthermore, Klein L., Haiduc Cr. (2003) estimated that the costs related to detection and prevention are 10-20%, and internal and external costs pertaining non-quality are 80-90% from the total amount of quality costs. Thus, the cost of quality leads the management team to improve the quality, providing the necessary information in the making and implementing the right decisions (Crosby, 1979).

As shown in the figure 1, different classifications of these costs can be found over time (Beckford, 1998), (Bendell ș.a., 1991), (Juran, 2000), (Olaru, 1995).

Regardless of the approach, we can consider finally that quality costs include the costs incurred to meet the requirements for the implementation and delivery of products and services, plus losses due to address / resolve situations related defects and / or complaints.

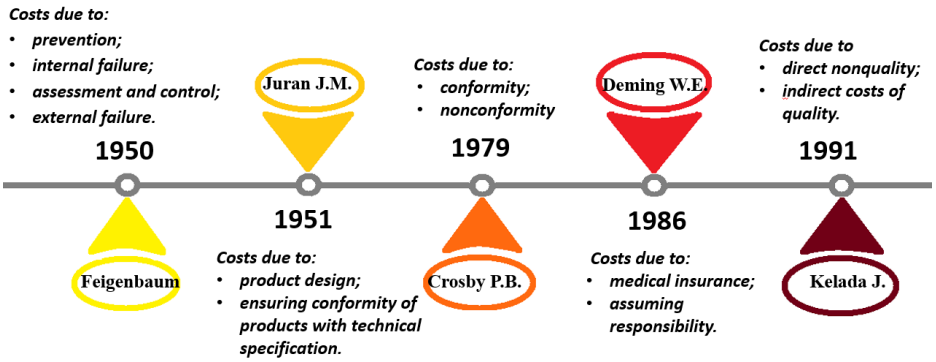


Fig. 1: Costs of Quality

Maintaining the Costs of Quality under Control

Mostly, the solutions adopted to keep the quality costs under control, and further reducing them, depend on the consumption of resources involved, the efficiency, the level of priority, but above all their realism (Defeo & Juran, 2014), (Mihalcea, 2012), (Shingo,1990).

From a quality management system perspective, there are several directions an organization needs to follow to ensure compliance with the requirements of the products and services provided: customer satisfaction evaluation, internal audit, implementing corrective actions, preventive actions (2008 version), actions to address risks and opportunities (version 2015), relationship with suppliers and other stakeholders relevant to the organization, monitoring and measurement of process performance etc. (ISO 9001:2008), (ISO 9001: 2015).

Perhaps the most common concept in organizations, that have implemented a quality management system, and not only, is CAPA (corrective actions - preventive action), introduced as such, especially after the 1994 (1995 in Romania) version of the ISO 8402, where the term "preventive action" is the first time defined.

Applying this concept, it involved from the beginning, for organizations to design and use supporting documents (forms), initially in physical form - the most commonly encountered: Corrective Action Report and Preventive Action Report, afterward, with the development of the means (intranet, internet), to take shape electronically, reaching today's increasingly diverse and complex applications (MasterControl's CAPA Systems, EtQ Reliance, SmartSolve® CAPA Management, etc.).

Currently, due to ISO 9001 new version, the organizations are faced with the need to adapt the CAPA system to the new requirements, represented by the exclusion of „preventive action" and introduction of the „actions to address risks and opportunities", as a requirement for quality management system.

The way each organization chooses to meet the above requirements can make the difference between struggling for survival in a changing market and tackling a road to success. The authors opinion, the steps are exemplified in figure 2.

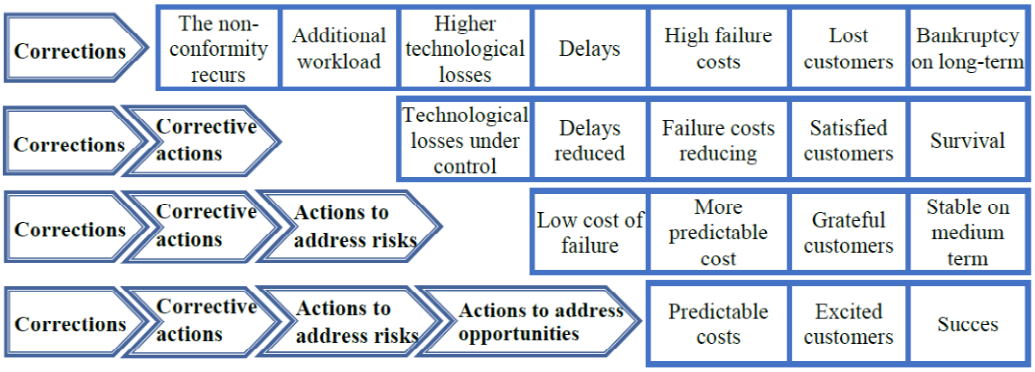


Fig. 2: Steps to success

In order to facilitate access to data on the quality costs paid by the organization to ensure the compliance of the products and services offered, in table 3, the authors propose and present an "Action Plan for Nonconforming Product, Nonconformity, Risks and Opportunities" (PANPNRO), along with examples from a car service organization. This instrument can be used by any organization, regardless of its field of activity.

Table 1: PANPNRO

Identify and document	**No.**	**1**	**2**
	Identification date	**06/05/2017**	**06/05/2017**
	Field/ process/ position	**Production**	**Reception**
	Description	The color of the product differs from that specified by the customer	**Project implementation errors to the client's requirements**
	Nonconforming product/ nonconformity/ risk / opportunity	**Nonconforming product**	**Risk**
Evaluate, decision making and implement corrections and actions	**Constatator – name and position**	**Delivery agent**	**Product Manager**
	Causes of nonconformities (if applicable)	**Not applicable**	**Client's requirements incomplete or inaccurate**
	Correction (if applicable)	**Acceptance under concession by the customer**	**Not applicable**
	Responsible for correction implementation	**Delivery agent**	**Not applicable**
	Correction deadline	**06/05/2017**	**Not applicable**
	Corrective/ addressed risk/ addressed opportunity action	**Not applicable**	Documented requirements confirmed together with the customer
	Action deadline	**Not applicable**	**By order**
	Responsible for action implementation	**Not applicable**	**Engineer**
Evidence-based decision making	**Correction records**	**Invoice, Discount form,**	**Not applicable**
	Responsible for correction verification	**Production Manager**	**Not applicable**
	Action records	**Not applicable**	**Minute records with the customer**
	Responsible for action verification	**Not applicable**	**Product Manager**

	Action effectiveness reviewing deadline	**07/05/2017**	**Monthly**
	Effectiveness review decision		**Effective. Recommend for maintaining the action.**
	The consumed resources	**1000 $**	**10$ x 15 orders = 150 $**

The data structure presented in Table 3, can be included in a simple, widely available software application such as Office Excel. Using the software filtering and sorting facilities, it enables organizations to get a fair and up-to-date image of the cost level on each category: corrections / corrective actions / risk-management actions / improvement actions, which can be deducted each turn on field / process / position.

Conclusions

The proposed work instrument PANNPNR, allows any organization to have an adequate image of the level of quality costs split into categories of general interest: corrections (with or without corrective action), prevention (risk treatment) and improvement (opportunities capitalize).

The information provided by this instrument can be used as a starting point for organizations in implementing the sixth principle of quality management "evidence-based decision-making".

References

Beckford J. (1998), *Quality. A critical introduction,* Routledge.

Bendell T, ș.a. (1991), *The quality gurus – their approaches described and considered*, Managing Service Quality: An International Journal, Vol. 5 Issue: 6, pp.44-48.

Crosby Ph.B. (1979) *Quality is free-The art of making quality certain,* ed. McGraw-Hill, New York.

Defeo J.A., Juran J.M. (2014), *Juran's Quality Essentials: For Leaders*, McGraw Hill Professional.

Deming W. E. (1986), *Out of the Crisis*, MIT Press.

Juran J.M. (2000), *Planificarea calității*, Ed. Teora, Bucureşti.

Klein L., Haiduc Cr. (2003), *Problema calității în concepția cercetării și dezvoltării produselor*, Ed. Dacia, Cluj Napoca.

Mihalcea E. (2012), *Sistemele de management – organizare, reducere a costurilor şi disponibilizări*, [Online], [Retrieved May 02, 2017], https://www.cariereonline.ro/antreprenor/start-up/sistemele-de-management-organizare-reducere-costurilor-si-disponibilizari.

OLARU M. (1995), *Managementul calității*, Ed. Economică, București.

Shigeo Shingo (1990), *Modern Approaches to Manufacturing Improvement: The Shingo System*, Productivity Press.

SR EN ISO 9001:2008, *Quality management systems – Requirements.*

SR EN ISO 9001:2015, *Quality management systems—Requirements.*

SR EN 8402:1995, *Quality management and quality assurance - Vocabulary*

SR ISO 8402:1986, *Quality – Vocabulary.*

Quality of E-government Services in Oman:

A Perspective of E-government Services Providers

Taiseera Hazeem Al Balushi
Department of Information Systems, College of Economics and Political Science
Sultan Qaboos University,
P.O. Box 20, P.C. 123, Al-Khoudh, Muscat, Sultanate of Oman
Email: taisira@squ.edu.om

Abstract

Governments are continuously working on improving their e-services delivery in order to serve citizens, other governments and businesses at the most effective and efficient manner. At the same time there are an extensive number of studies concerning the evaluation and assessment of e-services to improve users/citizen satisfaction with regards to e-government services. The purpose of this paper is to study the e-government services quality factors that are of key importance from the viewpoint of e-service providers in the Sultanate of Oman and what procedures followed in measuring service quality to ensure users' satisfaction. The study is based on six most important quality factors (personalization, performance, usability, and security, users' involvement, and web design) where about a qualitative content analysis approach was followed to e-service providers' view of quality and how it is measured. The analysis of the in depth interviews and the application of content analysis categorized the perspective of the e-service providers into three main categories: e-transformation strategy, technical requirements, and citizen's participation.

Keywords: e-government, e-services, content analysis, interviews, quality factors, user satisfaction.

Introduction

Governments are continuously working on improving their e-services delivery in order to serve citizens, other governments and businesses at the most effective and efficient manner. By using electronic service via internet, the governments of different countries are able to offer more convenient and faster access to their services and information to the users or citizens. The concept of e-services is now in initial phase of growing, even though it has become a hot issue for the researchers in last few years. Quality of e-service plays a leading role in context of providing efficient and reliable e-services to the users or citizen. Quality of service is a measure of how well a delivered service matches the customer's expectation1 (Hein, 2014). Quality of service is also explained as an assessment of customer as a whole service excellence (Zeithaml 1988) .

To maintain e-service quality, service provider provides services which fulfill users/citizens service expectations as well as satisfy users/citizens need. Service providers often perform self-assessment and follow international standards as a benchmark to maintain high level of service quality to reach the highest degree of participation, awareness, trust, and engagement among users(Sharma, Al-Shihi, & Govindaluri, 2013). There are also numbers of studies of e-government services quality with attention to the user side (Loiacono, Watson, & Goodhue, 2002; Manoharan, 2013; A Parasuraman, Zeithaml, & Berry, 1985; Stiakakis & Georgiadis, 2009; Ziemba, Papaj, & Descours, 2014)as well as various models to assess the quality of e-services. However, very limited number of studies considered the quality of e-services from the service providers' side to reveal their perceptions towards quality concerns when they offer services to intended users(Halaris, Magoutas, Papadomichelaki, & Mentzas, 2007; Stiakakis & Georgiadis, 2009). These types of studies are particularly important as they help with bridging the gap between the expectations of both service users and service providers.

The purpose of this paper is to identify and examine quality factors of key importance from the prospective of service providers in Oman. It is based on qualitative content analysis of transcribed in-depth face to face interviews with e-transformation project managers of ten government entities that provide e-services in Oman to examine their view of quality and how it is measured to ensure satisfaction among users.

This paper is organized as follows. In section 2, will discuss some related work in the area of e-government service quality. Section 3 will present the methodology used in the study and data analysis. A discussion on the results will be highlighted in section 4 and a summary of the work will be presented in section 5.

Related work

Service quality defined under many different perspectives, based on customer's perspective, service performance, customer expectations, and perceptions of service. In context of e-government, quality of e-service becomes an important ingredient to fulfill the users/citizens satisfaction (Hein, 2014). Many researchers in last decay perform different researches to find out the effective quality dimensions and measuring methods of online service quality which influences on the quality of e-services. (Alanezi, Kamil, & Basri, 2010) defined a large number of electronic service quality studies which identify different dimensions for measuring the quality of services. The foundation Model of service quality is define by (A Parasuraman, et al., 1985) proposed the development of first service quality measuring instrument which named SERVQUAL with ten key quality dimension by focusing on traditional quality services.

Quality plays a leading role in maintaining trust between citizens/users and government. The purpose of e-government in general, is to make information available online to citizens/users and allow them to communicate with the system by exchanging information. The governments need to improve the information communication technology for the assurance of reliable communication which fulfil the high quality service expectation of citizens/clients (A Parasuraman, et al., 1985).

For measuring quality of service different scales are proposed by researchers in different domains like SERVQUAL (A. Parasuraman, Zeithaml, & Berry, 1988) in domain of service quality, SiteQual (Yoo & Donthu, 2001) in domain of e-service quality, EtailQ (Wolfinbarger & Gilly, 2003) in domain of e-service quality, E-S-Qual (A Parasuraman, Zeithaml, & Malhotra, 2005) in domain of e-service quality, WebQual(Loiacono, Richard T., & Goodhue, 2007) to measure website quality. e-Selfqual(Ding, Hu, & Sheng, 2011) is applied to evaluate the online self-service quality of online retailers based on SERVQUAL. SALT (Magoutas & Mentzas, 2010) framework is used monitoring the satisfaction of e-government services, while SSTQUAL (Lin & Hsieh, 2011) based on self-service technology, a holistic assessment model for e-government service from the citizen's perspective (Osman *et al.*, 2011), E-GovQual (Papadomichelaki & Mentzas, 2012) is applied in domain of e-government as well as EGSPTA(Zaidi, Siva, & Marir, 2014).

There were also a number of studies in the domain on quality of e-services that focused on particular quality factor for their special impact on quality of e-services some of those factors were, Website design, reliability, responsiveness, security, usability, and efficiency. An extensive study which is based on a systematic literature review (AlBalushi & Saqib, 2015) on these quality factor revealed that the key quality parameters that effects the user/citizen satisfaction can be categorized under (content, performance, security, personalization, and citizen involvement).

Methodology

A. Design

In order to identify and analyze key factors that can impact e-government service quality, this study employed a qualitative approach in interviewing key e-government service provides a similar study

was conducted in the context of Saudi Arabia e-government services(Alanezi, mahmood, & Basri, 2012). This approach guided the research process to explore the subjective experiences, examine meanings of the experiences, compare these meanings, and construct concepts illustrating the unique experiences of the participants (Krippendorff, 2004). The researcher started with some initial quality factors in mind that was validated to be the most important quality factors or e-services(AlBalushi & Saqib, 2015).

B. Sample

Directors or managers in charge of the development and maintaining of e-government services from top ten government entities in terms of services offered to citizens and public were targeted in this study. The selection of government entities was based on the number of e-services they offer and their level of maturity with the e-services offered.

C. Interview process

An email was sent that included points of purpose, confidentiality, participants' rights and the researcher's responsibilities. To explore the participant's perception of e-government service quality in Oman, the researcher developed a range of questions and sub-questions through various themes. The interview medium was Arabic as it was more comfortable for the participants in providing more detailed information. All interviews were tape recorded better data analysis after the consent of the interviewee. The interviews started with a broad question about e-government service quality. Moreover, the interviewees were asked to specify the procedures used for the purpose of assessing the service quality provided by e-government's websites and how they deal with users concerns/complains to achieve citizen's satisfaction in connection to the e-services offered. After each interview, the researcher transcribed the interview and it was sent for verification to confirm the responses and the view in three cases a follow up interview was done by telephone for some unclear/missing information.

D. Data Collection

Qualitative interviews were conducted with the participants (IT manager/e-services lead team) from November 2016 to February 2017. The interview had two main sections, the first section explored the maturity of the government entities with respect to the number of years e-services were offered, the number of visitors, expertise inside the department with regards to developing and maintaining the e-services, channels from which they hear from the public. The second part of the interview shed light into the concerns they often receive from e-services users and what are the quality concerns they take into account before e-service provision.

E. Data analysis

Qualitative content analysis (Graneheim & Lundman, 2004)was employed in this study. Qualitative content analysis focuses on concepts to probe the meanings of the phenomena(Hsieh & Shannon, 2005) as "a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns". After transcribing the audio recorded interview, there are a number of steps follows to analyze the interview contents as follows (Graneheim & Lundman, 2004):

Step #1: in order to become familiar with interview transcripts, two independent researchers read the transcripts several times.

Step #2: The analysis began with a search for codes; these are odes containing aspects related to the quality factors, improvements, complains, evaluation, satisfaction, etc.

Step #3: the above 2 steps were carried out with each of the transcripts and each category to ensure the relationship held.

Step#4: all related categories from all the transcribed interviews were consolidated until no further relationship emerged.

Step #5: Finally, the notes on the original interview transcripts were reviewed to identify any possible outliers that could be incorporated into the categories. Further, direct quotes were extracted from the transcripts to support the qualitative data analysis findings (Hsieh & Shannon, 2005).

The data analysis process of qualitative content analysis is illustrated in Figure 1.

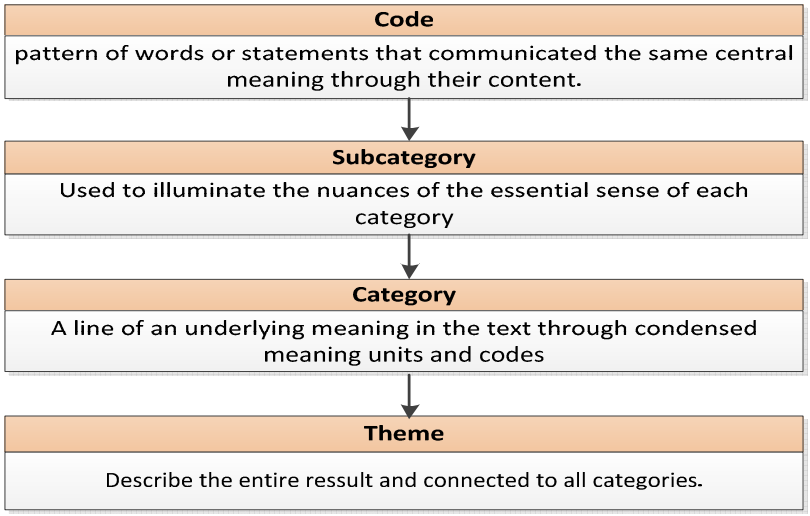


Fig 1. A procedure for qualitative content analysis 28

Results

The core theme of e-government service providers in Oman was "pre-request for e-service initiation in Oman" which was derived from three main categories:" national strategy of e-transformation", "technical requirement," and "citizen participation." As presented in Table 1. The theme entails those characteristics and features that major e-services providers finds it necessary before the initiation of any e-services. The theme is covering three key areas that are considered as main pillars for any business "strategies and policies, technologies and people".

Category 1: National strategy of e-transformation

This category comprised of the following subcategories: "national strategy"," process definition", "process re-engineering" and "systems integrations". These categories are considered as a strategic level basis for the success for the online services since key concerns as such reviewing the current processes to simplify, eliminate or integrated others will be the basis for a successful e-transformations. At a national level it is very important for regulators to understand that system integration is a must particularly with those types of services involving multiple government entities.

Category 2: Technical requirements

This category comprised of the following subcategories:" performance", "confidentiality"," usability" and "availability". It is evident that most of the quality factors identified as per the literature was classified a key quality factor important to e-services users. Users are often required to fill an overwhelming amount of forms while the utilization of e-services have some set rules and

objective of reaching e-government service at ease. Users are often concerned with privacy, security, and the confidentiality of the data and their transactions which is important to be taken by services providers to gain more trust from users. While usability and website design is considered another important factors given that the users come from different backgrounds, experiences, and computer literacy. These websites should be easy to learn and interact with. Lastly is the technical issues connected to service availability and accessibility sometimes it is out of service providers control but users should be aware and notified of such issues before hand if it is in the hand of service providers.

Category 3: citizen participation

It was evident by most of the government entities that they are receiving a number of concerns from users via various channels concerning a particular issue faced by individuals or something that is becoming a concern by the majority of the users. There is no systematic way to study these concerns and follow a proactive approach of addressing some issues before they come to existence. Users often discuss and voice their opinions on some new types of e-services they might benefit from with the provision of such service online.

Table 1: Content analysis key quality concerns of e-services from service providers view

Code	Subcategory	Category	Theme
1. Information Technology Authority of Oman regulation 2. national strategy 3. mandatory requirements	national level requirement	national strategy of electronic transformation	Pre-request for e-services initiation in Oman
1. clear guidelines to explain process step-by-step 2. unaware of the entire process to complete transaction	process definition		
1. define what's required for process completion 2. simplify process and cut unnecessary ones 3. re-engineering is a must prior to going online	process re-engineering		
1. gap of understanding between ministries about common and integrated process	integration		
1. too many files to be uploaded 2. speed to execute a transaction	performance	Technical requirements	
1. PKI# for security 2. Confidentiality 3. Privacy	confidentiality		
1. users with different background and experiences 2. website design is poor 3. usability is a key for a satisfied user	usability		
1. network issues 2. unavailable services 3. internet is slow	availability		
1. lack of awareness (2) 2. users often call and visit for small inquires 3. prefer physical channels	Awareness	citizen participation	
1. radio, TV, exhibition to spread awareness 2. social media interaction 3. demo application or trial application 4. e-services promotion	Promotion		
1. active and prompt responses to users inquires 2. continuous service improvements 3. integrate all channels, phone, visit and social media to listen to users	citizen involvement		

Discussion and Conclusion

The purpose of this study is to explore those factor or indicators of e-service from the perspective of service providers prior to service initiation. The analysis of the experience of service providers resulted in a theme: pre-request of e-service initiation in Oman having three main categories "national strategy e-transformation, technical requirements and citizen participation". The intension of the study is to contribute to the development and initiation of government e-services of a particular quality level to meet with users expectation, the study will also contribute to raise awareness among service provides of key quality factors that should not be overlooked. The relationship between what service providers are offering and what users are expecting in terms of level and quality of service is of key importance to meet user satisfaction.

The qualitative results of the study while it uncovered some important aspects that this research and any future research opportunity should consider particularly in the GCC and in Oman while it was evident from the interview and the data analysis that some government entities were so advanced in the number, quality of e-services offered, and new services are always initiated. Most of them lack systematic approach to look into the user's issues and concerns that are often received from multiple channels in order to follow a proactive approach and resolve some common issues before they escalate or even come up and initiate new e-services as per user wish list after conducting a reasonable feasible study.

A common concern by all government entities at a strategic level was the integration of systems between government entities is a must to meet quality factors in connection to performance and reliability. While at a technical level, usability, ease of use, and website design is an important factor to assure user satisfaction, accuracy of information provided, and lesser number of calls inquiring about the forms and information required. At a citizen level it is very important to raise awareness of the advantages provided by the provision of e-services and proper training or test prior to complete e-service launching in order to get feedback and offer the service as required by most of the public users.

Acknowledgments

The Research leading to these results has received Research Project Grant Funding from the Sultan Qaboos University of the Sultanate of Oman, Research Grant Agreement No [SR/EPS/INFS/14/01].

References

Alanezi, M., Kamil, A., & Basri, S. (2010). 'A proposed instrument dimensions for measuring e-government service quality'. *International Journal of u-and e-Service, Science and Technology Service, 3*(4), 1-18.

Alanezi, M., mahmood, A., & Basri, S. (2012). 'E- government service quality: a qualitative evaluation in the case of Saudi Arabia'. *The Electronic Journal on Information Systems in Developing Countries,* (3), 1-20.

AlBalushi, T., & Saqib, A. (2015). 'Quality Dimensions Trend Analysis in the Context of Evaluating E-government Services'. *Research Journal of Applied Sciences, Engineering and Technology ,, 11*(3), 315-324

Ding, D. X., Hu, P. J.-H., & Sheng, O. R. L. (2011). 'e-SELFQUAL: A scale for measuring online self-service quality'. *Journal of Business Research, 64*(5), 508-515. doi: 10.1016/j.jbusres.2010.04.007

Graneheim, U. H., & Lundman, B. (2004). 'Qualitative content analysis in nursing research: Concepts: procedures and measures to achieve trustworthiness'. *Nurse Education Today, 24*(2), 105–112.

Halaris, C., Magoutas, B., Papadomichelaki, X., & Mentzas, G. (2007). 'Classification and Synthesis of Quality Approaches in E-Government Services'. *Internet Research, 17*(4), 378-401. doi: 10.1108/10662240710828058

Hein, N. M. (2014). 'A study on evaluation of e-government service quality'. *International Journal of Social, Management, Economics and Bussiness Engineering 8*(1), 16-19.

Hsieh, H. F., & Shannon, S. E. (2005). 'Three Approaches to Qualitative Content Analysis'. *Qualitative Health Research, 15*(9), 1277-1288.

Krippendorff, K. (2004). Content analysis: An introduction to its methodology (2nd ed.). Thousand Oaks, CA: Sage Publishing.

Lin, J.-S. C., & Hsieh, P.-L. (2011). 'Assessing the self-service technology encounters: development and validation of SSTQUAL scale '. *Journal of Retailing, 87*(2), 194-206.

Loiacono, E. T., Richard T., W., & Goodhue, D. L. (2007). 'WebQual: an instrument for consumer evaluation of websites'. *International Journal of Electronic Commerce, 11*(3), 51-87. doi: 10.2753/JEC1086-4415110302

Loiacono, E. T., Watson, R. T., & Goodhue, D. L. (2002). 'WEBQUAL: A measure of website quality'. *Marketing Educators Conference: Marketing Theory and Applications, 13*(Winter 2002), 432-437.

Magoutas, B., & Mentzas, G. (2010). 'SALT: A semantic adaptive framework for monitoring citizen satisfaction from e-government services'. *Expert Systems with Applications, 37*(6), 4292-4300. doi: 10.1016/j.eswa.2009.11.071

Manoharan, A. (2013). 'A three dimensional assessment of U.S. county e-government'. *State and Local Government Review 45*(3), 153-162. doi: 10.1177/0160323X13494858

Osman, I. H., A. Anouze, Irani, Z., Lee, H., Balcı, A., Medeni, T., & Weerakkody, V. (2011). 'COBRA framework to evaluate e-government services: A citizen-centric perspective '. Paper presented at the tGov Workshop, Brunel University, West London.

Papadomichelaki, X., & Mentzas, G. (2012). 'E-GovQual: A multiple-item scale for assessing e-government service quality'. *Journal of Government Information Quartley, 29*(2012), 98-109. doi: 10.1016/j.giq.2011.08.011

Parasuraman, A., Zeithaml, A., & Malhotra, A. (2005). 'E-S-QUAL a multiple-item scale for assessing electronic service quality'. *Journal of Service Research, 7*(3), 213-233. doi: 10.1177/1094670504271156

Parasuraman, A., Zeithaml, V., & Berry, L. (1985). 'A conceptual model of service quality and its implications for future research'. *The Journal of Marketing, 49*(4), 41-50.

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988). 'SERVQUAL: A Multiple-Item Scale for Measuring Consumer Perceptions of Service Quality'. *Journal of Retailing (Spring), 64*(1), 12-40.

Sharma, S. K., Al-Shihi, H., & Govindaluri, S. M. (2013). 'Exploring quality of e-government services in Oman'. *Education, Business and Society: Contemporary Middle Eastern 6*(2), 87-100. doi: 10.1108/EBS-12-2012-0055

Stiakakis, E., & Georgiadis, C. K. (2009). 'E-service quality: comparing the perceptions of providers and customers'. *Managing Service Quality, 19*(4), 410-430.

Wolfinbarger, M., & Gilly, M. (2003). 'eTailQ: dimensionalizing, measuring and predictingetail quality'. *Journal of Retailing, 79*(3), 183–198. doi: 10.1016/S0022-4359(03)00034-4

Yoo, B., & Donthu, N. (2001). 'Developing a sale to measure the perceived quality of an Internet shopping site (SITEQUAL)'. *Quarterly Journal of Electronic Commerce, 2*(1), 31-47.

Zaidi, S. F. H., Siva, S., & Marir, F. (2014). 'Development and validation of a framework for assessing the performance and trust in e-government service'. *International Journal of Applied Information Systems (IJAIS), 17*(4), 28-37.

Zeithaml , V. A. (1988). 'Consumer Perceptions of Price, Quality, and Value: A Means-End Model and Synthesis of Evidence'. *Journal of Marketing, 52*(3), 2-22.

Ziemba, E., Papaj, T., & Descours, D. (2014). Assessing The Quality of E-Government Portals-The Polish Experience. Paper presented at the Federated Conference on Computer Science and Information Systems(FedCSIS),Warsaw.http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=6933163&abstractAccess=no&userType=inst

An Ontology Based Learning Objectives Development for Mobile Learning Domain

Rahma Al-Ghafri[1], Taiseera Al Balushi[2]
Information Systems Department,
College of Economics and Political Sciences,
Sultan Qaboos University, Oman
[1]Email: s88799@student.squ.edu.om,
[2]Email: taisira@squ.edu.om

Abstract

Mobile learning is about using mobile technology to access digital information while moving from one place to another. It supports anywhere, anytime learning approach by taking the latest advancement in mobile device to redefine the responsibility of teachers and students, and connect formal and informal learning together. Due to the development of mobile technology, it becomes necessary for instructors to take advantage of such development for effective learning process. However, instructors and instructional designers face challenges due to the lack of standardization of the pedagogical and curriculum theories in mobile learning domain compared to traditional learning domain. Therefore, this study proposes an ontology based approach to provide a roadmap for designing mobile learning courses in general and learning objective and outcomes in specific. The study follows METHONTOLOGY development method and uses protégé tool to construct the ontology. The study provides some initial evaluation results on the proposed ontology.

Keywords: mobile learning, learning objective, ontology

Introduction

Mobile learning considers as a new research area that keep developing and shaping as the development of mobile devices continue. Nowadays, it is becoming in the reach of all people and education sector is also taking advantages of this technology as many student own smart mobile devices and had mobile subscription (Poushter, 2016). Through these devices we can access to video and audio files, geo-locating, informational and academic resources ,and communicate with others through social media (Johnson & Witchey, 2011).

Many kinds of learning incorporate in M-learning overcome the traditional way of learning. For example, learners can learn alone using these devices or collaborate with others. Moreover, they can receive customized learning according to their context information. Furthermore, learning can take place outside the educational institutions boundaries, throughout the life. In any type of learning, instructors need to define the learning objectives for their students to help them focus on what is needed from them. Moreover, students need to know the suitable mobile application to support them in their learning experience. Therefore, there is a need to standardize the pedagogical requirements of mobile learning experience.

Despite the exposure in dependency on Mobile learning solution, it still considered in its infancy and development stage (Liaw, Hatala, & Huang, 2010). It has poor standardization of the educational and pedagogical requirements to support teaching and learning objectives (Barbosa, 2013). (Churchill, 2011) stated that most research done on technologies supporting teaching neglect discussing the significant role

of mobile application in learning experience. (Park, 2011) indicated that there is lack of solid theoretical framework in guiding instructional design and assessing the quality of learning activities supported by mobile technologies. Also, there is still scarce research on sustaining successful mobile application for attaining ideal learning outcomes that align between learner & instructors expectations and generating new skills in response to society's needs (Rajasingham, 2011).

While there are different stakeholders affected by the lack of standardization in Mobile learning domain. For instance, instructors face difficulties in integrating Mobile learning applications in the learning experience due to their lack of knowledge of the emergent Mobile learning applications (Khaddage, Lattemann, & Bray, 2011). There is a wealth of options of available Mobile learning applications which made the selection of the right applications for a given learning objectives more complex. They rely on other instructors or review the experience of others who have use that application earlier (Cherner, Dix, & Lee, 2014). This process is time consuming and it hinders the instructors on using mobile applications in education.

The challenge here is not only on the instructor, it also affect instructional designers in adapting new technologies to educational setting. (Hosler, 2013) has stated, "Implementing emerging technologies pose threats and challenges to well-established processes, procedures, and pedagogy entrenched in many higher education institutions".

Another issue is with mobile application developers who use programming languages and source code to create software that meets client requirements. (Khanghah & Halili, 2015) claim that the design of mobile learning applications is difficult process, which needs to combine the knowledge of programming and graphic design with the knowledge of pedagogical practice to design effective learning environment. While mobile applications developers may not have such knowledge as they are focusing more on the programming part.

Even the learner face challenge when searching for educational applications related to their age and their specific learning objective. What suit for kids cannot be qualified for adult and university students because kids need applications that are easy to use and have visual presentation and entertainment, while adults search for applications for just in time learning to enhance particular skills (Notari, Hielscher, & King, 2016). The alignment between the learning objectives, the learning experience supported by mobile application and the specific target group is very important.

From the other side, ontologies considered as a way for conceptualizing the terms in any domain. It used to share common understanding of subject area and it is very powerful for sharing and retrieving information (Noy & McGuinness, 2001). Moreover, ontologies are the state of art for constructing domain knowledge and Mobile learning applications can be consider as a specific kind of knowledge in regard of the learning objectives that support, the learning outcomes, and the learning theories that is based on. For mobile course design, there is a need to standardize the term used in designing Mobile learning experience and making this information accessible in convenient way for anyone want to implement or design mobile learning experience. There are a number of studies that used ontology based approach in the mobile learning domain (Abech, da Costa, Barbosa, Rigo, & da Rosa Righi, 2016), (Benlamri & Zhang, 2014), (Bremgartner, Netto, & Menezes, 2014)and (Soualah-Alila, Mendes, & Nicolle, 2013). However, these studies focus on customizing the learning experience to learner's preference like learner profile (their background, learning style, and interest), context information related to time and location, and description of the device used. However, there is still a gap in defining learning objectives for mobile learning domain while it is a very important component in the mobile learning domain. Therefore, this study will use ontology based approach to further the understanding and knowledge of educational community (instructor, learner, application designer, instructional designer)

about mobile-based learning objectives and outcomes. The following sections of the paper is divided as follows; section 2 presents a background study on learning objectives in the domain of mobile learning and ontologies, section 3 presents the research method used for the development of the ontologies, section 4 provides some initial evaluation for the proposed ontology while section 5 presents the summarizes the main contribution of the paper.

Background study

Mobile Learning

There are varieties of schools of thoughts that focus on mobile learning. One of the researcher stated that mobile learning is any kind of learning that is away from the normal environment or the one that count on mobile devices (Sharples, Taylor, & Vavoula, 2010). There is another important definition stated by the e-Learning Guild, it related mobile learning to any sort of activity that allowed individuals to be more productive when dealing with essential information through devices that people usually carry on daily basis and had constant connectivity besides fitting in a pocket or purse (Wexler, Brown, Metcalf, Rogers, & Wagner, 2008).

Huang discusses another diverse attitude to m- learning. He argues that, the term Mobile learning is not a new. It has been used to describe any learning that take place while student moving. For example, student who read book on the bus is learning. Instructors who talks to his student while moving is also learning. The term was more about the mobility of the learners and nothing to do with technology however, with the technology advancement in ICT tools, especially in mobile phone, it become synonymous with mobile devices (Huang, Zhang, Li, & Yang, 2012).

Ontology

Ontology is a form of naming and definition of the types, proprieties and interrelationship of the entities that really exist for a particular domain (Noy & McGuinness, 2001).

(Gruber, 1995) define ontology as an explicit specification of conceptualization. It considers as the most common definition for describing ontology as a conceptual model. Ontology is an explicit specification of knowledge level of a conceptualization, that affect the creation of a particular domain or task (Van Heijst, Schreiber, & Wielinga, 1997).

Ontology types and applications

There are various reasons for using ontologies on different domain including; sharing common understanding of the structure of information among people or software agents, enabling reuse of domain knowledge, making domain assumptions explicit, separate domain knowledge from the operational knowledge and analyzing domain knowledge (Noy & McGuinness, 2001). In general, there are two main reasons for using ontologies on learning environment which are representing knowledge and communicating knowledge (Ahmed, 2012).While (Stenzhorn, Beibwanger, & Schulz, 2007) distinguished between ontologies in three basic types: Top level ontology, top domain ontology and domain ontology.

This study will use domain ontology because it specifies concept and its relationship for a particular subject area and we are talking about specific domain that is Mobile learning course design, specifically learning objectives and outcomes design.

Learning objectives

Learning objectives is what the learner supposed to learn after completing the course. It defines the competency and the performance capabilities that the learner supposed to gain. According to (Mager, 1997) there is three fundamental components of learning objectives:

- Performance: it describes what the learner should be able to do.
- Condition: it defines the conditions under which the learner should be able to do it.
- Assessment: how well it must be done.

Setting the right learning objectives will help instructors and instructional designers on selecting the appropriate learning material for the learners. Moreover, it will help application developers on focusing their work on designing Mobile learning applications that achieve specific learning objectives instead of designing applications blindly without taking learning objectives on consideration. This will help them to see the missing area of application development that need to be fulfill for the student.

Furthermore, setting learning objectives is very important in education. This make educational institutions send their instructors to training course in order to know how to write learning objectives. The reason for that is setting appropriate learning objectives guide student on their learning experience. It let them focus on what they are supposed to learn. Starting with the learning objectives will guide the instructor on selecting the right course content, appropriate assessment and instructional strategies. It also will help student on focusing on their learning and monitoring their own progress.

There are many taxonomies and classification of learning objectives and outcomes used by instructional designers, trainers and educators to write effective learning objectives. Theses taxonomy is about the goal of the learning process. Bloom's Taxonomy (B. Bloom, Krathwohl, & Masia, 1984) is the most widely used by instructors in designing learning objectives. The original taxonomy has three domains of learning, which are the Cognitive, Affective and Psychomotor. The cognitive domain is about the mental skills or the knowledge that the learner should acquire. While affective domain is about the attitudes, psychomotor is about the skills (B. S. Bloom, 1956b). Moreover, there is other taxonomy developed after Blooms taxonomy for example, the SOLO (Structure of Observed Learning Outcomes) Taxonomy. It is an alternative of blooms cognitive domain. It describe the levels of learners understanding of a subject. It help both the instructor and learners in showing how the learner are progressing in their learning (Biggs & Collis, 2014). Furthermore, Finks (Fink, 2013) come up with a taxonomy that is not hierarchy as the other taxonomies but rather relational and interactive. It covers the cognitive and affective domains of learning.

Ontologies in learning objectives for Mobile learning domain

Although there is a breadth and depth of ontologies related studies in the educational domain, to the best of our knowledge there are no specific ontologies for learning objectives in Mobile learning domain. However, there are some similar studies related to learning objectives. For example, (Shroff, Keyes, & Linger, 2015) develop a taxonomy that link the learning theories with bloom's cognitive learning objectives and application classification. Another work done by (Andhare, Dalrymple, & Bansal, 2012), they standardize the learning objectives according to Bloom, Anderson and Krathwohl taxonomies of domain learning objectives and follow the instructional objective format defined by (Mager, 1997) to design the ontological model.

Research Methodologies

This study was conducted in order to help the educational community in designing appropriate Mobile learning experience by building ontology based domain knowledge for M-learning. The propose approach will focus on setting the learning objectives for Mobile learning and make this information accessible for educational community. This section will define the ontology development method, the tool used for constructing the ontology and the evaluation approach for that.

Development methodologies

There are various methods for ontology building. Since 1995, there were many methods developed for ontology like Methodology By Uschold And King (Uschold & King, 1995), Methodology By Grüninger And Fox (Grüninger & Fox, 1995), The approach of Amaya Berneras et al. (Bernaras, Laresgoiti, & Corera, 1996), METHONTOLOGY (López, Gómez-Pérez, Sierra, & Sierra, 1999) , and The SENSUS Ontology (Patil, Knight, & Russ, 1997).

(Fernández-López 1999) evaluate these methods. He found that most of these methods were not fully mature and it does not follow the IEEE stander. Among these methods, METHONTOLOGY consider the most mature one and it is widely used in many researches.

In 2001, ontology 101 has been develop by (Noy & McGuinness, 2001). It consider as the most practical and detailed method for constructing ontology from scratch, however, it has low compatibility with the IEEE standard. Later on, (Presutti, Daga, Gangemi, & Blomqvist, 2009) has introduce the eXtreme Design (XD) methodology and (de Almeida Falbo, 2014) introduce the second version of SABiO. The two methods depend on agile development process that is based on collaboration, incremental and iterative methods.

After careful consideration of the methods and referring to the scope of the study, METHONTOLOGY is selected to build the ontology. The reason for that is the study will not include people at this stage to build the ontology. In addition, METHONTOLOGY is commonly used in many research areas and has high compatibility with IEEE standards compare to other methods.

Ontology tool

Ontology tools are used to provide support for the ontology development process and for the subsequent ontology usage. The study will use Protégé tool because it is widely used by many ontology developers and it is available for free.

Ontology evaluation

Ontology evaluation refers to checking whether the ontology correctly conceptualizes the real world. It also check the content if it is correctly implemented, and that the ontology performs properly in the real world (Gómez-Pérez, 2001).

The study will be evaluated at the verification level to ensure that the ontology is developing in right way. Therefore, automatic analysis using OOPS Ontology Pitfall Scanner! (http://oops.linkeddata.es/), will be implemented for the evaluation. It is a web based evaluation method used to deduct common errors on ontology construction.

Construction of learning objectives ontology

This study will used METHONTOLOGY methods for the development of learning objectives ontologies as discussed in the previous section as illustrated in Fig 1. The steps for building the ontology will be explain in the following sections. The study will focus on constructing the ontology and evaluating it on verification level. The implementation will not be covered at this stage and thus the maintenance will be done after implementing the ontology.

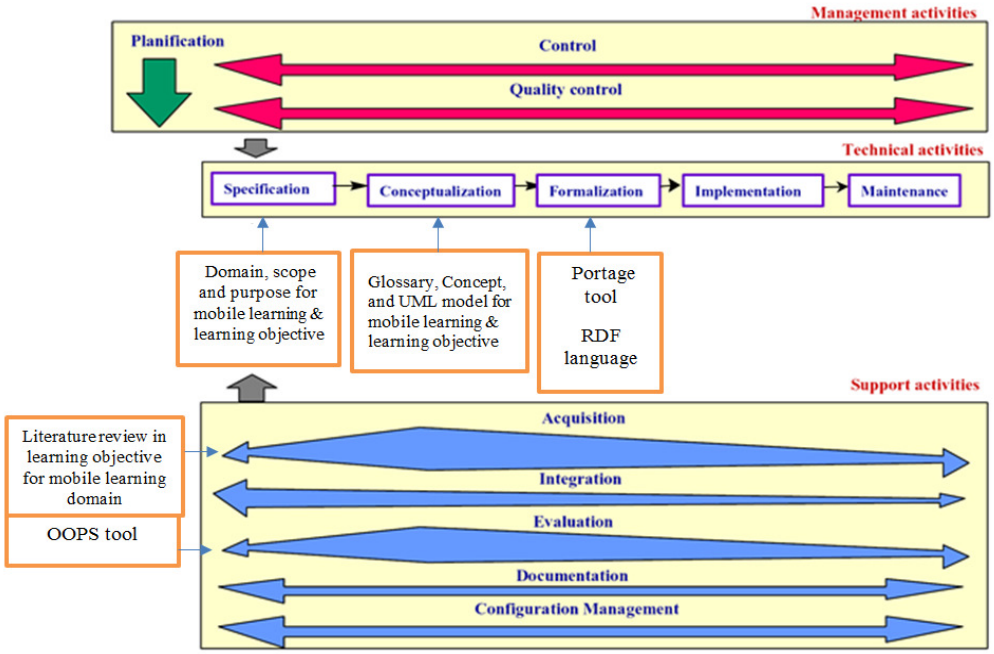


Fig 1. METHONTOLOGY process

Specification & Knowledge acquisition phase

It is the first step in the development of the ontology. Through this step, the goal, scope and domain of building the ontology will be define to guide the development of the ontology. This study has been conducted to provide instructors, instructional designers and application designers with common knowledge of learning objectives and outcomes for Mobile learning domain using ontology based approach. The proposed ontology will help instructors and instructional designers in determining and writing the learning objectives for Mobile learning activities. In addition, it will help mobile application designers on seeing the missing part for developing applications related to specific learning objectives.

The construction of the ontology will be limited to the studies found on the literature review based on competency questions developed in Table 1, which will help in identifying ontology purpose and scope.

Table 1: Competency questions

Q	Competency questions	Outcome	Reference
Q1	What are the components of learning objectives?	Criteria, performance, condition	(Andhare, et al., 2012)
Q2	What are the domains of learning objectives?	Cognitive, psychomotor, affective	(Anderson, Krathwohl, & Bloom, 2001), (B. S. Bloom, 1956a), (Simpson, 1971)
Q3	How to write learning objectives?	Identifying domain, level of domain, and selecting verbs	
Q4	How can M-applications support learning objectives?	Each level of domain has M-application to support	(Shroff, et al., 2015),
Q5	What are the verbs that can be used to write learning objectives?	Express, identify, find, etc.	(Anderson, et al., 2001), (B. S. Bloom, 1956a), (Simpson, 1971), (Biggs & Collis, 2014), (Fink, 2013), (Harrow, 1972)
Q6	What are the levels in each domain?	Remember, understand, apply, etc.	(Anderson, et al., 2001), (B. S. Bloom, 1956a), (Simpson, 1971), (Biggs & Collis, 2014), (Fink, 2013), (Harrow, 1972)
Q7	What is the relationship between learning objectives and Mobile learning experience?	Each domain in learning objectives can be apply to different Mobile learning experience	(Shroff, et al., 2015)

Conceptualization phase

This phase provide a conceptual model of the ontology. The knowledge collected in the previous phase will be analyzed and structured in a conceptual model. Therefore, the main concepts of the ontology should be identify. These concepts are identified as M-learning, learning objectives, mobile application, learning theories and learning domain. Then, these concepts are organized in hierarchy structure to show the classes with their subclasses. For example, cognitive, affective and psychomotor are subclasses of learning domain. After that, UML model is created to define the relationship between concepts as illustrated in Fig 2.

Formalization phase

In this phase, the conceptual model is transfer to computable model through ontology tools and languages. Protégé development tool and RDF language are used to construct the ontology. Fig 3 provides the visual presentation of learning objective ontology generated by OntoGraf tool.

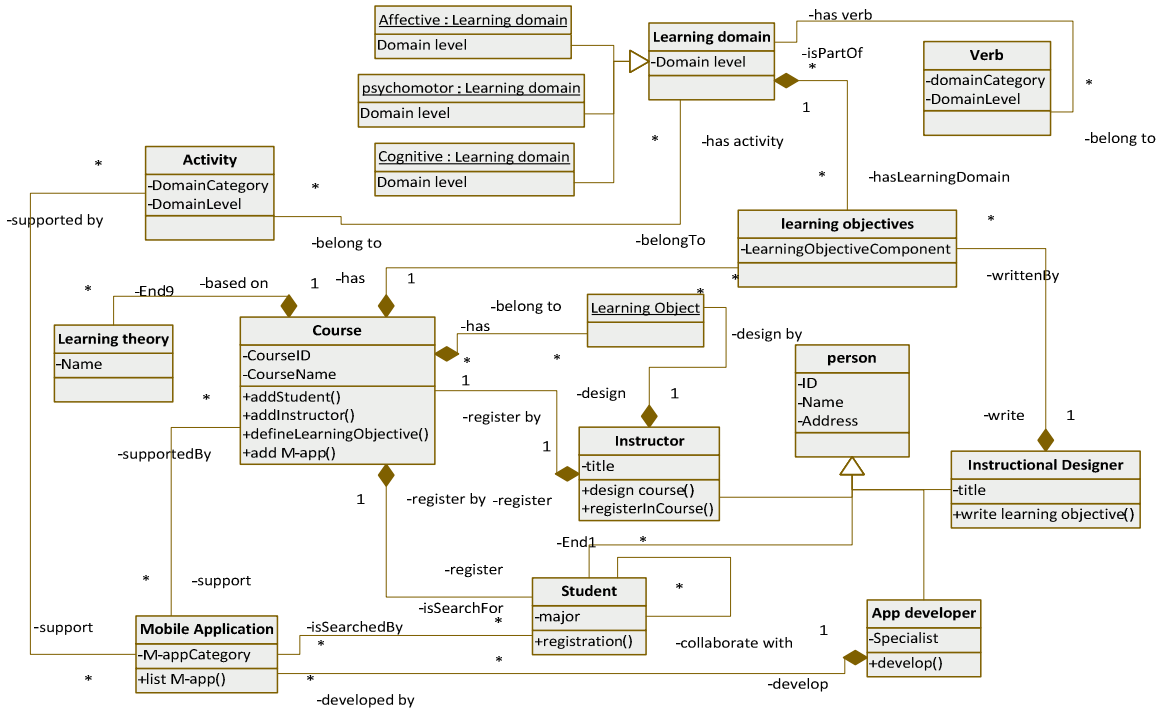


Fig 2. UML model for learning objectives ontology

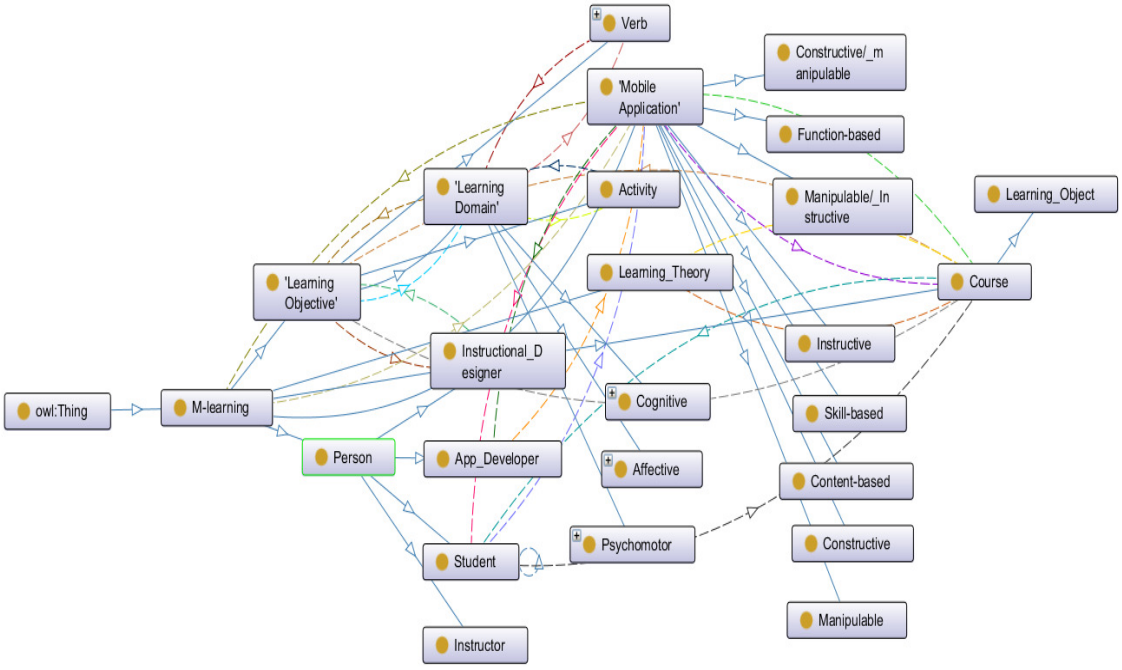


Fig 3. Part of learning objective ontology for M-learning

Evaluation

It is necessary to evaluate the ontology to ensure that it operate as intended to do. This will be by ensuring that the information is completed in each concepts, and the class attributes, and instance attributes are consistent and makes sense with each concept.

After performing OOPS pitfall scanner, it was found total of 102 errors between critical, important and minor cases. Most of the errors, 85 cases, were minor cases because of missing annotations. Critical errors appear because of defining multiple ranges or domains in properties and the important error because of missing domain or range in properties. After considering the suggestion of the tool the errors dropped to 4 cases which indicates good result because there is no critical errors and almost all of the errors were minor cases which are not really a problem as indicated by the OOPS tool. Fig 4 present the new result after modification.

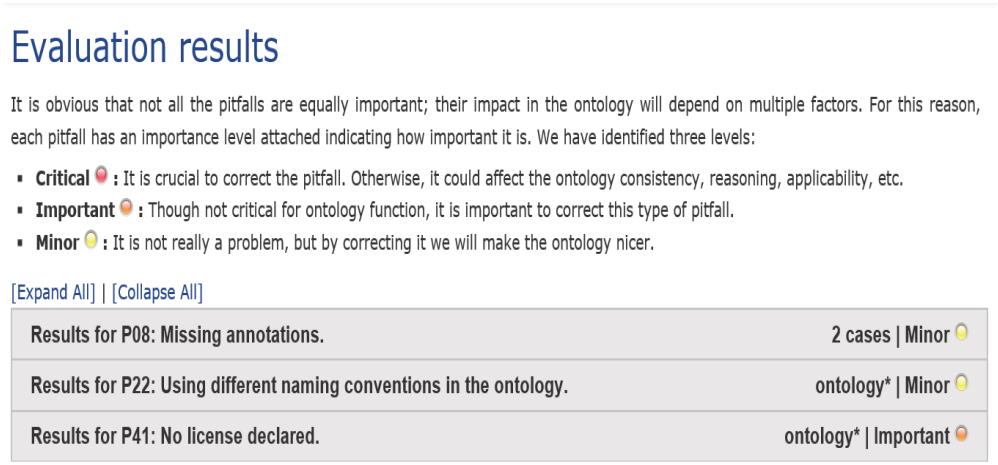


Fig 4. OOPS result

Conclusion

Research on Mobile learning area shows that there is lack of standardization of pedagogical requirements to support learning objectives. Therefore, this paper present an ontology based learning objectives for Mobile learning domain. The proposed ontology is based on other and previous work on ontologies development in mobile learning and learning objectives. It will help instructors and instructional designer in writing the appropriate learning objectives for their courses and select the suitable mobile applications for it. Moreover, it will help student to find the best applications for their courses and mobile application developer on developing applications for educational purpose. The ontology was developed using protégé development tool and evaluated using OOPS Ontology Pitfall Scanner!.

For future work, the ontology should be implemented to specific course and validated using other evaluation methods like expert evaluation to check the completeness and usefulness of this ontology when a course is developed. Moreover, this study was focus on the learning objectives for mobile learning however, it is intended to expand to include all parts of course design for mobile learning domain like the pedagogical approach used, the assessment technique, learners profile and their context information. For instance, researchers can go deeper to include the assessment part to insure that learning outcome achieve the learning objectives intended for the course.

Reference

Abech, M., da Costa, C. A., Barbosa, J. L. V., Rigo, S. J., & da Rosa Righi, R. (2016). 'A model for learning objects adaptation in light of mobile and context-aware computing'. *Personal and Ubiquitous Computing, 20*(2), 167-184. doi: 10.1007/s00779-016-0902-3

Ahmed, S. (2012). Mobile learning ontologies: supporting abductive inquiry-based learning in the sciences: a thesis presented in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Information Technology at Massey University, Albany, Auckland, New Zealand. Massey University. Retrieved from https://mro.massey.ac.nz/bitstream/handle/10179/4653/02_whole.pdf

Anderson, L. W., Krathwohl, D. R., & Bloom, B. S. (2001). A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives (1st Edition ed.). Longman: Allyn & Bacon.

Andhare, K., Dalrymple, O., & Bansal, S. (2012). 'Learning Objectives Feature for Instructional Module Development System'. Paper presented at the PSW American Society for Engineering Education Conference, San Luis Obispo, California.

Barbosa, E. F. (2013). 'A requirements catalog for mobile learning environments'. Paper presented at the Proceedings of the 28th Annual ACM Symposium on Applied Computing, ISBN: 1450316565, March 18 - 22, 2013 Coimbra, Portugal.

Benlamri, R., & Zhang, X. (2014). 'Context-aware recommender for mobile learners'. *Human-centric Computing and Information Sciences, 4*(1), 12. doi: 10.1186/s13673-014-0012-z

Bernaras, A., Laresgoiti, I., & Corera, J. (1996). Building and Reusing Ontologies for Electrical Network Applications'. Paper presented at the ECAI. http://dblp.uni-trier.de/db/conf/ecai/ecai96.html#BernarasLC96

Biggs, J. B., & Collis, K. F. (2014). Evaluating the quality of learning: The SOLO taxonomy (Structure of the Observed Learning Outcome): Academic Press.

Bloom, B., Krathwohl, D., & Masia, B. (1984). Bloom taxonomy of educational objectives: Allyn and Bacon, Boston, MA. Copyright (c) by Pearson Education.< http://www. coun. uvic. ca/learn/program/hndouts/bloom. html.

Bloom, B. S. (1956a). Taxonomy of Educational Objectives: Affective domain, by DR Krathwohl, BS Bloom [and] BB Masia (Vol. 2): D. McKay.

Bloom, B. S. (1956b). Taxonomy of educational objectives: The classification of educational goals: Cognitive Domain: Longman.

Bremgartner, V., Netto, J. M., & Menezes, C. (2014). 'Using Agents and Open Learner Model Ontology for Providing Constructive Adaptive Techniques in Virtual Learning Environments'. Paper presented at the IBERAMIA 2014: 14th Ibero-American Conference on Advances in Artificial Intelligence, Santiago de Chile, ISBN: 978-3-319-12027-0, November 24-27, 2014.

Cherner, T., Dix, J., & Lee, C. (2014). 'Cleaning up that mess: A framework for classifying educational apps'. *Contemporary Issues in Technology and Teacher Education, 14*(2), 158-193.

Churchill, D. (2011). 'Conceptual model learning objects and design recommendations for small screens'. *Educational Technology & Society, 14*(1), 203-216.

de Almeida Falbo, R. (2014). 'SABiO: Systematic Approach for Building Ontologies'. Paper presented at the ONTO. COM/ODISE@ FOIS.

Fink, L. D. (2013). Creating significant learning experiences: An integrated approach to designing college courses (2nd Edition ed.): John Wiley & Sons.

Gómez-Pérez, A. (2001). 'Evaluation of ontologies'. *International Journal of intelligent systems, 16*(3), 391-409. doi: 10.1002/1098-111X(200103)16:3<391::AID-INT1014>3.0.CO;2-2

Gruber, T. R. (1995). 'Toward principles for the design of ontologies used for knowledge sharing?'. *International journal of human-computer studies, 43*(5-6), 907-928.

Grüninger, M., & Fox, M. S. (1995). 'Methodology for the Design and Evaluation of Ontologies'.

Harrow, A. J. (1972). A taxonomy of the psychomotor domain: A guide for developing behavioral objectives (1st Edition ed.): Addison-Wesley Longman Ltd.

Hosler, K. A. (2013). Pedagogies, perspectives, and practices: Mobile learning through the experiences of faculty developers and instructional designers in centers for teaching and learning. Ph.D.Dissertation, University of Northern Colorado, Ann Arbor. Retrieved from https://ezproxysrv.squ.edu.om:2297/docview/1428371455?accountid=27575

Huang, R., Zhang, H., Li, Y., & Yang, J. (2012). A Framework of Designing Learning Activities for Mobile Learning. In S. K. S. Cheung, J. Fong, L.-F. Kwok, K. Li & R. Kwan (Eds.), Hybrid Learning: 5th International Conference, ICHL 2012, Guangzhou, China, August 13-15, 2012. Proceedings (pp. 9-22). Berlin, Heidelberg: Springer Berlin Heidelberg.

Johnson, L. F., & Witchey, H. (2011). 'The 2010 horizon report: Museum edition'. *Curator: The Museum Journal, 54*(1), 37-40.

Khaddage, F., Lattemann, C., & Bray, E. (2011). 'Mobile apps integration for teaching and learning (are teachers ready to re-blend?)'. Paper presented at the Proceedings of Society for Information Technology & Teacher Education International Conference, ISBN: 978-1-880094-84-6 Mar 07, 2011, Nashville, Tennessee, USA.

Khanghah, M. F., & Halili, S. H. B. (2015). 'Design and Development of Mobile Learning Application'. *The Online Journal of Distance Education and e-Learning, 3*(2), 31-40.

Liaw, S.-S., Hatala, M., & Huang, H.-M. (2010). 'Investigating acceptance toward mobile learning to assist individual knowledge management: Based on activity theory approach'. *Computers & Education, 54*(2), 446-454.

López, M. F., Gómez-Pérez, A., Sierra, J. P., & Sierra, A. P. (1999). 'Building a chemical ontology using methontology and the ontology design environment'. *IEEE Intelligent Systems and their applications, 14*(1), 37-46. doi: 10.1109/5254.747904

Mager, R. F. (1997). Preparing Instructional Objectives: A critical tool in the development of effective instruction (3rd edition ed.). Atlanta: The Center for Effective Performance, Inc.

Notari, M. P., Hielscher, M., & King, M. (2016). Educational Apps Ontology. In D. Churchill, J. Lu, T. K. F. Chiu & B. Fox (Eds.), Mobile Learning Design: Theories and Application (pp. 83-96). Singapore: Springer.

Noy, N. F., & McGuinness, D. L. (2001). Ontology development 101: A guide to creating your first ontology: Stanford knowledge systems laboratory technical report KSL-01-05 and Stanford medical informatics technical report SMI-2001-0880, Stanford, CA.

Park, Y. (2011). 'A pedagogical framework for mobile learning: Categorizing educational applications of mobile technologies into four types'. *International Review of Research in Open & Distance Learning, 12*(2), 25. doi: 10.19173/irrodl.v12i2.791

Patil, R., Knight, K., & Russ, T. (1997). 'Towards distributed use of large-scale ontologies'. Paper presented at the In AAAI Spring Symposium on Ontological Engineering.

Poushter, J. (2016). Smartphone Ownership and Internet Usage Continues to Climb in Emerging Economies Retrieved 3 Dec, 2016, from http://www.pewglobal.org/2016/02/22/smartphone-ownership-and-internet-usage-continues-to-climb-in-emerging-economies/

Presutti, V., Daga, E., Gangemi, A., & Blomqvist, E. (2009). 'eXtreme design with content ontology design patterns'. Paper presented at the Proceedings of the 2009 International Conference on Ontology Patterns, Aachen, Germany.

Rajasingham, L. (2011). 'Will mobile learning bring a paradigm shift in higher education?'. *Education Research International, 2011*, 10. doi: 10.1155/7592

Sharples, M., Taylor, J., & Vavoula, G. (2010). A theory of learning for the mobile age Medienbildung in neuen Kulturräumen (pp. 87-99): Springer.

Shroff, R. H., Keyes, C., & Linger, W. (2015). 'A Proposed Taxonomy of Theoretical and Pedagogical Perspectives of Mobile Applications to Support Ubiquitous Learning'. *Ubiquitous Learning: An International Journal, 8*(4), 23.

Simpson, E. (1971). Educational objectives in the psychomotor domain Behavioral Objectives in Curriculum Development: Selected Readings and Bibliography (1st Edition ed., Vol. 60, pp. 400): Educational Technology.

Soualah-Alila, F., Mendes, F., & Nicolle, C. (2013). 'A context-based adaptation in mobile learning'. *IEEE Computer Society Technical Committee on Learning Technology (TCLT), 15*(4), 5.

Stenzhorn, H., Beibwanger, E., & Schulz, S. (2007). 'Towards a top-domain ontology for linking biomedical ontologies'. Paper presented at the Medinfo 2007: Proceedings of the 12th World Congress on Health (Medical) Informatics; Building Sustainable Health Systems, ISBN: 9781586037741, Amsterdam.

Uschold, M., & King, M. (1995). Towards a methodology for building ontologies. Paper presented at the IJCAI'95 Workshop on Basic Ontological Issues in Knowledge Sharing, Montreal, Canada. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.697.8733&rep=rep1&type=pdf

Van Heijst, G., Schreiber, A. T., & Wielinga, B. J. (1997). 'Using explicit ontologies in KBS development'. *International journal of human-computer studies, 46*(2-3), 183-292.

Wexler, S., Brown, J., Metcalf, D., Rogers, D., & Wagner, E. (2008). 'eLearning guild research 360: report: Mobile learning'. *Santa Rosa, CA: eLearning Guild*.

The Participatory Process Approach Using and Building Open Education Resources. The Case of Learning University Network at UNAM, Mexico.

Alcantara-Concepcion Tamara, Dirección de Innovación y Desarrollo Tecnológico, Dirección General de Computo y Tecnologías de Información y Comunicación. Universidad Nacional Autónoma de México, Mexico City, México. E-mail: talcantarac@unam.mx

Abstract

The objective of this paper is to analyze the participatory experiences to integrate Information and Communication Technology (ICT) tools into teaching-learning processes. Nowadays, there are available numerous virtual learning objects, educational platforms, interactive systems and many other Open Learning Resources. Despite the ICT's widespread, not all the technologies are suitable to address the learning objectives or educational requirements; therefore, it is imperative not only developing, but also giving structure, and formalizing educative resources.

This paper also describes the experience of Mexican teachers building the Learning University Network (RUA). The processes have been developed to get assembled, organized and institutionalized Open Educational Resources with unified criteria; in order to support and recognize educative necessities throughout teaching and learning processes. Here, it is showed the system and participatory mechanisms to encourage the National Autonomous University of Mexico members to collaborate and build resources that aim to solve the educational needs in the whole process. The aim includes the RUA's evaluation and implementation know-how in the classrooms.

Keywords:

ICT, Online Educative Resources, Participatory Processes, Teaching and Learning Process.

Introduction:

In the last years, there has been a rapid growth in developing and integrating Information and Communication Technologies (ICT) into Teaching and Learning activities. Initiatives as how to manage the whole school or university until specific learning objects appeared. Complete platforms as Moodle, Sakai, Blackboard among others has been developed, as consequence of distance education evolution.

At the beginning, there were correspondence, cassettes and magazines distance courses, later CDs appeared. Even more basic education in homeschooling modality with special books and certifications appeared since 1950s decade (Courtenay, 2011). Currently, ICT incorporation into education processes allow complex, flexible and interactive tools. ICT permit fast information interchange and efficient communications, facilitating teaching-learning processes.

In the other hand, virtual education resources proliferation has not been enough. Now, it is possible to find a wide variety of this kind of resources in the World Wide Web, however not all topics of knowledge have related resources, there are different levels of developing. In consequence, it is possible to find conventional documents, books or journals; but some resources have been developed in very complex way. Some resources are very complex, with text, hyperlinks to navigate, evaluation and feedback, but it could be difficult to integrate digital resources into comprehensive curricula of schools or universities.

This paper is around the next research questions: How to develop reliable digital education resources related to big quantity of knowledge subjects? Is it possible to utilize participatory mechanisms to

build complex resources as a community? The Mexican University case is shown as an experience of participatory process approach to answer this questions.

Literature Review

Teaching and learning processes characteristics, methods and efficiency has been discussed throughout human history. Some periods and societies education was only for rich or religious people; un many cases small or individuals' interaction with teachers. Education in ancient Greece *was regarded as an essential component of a person's identity and the type of education a person received was based strongly on one's social class and the culture of one's poli* (Gvelesiani & Javakhishvili, 2013).

Education challenges have multiple aspects to deal with, for instance: the quality of knowledge and its transmission, inequity access conditions to acquire knowledge, high costs, lack of infrastructure and educators, and high rates of demand (Kremer, et al., 2013), (OECD, 2012).

Learning Theories

Diverse authors since 1950's decade have proposed theories and models to understand individual and organizational learning. Each of them has identified variables that affect the way people learn and make decisions. Table 1, shows some of the main theories.

Learning Theory	**Brief description**	**Reference**
Theory of cognitive dissonance	Continual adjustments, between cognition and action, result in one of three relationships with reality: Consonant relationship: Two cognitions or actions consistent with each other Irrelevant relationship: Two cognitions or actions unrelated to each other Dissonant relationship: Two cognitions or actions inconsistent with each other	(Festinger, 1957)
Cognitive, Affective and Behavioral Components of Attitudes	Stimuli provokes some attitudes that can be measure as: affect, cognition or behavior variables	Rosenberd and Hovland, 1960 in Freisbend, 1973 (Fishbein & Ajzen, 1975)
Theory of Reasoned Action.	The search for factors that systematically affect the amount of change due to active participation can be successful only when two conditions are met: First, the processes intervening between active participation and change in the independent variable must be well understood; and second, the investigator must be able to exercise sufficient control over the items of information to which subjects are exposed, so that the active participation experience will consistently facilitate the desired change in the dependent variable under investigation.	(Fishbein & Ajzen, 1975)
Social Learning Theory	Human behavior can be modeled by observation	(Bandura, 1977)
Adapted Theory of Reasoned Action	Introduces impact on intention from external variables demographic and personality among others, and	(Crosby & Muehling, 1983)
Organizational Learning	Describes organizational level of learning, and interchanging among individuals and the organization. Emphasize errors detections capabilities.	(Argyris, 1992)

Theory of Planned Behavior	Links beliefs and behavior. Generally speaking, a person will attempt to perform a behavior if he believes that the advantages of success. Some researchers reject it outright as an adequate explanation of human social behaviour. These investigators tend to deny the importance of consciousness as a causal agent (Wegner, 2002; Wegner & Wheatley, 1999)	(Ajzen, From intentions to actions: A theory of planned behavior. , 1985)
Double Loop Learning Theory	About individual learning, and how experience can modify the goals, objectives or decision choices. First loop following rules, second loop adapting goals.	(Argyris, Single and double loop models in research in decision making, 1976)
Five Disciplines	Proposed five competences to build a learning organization: Systems approach, individual mastering, changing individual and organization mental models, motivate learning sharing same vision than organization, increasing solve problem capacity conforming teams to learn and share the knowledge.	(Senge, 1990)
Knowledge Creating Company	knowledge creation is present when an organization generate and disseminate, deliberately, knowledge that enable or allows developing new products or modifying current processes. The author sustains the existence of two kinds of knowledge: tacit and explicit.	(Nonaka & Takeuchi, 1995)
Knowledge management	Davenport and Prusak's enounced three phases model: Generate, Codify, and Transfer. Later, Davenport affirmed than only humans generate knowledge, in consequence computers by itself are not enough to produce knowledge.	(Davenport & Prusak, 2000) (Davenport, 2005)
Knowledge management Cycle	European Committee for Standardization, identified five core activities of knowledge: Identify, Create, Storage, Share and Use.	(CEN, 2004)
Communities of practice	It is based in how to acquire specific knowledge thru sharing information and experiences.	(Wenger, 2010)

Table. 1: ***Learning Theories.***

E-learning

E-Learning is an electronic education system or distance program that integrates ICT and didactic elements to teaching and training students on line, in other words, the system is based in knowledge acquisition within electronic media. E-Learning is a distance education modality (EcuRed, 2015).

At UNAM, specialized E-Learning courses situated on line education advantages and disadvantages, when it is utilized a whole educative system, for instance an educative platform (CUAED-UNAM, 2012-1016):

Elimination of distance and time barriers, permanent availability of virtual resources and communication media as forums, chats, videoconferences, e-mails, blogs, social networks, slides presentations, books, journals and magazine, wikis and others. Assessors can be or not presents. Their benefits are: content changes and managing are easy to control, systems are flexible to add or change contents and times to adapt it according didactic requirements, organizing information, supervising, evaluating and feed backing constantly and individualizing is possible. Also stakeholders of the systems can enhance communications among them and with similar institutions. It is possible to share digital resources with similar courses or sessions.

In counterpart, some challenges detected utilizing virtual educative resources are: it is necessary to obtain reliance, trust and available for each study level. In other plane, teachers have to utilize educative resources with knowledge, not only about the subject of the course, but also about differences among face to face, semi-face to face and distance courses, considering furthermore the ICT skills. Even more it is indispensable to integrate pedagogic approaches, ICT knowledge and psychologic profiles. Adding to the requirement of infrastructure available for students and teachers as other critical factor, specially in countries or zones with economical insufficiency. Same point with normative to have access into virtual educative resources,

In their study about Everlyn Kahiigi and co-authors conclude that there emanate two problems in e-learning implementation within the higher education context (Kahiigi, et al., 2008):

1) the limited uptake of technology as an instruction delivery method; and

2) the ineffective use of technology to support learning.

Educative challenges

Educative international organizations, like the UNESCO, already worked and developed studies about the obstacles and advantages on the use of ICT in education (UNESCO, 2008; OCDE, 2017). For instance, it is relevant to mention an OCDE study that identifies four forces of change that will impact on high level education systems over the next decades (OCDE, 2017); those forces are:

- Globalization: The curricula will be internationalized, impacting in two ways: by increasing the pair to pair collaboration and by increasing the competition.

- Demography: Countries belonging to OCDE registered reductions in the traditional 18-to-25-year-old student age group will affect institutions. On the other hand, countries that do not belong to OCDE have also increased their education demands. Those demands are currently not fully covered; even more, there is an increase in educative demands among higher age groups. Mostly all countries are increasing their participation on higher education levels; and that demands are not overcome to date.

- New government forms: There are strong demands to improve public administrations. Lately there is an increase on all educative institutions to improve their areas in: Accountability, transparency, efficiency and effectiveness, responsiveness and forward vision. All those components are now considered of primordial importance to assure good public governance.

- Technologies: ICT developing an innovation has a large impact in education, but not in the expected magnitude. In contrast, e-learning does have a great potential; even when, to date, there are not monitoring studies. Institutions like the OCDE assure that there is an important increase in the number of students that opt for virtual environments.

On the other hand, the use of participatory virtual technologies, like Creative Commons and Web 2.0, to build digital contents does have rapid increase rates. This increase is mainly due to the increase of broadband and new software tools.

Mexico and education

Organization for Economic Co-operation and Development in Panorama 2017 study showed Mexican High Education Institutions have an insufficient capacity to face up to the student's education demand. Among others, study concludes only 16.8% people aged among 25-64 years-old receive a university degree (OCDE, 2017).

To have quality attention it is necessary to generate new ways to spread knowledge. ICT are offering, to general societies, more and more opportunities. The Virtual Systems developing enable easier productive and social processes Teaching-Learning Systems are not far of that changes, organizations

as UNESCO have formulated studies about advantages and disadvantages (UNESCO, 2008), however in Mexico there is not an accurate analysis of the situation and future actions to get teachers assimilation of ICT tools.

Open Educative Resources.

Due to editorial and distribution costs - and the business model of traditional editorials - many scientific journals started charging the authors with a publication fee. The cost of scientific journals implied a barrier, especially for scientist in the third world. Even more, the mandatory research copyright cession, in favor of the editorial - even with fees for the author of the manuscripts - was the origin of a movement. Such movement, called Open Access, started mainly in the USA, but quickly spread on many countries. Peter Suber defines Open Access as the movement that has the goal to assure the openness and freedom of scientific information to anyone. The academic activities supporting this idea started around 1966, spreading widely since them (Peter Suber, 2009).

While UNESCO has published the definition of *Open Educative Resources (OER) as learning, teaching and research material deposited in the public domain or published under an intellectual property license that allows their free use, adaptation and distribution* (UNESCO, 2017). Resources can be learning objects, full courses, simulations, manuals, books, and many other documents related to education and knowledge.

The participatory planning approach applied to the education process.

Participatory planning definition is: to build a desired future for a given system with all the involved people's actions and opinions. This approach is common when doing interventions of social organizations. Some advantages of this approach over the people involved are:

- They assume the plan's ownership and act consequently
- They know the system and it´s interactions; so, there is high confidence and reality when analyzing and collecting the data.
- They are a critical mass, with capacity of provide ideas and solutions in a wide variety of ways, including plenty knowledge of the today state and the past of the system.
- Many obstacles usually generate by the community on the system are overcome.

As Ming Sum and colleagues said: several studies on participatory process in education are focused on the students' participation (Ming-sum, T.B.K. et al, 2005 y Kucharčíková, A, 2016). This approach is straightforward for the education process, since mostly all learning and teaching process want to improve the students' capabilities; and the enabling media to reach the goal is basically the professor and the information and knowledge, including the mechanisms teachers decide to transfer.

In education, there is the collaborative learning concept. Developed by Vigotsky in the nineteen seventies, this concept is defined as: *the learning organization thru interaction of pairs* (Vigotsky, 1978). It is well documented an important group of efforts to set collaborative models; for instance the Badia job about: Learning through project' making and ICT (Badia, 2006). Most of these efforts are focused on facilitating the interaction among administrators and users thru technological tools.

Other projects, related to collaboration, are those that incorporate a specific ICT to stimulate collaboration. One example is given by Koschman, it is called: "*Computer Supported Collaborative Learning"* (CSCL); that is collaborative learning based on technologies for educative interaction (Koschmann, 1994). Also, Raidell Avello conducted a study focused on different sorts of ICT and their impacts when doing collaborative learning (Avello, 2016). Therefore, current collaboration research is mainly centered on the classroom and among students.

Despite the central role of teachers, the projects are not including in a systematic way the efforts from professors and researchers on the design and making ICT tools for learning, nor when building and electing tools during the teaching and learning process.

The system presented in next section, is centered in encouraging teachers' participation during the digital resources building, associated to the UNAM curricula. From the pedagogic stand point, teachers' participation is critical, due to their role as designers of the learning objectives, contents and dynamics on the day to day class. Is for this teachers' role, that assuring participation of all the elements related to the teaching and learning process is key when building tools. The main goal is to build the ICT according to the educative needs on each phase of the process, to have them evaluated and then to make them put in practice in the classrooms.

The *Learning University Network* Macro-System Analysis.

Figure 1 shows the background of ***Learning University Network*** (RUA by its acronym in Spanish) within the main components of its macro-system: National Autonomous University of Mexico (UNAM). As the support of the system, infrastructure has a fundamental role; academic activities at UNAM included education from the equivalent to High school to postgraduates, continuing education courses, and seminars. Those activities are conducted in an area over 2,815,591 m^2. That zone represents 2,183 buildings. The distribution of educative levels across the buildings is:

- University education: 15 departments, 5 multidisciplinary units and 5 National Schools.
- High Schools: 14 units.
- Research Institutions: 33 Institutes, 15 research centers, 10 university programs.

Over time, ITC have been included at all levels of the university, not without great efforts. By 2017, the UNAM has:

- 78,233 computers, all with Internet connection.
- 138,635 active accounts in the University Wireless Network.
- Supercomputing abilities, with 228 billion arithmetic operations per second.

Despite the large computer's amount, the numbers are not enough, considering that the UNAM's population is constituted by 349,539 students and 40,184 academics, for the year 2016-2017.
The University does have 120 academic programs at university level, with 208 educative options, 92 graduate programs (master's and doctorate), 3 high school programs, 35 technical programs among 5 areas: Social Sciences, Biological Sciences, Chemistry and Health Sciences, Physics and Mathematics, Humanities and Arts. In this setup, teachers are continually generating educative resources, practices, strategies, interactive systems, simulations, test questions, evaluations, and many other educative resources. The amount of materials is increasing constantly and keep track of all of them is not easy; but for instance, UNAM published a total of 1,944 books, in electronic and hardcopy formats, just for 2016.

On the other hand, in México there are several approaches oriented to make all publicly funded scientific information freely available, without any restrictions. In particular, the "*Ley de Ciencia y Tecnología, Artículo 65, Capitulo X. Del Acceso Abierto, Acceso a la Información Científica", Tecnológica y de Innovación y del Repositorio Nacional* (Science and Technology Law, article 65, chapter X, Regarding Open Access, Scientific, Technological, Innovation and National Repository Information Access) (H. Congreso de la Unión, 2014). Besides the UNAM's adhesion to this law, the institution has joined the Berlin declaration, whose mission is: "*to support new knowledge possibilities, not only in the classic way, but using the open access paradigm, through the use of internet. We define open access as an extensive human knowledge source and as a cultural heritage approved by the scientific community* "(Open Access 2003). Accordingly, UNAM has included open access and freely available resources though its own plans and programs since 2011 (UNAM 2011, 2015).

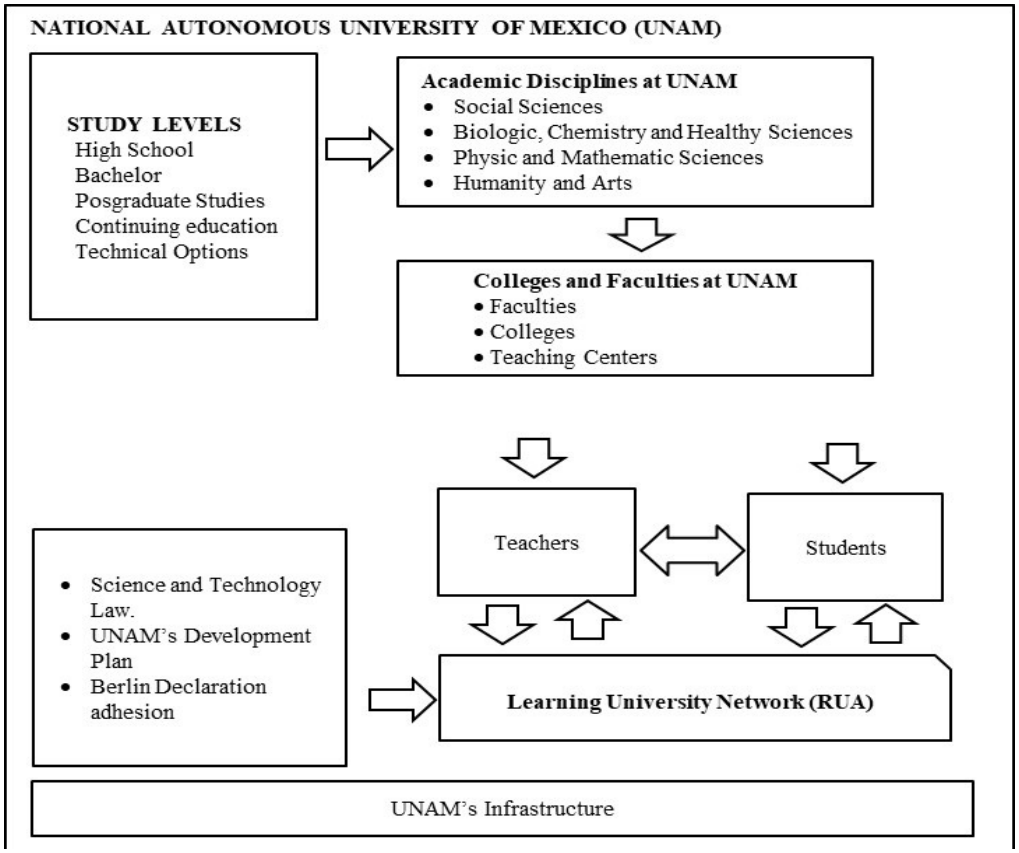


Fig. 1: ***Learning University Network*** **(RUA) Macrosystem.**

Many individual and institutional efforts have been done to make all UNAM information, completed with public resources, available and free to the members of the university and to the public. Among other efforts, an Open Educative Resources initiative appeared: The *Learning University Network*.

The System: *Learning Univerisity Network*

Felipe Bracho said: *Learning Univerisity Network* (RUA) is a cooperative institutional effort (Bracho 2017). The RUA started in 2011 and it is a virtual mechanism to hold Open Education Resources (OER). While, Castillejos added: the RUA goal is to make easily available to teachers all materials related to the UNAM curricula. Materials included in the RUA are generated by the UNAM or other university authors.
To date, the program "*Toda la UNAM en linea*" is the initiative that holds all the institutional efforts to publish open access information. The RUA is part of those efforts, but focused on educative resources (Castillejos et al, 2016).

The RUA is currently ministered by the *Dirección General de Cómputo y Tecnologías de Información y Comunicación (DGTIC)*. Many OER, focused on the university programs, have been published by DGTIC under the RUA, at least until 2016. A summary of the number of OER published is:

- *Iniciación Universitaria* (University Initiation Program): 1,649
- *Escuela Nacional Preparatoria* (ENP, High School): 5,735
- Colegio de Ciencias y Humanidades (CCH, High School): 4,230
- Bachelor programs: 3,700

- General interest subjects: 1,033

Nowadays, RUA contains different kinds of OER, as documents, books, apps, Web pages among others. All of OER has been reviewed by Academic Commit, and classified by school, semester, subject and themes, each of them with subdivision:

- Knowledge you must to knew
- Learning Resources for the topic
- Self-evaluation
- Teacher's resources
- Additional resources.

To date, DGTIC has been focused mainly on High School programs: CCH and ENP. High school OER about almost all the courses are already published. Therefore, the RUA is offering a group of advantages. According to Castillejos, advantages to the teachers' incudes (Castillejos et al, 2016):

- All OER can be used any time and everywhere.
- All members of the university have the possibility of publishing their own materials.
- Current participation channels are enhanced to all university members.
- The society has now high quality and resourceful OER.
- RUA is an institutional media to review and spread OER.
- All repositories with learning objects have high growing rates; this opens the door for automatic interchange among digital libraries and systems to educative applications.
- And for the students:
- To motivate, awake, and keep interest about the subjects.
- To serve as a learning guide to the students
- To evaluate knowledge and abilities
- To increase the learning opportunities
- To promote independent learning
- To speed up the study time
- To ease the access for learning materials without restrictions
- To get information about each course, including the syllabus and activities for each subject.
- To keep track about antecedents and follow ups on each subject

RUA's working processes and participation mechanisms.

Figure 2 includes the main processes, actors and activities needed to build, evaluate and divulgate OER. The efforts are focused to achieve the ITC incorporation to the educative process as efficient, effective and useful tools, capable to transmit abilities and knowledge at UNAM.

Therefore, the RUA has been designed and built according to the current Mexican laws and following international agreements regarding publishing research and teaching findings. Findings include all scientific, technological, and innovation data, already included in the strategic program "*Toda la UNAM en Línea*", since 2011. This strategic program is the fundamental stone that sustain all RUA's activities.

Five central processes to build the RUA are shown in Figure 2. Each process is linked to a responsible actor. Each actor is in charge of conducting or make possible the task, shown in the top of each process. All products and results are described in the lower part of each process. Relevant issues and characteristics are described in the lower section.

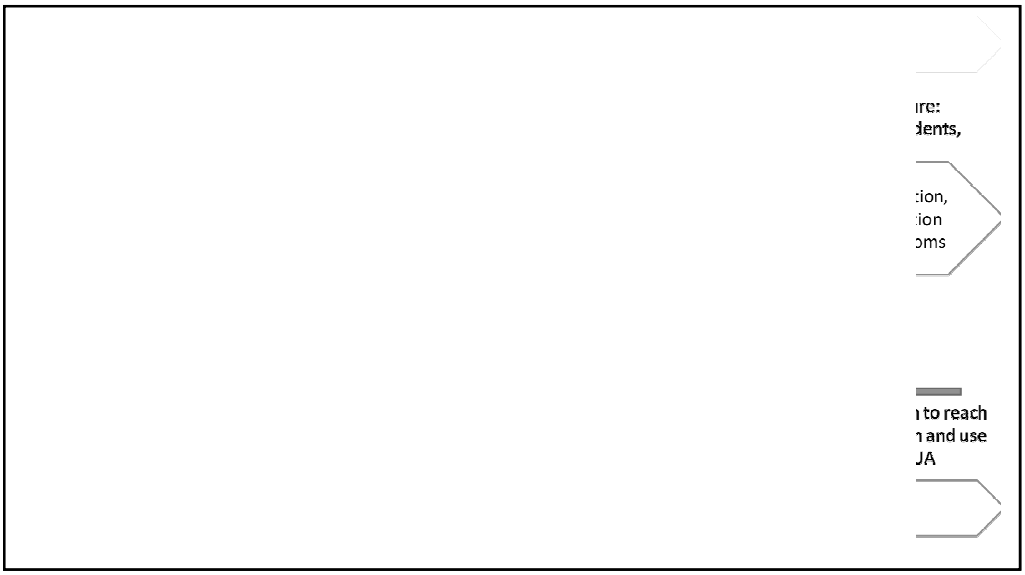


Figure 2: Processes and actors included in the building process of the *Learning University Network*. Own elaboration, based on internal working documents and personal interviews with *Dirección General de Cómputo y Tecnologías de Información y Comunicación* (DGTIC) employees (UNAM, 2016).

Each process implies large efforts and the need of involvement from authorities and professors. Included process and interactions to achieve community participation are:

1. Call for participation on developing digital resources.

The call for participation has been linked to the *Programa de Apoyo a Proyectos para la Innovación y Mejoramiento de la Enseñanza*, (Program to Support the Innovation and Enhancement Education Projects, PAPIME)" under the ministration of the *Dirección General de Asuntos del Personal Académico* (Direction of Academic Employment Subjects, DGAPA). Each year, the PAPIME is funding projects that propose building manuals, programs and digital applications, associated with the curricula and focused on strength the learning and teaching schemes (DGAPA, 2017). Independently from this call for participation, all university instances, teachers and researchers that develop or have developed their own materials are constantly invited to share them through the RUA.

Generally speaking, the only request is that all resources must be published and developed using free technologies, without restrictions, with free copyrights and, with preference, to be interactive. There is not a predefined format, so, any document, practice, simulation, or game that is linked to the UNAM curricula can be included freely.
DGTIC on their own is offering scholarships to teachers focused to achieve a RUA certification. This 180 hours' course, given to UNAM professors, is called "Digital resources for didactic planning" (UNAM, 2016).

This task is conducted by the professors, who add their knowledge and expertise when giving courses and on the Open Educative Resources (OER) development (RUA).
2. Sending materials for the RUA

Any OER can be uploaded to the RUA through a Web Page form. In order to ease communication and take advance of the online infrastructure, all the interactions between the users and the RUA is virtual. The RUA's Web Page has a section to login. All UNAM

researchers and teachers are allowed to login. Once logged in, there is a "suggest resources" option to suggest materials. All OER materials must be provided with: a title, a short description, the relation with any of the UNAMs' curricula, and the apps and/or documents (or links to them). Once the request is uploaded, DGTIC analyze and verify that the OER complies the copyrights, under the law - Ley Federal de Derecho de Autor - and the UNAM editorial guidelines (UNAM, 2007).

3. Validation

Evaluating the pertinence of contents is a complex task. May be this task will be unnecessary in the near future, given that all materials are generated by the university members. However, the learning process from DGTIC when building collaborations among professors has motivated them towards content validation. Content validation has allowed to strength the academic collaboration within the institutions and members, extend current collaborations, and even to build new partnerships.

Validation is conducted by an Academic Comitte. Each school or institution designs an ad-hoc academic body in charge to validate the OER. The procedure includes a meeting with DGTIC personnel to set goals and mechanisms needed when validating OER. The procedure includes:

- An evaluation, emitted from each participant professor.
- A collegiate judgment.

The process is reported online and the chief in charge of the institution is responsible to follow up the procedure. Final decision is registered in RUA's Web Page (UNAM, 2016).

4. Publication

Once the validation is done, there is a group of normalization and classification processes that must be meet prior publication. Normalization includes sometimes, the reconfiguration of materials to forms, styles, orthography, and grammar reviews. This reconfiguration is mainly done to achieve a standard on quality, regarding readability and easiness to display. None of the contents are modified. The classification includes the adjustment of an international standard: LOM (IEEE Std 1484.12.1 for Learning Object Metadata); this adjustment is called "LOM-RUA". LOM-RUA is a metadata that describes features and relevant data about the OER. The metadata are grouped in eight categories: General, Lifecycle, Technical information, Educative uses, Rights, Classification, and Control and Captures (RUA 2017).

5. Spread, divulgation and use on the classrooms

The fifth and last process is may be the largest challenge to the DGTIC personnel. The final goal of this effort is to achieve a full appropriation of the RUA contents by professors and students, mainly in the classrooms. This activity involved the willingness and decision from each teacher and researcher from every school and course; both elements out of the scope from the DGTIC. Consequently, to set spreading and use mechanisms is, in principle, a task that must be done by all (the teaching and learning actors, and the DGTIC personnel).

To date, DGTIC is conducting a project under the research-action methodology that support the constructs and a model building that help the use of materials in the classroom.

Conclusions

Teachers and researchers are, without doubt, the ones who better know the needs, strengths, and obstacles on the teaching and learning process due to their responsibility on giving a course. Here we want to stress that teacher participation process must be incentivized right from the design of educative tools. Open Educative Resources development by teacher's communities promotes the

intervention of the educators' groups on the design, elaboration, publication, and sharing materials of university's curricula. This promotion can encourage the utilization of each OER: if it has enough modularity to adapt at any course and learning objectives. And second: each OER would be enough strong to transmit a clear and effective knowledge.

Teachers participation is the key to overcome resistance to change problems. However, we must be aware that, in some cases, there are needs to be covered prior to the use an OER. We must have the proper technologies (ICT), knowledge, and skills that allow the OERs use. This use includes building tools with relevant features to get the message thru and transmit the knowledge centered in the learning and teaching process. Those lacks make it harder the production and use of virtual educative resources.

In UNAM case, participatory approach has encouraged participation and interest of teachers to learn and utilize OER into their classrooms. The Academic Program (PAPIME) to develop digital resources has had a good reception, increasing each year teacher participation. Therefore, universities must motivate the teachers work in creation and utilization of educative resources, associated with education budgets with same goal.

Presently, DGTIC is working in developing teachers' participation mechanisms. Currently, there is an effort to measure according constructs appropriated to a technological appropriation model (Saga and Zmud, 1999) and to the formulation of the use spreading strategy. Given the UNAMs' size, and the amount of institutions and curricula, it is very challenging for DGTIC personal alone to build the RUA. It is possible that in the near future the OER integration and creation for each course will be done by each school and department.

Acknowledgment

To Dr. Guillermo Rodríguez, Mta. Rebeca Valenzuela and their RUA team from DGTIC-UNAM to provide all information to analyze and to develop this paper.

Bibliography

Albors, J., Ramos, J., & Hervas, J. (2008). New learning network paradigms: Communities of objectives,. *International Journal of Information Management*(28), 194-202.

doi::10.1016/j.ijinfomgt.2007.09.006

Argyris, C. (1992). *On organisational learning.* Oxford: Blackwell Publishers.

Avello, R., & Duart, J. (2016). Nuevas tendencias de aprendizaje colaborativo en e-learning. Claves para su implementación efectiva. *Estudios pedagógicos, 42*(1). Obtenido de http://dx.doi.org/10.4067/S0718-07052016000100017

Badia, A., & García, C. (2006). Incorporación de las TIC en la enseñanza y el aprendizaje basados en la elaboración colaborativa de proyectos. *Revista de Universidad y Sociedad del Conocimiento, 3*(2).

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioural change. *Psychological Review, 84*(16), 191–215.

Bracho, F. (2017). ¿Qué es la RUA?. Entrevista al Dr. Felipe Bracho. UNAM FES Acatlán, CETED. Obtenido de http://mediacampus.cuaed.unam.mx/node/5701

Castillejos, J., & Peñaloza, M. (2016). Plataforma institucional para promover el Acceso Abierto a los contenidos digitales: Toda la UNAM en Línea. *Sexta Conferencia de Directores de Tecnología de Información, TICAL 2016.* Buenoa Aires, Argentina: Red Clara. Obtenido de http://tical2016.redclara.net/index.php/es/component/tags/tag/46-conferencia-tical

Crosby, L., & Muehling, D. (1983). External Variables and the Fishbeinmodel: Mediation, Moderation, Or Direct Effects? *Advances in Consumer Research*(10), 94-99.

CUAED-UNAM. (2012-1016). Diplomado en educación a distancia. *Docencia para la educación a distancia.* (C. d. Distancia, Ed.) CDMX: UNAM.

DGAPA-UNAM. (2017). *Programa de Apoyo a Proyectos para la Innovación y Mejoramiento de la Enseñanza (PAPIME)*. (P. d. (DGAPA), Productor) Recuperado el Mayo de 2017, de Universidad Nacional Autónoma de México: http://dgapa.unam.mx/

EcuRed. (2015). *Plataformas educativas.* Recuperado el 10 de Enero de 2016, de Enciclopedia colaborativa en la red cubana: http://www.ecured.cu/index.php/Plataformas_Educativas

Festinger, L. (1957). *A Theory of cognitive dissonance.* Stanford, CA: Stanford University Press.

Fishbein, M., & Ajzen, I. (1975). *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research.* Reading, MA: Addison-Wesley.

Gvelesiani, I., & Javakhishvili, I. (2013). Ancient and Contemporary Educational Systems. *European Scientific Journal, 4*(Special), 1857–7881.

H. Congreso de la Unión, C. (2014). Del Acceso Abierto, Acceso a la Información Científica, Tecnológica y de Innovación y del Repositorio Nacional. En *Ley de ciencia y tecnología.* CDMX: DOF 08-12-2015.

ITESM. (2017). *Aprendizaje Colaborativo. Técnicas Didácticas.* Instituto Tecnológico y de Estudios Superiores de Monterrey. Dirección de Investigación e Innovación Educativa. Obtenido de http://www.itesca.edu.mx/documentos/desarrollo_academico/metodo_apr

Kahiigi, E., Ekenberg, L., Danielson, M., Hansson, H., & Tusubira, F. F. (2008). Exploring the e-Learning State of Art. *The Electronic Journal of e-Learning, 6*(2), 77-88. Obtenido de www.ejel.org

Kremer, M., Brannen, C., & Glenner, R. (2013). The challenge of education and learning in the developing world. *Science, , 340*(6130), 297-300.

Kucharčíková, A., & Tokarčíková, E. (2016). Use of Participatory Methods in Teaching at the University. *The Online Journal of Science and Technology, 6*.

Mendoza, J. (2017). Participaciones en el foro universitario. *"La UNAM y los Desafíos de la Nación" sobre el tema de educación "Los temas críticos de la educación en México: Evaluación, financiamiento y equidad"*. CDMX, México: UNAM. Recuperado el 2017, de https://www.youtube.com/watch?v=0kV73gfXVWo

Ming-Sum, T., & Tsui, A. (2007). Participative Learning and Teaching Model: The Partnership of Students and Teachers in Practice Teaching. *The International Journal Social Work Education, 26*(4).

Muhlenbrock, M. (1999). A system for Analyzing Collaborative problem solving. *On line*. Obtenido de http://citeseerx.ist.psu.edu/viewdoc/download;jsessionid=D981C0EDF2B27AF1C898EE7C750583C2?doi=10.1.1.25.8372&rep=rep1&type=pdf

OCDE. (2016). *Panorama de la Educación 2016: Indicadores de la OCDE.* OCDE. Obtenido de https://www.oecd.org/mexico/Education-at-a-glance-2015-Mexico-in-Spanish.pdf

OCDE. (2017). *Panorama de la educación. Indicadores de la OCDE 2017.* Ma: MINISTERIO DE EDUCACIÓN, CULTURA, ESPAÑA.

OECD. (2012). *Equity and Quality in Education: Supporting Disadvantaged Students and Schools.* OECD Publishing.

OECD. (2017). *Giving Knowledge for Free the Emergence of Open Educational Resources.* Organisation for Economic Co-Operation and Development, Centre for Educational Research and Innovation.

Suber, P. (2009). *Timeline of the Open Access Movement. Formerly called the Timeline of the Free Online Scholarship Movement*. Obtenido de http://legacy.earlham.edu/~peters/fos/timeline.htm

UNAM. (2011). *Plan de Desarrollo Institucional (PDI) 2011-2015.* Dr. José Narro. Ciudad Universitaria, CDMX: UNAM. Recuperado el 2017, de http://www.planeacion.unam.mx/consulta/PlanDesarrollo2011-2015.pdf

UNAM. (2015). *Acuerdo por el que se establecen los Lineamientos Generales para la Política de Acceso Abierto de la Universidad Nacional Autónoma de México. Gaceta UNAM, 10 de septiembre de 2015.* C: UNAM.

UNAM. (2015). *Plan de Desarrollo Institucional (PDI) 2015-2019.* Ciudad Universitaria, CDMX: UNAM. Obtenido de http://www.rector.unam.mx/doctos/PDI-2015-2019.pdf

UNAM. (2016). *Red Universitaria de Aprendizaje (RUA)*. (U. N. México, Editor, & DGTIC, Productor) Recuperado el Abril de 2017, de http://www.rua.unam.mx/

UNAM. (2016). Red Universitaria de Aprendizaje (RUA), ¿Qué es y cómo funciona? Universidad Nacional Autónoma de México. DGTIC Documento de trabajo.

UNAM. (2016). Red Universitaria de Aprendizaje (RUA), Colegio de Ciencias y Humanidades. (U. N. trabajo, Ed.) Ciudad Universitaria, CDMX: UNAM.

UNAM. (2017). *La UNAM en números, 2016-2017.* Recuperado el Junio de 2017, de Portal de Estadística Universitaria. Coordinación de Sistemas, DGPL: http://www.estadistica.unam.mx/numeralia/

UNAM. (s.f.). *Toda la UNAM en línea*. Recuperado el Junio de 2017, de http://www.unamenlinea.unam.mx/

UNAM, L. t. (2007). *Edición y derecho de autor en las publicaciones de la UNAM.* (UNAM, Ed.) Recuperado el July de 2017, de Edición UNAM: http://www.edicion.unam.mx/html/4_6.html

UNESCO. (2008). *Etapas de las Sociedades del Conocimiento. Material de referencia para comunicadores.* InterPress Service.

UNESCO. (2008). *Etapas hacia las Sociedades del Conocimiento.* Uruguay: InterPress Service.

UNESCO. (2015). *Institute for Statistics. UIS.Stat Database; Education Theme.* UNESCO. Obtenido de http://www.uis.unesco.org

UNESCO. (2017). *Recursos Educativos Abiertos.* Comunicación e información de la UNESCO, Sección: Acceso al conocimiento. Obtenido de http://www.unesco.org/new/es/communication-and-information/access-to-knowledge/open-educational-resources/

Van der Krogt, F. (1998). Learning Network Theory: The Tension Between Learning Systems and Work Systems in Organizations. *Human Resource Development, 9*(2).

Vigotsky, L. (1978). *Mind in Society. The development of Higher Psycological Processes.* Harvard University Press.

Poland: immigration instead of emigration. Transformation of the mobility model

Assoc. Prof. Brygida Solga, Opole University of Technology, Faculty of Economics and Management, Department of Regional Policy, Opole, Poland, b.solga@po.opole.pl

Dr. Sabina Kubiciel – Lodzińska, Opole University of Technology, Faculty of Economics and Management, Department of Regional Policy, Opole, Poland, s.kubiciel@po.opole.pl

Abstract

Poland is still mostly a country of emigration, which features a substantial degree of departures. For many years now the rate of emigration continues to amount to approx. 2 million people. At the end of 2015, nearly 2.4 million Polish citizens resided abroad. Simultaneously, there is substantial transformation in the demographic structure of emigrants and emigration directions, and the effects of departures are becoming increasingly noticeable in the demographic and economic fields. Emigration abroad is thus becoming a huge challenge for the development of many Polish regions. Simultaneously, in recent years the number of arriving foreigners increased substantially. It is estimated that over 1.5 million foreigners resided in Poland in 2016. It is expected that along with the increasing social and economic appeal, Poland will attract increasing numbers of immigrants. The difference between emigration and immigration flows reduces gradually and Poland is becoming a country of immigration instead of emigration. It is expected that around 2020 Poland will become a country of net immigration.

In this context, the purpose of the paper is to present the nature and scale of the migration processes occurring in Poland. The paper starts with an overview of the migratory movement, with consideration of the development of foreign migration in Poland. Then, the paper presents selected statistical data on immigration – permanent and work-related, and relates them to the period after Poland joined the European Union. The forecast for abroad migration in Poland in 2014-2015 is also presented.

Keywords: Poland, immigration, emigration, labour market, migration cycle

Introduction

In Poland, similarly to Europe as a whole, migration became an integral element of the social and economic reality, and affects it strongly. They concern both emigration of Poles to other countries and an increasing inflow of people into Poland. Poland is no longer only a country of emigration, but its significance as an appealing country for immigrants increases, especially for immigrants from outside of the EU.

Over 1 million Ukrainian citizens worked in Poland in 2016, constituting the largest group of foreigners coming to Poland for work (Chmielewska, Doroczek, Puzynkiewicz, 2016:6). Approximately 200 thousand foreigners can be deemed as so-called long-term migrants, because they have a valid residence permit (UdSC 2015). It is estimated that the maintenance of the work resources at the current level until 2016, Poland would need to have another 5 million foreigners (Iglicka 2013:1). However, literature on migration views the country mainly as one that sends its migrants and this was the focus of most research papers conducted nationwide (Cieślińska 2012, Slany, Ślusarczyk 2012, Iglicka 2010, Kaczmarczyk, Okólski 2008a, Rajkiewicz 2002, Sakson 2002) and in regions (Solga 2013, Heffner 2012, Jończy 2010, Rauziński, Szczygielski 2009, Rostropowicz – Miśko 2007). The notion of viewing Poland as a target country is only just being developed. Gradual, but increasingly noticeable changes in mobility are also being observed. Poland's economic

and political transformation, and then its accession to the European Union and gradual opening to western labour markets contributed to the mass emigration of the Poles (Rokita-Poskart 2014: 163). The consequence of this emigration was labour shortages on the Polish labour market. The shortages were becoming compensated by foreign workers mainly from the post-USSR countries, including the largest group of Ukrainian citizens.

It can be assumed, based on the concept of the migration cycle (Okólski 2012, Fassmann, Reeger 2012:12, 66) implying the transformation of an emigration country into an immigration country, that Poland will also be the subject of this process (Kaczmarczyk, Okólski 2008b). This was the case for the Mediterranean region, which was an "exporter" of labour until the 1980's and 90s, when it became the target of migrant inflow (Cangiano, Strozza 2008:156-163, Hierro 2016). This type of mobility changes don't only happen in Poland. They are also becoming visible in other Central and Eastern European countries, e.g. the Czech Republic (Drobohlav, Dzúrová 2007, Klvaňová 2010, Janská, Čermák, Wright 2014) and Hungary (Jakobi 2010). These countries are referred to in literature as future immigration countries (Okólski 2012: 23) or transforming countries (Gropas, Triandafyllidou 2007) .

The purpose of the paper is to show in a statistical frame the changes occurring in Poland in the recent years in terms of the migration processes, i.e. emigration and immigration.

Emigration from Poland – nature and scope of the phenomenon

For decades Poland has been a traditional country of emigration (Solga 2013: 126-154). Migration took on massive sizes as early as in the 19th century due to deep social changes, including an accelerated demographic growth. It is estimated that between 1860-1940, approx. 5 million people left Poland, including 1.7 million who travelled to the USA and only 20-30% came back (Kaczmarczyk 2005:111). Between 1939-1944, migration was compulsory and was strictly related to military operations, after which resettlements took place as consequence of the post-war political and territorial changes in Poland. The period of 1951-1955 featured halting the departures, due to the politically-driven stoppage of abroad migration. In the 1960's, despite the restrictive state policy, permanent and temporary emigration grew constantly. In this period there was an increase in economic immigration to socialist bloc states, whereas departures to capitalist states was selective. In the case of FRG departures, emigration was limited almost exclusively to people of German descent. The number of Poles taking up jobs abroad in the 1960's is estimated at approx. 10-30 thousand people annually (Stola 2001: 62-101).

The 1970's is a period of border movement liberalisation and, in consequence, of increased abroad emigration of the Polish people. Over 4.2 million people left to Western European states. The dominance of temporary economic departures became consolidated in this period. The scale of departures was large at the end of the decade – in 1976, over 10 million people left Poland (i.e. 11 times more than in 1970), including nearly 7 million departures to the GDR (Kaczmarczyk 2005: 123).

It was only in the 1980's when the foreign travel restrictions were radically liberalised by the authorities of the People's Republic of Poland and migration became massive. It is estimated that the total number of emigrants amounted to 2.2 - 2.35 million people between 1980-1989, including 1.1 - 1.3 million long-term emigrants (Okólski 1994: 34). 80% of permanent emigrants and 45% of temporary emigrants left for the FRG, thus substantially increasing the scale of family ties with the country. A major part of this migration was illegal. Most featured tourist departures which ended in permanent or long-term residence abroad, often without the ability to join families left in the country.

The political changes of 1989, introduction of free passport access for Polish citizens and abolishment of the visa policies by most western countries contributed to substantial changes in the migration processes. In the 1990's, temporary economic migration, often of circulatory nature, has become the primary form of foreign mobility of the Polish people. Therefore, the most important

motivation of abroad migration were economic aspects, whereas political and national factors which were dominant earlier ceased to be relevant after transformation (Solga 2015a: 47-59). The scale of emigration was substantial and it is estimated that approx. 3 million people left the country annually in that period (Okólski 2001: 31-62).

An important turning point for international mobility was Poland's access to the European Union in 2004. From that moment on[1] Poles were free to travel to the EU states as residents, workers and entrepreneurs. This circumstance started a huge wave of departures and between 2004 and 2006, the number of migrants nearly doubled (table 1). Simultaneously, the migration processes featured a completely new situation in qualitative terms. It turned out that the post-accession outflow of people, which earlier was mostly circulatory, changed into emigration, i.e. long-term residence abroad. The data deriving from the census conducted in 2011 demonstrates that approx. 2 million people resided abroad for more than 3 months, most of which – 1.5 million – resided abroad for over 12 months. This means that for each thousand of Polish citizens, over 50 resides temporarily abroad for at least a quarter of a year (Anacka, Okólski 2014: 45-69).

The post-accession period featured a clear change in the structure, models and directions of emigration (Heffner, Solga 2014: 189-203; Anacka, Okólski 2010: 141-162). The census data demonstrates that the modern Polish emigrants are equally male and female, young people (83% in reproductive age) and people coming from cities (70%), who are also well educated (20% with higher education) (Fihel, Kaczmarczyk 2013: 112-159).

According to the newest estimations of the Central Statistical Office, at the end of 2015, nearly 2.4 million Polish citizens resided abroad temporarily (above three months), and most of them – over 1.9 million – resided in the UE member state (table 1).[2]. Most Poles are still residing in Great Britain (720 thousand), Germany (655 thousand), the Netherlands (112 thousand) and Ireland (111 thousand). A substantial increase in the number of Poles residing in Germany (almost by 7%) and in Great Britain (by 5%), i.e. main target countries of emigration from Poland has been noted in the recent years. Still, majority of temporary emigrants (approx. 80%) resides abroad for at least 12 months. They are therefore long-term emigrants and should be included in the population censuses of the immigration countries as residents.

[1] Repealing the restrictions to EU labour market access was executed successively. It was Great Britain, Ireland and Scotland that opened their labour markets for new EU countries the earliest, i.e. on the date that Poland joined the EU – 1 May 2004. The last countries to do so were Germany and Austria in 2011.

[2] Currently, the migration research system conducted by the Central Statistical Office uses an approach that integrates statistical information about migration, thus allowing the compilation of data about the scale and directions of abroad migration and specific forms of mobility (e.g. migration related to education, economic migration to Poland from outside the EU/EEA). The main sources of data about abroad migration and international security are: functioning national registration systems, registers, databases, statistical research, including: population censuses, sample surveys (BAEL, EU-SILC), Eurostat and OECD database, mirror statistics and foreign administration sources.

Table 1: Estimated emigration from Poland for temporary stay in years 2004-2015[a]

Country of residence	Emigrants in thousands											
	2004	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Total	**1 000**	**1 450**	**1 950**	**2 270**	**2 210**	**2 100**	**2 000**	**2 060**	**2 130**	**2 196**	**2 320**	**2 397**
Europe	**770**	**1 200**	**1 610**	**1 925**	**1 887**	**1 765**	**1 685**	**1 754**	**1 816**	**1 891**	**2 013**	**2 098**
European Union (27 countries)[b], including:	**750**	**1 170**	**1 550**	**1 860**	**1 820**	**1 690**	**1 607**	**1 670**	**1 720**	**1 789**	**1 901**	**1 983**
Austria	15	25	34	39	40	36	29	25	28	31	34	36
Belgium	13	21	28	31	33	34	45	47	48	49	49	52
Cyprus	.	.	.	4	4	3	3	3	2	1	1	1
Czech Republic	.	.	.	8	10	9	7	7	8	8	9	9
Denmark	.	.	.	17	19	20	19	21	23	25	28	30
Finland	0,4	0,7	3	4	4	3	3	2	2	3	3	3
France	30	44	49	55	56	60	60	62	63	63	63	64
Greece	13	17	20	20	20	16	16	15	14	12	9	8
Netherlands	23	43	55	98	108	98	92	95	97	103	109	112
Spain	26	37	44	80	83	84	48	40	37	34	32	30
Ireland	15	76	120	200	180	140	133	120	118	115	113	11
Germany	385	430	450	490	490	465	440	470	500	560	614	655
Portugal	0,5	0,6	1	1	1	1	1	1	1	1	1	1
Sweden	11	17	25	27	29	31	33	36	39	40	43	46
Great Britain	150	340	580	690	650	595	580	625	637	642	685	720
Italy	59	70	85	87	88	88	92	94	97	96	96	94
Countries outside the EU, including:	20	30	60	65	67	75	78	85	96	102	112	115
Norway	.	.	.	36	38	45	50	56	65	71	79	84

a - data concerning the number of people temporarily residing abroad: until 2006 - above 2 months, for years 2007-2015 - above 3 months, b - until 2006, of 25 countries.

Source: Information on the scale and directions of temporary emigration from Poland between 2004 – 2015, Central Statistical Office, Warsaw 2016, p.

Inflow of immigrants to Poland – selected statistical data

The constitutional transformation after 1989 and Poland's accession to the European Union (2004) resulted in an increased inflow of immigrants, which is becoming increasingly noticeable in the recent years. In 2015, Poland hosted nearly 92 thousand of foreigners registered for temporary residence of over 3 months, while in 2005 there were just over 41 thousand foreigners (Rocznik Demograficzny 2016:454). In 2016, over 211 thousand foreigners had documents confirming their right of residence (Rocznik Demograficzny 2016: 447). Currently, the most important source country for immigration to Poland is Ukraine. The citizens of Ukraine are leading the statistics in terms of establishment, work and higher education studies (Lesińska et. al. 2012 :3).

The knowledge on the presence of foreigners in Poland is available from several sources, including:

- data of the Foreigners Office (including, among others, registers concerning establishment permits, fixed-term residence permits, EC long-term resident permits, refugee status approvals, tolerated stay permits, permanent residence cards),

- data of the Ministry of Labour and Social Policy (including data concerning work permits and registered declarations on intent of entrusting a foreigner with work).

These registered apply to slightly different groups of immigrants. The statistics collected by the Foreigners Office concern people for whom Poland becomes a temporary (time for which the document is issued) place of residence and centre of interest (this group includes both foreigners residing in Poland for many years as well as refugees and foreign students). On the other hand, work permits and declarations (simplified form of employing foreign workers, allowing the citizens of Ukraine, Belarus, Russia, Moldavia and Georgia to take up work for 6 months without a permit) concern the group of immigrants whose main purpose of arrival is taking up work and usually returning to their country of origin. These persons can be classified as "economic immigrants". Of course, both groups overlap, because "permanent immigrants" take up work and a certain group of "economic immigrants" can obtain residence documents.

The backbone of immigrants in Poland features people arriving to find work. When analysing the statistical data concerning work permits and declarations on the intent to entrust work, it is possible to see an increasing relevance of foreign labour on the Polish labour market (figure 1). Starting from 2007, the number of documents issued began to rise. In 2008, there was 1/3 more documents than in 2004, in 2009 - nearly two and a half more, and in 2010 - the number tripled in comparison to 2004. Between 2011 and 2014, the average annual number of issued work permits fluctuated around 40 thousand. However, in 2015, we recorded a substantial increase in their numbers, as over 65 thousand permits were issued, while in 2016 - over 120 thousand.

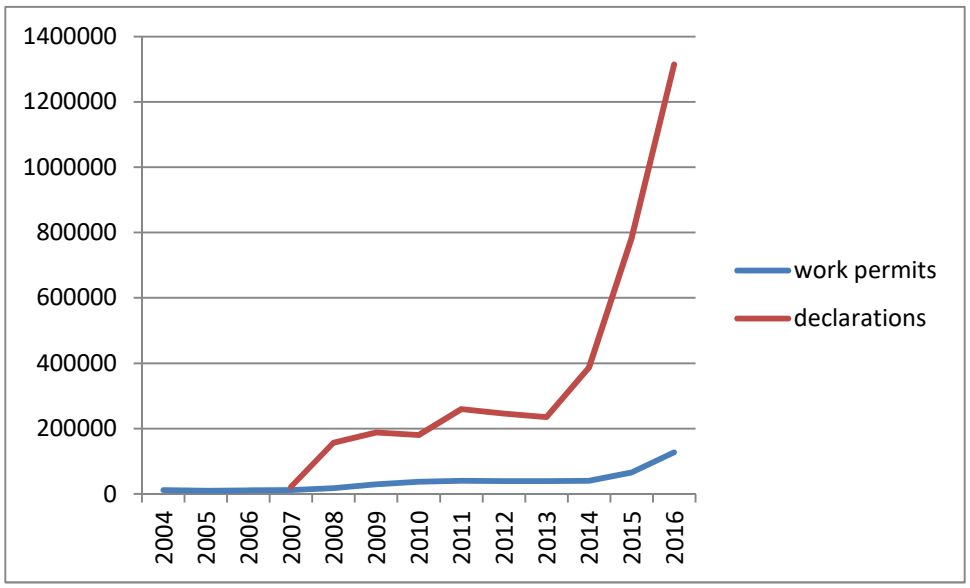


Figure 1. Work permits issued to foreigners in Poland in years 2004 - 2016 and registered declarations on intent of entrusting a foreigner with work in years 2007 -2016

Source: Ministry of Family Labour and Social Policy, http://psz.praca.gov.pl/rynek-pracy/statystyki-i-analizy/zatrudnianie-cudzoziemcow-w-polsce [22.08.2017].

Declarations on the intent to entrust work (simplified form of foreigner employment) is present in the Polish legal system from 2006, however the statistics only include data from 2007 onwards. Their numbers recorded all across the country are presented in figure 1. In 2007, there were nearly 22 thousand declarations, but only a year later over 156 thousand foreigners, i.e. seven times more, were registered! This shows that the interest in short-term (seasonal) employment of foreigners (mainly Ukrainians) was enormous. From 2014, we can observe substantial increases in the number of registered documents. In 2016, their number exceeded 1.3 million. The documents that allow foreigners to take up legal work are issued mainly to Ukrainian citizens.

The number of documents allowing foreigners to become long-term residents in Poland was also subject to comparison. Figure 2 presents the numbers of positive decisions issued to foreigners applying for: permanent residence permits, temporary residence permits and long-term EU residence permits. In 2015-2016, we recorded an increase in the number of positive decisions concerning residence legalisation. This mainly results from the situation in Ukraine, because its citizens are the most numerous group of applicants. In 2015, Ukrainians constituted over 60%, in 2014 - over 40%, and earlier - approx. 1/3 of the applicants (The Office for… 2015).

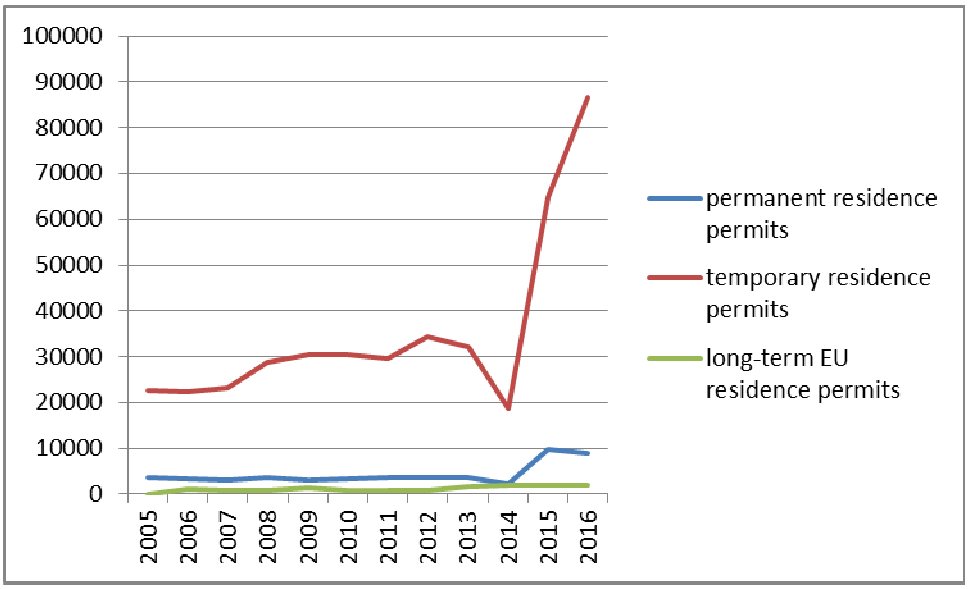


Figure 2. Positive decisions issued to foreigners in Poland applying for: permanent residence permits, temporary residence permits and long-term EU residence permits in years 2005-2016

Source: The Office for Foreigners, https://udsc.gov.pl/statystyki/ [22.08.2017].

One of the Polish demographic forecast scenarios until 2050 assumes that about 2020, the relevance of immigration will increase, while emigration will decrease (Population Projection, 2014:100) (figure 3). These assumptions are compliant with the entries of the "Poland 2030. The third wave of modernity" report, which includes recommendations for Poland's social and economic growth in the following years.

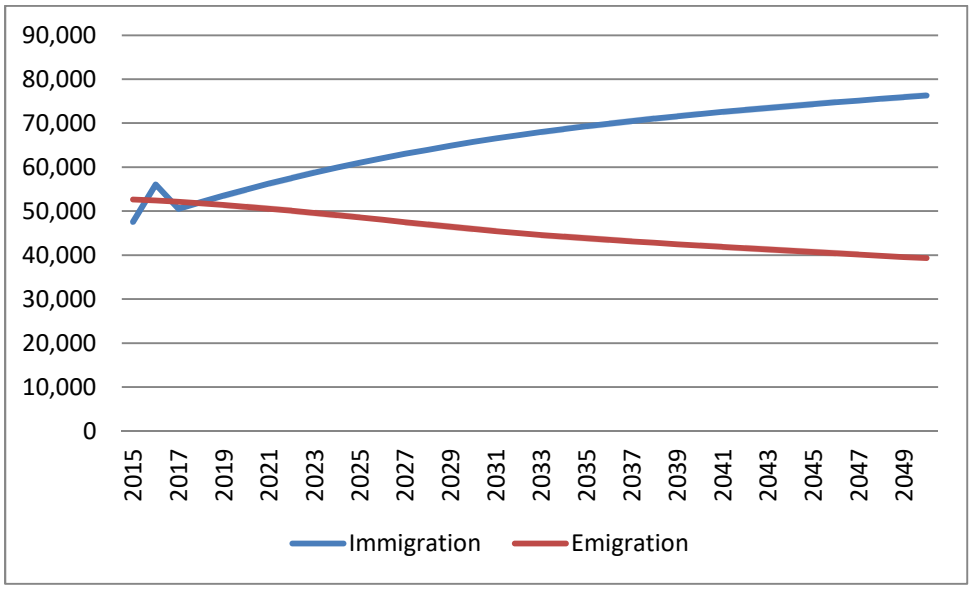


Figure 3. Forecast of international migration (permanent) in Poland for years 2015-2050

Source: Forecast of population residing in Poland for years 2015-2050 (2016), Central Statistical Office, Warsaw, http://stat.gov.pl/obszary-tematyczne/ludnosc/prognoza-ludnosci/prognoza-ludnosci-rezydujacej-dla-polski-na-lata-2015-2050,8,1.html.

The factors that favour the inflow of immigrants include economic growth, solidification of labour market segmentation and adverse demographic changes (Vishnevsky 2013). Ageing and shrinking society, and thus gradual decrease of labour resources, are deemed as the most important factor that stimulates immigration (Sassen 1988, Münz et. al., 2007, Harper 2016). These phenomena occur in Poland. It is predicted that the demand for services related to elder care and health care, mainly in geriatrics, will increase, thus stimulating the inflow of foreign labour, especially its feminisation, which is favoured by the increasing rate of occupational activity among Polish women (Maj 2017:68). According to the estimations, the number of foreigners in the overall population in Poland will increase and around 2060 will amount to approx. 11% and foreigners will constitute 16% of the group of 15-64 (Fihel, Okólski 2017: 37).

Summary

The experiences of western European states demonstrate that economic growth allows domestic labour to change employment and resign from working in secondary (unappealing) labour market sectors for primary (appealing) labour market sectors, thus causing the demand for replacement workers (Hudson, 2007). In the western European states, these generally included immigrants from less developed countries. The demand for workers was (and is) also stimulated by demographic changes, i.e. ageing of society and the deterioration of current and future labour resources. We are currently dealing with virtually the same situation in Poland which, for many years, was a country that people were leaving – permanently or periodically – for work. Currently, the emigration outflow has stabilised, despite still being high, but the inflow of foreigners, mainly people that intend to take up work, is becoming increasingly important. Periodical immigration is therefore dominant, whereas establishment immigration is substantially less relevant. Poland is mainly the target of people that are ready to take up work in sectors (occupations) from the

secondary labour market, which are not appealing from the point of view of domestic labour. Entrepreneurs are increasingly aware that they have to seek for employees, which causes positive changes, among others affects the improvement of working conditions (Polek – Duraj 2017: 220). However, in some industries, even these activities do not improve the availability of native labour. For Polish employers, foreigners therefore supplement the shortages in the labour market (Kubiciel – Lodzińska 2017), which can increase in the following years. It is estimated that the labour resource in Poland will decrease in 2060 in comparison to 2010 by 6.2 million people (European Committee 2012: 438) and the size of population in a mobile age, i.e. 18-44 will decrease by 6 million until 2050 (Population Projection 2014:148). Aside from work and permanent migration, also educational immigration is becoming increasingly relevant (Kubiciel-Lodzińska, Ruszczak 2016). According to the data of the CSO, the Polish universities featured nearly 66 thousand foreigners in the academic year 2016/2017, and over half of this group were students from Ukraine (CSO 2017). It is estimated that around 2025-2029, Poland will become a net immigration country (Fihel, Okólski 2017: 37).

It will be a challenge for Poland, which has a relatively homogenous society, to establish instruments that support the integration process (Solga 2015b:133-147). Currently no such need is noticeable, because the largest group is comprised of periodical immigrants that come to Poland for work, mainly from Ukraine, which is culturally similar. The question remains whether and how will the nature of immigration to Poland change, i.e. whether the persons that were initially economic migrants will decide to settle or not. The existing research demonstrates that Ukrainian workers, who are the dominant group among immigrants coming to Poland, do not intend to do so (Kubiciel-Lodzińska 2012:144). It seems however that Ukraine cannot be treated as a source of labour for Poland in a long-term perspective, because its society, similarly to Poland, is also ageing and Ukraine's population will decrease from 44 million in 2017 to slightly over 35 million in 2050 (Worldometers 2017).

It is possible to assume that Poland's migration policy should ultimately be focused on encouraging immigrants to settle down and the question remains as to the type of foreigners that Poland needs – foreigners that will execute simple works (non-qualified or ready to execute such works) or qualified workers. Countries with broader immigration experiences, e.g. the Netherlands, started to focus on the latter group (Zorlu, Hartog 2001: 21). It seems that the labour market will determine the immigration trends. However, considering the experiences of old immigration countries, foreigners should not be treated as a buffer – import them when they are necessary and export them when the economic situation diminishes (Plewa 2007:12). Dassetto (1990) specifies three sequences of the immigration process. In the first stage, foreigners are usually economic immigrants belonging to the margins of society. The second stage is dominated by family reunification, it becomes important to consider the notions related to immigrant children's education, making use of the state's social aid, health care and gradual integration with society. The third, last stage features the process of long-term inclusion and integration of immigrants with the society of the receiving country. Poland is only at the beginning of this road.

References

Anacka M., M. Okólski (2014), Migracja z Polski po akcesji do Unii Europejskiej, in: Dekada członkostwa Polski w Unii Europejskiej. Społeczne skutki emigracji Polaków po 2004 roku, M. Lesińska, M. Okólski, K. Slany, B. Solga (eds.), Komitet Badań nad Migracjami PAN, Ośrodek Badań nad Migracjami Uniwersytetu Warszawskiego, Warszawa.

Anacka M., Okólski M. (2014), Direct demographic consequences of post-accession migration for Poland, in: A Continent Moving West? EU Enlargement and Labour Migration from Central and

Eastern Europe, R. Black, G. Engbersen, M. Okólski, C. Panţîru (eds.), Amsterdam University Press, Amsterdam.

Cangiano, Strozza (2008), Foreign immigration in Southern European Reciving countries: New Evidence from national data sources, in: International Migration in Europe. New Trends and New Methods of Analysis, C. Bonifazi, M. Okólski, J. Schoorl, P. Simon (eds.), Amsterdam.

Chmielewska I., Dobroczek G., Puzynkiewicz J. (2016), Obywatele Ukrainy pracujący w Polsce – raport z badania. Badanie zrealizowane w 2015 r., Departament Statystyki NBP, Warszawa, [Online] [Retrieved July 4, 2017], https://www.nbp.pl/aktualnosci/wiadomosci_2016/20161212_obywatele_ukrainy_pracujacy_w_polsce_%E2%80%93_raport_z_badania.pdf

Cieślińska B. (2012), Emigracje dalekie i bliskie. Studium współczesnych emigracji zarobkowych na przykładzie województwa podlaskiego, Wydawnictwo Uniwersytetu w Białymstoku, Białystok.

CSO 2017, Szkolnictwo wyższe w roku akademickim 2016/2017 dane wstępne, [Online] [Retrieved July 26, 2017], http://stat.gov.pl/obszary-tematyczne/edukacja/edukacja/szkolnictwo-wyzsze-w-roku-akademickim-20162017-dane-wstepne,8,4.html

Dassetto F. (1990), 'Pour une théorie des cycles migratories', in: Immigration Immigration et nouveaux pluralisms: Une confrontation de societies, A. Bastenier, F. Dassetto (eds.) Brussels: De Boeck-Wesmael. Cited after: J. Arango (2012), Early starters and latecomers. Comparing countries of immigration and immigration regimes in Europe, in: European Immigrations: Trends, Structures and Policy Implications, M. Okólski (ed.), Amsterdam University Press.

Drbohlav D., Dzúrová D. (2007), 'Where Are They Going?' Immigrant Inclusion in the Czech Republic (A Case Study on Ukrainians, Vietnamese, and Armenians in Prague), *International Migration* Vol. 45 (2), 69-95. doi:10.1111/j.1468-2435.2007.00404.x

Drbohlav, D. (2011), Determinants of migration, in: Immigration puzzles: Comparative analysis of the Czech Republic, Hungary and Poland before and after joining the EU, I. Grabowska-Lusińska, D. Drbohlav, A. Hars (eds.), Saarbrücken: LAP Lambert Academic Publishing.

Drbohlav, D., L. Lachmanova-Medova, Z. Cermak, E. Janska, D. Cermakova & D. Dzurova (2009), The Czech Republic: On its way from emigration to immigration country', IDEA, Working Papers 11, [Online] [Retrieved August 22, 2017], www.idea6fp.uw.edu.pl/pliki/WP11_Czech_Republic.pdf

European Commision and Economic Policy Committee (2012), The 2012 Ageing Report. Economic and budgetary projections for the 27 EU Member States (2010-2060, European Economy 2.

Fassmann H., Reeger U. (2012), "Old" immigration countries in Europe. The concept and empirical examples, in: European Immigrations: Trends, Structures and Policy Implications, Okólski M. (ed.), Amsterdam University Press.

Fihel A. P. Kaczmarczyk (2013), Migracja a polski rynek pracy, in: Rynek pracy wobec zmian demograficznych, M. Kiełkowska (ed.) Instytut Obywatelski, Warszawa.

Fihel A., Okólski, M. (2017), Starzenie się ludności w Polsce w warunkach intensywnej migracji międzynarodowej, in: Starzenie się ludności, rynek pracy i finanse publiczne w Polsce, P. Lewandowski, J. Rutkowski (eds.), Warszawa.

Forecast of population residing in Poland for years 2015-2050 (2016), Central Statistical Office, Warsaw, [Online] [Retrived September 29, 2017], http://stat.gov.pl/obszary-tematyczne/ludnosc/prognoza-ludnosci/prognoza-ludnosci-rezydujacej-dla-polski-na-lata-2015-2050,8,1.html.

Gropas R., Triandafyllidou A. (eds.) (2007), European immigration: A sourcebook. Aldershot: Ashgate.

Harper S. (2016), 'The Important Role of Migration for an Ageing Nation', *Journal of Population Ageing* No 9 (3),183-189. doi:10.1007/s12062-016-9152-4

Heffner K., B. Solga (2014), Contemporary Challenges and Threats to the Development of Polish Regions in the Context of the Phenomena of Migration and Reemigration, "Central European Papers"/II/1, Silesian University in Opava Faculty of Public Policies, Kodolányi János University of Applied Sciences, 189-203.

Heffner K. (2012), Migracje a rozwój regionu. Znaczenie procesów migracyjnych dla rozwoju regionów Polsce, in: Społeczeństwo Śląska Opolskiego 1945-2011-2035 – aspekty społeczne, demograficzne i rynku pracy, R. Rauziński, T. Sołdra-Gwiżdż (eds.) Rządowa Rada Ludnościowa, PIN – Instytut Śląski, Urząd Marszałkowski Województwa Opolskiego, Opole.

Hierro M. (2016), 'Latin American Migration to Spain: Main Reasons and Future Perspectives', *International Migration* Vol. 54 (1), 64-83. doi:10.1111/imig.12056

Hudson K. (2007), 'The new labor market segmentation: labor market dualism in the new economy', *Social Science Research* 36 (1), 286-312. doi:10.1016/j.ssresearch.2005.11.005

Iglicka K. (2013), Imigranci pilnie potrzebni, Fundacja Energia dla Europy, Raport 8, Warszawa.

Iglicka K. (2010), Powroty Polaków po 2004 r. W pętli pułapki migracyjnej, Centrum Stosunków Międzynarodowych, Warszawa.

Jacobi A. (2010), Spatial and socio-economic characteristics of official labour migration from neighbouring countries to Hungary, [Online] [Retrieved July 10, 2017], http://www-sre.wu.ac.at/ersa/ersaconfs/ersa10/ERSA2010finalpaper748.pdf

Janská F., Čermák Z., Wright R. (2014), 'New Immigrant Destinations in a New Country of Immigration: Settelment Patterns of Non – natives in the Czech Republic', *Population, Place and Space*, Vol. 20 (8), 680-693. doi:10.1002/psp.1824.

Kaczmarczyk P. Okólski M. (2008 a), 'Demographic and labour-market impacts of migration on Poland', *Oxford Review of Economic Policy*, Vol. 24(3), 599-624. doi:10.1093/oxrep/grn029

Kaczmarczyk P. Okólski M. (2008b), Polityka migracyjna jako instrument promocji zatrudnienia i ograniczenia bezrobocia, Ośrodek Badań nad Migracjami Uniwersytetu Warszawskiego, Warszawa.

Kaczmarczyk P. (2005), Migracje zarobkowe Polaków w dobie przemian, Uniwersytet Warszawski, Warszawa.

Klvaňová R. (2010), 'Moving Through Social Networks: The Case of Armenian Migrants in the Czech Republic', *International Migration*, Vol. 48 (2), 103-132. doi:10.1111/j.1468-2435.2009.00565.x

Kubiciel – Lodzińska S. (2017), Employment of foreigners in Poland from the point of view of entrepreneurs – Opole Voivodeship study, Proceedings of the 5th International Conference Innovation, Management, Entrepreneurship and Sustainability, Prague, 482-495. doi: 10.18267/pr.2017.svo.2216.6.

Kubiciel-Lodzińska S. (2012), The Wage-Earning Immigration Into Opole Province. The Scale, Conditions and Prospects, Opole.

Kubiciel-Lodzińska S., Ruszczak B. (2016), 'The Determinants of Student Migration to Poland Based on the Opolskie Voivodeship Study', *International Migration*, Vol. 54 (5), 162-174. doi: 10.1111/imig.12257

Lesińska M., Grotte M., Brunarska Z. (2012), Migracje obywateli Ukrainy do Polski w kontekście rozwoju społeczno-gospodarczego: stan obecny, polityka, transfery pieniężne, CMR Working Papers 60/118, Warszawa, [Online] [Retrieved August 21, 2017], http://www.migracje.uw.edu.pl/publikacje/migracje-obywateli-ukrainy-do-polski-w-kontekscie-rozwoju-spoleczno-gospodarczego-stan-obecny-polityka-transfery-pieniezne/

Maj. J. (2017), Gender Equality in the European Union. A Comparative Study of Poland and Germany, German and European Studies of the Willy Brand Center at the Wroclaw University, NOMOS, Vol. 6, Baden Baden.

Ministry of Family Labour and Social Policy, [Online] [Retrieved August 22, 2017], http://psz.praca.gov.pl/rynek-pracy/statystyki-i-analizy/zatrudnianie-cudzoziemcow-w-polsce
Münz R. et. al (2007), What Are The Migrants' Contributions to Employment and Growth? A European Approach. Hamburg, [Online] [Retrieved July 29, 2017], https://www.oecd.org/dev/38295272.pdf

Okólski M. (2012), Transition from emigration to immigration: Is it the destiny of modern European countries?, in: European Immigrations: Trends, Structures and Policy Implications, Okólski M. (ed.), Amsterdam University Press.

Okólski M. (1994), 'Migracje zagraniczne w Polsce w latach 1980-1989. Zarys problematyki badawczej', *Studia Demograficzne* No. 3, 3-59.

Okólski M. (2001), Mobilność przestrzenna z perspektywy koncepcji migracji niepełnej, in: Ludzie na huśtawce. Migracje między peryferiami Polski i Zachodu, E. Jaźwińska, M. Okólski (eds.), Wydawnictwo Naukowe Scholar, Warszawa.

Plewa P. (2007), 'The Rise and Fall of Temporary Foreign Worker Policies: Lessons for Poland', *International Migration*, Vol. 45 (2), 3-36. doi:10.1111/j.1468-2435.2007.00402.x

Polek-Duraj K. (2017), 'Social responsibility as a determinant in the improvement of organizational competitivness (case study)', *Olsztyn Economic Journal*, Vol 12 (2), 213-223.

Population Projection 2014-2050 (2014), Central Statistical Office, Warsaw.

Rajkiewicz A. (2002), Wokół współczesnych migracji z Polski i do Polski, in: Uwarunkowania rozwoju regionalnego województwa opolskiego ze szczególnym uwzględnieniem migracji zagranicznych, K. Heffner (ed.), Urząd Marszałkowski Województwa Opolskiego, Politechnika Opolska, Opole.

Rauziński R., K. Szczygielski (2009), Skutki zjawiska emigracji z obszaru Śląska Opolskiego (wybrane aspekty demograficzne), „Biuletyn RPO", No. 6.

Rocznik Demograficzny [Demographic Yearbook of Poland] (2016), Central Statistical Office, Warsaw, [Online] [Retrieved August 22, 2017], http://stat.gov.pl/obszary-tematyczne/roczniki-statystyczne/roczniki-statystyczne/rocznik-demograficzny-2016,3,10.html

Rokita-Poskart D. (2014), 'Economic emigration by inhabitants of the city of Opole to other counrties in the light of empirical research', *Central and Eastern European Journal of Management and Economics*, Vol. 2 (3), 163-178.

Rostropowicz – Miśko M. (2007), Migracje ludności ze Śląska Opolskiego do Niemiec w latach 1989-2005, Fundacja Nauki i Kultury na Śląsku, Opole.

Sakson B. (2002), Wpływ „niewidzialnych" migracji zagranicznych lat osiemdziesiątych na struktury demograficzne Polski, "Monografie i Opracowania" 481, Szkoła Główna Handlowa, Warszawa.

Sassen S. (1988), The Mobility of labour and Capital: A Study in International Investment and labor Flow, Cambridge: Cambridge University Press.

Slany K., M. Ślusarczyk (2012), Zostać czy wracać? Dylematy emigranta, in: Drogi i rozdroża. Migracje Polaków w Unii Europejskiej po 1 maja 2004 r. Analiza psychologiczno-socjologiczna, H. Grzymała-Moszczyńska, A. Kwiatkowska, J. Roszak (eds.), Wydawnictwo Nomos, Kraków.

Solga B. (2015a), Einfluss der Auslandsmigration auf die Entwicklung der Regionen in Polen, in: Grenzüberquerungen und Migrationsbewegungen. Fremdheits- und Integrationserfahrungen in der österreichischen, deutschen, schweizerischen und polnischen Literatur und Lebenswelt, G. Jelitto-Piechulik (ed.), LIT-Verlag, Wien.

Solga B. (2015b), 'Polityka migracyjna jako element polskiej polityki społecznej", *Wieś i Rolnictwo* 3(168), 133-147.

Solga B. (2013), Miejsce i znaczenie migracji w rozwoju regionalnym, Politechnika Opolska, Opole.

Stola D. (2001) Międzynarodowa mobilność zarobkowa w PRL, in: Ludzie na huśtawce. Migracje między peryferiami Polski i Zachodu, E. Jaźwińska, M. Okólski (eds.), Wydawnictwo Naukowe Scholar, Warszawa.

The Office for Foreigners, [Online] [Retrieved August 22, 2017], https://udsc.gov.pl/statystyki/

Vishnevsky A. (2013), The New Role of Migration in Russia's Demographic Development, *Russian International Affairs Council*, [Online] [Retrieved April 27, 2017], http://russiancouncil.ru/en/inner/?id_4=1759

Worldometers.info [Online] [Retrieved April 24, 2017].

Zorlu A., Hartog J. (2001), Migration and Immigrants: The Case of the Netherlands, Tinbergen Institute Discussion Paper Vol. 042(3). [Online] [Retrieved July 20, 2017], https://papers.tinbergen.nl/01042.pdf

Technology for Control
An Efficiency in Production and Economic System

Orlova E.V., Ufa State Aviation Technical University, Ufa, Russia, ekorl@mail.ru

Abstract

The technology for control an efficiency in production and economic systems based on the situational balanced management methods is considered. The concept for production efficiency modeling regarding to life cycle stages, costs and prices level is proposed. For adjustment the controlled variables under endogenous deviations the situational balanced model is offered.

Keywords: production and economic systems; modeling; coordinated control; multiple criteria for decision making.

Introduction

To improve the economy productivity and to create the sustainable innovation development system for enterprises of different industries, organizational and legal forms, sizes and spatial location it is necessary to develop mechanisms of multi-level strategic planning and management. The control system, based on these mechanisms should include strategic planning at different level – the level of enterprise, the level of market agents and the level of state. At the enterprise level the strategic planning system must be unified in functional and management verticals. At the market level the development and implementation of strategic plans is to take into account the interests of all enterprise. At the state level, fiscal policy should be formed to be the most active component of economic and industrial policy, focused on the development of the capacity of enterprises as productive and economic system (PES) and its modernization.

Therefore the problem of modeling and controlling tools creating for the PES operation under systematic modernization of the economy, taking into account the interests of economic agents matching the most PES, market and institutional environments is of great importance. The solution of this problem and developed application decision will increase the efficiency of controlling processes in PES.

The analysis of the investigations in the field of modeling and control in different organizational systems [1-5] is showed the following. Problems related to the economic-mathematical modeling and control of the processes of harmonization the economic interests of participants in production and economic, in market and fiscal processes are not solved. Previous studies do not deal with dynamic pricing for enterprises products in a competitive market under changing consumer preferences and competitors behavioral strategies.

1. The proposed approach

The concept of management performance of PES is based on using modelling techniques and situation analysis. Analyzed factors are: changes in macroeconomic conditions, changes in the markets and marketing resources; enterprise management initiatives. As a result of this approach the following factors are determined:

a) the impact of resources (materials, wage, interest on loans, etc.) prices rising on the financial conditions of the company;

b) the impact of resources prices rising on the production costs;

c) the product effectiveness;

d) the possibility for efficiency increasing by costs reducing, streamlining of production and sales, price regulation;

e) administrative decisions in the field of improving the valuation of assets (in order to mergers, resale, credit, replacement of fixed assets, etc.).

A system of performance management as an integrated technology based on the use of specific methods and models that are adequate to revealed problems is developed. The technology consists of the following stages.

Step 1. Analysis of industrial, economic and financial conditions of the enterprise. At this stage the identification of the current enterprise's conditions based on financial activities analysis and financial management analysis methods is curried out.

Step 2. Product efficiency estimation by types and stages of product life cycle. Efficiency studying is carried out from two perspectives: static analysis to determine the profitability (loss ratio) for each product and identification an areas for improvement of the issue; dynamic analysis based on the identification of production functions for each product. Identification is performed the first stage of product life cycle, as well as trends in sales volumes and prices on the basis of econometric modeling methods. In this step, an assessment of the product position on the curve of its life cycle is performed; production capacity of the enterprise with the position of product life cycle is curried out. Then production efficiency is being evaluated by the monogrammed modeling method.

Step 3. Situational balanced management of economic parameters - product volume, price, and cost based on the methods of situational modeling and using of production rules.

Step 4. Decision making about economic parameters changing.

2. Modeling of economic efficiency

Researches in the field of companies' economic diagnostics have revealed a number of problems. First, companies are still oriented towards financial evaluation methods, built on a system of accounting and reporting, which largely corresponds to the dynamic economic conditions and consider the factor of periodicity analysis - not taken into account the economic efficiency of each product range, thereby sustainable management of all products is not implemented.

Second, analysis results are lagging in time and cause inconsistencies normal functioning more worsen enterprise economic conditions.

High dynamic of internal and external company environment currently makes to the instruments of economic governance new, higher requirements. These tools should be based on economic-mathematical methods and models that reflect the basic economic laws governing the enterprise activities and should ensure:

a) the representation of relationships between economic variables in the wide-range of possible values and their possible combinations in order to achieve a certain level of production efficiency;

b) the presence of fixed (pre-calculated) lines (values) of economic efficiency which is the standard profitability (efficiency) levels;

c) the identification of different requirements for achieving certain performance levels as well as defining the efficiency changes range for the uncertainty of input data;

d) the performance evaluation of economic variables changes.

System properties of the enterprise's economic mechanism include a large number of indicators that have a strong influence on each other. Quantitative description of these relations is a difficult

problem. Their rational (required) values must be justified, and the options selected for use by "cost-effeciency".

In the offered technology for efficiency assess is used tools such as "maps of economic behavior" based on monographic models [6, 7]. Such models allow to assess the effect of various combinations of economic variables on the enterprise's economic efficiency. The versatility of this tool ensured by using the following methods of information representations:

1. Valuation method which is to convert the absolute values of economic variables to their relative values and allows to apply this tool for any business and products.
2. Benchmarking technique is to form a universal model of conformity mutual relations between the main economic variables of production and sales of products, which provides a fixed level of efficiency.

By application of these methods it is possible to graphically reflect in the map many possible combinations of the basic economic variables which obtained the same efficiency level.

Using multivariable normalized models allow to prevent the adoption of irrational and wrong decisions, to save significant amounts of financial resources, to expedite the process of finding the most appropriate solutions that achieve the desired performance. Most valuable for practices is the breadth and integrity of the information field covered graph-analitical models, which give information about the production efficiency depending on the possible combinations of multivariate economic parameters.

The technology for producing economic evaluations is to determine the values of key factors determining the inputs to the model and performance evaluation. An application technology for using monographic models has the following features:

- the same level of efficiency depends not only on the absolute values of economic parameters and their mutual relations. This means that the same level of efficiency can be achieved at different production scales;
- multivariance of models allows to solve various problems.

The main objective of the model is the use of monographic definition and formation of such a mutual correspondence between resources, production volumes and prices at which it is provided a desired level of performance sufficient for sustainable operation and enterprise growth.

Efficiency is the productivity of the resources distribution under the production process. As indicators reflecting production efficiency (effectiveness) and business activities are the profitability (of sales, of assets, etc.). Further we will use performance as return on sales kind

$$\alpha = \frac{P}{C} = \frac{P}{C_v + C_f} = \frac{pq - \left(C_f + q \cdot c_v\right)}{C_f + q \cdot c_v}, \qquad (1)$$

where α – profitability (relative gain) in the production of goods in volume q; P – gross profit generated on the sale of goods in volume q at a price p; C – total costs, including the constant part C_f and a variable part $C_v = q \cdot c_v$; the relationship between cost and volume of output is considered to be linear $C = C_f + q \cdot c_v$.

Analysis of the equation (1) shows that the same level of efficiency can be achieved at various combinations of the factors standing in its right part. A certain level of profit is influenced by various factors, therefore, it is necessary to analyze their impact on the profit and formulate the most reasonable (rational) in these conditions a combination of these factors. Traditionally, such analysis is carried out within the concept of CVP-analysis (cost-volume-profit), or operational analysis, and modern accounting principles.

We also assume that the amount of profit affects four factors: price p, unit variable costs c_v, total fixed costs C_f, the volume of production q. In order to ensure the universality of developed models

using a valuation method, this consists in the transition from the absolute values of these variables to their relationship like $\frac{C_f}{q \cdot c_v}, \frac{C_f}{C_v}, \frac{p}{c_v}$. To do this, perform the necessary transformations of the expression (1): $\alpha = \frac{pq}{C_f + q \cdot c_v} - 1$, or $\frac{pq}{C_f + q \cdot c_v} = \alpha + 1$. Dividing the numerator and denominator of the right side of the last equation by $q \cdot c_v$, we obtain:

$$\frac{C_f}{q \cdot c_v} = \frac{p}{c_v} \cdot \frac{1}{(1+\alpha)} - 1, \text{ or } \alpha = \frac{p}{c_v} / \left(\frac{C_f}{q \cdot c_v} + 1 \right) - 1. \quad (2)$$

As seen from (2) the relationship between $\frac{p}{c_v}$ and $\frac{C_f}{q \cdot c_v}$ is linear, with the same level of efficiency achieved a variety of combinations of variables of these relations. Let us consider the relations $\frac{p}{c_v}$ and $\frac{C_f}{q \cdot c_v}$ in the expression (2) at different levels of economic efficiency α: $\alpha = 0$ - break-even; $\alpha > 0$ - profitability; $\alpha < 0$ - unprofitability.

If $\alpha = 0$, then $\frac{p}{c_v} - \frac{C_f}{q \cdot c_v} = 1$. This implies that a reduction value of the first term by a predetermined amount, such as price reduction, in order to maintain the break-even, the second term must be reduced by the same value. This is the essence of sustainable management of economic variables.

Similarly, if $\alpha > 0$, then $\left(\frac{p}{c_v} - \frac{C_f}{q \cdot c_v} \right) > 1$; if $\alpha < 0$, then $\left(\frac{p}{c_v} - \frac{C_f}{q \cdot c_v} \right) < 1$. This analysis suggests that the largest difference $\left(\frac{p}{c_v} - \frac{C_f}{q \cdot c_v} \right)$ can judge the level of economic efficiency and control its change as well as to manage balanced economic characteristics when the external and internal conditions of the functioning of the enterprise.

The essence of the method of sustainable management is presented below. Graphically law (2) can be reflected as shown in Fig. 1.

The abscissa represents the relative price $\frac{p}{c_v}$ as a fraction of variable cost. In the financial management practice is assumed that the unit price must be set at a level not lower than the direct (variable) costs. If revenues from product sales are variable costs, or loss equal to fixed costs, then the corresponding output, implemented at such a price, called a point of closing (meaning the inverse relationship of the volume of sales of its price - the demand curve). At a price higher than the closing point, the company produces these products, even at a loss, because the closing of enterprises will cause even greater losses. At a price less than the closing point, the company ceases its activities.

The axis of ordinates in Fig. 1 plotted values of permanent relationship in costs businesses attributable to this type of product, to variable costs for the production of this product.

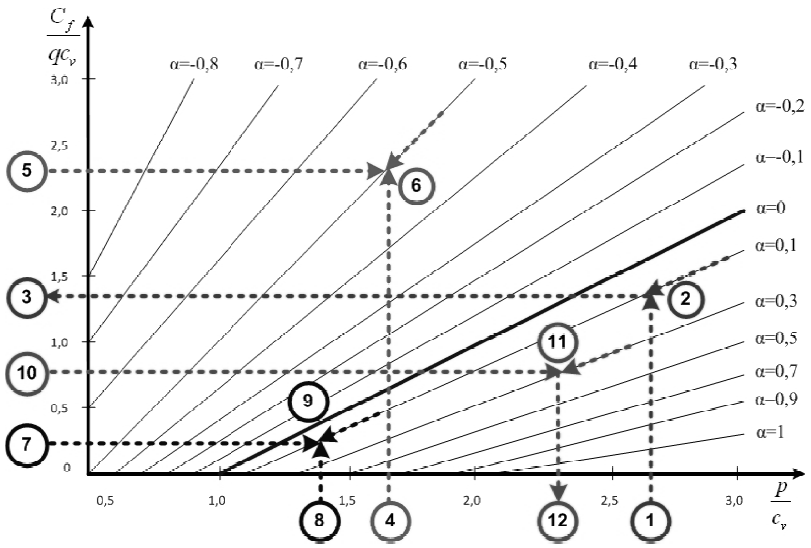


Fig 1. Homographic model

Substantially the numerator of this ratio characterizes the costs associated with the establishment and operation of basic production assets of the enterprise, their maintenance, repairs, payments for rent, land, heating, electricity and water supply, payroll management (nonproductive) personnel. Denominator defines the variable costs of production of the volume of production in the amount of q units.

In general, this ratio determines the amount of indirect costs attributable to one rub. direct costs. The smaller this ratio, the more efficient production, its technology, productivity and work organization. The information field of the model shows that there are two essentially different personal efficiency areas: the loss $\alpha < 0$, situated to the left and above the breakeven line $\alpha = 0$, and the area of profitability $\alpha > 0$ is the right and below the break-even line.

There is visible and the second pattern: loss levels increase with distance to the left from a direct break-even (with increasing ratio of cost $\frac{C_f}{q \cdot c_v}$ and a decrease in the relative price $\frac{p}{c_v}$), and profitability levels increase with the removal of the right and down from the line to break even.

Thus, the values of the level of profitability and loss level are determined by matching the ratio of fixed and variable costs and relative prices. The size of each of the five analyzed parameters (volume of production and sales of these products, unit variable costs, fixed costs attributable to these items, the unit price, gross profit from sales of this product) is determined by many factors, differing in the degree of influence on these parameters: type and the level of production technology, composition and technical level of equipment, product quality, species, quality and prices of raw materials used, the supply and demand of these products in the market, the organizational structure of the company, number of employees and its distribution units, wage, taxes [8, 9] . These factors affect the possible ranges of the main economic indicators of the enterprise, reflecting the features of its functioning.

Monogrammed representation of these relationships between indicators has the following features. The first feature is the fact that the same relative level of normalized earnings (profitability) depends not only on the absolute values of economic parameters, but on their mutual relations: the price to a specific variable costs, fixed costs to total variable costs or fixed costs of specific to variable costs. This means that the same relative income can be provided entirely at different scales of production.

Application of valuation allows providing a universality of graphic models and their suitability for the same economic management regardless of the scale of production.

The second feature is that the graphic lines on the models are in most cases the discrete solution level of efficiency to be achieved under certain relations between the economic parameters indicated on the input axes of the graphical model. The third feature is the multivariance of models that allows solving problems in various productions, i.e. defining and setting parameters can be reversed.

3. Decision support for efficiency control

To develop decision solutions based on the method of sustainable management, it is necessary initially to determine possible changes in the controlled variables - prices, unit variable costs, total fixed costs attributable to a particular type of product, the volume of production, as well as calculates the effects (efficiency) implementation of various control methods.

Balance control involves the preservation of the previous values of the production efficiency of a particular product in situations of change one or more controlled variables on the basis of changes in other variables. One of the possible alternatives such compensatory effect that returns profitability of the production to their former positions is to change one of the control variables in the model (2).

Quantify the values of variables can be controlled with the use of analytical expressions. Formulas are derived from the condition of conservation of the same level of profitability of ensuring fulfillment of (2).

Consider the following possible situations and the appropriate control action.

1. Changes in the composition of fixed assets ΔC_f, which leads to an increase in fixed costs at constant values of the other variables – $p = const$, $q = const$, $c_v = const$; in this case we need to use the following action (Fig. 1) 1-2-3, and the compensating effect is

$$\Delta c_v = \frac{p}{(1+\alpha)} - \left(c_{v0} + \frac{C_{f0}}{q} \right) - \frac{\Delta C_f}{q}. \quad (3)$$

2. Resources cost increasing at Δc_v, which leads to increase a unit variable cost at constant values of the other variables – $p = const$, $q = const$, $C_f = const$. This case requires action 4-5-6 and the compensating effect is

$$\Delta p = (1+\alpha) \cdot \left[\frac{C_{f0}}{q} + (c_{v0} + \Delta c_{v0}) \right] - p_0. \quad (4)$$

3. Product demand growth at Δq, that promotes changing in output at constant values of the other variables – $C_f = const$, $p = const$, $q = const$. This case requires action 7-8-9 and the compensating effect is

$$\Delta C_f = \Delta q \cdot \left[\frac{p}{(1+\alpha)} - c_{v0} \right] + \left[q_0 \left(\frac{p}{(1+\alpha)} - c_{v0} \right) - C_{f0} \right]. \quad (5)$$

4. Product price reducing at constant values of the other variables – $q = const$, $c_v = const$, $C_f = const$. This case requires action 10-11-12, for calculation the compensating effect see (3)-(5).

5. Output becomes unprofitable $\alpha < 0$, then see items 1-4.

All other situations, both internal and external can be attributed to the complex [10], which can be decomposed into its constituent situation discussed above.

Suggested options for management decisions necessary to neutralize the negative consequences as a result of one of these situations can be represented as follows. As a part of the price control: increased wholesale prices for the products; change the pricing method in the enterprise; improving product quality. In terms of production volume management: increase (decrease) in production; optimization of the structure of production of products; search and access new markets. In terms of cost management: minimizing receivables and payables; formation based system of allowances for basic salary; optimization of stocks of raw materials; renting extra storage space; change in base distribution of fixed costs (in material costs); energy-saving technologies in the workplace; e) the introduction of "lean production".

In the implementation of contingency management should also consider the following limitations. Factor for the "price" such restrictions are the production cost, the stage of product life cycle, competitors' prices for the same products, market share, brand recognition. For factor "production volume" is defining production capacity, a developed market and the demand for manufactured products.

For neutralization negative effects of these situations the method of compensating balanced control is to promptly bring the control object to its previous state, i.e. to the same measure of performance in terms of external and internal disturbances. Management decisions are implemented by influencing variables p, q, c_v, C_f .

Application of given formulas facilitates the analysis within the model and gives the best estimate of changes in the production and economic system conditions in the event of disturbances in values of external or internal environment factors.

Conclusion

The proposed approach for PES modeling and control is differ from similar ones in that takes into account its properties, complex nonlinear relationships between economic agents of internal and external environment. This allow to simulate the processes of PES functioning in conjunction with the economic agents, agreeing in control their conflicting goals and criteria.

There is designed the new conceptual approach of creation a performance management system for functioning of PES in a rapidly changing factors. This approach is based on the application: econometric methods for analyzing and identifying the current product life cycle stage; balanced compensating control methods for stabilizing disturbances. The developed control technology provides an effective analysis tool for monitoring and management of an economic efficiency of PES.

The advantages of proposed technology include quick information obtaining, implementation a situational approach in decision making procedures. Application of the technology makes it possible to respond external disturbances and internal changes of system factors, to control their deviation from the normal level, to form an optimal production product based on target efficiency.

References

[1] Prangishvili, I.V. (2000) The systems approach and system-wide patterns, Publishing House "SINTEG", Moscow.

[2] Burkov, V.N. (2012) "Theory of control of organizational systems and other management science organizations", *Control Problems*, 4, 2-10.

[3] Novikov, D.A. (2012) Control theory in the organizational systems, Publishing House "FIZMATLIT ", Moscow.

[4] Kleiner, G.B. (2013) "The system platform for the development of the economy of modern economic theory", *Problems of economy*, 6, 4-12.

[5] Livshits, V.N. (2014) "On Unsteady Russian transition economy", *Control Problems in theory and practice*, 2, 8-13.

[6] Orlova, E.V. (2007) "System Dynamic Modeling of Enterprise Costs", *Proceedings of 9th International Workshop on Computer Science and Information Technologies (CSIT'2007)*. 369-373.

[7] Orlova, E.V. (2016) "Concept for Industrial and Economic Systems Management Based on Criteria Coordination of Interested Agents', *Program Engineering*, 2, 86-96.

[8] Orlova, E.V. (2016) "Modeling and Decision Support for the Firms' Pricing Policy under a Chaotic Dynamic of Market Prices", *Proceedings of the Workshop on Computer Modeling in Decision Making (CMDM 2016)*, 1726, 81-88.

[9] Orlova, E.V. (2017) "Control over chaotic price dynamics in a price competition model", *Automation and Remote Control,* 1, 16-28.

[10] Orlova, E.V. (2016) "Simulation Model for the Firms' Financial Resource Management", *Proceedings of the 28th International Business Information Management Association Conference on Vision 2020: Innovation Management, Development Sustainability, and Competitive Economic Growth, IBIMA*, 1317-1321.

Classification of Risks Associated With Operation of Special Economic Zones

Olga Sinenko, Far Eastern Federal University, Vldivostok, Russia, sinenko.olga@gmail.com
Igor Mayburov, Far Eastern Federal University, Ural Federal University, Ekaterinburg, Russia, mayburov.home@gmail.

Abstract

Risk is an intrinsic element in the operation of special economic zones. The level of risk depends on a large number of factors and actions that are hard to foresee in their entirety. Effective risk management is largely determined by the accuracy of risk classification that makes it possible to identify the risks correctly and to make arrangements for risk control efforts. The article presents a classification of risks associated with the operation of special economic zones according to a range of criteria. The authors have developed a classification of risks that occur during the operation of special economic zones and affect the state and zone tenants. The authors substantiate and describe each type of risk: legislative, economic, organizational, political, infrastructure, social, innovation and environmental.

Keywords: risk, special economic zones, SEZ, risks for the government when creating and operating SEZ, risks for SEZ tenants.

Introduction

Risk is one of the key concepts in finance that is defined as the uncertainty of financial results in the future due to the uncertainty of the future itself. Risks associated with the operation of special economic zones (henceforth SEZ) are defined as the possibility of negative financial outcomes because of an ineffective structure and operation of special economic zones, ineffective tactic or strategy of investment or breaches of the law committed by parties to law relations within the territory. Today, the majority of researchers agree that it is impossible to completely mitigate risk and that investment is always accompanied by risk to one degree or another. This makes the problem of risk assessment particularly relevant to the operation of special economic zones both from the perspective of the government and the state treasury, and the investor.

The widely used term "risk" has numerous definitions and is used as a substitute for such concepts as "event", "probability of an event", "compensation", "compensation of damage", "liability" etc. In the 1930s, Alfred Marshall and Arthur Pigou developed the neoclassical theory of risk that holds that an entrepreneur working and making decisions in an environment of uncertainty where profit is a random variable is guided by two criteria: the expected value of his profits and the scale of profit fluctuations (Bladen, Vincent W., 1974). J.M. Keynes supplemented neoclassical risk theory with the factor of reward from risk-taking according to which an entrepreneur will take on additional risk in the hope of a bigger expected profit. Risk theory was further developed by G.L. Johnson, T. Schultz, and E. Heady, who focused on systems analysis, theories of management and decision-making, and by H. Markowitz, J. Tobin, and J. Lintner. Most of the economists stick to the traditions of classical risk theory and generally interpret risk as a potential quantifiable possibility of loss (Reamer, Norton and Downing, Jesse, 2016).

The risk object is the operation of special economic zones whose structural and functional effectiveness cannot be predicted with the required accuracy and comprehensiveness.

Several roles are identified in the institutional structure of SEZ governance: the government and the regulator (the state), the developer of the zone (the state or a private investor), the operator (private companies that maintain infrastructure and market the zone) and users (resident firms (ASEAN, 2016). The risk actors in the case of SEZs are parties to law relations (government,

operators, zone tenants, investors) as well as other parties involved, each of whom has a specific competence as to the risk object.

Despite the positive reputation of SEZ programs in general, their performance has varied across countries. The performance of SEZs is directly linked to the investment climate in the host countries, including economic and political problems, insufficient property rights protection, and an ineffective legal and judicial system. In 2010, the United Nations Industrial Development Organization conducted a survey of some 7,000 companies active in 19 countries in Sub-Saharan Africa in such sectors as agriculture, mining, manufacturing, utilities, construction and services. Investors were asked to rank the importance of 12 location factors influencing their business. The results of the survey are presented in Figure 1.

The survey showed that economic stability and political stability were the top two concerns of investors. By contrast, the transparency of the legal framework was ranked fifth, while incentive packages landed 11th among the 12 factors. These domestic and external factors are the main sources of risk for the investor and the state as they cause uncertainty in the operation of SEZs.

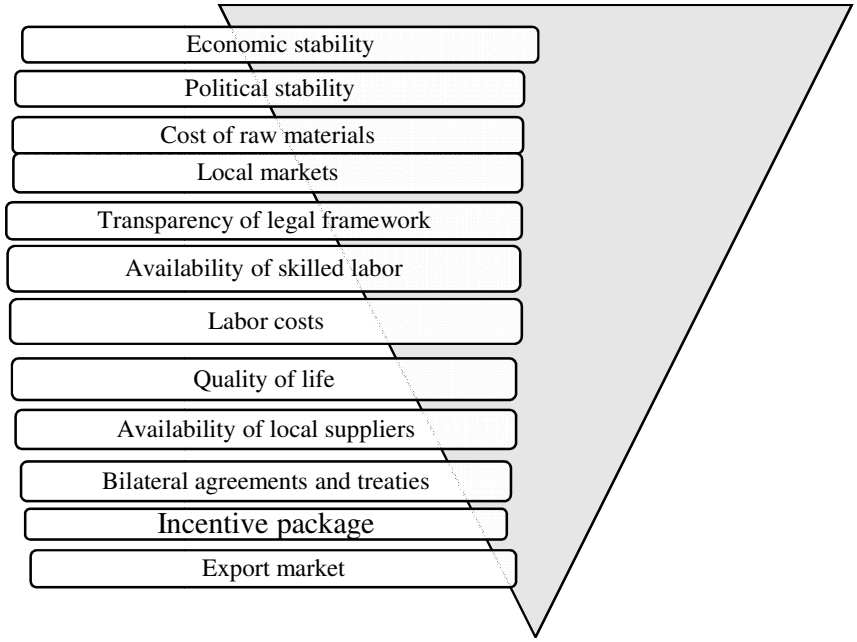


Fig 1. Ranking of importance of location factors that make SEZs attractive to investors Source: UNIDO (2011)

Economic and political problems, insufficient property rights protection and an ineffective legal and judicial system are the key risks to SEZs' operation.

1 Methods

The basic research methods were analysis, synthesis and comparative analysis. The authors have analyzed the problems associated with the operation of special economic zones. In the course of the study, types of risk have been systematized according to the following properties: risk actors, place of origin, factors of occurrence, industry (area) of occurrence, sources of occurrence, severity of damage/potential losses; degree of predictability, insurability, stage of a SEZ project/ tenant project lifecycle, level of occurrence. Problems associated with the operation of special economic zones have been analyzed and the key risks faced by the state when establishing and operating special economic zones have been summarized. As a result of the analysis, three main components of each type of risk have been identified. The dataset for the analysis was extracted from official websites of special

economic zones in the Asia-Pacific Region and scientific publications. The analysis covered various types of special economic zones as per the types of the main tax risks in the zones.

2. Research

2.1. Classification of main risks of SEZ operation. The effectiveness of risk management is largely determined by the accuracy of risk classification that makes it possible to identify the risk correctly and make arrangements for risk control. Classifications of risks occurring during the operation of special economic zones can be based on numerous criteria. Table 1 presents a general classification of risk by different criteria.

Table 1: Classification of main risks associated with operation of special economic zones

Criterion	Type of risk
Actors	State, regions Tenants, investors Social groups, individuals Industries Economic agents (business partners, rivals) Other stakeholders
Place of origin	External Internal
Factors of occurrence	Economic Political Social Environmental Legal (legislative) Information Organizational Innovation
Industry (area) of occurrence)	Financial Production Commercial Transportation etc.
Source of occurrence	Systematic (depends on the state and specific features of the actor) Nonsystematic (beyond actor's control, for example, natural disasters, political transformations, terrorist attacks and crime)
Severity of damage/potential losses	Partial Acceptable Critical Catastrophic (failed plans disable the operation of a tenant or the SEZ as a whole)
Degree of predictability	Known Predictable Unpredictable
Insurability	Insurable Uninsurable Partially insurable
By stage of tenants' project/SEZ lifecycle	Pre-investment Investment Operational
Level of occurrence	Macro-, meso,- and micro-level

Compiled by the authors

The above classification offers an in-depth explanation of the occurrence of risks associated with the operation of special economic zones. It is important to look closer at the risks for the key stakeholders – the state (as the regulator and developer of SEZs) and the tenant (investor).

2.2. Types of SEZ operation risks for the state. From the point of view of the state represented by authorized bodies, the risk associated with the operation of special economic zones can be expressed as the probability (threat) of non-collection of tax revenues for the treasury and extra-budgetary funds because of tax concessions, ineffective and non-refundable investment in infrastructure and SEZ operation etc. (Sinenko, Olga, 2016).

The main task of the state establishing special economic zones is to recruit tenants and attract investment in the development and operation of the zone. However, the risks faced by the state are rather high (Table 2). The risks are primarily associated with the need to design an appropriate legal framework for the operation of special economic zones and depend on the policies being carried out by the state. Conflicting legislative provisions and unappealing conditions for tenants increase the probability of the occurrence of various risks associated with the operation of SEZs (Zeng, Douglas Zhihua, (2017). Biased tenant selection criteria and the lack of transparency in the process of decision making by officials can make it difficult to attract investors, prevent tenants from meeting their performance targets and damage the reputation of the special economic zone in general.

Table 2: Main risks for the state when establishing and operating special economic zones

Risk	**Manifestation**
Legislative risks	Ineffective control and regulation of the zone The risk of shadow market activity (clandestine businesses or activities that are not allowed in the zone) Government relations problems faced by tenants and the zone as a whole. The incentive package does not appeal to foreign investors Unbiased and incorrect tenant selection criteria and lack of transparency in decision making by zone directors Absence of a unified strategy for establishing and developing SEZs
Economic risks	The government may not recoup its investment in zone infrastructure, including transportation and engineering networks Tax revenue shortfalls resulting from tax and tariff concessions offered to zone tenants The government might lose money due to incorrect SEZ performance evaluation and ineffective spending of public funds on infrastructure Tax revenue shortfalls due to business migration to SEZs in other regions Tax revenue falling due to companies re-registering to change their legal status or restructuring to become foreign investors to be entitled to tax concessions Loss of customs duty because equipment imported into a SEZ has been resold within the country Shortfalls in corporate tax collection due to the use by tenants of cost overstatement schemes: depreciated cost of assets (intellectual property), bogus expenditures on staff training etc.
Organizational (administrative) risks	Non-transparent and inefficient SEZ governance structure. Poorly devised and ineffective mechanisms of distribution of duties among government bodies and at all levels of governance The risk of current operational problems overshadowing strategic goals of SEZ operation Ineffective marketing events aimed at attracting investors (forums, exhibitions and presentations with the participation of world business leaders)
Political risks	Wrong positioning SEZ administration plagued by red tape Corruption Risks of sanctions (restricted access to external markets)

Infrastructure risks	Ineffective location of SEZ Absence of some elements of infrastructure (creation of so-called industrial islands) Construction of facilities taking too long Insufficient energy capacity Poorly developed transport infrastructure Lack of modern engineering infrastructure
Social risks	Shortage of skilled personnel for SEZ operation Low standard of living in the area Wage levels
Innovation risks	Absence of developed infrastructure for innovation in SEZ Absence of or poor cooperation with scientific organizations (research centers, business incubators etc.) Ineffective mechanisms of promoting and introducing innovations into production in SEZ Unwillingness of foreign investors to establish R&D departments abroad
Environmental risks	Environmental pollution because of "dirty" manufacturing practices Land utilized for SEZ (shrinking of arable or protected land)

Compiled by the author

The second group of risks is associated with the effectiveness of public spending on infrastructure and operation of special economic zones. The economic risks of the state are not limited to tax revenue shortfalls due to tax concessions (tax risks of the state) or the migration of businesses to special economic zones in other regions. There are also losses for the government's budget that are caused by expenditure on creating and operating SEZ infrastructure. There are no guarantees that the money invested by the state will be recovered and the special economic zone will be a success (Mayburov, I. A., Ivanov, Yu.B., Sinenko, O.A., eds., 2017a).

In order to prevent business from migrating to special economic zones, some cities close to Shanghai announced an 'X+1' plan for policy support in 2000, meaning these cities offered one additional form of policy support in addition to the policy support offered by Shanghai (X). In response, Shanghai expanded the planning area of the Economic and Technological Development Zones (ETDZ) from 67 square kilometers to 173 square kilometers (ADB, 2015).

Organizational risks, such as poorly devised and ineffective mechanisms of distribution of duties among government bodies, constitute another important group. All too often organizational risks interrelate with legal and political risks. Legal loopholes hamper the operation of special economic zones, breed red tape and corruption, which can become an antagonizing factor for potential investors and tenants. Bureaucratic barriers affect the speed of decision making and values of performance indicators, so in order to reduce the risks it is necessary to streamline the rights and responsibilities of government officials, clearly define the order of administrative processes and merge the locus of decision making with the locus of responsibility.

Infrastructure risks are to a certain degree the progeny of economic risks. The availability of transport and engineering infrastructure is directly linked to the availability of funding for elements of infrastructure. There is also the risk that the government will have to cover the cost of maintaining infrastructure in the absence of functional tenants. In a research study by Zeng, Douglas Zhihua, (2017), zone location at the crossroads of major transportation routes, near ports and border areas with access to the domestic market or the market of neighboring countries is an extremely important factor. Another risk faced by SEZs is that of turning into an "industrial island". For example, the Airbus Park in Tianjin could not attract high-skilled labor, which became a limiting factor for production and growth (ADB, 2015).

This highlights the huge importance of social risks, of the availability of skilled workforce in the first place and the overall quality of life in the area for the state and an investor.

The critical role of innovation risks for the state was shown in a number of Chinese studies. Guo Zheng, for example, proved that SEZs that were created in China's industrial regions with advanced infrastructure for innovation have the biggest economic effect on local development (Zheng, G., Barbieri, E., Tommaso, M., Zhang, L. (2016). The unwillingness of foreign investors to establish R&D departments abroad is often attributed to the impossibility of divulging manufacturing secrets and the lack of skilled staff (Zeng, Douglas Zhihua, 2015).

Environmental risks have been put into a separate group due to the substantial impact of economic activity on the environment and considerable funds and resources that have to be spent on clearing up the aftermath of such risks. (Kechichian, E. and M.H. Jeong, 2016). The state has to handle an important task of man-made disaster risk management and minimization of the environmental impacts of production. Liu Xiaomei (2004) states that India and China have encountered the problem of SEZs being created on agricultural land. In the PRC, for example, 55% of the SEZ territory in 2003 was claimed from arable land.

2.3. Risks of SEZ operation for the investor. Today, tenants of special economic zones have to make managerial decisions in an environment of risk. In terms of the place of origin, risks for the tenant can be divided into external and internal. External risks originate in an environment that is external to the tenant at the macro- and meso-levels.

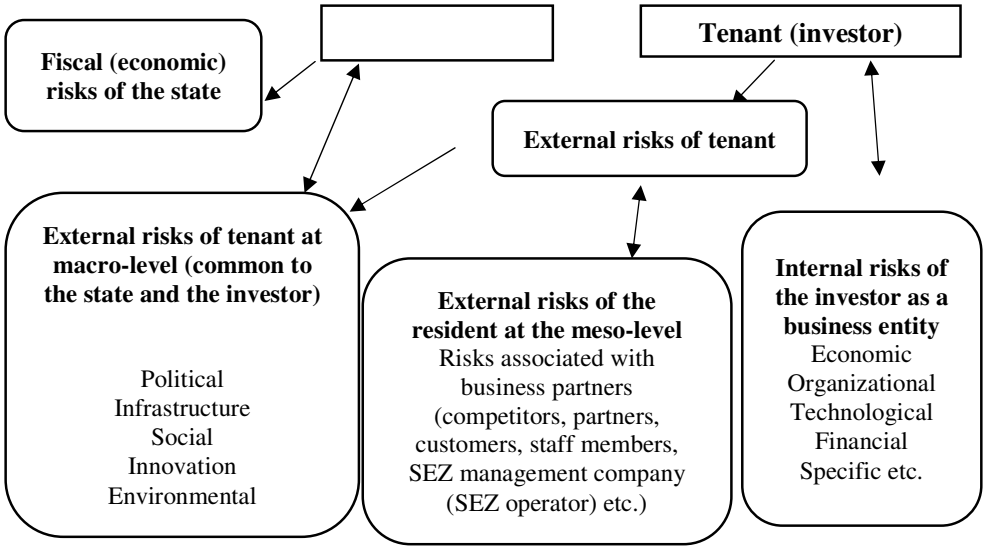


Fig 2. - Links between factors of SEZ operation risks for the state and the tenant
Compiled by the author

The factors of risk for the state and the investor are mutually influential and interdependent (Fig 2). A number of risks are common to both the state and the investor. The state, however, influences most of the external risks for the tenant, whereas the latter is often capable of only foreseeing them and factoring them into her business activity. External risks at the meso-level are linked to the immediate surroundings that can have a detrimental impact on the tenant (ineffective work of the SEZ regulator, failure to properly estimate competition, staff incompetence etc.) Any of the risks can cause significant economic losses or even bankruptcy of the tenant.

Internal risks of the tenant do not differ much from those faced by companies based outside special economic zones. A summary of classifications of the internal risks of the tenant as a business entity enabled the authors to identify the following groups of risks:

- economic (ineffective utilization of invested funds; price risk; accounts payable, tax risk etc.)
- organizational (ineffective organizational structure, legal risks, workforce risks (staff turnover, human factor risk), marketing risk etc.

- technology risks (obsolete technology and equipment, production risks, transport risks etc.)
- financial risks (irrational financial and investment policies, currency risk; credit risk etc.);
- specific risks that are specific to an industry or area of business (bad weather etc.)

When making economic decisions, a tenant of a special economic zone needs to simultaneously identify, assess the impact and probability of risks (Mayburov, I. A., Ivanov, Yu.B., Sinenko, O.A. eds., 2017b). The key question in managing the risks of SEZ operation for the tenant is to correctly set the goals that match the economic interests of his business. For the state, it is of principal importance to ensure effective and transparent administration of the SEZ operation. Experts with the Asian Development Bank (2015) consider wrong positioning to be the most dangerous risk for development countries. It stems from unrealistic assessments of existing conditions and potential by host areas. The ineffectiveness of zone programs in most African countries is attributed to insufficient infrastructure and ineffective governance institutions (Farole, T., and G. Akinci, eds., 2011). In Russia, most of the SEZs have failed to become drivers of development and economic growth in their host territories. A carefully elaborated policy and development strategy and administrative procedures restrict the playing field for corruption and increase the trust of investors and the public in special economic zones.

3. Conclusion and Future Research

Special economic zones are an instrument for limiting the government's influence on the local economy. Yet it is extremely important for the state to have a clear concept of SEZ development that takes into account risks associated with the operation of special economic zones and is aligned with the priorities of the domestic and international economic policies and the best global trends. The key factors of risk to the operation of special economic zones are connected with the creation of a business-friendly institutional environment that meets various conditions: legal (transparency of the legal framework), social, innovation, and infrastructure (lack of mechanism of state-investor partnership for creating innovation and social infrastructure etc.) ones. Failure to properly assess any of the risks can be detrimental to the reputation of the special economic zone and discourage potential tenants from investing in the program. Further research will be aimed at developing a universal approach to assessing the effectiveness of estimation of risks to the operation of special economic zones in Russia.

References

Bladen, Vincent W. (1974), From Adam Smith to Maynard Keynes: The Heritage of Political Economy. Series Heritage. Published by University of Toronto Press.

Reamer, Norton and Downing, Jesse (2016), Investment: A History. Series: Columbia Business School Publishing. Published by Columbia University Press.

ASEAN. 2016. *Guidelines for Special Economic Zones (SEZs) Development and Collaboration.* [Online]. [Accessed June 12, 2017]. Available: http://asean.org/storage/2016/08/ASEAN-Guidelines-on-SEZ-Development.pdf

UNIDO. 2011. *Africa Investor Report 2011.* [Online]. [Accessed June 15, 2017]. Available: http://investment.unido.org/imp/DataFiles/Reports/AISReport2011.pdf

Sinenko, Olga. (2016), Methods of assessing of tax incentives in special economic zones: an analytical overview, *Journal of Tax Reform*, 3(2), 168-179. [Online]. [Accessed June 10, 2017]. Available: http://jtr.urfu.ru/en/archive/journal/83/article/1024/

Zeng, Douglas Zhihua. (2017), *Special Economic Zones: Lessons from the Global Experience*. PEDL Synthesis Paper Series. No. 1 [Online]. [Accessed July 15, 2017]. Available: http://pedl.cepr.org/sites/default/files/PEDL_Synthesis_Paper_Piece_No_1.pdf

Mayburov, I. A., Ivanov, Yu.B., Sinenko, O.A. eds. (2017a). *Osobye ekonomicheskie zony. Zarubezhnyy i otechestvennyy opyt [Special economic zones. Foreign and domestic experience*]. Moscow: UNITY-DANA Publ., pp. 228-237. (in Russian).

Asian Development Bank. 2015. *Asian economic integration report. How Can Special Economic Zones Catalyze Economic Development?* Asian Development Bank [Online]. [Accessed June 18, 2017] https://www.adb.org/sites/default/files/publication/177205/asian-economic-integration-report-2015.pdf

Zeng, Douglas Zhihua. (2017) *Special Economic Zones: Lessons from the Global Experience*. PEDL Synthesis Paper Series. No. 1 [Online]. [Accessed June 28, 2017] Available: http://pedl.cepr.org/sites/default/files/PEDL_Synthesis_Paper_Piece_No_1.pdf

Zheng, G., Barbieri, E., Tommaso, M., Zhang, L. (2016), Development zones and local economic growth: zooming in on the Chinese case, *China Economic Review*, 38, 238–249.

Zeng, Douglas Zhihua (2015). *Global Experiences with Special Economic Zones: Focus on China and Africa.* World Bank Policy Research Working Paper 7240. Washington, DC: World Bank. [Online]. [Accessed November 4, 2016] Available: http://documents.worldbank.org/curated/en/810281468186872492/pdf/WPS7240.pdf

Kechichian, E. and M.H. Jeong. (2016). *Mainstreaming Eco-Industrial Parks: Conclusions from the Eco-Industrial Park* 2015 Event in Seoul. Washington, D.C.: World Bank. [Online]. [Accessed June 14, 2017] Available: http://documents.worldbank.org/curated/en/965391469043801584/pdf/107006-REVISED-PUBLIC-World-Bank-Mainstreaming-EIP-2016-Final.pdf

Liu, Xiaomei (2004), China's food security and the scope of grain imports, *Macroeconomic*, 9, 16-18.

Mayburov, I. A., Ivanov, Yu.B., Sinenko, O.A. eds. (2017b). *Osobye ekonomicheskie zony. Teoretiko-metodologicheskie aspekty razvitiya [Special economic zones. Theoretical and methodological aspects of development]*. Moscow: UNITY-DANA Publ., pp. 318-331. (in Russian).

Farole, T., and G. Akinci, eds. (2011). *Special Economic Zones: Progress, Emerging Challenges, and Future Directions*. Washington, DC: World Bank. [Online]. [Accessed November 28, 2016] Available: https://openknowledge.worldbank.org/bitstream/handle/10986/2341/638440PUB0Exto00Box0361527B0PUBLIC0.pdf

Mechanism for Credit Risk Management

Orlova E.V., Ufa State Aviation Technical University, Ufa, Russia, ekorl@mail.ru

Abstract

The article presents the results of the study related to the development and implementation of the bank's credit risk management mechanism, which ensures the growth of using financial resources efficiency based on the regulation of the risk-return relationship. The model for the formation of homogeneous groups of borrowers based on cluster and factor analysis methods is developed. It is distinguished by the principles of class formation and allows to form management decisions to reduce the likelihood of risk events and increase manageability of credit risks. A model for determining the optimal structure of clients is proposed, which allows to minimize the total damage to the emergence of credit risks and allows to form management decisions to achieve the optimal structure.

Keywords: risk management; credit risks; scoring model; statistical analysis of financial information; optimization model.

Introduction

The choice of specific methods for analyze and control the investment risks depends on the capabilities of the available information, the requirements for the final results and the level of planned reliability of investment. We can distinguish the following investment risks in banking: credit risk, interest rate risk and liquidity risk. Credit risks are one of the basic bank risks and are associated with non-payment of liabilities in the performance of borrowing activities. This risk is appeared in the full or partial non-return of borrowed resources or interest on them. This risk can be defined as the probability and magnitude of the damage incurred by the credit institution due to the inability or unwillingness of the borrower to provide the appropriate cash flows to repay the loan debt and interest [4], [7], [12]. Interest rate risk arises from adverse fluctuations in the interest rate, which leads to an increase in the costs of paying interest or a decrease in income from investments and proceeds from loans granted. The liquidity risk manifests itself in the likelihood of a lack of ability to meet the anticipated or sudden situation of cash requirements in the company.

Traditionally in order to monitor the solvency of customers credit institutions there are used scoring models and analyze the credit histories of previous clients to compile a rating of borrowers and determine the probability of repayment of a loan by a potential borrower. The main problems solved in scientific research related to the construction and use of scoring models in decision-making can be grouped into two groups.

The first group of problems is related to the selection of an adequate complexity of the solved tasks of the toolkit, the formation and justification of factors included in the model. Known models for assessing credit risk use a statistical approach and are based on the processing of empirical information of past credit histories, but differ in the ways of constructing approximating dependences - neural network, fuzzy and hybrid algorithms for constructing an approximation [5], [6]; econometric methods [1], [3], [14]-[18]. The methods of gathering the necessary information, the need for and the number of qualitative characteristics to be included in model designs are discussed to more accurately reflect the portrait of the borrower, the methods for identifying the models, analyzing their quality and prognostic properties, and others.

The second group of problems is connected with the development of automation systems for the processes of collecting, processing and storing information about borrowers, with the design of support systems for making investment decisions of the bank [2], the formation of customer databases. In the conditions of a large flow of dissimilar customers, the main requirement in the development of such systems is the speed of decision-making.

The analysis of existing methodological approaches and analytical tools showed that existing models of credit risk assessment do not allow revealing trends in the behavior of certain categories of customers with a similar economic profile [4], [7]. The formation of such groups of clients will allow, on the one hand, to identify common patterns of economic behavior of agents, on the other, to form a set of differentiated requirements on the part of the credit organization, presented to borrowers of certain groups, taking into account their specificity; thirdly, take into account the propensity to take risks of the person making decisions on the elements of the loan - volumes, terms, percentages.

1 Description of the mechanism

For effective functioning of banking system it is necessary to develop a risk management mechanism that will provide an acceptable risk-return relationship depending on the risk appetite of the decision-maker. The bank's risk management mechanism has been developed and described in the following stages.

Stage 1. Classification of customer-borrowers. It is necessary to develop measures for client (customer) insurance, that is, to identify the requirements that would be attractive enough for them, while at the same time guaranteeing the inflow of deposits and repayment of loans. The development of individual requirements for each particular client is not productive. Therefore, there are several main groups of clients that have similar characteristics and properties, using cluster analysis methods.

Stage 2. Risk assessment by customer groups. To assess the level of risk in each of the educated classes k, the variation coefficient: $V_{\sigma_k} = \frac{\sigma_k}{\bar{x}_k}$, $\sigma_k = \sqrt{\frac{\sum_{i=i}^{m}(x_i - \bar{x}_k)^2}{n_k}}$, where x_i - is the value of damage caused by the i-th client; $\bar{x}_k$ - the average value of damage in the k-th class; n_k - number of k-th class.

Stage 3. Development of the optimal structure of the client. The purpose of this stage is to obtain a set consisting of the numbers of each class of customers that provide the minimum aggregate risk (damage) that an organization can incur in the event of clients failing to fulfill their obligations. At the same time, each class of customers is characterized by the following characteristics: the class size, the total revenue of the class, the specific volume of working capital for each client, the coefficient of variation in the deviation of the amount of cash flow in violation of the terms of contracts. At the same time, the search for optimal structures is conducted from the position of the decision-maker's attitude toward risk. This stage is realized with models and methods of mathematical programming.

Stage 4. Managing the structure of the client base. At this stage the existing structure of clients is managed to bring it closer to the optimal structure obtained. This stage is based on the use of production rules "if-then". An analysis of the discrepancy between the existing and optimal structures is carried out according to the selected classes, the elements of which have similar individual properties reflecting the interests of the clients entering this class. In accordance with these interests, the size of each class should be influenced. Management methods are: interest policy, a set of requirements for borrowers to obtain a loan, the flexibility of working with deposits (the possibility of extending and early termination of deposits), a set of fixed parameters of services or their individual character.

Stage 5. Forming management decision and evaluation of its effectiveness, assessment the impact of risk management methods on the bank's competitiveness. To assess the impact of proposed risk management measures, the organization is encouraged to use the hierarchy analysis method. The purpose of the analysis is to compare the current position of the organization in the market with the position it will take as a result of the proposed changes in the policy of working with clients. The choice of this method is due to the fact that it involves carrying out such an assessment, taking into account both quantitative and qualitative indicators.

First, the problem is structured in the form of a hierarchical structure with several levels: goals, criteria, alternatives. The criteria for assessing lending services are: 1) the rate of interest for which loans are issued; 2) the severity of the claims against the borrower (surety, bail, income certificates);

3) adaptability of contracts, flexibility of rendered services; 4) waiting time for obtaining a loan. The criteria for evaluating the services for accepting deposits: 1) the annual interest accrued on the invested amount; 2) the degree of reliability of the organization that receives deposits; 3) adaptability of contracts, flexibility of rendered services; 4) transparency of clients organization's activities. Alternatives are the current position of the organization and the expected position that the organization will take on the market due to proposed risk management activities.

The proposed mechanism allows to change the risk-return ratio and increase the efficiency of using the bank's financial resources.

2 Classification of borrowers

The principle for assessing credit risk is based on the use of multidimensional analysis of credit history data of borrowers - clustering, factor analysis (the variance and the method of principal components) and has the following stages:

- Reduction in the sample size of credit histories of clients, research of significant factors affecting the creditworthiness of borrowers;
- Classification of clients, identification of homogeneous groups with the same level of risk (reliable and risky customer groups);
- Prediction the level of credit risk for a potential client and justifying a decision to refuse or issue a loan.

For effective risk management in a credit institution, it is necessary to develop such requirements for borrower clients that are attractive enough for them and at the same time guarantee repayment of loans. However, for each specific borrower to develop individual requirements is not appropriate. To solve this problem, it is necessary to distinguish several main groups of customers with similar properties. And then, based on the properties that characterize customers in homogeneous groups, to develop adequate requirements for each client group requirements.

To determine the significant factors that change the credit rating of enterprises-borrowers we assess the level of risk of insolvency of enterprises using the method of factor analysis, which allows to solve problems. First, to reduce the dimension of the initial data, describing the credit history of previous customers, without losing important information. Secondly, combine in several factors the studied indicators, described different properties of customers. In this case, the correlation factors are combined into factors, that is, such correlation coefficient between them exceeds 0.7. This combination allows you to redistribute the variance between the individual factors (components) and get a visual data structure.

We use the principal component method as a procedure for reducing the size of the original data without loss of information content. The essence of the method is to transform the original correlating variables into another set of miscorrelating variables on the basis of the rotation of the factors.

In order to assess the risk of investment activity, it is necessary to find the statistics of violations by customers of the terms of contracts and the amount of damage caused to the credit organization, due to each such violation. In this case, each of the identified classes of customers is characterized by a number of indicators - the number of class, the specific volume of working capital attributable to each client, the coefficient of variation of cash flow in violation of contractual obligations, and others. The magnitude of the risk as the amount of damage *risk* (non-payment in the period of the principal debt) can be considered as a regression dependence on the factors of the average loan size, the period for which the loan is issued, and a number of other identified factors.

The specification and identification of regression should be carried out using information about the damage and credit characteristics for customers of each class. The forecast of the risk level of a potential customer can be carried out on the basis of one of mentioned methods.

3 Development of borrowers optimal structure

The problem of optimization the structure of the client base is set as follows. Designations of the task: k - number of classes of clients; n_i - number of i -th class; V_i - coefficient of variation in the i-th class; r_v - is a coefficient reflecting the propensity of the decision maker to take risks; Dy_i - the specific volume of working capital for each client in the i-th class; $Dy_i n_i$ - working capital in the i-th class; N_0 - number of clients in the base period; T - the growth rate of the client base; $D\min_i$ - the minimum value of circulating assets of the i-th class.

The optimality criterion that minimizes the risk-return relationship is defined as:

$$f(n) = \frac{\sum_{i=1}^{k} r_v V_i Dy_i n_i}{\sum_{i=1}^{k} Dy_i n_i}, \quad (1)$$

under the following restrictions:

$$\sum_{i=1}^{k} n_i \geq N_0 T , \quad (2)$$

$$Dy_i n_i \geq D\min_i . \quad (3)$$

In (1) the expression $\sum r_v V_i Dy_i n$ reflects the amount of damage in the form of a reduction in the volume of working capital, $\sum Dy_i n$ - is the total volume of circulating assets in all classes. Inequality (2) restricts the total number of clients in the planned period, which should be no less than the product of the current number N_0 by the average growth rate for the period T. At the same time, the condition for the limitation of the minimum working capital of each class in the total share of the organization's circulating assets (3).

The solution of system (1) - (3) is the definition of the numbers of each class, that is, the structure of the client base that provides the most acceptable risk-return ratio, taking into account the propensity to take risks of the decision maker.

4 Management decisions to minimize risks

The next stage of the mechanism is to manage the existing structure of customers in order to bring it closer to the optimal structure obtained. Having information on the optimal structure of clients, the organization faces the problem of changing the existing structure of the client base. This stage of the proposed technology consists of production rules for managing the number of each client class received.

An analysis of the discrepancy between the existing and the optimal structure should be carried out according to the selected classes. Each class has specific characteristics, classification characteristics that reflect the interests of the clients entering this class. In accordance with these interests, the size of each class should be influenced.

The means of influencing the interests of clients for a credit organization are: interest policy, a set of requirements for borrowers to obtain a loan, the flexibility of working with deposits (the possibility of extending and early termination of deposits), a set of fixed parameters of services or their individual character. When working with classes of borrowers, an effective means of managing the number is the set of requirements that the client must meet to obtain a loan. Such requirements include the necessary number of guarantors; the availability of income statement; the need to secure a loan with collateral.

If the current number of a certain class of borrowers is less than optimal, the existing requirements should be mitigated to ensure the flow of customers into this class. Conversely, to reduce the size of

the class, more stringent requirements should be applied to customers whose interests coincide with the characteristics of the managed class.

At each moment of time, the structure of the working capital of the organization engaged in credit and savings activities consists of the following scheme:

$$WC = C + LI + FF = DI + C \pm \Delta LI + FF\,, \tag{4}$$

where C - contributions received in the current period; LI - loans and interest on them, the maturity of which expires in the current period; DI - deposits and interest on them, subject to return in the current period; ΔLI - the difference between the amount of deposits and the amount of loans, the maturity of which expires in the current period; $C \pm \Delta LI$ - the amount of funds that can be issued in the form of loans; FF - free funds of the organization.

Consider the expected structure of working capital in the future period n. This should be done based on the concluded deposit and loan agreements, the maturity of which expires in the period n. Suppose, in period n, the structure of working capital will be formed at the expense of contracts concluded in periods 1, 2 and 3. Suppose that in the future period n it will be necessary to return deposits (together with interest accrued on them) made in periods 1 and 2: $LI_n = r_{ls}\left(C_1 + C_2\right)$, where r_{ls} is the interest accrued on deposits. Suppose that in the period n borrowers, based on loan agreements, will have to repay loans (and interest on them) received in periods 2 and 3, then $LI_n = r_k\left[\left(DI_2 + \Delta DI_2\right) + \left(DI_3 + \Delta DI_3\right)\right]$, where r_k is the interest for the loan.

The amount of personal savings that can be deposited into the bank in the future (Bn) can only be approximately predicted, based on data for similar periods of past years. For clarity, suppose that during the period n personal savings will not be received. Suppose, at the moment, there are customer applications for the provision of services for deposits and loans. Let's define the possibility of the organization providing these services with a maturity period that expires in the period n, that is, we determine the amount of deposits that can be accepted for safekeeping and the amount of loans that can be issued before the period *n*.

To minimize the risk of insufficient liquidity, the following condition must be met:

$$DI_n \le LI_n + FF_n\,,$$

or

$$r_{ls}\left(C_1 + C_2 + C_3\right) \le r_k\left[\left(C_2 + \Delta LI_2\right) + \left(C_3 + \Delta LI_3\right) + \left(\alpha C_n + \Delta LI_n\right)\right] + FF_n\,, \tag{5}$$

where α is the share of deposits deposited prior to period n, which can be issued as a loan with a maturity in period *n*.

Depending on which service is more in demand, the organization can adjust the coefficient α. With a greater demand for loans, α increases, with a larger number of applications for depositing deposits - decreases. When deciding on the provision of deposit storage services, the credit committee of the organization should conduct such a calculation and conclude whether the organization will be able to satisfy the application and to what extent to return the deposit and the interest thereon within the required time. If the inequality is not met, then either change α, or decrease the amount of deposits accepted for deposit, or change the maturity of contracts.

Thus, using the schedule of the structure of working capital versus time, it is possible to prevent the risk of insufficient liquidity associated with the lack of available funds due to their incorrect distribution.

Developed mechanism also allows minimizing the damage from reducing liquidity due to early termination of deposits by some investors. Based on the amount of damage that is possible in a certain class of investors, we can conclude on the amount in which the amount of free funds of the organization is reduced in comparison with that planned under existing contracts. Taking into account the size of this possible damage in the considered schedule will allow the organization to build such strategy of distribution of circulating assets at which the liquidity risk will be minimized.

5. Numerical experiments

The authored mechanism for credit risks management ensuring credit risks minimization of the financial organization consists of the five stages: 1. Classification of customer-borrowers; 2. Risk assessment by borrowers groups; 3. Development of the optimal structure of borrowers; 4. Management of the borrower's structure; 5. Working out of management decisions.

We apply this mechanism in one the financial organization in Bashkortostan republic and assess the mechanism economic efficiency.

Model experiments are conducted using statistical information about borrower's credit histories in the financial organization and statistical processing program Statistica 7.0. The features of the data under study are their heterogeneity and multidimensionality. The model sample under study includes data on 38 clients and consists of the following indicators characterizing borrowers: credit period *(month)*, credit value (*value*), gender (0 - male, 1 - female), age (*age*), children (*children*), average monthly income (*income*). For each borrower we also introduce a variable, characterizing the presence or absence of *problems* with the credit repayment (0 - there is no problem, 1 - the problem exists), and the economic losses *risk* for the organization. The fragment with initial data for analysis is presented below, table 1.

Table 1: Initial data about borrowers (fragment)

Client's number	Months	Value, rub.	Age	Children	Gender (0-male, 1-female)	Income, rub.	Problems
1	5	10000	25	1	0	15000	1
2	12	10000	36	2	0	10000	1
3	12	13000	56	3	0	8000	0
4	12	15000	45	4	0	12000	0
5	6	15000	39	2	0	11256	0
6	12	17000	42	0	0	18000	1
7	12	25000	44	0	1	23000	1
8	12	25000	48	0	0	25035	1
9	6	25000	20	0	1	30000	0
10	12	25000	21	0	1	15065	0

First, homogeneous groups of customers are formed according to two indicators determined by the first factor, selecting the variable "month" and "value". Clustering is carried out in two stages - qualitative analysis using hierarchical methods and analysis with using the k-means method. Exploration analysis to determine the possible number of groups is carried out using a hierarchical classification using different measures of similarity and differences in objects in groups - Euclidean distance, Manhattan distance, Chebyshev distance - to assess the degree of proximity of objects within groups and measures of distances between clusters - single, complete communication. By varying the distance measures, one can qualitatively evaluate the possible composition of clusters and the number of these clusters. An analysis of the different partitions of the original sample by the method of hierarchical classification showed that it is possible to form three to six clusters. For a more reasonable grouping of objects, it is necessary to use clustering methods that use quantitative criteria to assess the quality of the partition. These methods include the k-means method. Below are the results of the partitioning, in which four groups (k = 4) and showing a significant difference between the classes formed among themselves.

The data was supplemented with information about the cluster to which the particular client belongs. Father for each cluster we calculate the basic descriptive statistics, build regression models and generate forecasts. The statistical characteristics are the mean, the standard deviation and the number of objects in each class is shown in table. 2.

Table 2: Descriptive statistics for determined clusters

Cluster	Number of borrower's	Borrower's numbers	Descriptive statistics for the variable month		Descriptive statistics for the variable value	
			Mean	Standard deviation	Mean	Standard deviation
1	7	1-16, 24, 30	33,4	15,44	327142,9	76313,9
2	6	17-21, 37	16	15,95	125000	41833,0
3	7	25, 31-36	51,4	13,35	52142,9	11495,3
4	18	22, 23, 26-29, 38	14,6	12,26	22222,2	8292,8

At this stage the following information was received: the number of borrower's clusters, cluster size, the share of working capital of each class in their total value, information about unit working capital. The most numerous cluster (18 borrowers) is the fourth, characterized by the lowest credit values, from 10 to 35 thousand rubles, and the average credit fluctuation is quite high (37 %). This cluster is rather unstable and determines about 10 % of the total credit value, table. 3.

Table 3: Summary information about clients clusters

Indicator	The value of the indicator in the cluster			
	1	2	3	4
Number of class, people.	7	6	7	18
Total credit, rub.	2 290 000	750 000	365 000	400 000
Share of total credit,%	60,2	19,7	9,6	10,5
Minimum credit, rub.	290 000	100 000	40 000	10 000
Maximum credit, rub.	500 000	200 000	70 000	35 000
Average credit, rub.	327 143	125 000	52 143	22 222
Average credit period, months.	33,4	16	51,4	14,6
Standard deviation for credit, rub.	76 314	41 833	11 495	8 293
Variation for credit	0,23	0,33	0,22	0,37

The third cluster is quite stable - the coefficient of variation is about 22 %, the credit value is low - from 40 to 70 thousand rubles and about of 9.6 % of total credit sum, but the credit period for this cluster is largest - an average of 51.4 months. The second class is small, has a high value of the average credit, can be characterized as a medium stable. The cluster which gives the highest income is the first, it is about 20 % of all customers who take significant credits for not very long tome - on average 33 months, the cluster is stable.

For a deeper analysis of each customers cluster and for decision-making on credit policy, it is necessary to investigate statistics on the credit repayment. It is possible to design the regression model (for each cluster) of the credit repayment (in accordance with contractual obligations) from the variables of credit value, credit period and other significant factors.

Results of optimization which are being obtained for the three cases of variable r_v are presented in table 4.

Table 4: Results of optimization in depending on r_v

Cluster	Working capital per borrower	Number of borrower	Sum of working capital	Share of working capital in total, %	Risk level under the propensity to take risks of the decision maker		
					Case 1 r_v=1	Case 2 r_v=0.4	Case 3 r_v=0.2
1	103 961,41	295	30 702 666,46	27	9,11	3,71	1,85
2	83 178,54	410	34 114 073,85	30	12,00	4,87	2,44
3	47 092,33	362	17 057 036,92	15	11,12	4,56	2,28
4	3 080 000,00	10	31 839 802,26	28	0,00	0,00	0,00

The ratio of risk-return is 7.73 % (for case 1), 3,09 % (for case 2) and 1,55 % (for case 3).

Next, we need to compare the existing structure of borrowers with the obtained optimal structure. To ensure comparability, it is necessary to increase the number of each cluster in the existing structure in proportion to the received growth factor of the borrower. This coefficient is equal to 1.43.

Table 5: Comparison of the existing and optimal structures of borrowers

Cluster	Number of cluster with the current structure, people	Comparable class size under the existing structure, people	Number of cluster s with the optimal structure, people	Difference between the current and optimal class size	Ratio of current and optimal class numbers,%
1	238	340	295	-45	86,76
2	351	499	410	-89	82,16
3	163	232	362	130	156,03
4	5	7	10	3	142,86
Total	754	1 078	1 078	-	-

The number of the first and second cluster is required to be reduced. The first cluster of borrowers is characterized by credit value ranging from 15 to 290 thousand rubles. The credit period in the first cluster is from 30 to 60 months. The second cluster is also characterized by long credit period - from 20 to 24 months. The third cluster is comparable to the first two from the credit value, but the credit period is from 1 to 12 months. The number of the third cluster is required to be increased. It is proposed to do this by moving the customers entering the first two classes. The total number of customers which is to be reduced in the first two classes is comparable to the appropriate one in the third cluster which is to be increased.

Thus, it is required to increase the attractiveness of credit services, which are characterized by a credit value from 20 to 350 thousand rubles and credit period from 1 to 12 months. For the customers wished to take credit for longer that one year its recommended to make the obligation requirement more strictly.

The fourth cluster is significantly different from the first. The credit value in this cluster is in the range of 2 to 4 million rubles. This segment includes borrowers who take credits to invest projects. The fourth cluster is weakly filled. Accordingly, it is possible to study in detail each customer and evaluate the investment attractiveness of the project for which the credit is taken. This explains the minimum risk level in this cluster.

In order to achieve an optimal ratio of risk and profitability it is necessary to increase the size of the fourth cluster to 10 persons. To increase the attractiveness of this cluster it is necessary to develop an individual approach to each customer, for example, variable credit conditions. This cluster is the safest from the point of view of terms of contracts fulfillment, which is it possible to weak credit conditions in order to increase number of this cluster.

Having the risk values in each cluster we can compare the risk and profitability ratios, reduced to comparable numbers of cluster for the proposed optimal structure and the current structure.

Table 6: Current and optimal cluster structure on the risk / profitability ratio

Risk propensity	Existing structure		Optimal structure		Change in working capital with risk, mln.r
	Working capital, Mln.r	Risk / profitability ratio, %	Working capital, Mln.r	Risk / profitability ratio, %	
Pessimistic option	109 338	8,61	113 713	7,73	4 998,99
Realistic option		3,44		3,09	4 622,50
Optimistic option		1,72		1,55	4 493,06

Changing in working capital with apply the proposed decision to minimize risks is calculated as follows. The expected value of working capital is reduced by the risk value that the organization may incur as a result of risk situations. This risk is calculated from the risk / return ratio and depends on the risk appetite of the decision-maker. Thus, the expected values of the organization's circulating assets are obtained taking into account the risk. The difference between the amount of funds that is expected under the existing policy of the organization and the amount that can be received when making the proposed management decisions is calculated.

As a result of the developed mechanism application the growth of working capital in the organization is about from 4.1 % to 4.6 % depending on the propensity of the decision maker to take risks.

6 Results and conclusions

Investment activity is one of the most actively developing forms of economic activity. The problem of investment risk has sufficient scientific elaboration. However, in such a sphere of investment activity as credit activity, the risks are regarded as applied and do not have a serious scientific elaboration. In this regard, the problems of managing the credit risks are important and significant.

The scientific novelty of the work is as follows:

- The credit risk management mechanism has been developed that makes it possible to assess risks in homogeneous classes of customers and to formulate management decisions to minimize risks;
- The principle for clients classification into homogeneous groups based on cluster and factor analysis methods is proposed. It makes it possible to reduce the likelihood of risk occurrence and improve manageability of credit risks;
- The model for optimizing the structure of clients is proposed, which allows to minimize the total damage to the occurrence of risks and allows to form management decisions to achieve the optimal structure.

The results of the developed mechanism application in the credit organization have proved the reliability of the developed mechanism, and its economic effectiveness has been confirmed. The results obtained will contribute to the effective use of the developed risk management mechanism for

the sustainable organization development, to the well-founded planning of working capital and to the investment efficiency growth of the credit organization as a whole.

References

1. Bankova V. K.: Scoring Models to Assess the Creditworthiness of Borrowers in Russia. In: Izvestiya of the Academy of Management: Theory, Strategy, Innovation, pp. 14-16, no. 4. (2011)

2. Basulin M. A.: Analysis Software "Sas Credit Scoring" for the Commercial Bank. In: Innovative Information Technologies, pp. 32-37, no. 2. (2013)

3. Glinkina E. V.: Credit Scoring as a Tool for Effective Credit Assessment. In: Finance and Credit, pp. 43-47, no. 16. (2011)

4. Guzairov M., Orlova E. V.: Modeling of Innovation Processes in Regional Systems under risk. In: Bulletin of the Ufa State Aviation Technical University, pp. 226-232, no. 1. (2012)

5. Lebedev E. A.: Synthesis of Scoring Models Method of Systemic-Cognitive Analysis. In: Polythematic Network Electronic Scientific Journal of the Kuban State Agrarian University, pp. 17-30, no. 29. (2007)

6. Makarenko T. M.: The Combination of Scenario Forecasting Procedures with the Dynamic Ranking of Experts when Assessing the Credit Risk of the Borrower - Physical Persons in the Bank. In: Bulletin of Leningrad state University of A. S. Pushkin, pp. 56-63, no. 3. (2012)

7. Orlova E. V.: Economic and Mathematical tools of Management of Economic System in Uncertainty Conditions. Ufa: USATU, 172 p. (2012)

8. Orlova E. V.: Econometric Modeling and Prediction. Ufa: USATU, 250 p. (2013)

9. Orlova E.V.: Simulation Model for Stochastic Control of Financial Flows of the Enterprise. In: Scientific and Technical Gazette of St. Petersburg state Polytechnic University, pp. 185-189, no.5. (2012)

10. Orlova E. V.: Identification and Prediction of Risks of the Economic System on the Basis of Simulation. In: Problems of Risk Analysis, pp. 40-49, no. 11. (2014)

11. Orlova E. V.: Evaluation of Credit Risk Based on Methods of Multivariate Analysis. In: Computer Research and Modeling, pp. 893-901, no. 5. (2013)

12. Orlova E. V.: Synthesis of Optimal Management System for the Stochastic Financial Flows Distribution of the Production-Economic System. In: Audit and Financial Analysis, pp. 149-153, no.6. (2013)

13. Orlova E.V., Harrasov R.R.: Econometric model for estimation and prediction of individuals creditability. In: Audit and financial analysis, pp.131-136, no.2. (2016)

14. Orlova E.V.: Simulation Model for the Firms' Financial Resource Management. In: Proceedings of the 28th International Business Information Management Association Conference on Vision 2020: Innovation Management, Development Sustainability, and Competitive Economic Growth, IBIMA. (2016)
15. Crone S.F., Finlay S.: Instance Sampling in Credit Scoring: an Empirical Study of Sample Size and Balancing. In: International Journal of Forecasting, pp. 224–238, no. 28. (2012)

16. Crook J.N., Edelman D.B., Thomas L.C.: Recent Developments in Consumer credit Risk Assessment. In: European Journal of Operational Research, pp. 1447–1465, no. 183 (3). (2007)

17. Mircea G., Pirtea M., Neamţu M., Băzăvan S.: Discriminant Analysis in a Credit Scoring Model. In: Recent Advances in Applied & Biomedical Informatics and Computational Engineering in Systems Applications, pp. 56-69, no. 2. (2011)

18. Ong C., Huang J., Tzeng G.: Building Credit Scoring Models Using Genetic Programming. In: Expert Systems with Applications, pp. 41–47, no.9. (2005)

Transformation of logistical processes in digital economy

Irina Karapetyants, Moscow State University of Railway Engineering, Moscow, Russia, karapetyants.imo.miit@gmail.com

Yrii Kostuhin, National University of Science and Technology "MISIS", Moscow, Russia, kostuhinyury@mail.ru

Tatyana Tolstykh, National University of Science and Technology "MISIS", Moscow, Russia, tt400@mail.ru

Elena Shkarupeta, Voronezh State Technical University, Voronezh, Russia, 9056591561@mail.ru

Elena Syshhikova, Russian University of Justice, Moscow, Russia, syshhikova.elena@mail.ru

Abstract

A variety of economy areas are subject to digitalization, and logistics (digital logistics) is not an exception. The reason of speedy digital logistics progress basing on the functioning machinery, and a great attention to this transformation have merely economic reasons of driving down of logistic element costs which is present in every product or commodity and, along with the logistics, has influence on basically all economy sectors. For example, there is the Permanent Digital Transport and Logistics Forum in the European Union. In our opinion, the existing trans-formation models are extremely useful in connection with Russia's and EEU member countries' decision on the digital transformation of economy. Highly-developed and contemporary transport and logistical systems are now the key factors in economic competitiveness of the country. Roads, railroads, inland waterway system, seaports and airports facilitate union of different regions of the country, population and employment centers and international exchange. Maintenance and improvement of effective and striking transport and logistics infrastructures for people and freight traffic keep being the pivotal points of the modern national and global markets. This becomes particularly important in the light of predicted growth of population and inevitable fundamental changes in industry, energetics (especially in oil and gas sectors) and farming industry. Movement of goods and manufacturing component between goods manufacturers, growth of urban logistics, international supply chains and logistics are already an interface between such phenomena as digital economy and new industries. It is necessary to say that logistics amounts to from 10% to 20% in every final product. Logistics costs vary greatly and may amount to a negligible component for merely digital products, transmitted via Internet, or, for example, total up to 60% for oil. The issues of logistics and digital economy are considered in this article.

Keywords: smart logistics, digital transformation, digital logistics, digitalization.

Introduction

To date, highly-developed and contemporary transport and logistical systems are now the key factors in the economic competitiveness of the country. Roads, railroads, inland waterway system, seaports and airports facilitate union of industrial, agricultural and resource regions, population and employment centers and international exchange. Maintenance and improvement of effective and striking transport and logistics infrastructures for people and freight traffic keep being the pivotal points of the modern national and global markets, particularly in the light of predicted growth of population and inevitable fundamental changes in industry, energetics (especially in the oil and gas sectors) and farming industry. Movement of goods and manufacturing component between goods manufacturers, growth of urban logistics, international supply chains and logistics are already an interface between such phenomena as digital economy and new industries. It is necessary to say that logistics amounts to about 10% in every final product (about 20% in the Russian economy). Logistics costs vary greatly

and may amount to a negligible component for merely digital products transmitted via Internet, up to 60% for oil, for example. It is just development of international logistics that has in large part made the sanctions against the Russian Federation extremely ineffective. Today, logistics in digital economy is forced to become a kind of "intellectual glue" (that facilitates smart mobility) of a large amount of concepts, and reflect all phenomena of this new mode of economy transfer, which are still not quite understandable. In practice, a new branch is developed - smart mobility, which unites movement of physical objects and people. Differences between methods of movement of people and objects blend. While understanding of the digital economy phenomenon is multidimensional, economic growth, today country competitiveness and prosperity of its citizens are dependant on it as shown in the book by Kupriyanovskiy V.P. et al (2017).

Problem Statement

The most substantial part of changes is new paradigms of production and logistics which are extremely rapidly developing. The logistics company DHL has given the most capacious description of this ongoing process (2015):

"Engineering and manufacturing sectors (E&M) are in the zone of sweeping changes. Trends, determined and described by us in this paper, confirm that E & M companies must be ready for a totally new and competitive market in the nearest 10-20 years. Many enterprises have extensively begun to reorganize their manufactures and business models for being prepared for these changes.

Their goal is to become more client-minded and competitive.

We, in DHL, consider that supply chains management will become the key factor and driver for achieving it.

However, our studies show that managers of supply chains will have to deal with even higher level of complexity in future. A wider and more individual product range, various details, more suppliers, more interfaces along the chain of added value and consideration of individual requirements of new markets are essential. Hence, we expect a number of serious consequences for future supply chains".

Review of Literature

Other logistics in digital economy, called "digital logistics", springs up as a response to a global challenge for logistics sector. In the article by Kupriyanovskiy V.P. at all (2017) there is the list of the principal challenges:

- logistics must dwell and function in the rapidly changing, competitive and globalizing economy;
- in digital economy there are centers of global economic gravity which are rapidly changing;
- as a result of such changes, supply chains become more complicated;
- in digital economy the state of society changes and customers expectations are growing;
- it becomes necessary to operate with limited resources;
- it is essential to solve problems of development sustainability and environment impact;
- there is a speedy progress of new parts of digital economy. For example, growth of role and value of circular economy results in a necessity of creating of logistic cycles close systems.

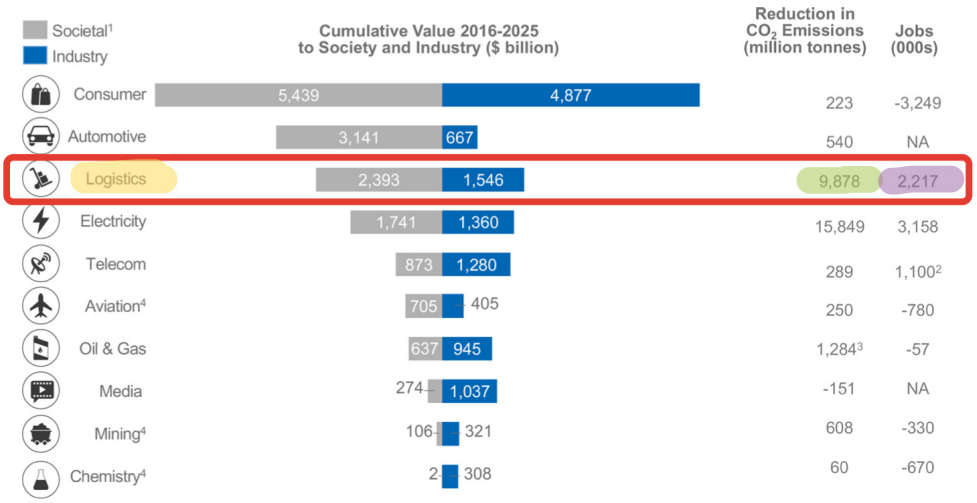
Let us analyze the transformation of logistical processes at a global scale.

The enterprise called Cloud Strategies has been developing in the USA. According to the design of its initiators, the Cloud Strategies must allow to implement modern technological initiatives in lines of

setting up of "smart" industrial productions, shops, cities and transport systems, grid technologies in energetics and resolving of issues of social interaction, e-commerce, goods supply chains monitoring (including global logistics flows). In authors' opinion, in years to come, the "cloud" and super-computer technologies will allow to implement modern technological initiatives in such lines as the development of "smart" industrial productions and shops, "smart" cities and transport systems, grid technologies in energetics. At the same time, the most popular will be "cloud" and super-computer solutions designed for social interaction, e-commerce, and goods supply chains monitoring (including global logistics flows).

In 2015 the World Economic Forum (in Davos) admitted the Digital Transformation Initiative, DTI. In 2015-2016 the project was focused on six fields: Logistics, Media, Consumer Goods, Electricity, Automotive Industry and Health. It also examined four cross-industry themes: Digital Consumption, Digital Enterprise, Social Implications and Management Platforms. In 2016-2017 the project will extend to 8 more industrial sectors: Chemical Industry, Mining and Metals, Oil and Gas, Insurance, Aviation, Accommodation, Professional Services, Telecommunications, Retail. Cross-industry themes are Management Platform, Politics Impact and Regulation of Social Consequences and New Technologies Impact (Analysis of Global Experience of Industrial Development and Approaches to Digital Transformation of Industries, 2017).

According to estimates of the World Economic Forum, digitalization will have immense potential for business and society over the next decade and can deliver over $30 trillion more for global economy over the next 10 years (up to 2025) (Figure 1).



(1) Total societal value at stake includes impact on customers, society and the environment; the impact on external industries has not been considered; (2) Excludes the Extending Connectivity digital initiative; (3) Reduction in emissions for Oil and Gas refers to reduction in CO_2e emissions (4) Aviation refers to Aviation, Travel and Tourism industry. Mining refers to Mining and Metals industry. Chemistry refers to Chemistry & Advanced Materials industry. Source: World Economic Forum/Accenture analysis

Fig. 1. The value of digitalization across the industries analyzed by the Digital Transformation Initiative

Source: based on the data from the Digital Transformation Initiative (DTI),

http://reports.weforum.org/digital-transformation/introducing-the-digital-transformation-initiative/

At present, as the Internet has been developing, e-commerce market is one of the most attractive business lines in Russia and abroad. E-commerce market in Russia is one of the most dynamically developing markets.

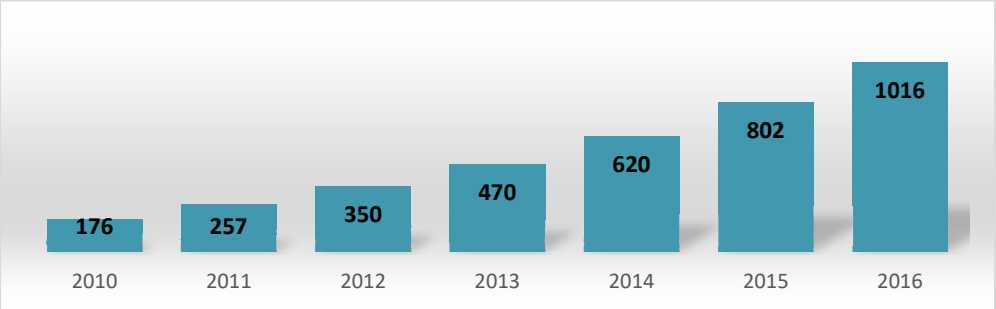


Fig. 2. E-commerce market volume in Russia and forecast for 2014-2016, milliard, roubles

Source: based on the data from InSales,

https://www.insales.ru/blog/2015/09/30/ecommerce_services_report_2015/

The electronic business uses not only market transparency but it also generates a background for establishing of electronic business chains. To achieve an effective chain management is possible only with the help of IT-solutions and the Internet. E-business support of supply chains allows to implement an immense potential of optimization. In such a case, market transparency grows, which leads to customers and suppliers finding each other faster and easier, and pricing being more transparent. In the meantime, business transactions become more effective. Paper-based handling of documents disappears, and time of document handling reduces. E-business has a great impact on quality of all supply chains.

To date, almost the only way to open a successful small or medium business without investment is a remote online income, that is distance selling. This business sector is an integral part of logistics. Logistics in this business sector acts as a fulfillment (storage, packaging, processing of goods for online shops), which implements professional delivery of goods, its further storing, and develops more profitable logistic structure, seeks for reliable partners, performs calculations, deals with analyzing of transport service market, prepares necessary documents. Put simply, task of fulfillment is considered to be fully implemented if an ordered product has been delivered to a customer in its proper quality, in quantity and volume as required, in due time, and with minimal financial resources and efforts.

At present, the market offers complete solutions allowing to integrate the augmented reality into their business right away. Sphere of its usage ranges from medicine, space, production and logistics to education and modeling of behavior in different situations. As analytics estimate, sales volume in this sector amounts to several billion US dollars, but by 2020 it will amount to more than 150 billion dollars. Fundamental modifying of retail sales scheme is inevitable. Even today, a carried out in the USA poll shows that 61% of buyers prefer to shop in shops using the augmented reality technologies.

The Internet of Things has reached factory production where it not only modifies production logistics but also challenges business models of many enterprises. Pricing chains are being transformed into networks, products turn into platforms for innovative services, real-time data processing gains in more importance. In accordance with estimates, now there are only 3.5% of factories around the world which have been connected to the Internet of Things platform. Here it opens a huge market: in ten years, 75% of all industrial sites may be connected to digital chains. Even now, the necessity of services related to analysis of industrial data grows rapidly.

In authors' opinion, digital economy on transport may be treated as IT-platform for tasks of innovative, balanced development and effective use of integrated transport infrastructure. Whereas logistics in digital transformation - as a new mechanism of accelerated consistent development of economic systems which is based on effective information chains, and optimized, value data-flow required for fulfillment of operational and strategic business tasks. It affects not only systems information realm providing movement of product flows and management of infrastructure balanced development of different types of transport, but also systems of trade exchange, production, management of all key

business processes of transport and logistical companies of passenger and cargo transportation services, supply chains management as it shown yn the book by Bubnova G.V. et al (2017).

In our opinion, the digital logistics must be based on IT-support of harmonized systems, and production, trade and economic processes of goods and product flows movement in "pricing chains". It's applied problems are reduction of time, labor, financial losses connected with data search, as well as IT-applications for optimal patterns of business partnership basing on effective modeling of horizontal production-economic and trade-economic communication between different companies.

Smart carriage as an innovative product, the digital logistics product which allows to create innovative comprehensive transport services depending on continually changing customer needs. Target consumer group of digital logistics in the sphere of freight transportation is, first of all, entrepreneurs, small and medium business enterprises which are now in desperate need of information analysis systems and technologies for management of business processes in the context of incomplete and contradictory information. Digital logistics of the passenger field is closely associated with the key project of smart mobility as shown in the book by Kupriyanovskiy V.P. et al (2017).

For business processes management, establishment of effective environment for business in Russia, it is necessary to create and use not only appropriate for these conditions IT-systems, but also adaptation of "transparent" IT-technologies based on the united transport-logistical and trade infrastructure which provides for networking of business processes and creation of "customer value chains".

Thus, we think that among primary tasks which provide for creating of chains (SCM), it is possible to emphasize information flow optimization between all participants of supply chains, which results in reduction of standby time, delays and costs related, growth of loyal customers number, yield increase as a result of grading of service improvement by means of reduction of order processing time, etc.

We support the point of view of authors, claiming that, today the Supply Chain Management technology (SCM) is considered as the "digital SCM, using "the Internet of Things".

The name of the process changes too - Supply Chain is substituted by Supply Chain 2.0 - as well as optimization criteria does. "Minimal expenses and costs" economic criterion, generally accepted in logistics theory, becomes irrelevant, whereas "maximal economic impact, benefit, value" steps forward. Within the framework, a goal, new approach to logistics and KPMG Supply Chain Management, "Demand-Driven Supply Chain 2.0. as a direct way to efficiency", is significant.

Results

Establishment of development mechanism and effective functioning of transport-logistical systems and centers, basing on digital transformation of logistics, will allow to create a cooperation platform for synchronized development of Eurasian transport links, development of priority Eurasian surface transport routes (corridors) in the frame of UNECE and UNESCAP project.

Bubnova G.V. et al (2017) mentioned to form the aforesaid mechanism it is necessary to:

- develop digital transport and digital logistics concepts;
- develop methods of identification of "value" points, information useful for establishment of harmonized price chains and the "jointless", transparent logistics aimed at achieving of the common result;
- describe the multidimensional competency model, "knowledge" chains; determine the list of cognitive maps, to form the competency matrix (science schools, best practices) with competency marks (keys);
- create a new architecture of business systems with a jointless integration;
- start working with IT-integration of adjoining enterprises production processes and creating

cross-industry cooperatives;

- enable adoption of service models of traditional fabric consumption;
- establish a project office and Logistics and Transport Competency Center, which will involve successful companies, leading research and educational organizations, leading scientists and specialists in different subject fields;
- determine the operator of the digital platform; activate harmonization and standardization of technologies, architectures and business models for problem solving of logistics and Supply Chain Management;
- replicate the best practices of transport and logistical companies business in cross-industries;
- train specialists for IT-logistics so that they have a special range of competencies to create information flows in digital economy and analytical applications for optimization of business processes on different levels of economy management.

Conclusions

Obviously, enabling of radical improvement of the underlying indices of Russian organizations activities which deal with material production, transportation and trade, is possible only with the fundamental reconsidering and radical change of business partnership, restructuring of transport and logistical systems. What is meant here is not only forming of new logistic structures using current transport infrastructure but also development of the latter. As well as finding of combined solutions, enabling the organization of important strategical directions of material flows movement using new technologies of transportation and modern methods of economic phenomena management. Namely, integrated logistical solutions basing on modern methods of estimate of transaction costs and specific assets in logistical systems, and generation technology of "smart projects".

In our opinion, the application of new digital solutions specifies direction for innovative development of transport systems and centers, as well as determines relevance of the digital logistics transformation.

References

Kupriyanovskiy, V.P., Evtushenko, S.N., Dunaev, O. N., Bubnova, G. V., Drozhzhinov, V.I., Namiot, D. E., & Sinyagov, S.A. (2017). 'Government, industry, logistics, innovations and smart mobility in digital economy', *International scientific journal "Modern Information Technologies and IT-Education"*, 13(1), 74-96.

Engineering & manufacturing 2025+ building the world A DHL perspective on future Engineering & Manufacturing Supply Chains 2015. [Online], [Retrieved October 1, 2017], http://www.dhl.com/content/dam/downloads/g0/logistics/white_papers/DHL_EandM_2015%2B_Building_The_World.pdf

Kupriyanovskiy, V.P., Dunaev, O. N., Fedorova, N. O., Namiot, D. E., & Kupriyanovskaya, Y. V. (2017). 'Smart mobility in digital economy', *International Journal of Open Information Technologies*, 5(2).

Analysis of Global Experience of Industrial Development and Approaches to Digital Transformation of Industries of The Eurasian Economic Union Members. Information and Analysis Report. The Eurasian Economic Union Department of Industrial Policy. Moscow, 2017. [Online], [Retrieved October 1, 2017], http://www.eurasiancommission.org/ru/act/prom_i_agroprom/dep_prom/SiteAssets/Материалы%20в%20разделе%20Аналитика/Отраслевые%20обзоры/ЦИФРОВАЯ%20ТРАНСФОРМАЦИЯ%20ПРОМЫШЛЕННОСТИ%2013.02.2017.pdf

Bubnova, G. V., & Lyovin, B.A. (2017). 'Digital logistics - innovative mechanism of development and effective functioning of transport-logistical systems and centers', *International Journal of Open Information Technologies*, 5(3).

Zhong, R. Y., Newman, S. T., Huang, G. Q., & Lan, S. (2016). 'Big Data for supply chain management in the service and manufacturing sectors: Challenges, opportunities, and future perspectives', *Computers & Industrial Engineering*, 101, 572-591.

Tolstykh, T.O., Shkarupeta, E.V., & Shishkin, I.A. (2017). 'Innovative changes influence effects on processes region social and economic development', *Proceedings of VSUET*, 79(1).

Tolstykh, T., Vertakova, Y., Sviridova S., Shkarupeta E., Shishkin I. (2016). 'Development of Methods and Models for Analysis the Effectiveness of Commercial Activity of Industrial Enterprises'. Proceedings of the 6th EACO International Scientific Conference, ISBN: 978-80-905405-2-1, 8-9 December 2016, Krakow, Poland, 139-155.

Establishment of research competencies in

The context of Russian digitalization

Irina Karapetyants, Moscow State University of Railway Engineering, Moscow, Russia, karapetyants.imo.miit@gmail.com

Yrii Kostuhin, National University of Science and Technology "MISIS", Moscow, Russia, kostuhinyury@mail.ru

Tatyana Tolstykh, National University of Science and Technology "MISIS", Moscow, Russia, tt400@mail.ru

Elena Shkarupeta, Voronezh State Technical University, Voronezh, Russia, 9056591561@mail.ru

Anna Krasnikova, Voronezh State Technical University, Voronezh, Russia, anna-solomka@yandex.ru

Abstract

The configuration of global markets undergoes substantial changes as affected by digitization. Many traditional industries become less significant in the global economy structure alongside the rapid growth of new sectors, generating fundamentally new needs. The determinant role in the ongoing transformation is acquired by research and invention, which requires creation of system of research and invention management in digital economy field enabling coordination of efforts of interested parties - representatives of the Federal Agencies of Executive Authority, companies, higher educational establishments and scientific organizations.

Intensive development of digital economy society inevitably involves tasks in knowledge management field. The priority sources are information and knowledge acquired from the knowledge-based experience. And, competencies, being a competitive position on the market, are innovativeness, expert knowledge, creativeness, cognition. Therefore, transition from physical to digital economy requires fundamentally new approaches not only in industries and factories, but also in formation of human resources for digital economy: education, staff training, establishment and innovative human capital management.

In the paper we considered approaches, tools and mechanisms of formation of key conditions for digital economy staff training and perfection of the educational system which must provide digital economy with the competitive work force. The crucial point of the approach must be formation of the support system of exploratory and applied research in digital economy (research infrastructure of digital platforms), providing technological independence of every direction of transparent digital technologies which are competitive on a global basis.

Keywords: digital transformation, digital economy, digitalization, competencies, competency-based approach.

Introduction

Study of problems of education and formation of research competencies is determined by transformations in social aspect and economy of Russia, new requirements for a profession, new approaches in professional education.

Inherent innovators (schools, higher educational institutions), supranational standards, new customer requirements (family, business, society, government) are the drivers of education development. At present, in authors' opinion, factors affecting the education are as follows:

- the Fourth Industrial Revolution;
- globalization;
- cultural and social diversity;
- new requirements of families, society, government;
- the 21st century skills and competencies;
- new meaning of education;
- new forms, technologies and educational tools;
- sustained educational and career path.

In the course of the Fourth Industrial Revolution, a traditional competitive position in the form of inclusive institutes and strong leaders was associated by a major factor of high technologies access. Technological explosion leads to quality changes in business and management. Among technological development trends relating to the 21st century educational transformation there are the following trends as well as it shown in the paper by Andreeva et al (2017):

- transition from "manufacturing" being a "manufacturing by means of human physical force to "brainfacturing" - a smart manufacturing or "manufacturing by means of human intelligence";
- transition from the 20th century "high-tech" and "low-tech" concept to the 21st century "advanced" industries concept;
- transition from B2B, B2C to M2M - IoT concept ("Internet of Things").

The ten main trends identified by authors de Wit, Hunter, Howard and Egron-Polak (2014) are as follows:

- growing importance of internationalisation at all levels (broader range of activities, more strategic approaches, emerging national strategies and ambitions);
- increase in institutional strategies for internationalisation (but also risks of homogenisation, focus on quantitative results only);
- challenge of funding everywhere;
- trend towards increased privatisation in IoHE through revenue generation;
- competitive pressures of globalisation, with increasing convergence of aspirations, if not yet actions;
- evident shift from (only) cooperation to (more) competition;
- emerging regionalisation, with Europe often seen as an example;
- numbers rising everywhere, with challenge of quantity versus quality;
- lack of sufficient data for comparative analysis and decision-making;
- emerging areas of focus are internationalisation of the curriculum, transnational education and digital learning.

To date, in Russia a number of stuff training and accordance of curriculum with the digital economy needs are insufficient. There is a significant staff deficiency in educational process of all educational levels. Moreover, there have been established an infrastructure of science and innovations in Russia which is represented by different development institutions, technological parks, business incubators, which can and should be used for digital economy development.

Problem Statement

Nowadays, the world is a dynamic global reality. The next decade will be an era of more significant changes in education. There will appear a new global architecture of education. Over the next two decades, new technologies and digitalization processes will change radically the education approach, and it is necessary for us today to take measures to get prepared for these changes in advance. The knowledge and information may be digitalized and transfered by electronic means, it changes education. The best world educational institutions post all their curricula on the Internet. Number of remote students has increased significantly. The educational process becomes more flexible and personalized, practice projects will be addressed as more important, major purpose of education will be to help students to be able to deal with enormous scope of information. Jointing of academic and technological areas, opportunities of blended teaching methods, early vocational guidance in new industries - all these are only a part of trends which determine future of education. The major part of breakthrough solutions in this area is realized by means of not traditional academic institutions, but by new players of the educational market: financial and technological companies, scientific associations, bright individual initiatives. A new transnational market, which can promptly enough become a notable competitor of traditional educational institutions, change educational markets and set new rules of game for them, is being formed. Consequently, commitment of the Russian economy to innovative development, overcoming crisis phenomena have demanded fundamental, substantial and organizational transformations from education. Typical for the “industrial” 20th century, traditional technocratic approaches in management have become irrelevant. In the 21st century, management effectiveness will in many respects be determined by readiness to solve professional tasks in the context of prompt changes, ability to generate these changes, to interpret them as an integral part of one’s life, examine and solve problems.

Ongoing changes all over the world, society, professional area in Russia and abroad newly identify issues of development and preservation of competencies, skills, a part of which is unnecessary now, but in future they may become popular. Therefore, here arises a problem of preservation of skills (even though on description level), important for history educational culture, but even more critical need is to form “new” skills which were not operational earlier. It is connected not only with introduction of ICT into educational area, or further entrance of networking cooperation in it, but also with application of non-traditional research technologies, which presupposes other methods of students activity organization.

Review of Literature

In the context of higher education modernization, the competitive approach provision was theoretically substantiated as an alternative for traditional education, oriented to formation of knowledge and skills of future students. In the 1990s of the 20th century, world community on the level of UNESCO determined a range of competencies which should be considered as an important result of education in the 21st century. In the report of the International Commission on Education for the 21st Century, called “Education: a hidden treasure”, Jacques Delors represented four matters - global skills, which must be the basis of education: learn to experience, learn to do, learn to live together, learn to live. In other words, education should be directed not so much to communication and learning of specific subject knowledge, but more to ability to find necessary information, change it, apply it in different professional situations, being in contact with other people at the same time and carrying one’s point. Thus, the competence may be considered as being an integrative personal quality which is formed on the basis of a combination of subject knowledge, skills, experience reflected in theoretical and applied readiness for its realization on the level of functional literacy.

The concept of competency was firstly applied by D. McClelland in his writings. Though, thanks to the paper of Richard Boyatzis "Competent manager", the term "competencies" became commonly used much later. The concept of competency was spread by R. Boyatzis.

Competence and competency are the terms which are commonly used as synonyms. But Charles Woodruff and other researchers consider that the word "competence" shall be used to tell about an ability to do one's work competently and a worker's activity. Thus, in order to avoid misunderstanding and confusion it makes sense to separate the two concepts:

- competence is a concept relating to an individual, which tells about aspects of behavior required for performance of work;
- competency is a concept relating to labor activity, which tells about the area of professionalism where a worker is competent.

D.K. McClelland, R. Spencer and other researchers consider that the competency consists of:

- motives, representing basic needs, which rule and drive one's behavior forcing a person to make his choice;
- qualities - basic propensities to a specific behavior or method of reaction; for example, self-confidence, self-control, stress tolerance and endurance;
- "I am" concept - personal orientation and values;
- knowledge volume - knowledge of facts or technical (how to fix a computer fault) or communicative (how to provide a feedback) procedures;
- cognitive and behavioral skills which are behind the scenes (for example, capacity for deductive and inductive conclusions) or those which are in view (for example, active listening).

D.K. McClelland determines the aforesaid competency components as being the basic qualities. He determines the competency as being the basic personal quality having causal relation to effective performance on the basis of criteria and other situations. Others (for example, A. Fletcher) emphasize that "for competitive work performance it is important not only knowledge but also its practical use".

The Russian Managers Association includes two major groups of competencies into the professional frame of competencies: lafe skills and hard skills. The first group of competencies includes communicative and personal competencies, the second - interprofessional, professional and branch competencies.

Over the last years, many researchers consider emotional intelligence as being an important competency for university graduates. D. Goldman has determined the emotional intelligence as a "capacity for understanding of personal emotions and feelings, feelings of other people, motivating oneself, controlling of emotions towards oneself or one's relationship".

V. Dulevich and M. Higgs have examined in details how much components of the emotional intelligence (self-consciousness, emotions control, empathy, partnership, communication) and personality type comply with such competencies as sensitivity, flexibility, adaptiveness, resiliency, influence, ability to listen, leadership, consistency, motivating of others, vitality, resolution and achievement orientation.

At the present stage, different educational systems are attempted to be included in educational institutions. As an example may serve different models and systems basing on informative and communicative technologies. Researchers of informative and communicative technologies emphasize that up-to-date communicative means have already reached their development level which allows to transfer from a teacher to a student not only contents, but also an emotional message, which is significant for

effective learning and skill acquisition. This fact says that it is necessary to adopt new teaching skills which allow a teacher to organize cooperation effectively, as well as in the virtual world. Innovative character of the teaching process basing on this type of learning is pointed out by S.S. Neustroev, A.V. Simonov (2015), who say in their research that "electronic learning (e-learning), nowadays, plays a role of a giant accelerator of educational innovative development... In addition, it is noticed that being essentially a tool of online study mode, e-learning increasingly involves all range of up-to-date network informative and technological solutions which satisfied the Internet with different social services of communication, online exchange of information and cooperation, formation and support of networking professional societies". This results in changes of early existing points of view according to which the up-to-date IT solutions were considered as being the tools and means additional to the traditional educational system for giving to the state-of-the-art IT solutions an independent tool, independent educational modes, a tool which is being integrated on equal terms with the traditional system. Use of different models of network cooperation in teaching societies leads to formation of new skills, not used by teachers in the past time. In this context, the problem of new teaching skills development and preservation of old skills (skill archive) is of interest. Whereas preservation of old skills is supposed to be a major didactic task in future supplementary vocational education.

The report, called "Expecting for "the tenth wave": competencies and educational models of the 21st century" (2015) sets the question of future skills which presupposes skills allowing staff to be competitive in future social and economic and technological reality, which are necessary not only for employment and a successful career, but also for social activism and a superior quality of private and domestic life; with that the author emphasizes the updating of industrial practices, guidance institute, practice societies, etc. "What functioned in the past - may possibly fail in the future" (new practices, new skills and new professions are required). Talking about future skills, P. Luksha (2015) emphasizes the key types of literacy and basic skills (controlling of concentration and attention, cooperation (as a critical skill which must be built in different aspects of work and learning), working in cross-disciplinary spheres, flexibility and adaptiveness, capacity for learning, "forgetting" and "learning again" throughout life, responsibility at work - ethics in cooperation with other associates and work ethics of human-oriented services, ect.) These key types of literacy and basic skills outline also skills required for the 21st century teachers. Into the list of these skills Pavel Luksha includes flexibility and openness, readiness for accepting and creating new things, creating of blended pedagogics, pedagogics of supporting cooperation between pupils and teachers, learning through joint research, mentoring and coaching (basing on pupil's goals), research teaching, project-oriented education, "skill archive" which presupposes training of skills of records creation of obsolescent skills and their recovery if required.

Results

At the present stage of the competency-based approach development, competencies and ways of their formation in different professions are being specified, itemized and designed. Academic and professional communities take part in this process. Analysis of state and public regulatory documents, specifying necessary competencies, make it possible to talk about introduction of intellectual, skills component of education with closely related know-how and knowledge with respect to wide spheres of culture and activity. The Atlas of new professions emphasizes the importance of acquiring of supra-professional skills and know-how which will allow a worker to increase the effectiveness of work not only in his branch but also in related branches, preserving his relevance. The authors see innovative-oriented skills and competencies which are of high demand in digital economy as the follows:

- personal qualities: admitting of basic national values, intellectual curiosity, initiativity, insistence, leadership skills, social and cultural inclusion in public life, deliberate and responsible actions;

- competencies: critical thinking, creative thinking, communication ability, team spirit, cooperation and partnership;

- basic know-how: reading and writing in several languages, quantitative literacy, humanities knowledge, natural-science knowledge, financial and business literacy, information-al and communicative literacy;

- professional skills: cognitive ability, system ability, complex problem solving, content creation skills, processing skills, communicative skills, resources management skills, technical skills, physical capabilities.

Supraprofessional innovative-oriented skills which have been indicated by employers as being the most important for their employees in the digital economy era are as follows:

- multilingual and multicultural skills (free English and the second language knowledge, comprehension of national and cultural context of partner-countries, comprehension of specifics of work in branches of other countries);

- cross-industry communication skills (comprehension of technologies, processes and market environment in different related and non-related branches);

- customer-oriented approach, skills of handling with customer needs;

- programming of IT-solutions/ complicated automated complex management/ working with artificial intelligence;

- skills of working with collectives, groups and individuals;

- systems thinking (ability to determine complex systems and work with them, including systems engineering).

- skills of project and process management;

- lean production, production process management basing on constant striving for elimination of all kind of loss which presupposes involving of every employers in business optimization and maximal consumer orientation;

- working in the mode of high degree of uncertainty and rapid shift of problem situations (to be quick in decisions, skills of reacting to changes in conditions of work, skills of resource allocation and time management);

- ecological thinking;

- capability for artwork, good aesthetic sense.

Means (mechanisms) of solving problems of education in forming of present competencies at the regional level may be as follows:

- formation of Competency Affirmation Centers;

- clustering and networking of higher education institutions, business and professional communities on the basis of effective feedback with consumers through, for example, technical parks, innovative clusters with the leading higher education institutions being anchor structures;

- elaboration and implementation of effective mechanisms of group learning support basing on state and private partnership;

- proceeding with the introduction of dual learning components into learning process;

- proceeding with the integration of the new model of professional education management in the Voronezh region with activity organization of branch (supervisory) committees on staff training in economy;
- globalization of education and expansion of foreign educational franchise;
- polarization of exclusive (offline) and mass (online) modes of higher education;
- introduction of digital technologies into the group learning system; gamification (game technologies) in learning; development of virtual tutors (virtual teachers 24/7) and mentoring networks; introduction of artificial intelligence into continuous education practice; development of educational paths and wide expansion of MOOC (massive open online courses);
- perfection of talent investment model and other financial/insurance tools;
- expansion of international standards in education as a job market requirement (4+2, PhD, tenure);
- establishment of business higher educational institutions (University 4.0 and higher models);
- establishment of the regional innovative and educational lift providing branch economy development in the following areas: production and technology, science, culture, staff, consulting, innovations, information;
- innovations management in the frame of forming model of "open innovations";
- development of innovative entrepreneurship. Startup education (acceleration).

In accordance with the "Digital Economy in Russian Federation" Program, tasks of establishment of institutional environment for research development and inventions in digital economy in Russia up to 2024 are as follows (Figure 1).

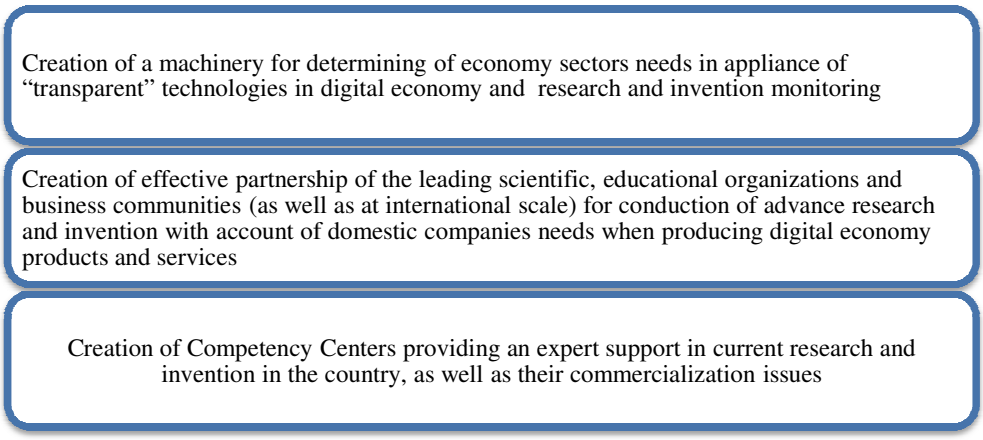


Fig. 1. Tasks of Establishment of Institutional Environment for Research Development and Inventions in Digital Economy

Source: based on the data from the Program «Digital Economy in Russian Federation",

http://government.ru/docs/28653/

The results of digital economy research and invention in Russia for the period up to 2024 are presented on the diagrams below (Figure 2, Figure 3, Figure 4).

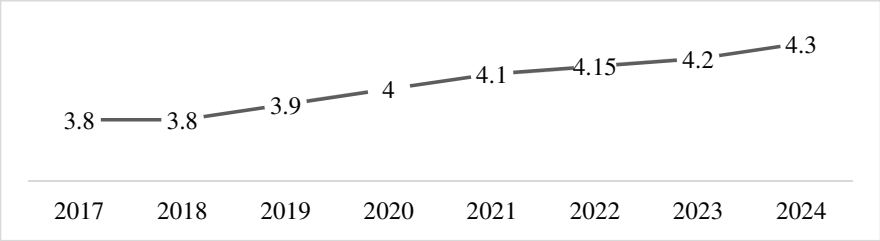
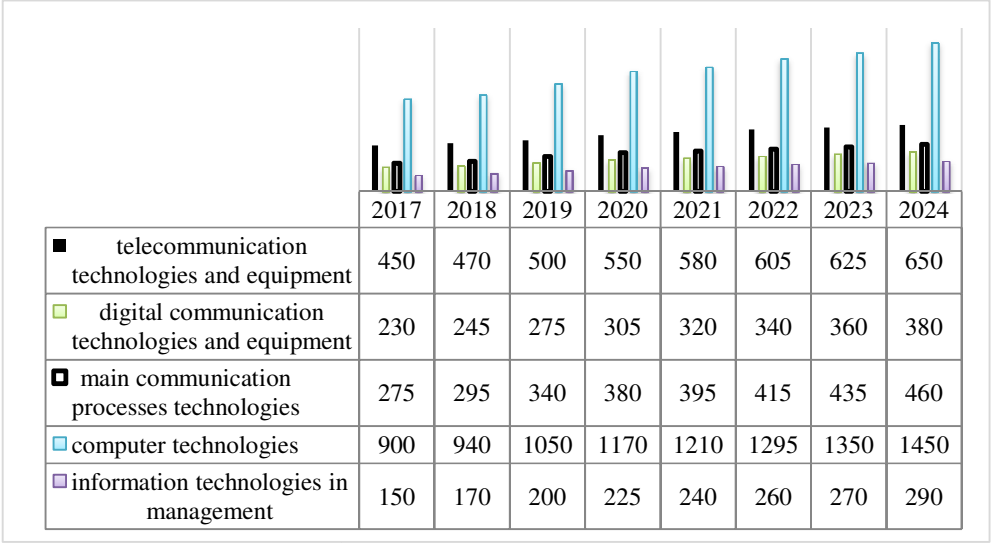


Fig. 2. Proportion of domestic costs of research and invention in ICT sector in the total volume of domestic research and invention costs, percent

Source: based on the data from the Program «Digital Economy in Russian Federation",

http://government.ru/docs/28653/

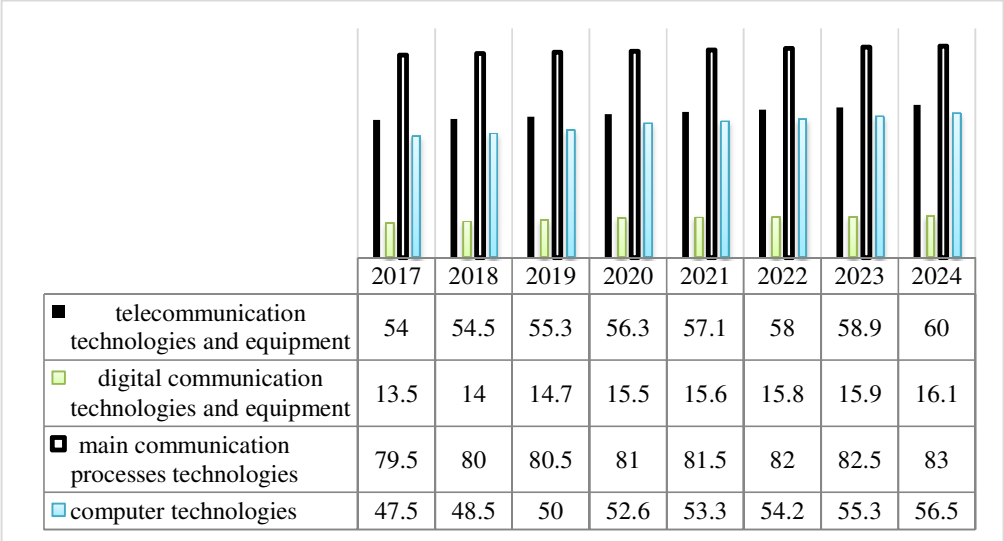


	2017	2018	2019	2020	2021	2022	2023	2024
telecommunication technologies and equipment	450	470	500	550	580	605	625	650
digital communication technologies and equipment	230	245	275	305	320	340	360	380
main communication processes technologies	275	295	340	380	395	415	435	460
computer technologies	900	940	1050	1170	1210	1295	1350	1450
information technologies in management	150	170	200	225	240	260	270	290

Fig. 3. Number of patent applications (published) submitted by Russian applicants in Russia and abroad, in accordance with a technological field

Source: based on the data from the Program «Digital Economy in Russian Federation",

http://government.ru/docs/28653/



	2017	2018	2019	2020	2021	2022	2023	2024
telecommunication technologies and equipment	54	54.5	55.3	56.3	57.1	58	58.9	60
digital communication technologies and equipment	13.5	14	14.7	15.5	15.6	15.8	15.9	16.1
main communication processes technologies	79.5	80	80.5	81	81.5	82	82.5	83
computer technologies	47.5	48.5	50	52.6	53.3	54.2	55.3	56.5

Fig. 4. Proportion of national patent invention applications in the total volume of submitted in Russia patent applications, in accordance with a technological field

Source: based on the data from the Program «Digital Economy in Russian Federation",

http://government.ru/docs/28653/

Conclusions

The modern economy is characterized by the advent of the sixth technology revolution and globally share growth of digital technologies and production. These factors challenge domestic education and science in formation of innovative competencies of graduates of all national economy branches, stipulate the necessity of innovation consideration as the key factor in tasks teaching of effective market introduction of innovative projects.

1. In the era of digital economy, business development with a complex nature inevitably requires a consistent implementation of innovative programs and projects. A comprehensive approach determines not only choice of innovative development mechanisms, but also continuous monitoring of current results of its all aspects implementation. New comprehension of management problems, necessity of management technologies which are able to transform a potential innovation capital into an active innovation capital, acts as a key factor in tasks formation of innovative projects human capital solving. But the digital society human capital is being formed only through a combination of innovative and project-oriented competencies in the form of intellectual abilities and practical skills acquired during learning and practicing. In our context, this is a graduates' ability to take part in innovative processes. The innovative human capital may become a competitive position of domestic economy at macro- and meso-levels.

2. Research competence is considered by scientists and experts from the point of view of its applied nature as a combination of knowledge in one area or another, presence of research skills (to see and solve problems on the basis of hypothesizing and its justifying, to set goals for oneself and activity plans, collect and analyze the information required for choosing the best practice of an experiment implementation in order to communicate research results), having an opportunity to apply these knowledge and skills in one or another activity. Nevertheless, in the fast-paced world and vital space, rapidly changing innovative economy, the following qualities step forward: capacity for adapting to professional life conditions; personal and professional realization; to build interpersonal, business, professional, social contacts and relationship; to continue one's education (primary or secondary) on the basis of obtaining of professional information sources relating to different cultures, informative,

scientific concepts, theories, concepts, paradigms of different areas of general and professional culture, universal method of practical and theoretical educational activities, research methods.

This article proposes a critical analysis and generalization of results, which have been obtained earlier, for research competency development. There have been presented new approaches and laid out specific practical results. This paper will allow to converge different points of view and shift focus to the direction of character changing research competence, representing it as being an element of personal qualities which are expressed in readiness and capacity for unaided invention and obtaining of new knowledge as a result of communicating of a functional transformation activity context on the basis of existing knowledge, skills and working practice. This will allow to increase competitiveness and resiliency of the younger generation which will in the nearest future become the basis of civil society and government.

References

Kupriyanovskii, V.P., Dobrynin, A.P., Sinyagov, S.A., & Namiott, D.E. (2017). 'Transformation complete model in the digital economy - how to become digital leaders'. *International Journal of Open Information Technologies*, 5(1).

Andreeva, E.L., Gluhikh, P.L., & Ratner, A.V. (2017). 'Development strategy'. *Economic and social changes*, No 6 (36) 2014, 21.

International Association of Universities. (2014). 4th Global Survey: Internationalization of Higher Education - Growing expectations, fundamental values. Paris. [Online], [Retrieved October 1, 2017], http://www.iau-aiu.net/sites/all/files/IAU-4th-GLOBAL-SURVEY-EXECUTIVE-SUMMARY.pdf

Efimov, V. S., Lapteva, A. V., & Dadasheva, V. A. (2012). 'Russia higher school forsythe: new missions and functions, perspective technologies and activity formats'. *University management: practice and analysis*. 2012.№ 3, 13-48.

Vertakova, J., & Plotnikov, V. (2014). 'Public-private partnerships and the specifics of their implementation in vocational education'. *Procedia Economics and Finance*, 16, 24-33.

Neustoev, S. S., & Simonov, A. V. (2015). 'Innovative directions of electronic training development'. *The Human and Education*, (3 (44)).

Luksha, P., & Laszlo, A. (2017, February). 'Education for Anthropocene Governance Part I and II'. Proceedings of the 59th Annual Meeting of the ISSS-2015 Berlin, Germany (Vol. 1, No. 1).

Savinova, S. U., & Shubnyakova, N. G. (2015). 'Project activity in vocational bachelors-managers training'. *Innovative projects and programs in education*, (5).

Tolstykh, T. O., Shkarupeta, E. V., & Shishkin, I. A. (2017). 'Innovative changes influence effects on processes region social and economic development'. *Proceedings of VSUET*, 79(1).

Gorbunov, I. G., & Surtaeva, N. N. (2016). 'Pedagogical competences development and preservation as social and economic effect'. *The Human and Education*, (3 (48)).

Tolstykh, T., Vertakova, Y., Sviridova S., Shkarupeta E., Shishkin I. (2016). 'Development of Methods and Models for Analysis the Effectiveness of Commercial Activity of Industrial Enterprises'. Proceedings of the 6th EACO International Scientific Conference, ISBN: 978-80-905405-2-1, 8-9 December 2016, Krakow, Poland, 139-155.

Cross-Border Merger among Nordic Banks – A Longitudinal Study

Akmal S. Hyder*, Department of Business and Economic Studies, Faculty of Education and Business Studies, University of Gävle, Sweden, E-mail: ahr@hig.se

Aihie Osarenkhoe, Department of Business and Economic Studies, Faculty of Education and Business Studies, University of Gävle, Sweden, E-mail: aihie.osarenkhoe@hig.se

*Corresponding author

Abstract

Researchers have found that even international merger and acquisition (M&A) are popular, they usually fail for its complexity. A large number of studies looked on the failure from financial, non-financial, managerial and HRM perspectives, but reasons for the failure is not yet understood. Recently few studies have tried with process perspective to penetrate into merger integration without much success. We argue that focus on pre- and post-merger stages is good but not enough to provide a total picture of the process. This study uses a longitudinal approach to analyze the establishment, development and consolidation of a cross-border merger between banks from four Nordic countries. Based on theories on strategic motives and culture, a theoretical framework has been developed showing how merger can lead to better competitiveness and performance. By using a qualitative method, data has been collected through semi-structured interviews with officials from the merging firms, and secondary materials and documents during the period of 1997-2015. The merger process is described in four stages. The first stage deals with the initiation and establishment of the merger. Critical period and cultural clashes are covered in the next stage. The third stage concentrates on the development of synergy and other measures. The final stage reflects on how the process has consolidated and what result it has so far achieved.

Keywords: consolidation, merger, synergy, culture

Introduction

Researchers have found that even international mergers are popular, they usually fail for their complexity (Weber at al., 2013). Complexity in merger occurs as different changes take place in the new organization to cope with diversified conditions and needs of the integrating partners. Recently few studies have tried with process perspective mainly by reflecting on pre- and post-merger stages to penetrate into merger integration without much success (Gomes et al., 2003; Wang et al., 2016). We argue that focus on these vital stages is necessary but not enough to provide a total picture of the merger process. Stahl et al (2013), Hyder and Osarenkhoe (2017) claim that longitudinal research can be appropriate to capture the dynamism of speed and happenings in mergers from a sociocultural viewpoint. By using a longitudinal approach this study analyzes the establishment, development and consolidation of a cross-border merger between banks from four Nordic countries.

Based on theories on strategic motives and culture, a theoretical framework has been developed showing how merger process can lead to better competitiveness and performance. Usunier (2003) highlights culture because parties when interacting expect each other to behave in line of their acting and doing. It becomes difficult to fulfill motives when communication goes wrong.

Data has been collected through semi-structured interviews with officials from the merging firms, and secondary materials during 1997-2015. The merger of Nordea, the newly created bank, is described in four stages. The first stage deals with the initiation and establishment of the merger. Critical period and cultural clashes are covered in the next stage. The third stage concentrates on the development of synergy. The final stage reflects on how the process has consolidated and what result it has so far achieved.

Empirical study

Merging stage (1997-2000)

This is a period when the mergers among the four Nordic banks from Sweden, Finland, Denmark and Norway took place. The founder CEO identified four specific motives: growth; flexibility; increased sales and synergies. When the banks entered the merger, they brought with different national and organizational cultures with them. Initially the differences were not perceived as a big issue due to the geographical closeness. But already in the first merger between Finland and Sweden, conflicting issues including language, decision making, organizational structure and implementation of decisions came out. In 1999, the management organized cultural seminars to identify and minimize gaps. With the inclusion of Danish and Norwegian banks, the official language was changed from Swedish to English to facilitate communication. With the inclusion of four banks from the four Nordic countries, a major vision of the management was fulfilled.

The choice of the merging banks was based on the complementary nature of the resources. The motive was to combine the partners' unique competence and become a Nordic bank with a large customer base. The Finish partner was accustomed with large customers while the Swedish bank's expertise was dealt with small customers. The Norwegian bank had large customers with specialty in fishing, shipping and oil industry. The Danish partner's competence was related to retail banking and customer relationship. The total number of employees went up to 38,000 making the company largest employer in the Nordic financial sector. Operating profit for Nordea went up to EUR 2,435m in 2000. Further it passed the milestone of two million clients using internet banking.

Critical stage (2001-2004)

Several concrete motives including reduction of cultural and organizational gaps, integration of the diversified activities, developing synergies and best practices to generate most value for the clients had been set. To achieve these, three issues were found important: (1) one Nordea business model; (2) one way of doing business and (3) developing one Nordea business support system. When internal decision-making started during 2001-2002, it was realized that merging partners had different opinions on decision-making and implementation. Due to national feeling and experience, partners considered their own solutions better than the other.

For developing competitiveness, management emphasized on finding synergies and best practices. A lot of activities over the borders started and one of the interviewees claimed that SAS planes were full with Nordea executives around 2001-2002 travelling to capitals of the four Nordica countries. Everything had to be done quickly to show the market positive outcome of the merger. In 2001, a group of executives from the four countries were assigned to identify what unique and successful concepts they had and how they could implement those solutions in the whole organization. Cost for different activities went up quickly and more time was engaged in solving differences.

Development stage (2005 - 2010)

Situation gradually improved in 2005 and onward due to cost reduction and internal efficiency. Implementing synergy, which was a main motive at this stage, seemed many times difficult to achieve. Instead of implementing the partners' expertise, it became more important to acquire best competence worldwide. By the end of 2007, number of systems used in Nordea was down to four from nearly 200. Retail banking was an important area of expertise for the Danish partner that came to be widely used elsewhere in Nordea. An effort was made to find ways how to implement a common retail banking system across the Nordic countries. Cultural differences, which were initially painful, made a substantial contribution to realization of synergy in Nordea. Slow Swedish processes speeded up due to pressure from the Finnish side, while the Swedish humanistic view became an important part of management to deal with customers and employees. The critical way of looking at things by the Danes got others thinking about the true complexities of international business and the need to be more cautious for competitiveness. The bank's post-merger activities concentrated on creating more value for the customers than the pre-merger partner banks had offered individually.

Consolidation stage (2011 – 2015)

At this stage, the main motive was to end up with a bank with the same value and vision. The previous country managers had a limited focus. Over time the situation changed as activities were distributed according to functional areas, such as production, IT and business support, HRM, and accounting. The bank management used different strategies to make the integration process successful without hampering financial position of the bank. The aim was to build one integrated bank. Harmonization and one way of doing things required top management to know how things were done in the four different countries. Having functional cross-border managers also required close contact with managers from other Nordic countries. The previous values – "focus, speed, and performance" – served their purposes, and the new values – "great customer experience, it's all about people, and one Nordea team" – were introduced to unite the banks under the same umbrella and with the same identity.

By becoming the largest bank in the Nordic region, Nordea fulfilled some of its commitments to the stakeholders. For the third consecutive year, Nordea was named "Best bank in the Nordics" by *World Finance* magazine (Nordea Annual Report, 2013), but the work to achieve one Nordea was not yet completed. The next step was said to become a major bank in Europe with a one-bank focus but with a different approach. The newly appointed CEO rephrased the vision: "And, in the coming years, we will take the steps towards One Nordea – a digital, agile, efficient, and robust bank that fully capitalizes on its size and the immense expertise of our 30,000 employees" (Nordea Annual Report, 2015, p. 4).

Conclusions

This study has shown how different banks engage in merger to become a new integrated organization. Although the potential of growth has been high, the process of achieving the goal has been difficult. In the first stage, most time went to cultural issues and narrow down the cultural differences. However, cultural differences could also play a complementary role as the integration process continued. In the critical stage, the management saw how the cost went up and there was little control on the bank's economy. The next stage was characterized by synergies, particularly based on new technological solutions. Creating common value for the merger appeared to be the final goal of the merger process. In future research, result of this study can be compared with merger in some other industry by applying a longitudinal case study method.

References

Gomes, E., Angwin, D. N., Weber, Y. and Tarba, S. Y. (2013) 'Critical service factors through the mergers and acquisitions process: Revealing pre- and post-M&A connections for improved performance,' *Thunderbird International Business Review*, 55(1), 13–35.

Hyder, A.S. and Osarenkhoe, A. (2017) 'Partial or Total Integration in a Cross-Border Merger? Building a Nordic Bank Culture,' *Thunderbird International Business Review*, Forthcoming.

Stahl, G. K., Angwin, D. N. Very, P., Gomes, E., Weber, Y., Tarba, S. Y., et al. (2013) 'Sociocultural integration in mergers and acquisitions: unresolved paradoxes and directions for future research,' *Thunderbird International Business Review*, 55(4), 333–356.

Usunier, J.-C. (2003), Cultural aspects of international business negotiations, International Business Negotiations (pp. 97–135), Ghauri, P. N. and Usunier, J-C. (Eds.) Pergamon, Amsterdam:

Wang, D., Sørensen, O. J. and Moini, H. (2016) 'Disentangling the value creation mechanism in cross-border acquisitions: A process-oriented approach,' *Thunderbird International Business Review*, 58, 1–23.

Weber, Y., Tarba, S. and Oberg, C. (2013) A comprehensive guide to mergers & acquisitions, managing the critical success factors across every stage of the M&A process, FT Press, Upper Saddle River, New Jersey.

Typology of Lean Construction Management Tools and Implementation Frameworks

Dr. Mira Thoumy and Claudette Hajj

Mthoumy@ndu.edu.lb

Chajj@ndu.edu.lb Notre Dame University – Louaize – Lebanon

Background

Lean thinking is a philosophy based on the concepts of lean production (Sacks, Koskela, Dave & Owen, 2010). Lean production management principles were developed by Toyota led by engineer Ohno who has focused his efforts into finding ways to convert waste 'muda' into value, and to alter attentions and thoughts from the narrow focus of craft production on worker productivity and mass production on machine to the entire production system (Womack & Jones, 1996; Howell & Lichtig, 2008)

The first consideration of the ideas of lean production for use within construction is attributed to Koskela (1992) who proposed the need to review construction production as a combination of conversion and flow processes to remove waste, when traditional thinking of construction was only focusing on conversion activities and ignoring flow and value considerations (Garnett, Jones & Murray, 1998; Senaratne & Wijesiri, 2008; Mossman, 2009).

The five principles of lean are: Value, Value stream, Flow, Pull and Perfection (Womack & Jones, 1996). According to Garnett *et al.* (1998), Lean Project Delivery System (LPDS) is divided into four interconnected phases: project definition, lean design, lean supply, and lean assembly.

LC includes: practice of just in time (JIT), use of pull-driven scheduling, reduction of variability, improvement of flow reliability, elimination of waste, simplification of the operation, and benchmarking (Aziz & Hafez , 2013). Evidence of the use of lean thinking has shown improved productivity, increased reliability, improved quality, more client satisfaction, increased predictability, shortened schedules, less waste, reduced cost and improved safety (Mossman 2009; Maaninen-Olsson & Müllern, 2009).

Contractor firms have begun to seek ways of increasing their competitive advantage by removing all kinds of waste inherent in the construction process by means of implementation of lean construction techniques (Polat & Ballard, 2004). Having the characteristics of both "production" and "service" systems, the construction industry is shifting toward the lean production concept

The next chapters will present a summary of the tools and techniques used in the implementation of Lean construction found in the literature, in addition to the frameworks offered by different authors to reach a successful implementation.

Lean Construction Management

Lean Thinking is a philosophy of business management that focuses on reducing waste while creating value in the eyes of the customer (Staats, Brunner & Upton, 2011). Waste in construction is defined as "the difference between the value of those materials delivered and accepted on site and those used properly as specified and accurately measured in the work, after the deducting cost saving of substituted materials and those transferred elsewhere" (Pheng & Shang, 2011).

The main sources of waste are classified as: Design, procurement, materials handling, operation, and others. Apparently, waste is a major problem in the construction (Polat & Ballard, 2004) and should be eliminated using lean principles and techniques. The main objective of lean is to deliver a custom made product, instantly delivered with nothing in stores and to organize and manage processes like product development, operations, design, production, supply chain interactions, and customer relationship (Hamzeh, Ballard & Tommelein, 2012).

Principles of Lean Construction Management

Principles of Lean focus on the optimization of the whole process of production through waste eradication, improving continuously, collaboration as well as satisfaction of customer by handing the end user's wanted value (Enache-Pommer, Horman, Messner & Riley , 2010)

The following are the five prime principles of Lean method of production as originally outlined by Womack and Jones (Bertelsen, 2002):

a) **Customer value identification** – it is of great importance to bring satisfaction to a customer by meeting the required specification and value. Therefore distinctly value defining for services or product, the value of customer turn into the mutual target for players on the project.

b) **Stream value mapping** – these techniques focus on operations that generates value. It is the measures between the entire process required to make available a service or product as well as the degree to which customer value is met. It represents the end-to-end process of delivery by reducing non-value added activities.

c) **Make the product flow, wait is waste** – this is the maintenance of good flow of work in order to actualize the greatest of work sequence. The sequential flow of work whereby the service or product at no time stop across the whole value chain will concurrently minimize waste as well as increase customer's value.

d) **Usage of Pull Logistic** – this is the production of services or production in accordance to the demands of customers, meaning what the customer is looking for and when the customer wants the product or service.

e) **Seek out Perfection in all Processes** – this is to pursue perfection at all time by improving the process continually and by the implementation of right approaches to the process.
Lean principles that are widely used in operations are fundamentally driven by customer in terms of understanding customer value, value stream analysis, continuous flow, "pull not push" demand-driven flow, and perfection (Aziz & Hafez, 2013).

These principles are universal; they apply to different kinds of productions like physical production, information and design and even to construction. Below are the modern lean techniques mostly used in each stage of the construction in order to eliminate waste.

Table 1: Lean techniques used in different stages of construction

Source	Lean Construction Techniques
Design	Cross functional team, Sharing incomplete information.
Procurement	Pull scheduling, Supplier training, Kanban.
Material Handling	5S, Just in time deliveries.
Operation	First Run Studies, Last Planner, Increased visualization, Multi -skilled workers, huddle meeting.

LCM Tools and Techniques

Lean production principles affords many tools and techniques which when applied in the construction industry can be used to improve its performance to effect efficient process in the construction phase of a project (Shehata & Gohari 2011; Salem, Solomon, Genaidy & Minkarah, 2006). Lean construction techniques are gaining popularity because they can affect the bottom line of projects. The most common Lean tools and techniques that are mostly documented in the literature are briefly described as follows:

2.2.1 *Increase Flexibility*

This could be achieved by engaging multi-skilled players in the process's flow. The productivity rates is increased by reducing changeover time to move from an activity to the next (O'Connor & Swain, 2013).

2.2.2 *Pull Approach*

The utmost important as well as imperative lean method features is adopting the pull planning as a suitable approach. From Sacks *et al.* (2010), the flow is an approach of monitoring product flow in which the extent of 'Work In Progress Inventory' (WIP) between process stages is reduced, plus only products demand "pulled" by ultimate "customer" process are formed in pull system.

2.2.3 *Last Planner System (LPS)*

The Last Planner System (LPS) directs planners away from after-the-fact detection of variances and helps them improve predictability, and reliability in planning and workflow (Ballard, 2011). What is meant by predictability is the capability of properly defining which tasks can be done on site, and predicting variations related to uncertainties while allocating a proper buffer for them. As for plan reliability it is measured by the Percent Plan Complete. Workflow however can be understood as: (1) material flow through the supply chain, (2) task flow on a project, (3) location flow of work through locations, and (4) assembly flow that describes the flow of work from a construction phase to another.

The Last Planner System includes: (1) the master schedule containing milestones of the entire project, (2) the phase schedule developed from collaborative planning, (3) the look-ahead plan, and (4) the weekly

work plan. In the master schedule, dates for major milestones of the entire project are specified and critical path method (CPM) is done to determine the overall project duration (Ballard & Kim, 2007).

2.2.4 *Just in Time Technique*

Just in time as creating only what is required or wanted, when it is required, as well as in the quantity required. Thus, it is a Pull system that answers to definite demand of customers also primes to lessen inventories as well as good equipment efficiency.

It is based on the concept that inventories are not valuable and should be regarded as waste; accordingly, units should be available only when required. Three methods are associated with just-in-time: First, the kanban system is used to minimize inventories according to backward requests that flow through cards, baskets, or digital signals. Second, production leveling ensures that fluctuation in demand can be met by the right sequence of products in minimum batches (Miltenburg, 2002). Third, decreasing the number of setup activities reduces the number of activities performed during downtime so that changeovers do not interfere with minimum batches.

JIT is as a set of principles, tools and techniques that allows a company to produce and deliver products in small quantities with short lead times to meet specific customer needs (Liker, 2004). JIT is viewed by Pheng & Shang (2011) as a long-term strategy that can promote excellence and eliminate waste throughout the entire organization.

2.2.5 Continuous *Improvement*

According to Sacks et al. (2010), improving continuously can assist in minimizing variations as well as workflow improvement. Thus, the continuous improvement principle is supported by the lean techniques. Furthermore, continuous improvement of the building procedure can be grouped into two forms: 'Operation Improvement' and 'Process Improvement' as opined by (O'Connor & Swain, 2013).

2.2.6 The *Five S'*

This was presented in business to identity housekeeping in plants as in lean manufacturing. The 'Five S's' are namely; *Straighten, Sort*, *Shine, Standardize* and *Sustain*. In building, employing this tool (5S's) permit for a see-through job site, at which material flow proficiently between pertinent jobs in site and the warehouses. In construction, the five S's allow for a transparent job site, at which materials flow efficiently between warehouses and specific jobs in the field.

Sort: is the process of separating material by reference and placing materials and tools close to the work areas with consideration of safety and crane movements. Straighten: materials are to be piled in a regular pattern and tools were placed in gang boxes. Each subcontractor took responsibility for specific work areas on the job site. Standardize: includes the preparation of a material layout design which contains key information of each work activity on the job site. Shine: consisted of keeping a clean job site. Workers are encouraged to clean workplaces once an activity had been completed.

Sustain: the final level of housekeeping is to maintain all previous practices throughout the project. Personnel should view it as a continuous effort.

2.2.7 Visual *Management*

In construction process, visualization is significant to avoid any information ambiguity. From Salem *et al.* (2006), it assists in identifying the workflow as well as creating responsiveness of on-site action plans. The practice comprises displaying the status of completed work, work in progress, material availability, layout changes as well as other resources locations to effectively advance production planning/scheduling and control as well as minimize the propensity for errors within the course as Sacks et al. (2010) advocated. They further stated that, Safety signs, notice boards electric wiring, Mobile signs, project milestones as well as 'Planning Programming & Coordination' (PPC) charts are some of the visualization forms that can be employed in building projects.

2.2.8 *Multi-Tasks Team*

Lean production promotes multi-skilling of teams of workers so they will be able to perform more than just a few specialist tasks and assemble a multitude of systems, thereby avoiding process fragmentation otherwise imposed by tradition or trade boundaries. Multi-skilled workers can better support and maintain CFPs by being able to do a broader range of work, which is especially important when work flows are variable.

2.2.9 Huddle *Meetings*

Is a brief daily start-up meeting where team members briefly give the status of what they had been working on since the previous day's meeting. This tool ensures rapid response to problems.

Benefits of Lean Construction Management

Studies have focused on the advantages of lean construction in improving cost Structure (Salem et al. 2006), productivity (Agbulos, Mohamed, Al-Hussein, AbouRizk & Roesch, 2006; Kung, Alex, Al-Hussein & Fernando, 2008); Delivery times, plan reliability (Cho & Ballard, 2011), quality (Pakdil, 2014), relationship between working partners, and job satisfaction to reach a lower employee turnover (Nahmens, Ikuma, & Khot, 2012).

A study about the possibility of applying lean manufacturing principles to construction , the results of the study showed the potential benefits of the implementation in improving construction in terms of team work , safety , and increased machine uptime. A 50 % increase in process efficiency for block-laying and plastering from 13 cases of low-rise residential buildings in Saudi Arabia was reported by Al-Sudairi (2007). In the UK, Balfour Beatty, reported its experience with sports stadium construction (the Emirates Stadium): it applied JIT delivery of the pipe reinforcement cages and saw a 20% improvement in productivity (Gao & Low, 2014).In addition to a 20 to 30 % reduction in construction time in a project UK , and a decrease in the overall cost of the project by 5 to 12 % .

In the USA, the benefits of lean construction implementation were tangible: a car park project in Ohio implemented lean construction techniques and was completed under budget and 3 weeks ahead of schedule. The subcontractors were also more satisfied with their relationships with the general contractor, Salem et al. (2006) noted. This is consistent with the finding of Song and Liang's (2011) study that time saving was among the greatest benefits of using lean construction concepts, because these helped to generate teamwork among the subcontractors.

Lean motivates staff to continuously improve and solve problems with tools like Kaizen, value-stream mapping, and root-cause analysis. Standardized work processes map the right practices to improve performance and train and cross-train employees.

Construction is challenging because the output is a management-based project delivery system that emphasizes the reliable and speedy delivery of value. Thus, Construction industries are putting more effort on emphasizing these principles on all the project stages to improve the quality of their work and reduce their cost in order to be competitive in the market (Al Aomar, 2012)

To reach this goal lean methods and tools are to be applied in all sectors of construction to reduce delays, reruns, and re-work. These tools are important in structuring the supply chain, allocating resources, and designing pieces to attain reliable work flow (Koskela, 1992; Hamzeh, 2012).

Typologies of Lean Construction Management Implementation frameworks

A framework is considered as the guiding torch that helps a manager in providing necessary direction during the change management programs that are implemented in an organization. It explains either "what constitute a change management program" or it discusses about "how to carry out the implementation of a change management program". (Anand & Kodali, 2010) It also consists of various elements or blocks, which an organization needs to follow when trying to implement a new methodology or changing its current way of functioning. Thus, in promoting lean and providing the means of implementation, a framework is normally adopted by researchers with the aim to provide technical knowhow about lean and the milestone towards lean transformation.

Different types of lean production framework were proposed by researchers worldwide, however they can be categorized into two broader themes, namely 'design/conceptual' frameworks and 'implementation' frameworks. Conceptual framework discusses the contents of lean production, i.e. what the elements of lean production are, whereas the latter deals with frameworks that can provide a discussion on how to implement lean production, including what the sequence of activities should be and so on (Gao & Low, 2014).

Another comparative study was performed by Paez et al. (2004), in their study; each framework was assessed with respect to its human and technological aspects. The finding implied that most frameworks did not equally take into account of both lean tools on the shop floor and the development of the workforce.

Below is a comparison between the mostly used frameworks presented in the literature in term of LC frameworks and the type, Approach and process used in the implementation. The following frameworks provide an idea about how and what to consider when applying lean in construction .in addition each of them adopt one or more lean tools to reach the optimum lean design.

1). Frameworks Proposed By Anand And Kodali (2009)

It is a design framework which constituted 65 lean elements and an implementation framework with ten stages where each stage contained different tools or practices.
The implementation starts at a managerial level with one piece flow at a time and encourages the use of just in time techniques in the production.

2). Framework Proposed By Upadhye Et Al. (2010)

A lean manufacturing system implementation framework for medium size manufacturing enterprise to improve the readiness of a manufacturing company in supplying quality products at the right time, quantity and price as required by its customers. It focuses on the elements needed to implement Lean practices to ensure continuous improvement through one piece flow at a time.

3). Framework Proposed By Rose Et Al. (2010)

This framework is used in small and medium enterprises and aim to improve their performance in the area of inventory level, cycle time, and delivery time and product quality The top management considers employee empowerment and involvement, continuous improvement, Multifunction employees, 5S, Standardization, Visual control. teamwork, effective communication in considering the content of the implementation .

4). Framework proposed by Van Aken et al. (2010)

A framework used by top and senior management in designing and improving continuously that aims to assist an organization in systematic design, management and assessment of short-term rapid improvement projects or Kaizen events in a company.

Framework proposed by Wong and Wong (2011)

The implementation framework is designed based on the famous five lean principles proposed by . It was formed based on workers involvement in Kaizen activities. These activities usually started from understanding the condition of current state before moving towards the desired future state. Practitioners need to plan, check and monitor their lean implementation at the enterprise level to reach a pull approach.

6). Framework proposed by Anvari et al. (2011)

The model starts with an initial investigation, preparation, focus on a specified pilot project, expand to the whole organization and– pursue of perfection. It is a dynamic approach that helps top management current in defining its future state based on the current status.

7). Framework proposed by Wanitwattanakosol and Sopadang (2011)

The framework proposed by the top management of the company to Re-engineers the business activity , apply value stream mapping and evaluate the supply base of an organization. Computer simulation, value stream mapping and JIT scheduling method are among the suitable TTPs to be used in this context.

8). Framework proposed by Vinodh et al. (2011)

The framework used by senior employees claimed to understand and implement, with both "What" and "How" criteria in the integration. It incorporates Six Sigma methodology – DMAIC, i.e. define, measure, analyze, improve and control with lean principles such as value stream mapping, waste elimination, set-up reduction.

9). Framework proposed by Suhartini et al. (2012)

The proposed lean system Kaizen framework focuses on standardizing the process; JIT and Jidoka; and continuous improvement. Further, Kanban and visual tools are designed to attach with the trolleys. Poka-yoke is designed to improve the flow of trolleys and ergonomics of workers. It represents a well-designed

and systematic problem-solving framework through the use of 5-why, fishbone diagram and PDCA to evaluate and analyze the problem.

10.) Frameworks proposed by Salimi et al. (2012)

Top management presumed that application of lean tools will improve the operation performance of an organization through applying just in time techniques.

11). Framework proposed by Karim and Arif-Uz-Zaman (2013)

The implementation framework was used to implement lean tools in manufacturing processes as well as to develop continuous improvement techniques within organizations.

The Framework consists of five phases: Value proposition, Value Stream, Flow phase, Pull, and Perfection. The culture for continuous improvement techniques will be developed and every staff who engaged to the relevant Kaizen area has to change their mindset and work in a cross functional team.

12). Framework proposed by Jagoda et al. (2013)

A continuous improvement model that encourages shop floor employees to focus, measure, communicate, innovate, and evaluate the previous actions. By evaluating the progress of improvement at regular intervals, adjustments can be made on an on-going basis.

More than thirty five different Lean frameworks were discussed in the literature . After reviewing them all , the researcher have focused only on the frameworks that are used in the implementation phase - which are 12 only- .Other frameworks that are related to lean adoption , lean transformation , lean assessments , lean design would not be discussed here.

Moreover the researcher didn't include in his study the frameworks that serves as a reference for waste identification. The main purpose of the study is to analyze the frameworks that are related directly to the implementation process.

In order to achieve the goal of this study, criteria for the review and analysis of lean implementation frameworks such as the of the implementation type, the approach to it, and the Implementation process are outlined in tables 2 and 3 as well as a comparison in table 4.

Table 2: Comparison between LCM implementation frameworks

Framework Proposed by	Type	Approach	Implementation Process
1-Anand and Kodali	Conceptual + Implementation	Top-down	Just in time , one piece flow
2- Upadhye et al.	Conceptual	Top-down	Kaizen , one piece flow
3- Rose et al.	Conceptual	Top-down	Multifunction employees, 5S, Standardization, Team work, Visual control.
4- Van Aken et al.	Conceptual + Implementation	Top-down	Kaizen
5- Wong & wong	Conceptual	Top-down	Kaizen , standardization ,(plan, do , check), Pull
6- Anvari et al.	Implementation	Top-down	Kaizen , Focus on Pilot project and then expand on the whole organization .
7- Wanitwattanakosol & Sopadang	Conceptual	Top-down	Just in time , Value stream mapping .
8-Vinodh et al.	Conceptual + Implementation	Top-down	DMAIC (Six Sigma) , Value stream mapping.
9- Suhartini et al.	Conceptual + Implementation	Top-down	Kaizen , Just in time , Standardization , Visual control
10-Salimi et al.	Conceptual	Not specified	Just in time.
11- Karim & Arif uz Zaman.	Conceptual + Implementation	Top-down	Cross functional team, Value stream , Pull , Kaizen .
12- Jagoda et al.	Conceptual + Implementation	Bottom -up	Kaizen , last planner

Table 3: Lean tools presented in the implementation frameworks.

	Framework											
Tool	1	2	3	4	5	6	7	8	9	10	11	12
Just in Time	X						X		X	X		
One piece flow	X	X										
Kaizen		X		X	X	X			X		X	X
Multi-function employee			X								X	
5S			X									
Standardization			X		X				X			
Visual control			X						X			
Pull					X						X	
Plan, Do, Check					X							
Pilot						X						
Team work			X									
Value stream mapping							X	X			X	
DMAIC								X				

Table 4: Analysis of the Implementation frameworks

Framework	Advantage	Disadvantage	Main Application
1-Anand and Kodali	Very detailed	Lack of contingency	Just in time
2- Upadhye et al.	Improve the readiness	lacks the flow of the implementation	one piece flow
3- Rose et al.	Helps SME	TTP Is not well studied	5S
4- Van Aken et al.	Assist an organization in systematic design	Designed of kaizen events only	kaizen
5- Wong & wong	Comprises most of the important elements of lean,	Lacking technical knowhow among shop floor employees	plan, do , check
6- Anvari et al.	Categorizes previous studies into 3 stages	Reasoning to apply this frameworks is no clearly mentioned	Last planner
7- Wanitwattanakosol & Sopadang	Helps SME	Suitable for lean supply chain only	just in time
8-Vinodh et al.	Improve the first-time-right in a project	Doesn't benefit the company as a whole	DMAIC
9- Suhartini et al.	Well designed, systematic problem-solving	Applied in specific areas	Just in time
10-Salimi et al.	Identify the preferences of TTP	Doesn't include the aspects of how to implement	Just in time
11- Karim & Arif uz Zaman	Ensure long-term sustainability	biased towards top-down approach	Pull
12- Jagoda et al.	total involvement of employees		Last planner

Conclusion

Lean is a culture that emphasizes collaboration, reliability of scheduling and delivery of the most value - from the client's perspective - while consuming the fewest resources.

The fundamental principles of Lean are: defining value from the customer's perspective, understanding the value stream of all steps in the process used to create the end product, reducing waste, smoothing the flow of value added activities, utilizing collaborative pull scheduling to provide each internal and external customer what they want, when they request it, and seeking perfection by committing to continual improvement in all areas of the process.

Different LCM tools and techniques are used worldwide in order work on well defined deliverables at a reliable and predictable pace and to eliminate re-work and waiting, The project manager should be aware of these tools and study the market and the project conditions in order to know which tools and technique fits more.

Lean principles drive efficient deliveries with eliminating waste and creating predictable, reliable workflows. On projects that develop and maintain a Lean culture of continuous improvement, improvements in communication, scope definition, coordination, cost and schedule performance is experienced

After reviewing the above lean implementation frameworks, this study finds that most of the proposed framework are analyzed to be conceptual and implementation at the same time. and this is very important in term of defining not only the elements and principles needed, but also the methods an equipment to be used in the implementation .

Moreover, It is clear that the approach used in most of the frameworks is a top-down approach; only one framework focuses on the bottom-up approach which emphasizes more on shop floor employees' initiatives in carrying out lean.

Both approaches are important in the implementation; the involvement of all the internal stakeholders of a company is a must towards a complete integration.

Moreover most of the studies presented have focused on the use of Kaizen and just in time as tools of the implementation but none have presented the Last planer, 5S, and huddle meeting tools .

Reference

Al-Aomar, R. (2012). Analysis of lean construction practices at Abu Dhabi construction industry. *Lean Construction Journal*.

Al-Sudairi, A. A. (2007). Evaluating the effect of construction process characteristics to the applicability of lean principles. *Construction Innovation*, *7*(1), 99-121.

Anand, G., & KODALI, R. (2010). Analysis of lean manufacturing frameworks. *Journal of Advanced Manufacturing Systems*, *9*(01), 1-30.

Anvari, A., Ismail, Y., & Hojjati, S. M. H. (2011). A study on total quality management and lean manufacturing: through lean thinking approach. *World applied sciences journal*, *12*(9), 1585-1596.

Agbulos, A., Mohamed, Y., Al-Hussein, M., AbouRizk, S., & Roesch, J. (2006). Application of lean concepts and simulation analysis to improve efficiency of drainage operations maintenance crews. *Journal of Construction Engineering and Management*, *132*(3), 291-299.

Aziz, R. F., & Hafez, S. M. (2013). Applying lean thinking in construction and performance improvement. *Alexandria Engineering Journal*, *52*(4), 679-695.

Ballard, G., & Kim, Y. W. (2007, July). Implementing lean on capital projects. In *Proceedings of the 15th IGLC conference, Michigan, USA*.

Ballard, G. (2011). Target value design: current benchmark. *Lean Construction Journal*, *6*(1), 79-84.

Bertelsen, S. (2002). Bridging the gap–towards a comprehensive understanding of lean construction. *IGLC-10, Gramado, Brazil*.

Enache-Pommer, E., Horman, M. J., Messner, J. I., & Riley, D. (2010). A unified process approach to healthcare project delivery: Synergies between greening strategies, lean principles, and BIM. In *Construction Research Congress 2010: Innovation for Reshaping Construction Practice* (pp. 1376-1405).

Gao, S., & Low, S. P. (2014). *Lean Construction Management*. Springer

Garnett, N., Jones, D. T., & Murray, S. (1998, August). Strategic application of lean thinking. In *Proceedings IGLC* (Vol. 98).

Hamzeh, F., Ballard, G., & Tommelein, I. D. (2012). Rethinking Lookahead Planning to Optimize Construction Workflow. *Lean Construction Journal*.

Howell, G., & Lichtig, W. (2008). Lean construction opportunities ideas practices. In *Introduction to lean design workshop, Seattle, Washington*.

Karim, A., & Arif-Uz-Zaman, K. (2013). A methodology for effective implementation of lean strategies and its performance evaluation in manufacturing organizations. *Business Process Management Journal*, *19*(1), 169-196.

Kung, D., Alex, D. P., Al-Hussein, M., & Fernando, S. (2008). Application of lean thinking to improve the productivity of water and sewer service installations. *Canadian Journal of Civil Engineering*, *35*(4), 418-430.

Liker, J.K. (2004). The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer. New York: McGraw-Hill.

Maaninen-Olsson, E., & Müllern, T. (2009). A contextual understanding of projects—The importance of space and time. *Scandinavian Journal of Management*, *25*(3), 327-339.

Miltenburg, J. (2002). Balancing and scheduling mixed-model U-shaped production lines. *International Journal of Flexible Manufacturing Systems*, *14*(2), 119-151.

Mossman, A. (2009). Why isn't the UK construction industry going lean with gusto?. *Lean Construction Journal*.

Nahmens, I., Ikuma, L. H., & Khot, D. (2012). Kaizen and Job Satisfaction-A Case Study in Industrialized Homebuilding. *Lean Construction Journal*.

O'Connor, R., & Swain, B. (2013). Implementing Lean in construction: Lean tools and techniques-an introduction. *CIRIA, London, UK*.

Pakdil, F., & Leonard, K. M. (2014). Criteria for a lean organisation: development of a lean assessment tool. *International Journal of Production Research*, *52*(15), 4587-4607.

Paez, O., Dewees, J., Genaidy, A., Tuncel, S., Karwowski, W., & Zurada, J. (2004). The lean manufacturing enterprise: An emerging sociotechnological system integration. *Human Factors and Ergonomics in Manufacturing & Service Industries*, *14*(3), 285-306.

Polat, G., & Ballard, G. (2004). Waste in Turkish construction: need for lean construction techniques. In *Proceedings of the 12th Annual Conference of the International Group for Lean Construction IGLC-12, August, Denmark* (pp. 488-501).

Pheng, L. S., & Shang, G. (2011). The application of the just-in-time philosophy in the Chinese construction industry. *J. Constr. Dev. Ctries*, *16*(1), 91-111.

Jagoda, K., Lonseth, R., & Lonseth, A. (2013). A bottom-up approach for productivity measurement and improvement. *International Journal of Productivity and Performance Management*, *62*(4), 387-406.

Rose, A. M. N., Deros, B. M., & Rahman, M. A. (2010, December). Development of framework for lean manufacturing implementation in SMEs. In *The 11th Asia Pacific industrial engineering and management systems conference, Melaka, Malaysia*.

Sacks, R., Koskela, L., Dave, B. A., & Owen, R. (2010). Interaction of lean and building information modeling in construction. *Journal of construction engineering and management*, *136*(9), 968-980.

Salem, O., Solomon, J., Genaidy, A., & Minkarah, I. (2006). Lean construction: From theory to implementation. *Journal of management in engineering*, *22*(4), 168-175.

Salimi, M., Hadjali, H. R., & Sorooshian, S. (2012). Critical success practices (CSP) toward implementing lean production among international companies in Malaysia. *African Journal of Business Management*, *6*(27), 8118.

Shehata, M. E., & El-Gohary, K. M. (2011). Towards improving construction labor productivity and projects' performance. *Alexandria Engineering Journal*, *50*(4), 321-330.

Senaratne, S., & Wijesiri, D. (2008). Lean Construction as a Strategic Option: Testing its Suitability and Acceptability in Sri Lanka. *Lean Construction Journal*.

Staats, B. R., Brunner, D. J., & Upton, D. M. (2011). Lean principles, learning, and knowledge work: Evidence from a software services provider. *Journal of operations management*, *29*(5), 376-390.

Song, L., & Liang, D. (2011). Lean construction implementation and its implication on sustainability: a contractor's case study. *Canadian Journal of Civil Engineering*, *38*(3), 350-359.

Suhartini, et al. "An implementation of set parts supply system in the malaysian automotive industry." *Jurnal Teknologi (Sciences and Engineering)* 59.SUPPL. 2 (2012): 19-24.

Upadhye, N., Deshmukh, S. G., & Garg, S. (2010). Lean manufacturing system for medium size manufacturing enterprises: an Indian case. *International Journal of Management Science and Engineering Management*, *5*(5), 362-375.

Van Aken, E. M., Farris, J. A., Glover, W. J., & Letens, G. (2010). A framework for designing, managing, and improving Kaizen event programs. *International Journal of Productivity and Performance Management*, *59*(7), 641-667.

Vinodh, S., Arvind, K. R., & Somanaathan, M. (2011). Tools and techniques for enabling sustainability through lean initiatives. *Clean Technologies and Environmental Policy*, *13*(3), 469-479.

Wanitwattanakosol, J., & Sopadang, A. (2012). A framework for implementing lean manufacturing system in small and medium enterprises. In *Applied Mechanics and Materials* (Vol. 110, pp. 3997-4003). Trans Tech Publications.

Womack, J. P., & Jones, D. T. (1996). Beyond Toyota: how to root out waste and pursue perfection. *Harvard business review*, *74*(5), 140.

Wong, Y. C., & Wong, K. Y. (2011). Approaches and practices of lean manufacturing: The case of electrical and electronics companies. *African Journal of Business Management*, *5*(6), 2164.

Wages of ICT Managers – Czech Republic Case

Petr Doucek, University of Economics, W. Churchill sq. 4, Prague, Faculty of Informatics and Statistics, Czech Republic, doucek@vse.cz
Luboš Marek, University of Economics, W. Churchill sq. 4, Prague, Faculty of Informatics and Statistics, Czech Republic, marek@vse.cz

Abstract

This article analyzes the trend in the real gross wages of ICT workers in the Czech Republic during 2000-2016, i.e. the trend in the wages of ICT managers (CZ-ISCO 133) and marginally also the trend in the wages of ICT specialists (CZ-ISCO 25) and ICT technicians (CZ-ISCO 35). The wage trend is analyzed by gender and sector (business and non-business sector). Our analyses practically show a permanent increase for all analyzed categories of ICT professions growth during 2000-2008 (economic boom). After the year 2008, the wages in ICT professions stagnated, with the exception of the wages of ICT managers, and the real wages of ICT technicians actually dropped. Our analysis proved the impact of the sector (ICT) and gender on the average real wage in the Czech Republic.

Keywords: ICT Managers, wages in ICT, gini index, gender aspect, sphere aspect.

Introduction

Professionals working in information and communication technologies (ICT) and the banking sector (Marek and Doucek, 2016) are among the best paid in the Czech Republic. As many professional studies show (Dedrick, Gurbaxani, and Kraemer, 2003; Zelenyuk, 2014; Hanclova, Doucek, Fischer and Vltavská, 2015; Hanclová, and Doucek, 2012), the importance of ICT stems mostly from its positive impact on labor productivity. The running of the entire society practically depends on ICT. All banking transactions on the global market are virtually made by means of information and communication technologies, and transportation, logistics and international trade depend on them as well. Information and communication technologies are believed to be of great importance for the public administration and local governments, which the current trend has confirmed (Marek, Doucek, and Nedomova, 2016; Nedomová, Doucek, and Maryška,2015).

The first relations of economy and wages are presented in Smith (1776). The modern period enrich economy by different new jobs, ICT including. Wages in ICT, which are usually higher than average wages in economies, represent an important dimension of ICT implementation (Marek and Doucek, 2016 ; Torrent-Sellens, 2008). The same pay for the same work, i.e. an equal pay for the work of ICT professionals in the economy, is also a current topic. The importance of heterogeneous work teams comprised of men and women is emphasized mainly in the studies done in the United States (Simard, Davies Henderson, Gilmartin, Schiebinger, and Whitney, 2014).

The goal of this article is to analyze the trend in the real gross average wages of ICT managers in the Czech economy during 2000-2016. The wage trend is analyzed in view of the gender and sector of ICT managers. For the year 2016, we also calculated the Gini index for ICT managers, ICT specialists and ICT technicians and compared it with the Gini index for the Czech economy. The Gini index shows the equality in the pay of ICT workers. All calculations and analyses were made using standard functions in the MS Excel program.

Data Collection and Methodology

We used select data from the Average Earnings Information System (AEIA). Based on the source (ISPV, 2017), it is a system that regularly monitors the earnings and work hours of employees in the Czech

Republic. The Average Earnings Information System contains data obtained from regular statistical surveys called the "Average Earnings Quarterly Survey," which are included in the statistical survey program announced by the Czech Statistical Office (CZSO) in the collection of laws for the relevant calendar year. The statistical survey program for the relevant calendar year is laid down by the decree in the collection of laws.

The Average Earnings Quarterly Survey is harmonized with the structural survey of the European Union called the Structure of Earnings Survey (see Commission Regulation (EC) No. 1916/2000 as amended). We analyzed the gross monthly wage or salary and hourly earnings as well as the individual components of the gross monthly wage (salary), i.e. bonuses, extra pays and reimbursements. The gross monthly wage in our data group was calculated as a multiple of hourly earnings in the second quarter and average monthly working hours for each year. We rounded off the average working hours to a whole number. We analyzed the number and structure of hours worked (e.g. overtime) and not worked (e.g. sickness and vacation). The Average Earnings Information System includes the Labor Cost Regional Statistics providing detailed information about wage gaps in the individual regions of the Czech Republic. The administrator of the Average Earnings Quarterly Survey is the Ministry of Labor and Social Affairs. The survey and its progress is overseen by a commission composed of the representatives of the Ministry of Labor and Social Affairs, the Czech Statistical Office, the Ministry of Finance, the Czech National Bank, the Bohemian-Moravian Confederation of Trade Unions, the Confederation of Industry and Transportation of the Czech Republic, CERGE EI, the University of Economics in Prague and other institutions. The Average Earnings Information System is maintained by TREXIMA, Ltd.

When performing analyses, we always work with data for the second quarter of the relevant year because this quarter has the most stable working hours out of the entire year. The size of the analyzed sample of ICT professionals gradually increased from over 8,000 in 2000 to over 53,500 in 2016 and the size of the sample for the Czech Republic increased from one million to over two million. In 2000, this sample included approximately 560,000 records about men's wages and 495,000 records about women's wages (in 2016, this sample already included 1,027,000 and 1,091,000 records). For the business sector, we had 824,000 records in the year 2000 and 1,412,000 records in the year 2016. For the non-business sector, we had 229,000 records in the year 2000 and 708,000 records in the year 2016. This quantity of analyzed data provides a good premise for very good validity of our following analyses.

ICT Professionals - - Managers, Specialists and Technicians

Occupation classification is another point of departure used in our article. The classification of different occupations, including the skills required for different occupations, has been made in the Czech Republic for approximately 50 years now. In 2010, the Czech Republic switched from K-ZAM to CZ-ISCO (Klasifikace zaměstnání, 2017) that divides ICT professions into the following three main groups (CZSO, 2017):

- ICT managers (CZ-ISCO 133);
- ICT specialists (CZ-ISCO 25) and
- ICT technicians (CZ-ISCO 35).

Our article compares wage data over a rather long time period of 17 years (2000-2016). During such a long time period, inflation of course becomes a factor that is not negligible. Therefore, we converted our data to the second quarter of 2016, based on inflation data from the Czech Statistical Office, which means that it is the real gross wage. After that, we converted the data to EUR, using the average CZK/EUR exchange rate for the second quarter of the relevant year that we had obtained from the Czech National Bank (CNB, 2017).

We further modified our data because e.g. the average wages of ICT managers were already included in the average wages for the entire Czech Republic. Therefore, it was necessary to first exclude the wages of

ICT managers or potentially the wages of ICT specialists and ICT technicians from the average wages for the Czech Republic, which meant recalculating average wages so that they could be correctly compared.

The Gini Index – an Income Inequality Indicator

The Gini index was developed by the Italian statistician Corado Gini in 1912. The index compares the Lorenz curve with the equality curve. It is in fact the ratio of the area that lies between the line of equality and the Lorenz curve (area A) and the area that lies under the actual Lorenz curve (area B) over the total area under the line of equality (area A). The index can be simply formulated as follows:

$$GI = \frac{A - B}{A}$$

The Gini coefficient ranges from 0 to 1, where 0 (area B equals area A) would mean a completely egalitarian system of wage distribution, and 1 (area B is 0) would mean complete inequality. These extreme values are of course only hypothetical and unattainable in real life. For our wage sample, it means that a higher Gini index means a bigger gap in wages.

Results and Discussion

Our analysis focuses on the trend in the wages of ICT managers in the Czech Republic, specifically real gross wages (adjusted for inflation). We compared these wages by gender – the wages of women and men in both the business and non-business sectors.

Comparison by ICT Profession

First let's see what the trend in the wages of ICT managers looks like as compared to the average wage in the Czech Republic. This information is provided in Fig. 1.

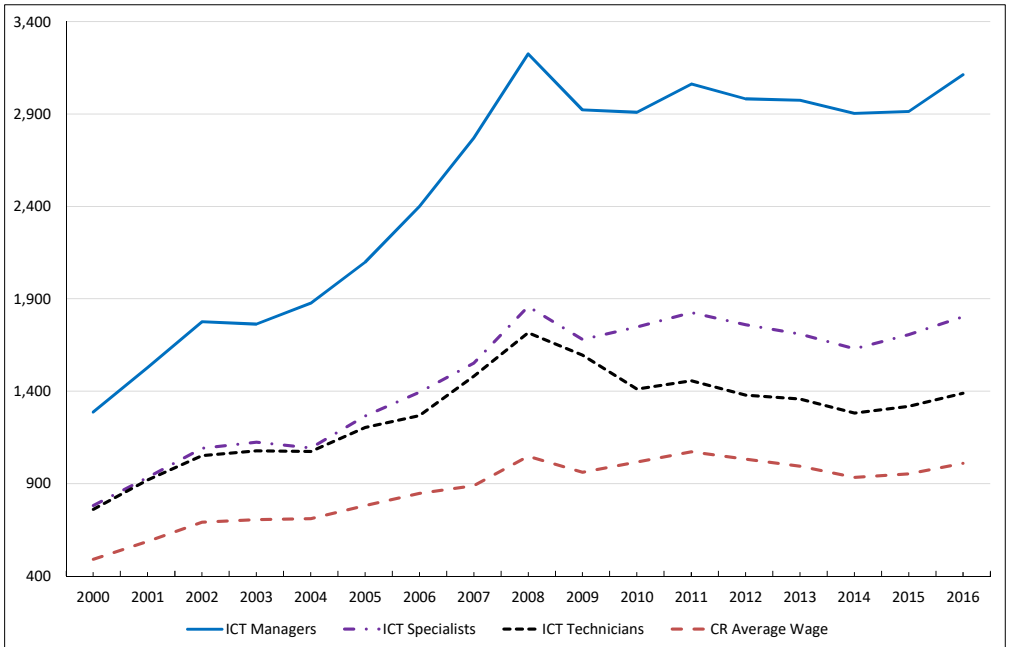


Fig 1 Trend in the average wage for ICT and for the Czech economy

Source: Data [10], authors

Fig 1. clearly shows that the trend in average wages in the analyzed categories is very similar over time – it has the same phases of growth, drop, stagnation, etc. However, there is a very considerable difference in wage dynamics and especially in wage levels. The wages of ICT managers are several times higher. For instance, the average wage of ICT managers in 2016 was 3,112 EUR, while the average wage for the entire Czech Republic (without ICT) was only 1,024 EUR, which is more than three times less. The difference in wage dynamics is reflected in the average growth coefficient, which is 1.053 for ICT managers and only 1.044 for the Czech Republic (Table 1). The average wage of ICT managers went up by 5.3% a year on average, which represents 107 EUR, while the average wage in the entire economy went up only by 4.4% a year, which represents 31 EUR. The average wage of ICT specialists and ICT technicians shows a rather similar trend during 2000-2008. Between 2008 and 2016, the average wage of ICT specialists oscillates toward that gained in 2008. On the other hand, the wages of ICT technicians kept going down until the year 2014 due to the economic crisis. Based on the analysis of the Czech National Bank (2017), the wage growth in 2008 was a result of the fact that it was an election year and because of a big shortage of professionals practically in all professions in the Czech Republic. This shortage remained pretty much the same during the following years, but there was less need for professionals due to the economic crisis. The problem recurred in the Czech economy in 2014 as the economy started recovering after the crisis.

Gap between Men and Women and Sectors

ICT is generally believed to be mainly a male domain. Therefore, we will take a look at women and men working in ICT. The wage level in the Czech Republic also depends on the sector - the business and non-business sector. Therefore, we compared in detail the four mentioned categories (by gender and by sector), which resulted in many tables and figures. We decided to use mainly the figures that clearly show the discovered gaps. We will first look at the trend in the average wage of ICT managers by gender and sector.

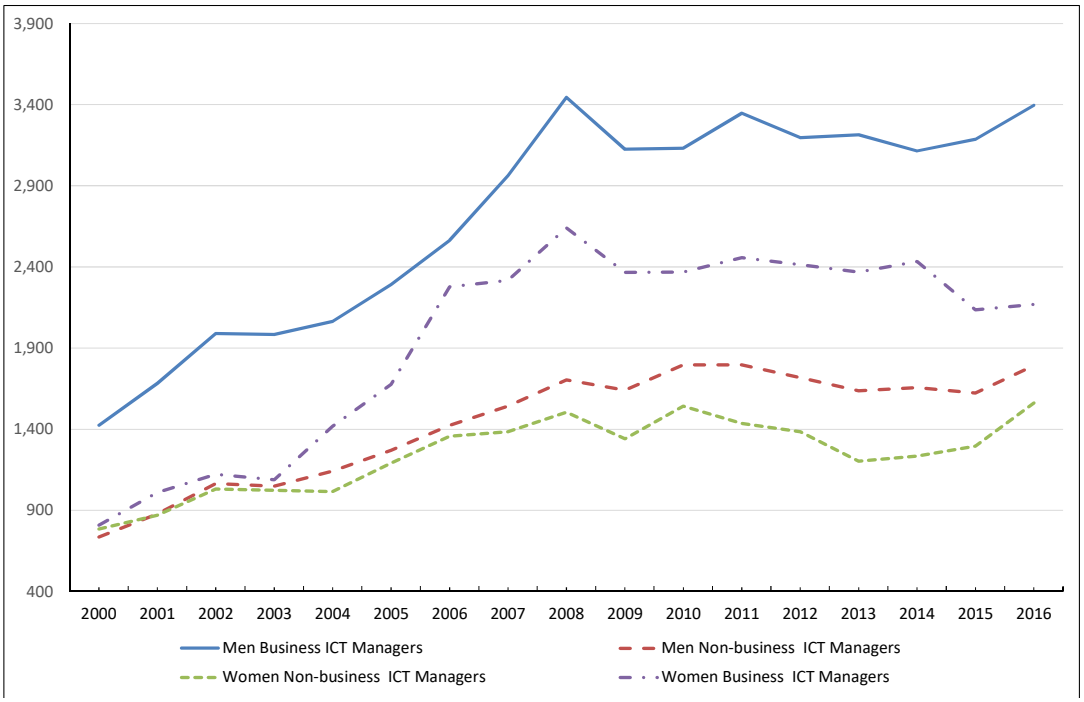


Fig. 2: Average wages – ICT managers by gender and sector Source: Data [10], authors

Fig 2 clearly shows that the average wages of male ICT managers working in the business sector are the highest by far. The second highest wages are those of their female counterparts working in the same sector; they are actually considerably higher than the average wages of male ICT managers working in the non-business section. The lowest average wages are those of female ICT managers working in the non-business sector. The gap between men and women working in the business sector is also interesting because it is much bigger than that in the non-business sector. The smaller gap in the non-business sector is also a result of the fact that this sector represents public administration organizations where employees are remunerated based on pay groups. But even so, the gap between the wages of female ICT managers and their male counterparts increased after the year 2008 (i.e. during the economic crisis). The wages of both analyzed groups seem to finally approximate between 2015 and 2016 (the growth of the Czech economy). The wages of female ICT managers working in the business sector departed from the two previously mentioned categories already in 2003, and the wages of male ICT managers are considerably higher than those of female ICT managers working in the same sector – approximately by 25 – 30%. Our analysis clearly proves that the wages of Czech female ICT managers are considerably lower than those of their male counterparts.

We also analyzed in depth the wages of male ICT managers. We wanted to find out the average wage of ICT managers working in the business sector and in the non-business sector. We also wanted to find out the average wage in both sectors without ICT and to compare it with the average wage in the Czech Republic. Again, we would like to point out that the data are recalculated so that one category would not distort the other one.

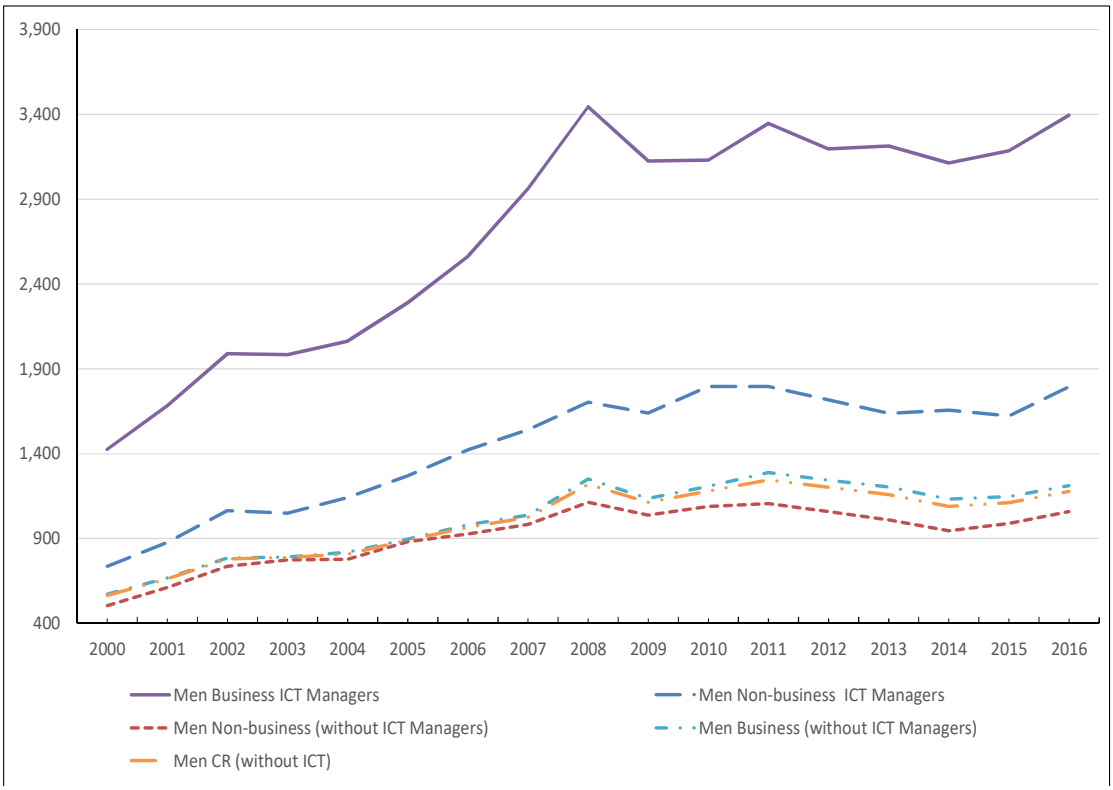


Fig. 3: Average wages of men – ICT influence Source: Data [10], authors

Fig 3. clearly shows that the average wages of ICT managers in the business sector are considerably higher than those for all other categories. They are followed by the wages of ICT managers working in the non-business sector. Therefore, we can see a significant impact of the profession of ICT manager, as well as of the sector, on the average wage. Wages in the business sector are much higher than wages in the non-business sector. The non-business sector also shows a smaller gap between the average wage for the Czech Republic than the business sector. We can clearly see very fast growth in the average wages of ICT managers in the business sector during the economic boom between 2000 and 2008.

We will now perform a similar comparison for women. The results are shown in Fig 4.

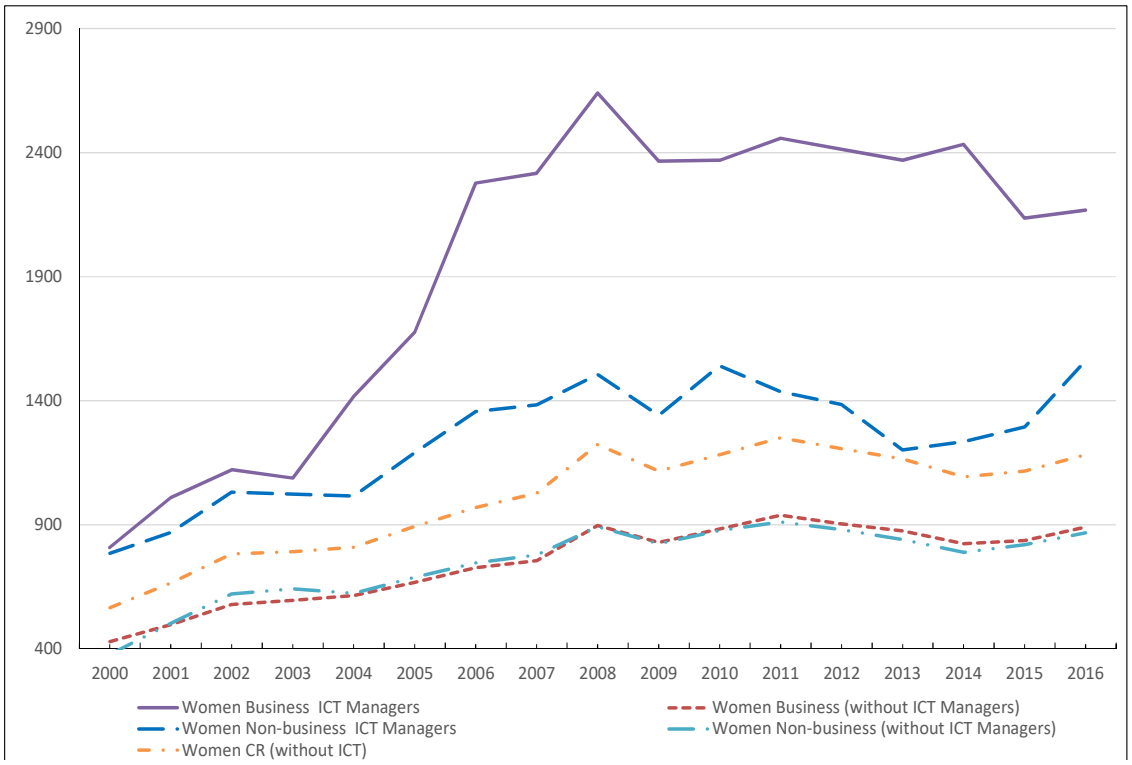


Fig 4. Average wages of women – ICT influence **Source: Data [10], authors**

Similar conclusions are true about the average wage of women as well. However, their average wages are lower in the same categories than those of men. This is why the gap between the average wage of women and the average wage for the Czech Republic is in general smaller. Based on Eurostat (2017), the average wages of women in the Czech Republic are lower by 23.3% as compared to the average wages of men.

In the long run, male ICT managers working in the business sector are paid the best. ICT managers working in the non-business sector are second best paid. They are followed by female ICT managers working in the business sector and finally female ICT managers working in the non-business sector. Therefore, it pays off to work as an ICT manager since the wage gap between the entire business and non-business sectors and the Czech economy is very significant.

Let's look at the following table that shows both the average annual growth coefficient and the average annual absolute increment in all analyzed wage categories.

Table 1: Annual average basic characteristics of wage trend

Category	Average Annual Growth Rate	Average Annual Absolute Increment (EUR)
Men Business	1.045	38
Men Business ICT	1.043	57
Men Business ICT Managers	1.053	116
Men CR	1.045	38
Men Non-business	1.045	33
Men Non-business ICT	1.043	32
Men Non-business ICT Managers	1.054	62
Women Business	1.044	27
Women Business ICT	1.044	45
Women Non-business ICT	1.046	32
Women Business ICT Managers	1.060	80
Women CR	1.050	29
Women Non-business	1.050	29
Women Non-business ICT Managers	1.041	46

Source: own calculations

Note to Table 1: The same average growth rate in the analyzed period shows a different absolute contribution to the average wage growth because the level of average wages in the analyzed occupation category was different at the beginning of 2000.

The table surprisingly shows the fastest annual average growth in female ICT managers – 6%, which, however, represents an annual average increase by 80 EUR, while male ICT managers show the highest average annual increase by 116 EUR but a slower average growth – 5.2%.

We also analyzed ICT professions in terms of income equality and inequality (measured by the Gini index).

The Czech Republic is one of the countries worldwide that show the smallest Gini index, which means that the Czech economy is an egalitarian economy in terms of wage differentiation. We can compare the Gini index in different select countries. The index in 2014 (according to OECD, 2015) was as follows: Chile (0.503), Mexico (0.472), Turkey (0.402), USA (0.41), Israel (0.36) and Portugal (0.338). The Gini index is the lowest (i.e. shows the biggest equality in terms of wage differentiation) in Slovenia (0.25), Denmark (0.249), Norway (0.252), Czech Republic (0.255), Slovakia (0.249), Austria (0.276), Finland (0.262), Sweden (0.274) and Belgium (0.262). For the purposes of our analysis, we are mainly interested in the ICT management category. We used the Gini index for this comparison. The calculation results are shown in Fig 5.

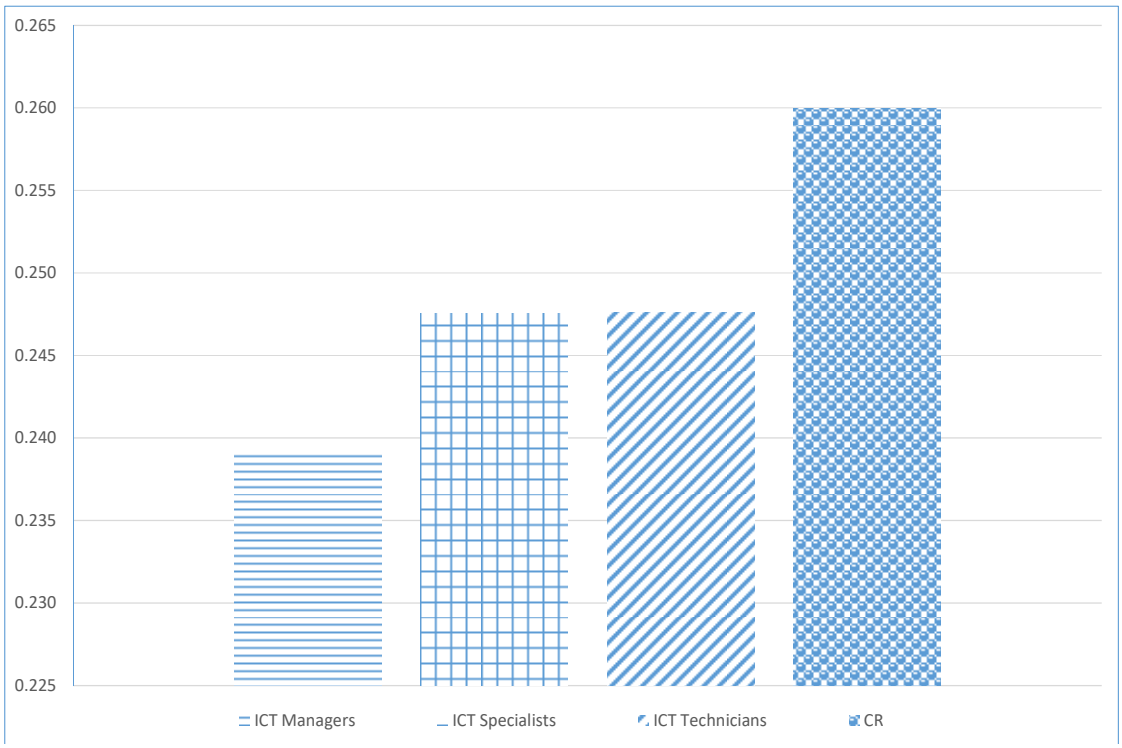


Fig 5. The Gini index in ICT - 2016 **Source: own calculation**

Although it may seem that there is a big gap between individual specializations, this gap is in fact insignificant (due to the scale). It is surprising that the redistribution rate is smaller in ICT than in the Czech economy. We would have expected it to be higher than that for the entire Czech Republic. It is probably due to relatively high wages and because these professions are paid approximately equally well and thus there is no big gap in distribution equality. Another interesting finding is that wage equality is practically identical for ICT specialists and ICT technicians. The wage trend in both these categories was very similar up to the year 2009 (Figure 1), but starting in 2010, the wages of ICT technicians kept dropping (this concerns mostly the professions that require a secondary education).

The exchange rate of the local currency (the Czech Crown – CZK) shows an interesting impact on average wages reported in EUR. While the permanent appreciation of the Czech Crown (approximately 3% per year) in 2000-2008 promoted the growth of real wages, later on (up until 2013), this appreciation only diminished the impact on the decrease in real wages. At the end of 2013, the Czech National Bank abruptly devaluated the Czech Crown by approximately 10% and thus intervened to keep the CZK/EUR exchange rate at 27 CZK per EUR for two and a half years (this affected wages in the second quarter of 2014). Average wages practically dropped in all analyzed ICT profession categories. The intervention, which ended in April 2017, could not yet be reflected in our analysis, but in spite of a practically fixed CZK/EUR exchange rate, average wages have started going up since 2014.

Conclusions

Our analysis of the real gross average wages of ICT managers by gender and sector and the related analysis of their average wages compared to the average wages for the Czech economy during 2000-2016 provided the following major results.

The average wage of ICT managers is approximately triple the average wage in the Czech economy. The average wage of ICT specialists is approximately double the average wage in the Czech economy and the average wage of ICT technicians is about 1.5 times higher than that in the Czech economy.

The comparison of the average wage of male ICT managers and their female counterparts shows that men's wages are higher by approximately 30% as compared to women's wages. This conclusion means that gender inequality is higher in ICT managers than in the Czech economy as a whole (23.3 %) (Eurostat Gender Statistics, 2017). The inequality in ICT managers is also significantly higher in comparison to the inequality in ICT specialists (14.9 %) and ICT technicians (16.3 %) (Nedomova, and Doucek, 2015).

Our analysis by sector clearly shows that the average wages of ICT managers are significantly higher particularly in the business sector (Fig 3. a Fig 4.).

Surprisingly, the wage level inversely proportionally impacts the equality in the wages of ICT professionals. The Gini index of ICT managers is the smallest, while the Gini index of ICT specialists and ICT technicians is slightly higher, although even their index is relatively small as compared to the Czech economy or other developed countries in Europe and around the world.

When analyzing the wages, we noticed the non-negligible impact of the change in the CZK/EUR exchange rate on average wages. While the permanent appreciation of the Czech Crown in 2000-2008 promoted the growth of real wages, after the intervention of the Czech National Bank in 2013 (which shows up in the analysis results in 2014), not even the fixed CZK/EUR exchange rate stopped average wages from going up, thanks to the economy's better performance and recovery. However, these trends are yet to be confirmed based on additional analyses, especially for the year 2017 when the Czech Crown is expected to slightly appreciate with respect to EUR (by 2 to 3%).

References

CNB. Czech National Bank. [Retrieved September 22, 2017], https://www.cnb.cz

CZSO. IT odborníci. [Retrieved September 18, 2017], https://www.czso.cz/csu/czso/lidske_zdroje_v_informacni_spolecnosti_it_odbornici

Dedrick, J., Gurbaxani, V. and Kraemer, K. L. (2003) Information Technology and Economic Preformance: A Critical Review of the Empirical Evidence. *ACM Computing Sur*veys. 35 (1), 1-28.

Eurostat Gender Statistics. [Retrieved September 16, 2017], http://ec.europa.eu/eurostat/statistics-explained/index.php/Gender_statistics

Hanclova, J., Doucek, P., Fischer, J. and Vltavská K. (2015) Does ICT capital affect economic growth in the EU-15 and EU-12 countries? Journal of business economics and management. (online), 16 (2), 387–406.

Hanclová, J. and Doucek, P. (2012) The impact of ICT capital on labor productivity development in the sectors of the Czech economy. Proceedings of the IDIMT-2012, ISBN: 978-3-99033-022-7, 12-14 September 2012, Jindřichův Hradec, Czech Republic, 123–133.

ISPV. [Retrieved September 20, 2017], https://www.isp v.cz.

Klasifikace zaměstnání (CZ-ISCO). [Retrieved September 14, 2017], https://www.czso.cz/csu/czso/klasifikace-zamestnani-cz-isco-n-f4yhpe3xt8

Marek, L. and Doucek, P. (2016) Vývoj mezd a příjmové nerovnosti u ICT odborníků v České republice. *Politická ekonomie* [online]. 64 (8), 922–938, doi: 10.18267/j.polek.1118

Marek, L., Doucek, P. and Nedomova, L. (2016) Does Higher Education Generate Higher Wages in the Czech ICT? Proceedings of the IDIMT-2016, ISBN: 978-3-99033-869-8, 7-9 September2016, Poděbrady, Czech Republic, 21–28.

Nedomova, L. and Doucek, P. (2015) Gender Aspects in ICT. Proceedings of the International conference of management and industrial engineering, ISSN: 2344-0937, 22-23 October 2015, Bucharest, Romania, 508–516.

Nedomová, L., Doucek, P. and Maryška, M. (2015) ICT Professionals in the Czech Economy, Structural Changes in Human Resources. Proceedings of the 11th international conference on Strategic Management and its Support by Information Systems 2015 (SMSIS) [CD], ISBN: 978-80-248-3741-3 21-22 May2015, Uherské Hradiště, Czech Republic, 419–430.

Simard, C., Davies Henderson, A., Gilmartin, S. K., Schiebinger, L. and Whitney, T. (2014) Climbing the Technical Ladder: Obstacles and Solutions for Mid-Level women in Technology. Anita Borg Institute For Women and Technology and Michelle R. Clayman Institute for Gender Research at Stanford University, [Retrieved September 10, 2017], http://anitaborg.org/wp-content/uploads/2013/12/Climbing_the_Technical_Ladder.pdf

Smith, A (1776) Wage theory of labour supply. The Wealth of Nations

Torrent-Sellens, J. (ed.). (2008) La empresa red: tecnologías de la información y la comunicación, productividady competitividad. Madrid: Ariel

Zelenyuk, V. (2014) Testing Significance of Contributions in Growth Accounting, with Application to Testing ICT Impact on Labor Productivity of Developed Countries. International Journal of Business and Economics. vol. 13, no. 2, pp. 115-126.

Quality Management of Selected Tourism Activities

Zdeněk Málek, Department of Gastronomy, College of Business and Hotel Management, Bosonožská 9, 625 00 Brno, malek@hotskolabrno.cz
Eva Lukášková, Department of Gastronomy, College of Business and Hotel Management, Bosonožská 9, 625 00 Brno, lukaskova@hotskolabrno.cz
Kateřina Pitrová, Department of Environmental Security, Faculty of Logistics and Crisis Management, Tomas Bata University in Zlín, Nám T. G. Masaryka 5555, 760 01 Zlín, pitrova@flkr.utb.cz
Tomáš Jeřábek, Department of Economics, Economy and Management, College of Business and Hotel Management, Bosonožská 9, 625 00 Brno, jerabek@hotskolabrno.cz

Abstract

Tourism is today an inherent part of the lifestyle and needs of people. Quality management in tourism has undergone a similar evolution as other industries and service disciplines. In the seventies and eighties of the 20th century in particular, company and industry standards started to be formulated, especially in hotel businesses and transport companies. Hotel chains and airlines in the United States may serve as examples.

Keywords: Tourism, quality system, complaints, quality standards.

Introduction

In the first decade of this century so-called "National Systems of Quality of Tourism Services" were gradually developed and implemented in a number of European countries. These are based on the principles of ISO 9000 or EFQM[1] management models and respect the local business environment and specifics of a particular tourism sector. A comprehensive literary overview that is of global importance does not exist, and it is necessary to rely on national specifications for quality requirements.

Service Quality

The service quality is represented by products in tourism, which are characterized by immateriality, short durability, heterogeneity, and human factor effect. Many destinations offer substitution products, as well as the services the clients use on their way to different destinations can be almost identical, so quality becomes a critical moment of differentiating one destination from another. At today's strong competitive pressure, the strategies of traditional tourist-based destinations are based on product quality and differentiation. The decisive elements of competitive struggle have taken place especially in European destinations, which, in most cases, cannot compete with new low-cost exotic targets, proximity to the client, high quality of services and their appropriate interconnection with the service chain and rapid response to changes in target groups. **(Palatková, 2006)**

[1] The EFQM excellence model is a voluntary tool for evaluating organizations regardless of their size, industry, or maturity. EFQM (European Quality Management Foundation) is a non-profit foundation that brings together organizations seeking sustainable excellence.

Quality is a constantly verbalized word in all modern industries and it is the key to achieving customer satisfaction. It can be divided into two types:

- Technologically driven and product-oriented definitions that defined quality in terms of compliance with requirements based on company specifications.
- Definitions depending on their purpose which are market-orientated and customer-oriented, focusing on customer benefit and satisfaction. **(Swarbrooke, 2007)**

"Quality is what a client desires, plus what the destination can offer to the client in differentiating and profiling his product compared to competitors." **(Palatková, 2006)** Quality has a very subjective nature in the field of tourism services. The quality of the product - the tourism product - is according to the ČSN ISO 9004-2 standard, both by defining the need to satisfy the service, the character of the service in terms of value added to the customer, and by comparing comparable services to one another.

Quality Standards

Determining quality standards helps to tell customers what quality of service they can expect. It also serves as a basic standard and a tool for motivating employees. Determining quality standards is very difficult. There are several ways:

- Standards based on business conditions. In the tourism industry terms and conditions that are contractually secured and are included in the price. This may be the hotel's star rating. These conditions can be considered as setting a minimum service quality standard.
- The organization sets basic standards for employee behaviour and service performance rules, including how complaints should be handled. The results of the above-mentioned shopping method can serve as a basis for this. These standards and regulations should be made public and can serve both customer information and, in particular, the internal organizational chart for employees.
- For specific services, organizations provide certain guarantees that should not be exceeded.
- If the service provider is a member of a professional association, the minimum quality standards can be set by these associations. Their non-compliance can be sanctioned; punishment may also be their exclusion from the association.
- The introduction of ISO 9000 standards is now a universal service quality criterion that guarantees a consistent quality of service. By obtaining a certificate of compliance with the required ISO standards, which are international quality indicators, the organization will significantly increase its competitiveness in the given market.
- In the predominantly monopolistic environment of public services, quality standards are introduced from the outside, by the higher authority. The quality of public service provision is not only tested for compliance with standards but it can also be valued. **(Vaštíková, 2008)**

The new Civil Code, in connection with claiming a tour, has brought some changes. Compared to the original modification, when it was possible to claim the trip within 3 months of its end, the period was now reduced to 1 month from the end of the trip. The Civil Code directly states that the defect of the tour must be denounced by the customer without undue delay. It is best to solve the defects of the on-site tour with the delegate. If there is no rectification to the satisfaction of the customer, after returning from the holiday, it is necessary to complain in writing to his organizer. This is usually the case for a travel

agency. If the trip was purchased from a travel agency agent, you can claim it directly from them. Claims should be based on 'evidence' of your claim, various photographs, videos, witness testimonies, etc.

The new Civil Code also introduces a completely new institute, namely damage to holiday disruption, sometimes also called compensation for spoiled holiday. The organizer of the trip is responsible to the customer for fulfilling the obligations under the contract, even though these obligations are provided by the third parties. In the event of breach of these obligations, the organizer is liable to the customer for damage to the holiday. This compensation may be claimed as a defeat or substantial disruption of the holiday. At this time, it is not yet clear how the tournament organizers will be set up and what amounts can be claimed. A more detailed adjustment will therefore be brought by the judicial jurisprudence. **(Hlucháňová, 2014)**

Now the so-called compensation for the loss of pleasure from vacation is known and used. This, however, is based on the so-called ITQ Code that is volunteered by some travel agencies. This Code is based on the so-called Frankfurt Table, which guarantees to all clients a consistent approach to resolving travel claims and corresponding compensations.

Another novelty is the organizer's obligation to remove the defects of the trip within the time limit set by the customer. If he fails to do so, the customer can arrange for the trip to be rectified, and subsequently claim reimbursement for the organizer. However, the question remains how these costs can be high and what the organizer will have to pay back to the customer. Judicial jurisprudence will probably be the answer.

The Civil Code also addresses the case when the trip will have significant defects. The organizer must first arrange a correction to allow the tour to continue. If the customer refuses to correct this remedy for good reason, the organizer will ensure the customer's transport to the original place of departure (or other agreed place) at his own expense. However, the new Civil Code does not specify what will be the major defects of the trip or what will be considered a valid reason for refusing to continue the trip. **(Hlucháňová, 2014)**

Violation of Laws and Other Regulations

The results of the 2015 inspections carried out by the Czech Trade Inspection Authority have shown that there are still travel companies and travel agencies in the market that have problems in complying with generally binding legal regulations. Weaknesses have been identified in more than a third of the 310 controlled travel companies and agencies. Fines in excess of CZK 700,000 were imposed in 82 cases; proceedings in the next dozen cases are ongoing. "Incomplete or deceptive information on the extent, conditions and manner of claiming, including deception of the length of time for submission, have been shown by the inspectors at every sixth inspection. Tourism service providers continue to use banned unfair commercial practices as they do not inform consumers with true and professional care about their tours or selected destinations. They also often fail to comply with the formal requirements for the receipt and settlement of complaints or set a deadline for their settlement", said Mojmír Bezecný, Central Director of the Czech Trade Inspection. **(Česká obchodní inspekce)**

In the period from 1 January to 31 December 2015, a total of 310 inspections were carried out in which inspectors of the Czech Trade Inspection Authority verified the compliance of the conditions for the provision of tourism services for consumers with the requirements of the relevant generally binding legal regulations. Particular attention was paid to verifying whether travel companies and travel agencies have

not used unfair commercial practices to acquire clients and whether they comply with the obligations laid down by the law on certain business conditions and the performance of certain activities in the field of tourism **(zák. č. 159/1999 Sb.).**

During the year, the Czech Trade Inspection Authority received over two hundred complaints from consumers, dissatisfied with the offer and level of services provided by travel companies and agencies, and then with the settlement of the claim. When investigating by inspectors, the violation of duties under the control authority of the CTI was proven in 36 complaints filed. **(Česká obchodní inspekce)**

The following table shows that out of the total of 310 controls, a violation of generally binding legislation was found in 117 of them, i.e. 37.7%. **(Česká obchodní inspekce)**

Table 1: Controls of travel agencies and agencies in 2015

Inspectorate	**Number of controls**	**Inspections with findings**	**Violation in %**
Central Bohemian Region and Prague, the Capital City	69	34	49,3 %
South Bohemian Region and Vysočina Region	47	13	27,7 %
Plzeň Region and Karlovy Vary Region	58	13	22,4 %
Ústí n. L. Region and Liberec Region	52	22	42,3 %
Hradec Králové Region and Pardubice Region	22	8	36,4 %
South Moravian Region and Zlín Region	30	18	60,0 %
Moravian-Slesian Region and Olomouc Region	32	9	28,1 %
Total	**310**	**117**	**37,7 %**

Source: Česká obchodní inspekce 2016

Solving Deficiencies

Problems need to be resolved right on the place of vacation with the delegate. If the holiday does not go as it should and the travel agent's assurances or customer expectations with reality differ from reality, the matter needs to be solved right away. Every deficiency of a trip is to be declared by law without undue delay. The organizer must immediately provide a remedy and if he fails to do so within a reasonable time, we can arrange for the remediation itself and the organizer has to reimburse the costs. If you cannot remove a fault on the spot - if you were promised, for example, a room with a balcony, but the hotel does not have any balconies, you definitely have the right to financial compensation. (**Zelený, 2016)**

The new Civil Code also remembers the situation where the trip has significant deficiencies. In this case, the organizer must first arrange a correction so that the tour can continue. However, if you reject the proposed solution for duly justified reasons, the travel organizer is obliged to bring you back at your place of departure. However, the Civil Code does not specify what can be considered as material deficiencies, and what can be the good reason for having refused to go on holiday. The guideline will only provide the results of the first litigation. If you want to complain, you have to be able to prove that there was something wrong with the trip. The tip is simple: shoot photos, videos, seek testimony. Along

with other travellers, you can write a collective statement. For example, you can request a written document from the hotel staff or the carrier. **(Dlouhá, 2014)**

How Much Discount to Ask

"If you require a discount on the price of a trip, you can be guided by the so-called Frankfurt discount table. It lists the many types of deficiencies and the corresponding discounts that are admitted to customers by the courts," says dTest attorney Zelený. **(Dlouhá, 2014)**

And what can you find in the table?

- A different hotel than the agreed one: 15 to 20 percent discount.
- A room without (promised) balcony: 5 to 10 percent discount.
- Rooms without (promised) sea view: 5 to 10 percent discount.
- A room without (promised) air conditioning: 10 to 20 percent discount.
- Non-functional elevator: 5 to 10 percent discount.
- Too little space in the room: 5 to 10 percent discount.
- Rust or mould in the room: 10 to 50 percent discount.
- Insufficient cleaning: 10 to 20 percent discount.
- Noise at night: 10 to 40 percent discount.
- Self-service buffet instead of service: 10 to 15 percent discount.
- Monotonous food: 5 percent discount.
- Missing or dirty pool (if promised): 10 to 20 percent discount.
- Dirty beaches: 10 to 20 percent discount.
- Missing transfer from the airport: actual costs spent. **(Evropské spotřebitelské centrum pro ČR)**

In general, however, you should evaluate the trip deficiency in a realistic way and ask for a reasonable discount - significantly increasing the chance that the travel agent will be willing to agree. It is also possible to turn to one of the associations in which the agencies are associated, if they would not try to make an appointment with their member. There are two associations in the Czech Republic - the Association of Czech Travel Companies and Agencies and the Association of Czech Travel Agencies. However, the travel agency may not be a member of either of them. If the travel agent does not want to agree with you, there is a court. However, the practical experience of consumers shows that they often only hire a lawyer - once they start to act with the travel agent and threaten to sue, the offices often change their attitude because they want to avoid the court. But of course, it depends on whether your discount claim is justified or not. **(Dlouhá, 2014)**

Conclusion

The results of the inspections of the tourism service providers show that the travel companies and travel agencies still have a role in the market, which have problems with compliance with the basic requirements laid down for this area of business by generally binding legal regulations. The biggest problem is the provision of true and complete information about the conditions and extent of liability for defective performance, the services offered, and the fulfilment of formal requirements in dealing with consumer complaints.

References

Česká obchodní inspekce. *Trvalý problém jsou reklamace zájezdů a informace o nich.* [online]. © 2016. [cit 2017-02-15]. Available from http://www.coi.cz/cestovni-kancelare-2015-nc1892/

DLOUHÁ, Petra. *Dovolená jako špatný vtip. Jak správně reklamovat zájezd.* [online]. © 2014. [cit 2017-02-18]. Available from http://www.penize.cz/spotrebitel/289762-dovolena-jako-spatny-vtip-jak-spravne-reklamovat-zajezd

Evropské spotřebitelské centrum pro ČR. *Frankfurtská tabulka slev.* [online]. © 2016. [cit 2017-02-15]. Available from http://www.evropskyspotrebitel.cz/files/frankfurtska-tabulka.pdf

HLUCHÁŇOVÁ, Vlasta. *Reklamace zájezdu podle nového občanského zákoníku.* [online]. © 2016. [cit 2017-02-15]. Available from https://www.asociace-sos.cz/reklamace-zajezdu-podle-noveho-obcanskeho-zakoniku/

PALATKOVÁ, Monika. *Marketingová strategie destinace cestovního ruchu: Jak získat víc příjmů z cestovního ruchu.* 1st edition. Praha: Grada Publishing, 2006. 348 p. ISBN 80-247 1014-5

PravoProPodnikatele. *Cestovní kanceláře a agentury nedodržují právní předpisy, pokuty 709 tisíc.* [online]. © 2016. [cit 2017-02-15]. Available from http://pravopropodnikatele.cz/cestovni-kancelare-agentury-nedodrzuji-pravni-predpisy-pokuty-709-tisic-kc/

SWARBROOKE, HORNER. *Consumer behaviour in tourism.* 1st edition. Oxford: Elsevier Ltd., 2007. 428 p. ISBN-10: 0-7506-6735-4

VAŠTÍKOVÁ, Miroslava. *Marketing služeb: efektivně a moderně.* 1st edition. Praha: Grada Publishing, 2008. 232 p. ISBN 978-80-247-2721-0

ZELENÝ, Lukáš. dTest. [online]. © 2016. [cit 2017-02-15]. Available from: https://www.dtest.cz/?gclid=CjwKEAiAoaXFBRCNhautiPvnqzoSJABzHd6hwmxS0bxi4cdf3iTQNyj6aEXUOs4ce3rbL7u87zJUcBoC_aPw_wcB

Regional Innovation Foresights: Drivers and Barriers for Development[1]

Irina Rudskaia
Peter the Great Saint-Petersburg Polytechnic University, Institute of Industrial Management, Economics and Trade, Finance and Monetary Economics Department
iarudskaya@mail.ru
Russia, 195251, St.Petersburg, Polytechnicheskaya, 29

Abstract

One of the most efficient ways to improve the effectiveness of innovation policies is a foresight approach, which is applied nationally, at a sectoral level, regionally and corporately. The author proposes principles have must be complied with so that the results of foresight studies will be useful for innovation policies of the region. Also, the author has developed an evaluation system of elements of foresight and efficiency evaluation model of foresight studies. The article justified the role of universities in forming the structure of the region's economy. In the context of the regional innovation system, were identified the universities' functions defined by its key features.

Keywords: region, innovation systems, foresight, development, regional strategic projecting.

Introduction and Literature Review

The growing complexity of innovation processes in a region calls for a wide range of methods to develop innovation policies with due consideration of all involved actors' interests. One of the most efficient ways to improve the effectiveness of innovation policies is a foresight approach, which is applied nationally, at a sectoral level, regionally and corporately. Moreover, foresight is fostered by growing uncertainty of the external environment.

Thus, regional strategic projecting is becoming more and more important to follow the development trends in science and technology and pursue relevant strategies on the basis of regional foresight. Foresight is there to supplement the exiting elements of regional planning and improve their efficiency [Meissner, 20142].

In literature there is quite a variety of definitions of foresight, with each of them embracing some features. According to the generally recognized approach, foresight is seen as systematic activities designed to project long-term development trends in science, technology, economy and society in order to identify the areas for strategically important research and technology, contributing to the growth of economic and social benefits [Martin, 19953]. In this context foresight can be seen both as a tool for policy development (if it is used one time as a basis for further strategic decisions) and as a process by which policies are not only developed but also evaluated and enhanced.

In the Russian legislation, the concept of foresight (sientific anticipation) was introduced in the Program for Nano-Industry Development in the Russian Federation until 2015, approved by the RF Government

[1] The paper has been written under support of the Ministry of Science and Education of the RF (project No. 26.6446.2017/BCH).
[2]Meissner, D. (2014). Approaches for developing national STI strategies.STI Policy Review, 5(1), 34–56.
[3]Martin, B.R. (1995). ForesightinScienceandTechnology, TechnologyAnalysis&StrategicManagement 7(2), 1995, 139–168.

on 17.01.2008. [4]. Supplement 1 to this document, which specifies the main terms used in the Program, provides the following definition: "Foresight is a systematically organized process intended to identify long-term development prospects for science, technology, economy and society aimed at determining strategic areas for research and new technologies capable of bringing utmost socioeconomic benefits". Thus, the important social role of foresight is immediately emphasized not only as a narrow projection tool, but also as a wider methodology aimed at improving the life of the entire society.

Some researchers [Calof et al., 2015[5]] emphasize that foresight is not about fortune-telling or assessing probability of certain scenarios. Foresight is intended to widen the understanding of the propulsions for developing the society and enhance its readiness for inevitable change. "Foresight asks 'what range of plausible futures might our organization have to be prepared for, and which strategies can help us build resilience and create adaptive capacity to anticipate and thrive in the turbulence of change?'... Essentially, foresight employs a rehearsal approach to preparedness by addressing the 'what if' scenarios. Foresight establishes a context (i.e. the boundaries and possibilities of what are deemed plausible narratives) for both the extent and speed of potential change and the adaptive risks of a designated sector, emerging market or technology domain" [[6], p. 69].

The main principles of foresight concept:

- commitment of various social forces – business, academic community, government bodies and civil society on discussion and comparison of long-term projections, development strategies, elaboration of a more comprehensive vision of the future, consensus achievement and agreement on the ways to achieve the future;

- communication of actors;
- concentration on the longterm;
- coordination. It means that science and technology are evaluated in reference to economic and social achievements;
- consensus – the need for coordinated operation of business, academic community, government bodies and civil society, which are trying to achieve consensus based on the society development scenarios worked out by experts;
- process consistency, based on structured judgments of experts [Streltsov, 2007[7]].

Foresight is actively used in Russia to solve the problems related to shaping national science, technology and innovation policies. Thus, foresight is used as a basis for developing the Strategy for Science and Technology Development of the Russian Federation [[8]], a list of critical technologies has been made and is relied on to form technology platforms, etc. Foresight sessions have been used in a sectoral and regional context.

Researchers distinguish several stages in foresight development and several generations of foresight research, which can co-exist or prevail depending on the purpose of foresight.

[4]The Program for Nano-Industry Development in the Russian Federation until 2015. Approved by the RF Government on 17.01.2008. URL: http://www.consultant.ru/document/cons_doc_LAW_106174/ (date of visit 28.01.2017).
[5]Calof J., Richards G., Smith J. Foresight, Competitive Intelligence and Business Analytics - Tools for Making Industrial Programs More Efficient //Foresight. 2015. Vol. 9. No. 1. PP. 68-81
[6]Calof J., Richards G., Smith J. Foresight, Competitive Intelligence and Business Analytics - Tools for Making Industrial Programs More Efficient //Foresight. 2015. Vol. 9. No. 1. PP. 68-81
[7]Streltsov R.S. A Tool for Long-Term Projecting // Vladimir State University, Electronic journal "Regional Economy and Governance" No. 18, December 2007, (Part 2) [Electronic resource] Access mode: http://journal.vlsu.ru/index.php?id=1905.
[8]The Long-Term Strategy for Science and Technology Development of the Russian Federation. Approved by the RF Presidential Decree 01.12.2016.URL: http://sntr-rf.ru/materials/strategiya-nauchno-tekhnologicheskogo-razvitiya-rossiyskoy-federatsii-na-dolgosrochnyy-period/Date of visit 06.01.2017.

Foresight principles are implemented given a coordinated interaction of all agents and stakeholders of a region's socioeconomic sphere.

Regional foresight is a process of systematical determination of new strategic scientific areas and technology achievements, which will seriously affect the region's economic and social development in the long term [9].

Linkages of the foresight level and the relevant innovation system should be emphasized (Fig. No. 1). This linkage has a dual nature. On the one hand, foresight investigates the future of technologies and establishes priorities for investing in research and development and new technologies. These priorities are a basis for developing innovation policies of a country (region) or innovation strategy of a company. On the other hand, innovation systems rely on cooperation, interrelations between research and development areas, markets and industries, which allows defining early signals in technology development. Given the uncertainty and high risk of innovation development, it is necessary to create a vision of future through research foresight, as well as to discuss this future and identify the general consensus among all actors of innovation systems.

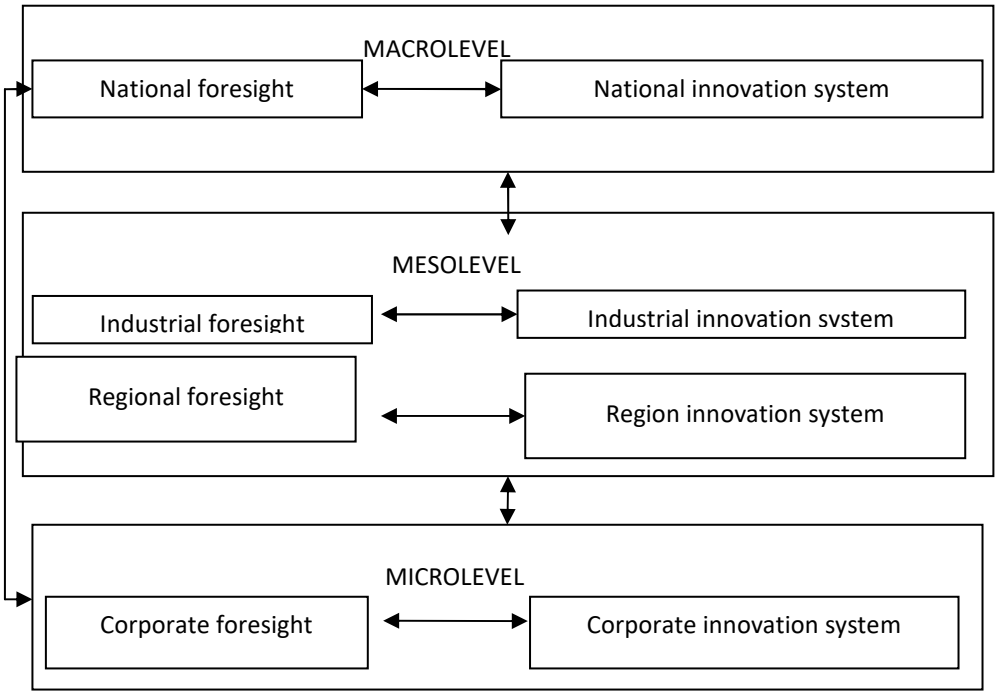


Fig.1: Interrelation of foresight levels and innovation systems

Over the recent years, regional foresight is widely used both in developed and developing countries. Herewith, as emphasized by researchers [10], the functions of regional foresight in developed and developing countries are different. In developed countries, where innovation ecosystems are already formed, regional foresight is a means of strategic planning and efficient distribution of budget expenses. In developing countries foresight is primarily a communication tool. It is used to develop new modes of cooperation and form innovation ecosystems.

[9]Prudsky V.G., Oschepkov A.M. Foresight as a Basis for the Socioeconomic Strategy of a Region //Perm University Gazette. Series: Ekonomika. 2012. Special issue. PP. 22-27

[10]Vishnevskiy, K., Meissner, D., &Karasev, O. (2015b). Strategic foresight: state-of-the-art and prospects for Russian corporations. Foresight, 17(5), 460–474.

The following factors can be distinguished among those affecting the growing popularity of foresight as a policy development tool:

1. Due to globalization, rapid technology and organization changes occur. It improves the value of the ability of all actors of innovation activities to adapt and learn in a fast changing world. I.e. all actors of innovation activities must develop new strategic priorities given these rapid changes. In order to achieve it, they should be able to understand each other and know about the key areas of development and technologies, determining long-term prospects.

2. Rapid change in technology development considerably reduces the value of even the most advanced projection models [Havas, 2003[11]]. Thus, the importance of flexibility and diversity in projecting the future is growing.

3. As mentioned above, today policy development is a set of integrated actions influenced by many factors. These are different interests of key actors, new requirements to the education system, environment protection issues, issues related to improving the population's quality of life, ensuring long-term competitiveness, the problem of regional inequality etc. Most of these problems do not have obvious solutions. Moreover, the growing uncertainty of the external environment have to be considered. So, diversified methods have to be applied and a consensus should be found in various strata of society.

4. Given the growing complexity in political decision-making, decision-makers have to learn new knowledge and behavior models, which allow them to consider a wide range of uncertainty factors and effectively use various methods for determining development priorities. In turn, it provokes the need for new competences, affecting the system of education and staff training.

5. As mentioned above, various modes of cooperation (clusters, research networking, technology platforms, etc.) become a key factor in creating, distributing and commercializing knowledge and technology, and, consequently, in meeting social needs and improving the economic situation. These cooperations are often informal and hard to identify officially, which requires involving a wide circle of actors with various interests in the processes of forecasting future priorities.

6. Researchers mark out the growing gap between the speed of technology changes and the capability to form adequate technology politics, which makes it important to learn the causes of this gap and work out some mechanisms to narrow or remove it.

7. The world economic crisis and its consequences have important implications. Given the attempts to encourage economic growth in many developed and developing countries, governments have to cut down on public spending, or, at least, justify its expediency. This is especially topical for regions, given the limitations of their budgets. Correspondingly, long-term expenses on research and development should be also substantiated and clear for society.

8. Apart from the above factors, we should single out the ability of foresight to pick up "weak signals", which can affect the future development. Foresight can work as a system of "early prevention" against plausible threats of accepting one or other technologies are preferred or neglected. It can also be a tool of the "learning economy", not causing serious negative environmental, political or economic effects.
It should be noted that foresight itself is not aimed at evaluating the plausibility of the scenarios that have been worked out in its course. However, in foresight, future situations to be prepared for are determined;

[11]Havas, A. Socio-Economic and Developmental Needs: Focus of Foresight Programmes, KTK/IE Discussion Papers 2003/13, Institute of Economics Hungarian Academy of Sciences, Budapest 2003, Paper presented at a UNIDO workshop on Implementation of the Regional Programme on Technology Foresight for CEE/NIS held in Ankara, Turkey on 8-12 December 2003, p. 4-7.

strategies are mapped out, increasing flexibility and adaptability of the regional innovation system actors and allowing anticipating change in the dynamic external environment [[12]].

Regional foresight has been developing for quite a while in the European Union. The experience of applying regional foresight is reviewed in their paper by [Meshkova, Kozlov, Tretyak, 2011[13]]. The authors give cases of regional foresights in Catalonia, Uusimaa (Finland), Liege (Belgium), Limousin (France) and Lombardia (Italy). The authors of the paper [Kindras, Meissner, Vishnevskiy, 2015] also analyze the experience of Linz (Austria) and three Ireland's regions (Border, MidlandandWestern – BMW).

Another important feature of the project to discuss in more detail is foresight in the context of regional innovation systems. The competitiveness of every region is judged in terms of its current and future capabilities to update and create favorable conditions for innovation activities.

The Methodological Basis of Foresight

In today's practice of foresight studies in Russia there are attempts to form foresights in Bashkortostan, Irkutsk region, Perm Krai, Samara region and some other regions.
The foresight study in Bashkortostan served as a basis for elaborating the region's development strategy and was limited by working out a system of priorities.

In Samara region, in order to form the strategy for socioeconomic development of the region, a "road map" was designed. It substantiated the main areas of regional innovation development, described the factors for constructing scenarios, determined the critical challenges and threats and the ways to react to them.

One more example of regional foresight in Russia is the "Foresight study of human capital development in Krasnoyarsk Krai until the year 2030" [16], which was carried out under financial support of the Krasnoyarsk Krai Fund of Scientific and Technological Activities Support. In this study, global development trends were identified, possible threats and critical situations were evaluated for Russia as a whole and Krasnoyarsk Krai in particular for the period 2010 to 2030.

After federal law No.172 "On strategic planning in the RF" was adopted in 2014, the basis for longterm planning on the national, sectoral and territorial levels has been set and it is expected that the processes of creating regional foresight studies will activate in order to form development priorities of the region and tackle specific problems in a certain locality, as well as to promote cooperation with other territorial subjects.

Moreover, an attempt was made to apply foresight technology for Vasileostrovsky District, St. Petersburg and Ust-Luga region. In 2014-2015 St. Petersburg saw foresight studies in terms of the club "Future St. Petersburg". However, these studies, from our standpoint, did not consider the potential of regional innovation systems and their features to a sufficient extent or at all.

Apart from providing a vision of the future development for the regional innovation system, foresight is intended to specify its parameters and determine the ways for the best consistent achievement of the planned outcomes. Correspondingly, its results must be the basis for development "road maps" for the innovation system of the region and for the region's interaction with other innovation systems, which is

[12]Calof J., Richards G., Smith J. Foresight, Competitive Intelligence and Business Analytics - Tools for Making Industrial Programs More Efficient //Foresight. 2015. Vol. 9. No. 1. – PP. 68-81.
[13] Meshkova N.V., Kozlov V.A., Tretyak V.P. Lessons of Regional Foresights in the EU countries //Regional Economics: Theory and Practice. 2011. No. 18 (201).

very important in the conditions of globalization and growing openness of innovation activities. The following principles must be complied with so that the results of foresight studies will be useful for innovation policies of the region.

1. **Leadership and responsibility for implementation of foresight studies and decision-making**. Even though foresight studies focus on quite distant future and embrace wide circles of stakeholders, successful experience in conducting these studies determines the need to organize them as projects with clearly appointed project leaders (managers). Managers take a decision about organizing studies and determine the configuration of the project, its key points.

2. **Balanced participation of all stakeholders in the process of regional innovation foresight**. These are key actors in innovation activities (enterprises, research institutes, higher educational institutions, representatives of small innovation business and clusters, representatives of executive government bodies, responsible for innovation policies in the region and representatives of different groups of population)/ Direct participation of stakeholders in foresight studies and discussion of their results guarantee that all actors will have a common vision of the innovation development ways in the region, understand the steps to be taken, and share the responsibility for implementing the decisions that have been made.

3. **Organization of effective communications at all levels of foresight studies.** Despite the fact that the key role in organization of regional innovation foresight belongs to the project leaders, communications must be maintained between all actors. It will contribute to the development of the project. Spreading information about the foresight study via a web-site, establishing contacts and connections with other projects in the region are necessary so as to avoid unwanted actions and determine the key priorities.

4. **Flexibility**. Regional innovation foresight must have quite a flexible structure, be able to adapt to the changing needs of the key actors and integrate useful initiatives, which were not initially considered.
5. **Consistency**. It is necessary that the matters under discussion, identified trends and moving forces of innovation development should be embodied in documents ("road maps"), addressed to the people responsible for innovation policies in the region.

6. **Assessment at all stages of foresight implementation**. Since the results of foresight must become the basis for adopting and pursuing regional innovation policies, it is necessary to assess foresight at all stages - from the project team to the actual results.

The methodological basis of foresight is formed by a constantly expanding set of tools [14], including special qualitative and quantitative methods (table No. 1).

Table 1: Classification of foresight methods

Characterization of the group of methods	Methods
Methods, using expert knowledge for long-term strategy development	The Delphi method Expert panels Brainstorming Intellectual maps Scenario analysis SWOT, STEEP and PESTEL analysis
Quantitative methods based on statistics and other	Trend method

[14]Shvetsov A.N. Projecting in the system of locality development elements //Works by the federal research center "Computer Science and Control", RAS. 2009. Vol. 43. PP. 5-24

Characterization of the group of methods	Methods
initial data	Simulation modeling Cross-factor analysis Method of system dynamics Big data analysis
Methods for determining key impact points for long-term goal-setting	Relevance trees Morphological analysis Determination of key technologies Development of road maps

Source: developed by the author on the basis of [15]

Methods are selected depending on the approach pursued by regional innovation foresight initiators.
One of the main problems of regional innovation foresight is the fact that its authors do not consider the innovation drivers and the interests of the members of innovation activities existing in the region. In this case it looks as if the foresight results are isolated from the innovation development drivers existing in the region and their nature is too general, which impedes them from being introduced in the region. In order to combat this problem, scenarios must be developed in the course of regional innovation foresight in parallel with its evaluation.

The following elements of foresight are to be evaluated (Table No. 2)

Table 2: Evaluation of foresight studies elements

Element	Criterion	Evaluation method	Grading scale
Foresight goals	Adequacy of goal-setting Achievability Consistency Consideration of all stakeholders' interests	Interviews Comparison with the results	Responses to interview questions Full or partial achievability Full or partial consideration of stakeholders' interests
Project team	Qualification level and relevant experience Representativity in relation to all stakeholders Effective communications in the team Independence level of the team members	Analysis of documentation (personal and from previous projects) Interviews with the team members Analysis of stakeholders	Responses to interview questions Full or partial achievability Share of the team members previously involved in similar studies Scope
Project initiator	Position of the initiator in the project team Interaction with the team	Document analysis Interviews	Does the initiator bear responsibility? How effective is interaction with the team?
Stakeholders	Identification of all regional stakeholders Identification of all interests of the	Analysis of stakeholders Document analysis	All stakeholders are presented Stakeholders' key interests are identified Intercepting points of

[15]J. P. Gavigan, F. Scapolo, M. Keenan, I. Miles, F. Farhi, D. Lecoq, M. Capriati, T. D. Bartolomeo (eds), A practical Guide to Regional Foresight, FOREN, Foresight for Regional Development Network, European Communities 2001 (http://forera.jrc.es/documents/eur20128en.pdf, accessed on: 2008-02-08), p. 100

Element	Criterion	Evaluation method	Grading scale
	stakeholders Interaction between the stakeholders		interests (common interests) are found
Methodology	Diversity of the applied methods Correspondence of the applied methods to the goals set Balance of the approaches Efficiency in achieving the goals Quality of the obtained results	Document analysis Analysis of the project results Matrix analysis Interviews	Evaluation of every method contribution in goal achievement Conformity evaluation of the applied methods and obtained results Efficiency evaluation of the achieved goals by using specific methods
Study management	Sequence of actions Management efficiency Integrity of actions	Document analysis Interviews	Correspondence of the project to the requirements for results, resources, time limitations Consistency and non-contradiction of the results
Project resources	Sufficiency of the resources Quality of the resources Efficiency of resource distribution	Document analysis Interviews	Project resources are used efficiently (value for money)
Project results	Importance for the project initiator Importance for the stakeholders Importance for the region	Document analysis Interviews	Results are used to work out the region's development strategy All stakeholders have a notion about the foresight results

Source: developed by the author based on [Makarova, Sokolova, 2014[16]; Sokolova, 2015[17]].

It should be noted that although foresight can be seen as a project, as stipulated above, its features determine the specifics of foresight studies. If for traditional projects, first of all, their efficiency is evaluated (both commercial efficiency measured in net present value or internal rate of return, and efficiency in terms of the achieved goals appraised on the basis of cost and benefit analysis), then for foresight studies the most important criterion of success is its impact on a relevant strategy (for example, innovation strategy of a region) or a possibility to organize next study based on it, i.e. integrity, value of the results, their possible application in specific guidelines, etc.So, quantitative methods are mostly used for evaluating traditional projects, whereas approaches relying on qualitative criteria are more common for foresight studies.

Efficiency evaluation model of foresight studies is presented in Fig. No. 2.

[16]Makarova, E.A.,Sokolova, A. (2014)," Foresight evaluation: lessons from project management ", Foresight, Vol. 16 Iss 1 pp. 75 - 91

[17]Sokolova, A. (2015). An integrated approach for the evaluation of national Foresight: The Russian case. TechnologicalForecasting&SocialChange, 101, p. 216-225.

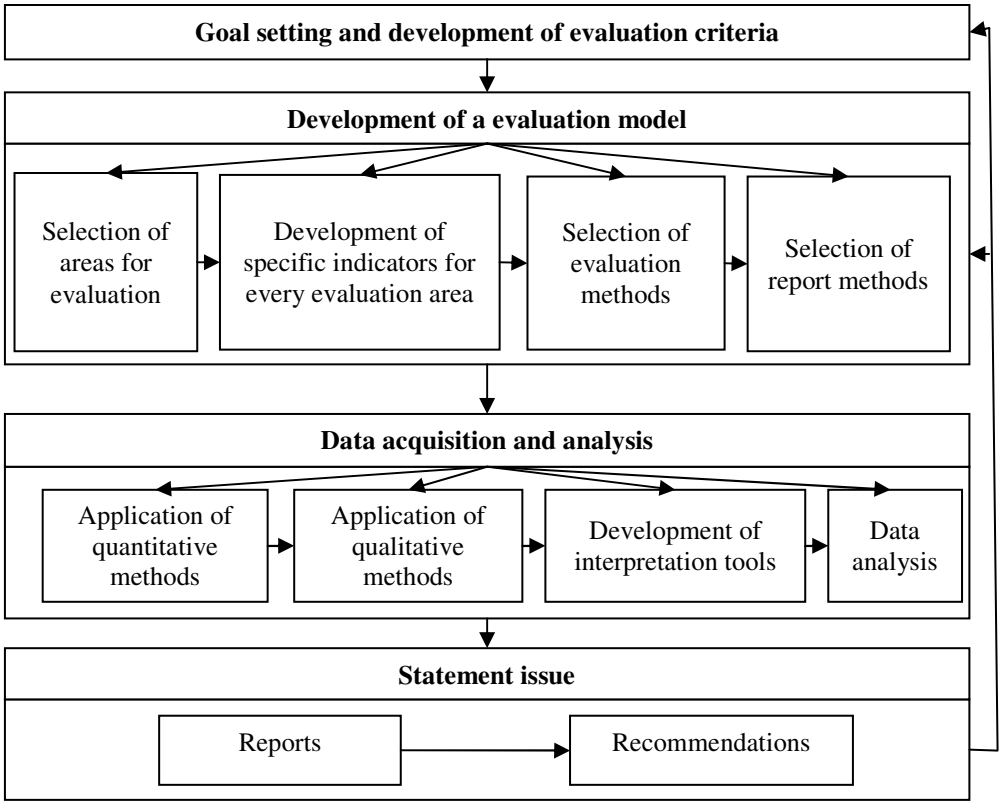


Fig. 2: The efficiency evaluation procedure of a foresight study

Source: developed by the author.

Since foresight studies must be closely connected with the specifics of innovation activities in the region, a single methodology cannot be developed. Regions should begin foresight studies from different starting points and consider the features of the developing or developed innovation system. So, prior to discussing a methodological approach to managing regional innovation foresight in Russia, it should be pointed out that this approach calls for specification for every individual region.

Given that the results of foresight are the basis for taking strategic innovation decisions at a regional level, it is logical that the executive government bodies, responsible for innovation policies, should be considered as the main customer of foresight studies. We see representatives of universities as leaders of the project team.

The Role of Universities in Forming the Structure of the Region's Economy

The importance of universities for innovation development of the region does not need any special substantiation. Universities are the main suppliers of qualified staff for the region. They create and spread the latest knowledge and technology, i.e. they are paramount creators of the region's intellectual capital. They also perform a very important function in managing interaction between graduates and employers. By organizing research studies, universities become the centers attracting not only intellectual, but also

physical and financial capital. The "third mission" (together with education and science) of universities discussed by many scientists is about forming this capital [Rolfo, Finardi, 2012[18]].

Today activities of universities can be compared to those of an industrial enterprise, manufacturing and offering various types of products to the market. In application to universities these are:

educational programs;
research studies done according to contracts with enterprises, government bodies, academic organizations, non-profit making organizations and other customers;
new knowledge;
appearance of new products (samples) and areas of their application;
qualified labor resources;
technologies and intellectual property rights for them;
new sociocultural norms and relations.

From the position of regional innovation systems, universities can be seen as an economic agent, whose function in the region is to produce and spread knowledge for other economic agents. American researchers point out two models of interaction between universities, industry and state in terms of their influence on the development of the regional economy.

The first model was developed in Massachusetts Institute of Technology and used in such countries as Iran, Spain, Brazil, the UK and India. This model is related to setting up temporary scientific teams made of highly-qualified engineers and visiting professors from universities involved in fundamental research studies and interested in practical implementation of their results.

The second model was developed in Stanford University and exported, mostly, in new industrial countries of the Pacific region, especially in Korea. This model is based on creating new higher education institutions and (or) new training courses for university graduates or joint research programs in close cooperation with industrial research laboratories. This second approach ends up in creating a new type (the so-called "mixed") institutions, which are considerably different from the existing "traditional" universities. Universities are more and more trying to turn into research universities. Wide tasks of contemporary science go outside the boundaries of university limitations. At the same time modern development trends of higher education (for example, life long learning concept) make it necessary to withdraw from the traditional university educational model [Lee, 2000[19], c. 58].

THE external milieu of contemporary technical universities and existing integration modes of science, education and industry, with constantly growing importance of education in the economy predetermine the emergence of structures which transfer the findings of scientific research studies conducted by universities to industry. Universities act as a central link in forming local innovation industrial clusters. Joint activities of three institutions - academic, educational, state and cooperative - allow them to develop consistent innovation policies, aimed at generating entrepreneurship in high-tech sectors, advancing new scientific areas and new business models (Fig. No. 3).

[18]Rolfo, S., Finardi, U. (2012). University Third mission in Italy: organization, faculty attitude and academic specialization, The Journal of Technology Transfer, Vol. 37, no. 2, pp. 1-15.
[19]Lee Y.S. The sustainability of university-industry research collaboration: an empirical assessment // Journal of Technology Transfer. – 2000. – Vol. 25. – P. 111-133.

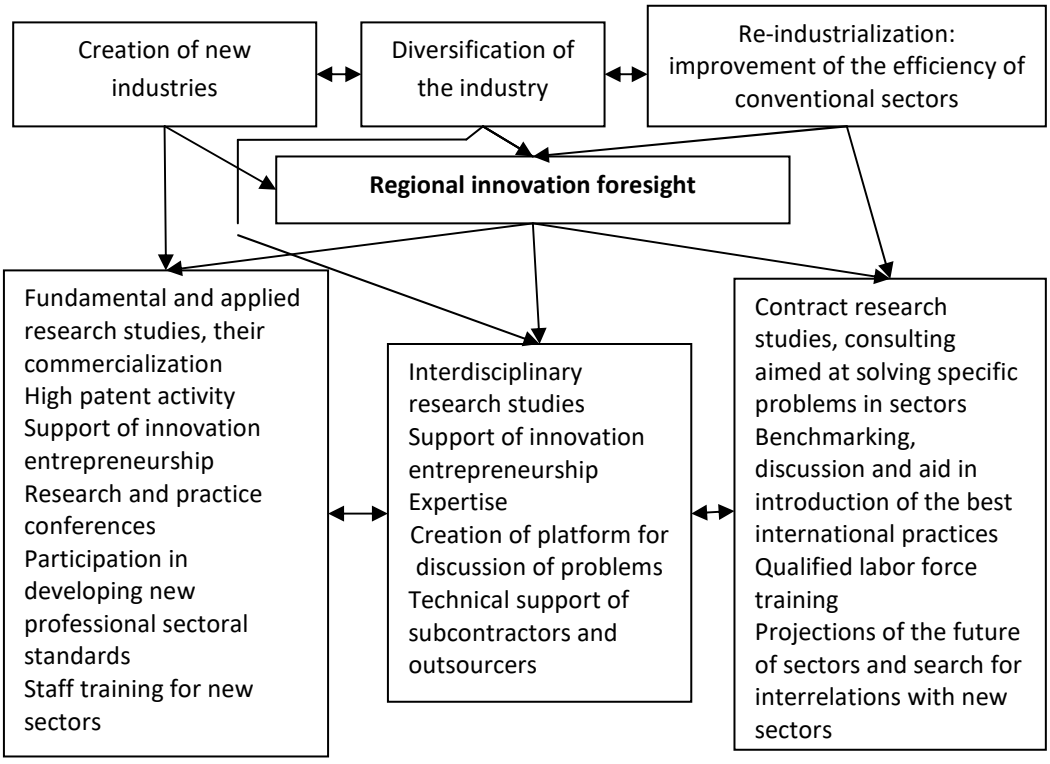


Fig. 3: The Role of Universities in Forming the Structure of the Region's Economy

In the context of the regional innovation system, the universities' functions are defined by its key features. As discussed in the previous papers by the author [Rudskaya], the main feature of the regional innovation system is formation of many cooperative interactions between various members of innovations activities in the region. Universities help this interaction by creating elements of the innovation infrastructure - technology parks, business incubators, technology transfer centers, laboratories and research centers with business participation, innovation industrial clusters, etc. In a number of regions (including some Russian ones), universities are actively involved in the entrepreneurial framework of the region by creating not only elements of the infrastructure, but also entrepreneurial structures themselves - small innovation enterprises (spin-off companies).

So a new type of universities can be mentioned – "entrepreneurial university", which is an active stakeholder of the regional innovation system [Clark, 2011[20]].

However, it is possible to point out the elements of indirect impact of universities on cooperative interactions in the region, such as creation of regional programs of staff training, participation in project expertise, distribution of the results of federal and international research projects in the region, etc.
The second important feature of the regional innovation system, where universities are actively involved, is formation of the regional human, social and intellectual capital. Universities train staff, spread knowledge and contribute to a growth in entrepreneurship via activities of business incubators and spin-off companies (small innovation enterprises), set up on the basis of universities, as a rule, by their

[20] Clark, Burton R. Creating entrepreneurial universities: organizational pathways of transformation (scientific editor D.A. Aleksandrov). – Moscow: Publishing House of the National Research University "Higher School of Economics" (NRU HSE), 2011. 240 p.

employees - teaching staff, researchers, students or graduates. Moreover, universities should play an important role in defining anticipating needs of the labor market by answering the question about which jobs will be mostly demanded in the medium-term and long-term perspective, as well as which competences (knowledge, abilities, skills) of the existing professions will form the long-term competitive advantages of the region. Through creating such enterprises, universities will be able to attract strong entrants focused on professional carrier in the region and keep the best graduates in it.

The third important function of universities in the regional innovation system concerns their interaction with executive government bodies, responsible for development and pursuit of regional innovation policies. Universities carry out an analysis of the internal and external environment of the region, define the directions for innovation development and become platforms for discussing widely the proposed measures of innovation policies.

Following these considerations, in 2007 OECD suggested a methodology for estimating the impact of higher education on regions [[21]]. In the methodology three blocks of indicators were studied: indicators, characterizing universities' contribution to innovation activities of the region (innovation university-based infrastructure, cooperation growth, direct contribution to creating innovation - patents, licenses); contribution to the development of the human capital in the regions (expanded access to higher education, creation of life-long learning system, highly-qualified staff training and liquidation of regional disproportions, search for and nurturing talents, sustainable interaction with employers, stimulation of entrepreneurship, employment growth); contribution to the sociocultural and environmental development (improvement of the environmental situation, creation of new places of cultural attraction, enhancement of demographic situation). In 2017, according to this methodology, the results of complex research of the Russian regions and contribution of universities in their development were published [Leshukov, Evseeva, Gromov, Platonova, 2017[22]]. They did not allow establishing direct dependence between the universities' characteristics and regions' development level, which calls for further research in this area. However, a group of regions was pointed out, where universities can be seen as innovation development drivers. They include Moscow and Moscow region, St. Petersburg and Leningrad region, Krasnoyarsk Krai, Perm Krai, the Republic of Tatarstan, the Repubic of Sakha - Yakutia, the Republic of Kalmykia and Chechen Republic.

The functions of universities in the regional innovation system are shown in Fig. No.4.

[21]OECD: Higher Education and Regions. Globally competitive, locally engaged, 2007 [Electronic resource] // URL: https://www.oecd.org/edu/imhe/highereducationandregionsgloballycompetitivelocallyengaged.htm

[22]Evaluating the Contribution of Regional Higher Education Systems in the Socioeconomic Development of Russia's Regions / O. V. Leshukov, D. G. Evseeva, A.D. Gromov, D. P. Platonova; National Research University "Higher School of Ecnomics", Institute of Education. — Moscow: NRU HSE, 2017.

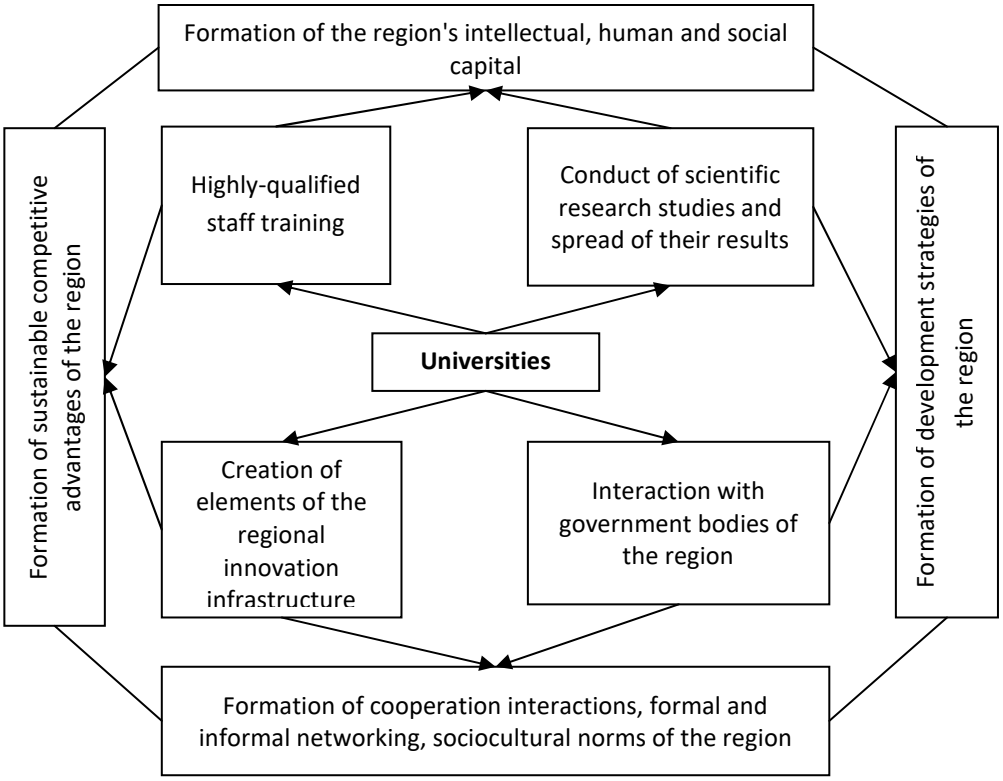


Fig.4: Functions of universities in the regional innovation system

The impact of universities on the results of regional innovation foresight relies on their "third mission". If one of the key implications of foresight is to foresee the future development of the region, three directions of foresight, related to university research studies, can be defined (Table No.3).

Table3: Interconnection of the foresight and the functions of universities

Areas of foresight	Description of the area	Interconnection with the functions of universities
Knowledge of the future (cognitive area)	Foresight determines new trends, driving forces of development and gives resources for strategic decision-making It is aimed at identifying the priorities of innovation development based on consistent understanding of the future development of science, technology, economy and society	Identification of new development directions for science and technology Identification of new knowledge and skills required in future
Discussion of the future (normative-value direction)	Foresight is carried out by open discussion and is aimed at working out common understanding of development priorities Foresight implies involvement of various stakeholders at different	Universities, due to the diversity of their products and linkages, can become the best platform for a dialog between various stakeholders and search for a common vision of the future

Areas of foresight	Description of the area	Interconnection with the functions of universities
	levels	Conduct of research studies for better understanding of development priorities
Formation of the future (practical direction, application of foresight results)	Based on the foresight results, strategic decisions are taken, which allow implementing these results in specific actions at the regional level	Implementation of possible projects Participation in strategic decision-making Search for and attraction of partners

Conclusion

Thus, regional innovation foresight should be carried out with active involvement of the region's universities and on their platform.

Summarizing the above-mentioned, we see regional innovation foresight as a project. In its essence, the project must have a certain goal, time limits, resources and a team. It should also have a certain management independence. Regional foresight meets all these conditions.

The finance of regional budgets can be seen as resources of the project. However, given the importance of the research study for all actors of the regional innovation system, private investors should be attracted for co-financing, such as enterprises, investment funds, venture capital funds and non-government organizations.

As defined above, the project team should include university representatives, because they are the force which is capable of considering the multi-variation of development to a full extent and attracting all stakeholders to participate in the project. To coordinate actors' work the university sets up an organization committee of the regional innovation foresight project.

References

1. Evaluating the Contribution of Regional Higher Education Systems in the Socioeconomic Development of Russia's Regions / O. V. Leshukov, D. G. Evseeva, A.D. Gromov, D. P. Platonova; National Research University "Higher School of Ecnomics", Institute of Education. — Moscow: NRU HSE, 2017.

2. Calof J., Richards G., Smith J. Foresight, Competitive Intelligence and Business Analytics - Tools for Making Industrial Programs More Efficient //Foresight. 2015. Vol. 9. No. 1. PP. 68-81.

3. Clark, Burton R. Creating entrepreneurial universities: organizational pathways of transformation (scientific editor D.A. Aleksandrov). – Moscow: Publishing House of the National Research University "Higher School of Economics" (NRU HSE), 2011. 240 p.

4. Gavigan J. P., F. Scapolo, M. Keenan, I. Miles, F. Farhi, D. Lecoq, M. Capriati, T. D. Bartolomeo (eds), A practical Guide to Regional Foresight, FOREN, Foresight for Regional Development Network, European Communities 2001 (http://forera.jrc.es/documents/eur20128en.pdf, accessed on: 2008-02-08), p. 100.

5. Havas, A. Socio-Economic and Developmental Needs: Focus of Foresight Programmes, KTK/IE Discussion Papers 2003/13, Institute of Economics Hungarian Academy of Sciences, Budapest 2003, Paper presented at a UNIDO workshop on Implementation of the Regional Programme on Technology Foresight for CEE/NIS held in Ankara, Turkey on 8-12 December 2003, p. 4-7.

6. Lee Y.S. The sustainability of university-industry research collaboration: an empirical assessment // Journal of Technology Transfer. – 2000. – Vol. 25. – P. 111-133.

7. Makarova, E.A.,Sokolova, A. (2014)," Foresight evaluation: lessons from project management ", Foresight, Vol. 16 Iss 1 pp. 75 – 91.

8. Martin, B.R. (1995). Foresight in Science and Technology, Technology Analysis&Strategic Management 7(2), 1995, 139–168.
9. Meissner, D. (2014). Approaches for developing national STI strategies. STI Policy Review, 5(1), 34–56.
10. Meshkova N.V., Kozlov V.A., Tretyak V.P. Lessons of Regional Foresights in the EU countries //Regional Economics: Theory and Practice. 2011. No. 18 (201).
11. OECD: Higher Education and Regions. Globally competitive, locally engaged, 2007 [Electronic resource] // URL: https://www.oecd.org/edu/imhe/highereducationandregionsgloballycompetitivelocallyengaged.htm.
12. Prudsky V.G., Oschepkov A.M. Foresight as a Basis for the Socioeconomic Strategy of a Region //Perm University Gazette. Series: Ekonomika. 2012. Special issue. PP. 22-27.
13. Rolfo, S., Finardi, U. (2012). University Third mission in Italy: organization, faculty attitude and academic specialization, The Journal of Technology Transfer, Vol. 37, no. 2, pp. 1-15.
14. Shvetsov A.N. Projecting in the system of locality development elements //Works by the federal research center "Computer Science and Control", RAS. 2009. Vol. 43. PP. 5-24.
15. Sokolova, A. (2015). An integrated approach for the evaluation of national Foresight: The Russian case. Technological Forecasting&Social Change, 101, p. 216-225.
16. Streltsov R.S. A Tool for Long-Term Projecting // Vladimir State University, Electronic journal "Regional Economy and Governance" No. 18, December 2007, (Part 2) [Electronic resource] Access mode: http://journal.vlsu.ru/index.php?id=1905.
17. The Long-Term Strategy for Science and Technology Development of the Russian Federation. Approved by the RF Presidential Decree 01.12.2016.URL: http://sntr-rf.ru/materials/strategiya-nauchno-tekhnologicheskogo-razvitiya-rossiyskoy-federatsii-na-dolgosrochnyy-period/Date of visit 06.01.2017.
18. The Program for Nano-Industry Development in the Russian Federation until 2015. Approved by the RF Government on 17.01.2008. URL: http://www.consultant.ru/document/cons_doc_LAW_106174/ (date of visit 28.01.2017).
19. Vishnevskiy, K., Meissner, D., &Karasev, O. (2015b). Strategic foresight: state-of-the-art and prospects for Russian corporations. Foresight, 17(5), 460–474.

The Role of Workforce Planning and HRM Improvement in Ensuring the Recruitment of Competitive Civil Service (1)

Zoltán Hazafi,PhD, National University of Public Service, Budapest, Hungary,

zhazafi@gmail.com

Abstract

Human Capital Management is one of the components of the civil service's competiveness. The global financial and economic crisis and the ageing society has been putting it in danger. Most of the countries had decreased the wages as well as the headcount in the public sector, which weakened employee retention and the public appeal of the civil service. These variables altogether decreased its human capacity and competitiveness. Several countries are currently in the process of the implementation of human capital strategic planning as a managerial tool for wages, headcount and demographic challenges. It is capable of making medium and long-term estimation for capacity needs, even in a restrictive environment.

Keywords: workforce planning, civil service, human resource management, recruitment

1. Introduction: The Management of Human Capital as a Determinant of Competitiveness

Although, the term 'competitiveness' tends to be used often in relation to Public Service (2), it is not quite clear how it is supposed to be interpreted in this case. The lack of clearness becomes even more apparent by raising the issue in the form of the following question: How to reveal the interrelation between a country's competitiveness and the contribution of civil servants? (Théophile, 2014)

The problem of interpreting the term in this context lies in the lack of market rivalry, i.e. there is no individual profit generated or fierce market competition in the public sector. The emphasis is laid on different aims, such as serving public interest, reducing social inequalities, granting access to public services, etc.

However, there is a certain level of competition but of a different kind: the parties involved compete for the available resources, which consequently influences the sector's economic competitiveness. (Gellén, 2012)

Therefore, the interrelation makes more sense, if the issue of competitiveness is not only addressed as a matter of financial and economic performance, but that of a steady social welfare increase as well.

By this extended interpretation, it is commonly accepted that enhancing the competitiveness of the economy is one of the state's primary objectives. The state ought to create and protect values simultaneously. It is important to realize that for the government, to be able to provide economic stability, it is crucial to establish its own (stability) first. (3)

Accordingly, there is an evident relation between the level of governance stability and the level of economic competitiveness. (sustainable economic development?) This is also supported by the competitiveness reports produced by the World Economic Forum, which see governmental instability as a threat to business ventures. (4)

Besides stable governance, these reports also take other variables of economic welfare into consideration, such as the efficiency of bureaucracy, corruption, tax levels, the complexity of the regulations, infrastructure as well as the education level of the workforce. (5)

Other reports focus on the regulatory environment of the state and how it boosts and impairs the operational efficiency of businesses. (6) They also consider the ageing society to be one of the negative influencing factors of economic development. (7)

In terms of public service, several of the aforementioned variables can be viewed as competitiveness factors, for instance the efficiency of bureaucracy, in which human capital management is deeply involved. The quality and amount of human capital affect the governmental capacity and ability, for this reason it is a vital indicator of government performance.

2. Threats to Public Sector Human Capital

However, Public Sector Human Capital must face many threats, including the restriction measures due to global financial and economic crisis and population ageing.

2.1 Restriction measures

Because of the global financial and economic crisis countries had to introduce a range of restrictions in the public sector, which required the reconstruction of the public finance system in some cases. 59 per cent of the OECD countries lowered the wages, whereas 28 per cent of them had several layoffs, hence their human capacity decreased. (Huerta Melchor, 2013)

However, it is quite hard to tell the level of sufficiency of this decision, and it is even harder to compare the countries concerned. Although most of the OECD analyses (8) use several indicators of efficiency, the number of clear conclusions to draw from them is limited.

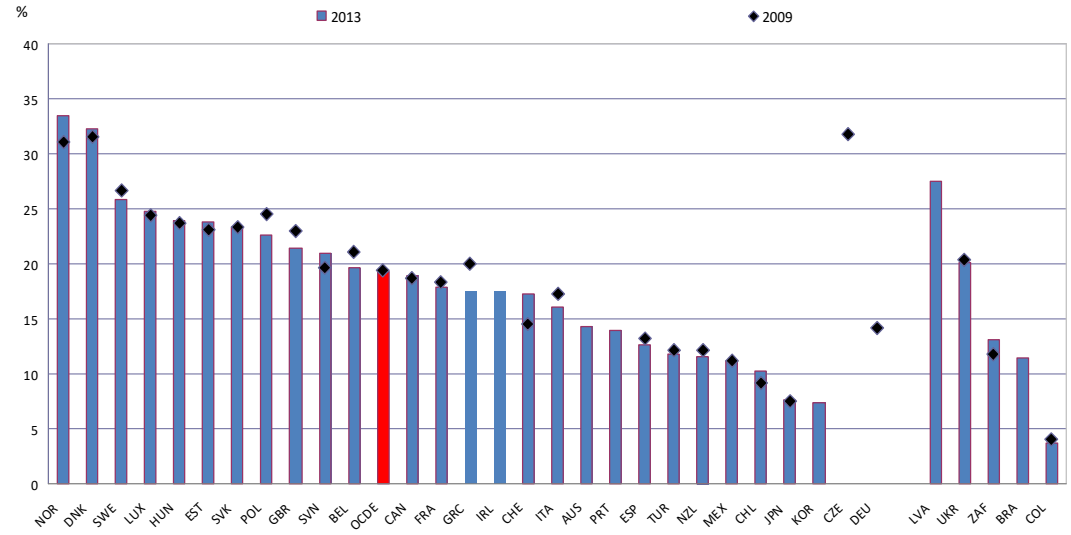


Fig. 1: The Share of Public Sector Employees of Total Employment Source: ILO statistics (9)

In case of the share of public sector employees of total employment there is obviously a high degree of variation. (3,7-33,4%) This could be accounted for the differences in the organizational and personal scope of public service, which varies by country, as well as for the differences in how public service is performed. It is important to note that in countries, where public services are outsourced to private contractors, the share of public sector employees is lower. For this reason, -as the experts of OECD have also pointed it out-, the operational costs of public service (OECD, 2010) should always be considered, when the number of employees and vacancies are being compared. It is usually determined by the GDP per person.

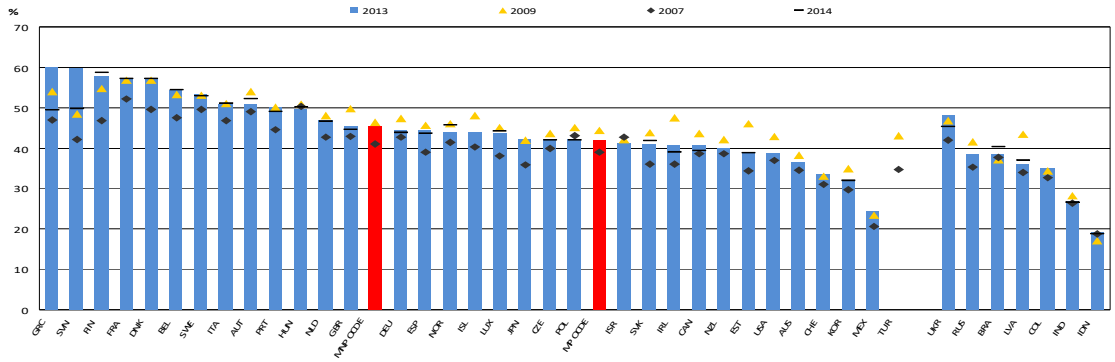


Fig. 2: The Share of Operational Costs of GDP (2007, 2009, 2013 and 2014). (OECD, 2012)

The share of operational costs of GDP shows a significant variance amongst the countries. (18,8-58,7%) However, the common view tends to consider it to be rather a matter of how public service is provided within a country than a matter of efficiency. For example, in countries where providing several kinds of tax reductions surpass direct financing of public services in state support, the expenses are lower. In addition to that, in several cases we might detect a fair decrease in the share of the operational costs over the years, but it does not mean that they were successfully reduced, it is just that they seem less due to the increased GDP of the respective country. (OECD, 2010)

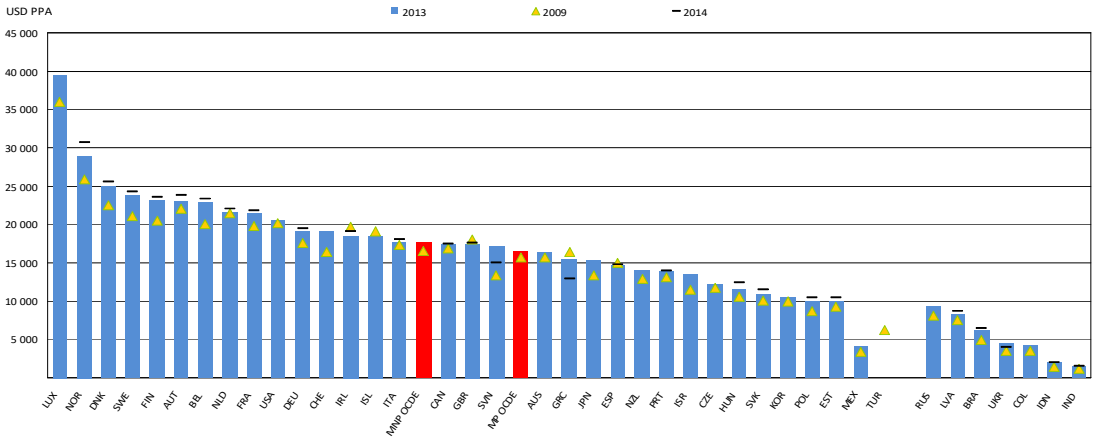


Fig. 3: General Government Spending, as a share of the GDP and per person (2009, 2013 and 2014). (OECD, 2016)

Comparing the countries based on the share of government expenditure of their GDP per person is another way to go. If we solely rely on the presented data, we can see that Luxemburg- being ranked as the first one- spends ten times more than Mexico. Nonetheless, it would not be advisable to jump straight away to the conclusion, saying Luxemburg is being more efficient or competitive than Mexico, which operates only on the tenth of its per capita government spending. (OECD, 2010)

The examples show that these indicators -such as the headcount or the amount of government expenditure- are not suitable for measuring human resource management in terms of efficiency.
Their importance rather lies in pointing out possible contradictions and anomalies within the management process and identifying further areas of research.

2.2. Ageing Population

Population ageing is another threat to human capital. It is not only an issue of the supply systems but it has been also increasing the competition for the young, highly qualified work force in the labor market.

According to analyses conducted before 2010, the level and pace of population ageing have increased, and the situation has worsened from a demographic point of view: whereas in 2000 there were only one inactive inhabitant to three active ones, in 2050 these proportions- based on the forecasts-, are likely to change to 2:3, and nearly 1:1 Europe-wise. (OECD, 2007)

Table 1: The Age Distribution of Inhabitants in the 27 Member States of the EU 1990-2060 (shown as a percentage of the overall population) (Bossaert, Demmke and Moilanen, 2012)

Age/year	1990	2000	2009	2020	2030	2040	2050	2060
0-14	19,5	17,2	15,5	15,4	14,5	14,0	14,1	14,0
15-64	66,8	67,2	67,2	64,6	61,9	59,2	57,1	56,0
65-79	10,6	12,3	12,7	14,4	16,6	18,0	17,8	17,8
80+	3,1	3,3	4,5	5,7	6,9	8,9	11,0	12,1

It is also a common phenomenon that ageing workforce is more significant in the public sector than in any other segments of society and vice versa: the share of young talents is the lowest in the public sphere. (OECD, 2007)

However, nowadays the effect of this issue on the European Union needs to be addressed in a subtler manner. (BISS, 2015) Apparently, the 'older' and the 'newest' members are characterized by different trends. (10)

The share of employees over the age of 50 is significantly lower (30,8%) in the recently joined member countries than the older ones. (41,1%) If we compare the data of 2010 and 2014 it becomes clear that in the newest member countries, the number of public service employees over the age of 50 has decreased over the years as opposed to the older ones, in which it has increased.

The highest decrease could be seen in Hungary (7%), whereas the most significant increase was experienced in Ireland. (12%) The number of public service employees over the age of 50 is the highest in Italy (64%) whereas it is the lowest in Slovenia (22%). (BISS, 2015)

This is usually accounted for the generation change occurred along with the fall of the socialist regime during the nineties, however, it might be a slight contradiction that those who were fresh graduates back then now make up the group of those who are already over 50. In addition, the most significant decrease in the number of older employees has happened over the course of the four years between 2010 and 2014.

The way I see it, the differences shown in the age distribution of the public sector amongst the countries is rather a consequence of their different takes on personnel policies, trying to adapt to the environment of the regional labor market. For instance, the employee attraction of the public sector is a lot lower in the western part of Europe than in the less developed countries due to the higher competition in the labor market. For this reason, Western-European countries make efforts to hold the employees back from retiring.

In France, the number of years of employment necessary to be eligible for full pension has been increased, the minimum age requirement to work in public service has been abolished, (OECD, 2007) and the elder generation is provided with tuition-free training and career counseling when it comes

about switching to another position, they are supported by occupational psychologists to retain their ability to work and the culture of knowledge transfer between the generations is highly encouraged. (Bossaert, Danielle, Demke and Moilanen, 2012)

In Denmark, a strategy has been implemented to tackle the challenges of the ageing workforce: the older employees are provided with flexible working hours and new training opportunities. Within the framework of collective contractual agreements, they can work even 15 hours less a week if they are above the age of 60 without having their pension affected, and they are eligible for 12 days more paid holiday when they are above the age of 62. They can get a bonus after mentoring new hires. (OECD, 2007)

In Germany, even from the beginning of the nineties one has started to address the issue of the disadvantageous effects of the ageing workforce, yet, in 2014 the percentage of people occupied in public service over the age of 50 was considerably high, 48%. (BISS, 2015)

An employee life cycle approach has been developed to manage careers to solve the problems caused by the generation change and to prepare for the retirement of their workforce. The core of this approach is that they take the different needs and requirements of each life stage into account. In case of younger employees, they focus more on settling down, starting a family and when it comes about the older ones the emphasis shifts to health care, knowledge and sharing their experience.

One of the tools of adapting to the different needs is a long-term, flexible-working-hours scheme, which enables the employees to cut back on their working hours during the times when they need to take care of their kids or sick parents and later they can make up for the deficit by working more than usual. (Bossaert, Demmke and Moilanen, 2012)

Flexibility is also of prior importance when they draw up the retirement plans. They allow their employees to work part-time for a while before retiring from their job without having their pension decreased proporinately (in case of decreasing the working hours by 50 per cent, their pension only decreases by 17 per cent). The employees can choose whether they want to work part-time until their retirement or work full-time and retiring earlier than initially planned. (OECD, 2007)

3. The Strategic Planning of Human Resources

The strategic planning of human resources has been certainly becoming a common tool of getting to work on the issues arisen from downsizing and pay cuts, which is capable of indicating the human capacity needed for task completion and sustaining HRM efficiency, even in a restrictive work environment-let that be planning for the mid or long-run.

HR Planning is also a way to improve the efficiency of downsizing programs, since it helps to avoid occasionally taking measures strictly alongside with fiscal policies. It also helps to get through the austerity by supporting the rearrangement of the HRM system.

All the HR processes and functions such as recruitment, onboarding, competency management, compensation, training and performance management, etc. could be reinvented through the implementation of HR Planning. It requires a complex set of standards to be met: (Huerta Melchor, 2013)

- The leaders have an analytical, strategic point of view
- The strategic objectives should be in line with the HR planning
- The required competencies for task completion should be cost-efficient
- Flexible and quick adjustment to the occurring changes of the labour market
- Identifying future needs for improvement

The OECD statistics suggest that most of the member countries have already implemented Strategic HR Planning in a centralized or decentralized way on an institutional basis. Usually it takes up 1-3

years, but in some cases, it could take even five (Austria, Ireland, South-Korea, Slovakia and Spain). (11)

Even though most of the OECD countries use HR Planning in one way or another, it has not been fully implemented yet. Having HR Management aligned with policy strategies is often difficult to manage and for this reason the quantitative and qualitative needs of executing the policy objectives are overlooked.

The island-like solutions are stucked within the organizational framework and do not become common practices. The institutional capacities and skills for planning are limited. The rigid and centralized HRM practices do not let adapting to the individual needs of the organization. There are no priorities and there is a frequent organizational opposition. (Huerta Melchor, 2013) However, some countries could be viewed as outstanding examples of successfully improving the strategic HR functions of their public service segment.

*3.1. Belgium (***Fedweb.belgium.be, 2017)**

The main principle of the Federal Public Service of Belgium (FPS) is the continuous reinvention. In this relation, the main emphasis is put on continuity, which means that they systematically keep reflecting on the environmental changes as a way of helping them to improve the responsiveness of public service.

The government units keep utilizing more and more managerial tools and techniques for organizational development. Strategic management tools are one of them.

They have realized they need a clear strategy in order to have everyone – both the leaders and the employees-, focused on the aims and objectives which are the most important for the organization.
The strategic approach is made up of several components, such as strategic positioning, management plan, personnel plan, directing contracts/agreements and tracking. These elements together ensure the strategic function of the organization.

The strategic positioning of the system is about deciding on which role to take in the economic environment and in the society. It determines the answer to questions such as what the aims and objectives of the organization are and what a possible threat to them could be or what the opportunities out there are that they could take to their advantage. What are the strengths and weaknesses of the organization and who might be considered a part of their focus group? Which field do they want to operate in and what is the level of their expertise and their competitive advantage? What are the demands of their customers they need to satisfy? What are their long-term goals of 3-5 years and which operational objectives could be allocated to them? What are the tools they need to achieve their goals?

The answers to these questions become a part of the management plan as well as of the director contract. The former one is an agreement in between the political and professional leaders of the organization, which contains strategic (3-5 years) and operational objectives (max. 1 year).

The latter is also for determining short and long-term objectives of the following areas:

- Improving efficiency, cost minimization
- Simplifying processes
- Improving customer-orientation
- Sustainable development
- Equality
- Improving internal control
- Cooperation with other institutions

Each objective has key performance indicators (KPI). They take all of the critical/risk factors of delivering success in achieving the objectives into consideration. The level and scope of cooperation is determined in a customized agreement.

The Personnel Management Plan helps to assess the quantity of human resources needed for meeting the short and long-term strategic goals within the budgetary resources and it evaluates and tracks the performance results as well. In addition, it serves the development of the personnel management related decision making process.

In practice it aids headcount management, workforce forecasting and the annual allocation of HR expenses while addressing potential change issues in the future, such as retirement, permanent leave, training, promotions etc. It matches individual career plans with the organizational human resource management plan, which makes internal mobility a part of resource management. From a strategic point of view it is probably the most important fact that it it takes the strategic goals of the organization into consideration when it comes about determining the amount of work-force and competencies needed. It makes a distinction between contractual, statuary, full-time and part-time staff, and it treats the resources of the external entrepreneur separately. They have developed an electronic planning platform (SEPPfed), which makes the organizational FTE and financial data available. It can analyze the mid-term effects of personnel decision making in terms of headcount and expenses.

The tracking of the implementation of the strategic plan is ensured by the annual self-evaluation of the managerial leaders. It is based on the strategic and optional aims of the managerial plan. They reflect on the status of their projects allocated according to the organizational aims to see whether they have started yet, if not then why, and which stage of the development they are at. They examine the possible consequences of the problems arising during the execution of the projects. The examined data is supported by the CAF and Balanced Scorecard applications.

3.2. The United States (GAO, 2012, cited in Huerta Melchor, 2013)

In the U.S. Human Resource Planning is a vital part of a complex, strategic planning on federal level, which aligns human capital strategy with the aims, objectives and the mission of the government units and agencies. HR planning is the responsibility of HR executives, they have to forecast and analyze the demand for skills and positions, as well as to plan and evaluate on how human resources are managed.

The HR strategies are an important part of organizational strategies, performance and financial planning. Several methods are used for developing HR strategies: HR Planning, Personnel Planning, sharing HRM practices, strategic partnership on an executive level. The efficiency of these methods is constantly measured with the help of KPIs, which are also used for tracking organizational performance.

Strategic Human Capital Plan (HR-plan) contains long-term goals, operational objectives, strategies, KPIs and milestones. It is used to evaluate the efficiency of the processes of the system.

Each of government units and agencies is obligated to submit its own HR-plan to the Office of Personnel Management. (OPM) Each of these HR-plans is aligned with the organizational strategy and performance plan of the respective agency. The plan is used for the organizational distribution of human resources and personnel decision making.

The necessary key competencies to executing the vision and the mission of the organization are determined to help to identify the individual training and professional development needs. These key competencies are also the foundation of talent management.

The government units and agencies compare the available and required competencies together to come up with solutions to make up for the lack of competencies, such as recruiting, outsourcing, reorganization, training, transfer, employee retention program and technological improvements.

They keep tracking the changes of the labor market, which helps the top management to address the changes effectively in a timely manner and keep up with the organizational aims.

The OPM has implemented a Federal Workforce Planning Model, which provides the scope of performance appraisal. Within the framework of the model, the Government Accountability Office has established five principles to align the organizational human resources program with the organizational strategic objectives. These principles support the units to develop long-term strategies for recruitment, selection, hiring, training and retention.

- Determining strategic direction: the main pre-condition of a successful strategic workforce planning is to know exactly where to move things forward. The planning is usually initiated by the organizational and HR executive management and it results in determining the strategic objectives, how and how fast they should be executed. They develop a communications strategy with the involvement of the employees and external partners.
- Analyzing workforce demand: an agency has to determine the necessary skills and competencies for accomplishing its goals. It should take into account several demographic, technological, financial and other external factors, which could prevent meeting its objectives and changing the processes.
- Developing personnel strategies for meeting workforce demands: the action plans for meeting the demands are based on the analysis of the workforce demands. It ensures that the competencies needed for achieving the organizational goals are available in the future.
- Tracking and evaluating development: it ensures the efficiency of the workforce plans and aids the execution of the strategies.
- Developing workforce planning capacity: providing the necessary conditions for efficient workforce-planning. (administrative duties, training capacity, etc.)

3.3. France

In France, strategic HRM is based on a 2-level job classification system (Gestion Prévisonnelle des Effectifs, des Emplois et des Compétences).

The classification takes place on ministry (répertoire ministeriel des emplois) and departmental (répertoire interministeriel des emplois) level. The job design takes place within the civil service units, which lack diversity and proper coordination. Similarly named positions stand for a different set of tasks and responsibilities or the other way around: differently named positions require the employees to complete nearly the same tasks. This makes it quite difficult to compare the positions, hinders mobility and reduces the efficiency of selection and training. With the help of the classification system, the positions are put into different reference position categories based on government functions. These categories take up positions with common objectives, requiring similar professional knowledge to complete the tasks. The reference positions provide a common terminology and language for the ministries, which enhance communication as a result. They build bridges between similar positions and help to assess their level of similarity.

The reference positions consist of the following elements: (Ministère, 2010a)

- job description
- main tasks and responsibilities
- competencies
- knowledge
- special requirements
- improvement tendencies

They use a standardized terminology for determining competencies and professional knowledge.

The classification system of the positions supports the transparency of civil service, HR planning, career-path development planning and helps to identify training and replacement needs. (Ministère, 2010b)

3.4 Hungary

In Hungary, the public service HR does not have a statistical decision support system, therefore the preconditions of strategic workforce planning are not met. The future personnel changes cannot be foreseen and the short-term and long-term demands of the public service labor market cannot be predicted either. Data collection is narrowed down to only a few categories: headcount, wages and working hours. This means that statistics lack a significant part of the information needed for the strategic ability to act.

A forward-looking, positive step has been taken recently by the Hungarian government to establish a Government Personnel Decision Support System (hungarian abbreviation: KSZDR) based on a standardized database. The purpose is to have an analytical and evaluating information system to significantly ease the Human Resource Management and Organizational decision making for the government by making it well grounded, quicker and more flexible. According to the plans the KSZDR will be able to provide the necessary data and information for HRM decision making. In the KSZDR database the following types of data could be differentiated:

- Organizational data: it contains the most important features of the organization, such as the organization type, scope of activities, hierarchical place, internal structure, tasks, headcount, etc.
- Personnel data: contains employee-related data such as demographics (e.g., age, gender) status (type of legal status, position, rating) and sociological data (education, prior work experience)
- Job function-related data: it contains the tasks, activities and responsibilities associated with each position as well as the necessary competencies and skills for eligibility.

The reporting function of KSZDR will offer three types of services for the decision makers: conducting a standard statistical analysis based on a predefined distribution of the employees according to categories (e.g., legal status, organizational units, management levels and branches, employers, employees, gender, age). On the other hand, whenever it is needed, the system is also able to generate the required amount of output with the required content based on the data stored.

Monitoring the HRM activities of the public service units as well as evaluating according to standardized indicators, which fit the information needs of HRM. Another tool of monitoring could be a standardized performance evaluation system based on the integrated strategic HR management public service model. (Szakács, 2014)

The reporting function might also be used for scientific research purposes. The analyses, forecasts can aid identifying the latest development trends, which could be of great use to the governmental personnel decision-making process.

4. Conclusion in Light of International Experiences

The international experiences have shown that strategic manpower planning ensures the continuous replacement of the workforce. The initial static approach has been changed to a dynamic approach. Whereas back then it used to be more important for the organizations to analyze and understand their ever-changing work environment as well as to adapt to it, today they rather try to predict possible changes and want to get ahead of them and be ready for organizational renewal whenever they feel like it is needed. They align the planning with the organization's strategic positioning, build their HR strategy in line with the organizational strategy and ultimately, they end up having an HRM system, which on the one hand takes the actual headcount and the current number of positions and competencies into consideration, on the other it measures the short-term and long-term demands and

at the same time it considers the possible changes in terms of the organizational system, tasks and available resources.

They evaluate the organizational and individual risks. On an organizational level, they measure the extent of the available human resources' capacity to see what those long-term and short-term demands are which it might be unable to fulfill or unable to face without compromising the quality of certain services. On an individual level, they assess the detrimental effects of capacity problems related to trainings and manpower planning (lack of expertise, work overload).

They use those tools of the resource management (personnel plan, performance contract, CAF, Balanced Score Card) which are already proven to be working and provide continuous feed-back.

The results of strategic HR management play an important role in selecting, evaluating and motivating the leaders of the organization. The planning is based on the positions and the relating competencies. They usually retrieve the necessary data for planning from different systems, such as payroll, recruitment and other organization-specific data systems. ('Public Service Management Dashboard' in Canada for instance)

Based on the above mentioned points, strategic workforce planning is a cyclical process, consisting of easily differentiable stages:

- Setting up the strategic framework (mission, strategic objectives, work environment of the organization)
- Measuring the human resources available (headcount, age distribution, profession distribution)
- Anticipating personnel development (retirement, promotion, permanent leave)
- Assessing short-term, mid-term and long-term demands
- Analyzing the differences between predictable demand and natural personnel development
- Developing action plans for meeting demands
- Analysis, evaluation, feed-back based on the experiences of the different planning systems
- A common set of functional principles can be concluded based on the experiences of the different planning systems:
- Strategic Partnership: manpower planning takes the function, strategic aims, future goals and mission of the organization into consideration, HR strategy is aligned with the organizational strategy when drawing up the action plans, strategic directions and objectives.
- Forecast: the necessary quantity and quality of human resources for completing the tasks are forecasted for the short-term and long-term needs, both, the shortages are indicated, and the necessary actions to be taken are determined to overcome these shortages.
- System Approach: treating and improving the HR processes, functions as an integrated system greatly contributes to employee attraction and retention.
- Signing up for high quality during the entire process of planning, execution, feed-back and intervention.
- Multifunctionality: data is not only used for decision-making but also for scientific research and external communication.
- Standardization: bringing the reports, data sheets, analytical framework and methodology in line with each other.
- Customization: planning is highly adjusted to all the divisions, managerial sections, departments and units, from governmental level to institutional level.
- Complex Analysis: quantitative data is supported by qualitative data to perform a complex analysis.

Several OECD countries have developed a strategic human capital plan to be able to provide the necessary human capacity for achieving their long-term objectives. The public sector has been struggling with replacing its retiring workforce, which makes human capital planning stand out in importance even more, especially in those OECD countries, where the public sector is likely to be less attractive than the private one. Human capital planning indicates the personnel's natural development as well as the changing mid-term and long-term competency needs of the various tasks.

Having a Human Resources Information System set in place is an inevitable precondition of that, which provides the necessary data and information for HR planning and decision making.

In Hungary, the establishment of strategic workforce planning to the public service HR system is still at an early stage. However, it has been already confirmed and regulated by the government.

A decision support system is about to be developed, which provides a wide range of statistical data about the personnel as well as about labor coordination activities. Besides, changes can be tracked with the help of indicators. Last, but not least, it supports the thorough analysis of correlations within the framework of analysis-evaluation models. Hopefully, it could be of great help to the governmental decision-making process.

References

Baltic Institute of Social Sciences (BISS) (2015). *The Study On The Future Role And Development Of The Public Administration. Riga*, pp.64, 94.

Báthory, Zs. (2005). *Az IMD és a WEFORUM versenyképességi jelentéseinek struktúrája és módszertani háttere. Versenyképességi kutatások műhelytanulmány-sorozat*. [online] pp.31. Available at: http://unipub.lib.uni-corvinus.hu/188/1/47_mht_B%C3%A1thory.pdf [Accessed 1 May 2017].

Bossaert, D., Demmke, C. and Moilanen, T. (2012). The impact of demographic change and its challenges for the workforce in the European public sectors. 1st ed. [ebook] European Institute of Public Administration, pp.44-45. Available at: http://www.eipa.eu/files/repository/product/20121018073618_WorkingPapers2012_W_01.pdf [Accessed 12 May 2017].

De Kerviler, I. (2011). *La compétitivité : enjeu d'un nouveau modèle de développement, Avis du Conseil économique, social et environnemental 2011*. 1st ed. [ebook] ESEC SCOPE, pp.8. Available at: http://www.lecese.fr/travaux-publies/la-competitivite-enjeu-d%E2%80%99un-nouveau-modele-de-developpement [Accessed 10 Aug. 2017].

Fedweb.belgium.be. (2017). *Développement de l'organisation et support du management* | Fedweb. [online] Available at: https://fedweb.belgium.be/fr/a_propos_de_l_organisation/developpement_et_support [Accessed 13 Apr. 2017].

Gellén, M. (2012*). A közigazgatási reformok az államszerep változásainak tükrében*. 1st ed. Győr: Kiadó, pp.231.

Huerta Melchor, O. (2013), "*The Government Workforce of the Future: Innovation in Strategic Workforce Planning in OECD Countries*", OECD Working Papers on Public Governance, No. 21, pp. 5-8, 11, 14-16, 18-20. OECD Publishing, Paris. http://dx.doi.org/10.1787/5k487727gwvb-en

Ministère (2010a) du Budget, des Comptes publics de la Fonction publique et de la Réforme de l'État, *Répertoire interministériel des métiers de l'État.* [online] Available at: http://rime.fonction-publique.gouv.fr/ [Accessed 04 May 2017].

Ministère (2010b) de la Fonction Publique, *Les usages du Répertoire interministériel des métiers de l'État*, [online] *Available* at: http://www.fonction-publique.gouv.fr/files/files/publications/politiques_emploi_public/rime/rime_usages.pdf [Accessed 4 Apr. 2017.]

Molnár, PhD, L. and Udvari, A. (2016). *Versenyképességi évkönyv 2016 Magyarország helyzetének változása a régiós versenyben*. 1st ed. Budapest: Friedrich-Ebert-Stiftung, GKI Gazdaságkutatói Zrt., pp.52.

OECD (2007), *Vieillissement et service public-Le défi des ressources humaines*, OECD Publishing, Paris

OECD (2010), *Panorama des administrations publiques 2009*, OECD Publishing, Paris.

OECD (2011), *Government at a Glance 2011*, OECD Publishing. http://dx.doi.org/10.1787/gov_glance-2011-en

OECD (2016), *Panorama des administrations publiques 2015*, OECD Publishing, Paris.

Porter, M. and Schwab, K. (2008). *The Global Competitiveness Report 2008–2009*. [online] pp.184. Available at: http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2008-09.pdf [Accessed 8 Jul. 2017].

Schwab, K. (2015). *The Global Competitiveness Report 2015–2016*. [online] pp.196. Available at: http://www3.weforum.org/docs/gcr/2015-2016/Global_Competitiveness_Report_2015-2016.pdf [Accessed 8 Jul. 2017].

Szakács, G. (2014). *Stratégiai alapú, integrált emberi erőforrás gazdálkodás a közszolgálatban „Közszolgálati Humán Tükör 2013" (Ágazati összefoglaló tanulmány)*. 1st ed. Budapest: Magyar Közlöny Lap- és Könyvkiadó, pp.17–34.

Théophile, J. (2014). *Pour une fonction publique audacieuse et "Business friendly"*. [online] Institut Montaigne, pp.9-11. Available at: http://www.institutmontaigne.org/fr/publications/pour-une-fonction-publique-audacieuse-et-business-friendly [Accessed 12 Jul. 2017].

United States Government Accountability Office (GAO) (2012). *DHS Strategic Workforce Planning - Oversight of Departmentwide Efforts Should Be Strengthened*

United States Government Accountability Office (2008). *The Strategic Alignment System*

United States Government Accountability Office (2017). *Workforce Planning Best Practice*

Notes

(1) The work was created in commission of the National University of Public Service under the priority project KÖFOP-2.1.2-VEKOP-15-2016-00001 titled „Public Service Development Establishing Good Governance" in (the) *Miklós Zrínyi Habilitation Program.*

(2) By public service I mean the public service officials, public service units, civil servants, state servants, government officials which are included in the Act LII. of 2016 on state servants as well as in the Act CXCIX of 2011on civil servants. The term public service employees is used to indicate those being employed in public service as civil servants according to the Act XLII. of 2015 on Public Service Employment. The term public sphere stands for the entire public sector.

(3) Competitiveness was extensively discussed during the European Congress held in Lisbon. The term was interpreted as the indication of a nation's ability to sustain a certain level of living standards as well as social cohesion, and ensure a high employment rate. The European Congress in Götheborg has agreed to also include the environment in the definition. (De Kerviler, 2011)

(4) Regarding Hungary, in 2008-2009 this value amounted 3,5 on a 30-degree scale, in 2015-2016 it has decreased to 0.7. (Schwab, 2015)

(5) Additional relevant threats are political instability, the level of corruption, the level of bureaucratic efficiency, the level of taxes, the complexity of tax regulations, inappropriately trained personnel, low employee morale, infrastructural shortages. See the Methodology of Global Competitiveness. (Báthory, 2005)

(6) The legal environment of Hungary had got significantly restricted in 2015, which limited the competitiveness of the businesses as a result. On a10-degree scale (0=the legal environment completely inhibits competitiveness, 10=the legal environment enhances competitiveness) Hungary's value has fallen under 3 from 4. *IMD WCY Executive Opinion Survey*. (Molnár, PhD., Udvari, 2012)

(7) According to a 2015 study Hungary's economic development is the most affected one by the negative effects of the ageing society. (Molnár, PhD., Udvari, 2012)

(8) The analyses are based on the entire headcount of the public sphere.

(9) Adapted by OECD: Emploi dans le secteur public = Panorama des administrations publiques 2015, OECD Publishing, Paris, 2016.

(10) The division of 'old' and 'new' member states differentiates between the member states joining the EU before and after 2004.

(11) 10 countries (Austria, Belgium, Mexico, Netherland, Poland, Portugal, Italy, Slovenia, Spain and Turkey) have indicated that they have a centralized public service workforce planning, whereas an additional group of 17 countries claimed to have a decentralized planning system involving different ministries and agencies. (OECD, 2011)

Intermodal transport strategy for logistics center On the example of "Euroterminal Sławków" Sp. z o.o.

Katarzyna Świerszcz, Military University of Technology in Warsaw, Warsaw, Poland,
katarzyna.swierszcz@wat.edu.pl

Bogdan Ćwik, Military University of Technology in Warsaw, Warsaw, Poland,
bogdan.cwik@wat.edu.pl

Abstract

The studies attempted to discuss one of the most important and contemporary issues, i.e. the operation of a logistics center on both national and global level in respect of intermodal services, with particular emphasis on transport strategy. The issue was described on the basis of the following aspects: 1. The essence of logistics center operation as a link in a chain of logistics services. 2. Role and significance of intermodal transport for services rendered by a logistics center. 3. "Euroterminal Sławków" Sp. z o.o. as an example of intermodal transport logistics center. Applied research method is participatory action research. Analytic and synthetic method was adopted to provide the issues in detail.

Keywords: logistics center, logistics services, intermodal transport, quality, added value.

Introduction

The role of transport for operation of logistics centers — and even for the entire economy — on both national and global level is continuously increasing. There are several relevant factors driving this increase. One of them is the contribution of transport in creating added values for services rendered and their associated products (goods) by making time and space efficient as a result of physical movement of goods to specified locations on specified time. An equally, or even the most, important factor is the dependence of companies and shops on transport providing them with procurement and distribution services. This dependence comes from the fact that numerous companies are located in different sites than their sources of supply and recipients of their products. Thus, the importance of intermodal transport services increases in connection with the following phenomena: work specialization and division, mass consumption, product volume economy, constant attempts to reduce costs, development of cooperation, market competition, making product life cycle shorter and pursuing to improve customer service. These issues are additionally overlapped with market globalization widening the gap between senders and recipients. They are often located thousands of kilometers from each other. As supply chains in modern economy expand, the importance of transport ensuring communication between senders and recipients (sellers and buyers) rises. The main aim of the article is to looking for solutions to improve the national logistics system in terms of global trends in logistics development. The essential information and observation results were obtained by the method of participatory action research.

The essence of logistics center operation as a link in a chain of logistics services

A logistics center operating as a multi-entity company constituting a substantial link for the provision of logistics services performs several critical functions. According to studies, the highest priority is assigned to: ensuring high customer service quality; optimization of stock; minimization of material and product flow time; coordination, integration and cooperation with various entities on actions related to resource

flow as well as decreasing logistics costs to an optimum level. Let's shortly discuss each of these values constituting the essence of logistics center operation.

The first value is related to ensuring high customer service quality. As numerous studies demonstrate, customer service has recently been the primary stimulus focusing common attention. The terms „customer logistics" and „customer approach", understood as efficient recipes for success in business, prove that the results of the studies are correct. Therefore, one of essential matters pertaining to the operation of a logistics center is to have a logistics system for effective customer service, referred to as Efficient Consumer Response (ECR). Logistic components of customer service are features to which customers generally attach special importance. They include: delivery time, product stock availability and flexibility, frequency, promptness, accuracy, completness and reliability of supplies. One of the main purposes of logistics center operation is referred as „8R": Right product, Right quantity, Right condition/quality, Right place, Right time, Right information, Right price and Right customer.

It should be noted that rates assigned by customers to individual values during order performance are subject to change and depend on market segment, type of products supplied, physical distribution system (traditional, supply chain) and competition growth. The aforemenetioned aspects are quantifiable and measurable. It is also easy to determine their performance standards, that is service standards providing specific customer expectations or demands on a given market in relation to logistics services (Kisperska-Moroń and Krzyżaniak 2009:77).

The second value constituting the essence of logistics center operation is optimization of stock. It is associated with JIT (Just-In-Time) concept for both supply system and stock. JIT suggests that stock should be available as required — not earlier and not later. JIT includes four basic assumptions: no stock; short order performance cycles; frequent replenishment of goods; high quality (no defects). The concept is used for the management of distribution, stock and schedules and consists in delivering strictly defined quantities of materials on required time, allowing to minimize stock-related costs and waste. In the full sense, it can be said that JIT means not only stock management, but also comprehensive quality culture and partnership with suppliers and employees (Coyle, Bardi and Langley 2010:277).

The third crucial value pertaining to logistics center operation is minimization of material and product flow time. Within the center's logistics operations, this purpose is connected with CRP (Continuous Replenishment) system. It is used for the development of methods of order and supply performance that both eliminate the possibility of stock unavailability and reduce stock on logistics channel or supply chain level. To attain these goals, it is required to retrieve updated data from Points of Sale (POS) which are indispensable for developing stock demand forecasts, placing supplementary orders and controlling product streams — from suppliers, through warehouses to retail shops. The stock replenishment system synchronizes product supply with product demand reported by consumers and end users (Fajczak-Kowalska 2013:121). It should be emphasized that CRP is directly correlated with QR (Quick Response) strategy. It is derived from the need to shorten order performance cycle time and restrict its randomness, complete order in place and on time required by customer or end user, improve manageability and information control capability in relation to both company and partners participating in the supply chain, as well as to reduce stock with simultaneous increase of responsiveness towards customer needs within the entire supply chain (Coyle, Bardi and Langley 2010:276).

The fourth fundamental value for the essence of logistics center operation include coordination, integration and cooperation with various entities on actions related to resource flowwithin supply chain

process. It is expressed as the ability to cooperate with other entities, undertake team works to harmonize various actions executed by particular entities (contractors) for achieving common goals superior to individual goals (Kisperska-Moroń and Krzyżaniak 2009:307). In other words, this value consists in the capability and need to start joint investments and organizational undertakings used for attaining various individual goals and for yielding to common goals aimed at creating values and gaining competitive advantage. Moreover, coordination, integration and cooperation are to be used to improve the ability to take on common risks and to solve problems jointly (Witkowski 2010:41-42).

The fifth value on which the substance of logistics center operation is based is to reduce logistics costs to an optimum level. Significant reduction of logistics costs to the best — optimum — level is possible owing to efficient management and coordination of individual supply chain internal processes controlled by logistics centers. This, in turn, translates into creating additional values (profits) for all entities constituting a given center (Skowronek and Sariusz-Wolski 2012:263). It is worth noticing that the essence of logistics center operation requires an economic and social perspective, revealing further equally important goals, such as: improved management of operating supply chains; increased intermodality of freight transport; best possible use of national and international roads; supporting the development of business on local and national level by providing logistics services for specific entities from manufacturing, commercial and service industries; proper management of business and greater development of spatial order; local growth; recovery of downtown areas previously used for industrial purposes; development of logistics services related to municipal logistics. It should be observed that these goals pertaining to the essence of logistics center operation are examined in view of general organization objectives. Thus, the hierarchy of logistics goals must be adopted to company goals and strategy. This mutual relationship between company and logistics goals in respect of strategic and operational actions indicates compatibility of goals of business entities, assuring efficient administration of information resource flow while ensuring appropriate service level (Kisperska-Moroń and Krzyżaniak 2009:295).

Role and Significance of Intermodal Transport for Services Rendered By a Logistics Center

R Intermodal transport is specific for the infrastructure related to logistics center services. In respect of logistics, transport as a business is responsible for haulage (flow) of goods and products from factories, raw material and material suppliers and manufacturers of semi-finished and finished products, through wholesalers, agents and warehouses to retail points of sale (shops, market chains) and end consumers. In other words, transport is an essential link (function) connecting other components of logistics supply chain for which a logistics center is responsible (Zamkowska and Zagożdżon 2015:223). It should be noted that aside from its independent function, transport considerably affects or even conditions the performance of other logistics functions of a center, such as: procurement, distribution, product return service, stock-building or customer service. Furthermore, transport interacts with other logistics areas and its organization is strictly linked to and affects their operation. Typical examples are relations between transport and warehouse operations, including stock control or logistics-related customer service. If a decision is made on, for instance, reducing delivery speed by utilizing slower means of transport and by limiting haulage frequency, transport costs are decreased. Such actions require the increase of stock level and, as a consequence, the increase of warehouse storage area and of costs related to frozen capital. As far as logistics-related customer service is concerned, it is vital to provide customers with as high product availability as possible by expanding chain of warehouses or executing frequent haulage operations over long distances. Customer service can be improved by the selection of fast yet more expensive means.

They ensure shorter delivery time but with higher costs (Majchrzak-Lepczyk and Gołembska 2015:78). It should be pointed out that transport costs are the most important component of the entire structure of logistics costs. They are superior to costs of any other logistics actions, such as stock maintenance, warehousing, order processing, etc.

Changes implemented into global logistics and consistent pursuit to integration of supply chains greatly influence the role and tasks of individual types of transport. Manufacturing concentration, that is organization of production in given single locations (regions) characterized by low production costs, causes that the increasing number of raw materials, materials, semi-finished products and finished products is transported on a global level over long distances. Therefore, the importance and utilization of long-distance transport increase. This particularly includes maritime transport that, on a global scale, guarantees the highest cost efficiency of logistics processes (Kowalska-Napora 2015:74). On the other hand, local logistics systems — mainly distribution and final delivery systems — are usually based on road transport. In relation to increasing customer requirements and higher market standards related to logistics customer service, average delivery distance is consistently decreasing. In comparison with other types of transport, road transport has significant competetive advantage. It is ensured by: easy access to any location; great service operability arising from vehicle fleet availability; high flexibility in adopting to customer needs; relatively fast delivery speed (especially in medium- and short-distance transport); service reliability and promptness of service performance (Grenda, Ślachcińska, Majdan 2017: 165-169).

Thanks to these features, road transport is the most popular and expansive means of transport both in Poland and in other EU countries. Demand for the remaining means of transport in Poland slightly differs from this demand in other member states (see Diagram 1).

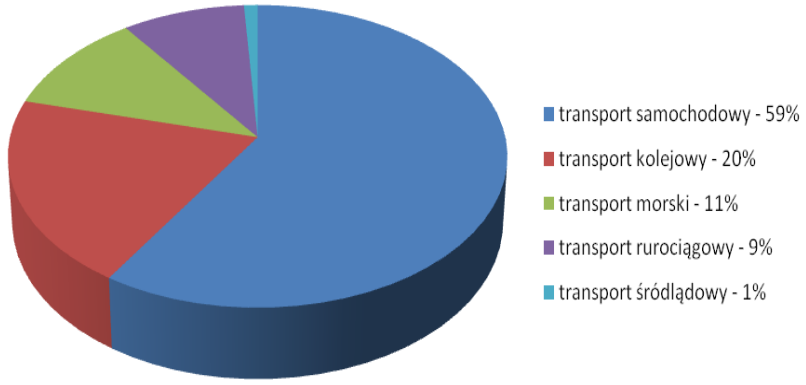


Diagram 1: ***Types of cargo transport in Poland and in EU countries***
(Source: Own work)

Term	Translation
transport samochodowy	road transport
transport kolejowy	rail transport
transport morski	maritime transport
transport rurociągowy	pipeline transport
transport śródlądowy	inland transport

The analysis of types of cargo transport used in Poland clearly indicates that the most popular is road transport (59%) and the following are, respectively, rail transport (20%), maritime transport (11%), pipeline transport (9%) and inland transport (1%). The same analysis pertaining to EU countries provides slightly other results. The most popular is also road transport (44%), whereas the following means are, respectively, maritime transport (40%), rail transport (10%), pipeline transport (3%) and inland transport (3%).

Due to this significant discrepancy, the European Union's policy attempts to balance the share of individual means of transport and better utilize the capacity of other means. Furthermore, the European Union — in fashion of the United States policy according to which 40% of cargo is transported by rail — strives to leverage the position of rail transport due to its considerably lower power consumption and reduced environmental pollution (Liberadzki and Mindur 2007:119).

Deciding on a particular means of transport, a logistics center is always guided by cost-benefit (trade-off) analysis and seeks appropriate relations between costs incurred and logistics-related customer service level obtained. In respect of long-term logistics center operation, the latter criterium seems to be more important. In this case (service cost-quality ratio), delivery speed, service reliability, delivery promptness and cargo safety should be considered (Kisperska-Moroń and Krzyżaniak 2009:148). Transport plays critical role in the operation of a logistics center responsible for quality and effectiveness of logistics actions (i.e. added value within supply chain). Moreover, special importance is now attached to intermodal transport. The significance of intermodal transport results from distinct work specialization and division, mass consumption, increasing relevance of product volume economy, constant attempts to reduce costs, development

of cooperation, severe competition, making product life cycle shorter and pursuing to professional customer service. Market globalization affecting the increase of distances between manufacturers and recipients is also crucial. More and more European companies currently buy goods and materials on Asian or African market and then send their products e.g. to the United States. In the context of modern economy, the longer the supply chain, the greater the importance of intermodal transport that ensures fast, safe, effective and economic connection between senders and recipients, i.e. sellers and buyers. It occurs because the concept of intermodal transport services primarily includes the possibility of using at least two means of transport. For instance: from point A to point B — road transport, from B to C — rail transport, from C to D — maritime transport, whereas from D to E — again road transport. This concept is a systemic approach to transport, covering all transport-related processes as a coherent, comprehensive and integrated entirety. It should be pointed out that the application of intermodal transport basics requires logistics centers to manage transport processes along the entire route, from sender to recipient, taking into account various economical, technical, engineering, organizational and legal aspects. Such modern transport approach allows more efficient execution of commercial transactions, more effective cooperation of senders and recipients (companies and shops), better customer service quality and at the same time better company quality and reputation as well as its higher profitability (Rydzykowski 2011:217).

"Euroterminal Sławków" Sp. Z O.O. As An Example of Intermodal Transport Logistics Center

"Euroterminal Sławków" International Logistics Center is a logistics center located at westernmost point of contact of two types of railway tracks: standard-gauge tracks (with standard European rail width: 1435 mm) and broad-gauge tracks (1524 mm or 1520 mm track gauge), being the junction of two Pan-European Transport Corridors connecting the East with the West and the North with the South. Another chief asset of this site is the vicinity of the most urbanized Silesian agglomeration with high demand for transport services.

The aim of Euroterminal construction was to create not only an important center of logistics services provided on transcontinental routes of movement of goods (via Trans-Siberian Railway and the so-called New Silk Road: China – Kazakhstan – Russia – Ukraine – Poland – Western Europe) or a center enabling the combination of maritime and land transport (via ports at the Black Sea and the Adriatic Sea), but also to create positive environment for projects executed on lands belonging to CZH in Sławków. „Euroteminal Sławków" Logistics Center is currently a state-of-the-art Polish logistics center for intermodal transport that will pursue to increase its competitive capabilities owing to synergy effect (Euroterminal Sławków Sp. z o.o. 2015).

Thanks to its location at the junction of two railway systems, the logistics center in question can provide transshipment of the majority of goods. It is a functional and spacious structure with proper infrastructure and organization in which intermodal logistics service related to stock management are rendered. They include: goods receipt, storage, distribution, release and haulage (including non-standard and oversize goods), as well as consolidation and commissioning of goods on pallets, packaging for retail and crossdocking. Additionally, Euroterminal provides transshipment, protections, rail and road forwarding and customs clearance owing to Customs Office that was moved to Sławków. Moreover, the center provides auxiliary services, that is: container unloading (filling and emptying), technical assessment and assessment of suitability for food products, minor container repairs, shipping depot and full terminal service. Logistics advisory and other services are also provided on the basis of customer requirements and expectations. They are rendered by business entities which are independent in relation to senders or recipients (service providers specializing in various logistics issues) (Ibidem).

The aforementioned intermodal services can be provided using "Euroterminal's" container terminal with surface area of 18,550 m2, container overhead crane with lifting capacity Q = 45 T and secondary equipment (reach stakers). Total container transshipment capacity exceeds 230,000 TEU per year. Furthermore, the center is equipped with up-to-date warehouses with surface area of 2660 m2 and 4860 m2 and a roofed storage yard with surface area of 3600 m2 with two overhead cranes (lifting capacity of one crane Q = 25 T). Both warehouses have access to standard- and broad-gauge tracks.

As can be seen, current capacity of "Euroterminal Sławków" as a state-of-the-art logistics center with extended infrastructure, great transshipment range and the possibiity of cargo series handling in virtually all directions, allows to establish a business entity with remarkable potential that can really face up with strong and constantly growing competitors on the logistics market. This is particularly important in view of the scheduled extension of broad-gauge track to Vienna except Poland (international agreements have been signed by stakeholders from Russia, Ukraine, Slovakia and Austria).

Euroterminal construction was executed as a project co-financed by the European Union from European Regional Development Fund as part of „Transport" Operational Programme for years 2004–2006. Investment works consisted in the transformation of the transshipment terminal for conventional goods into a state-of-the-art logistics center for intermodal transport, i.e. utilizing more than one means of transport (rail, road and maritime). Total value of all investments within Euroterminal area completed in recent years using both external sources of financing and CZH own funds exceed PLN 100,000,000.00.

"Euroterminal Sławków" center handles intermodal transport from the Western and Eastern Europe (Ukraine, Russia) and from Polish seaports. Goods in containers are shipped to the east — not only to Moscow or Kiev, but also to South Korea, Afghanistan, Kazakhstan and numerous other markets. Euroterminal also handles railway transport for shipping distributed containers (e.g. to Karaganda, Almaty and Kulsary). Such connections guarantee efficient movement of goods between EU countries, supplied to EU countries by sea, and transport of these goods to Ukraine, Russia, Kazakhstan, Tajikistan and Uzbekistan. It should also be noted that main business partners of "Euroterminal Sławków" logistics center are: PCC Intermodal S.A., Hupac Intermodal (Switzerland) Russkaya Troyka (Russia) and „Liski" Ukrainian National Logistics Center (Ibidem).

As for containerized cargoes, in 2010–2011 cargoes were mainly handled along N-S (north-south) line. Increasing number of containers handled along E-W (east-west) line can also be noticed. See Diagram 2.

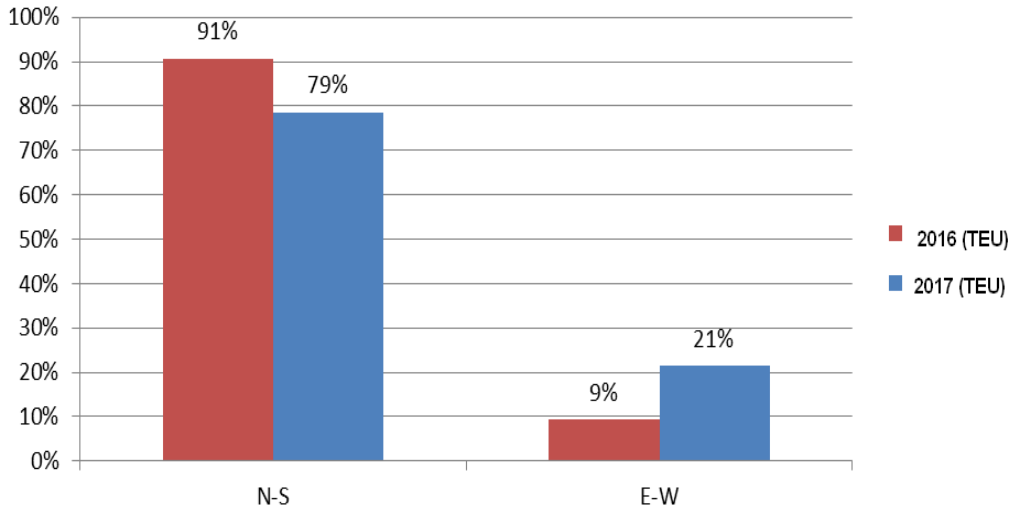


Diagram 2: ***Trend of containers handled along E-W (east-west) line***

(Source: Own work)

As far as handling of other cargoes (bulk, metallurgical, palletized and non-containerized) is concerned, percentages of cargoes handled (loaded and unloaded) on broad-gauge (1520 mm) and standard-gauge (1435 mm) cars and road vehicles are provided in Diagram 3.

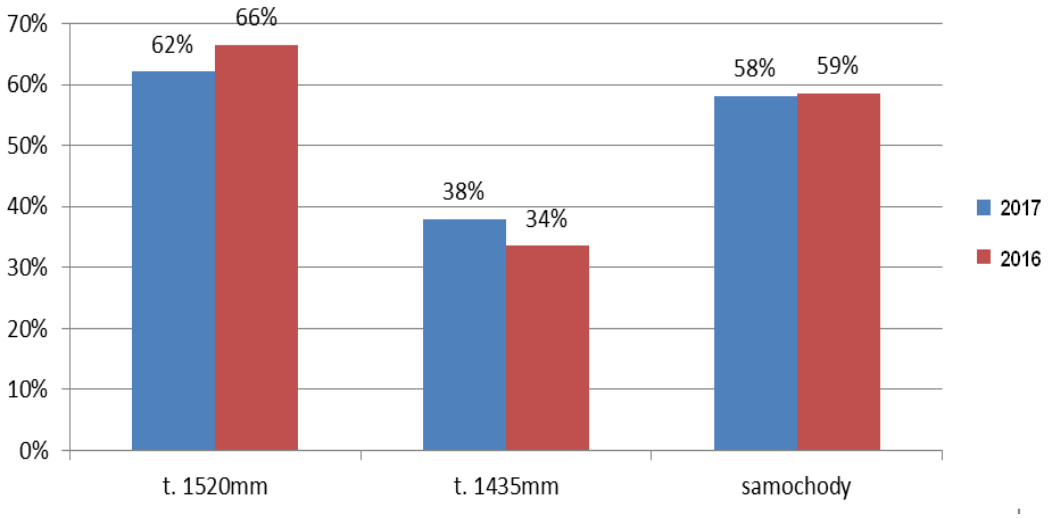


Diagram 3: ***Handling of other cargoes (bulk, metallurgical, palletized and non-containerized)***
(Source: Own work)

Term	Translation
samochody	road vehicles

Huge contribution in cargoes transshipped in "Euroterminal Sławków" is attributed to road transport which performs delivery and pick-up functions (main areas covered by this type of transport are: southern Poland, Czech Republic, Austria and Germany) in relation to cargo shipped by and received from rail transport.

Due to constantly increasing volume of container transshipment [from 2008 to 2010, the volume increased from 4798 TEU (monthly average in 2008) to 14,496 TEU (monthly average for 10 months of 2010), whereas in October 20,496 TEU was transshipped, "Euroterminal Sławków" Logistics Center is planning to realize further investments pertaining to IT system improving process management and enabling coordination with market partners. It will allow to facilitate logistics service, shorten operation time, improve transport safety and standardize procedures directly affecting the increase of service quality. As a result of increasing transshipment volume in Euroterminal, storage and transshipment infrastructure for handling containerized cargoes is going to be extended. Upon the completion of investment works, Euroterminal's transshipment capacity should increase to approx. 400,000–500,000 TEU per year (Ibidem).

Attempting to evaluate the operation of "Euroterminal Sławków" Logistics Center in view of its undertakings and tasks, it should be stated that the center is prepared for comprehensive logistics handling of goods on both national and international level using rail/road transport and warehouse infrastructure. The Company is currently aiming at increasing the number of containerized cargoes handled by Euroterminal along W-E line. The terminal displays an enormous potential to develop intermodal transport on global level. One of its operations may be related to a new intermodal connection referred to as „Słowiański Express" (Slavonic Express), opened during the third quarter of 2011 in cooperation with e.g. PKP LHS Sp. z o.o., Hupac Intermodal, Fesco and Russkaya Troyka, connecting

Sławków and Bryansk. Cargoes delivered from Western Europe by rail are transshipped onto flat container broad-gauge cars. This is a regular connection (trains depart from Euroterminal in Sławków every Wednesday). A block train is to supply goods to Russia.

Since Euroterminal in Sławków is also well located for maritime transport (with increasing importance of Baltic ports in Gdańsk and Gdynia), series of containerized cargoes sent along north-south line are crucial for the Company's business. Cooperation in the form of intermodal connections with Gdynia is planned to be extended in the foreseeable future. As part of cooperation with Mearsk Polska, intermodal transport is going to be provided in Sławków or in Katowice area for southern Poland with potential further eastward expansion using broad-gauge railway. Moreover, discussions concerning intermodal north-south connections from seaports via Sławków towards Austria and Slovenia are held.

Conclusions

In modern times characterized with dynamic globalization, intermodal services provided by logistics centers in respect of transport are fundamental and condition a company's market presence, its efficient operation and proper satisfaction of demand and market expectations. They include various actions — in particular intermodal transport services, such as road, rail, maritime/inland, air or pipeline transport. One of advantages of such centers is their ability to utilize the most effective and economic means of transport, contributing to streamline logistics operations taken internally and externally within the entire supply chain process. A model example of such center providing the aforementioned service is "Euroterminal" International Logistics Center in Sławków.

References

Online Journals and websites

Euroterminal Sławków Sp. z o.o., (Online), (Retrieved: May, 15, 2017). www.czh.pl/spolka/euroterminal-slawkow/.

Books

Kisperska-Moroń D, (ed.) (2009), Logistyka, red. D. Kisperska-Moroń, S. Krzyżaniak, Biblioteka Logi styka, Poznań.

Coyle J. J., Bardi E. J., Langley Jr. C. J (2010), Zarządzanie logistyczne, PWE, Warszawa.

Fajczak-Kowalska A. (2013), Transport kolejowy w procesach logistycznych polskiej gospodarki, Uniwersytet Łódzki, Łódź.

Witkowski J. (2010), Zarządzanie łańcuchem dostaw, PWE, Warszawa.

Skowronek Cz. and Sariusz – Wolski Z. (2012), Logistyka w przedsiębiorstwie, PWE, Warszawa.

Zamkowska S. and Zagożdżon B. (2015), Systemy logistyczne w obsłudze przedsiębiorstw, Uniwersytet Technologiczno-Humanistyczny, Radom.

Majchrzak-Lepczyk J. and Gołembska Z. and E. (2015), Eurologistyka aktualne trendy rozwoju najnowsze wyniki badań sprawdzone metody zarządzania, PWE, Warszawa.

Kowalska-Napora E. (2015), Infrastruktura logistyczna, Ekonomicus, Warszawa.

Liberadzki B. and Mindur L. (2007), Uwarunkowania rozwoju systemu transportowego Polski, Instytut Technologii Eksploatacji, Warszawa – Radom.

Rydzykowski W. (2011), Usługi logistyczne. Teoria i praktyka, Instytut Logistyki i Magazynowania, Warszawa.

ConferencePaper

Grenda B., Ślachcińska E., Majdan P., Terrorist Threats for the Critical Infrastructure of the State, 2017 4th International Conference on Management Science and Management Innovation, June 23-25, 2017 Suzhou, China, Published by Atlantis Press, ISSN: part of the series AEBMR, ISBN: 978-94-6252-369-2, ISSN 2352-5428, volume 31, pp. 165-169, doi:10.2991/msmi-17.2017.37.

E-Learning and the World University Rankings as the Modern Ways of Attractiveness Enhancement for the Russian Universities

Nataliia G. Fersman, Peter the Great St. Petersburg Polytechnic University, Saint-Petersburg, Russia
natdia@list.ru

Tatyana Ye. Zemlinskaya, Peter the Great St. Petersburg Polytechnic University, Saint-Petersburg, Russia
zem-tat1@yandex.ru

Larysa Novak-Kalyayeva, Lviv Regional Institute for Public Administration of the National Academy for Public Administration under the President of Ukraine, Lviv, Ukraine
novak.kayaeva@gmail.com

Abstract

Attention is drawn to the current situation of the Russian eLearning market in higher education. The development of eLearning is a priority for Russian higher education and is also of great interest to venture capital investors. Along with eLearning market analysis, the authors disclose the position of some leading Russian universities in World University Rankings. As an example, the authors explore both an overview of the electronic environment of Peter the Great Saint Petersburg Polytechnic University and its position in World University Rankings. The article states that the described methodologies for the development of Russian higher education increase visibility of Russian universities.

Keywords: e-learning, e-learning market, higher education, world university rankings, electronic information-educational environment, on-line courses platforms.

Introduction

The priority direction for development of the Russian higher education system is improving its attractiveness for both Russian and foreign students. This, in turn, as stated by Rodionov et al (2016) means raising the quality and competitiveness of Russian higher education in the global and regional educational space, as well as increasing the share of export of educational services in Russia's GDP.

As mentioned by Rodionov et al (2014) one of the tools of universities visibility both at the national and especially at the global level became University rankings. To increase internationally the prestige of Russian higher education and to support the country leading universities, since 2013 a state programme, "5-100-2020", has been launched. The main program strategic target is to make sure that at least five Russian universities will occur among the participants of the project in the Top 100 world universities according to the ratings Quacquarelli Symonds World University Rankings (QS WUR), Times Higher Education (THE WUR) and Academic Ranking of World Universities (ARWU).

The rating THE WUR 2015/2016 academic year included 800 universities from 70 countries. Russian universities were presented in the ranking by the following universities: Lomonosov Moscow State University (rank161), Peter the Great Saint-Petersburg Polytechnic University (rank 201-250), Novosibirsk State University (rank 401-500). In addition to the above mentioned universities, National Research Tomsk Polytechnic University, Tomsk State University, Kazan (Volga region) Federal University, Southern Federal University and Ural Federal University were included in the rating. All these universities are the program "5-100-2020" participants.

As one of the tools of boosting attractiveness of Russian Universities both for Russian and international students as well as rating parameters in both National University Ratings and World Universities Ratings can serve various forms of learning that are being implemented in universities nowadays. One of them, widespread worldwide, is eLearning.

The authors aim to analyze the current position of the leading Russian universities in both national and international universities rankings, as well as to analyze the use of eLearning technologies, particularly MOOCs, in order to increase the attractiveness of Russian universities in the regional and global educational space.

Analysis and Results

Russian National Universities Rankings

National University Ranking (NUR) started as a special project of the Interfax group in 2009 with the aim of developing and testing mechanisms for independent evaluation system of Russian universities. The methodology of rating calculation was based on the following parameters:

Table 1: Ranking indicators of the Russian National University Ranking (Interfax)

Indicator		Percentage
1.	University Activities Assessment in the field of "Education"	20
2.	University Activities Assessment in the field of "Scientific Researches"	20
3.	University Activities Assessment in the field of "Social Environment"	15
4.	University Activities Assessment in the field of "International Relations"	15
5.	University Activities Assessment in the field of "Innovations and Entrepreneurship"	15
6.	University Brand Assessment	15

Source: National University Ranking Interfax

Russian Rating Agency RAEX (Expert RA) since 2012 has been implementing a major project for the analysis of competitiveness of Russian universities. One component of this independent research and communication project is an annual ranking of Russian universities. Table 2 presents the criteria developed by the Agency RAEX (Expert RA), to assess the activities of Russian universities. The value of each integral factor is determined by groups of indicators characterizing the situation on the most important aspects of the University.

Table 2: Ranking indicators of the Russian National University Ranking (RAEX)

Integral Factor		Percentage
1.	CONDITIONS FOR RECEIVING A QUALITY EDUCATION	0,5
1.1	group: teaching level	
1.2	group: international integration	
1.3	group: resource security	
1.4	group: demand among applicants	
2.	THE LEVEL OF DEMAND FOR GRADUATES FROM EMPLOYERS	0,3
2.1	group: quality of career of graduates	
2.2	group: cooperation with employers	
3.	LEVEL OF RESEARCH ACTIVITY	0,2
3.1	group: innovative activity	
3.2	group: scientific achievements	
3.3	group: innovative infrastructure	

Source: National University Ranking RAEX

Thus, the studied research allow us to state that rankings of the Russian national universities, on the one hand, reflect the national features in the assessment of universities. On the other hand, the content of the national rankings parameters, in general, coincide with the contents of criteria used in international rankings, particularly in the ranking of the world best universities (Table 3):

Table 3: Ranking metrics of the QS World University Rankings (QS WUR)

Metrics		Percentage
1.	Academic reputation	40
2.	Employer reputation	10
3.	Faculty/Student ratio	20
4.	Citation per faculty	20
5.	International faculty ratio	5
6.	International student ratio	5

Source: QS World University Rankings

Current Position of the Leading Russian Universities in the National Universities Rankings

Traditionally leading national ranking positions belong to Lomonosov Moscow State University, National Research Nuclear University "MEPhI" (Moscow Engineering Physics Institute), Moscow Institute of Physics and Technology (MIPT /MIPT Moscow), Saint Petersburg State University (Table. 4).

Table 4: The Russian National University Ranking (Interfax)

Name of the University	2017		2016		2014/2015	
	Rank	Score	Rank	Score	Rank	Score
Lomonosov Moscow State University	1	1000	1	1000	1	1000
National Research Nuclear University MEPhI (Moscow Engineering Physics Institute)	2	856	2	862	2	874
Moscow Institute of Physics and Technology (MIPT /Moscow Phystech)	6	722	4	848	3	852
Saint-Petersburg State University	3	735	5	811	6	839
Novosibirsk State University	5	727	3	862	7	817
National Research University Higher School of Economics (HSE, Moscow)	4	734	6	780	10	747
Tomsk State National Research University (TSU) FSBEI HPO	8	707	9	738	8	797
National Research Tomsk Polytechnic University	10	680	10	738	9	764
Bauman Moscow State Technical University	12	621	7	771	4	849
Russian University of Friendship of Peoples (RUDN University)	9	706	8	756	5	839
Peter the Great Saint-Petersburg Polytechnic University	**14**	**607**	**13**	**699**	**14**	**681**

Source: National University Ranking Interfax

Peter the Great Saint-Petersburg Polytechnic University (SPbPU) (where the authors of the article work as professors) consistently occupies the top lines of Top-100 leading Russian universities (Table 5).

Table 5: Peter the Great Saint-Petersburg Polytechnic University Ranking (RAEX)

	Ranking in the UNR	Rating functionality	Quality of Education, rank	Demand of Employers, rank	Research Activity, rank
2017	10	3,890	12	13	8
2016	11	3,821	14	10	8
2015	11	3,737	15	9	6
2014	11	3,4685	15	14	7
2013	9	3,7750	12	13	7
2012	9	3,7501	7	24	7

Source: SPbPU Rankings

The data of the national rating RAEX (Expert RA) show the biggest demand for the universities where economic and managerial training courses are provided. According to the experts, the steady growth of students' interest to these training areas is associated with steady and good career prospects with those qualification, as well as a fairly high earnings level in the economic field.

Current Position of the Leading Russian Universities in the World Universities Rankings

Currently 22 Russian universities are parties in the rating QS World University Ranking. The leaders among them are Lomonosov Moscow State University (rank 108), Saint-Petersburg State University (rank 258), Novosibirsk State University (rank 291), Bauman Moscow State Technical University (rank 306), Moscow Institute of Physics and Technology (MIPT /Moscow Phystech) (rank 350). In addition, 4 local universities have been able to improve their performance in the rankings and take part in the Top 400 (Table 6).

Table 6: Ranking of the Russian Universities in QS WUR

Name of the University		2016/17	2015/16
1.	Lomonosov Moscow State University	108(=)	108
2.	Saint-Petersburg State University	258(↓)	256
3.	Novosibirsk State University	291(↑)	317
4.	Bauman Moscow State Technical University	306(↑)	338
5.	Moscow Institute of Physics and Technology (MIPT /Moscow Phystech)	350(↑)	431-440
6.	Moscow State Institute of International Relations (MGIMO University)	350(↑)	397
7.	Tomsk State University	377(↑)	481-490
8.	National Research Tomsk Polytechnic University	400(↑)	481-490
9.	National Research Nuclear University MEPhI (Moscow Engineering Physics Institute)	401-410(↑)	501-550
10.	National Research University Higher School of Economics (HSE, Moscow)	411-420(↑)	501-550
11.	**Peter the Great Saint-Petersburg Polytechnic University**	**411-420(↑)**	**471-480**
12.	Kazan (Volga region) Federal University	501-550	551-600
13.	Far Eastern Federal University	551-600(↑)	651-700
14.	National Research Saratov State University	551-600(↑)	601-650
15.	Southern Federal University	551-600(↑)	601-650
16.	The National University of Science and Technology MISIS	601-650(↑)	701+
17.	RUDN University	601-650(=)	601-650

18.	Ural Federal University	601-650(=)	601-650
19.	Lobachevsky University	701+(=)	701+
20.	Plekhanov Russian University of Economics	701+(=)	701+
21.	Voronezh State University	701+(=)	701+
22.	Novosibirsk State Technical University	701+	-

Source: World University Rankings Review (Summer 2016 – Spring 2017)

Taking into account the metrics of the QS WUR (see Table 3), the 2017 rating RAEX experts (Expert RA) note that the greatest progress of the Russian universities has been reached in the field of scientific publications indexed in foreign scientometric databases. Thus, the 2016 rating showed an average of 0.20 published works per year per one scientific and pedagogical employee of the top 100 Russian universities; in comparison to that, the results of current rating show 0.29 publishings. Also, the growth in the field of citation scientific papers is recorded: the average number of citations per scientific and pedagogical employee have increased from 0.32 to 0.53.

The Academic Ranking of World Universities (ARWU) was first published in June 2003 by the Center for World-Class Universities (CWCU), Graduate School of Education (formerly the Institute of Higher Education) of Shanghai Jiao Tong University, China, and since 2009 is updated on an annual basis by ShanghaiRanking Consultancy. Only two leading national universities were present constantly in the rating ARWU since 2003: Moscow State University and St.-Petersburg State University. In 2016, the rating includes Novosibirsk State University, taking up a position in the group "401-500". ARWU 2017 includes already 4 national universities: Moscow State University (rank 93), St.-Petersburg State University (group "301-400"), Novosibirsk State University (group "401-500") and Moscow Institute of Physics and Technology (group "501-600"). Table 7 shows the dynamics of Russian national universities' position in the Academic Ranking of World Universities (2015-2017):

Table 7: Ranking of the Russian Universities in ARWU

University	2017	2016	2015
Moscow State University	Top100 (93)	Top100 (87)	Top100 (86)
St.-Petersburg State University	Top400 (301-400)	Top400 (301-400)	Top400 (401-450)
Novosibirsk State University	Top500 (401-500)	Top500 (401-500)	–
Moscow Institute of Physics and Technology	Top600 (501-600)	–	–

Source: drawn out by the authors on the basis of ARWU

Traditionally Russian universities get low assessment on such indicators as “The number of highly cited researchers” and “The number of alumni and staff winning Nobel Prizes and Fields Medals”.

Times Higher Education (THE) is the leading provider of higher education data for the world's research-led institutions. THE DataPoints suite of tools is designed to provide detailed performance information across all of the core areas of university activity. Times Higher Education World University Rankings now ranks 2,150 institutions worldwide, with 1 million data points analyzed across 2,600 institutions in 93 countries. Table 8 shows the current position of Russian national universities in the Times Higher Education World University Rankings:

Table 8: Ranking of the Russian Universities in THE WUR

	University	2017		2015/2016	
		Rank	Overall Score	Rank	Overall Score
1.	Lomonosov Moscow State University	188	51.5	161	51.9
2.	Moscow Institute of Physics and Technology	301- 350	40.7- 43.3	501 - 600	
3.	ITMO University	351- 400	37.6 – 40.6		
4.	Higher School of Economics	401 - 500	32.6 – 37.5		
5.	Kazan Federal University	401 - 500	32.6 – 37.5	301 - 350	
6.	National Research Nuclear University MEPhI	401 - 500	32.6 – 37.5	251 - 300	
7.	Novosibirsk State University	401 - 500	32.6 – 37.5	401 - 500	
8.	St.-Petersburg State University	401 - 500	32.6 – 37.5	401 - 500	
9.	Tomsk Polytechnic University	501 - 600	27.6 – 32.5	251 - 300	
	Tomsk State University	501 - 600	27.6 – 32.5		
10.	Bauman Moscow State Technical University	601 - 800	18.6 – 27.5	501 - 600	
11.	**Peter the Great St.-Petersburg Polytechnic University**	**601 - 800**	**18.6 – 27.5**	**201 - 250**	

Source: drawn out by the authors on the basis of THE WUR

The rating THE WUR 2015/2016 academic year included 16 Russian leading universities. In 2017 the list of Russian leading universities ranked by THE WUR expanded to 24 universities.

Thus, the studied research allow us to state that leading Russian universities managed not only to enter the World Universities Rankings, but also to occupy a strong position there, despite some fluctuations in the ratings.

The presented above allows us to make a conclusion that Russian higher professional education has become a valuable product in demand internationally. The diagram below shows a tendency of foreign students studying in Russian universities increase:

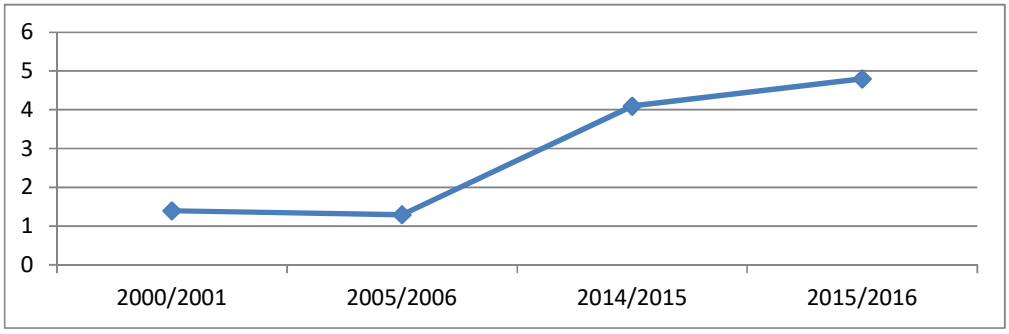


Fig.1: The proportion of foreign students in the total number of students studying in Russia, %

eLearning as a means of increasing the attractiveness of Universities

As stated in Introduction, one of the tools of boosting attractiveness of Russian Universities both for Russian and international students can serve various forms of learning that are being implemented in universities nowadays. One of them, widespread worldwide, is eLearning. ELearning refers to the use of electronic media, information and communication technologies (ICT) in education.

Between October and December 2013 a total of 249 institutions (of which 241 are EUA members) from 38 countries and higher education systems completed the survey on eLearning conducted by European University Association. Russia was represented by some of the leading universities such as Moscow State Linguistic University, National Research University Higher School of Economics, St. Petersburg State University, Southern Federal University and Peoples' Friendship University of Russia. The results confirm a strong trend towards institutional strategies for e-learning. Half of the respondent institutions have already established such a strategy, and a further 26% are preparing one. Relatively few institutions (14%) have strategies at only faculty level.

No less than 96% of the institutions surveyed use e-learning, mainly in blended learning (91%), but also for online learning courses (82%). However, there is potential both for expanding its development, given that only 53% of them use it across the board, and for exploring other types of application such as inter-institutional collaboration and joint online degree programmes (Fig.2).

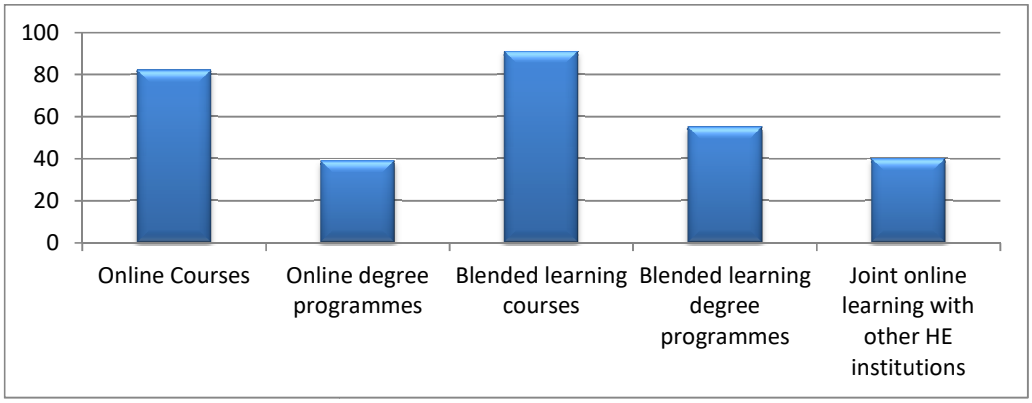


Fig.2: Types of eLearning offered by 249 European institutions, 2013, %

As it was stated by The Worldwide Market for Self-paced eLearning Products and Services: 2010-2015 Forecast and Analysis the global market for eLearning is one of the fastest growing segments of the global education market, the average growth rate over five years has been 9.2% (Figure 3).

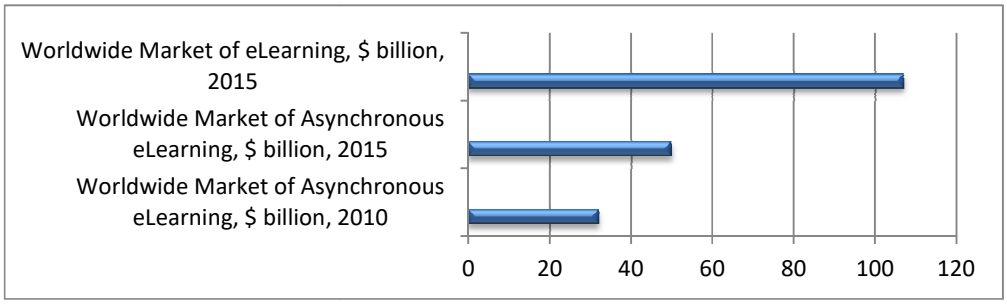


Fig.3: Worldwide eLearning Market Five-Year Growth Rates

The largest users of eLearning today are the USA, Europe, Asia and Latin America, the leaders of implementation growth and usage of this educational form are the countries of Asia (Figure 4).

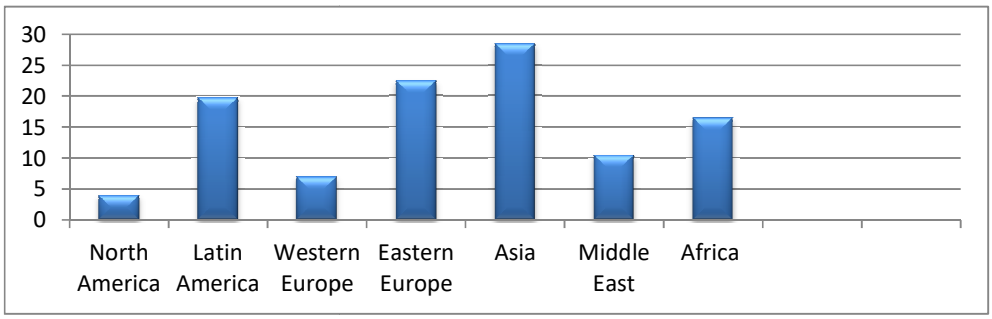


Fig.4: Worldwide Self-paced eLearning Five-Year Growth Rates by Region (across all products)

The growth rate of the eLearning market is an important indicator that shows how much the market is developing in a particular country. As CB Insight (TADVISER) analyses stated the growth rates data allow us to estimate the potential profit that the investors willing to invest in international projects on eLearning may get (Figure 5).

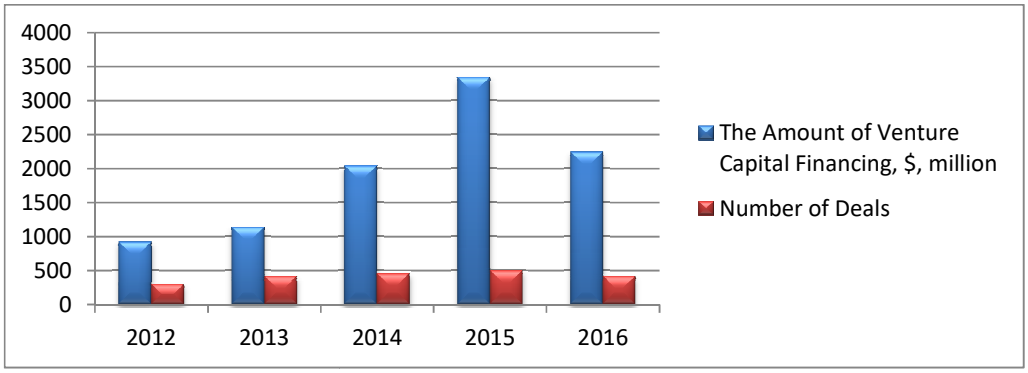


Fig.5: the Amount of Venture Capital Financing of eLearning Projects Worldwide

Trends 2015: Learning and Teaching in European Universities, published by the European University Association, states that internationalization and eLearning are important priorities in the learning environment. Indeed, when asked which developments have been important to their institution, 70% of respondents mention the former and 62% the latter (Question 11 in the Survey Questionnaire). Respondents were asked to consider the importance of the same set of items in the near future. As it turned out, internationalization and eLearning continue to occupy the top two places but with an increase in value: 83% for the former (+13 points) and nearly 78% for the latter (+16 points).

Massive Open Online Courses as a means of boosting eLearning worldwide

Since 2012, known as "the Year of the MOOC", Massive Open Online Courses (MOOC) have expanded worldwide and become the most popular type of eLearning. Since then more than 700 universities around the world have launched MOOCs. According to Class Center, a MOOC aggregator, by the end of 2016, around 58 million students had signed up at least one MOOC. In 2016, 2,600+ new courses were announced, taking the total number of courses to 6,850 from over 700 universities (Figure 6).

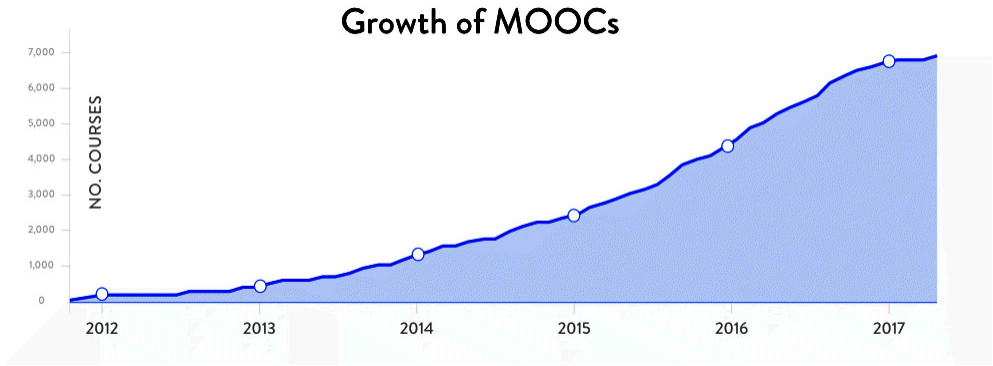


Fig.6 : Growth of MOOCs by Class Center

Based on the analysis of the *Grade Change Tracking Online Education in the United States* (2013), *E-Learning in European Higher Education Institutions* (2014), *Trends 2015: Learning and Teaching in European Universities* (2015), predominant motives for Higher Education Institutions and Universities to be involved in MOOCs are to enhance institutional visibility and reputation as well as student recruitment. *Making Sense of MOOCs: A Guide for Policy-Makers in Developing Countries,*

published by UNESCO and the Commonwealth of Learning (2016) stated the possible objective for using MOOCs by Higher Education Institutions and Universities:

- MOOCs can offer a good marketing model;
- MOOCs can attract better and/or more on campus students;
- MOOCs can attract new kinds of students;
- MOOCs provide innovation in educational provision;
- MOOCs result in scalable educational services;
- MOOCs can improve the quality of on campus education;
- MOOCs can reduce the costs of regular course provision;
- MOOCs can be a research area;
- MOOCs can be mass environments for exploring research questions

The diagrams below present MOOC distribution by subjects in 2015 and 2016.

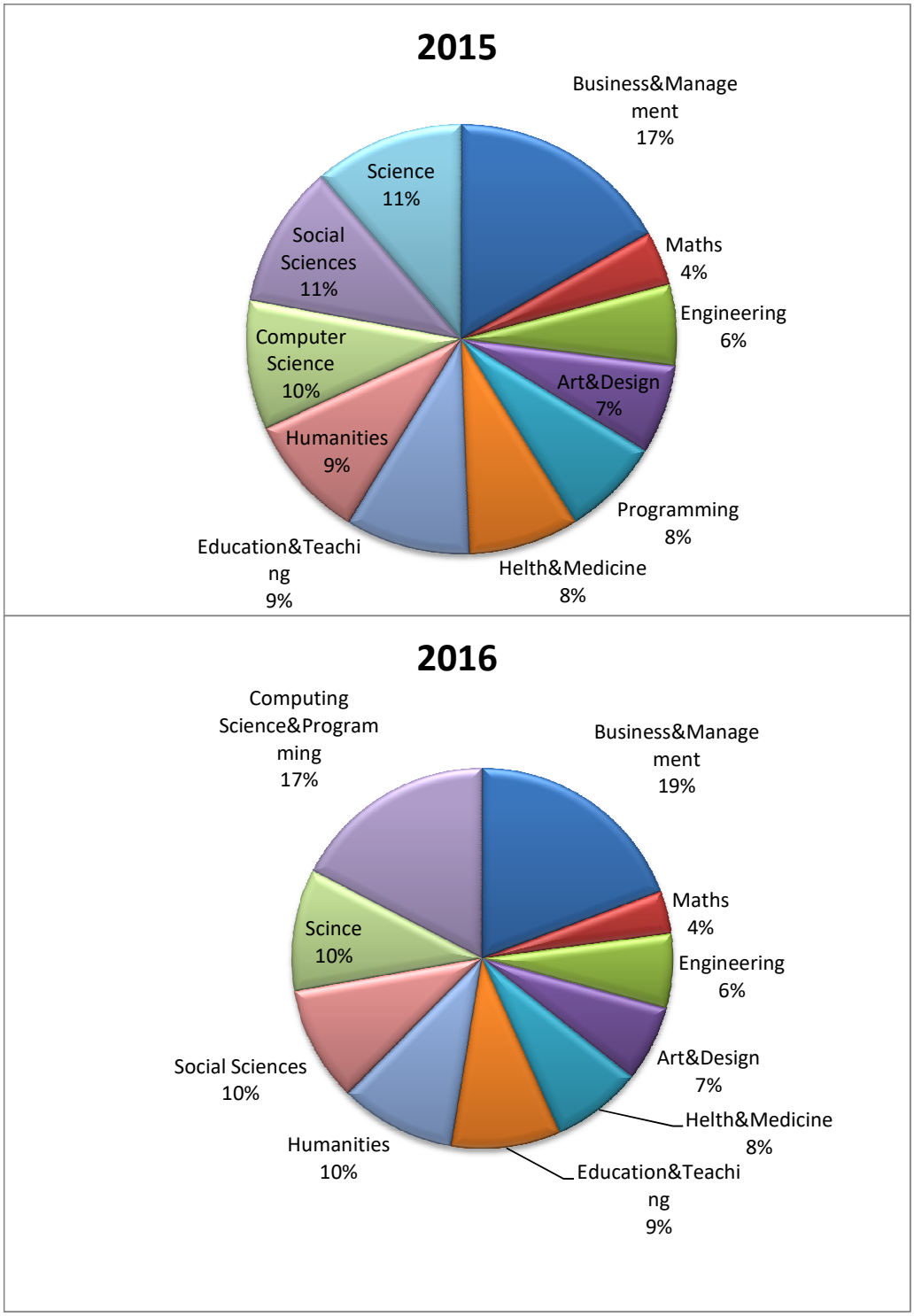


Fig.7: Course Distribution by Subjects by Class Center

In 2015 there was a distinct focus on monetization by MOOC providers. This has led to an increase in the percentage of courses focusing on the field of technology and business. The growth in technical

and business courses has led to a decrease in the humanities and social science courses, but overall there is still a healthy balance of technical and non-technical courses. In 2016, consistent with the last year, courses in business and technology form a big chunk of the courses that have been announced so far.

Russian eLearning Market

The Russian eLearning market began to develop in 2000, and according to the experts it is lagging behind the global market for 5-7 years (Table 9).

Table 9: The Amount of Venture Capital Financing of eLearning in Russia

	2014		2015		2016	
	Deal Value, $, million	Number of Deals, $, million	Deal Value, $, million	Number of Deals, $, million	Deal Value, $, million	Number of Deals, $, million
Cloud Technologies/Computer Software	47,7	13	34,4	11	41,8	19
Educational Services	5,7	7	4,1	7	2,9	4
Mobile Application	8	7	1,5	3	2,2	3

Source: PwC & PBK 2015-2016

Despite some venture investment decline, the Russian eLearning market attracts venture investors. According to experts J'son & Partners Consulting, for the last 2.5 years Russian projects attracted about $15 million.

In order to transmit the MOOCs, there are various commercial or non-profit platforms shown in Table 10.

Table 10: Commercial and non-profit platforms

Name of Provider	Time Type	Type	Users, million	Number of Courses	Investments, $, million
Coursera, 2012	Fixed time	Freemium	7,1	641	>65
EdX, 2012	Fixed time	Freemium	2,5	215	30
Udacity, 2012	Fixed time	Freemium	1,6	38	20
Udemy, 2010	Open schedule	Paid	3,0	16000	48
Lynda, 1995	Open schedule	Paid	4,0	2800	103
Khan Academy, 2006	Open schedule	Free	10,0	6000	n/a
MIT OpenCourseWare, 2002	Open schedule	Free	n/a	2180	>60

Source: J'son & Partners Consulting (2014)

The Russian eLearning market is presented by more than 50 providers of MOOC courses, according to experts J'son & Partners Consulting. The number of registered users on the largest MOOC platforms is made up of tens of thousands, and in some cases exceeds 100 thousand persons, 7.2 million inhabitants of Russia at least once studied online. In contrast to the global market of online education, the distinctive feature of the Russian market is a paid training model. The most significant free of charge projects include the free nonprofit academic educational projects Lektorium (www.lektorium.tv) and Universarium (www.universarium.org), as well as an aggregator of online courses UniverTV (www.univertv.ru) (Table 11).

Table 9: Russian Online Market by Segments

General Profile	Academic Knowledge	Language Platforms	Schoolchildren/Students	Aggregators
Uniweb	LectoriumTV	Lingualeo	YaKlass	Edumarket
Netology-FoxFord	Universarium	Busuu	Clearmath	Besmart
Zillion	Intuit	Study.ru	Moyuniver	Postnauka
Lendwings		Englishtown	Globallab	UniverTV
		Lingust	Inlearno	Yarbula
			Newtutor	Uchinovoe
			Eutorion	
			Tutotonline	

Source: J'son & Partners Consulting (2014)

Among Russian universities, the following online courses platforms become widespread:

- Lomonosov Moscow State University - *Universarium*;
- Saint-Petersburg State University – *Coursera*;
- National Research University Higher School of Economics (HSE, Moscow) – *Coursera*;
- Moscow Institute of Physics and Technology (MIPT /Moscow Phystech) - *Coursera*;
- The Russian Presidential Academy of National Economy and Public Administration (RANEPA) – *Uniweb/Hexlet*.

Discussion

In 2015, the eight leading Russian universities - National Research University Higher School of Economics (HSE, Moscow), Lomonosov Moscow State University, National Research Nuclear University MEPhI (Moscow Engineering Physics Institute), National University of Science and Technology (MISIS, Moscow), Saint-Petersburg State University, Peter the Great St. Petersburg Polytechnic University, ITMO University and Ural Federal University - initiated a project to start a National Open Education Platform on the basis of an open platform Open edX. All the courses placed on National Open Education Platform are for free and without any formal requirements to the basic level of education. For those students who want to have their MOOC results accepted there is an opportunity to get a certificate. To get the certificate the students have to pass the personal identification and all the obligatory tests and the exams.

The Russian national platforms courses have some certain features:

- all courses are developed in accordance with the requirements of Federal State Educational Standards;

- all courses meet the requirements of the learning outcomes of educational programs of universities;
- special attention is paid to the effectiveness and quality of online courses and assessment procedures of learning outcomes.

The National Open Educational Platform is developed at the expense of investment from eight universities: each participant will invest in the project RUB 50 million within three years. According to the Association "The National Open Education Platform" data, by June 2016 on Open Education there were hosted more than 90 courses, and the number of registered listeners has exceeded 120 thousand. On average one participant has applied for up to three courses.

The electronic information-educational environment of Peter the Great Saint-Petersburg Polytechnic University includes electronic media, eLearning resources, complex of Information and Communication Technologies that allow students to develop their educational programs in full volume irrespective of the location of students.

The electronic information-educational environment of Peter the Great St. Petersburg Polytechnic University includes the following resources:

- distributed e-learning system (network of educational portals of institutions and MOOC courses across platforms;
- information and education project Open Polytech;
- "private offices" and a portfolio of students and teachers;
- information-library complex;
- sites of the University;
- official groups and pages in social networks;
- automated control systems of educational process;
- IT services.

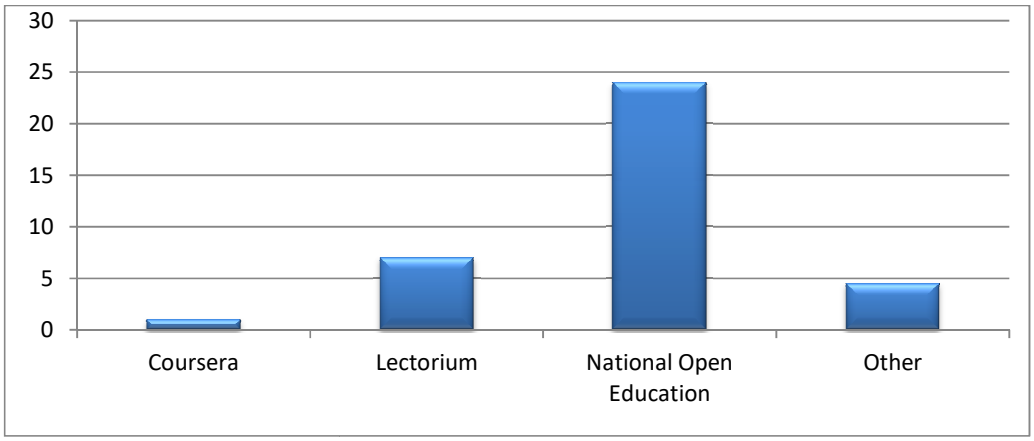


Fig.8: Peter the Great Saint-Petersburg Polytechnic University MOOC platforms and the Number of Courses

To improve the situation on the Russian eLearning market, in November 2016 the Russian passport of the priority project "Modern Digital Educational Environment of the Russian Federation" was developed. Within three years in the framework of this project one billion roubles in grants will be allocated to Russian universities for the development of eLearning. Also it is planned to create a web portal for online courses integrated with a Unified system of identification and authentication, as well

as to develop a system for assessing the quality of acquired knowledge. The number of online courses created within the project should reach 3,5 thousand.

Thus, within the framework of the project "Modern Digital Educational Environment of the Russian Federation" the new approaches of the implementing educational programs based on the use of eLearning will be developed. In particular, we are talking about the use of virtual academic mobility and the creation of individual learning paths.

Conclusion

UNESCO and the Commonwealth of Learning Survey stated the obvious benefits of Massive Open Online Courses such as:

- *improving access to Higher Education*. MOOCs are regarded as contributing to the democratization of Higher Education, not only regionally but globally as well. Students are able to access complete courses offered by universities all over the world.
- *providing an affordable alternative to formal education*. MOOCs are for large numbers of participants and can be accessed by anyone anywhere as long as they have an Internet connection. The MOOCs are open to everyone and offer a full/complete course experience online mostly for free.

Along with the obvious merits of eLearning, there are still a number of controversial points. One such point is as Novak-Kalyayeva (2013) stated the recognition of the autonomy of each person and respect for its uniqueness which is the supreme principle of information network functioning. This should be taken into account while creating student's personal identification system to pass MOOCs courses.

Another point is that today, there is a high demand for a high-quality content produced on the basis of the studio with a camera crew, director and educator is highly demanded. Amateur recordings of lectures and webinars are of no interest to their users.

One more point is about the cost of creating MOOCs. It very much depends on its duration and content and varies on average from 50 thousand to 1 million rubles. In the Western practice the figures are higher – MOOC-courses can cost >$150 thousand.

Despite all mentioned issues analysts and experts of the Ministry of Education and Science of the Russian Federation expect the outcome of the project as a comprehensive description of optimal patterns of eLearning application for educational process that can be offered for implementation in Russian universities. In the long term this will help to improve the quality and efficiency of educational programs to expand opportunities for students to choose their individual educational path.

References

Academic Ranking of World Universities, [Online], [Retrieved October, 01, 2017], http://www.shanghairanking.com/ARWU2017.html

By the Numbers: MOOCs in 2015, Class Central, [Online], [Retrieved October 01, 2017], https://www.class-central.com/report/moocs-2015-stats/

By the Numbers: MOOCs in 2016, Class Central, [Online], [Retrieved October 01, 2017], https://www.class-central.com/report/mooc-stats-2016/

E-learning in European Higher Education Institutions. Results of a mapping survey (2014), European University Association

Making Sense of MOOCs: A Guide for Policy-Makers in Developing Countries (2016), UNESCO and Commonwealth of Learning

National Open Education [Online], [Retrieved August 25, 2017], https://openedu.ru/

National University Ranking Interfax [Online], [Retrieved August 26, 2017], http://www.univer-rating.ru/txt.asp?rbr=29

Novak-Kalyayeva, L. (2013) Human Rights in Public Administration: Theoretical and Methodological Aspect, Lviv: LRIT NAPA.

Online Education (Worldwide Market) (2016), TADVISER, [Online], [Retrieved August 26, 2017], http://www.tadviser.ru/index.php/%D0%A1%D1%82%D0%B0%D1%82%D1%8C%D1%8F:%D0%9E%D0%BD%D0%BB%D0%B0%D0%B9%D0%BD-%D0%BE%D0%B1%D1%80%D0%B0%D0%B7%D0%BE%D0%B2%D0%B0%D0%BD%D0%B8%D0%B5_(%D0%BC%D0%B8%D1%80%D0%BE%D0%B2%D0%BE%D0%B9_%D1%80%D1%8B%D0%BD%D0%BE%D0%BA)

Peter the Great St. Petersburg Polytechnic University (SPbPU) Ranking (2016), [Online], [Retrieved August 26, 2017], http://5-100.spbstu.ru/en/about-program/spbpu-rankings/

PwC & PBK Russian Venture Industry Overview (2015), MoneyTree Venture Market Navigator

PwC & PBK Russian Venture Industry Overview (2016), MoneyTree Venture Market Navigator

QS World University Ranking (2016), [Online], [Retrieved August 27, 2017], https://www.topuniversities.com/university-rankings

RAEX Rating Agency (Expert RA) (2017), [Online], [Retrieved August 26, 2017], http://raexpert.ru/project/vuz_rating/2017/ranking

Rodionov, D.G., Fersman N.G. and Kushneva O.A. (2014), The Importance of the University World Rankings in the Context of Globalization, *Life Science Journal*, 10 (10s), 4423-446.

Rodionov, D.G., Fersman N.G. and Kushneva O.A. (2016), Russian Universities: Towards Ambitious Goals, *International Journal of Environmental & Science Education*, 11 (8), 2207-2222.

Russian Online Market (2014), J'son & Partners Consulting, [Online], [Retrieved August 28, 2017], http://json.tv/ict_telecom_analytics_view/rynok-onlayn-obrazovaniya-v-rossii-i-mire-2014090112414350

The Worldwide Market for Self-paced eLearning Products and Services: 2010-2015 Forecast and Analysis, Ambient Insight, LLC

The Times University Rankings 2015-2016, [Online], [Retrieved August 28, 2017], https://www.timeshighereducation.com/world-university-rankings/2016/world-ranking#!/page/0/length/25/locations/RU/sort_by/scores_overall/sort_order/asc/cols/scores

The Times University Rankings 2016-2017, [Online], [Retrieved October 01, 2017], https://www.timeshighereducation.com/world-university-rankings/2017/world-ranking#!/page/0/length/25/locations/RU/sort_by/rank/sort_order/asc/cols/scores

Trends 2015: Learning and Teaching in European Universities (2015), European University Associatio

World Universities Ranking Review (Summer 2016 – Spring 2017), [Online], [Retrieved August 28, 2017], http://univer-rating.ru/FtpRoot/files/%D0%90%D0%BA%D0%B0%D0%B4%D0%B5%D0%BC%D0%A0%D0%B5%D0%B9%D1%82%D0%B8%D0%BD%D0%B32017%20%D0%9E%D0%B1%D0%B7%D0%BE%D1%80(2).pdf

Improvement of Public Administration Based On Human Rights: Theoretical Approaches and Practical Implementation

Nataliia G. Fersman, Peter the Great St. Petersburg Polytechnic University, Saint-Petersburg, Russia
natdia@list.ru

Larysa Novak-Kalyayeva, Lviv Regional Institute for Public Administration of the National Academy for Public Administration under the President of Ukraine, Lviv, Ukraine
novak.kayaeva@gmail.com

Tatyana Ye. Zemlinskaya, Peter the Great St. Petersburg Polytechnic University, Saint-Petersburg, Russia
zem-tat1@yandex.ru

Abstract

Among the topical problems of the theory of public administration, the issue of human rights, as its theoretical basis and practical imperative, occupies a special place. State administration by its social purpose and structure largely correlates with the structure and social function of human rights as a social institution, and their interaction is quite organic. In conditions of social transformations against a background of democratization of managerial processes, the observance and maintenance of these rights in everyday life is a mission of administration. The analysis of the theory and methodology of public administration based on modern approaches, enriched by human rights issues, allows us to reveal the significant democratic potential of public administration in the process of its modernization in the face of contemporary global challenges and threats. The priority state of human rights in the European society, the insufficient elaboration of the tasks of public administration for the observance, maintenance and protection of human rights justify the research topic and confirm its relevance.

Keywords: governance, public administration, human rights, improvement of public administration

Introduction

The need to update the systems of state power and governance on the basis of human rights is caused by the global challenges of our time, which include, in particular, systemic problems: the acceptance of international law; processes of integration, disintegration, migration and intercultural communication; prevention of terrorism, implementation of collective security and so on. At the national level, these, among others, are the problems of public administration, caused by the increasing implantation of new information technologies of the society self-control in the daily life, and the increasing responsibility of the authorities for the metamorphosis of real democracy and its implementation in a close connection with the public. We are talking about the need to change the paradigm of power in the center and at the local level in favor of broad involvement of citizens into the processes of formation and implementation of state policies. Openness and transparency of the procedures carried out by authoritative structures, an access to public information, etc. are the guarantee of the legality and controllability of power by a civil society, and the evidence of formation of a free, decentralized, non-hierarchical tradition of communication between an individual and authorities. This is the only way both to public legitimization of power and for ensuring its effectiveness through public support and democratic practices that propose the direct participation of citizens in the preparation, adoption and implementation of managerial decisions in accordance with the principles of human rights.

The important aspects of human rights have been developed by such researchers as Andrews, R. and Van de Walle, S. (2012), Gosepat, S.G. and Lomann, K. (2008), Jellinek, G. (1979), Kolosovska, I. (2015) and others. The problems connected with human rights in the context of public administration have not been sufficiently studied, which indicates the relevance of its scientific development.

Analysis and Results

Argumentation of Human Rights as a Theoretical Basis of Public Administration and Its Practical Imperatives

Fundamental rights and freedoms of a person and citizen in the broadest sense are defined as legal opportunities that are necessary for the existence and development of the individual, are recognized as inherent, must be universal and equal for everyone and secured and protected by the state in the amount of international standards. However, each component of the definition is full of polemical potential and actual and undeniable only under certain conditions. Fundamental human rights do not belong to people as such, that is in absolute terms, but only in relation to certain other persons, provided that that society recognizes and determines by regulations the human rights and mechanisms of their respect by all members of society.

Personalistically, relative importance is a fundamental common feature of all rights, after all the phrase that everyone recognizes human rights remains largely relative. The existence of crime, corruption, terrorism limits the universalism and comprehensiveness of human rights by the need at the national level to put considerable efforts towards their observance by all members of society. This is the ideal which the humanity aspires. Globality in this context does not increase the optimism about the reality of its full implementation. A. Wildt (1997) noted that the idea of fundamental rights in the context of their universalism is ambiguous, as these are the most general human rights by means of which the others are justified and legitimized. The fundamental rights here mean the most important by content rights, i.e. "at least invariant core of minimum rights in the context of their integrity and inherence". Fundamental rights enshrined in the constitutions of states and major international legal acts, is the legal basis for the derivative, but no less important rights. According to R. Alexy (2008) it’s also possible to highlight the central and peripheral human rights on the grounds that the former basically are mostly insensitive regarding historical changes, while the latter being distanced from the center of legislative impulsing become increasingly dependent on historical variations.

Thus, the fundamental human rights are certain opportunities that are necessary for normal existence and development of a person in certain specific historical conditions which are determined objectively by the achieved level of economic, social and spiritual development of mankind and must be general and equal for all people. Provided by the state, they are designed to form and maintain human dignity and individuality.

Improvement of the current system of public administration requires the forming of innovative theoretical concepts that can substantiate its strategic and tactical imperatives. European democratic values, as a system of public priorities based on the inherited traditions of European humanism and Christian virtues, and on the liberal idea of natural and inalienable human rights, meet such requirements most of all. Human rights are their institutional, legal, moral and ethical, and, taking into consideration the level of cultural foundations development, the civilizational foundation. The process of shaping the concept of human rights in the dynamics of the European statehood forming significantly influenced the forming of a deep understanding of their rights among the population of the European countries, the belief that the state is obliged to ensure these rights realization, and the awareness of the power of a civil society which is capable to influence the power significantly. These days, this understanding, conviction and awareness were marked by the forming of a modern version of the human rights concept, which became the basis of approaches to governance in the European society.

In the concept of human rights the notion of human dignity, i.e. dignity, which is an integral organic characteristic of a human being, holds a prominent place. This is dignity that belongs to the man by the right of being born a man, regardless of origin, status or moral principles. While personal dignity is a concept close to the concept of honor, which is the product of individual activity of a man as social beings and has axiological characteristics and individual origin.

Human dignity is a fundamental characteristic for a person in his relations with the authorities which can by coercion in certain circumstances humiliate, harm, destroy a person, that is to violate his/her rights. Human rights and freedoms protect the person's dignity from infringement by the authorities. So one needs to understand that human rights only protect people from humiliation and attacks on dignity on the part of the government, which is one of the potential violators of those rights and freedoms. Human rights do not guarantee neither wealth nor justice, nor happiness.

However, there is interdependence and interconditionality of human dignity with the conditions of a person's existence, including material ones and the status in the society. Stipulation of the idea of human dignity by the right to a decent human existence theoretically has its roots in the works of jurists of the late nineteenth century. The right to a decent human existence determines social and economic doctrine of "freedom from want" and is complemented with the rights to a fair trial, education, consumer protection and so on. H. Ellinek (1979), in particular, believed that the implementation of socio-economic rights is directly dependent on the extent of the implementation of rights which a person claims and what extent of the legislative power the state has.

The concept of human dignity in this context is largely associated with the formulated by V. Solovyov (1990) the right of every person to a decent existence, which he deduced from the idea of the common good, which, in fact, conditions satisfaction within reasonable limits of any private interest. The state under such conditions has a supporting role and provides the conditions for a decent human existence of each person, offering, above all, the minimum level of material well-being.

The concept of the right to a decent human existence, formed in the late nineteenth century and enriched by the experience of renewal and the desire for a "welfare state" after the Second World War, was in line with the liberal system of values in which this right expanded the positive task of the state to ensure social equality of initial chances. In the mid-twentieth century the state-eudemonistic approach to the concept of socio-economic and cultural rights was suggested, which meant as Szymańska (2016) stated the ability of the political system to ensure high living standards and create the illusion of concern about the prosperity of the people.

This approach received development in the concept of "quality of life" which in the declared goals of public policy and social work of the developed countries brought to the fore the desire for raising the quality of life. Within these concepts, the concept of the right to a decent human existence was mainly reduced not so much to qualitative as to quantitative characteristics of the "consumer goods basket" and "living wage".

The Advisability of Governance Improvement Based On Human Rights

The state of the power system in the society is largely determined by the state of observance of human rights, which can serve as a criterion for government effectiveness. As a criterion for effectiveness, determining the content, the main directions of improvement and effectiveness of organizational and managerial activities of managing subjects (leaders, managers, machinery of government, etc.), human rights embody the connection between state management and society, which determines the readiness of the state to ensure the harmonious development of society. The level of observance, guaranteeing and protection of human rights by the government, thus, determines the society perception of the government ability to adequately perform its functions.

The sources of the state and law forming were at the same time the sources of the human rights concept, because they appropriately interpreted the role of a person who realized his own status as a personality and its subjectivity in the development of European statehood and governance. As a multifaceted phenomenon, human rights belong to both law and other social regulators, such as morality, state-power relations, ideology, ethics, religion, education, and others. Despite its universality, human rights always belong to a particular culture and era, because any thesis can have a universal significance only within a single culture, for example within Western legal societies, perhaps even within one state, if this state is democratic.

The ambiguous understanding of human rights by societies of different continents, faiths, traditions and cultures emphasizes a certain conventionality of the universality of human rights depending on cultural and religious factors. The concept of human rights is a specific product of the civilizational space, which in the modern humanitarian sphere is usually defined as the West. The development of the human rights concept on an interdisciplinary basis is seen as the evolution of Western political and legal doctrines that have as their natural outcome modern notions of human rights in their interaction with the state, particularly in the processes of state administration. The universality of human rights does not mean that the whole world must follow the Western culture patterns. At the same time, as it was stated in Amnesty International Annual Report (2016-2017), no arguments can be an excuse for mass violations of human rights by the state and officials on the basis of cultural differences. A culturally neutral or intercultural argumentation for human rights does not come from economic prerequisites, because human rights exist regardless of the management conditions or the political system specifics, and in this regard require universal legal protection. Thus, human rights are at the level of intercultural and timeless importance. The problem of human rights is transposed to the humanitarian background of intellectual discussions in the historical, spatial and industrial sense.

Algorithms of interaction of human rights with the state are reduced to their “observance”, “guaranteeing” and “protection” by the latter. In this regard, the observance of human rights in the framework of public administration should be understood as managerial actions, which, in fact, do not violate human rights in the legal field adopted at the state level. The implementation by state structures, in the person of civil officials, of authority over a person, group, collective, people that do not violate the rights of a particular individual personally or as a member of these sets also marks the observance of these rights. The guaranteeing of human rights by government bodies should be understood as management actions aimed at the forming and implementing of appropriate (regulatory, organizational, institutional, procedural etc.) conditions for the observance of human rights by the authorities when implementing their powers, and members of the society in relation to each other, with respect to groups, collectives, peoples and between them, and providing guarantees of these rights in accordance with the legalized scope and authority. In the preceding work (Novak-Kalyayeva 2013) we stated that the protection of human rights by government bodies is carried out in case of their violation and occurs within the limits of their powers, and the legal qualification of the violation of human rights stipulates the appropriate production of law enforcement and judicial bodies and justice bodies.

The need for universalization of public administration on the principles of human rights is based on the fact that then the activities of government bodies in the fullness of their functional purpose will lead to the fact that human rights will be respected. This, in turn, will lead to the universalization of managerial activities, since it covers both the majority of the population and virtually all spheres of the society functioning. That is, respect for human rights is the most natural state of government.

Public administration and human rights are linked by various forms of ties and are changing under the influence of the same factors. The same factors influence the state administration and the observance and protection of human rights in democratic countries, in particular the level of development of productive forces and market relations simultaneously determines the state of the economy and the opportunities for satisfying the social rights of citizens; the level of professionalism of managers and executives in the power structures simultaneously affects both the quality of management and the state of human rights at both the higher and local levels and so on. And one of these phenomena generates another. So, there is a connection both functional and cause-and-effect.

Statistical connection is the dependence of the state of observance and protection of human rights on the state of controllability of public institutions and their ability to ensure the implementation of guaranteeing of regulatory legal acts, organizational and other legal regulatory documents. In the preceding work (Novak-Kalyayeva 2014) we mentioned that the connection of states is characterized by the fact that the state of power implementation at each particular moment of time leads to the state of observance and protection of human rights for the future: the process of shaping the human rights concept in the dynamics of the European state significantly influenced the formation of awareness of their rights among the population of European countries, and the power of civil society to influence the authority, which in our day was marked by the formation of a modern version of the human rights concept, which has become the real basis of the approach to the management of European countries.

The concept of human rights, being inseparable from democracy, motivates the actions of government bodies and gives them a perfect and noble content. In general, the principles of modern public administration are reduced to the principles of effective governance: in a world where technological and social changes occur at high speed, management structures and officials need to be more autonomous in making managerial decisions and in choosing from alternative policy planning and implementation of options. The responsibility of government bodies to society is growing. State Effectiveness, Growth, and Development Overview (Bandiera 2014) said that the combination of the classical mechanism of administrative supervision and control with the latest management methods based on results, managed competition and so on, and public control mechanisms can produce positive results. Although the recent studies on the problems of implementing these, as well as others, based on the principles of "Good governance" concepts, lead to very mixed conclusions. Reformatory intentions, for example, the concepts of a new public management according to R. Andrews and S. Van de Walle (2012) turned out to be rather weak, and the processes of reforms carried out at the local levels, according to the researchers, do not show the expected effectiveness.

The theory and practice of modern public administration is formed and implemented on the basis of the norms of the main international human rights instruments that define the responsibilities of governments to ensure respect for and implementation of human rights. The state-members of the international law acts within the framework of the international system for the protection of human rights have engaged to take the necessary measures to implement these rights, including economic ones, according to the real capabilities of the state. As stated by Rodionov et al (2017) national legal frameworks compatible with the principles of human rights can strengthen the tandem of "power - the individual" in the activities of government bodies and the position of civil society organizations in interaction with the government on the basis of human rights.

Integration as the process of approachment of national political structures aimed at mutual cooperation with the aim of forming a certain integrated set of political systems at the interstate level is a component of many modern public administration concepts. One of the expected results of integration is the unification of these structures with the obligatory availability of both formal and informal public institutions for the general solving of significant issues. Fersman (2014) mentioned that in the integrated commonwealth, the level of transactions between participants in integration and opportunities for satisfying interests on the basis of common values increases, which increases the requirements for the quality of intercultural interaction.

The relevant concepts of public administration, focused on high quality of service to the population, taking into account the imperatives of the information society, have radically influenced the paradigm of public administration, which should determine the attitude to information as a strategic resource. Proper information support for management processes is a necessary basis for making effective management decisions. The main ideas, program and activities for the application of information and communication technologies in public administration are adopted, as stated by Szymańska (2016), in particular, in the EU countries in the form of an e-government concept, the implementation strategy of which is aimed at ensuring the possibility of providing public services primarily through the Internet at all levels of government. The introduction of "E-Government" significantly influenced the state administration. As a result, the effectiveness of communication between the population and the state, where the technical conditions were created for this purpose, has risen dramatically. K. Van

Kersbergen and F. Van Waarden (2004) noted that the problems remain debatable, in particular, with respect to the prospects for administrative integration, instruments for social, political and economic control, the ethics of civil officials and verification of the documents in connection with possible dishonesty of employees. Thus, the significant regional factors of universalization of public administration concepts remain common traditions of European management culture.

Discussion

The Problems of Democratization and Acceptance of Human Rights in the Countries of Democratic Transit

The modern management paradigm assigns a significant role to local self-government, whose aim is, depending on the level of the government system democratization, to undertake in a varying degree the significant part of the executive authorities competences and powers. The harmony between the competencies as a sphere of responsibilities and authority as the right to implement them, in turn, not only establishes the status, but also stipulates the ability of a local government to be responsible for the public policies implementation. According to I. Kolosovska (2015) an important participant of the management activities become public organizations and movements, political parties, trade unions, business structures; the interaction between them and authorities of course is the determining factor in the prospects of real democracy and social legitimization of power.

The population of those European countries, which were freed from authoritarian regimes only in the last quarter of the twentieth century, have ambiguous attitude towards a human rights problem. For a certain part of citizens, who have grown up in a “Soviet power” and “people's democracy” framework, human rights is largely an abstract concept perceived as a “figure of speech”. A considerable part of people, especially older generations, are not ready to believe that the respect for the human personality can be the basis of state policy or that the personal freedom and its self-realization opportunity may be a criterion of the self-control, true democracy and effectiveness of the government.

The level of civil activity of the population has been significantly raised by various social network since they are able to provide people with the opportunity of the self-expression, consolidation with the like-minded, obtaining the information needed and the ability to influence social and managerial processes in on-line environment. As a consequence, governments and local authorities have lost the opportunity to maintain a certain detachment from the civil society (which was typical for the management practices of the twentieth century), and thus they have been forced to reckon with its positions. At the same time, the boundaries of the possible political influence of the self-organized society are determined by the necessity not only to avoid the transformation of participatory democracy in democracy slogans and anarchy, but also to overcome the pressure of populism, to avoid a reduction in the level of professionalism in policy development and responsibility for the possible consequences of emotional and ill-considered political decisions. Besides, in the countries under democratic transition, the situation is complicated by the fact that governments and local authorities are lack of vertical and horizontal interaction experience, both in the system of administration and in the interaction with the public due to low level of mutual trust and weak awareness of the effectiveness of the entire spectrum of tools and possibilities for cooperation between authorities and society.

Conclusions

The concept of human rights as a dynamic system of the morality and law rules, guaranteed by the state, develops together with the society, responds adequately to the changes occurring in all spheres of the human life, and is able to be a universal motive, factor and purpose of a public administration system functioning in accordance with the needs of a modern society. Interaction of human rights and public administration at the national level in the management activities encourages the formation of a

powerful energy potential, providing the global effect of democratization and the supremacy of law through the democratic reforms.

Human rights as the basic principle of public administration are considered as a generally accepted theoretical and methodological basis and a non-confrontational platform for economic, political and ideological approaches coordination to the implementation of authority at the global, regional and national levels of governance. As a basis of public administration, human rights determine an implementation of all its functions and, thus, motivate the managerial activities and give them more universality and excellence.

References

Alexy, R. (2008) Institutionalization of human rights in a democratic constitutional state. Philosophy of Human Rights: ed. : S. Gosepat, G. Lomann. K.: Nika-Center, 172-190

Amnesty International Annual Report 2016/17, [Online], [Retrieved August, 7, 2017], https://www.amnesty.org/en/latest/research/2017/02/amnesty-international-annual-report-201617/

Andrews, R. and Van de Walle, S. (2012), New Public Management and Citizens' Perceptions of Local Service Efficiency, Responsiveness, Equity and Effectiveness, *COCOPS Working Paper,* 7, 5-29.

Bandiera O, Kleven, H. La Ferrara E., Padro, G.; Azulai M, Blum F., Tejada C.M. Evidence Paper: State Effectiveness, Growth, and Development. *The International Growth Centre (IGC)* [Online], [Retrieved February 28, 2014], 86 – 88 https://www.theigc.org/wp-content/uploads/2014/09/IGCEvidencePaperState.pdf

Encyclopedia of Public Administration 8 volumes Scientific and Editorial Board (2011) v.2., К.: NAPA, 2011, 272 – 273.

Encyclopedia of Public Administration 8 volumes Scientific and Editorial Board (2011) v.3., К.: NAPA, 2011, 246.

Fersman N.G. (2014) The Formation and Development of Innovative (Creative) Thinking within the System of Post-graduate Studies (by means of Foreign Language Learning), St. Petersburg, Asterion Publ.

Gosepat, S.G. and Lomann, K. (2008) Philosophy of Human Rights: Nika - Center, 72-190.

Jellinek, G. (1979) The Declaration of the Rights of Man and of Citizens: A Contribution to Modern Constitutional History. Westport, Conn: Hyperion Press.

Kolosovska, I. (2015) Peculiarities of communication influence on image making process, Explicit and implicit meanings of cultural communication, Poznan, 2, 325-336.

Novak-Kalyayeva, L. N. (2014) Conceptual positions of human rights in public administration in connection with their institutionalization, *Efficiency of Public Administration*, 41, – 29 – 39.

Novak-Kalyayeva, L. N. (2013) Polemical potential of human rights as a theoretical and methodological foundation of public administration, *Moldavian Journal of International Law and International Relations*, 2, 138–149.

Popper, K., Ryan, A. and Gombrich, E. H. (2013) The Open Society and Its Enemies. Princeton and Oxford: Princeton University Press.

Rodionov, D.G., Nikolova, L.V. and Afanasyeva, N.V. (2017) Impact of Globalization on Innovation Project Risks Estimation, *European Research Studies Journal*, 20(2), 396 – 410.

Solovyov, V.S. (1990) The Idea of Humanity in Auguste Comte, v.2 – M.: Thought.

Szymańska, W. (2016) Tradition and historical continuity of administrative functions in the former provincional cities in Poland*, Revista Romana de Geografie Politica,* 1, 5 – 17.

Van Kersbergen, K. and Van Waarden, F. (2004) Governance as a bridge between disciplines: cross-disciplinary inspiration regarding shifts in governance and problems of governability, accountability and legitimacy, *European Journal of Political Research*, 43, 143 – 171.

Wildt, A. (1997), Psychologische und rationale Moralbegrundung. – Berlin; N. Y.

Capabilities of Microsoft SharePoint Online to boost New Zealand SMEs Productivity

Marco Polo de Jesus Cetina Abreu, Edenz Colleges (Business Academy), Auckland, New Zealand, marco.707897@student.edenz.ac.nz
Nagateja Kothamasu, Edenz Colleges (Business Academy), Auckland, New Zealand, nagateja.kothamasu@edenz.ac.nz

Abstract

In this paper, we analyse the Microsoft SharePoint Online platform and its capabilities and discuss the implementation of some of the outstanding features of this platform in small and medium-sized enterprises (SMEs) in New Zealand. Accurate and timely processing of data has become increasingly necessary as businesses face fierce global competition. Being able to use information systems to outperform the competition adds a competitive advantage and ensures sustainable growth. SharePoint Online, a collaborative platform, can do a great deal to boost business through optimising and streamlining processes. SharePoint is not only a document management and storage system, but also a powerful tool that enables working collaboratively and helps analyse an organisation's data. Additionally, Office 365 is fully-integrated with SharePoint. However, the implementation has to meet certain requirements to take full advantage of its benefits.

Keywords: Capabilities, Benefits, Microsoft SharePoint, Productivity, New Zealand SMEs

Introduction

Businesses are constantly seeking profit maximisation and improving productivity is one of the best ways of doing this. However, in a world characterised by fast changes and producing vast amounts of data every second, working more efficiently is not always easy. Likewise, society is living in a time of hyper connection, we must capitalise on working collaboratively more than ever before. SMEs are increasingly adopting innovative ways of working such as using cloud computing, sharing files in real time and utilising new communication channels with clients and employees [2]. It is known that New Zealand businesses lag behind in the utilisation of Information and Communication Technologies and that this lag limits productivity [8]. This is where SharePoint becomes a powerful ally. As software packages evolve and mature they find new uses and Microsoft has found this to be the case with SharePoint Online. This software package now has features that enable SMEs to create an intranet where employees can share, search and manage content as well as collaborate with each other across the organisation in a secure environment [5]. This makes it a powerful productivity tool in the modern workplace. In addition to this, employees may want to seize the opportunity to integrate Microsoft Office 365 to enhance the performance at work or even make use of advanced data analysis tools such as Power BI and produce reports with relative ease.

KEY COMPONENTS AND CAPABILITIES OF MICROSOFT SHAREPOINT ONLINE

SharePoint Online is a cloud-based platform aimed to develop a business intranet that provides a way to create content, which can be completely customisable to meet the current and future business needs. This content creation process lends itself to content editing and collaboration in a single unified platform. Essentially, SharePoint allows designing sites and pages regarding how the published content is displayed. From a document management viewpoint, this solution store documents in a centrally managed repository, which are easily accessible from the browser or the Microsoft OneDrive file hosting service, as it may apply [10]. In the past, having a local SharePoint

environment was often cost-prohibitive to SMEs, but now that this tool is part of the Microsoft Office 365 suite based on the cloud, it becomes cost-effective. The following are the main components of Microsoft SharePoint Online:

Sites to customise the workplace

A site is a group of related web pages which becomes a space of collaboration where the members can exchange information easily. The sites and pages can be utilised to create workspaces assigned to departments, projects, teams or any particular need of the company.

Lists

A list is a website component to store, share, and manage information. This tool is extremely useful when it comes to creating databases rapidly, in much the same way as using Microsoft Excel, but with the difference that it is online.

Web parts

A Web Part is a modular unit of information that forms the basic building block of components displayed on a site. Depending on the permissions of the user, it is possible to edit a page through using Web Parts to display content, pictures and charts, lists of documents, embedded code, maps, etc.

Document Libraries

A Document Library is a file hosting storage used by the organisation to store all files related to the department or project. A library can be used to organise files and make it easier to find them. In this way, everyone can have access to them and share them with colleagues easily from any location. The access to files will depend on the employees' permissions. Additionally, Microsoft SharePoint Online integrates seamlessly with Microsoft Office 365, which means the document changes are instant.

Workflows

A workflow is a sequence of events triggered by actions carried out within the intranet. This is one of the outstanding features of SharePoint Online powered by Microsoft Flow. It allows automating the activities of the business process increasing productivity. The design of the business process in SharePoint turns out a critical area if the company want to take the most of this tool as automation will depend on the structure of the intranet and its content.

Views

A view is used to visualise the items of a list or library in different ways according to the selected fields. This can be modified in order to display specific data. As usage of the lists grows, using different views to organise the information is needed.

User Permissions

This functionality provides or restricts user access to the site or its contents. Site permissions apply normally throughout a site, and they allow assigning different access based on user role.

PowerApps

Microsoft PowerApps powers SharePoint Online to create sophisticated business applications to interact with the business information without writing code.

Mobile Experience

The platform is mobile-enabled which means the co-workers can use their mobile devices to access the sites or interact with other services at any time and in any place.

Some of the most significant capabilities that SharePoint Online brings to help users increase productivity at work are:

- Connectivity at any time, from anywhere, on any device with a responsive website design
- Centralisation and control of the information
- Storage of documents in the cloud via OneDrive
- Smart search system
- Collaboration and sharing of documents in real-time
- Revision and approval of documents
- Alert notifications to stay updated when lists or items change
- Improved graphic user interface to allow any employee to interact with the platform easily
- Automation of tasks by using workflows
- Integration with a range of different productivity apps and services

PRODUCTIVITY AND TECHNOLOGY IN NEW ZEALAND SMES ENTERPRISES

Some tend to associate productivity with working hard rather than working smart, and the former, in terms of worldview, may lead to undermining the productivity. In short, productivity is described as the process of doing more with less resource. The time has come and gone where productivity is a luxury. These days increasing productivity is indispensable to stay in business, and the usage of technology is critical to enhancing it in the organisation. The development of New Zealand IT and the mere fact of utilising data smartly could lead to an economic boost of up to $4.5 billion [7].

New Zealand is a small economy, which suffers from constraints of scale and other inefficiencies. Nevertheless, this is not an excuse to be disconnected from the world. IDC reported in 2016 that four out of five New Zealanders over the age of 18 own a smartphone [6]. The advances in mobility and cloud computing are changing the way of working, and utilising mobile-enabled IT solutions to be connected at the right time will allow us to transform business processes, operations or develop more profitable business models.

There has been evidence that SMEs in New Zealand are not taking sufficient advantage of computers apart from accounting applications, spreadsheets and word processors. In addition to this, most users are not computer specialists [3]. This means that either SMEs lack understanding of the potential of implementing more technological tools, or they believe these tools are still cost prohibited. Today there are several options, within budget, to take full advantage of new technology. Businesses are not making the money they should, and workers are not earning high enough wages because of the levels of productivity [1].

THE POTENTIAL OF SHAREPOINT ONLINE

The proper use of SharePoint Online brings significant productivity growth for the business. Mobility and connectivity are some of the most significant improvements in this release. Access to the intranet, which is the business information centre, everywhere and at any time helps co-workers to make more informed decisions. This also allows being connected with your work team to send and receive information in order to close deals faster. Work flows faster when everyone knows and can access to the business resources easily such as official documents, policies, and information. Modifying the business process to make it interact with SharePoint can streamline and automate processes. Administrative processes, for instance, can reduce the amount of paperwork, streamline the approval process and share the outcomes easily. The communication and collaboration are fully integrated by means of Office365 (Outlook, Skype or OneDrive).

With regard to data analysis, SharePoint displays specific primary reports automatically. However, advanced analysis and visualisation of data may be done via Power BI web-part. The real value of collecting and exchanging data is in using analytics to provide further information and insight. Instead of only inspecting raw data, analytics can solve the problems of the business.

CONCLUSIONS

Without a doubt, SMEs need to expand their horizons in terms of how to use technology for productivity enhancement. Microsoft Sharepoint Online is a versatile tool that can boost the productivity of SMEs and it is not necessary to utilise all functions available from the very beginning, as it is easily scalable. This platform has proven to help enterprises all over the world automate business processes and help provide a robust collaboration solution for employees. Nevertheless, it is imperative to implement easy to use solutions to promote the sense of ease of use and education programmes to increase the employee's familiarity with the computer systems. The perception of ease of use is inextricably linked to system's success. Failing to take it into account can result in a failed SharePoint Online implementation. Moreover, a genuine commitment is required by the management in order to obtain the best results.

Microsoft has made SharePoint incredibly easy to customize, but the help of a professional is still needed for configuration. It is not intended itself to be a plug and play solution. Building an effective intranet means more than only having access to commonly used enterprise content. It is important to underline that software adds no value in itself and that users usually do not care about the technology they are using; instead, they want solutions. Therefore, the management should invest time in internal conversations and in developing the business strategy as well as how SharePoint and its capabilities help streamline specific processes. Not to mention that the design of the intranet has to be user-centred in order to be useful.

Finally, many other technologies can provide extraordinary benefits in terms of efficiency, productivity and sustainability. SMEs should not forget to do a thorough analysis of their business requirements and processes to select the best IT solution and to take the most of it. Even small

enhancements in productivity growth can have a significant impact on the income and well-being of co-workers.

References

[1] Birchfield, R., n.d. Solving NZ's productivity puzzle. *New Zealand Management*, pp. 59(1), 34.

[2] Entrepeneur Middle East Staff, n.d. *SMEs Are Getting More and More Connected.* [Online]
Available at: https://www.entrepreneur.com/article/244030

[3] Igbaria, M., Zinatelli, N. & Alm, C., 1998. Analysis of Information Technology Success in Small Firms in New Zealand. *International Journal of Information Management,* pp. 103-119.

[4] Microsoft, 2017. *Microsoft SharePoint.* [Online]
Available at: http://sharepoint.microsoft.com

[5] Microsoft, 2017. *SharePoint 2016, Team Collaboration Software Tools.* [Online]
Available at: https://resources.office.com/en-us-landing-better-together-ebook.html

[6] New Zealand IoT Alliance, 2017. *Accelerating a Connected New Zealand.* [Online]
Available at: http://www.iotalliance.org.nz/

[7] New Zealand Technology Industry Association, 2017. *Research Reports.* [Online]
Available at: http://nztech.org.nz/wp-content/uploads/2014/10/NZTech-Annual-Report-2017-WEB.pdf

[8] Nolan, M., 2014. ICT and New Zealand. *New Zealand Management*, pp. 61(4), 29.

[9] OECD, 2017. *OECD Economic Surveys: New Zealand 2017,* Paris: OECD Publishing.

[10] O'Neil, K., 2016. *SharePoint 2016 Content Editor Instructor Guide.* s.l.:s.n.

[11] Oryszak, M., 2012. *Microsoft SharePoint 2010 Business Application Blueprints : Master SharePoint Application Development by Building Exciting SharePoint Business Solutions.* Birmingham: Packt Publishing.

[12] Ward, P., 2012. *Microsoft SharePoint for Business Executives : Q&A Handbook.* Birmingham: Packt Publishing.

Socially Responsible Investing as a Tool to Achieve Sustainable Development Goals

Stanislav A. Strizhov, Dr. Habil. in Economics, Professor, Head of the Department of Innovative Technologies in Public and Business Sectors, Institute of Business and Business Administration, Russian Presidential Academy of National Economy and Public Administration, Moscow, Russian Federation, st.strijov@gmai.com

Sergei Y. Abramovich, Ph. D. Student, Russian Presidential Academy of National Economy and Public Administration, Moscow, Russian Federation, s.y.abramovich@gmail.com

Abstract

The article is devoted to socially responsible investing (SRI) and its role in achieving sustainable development goals. Analyzing the dynamics of growth of socially responsible investment in the world, the authors explore the reasons of non-perception of the Russian financial and credit market important international initiatives in the field of SRI. Linking the issue of socially responsible investing with the level of development of corporate social responsibility in the business environment and showing the interaction and interdependence of these technologies, the authors formulate proposals which will give financial Russian market of a socially responsible nature, and turning his face to the issues of sustainable development. Among the proposed measures, there is the development of the Russian code of socially responsible investing.

Keywords: socially responsible investment; corporate social responsibility; sustainable development; environmental responsibility; credit and financial institutions.

Introduction

Sustainable development has become the main element of the global vision of our planet's future. The 2015 United Nations Climate Change Conference in Paris convinced skeptics of climatic changes and became a historic turning point in slowing the global warming (Climate Agreement, 2015). On September 25, 2015, in New York, the 193 member-states of the United Nations (including Russia) unanimously adopted a new sustainable development agenda, which is an ambitious global programme for sustainable future. They set 17 sustainable development goals (SDG) regarding climate and social and economic problems until 2030. Nowadays, it is these goals that are associated with sustainable development worldwide, with the search for the best ways to achieve them being the first priority for both the world and national economies.

Upon analyzing and grouping the goals into 3 dimensions (ecological, economic and social), the environmental safety appears to be the key condition for achieving the 17 SDG (Figure 1).



Fig. 1. The grouping of the 17 SDG into 3 dimensions: ecological, social and economic (Smith, 2017)

Among the contemporary problems able to do a potential harm, that of the climatic changes takes a lead. According to some experts, our planet has entered the era of dangerous ecological disasters. For now, about 40% of serious diseases and untimely deaths are connected with harmful environmental effects. Natural calamities deprive the global economy of 9% and the world GDP loses 3 % due to the ecosystem fragility, which has been rather noticeable in 2017. The share of the GDP losses is going to reach 8-10% due to the ecosystem degradation unless anything is done to change the situation.

The environmental changes have a significant effect on social and economic processes. Inaction may cost 2-4% of the world finance, which exceeds the sources used towards tackling the ecological safety challenges.

The realization of the 2030 Agenda for Sustainable Development (including the climate-related goals) will require $2-3 trillion annually but, despite all the good intentions of governments, only $160 billion is available. Currently, no country is ready to sacrifice the stability of its economic system for the 17 SDG achievements. Besides, considering the fact that very few instruments of monetary and tax policy are left in the developed countries, it becomes obvious that almost no-one is able to achieve these goals on their own. It normally requires the effective cooperation among a government, business and society.

Financial systems play the leading role in the process of achieving the sustainable development: money should work and be dynamic not static. This will require the creation and application of various financial instruments and technologies ensuring the solutions to the vital issues and achieving the sustainable future based on a new social contract. New financial instruments and technologies should be oriented towards society and applied on the world scale.

In order to make financial systems work for the good of the civil society rather than for the few (as is well known, in the contemporary world 1 % of the population has the same income as the rest 99 %), it is important to change the way the financial institutions function and ensure their social orientation. In this regard, the tools of socially oriented investing should be applied in business practice globally.

Literature Review

The single approach towards defining ‘socially responsible investment’ has not yet formed in the body of contemporary economic literature. The PRI Association states that “responsible investment represents an approach to investing that is oriented towards the inclusion of environmental and social factors and governance (ESG) into the investment decisions for a better risk management and long-term sustainable feedback (PRI Association, 2017)”. The Russian researches usually touch upon socially responsible investment that is, according to Demyakhina E. V. (2014), the guarantee for the sustainable economic and social development and the improvement of the living standards in general. Another view that is worthy states that socially responsible investment is the investment process which proves the investor’s responsibility for the consequences of these investments for the society, environment and their sustainable development and demonstrates the investor’s personal views and beliefs regarding socially important issues and social and cultural values through the voluntary and conscious choice of investing criteria and methods (Savina, 2015). There is an opinion that “socially responsible investments (SRI) are the investment of a company’s real assets in socially important public objects. This implies taking steps towards the solving the vital social issues” (Budenko, 2015).

In both publications and practice one can find the terms ‘social investments’ (SI) and ‘socially responsible investments’ (SRI) which are often used interchangeably. Taking into account such ambiguous views, there is a need for clarifying the definitions of these terms.

Social business investments are the finances as well as material, technological, managerial and other resources which business structures direct to the implementation of corporate social programmes and publicly important social projects in order to have internal (for the company) and external (for society) positive social and economic effects. SI are directed to the improvement of corporate policy and practice, relationships with internal and external concerned parties - the company’s stakeholders.

Socially responsible investments are the result of taking the decisions on investments considering their social and ecological consequences within traditional financial analysis. Socially responsible investments generate the need for the improvement of the policy and practice of a company and, unlike SI, function indirectly. The basis of SRI embraces the studying and defining companies as eligible for investing. The companies should meet certain criteria of corporate social responsibility that should be understood as open and transparent business practice based on ethics, respect for their employees, stakeholders and consumers as well as concern for the environment.

While social investments normally imply the inclination towards social responsibility, socially responsible investments are not always of social nature. For example, the investments in an oil production project are not social but if a borrowing company act according to the corporate social responsibility (CSR) principles, these investments can be considered as socially responsible.

Materials and Methods

The research was conducted based on the economic and logical analysis, expert evaluation method, and system approach.

The analysis of the dynamics of socially responsible investments in various world regions demonstrated that SRI represents the sustainable trend even in a volatile environment. This conclusion can be proved by reports presented at the 2015 United Nations Climate Change Conference and 2016 World Economic Forum in Davos, Switzerland. The ecological and social aspects are presented in almost all investments projects (Table 1).

Table 1: The dynamics of socially responsible investments in various world regions in 2014-2016 (trillion USD)

Countries	**2014**	**2016**
Europe	10,775	12,040
USA	6,572	8,723
Canada	729	1,086
Australia and New Zealand	148	516
Asia	45	52
Japan	7	474
Total	**18,276**	**22,890**

Source: Global Sustainable Investment Review 2016

The period of 2014-2016 saw an increase in socially responsible investments: 11.7% in Europe (from early 2014), 32.7% in the USA, 49% in Canada, the increase of 15.7% in Asia despite relatively small number of professionally managed assets. Overall, the amount of SRI has increased by 25% compared to 2014 and reached 22.89 trillion US dollars.

The 3-year profitability of the 20 largest foundations of SRI ranges from 40% to 60%. The average profitability of the largest SRI foundations for 3-year term is almost twice as high as that of Standard & Poor's (Table 2). This indicates positive dynamics of socially responsible investments on foreign financial markets (in post-crisis era).

Table 2: The 20 ethical foundations profitability for 3-year term, in percentage

No	Foundation	*3-year profitability in %*
1	Stewart Investors Asia Pacific Sustainability B GBP Acc	60.3
2	F&C Responsible Global Equity 2 Acc	59.2
3	Stewart Investors Worldwide Sustainability B Acc GBP	57.8
4	Pictet Water I dy GBP	57.2
5	Vanguard SRI Global Stock Acc GBP	53.1
6	FP WHEB Sustainability C Acc	52.9
7	Henderson Global Care Growth I GBP	51.0
8	Royal London Sustainable World Trust C Acc	50.9
9	Candriam Sustainable North America C Cap USD	49.6
10	Liontrust Sustainable Future Global Growth 2 Acc	48.8
11	Old Mutual Ethical R Acc GBP	47.8
12	Pictet Timber I dy GBP	45.5
13	Sarasin Responsible Global Equity P Acc	45.0
14	Aberdeen Multi Manager Ethical Portfolio I Acc	45.0
15	Candriam SRI Equity World C Cap EUR	44.2
16	Liontrust Sustainable Future European Growth 2 Acc	43.0
17	Liontrust Sustainable Future Absolute Growth 2 Acc	41.9
18	EdenTree Amity European B	40.5
19	BlackRock GF New Energy D2 USD	40.4
20	Jupiter Ecology I Acc	40.0

Source: Trustnet Limited, 2017

It is obvious that over the last 40 years the developed countries have come far in their practice of socially responsible investing. It has evolved from a single case of ethical investing, which is happening in Russia at the moment, to a separate segment of financial and stock markets having its own participants and infrastructure. Such investments are becoming prevalent and relevant even in crisis.

The 21 world largest bank group (39 countries, 90 banks, 80% of the world financial market (The Equator Principles Association, 2016)) signed the Equator Principles.

The number of financial institutions that signed the United Nations Principles for Responsible Investment increased from 100 in 2006 to 1,488 in 2016, with its assents estimated more than 60 trillion US dollars, which amounts to approximately a half of those of the world institutional investors in total (Responsible Investing is increasingly gaining power, 2016).

Taking such a step, the banks assumed the responsibility for the stability of the projects they invest to. The assumed responsibility is based on the transformation of the role played by financial institutions on the project finance market. Previously, ensuring the ecologically and socially responsible development was a unique prerogative of the borrowing party. Having maintained the non-interference earlier, the banks have come to the comprehension of their role and responsibility in the context of smart use of natural resources and social aspects regulation.

Unfortunately, Russia is still not a part of this as the system of socially responsible investment as such does not exist yet, the leading international initiatives in the field are not widely spread, every financial organization acts separately choosing its own way. For example, none of more than 600 functioning Russian banks share the Equator Principles and only few, e.g. Vnesheconombank,

URALSIB (Abramovich, 2016), adhere to some United Nations Principles for Responsible Investment. The disregard for those principles explains why the Russian financial institutions have not yet become full-fledged members of the world financial systems.

The current state of affairs is mainly due to the fact that the existing investment system is not oriented towards the sustainable development of the economy and society. The scheme (Figure 2) shows that, compared to the majority of other countries, Russia does not have a number of the key SRI elements, with social and economic environment being more likely to prevent rather than trigger sustainable development.

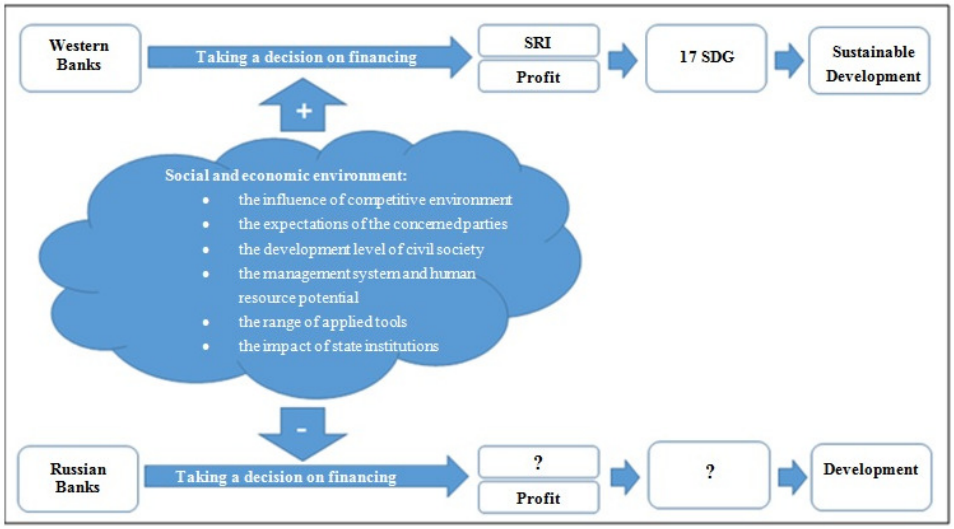


Fig.2. Investment purposes

Results

What are the reasons for the irresponsiveness of the Russian financial and credit market to the essential international initiatives regarding socially responsible investment?

These are the main of them.

First of all, one should note **the banks' apprehension about losing their borrowers if they are to observe the ecological and social requirements**. It is no secret that the majority of business structures do not burden themselves with the responsibilities for environment and labour relationship.

On should not fail to highlight **the lack of impetus for the financial services sector to actively introduce the consideration of ecological and social factors to the investment activity**. Both the government and the corporations and associations of the finance sphere do not pay sufficient attention to the problem of socially responsible investment. For example, despite being adopted by the Association of Russian Banks (ARB) in 2008, the Code of Banking Ethics does not have any reference to the socially responsible investment. The Association of Russian Banks has united about 80% of Russian banks (about 90% of the Russian bank system assets) (Abramovich, 2016), however, unfortunately, up to date, the Code is accepted by only 140 participants (the data obtained on the official website), with their number increased by 7 in 2016, and is not common among large financial organization. No mention of socially responsible investment can be found either in the charter or other documents of the Association of Regional Banks of Russia. In this context the Russian largest banks with state share show no initiative or example in terms of adopting the principles for the socially responsible investment.

The striking example of a passive state position is the adoption of more than 10 executive orders and programmes regarding the protection of the unique natural complex of Baikal lake at the federal level, with none of them being realized. Only when Vnesheconombank, which shares the United Nations

Principles for Responsible Investment, become the responsible creditor of the Baikal Pulp and Paper Mill, the production was halted.

Another thing that prevents SRI is **the underdevelopment of the stock market as a form of financing**. For example, in 2016 the number of IPO in Europe was 265 projects for 28.4 billion euros, in 2015 it was 364 projects for 57 billion euros (PricewaterhouseCoopers, 2017), whereas in Russia there were 3 projects for 750 million dollars in 2016 and 4 projects for 510 million dollars in 2015 (The IPO database, 2017).

The negative impact is also caused by **the structural crisis** that Russian economy faces. This crisis also involves the financial sector that is currently unable to receive foreign credits due to the sanctions imposed for political reasons and used as an economic pressure tool (according to the information dated by March, 2017, the 7 largest Russian banks (more than 50% of assets (Financial portal Banki.ru, 2017)) are subject to the sanctions).

Besides, **the Russian financial system does not generate "long-term" money** (it is very expensive for current state of economy).

The low information transparency of the financial sector does not stimulate SRI either.

On the whole, the above-mentioned factors point to the fact that, unlike the developed countries, the state of affairs in Russia does not stimulate the achievement of global sustainable development goals nor does it stimulate the most essential tool – SRI. The provision of the responsibility for the improper presentation of the social and ecological aspects in the projects has not been included in the government and the Central Bank agendas yet.

The projects with high profitability, which are intended to satisfy the economic interests of business without necessary relation to social and ecological needs, are still in preference. Even though all the documents are well designed, in practice normally the extra control over the implementation of such projects is not executed and the responsibility commitments are not evaluated.

The investment priority is still the orientation towards gaining profit in a short term. The only exception for the environment or social problems to be taken into consideration is when the participants of investment projects have or count on getting credited by foreign financial structures.

Discussion

What are the measures that should be taken to transform the landscape of the Russian credit and financial market making it socially responsible and turning it towards the sustainability problems?

Some problematic issues are mentioned above and one should put a sufficient emphasis on tackling them. However, there are two significant issues that, if ignored, will impede the dynamics of forming the socially responsible investment in the country.
Above all, the business community should reach the appropriate degree of social responsibility, which will allow to claim the CSR to be not only declared but also put into practice of many Russian companies. So far, only a couple of hundreds of business structures (mainly large business representatives) can be mentioned in this connection. They maintain their positions in different rankings from year to year and are familiar to the Russian Union of Industrialists and Entrepreneurs (RSPP), the Association of Russian Managers and experts community (there are 165 companies in the National Register of corporate nonfinancial reports of the RSPP). If a credit and financial organization does not have the appropriate pool of socially responsible potential borrowers, of course, it is unlikely to limit its actions and credit opportunities assuming the commitments imposed by certain international initiatives.

In this case, one can notice the mutual influence and interrelation between socially responsible investment and corporate social responsibility.

On the one hand, the business structures, whether they want it or not, have to implement the ISO standards, demonstrate the adherence to the Global contract requirements, draw up the nonfinancial reports based on the GRI, comply with other requirements of the main CSR documents. And the occasional charity alone is not an option.

On the other hand, the formation of the system platform of CSR in the business environment provides the financial institutions with the favorable conditions for backing the initiatives about the socially responsible investment.

However, the current state of affairs in both the country's financial and credit system and its business environment should be perceived adequately.

Even in the emergence of favorable conditions, one should not expect active steps towards joining the Equator Principles and the United Nations Principles for Responsible Investment on behalf of the Russian banks as the commitments they would have to assume are rather strict. The examples from the CSR development practice show that only the pressing circumstances push the Russian companies towards the implementation of the international CSR standards. Thus, in case of SRI, the first step should be a Russian document, perhaps, ***The Russian Code of Socially Responsible Investment***. It is sure to be carried out taking into account the provisions of the main international SRI initiatives, but also considering the changing landscape of Russian business environment and stock market. Whether this mechanism function or not depends on who the initiator will be and what resources will be used to carry out the Code draft. And, certainly, the success will depend on the interest of the Government and Central Bank in solving this problem.

Conclusion

The contemporary conditions make it clear that the mechanism of socially responsible investment is the key tool of sustainable development.

The successful integration of SRI into the practice of Russian financial institutions can be realized only if this process becomes systemwide including both the support for commonly acknowledged world initiatives and the development of the Russian document (the Russian Code of Socially Responsible Investment) whose adoption will expand the scale of the socially responsible investment in the country. The realization of such measures will allow to enter a new development stage, create a wide number of the opportunities to minimize and optimize risks (including the ecological and social ones), ensure the implementation of policies and procedures providing the proper reaction to negatives factors. Besides, it will allow to define the space for synergy and the achievement of high results in social and economic activity. Moreover, there will be the possibility to create such a Russian investment system, which would consider the ecological safety as the integral part of the technical and technological progress, creating the favourable environment for human life.

Finally, there will appear the possibility to conduct a systematic transformation of the investment processes management system, create new socially oriented systems based on the common world initiatives, modern risk management practices, new technologies (including IT), innovation management, performance quality management system (GRI 4), project management. The new socially oriented management system of investment flows will ensure the effective realization of 17 SDG and be synchronized with the key objectives of the concerned parties.

The procrastination of the reforms will lag increasingly behind (compared to the developed economies) in terms of the social and economic development pace.

References

Abramovich, S. Y. (2016) Corporate social responsibility as an effective tool of integrating the domestic investing to business practice of Russian financial institutions, *Voprosy economiki i prava*, 3(93), 116-120.

Budenko, N. V. (2015) CSR: responsible investment is gaining momentum. Retrieved from http://csrjournal.com/16266-kso-otvetstvennoe-investirovanie-nabiraet-oboroty.html (accessed August 10, 2017)

Demyakhina, E. V. (2014) Principles for corporate social responsibility of business. *Science, Technology and Life – 2014: Proceedings of the international Scientific Conference*. Karlovy Vary, December 27-28, p. 399-407.

Fabius, L. (2015) With landmark climate accord, world marks turn from fossil fuels. Retrieved from http://www.reuters.com/article/us-climatechange-summit-idUSKBN0TV04L20151212#gVKudBATCD0EGdxL.97 (accessed on April 6, 2017)

Financial portal Banki.ru (2017). Retrieved from http://www.banki.ru/banks/ratings/?PROPERTY_ID=30&search[type]=name&sort_param=rating&sort_order%20=ASC&REGION_ID=0&date1=2017-03-01&date2=2015-12-01&IS_SHOW_GROUP=0&IS_SHOW_LIABILITIES=0 (accessed May 2, 2017)

Global Sustainable Investment Review 2016 (2016) Retrieved from http://www.gsi-alliance.org/wp-content/uploads/2017/03/GSIR_Review2016.F.pdf (accessed on April 4, 2017)

Paris Climate Agreement (2015). Retrieved from http://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf (accessed April 20, 2017)

PRI Association (2017) What is responsible investment? - Principles for Responsible Investment. Retrieved from https://www.unpri.org/about/what-is-responsible-investment (accessed on August 22, 2017)

PricewaterhouseCoopers (2017). Retrieved from http://www.pwc.ru/ru/press-releases/2017/ipo-press-release.html (accessed April 28, 2017)

Responsible Investing is increasingly gaining power (2016). Retrieved from http://www.investinfra.ru/novosti/570-otvetstvennoe-investirovanie-stanovitsia-vse-bolee-vliiatelnoi-ideologiei.html (accessed April 28, 2017)

Rockström, J., Sukhdev, P. (2016) Presentation at EAT conference. Retrieved from https://www.youtube.com/watch?v=tah8QlhQLeQ (accessed on April 6, 2017)

Romanova, E. (2014) Investments and conscious. Retrieved from http://www.kommersant.ru/doc/2427127

Savina, T. N. (2015) Conceptual basis of the research methodology of the socially responsible investment research, Ekonomicheskii analis: teoria i praktika, 9(408), 52-62.

Smith, P. (2017) The Sustainable Development Goals: No More Business As Usual. Retrieved from http://drukjournal.bt/the-sustainable-development-goals-no-more-business-as-usual/ (accessed on August 11, 2017)

The 17 sustainable development goals to transform our world. Retrieved from http://www.un.org/sustainabledevelopment/ru/sustainable-development-goals/ (accessed April 3, 2017)

The Association of Russian Banks. Retrieved form https:// www.arb.ru/ (accessed on May 1, 2017)

The Equator Principles Association (2016) The Equator Principles. Retrieved from www.equator-principles.com (accessed on May 4, 2017)

The IPO database (2017). Retrieved from http://www.preqveca.ru/placements/ (accessed on April 28, 2017)

Trustnet Limited (2017). Retrieved from https://www.trustnet.com/ia-unit-trusts/price-AssetClass=I:ETHL&Pfsorte%20dColumn=Performance (accessed May 6, 2017)

US SIF (2013) Investing to Curb Climate Change: A Guide for the Individual Investor. Retrieved from http://www.ussif.org/files/Publications/SRI_Climate_Guide.pdf (accessed on April 6, 2017)

US SIF (2016) The Impact of Sustainable and Responsible Investment. Retrieved from http://www.ussif.org/files/Publications/USSIF_ImpactofSRI_FINAL.pdf (accessed on August 8, 2017)

Application for Human Resource Training and Cost Reduction by Prescribing Product Precision Based On Size Dependent Geometric Tolerances

Ionuţ Ghionea, POLITEHNICA University of Bucharest, Romania, ionut76@hotmail.com
Aurelian Vișan, POLITEHNICA University of Bucharest, Romania, aurelianvisan2003@yahoo.com
Paulina Spânu, POLITEHNICA University of Bucharest, Romania, pauspa16@yahoo.com
Cătălin Ionescu, POLITEHNICA University of Bucharest, catalin.ionescu24@gmail.com

Abstract

The paper highlights the training of design engineers for reducing manufacturing costs at the design stage using prescription of product precision based on size dependent geometric tolerances. Given the complexity and multitude of such cases, the authors have made several LabView applications to help designers. In the present paper, there is presented an application in case of precision prescription of true position. For this, one of the cases has been generalized and the necessary mathematical models have been achieved. The author's application provides support to designers and technologists for prescribing and interpreting precision of true position based on the principle of maximum material level.

Keywords: human resources, cost reduction, LabView, prescribed precision, tolerance

1. Introduction

In designing activity, an important factor influencing the final cost of a product is the precision prescribed for the characteristics of its surfaces, namely the precision of the dimensions, macro-geometric shape and micro-geometric shape, the precision of the relative position, etc. From the literature (Ionescu N., 2016) it is known the principle according to which the lower the tolerance of a characteristic, the higher its cost of realization. At very small tolerances prescribed for certain dimensions, the cost can increase exponentially. Under these circumstances, each class of tolerance prescribed in the design by the design engineer can lead to significant variations in the cost of manufacturing the product. One way to reduce manufacturing costs is to prescribe the precision of certain features of products or their components based on size-dependent geometric tolerances. This approach leads to increased tolerances of shape and position depending on the actual size and consequently to the reduction of manufacturing costs. Both ASME (ASME, 2009) and ISO (ISO, 2015) standards have numerous cases where dimensional tolerances can be used, such as the maximum material principle Ⓜ, the envelope condition Ⓔ, and the minimum material principle Ⓛ.

Prescribing precision based on size-dependent tolerances is a complex activity that involves a lot of knowledge and a high design experience. Under today's competitive pricing markets, the professional training of designers has a very important role in reducing manufacturing costs. In many cases, design engineer training relies heavily on knowledge of software commands used without prioritizing design skills in accordance with the functional role and without actually looking for cost reduction solutions at the design stage.

In this context, an idea of creating an easy to use, but complex, tool appeared and our team designed it as a LabVIEW virtual instrument using existing literature (Abaza, 2014, Savu, 2014). This tool supports both engineers: the designer, who prescribes the size-dependent tolerances and the technologist, who should be able to know and interpret these prescriptions in the design process of manufacturing technologies. Currently, there are no support applications for interpretation of precision prescribing based on size-dependent geometric tolerances. How to interpret and implement such prescriptions depends on the experience of the designer or technologist.

The paper is a part of a more complex project that aims to provide applications for a larger number of situations that the designer or the technologist could come across. It also aims the design of indicators that will be used in a general methodology for assessing the product recyclability.

2. View Points On the Design Engineers' Competences

The design activity involves the designers' competence to prescribe dimensional precision (DP), macro-geometry or shape precision (SP), micro-geometry or roughness precision (RP), relative position precision (PP), etc. Based on the experience, the authors consider that the main competencies of designers can be synthesized as follows:

- to be able to analyze and interpret all aspects of prescribing DP, SP, RP, PP, existing in the assembly and execution drawings;
- to set the values of the required sizes in prescribing DP, SP, RP, PP, including by choosing appropriate values based on standards;
- to inscribe the DP, SP, RP, PP in drawings based on individual and general tolerances in design activity, in accordance with the standards;
- creatively use the DP, SP, RP, PP in the complex professional projects involving execution drawing and assembly drawings in computer assisted design;
- to make decisions on the tolerance of dimensional, shape and position characteristics in individual and general tolerance classes, taking into account the functional role of parts and surfaces, and assume responsibility for their concordance with the functional role and rational prescription tolerances based on cost-tolerance dependency;
- A distinct ability, of particular importance, is the prescription of the macrogeometric shape and the position based on the size-dependent tolerances, respectively on the principle of the maximum material, the envelope condition, the principle of the minimum material and the reciprocity condition.

Various studies carried out as part of the projects as well as the professional training experience of the authors have highlighted that design engineers often do not know the correct meaning and use of these notations, prescribe them intuitively, sometimes based on experience, and in very many cases of complex designs, some prescriptions are wrong or incomplete. The applications developed by the team of authors and the researches they have carried out aim to help the designer to prescribe and the technologist engineer to implement in manufacturing the prescribed features in the piece in an intuitive and simulated – assisted environment. Based on the experience gained through the first application regarding precription precision of straightness (Ionescu C., 2016) based of maximum material principle, the authors continue the work of realizing applications in LabView to help designers and technology by addressing true position precision in this paper.

3. Prescribing True Position Precision Based On Size-Dependent Tolerances

The true position, also named in ISO standards position (ISO, 2015), is a characteristic of surface position, by means of which we require the tolerance to the relative position of certain surfaces be different from that set by the nominal dimension of relative position, namely the one inscribed in the tolerance frame. In that case, the nominal dimensions that determine the relative position of surfaces, in relation with the datum, are no longer tolerated, but they are inscribed in a rectangle, assigned with the significance of „exact theoretical sizes" (Ionescu N., 2016).

For the realization of the application it is considered a very common case in the design activity, namely the true position of a cylindrical surface (hole) compared to three reference surfaces, according to the example in Figure 1. If we prescribe the true position precision of the surface only by tolerance of the 50 and 60 mm dimensions (based on individual o general tolerances), the tolerance zone for the hole axis is parallelepipedal. If we consider the "theoretically exact" 50 and 60 dimensions and prescribe precision based on the true position tolerance, as in Figure 1, the tolerance zone will be cylindrical with a circular transverse section (circle C_3 in figure 2; circle C_6 in figure 3).

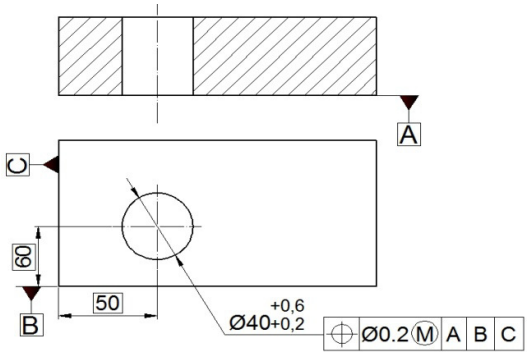


Fig. 1: Example of true position prescription based on maximum material principle

When prescribing true position precision based on the principle of maximum material applied to the tolerated surface, the diameter of the tolerance zone may vary from the value Ø0.2 if the effective hole dimension is the maximum of the material (minimum diameter, D_{min} = 40.2) and Ø0.6 (sum of the inscribed value 0.2 and the difference between the effective diameter 40.6 and the maximum material diameter Ø40.2) if the effective hole diameter is at least the material (D_{max} = 40.6).

In Figure 2, the centers of the actual C_2 circles must be within the tolerance zone of Ø0.2. The locus of the points having the minimum distance from the origin P of the axis system is the circle C_2, referred to as the Virtual Condition Boundary, which must not be violated.

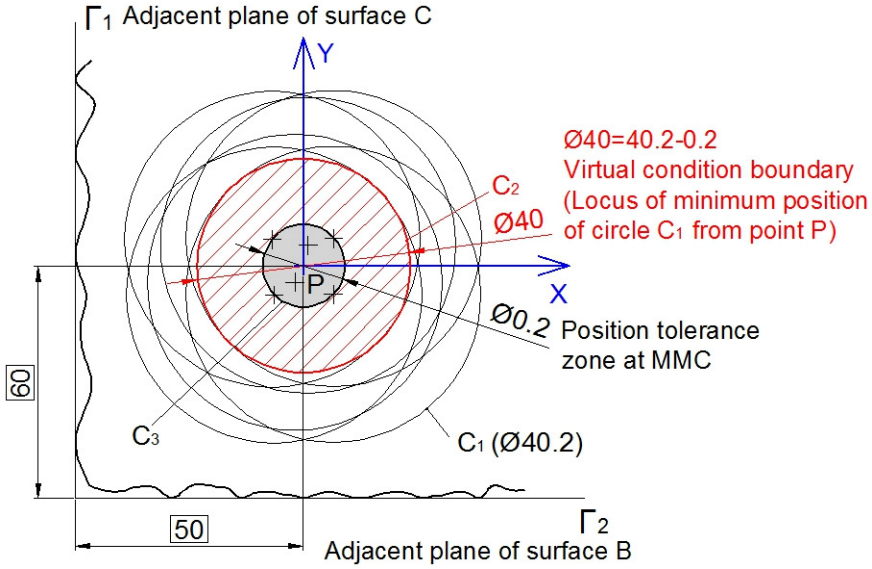


Fig. 2: Generation of virtual condition boundary

At minimum of material level (D_{max}), the diameter of the tolerance area increases to Ø0.6 and the centers of circles C_4 (effective diameters) must be included in this area (figure 3). In this case, the locus of the points of the C_4 circles at maximum distance to the origin P generates the C_5 circle, referred to as the Resultant Condition Boundary.

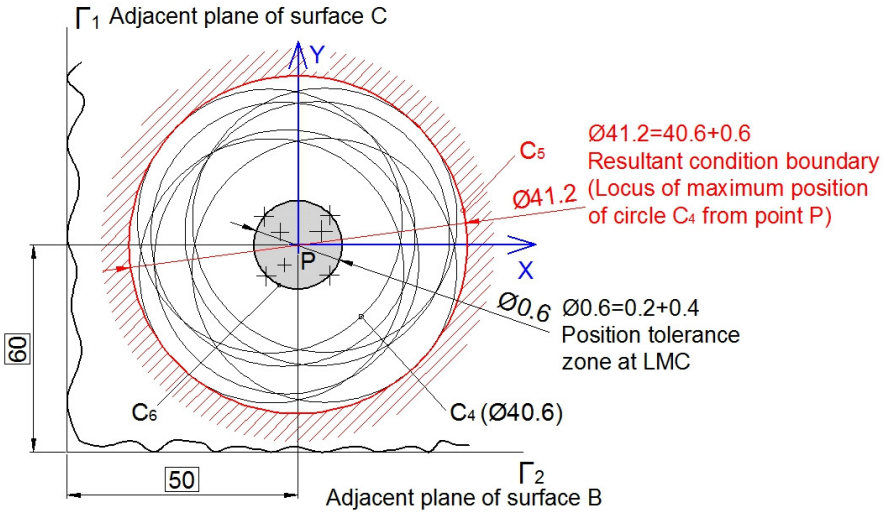


Fig. 3: Generation of virtual resultant condition boundary

For actual diameters with intermediate values, between D_{min} = 40.2 and D_{max} = 40.6 at the tolerance value of 0.2 inscribed in the drawing, the difference between the actual diameter and the maximum material level is added.

From the above it follows that this case, although it is only one of the many relatively simple cases, has a relatively complex interpretation and can raise serious problems for less experienced designers and manufacturing engineers. In order to create the application to help them, we need to generalize this case and translate the whole situation into mathematical models that help us make the LabView application.

3. Mathematical Modeling of True Positioning Precision Prescription

For generalization, T_i is denotes inscribed true position tolerance (Ø0.2), with D_{MML} = D_{min} the diameter of the hole to the maximum material level (Ø40.2), with D_{LML} = D_{max} the hole diameter at the minimum material level (Ø40.6), D_{ef} = actual (effective) diameter and with x_0, y_0 the coordinates of centers of circles C_1 and C_6.

In relation to the coordinate system (Figure 2), the circle C_2 represents the virtual condition boundary (VCB) and is, in fact, the locus of the minimum position of the circle C_1 points from point P. C_2 is centered in the origin and has the equation:

$$(C_2)\ x^2 + y^2 = \left(\frac{D_{MML} - T_i}{2}\right)^2 \tag{1}$$

Circle C_1 has the coordinates of the center x_0 and y_0 and will have the equation:

$$(C_1)\ (x - x_0)^2 + (y - y_0)^2 = \left(\frac{D_{MML}}{2}\right)^2 \tag{2}$$

where x_0 and y_0 must be included in the tolerance zone of $ØT_i$, so:

$$(C_3)\ x_0^2 + y_0^2 \le \left(\frac{T_i}{2}\right)^2 \tag{3}$$

For the resultant condition boundary (RCB) (fig. 3) the ecuation of circle C_5 is:

$$(C_5)\ x^2 + y^2 = \left(\frac{D_{LML} + T_i + T_D}{2}\right)^2 \tag{4}$$

$$(C_4)\ (x - x_0)^2 + (y - y_0)^2 = \left(\frac{D_{LML}}{2}\right)^2 \tag{5}$$

$$(C_6)\ x_0^2 + y_0^2 \le \left(\frac{Ti + T_D}{2}\right)^2 \tag{6}$$

Generalizing relations (3) and (6) is obtained:

$$x_0^2 + y_0^2 \le \left(\frac{Ti + D_{ef} - D_{MML}}{2}\right)^2 \tag{7}$$

The relation (7) is the general equation of the true position tolerance zone. It can be noticed that if $D_{ef} = D_{MML} = D_{min}$ we get the relation (3), and if $D_{ef} = D_{LML} = D_{max}$ we get the relation (6) because $T_D = D_{max} - D_{min} = D_{LML} - D_{MML} = ES - EI$ is the prescribed tolerance of the hole.

4. Designing the Application In The Labview Programming Environment

4.1. Description of application

The virtual instrument developed by authors in LabVIEW allows the user to specify, using numeric control elements, the following entry values: nominal diameter of the hole, effective hole diameter, length, the lower limit deviation, the upper limit deviation and inscribed position tolerance.

For example, the LabView application for design and technology engineers allows the user who encounters positioning precision based on the maximum material principle to enter the nominal diameter D_{nom} (40 in the example shown in figure 1), the upper limit deviation *ES* (0.6), the lower limit deviation *EI* (0.2) and true position tolerance (0.2) valid for maximum material level (MML). The application displays true position tolerance (intermediate) resulting from obtaining a certain effective diameter (D_{ef}) of hole as well as the interpretation according to the figures 2 and 3.

4.2. User interface design

On the Front Panel there are different types of control elements, as is shown in the figure 4, which are used for introducing data as it follows:

- Five numeric control elements and two numeric control elements of the *Knob* type having the digital display visible used to specify the diameters. The control elements were configured to allow the numerical values introduction with three decimals;
- Two String Indicators elements to display the length calculated values with their units;
- Three numerical indicator elements configured to display the numerical values with three decimals;
- One XY Graph type indicator element used for graphical representations.

Figure 4 shows a concrete example of the program. The user types the values of the nominal diameter of the hole, the position sizes related to datums, the lower limit deviation *EI*, the upper limit deviation *ES*, and the inscribed position tolerance T_i. Taking into account that the effective diameter is 40.4, the software does the difference between 40.4 and 40.1 which is 0.3 and is automatically added to the inscribed tolerance which equals 0.6. Doing so, the sizes calculated values will be *Lc* = 50±0.3, *lc* = 60±0.3, D_{MML} = 40.2, D_{LML} = 40.6 and *T* size dependent position tolerance equals 0.6.

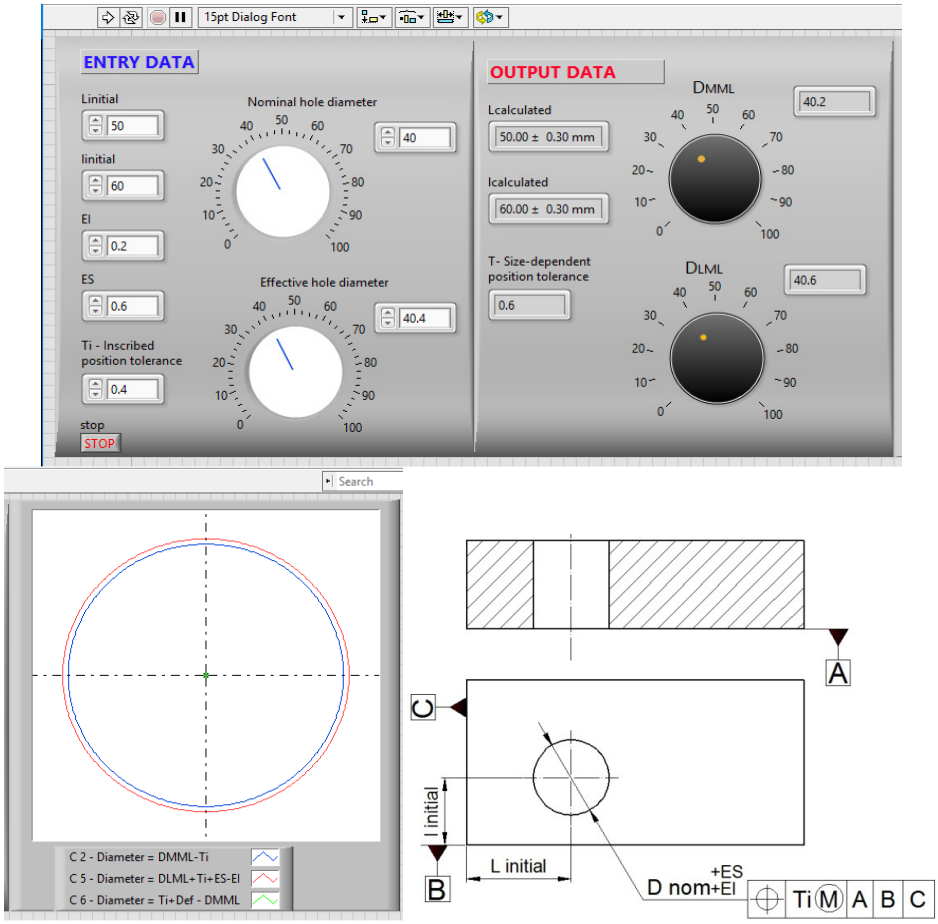


Fig. 4: Front panel of the virtual instrument

4.3. Interface Design with the Designer

The mathematical modeling of the data was made by developing the programming algorithm using the Block Diagram of the virtual instrument as is shown in the figure 5. For the graphic representations, there were used a *For* structure, *Build Array* and *Bundle* functions. Also, a *Formula Node* was used to calculate the results according to the formulas 1 – 7. The transformation of numeric values into text values was performed using the *Number to Fractional String* function. A *Case* structure was used for calculating the results only that the value of the effective diameter specified by the user belongs to the [DMML, DLML] range. The virtualinstrument will run until the user will press the *Stop* button because all functions and elemets are displayed into the *While* structure action towhose conditioning terminal is connected a *Bolean* control element.

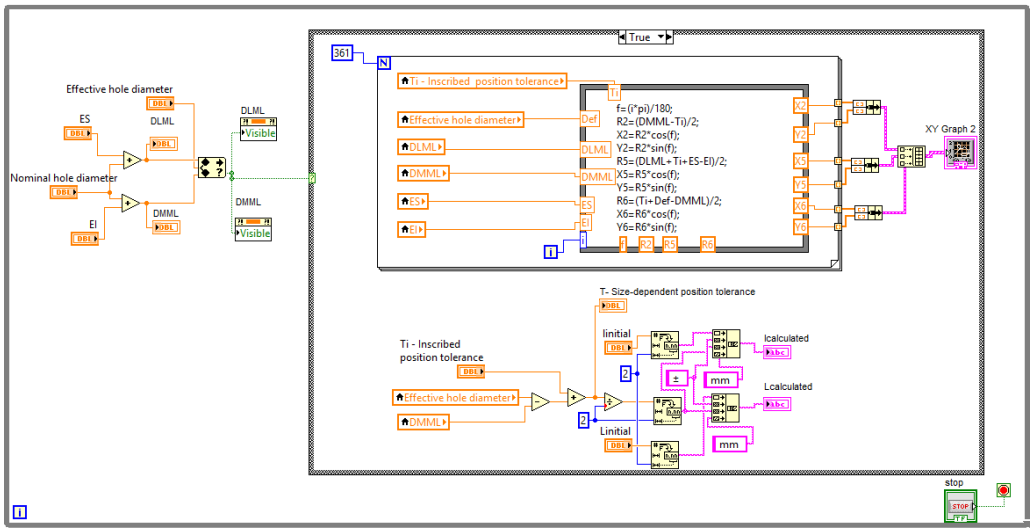


Fig. 5: Block Diagram window of the application

4.3. Using the application

To use the virtual instrument, the technologist or the designer has a friendly and simple interface**.** In order to obtain the values of the size dependent geometrical tolerances the following steps must be followed:

STEP 1: Specify the nominal diameter of the hole D_{nom};
STEP 2: Specify the sizes;
STEP 3: Specify the lower limit deviation *EI*, the upper limit deviation *ES*;
STEP 4: Specify the inscribed position tolerance T_i from execution drawing;
STEP 5: Specify the effective diameter of the hole D_{ef};
STEP 6: Run the program to display the computed values and the graphical representations of the tolerance dependency on the actual dimension and the drawing of the hole.
STEP 7: The virtualinstrument will run until the user will press the Stop button.

In the manufacturing process, the tehnologist engineer will enter the input data according to figure 4. After the piece has been machined, the diameter of the piece is measured (actual diameter) and is set in the application (Figure 5 – entry data). According to this effective diameter, the application provides the tolerance value at the true position in the output data window and the tehnologist can determine the position of the hole axis relative to the reference surfaces (datums).

5. Conclusions

The competences of design engineers to prescribe, interpret and implement precision of product characteristics based on size-dependent geometric tolerances are particularly important for reducing manufacturing costs of products. The application developed by authors in the LabView programming environment has a three-fold purpose: engineers' training, support for design engineers in designing activity and support for technology engineers in manufacturing according to prescriptions on true position precision based on size-dependent tolerances. To accomplish this and other similar applications, mathematical modeling of the way in which the tolerance zone is generated and modified with the change in effective size is required.

The application developed in the paper is part of a wider project of authors aimed at creating a set of similar applications for prescribing precision of shape and position. The application can also be adapted for shafts with the indication that in this case the diameter of maximum material level is the

maximum diameter of the shaft and the minimum material level diameter is the minimum diameter of the shaft.

Acknowledgement

The research paper was performed within the project entitled "Researches on the development of some support applications for precision prescribing based on dimension dependent geometrical tolerances in computer-aided design and training of specialists in the field", Project no. 1/2017, Partners: University Politehnica of Bucharest, Center of Advanced Technologies CTANM and Pro Management Training Center Bucharest.

References

[1] Abaza B., Savu T., Spânu P. (2014), Algoritmi – îndrumar de laborator, Editura PRINTEH, Bucureşti;
[2] Ionescu C., Spânu P., Vişan A. (2016), Reducing Products Costs by Prescribing Geometric Precision based on Size - Dependent Tolerances, Proceedings of 28th IBIMA Conference Seville, Spain 9 - 10 November 2016, ISBN: 978-0-9860419-8-3;
[3] Ionescu N., Visan A. (2016), Tolerances Design, Editura PRINTECH, Bucureşti;
[4] Savu T., Abaza B., Spânu P. (2014), Reprezentări grafice – îndrumar de laborator, Editura PRINTEH, Bucureşti;
[5] ***, Dimensioning and Tolerancing, ASME Y15.5M:2009;
[6] ***, EN ISO 2692/2015, Geometrical product specifications (GPS) - Geometrical tolerancing - Maximum material requirement (MMR), least material requirement (LMR) and reciprocity requirement (RPR)".

Incentives in Strategy Implementation Projects: A Normative Analysis

Jan Kiehne, Bucharest University of Economic Studies, Bucharest, Romania, jan.kiehne@gmail.com
Ann-Kathrin Arp, Bucharest University of Economic Studies, Bucharest, Romania, annkathrin_arp@web.de
Timm Schüler, Bucharest University of Economic Studies, Bucharest, Romania, timmcs@gmx.net

Abstract

Strategies often fail not because they are poorly designed but because they are poorly implemented. Empirical research has identified and described numerous obstacles to successful strategy implementation, however little work has been done regarding normative analysis of such problems and how they relate to and impact strategy implementation processes.
This article builds upon a previous analysis of middle management's role in strategy implementation by extending the analytical model presented in that study in terms of transformational input-output relationship as well as in terms of how values are assigned to certain project results.
The authors show that the owner of a strategy should set incentives such that a strategy implementation manager puts forward sufficient effort to push the project beyond a minimal implementation level, otherwise the strategy owner runs the risk of realizing a negative return. As a consequence he may have to take on a higher share of cost associated with implementation risk than in non-strategic projects. The authors further discuss alternative compensation approaches in order to overcome some of the issues inherent in classic incentive schemes.

Keywords: Strategy Implementation, Incentives, Normative Analysis, Risk Sharing.

Introduction

Sound strategy execution is at least as important as high quality strategy formulation (Hrebiniak 2008). Two out of three strategies never get fully implemented (Johnson 2004). Multiple studies have identified and described factors which cause problems in strategy implementation (Alexander 1985; Al-Ghamdi 1998; Wernham 1985; Beer & Eisenstat 2000). However, the issues at hand are not only process related but also behavioral in nature (Kolks 1990). Yet little research effort has been conducted in the past to go beyond pure descriptive analysis when it comes to understanding issues around strategy implementation activities. Building upon a recent study (Kiehne et al. 2017) this paper is aiming at making a contribution in this regard by looking at and analyzing how and when certain incentives promised to a manager responsible for implementing a strategy work and when not.

Literature Review

"Strategic management is defined as the set of decisions and actions resulting in the formulation and implementation of strategies designed to achieve the objectives of the organization" (Pearce & Robinson 2000). While there are schools of thought that strategies sometimes are emergent in nature and develop from within an organization (Mintzberg et al. 2001), this study takes on a classic normative view (Ansoff 1965; Andrews 1971; Porter 1985) with hierarchically formulated strategies limiting the degrees of freedom for lower level strategies within the organization (Welge & Al-Laham 2012).

Strategy implementation can be defined as the transformation of strategic plans in specific, strategically directed action of all members of an organization (Al-Laham 1997). For analytical purposes strategy formulation and implementation are considered subsequent phases of the strategy process even though there is agreement in the literature and empirical evidence that implementation issues should be considered already when the strategy is being formulated (Bourgeois & Brodwin 1984).

The organizational variables that need to be worked on depend on the given context (Balogun & Hailey 2008). Strategy implementation impacts both the structural framework of an organization as well as process interactions (Skivington & Daft 1991). Autocratic, participative, and cultural implementation styles have been empirically confirmed (Lehner 2004). Using an approach which matches given context variables (Nutt 1989) or strategic orientation (Andrews et al. 2011) significantly increases the likelihood of implementation success. High management involvement tactics generally yield better results than approaches with less involvement (Nutt 1987). Participative leadership styles take top management closer to where the work is done. It improves flow of information, provides additional perspectives and minimizes resistance to change (Salih & Doll 2013). Not involving middle management reduces process complexity for top management but should be balanced against negative effects of potential demotivation (Westley 1990).

Consensus as a strategic success factor should be managed along the dimensions of understanding and commitment. While commitment without full understanding of a strategy may deliver good results, no level of understanding can make up for lack of commitment (Floyd & Wooldridge 1992). Strategic alignment among the top management team has been found to positively impact organizational performance (Bourgeois 1980). The same is true in the context of a customer oriented strategy for managers and front-line employees (Ho et al. 2014). While some research suggests that the right level of consensus is contingent to the type of strategic process (normative or emergent) and the state an organization is within that process (Wooldridge & Floyd 1989), other studies found that consensus on the strategic approach (the means) or the strategic objectives (the ends) together with the strategic environment as mediating factors drive organizational performance (González-Benito et al. 2012). Yet, consensus on approach don't seem to correlate directly with consensus on objectives (Dess 1987). Consensus can be induced top-down as well as develop from within the organization (Markóczy 2001). In an international context, the degree of risk taking and the openness of decisions together with consensus positively impact performance (Roth 1992). Consensus has been found impact organizational performance more for differentiation strategies than for low-cost strategies (Homburg et al. 1999). Poor consensus may cause ineffective upward communication which in turn has negative effects on the quality of strategic decisions (Beer & Eisenstat 2000).

Communication as an important success factor for strategy implementation (Raps 2005) supports the achievement of consensus between management and operating staff (McDermott & Boyer 1999). Communication should be rich, two-way, critical and constructive (Balogun 2006). It need to be clear and in the language of the recipient, i.e. it must not only transport information but also translate it and put in context as required (Miller et al. 2008). Constant communication helps employees to connect their tasks with high-level goals of the organization (Johnson 2004). Communication is seen as particularly important for firms following prospector or differentiated defender strategies (Slater & Olson 2000). Adequate information systems help to integrate communication and control activities (Shah 2005). Communication should be directed both vertically to sell the change from top management to the organization (Hambrick & Cannella 1989) as well as horizontally for the purpose of lateral coordination (Wooldridge et al. 2008).

Structural changes as a means to implement strategies should be avoided if possible and no form of organizational structure seem to be superior in implementing strategic decisions (Miller et al. 2004). Before adjusting an organization, tools like the Balanced Scorecard based system of strategic schemes should be used to manage change within existing structures (Kaplan & Norton 2006).

Middle managers are key players in strategy implementation (Huy 2011; Wooldridge et al. 2008). Their participation tend to increase performance, but only up to a certain level. Increases in efficiency because of reduced complexity have to be traded off by top Management with loss of strategic control (Ahearne et al. 2014). Middle managers are a center of knowledge and idea generation for top management and particularly contribute during the phase of strategy formulation by generating strategic options to choose from (Wooldridge et al. 2008). They are an important source of innovation for top leadership (Kanter 1982).
Middle management can point at potential implementation problems (Salih & Doll 2013). They know who in their staffs is best qualified to support implementation activities (Huy 2001), help connect top

management with operational levels by facilitating the communication of the strategy (Herzig & Jimmieson 2006), translate strategic content (Salih & Doll 2013), and synthesize the change programs to be executed (Huy 2001). Middle managers help their staffs to cope with uncertainty experienced because of the change (Herzig & Jimmieson 2006), and by managing their emotions (Huy 2001). They keep day-to-day operations running (Huy 2001), which sometimes don't leave enough time to actively support the change process (Hornsby et al. 2002) which in turn may negatively impact the overall outcome. It is important that middle managers trust that the strategy will be successful, that they have the required skillset for execution, and that strategic goals are not in conflict with their personal goals (Judge & Stahl 1995). Particularly goal alignment between strategy owner and manager is important (Guth & MacMillan 1986), for example with performance oriented incentive systems which work best for employees with high level of consensus (Ho et al. 2014). Performance based measurement systems should be aligned with the chosen strategy and the industry the company competes in (Micheli et al. 2011).

Culture has been shown to be an important success factor (Alamsjah 2011). Middle managers may support or resist change correspondingly to their social status. Social emotional matters need to be actively searched for by top management by installing adequate communication forums or actively questioning taken-for-granted beliefs (Huy 2011).

Research Methodology

This study is normative in nature. It uses a quantitative model derived by the authors in an earlier paper (Kiehne et al. 2017) and extends it in terms of transformational input-output-relationship as well as output valuation approach. Theoretical results are discussed in the context of a strategy implementation environment as described in the previous section.

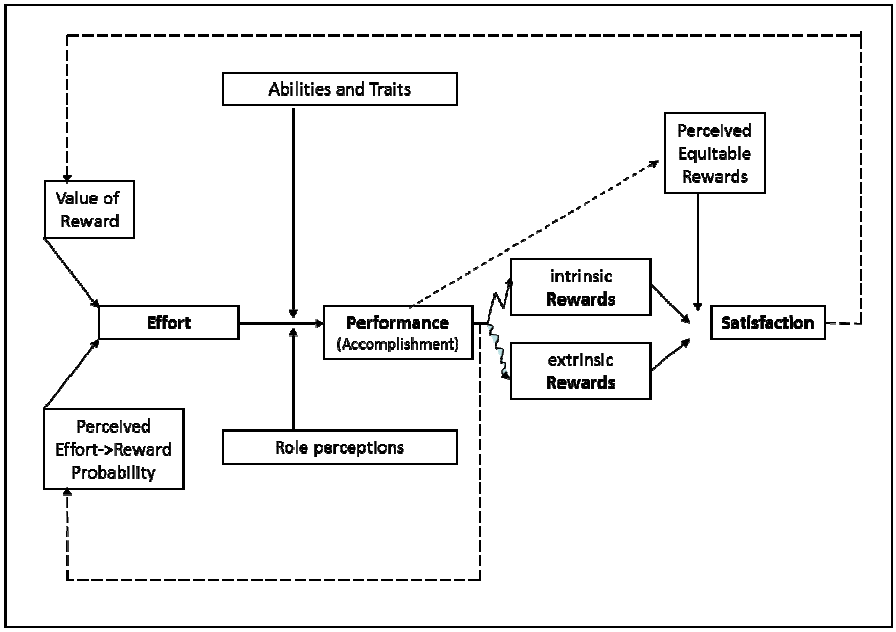


Fig. 1: Model of Managerial Motivation (source: Porter & Lawler 1968)

Theoretical Basis

Lyman Porter and Edward Lawler's model of managerial motivation (see Figure 1) can be transformed into a quantitative principal-agent model (see Figure 2) by making following additional assumptions: 1) the manager makes decisions in line with the Bernoulli principles, 2) the value the manager derives from intrinsic and extrinsic rewards can be described by a von Neumann - Morgenstern utility function, 3) the implementation manager and the owner of the strategy enter into

a contract which regulates (monetary) rewards based on project outcome, which is assumed to be measurable in an cardinal way and which takes on values between 0 (strategy not implemented) and 100 (strategy fully implemented), 4) the effort-performance relationship can be expressed or at least approximated by a mathematical input-output relation, 5) the uncertainty that certain input (effort) leads to certain output (performance) can be expressed by a probability function without shifting the upper or lower boundaries of the range of possible outputs. In line with the original Porter-Lawler model, the owner of the strategy cannot directly observe the (directed) effort of the implementation manager, and 6) the manager has an alternative, risk free source of income.

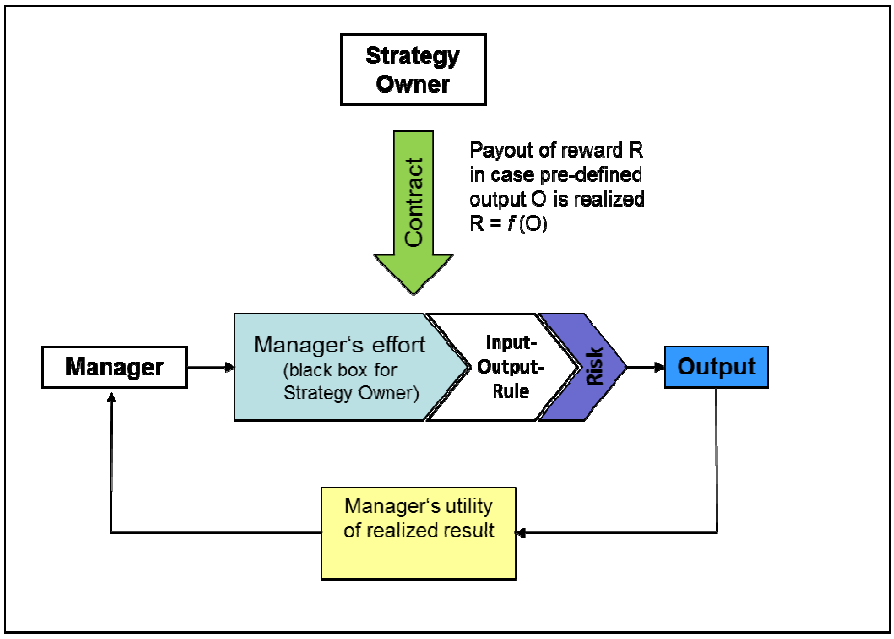


Fig. 2: Modified Porter-Lawler Model (source: Kiehne et al. 2017)

The Analytical Base Model

The base model assumes a linear input-output relationship where input is the effort level I chosen by the implementation manager and output is the degree to which the strategy has been implemented. In line with the assumptions described in the previous section, the owner of the strategy knows that increased effort on behalf of the manager increases expected output in the meaning of first order stochastic dominance without impacting the upper and lower output boundary. Therefore, the strategy owner cannot directly conclude from observed output levels to the manager's (directed) effort. Expected output increases with a factor x times effort I brought forward by the manager: E(O) = x * I. Output is assumed to be normally distributed with variance σ^2. The manager is risk averse with "a" being his risk-averseness factor. The strategy owner is risk neutral. The manager's utility function is additively separable $U_M(B,I) = - e^{-a*B} - y*I^2$ with "B" being a monetary reward received by the manager and "y" being the manager's penalty of work factor. The manager's risk free income alternative is RFI.

Both the owner of the strategy as well as the implementation manager strive to maximize their individual well-being, which yields following formal optimization problem:

The strategy owner is maximizing his expected utility level

$$Max_{f,F}\, E(U_S) = x * I^* - [f * x * I^* + F]$$

where f is the variable compensation factor (applied to the realized output), F is the fixed compensation and I^* is the effort level chosen by the manager given the agreed contract conditions.

The manager is aiming at maximizing his security equivalent

$$Max_{I^*}\, SE_M(B,\ I^*) = f * x * I^* + F - \frac{a}{2} * f^2 * \sigma^2 - y * I^2$$

where B is the total expected compensation f * x * I + F received by the manager. The term $\frac{a}{2} * f^2 * \sigma^2$ can be interpreted as the risk premium demanded by the manager and y * I^2 is the disutility of work experienced by the manager for the effort level brought forward.
The manager will only enter into the contract if his expected security equivalent is at least equal or greater than his risk free income alternative RFI which yields the following boundary condition (cooperation condition):

$$SE_M(B, I^*) = f * x * I^* + F - \frac{a}{2} * f^2 * \sigma^2 - y * I^2 \geq RFI.$$

The optimal effort level I^* can be found by setting the first derivative with respect to I of the manager's target function to zero:

$$I^* = f * \frac{x}{2y}$$

If the strategy owner sets the fixed compensation such that the cooperation condition is just being fulfilled, the optimal contract parameters f and F can be deducted by inserting the effort level chosen by the manager into the other equations and performing some rearrangements

$$f_{opt} = \frac{1}{1 + a * \frac{2 * y * \sigma^2}{x^2}}.$$

and inserting f_{opt} into the cooperation condition

$$F_{opt} = RFI - f_{opt}^2 * \left[\frac{x^2}{4 * y} - \frac{a * \sigma^2}{2}\right].$$

For a full description of the mathematical solution see for example (Laux 1990).

The base model yields some interesting insights into what drives successful implementation processes (Kiehne et al. 2017).
First, setting the right incentives is important in terms of how implementation managers act. This aspect will be further elaborated on and discussed during the remaining parts of this paper.
Second, the strategy owner will have to accept a certain risk premium over and above what the manager requests based on the model parameters in order to minimize the risk that the cooperation condition is violated in case unexpected issues appear during project execution.
Third, the strategy owner has to consider both process issues as well as behavioral issues when managing the overall process where behavioral issues do add to and reinforce process issues.
Fourth, the strategy owner needs to address both objective risks (tangible aspects of the implementation process) as well as perceived risks. Behavior of the implementation manager is driven by how he perceives the situation of the project, especially its risks and chances of being successful (successful in terms of the manager receiving the reward he expects for his effort). Thus perceived risks can negatively impact project results even if there are no real problems present

Critique of the Analytical Base Model

The base model described in the previous section has two significant shortcomings that need to be addressed for a more refined analysis in the context of strategy implementation. One of these is the fact that change processes are not linear. Change happens in several phases and this should be reflected in the design of the model. The other issue is that the base model assumes that strategy owner and implementation manager share the return of the project (the implementation manager receives his compensation, the strategy owner keeps the rest which under the assumptions taken can be positive or negative). This assumption is problematic for at least two reasons: 1) the monetary value of a successfully implemented strategy is hard to assess. 2) the value of a successfully implemented strategy can be expected to be significantly higher than the compensation the implementation manager receives and consequently the variable compensation factor f would be very small (and sensitive to data volatility).

Valuation of Successful Strategy Implementation Projects

Attaching a value to a new strategy is a challenging task. Using portfolio techniques , the value of one strategy vs. another (or the status quo) could be defined as the discounted cash flow difference between the two alternatives over time (Damodaran 2012). However, since only one scenario becomes reality, one stream of cash flows would always have to be estimated with corresponding

inaccuracy in results. For publicly traded companies, the change in market capitalization could be used to approximate how the markets value a new strategy. Problem here would be to determine when the markets start to reflect a new strategy in stock prices and how to eliminate other interfering factors. Realistically, the value of a strategy can be only very roughly approximated. Tying a manager's compensation to it would add a significant amount of uncertainty for him which, as pointed our earlier, is something the strategy owner would try to avoid since it unnecessarily increased the overall compensation level of the manager.

Change Process

A strategy can be considered successfully implemented when it is sufficiently applied at all levels of the organization which can be interpreted as "all members of the organization being aligned with the strategy to be implemented" (Kolks 1990).
For practical matters, the authors suggest that the degree to which a new strategy is being applied by an organization is assessed by defining key performance indicators (KPIs) during the planning phase and tracking their achievement. Tools like the Balanced Scorecard (Kaplan & Norton 1996) and Strategy Maps (Kaplan & Norton 2004) can be very useful in such a context. While many of such KPIs would still be qualitative in nature or only ordinarily measurable, thus resulting in a significant degree of subjectivity in setting individual scores and aggregating them to an overall target achievement value, the overall result can be expected to be sufficiently representative and not too sensitive to individual ratings. It has to be recognized though, that in cases where more than one manager is responsible for implementation or several strategies are being implemented in parallel (both may be the case for example when several functional strategies are being rolled out in one organization in parallel or at least with overlapping timing) assessing individual contributions may become difficult.

The base model assumes two things: 1) change happens linear, 2) project value materializes proportionally to implementation success which takes on values between 0 and 100%. Organizational theorists generally agree that change processes, especially strategic change processes, at the organizational level take place in three phases (Balogun & Hailey 2008): 1) mobilize, 2) move, 3) sustain. At the individual level, people affected by strategic change go through phases of shock, denial, awareness of incompetence to fulfill the new role, acceptance, testing new roles and behaviors, search for meaning based on individual success and failures, integrating new behaviors into day-to-day work (see Figure 3).

In line with the organizational change model shown in figure 3 the authors separate the transitional relationship of the modified Porter-Lawler model shown in figure 2 into three phases (see Figure 4). Research on organizational change suggests that the mobilization phase takes on relatively more effort than the move phase. In the model this is reflected by the fact that the transformational factor $x_1 = \frac{S_1}{I_1}$ of the mobilization phase is smaller than $x_2 = \frac{S_2 - S_1}{I_2 - I_1}$ of the move phase. Once the process enters into the sustain phase, relative effort again increases vs. the move phase ($x_3 < x_2$). The degrees to which the strategy can be considered implemented are called implementation levels S. S_1 is the first hurdle to be overcome. Unless the organization can be mobilized to actually start changing, the overall project is bound to fail. S_3 represents a fully, non-reversably implemented strategy while S_2 is the minimal level to be achieved during the move phase in order to consider the strategy implemented. However, without further activities a risk remains that the change could be at least partially reversed and the organization falls back into old patterns of behavior.

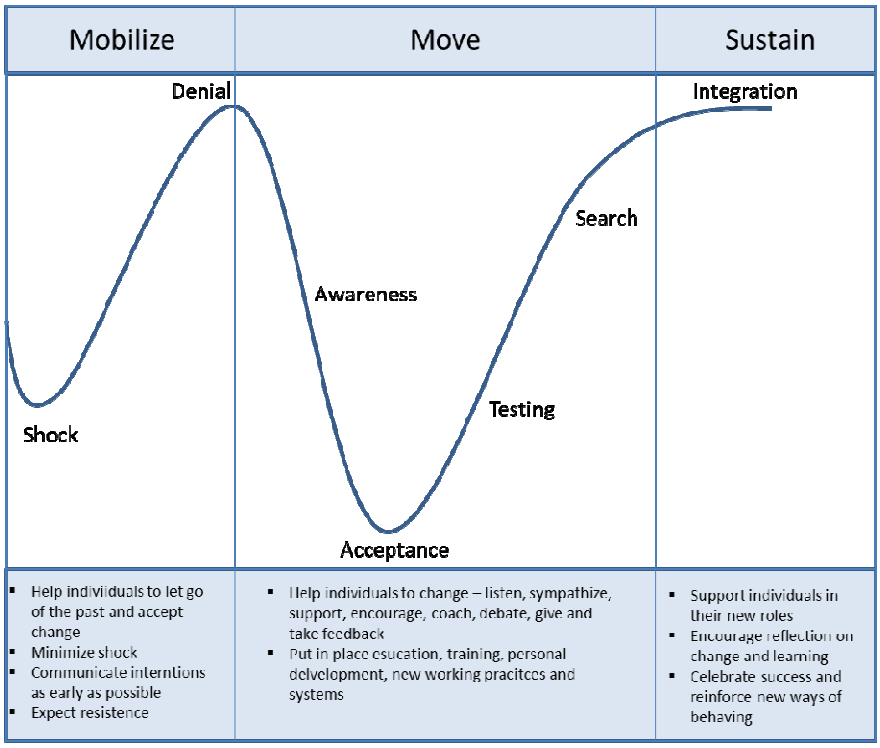


Fig. 3: Organizational and Individual Change, source: (Balogun & Hailey 2008)

Incompletely implemented strategies hardly work and hence have no or even negative value for the strategy owner. For the purpose of this analysis, the authors therefore define the value of a strategy to be 0 for implementation levels below S_2 and K for implementation levels equal or above S_2 where K is a constant value.

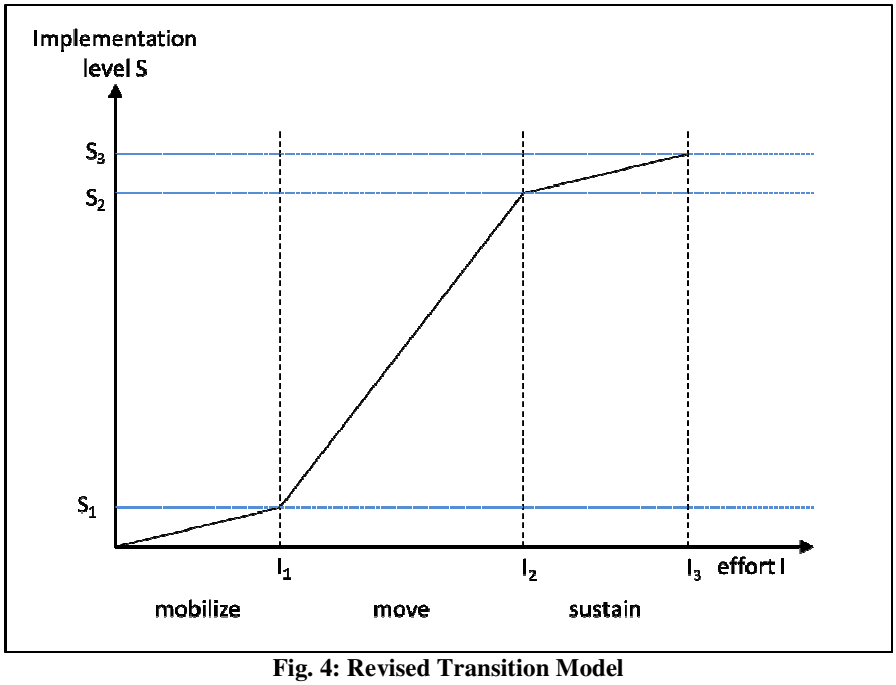


Fig. 4: Revised Transition Model

Extension of the Analytical Base Model

In line with what was pointed out in the previous section, the transition function shown in figure 4 can be expressed as

$$S(I) = \begin{cases} \frac{S_1}{I_1} * I + \tilde{};S & for\ I < I_1 \\ \frac{S_2 - S_1}{I_2 - I_1} * (I - I_1) + S_1 + \tilde{};S & for\ I_1 < I <= I_2 \\ \frac{S_3 - S_2}{I_3 - I_2} * (I - I_2) + S_2 + \tilde{};S & for\ I_2 < I \end{cases}$$

S(I) is normally distributed with variance σ^2. As in the base model the strategy owner can not directly observe the effort level of the manager. If the manager is indifferent between two effort levels he will chose the one which results in higher expected utility for the strategy owner. Higher effort on behalf of the manager leads to distributions of results which are statistically dominant by the first order vs. distributions with lower effort without changing the upper or lower boundaries of the distribution itself.

The value function can be expressed as

$$V(S(I)) = \begin{cases} 0 & for\ S(I) < S2 \\ K & for\ S(I) \geq S2 \end{cases}$$

The strategy owner still seeks to maximize his expected utility level

$$Max_{f,F}\ E(U_S) = V(S(I)) - [f * E[S(I*)] + F] \qquad [equation\ 1]$$

The manager still aims at maximizing his security equivalent

$$Max_{I^*}\ SE_M(B,\ I^*) = f * E[S(I^*)] + F - \frac{a}{2} * f^2 * \sigma^2 - y * I^{*2} \qquad [equation\ 2]$$

Where B represents total compensation f * S(I*) + F received by the manager.

In order for the manager to accept the contract offer of the strategy owner the well-known cooperation condition still has to hold

$$SE_M(B, I^*) = f * E[S(I^*)] + F - \frac{a}{2} * f^2 * \sigma^2 - y * I^2 \geq RFI \qquad [equation\ 3].$$

With $x_1 = \frac{S_1}{I_1}$, $x_2 = \frac{S_2 - S_1}{I_2 - I_1}$ and $x_3 = \frac{S_3 - S_2}{I_3 - I_2}$, setting the first derivative with respect to I of equation 2 equal to zero brings

$$\frac{\partial SE_M}{\partial I} = 0 = \begin{cases} f * x_1 - 2 * y * I^* & for\ I \leq I_1 \\ f * x_2 - 2 * y * I^* & for\ I_1 < I <= I_2 \\ f * x_3 - 2 * y * I^* & for\ I_2 < I. \end{cases}$$

Rearranging for I^* yields as the activity level chosen by the manager

$$I^* = \frac{f * x_j}{2 * y}\ with \quad \begin{cases} j = 1 & for\ I \leq I_1 \\ j = 2 & for\ I_1 < I <= I_2 \\ j = 3 & for\ I_2 < I \end{cases} \qquad [equation\ 4]$$

which corresponds to the result of the base model.

As in the base model, the strategy owner will try to set the fixed compensation F as low as possible, i.e. such that the cooperation condition is just being fulfilled as an equation. After rearranging for F we get

$$F = RFI - f * E[S(I)] + \frac{a}{2} * f^2 * \sigma^2 + y * I^2 \qquad [equation\ 3a]$$

Inserting equations 3a and 4 into equation 1 yields

$$\begin{aligned} Max_f\ E(U_S) &= V(E[S(I^*)]) - [f * E[S(I^*)] + F] \\ &= V(E[S(I^*)]) - [f * E[S(I^*)] + RFI - f * E[S(I^*)] + \frac{a}{2} * f^2 * \sigma^2 + y * I^{*2}] \\ &= V(E[S(I^*)]) - [RFI + \frac{a}{2} * f^2 * \sigma^2 + y * I^{*2}] \\ &= V(E[S(I^*)]) - [RFI + \frac{a}{2} * f^2 * \sigma^2 + y * \left[\frac{f * x_j}{2 * y}\right]^2] \qquad [equation\ 5] \end{aligned}$$

Setting the first derivate with respect to f of equation 5 equal to zero yields

$$\begin{aligned} 0 &= a * f * \sigma^2 + f * \frac{x_j^2}{2 * y} \\ &= f * [a * \sigma^2 + \frac{x_j^2}{2 * y} \qquad [equation\ 6] \end{aligned}$$

Equation 6 only holds true for f = 0 because the term in squared brackets is always positive for a risk averse manager. However, a variable compensation factor equal to zero would eliminate any incentive effect (according to the cooperation condition, the strategy owner would have to offer the manager a fixed compensation RFI + y * I_2 while the manager, according to equation 4, would always chose an effort level of 0). This is obviously not desirable for the strategy owner.

Let's look at two cases. First, we assume that the effort level I^* chosen by the manager was smaller than I_2. In this case V(E[S(I*)]) = 0. Since the term in squared bracket of equation 5 is always larger than zero, the strategy owner would realize a negative return. Second case assumes I^* to be equal or larger than I_2 which leads to V(E[S(I*)]) = K. As long as K is larger than the term in squared brackets of equation 5, the strategy owner would benefit from offering the manager a contract. Since there is no absolute minimum for equation 6 other than f = 0 and since equation 5 is a strictly monotonic decreasing function with respect to f, the strategy owner will set the variable compensation factor f as low as possible while inducing an activity level of at least I_2.

$$I^* = f_{opt} \frac{x_j}{2*y} \geq I_2 \qquad \textit{[equation 7]}$$

$$f_{opt} = \frac{2*y*I_2}{x_3} \quad \textit{(with } x_j \textit{being } x_3 \textit{ because } I \geq I_2\textit{)} \qquad \textit{[equation 7a]}$$

Inserting equation 7a into equation 3a yields for the fixed compensation to be offered to the manger (with $x_j being\ x_3$ because $I \geq I_2$):

$$\begin{aligned} F_{opt} &= RFI - f_{opt} * E[S(I^*)] + \frac{a}{2} * f_{opt}^2 * \sigma^2 + y * I^{*2} \\ &= RFI - \frac{2*y*I_2}{x_3} * S_2 + \frac{a}{2} * \left[\frac{2*y*I_2}{x_3}\right]^2 * \sigma^2 + y * {I_2}^2 \end{aligned}$$

Discussion

Compared to the base analytical model, the extended model reflects a transformational relationship between effort brought forward by the implementation manager and implementation result which has been divided into three different change phases: mobilize, move, sustain. Further, the value function of a strategy implementation project has been changed from a continuous and proportional relationship between effort and expected result to a step function. While for practical matters it may be difficult to define which degree of implementation has to be achieved in order to create value for the strategy owner (i.e. define implementation levels S_1 and S_2), it should be clear that incompletely implemented strategies at best have a value of 0 if not negative because of the disturbing effects on the organization.

The fact that the strategy owner has a very high interest in achieving a certain minimum implementation level forces him to take on more costs associated with implementation risk than in the base case. This can be demonstrated as follows: As can be seen in equation 7a, and in contrast to the optimal solution in the base analytical model, the optimal variable compensation factor does not depend on the variance of the implementation result S(I). In other words, regardless of how risky the implementation project is, the strategy owner always has to offer the same variable compensation level. The only place were project risk is being considered in the compensation theme is the fixed portion F. Here the amount to be offered to the manager increases with the level of project risk. Assuming two project scenarios with identical expected input-output relationship but were project 1 has a higher variance in output than project 2, the implementation manager would request a higher fixed compensation F for project 1 than for project 2. However, the strategy owner would have to offer the same variable compensation factor for both projects in order to induce the desired effort level of the manager. Since the expected total project value for project 1 and 2 are the same, the strategy owner's expected utility, i.e. the expected net gain, for project 1 is lower than for project 2.

Alternatively to the compensation scheme discussed sofar, the strategy owner could grant a variable compensation only if an implementation level of at least S_2 is being realized. This kind of incentive scheme is being widely used in corporate practice. The main issue with such an approach is that it potentially incentivizes the manager to engage in risky activities since he would benefit from positive results more than suffer from negative ones. Imagine the following scenario (remember: the strategy owner cannot observe the manager's activity level):the manager has two alternative plans to

implement the strategy. P_1 which requires little effort I_L on his behalf but also has relatively small chances of success w_1 and P_2 which requires high effort I_H on his behalf but would also yield a higher likelihood w_2 of being successful. If the opportunity gains by avoided disutility of work due to lower effort $I_H - I_L$ for the manager is higher than the reduction in utility from [($w_2 - w_{1)}$ * variable compensation] if S_2 is achieved, he may opt to go for P_1. For the strategy owner this would mean a significant reduction of his expected utility, i.e. expected net gain.

Another alternative approach could be to tie variable compensation to both positive and negative variances vs. a minimum implementation target. The modified target function for the manager would then read

$$Max_{I^*}\, SE_M(B,\ I^*) = f * [E[S(I*)] - S_2] + F - \frac{a}{2} * f^2 * \sigma^2 - y * I^{*2} \qquad [equation\ 2a]$$

This would avoid the adverse selection issue described above. However, since a corresponding adjustment as in equation 2a would also have to be made to equation 3a the situation for the strategy owner in terms of setting the variable compensation factor would not change and also not his total expected utility (because $E(S(I^* = I_2) = S_2$). Therefor such a model would result in similar risk sharing consequences as in the extended analytical base model.

Conclusion

The question if a minimum target should be established and if incentives should be tied to realized outcomes relative to such minimal target cannot be finally answered in this study. The issue may be rather psychological than analytical depending if a manager is motivated more by closing a gap to a target or by striving for a certain absolute performance.

Even the extended model presented here may be too simple to provide sufficient insights into what drives implementation processes from a behavioral point of view. The authors therefore suggest to further refine the approach by either introducing more sophisticated input-output-relations (possibly non-linear) or by considering alternative utility functions for the manager and/or the strategy owner. In order to deal with the mathematical complexity of such refinements, one could consider to use simulation tools instead of exact theoretically derived solutions.

Further, as suggested in (Kiehne et al. 2017), analyzing empirically reported implementation issues in terms of process and behavioral issues as well as objective and perceived risks, may yield additional insights.

Bibliography

Ahearne, M., Lam, S.K. & Kraus, F., 2014. Performance impact of middle managers' adaptive strategy implementation: The role of social capital. *Strategic Management Journal*, 35, pp.68–87.

Al-Ghamdi, M.S., 1998. Obstacles to successful implementation of strategic decisions: the British experience. *European Business Review*, 98, pp.322–327.

Al-Laham, A., 1997. *Strategieprozesse in deutschen Unternehmungen: Verlauf, Struktur und Effizienz*, Wiesbaden: Gabler.

Alamsjah, F., 2011. Key success factors in implementing strategy: Middle-level managers' perspectives. In *Procedia - Social and Behavioral Sciences*. pp. 1444–1450.

Alexander, L.D., 1985. Successfully implementing strategic decisions. *Long Range Planning*, 18, pp.91–97.

Andrews, K.R., 1971. *The concept of corporate strategy*, New York: Dow Jones-Irwin.
Andrews, R. et al., 2011. Strategy Implementation and Public Service Performance. *Administration & Society*, 43, pp.643–671.

Ansoff, H.I., 1965. *Corporate Strategy*, New York: McGraw Hill.

Balogun, J., 2006. Managing Change: Steering a Course between Intended Strategies and Unanticipated Outcomes. *Long Range Planning*, 39, pp.29–49.

Balogun, J. & Hailey, V.H., 2008. *Exploring strategic change*, Harlow: Pearson Education.

Beer, M. & Eisenstat, R.A., 2000. The Silent Killers of Strategy Implementation and Learning. *Sloan Management Review*, 41, pp.29–40.

Bourgeois, L.J., 1980. Performance and Consensus. *Strategic Management Journal*, 1(3), pp.227–248.

Bourgeois, L.J. & Brodwin, D.R., 1984. Strategic implementation: Five approaches to an elusive phenomenon. *Strategic Management Journal*, 5, pp.241–264.

Damodaran, A., 2012. *Investment valuation: Tools and techniques for determining the value of any asset*, New Jersey: John Wiley & Sons.

Dess, G.G., 1987. Consensus on strategy formulation and organizational performance: Competitors in a fragmented industry. *Strategic Management Journal*, 8(3), pp.259–277.

Floyd, S.W. & Wooldridge, B., 1992. Managing strategic consensus: the foundation of effective implementation. *Academy of Management Executive*, 6(4), pp.27–39.

González-Benito, J. et al., 2012. Coming to consensus on strategic consensus: A mediated moderation model of consensus and performance. *Journal of Management*, 38(6), pp.1685–1714.
Guth, W.D. & MacMillan, I.C., 1986. Strategy Implementation Versus Middle Management Self-Interest. *Strategic Management Journal*, 7, pp.313–327.

Hambrick, D.C. & Cannella, A.A., 1989. Strategy Implementation as Substance and Selling. *Academy of Management Executive*, 3, pp.278–285.

Herzig, S.E. & Jimmieson, N.L., 2006. Middle managers' uncertainty management during organizational change. *Leadership & Organization Development Journal*, 27, pp.628–645.

Ho, J.L.Y., Wu, A. & Wu, S.Y.C., 2014. Performance measures, consensus on strategy implementation, and performance: Evidence from the operational-level of organizations. *Accounting, Organizations and Society*, 39, pp.38–58.

Homburg, C., Krohmer, H. & Workman, J.P., 1999. Strategic consensus and performance: The role of strategy type and market-related dynamism. *Strategic Management Journal*, 20, pp.339–357.

Hornsby, J.S., Kuratko, D.F. & Zahra, S.A., 2002. Middle managers' perception of the internal environment for corporate entrepreneurship: Assessing a measurement scale. *Journal of Business Venturing*, 17, pp.253–273.

Hrebiniak, L.G., 2008. Making strategy work: Overcoming the obstacles to effective execution. *Ivey Business Journal*, 72, pp.1–7.

Huy, Q.N., 2011. How middle managers' group-focus emotions and social identities influence strategy implementation. *Strategic Management Journal*, 32, pp.1387–1410.

Huy, Q.N., 2001. In Praise of Middle Managers. *Harvard Business Review*, Sep, pp.72–80.

Johnson, L.K., 2004. Excecute Your Strategy - Without Killing It. *Harvard Management Update*,

pp.3–5.

Judge, W.Q. & Stahl, M.J., 1995. Middle-manager effort in strategy implementation: A multinational perspective. *International Business Review*, 4, pp.91–111.

Kanter, R.M., 1982. The middle manager as innovator. *Harvard Business Review*, 60(4), pp.95–105.

Kaplan, R.S. & Norton, D.P., 2004. How Strategy Maps Frame an Organization's Objectives. *Financial Executive*, 20, pp.40–45.

Kaplan, R.S. & Norton, D.P., 2006. How to implement a new strategy without disrupting your organization. *Harvard Business Review*, 84(3), pp.100–109.

Kaplan, R.S. & Norton, D.P., 1996. *The Balanced Scorecard - Translating Strategy In Action*, Boston: Harvard Business School Press.

Kiehne, J. et al., 2017. Middle management's role in strategy implementation projects: a behavioral analysis. In *Proceedings of the 11th International Conference on Business Excellence, 30-31 March 2017, Bucharest, Romania*.

Kolks, U., 1990. *Strategieimplementierung*, Wiesbaden: Dt. Univ.-Verlag.

Laux, H., 1990. *Risiko, Anreiz und Kontrolle*, Heidelberg: Springer.

Lehner, J., 2004. Strategy Implementation Tactics as Response to Organizational, Strategic, and Environmental Imperatives. *Management revue*, 15, pp.460–480.

Markóczy, L., 2001. Consensus Formation during Strategic Change. *Strategic Management Journal*, 22(11), pp.1013–1031.

McDermott, C. & Boyer, K.K., 1999. Strategic consensus: Marching to the beat of a different drummer? *Business Horizons*, 42, pp.21–28.

Micheli, P., Mura, M. & Agliati, M., 2011. Exploring the roles of performance measurement systems in strategy implementation: The case of a highly diversified group of firms. *International Journal of Operations & Production Management*, 31, pp.1115–1139.

Miller, S., Hickson, D. & Wilson, D., 2008. From Strategy to Action. *Long Range Planning*, 41, pp.606–628.

Miller, S., Wilson, D. & Hickson, D., 2004. Beyond Planning:Strategies for Successfully Implementing Strategic Decisions. *Long Range Planning*, 37, pp.201–218.

Mintzberg, H., Ahlstrand, B. & Lampel, J., 2001. *Strategy Safari: A Guided Tour Through The Wilds of Strategic Mangament*, New York: Free Press.

Nutt, P.C., 1987. Identifying and Appraising How Managers Install Strategy. *Strategic Management Journal*, 8(1 (Jan-feb 1987)), pp.1–14.

Nutt, P.C., 1989. Selecting tactics to implement strategic plans. *Strategic Management Journal*, 10(2), pp.145–161.

Pearce, J.A. & Robinson, R.B., 2000. *Strategic management: Formulation, implementation, and control*, Irwin: McGraw-Hill.

Porter, L.W. & Lawler, E.E., 1968. Management attitudes and performance. *Homewood IL.: Richard*

D. Irwin Company.

Porter, M.E., 1985. *Competitive Advantage - Creating and Sustaining Superior Performance*, New York: The Free Press.

Raps, A., 2005. Strategy implementation – an insurmountable obstacle? *Handbook of Business Strategy*, 6, pp.141–146.

Roth, K., 1992. Implementing International Strategy at the Business Unit Level: The Role of Managerial Decision-Making Characteristics. *Journal of Management*, 18, pp.769–789.

Salih, A. & Doll, Y., 2013. A Middle Management Perspective on Strategy Implementation. *International Journal of Business and Management*, 8(22), pp.32–39.

Shah, A.M., 2005. The Foundations of Successful Strategy Implementation : *Global Business Review*, 6, pp.293–302.

Skivington, J.E. & Daft, R.L., 1991. A study of Organizational "Framework" and "Process" Modalities for the Implementation of Business-Level Strategic Decisions*. *Journal of Management Studies*, 28, pp.45–68.

Slater, S.F. & Olson, E.M., 2000. Strategy Type and Performance: The Influence of Sales Force Management. *Strategic Management Journal*, 21, pp.813–829.

Welge, M.K. & Al-Laham, A., 2012. *Strategisches Management: Grundlagen - Prozess - Implementierung.*, Wiesbaden: Springer Gabler.

Wernham, R., 1985. Obstacles to strategy implementation in a nationalized industry. *Journal of Management Studies*, pp.632–648.

Westley, F.R., 1990. Middle Managers and Strategy: Microdynamics of Inclusion. *Strategic Management Journal*, 11, pp.337–351.

Wooldridge, B. & Floyd, S., 1989. Research notes and communications strategic process effects on consensus. *Strategic Management Journal*, 10(3), pp.295–302.

Wooldridge, B., Schmid, T. & Floyd, S.W., 2008. The Middle Management Perspective on Strategy Process: Contributions, Synthesis, and Future Research. *Journal of Management*, 34, pp.1190–1221.

Regional Economic Resilience: An Entropic Analysis of the 2008 Economic Crisis

Martin Ibl, Institute of System Engineering and Informatics, Faculty of Economics and Administration, University of Pardubice, Pardubice, Czech Republic; E-mail: martin.ibl@upce.cz

Ondřej Svoboda, Institute of Regional and Security Sciences, Faculty of Economics and Administration, University of Pardubice, Pardubice, Czech Republic; E-mail: ondrej.svoboda@upce.cz

Michael Siegert, Faculty of Economics and Administration, University of Pardubice, Pardubice, Czech Republic; E-mail: siegert@centrum.cz

Abstract

This paper provides an analysis of labour force market dynamics of the 2008 financial crises and discusses the extent to which entropy measures can be useful in predicting regional employment dynamics. We find that the Shannon entropy and Tsallis entropy is more suitable for prediction of size of employment downturn (recession index) while the Rényi entropy is the dominant predictor of rate of employment downturn in recession phase. The results of the statistical analysis show that when Shannon entropy was growing through the recovery phase before the crisis, regions experience a higher rate of employment decrease in the following recession period. On the other hand, the higher the Shannon entropy was, the smaller recession index. However, the Tsallis entropy plays a different role in comparison to Shannon entropy. The higher the measured Tsallis entropy was, the more significantly the region was affected. In conclusion, the use of entropy as a resilience indicator in terms of regional policy is a significant predictor of regional resilience.

Keywords: Entropy, Economic Activity, Regional Resilience, Economic Crisis 2008

Introduction

The use of predictors based on the calculation of entropy has been already tested in many economic studies. However, only few studies exist in the area of analysis of the economic resilience. The prediction of the impact of the economic crisis on the region will always be a topical issue. Employment is one of the key macroeconomic indicators and we therefore attach great importance to its analysis. Quantifying entropy as a measure of uniformity in distribution of economic activities in the region is a suitable predictor because it is influenceable (e.g. in the form of subsidies for a certain economic activity, etc.). This paper aims to evaluate the importance of indicators based on the calculation of entropy derived from regional employment in the main economic activities in terms of predictors of regional economic resilience. Main research question is whether the higher diversity of regional employment (among economic activities) make a region more resilient against shocks and, thus, could weaken the effects of a shock. To achieve this goal, labour dynamics of 186 regions of 11 EU Member States has been reviewed in the context of the economic crisis in 2008. These countries were selected mainly for the purpose of the geographical and historical diversity (three countries were from West, four are from South and four are form East Europe). The research question of this paper is whether entropy measures are significant predictors of regional recession (measured by employment).

Within the analytical part of the article, we estimate the β coefficients of regression analysis that indicate the importance and role of examined predictors based on the entropy calculation. The results of the statistical analysis show that the Shannon entropy and Tsallis entropy is more suitable for prediction of size of employment downturn (recession index) while the Rényi entropy is the dominant predictor of rate of employment downturn in recession phase. The results of the statistical analysis show that when Shannon entropy was growing through the recovery phase before the crisis, regions experience a higher rate of employment decrease in the following recession period. On the other hand, the higher the Shannon entropy was, the smaller recession index. However, the Tsallis entropy plays a different role in comparison to Shannon entropy. The higher the measured Tsallis entropy was, the more significantly the region was affected. In conclusion, the use of entropy as a resilience indicator in terms of regional policy is a significant predictor of regional resilience.

The article shows how the level of regional employment entropy determines the level of regional economic resilience (measured through the lens of the employment dynamics in main sectors). The analytical part also presents evidence to support three research hypotheses that describe the relationship between three entropy indicators (Shannon, Rényi and Tsallis entropy) and four examined resilience indicators. The methodological part describes the approach by Ron Martin (Martin, 2012) who has developed the procedure for measuring regional economic resilience. We adopt his approach in this paper.

Regional Resilience

Since the 1970s, the study of the resilience of socio-ecological systems has been the topic of many investigations. At the beginning of the 21st century, some regional economists use this concept in relation to the dynamics of the region's economy, claiming that viewing the region through resilience prism can help explain how these systems respond to various perturbations (see e.g. Reggiani (Reggiani et al., 2002)).

The first fundamental definitions were presented by Holling (Holling, 1973) and Perrings (Perrings, 1998). For example, Hill et al (Hill et al., 2008) describe the definition of economic resilience as the ability of the region's economy to recover from a perturbation that had a negative impact on the region's development. Rose (Rose, 2009) sees resilience as the ability to absorb the influence of external shocks. The economic resilience of the regions to the national and international economic crises is often mentioned in the European Union since the beginning of the global economic crisis in 2008. The usefulness of understanding the factors behind the regional resilience phenomena is justifiable by the fact that the impact of the global economic crisis on the economic situation of the EU regions was asymmetrical.

On the other hand, a number of regions continue to suffer economic downturns or have been hit by a second wave of economic downturn after a relatively short recovery. The quick and successful recovery of the economies of some regions raises the question of what is behind this success. Moreover, a comprehensive assessment and synthesis of what makes some regions more resilient than others, and what regional policy makers can do to increase the resilience of the regions to the future economic crises, needs to be answered.

There are three ways of seeing the economic resilience of the regions. The first is based on the so-called "engineering" concept of resilience (Modica and Reggiani, 2015). An essential characteristic of this

approach is to assess the ability of the region to “go back” to its original state before crisis. For example, it may be a return of the growth rate of employment in the region to the same level before the crisis.

Within this approach, the economic resilience of the region is quantified according to the level of recovery of the selected indicator of the corresponding state before the economic downturn of the economy. The rate of economic downturn or recovery is usually measured in relation to the dynamics of regional employment or regional product, either in terms of achieving absolute value or even in terms of renewing the rate of growth of these quantities.

This approach is easily applicable and is used in studies of British economist and geographer Ron Martin (e.g. (Martin, 2012), (Martin et al., 2016)). Within this engineering approach, it is also possible to evaluate the time of returning to the level before the negative economic downturn. Other suitable indicators for quantifying economic resilience index can be based on, for example, employment by industry, labour productivity, the number of workers, employment rate, economic activity rate, gross value added, the number of enterprises in the region or the number of enterprises in export sectors (Martin, 2012).

The second approach to regional resilience is the so-called "ecological" concept that emphasises the magnitude of the disturbance that the region is able to absorb before it deviates from the original state. As Walker et al (Walker et al., 2002) states, an emphasis is placed on the behaviour of the system beyond equilibrium. The resilient region has the ability to absorb the deviation from equilibrium by changing its internal structure. The purpose of this adaptation is to preserve the function of the system.

The two approaches mentioned above are criticised because, according to some authors ((Pike et al., 2010), (Martin and Sunley, 2007)), they do not sufficiently address the economic development perspective over the long term, which is inconsistent with the perceived dynamics of successful economies. This resulted in the third approach called "adaptive", also known as "evolutionary" approach. This third approach highlights the ability of the system to undergo, either in a preventive way or in response to a sudden change, the modification of its structure or function to minimise the impact of destabilising change. The supporters of this approach highlight the adaptive capability of the system. They understand the region as a "complex adaptive system" that can never be in balance, and therefore the economic resilience of the region is achieved by a constant change in the region's economy. Resilience turns into the continuous ability to adjust to stress, and the analysis of resilience becomes the study of how economics adjusts to varying stages in economic cycles (Pendall et al., 2009).

It should be stated that a change in the internal structure of the economy might not necessarily be desirable. In connection with regional resilience the so-called hysteresis in the labour market is often mentioned (e.g. (Martin, 2012)). This is a situation where the economic downturn leads to a steady increase of the natural rate of unemployment. This negative hysteresis effect in the labour market occurs when the economic downturn is strong enough to cause a change in the behaviour of economic subjects and change the structure of the economy, thus adversely affecting the course of the adaptive process of the region's economy.

However, some authors believe that crises can lead to the transformation of economies towards an economic structure that is in line with the idea of sustainable development (e.g. see (Folke et al., 2003), (Duit et al., 2010), (Shaw, 2012)). The crisis can cause or permit the necessary transformation of economic systems ((Pike et al., 2010)).

This understanding is related to the Schumpeter concept of "creative destruction". From this point of view, the mechanism of the positive impact of the crisis is perceived by the fact that the crisis removes those kinds of economic activities that can be considered less productive. Removing non-productive activities will create space for new opportunities for the development of new industries (Simmie and Martin, 2010).

Data, Methods and the Model

For the purpose of verifying the research question, it was necessary to implement the following preparatory steps:

1. Obtain and treat employment data from selected EU Member States.
2. From pre-crisis data, quantify predictors based on selected entropy measures.
3. From the post-crisis data, quantify the appropriate dependent variables.
4. The generated variables are subjected to a correlation analysis

Data on employment in selected EU Member States was obtained from Eurostat (Eurostat, 2017). Exactly 235487 employment records (1 record per specific country, region, quarter and economic activity) were obtained from 11 EU Member States classified by region, economic activity and quarter. The basic data structure is presented in Table 1.

Table 1: Employment data structure

Category	N	Details
Country	11	CZ, ES, FR, UK, DE, IT, PL, SK, GR, HU, PT
Region	f(country)	CZ=8, ES=18, FR=22, UK=36, DE=34, IT=21, PL=16, SK=4, GR=13, HU=7, PT=7
Time (quarters)	74	1998Q1 – 2016Q2
Economic activity	17	Before 11 August 2008 - ISIC Rev.3.1, digits 1 (UN, 1989)
	21	Since 11 August 2008 - ISIC Rev.4, digits 1 (UN, 2008)
Employment records	235497	Min = 0.125 Max = 2187.769 Mean = 50.25 Std. Dev = 72.049

The data contained a large number of shortcomings that had to be removed. Namely, these were the following issues:

- Renaming of regions in different countries over the years (for example, Inner London was divided into Inner London-East and Inner London-West or Sachsen-Anhalt in Germany in 2011 also changed). The problem has been solved by merging the nomenclature over the years, and if the region was divided, the region was treated as before the division.
- Changing the methodology of the classification of economic activities in 2008 (from ISIC Rev.3.1 to ISIC Rev.4). It was not possible to unify these two methodologies; therefore, it is necessary to consider this change in the following analyses.
- For some countries, data was not quarterly but annual. Since these issues were mostly presented in the first values of time series (FR 1998Q1 – 2002Q4, DE 1998Q1 – 2005Q2, PL 1998Q1 – 2000Q2 and HU 1998Q1 – 1999Q1), these values were ignored in the affected regions.

The treated data was further processed in the Matlab tool. Because of the seasonal fluctuations in some regions, all regions were treated with the X13-ARIMA-SEATS (Lengwiler, 2016).

Because of adopting Ron Martin's methodology for resilience analysis, we had to proceed with the finding of significant peaks and troughs. This was done by the BBQ algorithm (Harding and Pagan, 2002) implemented in the Matlab tool (Engel, 2005). Due to the high variability of the peak position in the immediate vicinity of the economic crisis of 2008, it was necessary to specify a general rule that would suppress this variability. For the needs of analysis, one peak (continued to be marked V) as the beginning of employment downturn due to crisis (2008-2010) and two troughs, one after crisis (we will mark E) and one before the crisis (hereafter D) will be selected from the set of all peaks and troughs. Figure 1 illustrates all of the characteristics described above for the 14th region in Spain (NUTS2 ES53 - Balearic Islands), i.e. the original time series with visible seasonal influences (green), seasonal adjusted series by X13-ARIMA-SEATS (red), ***V*** (red +), the trough before the crisis (red <, in the text marked ***D***) and trough after the crisis (red >, in the text marked ***E***).

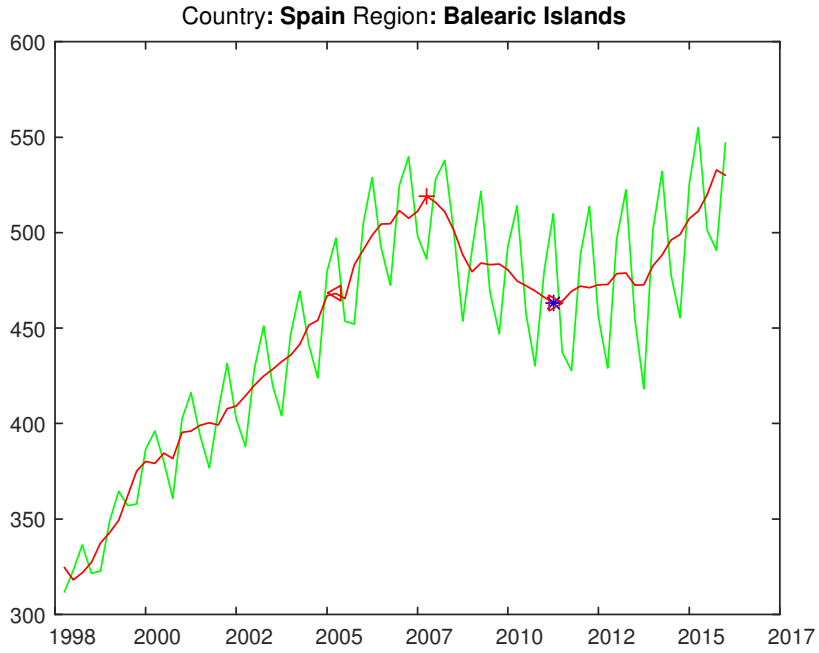


Fig. 1: Employment in Spain for 14th region (green), smoothened time series (X13-ARIMA-SEATS - red), peak V (red +) and troughs D and E.

For the purpose of creating explanatory variables, a number of indicators based on several significant definitions of entropy were used. The following will briefly define significant entropy rates.

In the following, the entropy rates are used on employment data to produce the final number of predictors of the impact of the 2008 economic crisis in the EU's regions. The entropy itself is calculated from the relative frequency of employment in different economic activities in the individual regions of the EU Member States.

The relative frequency (probability) ***p*** of employees in a specific quarter and region can be expressed as follows:

$$p_{i,j,k,l} = \frac{y_{i,j,k,l}}{\sum_l y_{i,j,k,l}} \tag{1}$$

where $i = 1..N_{country}, j = 1..N_{Region,i}, k = 1..N_{Time}, l = 1..N_{Economic\ Activity}$ and $y_{i,j,k,l}$ is number of employees in i-th country, j-th region, k-th time and within l-th economic activity.

The above-mentioned entropy rates are then quantified using this relative frequency, since the condition $\sum_i p_i = 1$ holds.

Rényi entropy (Renyi, 1960) (Shannon entropy (Shannon, 1948)) for i-th country, j-th region, k-th time can be calculated according to the following formula:

$$H_{q,i,j,k} = \begin{cases} \frac{1}{1-q} log_2 \sum_l {p_{i,j,k,l}}^q, if\ q \neq 1 \\ -\sum_l p_{i,j,k,l}\, log_2\, p_{i,j,k,l}, if\ q \to 1 \end{cases} \tag{2}$$

where $p_{i,j,k,l}$ represents the relative representation of the l-th economic activity in the j-th region of the i-th country at time k.

Tsallis entropy (Tsallis, 1988) (Shannon entropy) for i-th country, j-th region, k-th time can be calculated according to the following formula:

$$S_{q,i,j,k} = \begin{cases} \frac{1}{q-1}\left(1 - \sum_l {p_{i,j,k,l}}^q\right), if\ q \neq 1 \\ -\sum_l p_{i,j,k,l}\, log_2\, p_{i,j,k,l}, if\ q \to 1 \end{cases} \tag{3}$$

For the simpler notation, we will use the following for Rényi entropy $H_{q,i,j,k} = H^R_{q,i,j,k}$ and for Tsallis entropy $S_{q,i,j,k} = H^T_{q,i,j,k}$.

The following indicators were selected as suitable **predictors**:

- The values of specific entropy at time $V_{i,j} - s$, where V is the peak at the beginning of employment decline due to the crisis in the i-th country, j-th region and $s = 0,1,2$:

$$H_{q,i,j,V_{i,j}-s} \tag{4}$$

- The variance values of the selected entropy in the interval $\langle D, C \rangle$, where D is the time before the crisis and C represents the last quarter before change in the ISIC methodology:

$$var_{q,i,j} = \sum_{k=D_{i,j}}^{C} \left(H_{q,i,j,k} - \frac{1}{D_{i,j} - C} \sum_{l=D_{i,j}}^{C} H_{q,i,j,l} \right)^2 \tag{5}$$

- The slope of the linear regression line of entropy development at $\langle D, C \rangle$ interval:

$$slope_{q,i,j} = \frac{\left(D_{i,j} - C\right)\sum_{k=D_{i,j}}^{C} kH_{q,i,j,k} - \sum_{k=D_{i,j}}^{C} k * \sum_{k=D_{i,j}}^{C} H_{q,i,j,k}}{\left(D_{i,j} - C\right)\sum_{k=D_{i,j}}^{C} k^2 - \left(\sum_{k=D_{i,j}}^{C} k\right)^2} \quad (6)$$

- The geometric mean value of entropy quotients $\langle D, C\rangle$:

$$geomean_{q,i,j} = \sqrt[D_{i,j}-C]{\prod_{k=D_{i,j}}^{C} \frac{H_{q,i,j,k+1}}{H_{q,i,j,k}}} \quad (7)$$

The $\langle D, C\rangle$ interval was used instead of the $\langle D, V\rangle$ interval due to a change in the ISIC methodology that caused a sudden change in entropy development. Since the change of methodology was in the immediate vicinity of the peak after the crisis, this change did not cause any significant alternation in quantification of economic changes before the crisis.

Three measures of entropy were specifically selected for further analysis, namely the Shannon entropy, Rényi entropy (q=2) and Tsallis entropy (q=2). In combination with the indicators defined above, 18 potential predictors were developed, the distribution of which is summarized in Table 2. The set of all predictors will be denoted as reg.

Table 2: Potential predictors' distribution and the naming convention

	Shannon	Rényi (q=2)	Tsallis (q=2)
Entropy s = 0	Shannon0	Renyi0	Tsallis0
Entropy s = 1	Shannon1	Renyi1	Tsallis1
Entropy s = 2	Shannon2	Renyi2	Tsallis2
Variance	varShannon	varRenyi	varTsallis
Slope	slopeShannon	slopeRenyi	slopeTsallis
Geometric mean	geoShannon	geoRenyi	geoTsallis

Dependent variables were prepared in a similar way as predictors. Four indicators were prepared in total:

- The recession index $recY_{i,j}$ expressed as a share of employment in the i-th country, j-th region at the time of the post-crisis trough $E_{i,j}$ and employment at peak time immediately after the crisis $V_{i,j}$ (indicator express size of employment decline in recession phase):

$$recY_{i,j} = \frac{y_{i,j,E_{i,j}}}{y_{i,j,V_{i,j}}} \quad (8)$$

- The value of the employment variance in the interval $\langle V, E\rangle$:

$$varY_{i,j} = \sum_{k=V_{i,j}}^{E_{i,j}} \left(y_{i,j,k} - \frac{1}{V_{i,j} - E_{i,j}} \sum_{l=V_{i,j}}^{E_{i,j}} y_{i,j,l} \right) \quad (9)$$

- The value of the regression line slope approximating the development of employment in the time interval $\langle V, E \rangle$:

$$slopeY_{i,j} = \frac{\left(V_{i,j} - E_{i,j}\right) \sum_{k=V_{i,j}}^{E_{i,j}} k y_{i,j,k} - \sum_{k=V_{i,j}}^{E_{i,j}} k * \sum_{k=V_{i,j}}^{E_{i,j}} y_{i,j,k}}{\left(V_{i,j} - E_{i,j}\right) \sum_{k=V_{i,j}}^{E_{i,j}} k^2 - \left(\sum_{k=V_{i,j}}^{E_{i,j}} k\right)^2} \tag{10}$$

- The geometric mean value of employment quotients from $\langle V, E \rangle$ interval (indicator express rate of employment downturn in recession phase):

$$geoY_{i,j} = \sqrt[E_{i,j}-V_{i,j}-1]{\prod_{k=V_{i,j}}^{E_{i,j}-1} \frac{y_{i,j,k+1}}{y_{i,j,k}}} \tag{11}$$

The general multinomial regression model will then have the following form:

$$z_{i,j} = \beta_0 + \beta_1 reg_{i,j}^1 + \cdots + \beta_M reg_{i,j}^M + \varepsilon_{i,j} \tag{12}$$

where $z_{i,j} \in \{rec_{i,j}, varY_{i,j}, slopeY_{i,j}, geoY_{i,j}\}$ is the selected indicator (dependent variable) for the i-th country and j-th region, M is the number of predictors, β_k is the value of the k-th coefficient, k=0,...,M, $reg_{i,j}^l$ is the value of the ith country and j-th region for the l-th predictor, $l = 1, .., M$, and $\varepsilon_{i,j}$ is the error in the observed value for the i-th and j-th case.

Possible extensions are mixed models in the following form:

$$z_{i,j} = \beta_{0,i} + \beta_{1,i} reg_{i,j}^1 + \cdots + \beta_{M,i} reg_{i,j}^M + \varepsilon_{i,j} \tag{13}$$

Subsequent analyses were performed in the SPSS statistical tool.

Results

The first step was to select the optimal dependent variable (recY, varY, slopeY or geoY). Due to the large number of predictors, a stepwise method in SPSS Statistics was used to select appropriate dependent variables for the individual dependent variables (other methods generally returned a large number of highly correlated explanatory variables). Table 3 shows the found patterns for the dependent variable recY. Data from all regions was used for the analysis.

Table 3: Model summary of stepwise method for dependent variable recY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,236[a]	,056	,051	,057338	,056	10,711	1	181	,001
2	,299[b]	,089	,079	,056466	,034	6,630	1	180	,011

a. Predictors: (Constant), Shannon1

b. Predictors: (Constant), Shannon1, Tsallis2

The most suitable predictor in this case is Shannon1 and the Tsallis2 predictor was added for the second model. Table 4 summarizes important information about the coefficients for both selected models. From the VIF values, the Shannon1 and Tsallis2 predictors are relatively strongly correlated (corresponding to a correlation coefficient of 0.81).

Table 4: Coefficients of stepwise models for dependent variable recY

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	,644	,087		7,400	,000		
	Shannon1	,080	,024	,236	3,273	,001	1,000	1,000
2	(Constant)	1,222	,240		5,087	,000		
	Shannon1	,167	,041	,495	4,022	,000	,334	2,990
	Tsallis2	-,998	,387	-,317	-2,575	,011	,334	2,990

As the second dependent variable, the employment variance (varY) was chosen. However, the stepwise method has not returned any outputs, so it can be concluded that there is no significant predictor in the reg set for the employment variance. Therefore, it is possible to exclude it from further analysis.

Another chosen dependent variable is the slope of regression line of employment (slopeY). Table 5 shows that only one significant predictor was found (Shannon0).

Table **6** summarizes selected important properties of the coefficients of the model.

Table 5: Model summary of stepwise method for dependent variable slopeY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,217[a]	,047	,042	12,15783	,047	8,913	1	181	,003

a. Predictors: (Constant), Shannon0

Table 6: Coefficients of stepwise models for dependent variable slopeY

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	52,061	20,333		2,560	,011		
	Shannon0	-16,827	5,636	-,217	-2,985	,003	1,000	1,000

The last dependent variable is the geometric average of the employment shares (geoY). The Stepwise method identified three significant models (see Table 7), whose coefficient of determination is, at first glance, more significant than the previous dependent variables. For this reason, geoY was chosen as the most suited dependent variable in the context of this analysis.

Table 7: Model summary of stepwise method for dependent variable geoY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,307[a]	,094	,089	,0075014	,094	18,834	1	181	,000
2	,372[b]	,139	,129	,0073352	,044	9,298	1	180	,003
3	,431[c]	,186	,172	,0071525	,047	10,314	1	179	,002

a. Predictors: (Constant), varRenyi

b. Predictors: (Constant), varRenyi, geoShannon

c. Predictors: (Constant), varRenyi, geoShannon, varTsallis

Table 8 summarizes the selected properties of the coefficients of each model. From the VIF values, the varRenyi and varTsallis predictors in the third model show a high collinearity (correlation coefficient of 0.955), which must be taken into account in further analyses.

Table 8: Coefficients of stepwise models for dependent variable geoY

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	,991	,001		1449,741	0,000		
	varRenyi	-,822	,189	-,307	-4,340	,000	1,000	1,000
2	(Constant)	1,500	,167		8,992	,000		
	varRenyi	-,662	,193	-,247	-3,438	,001	,926	1,080
	geoShannon	-,509	,167	-,219	-3,049	,003	,926	1,080
3	(Constant)	1,532	,163		9,403	,000		
	varRenyi	-2,531	,611	-,945	-4,139	,000	,087	11,452
	geoShannon	-,540	,163	-,233	-3,315	,001	,922	1,084
	varTsallis	177,306	55,210	,734	3,211	,002	,087	11,486

Potential models for further analysis were Model 2 (the best model without collinearity) and Model 3 (the best model in general). Because the analysed data are naturally hierarchically structured by individual EU member states, it is possible to use the so-called mixed models. For each model, all possible combinations of fixed and random intersections and guidelines were tested, i.e. four options:

- Fixed intercept and fixed slope,

- Random intercepts and fixed slope,
- Fixed intercept and random slopes,
- Random intercepts and random slopes.

Table 9 illustrates the values of the various information criteria for these four combinations for Model 2. At first glance, it is clear that all criteria positively respond to the addition of random slopes (beta coefficients). For this reason, this model can be called the optimal model in the context of available data and selected indicators without the occurrence of collinearity in explanatory variables.

Table 9: Information Criteria for model 2 (geoY) with dependent variables varRenyi and geoShannon

Intercept Slope	Fixed Fixed	Random Fixed	Fixed Random	Random Random
-2 Log Likelihood	-1266,106	-1268,851	-1279,837	-1279,881
Akaike's Information Criterion (AIC)	-1264,106	-1264,851	-1273,837	-1271,881
Hurvich and Tsai's Criterion (AICC)	-1264,084	-1264,784	-1273,701	-1271,653
Bozdogan's Criterion (CAIC)	-1259,914	-1256,465	-1261,258	-1255,109
Schwarz's Bayesian Criterion (BIC)	-1260,914	-1258,465	-1264,258	-1259,109

The information criteria are displayed in smaller-is-better form.

Table 10 presents the information criteria for Model 3. Similar to Model 2, the best results of the model are with random slopes. Only the CAIC and BIC information criteria favour a classical regression model without any influence of particular country.

Table 10: Information Criteria for model 3 with dependent variables varRenyi, geoShannon and varTsallis

Intercept Slope	Fixed Fixed	Random Fixed	Fixed Random	Random Random
-2 Log Likelihood	-1286,047	-1290,193	-1295,729	-1291,981
Akaike's Information Criterion (AIC)	-1284,047	-1286,193	-1287,729	-1281,981
Hurvich and Tsai's Criterion (AICC)	-1284,025	-1286,125	-1287,500	-1281,634
Bozdogan's Criterion (CAIC)	-1279,860	-1277,818	-1270,980	-1261,044
Schwarz's Bayesian Criterion (BIC)	-1280,860	-1279,818	-1274,980	-1266,044

The information criteria are displayed in smaller-is-better form.

However, it appears from the results of both models that the influence of the country affects the data, and therefore the use of mixed models is appropriate.

Discussion

Results show that the higher the instability (high varRenyi), the greater the rate of decline of employment in regional recession phase. High varRenyi could mean either growth or decrease or even fluctuation around the average of entropy calculated based on Rényi (q=2). The Adjusted R Squared of the model for dependent variable geoY predicted based on only varRenyi as predictor is about 0,089. Because of this result, this model was enhanced by geoShannon. The results show similar relation like in the case of varRenyi. The more geoShannon grows before the crisis the higher speed of employment downturn in regional recession phase.

This can be justified by two cases. The growth of entropy could have occurred based on dismissal of employees in sectors that had a large share in the economic activity of the region or, conversely, the growth of entropy is caused by hiring employees in less represented economic sectors. This second interpretation could have been caused by massive subsidies from the European Union before the economic crisis. In both cases, the entropy was increasing in the pre-crisis period.

The predictability of the second model (see table 7) expressed by Adjusted R Square is higher than in the case of the first model (0,129). This improvement of models predictability is because of additional information of Shannon entropy, which is calculated and aggregated during expansion phase before beginning of crisis. However, the third model shows possible collinearity but the predictability is even higher than in the second model (Adjusted R Squared is 0,179). Despite the multi-collinearity issue, the model has good significance for prediction usage. Moreover, mixed model analysis shows the importance of country influence to modelled geoY.

Conclusion

This article gave a new look at the financial crisis in 2008 and discusses the extent to which entropy-based indicators can be useful in predicting regional employment dynamics. The results of the statistical analysis show that while variation of Rényi entropy was high and Shannon's entropy grew in the pre-crisis recovery phase, the regions showed a higher rate of decline in employment in the subsequent recession. We find also that the Shannon entropy and Tsallis entropy is more suitable for prediction of size of employment downturn (recession index) while the Rényi entropy is the dominant predictor of rate of employment downturn in recession phase. On the other hand, Tsallis entropy plays a different role. The higher the Tsallis entropy measured, the lower the rate of employment in the recession phase. Last part of results show importance of country influence because the information criteria were the lowest in the cases of random slopes in both the second and the third model (for geoY). Results show that use of entropy, as an indicator in terms of regional policy is a significant predictor of regional resilience. Based on these conclusions, it can be stated that the diversity of economic activities (expressed in terms of entropy measures) presents a significant antecedent to predict the impact of the crisis on a region.

Acknowledges

The paper was supported by the University of Pardubice, Faculty of Economics and Administration, Project SGS_2017_021.

References

DUIT, A., GALAZ, V., ECKERBERG, K. & EBBESSON, J. 2010. Governance, complexity, and resilience. *Global environmental change,* 20**,** 363-368.

ENGEL, J. 2005. Business Cycle Dating Programs (BBQ).

EUROSTAT. 2017. *Labour Force Survey* [Online]. Available:

http://ec.europa.eu/eurostat/web/microdata/european-union-labour-force-survey [Accessed 2016-09-05.
FOLKE, C., COLDING, J. & BERKES, F. 2003. Synthesis: building resilience and adaptive capacity in social-ecological systems. *Navigating social-ecological systems: Building resilience for complexity and change,* 9**,** 352-387.

HARDING, D. & PAGAN, A. 2002. Dissecting the cycle: a methodological investigation. *Journal of Monetary Economics,* 49**,** 365-381.

HILL, E., WIAL, H. & WOLMAN, H. 2008. Exploring regional economic resilience. Working Paper, Institute of Urban and Regional Development.

HOLLING, C. S. 1973. Resilience and stability of ecological systems. *Annual review of ecology and systematics,* 4**,** 1-23.

LENGWILER, Y. 2016. X-13 Toolbox for Matlab. 1.3 ed. Mathworks File Exchange.

MARTIN, R. 2012. Regional economic resilience, hysteresis and recessionary shocks. *Journal of economic geography,* 12**,** 1-32.

MARTIN, R. & SUNLEY, P. 2007. Complexity thinking and evolutionary economic geography. *Journal of Economic Geography*.

MARTIN, R., SUNLEY, P., GARDINER, B. & TYLER, P. 2016. How regions react to recessions: resilience and the role of economic structure. *Regional Studies,* 50**,** 561-585.

MODICA, M. & REGGIANI, A. 2015. Spatial economic resilience: overview and perspectives. *Networks and Spatial Economics,* 15**,** 211-233.

PENDALL, R., FOSTER, K. A. & COWELL, M. 2009. Resilience and regions: building understanding of the metaphor. *Cambridge Journal of Regions, Economy and Society***,** rsp028.

PERRINGS, C. 1998. Resilience in the dynamics of economy-environment systems. *Environmental and Resource Economics,* 11**,** 503-520.

PIKE, A., DAWLEY, S. & TOMANEY, J. 2010. Resilience, adaptation and adaptability. *Cambridge Journal of Regions, Economy and Society***,** rsq001.

REGGIANI, A., DE GRAAFF, T. & NIJKAMP, P. 2002. Resilience: an evolutionary approach to spatial economic systems. *Networks and Spatial Economics,* 2**,** 211-229.

RENYI, A. On measures of information and entropy. Proceedings of the 4th Berkeley Symposium on Mathematics, Statistics and Probability, 1960. 547-561.

ROSE, A. Z. 2009. Economic resilience to disasters. *CARRI report No. 8.* Community and Resilience Institute.

SHANNON, C. E. 1948. A mathematical theory of communication. *Bell System Technical Journal,* 27**,** 379-423.

SHAW, K. 2012. "Reframing" Resilience: Challenges for Planning Theory and Practice. *Planning Theory & Practice,* 13**,** 308-312.

SIMMIE, J. & MARTIN, R. 2010. The economic resilience of regions: towards an evolutionary approach. *Cambridge journal of regions, economy and society,* 3**,** 27-43.

TSALLIS, C. 1988. Possible generalization of Boltzmann-Gibbs statistics. *Journal of Statistical Physics,* 52**,** 479-487.

UN 1989. International Standard Industrial Classification of All Economic Activities, Rev.3.

UN 2008. International Standard Industrial Classification of All Economic Activities (ISIC), Rev.4. New York.

WALKER, B., CARPENTER, S., ANDERIES, J., ABEL, N., CUMMING, G., JANSSEN, M., LEBEL, L., NORBERG, J., PETERSON, G. & PRITCHARD, R. 2002. Resilience management in social-ecological systems: a working hypothesis for a participatory approach. *Conservation ecology,* 6.

Labor Stimulation in Systemically Important Russian Banks within the Conditions of Economic Crisis and Sanctions

Olga Osipova, Professor, Financial University under the Government of the Russian Federation, Moscow, Russia, e-mail: ososipova@fa.ru

Alexander Artamonov, Head of Compensation for Retail Business, Sberbank, Applicant, Financial University under the Government of the Russian Federation, Москва, Россия, e-mail: a_artamonov@mail.ru

Received from: Olga Lvova Lvova@spa.msu.ru, lvova.oa@gmail.com

Abstract

The purpose of the research is to observe employee labor stimulation system development in conditions of economic sanctions in two Russia's largest financial state-owned Corporations 'Bank for development and foreign economic Affairs (Vnesheconombank)' and Sberbank. Research is introducing recommendations to improve the remuneration system in the conditions of crisis management. For the first time special attention is paid to the role of labor stimulation policy of retail bank front-office staff within the system of anti-crisis measures regulating the banking sector.

Keywords: human resources management, labor evaluation, labor incentives, staff motivation, remuneration policy, compensation policy, banking sector.

Introduction

The banking sector is one of the most challenging areas to manage. Managing credit institution and bank staff in the times of economic crisis becomes even more difficult. Negative phenomena in the economy caused by started in 2008 economic crisis, has received a new impulse with the introduction of U.S. and European Union economic sanctions against Russian financial institutions in 2014. Economic crisis and sanctions primarily touched upon the banking system, which took the brunt, as they have restricted the access of banks to obtain long-term loans for investments in the external capital market. Economic sanctions were imposed firstly on systemically important Russian banks and the largest Russian state-owned corporations. Thus, special attention in this article will be given to this most complex period of Russian banks development. The aim of this research is to offer recommendations for staff remuneration system optimization in the crisis management conditions based on the analysis of Russia's largest financial state Corporation 'Bank for development and foreign economic Affairs (Vnesheconombank)' and Sberbank evolution of employee work stimulation.

State corporations differ in several ways: the organizational structure and the share of state participation in the authorized capital, functions, staff, performance. For the successful implementation of staff remuneration and labor stimulation policy one must take these differences into account ('Unified principles', 2015). According to Frank Research Group, Sberbank takes the 1st place in Russia by volumes of attracting funds and lending to the population (Frank Research Group). Sberbank has the largest branch network in Russia, running 15 000 points of service, which serve more than 130 million customers ('Annual report of Sberbank for 2016'). Vnesheconombank's feature is that it is 100% owned by the Russian Federation (Federal Law of 17.05.2007 No. 82-FZ). Vnesheconombank is working to improve the competitiveness of Russian economy, its diversification and stimulation of investment activities. Vnesheconombank is not a commercial bank, its activities are regulated by special law No. 82-FZ 'On the Development Bank', which entered into force on June 4, 2007. Vnesheconombank does not compete with commercial lending institutions and participates only in those projects that cannot be funded by private investors.

The monetary policy pursued by the Central Bank of the Russian Federation during the crisis and sanction period reduced the influence of crisis factors on systemically important banks development. In particular, the Government of the Russian Federation decided to support the Development Bank through capitalizing it with funds from the federal budget in order to retain its volume in the development of the national economy. The second favorable factor was the policy of banks' sanation, which increased competition among bank employees in the labor market. The Bank of Russia's policy on banks' sanation became an important non-economic factor for increasing the bank employees work motivation, as it objectively gave the employees fear of losing their jobs, created favorable conditions to the leading bank employers to increase the share of qualified personnel including branch network front - office staff: sales and operations managers, cashiers.

Theoretical and Literature Review

During the reviewed period, Russian scientists are actively turning to the study of the issues of preserving the stability of Russia's financial and socio-economic systems (Eskindarov, M., 2012; Eskindarov M., 2015; Belyaeva I. & Pukhova M., 2017; Osipova O., 2015; Kozhevina O. & Bataeva B., 2017) and analyzing the fundamental issues of anti-crisis management transformation (Abdikeev, N., Ivanyuk, V., & Pashchenko, F., 2017; Ryakhovskaya A., & Kovan S., 2013). The issues of stimulating of bank employees labor in the conditions of the economic crisis are mainly raised by practitioners. The economic crisis aggravates many social issues, including social differentiation of the population. Government of the Russian Federation initiated a scientific study, under which Russian scientists are carrying out a multilateral analysis of development of the principles of remuneration for employees of state bodies and organizations with state participation, including Russia's systemic banks (‘Unified principles of labor’, 2015). In 2017, scientific publications devoted to bank employees labor stimulating in the midst of an economic crisis, appear directly in the press (Osipova O., 2017; Artamonov A., 2017). However, there is no analysis of retail bank front-office staff monetary incentivizing specifics. This appears to be a huge problem in terms of turnover as it’s a group of employees that directly serves the bank clients. The authors set themselves the task of presenting a systemic vision of remuneration system evolution of the two leading Russian banks in the context of the economic crisis.

Methodology

The methodological basis is the modern understanding of the theory of Human Capital in the context of the Concept of Sustainable Development, the Concept of Human Development and the Decent Work Conception; Management by Results, a System of Balanced Indicators, a Socio-synergetic Theory. The method of statistical analysis, the results of sociological research are used in the work.

Results

One of the important anti-crisis tools in the conditions of economic sanctions, used by banks, was the optimization of the organizational structure and the number of employees. In crisis conditions the systemically important Russian banks made reorganizations, organizational and staff arrangements, as well as staff reduction. Unlike a number of commercial banks, leading players of the Russian banking sector continued to develop the employee labor stimulation system basing not only on the fear of employees losing their jobs. An ambitious task was set to preserve and develop the image of a socially responsible employer in the crisis economic conditions. The task was rather complicated, considering that in 2014, for example, Vnesheconombank suspended the indexation of employee salaries. This forced the bank management to pay more attention to a better distribution of the stimulating part of salary for all employee categories under conditions of ever-growing prices for essential goods.

Certain activities in labor stimulation system carried out in 2011-2013 helped to mitigate the possible negative consequences of economic sanctions on the degree of employees' satisfaction. The most interesting among them is Sberbank’s accumulated experience, due to an extensive branch network

and a significant number of front-office staff. In the years leading up to the introduction of economic sanctions, the leading Russian bank paid special attention to the development of labor stimulation policies in close correlation with the Bank's changing strategy. In 2011 Sberbank introduced the unified incentive system for retail branch front-office staff.

The implementation of the first phase of the unified remuneration system in 2010 was complicated by the absence of a centrally implemented formalized retail branch business model throughout the country. There was a decentralized approach in terms of roles, functions of retail branch employees, of rationing their number. Automated data sources for productivity and bonus calculations were decentralized and disjointed.

The Sberbank Strategy adopted in 2008 recognized labor stimulation system as the most important leverage for the Bank's tasks, determined the vector of its change towards transparency and objectivity, strengthening the remuneration dependence on the results of each employee' work, and the unification of the principles of financial incentivizing throughout the bank's system. The most important task was to ensure a level of pay that would ensure worthy and fair material income for employees. Sberbank planned to increase the salary level to an extent significantly higher than the inflation rate, which could contribute to the increase in the efficiency of its activities. Sberbank also decided to expand and improve the system of non-material labor stimulation, which in the conditions of increasing the share of highly qualified employees became increasingly important. The implementation of these changes was reinforced by the introduction of a system of balanced indicators, their use as criteria for assessing the quality of work and determining the material remuneration. The change in the mentality of employees and their approach to work, the introduction of a quality monitoring system and customer satisfaction, which also correlated with the salary system, was stipulated separately. To succeed, the IT systems were centralized and modified, constant management mechanisms improvement was in place, technological systems were set, and a transition to a fully centralized and automated system of labor incentive system was launched. Employee productivity growth by 50% was among the key factors used to evaluate Retail Strategy success ('Sberbank Development Strategy until 2014').

In accordance with the Strategy, in 2011 Sberbank began to introduce a new incentive system simultaneously with the new centralized business model of the retail branch network. It was based on Grade Pay System launched a year earlier: a system of official ranks based on Hay Group methodology, which was used to determine the correct salary ratios between different positions on the basis of criteria of responsibility, knowledge, freedom in decision-making.

Based on the strategy and business objectives of the job roles two versions of a combination of guaranteed and variable parts in the annual structure of incomes of employees of the retail network were developed and proposed for implementation. Branch managers had base salary as 60% and 40% bonuses as of the annual income. Line staff had a salary of 50%, the rest of the annual income consisted of three types of incentives In particular, to get the target amount of the monthly premium, the employee had to collect a certain number of points for operations conducted. Failure to comply with the labor rate led to the zeroing of premiums, overfulfillment of two or more times did not result in a proportional increase in earnings. The practice of introducing a new incentive system showed its imperfection. The number of points in relation to the types of transactions was the same for the entire retail network, the basis for assessing the operation in points was labor intensity and priority for the bank. Information on how to transfer the exchange rate of points into Russian Rubles was closed directly from line staff. The reasoning for this were differences in market wage rates in the territories, which was revealed in the relatively low level of involvement of workers in the first year of the system's existence. In addition to external Employee Involvement Surveys, Sberbank itself monitored the employee incentive system satisfaction level. First employee responses in December 2011 are worth mentioning: 62% of sales managers responded positively to the question 'I understand how my monthly premium is calculated', while 59% of the 307 interviewed workers doubted that the more they work, the more they earn ('Results of the First internal survey', 2012).

Sberbank began to measure the level of staff involvement through an annual survey of more than 100,000 employees. The survey is conducted according to the standard methodology used by other companies and measures the following parameters: pride in the Bank as a company, evaluation of the

Bank as an employer, identification with the Bank at the level of goals, values and future, and how the Bank encourages employees to work at their maximum potential. The results of annual research have shown that the involvement of employees in general is gradually growing and is on the same level with the majority of the western commercial banks. From 2011 to 2016, taking into account the modernization of the system, it increased by 15% as GFK reports.

Despite the weaknesses identified in 2012, by the time of the imposition of economic sanctions, the Bank had established a system of HR management based on new system of motivation and labor remuneration, also the income level of the staff was set to market. This helped to ensure transparency of payments for employees and increase the efficiency of the financial component of motivation. Sberbank also implemented measures which led to the significant increase in labor productivity accompanied with the reduction in staff numbers. Indicators of Bank productivity and efficiency of the staff costs in 2014 were consistent with the level of similar indicators of comparable scale international banks in developed and emerging markets ('Report of OAO Sberbank of Russia for 2014').

Further standardization and separation of functionality between the various retail branch specialties was continued in terms of the economic sanctions. Two-year front-office staff incentive calculators' performance monitoring gave the opportunity to plan the quantitative branches' role mixes more accurately. Geomarketing researches have allowed to more closely track hiking thread in office, to introduce flexible work schedules for employees based on peak loads (breaks for businesses, the payment of salaries, pensions, benefits, transfers). Thus, the workload and types of work were scheduled more precisely in time and space which led to plan accurately the job mix and staff counts. More accurate planning and centralization of IT systems made it possible to start the process of getting rid of complicated, zeroing and restrictive incentive formula elements, introduced in the very beginning mainly to replace the missing operational governance mechanisms.

Branch network 2011 - 2012 was transferred to a centralized model of work. From the second half of 2013, the calculation of front-office employee incentives was reoriented towards paying for the employee's personal contribution in the framework of his job's standard functionality for a centralized sales and service model. Effective second quarter 2014, the sales incentive formula calculation order has been reduced from four actions to two. Sales or transactions that were not part of the standard functional of the employee in his position, were not paid anymore. The standard functionality of the employees was clarified, the intersections in the jobs functional were either eliminated or remained, but, as compared to 2011 - 2012, became minimal. A review of the set of quarterly key performance indicators (KPIs) was conducted. If in 2011-2012 the number of quarterly KPIs was unified to all positions, effective 2014, as a result of employee feedback, each job role had its particular set of KPIs individualizing its impact. As a measure to stimulate cross-selling in the changed roles of sales manager and consultant, these jobs were introduced crossed quartered KPIs ('Retail Front-office employees incentivizing procedure by Sberbank', 2011).

In October 2014, a third survey of employee incentive system satisfaction survey was carried out ('Results of the Third internal survey'). Like the poll of 2012, the survey of 2014 was conducted among employees having received at least two monthly and quarterly modified-type incentives. 20 months work within the framework of a countrywide unified model of the branch network and an improved payroll system led to a decrease in the role of the uncertainty factor in calculating and forecasting the income of Sberbank employees compared with 2011-2012. The results of the survey showed that employees began to understand better how their monthly and quarterly incentives were calculated, the relationship between the accrued bonus and their functionality (an average increase of 24% compared to 2012) and the essence of teamwork as well as cross-sales (+ 22%). The change in the quarterly award for cross-selling was supported by focus group sales managers and consultants having received quarterly incentives for the second and third quarters of 2014 (+25 and + 19% respectively). The most satisfied groups were sales managers, consultants and operation specialists. Despite a significant increase in satisfaction with the labor incentive system after simplification of calculations, a number of fundamental areas required further elaboration. Among them, revealed tendency of employees to less labor-intensive sales (47% preferred answers) and overall satisfaction with the methods of calculation and the incentive size ('I like the current motivation system', 'I consider the

current motivation system fair,' 'This is the best motivation system I've worked with in Sberbank') - 21%, 45% and 27% total preferences matching each of the above job groups, respectively.

The third stage of Sberbank's front-office employee labor incentive system development covers the period from 2015 to 2016, when, to a certain extent, there has been an adaptation to economic sanctions imposed on Russia. The changes were carried out simultaneously from the fourth quarter of 2015 to all types of positions in all Sberbank's regions within the framework of the existing centralized sales and service models. In connection with the transition to new income structures, for the line specialties the proportion of guaranteed and variable parts of monthly income increased by 7%, simultaneously the quarterly incentive was abolished. This made it easier to attract staff from the labor market; reduce the turnover of line personnel; to tie and focus the attention of front-office staff on the monthly performance results. At the same time, due to the cancellation of the quarterly incentive, the assessment of compliance with corporate competencies (5+) and the assessment of the accomplishment branch team-wide goals, which have been exhibited on a quarterly basis, have been eliminated. As practice has shown, at present, the risks of abolishing the quarterly evaluation and bonus system have not been realized. Calculation of monthly incentives of sales managers and consultants started to be based solely on piece-rate principles of labor payment ('The Labor Code of the Russian Federation of December 30, 2001 No. 197-FZ). Employees were sent a signal that their earnings did not depend on the time they spent in the office, but only on their performance in the workplace.

Operational specialists and chief specialists service model was unified and reduced to transaction and settlement-cash services for clients. At the same time, the former specialized in less complex 'short' operations, while the latter specialized in cash settlement services and more complex, long-term customer transactions. The purpose of the work in this and other positions was customer service. The incentive calculations were unified as well.

Third survey of employee incentive system satisfaction was made in the second quarter of 2016, three quarters after the change in the basic conditions of the branch network employee work stimulation system. The change in the structure of income in the direction of increasing the guaranteed part was supported by all line specialties ('With a new system of motivation, I earn more', 'This is the best motivation system for line staff, which I worked with in Sberbank', 'I like the current motivation system'). The growth to the affirmative responses of 2014 was an average of 6% for sales managers, 12% for consultants and 10% for specialists ('Results of the Fourth internal survey). The transition from a formally unlimited piece-rate incentive calculating type to mono-KPI with a de facto set maximum fixed income limit was more painful for specialists: on the question 'The more efficiently I work, the more I earn,' satisfaction decreased by 34%, 'The new monthly bonus system fosters competition in the team' showed a decrease of 32%. However, chief specialists having worked at the time of the survey on a similar bonus system of 18 months did not experience such a dramatic drop in satisfaction (-17% and -7% respectively), which may be explained by a higher salary at another rank of job, as well as a longer, than the specialists, adapting to the new bonus conditions ('Results of the Fourth internal survey).

In 2012, there were two coefficients for assessing the performance against the load normative (for credit and non-credit products) and the bonus cap, all used in calculating the monthly premiums of sales managers. In 2014, two coefficients were replaced by one, and in 2015 all these were abolished and replaced by a piece-rate premium calculation without any limits. The abolition of the incentive coefficients estimating meeting the load standards, the threshold value of payments and the refusal of trigger payments received broad support from selling employees. Withdrawing the ceiling of the premium raised satisfaction and competition among employees engaged in sales. After the transfer of consultants to the piece-rate incentive system and payout caps 2016, the sense of fairness of payment increased in the collectives. On average, the approval of innovations was reflected in the increase in overall satisfaction with changes in the system of labor incentives, the questions 'I like the current motivation system', 'This is the best system of motivation of line staff, which happened to work in Sberbank', 'I consider the current system of motivation fair' had + 11%, + 10%, + 8% increase in satisfaction compared to 2014.The new system of incentive calculating has increased the competition in the team, and raised the importance of individual contributions (+20%). Thus, the employees confirmed that the innovations provided full coverage of the new functional posts, provided a link

between the actions of employees and the results of their individual efforts and eliminated additional management barriers - conditions and limitations of incentive payments.

In 2014, Vnesheconombank also continued to work on system of labor remuneration development aimed to increase employee motivation in order to conscientiously and qualitatively perform their duties. Without that it was impossible to successfully fulfill the strategic goals that the bank was facing. An annual staff assessment was conducted in 2014 to determine the individual performance of employees for the year 2013. Besides production indicators, individual achievements by employees, also the development of professional and personal competencies were taken into account. In 2014, 4,836 Vnesheconombank Group employees (1,950 men and 2,886 women) passed the performance evaluation, which is 402 more than in the previous reporting period. The results of the evaluation served as the basis for paying employees an individual part of the annual bonus ('Vnesheconombank's Group Sustainability Report 2014'). This work to a large extent allowed to mitigate the social tension in the organization in the conditions of economic sanctions, to optimize the number of staff on more transparent, understandable principles to the employees.

Since 2014, due to new economic and political challenges, it became necessary to strengthen the innovative adaptive activity of employees. Vnesheconombank continued to develop the procedure for lump-sum bonuses for employees participating in solving urgent bank problems as well as to implement initiatives that promote the development of a state corporation [6]. In the years that followed, much attention was paid to improving the key performance indicators of workers. The level of remuneration of employees is based on sufficiently standardized mechanisms that provide a differentiated approach to incentive payments, depending on the performance of corporate-wide key performance indicators and evaluation of individual performance of employees.

In order to improve the remuneration system, increase its transparency and objectivity, the first stage of the Vnesheconombank's labor standardization system was implemented in 2015. Work rating of three independent structural divisions of the Bank was performed ('Annual report of Vnesheconombank - Development Bank 2015'). In 2015, in order to improve the effectiveness of evaluation procedures, the Bank introduced an automated WebTutor system with an individual office feature, in which each employee can get acquainted with the rating of his individual performance. The most notable results in the development of the internal regulatory framework were achieved by EXAR, providing quarterly procedures for monitoring and evaluating the performance of workers ('Non-financial report of Vnesheconombank's group - 2015', p. 128).

Since the salary increase in order to motivate employees is an 'impermissible luxury' in the context of the economic crisis, in systemically important Russian banks special attention was paid to the encouragement of an intangible nature, which is an important component of the social policy of the organization (Osipova O., 2015). The application of intangible incentives allows the organization to deepen the dedication of employees, increase their interest in their own professional level, reduce panic in the team and, as a result, improve the quality of their professional activities. In 2014, 89 employees of Vnesheconombank received the distinctions 'Best employee' or 'Excellent employee of Vnesheconombank', the names of 10 employees were included in the Vnesheconombank's Book of Honor, 140 employees received the Gratitude of Vnesheconombank Chairman ('Vnesheconombank's Group Sustainability Report', 2014). A good tradition in Vnesheconombank was the congratulation of pensioners - members of the Council of Veterans of Labor on the Victory Day. In honor of the holiday, a gala dinner and a ceremony of awarding a number of veterans with a badge 'Excellent employee of Vnesheconombank' are organized ('Annual report of Vnesheconombank - Development Bank 2015'). The leaders of Sberbank paid much attention to the development of non-material incentives as well ('Sberbank Development Strategy 2014 – 2018', p. 49).

Vnesheconombank and Sberbank have been implementing an HR policies for a number of years, the priority of both is to ensure the social security of staff in order to attract, retain and motivate employees, create conditions to fulfill their professional and personal potential. Benefits and compensation for bank employees, carried out within the framework of social programs developed in previous years, also helped to alleviate social tension in the face of economic sanctions.

Conclusion

Despite the significant differences between the two systemically important Russian banks - the largest Russian state corporations, it is possible to identify similar measures to improve their work in the conditions of the economic crisis. Both banks paid considerable attention to the development of the incentive system for their employees.

Basing on the studied statistical material, a pilot sociological survey of Vnesheconombank employees and the results of the study of the involvement level of Sberbank's front-office staff, we can reveal that a socially responsible personnel policy is possible in the conditions of the economic crisis. Leading Russian banks were able to improve the HR management of organizations and the reward system thanks to improving the system of labor rationing, the transition to KPI, optimization of staff numbers and increasing the individual performance of each bank employee. The management of Vnesheconombank and Sberbank in the face of economic sanctions paid great attention to improving the monetary remuneration system efficiency for all categories of employees, from front-office employees to top managers. Thanks to continuous work to improve the system of front-office incentive payments, Sberbank has made significant progress in increasing the productivity of line personnel.

A special emphasis by two banks was made on the development of intangible methods of stimulating labor, including the preservation of the social package. The extended social package provided to employees now meets the basic expectations of the staff. However, there are opportunities for its improvement. The staff of the leading banks is represented by different age and job categories: thus further development of an optimal system to boost stimulating effect on the entire staff of the bank is a complex but quite solvable multifunctional task.

References

Abdikeev, N., Ivanyuk, V., & Pashchenko, F. (2017), 'Anti-crisis model of management of the world banking system, based on the network central approach (on the example of the 2008 crisis)', *Fundamental Research*, 6, 86 -90.

'Annual report of Sberbank for 2016', [Electronic resource] - URL: https://2016.report-sberbank.ru/en/portrait/today (accessed 04.09.2017).

'Annual report of Vnesheconombank - Development Bank 2015', [Electronic resource] - URL: http://veb.ru/common/upload/files/veb/reports/annual/VEB_Annual_2015_2eng.pdf (circulation date 01.04.2017).

Artamonov A. (2017) 'Calculation of front-office employee incentives: difficulties in legislative regulation', *Problems of Economics and Legal Practice*, No. 3, 48-51.

Belyaeva I., & Pukhova M. (2017), 'Integration of corporate social responsibility to the corporate governance system in Russia', *Economic systems*, T.10, №2, 20-23.

Eskindarov M. (2015), 'Financial system of Russia: conditions and risks of sustainability', *Scientific works of the Free Economic Society of Russia*, Vol. 190, No. 1, 166-173.

Eskindarov M. (2012), 'Sustainability of financial system of Russia: indicators and criteria of evaluation', *Bulletin of the Financial University*. № 2 (68), 8-18.

Federal Law of 17.05.2007 No. 82-FZ 'On the Development Bank', [Electronic resource] - URL: http://www.veb.ru/about/normpr/ (accessed 01.04.2017).

Frank Research Group 'The largest players of retail banking services', [Electronic resource] - URL: https://www.frankrg.com/index.php?new_div_id=145 (accessed 04.09.2017.

Kozhevina O., & Bataeva B. (2017), 'Improvement of strategic goal-setting in companies with state participation', *Problems of management theory and practice*, 3, 33-44.

'Non-financial report of Vnesheconombank's group - 2015', [Electronic resource] - URL: http://veb.ru/common/upload/files/veb/reports/rsd/rsd_15_2_eng.pdf (accessed 01.04.2017).

Osipova O. (2017), 'Developing the bank employees labor stumilating system in the conditions of the economic crisis', *Science and practice*. 2. 18-27. Moscow: Russian Economic University named after G.V. Plekhanov.

Osipova O. (2015), 'Social aspects of sustainable development'*Management of sustainable development* / Ed. A.V.Trachuk. SPb: OOO 'Publishing House'Real Economy', 371 – 412.

'Report of OAO Sberbank of Russia for 2014', [Electronic resource] - URL: http://2014.report-sberbank.ru/en/ar/strategy-implementation/strategy-implementation/ (accessed 04.09.2017).

'Results of the First internal survey of satisfaction with the incentive system of Sberbank Retail front-office employees, December 2011', (2012), Reprint, 5.

'Results of the Third internal survey of satisfaction with the incentive system of Sberbank Retail front-office employees, October 2014' (2015), Reprint, 5.

'Results of the Fourth internal survey of satisfaction with the incentive system of Sberbank Retail front-office employees, 2nd quarter 2016'(2016), Reprint, 5.

'Retail Front-office employees incentivizing procedure by Sberbank' (2011), 47.

Ryakhovskaya A., & Kovan S. (2013), 'Transformation of anti-crisis management in modern economic conditions', *Effective anti-crisis management*, 5 (80), 62-73.

'Sberbank Development Strategy until 2014'. (2014), Moscow.

'Sberbank Development Strategy 2014 – 2018', [Electronic resource] – URL: http://www.sberbank.ru/common/img/uploaded/files/SberbankDevelopmentStrategyFor2014-2018.pdf (accessed 04.09.2017).

'The Labor Code of the Russian Federation of December 30, 2001 No. 197-FZ (as amended on July 29, 2017), art. 150 year', [Electronic resource] - URL: http://www.consultant.ru/document/cons_doc_LAW_34683/e30b03a256c97ee2026d39b102ae1e2f108597d2/ (accessed 04.09.2017).

'Vnesheconombank's Group Sustainability Report 2014', [Electronic resource] - URL: http://veb.ru/common/upload/files/veb/reports/rsd/rsd_14_1_eng.pdf (circulation date 01.04.2017);

'Vnesheconombank's report on sustainable development in 2013', [Electronic resource]. - URL: http://csr2013.veb.ru/en/group/personnel_management/ (accessed - 12.02.2016).

'Unified principles of labor remuneration for state bodies and local self-government bodies, organizations with state participation, public sector institutions development. Collective monograph / under total. Ed. O.S Osipova' (2015), Moscow: 'Onebook.ru', 236.

Public private projects as an instrument for sustainable economic growth in Russia: risks and opportunities

Aleksandr Pastukhanov, graduate student, Lomonosov Moscow State University, Moscow, Russia, e-mail: PastuhanovAE@spa.msu.ru

Abstract

The main purpose of the article is to define possibilities of PPP institute as an instrument for sustainable economic development in Russia. Much attention is given to identifying risk factors and possible directions for the development of PPP institute in Russia. At the end of 2016 and the beginning of 2017 positive tendencies were revealed in the Russian economy, what demonstrated signs of recession overcoming. In view of this, the assessment of PPP projects realization contribution to the economic growth was carried out. The author of the article uses the following general scientific approaches: analysis, synthesis, induction, deduction, method of classification, logical analysis, methods of comparative analysis and statistical method. The author comes to the conclusion that PPP institute in Russia is at its early stages now and not fully implemented in practice, that is why it cannot become an instrument for sustainable economic development in Russia.

Key words: Public Private Partnership, economic growth, sustainable development

Introduction

Nowadays, searching for the ways of sustainable economic development is the key problem for every modern country. As its solution can determine economy leaders in XXI century. However, an achievement of sustainability represents a sophisticated problem today. The results of the crisis in 2008 showed that all economic development issues are complex and more than one decade is needed to deal with them. Growth rate reduction in western countries in recent years acts as a signal to a secular stagnation, according to Mau (2017).

Outcome of the global processes and economic imbalance within the country were reasons that Russia became one of those countries which suffered greatly from the consequences of economic crisis in 2008.
Figure 1 demonstrates countries Gross Domestic Product (hereafter GDP) development. According to this, GDP's growth rates in Russia in 2009 was 7.7 % lower than the global one, and also 3.5% and 5% lower than the growth rate of EU and USA respectively.

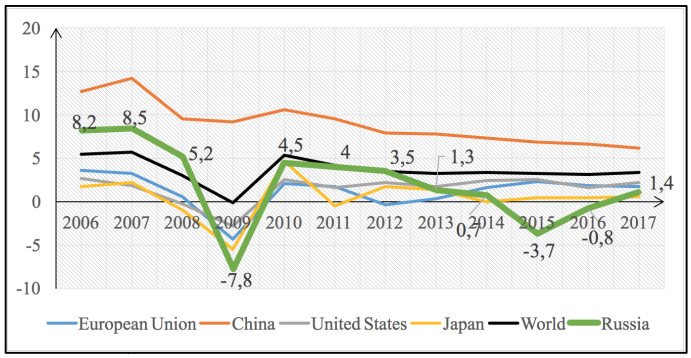


Fig 1. Real GDP Growth by countries, %

Evidently, such a severe economic recession after the rapid growth in early and middle 2000's was not only the result of global crisis, but also internal problems of Russian economy. As Russia is still influenced by the global crisis, the problem of searching for ways and instruments for sustainable

development remains relevant. Today oil price volatility, fluctuations of rubles and economic sanctions are deterring factors behind economic growth. However, the negative growth of GDP was slowed down, according to the results of 2016. Expectations for 2017 are even more positive. In the view of International Monetary Fund (2017), Russian economy is expected 1.4% growth. Experts of the World Bank (2017) give similar estimates, thinking that Russia has entered a path to recovery.

Today specified requirements for growth indicators have to influence directly on the choice of state regulatory mechanisms, which in its turn have to become the foundation for the harmonious development of economic, social and ecologic processes.

Public Private Projects (hereafter PPP) can become an instrument for sustainable development for several reasons. First of all, they are instruments for attracting private investments in public sector, resulting in growth economic activity. Secondly, they are aimed at accomplishment of social tasks. Thirdly, PPP projects implemented in infrastructural sphere can result in economic growth.

However, an implementation of public-private projects has special aspects from one country to another. An implementation of this type of projects in Russia is of interest due to several reasons such as specifics of Russian institutional environment, statehood in economy, growing interest to PPP projects.

Figure 2 illustrates the volume of projects investments in percentage of GDP. There is a marked growth of interest for this type of public private cooperation, in spite of the fact, that the volume of investment in PPP projects is less than 1% of Russian GDP. In 2016 investments in PPP projects increased by 2.7 times in comparison with 2015.

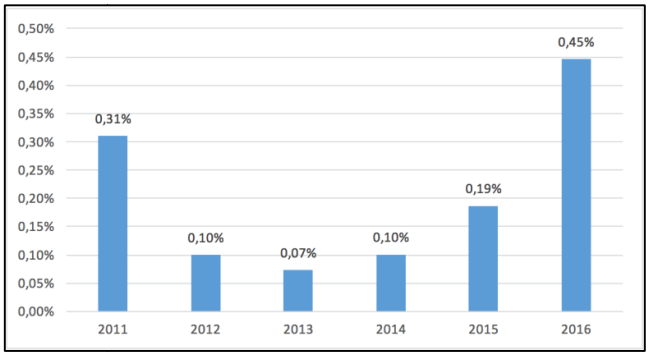


Fig 2. Investments in PPP projects, percent of Russian GDP.

This article deals with Russian practice of PPP projects implementation. The author makes an attempt to define the advantages of using this type of projects for sustainable development of Russian economy and to identify risks and opportunities of PPP projects implementation as one of the instrument for economic growth in Russia.

Literature review

Challenges of economic growth and development of countries are the dominating lines of research in economics. Since the very beginning of economic science the major issue in economists researches have been wealth of nations and the identification of its growth factors. Smith (1776) and Ricardo (1817) were the first who studied influence of capital and labour on economic growth.

One of the most known concept of economic growth among the modern author's works is the Solow model (1956). According to this model, in stationary state economic growth depends on the technological advance and population growth rate. An idea of necessity to access high level of technical progress was elaborated in works of soviet economic school as well, namely in the Glazyev's work (1993). Technological leadership constitutes country's economies success. It should be noted that similar ideas were pitched in 1940's, when the theory of Big Push had been developed. This theory

suggested technological breakthrough as one of the growth strategy. The idea was developed by Murphy et al (1989).

The first endogenous growth theories were developed after the publication of Romer (1986) and Lucas (1988) researches. Such theories consider reasons for actualization of economic growth factors such as advancement of education and innovations. However, the non-applicability of these theories to the countries with developing economies stimulated Galor (1999 and 2005) to work out Unified growth theory, which demonstrated the development of correlation between population growth rate, technological advances and standards of living.

Nowadays, institutional theory appears to be one of the latest modern concepts of economic development. Acemoğlu et al (2001) associated economic growth with the development of institutes. Moreover, according to the authors, the level of political institutes predetermines the development of economic ones.

Submitted theories and models of economic growth help to formulate requirements imposed on the modern instruments for increasing economic development of countries.

PPP institute is theoretically well interpreted in economic growth and sustainable development terms for several reasons. Firstly, PPP is an instrument of private and public sectors integration, manufacturing capacity, capital and investments. Secondly, PPP can be seen as an instrument of innovative projects co-financing and technical progress as a consequence. Thirdly, it fosters the development of human capital assets and also the improvement of living standards. Many socially important projects in education, medical, building sectors and infrastructure are implemented on the basis of PPP. Finally, PPP institute has features of inclusive institute according to the Acemoğlu and Robinson concept.

At this moment a number of researches, devoted to the assessment of PPP's influence on some countries economic growth, has been conducted. For example, Pimentel et al (2016) measured influence of investments in PPP on a dynamics of macroeconomic indicators. Similar attempts were made by Aschauer's (1989), who tried to estimate an influence of investments in PPP on fluctuation of economic activity. Jasiukevicius (2013) tried to establish relation between economic growth and public-private partnership market development in the countries of European Union. The conducted researches did not prove any positive correlation between investments in PPP and economic growth.

Apart from above mentioned works, there is a large number of consultancy's works as well as World Bank's and other international organization's publications on this theme. For example, the main principles to implement PPP's projects in order to make them the foundation for economic growth, are formulated by Hamilton (2013) in the presentation of United Nations Economic Commission for Europe. One of the notable publications among consultancy's publications on this topic is Booz&co's report provided by Shediac et al (2008). This work was aimed at showing the value of PPP projects implemented in infrastructural sphere for economic growth.

Apart from positive estimates, there are also more conservative ones towards PPP's ability to become the basis for an achievement of sustainable development. As Jomo et al (2016) demonstrated in their research, PPP projects are more expensive than public procurements and that benefits from PPP projects differ from one sector to another and that PPPs often fail to yield 'value for money'.

The listed reviews and reports of international organizations and consultancies are often descriptive and pragmatic, and they do not give objective and reliable assessments of PPP's value for economic growth of the country. Today it is possible to observe divergence between the development of PPP and the results of empirical studies.

Research question

In this research the author makes an attempt to define usability of PPP institute as an instrument for sustainable economic development in Russia and to estimate PPP projects influence on the economic

growth of the country. In this respect, the aim of this study is to define risks and opportunities for PPP projects realization as an instrument for economic growth in Russia.

To solve the formulated problem, the following aims were set:

- To conduct an analysis practice in realization of PPP projects in Russia,
- To identify risks of using PPP projects as an instrument for sustainable economic growth in Russia,
- To define principle growth direction for PPP institute development in Russia.

Research design and methodology

This research is based on the review of western countries practice in the context of cooperation of public and private investments, analyses of the information submitted by World Bank, The Central Bank of the Russian Federation, Russian Federal State Statistics Service, regulatory legal acts, related publications and proceedings of the research and practice conference. Empirical analysis of the article is based on the database of the website 'Infrastructure projects Platform'.
The author of the article uses the following general scientific approaches: analysis, synthesis, induction, deduction, method of classification, logical analysis, methods of comparative analysis and statistical methods.

Results

PPP institute in modern Russia had two stages of legislative recognition. In 2005 it started with the enactment of Federal Law №115-FZ 'On concession agreements', that established concessions as a form of public and private cooperation, known both in pre-revolutionary Russia and in 20-30's of Soviet Russia. Furthermore, in 2015 the Federal Law №224-FZ 'On public-private partnership', that made PPP agreements legal in Russia, was drafted and passed.

In this regard it is possible to conclude that PPP is a relatively new institute in Russia, so that the practice of such projects realization has not taken significant effects so far. The author analyzed 2.446 projects and drew the following conclusions.

- *Rapid increase of PPP projects popularity in Russia in 2013-2016.*

Figure 3 demonstrates a huge increase in volume of investments in 2016 (2.4 times in comparison with 2015) and in a number of concluded contracts (1.7 times in comparison with 2015) for the considered period.

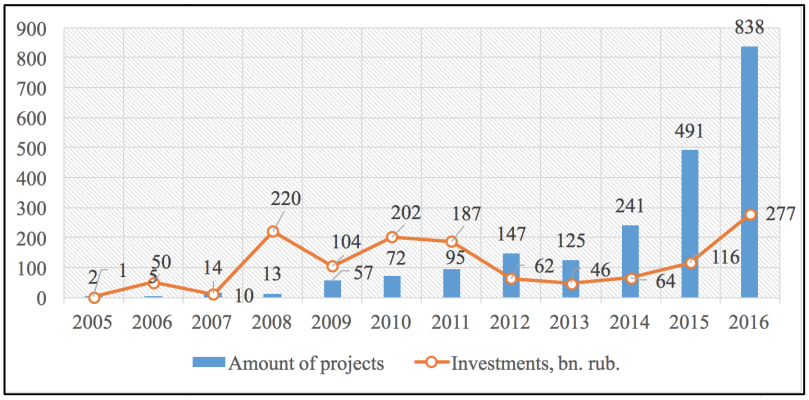


Fig 3. Investments and amount of public private projects in Russia from 2005 to 2016

Although it should be noted that the volume of investments increases not linearly, but with fluctuations in 2008, 2010, 2011, which can be explained with executing of some important contracts. For example,

in 2008 the dynamics of investments was influenced by the contract for building a motorway Western Rapid Diameter to the amount of 12.720 ml. rubles (or 96% of investments in 2008).

- *Most of the projects are implemented at a regional level, in constituent entities of Russian Federation, mostly leaders in gross regional product (hereafter – GRP).*

If to analyze investments at a federal, regional and municipal level, it is possible to conclude that most of the projects are implemented in partnership with constituent entities of Russian Federation – 1.444 bn. rubles or 60% of the total volume. Whereby investments at the regional level are distributed unevenly – most of the projects are implemented in federal cities and megapolisis. For example, Moscow and Saint Petersburg account for 828 bn. rubles of investments, 58% of regional level or 35% of cumulative investments in 2005-2017. They are followed by the Moscow Region, the Yamalo-Nenets Autonomous District, the Volgograd Region, the Saratov Region, the Novosibirsk Region (Table 1).

Table 1: Investments by constituent entity of Russian Federation

Constituent entity	Investments, bn. rub.	GRP as for 2015, bn. rub
Moscow	541	13,533
Saint Petersburg	287	3,024
Moscow Region	124	3,214
the Yamalo-Nenets Autonomous District	120	1,813
the Volgograd Region	88	735
the Saratov Region	71	617
the Novosibirsk Region	59	981
Pearson correlation	84%	

To illustrate the fact that the unevenness in investments distribution is not an accident, the Pearson correlation index was calculated. Performed calculations showed that differences in volume of investments at the level of subjects can be explained with unevenness of created GRP (Table 1).

- *Preferred sphere of realization - transport, building of road and railroad infrastructure, operation of public service vehicle.*

Concerning sphere of projects implementation, most of the investments are attributed to the transport sector – 61% of aggregate investments (Figure 4). It is followed by energy and housing sector (18% of aggregate investments) and the social sector (17% of aggregate investments). If to compare these rates with the global ones, it is obvious that the similar sectors remain leaders.

According to the World Bank (2015), the sectors with the highest volume of investments in PPP projects are transport (63% of total sum of investments), energy (34%), housing (4%).

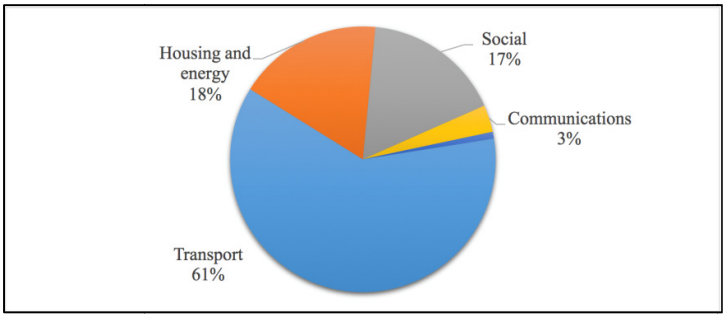


Fig 4. Investments by spheres in 2005-2017, %

- *The implemented projects are capital intensive and need a high volume of investments.*

Transport sector has not only the highest level of gross investments, but also an average cost of project realization – 23.512 bn. rubles for 1 project (Table 2). The transport sector is followed by the communication, public services sphere and utility infrastructure, which average investments for one projects are much lower – 2.211 ml. rubles and 1.229 ml. rubles respectively.

Table 2: Average cost of a PPP project by sphere

Sphere	Investments, mn. rub	Total amount of contracts	Average cost of a project
Transport	822,909	35	23,512
Housing and energy	236,879	1806	131
Social	226,165	228	992
Communications	44,221	20	2,211
Engineer-technician infrastructure	11,061	9	1,229
TOTAL	1,341,241	2,100	28,075

- *Preferred form of agreement - concession, public private projects agreements are not used.*

Today a large number of public private projects are implemented in Russia (Table 3). Concessionary agreements are the most popular form of agreements according to the number of negotiated contracts and volume of investments (37% of the cumulative investments). They are followed by different types of public contracts, such as investment agreements (32%), life cycle contracts (8%), lease arrangements (0.4%), energy service agreements (less than 0.1 %). Corporative partnership agreements amounted to 3.6% of aggregate investments and became less popular form of agreement.

Table 3: Types of PPP contracts in Russia

Type of the contract	Amount of contracts	Investments, mn. rub	Share, %
Concession	2,195	872,487	37%
Investment agreements	74	755,294	32%
Life cycle contracts	11	186,650	8%
Corporative partnership agreements	16	102,733	3,6%
Lease arrangements	70	9,662	0,4%
Energy service agreements	3	31	Less than 0,1%
Other contracts	73	457,852	19%
TOTAL for 11 years (from 2005 till 2017)	2,442	2,384,710	100%

- *Long-term investments – 10 years is an average period of realization.*

Period of projects realization varies based on form of concluded agreements. As was shown, 3 major groups of agreements, completed in Russia on terms of public private cooperation can be singled out – concessions, PPP/PIL agreements, public contracts. An average period of realization of this type of agreements is calculated in Table 4. Generally speaking, according to the calculation, PPP projects are mostly mid- and long term.

Table 4: Average term of PPP projects realization

	Arithmetic average	Mode	Median	Std. dev.	Skewness	Maximum	Minimum
Total, years	11	10	10	9.15	1.92	49	1
Corporate partnership, years	13	15	15	4.21	(1.77)	16	4
Concession, years	11	10	10	9.14	1.91	49	1
Public procurement, years	11	5	7	10.58	1.88	49	1

The specific features of PPP projects listed above suggests that PPP institute in Russia is in its early stage at the moment. Practically half of all projects due to volume of investments are a variety of public procurement by definition, but they are attributed to PPP in Russia and included in government statistics.
From the other hand, at this moment PPP contracts, established by Federal Law №224-FZ «On public-private partnership», are not used. Nevertheless, concessions are the most popular form of agreements. It indicates that PPP institute is not fully implemented in Russia.

Influence of PPP projects risk factors on economic growth in Russia

The idea of PPP consists in cooperation of private and public sector on equal terms for socially important project realization. However, this cooperation model has its own restrictions in Russia. According to the terminology of Acemoğlu – Robinson, Russian economy is extractive one and characterized by a considerable state influence on social spheres of life, underdeveloped market relations, rule of bureaucracy.

All these facts increase risks for using this type of projects as an instrument for economic growth in Russia. The main risk factors can be restricted to 4 key factors, listed below.

Firstly, the large state participation in Russian economy.

Nowadays the rate of state participation in the economy is very high. According to the Federal Anti-Monopoly Service 2015 report, the contribution of state and state-owned companies to the GDP is up to nearly 70%. As a comparison, in 2005 the state contribution was equal to 35% of Russian GDP. Despite the fact that these indicators are not the result of empirical analysis, but the expert opinion, similar assessments of state participation are presented in other federal documents.

According to the publications of the Analytical Center for the government of the Russian Federation, state participation in economic process increases. To confirm this dynamic experts of Analytical Center carried out an assessment of state participation in the view of state-owned companies in corporate sector and state procurements. Thus the analysis of companies included in the TOP-100 of Expert Ra ranking has shown that the revenue of these state-owned companies has increased from 46% to 51% in 2014. In terms of public purchases, the number of contracts negotiated with 50 largest state companies are equal to 41-42% from the amount of executed contracts under the Federal Law №44-FZ. «Gazprom» and «Rosneft» became the main customers under the Federal Law №223-FZ. Their revenue from the total price of published lot was up to 43% in 2015.

Secondly, significant state influence on the business success.

In Russia state plays an important role in realization of socially important projects and also greatly influences effectiveness of large business. Crony capitalism index, compiled by the analytical center of The Economist magazine, demonstrates this tendency. It turned out to be the highest for our country in 2015. This indicator also shows that private investments and initiative are rather low developed.

As far as the experience of PPP projects realization in Russia is concerned, business corporations, controlled by the state, often act as «private partners». The list of private partners, which are taking part in the realization of the largest infrastructure projects is given in the Table 5. The analysis of capital structure and final beneficiary of these companies has shown that in the largest projects, private partners are in fact quasi-public companies.

Table 5: Private partners in most expensive projects

Company	Cost of the project, mn. rub	Beneficiary	Company's share capital owned by state
LLC Magistral' severnoy stolitsy	212,720	VTB Bank Bank of GPB (JSC)	21%
OJSC Mostotrest	176,900	JSC Russian Railways	100%
LLC EcoLine, LLC Hartiya, LLC MSK-NT , LLC MKM-Logistika, LLC Spetstrans	142,283	Not identified	-
LLC VIS TransStroy	113,142	PJSC Gazprom	50,2%
OJSC Mosinzhproekt	82,000	The government of Moscow	100%

Thirdly, the problem of Acemoğlu – Robinson «vicious circle».

Difficulties in adaptation of western models for correlation between state and business can be explained through the use of Acemoğlu - Robinson «vicious circle» concept. The advent of inclusive economic institutions is impossible in countries with a domination of extractive political institutions (for example, in Russia), according to Acemoğlu and Robinson. The last one (economic institution) is predetermined by the first one (political institution).

So that the adaptation of western models in extractive economy inevitably leads to the transformation of core principles. As a result, possibilities for corruption and abuse of authority emerge:

- Holding competitions (tenders) for interested parties at signing contracts;
- Considerable participation of public funds in realization of projects;
- Escalation of costs for implementation of a project;
- Rise in final product price.

Fourthly, lack of correlation between PPP projects implementation and economic growth of the country.

Theoretically, the use of PPP institute presupposes the attraction of private sector and private investments in socially important spheres. Enhancing business activities and investments leads to the GDP growth and the development of an appropriate infrastructure for the free movement of commodities, services and citizens. Investments increase in such spheres produce the multiplicative effect, that positively influences economic growth.

Nevertheless, it should be noted that there is also no correlation between the growth of GDP and PPP investments in Russia (Figure 5).

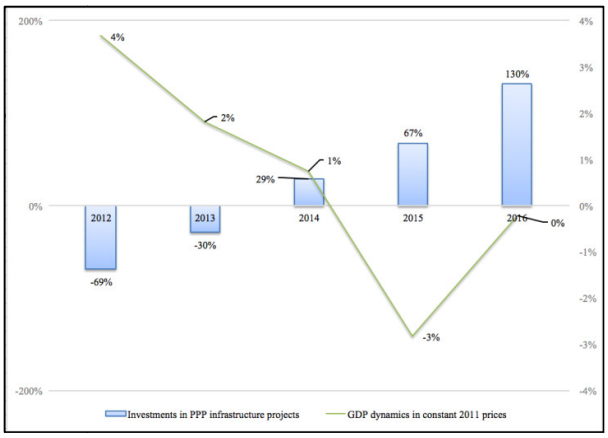


Fig 5. Investments in PPP projects and GDP dynamics

However, the divergence of short- and long-term tasks may be the reason for such configuration of PPP investments dynamics and GDP growth. Investments in PPP projects are long-term and characterized by the lasting effect on economy, that cannot influence GDP growth in near-term prospects. Long-term projects are quite expensive at the first stage of their implementation and they bring income in mid- and long-term prospects, due to this the short-term effect from PPP projects implementation is not seen.

Discussion

Based on the received results, it is possible to make some valid conclusions concerning status of PPP projects in Russia and their usability as an instrument for sustainable development in Russia.

- It is impossible to establish correlation between an increase of investments in PPP projects and growth of Russian GDP in the short term, because most of PPP projects are at the early stage of realization;
- PPP projects realization depends to a greater extent on public initiative and financial support. Equity of public contribution far exceeds equity of private contribution, what leads to the decline in efficiency of projects realization;
- PPP institute is at its early stage of development and there was no successful practical application in Russia, furthermore agreements established under the Federal Law №224-FZ are not popular in Russia;
- At this stage, concession is a functional form of agreement between state and business. Their total sales revenue amount to 0.2% of GDP, that hardly influences economic growth.

However, despite the fact that PPP institute is underdeveloped in Russia at the moment, there are still some positive trends in economy, demonstrating potential for its development. One of the trends is the increase in volume of private investments in fixed capital. According to the diagram (Figure 6) both aggregate private investments and share of private property in cumulative investments increase from 2000 to 2016.

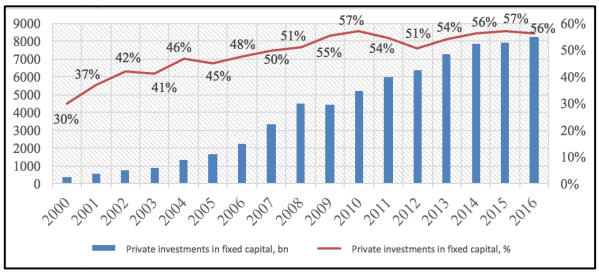


Fig 6. Private investments in fixed capital in Russia

This indicator shows that private investors have level of trust for Russian economy. In spite of economic sanctions and fluctuation of oil prices and national currency, private investments maintained its share in cumulative investments at the level of more than 50% in 2014-2016. This means that there is a growth potential for public private partnership.

However, not only an increase of volume of investments is important for the growth acceleration of country's economy based on the PPP projects realization, but also the selection of the most potential economic spheres for its realization. In this respect the following can be attributed to the feasibility of using PPP institute for the economic growth in Russia.

- Firstly, the use of development banks potential for accumulating long money in socially important projects,
- Secondly, development and legislative recognition of comprehensive and transparent business assessment when negotiating PPP contracts,
- Thirdly, establishing of accessible and transparent accounting of socially important projects realization,
- Fourthly, attraction of financial resources of pension savings. Example of the best practice in this direction is Canada. Within Ontario's Infrastructure Investment Program large pension funds of Canada OMERS and OTPP invested nearly 10% of investment portfolio resources as direct investments in PPP,
- Fifthly, technology and reorientation of PPP projects. Such Russian scientists as Glazyev (2012), Malinetskii (2010) suggest Russian adoption to VI wave of innovation as an opportunity to be one of the world's major economies. PPP projects priority spheres reorientation can become the basis for technological advances within the country.

Implementation of such capabilities appears to be a complex issue and depends not only from the state initiative, but also from business interest to negotiate PPP contracts and invest in socially important projects. Development of institutional environment and adoption of an inclusive model of socio-economic development is the key factor for achievement of partnership between business and state.

Conclusion

Today PPP institute is at its early stages in Russia and has its own specific issues, that limit PPP potential as an instrument for sustainable economic development. As it is shown in the research, PPP projects are implemented in Russia for account of public resources, investments of quasi-public companies and, in a lesser extent of private investors funds. This specific situation increase budget expenditure and imposes additional risks for the state. Moreover, as practice shows, PPP projects are more expensive than public procurements. In this regard, at this stage of PPP development in Russia it is not possible to say that there is a measurable effect of PPP projects implementation on economic development in Russia.

References

Acemoglu, D., Johnson, S. and Robinson, J. (2001), 'The Colonial Origins of Comparative Development: An Empirical Investigation', *The American Economic Review*, Vol. 91, № 5, 1369-1401, [Online], [Retrieved August 30, 2017], http://www.jstor.org/stable/2677930

Aschauer, D. (1989), 'Does public capital crowd out private capital?', *Journal of Monetary Economics*, vol. 24, №2, p. 171-188.

Barro, Robert J. (1989), 'A cross-country study of growth, saving and government', *NBER Working Paper*, № 2855.

Barro, Robert J. (1990), 'Government spending in a simple model of endogeneous growth', *Journal of Political Economy*, Vol. 98, №5, p. 103-125.

Becker, G., Murphy K. and Tamura R. (1990), 'Human Capital, Fertility, and Economic Growth', *Journal of Political Economy*, №5.

Federal Law №44-FZ at 05.04.2013 'On the contract system of the federal and municipal procurement of goods, works and services' (last amendment at 29 July 2017).
Federal Law №115-FZ at 21.07.2005 'On concession agreements' (last amendment at 29 July 2017).
Federal Law №224-FZ at 13.07.2015 'On public-private partnership' (last amendment at 03 July 2016).
Federal Law №223-FZ at 18.07.2011 'On purchases of goods, works and services by certain types of legal entities' (last amendment at 07 June 2017).
Galor O. (2005), 'From Stagnation to Growth: Unified Growth Theory', Handbook of Economic Growth, Elsevier.
Galor, O. and Weil, D. (1999) From Malthusian Stagnation to Modern Growth, The American Economic Review, №2, p.150-154
Glazyev S.Iu. (1993), 'Teoriia dolgosrochnogo tekhniko-ekonomicheskogo razvitiia'[Theory of long-term technical and economic development], *VlaDar*, Moscow (in Russian)
Glazyev S.Iu. (2012),'Sovremennaia teoriia dlinnykh voln v razvitii ekonomiki' [The modern theory of long waves in the development of the economy], Ekonomicheskaia nauka sovremennoi Rossii [Economics of Contemporary Russia], vol. 2, № 57, pp. 8–27. (in Russian)
Hamilton, G. and Holcomb, V. (2013), 'Public-private Parterships for Sustainable Development', *United Nations Economic Commission for Europe*, [Online], [Retrieved August 30, 2017], https://sustainabledevelopment.un.org/content/sustdev/csd/csd16/PF/presentations/hamilton.pdf
International Monetary Fund (2017), 'World Economic Outlook Update', [Online], [Retrieved August 30, 2017], http://www.imf.org/en/Publications/WEO/Issues/2017/07/07/world-economic-outlook-update-july-2017
Jasiukevicius, L. and Vasiliauskaite, A. (2013), 'The Relation Between Economic Growth and Public-Private Partnership Market Development in the Countries of the European Union', *Economics and Management*, vol. 18, №2.
Jomo KS, Chowdhur, A., Sharma, K. and Platz, D. (2016), 'Public-Private Partnerships and the 2030 Agenda for Sustainable Development: Fit for purpose?', *DESA Working Paper*, № 148, [Online], [Retrieved August 30, 2017], http://www.un.org/esa/desa/papers/2016/wp148_2016.pdf
Lucas, R. (1988), 'On the mechanics of economic development', *Journal of Monetary Economics*, vol. 22, issue 1, 3-42.
Malinetskii G. G. (2010), Designing of Future and Modernization of Russia, *KIAM Preprint № 41*, [Online], [Retrieved August 30, 2017], http://keldysh.ru/papers/2010/prep41/prep2010_41.pdf In Russian.
Mau, V.A. (2017), 'Uroki stabilizatsii i perspektivy rosta: ekonomicheskaia politika Rossii v 2016 godu' [The lessons of stabilization and prospects of growth: Russia's economic policy in 2016], *Voprosy ekonomiki*, № 2, p. 5– 29. In Russian.
Murphy, K., Shleifer, A. and Vishny, R. (1989), 'Industrialization and the Big Push', *Journal of Political Economy*, October, Vol. 97, № 5.
Pimentel, I., St.Aubyn, M. and Ribeiro, N. (2016), 'The impact of investment in Public Private Partnerships on Public, Private investment and GDP in Portugal', *Lisbon School of Economics and Management*, [Online], [Retrieved August 30, 2017], http://pascal.iseg.utl.pt/~depeco/wp/wp132017.pdf
Ricardo, D. (1817), On the Principles of Political Economy and Taxation, John Murray, 3rd edition, London.
Romer, P. (1986), 'Increasing Returns and Long Run Growth', *Journal of Political Economy*, № 94, 1002–37.
Shediac, R., Abouchakra, R., Hammami, M. and Ramsay Najjar, M. (2008), 'Public – Private Partnerships A New Catalyst for Economic Growth', *Booz & Company*, [Online], [Retrieved August 30, 2017], https://www.strategyand.pwc.com/media/uploads/Public-Private-Partnerships.pdf
Smith A. (1776), An Inquiry into the Nature and Causes of the Wealth of Nations [WN], in R.H. Campbell, A.S. Skinner, W.B. Todd, eds., Clarendon Press, Oxford.
Solow, R. (1956), 'A Contribution to the Theory of Economic Growth', *The Quarterly Journal of Economics*, Volume 70, Issue 1, 65–94.
Stiglitz, J., Sen, A. and Fitoussi, J.P. (2009), 'The Measurement Of Economic Performance And Social Progress Revisited', *OFCE*, № 33, [Online], [Retrieved August 30, 2017], https://www.ofce.sciences-po.fr/pdf/dtravail/WP2009-33.pdf

The Central Bank of the Russian Federation (2017), 'Annual Report 2016', Moscow, [Online], [Retrieved August 30, 2017], http://www.cbr.ru/publ/God/ar_2016.pdf in Russian.
World Bank (2015), Global PPI Update. World Bank Group, [Online], [Retrieved August 30, 2017], http://ppi.worldbank.org/~/media/GIAWB/PPI/Documents/Global-Notes/Global2015-PPI-Update.pdf
World Bank (2016), 'The state of PPPs: Infrastructure Public-Private Partnerships in Emerging Markets and Developing Economies 1991-2015', World Bank Group, [Online], [Retrieved August 30, 2017], https://ppiaf.org/documents/3551/download
World Bank (2017), 'From Recession to Recovery: Russian Economic Report', World Bank Group, Moscow, [Online], [Retrieved August 30, 2017], http://pubdocs.worldbank.org/en/383241495487103815/RER-37-May26-FINAL-with-summary.pdf

Financial Distress and Corporate Restructuring. Sell Off Decisions on BRICS Markets

Andrey Teplov, Higher School of Economics — National Research University, Moscow, Russia,
State University of Management, Moscow, Russia
andyteplov@yandex.ru
Tatiana M. Rogulenko, State University of Management, Moscow, Russia,
tmguu@mail.ru

Abstract

The paper presents the empirical results of several hypotheses deals with factors that influence corporate restructuring in the form of asset's sales. The estimation of short-term wealth effects at 21 days around the sell off announcement for five BRICS markets and 1247 events shows positive reaction with cumulative abnormal returns (CARs) of 1,2 % for two-day announcement windows (−1;0) and of 1,28% for five-day announcement windows (-3; 1). The method of calculation the normal daily return does not change the testing results. The analysis of completed sell off transactions with a deal value more than US$ 5 million demonstrates that overleverage can be considered as a significant motive for break-ups decisions. The financial and focused hypotheses can not be rejected for BRICS firms. The logit model identifies the divestitures factors for 780 BRICS firms on the period 2000-2016. We econometrically (cross-sectional multivariate analysis) estimated factors that determine CAR on the event window (-3; 1). The paper is focused on the parent's debt measures, CEO power and state ownership in the explaining the company's exit choice. Several indicators measure the company's financial distress in current study, including traditional (debt to equity, net debt ratio) and original (overleverage, as the excess of the actual debt over the target level).

JEL: G30; G34

Keywords: sell off; divestitures; financing hypothesis; financial distress, BRICS firms

Introduction

Motivation of corporate restructuring are often investigated in the context of analysis of growth strategies and the M&A schemes (full purchase of control or partial, payment of money or financial assets, etc.). The researches in business breakdown (spin off, sell off) are less popular. The paper continues the academic line to study the motivations and success factors of the divestiture (break-ups decisions).

According to EY interview (Hammes and Krouskos, 2016), 49% of the CEO plan to divest in the next two years, 28% of respondents are ready to take this step during one year (a survey of 900 heads of real sector companies and 100 private investment funds). Value of corporate assets sales in 2015 reached US$ 523,6 bn, showing almost 30% growth to the level of 2014 (US$ 403,9 bn).

Decisions on firm's splitting, brake up and sell off assets are often motivated by the financial distress and the lack of cash flow – so-called financing hypothesis. This hypothesis implies that poorly performing (ROA, ROE low levels), overleveraged firms with lack of liquidity can push companies to the selling policy. This choice becomes especially important when outside funds are too expensive (high WACC). The risk of bankruptcy forces companies to conduct divestments (to split up the business, to sell all or part of the business units). 70% of the divestments are motivated by the need to raise funds by EY review (Hammes and Krouskos, 2016).

We analyze two reasons of restructuring (financial and managerial). The general purpose of this paper is to identify how much the shareholders of the parent company can benefit from the sell off strategy (we test short term wealth effect), what factors really push the company to such a decision

and whether the outsider can predict the probability of such an event. The study reveals factors that increase the short term shareholders wealth.

Restructuring in the form of sell off may be dictated by non-financial reasons, for example, by changing the corporate strategy from diversification to focusing. A whole line of academic research proves that focusing (core operations) can create additional value (Daley et al, 1997, Rajan et al, 2000). The main explanation for this benefit is the elimination of information asymmetries between firm's management and investors. On the other hand, if the market is sufficiently developed, investors are able to independently build an investment portfolio.

For firm's management view, divestment can be interpreted as recognition of failures, erroneous decisions that were made earlier. Overstayed top management unlikely admit mistakes and choose a sell off strategy. Therefore, in our work, we test the hypothesis that the behavioral features of decision-making (psychological rejection of recognition of past mistakes) forces management to keep inefficient (initially or not effective with regard to external changes) units in the portfolio, even in the situation of limited financial resources. Change of top management and CEO (often due to poor financial results) generates a change in strategy, restructuring.

Business brake up (divestiture of assets) can also be forced due to the pressure of antimonopoly regulation. An example of the 1980-ies — US corporation AT&T, which was forced to allocate part of the divisions, which gave birth to seven new companies on the market.

A bright feature of emerging capital markets is a small share of public companies. The processes of business separation and asset sales are quite active, but analysts can explore it only by comparing operational measures before and after deals (financial statements are often not available). In which cases can we conclude that the divestiture will lead to an increase in the parent's market value? Who benefits from changing the investment portfolio? In the academic literature, a whole line of studies is devoted to these questions (Rosenfeld, 1984, Jain, 1985, Mulherin and Boone, 2000, Veld and Veld-Merkoulova, 2002, Gadad and Hardy, 2005, Prezas and Simonyan, 2013). Interest in sell off also is manifested by consulting companies (BCG, 2014, EY, 2016 - Hammes and Krouskos, 2016).

We focus this research in emerging markets, in particular BRICS (Brazil, Russia, India, China, South Africa). The following characteristics unite these countries: 1) the complexity of attracting external capital and the relative high cost of capital due to country risks, 2) the conglomerate structure of most companies due to markets imperfections, including corporate control, communication problems, low trust level and the difficulty of building business links, 3) low competition in different markets, including labor and capital markets.

The study conducted the four research directions on the time horizon of 2000 — 2016. We collect sell off data by countries and industries. Statistical methods were used to evaluate the market reactions by sell off announcements. Econometric methods were used to identify factors that determine the decision to split the business. Cross-sectional model assumes further examination of the link between selling firms' financial condition (different debt measure) and market reaction. Logit model specification allows us to estimate the probability of sell off.

Sell off statistics

According to the Boston Consulting Group (BCG, 2014), at least 1 thousand sell off transactions with public companies (sale or allocation of assets) occur annually on the global market. The largest increase in asset sales took place since 2012. In 2012—2015, such deals were annually over 1600. Our statistical analysis shows (source: Zephyr Bureau Van Dijk) that the group of BRICS countries get second ranks with the number of divestments. 14,7% - the share of BRICS in M&A in the world and 17,3% - in divestments. Among BRICS countries, a large share of transactions in amount (numbers) of deals and in market value belongs to China (35%), and the Russian market get the second rank. We document a cyclic activity in the sell offs over the period from 2000 to 2016. The greatest activity in the BRICS countries was observed in 2003—2004, in 2009, in 2013—2015. The following industries are the leaders for the target companies in BRICS in sell off deals: industrials (at

least 15% share by years), real estate (10-13%), high technology (10%), energy (10%). Selected statistics of sell off in emerging markets are shown in the Table 1 (source: Zephyr Bureau Van Dijk).

Review of previous studies

Previous studies on asset divestiture generally finds positive wealth effects on the announcement. Our study continues the research of Clubb and Stouraitis (2002), Powell and Yawson (2005), Coakley et al. (2008), Nguyen (2014) on the identification of factors that can explain the magnitude of the reaction of stock prices to sales announcements and develops conclusions by Schlingemann et al. (2002) to identify factors that facilitate the decision-making on the asset's sale. Kengelbach et al. (2014, BCG report) document that the stock market reaction to divestiture is higher for companies with high debt, which confirms the financial or liquidity (lack of liquidity) motive for the sale. Taking into account the level of parent's assets diversification we try to confirm the significance of the focus motivation (Cooney et al., 2004). The efficiency motive is investigated by comparing wealth effect for a profitable and unprofitable subsamples (Shin (2008) for Korean market). Alexandrou and Sudarsanam (2001) show that during the economic crisis the frequency of divestiture increases, and the market reaction is more pronounced. Based on the findings of previous studies we test different hypotheses (the lack of liquidity, focusing, the impact of the crisis on decision-making).

Hypotheses and methodology of our research

The paper focus attention to examine the motivation for divestiture and to test the hypothesis of recognizing the benefits of these solutions by market investors in the capital markets of the five BRICS countries. Several hypotheses on the sample of BRICS companies are testing. The first set of hypotheses deals with the verification of the motive for selling assets of the local market due to high debt and the luck of liquidity. The second set of hypotheses analyzes the reaction of the stock market to announcements of public companies. We consider completed sales of more than (50% + 1) control of functioning target firms with a deal value more than $ 5 million. The third set of hypotheses is related to the influence on decisions to get rid of the company's intellectual capital. We are interested in the question of how investments in R&D, in human capital (for example, the invitation of a new CEO) affect the processes of corporate restructuring. The CAR dependence to the characteristics of parent companies and deals is tested.

Several research methods are used in this study — logit model (step-by-step algorithm), event study (ES) for estimating market reaction to announcements and econometric analysis (3) on the panel data. The paper proves that in emerging markets (BRICS) the reaction to sell off is different, but generally positive. In general, we can assume that, in contrast to M&A, the stock market evaluates sell off decisions with an increase in daily return. Logit model allows us to identify factors that increase the likelihood of sell off decisions. The factors of financial distress, ROE of parent firm, as well as components of firm's intellectual capital, are tested.

A stepwise logit model assumes that at the first step, we estimate the probability of sell off with control variables and then new, controversial variables are added to them. At each step with the addition of variables, the statistical estimation of the model (chi-square statistics) is recalculated. Acceptable level of statistical significance was adopted in 5%.

H1: Divestment announcements in the form of sell-offs generates a positive response in the share price of the seller (parent firm) in the emerging capital markets (BRICS) in the form of positive cumulative abnormal return (CAR):

$$CAR_{sell-off}^{Div} > 0 \quad (1)$$

Since the calculation of abnormal return (AR) and CAR involves modeling of normal returns on event window (-10; +10 days), several approaches have been implemented in our work. The normal return for parent company's stock was estimated at 120 trading days before the event window (-10;

+10) by: 1) the average daily return of the stock; 2) the market model with the "raw" beta coefficient; 3) the market model with the introduction of the adjusted beta using formula by M. Blum (this formula is used by Bloomberg analysts).

H2: If a company has a high debt or overleverage, then the probability of choosing an asset sales strategy is higher.

The hypothesis is checked by logistic regression (2) with the introduction of control variables:

$$P(Sell-off=1, \text{industry average}=0)=\beta_0+\beta_1 \text{Debt level}+\sum\alpha_i \text{Company factors}\ (i,t-1)+\sum\beta_i \text{Industry factors}\ (i,t-1)+\sum\gamma_i \text{Market factors}+\varepsilon_i \quad (2)$$

H3. For sell off decisions human capital of parent firm is important. The arrival of a new management team and CEO will allow the company to more actively carry out restructuring (we consider 2 years period before the announcement).
Firms with high R&D costs are not always recognized in emerging markets as winners. It is more difficult for such companies to sell a business units. Although there may be a different interpretation of these costs: to bring the development to commercial success, the company may not have enough funds and the company will be interested in selling assets to focus efforts. The sign of influence in the model is not obvious.

H4. The high R&D costs reduce the likelihood of the sell off.

Logistic regression was also used to test hypotheses 3 and 4.

H5. The market recognizes the motivation for restructuring and the reaction increases if the target companies of the non-core industry and if the parent company the year before announcement was in a distress.

H6. The stock market reaction increases in the case of a high cost of capital (WACC) in the global market.

H7. Abnormal return is higher if there are state control in the ownership structure.

H8. The market recognizes large sales. The larger the target company (in relative terms to the parent company), the more significant the market reaction is and more pronouncement the wealth effect of sell-off.

Hypotheses 5-7 test a set of factors that can influence the market reaction to the announcements. Hypothesis 5 and 6 is related to the effect of the transaction motive (focusing or liquidity problems). Hypothesis 7 reveals the problematic of the agency problem when it is assumed that the state is viewed by the market as a weak controller. For hypothesis 5, we compare the industry of the target company and business, which forms more than 50% of the revenue of the parent company. The dummy variable "Related" get 3 values: 0, if the target company's industry intersects with the largest business lines less than 15%, dummy = 1 if the intersection is from 16% to 50% and dummy = 2 if the target company's business area belongs to the main business of parent firm.

The impact of the target size is not obvious. On the one hand, large deals are widely sanctioned in the press, are under the attention of analysts and can generate a bigger market reaction (for M&A Hayward, 2002 documents such result). On the other hand, investors can perceive large sales as a dangerous signal about the prevalence of short-term interests over long-term ones, especially if efficient assets are sold, in terms of the future benefits of shareholders (long-term rather than short-term). The problem of tracking a short-term reaction is that market investors can also think short-term. The traditionally used method of event study analysis (ES) can distort conclusions on this issue.

General market financial problems diagnose a dummy variable Dcrisis =1 for 2008 and 2009.

The explanatory variable for testing hypothesis 2 (H2) is the debt measure. These variables were included sequentially and we looked for the specification that best characterizes the model. In addition, control variables were used (a multivariate regression based on panel data is built in our work).

To test hypothesis 3 (H3), the dummy variable CEOChange was introduced. It is assumed that the new management team will choose a restructuring strategy, including a change in the investment portfolio. The change of CEO is considered 2 years before the announcement (ie, in years t-1, t-2). The results of the calculations are shown in Table 6.

To test hypotheses 2-8, we use the following controlling explanatory variables: the size of the parent company (ln (size)), intangible assets (intangible assets / total assets), dividend payout, asset turnover ratio, return on capital (ROC, ROE) and spread of returns with industry average. The industry characteristic is formed by the growth rate: industry growth. We argue this choice as follows: companies in financial distress are forced to sell assets in periods of market volatility, high WACC (we used S&P 500 (excluding financials) cost of capital (WACC) estimation by J.P. Morgan 2017), low return on assets (capital). A high dividend reduces the available funds for the continued functioning of inefficient assets. The financial motive of sales increases. In our study, the dummy variable DIVR (degree of diversity) is considered. DIVR =1 if the parent company has a number of big (with a share of more than 10%) business directions more than 5 and DIVR =0, if the company has less than 5 big business lines (each share has more than 15%).

Three variables for parent firm diagnose an inefficient assets: asset turnover (the lower the turnover, the higher the probability that the company choose sell off), return on capital (ROC and ROE), the gap between the industry average return on assets and reported by company.

We assume that high growth rates in parent industry open up new investment opportunities, for the realization of which funds will be required and the company may choose sell off policy. In fact, the hypothesis of a lack of liquidity is tested. We assume that financial distress companies in a recession choose sell off policy. In our model we use a complex variable: DoverLev*GDP = (dummy high debt)*(economic growth). A significant positive value of this variable should confirm our hypothesis.

Since BRICS markets demonstrate a large state participation on the parent's equity, the possible influence on the decision to restructure may be motivated not only economic reason but also the interests of the state as the main owner. On the other hand, the management of companies with such a specific owner can demonstrate the effects of "digging in" - making decisions in their own interests. A number of studies confirm that companies with state control conduct a specific dividend policy (less dividends payment), choose a financial leverage below the optimal one. The hypothesis tested in our work: state ownership (more than 50%) inhibits the sell offs. The variable that is taken into account in our model - the dummy GovControl. Statistics for 780 BRICS companies and industry average are given in Table 1. Source of Tables 1 — 9: A.Teplov' estimations.

Descriptive statistics of the model's variables and the testing results

Table 1: Sample descriptive statistics and industry average

Model variables	Sell off		Industry	
	mean	St.dev	mean	St.dev
STD/TA	0,18	0,11	0,15	0,16
NDR	7,15	0,36	1,37	0,20
TD/TA	0,31	0,22	0,27	0,16
Total debt/ total equity	1,07	1,66	0,98	1,13
Return on equity	0,13	0,27	0,15	0,24
Asset turnover	0,65	0,44	0,88	0,94
Dividend payout	0,31	0,54	0,30	0, 59
DIVR	0,66	0,28	0,32	0,17
Overleverage	0,26	0,15	0,22	0,18
EBITDA/TA	0,08	0,19	0,12	0,17
Tangible/TA	0,61	0,51	0,72	0,43
R&D/TA	0,01	0,07	0,02	0,06
MBR	0,83	1,12	0,58	0,73
Ln(sales)	3,23	1,13	4,77	0,68
GovControl	0,26	0,29	0,37	0,32

The parent's debt level is diagnosed in our study by a few measures (6 basic and some dummies), starting from the simplest ones (often used in research) and ending with innovative ones (as excess over the target level).
1) debt to equity. This is a traditional indicator of debt in academic research

2) net debt ratio (NDR). NDR = (Debt-cash) / EBIT

3) Book leverage = Total debt / TA = (LTD + STD) / TA = TD / TA

4) Short term debt / TA = STD / TA

5) Overleverage = Fact firm leverage - Target leverage — the indicator compares the actual recorded debt (NDR) with the regulatory (model) level.

6) Fin - is a dummy variable, a binary indicator. Fin =1 if in the year of divestiture, the parent company has reduced its debt compared to the year preceding the divestiture, otherwise Fin =0.

To test the hypothesis H2, the target (model) level of debt is determined by five main indicators: company size, growth prospects (according to the Market to Book ratio), the uniqueness of the product (the amount of R&D costs) and the availability of tangible assets according Harford et al (2009).

Results of testing hypotheses

Results of event study

Table 2 presents the results for the full sample of five markets. Table 3 shows country specific market reaction (estimates for three countries separately at different time windows). The Table 4 shows the differences in CAR estimates for South African companies (113 deals), depending on the choice of the method for calculating the normal return (Adj. beta by Blum (1975)). We conclude that the method of calculating the normal return does not fundamentally change the result and final conclusions.

Table 2: Cumulative abnormal returns for 5 BRICS markets (1247 obs.)

Event windows	CARs	t- stat	min CAR	max CAR	CAR>0
(-5,5)	1,05**	2,27	-18,5	21,6	0,627
(-3,3)	1,09***	2,78	-9,1	16,2	0,684
(-3,1)	1,28***	3,65	-5,2	15,8	0,75
(-1,1)	1,1*	1,74	-19,2	16,9	0,746
(-1,0)	1,2***	4,04	-6,6	18,7	0,642
(-1,5)	0,7	1,43	-8,1	22,0	0,578

* 10%, ** 5%, *** 1%

The sample includes deals with control sales of 50%+1 or more. Econometric analysis takes into account the variable of selling share. Market reaction to 100% control selling (truncated sample) is slightly higher than in Table 2. Our CAR results are somewhat lower than estimates (Prezas and Simonyan, 2015 - sell-offs CARs from 1,04% to 1,58%). According to BRICS, the average statistically significant CAR values range from 1,1% to 1,28%, depending on the observation window. The maximum CAR in our research is documented on the window (-3; +1). For Brazil and South Africa, the market reaction is less pronounced than in Russia, China and India (Table 3). Table 3 shows results for the market model with «raw beta».

Table 3: CARs for local markets

* 10%, ** 5%, *** 1%		(-10; +10)	(-5; +3)	(-1; +1)	(-1; 0)	(0; +1)
Russia	CAR, %	3,31*	1,58*	1,2**	1,62**	1,41**
	t-statistic	1,79	2,08	2,21	2,15	2,38
Brasil	CAR, %	1,26*	0,19	0,9	1,3*	0,23
	t-statistic	1,66	0,84	1,47	1,87	0,63
S Africa	CAR, %	0,48	0,65	0,11	0,045	0,197
	t-statistic	0,69	3,32***	0,49	0,05	0,925

Table 4: CARs for South Africa. Different models for normal daily return

t statistics are shown in parentheses	CAR (%)			
	(-10;+10)	(-5;+5)	(0;+1)	(-3;+1)
120 days average return	0,491 (0,702)	0,562 (1,79)*	0,122 (0,546)	0,698 (3,11)***
raw beta and market model	0,478 (0,688)	0,497 (1,64)*	0,197 (0,925)	0,682 (3,21)***
Adjusted beta and market model	0,482 (0,696)	0,544 (0,791)*	0,237 (1,126)	0,721 (3,429)***

The model for estimating the target level of debt is shown in the Table 5. The results correspond to the findings of Harford et al (2009).

Logit model variables and results

Table 5: Debt level factors for 780 BRICS firms

* 10%, ** 5%, *** 1%	Dependent var, NDR			
	Coefficient	St,Dev	z-Statistic	Prob,
C	-0,035	0,032	-1,102	0,269
$\text{Tangible}/\text{TA}_{t-1}$	0,059***	0,022	2,791	0,008
Ln(sales)_{t-1}	0,017**	0,007	2,432	0,015
MBR_{t-1}	-0,026**	0,011	-2,442	0,015
$\text{EBITDA}/\text{TA}_{t-1}$	-0,316***	0,065	-5,126	0,000
Ind Basic Materials	-0,092***	0,027	-3,363	0,001
Ind Industrials	0,041	0,036	1,122	0,262
Ind Oil&gas	-0,136***	0,033	-4,328	0,000
R-squared	0,289			

The statistical significance of the NDR in logit model is at the 5% level, which is acceptable. Debt to equity, TD / TA, STD / TA indicators showed lower statistical significance (10%) — Table 7 (four different model specifications).

Table 6: The impact of the financial distress on the sell off decisions. The best model specification

	Dependent var, Sell off			
Method: ML - Binary Logit (Quadratic hill climbing)	Coefficient	St Dev	z-Statistic	Probab
C	8,912	0,957	9,315	0,000
Overleverage	0,931***	0,179	4,882	0,007
Ln(sales)	-1,042***	0,104	-8,553	0,000
Tangible/TA	1,176***	0,323	3,466	0,000
Asset turnover	-0,759***	0,335	-3,512	0,001
ROE	-0,030*	0,011	-1,742	0,083
DIVR	0,046***	0,038	2,870	0,004
WACC	0,037**	0,034	1,981	0,047
GovControl	-0,018*	0,025	-1,714	0,066
GDP	0,023*	0,093	2,198	0,055
DoverLevGDP	1,113***	0,288	2,996	0,000
McFadden pseudo R2 (R-squared)	0,347468			
LR statistic	214,0763			
S.D. dependent var	0,484465			
Akaike info criterion	0,881468			
Schwarz criterion	0,914061			
Hannan-Quinn criterion	0,903352			
Restr. deviance	597,5400			
Prob(LR statistic)	0,000000			

* 10%, ** 5%, *** 1%

Table 7: Statistical significance of debt indicators of the parent company.

	Coefficient	St,Dev	z-Statistic	Prob,
Total debt/Equity	0,703*	0,395	1,782	0,077
STD/TA	1,512	1,025	1,475	0,120
TD/TA	1,551*	0,946	1,683	0,091
NDR	0,631**	0,379	1,882	0,031

* 10%, ** 5%, *** 1%

Table 8: WACC (%) dynamics in the global market. S&P500 analysis

	Median WACC	25% percentile	75% percentile
2000	7,8	6,9	8,7
2001	8	7,1	8,9
2002	8,2	7,2	9,3
2003	7,3	6,4	8,3
2004	7,5	6,5	8,5
2005	7,9	6,9	8,8
2006	8,2	7,4	8,9
2007	8,2	7,4	8,9
2008	8,9	8,1	9,7
2009	9,2	8,3	10,3
2010	9,1	8	10
2011	8,8	7,7	9,9
2012	8,7	7,2	9,8
2013	8,5	7,1	9,7
2014	8,5	7	9,3
2015	8,1	6,9	8,9
2016	7,6	6,5	8,5
(excluding financials)		Source: J.P. Morgan Report 2017	

Sources of shareholders' wealth gains

Cross-sectional multivariate analysis was realized by model (3)

$$CAR_i = \alpha_0 + \alpha_1 REL\_size_i + \alpha_2 Exp_i + \alpha_3 Overleverage_i + \alpha_4 ROE_i + \alpha_5 Related_i + \alpha_6 GovControl_i + \alpha_7 DIVR_i + \alpha_8 Industry_i + \alpha_9 Dcrisis_i + \alpha_{10} WACC_i + \alpha_{11} WB\_inst_i + \alpha_{12} Country_i + \varepsilon_i$$

CAR = (-3; +1) is regressed to a number of explanable and control variables (3). Three model specifications are shown in Table 9. If the parent company belongs to two fast-growing Asian countries (China and India), then dummy Country = 1. Otherwise, the dummy variable takes a zero. If the parent industry is metal, oil or gas, then dummies Industry = 1.

Table 9: Multifactor cross-sectional results

variables	**Model 1**	**Model 2**	**Model 3**
REL_ size	0,00689	0,00613	0,00599
Related	-0,00084	-0,00113	-0,00122
Exp		0,00593*	0,00575*
Overleverage	0,03466**	0,03767**	0,04111**
ROE	-0,00115		
GovControl	0,06121*		0,09476**
DIVR	0,00115		0,00758*
WACC	0,46871*	0,31266*	0,41331*
Country	0,02498**	0,02166**	0,02369**
Industry	0,00433*	0,00447*	0,00816**
Dcrisis	0,00098	0,00114	0,00232*
			* 10%, ** 5%, *** 1%
R^2	0,085***	0,099***	0,091***
R^2 Adj.	0,0369	0,0485	0,0423

The experience of restructuring transactions (2 years before announcement, variable *Exp*) is recognized by the stock market (CAR). Perhaps an active company is well-known by analysts and new deals are of interest, given the past reaction to similar announcements. The second explanation is the formation of management experience (human capital). In the crisis years and years with expensive money (WACC), the market reacts more strongly to announcements. The sign of the reaction is positive. CAR higher for India and China (dummy Country). The market is more sensitive to announcements in commodities (metal, oil, gas).

Conclusions

All our hypotheses have found empirical confirmation. At 780 BRICS companies, we confirm the hypothesis of financial distress. Overleverage can be considered as a significant motive for break-ups decisions and the asset's sale. NDR is an acceptable indicator of debt level, but the best explanatory power has showed by "Overleverage", which compares the target and actual debt level. Model by Harford et al (2009) allows to determine the target debt level for BRICS firms. Traditional debt indicators have less explanatory power. The focus hypothesis also can not be rejected for BRICS firms (Table 6). The worse the firm's financial performance, the higher the likelihood of a sale. A large size of the parent company does not stimulate the sale of assets. It may be easier for a company to raise funds from an external market, or select a spin off strategy. Companies with state participation are also less likely to choose a sell off strategy. Highly diversified companies are easier to sell off some assets.

The study documents positive short-term wealth effects on the announcement of asset sales. Cumulative abnormal returns (CARs) of 1,2 % for two-day announcement windows (−1; 0), of 1,28% for five-day announcement windows (-3; 1), and 1,10% for the tree-day window (-1; 1). CARs begin to increase 3 days before the announcement day and growth continues until the fifth day after the event.

References

Alexandrou, G. and Sudarsanam, S. (2001), 'Shareholder wealth effects of corporate selloffs: impact of growth opportunities, economic cycle and bargaining power,' *European Financial Management*, 7(2), 237–258.

Blume, M.E. (1975), ' Betas and their regression tendencies, ' *Journal of Finance,* 30, 785–799.

Clubb, C. and Stouraitis, A. (2002), 'The significance of sell-off profitability in explaining the market reaction to divestiture announcements, ' *Journal of Banking & Finance*, 26, 671– 688.

Coakley, J., Thomas, H. and Wang, H. (2008), 'The short-run wealth effects of foreign divestitures by UK firms, ' *Applied Financial Economics*, 18, 173–184.

Cooney, M., Finn, F. and Karl, A. (2004), 'Australian divestiture activity: an examination of gains to sell-off announcements, ' *Australian Journal of Management*, 29, 135–152.

Daley, L., Mehrotra, V. and Sivakumar, R. (1997), 'Corporate focus and value creation: evidence from spinoffs,' *Journal of Financial Economics*, 45, 257 –281.

J.P.Morgan 2017 Equity Research, jpmorgan.com

Gadad, A.M. and M.T. Hardy (2005), 'Sources of shareholders' wealth gains from asset sales,' *Applied Financial Economics*, 10, 137–141.

Hammes, P. and Krouskos, S. (2016), 'EY Global Corporate Divestment Study (January). Private equity: experts at extracting hidden value'. EY Report

Harford, J., S. Klasa, and N. Walcott (2009), 'Do Firms Have Leverage Targets? Evidence from Acquisitions,' *Journal of Financial Economics*, 93, 1–14.

Jain, P.C. (1985), 'The effect of voluntary sell-off announcements on shareholder wealth,' *Journal of Finance*, 40, 209 –224.

Kengelbach, J., Ross A. and Keienburg G. (2014) 'Don't miss the exit: creating shareholder value through divestitures,' BCG 2014 report

Mulherin, H. and A. Boone (2000), 'Comparing acquisitions and divestitures,' *Journal of Corporate Finance*, 6, 117–139.

Nguyen, P. (2014), 'The role of the seller's stock performance in the market reaction to divestiture announcements,' *Journal of Economics and Finance*, 40(1), 19–40.

Powell, R. and A. Yawson (2005), 'Industry aspects of takeovers and divestitures: Evidence from the UK,' *Journal of Banking & Finance,* 29, 3015–3040.
Prezas, A.P. and K. Simonyan (2015), 'Corporate *divestitures:* Spin-offs vs. sell-offs,' *Journal of Corporate Finance,* 34, 83–107.
Rajan, R., H. Servaes and Zingales, L. (2000), 'The cost of diversity: the diversification discount and inefficient investment,' *Journal of Finance*, 55, 35–80.
Rosenfeld, J. (1984), 'Additional evidence on the relation between divestiture announcements and shareholder wealth,' *Journal of Finance*, 39, 1437–1448.
Shin, G. H. (2008), 'The profitability of asset sales as an explanation of asset divestitures,' *Pacific-Basin Finance Journal,* 16, 555–571.
Veld, C., and Y. Veld-Merkoulova (2004), 'Do spin-offs really create value? The European case,' *Journal of Banking and Finance*, 46, 1111–1135.

Performance Management of Innovation Program at an Industrial Enterprise: An Optimisation Model

Nikolova L.V., Peter the Great St.Petersburg Polytechnic University,
Russia, 195251, St. Petersburg, Politekhnicheskaya street, 29, E-mail: nikalvsk@yandex.ru

Malinin A.M., Federal State Budget Educational Institution of Higher Education "Saint- Petersburg State Economic University" Department of Regional Economics and Nature Management
Russia ,191023, St.Petersburg, , Sadovaya, 29, E-mail: mail@finec.ru

Rodionov D.G., Peter the Great St.Petersburg Polytechnic University,
Russia, 195251, St. Petersburg, Politekhnicheskaya street, 29, E-mail: rodion_dm@mail.ru

Velikova M.D., Varna Free University "Chernorizets Hrabar", Bulgaria,
Varna, k.k. Gull, 9007, E-mail: velikova.mariya@gmail.com

Abstract

At resent, the process of innovative development is best described by the comprehensive systems approach, the one that allows to solve difficult tasks faced by innovative economy. Innovative activity is very risky, so when making decisions on its implementation we have to first carry out a detailed analysis of its efficiency. In this study we propose, work out and describe an optimisation model for performance management of an innovation program at an industrial enterprise, using the dynamic programming methods. This model allows to take into account cash flow changes and permits participation in individual investment projects or shifting their start/completion dates. When building the model, we formalised correlations between individual parameters and constructed an optimisation model for program implementation that comprises three innovation projects. The proposed model can be used for express analysis of an innovation program's performance at an industrial enterprise.

Keywords: innovation program, optimisation model of management, dynamic programming, optimality principle, NPV's optimality criterion.

Introduction

Today in the Russian Federation, we are witnessing that the transition to strategic, long-term R&D and innovation policy has taken place in almost all economic initiatives of the government, including those in the industrial policy.

Implementation of innovation at industrial companies is associated with high risk of loss of desired profits; because of this, the shaping of a model of innovation program's performance management is a challenge.

Risk management in innovation projects within a program is done relying on mathematical economic models. Due to its deep insight into the nature of innovation process, a mathematical economic model is what allows us to estimate and forecast the outcomes of innovation projects and try to steer this implementation. (Marmier et al., 2013; Marxt and Brunner, 2013; Mikkola, 2001; Moutinho et al., 2015; Stubbs and Cocklin, 2008; Schumpeter, 1939; Short et al., 2012; Borowiec, 2013; Buyanov et al., 2002; Grachova, 2001).

Research within area of management innovation and organizational performance was done by Walker, R. M., Damanpour, F., & Devece, C. A. (2010); Damanpour, F., Walker, R. M., & Avellaneda, C. N. (2009); Hull, C. E., & Rothenberg, S. (2008); Adams, R., Bessant, J., & Phelps, R. (2006); Tidd, J. (2001).

The economic-mathematical models developed by S. Myers and D. Pogh are well-known: the "Longer" model of financial planning and the model of the best cash asset placement (capital planning problem) are widely adopted by colleagues and used in the methods of sensitivity assessment and scenario analysis. Recently, other models have been getting popularity – those proposed by M.V. Gracheva: project efficiency assessment model with regard for risk-aversion measures; optimization of integrated risk cost model; optimization of integrated internal and external risk costs model; these are also used in the methods of sensitivity assessment and scenario analysis. The complexity of calculating the probability-simulation models of assessment, management and optimization proposed by A.G.Novokreshchenov – based on the method of simulation modelling – has led to a situation where such models are very rarely applied to the practical problems of investment.

The above mentioned mathematical economic models are successfully used for risk assessment when it is associated with innovation projects, and for management of such projects; none of them, however, does consider optimisation of the very process of an innovation program's performance management.

The challenge is that the shaping and building of such an optimal model for innovation efficiency management at an industrial enterprise is related to solution of mathematical problems that are not widely used in practice due to their complexity. Therefore, in this study we propose a model that allows us to solve such problems through express analysis procedure.

The goal of this paper is to build an optimisation model for innovation efficiency management at an industrial company (hereinafter - enterprise), by a chosen optimisation criterion 'net present value' (NPV).

To achieve this, we shall have to solve the following series of tasks:

- to substantiate a methodological approach to the attainment of the goal;
- to build an optimisation model of innovation efficiency management in a company.

Methodology

The most widely used and effective mathematical methods that have found both theoretical and practical use in research are as follows: differential calculus, mathematical statistics, linear algebra, dynamic programming, graph theory, theory of probability and games theory.

In this paper the solution of the problem of managing the effectiveness of an innovation program at an enterprise relies on the method of dynamic programming - the one that is widely and successfully used for choosing an optimal plan for multi-stage economic problems when the outcomes of each successive stage depend on those of the previous one.

Dynamic programming is closely related to representation of management process as a chain of successive actions or steps unfolding in time and leading to a goal. Thus, management process can be divided into two stages, represented as a dynamic succession and interpreted as a step-by-step program that develops temporally.

Designing and building a mathematical economic model (hereinafter 'model') of managing an innovation program in a company allowed us to reduce economic analysis of the processes under consideration to mathematical analysis and effective decision-making. Model building stages:

- identifying structural and functional elements and their fundamental qualitative features that bear upon the attainment of the goal;
- introduction of symbols to designate the innovation characteristics taken into account;
- formalisation of relations between individual model parameters, i.e. construction of the model per se.

This approach was what allowed us to choose the most effective mode of innovation program management, by a certain optimisation criterion that simultaneously is the key effectiveness indicator, i.e. the net present value (NPV).

Result

The innovation program of an enterprise is comprised of three innovative projects carried out concurrently, due to which cash receipts from one project can be used to cover expenditure on the other. All the three innovation projects can be considered as effective, by the key indicators: NPV (net present value), IRR (internal rate of return), PI (profitability index), DPP (discounted payback period).

The proposed model helps optimize fund distribution and management within a company between the three innovation projects at the given level of effectiveness.

A company with available cash in the amount of K has a goal to distribute them optimally between the chosen n (n=3) projects that make up the innovation program of the enterprise.

The planning period of the investment program we are considering here is broken up into m steps (in our case a 'step' means a quarter of a year):

$$m = 1,2...M ,$$

where M is the planning period of the investment program equal to 24 quarters.
The first advance towards solution of this problem is defining possible time boundaries of the initial stage of financing each i-th project ($i = 1,2..n$): working out the timetable of the start of all projects (Fig. 1). Here j refers to the number of the planning period when the project can be started.
Factors that lay constraints upon joining an investment program may be the ones with different causes, such as: seasonality, various increased uncertainties (including, consequently, risks related to effective implementation), decreased relevance of the project's underlying idea per se, the risk of competitors' takeover of the market sector, etc. An obstacle to an earlier initiation of the project may be lack of funds. Also, to this category can belong delays in obtaining the permits, licenses and approvals necessary for the project's implementation, and other extraeconomic factors.

Let us now indicate these constraints as $l_i^{\min}$, $l_i^{\max}$ (min/max number of the planning period when the i-th project can be started):

$$l_i^{\min} \le j \le l_i^{\max}$$

Hence, when considering the problem we have to take into account the project's specific features along with its environment (e.g., the company's interests can intersect those of other project participants (like investors, banks, the government, etc.)). In connection with the above, setting the start-date needs coordination and agreement, the results of which may not always match existing opportunities and capabilities.

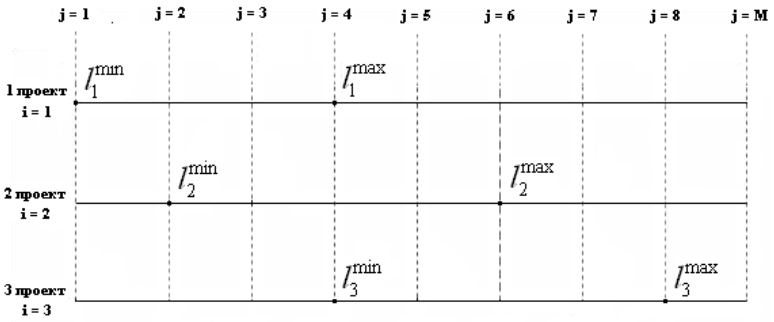


Fig. 1: Dynamic model for project implementation

In Fig. 1 you can see the planning horizon with j=M (M = 24 steps). Within this span we can see the investment projects under consideration (for illustrative purposes, they are placed one under the other). The dates for the start of each ij-th project (i.e. the i-th project starting in j-the period) do vary: $l_i^{\min} \le j \le l_i^{\max}$.

In the model we are building, we'll follow the rule of discreet cash-flow distribution, at that the estimated plan of each of them is based on the same time scale (quarters of a year). At the same time, project start dates, accordingly, are also discrete and defined relying on the same time scale where innovation planning is done.

Financial receipts are the forecasted cash flows from the innovation projects' implementation

Financial yield appraisal for this or that project is based on the NPV indicator. The goal of the enterprise is to yield the max. possible income from each of the investment program's projects, which means maximisation of the net present value (NPV). what is necessary is to arrange the projects on the temporal scale in the most optimal way, relative to each other, so that the financial feasibility of the program is ensured and the net present value is obtained.

Its is supposed that the company can participate in funding all or some of the projects in the program, i.e. that each element of the cash flow is taken for the company with some fixed portion X_{ij}, which, in its turn, leads to by the enterprise receiving a corresponding share in the project's NPV. Let us indicate the minimum permissible company's share in the i-th project as $p^i_{\min}$, while the maximum permissible one as $p^i_{\max}$. Then this constraint for all the projects will look as:

$$p^i_{\min} \le \sum_{j=l_i^{\min}}^{l_i^{\max}} X_{ij} \le p^i_{\max}$$

Thus, the constraint described above indicates the permissible boundaries of the minimal and maximal participation of the company in the i-th project. Generally, the constraint shall look like the following: $0 \le p^i_{\min} \le p^i_{\max} \le 1$.

The possible share can be considerably smaller than 1. The causes are so numerable that in practice it is rather normal than extraordinary, which is what makes us include this constraint into the model we have developed. For instance, company might have insufficient funds K to invest in one of the projects that needs financing already at the first step. Therefore, the enterprise may have to reject the idea of raising extra funds and invest only part of financing thus taking the role of co-investor. Otherwise, we witness normal competition among companies for profitable projects where they may find an opportunity to finance only part of them.

Accordingly, the model's target function shall look as follows:

$$NPV(X) = \sum_{i=1}^{n} \sum_{j=l_i^{\min}}^{l_i^{\max}} NPV_{ij} \cdot X_{ij} \to \max \qquad (1)$$

Also we have to take into account that at least one of the projects must be funded at the first step.

The source of funds at investment step m may be external receipts b_m: both incomes from projects started earlier and current receipts.

At step one (m=1) of the innovation program, the company allocates its funds in the following manner:

$$\sum_{i=1}^{n} \sum_{j=l_i^{\min}}^{l_i^{\max}} a^m_{ij} \cdot X_{ij} + r'_m = \sum_{i=1}^{n} \sum_{j=l_i^{\min}}^{l_i^{\max}} b^m_{ij} \cdot X_{ij} + K \qquad (2)$$

where K - equity capital;

$\sum_{i=1}^{n}\sum_{j=l_i^{\min}}^{l_i^{\max}} b_{ij}^{1}\cdot X_{ij}$ - proceeds from the projects that need funding themselves;

a_{ij}^{m} - the entry of the input matrix sitting at the intersection of line m and the column corresponding to the cash flow of ij-th project (the input matrix $A(M\times N)$ with the dimension of M lines to N columns, is defined at the pre-investment stage of project planning (where N is the set of all investment project versions where each of the variants only differs from the others by its start date));

$r_m^{'}$ - cash balance of the company, after all transactions and operations at this particular step.

Accordingly, the right-hand side of the above equality shows the funds with which the innovation projects will be financed, whereas the left-hand side reflects the parameters on which these amounts of cash receipts do accumulate themselves. Under the double amount sign are concentrated aggregate proceeds and expenses across all n-th projects, the ones that occur at step 1 of the innovation program. It is also clear that we have to introduce, within this model, a constraint on non-negativity of parameter $r_m^{'}$, which testifies to the fact that cash is allocated optimally in the context of equity financing and cash inflows from the projects under consideration. In practice, however, no company in the world relies solely on its own funds. So, when allocating cash on step 2 and on subsequent steps, we have to consider the cash flow distribution pattern within two possible scenarios:

1. Positive balance (by $r_m^{'}\geq 0$)

A positive balance indicates temporarily free cash that remains at the disposal of the enterprise. Following the famous rule that 'money must work', when we work out a financial model we should take into account how free cash is placed on deposit bank accounts at E% interest rate. Thus, an entrepreneur shall gain income from this operation at the next step, in the amount of $r_{m-1}^{'}\cdot(1+E)$:

$$\sum_{i=1}^{n}\sum_{j=l_i^{\min}}^{l_i^{\max}} a_{ij}^{m}\cdot X_{ij}+r_m^{'}=\sum_{i=1}^{n}\sum_{j=l_i^{\min}}^{l_i^{\max}} b_{ij}^{m}\cdot X_{ij}+r_{m-1}^{'}\cdot(1+E) \qquad (3)$$

2. Negative balance (by $r_m^{'}<0$)

If negative balance occurs, the company raises funds from external sources at the rate of R %, and pays interest on it in the amount of $r_{m-1}^{'}\cdot R$ from the projects' proceeds.

The remainder is allocated to project funding and distributed accordingly. If at step m the volume of external income is sufficient to repay all the necessary integrated expenses, then the remainder is allocated to repayment of the principal debt related to loans and credits drawn earlier. If, however, the amount of proceeds is less than that of necessary expenses, the company is compelled to raise additional funds again:

$$\sum_{i=1}^{n}\sum_{j=l_i^{\min}}^{l_i^{\max}} a_{ij}^{m}\cdot X_{ij}+r_m^{'}-r_{m-1}^{'}=\sum_{i=1}^{n}\sum_{j=l_i^{\min}}^{l_i^{\max}} b_{ij}^{m}\cdot X_{ij}+r_{m-1}^{'}\cdot R \qquad (4)$$

If our goal is to place constraint on the company's raising external funds at step m, then the following condition is to be met: $r_m^{'}\geq 0$.

From all the variants of the i-th project's start date we have to accept only the one that allows us to allocate funds within the optimal version of the innovation program, i.e. to reach the point of extremum of the target function (see formula 1), given the above mentioned constraints (see formulas 2-4).

Let we introduce a Boolean variable:

$$\delta_{ij}=\begin{cases}0, if\ X_{ij}=0\\ 1, if\ p_{\min}^{i}\leq X_{ij}\leq p_{\max}^{i}\end{cases} \qquad (5)$$

Then, the one and only solution can be achieved due to mutual exclusion of the versions of a single project with different start dates:

$$\sum_{j=l_i^{\min}}^{l_i^{\max}} \delta_{ij} \cdot X_{ij} = \sum_{j=l_i^{\min}}^{l_i^{\max}} X_{ij} \qquad (6)$$

Constraint (6) mandatorily leads to 0 value for rejected projects. This is possible only if the total of participation shares in all the alternative variants (with different start dates) of a project numbered i (the right-hand side of equation 6) is equal to the participation share in the one and only accepted variant of the i-th project (the left-hand side of the same).
Consequently, it would seem quite possible to provide a detailed description of a dynamic model for cash flow optimisation in innovation projects (table 1).
As a result, we have developed a model of dynamic programming with Boolean variables where optimisation is achieved by the sole criterion: net present value.
This model permits participation in individual investment projects or shifting their start dates; among its virtues we have also to recognize the fact that if delays in the project start occur it allows to take into account cash flow change. Delay causes may be various, due to inflation, seasonal fluctuation, a regard to the interests of other project participants, etc.

Table 1: Innovation project program: a description

1. Financial model's target function	
$NPV\,(X) = \sum_{i=1}^{n} \sum_{j=l_i^{\min}}^{l_i^{\max}} NPV_{ij} \cdot X_{ij} \to \max$	
2. Restrictions	
2.1.	$\sum_{i=1}^{n} \sum_{j=l_i^{\min}}^{l_i^{\max}} a_{ij}^{m} \cdot X_{ij} + r_m^{'} = \sum_{i=1}^{n} \sum_{j=l_i^{\min}}^{l_i^{\max}} b_{ij}^{m} \cdot X_{ij} + K$
2.2.	$\sum_{i=1}^{n} \sum_{j=l_i^{\min}}^{l_i^{\max}} a_{ij}^{m} \cdot X_{ij} + r_m^{'} = \sum_{i=1}^{n} \sum_{j=l_i^{\min}}^{l_i^{\max}} b_{ij}^{m} \cdot X_{ij} + r_{m-1}^{'} \cdot (1+E)$
2.3.	$\sum_{i=1}^{n} \sum_{j=l_i^{\min}}^{l_i^{\max}} a_{ij}^{m} \cdot X_{ij} + r_m^{'} - r_{m-1}^{'} = \sum_{i=1}^{n} \sum_{j=l_i^{\min}}^{l_i^{\max}} b_{ij}^{m} \cdot X_{ij} + r_{m-1}^{'} \cdot R$
3. Decision-making condition	
$\sum_{j=l_i^{\min}}^{l_i^{\max}} \delta_{ij} \cdot X_{ij} = \sum_{j=l_i^{\min}}^{l_i^{\max}} X_{ij}$	

Moreover, this model allows to recognize extra financing by funds on bank deposit, or from external sources. Therefore, the model we have built allows us to optimize solutions when considering the various versions of innovation program implementation in a company.

In the process of innovation project planning, however, we are faced with a range of problems that can also considerably distort the outcomes of the model presented here: acquisition of necessary data, assessment of all risks, and cumbersome computation. In order to estimate a risk adequately, what we need is to formulate, on the basis of the data we have, plausible hypotheses of probability distributions of a project's key parameters. Consequently, the described model is capable of data processing, relying on probability calculation whose accuracy shall always remain the responsibility of those who are in charge of the project design.

Conclusions

In this study we propose, work out and describe an optimisation model for performance management of an innovation program at an industrial enterprise, using the dynamic programming methods.
This model allows to take into account cash flow changes and permits participation in individual investment projects or shifting their start/completion dates. When building the model, we formalised correlations between individual parameters and constructed an optimisation model for program implementation that comprises three innovation projects. The proposed model can be used for express analysis of an innovation program's performance at an industrial enterprise.
In this study we propose principal ways and methods for building an optimisation model to manage performance of an innovation program at an industrial enterprise. In their further research, the authors of the paper are planning to supplement the model design with the following parameters: internal rate of return (IRR), profitability index (PI), discounted payback period (DPP).
Application of this optimisation model to innovation program's effectiveness management shall allow an industrial enterprise to minimise its risks and maximize profits.

Acknowledgements

The research was carried out with the support of the Ministry of Science and Education of the Russian Federation (project No. 26.6446.2017/БЧ).

References

Adams, R., Bessant, J. and Phelps, R. (2006) Innovation management measurement: A review. *International Journal of Management Reviews*, 8(1), 21-47.

Buyanov, V.P., Kirsanov, K.A. and Michaylov, L.A. (2002) "Riskology: Risk Management", Moscow, 384 p.

Borowiec, A. (2013) "Conditions for the Development of Innovation Companies Based on Public-Private Partnership," Economy Copernican, 2, pp. 20-36.

Damanpour, F., Walker, R. M. and Avellaneda, C. N. (2009). Combinative effects of innovation types and organizational performance: A longitudinal study of service organizations. *Journal of management studies*, 46(4), 650-675.

Chernoruchcky, I.G. (2001) "Methods of Optimization and Decision Making,", Publishing house "Lan", pp.34-40.

Farmer, N. (2013) "The Future: Global Trends and Analysis for the International Packaging Market in Relation to the Speed of Impact of Packaging Innovation and Likely Material Changes," Trends in Packaging of Food, Beverages and Other Fast-Moving Consumer Goods (FMCG), pp. 288-312.

Grachova, M.V. (2001), Risk-Analiz Investitsionnogo Proekta. Moscow: Unity., pp.230-243.

Hull, C. E., and Rothenberg, S. (2008). Firm performance: The interactions of corporate social performance with innovation and industry differentiation. *Strategic Management Journal*, 29(7), 781-789.

Levén, P., Holmström, J., and Mathiassen, L. (2014) "Managing Research and Innovation Networks: Evidence from a Government Sponsored Cross-Industry Program," Research Policy, 43(1), pp. 156-168.

Marmier, F., Gourc, D., and Laarz, F. (2013) "A Risk Oriented Model to Assess Strategic Decisions in New Product Development Projects," Decision Support Systems, 56, pp. 74-82.

Marxt, C. and Brunner, C. (2013) "Analyzing and Improving the National Innovation System of Highly Developed Countries: The Case of Switzerland," Technological Forecasting and Social Change, 80(6), pp. 1035-1049.

Mikkola, J. (2001) "Portfolio Management of R&D Projects: Implications for Innovation Management," *Technovation Journal*, 21(7), pp. 423-435.

Moutinho, R., Au-Yong-Oliveira, M., Coelho, A, and Manso, J. (2015) "Beyond the "Innovation's Black-Box": Translating R&D Outlays into Employment and Economic Growth," Socio-Economic Planning Sciences, 50, pp. 45-58.

Nikolova, L.V., Rodionov, D. G., and Afanasyeva, N. V. (2017). Impact of Globalization on Innovation project Risks Estimation. European Research Studies, 20(2), pp.396-410.

Schumpeter, J. (1939) "Business Cycles. A Theoretical, Historical and Statistical Analysis of the Capitalist Process," NewYork, Toronto, London, McGraw-Hill Book Company, 461 p.

Shabunina, T.V., Shchelkina, S.P. and Rodionov, D.G. (2017) An innovative approach to the transformation of eco-economic space of a region based on the green economy principles, 16 (Specialissue1), p. 176-185

Short, S.W., Rana, P.,Bocken, N.M.P., and Evans, S. (2012) "Embedding Sustainability in Business Modelling through Multi-stakeholder Value Innovation," Proceedings of the APMS Conference, Advances in Production Management Systems, Rhodes, pp.12-14.

Stubbs, W. and Cocklin, C. (2008) "Conceptualizing a Sustainability Business Model," Organization & Environment, 21, pp.103-127.

Tidd, J. (2001). Innovation management in context: environment, organization and performance. *International Journal of Management Reviews*, 3(3), 169-183.

Varma, V., Reklaitis, G. , Blau, G., and Pekny, J.F. (2007) "Enterprise-wide Modeling and Optimization: An overview of Emerging Research Challenges and Opportunities," Computers and Chemical Engineering, 31(5–6), pp. 692-711.

Walker, R. M., Damanpour, F., and Devece, C. A. (2010). Management innovation and organizational performance: The mediating effect of performance management. *Journal of Public Administration Research and Theory*, 21(2), 367-386.

Statistic Modeling Industrial Enterprises Production Process Parameters

Alexander Sergeevich Sokolitsyn, Governmental and financial management high school, Industrial management, economics and trade institute, Peter the Grate St-Petersburg polytechnic university, St-Petersburg, Russia, alex.sokol1951@yandex.ru.

Maxim Vladimirovich Ivanov, Governmental and financial management high school, Industrial management, economics and trade institute, Peter the Grate St-Petersburg polytechnic university, St-Petersburg, Russia, ivanov_fuit@rambler.ru.

Natalya Alexandrovna Sokolitsyna, International management high school, Industrial management, economics and trade institute, Peter the Grate St-Petersburg polytechnic university, St-Petersburg, Russia, natasokoli@yandex.ru.

Abstract

There is formed interfirm enterprise management tasks complex informational model. Statistic modeling industrial enterprises production process parameters on united balance model base, differing with their system integration on base of united information base and software. Coordinated operative account and accounting in united balance model leads to showing initial and final inventories and circulation of materials, middle, non-finished and mature product for set operative time in natural units and in money. Elaborated model allows assessing enterprise production process condition and rising economic analysis results usage effectiveness in several level production plans preparation and realization and, in result, rising set production plans realistic execution estimation level.

Keywords: Modeling; Production process; Parameters; Economic analysis.

Introduction

Modern Russian economy needs low-cost and lean mechanisms creation with realizing organizationally-technic and economic enterprises measures on manufactured product competitiveness rise. An important role in these mechanisms belongs to wide and systematic searching internal reserves of economizing in production, assessing and choosing variants of improving constructions, technologies and ways to organize production.

It increases role of statistic modeling industrial enterprises production process parameters and practice interest to its entering in all enterprise management levels (Gluhov at al (2007), Demidenko and Malevskaya-Malevich (2016), Mednikov (2012), Nikolova et al (2017), Nikolova et al (2014), Semenov at al (2016), Silkina (2017), Sokolitsyn at al (2016), Sokolitsyn at al (2016)).

Like in other discrete production processes mathematic models, the elaborated model base is production process identification on initial, middle and output resources and products. The modeling includes the following resources kinds: raw materials, basic materials, bought and middle products, workforce and equipment. Products are middle and end production-household activity results of firm enterprises and their units, i.e. manufactured in production process details, assembly units and mature product.

Technology is «receipt» of receiving a product from determined resources combination, when «receipt» is data on resources costs on production product unit. Then enterprise production process can be shown as interconnected technologies dozen. One enterprise production-household activity element in one production process part can be a product (for example, detail), and in another – a resource (detail in assembling). Therefore, dividing into resources and products for manufacturers and consumers in and out the enterprise is conditional and has no principal mean. Therefore below we use term «resource-product» and, if it's important for mean, say about an element as about a resource or a product.

Enterprise production process resource-products dozen creates elaborated model resource-products dozen.

In mathematical modeling economic processes, possible technologies dozen, each of them transfers resources combination into determined product from their identified dozen, creates technologies dozen. Each single technology provides making only one identified resource-product kind. It's because that the model doesn't consider continuous layout enterprises and enterprises, in which production process high share is for technologies with rigid structure of manufacturing some sever resource-products. Therefore, technologies dozen is marked with products sub-dozen from general resource-products dozen.

About considered technologies dozen there are hypotheses, leading eventually to linear production models. First hypothesis: this dozen is finite; second: each average resource on product unit on each technology is independent on this technology usage intensity (technologies homogeneity); third hypothesis: average resource on some technologies doesn't change with their uniting into one complex technology in one production unit (technologies additivity).

In real economy the majority of dependences are more complex, non-linear, and, therefore, linearity hypothesis simplifies reality. But the suggested simplification is necessary because of two conditions. Firstly, the production process characteristic links linearity allows simplifying production process mathematical description and usually enough adequately express real this process character. Secondly, deviations from linearity are compatible with inevitable «noise» of modeling – casual changings in production process, account and calculation errors.

All three mentioned hypotheses mean that each of production process parts can be shown as initial technologies linear combination, where the linear forms coefficients are average resource-products and its variables are technologies usage intensities.

Literature Review

One of the most important enterprise management mechanisms, concerned with providing competitiveness and increasing its activity effectiveness, is statistic modeling enterprise production process parameters, which elaboration is executed on united balance model base. Elaborated model allows assessing enterprise production process condition, rising economic analysis usage effectiveness in several level production plans preparation and realization. It requires studying several literature sources in this enterprise management area, in which forming model of defining enterprise production process parameters is considered taking into account several aspects of enterprise production-household and financial activity in market environment uncertainty conditions.

In modern organizationally-economic conditions much attention is paid to real production process data transformation for process-mining analysis. Dišek at al (2017) consider real data transformation from several information systems to format, achievable for production process process-mining analysis in big automobile company. It allows detail analyzing production process, identifying "bottlenecks". And Khalili and Chua (2014) suggest resources optimization for planned production with forming integrated pre-configuring and grouping components. For predicted complex configurations production resources and costs optimization, it adopts two new ideas – pre-configuring and components group, integrated into the mixed integer linear programming (MILP) model. These

concepts are the base for optimization MILP-model development for appropriate models adaptation and optimal production plan creation.

Ben-Gal and Singer (2004) present new statistical process control methodology, based on context modeling discrete processes. The method uses context trees models series to estimate process results condition distribution, got on previous observations data. Kullback-Leiber divergence statistic is used to find sufficient changes in trees during the process. The method is used in flexible production system simulation.

Now very common is approach to structure design matrix usage for both module product analysis and module product design architecture decomposition level optimization. For example, Qiao at al (2017) suggest to use module analysis with structural design matrix (SDM), which identifies interrelations between components groups and clusters them into modules to get competitive advantages in product design processes. There hybrid approach, based on multidimensional scaling and clustering, is used for component SDMs in product elaborations. Suggested method allows dividing product architecture in corresponding modules and creating optimal modules for each number of clusters, which is especially important if its number is set by top management. And Algeddawy and Elmaraghy (2013) consider issues of using hierarchical clustering to automatically create hierarchical product architecture on SDM. Got tree of clustering presents product architecture, which deepness shows its decomposition. Optimal decomposition level and number of clusters are determined and mark potential products and process platforms. Besides that, especial attention in modern conditions is paid to optimization process design support in uncertainty (Steimel and Engell (2016)). This work considers two-step stochastic optimization usage for support of solving process design problems on early process development stage, when several potential production process elements can be described only with sufficient uncertainty.

Now issues of analyzing functioning and predicting several technologies and objects development with mathematical programming get enough attention in several aspects of their production-household activity (Yabuta et al (2017), Brezhnev and Chernetskiy (2016)), which allows rising their competitiveness and effectiveness.

Therefore, mathematical programming methods are widely used for describing and analyzing production and technologic processes of household subjects of several industries and property forms, because they have enough universal character.

Research Methodology

Conceptual approach to statistical modeling enterprises production process parameters

Enterprise resource-products transformation production process is modelled using the mentioned technologies dozen per defined time – usually year. Like in other such models, stocks of all identified resource-products are defined on considered time begin and end, and resource-products circulation (consumption) per this time. Any technological process usage intensity is measured as its product volume per considered time.

Technologies dozen is also used to model that enterprise production process part, in which the same resource-products are manufactured on several technologies, or resource-products can be changed with entering new technologies and organizational measures, changing average resources of the products. Results of elaborations and organization measures, named in general organizationally-technical measures on economizing resources, are shown like changed or added technologies as new «receipts» of getting resource-products.

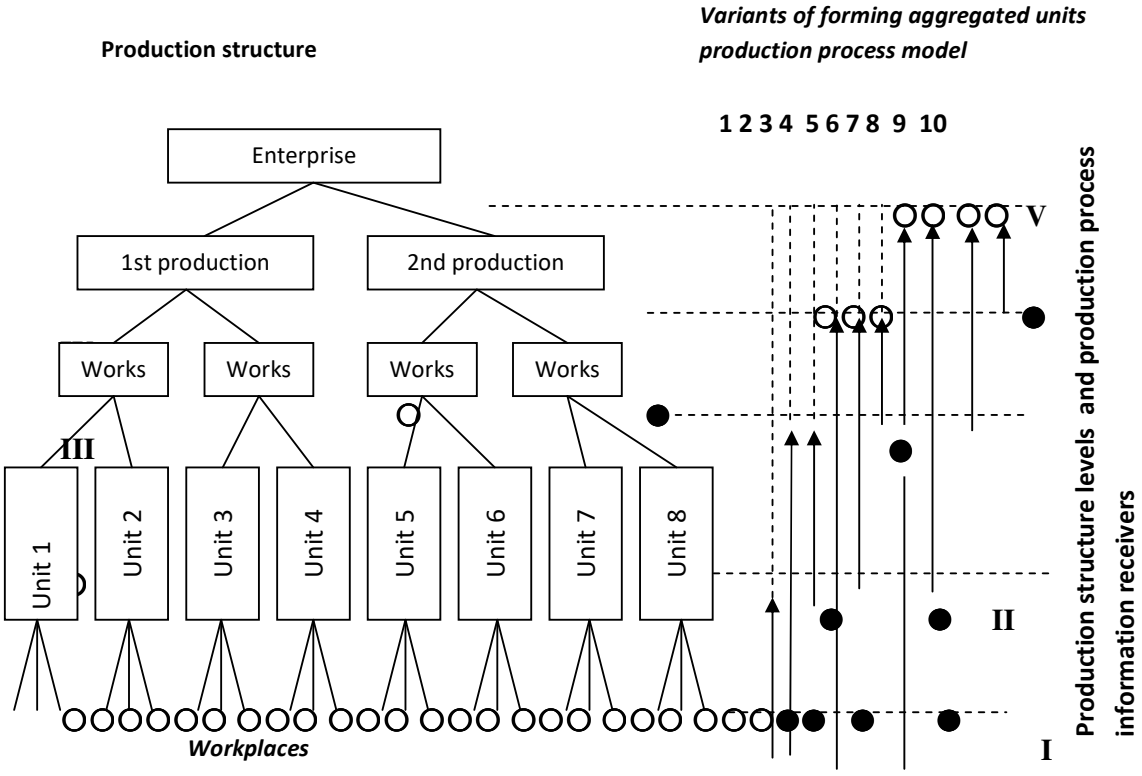
Existing hierarchical enterprise management structures use economic information of several detail or generalization degrees. Higher unit level in management structure – more generalized economic information is needed because of its volumes and limited elaboration possibilities. Therefore, there is

production process model aggregation task for enterprise production structure aggregated units. Each aggregated unit (works or production, whole enterprise) correspond a linear-functional management structure unit (works or production chief, production director), using fit to his level generalized economic information.

Enterprise production structure can be shown as a logical scheme of uniting workplaces into several aggregation levels production units. Enterprise production structure abstract example, formed on four unit aggregation levels (primary units, works, productions and whole enterprise) is in picture 1. This structure is a general enterprise management scheme part.

For each aggregated production unit and each enterprise management body there can be its production process generalized model depending on choose as «black boxes» (primary undisclosed information sources) workplaces, primary units, works or productions. Picture 1 includes 10 several possible variants of forming production process model for all enterprise production structure levels aggregated units.

Principle of considering supervised unit as a «black box» means that the supervising unit controls only resource-products inflows, outflows and stocks of the supervised unit. Such principle is common and inevitable in multivariate calculations on several decisions economic analysis. The elaborated enterprise production process model is for several economic analysis tasks. For each of these tasks better use deter-mined production process model variants depending on several conditions.



Pic. 1 - Abstract enterprise production structure and variants of forming production process model for several aggregation levels units: ● - «black box» information source; ○ - information receiver

Such, organizationally-technical measures variants economic analysis and choose requires defining minimally aggregated production unit, outside which there is no changing direct resource-products costs because of this measure. If this measure realization requires no additional costs of resource-products, distributed by higher level units, then this measure variants analysis and choose requires

only local model of production process part, executed and controlled by the considered unit. The better is maximal production process differentiation for more precisions finding all chain of changes in all supervised units (till workplaces) costs and results relation. Therefore in the local model of production process, for example, works, usable are variants 2 and 3, shown in picture 1, in their preference order.

For organizationally-technical measures variants analysis and choose, requiring additional costs of resources, distributed by higher level units, is necessary to use these higher level units local models of production process.

Enterprise production program variants analysis requires whole enterprise production process model. Like in the previous tasks, the better is maximal production process differentiation for more precisions finding its «bottlenecks». It allows using model variants 7-10 (picture 1) in their preference order.

Statistical modeling enterprises production process parameters

Production process initial characteristics statistic description is used to form and use complex information model of current condition, developing and functioning the enterprise (Sokolitsyn et al (2013), Sokolitsyn et al (2015)). This model helps to determine and compactly write figures, methods and algorithms of solving enterprise work economic analysis tasks.

Uniting enterprise controlled and planned characteristics and figures description and measurement requires that enterprise information model mathematically-statistical description can be used in its work planning. Therefore enterprise mathematically-statistical description must be determined by essence of tasks of planning.

Basic task of planning, using economic analysis mathematically-statistical methods, is forming enterprise technological and financial plan in matrix form. There are economically-mathematical methods of forming matrix technological and financial plans, based on classic balance input-output model.

Let's set production process initial characteristics marks. Their definitions are based on "resource-product" term – each material or labor resource or product of any production process unit.

Details elaboration and assembly units' assembly middle conditions identification is determined by particular economic analysis task. For example, assembly units and details elaboration functionally-cost analysis can require production process identification until detail operations, and constructing-technologic elaborations economic analysis on early project stages requires identification only until basic future product components and resources. In any case all resource-products in middle, non-identified, elaboration or assembly stages, are first previous in technological process identified stages.

Let's mark: $I = \left\{ i \mid i = \overline{1,n} \right\}$ is enterprise resource-products dozen for enterprise work economic analysis; depending on particular economic analysis task this dozen can include only input and output resources and products for single workplaces, primary units, works or whole enterprise; I_{op} is equipment type-sizes, professions and workers levels sub-dozen; T is basic technological equipment work time regime fund in analyzed period (below named «period T»); $V=\{v_1,v_2,\ldots,v_n\}$ is enterprise resource-products circulation vector-column in period T; $Y=\{y_1,y_2,\ldots,y_n\}$ is resource-products inputs from environment and production stocks vector-column in period T; for equipment and workers – their units or groups effective time funds (depending on classification); $W=\{w_1,w_2,\ldots,w_n\}$ is enterprise resource-products and production stocks manufacturing vector-column in period T; for equipment and workers – their underload; $d_{i\ell}$ is i product direct cost coefficient per *l* resource-product unit in production process; for equipment and workers – exploitation hours number; $D=\{d_{i\ell} | i, \ell \in I\}$ is enterprise resource-products direct costs coefficients square matrix.

Coefficients $d_{i\ell}$ describes costs relation in production technological processes with set resource-products elaboration and assembly initial and middle conditions description differentiation level.

Used hypotheses are usual for economically-mathematical modeling production technological processes:

1) modeled technological processes dozen is finite;

2) average resources (direct cost coefficients) per product unit for each product are independent on process usage intensity;

3) average resources of some processes don't change with their uniting into one complex technological process in one production unit.

In case of resource-products identification on some sever classification levels which used in the enterprise classification group has own number as particular resource-product kind. Such method allows forming production process model the same time for several equipment, labor resources and materials classification levels.

In this model equipment and labor resources are got from the environment, i. e. requires no resources excluding financial. It means that

$$\sum_{i \in I} d_{i\ell} = 0 \quad \text{for } \ell \in I_{op} .$$

Figures v_i, $i \in I$ of vector-column V are determined the following way:

$$v_i = \sum_{\ell \in I} d_{i\ell}(v_\ell - y_\ell) + w_i, i = I, \qquad (1)$$

if

$v_\ell \geq y_\ell$, $\ell \in I$, $v_i \geq w_i$, $i \in I$.

In matrix form equation (1) is written as:

$$V=D(V-Y)+W, \; V-W=D(V-Y), \qquad (2)$$

when V, V-Y, V-W is, correspondingly, resource-product circulation, production and consumption vector-column.

Let's solve equation (2) relatively to V:

$$V= (E-D)\text{-}1(W-DY) \qquad (3)$$

(E is single square matrix with scale nxn).

Reciprocal matrix $(E-D)^{-1}$ is determined with dividing (4), if described by matrix D production process has no «turns», i. e. no middle process product is resource for itself:

$$(E-D)\text{-}1=E+D^1+D^2+\ldots+D^k+\ldots, \qquad (4)$$

if corresponding $k \leq n$ then $D^k=0$.

Let's mark this matrix through F:

$F=(E-D)^{-1}=\{f_{ij}|j \in I\}$,

where f_{ij} for $i \neq j$ is i resource-product total costs coefficient per j resource -product unit.

$$FD=F-E=DF. \qquad (5)$$

According to (3) and (5)

$V=FW-(F-E)Y$ (6)

or

$V-Y=F(W-Y)$.

Marking matrix (5) as F*, we get

$$V-W=F^*(W-Y). \quad (7)$$

Matrix equations (5)-(7) are the base of forming FIG enterprises balance.

Let's mark as $I_0 \subset I$ resources sub-dozen, got only from environment. Set $I_{op} \subset I$. It must confirm that $v_i=y_i$, $i \in I_0$. Then from (6) we get FIG enterprises balance equation:

$F_{(i)}(W-Y)=0$, $i \in I_0$, (8)

where $F_{(i)}$ is i row of F matrix.

All other resource-products must confirm that

$v_i-y_i \geq 0$,

i. e.

$$F_{(i)}(W-Y) \geq 0, \; i \in I \setminus I_0. \quad (9)$$

Besides that, there are limitations on resource-products consumption from the environment:

$$Y \leq Y_0, \quad (10)$$

where Y_0 is corresponding limitation vector-column in plan period T;

and limitations on manufacturing products:

$W \geq W_0$, (11)

where W_0 is minimal tasks vector-column on manufacturing products.

All non-negative W and Y values, confirming (8)-(11), form firm enterprises possible plan in period T.

Fact (present) production process condition corresponds to one of system (8)-(11) possible answers:

$$\begin{cases} v_i = w_i + \sum_{j \in I \setminus I_0} f_{ij}^* (w_j - y_j), & i \in I \setminus I_0; \\ y_i = v_i = w_i + \sum_{j \in I \setminus I_0} f_{ij}^* (w_j - y_j), & i \in I \setminus I_{op}; \\ w_i = y_i - \sum_{j \in I \setminus I_0} f_{ij}^* (w_j - y_j), & i \in I_{op}; \end{cases}$$

because $f_{ij}^* = 0$ for $i \in I$, $j \in I_0$ according to initial resources dozen I_0 definition (including equipment and workers sub-dozen I_{op}).

Let's mark as $t_{i\ell}$ time of closing (manufacturing forwarding) i resource-product unit in production process of making ℓ resource-product unit. For equipment and workers $t_{i\ell}=0$, $i \in I_{op}$, $\ell \in I$. For $i=\ell$ set $t_{i\ell}$

equal to time of closing I resource-product in its own circulating stock, if this stock isn't included into any production process of making another ℓ resource-product (then time of closing in this circulating stock is included into time of closing in production process). It gives the stocks levels characteristic:

$$h_{il} = \begin{cases} \frac{1}{T} d_{i\ell} t_{i\ell}, i \neq \ell, i \in I \setminus I_{op}, \ell \in I, \\ \frac{t_{i\ell}}{T}, i = \ell, \end{cases}$$

where $h_{i\ell}$ is level of direct closing (stock) of i resource-product in production process of making ℓ resource-product unit, particularly – circulating stock if $i=\ell$. For equipment and workers, definitely, $h_{i\ell}=0$, if $i \in I_{op}, \ell \in I$ or $\in I, \ell \in I_{op}$.

Let's mark $H=\{h_{ij} | i_{ij} \in I\}$ – square matrix of levels of direct closing (stocks) resource-products in production process. Let's define

$$g_{ks} = \sum_{i \in I} \sum_{\ell \in I} f_{ki} h_{i\ell} f_{\ell s}, \; k \in I, \; s \in I \setminus I_{op}; \; g_{ks} = 0, \; s \in I_{op} \qquad (12)$$

- level of direct closing k resource-product in production process of making s resource-product.

All possible g_{ks} characteristics if $k, s \in I$ form matrix of levels of total closing resource-products in production process:

$$G = \{g_{ks} \mid k, s \in I\} = FHF.$$

g_{ks} characteristics is used for calculation

$$\tau_{ks} = \frac{g_{ks}}{f_{ks}} T, \quad k \in I, \; s \in I \setminus I_{op}$$

- time lag between manufacturing k and s resource-products.

Therefore, there is financially-industrial groups' enterprises production process initial mathematically-statistical characteristic and natural figures system.

Elaborated statistic model of defining production process parameters used for calculating both primary and united natural figures and money figures, which provides interconnecting tasks of account, planning and economic analysis and allows increasing level of complexity, coordination and trust of the corresponding considered management object description. Therefore, the suggested model of defining production process parameters is the base instrument in forming complex economic analysis, which is the most important enterprise management function despite the industry and specific conditions.

Providing production process description trust, especially high-tec enterprises. An important reserve of enterprise production process description and analysis trust increase with set detalization level is in production, making mature product with entering information massives of labor object move in technologic process operations.

Operative and statistic accounts coordination is provided with giving needed for CEA statistic data (about fact labor and material costs on technologic process operations) not with special sample

researches(observations), but with current operative information accumulation and correcting statistic averages on resources costs.

Statistic account and accounting coordination is provided on the base of entering normative production costs account method, which is not pure account enterprise accouter measure, and organizationally-production and technically-economic measures complex, including not only account, but also planning, norming, operative dispatching, organizing production, labor, materially-technical supply.

Normative method fundament must be high organized, developed normative household. The enterprise needs improving current changes account of cost norms and normative figures by constructing, technologic, production, economic, commercial and general purposes. These data must present technologic operations, works kinds, details, middle and end product, homogenous product groups, costs articles and organizational and science-technical measures destinations, technically-economic, intensive and extensive factors and production resources usage degree. Therefore normative costs account method is information base for forming statistic enterprise production process description model, which allows increase its digitization level in digital economy conditions.

Therefore, providing complex, detail and true firm enterprises production process description is a complex problem with various methodological and organizational aspects.

Practical Result

With coordinated operative account and accounting, united balance model of statistical modeling enterprises production process parameters includes initial and final stocks and circulations of materials, middle, non-finished and mature product in set operative period in natural and money volumes. It allows getting needed data for both basic production operative management and material values accounting.

Elaborated enterprises production process parameters definition economic-mathematical model can be used for solving wide tasks ring of managing market economy household subjects of several industries and property forms.

Elaborated production process model realization provides solving the following economic analysis tasks complexes:

- production process initial characteristics account;

- primary natural figures calculation;

- united natural and money figures calculation.

Diminishing costs on entering elaborated model requires using standardized software. Calculating considered in model figures consist in standard matrix calculations, and the production process model is realized in one of mechanically-assembling productions an energetic machine-making enterprise, having leading position in St-Petersburg and Russian North-West in this industry.

Limitation

Factors, limiting such economic analysis multivariate include used production way and costs operative account system capabilities, and also needed recalculation possibilities (or previously calculated presence) production process plan conditions for analyzed time intervals. It leads to necessary mark three main conditions of economic analysis frequency and variance increase on suggested methods:

✓ presence of united centralized system of operative detail production account on controlled in enterprise balance model labor objects elaboration and assembly middle conditions;

✓ entering normative production costs account method, including systematical taking into account, cumulating and giving every set period for planning all caused changing resources costs norms and fact costs deviations;

✓ organizationally-technical possibility to calculate and correct operative plan tasks to production units with wanted frequency.

Significance of Research

Elaborated enterprises production process parameters definition economic-mathematical model has significant universality. Firstly, it is usable for each enterprise management unit on each production process part with each set description decomposition or aggregation level. Secondly, it can be used in several kinds' economic analysis tasks. Such, presented production process description is made for operative, retrospective and perspective economic analysis kinds several ways, but in structure and contents it must be unified, corresponding to united conceptual balance model – statistic enterprises production process parameters definition.

Conclusions and Recommendation

Providing complex, detail and true enterprises production process description is complex problem with several methodological and organizational aspects. Solving economic analysis tasks, based on united complex enterprises production process description with taking into account several enterprises production-household activity factors requires corresponding mathematical and informational support. If factor economic analysis mathematic apparat is enough elaborated and universal for all analyzed figures factor models, then making the factor models with statistic modeling enterprises production process parameters on existing statistic enterprise data is non-worked task in both methodological and organizationally-informational aspects. This task is most effectively solved in special complex economic analysis subsystem creation framework, which core is united complex balance enterprises production process parameters statistic definition model. Useful is making all needed for several economic analysis tasks particular figures factor models from this general balance enterprises production process parameters statistic definition model.

Existing enterprise management systems are maximally prepared to wide entering only retrospective economic analysis tasks, using traditionally cumulated account-statistical production data.

Obviously, solving these questions in particular enterprise management system can be several. Therefore elaborating economic analysis models and software, oriented not on particular enterprise management system, and on whole discrete industrial enterprises, require clear unites standard (type) base, on elaborated complex balance enterprises production process parameters statistic definition model base, universal for several enterprises of the firm, and also tasks and ways to build its original «top» for particular enterprise of the firm.

References

Algeddawy, T. Elmaraghy, H. (2013). 'Optimum Granularity Level of Modular Product Design Architecture', *CIRP Annals - Manufacturing Technology 62* (1), 151-154, Publisher: CIRP. DOI: 10.1016/j.cirp.2013.03.118. ISSN: 00078506.

Ben-Gal, I., Singer, G. (2004). 'Statistical Processes Control Via Context Modeling of Finite-State Processes: an Application to Production Monitoring', *IIE TRANSACTIONS 36* (5), 401 – 415, Publisher: Taylor & Francis, Ltd., DOI: 10.1080/07408170490426125. ISSN: 0740-817X.

Brezhnev, E. Chernetskiy, B. (2016). 'Risk Matrix-Based Method for Critical Infrastructure Safety Assessment Taking into Account Interdependencies', *Proceedings of the MATEC Web of 20th International Conference on Circuits, Systems, Communications and Computers, CSCC 2016; Corfu*

Island; Greece; 14 July 2016 to 17 July 2016 76 (21 October 2016), Publisher: EDP Sciences. DOI: 10.1051/matecconf/20167602050. ISSN: 2261236X. Article number: 02050.

Demidenko, D. S., Malevskaya-Malevich, E. D. (2016), 'Resource Management in Enterprise's Production Process (Conference Paper)', Proceedings of the 28th International Business Information Management Association Conference - Vision 2020: Innovation Management, Development Sustainability, and Competitive Economic Growth (IBIMA), ISBN: 978-098604198-3, 9 - 10 November 2016; Seville; Spain, p. 3789-3793, Publisher: International Business Information Management Association, IBIMA.

Dišek, M., Šperka, R., Kolesár, J. (2017). 'Conversion of Real Data from Production Process of Automotive Company for Process Mining Analysis', *Smart Innovation, Systems and Technologies, Proceedings of the 11th KES International Conference on Agent and Multi-Agent Systems—Technologies and Applications (KES-AMSTA 2017), 21 June 2017 to 23 June 2017; Vilamoura; Portugal (74)*, 223-233, Publisher: Springer International Publishing AG 2018. DOI: 10.1007/978-3-319-59394-4_22. ISSN: 21903018.

Gluhov V.V., Mednikov M.D., Korobko S.B. (2007). Mathematical Methods and Models for Management: High school supplementary file. Edition 2nd corresponding addicting. Publisher: Lane, St-Petersburg, 528 p.

Khalili, A., Chua, D.K. (2014). 'Integrated Prefabrication Configuration and Component Grouping for Resource Optimization of Precast Production', *Journal of Construction Engineering and Management* 140 (2, 1 February 2014), article number: 04013052. Publisher: American Society of Civil Engineers. DOI: 10.1061/(ASCE)CO.1943-7862.0000798. ISSN: 07339364.

Mednikov M.D. (2012). Crisis Firm Management. Publisher: Polytechnic University Press, St-Petersburg, 198 p.

Nikolova, L.V., Rodionov, D.G., Afanasyeva, N.V. (2017). 'Impact of Globalization on Innovation Project Risks Estimation', European Research Studies 20(2), p. 396-410, ISSN: 11082976, Publisher: International Strategic Management Association.

Nikolova L.V., Rodionov D.G., Mokeeva T.V. (2014) 'The Formalization of the Conflicts Management Models of the Strategic Alliances Under the Conditions of the Globalizations', *Asian Social Science 10* (19, 29 September), 296 – 302. Publisher: Canadian Center of Science and Education. ISSN: 19112017, DOI: 10.5539/ass.v10n19p296.

Qiao, L., Efatmaneshnik, M., Ryan, M., Shoval, S. (2017). 'Product modular analysis with design structure matrix using a hybrid approach based on MDS and clustering', *Journal of Engineering Design 28* (6, 3 June 2017), 433-456. Publisher: Informa UK Limited, trading as Taylor & Francis Group. DOI: 10.1080/09544828.2017.1325858. ISSN: 09544828.

Semenov, V.P., Sokolitsyn, A.S., Sokolitsyna, N.A. (2016), 'Forming production program with homogenous product in market environment uncertainty (Conference Paper)', Proceedings of 5th IEEE Forum on Strategic Partnership of Universities and Enterprises of Hi-Tech Branches, Science. Education. Innovations 2016, ISBN: 978-150905424-4, DOI: 10.1109/IVForum.2016.7835860, 16-18 November 2016, St. Petersburg, Russian Federation, 76-78, Publisher: Institute of Electrical and Electronics Engineers Inc.

Silkina G.Y. (2017). Decision-Making Methods. Publisher: Polytechnic University Press, St-Petersburg, 184 p.

Sokolitsyn, A.S., Ivanov, M.V., Sokolitsyna, N.A. (2016a), 'Optimal Financial Means and Profit Distribution between Public and Private Partners in PPP Project Realization (Conference Paper)',

Proceedings of the 28th International Business Information Management Association Conference - Vision 2020: Innovation Management, Development Sustainability, and Competitive Economic Growth (IBIMA), ISBN: 978-098604198-3, 9-10 November 2016; Seville; Spain, 2122-2129, Publisher: International Business Information Management Association.

Sokolitsyn, A.S., Ivanov, M.V., Sokolitsyna, N.A., Semenov, V.P. (2016b), 'Optimal Finance Distribution between Public-Private Partnership Project Participants (Conference Paper)', Proceedings of the 19th International Conference on Soft Computing and Measurements (SCM 2016), ISBN: 978-146738919-8, DOI: 10.1109/SCM.2016.7519836, 25 -27 May 2016, Saint Petersburg; Russian Federation, 529-530, Publisher: Institute of Electrical and Electronics Engineers Inc.

Steimel, J., Engell, S. (2016). 'Optimization-Based Support for Process Design under Uncertainty: A Case Study', *AIChE Journal 62* (9), 3404-3419. Publisher: American Institute of Chemical Engineers. DOI: 10.1002/aic.15400. ISSN: 00011541.

Yabuta, K., Hirao, M., Sugiyama, H. (2017). 'Process Model for Enhancing Yield in Sterile Drug Product Manufacturing', *Journal of Pharmaceutical Innovation (Open access) 1 April 2017*, 1-12. Publisher: Springer Science+Business Media New York. DOI: 10.1007/s12247-017-9278-9. ISSN: 18725120.

Forming Optimal Enterprise Development Strategies

Mikhail Dmitrievich Mednikov, International management high school, Industrial management, economics and trade institute, Peter the Grate St-Petersburg polytechnic university St-Petersburg, Russia, m_mednikov@mail.ru.

Alexander Sergeevich Sokolitsyn, Governmental and financial management high school, Industrial management, economics and trade institute, Peter the Grate St-Petersburg polytechnic university, St-Petersburg, Russia, alex.sokol1951@yandex.ru.

Maxim Vladimirovich Ivanov, Governmental and financial management high school, Industrial management, economics and trade institute, Peter the Grate St-Petersburg polytechnic university, St-Petersburg, Russia, ivanov_fuit@rambler.ru.

Natalya Alexandrovna Sokolitsyna, International management high school, Industrial management, economics and trade institute, Peter the Grate St-Petersburg polytechnic university, St-Petersburg, Russia, natasokoli@yandex.ru.

Abstract

There are elaborated and backgrounded (on approval balance relations and reliability conditions) principal schemes of development strategies with long-term and short-term crediting, own means, differing from used methods of investment projecting with taking into account requirements of providing financial sustainability. There is elaborated perspective development optimization model, which takes into account processes cycles of production, investment means sources formation and distribution for development and suggests achieving maximal and sustainable return on enterprise activity.

Key-words: Optimality; Balance relations; Model; Financial sustainability.

Introduction

In modern Russian development economic conditions the main task is growing industrial production and whole economy, and for particular enterprises – forming socially-economic conditions for their effective strategic development. Sustainable enterprise development in both production-household and financial aspects is sequence of made managerial decisions quality and resultatives. Enterprise development, taking into account its sustainable financial providing, must be executed with strategic management mechanisms improvement. Therefore sustainable enterprise development basis is managerial decisions optimization with complex taking into account its current financial and investment activity, destined to investments results maximization, i. e. it needs creating organizationally-economic mechanisms and instruments, allowing finding optimal coordinating enterprise investment and financial activity taking into account its specifics (Kudryavtseva at al (2015); Mednikov at al (2016); Mednikov at al (2017); Niyazova at al (2016); Nikolova et. al. (2015); Nikolova et. al (2014); Novikova and Polutorny (2008); Sokolitsyn et. al. (2016); Sokolitsyn et. al. (2017); Trubitskov et. al. (2012)). However literature sources analysis shown necessarily of

additional this problem investigations because of science-practical sufficiency. Therefore this work as economically-organizational background of forming optimal enterprise development strategies uses the following conditions: presence of clearly formulated and backgrounded general aim – corporative enterprise mission on particular activity and development destinations; satisfying balance structure, and also enough financial sustainability (payability); presence of conditions and abilities to credit developing strategic good group production or activity kinds with borrowing external and own investment sources for development aims. Objective function of strategic enterprise development is total economic return increase, and limitations are economically-organizational background range, caused by requirements to support in strategic perspective (at least in investment development project realization time, and maybe the enterprise "lifecycle") sustainable payability (enterprise liquidity), business activity (actives circulation), investments attractiveness (return on assets not less then stock market interest rate) etc., which are the base of economic-mathematical model of defining optimal enterprise development strategies.

Literature review

One of the most important enterprise development mechanisms, concerned with providing competitiveness and activity effectiveness increase, is forming optimal strategies, which elaboration is based on approval balance relations and reliability conditions of principal schemes of development strategies with both long-term and short-term credits and own means. In result it requires elaborating perspective enterprise development optimization model, taking into account processes cycles of production, investment means sources and its distribution for development taking into account maximal and sustainable return on activity. Therefore it needs studying several literature sources in this strategic development sphere, considering forming development strategies taking into account several enterprise production-household and financial activity aspects.

Thus (Pan, J. and Xiao, Q. (2017)) inquire investments optimization problem for investor, objecting to maximize expected value of temporary relation of assets and liabilities with limited liquidity and stochastic interest rates, and show, that using stochastic control method and variable measurement technic allows solving problems of optimal investment strategy and optimal temporary relation of assets and liabilities for value functions with constant perceiving relative and absolute risk. And Demidenko and Malevskaya-Malevich (2016) shown, that making profit and increasing company market value are possible, if production costs are diminished faster then sales, and it can be achieved with using fundamental neoclassic principle "diminishing marginal costs effectiveness". Besides that, they suggest to use more sustainable to rising risks and uncertainty new economic model. Some interest is in case of defining enterprise information system development strategies for Latvian Telecommunication Company, identifying typical practical problems of building enterprise architecture and defining information system development strategies role in enterprise management improvement (Pirta and Grabis (2014)). Hjaila, et al., (2017) focus on integrated game theory approach development for coordinating supply chains, consisting from some enterprises, in uncertain competitive approach, and suggest new way to analyze game results, based on Pareto-optimal Stakelberg situations set with mutual win. Especial interest is for elaborating enterprise development strategies, based on forming competent approach. Thus, for example, Amiri, et al., (2009) suggested hybrid multicriterial model of decision-making for firm competence assessment, considered for exclusive and uncial firm opportunities in market, based on using set theory in results change, and Kulik and Tkachenko (2016) considered problem of forming optimal enterprise development strategies with elaborating special competencies set, which is the base for defining optimal strategy.

Besides that, some works enough inquire problem of forming enterprise development strategies taking into account impact of sufficient economic factors or current conditions. For example, (Damayanti, et al., 2015) plot to consider, can profit, made by small and middle business in Indonesia, rise with forming corresponding investment strategy, including creating mutual foundations, i. e. find investors opportunities, especially for small and middle enterprises, in defining effective investment strategy.

And (Rokhlinand and Mironenko (2016)) consider dynamic monopoly model of product and price strategies choice for single product with discounted profit maximization in infinity time with corresponding limitations.

Research methodology

Conceptual approach to forming optimal enterprise development strategies

Changes in Russian economy require improving management mechanisms of forming enterprise development strategies and providing their financial sustainability. But choosing only one best enterprise development strategy variant from the set is usually hard, because on predicted assessment enterprise development figures they can contradict.

Estimating each of these strategic development variants value becomes possible with the choice objective function, limitation and border usage conditions, which will form enterprise development strategy optimization task.

This task economic interpretation and mathematic formulation: objective function, limitation and border conditions, - will be defined with current financial viability level. Thus, for unpayable enterprises in pre - or crisis conditions setting this task will be in choosing most effective reorganizational for this activity actives and passives management strategy. For financially - sustainable enterprises setting optimization task is supporting and developing achieved financial sustainability level with realizing such organizationally-technic measures complex, which will provide possibility to improve the majority of basic financial viability figures.

According to this concept, this basic development strategy parameters optimization task can be presented in the following general setting:

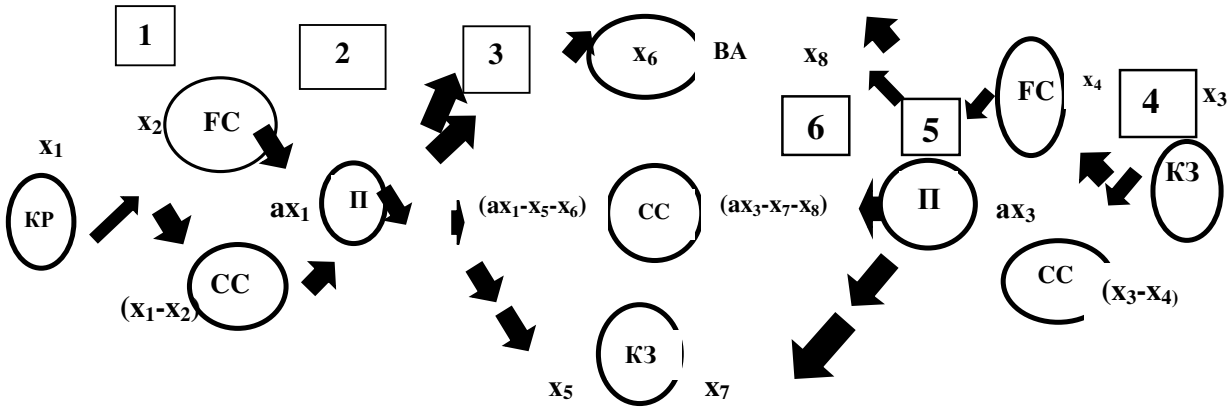
$$\begin{cases} \min F(x_i) = \sum_{i=1}^{n} \delta_i x_i; \\ \sum_{i=1}^{n} a_i x_i \geq q; \ w \leq \sum_{i=1}^{n} x_i \leq \alpha; \\ \rho_i^{'} \leq \rho_i x_i \leq \rho_{i.}^{''} \ (i = \overline{1,\mathrm{n}}); \\ x_i - x_{i+1} > 0, (i = \overline{1,\mathrm{n}\text{ - }1}), \end{cases}$$

where $F(x_i)$ is objective function; n is number of development strategy destinations (independent unknown variables); δ_i is i development strategy destination priority normed expert estimation; x_i ($i = \overline{1,n}$) are independent unknown variables, enterprise equity structure management vector (unknown volume of one means kind sell, other kind buy, paying debts etc.); w is constant of providing current liquidity ($w = 2K3 - OA$); a_i , ($i = \overline{1,n}$) are coefficients at unknown variables in limitation on own circulating capital; q is minimal - approval level of own circulating capital ($q = BA + 0{,}1 * OA - KP$); α is top limit of enterprise assets sale and buy; $\rho_i^{'}, \rho_i^{''} \ (i = \overline{1,n})$ are correspondingly bottom and top borders of i enterprise assets kind change; $\rho_i \ (\mathrm{i} = \overline{\mathrm{1,n}})$ is i enterprise assets kind share in its total costs on equity.

Let's consider economically-organizational background of forming optimal enterprise development strategies: (1) presence of clearly formulated and backgrounded general aim – corporative enterprise

mission on particular development destinations; (2) satisfying balance structure, and also enough financial sustainability (payability); (3) presence of conditions and abilities to credit developing enterprise with borrowing external and own investment sources for development aims.

With such common background sustainable and effective in strategic perspective development possibility can be achieved, for example, with realizing the following actives and passives management scheme (procedure) (pic. 1):



Pic. 1. Strategic enterprise development means sources and distribution destinations

This combined investment scheme economic interpretation consists in the following (according to variables numeral marks and indexes):

1) First strategic development impulse (similar to investments character in macroeconomical theory) can be external credit means – long-term credits and loans, and also own means sources – assuming that all cash flows are discounted on time factor and inflation temps.

This means are distributed in two destinations:

in x_2 volume – directly on development aims, concerned with enterprise reprofilation, modernizating and widening production facilities, technical preparing and marketing production of strategic group etc., which realization requires fixed capital FC increase;

other this means sources part ($x_1 - x_2$) - on circulating capital CC increase, firstly on inventory and costs, caused by launching strategic product group and producing tactic group.

2) It is assumed that investment project is caused by possibility to achieve (with realizing included in it development destinations) enough profit rate on investment capital, i.e. not less average calculated interest rate on loan means ACIR, and it means that investments result must be making undistributed (net) profit not less ax_1 (when $a = ACIR$).

3) Together with long-term credits and loans, investments source for perspective and current production can be short-term credits and loans, creditor indebtedness means - in x_3 volume, which are also distributed:

in x_4 volume - on development aims (FC increase);

in $(x_3 - x_4)$ volume - on current production aims (recovering and rising CC inventory).

4) New profit ax_1 can be distributed even in three destinations:

in x_5 volume - on paying liabilities to all levels budgets and non-budget foundations, interests for bank credit, creditor indebtedness to suppliers and enterprise personnel;

in x_6 volume - on development aims, requiring fixed capital FC increase;

in $(ax_1 - x_5 - x_6)$ volume - on circulating capital CC increase.

5) It is assumed that x_3 credit means usage result will be undistributed net profit ax_3.

6) Got profit ax_3 (which, like before made profit ax_1, is similar to induced investments in macroeconomical processes) also be distributed in three destinations:

in x_7 volume - on in-time paying short-term indebtedness;

in x_8 volume - on development aims (FC increase);

in $(ax_3 - x_7 - x_8)$ volume - on current production aims (CC increase).

This scheme allows formulating limitations and border conditions, defining sphere of approval on providing financial sustainability enterprise development strategies parameters figures.

Most generalizing development functional seems return on assets

$$R_A = \frac{x_1 + a(x_1 + x_3)}{FC + CC + x_1 + a(x_1 + x_3) + x_3 - x_5 - x_7},$$

or increase of net return on assets

$$\Delta R'_A = \frac{a(x_1 + x_3)}{x_1 + x_3 + a(x_1 + x_3) - x_5 - x_7} = \frac{a(x_1 + x_3)}{(1+a)(x_1 + x_3) - x_5 - x_7}.$$

Objective function of forming development strategies can be also other functional, for example: revenue (predicted) from strategic and tactic goods groups realization

$$R = \frac{R_{t-1}(CC - K3 + x_1 - x_2 + ax_1 + ax_3 - x_4 - x_6 - x_8)}{CC - K3},$$

where Rt-1, $(CC - K3)$ are correspondingly current revenue and net circulating assets, as constants may be eliminated from development strategies optimization task; then predicted revenue objective function will be

$$R' = x_1 - x_2 + ax_1 + ax_3 - x_4 - x_6 - x_8;$$

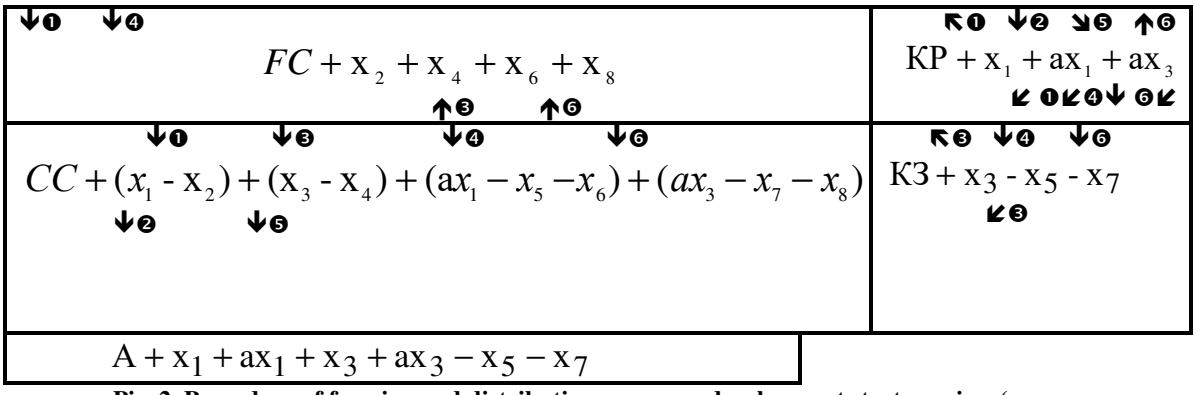
and profit from realization

$$ЧП = a(x_1 + x_3),$$

where a is investment resources single effectiveness ("profit rate on capital") can be set parametrically.

Modeling optimal enterprise development strategies

Suggested development strategy realization scheme (pic. 1) allows presenting the following perspective prediction balance structure (pic. 2):



Pic. 2. Procedure of forming and distributing means on development strategy aims (arrows numeral marks corresponds to stages of forming and using means)

Enterprise equity and technical potential during corresponding investment project realization will be increased and become

$$A + x_1 + ax_1 + x_3 + ax_3 - x_5 - x_7. \quad (1)$$

Trust of suggested scheme of forming and distributing investment means (elaborated including usable minimal number of variables and limitations; such scheme retains, despite its generalized character, very real for the majority of household economic condition) is proved with basic balance equation (1) trust, and also with including into this scheme a range of other balance relations and household development proportions of modeled production object:

diminishing (selling) circulating capital in strategic development process is not assumed

$$x_1 - x_2 \geq 0; \quad (2)$$

Payed creditor indebtedness volume must not exceed expected from all investments sources usage undistributed profit, and payed new creditor indebtedness volume must not exceed its average level

$$ax_1 + ax_3 \quad (x_5 + x_7) \leq 0{,}5(КЗ + x_3); \quad (3)$$

analogically other, enough obvious, balance relations

$$x_3 - x_4 \geq 0; \quad (4)$$

$$ax_1 - x_5 - x_6 \geq 0; \quad (5)$$

$$ax_3 - x_7 - x_8 \geq 0; \quad (6)$$

no hard-realized fixed capital above fixed passives - capital and reserves, which will provide other crisisless sustainable development most important balance proportions trust

$$KP - FC + x_1 + ax_1 + ax_3 \geq KP - FC + x_2 + x_4 + x_6 + x_8,$$

therefore

$$x_1 - x_2 + ax_1 + ax_3 - x_2 - x_4 - x_6 - x_8 \geq 0; \tag{7}$$

current payability in strategic development process must not be lost, i.e. liquidity gaps are forbidden and its level cannot be less than achieved at investment problem realization start

$$\frac{CC + x_1 - x_2 + ax_1 + x_3 + ax_3 - x_4 - x_5 - x_6 - x_7 - x_8}{K3 + x_3 - x_5 - x_7} \geq \frac{CC}{K3}; \tag{8}$$

the same, on own means level

$$\frac{KP + x_1 + ax_1 + ax_3 - (FC + x_2 + x_4 + x_6 + x_8)}{CC + (x_1 - x_2) + ax_1 + x_3 + ax_3 - x_4 - x_5 - x_6 - x_7 - x_8} \geq \frac{KP - FC}{CC}; \tag{9}$$

Assets circulation cannot be diminished because of development strategy realization

$$\frac{R(CC + x_1 - x_2 + ax_1 + ax_3 - x_5 - x_6 - x_7 - K3)}{(CC - K3)\,(FC + CC + x_1 + ax_1 + x_3 + ax_3 - x_4)} \geq \frac{R}{FC + CC},$$

or, the same

$$(FC + CC)(CC + x_1 - x_2 + ax_1 + ax_3 - x_5 - x_6 - x_7 - K3) \geq (CC - K3)(FC + \\ + CC + ax_1 + x_3 + ax_3 - x_4) \tag{10}.$$

After some formulated limitations (2) - (10) transformations and simplifications task of development strategies optimization on functional of increasing total economic return on activity can be presented:

$$\begin{cases} \max \Delta R_A' = \dfrac{a(x_1 + x_3)}{x_1 + x_3 + ax_1 + ax_3 - x_5 - x_7}; \\ \dfrac{CC + x_1 - x_2 + ax_1 + x_3 + ax_3 - x_4 - x_5 - x_6 - x_7 - x_8}{K3 + x_3 - x_5 - x_7} \geq \dfrac{CC}{K3}, \\ \dfrac{KP - FC + x_1 + ax_1 + ax_3 - x_2 - x_4 - x_6 - x_8}{FC + CC + x_1 + ax_1 + x_3 + ax_3 - x_4} \geq \dfrac{KP - FC}{CC}; \\ \dfrac{CC - K3 + x_1 - x_2 + ax_1 + ax_3 - x_5 - x_6 - x_7}{CC + x_1 - x_2 + ax_1 + x_3 + ax_3 - x_4 - x_5 - x_7 - x_8} \geq \dfrac{CC - K3}{FC + CC}; \\ x_1 - x_2 + ax_1 + ax_3 - x_3 - x_5 - x_6 - x_7 < \mathrm{FC} - \mathrm{KP}; \\ x_1 - x_2 \geq 0;\ ax_1 + ax_3 - x_4 \geq 0; \\ ax_1 - x_6 \geq 0; ax_3 - x_7 \geq 0;\ ax_3 - x_7 \geq 0;\ \ x_3 - x_5 \geq 0; \\ x_3 - x_5 \geq 0;\ x_4 - 0{,}5x_3 \geq 0{,}5K3;\ \mathrm{x}_1, ..., x_8 \geq 0. \end{cases}$$

Setting for next limiting conditions transformations unknown variables aggregates allows writing task of development strategies optimization:

$$
\begin{cases}
\max \Delta R_A^{'} = \dfrac{a(x_1 + x_3)}{x_1 + ax_1 + x_3 + ax_3 - x_5 - x_7}; \\
\dfrac{\mathrm{CC} + \mathrm{b}}{\mathrm{K3} + \mathrm{c}} \geq \dfrac{\mathrm{CC}}{\mathrm{K3}}; \\
\dfrac{KP - BA + d - e}{CC + b} \geq \dfrac{KP - BA}{CC}; \\
\dfrac{B(CC - K3 + b - c)}{(CC - K3)(OA + BA + f)} \geq \dfrac{B}{CC + BA}; \\
KP - BA + d - e \geq KP - BA; \\
e = x_2 + x_4 + x_6 + x_8; \\
b = x_1 - \mathrm{x}_2 + \mathrm{x}_3 - \mathrm{x}_4 + \mathrm{a}x_1 - \mathrm{x}_5 - \mathrm{x}_6 + \mathrm{a}\mathrm{x}_3 - \mathrm{x}_7 - \mathrm{x}_8; \\
c = \mathrm{x}_3 - \mathrm{x}_5 - \mathrm{x}_7; d = x_1 + \mathrm{a}x_1 + \mathrm{a}x_3; \\
f = x_1 + \mathrm{a}x_1 + \mathrm{a}x_3 + \mathrm{x}_3 - \mathrm{x}_5 - \mathrm{x}_7; \\
x_1 - \mathrm{x}_2 \geq 0; \\
ax_1 + \mathrm{a}\mathrm{x}_3 - x_4 \geq 0; \\
ax_1 - x_6 \geq 0; \\
ax_3 - x_7 \geq 0; \\
x_3 - x_5 \geq 0; \\
\mathrm{x}_4 - 0{,}5x_3 \geq 0{,}5K3; \\
x_1, \ldots, \mathrm{x}_8 \geq 0.
\end{cases}
$$

Such formalization is of partial-linear programming sums kind, known methods of solving which uses their transformation into linear programming sums

Practical results

The elaborated setting task of forming optimal enterprise development strategies uses as functional the total economic return (return on assets) figure. The limitations are payability normatives, conditions of providing enterprise financial activity, aim figures of revenue, net profit and return. Partially-linear development strategies optimization task functional kind caused its realization as partial-linear programming sum.

Elaborated economically-organizational principles of forming optimal enterprise strategies can be used for solving wide tasks ring in several industries and property forms household subjects management, because these principles have enough generalized and universal character.

Limitation

Suggested setting task has limitations, besides payability normatives, conditions of providing fitting to enterprise activity financial sustainability requirements, aim figures of revenue, net profit and return in market environment uncertainty conditions. It requires more detail account and prediction of external and internal environment impact on enterprise production-household activity in fast changing Russian economy conditions.

Significance of Research

Suggested setting task of forming optimal enterprise development strategies in market environment uncertainty conditions differs with enough complex schemes, showing caused by these strategies investment processes, stages of recovering circulating capital inventories, forming revenue and profit. Optimal development strategies' functional is total economic return (return on assets) figure. Besides

this development strategy functional, the work includes possibility to form on Pareto complex functional, including, for example, also such objective functions, as net profit and assets circulation. Realizing elaborated task of forming optimal enterprise development strategies will allow rising their financial sustainability and competitiveness in modern Russian economy conditions.

Conclusions and Recommendations

On approval balance relations and optimal enterprise development strategies reliability conditions base there is elaborated procedure of forming and distributing means on development strategies aims from long-term and short-term credit means, own means, differing from used investment projecting methods with taking into account requirements of providing financial sustainability. On this procedure base there is elaborated conceptual approach to forming optimal enterprise development strategies. According to suggested conceptual approach there is formed perspective enterprise development optimization model, taking into account production processes cycles, sources of forming investment means and their distribution on development aims taking into account requirement of achieving maximal return on activity.

Uncertainty in achieving calculated (predicted) formed strategies parameters because of exo- and endogenous environmental factors impact (sequence) can be in some degree eliminated with suggested enterprise development optimization strategic models modification as stochastic programming tasks.

References

Amiri, M., Zandieh, M., Soltani, R., Vahdani, B. (2009). 'A Hybrid Multi-Criteria Decision-Making Model for Firms Competence Evaluation'. *Expert Systems with Applications* 36 (10, December), 12314-12322, ISSN: 09574174; DOI: 10.1016/j.eswa.2009.04.045.

Damayanti, S.M., Cintyawati, C., Utomo, S. (2015). 'Winning Investment Strategy for Venture Development of Small and Medium Enterprise (SMES) in Indonesia in Facing Asian Economic Community (AEC) 2015'. *International Journal of Applied Business and Economic Research 13* (7), 5789-5802, ISSN: 09727302; Publisher: Serials Publications.

Demidenko, D.S., Malevskaya-Malevich, E.D. (2016). 'Features of Enterprise's Optimal Innovation Strategy Development', *Actual Problems of Economics 186* (12), 130-137, ISSN: 19936788; Publisher: National Academy of Management.

Hjaila, K., Puigjaner, L., Laínez, J.M., Espuña, A. (2017). 'Integrated Game-Theory Modelling for Multienterprise-Wide Coordination and Collaboration under Uncertain Competitive Environment', *Computers and Chemical Engineering*. 98(4 March), 209-235, ISSN: 00981354, DOI: 10.1016/j.compchemeng.2016.11.041, Publisher: Elsevier Ltd.

Kudryavtseva, T.J., Kuporov, J.J. (2015). 'Evaluation of Social and Economic Efficiency of Investments in Public Utility Services', Asian Social Science 11(19), 151-158, ISSN: 19112017, DOI: 10.5539/ass.v11n19p151, Publisher: Canadian Center of Science and Education.

Kulik, S. and Tkachenko, K. (2016). 'Effective Strategy for Competences Forming', *Proceedings of 3-rd International Conference on Digital Information Processing, Data Mining, and Wireless Communications* (DIPDMWC 2016), 6 July 2016 through 8 July 2016, Moscow; Russian Federation, 239-244. DOI: 10.1109/DIPDMWC.2016.7529396. ISBN: 978-146739379-9, Publisher: Institute of Electrical and Electronics Engineers Inc.

Mednikov, M.D., Sokolitsyna, N.A., Sokolitsyn, A.S., Semenov, V.P. (2016), 'Corporative Structures Participants Economic Interests Coordination Models (Conference Paper)', Proceedings of the 19th International Conference on Soft Computing and Measurements (SCM 2016), ISBN: 978-146738919-8, DOI: 10.1109/SCM.2016.7519813, 25 - 27 May 2016; Saint Petersburg; Russian Federation, 459-461, Publisher: Institute of Electrical and Electronics Engineers Inc.

Mednikov, M.D., Sokolitsyna, N.A., Sokolitsyn, A.S., Semenov, V.P. (2017), 'Game Theory Model of Forming Enterprise Development Strategy in Market Environment Uncertainty' (Conference Paper), Proceedings of 20th IEEE International Conference on Soft Computing and Measurements (SCM, 2017, July 2017), Article number 7970752, Pages 876-878, 24 - 26 May 2017, St. Petersburg; Russian Federation, Publisher: Institute of Electrical and Electronics Engineers Inc., ISBN: 978-153861810-3, DOI: 10.1109/SCM.2017.7970752.

Nikolova L.V., Kuporov J.J., Rodionov D.G. (2015). 'Risk Management of Innovation Projects in the Context of Globalization', *International Journal of economics and financial issues 5* (38), 68 – 72, Publisher: Econjournals, ISSN: 21464138.

Nikolova L.V., Rodionov D.G., Mokeeva T.V. (2014). 'The Formalization of the Conflicts Management Models of the Strategic Alliances under the Conditions of the Globalizations', *Asian Social Science 10* (19, 29 September), 296 – 302. Publisher: Canadian Center of Science and Education. ISSN: 19112017, DOI: 10.5539/ass.v10n19p296.

Niyazova, S.R., Kuporov, J.Ju., Nadezhina, O.S. (2016), 'Development of an Adaptive Management Model for Innovative Activities of an Enterprise', Proceedings of the 28th International Business Information Management Association Conference - Vision 2020: Innovation Management, Development Sustainability, and Competitive Economic Growth (IBIMA), ISBN: 978-098604198-3, 9 - 10 November 2016; Seville; Spain, p. 2210-2222, Publisher: International Business Information Management Association, IBIMA.

Novikova, I.K., Polutorny, A.V. (2008). 'Analyzing Conceptual Approaches to Forming Strategic Industrial Organizations Management Process', *Mountine Information-Analytical Bulletine (science-technic journal) 2* (2), 103-110, Publisher: Closed joint-stock company Mountine book, Russia, Moscow, ISSN (print variant): 0236-1493, http://cyberleninka.ru/article/n/analiz-kontseptualnyh-podhodov-k-formirovaniyu-protsessa-strategicheskogo-upravleniya-promyshlennymi-organizatsiyami.

Pan, J., Xiao, Q. (2017). 'Optimal Asset–Liability Management with Liquidity Constraints and Stochastic Interest Rates in the Expected Utility Framework,' *Journal of Computational and Applied Mathematics 317* (1 June 2017), 371-387, ISSN: 03770427; DOI: 10.1016/j.cam.2016.11.037; Publisher: Elsevier B.V.

Pirta, R., Grabis, J. (2014). 'Strategy Guided Enterprise Architecting: a Case Study', *Communications in Computer and Information Science 465*, 59-72, ISSN: 18650929; Publisher: Springer Verlag.

Rokhlinand, D.B. and Mironenko, G. (2016). 'Optimal Production and Pricing Strategies in a Dynamic Model of Monopolistic Firm', *Japan Journal of Industrial and Applied Mathematics* 33(3, 1 December), 557-582, Publisher: Springer Tokyo, ISSN: 09167005, DOI: 10.1007/s13160-016-0235-7.

Sokolitsyn, A.S., Ivanov, M.V., Sokolitsyna, N.A. (2016), 'Investment Policy: Determining Short-Term Credit under Circulating Capital (Conference Paper)', Proceedings of the 28th International Business Information Management Association Conference - Vision 2020: Innovation Management, Development Sustainability, and Competitive Economic Growth (IBIMA), ISBN: 978-098604198-3, 9 - 10 November 2016; Seville; Spain, 2130-2144, Publisher: International Business Information Management Association.

Sokolitsyn, A.S., Kovalenko, I.I., Zvontsov, A.V. (2017), 'Production Risk Economic Assessment Based on the Fuzzy Logic Approaches (Conference Paper)', Proceedings of 20th IEEE International Conference on Soft Computing and Measurements (SCM, 2017), ISBN: 978-153861810-3, DOI: 10.1109/SCM.2017.7970738, 24 - 26 May 2017, St. - Petersburg; Russian Federation, Publisher: Institute of Electrical and Electronics Engineers Inc.

Trubitskov, S.V., Zinger, O.A, Sergunyaev, S.N. (2012). 'Forming of Strategy of Steady Development of Industrial Enterprise', *Novosibirsk State University Journal. Series: Socially-*

Economic Sciences 12 (4), 179-188, Publisher: Russian science academy Siberia department press, ISSN 1818-7862, Open access: http://www.nsu.ru/rs/mw/link/Media:/22986/17.pdf.

Use of Cloud Computing in SMEs of Baltic Countries

Karlis Kreslins, Ventspils University College, Ventspils, Latvia, karlis.kreslins@venta.lv

Darya Novik, FAU Nuremberg, Germany, dariyanovik@gmail.com

Tatjana Vasiljeva, RISEBA University, Riga, Latvia, Tatjana.vasiljeva@riseba.lv

Abstract

Small Business Act for Europe pinpoints that small and medium size businesses have the key role in the EU economy. SME policy framework developed in 2008 for EU member states puts special emphasis on ICT technologies. Therefore, the purpose of the research is to evaluate situation with the small and medium size enterprises in Baltic countries and to highlight reasons which are behind managerial choices to use cloud computing for their IT resources. Qualitative research methods i.e. in-depth interviews with cloud experts and managerial authorities of SMEs in Baltic countries were used in this research. Results of the interviews are analysed using technology – organization – environment model which helps to structure favourable and unfavourable conditions for cloud computing in the Baltic countries. Based on opinions of SMEs the research summarises experience with cloud computing technology in Baltic countries as well as reveals potential for the development of cloud computing and main restricting factors for successful implementation of this new solution. The paper analyses main barriers for the successful development of cloud computing taking into account both supply and demand side and other impacting factors and provides solutions on how to overcome those restrictions. The main value of the paper is usage of technology-organization-environment model for the analysis of interview results which allows to reveal justified conclusions about the existing situation and provide implementable recommendations for SMEs regarding cloud computing technology.

Keywords: Cloud Computing, Small and Medium Size Enterprises, Entrepreneurship

Introduction

Small and medium size enterprises (SME) are taking the key place in the European Union (EU) economy. A comprehensive SME policy framework has been developed by the European Commission (2008) with a special emphasis on the information and communication technologies. Bajenaru (2010) mentioned that because of the resource limitations SMEs should consider to use such information and communication technology (ICT) systems as cloud computing and other alternatives in comparison to traditional "in-house" information technology (IT) systems which require considerable amount of financial resources. As noted by Zabalza (2012) cloud computing (CC) allows to keep IT resources (data, infrastructure and applications) in the internet as a "pay-for-use" service managed by one or more providers.

Cost and time saving, increased efficiency, flexibility and scalability of resources, increased collaboration in innovation, quick recovery of data in case of emergency, better communication with a client are mentioned among key advantages of cloud computing. On contrary security and confidentiality, legislation and compliance, switching costs and lack of control often are highlighted as main drawbacks of CC services.

According to Giannakouris (2014) cloud computing is novel and relevant for the Baltic economy however, the usage of CC services in Baltic countries is relatively low if comparing with Northern European countries i.e. in 2014 it was 6% in Latvia and 13% in Lithuania whereas in Denmark it was 38% and in Finland 51%. Nevertheless, Giedrimas (2011) pinpointed that over the last years all Baltic

countries were engaged in various activities which promote cloud computing i.e. in Baltic Grid project called Baltic Cloud which was created to develop infrastructure for the joint cloud in Latvia, Estonia, Lithuania and Belarus.
Based on the fact highlighted in the study carried out by Milian (2013) that internet infrastructure in Baltic countries is one of the most developed in Europe i.e. internet speed in Latvia, Lithuania and Estonia is one of the fastest in the world, the paper analyzes how do SMEs in Baltic countries perceive cloud computing technology and what are the reasons for the slow spread and implementation of CC technology in the Baltic SMEs. The aim of the paper is to research the situation with small and medium sized companies in Baltic countries, to understand factors and reasons behind the managerial choices of IT systems by creating a framework which is adjusted for peculiarities of geography of the study. Results of the research are analyzed using Technology – Organization – Environment (TOE) model, which helps to structure and understand favorable and unfavorable conditions for the cloud computing development within the region.

Theoretical Framework

According to Gartner (2009) cloud computing can be defined as a computing style, which provides external users an access to scalable and flexible IT facilities over the internet. Tsai (2012) noted that cloud computing architecture involves three levels i.e. software as a service (SaaS) where all software are installed on external servers, platform as a service (PaaS) where operating systems are installed on external servers and infrastructure as a service (IaaS) where data or networking components are stored on external servers. Several advantages of cloud computing can be highlighted on the micro level. Zabalza (2012) mentioned that cost reduction and time saving have been mentioned as main economic advantages, whereas in KPMG Cloud Survey Report (2014) it was stressed that improved labour flexibility, better customer service and communication with partners as well as improved data analytics are the main benefits regarding increased flexibility of resources. McCarthy (2012) also mentioned that communication and collaboration in technology innovation and data analysis as well as improvements of sustainability can be highlighted among organizational benefits on micro level. However, Law (2013) stressed that easy disaster recovery and higher auditable security are considered to be important factors concerning data security and backup system on the micro level.

When discussing financial benefits of cloud computing which lead to considerable changes in the cost structure, than according to Etro (2011) growth of enterprises, new development of labour market i.e. creation of new jobs, reallocation of labour in the IT sector as well as change in government expenditures and indirect change in revenues due to taxes can be considered as main impact factors on macroeconomic situation. In terms of challenges concerning adoption of cloud technology security risk, lack of control, lack of customization, economic disadvantages and compliance are mentioned as main drawbacks.

The main criticism of cloud computing is related to the fact that the service is completely based and independent on internet technology which always implies a certain security risk. The security problems may emerge as the result of failing to verify the physical infrastructure i.e. location of information and methods used for data protection are often unknown for majority of SMEs. Several authors including Belicove (2013) emphasize that lack of control in case of emergency is another drawback of cloud computing. For example, the cloud computing platform of Amazon during the last three years experienced at least three major interruptions which resulted in loosing information of the clients.

Lack of customization and compatibility is analyzed by Yi-Wen (2015) who stresses that in general benefits from cloud computing are varying from industry to industry. Regarding economic disadvantages Keskin and Taskin (2015) have described pricing model of cloud computing where high switching costs were stated as the main drawback. Sommer (2013) also mentioned that potential growth of costs in the cloud computing providers' industry including rise of amount of payment for extension of storage capacity can be highlighted as another economic drawback. Finally, compliance i.e. legal aspects of

storage of personal data outside the companies in the cloud is another concern of cloud computing which need to be taken into account.

Several studies including research carried out by Neves (2011), Carcary (2014) and Tsai (2012) revealed that the main impediments which impact decision of managers to adopt or not adopt cloud computing in their companies are fear of capital investment and complexity, lack of realizing possible benefits, lack of technical resources as well as lack of time and IT skills, security issue, data ownership and protection and also philosophy of managers and their subjective opinion. Risk of intellectual property leakage, high switching and not determined final costs as well as problems of integration with existing systems were also mentioned as impediments for use of cloud computing in SMEs.

In terms of drivers for adoption of cloud computing in small and medium size companies, Gutierrez, Boukrami and Lumsden (2015) in their study revealed that pressure of competitors, technology efficiency and pressure from the business partners are the main factors which stimulate introduction of new technologies in the companies. Another research carried out by KPMG (2014) also revealed that cost efficiency, facilitation of labour flexibility and improvement of communication with clients and business partners can also be named as favourable aspects for introduction of cloud computing.

Kushnir (2010) noted that in Baltic countries density of micro, small and medium enterprises (MSME) per 1000 people is quite high i.e. in Latvia and Estonia it is around 31-40 and in Lithuania it is 41-50 MSMEs per 1000 people. The same indicator for the USA is around 21-30. All three Baltic countries have also well-developed ICT infrastructure including internet speed and broadband connections. Nevertheless, research carried out by Meijere (2017) revealed that despite the considerable benefits which can bring the usage of the latest information technology solutions, many companies in SME segment are not ready to invest in IT and increase performance and competitiveness of their companies. Similarly, Vasiljeva (2017) recommended that in order to get the most benefits SMEs should align their business needs with cloud computing technology as well as that all technical, organizational and legal aspects should be taken into account to mitigate possible risks of CC.

Regarding adoption of innovation Rogers (1983) has developed five stage innovation adoption model which consists of knowledge, persuasion, decision, implementation and use. The innovation adoption model apart from all five above mentioned stages called as communication channels also include prior conditions for innovations. There might be a case when Knowledge – Persuasion – Decision stages transform into Knowledge – Decision – Persuasion stages. For example, because of collectivistic behaviour which was a part of historical development in Eastern Europe some managers in Baltic countries might choose Knowledge – Decision – Persuasion stages as typical approach for adoption of innovation because they would assume that initiative and motivation for adoption of new technological solutions should come from the government or industry associations.

In order to research innovation adoption process both on a company's as well as on region's level Technology – Organization – Environment or TOE model is often used as a theoretical basis for analyzing adoption of cloud technology which is described in the research carried out by Alshamaila (2013). According to the TOE model the innovation adoption process is defined by technological, organizational and environmental aspect. Technological context covers internal technologies which are already implemented in the company as well as external technologies which are used in the market but are not implemented in the company. Baker (2011) stressed that the internal technologies which place a certain boundaries for the scale and speed of technological change in a company are important in the process of innovation adoption. Organizational context covers such features of a company as its size, managerial design, communication links and amount of available resources in general. Each of those factors can either facilitate or prevent implementation of innovation. Finally, environmental aspect includes market situation, industry characteristics and other external factors which form business surroundings.

Based on literature review, Table 1 summarizes major strengths, weaknesses, opportunities and treats related to implementation of cloud technologies in the companies.

Table 1. SWOT analysis of cloud computing implementation (designed by authors)

Strengths	**Weaknesses**
- cost saving - time saving - easy set-up - improved efficiency of resource utilization - higher workforce flexibility - scalability and flexibility of system capacity	- unclear final cost of cloud computing utilization - dependency on the Internet connection - lack of speed - lack of customization - large electricity consumption
Opportunities	**Threats**
- enhanced communication with partners/clients - easy extension - easier collaboration in innovation - guaranteed fast recovery of lost data - opportunity of 24/7 real time management	- security and confidentiality problems - loss of control over data - intellectual property theft - could be more expensive than in-house systems - service provider reliability and trustworthiness

Research Methodology

Multiple-case study method which provides an opportunity to research differences and similarities within each setting and across diverse settings of the cases was used in this study. Data are based on primary sources. Semi-structured in-depth interviews with nine senior executives of Baltic SMEs and four cloud computing experts were conducted to discover their attitude concerning cloud computing. In-depth interviews provide a possibility to outline new issues and aspects of the problem as well as new opinions and challenges which was also stressed in the study carried out by Barnham (2015). Decision making authorities were selected for the interviews including senior executives or IT managers. Because of geographical differences interviews were conducted using Skype video calls.

Concerning development of interview questions, those were formulated in a way that covers all important aspects and issues of the TOE model which is applied when analyzing interview results. Based on the factors and purposes of the interview all questions were designed in three parts i.e. 1) questions about implemented IT systems, selection of in-house solutions, internal infrastructure; 2) experience with cloud computing and attitude towards cloud technology; 3) discussion on common perspective for the cloud potential and reasons for relatively slow implementation of technology in Baltic countries. In order to facilitate discussion and elaboration on the topic from interviewees, the questions of the interviews were designed as open-ended. Manual coding method was used to process information gained during the interviews which then can be analyzed by the TOE model.

A purposive sampling method was used to cover diverse of companies i.e. in terms of industry, size, structure etc. Patton (1990) highlighted that important advantage of purposive sampling is a possibility to focus on relatively small sample which contain participants of information rich cases. The main focus was on companies which have implemented and were utilized IT systems in their daily business operations. The sample consisted of two parts. The first part included companies both from IT and non-IT industries. The main selection criteria was operation of company in the market for at least three tears, being SME in terms of number of employees and turnover and diversification of industries and business activities across the sample. The second part of the sample consisted of independent IT professionals and cloud providers

in order to get an independent observation and opinion regarding technology supply and impediments for implementation of cloud computing.

Main Findings and Analysis of Results

Questions for the in-depth interviews were grouped in three blocks. Each block covered around ten to fifteen questions. The first block included questions about the internal and external IT system used in the company i.e. "Does the company has an internal IT system?", "Does the company experience lack of capacity of the resources?", "Does the company uses backup services?". The second block of questions covered questions related to experience with cloud computing technology for example, "When did the company started to use cloud computing and what was the reason?", "How expensive is to rent the cloud?", "Do you have any negative experience with the cloud?". Finally, the third block of questions was dealing with opinion regarding the potential of cloud computing in the Baltic countries and impediments for the spread of technology i.e. "What would be the impediments for the SMEs in Baltic countries to employ cloud technology?", Which companies will benefit the most from the implementation of cloud computing?", "What would the potential of cloud computing technology in the Baltics during the next 3-5 years?".

Summarising answers expressed by the representatives of small and medium size companies revealed that almost all companies within the sample used some kind of cloud technology. Respondents appreciated security and backup systems of cloud computing providers and considered it sufficient. The reasons for shifting to the cloud computing was almost the same across the sample i.e. necessity to make data accessible from any place and device, need of scalability of IT resources as well as need in automatization of standard manual processes and provision of safe backup of the company's IT system.

When asked about the main advantages of cloud computing, respondents from SMEs mentioned flexibility, scalability and accessibility. Some respondents also stressed that cloud computing is especially beneficial for small and medium size companies. Regarding impediments for spread of technology majority of interviewees stated that fear of technology and mentality of people are the primary obstacles. Lack of knowledge and weak promotion of cloud computing and its benefits were also mentioned as restricting reasons of introducing new technologies in companies.

The second group of interviewees i.e. independent IT experts and cloud providers shared their opinions about general vision of the cloud as well as about impediments for cloud development both from supply and from demand side. Device independency, high speed of work, efficiency, scalability and flexibility were highlighted as advantages of the cloud. Experts also pinpointed the possibility to avoid high initial investments and shift from capital expenditure to operational costs of the cloud technology. Although majority of reliable cloud computing services are not free of charge, cost advantage of the cloud was mentioned as important positive aspect because a company by using cloud technology can decrease its spending for electricity, own data centre support and security implementation as well as for IT personnel. Security considerations and time consuming for shift of big data amounts were mentioned as potential drawback of the cloud.

Lack of partners in Baltic countries who provide cloud services as well as lack of promotional activities for cloud computing which links to poor knowledge among Baltic entrepreneurs on the topic about the cloud were mentioned as impediments for the cloud computing from the supply side. Some respondents stressed that because of business threats some local hardware companies are reluctant to promote cloud to their clients which results in absence of the local marketing programmes for the cloud. Security and compliance considerations, consideration about performance and technical specifications, reluctance to change and move by IT department, fear of new technology and lack of education were mentioned as main obstacles for successful cloud development from the demand side.

Aggregated results of the interviewed sample were analysed using Technology-Organization-Environment model and its three contexts of cloud computing adoption. In terms of technological context which covers such factors as advantage, uncertainty, compatibility, complexity and trialability, relative advantage of cloud computing including flexibility, scalability, accessibility, improved efficiency, speed of work, facilitated capacity of resources, was understood by majority of respondents across the sample. Factor of uncertainty concerning security and reliability was observed during the interviews both with representatives of SMEs and IT experts. Lack of knowledge and experience with the cloud which is closely linked to poor marketing activities also rises uncertainty among potential clients. Compatibility was noted by all respondents as a significant factor for innovative technology implementation and it should match technological needs of the company and be in line with other software application which is not always a case of the cloud technology. Complexity of cloud technological context was highlighted as favourable for the technology spread and easiness of utilization was mentioned by majority of respondents. Finally, trialability was stressed as an important factor for adoption of cloud technology and those companies which could test the cloud during some EU supported project had smooth and fast cloud adoption process.

Size, top management support, innovativeness and openness to new technologies and prior technology experience are key factors which form organizational context. Theoretical aspect of company size concerning adoption of new technologies is not clearly defined in the literature. Respondents considered that it would be easier for SMEs to implement cloud applications as they are more flexible and efficient in decision making which facilitate cloud adoption. Top management support and management attitude towards cloud computing was a crucial factor for shifting or not shifting to the cloud technology. Respondents also mentioned that fear to loose jobs concerning IT personnel can be direct impediment for the positive managerial decision. Many interviewees also pinpointed that fear of new technology can be considered as main obstacle against the innovativeness and openness to new technologies. Nevertheless, during the interviews IT experts noted that rate of innovativeness in Baltic countries is on the medium level so, therefore companies and its managers have average openness to innovations. Prior technology experience in organizational context was also mentioned as important factor because those managers which have used some cloud solutions earlier would be more open and ready to implement the cloud technology to larger extent.

When applying the TOE model, competitive pressure, industry, market scope, supplier support and legal aspect are factors which form environmental context. Although in the previous research carried out by Alshamaila (2013) competitive pressure was mentioned as a factor with strong impact on the decision making process within a company, across the interviewed sample this factor was never directly mentioned as important for adoption of innovation. In terms of industry factor some respondents stated that every industry can benefit from cloud solutions. During the interviews a positive correlation between internationalization and globalization of a company and utilization of cloud services was observed. It means that the market scope i.e. operation of a company in several countries facilitates implementation of cloud technology. Regarding supplier support all respondents agreed that a large number of providers offer cloud services in the market. However, the interviewees also noted that due to weak promotional channels and lack of IT consultancy, the promotion of cloud services is weak across the Baltic countries. Based on interview results legal aspect was added to the environmental context of TOE model because this factor plays a significant role in the process of cloud technology diffusion in the Baltic countries. According to the opinion of experts confusion concerning data storage regulations which were created during the past decade is important drawback. Limitation to use the EU funds for IT development regarding implementation of the cloud also relates to the legal aspect i.e. cloud expenditure is not covered by the eligibility criteria of the fund as it is considered to be mostly operational cost. Finally, according to the official statistics mentioned in the study carried out by Schneider (2015) relatively high rate of shadow economy in the Baltic countries is also important part of the legal aspect which strongly acts against implementation of cloud technology.

Conclusions and Recommendations

Summarising analysis based on TOE model it can be concluded that the technological context is partly applicable for adoption of cloud technology. Majority of clients understand the relative advantage of this solution and can deal with complexity issues. Nevertheless, uncertainty and lack of trust exist even among experienced users of the cloud and therefore, form significant impediment for dissemination of cloud computing. Among other revealed drawbacks there were problems with compatibility and customization of the cloud as well as poor trialability possibilities for it.

The organizational context of the TOE model is more favourable. Although the innovativeness of the region is on a satisfactory level, fear of technology still exists. Managerial factor would not be an impediment for cloud solutions if the IT personnel would support shift to new technologies.

The environmental context contains significant impediments for adoption of cloud computing in Baltic countries. Although the market scope of companies in the Baltic countries is relatively favourable, lack of information and marketing activities about new technological solutions has created limited awareness about benefits of the cloud. Therefore, uncertainty regarding security and reliability of the cloud is increasing and spreading among the target audience without logical rationale.

The relatively small sample size of respondents can be mentioned as one of the weaknesses of this study. Mainly the management side of the company was interviewed and answers from the managers were analysed and discussed. In order to gain more objective overview of the company, representatives from other departments and especially IT staff should also be interviewed. The fact that all interviews were conducted via Skype can be named as another drawback because it might create some barriers in communication and some non-verbal language and emotions which would be present during the face-to-face interviews, might be missed out. Therefore, as for further research the sample size of companies to be interviewed as well as number of interviews within the company should be increased. Also, as different impediments were revealed during the interviews, further researches can analyse each of them more in depth. For example, the grey economy in relation to cloud computing as well as promotional activities for increasing trust and usage of the cloud by customers can be highlighted as directions for further research.

Based on analysis and conclusions the following recommendations can be made to facilitate introduction and use of cloud technology in the SMEs of Baltic countries:

- Cloud technology promotion targets should be shifted from IT department to management of the company;
- Marketing programmes on industry level and also on governmental level should be implemented;
- IT consultancy within the Baltic region should be developed;
- Educational activities aimed for promotion of cloud solutions should be increased by the use of conferences, managerial courses and seminars etc.;
- Regulations on data storage should be clarified and delivered to the companies;
- Eligibility regulations of the EU funds should be adjusted to speed up IT industry development especially regarding simplification of application procedure and extending the funds for the operating expenses.

To conclude, cloud technology has remarkable potential in the Baltic countries and there will be a rapid growth of technology in the nearest future. However, the industry of cloud computing and the IT associations should carry out a wide range of various activities to facilitate introduction of cloud solutions in the companies and to eliminate existing impediments.

References

Alshamaila, Y., Papagiannidis, S. and Feng, L. (2013). Cloud computing adoption by SMEs in the north east of England: A multi-perspective framework. *Journal Of Enterprise Information Management* 26(3), 250-275.
Bajenaru, A. (2010). Software-as-a-service and cloud computing, a solution for small and medium-sized companies. *Bulletin Of The Transilvania University Of Brasov. Series V: Economic Sciences*, 3173-184.

Baker, J. (2011). The technology-organization-environment framework, Dwivedi, Y., Wade, M. and Schneberger, S. (eds.), *Information Systems Theory: Explaining and Predicting Our Digital Society*. [Retrieved October 2, 2017], https://www.researchgate.net/publication/226145805_The_Technology-Organization-Environment_Framework
Barnham, C. (2015). Quantitative and qualitative research. *International Journal Of Market Research* 57(6), 837-854.

Belicove, M. E. (2013). Will the cloud rain on my parade? *Entrepreneur* 41(8), 40.
Carcary, M., Doherty, E. and Conway, G. (2014). The Adoption of Cloud Computing by Irish SMEs -- an Exploratory Study. *Electronic Journal Of Information Systems Evaluation* 17(1), 3-14.

Etro, F. (2011). The Economics of Cloud Computing. *IUP Journal Of Managerial Economics* 9(2), 7-22.
Gartner. (2009). *Gartner Highlights Five Attributes of Cloud Computing.* [Retrieved October 2, 2017], http://www.gartner.com/it/page.jsp?id=1035013

Giannakouris, K. and Smihily, M. (2014). Cloud computing - statistics on the use by enterprises, *Eurostat.* [Retrieved October 2, 2017], http://ec.europa.eu/eurostat/statistics-explained/index.php/Cloud_computing_-_statistics_on_the_use_by_enterprises
Giedrimas, V., Varoneckas, A. and Juozapavicius, A. (2011). The grid and cloud computing facilities in the Lithuania. *Scalable Computing: Practice and Experience,* 12(4). [Retrieved October 2, 2017], http://www.scpe.org/index.php/scpe/article/view/750/342

Gutierrez, A., Boukrami, E. and Lumsden, R. (2015). Technological, organisational and environmental factors influencing managers' decision to adopt cloud computing in the UK. *Journal Of Enterprise Information Management* 28(6), 788-807.
Keskin, T. and Taskin, N. (2015). Strategic Pricing of Horizontally Differentiated Services with Switching Costs: A Pricing Model for Cloud Computing. *International Journal Of Electronic Commerce* 19(3), 34-53.

KPMG Cloud Survey Report. (2014). [Retrieved October 2, 2017], http://www.kpmg.com/US/en/about/alliances/Documents/2014-kpmg-cloud-survey-report.pdf
Kushnir, K., Mirmulstein, M. L. and Ramalho, R. (2010). Micro, Small, and Medium Enterprises Around the World: How Many Are There, and What Affects the Count? *IFC World Bank group*. [Retrieved October 2, 2017], http://www.ifc.org/wps/wcm/connect/9ae1dd80495860d6a482b519583b6d16/MSME-CI-AnalysisNote.pdf?MOD=AJPERES

Law, D. (2013). Will the cloud rain on my parade? Clarifying terms and privacy concerns. *Claims* 61(4), 20-25.
McCarthy, A. (2012). Drug discovery in the clouds. *Chemistry & Biology* 19(1), 1-2.

Meijere, S. and Tambovceva, T. (2017), Information Communication Technologies as Enabler for Rural Development. Proceeding of the 2017 International Conference "Economic Science for Rural Development", ISBN: 978-9984-48-261-3, 27-28 April, 2017, Jelgava, Latvia, 110-115.
Milian, M. (2013). Top 10: Where to Find the World's Fastest Internet, *Bloomberg Business*. [Retrieved October 2, 2017], http://www.bloomberg.com/slideshow/2013-01-23/top-10-countries-with-the-fastest-internet.html#slide8

Novik, D. (2016). Cloud computing in the context of Baltic SMEs. *Bachelor Thesis,* SSE Riga, 54.
Rogers, E. (1983). *Diffusion of Innovations*, 3rd ed. [Retrieved October 2, 2017], https://teddykw2.files.wordpress.com/2012/07/everett-m-rogers-diffusion-of-innovations.pdf

Patton, M. (1990). *Qualitative evaluation and research methods*. [Retrieved October 2, 2017], http://legacy.oise.utoronto.ca/research/field-centres/ross/ctl1014/Patton1990.pdf
Schneider, F., Raczkowski, K. and Mroz, B. (2015). Shadow economy and tax evasion in the EU. *Journal of Money Laundering Control* 18(1), 34 – 51. [Retrieved October 2, 2017], http://www.emeraldinsight.com/doi/abs/10.1108/JMLC-09-2014-0027

Sommer, T. and Subramanian, R. (2013). Implementing Cloud Computing in Small and Mid-Market Life-Sciences: A Mixed-Method Study. *Journal Of International Technology & Information Management* 22(3), 55-76.
Tsai, B. J. and Shen, J. (2012). Securities operations: In-house or in the cloud? *Journal Of Securities Operations & Custody* 5(2), 110-117.

Vasiljeva, T., Shaikhulina S. and Kreslins K. (2017). Cloud Computing: Business Perspectives, Benefits and Challenges for Small and Medium Enterprises (Case of Latvia). *Procedia Engineering*, 178 (2017), 443-451.
Yi-Wen, F., Cheng-Chieh, W., Chun-Der, C. and Yu-Hsien, F. (2015). The Effect Of Status Quo Bias On Cloud System Adoption. *Journal Of Computer Information Systems* 55(3), 55-64.

Zabalza, J., Rio-Belver, R., Cilleruelo, E., Garechana, G. and Gavilanes, J. (2012). *Benefits Related to Cloud Computing in the SMEs*. [Retrieved October 2, 2017], http://www.adingor.es/congresos/web/uploads/cio/cio2012/EN_09_Information_Systems_and_ICT/637-644.pdf

Bank Deals With Liquidity: The Micro and Macroeconomic Determinants Approach evidence from Pakistan

Shakira Fareed

PhD Scholar Department: Accounting and Finance Department University,Institute of Business Management ,Karachi ,Pakistan. Email: std_12751@iobm.edu.pk

Tazeen Arsalan

Assistant Professor,Accounting and Finance Department University: Institute of Business Management ,Karachi , Pakistan Email: tazeen.arsalan@iobm.edu.pk

Sharique Ayubi

Associate Professor Affiliation: Institute of Business Management (IOBM) Department: Accounting and Finance Department , Karachi , Pakistan. Email: shariq@iobm.edu.pk

Abstract

Liquidity is more important than profitability for the survival of an organization. Banking industry is the key financial institution in Pakistan having a substantial impact on the Gross Domestic Product of the country. This research investigates and analyzes the determinants of liquidity in private banks of Pakistan for the period 2004- 2015. Liquidity is impacted by micro as well as macroeconomic indicators. The study includes capital adequacy, size, operational efficiency, asset quality, and return on assets as micro economic indicators. Gross Domestic Product and Inflation are included as macroeconomic indicators. Microeconomic data is collected from State Bank of Pakistan's financial statement analysis report as well as published annual reports of private banks in Pakistan. Macroeconomic data is collected from World bank data. The study has analyzed the relationship through Pooled, Fixed and Random Effect Regression techniques. To assess the most reliable results f-test, Breusch Pagan and Hausman tests is used. The private banks in Pakistan conclude that capital adequacy, size, operational efficiency, asset quality and profitability have an insignificant impact on bank liquidity in pooled regression. However, inflation and gross domestic product have substantial influence on bank liquidity in all the regression models. The study will not only help banks in understanding the determinants of liquidity but will also help analyzing the relationship of liquidity with micro and macroeconomic variables.

Keywords: Bank Liquidity, Capital Adequacy, Size, Operational Efficiency, Asset Quality, Return on Assets, Gross Domestic Product and Inflation

Introduction

Banks play a pivotal role in any financial system. Banks are financial institutions that play the role of intermediary between the surplus economic units and deficit economic units and facilitate the saving and capital formation in an economy. To be able to perform its role effectively, banks must be safe. The soundness of a bank entails two things: it should be liquid and profitable. However, liquidity and profitability seems to be inversely related. Liquidity is defined as the capability of bank to finance

increases in assets and meet obligations as they come due, without incurring objectionable losses (Bank for International Settlements, 2008). More liquidity would impinge upon bank's profitability and higher profits could be at the expense of liquidity. This requires that a balance needs to be maintained. If a bank is liquid it is perceived to be solvent as well. Hence, the importance of liquidity for a commercial bank cannot be undermined (Diamond and Dybvig, 1983). A bank's survival hinges on the fact that it is able to meet its financial obligations (Vodova, 2013). Banks need liquidity for two reasons: First, bank deposits are convertible on demand into cash, i.e., to meet withdrawals (Calomiris and Kahn, 1991; Diamond and Rajan, 2001), and secondly, bank need liquidity so that it is able to accommodate customers when they come for loans

Pakistan's banking sector is divided into five segments; private, public, Islamic, foreign and specialized (State Bank of Pakistan). Private Banks in Pakistan is more in number and is more profitable than other segments. These banks were even profitable when banks in developed countries were facing bankruptcy problems. It is mandatory on commercial banks in Pakistan to maintain liquidity according to the requirements of Central Bank. Required reserves, which in the case of Pakistani banks mean cash reserve ratio (CRR)[1]and statutory liquidity ratio (SLR)[2], are not there to provide banks with liquidity. Their purpose is to help the State Bank of Pakistan (SBP) control the banks' creation of new deposits as well as to maintain money supply. A bank could ensure liquidity with reserves in excess of those required. But excess reserves are expensive and carry an opportunity cost in the form of interest a bank could be earning on something else. Although SBP, through its prudential regulations provide guidelines to the banks to ensure sufficient liquidity at all times.

Over the past years, bank liquidity has become the subject of research in many countries. Banks faces liquidity problems when unexpected withdrawal arises. In case bank is unable to service the demand it damages the credibility of the bank and future revenues. On the other hand maintaining high liquidity reduces current and future cashflows. Hence, all commercial banks have to pay attention on its profit maximization, and during this, they should capable to meet its obligations, in order to achieve equilibrium between the profitability and liquidity (Alshatti, 2015). The aim of this paper is, therefore, to identify micro and macroeconomic determinants of liquidity in private banks in Pakistan. This study will endeavor to add to the current literature on the subject as the researches available on banks in Pakistan are limited and do not investigate the impact of macro as well as micro determinants on liquidity in depth. Therefore, this research seeks to answer the following questions:

Research Problem

What is the impact of micro and macroeconomic factors on bank's liquidity? It is needed to understand and to know what their determinants that affect banks in difficulties are. There are various micro and macroeconomic factors that can affect bank liquidity.

The study is structured into sections and has five sections in all. Section-One is the Introduction to the study. Section-Two of the study deals with previous studies about determinants of bank liquidity. A survey of the literature on bank liquidity is carried out and covers some of the seminal work undertaken in the area of liquidity in commercial banks. Section-Three deals with research methodology used in collecting and analyzing the data. Section Four deals with presentation, analysis and interpretation of the

[1] CRR is the minimum proportion/percentage of a bank's deposits to be held in the form of cash. SLR is the minimum percentage of deposits that a bank has to maintain in the form of approved securities.

[2] The **Statutory Liquidity Ratio (SLR)** refers to the proportion of deposits the commercial bank is required to maintain with them in the form of **liquid assets** in addition to the cash reserve ratio.

data. Section Five is the last section which provide summary of result, discussion, conclusion and recommendations.

Literature Review

Lesson learnt from the recent financial crisis is that Banking institutions have a crucial role in financial system of a country. Bank liquidity plays a key role in performance of the bank because of which empirical and factual investigations have paid more attention on banks liquidity in present time. Following are the studies in this section targeted to explain the liquidity of banks through its determinants. Recent financial crisis have taught the financial institution that bank liquidity need is crucial for banks facing uncertainty in recession (Freixas et al., 2015). Other studies have also validated that, in recent global financial crisis, the shortage of bank liquidity was the basic stimulus of all the bad events in financial institutions (Munteanu, 2012; Sudirman, 2014). They also found that there were difficulties in managing funds for many profitable banks because there was lack of understanding of liquidity risk in the period of crisis (Munteanu, 2012). Further, Sudirman, (2014) supported the these studies that the barriers in creation of bank liquidity increased the widespread bad situations for banks in the crisis.

The central bank should have taken some actions such as, to examine the internal factors critically when encountered with a crisis condition (Freixas et al, 2015). In order to control liquidity risk, Freixas et al, (2015); Sudirman, (2014) emphasized that a bank should increase its capital, efficiency, maintain its asset quality, and escalates profitability as liquidity sources. These actions might eliminate the causes of disparity in the liquidity held among banks (Freixas et al., 2015). Other studies validated that the liquidity is an important factor for the banking and banking specific components (Moussa, 2015; Munteanu, 2012).

It is necessary for the bank to meet its obligations for its creditors and depositors and fund investments. Further, Moussa, (2015) found that there is not only significant impact of some micro and macro-economic variables but also insignificant impact of some other variables. Sudirman, (2014) also found that bank performs as an intermediary institution; the bank should have liquidity as much as it can be by macro-economic factors, such as, inflation, interest rate, economic growth, and capital market development.

According to “the modern theory of financial intermediation”, there is key role of liquidity creation since comprehensive measures of bank liquidity creation still do not exist in financial institutions (Berger & Bouwman, 2009). They explored that there was a positive correlation between bank value and bank liquidity creation (Hackethal et al, 2010; Berger & Bouwman, 2009). Further found that it is probability that the higher capital subdue liquidity creation and can able to enhance banks' ability to create more liquidity(Berger & Bouwman, 2009; 2014). Moreover , they focused and found that capital has a positive and significant impact on liquidity creation for large banks, and insignificant for medium banks, whereas, negative and significant for small bank (Berger & Bouwman, 2009; Chatterjee 2015). On the contrary, Hackethal et al, (2010) did not find any micro economic variables, such as size to have any substantial impact on creation of liquidity.

Freixas et al.,(2015) presented a model where they discussed the low rates advantages for the efficient process of redistribution of liquidity in the interbank market. In addition, they found that during a crisis period, the failure to reduce interest rates destroy financial strength by increasing the risk of bank runs. Eventually interest rate empowered the liquidity shocks that could be created sensitivity of banking under suboptimal interest rate policy (Freixas et al.,2015). Vodová, (2008) identified determinants of liquidity of commercial bank with the help of macroeconomic variables where they explored that liquidity of banks dropped down mainly due to financial crisis. They also examined that the bank solvent assets decreased as a result of higher capital adequacy, size of bank and higher bank profitability. In addition, his research also measured bank liquidity by macro-economic factors such as v bank lending activity that

increases with bank profitability, decrease unemployment, growth of gross domestic product (GDP) and rate of inflation. Moreover, (Vodová, 2008; Wuryandani, (2012) worked on micro-economic factors like interest rates, interest margin, and the level of non-performing loans and checked their effect on liquidity of commercial banks. Whereas, Wuryandani, (2012); Deléchat, et al, (2012) divided the determinants of banks liquidity into two category of bank liquidity "Precautionary and Involuntary". In addition, he defined the precautionary liquidity, as microeconomic factors, that is, the ratio of total cash, demand deposit at central bank, and other banks, to total asset. He defined involuntary liquidity as macroeconomic factors, that is, the ratio of total traded securities of central bank, government, and others, to total asset. Furthermore, he examined that the precautionary liquidity affected by operational bank activities such as saving, credit and deposit. In contrast, involuntary liquidity has affected by financial system and macroeconomic conditions. He highlighted the history of precautionary and involuntary that they are strongly determined each other. Moreover, he also discussed that fiscal policy has sustainable influence on small banks liquidity in precautionary and involuntary. In addition, he examined that monetary policy, with respect of reserve requirement, that could affects only small bank's precautionary liquidity.

Diamond & Dybvig, (1983) explored the demand for liquidity. They also examined how Bank Deposit Contracts can provide grants important to those of exchange markets and presenting clarification of banks runs in order to achieve more deposits. They further explained that prevailing demand deposit contracts have various equilibrium components for liquidity. In addition, they described one of that equilibrium components is bank run that causes damage in real economic. These demand deposits avoid bank runs when government provides deposit insurance (Diamond & Dybvig, 1983, 2000).

Alper et al.,(2012) explained that the manipulation of liquidity position of banks such as macroeconomic factors may leads to effect bank lending . They also found that bank liquidity is crucial in credit supply. Berger & Bouwman, (2009) described that if bank do not use comprehensive liquidity creation techniques it will curb the bank liquidity. So that, they have developed four measures and explored the magnitude for liquidity creation such as cross-sectional variation, it's interred temporal patterns, high and low liquidity creators and the relationship between liquidity (Berger & Bouwman, 2009). Vodová, (2013) discovered that interest rate on loans, capital adequacy, and bank profitability have significant relationship with bank liquidity whereas, bank size, monetary policy, interest margin and interest rate on interbank transactions have insignificant relationship with bank liquidity. Further he examined the relationship between GDP growth rate and bank liquidity is suspicious and undetermined. Hartlage, (2012) delineate the insight of maturity transformation of bank borrowing and lending that is beneficial function of banks. It was examine that banks may raise the amount of credit through lending for long period and borrowing for short period of time. He further disclosed that US financial system had faced the risk of a system wide failure from inadequate liquidity. He also discussed that financial regulators around the world have proposed new internationally uniform bank liquidity standards which enhancing the Basel Capital Accord.

Hypotheses

The literature suggested that there are two hypotheses;

H0: The micro and macro-economic determinants have significant impact on bank liquidity

H1: The micro and macro-economic determinants have no significant impact on bank liquidity

Dependent variable

Bank Liquidity

Independent variable

Micro Economic Variables

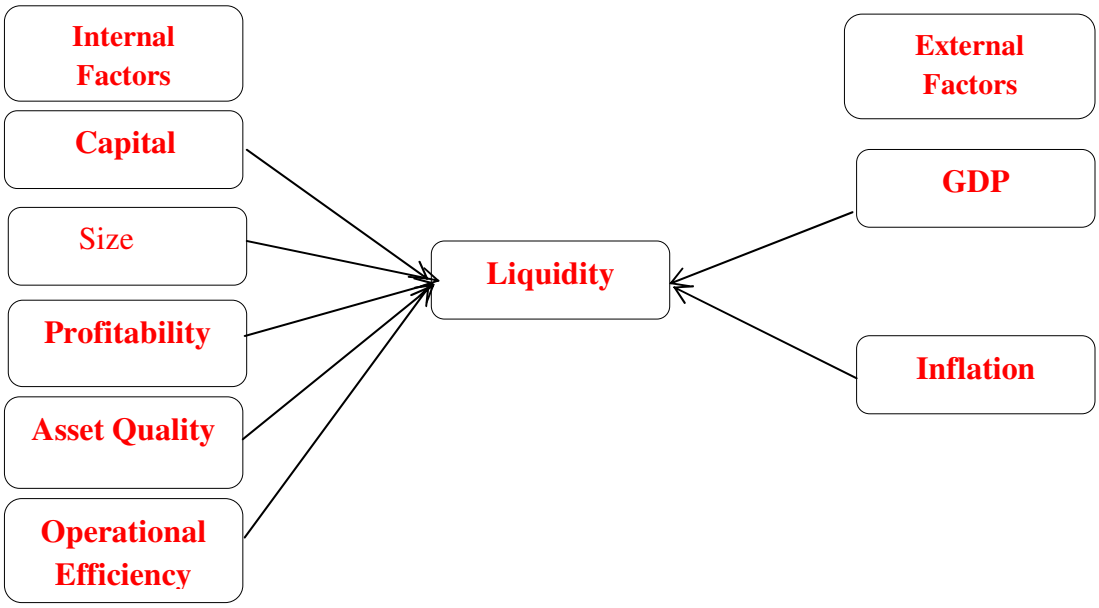
- Capital adequacy
- size
- operational efficiency
- asset quality
- return on assets (Profitability)

Macro-Economic Variables

- Gross domestic product
- Inflation

Model

The examination of the empirical researches, led to the development of the following model:



The regression model developed for the study is as under:

Liquidity = f (Capital Adequacy, Asset Quality, Efficiency, Profitability, Size, GDP, Inflation)

Or

$$Yt = \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \beta_4 X_4 t + \beta_5 X_5 t + \beta_6 X_6 t + \beta_7 X_7 t + \beta_8 X_8 t + ut$$

Where;

Yt = Liquidity represents net loan to total assets for bank i at time t.

X_{1t} = Capital Adequacy depicts the ratio of total equity to total asset for bank i at time t.

X_{2t} = Asset Quality represents ratio of nonperforming loans (NPL) to total (gross) loans for bank i at time t.

X_{3t} = Efficiency represents the ratio of administrative cost to net income for bank i at time t.

X_{4t} = Profitability represents ratio of total assets to net income for bank i at time t.

X_{5t} = Size depicts asset growth rate of total for bank i at time t.

X_{6t} = Growth rate of gross domestic product (GDP) of bank i at time t.

X_{7t} = Inflation calculated as Consumer Price Index at time t.

ut = Error term

Methodology

The study focused on twelve private banks (appendix 1) operating in Pakistan for the period of 2004-2015. The research includes two macro-economic factors and six microeconomic variables to determine the factors which contribute to the liquidity of the private banks in Pakistan. Macroeconomic variables include gross domestic product and inflation. Micro economic variables include; profitability, asset quality, efficiency, size, capital and liquidity. Liquidity ratio serves as dependent variables while remaining macro and micro variables are independent variables. The micro economic variable data was collected from State Bank of Pakistan's data hand book while data of macroeconomic variables was collected from Economic Survey of Pakistan and World Bank country wise data reports.

The research utilized quantitative research method by employing panel data techniques to establish the relationship of liquidity with micro and macro variables used in the study. Results were analyzed through STATA through descriptive as well as econometric analysis. Descriptive analyses assess and observe the means of the variables and further express the normality of the distribution. Pooled ordinary least square (OLS), fixed and random regression techniques were utilized to infer the results. Pooling provides more reliable and consistent estimate of the parameters in the model. Fixed and random effect technique provides less bias results and is consistent when evaluated with pooled regression.

Technique Determination Tests

To determine which techniques provide most reliable results, following tests were conducted:

F-test of the combine significance of the fixed effects intercepts is achieved to select between both models such as Pooled OLS and Fixed effect model. It is stated that all of the fixed effect intercepts are zero in null hypothesis. Rejection of null hypothesis leads to utilization of fixed effects method.

LM Test assists in selecting between random effect and pooled regression. The null hypothesis states that variance across individual variable is zero indicating that there is no significant difference across units (i.e. no panel effect). If chi square is less than ten percent it signifies that random effect has more reliable results.

The Hausman specification test evaluates the reliability of fixed effects model and random effects model by analyzing the significance of chi square. In case of null hypothesis fixed effect model is considered due to higher efficiency while in case of rejection of null hypothesis, random effect model is preferred.

Results

The research adopted both descriptive as well as econometric analysis to establish the micro and macroeconomic determinants of liquidity.

Descriptive Statistics

Descriptive statistics include information of twelve private banks included in the research for the period of 2004 to 2015.
The following Table 1 gives descriptive results of micro economic variables of twelve banks:

Table 1 : Descriptive Statistics of Micro Economic Indicator of Liquidity of Banks

	Capital	Size	Asset Quality	Profitability	Efficiency	Liquidity
Overall						
Mean	0.08	0.19	0.11	0.01	1.88	0.49
Maximum	0.52	1.53	0.90	0.04	54.02	0.98
Minimum	0.00	-0.22	0.00	-0.08	-112.46	0.23
Std. Dev	0.06	0.19	0.12	0.02	11.33	0.11
Observations	144	144	144	144	144	144
Within						
Maximum	0.17	1.46	0.63	0.45	19.85	0.86
Minimum	0.01	-0.27	-0.15	-0.04	-104.97	0.30
Std. Dev	0.02	0.19	0.08	0.01	11.02	0.10
Observations	12	12	12	12	12	12

Sample (N=144), 12= number of years between (2004-2015), 12=number of banks in the sample studied

Descriptive Analysis Micro Economic Determinants

Capital Adequacy: The capital adequacy represent on average 8% of risk weighted average and according to state bank of Pakistan "it has to be maintain a minimum CAR of 10 percent on an ongoing

basis at both standalone and consolidated basis". So the private banks in Pakistan hold on an average 8% of CAR and to make sure that banks have adequate reserve to bear a rational amount of losses before they become illiquid. But there is a little variation in CAR between banks (standard deviation = 0.02).

Size: The mean equals to 19% that show some banks are small and some are medium in size. There is no much variation in size between banks (standard deviation =0.19).

Asset Quality: depicts ratio of nonperforming loans to total (gross) loans for bank which is equal to 11%

Profitability: the mean return represents 1.1% of total assets for bank which shows the average return is not acceptable and there is not much variation within banks as SD=0.01.

Efficiency: Represents ratio of administrative cost to net income for bank which is equal to 1.88 is acceptable.

Liquidity: Liquidity represents net loan to total assets for bank is equal to 48.5%. Fluctuation in the liquidity ratio of banks is typically indicated by the standard deviation, which is 0.098.

The following table 2 gives descriptive statistics of macroeconomic variables for the period of 2004 to 2015 of twelve banks in Pakistan.

Table 2: Descriptive Statistics of Macro Economic Indicators of Profitability

	Gross Domestic Product	Inflation
Mean	0.05	0.10
Maximum	0.09	0.17
Minimum	0.00	0.05
Std. Dev	0.02	0.03
Observations	12.00	12.00

12= number of years between (2004-2015), 12=number of banks in the sample studied

Descriptive Analysis Macro Economic Determinants

Gross Domestic Product (GDP): The growth of GDP is on average 4.7% over the period of (2004-2015). Standard deviation is low.

Inflation: Inflation calculated as Consumer Price Index and the mean is 9.5% during 2004-2012. The standard deviation is 0.034(high). There is no much difference in inflation between the years of sample.

Regression Results

The following table 3 gives regression results of pooled, regression and fixed effect models.

Table 3: Regression Results of Model 1: All Private and Public Commercial Banks

	Pooled Regression				**Fixed Effect**				**Random Effect**			
		Adj. R square 0.16			R square Within 0.23				R square Within 0.22			
					Overall 0.11				Overall 0.20			
		F test 4.99			F test 5.24							
Independent Variables	Coef.	Std. Err.	t	P>t	Coef.	Std. Err.	t	P>t	Coef.	Std. Err.	z	P>z
Capital	-0.254	0.144	-1.75	0.082	-0.161	0.185	-0.87	0.385	-0.070	0.153	-1.11	0.267
Asset Quality	-0.105	0.088	-1.19	0.236	-0.174	0.100	-1.74	0.085	-0.130	0.088	-1.47	0.141
Efficiency	0.000	0.000	0.81	0.421	0.000	0.000	0.05	0.961	0.000	0.000	0.41	0.685
Profitability	0.396	0.557	0.71	0.478	1.300	0.643	2.02	0.046	0.776	0.580	1.34	0.181
Size	-0.033	0.044	-0.75	0.454	-0.039	0.041	-0.95	0.344	-0.036	0.042	-0.86	0.039
Inflation	0.800	0.310	2.59	0.011	0.783	0.284	2.76	0.007	0.780	0.288	2.78	0.005
GDP	2.121	0.494	4.29	0.000	2.140	0.457	4.69	0.000	2.151	0.461	4.67	0.000
_cons	0.346	0.053	6.53	0.000	0.342	0.054	6.32	0.000	0.009	0.010	0.880	0.377

Dependent variable is Liquidity at 5% significance level, 12=number of banks in the sample studied

R square is approximately 16% in pooled regression and is 23% and 22% in fixed effect and random effect respectively. The value of F also indicates that the models used are satisfactory.

Regarding the significance of individual variables, gross domestic product and inflation are significant in all the regression models. All the variables experience substantial relationship with liquidity besides capital, asset quality and size.

Technique Determination

Pooled or Fixed Effect: F-test

Since F test probability is significant in fixed effect, it can be derived that Fixed Effect is better than Pooled regression.

Pooled or Random Effect: Breusch and Pagan Lagrangian multiplier test assists in selecting between pooled regression and random effect.

Table 4: Breusch and Pagan LMT

liquidity	0.012	0.110
e	0.008	0.092
u	0.001	0.033

Var(u)	0.000000
chi2(1)	17.31
Prob > chi2	0

Significant probability of chi square infers that random effect is better than pooled regression.

1. ***Fixed Effect or Random Effect:*** Hausman Test showed in table 5 was applied for deciding the appropriate test between fixed and random**.**

Table 5 Hausman Test

chi2(8)	1.54
Prob>chi2	0.957

Since chi square is not significant, it is inferred that fixed effect regression results are more consistent and reliable than random effect regression results.

Discussion

This research attempt to analyze the impact of microeconomic factors (Capital adequacy (CAR), bank size, operational efficiency, asset quality, and return on assets (ROA)) and macroeconomic (GDP, Inflation) factors on banks' liquidity. Various studies have examined bank liquidity and its relation with internal (microeconomic) and external (macroeconomic) factors. The literature of various studies has provided the base for developing the hypotheses in this paper. The results highlight that at 5% significance level, capital adequacy ratio, bank size and asset quality have a negative relationship with bank liquidity. Asset quality has negative relationship with liquidity indicating that Nonperforming loan increases liquidity of bank decreases. This is because the banks not only loose the principal amount but also loose the annual revenue on advances. Increase in bank size, requires more capital to be invested in infrastructure which leads to increase in expenses and decrease in liquidity. Microeconomic factors such as efficiency, profitability and macroeconomic factors such as GDP and inflation have positive impact on liquidity. The positive relationship of efficiency and liquidity depicts that as administrative expenses to EBT increases, bank increases the liquidity to fulfill its expenditure requirements. This study explore that all bank specific items, (Capital adequacy (CAR), size, operational efficiency, asset quality, return on assets (ROA) have an insignificant effect on bank liquidity in pooled regression. In fixed effect regression, only profitability has significant impact on bank liquidity. In random effect regression only bank size has significant impact on bank liquidity. Both the macroeconomic factors, GDP and Inflation, have significant impact on bank liquidity in all three regressions. Similar results were found by Wuryandani, (2012). Banks in Pakistan are risk averse and invest a significant percentage of its capital in Government Papers which reap low returns. This is because of the risky business environment, due to

unstable economic and political condition in Pakistan. Thus, in order to increase profitability, banks increase its liquidity in Government Papers and also decrease Nonperforming loans.

Sudirman, (2014) found that there are some significant variables which capital, interest rate, profitability, asset quality, , funding, , inflation, and capital market development determine the banking liquidity. Banks are dependent on deposits and external funds for their liquidity needs (Singh & Sharma, 2016). Further they found that when funding cost rises, banks begin to hold more liquidity (Singh & Sharma, 2016). They explore that in order to maintain adequate liquid buffer or capital; banks facilitate them from other sources (Singh & Sharma, 2016). Capital adequacy showed a coefficient of -0.254 and p value of 0.082, exhibiting a statistically negative and insignificant impact on bank liquidity at 5% significant level. In contrast of this study, the results of other studies showed capital adequacy has positive impact on liquidity (Vodova, 2013; Berger and Bouwman 2009). Singh & Sharma, (2016) found that high level of capital give the permission for more liquidity creation. In addition, they discussed that holding liquidity is difficult for banks as no income is generated by liquid assets (Singh & Sharma, 2016). Moreover, according to state bank of Pakistan "it is obligatory to hold liquidity at 10% because if a situation of unpredicted customer demand arises, banks may face a liquidity stress which might lead to a crisis in the banking system as a whole". The results of this study stated that bank size, capital and asset quality have indirect and negative impact on liquidity means liquidity increased with the decrease in the capital, bank size and asset quality and vice versa. Results of all three regressions are showing that efficiency and profitability have direct and positive impact on bank liquidity which is also showing that when efficiency and profitability increases bank liquidity increases in banking industry of Pakistan. Similar results were reported by Lartey et al (2013); Odunga et al (2013). Profitability of banks could be increased from investment in risky assets, but due to the risk involved in the investment, adequate liquid buffer is needed (Singh & Sharma, 2016). Positive relationship between liquidity and profitability depict that total equity to total asset increases so that liquidity increases. Inflation and Gross domestic product have coefficient value of 0.800 and 2.121 in pooled regression. At 5% significance level, both the macroeconomic variables significantly determine bank liquidity. When inflation increases interest rate can be adjusted accordingly and then banks can generate reserves and increases liquidity. There are various studies on gross domestic product and its impact on bank liquidity. Whereas, research on impact of inflation on bank liquidity suggests that increased inflation decreases bank liquidity (Vodova, 2011; Moussa, 2015). Contrary to this, (Singh & Sharma, 2016) results suggested that as the inflation rate of an economy increases, banks begin to hold more liquidity to curb the effect of inflation on the economy.

Limitations

This research is limited to private banks of Pakistan those established in 2004 and working up to 2015. We do not consider foreign and government banks working in Pakistan which shows that there is need to consider whole banking system which gives a true picture. There is also need to consider other Micro and Macroeconomic determinants.

Recommendations

The implications of the study will give financial institutions insight to analyze the other micro and macroeconomic factors and bank liquidity that stimulate or hinder behind the performance of the bank.

Conclusion

Liquidity is essential for the better functioning of the banking system. It is useful for the bank to meet its obligations to borrowers and lenders and fund investments. In the context of this article, we found after a study of 12 banks in Pakistan over the period (2004-2015) that capital adequacy, size, operational efficiency, asset quality, return on assets have a substantial impact on bank liquidity, however in all the

regression model shows not only gross domestic product is significant but also inflation is significant in fixed effect on bank liquidity. The entire research shows microeconomic factors are significance for bank liquidity and fixed effect regression results are more consistent and reliable.

References

Acharya, V. V., Shin, H. S., & Yorulmazer, T. (2011). Crisis resolution and bank liquidity. *Review of Financial Studies*, *24*(6), 2166–2205. https://doi.org/10.1093/rfs/hhq073

Adrian, T., & Shin, H. S. (2010). Liquidity and leverage. *Journal of Financial Intermediation*, *19*(3), 418–437. https://doi.org/10.1016/j.jfi.2008.12.002

Ali, M. (2015). Bank profitability and its determinants in Pakistan: A panel data analysis after financial crisis, (67987). https://doi.org/10.1227/01.NEU.0000349921.14519.2A

Alshatti, A. S. (2015). The effect of liquidity management on profitability of commercial banks in Kenya. *Journal of Chemical Information and Modeling*, *53*(19), 160. https://doi.org/10.1017/CBO9781107415324.004

Banerjee, A. V. (2016). Liquidity crises in emerging markets : Theory and Policy. *The University of Chicago Press*, *14*(1999), 58–61.

Berger, A. N., & Bouwman, C. H. S. (2009). Bank liquidity creation. *The Review of Financial Studies, 22,*(9), 3779–3837. https://doi.org/10.1093/rfs/hhnl04

Berrospide, J. (2012). Liquidity hoarding and the financial crisis: An empirical evaluation. *Manuscript, Washington, DC: Federal Reserve Board*, (April). https://doi.org/10.2139/ssrn.2207754

Bhattacharyay, B. N. (1998). Precision in liquidity risk management : a segmented approach / la précision dans la gestion du risque de liquidité : une approche segmentée, *22*(1), 27–49.

Bordeleau, É., & Graham, C. (2010). The impact of liquidity on bank profitability the impact of liquidity on bank profitability.

Delechat, C., Henao, C., Muthoora, P. ., & Vtyurina, S. (2012). *The determinants of banks' liquidity buffers in Central America*. *International Monetary Fund.*

Diamond, D. W., & Dybvig, P. H. (2000). Bank runs, deposit insurance, and liquidity. *Federal Reserve Bank of Minneapolis, Quarterly Review*, *24*(Winter 2000 No.1), 24.

Dybvig, D. W. D. P. H. (1983). Bank runs , deposit Insurance , and liquidity. *Journal of Political Economy*, *91*(3), 401–419. https://doi.org/10.1086/261155

Eiteman, W. J. (2017). Bank liquidity and commodity prices, *24*(4), 635–645.

Eljelly, A. M. A. (2011). Liquidity – profitability tradeoff : An empirical investigation in an emerging market. *Internationa Journal of Commerce and Management*, *14*, 48–61. https://doi.org/10.1108/10569210480000179

Freixas, X., Martin, A., Skeie, D., Freixas, X., & Skeie, D. (2015). Bank liquidity , interbank markets , and monetary policy, *24*(8), 2656–2692. https://doi.org/10.1093/rfs/hhrO

Gambacorta, L., & Mistrulli, P. E. (2004). Does bank capital affect lending behavior? *Journal of Financial Intermediation*, *13*(4), 436–457. https://doi.org/10.1016/j.jfi.2004.06.001

Gatev, E., Schuermann, T., Strahan, P. E., The, S., Studies, F., & Mar, N. (2016). Managing bank liquidity risk : How deposit-loan synergies vary with market conditions http://www.jstor.org/stable/30225683 Your u, *22*(3), 995–1020.

Javaid, S., Anwar, J., Zaman, K., & Gafoor, A. (2011). Determinants of bank profitability in Pakistan: Internal factor analysis. *Journal of Yasar …*, *2*(1), 59–78. https://doi.org/10.2110/jsr.2005.053

Jiménez, G., Ongena, S., Peydró, J., & Saurina, J. (2017). Credit supply and monetary policy : Identifying the bank balance-sheet channel with loan applications, *102*(5), 2301–2326.

K, N. D. (2013). Liquidity, capital adequacy and operating efficiency of commercial banks in Kenya. *Research Journal of Finance and Accounting*, *4*(8), 2222–2847.

Keles, G., Alper, K., & Hulagu, T. (2012). *An empirical study on liquidity and bank bending*. Turkey.

Kishan, R. P., & Opiela, T. P. (2000). Bank size, bank capital, and the bank lending channel. *Journal of Money, Credit and Banking*, *32*(1), 121. https://doi.org/10.2307/2601095

Lartey, V. C., Antwi, S., Boadi, E. K., Polytechnic, K., & Kf, P. O. B. (2013). The relationship between liquidity and profitability of listed banks in Ghana, *4*(3), 48–56.

Moussa, M. A. Ben. (2015). The determinants of bank liquidity : Case of Tunisia. *International Journal of Economics and Financial Issues*, *5*(1), 249–259.

Nagel, S. (2012). Evaporating liquidity. *Review of Financial Studies*, *25*(7), 2005–2039. https://doi.org/10.1093/rfs/hhs066

Nishat, M., & Bilgrami, N. (2017). Determinants of growth of bank deposits in pakistan / les determinants de la croissance des depots bancaires au pakistan , Vol . 13 , No . 4, *13*(4), 391–400.

Rauch, C., Steffen, S., Hackethal, A., & Tyrell, M. (2010). Determinants of bank liquidity reation. *SSRN Electronic Journal*, (October), 1–42. https://doi.org/10.2139/ssrn.1343595

Rockoff, R. H. H. and H. (2017). Economic history association banking under the gold standard : An analysis of liquidity management in the leading financial centers, *36*(2), 379–398.

Rogers, K., & Sinkey, J. F. (1999). An analysis of nontraditional activities at U.S. commercial banks. *Review of Financial Economics*, *8*(1), 25–39. https://doi.org/10.1016/S1058-3300(99)00005-1

Singh, A., & Sharma, A. K. (2016). An empirical analysis of macroeconomic and bank-specific factors affecting liquidity of Indian banks. *Future Business Journal*, *2*(1), 40–53. https://doi.org/10.1016/j.fbj.2016.01.001

Sudirman, S. N. (2014). Determinants of bank liquidity in Indonesia: Dynamic panel data analysis. In *11th International Annual Symposium on Management*. https://doi.org/10.2139/ssrn.2583985

Vodova, P. (2013). Determinants of commercial Bank Liquidity in Hungary. *Financial Internet Quarterly "e-Finanse," 9*(3), 64–71.

Wuryandani, G. (2012). The determinants of bank liquidity, *3*(December), 1–22.

Appendix-1

S.No.	Banks Name
1	Allied Bank
2	Askari Bank
3	Bank Alfalah Ltd
4	Bank Alhabib
5	Faisal Bank Ltd
6	Habib Bank Ltd
7	MCB
8	HMB
9	Soneri Bank
10	United Bank
11	Samba
12	Silk Bank

Occupational Health Maturity by Combined AHP and Fuzzy Comprehensive Evaluation Methods

Latifa Fertat, EMISys Energetic, Mechanical & Industrial Systems, Engineering 3S research center, Industrial Engineering Department, Mohammadia Engineers School (EMI) Mohammed V University, Rabat, Morocco, latifa.fertat@gmail.com

Professor Abdelghani Cherkaoui, EMISys Energetic, Mechanical & Industrial Systems, Engineering 3S research center, Industrial Engineering Department, Mohammadia Engineers School (EMI) Mohammed V University, Rabat, Morocco, cherkawi@emi.ac.ma

Abstract

Occupational Health and Safety OHS is becoming necessary to manage sustainable performance in the enterprise. Executives are seeking efficient systems to manage global performance and steer their strategic goals. That's why centered human factors systems are needed.A global OHS vision helps executives and managers to evaluate at first their OHS maturity through different management levels, and secondly make the right decisions to develop their OHS strategy for better performance: OHS maturity in strategic management level, in HR management dimension and finally in operational management.A combined AHP and Fuzzy comprehensive evaluation method is used to challenge the established OHS maturity model. By this way, the model is scientifically stronger that converts qualitative data collected from experts to quantitative ones.

Keywords: Fuzzy, AHP method, OHS Occupational Health and Safety, Maturity matrix

Introduction

Measuring the global performance of a company is steering its effectiveness and its attractiveness, hence also measuring the health of its employees.

In the book Managing the Risk of Workplace Stress by David J. Cooper (2004), steering performance without considering the human factors dimension keeps from seeing the global image of company's health and other impacting levers.

Indeed, OHS is multidisciplinary field concerning activities and work environment risks according to S. D. Summerhayes in Design Risk Management: Contribution to Health and Safety (2010).

Depending on the adherence degree to OHS, it can be in the first step a measure to satisfy standards and local regulation. In a second step it can be a simple marketing lever to improve company's attractiveness. Finally, F. Székely mentioned in European Management Journal (2005) that the long-term approach consists on considering the OHS as a strategic tool of sustainable and global performance.

Indeed, occupational health intervention is not only about improving conditions and workplaces, but it aims to improve productivity and make performance more sustainable as mentioned by A. J. Oswald, E. Proto, and D. Sgroi in Happiness and Productivity (2014), also by G. Spreitzer, C. Porath in Harvard

Business Review (2012), and by P. Garibaldi, J. O. Martins, J. V. Ours in Ageing, Health, and Productivity (2011).

It is common that an employee in good health performs better, especially when risk activities are controlled and human factors capacities and limits are taken into consideration (David J. Cooper (2004)).

This research will highlight the contribution of OHS and make it a priority in decider's agendas to invest more in human factors.

That's why it is interesting to study OHS maturity to 1) determine the gaps compare to international standards in terms of OHS practices 2) set a development roadmap to improve one enterprise OHS maturity 3) and finally maintain a continuous improvement by monitoring and reengineering OHS indicators.

Our maturity evaluation model is about 1) categorizing Key Performance Indicators KPI that impacts OHS according to the literature and OHS experts 2) weighting these indicators according to AHP method 3) evaluating maturity level of a company according to Fuzzy comprehensive evaluation method 3) illustrating the impacting levers of OHS and suggesting an action plan to enhance OHS maturity.

Occupational Health Maturity

Literature Review

According to International Labor Organization ILO, a worker dies every 15 seconds (more than 2.3 million deaths every year) from a work disease or simply an occupational accident. This statistics are scaring and must be taken seriously into consideration.

In one hand, these absences and sick leaves are a big cost to the companies. In the other hand, 4% of global Gross Domestic Product is the estimated cost of the OHS poor practices according to C. Clarke, C. L. Cooper in Managing the risk of workplace stress (2004).

Visibly, there is an emerging opportunity to enhance company's maturity in terms of OHS. Unfortunately in many countries talking OHS in the company is just unimaginable, it depends closely on the culture of the company that is in most of times a top down culture as mentioned by J. Purcell in People management and performance (2008).

In the other hand, enhancing work conditions improves global performance and develops a sustainable vision. Indeed, F. Székely affirmed in European Management Journal (2005) an organization that manages better the human factors dimension can give a big push up to the company's efficiency and attractiveness.

According to European Agency for Safety and Health at Work, 1999, the economic effects of occupational safety and health in the Member States of the European Union. Bilbao, European Agency, stress cost in European Union is 20 Billion euros a year. It is also a source of about 60% of non working days. In 2001 stress was the first cause of sick leave according to the same source.

Even if the economic considerations are not pushed forward, they are usually taken into consideration when new measures and practices of OHS are opted for. In Europe, these measures are rising thanks to high requirements of protecting employers and regulations.

Some countries such as UK are opting for raising public policy awareness about OHS positive impact.

Other countries such as Finland and Netherland are putting their efforts into developing instruments to assess costs and benefits to encourage OHS. The ethical and responsibility levels are also rising.

Today, the awareness about the OHS question is raising and companies are more receptive about upgrading their OHS maturity and this is a positive point. And what makes things easier for decision makers is to have the right tools to evaluate their maturity first and than steering their performance by KPIs involving OHS dimension.

It is interesting to cite GRI standards in sustainability KPIs that covers many dimensions of the organization and their interaction with the environment especially some of OHS indicators. GRI is a rich referential of global reporting in many activity sectors (M. Arnaboldi, G. Azzone, M. Giorgino in Performance Measurement and Management for Engineers (2015)).

According to World Health Organization WHO, occupational health deals with workplace aspects of safety and focus on first-degree prevention of identified hazards. The safety and health of employees have several determinants. For examples, accidents, workplace's risk factors that can cause cancers, musculoskeletal, respiratory, hearing loss, circulatory and communicable diseases, and disorders caused by stress.

Maturity Matrix

As stated by HSL Health and Safety Laboratory, Occupational Health Management refers to: preventing workers from suffering adverse effects on their health caused by their job, by avoiding or controlling risks through task and worker adaptation.

IOSH the Institution of Occupational Safety and Health, as the biggest professional health and safety membership organization, organized OHS maturity survey by HSL. What is interesting in their approach is the evaluated dimensions. It concerns Business beliefs, Fairness, Mindful, Collective Responsibility, Leadership and Learning maturity levels.

HSE Health and Safety Executive study about Occupational health provision on the Olympic Park and athletes' village in collaboration with ODA Olympic Delivery Authority 2012 study another aspects. They focused on workplace, workers, and well-being dimensions to measure the OHS maturity.

Finally, Regional health agency ARS made a state of the art of occupational health management in the Ile-de-France healthcare establishments. This study is axed of on different process of OHS: 1) How deep is the OHS processes are institutionalized 2) How is OHS taken into account in work activities 3) How OHS risks prevention is managed and steered. This approach is axed mainly on operational management level of OHS.

What is interesting here is comparing different levels of evaluating OHS maturity according to the aim and context of each study. It also depends on the final supplier of the maturity evaluation.

In our study we defined different levels of maturity evaluation axed on a global view of the company and its interaction with their environments including strategy's level which is more exhaustive and defines a global view of performance. This level of evaluation explains how top down OHS strategy can create sustainable performance, and how efficient can culture change be in institutionalizing new practices in OHS. That's why the involvement of executives in this project is highly recommended as mentioned by A. Mazur in "Model of OHS Management Systems in an Excellent Company" research (2015).

The established maturity matrix is destined to decision makers and executives to be used as a strategic lever of management:

First of all, we focus on strategy management aspects especially management style, leadership, culture and values in the company and its relationship to sustainability as developped by J. Purcell, N. Kinnie, J. Swart, B. Rayton, S. Hutchinson in People management and performance (2008).

Strategy defines the culture and values of the company that's why it is interesting to evaluate OHS maturity from top to down management as mentioned by J. Purcell in People management and performance (2008).

Indeed, according to J. P. Helfer, M. Kalika, J. Orsoni in Management, Strategy and Organization (2010), if executives are aware about the positive impact of developing an OHS strategy, things goes easier and sponsorship of the OHS project is guaranteed. Executives and leaders are by nature the key actors of strategic change.

At a second level, we focus on Human Resources Management HRM, especially how careers are managed, how can we evaluate the company's social climate, and how deep is awareness to wellness at work (A. Mazur in "Model of OHS Management Systems in an Excellent Company" research (2015)).
Indeed, Human Resources Management is a source of value creation and has as aim to optimize intern resources as mentioned by R. J. Burke, C. L. Cooper in Building more effective organizations: HR management and performance in practice (2007). After the last financial crisis, social responsibility is promoted and traditional practices in HR management are questioned. So today we talk about Stakeholders instead of Shareholders. It means that the enterprise has to develop its social responsibility (C. Boyd in Human resource management and occupational health and safety (2003)). In other words, the immaterial resources are considered as a wealth and a competitive advantage for the company as mentioned by A. Dietrich, F. Pigeyrein in Human Resources Management (2005). So we can talk about social performance instead of economic performance as a restrictive way to evaluate effectiveness and attractiveness.

Finally, we evaluate operational management aspects, which is the traditional level in OHS diagnostic. For example, work conditions as workplace ergonomics, risk and safety management and all the devices used to manage work accidents and prevention, without missing the evaluation of the performance system and analyze the steering systems to monitor activities and measure key of performance as productivity and effectiveness. (M. Arnaboldi, G. Azzone, M. Giorgino in Performance Measurement and Management for Engineers (2015) and F. Djellal, F. Gallouj in Measuring and improving productivity in services(2008)).

In the next paragraph we will explain the methodology we follow to develop our OHS maturity matrix.

Methodology

AHP Method

In order to evaluate the importance of each index of OHS maturity evaluation and prioritize them, we will use the Analytic Hierarchy Process (AHP) method. It is a mathematic model based on Multi Criteria decision-making method to organize and analyze complex decisions from subjective data. It is also called scales method for comparison. Tha's what Han Li, Mei Qiang, Lu Yu-mei developped in Analysis and Study on AHP-the Fuzzy Comprehensive Evaluation Method, China Journal of Safety Science (2004).

To compare criteria, we use consistence matrix of binary comparison. However, due to human subjectivity, AHP method tolerates relatively small inconsistency in human judgment usually provided by expert reviews.
AHP in our case is used to weight and define the priority order of the overall evaluation areas of OHS in the company called first class indexes, and KPIs in each evaluation area also called second-class indexes.

Fuzzy Evaluation Method

Principals of comprehensive fuzzy evaluation will be used to define the membership of OHS maturity matrix which is in the fuzzy evaluation method the evaluation matrix R_{ijk} :

$$R_{ijk} = \begin{bmatrix} r_{i11} & r_{i12} & \cdots & r_{i1m} \\ \vdots & \vdots & \ddots & \vdots \\ r_{ij1} & r_{ij2} & \cdots & r_{ijm} \end{bmatrix} \quad (1)$$

Where k = 1, 2,..., m, m is the evaluation level, i is the class indexes number, and j is the second indexes number (Wang Jian, Xu Ya-bo in Application of Fuzzy Mathematics, Safety Evaluation, Theory and Research 2 (2005)).

The second-class indexes are ranked by importance degree according to the judgment matrix. This matrix is set using 1-9 scale method also named Saaty scale, weight vector W_{ij} , and membership matrix R_{ik} of each second class index are got from the equation:

(∘ is the fuzzy operator)

$$R_{ij} = W_{ij} \circ R_{ijk} \quad (2)$$

$$[w_{i1}\ w_{i2}\ \dots\ w_{im}] \circ \begin{bmatrix} r_{i11} & r_{i12} & \cdots & r_{i1m} \\ \vdots & \vdots & \ddots & \vdots \\ r_{ij1} & r_{ij2} & \cdots & r_{ijm} \end{bmatrix} = [r_{i1}\ r_{i2}\ \dots\ r_{im}] \quad (3)$$

Model Conception

The Occupational Health and Safety maturity index evaluation is build from a global view of the different impacting indicators including different levels of managing OHS in a structure whatever is the nature of its business or its organization: Strategic management M_1, Human Resources management M_2, and Operational management M_3 (see Table 1).

Mi are the first class indexes and Mij are the second class indexes. Each index is evaluated from a lower to a higher level of OHS maturity, using fuzzy method (Zhang Jun, Yang Wei-ping, Yang Li-gong in Application of Fuzzy Comprehensive Evaluation (2011)) :

V={Institutionalized; Advanced; Basic; Absent}

Each level's meaning is fully explained in Figure 1, from an operational level to a strategic one.



Fig. 1: OHS Maturity

APPLICATION CASE

Our theoretical model has been applied in a service company context involving OHS experts and different management levels. The data case are shown below:

The weight and membership results of the second-class index are shown in Table 2.

Table 1: Occupational Health Maturity index evaluation

Maturity level	Overall evaluation area	KPIs of the area
OHS maturity level (M)	Strategic management (M1)	Sustainability management (M11)
		Organization (M12)
		Culture (M13)
		Change management (M14)
	HR management (M2)	Career management (M21)
		Social climate (M22)
		Wellness management (M23)
	Operational management (M3)	Work conditions (M31)
		Risk management (M32)
		Safety management (M33)
		Performance management system (M34)

Table 2: Weight and membership results of the second class index

1st class index	2nd class index	Weight	Level			
Mi	Mij	Wij	Institutionalized	Advanced	Basic	Absent
M1	M11	0,4239	0	0,1	0,5	0,4
	M12	0,0835	0	0,7	0,3	0
	M13	0,2873	0	0,4	0,6	0
	M14	0,2053	0,4	0,6	0	0
M2	M21	0,2249	0,4	0,6	0	0
	M22	0,3545	0	0,2	0,8	0
	M23	0,4206	0	0	0,6	0,4
M3	M31	0,2412	0	0,3	0,7	0
	M32	0,0930	0	0,2	0,6	0,2
	M33	0,2852	0	0,2	0,8	0
	M34	0,3806	0,2	0,5	0,3	0

The first class index membership by fuzzy comprehensive evaluation and the weights of the first class index are shown in Table 3.

After the application of our OHS maturity evaluation model, we reach these results:

Let's put M as the vector of OHS maturity level, $M=WR$.

W is the first class index vector

R is the first class index membership matrix (see Table 3)

Numerically, we get the value of OHS maturity level like that:

M=(0.0817; 0,2942; 0,5304; 0,0817)

Table 3: Maturity level membership matrix of the first class index

Ri	Wi weight	Institutionalized	Advanced	Basic	Absent
M1	0,1667	0,0821	0,3390	0,4094	0,1696
M2	0,3333	0,0899	0,2058	0,5360	0,1683
M3	0,5000	0,0761	0,3383	0,5670	0,0186

Results Analysis

First lecture of the results and according to the maximum membership degree principle, the OHS maturity of this company is "basic" which means that OHS is only here to respond to legal obligation, so the company acts as a reactive actor in OHS to external constraints and structuring problems with high impact.

As a recommendation, we suggest adopting transformation program to reengineer the existent processes. This program has as an aim to inject human factors in the structures of the company. In practice, redesign KPIs by injecting OHS indicators to both monitoring and improving sustainable performance. It is also necessary to set a coaching program to accompany the leaders, executives and middle management to lead the culture change and institutionalized the new practices and measures around Occupational Health and Safety. This change will also impact positively the strategy of branding beyond the positive impact on business goals.

In the other hand, we observe that the most impacting factor that has the highest weight is operational management factor especially the performance management system. That means production system and how it is monitored are reflecting OHS maturity. Indeed, this level reflects how deep executives are sensitive to human factors dimension and shows the gap between the current production system and standards in OHS.

Well, to improve OHS maturity, we should focus on work conditions and risk management system because they are impacting levers to enhance OHS in operational management system. We can also improve safety management and develop performance system by including global performance concept.

Global performance guaranties a sustainable effectiveness and attractiveness if OHS is integrated to business strategy.

Conclusion

This study has as a major aim to highlight the positive impact of a centered human factors strategy and change the received ideas of executives and decision makers about Occupational Health and Safety.

To institutionalized OHS best practices, we need a long-term culture change but the benefit is recognized in a short term.

Combining the fuzzy evaluation method and AHP method is a strong way to talk about OHS maturity with more scientific argument and less subjectivity.

This model's strength lies in its scalability, it can be used in other maturity evaluation process especially continual improvement process and quality approaches.

This model can also be used in different activity domains, in industry or in service sectors, only the used survey can be adapted to each context, which is a part of a preparative analysis to the OHS maturity program.

Otherwise, this scientific model will encourage decision makers to support OHS as a priority in performance system and enhance the importance of human factors in management systems. In these conditions, we are going towards a sustainable performance.

As a perspective, we can experiment this model by using other scientific method such as entropy method (Zhao Guang-jin, Research on Mine Enterprise's Safety Management Based on Entropy Theory (2012)

and Qiu Wan-hua, Liu Bei-shang, Hou Lin-lin in REM Assembly Based on the Reliability of Entropy, Systems Engineering (2008)) to determine indexes weightings of the OHS maturity matrix, by using the information system data of the company instead of interviewing experts. This experimentation will allow a comparison between objective data source and subjective one and watch the impact in final result.

Aknowledgement

A special acknowledgement to IST Institut universitaire romand de Santé au Travail which coaches me about practices in Occupational Health and Safety, and different issues experienced in their missions.

References

Arnaboldi, M., Azzone, G. and Giorgino, M. (2015), "Value Drivers," in *Performance Measurement and Management for Engineers*, *1*st ed. London, UK: Elsevier, ch. *4*, sec. *1*, pp. *51-57*.

Boyd, C. (2003), "Mapping the OHS Landscape, Human resource management and occupational health and safety" in *Human resource management and occupational health and safety*: Routledge Taylor & Francis Group, NY, USA.

Burke, R. J. and Cooper, C. L. (2007), "Treating people right," in *Building more effective organizations: HR management and performance in practice: Cambridge University Press*, UK, pp *21-22*

Clarke, C. and Cooper, C. L. (2004), "Costs associated with occupational stress, Absenteeism, turnover and productivity, Work-related accidents" in Managing the risk of workplace stress: Health and safety hazards: Routledge Taylor & Francis Group, London, UK, pp. 5-18

Clarke, C. and Cooper, C. L. (2004), "Human Factors", In *Managing the risk of workplace stress: Health and safety hazards*: Routledge Taylor & Francis Group, London, UK, pp. 61.

Clarke, C. and Cooper, C. L. (2004), "Organization and management, Safety management practices, Safety culture, Safety climate, Leadership," in Managing the risk of workplace stress: Health and safety hazards: Routledge Taylor & Francis Group, London, UK, pp. 32-56.

Dietrich, A. and Pigeyre, F. (2005), "Strategic choices and social legitimacy," in *Human Resources Management, 1*st ed. Paris, France: La Découverte, ch *6*, pp. *105-109*

Djellal, F. and Gallouj, F. (2008), "PRODUCTIVITY: DETERMINANTS AND STRATEGIES, The traditional factors influencing productivity," in *Measuring and improving productivity in services: Issues, strategies and challenges:* Edward Elgar Publishing, Cheltenham, UK, Northampton, MA, USA, pp. *121-142*

Garibaldi, P., Martins, J. O. and Ours, J. V. (2011), "The impact of Health on Productivity and Growth, Health, Human Capital, and Growth: General results," in *Ageing, Health, and Productivity: The Economics of Increased Life Expectancy*: Oxford University Press, City, Country, pp. *73*.

Han Li, Mei Qiang, Lu Yu-mei etc., (2004), Analysis and Study on AHP-the Fuzzy Comprehensive Evaluation Method, China Journal of Safety Science 14(7), pp. *86*.

Helfer, J. P., Kalika, M. and Orsoni, J. (2010), "Strategic change," in *Management, Strategy and Organization, 8*th ed. Paris, France: Magnard-Vuilbert, ch. *8*, sec. *1*, pp. *393–404*

Mazur, A. (2015), "Model of OHS Management Systems in an Excellent Company," In *Antona M., Stephanidis C. (eds) Universal Access in Human-Computer Interaction. Access to the Human Environment and Culture*. UAHCI 2015. Lecture Notes in Computer Science, vol 9178: Springer, Cham. Aug. DOI: 10.1007/978-3-319-20687-5_44

Oswald, A. J., Proto, E. and Sgroi, D. (2012), "Happiness and Productivity," [Online]. JOLE, vol. 33, n. 3, pp. *4-10, 10th* Feb. 2014, .[Retrieved July 3, 2016]. https://doi.org/10.1086/681096

Purcell, J., Kinnie, N., Swart, J., Rayton, B. and Hutchinson, S. (2008), "Culture and Values" in *People management and performance:* Routledge Taylor & Francis Group, Thames, Oxfordshire UK, Jul., pp. *19-41*

Purcell, J., Kinnie, N., Swart, J., Rayton, B. and Hutchinson, S. (2008), "Understanding the link between people management and organisational performance" in *People management and performance:* Routledge Taylor & Francis Group, pp. *1-18*

Qiu Wan-hua, Liu Bei-shang and Hou Lin-lin, (2008), REM Assembly Based on the Reliability of Entropy, Systems Engineering 26(5), pp. 80-84.

Spreitzer, G. and Porath, C. (2012), "Creating sustainable performance," : Harvard Business Review.

Summerhayes, S. D. (2010), "Construction-related health and safety legislation," in *Design Risk Management: Contribution to Health and Safety*: Wiley Blackwell, Oxford, UK, pp. *39-40.*

Székely, F. (2005), "Responsible Leadership and Corporate Social Responsibility: Metrics for Sustainable Performance," in *European Management Journal*, [Online].Volume 23, Issue 6, Dec. 2005, pp. *628-647.*[Retrieved June 15, 2017]. https://doi.org/10.1016/j.emj.2005.10.009

Wang Jian and Xu Ya-bo, (2005), "Application of Fuzzy Mathematics," in *Safety Evaluation*, Theory and Research 2, pp. *29*.

Zhang Jun, Yang Wei-ping, Yang Li-gong etc., (2011), "Application of Fuzzy Comprehensive Evaluation," in *Open-pit Mine Safety Assessment*, Journal of Safety and Environment 6, pp. *259*.

Zhao Guang-jin, (2012), Research on Mine Enterprise's Safety Management Based on Entropy Theory, China Journal of Safety science 22(3), p. *73*.

Phenomenological Study on the Governance of "Social Welfare Institutions" in Special Region of Yogyakarta

Sugiyanto, STPMD "APMD" Yogyakarta, Indonesia

Heru Kurnianto Tjahjono, Prof., Dr., MBA., Dept. of Management Universitas Muhammadiyah Yogyakarta, Indonesia

Arief Hartono, Dept. of Management Universitas Islam Indonesia, Indonesia

Lathiful Khuluq, Universitas Islam Negeri Sunankalijaga Yogyakarta, Indonesia

corresponding author: probosugiyanto@gmail.com

herukurnianto@umy.ac.id ; arifhartono@uii.ac.id ; elkaha@gmail.com

Received from: Musoli CS; musoli27@gmail.com

Abstract

This study examines the activities of the Social Services (Dinsos) of the Special Region of Yogyakarta (DIY) using the Social Welfare Institutions (LKS) Census and the arrangements of Regional Regulations of DIY on LKS. The implementation of both agenda of Dinsos DIY is in the cooperation with Dinsos and the Regency/Municipal LKKS, universities, and NGO. This research aims 1) to portray the phenomenology of Good Governance LKS in DIY in order to study the phenomenology of Good Governance LKS in DIY and 2) to find out the methods and frequency of the guidance of LKS of Dinsos DIY. The research approach applied qualitative method. The research setting took place in Dinsos DIY. The data collection used the methods of observation, interview, and documentation. The qualitative data analysis used the technique from Miles and Huberman (1984). The results show that Dinsos DIY has not put strong focus in setting the guideline to the Social Welfare Institutions especially on governance issues. 2) The guideline tends to be project-based which is top down and has not covered the fundamental needs related to governance issues. The suggestions for the research are: 1) Dinsos DIY needs to improve the empowerment and guidance of the LKS focusing on the governance of LKS DIY so that it can achieve more trust from various parties. 2) Further research in the theme of the governance of LKS in DIY are essential to describe the map of strengths and weaknesses in order to find out the quality of each LKS in DIY.

Keywords: *Phenomenology, Governance, Social Welfare Institutions (LKS), DIY*

*** Sugiyanto,** STPMD "APMD" Yogyakarta and A Student of Doctoral Program Universitas Islam Indonesia, **Tjahjono, H.K.**, Prof., Dr., MBA., Dept. of Management Universitas Muhammadiyah Yogyakarta; **Hartono, A.,** Dept. of Management Universitas Islam Indonesia; **Khuluq, L**., Universitas Islam Negeri Sunan Kalijaga Yogyakarta

✉corresponding author: probosugiyanto@gmail.com

✉herukurnianto@umy.ac.id ; arifhartono@uii.ac.id ; elkaha@gmail.com

Introduction

The history of DIY starts with the unification of the Sultanate Region of Yogyakarta and the Principality of Paku Alaman. In 1945, the king declared to join The Unitary State of the Republic of Indonesia (NKRI). Based on the Government Regulations No. 18 Year 1946, Yogyakarta is declared as the Province of DIY. Then in 2012, DIY was set as a Special Region through the Laws No. 13 Year 2012 on Yogyakarta's special status. Since its joining with NKRI, the governance of DIY consists of 1 municipality and 4 regencies with the area of 3.185,80 km^2. In 2010, the population of DIY reached the number of 3.452.390 people with the population density of 1.084 people per km^2. DIY is well-known because its head of the province is a king. In addition, Yogyakarta is known as the city of tourism, city of education, and city of culture. Sugiyanto and Yenni S.U (2013) mention that the elements labeling DIY form a special identity differentiating DIY from other regions.

One of the impacts of DIY various labels is the rise of some social problems in DIY driven by three factors, those are: a) geographical factor, b) historical factor, and c) population and technology development factor. As it is stated by Bambang Soewondo (1977), the birth of DIY was rooted from the Sultanate. Therefore, the palace became the center of learning for the society. In Yogyakarta, the cultural education was started from the 18th century and taken place around the palace. One of the positive impacts of the Dutch and Japanese colonializations is that Yogyakarta people pioneered many social organizations dealing with education and social community actuator. Sugiyanto (2004) proposes that the Yogyakarta people upholding high sense of culture and courtesy and egalitarianism make the newcomers feel at home. These newcomers spread the information that living in Yogyakarta is safe as many facilities provided by the local government. Such attitude and culture encourage the development of urbanization in Yogyakarta. The openness of DIY government toward the population diversity has significant impacts on the natural population and migration growth causing the population of DIY to reach the number of 3.627.962 people in 2016. Due to the population density and natural disasters, various social issues occur in DIY such as: poverty, negligence, disability, immorality or behavioral disorders, the existence of victims of disaster, violence, exploitation, and discrimination (Untung. S, 2014). The mentioned social issues become the evidences that the social endurance in DIY is getting weaker and the social function of some citizen of DIY is suppressed and vanished due to the harsh life.

Sugiyanto (2011) states that one of the positive impacts of Yogyakarta's label as the city of education and the rising of social issues in DIY is that these circumstances encourage the social awareness to set up various non-profit organizations including Non Government Organizations and Social Welfare Institutions (LKS). Instead of being initiated by the government, these organizations are initiated by the willingness and motivation of individuals or particular groups. The factors driving both individuals and groups in founding LKS are based on certain values such as: nationalism , humanity , religious , and cultural. These values stimulate high spirit and enthusiasm in founding various LKS. Hence, the presence of LKS has two meanings, those are: first, LKS acts as a mediumto restore the suppressed social function

and as a means to improve social welfare for the people with social welfare problems (PMKS). Second, LKS serves as a social capital both for the society and government in DIY. Fukuyama. F (1995) defines social capital as a series of informal values shared among members of certain group facilitating cooperation among them. The research result by Tjahjono (2011) shows that social capital is a property from the subject to increase both personal and organizational outcome. Based on these definitions, the founding of LKS will lighten the burden of the members and government as well as it becomes a medium for charity for people interested in it.

Considering the very high number of LKS growth in DIY, Regional Government Dinsos DIY conducted a census on LKS aiming to gain the accurate data of LKS in 2015 as a base in giving services to PMKS and to find out the classification or category of LKS having score A, B, C, D, or E. The census data result will be used as Government sources or references to arrange some policies and program so that the LKS quality of service is increasing.

From the census result, there are 366 LKS in DIY. This number shows that the public participation level in handling social welfare issues in DIY is quite high and relevant with the public needs. On one hand, the huge numbers is an asset as social capital since it provides opportunities for the government in reducing various existing social issues. On the other hand, there are new rising issues related to the lack of quality of LKS performance by a number of individuals collecting personal benefit in the name of LKS.

In relation these issues, this paper focuses on the governance issues of LKS in DIY and describing the role of government in setting the guidelines for LKS as previous research on governance of LKS-based theme are still very limited. The existed researches tend to highlight the role of LKS in mentoring the client as conducted by Jumayar Marbun (2012), Risma Indriyani (2015), and Anwar Sitepu (2010).

Problem Formulation, Objectives, and Research Method

This research examines how the phenomenon of governance of LKS in DIY and portrays the government role in conducting the guidance on LKS. This research aims at finding out the general description about the phenomenon of LKS governance in DIY. The method used was qualitative phenomenology. Primary data source was gathered from 18 informants from the Social Service and Regional/ Municipal LKKS. Meanwhile, the secondary data was gathered from the documents of the reports of LKS census results in 2015. The data was collected using interview, unstructured observation, and documentation study while the data were analyzed using qualitative method.

Theoretical Review

This research will describe the meaning of an experience as revealed by Creswell (1989) in phenomenology method. Phenomenology approach delays (epoche) all assessments on natural attitude until certain basis are found. The epoche concept differentiates the data area

(subject) from the researcher's interpretation. The epoche concept/ delaying becomes the center in which the researcher arranges and classifies preliminary guesses about the phenomenon to comprehend the information delivered by the informants.

Corporate Governance

Khairandy. R & Malik. C (2007) state that Corporate Governance was developed in United States starting from 1970's. Anthony, A & Subarto, Z (2004) put forward their view that corporate governance means a matter relating to effective decision making resulting from company culture, ethics, system, value, business process, policy, and organizational structure aiming at encouraging the growth of company performance, resources management, and effective and efficient risk as well as the company responsibility toward other investors and stakeholders.

The Government Regulation No. 101 Year 2000 defines good governance as "The governance developing and implementing the principles of professionalism, accountability, transparency, ultimate service, democracy, efficiency, effectiveness, law supremacy, and acceptability from the society". Based on this concept, corporate governance limits and manages personal behavior within the system so that the culture of greed representing the fight for personal freedom and collective responsibility do not occur. The reason is that a conflict between personal and public interests will always raise and precede each other within any organizations. Therefore, either for the owners and the agents, they hide the information from one to another (Berle and Means, 1932).

In order to be a professional one, companies, governments, and nonprofit organizations should implement the principles of good governance as an essential subject (Sektiono D, 2016). Considering the increasing demand for thorough accountability within nonprofit organizations, transparency, and information sharing are needed in fulfilling the rights of public.

According to Alijoyo. A and Subarto, Z (2004), a good dimension of governance consist of transparency, accountability, independence, responsibility, and equity. This dimension is described in the form of justice and equity in fulfilling the rights of shareholder and stakeholder in accordance with laws and regulations. This situation is in accordance with the theories of stakeholder introduced by Mason and Mahoney (2008), Charron (2007) and Kooskora (2008) which are acceptable and can be applied for the LKS governance. A good and ideal organization will definitely apply the good governance principles in organizing its activities. These principles are applied to maintain the organization's actions so that they can be in line with the goals and the actions taken do not suffer its members.

Social Welfare Institutions (LKS)

The Laws of Republic of Indonesia Number 11 Year 2009 about the Social Welfare. "Social Welfare Institutions are the social organizations and associations performing the governance of social welfare formed by the society both the incorporated and non- incorporated ones".

Based on the definition above, F.W. Taylor (1911) and Seashore (1976) stated that an organization is a social entity consciously coordinated with a limitation that can be relatively identified and operated based on constant basis to achieve the goals. Legally, the position of LKS is under a foundation or social agency having primary task to organize the social welfare services that aim to solve problems and fulfil the needs of society. Based on the position of LKS, it is obvious that the role of LKS as a mediator between the government and society, especially PMKS and other related stakeholders' interest with the social services products which is value-free. Based on this, the movement arena of LKS is grounded on charity and social works so that the social marketing strategies rely on the philanthropic market. The results from the country's donation and support will be allocated as the source of production cost. Meanwhile, the forms of LKS production are the advancement of knowledge and skills, awareness building, and basic life rights fulfillment in the scope of social welfare improvement.

LKS as a formal organization must focus its performance not on the efficiency but on the effectiveness depending on the professional social workers and social welfare workers as well as the social volunteers in which the three are not a hardware technology but human ware. Furthermore, the benefit gained is not materials and it is not shared to the investors. The benefit is in the form of trust and is developed to improve and expand services to clients.

According to Dawam R.M (1995) states that there are two donor types in nonprofit organizations both from institutions and individuals with various sources such as NGO, governmental agencies, charity institutions, international agencies, or financial institutions and banks. These sources can be both local or foreign ones. Meanwhile, individual donor is the individuals from the society or commercial ventures both local and foreign ones.

Finding And Discussion

The Governance Phenomenon of LKS in DIY

Considering that society is now becoming more critical, principles of good governance have become a solution for professionalism demand within non-profit organization including LKS. This is because in implementing good governance, there are some principles to be taken as consideration; such as accountability, transparency, independence, responsibility, and appropriateness in fulfilling the rights of shareholder and stakeholder as stated on the agreement and the current regulation. Institutionally, LKS consists of owner and management. Owner is someone possessing the right to delegate task to management. There is also a task delegation

from owner of social body or institution to management in running the organization to be in accordance with the vision and mission. This task delegation applies the principles of good governance. By conducting a proper task delegation in accordance with good governance, the implementation phenomenon form of good governance principles applied by the organization can be identified.

As one of social bodies in Indonesia which focuses on the handling of social problems, LKS is regulated by Laws Number 11 year 2009 about social welfare., Social Ministerial Regulation of Republic of Indonesia Number 187 about Social Welfare Institution., and Social Ministerial Regulation of Republic of Indonesia Number 17 year 2012 about Accreditation of Social Welfare Institution.

The Regional Government of DIY makes some efforts in verifying data to govern the operational of LKS. It is by considering that there have been many reports form society and Regional/Municipal LKKS on LKS performance which is not benefiting society and specifically is bringing disadvantageous for client. The effort also includes clustering or labelling the quality of LKS based on its governance into five categories as follows:

Independent LKS with the very good qualification is symbolized by letter A, Developing LKS with good qualification is symbolized by letter B, Growing LKS with average qualification is symbolized by letter C, Embryo LKS with fair qualification is symbolized by letter D, and Problematic LKS with poor qualification symbolized by letter E.

The assessment criteria covers: institutional, legal permit, human resource and funding, service program, initiative and creativity. According to the data collection form of LKS year 2015 conducted by respective regional/municipal Dinsos under the control of DIY Dinsos; some data are compiled:

Municipal Dinsos of Yogyakarta; the number of LKS listed in DIY Dinsos is 82 LKS, the ones listed in Yogyakarta municipal Dinsos are 68 LKS with the following detail; 7 LKS have changed their address to be no longer within the area of Yogyakarta without filing report, 5 LKS declare themselves to no longer have activity or have been closed due to particular reason and 2 LKS are listed twice (doubled). From those 82 LKS, those with operational validity are only 68 LKS. From these 68 LKS, the verification result indicates that 10 are in B qualification, 31 are in C qualification, 24 are in D qualification and 3 are in E qualification.

Regional Dinsos of Bantul; there are 105 LKS listed in DIY Dinsos. However, the factual data shows that there are only 81 LKS in Bantul regency; there has been a different of 24 LKS with the condition as follow: 2 LKS are closed and are out of service, 12 LKS are actually Islamic boarding school and therefore should not be categorized as LKS, 6 LKS have changed their address without filing report, and 4 LKS are coordinative LKS which are not providing any service for client. Out of those 81 LKS, based on the verification result, 21 LKS

are categorized into B, 34 LKS are categorized into C, 18 LKS are categorized into D and 8 LKS are categorized into E.

Regional Dinsos of Kulonprogo; there are 49 LKS listed in DIY Dinsos. However, the factual data shows that there are only 47 LKS Kulonprogo regency; there has been a different of 2 LKS with the condition as follow: 2 LKS are closed or are no longer operating. Out of those 47 LKS, based on the verification result, 3 LKS are categorized into B, 25 LKS are categorized into C, 15 LKS are categorized into D and 4 LKS are categorized into E.

Regional Dinsos of Gunungkidul; there are 54 LKS listed in DIY Dinsos. However, the factual data shows that there are only 51 LKS in Gunungkidul regency; there has been a different of 3 LKS with the condition as follow: 3 LKS are closed or are no longer operating. Out of those 51 LKS, based on the verification result, 1 LKS is categorized into B, 31 LKS are categorized into C, and 19 LKS are categorized into D.

Regional Dinsos of Sleman; there are 109 LKS listed in DIY Dinsos. However, the factual data shows that there are 115 LKS in Sleman regency, 6 LKS have been listed at DIY Dinsos. Out of those 115 LKS, based on the verification result, 2 LKS are categorized into A, 29 LKS are categorized into B, 44 LKS are categorized into C and 24 LKS are categorized into E.

Referring to the census result conducted in 2015, it is recorded that in DIY there are 4 LKS in A category, 64 LKS in B category, 169 LKS in C category, 92 LKS in D category and 39 LKS in E category. The data shows that only 2 LKS or the 0,5% of those are in a very good predicate, whilst 39 LKS or 10,6% are indicated to be problematic or in alarming condition, and 92 LKS or 25,13% are growing. If those in good and average category are combined, there will be 233 LKS or 63,66%.

Based on the aforementioned data, it has become a task for Dinsos to conduct an intensive guidance on LKS in D category or those which are growing, most importantly on those in E category which are highly possible to be out of service if being neglected. This finding has been a concern for DIY regional government since several years before conducting the census. Thus, while coordination for data collection on LKS is on progress, DIY regional government has organized academic team to prepare the arrangement of regional regulation about LKS on 2013. The academic team has successfully made preparation on the arrangement of regional regulation about LKS. The academic team has arranged regional regulation on LKS which has been stipulated through the provision of Regional Regulation Number 11 year 2015 about National Welfare Institution.

The Role of DIY Regional Government in Mentoring LKS

In performing its task to mentor LKS, DIY Regional Government is cooperating with Coordinating Agency for Social Welfare Activities (BK3S), State-owned Enterprises (BUMN)

and private companies, University, Forum for shelter house, Social Welfare Education and Training Centre, Regional/Municipal LKKS, Regional/Municipal Dinsos, etc. The followings are mentoring role performed by DIY Dinsos: a) the role of judge; Dinsos has a role as a judge for LKS. In case of LKS violating several regulations and still does the violation after being given verbal and written warning, Dinsos will proceed the case by enforcing the closure of the LKS. According to an informant, the last time this role being conducted was on 2014. b) injector; the role of injector is performed by Dinsos toward several LKS undergoing issues related to its organization health such as energy, inspiration, participant's enthusiasm. c) initiator on planning, execution and evaluation; initiative is highly necessary in the events of being stuck, multiple opinion and dead-lock. d) counselor; the role is frequently performed by DIY Dinsos. The managerial of LKS or independent LKS frequently consult with Dinsos related to problems they have, either specifically or closed or publically or opened. Take for example, many LKS consult about permit renewal, annual report preparation, service issue, etc. e) supervisor and evaluator; DIY Dinsos performs its role as supervisor together with its role in monitoring post activity of technical guidance or other activities to take a closer observation on the application of technical guidance. Thus, Dinsos will be able to identify the difficulty or the obstacle as well as the level of success. e) mediation and negotiation; there are two roles of mediation and negotiation performed by Dinsos, those are mediation and negotiation associated with negative connotation such as conflict both the ones occurred internally and externally -e.g. LKS which rejects government regulation-, and mediation and negotiation associated with positive denotation; in this case DIY Dinsos provides and develops support in a way that it is willingly participating in group activity such as collaborating LKS whose client is children with NGO Save the Children to enhance parenting capacity. f) facilitator and supporter; the support given by DIY Dinsos are in a form of material such as food aid, office equipment or furniture donation, milk, computer, etc. whilst, the non-material support given are management support, consultation service, etc. g) coach or trainer; in order to enhance the capacity of LKS management, DIY Dinsos organizes annual technical guidance on "enhancing institutional capacity" collaborating with BK3S, University, Practitioner, etc. as training sources. h) Communicator; DIY Dinsos delivers various information on both the policy of Dinsos itself and information from Regional and Central Government; the information should be valid and in time. As the data is often late and invalid, reinform (rectification) to prove the authentication is conducted whether through verbal, text message, or written form.

The total of 366 LKS in DIY, as of the potential source of social welfare, has been utilized by DIY Regional Government and Regional/Municipal Government as partner in handling social issues within the area, and is benefited by society as shelter house –a place to have consultation and assistance in coping with problems. The mentoring activity provided by DIY Regional Government covers: a) technical guidance on LKS management., b) profession or specialist training, such as financial management, parenting., c) technical guidance on productive economic business., d) technical guidance on preparation on the selection of outstanding and accredited LKS., e) the provision of operational fund stimulant., f) education and training on Voluntary Workforce (TKS) and Community Social Worker (PSM)., g) education and training for Social Worker., h) training, capacity building,

Activities of the technical guidance covers: a) LKS management, b) profession or specialist training such as financial management, parenting., the provision of operational fund stimulant., d) preparation for accreditation, e) LKS data collection., f) productive economic business, g) LKS competition, and many other activities whose duration and opportunities are very limited. For the limited sources, the provision of mentoring toward LKS in a form of specialist technical guidance is conducted only once in a year and not every LKS can be the participant considering that the average technical guidance can only accommodate around 50 LKS. For this reason, one LKS can approximately have one opportunity in 2 until 3 years. This condition affects the governance quality of LKS that the 63,66% of all is still concerning. On the other hand, LKS is expected by external party such as governance, son governance, client and public to be dynamic and variative. Hence, not every LKS can meet the standard. To achieve this, management and organization are very necessary. This also includes the data base which is expected to be able to control governance and give appreciation and support to LKS for its participation in supporting social welfare.

There are 2 factors causing LKS to have considerably low quality, those are: a) most LKS in Yogyakarta are dominated by individual and family philanthropic spirit which open a possibility for variative governance in accordance with the financial ability. With such condition, LKS tends to rely on external donation and therefore not every LKS is able to conduct social rehabilitation, to provide social security and to support social empowerment as well as to provide social protection., c) monotonous annual agenda and -on most cases- family-based management lead to low managerial skill, less transparent staff and also effects the system accountability to be prone to conflict which may also cause moral hazard in a way that it makes clients a victim since their right is not fulfilled as how they supposed to be. All of this will eventually decrease public support and trust toward LKS.

The above findings describe that LKS in DIY is partly experiencing sources crisis including leadership crisis and tendency to bureaucratic pathology, and also variative growth. On the other hand, the selection for the best LKS in DIY has once sent its representative in national scale competition and was successfully achieved position of 10 best LKS. It indicates that LKS in DIY shows national-scale positive capacity; proven from the achievement as 5 best LKS on 2012, 2013, 2015 and 2016. From these contrasting facts, a significant different among the organizational performance, seen from factors of human resource and independence of the respective LKS, can be seen. Rationalization to justify moral hazard (deceitfulness) on everything that we do in order to fulfill self-satisfaction without any strong reasoning and justification is unaccountable both morally and ethically.

In a modern management system, there are always instruments called internal control and external control in every work unit. Thus, even the slightest irrelevance will be detected early and correction will be done automatically. Some LKS are not yet implementing internal control instrument and for LKS which already have the instrument there is still possibility for not functioning it maximally due to certain reason.

The human resource of LKS is mostly dominated by volunteer, and so 50% of the total LKS haven't hired permanent employee with salary in accordance with current regional minimum wage; seen from the low rate compensation. Such condition proves that LKS haven't been able to provide high compensation for its employee. Managerial policy tends to prioritize the use of funding on physical facilities, which allegedly trigger deceitfulness among its employee such as having individual part time job and side job, and possibly other activities that generate money to balance their income with individual or family expenses. As supposedly a non-profit organization, both new and developing LKS, should prioritize human resource reinforcement. However, the newly found phenomenon is the other way around; many LKS focus more on their physical condition and hence leads to chaotic management.

Conclusion

LKS is a social capital for public and more than 90% of the LKS funding source highly relies on philanthropy market, state aid and individual effort. Having an external source of energy, every LKS needs a proper management to gain trust from shareholder and stakeholder.

Several findings related to the management of LKS in DIY are as follow: a) licensing problem which rarely checked by DIY Dinsos., b) LKS founder mostly also acts as management and so gives a very dominant role., c) part of the management have double position., d) 70% of the LKS management are volunteers and family., e) if employee is paid, the salary will be under DIY regional minimum wage. There are eight roles of guiding and mentoring and 10 types of mentoring with unstable frequency. There are 39 LKS in alarming condition to close its financial access.

The result of the research is recommended to be used by practitioners and activists of LKS as well as by governance at a local and national scale in making a policy to improve the service quality, policy quality, and interaction pattern among management. To avoid data confusion, DIY Dinsos is advised to register and list LKS in an online system; as the result of research by Aditya Kurniawan, (2012). The future research is recommended to study the mechanism of policy making in every LKS in order to monitor the discipline of each stipulated regulation, both internally and externally. Thus, LKS will gain higher and wider trust from public.

The weakness of this research lies on the data confusion in DIY Social Service, BK3S and Regional/municipal LKKS. Researcher hasn't confirmed directly to LKS management. For this, researcher recommends the future research focuses more on LKS governance whose subject of the research is LKS management and also to conduct research on LKS which once gained a national achievement so that the research result would be beneficial for LKS in alarming condition.

Dinsos is advised to strengthen the control toward LKS to minimize deceitful acts within its governance; since those acts will negatively impact client, philanthropy market, government and public.

References

Adolf A. Berle, JR. and Gardiner C. Means. (1932). *The Modern Corpation and Private Property*, The Macmillan Company, New York.

Aditya Kurniawan, (2012), *Pengembangan Sistem Registrasi Lembaga Kesejahteraan Sosial Anak pada Kementeriaan Sosial Menggunakan Arsitektur Model View Controller, Proceedings, Simantics*. Binus Teknik Informatika University.

Alijoyo. A and Subarto, Z, (2004), *Komisaris Independen Penggerak Praktik GCG di Perusahaan*, PT. Indeks, Gramedia Group, Jakarta.

Anwar Sitepu, (2011), Kontruksi Lembaga Kesejahteraan Sosial Untuk Pemberdayaan Masyarakat Dalam Rangka Penanggulangan Kemiskinan, *Jurnal Penelitian dan Pengembangan Kesejahteraan Sosial Volume 16 Number 1 year 2011*, Baldiklit Kemensos RI.

Charron, D. C., (2007). *Stockholder and Stakeholder*: The Battle from Control of The Corporation. *Cato Journal*; 27,1.

Creswell, JW, 1989, *Qualitatif Inquiry and Research Design : Choosing Among Five Traditions, Thousand Oaks, CA, Sage.*

Dawan, Rahardjo.1995. *Secangkir Kopi Max Havelar.*PT Gramedia pustaka utama.

Francis Fukuyama. (1995). *Trust Kebijakan Sosial dan Penciptaan Kemakmuran*, Qalam. Yogyakarta.

Frederick W. Taylor, (1911), *The Psinsiplies of Scientific Management,* New York, Harper. Freeman & Halt, 1987, *Permanent Homelessness in America?* "Population Research and Policy Review", 6.3.

Jumayar Marbun, et. al, (2012). *Peran Lambaga Kesejahteraan Sosial (LKS) Dalam Penanganan Penyalahgunaan Napza di Jawa Barat*, *Jurnal Peksos. Volume 11 No.1 year 2012*. STKS. Bandung.

Khairandy. R & Malik. C. (2007). *Good Corporate Governance* : Perkembangan Pemikiran dan Implementasinya di Indonesia dalam Perspektif Hukum, Kreasi Total Media, Yogyakarta.

Kooskora , M. (2008). Corporate Governance from the stakeholder perspective, in the context of Estonian business organizations. Baltic *Journal of Management*. Vol. 3 No. 2, pp.193-217.

Mason, M., & O' Mahoney, J., (2008). Post-traditional *Corporate Governance. The Journal of Corporate Citizenship*; Autumn 2008;31.

Miles, M.B., & Hubermas, A.M., (1984), Qualitative Data Analysis: A Sourcebook of New Methods. Beverly Hills, CA: Sage

Risma Indriyani, (2015), *Efektifitas Pembinaan LKSA di Kota Tasikmalaya DinSosnakertrans. West Java.* STIA YPPT Priatim Tasikmalaya. Journal Risma, 2015.

Sektiono Dwi., (2016), *Implementasi Good Governance pada Lembaga Swadaya Masyarakat :Studi Kasus Pada Aksi Cepat Tanggap Cabang Semarang*. Faculty of Ekonomic and Bussiness. UNDIP Semarang.

Seashore, (1976), *Factorial Analysis of Organizational Non Profit Performance,* Science Quarterly.

Sugiyanto, (2004), Yogyakarta Kota Pendidikan dan Ekonomi Alternatif, *Jurnal Ilmiah Pendidikan "Cakrawala Pendidikan" Edition November 2004, Th. XXIII, No. 3*. LPKM. Universitas Negeri Yogyakarta.

Sugiyanto and Yenni. S.U., (2013), Strategi Komunikasi Kos Crisis Center Terhadap Anak Kos dan Induk Semang dalam Berkontribusi mempertahankan Predikat Yogyakarta sebagai Kota Pendidikan, *Jurnal Paradigma Vol. 17 No.2 Edition August 2013*. Fisip UPN Veteran Yogyakarta.

Suwondo, Bambang, (1977). *Sejarah Daerah Istimewa Yogyakarta*, Pusat Penelitian Sejarah dan Budaya Departemen Pendidikan dan Kebudayaan.

Tjahono, H.K, (20011). The configuration among social capital, distributive and procedural justice and its consequences to individual satisfaction, *International journal of information and management sciences*, 87-103.

Untung. Sukaryadi, (2015), *Kebijakan Pembangunan Kesejahteran Sosial Di Daerah Istimewa Yogyakarta year 2015*, Dinas Sosial Daerah DIY.

Ministerial Regulation of Republic of Indonesia Number 187 Social Welfare Institution.

Government Regulation Number 101 year 2000 about Good Corporate Governance.

DIY Local Regulation Number 11 year 2015 about Social Welfare Institution.

Law of the Republic of Indonesia Number 11 year 2009 about Social Welfare.

Effects of Social Rights and Environmental Issues in International Market; The African Experience

Abiola Esther Ogunmokun, Bucharest University of Economic Studies (PhD Student), Bucharest, Romania
abiolaogunmokun@yahoo.com

Abstract

This study will focus on the effects of social and environmental issues on producers in their attempt to enter international markets. Trade serves as an avenue through which interrelationships exist amongst economies. In order for resources to be efficiently and effectively utilized, measures are put in place to promote trade transactions across national boundaries. These measures entail requirements producers may be asked to meet which relates to a wide range of sustainability metrics, respect for basic human rights, worker health and safety, the environmental impacts of production, community relations, land use planning and others. The aftermath of these measures on commercial relations amongst economic regions is what makes this study considered as a topic of interest. This paper tends to highlight the effect of these measures on international business using comparative analysis. Infringement of social rights and environmental degradation, are deeply rooted in modern industrial revolutions. However, large-scale industrialization, besides its unquestionable benefits, triggered a systematic assault against human dignity and environmental health. The ensuing expansion of world trade further worsened the consequences. More so, environmental and social issues may manifest in diverse ways, thereby affecting operations in international market and also limiting the number of participants in international market.

Keywords: International market, social and environmental issues.

1. Introduction

Of a truth, trade relationships amongst countries are inevitable because some countries have absolute advantage in some resources while others have absolute disadvantage. As a result of this, commercial relations will exist among economic regions which give rise to regulations, measures and policies to promote exchange or trade among countries. The effect of these measures in international market is what this paper tends to focus on. However, social and environmental issues have got entangled in international trade since the beginning of industrialization, which triggered a boom in the international flow of goods and services. McKenzie, Lionel W. (1954) mentioned that exchange of capital, goods and services among governments or individuals creates an avenue for specialization and brings about increase in a country's capacity to produce goods and render services. This portrays the significance of foreign trade in an economy because it also makes it possible for countries to have access to goods and services which it has absolute or comparative disadvantage over. Also international trade is beneficial to the economy because it promotes increased efficiency and greater wealth among trading nations. Despite the significance of international trade, the growing tendency of economies to operate across national boundaries is presented with challenges which can be detrimental to economic growth and development. The challenges come into play in the area of measures or standards placed on international trade that is most times difficult to comply with by producers (mostly from less developed regions). Most of these measures emerged in developed economies to deal with sustainability problems driven by production issues and to improve the quality of products sourced from different countries.

Also, as a result of human activity, changes occurred in the environment that led to environmental degradation. These environmental issues bring about changes which can be temporal or permanent to the atmosphere, water or land thereby causing pollution. More so, to collect export earnings nations would

relentlessly boost export production, most often overlooking the serious harm they were inflicting upon the environment and human rights which may be either reversible or irreversible. Though, social issues may have an effect on the surrounding communities, but the extent of social and environmental impacts depends on the industry sector and can be categorized into low risk, medium risk or high risk. The effects of standards implemented by the economies which brought about the social and environmental issues are what this study will focus on. This standard implies a generally accepted behavior in a society and a guideline that regulates the effect of human activity upon the environment. Standards are placed by countries to protect or promote trade and growth. The international market is subject to regulations made by governments in "home" and "host" countries.

Countries adopt strategies to promote domestic trade against foreign competition or as a way to avoid it been used as a dumping ground by some countries who export inferior or substandard and harmful products. These countries use some of these forms; - tariffs "taxes imposed on imported goods which make them expensive and less competitive relative to goods produced domestically", subsidies "transfer payments given by governments to domestic suppliers of goods and services to increase production and make domestically produced goods more competitive". Quotas "it is a limit on the amount of goods that can be imported in a given period". These measures limit imports into a country by protecting commercial activities within that country against foreign competition as mentioned by Jones, Ronald W. (1961). On the other hand, protectionism as a strategy mostly proves to be counterproductive because it creates a reaction whereby other countries engage in their own protection policy thereby leading to high cost of goods and services. More so, an act of protectionism creates short term gains at the expense of substantial long term gains. The outcome of these trade barriers is that it leads to increase in cost of goods and this becomes unaffordable or too expensive for citizens in less developed or developing regions that rely on this trade from their meager income. It is against this background the effect of social and environmental issues in international market is considered as a topic of interest. As such, this study is further sub-divided into four sections. Section two reviews literature pertinent to this study while section three covers standards in international market. Section four will cover the effects of social and environmental issues and some challenges faced by African exporters in their attempt to enter the international market while section five concludes the study.

2. Literature Review

Daniels, J. et al (2007) mentioned that due to the world economy that has become global in scope, there is exchange amongst countries which leads to market expansion due to commercial transactions like investments, sales, transportation, private, logistics and governmental that occurs between two or more regions beyond their political boundaries. In as much as these commercial relations are beneficial, it is faced with some obstacles. For instance, to trade in international market producers or manufacturers are increasingly required to adopt standards before they are able to showcase their products through export. More so, a producer may even be excluded from international value chains if he fails to comply with the set standards. A producer's inclusion in a sustainable value chain fosters better environmental and social practices and can improve financial outcomes for participating producers as mentioned by von Hagen and Alvarez (2011). The effect of this exclusion for less developed or developing regions will be inability to attain sustainable growth and reduce chronic poverty failing their interaction and integration with the rest of the world, which obviously entails making strong efforts to comply with the social and environmental policies as mentioned by Oluwasola (2014). There are variations in the standards operating in countries which impact their accessibility and these differences may have a significant impact on producers especially small and medium scale enterprises (SMEs) and small farmers. A number of studies also found mixed evidence on the net income for producers and some even found a negative impact on net income for producers. This was the case where the increased earnings did not compensate for the additional costs and increased labour involved in complying with standards' provisions as mentioned by Jaffee (2008). However, the overall impact of standards is not always entirely visible when donors or non-governmental organizations (NGOs) temporarily cover certification costs. Lastly, there is a risk that increased supply of

certified products may create increased competition to find buyers. Nebel et al.,(2005) mentioned that oversupply may lead to certified products being traded without being distinguished from noncertified products, resulting in diminishing or eliminated premiums. On the other hand, business related positive effect can outweigh direct financial impact of standards. These business conditions like a guaranteed sales for certified produce, better relationships with buyers, increased yields and enhanced quality.

3.0. Standards in International trade

Social and environmental standards have increasingly become the tool of choice in international value chains, covering agricultural products, electronics and services. Standards first emerged in developed countries, but a growing number of new standards are now being created in developing countries. These standards emerged as a market instrument to tackle multiple sustainability issues that cannot be resolved through compliance with national legislation and compulsory market requirements. Standards used in international business can be set by non-governmental organizations (NGOs), private enterprises and consortiums of companies. However, the number of available standards is much higher in larger and richer countries where there is an increased demand for certified products. However, major worldwide brands have coordinated their manageable sourcing responsibilities into their corporate techniques. Although, many studies have explored the nature of these standards and their effects on various stakeholders but no large scale empirical evidence is available on how accessible and user friendly these standards are for producers.

More so, the new economic order has two aspects: on the one hand, formerly poor countries from the South have managed to carve out industrial apparatuses of their own, thereby reducing their dependence on imports from the North, especially in terms of processed goods like machinery, chemicals etc. This is doubtless a good thing. While on the other hand, their export production is, to a great extent, destined to developed countries' markets. The latter (with the EU as the flagship) have embarked upon a far-reaching program aimed at stopping environmental degradation and social rights infringement, imperatively requesting that goods and services be sold in the respective countries' markets, whether domestically produced or imported, conform to a set of social and environmental standards. Consequently, a host of exporting firms from developing countries (and not solely) that used to export their goods on western markets or wish to do it in the future, are now making great efforts to comply with these standards. Based on the fact that these standards are hard to surmount an obstacle, such standards are viewed not as a necessity but rather as a surrogate for non-tariff barriers on imports and therefore hinted at as veiled protectionism.

Subsequently, the exports of agricultural products operate within a political, social and legal guideline. The most significant principles in any system are those characterizing, allotting and authorizing property rights, guidelines and conventions defining suitable and non-suitable forms of cooperation and competition (measures, tenets of agreements etc.). Frameworks in regards to property rights are essential. Rights to utilize, trade and change resources is fundamental to market improvement, since this assigns to individuals the privilege to advantages and disadvantages in production and marketing activities. Standards indicating entry conditions and limits on agreeable and aggressive strategies likewise encourage international trade. Standards set up and enforced can reduce exchange cost by expanding accessible information to buyers and consumers. These standards can include basic weights, measures, quality evaluation and contract forms.

Why are social and environmental standards hard to comply with? It is hard to comply with because such standards differ a great deal from the common standards that have been used in international trade as barriers against imports. Moreover, governments often arbitrarily impose irrelevant, even useless standards, on purely protectionist purposes. By contrast, social and environmental standards are both relevant and necessary but they are hard to fulfill by exporters because they entail large investments as

well as production and distribution chains restructuring and ultimately, serious governmental involvement. Surely, this often surpasses poor countries' possibilities.

3.1. Social rights and environmental issues

This focuses on why social rights and environmental issues emerge in international trade. Exportation of products with high environmental impacts may bring about pollution in the economy that imports such product. As a whole, international exchange among countries leads to increase in world output which implies that the total volume of pollution and environmental degradation is likely to increase. Environmental effects of trade could be direct or indirect. More so, international trade environmental effects may also be beneficial. This arises through the spread of environmentally friendly technology, more efficient production which tends to reduce materials and energy use per unit of output. Based on social rights and environmental issues, trading nations may come under pressure to improve environmental standards when products quality or trans-boundary impacts are at issue. The social and environmental standards are a thorny issue because it requires the convergence of national policies in the field (mutual acceptance or recognition), even the inclusion of inter-regional agreements. The EU is on the front lines to defend environmental health and social rights observance. As mentioned by Kishlanski et al (1995), the relationship between environment and international trade is an indirect one: it goes through the industrial development process that began in the West two hundred years ago. Industrial activity has been acting as a threat to the environment continuously ever since. However, these environmental issues centers around;-Property rights (patents, trademarks), taxation, institutional environment within which the global marketer must operate, movement of equity and expropriation threats that often necessitate signing of trade frame working agreements and so on.

Provisions were made for protecting the environment and conserving resources by international trade agreements. Nations are permitted in World Trade Organization (WTO) to take into account the ecological effects of items, but not those associated with production process. This has prompted various trade disagreements about whether particular measures are defended on the grounds of security of life and wellbeing, or are essentially masked protectionism. Efforts to regulate the international legal system include individual country efforts e.g. USA, international Trade Commission and the GATT system. The GATT system is a set of norms and procedures which member governments have accepted to create order and predictability in international trade relations. Countries that industrialized at an early age also became great exporters of the goods and services they produced thereby triggering a boom in the international flow of goods and services. As mentioned by United Nations (2005), the ceaseless increase in export production has been inflicting pernicious effects upon environment health and human rights, which were nevertheless long overlooked. Yearly, S. (1995) mentioned that developing countries' industrialization, which was much delayed, chiefly unfolding after the 2nd world war, further compounded the harm to the environment. Since industrialization in the developing world generally embraced the highest polluting industries, (coal and steel, textiles, etc.) pollution eventually spanned the Planet.

Trade issues get reactions at various levels; national, regional or international. To promote trade, institutions for transnational environmental standards were set up by the European Union. Also, an environmental monitoring authority was established by the North American Free Trade Agreement but it has little control. Global ecological issues are addressed by the Multilateral Environmental Agreements (MEAs). However, propositions have been made for a World Environmental Organization to administer worldwide ecological approach, and to fill in as a supporter for natural interests in global trade. In situations of ineffective environmental policies at the provincial or worldwide level, national approaches are expected to address any trade related environmental issues. More so, labeling and certification requirements established by nongovernmental organizations (NGOs) or governments can go a long way in promoting international trade in areas of corporate practices and consumer awareness.

4.0. Effects of social and environmental issues in international market (African Experience)

Considering the fact that interrelationship exists among economies through trade which is seen as a means of sustainability for most less developed regions; these economies would always want to be involved in global market. Trade amongst economies leads to market expansion thereby improving total welfare and consumer choice**.** These environmental policies do provide opportunities in the area of redirection to "green" innovation and productivity growth in which most advanced firms gain while others loose. It also aims at protecting human health and the environment. Even though international trade has been recognized as been valuable based on the propositions that there will be trade flows among or between participating countries, if gains are possible, this is often not the case in reality. These policies bring about various hindrances to some key exports, especially those in which some developing countries and particularly Africa have a comparative advantage, which restrict trade flows. Jabati et al, (2013) mentioned that as a result of these trade obstructions, African nations have found it difficult to take full advantage of the opportunities embedded in international trade. African economies are enriched with agricultural products and over 50% of the world trade comes from developing countries and these economies depend on these key exports for sustaining their economy. As such, special and differential treatment provisions call for consideration of the needs of less developed or developing regions when establishing and implementing these measures. The effects of these measures or policies on exports from less developed regions is that it leads to;-

- Lengthy and unfair bans on some products from Africa.
- Application of measures to ban exports without sufficient scientific evidence.
- Inability of some exporters to participate in the international market due to prohibition or restriction of their products which denies them access to developed market.
- Decrease or hindrance to economic growth of less developed regions which depend solely on these exports for sustainability.
- Exclusion from the market due to inability to meet up with the measures or policies.
- An increased energy prices or non availability of some certain products. It also affects the availability and price of certain products because of increased tax or ban as a result of its effect on human health or the environment.

Subsequently, developed regions have many advantages over the less developed regions in internal and foreign markets because they have adequate facilities and access to technology. These facilities make it possible to test quality and safety of products. This enables developed regions to set high standards for imports which are difficult or impossible for less developed economies to meet. In the long run, the effects of these measures on exports from these economies is that it hinders their capacity to show case their products and participate in the international market which in turn has a negative effect on the economic growth and development of these economies. Social and environmental issues also affect the number of participating economies in the international market thereby leading to reduction in global trade transactions.

4.1. Africa's export in international market.

As at the year 2016, the world's total export of goods and services was estimated at 17,018,115 million US dollars of which the top 5 countries (United States of America, China, Germany, Japan, and France) account for 44.46 % of it. According to WTO (2017) statistical review, merchandise trade by region 2015-2016 illustrates Africa's participation in the global market. Developing economies recorded a decline in the share of merchandise exports from 43.4(2015) to 42.4(2016). Also in its participation in world merchandise trade, there was a slight decrease in 2016 to 42% of world exports and 40% of worlds imports. Developing economies in Asia happen to account for the largest share of developing economies

trade in the world (28% of total world exports and 25% of total world imports) followed by developing economies of Latin America. Africa recorded a slight decline in trade in 2016 and accounts for 2.2% of the total world exports and 3.2% of the total world imports. This shows that it is importing more than its exporting which is not healthy for the economy. To attain economy growth, there is need for increased exports. Africa accounts for a small fraction (2.2% in 2016) of the global exports of merchandise trade. This analysis shows that Africa is not having full access to developed market because its percentage share in global trade is too little. Africa's participation in international market (in terms of export) can be hindered by its inability to meet up with social and environmental standards in international market and any other factor. As such, there is need for an increased participation of Africa in global market because it will go a long way in boosting the economy and pave way for attaining economic sustainability in these regions.

4.2. Challenges faced by African exporters in their attempt to enter international market

Export is of great significance to an economy because to an extent it influences the growth of the economy. Exchange by economies in the global market brings about expansion if goods thereby increasing consumer choice. Also because some countries are better at producing some goods than the others, there is need for trade relationships among countries. As much as African exporters want to be fully involved in the global market, there are faced with some stumbling blocks which limit their level of participation. Some of these challenges are;-

1. Inadequate scientific and technical infrastructures which makes it difficult to meet up with measures set in international market
2. Lack of financial or technical resources to implement stringent requirements.
3. Insufficient awareness and misapplication of regulations.
4. Poor communication and networking within and between countries.
5. Frequent changes in the importing countries requirements; compliance in the new food laws and requirements of importing countries.
6. Lack of capacity to mitigate against unfair trade barriers.
7. Lack of an effective monitoring control and surveillance system.
8. Tax policies.
9. High cost of doing business.

More so, African producers especially SMEs are often poorly informed and may not possess the technical knowledge or have access to modern technologies necessary to implement social and environmental standards. These limitations can make it very difficult for them to compete in global markets. For instance, about 22 percent of all Nigeria's exports go to Europe and this account for 25 percent of Nigeria's trade. These possibilities are limped by such a large number of imperatives including high cost of doing business, inadequate infrastructures, lack of standardization, and unfavorable international trade rules and practices.

5. Conclusion

Of a truth, international transaction is needed among countries, thereby creating room for market expansion across the territory. More so, these trade transactions amongst countries have a multiplier effect on a nation's growth and development which leads to an increased involvement in international business. Although, the aim of this policy is to improve individual well-being and environmental sustainability of the economy; but it met unusual strong resistance by stakeholders who are faced with challenges in the market. The world seems to be hardly prepared for an outright battle for containment of environment deterioration. Though certain developing countries are making some headway but the capacity of firms to comply with technical regulations is at the present time, limited. However, for an

effective quality and safety assurance systems there is need for capacity building, and improvement in scientific and technical infrastructures of the less developed economies.

Environment protection involves administrative efforts, no-negligible expenditures and not least, determined political will. Governments must get involved by providing industries with information, guidance, and infrastructure in the field. EU's new legislation in the field is in fact, a starting block that will surely trigger emulation among countries and regions in the long run. Yet in the short run, EU's rules are a challenge for its trade partners that must comply with them or otherwise risk been excluded from the single market. Such an outcome would be disastrous for many developing countries, whose dependence on the single market is vital.

Also, as efforts to encourage free trade, European Union aims to play a key role in keeping markets open worldwide and helping Europe to exit from the economic crisis. European Union trade policy is working to; create a global system for fair and open trade which reflects and respects the needs and concerns of developing countries, open up markets with key partner countries, ensure trade is a force for sustainable development etc. In addition, a more effective policy that tackles new economic realities is being proposed. This new policy tagged "trade for all" is a new trade and investment strategy that will make trade agreements more effective at delivering new economic opportunities in Europe. With this one could conclude that liberal trade is of great significance to economic growth and development of less developed regions because it brings about increased savings and investment which has a multiplier effect on the nation's growth

References:

AfDB, OECD and UNDP (2015) *African Economic Outlook 2015*: *Regional Development and spatial inclusion*

Daniels, J.,Radebaugh, L., Villarreal, D. (2007). International Business: environment and operations. 11th edition, Prentice Hall. ISBN 0-13-186942-6

Frank, A.G. (2015) The Development of Underdevelopment, in Roberts, T., Hite, A.B. and Chorev, N. (eds.) The Globalization and Development Reader: Perspectives on Development and Global Change (John Wiley and Sons, Ltd.)

Jabati, M.C. (2003) Market access for developing countries of Africa: the reality, *AGSF Occasional Paper No. 1*, United Nations Food and Agriculture Organization, Rome

Jones, Ronald W. (1961). "Comparative Advantage and the Theory of Tariffs". The Review of Economic Studies

Kishlanski, M., Geary, P. și O'Brien, P. (1995) Civilization in the West, 2nd ed. , Harper Collins College Publisher

Kogan, R.A. (2012) REACH Revisited: A frame work for evaluating whether a non-tariff measure has matured into an actionable non-tariff barrier to trade, *American University International Law Review 2*8

McKenzie, Lionel W. (1954). "Specialization and Efficiency in World Production", The Review of Economic Studies.

Michida, E. (2014) The Policy Impact of Product-Related Environmental Regulations in Asia, *The Institute of Developing Economies, Discussion Paper nr. 451*

Oluwasola, O. (2014) Environmental pollution is inevitable in developing countries. Breaking energy, http://breakingenergy.com/2014/09/23/environmental-pollution-is-inevitable-in-developing-countries/)

Oyeshola Dokun, O.P. (2008), Sustainable Development – Issues and challenges for Nigeria.

Stiglitz, J. E., Charlton A. (2005) Fair Trade for All: How Trade Can Promote Development, Oxford University Press

United Nations (2005) Environment and Trade: A Handbook, United Nations Environment Programme, International Institute for Sustainable Development

von Hagen, O and Alvarez, G. (2011), The Impacts of Private Standards on Producers in Developing Countries. Retrieved from http://www.intracen.org/The-Impacts-of-Private-Standards-on-Producers-in-Developing-Countries/

WTO (2017), World Trade Statistical Review [Retrieved September 25, 2017], https://www.wto.org/english/res_e/statis_e/wts2017_e/wts17_toc_e.htm

Yearly, S. (1995) Dirty connections: transnational pollution, in Allen, J. and Hamnett, C. (eds.) A Shrinking World? Global Unevenness and Inequality (Oxford University Press).

Importance of Systematic and First Mover Approach in Startups

Ing. Branislav Zagoršek, PhD., University of Economics in Bratislava, Bratislava, Slovak Republic, branislav.zagorsek@euba.sk

Ing. Katarína Procházková, PhD., University of Economics in Bratislava, Bratislava, Slovak Republic, katarina.prochazkova@euba.sk

Ing. Richard Bednár, PhD., University of Economics in Bratislava, Bratislava, Slovak Republic, richard.bednar@euba.sk

Abstract

Startups are small newly founded companies in the process of developing a viable business model. Startups usually have a potential of exponential growth while having unclear future as they are providing a new product and creating a new market. In this paper we present results of our three-year long research where we studied over 70 startups using regular one on one interviews with the founders. The obtained data were processed using descriptive statistic methods. First we expected to find some evidence that would be beneficial for startups to have systematic approach and first mover approach as well. We found no conclusive evidence of such benefits in either approach, so we have to stay by the null hypothesis what has very interesting implications for these young companies in the unstable environment as well. Our results create options for an alternative approach like pivot and trial and error and uncovering opportunities for companies that do not have global first mover advantage but could take advantage of regional one. That is why we see entrepreneurs, investors, and accelerators benefiting from our results.

Keywords: startup, business model, systematic approach, first mover advantage

Introduction

In this paper, we present the results of our research project on business models and startup strategies. In the topic of startups, we are dealing with current questions of emerging approach to entrepreneurship. While among established companies the best practices are identified, the business model of startup seems not to behave within them. In this paper, we will study whether there is a better way how to approach the business model development and whether it is recommendable to reach for first mover advantage.

A business model describes the logic behind a company. The main goal of each business model is to generate cash flows to cover the costs, invest in the company's growth, and pay investors. According to Thomas Wheeler and David Hunger (2008), "the business model is a method for making money in a certain business environment. It includes the key structural and operational characteristics of the company – ways how to create and generate profit." What matters is not just the system of making money but also the way of managing processes. According to Allan Afuah (2003), these activities "generate profit in an enterprise depends on which of them a company performs, how they perform and when." In addition to setting processes, it is crucial to creating the correct timing of launch.

Startups usually operate in a highly risky environment. According to Eric Ries (2015), the startup is "a human institution designed to bring a new product or service under conditions of extreme uncertainty." This creation of blue ocean is the most typical characteristic for startups. The desired exponential growth is achieved only by a small fraction of startups. However, it is the main motivation for all founders. "The essence of the startup is unconventional thinking, creativity, originality, or novelty" (Ljudvigova, 2017). British developer and co-founder of the American accelerator YCombinator Paul Graham (2012) see in the startup business, that is destined for rapid growth." This growth can be driven by sales or number of users.

According to the European Business Association of Business Angels (2016), there are about 300 million founders currently running 150 million businesses worldwide. Every year approximately 50 million new projects are launched (137.000 per day). CB Insight's research (2016) analyzed the causes of 101 startup failures and had shown that 9 out of 10 startups fail to 1-3 years. So the startup model is 40% riskier than standard business models. According to this research, the most common reasons for failure include the lack of finance (29%) and the reliance on goods and services (18%). According to Bloomberg's analysis, 8 out of 10 startups fail over 18 months, mainly due to lack of understanding of customer needs and inadequate revenue generation. According to KPMG Startup Survey (2016), up to 84% of startups consider sales and revenue growth to be their most important priority.

There are two main ways how to think about the business model and product development. A startup can think systematically or spontaneously. According to Cambridge Business Dictionary, the system means "an agreed set of methods or organized plan." The systematical approach is a step by step procedure. Startup founders and their coaches usually think that the systematical approach is better. "There is convincing evidence that writing a business plan contributes to startup success. It forces the founders to think to systematically through every aspect of their business." (Barringer, 2010) One of the well-known systematical methods is Design thinking. This technique has 6 phases: "Definition, Research, Interpretation, Idea Generation, Prototyping, and Evaluation." (Yayici, 2016) In the startup, we can talk about next phases of development: The first one is the definition of a customer problem. This discovery usually comes from analyzing daily life. Afterwards, founders start to do own research and define some results. Using brainstorming or survey by talking with potential customers, founders with teams create a solution and minimum valuable product (MVP). In the last phase, they put the MVP in a real market and evaluate the product and the processes. In each phase, it is the most important to think strategically and systematically.

On the other side, startups can create their business models spontaneously. According to Cambridge Business Dictionary, to be spontaneous means "done things in a natural, often sudden way, without any planning." This approach is about intuition and experiments. Using spontaneous approach, a startup can skip 2-3 steps in planning and can focus only on MVP and can test it without any research on a real market.

Startups usually rely on first mover advantage. A company can achieve first-mover status in numerous ways. For example, a firm "can produce a new product, use a new process or enter a new market." (Kornum, Bjerre, 2005) In case of startups, we talk mostly about a creation of a new product/service or some unique process which brings irresistible customer value. Robinson and Fornell (1985) analyzed 371 mature consumer goods business and found "first-movers to have higher market share than later entrants. Along similar lines, other studies have focused on cigarettes (Whitten, 1979), startup and adolescent business (Lambkin, 1988), prescription drugs (Bond and Lean, 1988) and new corporate ventures (Miller et al., 1989) and results brought that generally speaking, pioneers attained an important market share advantage over later entrants (about 24% on average for pioneers vs. 9.7% for late entrants). This fact creates a desire to be first on the market and create a blue ocean. (Mauborgne and Kim, 2015). In the case of doing business on foreign markets, the big advantage can also be the fact that your company is the first on this market. Most researchers use the term "first mover" to refer to the first company to enter a market. This step can bring many advantages, but also disadvantages. According to Investopedia, the first mover is a term that describes a certain competitive advantage a business obtains by being the first to bring a specific product or service to market. Among other things, being first typically enables a company to establish strong brand recognition and customer loyalty before other entrants to the market arise. In research of Suarez and Lanzola (2005) authors noticed, that "first mover status can confer advantages, but it does not do so categorically. Much depend on the circumstances." The truth is, that first-mover can bring some positives as possibility to build customer loyalty, better market stability or effective cost-cutting, but it also brings disadvantages (sometimes it is expensive to be first, and sometimes the market is not ready, and a product or service is not sold as good as a company expected).

Competitiveness and startup stability in the international environment is dependent on several factors. For a startup to have a product with reasonable business potential, with simple to understand

customer benefits and good scaling possibilities looks likes as critical prerequisites. It is important from early stages to pay attention to branding, positioning and market targeting of the product. Building a strong brand appears to be one of the critical strategic areas bolstering the competitiveness of any business in today world. For startups, it is also important to find the optimal financing scheme where various options as government programs, bank loans, subsidies need to be considered and analyzed.

The success and lifespan of the startup also rely on the specifics of its business model, the direction of business activities, and the specific strategy that should be global or at least regional in the case of a startup originating from smaller, local economies. According to Slávik and Hagarová (2016), "the key issue for the startup is the design of a viable business model that needs to evaluate the key resources so that the output will be valuable for both the customer and the entrepreneur." Remeňová (2017) studied the revenue models; she wrote that whether the startups have one or more revenue streams depends on the business model and customer segmentation. A new type of organizational structure suitable for startups called holacracy was identified and described by Skorkova (2016). In this type of organizational structure, a startup has decentralized management and is significantly selforganized. Blštáková and Joniaková (2015) studied how the human resources impact the competitiveness of companies. They found that businesses will face two fundamental challenges to formulate strategies for competing in the labor market changed conditions and the development of employees' potential. Bolek (2016) studied competitiveness, systematic approach and information technologies. He wrote that information technologies are driving force of the current society and that they need a systematic approach to be fully utilized. The startups generally prefer services as the initial costs of such businesses are lower, and so contribute to the trend of deindustrialization. This phenomenon can be perceived as a positive development. However, deindustrialization can also be a result of growing primary sector and thus a sign of regression, as described by Hlavová (2017). Based on their research Zagoršek and Slávik (2017) claim that a strategy requires a certain business model configuration to be effective.

The competitive advantage of startups is often based upon a combination of simple key factors and activities such as advertising, effective partnership building, customer communication, product quality its scalability and usability supported by deliberate brand management. Last, but not least, the form of entry of the foreign market, which largely depends on the financial possibilities of the startup, the nature of the product or service, the distance of the market it wants to penetrate is of great importance. Startups that want to become global must be able to identify the best business model that suits the needs of individual local or regional markets (Maner, 2013).

There are few recommendations for the startups, which should be followed, or at least mindfully considered, when starting the business: "get international, speak customers' language, do not be unreasonably constrained by cost concerns and consider an acquisition." (Fetik, 2013). Become and think globally, considered scaling and growing possibilities, which may be exploited immediately after the development of the prototype. Focusing on customer's language is also very important. Customization is also necessary, even though we live in a world where men use English as a business language, ordinary population of the foreign countries incline more to use a service or an application, which they understand. Initial startup costs are often overrated as several co-working centers that offer rental space at very favorable prices can now be used, as well as the possibility to use various state development programs, subsidies or to take part in the startup competitions with a possibility of winning money to start a business. The last step is focused on acquisitions. Often, even smaller acquisitions that involve entering new markets or joining forces with a new partner and exploiting offered synergy effect. Acquisition of a company is also an excellent strategy for expansion into foreign markets.

Globalization and the internationalization of economic space have also made it often necessary to view the market as global or at least regional. Nowadays, due to the development of science, research, technology, and trend of constant innovation, it is possible to sell products or provide services to anyone in the world. At the same time, the customer also has an almost unlimited supply of goods and services. This is the reason why nowadays, more than ever, a great emphasis is put on marketing - especially on building a positive PR, effective branding and building customer value.

One of the basic features of the startup is its scalability - applying a scalable business model that is based on the potential to achieve significant revenue growth without significant cost increases. In this way, the startup can provide a fast pace of growth in a short time. This scalability is very challengeable for Slovak startups. They should think about foreign markets from the early beginning, at least, about the regional market, for example – European Union.

The startup, which makes a product for the mass market, is much easier to build in America, directly in touch with the big market there. Who wants to make B2C startup from Slovakia, a company with a product for end-users, needs a very low cost for the profits of the users and at the same time be able to form a project for markets whose culture does not know very well. Slovak startups have to prove that they are profitable to attract users from the funds they get from the investors, that is, they manage mainly mass marketing on global markets. (Forbes Slovakia, 2017)

When choosing a suitable form of entry to the foreign market, the time plays a key role because most startups need to expand almost immediately after the completion of product development to find out whether they evoked an interest of foreign customers and investors. Firms can use different modes to enter foreign markets: exporting, licensing, franchising, establishing Joint Ventures, setting up a new wholly owned subsidiary (Hill, 2014) or can also consider about mergers and acquisitions.

Export is the most widespread form of entry, there is possible use direct export (when firms sell services or goods directly) or indirectly form through agents and distributors. Many Slovak startups are also trying to search customers and clients abroad directly, questionable is how much they can analyze the foreign market and capture all the potential opportunities in this market.

Considering entry mode is one of the strategic issues to decide. Startups choose the export as the main form of entry into foreign markets (direct export 67.35 %, indirect export 16.33 %). The next popular entry mode is franchising, about one-tenth of the startups are considering using this form. Licensing is also recommended as an effective entry mode for applications and technological products. However, just under 2 % of the startups use this entry mode (this information is the result of the last phase of the questionnaire collection of our research).

Objectives and methods

The main objective of our paper is to investigate whether a systematic approach is suitable for such unstable and young companies as startups or the more chaotic approach bear some advantages in finding opportunities. Next, we are looking into first mover advantage and whether its pursue is more desirable than deferring and waiting for others to test the market.

Under the systematic approach, we understand an approach where a company strictly follows its plan and does not do fundamental changes to it. This is aligned with the position that a plan needs time to operate efficiently and the benefits from the plan are emerging progressively. Frequent changes on the other hand negatively influence the progress that has to restart every time such a change is made. The opposite approach is the chaotic approach but is not meant derogatory. It is more randomized approach incorporating behaviors reaching from randomized, opportunistic to forced, all having common the strong dependence on outside circumstances. Such approach can be beneficial if there is some substantial unknown variable.

In first mover approach, a startup is pursuing first mover advantage developing and proposing a unique product on the target market, using the proactive approach. The company then collects all the advantages that are associated with it. On the other hand, some second movers are deferring their move and waiting how the situation develops. They react and learn from their competitors' errors and try to enter the market with a refined product.

During our three-year research project, we studied over 70 startups covering their business model and competitive strategy. In this paper, we present the results of the third and final research round. The sampling took place as follows. First, we created a list of startup accelerators and incubators. Next, we contacted all accessible ones within Bratislava region and asked them for assistance. We then

either received a list of startups with contact information, or the request was forwarded to the startups, or the cooperation was denied. Finally, we arranged personal meetings that were then further followed and usually took 2 hours. The first round took place in winter 2015, second in summer 2016 and third in winter 2016.

In our research, we applied following methods. First, we made a general description of the data that we acquired in our research. We described the present state of startup companies, using descriptive statistical methods. During the third round of our research, we collected the data from 53 surviving startup companies using a one on one in person interview with standardized structured questions, interviewing the company founders. Next, we studied the association between systematic and first mover approach and performance factors of startup companies represented by a number of users, paying users, revenue on costs and international reach. To analyze whether the differences were significant we used the t-test. We considered the results to be statistically significant if the p-value was 0.05 or less. To analyze the data we also used the inductive statistical method of multiple linear regression supported by ANOVA. However, these results are not included in this paper as they were not conclusive and did not add any additional value.

In general, the variables were constructed that they could have values from 1 to 5, where the greater number, the better. This could measure the difference from none to great, the development from almost none to fully developed or performance from zero to creating an income.

As a whole, the business model indicator consists of variables based on Osterwalder and Pigneur's Business model canvas presented in Table 1, where at least one variable represents each block of the business model. If there are more variables for one block, an average of these variables was used.

Table 1: Business model indicator construction

<table>
<tr><td rowspan="2">Key Partnerships
1.Partners Presence</td><td>Key Activities (KA)
1.KA Presence</td><td rowspan="2">Value Propositions
1.Customers' Needs Satisfaction
2.Product development</td><td>Customer Relationships (CR)
1.CR Development</td><td rowspan="2">Customer Segments
1.Customers Identification</td></tr>
<tr><td>Key Resources (KR)
1.KR Presence</td><td>Channels (Ch)
1.Distribution Ch Development</td></tr>
<tr><td colspan="3">Costs Structure
1.Cost Structure Knowledge</td><td colspan="2">Revenue Streams
1.Knowledge of Final Price
2.Knowledge of Demand</td></tr>
</table>

Source: Own Research

Our research has limitations in the subjective way of self-evaluation. Self-evaluation is a legitimate method used in a broad field. Self-evaluation provides satisfactory results because the respondents are usually best familiarized with the research object, however, sometimes it can be skewed.

Results

In the results section, we present the results of our research. We describe the studied startup companies in general, as we describe the basic characteristics of the startups and their environment. Then we describe the results of success indicators and the tendency towards systematic and proactive approach.

In our research, we studied 53 startups that are characterized in Table 2. As by definition, startup is a small and young company. There were typically 2 to 12 members in a startup company, existing for 2

to 5 years. A startup in our sample is at least testing its prototype while a typical startup has achieved its first revenues.

Table 2: Sample description

Variable	N	Mean	St.dev.	Min	Max
Age of startup	51	3,84	1,78	1	10,5
Number of team members	52	7,13	5,67	1	30
Business idea development	53	4,36	0,75	3	5
Total addressable market (EUR)	46	$2{,}8x10^{9}$	$10{,}9x10^{9}$	$5x10^{3}$	$62x10^{9}$
Global market	53	3,59	1.39	1	5
Business model (9-45)	47	39,41	5,72	18	45

Source: Own Research

The average market size that a typical startup in our research sample addresses is almost 3 billion EUR and it is an international market. Judging the business model, the entrepreneurs consider their business model as almost final at this stage.

To create a more comprehensive picture of start-ups, we evaluate the competitive environment as is described in Table 3. The life cycle of the industry as well of the key technology is in growth phase what means that the market and the opportunity are still growing. The dynamics of the environment is rather high, but the predictability of future development is also higher. The Competition intensity is rather higher as well. In other words, the startups are active in a growing industry, dynamic and competitive industry with predictable future.

Table 3: Environment description

Variable	N	Mean	St.dev.	Min	Max
Life cycle of industry	53	2,69	1,06	1	4
Life cycle of key technology	53	2,82	0,98	1	4
Environment dynamics	53	3,16	1,24	1	5
Predictability of future development	53	2,79	0,94	1	5
Competition intensity	53	2,98	1,12	1	5
Segmentation	53	2,94	0,88	1	5
Costs	53	3,42	1,02	1	5
Price	52	2,85	0,91	1	5

Source: Own Research

In general, startups from our sample serve several segments offering a product that is rather different from competitors. Their costs are considered to be lower than the costs of competitors. Meanwhile, the price is considered to be the same what indicates price as a mean of differentiation. The other way of differentiation they use is different key technology.

To measure the success of studied startups we selected the number of users, the number of paying users and the portion of revenue on costs as economic indicators and the international market penetration as international reach indicator. Our results are shown in Table 4.

Table 4: Indicators of success

Variable	N	Mean	St.dev.	Med	Mod	Min	Max
Number of users	53	3,87	1,14	5	5	1	5
Number of paying users	53	3,21	1,31	3	3	1	5
Revenue on costs ration	53	3,40	1,66	3	2	1	7
International reach	53	3,58	1,40	4	5	1	5

Source: Own Research

Most of the studied startups had several thousands of users while having several tens of paying user. Most startups could not cover their costs from revenues. However 17 (32,08 %) were profitable. Most startups are already operating on the global market.

Next, we studied whether there is a common approach in respect of systematicness and proactivity what is summarized in Table 5.

Table 5: Systematic and proactive approach

Variable	N	Mean	St.dev.	Min	Max
Systematic approach	53	0,60	0,49	0	1
First mover approach	53	0,42	0,50	0	1

Source: Own Research

We wanted to find out what portion of startup companies have thoroughly planned their approach and are following these plans. We also studied what portion chose to be proactive and tried to gain the first mover advantage with the pioneering proactive approach. We found that the biggest share of startups (22/53, 41,51%) declared a pioneering approach, trying to gain the first mover advantage, followed by second movers adapting to changing the environment (21/53, 39.62%) and other approaches (in SUM passive, reactive, waiting for 10/53, 18.86%).
The most companies tried a systematic approach (32/53, 60.38%) rather than nonsystematic (chaotic, spontaneous, opportunistic, forced, 21/53, 39,62%). These systematic companies tried to set their goal and the way how to achieve it, and then they followed their designated path.

Discussion

In this section we investigate whether there is a positive impact of first mover approach and systematic approach on the success of companies. We want to test whether startups that are proactive and pioneering in their field and hold to their plans can have more users, paying users, revenues on cost ratio and are more widespread on foreign markets compared to their competitors with a different approach.

In the examination we anticipated that the traits of systematicness and proactivity would manifest themselves in some indicator of success. We analyzed its impact on users, customers, revenue to cost ratio, and international reach using t-test, logistic and linear regression, however, we did not find any conclusive evidence for such outright relationship. In our research, we expected one of two outcomes that either a more systematic approach would lead to some advantage based on a principle that it allows companies to focus on the goal as analogously described by Collins (2001) as the flywheel concept. Alternatively, that companies would benefit from a more random approach using trial and error and so finding their way through the business environment. However, as can be seen in Table 6, we were not able to prove none of these results as they were inconclusive. That means that there was no clear impact of systematic approach and it has to be further researched. The explanation could be

that some situations require more systematic approach while other more random as the startups are still looking for the business model.

Table 6: The difference in outcome between systematic and chaotic approach

	Chaotic approach (N=21)		Systematic approach (N=32)			
	M	SD	M	SD	t-test	P
Number of users	3.62	1.84	4.03	0.93	-1.29	0.20
Number of paying users	3.05	2.05	3.31	1.51	-0.72	0.48
Revenue on costs ration	3.19	2.86	3.53	2.71	-0.73	0.47
International reach	3.64	1.73	3.56	2.19	0.20	0.84
Significance level*p<0.05						

Source: Own Research

In Table 7 we analyze the first-mover approach. As you can see we did not found any significant difference in success whether companies were first movers or not. Because startups are very small companies finding themselves in the beginning phase of their development, testing their ideas, it seems that one way how startups are looking for ideas is copying startups in other regions. These startups being copied do not have the reach and power to fight the global competition by now, so the regional market is not occupied right now and can be claimed by the local startup.

It is also meaningful to think about first mover advantage in two ways: the first-mover advantage can be achieved by occupying a new market or by being the absolute pioneer with a new product on the existing market.

In their paperwork from 1988, Lieberman and Montgomery noticed that first mover advantages arise from three primary sources: technological leadership, preemption of assets and buyer switching costs. In the case of a startup, it is possible, at least, to have two of these sources from the very beginning. Standardly startup´s ideas are very innovative and are followed up by a brand new product. Via crowdfunding campaigns or investor´s interest startups can get enough money. When talking about successful startups, the truth is that their products are scalable and can quite quickly reduce both product and buyer costs. Managers often put great emphasis to first mover advantage. According to Victor Finch (2016) “Those institutions – whether in financial or technology sectors – that are willing to move first are most likely going to gain the largest benefits.”

Startups can also benefit from the first mover advantage by implementing a local strategic decision. For example, startup Orderlord is providing “restaurant delivery management software.” Their platform helps to increase customer retention, to boost loyalty and repeating orders and helps to reduce costs thanks to extra gained efficiency. In 2014 startup acquired a very valuable customer (Sushi time) and in the same year, the startup has also acquired its first foreign customer - McDonald´s in Vienna. Startup´s office is situated in Bratislava, what is close to Vienna, so geographic distance was not a problem for business development. Thanks to membership in the EU it was also easier to sign the mutual business agreement. With this local Vienna customer, they have started to operate on Austria market very quickly. Now they are operating in 16 countries worldwide.

Table 7: The difference in outcome between first mover and deferring approach

	Deferring (N=31)		First-mover (N=22)			
	M	SD	M	SD	t-test	P
Number of users	3.81	1.63	3.95	0.90	-0.46	0.65
Number of paying users	3.19	2.09	3.23	1.23	-0.09	0.93
Revenue on costs ration	3.16	2.87	3.68	1.84	-1.19	0.23
International reach	3.53	2.12	3.68	1.85	-0.38	0.71
Significance level*p<0.05						

Source: Own Research

As indicated, startups incline to a systematic approach. However, if the real market changes their mind, they have to act spontaneously. David Menger and Hynek Husník from Prague were coffee lovers, and in 2012 they decided to create a social network that would provide users with the opportunity to write reviews and upload photos from cafes. Moreover, so on November 7, 2012, the first version of the social coffee network Storyous was created. The name comes from the main idea where users will write stories - their impressions of cafes. Over six months, the app downloaded more than 1,000 people who created 837 stories. Later, they added the option of booking tables, ordering meals and paying. After a short time, they found that the restaurant systems are outdated and cannot be linked to modern payment tools. These systems cost 3,000 - 5,000 €, their graphics are old and not user-friendly, all of them are offline, and they do not allow connection between kitchen and storage. So they spontaneously thought to create a universal system for restaurants or cafes - Storyous.Pro. It is an online system that has several advantages: simplicity, great UX, online access to revenue, review of sold products, kitchen connection, storage and 24/7 service. The data is encrypted via an SSL certificate. One of the biggest benefits is low investment costs. The company provides two variants. The Start version is suitable for small and medium businesses with or without a kitchen and includes a large tablet, network printer, rack, and online training. The Profi version is expanded with additional tablet and printer, warehouse management and mobile waiter. The company is constantly growing and currently manages more than 3,000 operations with more than 3 million payments per month. The Storyous team is more than 100 people, and their average age is 26 years. The clients include Pilsner Urquell, Ambiente, mamacoffe, and others.

Some business ideas and models are created systemically: at first find and define the problem, then create a solution, business model, test, and finally launch at the real market.

Andrej Wittner worked in HR, where he still faced the same problem - the finding of right employees. Personnel managers often say they because of not systematic or pragmatic CV they do not invite the right people. All the CVs appear to companies as a single piece of mass with the same skills: creativity, responsibility, teamwork, flexibility, and others. This was the main reason why Andrej took part in the StartupWeekend Bratislava competition in 2012 and together with his team created a platform Challengest that connects students and potential employers. If a company searches for employees, it creates with Challengest a case study. Candidates who apply for a given position will send a case study in addition to their CV. The team in Challengest and in that company will evaluate the results and hire the best one. After they start the project, they have received an investment of € 110,000 to cover operating costs. So the startup could be fully exploited, and the founders left their jobs. Income comes directly from companies that want to find high-quality employees at relatively low-cost and time efficiency. At the same time, startup offers long-term care in branding by companies as quality employers. The company earned the HR Gold award at the end of 2013, has been working with more than 40 companies and the results are very positive. Clients include Microsoft, Eset, Dell, Erste Bank, Hewlett-Packard, Heineken, Orange and many others. The vision is to create a successful international company. They are currently planning to expand to the middle Europe and afterward to the USA. Despite the systematic approach as well as the investment obtained, the company still cannot get the amount that would cover at least the operating costs.

Conclusion

We occupy the position that as a conference paper it is important to report negative results and their implication also especially if they are as interesting as ours are. The approach of a company is strategically important as it is fundamental and it has trade-off characteristics, what means that companies can choose only one and all the processes are then aligned with this approach. The results of our paper suggest further investigation of how and in which circumstances play the systematic approach a role and how it shapes the success of the business. As indicated in our research the evidence of one approach to be more promising was inconclusive. That gives a great evidence that there could be plenty of circumstances when it is beneficial for startups to have a more randomized approach. That means that a thrive for a system or a plan must not always be the right thing to do in startups as suggested by Van Gelderen et al. (2005). Likewise, the inconclusive evidence of positive effect of first mover approach creates the need for further research. It seems that companies do not have to thrive for first mover advantage globally but can benefit from being the first mover on the regional market. We also conclude that in the startup development stage of a company the chance plays a great role in the future success and that the idea can be more important than the approach itself as indicated by our research.

Acknowledgement

This paper is a part of research project VEGA n. 1/0019/15 Business models and business strategies of start-ups.

References

Afuah, A. (2003), Business Models: A Strategic Management Approach, McGraw-Hill/Irwin, New York.

Barringer, B. (2010), The Most Important Considerations for Starting Your Own Business, FT Press Delivers elements.

Blštáková, L. and Joniaková, Z. (2015), Age management as contemporary challenge to human resources management in Slovak companies, Procedia Economics and Finance 34 (2015), 202 – 209.

Bolek, V. (2016). Management skills in working with information. Economics and Management, 13 (1), 65-75.

Collins, J. (2001), Good to Great: Why Some Companies Make the Leap...and Others Don't, HarperCollins, New York.

Early stage investing explained (2016), [Online], [Retrieved May 16, 2016], http://www.eban.org/about-angel-investment/early-stage-investing-explained/

Fetik M. (2013), "Go International, Young Startup,' Harvard Business Review. [Online], [Retrieved June 22, 2016], https://hbr.org/2013/01/go-international-young-startup

Finch, V. (2016), Blockchain: The Essential Quick & Easy Blueprint To Understand Blockchain Technology And Conquer The Next Thriving Economy! Get Your First Mover Advantage Now! Victor Finch, United States.

First Mover [Online], [Retrieved, June 17, 2017], http://www.investopedia.com/terms/f/firstmover.asp

Hill CH. W. L. (2014), International Business: Competing in the Global Market. 10th Global Edition. McGraw Hill Education, Berkshire.

Hlavová, N. (2017), The impact of mineral resources on development in Sub-Saharan Africa. Journal of Environmental Management and TourismOpen Access, 8(1), 67-77.

Hunger, D. L. and Wheelen, T. L. (2008), Concepts: Strategic Management and Business Policy, Prentice Hall, New Jersey.

Kim, W. CH. and Mauborgne, R. (2015), Blue Ocean Strategy, Expanded Edition: How to Create Uncontested Market Space and Make the Competition Irrelevant. Harvard Business Review Press, United Kingdom.

Kornum, N. and Bjerre, M.(2005), Grocery E-commerce: Consumer Behaviour and Business Strategies, Edward Elgar Pub, Cheltenham, United Kingdom.

Liebermann M. B. and Montgomery D. B. (1988), First Mover Advantages. Strategic Management Journal. Volume 9. Special issue: Strategy Content Research, Chicago, IL, USA.

Ljudvigová, I. (2017), Výskum vertikálneho a tímového vodcovstva v slovenských startupoch. Manažment podnikania a vecí verejných : vedecko-odborný časopis, Slovenská akadémia manažmentu, Bratislava.

Lopez, E.L. (2016), First Mover Advantage in Financial Service Innovations, Sloan Schood of Management, Cambridge, USA.

Maner T. (2013), How to take your Startup Global. [Online], [Retrived April 2016] http://www.startupcity.com/leaders-talk/how-to-take-your-startup-global-nid-1149.html

Paulgraham.com. (2012), Startup = growth, [online], [Retrieved 13 June, 2017], http://paulgraham.com/growth.html

Prieskum Startup Ecosystem Survey. 2016 [Online], [Retrieved, July 12, 2017] https://home.kpmg.com/sk/sk/home/insights/2016/06/startup-ecosystem-survey-slovakia-2016.html

Processed according to: Ako uspieť v startupe. FORBES Slovakia, March 2017.

Remeňová, K. (2017), Revenue model as an indicator of business model efficiency of food firms. In Stratégia rozvoja agropotravinárstva a konkurenčná schopnosť agropotravinárskych podnikov II, Recenzovaný zborník vedeckých prác, Ekonóm, Bratislava.

Ries, E. (2015), The Lean Startup. Bizbooks, Brno.

Skorková, Z. (2016) Organizovanie: prípadové štúdie. EKONÓM, Bratislava.

Slávik Š. and Hagarová R. (2016), Business models of start-ups. Podnikateľské modely a podnikateľské stratégie startupov II., Recenzovaný zborník vedeckých prác, Ekonóm, Bratislava.

Suarez F. and Lanzolla G. (2005), The Half-Truth of First-Mover Advantage. Harvard Business Review. [Online], [Retrieved July 22, 2017], https://hbr.org/2005/04/the-half-truth-of-first-mover-advantage

The Top 20 Reasons Startups Fail. [Online], [Retrieved May 15, 2016], https://www.cbinsights.com/research-reports/The-20-Reasons-Startups-Fail.pdf

Van Gelderen, M., Thurik, R. and Bosma, N. (2005). Success and risk factors in the pre-startup phase. Small Business Economics, 24(4), 365-380.

Wagner, E. T.: Five Reasons 8 Out of 10 Business Fail. [Online], [Retrieved June 10, 2017], https://www.forbes.com/sites/ericwagner/2013/09/12/five-reasons-8-out-of-10-businesses-fail/#11bf7b266978

Yayici, E. (2016), Design Thinking Methodology Book. Emrah Yayici, Whitby, Canada.

Zagoršek, B. and Slávik, Š., (2017). How can strategy influence the internal nature of business model? Journal of Applied Economic Sciences, 7 (50), 1080-1090.

Some Considerations about Text Classification Systems Using Weka

Livia Sangeorzan, Transilvania University, Brasov, Romania, livia.sangeorzan@gmail.com

Nicoleta Enache-David, Transilvania University, Brasov, Romania, nicoleta.enache@unitbv.ro

George-Alex Stelea, Transilvania University, Brasov, Romania, george@stelea.ro

Streitferdt Detlef, Technische Universität, Ilmenau, Germany, detlef.streitferdt@tu-ilmenau.de

Elena Rozova, Technische Universität, Ilmenau, Germany, elena.rozova@tu-ilmenau.de

Abstract

We analyze the SMO, Naïve Bayes and J48 performance on a text training dataset. We have done the same analysis having pairs of synonyms, when taking into account the assumption that the synonyms selection must be done according to the meaning of the information in the document.

Keywords: SMO, Naïve Bayes, J48, performance, synonyms.

1.Introduction

Nowadays, machine learning techniques have developed very quickly and they are being used to solve many real-life problems. Document classification is a very actual issue and it has many applications in economy, spam filtering, social media, etc. Document classification uses the following machine learning techniques: SVM classifiers (Support Vector Machine) like in Khashman and Nwulu (2011), Bayesian classification like in Witten et al (2005), classification based on association rules like in Manning et al (2008). The authors Mandru (2016) and Popescu and Mandru (2016) present decision trees and in Guermeur (2005) the authors highlight the k-NN (k-Nearest-Neighbor) classifier, as another machine learning techniques.

These machine learning methods can be used for complex information systems management, like the ones presented by the author in Carstea (2013) and Carstea (2015) and for mathematical models like the one presented by Florea and Rosca (2015).

In this paper we make a comparison of the accuracy and error rates of three classifiers, SMO, J48 and Naïve Bayes on a text training dataset. The training dataset contains also synonyms and we want to see the classifiers' behavior in this situation.

In literature there exist many studies on extracting synonyms automatically, like the authors presented in the paper Wang et al (2012). In the paper Murata et al (2013) the authors use machine learning methods for the automatic selection of synonyms. In our paper we are focusing on studying the three classifiers performance on a training dataset with and without synonyms.

2. Text classification problem

Text classification is used in a variety of fields, like spam detection, social media, language identification, etc and it has a huge commercial potential.

A text classification definition is given by Manning et al (2008): let us consider as input a document d, a fixed set of classes $C=\{c_1,c_2,...,c_n\}$ and as output a predicted class $c\in C$. One can use a Supervised Machine Learning Method that means we consider as input a document d, a fixed set of classes $C=\{c_1,c_2,...,c_n\}$, a training set of m labeled documents $(d_1,c_1),(d_2,c_2),...,(d_m,c_m)$. Then the output will be a learned classifier denoted by $g:d\to c$.

Let us denote the document space by X. In text classification, the authors consider in Manning et al (2008) a description $d\in X$ of a document and a fixed set of classes $C=\{c_1,c_2,...,c_n\}$. Classes are called categories or labels. Basically, text classification means to assign subjects to categories.

3. Weka environment

The classifiers SMO, Naïve Bayes, J48 are implemented in Weka (Waikato Environment for Knowledge Analysis). Weka is a collection of machine learning algorithms for solving data mining problems. It is written in Java and runs on almost any platform. In Witten et al (2005) the authors present the features of Weka: data mining, machine learning, preprocessing, classification, regression, clustering, association rules, attribute selection, visualization

There are three major schemes implemented in Weka:

1. Classification;
2. Numerical forecast /prediction;
3. Another meta-schemes.

4. Case study using SMO, Naïve Bayes, J48 classifiers

We have used a training dataset consisting of 40 documents having 2131 words, respectively 10 documents for the following categories: sport, social media, spam and travel. We have studied the accuracy and error rate when applying three classifiers: SMO, Naïve Bayes and J48.

The dataset was tested using two methods for testing the accuracy: percentage split method, where 66% of the data was used as training dataset and 33% as testing dataset and the 10-fold cross validation method. We have obtained the results from the Table 1.

Table 1: Accuracy and error rate -all

Method	Accuracy			Error Rate		
	SMO	Naïve Bayes	J48	SMO	Naïve Bayes	J48
Percentage Split 66%	63.63%	81.81%	54.54%	36.36%	18.18%	45.45%
10 Folds Cross Validation	65.62%	71.87%	53.12%	34.37%	28.12%	46.87%

From Figure 1 we can see that the Naïve Bayes classifier achieved the highest accuracy (81.81%) and the lowest error rate (18.18%) using the percentage split 66% option.

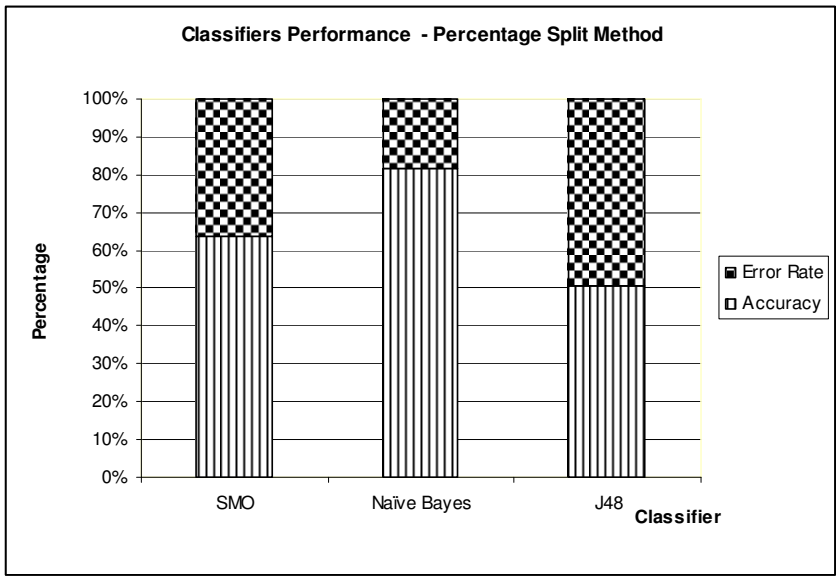


Fig. 1. Accuracy and Error Rate using percentage split method

From Figure 2 we can see that the J48 classifier achieved the lowest accuracy (53.12%) and the highest error rate (46.87%) using 10-folds cross validation option.

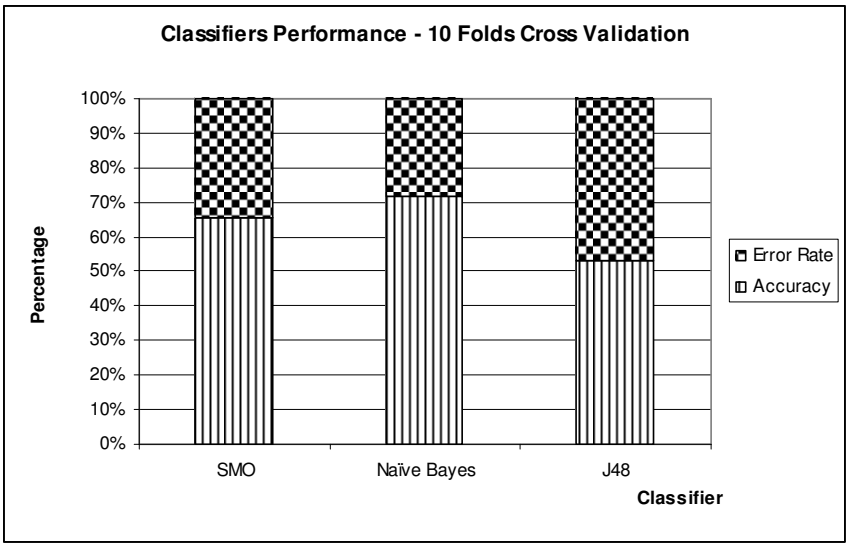


Fig. 2 Accuracy and Error Rate using 10-folds cross validation method

Our study was conducted also on the time recorded to build the model for the three classifiers. The results are presented in Table 2.

Table 2: Time to build the model for SMO, Naïve Bayes and J48

Method	Time (sec)		
	SMO	Naïve Bayes	J48
Percentage Split 66%	0.02	0.08	0.02
10 Folds Cross Validation	0.09	0.03	0.09

The results show that the best amount of time was achieved by SMO and J48 classifiers with percentage split method (0.02 sec), followed by Naïve Bayes classifier that achieved the time 0.03 sec for 10-folds cross validation method.

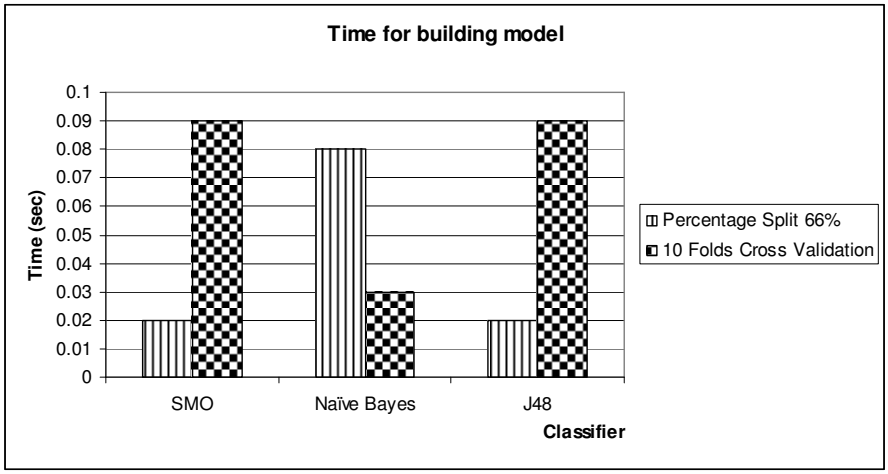


Fig. 3 Amount of time to build the model

In conclusion, Naïve Bayes classifier achieved the highest accuracy, while SMO and J48 classifiers achieved the best amount of time for building the model, with percentage split method.

In our training dataset we had a pair of synonyms: holiday and vacation and we have obtained the accuracy and error rate from Table 1. We made a simulation of accuracy and error rate by replacing vacation with its synonym holiday in the training dataset. We have obtained the results from Table 3.

Table 3. Accuracy and error rate by replacing synonyms

	Accuracy			Error Rate		
	SMO	Naïve Bayes	J48	SMO	Naïve Bayes	J48
Percentage Split 66%	63.63%	81.81%	54.54%	36.36%	18.18%	45.45%
10 Folds Cross Validation	68.75%	71.87%	53.12%	31.25%	28.12%	46.87%

One observes that the accuracy of SMO with 10-folds cross validation method has increased from 65.62% to 68.75%. The conclusion is that replacing one word with its synonym can be done with the help of an expert in respective domain, in order to increase the accuracy of the model.

5. Conclusion

In our study we make a comparison of the accuracy and error rates of three classifiers, SMO, J48 and Naïve Bayes, on a text training dataset. Firstly, we do not take into account the synonyms, and secondly we replace the synonyms in entire document.

In first case, the results show that Naïve Bayes classifier achieved the highest accuracy (81.81%) and the lowest error rate (18.18%) using the percentage split 66% option, and the J48 classifier achieved the lowest accuracy (53.12%) and the highest error rate (46.87%) using 10-folds cross validation option.

In second case, the accuracy of SMO with 10-folds cross validation method has increased from 65.62% to 68.75%.

The conclusion is that when taking into account the synonyms, their selection must be done according to the meaning of the information in the document.

References

Carstea, C. (2013), 'Control and management in complex information systems', Bulletin of the Transilvania University of Braşov, Series III Mathematics • Informatics • Physics, 73-87.

Carstea, C. (2013), 'Optimization Techniques in Project Controlling', Ovidius University Annals Economic Sciences Series, 1: 428-432.

Carstea, C.G. (2015), 'Modeling System's Process for Control Of Complex Information Systems', Proceedings of The 25th International Business Information Management Association Conference (IBIMA), ISBN: 978-0-9860419-4-5, 7-8 May, 566-574.

Florea, O. and Rosca, I. (2015), 'The Mechanical Behavior and the Mathematical Modeling of an Intervertebral Disc', Acta Technica Napocensis Series-Applied Mathematics Mechanics and Engineering; 58, 213-218.

Guermeur, Y. et al (2005), 'A comparative study of multi-class support vector machines in the unifying framework of large margin classifiers', J Appl Stoch Model Bus, 21, 199-21

Khashman, A. and Nwulu, N.I. (2011), 'Support vector machines versus back propagation algorithm for oil price prediction', Advances in Neural Networks, 530-538.

Meyer, P.L. (1970), Introductory probability and statistical applications, Addison Wesley Publishing Company.

Manning, C.D., Raghavan, P. and Schütze, H. (2008), Introduction to Information Retrieval, Cambridge University Press.

Mandru, L. (2016), 'How to Control Risks? Towards A Structure of Enterprise Risk Management Process', Journal of Public Administration, Finance and Law, 80-92.

Murata, L., Goda, Y. and Tokuhisa, M. (2013), 'Automatic Selection and Analysis of Synonyms in Japanese Sentences Using Machine Learning', International Journal of Innovative Computing, Information and Control, 9, 4231-4246.

Murata, M., Kojima, M., Minamiguchi, T. and Watanabe, Y. (2013), 'Automatic selection and analysis of Japanese notational variants on the basis of machine learning', International Journal of Innovative Computing, Information and Control, 9, 4231–4246.

Popescu, M., Mandru, L. (2016), 'Relationship between Quality Planning and Innovation', Bulletin of the Transilvania University of Braşov, Series V, Economic Sciences, Vol 9 (58) No. 2, 203-212.

Sangeorzan, L., Stelea, G.A., Enache-David, N. (2016), Web Development Techniques for Applications and Websites, Transilvania University Press, Brasov, Romania.

Wang, T., Hirst, G. (2012), 'Exploring patterns in dictionary definitions for synonym extraction', Natural Language Engineering, 18, 313–342.

Witten, I.H., Frank, E., Hall, M.A. and Pal, C.J. (2005) Data Mining: Practical Machine Learning Tools and Techniques, Morgan Kaufmann, Amsterdam.

An Analysis of Direct Leadership in The Army of the Czech Republic

Kozáková Eva, University of Defence, Brno, Czech Republic, eva.kozakova@unob.cz
Radomír Saliger, University of Defence, Brno, Czech Republic, radomir.saliger@unob.cz

Abstract

The article analyzes process of leadership and its way of acceptance by leaders at level of direct leadership from the perspective of all published accessible documents in the army of the Czech Republic. This paper finds out the current conditions of represented area, causes, defines and specifies the issue with following methods: dimensional analysis, stakeholder analysis and problem tree analysis. The result of this study is a proposal for further steps that will be taken to ensure a unified promulgated concept in the field of leadership of the ACR.

Keywords: Analysis, Direct leadership, Leader, Army of the Czech Republic

Introduction

Nowadays a new trend is appearing that army shouldn't be different from democratic society. Thanks to that a new need is created to describe existing leadership's styles and considering new form of leadership. Application of democratic form of commanding means replacing authority of power by partnership in conditions of the Czech professional army.

M. Janowitz, describes that the fulfillment of term army authority has already changed. More emphasis is focused on the treatment, persuasion and consent of the group than authority of power (Janowitz, 1964). The leaders cannot present their under influences of authority of power. It is necessary to behave as army professional, partner, adviser, defender, speaker of subordinates and team worker. If they are able to behave this above mentioned way, they are able to get natural influence and then become good partner of soldiers and be successful in their work function. It is important to realize that army leader has only responsibility of accepted decisions (Woolfe, 2002).

Based on this notification is important to be apprising with all factors which can impact the leadership in different kind of circumstances. Leaders need for their decisions the newest information which accurately reflecting reality. The growing up volume of information is connected with increasing difficulty of their processing. In contemporary conditions leadership requires maximal concrete. The requirement as efficiency, precision and speed are more important than before. Also the range of working assignment is extended (Bartholomees, 2010).

Theoretical background

In the Czech Republic the process of professionalization of armed forces was finished on 1. 1. 2005. First change for army leaders has manifested in external environment. The security risk has transformed the characters of the threats to asymmetric form (terrorism) and non-military character (natural disasters). This requires international army cooperation and close connection with civil folders. The second change has been appeared in intern environment. Soldiers of basic service were replaced by professional soldiers in basic positions. The consequences of this transfer can be seen, among other things, in the potential need to modify the pattern of commanding of subordinates (Laštovková, 2014). Based on the findings of literature, documents and researches relating to the given issue, the following research problem has been defined: What is the key

problem in the process of leadership and its way of acceptance by leaders at level of direct leadership from the perspective of all published accessible documents in the army of the Czech Republic.

The army leader should be a manager and also coordinator, who streamline the work of subordinates to achieve defined goals. Commanders of all levels are required to ensure the sequence of training at all stages of preparation during the planning and execution of the training and to seek to use the planned number of hours efficiently to meet the stated objectives. In order to achieve these above-mentioned aspects, it is necessary for the leaders in the given locations to be able to rely on sufficient publication support that can facilitate the process of leadership and the way of its acceptance.

Currently a huge amount researches and articles about leadership styles and their acceptance of leaders are published (Plamínek, 2002). The first aspect is the linking of pedagogical psychology to the leader's work. It emphasizes the training and professionalism which are basic features of the present army. The obligation to conduct professional training is the responsibility of each leader. It is necessary to have basic knowledge in this area and to guide the educational process of his subordinates to achieve effective and highest quality results (Armáda České republiky, 2007).

Further there are also discussed trends in the effective preparation of leaders for the modern security environment. It focuses on the requirements of person's ability and their preparation to fulfill the functions and tasks in this setting (Ministry of Defense, 2005). Some authors are focusing on the training of senior officers. In the career courses is reducing the number of teaching hours and content of selected topics. For keeping required quality of military career courses is necessary to create highest and efficient system of autonomously preparation of soldiers for instance with using e-learning.

In the United States leadership is compiled by document called Leadership, Competent, Confident, and Agile, which was published in 2006. This edition was edited and extended to profounder details and concluded new area in 2015 (Department of the Army Washington, 2006). It contains all features, which are connected to process of leadership in the army. It is very accurate and educative document. The follow example of similar publication is Developing Leaders - a British Army Guide, which was published in England in 2014 (The Royal Military Academy Sandhurst, 2014).

Methods

For clarifying the introductory issue of process of leadership and his way of acceptance from perspective of accessible published materials and document at the level of direct leadership were applies following methods: dimensional analysis, stakeholder’s analysis and method tree problem analysis.

The goal of this study is to analyze the mentioned above process through chosen methods and based on them defined, reframe and specifies the key problem in training and development of leaders on the level of direct leadership.

The problematics is solved in several below mentioned perspectives:

1. To reveal the widest range of aspects of the problem by using dimensional analysis.

2. To identify all entities and persons involved in the problem by influencing their interest and power through stakeholder analysis.

3. To formulate and specifies the issue through tree problem analysis.

The limits of the research are following. The article is focused mainly on direct level of leadership in the Army of the Czech Republic. Another limiting condition for solving selected problems is that the defined methods are applied only within the Army of the Czech Republic. Due to the timing of article processing and gradual changes related to the given issue, an Analysis of Direct Leadership in the Army of the Czech Republic has been examined until August 30, 2017.

In the Czech army, several publications and documents exist, which describing army leadership. At present, unfortunately, compared to foreign countries, the publications are not uniform. There is no uniform concept that would be presented in a single publication focusing on the issue of leadership. For analyze the aspects of the issue was applied dimensional analysis.

Table 1: Dimensional Analysis

Dimension	Critical question	Questions to analyze the issue in defined dimension	Answers to questions
Substantive	**What?**	Doing something wrong, or failing to do something? Is it necessary to change attitudes or practices? Is the irritant we see the actual problem or merely a symptom of it? Active threat or source of irritation? Is the problem masked (e.g. covert human relations issues)	There are not possibilities to issue on a unified concept of leadership in the process of leadership and the way of its acceptance in the army leaders. It is necessary to unify fragmented individual documents into one concept. We are dealing with the problem. Problem is obvious.
Spatial	**Where?**	Is it merely local or are their some remote influences? Recognize the exact area concerned? Is the problem isolated or linked to several other problem areas.	This is a problem in our country Czech republic. The coming trends have influence from other foreign

			armies, where the concept of leadership is worked out as a comprehensive publication. It is necessary to make improvement in publication which are available in ACR For example, they do not have such a sophisticated concept of leadership in Slovakia. Influences the leaders at all levels of command and their subordinates, impact on the population.
Temporal	**When?**	Which are parts are new and which are old? Is the problem happening or looks as though it may happen? Is the problem always there, irregular or cyclic?	The problem is constant, real and actual.
Quantitative	**How much?**	Is there a single cause or are there many? How many people are affected by the problem? Is the problem applicable to a broad category or very specific sub-area? Are there several elements to the problem with complex interactions? Appears as a shortage or surplus?	This is a specific issue that has multiple causes. It applies to all components of the ACR and mainly to the leaders. There is insufficient uniform published leadership concept.
Qualitative	**How serious?**	Is it an issue with deep values or surface practicalities? Is it a live-or-die issue, or one to do with managing quality? What priority does the issue have top or bottom? What values are being violated?	The problem concerns the fundamental values and principles of the whole leadership in the

		To what degree are they being violated? Proper/improper values? Not all values should be honoured.	ACR. It is about improving the quality of documentation provided in the field of leadership in the army. The priority is high because the documentation is linked to the implementation of the leadership process and the way of acceptance by the leaders at all army level.

Source: made by the author

Stakeholder's analysis

Based on the discussed problematic and defined goal of study was conducted the stakeholders analysis. Stakeholders is a person or organization which is active connected to process of leading and his acceptance or their interest can be positive of negative affected. It can influence the running of define aspects and results (Grasseová, 2008). First step is identifying stakeholders and their interest. Than is creating analysis matrix of power and interest to reveal key stakeholders (high power and high interest).

Table 2: Analysis of stakeholders

Stakeholders	**Their interest**
President , Parliament a government CZ	Responsible for political-strategical level of leadership and management.
Ministry of Foreign Affairs	Responsible for practical establishments, which conclude the processes of leadership in international organization which Czech republic is member of.
Ministry of defense	Responsible for function of army strategical level of leadership and management for realization accepted army establishments to fill state security policy.
Chief of the General Staff of Armed Forces (NGŠ AČR),	Is representor of army strategical level of leadership and management AČR and he is responsible for construction, training and reaching operational abilities ACR which are defined by Army strategy CR. It assures delegation of need authority to leadership and management and for transmits allocated units to subordinates to international leaders.
Commander of Air Force Commanders of Land Forces	Responsible to be represented of fulfillment defined army values. They require accomplish assignment, understand requirements assure their training, support and develop of subordinates and motivation to achieve the highest results, keeping standards of army training, helping to create safety environment.
Training Command - Military Academy	Be responsible for organization and providing basic, professional, specialize training, career and army education and training officers, first class sergeants and command sergeant majors.
Capabilities Development and Planning Division	Be responsible for professional management of system of the leadership, define principles and standards in area of common preparation of land, air forces and Combat Search and Rescue ACR
Personnel Agency AČR	Be responsible for realization of management of career soldiers, evaluating of professional quality, education, personal administration (key choice of leaders).
Military schools	To be responsible for acquiring and developing competences to leadership, ensure theoretical knowledge in define areas in student of accredited study. Organize a provide career courses for higher officers.
Military professionals	Be responsible for their working assignments in their position. They support with their practical knowledge to the process.
Secondary	
Professional public	Interest about defense strategy of our country.

Source: made by the author

Following step for stakeholder's analysis is estimating the level of power and the degree of influence of each stakeholder. The stakeholder power refers to the quantity of resources: human, financial and political resources available to the stakeholder and their ability to mobilize them. The influence refers the sum of power level of each stakeholder has in terms in human, financial

and political resources. For assigning the level of interest and influences were defined below mentioned scale.

Level of interest
0 – A very uncertain assumption, there is no evidence to support the claim.
10 – A very certain assumption is the evidence to support the claim.

Level of influences
0 – An insignificant assumption, that the influence of the stakeholders is negligible.
10 – A very significant assumption, the influence of stakeholders on achieving the goal is substantial

Table 3: Evaluation the level of power and interest

Stakeholders	**Interest**	**Power**	**Recommendation**
President , Parliament a government CZ	8	2	Continually inform
Ministry of Foreign Affairs	4	1	Track and answer questions
Ministry of defense	10	10	Intensely communicate and manage relationship, lead dialogue
Chief of the General Staff of Armed Forces (NGŠ AČR),	10	10	Intensely communicate and manage relationship, lead dialogue
Commander of Air Force Commanders of Land forces	4	10	Ensure satisfaction
Training Command Military Academy	4	10	Ensure satisfaction
Capabilities Development and Planning Division	10	10	Intensely communicate and manage relationship, lead dialogue
Personnel Agency AČR	7	1	Continually inform
Military schools	4	10	Ensure satisfaction
Military professionals	8	0	Continually inform
Secondary			
Professional public	1	1	Track and answer questions

Source: made by the author

Identification of person and subjects are divided to stakeholder's matrix. Based on level of power and influence they are categorizes to each appropriate area. As can be interpreted from the mentioned above table of the level of influence and interest, the greatest influence and interest in

solving the given issue should have the Ministry of Defense, the Chief of Staff of the Czech Armed Forces Development and Capabilities Development and Planning Division.

Level of interest:

High: President , Parliament a government CZ, Ministry of Defense, Chief of the General Staff of Armed Forces, Capabilities Development and Planning Division, Personnel Agency AČR, Military professionals.

Low: Ministry of Foreign Affairs, Commander of Air force, Commanders of Land forces, Training Command - Military Academy, Military school, professional public.

Level of power:

High: Ministry of Defense, Chief of the General Staff of Armed Forces, Commander of Air force, Commanders of Land forces, Training Command - Military Academy, Capabilities Development and Planning Division Military schools.

Low: President, Parliament a government CZ, Ministry of Foreign Affairs, Personnel Agency AČR, Military professionals, professional public.

Graphically, stakeholder analysis can be illustrated as follows:

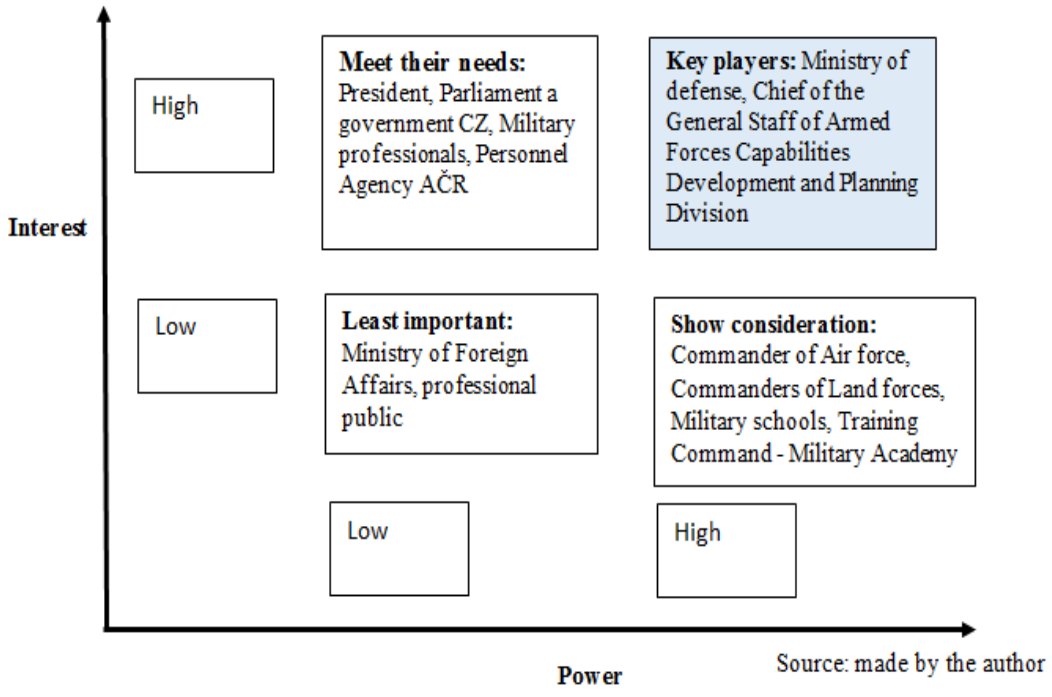


Fig 1: Graphical indication of stakeholder's analysis matrix

Problem tree analysis

This part is focused on formulation of problem through problem tree analysis. It is necessary to define the required state of the problem to appropriate and prehension formulation of the issue. The expected condition is unique publication of leadership in ACR. The concept should contain explanatory basic terms, structure, competency model, requirements of leaders, leader's performance indicators, preparation and de development, support by everyday situations, possible problem and their solution and others.

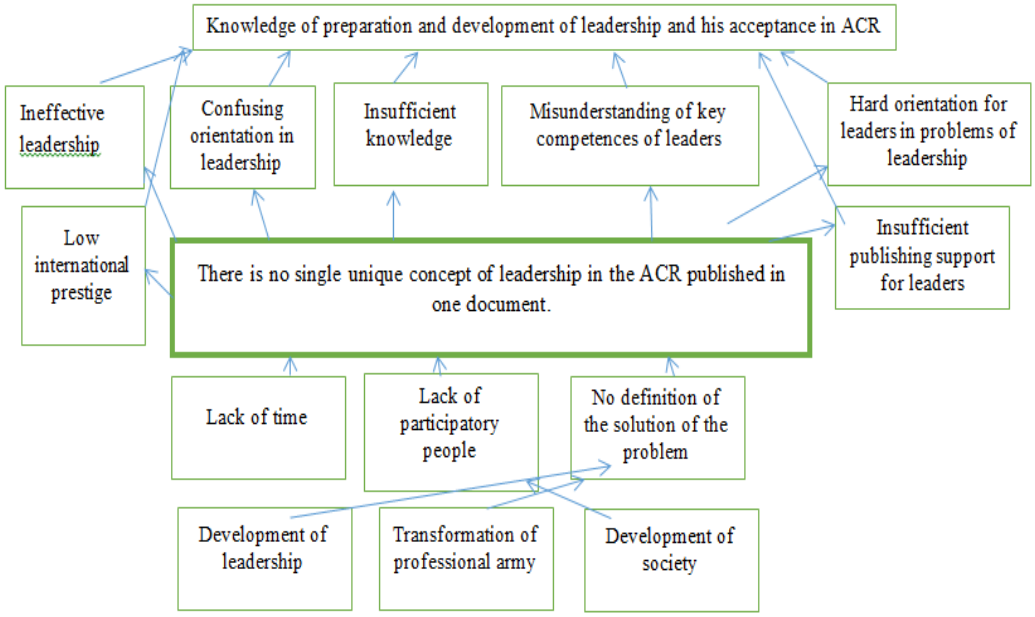


Fig 2: Problem tree analysis

Source: made by the author

Conclusion and recommendation for next procedure

To fulfill aim of this study were applied the following methods dimensional analysis, stakeholder's analysis, problem tree analysis. The previous formulation of key problem was: *"What is the key problem in the process of leadership and its way of acceptance by leaders at level of direct leadership from the perspective of all published accessible documents in the army of the Czech Republic"*.

Based on the study the key problem has been rephrased and specifies to following formulation: *"There is no unique concept of leadership in one publication in the army of the Czech Republic"*. On the basis conducted analysis has been suggested following steps. First step is to analyze all availability publicized concept of army leadership and make comparison of them. The second step is creation the suggestions of concept to unique publication. Than is necessary to lead a discussion with key selected individuals. Based on the result of these discussions will be done correction of text. After final correction the concept will be submit to selected structures. Than will be review and approval procedures. Afterward the publication will be published, it should be possible to educate carefully chosen individuals how to apply the publication to benefit in practice.

The analysis provides complex review about this problematics and thanks to analysis has been specified the formulation about problem and set up following steps. The study is also serving as a background for dissertation thesis with the title direct leadership in the army of the Czech Republic.

References

Armáda České republiky (2007) Příprava příslušníků Armády České republiky, Praha.

Bartholomees, J. Editor Jr. (2010) Theory of war and strategy, United States.

Department of the Army Washington (2006) Army Leadership Competent, Confident, and Agile, FM 6-22, Washington.

Grasseová, M., Dubec, R., & Horák, R. (2008) Procesní řízení ve veřejném sektoru: teoretická východiska a praktické příklady, Computer Press, Brno,

Janowitz, M. (1964) The Military in the Political Development of New Nations. University of Chicago Press. Chicago.

Laštovská, J. ,Bernádrová, K. (2014) 'Proč Afghánistán? Profesionalita, peníze, nebo ideály? ' *Vojenské rozhledy*, roč. 23 (55), č. 4, s. 40–50.

Ministry of Defence (2005) Programy přípravy mechanizovaných jednotek, Praha.

Plamínek, J. (2002) Vedení lidí, týmů a firem: praktický atlas managementu, Grada, Praha.

The Royal Military Academy Sandhurst (2014) Developing leaders a british leaders guide, The Sandhurst Collection, The Royal Military Academy Sandhurst,

Woolfe L. (2002) The Bible on leadership, NY: AMACOM, New York.

Risk Management in Agriculture

Iulia Gradinaru (Cristea), University of Agronomic Sciences and Veterinary Medicine Bucharest, 59 Marasti Boulevard, District 1, 011464, Bucharest, Romania iulka2003@yahoo.com

Dorina Mocuta A.Prof. Univ PhD University of Agronomic Sciences and Veterinary Medicine Bucharest, 59 Marasti Boulevard, District 1, 011464, Bucharest, Romania dorinamocuta@yahoo.com

Corresponding author: dorinamocuta@yahoo.com

Abstract

What risk means? Risk - (in the spelling of risque from French) is the potential of gaining or losing something of value.
Risks can be identified in any field of activity. It is extremely important to be able to identify, quantify and manage them. Comparing to the risk, uncertainty in agriculture takes a multitude of forms and is determined by the random character of natural (climatic) events.
Agriculture is one of the largest and most significant industries in the world. Agriculture, as we all know, is the backbone of any country.
Agricultural productivity is important not only for a country's balance of trade, but the security and health of its population as well.
Agriculture covers a wide range of subjects: economic situation, financial aspects, structure, trade, rural development, markets et cetera. [1]
A common phenomenon in agriculture is an asset structure incompatible with farming conditions. [2]

Key words: risk, risk in agriculture, risk management, agriculture

Introduction

Risk can be defined as a possible, predictable or unpredictable event that generates material profits or losses. Starting from this definition we can uncover idea that risk should not arise only as a negative event, because it can also bring extraordinary opportunities for those who know how to evaluate and manage it. In fact, in the Guide proposed by The Economist Books, it is said that "for the risks assumed investors get a gain" and, in general, "the higher the risk, the more substantial the gains will be." [3]

In the world of finance, risk management can be defined as a practice to identify potential risk in advance, analyze it and take precautionary steps to reduce/curb the risk. It is well known that when an organization makes an investment decision, it exposes itself to a number of financial risks. These risks might be high inflation, volatility in capital markets, recession, bankruptcy, etc. In order to control the exposure of investments to such risks and to minimize it, fund managers and investors practice risk management. [4]

In conclusion, the risk should not be avoided but primarily identified and evaluated in order to turn potential negative outcomes into opportunities.

Materials And Methods

Last few years were tumultuous in the agricultural sector due the price volatility, with sharp swings in product and input prices. The macro-economic disturbances, disease outbreaks and adverse weather (floods and droughts) affected the markets quite a lot. With agricultural policies that are more decoupled from production and prices, farmers are now more exposed to market forces than in the past.

Now, the risk management in agriculture is an essential tool for farmers to anticipate, avoid and react to possible shocks. The standard of living of those who depend on farming, the strength of the viability of farm businesses, an environment which supports investment in the farming sector can be preserved with an efficient risk management system for agriculture.

The National Union of Insurance and Reinsurance Societies of Romania (UNSAR) considers that France's risk management model has proved to be functional and has inspired several European Union countries to manage agricultural issues. Thus, risk management in the agricultural sector could be achieved by subsidizing insurance premiums, a measure that would increase the accessibility of agricultural insurance and would cause insurance companies to cover risks that are not insured in Romania at this time, such as the drought. We mention that at the level of the EU countries, 82% of the European and national subsidy is oriented towards the subsidization of insurance premiums. Mutual funds are also an effective tool for farmers as a solution to unsafe risks with a significant impact but also a lower frequency. In France, for example, this mutual fund covers systemic environmental and sanitary risks. [5]

Farming is risky. Farmers live with risk and make decisions every day that affect their farming operations. Many of the factors that affect the decisions that farmers make cannot be predicted with 100 percent accuracy: weather conditions change; prices at the time of harvest could drop; hired labour may not be available at peak times; machinery and equipment could break down when most needed; draught animals might die; and government policy can change overnight. All of these changes are examples of the risks that farmers face in managing their farm as a business. All of these risks affect their farm profitability.

Risk in farming can be structured in five areas : production, marketing, financial, institutional and human.

- Production risk – the weather, the pests and deseases can affect the crop and livestook performance. Low rainfall or drought, outbreaks of pests or diseases may lead to low yields. Hail or heavy rains could damage or even wipe out crops. It is impossible for farmers to know how much rain will fall, or whether there will be a hail storm when are sowing their seeds or fertilize their land,or if there will be a problem with pests or diseases, but still they have to decide whether they are going to plant their crops or raise their livestock. They dont know for sure that the investemnet in plough, plant and fertilize their crops can be recovered. So, this is why there is a risk. The equipment can be also a source of production risk. A scenario can be a tractor that may break down during the production season resulting in an inability to harvest in time, thus affecting yields.

- Marketing risk -changes in prices are beyond the control of any farmer. The price of farm products is affected by the supply of a product, demand for the product, and the cost of production. Price movements can be predicted when they are follow seasonal or cyclical trends, that can also be predicted. The lack od rain affects crop production and as a result prices rise.

- Financial risk – occurs when money is borrowed to finance the farm business The risk is the incertitude of future interest rates, the assurance of having funds when needed and, of course, the ability of the farmer to generate income for refunding the loan.

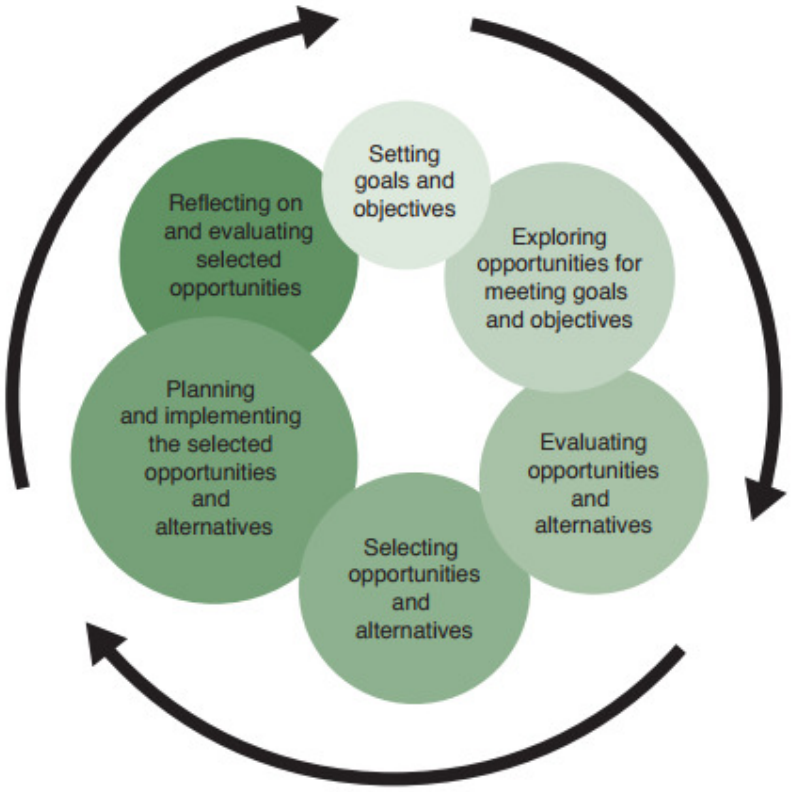
- Institutional risk - unpredictable changes in the provision of services from institutions that support farming, such as banks, cooperatives, marketing organizations, input dealers and government extension services. Price support and subsidies are part of government policy, an uncertain risk rated as institutional one.

- Human risk - refers to the risks to the farm business caused by illness or death and the personal situation of the farm family. Such kind of incidents can disrupt farm performance. Migration away from rural areas can cause labour shortages for the farm. When farmers plant their crop or commit resources to raise livestock they cannot be certain whether they will have enough labour to manage the farm enterprises.

All these 5 types of risk, production, marketing, financial, institutional and human, exist on most farms. The ability to repay debts depends on levels of production and the prices received for produce sold. Financing of production depends on the ability to borrow capital and the ability of the lender to supply capital in time. The different types of risk often need to be considered together.

Decisions about the farm are made in the context of the farmer’s goals and objectives. They guide and influence the decisions the farmer makes. Because decisions are made to achieve goals and objectives, it is helpful for farmers to understand the essential elements of decision-making. The basic decision-making process is shown in Figure 1. The goals are set; farmers look at the different ways to achieve the goals; they evaluate the different alternatives; select the best alternative; plan for implementation; and review and evaluate the consequences of the action. This is often called the decision-making cycle. [6]

Figure 1 Risk management: the decision-making cycle



Source: http://www.fao.org/

Results And Discussions

Based on the specific of the country, climate, and local agricultural production systems, risks faced by farmers are numerous and varied. The key risks faced by farmers are shown in Table 1.[7]

Table 1. Key Risks Faced by Farmers

RISK	EXAMPLES/FACTORS	EFFECTS
Weather risks	Rainfall or temperature variability or extreme events	Lower yields, loss of productive assets or income
Biological risks	Pests, disease, contamination	Lower yields, loss of income
Price risks	Low prices, market supply and demand, volatility	Lower prices, loss of income
Labor and health risks	Illness, death, injury	Loss of productivity, loss of income, increased costs

Policy and political risks	Regulatory changes, political upheaval, disruption of markets, unrest	Changes in costs, taxes, market access

Source: https://nevegetable.org/big-five-risks-faced-farmers

In agriculture exists multiple risks that should be well noted. For example, even if farmers have managed their own direct risks, indirect risks can cause losses – an outbreak of aflatoxin in maize in a given country may lead to the imposition of an import ban by potential buyers. Even though farmers and the supply chain they are involved with may have well managed this risk and their maize is aflatoxin free, they will suffer from the country's market access restrictions

.

Table 2, provides some examples of the different tools according to severity and stakeholder.[7]

Table 2. Risk Management Tools

	POTENTIAL RISK MANAGEMENT MECHANISMS			
SEVERITY OF RISK		HOUSEHOLD/COMMUNITY	MARKETS	GOVERNMENTS
	Nonspecific	Sharecropping Farmer self-help groups Water resource management	New technology Improved seed	Irrigation infrastructure Extension Agricultural research Weather data systems
	Low	Crop diversification Savings in livestock Food buffer stocks	Formal savings	
	Moderate	Labor diversification Risk pooling (peers, family members) Money lenders	Formal lending Risk sharing (input suppliers, wholesalers)	State-sponsored lending
	High/ Catastrophic	Sale of assets Migration	Insurance	Disaster relief State-sponsored insurance

Source: https://nevegetable.org/big-five-risks-faced-farmers

One of the major risks in agriculture is the weather. It is also very difficult to generalize weather-related risks due the vast variety and complexities of global climates. The negative impacts of weather events can be aggravated by poor infrastructure and mismanagement. From this point of view there are two main types of risk to consider: unforeseen events (windstorms or heavy rain) and cumulative events that occur over an extended period (drought). Key weather risks are shown in Table 3.[7]

Table 3. Main Weather-Related Risks Affecting Agriculture

HAZARD	COMMENT
Drought (rainfall deficit)	Crop varieties adapted to mean rainfall and water balance Rain-fed agriculture predominates globally Annual or multiannual Key risk to livestock
Excess rainfall and flood	Excess rainfall causes direct damage and indirect impacts Riverine, flash, coastal floods Watershed management, drainage, irrigation have impact on flood
High temperatures	Impact on evapotranspiration and related to drought Seasonality and vulnerability to crop stages
Low temperatures	Frost (short-term low temperatures, early and late season damages) Freeze (winterkill) Growing degree days (lack of warmth during season)
Wind	Cyclonic severe events (hurricane or typhoon) Frontal windstorm Local windstorm and tornado
Hail	Localized, but may be severe

Source: https://nevegetable.org/big-five-risks-faced-farmers

Insurance is a small part of an array of approaches and instruments that are available to help the financial management of risks through transfer to a third party.
The risk-layering concept is useful for planning and structuring of risk financing and transfer. Layering risk allows systematic decisions for more efficient risk retention, mitigation, and risk transfer. [8]

In terms of recommendations we can name all bellow:

- Government policies should take a comprehensive approach to risk management, estimate all risks and their relationship to each other and avoid focussing on a single source of risk such as prices.

- Agricultural risk management policies should focus on catastrophic risks that are rare, but cause significant damage to many farmers at the same time. The plans should be defined in advance in terms of procedures, responsibilities and limits of the policy response.

- One way of providing disaster assistance can be the subsidized insurance which tends to crowd out the development of private insurance markets and has not been successful in preventing additional ad hoc assistance being granted after the event.

- Good “start-up” conditions should be facilitated and we refer here at information, regulation and training, which – should be the primary role for the government in the development of market-based risk management tools such as futures, insurance and marketing contracts.

- Farmers themselves should preserve the management of normal risk. Government policies should not provide support to deal with normal risk. [9]

Conclusions

Risk management is and will be a key driver of policy in agriculture. Climate change is likely to increase the probability of extreme events. Especially for "Small farms, it is the most important for adapting to climate change" [10] by analysing risks and preventing them. Catastrophic risks affecting agriculture will continue to require government action to ensure quick recovery. This is particularly the case for risks and risk management strategies involving externalities like pest and disease risks.

The challenge ahead is separating this legitimate policy objective of assistance to disasters from the management of “normal risks” and the provision of general income support to agriculture.

Farmers should develop a broad range of strategies that take into account the advantages and disadvantages (benefits and costs) of each risk management option individually and in combination. In this case, several training activities sessions should be organized to sensitize farmers to the need for a more systematic risk management and also to assurre them about the importance of financial institutions, which matters when it comes of risk management, because they affect the way risk is managed.

References

[1] http://www.madr.ro/en/

[2] TRENDS IN AGRICULTURE ENDOWMENT WITH MACHINERY IN ROMANIA 2007-2015**.** Agatha POPESCU, Toma DINU, Elena STOIAN, Ionela Mituko VLAD

[3] Hindle T., (Coordinator), Finance. Guide proposed by The Economist Books, Ed. Nemira, Bucharest, 1998, pg. 163.

[4] http://economictimes.indiatimes.com/definition/risk-management

[5] [www.unsar.ro]

[6] http://www.fao.org

[7] https://nevegetable.org/big-five-risks-faced-farmers

[8] https://www.agriskmanagementforum.org/

[9] http://www.oecd.org/agriculture/

[10] GURLUK S., ADAPTATION ECONOMICS TO CLIMATE CHANGE: KEY VULNERABILITIES OF SMALL-HOLDER FARMS, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 17, Issue 2, 2017 PRINT ISSN 2284-7995

E-Government and Corruption in East European Countries

Bernard Neuwirth, Veronika Novotna, Stanislav Skapa

Lanre Amodu, Department of Mass Communication Covenant University Ota, Nigeria Email: lanre.amodu@covenantuniversity.edu.ng *Corresponding Author

Dominic Azuh, Department of Economics and Development Studies Covenant University Ota, Nigeria dominic.azuh@covenantuniversity.edu.ng

Akunna Ebere Azuh, Department of Estate Management Covenant University Ota, Nigeria akunna.azuh@covenantuniversity.edu.ng

Toluwalope Oresanya, Department of Mass Communication Covenant University Ota, Nigeria teaoresanya@gmail.com

Abstract:

The principle of openness and transparency constitutes one of the components of the set of modern principles imposed on public administration. The principles of openness and transparency are related to the requirements to make public administration accessible for outside inspection and supervision and to protect public interest, in order to reduce the probability of corruption and bad government. Accessibility of information and online services of public administration play one of the key roles in bringing public administration closer to the public. In this paper, the authors confirm the relationship between the level of corruption and the degree of implementation of the e-government methods in selected countries of Eastern Europe. Cluster and correlation analysis was used to achieve this aim.

Keywords: corruption, eGovernment, cluster analysis, correlation analysis

Introduction

As citizens, we are currently often confronted with the issue of corruption, either in the form of corruption allegations and its proofs or in relation to the introduction or discussion of new anti-corruption measures. Although corruption is not a new phenomenon, there is no unambiguous and universally accepted definition of corruption as yet. And it is the difference in perception and the effort to name the problem that has led to the formulation of numerous definitions of corruption. Heidenheimer (1989) defines corruption as any behaviour of public officials that deviates from the accepted standards by favouring private interests.

In general, it has been well established that corruption is one of the causes of undermined trust of citizens in the state and elected politicians in particular, and with the aggravating corruption in the country, the risk of state failure increases in all state institutions. However, according to Kotlánová (2012), corruption is present in all types of state bodies and political systems, as well as in all areas of state administration. As Heidenheimer (1989) specifies, corruption does exist in all societies; however, certain societies meet the prerequisites for the presence of a larger degree of corruption than others. He adds that corruption flourishes the most in states without stable political systems and societies where the interests of individuals or a certain group prevail.

Restriction of mutual interactions between officers and the public may be a way to reduce corruption, mainly in the public sector. This can be achieved through e-government methods.

In our paper, we intend to confirm or disprove the relationship between the level of corruption and the degree of e-government implementation in the country. To meet this aim, methods of analysis and synthesis and cluster and correlation analysis are used.

Literature Review

In literature, we can find many contributions whose authors state that e-government plays an important role in enhancing transparency and accountability of public administration. The prevailing opinion is that internet is a promising tool for improving both citizens' engagement and democratic, as it allows easy access to public

information and communication with officials on the part of the citizens, as well as supporting accountability of public officials to the public. (Halachmi, 2013)

The attitude of OECD is similar: E-government is an important tool to ensure public administration transparency. Citizens get easier access to information, which also facilitates monitoring of the activities of public administration bodies, which significantly mitigates the threat of corruption, favouritism and other types of inappropriate behaviour of the officials (OECD)

E-government has become an umbrella term, including all use of information and communication technology (hereinafter referred to as ICT) in state administration and includes information sharing and transactions within government (G2G), between government and businesses (G2B) and between government and citizens (G2C) based on such technology. Restriction of mutual contacts between officials and the public may be one possible way to reduce corruption, particularly in the public sector. This can be achieved through e-government. Not only can electronic government ensure higher level of public awareness, it can also remove any discretionary powers of public officials (Mistry, 2012; Mistry, Jalal, 2012; Seo, Mehedi, 2016) and facilitate decentralization (Goel and Saunoris, 2016). Torres et all (2006) and Andersen and Rand (2006) studied the connection between corruption and e-government and concluded that well-designed ICT policies can be effective in fighting corruption.

Other studies based on growth theories and the institutional theory identified advanced technologies, education, technological openness, government and regulation effectiveness as the driving forces of e-government development (Lakka, 2013) and point out the clear connection between effective management and successful e-government implementation (Jeff et al., 2012) as well as indisputable relation of the level of corruption and the expected result of e-government implementation (Bussell, 2011). The authors successfully use a number of methods in their studies, including panel data models (Lakka et al., 2013), the Unified Theory of Acceptance and Use of Technology (UTAUT) model (Alawadhi, 2009) (Bussell, 2011), interview analysis (Naputupulu, 2013), and regression statistical methods (Lee et al., 2011), (Jeff a kol., 2011), etc.

Analysis of the relationship between corruption and e-government level is exceptionally significant in countries with a high level of corruption. In a study on the impact of e-government measures on the control of corruption index (World Bank index), Andersen et all (2009) found that e-government implementation often results in considerable reduction of corruption. According to conservative estimates, the shift from percentile 10 to percentile 90, as far as e-government implementation is concerned, represents reduction of corruption manifested by a shift from percentile 10 towards percentile 23 in the corruption measurement control. Many studies have proven that countries that invest more money in electronic administration achieve greater corruption reduction when compared to countries where such investments are not realized (Andersen et all, 2011).

Linhartová (2016), and Mistry and Jalal (2011) performed an analysis of publicly available data (open data) of an extensive set of countries. With the application of correlation coefficient and regression analysis, a positive effect of e-government methods on reduced corruption rate was confirmed for a majority of the countries.

Data

Established indexes measuring the degree of corruption (CCI) and the index of e-government implementation in the country (EGOV) will be used for modelling the relationship between the level of corruption and the level of e-government implementation. The analysed time series is the period from 2008 to 2015. We analysed the data related to the group of East European countries that were evaluated as the most mutually similar by means of a cluster analysis.

The data determined for the cluster analysis used to compare selected 27 EU member countries in terms of ICT use were provided by Eurostat, the statistical office of the European Union. The data were gathered during a Europe-wide Community survey on ICT usage in households and by individuals, which is coordinated annually by Eurostat.

The data concerning cultural dimension were adopted from (Hofstede, 1984) and (Hofstede et all 2010), the dimension in question being “individualism vs. collectivism” – under collectivism people are motivated by norms and obligations imposed on the group as a whole (Kacen & Lee, 2002). However, the extent of individualism and collectivism varies among the respective countries (Nayeem, 2012), (De Mooji & Hofstede, 2015). The United Kingdom and the Netherlands score the highest, while Portugal and Greece score the lowest.

The cluster analysis employed the data with information about the use of the Internet for communicating with public administration, data on the use of cloud computing by individuals and information about the rate of individualism (Hofstede et all 2010). The vertical axis of the graph (see fig. 1) shows the distances (difference) between the individual clusters and the horizontal axis shows the individual states. A dendrogram could be

created in order to standardize the data. Complete connection was used as the clustering rule and euclidean distances as the metric.

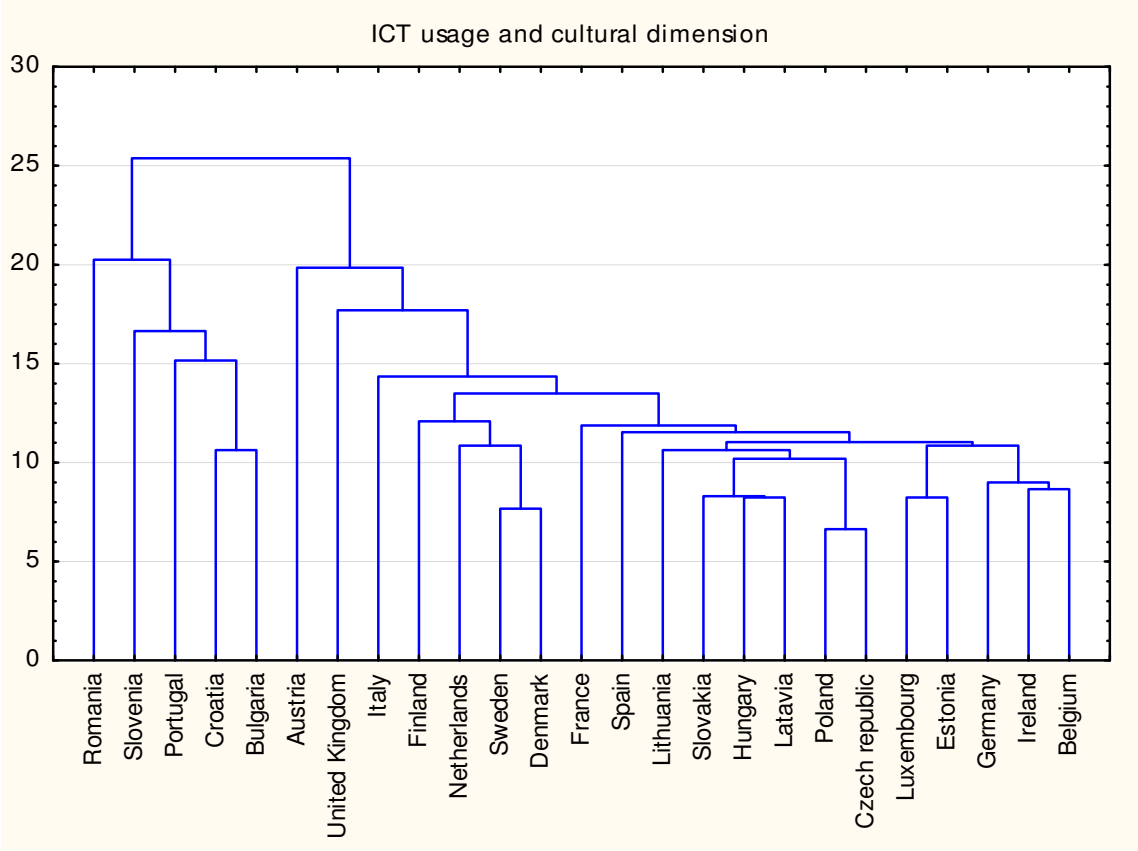


Fig. 1: ICT usage and cultural dimension

One can see that the cluster including the countries of Eastern Europe – Lithuania, Slovakia, Hungary, Poland, Czech Republic, Latvia – is clearly identifiable. Similar history may be seen as the link between these countries.

A number of evaluation frameworks have been created worldwide in the last 10–15 years, focused on the comparing the development of electronic public administration (e-government) in selected countries of the world. The E-government Development Index (EGDI) is used to estimate the level of e-government in the given country. EGDI was first drawn up in 2003 and it is in the interval of <0;1> where the value of one represents a high level of e-government implementation and the zero Index level represents a low level of application of the methods in the field of public administration.

The authors decided to use the World Bank index for the analysis of the corruption rate, which separates Control of Corruption as an individual value. The index is focused on quantification of the corruption level for the assessed state. The number in the interval of <-2.5;2.5> includes information about corruption among public officials, illegal fund channelling, informal payments, corruption among government officials, MPs and anti-corruption measures. The lower the number, the worse the corruption and vice versa.

Examined Model

We consider a linear mathematical model of a dynamic system focused on the relationship between the change in corruption level (CCI) and the level of e-government (EGOV). The model is based on the publications by Andersen (2009, 2011) and Linhartová (2015), which also describe in detail its different versions and discuss the solutions of these models. In a mathematical model, the phenomenon of delay means a time shift, therefore

differential equations with delayed argument are the usual model of systems with delay. The relationship in question can thus be expressed as follows:

$$\frac{dCCI}{dt} = \alpha_2 CCI(t-\Delta) + \alpha_1 EGDI(t) + \alpha_0 \quad (1)$$

Where $CCI(t-\Delta)$ is the level of corruption in time $t-\Delta$ and $EGDI(t)$ the level of e-government in time t, $\alpha_i, i \in \{1,2,3\}$ are coefficients. The Δ parameter expresses the time necessary for capturing the change of the variable CCI, let us continue calling it a delay and assume that $\Delta = 1$.

The natural consequence of the requirement of continuous succession $CCI(t)$ from the interval $[0,T]$ to the "historical" function $CCI_h(t)$ $(t\epsilon[-1,0])$ is the initial condition of solving $CCI(t)$ the equation (1) in the current form $CCI(t)$ $(0) = CCI_h(0)$.

The existence of the relationship between the change in the value of the corruption level index, the degree of e-government implementation and the corruption rate in the previous period will be verified by ***a correlation coefficient***. The correlation relationship between the defined quantities entering the analysis will be verified using the Spearman correlation coefficient value (hereinafter referred to as "the correlation coefficient") at the standard significance level, i.e. 0.05. The correlation coefficient value will be calculated by the STATISTICA statistical software, version 12.

A zero hypothesis will be defined and later verified in the course of the calculation process, which determines there is no correlation relationship between the monitored quantities.

The performed analyses examined the existence of a relationship between the values from 2008 to 2014 and the relationship between the change in EGOV and CCI in the course of the above period. Moreover, this relationship was examined with regard to a potential time delay between the change in the EGDI value and the change in the CCI index.

	CCI(t-1)	EGDI(t)	DEGDI(t)	CCI(t)-CCI(t-1)
CCI(t-1)	1.000000	0.748252	0.314685	0.804196
EGDI(t)	0.748252	1.000000	0.748252	0.594406
DEGDI(t)	0.314685	0.748252	1.000000	0.069930
CCI(t)-CCI(t-1)	0.804196	0.594406	0.069930	1.000000
Tab. 1: Correlation				

Spearman correlation coefficient for the individual variables of all evaluated countries is given in Table 1. The values that Statistica marked as statistically significant are in bold. The table shows that there is a positive correlation relationship between quantities CCI(t-1) and EGDI(t). The higher the level of e-government implementation in a country, the better was the corruption situation.

Discussion

eGovernment cannot be understood solely as electronic communication of citizens or any parties in general with the state, although criteria such as band width, connection speed, the requirement of a computer in every household, etc. are often monitored in EU evaluations. In our opinion, it should entail the functions of the public authorities and provision of public services by means of modern information and communication technologies. However, there should be complex transformations of both internal and external relationships of public administration through ICT and the related optimization of internal processes of the public bodies. On the one hand, these are external services of public bodies, on the other hand there is procurement of the activities performed by public authorities including mutual assistance and communication with other public bodies.

Effective electronic administration can bring a wide range of benefits, including higher efficiency and savings of public funds followed by the private sector. One of the most significant benefits of using eGovernment is higher

transparency and improved engagement of citizens in public life. As a side effect, eGovernment also enhances safety and data protection. When used appropriately, it can also ensure unalterability and explicitness of documents and procedures within public administration. After implementation, eGovernment allows to remove errors, check work quality, deadlines, and delays within the proceedings and basically enables the suspicion of power abuse or other ineffective or unfair employee activities to be revealed. However, these side effects may cause passive and sometimes even active resistance of public administration workers against eGovernment.

eGovernment includes much more than just tools, it incorporates review of procedures and change of behaviour in order for the public services to be provided more effectively.

The potential cost savings are substantial and are not limited to public administration only. According to (https://ec.europa.eu/digital-single-market/en/lab-market-what-happens-after-projects-end) in Denmark, for example, the use of electronic invoices meant annual saving of EUR 150 million for tax payers and EUR 50 million for businesses. If the system is implemented in the whole EU, the annual savings could exceed EUR 50 billion. The introduction of the eProcurement system for public procurement in Italy caused reduction of costs by more than EUR 3 billion.

From another perspective, eGovernment could be seen by companies as a space open to corruption. In this respect, it is referred mostly to its implementation and subsequent operation of its individual parts. In these cases the public contracts are extremely profitable, which logically creates an environment for corruption.

Conclusion

Arguably, there is a relatively strong dependence between the eGovernment level and the corruption rate. We find it very interesting that mostly in the beginning of eGovernment implementation or at its early development stages, the degree of corruption in the society can even increase. This is also related to the fact that the implementation of the individual eGovernment components brings relatively attractive public contracts. With a continuous eGovernment development in society, there is a clear and positive change that follows and the space for corruption becomes limited. Thus it can be stated that the positive side effects of eGovernment include not only reduction of corruption in the society but also increasing effectiveness in public service provision and administration, as well as public fund collection.

Literature:

AlAwadhi, S., & Morris, A. (2009). Factors Influencing the Adoption of E-government Services. *Journal Of Software*, *4*(6), -. https://doi.org/10.4304/jsw.4.6.584-590

Andersen, T. B., Bentzen, J., Dalgaard, C. -J., & Selaya, P. (2011). Does the Internet Reduce Corruption? Evidence from U.S. States and across Countries. *The World Bank Economic Review*, *25*(3), 387-417. https://doi.org/10.1093/wber/lhr025

Andersson, S., & Heywood, P. M. (2009). The Politics of Perception: Use and Abuse of Transparency International's Approach to Measuring Corruption. *Political Studies*, *57*(4), 746-767. https://doi.org/10.1111/j.1467-9248.2008.00758.x

Bussell, J. (2011). Explaining Cross-National Variation in Government Adoption of New Technologies1. *International Studies Quarterly*, *55*(1), 267-280. https://doi.org/10.1111/j.1468-2478.2010.00644.x

de Mooij, M., & Hofstede, G. (2015). The Hofstede model. *International Journal Of Advertising*, *29*(1), 85-110. https://doi.org/10.2501/S026504870920104X

Goel, R. K., & Saunoris, J. W. (2016). Virtual Versus Physical Government Decentralization: Effects on Corruption and the Shadow Economy. *Public Budgeting*, *36*(4), 68-93. https://doi.org/10.1111/pbaf.12105

Graham, C., Hopper, T., Tsamenyi, M., Uddin, S., & Wickramasinghe, D. (2009). Management accounting in less developed countries: what is known and needs knowing. *Accounting, Auditing*, *22*(3), 469-514. https://doi.org/10.1108/09513570910945697

Halachmi, A., & Greiling, D. (2013). Transparency, E-Government, and Accountability. *Public Performance*, *36*(4), 572-584. https://doi.org/10.2753/PMR1530-9576360404

Heidenheimer, A. J., Johnston, M., & Le Vine, V. T. (c1989). *Political corruption: a handbook*. New Brunswick, U.S.A.: Transaction Publishers.

Hofstede, G. H. (1984). *Culture's consequences: international differences in work-related values* (Abridged ed.). Beverly Hills: Sage Publications.

Hofstede, G. H., Hofstede, G. J., & Minkov, M. (2010). *Cultures and organizations: software of the mind : intercultural cooperation and its importance for survival* (3rd ed.). New York: McGraw-Hill.

Jeff, G. J., Yates, D. J., & Williams, C. B. (2012). Understanding the Impact of Political Structure, Governance and Public Policy on E-Government. In *2012 45th Hawaii International Conference on System Sciences* (pp. 2541-2550). Hawai: IEEE. https://doi.org/10.1109/HICSS.2012.617

Kacen, J. J., & Lee, J. A. (2002). The Influence of Culture on Consumer Impulsive Buying Behavior. *Journal Of Consumer Psychology*, *12*(2), 163-176. https://doi.org/10.1207/S15327663JCP1202_08

Kaufmann, D., Kraay, A., & Mastruzzi, M. (2007). Governance Matters IV: Governance Indicators for 1996-2004 [Online]. *Ssrn Electronic Journal*, *2005*(1), -. https://doi.org/10.2139/ssrn.718081

Kotlánová, E. (2012). *Korupce a ekonomický růst* (1st ed.). Karviná: Slezská univerzita v Opavě, Obchodně podnikatelská fakulta v Karviné.

Lakka, S., Stamati, T., Michalakelis, C., & Martakos, D. (2013). What drives eGovernment growth? An econometric analysis on the impacting factors. *International Journal Of Electronic Governance*, *6*(1), 20-. https://doi.org/10.1504/IJEG.2013.053366

Lee, C., Chang, K., & Berry, F. S. (2011). Testing the Development and Diffusion of E-Government and E-Democracy: A Global Perspective. *Public Administration Review*, *71*(3), 444-454. https://doi.org/10.1111/j.1540-6210.2011.02228.x

Linhartová, V. & Židová, E. (2016) The impact of corruption on economic growth in oecd countries. *Scientific Papers of the University of Pardubice, Series D*, 23(37), 83-94.

Mistry, J. J. (2012). The Role of eGovernance in Mitigating Corruption. *Accounting And The Public Interest*, *12*(1), 137-159. https://doi.org/10.2308/apin-10287

Mistry, J. J., & Jalal, A. (2012). An Empirical Analysis of the Relationship between e-government and Corruption. *The International Journal Of Digital Accounting Research*, *12*(1), -. https://doi.org/10.4192/1577-8517-v12_6

Napitupulu, D. (2014). The Critical Success Factors Study for e-Government Implementation. In *International Journal of Computer Applications* (Vol. 89, pp. 23-32). https://doi.org/10.5120/15716-4588

Nayeem, T. (2012). Cultural Influences on Consumer Behaviour. *International Journal Of Business And Management*, *7*(21), -. https://doi.org/10.5539/ijbm.v7n21p78

Rose, R.. (1999). A Global Diffusion Model of e-Governance. *Journal Of Public Policy*, *25*(1), 5-27. https://doi.org/10.1017/S0143814X05000279

Seo, J. W. & Mehedi, H. G. (2016). E-government Efforts against Corruption in Bangladesh: What We Have Done and What We Have to Do, *International Journal of Political Science & Diplomacy*, 2 (107), pp. 1-6, DOI 10.15344/ijpsd/2016/107.

Torres, L. Pina, V. & Acerete, B. (2006). E-Governance Developments in European Union Cities: Reshaping Government's Relationship with Citizens. *Governance*, *19*(2), 277-302. https://doi.org/10.1111/j.1468-0491.2006.00315.x

E-Government Knowledge Database [Online]. (2017). Retrieved August 30, 2017, from https://publicadministration.un.org/egovkb/en-us/reports/un-e-government-survey-2016

Worldwide Governance Indicators [Online]. (2017). Retrieved 2017, from http://info.worldbank.org/governance/wgi/#home

The Dynamic Model of System Development in the area of E-government

Jan Luhan, Department of Informatics, Faculty of Business and Management (FBM), Brno University of Technology (BUT), Brno, Czech Republic, LUHAN@fbm.vutbr.cz

Veronika Novotna, Department of Informatics, Faculty of Business and Management (FBM), Brno University of Technology (BUT), Brno, Czech RepublicNOVOTNA@fbm.vutbr.cz

Vaclav Olesovsky, Department of Informatics, Faculty of Business and Management (FBM), Brno University of Technology (BUT), Brno, Czech Republic, OLESOVSKY@fbm.vutbr.cz

Abstract

The provision of services in governmental portals has influenced the strategies of electronic services offered by several governments all over the world. More than offering services, development related policies have tried to widen the scope of their actions, bringing together the necessary aspects for an accurate alignment between the implementation of public services and the needs of the population.
The focus of this article is to present a model of e-government system development which analyses the system integrity of organization management, operation application, information resources and technology by the use of analytic and synthetic methods, dynamical modelling and solving the system of delay differential equations.
The characteristics of Czech Republic are used as an illustrative example based on The Digital Economy and Society Index.
It can be expected that the procedure for solving the dynamic model, described in the article, that uses contemporary mathematic methods of so-called "Differential Equations Theory" with delayed argument, can be successfully used for both modelling further concrete economic relations and for economic models in general and in various conditions.

Keywords: E-government, Dynamic Modelling, Delay Differential Equations

1. Introduction

Information technology has taken the world by storm. Its emergence has given rise to a new level of digital knowledge systems. Its application has been catalytic to the rapid changes taking place in the way people work, live and think, and is facilitating the development of our society and civilization in a new era. However, along with the tremendous benefits of information technology comes the challenging problem of e-government and information security management.

Currently, it is a natural trend in theoretical scientific disciplines to study various situations using increasingly precise models which, among other things, enable us to analyze more accurately the simulated processes, to search for more exact meaning of the circumstances under which they run, and to derive practical conclusions, bases, optimum solutions, and such from the findings. Measurement of economic quantities then corresponds to the use of quantitative methods, i.e. methods based on mathematical disciplines.

The aim of this article is to present a model of e-government system development which analyses the system integrity of organization management, operation application, information resources and technology by the use of analytic and synthetic methods, dynamical modelling and solving the system of delay differential equations. The model allows for the influence of previous periods, thus leading to the system of differential equations with delay.

2. Literature review

The provision of services in governmental portals has influenced the strategies of electronic services offered by several governments all over the world. More than offering services, development related policies have tried to widen the scope of their actions, bringing together the necessary aspects for an accurate alignment between the implementation of public services and the needs of the population.

Consequently, Local Public Administrations are now faced with a challenge of administrative modernization which tries to draw citizens closer to their services and, concurrently, to dematerialize their processes (Rocha & Sá, 2013; Sá & Rocha, 2012).

Over the last years, the quality of services in the public sector has been the subject of significant concerns. Many organizations have started to self-assess and measure the quality of the services they provide.

The European Commission (2013), in a press release, declared that in the universe of EU Citizens, 46% use the Internet to look for a job, to use the public library, to submit tax declarations, to register births, to request a passport or to use other public administration services. In the same document, it is said that 80% of the citizens believe that the public services offered on the Internet allow them to save time, 76% appreciate their flexibility, and 62% claim to save money with them.

Faced with the growing technological evolution and daily access to public services by populations, governments all over the world are constantly challenged to transform and reinvent themselves, in order to provide efficient, effective and economical services. Citizens, users who evaluate the provision of these services, are increasingly well informed on the one hand, and demanding on the other hand. Lee and Kim (2014) contend that the ability to measure the quality of a service is a prerequisite to obtain a high quality level. In their study, Khawaja and Bokhar (2010), reveal that organizations struggle to evaluate the quality of the services they provide to clients, that is, they find it difficult to evaluate if, in the context of a service, there are any faults or if the delivery takes place within the stipulated time.

Local Public Services are thus facing the challenge of administrative modernization, trying to bring the residents closer to their services and, simultaneously, dematerializing their processes (Rocha and Sá, 2014; Sá and Rocha, 2012).

Based on these assumptions, concepts, models, frameworks and methodologies need to be developed to evaluate, in the specific context of local authorities, the quality of Electronic Government services, in order to improve the level of satisfaction attached to these services.

Methods and Data Sources

The study of various models, focus on simulating conditions, and search for outcomes, optimal solutions and so on are among the most important current trends. For example, McNelis (2003) in his paper applies neural network methodology to inflation forecasting in the Euro-area and the USA. Ioana et al. (2015) present a new concept for Fuzzy Logic in economic processes. They then compared the effects of reform policies on access to institutional credits in the Nigerian agricultural sector before and after the reforms (1978 - 1985; and 1986 -2009). In his paper, Zhang (2012) investigated the sensitivity of estimated technical efficiency scores from different methods including stochastic distance function frontier. In related work, Boucekkine et al.(1999) also studied the two-stage optimal control problem involving two deterministic AK models, and Harada (2010) examined the switch from the Solow to AK economies using a similar technique. Many studies have been conducted in order to validate the hysteresis hypothesis, e.g. Pérez-Alonzo (2010).

Particular specific sets of tasks concerning differential equations with dynamic arguments were being solved by L. Euler and M. Kondors, but their systematic study only began in the 20th century.

In their monograph, Kobrinskij and Kuzmin (1981) pointed out the necessity of using historic variables in dynamic economic models that have impact on system development and lead to major changes in the character of the entire process. Simonov (2003, 2009) has modified existing micro and macro economical models, such as the Walras-Evans-Samuelson (WEC) model with regard to delay between offer and demand, Allen's model on the single-commodity market, with regard to delay of deliveries and dependence of demand and offer on the price and speed of price changes Alen, Vidal-Wolf's model of single-product sale Dykchta and Samsonjuk (2003) etc.

Included in the category of dynamic economic models we can recognize such economic and mathematical models, the structure of which includes behaviour of the analysed system over time. McNelis (2003) presents a dynamic model of e-government system development, composed of fourth first-order differential equations. The author has come up with a model which describes the temporal variation of three static variables:

Suppose **M** is the Government Efficiency level state value of a government system.

A is the state variable of corresponding Economic Performance level.

R is the state variable of corresponding Digital Public Services level.

T is the state variable of present technological Infrastructure development level.

The model is then represented by fourth-dimensional ordinary differential equations:

$$M'(t) = -k_1M(t) - k_2A(t) + k_3T(t)$$

$$A'(t) = k_4M(t) + k_5R(t) + k_6T(t)$$

$$R'(t) = k_7M(t) + k_8T(t)$$

$$\mathbf{T'(t) = k_9T(t-\Delta)} \quad (1)$$

where $\mathbf{k_i, i = 1..9}$ are non-negative constants.

3. Analysis of the solution

Let us now analyse the problem mentioned above using the modern theory of so-called functional differential equations, a very special part of which is also the theory of linear difference equations with delayed argument. In order to numerically solve the problem in question for the system of differential equations with delayed argument, a method was used, which has been, in current studies, derived for solving marginal problems for systems of so-called functional differential equations.

General theory, which makes it possible to solve not only the above mentioned problems, but also others, can be found in a monograph Kiguradze and Půža (2003), and its application on the above mentioned types of differential equations with delay, including the description of the way the desired solution was designed can be found in for example Novotna (2015) and their cited bibliography.

Calculations were made using the system Maple, which is used as mathematical software because of the possibility to deal with calculations symbolically. It is very similar to the programs Mathematica and Maxima, which offer much fewer functions. An indisputable advantage of Maple is that it can not only make analytic calculations with formulae, but it can equally provide a numerical calculation or graphic representation of results. Therefore, it is a system with a very attractive and user-friendly environment which offers a range of options regarding the application of quantitative methods in practice, application problems, and scientific calculations for many disciplines, etc.

Numerical procedures for solving ordinary differential equations used in Maple are transferred, via the theory mentioned above, to solutions of differential equations with delayed arguments.

4. Situation for the Czech Republic - illustrative example

To demonstrate the initial problem solution we have selected the environment of the Czech Republic in the sense of setting the initial solution conditions at values known for the Czech Republic.
The data were acquired from the IMD World Competitiveness Center (hereinafter "IMD") (2015) comparing the competitiveness of different countries in the new issue of "Yearbook 2015" and from the Digital Economy and Society Index (DESI) (2015), which is a composite index developed by the European Commission.

(DG CNECT) to evaluate progress of EU countries towards digital economy and society. IMD compares the individual pillars of overall competitiveness, including economic performance, state governance efficiency, efficiency of enterprises and infrastructure. DESI collects a set of relevant indicators divided into 5 dimensions: Connectivity, Human Capital, Use of Internet, Integration of Digital Technology and Digital Public Services.

In 2015 the Czech Republic took the 29th position according to IMD. The current advance of the Czech Republic to a better position was promoted by economic growth, positive development of government finance and improved motivation and organization in business. These factors collectively contributed to an improvement in the relative status of the Czech Republic in economic performance (26th position), governance efficiency (31st) and business efficiency (31st).

When compared to other countries, according to IMD the Czech economy is attractive due to its skilled work force, cost competitiveness, level of education and reliable infrastructure.

Based on the DESI 2015 index evaluation, the Czech Republic achieved an overall score of 0.46 (1 being the maximum level), which put it in the 17th position out of 28 EU member states. Czech citizens demonstrate a good level of digital skills, which enable them to use the Internet for a wide range of activities. At the same time, Czech small and medium enterprises are at the top of online sales in the EU, their turnover reaching top positions.

However, the Czech Republic shows substandard results in ensuring advanced digital public services. This area remains the principal challenge for the Czech Republic. This is illustrated by the mere 14% of users who use the Internet to fill in and send forms to public administrative bodies, which places the Czech Republic at the 26th position in the EU for this metric.

5. Model Solution

To demonstrate the options of solving the initial problem we assume "historical development" of the T variable before time t=0, which may be simulated by function y=0.6sin(t)+27. The development of the respective variables will be monitored for 86 months.
The initial conditions were set as follows:

$$M(0) = 31, A(0) = 38, R(0) = 0.46, T(0) = 27.$$

After insertion of selected parameters into the system the result is:

$$M'(t) = -0.001M(t) - 0.001A(t) + 0.015T(t)$$

$$A'(t) = 0.0001M(t) + 0.0003R(t) + 0.0001T(t)$$

$$R'(t) = 0.00001M(t) + 0.00002T(t)$$

$T'(t)=0.01T(t-\Delta)$

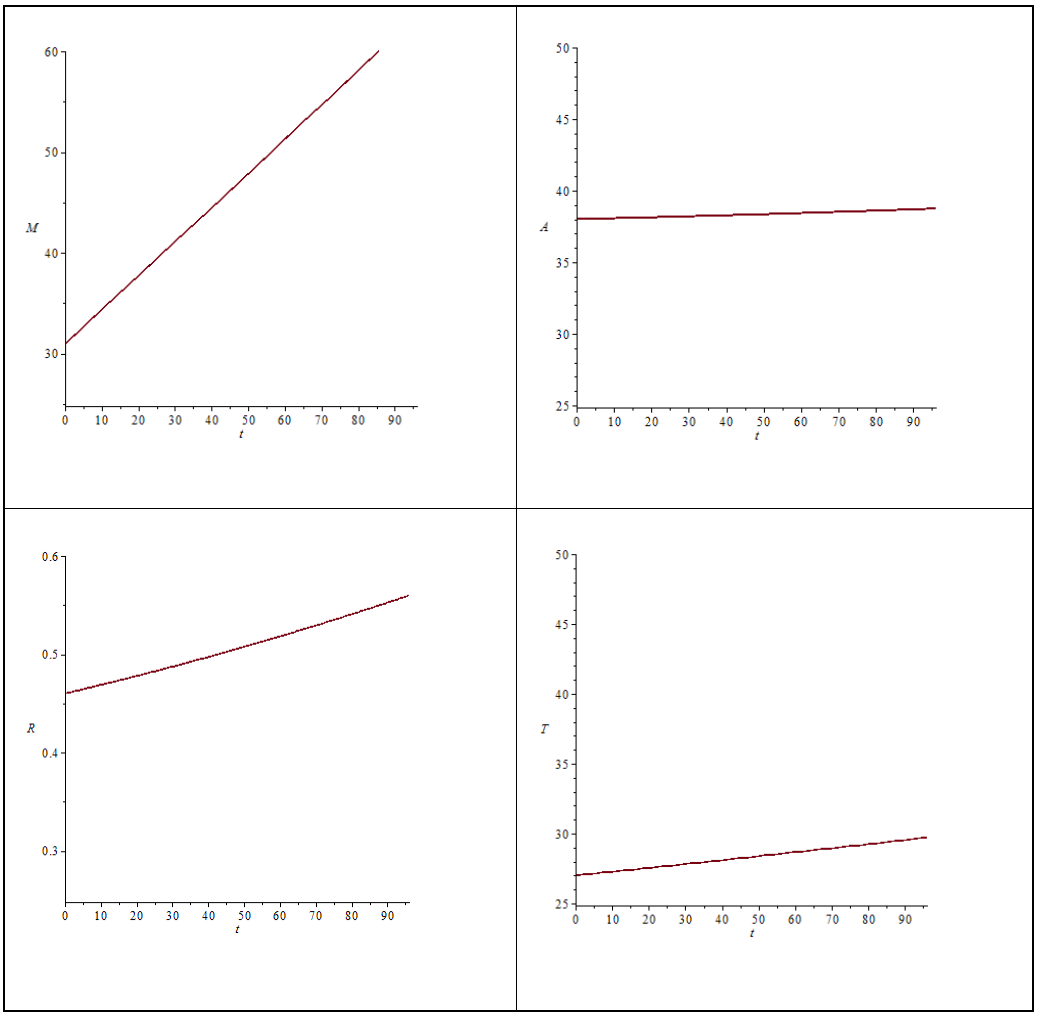


Figure 1. - The delay is three months. (Source: Own processing)

The first set of graphs illustrates a system solution in the event the delay in the fourth equation is three months.

The second set of graphs demonstrates a solution in the event the parameter k_1 is altered to 0.009 and the remaining parameters are maintained. The value of this parameter will have a significant impact on the development of government efficiency and slow down its increase:

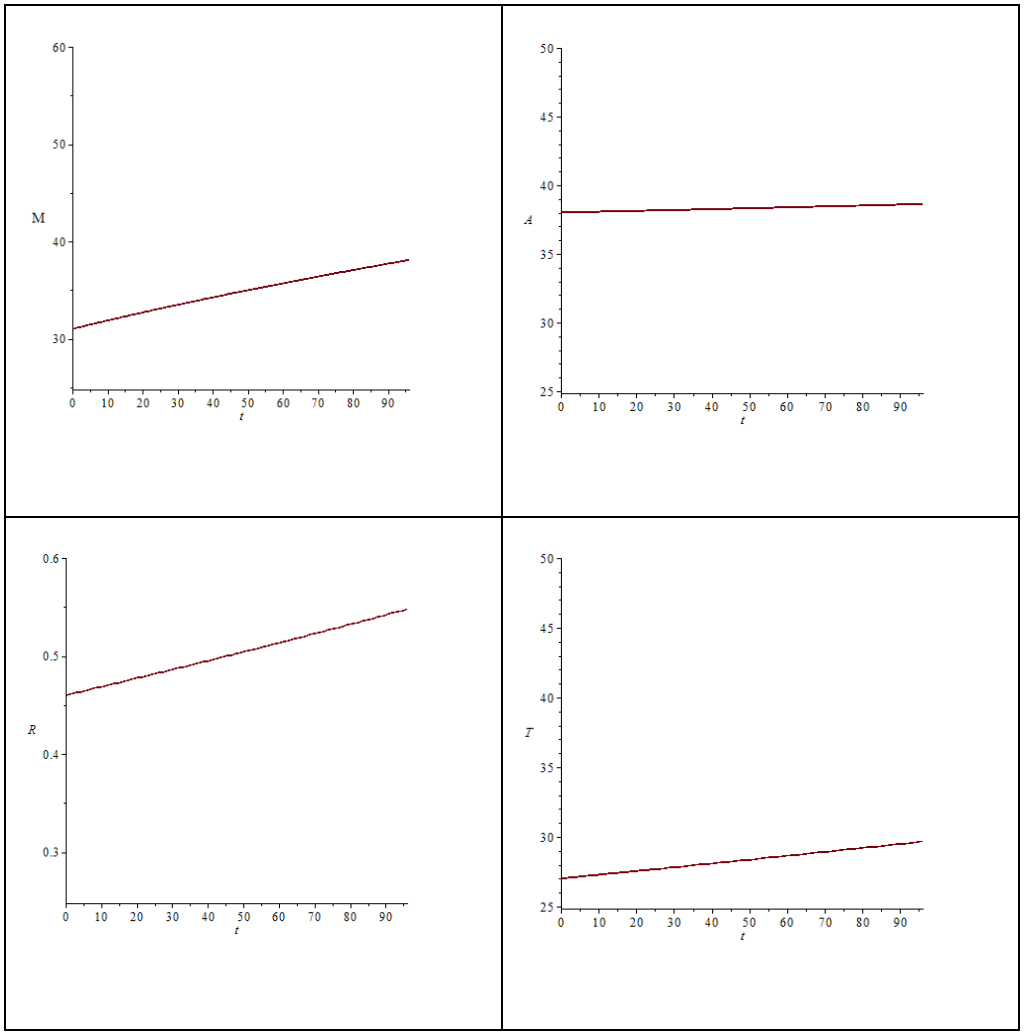


Figure 2. – The parameter k_1 is altered to 0.009. (Source: Own processing)

The third set of graphs demonstrates a solution in the event the parameter k9 is altered to 0.01 and the remaining parameters are maintained. The value of this parameter will have a significant impact not only on further technology development but also on the development of government efficiency and will considerably accelerate its increase:

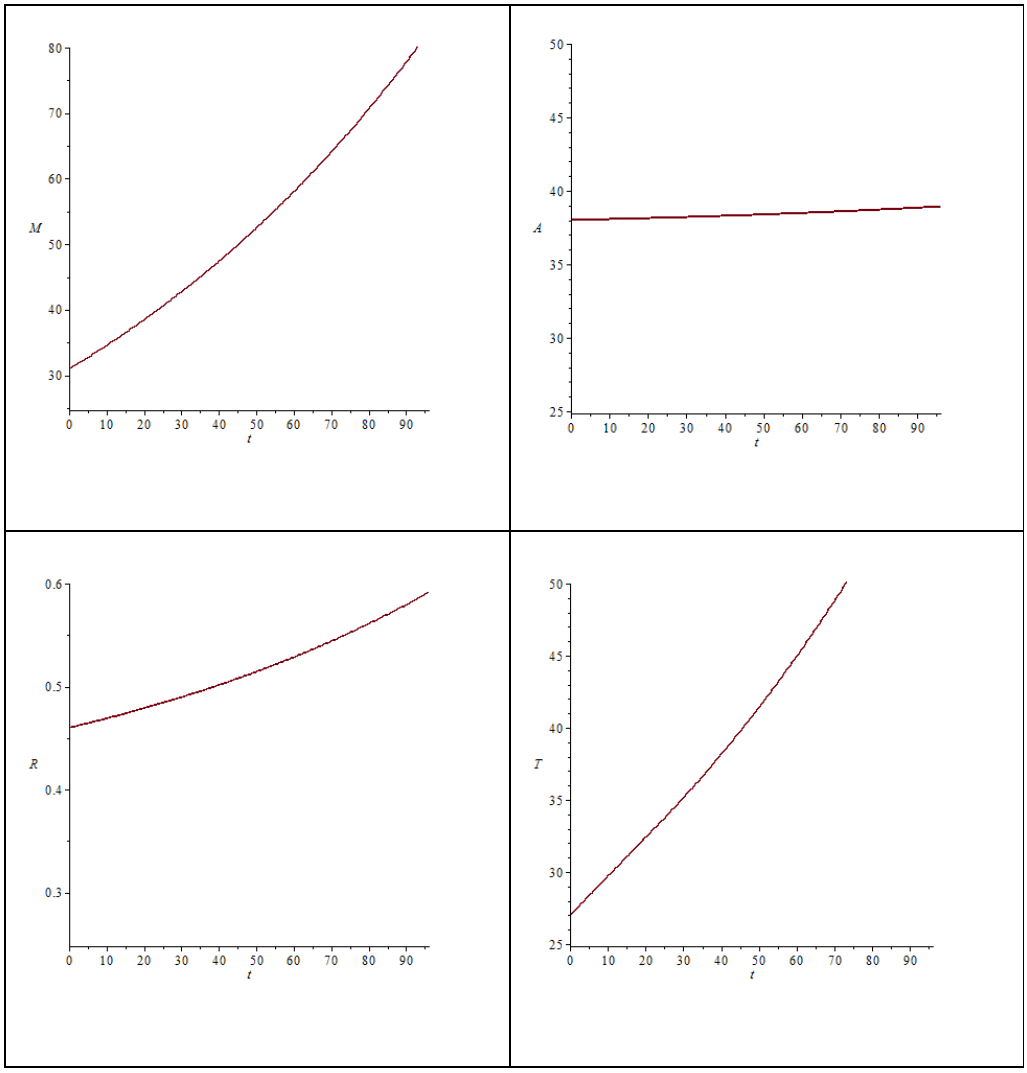


Fig. 2. -The parameter k_9 is altered to 0.01. (Source: Own processing)

To conclude, the examined system demonstrates unambiguous complex dynamic performance. Based on an analysis of the above solutions of delay differential equation systems it can be stated that an alteration of system parameters has a significant effect on the overall system stabilization. As far as we are able to estimate the parameter value, conclusions can be made concerning other system trends and stabilization options.

The newly used methodology of delay differential equation system numerical solution using the fixed point method provides for a successful solution to the above problem and thus for performing an analysis of the effect of the individual parameters alteration. Alterations of the coefficient of delay impact on system performance were the sole alterations demonstrated as an illustration.

6. Conclusion

When modelling complex economic issues we often have to face the fact that trade-offs between variables are temporal. The dynamic character can be captured by including delay exogenous and endogenous variables in specifying the structure of a model.

Another way to include dynamic processes in models is to see time as a continuous variable and to describe dynamic models by means of differential equations.

The new model allows for the influence of previous periods, thus leading to the system of differential equations with delay. Its solution required use of modern methods of the theory of functional differential equations.

It is to be expected that the procedure for solving the dynamic model, described above, that uses contemporary mathematic methods of so-called "Differential Equations Theory" with delayed argument, can be successfully used for both modelling further concrete economic relations and for economic models in general.

7. References

Boucekkine R, Saglam C, Valle T (1999) Technology Adoption Under Embodiment: A Two-stage Optimal Control Approach. *Macroeconomic Dynamics*. 8(2), 250-271. DOI: 10.1017/S1365100503030062. ISSN 1365-1005. Available at: http://www.journals.cambridge.org/abstract_S1365100503030062.

Dykhta V, Samsoniuk O (2003) Optimal′noe impul′snoe upravlenie s prilozheniiaami. *Fizmatlit*. (1). ISSN 978-5-9221-0877-5.

Harada T (2010) Path-dependent economic growth with technological trajectory. *Economics of Innovation and New Technology*. 19(6), 521-538. DOI: 10.1080/10438590903166412. ISSN 1043-8599. Available at: http://www.tandfonline.com/doi/abs/10.1080/10438590903166412.

IMD WORLD (2015) IMD [online]. Switzerland [cit. 2016-10-20]. Available at: http://www.imd.org/wcc/news-wcy-ranking/

Ioana A, Semenescu A, Marcu D, Pollifroni M, Brezinova M (2015) Some Aspects about Product Management of Electric Arc Furnace Elements. *Applied Mechanics and Materials*. 809-810(1), 1319-1324. DOI: 10.4028/www.scientific.net/AMM.809-810.1319. ISSN 1662-7482. Available at: http://www.scientific.net/AMM.809-810.1319.

Kiguradze I, Puza B (2003) *Boundary value problems for systems of linear functional differential equations.* Brno: Masaryk University. ISBN 80-210-3106-9.

Kobrinskij N, Kuzmin V (1981) *Točnost ekonomiko-matematičeskich modelej*. Moskva: Finansy i statistika. ISBN 0-521-35984-8.

McNelis PD (2003). Nonlinear Phillips curves in the Euro area and USA? Evidence from linear and neural network models. *2003 IEEE International Conference on Computational Intelligence for Financial Engineering,* 2003. Proceedings. IEEE, 2003(1), 145-149. DOI: 10.1109/CIFER.2003.1196254. ISBN 0-7803-7654-4. Available at: http://ieeexplore.ieee.org/lpdocs/epic03/wrapper.htm?arnumber=1196254.

Novotná V (2015) Numerical Solution of the Inventory Balance Delay Differential Equation. *International Journal of Engineering Business Management.* 7(1), 1-9. DOI: 10.5772/60113. ISSN

1847-9790. Available at: http://www.intechopen.com/journals/international_journal_of_engineering_business_management/numerical-solution-of-the-inventory-balance-delay-differential-equation

Pérez-Alonso A, Di Sanzo S (2010). Unemployment and Hysteresis: A Nonlinear Unobserved Components Approach. *Studies in Nonlinear Dynamics*. 15(1), -. DOI: 10.2202/1558-3708.1806. ISSN 1558-3708. Available at: http://www.degruyter.com/view/j/snde.2010.15.1/snde.2010.15.1.1806/snde.2010.15.1.1806.xml.

Rocha, A. and F. Sa (2014). Planning the information architecture in a local public administration organization. *Information Development.* 30(3)m 223-234. DOI: 10.1177/0266666913489841. ISSN 0266-6669. Available at: http://idv.sagepub.com/cgi/doi/10.1177/0266666913489841.

Sa, F. and A. Rocha (2012). Definição da Arquitetura de Informação em organismo da Administração Pública Local. *Iberian Journal of Information Systems and Technologies*. (10), -. DOI: 10.4304/risti.10.51-64. ISSN 1646-9895. Available: http://www.scielo.gpeari.mctes.pt/scielo.php?script=sci_abstract

Simonov PM (2003) Issledovanie ustoichivosti rešenij někotorych dinamičeskich modelyach mikro - i makroekonomiki. Vestnik PGTU. 1. 2003(1), 88-93. ISSN 1993-0550.

Simonov PM, USTINOV AS (2009). An approach towards quality evaluation of management of budget funds (financial management) in the governmental sector. Vestnik Permskogo Universiteta naučnyj žurnal: Economics Series. 1. 2009(1), 63-69. ISSN 1994-9960.

The Digital Economy and Society Index (DESI) (2015) The Digital Economy and Society Index (DESI) [online]. [cit. 2016-10-20]. Available at: https://ec.europa.eu/digital-single-market/en/desi

Zhang T (2012) A Monte Carlo Analysis for Stochastic Distance Function Frontier. Engineering Economics. 23(3), -. DOI: 10.5755/j01.ee.23.3.1937. ISSN 2029-5839. Available at: http://www.inzeko.ktu.lt/index.php/EE/article/view/1937.

Application of Neuro-Fuzzy Approach in Predicting the Number of Bankruptcies of Legal Persons in the Czech Republic

Monika Šebestová, Faculty of Business and Management, Institute of Informatics, Brno University of Technology, Brno, Czech Republic, sebestova@fbm.vutbr.cz

Abstract

This article deals with the application of the neuro-fuzzy approach in estimating the number of companies going bankrupt in the Czech Republic. The prediction is based on macroeconomic indicators from 2011–2016, namely inflation, interest rate and unemployment rate. Unlike statistical models, the neuro-fuzzy models have the advantage of rules made up directly from the used data, and therefore they enable modelling of complex, dynamic and non-linear problems. Based on the obtained results, it can be stated that the designed ANFIS (Adaptive Neuro-Fuzzy Inference System) is able to predict the number of financial failures of companies with sufficient accuracy and thus give a picture of the future market development.

Keywords: Neuro-fuzzy, bankruptcy, macroeconomic indicators

Introduction

Many models based on mathematical, statistical and advanced methods have been implemented to predict financial failures of companies. Currently, there are numerous real financial applications whose behaviour is non-linear and uncertain. These issues, together with other drawbacks of the traditional methods (discrimination analysis, logistic regression,…), resulted in an increased interest in soft computing methods that include artificial neural networks and fuzzy logic. Fuzzy logic is advantageously used to solve various non-technical problems, see, for example (Dostál et al., 2016; Dostál et al., 2017).

The aim of this paper is to design a neuro-fuzzy model for estimating the number of companies going bankrupt in the Czech Republic. The model inputs are formed by macroeconomic indicators, for which previous literature has proven that they affect the number of company bankruptcies in a given period of time. The prediction of company bankruptcies is a widely discussed topic these days, which should be analysed to reveal the symptoms that result in this situation. In most cases, bankruptcy is regarded as a continuous process that may manifest itself in several stages. The bankruptcy process may take 5–6 years (Korol, 2013). Therefore, it is not a sudden phenomenon that would be impossible to predict with a certain degree of probability.

The number of companies going bankrupt in the Czech Republic has been decreasing recently. In the first half-year of 2017, the number of bankruptcies was the lowest in the last 6 years. There were 414 declared bankruptcies of companies, which is 66 fewer than in the first half-year of 2016. On the other hand, the number of motions for bankruptcy has increased considerably. However, according to CRIF – Czech Credit Bureau (2017), this phenomenon has not been caused by any macroeconomic aspects, but most probably is rather linked to the insolvency act amendment, which has been in force in the Czech Republic since July 2017. The development of bankruptcies of legal persons since 2011 in the respective months is shown in Figure 1.

The structure of the remainder of the paper is as follows: Part 2 gives an overview of literature, describing publications focused on the use of artificial intelligence for predicting company bankruptcies and macroeconomic determinants affecting the number of these bankruptcies in time. Part 3 lists the methods used for solving the problem of bankruptcy prediction. Part 4 discusses the process of solving the problem and the achieved results. Part 5 concludes by providing a summary of the whole paper content and giving its particular outputs.

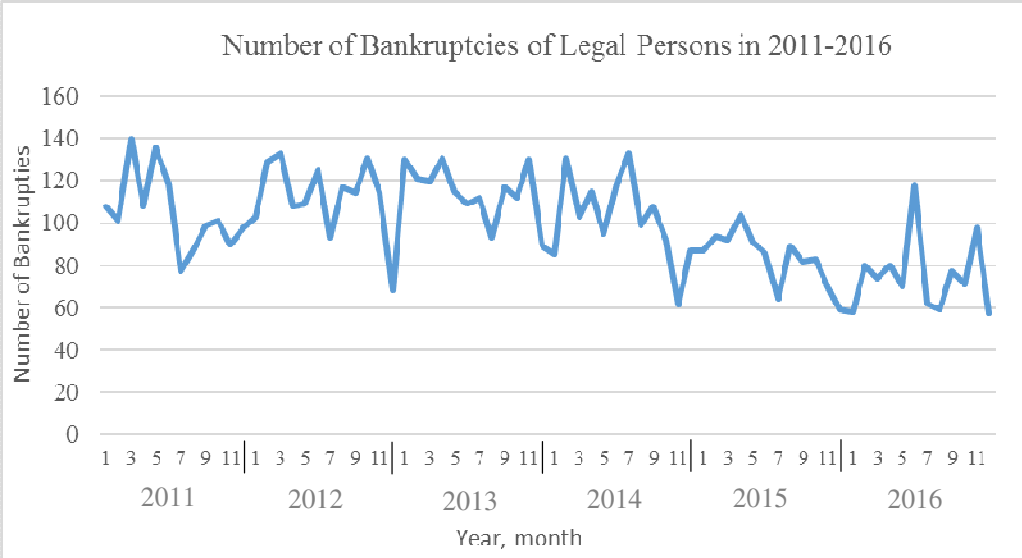


Fig 1. Number of bankruptcies of legal persons in 2011–2016 (CRIF, 2017)

Literature Review

In the last decades, a large volume of research has been published, dealing with the prediction of the future in order to improve the decision-making process in the area of economics and finance. This research has resulted in a number of changes in the development and use of prognostic methods (Keles et al., 2008). Most financial models are based on the assumption of data normality and linear relationship between the variables. Based on these assumptions, the majority of prediction models in the last years were based on statistical methods and regression was used for model estimation. The methods used for these purposes include logarithmic regression, the probit and logit model, etc. (Séverin, 2010). However, currently there are numerous financial applications whose behaviour is non-linear and uncertain. For this reason, new techniques based on artificial intelligence, such as fuzzy logic (Vigier et al., 2016) and neural networks (Keles et al., 2008), started to emerge.

Many studies have proven that the artificial intelligence methods, in particular the neural networks, are more accurate, adaptable and robust compared to the traditional statistical models (López Iturriaga et al., 2015; Geng et al., 2015). They show great results in predicting financial failure. Several authors focus on bankruptcy prediction using methods of artificial intelligence (Kim and Kang, 2010; Mohamed and Salama, 2013; Vigier et al., 2016). However, most of them concentrate solely on the application of neural networks or fuzzy logic separately, not in mutual combination. One of the methods that use the fuzzy logic functionality together with neural networks are the ANFIS systems (Adaptive Neuro-Fuzzy Inference System). The authors that have used ANFIS to predict bankruptcy of companies include Zanganeh et al. (2011), whose results show that the ANFIS model achieves better results in predicting bankruptcy than logistic regression.

Plenty of company bankruptcies are affected by the macroeconomic situation of the respective country. Moravec (2013) analysed the dependence of macroeconomic indicators on the number of bankruptcies in the Czech Republic for 1993–2012. By a correlation analysis, he established that in the years in question there was a dependence between the number of declared bankruptcies and macroeconomic indicators – gross domestic product, indebtedness, interest rate and inflation. The results of Liu (2004) imply that the degree of failure among businesses reacts to changes in nominal interest rate, price level and the amount of state debt. The research of Ahmad et al. (2009) examines long-term dynamic relations between company bankruptcies and selected macroeconomic variables using the ARDL (Autoregressive Distributed Lag) econometric analysis. It is based on the hypothesis whether the financial failures of businesses in Malaysia can be explained by macroeconomic indicators, namely state indebtedness, inflation and gross domestic product.

Methods

Adaptive Neuro-Fuzzy Inference System (ANFIS) and Its Architecture

Models based on conventional mathematical tools are not suitable for solving incorrectly defined and vague systems. On the contrary, fuzzy inference systems using the fuzzy IF-THEN rules can model qualitative aspects of human knowledge. These systems are able to transform human knowledge and experience to the form of rules and membership functions of a fuzzy system. For this reason, effective methods for refining membership functions need to be found in order to minimize any output errors. The most frequently used membership functions for predicting company bankruptcies have the form of a Gaussian curve (Keles et al., 2008, Zanganeh et al., 2011). ANFIS (Adaptive Neuro-Fuzzy Inference System) developed in the early 90s by Jang (1993) is one of the methods for refining the model parameters. Neuro-fuzzy networks use the functionality of fuzzy logic and neural networks that are able to learn from the input data independently. These are fuzzy systems using neural networks for setting system parameters and at the same time they enable these parameters to be changed adaptively (Keles et al., 2008). For more information on ANFIS see (Jang, 1993).

Figure 2 shows ANFIS architecture with two inputs x_1, x_2 and one output *Output*:

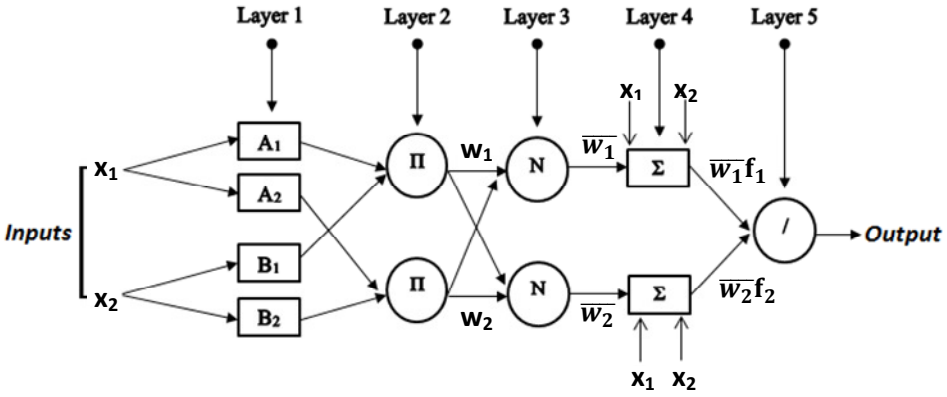


Fig 2. ANFIS architecture with 2 inputs (adjusted according to Behnia et al., 2013)

The circle in Figure 2 marks a fixed node, whereas the rectangle marks an adaptive node. An adaptive node means that the parameters are changed during adjusting or training of the neural network. The Sugeno fuzzy model is used as a means for modelling fuzzy rules to the required outputs:

$$if\ x_1 = A_i\ and\ x_n = B_j\ \textbf{then}\ f_i = p_i x_1 + q_i x_n + r_i$$

Where p_i, q_i *and* r_i are parameters that are changed during learning.

The ANFIS architecture has five layers and is designed as a feed-forward neural network; the function of neurons in the individual layers is as follows:

Layer 1 – All nodes in the first layer are adaptive. Each neuron is transformed into a linguistic form by fuzzification and the shape of the membership function is determined for each neuron.

$$O1_{i=}\mu A_i(x_1)$$

Where x_1 is the node input and *Ai* is a linguistic description (e.g. "small" or "large") of the node. $O1_i$ is a degree of the membership of fuzzy set *A (=A1, A2, B1 and B2)*. The Gaussian curve is usually used as the input function, as it guarantees a smooth transition from 0 to 1.
Layer 2 – Nodes in the second layer are fixed. Each neuron in this layer represents one rule, whose weight is subsequently determined by multiplying the individual inputs:

$$O2_i = w_i = \mu A_i(x_1)\mu B_j(x_n)$$

Layer 3 – Nodes in the third layer are also fixed. It is a normalization layer used for normalizing the rule strength. The normalized rule strength is determined by the ratio of the weight of the rule of the given neuron and the aggregate weight of all neurons *j*. The output of each node in this layer is determined:

$$O3_i = \overline{w_i} = \frac{w_i}{\sum_{j=1}^{i} w_i}$$

Layer 4 – All nodes in the fourth layer are adaptive. It is a defuzzification layer, in which the strength of the consequence of each rule is counted (result of the part after THEN) based on the first order Sugeno model:

$$O4_i = \overline{w_i} f_i = \overline{w_i}(p_i x_i + q_i x_n + r_i)$$

where $\overline{w_i}$ is the normalized strength of the rule from the previous Layer 3 and $\{p_i, q_{i,}\text{a}\, r_i\}$ is a set of parameters of the given node.

Layer 5 – The fifth layer includes only one node and counts the network output as a sum of all its inputs determined by the equation:

$$O5_i = \sum_{i=1}^{j} \overline{w_i} f_i$$

Afterwards, the results are defuzzified by a weighted average.

There are two adaptive layers in the ANFIS architecture (Layer 1 and Layer 4). Parameters related to input membership functions are modified in the first layer. The fourth layer includes 3 modifiable parameters (p_i, q_i *and* r_i) that belong to a first degree polynomial. The aim of the training and learning algorithm is to set all modifiable parameters so that the output corresponds to the required values. The back-propagation method is used in training the neural network, looking for optimal values for

the modifiable parameters by the smallest square method, in order to minimize the error between the input and output pairs (Keles et al., 2008).

Data

Macroeconomic data obtained from the databases of Eurostat (Eurostat, 2017) and the Czech Statistical Office (Czech Statistical Office, 2017) were used for compiling the paper. Based on the research presented in previous literature (Moravec, 2013; Ahmad et al., 2009), the monthly values of the indicators of inflation (INFL), unemployment rate (U) and PRIBOR interest rate (IR) related to the period of 2011–2016 were used. These indicators were established as the macroeconomic factors affecting the number of company bankruptcies. The numbers of bankruptcies of legal persons in the Czech Republic were obtained for the corresponding years (CRIF – Czech Credit Bureau, 2017).

The data set includes 70 samples and is randomly divided into 2 parts: training (60 samples) and testing (10 samples). The model inputs are the above variables listed in Table 1. These inputs are used to predict the number of bankruptcies in the current month.

Table 1: Inputs used in the model

Inputs	Name
$\mathbf{X_1}$	Inflation (INFL)
$\mathbf{X_2}$	Interest rate (IR)
$\mathbf{X_3}$	Unemployment rate (U)
Output	**Name**
$\mathbf{O_1}$	Number of bankruptcies (NB)

A correlation matrix was created to determine the effect of the respective macroeconomic indicators on the number of bankruptcies (Table 2), which shows the strength of the relationship between the input variables and the output variable (number of bankruptcies, NB). The matrix clearly shows that the number of bankruptcies in the individual months is most affected by the unemployment rate (U), followed by inflation (INFL). The least significant, yet not negligible impact was established for the PRIBOR interest rate. It is therefore clear that all three macroeconomic indicators have a certain degree of influence on the number of bankruptcies in the Czech Republic, which is why they will be incorporated in the model for predicting financial failure of businesses.

Table 2: Correlation matrix of macroeconomic indicators

	INFL	IR	U	NB
INFL	**1**			
IR	0.611	**1**		
U	0.814	0.592	**1**	
NB	0.554	0.399	0.682	**1**

Processing and Results

MathWorks MATLAB with the Fuzzy Logic Toolbox was used for creating the model. Before the ANFIS system training and testing, 2 facts need to be taken into account. First, the data for the network training and testing must be different, and second, the data set must be well mixed before the division of the training and testing sets. The iteration process was used in the training stage, aiming to determine the optimal values of the parameters by minimizing the sum of the squares of deviation of the predicted and real data.
A large number of experiments were performed in order to achieve the best possible results. The parameters applied to the generation of the final fuzzy inference system (FIS) are as follows:

- Gaussian-bell shaped membership function (gbellmf – 5 5 5).
- Train FIS optimum method: Hybrid learning.
- Generate FIS method: Grid partition.

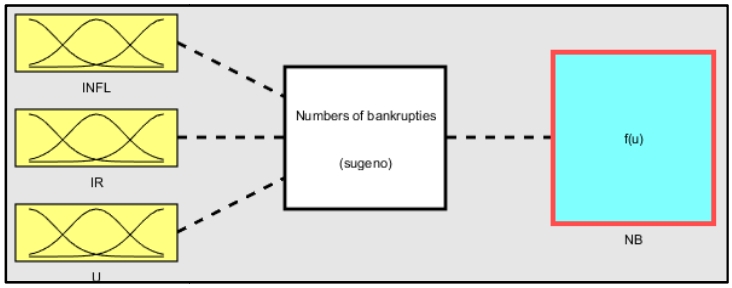
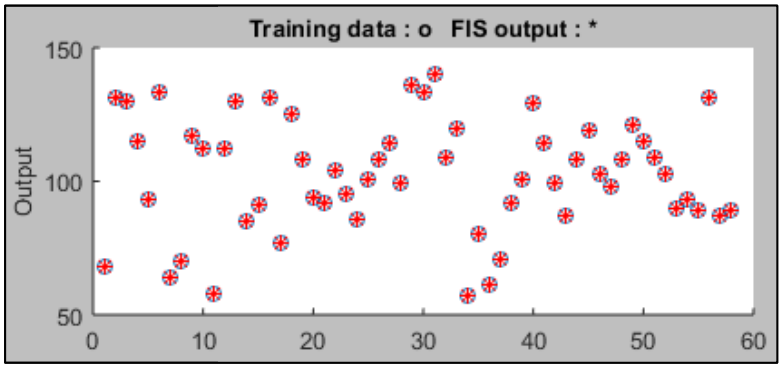


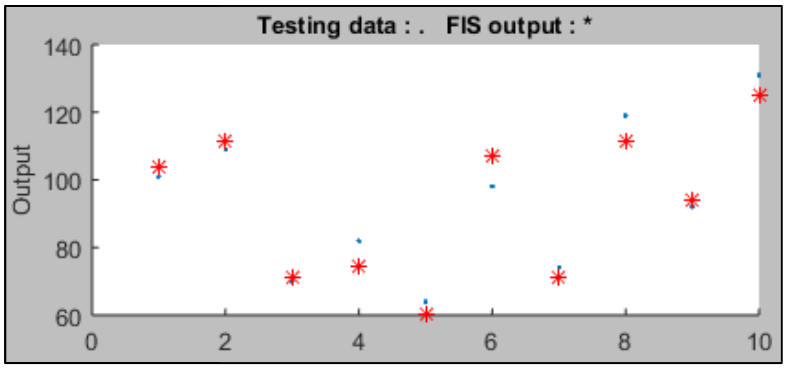
Fig 3. Structure of the model for predicting the number of bankruptcies

The generated model (Figure 3) includes 125 rules. An example of these rules that constitute the decision-making mechanism is given below. The error value in the model training process reached 0.030741. Graphic depiction of the results is shown in Figure 4. In the testing stage, the average error value was somewhat higher, namely 5.2677 (Figure 5).

Rule 1: If (INFL is in1mf1) and (IR is in2mf1) and (U is in3mf1) then (NB is out1mf1) (1)
Rule 2: If (INFL is in1mf1) and (IR is in2mf1) and (U is in3mf2) then (NB is out1mf2) (1)
Rule 3: If (INFL is in1mf1) and (IR is in2mf1) and (U is in3mf3) then (NB is out1mf3) (1)
……...
Rule 124: If (INFL is in1mf5) and (IR is in2mf5) and (U is in3mf4) then (NB is out1mf124) (1)
Rule 125: If (INFL is in1mf5) and (IR is in2mf5) and (U is in3mf5) then (NB is out1mf125) (1)



g stage results generated by the ANFIS system



The testing data for the model quality testing consisted of 10 randomly selected samples, see the example in Table 3. Furthermore, Table 4 shows the real and estimated values of the number of bankruptcies for the given month. The correlation between these values is shown in Figure 6.

The correlation coefficient for the real and estimated values is 0.9383. Therefore it can be stated that the created ANFIS model can be considered a suitable model for predicting the number of company bankruptcies for the given calendar month and the means of artificial intelligence can be used for solving economic problems dealing with financial failure of companies.

Table 3: A few sample data used in model

Monthly period	Inflation % (INFL)	Interest rate % (IR)	Unemployment rate % (U)	Number of bankruptcies (NB)
May-16	0.4	0.29	4.1	**70**
Sept-15	0.4	0.30	4.8	**82**
Dec-11	1.9	1.16	6.6	**98**
Mar-16	0.4	0.29	4.1	**74**
June-11	1.9	1.20	6.8	**119**

Table 4: Model estimates and real observations (testing data)

Sample number	Monthly period	Real NB (RNB)	Estimated NB (ENB)	RNB-ENB (real - estimated)
1	Oct-11	101	104	-3
2	May-13	109	111	-2
3	May-16	70	71	-1
4	Sept-15	82	74	8
5	July-15	64	60	4
6	Dec-11	98	107	-9
7	Mar-16	74	71	3
8	June-11	119	111	8
9	Oct-14	92	94	-2
10	Apr-13	131	125	6
R^2 for		**Mean of**	**Mean of**	
model = 0.9383		**RNB** = 94	**ENB** = 93	

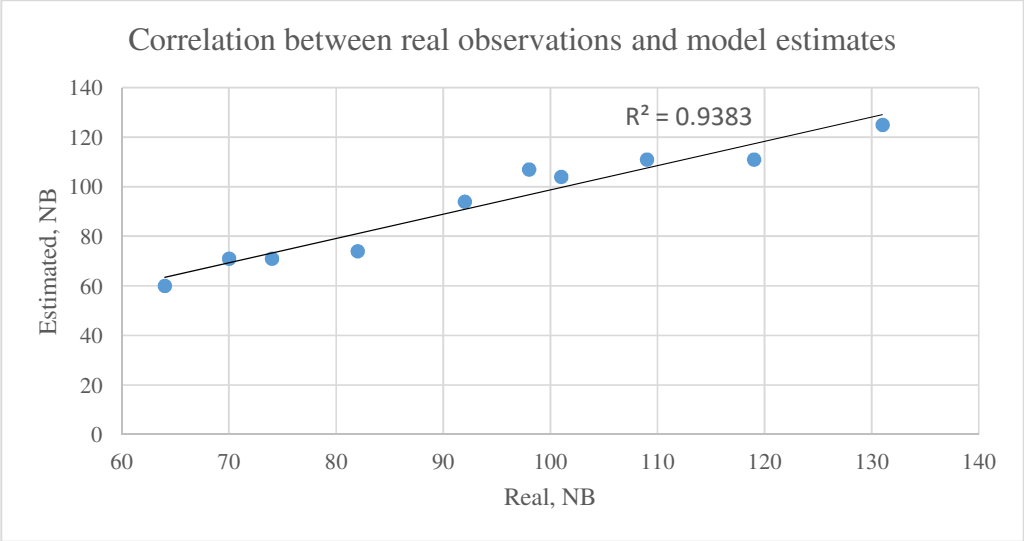


Fig 5. The correlation between real observations and model estimates

Conclusion

The artificial intelligence models are currently being used in a number of scientific fields, economics undoubtedly being one of them. They are able to solve important financial problems and make prognoses based on economic data. One can find many studies dealing with modelling of problems in economics. However, there are few studies focused on the creation of models for predicting bankruptcies of companies based on macroeconomic data.

This paper focused on the design of the ANFIS model for estimating the number of bankruptcies of legal persons in the Czech Republic with the use of macroeconomic indicators. The indicators of inflation, interest rate and unemployment rate were used for this purpose. Based on the obtained results, it can be stated that the designed ANFIS model is able to predict the number of financial failures of companies with sufficient accuracy.

When compared to the statistical models, the neuro-fuzzy models have the advantage in the form of "rules" that are drawn up based on the used data and thanks to the excellent computing and modelling abilities, ANFIS systems are especially suitable for modelling of complex, dynamic and non-linear problems.

For further research, it would be advisable to extend the model by adding more macroeconomic indicators and monitor the predictive strength using other outputs.

Acknowledgement

This paper was supported by grant FP-J-17-4174 'The Use of Artificial Intelligence in Business' from the Internal Grant Agency at Brno University of Technology.

References

Ahmad, A.H. @ H., Daud, S.N.M. and Marzuki, A. (2009) 'Macroeconomic Determinants of Corporate Failures in Malaysia,' *International Journal of Business and Management*, 3 (3).

Behnia, D. (2013) 'Predicting crest settlement in concrete face rockfill dams using adaptive neuro-fuzzy inference system and gene expression programming intelligent methods,' *Journal of Zhejiang University SCIENCE A*, 14 (8), 589-602.

Dostál, P., Machů, E. and Rukovanský, I. (2016) 'Identification of Gifted Students via ANFIS for a Purpose of their Inclusion into Special Educational Program,' *The 28th International Business Information Management Association Conference* Spain, 262-268.

Dostál, P., Rukovanský, I. and DOSKOČIL, R. (2017) 'Risk Investment and Fuzzy Interface System,' *The 29th International Business Information Management Association Conference* Austria, 117-121.

Geng, R., Bose, I. and Chen, X. (2015) 'Prediction of financial distress: An empirical study of listed Chinese companies using data mining,' *European Journal of Operational Research*, 241 (1), 236-247.

Jang, J.-S.R., (1993) 'ANFIS: adaptive-network-based fuzzy inference systém,' *IEEE Transactions on Systems, Man, and Cybernetics*, 23 (3), 665-685.

Keles, A., Kolcak, M. and Keles, A. (2008) 'The adaptive neuro-fuzzy model for forecasting the domestic debt,' *Knowledge-Based Systems*, 21 (8), 951-957.

Kim, M.-J. and Kang, D.-K. (2010) 'Ensemble with neural networks for bankruptcy prediction,' *Expert Systems with Applications*, 37 (4), 3373-3379.

Korol, T. (2013) 'Early warning models against bankruptcy risk for Central European and Latin American enterprises,' *Economic Modelling*, 31, 22-30.

Liu, J. (2004) 'Macroeconomic determinants of corporate failures: evidence from the UK,' *Applied Economics*, 36 (9), 939-945.

López Iturriaga, F.J. and Sanz, I.P. (2015) 'Bankruptcy visualization and prediction using neural networks: A study of U.S. commercial banks,' *Expert Systems with Applications*, 42 (6), 2857-2869.

Mohamed, A. and Salama, A. (2013) 'A Fuzzy Logic based Model for Predicting Commercial Banks Financial Failure,' *International Journal of Computer Applications*, 79 (11), 16-21.

Moravec, T. (2013). 'The Bancruptcy in the Czech Republic – influence of macroeconomic variables,' *Acta academica karviniensia*, 8 (3), 136-145.

Séverin, E. (2010) 'Self organizing maps in corporate finance: Quantitative and qualitative analysis of debt and leasing,' *Neurocomputing*, 73 (10-12), 2061-2067.

Vigier, H.P., Scherger, V. and Terceño, A. (2017) 'An application of OWA operators in fuzzy business diagnosis,' *Applied Soft Computing*, 54, 440-448.

Zanganeh, T., Rabiee, M. and Zarei, M. (2011) 'Applying Adaptive NeuroFuzzy Model for Bankruptcy Prediction,' *International Journal of Computer Applications*, 20 (3), 15-21.

Expansive Use of Planning and Finance Mechanisms as a Factor Increasing the Living Standard of Elderly People

Natalia Goncharova, Higher School of Public Administration and Financial Management, Institute of Industrial Management, Economics and Trade, Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russia, goncharova_nl@spbstu.ru

Viktoriia Degtereva, Higher School of Public Administration and Financial Management, Institute of Industrial Management, Economics and Trade, Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russia, degtereva_va@spbstu.ru

Abstract

Creating a system of interaction and active participation of elderly people in forming their incomes by using various planning and finance mechanisms acts as an important factor to improve their living standard, to increase incomes of regional and municipal budgets through service industries and to stabilize the costs of services in the conditions of inflation processes.

In this research study, according to the reviewed results of surveys conducted in 2017, primary and secondary statistics about the living standard of elderly people over the period 2011-2016, recommendations are suggested aimed at searching for and applying planning and finance mechanisms to increase their living standard under the conditions of accelerating inflation.

Key words: senior citizens, living standard, service sector, incomes, inflation

Introduction

Topicality

The problem of improving the living standard of the elderly is extremely topical, since, firstly, the level of population's real income is constantly going down, even though Russia is a social state; secondly, incomes of regional and municipal budgets have a reducing trend, which narrows the capabilities of help provision; thirdly, the service sector is focused on meeting the needs of wealthier population strata, which is caused by a growing cost of services in comparison with the average inflation indicators countrywide, in particular, the cost of consumer goods basket.

Problem Statement

Due to a budget deficit, no growth in the real income of the elderly is observed and so the specific weight of senior citizens in St. Petersburg who continue to work is the largest (40%), with the mean being around 30% countrywide. Over the last five years, the income growth rates of non-working seniors considerably fall behind the inflation rates, although it is provided for in pension payments, which determines a constant trend for reducing the living standard. As a result, the availability of services for the elderly is going down. It negatively affects their living conditions, earnings of the service sector and formation of the municipal budget.

Research Goal

Based on statistics, surveys and foreign experience in providing a high living standard, methods to form sources for stimulating labor of the elderly in St. Petersburg, guidelines are to be worked out to improve the planning and finance mechanism for increasing the living standard of the senior citizens in St. Petersburg.

Research Objectives

- to investigated the national experience in improving the living standard of the elderly;
- to identify potential financial sources ensuring growth in real incomes of the elderly;
- to determine the existing and possible industries which can use the labor of the elderly in the service sector.

Research Hypothesis

If a variety of planning and finance sources is used to provide a decent standard of life for the elderly people in St. Petersburg, the latter ones become actively involved in the social life and in the activities of the service sector. So conditions for their psychological well-being can be formed and they can gain respect on the part of a wider public.

Literature review

The surveys of the elderly in Russia, described by Pisarev A.V. (2001) in his research study, show that the main motive to work after retirement age is a material factor (60-78%), including the following reasons: need to help their grown-up children and grand-children; wish "to get rid of the feeling of isolation". "Sense of unspent energy" was selected by 12 to 20% of the elderly [1]. [1 Pisarev A.V. Wellbeing of an Elderly Person in Today's Russia. M., ISPI RAS, 2001, pp. 12-13]. Consequently the author determined the importance and the need to actively involve senior citizens in different forms of labor.

In the paper by Bogacheva N.L. and Tyvin L.F. (Bogacheva N.L.. & Tyvin L.F.. (2011)) they look into the forms of stimulating the labor activity of senior citizens to ensure growth of their real incomes, including provision of services to the people living next door, which are in high demand today.

Litvinov I.B., in his dissertation study (Litvinov I.B. (2005)), discusses the reasons for inhibiting a wider use of the elderly labor in service enterprises and rightly stipulated the following ones: no capability for retraining or upgrading - 16.5%; care for members of the family and close relatives (grandchildren, ill people, older people etc.) - 15.6%, unsatisfactory health as a significant obstacle to being able to continue work - 14.7%. The latter reason, in our opinion, can be the case for those older than 72, since according to the Central Research Institute for Expertise of Employability and Labor Organization of the Disabled (Moscow), around 80% of senior citizens (younger than 72) are fully or partially capable to work. However, some of them, who want to continue their labor activity, according to the data of Litvinov I.B. (Litvinov I.B. (2005)), lay down such terms as: an opportunity to get an easier job (15-20% of respondents); to improve their qualifications not in an educational institution but directly at a workplace in the service sector, being able to feel the moral climate in the team, future labor conditions, to adapt quicker (20-25%); to shift for a part time job (10-18%), etc., all of which, in our opinion, is important for employing the elderly in the service sector.

Generalization of the national and foreign experience performed by Pisarev A.B. (Pisarev A.B. (2001) shows that, with the introduction of part-time modes of work, industrial and service enterprises see an increase in the efficiency coefficient of equipment use by 10-15%, staff turnover reduces by 15% because fewer people resign for family reasons, the whole day and inter-shift working time fund is used more effectively, with the use of part-time mode of work and introduction of ribbon and staircase working schedules, which consider the customer flow motion by hours of the day and days of the week in 1.5 and 2 shift public service enterprises, the productivity grows by 4-7%, in retailing - by 10-12%, the quality of servicing improves Pisarev A.V. (2001) (Pisarev A.V. (2001)). It proves the plausibility of effective use of senior citizens' labor in the service sector. Moreover, according to the UNO recommendations about the right of the elderly people to take part in social, cultural and economic development (Declaration of Human Rights of Older People, UNO) the state has to provide them with participation and their individual support on the usual terms with

people of other age groups, as well as to comply with the main labor standards adopted by the International Labor Organization in 1998, which declare the following five fundamental principles (Tornow W.W. (2001)) the right to freedom of associations; the right to make collective agreements; freedom from mandatory or forced labor; liquidation of child labor; liquidation of discrimination in employment, including in terms of labor payment by age or gender.

In their research study Sonina Yu. V., Kolosnitsyna M.G. (Sonina Yu. V. & Kolosnitsina M.G (2015)) conclude that the dynamics of economic activity among the elderly is derivative on the employment capabilities in such sectors as education, health care, science, military industry complex (MIC) and housing and utility sector (HUS), i.e. where the state prevails. Thus, the share of the employed in these industries among all working elderly males increased from 40% in 2004 to over 55% in 2013. Similar change is true for women - a growth from 60 to 67%. In the work of Rodionov and all (Rodionov D. & Nikolova, L. & Velikova, M. & Kalubi, R.D.M. (2016)) specifies specific mechanisms for the employment of older people in these areas of activity. Further they mention that, neither part-time employment, nor self-employment have become growth factors of senior citizens' economic activity over the recent years. In order to use effectively the potential of these workers, who are well-educated and have up-to-date skills, the state has to develop special politics, encouraging diverse and flexible forms of employment, retraining programs, self-employment opportunities and other direction for the service sector has aggravated, are highlighted in their paper by Rodionov D.G. and Zhilyaeva I.A. (Rodionov D.G. & Zhilyaeva I.A. (2017)).

The above-mentioned researchers' opinions prove our hypothesis about the plausibility and suitability to expand the forms of senior citizens' further participation in the service sector.

Analyzing the activity of the elderly, Barsukov V.N. (Barsukov V.N. (2016))), correctly determines the following main areas for the state and society be involved in, which will contribute to an effective use of senior citizens' labor potential. In our opinion focusing on training and retraining of pre-retirement aged workers in the direction of the service sector will allow solving the tasks of senior citizens' employment, making their incomes grow and helping them to have a job closer to the place where they live, since the objective of the service sector is mostly related to giving services primarily in the residential area of the customer, being within a transport or walking distance. The paper by Kolosnitsyna M.G., Gerasimenko M.A. (Kolosnitsyna M.G. & Gerasimenko M.A. (2014)), substantiates, without specialization, in general words, the issues concerning the improvement of economic activity among the elderly, in such areas as: legislation enhancement; wider use of financial tools; information campaigns to change the attitude to older workers in society (among employers, colleagues). More definitive forms of incentive taxation of senior citizens are presented in the paper by Goncharova N.L. and Kozlova E.A. (Goncharova N.L. & Kozlova E.A (2015)).

The experience of Tatarstan is interesting in fighting the isolation of the elderly by uniting them with young families with kids, who do not live jointly with their own grandmothers and grandfathers or do not have their own grandmothers and grandfathers. (The newspaper «Arguments and facts (2007)).

At the same time, the issues of using planning and finance sources as a factor improving the living standard of the elderly have not been investigated enough.

Research methodology

In order to determine to what extent our hypothesis is substantiated in terms of using the diversity of planning and finance sources to ensure a decent living standard for elderly people, which can stimulate their active involvement in social life and employment in the service sector, what will form the conditions for their psychological well-being and respect on the part of the wider public, the author, using statistical analysis methods, has analyzed primary and secondary sources of sociological research studies and statistics, evidence from St. Petersburg and and some other regions of the Russian Federation over such an important period in the life of the state as 2012-2017. The importance of this period is governed by the fact that it saw both reduction in microeconomic

characteristics and aggravation of the external economic and political situation. It contributed to change in reasons related to the living standard of the elderly.

Based on the questionnaire sheets, developed by the authors and containing five questions, data was acquired and analyzed about the reasons why senior citizens continue to work. The data was collected at 51 workplaces in the service sector, in the municipality "Shushary", St. Petersburg, which belong only to the private sector or the economy and are, as a rule, branches of large firms, including the majority of industries: consumer services, health care, trade, catering, housing and utility sector.

The research materials, statistic and sociological studies have been processed based on correlation analysis methods, common features have been identified and conclusions have been made.

Research findings

Given the data of literature in terms of the suitability to involve senior citizens in jobs in the service sector and according to the survey conducted by the authors among employed pensioners in an individual municipality, the following features have been revealed concerning the employment structure preferences by types of activity: for elderly males the possible spheres of activity are the housing and utilities sector, education, health care; for females approaching the retirement age the most acceptable employment can be in health care, education, housing and utility sector and retailing.

According to Rosstat sampling inquiry, cash income data is presented for households consisting of the elderly for the years 2011 and 2015 (see Table 1). This data for the analyzed year 2015. In comparison to 2011, with an official inflation index equal to 1.515, the cash income increased by 106.0%. It increased more from labor activity (140.1%), with a simultaneous sudden fall of social payments, pensions and subsidies. Given that the majority of senior citizens belong to the families with low levels of earnings, their consumer goods basket is somewhat focused on purchasing food and paying for housing and utility services, whose growth rates over the same period were even higher that those stipulated in the official statistics and amounted to 159.7%. Thus, senior citizens' monthly income can be determined in 2011 as equal to 39107.6 rub. per month. The growth in earnings over 5 years is only 101.6%. Special attention must be paid to the insignificant growth and absolute value of cash receipts from individuals and organizations where senior citizens used to work, apart from social protection bodies, as well as from such sources as property income, which grew considerably (156.2%), including renting out properties (137.2%). An example of positive experience can be given, when, pooling the property, three elderly women started to live in one apartment and rented out the other two. Moreover, now they use only one car, so they have money for rest, trips and medications.

Today, according to the survey published by Rosstat in 2017, the length of employment after retirement pension is awarded was an average of 4.9% in Russia in 2016, whereas in 2011, labor activity was simultaneously terminated by 5.2% with the year of pension granting, which is the evidence of the sharp leave of the elderly from their customary sphere of activity.

At the same time, the financial state of the elderly, characterized by the levels of minimum wage (hereinafter MW) and minimum pension established in the region, is essential for ensuring their living standard. In particular the current value of MW in St. Petersburg for the year 2017 is established as 16,000 rubles.

The amount of the senior citizen's living wage in St. Petersburg (SPb) in 2017 is established as 8 540 Russian rubles, the same as countrywide, but it is lower than the amount of 8 803 in 2016, by 3%, which equals to 263 rub. a month. This amount is significant for a person who receives a minimum pension. It is sufficient to buy 5 loaves of bread. At the same time the amount of living wage is several times higher than the MW established countrywide, but almost twice less that the MW established for working people in SPb. It is this figure which is considered when a social additional payment to a pension is granted. I.e. the minimum pension in St. Petersburg (SPb) in 2017

is equal to 8 540 rubles. But there are other local payment, which also have to be taken into consideration to understand what pension the elderly receive in St. Petersburg.

The reviewed system of monthly payments to the elderly in St. Petersburg (SPb) in 2017 shows that St. Petersburg has a special system of social support measures from the local budget. According to the Social Code of SPb, the money is received by the disabled, families with children, veterans, survivors of the seige and some other categories of citizens. There are special subsidies for the elderly too.

The demographic characteristics of aging are common for the majority of developed countries. According to American statisticians, by 2030, when those from the baby-boom generation achieve the age of 65, the number of the elderly (over 65 years old) will amount to 70 mil., i.e. two times more than now, and 30% of the population will be older than 50. A similar situation is observed in other developed countries. It is expected that by 2025 the share of elderly citizens in the Russian Federation according to the low and high levels of projection options will be from 27.2% to 27.5% (see Table 4), and the number of working-age population will reduce, on average, by 0.8 mil. people.

Thus, for the first time in history, thanks to a healthy lifestyle and achievements of medicine, people started to live much longer. As a result, given that the constitution has provisions about the social form of the state and provisions about free health care, there is a risk that budget means will be insufficient to solve these problems. It is necessary to develop a system of private medical insurance and increase the length of labor activity for the elderly in jobs they are capable of coping with, focusing in social aid on senior citizens aged after 72.

One of the special features of budget activities of St. Petersburg municipalities is, on the one hand, a wide range of measures conducted in social policy, and, on the other hand, these measures are financed not in accordance with the normative standards, but with whatever remaining funds that are available. It is also true in respect of helping veterans. Along with that, the indicator of specific expenses aimed at providing the activity of local government bodies themselves is considerably higher than the social policy costs.

A strive to secure savings through purchase of real estate property, which is considered a good investment, does not considerably improve the living standard of the elderly, both due to overproduction in residential construction and due to a stricter control over lease and sub-lease incomes.

Frugality, common for Germans, is not inherent in Russians. They save little of their cash incomes in bank accounts and rarely buy securities. The reasons for this lie both in the instability of banks, their systematic bankruptcy and in high volatility of Russian securities.

Russia does not have a teaching system of reasonable family budget planning, which does not allow families to save money on such expenses as: buying at sales, operating electrical appliances (including the heating systems and the washing machine) at a night tariff; collection of rainwater not only for watering plants in the garden, but also for household purposes. In this case there is no need to pay for water supply and discharge, whose cost, according to the data of Degtereva V.A. and Kuporov Yu.Yu. (Degtereva V.A. & Kuporov Yu.Yu (2017), is comparable to the cost of consumed water; collection of receipts to get refunds from medical insurance funds, use car pooling and share all the expenses.

In order to tackle the problem of aging and preventing the problems of social isolation, to prepare the elderly for retirement, to widen their mind, to prepare them for adequate labor and social activities, one of the thing to to is develop educational institutions, the so-called "universities of the third age", which have been successfully applied in some regions of Russia since 2000s (for example, Vladimir, Rostov and Tumen Regions) (Socioeconomic Development Strategy of Rostov Region

until 2020. (2012)) and the direction of the training programs are detailed in the work Wacker, R. R., Roberto, K. A. (Wacker, R. R. & Roberto, K. A (2013)).

Conclusions

Given the conducted investigations about the nature of cash incomes obtained by households which consist of the elderly over the years 2011 and 2015, it can be reasonably concluded about exceptional benefit for senior citizens to be involved in adequate labor. In this case growing incomes neutralize inflation processes in the country, allow filling in vacancies in low-paid jobs in the service sector, primarily in the HUS, education, health care and retailing.

At the same time, the role of pensions, and, especially social payments and benefits in the incomes of senior citizens' households is rapidly reducing, which is caused by a transfer to a point system for determining the amount of pension and by toughening the procedure for granting social benefits and payments. Moreover, the analysis revealed the insignificant growth and absolute values of cash inflows from individuals and organizations where the elderly used to work, apart from the social protection bodies. Consequently, expansion of the existing and search for new planning and finance mechanisms are necessary to ensure a decent living standard for the elderly.

After looking into the organization of the conditions for continuation of employment among people of retirement age, it has been revealed that this issue is considered less and less in Russia, which is proven by a conducted analysis of the length of employment after pension is granted due to a retirement age in the RF, when over five years, from 2011 to 2016, the share of senior citizens who terminated their labor activity after pension was granted increased from 4.9% to 5.2%. This is the evidence of a sudden leave of the elderly from their usual sphere of activity without being prepared to a new type of activity, which calls for urgent means to adapt future senior citizens to new types of activity.

Review of social benefits and subsidies established for the elderly by regional government bodies given their budget capacities demonstrated their large diversity. The living standard in the northern capital is somewhat higher than in many regions of Russia, so the minimum pension in St. Petersburg (SPb) in 2017 is much higher than in neighboring localities. Payments and additional payments from regional budgets are provided to the elderly given the established senior citizen's living wage in the region of residence. So the source of means from the regional and municipal budgets is very limited and cannot be seen as a major one to maintain a decent living standard of the elderly.

The revealed systems of interaction and active participation of elderly people in forming their incomes by using various planning and finance mechanisms acts as an important factor to improve their living standard, to increase incomes of regional and municipal budgets through service industries, whose work they will be capable to activate, as well as help to stabilize the costs of services in the conditions of inflation processes.

The reviewed demographic projections by individual age groups show that in the Russian Federation by 2025 the share of the elderly will be from 27.2% to 27.5%, and the number of the working-age population will reduce, on average, by 0.8 mil. people. Consequently, planning and finance sources of future pension payments must be searched for, including further development of a private medical insurance system, capable to increase the length of labor activity for the elderly in adequate jobs, with a focus on senior citizens aged after 72 in providing social aid.

The analyzed mentality of the Russian population shows that Russians are not taught reasonable planning of the family budget, the experience of reasonable expenses, so they do not try to save money for everything possible or invest it with profit, in particular, in pension. It is explained by economic insecurity, caused both by the instability of the ruble, frozen funds of non-government pension funds by the state, instable operation of banks, volatility of Russian securities, changing

legislation, unreliability of entrepreneurs as partners, who transfer money to social funds for their employees.

Recommendations

- clearly determine the list of the elderly living in a certain region (district), who have the right to use any form of local budget financial sources of aid. For example, the elderly entitled for incentives in St. Petersburg should include individuals who have worked in this territory for not less than the minimum period for retirement (10 years) upon achievement of the pension age (now minimum of 10 years), retired at the age of 55 for women and 60 for men (in case of change in the law about the terms of retirement, new terms of retirement are applicable), which will make it possible to considerably increase payments to indigenous inhabitants of the city, as a rule, having no connections with other regions;

- make payments from the municipal budgets, in case there are enough city's budget planning and finance sources, to the elderly whose employment record in St. Petersburg is less than 10 years;

- form individual territorial budget planning and finance sources, which will be available for individuals living in a certain administrative district, as a rule, for more than 10 years (separate locality, micro-district, municipality, district), and, in case the budget sources allow, for the retirement age residents living there for a shorter period of time;

- via the system of taxation, stimulate creation of out-of-city planning and finance sources

a) specific enterprises in relation to their former workers;

b) national, in reference to individuals of certain nationality, compactly living in the locality of the region, who can be used as target for specific social groups of retirement age in accordance with the wish of the organizers of this event;

c) financial sources of the Eurasian Union can be used to support the elderly who have employment experience in the territory of the state member of the Eurasian Union based on an interstate agreement.

d) budget planning and finance sources of other municipalities of the Russian Federation (republics, krays, regions, cities and towns, etc.) can be used in St. Petersburg for the relevant social groups in compliance with inter-territory agreement or directly to a certain senior citizen with financial means being sent to them directly from the source located outside St. Petersburg (an offsetting system between federal subjects can be applied).

Develop the following types of planning and finance sources to increase the living standard of the elderly:

- chargeable service market for the elderly, in particular, with the use of budget means;

- chargeable service market to use adequate labor of the elderly, including with the use of additional payments form budget means to the individuals who provide them with jobs (an an equivalent of additional payments from SPb budget to entrepreneurs hiring teenagers);

- tax free system of mutual services in terms of a specific locality (house committee, home owner association, housing association, micro-district, village, municipality, district, city, town, etc.),

- family relations between single (as a rule, childless) senior citizens in the following organizational forms: property pooling and joining single old people with young families with children, who do not live together with their own grandmothers and grandfathers or have no grandmothers and grandfathers;

- advocate rational methods of household running, including the use of examples of single people who pool their property on some legal basis and live together in one home while renting out the rest and thus having an additional source of income, as well as using pooled property with a large coefficient of loading, i.e. with improved efficiency.

- introduce an educational system of finance and reasonable family budget planning, at the pre-retirement stage of life provide free professional education, retraining, advanced training of future senior citizens in service jobs (in housing and utility, education, health care and retailing. On the one hand, it will considerably reduce the share of senior citizens involved in unskilled labor, who are ready to work in low-paid jobs without official registration to ensure at least some allowance to pension. On the other hand, the number of employed senior citizens in qualified jobs will grow.

Further research should be directed in the area of preparing specialized methodological guidelines to introduce the proposed measures in the practical activity of regional and municipal divisions.

References

Pisarev, A.V. (2001) 'Wellbeing of an Elderly Person in Today's Russia' M., ISPI RAS, 12-13.

Bogacheva, N.L. & Tyvin, L.F. (2011) 'Pension Funds and Citizens' Interest in Their Formation' Journal: Society. Environment. Development. Science and theory journal, 3, 98-102.

Litvinov, I.B. (2005) 'Employment of Senior Citizens at Enterprises of the Service Sector', ABSTRACT OF a DISSERTATION for a Degree of a Candidate of Economic Sciences, Moscow

'Declaration of Human Rights of Older People UNO' (2016). [Online], [Retrieved September 04, 2017] http://funnysms.ru/deklaratsiya-prav-starogo-cheloveka-oon.php.

Tornow, W.W. (2001) 'The Human Side of Enterprise', N.Y.

Sonina, Yu. V. & Kolosnitsina, M.G.(2015) 'Senior Citizens on the Russian Labor Market: Trends of Economic Activity of the Elderly', journal Demographic Survey, 2, 37–53 [Online], [Retrieved Septermber 04, 2017] https://demreview.hse.ru/2015--2/167982382.html.

Rodionov, D., Nikolova, L., Velikova, M. & Kalubi, R.D.M. (2016). 'Competitive strength of a concession integration model of labour market to education market interaction'. Proceedings of the 28th International Business Information Management Association Conference - Vision 2020: Innovation Management, Development Sustainability, and Competitive Economic Growth, ISBN: 978-0-9860419-8-3, 9-10 November 2016, Seville, Spain

Rodionov, D.G., & Zhilyaeva, I.A. (2017) 'Service Sector as a Subject of Regulation in Today's Economy', In the book: Economy, Environment and Society of Russia in the 21st Century. Collected Book of Scientific Works of the 19th International Scientific and Practical Conference, 232-236

Barsukov, V.N. (2016) 'Labor Activity of the Elderly Population as a Factor of Socio-economic Development of a Locality ', Journal: Economic and Social Change: Facts, Trends, Projections, 1 (43), 195 – 211

Kolosnitsyna, M.G., & Gerasimenko M.A. (2014), 'Economic Activity in the Old Age and State Policy', Journal: The Issues of the State and Municipal Governance, 4, 47–68, [Online], [Retrieved September 04, 2017] https://vgmu.hse.ru/2014--4/141013353.html.

Goncharova, N.L. & Kozlova, E.A. (2015) 'Development of the Russian Federation Taxation System in the Sphere of Family Taxation ', In the collected book: A Week of Science in SPbPU. Materials of scientific forum with international participation. Institute of Industrial Economics. Peter the Great St. Petersburg Polytechnic University, the Institute of Industrial Economics, 42-44

A Grandmother for Some, a Grandfather for Others. Gas (2007), The newspaper «Arguments and facts Long-Liver, 11-12

Website statistics of the Russian Federation «Rosstat» [Online], [Retrieved September 04, 2017] http://www.gks.ru

Degtereva, V.A. & Kuporov, Yu.Yu. (2017) 'Methodological Guidelines to Form Tariffs for the Services of Water Supply and Discharge Enterprises', Journal: Economics and Entrepreneurship, 5-2 (82-2), 729-732.

Socioeconomic Development Strategy of Rostov Region until 2020. 4.4. Improving the Level and Quality of Population Life. 2012. http://donland.ru/Default.aspx?pageid=85428.

Wacker, R. R., & Roberto, K. A. (2013). Community resources for older adults: Programs and services in an era of change. Sage.

Problems and Directions for Improving Labor Rating

Ludmila Nadreeva, Professor of Industrial economics and management department, Kazan National Research Technical University named after A. N. Tupolev – KAI, Kazan, Russian Federation, nadreeva@mail.ru
Vladimir Abramov, Associate Professor of Industrial economics and management department, Kazan National Research Technical University named after A. N. Tupolev – KAI, Kazan, Russian Federation, abramov@re-audit.ru

Abstract

The article is based on the growing importance of labor rating as a tool of integrated impact on the enterprise performance. A study of the organization on labor rating is presented by a group of enterprises in the leading sectors of the Republic of Tatarstan, including an assessment of the quality of labor standards, intensity of labor and calculated standards. The areas for improvement of labor rating that could form the basis for the development of a regional program for the improvement of the labor rating management system are identified.

Keywords: human resources, labor rating, quality of labor standards, labor intensity.

Introduction

One of the important functions of the enterprise management is labor rating. The best foreign practices confirm the positive impact of the labor rating system on the operating efficiency of an enterprise and its subsystems: production, financial, economic, human, social, etc., as a result of the functions assigned to the system of labor rating.

For example, the current labor standards for the various types of operations determine the labor intensity of the work, the number of industrial production personnel required, the professional and skill mix of workers and, as a result, the scope and timing of the work. The use of such indicators as wage per operation (type of work) and the wage per hour of the standard and actual time worked, along with the labor intensity, make it possible to control the production costs.

Indicators of the impact of the rating system on the quality and efficiency of production are assumed abroad as the frequency of absence from work and staff turnover rate [1]. As a result of a series of economic and sociologic surveys of a number of foreign firms, these indicators have been reduced by more than 80% through a reasonable approach to the labor standards.

The relevance of the problem stated in the article is associated with the fact that the high degree of labor rating integration with the production and technical, financial and economic areas of the firm operations implies an increase in the status of labor rating as a part of the management of economic stability not only of individual enterprises but also of territorial entities.

The object of the article is to study the state of labor rating at the enterprises of the Republic of Tatarstan and to develop the recommendations for its improvement.

Methodology of the Study

In the course of the study, the following methods were used: analysis of regulatory documents, statistical methods of research, such as data grouping and analysis, systematization and aggregation of facts and concepts.

Results of the Study

The state of the labor rating organization was studied at the enterprises of various types of ownership, representing the chemical industry (Nizhnekamskneftekhim PJSC, Kazanorgsintez PJSC, NPP TASMA LLC, KZSK OJSC, Nefis Cosmetics JSC) and the machine-building complex of the Republic of Tatarstan (Radiopribor JSC, Kazan Helicopters PJSC, Kazan Plant Electropribor OJSC, Kazancompressormash OJSC, Teplocontrol JSC, KamPRZ OJSC, Kamaz-Diesel OJSC).

An analysis of the level of labor rating organization was carried out in the following areas and indicators:
- Assessment of the level of coverage of the various categories of industrial production personnel (IPP) by the labor rating;
- Assessment of the scientific validation of the labor standards of different categories of IPP and indicators of standards performance;
- Consideration of labor intensity in labor rating;
- Assessment of the intensity of the calculated standards;
- Assessment of the level of automation of labor rating.

The performed study identified that more than a half of workers, both in IPP and by separate categories, are subject to labor rating at the industrial enterprises of the Republic of Tatarstan. At the same time, more workers in the machinery than in the chemical industry are subject to labor rating (78.7% and 69.4%, respectively). Of special interest are data on the high relative share of time-workers covered by labor rating (87.8% in the machinery and 78.4% in the chemical industry).

The attainment of this level of labor rating coverage in this category of workers is associated, to a certain extent, with the expansion of time wage system application at the enterprises of the machine-building complex, which is to be seen as a positive trend.

However, in our view, the high coverage rates of labor rating of time-workers are also explained by that availability of regulations (instructions) which indirectly indicate the volume of work rather than modern, advanced standards, specifications and guidelines that clearly indicate the required amount of work per unit of time (standardized tasks) are generally considered as labor standards. The following information may be reported as additional support: only 38% of the enterprises surveyed are subject to the development, issuance and recording of standardized tasks for time-workers.

An important indicator of the state of the labor rating organization is the composition and structure of the labor standards in force.

A study of the degree of scientific evidence of labor standards in the chemical industry, in particular, at Nizhnekamskneftekhim PJSC and KZSK OJSC, showed that the relative share of the technically based standards in piecework jobs is 90.5%, in time-paid work – 98%.

In the machinery, the relative share of technically based standards is slightly lower than that of the leading enterprises in the chemical industry (80% in piecework jobs and 74% in time-paid work), and consequently, the relative share of the empirical and statistical standards is higher than in the chemical industry, which is explained, in our view, by the large volume of labor rating work and the performance potential of rate fixers, inadequate to this volume.

A positive point is the roughly equal relative share of the technically based standards for workers with different labor compensation systems at the most of the surveyed machinery enterprises, which provides a basis for making conclusion about the quality of work on labor rating.

An absolute indicator of the relative share of the technically based standards gives only a rough idea of the quality of standards in force. This is due to that it is impossible to determine precisely what type of rates should be applied at a given enterprise so that the standards calculated according to them can be considered technically based, because of the large variety of operating processes, the extent of

production and forms of labor and production organization, the different levels of production specialization, and the standardization and normalization of units and parts. It is possible to draw conclusions about the work done at the enterprise to improve the quality of existing standards over a period.

Since there are no scientifically valid criteria for establishing a normal level of standards performance, it is possible, with known degree of accuracy, to adopt the best level of standards performance, proposed by the research institute, based on data from leading enterprises with different types of production:

- Mass production – 110%;
- Serial production – 113%;
- Lot and single piece production – 117%.

However, within the site and individual work stations, it is not possible to objectively assess the intensity of the existing standards using such indicator, since there are significant differences between the actual and standardized time of operation on this scale as a result of the impact of specific characteristics and conditions of production. In addition, the low reliability of statistical recording of deviations from normal working conditions, that is, the downtime of workers and equipment, the overtime, the deviations from the requirements of the process, the performance of work by workers with lower qualification than that provided for by the technology, deviations from the lot, etc., does not allow for the precise determination of the actual time spent.

It is also important that the level of standards performance by individual workers or a group of workers depends on differences in levels of standards intensity and individual productivity. If all the norms were to be equally intense, the differences in their levels of performance precisely corresponded to the differences in individual productivity levels.

Therefore, the most common way to examine the quality of the standards is through the performance indicators and the distribution of workers by the performance levels, as shown in Table 1.

The analysis of these indicators is based on the following assumption: the higher the standards performance rate, the lower the quality of the standards development.

Table 1: Distribution of workers by standards performance levels

Name of indicators	Relative share of workers by standards performance, %	
	Machinery enterprises	Enterprises of chemical industry
Of the total number of workers covered by rating:		
Do not comply with the standards, %	2.7	-
Comply with the standards, 100–105%	23.6	32.4
Comply with the standards, 105–130%	30.0	24.4
Comply with the standards, 130–150%	13.6	33.0
Comply with the standards, 150–200%	14.1	10.2
Comply with the standards, 200% and more	17.8	-
Average % of labor standards performance	160.2	122.6

For illustration, the distribution of workers by standards performance levels is shown in Figure 1. The data in Table 1 and Figure 1 show a high level of performance in the machinery, average rate is 160%, with almost 32% of workers complying with the standards for more than 150%.

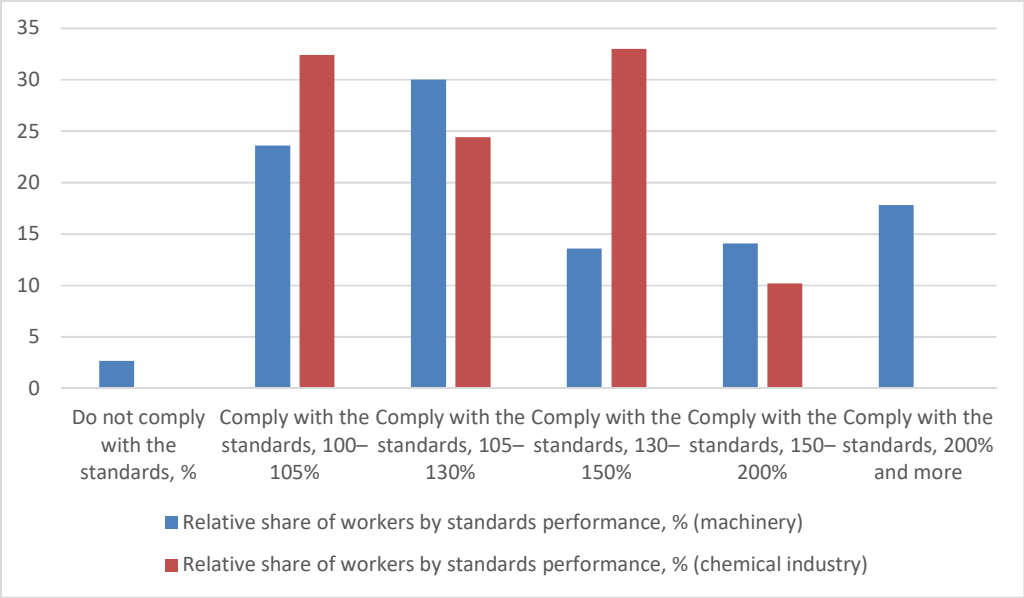


Fig. 1: Distribution of workers by standards performance levels at the enterprises surveyed

Given the high relative share of technically based standards, this situation seems counterintuitive at first glance. In fact, in practice, technically based standards include all the standards based on time and motion study, i. e. obtained using analytical and research methods, or based on the standard time and mode of equipment operation. This leads to that the standards are often established regardless of how the work is organized, what working practices and methods are applied, how well the specified modes of equipment operation correspond to the best possible ones.

As a result, the technically based standards also include such standards that only record the prevailing conditions of work and the organization of work (without prior analysis and improvement). It is obvious that these standards cannot be recognized as of high quality and are not very different from the empirical and statistical ones.

Approaches to the justification of standards used at most enterprises cannot be considered adequate in this situation. In fact, in the planned economy, the objective of the enterprise's production and commercial operations was to meet the plan targets, and the objective of labor standards was to economize such a limited resource as working time. In the market economy, the objective of labor rating should be chosen on the basis of the maximum satisfaction of the market demand. As a result, the very approach to the practice of calculating and justifying the standard should be conceptually changed, which is discussed in sufficient detail in the thesis of L. R. Bartunaev [2].

In his view, it is not the labor standard for each worker to be justified on the basis of organizational and technical requirements. On the contrary, the organization of labor, production and management should aim at the unconditional fulfillment of the labor standards, which ensure the objectives of the enterprise are met in the market conditions, not the plan.

Such a focus on labor rating changes the usual (traditional) scheme of calculation, justification and establishment of the standards. They should not be established in accordance with the modes of operation of the processing equipment, as it was in the previous system of labor rating, but, conversely, the equipment and its modes of operation should be adapted to the market demand. The market justification of the labor standard value is implemented in three stages:

- The value of the monthly demand for the product is set equal to the monthly production rate;

- The daily production rate is determined by dividing the monthly production rate by the number of working days in a month;

- The standard hours per piece is calculated by dividing the length of a working day by the daily production rate [2].

The number of working machines and their modes of operation should be such that the enterprise is able to meet the market demand for the goods, since the unsatisfied demand is the lost advantage. This is one form of appearance of the law of demand that objectively provides for the need to conform the labor standards as a function of management to the market requirements.

The following areas of analysis of the level of labor standards organization is the analysis of labor and standards intensity. The labor intensity factors and the analysis of labor standards form an integral estimation of the quality of labor standards development.

Maintaining an optimal level of labor intensity is one of the important functions of the labor rating. This is because the excessive labor intensity causes unacceptable reduction in performance efficiency, inattention, loss of care, resulting in injuries and accidents, and an increase in the share of defective products. Low-intensity work is ineffective and adversely affects individual and collective production rate.

A study of these factors in the group of the surveyed enterprises led to the conclusion that 67% of enterprises do not maintain accounting of labor intensity. Only 33% of enterprises take into account the labor intensity in developing the technically based standards at the establishment of time off. These include KZSK OJSC, Kazancompressormash OJSC, Kamaz-Diesel OJSC, KamPRZ OJSC.

At the same time, the variety of methodological approaches to measurement and assessment of labor intensity does not allow for an objective judgment on the scientific validation of the intensity calculations at industrial sites.

It should be noted, however, that in order to improve the quality of existing standards and the level of organization of labor rating in general, the problem of labor intensity recording in the process of developing and establishing labor standards is currently important not only to the enterprises of the surveyed population, but also to those that are not. The need for such a question is confirmed by the fact that only 25% of enterprises establish a certain dependency of labor compensation on the level of standards intensity. An example is Kazan Plant Electropribor OJSC, KZSK OJSC, KAMAZ-Diesel OJSC.

As regards the analysis of standards intensity, there are similarities to the ratios found in the analysis of labor intensity, due to the close relationship between the intensity of standards and labor.

The indicated trends in the labor rating organization require a study of the regulatory framework. In the 1970–80s, the Central Bureau of Labor Rating, together with research organizations, established a substantive regulatory framework (more than 500 names of cross-sectoral standards and more than 3,000 names of industry standards), allowing to rate about 90% of work in the production sector, as well as much of the work in the area of non-production services.

The collapse of the state regulatory and research system covering all sectors of the economy resulted in little or no new and amended current uniform and model cross-sectoral standards and rates. 70% of the enterprises surveyed use the rates issued in 1975–1991, which are long-outdated, do not meet the technical and organizational level of production and cannot contribute to the rational use of labor resources and productivity. The rates developed on the basis of such standards do not take into account new technologies, regulations, new equipment, new types of work, tools, mechanization and automation of work stations, optimized business processes of enterprises.

Only 30% of the enterprises surveyed use, in addition to the model mechanical regulations, internal standards developed by the labor rating specialists. These enterprises may include Kazancompressormash OJSC, Kamaz-Diesel OJSC, Kazan Helicopters PJSC.

Automated methods for calculation of the labor standards and rates should play a special part in the work for labor rating organization. The use of these technologies improves productivity by 5–7 times [3], which is particularly important to the current situation of declining quantity of rate fixers.

Other advantages of the use of automated calculation methods include the achievement of equal time intensity of standards, which provides a confidential psychological climate at the workplace, as well as the possibility of calculating the time standards in the early stages of production planning, in the absence of processes.

Meanwhile, the automated methods for the calculation of labor standards and rates are still of limited use [4]. Kazan Helicopters PJSC may be marked as a leader in the application of automated methods of labor rating, which operates an automated CAD system of labor standards NORMA, developed by the Kazan branch of National Institute of Aviation Technologies, now the Aeronautical Technology Research Institute (KNIAT). The system covers the main processes (machining, galvanics, stamping, welding) and ancillary processes (manufacture of special tools, cold and hot-stamped dies, cutting and measuring tools; input, intermediate and final inspection) [3].

Conclusions and Recommendations

The integration of the analysis results allows for making the following conclusions. The target for increasing internal efficiency of production through the saving use of all types of resources, including living labor, is insufficiently applied in the practice of the Tatarstan industrial business. At present, the labor rating is not a means for reducing the cost of living labor and the existing methods of establishing standards largely oriented towards a planned economy do not meet current conditions.

The improvement of labor rating at the enterprises of the Republic of Tatarstan is proposed primarily in the following main areas:

- Updating the regulatory framework for labor, developing of model industry standards;
- Comprehensive justification of labor standards, taking into account not only internal but also external factors and conditions;
- Improvement of tariff rating;
- International cooperation in the field of the labor rating;
- Expansion of microelement rating, automation and computerization of work on labor rating in a single cycle with automated design of processes and work organization, which will allow for the expansion of the rating area to virtually all categories of personnel without exception.

Of special note is that new high-speed video cameras and algorithms for the identification of video images, the motion scanners open new levels for the use of the domestic microelement labor rating system [7], which, unlike the western systems, established a psychophysiologically acceptable level of labor intensity or a rate of work, in which fatigue is not more than acceptable.

Measures implementation within these activities should reduce production costs, increase labor productivity, improve labor organization and production management, establish the dependency of the labor compensation on the end result of work, improve production efficiency and increase competitiveness.

The practical value

The recommendations presented in the article can be as a basis for a regional program for improvement of the management system of labor rating, which will lead to a sustained increase in

labor productivity, improved personnel motivation, increase of production efficiency and competitiveness of products.

References

1. Maenskaya M. (2011), 'Foreign experience in the improvement of the system of labor rating in construction.' [Online], [Retrieved October 3, 2017], http://its.grandsmeta.ru/estimate/41/
2. Bartunaev L. R. (2005), 'Transformation of the system of labor rating under market economy conditions: Matters of theory and practice. Doctoral thesis in Economic Science,' Moscow.
3. Sharafeev I. Sh. (2010), 'Development of the theoretical foundations and practical applications of the automated design of the main and auxiliary production systems. Doctoral thesis in Engineering Science,' Kazan.
4. Nadreeva L. L., Akhmetova I. A., Shigapova D. K. (2013), 'Analysis of the state of labor rating at the enterprises of the Republic of Tatarstan,' *Ekonomichesky vestnik Respubliki Tatarstan [Economic Bulletin of the Republic of Tatarstan]*, 4, 53–59.
5. Nadreeva L. L., Melnichnov V. V., Mingaleeva A. G. (2013), 'On the synergy of reprofessionalization and multiprofessional project training in the organization of human resourcing for the innovation complex,' *Vestnik Kazanskogo gosudarstvennogo uekhnicheskogo universiteta im. A. N. Tupoleva [Bulletin of Kazan State Technical University named after A. N. Tupolev]*, 2-2, 269–273.
6. Mingaleev G. F., Nadreeva L. L., Bashirova A. G. (2009), 'On certain areas of human resourcing for anti-crisis investment projects and stabilization of the labor market in the Republic of Tatarstan,' *Ekonomichesky vestnik Respubliki Tatarstan [Economic Bulletin of the Republic of Tatarstan]*, 4, 76–80.
7. (1989) Basic system of microelement time standards. Methodological materials and standards, specifications and guidelines (ed), Ekonomika [Economy], Moscow.

The Self-Internationalization Model (SIM) versus Conventional Internationalization Models (CIMs) of the Institutions of Higher Education: A Preliminary Insight from Management Perspectives

Mohammad Ayub Khan, Tecnologico de Monterrey, Monterrey, Mexico
mkhan@itesm.mx

Noam Ebner, Creighton University Graduate School, Nebraska, USA
NoamEbner@creighton.edu

Abstract

Institutions of higher education increasingly engage in internationalization efforts, for a variety of reasons. The collection of practices these institutions engage in, which can be called conventional internationalization models (CIM) largely focus on centralized and institutionalized efforts. This paper reviews typical aspects of CIM, noting their benefits while also spotlighting the costs they entail and the open spaces they leave. The paper then introduces the self-internationalization model (SIM) as a complement and a supplement to CIM. SIM offers a less centralized approach to internationalization, focusing instead on individual initiatives taken by faculty, academic managers and students. SIM offers institutions a way to continue their ongoing internationalization efforts given the anticipated educational landscape of the future, in which educational models are foreseen to be flexible, student-oriented and less costly because of the rapid increase in the supply of quality technology-based education, hybrid education, and internationalization of institutions of higher education through diverse modus operandi. This paper explains the functional aspects of SIM, and its comparative advantages and disadvantages vis-à-vis CIM. Furthermore, it provides guidelines for the design and implementation of comprehensive, innovative and dynamic internationalization models combining SIM and CIM in a manner that is suitable, convenient, affordable, and beneficial for all stakeholders in higher education institutions.

Keywords: Higher education institutions, Internationalization, Self-internationalization, Types of education internationalization

Introduction

Internationalization is of growing significance worldwide, with economic, political, and social changes driving an increasingly global knowledge economy. Internationalization within universities continues to develop apace, as institutions move from equating international strategy with international student recruitment to developing mature internationalization agendas that incorporate recruitment, research collaborations, and capacity-building (International Strategy Office, 2015). The 2014 Trends Report highlighted the ways in which international education has developed into a means to achieve a range of broader goals, ranging from study abroad to improving students' work readiness, the strategic development of international collaborations to drive up national university research rankings, and using transnational education to construct regional identity. These changes are expanding the nature of tertiary education at all levels to include personal skill development, novel ways of thinking, and practical job preparation in addition to subject-specific knowledge and skills (International Strategy Office, 2015). According to an OECD study published in 2012, the number of students enrolled in universities outside of their country of origin had doubled over a period of ten years; this trend has been increasing since then and is likely to develop at an even faster pace in the future. This trend persists even given the current political conflicts of different natures and scope playing out across the globe. Advances in technology, modernization of academic institutions in terms of systems and culture, innovative and flexible curricula, and competency-based pedagogical approaches are the driving forces behind the search for modernized

internationalization approaches to higher education. The OECD (2012) study also emphasized the need to increase and improve international educational systems' and programs' capacity to meet the needs and demands of the current labor market. This requires matriculating students who possess competencies (knowledge, ability, values and attitude) such as foreign-language proficiency, social relationship management skills, intercultural work skills and the overall ability to work in a global setting.

As in business industries, international alliances and collaborative projects between academic institutions are increasingly becoming ubiquitous, at all levels of primary, secondary and higher education. Focusing on this from the perspective of individual universities, internationalization is key to increasing their scope of activity, for reaping benefits from economies of scale, and for evolving into truly globalized and globalizing educators, as their roles and core functions in the 21st century continue to change and evolve according to market forces (Khan et al, 2014). Globalization, as an influential force, has already transformed higher education systems, policies and institutions (Held et al, 1999). This is an ongoing, accelerating process; the evolution of global communities, combined with the emergence of knowledge societies, is the driving force behind modifications in management approaches in institutions of higher education, such as changes in managerial attitudes and cultures (Deem and Brehony, 2005). A proactive attitude towards globalization, and the effects and changes it is bound to bring, can be adopted and expressed through an academic institution's approach to institutional internationalization (Khan et al, 2014)

Academic institutions, regardless of their origins, sizes, or the nature of their educational services, must be innovative and entrepreneurial when it comes to their internationalization programs and services. To meet the emerging trends and demands in the industrial world as well as in society at large, researchers such as Knight (1997) and De Wit (1995) have called for two primary strategies. One of these strategies is called program related strategies which involves academic initiatives in education, research and services. The other strategy calls for organizational-level strategic action by institutions of higher education, through the institutionalizing of all internationalization initiatives, programs and services and their facilitation through proper and effective management and operating systems. These strategies, to a great extent, are the extension of conventional internationalization models (CIM) whereby, in a nutshell, institutions retain ownership and control of all aspects of the internationalization process and centralize all efforts on this front. Indeed, many universities have undertaken measures in alignment with CIM, which has been characterized by its traditional initiatives and activities such as student and staff mobility, curriculum change and institutional collaboration for both teaching and research (Alemu, n/a).

By contrast, this paper proposes an alternative, innovative model of internationalization for institutions of higher education. Due to the radically new, complex, differentiated, and globalized socio-economic, cultural and political context, internationalization of higher education is facing new actors, aims, activities, rationales and processes (Alemu, n/a). This transformation has led scholars to reexamine terminologies, conceptual frameworks, values, purposes, goals, means, and impacts of the internationalization of higher education (IAU, 2012). It builds on the fact that, in the changed educational landscape, convenience, low cost, time-efficiency and quality have become key characteristics of modern education. Conversely, the salience of such traditional elements such as physical location and preference for local standards has diminished. This flux provides fertile ground for the proposed self-internationalization model proposed in this paper, which institutions of higher education - regardless of their specific academic programs and nationality - can adopt to complement and supplement their existing, centralized initiatives to internationalize their professors, students, academic programs and academic leadership.

Literature Review

The following literature review surveys existing theories and practices concerning internationalization approaches taken by institutions of higher education around the world.

Internationalization in Higher Education: Areas and Activities

Internationalization in higher education has been defined in many ways. Knight (2003) defines internationalization at the national, sectoral, and institutional level is "the process of integrating an international, intercultural or global dimension into the purpose, functions or delivery of postsecondary education". Internationalization at large also involves promoting cooperation and solidarity among nations, improving the quality and relevance of higher education, and contributing to the advancement of research for international issues (OECD, 2003, Knight, 2004).

In the current literature, a variety of terms exist related to internationalization in higher education, including international education, international studies, internationalism, transnational education, and globalization. There are also various categories of internationalization branches such as academic mobility, international cooperation, studies abroad, and international exchange. Other terms focusing on the internationalization on the content of students' learning include: multicultural education, intercultural education, cross-cultural education, education for international understanding, peace education, global education, and transnational and global studies (De Wit, 2002; De Wit, 1995). Internationalization is also defined as the process of integrating an international and intercultural dimension into the teaching, research and service functions of the institutions to improve the quality of education and research for students, faculty and the society in its whole (Knight, 1994).

In other words, the internationalization of higher education institutions is the process of integrating the institution and its key stakeholders, such as students, faculty, management staff into a rapidly changing and globalizing world (Hawawini, 2011). Clearly, this broad spectrum of terms covers a wide area of impact, which would benefit by being broken down into different zones of activity. In his study on the internationalization of higher education, Bernardo (1998), highlighted several potential areas for internationalization within an academic institution:

- Student and staff mobility.
- International curriculum.
- International studies.
- Research collaboration.
- International networks.
- Transnational distance education.
- International quality assurance systems.
- Faculty development and exchange.
- Foreign language studies.
- Building international perspectives.
- International networks.
- Branch campuses.

With specific focus on teaching and learning activities (touching on the areas of international curriculum, international studies, building international perspectives, and forming students' international networks, from the list above), universities conduct a wide variety of internationalization programs based on different models. Some of these fall into the category of 'internationalization at home' whereby incorporating intercultural and international dimensions into the curriculum, teaching, research and extracurricular activities helps students develop international and intercultural skills without ever leaving their country (OECD, 2004). Other rapidly developing forms of internationalization are emerging which can be categorized as 'internationalization away', including, for example, transnational education delivered through off-shore campuses, joint programs with foreign institutions, and different forms of distance learning. The latter category seems to suggest a more far- reaching approach, especially given that higher education is now seen as an integral part of the global knowledge economy (Henard, Diamon and Roseyeare, 2012).

The Potential Benefits of Internationalization of Academic Institutions

The effects of internationalization of educational institutions benefit all stakeholders in education. These benefits include improving students' preparedness for life and career after their studies, enriching the curriculum, enhancing the institution's international profile and presence, increasing its research and knowledge production, and diversifying its faculty and staff (Marmolejo, 2012). Other benefits include increasing international awareness among students, faculty and management staff, sharing knowledge and experience among participating institutions (Luijten-Lub, 2007), and institutions complementing each other´s skills, resources and knowledge (Knight, 2009). Furthermore, as academic institutions work hard on improving their practices, operational efficiency and productivity to compete successfully with other quality institutions across the world (European Union, 2015), their efforts are supported by internationalization practices by providing a source of global presence, prestige, and standards (Chan and Dimmock, 2008). National and international agencies use internationalization of students as one of the criteria to rank and accredit academic institutions; high-ranked and accredited academic institutions attract quality students, qualified faculty and much-needed funding from governments and donor agencies (Mansor, 2009; Daly, 2011). Internationalization is also a source of increased and diversified revenue generation, since it can expand the number of full-fee paying foreign students (Knight and De Wit, 1995).

Other emerging demands and needs of the education industry - such as increasing demands for courses and programs taught in foreign languages, increasing mobility of faculty among institutions in a time of scarce resources (Cantwell and Maldonado-Maldonado, 2009), and investing in researchers at home and abroad - form key interests that institutions have in becoming globally relevant. Academic mobility enhances research and teaching internationally as do other general professional development activities and programs of the academic institutions (Colucci, Ferencz, Gaebel and Wächter, 2014). Obviously, academic staff with international experience and exposure can add value to all academic activities and support systems (Colucci et al., 2014).

Student mobility is a similarly key issue. Professional development opportunities are encouraging students to move around the world, train themselves, learn from distinct cultures and discover attractive and well-paid jobs (Altbach, 2009). In addition to granting institutions of higher education increased revenues, students' mobilization also grants them name recognition and brand management abroad (Becker, 2010). On top of all those factors, the role of information and communication technologies in influencing the internationalization of academic institutions and their programs and services cannot be overstated. Indeed, information and communication technologies are one of the key parts of the academic transformation of the 21st century (Altback et al, 2009). The internet, e-mail, and online social networks have provided innovative ways of attracting and reaching out to ever-increasing students, many of whom can study remotely, should other pedagogical choices may not be available or may be severely limited.

In sum, both internal (institutional) and external (contextual) factors are responsible for encouraging academic institutions to align themselves with the flow of the forces of internationalization. An OECD (www.oecd.org/edu/imhe) study finds the following forces driving internationalization forward in the academic industry: Increasing national and international visibility; leveraging of institutional strengths through strategic partnerships; enlarging the academic community within which an institution can benchmark its activities; mobilizing internal intellectual resources; adding important, contemporary learning outcomes to students' experience; and developing stronger research groups. Moreover, national governments promote internationalization to develop national university systems within a broader, global framework; produce a skilled workforce with global awareness and multi-cultural competencies; use public higher education funds to promote national participation in the global knowledge economy; and benefit from trade in educational services (www.oecd.org/edu/imhe).

The increasing presence of the phenomenon of internationalization in the education industry, as in any business industry, cannot be ignored; all academic institutions must be aware of its forces and embrace strategic approaches not only for coping with it, but also for leveraging it to their benefit. As discussed above, the competitive advantage and sustainable growth of academic institutions depends on how they address the diverse challenges presented by the emerging globalization of economic, market, social and technological forces, and take advantages of the numerous opportunities these present. In the following section, we will discuss typical strategies that institutions have adopted in doing so.

Conventional Models of Internationalization

Universities traditionally use a variety of models or paths in undertaking their internationalization initiatives and programs. Quite often, an international program office within a university management system is responsible for most of the university's international expansion, speaking both geographically and program-wise. Universities follow different paths, ranging from what might be the narrowest - only sending students out to other countries for a brief duration, or only having management-to-management contact with other academic institutions. Others follow broader approaches to internationalization, which can expand to involve all sorts of exchanges between academic institutions: sending and receiving students; exchanges of faculty; joint management trainings; joint and double -degree programs; and research collaboration. There is certainly no one specific overall model for conducting internationalization initiatives (Knight, 2009).

Other researchers such as Hawawini (2011) classify internationalization models into the following categories:

1. Import and export models in which academic institutions import and export students through a variety of academic program and activities. This mode is also called inward and outward internationalization.
2. Academic joint ventures (also called international joint venture), in which universities offer complementary and supplementary academic programs This model includes collaborations such as student exchange programs (inward and outward) under different agreements including joint and double -degree programs, certifications, specializations, and internships that students can benefit from (between two academic institutions).
3. Academic partnerships, alliances and consortia, in which two or more academic institutions are co-joined. Such partnerships could be absolute, or limited to certain areas, but cooperation is robust and spans multiple areas, such as student and faculty exchanges, joint programs, faculty researches, etc.
4. Campuses abroad, in which academic institutions establish physical presence in a different country, comparable to direct foreign investment by firms (Kim and Zhu, 2010). Institutions can establish campuses abroad offering a variety of academic programs and services to local and international students.

All these modes and models involve official programs, which are centralized, well-institutionalized, and designed to serve institutional requirements and interests. Proper systems for planning, implementing, and evaluating of such models is crucial for them to be established successfully and grow in the long run. For example, one primary perspective through which one can approach internationalization is that of forming partnerships. The American Council on Education (2016) recommends several key elements for successfully creating and managing international partnerships: (1) Planning and preparation; (2) Aligning the organizational goals and objectives with overall missions and priorities of the institution; (3) Identifying and studying modes and alternatives of potential collaborations; (4) Evaluating and selecting amongst proposed partners; and (5) Ongoing management, evaluation and feedback of collaboration.

Limitations Associated with the Conventional Model of Internationalization

This paper has thus far assumed, and listed, the benefits of internationalization for all stakeholders in educational programs and services. To present a well-rounded survey, however, we note that there are some authors holding anti-internationalization positions, expressing concerns about the detriments of internationalization of academic institutions. For example, Baburaian (2011) suggests that internationalization presents risks to the host or receiving nations; by attracting external universities and other related institutions, these countries or specific cities/places can become unnaturally crowded, creating an over-supply of educational services and programs. Other effects may include quality decline, cultural degradation and social problems in the host nation or cities. Other limitations associated with internationalization are shortages of necessary or required academic programs, existing internationalization packages are too expensive for students, faculty and academic administrators, especially from developing nations (Daly, 2011). Other studies find that not all academic leaders are forward-looking and visionary and therefore, internationalization programs, systems or culture may never be initiated by such institutions. Moreover, many some nations in the world today prohibit their citizen to travel abroad for a variety of reasons; other travel limitations are imposed by educational institutions seeking to avoid liability. Institutionalized internationalization programs are also limited because there are institutional requirements such as criteria for academic transfers and revalidation of academic works, variations in institutional academic standards, and, differences academic calendar.

While some of these challenges relate to the potential and actual benefits of the internationalization philosophy and functions, we suggest that most of them pertain to the management system and process used in managing internationalization efforts:

1. Bureaucracy: Involving slow decision-making and ineffective implementation of decisions.
2. Connected at the top: Large-scale internationalization decisions - such as designing academic programs, or forming strategic alliances with other academic institutions - are often taken to serve the interests of the educational organization, its policy makers and top managers. The interests of other beneficiaries and their needs are often ignored or not fully taken into consideration.
3. Anchored: Internationalization programs and services are limited and lack innovation and flexibility.
4. Kept lean: Lack of resources – including personnel, finances, time, space, or technological infrastructure - inhibit the growth of internationalization options and facilities beyond the conventional frontiers of the institution.
5. Non-entrepreneurial: Lack of knowledge and interest in exploring and expanding the resources (such as networks, strategic partners and global issues), internationalization programs in many universities are left in the hands of few traditionally-minded operational staff.
6. Marginalization: Lacking a comprehensive approach to internationalization within a university system often results in internationalization efforts becoming, or being perceived as, peripheral to the core issues and programs of the institution.

Moreover, often features like flexibility, options-for-all, fairness and meritocracy are ignored in the conventional model of internationalization where preferences, self-interest and connections traditionally dominate the decisions of allocating resources and selecting individuals (students, faculty, administrators for example) for internationalization purposes.

To address these limitations associated with existing management and operation systems of internationalization programs, this paper puts forwards a self-internationalization model, seeking to complement the conventional model of internationalization.

The Self-Internationalization Model

This paper introduces the self-internationalization model (SIM). This model focuses on the activities of students, faculty and management of academic institutions as they search, explore and select options of participation in (or, undertaking of) international projects, assignments, and activities on their own – all without the direct involvement or guidance of their academic institution. Whereas CIM aims to create an international/ intercultural environment in research, teaching and studying with the aim of supporting the international/intercultural interactivity of involved individuals in all the field mentioned above (Knight 1999), it does so through centralized processes managed by the academic institutions themselves. In contrast, SIM calls for creating such an environment through the efforts of the beneficiaries themselves, with the institution playing a far more limited role such as guiding and assisting in internationalization initiatives and, verifying and recognizing internationalization efforts undertaken by students, faculty and administrative staff, for example.

The value of such an approach is best introduced by noting the changes that characterize the contemporary educational landscape: Increased demand, changed mobility patterns, public disinvestment in higher education, growing privatization of higher education, increasingly cost/quality -sensitive users of education, prevalence of non-traditional students, demand for innovative programing, competition for quality faculty and students, and massification commodatization of education (Hudzik, 2012), universities must think beyond their traditional-internalized approaches to internationalization. Overly structured and systemized approaches to internationalization are not enough to fully exploit the emerging systems of internationalization, which increasingly go beyond trade fairs and international scholarships to include global socio-political events, technologically-mediated educational opportunities of different natures, and other academic and non-academic learning venues.

So, self-internationalization by whom? Academic leadership, faculty and students alike can pursue activities and initiatives in line with internationalization, according to their interests and choice. For example, from the perspective of students, adopting the self-internationalization model by their institution would mean that students - whilst studying in their own home institution - will explore academic and non-academic activities, events and programs globally, and select according to their own convenience, interest and needs. An example of an academic activity might be participation in a Massive Online Open Course (MOOC); an example of a non-academic activity might be online mentoring of a child in a disadvantaged region of the world. By allowing and encouraging students to engage in such activities, the institutions will promote habits and skills of self-learning and self-evaluation in line with the university's learning outcomes and standards. The institution's role in this is that of facilitator and encourager, providing monitoring and assessment. For participating in self-defined academic activities, students should be awarded academic credits towards their core-curricular requirements including foundational courses, specialization courses and general education courses. Engaging in co-curricular activities - including language, cultural, or leadership programs - will allow student to get credits for internationalization, social-services, community services and the like, meeting a variety of other graduation requirements, such as required internships, or professional experience abroad. In summary, institutions should encourage students to create their own internationalization pathway and engage in its activities. The

academic institution will not need to arrange or organize these activities. However, it will need to invest resources in (a) encouraging students to do so and (b) accrediting such activities.

Similarly, internationalization of faculty and of academic leadership under SIM implies that responsibility and freedom to initiate international trainings, scholarships, research collaborations, sabbatical programs, co-teaching projects, and the like, should be given into the hands of faculty and academic administrators. Training programs identified and participated in by faculty, on their own, that is in in line with the teaching activities and standards of the university should be valued and recognized as much as official university-internal programs. Faculty and academic leadership should be allowed to organize their own international visits including social, cultural, and academic events, conferences, and workshops. They would be encouraged to seek research collaboration, or to create opportunities for international team-teaching with faculty from other nations and disciplines

What, then, is the role of the institution under the SIM model? This role involves, first of all, taking a step back, and allowing beneficiaries to take initiative rather than attempting to guide and control them through institutionally devised and sanctioned programs. This will entail quite a mindset-shift, for some institutions. In a more practical sense, it will include adaptations in institutional encouragement and reward. The university will need to develop flexibility in its academic accreditation, credit transfers, and selection of disciplines, in order to review and accredit student accomplishment in an academically responsible manner. It will need to recognize and reward internationalization activities, self-initiated by faculty and management.

To provide institutional support and resources, in case of any need for support by students, faculty and management engaged in self0internationalization efforts, a university can open a self-internationalization office, perhaps as a sub-unit within the domain of its International Program Office. Through such a unit or elsewise, the university can provide advisory services as needed, particularly after institutional experienced and knowledge has been gained through tracking early self-internationalization activities. It can serve as a resource expander and provide referrals, as well as grant validation and recognition of the projects and activities undertaken by students, faculty and management. It can set guidelines for what types of internationalization initiatives 'count' in terms of student accreditation or faculty productivity, and formally acknowledge projects as 'counting' once they have been completed. Furthermore, the university could particularly promote and support self-initiated programs that harmonize with its existing CIM programs and activities. Finally, the university should engage in efforts to collect data about SIM activities undertaken by students, faculty and managers. In the aggregate, these can be reported to accrediting bodies, ranking agencies, donors, etc. Individual activities can be reported for public relations purposes. In a more proactive way, institutions could prepare their members for participation in SIM activities, seeing them all as institutional ambassadors whose activities advance the goals of the institutions and beyond while promoting the interest of the nations they belong to. For example, offering a workshop on application to study-abroad programs might enhance students' chances of acceptance. Offering a workshop on online learning skills necessary for success in MOOCs might lead to students taking a lead role, with increased visibility, in those courses. The self-internationalization office, whether established in within the domain of the International Program Office of a university system or in some other organizational framework, should be independent in its operations, and allowed to keep records, prepare promotional materials, and organize workshops and seminars promoting the concept and practices of the self-internationalization model.

It should be stressed, that this paper is not presenting a choice to institutions between centralizing all internationalization efforts or abandoning the field to individuals. The proposal differs from this choice in two important dimensions. First, in that universities do not need to choose between CIM and SIM; SIM can easily be adopted as a complementary approach to an existing CIM framework. Second, in that far from requiring universities to take a hands-off approach to internationalization, SIM is best served by taking a proactive stance – but a non-traditional one. Such a stance would encourage individual

innovation and initiative in the realm of internationalization, reward it, capitalize on the returns of these efforts, and spotlight and reinforce particularly successful efforts. Eventually, such spotlight and reinforcement might upgrade an individual initiative into being a part of the university's formal CIM model. Such recognition would only serve to increase motivation for innovation at the SIM level.

Operationalization of the Self-Internationalization Model

To operationalize the model, participants in SIM including students, faculty and administrative personnel:

1. Initiate search for programs in different countries on their own.
2. Make contacts with organizations (educational and non-educational) identified to learn about their projects and activities.
3. Sharing information about the intended program with IPO in order to make sure that program is acceptable and recognized by the academic institution.
4. Apply for the programs, and if accepted, participate in the program and get certification/diploma from the program offering institution. Such programs will either be self-financed, shared-financed and fully funded by the institution.
5. Bring the certificate/diploma and demonstrate to the IPO of the university and the related organizational units to register the certificate and get the required internationalization credit.

Strengths and Weaknesses of the Self-Internationalization Model

SIM presents a variety of viable alternatives to complement and supplement existing internationalization management models. It provides flexibility and self-managed programs allowing students, faculty and management to serve their own interests and needs, and to do so at a timing of their own choice. Efficiency and fairness in the process of internationalization will be enhanced through the bypassing of institutional red-tapes and bureaucracy, limitations and administrative barriers. Also, SIM will reduce the burden of permanent staff, fixed budget, time and international travels. It will incentivize members of all of the beneficiary groups to self-initiate, innovate, develop new projects and increase their networking. Moreover, institutions will be relieved from some of the traditional obligations and responsibilities associated with CIM, such as:

1. Contracting with other partner institutions.
2. Arranging visas and other international travelling documents.
3. Admissions and graduations from foreign universities.
4. Maintaining and serving the needs and interests of partner institutions.
5. Financial resources.
6. Health, safety and insurance-related issues;
7. Pressure from partner institutions to be accredited and ranked by international or national agencies in order to merit partnership.
8. Looking for or designing programs to meet diverse needs of different parties (students and faculty from different academic and experience backgrounds).
9. Any other risk or conflict associated with the participation in international programs, either by students, faculty or administrative staff.
10. Developing, managing and maintaining university-level strategic alliances in a changing world.

Like any other idea or project or model, SIM is not without its limitations; it has several weaknesses, some of which are transitional or whereas others are permanent. For example, there are likely to be collisions between SIM efforts CIM efforts at universities in the establishment stages of SIM. The need to cope with hundreds, even thousands, of small-scale initiatives requiring attention (e.g., accrediting an

online course for a single student) will require manpower; particularly, at first, as the system gains familiarity with each initiative for the first time. From the faculty perspective, it would be realistic to expect clashes between some SIM activities and traditional faculty duties of teaching, research and service. Organization and having an effective and flexible management system in place in collaboration with the existing internationalization efforts of the institutions is another challenge SIM will face. Other challenges are:

1. Different academic and internationalization programs may will require different accreditation and revalidation mechanisms and standards.
2. Mismatching of the timing of the internationalization programs opted for by a student or faculty offered by foreign organizations and the academic calendar used by an academic institution.
3. Lack of direct supervision and control over the selection of the foreign programs (academic and non-academic) will jeopardize the quality standards desired by the institution.
4. Potential for conflicts with the already established programs and associates, and probably losing incoming students and faculty.
5. Potential loss of the external funds and donations coming from private and public agencies aimed at the internationalization efforts and activities of the university.
6. The risk of losing the existing programs and links and/or initiating new programs and links with the industrial world abroad such as internships and research funds.

Conclusion and Recommendations

In the 21st century and beyond, emerging and complex challenges facing humanity demands from institutions of higher education - regardless of their size, origin and the nature of the academic programs and services they offer - to prepare graduates with global knowledge and a global mindset. Internationalization is no longer an optional activity; it is rapidly becoming a core, strategic, goal and value for academic institutions. Current and future university graduates must be multi-perceptive, have broad knowledge-horizons, and possess the ability to cope with change. Their international and multicultural competencies are key for enhancing their success in the global job market. Neither the industrial world nor the society we live and work in can afford to continue to nurture individuals with limited knowledge and experience of international issues and with limited intercultural skills with regards to interaction, communication, decision making, team work etc. (Knight, 2003; Knight, 2004). Internationalization opens many possibilities for higher education institutions and, managed well, can yield a range of benefits for the institution and its broader community, including, but not limited to, its students and faculty. However, institutions face a range of challenges when it comes to managing internationalization (Hénard, Diamond and Roseveare, 2012).

In the globalized knowledge society, international competition in higher education has become more intense; the interest in measuring this phenomenon has increased concurrently (Delgado-Márquez, Hurtado-Torres and Bondar, 2011). Many HEIs are becoming global, as competition has accelerated and exchange programs and international branches have proliferated. This has decreased the “psychic distance” between all involved, and increased the “push-pull” experienced by students, professors or whole institutions (Khan, et. al. 2014). In this way, the new “academic capitalistic system” has pushed universities towards higher degrees of competitiveness and merit, engaging in a cycle of competition with each other - for the prize of attracting the best students, the highest quality of professors and the most funding - so as to increase their status and prestige; this all forms an ever-reinforcing circle. Like the business sector, this service industry is vying for resources, faculty and students. HEI management decision-making is constantly exploring the pros and cons of internationalization: Will it bring the institution additional resources, or wind up costing more than it is worth? The impact of HEI internationalization is being felt widely felt, and should be helped along, promoted and supported by both the private and public sectors to increase innovation and competitiveness within and amongst institutions, and in countries at large (Khan, et. al. 2014).

As global education becomes even more demanding, complex and competitive, international alliances in the forms of partnerships in diverse activities, which enhance the links and mobility between universities of different countries and regions, should become the main strategy of these institutions. Not only will they attract the most talented student body, but will further enhance the competitiveness of faculty, which in turn, will continue attracting the best students, thus increasing the international prestige of the institution. Finally, as universities are relying ever more on their own sources for self-financing, internationalization efforts and initiatives can be optimized by looking for alternative complimentary options such as self-internationalization models partially supported by an ever-increasing number of online programs which will bring paying "customers" to an efficient and relatively low-cost platform of exchange and learning.

In closing, we provide a few recommendations for internationalization efforts of HEIs to succeed, grow, and sustain their institutions not only in the short but also - and most importantly - in the long run while bringing together the two contrasting but complementary models of CIM and SIM.

First, an institution encouraging SIM needs to clarify, at all levels, that SIM activity is viewed as important, and that it *counts*, in terms of expected faculty productivity and rank and tenure considerations. Second, academic institutions (universities, schools and colleges) should incorporate the SIM- internationalization program in the mission of the institution; and, to adequately support the mission, institutional culture and policies should be re-organized. and re-energized. Third, the commitment and enthusiasm of the university´s staff - let it be the international office in charge of faculty exchanges or the faculty itself, who understands the importance of these experiences - must be secured, as it is key for continue creating opportunities for intellectual stimulation and learning. These include the promotion of exchange opportunities, selection mechanisms and criteria, a range of relevant and attractive agreements with host partners, recognition of overseas study, financial support and a credit transfer system to participate in an exchange program. Fourth, in developing internationalization planning, academic institutions must involve key stakeholders to reflect the institution's commitment to internationalization and receive support from various interest groups in the implementation process. Fifth, any internationalization program within an academic institution must encompass these strategic actions: As mentioned earlier, internationalization must be given an important attention, place and space in the strategic planning of the institution; internationalization activities and programs must be institutionalized. It means that establishing a full-fledged international program office with enough resources (people, budget and technology) is essential for planning, implementing and following up initiatives; all key stakeholders must contribute in regular meetings, revisions, and feedbacks in order to learn from the current practices of internationalization and remain informed; formal and continuous assessment mechanisms and systems must be put in place in order to assess goals, progress and outcomes of internationalization; and, internationalization models and alternative revisions, negotiations and renegotiations should be an ongoing process and activity on the campus.

Finally, working in close collaboration with other key players and stakeholders in higher education sector including government, industry and community will make any initiative and proposal attractive, acceptable and doable.

References

Altbach, P. G. (2004b), ´Globalization and the University: Myths and Realities in an unequal world, ´ In Tertiary Education 10:3-25, Netherlands: Kluwer Academic Publishers in Altbach, Philip G.,
Reisberg, L. and Rumbley, Laura E. (2009), ´Trends in Global Higher Education: Tracking an Academic Revolution, ´ France: UNESCO.

Alemu, S. K. (n/a), ´Rewards and Challenges of Internationalization of Higher Education in Africa, ´ Sintayehu Kassaye Alemu, University of Ljubljana, Ljubljana-Slovenia. Retrieved from https://www.pef.uni-lj.si/fileadmin/Datoteke/Mednarodna/conference/wher/after/alemu-proceedings.pdf.
Altbach, P. G., Reisberg, L. and Rumbley, L.E. (2009), ´Trends in global higher education: Tracking an academic revolution, ´ A report prepared for the UNESCO 2009 World Conference on Higher Education.
American Council on Education (2015), ´CIGE Model for Comprehensive Internationalization, ´ Retrieved from http://www.acenet.edu/news-room/Pages/CIGE-Model-for-Comprehensive-Internationalization.aspx/.
Baburajan, P.K. (2011), ´Impact of Globalization of Higher Education in the UAE, ´*Delhi Business Review* X,*12(1).*
Becker, R. (2010), ´International branch campuses: New trends and directions, ´*International Higher Education,* 58, 3-5.
Bernardo, A. B. I. (1998), ´Towards the functional diversification and specialization of Philippine higher education institutions: A one-hundred-year proposition for the evolution of Philippine colleges and universities, ´ Perspectives, 19(1), 18-32.
Cantwell, B. and Maldonado-Maldonado, A. (2009), ´Four stories: confronting contemporary ideas about globalization and internationalization in higher education, ´*Globalization, Societies and Education*, 7(3): 289–306.
Chan, W. W., and Dimmock, C. (2008), ´The internationalization of universities Globalist, internationalist and translocalist models, ´ *Journal of Research in International Education,* 7(2): 184-204.
Colucci, E., Ferencz, I., Gaebel, M. and Wächter, B. (2014), ´Connecting mobility policies and practice: Observations and recommendations on national and institutional developments in Europe, ´ Brussels: European University Association.
Daly, A. (2011), ´University of South Australia, Australia. *Journal of Research in International Education,* 10, 58–70.
De Wit, H. (1995), ´Strategies for the Internationalization of Higher Education. A Comparative Study of Australia, Canada, Europe, and the United States of America. *European Association of International Education (EAIE).*
De Wit, H. (2002), ´Internationalization of Higher Education in the United States of America and Europe: A Historical, Comparative and Conceptual Analysis. Westport, CT: *Greenwood Press.*
Deem, R., and Brehony, K. (2005), ´Management as Ideology: The Case of New Managerialism in Higher Education. *Oxford Review of Education*, 31(2): 213-231.
Delgado-Márquez, B. L., Hurtado-Torres, N. E., and Bondar, Y. (2011), ´Internationalization of Higher Education: Theoretical and Empirical Investigation of Its Influence on University Institution Rankings, ´ In: Globalization and Internationalization of Higher Education. *Revistade Universidad y Sociedad del Conocimiento (RUSC)*. 8 (2): pp. 265-284. Retrieved from http://rusc.uoc.edu
Egron-Polak, E. and Hudson, R. (2014), ´Internationalization of higher education: Growing expectations, fundamental values, ´ IAU 4th Global Survey. International Association of Universities.
European Union, (2015), ´Centre for Higher Education Internationalization (CHEI). Retrieved from http://www.europarl.europa.eu/studies/.
Hawawini, G. (2011), ´Faculty and Research Working Paper: The Internationalization of Higher Education Institutions: A Critical Review and A Radical Proposal. INSEAD: The Business School for the World. Retrieved from http://www.insead.edu/facultyresearch/research/doc.cfm?
Held, D., Mcgrew, A., Goldblat, D. and Perraton, J. (1999), ´Global Transformations: Politics, Economics and Culture, ´ *Stanford University Press,* Stanford.
Hudzik, J. K. (2012), ´Emerging Models of Higher Education Internationalization: Concept to Action, ´ Challenge and Opportunity STINT Foundation Seminar on University Strategies for Internationalization Stockholm.
Henard, F., Diamond, L., and Roseyeare, D. (2012), ´Approaches to Internationalization and Their Implications for Strategic Management and Institutional Practice.
International Strategy Office (2015), ´International Trends in Higher Education. University Offices, ´ Wellington Square, Oxford, OX1 2JD. Retrieved from:

https://www.ox.ac.uk/sites/files/oxford/International%20Trends%20in%20Higher%20Education%202015.pdf
International Association of Universities (IAU) (2012), ´Affirming Academic Value in Internationalization of Higher Education: A Call for Action.
Khan, M. A., Bank, D., Okon, E. E., Al-Qaimari, G., Olivares-Olivares, S. L., and Treviño-Martinez, S., (2014), *Diverse Contemporary Issues Facing Business Management Education.* Idea Group, USA.
Kim, E.H., and Zhu, M. (2010), ´Universities as firms: The case of US overseas programs, ´ In C.T.
Knight, J. and de Wit, H. (1995), ´Strategies for internationalization of higher education: historical and conceptual perspectives,´ Retrieved fromhttp://lisbon2011.bolognaexperts.net/sites/default/files/yesinternationalis_knight_and_de_wit.pdf
Knight, J. (1994), ´Internationalization: Elements and Checkpoints, ´ *Research Monograph*, 7, Ottawa: Canadian Bureau for International Education.
Knight, J. (1997), ´Internationalization of Higher Education: A Conceptual Framework, ´ In:
Knight, J. and De Wit. H. (eds), ´Internationalization of Higher Education in the Asia Pacific Countries, ´ Amsterdam: European Association of International Education (EAIE). Pages 5-19.
Knight, J. (2009), ´Internationalization plans for higher education institutions. *Journal of Studies in International Education,* 13(3): 289-309.
Knight, J. (2003), ´A time of turbulence and transformation for internationalization, ´ (Research Monograph, No. 14). Ottawa: Canadian Bureau for International Education 1999, Knight, Jane: Updated internationalization definition. In: International Higher Education 33 (2003) 2-3.
Luijten-Lub, A. (2007), ´Choices in internationalization. How higher education institutions respond to internationalization, Europeanisation, and globalization, ´ Enschede: CHEPS.
Mansor, Z. D. (2009), ´International strategic alliance in higher education sectors (Learning for competitive advantage) - A case from Malaysian private college, ´ *The Journal of Human Resource and Adult Learning,* 5(2).
OECD (2004), ´Education at a Glance, ´ OECD Indicators 2004, Paris: OECD.
Knight, J. (2004), ´Internationalization Practices and Priorities: 2003 IAU Survey Report, ´ International Association of Universities, Paris.
Vught, F. V. (n.d), ´Internationalization and globalization in European Higher Education, ´ The Netherlands: University of Twente.

Improving the critical infrastructure protection system

Bogdan Grenda, Faculty of Finance and Banking, WSB University in Poznan, Poznan, Poland,
bogdan.grenda@wsb.poznan.pl
Edyta Ślachcińska, Faculty of Finance and Banking, WSB University in Poznan, Poznan, Poland,
edyta.slachcinska@wsb.poznan.pl
Paweł Majdan, Faculty of National Security, War Studies University, Warsaw, Poland,
p.majdan@akademia.mil.pl

Abstract

Power plants, hospitals, banks and waste water treatment plants are just some of the critical infrastructure components. Each of them directly affects the quality of life of society. Together they form a system whose functioning guarantees the security and stability of the state. Hence, ensuring effective protection of critical infrastructure is today one of the most important challenges for operators of this infrastructure, public administration and security services. Technical infrastructure, human errors, but also criminal, terrorist and other crimes can be a threat to the operation of critical infrastructure. That is why the article discusses various concepts of critical infrastructure and describes its key features of the infrastructure protection system. In the following, solutions were proposed to improve the critical infrastructure protection system, addressing legal, procedural, organizational and technical issues.

Keywords: Critical infrastructure, protection, safety

Introduction

„The ones which have a clear vision of what is awaiting them,
they will deal more effectively with every threat"
Tukitydes

The safety and the development of states and societies are dependent to a large extent from different systems guaranteeing meeting the diversified needs. In order to every individual person, nation, or state developed in the undisturbed way, the infrastructure solutions are needed. Systems guaranteeing safety of citizens, health, the electric energy and water supply and into other necessary goods constitute the critical infrastructure. However it should be emphasized that the discussed type of the infrastructure is particularly susceptible to threats of different kind.

Each of the systems classified as critical infrastructure may become a potential object of the penetration or the terrorist attack, although the purpose of the attack may be different. Hence, it is particularly important to ensure the safety of all critical infrastructure facilities (including systems and subsystems, and components) and personal security. One of the areas of widely understood critical infrastructure protection of the state is secure. Critical infrastructure protection should be understood as a set of actions that prevent the unauthorized or unreachable trespassing of unauthorized persons into the area, the intent of which is the destruction and neutralization of personnel and military equipment and technology. The protection purpose is to ensure order and security in the area of the facility, counteracting acts of diversion or the manifestations of terrorism. The task of protective measures is to ensure the effective, direct and indirect protection of certain facilities and personnel, which may be the subject of the identification and assault of terrorist groups or common criminal groups.

Therefore, the critical infrastructure protection system should protect objects against all external and internal threats and lay down appropriate organizational structures, develop procedures for operation, equipping facilities with technical protection measures, etc. Critical infrastructure protection is constantly improving, as new threats are still emerging, and potential opponents have increasingly better means of fighting. In view of the above, the purpose of this article is to: Identify Critical Infrastructure Protection System and formulate proposals for its improvement.

The Essence of Critical Infrastructure

The term ,,critical infrastructure" is relatively new. In the past, it was used as a name for strategic objects such as roads, bridges, viaducts, and water and transport systems. In the 1990s President Bill Clinton's directive of 22 May 1998 contained information on the critical infrastructure protection of the state understood as systems and installations necessary for the functioning of modern society and administration [The Clinton Administration's Policy on Critical Infrastructure Protection: Presidential Decision Directive 1998]. In turn, the EU Council Directive 2008/114/EC of 8 December 2008 identifies critical infrastructure as a component, system or part of infrastructure located in the territory of the Member States, which is essential for maintaining the necessary social, health, safety and material prosperity or social population and whose disruption or destruction would have a material impact on the Member State concerned as a result of the loss of these functions [Directive 2008/114/EC on the identification and designation of European Critical Infrastructures].

It is also worth mentioning the definition developed by the experts of the NATO Civil Protection Committee, who interpret critical infrastructure as objects, services and information systems that are vital to the state, and their damage or destruction could have a profound impact on state security, national economy, health and safety, public and proper functioning of the government [NATO's Role in Civil Emergency Planning 2006:11]. According to the Polish Crisis Management Act, critical infrastructure constitutes systems (buildings, installations, services) critical for the security of the state and its citizens and to ensure the smooth functioning of the public administration, institutions and entrepreneurs [2007 Crisis Management Act, Journal of Laws of 2001].

Critical infrastructure includes economic sectors, institutions, distribution networks, systems that ensure the continuity of the flow of goods and services vital to the country's defense, economic security, health, and security. Infrastructure should be considered as ,,critical" when its malfunction, capacity limitation or destruction could affect the weakening of the country or region [Executive Order 13010 - Critical Infrastructure Protection. Federal Register 1996:37347-37350].

Identification of the Protection System of the Critical Infrastructure

The term protection of an object ,,should be understood as a set of undertakings preventing the intrusion into the premises of unauthorized persons and carrying out a destructive action" [Lipski 1996:453]. The concept of Janusz Wojtal and Marian Milewicz is slightly different, stating that it is ,,a set of organizational, tactical, technical and physical measures to prevent crimes and offenses against property, and to prevent the occurrence of damage arising from these events and to prevent unauthorized persons entering the protected object" [Wojtal and Milewicz 2008:581]. On the other hand, the concept of physical (personal) protection ,,includes a system of human protection (physical protection), together with the provision of necessary technical means, such as communication and direct coercion" [Wójcik

2003:3]. Property protection is provided by guard posts, observation, patrolling, traffic control, intervention groups and technical security (mechanical and electronic).

Therefore, the protection of critical infrastructure objects is „any effort to ensure the functionality, continuity and integrity of critical infrastructure to prevent threats or vulnerabilities, and to mitigate and neutralize their effects, and to rapidly restore this infrastructure in the event of a disaster, attacks or other events disorting its proper functioning" [2007 Crisis Management Act 2001].

1. Physical security - understood as a set of undertakings aimed at minimizing the risk of disruption of critical infrastructure in an unauthorized manner by people who were in critical infrastructure. It consists of the protection of persons, understood as actions aimed at ensuring the safety of life, health and personal integrity and the protection of property (preventing offenses and offenses against property and preventing the occurrence of damage arising from these events) and preventing unauthorized persons from entering the protected area.

2. Technical protection - including a set of measures and procedures to minimize the risk of disruption to critical infrastructure, operations related to the technical aspects of the construction and operation of critical infrastructure facilities, equipment, installations and services, including technical protection measures. Technical critical infrastructure protection covers issues related to the compliance of buildings, equipment, installations and services with applicable standards (e.g. construction) and other regulations (e.g. fire) to ensure the safe use of critical infrastructure and the technical security of the facility, fences, barriers, CCTV systems, access systems, etc.

3. Personal protection - a set of ventures and procedures designed to minimize the risk of people who, through authorized access to critical facilities, equipment, installations and services, can cause disruptions in their functioning. This protection should therefore be linked to employees and other people temporarily located within the critical infrastructure (service providers, suppliers, visitors).

4. An IT Protection – is a set of undertakings and procedures aimed at minimizing the risk of disrupting the operation of critical infrastructure related to the use of IT systems and networks. It also means protection against cybercrime and cyber terrorism and effective countermeasures against such incidents.

5. Legal protection - a set of ventures designed to minimize the risks associated with the activities of other economic, state or private entities whose activities could lead to disruption of IK services, facilities, installations and services. In this respect, it is important to use legal instruments that are not permissible, through the ability to control and possibly block or reduce management decisions, such as hostile takeovers, mergers, or sales of certain infrastructure items that may interfere with its functioning.

The organization and implementation of critical infrastructure protection tasks is one of the voivodship, county and municipal crisis management bodies that are required to create national, provincial, district and municipal crisis management plans.

Improvement of the critical infrastructure system

In order to ensure the safety of critical infrastructure, a suitable protection system, consisting of a number of different elements, should be constructed. This system is designed to ensure the safety of persons, property and non-disrupted object functioning. The creation of an object security system is preceded by preliminary actions aimed at the precise (detailed) knowledge of the subject matter, the circumstances in which it is implemented, the potential risks and the possibilities of limiting it.

Detailed cognition of the protection object will ensure that activities known collectively as the object recognition. It will thus determine the existence (by place, time and circumstances) of immediate danger or threat thereof (potential danger) of persons or protected property [Basałyga 2007:3-4].

Proper cognition of the object, area, device will be possible thanks to [Bejgier and Stanejko 2012:168-169]:

1. An on-site verification, e.g. direct contact with the subject of protection, within which to determine:
   - nature of the protection object (e.g. industrial plant, dam, power plant, etc);
   - location of the object of protection (its location, as well as distance from Police units, fire brigades, city guards, hospitals etc);
   - object of protection from the outside (immediate surroundings of the object, area, equipment, including the type and condition of the fence, lighting, traffic intensity, nature and nature of adjacent objects, etc.);
   - object of interior protection (area of the object, its topography, distribution of rooms, their availability and destination, internal communication, etc.);
2. Documentation such as architectural foundations (bearing and partition walls, chimneys and ventilation systems), executive projects of technical security systems (alarm systems, building and mechanical protection systems), organizational schemes (arrangement of rooms and their use and distribution), orders circular, instructions relating to safety.
3. For background interview (information concerning crime in the most immediate surroundings and inside the object of protection, susceptibility of the object of protection to threats).
4. For external security, especially the Police, Transit Police, mobile intervention teams, protection of neighboring objects.
5. For internal conditioning (organization of work) such as employment structure, personal and material movement, time of activity of the protection object, etc.

Effective protection of an object occurs only when the subject of protection is sufficiently known and determined. It is therefore necessary to establish the detailed conditions and circumstances under which protection is provided. In the case of an object, area or device, this shall include its location in the field, the manner of separating it from other (no longer protected) objects, the way of isolating from them, its characteristics (posing or enhancing threats), and the types and used security methods, both physical and

technical. It is also necessary to know the hazards surrounding the protected object. It is therefore important to know the dangers, both objectively as well as potential, within the facility. For this purpose, it will be necessary to take steps to identify hazards. In order to be able to speak about the full effectiveness of the facility's protection, risks must also be assessed in addition to hazard identification.

As a further area of critical infrastructure protection, normative documents should be indicated. Critical infrastructure protection regulations are contained in legislation covering various areas of the state, such as telecommunications; production and trading of fuels and electricity; performing defensive tasks by entrepreneurs; creation of strategic reserves; powers of the Minister competent for State Treasury matters in some companies; realization of protection of persons and property. On the basis of these documents, the concept of a protection system should be developed in each critical infrastructure complex. It is an informal document, but its development greatly improves the efficiency of the planning process of the facility and improves its performance, hence it is recommended as an integral part of the process. The concept usually takes the form of a text document varied, if necessary, with graphical attachments. Based on the concept, the „Object Protection and Defense Plan" is being developed. The plan defines the scope of the activities related to the organization of the facility protection system and the ways of minimizing the effects that may affect the operational capacity.

According to the provisions of the act, critical infrastructure protection plans should contain [Lidwa, Krzeszowski and Więcek 2010:60–62]:

- the list of objects and systems of the critical infrastructure,
- Critical Infrastructure Hazard Identification and Risk Assessment,
- characteristics of resources that can be used to protect critical infrastructure,
- variants of acting in cases of threats or disrupting functioning of the critical infrastructure,
- variants of action in cases of threats or disruptions of the functioning of critical infrastructure,
- the principles of cooperation of public administration with the owners and possessors and dependent objects, installations or equipment of critical infrastructure in the scope of its protection, including the rules for the transmission of information,
- indication of the dates and procedures for updating the plan.

There are strict rules on each Critical Infrastructure facility that should be included in the relevant documents [Świerszcz and Piedziuk 2016:107-136]. The specificity of critical infrastructure operation necessitates precise specification of norms and rules, both on site and adjacent areas. Therefore, it is justified to develop for each Critical Infrastructure Critical Facilities Operational Procedures.

The concept of procedure is most often associated with specific proceedings relating to a given case. Procedures in the airport security system should be understood as an agreed manner (rules) of conduct at various organizational levels in the event of a crisis. They can be treated as a specific hazard-mitigation algorithm, resulting in hazard monitoring, compilation, and power usage scenarios, ways to minimize the scale of losses and the effects of threats [Sobolewski 2011:64].

Fixed Operational Procedures should include such information as: hazard identification, protection zones, crisis management procedures, organization of the physical and technical protection system and the location of such facilities within the facility, access and control rules, pass patterns, organization of the communication system, training and exercise requirements, etc.

Another important document from the point of view of the organization of the protection system to be developed at the level of a critical infrastructure facility is the „Engineering Protection Plan". This document should contain the necessary information on the development of the engineering infrastructure, including the organization of masking and fortification components, e.g.: the extension of road and engineering dams to restrict traffic and access to particularly dangerous directions, concrete protection walls, observation posts and checkpoints, etc.

Another area of improvement can be classified as operational security. Critical infrastructure objects are subject to mandatory protection. There are significant differences depending on the type of object. Other requirements are, for example, for a gun manufacturer and different for a power plant. That is why some institutions have their own security services, others hire outside companies. According to experience, security companies often do not meet the standards required for such important facilities. Therefore, a rational solution would be creating a Defense and Defense Group to carry out: the identification and prevention of threats, the protection of personnel, equipment and infrastructure, the elimination of Weapons of Mass Destruction, medical and fire safety, and the development of engineering. It would be appropriate to create an organizational structure for the Group, which could consist of four main cells: Passive Defense Team, Recovery Capability Team, Ground Defense Team and Secret Information Agent Division.

Definitely the most important issue in the development and implementation of critical infrastructure protection strategies is the development of mechanisms for cooperation between government departments and the private sector. Private sector owns the majority of critical infrastructure facilities, completely controlling their state, development, investments, including security. This private sector is in the first line of attack, but there is no access to classified information collected by government departments, especially from operational sources. The government, on the other hand, creates strategic defense plans based on their own analytical knowledge and gives them the appropriate legal classified information, but gathering data does not have full knowledge of the opportunities or vulnerabilities of critical infrastructure owned by the private sector. This knowledge is very closely guarded by infrastructure owners as one of the most sensitive factors in assessing the ability to win a position on a competitive market. It is necessary to find a platform for exchanging information and work together to better understand conditioning and interdependence. Improving reliability and security in the e-economy should strengthen the position of critical infrastructure owners.

Another technical element of the Critical Infrastructure Protection System is technical supportive measures. The essential function of the technical protection subsystem of a critical infrastructure object is to create a safe environment for the functioning entities in the premises of the facility. This is achievable through the proper functioning of the traffic system and the granting of access rights to individual zones of the facility. The proper organization of the intrusion detection and information system is also important. All these elements must be integrated into one common system managed by the Surveillance Center.

Taking into account particular current threats, critical infrastructure facilities should be equipped with the following groups of technical means:

1. Warning and lighting equipment such as automatic ground sensors and lighting, such as lighted mines, rocket lighters (signaling cartridges), wide beam headlamps and searchlights mounted on watch towers.

2. Instruments for observation in conditions of limited visibility. Security subdivisions should have adequate equipment for observation and combat in night conditions and limited visibility. Such instruments include: luminescent binoculars, night vision goggles and night vision eyewear active.

3. Engineering dams. In the area of counteracting the movement, inhibiting or delaying the intrusion of the opponent, connected to the observation system. Includes barbed wire / concetrina barriers (concrete barriers, portable buildings, barbed wire - portable pneumatic piercing devices) and stone and concrete blocks.

4. Protective system, in the form of entrance and entry controls, guard posts adequately protected against the effects of conventional weapons and NBC (nuclear, biological, chemical) destruction. Taking into account the location of all the facilities of a given critical infrastructure complex, it is proposed to divide into the following four protection zones:

   - Periphery Protection Zone - a separate area of the site outside the external fence of the protected object. This zone does not install alarm systems and systems, but should maintain a strip 25 m wide, free from high bushes and grasses, providing access to the ground adjacent to the facility;

   - Peripheral external protection zone - terrain area between the external and internal fence of a critical infrastructure facility. In this zone, there are installed external devices and alarm systems, lighting, wired communication system for protective forces. In the outer perimeter protection zone, at least two independently operated alarm systems, e.g. fencing and surface systems, and underground systems, two surface systems including active infrared and microwave barriers, and other system combinations;

   - Direct external protection zone - terrain directly adjacent to individual buildings in a critical infrastructure facility. In this zone, external devices and alarm systems are installed, which can be used with surveillance cameras. In the area of direct external protection, single alarm systems - terrestrial, underground or fence - should be used;

   - Interior protection zone - indoor area with all windows, doors, air vents, etc. In this zone, internal alarm systems are installed. There are also used surveillance cameras systems that are compatible with internal alarms and other physical security devices in this zone.

The next area concerns the protection of important personnel. This protection is accomplished through individual personnel equipment in armaments and special equipment (anti-skid vests, protective clothing, personal medical equipment, etc.) and personal protection provided by the service department, as well as the development of appropriate procedures. The third area is document protection and information security.

Documents in accordance with binding regulations should be kept in separate offices (open and secret offices with foreign document handling points) and in workplaces specified in the requirements of safes, armored cabinets and containers. The principles of protection and access to these sites will determine procedures at the workplace [Ćwik 2017: 170-174]. In case of attempting to penetrate these places, any staff member will be required to follow the procedure (violation of the security zone by an unauthorized person). The next area is related to passive defense, which aims to ensure the implementation of tasks such as: identification, identification and monitoring, warning, alerting and reporting of contamination. The last area is the recovery of operational capacity. It may include the destruction of dangerous and explosive objects (IED - Improvised Explosive Device and UXO - Unexploded Ordnance), health care, fire safety and damage remediation.

Conclusions

Protecting critical infrastructure, due to its importance for the state security system, has a priority in the present day. The threat posed by organized criminal groups has been increased. They aimed at gaining weapons, ammunition and explosives. At the same time, terrorism has developed, and the cost-effective target of attacks by terrorist groups may become critical infrastructure.

It is also not possible to underestimate the possibility of the emergence of strictly military threats. Therefore, the safety of critical infrastructure facilities can be assured. By effective protection, which always depended on the possibility of detecting the presence of an intruder - even before entering protected areas - and informing the fact to the physical security services. The assessment of the functioning of the facility protection systems shows that the weakest link still remains people who are designated for protection, as well as defective security systems.

In order to improve the level of protection of critical infrastructure complexes, the following actions should be taken:

1. To develop detailed operational procedures for the protection of facilities

2. to conduct ongoing analysis of external threats (especially in terms of terrorist threats) and internal threats and to implement practically the conclusions derived therefrom;

3. improve organizational solutions that enhance the effectiveness of protection systems (create organizational structures such as the Defense and Defense Group);

4. successively increase the installation of modern, technical security devices, both mechanical and electronic;

5. to equip critical infrastructure facilities with modern communication technologies and robotic signaling equipment and transport vehicles for value and service;

6. to conduct periodic training on the protection of objects and property of considerable value with the persons responsible for the organization and implementation of those goals and the administrators of alarm systems in the field of work control and maintenance of equipment;

7. to develop cooperation with other security services, such as the army, Police, etc., in the field of risk information exchange and take action in the event of a breach of the protection system.

References

Journal Articles

2007 Crisis Management Act, Journal of Laws of 2001, no 22, item 114.

Executive Order 13010 - Critical Infrastructure Protection. Federal Register, July 17, 1996. vol. 61, no 138, 37347-37350.

2007 Crisis Management Act, Journal of Laws of 2001, no 89, item 590.

Online Journals and websites

The Clinton Administration's Policy on Critical Infrastructure Protection: Presidential Decision Directive, no 63, White Paper, May 22, 1998 (Online), (Retrieved: August 12, 2017), https://fas.org/irp/offdocs/paper598.htm.

Directive 2008/114/EC of 8 December 2008 on the identification and designation of European critical infrastructures and the assessment of the need to improve their protection, Official Journal of the European Union, L 345/75 1998 (Online), (Retrieved: August 15, 2017), http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32008L0114.

NATO's Role in Civil Emergency Planning, NATO Public Diplomacy Division, Belgium, September 2006, p.11, (Online), (Retrieved: August 16, 2017) www.igsu.ro/documente/SAEARI/NATO_CEP.pdf.

Narodowy Program Ochrony Infrastruktury Krytycznej, Rządowe Centrum Bezpieczeństwa, (Online), (Retrieved: July 05, 2017), http://rcb.gov.pl.

Books

Wojtal J., Milewicz M. (2008), „Ochrona osób i mienia", Toruń, 581.

Bejgier W., Stanejko B. (2012), „Ochrona osób i mienia", Oficyna wydawnicza Łośgraf, Warszawa, 168-169.

Lidwa W., Krzeszowski W., Więcek W. (2010), „Zarządzanie w sytuacjach kryzysowych", Wydawnictwo AON, Warszawa, 60–62.

Sobolewski G. (2011), „Organizacja i funkcjonowanie centrum zarządzania kryzysowego", Wydawnictwo AON, Warszawa, 64.

Edited Books

Lipski S. (1996), „Ochrona obiektów", [in:] Grzeszczyk C. (ed.), „Vademecum agenta ochrony i detektywa", Wydawnictwo CRIMEN, Warszawa, 453.

Wójcik A. (red.) (2003), „Ocena bezpieczeństwa obiektów", [in:] „Mechaniczne i elektroniczne systemy zabezpieczeń", vol, II, no. 2.12.3.1, Wydawnictwo VERLAG DASHOFER, Warszawa, 3.

Świerszcz K, Piedziuk E. (2016), „Formalnoprawne i normatywne podstawy współdziałania podsystemu niemilitarnego i militarnego w kształtowaniu bezpieczeństwa państwa", [in:] „Obronność państwa.

Strategie oraz systemy bezpieczeństwa i obronności", Trejnis Z., Marciniak M., Marszałek A (ed.), Toruń, 107-136.

Periodicals

Basałyga E. (2007), „Organizacja i taktyka ochrony obiektów", vol. I. System bezpieczeństwa obiektu [in:] „Systemy Alarmowe", no 6, 3-4.

Conference Paper

Ćwik B. (2017), „A survey on willingness to provide warning information within a company during crisis", 4th International Conference on Management Science and Management Innovation, June 23-25, 2017 Suzhou, China, Published by Atlantis Press, ISSN: part of the series AEBMR, ISBN: 978-94-6252-369-2, ISSN 2352-5428, vol. 31, 170-174, doi:10.2991/msmi-17.2017.38.

Social Loafing in Group Activities of Manufacturing Companies

Jolita Vveinhardt, Professor, Ph.D., Faculty of Management Sciences, Vytautas Magnus University, Kaunas, Lithuania, e-mail: jolita.vveinhardt@gmail.com

Justina Banikonyte, Business relation coordinator, Faculty of Management Sciences, Vytautas Magnus University, Kaunas, Lithuania, e-mail: justina.bamikonyte@vdu.lt

Rizwan Raheem Ahmed, Professor, Ph.D., Faculty of Management Sciences, Indus University, Karachi, Pakistan, e-mail: rizwanraheemahmed@gmail.com

Abstract

The purpose of this research is to diagnose the spread of the phenomenon of social loafing in-group activities of manufacturing companies. The theoretical part of the article is prepared by using the methods of scientific literature analysis, synthesis, chronology, and analogy. After a detailed analysis of the researches, the dimensions for a new questionnaire have been distinguished. After attributing the items to the dimensions, the expert assessment of the questionnaire was organized. On the basis of the results of the assessment, the appropriate for diagnostics version of the questionnaire was obtained. The empirical research was conducted using the questionnaire developed by the authors, i.e. by carrying out the closed-type questionnaire survey for employees working in-group activities of the manufacturing companies. Only employees of three of the eight groups of manufacturing companies involved in the research admit to loaf socially. It was found that interaction with the leader of the group has quite a large influence on the emergence of the social loafing of the group. When evaluating the emotional commitment it was found that employees are more likely to be committed to colleagues working in the group than to the company where they work. The analysis of the group support aspect highlighted the differences between generations and avoidance to interact in an informal environment, i.e., outside the workplace.

Keywords: social loafing, in-group activities, manufacturing companies, emotional commitment

JEL Classification: M12, M19

Introduction

Relevance of the research

Work in a group provides business entities an opportunity to work more efficiently, exploit strengths of current employees, creating a synergy effect, and to generate income without increasing the number of employees in the organization. However, a variety of studies show that when working in groups, contribution of each member of the group to the performance of the common task may be unequal – i.e., social loafing occurs when working in groups. Social loafing is a tendency when individuals reduce personal effort when working in a group and use the efforts of other members of the group, when the lack of control and direct supervision, and the growth of the size of the group become the key conditions to facilitate the emergence of social loafing in established real groups (Latane et. al., 1979; Karau and Williams, 1993; Murphy et al., 2003; Brandyberry and Bakke, 2006; Srinivasan et al., 2010; Omar et al., 2010; Ying et al., 2014; Lee et al., 2015; Klug and Bagrow, 2016; Perry et al., 2016; Shih and Wang, 2016; Vveinhardt and Banikonyte, 2017).

Loafing is also promoted by the individuals' belief that the group will also succeed without the contribution of single individuals and, therefore, some members of the group expect that their colleagues will idle. In anticipation of such behaviour of colleagues they consciously reduce the efforts when working in groups in order to avoid a possible exploitation by colleagues. This explanation is often treated as a "Sucker effect" (Asmus and James, 2005; Lam, 2015). It should be stated that the "Sucker effect" and the perceived social loafing are interrelated, since both of them result from the beliefs and attitudes that colleagues are likely to reduce the individual efforts in-group work. The relevance of this research is presupposed by the fact that the phenomenon of social loafing not only has influence on the results of tasks performed in groups, but can also influence the organizational climate, the relations between employees, the implementation of the strategic goals of the organization and the successful operation of the organization as a whole. This article presents the causes and possible consequences of social loafing in organizations for work performance. The results of the research are analysed in the following major sections: the reputation, the image, the goals, the justice, the commitment, the support of the group, the coherence of the group, the results of the group, competition vs. cooperation.

The problem of the research is posed by the question: what is the extent of the spread of social loafing in group activities of manufacturing companies and what influence can the consequences of the analysed phenomenon have on the performance of the companies?

Level of exploration of the problem

Some studies show that the phenomenon of social loafing occurs regardless of age or the nature of activity. For instance, the phenomenon was observed among preschool children (Thompson and Thornton, 2014), among students (Arevalillo-Herraez, 2014; Schippers, 2014; Li and Ma, 2014; Teng and Luo, 2015), in sports (Jones et al., 2014; De Backer et al., 2015; Czyz et al., 2016; Haugen et al., 2016), among representatives of different occupations in different work organizations (Chen et al., 2014; Ying et al., 2014; Klug and Bagrow, 2016; Perry et al., 2016; Shih and Wang, 2016). The geography of the studies also shows that the problem is of the multicultural nature. Since, as stresses Lee et al. (2014) emphasize, social loafing is a general social disease „whereby individuals exhibit lower performance when they work in a group than when they work alone, causing waste of manpower in organizations".

Looking at the reasons that encourage employees to give more energy when performing the tasks, and to work more creatively, a wider field of research of the problem is highlighted. For example, evaluation of congruence between values (Newton and Mazur, 2016), when incongruence of values becomes the cause of social conflict and ostracism (Scott and Duffy, 2015; Erkutlu and Chafra, 2016), not mentioning the fact that the employees do not want to become "mugs", distinguishing from the colleagues (Høigaard et. al., 2006a, 2006b), and the leadership remains a relevant problem (Lee et al., 2015).

Other reasons identified by researchers are a low level of coherence and identification with the group, (Srinivasan et al., 2010), poor relationships with the managers and the perception of social injustice, (Jassawalla et al. (2009), the existence of an external subject (an experimenter, an observer, a chief, an evaluator, a teacher) and his/her expectations (Karau and Williams, 1995), tasks are scarcely defined, are "vague" (Perron, 2011; Lam, 2015), social loafing is associated with anonymity and is occurs more often when working with strangers (Williams et al., 1981; Chen et al., 2014), when the person works alone, visibility of task is high, and it is easy to evaluate the efforts of the individual (however, when the same person works in a group, visibility of his/her tasks decreases) (Poddar, 2011). Also, when the reward for the success of the group is distributed equally to all members of the group, social compensation for others may occur as doing a larger volume of work than it had been planned for each member of the group. This unequal distribution of work under certain conditions leads to the loss of motivation: in the course of time members of the group would rather reduce their efforts (along with the chance for success of the entire group) than will carry out more than they think is fair according to equal parts of work (Todd et. al., 2006). The relationship between the decrease in motivation, the "sucker effect" and the total remuneration to the whole group may be noticed, as under the conditions when individual members of the

group are rewarded equally for the final product of the group (i.e. the result) some members may think that they won't receive a fair part of reward for a strong individual contribution to the overall group result. For this reason, they tend to loaf (Sturman and Ford, 2011). The purpose of this research is to diagnose the spread of the phenomenon of social loafing in-group activities of manufacturing companies.

Methods of research

The theoretical part of the article is prepared by using the methods of scientific literature analysis, synthesis, chronology, and analogy. After a detailed analysis of the researches, the dimensions for a new questionnaire have been distinguished. After attributing the items to the dimensions, the expert assessment of the questionnaire was organized. On the basis of the results of the assessment, the appropriate for diagnostics version of the questionnaire was obtained. The empirical research was conducted using the questionnaire developed by the authors, i.e. by carrying out the closed-type questionnaire survey for employees working in-group activities of the manufacturing companies.

Methodology of the research

The original version of the questionnaire included 8 scales (reputation, image, goals; social loafing; justice; commitment; support of the group; coherence of the group; results of the group; competition vs. cooperation), 20 subscales and 118 items. This version was submitted to the experts for assessment. Five experts (3 of them scientists and 2 business representatives) participated in the expert assessment. The expert assessment was organised in several stages:

First stage – selection of experts in accordance with the documentary way of selection (evaluation of potential experts' competencies, areas of research, specialization and experience in relation to the object of the research);

Second stage – adjustment of the aims and terms of expert assessment of the questionnaire is carried out (individually with each of the experts participating in the assessment);

Third stage – interviews with randomly selected experts are conducted (1 scientist, 1 business representative) in order to clarify the suitability of the structure of the questionnaire for the research;

Fourth stage – based on expert assessments (verbal and written) the correction of the questionnaire is carried out.

During the assessment, the experts were asked to evaluate the suitability of the submitted scale for the questionnaire, the suitability of the item for the scale and to evaluate the general suitability of the questionnaire for the research. Five-point Likert scale was used for evaluation of the items. Points 1-2 meant that the scale/item was absolutely unsuitable and should be withdrawn because of its incorrectness and/or unsuitability for the scale/subscale and the questionnaire in general, and points 4-5 meant that the scale/item was suitable.

Taking into account the comments and recommendations of the experts, the changes of the structure of the questionnaire are reflected in the decrease of the number of subscales (19 subscales) and items (92 items). The structure of the questionnaire and the internal reliability of scales of the questionnaire determined after the survey are presented in Table 1.

Table 1: Internal reliability of the scales of the questionnaire

Scale	Cronbach alpha	Scale	Cronbach alpha
The reputation, the image, the goals	0.650	The support of the group	0.878
Social loafing	0.924	The coherence of the group	0.712
The justice	0.759	The results of the group	0.838
The commitment	0.725	Competition *vs.* cooperation	0.713

Research results

The research was carried out in departments of eight manufacturing companies (in case of this research, departments are equivalent to groups). The groups involved in the research consisted of 4 (min) to 11 (max) persons (i.e., two groups of 4 employees; two groups of 5 employees; two groups of 6 employees and two groups of 11 employees). The questionnaire survey of groups of employees in the manufacturing companies has highlighted certain tendencies. Firstly, the employees of the companies admit that social loafing exists in their working groups, but avoid mentioning about their "personal contribution" to the spread of this phenomenon. The results of the survey carried out show that social loafing behaviours are typical in all the eight investigated groups, but respondents of only three groups (out of 8) agree that they sometimes reduce their individual efforts, while working in their group. Secondly, the results of the research showed that social loafing is the most typical when there are "favourable" conditions to transfer their tasks to other colleagues. Social loafing is also characteristic to employees, who could represent the category of the longest serving employees according to the socio-demographic indicators. Considering that perceived social loafing dominates almost in all of the departments of the employees, taking into account the "Sucker effect", even the influence of a small group of employees may be particularly significant to social loafing, what should be taken into account by the leaders of the working groups.

One of the most pronounced problematic areas found in-group activities of manufacturing companies is interaction with the head of the group. Although as a whole, the overall satisfaction of employees by justice (i.e., the role of the manager, interaction with the manager, satisfaction by authorities and management) in the research sample indicates that the employees evaluate the justice resulting from the role of the managers favourably, however, the fact that the relationship with the managers in the organization indicates certain problematic aspects is highlighted at a more elaborate level, i.e., at the level of subscales. Employees of 7 out of 8 divisions say that managers are biased and do not hold back from inappropriate comments to employers. The results of the research also showed that the behaviour of the managers with employees has an impact on the employees' behaviour – disrespectful behaviour and deliberately formed competitive situations do not motivate, so the managers' behaviour can affect the employees and encourage them to get involved in social loafing. During the research the employees mentioned the fact that the results of the employees showing different efforts are evaluated equally (or the employees achieving worse results are valued more highly in the organization than the employees achieving good results) as one of the possible reasons of a reduction in the personal effort. They also doubted the fairness of distribution of tasks by the managers (it is assumed that the guiding principle was that those who worked most received the highest load) and the decisions taken by the manager.

Emotional commitment in groups of companies is strong, but the employees' tendency to be more firmly committed to the colleagues than to the company where people work both with respect to the analysed departments in general and socio-demographic indicators was found. One of the most prominent factors indicating a low level of commitment to the organization is that employees frequently consider their intention to change jobs (characteristic to 4 departments out of 8). The most frequent intention to change the workplace is among the employees who create the maximum added value for the organization (i.e., those who carry out the technical and physical manufacturing work, who traditionally account for about

70-80% of the total number of employees in a manufacturing company). Possibly due to the low emotional commitment to the organization, the indicators of staff turnover in the organization can be quite high. The strongest commitment to the organization and colleagues is characteristic of the employees whose both working conditions and other demographic indicators indicate stability (the need for it) (e.g., managing positions, the administrative nature of the work, a fixed salary, etc.). The minimum commitment is characteristic of the employees, whose both working conditions and other demographic indicators show less stable conditions, i.e., the employees who may be inclined to pursue both personal career and better working conditions, doing the physical work.

A moderate level of group support, which is most strongly revealed in cooperation and support to each other in important moments, is typical of the companies, but the employees are reluctant to be involved into friendship outside the workplace, i.e. in an informal environment. Academic literature suggests that when employees know each other, they form certain relationships, which they do not want to spoil by getting involved into the activities of social loafing. It is important to note that the group support in companies is the strongest among the employees, when socio-demographic indicators show the employees of possibly different profiles (Table 2): those who have a strong support of the group (employees who are 41-45 years old, have been working for the organization for 16-20 years, do technical (physical) work, perform tasks that are not related to the tasks of the colleagues, receive a differentiated pay; have adult children)); those who have a weak support of the group (employees who are 26-30 years old, with higher education; carrying out the coordination, administration tasks that are either strongly or partly depend on the colleagues).

Table 2: Summary of distribution of the results of the research in respect of socio-demographic indicators

Demographic criteria		Average estimates of scales (mean)							
		Reputation, image, goals	Social loafing	Justice	Commitment	Support of the group	Coherence of the group	Results of the group	Competition vs. cooperation
Sex	Male	2.84	**2.84**	3.5	3.64	3.58	3.53	3.55	3.55
	Female	**2.74**	**2.86**	3.49	3.76	**3.23**	**3.47**	3.51	3.49
Age	18-25 years	2.79	**2.43**	**3.75**	**3.4**	3.63	3.55	3.73	3.48
	26-30 years	2.78	2.79	3.4	3.61	**3.23**	3.61	3.5	3.52
	31-35 years	2.76	2.93	3.51	3.84	3.42	**3.4**	**3.44**	3.53
	36-40 years	**2.67**	3.19	3.48	3.9	3.67	3.69	3.57	**3.97**
	41-45 years	3	2.91	3.51	3.48	**3.88**	3.57	**3.8**	3.56
	51-60 years	2.76	2.66	**3.37**	3.61	3.49	3.55	3.45	**3.34**
	61 years and more	3.02	**3.42**	3.5	**4.05**	3.85	**3.73**	3.5	3.7
Education	Higher	2.72	2.74	3.48	**3.74**	**3.47**	**3.46**	3.54	3.53
	Higher (college)	**2.25**	**1.88**	**4.31**	**3.2**	**3.6**	3.67	**3.29**	**3.18**
	Vocational	3	2.95	3.6	3.57	3.55	3.53	**3.64**	3.55
	Secondary	2.94	**3.16**	**3.32**	3.64	3.53	**3.7**	3.41	**3.57**

Demographic criteria		Average estimates of scales (mean)							
		Reputation, image, goals	Social loafing	Justice	Commitment	Support of the group	Coherence of the group	Results of the group	Competition vs. cooperation
Length of service in the organization	Up to 1 year	2.65	**2.23**	3.7	3.82	3.72	3.51	**4.11**	3.47
	1-3 years	2.78	2.95	3.47	**3.46**	3.23	**3.41**	3.33	3.47
	4-7 years.	2.97	2.79	3.54	3.62	3.52	3.51	3.6	3.55
	8-10 years	2.66	2.86	3.56	3.74	3.7	3.56	3.68	**3.85**
	11-15 years	2.85	3.19	3.36	3.78	3.24	3.53	**3.03**	3.55
	16-20 years	**2.57**	2.6	**3.18**	**3.88**	**4**	3.59	3.57	**3.15**
	21 years and more	**3.33**	**3.5**	**3.75**	3.8	**3.2**	**3.71**	3.52	3.61
Level of position held	Top-level manager	**2.58**	**3.44**	**3.13**	3.6	**2.4**	**3.27**	**2**	3.55
	Middle level manager	2.68	**2.75**	**3.58**	**3.98**	**3.97**	**3.59**	**4.02**	**3.74**
	Lowest level manager	2.69	3	3.45	3.78	3.23	3.52	3.33	3.56
	Ordinary employee, professional	2.86	2.82	3.51	3.61	3.5	3.51	3.53	3.5
Specifics of work	Provision of services	2.9	3.05	**3.38**	3.69	3.44	3.48	3.43	3.47
	Technical, physical work	2.88	2.83	**3.54**	3.59	**3.53**	**3.54**	3.56	3.51
	Other (coordination, administration)	**2.46**	**2.62**	3.53	**3.95**	3.48	3.48	**3.59**	**3.73**
Results of work	Depend on colleagues very much	2.73	2.82	3.58	3.72	3.41	3.52	3.46	3.56
	Not really depend on colleagues	**2.69**	**2.76**	3.44	**3.79**	3.74	3.51	3.57	3.45
	Depend on colleagues partly	2.92	2.9	3.42	3.58	3.41	3.49	3.57	**3.57**
	Other (completely independent, I perform unrelated tasks)	2.93	2.85	**3.6**	3.66	**3.88**	**3.59**	**3.66**	3.4
Remuneration	Fixed	2.83	2.94	3.46	**3.77**	3.54	**3.57**	3.55	3.55
	Differential	2.86	**2.68**	**3.68**	3.47	**3.68**	**3.57**	3.61	3.48
	Confidential	**2.74**	2.87	3.42	3.71	3.34	3.47	3.44	**3.57**
	Other	3	2.81	3.56	3.7	3.6	3.31	**3.76**	3.39
Marital status	Single	2.63	**2.69**	3.36	3.42	3.32	3.52	3.43	3.49
	Married	2.88	2.94	3.48	**3.81**	**3.64**	**3.54**	**3.62**	**3.61**
	Divorced	**2.58**	3.08	3.4	3.73	**3**	3.31	**2.9**	3.52
	Living with a partner	2.89	**2.69**	**3.72**	3.53	3.45	3.53	3.6	3.4
Family commitments	I am raising a child (children) with my spouse	2.82	2.91	3.43	3.76	3.58	3.45	3.59	3.53
	I don't have children	**2.79**	**2.76**	3.54	3.62	3.44	3.54	3.55	3.52

Demographic criteria		Average estimates of scales (mean)							
		Reputation, image, goals	Social loafing	Justice	Commitment	Support of the group	Coherence of the group	Results of the group	Competition vs. cooperation
	Other (children are grown up)	3.11	3.19	**3.65**	**3.77**	**4.13**	**3.76**	**3.67**	**3.73**

Source: own

xxx	The estimates, which are the lowest on the scale and do not reach (and/or are equal) 3.00 estimate are presented in the cells marked in dark grey color.
xxx	The estimates, which are the highest on the scale, are presented in the cells marked in light grey color.
xxx	The lowest values of the estimates of the scale that are > 3.00 are marked in black bold text in the table

The results show that the group support may be determined by differences between the generations, which accordingly affect the differences in approach towards the job, group and tasks carried out. But it is also important to consider the fact that the group support is different for employees, whose: job includes physical and administrative work (with a stronger support in production); in the tasks, the results of which depend on colleagues and in the tasks, the results of which are independent of the colleagues (the stronger group support was found when tasks are unrelated), etc. It is important to draw attention to the fact that during the research it was found that social loafing and group support correlate with each other (i.e., characterized by a negative moderate correlation), and this informs about a more active involvement in social loafing when the group support decreases.

The group support is closely related to the coherence of the group, which is one of the key factors to reduce the extent of social loafing in-group activities. The research has found the relationship between the coherence of the group and the group support (group support increases with the strengthening of coherence of the group). However, the results of the research showed that there are weak relationships between employees within companies, even in the groups of respondents, where the level of coherence in the group is relatively high, in terms of most socio-demographic indicators the employees have little similar interests, there is the lack of informal communication and mutual relations in a more relaxed environment outside the workplace. Cooperation occurring as mutual help has most influence on coherence of groups of employees, however, it can be assumed that it is likely that such help is determined by a variety of other reasons (work specifics, machine operating schedule, etc.).

It was found that the employees' satisfaction with the working process and the work outcomes is related to the group support. Thus, the aforementioned problem areas may also affect the results of the group of employees that determine satisfaction with the working process and satisfaction with the work outcomes. It is important to pay attention to the fact that the satisfaction with the work outcomes and process is the most characteristic in respect of the length of service and position in the organization: i.e., satisfaction with both the outcomes and processes is most characteristic of the employees working within the organization for a short period of time (i.e. up to 1 year), thus, it can be assumed that this satisfaction is determined by adaptation in the organization, since the employees are not yet fully aware of the organizational culture, processes, procedures, etc. It is important to note that the results of the group have a moderately strong relationship with justice (i.e. the results of the group are directly influenced by the role of the manager and managers' interaction with the employees and the resulting satisfaction with the management). It should be emphasized that the dissatisfaction of the manager with the work processes

and the results of the work is also reflected in the managers' behaviour and interaction with the staff, and this determines low level of employees' interaction with the manager.

The results of the research showed that the disposition of employees of companies to cooperate is stronger than the disposition to compete with other groups of employees. However, the employees are characterized by the objective to surpass the results of others, and winnings-induced feeling is favourite (it is admitted in 6 departments out of 8). It is obvious that deliberately caused competitive situations are not acceptable to employees, but other departments are characterized by a natural need for competition.

Conclusions

Only employees of three of the eight groups of manufacturing companies involved in the research admit to loaf socially. It was found that interaction with the leader of the group has quite a large influence on the emergence of the social loafing of the group. When evaluating the emotional commitment it was found that employees are more likely to be committed to colleagues working in the group than to the company where they work. The analysis of the group support aspect highlighted the differences between generations and avoidance to interact in an informal environment, i.e., outside the workplace.

The following main problem areas have been identified in the researched groups: social loafing determined by perceived loafing; a strong influence of the role of the manager on the scale of social loafing in the organization; weak emotional commitment of employees to the organization; weak mutual relationships and relationships affecting the reduction of the group support and coherence; weak orientation of employees towards achievement in the departments that create the greatest added value to the organization (production).

References

Arevalillo-Herraez, M. (2014) 'Impact evaluation of reactive assessment strategies to address social loafing by promoting student cooperation and encouraging mutual support', *Innovations in Education and Teaching International*, 51 (5), 523–532. doi: 10.1080/14703297.2013.785646

Brandyberry, A.A. and Bakke, S.A. (2006) 'Mitigating negative behaviors in student project teams: an information technology solution', *Journal of Information Systems Education*, 17 (2), 195–209.

Chen, F., Zhang, L. and Latimer, J. (2014) 'How much has my co-worker contributed? The impact of anonymity and feedback on social loafing in asynchronous virtual collaboration', *International Journal of Information Management*, 34 (5), 652–659. http://dx.doi.org/10.1016/j.ijinfomgt.2014.05.001

Czyz, S.H., Szmajke, A., Kruger, A. and Kübler, M. (2016) 'Participation in team sports can eliminate the effect of social loafing', *Perceptual and Motor Skills*, 123 (3), 754–768. doi: 10.1177/0031512516664938
De Backer, M., Boen, F., De Cuyper, B., Hoigaard, R. and Vande Broek, G. (2015) 'A team fares well with a fair coach: predictors of social loafing in interactive female sport teams', *Scandinavian Journal of Medicine & Science in Sports*, 25 (6), 897–908. doi: 10.1111/sms.12303

Erkutlu, H. and Chafra, J. (2016) 'Value congruence and commitment to change in healthcare organizations', *Journal of Advances in Management Research*, 13 (3), 316–333. doi: 10.1108/JAMR-11-2015-0078
Haugen, T., Reinboth, M., Hetlelid, K.J., Peters, D.M. and Hoigaard, R. (2016) 'Mental toughness moderates social loafing in cycle time-trial performance', *Research Quarterly for Exercise and Sport*, 87 (3), 305–310. doi: 10.1080/02701367.2016.1149144

Høigaard, R., Säfvenbom, R. and Tønnessen, F.E. (2006) 'The relationship between group cohesion, group norms, and perceived social loafing in soccer teams', *Small Group Research*, 37 (3), 217–232. doi: 10.1177/1046496406287311

Jassawalla, A., Sashittal, H. and Malshe, A. (2009) 'Students' Perceptions of Social Loafing: Its Antecedents and Consequences in Undergraduate Business Classroom Teams', *Academy of Management Learning & Education*, 8 (1), 42–54. doi: 10.5465/AMLE.2009.37012178.

Jones, G.W., Hoigaard, R. and Peters, D.M. (2014) '"Just going through the motions....": a qualitative exploration of athlete perceptions of social loafing in training and competition contexts - implications for team sport coaches', *International Journal of Sports Science & Coaching*, 9 (5), 1067–1082. doi: 10.1260/1747-9541.9.5.1067

Karau, S.J. and Williams, D.K. (1993) 'Social loafing: a meta-analytic review and theoretical integration', *Journal of Personality and Social Psychology*, 65 (4), 681–706. doi: 10.1037/0022-3514.65.4.681

Karau, S.J. and Williams, D.K. (1995) 'Social Loafing: Research Findings, Implications, and Future Directions', *Current Directions in Psychological Science*, 4 (5), 134–140. doi: 10.1111/1467-8721.ep10772570.

Klug, M. and Bagrow, J.P. (2016) 'Understanding the group dynamics and success of teams', *Royal Society Open Science*, 3 (4), Article Number: UNSP 160007. doi: 10.1098/rsos.160007

Lam, C. (2015) 'The Role of Communication and Cohesion in Reducing Social Loafing in Group Projects', *Business and Professional Communication Quarterly*, 78 (4), 454–475. doi: 10.1177/2329490615596417.

Latané, B., Williams, K. and Harkins, S. (1979) 'Many hands make light the work: the causes and consequences of social loafing', *Journal of Personality and Social Psychology*, 37 (6), 822–832. http://psycnet.apa.org/doi/10.1037/0022-3514.37.6.822

Lee, P.C., Chen, C.M. and Chou, C.H. (2014) 'Decreasing Tax collectors' perceived social loafing through collaborative behaviors of taxpayers', *Journal of Public Administration Research and Theory*, 24 (4), 1037–1064. doi: 10.1093/jopart/mut015

Lee, P.C., Chen, C.M. and Liou, K.T. (2015) 'Using citizens' leadership behaviors to enhance worker motivation: reducing perceived social loafing in a coproductive tax service program', *Public. Performance & Management Review*, *39*(1), 172–197. doi: 10.1080/15309576.2016.1071172

Li, H.X. and Ma, S.M. (2014) 'The research of effective teaching in colleges based on the theory of social facilitation and social loafing', Edited by: Zheng, F. Proceedings of the 2nd International Conference on Education, Management and Social Science. Book Series: *Advances in Social Science Education and Humanities Research*, 6, 183–186.

Murphy, S.M., Wayne, S.J., Liden, R.C. and Erdogan, B. (2003) 'Understanding social loafing: the role of justice perceptions and exchange relationships', *Human Relations*, 56 (1), 61–84. https://doi.org/10.1177/0018726703056001450

Newton, C.J. and Mazur, A.K. (2016) 'Value congruence and job-related attitudes in a nonprofit organization: a competing values approach', *International Journal of Human Resource Management*, 27 (10), 1013–1033. doi: 10.1080/09585192.2015.1053962

Omar, A.A., Lionel, P.R. and Likoebe, M.M. (2010) 'Team Size, dispersion, and social loafing in technology-supported teams: a perspective on the theory of moral disengagement', *Journal of Management Information Systems*, 27 (1), 203–230. doi: 10.2753/MIS0742-1222270109

Perron, B.E. (2011) 'Reducing Social Loafing in Group-Based Projects', *College Teaching*, 59 (4), 163–164. doi: 10.1080/87567555.2011.568021.

Perry, S.J., Lorinkova, N.M., Hunter, E.M., Hubbard, A. and McMahon, J.T. (2016) 'When does virtuality really "work"? Examining the role of work-family and virtuality in social loafing', *Journal of Management*, 42 (2), 449–479. doi: 10.1177/0149206313475814

Poddar, A. (2010) 'Continuous Additive Peer Review: A New System to Control Social Loafing in Group Projects', *Journal for Advancement of Marketing Education*, 17, 1–12.

Schippers, M.C. (2014) 'Social loafing tendencies and team performance: the compensating effect of agreeableness and conscientiousness', *Academy of Management Learning & Education*, 13 (1), 62–81. doi: 10.5465/amle.2012.0191

Scott, K.L. and Duffy, M.K. (2015) 'Antecedents of workplace ostracism: new directions in research and intervention', In: Pamela L. Perrewé, Jonathon R.B. Halbes leben, Christopher C. Rosen (ed.) *Mistreatment in Organizations (Research in Occupational Stress and Well-being*, Vol. 13). Emerald Group Publishing Limited, 137–165. doi: 10.1108/S1479-355520150000013005

Shih, C.H. and Wang, Y.H. (2016) Can workplace friendship reduce social loafing? Edited by: Barolli, L.; Xhafa, F.; Uchida, N. 10th *International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS)*, 522–526. doi: 10.1109/IMIS.2016.144

Srinivasan, S.S., Maruping, L.M. and Robert, L.P. (2010) 'Mechanisms underlying social loafing in technology teams: an empirical analysis', *International Conference on Information Systems*, ICIS 2010 Proceedings, 183. http://aisel.aisnet.org/icis2010_submissions/183

Sturman, M.C. and Ford, R. (2012) 'Motivating Your Staff to Provide Outstanding Service', in *The Cornell School of Hotel Administration on Hospitality: Cutting Edge Thinking and Practice* (eds M.C. Sturman, J.B. Corgel and R. Verma), John Wiley & Sons, Inc., Hoboken, NJ, USA. doi: 10.1002/9781119200901.ch11

Teng, C.C. and Luo, Y.P. (2015) 'Effects of perceived social loafing, social interdependence, and group affective tone on students' group learning performance', *Asia-Pacific Education Researcher*, 24 (1), 259–269. doi: 10.1007/s40299-014-0177-2

Thompson, R.B. and Thornton, B. (2014) 'Gender and theory of mind in preschoolers' group effort: evidence for timing differences behind children's earliest social loafing', *Journal of Social Psychology*, 154 (6), 475–479. doi: 10.1080/00224545.2014.933763

Todd, A.R., Seok, D.H., Kerr, N.L. and Messém L.A. (2006) 'Social Compensation: Fact or Social-Comparison Artifact'? *Group Processes & Intergroup Relations*, 9 (3), 431–442. doi: 10.1177/1368430206064643.

Vveinhardt, J. and Banikonyte, J. (2017) 'Prospects of development of the social group cohesion in reducing social loafing', *Organizacijų vadyba: sisteminiai tyrimai. (Management of Organizations: Systematic Research)*, 77 (1), 185–202. http://dx.doi.org/10.1515/mosr-2017-0011 [in Lithuanian].

Williams, K., Harkins, S. and Latané B. (1981) 'Identifiability as a Deterrent to Social Loafing: Two Cheering Experiments', *Journal of Personality and Social Psychology*, 40 (2), 303–311. doi: 0022-3514/81/4002-0303100.75.

Ying, X.Y., Li, H.H., Jiang, S., Peng, F. and Lin, Z.X. (2014) 'Group laziness: the effect of social loafing on group performance', *Social Behavior and Personality*, 42 (3), 465–471. doi: 10.2224/sbp.2014.42.3.465

Development and Validation of the Semi-Structured Interview Questionnaire of Congruence of Personal and Organizational Values

Jolita Vveinhardt, Professor, Ph.D., Faculty of Management Sciences, Vytautas Magnus University, Kaunas, Lithuania, jolita.vveinhardt@gmail.com

Evelina Gulbovaitė, Ph.D., Faculty of Management Sciences, Vytautas Magnus University, Kaunas, Lithuania, e.gulbovaite@gmail.com

Rizwan Raheem Ahmed, Professor, Ph.D., Faculty of Management Sciences, Indus University, Karachi, Pakistan, rizwanraheemahmed@gmail.com

Abstract

The dilemma of congruence of personal and organizational values prevailing in the studies fosters the new search for answers and ways to achieve the coherence of employees and the organization. The values congruence phenomenon is mostly investigated using quantitative approach. The quantitative employees' surveys help to identify the gap between particular values of employee and organization, however do not highlight the reasons for this gap. Personality psychologists affirm, analyzing values only based on quantitative methods is extremely difficult, because it is possible to measure only the individual reactions to them and to identify trends. The qualitative methods can reveal not only the visible and rationally perceived aspects of different reactions and assessments, but also deeper underlying approaches that influent the reasons of occurring trends. Qualitative research a method allows to reveal latent causes arising from different experiences and practices of organizations. In terms qualitative approach the phenomenon of values congruence is not widely investigated. In order to obtain the necessary qualitative information, which helps to look at the values congruence phenomenon in organization in deeper way, a comprehensive questionnaire of congruence of personal and organizational values is designed. The expert evaluation of the quality of content of a newly designed interview questionnaire was carried out. The validity of the content of the developed interview questionnaire in the qualitative and quantitative approaches was carried out, invoking the group of six experts. Data of the expert evaluation (assessments, comments, observations and suggestions) was rationally used to adjust and prepare the final interview questionnaire for congruence of personal and organizational values. The final version of the questionnaire on the basis of results of the expert evaluation is presented in this paper. Interviews with managers would allow identifying and properly interpreting the obtained results of quantitative research.

Keywords: personal values; organizational values; values congruence; semi-structured interview; expert evaluation; instrument validation.

Introduction

In recent decades, the interest in and an increasing number of studies on the topics of congruence of personal and organizational values were inspired by the perception of importance of this concept. Analysis of empirical research shows that value congruence is associated with positive influence both on the person and the organization. However, the studies in the academic literature are of empiric nature, and therefore the results and conclusions are formed on the basis of statistical data. However, there is a lack of qualitative research, which, combined with quantitative research, would allow to provide a more comprehensive view of why the congruence of personal and organizational values in practice of some organizations is strong, and what determines that the gap between the values of employees and the values of organization is formed in the practice of the other organizations. Interviews with managers would

allow identifying and properly interpreting the obtained results of quantitative research. However, in order to obtain the necessary qualitative information, a comprehensive questionnaire of congruence of personal and organizational values is necessary. Therefore, on the basis of the detailed analysis of scientific literature and topics related to the objective of value congruence in organizations, the interview questionnaire of congruence of personal and organizational values was designed. Expert evaluation was applied to substantiate the designed interview questionnaire, to identify its shortcomings and validity.

The research problem is raised by the question: what are the major drawbacks of the newly developed interview questionnaire of congruence of personal and organizational values, and how to ensure the quality of its content on the basis on the expert evaluation? The aim of the research is to carry out expert evaluation of the quality of content of a newly designed interview questionnaire of congruence of personal and organizational values, and to present the final version of the questionnaire on the basis of results of the expert evaluation. To achieve the aim of the research, the following objectives have been set: 1) to discuss the congruence of personal and organizational values in the theoretical aspect; 2) to carry out expert evaluation of the interview questionnaire of congruence of personal and organizational values; 3) to present the results of expert evaluation of the interview questionnaire of congruence of personal and organizational values; 4) to present the final version of the interview questionnaire of congruence of personal and organizational values. The study was carried out on the basis of the following research methods: analysis of academic literature based on its systematization, synthesis, generalization and comparison, expert evaluation.

The Importance of Congruence of Personal and Organizational Values for the Organization

The importance and stability of the values of the organization is the key to long-term success of the organization (Garza and Morgeson, 2012). It is wrong to believe that values are changing over time, and can easily be replaced in respect of certain changing circumstances by "new" ones, thus, easily adaptable, as organizations adapt to new changes in order to survive in the market (Bradley and Caldwell, 1999; Jin and Rounds, 2012). On the contrary, a feature of the strong organization is clear values, embedded not only in the codes, but also in behaviour and equally known to and understood/perceived by all members of the organization (Begley and Boyd, 2000; Suar and Khuntia, 2010; Garza and Morgeson, 2012; Bourne and Henkins, 2013). McDonald and Gandz (1994) describe a "healthy" organization as the one that successfully integrates its organizational values as a means to implement its plans. Therefore, the first step on purpose to base the activities on values is to identify fundamental values and describe what they mean for the organization in practical terms (Voss *et al.*, 2000). However, the fact that the values are articulated in the annual reports, strategic plans and/or the mission of the organization does not necessarily mean that they are reflected in the real behaviour. Organizational values become really prevailing ones only when they are internalized: realized by employees, they are complied with, and this is reflected in the behaviour (Johnson and Jackson, 2009). Therefore, the management must influence the values through variety of management mechanisms (Michailova and Minbaeva, 2012). As the organizations where executives failed to understand the importance of organizational values in their activities can expect numerous problems, including unnecessary formalism and procedures, buck-passing and avoidance of responsibility, extension of responsibility (is transferred to more members), concentration of power and wrong (restricted) selection (Deng *et al.*, 2016).

For organizations seeking to ensure compliance with their values (Adkins *et al.*, 1994; Suar and Khuntia, 2010), the search for the dialogue towards value congruence is becoming the aim of employees and the organization (Michailova and Minbaeva, 2012). In organizations, providing attention to management on the basis of values, there is a dilemma of how to seek and ensure the congruence of values of the organization and the employees. However, often the actions of organizations are incongruent with the values expressed by employees, or vice versa, as a result of which the conflict between the employee and the organization develops (Jehn, Thatcher and Chadwick, 1997; Jehn, Northcraft and Neale, 1999;

Verplanken, 2004; Fitzpatrick, 2007). In order to achieve strong value congruence at the organization-wide level rather than at the level of individual employees, organizations have to properly identify, describe, communicate and act on the basis of actual organizational values.

Analysis of academic literature shows that usually studies of a random sample or in the case of a particular organization, its groups are conducted (Edwards and Cable, 2009). However, each organization has its own organizational culture with a unique system of values, and therefore understands the significance, meaning and importance of values in different ways (Verplanken, 2004; Lok and Crawford, 2000). Even identical values, but declared by different organizations, can be expressed differently in behaviour of employees of different organizations or not expressed at all. Not comparing different organizations, such examples can also be detected on the level of the unit or units of international companies in different countries. Intercultural differences between employees of international organizations presuppose that even in the units of organizations located in different states, different organizational values, suited to this country and its culture, are set or formed purposefully (Seong and Kristof-Brown, 2012). Therefore, the question arises whether it can be stated that the results obtained are really representative of and proposals are recommended to apply in another organization? The dilemma of congruence of personal and organizational values prevailing in the studies fosters the new search for answers and ways to achieve the coherence of employees and the organization. However, nothing more than a practical touch may answer the questions of what the congruence or the gap between the values of the employee and the organization means for the organization. Therefore, the managers of every organization themselves or with the help of external consultants have to discover and identify why certain value gaps potentially occurred, what causes its increase in the congruence of certain personal and organizational values, and the lack of what measures or what wrong behaviour does not allow embedding the necessary values in the organization.

To achieve this aim, the interview questionnaire of congruence of personal and organizational values is developed. Interview questions for managers, were developed after a thorough analysis of academic literature on the phenomenon of value congruence in organizations and its problems. The structure of the instrument is developed in consideration of the object of the study and objectives of the research in the context of the full research of personal and organizational values, i.e., it is recommended to carry out the interview after identifying personal values and values prevailing in the organization subjectively evaluated by employees. The interview questionnaire, which consists of 8 categories of questions is designed to find out how an organization works with values in practice: what is the attitude of the leaders towards the values and their importance, value congruence in the organization, what actions of the formation, internalization, support of values have been carried out, in what ways values are supported and their uniformity is ensured in the organization, and how values influence the selection of employees. The questionnaire consists of 28 questions, which will facilitate the identification of specific organizational practices that will reveal, why the gap between the values of the employees and the organization occurs in organizations or the reasons of value congruence. On the basis of the results of the interview, it is possible to develop recommendations for reduction and/or elimination of the gap in congruence of personal and organizational values. As one can see from the categories and the questions assigned to them, it is assumed that the complex formation of values within the organization, ensuring the existence of not only formally declared, but also really existing values in the organization, must be consistently thoughtful and reasonable.

Organization of Expert Evaluation

Substantiation and provisions of the choice of the method of expert evaluation

Olson (2010) has empirically proven that experts see the problematic issues, which can reduce the quality of the research data, even if different experts have unequally evaluated them as problematic. Therefore, critical evaluation of the experts' recommendations could lead to elimination (Chaiyawat and Brown,

2000; Schilling *et al.*, 2007) or more detailed review of irrelevant questions. Experts rephrase or recommend a new wording for the question associated with the measured constructs, as well as suggest new questions (Tilden *et al.*, 1990; Hughes, 1998; etc.). Therefore, a more comprehensive suitability of the content of the instrument, determining its significance for the researched population, becomes the result of expert evaluation. Taking into account the advantages of the expert evaluation, the method to evaluate the newly developed interview questionnaire for research of congruence of personal and organizational values and verify the quality of its content has been selected: whether the categories of the questionnaire are distinguished and questions constituting the categories, evaluation of which can identify the congruence of personal and organizational values, match the object of study.

Logical Sequence of Expert Evaluation

The essence of expert evaluation is the specific problem analyzed by experts, with evaluation and formal processing of data. Congruence between expert opinions on the researched question and objectivity of their conclusions is determined. *Reliability* is ensured by professionalism of the researcher, validity of wording of the questions, the object of the research and professional experts. *Objectivity* of expert evaluation is ensured by the proper choice of professionals, organization of the survey, expert evaluation data processing, many logical and statistical procedures. Reliability and objectivity of expert evaluation of research are ensured in the following stages: the problem is raised, aims, limits of expert evaluation are provided; the standardized expert evaluation questionnaire has been prepared; experts have been selected, their competence is verified, the expert group has been formed; the survey of experts has been carried out and expert evaluations coordinated; information received has been formalized, the data has been processed, its analysis and interpretation of research results carried out.

Criteria for selection of experts

To ensure the scientific objectivity, there is a focus on the selection of criteria, as the persons capable of evaluating some feature, are not of equal competence. To ensure the quality of the results, qualified and independent experts were selected on the basis of the principles formulated for their selection. Finley *et al.* (2003) argues that the expert group should consist of experts from different fields, selected on the basis of their competencies in the researched field, interested in the question of research from the practical point of view, and none of the experts should contribute to the desired conclusions of the research. Therefore, competent persons having special knowledge, experience and knowing the area directly related to the object of the expert evaluation, thus, able to properly evaluate the research instrument, were selected as experts. The following criteria of expert competence were applied: academic degree, position, area of research interests, academic, and practical experience. The experts participating in the expert evaluation were supposed to have conducted research related to the employees' values in organizations. The phenomenon of congruence of personal and organizational values in accordance with its object of study is of interdisciplinary character. This approach presupposed the use of different perspectives of social sciences, so the scientists whose research interests are organizational behaviour, organizational culture, organizational psychology, human resource management, and who could provide the necessary high-quality information on the evaluated object, its features and functioning, were chosen as experts.

Sample of experts

The group of experts must ensure the completeness and reliability of the information received, the opportunity to verify it and validate statistically, therefore, the accuracy of expert group evaluation, which depends on the size of the group of experts, is very important. According to Lynn (1986), the minimum number of experts is 5, however, Podvezko (2008) argues that in order to achieve credible and objective results, 6–9 specialists in the specific area have to be interviewed. After selection of potential experts in accordance with the established selection criteria, 27 requests inviting to participate in the expert

evaluation have been sent by email, however, 6 experts agreed to participate in the research. To ensure the anonymity of experts, the names and surnames of the experts are not published, but the characteristics of the experts who participated in the study are presented: academic degree, pedagogical title, area and field of science, areas of research interests, scientific and/or practical experience. The expert group consisted of experts with an average of about 15 years of academic experience in the area of human resource management, whose areas of research interest are human resource management, and the scientists who participated in the research have published scientific papers on the topics of analysis of organizational values. Thus, the available competence and work experience of persons selected for evaluation allows treating them as experts of evaluation of the phenomenon of congruence of personal and organizational values.

Method of the Research

MacCarthy and Atthirawong (2003) argue that the experts must not affect one another's opinion, therefore, the active individual survey in writing by correspondence, which provides an opportunity to involve experts regardless of their place of residence and workplace, has been chosen as the method of expert evaluation. Questionnaires were sent to the experts personally by email, so they did not know the identity of other experts involved in the expert evaluation and did not have mutual contacts, it is therefore considered that the experts did not have any influence on each other's opinions.

Results of the Expert Evaluation

Analysis of the quantitative expert evaluation

In order to determine the compatibility of the expert opinions in respect of questions of the questionnaire, the averages of total estimates of expert evaluations, which show how much the question is appropriate for the category and meaningful to the developed questionnaire, were calculated. The summary of indicators of expert evaluation of the interview questionnaire is presented in Table 1.

Table 1: Summary of indicators of expert evaluation of the interview questionnaire

	Questions	E1	E2	E3	E4	E5	E6	Average
Relevant information about the organization	How would you briefly present the organization you manage?	4	3	5	4	3	2	3.50
	How long does the organization exist on the market?	3	3	5	4	3	2	3.33
The attitude of the executives to values, their relevance to the organization	What are the values of your organization?	5	5	5	5	4	5	4.83
	What are the benefits of the current system of values to the organization?	4	5	5	5	5	1	4.17
	Who are the values of your organization designed for?	4	5	4	5	5	3	4.33
Value congruence	Do you think that formally declared values are identical with the values actually prevailing in the organization?	5	3	5	5	5	4	4.50
	Do you think that organizational values are acceptable to the majority of the employees of the organization?	5	3	5	5	5	4	4.50
Formation, internalization of values	In what way were the organizational values formed?	5	5	5	4	5	4	4.67
	Who participated in the identification	5	5	5	5	5	5	5.00

	Questions	E1	E2	E3	E4	E5	E6	Average
	of values?							
	What principles did you refer to when shaping specific values?	5	5	5	5	5	3	4.67
	How are the values formalized in the organization?	4	5	5	5	5	3	4.50
	How did you communicate the values to the employees?	4	5	5	5	5	3	4.50
Integrity of values	Are values the same for everyone: both for employees and managers?	5	5	5	5	5	3	4.67
	Do both employees and managers comply with the same values?	5	5	5	5	5	4	4.83
	How do you behave with those employees who do not accept organizational values?	4	5	5	5	5	5	4.83
Reflection of values in practice of the organization	What real work examples reflect organizational values?	3	5	5	3	5	4	4.17
	How are organizational values recognizable in employees' daily activities?	5	5	5	5	5	5	5.00
	How long did it take you to understand that the organization actually works in accordance with the desired organizational values?	3	3	5	5	5	5	4.33
Actions to support congruence	In what ways are organizational values supported?	5	5	5	5	5	5	5.00
	Who is responsible for the maintenance of values in the organization?	5	5	5	3	5	5	4.67
	How is monitoring of values carried out in the organization?	2	5	5	5	5	5	4.50
	How often do you evaluate the declared and actually prevailing organizational values? Who is responsible?	5	5	5	4	5	4	4.67
	What action do you take if you notice the gap between the values of the employees and the organization?	3	5	5	4	5	5	4.50
	How would you accept the idea to change the values by new ones, if existing values are not acceptable to most members of the organization?	5	3	5	5	5	4	4.50
The role of values in staffing	What is the principle of selection of new employees?	5	3	5	5	5	4	4.50
	Does the value system of employees have any influence during the selection of employees?	5	3	5	5	5	4	4.50
	How do you find out what the values of the applicants are?	5	3	5	5	5	5	4.67
	How do you socialize a new employee and make him/her familiar with the values?	5	5	5	5	5	4	4.83

Source: own

The experts evaluated the questionnaire on a five-point scale, where they were asked to evaluate and write the approval of the submitted questions from 1 – "I disagree that this question is suitable to disclose the analysed problem" to 5 – "I agree that this question is suitable to disclose the analysed problem". When calculating the average of total estimates, the estimates of each expert for the question were summarized and the average estimate was calculated. The averages of total estimates of expert evaluations that range from 3.33 to 5 indicate that some of the questions in the questionnaire should be re viewed. The analysis of the averages shows that there is low level of experts' approval to the questions as suitable for the category of *relevant information about the organization*, in which both questions were evaluated as partly suitable for the formed category or for the questionnaire. The average of the question "*How would you briefly present the organization you manage?"* is 3.5, and the average of the question "*How long does the organization exist on the market?"* are 3.33. All the other items in the questionnaire have received high experts' approval (from 4.17 to 5). A more detailed analysis of the experts' comments will allow identifying the reasons of why some of the questions received lower approval to the appropriateness for the analysed problem.

Analysis of The Qualitative Expert Evaluation

It was planned in advance that each participant of the interview will provide the subjective personal opinion, however, it will be analyzed only in the context of the object of the research. Comments, observations and suggestions made by the experts for each category of the questionnaire and its questions have been analysed.

Category of questions "***Relevant information about the organization"***, most experts made comments on the abstractness of the question "*How would you briefly present the organization you manage?"* E2 argued that first of all it was not clear what "briefly" meant, in addition the expert noted that it might be difficult to summarise a variety of answers to the question. According to E4, this question is dangerous, as the informants themselves can define criteria for presentation, what means that they will focus on different priorities, which can be unnamed and therefore one will have to speculate whether this is a bad thing. In the opinion of E6, this question lacks clarity, therefore, the answers may be very different, and useful information will hardly be provided, since it is likely that area of activities of the company, origin and the size of the capital, and other publicly available information will be stated in the responses, thus the expert suggests to evaluate the usefulness of the question critically or reassess its wording. According to E1, the question "*How long does the organization exist on the market?"* is not quite clear, it is difficult to understand what is intended to diagnose by this question, since it is the actual information that is publicly available, however, according to the expert, it is the right question to start the interview. E2 notes that it is a supporting question for data analysis, but not for revealing the subject. E6 agreed with the comments made by other experts stating that information about the year of foundation of the company is publicly available and, therefore, suggested to reject it, but if the question was left, the expert recommended a more precise wording – in which year was the organization established/started operations, or similar. Taking into account the experts' comments and the averages of evaluation for this category of questions, relevant information about the organization was eliminated from the interview questionnaire, as factual information will be analysed in advance during preparation for the interview with the head of the certain organization.

Category of questions, "***The attitude of the executives to values, their relevance to the organization"***. The question "*What are the values of your organization?"* received the maximum scores by the experts. This shows that the item is suitable for the category. However, to clarify the question, the additional question "*Are they formalized?"* will be asked. E4 pointed out that the question "*What are the benefits of the current system of values to the organization?"* is dangerous, as declarative statements can be provided. In the opinion of E5, the concepts of *values* and *benefits* should not be compared. Therefore, the expert suggests inquiring about their importance to the organization, or asking how they help pursue the aims, i.e. contributes to the achievements. E1 advises to unify the concepts, as the concept of *values* is

used in some questions, and the *system of values* is used in other questions. On the basis of the experts' comments, the wording of the question was corrected as follows: "*What is the importance/purpose of existing values for the organization?"* The question "*Who are the values of your organization designed for?"* according to E3, is similar to the previous question. E6 thinks that the wording of the question is unclear and asks whether it is intended to ask who (what stakeholders) are the values oriented to, or for what purpose they are selected. On the basis of experts' comments, the question was revised to "*What stakeholders are the values of your organization oriented to?"* According to E5, the evaluated category does not reflect the questions, therefore, the expert proposes to rename the category to "General information about values", and if the existing category was left, the questions should be reconsidered. Taking into account the logical comment of the expert, the category "*The attitude of the executives to values, their relevance to the organization* was renamed to *General questions about organizational values"*.

Category of questions ***Value congruence***. The question "*Do you think that formally declared values are identical with the values actually prevailing in the organization?"* according to E4 is very good. However, E1 notes that perhaps firstly there should be the question whether values in general are described formally. According to E2, the executive's answer to the question would be "yes" or "no" because of the wording of the question, so the expert suggests to formulate the question as follows: to what extent/percentage do they coincide? If a 100 per cent responded, the answer would be "yes". However, the expert notes that it would be appropriate to leave the current wording only if the aim is to receive a "yes/no" answer. E6 assures that the question is important, however, the expert, as well as E2 offers to correct the wording as follows: *To what extent / how much are the declared values identical with the values actually prevailing in the organization?* In addition, E2 offers to add the specifying question "*Why do you think so?"* On the basis of the experts' comments, the wording of the question was adjusted as follows: "*How much/to what extent are formal values identical with the values actually prevailing in the organization?"* and the specifying question "*Why do you think so?" was* added. When evaluating the question "*Do you think that organizational values are acceptable to the majority of the employees of the organization?"* E6 recommends changing the wording by concretizing the question. E1 considers that maybe it should be asked not only whether the values are acceptable, but are they followed. According to E2, there are several values, so if some are acceptable, and the others are not, how to answer this question? The authors agree with this comment, however, there were some doubts on the questions of extent / amount / degree / percentage reasoning, as they are quantitative terms, therefore, it was decided to retain the wording that is posed by the question "to what extent", since it is more abstract and more distant from the quantitative measurement. On the basis of expert comments the question was corrected to "*To what extent/amount/degree/percentage do the employees of the organization comply with organizational values?"*

Category of questions ***Formation, internalization of values***. When evaluating the question "*In what way were the organizational values formed?"* E4 emphasises that the question is good, but the "way" can be understood differently, and in this case, it remains a mystery, i.e., what the informant was oriented to. According to E6, it should be clarified, what values are meant – formal or real. On the basis of the experts' comments, the question was concretized as follows "*How were organizational values formed?"* The question "*Who participated in the identification of values?"* has received the maximum amount of expert evaluation, only E6 noted that "identification" is not the right word. The question "*What principles did you refer to when shaping specific values?"* according to E6 basically repeats the question presented above "*How were organizational values formed?*" On the basis of the expert's remark and corrections carried out for the mentioned question, aiming at cohesion of questions, it was decided to remove it from the interview questionnaire. E4 evaluates the question *"How are the values formalized in the organization?"* positively and points out that it is a good question. E3 argues that the word "formalized" can be unclear, E6 stresses that the wording of the question is unclear and specifies whether it means what was done after the organization has chosen values or in what documents they are written. Taking into account the experts' comments, the question was corrected as follows: *In what documents were the*

formed values formalized in the organization? E4 pointed out that the past tense in the question "*How did you communicate the values to the employees?"* is not appropriate. E6 partly repeats this comment arguing that the wording of the question is unclear: whether it is intended to find out what was done after the values were chosen and how they were communicated to the current employees, or how new employees are familiarized with the values. Taking into account the experts' comments, the question was corrected as "*How were the formed values communicated to the current employees?"*

Category of questions ***Integrity of values***. When evaluating the question "*Are values the same for everyone: both for employees and managers?"* E4 recommends rather asking by what (what kind of behaviour, what behavioural manifestations) it is shown. In other words, what makes them think so? According to E6, the wording of the question is unclear: do you want to learn about formal values (they are the same by default), or about real values? On the basis of experts' comments, the item was adjusted, as "*What manifestations of behaviour show that values are the same for all the employees?"* The question *Do both employees and managers comply with the same values?"* According to E1, perhaps it would be appropriate to ask whether it is required to comply with them equally. E4 is trying to find out on the basis of what they can evaluate it. Considering the experts' comments, the question has been adjusted to "*To what extent do employees and managers comply with the same values*?" and asked earlier than the latter in the questionnaire. When evaluating the question "*How do you behave with those employees who do not accept organizational values?"* E1 offers to change the words *do not accept* to *do not comply*. E4 pointed out that there is some doubt as to whether a leader of authoritarian type will respond honestly, so this may be just a declaratory, conventional answer. On the basis of the experts' comments, the question has been corrected to "*How are the employees who do not accept organizational values treated?"*

Category of questions ***Reflection of values in practice of the organization***. Question, "*What real work examples reflect organizational values?"* E1 thinks that this is quite a broad question, so it should be concretized, depending on the situation, in accordance with the values of the organization presented by the manager. According to E4 and E6, the question is good, but the wording of the question is unclear. On the basis of the experts' comments, the question has been deleted because of its unclear wording and another basically very similar question in this category of questions. The question "*How are organizational values recognizable in employees' daily activities?"* has received the maximum approval of experts and has not received any specifying comments from any expert. According to E1, it is unclear what is intended to find out by the question "*How long did it take you to understand that the organization actually works in accordance with the desired organizational values?"* because possibly they do not follow values within the organization by now. E2 had a question, is it really intended to assess the duration of understanding? The duration of understanding may differ from the real duration of application, so the expert offers to change it to: "*How quickly did the organization start work in accordance with the values implemented?"* On the basis of recommendations of E4, the question, which would identify how long it took to understand that an organization is not actually working in accordance with the organizational values, is also required. On the basis of the comments of both experts, an additional question "*How much does the organization actually work in accordance with the desired organizational values"*, was included and in accordance with the experts' proposal, the question was concretized as follows: "*How quickly did the organization start work in accordance with the values implemented?"*

Category of questions "***Actions to support congruence"***. The question "*In what ways are organizational values supported?"* received the maximum approval of experts, and no comments in respect of the item were expressed. According to E4, the question "*Who is responsible for the maintenance of values in the organization?"* is interesting, but it provokes a response that there has to be one person, at least a part of informants can focus on this. In the opinion of E1, the question "*How is monitoring of values carried out in the organization?"* is unclear. E4 had some doubts about the question "*How often do you evaluate the declared and actually prevailing organizational values? Who is responsible?"* whether it will be asked how it is done? E6 offers to unify the terminology, as the terms *declared, formal, desired, existing values*

are used. Based on the expert's observation, the terms in the entire questionnaire have been reviewed repeatedly and only those terms that would be the most understandable for everyone have been selected and unified in the questionnaire. According to the authors, there are differences in terminology, so the different terms were used purposefully. The declared values are those that are declared and most likely they are not followed, and the management possibly does not care about it. The desired values are those wanted by the management (this adjective is more positive than the "declared"), but if the management wants, then not all is lost with the organization. The term "current values" simply states the fact that these values exist, but it is unclear whether they follow them, or just want to follow, they merely exist values. Considering the experts' criticism, the question was revised to "*How often do you evaluate the declared and actually prevailing organizational values? Who is responsible? How is it done?"* According to E4, the question "*What action do you take if you notice the gap between the values of the employees and the organization?"* is really good, but usually these questions are not responded openly, the response is oriented to what it should be, or to how it would be good. According to E2, the question "*How would you accept the idea to change the values by new ones, if existing values are not acceptable to most members of the organization?"* is ambiguous. On the one hand, one can respond about the procedures, "what would I do if", on the other hand, one can reply "I would evaluate it favourably, unfavourably, it depends on who offers". In the opinion of E4, the easiest answer to the question is "favourably". And then it is unclear what lies behind it. According to E6, the wording of the question is somewhat unclear. Do you want to ask, what would encourage? The question was revised to "*What would encourage changing the existing values by new ones, if the existing values are not acceptable to most members of the organization?"*

Category of questions "***The role of values in staffing"***. The question "*What is the principle of selection of new employees?"* according to E2, is a supporting questioned for the analysed topic, as there is nothing about values. The expert also asks, whether the word *principle* is really right, or it is intended to find out about the procedures? According to E6 it is also better to ask not about on the basis of what principle, but about the criteria and who selects new employees. On the basis of the observations made by the experts, the question was eliminated from the category "The role of values in staffing". When evaluating the question "*Does the value system of employees have any influence during the selection of employees?"* E1 clarifies whether it is the "values" or "value system". According to E2, this is a closed-type question. The expert also asks if it is really necessary. E6 suggests to change *does* to *how much*. The question has been corrected to "*How much do employees' personal values influence the selection of employees?"* The question "*How do you find out what the values of the applicants are?"* has raised some doubts to E2. The expert considers whether the researchers will really be satisfied with the answers that they will ask about it, or will watch the applicant's behaviour during the interview. Therefore, according to E2, it may be important to clarify not only what the values are, but also the congruence with existing values of the organization. On the basis of the observations made by the experts, the wording of the question was corrected to the following: "*How do you find out the match of the applicants with the existing organizational values?"* According to E4, the question "*How do you socialize a new employee and make him/her familiar with the values?"* is a very good question, because usually a new person is left to the mercy of fate, according to the principle: if he survives, then he deserves it. In E6 opinion, socialization and familiarization with values are two separate and quite broad questions. Therefore, taking into account the experts' comments, the question is abbreviated to: "*How are new employees familiarized with organizational values?"*

General Experts' Comments after Filling in the Expert Evaluation Form

According to E2, closed questions during the interview are rarely used, therefore they recommend to think about all general questions starting by "do", "does", "are", since otherwise, according to E2, it is probably easier to give the questionnaire and not to conduct the interview. E4 also suggests avoiding the questions you can answer "yes" or "no". The remark of these experts was taken into account and the questions were corrected in order to avoid "yes" or "no" answer. E1 argues that when evaluating the

questions there was the impression that the two things are intertwined: the compliance of employees with organizational values and congruence between the values of the employees and the organization. Some questions are more about how much the values are complied with, some about how much the values of employees and the organization are similar. To E1 it is unclear; therefore, E1 wants some concreteness. However, it should be emphasized that the interview with the leaders of organizations is an integral part of the research of congruence of personal and organizational values. The quantitative research, during which employees of organizations are surveyed, evaluates what the values of the employees are, what the prevailing values of the organization are, and how much congruent they are. The approach to the phenomenon of value congruence in the organization that gives the results is possible only by complex analysis of the phenomenon, i.e., taking into account both the employees' values and the values within the organization, thus these aspects should not be bypassed. The aim is to look at the phenomenon of value congruence from the perspectives of both subjects: the organization and the employee, therefore, both the congruence which is more evaluated from the employee's perspective, and compliance with organizational values, which is evaluated from organizational perspective, in case of the interview, the manager's perspective, are analyzed.

E2 voiced a number of considerations on what is intended to measure by specific questions: whether they are procedures or analysis of specific responsibilities or opinion, or something else. The expert did not comprehend which model was followed when arranging the questions from the wording of the questions. For example, why there are questions about the selection, socialization, but there are no questions about training, performance evaluation, if the personnel subsystem is taken. According to E2, the researchers have perfectly mastered E. Schein's concept of organizational culture, therefore, it is recommended to cover a wider context of values, including details about the artefacts. E2 also argues that the preliminary interview that would show whether we obtain the desired information, i.e. whether the informants understand the questions as expected, should help much more. E5 argues that the questions are good, but like E2 states that the pilot research, i.e. research of 3-5 informants, would be necessary to understand the diversity of responses, received during the interview and to clarify the questions. It was refused to cover a wider context of values in the research, as it is focused on congruence of personal and organizational values and strengthening of the congruence in the organization. Therefore, the important details that are contextually related with the values in the organization will be naturally highlighted during the interview with the head of the organization.

E4 explicitly said that he filled in the evaluation form as a practitioner, because he had established two state institutions and is the head of one it, which has just been established. E4 argues that it was interesting to read the questions and think about how he would answer himself, so he thanked for the invitation to participate in the expert evaluation. In addition, the author emphasises that in order to maintain the consistent logic of the research, during the interview the managers are firstly asked about values of the organization, and later, when questions about formalization of values are available – about organizational values. It is assumed that if the managers purposefully formed the values of the organization, then we have to ask about organizational values, but if the values were not formed purposefully – then it will be asked about the values of the organization, thus, avoiding confusion, as neither organizations, nor organizational values are bypassed when researching the values.

Conclusions

The research was carried out on purpose to verify the validity of the content of the developed interview questionnaire in the qualitative and quantitative approaches, invoking the group of six experts. Qualitative analysis of the experts' comments helped to identify the reasons of the questions evaluated by low scores during the quantitative analysis and problematic questions. Data of the expert evaluation (assessments, comments, observations and suggestions) was rationally used to adjust and prepare the final interview questionnaire for congruence of personal and organizational values. Taking into account the results of the analysis of the content of the questionnaire, the wording of the questions, which raised uncertainty, was

revised; some questions that overlapped or did not match the specific category of questions were eliminated. The questionnaire was also supplemented by several specifying questions. After correction of the interview questionnaire of personal values and organizational values, the number of categories decreased from 8 to 6, and the number of questions in them has changed from 28 to 23. After the detailed analysis of the results of the expert evaluation, taking into account the averages of estimates of the items and in particular focusing on the experts' comments for each category and the questions of which they are composed, the questionnaire has been adjusted and prepared for the research. It is recommended to apply the questionnaire for qualitative research of congruence of personal and organizational values in organizations. The questionnaire will help find out how an organization works with the values in practice, as well as identify the possible causes of the gap between publicly declared values and their application in practical activities of the organization and thus to develop guidelines for reduction and/or elimination of the gap in congruence of personal and organizational values.

References

Adkins, CL., Russell, CJ. and Werbel, JD. (1994) 'Judgments of Fit in the Selection Process: The Role of Work Value Congruence,' *Personnel Psychology*, 47 (3), 605–623.

Begley, TM. and Boyd DP. (2000) 'Articulating corporate values through human resource policies,' *Business Horizons*, July-August, 8-12.

Bourne, H. and Jenkins, M. (2013) 'Organizational values: A dynamic perspective,' *Organization Studies,* 34 (4), 495–514.

Bradley, RA. and Craig, BC. (1999) 'Understanding Research on Values in Business A Level of Analysis Framework,' *Business and Society*, 38 (3), 326–387.

Chaiyawat, W. and Brown, J. (2000) 'Psychometric Properties of the Thai versions of State-Trait anxiety inventory for children and child medical fear scale,' *Research in Nursing and Health,* 23 (5), 406–414.

Deng, H., Wu, Ch., Leung, K. and Guan, Y. (2016) 'Depletion from Self-Regulation: A Resource-based Account of the Effect of Value Incongruence,' *Personnel Psychology*, 69 (2), 431–465.

Edwards, JR. and Cable, DM. (2009) 'The Value of Value Congruence,' *Journal of Applied Psychology*, 94 (3), 654–677.

Finley, BL., Iannuzzi, TJ., Wilson, ND., Kinnell, JC., Craven, VA., Lemeshow, S., *et al.* (2003) 'The Passaic River Creevangler Survey: Expert Panel Review, Findings, and Recommendations,' *Human and Ecological Risk Assessment,* 9 (3), 829–855.

Fitzpatrick, RL. (2007) 'A literature review exploring values alignment as a proactive approach to conflict management,' *International Journal of Conflict Management,* 18 (3), 280–305.

Garza, AS. and Morgeson, FP. (2012) 'Exploring the link between organizational values and human resource certification,' *Human Resource Management Review*, 22 (4), 271–278.

Hughes, L. (1998) 'Development of an instrument to measure caring peer group interactions. *Journal of Nursing Education*, 37 (5), 202–207.

Johnson, RE. and Jackson, EM. (2009) 'Appeal of organizational values is in the eye of the beholder: The moderating role of employee identity,' *Journal of Occupational and Organizational Psychology*, 82 (4), 915–933.

Jehn, K. A., Chadwick, C. and Sherry Thatcher, S. (1997) 'To agree or not to agree: diversity, conflict, and group outcomes,' *International Journal of Conflict Management*, 8 (4), 287–306.

Jehn, K., Northcraft, G. and Neale, M. (1999) 'Why differences make a difference: A field study of diversity, conflict, and performance in workgroups,' *Administrative Science Quarterly,* 44 (4), 741–763.

Jin, J. and Rounds, J. (2012) 'Stability and change in work values: A meta-analysis of longitudinal studies,' *Journal of Vocational Behavior,* 80 (2), 326–339.

Lynn, M. R. (1986) 'Determination and quantification of content validity,' *Nursing Research*, 35 (6), 382–385.

Lok, P. and Crawford, J. (2000) 'Antecedents of organizational commitment and the mediating role of job satisfaction,' *Journal of Managerial Psychology,* 16 (8), 594–613.

MacCarthy, BL. and Atthirawong, W. (2003) 'Factors Affecting Location Decisions in International Operations – a Delphi Study,' *International Journal of Operations and Production Management,* 23 (7), 794–818.

McDonald, P. and Gandz, J. (1994) 'Getting Value from Shared Values,' *Organizational Dynamics*, 20 (3), 64–77.

Michailova, S. and Minbaeva, DB. (2012) 'Organizational values and knowledge sharing in multinational corporations: The Danisco case,' *International Business Review,* 21 (1), 59–70.

Olson, K. (2010) 'An Examination of Questionnaire Evaluation by Expert Reviewers,' *Field Methods,* 22(4), 295–318.

Podvezko, V. (2008) 'Comprehensive evaluation of complex quantities,' *Business Theory and Practice*, 9 (3), 160–168.

Schilling, LS., Dixon, JK., Knafl, KA., Grey, M., Ives, B. and Lynn, M. R. (2007) 'Determining content validity of a self-report instrument for adolescents using a heterogeneous expert panel,' *Nursing Research*, 56 (5), 361–366.

Seong, JY. and Kristof–Brown, AL. (2012) 'Testing multidimensional models of person–group fit,' *Journal of Managerial Psychology,* 27 (6), 536–556.

Suar, D. and Khuntia, R. (2010) 'Influence of Personal Values and Value Congruence on Unethical Practices and Work Behavior,' *Journal of Business Ethics,* 97(3), 443–460.

Tilden, V., Nelson, C. and May, B. (1990) 'Use of Qualitative Methods to Enhance Content Validity,' *Nursing Research*, 39(3), 172–175.

Verplanken, B. (2004) 'Value Congruence and Job Satisfaction among Nurses: A Human Relations Perspective,' *International Journal of Nursing Studies*, 41(6), 599–605.

Voss, GB., Cable, DM. and Voss, Z. G. (2000) 'Linking organizational values to relationships with external constituents: A study of non-profit professional theatres,' *Organization Science,* 11(3), 330–347.

Interpersonal relationship in the process of educating on The example of University of the Defence in Brno

Edyta Ślachcińska, Faculty of Finance and Banking WSB University in Poznan, Poznan, Poland, edyta.slachcinska@wsb.poznan.pl
Ilona Ziemkiewicz-Gawlik, Faculty of Finance and Banking WSB University in Poznan, Poznan, Poland, ilona.ziemkiewicz-gawlik@wsb.poznan.pl
Radomir Saliger, University of Defence in Brno, Brno, Czech Republic, radomir.saliger@unob.cz

Abstract

The article refers to the research conducted at University of Defence in Brno among students of the sixth semester of undergraduate degree. The purpose of the research was to establish whether the occurring interpersonal relationship at the college is a part of the education quality system.

Keywords: relations, interpersonal relationship, quality of education, CRM.

Introduction

Interpersonal relationships which occur between employees and students at colleges, play an important role. They are being built in three interweaving areas (unit, organization, and customer). Developing skills in these areas contributes to increased work efficiency for both individuals and the entire team, and this translates into improved performance.
The concept of interpersonal relation occurring in literature concerns persons and groups and mutual abilities which these entities are able to provide into the area of bilateral cooperation as part of everyday functioning in given areas. Human relationships in the marketing term constitute the extension of the role played by a customer service and associate it with quality improvements. The essence of marketing based on relations focuses on two destinations – acquiring the clients and then on keeping them (Christopher, Payne and Ballantyne 1991:4). An every company should make employees aware of the essence of a positive customer approach. The loyalty of the staff may be the cause of the company's advantage over its competitors. An employee is one of the factors that determine the purchase of a product or service (Kowalska, Olszańska, Urban 2016:237).

Mutual interactions of groups of teachers and students and relations within these groups often decide about the college character and its perception by the external environment.

The concept of mutual relations, in social psychology and sociology is determined as the complicated sequence of diverse behaviors, manners of the intercommunication, mutual awarding and punishing social in the context of performed social roles. Positive interactions require a proper communicating with other people, affecting them, which means interpersonal abilities (Jasiulewicz-Kaczmarek, Szwedzka 2016:267-271). This type of abilities are manners of dealing with other people which supports construction of mutually accepted connections. They contribute to the development of the involved people and the realization of their aims.

To the main goals of the college development belong: creating an atmosphere conducive to solve the problems and built of trust amongst employees, the improvement and the increase in the efficiency of the college and the forming of the attitude of the willingness to implementing the changes. The development of the college is conditioned with many factors such as (Kuźma 2000:125):

- determining the current problems;
- producing motivation for implementing changes;
- seeking ways of solving these problems;
- planning action;
- making observation of changes;
- evaluation of the implemented change and further forecasts.

Relations occurring at the university

Relations play the particular role in services (Jasiulewicz-Kaczmarek, Saniuk 2015:444-455). It results from character of services which are a process, last in the time, and which are composed of many different interactions comprising the relation. Certainly it is possible to state, that the service has a form of the relational structure (Rogoziński 2006:14). In the context of professional services the relation between the professional (academic), and customer (student) is being defined as ,,constant interactions between them lasting in the time" (Ibidem:18).

The concept of relation is used in literature from the scope of management studies in very different contexts and meanings. It is possible to find basics of using this notion in the history of economics. According to K. Marks an exchange of goods expresses the connection between individual producers via the market (Lange 1974:25). The notion relation comes from the Latin word relation which means relationship, reference, contact, account and ,,occurring relation between people or social groups" (Bralczyk 2005:701). In Polish language the notion relation is understood as every connection, interdependence relationship, etc. between elements, objects or processes (Kulikowski 1981:440), as ,,relationship occurring between objects, notions, sizes, etc." (Encyklopedia Popularna PWN 1982:656), ,,relation occurring between people or social groups" (www.sjp.pwn.pl) or ,,relation between something and something" (Słownik wyrazów obcych 2002:506). J. Otto is defining the relation, as ,,long-lasting and developing process which is a result of the earlier individual transaction, favorable for mutually advantageous, repeated buys". At the macro level these are relations occurring between the company and different market subjects so as: government, suppliers, consumers, intermediaries. On the other hand, on the micro level these are relations between the organization and the customer.

R.W. Griffin claims that, ,,an organization is a group of people working together in structured and coordinated fashion to achieve a set of goals" (Griffin 2007:5). Every college is an organization which functions according to widely accepted norms and principles described in the management literature. The functioning of a university as an organization is subject to continuous processes and the influence of internal and external factors, but the sense of existence of each such organization is one and consists in the fact that it is necessary for the society. Fulfilling this function requires forming determined social environment compound of employees (administration and teachers), but also of establishing and describing the strategic objectives of the organization. The college as the organization should be responsible for the quality and the way of fulfilling social functions (Drucker 2001:34-35).

Relations occurring in the college characterise a group of teachers and students. They are defined as the bonds between parties developed in the course of a long process, on the basis of which a number of different factors are commonly created by the value that both sides derive benefits from. In the case of the college every of relations has a different character and a different degree of the intensity. Relations with employers or government subjects will have a different character, and other with students. This process is prolonged, therefore the college, according to the chosen strategy, should make decision, which relations in her case are worth of investing its available resources and to which level it is worth to invest in it.

Amongst the relation with different partners on the market relations with customers attract the particular attention. Through its creating it is possible to reach its competitive advantage. In reference to R.A. Coulter and M. Ligas „as long as the customer - student is pleased with the service which he receives, there's a higher probability that employing him will grow and interactions will be continued" (Coulter and Ligas 2004: 483). S.U. Yang and J.E. Grunig defined relations between students and college as „interdependence between students and the university, and consequences of this interdependence" (Yang, Alessandri and Kinsey 2008:149).

The essence of relations management

Relations should be created and managed in full awareness. However, creating a relationship does not depend solely on the university, because any action taken by the university will not produce the expected result if the partners in its surroundings do not want to engage in it. In this case the customer is picking up a decision, whether wants to become involved into the relation with the organization. In many cases, may not have such will (Gronroos 2006:402). To reach the relation effort of two sides is needed. On the competitive market of education services a college is responsible for creating and improving the relation.

The relations management with the customer is one of concepts which for a few years is a substantial issue in an academic publications and the business practice. In the last decade, it has been a time of significant changes in the global market, driven by increasing competition, globalization, rising customer expectations from growing awareness and new technologies (Buchnowska 2006:13-14). In a changing environment, one of the most valuable assets of every business becomes the customer and knowledge of it (Orzelska 2010:229). A company is built by customers, its condition depends on behaviours of customers, and therefore everything begins and finish with a client (Lisiecka 2006:46-55). Thanks to the individually selected offer and additional appropriate conditions the customer can become not only a buyer, but, in the longer temporary horizon, a partner also. The management should be focused on the customer, on creating the value of the customer and values for the customer (Skrzypek 2006: 90-99).

It is imperative to change the approach of „mass" traditional marketing to the full range of company-customer relationships. A customer relationship management is a business strategy that builds customer loyalty to the company /brand by developing long-term, mutually beneficial relationships using the latest information technology (Deszczyński and Deszczyński 2011:19).

Customer Relationship Management (CRM) strategy is one of the methods of the consumer relationship management. This approach is based on a partnership and widening connections of both sides - that is of marketing of the relation, which supplemented with technical solutions a CRM constitutes the base for development (Deszczyński 2011:19). According to J. Otto, CRM is mainly determined by the strategy of the business, in which the customer is the center of attention (Otto 2004:27). The CRM is based on a belief that „gaining new clients is repeatedly more expensive than supporting loyal buyers" (Fonfara

1999:104), therefore the CRM strategy enables recruiting loyal customers, guaranteeing demand, satisfying turnovers, and in the more distant temporary perspective is contributing to the development of the enterprise, among other things by consolidating the market position.

Institutions focused on their development should keep permanent relations with customers not only through the alteration of provided services and the improvement in their quality, but also through creating the appropriate atmosphere so that they want to come back to this institution or to recommend her services other. A crucial thing is meeting the expectations of the target customer, even being up to such expectations, and then establishing such relations so that they still want to cooperate with the institution and recommended it to other. The basis of marketing partner is „moving the centre of gravity from the completion of individual transactions with the customer for building long-lasting relations with the customer in order to hold it in a long stretch" (Gordon 2001:123-124).

Marketing of higher education services is a process creating and managing the knowledge transfer through building the partner relations with customers in order to accomplish quality requirements on the market amongst students and the aspiration to getting the societal acceptance and satisfaction of the very organization. Colleges should incessantly concentrate their attention on customers and aspire for supporting them as long as possible. In the specialized literature it is emphasized that the partnership should not concern an exclusive of partners and be focused on getting the new ones who can bring the determined intrinsic value in from a point of view of the subsequent development for the producer of education services.



Fig. 1: ***Interrelations between quality, customer service and marketing***
(Source: Payne A. (1996), *Marketing usług*, PWE, Warszawa, 261)

Close cooperation and partnerships enhance the university's competitiveness and build student confidence. Additional benefits for higher education institutions are the recommendation from the customer-student. She is gaining a particular importance when the customer is looking for a reliable, responsible and competent educational service. Commands are treated as a source of additional benefits, and the strength of the relationship and client-student propensity for recommendation is closely linked to the good of the university (Reichheld 1981:45-55). Satisfied students constitute a so-called group of

„attorneys" (lawyer, counselor) of universities who are usually resilient to competition, are eager to use the services of a „well-known" company and provide positive feedback to the community. The „attorneys" institutions are at the top of the ladder of loyalty. Gaining them means that the contractor attains the highest level of relationship and trust of the client (Wereda 2009:170).

According to E. Piwoni-Krzeszowska a purpose of construction of partner relations with customers is accepting adequate solutions about organizational, instrumental, information, personal and psychological character. This action can lead for building the partnership with customers about the favourable, friendly or tying grade (Piwoni-Krzeszowska 2004:52). P. F. Drucker stated that the starting point for business management should not be product, service, market or final product users but, above all, customer values and needs (Drucker 1999:29). This loyalty in the broadest sense is synonymous with the dissemination by the customer of positive information about higher education among third parties. Maintaining long-term customer relationships plays an important role, both from the point of view of increasing the effectiveness of the activity and the ability to obtain recommendations passed on to other customers (Otto 2004:155).

Customer orientation should be an essential element of the functioning of the university, where strong competition displaces a weaker deal. Identifying the audience, their preferences and expectations gives the opportunity to design and improve the offered educational services. By offering a high level of service, it is possible to gain the trust of the customer, which is the guarantee of a long lasting relationship between the university and the student. The level of satisfaction of the student must become a priority of the quality system functioning at the college.

The Process of Educating and the Quality of Education

According to W. Okoń education are „all activities (external and internal) that enable people to learn about nature, society and culture, and to participate in shaping them, while achieving the most comprehensive development of dexterity, ability and aptitude, interest and passion, conviction and attitudes. Also acquire the desired professional qualifications" (Okoń 1995:41).

This refers to J. Kędzierska, who said that education „is the whole of such actions, processes and methods of influencing individuals and groups to result in education, e.g. acquisition of qualifications and general competences. Understanding this general education is meant to master basic knowledge, skills, habits, development of abilities and general aptitudes" (Kędzierska 2003:858).

Education is a regular, repetitive activity, so it can be seen as learning process (Sobol 1993:631). While talking about the process of educating, it is necessary to take a wide range of this notion into account. This can be a general education process, to acquire the qualifications needed in today's world, regardless of the profession, or the process of special, which means professional education, that allows one to acquire the competences to pursue a profession. Regardless of the accepted definition of the learning process, particular attention should be paid to the fact that this process is effective (the effectiveness of education can be determined by comparing the obtained results with the objectives of education) (Palka 1993:22), care of his quality should be taken.

Ensuring the highest quality of educational services is important both to the recipients of this service - students and later graduates as well as their suppliers, e.g. employees (Piotrowska-Piątek 2009:32-37). Each of participants in this process, has different needs and is paying attention to the other aspects, what is conditioned with different causes.

In academia, the quality of education is usually determined by the level of the activity and the results of the didactic work of academic teachers. K. Żegnałek, however, defines it as a component of the following elements: the quality of candidates for study, the program of study, the quality of academic teachers and the motivation of the learners (students) (Żegnałek 2011:117). It should be remembered that the quality of education also includes the non-teaching factors e.g. a hardware base, organization and implementation of the teaching process, the identity of the program in the field of education cycle, improve research and teaching academic staff and students within their own work, scientific and organization.

With regard to higher education, quality assurance can be defined as any planned and systematic effort directly related to the maintenance and enhancement of the quality of education and research necessary to provide an appropriate level of confidence that the service will meet the customer's quality requirements (Skrzypek 2006:17).

A. Krajewska believes that the quality of education is the sum of the positive characteristics of the didactic process resulting from the interaction (e.g. relations) of teachers and students in formulating learning objectives, the process and conditions of their implementation, the degree of their achievement, evaluating actions taken by participants in the learning process and standards accreditation. The positive characteristics of the didactic process are the practical qualities determined by the characteristics of the interaction between teachers and students and the characteristics of the lecturers and students themselves (Krajewska 2004:221–222).

The relationship between universities and external actors is also important in the learning process, as such cooperation can significantly influence the level of attractiveness of graduates in the labor market.

Characterization of interpersonal relations in the education process on the example of the University of Defence in Brno

In carrying out the research a quantitative method was used. Within the framework of the research a survey was conducted among 78 students of the 6th semester of full-time studies studying Security Management at the University of Defence in Brno. Students have the following specializations: Civil Protection, Security Services and Cybernetics Security. The purpose of the research was to determine whether the interpersonal relationships at the university are part of the quality system of education. The following research hypothesis has been accepted - positive relationships between students and academics and university cooperation with outside organizations are important elements in the successful implementation of the education process. The characterization of examined groups of students are presented in table 1.

Table 1: Basic characterization of examined groups of students

Criteria	**%**
Gender	
Woman	24
Man	76
Age	

To 25 years old	95
26-35 years old	5
Above 35 years old	0
Professional status	
Employed	73
Unemployed	27
Work	
Assent with the course of studies	96
Dissent with the course of studies	4

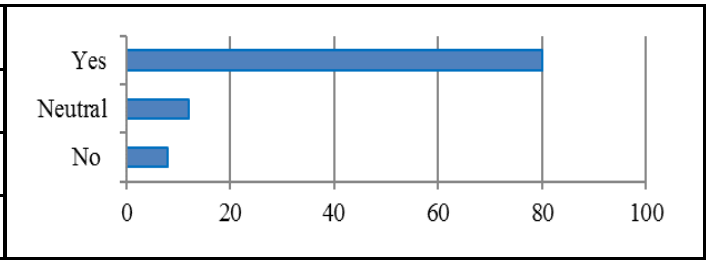
Source: author's own elaboration.

The participants of the survey were students of both sexes. At the University of Defence in Brno higher education is dominated by men, 76% men and 24% women. The students are mainly young people. The largest group was under 25 (95% of the respondents), and 5% were 26-35. 73% of the students work professionally, of which 96% follow the direction of their studies.

To identify the extent to which students assess interpersonal relationships in the institution and the quality of their education, they were asked to refer to the written statements on a scale of 1 to 3 (3-yes, 2-neutral, 1-not) . The results are shown in the tables below.

Table 2: Basic characterization of examined groups of students

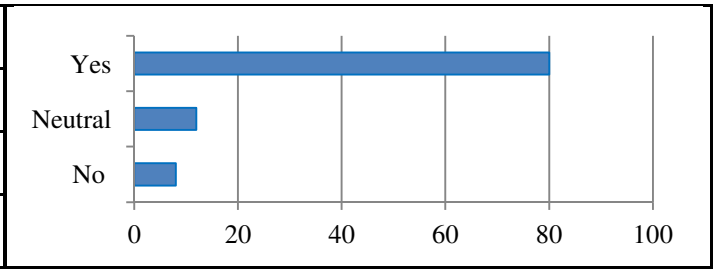
Answers	%
No	8
Neutral	12
Yes	80



Source: author's own elaboration.

Table 3: The University purchases on improving the quality of education

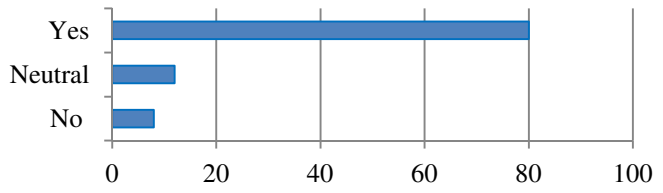
Answers	%
No	21
Neutral	37
Yes	42



Source: author's own elaboration.

Table 4: The university employees are competent teachers.

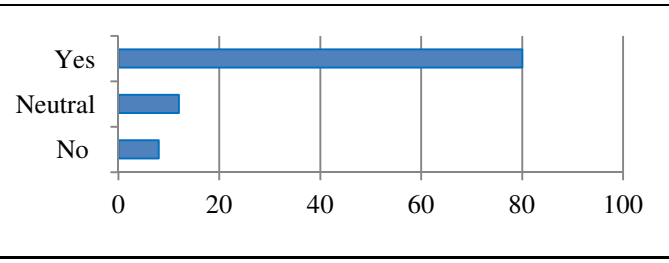
Answers	%
No	12
Neutral	32
Yes	56



Source: author's own elaboration.

Table 5: The cooperation of the college with employers is ensuring that programs of the education will enable to get essential qualifications for the placement in the region

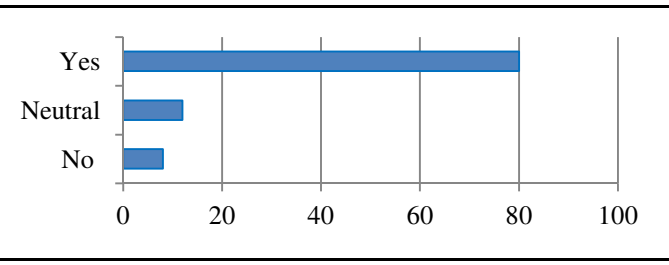
Answers	%
No	23
Neutral	40
Yes	37



Source: author's own elaboration.

Table 6: I am pleased with chosen subject

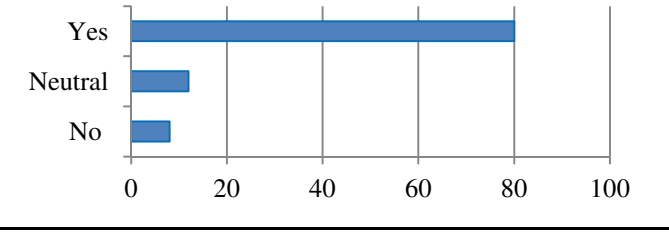
Answers	%
No	8
Neutral	10
Yes	82



Source: author's own elaboration.

Table 7: There are employment prospects in the profession after graduation

Answers	%
No	12
Neutral	15
Yes	73



Source: author's own elaboration.

Among the respondents, 82% are satisfied with the chosen field of study, which may indicate that the respondents have made an informed choice of a course of study that is consistent with their interests or related to their occupation.

Among the surveyed students 80% think that the relationship between the university and students is friendly, meaning that students can count on the help and support of the faculty in gaining knowledge, are not afraid to ask questions, are treated with kindness. Such conditions create the basis for their development, creativity and make the students willing and actively participate in the classes. The statement on employment prospects after graduation (73%) was also positive.

More than half (56%) of the respondents said that their lecturers are competent teachers. Academic teachers are an important part of the learning process because they, in their own words as well as their own example and attitude, shape behavior patterns in students, provide them with the appropriate knowledge, and acquire the skills they will need in future professional work.

The implementation of the didactic process at the University of Defence in Brno is focused on preparing graduates as specialists in the organization and functioning of the security system in public administration and business entities. The main purpose of education is to prepare students to function in the most important subjects of the national security system, prepare them to meet the challenges of the future, including functioning in the conditions of accelerated socio-economic development of the country, globalization and the unpredictability of modern threats. The positive opinion of the students regarding the prospects of employment in the profession and the fact that the classes are conducted by competent lecturers indicate that the current process of education of students at the University in Brno ensures that students acquire appropriate professional competences and thus is effective.

On the other hand, the lowest is the statement that the university's co-operation with employers ensures that the training programs will enable them to acquire the qualifications needed to find a job in the region (37% of respondents). This may mean that the university does not actively cooperate with the practitioner community in the development of study programs and, consequently, does not take into account their suggestions and suggestions on both subjects, forms of work and the number of hours.

Conclusions

The process of education is an essential element of the activity of each university. The relationships between students and academics and the relationships of universities with external organizations are becoming increasingly important in the successful implementation of this process.

As a result of the research, the accepted research hypothesis has been positively verified, assuming that positive relations between students and academic teachers and the cooperation of universities with external organizations are important elements in the effective implementation of the education process.

The research conducted at the University of Defence in Brno have shown that the relationship between students and academics is friendly, most students are satisfied with their chosen field of study. Respondents also found that there are good chances of employment in the profession after graduation.

Among negative indications, it was most often reported that university-employer collaboration does not ensure that education programs allow them to acquire the qualifications needed to find a job in the region,

so the university should pay more attention to cooperation with external institutions dealing with security aspects.

References

Journal Articles

Coulter, R.A. and Ligas, M. (2004), "A topology of customer-service provider relationship: the role of relational factors in classifying customers", Journal of Service Marketing theory and Practice, vol. 18, no 6, 483.

Yang, S., Alessandri, S. W. and Kinsey, D.F.(2008), "An Integrative Analysis of Reputation and Relational Quality: A study of University-Student Relatonships", Journal of Marketing for Higher Education, vol. 18, 149.

Online Journals and websites

Słownik Języka Polskiego (Online), (Retrieved: January 20, 2014), www.sjp.pwn.pl.

Books

Bralczyk, J. (ed.) (2005), Słownik 100 tysięcy potrzebnych słów, PWN, Warszawa.

Buchnowska, D. (2006), CRM strategii i technologia, Wydawnictwo UG, Gdańsk.

Christopher, M., Payne, A. and Ballantyne, D. (1991), "Relationship Marketing: Bringing Quality, Customer Service and Marketing Together", Butterworth-Heinemann: Oxford.

Deszczyński, B. (2011), CRM strategia system zarządzanie zmianą. Jak uniknąć błędów i odnieść sukces wdrożenia, Wolters Kluwer Polska, Warszawa.

Drucker P.F. (1999), Management Challenges for the 21st Century, HarperBusiness, New York.

Drucker, P.F. (2001), Myśli przewodnie Druckera, MT Biznes, Kraków.

Encyklopedia Popularna PWN (1982), PWN, Warszawa.

Fonfara, K. (1999), Marketing partnerski na rynku przedsiębiorstw, PWE, Warszawa.

Gordon, I. H. (2001), Relacje z klientem. Marketing partnerski, PWE, Warszawa.

Griffin, R.W. (2007), Fundamentals of Management, Boston.

Kędzierska J. (2003), Encyklopedia Pedagogiczna XXI wieku, Wydawnictwo „Żak", Warszawa.

Kowalska, A., Olszańska, A. and Urban, S. (2016), Marketing produktów spożywczych i gastronomii. Wydawnictwo Uniwersytet Ekonomiczny we Wrocławiu, Wrocław.

Krajewska A. (2004), Jakość kształcenia uniwersyteckiego – ujęcie pedagogiczne, TransHumana, Białystok.

Kuźma, J. (2000), Nauczyciele przyszłej szkoły, AP, Kraków.

Lange, O. (1974), Ekonomia polityczna. t. 1., PWN, Warszawa.

Okoń, W. (1995), Wprowadzenie do dydaktyki ogólnej, Wydawnictwo „Żak", Warszawa.

Otto J. (2004), Marketing relacji. Koncepcja i stosowanie, C.H. Beck, Warszawa.

Rogoziński, K. (ed.) (2006), Zarządzanie relacjami w usługach, Difin, Warszawa.

Słownik wyrazów obcych (2002), Wydawnictwo Europa, Wrocław.

Sobol E. (ed.) (1993), „Mały słownik języka polskiego", PWN, Warszawa.

Wereda W. (2009), Zarządzanie relacjami z klientem a postępowanie nabywców na rynku usług, Difin, Warszawa.

Edited Books

Kulikowski J. (1981), Relacja, [in:] Bednarkiewicz M. & others (ed.), „Encyklopedia organizacji i zarządzania", PWE, Warszawa.

Lisiecka, K. (2006), „W kierunku zrozumienia klienta", „Klient w organizacji zarządzanej przez jakość", Sikora, T. (ed.), Kraków, AE.

Palka S. (1993), „Skuteczność procesu kształcenia studentów uniwersyteckiego kierunku nauczanie początkowe", Skuteczność kształcenia nauczycieli klas początkowych, Moroz H. (ed.), Katowice, TWP WSP.

Skrzypek, E. (2006), „Klient jako współtwórca poziomu jakości w organizacji", Klient w organizacji zarządzanej przez jakość, Sikora, T. (ed.), AE. Kraków.

Periodicals

Deszczyński, B. and Deszczyński, P. (2011), „Customer Relationship Management konsekwencją globalizacji", *Zeszyty Naukowe Akademii Ekonomicznej*, no 44, Poznań, 19.

Gronroos, Ch. (2006), "On defining marketing: finding a new roadmap of marketing, *Marketing Theory*, vol. 6 (4), 402.

Piotrowska-Piątek A. (2009), Ocena jakości kształcenia w zakresie nauk o zarządzaniu, *Marketing i Rynek*, no 7, 32-37.

Reichheld, F. (2003), "The One Number you Need to Grow", *Harvard Business Review*, no 88, 45-55.

Skrzypek E. (2006), Jakość w oświacie. Uwarunkowania i czynniki sukcesu, *Problemy Jakości*, no 2, 90-99.

Conference Paper

Jasiulewicz-Kaczmarek M. and Saniuk A. (2015), Human factor in Sustainable Manufacturing, (in☺ M. Antona, C. Stephanidis (ed.) , Universal Access in Human-Computer Interaction. Access to the Human Environment and Culture, LNCS Vol. 9178, pp. 444 – 455, DOI 10.1007/978-3-319-20687-5_43

Jasiulewicz-Kaczmarek, M. and Szwedzka K. (2016), Were our leaders ready to implement the changes? – a case study, (in:) Yue X.-G., Duarte N.J.R. (ed.), Proceedings of the 2016 International Conference on Economics and Management Innovations, part of Advances in Computer Science Research vol. 57, pp. 267-271 DOI: 10.2991/icemi-16.2016.6

Orzelska, P. (2010), System CRM podstaw sukcesu zarządzania relacjami z klientem, (in:) Skrzypek, E. (ed.)., Klient jako wyznacznik sukcesu organizacji, , ISBN: 9788392454762, Ogólnopolska Konferencja Naukowa: Klient jako wyznacznik sukcesu organizacji, 6-7 V 2010, UMCS, Lublin, 229.

Żegnałek K. (2011), Jakość czy bylejakość edukacji nauczycielskiej (in:) Ślachcińska E., Zduniak A. (ed.) Jakość wobec wyzwań i zagrożeń XXI wieku, Edukacja XXI w., t. 3/24, Poznań, Wydawnictwo Wyższej Szkoły Bezpieczeństwa w Poznaniu, ISBN: 9788361304241, IX Międzynarodowa Konferencja: Edukacja XXI wieku, 19-21 X 2011, WSB, Zakopane, 117.

Social-Cultural and Marketing Aspects of The Charity and Fundraising Development in Russia

Irina Lychagina, South Ural State University (National Research University), Chelyabinsk, Russia, lychaginain@susu.ru
Victor Katochkov, South Ural State University (National Research University), Chelyabinsk, Russia, mohtan@yandex.ru
Tatyana Konovalova, South Ural State University (National Research University). Chelyabinsk, Russia, konovalova02@mail.ru
Denis Stukalov, South Ural State University (National Research University). Chelyabinsk, Russia. denvs74@gmail.com

Abstract

The article is devoted to a comprehensive study of philanthropy and fundraising in Russia. The purpose of the article is to analyze the socio-economic and cultural origins of this phenomenon in the Russian society, to determine their impact on the formation of modern charitable institutions and the activities of the third sector of economy. On the basis of the research, the attitude of Russians towards charity and fund-raising has been revealed as activities, as well as the value of the marketing aspect for the development of a full-fledged fundraising infrastructure and mechanisms for interaction with donors.

Keywords: charity, fundraising, non-profit organizations, marketing.

Introduction

In recent decades, in many countries, much attention has been paid to charity. Studies show that, despite the continuing volatile situation in the global economy, charity is developing in 140 countries; in Russia, even the indicator of monetary donations has increased, as well as the share of those who provide assistance directly to the needy strangers (World charity rating, 2016). The urgency of cognition and development of this phenomenon is connected with pragmatic tasks: it contributes to the solution of social problems, helps to improve the quality of life of millions of people and improves the positive interaction of business, state and non-profit organizations. The skills of this cooperation in Russia are only being formed and are becoming an incentive for the development of a specific type of activity of non-profit organizations - fundraising.

Given the worsening financial situation of the institutions of the third sector of economy, especially to the extent that it depends on government revenues, fundraising becomes one of the factors of economic survival and effective functioning of non-profit organizations, allowing to attract additional resources from various sources.

The purpose of this study is to try to answer the important questions for modern non-profit organizations: how charity has been carried out in Russia for many centuries; how to solve the problem of raising funds for those who need it at different times; what socio-economic and cultural grounds for this activity exist in the Russian society and how they influence the formation of modern charitable institutions and the activities of the third sector of economy?

The presented data were obtained as a result of two stages of the study carried out by the research group of the South Ural State University. The study included: 1) an analysis of the socio-economic and cultural aspects of the origin of charity in Russian society; 2) a study of the attitude of Russia's adult population to charity and fundraising.

The study has showed that the Russian charity has gone from private donations of monarchs and the church to mass involvement of the population in this process. Later this served as an incentive for the development of fundraising - a specific type of activity of non-profit organizations. In modern conditions, the marketing aspect of fundraising, related to the search for sources of financing in a competitive market, is being updated, as well as the ways of influencing this situation. To create a full-fledged fundraising infrastructure for non-profit organizations, it is necessary to rely on public opinion on charity and fundraising, formed by the modern adult population of Russia - real and potential benefactors.

The results of the research can be used to improve the marketing activities of non-profit organizations, allowing to increase the effectiveness of work with philanthropists. Simplifying, it can be said that the variety of channels of fundraising that provides fundraising, and the degree of satisfaction of the donor (donor), affect the amount of charitable donations that can range from several hundreds to tens of thousands of dollars.

The scientific novelty of the study is to study the interaction of factors that determined the development of charity and fundraising in Russia; refuting the established opinion that the formation of domestic fundraising and charity is exclusively under the influence of the Western values.

In this article, we would like to include these issues in a historical context, in a short historical overview, presenting the long path that charity has taken in Russia before its modern system arose, including private, public and state charity.

Socio-economic and cultural foundations of domestic philanthropy and fundraising

Charity is the provision of material and spiritual-moral assistance to those in need. Charitable activities are understood to mean voluntary activity of citizens and legal entities for the disinterested (free or concessional) transfer to citizens or legal entities of property, including monetary funds, for the unrestricted performance of work, the provision of services, and other support (Federal Law "On Charitable Activities and Charitable Organizations", 1995).

Fundraising is understood as an activity to find and attract funds to provide socially significant, non-commercial activities. The word is borrowed from the English vocabulary (from English "fundraising", "fund" - "financial resource" and "raising" - "increase, increase"), there is no exact Russian equivalent of this word. In studies of domestic authors, the term has been used since the mid-1990s, when a new economic reality required a multitude of new names to designate new phenomena. The peculiarities of the transformation of social and economic relations of that time contributed to the introduction of a multitude of foreign borrowings into the language, one of which is the word "fundraising".

Abroad, fundraising is widespread, but there are significant differences in the level of its development in various regions of the world. The world leader in fundraising and in philanthropy is the United States, although the progenitor of charity, as a social phenomenon, is the European continent (Peshkova, N.N., 2014). In the ancient world, donations were distributed throughout the Mediterranean region. Examples of philanthropic activities in the ancient era are associated with the names of Plato, who doneted money of the Academy, which bore his name; Epicurus, who bequeathed part of the property to the school he created; Theophrastus, bequeathed funds for the maintenance of the Aristotelian Lyceum he headed. Ptolemy, ruling by Egypt, founded the famous Alexandrian library and constantly supported it financially (Borgman, K. and Smith D.A., 2006).

The practice of fundraising in Russia is still quite new, as a result of which it is widely believed that the formation of domestic fundrising and charity is exclusively influenced by the Western values (Peshkova,

N.N., 2014). However, the socio-economic and cultural sources of these phenomena are connected with the historical past of Russia and the peculiarities of the Russian mentality.
Fundamentals of philanthropy (and subsequently fundraising) in Russia were determined by the interaction of several factors:

1) the Christian culture of charity, which has established in the popular consciousness the notion that the main moral duty of believers is an unselfish giving;
2) the peculiarities of the Russian mentality - the so-called "Russian sincerity", known all over the world, based on the imperative of the spiritual and moral motives of life behavior;
3) the formation and development of the sector of the economy, which today is called the non-profit or "third" sector, and the need to ensure its mixed financing.

These factors were identified in the course of historical development and in different historical periods performed their function either alone or in a complex.

Primary Manifestations of Charity in Ancient Rus

Charity in Russia has centuries-old traditions, which are found in ancient Rus during paganism. In the course of the historical development of social relations in tribal communities of the Eastern Slavs, valuable social stereotypes of behavior that influenced their life activity were fixed. These stereotypes were realized in various forms of communal-clan and economic assistance and mutual assistance. So, during the "bratchina" - a holiday celebrated by the rural community in honor of its patron saint, the community members allocated a certain number of products for public needs, that is, the process of redistribution of products in favor of those in need. Thus, in addition to honoring the gods, such festivals carried in themselves important functions to protect and assist poor members of the community, emerged the mechanism of economic equilibrium and joint consumption in situations of social and economic inequality. During this period, the foundations of the traditions of Slavs for caring and helping the weak and the poor were laid. Slavs helped the least protected members of the community, such as children, old people and women (Firsov, M.V., 1999). All this can be considered the primary manifestations of public charity.

With the weakening of pagan beliefs and the adoption of Christianity in Kievan Rus, charity had further developed. Prince Vladimir of Kiev Prince of 996 officially imputed to the duty to engage in public charity, having determined tithes for the maintenance of monasteries, churches, hospice and hospitals. For many centuries, the church and monasteries remained the focus of social assistance to the needy, showing the believer an example of mercy.

Charity in the Moscow State

The period of the reign of Ivan IV the Terrible (1547-1584) is known not only for the severe tests of the oprichnina, but also for the centralization of power, the strengthening of the state, and also for the beginning of the adoption of laws on charity on the scale of state policy. In the era of Grozny, the processes of institutionalization of charity are beginning:

1) laws were issued aimed at providing assistance to various groups of people in need;
2) charitable institutions were created - the almshouse;
3) foundations of mixed financing of philanthropic institutions were laid - both at the expense of the state treasury, and at the expense of private donations (Utkin, A., 2013).

In pre-Petrine Rus, charity included the following main areas: the distribution of food and clothing; creation of shelters and an almshouse for those who did not have the opportunity to live independently by

their labor; creation of special orders dealing with the charity of the poor; oganization of medical care. A distinctive feature of the charity of this period was the "blind" distribution of alms, which was given to all who ask for it.

Directions of charity in the Russian Empire

In the Petrine era, the institutional and legislative foundations of philanthropy are further developed; the principles of multi-channel financing of charitable institutions were being developed. Legislation of this time ordered to place incapable of work in hospitals, almshouses, to give old and maimed "fodder" money, arrange hospitals, to take care of the charity of military ranks.

Under Empress Catherine II in 1775, Offices of public charity were created, which were entrusted with the care of the organization and maintenance of hospitals, almshouses, orphanages and workhouses and houses for the soul-sick. Funds for their maintenance were formed basically due to donations of private persons and establishments, and also state grants.

In 1796, the department for the management of charity in the Russian Empire was established - the Office of the Institutions of the Empress Maria (also the fourth branch of His Own Imperial Majesty's Office, the Mariinsky Department). This is one of the largest philanthropic organizations of pre-revolutionary Russia, the main activities of which were to help children, disabled people, widows and the elderly.

Under Alexander I, charity in the sphere of education was spread, which was coordinated by the Ministry of Popular Enlightenment; the network of invalid houses for retired military personnel has expanded. The Empress Elizaveta Alekseevna, the wife of Alexander I, founded the "Emperor's Philanthropic Society" and the "Women's Patriotic Society". On the account of this society there were hospices, houses of free and cheap apartments, shelters for shelters, folk dining rooms, sewing workshops, dispensaries and hospitals. The financial basis was made up of contributions, which were donated by private individuals and entire estates.

The reign of Emperors Alexander II, Alexander III and Nicholas II is the "golden years" of charity and mercy. At this time, a whole system of guardianship begins to take shape. Many members of the House of Romanov at their own expense built charitable institutions, shelters and hospices.

Private charity is actively developing. Numerous dynsaties traders and industrialists donated funds for charity and charity. Throughout the country, the names of philanthropists from the dynasty of the Strogovs, the Bozov dynasty and the dynasty of the Demidov breeders were known.

Since the end of the XVIII century, manifestations of charity in the form of patronage - the patronage of art, the collection of large libraries, collections, the creation of art galleries, theaters, etc., were opening up. The Russian history included patrons of Tretyakov, Mamontov, Bakhrushiny, Morozov, Prokhorov, Shchukin, Naydenov, Botkin and many others. By the end of the XIX century in Russia there is a wide system of charity: private, public, state. There is a need for a theoretical interpretation of practical experience.

In the early XX century. There are fundamental works devoted to the questions of private and public charity. Leading expert of the time on public assistance to those in need Maskimov E.D. (1858-1927), publishes articles both in general periodicals (Novoye Slovo, Russkoye Bogatstvo, Russkie Vedomosti, and others) and in special publications (Bulletin of Charity and Labor Aid) . A large number of works have been published that tell of the philanthropic activity of representatives of various classes in the 17th-19th centuries. In 1907, the official reference publication Charity in Russia appeared.

There is a comprehension of certain directions of charitable activity and at the same time a comprehension of social processes through the historical experience of foreign countries. Thus, national self-determination of the ways of charity development takes place at the turn of the 19th and 20th centuries.

The Russian experience of charity in turn also had a positive effect on the emergence of a culture of patronage in Western countries. Among the most striking examples - the Nobel Prize. When it was created, the Swedish industrialist A. Nobel, who lived in Russia for a long time, used the practice, which was widely used in pre-revolutionary Russia, when patrons contributed the so-called "eternal" contribution to the bank, the prices for which were sent to charity (Tyutyunnik, V.M., 1988).

Charity and Fundraising in Soviet Russia

The October Revolution brought decisive changes to the entire traditional structure, practically destroying its public and private content and replacing them with the state system of provision. All charitable organizations, public and private, were transferred to the Soviet state, all charitable institutions were transformed into state-owned or closed. Charitable activity at that time was assessed as "one of the means of the bourgeoisie to mask its parasitism and its exploitative essence by means of a hypocritical, humiliating" help to the poor "in order to divert from the class struggle" (Firsov, M.V., 1999).

In the USSR fundraising was also not given much attention, since private donations were impossible, government organizations were financed from the country's budget. Over the years, this has contributed to the weakening of the initiative of citizens and organizations, the development of dependency attitudes, the consolidation of the habit of shifting the solution of all problems to the shoulders of the state, justifying their inaction and lack of initiative.

Revival of charity and formation of fundraising in Russia at the turn of the XX-XXI centuries

At the end of the 20th century Russian society entered a period of systemic crisis. First and foremost, the crisis affected the social and economic sphere, then came the political chaos caused by the collapse of the Soviet Union as a superpower. In the second turn, crisis phenomena overtook the spiritual and moral sphere, which manifested itself in the process of general transformation of sociocultural values (Streis, V.A., 2011).

The negative consequences of the socio-economic situation in Russia in the 1990s. XX century, which exposed many problems, led to the plight of many people in the country. In such circumstances, it became necessary to revive philanthropic activities to provide comprehensive support to socially unprotected members of society and non-profit organizations. Revival of charity and development of fundraising activity became a necessary regularity (Kesaeva, Zh.E., 2014).

The legislative basis for the revival and development of Russian charity was laid in 1995 with the adoption of the Federal Law "On Charitable Activities and Charitable Organizations." The law defines and establishes the framework of this phenomenon of Russian society, affecting the behavior of individuals and the functioning of public institutions. In addition, charitable activities are regulated by the relevant articles of the Constitution of the Russian Federation and the Civil Code of the Russian Federation.

Individual subjects of the Russian Federation, developing federal legislation, adopt their own laws on charity. These documents regulate the relations arising in connection with the implementation by citizens and legal entities of charitable activities on its territory and determine the forms, grounds and procedures

for its support by state authorities on the territory of the subject and local self-government bodies. An example is the lawmaking of Samarskaya, Arkhangelsk, and Novosibirsk oblasts.
The federal law indicates voluntary implementation of charitable activities and establishes tax incentives for organizations and individuals who are engaged in charity. In the list of goals of charitable activities prescribed in the law, namely, in our opinion, predetermine the development of fundraising activities of non-profit organizations:

- assistance in the field of education, science, culture, art, education, spiritual development of the individual;
- support of socially significant youth initiatives, projects, children's and youth movement, children's and youth organizations.

The development of charity, on the one hand, and the acute social and economic problems that lead to the deterioration of the financial situation of non-profit organizations, on the other hand, have stimulated the formation of fundraising activities in Russia. Non-profit organizations should seek ways to reduce the dependence of their incomes on the government and taxpayers.

The legislative framework for the development of fundraising was laid in 2006 by the adoption of the Federal Law "On the Procedure for the Formation and Utilization of Targeted Capital of Non-Profit Organizations." In addition, according to the initiative of the Commission of the Public Chamber of the Russian Federation on issues of charity, charity and volunteerism, several collections of recommendations were published, conferences and studies on this problem are regularly held (Zadorin, I.V., 2008).

Studies show that in modern Russian society, charity and fundraising perform similar functions:

- economic - ensuring diversification of sources of financing for non-profit organizations and projects; providing economic support to citizens who, due to objective characteristics and life situations, find themselves in a difficult situation;
- social - contributing to the reduction of social tension by supporting social projects, socially unprotected strata of the population, thereby filling the shortcomings of the state's social policy;
- market - promoting the improvement of the activities of non-profit organizations in the conditions of the functioning of market mechanisms - first of all, due to the promptness and targeting of the delivered assistance, which increases its effectiveness;
- public - influencing public opinion by mitigating the distortions of social relations, leading to a restriction of the possibility of consumption of public goods and self-realization by poor citizens, while simultaneously - cultivating altruistic attitudes in society;
- marketing - through meeting the needs of philanthropists, providing donors with services to implement charity projects; Implementation of mechanisms for feedback of the population and power structures.

Studies show that at present the number of philanthropists who donate to non-profit organizations in Russia is constantly increasing, but the country still occupies low positions in the World Rating of Charity (World charity rating, 2016).

The motives of charitable activity are most often associated with a feeling of compassion, pity, and duty (Kulakova, O.S. and Novikova N.A., 2017). The philanthropist does not expect to benefit from his actions, does not expect a reward. However, if the non-profit organization is engaged in fundraising, then donors tend to expect some compensation.

Marketing Aspect of Fundraising Development in the Modern Russian Society

Today, fundraising is an integral part of the infrastructure of European non-profit organizations. In Russia, the creation of a full-fledged fundraising infrastructure and mechanisms for interaction with donors are in the process of becoming.

Fundraising is, to a large extent, the definition of priorities, which become weighty arguments when non-profit organizations appeal to a wide range of financial sources. Most of the process of fundraising is "justification" of their needs to organizations or people on whom it depends, to support them or not. At the same time, support is not prescribed by law and is not their moral duty. This is their choice. And this choice must be justified.

The marketing aspect of fundraising development presupposes the definition of the organization's behavior regarding the search for sources of financing in accordance with the situation on the market, and the impact on this situation. It includes understanding the motivation of potential sponsors and the organization itself, programming activities, implementing it, monitoring implementation, evaluating both the activity itself and its results. In other words, the marketing aspect is to ensure predictability of the results of fundraising activities, to minimize uncertainties and risks associated with meeting the needs of philanthropists looking for a worthy use of their means. The motivation of philanthropists appeals in this case not only to a sense of duty, but also prestige, because it is a testament to the prosperity of business. Therefore, it is important to formulate goals as clearly as possible and to try to guess the true needs and expectations of the sponsor.

The conditions for the development of effective fundraising in Russia include:

- firm intention of the country's leadership to bring Russia to the innovation path of development;
- presence in the country of active wealthy people - business owners and top managers;
- stimulating the interest of business to sponsor the non-commercial sphere and establishing fruitful cooperation between these spheres that benefits the society as a whole;
- entrepreneurial activity of a significant part of the Russian society.

Attitude of Russians towards charity and fundraising as an activity

In modern conditions, it is important to solve the problem associated with the identification of the main factors affecting the development of charity in Russia. The study was conducted by the research team of the South Ural State University in March 2017.

The purpose of the study is to reveal the attitude of the adult population of the Russian Federation to charity and fundraising.

The object of the study is the adult population of Russia (from 18 to 65 years).

The research is based on the methodology and technique of carrying out sociological surveys of the population.

The study was conducted in the capitals of the federal districts of the Russian Federation for a re-representative sample.

The volume of samples amounted to 3118 respondents. The sampling set corresponds to the characteristics of the population of the Russian Federation by sex, age, education and type of settlement.

Means of collecting primary information - a questionnaire consisting of 14 content questions, grouped by the following blocks:

1. Awareness of charity and attitude to this type of activity.
2. Awareness of charitable foundations and their attitude towards them.

3. Personal involvement in charitable activities.

4. Determination of priority directions of charitable assistance.

5. Awareness about fundraising and attitude to this kind of activity.

1. The attitude of Russian citizens toward charity is generally positive, and this is natural from the basic understanding of the word "charity". However, there are differences in what specific areas and types of charity the population recognizes as important. Citizens, first of all, expect philanthropists and philanthropic organizations to solve acute social problems that are directly related to the life and health of the population (especially its socially vulnerable groups), as well as environmental problems and education issues. Activities related to the development of culture and art, sports, scientific research, at the grassroots level are perceived as less priority. Obviously, it is believed that this activity is not related to the satisfaction of basic needs and, under conditions of economic instability, is less important, secondary.

2. Proceeding from the social "approval" of charitable activities, many Russians declare their feasible participation in it: approximately 73% of respondents, they said, took part in various forms of charity over the past three years. However, for the overwhelming majority, this participation was limited to very small amounts transferred to those in need of extra-institutional order. First of all, this is determined by the low material capacities of people, although 59.5% of the polled Russians expressed a willingness to participate in charitable activities.

3. In public views, the main subject of charity should be the state (30%). A somewhat smaller number of respondents (27%) believe that everyone's duty is sometimes to help those who are in need. 44% of citizens believe that charity should be disinterested,

4. Attitude to non-state actors, professionally engaged in charitable activities, is very ambiguous. On the one hand, the declared awareness of Russians about charitable organizations is quite high - only one third of respondents said they did not hear anything about their activities or found it difficult to answer. However, as is known, real awareness is usually lower than that claimed during surveys.

Public opinion about charitable organizations is not fully formed, as evidenced by the high degree of ambiguity, the contradictory nature of assessments of charitable organizations: on the one hand, the majority of Russians believe that these organizations bring more benefits than harm and contribute to the solution of problems Social problems (68%); On the other hand, more than a quarter of Russian citizens believe that charitable organizations are the proxies of business structures and contribute to money laundering (16.5%). 41.5% of respondents in general consider the activities of charitable organizations as insignificant and inconspicuous for the majority of citizens.

5. Surface awareness and ambiguous attitude towards charitable organizations in many ways nourish the weak interest of citizens to cooperate with them. Only 24% of respondents wishing to provide charitable assistance would entrust their funds to an independent Russian charitable organization, while 60% of citizens would do it themselves. In the opinion of the majority of the population, the independent provision of charitable assistance is more effective today than calling for the mediation of professional funds and organizations.

6. Public opinion about fundraising is not formed. The indicators of the unshapeness of public opinion are:

- low declared awareness of Russians about fundraising: only one third of respondents said they heard about such activities, and only 6% faced it. Real awareness is usually lower than declared;
- the superficial nature of the declared awareness: it is not surprising that 67% of citizens found it difficult to assess and express any opinion about fundraising;
- high degree of ambiguity, inconsistency of assessments of fundraising activity: on the one hand, two-thirds of citizens aware of fund-raising consider this activity necessary for the successful operation of NGOs, on the other hand, a third of informed citizens consider such activity to be reprehensible, because it is "begging for money".

The study showed that the development of skills of fundraising requires time. If we want to create an effective system of fundraising in the country, it is necessary that the three areas mature and unite:

1. Politics - it is necessary to achieve that people understand what the meaning of fundraising is, what are its possibilities and limitations. This knowledge should be brought to the authorities, to the organization's employees and to potential sponsors.

2. Technology - the transition from simple philanthropy to a thoughtful social partnership. Business and the non-profit sphere are doomed to cooperation, their interest in each other is mutually reinforcing.
3. Relationships - building relationships with sponsors and with the public at large. Relations with sponsors have been developing for a long time. It takes time and effort for the business community to support the idea of sponsorship. Non-profit organizations should formulate arguments that will attract external sponsors.

In order to achieve economic equilibrium in the situation of socio-economic inequality in modern Russia, it is necessary to take the following key actions:

- development of state programs to increase the economic literacy of the population;
- development of state programs for involving the population in charitable activities;
- optimization of the taxation system for organizations and entrepreneurs engaged in charity;
- development of the theory and practice of fundraising and its active implementation in the practice of non-profit organizations;
- development of an optimal strategy in the constantly changing interaction of the state, the market and the non-profit sphere by government agencies.

Thus, the process of establishing charity and fundraising in Russia, firstly, is represented by its history of development in the socio-historical process; secondly, characterized by the fact that it performs important social functions; thirdly, it can be noted that with the change of ideology, the mechanisms of aid and support remain in society, which are fixed in a new historical reality; fourthly, he finds interpretation in linguistic forms and conceptual constructions.

The historical experience of the development and functioning of the sphere of charity and fundraising in our country demonstrates how the lack of state funding was compensated by the public activity of organizations and individuals; it is very relevant for the development by government agencies of an optimal strategy in the constantly changing interaction of the state, the market and the non-profit sphere.

References

Borgman, K. and Smith D.A., (2006), “Charitable institutions in European countries: historical context”, *Polit.ru.* [Online], [Retrieved May 04, 2017], http://polit.ru/article/2006/11/26/philanthropia

Federal Law "On Charitable Activities and Charitable Organizations" (1995), *Garant.ru* [Online], [Retrieved April 16, 2017], http: // base.garant.ru/104232

Firsov, M.V. (1999), The history of social work in Russia: a textbook for higher educational institutions, Humanité. Ed. Center VLADOS, Moscow.

Kesaeva, Zh.E. (2014), “The socio-economic development of RNO-Alania and the emergence of charity in the 1990s. XX century”, *Bulletin of the North Ossetian State University. K.L. Khetagurov*, 3(1), 184-187.

Kulakova, O.S. and Novikova N.A., (2017), “Commentary to the Federal Law of 11.08.1995 N 135-FZ "On Charitable Activities and Charitable Organizations" *GARANT System.* [Online], [Retrieved April 16, 2017], http://base.garant.ru/57862833

Peshkova, N.N. (2014) “Charity in Europe: the whim of the rich or the way to solve social problems?’, *Modern Europe. Publisher: The Federal State Budgetary Institution of Science Institute of Europe, Russian Academy of Sciences (Moscow),* 3 (59), 106-116.

Streis, V.A. (2011), "The phenomenon of charity in modern Russia: socio-philosophical analysis", *Proceedings of the Russian State Pedagogical University named after A.I. Herzen*, 132(1), 81-85.

Tyutyunnik, V.M. (1988), Alfred Nobel and the Nobel Prizes, Tambov.

Utkin, A., (2013),"The history of charity in Russia: tsarist, Soviet and modern", *Ria.ru.* [Online], [Retrieved June 06, 2017], https://ria.ru/disabled_know/20130226/924715394.html

World charity rating (2016), "Gallup. The official Internet portal of the company", *Gallup*. [Online], [Retrieved May 05, 2017), http:// www.gallup.com/home.aspx

Zadorin, I.V., (2008), "Public trust in the institution of charity in Russia in figures and facts", *Zircon.ru*, [Online], [Retrieved June 16, 2017], http:// www.zircon.ru/russian/publication/5_4.htm.

Determinants of External Debt Accumulation in Turkey: Evidence from an ARDL Bound Test Approach

Erkan Özata
Anadolu University
Eskişehir/TURKEY
eozata@anadolu.edu.tr

Abstract

External debt is one of the most important problems for underdeveloped countries and emerging markets like Turkey. External debt and its refinancing remain the main challenges for Turkey over the last decades. The purpose of this study is to examine the impact of interest rates, savings, exchange rates and budget deficits on external debt in Turkey through the Autoregressive Distributed Lag (ARDL) bounds testing approach developed by Pesaran, Shin and Smith (2001). The ARDL test has many advantages over the other time series methods. The dependent variable is the ratio of external debt to GDP. The explanatory variables are the exchange rate, interest rate, savings rate and the budget deficit. The results reveal that those variables have significant effect on the accumulation of external debt both in the short and the long runs. To improve this outlook, many structural reforms are required to increase domestic savings and competitiveness and boost potential output.

Keywords: External Debt, savings, budget deficit, interest rates, ARDL

Ex ante and ex post regulatory impact assessment in Russia: framework and practice

Marina Ivanova, Ph.D Peter the Great St.Petersburg Polytechnic University, St. Petersburg, Russia, mvipochta@gmail.com
Victoria Degtereva, Ph.D Peter the Great St.Petersburg Polytechnic University, St. Petersburg, Russia, degvi@yandex.ru
Alexander Gorovoy, Ph.D ITMO University, St. Petersburg, Russia, gorovoy@limtu.ru

Abstract

The aim of this paper is to examine the performance of regulatory impact assessment (ex ante and ex post) in Russia in relation to existing framework of the RIA system and actual practice since its implementation in 2010. Evaluation is an emerging field in Russia and regulatory reforms meet particular challenges because of both framework problems and implementation context. The paper describes the procedures of regulatory impact assessment in Russia in their evolution and provides authors' view of the problems and challenges that RIA in Russia can have. Special attention is paid to the methodology of RIA. The work is based on the analysis of existing problems in russian model of RIA and its systematization. The paper proposes a hypothesis that solution of these problems will improve RIA procedure at the federal level in Russia.

Keywords: regulatory impact assessment, ex post analysis, Russia.

Introduction

Regulatory impact assessment (RIA) is intended to improve the quality of regulation and to enhance the accountability and legitimacy of policy-making and law-making. Although RIA is mostly used as ex ante, its logic and main components can be deployed ex post, too. The aim of the research was to examine the performance of RIA (ex ante and ex post) in Russia in relation to existing framework of the RIA system and actual practice. The authors set the task to systematize the problems of the RIA system itself and of the implementation of the RIA procedures.

Regulatory impact assessment (RIA) is intended to improve the quality of regulation in the hope that it will achieve the minimum of adverse impacts, especially in relation to business and economic performance. RIA systems are also expected to enhance the accountability and legitimacy of policy-making and law-making. The essential sense of this tool is encompassing not only government-internal effects and administrative costs but also external effects such as economic, social and environmental impacts.

RIA emerged in the United States during the seventies but nowadays every OECD country has implemented and required some form of RIA. NonOECD countries, including Russia, have adopted this practice more recently.

Although RIA is mostly used as ex ante, its logic and main components can be deployed ex post, too.

The aim of this paper is to examine the performance of RIA (ex ante and ex post) in Russia in relation to existing framework of the RIA system and actual practice.

Most studies assume that the availability and use of information from RIAs lead to better law-making and improve regulatory quality (Hahn and Litan, 2000, OECD, 2005; European Commission, 2004). Policy-

makers in number of countries have begun to use ex post evaluation tools to assess systematically the outcomes of regulatory decisions. Such analyses take place *after* implementation of new rules and examine the relevance, effectiveness, impacts and unintended outcomes of regulatory decisions. Karpen, Xanthaki (2017) point that RIA has to be systematic (coherent, not episodic or random) and comparative (more than one option has to be appraised, including the option of "no-change").

RIA implementation in Russia started in 2010 on federal level, in 2012 with a pilot phase on regional level (in 2014 – fully implemented on regional level). The Ministry of Economic Development (MED), the authorized coordinating and oversight body of RIA in Russia, has been inquiring the institutional mechanisms and best practice of RIA in the world several years before that. But in spite of this immersion in the achievements and of having clear political support, actual deployment of RIA has been and stays limited.

In 2010 the Order of the Ministry of Economic Development No. 398 enacted truncated procedure of RIA comparing to OECD countries practice. Ex ante RIA procedures comprises limited scope of the secondary legislation governing relations in:

- Organizing and implementing state control and overseeing;
- Establishing, application and enforcement of requirements for products or related design processes, processes of manufacturing, construction, assembling, setting up, operation, storage, transportation, distribution and utilization;
- Conformity assessment;
- Safety of production processes.

Assessment is conducted by the MED. The external evaluation, as well as the public discussion, do not provided for by the modalities.

A first step towards the development of the current mechanism of ex post evaluation has been taken in 2011 by the adoption of Government Decision No. 633. According to this Decision, legislation governing business and investment relations, had to be subject to analysis in order to identify the provisions which unduly hinder doing business and investment. The analysis could get started at the initiative of the overseeing authority (the MED) or at the initiative of businesses.

RIA mechanisms further developed in 2012-2013 with the adoption of the Presidential Decree on the key activities for improvement of governance No. 601 and several acts following the decree. In particular, the MED had enacted the guideline of implementation the procedures and modalities of RIA in regions of Russia and the Government Decision No. 1318 had changed the procedures of RIA on federal level.

All the above acts declared that RIA in Russia is aimed to determine and assess the effects and positive and negative consequences of draft legislation adoption. The assessment is based on identification of the problem, regulatory objectives and possible solutions to the problem. The main point is to identify the provisions of the draft legislation which are creating or fostering the creation new redundant obligations, prohibitions and restrictions for natural and legal persons in business and economic sphere. Also the provisions contributing unjustified costs for natural and legal persons as well as all types of state and municipal budgets have to be considered. The list of activities requiring RIA procedures has been expanded. Besides the above-mentioned relations, RIA is now required for the acts governing the relations in taxes and charges sphere, state customs services, establishment, reorganization and dissolution of the legal persons, the application of liability measures in business and economic sphere.

Quality oversight is still carried out by the MED, the procedures are concentrated on the Ministry's web portal. But the federal executive body that had prepared a draft are now becoming the responsibility centers for maintaining the RIA procedures.

Since 2012 the public discussions on the draft acts has been implemented (via the web portal regulation.gov.ru). Procedures of the discussions and participating expert society has been in the making since. The expert society was really active in the beginning of the implementation the RIA procedures. As a result, more than 60% of the drafts have been receiving negative assessment. It is important to note that government regulation does not require the decline of the act that was voted down by RIA procedures. Anyway, it can be sent back for the further changes. Nevertheless, the Russian Union of Industrialists and Entrepreneurs claims in its reports that no legislation having the negative assessment has passed the Government ever since the procedure had been introduced.

In 2015 the Government Decision No. 83 had launched the procedures of ex post assessment for secondary legislation. This Decision had repealed the provisions of the above-mentioned Decision No. 633 and, in fact, had substituted the previous analysis procedures for the procedure of the evaluation. The evaluation's stated objectives are:

- Analysis of the regulation goals achievement;
- Identifying and assessment of actual positive and negative impacts of the regulation;
- Actual compliance costs for businesses, investors and other economic subjects.

Hence, the new mechanism unlike the old one, provides the goals achieving analysis and the impact assessment.

The plan of ex post evaluation is published annually by the MED. The plan goes through public debate and then gets approved by the government. Federal executive bodies that had issued the legislation undergoing the assessment procedures according the plan, have to prepare the RIA report for the MED. The report includes evaluation of an act by the given set of indicators that should be used depending on the purposes of evaluating. The report should also include the recommendations on further changing the legislation, its suspension or repeal. In some cases the report can be subject to a public discussion but it's not mandatory. The report then has to be submitted to the MED for making the final decision.

It must be noted, that representative data of ex post RIA practice in Russia is not available since the first plan of assessment was approved in 2016 for 2017. But the comparative analysis of the RIA framework and mechanisms in Russia and OECD countries as well as actual practice in the regions of Russia where this tool has been introduced earlier, give us ground for thinking of several challenges that RIA in Russia can have:

Coverage - limited scope of legislation undergoing RIA.

The most successful in RIA countries such as Australia, Germany, Canada, apply RIA to all regulation that imposes an appreciable burden on any sector of the public. Furthermore, the principle of responsibility for the RIA procedures maintenance and for the regulation impacts had been well established in those countries. Whereas in Russia ex post evaluation is only provided for the legislation that went through the ex ante RIA procedures. The latter assessment only apply to the acts governing the above-mentioned limited scope of relations. It is important to underline that RIA applies to the secondary legislation only so one of the main policy-making process – primary legislation adoption – is now out of RIA coverage.

Methodology of impact assessment

It is well known fact that RIA can be based on cost-benefit analysis, compliance costs analysis, business impacts testing, fiscal analysis etc. OECD (2004) increasingly supports application of the benefit-cost principle. A classic cost-benefit principle is that the flow of discounted benefits should overweigh the

flow of costs. The cost-benefit analysis involves the assess of the most direct effects, as well as consequences of side effects that can occur beyond the specific sector being regulated. Russian RIA procedures tend to use compliance cost analysis. This method provides quite narrow view comparing to cost-benefit analysis: there is no evaluation of side effects and no quantifications of compliance costs (as well as benefits).

Absence of alternatives

Generally, RIA is a process for assessing the likely effects of a proposed policy changes against the benchmark of the status quo ("no-change" hypothesis). When the "no-change" option is not appraised, the RIA is weakened (Karpen, Xanthaki, 2017). The mechanism of RIA in Russia does not consider the possibility of status quo, self-regulation, regulation of professional associations etc. and does not apply the comparative analysis that would include these options.

Limited purposes of assessment

The main purpose of the RIA in Russia can be defined as "avoiding excessive regulation and following excessive costs". But the objectives of RIA as a better governing tool are more complex. RIA is a systematic, comparative appraisal of how proposed legislation might affect stakeholders, society, economic sectors and the environment.

Lack of public involvement

Ex ante RIA in Russia requires the open public debates involving stakeholders, experts etc. On the early stages of the RIA the public concern was significant (as mentioned above). Now the interest of public fades. For example, in June, 2017 there are more than 600 draft legislations open for the debates on RIA web portal. Only 16 of them have comments. There are 116 comments in general and 79 of them are related to 3 drafts. In the same time the MED keeps holding the negative decision rate for the drafts on 40% level so it is not the case of significant enhancement of regulation quality. Most likely the absence of the direct link between public opinion and a draft adoption is de-motivating. There is no reason to believe that ex post procedures will draw more public attention.

The practice of ex post RIA in Russia needs to be researched deeper when the first annual plan of evaluation will be fully implemented but it can be said now that the framework itself has several problems that prevent the RIA from being as useful for good governance as it can be.

References

Carroll P. (2010) Does Regulatory Impact Assessment Lead to Better Policy? *Policy and Society,* 29 (2010), 113-122

Hahn R.W. and Litan R. (2000) An Analysis of the Third Government Report of the Benefits and Costs of Federal Regulation, AEI-Brookings Joint Center for Regulatory Studies, Washington, D.C.

European Commission (2004) Commission report on impact assessment, *Next Steps – In Support of Competitiveness and Sustainable Development*, SEC(2004) 1377 of 21 October 2004

Karpen U. and Xanthaki H. (2017) Legislation in Europe: A Comprehensive Guide For Scholars and Practitioners, Bloomsbury Publishing

OECD (2005) Regulatory Impact Analysis in OECD Countries: Challenges for Developing Countries, Paris: OECD

Staronova K. (2010) Regulatory impact assessment: Formal institutionalization and practice. *Journal of Public Policy,* 30(01), 117-136

Management System of Migration Processes In the Modern Global World

Minakova Irina Vyacheslavna, Southwest State University, Kursk, Russia, minakova-irena@yandex.ru
Bukreeva Tatyana Nikolayevna, Southwest State University, Kursk, Russia, tnbinchina@yandex.ru

Abstract

The paper studies the main problems of international migration, and the role of international organizations in regulating migration processes. It proves the statement that the existing migration regulation system is based on individualism, excluding justice and altruism. The purpose of the research is to reveal the problems of migration regulation in the context of the growing globalization of economic relations. The informational base of the research includes international acts in the field of migration (charters, conventions, agreements, and resolutions), materials of the United Nations General Assembly, the International Labor Organization (ILO), and the International Organization for Migration (IOM), and the World Health Organization (WHO).

Keywords: international migration of labour force, regulation of migration processes, refugees, labour migration, adaptation strategy.

Introduction

International labor migration in the 1990s is a very significant aspect of the globalization of the world economy. It was not just a quantitative increase of migration and widening of geographical distribution of labour migration, but there were also changes in quality of migrants, as well as a reassessment of the role of labor migration in economy of developed and developing countries. According to the World Bank, the growth in the number of immigrants in developed countries until 2025 will lead to an increase in aggregate income in these countries by $ 365 billion. It shows a significant impact of labor migration on the most important macroeconomic indicators. This situation has required an analysis of a wide range of issues related to formation and modification of migration policy at the national and international levels.

Research methods. The growing importance of international migration in the context of globalization was studied in scientific research; it was formed in migration concepts at the end of the 20th century and the beginning of the 21st century. A significant contribution towards development of this problem was made in materials of Cristiano Codagnone, Christina E. Lee, N. Luhmann, K. Newland, Michael J. Piore, J. Simon, P. Stalker, G. Freeman, Samuel P. Huntington, Fred Halliday and others.

The paper defines that migration processes split into two components: labor migration and forced migration (refugees, immigrants). For the first component the activities of international organizations are aimed to protect migrants' rights through the development of legislation, providing suitable living conditions for migrants. According to the materials published in the article 'General Assembly Adopts Declaration for Refugees and Migrants, as United Nations, International Organization for Migration Sign Key Agreement the article' (2015), in 2013, the total number of migrants living outside their countries reached 232 million people, or 3.2% of the world's population. For comparison: in 2000 there were 175 million, and in 1990 - 154 million.

In the 'International Migration Report' (2013), the main reason for increasing migration flows is the widening gap in living standards between the 'golden billion' countries and the rest of the world. About 59% of migrants live in developed countries; about 60% of them are from developing countries. Thus, the phenomenon of migration is caused by socio-economic reasons.

The second case is related to protecting refugees, the total number of which reached 33.9 million people. The main reason for this phenomenon is a high level of conflict in the world, continuing wars, especially for control over natural resources.

Regulation of migration processes is carried out at the level of universal organizations, as well as through a system of regional agreements in the framework of national legislation. Movement of labour force and forced displacement under the conditions of open borders are beyond control of one country, that's why the collective efforts of all participants in the world society should be applied for solving issues in migration process.

In some ways such organizations as the World Food Programme, the United Nations Children's Fund, the World Health Organization (a special agency develops specific standards of physical health of migrant workers and their families*),* the United Nations Development Programme *(*UNDP), UNESCO (a special service develops education programs for migrant workers and their families), the International Bank for Reconstruction and Development (IBRD) are involved in solving migration issues.

Coordination of migration processes is based on the principle of satisfaction of the developed world needs in the workforce, and the maximum control of unwanted refugee inflow. This system is unbalanced: the gap between the rich North and the poor South is increasing; the North is 'draining' human capital from the developing world and, under the pretense of humanitarian functions, is gaining control over migrant flows. It has been processed through special structures, financed by developed countries.

There is a number of migration problems, which do not find solutions (or any proposals for overcoming them are ineffective) in the framework of the existing migration regulation system. One of them is a dominance of operational approach, in which the world community does not solve the problem, but struggles with the consequence of this problem. Thus, UNHCR (the United Nations Refugee Agency) coordinates the distribution of refugee flow, but the solution of the problem remains unaddressed. Similarly, socioeconomic backwardness being the main reason for migration is not taken into account by organizations in the field of migration.

The main task of international organizations in the field of migration is to create the most favorable conditions for the beneficiary's club members. Thus, UNHCR (2011) addressing the problems of victims of armed conflicts also serve as a deterrent to refugee flow to developed countries. To this end, the movements of refugees are closely monitored, only 17% of refugees leave their region of origin, the rest often move to neighboring countries. In recent years, the refugee flow has been redirected to Asia and Africa, while the number of refugees in the developed countries has decreased.

According to the Report of the United Nations High Commissioner for Refugees (2013), the growing responsibility for displaced persons continues to lie with developing countries, where more than 4/5 of all refugees live.

The camp approach to refugee migration is mistaken. This approach leads to an inadequate quality of life for refugees, an increase of the UNHCR's needs itself, a loss of socialization of refugees who are psychologically accustomed to a state of dependency. In research study of Pyazantsev (2003), refugees integrated into society are able to provide themselves with more adequate and decent living conditions compared to the artificially created living conditions in camps. According to statistics published by UNHCR (2012), currently 35% of all migrants live in special camps located in Africa and Asia (total of all refugees living in camps, 92% live in camps in Africa and Asia), 54% are resettled on their own.

Since the vast majority of refugees remain within the neighboring regions, must be strengthened regional cooperation. However, most of the refugee-hosting countries are in conflict with the refugee-producing countries. The situation is complicated by the fact that special conventions regulating the protection of

refugees have been signed by a limited number of the countries. For example, in 1990, the UN General Assembly adopted the International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families (a comprehensive international treaty dealing with the protection of the rights of migrant workers). It was mainly ratified by developing countries, i.e. countries that export labor, but not countries that accept migrants.

In the research study by Kapur and McHale (2005), intellectual migration is detrimental to the socio-economic development of exporting countries. The funds invested by a state in human capital are not payed off. The best experts leave the country looking for more favourable conditions. For example, 80% of migrants from India at the age of 25 and older have university degrees, while in India this figure for this age group is only 2.5%.

The modern migration of highly skilled persons belongs to completely different organizational level, materializing in a kind of international corporation of 'bounty hunters'. Migration flows also increase due to the movement of labour within a single corporate structure - TNC, which branches are located around the world.

States inviting migrants to work are ready to accept only certain categories of migrant workers: workers who agree to do heavy, harmful and unskilled labour for a minimum wage (construction workers and subsidiary workers, seasonal workers, etc.), experts in new and promising sectors of the people's economy (programmers, highly specialized engineers, bank employees), specialists with a worldwide reputation (musicians, doctors, writers, scientists, artists, athletes), businessmen who invest their capital in a foreign country, creating new jobs.

The system is based on redistribution of labour in favour of developed countries, while developing countries bear losses because of labour shortage. Although poor countries receive compensation for the loss of labour in the form of remittances from migrants, but these funds ultimately work for the developed economies. For example, in the early 2000s they have twice exceeded the volume of foreign aid, the net private capital inflow increased ten times. About half of all migrant remittances are from countries with income levels of $ 736 to $ 2935 per capita. In 2013, the amount of international migrants' remittances was $ 549 billion, of which 414 were to developing countries (officially recorded amounts of cash transfers.) The true amount of recorded and unaccounted remittances through official and unofficial channels is probably more than 1.5 times or even more). Pyazantsev (2003) mentioned, in 2000 migrants' remittances from abroad to their countries amounted to more than 10% of the GDP of Albania, Bosnia and Herzegovina, Cape Verde, El Salvador, Jamaica, Jordan, Nicaragua, Samoa, Yemen.

According to Kapur and McHale (2005), the funds inflow is so significant for economies, that some countries even induce labour export. For example, in 2003, Pakistan promulgated a plan for the additional 'export' of 200 thousand migrant workers. The advantages of this income source include not depending on the attitude of a donor country, not having loan burden like IMF loans. However, these funds will be again returned to the beneficiary club: half of them through inflated transfer fees, another part through the purchase of manufactured goods by developing countries in developed countries.

In 2013, half of all international migrants were living in just 10 countries: 45.8 million of international migrants resided in the United States, Russia and Germany hosted the second and third largest numbers of migrants worldwide (11 million and 9.8 million accordingly), followed by Saudi Arabia (9.1 million), the United Arab Emirates (7.8 million), the United Kingdom (7.8 million), France (7.4 million), Canada (7.3 million), Australia (6.5 million) and Spain (6, 5 million).

Minakova et al (2015) mentioned that unskilled workers have formed a special layer on the international labour market that becomes the object of exploitation by various international organizations. Western countries with increasing wealth as a magnet attract the indigent from Africa, Asia, Latin America, and

the CIS countries. The difference in cultures and ineffective adaptation strategy give rise to the problem of integration of migrants into a new socio-cultural environment.

Conclusion

At present, there are four types of integration models: illusory, exclusive, republican-imperial and multicultural. The illusory model deliberately ignores immigrant communities (Japan, Italy), the consequence is the marginalization of society and the restriction of immigrants' rights. Within the framework of the exclusionary model (in Switzerland, Germany and Belgium) migrants come mainly through strictly regulated guest worker programs, which do not provide a pathway to citizenship, and formal and informal cultural contacts between migrants and local population are unequal and restrained. The republican model (the UK, France) allows immigrants to integrate into society if they have already lived in the country (second-generation immigrants) or came from controlled territories. The most loyal to immigrants is the multicultural model of USA, Canada, Australia, and Sweden where immigration becomes a permanent phenomenon; migrants remain in the country and successfully integrate into the community. The shortcomings of these models give rise to the discontent of the indigenous population, leading to numerous inter-ethnic clashes: in Sweden, France, Italy, Spain, Belgium, the Netherlands, Switzerland and Eastern Europe.

References

1. General Assembly Adopts Declaration for Refugees and Migrants, as United Nations, International Organization for Migration Sign Key Agreement (2015), [Online], [Retrieved August 28, 2017], https://www.un.org/press/en/2016/ga11820.doc.htm
2. Global Trends 2011. 'A year of crises' United Nations High Commissioner for Refugees.
3. International Migration Report 2013. Department of Economic and Social Affairs, Population Division // ST/ESA/SER.A/346.
4. Kapur, D. and McHale, M. (2005), 'The Global Migration of Talent', *Pro and contra*, 7-8, 81-90.
5. Minakova, I V. and Kovarda V V. (2015) New Perspectives in International Economic Relations, Problems of Modern Society Development, Kursk 'Universitetskaya kniga'.
6. Pyazantsev, S V. (2003) 'Migration Trends and International Security', *International Processes,* 3, 30–43.
7. Report of the United Nations High Commissioner for Refugees (2013), New-York: UN, A/68/12 (Part II).
8. Statistical Yearbook (2012), 12th edition, UNHCR.

Forecasting Sub-Sovereign Credit Ratings Using Machine Learning Methods

Toseafa Evelyn, University of Pardubice, Studentska 95, Pardubice 53210, Czech Republic, st36216@upce.cz

Abstract

This paper mainly analyses the forecasting of sub-sovereign credit ratings using machine learning methods in the non-US, Europe and other regional and sub-sovereign ratings. Specific focus is based on developing an accurate forecasting model based on machine learning. We examine its forecasting accuracy on two forecasting horizons, one and two years ahead. The study was designed to determine the cost sensitivity of various machine learning methods and to develop an accurate decision-support system that minimize the cost of credit rating classification for sub-sovereign entities across countries and world regions. We looked at each side of the economic, financial and debt and budget, revenues and expenditures, to provide sufficient inputs for the machine learning models. The analyses is to consider the ordinal character of the rating classes, classification cost (cost-sensitive) which is used as objective function, in assessing credit ratings and evaluating of bonds i.e. regional credit rating modelling.

Keywords: sub-sovereign, credit risk, credit rating, machine learning.

Introduction

Recently, credit rating agencies worldwide have gained higher rate of criticisms for their influence on the economic crisis that started in 2007. These rating agencies are often criticized for their perceived inaccurate ratings and slow reactions to new information (Paudyn, 2013; Kim and Park, 2016). The role of these credit rating agencies is very influential on the financial markets in the production of credit risk information of issuer's and its allocation to market participants. Credit rating reviews the solvency of an entity or a particular debt obligation in a single ordinal class. The credit rating can be defined as a degree of the ability of a firm to meet its debt servicing obligations in time, and gives a way to quantify how close the entity is to avoidance. The main property of ratings is to translate credit risk into a single class to make them very attractive to the market participants. Credit ratings boost borrowing conditions by the cost of credit and the availability of the credit. For example, a lower bond rating would increase the risk quality demanded by the market and therefore the cost of borrowing; a lower rating could also result in the reduction of the potential market for the downgraded debt, since some investors are either incapable or not ready to hold debt below a certain rating (Cheung, 1996). In a municipal and regional setting (sub-sovereign), credit ratings are usually used to express the general financial performance. This rather difficult evaluation is based on diverse criteria than the financial performance of firms (Beck et al., 2017). Regional financial performance is influenced by various socio-economic determinants.

In recent years, the demand for sovereign (country) and sub-sovereign ratings has improved mainly due to the unpredictable globalization of markets (Liu and Tan, 2009). Investors and mainly managed funds are gradually based on international change. A change in these ratings can be a major input in the re-weighing of international portfolios. However, previous literature has been concentrated on sovereign (Bennell et al., 2006) and municipal ratings (Hajek, 2011), except for the vast amount of literature on corporate credit ratings, see e.g. Huang et al. (2004) or Hajek and Michalak (2013) for a review. The study by Cantor and Packer (1996) explored the determinants and effect of sovereign rating assigned by the two leading agencies, Moody's and Standard and Poor's using a sample of 49 countries at a specific point in time. They measured eight economic variables to evaluate the determinants of ratings using the ordinary least square method. The cross-sectional analysis suggests that sovereign ratings are generally consistent with the macroeconomic fundamentals, which the two agencies appear to weigh equally. Reinsen and Von Maltzan (1999) studied the links between

sovereign credit ratings and dollar bond yields spread over the years 1989 to 1997 so as to judge whether the three rating agencies, namely, Moody's, Standard and Poor's, and Fitch IBCA can increase or decrease boom-bust cycles in emerging markets. The study firstly assessed whether the rating agencies have an impact on the market using the event study methodology as well as employing a Granger causality test in order to establish the extent to which sovereign rating lead or cause changes in yields spreads beyond and above other observable yield determinants. They found a significant impact of upgrades and downgrades on spreads for a combination of ratings by the three agencies. The Granger causality test revealed that changes in sovereign ratings are mutually interdependent with changes in bond yield.

Past ratings reflect a variety of factors, including wars, revolutions, fiscal and monetary policies, and external shocks. As we enter the new millennium, fiscal discipline, debt management, structural inefficiencies constraining productivity, and the contingent liabilities arising from weak banking systems are among the significant economic policy challenges facing many sovereign and sub-sovereign entities. The associated credit risk, which may seem manageable for a time, can quickly spring up as events in a number of emerging market countries since 1997 have shown. Rating agencies believe that an understanding of sovereign and sub-sovereign ratings' criteria is more relevant now than ever before.

Since the emergence of decentralization in developed countries in the 90s contributed to changing fiscal and tax relationships between the central and regional political levels. The shift had significant concerns on the borrowing policy of local and regional governments because their borrowing capacity, their resorting to international capital market and their dependence on credit ratings are all-greater than before as asserted by (Huang et al., 2004).

The costly nature of credit rating is due to the fact that rating agencies invest large amount of time and human resources to perform the credit rating process. These lead to more effort, which is required in order to simulate the credit rating process of rating agencies through statistical (Gaillard, 2009) and machine learning methods (Hajek and Michalak, 2013). The difficulty in designing such models lies in the subjectivity of the credit rating process. Complex relations between financial and other variables are evaluated. Such intricate process makes it difficult to categorize credit ratings (rating classes) through statistical methods. Machine learning methods can be applied for the modelling of such complex relations. These make accurate predictions of credit ratings possible. This is important for all market participants to make investment decisions, including investors, financial institutions and sub-sovereign entities. Prior literature on the prediction of sub-sovereign credit ratings has been limited to statistical methods (Gaillard, 2009). Here we aim to fill this gap and employ a variety of machine learning methods to predict sub-sovereign credit ratings. We hypothesize that machine learning methods significantly outperform the previously used statistical methods. Therefore, the main aim of this paper is to develop an accurate forecasting model based on machine learning. We examine its forecasting accuracy on two forecasting horizons, one and two years ahead. To consider the ordinal character of the rating classes, classification cost (cost-sensitive) is used as objective function.

The paper is structured as follows. In section 2, we provide a review of related literature. Section 3 presents the research methodology. Section 4 shows the results and the final section concludes the paper.

Related Literature

The primary activity of rating agencies is to issue ratings for bonds and other debt obligations of corporates. They also publish overall issuer ratings, to which the agencies sometimes refer as senior indiscreet ratings. The two main objectives are steady and precise of ratings, can be conflicting, resulting in a trade-off. The exact definition of issue ratings differs along the agencies. It usually is a measure of long run overall credit quality, but can possibly take into account additional information on expected recovery amounts. The ratings assigned by Standard & Poor's are expressed in letterform, ranging from AAA, the highest, to CCC, the lowest. These ratings represent an attempt to

divide a pattern of risk into discrete risk classes based on an assessment of the capacity of the debt issuer to pay interest and repay the principal in accordance with the terms of the issue.

The assessment of the credit risk of provincial governments (sub-sovereign credit ratings) take into account actual and projected developments in a wide number of areas, including demographic economic, financial and debt indicators. Informed judgment by the rating agency analysts also plays an important role. The highest rating, AAA, indicates an extremely strong capacity to pay interest and repay principal, while the lowest rating, CCC, indicates a serious vulnerability to default on payment of interest and or repayment of principal. Debt rated from AAA to BBB is considered "investment" grade, while debt rated at BB and below is considered "speculative" grade. Since 1974, plus and minus symbols have been attached to the ratings from AA to CCC in order to show relative standing within the major rating categories. Standard & Poor's also introduced rating outlooks in the summer of 1989, which indicate the likely direction of the next rating change if current economic and financial conditions continue. A higher credit rating shows a low credit risk. According to the assessed object, credit ratings of the state, company, provincial governments, financial institution, single bond, etc. exist.

Credit rating is a result of a credit rating process and a rating class defined on a rating scale to represent it. Rating classes are allotted to assessed objects whiles credit ratings are used by bond investors, debt issuers, and governmental officers to measure the risk of companies. They provide a means of determining risk premiums and marketability of bonds, allowing firms issuing debt to estimate the likely return investors require. Bankers and companies considering providing credit rely on credit ratings to make important investment decisions; many regulatory requirements for financial decisions are based on credit ratings, etc. Credit ratings are costly to obtain because rating agencies invest large amount of time and human resources to perform the credit rating process. Therefore, much effort has been made in order to simulate the credit rating process of rating agencies through machine learning methods (Hajek and Olej, 2011; Hajek and Michalak, 2013; Zhong et al., 2014; Jones et al., 2015).

Sovereign and sub-sovereign ratings are usually the assessment of each government's ability and willingness to service its debts in full and on time. Rating is a forward-looking evaluation of the default probability. Sovereign (sub-sovereign) ratings address the credit risks of national (regional) governments but not the precise default risk of other issuers. Ratings given to other private and public sector entities in each country can, and often do vary. Ratings of some issuers could be the same as the sovereign's, while others are a bit lower.

The important set of research places emphases on the determinants of credit ratings. The existing research on these subjects has been analyzed in order to address the issues relating to the methodology applied, the data collection, the construction of indicators and variables best suitable for the research goals, and the understanding of the results. Looking over the years, (Flandreau and Flores, 2009) present a unique comparison of sovereign ratings and findings that Standard and Poor's and Moody's ratings turned out to be slightly more accurate than those of Fitch.

Research Methodology

In this study, sub-sovereign credit ratings cover both developed and emerging countries, including Europe, North and South America, Africa and other parts of the world. The input data was obtained from Moody's Credit Rating agency for the years 2003-2007, with the output credit ratings from 2008 and 2009 for one-year and two-year ahead forecasts, respectively. In these ratings, the input variables are designed specifically for the credit rating assessment, based on the variables presented by Moody's. Specifically, the forecasting model was based on several categories of variables, including economic, financial, debt, etc. In this paper, a comprehensive time series dataset of sub-sovereign entities was collected over the period of 2003–2007, and 257 regions was extracted from Moody's ratings and categorized into 15 rating classes. The study was designed to minimize the cost of classification.

The input variables (Table 1) were extracted from Moody's financial reports from 2003 to 2007. These variables represent the inputs of models, while the rating classes 1 (one-year forecasting horizon) and 2 (two-year forecasting horizon) from Moody's rating agency stand as the outputs of the models.

The economy, which is most probably the factor, generates the resources to repay the sub-sovereign debt. Country and government rating class show long-term foreign currency credit ratings for sovereign and government bonds (Mohapatra et al., 2017). GDP per capita is a percentage of national GDP per capita and it is included to gauge relative economic performance and assess the likely impact of redistributive programs on fiscal performance. GDP/national average denotes the relative wealth levels which may be unevenly distributed across a country and reflect regional concentrations of economic activity. These differences may influence the fiscal capacities of sub-sovereign governments. GDP in PPP represents the current exchange rates that is used as the basis to measure economic size for the purpose of international rankings, however, it does not fully account for real cost-of-living differences across countries, they may, in certain cases, inaccurately reflect relative standards-of-living. Real GDP change is the economic growth, as measured by the annual percentage change in GDP, adjusted for inflation, is a key variable of economic performance. The unemployment rate indicates the size of the output gap and of the under-utilization of human resources, as well as a signal of potential political pressure on government to take action to stimulate the economy.

Net debt per capital is the ratio of net direct and guaranteed debt over population provides an internationally comparable gauge of debt levels. Debt/GDP is the amount of total gross government debt as a percentage of GDP. It shows the key factors for the sustainability of government finance. The short-term debt includes the total debt instruments with maturity period less than a year, for example government securities and treasury bills. The long-term debt instruments are payable within a period of time more than one year. Debt maturity is the principal amount of note, draft and any other debt instruments due for payment to investors by the government. It outlines the length of time until the debt obligation of the government stock matures or redeemed.

Own revenue encompasses all revenue -taxes, charges and other revenue generating sources, partially controlled, by the government. This ratio indicates whether government has financial flexibility or not to address its fiscal challenges that may arise. Governmental transfers capture all revenues transferred from higher levels of government, whether intended as general fiscal support or as cost-sharing for particular spending categories. Earmarked revenue refers to all revenue flows that are dedicated to specific purposes, other than debt service, which ultimately limit the debt service capacity of a government. Interest/operating revenue shows the government's ability to execute interest payment from operating revenue. Debt service helps in some cases to ascertain potential fiscal pressures on government as a result of excessive debt burden. The borrowing ratio helps to ascertain the annual cash requirement of government. Total expenditure as a percentage of GDP measures the impact or effect of a subgroup government's expenses on the entire national economic output. Operating balance used to determine the structural capacity of government to maintain operating expenditure below operating revenue. A self-financing ratio with a value less than one implies the need to borrowing to meet capital budget requirements. The NWC ratio provides a point-in-time view of an entity's liquidity position and provides an indication of the need for market access in the short-term. Below is the brief description of steps of the methodology.

Step 1: Proposal of variables are the input variables in (Table 1) that was extracted from Moody's financial reports from 2003 to 2007. These variables represent the inputs of the models, while the rating classes 1 (one-year forecasting horizon) and 2 (two-year forecasting horizon) from Moody's rating agency stand as the outputs of the models. The forecasting model was based on several categories of variables, including economic, financial and debt.

Step 2: Data collection is a collection of a comprehensive time series dataset of sub-sovereign entities that was collected over the period of 2003–2007 that was extracted from Moody's rating from 257

regions categorized into 15 rating classes. The study was designed to minimize the cost of classification.

Step 3: Data preprocessing, the data was cleaned by filling in missing attributes, then transformed through normalization and aggregation to reduce the number of attributes of the variables for the analysis.

Step 4: Data analysis, Statistica was used to analyze the descriptive statistics such as the mean and standard deviation of the variables.

Step 5: Cost matrix was proposed to take the ordinal character of the output into account.
Step 6: Various machine learning algorithms were used to forecast sub-sovereign credit ratings. The experiments were carried out in WEKA.

Step 7: Statistical tests were performed to detect significant differences between the ROC and average cost of the model.

In Table 1 below, Statististca was used to analyze the input variables to obtain the descriptive statistics such as the mean and the standard deviations for their institutional quality, economic structure and performance, debt profile and the financial performance.

Table 1: Input and output variables for sub-sovereign credit rating forecasting

Category	Input Variables	Mean	Standard Deviation
Economic	Country_rating_class	4.18	4.04
	Developed country (0/1)	0.54	0.50
	Government rating class	5.26	3.83
	City (0/1)	0.44	0.50
	Previous sovereign default (0/1)	0.36	0.48
	GDP per capital	21939.92	18311.96
	GDP/(national average)	105.20	44.36
	GDP in PPP	22729.18	13388.28
	Real GDP change	3.19	2.88
	Unemployment rate	6.40	3.84
Debt	Net debt per capital	188.63	3906.52
	Debt/GDP	7.06	13.76
	Debt/operating revenue	6.22	73.32
	Short-term debt/debt	16.33	22.78
	FX debt/debt	7.23	19.24
	Long-term debt/debt	51.46	41.39
	Debt maturity	7.88	3.73
Financial	Own revenue/OR	40.42	29.45
	Government transfers/OR	46.85	27.99
	Earmarked revenue/OR	23.86	25.92
	Interest/OR	2.53	2.66
	Debt service/TR	7.65	9.63
	Cash surplus/TR	-0.45	8.55
	Borrowing/TR	7.29	10.95
	TE per capita	2261.95	2819.64
	TE/GDP	12.26	7.75
	Operating balance/OR	13.49	10.89
	Gross operating balance/OR	10.99	11.14

	Self-financing ratio	0.97	1.04
	Capital spending/TE	19.72	12.91
	TR-TE(%)	0.14	2.98
	NWC/TE	4.18	22.40
Output variables	Rating class +1	6.62	4.75
	Rating class +2	6.71	4.76

Legend: TR is total revenue, TE is total expenditure, OR is operating revenue, and NWC is net working capital.

Methods

Here I briefly present the machine learning methods used for forecasting.

The Naïve Bayes algorithm is a very simple and probabilistic and an efficient classification algorithm classifier that calculates a set of probabilities by counting the frequencies and combinations of values in a given data set. The algorithm uses Bayes theorem and assumes all attributes to be independent given the value of the class variable.

A Bayesian network, Bayes network, belief network, Bayesian model or probabilistic directed acyclic graphical model is a probabilistic graphical model (a type of statistical model) that represents a set of random variables and their conditional dependencies via a directed acyclic graph.

J48 is an algorithm used to generate a decision tree developed by Ross Quinlan. J48 version was used with the minimum no. of instances per leaf = 2, and confidence factor for pruning = 0.25.

Random Forest is an ensemble learning method for classification, regression and other tasks that operate by constructing a multitude of a decision tree training time and outputting the class that is the mode of the mode or the mean prediction of the individual tree. Maximum depth of trees was set as unlimited, no. of trees to be generated = 100, and no. of variables randomly sampled as candidates at each split = $\log_2$ (#predictors) + 1

Simple logistics is an algorithm used to classify building logistic regression models.

A Support Vector Machine (SVM) is a supervised machine learning algorithm that can be used for both classification and regression purposes. SVMs are more commonly used in classification problems and as such, finding a hyperplane that best divides a dataset into two classes. SMO algorithm with complexity parameter C= {1, 2, 3, … , 15}, polynomial kernel function with exponent = {1, 2}, RBF kernel function with gamma = 0.01. SMO is an algorithm that generally substitutes all missing values and changes nominal attributes into binary ones. It also normalizes all attributes by default in the case that the coefficients in the output are based on the normalized data.

Radial basis function (RBF) neural networks are neural nets that have three layers. The first input layer feeds data to a hidden intermediate layer. The hidden layer processes the data and transports it to the output layer.

Multilayered Perception (MLP) is a feedforward artificial neural network that generates a set of outputs from a set of inputs. MLP is characterized by several layers of inputs nodes connected as a direct graph between the input and the output layers. MLP uses backpropagation for training of the network. The following setting was used for MLP: neurons in hidden layer = {1, 2, 3, ….,15}, learning rate = 0.1, and no. of iterations = 500.

Table 2 below illustrates the 15-rating classes of the rating agencies used as the cost matrix used to determine the cost sensitivity.

Table 2: Cost matrix

Predicted/ Target class	Aaa	Aa+	Aa	Aa-	…	C
Aaa	0	1	2	3	…	15
Aa+	1	0	1	2	…	14
Aa	2	1	0	1	…	13
Aa-	3	2	1	0	…	12
…	…	…	…	…	…	…
C	15	14	13	12	…	0

Source: own calculations

Results

In Table 3 below, average results across 10-fold cross-validation are presented. 10 folds were generated as 66/34 percent split of training/testing data. This procedure avoids overfitting of the machine learning methods.

For Rating +1, Naïve Bayes algorithm achieved 1.4571 average cost and 0.801 ROC (area under receiver operating characteristics). The ROC shows how the algorithms perform on all classes on average. In other words, a high ROC value indicates that the algorithm performed well also on imbalanced classes. In case of sub-sovereign credit ratings, these are the best and the worst credit ratings. The result of Naïve Bayes was the worst one, together with the RBF neural network. Similar results were also observed for Rating +2. In contrast, Random Forest and SMO algorithm performed best for both forecasting horizons, providing almost two-times lower classification cost compared with Naïve Bayes. As expected, the cost increased with a longer forecasting horizon (for Rating +2). To compare the results, we performed Student's paired *t*-test and marked the significantly better results at $p<0.05$ in bold in Table 3. Obviously, the differences were significant for both accuracy measures, in particular for average cost. The empirical hypotheses articulated in the beginning of this chapter from the results of the sub-sovereign credit rating forecasting signifies that Random Forest and SMO algorithm performed significantly better than the statistical methods.

The results strongly suggest that the machine learning models based on current available financial and economic data could present accurate classifications of credit ratings. Even though, the rating agencies and many other institutional writers stresses on the importance of subjective analyses in determining the ratings, it seemed that a small list of input variables largely determine the rating results. This also asserts that the set of variables discovered in this study represent the most relevant information for the credit rating decision.

The proposed model gives an easier idea of the evaluation of the sub-sovereign credit rating for public administration managers, banks, investors, or rating agencies. In future, such models should be developed in a way to make it possible to precisely forecast credit rating. This can be realized by using input variables significant for credit rating process and, consequently, by the classification of the sub-sovereigns into rating classes.

Table 3: Results of sub-sovereign credit rating forecasting

	RATINGS +1		RATINGS +2	
	Average cost	**ROC**	**Average cost**	**ROC**
Bayes Net	0.914	**0.876**	0.850	**0.895**
J48	0.971	0.735	0.939	0.725
Random Forest	**0.747**	**0.886**	**0.835**	**0.870**
SMO	**0.751**	**0.881**	**0.825**	**0.890**
RBF Network	1.400	0.807	1.289	0.760
Simple Logistics	0.861	**0.866**	0.890	**0.869**
MPL	1.045	0.820	1.102	0.838
Naive Bayes	1.457	0.801	1.354	0.797

Source: own calculations

Conclusion

Credit ratings contribute greatly to the capability and clarity within the financial markets. They have become the precondition for the development of emergence of the capital markets and also a very important tool in the regulatory context. In this study, a comprehensive time series dataset of sub-sovereign entities over the period of 2003–2007 was extracted from Moody's rating agency. The study was designed to determine the cost sensitivity of various machine learning methods. The main aim was to develop an accurate decision-support system that minimizes cost of credit rating classification for sub-sovereign entities across countries and world regions. We looked at each side of the economic, financial and debt and budget, revenues and expenditures, to provide sufficient inputs to the machine learning models.

We found that Random Forest has the most accurate forecasts with 0.747 average cost for Rating +1 (and 0.835 for Rating +2) and ROC of 0.886 for Rating +1 (0.870 for Rating +2). SMO performed even better for Rating +2. It is therefore recommended to combine Random Forest for a short-term credit rating prediction and SMO algorithm for a long-term forecasting.

This paper was limited in several ways such as the unavailability of more recent data. Moreover, a more precise costs matrix defined by experts based on actual costs would also be beneficial. The experimentation was carried out in WEKA.

Acknowledgement

This article was supported by the grant No. SGS_2017_017 of the Student Grant Competition.

References

Beck, R., Ferrucci, G., Hantzsche, A., and Rau-Goehring, M. (2017). 'Determinants of sub-sovereign bond yield spreads' – The role of fiscal fundamentals and federal bailout expectations. *Journal of International Money and Finance*.

Bennell, J. A., Crabbe, D., Thomas, S., & Ap Gwilym, O. (2006). 'Modelling sovereign credit ratings: Neural networks versus ordered probit,' *Expert Systems with Applications*, 30(3), 415-425.

Cantor, R., and Packer, F. (1994). 'The credit rating industry,'. *Quarterly Review*, (Sum), 1-26.

Cheung, S. (1996) 'Provincial Credit Ratings in Canada,' *An Ordered Probit Analysis*. Working Paper 96-6.

Flandreau, M., and Flores, J. H. (2009). 'Bonds and brands: foundations of sovereign debt markets,' 1820–1830. *The Journal of Economic History*, 69(3), 646-684.

Gaillard, N. (2009) 'The determinants of Moody's sub-sovereign ratings,' *International Research Journal of Finance and Economics*, 31(1), 194-209.

Hajek, P. (2011) 'Municipal credit rating modelling by neural networks,' Decision Support Systems, '51(1), 108-118.

Hajek, P., and Michalak, K. (2013), 'Feature selection in corporate credit rating prediction,' Knowledge-Based Systems, 51, 72-84.

Hájek, P., and Olej, V. (2011), 'Credit rating modelling by kernel-based approaches with supervised and semi-supervised learning,' Neural Computing and Applications, 20(6), 761-773.

Huang, Z., Chen, H., Hsu, C. J., Chen, W. H., and Wu, S. (2004), 'Credit rating analysis with support vector machines and neural networks: a market comparative study,' Decision Support Systems, 37(4), 543-558.

Jones, S., Johnstone, D., and Wilson, R. (2015), 'An empirical evaluation of the performance of binary classifiers in the prediction of credit ratings changes,' *Journal of Banking & Finance*, 56, 72-85.

Kim, S., and Park, S. (2016), 'Credit Rating Inflation during the 2000s: Lessons from the US State Governments,'. *International Journal of Economics and Financial Issues*, 6(1).

Liu, L., and Tan, K. S. (2009), 'Subnational credit ratings: A comparative review,' World Bank Working Paper 5013.

Mohapatra, S., Nose, M., and Ratha, D. (2017), 'Determinants of the distance between sovereign credit ratings and sub-sovereign bond ratings: Evidence from emerging markets and developing economies,' Applied Economics, 1-23.

Paudyn, B. (2013), 'Credit rating agencies and the sovereign debt crisis: Performing the politics of creditworthiness through risk and uncertainty,' Review of International Political Economy, 20(4), 788-818.

Reisen, H., and Von Maltzan, J. (1999), 'Boom and bust and sovereign ratings. International Finance,' 2(2), 273-293.

Zhong, H., Miao, C., Shen, Z., and Feng, Y. (2014), 'Comparing the learning effectiveness of BP,' ELM, I-ELM, and SVM for corporate credit ratings. Neurocomputing, 128, 285-295.

Changes in Relation between University and Company Regarding Human Resources Management

Antonin Max, University of West Bohemia, Pilsen, Czech Republic, antoon@kks.zcu.cz
Jakub Jirasko, University of West Bohemia, Pilsen, Czech Republic, jirasko3@kks.zcu.cz
Martin Hynek, University of West Bohemia, Pilsen, Czech Republic, hynek@kks.zcu.cz

Abstract

Due to the high demand for new employees in the technical fields and also because of the low unemployment rate, employers are forced to change the strategies related to human resources management. The focus of this article is the engineering branch and deals with changes in the relationships between companies and universities. These changes are described in the article. In addition, their benefits are analyzed from the side of the University and students, as well as by the companies.

Keyword: human resources management, university, company, relation

Introduction

Employers are looking for new ways to get more workers into their companies. This trend is worldwide. Major efforts have been made by the European Union to increase the fundamental interaction between research, education and innovation, as key driver of a knowledge-based society. Furthermore, the Union recognized that the relationship between the business community and the university, considering its double role as education and research institution, is of strategic importance for a modern vision of future and development. Several "case-studies", made across the whole Europe, have demonstrated an increase of opportunities by "structured business-university partnerships", especially in industrial innovation and social deployment (AdriaHUB, 2007). For this reason, many companies have established a department focusing on human resources management: the organization function that focused on the management and direction of people (Tracey, 2016). They are forced to do so for several reasons. As the main one, it should be noted that in the engineering field there is long-term shortage of educated qualified workers in relation to the number of vacancies for the given position. At the same time after the end of the period of economic crisis and economic stagnation is a very low level of unemployment in the Czech Republic, 2,9% in June 2017 (Czech statistical office, 2017). Of course, these negative impacts have also positive effect on the engineering sector. Due to the large shortage of employees, it is a very common phenomenon that firms drag employees on each other on the basis of offering better salary conditions. Therefore, there is a significant increase in wage conditions.

The spectrum of companies looking for new employees among students and graduates of the faculty is very wide. Some companies are still using obsolete methods. Unfortunately, not all of them are efficient enough. That is why employers must look for more direct methods of contacting potential employees in order to attract attention. Some of them are described below.

Primary and commonly used approaches

In this paragraph are presented commonly used approaches that companies use to attract students to their businesses. Unfortunately, some of these methods are not always effective enough and they are often overlooked by students.

The first commonly used approach is advertisement. The most common form of advertising is a job offer with a short company description and a link to their website where students can find more information. The most important is placement of advertisement. The least suitable placement is in a

university magazine or university newspaper. However, these publications end up more often in the nearest wastebasket without noticing of advertisement. The second possible form is a poster located in the university premises. Students most often look at the poster only if the poster is different from others in a row. For this reason, it is advisable to place a poster near an interactive screen, a corporate product, etc., which students can explore further. For example, when they need to shorten the time before the lesson begins. A similar approach is in the case of promoting the university at public events such as Science and Technology Days. It is always important for companies to attract potential employees (students) to the place where the advertisement is placed. The last possible placement is at university portals and student portals, which are often attended.

Other commonly used approaches are:

- Offer of excursions to industrial enterprises during the study.
- Offer bachelor´s and diploma´s theses, which serves to establish future cooperation. Often it also brings innovative solutions for the contracting authority.
- Granting scholarships to students during their studies and thus creating a contractual obligation for future employment.
- Technical lectures made by practitioners that are integrated into the studies. These lectures usually include a brief introduction about the company and some motivational part why a student should choose this business as their future job.
- Occupational fair held at the University. Where companies have their own stands with a presentation of their industrial field, product and job vacancies.

Newly Used Approaches

The new approaches that companies begin to apply directly at the University zone are mainly the rental of premises. Subsequently, in these spaces (most often the rooms), he creates design offices. In these offices students can attend training programs, brigades, etc. For students, it has the advantage of being able to earn money while studying and also to gain experience. However, this they can do normally. But in this case the students do not need to leave the university campus and they save much time that lose on traveling. Another advantage is that students can spend more time in work between lessons. In the total they can to work in the sum of more time.

The second most important step for companies is to engage in University Projects. Such a project is, for example, the University Formula SAE. The SAE International Formula SAE program is an engineering design competition for undergraduate and graduate students. The competition provides participants with the opportunity to enhance their engineering design and project management skills by applying learned classroom theories in a challenging competition. The engineering design goal for teams is to develop and construct a single-seat race car for the non-professional weekend autocross racer with the best overall package of design, construction, performance and cost (SAE International, 2017). In this case, companies provide expert consultations, cooperate on the production of components, and last but not least, provide funding. Thanks to this collaboration, companies have the opportunity to reach out to students, to make deeper co-operation and to reach out students for further co-operation after graduation.

The latest approach is centered on the establishment of a university subject at the University, which is strongly oriented towards industry field of supportive firms. These companies are at the beginning of creation of a concept of subject and design of a study plan. Companies also provide practice know-how enriching learning materials. Experts participate in lessons during study year also.

Of course, it is not ideal to concentrate on university students only. There is need to increase interest in promotion at elementary and secondary schools. Companies are aware of this fact. That is why they lecture at these institutions as well. This step is generally beneficial because it increases interest in the field as such. At the same time, appropriate support (based on the trend of today) is an active presentation on the university social networks and student social networks.

Conclusion

Industry-university cooperation has been recognized as an important strategy to make innovation happen in an industrial society today (Nomakuchi and Takahashi, 2015). Over the last few years the number of students who have been working during their studies has increased. It can be said that a quarter of students are preparing job opportunity in field where they would like to continue after graduation. The other quarter of students irregularly work in different sectors. Although they do not have a specific focus, these general practical skills and knowledge are beneficial for their work opportunities in subsequent years. From this trend, it can be seen that the methods of direct contact between the possible employer and the student are able to ensure an increased supply of workers. For this reason, it is necessary to continue to maintain and to develop the established methods.

At the same time, the cooperation is beneficial for both parties (Mora Valentín, 2000). The changes in relation bring financial benefits for companies and universities. Other benefits of new approaches include higher transfer of practical know-how to the university. Therefore, it can be stated that close cooperation between industry and universities in recruiting workers is an effective way. Thanks to these changes, the nature of the university has shifted from a simple "knowledge factory" to an "entrepreneurial-relational university" with links to industry and research facilities (Uyarra, 2010).

Acknowledgement

The research work was supported by the project SGS-2016-012 of the University of West Bohemia.

References

AdriaHUB (2007) *Project summary*. Available at: http://www.adria-hub.eu/project/project-summary (Accessed: 29 August 2017).

Czech statistical office (2017) *Rates of employment, unemployment and economic activity - June 2017*. Available at: https://www.czso.cz/csu/czso/ari/rates-of-employment-unemployment-and-economic-activity-june-2017 (Accessed: 28 August 2017).

Mora Valentín, E. M. (2000) 'University–industry cooperation: a framework of benefitss and obstacles', *Industry and Higher Education*, (June), pp. 165–172. doi: 10.5367/000000000101295011.

Nomakuchi, T. and Takahashi, M. (2015) 'A Study about Project Management for Industry-University Cooperation Dilemma', in *Procedia Computer Science*, pp. 47–54. doi: 10.1016/j.procs.2015.08.462.

SAE International (2017) *About Formula SAE Series*. SAE International. Available at: http://students.sae.org/cds/formulaseries/about/ (Accessed: 4 September 2017).

Tracey, W. R. (2016) *The human resources glossary: The complete desk reference for HR executives, managers, and practitioners*. Third Edit. CRC Press.

Uyarra, E. (2010) 'Conceptualizing the Regional Roles of Universities, Implications and Contradictions', *European Planning Studies*, 18(8), pp. 1227–1246. doi: 10.1080/09654311003791275.

Customer Retention, Behavior and Emotions

Mihai Dragnea , The Bucharest University of Economic Studies, Bucharest, Romania;

Prof. Dr. Niculae Mihaiță, PhD Univ. Professor, the Bucharest University of Economic Studies, Bucharest, Romania.

Abstract

During a preliminary study about Customer Retention strategies, one of the most important outcomes was that, according to loyalty & retention professionals, there are 3 major needs for a Customer Retention Strategy to become successful: knowing your customers, adaptability to customer's feedback & freedom in choosing the right solution for retaining a churning customer.

Exploring these needs from an individual-psychological perspective while entering on the semiotic field of happiness, smile and basic human needs where the Romanian academician Solomon Marcus (Smile and Suspicion in "Multimedial Communication" (1982), ed. E.W.B.Hess-Luttich, vol.1, Semiotic Problem of its Notation. Günter Narr Verlag, Tubingen, , p.77-85.) proposed semiotic of at least order 5 to understand the variants of a smile between two persons, we can confidently say that, to an extent, all the three needs have in common 2 things: customers & empathy – or, in a simplified way, humans & emotions.

The article aims to start challenging every Customer Retention Strategy that businesses around the world use today without taking into account personal and not brand related customer feelings.

Keywords: Customer, Retention, Emotions, Statistics.

Introduction

taking into account the AI recent developments with direct impact on the humanity fundamental values like love and freedom merged with the digital transformation of all businesses across the globe and with the new sharing economy, there are three essential questions to answer to understand in depth the evolution of Customer Retention Strategies:

1. Do customers have the power to change a business only with their feelings?

2. Are we in the Era where customers should be aware they don't need to ask anymore as it should be enough to feel in order to be understood?

3. Are businesses ready for this Era or they are just overestimating their power to control the customers?

Theoretic considerations

Customer Loyalty & Retention – The concepts

Loyalty, as defined by Dixon, Freeman & Toman, represents "the willingness of someone - a customer, an employee, a friend - to make an investment or personal sacrifice in order to strengthen a relationship. For a customer, that can mean sticking with a supplier who treats him well and gives him good value in the long term even if the supplier does not offer the best price in a particular transaction" (Dixon, M.; Freeman, K.; Toman, N. (2011), Increasing Customer Loyalty, USA: Harvard Business Review.)

Retention was best defined in 1970 by German economist O. Hirschman. Hirschman defines the opposite of retention as being one of the answers of customers to decrease the quality of a product or service the organization offers – more precisely, the exit option. "Some customers stop buying the firm's products or some members leave the organization. [...] As a result, revenues drop, membership declines, and management is impelled to search for ways and means to correct the elements which have led to exit." (Hirschman, A.O. (1970). Exit, Voice, and Loyalty, USA: Harvard University Press).

The confusion One of the best definition describing the return of investments differences between the two concepts comes from Frances Frei, Senior Associate Dean for Executive Education and the UPS Foundation Professor of Service Management at the Harvard Business School: "When companies pay customers to remain customers, it's part of a customer retention program. When companies invest in activities that increase customers' willingness to pay, they have a customer loyalty program." (Frei. F. (2009). Illusions of Customer Loyalty, Decision to Lead. [Retrieved June 22, 2014] Available: https://decisiontolead.com/2009/10/03/illusions-of-customer-loyalty/).

Human Motivations and Values

Human motivations

Self-determination theory initially developed by professor Edward L. Deci and clinical psychologist Richard M. Ryan and it is considered a theory of motivation. "Self-Determination Theory (SDT) represents a broad framework for the study of human motivation and personality. SDT articulates a meta-theory for framing motivational studies, a formal theory that defines intrinsic and varied extrinsic sources of motivation, and a description of the respective roles of intrinsic and types of extrinsic motivation in cognitive and social development and in individual differences (http://selfdeterminationtheory.org/)."

Summarizing one of the most important outcomes of the SDT, there are 5 intrinsic motivators also used by Rajat Paharia (Paharia, R. (2013). *Loyalty 3.0*, USA: McGraw-Hill.) to explain the basics of the Gamification concept:

1. Autonomy – I control;
2. Mastery – I improve (which they refer to as "competence");
3. Purpose – "I make the difference";
4. Progress – "I achieve";

Social Interaction – "I connect with Others".

Values

The starting point for values considerations within this research is Schwartz's Theory of Basic Values (Schwartz, Shalom H. (2012). "An Overview of the Schwartz Theory of Basic Values". *Online Readings in Psychology and Culture*).

The theory claims there are ten basic personal values well known irrespective of culture and region: self-direction (e.g. creativity, freedom), stimulation (e.g. novelty, daring), hedonism (e.g. pleasure, enjoying life), achievement (e.g. ambitious, successful), power (e.g. authority, wealth), security (e.g. family security, safety), conformity (e.g. politeness, self-discipline), tradition (e.g. respect for tradition, humble), benevolence (e.g. helpful, responsible), universalism (e.g. world at peace, wisdom).

The above concepts were integrated in the questionnaire under three main sections (except standard demographics):

1. About the respondent – with focus on personal values, independent of consumption behavior of the individual. This is also the fixed point to compare personal beliefs with the customer's consumer routine.

2. About brands – with focus point on a brand randomly named by the respondent, without any predefined values and without previously influencing the choice by using adjectives related to the brand choice (e.g. satisfied/dissatisfied).

3. About the responded when he acts like a customer/consumer – the core of this section represents in fact the mix between sections 1 and 2 related again to personal values, therefore, closing the circle of the research.

The Study

Target group

The target group is enlarged to avoid any expertise, social environment pre-segmentation and is addressing all regular consumers around the globe with no limitations. An intermediate version of the questionnaire can be found here: https://goo.gl/fEFPdp.

The database structure:

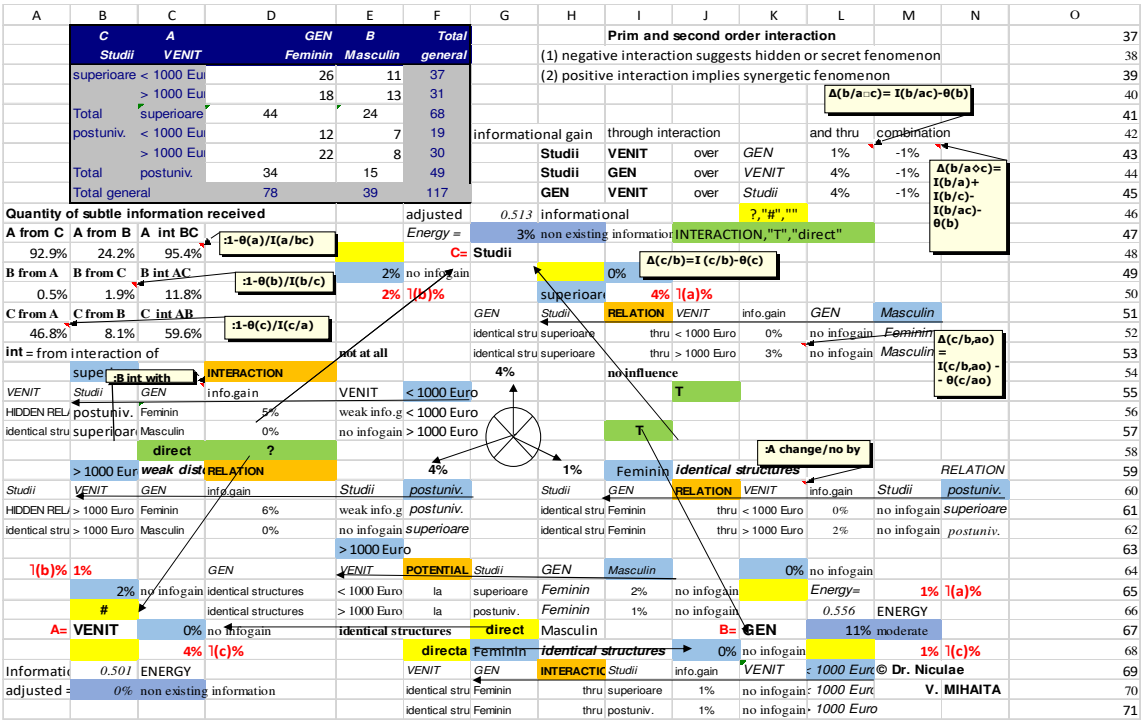
Currently, there are more than 100 answers within the database that allowed to test the database credibility.

From an informational standpoint, the level of influence is lower than 5% which confirms the high level of the data credibility.

The segmentation variables related to demographic aspects of the research already generate both a first level of correlation (gender + revenue for female) and no correlation on male segment.

With the above preliminary considerations, the next step is to implement factorial analysis in order to reduce the number of resolving variables.

Table 1: MONALIS, Methodology of Onicescu Negentropic Analysis in the Language of Informational Statistics



Preliminary Results

The first results, using a basic linear regression analysis, are not yet enough to confirm or infirm the hypothesis within the motivation questions, but for sure shows in these early stages of the study that there is a strong connection between general level of customer satisfaction and several factors that are influencing direct experience, as detailed below.

Answers were analyzed for the following question: *How would you rate your experience with 17 - Choose a single company... in the last year?*

The linear regression analysis shows a positive Adjusted R Square as represented in the tables bellow.

Q1: Constantly adapts to customers and the market, being always among the first to improve the full package (shop / online experience, prices, products, services, benefits).

Table 2: Linear regression analysis Q1

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0,63367994							
R Square	0,40155027							
Adjusted R Sq	0,39610982	39,61%						
Standard Erro	1,64742477							
Observations	112							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	200,316221	200,316221	73,8082546	6,4462E-14			
Residual	110	298,540922	2,71400838					
Total	111	498,857143						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	3,28914125	0,43574988	7,54823213	1,3715E-11	2,42558726	4,15269523	2,42558726	4,15269523
8	0,51732653	0,06021605	8,59117306	6,4462E-14	0,39799244	0,63666061	0,39799244	0,63666061

Q2: Knows you well, so well that you can always receive personalized offers, fully adapted to your needs, when you need it, how you need it.

Table 3: Linear regression analysis Q2

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0,49176899							
R Square	0,24183674							
Adjusted R Sq	0,23494435	23,49%						
Standard Erro	2,21526161							
Observations	112							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	172,187759	172,187759	35,0874841	3,6646E-08			
Residual	110	539,812241	4,90738401					
Total	111	712						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	1,75820401	0,5859448	3,00063077	0,0033336	0,59699894	2,91940907	0,59699894	2,91940907
8	0,47963164	0,08097141	5,92346893	3,6646E-08	0,31916531	0,64009797	0,31916531	0,64009797

Q3: *17 - Choose a single company...* website is built in such a way that it almost takes decisions for you in a way that helps you.

Table 4: Linear regression analysis Q3

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0,51907484							
R Square	0,26943869							
Adjusted R Sq	0,26279722	26,28%						
Standard Erro	2,31856279							
Observations	112							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	218,088966	218,088966	40,5691555	4,531E-09			
Residual	110	591,330677	5,37573343					
Total	111	809,419643						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	1,57482316	0,61326834	2,56791855	0,01157253	0,35946924	2,79017707	0,35946924	2,79017707
8	0,53978838	0,08474724	6,36939209	4,531E-09	0,37183925	0,70773752	0,37183925	0,70773752

Q4: Constantly, things that were dissatisfying in your experience with *17 - Choose a single company...* including the services offered, including the services offered, have changed without having to complain.

Table 5: Linear regression analysis Q4

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0,70716955							
R Square	0,50008877							
Adjusted R Sq	0,49554412	49,55%						
Standard Erro	1,89920757							
Observations	112							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	396,909739	396,909739	110,039065	2,9245E-18			
Residual	110	396,768833	3,60698939					
Total	111	793,678571						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	0,52455536	0,50234735	1,04420846	0,29867829	-0,4709792	1,5200899	-0,4709792	1,5200899
8	0,72820317	0,06941912	10,4899507	2,9245E-18	0,59063076	0,86577558	0,59063076	0,86577558

Q5: *17 - Choose a single company...* has the ability and speed to react quickly & efficient to a new offer or service from competitors.

Table 6: Linear regression analysis Q5

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0,6101469							
R Square	0,37227924							
Adjusted R Sq	0,36657268	36,66%						
Standard Erro	2,01579314							
Observations	112							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	265,086083	265,086083	65,2371536	9,2399E-13			
Residual	110	446,976417	4,06342197					
Total	111	712,0625						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	2,29016712	0,53318466	4,2952607	3,7785E-05	1,23352027	3,34681397	1,23352027	3,34681397
8	0,59511398	0,07368051	8,076952	9,2399E-13	0,44909649	0,74113147	0,44909649	0,74113147

Q6: How easy would it be for you to stop being *17 - Choose a single company*...customer or start buying less?

Table 7: Linear regression analysis Q6

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0,57025584							
R Square	0,32519172							
Adjusted R Sq	0,3190571	31,91%						
Standard Erro	1,1563426							
Observations	112							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	70,8801818	70,8801818	53,0092633	5,265E-11			
Residual	110	147,084104	1,33712822					
Total	111	217,964286						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	4,77146631	0,32824907	14,5361152	2,3221E-27	4,1209537	5,42197893	4,1209537	5,42197893
4	-0,6232203	0,08559841	-7,2807461	5,265E-11	-0,7928563	-0,4535843	-0,7928563	-0,4535843

Ideas to Explore

Based on the preliminary results of the case study presented below, we consider relevant to further explore the following ideas:

1. Customers perception is relevant enough to be used as benchmark in identifying in a relevant way the probability to churn based on personal motivations and values?

2. What other type of Big Data could be added to the questionnaire answers to build a churn prediction model with higher than 0.5 probability rate? (e.g. Facebook activity)?

Acknowledgment

I thank Prof. dr. Niculae Mihaiță, PhD Univ. Professor, The Bucharest University of Economic Studies, Bucharest, Romania who invested valuable expertise and offered essential assistance for the research.

References

Dixon, M.; Freeman, K.; Toman, N. (2011), Increasing Customer Loyalty, USA: Harvard Business Review.

Frei. F. (2009). Illusions of Customer Loyalty, Decision to Lead. [Retrieved June 22, 2014] Available: https://decisiontolead.com/2009/10/03/illusions-of-customer-loyalty/

Hirschman, A.O. (1970). Exit, Voice, and Loyalty, USA: Harvard University Press.

Paharia, R. (2013). Loyalty 3.0, USA: McGraw-Hill.

Schwartz, Shalom H. (2012). "An Overview of the Schwartz Theory of Basic Values". Online Readings in Psychology and Culture.

Solomon Marcus, Smile and Suspicion in "Multimedial Communication" (1982), ed. E.W.B.Hess-Luttich, vol.1, Semiotic Problem of its Notation. Günter Narr Verlag, Tubingen, , p.77-85.

Customer Retention Strategies and Organizational Adaptability

Mihai Dragnea, PhD, The Bucharest University of Economic Studies, Bucharest, Romania;

Niculae Mihaiță, PhD Univ. Professor, The Bucharest University of Economic Studies, Bucharest, Romania.

Abstract

Customer Loyalty & Customer Retention are two frequently used concepts, especially as part of modern organizations strategies. They have become a priority because they share an essential purpose for sustainable businesses: keeping customers their revenues. This common purpose seems to lead to a strong overlapping and confusion, starting from the usage of terminology and ending with the strategy definition and design. Therefore, it becomes strongly debatable if there are structural differences in the return of investment between the two strategies, when referring to timeframes. This article is aiming to opening the debate around to the confusion perception and will focus on delivering preliminary answers about the assumed fundamental differences, having as a main focus the Customer Retention Strategy, concluding with a case-study exercise build with MONALIS, Methodology of Onicescu Negentropic Analysis in the Language of Informational Statistics.

Keywords: Customer, Retention, Loyalty, Statistics.

Introduction

Customer Retention or Customer Loyalty? Or both? Are these concepts different from the marketing-management strategy perspective? Is the return of investment the same? How are they perceived by marketing professionals? Within this paper we are going to start answering the questions above using statistics concepts – this also being the core motivation of the research.

Theoretic considerations

Customer Loyalty & Retention – The concepts

Loyalty, as defined by Dixon, Freeman & Toman, represents "the willingness of someone - a customer, an employee, a friend - to make an investment or personal sacrifice in order to strengthen a relationship. For a customer, that can mean sticking with a supplier who treats him well and gives him good value in the long term even if the supplier does not offer the best price in a particular transaction" (Dixon, M.; Freeman, K.; Toman, N. (2011), Increasing Customer Loyalty, USA: Harvard Business Review.)

Retention was best defined in 1970 by German economist O. Hirschman. Hirschman defines the opposite of retention as being one of the answers of customers to decrease the quality of a product or service the organization offers – more precisely, the exit option. "Some customers stop buying the firm's products or some members leave the organization. [...] As a result, revenues drop, membership declines, and management is impelled to search for ways and means to correct the elements which have led to exit." (Hirschman, A.O. (1970). Exit, Voice, and Loyalty, USA: Harvard University Press).

The confusion One of the best definition describing the return of investments differences between the two concepts comes from Frances Frei, Senior Associate Dean for Executive Education and the UPS Foundation Professor of Service Management at the Harvard Business School: "When companies pay customers to remain customers, it's part of a customer retention program. When companies invest in activities that increase customers' willingness to pay, they have a customer loyalty program." (Frei. F. (2009). Illusions of Customer Loyalty, Decision to Lead. [Retrieved June 22, 2014] Available: https://decisiontolead.com/2009/10/03/illusions-of-customer-loyalty/).

Organizational systems – Intelligent Organizations

Organizational systems

We will further refer to Henry Mintzberg's organizational systems, described in 1989 in his book Inside Our Strange World of Organizations. We will summarize only the 3 types of organizational structure used during the study. (Iacob, D.; Cismaru, D.M. (2003). Organizaţia inteligentă – zece teme de managementul organizaţiilor, România: Editura Comunicare.ro.)

- The machine bureaucracy best described as hyper-formal, with highly increased focus on precise rules, procedures, regulations: banks, airlines (mostly in their operational departments).

- The divisionalised form of bureaucracy is assumed to be the most commonly found in today's large corporations. Based on the "headquarters" organizational concept, the main differentiator versus machine bureaucracy is a certain higher level of autonomy that generates higher adaptability potential.

- Adhocracy. To be found mostly in young organizations. Main differentiator versus the above 2 forms is the higher tendency to focus on experts than on hierarchical authority.

Intelligent organizations.

We considered relevant for our study the following works on intelligence organizations:

- Dragomirescu, H. (2001). Studiu tematic elaborat în cadrul proiectului prioritar „Societatea informaţională – societatea cunoaşterii", Academia Română.

- Liang, T.Y. (2004). Intelligence Strategy: The Integrated 3c Ok Framework of Intelligent Human Organizations, Human Systems Management.

- Iacob, D.; Cismaru, D.M. (2003). Organizaţia inteligentă – zece teme de managementul organizaţiilor, România: Editura Comunicare.ro.

To summarize the above mentioned authors' views on the characteristics of intelligence organizations, these are the aspects we considered to be most relevant to the study:

- Adaptability – the capacity to respond to external and internal factors as part of an established, stable and organized process;

- Knowledge – knowledge management and/or collective intelligence;

- Efficiency – as in net positive contribution the organization has on its environment;
- Power to change and influence its environment – similar to the dynamics of human mental functions;

The Study

Preliminary Remarks

Hypothesis: high confusion between Customer Loyalty and Customer Retention within the marketing specialists' community, but with significant differences between the needs of the two strategies.

Target group: 88 Romanian professionals involved in Customer Retention both strategy development & customer facing functions.

In order to assure a high number of non-altered responses, none of the concepts was explained prior to filling the questionnaire. The core question of the study was "Please specify the order of importance of the elements below in your daily activity (where 1 is essential for retaining customers).", with the following 7 options (structured based on the intelligent organizations features mentioned above):

1. The power to influence customer decision;
2. Freedom to decide the way to retain customers;
3. The level of power you have to make changes;
4. Time and effort expended to implement a change;
5. Retention strategies' adaptability to external and internal customers' feedback;
6. Retention tactics dynamics in regard to competitors;
7. Knowing the customers and availability of information about them;

Furthermore, the core question was used to build the pyramids of acquisition, loyalty & retention strategies needs. We considered adding the acquisition strategy as being an additional comparison factor to increase relevance.

Analysis and Preliminary Results

Qualitative

When asked "What is the order of importance of the following strategies in your organization?", 51% of respondents considered that acquisition strategies are the most important ones, followed by 40% opting for the loyalty strategies and only 9% considered the Customer Retention strategies as the most important. Which leads to confirming, from a qualitative stand point the confusion between retention and loyalty strategies – it is practically impossible not to want to retain your customers.

Consequently, the pyramids of the acquisition, loyalty and retention strategies needs are the following:

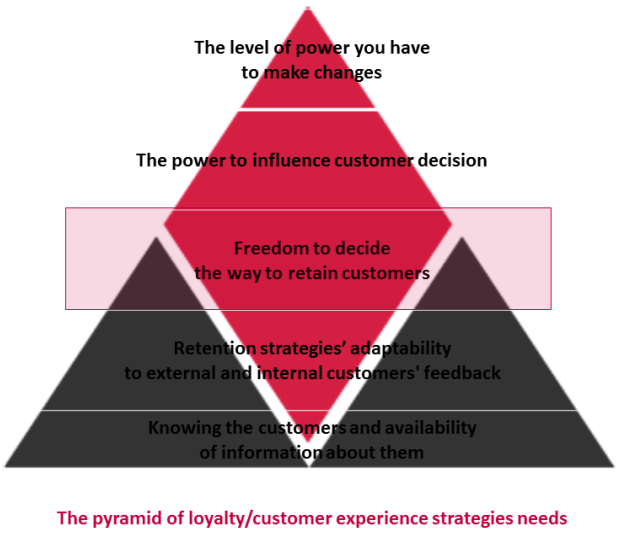


Fig. 1: The pyramid of loyalty/customer experience strategies needs

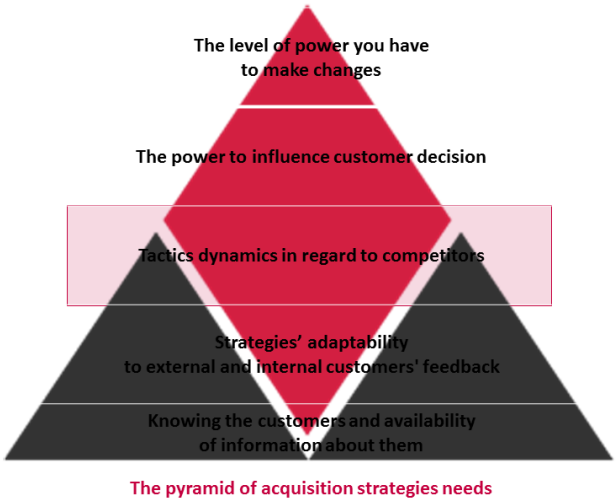


Fig. 2: The pyramid of acquisition strategies needs



Fig. 3: The pyramid of retention strategies needs

Observations

All strategies, whether they are acquisition, loyalty or retention, have two essential needs for the businesses of today or of tomorrow: knowing the customer and adaptability – we therefore get the confirmation that customer retention specialists do have adhocracy needs.

We can notice that the third need, in order of importance is different for each strategy – (marked in each of above).

Acquisition strategies: marketing tactics dynamics in regard to competitors is more important than the power to influence customer decision, the level of power employees have to generate changes and the freedom specialists have to decide how to address customers.

Loyalty/Customer Experience Strategies – the freedom specialists have to decide how to address customers becomes more important versus acquisition strategies, and it takes out the competitors' dependency.

Customer Retention – the power to influence customer's decision to churn becomes more important as the relationship tends to be more personal (e.g. direct contact vs. loyalty programs).

Ideas to explore

Based on the preliminary results of the case study presented below, we consider relevant to further explore the following ideas:

1. Specialists perception is relevant enough to be used as benchmark in defining the confusion between Customer Loyalty & Retention Strategies without taking into account the actions they take in their organizations to retain customers? (e.g. specialist might confuse the naming, but use the right strategy);

2. What other indicators could increase the relevance of the difference in needs for each strategy and be integrated in a prediction statistical model of customer churn propensity.

Case Study

Assumptions

We consider the trust that respondents have in strategies level of adaptability within a company with the below statistics (study outcome) and we assume the fact that they can have the ability to retain an X number of potentially churning customers in a given number of days (for all forms of organizations). The business coordinator asks predict the intermediate number of customers that the specialists believe they can retain according to the distribution below.

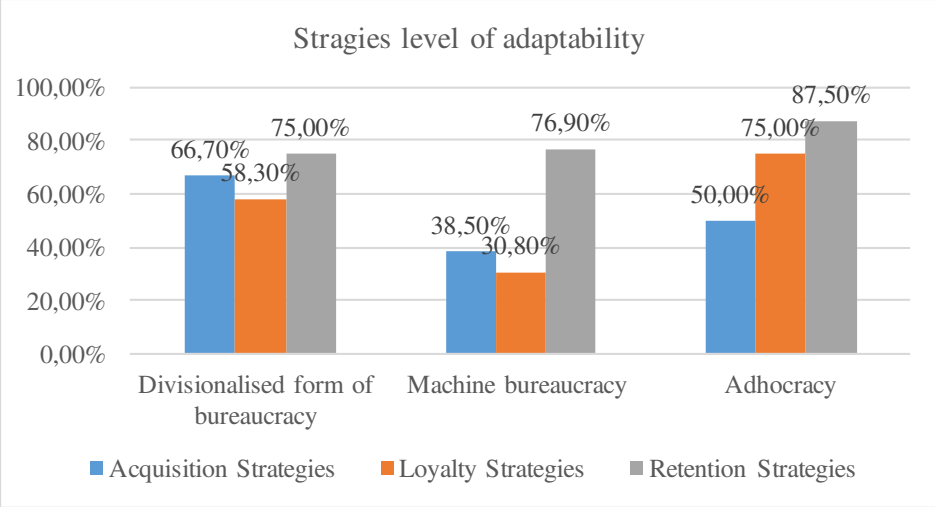


Fig. 4: Strategies level of adaptability

Table 1: Strategies level of adaptability analysis assumptions

Specialist	*Acquisition*	*Machine bureaucracy*	*Adhocracy*
Divisionalised form of bureaucracy	*67*	*38*	*50*
Loyalty	*58*	*31*	*75*
Retention	*75*	*77*	*87*

No specialists	*Acquisition*	*Machine bureaucracy*	*Adhocracy*
Divisionalised form of bureaucracy	*133*	*108*	*162*
Loyalty	*142*	*115*	*137*
Retention	*125*	*69*	*125*

Penalty	*Customers*	*Promised*	*Strategy*
0	*50*	*50*	*Adhocracy*
5	*17*	*12*	*Acquisition*
0	*50*	*50*	*Acquisition*

Table 2: Potential in the Experienced Period and Planning: Scenario: The strategy is not known; the plan is the confidence of the specialist himself and takes the intermediate value

Potential	***Acquisition***	***Machine bureaucracy***	***Adhocracy***	***Plan***
Divisionalised form of bureaucracy	*67*	*38*	*50*	*50*
Loyalty	*58*	*31*	*75*	*58*
Retention	*75*	*77*	*87*	*77*

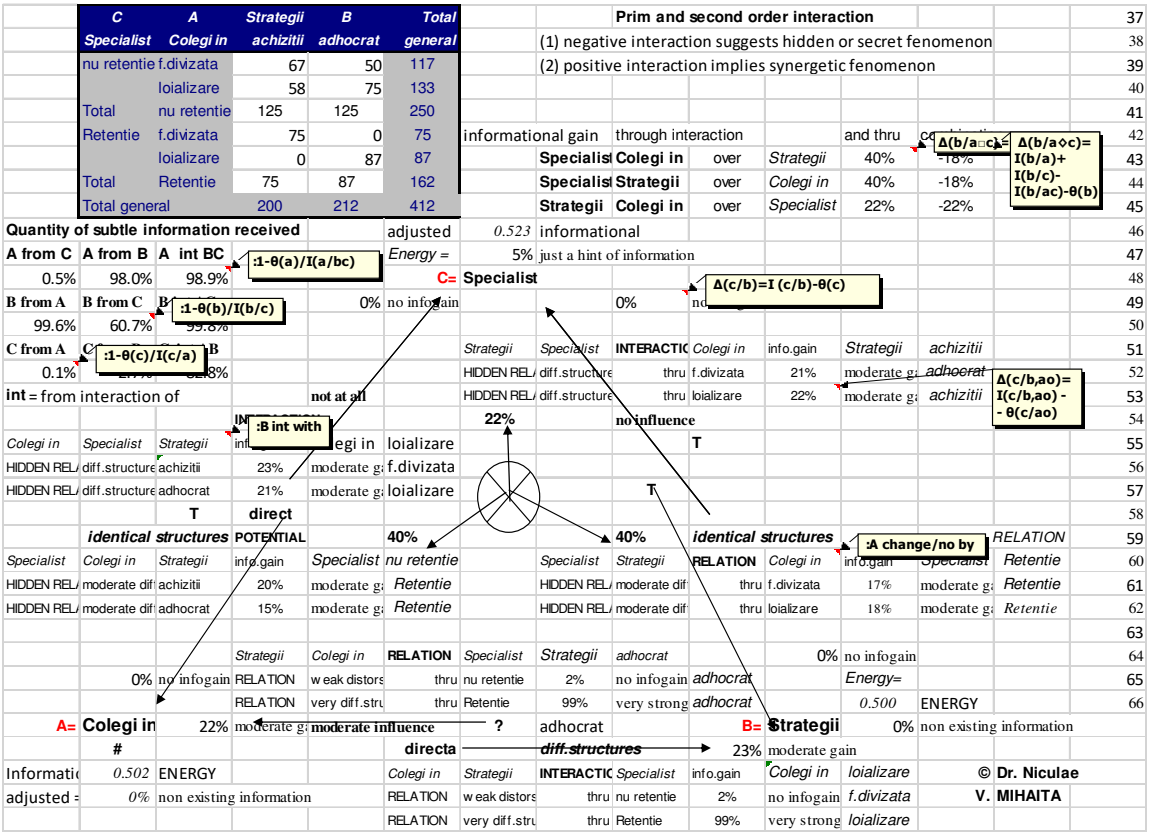
Table 3: The inverse matrix values were multiplied by 100 for visibility, so pure values would be interpreted as divided to 100, total 0.946

Divisionalised form of bureaucracy	*Loyalty*	*Retention*	*Plan*	*Pure values*
3.99	*-0.70*	*-1.68*	***50***	*28.8*
-0.75	*-2.69*	*2.75*	***58***	*18.3*
-2.77	*2.99*	*0.16*	***77***	*47.5*

Table 4: MONALIS, Methodology of Onicescu Negentropic Analysis in the Language of Informational Statistics.

Specialist				**Plan**					**3 strg**
Divisionalised form of bureaucracy	19.32	6.94	23.75	**50.00**	47.68	31.06	26.25	**105.00**	155.00
Loyalty	16.72	5.66	35.62	**58.00**	41.28	25.34	39.38	**106.00**	164.00
Retention	21.62	14.06	41.32	**77.00**	53.38	62.94	45.68	**162.00**	239.00
	57.66	26.66	100.68	**185.00**	142.34	119.34	111.32	**373.00**	**558.00**
	31%	14%	54%	100%	38%	32%	30%	100%	
	10%	5%	18%	33%	26%	21%	20%	67%	100%

Potential	Acquisition	Machine bureaucracy	Adhocracy	Diff.	**Indif.**	**Indif.**	**Indif.**		**3 strg**
Divisionalised form of bureaucracy	67	38	50	**155**	56	40	59	155.00	56
Loyalty	58	31	75	**164**	59	43	62	164.00	59
Retention	75	77	87	**239**	85	63	91	239.00	85
	200	166	212	**558**	200	166	212	**558.00**	**200**



Acknowledgment

I thank Prof. dr. Niculae Mihaiță, PhD Univ. Professor, The Bucharest University of Economic Studies, Bucharest, Romania and Prof. Univ. Dr. Diana-Maria Cismaru, NUPSA Bucharest, Romania who invested valuable expertise and offered essential assistance for the research.

I would also like to show my gratitude to University Assistant, Denisa-Andreea Tudor, NUPSA Bucharest, Romania who facilitated master classes dedicated to Customer Retention vs. Loyalty topic.

References

Dixon, M.; Freeman, K.; Toman, N. (2011), Increasing Customer Loyalty, USA: Harvard Business Review.

Dragomirescu, H. (2001). Studiu tematic elaborat în cadrul proiec-tului prioritar „Societatea informaţională – societatea cunoaşterii“, Academia Română.

Frei. F. (2009). Illusions of Customer Loyalty, Decision to Lead. [Retrieved June 22, 2014] Available: https://decisiontolead.com/2009/10/03/illusions-of-customer-loyalty/

Hirschman, A.O. (1970). Exit, Voice, and Loyalty, USA: Harvard University Press.

Iacob, D.; Cismaru, D.M. (2003). Organizaţia inteligentă – zece teme de managementul organizaţiilor, România: Editura Comunicare.ro.

Liang, T.Y. (2004). Intelligence Strategy: The Integrated 3c Ok Framework of Intelligent Human Organizations, Human Systems Management.

Influence of the Meso-environment and the Macro-environment on the Success of Enterprises in the Czech Republic

Jarmila Straková, Institute of Technology and Business in České Budějovice, Department of Management, České Budějovice, Czech Republic, strakova@mail.vstecb.cz

Abstract

The paper presents the results of an extensive survey of the business sphere in the Czech Republic (about 460 enterprises) realized in 2016, focused on strategic management and decision making. Using the dimensional reduction, from the point of view of sectoral differentiation, the factors of the meso-environment and the macro-environment are analyzed and their influence on the profitability, development and competitiveness of Czech enterprises is assessed.

Keywords: Business Environment, Meso-environment, Macro-environment, Competitiveness

Introduction

With the existing business sphere in the national as well as the international context, it is increasingly possible to observe and indicate ground-breaking, often discontinuous changes in macro, meso and micro-environment. Since the beginning of the 21st century, this attribute has been amplified by the fact that the changes taking place in the macro-environment and in the meso-environment have not induced or have had an adequate response in the internal environment of the businesses, i.e. their microclimate. This real-existing state, by a renowned scientific community declared as a management paradigm, or the macro-meso and micro-environment paradigm, is reflected in a number of contemporary economic and management theories, including strategic planning cycle methods, the basic scientific approach of which is strategic situational analysis. It is important to note that in recent years this trend has been accelerating and deepening, and in this reality one of the reasons for the growing interest of the professional and lay public in the impact of the business environment on the profitability, development and competitiveness of enterprises can be seen.

Literature Review

The external business environment includes the meso-environment, or close business environment, and macro-environment (Šulák, Vacík, 2005). Mallya (2007) characterizes the meso-environment as a branch business environment that is defined by five forces (the power of suppliers, customers, competitive ring, new potential competitors and the threat of substitutes). On the contrary, the macroeconomic environment can be described as wide-ranging /many sided and complex, including the influence and impact of external factors on the enterprise, from social-cultural, technological, economic, political- legal, ecological, ethical, etc. (Gregory, 2001; Murray-Webster and Office of Government Commerce, 2010). Similarly, Jakubíková (2008), Dedouchová (2001), Gomes et al. (2011), Nigel et al. (2003), Swayne, Duncan and Ginter (2008) devide the business environment into macro-environment (general environment), micro-environment (close or branch environment) and enterprise. Other authors specify the business environment in addition from the point of view of the national and international (global) perspective (Wetherly, Otter, 2014; Austin, 1990; Veber et al., 2004; Keillor, 2013; Malach, 2005).

The world-known and widespread tools for evaluating macro-environment and meso-environment are in particular STEP analysis facilitating a broad scan of actual or potential factors that have or could have an impact on the enterprise, its future development and its very existence (Wetherly, Otter, 2014; Gregory, 2001; Murray-Webster and Office of Government Commerce, 2010; Jain, Trehan, Trehan, 2011; Worthington, Britton, 2009; Acs et al. 2014; Sanders, 2007; Gajewski, 2017) and Porter's Five-Power Model (Porter, 2008), who was followed by other authors (Gibb, 1987; Lundström, Stevenson, 2005). Porter through the Five-Power Model, explains how the individual branches "work", because in his opinion five of the analyzed forces (the intensity of competing

between existing competitors, the bargaining power of customers, the bargaining power of suppliers, the threat of substitutes and the threat of competitors) determine the branch structure which influences the profitability of the branch (Porter, 2008; Magretta, 2012). Porter's model was criticized by a number of authors (Lynch, 2005; D'Aveni, 1994; Harvey et al., 2001). The criticisms were mainly concerned with the static nature of the model in the current "hyper-competitive" environment and the ability of enterprises to gain profits. According to the mentioned authors, the model is not able to help enterprises cope with a rapidly changing business environment and ignores the importance of human resource management. According to critics, Porter supposes that if there is an intensive economic competition, enterprises will achieve low profits, no matter what their management capabilities are. Research studies, to the contrary, showed different finding. Several studies compared the relative importance of the specific effects of the branch and the specific effects of enterprises on their profitability, and it was found out that only a small share of the capabilities of enterprises can be attributed to the branches in which enterprises operate and so the profitability of enterprises depends mainly on abilities of managers (Rumelt, 1991; Mauri and Michaels, 1998). In spite of this criticism, Porter, in his scientific papers, explains that the structure of the branch is surprisingly constant, although there is a predominant idea in the scientific community that "business" changes very rapidly. He reveals the structure of a branch (as soon as the branch passes the arising phase) is relatively stable in a long-term perspective and that a change in structure and also profitability requires a relatively long time (Magretta, 2012).

The analysis of the business environment, or rather all of its components (micro-environment, meso-environment and macro-environment) becomes the essential part of the process of strategic management of enterprises. Strategic management is an important part of enterprise management in a dynamic and competitive environment of the 21st century. Strategic decisions help managers evaluate changes in the external environment and suitably respond to them. An effective strategy allows to optimise using the enterprise resources and so creates space for stability, development and competitiveness of enterprises operating in today's highly changing business environment (Salamzadeh et al., 2016).

The development of the world economy requires acceleration of the adaptation of the business environment to the requirements of the home and world markets (Dagnino, King, Tienari (2017). This fact is also related to the lifelong deepening of managerial literacy and ethical attitudes of managers and senior executives. The business environment is not static, it is constantly evolving depending on the development and level of the national and world economy. Successful management of enterprises in the superturbulent environment of the 21st century is becoming an increasingly difficult task. Only those managers who are constantly trying to complement their theoretical knowledge and to use them practically in the environment where they operate are supposed to be succsessful (Adamik, Matejun, Zakrzewska-Bielawska, 2011; Dytrt, 2006; Jain, Trehan and Trehan, 2010). At the same time, the dynamics of internal enterprise resources supports business growth and business sustainability, and last but not least, it helps to create a competitive advantage in the enterprise environment (Teece and Pisano, 1997, Augier and Teece, 2006, Ambrosini and Bowman, 2009, Kuuluvainen, 2011). This statement is also confirmed by the author's extensive research focused on strategic management issues of Czech enterprises in terms of their sector differentiation, size categorization and scope of activity.

Material and Methods

The research was carried out by a group of 456 enterprises from the whole Czech Republic, composed of 109 micro-enterprises, 140 small enterprises (up to 50 employees), 124 medium-sized enterprises (up to 250 employees) and 83 enterprises (over 250 employees). The predominant representation of small and medium enterprises in the test set corresponds to the structure of economic entities in the Czech Republic characterized by a very high representation of small and medium-sized enterprises. Their share in the total number of active business entities is 99.83 %, the comparable share is also reported by countries in the European Union. Besides size categorization of enterprises, enterprises were classified in terms of the basic sectoral differentiation of the Czech Republic (excluding the quaternary sector), namely manufactoring and industrial (187 enterprises),

services (255 enterprises) and primary sector (14 enterprises) and in terms of province extent they were regional (189), national (126) or supranational (141).

The aim of the paper is to analyze and assess the influence of meso-environment and macro-environment factors on profitability, respectively the success of enterprises in terms of their sectoral differentiation. For testing, the dimensional reduction (DR) method, which extracts information from multidimensional data into a smaller number of variables (Cook, 1998; Cook and Lee, 1999; Chiaromonte, Cook and Li, 2002) was used. The dimensional reduction reduces the dimension of variables (meso-environment and macro-environment factors) with respect to the explained variable (enterprise profit/loss - HV.) Given the expected different structure of the meso-environment and macro-environment factors in different sectors of the national economy, the dimensional reduction was performed for each sector separately.

DR meso-environment

$$Dr(formula = HV \sim KON + DOD + ZAK + DISTR + OP + FI + VS + VU + MSS + PS + VLAD + MED + ES, data = MS, MVP, MPS, method = \text{“sir“})$$

Meso-environment factors

HV - economic result (profit/loss), KON - competitors, DOD - suppliers, ZAK - customers, DISTR - distributors, OP - business partners, FI - financial institutions, VS - universities, VU - research institutes, MSS - local authorities and autonomy, PS – political parties, VLAD - government, MED - media, ES - ecological associations
MS - service sector, MVP - manufacturing and industry, MPS - primary sector

DR macro-environment

$$Dr(formula = HV \sim DEMV + DISP + ZIVS + UV + MOB + PVC + VAV + PAT + TRT + MZVP + HDP + + USAZ + INF + ZCP + NEZ + STAV + RZO + DANE + LEG, data = MS, MVP, MPS, method = \text{“sir“})$$

HV – economic result (profit/loss), DEMV - demographic development, DISP - distribution of income, ZIVS - lifestyle, UV - level of education, MOB - population mobility, PVC - leisure time approaches, VAV – government expenditures on research and development, PAT – patents, TRT – transfer of technologies, MZVP- rate of obsolescence of production means, HDP - gross domestic product, USAZ - interest rates, INF - inflation, ZCP - business life cycle, NEZ - unemployment, STAV - government stability, RZO - foreign trade regulation, DANE – tax policy, LEG - legislation
MS - service sector, MVP - manufacturing and industry, MPS - primary sector

Besides the dimensional reduction, Pearson's Chi-quadrate Test was used to determine the dependence / independence of selected categorical variables (meso-environment and macro-environment factors) in relation to the profitability of enterprises. In the test, we assume zero (H0) and alternative hypothesis (HA). The zero hypothesis (H0) indicates that there is no dependence between the selected characters, whereas the alternative hypothesis (HA) assumes the dependence between the selected characters. The evaluation criterion for verifying or rejecting the hypothesis is the p-value at a specified significance level of $\alpha = 0.05$. For the primary sector, the test of dependence / independence of the tested variables was not performed due to the scope of data.

Results and Discussion

Table 1: Influence of the meso-environment factors on the profitability of enterprises in terms of their sectoral differentiation

	Dir1	Dir1	Dir1
	Services	**Manufacturing enterprises**	**Primary sector**
Competitors	0.222625	-0.06435	0.04890
Suppliers	-0.031152	**0.49897**	-0.04249
Customers	-0.125936	-0.19113	0.04485
Distributors	0.224714	0.03375	-0.06323
Business partners	-0.080058	-0.02135	-0.01239
Financial institutions	-0.002253	**-0.34143**	0.02917
Universities	**-0.665084**	-0.08129	**0.56652**
Research institutes, Academy of Sciences	0.284509	0.28762	**-0.76784**
Local authorities and autonomy	-0.051542	**-0.59327**	-0.16540
Political parties	0.244768	0.18837	0.06761
Government	**-0.504027**	0.32039	0.08220
Media	0.117814	0.06571	0.11811
Ecological associations	0.151404	0.09188	0.16009

Source: Own research.

Note. Due to the low representation of primary sector enterprises, its results can be considered as indicative, research in this sector will be the subject of further research.

For the service sector, factors that negatively affect the profitability of enterprises dominate to a greater extent, in particular at universities in terms of their cooperation with the business sector and government policy. The results can be commented with the assumption that it is the matter of the level of opinion of the managers, not the real state of the business practice. They document a negative view of the current role of universities, respectively a lack of appreciation of the role of tercial education institutions in the development of the business sector. The economic policy of the government negatively assesses the development of this sector, especially in the field of innovation process. Some of the specifics of the service sector may also be reflected in the results compared to the manufacturing sector, such as a higher proportion of micro-enterprises, high representation of service specialists and increased competition.

For production, the positive effect was observed with suppliers, negative, on the contrary, with financial institutions and local authorities and autonomies. Suppliers are one of the decisive factors, their quality limits the final profit, and enterprises pay extraordinary attention to their decision and production processes. When commenting on the negative impact on financial institutions, local authorities and autonomies, there is the same situation as in the service sector. As for the first factor it is, in particular, the negative view of the managers of the above-mentioned institution, when it is mostly perceived as a repressive state institution.

On the contrary, for the primary sector a positive impact on universities has been shown and a negative impact on research institutes and academies, which is the opposite of the service sector. The primary sector has only confirmed the tendencies of the previous sectors, with the crucial role of the Academy of Sciences of the Czech Republic (the area of basic theoretical research) in cooperation with the relevant base of research institutes (application research) for its stabilization and development. The current state is constantly criticized by the business sphere, and the resources of the government and relevant ministries point to reserves in this area.

Table 2: Dependence / independence of meso-environment factors on profitability of the tested Enterprises

	p-value	p-value
	Services	**Manufacturing enterprises**
Competitors	**0,00005217**	0,9289
Suppliers	0,4189	**0,0113**
Customers	0,8524	0,955
Distributors	**0,007646**	0,4247
Business partners	0,5053	0,7473
Financial institutions	0,06022	0,5172
Universities	**0,002301**	0,9748
Research institutes, Academy of Sciences	0,1376	0,9168
Local authorities and autonomy	0,4108	0,3795
Political parties	0,1452	0,7662
Government	**0,0158**	0,9766
Media	0,4021	0,9211
Ecological associations	0,3487	0,9017

Source: Own research.

Dependence on the profitability of enterprises (Table 2) was proved in the service sector for the following factors: competitors, distributors, universities, but also the government. These results correspond at the general level to the service sector character pointing to the ever-increasing competitive struggle mainly in the service sector, which is partly due to the massive entry of foreign entities into the market of the Czech Republic, often also the offer of above-standard services to customers. Distributors in this sector also play a significant role as they affect the final profitability of the provided services. The unexpected result can be seen in collaborating with universities, from which it can only be deduced its higher dynamics, frequency, less time consuming and faster operative and flexible implementation of knowledge in the field of services.

For the manufacturing sector, dependence was only indicated for the suppliers, which proved the significance of the input resources affecting the overall profitability and efficiency of the production process.

The fact that for other factors the dependence on business profitability has not been proved, may indicate unsatisfactory literacy of managers of small and middle-sized enterprises in strategic management and decision-making , when managers do not fully appreciate the importance and role of meso-environment factors in creating added value, product uniqueness and enterprise competitiveness.

Table 3: Influence of macro-environment factors on the profitability of enterprises in terms of their sectoral differentiation

	Dir1	Dir1	Dir1
	Services	**Manufacturing enterprises**	**Primary sector**
Demographic development	0.111565	0.31190	-0,09545
Distribution of income	**-0.328866**	-0.34893	**0.4295**
Lifestyle	-0.282581	-0.05560	-
Level of education	**0.509325**	-0.14519	0.2386
Population mobility	-0.305454	-0.10096	-0.09545
Leisure time approaches	**0.361179**	0.38074	**0.3818**

Government spending on research, development	-0.037277	**-0.41150**	-0.09545
New patents	-0.045444	0.20544	**-0.4295**
Technology transfer	0.002626	0.15403	0.1909
Obsolescence rate of production means	-0.123675	0.19057	0.3818
GDP development	-0.017310	-0.07761	-
Interest rates	-0.153895	0.17215	0.1909
Inflation	**0.320081**	0.19934	-0.1909
Life cycle of the enterprise	-0.220153	0.04796	-
Unemployment	0.084723	-0.03499	-
Government stability	-0.092615	0.02528	-
Foreign trade regulation	-0.060837	0.23693	**-0.3818**
Tax policy	-0.150689	-0.13296	-4.174e-17
Legislation	0.283832	**-0.42032**	-

Source: Own research.

For the service sector, a positive impact on enterprise profitability was indicated for factors: levels of education, approaches to leisure time and inflation, negative for the income distribution factor. All of these factors are linked to the service sector. The current development of services requires a high degree of education and specialization. Inflation directly affects purchasing power of the population and, at the same time, significantly affects the pricing of the provided service products. Also, the specifics of the service sector are fully reflected here.

On the other hand, in the manufacturing and industrial sectors the negative impact of the government spending factor on research and development and legislation was demonstrated. The results document a negative view of managers of financial support for science and research, especially the manufacturing sphere considers it to be totally insufficient. The results of the extensive survey only confirmed the expected situation in the area of science and research in the Czech Republic. Following this finding, the negative evaluation of the legislative factor is logical. Insufficient and complicated laws, implementing regulations, complicated and overwhelming administration, rather annoying the production sphere, must naturally be reflected in the negative attitude of managers.

Within the primary sector, the positive impact on factors of income distribution and approaches to leisure time and negative impact on patents and foreign trade regulation were indicated. As already mentioned, the results can be considered highly indicative due to the small scale of the test set. The positive assessment of income distribution can be attributed to the primary sector's dependence on state financial resources. There is no relevant background to assess the leisure time factor, and this will need to be further specified by follow-up research.

Tab. 4: Dependence / independence of macro-environment factors on the profitability of the tested enterprises

	p-value	p-value
	Services	**Manufacturing enterprises**
Demographic development	0,6355	0,8687
Distribution of income	0,5733	0,419
Lifestyle	0,7021	0,4067
Level of education	0,05759	0,7105
Population mobility	0,2911	0,7181
Leisure time approaches	0,4484	0,8195
Government spending on research, development	0,3557	0,9651
New patents	0,05365	0,6297

Technology transfer	**0,01552**	0,2526
Obsolescence rate of production means	**0,01499**	0,108
GDP development	0,2726	0,4945
Interest rates	0,1738	0,864
Inflation	**0,01514**	0,7114
Life cycle of the enterprise	**0,003161**	0,3301
Unemployment	0,4159	0,9358
Government stability	0,1104	0,7162
Foreign trade regulation	**0,02244**	0,8432
Tax policy	**0,0148**	0,3843
Legislation	0,05753	0,4224

Source: Own research.

Data and results in Tab. 4 indicate in the service sector dependence of economic and legislative factors (inflation, business life cycle, tax policy and foreign trade regulation) as well as in the technological area (rate of obsolescence of provided services, transfer of technologies) on the profitability of enterprises. In the manufacturing sector, no dependence was statistically confirmed on any of the tested factors although according to the author the rate of obsolescence of the manufacturing means plays a significant role. The outputs document the difference in sectoral differentiation between services and manufacturing sector, when the service sector is highly dependent on the purchasing power of the population, and factors such as inflation and tax policy play a significant role. At the same time, differences can be seen in the life cycle of enterprises in both tested sectors, both in terms of a sharp competitive battle in the service sector, but also in the rate of obsolescence of the provided services and manufacturing means related to the intensity of innovation processes in both sectors.

Conclusion

The results of the analysis of the effect of the meso-environment factors on the profitability of enterprises in terms of their sectoral differentiation can be summarized as follows:

- The services sector documented a negative view of the current role of universities and the economic policy of the government.
- For the manufacturing sector, suppliers are one of the most important competitive factors, their quality limits the final profitability of enterprises, and therefore this factor is paid an increased attention. The negative evaluation of financial institutions expresses the unfavorable view of the managers of these institutions in terms of their function and mission. As for local authorities and autonomies it can also be seen as the lack of synergy between the production enterprises and their management and these institutions.
- The results from the primary sector confirm the insufficient role of the Academy of Sciences of the Czech Republic and of the research institutes in its stabilization, but especially the increase of its competitiveness on foreign markets.

The analysis of macro-environment factors on the profitability of enterprises in terms of their sectoral differentiation allowed the following conclusions to be drawn:

- The services sector has a positive impact on the profitability of enterprises at the level of education, leisure time and inflation. These factors express the specifics of this sector, as well as the importance of managers' education, the role of time factor in value creation and the crucial role of inflation in business decision-making policy and consumption.
- For the manufacturing and industrial sectors, the results point to a negative view of managers of the financial support for science and research by the government and disproportionate administrative burdens on enterprises.

- The results of the primary sector very indicatively imply a significant pro-growth role of the income distribution factor and indicate a possible overload of top managers in particular. No relevant data for evaluation of other factors were available.

The results of the dependence / independence test of macro-environment and meso-environment factors in the service sector have shown dependence especially on macro-environment factors in the economic and legislative areas, for meso-environment factors at competitors, distributors, surprisingly universities and the government. In the case of manufacturing sector in the context of meso-environment statistical testing the dependence on the profitability of enterprises was only indicated by the suppliers. The macro-environment analysis has not confirmed the dependence on any of the tested factors. A reduced (in the manufacturing sector to zero) impact of macro-environment factors was expected as macro-environment factors can only eliminate enterprises, not significantly affect them. In the framework of the Pearson's Chi-quadrate Test of dependence / independence of the tested variables, the basic specifics of the sectoral differentiation of enterprises have been confirmed.

These results demonstrate the urgent need to focus research activities on strategic management and decision-making and on the business environment. The gained findings implemented in business practice will have a character of pro-growth measures.

References

Acs, ZJ., Autio, E. and Szerb, L. (2014), 'National systems of Entrepreneurship: Measurement issues and policy implications,' *Research Policy,* 43 (3), 476 -494.

Ambrosini, V and Bowman, C. (2009), 'What are Dynamic Capabilities and are They a Useful Construct in Strategic Management?' *International Journal of Management Reviews,* 11 (1), 29-49.

Augier, M and Teece, DJ. (2006), 'Understanding complex organization: the role of know-how, internal structure, and human behavior in the evolution of capabilities,' *Industrial and Corporate Change,* 15 (2), 395-416.

Austin, J E. (1990) Managing in Developing Countries: Strategic Analysis and Operating Techniques, Free Press, New York.

Adamik, A., Matejun, M. and Zakrzewska-Bielawska, A. (2011) Influence of Socio-Economic Environment on the Development of Small and Medium-Sized Enterprises, Technical University of Lodz Press, Lodz.

Cook, R D. (1998) Regression Graphics: Ideas for Studying Regressions Through Graphics New York Wiley, New York.

Cook, RD and Lee, H. (1999), 'Dimension Reduction in Binary Response Regression,' *Journal of the American Statistical Association*, 94 (448), 1187-1200.

Dagnino, GB., King, DR. and Tienari, J. (2017), 'Strategic management of dynamic growth,' *Long Range Planning,* 50 (4), 427-430.

D´Aveni, R A. (1994) Hypercompetition: Managing the Dynamics of Strategic Maneuvering, Free Press, New York.

Dedouchová, M. (2001) Strategie podniku*,* C. H. Beck, Praha.

Dytrt, Z. (2006) Etika v podnikatelském prostředí, Grada, Praha.

Gajewski, M. (2017) 'Policies Supporting Innovation In The European Union In The Context Of The Lisbon Strategy And The Europe 2020 Strategy,' Comparative Economic Research, 20 (2), 110-127.

Gibb, A A. (1987) 'Enterprise culture. Its meaning and implications for education and training,' Journal of European Industrial Training, 11 (2), 1–38.

Gomes, E., Weber, Y., Brown, CH. and Tarba, SY. (2011) Mergers, acquisitions, and strategic alliances: understanding the proces, Palgrave Macmillan, London.

Gregory, A. (2001) Planning and managing public relations campaigns: A strategic approach, Kogan Page, London.

Harvey, M., Novicevic, MM. and Kiessling, T. (2001), 'Hypercompetition and the future of global management in the twenty-first century,' Thunderbird International Business Review, 43 (5), 599-616.

Chiaromonte F., Cook, RD. and Li, B. (2002), 'Sufficient dimension reduction in regressions with categorical predictors,' Annals of Statistics, 30, 475-497.

Jain, TR., Trehan, M. and Trehan, R. (2010) Business Environment, V. K. Enterprises, New Delhi.

Jakubíková, J. (2008) Strategický management, Grada Publishing, a.s., Praha.

Keillor, BD. (2013) Understanding the Global Market: Navigating the International Business Environment, ABC-CLIO, LLC, Santa Barbara.

Kuuluvainen, A. (2011) Dynamic capabilitiesin the International Growth of Small and Medium-Sized Firms, Turku School of Economics, Turku.

Lundström, A. and Stevenson, LA. (2005) Entrepreneurship Policy. Theory and Practice, Springer, New York.

Lynch, R. (2005) Corporate Strategy, FT Prentice Hall, New Jersey.

Magretta, J. (2012) Michael Porter jasně a srozumitelně, Management Press, Praha.

Malach, M. a kol. (2005) Jak podnikat po vstupu do EU, Grada publishing, a. s., Praha.

Mallya, T. (2007) Základy strategického řízení a rozhodování, Grada Publishing, a.s., Praha.

Mauri, AJ. and Michaels, MP. (1998), 'Firm and industry effects within strategic management an empirical examination,' Strategic Management Journal, 19 (3), 211-219.

Murray-Webster, R. and Office of Government Commerce (2010) Management of risk: guidance for practitioners, TSO, London.

Nigel, E., Campbell, D. and Stonehouse, G. (2003) Strategic management for travel and tourism, Butterworth-Heinemann, Oxford.

Porter, M E. (2008), 'The Five Competitive Forces That Shape Strategy,' Harvard Business Review, 86 (1), 78-93.

Rumelt, RP. (1991), 'How much does industry matter?' Strategic Management Journal, 12 (3), 167-185.

Salamzadeh, Y., Nia, MY., Markovic, MR. and Salamzadeh, A. (2016), 'Strategic Management Development: The Role of Learning School on Promotion of Managers' Competence,' Economía y Sociedad, 21 (50), 1-25.

Sanders, M. (2007), 'Scientific paradigms, entrepreneurial opportunities and cycles in economic growth,' Small Business Economics, 28 (4), 339–354.

Swayne, L E., Duncan, W J. and Ginter, P M. (2008) Strategic management of health care organizations, John Wiley & Sons Ltd, Chichester.

Teece, D J. (2007), 'Explicating Dynamic Capabilities: The Nature and Microfoundations of (Sustainable) Enterprise Performance,' Strategic Management Journal, 28 (13), 1319-1350.

Teece, D J., Pisano, G. and Shuen, A. (1997), 'Dynamic Capabilities and Strategic Management,' Strategic Management Journal, 18 (7), 509-533.

Šulák, M. a Vacík, E. (2005) Strategické řízení v podnicích a projektech, VŠFS, Praha.

Veber, J. a kol. (2004) Management: základy, prosperita, globalizace, Management Press, Praha.

Wetherly, P. and Otter, D. (2014) The Business Environment: Themes and Issues in a Globalizing World, Oxford University Press: Oxford.

Worthington, I. and Britton, Ch. (2009) The Business Environment, FT Prentice Hall, Oxford.

Contact adress

Ing. Jarmila Straková, Ph.D., Department of Management, Faculty of Corporate Strategy, Institute of Technology and Business, Okružní 10, 370 11 České Budějovice, Czech Republic, e-mail: strakova@mail.vstecb.cz

Reaction of Share Prices on Financial Decisions in Russia

Kristina V. Galenskaya, National Research University Higher School of Economics,
Moscow, Russia, e-mail: kgalenskaya@hse.ru

Abstract

Nowadays significance of an optimal proportion of borrowed and own capital of companies is intensifying due to the crisis. To find the right solution, it's necessary to answer the questions, that have not been analyzed profoundly in the literature: what the choice of a borrowing type depends on, how it influences on the company financial stability and its' long term efficiency. Those issues are analyzed in the research with the help of a risk-management tool, which is monitoring of a market reaction to financial decisions.

The aim of the study is the definition and the quantitative assessment of the difference of the shares price response to attraction external capital (bank loans and bonds issue). To achieve the aim an event study is carried out. The key data is based on the observations of the activities of the companies' share prices that are usually taken into consideration by Moscow Interbank Stock Exchange for its' index calculation since January 2000 till March 2016. In this research we come to a paradoxical conclusion that the news about bonds issue has a negative influence on the shares price comparing with the information about bank loans.

JEL: G1, G100, G140, G150, G210

Keywords: bonds, loans, share prices reaction, event study

Introduction

Nowadays Russia is still affected by the consequences of the latest crisis. Thus, for running a business successfully a company has to pay a lot of attention to the sources of financing which can be short term loans or a credit debt, or an advanced capital. Long term financing helps to generate financial resources that become additional capital sources for the future and stimulate further development of a company. So, companies can finance their own activities, as well as activities of others, with their own money (for instance equity shares, privileged shares, unallocated profit) or with an external funding.

Borrowing increase has its' positive and negative features. The positive ones are a possibility of fast growing: tax benefits, excess of ROE on ROC, and the negative ones are financial stability risk, value of capital elements and WACC. It should be emphasized that, a lot of researches in the area of corporate finance are dedicated to the achievement of an optimal proportion of own and borrowed capital. Nevertheless, issues of debt elements choice and its influence on financial stability and long term efficiency of a company are less studied. The research of Stock Market reaction on different forms of borrowed capital solves this issue partially.

Thereby, this research is aimed to uncover one of issues studied no profoundly enough, which is of current importance in general and Russia in particular. In this case, the novelty of this research lies first of all in examination of event study regarding bank crediting and bonds issuing considering the companies counted by MICEX for the index calculation. The aim of the research is definition and evaluation of difference of the reaction of share prices to declaration of borrowed capital attraction from various sources.

Literature Review

The theme of capital structure optimization and justification of liability sources choice is attracting researchers' attention for several decades. First works were mostly concentrated at perfect markets and introduction imperfections into them. Empirical researches of well-developed capital markets started appearing just in 1980-s. Researching of emerging markets started in 2000-s and econometric

comparison of liability sources in Russian market has never been carried out due to lack of statistics and market visibility (the market of corporate bonds started developing only after the crisis in 1998th).

Nevertheless, clearing up the essence of the research it should be emphasized, why the attraction of borrowed capital (for instance, bond issues or crediting) is more preferable rather than using a company's own capital (shares issue). Substantiation of this can be found in the following researches: Hovakimian et al. (2001), Gaud et al. (2007), Cotei & Farhat (2011), Salman & Munir (2012), Lewis & Tan (2016). Those substantiations are as follows: In spite of positive influence of shared sponsorship on the efficiency of a company, the following imperfections should be taken into consideration – the shareholders will have to share the profits if the company is successful. All the above arguments prove the attraction of borrowed capital as the most preferable.

The reasons of some other authors, answering the questions, why a debt declaration could be important for the share price, should be taken into consideration, as well. For instance, Godlewski et al. (2011), Davydov et al. (2014), Elian & Young Taft (2014), Li et.al (2015) justify the fact that bank crediting and bond issue are significant events for a company as well as an annual reporting or a dividend policy. So, all the above makes the evaluation of the influence of various types of debt financing on share prices allowable.

As various sources of debt financing are being researched, conclusions of Godlewski et al. (2011) about the influence of syndicated loans and bonds on Russian stock market is of current interest. The analyzed period is June 2004 – December 2008. The most interesting conclusion is that the stock market reacted negatively to a debt agreement declaration. It was explained that the shareholders have a moral hazard towards the debt-holders. The authors didn't find out any significant difference between the reactions to the declaration of syndicated financing and to bonds issue. So, the authors confirmed the opinion that Russian companies could be more inclined to limit their dependence on their external debt than companies in other countries.

Brealey et al. (1971), Diamond (1984), Aivazian et al. (2006), Arena (2011) and Allen et al. (2012) performed in their works gap analysis comparing bank financing and bond issue. In their researches the authors come to the conclusion that banking institutions have some informational advantages in comparison with bond market, and those advantages make working with banks less expensive for the companies. The authors explain that banks can decrease their expenses on monitoring of the companies' activities due to obligatory requirements to credit contract execution. Opening of a settlement account in a lender bank and a possibility of daily monitoring of borrower's financial flows give the banks a possibility to obtain confidential information which is closed for market investors and to communicate directly with top managers of the borrowers. So, a bank is well informed about financial situation of a company and prospects of its' growth. One of the obvious advantages of borrowing from a bank is a possibility of monthly annuitant payments, that allows a company during the whole period of crediting to decrease the risks that increased due to appearance of external funding.

Aivazian et al. (2002, 2006) came to the conclusion that the size of the business and assets of a company can significantly influence on the difference of credit interest rates of bank financing and bonded debt. The authors assume that smaller companies have impact of informational asymmetry. So bond issues will be more costly for them than bank crediting.

Research Methodology

The tested cases are based on the market news about attraction of borrowed capital by the companies.

Hypothesis 1. Financial decision of a company to attract borrowed capital influences the share price negatively.

$$CAAR\ (financial\ decision) < 0$$

This hypothesis gives an opportunity to verify the results of researches that were carried out earlier and to prove risks increase for capital owners while gearing grows Theoretically, in this case, the price reaction of the shares may be ambiguous, as, on the one hand, this can cause significant increase of gearing and to influence market price of the shares and the whole business negatively, on the other hand, it can mean getting the benefit of the financial instrument and the price increase due to capital reduction (reduction of WACC), and further development of the company. As far as in this case contrastive analysis of "a bad" news was used, hypothesis 1 assumes that the "bad" news influence should be stronger.

Hypothesis 2. Financial decision of a company about a bonded debt influences the share price negatively.

$$CAAR\ (bond\ issues) < 0$$

This hypothesis is based on an assumption that the company value will not be increased, i.e. the Board decision to attract borrowed capital issuing bonds is met by the Stock Exchange negatively. As far as the informational transparency of the most of Russian companies is rather low, it is considered, that transactional expenses for bonds allocation in complete selection of companies are pretty high. This hypothesis characterizes a bonded debt as "a bad" news.

Hypothesis 3. Financial decision of a company to obtain a bank loan influences the share price positively, i.e. positive cumulative average abnormal return is recorded at the action moment and after it.

$$CAAR\ (bank\ loans) > 0$$

While analyzing the literature dedicated to the defined subject it was found out that for bigger companies bank loans, as a source of additional money, are more attractive than bonds. Taking into consideration credit lines, such a borrowing can be estimated as "a good" news, because, on the one hand, banks can verify risk factors of the company rather easily, on the other hand, a company gets an opportunity to manage its' gearing.

Hypothesis 4. Shares price reaction is sharper if a company decides to get a bonded debt rather than a bank loan.

$$|CAAR\ (bond\ issues)| > |CAAR\ (bank\ loans)|$$

As it was defined in the researches of the influence of "good" and "bad" news on the total company value and shares price, the "bad" news influence is stronger. Thus, it can assume that shares price reaction to bonded debts is sharper than on credit lines. It's worthwhile to mention, that the hypothesis not just helps to uncover the issues of the research, but introduces scientific novelty.

Event study is the most appropriate method of evaluation of shares price reaction to a financial decision (credit lines, bonded debts). Comparison of an expected shares return with actual one during the events are in action is the key idea of this method. An expected return can be evaluated with the help of modeling of compensation of market or any other type of risks. Shares price reaction to financial decisions should be measured with abnormal returns (the difference between expected and actual return), measured within the analyzed period on the daily basis, and cumulative abnormal return.

The key problems of choice are considered below by using event study method.

The first problem that an analyst comes across is an exact definition of the event date. A share price reaction to a financial decision of a company is a news event that indicates a sharp price changes. It

can be concluded, that appearance of such news in the market causes a price shock, or, using financial terms, abnormal return (AR), that can be calculated as a difference between the actual return fixed on a certain date and an expected return. In other words, an abnormal return (AR) is the difference between share returns before the event and after it:

$$AR_{it} = R_{it} - ER_{it} \quad (1)$$

where AR_{it} means the abnormal return of the share (i) on the date (t). R_{it} is the actual daily value of share return, ER_{it} is "normal" (expected) return of the share (i) on the date (t).

Abnormal return should be calculated for each date (t) within the event window (-n; +n) and bound to a certain event (credit line declaration of bonds issue).

According to the results of each trading day (t) the share return (R) is calculated as a ratio of the closing price (P) of the share (i) at the date t (P_{it}) to the closing price of the share (i) at the date (t-1). But in order to avoid complications working with positive and negative numbers a simplified method of share return calculation is applied using lognormal allocation:

$$R_{it} = \ln \frac{P_{it}}{P_{it-1}} \quad (2)$$

The second problem is definition of an event window duration in the middle of which is a company financial decision about borrowed capital attraction, and of a period of shares return observation, i.e. definition of a consideration period for substantiation of normal shares return. Some ideas, how to define those periods are introduced below. For studying the most significant events, for instance, merger agreement, a longer event window may be considered. However, for analysis of an influence of financial decisions declaration, a dividend policy, financial results on shares price a shorter period is recommended and its' total duration should be not longer than 41 days. For example, Oler et al. (2007) noticed in their research that the most common duration of an event window is 21 days. It should be emphasized, that this particular event window duration will be used in this research.

Moreover, it should be born in mind, that an analysis of too long period may cause "a noise" consideration. At the same time, if a selected period is too short the event significance may be taken wrong due to possibly wrong indication of the dates in databases. For instance, in the research by Park (2004) is mentioned that if the period is longer than 100 days, the results are less receptive to the size of the event window. Thus, it was decided to take into consideration the estimation period of 90 trading days.

Figure 1 demonstrates graphically the correlation of the event window, estimation period and the date of the event, which was the company Board of Directors decision about attraction of borrowed capital.



Figure 1: Graphical location of the event window and the estimation period

The third problem an analyst comes across is substantiation of a calculation model for each day of normal return. The most commonly used is *the model of an average share return* (average daily return is being calculated for each share within an analyzed period, and it's assumed that it will stay constant within the event window).

$$\overline{R_i} = \frac{1}{L} \sum_{t=-n-1-L}^{-n-1} R_{it} \quad (3)$$

where L is a period of forecast, i.e. a time frame before an event window (-n; +n).

The second popular model is *market model*. The key difference between market model and the model of average return is estimation of market (systematic) risks for each researched company. The method is based on regression modeling considering a linear relation of shares return of an analyzed company and total market return (stock market index). Moreover, it should be emphasized, that some foreign researchers use more inclusive models (for instance, a three factors model by Fama, French (1993)), that take into consideration not just market factors, but also industrial ones.

In the research by Holler (2014) about 400 works were examined with the method of event study and the market model was considered as a reasonable one, so, further in this research this model will be used. For definition of stock market index the calculation of share return for each share is recommended, using lognormal allocation:

$$R_{mt} = \ln\left(\frac{I_t}{I_{t-1}}\right) \quad (4)$$

where I_t is the value of stock market index on the day t, I_{t-1} is the value of stock market index on the day (t-;+1).

For market research in MICEX is taken into consideration as a stock market index.

Thus, the calculation of an abnormal return with the market model application looks in the following way:

$$AR_{it} = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{mt}) \quad (5)$$

if

$$ER_{it} = (\hat{\alpha}_i + \hat{\beta}_i R_{mt}) \quad (6)$$

where $R_{mt\ i}$ is a value of market return index on the day t, $\hat{\alpha}_i$ и $\hat{\beta}_i$ are parameters of a regression model evaluated with least square method (LSM).

The regression model evaluates an approximate value of beta-coefficient usage of which is slightly incorrect, as it supposes a complete following the existing trends in future. Thus, the research was corrected by Blume (1971) who took into consideration that in future beta-coefficient of the shares tends to a unit (systematic risk tends to an average value in the market). Similar correction was made by Bloomberg (where the weight of beta is 33% of unit value);

$$\beta_{blume} = 0.67 * \beta_{LSM} + 0.33 * 1 \quad (7)$$

Average abnormal return (AAR) is calculated for all the selected shares for each day t within an event window (-n; +n). Thus, abnormal return of the selected shares is averaged. This gives an opportunity to evaluate, if the event influences on the market situation significantly, then getting of a positive value of an average abnormal return and not equal to zero is highly possible.

The formula for calculation of the indicator for each day t looks in the following way:

$$AAR_t = \frac{\sum_{i=1}^{N} AR_{it}}{N} \quad (8)$$

where N is a number of events (shocks) happened to the selected shares within the analyzed period.

Fourthly, next stage for event study method application is calculation of cumulative average abnormal return (CAAR), which is based on the calculation of average abnormal return for each event window (-n;n). CAAR is calculated for each considered news, for instance, for a Board of Directors' decision about bonds issue of or about bank loans.

$$CAAR_j = \sum_{t=1}^{T} AAR_{it} \quad (9)$$

The formula for test statistic calculation is presented below.. It's applied to define the statistic significance of the average abnormal return values and cumulative average abnormal return values:

$$t - statistic = \frac{\frac{\sum_{i=1}^{N} AR_{it}}{N}}{(\frac{\sum_{i=1}^{N}(AR_{it} - \sum_{i=1}^{N}\frac{1}{N}AR_{it})^2}{N(N-1)})^{1/2}} \quad (10)$$

It should be emphasized, that the calculation of the indicator above should be made with the help of the statistic command "ttest", which helps to find out if the selected shares have equal average indicator. If it really is, it means that the event study is carried out properly and consideration of the influence of the analyzed events on the companies' values can be carried on.

For an additional check up of the hypothesis of the significance analyzed selection a normality test by Jarque-Bera should be used according to assumptions of the event study. Otherwise, the significance of the research results could not be estimated. The statistic command sktest can be realized through STATA. Greene (2003) mentions in his research that this test is the most efficient for detection of correctness of the analyzed indicators allocation or they are allocated according to Student's method. The test results give an opportunity to verify the hypothesis that the event influences significantly on the prices of the shares of the analyzed companies. The research of the normality of allocation will be done with the help of Jarque-Bera test in order to verify cumulative average abnormal return.

The criteria of companies selection was based on MICEX, which is a benchmark for substantiation of expected return (application of the market model). 35 Russian companies[1] were and 16 years period was analyzed. A date of an event means the date of an official publication of a company decision to attract external money. In case of bond issues the date of the documentary decision on bond issue was taken into consideration. In case of bank loans official news indicating the details of the decision (value of the loan, date of opening, duration) were taken into consideration. The selection doesn't include the cases of money attraction with the help of Eurobond transactions and syndicated loans, For getting information about financial decisions of the companies the following sources were used bond searching service and the site of cbonds company (cbonds.ru), the site of The Center of Corporate Information Disclosure (e-disclosure.ru) The information about share prices of the selected companies and MICEX was taken from the site of Russian Investment Holding "Finam".

The analyzed selection consists of 197 events: 88 bond issues decisions and 109 cases of bank loans' attraction. The events allocation in terms of time is not homogenous. Before the 2009th most of the news were about bond issues (25 companies out of 35 declared such a decision), and during the post-crisis recovery the number of organizations attracting bank loans increased. The calculation of

[1] Analyzed companies: "Gazprom", "LUKOIL", "Magnit", MMC "Norilsk Nickel", "NOVATEK", "Rosneft", "MTS", "Tatneft", "Urals", "Severstal", "ALROSA", "Megafon", "RusHydro", "Rostelecom", "NLMK", AFK "Sistema", ANK "Bashneft", "FosAgro", "PIK Group", "MMK", FGC "UES", "LSR Group", "Dixy Group", "Cherkizovo Group", "Inter RAO", "Pharmstandard", "Acron", "Rosseti", "Aeroflot", "TMK", "Mechel", "Mostotrest", "Sollers".

abnormal return bound with the selected events indicated that the median value of abnormal return in case of bond issue fluctuates from 0,5 to 1% (see figure 2).

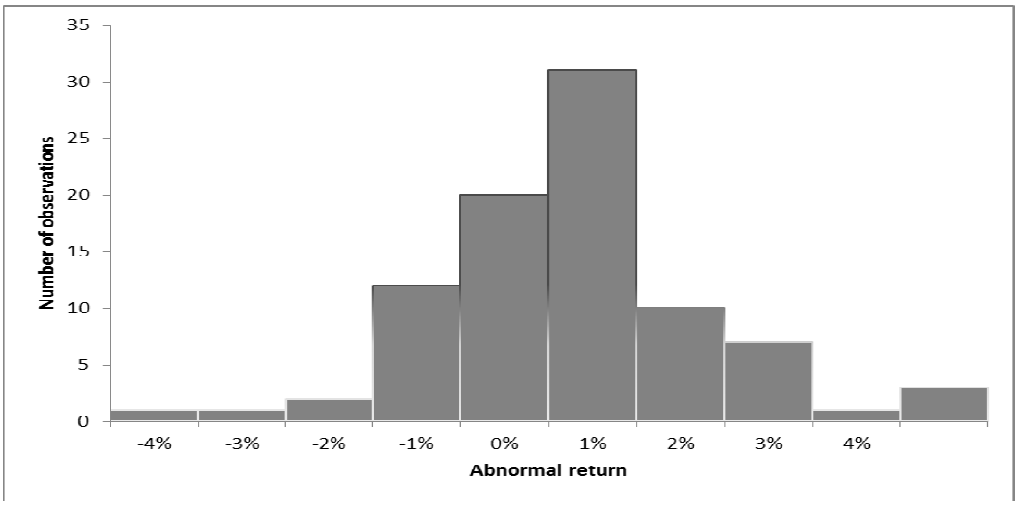


Figure 2: The histogram of AR allocation (bond issues)

Besides, the test by Jarque-Bera was applied to check the normality of allocation. (See table 1). The test results give us a reason to affirm that return of CAAR is allocated normally or close to it, and application of the events study method is possible for the future for bond issue (the first type of the analyzed financial decisions).

Table 1: Results of Jarque-Bera test (bond issues)

Skewness/Kurtosis tests for Normality

				joint	
Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	Prob>chi2
caar	21	0.7401	0.6038	0.39	0.8236

The results of estimation of the selection of bank loan news are similar. The histogram of abnormal return allocation is shown in the figure 3, and results of the test are presented in the table 2.

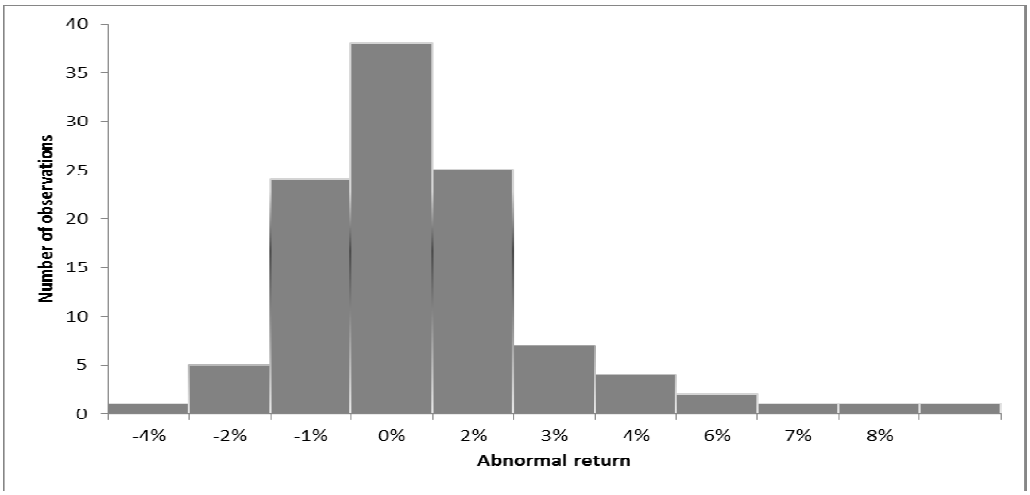


Figure 3: The histogram of AR allocation (bank loans)

Table 2 indicates that the allocation of cumulative abnormal return in case with bank crediting corresponds the normal one, and future calculations will not contradict the conclusions.

Table 2: The results of Jarque-Bera test (bank loans)

Skewness/Kurtosis tests for Normality

				joint	
Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	Prob>chi2
caar	21	0.2986	0.7520	1.29	0.5245

Results of the hypothesizes testing and conclusions of bond issue and bank crediting comparison

Table 3 shows the results of the calculation of statistic significance in the event window (-10;+10). The average abnormal return a day before the event is 10%, at the moment when the event happened and the next day it is 5%, the second day shows 10%. It should be emphasized, that significance level before the event happened can be explained with insiders' information admission to the market. Within two days after the information appearance the reaction of the shares is visible.

Table 3: Evaluation of the statistic significance of the average abnormal return for bond issues and bank loans in the event window of 21 days

Event Window	AAR	p-value
-10	-0.09%	0.500
-9	-0.05%	0.765
-8	0.09%	0.571
-7	-0.04%	0.782
-6	0.24%	0.192
-5	-0.05%	0.824
-4	0.09%	0.619
-3	-0.09%	0.570
-2	-0.04%	0.796
-1	-0.13%	**0.051**
0	0.11%	**0.042**
1	-0.13%	**0.041**
2	-0.32%	**0.075**
3	0.07%	0.711
4	-0.11%	0.537
5	0.05%	0.725
6	0.08%	0.534
7	-0.16%	0.227
8	-0.06%	0.725
9	-0.08%	0.545
10	-0.05%	0.771

Figure 4 presents the chart of cumulative average abnormal return (CAAR). The reaction to the news about borrowing is negative, that proves hypothesis 1.

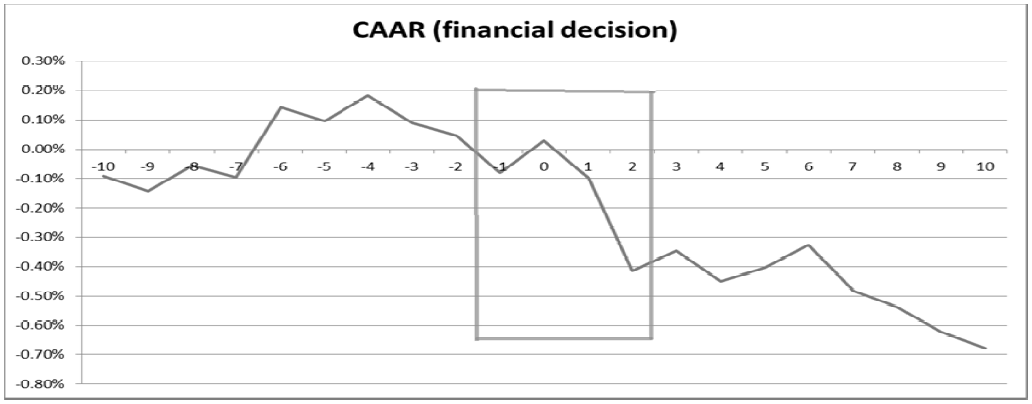


Figure 4: The reaction to the decision about attraction of external sources of financing (bond issues and bank loans)

Table 4 demonstrates the results of the calculation of the statistic significance of average abnormal return in the event window of 21 days. The results become statistically significant two days before the anticipated event, i.e. the decision about attraction of borrowed capital by bonds issue. The average abnormal return a day before the event and at the moment when the news appeared the statistic significance is 5%. Meanwhile, the news doesn't have a spillover effect influencing the prices, as next day the value of the average abnormal return doesn't indicate the statistic significance.

Table 4: Evaluation of the statistic significance of the average abnormal return for bond issues in the event window (-10;+10)

Event Window	AAR	p-value
-10	-0.006%	0.97644
-9	-0.028%	0.88414
-8	-0.013%	0.95236
-7	0.010%	0.95628
-6	-0.011%	0.96528
-5	-0.017%	0.95043
-4	-0.009%	0.95567
-3	-0.005%	0.09751
-2	**-0.044%**	**0.08148**
-1	**-0.011%**	**0.04793**
0	**-0.009%**	**0.05522**
1	-0.009%	0.19636
2	0.002%	0.99375
3	0.078%	0.74568
4	-0.028%	0.91663
5	-0.001%	0.99611
6	-0.014%	0.93222
7	-0.002%	0.9924
8	0.022%	0.9303
9	-0.015%	0.95163
10	-0.001%	0.99471

Figure 5 demonstrates the chart of cumulative average abnormal return for the news about bond issue. The chart shows that the maximum decrease happened two days before the event. This confirms the hypothesis 2 that the financial decision about bonded loan influences the share prices negatively.

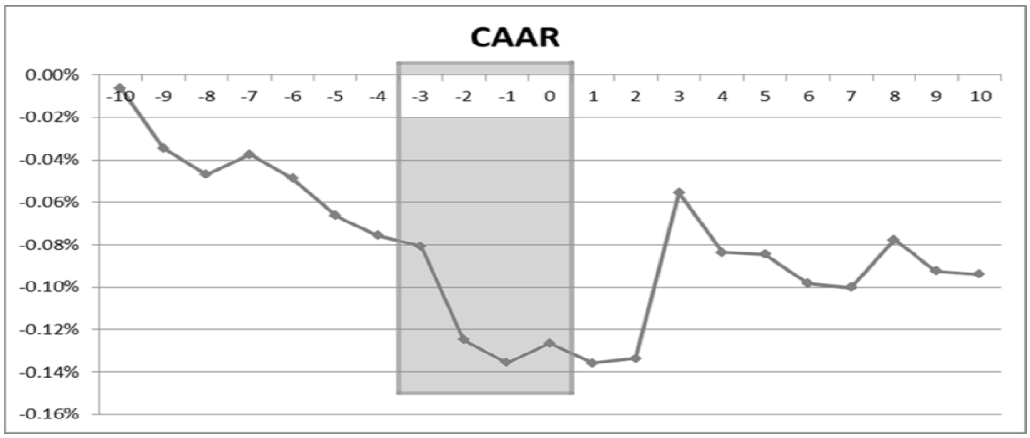


Figure 5: The reaction to the decision about attraction of external sources of financing (bond issues)

The table 5 presents the results of the calculation of the statistic significance of the average abnormal return in the event window of 21 days. The results become statistically significant two days before the event which is the decision about attraction of borrowed capital by bank crediting. The average abnormal return indicates the significance 10% two days before the event and 5% at the day when event happened.

Table 5: The evaluation of the statistic significance of the average abnormal return for bank loans in the event window (-10;+10)

Event Window	AAR	p-value
-10	0.00025	0.88847
-9	0.00175	0.51343
-8	0.00174	0.42603
-7	-0.0006	0.7727
-6	0.00482	0.95628
-5	-0.0003	0.93195
-4	0.00445	0.11177
-3	0.0008	0.75601
-2	**0.0014**	**0.05887**
-1	**0.0039**	**0.02048**
0	**0.00178**	**0.03745**
1	0.00047	0.8309
2	-0.0025	0.27066
3	-0.0034	0.20845
4	-0.0009	0.69828
5	0.0018	0.37918
6	0.00153	0.40718
7	0.00034	0.84736
8	-0.0014	0.49032
9	0.00127	0.42563
10	-0.0017	0.56588

The figure 6 demonstrates the chart of accumulated average abnormal return for the event which is the decision about bank crediting. The figure shows that the news about bank crediting influences on the share prices positively.

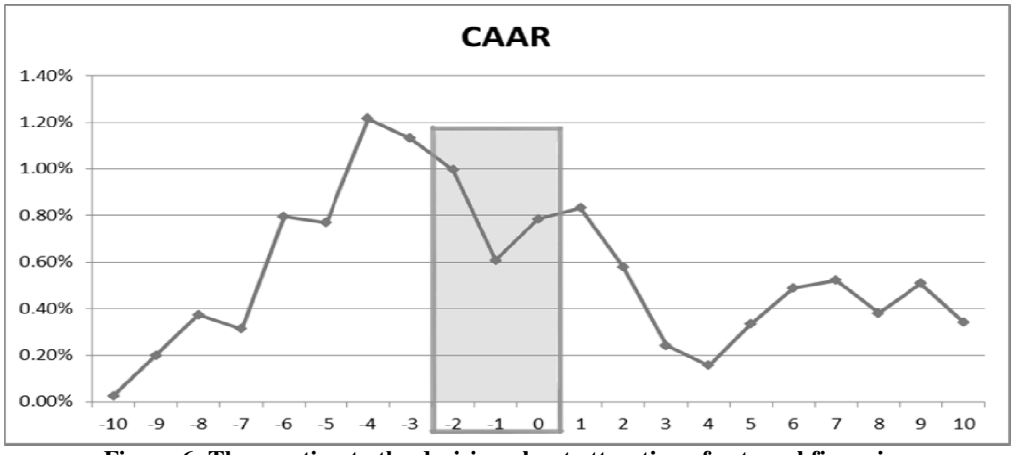


Figure 6: The reaction to the decision about attraction of external financing sources (bank loans)

Thus the hypothesis 3, saying that the financial decision of the company about the bank crediting influences positively on the share prices, is confirmed. A decision of Board of Directors about bond issue is taken as "a bad" news in Russian market, at the same time the decision about bank crediting is taken positively. Due to asymmetry of information in the market reaction to "bad" news is stronger.

The calculations confirmed all the four hypothesizes put in this research. In general, the market reacts positively to a decision about bank crediting and negatively to bond issue. This can be explained that opening of a credit line is much easier, as well as gearing regulation. It should be emphasized, that

the evaluations mentioned in this research do not take into account the following factors: the market attitude ("bulls" or "bears" trends), gearing increase higher than the average level in the industry, a position and a name of a creditor, which belongs to the top three and having a possibility «to beat out the debts", a choice of a currency, urgency and value of the capital. If the above mentioned characteristics of borrowers and loans could be taken into consideration the paradoxical reaction of Russian investors could be explained better.

All the above mentioned in this article can be considered as the first step towards revealing of the problem of unattractiveness of corporate bonded loans for the companies of the real economy sector in Russian market.

Conclusion

The consequences of the latest instability period started during the crisis of 2014-2015 are still affecting economic situation in Russia in general, as well as the situation in the companies. As a result, the problem of an optimal proportion of own and borrowed capital became more critical. Moreover, possible sharpening of disadvantages of borrowing increase (financial stability risks, increase of capital elements value and WACC) became more significant, in spite of related advantages (possibility of fast growth, tax benefits, exceeding ROE on ROC);

Thus, uncovering of the issues, less studied in the literature and dedicated to the choice of debt elements and its influence on companies' financial stability and long terms efficiency, became of current importance. Monitoring of a market reaction to the ways of borrowed capital attraction, as one of the risk-management tools, resolves those issues partially.

The key conclusion of this research, characterizing its' novelty, emphasizes a paradoxical reaction: the appearance of the news about bond issues in the market has a negative influence on the share prices, in contrast to the information about bank crediting. Moreover, the results of the research can be really useful for portfolio managers orientated to corporate public debts, as well as for managers of companies selecting sources of financing.

References

Aivazian, V. A., Booth, L., Cleary, S. (2006), 'Dividend smoothing and debt ratings,' *Journal of Financial and Quantitative Analysis*, 41(02), 439-453.

Aivazian, V., Booth, L., Cleary, S. (2002), 'Why some firms smooth their dividends and why others don't,' *University of Toronto Working Paper*.

Allen, L., Gottesman, A., Saunders, A., & Tang, Y. (2012), 'The role of banks in dividend policy, *Financial Management*,' 41(3), 591-613.

Arena, M. P. (2011), 'The corporate choice between public debt, bank loans, traditional private debt placements, and 144A debt issues,' *Review of Quantitative Finance and Accounting*, 36(3), 391-416.

Blume, M. E. (1971), 'On the assessment of risk,' *The Journal of Finance*, 26(1), 1-10.

Brealey, R., Leland, H. E., Pyle, D. H. (1977), 'Informational asymmetries, financial structure, and financial intermediation,' *The Journal of Finance*, 32(2), 371-387.

Cotei, C., Farhat, J. (2011), 'An application of the two-stage Bivariate Probit–Tobit model to corporate financing decisions,' *Review of Quantitative Finance and Accounting*, 37(3), 363-380.

Davydov, D., Nikkinen, J., Vähämaa, S. (2014), 'Does the decision to issue public debt affect firm valuation? Russian evidence,' *Emerging Markets Review*, 20, 136-151.

Diamond, D. W. (1984), 'Financial intermediation and delegated monitoring,' *The Review of Economic Studies*, 51(3), 393-414.

Elian, M., & Young Taft, T. (2014), 'Stock Market Reaction to Debt-Based Securities: Empirical Evidence.'

Gaud, P., Hoesli, M., Bender, A. (2007), 'Debt-equity choice in Europe,' *International Review of Financial Analysis*, 16(3), 201-222.

Godlewski, C., Fungáčová, Z., Weill, L. (2011), 'Stock market reaction to debt financing arrangements in Russia,' *Comparative Economic Studies*, 53(4), 679-69.

Hovakimian, A., Opler, T., & Titman, S. (2001), 'The debt-equity choice,' *Journal of Financial and Quantitative analysis*, 36(1), 1-24.

Lewis, C. M., Tan, Y. (2016), 'Debt-equity choices, R&D investment and market timing,' *Journal of Financial Economics*, 119(3), 599-610.

Li, C., Ongena, S. (2015), 'Bank loan announcements and borrower stock returns before and during the recent financial crisis,' *Journal of Financial Stability*, 21, 1-12.

Oler, D., Harrison, J. S., Allen, M. R. (2007), 'Over-interpretation of short-window event study findings in management research: an empirical illustration,' Available at SSRN: 665742.

Salman, A., Munir, N. (2012), 'Choice between debt and equity and its impact on business performance,' International Journal of Organizational Innovation, 5(1), 284.

Leadership, Situational and Systemic Critical Thinking

David Ullrich, Univerzita Obrany, Brno, Czech Republic, david.ullrich@unob.cz
Vratislav Pokorný NEWTON College, Brno, Czech Republic, pokorny.v@seznam.cz
Eva Ambrozová, NEWTON College, Brno, Czech Republic, eva.ambrozova@newtoncollege.cz

Abstract

The text deals with the specifics of the situational and systemic leadership. It discusses the selected characteristics of critical thinking skills for the cognition, decision making and leadership behavior in challenging, complex and dynamically changing conditions and circumstances of modern corporate environment. It presents selected multidimensional models, within which the critical thinking qualities can be identified and the level of their parameters is measured.

Key words: leadership, leader, corporate environment, cognitive continuum, personal, mental and psychophysical condition, critical, situational and systemic thinking, rationality, analysis, intuition, insight.

Introduction

In the following text, we will focus on some issues related to leadership in terms of critical thinking for learning, decision making, negotiation and people´s leadership in specific situations, complex systems, and relationships, and in the dynamically changing conditions and circumstances of a modern corporate environment. The reason is, that the environment in which today's specialists work and continue their education is ever more volatile, more demanding, and more critical of possible mistakes; therefore, specialists are constantly forced to expand their knowledge and improve their occupational skills (Cech at al).

Theoretical background

Our environment is constantly changing. Similarly to humans, the characteristics of human systems that we create in this environment, for different purposes and functions, are changing. The modern corporate environment evolves and transforms more dynamically than the natural environment and, in relation to these changes, the quality requirements on the natural potential of leaders, managers, and entrepreneurs change either. The concept of a modern corporate environment is used in the context of professional leadership for management and business. This environment has been brought closer to the parameters of the unstable environment due to various changes (modern information technologies, globalization and others). The environment, which used to be the domain of crisis management, the environment in which security forces were more likely to perform. The characteristics of this approach are as follows:

a) The high complexity of factors and relationships related to conditions and circumstances.
b) The high dynamics of changes in conditions and circumstances.
c) Increasing the frequency and asymmetry of the effects of various non-standard and difficult to predict or structurally intervening variables.

Professional Leader (Three Areas, Functions and Abilities)

Professional leadership for both management and business in this environment involves, among other things, three areas. The first area includes proactivity in thinking, learning and decision making, discovering weaknesses, hidden potentials[1]of resources and abilities, and creating opportunities, exploring and developing (inventing and innovating) ways of solving tasks, simplifying existing and organizing new processes etc. The second area represents sharing information and creating knowledge for decision making and negotiation, working with information networks and networks of links, processes, etc. The third area covers the creation, organization, and management of human relations and processes between human systems as a whole and their external environment, i.e. the management and management of people and human systems. For professional leadership the following activities and functions are essential and distinctive:

a) Proactive learning, decision making, negotiation, and leadership.
b) Knowledge creating and sharing.
c) Relationships and processes creating and organizing.

These activities and functions constitute the essence of what enables the existence, survival, and prosperity of any entity (an individual, a team, organizational unit - firm) in a corporate environment. The existence of a subject in the long-term context depends on the extent to which its internal environment is intelligent, vital, and consistent with the external environment. The quality of its existence depends on how it uses, develops and cultivates its potentials in changing conditions and circumstances. How it recognizes, decides and acts, how it organizes relationships and shares knowledge in the internal environment. Therefore we will further on concentrate in particular on thinking that enables the learning and decision making, as well as actions and other aspects.

It turns out that in case of people working in this environment besides the knowledge, abilities, and skills that can be acquired or created by education and training, there is an area of natural potentials, that can neither be identified, diagnosed, or "measured" by the usual mono-disciplinary methods and procedures, and nor created, cultivated or developed by various education models and preparation methods. However, simple and always valid prescription for knowledge management does not-exist, say Konecny and Tomastik (2015). Nor can they be replaced or improved by sophisticated modern communication or information technologies or artificial intelligence. However, they do exist and are related to the qualities of critical thinking skills that the modern environment increasingly requires from professional leaders. In particular:

• Mobility between concrete and abstract (e.g. heuristics type problem solving, decision-making and behavior in a particular situation versus systemic, process, algorithm or mediated / indirect / decision-making and management).
• Mobility on a cognitive continuum from predominantly analytic to predominantly intuitive (L. Kostroň, 1997, K. R. Hammond, 2000; D. Kahneman, 2012).
• Mobility in the sense of applying an adequate way of recognizing and judging for correct decision making and effective negotiation in complex and dynamically changing conditions, relative relationships and circumstances of job situations. Deliberate decision-making, negotiation, and management of people burdened by uncertainty, randomness, lack/excess of information and high risk, etc.

[1] Potentials either in the internal or external environment, or due to changes in the characteristics of relationships and their organization.

These aspects are closely interwoven with each other, or conditioned by the personality or personal condition of a particular individual, including mental, psycho-physical, and in relation to leadership, as well as social condition. The personal condition includes not only mental and psychophysical condition of an individual, for example in the form of concentration in the sense of undisturbed attention and discipline of mind, thinking process. But also personality disposition such as maturity of an individual manifested as autonomy, stability, and situational adaptability without losing authenticity or personal identity. The personal condition also includes the level of self-awareness, self-control, openness, and curiosity as a realistic situational and systemic reasoning and the ability to learn in the process of solving problems. Another prerequisite features involve invincibility in the sense of patience, endurance, persistence and personal integrity (inner integrity, balance, and harmony), the aspect of which is not / fragility, de facto antifragility (Taleb, 2014).

The need for these abilities and their optimal organization reflects in decision-making and leadership of all entities operating in a modern corporate environment. Their significance dramatically increases in two specific versions of conditions and circumstances, and the significant increase in the frequency of occurrence of these variants is one of the major characteristics of the development of this environment.

The first version represents decision-making of the team leader in task situations. The other covers decision of the leader of a larger human unit in the system context - making decisions in predominantly non-standard, complex conditions, dynamically changing relationships, states and processes linked with the increase of asymmetric influences, coincidences or other intervening variables (such as failure of information flows in the form of network collapse). These are situations where the correct solution cannot be realized with the help of the usual tools of cognition, ways of thinking, using logic or so-called "rationality", but only with the help of "mind relaxing" in terms of mobility on the cognitive continuum, using the original "scientific" observation method that allows both insight (into situation) and view (on system, context, totality of relationships and processes) and provides sufficient number of information sources for judgment and correct decision making. This relaxation allows the openness or mobility of thinking, creates the ability to step out of a reactive into the proactive level, resulting in determining the quality and level of mental condition. It also represents the crucial point for distinguishing the level of the individual's potential for leadership and management.

These two versions are considered in terms of leader and leadership in the full sense of the words, and therefore in a bit varied term than in usual classical management. It is a qualitative differentiation and in terms of the requirements of the business practice of selecting and modeling the training of professionals, we had to distinguish more precisely the situations, the tasks and the conditions of their fulfillment, in terms of their demands on the quality of people and human systems. Therefore we work with the continuum model: leadership - management, whose basic parameters derive from human relationships (human system - system) - the situation (conditions and circumstances) - the task (the requirements of the problem solution). In the following table, we present a pragmatic differentiation of the forms of leadership of people and human systems in relation to the requirements of the situation (conditions and circumstances) and the role (function, activity). Table 1 represents a continuum for the qualitative differentiation of characteristics of human system management forms in environmental conditions and circumstances:

Table 1: Forms of People´s Leadership in Relation to the Characteristics of the Situation and the Responsibility

Dominant Form of Management	Characteristics of Conditions and Circumstances of Environment, Situation, and Task	Responsibility	Job Position (example)	Management Type Ratio		
				A	M	L
Administration	There are only one way and method. The task is well structured. Managing people in standard conditions[8].	For meeting a partial goal, a task.	Production Line Manager	70%	20%	10%
Management	There are more ways, but their number and functions are limited.	For the entire system perfomance.	Manager of a company or self-contained entity.	30%	50%	20%
Leadership	There are a lot of ways and methods.	For meeting the goal or mission accomplishment .	Project Team Leader.	5%	15%	80%

Source: Own

Predominant features of the characteristics for distinguishing the forms of leadership:

a) ***Administration*** as a capacity for a standardized, well-structured, usually technical, manufacturing or institutional environment, with formalized inputs, processes and output functions. It relates to the standardized system and the rules for its functioning and purpose. Determining aspect is meeting the task and the record. An example is the production manager.

b) ***Management*** as a capacity for roles and functions in the more complex environment of the human system itself and its functioning in moderately structured conditions being the subject to gradual change and transformation. The need for transformation of an approach according to a situation. The capability of adaptation, survival, and prosperity of the system in a relatively stable environment as well as ensuring the effective fulfillment of its functions. An example is an entrepreneur, the manager of an independent company. It is determined to maintain the capabilities of the human system as a whole in the environment, or its improvement or transformation.

c) ***Leadership*** (leader of a small team and leader of a large organizational unit) as a capability to manage the transformation of human systems in changing conditions and circumstances in the context of situations and environments.

Important factors are therefore the time factor, a factor of the character of the conditions and circumstances of the situation, and the factor of the characteristics of the task. In this respect, the position of a leader is "the least stable" over time. The most stable positions are the positions of management, especially in terms of institutions or industries. In other words, fulfilling the task or

mission accomplishing change the conditions and requirements and thus also the way of learning, the character of decision making and leadership. The mission is accomplished, the task is executed, and leadership as a dominant style passes into management, or administration and organization. The quality of the leader must come to the foreground and then, after completing the task or mission, consciously withdraw, retreat to the quality of the ruler, economist or administrator of processes, or transform into a different quality.

From here, requirements for the characteristic qualities of critical thinking for administration, management, and leadership are developed. The pragmatic requirements of business practice on selection and preparation for the challenging environment have also led to even more subtle categorization of leadership within management, i.e. organization, administration and management of human systems. The more subtle differentiation of the leader's status, according to the conditions of the situation and the characteristics of the task or mission, is as follows:

- Team Leader - situational leadership. Assignment - role in the situation (a higher level of change and transformation of the environment, a higher level of variability of tasks/assignments and a higher level of complexity, variability of conditions and environmental circumstances, competencies - tactical decision-making. There is also less predictability of development, a lower reliability of methods and techniques of preparation and training. It is necessary to adapt to or create new ones (tactics of struggle - the opponent changes/learns). Situational, specific (tactical), critical and process thinking prevail. Output – task fulfillment.
- System Leader (a firm, a corporation) - system leadership. Assignment - mission; operational and strategic decision-making capacities. Systematic, abstract (strategic), critical and process thinking prevails. Output – mission accomplishment.

The business practice shows that it is more appropriate to use the terms of critical situational thinking and critical system thinking rather than the terms of tactical thinking or strategic thinking for learning and deciding in two of the above-mentioned versions. The essence of situational (tactical) thinking is reflected, clever action adequate to the situation and the role. The term tactics comes from the Greek *taktiké techné* (the arts to organize an army). It is used for thinking, learning, and decision-making in the present situation, and represents a kind of rational, planned and smart situation-adequate action. The tactic is perceived as effective, operational application of the potential, resources, and strengths in a particular situation, or as a set of specific procedures in individual sub-tasks and task situations. Situational approach and thinking emphasize a pragmatic, effective way of fulfilling or solving a task, the output is an act in the form of a specific acting, action taking.

The core of systemic (strategic) thinking is the act of decision-making dealing primarily with long-term intentions or the overall picture of the situation, conditions, and circumstances that encompasses extensive human systems, multi-level contexts, relationships and processes, their condition and the potential dynamics of their transformation and changes. The systemic approach and thinking highlight the frameworks, intentions, values, the basic directions, and principles. The output represents a decision and dealing, frequently in the form of formative instruction.

Both ways allow identification of the weakness (empty space) in the overall situation, the system, and the environment, and provide the right solution into the negotiating decision. However, the interface between situational and systemic thinking is blurred, and the two areas are mutually interwoven, especially in terms of thinking and learning. It turns out that in the above two versions of leadership, the success is not determined by the size, strength, power, or "perfect" readiness (though these factors always play a role), but by intelligence manifested as cleverness or deliberate and critical thinking, core characteristics of which is attention, openness and mobility on the cognitive continuum. These aspects are based on the level and quality of the personal, psychophysical and mental condition of each particular individual. We have called this cleverness

critical thinking, i.e. thinking that creates the right conditions for deliberate, accurate and prompt judgment enabling proper decision-making and effective action, including leadership.

How to look for real leaders and how to identify whether they have the quality, the real manifestation of which is the ability to come to the foreground, make right decisions and act in the above-mentioned versions? Pragmatics of business practice requirements for the selection and preparation of professional managers has shown that due to the dynamics of development and the complexity of conditions, circumstances and relationships, the usual way of thinking about the leadership of leaders using one or two-dimensional modeling, corresponding to the type of organization, function or position, or according to the scientific discipline, which deals with it, proves less useful. The reality of professional practice in terms of selection and preparation in the long term has shown the following:

• The validity of a proven diagnosis of specific abilities or mental functions or personality dispositions usually carried out in relation to a particular occupational, job or system position and under standard conditions, has declined sharply due to changes of the conditions and circumstances of the situations of tasks and missions.

• As well in terms of preparation, the dynamics of change and variability of complexity of circumstances and influences, intervening variables in fulfilling tasks or missions, has seriously reduced the expectations put into adopting optimal tools or "correct" and standardized algorithms of procedures, in terms of effectiveness of fulfilling the task, despite the fact that at the end of the training, individuals demonstrated their excellent mastery and control, as measured by pedagogical diagnostics.

The concept of a cognitive continuum, according to K. R. Hammond (2000) proved its usability, providing parameters for criteria of ability qualities, which we have called the leader's mental mobility in relation to the characteristics of the situation and the requirements of tactical or strategic tasks. A focus was put on solving the relationship between the individual - the situation - the task, which led to creating the following models and methodology of X-Stream. The models and methodology are based on the pragmatics of the requirements of the situations of practical tasks on the qualities and abilities of the individual and the human system. The pattern of models is the result of a long-term influence in the selection and preparation of professionals and commanders in the security environment as well as managers and entrepreneurs in the MBA training model of 2009-2017. The business practice has verified, that the methodology and its models allow for an objective survey of the level of required qualities of potentials and abilities, because the individual, his / her mobility, should be monitored from several points of view and within more, at least three contexts:

Table 2: Mobility of an Individual in Relation to the Leader's Competencies

Mobility of an Individual	Parameters
Social context	Individual – team member – team leader
Cognitive context (dominant cognitive characteristics)	Analysis – critical thinking – intuition
External environment context - situation (of a system) and task (mission)	Situation (conditions, circumstances) and tasks (values, functions, activities, final state).

Source: Own.

The methodology has several models, the competence model of a professional leader (Ambrozová, Koleňák, Ullrich, Pokorný, 2016), the subtle skills model, the model for identification of individual parameters, situation and tasks, the cognitive continuum model and others.

In addition to traditional hard and soft skills, that back up a successful management of tasks, performance of functions and activities in changing and complex situations, the model of subtle skills emphasizes aspects of mental condition; psychophysical condition, critical and creative thinking, mental qualities such as discipline, stability, distance, concentration, endurance, patience, openness to changes and others (Ullrich, Pokorný, 2012). The critical thinking plays a crucial role in situational and systemic leadership. The importance and characteristics of truly critical thinking in leadership, decision-making in challenging conditions and stress, which features suggested and studied K.R. Hammond (2000) or L. Kostroň (1997) have currently been increasing for several reasons. These include, for example, the quantity and availability of information and knowledge, their topicality and reliability, and validity. For example, the rate of obsolescence of information and knowledge is so high that the ability to create own and "fresh" one significantly influences the potential success of the decision. Similarly, the amount of information (related to cognitive optimum) plays an important role in decision making, and the ability of prompt, fine, and accurate differentiation, falling more into the domain of insight and professional intuition, is a highly valued feature (Cejpek, 2005).

Critical thinking should be discussed for two modalities that are grouped together in the context of leadership in a modern corporate environment - critical situational thinking and critical system thinking. The critical thinking for these modalities has three aspects or dimensions. Above all, it enables to identify a weakness (empty space) in the whole situation and system; further, it also allows to decide on the optimal way of an effective procedure and, in the final dimension, to formulate recognition and decision as knowledge for communication and sharing. Critical thinking in situational and systemic leadership is manifested as a mobility on a cognitive continuum. The central concept of the cognitive continuum is quasi-rationality (Hammond, 2000), which represents the situation and role-adequate representation of analysis and intuition (insight) as modalities of the cognition. Forms of cognition on the continuum between intuition and analysis, always contain elements of both intuition and analysis and are summed up under the term of quasi-rationality. This allows thinking as a process to be better applied not only in linear tasks, but also in heuristics (both according to Hammond, 2000 and Kahneman, 2012), or tasks requiring decision-making under uncertain conditions, permanent changes and transformations, or under the influence of random processes, etc. All the tasks can be arranged on a cognitive continuum with respect to their ability to create intuition, quasi-rationality or analytical cognition. Mental mobility in the actual representation of these modalities in the form of requirements on an effective way of learning, enables, for example, the ability of subtle and accurate differentiation between facts and fictions (for example, minimizing deformation of the meaning and information due to stress or expert cognitive stereotype), ability to cope with change and transformation of the conditions of the task situation as well as the ability to properly handle the circumstances, relationships and sources of information and knowledge, as well as ways of cognition etc. Critical thinking is also a quality that requires reflection, undisturbed concentration, and openness, constant cultivation and improvement in changing environmental conditions and circumstances. One of the possible versions of the positive operationalization of critical thinking as the quality or ability that every individual who has the right to lead other people and human systems should possess, is as follows: *"Critical thinking is an individual's ability to create optimal conditions for correct judgment in a situation and role that manifests itself in mental mobility. Mental mobility saturates the following measurable parameters:*

a) Cognitive variability and mobility between analysis and intuition.

b) Sceptic curiosity and courage, openness and spontaneity of learning.

c) A psychophysical condition in terms of stability of quality and quantity of mental functions performance over time (attention and memory). "

Other models of methodology (Ambrozová, et al., 2016) allow to parametrically capture any specific situation, role or function, and at the same time formulate requirements on the abilities of

the human system (company) or the capabilities and skills of an individual. The following table lists three basic elements used by the methodology to describe the multidimensional model and its characteristics.

Table 3: Basic Elements for the Methodology Modeling

Model Components	Basic Characteristics	Basic Parameters for Successful Running
Situation	The state and processes of the external environment in which the task is being executed.	Conditions and circumstances
Task	Purpose, function, activity, result, task (to be executed).	Outputs
Individual	State and processes of the internal environment (potentials, capabilities).	Quality of potentials, abilities, knowledge, and methods

Source: Own.

The three elements (individual - task - situation) can be described using the following dimensions:

a) The analysis - intuition dimension (cognitive continuum) refers to the way of cognition.

b) The static - dynamic dimension refers to the dynamics of the changes over time.

c) The simple – complex dimension, refers to the characteristics of the conditions and circumstances of the situation and the task. It includes aspects such as things (phenomena) versus relationships, details versus the whole, concrete versus abstract, structured versus unstructured.

These dimensions should be seen as parallel continuums of qualities that complement each other and are not opposed. On one side of the continuum, there is a maximum of one quality (0.999), but this maximum is not absolute. The second quality is also present, even if only in the minimum representation (0.001). At the center of the continuum, there is an equilibrium state in terms of the requirement for the presence of both. The figure below shows a three-dimensional model for describing the tasks and situations in which the leader can move. The practice-based model results from the following assumptions:

a) Each situation can be considered as a state and process.

b) Each situation can be described by three dimensions.

c) Each situation is specific, there are no two identical situations.

d) Each situation requires specific ways of learning and cognition and their combinations, specific solutions and procedures.

In business practice, a three-dimensional model has proven for identification of situations and a multi parametric model of competencies for identifying the potential, the qualities of an individual and the human system to handle the situation of the task effectively. The above-mentioned assumptions and model in Figure 1, form the basis for the typology of the ways of thinking of professionals, leaders, for cognition, decision-making, negotiation, and leadership.

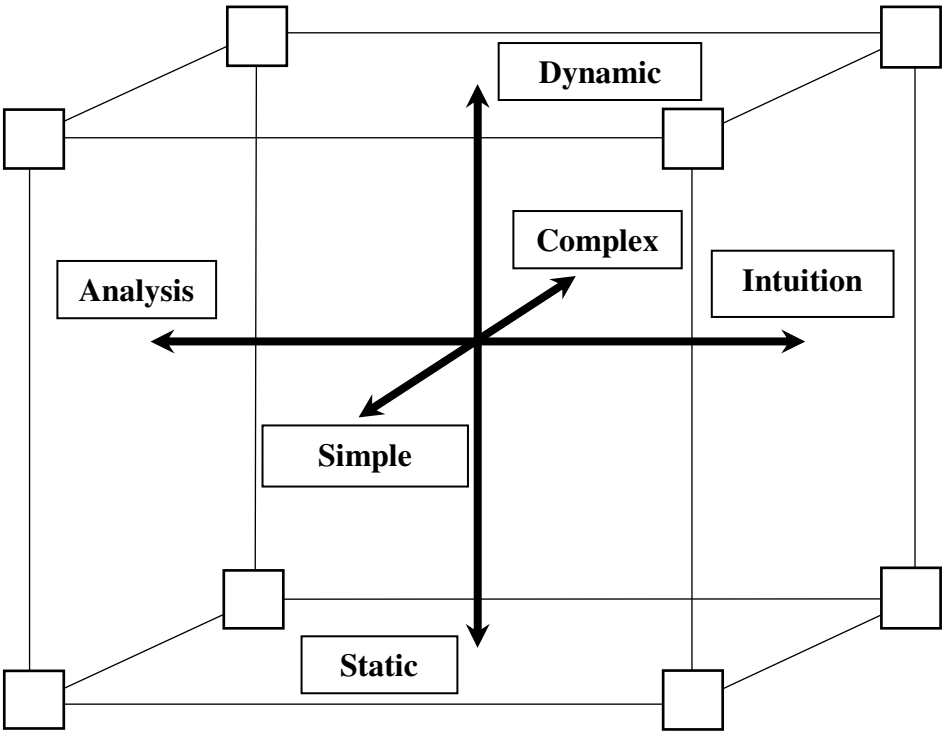


Fig 1 – Three-dimensional Model for Description of Environmental Requirements and Situations of Tasks

Source: Ullrich, 2017.

The individual extreme positions in the three-dimensional model can be given an example of a specific type of position for a way of cognition, deciding and negotiating. For example, position 2 corresponds to the situation and task that are in a dynamic and complex environment. From the point of view of cognition, decision-making, and negotiation, it requires prevalence of analytical competence. This may be the position of an exchange broker or IT manager or banking sector. Further examples of the individual extreme positions of the three-dimensional model are given in Table 4.

Table 4: Examples of Position Types

Position Number	Position Type in Management	Dimension analysis– intuition	Dimension static – dynamic	Dimension simple – complex
1	Small Businessman	analysis	dynamic	simple
2	Crisis Manager	analysis	dynamic	complex
3	System Unit Leader	Intuition	dynamic	complex
4	Small Team Leader	intuition	dynamic	simple
5	Workshop Manager	analysis	static	simple
6	Principal	analysis	static	complex
7	Marketing Manager	intuition	static	complex
8	Project Manager	intuition	static	simple

Source: Adopted and modified Kostroň, L. 1997.

Using the model, you can also describe any situation, system, process, professional environment, profession, role or mission, and its requirements or demands on a way of cognition for decision

making and leadership. It is particularly suitable for modeling difficult-to-structured situations and tasks within the domain of heuristics.

Conclusions

The development of a modern corporate environment puts new demands on the quality of natural leadership capabilities for situational and systemic learning, decision making, negotiation, and leadership of people and human systems. The business practice shows that selection and preparation of leaders for effective acting in this environment requires changes not only in approaches and methods but also in focusing on the quality of the natural abilities of specific people that are decisive for the correct solution of situational tasks and systemic decision making in complex conditions and dynamically changing circumstances. It turns out that attention should be focused especially on the characteristics involved in actual critical thinking, while the predominant feature represents the mobility on the cognitive continuum. Methods of selection, methodology and preparation models must be multidimensional and multi-parametric so as to enable individuals to grasp selected indicators of critical thinking in a wide range of situations and tasks from simple and well-structured to tasks and situations with high complexity, development of dynamics and uncertainty of outcome. Thus we can identify individuals who have not only an appropriate level of subtle qualities but also their appropriate combination or organization that enables them to manifest, update and apply in situational and system leadership.

References:

AMBROZOVÁ, E., KOLEŇÁK, J., ULLRICH, D., POKORNÝ, V. *Kognitivní management.* KEY Publishing, s.r.o., Ostrava, 2016, ISBN978-80-7418-254-9, 190 s.

CECH, P., KOKLAROVA, B., CECHOVA, I. *Professional Education in Different Specializations.* In: 8th International Conference of Education, Research and Innovation (ICERI). Spain, Seville: 2015, p. 6771-6780. ISBN:978-84-608-2657-6. ISSN: 2340-1095.

CEJPEK, J. *Informace, komunikace a myšlení (úvod do informační vědy),* 2. přeprac. Vyd. Karolinum, Praha, 2005, ISBN 80-246-1037-X, 233 s.

HAMMOND, K. R. *Judgments Under Stress*, Oxford University Press Inc., New York, 2000, ISBN 0-19-513143-6.

KAHNEMAN, D. *Myšlení rychlé a pomalé. Brno:* Jan Melvil Publishing s.r.o., 2012. ISBN 978-80-87270-42-4.

KONECNY, J., TOMASTIK, M. *Qualitative Modeling and Knowledge Management.* In. International Scientific Conference on Knowledge for Market Use - Women in Business in the Past and Present. Czech Republic, Olomouc: Palacky Univ. 2015, p. 388-397. ISBN:978-80-87533-12-3.

KOSTROŇ, L. *Psychologie vytváření úsudků.* Brno*:* MU, 1998. ISBN 80-210-1646-9.

POKORNÝ, V., AMBROZOVÁ, E., ULLRICH, D., KOLEŇÁK, J. *Mentální trénink jako efektivní metoda pro osobní život, profesi a leadership.* In: Scientia et Societas XIII/2, Czech Republic, Praha: Newton College, 2017, p. 177-189. ISSN 1801-7118

STERNBERG, R. J. *Kognitivní psychologie*, Portál, Praha, 2009, ISBN 80-7178-376-5,

TALEB, N. N. *Černá labuť (následky vysoce nepravděpodobných událostí),* Paseka, Praha, 2011, ISBN 978-80-7432-128-3, 461 s.

TALEB, N. N. *Antifragilita.* Praha: Paseka, 2014. ISBN 978-80-7432-498-7.

ULLRICH, D. *Kompetence velitele – leadera.* Brno: Univerzita obrany, 2017. Habilitační práce. 150 s.

Simulating Electronic Records Management System (ERMS) Functionality via Hypertext Preprocessor Scripting

Ap-Azli Bunawan[1, 2], Sharifalillah Nordin[1], Haryani Haron[1] and Ahmad Zam Hariro Samsudin[2]

[1]Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA, 40
450 Shah Alam, Selangor Darul Ehsan, Malaysia.
[2]Faculty of Information Management, Universiti Teknologi MARA, 40150, Shah Alam, Selangor.
Malaysia.
E-mail: ap-azli@salam.uitm.edu.my, sharifa@tmsk.uitm.edu.my, harya265@salam.uitm.edu.my.
ahmadzam@salam.uitm.edu.my.

Abstract

This paper highlighted the types of programming scripting used in simulating the actual ERMS functionality. This simulation need to be developed in completing the study on validating the Preservation Electronic Records Event History Metadata (PEREHM) model viability. By simulating the actual ERMS functionality using Personal Home Page (PHP) Hypertext Preprocessor scripting, a dedicated prototype can be developed. This is because the difficulties have occurred in terms of using the actual ERMS for testing new ideas especially in solving the related issues on the existing ERMS functionality. Thus, this has also can affected the reputation of the current ERMS if there are functions that needs to be modified and eliminated. By avoiding these sensitivity issues, the development of the prototype is the best solution. An in-depth review on the several types of scripting language for the prototype development is conducted. However, the PHP scripting language is selected. This is because the PHP are widely known as a web system development tools and open sources. By having these characteristics, the developed prototype can be easily access on web and also ease to be modified. On top of that, this paper also presenting the example scripting of PHP that have been used in developing the prototype for electronic records. This includes structuring the prototype scripting using the actual set of e-records metadata that used by ERMS. This is to ensure the developed prototype can significantly simulate the actual ERMS functionality. As this simulation being tested, the result has shows that the main objective of the study is completely achieved. Thus, this can be concluded that the used of PHP scripting language for the purpose of prototype development has adequately simulated the real system functionality. This is where the PHP scripting has been selected to be used in this study.

Keyword: Simulation, Electronic Records Management System (ERMS), Personal Home Page (PHP), Hypertext Preprocessor, PEREHM Model

Introduction

In the process of validating the Preservation Electronic Records Event History Metadata (PEREHM) model, the testing on the actual ERMS need to be conducted. This was to ensure the PEREHM Model viability in solving the issues regarding incomplete e-records metadata reported can be validated. However, the process of validating cannot be tested in the actual ERMS system. This was because the issues on receiving permission for existing ERMS scripting modification have become unethical. This was where the simulation system was needed to test the entire elements contain in the PEREHM Model (Bunawan, Nordin & Haron, 2015). Due to this development, several types of programming language scripting have been reviewed. Through the reviews, the PHP Hypertext Preprocessor scripting has shown the common scripting used in simulating the ERMS functionality (Gonzales & Casquejo, 2013) Thus, the PHP scripting has also enabled the developed system to be accessed through the web. By presenting the prototype through web, this can ease the process of the testing.

This was because the real user can easily test the prototype without having any limitation on the system functionality and accessed in validating the PEREHM Model viability.

Literature Review

Currently, the creation of electronic records (e-records) has extremely evolved (Peters & Buntrock, 2014; Yaacob & Sabai, 2011). This evolvement has given an impact towards the management of e-records. This impact can be seen through several issues occurrences regarding ERMS functionality (Chasse, 2015). According to Iwhiwhu (2010), the ERMS can preserve the security, integrity and authenticity of record for the purpose of permanent preservation. There were various types of ERMS available to be used as e-records management system. These includes the TRIM Context Software (Talbot, 2013), Generic Office Environment (Hussin & Saman, 2015) and also IBM FileNet (Paknad, Raynaud-Richard, & Pogodin, 2014). However, towards changes on the technology, the demands from user to suite current technology management on ERMS have increase (Simon, 2014). This increasing demand was to ensure current issues on the management of e-records can be solved properly. This was because the changes on the technology lead to the changes on management on e-records as well. This is where the issues and challenges in managing the e-records have rapidly increased (Bunawan & Nordin, 2015; Asogwa & Ezema, 2012). Part of the issues that have been discussed by the scholar is on the e-record event history metadata (Niu, 2013).

On top of that, the number of system application that simulates the ERMS functionality has increased. This has been proven by Miah & Samsudin (2016) who stated that many universities have used their own specific software as an effective mechanism in handling the academic records. This is because the users have their own preferable software in handling the e-records within their life cycle. By simulating the ERMS functionality, the purpose of handling daily business transaction activity on e-records can be managed nearly to the actual ERMS behavior and functionality. This has also can eliminate the issues regarding misused or misconduct the actual ERMS for specific purposes or means in testing new research ideas. Thus, this is also supported by Idowu & Bari (2012) which stated that *simulation system is to act as decision support for the real system, understand and estimate how future changes in the real system can affect the current system with its new change.*

Moreover, Nahas & Maaita (2012) stated that the selection of suitable programming language has become the major factor in the development of system. According to Haverbeke (2014), a good programming language can help the programmer to talk about the action that computer has to perform. These have shown that in developing the simulation system, the appropriate selection of programming scripting was important. However, by selecting inappropriate programming language scripting, this can affect a developed system if it was not compatible to be used. This is where the PHP scripting programming language has been selected for the prototype simulation.

Overall, the PHP scripting is an open source that widely used (Paudel, 2016) and multipurpose scripting language for web application development (Hosek at el. 2012). According to Padmanabhan (2013), the *PHP was installed on more than 20 million Web sites and 1 million Web servers*. This has shown that the PHP is most preferable tool to be used in developing any dedicated system. Through this explanation, this has shown that the selection of PHP scripting in simulating the ERMS for PEREHM Model validation process has adequately justified.

Methodology

In this paper, a systematic review technique is adopted. According to Wang et al. (2016), the systematic review technique can provide a comprehensive coverage and analysis of related literature. Moreover, the study conduct by Ahali (2016) shows that a systematic review technique help to search, appraise and synthesize available literature to satisfy the aim of the study. Additionally, this followed by Hessels and Larson (2016) which explain that the systematic review is required to summarize their research evidence, thereby accelerating the translation of evidence into practice and guiding future research as appropriate. Overall, these have shown that the systematic review technique is widely adopted as the structured technique to be used in gathering information and

evidence for supporting constructive research ideas. Thus, this is where the technique has been adopted to present the main ideas of this paper.

Result

As presented in the literature, the selection of PHP as a tool in developing the ERMS simulation is justified. By using the PHP, the entire element of PEREHM Model has been validated adequately (Bunawan et al, 2015). Therefore, the next table is tabulated to present the motivations factors on the selection of PHP as a tool in developing the ERMS simulation.

Table 1: PHP Selection Motivation Factor

No.	PHP Selection Factor
1.	Common Scripting Used
2.	Access Available Through Web
3.	Support Any Business Activities
4.	Ease to Update
5.	Ease to Program
6.	Ease Real Testing Process
7.	Over Million Users

Based on Table 1 above, this has shown that there are Seven (7) factor of selecting the PHP for simulating the ERMS. These includes a common scripting used, access available through web, support any business activities, ease to update, ease to program, ease real testing process and has been applied over million users throughout the world. These are the seven factors that has been synthesized through the entire literature gathered in terms of the selection of PHP.

Conclusion

As a conclusion, the seven motivation factor that being described in the result section is firmly justified by the scholars. These factors can also be used as a reason for other domain research in justifying the selection of PHP as the tool for testing any developed model. As being proven workable to adequately validate the PEREHM Model, the PHP is recommended to be used in other field of research.

References

Adhatrao, K., Gaykar, A., Dhawan, A., Jha, R., & Honrao, V. (2013). Predicting Students' Performance using ID3 and C4. 5 Classification Algorithms. *arXiv preprint arXiv:1310.2071*.

Ahali, A. Y. (2016). Improving electricity access in Ghana: Challenges and the way forward. *International Journal of Energy and Power Engineering*, *5*(2-2), 9-17.

Asogwa, B. E., & Ezema, I. J. (2012). The challenges of preservation of archives and records in the electronic age. *The Official Journal of the Pacific Northwest Library Association*, 115.

Bunawan, A. A., & Nordin, S. (2015) The Challenges in Preserving The Electronic Records Metadata.

Bunawan, A. A., Nordin, S., & Haron, H. (2015, July). A Model for Preserving the Electronic Records Event History Metadata in Malaysia Government Agencies. In *Proceedings of the 2015 Seventh International Conference on Computational Intelligence, Modelling and Simulation* (pp. 29-34). IEEE Computer Society.

Bunawan, A. A., Nordin, S., & Haron, H. (2015, July). A Model for Preserving the Electronic Records Event History Metadata in Malaysia Government Agencies. In *Computational Intelligence, Modelling and Simulation (CIMSim), 2015 Seventh International Conference on* (pp. 29-34). IEEE.

Chasse, K. (2015). 'Records Management Law'—A Necessary Major Field of the Practice of Law—A Summary. *Available at SSRN 2584422*.

Gonzales, A. J. S., & Casquejo, M. N. S. (2013). A Web-based Records Management System for the Electrical Equipment and Energy Utilization of the University of the Immaculate Conception. *IAMURE International Journal of Mathematics, Engineering & Technology*, *8*, 31.

Haverbeke, M. (2014). *Eloquent JavaScript: A Modern Introduction to Programming*. No Starch Press.

Hessels, A. J., & Larson, E. L. (2016). Relationship between patient safety climate and standard precaution adherence: a systematic review of the literature. *Journal of Hospital Infection*, *92*(4), 349-362.

Hosek, J., Vajsar, P., Bartl, M., & Molnar, K. (2012). Implementation of Mobility Management Methods for MANET. *International Journal of Advances in Telecommunications, Electrotechnics, Signals and Systems*, *1*(2-3), 42-48.

Hussin, N., & Saman, W. S. W. M. (2015). E-Government Initiative: Key Functions of Electronic Records. *Digital Solutions for Contemporary Democracy and Government*, 149.

Idowu, S., & Bari, N. (2012). A Development Framework for Smart City Services. *Master's thesis, Lulea University of Technology, Lulea, Sweden*.

Iwhiwhu, B. E. (2010). Electronic records management in Africa: problems and prospects. *Handbook of Research on Information Communication Technology Policy: Trends, Issues and Advancements: Trends, Issues and Advancements*, 161.

Miah, S. J., & Samsudin, A. Z. H. (2016). EDRMS for academic records management: A design study in a Malaysian university. *Education and Information Technologies*, 1-16.

Nahas, M., & Maaita, A. (2012). *Choosing Appropriate Programming Language to Implement Software for Real-Time Resource-Constrained Embedded Systems*. INTECH Open Access Publisher.

Niu, J. (2013). Recordkeeping metadata and archival description: a revisit.*Archives and Manuscripts*, *41*(3), 203-215.

Padmanabhan, S. (2013). *U.S. Patent Application No. 13/535,942*.

Paknad, D., Raynaud-Richard, P., & Pogodin, A. (2014). *U.S. Patent No. 8,655,856*. Washington, DC: U.S. Patent and Trademark Office.

Paudel, S. (2016). Vulnerable Web Applications And How To Audit Them: Use of OWASP Zed Attack Proxy effectively to find the vulnerabilities of web applications.

Peters, S. G., & Buntrock, J. D. (2014). Big data and the electronic health record. *The Journal of ambulatory care management*, *37*(3), 206-210.

Simon, J. C. (2014). E-Book purchasing best practices for academic libraries. *Journal of Electronic Resources Librarianship*, *26*(1), 68-77.

Talbot, D. (2013). The future of records management: A personal view. *IQ: The RIM Quarterly*, *29*(1), 8.

Wang, J., Muddada, R. R., Wang, H., Ding, J., Lin, Y., Liu, C., & Zhang, W. (2016). Toward a resilient holistic supply chain network system: Concept, review and future direction. *IEEE Systems Journal*, *10*(2), 410-421.

Yaacob, R. A., & Sabai, R. M. (2011). Electronic Records Management in Malaysia: A case study in one government agency. In *Asia-Pacific Conference on Library & Information Education & Practice*.

Value, attitude, and intention to quit as an entrepreneur: An empirical study on Indonesian youth

Sabrina O. Sihombing, Universitas Pelita Harapan, Tangerang, Indonesia, sabrina.sihombing@uph.edu

Abstract

Youth entrepreneur is one nation strategy to develop its economic and social development. Extensive research has been conducted to examine student's intention to become entrepreneur. Specifically, a great deal of research on entrepreneurship have been conducted to explore and predict various factors that influence youth intention to become an entrepreneur. However, limited research has been examined to understand youth intention to quit as entrepreneur, especially in Indonesian youth context. Young entrepreneur have inherent characteristics such as lack of experience, skill, and some of them are mentally not stable in working such as easy to change their jobs. Therefore, understanding intention to quit among youth entrepreneur may contribute not only in entrepreneurship literature but also support Indonesian government, academicians, and entrepreneurs themselves in understanding and creating ways to make young entrepreneurs sustain in entrepreneurship. Thus, this study aims to predict the relationship between personal values and intention to quit as entrepreneur with attitude toward entrepreneurship as a mediating variable in the context of young entrepeneur in Indonesia. Respondents were 150 students which collected from a private university in Tangerang, Indonesia. Respondents were collected by using purposive sampling technique. Structural equation modeling (SEM) was used to analyze the data. Results indicate that the relationships between personal values (i.e., instrumental and terminal values) and attitude are not significant, but attitude has significant impact toward intention to quit as entrepreneur. This paper provides an analysis of the data, a discussion of the findings and the directions for future research.

Keywords: values, attitude, intention to quit, entrepreneur

Introduction

Youth is one key element in a nation. Understanding youth and all things related to youth is important since youth will become leaders of a nation in future. Entrepreneurship is one activity is that attract to young people. Specifically, studies show that the main attraction for young people to become entrepreneurs is self-employment that has the potential to create jobs, significant financial rewards, prestige, and others. Many studies have been conducted in predicting and understanding the intentions of youth to become an entrepreneur (e.g. Ozaralli & Rivenburg 2016; Dogan, 2015; Hattab, 2014; Kuttim et al., 2014; Peng et al., 2012; Campo, 2011; Turker & Selcuk, 2008; Van Gelderen et al., 2008). On the other hand, young people have characteristics that may hamper them in becoming sustainable entrepreneur that not easily give up in their entrepreneurship. Temptation to work with established companies and having consistent and stable income are two main factors that may influence their intention to quit as entrepreneurs.

Intention to leave or quit is a condition when a person not feel comfortable and enjoy with their jobs or works. Intention to quit may happen to entrepreneurs when those entrepreneurs have difficulties and problems with their business. Especially for young entrepreneurs, intention to quit as an entrepreneur is one thing that they can easily considered as one way solution when young entrepreneurs are having encountered with problems. Many researches have been conducted in understanding intention to leave in the context of organization and companies (e.g. De Hoer, Giacomin, & Janssen, 2016; Rizwan, 2014; Masum et al., 2010; Saungweme & Gwandure, 2011). Furthermore, research in entrepreneurship also shows that intention to leave is one important topic (e.g. Forster-Holt, 2013; Zhu, Burmeister-Lamp, &

Hsu, DeTienne, 2010; Justo & DeTienne, 2008), however, it is rarely studied (DeTienne, 2010). Moreover, as far as the researcher knowledge, there is no research conducted in predicting of young entrepreneur's intention to quit especially in the context of Indonesia.

Young and tough entrepreneurs are especially needed for Indonesia as a developing country. The resilience of young entrepreneurs is expected to be able to survive in creating jobs and will have an impact on the improvement of the nation's economy. Predicting the intention to quit young entrepreneurs in empirical studies is one way to understand the toughness of young entrepreneurs who some of their common traits are more unstable and sometimes easier to give up.. Therefore, this paper aims to examine the relationship between personal values and intention to quit as entrepreneur with attitude toward entrepreneurship as a mediating variable. Personal values will be measured by applying terminal and instrumental values as proposed by Rokeach (1973). Terminal values refer to beliefs in achieving ultimate goals and instrumental values represent ways in achieving that end goals. Those instrumental and terminal values represent two separate, yet functionally connected systems (Rokeach, 1973). Thus, both types of these values affect people behavior in their daily life. However, few researches have been conducted to understand instrumental and terminal values of entrepreneurs (e.g. Jakubczak, 2016; Uy, 2011). Furthermore, as far as the researcher knowledge, there is no study that focuses on applying these two types of personal values in predicting youth intention to quit as an entrepreneur in Indonesian context. Based on the explanation before, the research questions of this paper can be stated as follows:

RQ1 : Is there a positive relationship between terminal values and attitude toward entrepreneurship?
RQ2 : Is there a positive relationship between instrumental values and attitude toward entrepreneurship?
RQ3 : Is there a negative relationship between attitude toward entrepreneurship and intention to quit as entrepreneur?

Literature review

Entrepreneurial Intention

Intention is a motivation to engage the behavior in the future (Blackwell, Miniard, & Engel, 2006). This motivation is the main antecedent variable in explaining people behavior. Several main attitude theories such as theory of reasoned action, planned behavior theory, and the theory of trying put intention as the main antecedent variable that influence behavior. Related with entrepreneurship, entrepreneurial intention is defined as the intention to start a new business (Van Gelderen et al., 2008; Pilis & Reardon, 2007).

Entrepreneurial intention is one dependent variable that has received great attention by many scholars. Youth entreprenurial intention is important since youth are potential driver of economic development of a nation. Moreover, many researchers also focus in understanding youth entrepreneurial intention (e.g. Ozaralli & Rivenburg 2016; Dogan, 2015; Kuttim et al., 2014; Peng et al., 2012; Turker & Selcuk, 2008; Pilis & Reardon, 2007). Youth entreprenurial intention is important since youth are potential driver of economic development of a nation.

One phenomenon in working environment is the intention quit of the employee. Intention to quit is defined as individual's decision to stop working a company or organization (Aziz & Ramli, 2010). Intention to quit can be applied in entrepreneurship area. Specifically, start-up entrepreneurs or businessmen with long experience, or young or old entrepreneur may face the possibility of quitting from entrepreneurship. There are several factors of entrepreneurial exit such as family matter (e.g. DeTienne & Wennberg, 2014), personal characteristics (e.g. Justo & DeTienne, 2008; Stam, Thurik, & van der Zwan, 2008), institutional environment (e.g. Stam et al., 2008), and others.

People intention can be influenced by many factor. Attitude theories such as the theory of planned behavior (Ajzen, 1988) and the theory of trying (Bagozzi) shows that two main antecedent variables of people intention are attitude and subjective norm. This research applied the value-attitude-behavior hierarchy that was developed by Homer and Kahle (1988). In other words, this hierarchy shows that personal values influence people behavior indirectly through attitude.

Attitude

An attitude is defined as a learned predisposition to behave in a consistently favorable or unfavorable way toward a given object (Schiffman & Wisenblit, 2015, p.172). Attitude is considered as one main variable in explaining people variable in which attitude can be divided into three dimensions: cognitive (i.e., belief), affective (i.e., feel), and conative (i.e., intention).

Attitudes can be explained into two main types in people behavior perspectives (Blackwell et al., 2006). The first type is attitude toward the object (A_o). A_o represents a consumers' evaluation toward objects such as products, brands, or services. The second type is attitude toward the behavior (A_b). It represents an evaluation of performing a particular behavior such as buying or doing something. As A_b focus on performing behavior, then it can be stated that A_b is related strongly to behavioral intention (Blackwell et al., 2006). Thus, this research applied the concept of A_b in predicting people intention.

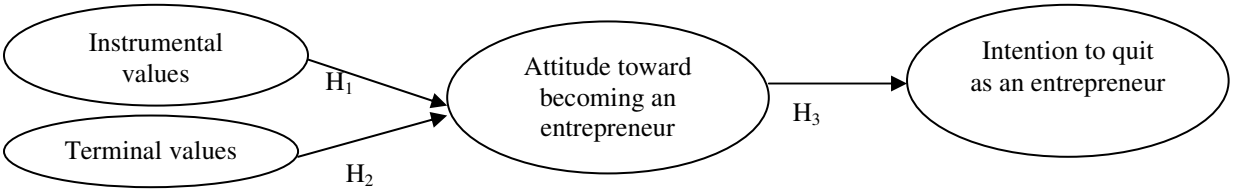
Values

Personal values are one significant variable in explaining people attitude and behavior. Value refers to a desirable trans-situational goal which varying in importance and its serves as a guiding people principle in life (Schwartz, 1992). Specifically, values influence many aspects in human lives and it represents what are important to our lives (Bardi & Schwartz, 2003).

Entrepreneurship research show that one important variable that influence entrepreneurs' behavior is their personal values (e.g. Malovics *et al*., 2015; Rohani, Kamariddun, Yahya, & Sanidas., 2015; Nguyen & Nguyen, 2008; Halis, Ozsabunouglu, & Ozsagir 2007; Hemingway 2005; Lindsay, Jordaan, & Lindsay, 2005). However, those studies applied personal values in general. Rokeach (1973), on the other hand, suggested that personal values can be divided into 2 types: instrumental values and terminal values. Terminal values refer to a condition that is ideal or desired end goals. On the other hand, instrumental value is an ideal way of behaving in order to achieve terminal values. Those instrumental and terminal values represent two separate, yet functionally connected systems (Rokeach, 1973). Thus, both types of these values affect people behavior in their daily life.

This research developed a model that picture the relationship between personal values (that is, instrumental and terminal values) and attitude toward becoming an entrepreneur. It is predicted that there will be a positive relationship between these two types of values toward attitude toward becoming an entrepreneur. As attitude theories show that the stronger the attitude of a person then the stronger the intention to perform a behavior. Since this research focus on intention to quit as an entrepreneur, this negative relationship between attitude and intention to quit is predicted.

Research model and hypotheses



Source: developed for this research (2017)

Hypotheses:
H_1: Instrumental values will be positively related to attitude toward becoming an entrepreneur.
H_2: Terminal values will be positively related to attitude toward becoming an entrepreneur.
H_3: Attitude toward becoming an entrepreneur will be negatively related to intention to quit as an entrepreneur.

Research method

Sample and sampling design

The target population covered in this research was undergraduate students who are small and medium business entrepreneurs and live in Jakarta and Tangerang. The sample size of 150 was set for this research. This research applied purposive sampling. In particular, only students who has his own business within the past 1 year period can be a respondent of this study.

Survey

Data were collected a self-administrated questionnaire and was collected in one month period. The questionnaires were delivered to respondents by the researcher and research assistants. This method was chosen because this method gives flexibility time for respondents in answering the questionnaire. To appreciate respondents' time, a pen was given to respondents in order to appreciate their participation this research.

Measures and the goodness of measures

This study applied multi-item scales that were adapted from previous studies to measure constructs in this research model. Five-point Likert scale was used to measure all items in the questionnaire. All constructs' indicators were adapted from Sihombing et al (2016), Ariff *et al*. (2010), and Linan and Chen (2000). The goodness of measures was tested through reliability and validity analysis. analysis (Sekaran & Bougie, 2013). Sekaran and Bougie (2013) pointed out that reliability analysis is making sure that the instrument is consistently measure the concept that is measured. This analysis apply the examinations of Cronbach's Coefficient Alpha and item-to-total correlations (Churchill, 1979). After having done with reliability checking, validity analysis is conducted to assess how well the instrument measures the particular concept (Sekaran & Bougie, 2013). Construct validity is applied in this research through the assessment of convergent and discriminant validity. Discriminant validity of the applied constructs was tested by assessing correlations between constructs (Bagozzi et al., 1991). Specifically, discriminant validity was achieved when the factor correlations were significantly different from one.

Analysis Data

After the research data was examined to confirm that the data are realible and valid, then a structural equation modeling (SEM) was used to test the relationship between constructs. SEM predicts the relationships among the latent variables and encompasses two components: a measurement model and a structural model (Schreiber et al., 2006).

Results and discussion

Respondents profile

A total of 120 questionnaires were returned out of 150 distributed. Eight questionnaires were eliminated due to incomplete questionnaire. Hence, 112 usable questionnaires were obtained, yielding a response rate of 74.6%. The profile of the sample reveals that male constituted about 55 per cent of the sample. Those between 18-20 years old represent 70.5% of the sample, and most of them (78.6%) have experience as entrepreneurs for about 1 year.

Descriptive statistics, reliability, and validity

The means, standard deviations, and correlations for terminal values, instrumental values, attitude, and intention to quit are shown in Table 1. The table also shows a positive relationship at 0.01 has been found among personal values, attitude, and intention. However, no significant relationship has been found between religious values and attitude, and religious values and intention.

Table 1. Descriptive statistics and correlations

Variables	Mean	Std. Deviation	1	2	3	4
1. Terminal Values	4.594	0.522	1			
2. Instrumental Values	4.455	0.547	0.529**	1		
3. Attitude	4.096	0.744	0.139	0.205*	1	
4. Intention to quit	1.604	0.708	-0.416**	-0.285**	-0.379**	1

Note: n = 112; **correlation is significant at the 0.01 level, * correlation is significant at the 0.05 level

Before testing the hypotheses, the goodness of measures was established through reliability and validity analysis (Sekaran & Bougie, 2013). Sekaran and Bougie (2013) pointed out that reliability analysis is making sure that the instrument is consistently measure the concept that is measured. This analysis applied the examinations of Cronbach‘s Coefficient Alpha and item-to-total correlations (Churchill, 1979) as shown in Table 2. Two items of the research questionnaire (one from instrumental values and one from attitude) were excluded because the item-to-total correlation was below 0.4.

Table 2. Cronbach Alpha and item-to-total correlation

Indicator(s)	Cronbach's Alpha	Item-to-total correlation
Terminal Values	0.840	
- Success is the purpose of my life (TV1)		0.559
- Being an honest person is the purpose of my life (TV2)		0.612
- I want to obtain the happiness of life (TV3)		0.702
- Being responsible is my purpose in life(TV4)		0.657
- I want to have a good future (TV5)		0.707
Instrumental Values	0.712	
- Honesty helps me to obtain my goal (IV1)		0.443
- Hard work is the key to achieving my goals (IV2)		0.571
- To achieve my purpose in life, success is one way to achieve that goal (IV4)		0.422
- Work with diligently is my way to achieve my life purpose (IV5)		0.593
Attitude	0.830	
In my opinion, being an entrepreneur is:		
- Very unpleasant- very pleasant (Att2)		0.535
- Very unwise-very wise (Att3)		0.596
- Very negative – very positive (Att4)		0.772
- Very bad – very good (Att5)		0.736
Intention to quit	0.827	
- I intend to quit becoming an entrepreneur within the next 1 year (Int1)		0.621
- I plan to no longer be an entrepreneur in the next 1 year (Int2)		0.755
- I will try to quit becoming an entrepreneur within 1 year (Int3)		0.738

Validity analysis refers to how well the instrument measures the particular concept (Sekaran & Bougie, 2013). Construct validity is applied in this research through the assessment of convergent and discriminant validity. Discriminant validity of the applied constructs was tested by assessing correlations between constructs (Bagozzi & Yi, 1991). Specifically, discriminant validity was achieved when the factor correlations were significantly different from one. Table 1 above shows a coefficient correlations among constructs are different from one indicated discriminant validity was achieved. On the other hand, Hill and Hughes (2007) stated that convergent validity was assessed by applying exploratory factor analysis (Table 3). Table 3 shows that the factor loadings are statistically significant indicated that convergent validity was achieved.

Table 3. Exploratory Factor Analysis

	1	2	3	4
TV2	0.769			
TV3	0.703			
TV4	0.873			
TV5	0.731			
IV2				0.618
IV4				0.766
IV5				0.702
Att2		0.644		
Att3		0.730		
Att4		0.900		
Att5		0.895		
Int1			0.687	
Int2			0.883	
Int3			0.892	

Structural Equation Modeling

Structural equation modelling was applied to validate the proposed model (Figure 1). The structural equation analysis was conducted in two main steps: the estimation of the measuring model (Confirmatory Factor Analysis, CFA) and the estimation of the structural model. The measurement model focuses on the link between factors and their measured variables. Furthermore, the relationship between the constructs was assessed in the structural model.

CFA using maximum likelihood method was performed to assess the measurement model (Table 4). The results show a marginal-fit model (GFI = 0.784, CFI = 0.867, RMR = 0.055, CMIN/DF= 1.781). Table 5 shows the parameter estimated for structural paths. The results indicated that estimates for a set of recommended indices (GFI = 0.780, CFI = 0.864, RMR = 0.060, CMIN/DF= 1.794) were in the range of accepted threshold. It can be stated that the proposed model has an acceptable fit.

Table 4. Confirmatory Factor Analysis

Path	**Standardized Regression Weight**	**CR**	**Goodness of Fit**
TV2 ← Terminal Values	0.571		CMIN/DF = 1.563
TV3 ← TerminalValues	0.805	5.871	GFI = 0.885
TV4 ← Terminal Values	0.673	6.703	CFI = 0.944
TV5 ← Terminal Values	0.855	5.990	RMSEA = 0.071
IV2 ← InstrumentalValues	0.745		
IV4 ← Instrumental Values	0.504	4.509	
IV5 ← Instrumental Values	0.737	5.906	
Att2 ← Attitude	0.563		
Att3 ← Attitude	0.616	5.237	
Att4 ← Attitude	0.926	6.508	
Att5 ← Attitude	0.859	6.438	
Int1 ← Intention	0.667		
Int2 ← Intention	0.927	7.701	
Int3 ← Intention	0.822	7.560	

Table 5 shows that all path estimates were found not to be statistically significant except the path between attitude toward becoming an entrepreneur and intention to quit (H_3). Those two hypotheses that are not significant are the relationship between terminal values and attitude toward becoming an entrepreneur (H_1) and the relationship between instrumental values and attitude toward becoming an entrepreneur (H_2).

Table 5. Parameter Estimates for Structural Paths

Hypo -theses	Path	Standardized	CR	Absolute fit
		Regression Weight		
H1	ATT <-- TV	0.065	0.360	CMIN/DF = 1.827 GFI = 0.865
H2	ATT <-- IV	0.111	0.582	CFI = 0.915
H3	INT <-- ATT	-0.295	-2.637	RMSEA = 0.086

Note
TV : Terminal values
IV : Instrumental values
INT : Intention to quit
ATT : Attitude toward becoming an entrepreneur

Discussion

Personal values are our beliefs or principles that will direct us in understanding what is meaningful and important to us. Rokeach (1973) divided personal values into two types of values: terminal and instrumental values. Terminal values refer to beliefs that are ultimate things to achieve such as happiness and success in life. On the other hand, instrumental values are beliefs as modes of conduct to achieve ultimate things in life such as hard-working and honest. In this research, the two types of personal values are having no significant relationship with attitude toward becoming an entrepreneur.

The insignificant relationship between personal values (terminal and instrumental values) with attitude toward becoming an entrepreneur can be explained as follows. This research applied student samples in understanding their intention to quit as an entrepreneur. Several research shows that many young people have embraced personal values such as individualism (Jang, 2015; Sihombing, 2014; Sun & Wang, 2010), materialism (Jang, 2015), freedom, and others. These values such as individualism and materialism are across many countries as influenced by western culture and spread through globalization and technology. In other words, it can be stated that the personal value of the young today is not focused on their ultimate goals in life such as happiness, success, responsible people, honest people, and a good future. Yet, young people focus on their own personal values such as individualism and materialism as stated earlier.

This research confirms the negative relationship between attitude toward becoming an entrepreneurs and intention to quit as an entrepreneur. This result of the relationship between attitude and intention is consistent with previous findings (Rahab & Wahyuni 2013; Ibragimova et al. 2012; Kuang et al. 2012; Cai & Shannon 2011; Teh & Yong 2011; Teh et al. 2011; Zhang 2011; Bock et al. 2010; Chen et al. 2009; Lin 2007; Wu and Li 2007; Lin & Lee 2004). Thus, it can be stated from the research results that respondents in this research (i.e., youth entrepreneurs) have positive attitude toward becoming an

entrepreneur (mean = 4.096) and they have no intention to quit as an entrepreneur (mean = 1.604). The result can be interpreted that the more they have positive attitude toward becoming an entrepreneur, the less their intention to quit as an entrepreneur. This result was delighted since it is hoped youth entrepreneur is can be tough and sustain in their job as entrepreneur.

Conclusion

This research is motivated by a need to understand the relationship between personal values and attitude toward becoming an entrepreneur, and the relationship between attitude toward becoming an entrepreneur and intention to quit as an entrepreneur. Entrepreneur's supports, especially young entrepreneurs, will no doubt have a positive impact on the nation's economy. However, young entrepreneurs need to continue to be given attention, nurtured, and supported by the government and the society so that they become a formidable businessman who can create jobs for many people and a positive impact on the environment, society, and nation.

We believe our study adds to the understanding of the determinants of intention to quit among youth entrepreneurs. Specifically, this research found that personal values (i.e., terminal and instrumental values) have no significant relationship with young entrepreneur's attitude but their positive attitude toward being entrepreneur has negative significant relationship with their intention to quit as entrepreneur. Understanding entrepreneurship, especially knowledge of factors that explain entrepreneurial intention to quit are indispensable for practical and theory matter.

Limitations and Recommendation for Further Research

The main objectives of this study are to predict the relationship between personal values (i.e. terminal and instrumental values) and attitude toward becoming an entrepreneur, and the relationship between attitude toward becoming an entrepreneur and intention to quit as an entrepreneur. There are two main limitations of this study. First, this research applied students who are young entrepreneurs as research respondents. Specifically, this research tests the fit of the model within a single university in Indonesia. Thus, the results of this study were limited to this sample. Furthermore, generalization cannot be made to Indonesian youth. In relating with this, further research should attempt to replicate this research to a wide array of settings and populations.

Second, this research applied cross-sectional survey data to test the hypotheses. On the other hand, cross-sectional survey data reflects that respondents are recorded only one time. Therefore, the results only infer the temporal relationship between variables and not the causality among variables. Thus, it is recommended that future studies utilize a longitudinal study.

References

Ariff, A.H.M., Bidin, Z., Sharif, Z. and Ahmad, A. (2010), 'Predicting Entrepreneurship Intention Among Malay University Accounting Students In Malaysia,' UNIFAR e-journal, 6, 1. Available: http://ejournal.unirazak.edu.my/articles/Predicting_Entrepreneur_p16n1Jan10.pdf

Aziz, N.N.A. and Ramli, H. (2010), 'Determining Critical Success Factors Of Intention To Quit Among Lecturers: An Empirical Study At Uitm Jengka,' *Gading Business and Management Journal*, 14, 33-46.

Bagozzi, R., Yi, Y., and Phillips, L. (1991). Assessing Construct Validity in Organizational Research. *Administrative Science Quarterly*, 36(3), 421-458.

Blackwell, R.D., Miniard, P.W. and Engel, J.F. (2006). Consumer Behavior. 10th ed. USA: Thomson South-Western.

Bock, G., Lee, J.Y. and Lee, J. (2010), 'Cross Cultural Study on Behavioral Intention Formation In Knowledge Sharing,' *Asia Pacific Journal of Information Systems*, 20(3), 1-32.

Burgess,S.M. and Steenkamp,J.E.M. (1998). Value Priorities And Consumer Behavior In A Transitional Economy: The Case Of South-Africa. Working paper No. 166,The William Davidson Institute, University of Michigan Business School, USA.

Cai, Y. and Shannon, R. (2012), 'Personal Values And Mall Shopping Behavior: The Mediating Role Of Intention Among Chinese Consumers,' *International Journal of Retail & Distribution Management*, 40(4), 290-318.

Churchill, G.A. (1979), 'A Paradigm For Developing Better Measures Of Marketing Constructs. *Journal of Marketing Research*,' 16, 64-73.

Chen, I.Y.L., Chen, N. and Kinshuk (2009), 'Examining The Factors Influencing Participants' Knowledge Sharing Behavior In Virtual Learning Communities,' *Educational Technology Society*, 12(1), 134-148.

Campo, J.L.M. (2011), 'Analysis Of The Influence Of Self-Efficacy On Entrepreneurial Intentions,' *Prospect*, 9(2), 14-21.

De Hoe, R., Giacomin,O. and Janssen, F. (2016), 'Entrepreneurial Exit And Explanatory Determinants Of Reentry Intention. Entrepreneurship, Culture, Finance And Economic Development,' June 23-24, University of Lyon, France. Available at coachs.org/wp-content/upload/2015/09/session-24-Roxane-De-Hoe-et-al.pdf

Dogan, E. (2015), 'The Effect Of Entrepreneurship Education On Entrepreneurial Intentions Of University Students In Turkey,' *Ekonometri ve Istatistik Sayr*, 23, 79-93.

Fishbein, M. and Ajzen, I. (1975). Belief, Attitude, Intention And Behaviour: An Introduction To Theory And Research. Reading: Addison Wesley.

Forster-Holt, N. (2013), 'Entrepreneur as "End"repreneur: The Intention to Retire,' *Small Business Institute Journal*, 9(2), 29-42.

Hattab, H.W. (2014), 'Impact Of Entrepreneurship Education On Entrepreneurial Intentions Of University Students In Egypt,' *The Journal of Entrepreneurship*, 23(1), 1-18.

Hill, C. R. and Hughes, J. N. (2007), ' An Examination Of The Convergent And Discriminant Validity Of The Strengths And Difficulties Questionnaire. School Psychology Quarterly : The Official Journal of the Division of School Psychology,' *American Psychological Association*, 22(3), 380–406. http://doi.org/10.1037/1045-3830.22.3.380

Ibragimova, B., Ryan, S.D., Windsor, J.C. and Prybutok, V.R. (2012), 'Understanding The Antecedents Of Knowledge Sharing: An Organizational Justice Perspective,' *Informing Science: the InternationalJournal of an Emerging Transdiscipline*, 15, 183-205.

Jang, H.S. (2015). Social Identities Of Young Indigenous People In Contemporary Australia, Neo-Colonial North, Yarabah. Springer: Switzerland.

Jakubczak, J. (2016), 'Young People Terminal And Instrumental Values Impact On Youth Entrepreneurship. Management Knowledge and Learning Joint International Conference,' 25-27 May, Romania. Available: http://www.toknowpress.net/ISBN/978-961-6914-16-1/papers/ML16-176.pdf

Justo, R. and DeTienne, D.R. (2008), 'Family Situation And The Exit Event: An Extension Of Threshold Theory,' *Frontiers of Entrepreneurship Research*, 28(14), 1-13.

Kahle, L.R., Beatty, S.E. and Homer, P. (1986), 'Alternative Measurement Approaches To Consumer Values: The List Of Values (LOV) And Values And Life Style (VALS),' *Journal of Consumer Research*, 13, 405-409.

Klamer, A. (2003), 'A Pragmatic View On Values In Economics,' *Journal of Economic Methodology*, 10(2), 1-24.

Kim, H.Y. and Chung, J. (2011), 'Consumer Purchase Intention For Organic Personal Care Products,' *Journal of Consumer Marketing,* 28(1), 40-47.

Kuang, L.C., Davidson, E. and Yao, L. (2012). A Planned Behavior-Based Investigation of Knowledge Sharing In Construction Industry. Proceedings of International Management & Engineering Conference (EMC 2012). Available: umpire.ump.edu.my/3187/1/Lee_EMC_2012.paper.pdf

Kuttim, M., Kallaste, M., Venesaar,U. and Kiis, A. (2014), 'Entrepreneurshipeducation at University Level And Students' Entrepreneurial Intentions,' *Procedia – Social and Behavioral Sciences*, 110, 658-668.

Lin, H. (2007), "Effects of Extrinsic and Intrinsic Motivation on Employee Knowledge Sharing Intentions,' *Journal of Information Science*, 33(2), 135-149.

Lin, H. and Lee, G. (2004), 'Perceptions of Senior Managers Toward Knowledge-Sharing Behavior,' *Management Decision*, 42(1), 108-125.

Linan, F. and Chen, Y. (2006), 'Testing The Entrepreneurial Intention Model On A Two-Country Sample,' Document de Trball num.06/7. Department d'Economia de l'Empresa. Available: http://selene.uab.es/dep-economi-empresa/.

Masum, A.K.M., Azad, M.A.K., Haque, K.E., Ben, L., Wanke, P. and Arslan, O. (2010), 'Job Satisfaction and Intention to Quit: an Empirical Analysis of Nurses in Turkey." *PeerJ*, 4, e1896, http://doi.org/10.7717/peerj.1896.

Ozaralli, N. and Rivenburgh, N.K. (2016), 'Entrepreneurial Intention: Antecedents To Entrepreneurial Behavior In The USA and Turkey,' *Journal of Global Entrepreneurship Research*, 6(5). Available: journal-jjger.springeropen.com/articles/10.1186/s40497-016-0047-x.

Peng, Z., Lu, G., and Kang, H. (2012), 'Entrepreneurial Intentions And Its Influencing Factors: A Survey Of The University Students In Xi An China,' *Creative Education*, 3, 95-100.

Pilis, E. and Reardon, K.K. (2007), 'The Influence of Personality Traits and Persuasive Messages on Entrepreneurial Intention: A Cross-Cultural Comparison,' *Career Development International*, 2(4), 382-396.

Rahab and Wahyuni, P. (2013), 'Predicting Knowledge Sharing Intention Based On Theory Of Reasoned Action Framework: An Empirical Study on Higher Education Institution,' *American International Journal of Contemporary Research*, 3(1), 138-147.

Rizwan, M. (2014), 'Determinants of Employees Intention To Leave: A Study From Pakistan,' *International Journal of Human Resources Studies*, 4(3), 1-18.

Saungweme, R. and Gwandure, C. (2011), 'Organisational Climate Andintent to Leave Among Recruitment Consultants Injohannesburg, South Africa,' *J.Hum.Ecol,* 34(3), 145-153.

Schiffman, L.G. and Wisenblit, J.L. (2015). Consumer Behavior, 11th ed. USA:Pearson.

Schreiber, J.B., Stage, F.K., King, J., Nora, A. and Barlow, E.A. (2006), 'Reporting Structural Equation Modeling and Confirmatory Factor Analysis Results: A Review,' *The Journal of Educational Research*, 99(6), 323-337.

Sihombing, S. O., Pramono, R., Zulganef and Ismanto, I. (2016), 'Instrumental and Terminal Values of Indonesian Micro-Finance Entrepreneurs: A Preliminary Report,' *International Journal of Economic Research*, 13(3), 841-853.

Sihombing, S.O. (2014), 'Identifying Current Values of Indonesian Youth,' Proceeding of the 9th International Conference on Business and Management Research, 24-25 October, Kyoto University, Kyoto.

Sun, J. and Wang, X. (2010), "Value Differences between Generations in China: A Study in Shanghai,' *Journal of Youth Studies*, 13(1),65-81.

Teh, P., Yong, C., Chong, C. and Yew, S. (2011), 'Do The Big Five Personality Factors Affect Knowledge Sharing Behavior? A Study Of Malaysian Universities,' *Malaysian Journal of Library & Information Science*, 16(1), 47-62.

Turker, D. and Selcuk, S.S. (2008), 'Which Factors Affect Entrepreneurial Intention Of University Students,' *Journal of European Industrial Training*, 23(2), 142-159.

Van Gelderen, M., Brand, M., Van Praag, M., Bodewes, W., Poutsma, E. and Van Gils, A. (2008), 'Explaining Entrepreneurial Intentions By Means of The Theory Of Planned Behavior,' *Career Development International*, 13(6), 538-569.

Wu, W. and Li, C. (2007), 'A Contingency Approach To Incorporate Human, Emotional And Social Influence Into A TAM For KM Programs,' *Journal of Information Science*, 33, 275-297.

Zhang, P. (2011), 'Analysis Of Factors Affecting Individual Knowledge Behavior In Construction Teams In Hong Kong,' Thesis. The University Of Hong Kong.

Zhu, F., Burmeister-Lamp,K. and Hsu, D.K. (2014), 'To Leave Or Not To Leave/ The Role Of Psychological Ownership,Family Support and Hindrance-Related Stress In Entrepreneurs' Venture Exit Decisions,' Available: http://conference.iza.org/conference_files/EntreprR2014/burmeister-lamp_k5839.pdf

Analysis of Innovations and Advantages of Human Computer Interaction

[1]Anwar M. A.
Associate Professor,
College of Engineering and Computing
Al Ghurair University, Dubai, UAE
Email: anwar@agu.ac.ae

[2] Sayed Sayeed Ahmad
Associate Professor,
College of Engineering and Computing
Al Ghurair University, Dubai, UAE
Corresponding Author Email: sahmed@agu.ac.ae, saeed.ks@gmail.com

Abstract

The Human Computer Interaction (HCI) is a vital piece of system plans and the nature of framework relies on upon how it is spoken to and utilized by clients. The colossal measure of consideration has been paid to better plans of HCI. The new bearing of research is to supplant normal customary strategies for connection with intelligent, versatile, multimodal, and common strategies. The surrounding insight or pervasive registering which is known as the Third Wave is attempting to implant the innovation into the earth so to make it more common and imperceptible at the same time. The virtual reality systems are additionally an advancing field of HCI which can be the normal interface without bounds. This paper endeavors to analyze and study on multiple aspects of HCI based on a survey.

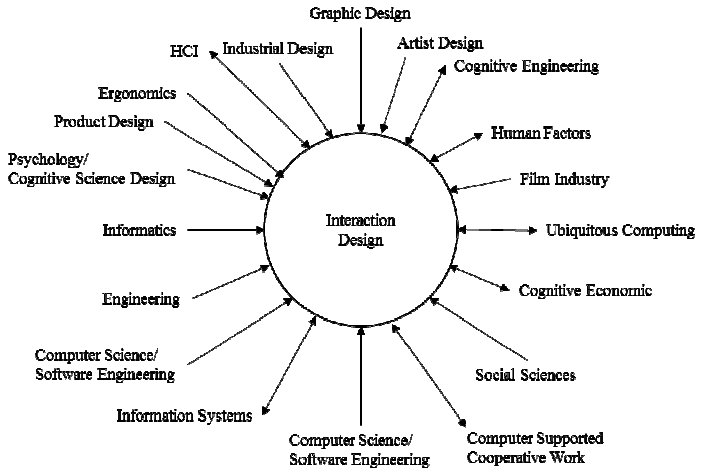
Keywords: HCI and Interdisciplinary Overlapping Fields, Organizational and Environmental Factors, Constraints.

Introduction

The HCI is a study that deals with how the human interact with the computer and how in turn of the human interaction computer are or not develop any interaction with the human [9]. HCI "is recognized as an interdisciplinary subject" [1]. Current study highlights Pervasive Computing change faces, learning cultures, structures, communications, intellectual properties, information securities, data presentations and web dis-plays to make attraction for human interaction [8]. There is a big clash between the health issues as well as the use and safety of the computers. Many researches indicate that computers developers do not focus much on the safe use of the computers. The computer developers do not put more focus on the ease of use but focusing on the new and eye capturing function into the computer. It is a very common research area and it deals with the computer technology and large focus on the computer interface and user. It usually refers to the use of machine in such a way that it becomes very helpful and very supportive for the success of the human being as well as incorporation of new designs which are easy to use and not harmful for the human being as well. There are three parts with which HCI deals, these three parts can be considered as a triangle as all are interconnected with each other and are very important; (i)

[1] First Author
[2] Corresponding Author

user, (ii) computers, and (iii) interaction between user and computer. The overlapping between HCI and figure related interdisciplinary fields is shown in Figure 1



The user involves the group or bunch of people suing the computer and will use the computer in the future. This category is very important and the people using the computer are tend to be most vulnerable group when we talk about the safety issue related to the computer. The national and cultural differences of user are also very important and playing very important role.

The computers include any technology ranging from simple computer to portable computer it also includes the VCR, DVD CD player. It includes the direct technology which a human is interacting every day and obviously not limited to simple desktop computer.

A human mind cannot work just like a computer and a computer cannot operate just like a human body so there is a great difference between both of them but the matter of discussion here is that both computer and human in interacting with each other in a best way.

The HCI may be very helpful but there are many disadvantages of the interaction and human being are losing real experiences as well do not try to use his own senses but relying more on a machine. This scenario is not healthy and we are becoming slaves of the technology. This paper present result of a survey conducted for highlighting the importance of HCI in human life and its consequences.

The paper is organized as follows; in section 2 we present literature review, section 3 describes methodologies and in section 4 we present the finding and recommendations for each question in the survey. Finally, in section 5 we present our conclusion.

Literature Review

In development of any usable system, user involvement is very important and is a widely accepted principle. The study focuses on the nature of the user involvement and benefits of the user involvement. The research not only focus on the advantages of user involvement but also focus on the early activities of any development process. Studies and researches suggest that user involvement usually have positive impacts like it becomes easy to satisfy a customer. It is also effective mean of information capture while talking the user as a source of primary information. But the important thing which should be kept under consideration is the role of the user. There is also need to introduce more cost-effective practices [2]. A

group of researchers in Information Systems interested in the advancement, usage, and effect of information technology and systems in social and organizational settings [6,7].

The basic purpose of the paper is to provide a brief overview of the HCI. The brief overview means the definition of HCI, benefits of HCI and to determine the recent technology, to find out the future outcomes related to this field, the design or architecture system which is used for the design of HCI like multimodal and unimodal and finally the use or application of HCI [3].

Beyond HCI discuss affective learning as a way to design systems to elicit positive responses from users (feeling at ease, being comfortable, enjoying the experience) and topics such as user frustration caused by an interface and how interface agents (anthropomorphism) and synthetic characters affect us [4]. Brave and Nass also examine the effects of emotions during HCI and how emotions tend to alter attention and memory, bias judgment and motivate behavior [5].

HCI and usability are core aspects and are very necessary in system development, as very necessary to enhance the facilities for the users and satisfaction of the users. HCI will push the users and designers to find out the different ways by which HCI can be improved like its graphics, layout font, utility and color etc. by incorporating all these aspects, the system design will be easier to use, more efficient, practically visibly and satisfaction of the user will also be increased by this.

Methodology

There are many steps that are included in this research process; literature review, artificial intelligence questionnaire, data collection, data analysis, and conclusion.

Data Collection

The primary and secondary data was collected from different sources. The data collected from both of these sources was used in analysis of this research. The secondary data was collected from the various sources for example journals, research papers, documentaries etc. After collection of data the analysis was performed. A questionnaire was prepared and it was filled by forty respondents. Questionnaire contains the questions of all aspects that are considerable in the research process of HCI. The questionnaire consists of the questions and scales. These scales are helpful in the analysis that what users think about HCI and its consequences. The questionnaire was developed after thoroughly studying the secondary data resources in detail.

The scale that was used for the data collection contains five parameters to measure the answers

Strongly disagree

Disagree

Neutral

Agree

Strongly agree

The questions and rating of each question by respondents is presented in Table 1.

Table 1: Question and feedback

	Strongly Agree	Agree	Strongly Disagree	Disagree	Neutral
1. Is your computer convenient to use?	18	20	2		
2. Is your computer interface is very easy to use?	13	23		2	2
3. Is the keypad of your computer is convenient method of data input or not?	9	28			3
4. Do you prefer using laptop over desktop computer for your daily task?	14	15	1	8	2
5. Is setting up a wireless connection on computer easy?	8	23	2	5	2
6. Is it very difficult to complete the tasks on interface?	3	10	9	10	8
7. Do various instructions and commands which appear on computer's screen difficult to understand?	1	10	12	12	5
8. Is every task on computer performed in a straightforward manner?	4	25		5	6
9. Is your system's speed faster?	6	23	3	5	3
10. Have your computer good feedback system?	5	19	4	4	8

Findings

The questionnaire paper was filled by the 40 respondents who were randomly selected and could answer it accurately and were well aware of the HCI. Here we present the analysis of data collected in form of charts followed by the explanation. The PIE chart is used present the percentage of respondents for each category on the horizontal axis.

The analysis of the response of Question No. 1; "Is your computer convenient to use?" is shown in Figure 2.

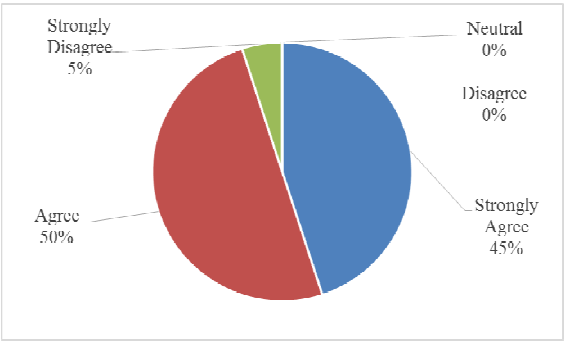


Figure 1: Response of Question No. 1

The response shows that 95% of the respondent were agreed and strongly agreed that they are conveniently using their computers. This reflects that today's computer have improved a lot in the HCI aspect.

Analysis of the response of Question No: 2; "Is your computer interface is very easy to use?" is shown in Figure 3.

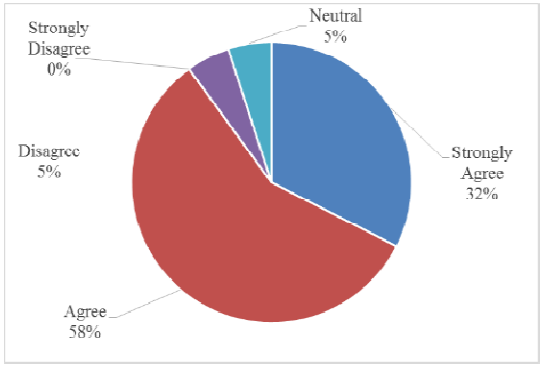


Figure 3: Response of Question No. 2

In the light of above analysis of the response, it is concluded that the GUI of application being used are very easy and comfortable. There were 90% of the respondents who either agreed or strongly agreed with this question statement.

Analysis of the response of Question No: 3; "Is the keypad of your computer convenient method of data input or not?" is shown in Figure 4.

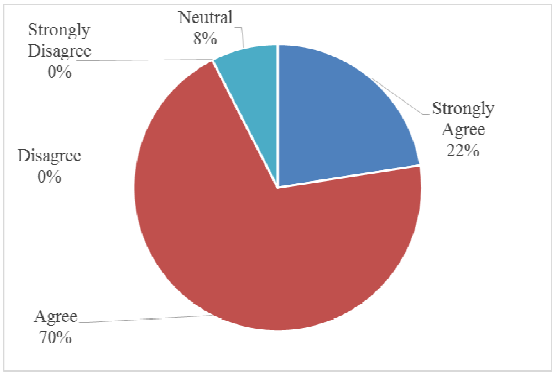


Figure 4: Response of Question No. 3

The analysis of the data regarding this question shows that only 22% of the respondent were strongly agreed and 70% were agreed that the keyboard is very convenient for data entry into computer. The research has greatly emphasized on the ergonomics of the computer usage and keyboards are being continually improved to avoid possible finger strains. This aspect of HCI needs or attention to improve.

Analysis of the response of Question No: 4; "Do you prefer using laptop over desktop computer for your daily task?" is shown in Figure 5.

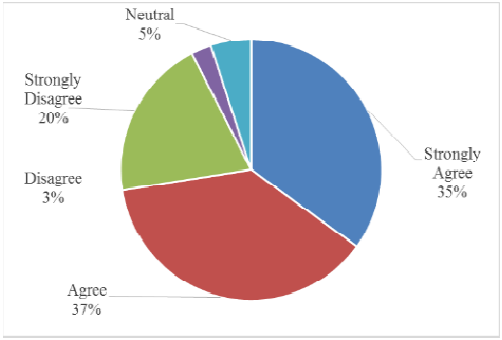


Figure 5: Response of Question No. 4

The analysis of the data regarding this question shows that 72% of the respondent were strongly agreed and above but still reasonable percentage of respondents i.e. 20% strongly disagree and prefer to use desktops. So, the desktop will remain in use for future.

Analysis of the response of Question No: 5; "Is setting up a wireless connection on computer easy?" is shown in Figure 6.

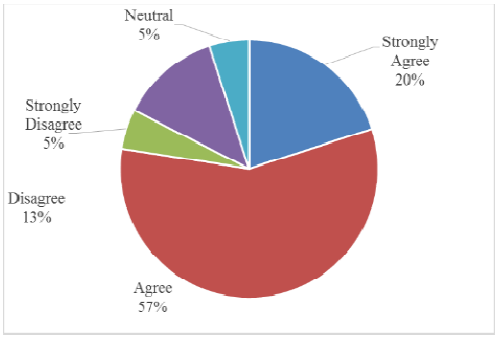


Figure 6: Response of Question No. 5

The analysis of the data regarding this question shows that 77% of the respondent were strongly agreed and above but still reasonable percentage of respondents i.e. 23% strongly disagree and lower. The HCI research should address the issue of easy usage of new technologies that are to come in future. It is recommended that videos based tutorials should be part of the user manuals.

Analysis of the response of Question No: 6; "Is it very difficult to complete the tasks on interface?" is shown in Figure 7.

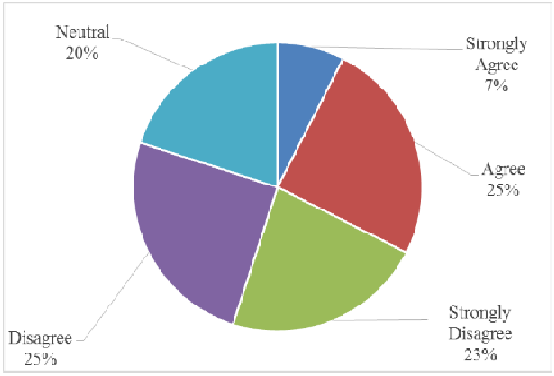


Figure 7: Response of Question No. 6

The analysis of the data regarding this question shows that 32% of the respondent were strongly agreed and above in completing the task on the user interface of the application. But, 48% were of the opinion that it is not difficult. Therefore, we can conclude that GUIs of the application should provide the facilities to complete that tasks on one interface.

Analysis of the response of Question No: 7; "Do various instructions and commands which appear on computer's screen difficult to understand?" is shown in Figure 8.

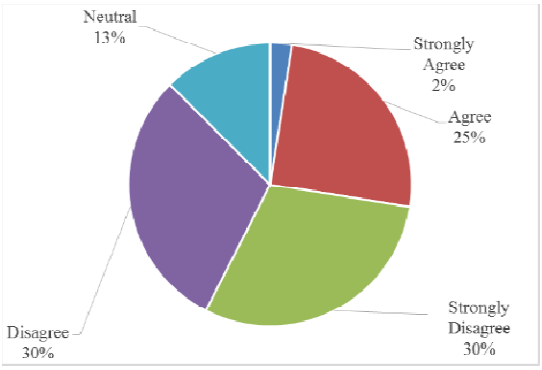


Figure 8: Response of Question No. 7

The analysis of the data regarding this question shows that 27% of the respondent were strongly agreed and above in understanding the commands and instructions that appear on computer screen. But, 60% were of the opinion that it is not difficult to understand. Therefore, we recommend that each that appear on the computer screen should have help feature that could be displayed when mouse is hovered on it.

Analysis of the response of Question No: 8; "Is every task on computer performed in a straightforward manner?" is shown in Figure 9.

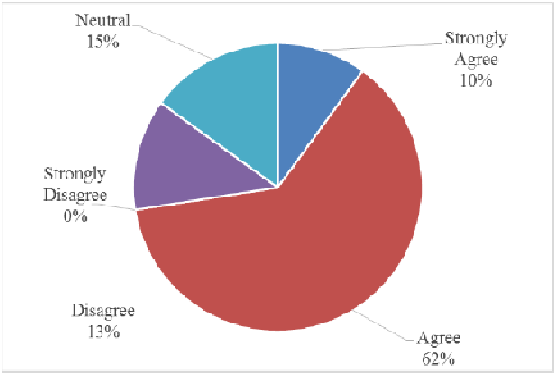


Figure 9: Response of Question No. 8

The analysis of the data regarding this question shows that 72% of the respondent were strongly agreed and above in completing that tasks on computer in straightforward manner without any problem. There are only 13% who disagree with this aspect.

Analysis of the response of Question No: 9; "Is your system's speed faster?" is shown in Figure 10.

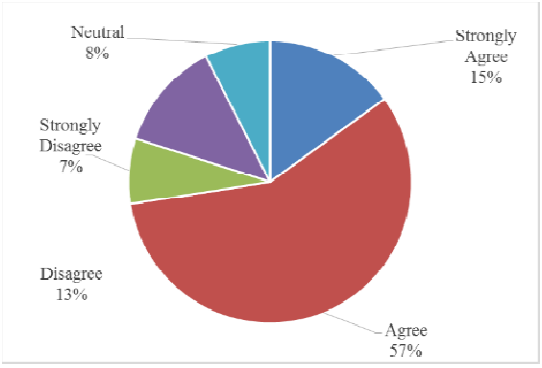


Figure 10: Response of Question No. 9

The analysis of the data regarding this question shows that 72% of the respondent were strongly agreed and above were satisfied with the computer specifications. Hence, it could be concluded that organizations and people are continuously updating their computing resources. This is a healthy sign for the flourishing the IT industry.

Analysis of the response of Question No: 10; "Have your computer good feedback system?" is shown in Figure 11.

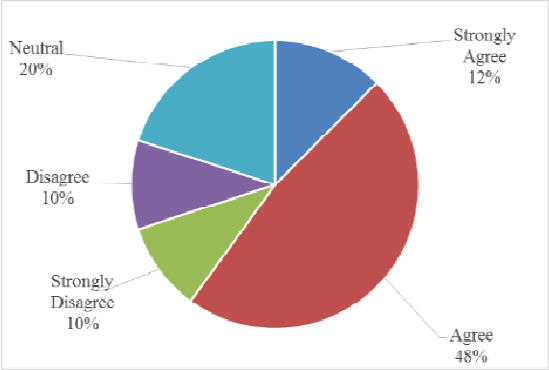


Figure 11: Response of Question No. 10

The analysis of the data regarding this question shows that 60% of the respondent were strongly agreed and above were satisfied and only 20% did not agree.

Conclusion

The HCI is in simple words relationship of human mind to the computer and computer's relation to the human. We presented the analysis of a survey conducted to find out what user thinks and feel when they interact with the computers. We also presented some recommendations for the researchers in the HCI field to further improve some aspects of HCI for layman users.

Acknowledgements

The authors wish to acknowledge the support provided by the Al Ghurair University, UAE for this research.

References

[1] Dix A, Finlay J, Abowd G, Beale R (2004) Human-computer interaction, 3rd edn. Pearson Education Limited, Harlow.

[2] Karray,F. ,Alemzedah,M., Abou Saleh,J. 2004. Human-Computer Interaction: Overview on State of the Art, International Journal of Smart Sensing and Intelligent Systems, Vol.1, No.1.

[3] Kujala, S. 2003. User involvement: a review of the benefits and the challenges. Behavior and information technology, Volum:22,pp1-16.

[4] Rodgers, Y., Sharp, H., & Preece, J. (2011). Interaction design: Beyond human-computer interaction. Chichester, UK: John Wiley & Sons Ltd.

[5] Brave, S., & Nass, C. (2002). Emotion in human-computer interaction. In J.Jacko, & A. Sears (Eds.), The human-computer interaction handbook: ICICTE 2013 Proceedings 107 Fundamentals, evolving technologies and emerging applications.

[6] Zhang, P., & Dillon, A. (2003). HCI and MIS: Shared Concerns, Editorial Introduction. International Journal of Human–Computer Studies, 59(4), 397–402

[7] Zhang, P., and Li, N. (2004). An assessment of human–computer interaction research in management information systems; topics and methods: Computers in Human Behavior, 20: 125–147.

[8] Karray, F., Alemzadeh, M., Saleh, J.A. and Arab, M.N. (2008). Human-Computer Interaction: Overview on State of the Art: International Journal on Smart Sensing and Intelligent Systems, 1 (1): 137-159.

[9] Mackenzie, I.S. (2013). Human-Computer Interaction an Empirical Research Perspective: Elsevier, pp: 1-370.

Theoretical and Methodological Approaches to Improving Management of Integration Processes of Potentials of Balanced Enterprise Development

Anatoly A, Alabugin, South Ural State University, Chelyabinsk, Russia, alabugin.aa@mail.ru
Kirill V. Kardapoltsev, South Ural State University, Chelyabinsk, Russia, kardapoltsev_kv@mail.ru
Sergei V. Aliukov, South Ural State University, Chelyabinsk, Russia, alysergey@gmail.com

Abstract

Currently, the urgent problem of managing the development of socio-economic systems is the search for optimal mechanisms and methods for organizing internal resources and potentials with the ability to adapt flexibly to a dynamic external environment. Therefore, new methodological approaches are needed to evaluate and manage the processes of integrating the potentials of a balanced development of enterprises, taking into account the characteristics of external impulses that affect the development of the economic system. The aim of the study is to find approaches to improving the management of enterprise development through the organization of processes of integration of potentials and their balancing in development indicators.

Keywords: economic potential, balance of potentials, processes of integration of potentials, balanced development, management of development of socio-economic systems.

Introduction

Modern conditions of functioning and development of enterprises are characterized by an increase in the dynamism of internal and external factors of various forms of manifestation that determine the ability of economic entities to realize the accumulated economic potential. In these conditions, the realization of the aggregate potential of the economic system is largely determined by the level of integration of local potentials for balanced functioning and development. Such a set of local potentials must take into account a set of resources and resources that ensure the achievement of an adaptive dynamic equilibrium of the economic system in the face of multidirectional factors of different forms and characteristics (Alabugin, 2005).

Inadequate performance of unbalanced development can largely be explained by the inconsistency of the capabilities of internal subsystems of the enterprise to prevent multidirectional negative effects of external factors. This is reflected, in particular, in the inability of the enterprise to ensure the balance of operational processes and to function successfully in a competitive environment. In addition, internal imbalances in the integration of internal capacities are not capable of ensuring the sustainability of the enterprise's development in the long run and increasing the level of economic potential (Trusova, 2016).

The need to identify the interrelations and interdependencies of determinants that contribute to or hinder the enhancement of the economic potential of an enterprise, it is necessary to investigate the entire system of contradictions associated with its functioning. Identifying and determining the level of influence of factors-the determinants of contradictions, as well as evaluating their relationship with the results of their combined effect, allows forming a mechanism for a balanced development of the enterprise in dynamic environmental conditions. For this purpose it is expedient to use the laws and principles of taxonomy.

Characteristics of types of contradictions in realizing potentials of balanced development of enterprises

The inherent methodological connection and the conditionality of the contradictions in the realization of the potentials of the system make it possible to systematize the types of contradictions according to the signs of the closeness of the cause-effect relations (Fig. 1)

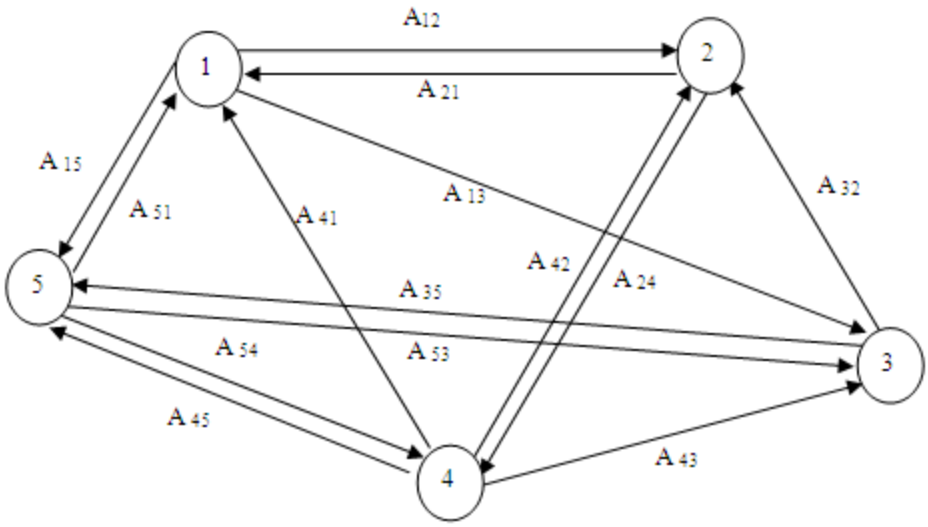


Fig. 1: Graphical model of the set of interrelated and interrelated contradictions of the potentials of the system

In the conditions of systematization, it becomes possible to compare the types of contradictions among themselves by the similarity (difference) in characteristics. This distinguishes the systematic approach from classification, which does not provide a comparison of the identified types of objects (contradictions). The variety of types of contradictions in the context of the integration of potentials is determined by the large number of directions of integration and its impacts on the balance of enterprise development (Dudin, 2015).

The main system-forming contradictions in the processes of integrating the potentials of a balanced development of an enterprise will allow us to systematize the diversity of contradictions and the types of problems they determine. The whole set of signs of the contradictions in the development of economic systems can be represented in 4 groups, differing in the level of analysis of contradictions (Camelo-Ordaz, 2015):

1. Theoretical level.
2. Methodological level.
3. Methodological level.
4. Application level.

At these levels, contradictions are determined by determinants based on the need for changes in the system and the possibilities of theory, methodology, management methods, and experience in their implementation.

At the theoretical level, such determinants are:

- need to define the main complex concept of "integration of the potentials of balanced development";
- clarification of the concepts of "integration of potentials" and "development balance";
- tightness of the relationship and the impact of quality management of the integration of potentials on the balance of development;
- stabilizing effect of the cyclicality of the processes of integration of potentials on the reduction of imbalances in development.

At the methodological level, the determinants are:

- impact of imbalances of the goals of the supporters of preferential development of individual potentials;
- impact of the conditions for minimizing imbalances of the goals of the supporters of the primary development of individual potentials;
- influence of conditions for minimizing imbalances of sustainability and efficiency objectives on the stability of potential integration processes.

At the methodological level, the following determinants can be identified:

- achievement of positive synergistic effects of integration of potentials;
- change in the entropy of the synergy of the potential integration processes;
- flexibility and controllability of processes of potential integration;
- ensuring the stability of integrating impacts of the integration of development potentials on the development balance.

At the application level, the factors-determinants include:

- increasing uncertainty and dynamism of environmental factors;
- unbalanced development of local potentials of the enterprise;
- imbalance of integrating and disintegrating influences of the goals, strategies and structures of the enterprise related to the realization of its economic potential.

Evaluation of contradictions in integration of enterprise development potentials

The need to manage the contradictions of the integration of development potentials at the applied level implies the formation of a system for managing the integration of potentials in the context of three groups:

- operational potential;
- investment potential;
- financial potential.

From the point of view of describing the state of the economic system, the operational potential (O) can be represented as a characteristic of the functioning and organization of operational business processes, expressed in their ability to take the properties necessary for the effective functioning and development of the enterprise in changing environmental conditions. At the same time, this group of potentials includes a set of local potentials that characterize the level of resource use efficiency in the context of individual operational business processes.

The investment potential (I) of an enterprise is characterized by a demonstrated and potential opportunity to carry out investment activities in the conditions of existing organizational and resource constraints. In turn, the investment potential also includes a number of local potentials that determine the ability of the enterprise to make effective investment decisions, as well as to carry out investment activities with the required level of profitability and an acceptable level of investment risk.

The financial potential (F) of the enterprise is characterized by the current and potential opportunity to provide financing for the operating and investment activities of the enterprise, using both internal financial resources and external opportunities associated with the use of various financial instruments capable of achieving the required profitability and business value with an acceptable level of financial risk.

In general, we can distinguish the following types of potential imbalances that characterize the applied level of research:

- Corporate contradictions are caused by discrepancy of interests of separate participants and stakeholders in relation to business;

- operational contradictions characterize imbalances in the implementation of individual business processes that form an added value; degree of reaction of business processes to required changes; current state of the resource base that ensures the implementation of the current activities of the enterprise.

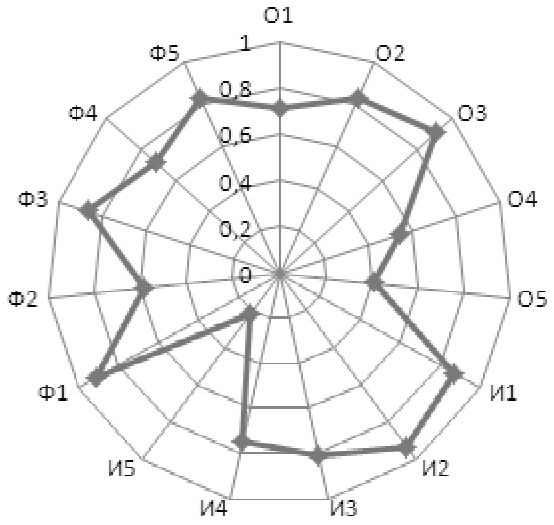


Fig. 2: Characteristic of imbalances of integration of enterprise development potentials.

At the same time, the whole set of local potentials and contradictions of the economic system is characterized by a high level of entropy caused by existing imbalances in the directions of functioning and development of individual business processes, priorities for using resources, the interests of individual participants, the level of reaction of individual enterprise processes to changes in the external environment and other factors that determine the direction of movement and development of both individual local potentials and the entire economic system.

The most important internal potential of the economic system is the organizational or managerial potential, characterized by the ability to purposefully balance the activities of individual processes, and the associated potentials to achieve system-wide (corporate) goals. In this case, the necessary effectiveness of the processes can be improved on the basis of a stabilizing cyclical model of integration of the potentials of a balanced enterprise development:

$$GP = f\{x_1, x_2, x_3, \ldots x_n\} \rightarrow \max, \quad (1)$$

where GP is the general (cumulative) economic potential of the system; x1, x2, x3…xn – a set of interconnected and interdependent local potentials; f is a functional describing the interconnection of potentials among themselves and parameters of environmental constraints.

Such a theoretical model should be able to harmonize the potentials in the iterative processes of evolutionary development by the criterion of compromise of the goals expressing the interests of the proponents of preferential development and expressing the properties of the individual potentials of the economic system. To implement such processes, it is necessary to form an integration management mechanism (IMM) that improves the quality of management in order to achieve and stabilize the sustainability of a balanced development of the enterprise.

The development balance is achievable in the context of the integration of potentials according to the criteria for the positive synergy of the manifestation of potentials. In this case, the task of the management system is also to find the optimal compromise and determine the priorities of the current functioning and long-term development, which also forms a set of limitations in the choice of the optimal control structure for the manifestations of the system potentials. Such initial assumptions of the model determine the need to include methods for identifying and implementing a set of potentials in the enterprise management system. The variety of potentials determines the importance of improving and supplementing the methods of impact management. At the same time, the toolkit for advanced investment, transforming management and change management, even with the use of knowledge management systems and balanced indicators, is insufficient.

In modern conditions of spatio-temporal disintegration and scales of integration processes, in the development of enterprises, the relevance of the balance of internal subsystems as carriers of development potential increases.

Stability of integration processes in the management mechanism can be achieved by the criterion of minimizing the imbalance of the sustainability goals and the effectiveness of the balanced development of the enterprise. Currently, the underestimation of the potential for stabilizing the quality of management of potential complexes is explained by the lack of a methodology for managing the processes of integration of potentials, aimed at balancing the development and stability of the results of integrating the processes, resources and interests of various business stakeholders. This implies the improvement of theoretical models of convergent dynamics of processes, the development of concepts, principles, indicators and methods of managing the processes of integrating the potentials of a balanced development of the enterprise (Xingyi Liu, 2016).

Substantiation of factors, directions and methods of improving the quality of management will help to identify strategies and structures that ensure the stability of the processes of integration and the balance of development of the enterprise's aggregate potential. The lack of quantitative assessments of stability and balance increases the likelihood of risks of economic losses from erroneous management decisions in the context of these imbalances. The lack of indicators and criteria for the integration of potentials in enterprises reduces the effectiveness of strategies and plans for balanced development. In this regard, it is necessary to improve the theory and methods of improving the stability of a balanced development of enterprises in terms of the integration of potentials. Forming a mechanism to improve the quality of management contributes to improving the organization of processes, the use of resources, as well as the interests of various stakeholders of the enterprise, which in turn determines the possibility of achieving positive effects of synergies of potentials (Niculiță, L., 2010).

Research and management of the balance of local potentials from the point of view of managing the total potential of the economic system presupposes an assessment of the ability of the enterprise's business processes to increase the added value per unit of time, despite the increase in the inertial forces of the system and an increase in the total entropy, expressed in increasing aggregate risks. The final assessment of the balance of the potentials of the enterprise implies the study of the compliance of their parameters

with the established requirements, determined for each group of parameters of the enterprise development potentials.

The manifested result of local potentials can be considered as a point in n-dimensional Euclidean space, while the coordinates of the point are the values of the indicators of local potentials over which the estimate is made. The standard in this case is the required value of the parameters of the state of individual potentials, based on the required characteristics of its quality with respect to any higher-level potential (Raffaele Fiocco, 2016).

By the combination of the correspondence of the parameters of local potentials to the established requirements, the evaluation of the potential balance is estimated as:

$$K_i = \sqrt{(1 - x_{11})^2 + (1 - x_{21})^2 + \cdots + (1 - x_{ni})^2}, \quad (2)$$

where xni – a standardized indicator of compliance with the n-th required (normative) indicator of the i-th type of development potential.

$$X_{ki} = \frac{a_{ni}}{a_{norm\ ni}}, \quad (3)$$

where ani – value of the n-th indicator of the i-th type of development potential, anorm ni – required (normative) value of the n-th indicator of the i-th type of potential (Pollack,2016).

Conclusion

Achieving the required level of integration of potentials for long-term development of enterprises is one of the key tasks of modern research in the management of socio-economic systems, and at the present time, integration processes are not sufficiently studied by methods of improving the quality of management based on additional functions and quality indicators of their application to achieve stable Results of balanced development of the enterprise. At the same time, this approach can be implemented on the basis of the formation and management of the integration of balanced development potentials at various levels.

At the enterprise level, the result of the assessment of the development potential allows us to determine the balance of local potentials, and to identify their compliance with the parameters of the development of the enterprise as a whole. In addition, this approach allows us to analyze the current state of the total economic potential of the enterprise, and to identify key imbalances that restrain its development. This analytical information can serve as a basis for management actions, including the development of management regulations to improve the operation of the enterprise and the balancing of its individual business processes and regulations.

Acknowledgment

The work was supported by Act 211 Government of the Russian Federation, contract № 02.A03.21.

References

Alabugin, A.A. (2005). Managing of balanced development of the enterprise in dynamic environment. Book 1. Methodology and the theory of the formation of adaptive management mechanism of

development of enterprise: Monograph. Chelyabinsk: South Ural State University Publishing House, 362p.

Camelo-Ordaz, C., García-Cruz, J., Sousa-Ginel, E. (2015). The Influence of Top Management Team Conflict on Firm Innovativeness. Group Decision and Negotiation, 24 (6), pp. 957-980.

Dudin, M.N., Frolova, E.E. (2015). The balanced scorecard as a basis for strategic company management in the context of the world economy transformation. Asian Social Science, vol. 11, no. 3, pp. 282-288.

Hunold, Matthias; Stahl, Konrad. (2016). Passive vertical integration and strategic delegation. Rand journal of economics, vol. 47, no. 4, pp. 891–913.
Lei, H., Yifei, H., Yi, G. (2015). The research of business intelligence system based on data mining. International Conference on Logistics, Informatics and Service Science, pp. 23-46.

Niculiţă, L., Cost, P. (2010). Implementation of integrated management systems (IMS) [Article@Implementarea sistemelor de management integrat (SMI)]. Quality - Access to Success, vol. 11, no. 11, pp. 17-26.

Niculiţă, L. (2010). Projecting process analysis in integrated management systems [Article@Analiza procesului de proiectare în sistemele de management integrat]. Quality - Access to Success, vol. 11, no. 6, pp. 3-9.

Panin, A.U, Semenenko S.V, Baklanova V.I. (2008). Social and economic potential as a necessary factor of competitiveness of the organization. The bulletin of the Belgorod university of cooperation, economics and law, no. 4, pp. 127-1309.

Pollack, J. (2016). The need for integration between organizational project management and change management. IEEE International Conference on Industrial Engineering and Engineering Management, 2016-December, pp. 1245-1249.

Raffaele Fiocco. (2016). The strategic value of partial vertical integration. European Economic Review, vol. 89, pp. 284-302.

Trusova, N. (2016). Systemic factors of projected financial potential of business entities. Economic Annals-XXI, vol. 161, no. 9-10, pp. 61-65.

Xingyi Liu. (2016). Vertical integration and innovation. International Journal of Industrial Organization, vol. 47, pp. 88-120.

Willingness to Accept for Municipal Waste Recycling:

A Case Study from Lima, Peru

R. Oliver Castañeda Limas, Universidad San Ignacio de Loyola, Lima, Peru, olivercl23@yahoo.com
J. Fernando Larios Meoño, Universidad San Ignacio de Loyola, Lima, Peru, flarios@usil.edu.pe
Benoit Mougenot, Universidad San Ignacio de Loyola, Lima, Peru, bmougenot@usil.edu.pe

Abstract

Waste management seems to be a wide challenge for cities in developing countries. Resource constraints and inefficient institutions inevitably call for labour from the informal sector in this activity. We employ the contingent valuation method and a logit model to estimate recyclers' Willingness To Accept (WTA) to participate in recycling household's waste in Lima (la Victoria District). We examine various aspects, including socioeconomics factors, awareness and recycling activity.
The required WTA estimate is 1,355.86 Soles (USD 413.13), higher than both the minimum living wage fixed at 750 Soles and the monthly per capita productivity of recyclers, calculated at 986.05 Soles (USD 300.45), using a market prices method in the latter. The economic value of solid waste finance more than 70 percent of the recyclers' monthly willingness to accept, considering recyclers productivity. Although this is a promising outcome, there is a need for further research on the effects of education, attitudes, and awareness of solid waste management from both the public and private sectors.

Keywords: Waste management, contingent valuation, informal sector, Lima.

Introduction

Overview

Municipal waste management in developing countries is characterized by the weak participation of the public sector, although it implies a large part of the municipal budget, between 3-15 percent according to estimates (Masood and Barlow 2013, Wilson et al., 2012). The presence of resource constraints and inefficient institutions imply the role of the informal sector in this management (Gutberlet, 2008). In the case of Peru, around 100,000 people work as recyclers, more than 50 percent of them in Lima Metropolitan (Diaz and Otoma, 2012). Informal sector in waste management is characterized by its diversity of practices (waste collection, disposal and resale of recyclable products,...) and profiles: recyclers, sellers, micro enterprises, NGOs, communities, etc. It is also defined by its low productivity level and the presence of high risks for health by emissions of harmful substances impacting workers and their families living near landfills. However, the role of the informal sector is essential for the municipal waste management, through the interrelations between the public sector and private enterprises in the formal sector. Similarly, governments and cities in developing countries have an increasing responsibility to develop an integrated and inclusive approach to waste management (Gutberlet, 2008; Sembiring and Nitivattananon, 2010).

We employed the contingent valuation method to estimate the recyclers' perception of Lima (la Victoria District) to recycle. We examine various aspects of recyclers' perception of municipal

waste collection, in particular. First, we investigate the factors that can improve participation in municipal waste collection, including socioeconomics factors, awareness and recycling activity. Then, we analyse average incentive levels, approximated by the willingness to accept (WTA) required attracting recyclers' participation in municipal waste collection and whether incentives are appropriate, given the current recyclers' productivity and municipal waste market price.
The contributions of this study are twofold. First, few studies include the informal sector in contingent valuation approach (Afroz et al., 2009). This study is probably the first to concern evidence about recyclers' perception in Lima about municipal waste. Second, most of studies concern evidence for willingness to pay (Damigos et al., 2016; Afroz & Masud, 2011; Akhtar et al., 2017; Challcharoenwattana & Pharino, 2016; Ezebilo, 2013; Hazra et al., 2013; Rahji & Oloruntoba, 2009) and few concern willingness to accept (Basili et al., 2006; Cho et al. (2015).

Waste Management in Lima and la Victoria District

La Victoria (Lima City) is one of the smallest district of Lima (8.74 km²), but the waste production per capita is almost double, compared on average to the other districts (0.976 kilograms<1.94 kilograms). The commerce and industry generate waste represented by the so-called Gamarra Mart, which includes thousands of shops (fruit markets and popular kitchens and restaurants). The streets are contaminated by solid waste, affecting hospitals and other places that clearly seek an improvement in the quality of life. As presented in Figure 1, the main component of the Municipal waste is the organic waste, approximately 45% of the total waste.

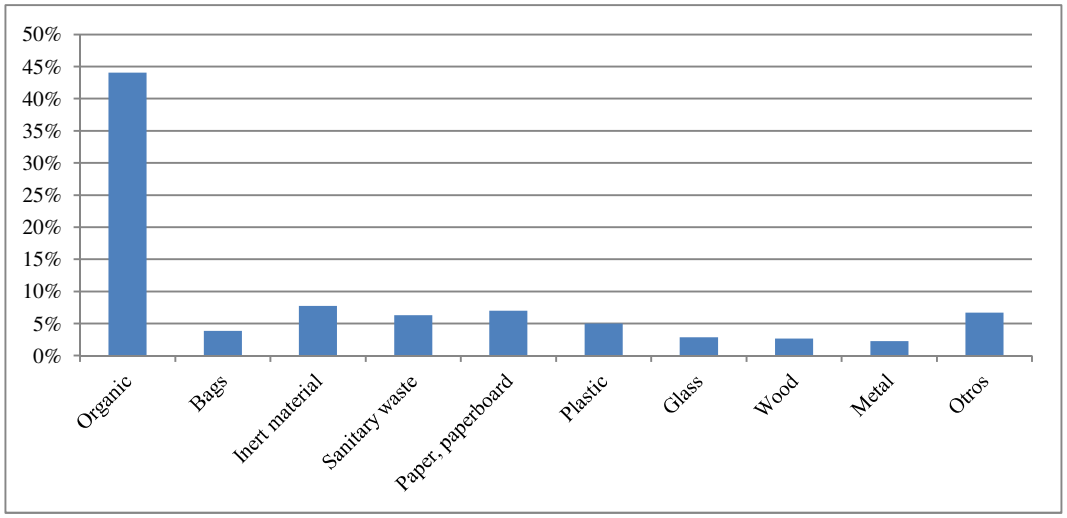


Fig 1: Main components of the municipal waste in the Coast Region of Peru, 2013. Source: 6th National Report on Solid Waste of Municipal and No Municipal Management, 2013.

Since 2011, the Ministry of the Environment has been implementing a national program called the Program for Sorting at the Source and Selective Collection of Solid Waste. According to the Ministry (2014), the criterion of a recycling economically efficient implies the collection of waste at the source by 100 percent community support of a locality.

Methodology

Measuring

The contingent valuation method attempts to measure changes in the welfare of people in money, due to an increase or decrease in the quality and / or quantity of a good, this measure in monetary units is usually expressed in terms of the maximum amount that a person would pay for a good, also known as the Willingness to Pay, or the minimum amount that a person would accept to be compensated for not having a good or service, also known as the Willingness to Accept.
To model willingness levels for tolerating loss, the utility function is defined as follows,

$$u_j = v_j(p, y; q_j) + \varepsilon_j$$

Where j=0 is the initial situation and j=1 represents the changed situation, in this case the improvement in the quality of the environment, and *y* represents the family income, p is the vector of prices that individuals face to get their goods and q represents the quantities that individuals ultimately consume, ε the error term.
Hanemann (1984) describes the mathematical behavior equivalent to the willingness to pay, in this investigation we represent in a similar way the mathematical behavior for the willingness to accept.

$$\Pr(si) = \Pr\left[v_1(p, y; q_1) + \varepsilon_1 < v_0(p, y + A_t; q_0) + \varepsilon_0\right]$$
$$\Pr(si) = \Pr\left[v_1(p, y; q_1) - v_0(p, y + A_t; q_0) < \varepsilon_0 - \varepsilon_1\right]$$
$$\Pr(si) = \Pr\left[\Delta v < \varepsilon_0 - \varepsilon_1\right]$$
$$\Pr(si) = \Pr\left[\Delta v < \eta\right]$$
$$\Pr(si) = F_\eta(\Delta v)$$

Where F_η remains the cumulative distribution function of η which also remains η =$\varepsilon_0 - \varepsilon_1$, and Pr represents the probability of such a situation occurring. It is understood that the payment is an amount to receive (Hanemann, 1984), so A_t is positive in the equation, in addition the initial situation and the amount received are more useful than the final situation. If the indirect utility function is linear we have for the initial situation:

$$v_0 = \alpha_0 + \beta(y + A_t) + \varepsilon_0$$

Finally we observe:

$$v_1 = \alpha_1 + \beta y + \varepsilon_1$$

The difference between these two utilities represents the change in well-being:

$$\Delta v = v_1 - v_0 = \alpha_1 - \alpha_0 - \beta A_t + \varepsilon_1 - \varepsilon_0$$
$$\alpha_1 - \alpha_0 + \varepsilon_1 - \varepsilon_0 = \beta A_t$$
$$\alpha - \eta = \beta A_t$$
$$A_t = \frac{\alpha - \eta}{\beta}$$

Where A_t represents the disposition to Accept.

Logit model

The participation in recycling is influenced by socioeconomic factors, awareness of recycling activity and initial bid amount. These potential determinants are examined by estimating the following binomial logit model,

$$P_i = \frac{1}{1 + e^{-Z_i}}$$

where $Z = \beta_0 + \beta_i X_i$

P_i represents the probability of an event occurring given certain variables called X_i, the utility of the model consists in that Z_i as takes infinite values, the probability that the event occurs will be a dichotomous variable with a value of one if the respondent states that they do want to accept the amount of S /.1200 soles per month to recycle and a value equal to zero if the respondent states that he does not want to accept the amount. β_0 represents the intercept of the model. X_i represents a set of explanatory variables of the model, corresponding to the survey questions to recyclers. The subscript i refers to the number of variables included in the model (5 exogenous variables). β_i represents the set of betas parameters related to each of the explanatory variables, the subscript i in this case is related to the explanatory variable that we mentioned in the previous paragraph. The coefficients are 6, one for each model variable and one intercept. u_i represents the error of the econometric model. Finally, the average productivity of a recycler has been defined using the market price method.

Questionnaire design

The questionnaire included five sections. The first and fifth section presented questions about the recyclers' socio-economic characteristics, such as gender or education. The second section included questions related to awareness. The third section reported information about willingness to accept and the fourth to the recycling activity.

Data description

Sample selection

The population analyzed is the total of recyclers working in the La Victoria district, Lima. Due to the lack of formal data on the amount of recyclers in the district of La Victoria, a short random interview with some recyclers in the La Victoria district was carried out. From this interview it can be seen that there are approximately 400 recyclers in this district. This data was corroborated with personnel working in the municipality of La Victoria who were not clear about how many recyclers are currently working in La Victoria. To make the calculation of the sample of analysis, we use the characteristic formula for the calculation of a sample for a finite population of individuals, according to the following equation:

$$n = \frac{N\ (Z^2)\ p\ q}{d^2(N-1) + Z^2\ p\ q}$$

Where n represents the sample size, Z the Degree of reliability (1,645), p the probability of occurrence of the event (0.5), q the probability of non-occurrence of the event (0.5), d the level of significance (0.10) and N the size of the total population (400).

Therefore, our total sample represent 58 persons. In addition, a pilot survey was carried out on 20 recyclers, which were added to the research sample for the purpose of improving the sample size and thus moving away from the problems that can present a small sample, because while the

samples are larger the estimators have diverse desirable statistical properties. Finally, 78 surveys were carried out.

Socio-economic characteristics

The population surveyed consisted of among 400 recyclers from La Victoria district aged from 20 to 82 years old. A questionnaire was administered to 78 individuals. The survey was conducted via face-to-face interviews in 2016.

Table 1 summarizes the socio-economic characteristics of the respondents. The target population included recyclers. Due to particularity of the recycling activity, mostly occupied by men; the sample was composed by 98.7% male and 1.3% female. The respondents' ages ranged from 20 to superior to 71, with the majority (38.5%) between 51 to 60 years old. The education level corresponds from basic school completed (29.5%) to high school uncompleted (34.6%).

Table 1: Descriptive statistics for recyclers' socio-economic characteristics

Characteristics	Number of respondents
Gender	
Female	1(1.3%)
Male	77(98.7%)
Age	
20-30	9(11.5%)
31-40	5(6.4%)
41-50	12(15.4%)
51-60	30(38.5%)
61-70	17(21.8%
> 71	5(6.4%)
Education	
High school completed	18(23.1%)
High school uncompleted	27(34.6%)
Basic school completed	23(29.5%)
Basic school uncompleted	10(12.8%)

Awareness of and attitudes toward recycling

The respondents were generally concerned about the problem of municipal waste (Table 2), according to the mean statement (6). However, the respondents seem not concerned about health impact of recycling activity (3). The awareness about environment seems moderate (5). Then, the respondents reported the awareness on their activity, comparing to other collectives. The impact activity is higher (14), considering other groups (authority (6.2), community (6.8)). Finally, the respondents are very concerned to improve their labor situation and occupy a formal job.

Table 2: Awareness of the socio-environmental effects of waste management in La Victoria district (Lima, Peru)

Variable	**Mean (S.E)**
Problematic of urban waste (0=no problem-10= high problem)	6 (2)
Awareness on waste impact on health (0= no impact-10= high impact)	3(3)
Awareness about environment (0= no impact-10= high impact)	5(3)
Awareness of the recycler's activity on environment (0= no impact-20= High impact)	14(2.5)
Awareness of the authority's activity on environment (0= no impact-20= High impact)	6.2(4.2)
Awareness of the community's activity on environment (0= no impact-20= High impact	6.8(4.3)
Willingness to occupy a formal job (0=no; 1=yes)	0.8(0.4)

Results

Factors influencing participation in recycling activity

Table 3 summarizes the definitions and descriptive statistics for the explanatory variables.

Table 3 Definitions and descriptive statistics for explanatory variables

Variable	Definition		Mean (S.D)
WTA	Willingness to accept		1567.3 (1323.4)
DAY WORK	Number of day worked in a week		6.2 (1)
DISTANCE	Number of kilometers covered in a week		16 (9.1)
PROD	Productivity per Capita		1469.9 (1282.1)
HEALTH	Awareness of the health effect of Waste Municipal Collection (1-10: 1 not at all concerned; 10 very concerned		0.3 (0.3)

The results to estimate the minimum wage for a recycler of the La Victoria district would be willing to accept to carry out future activities of recycling, is on average S /. 1,355.86 soles per month (Table 4). The econometric model was corrected for heteroskedasticity problems with the standard errors and Huber-White (QML) method of covariance.
On the other hand, the test of significance for the variables is checked with the z-statistic that is analogous to Student's t of linear models and has a null hypothesis of non-significance for each of the variables, therefore for all variables model can be verified to reject the null hypothesis raised in this test, which means that all coefficients of the model are significant, except the intercept coefficient, fulfilling the expected results in a model with logistic cumulative distribution.
Similarly we can evaluate the joint significance of the variables of the models with the statistical LR (likelihood ratio) which is also equivalent to the statistical F for linear models and has as null hypothesis the joint significance of the estimated coefficients, so we can observing that there is no probability to accept this hypothesis, and for this reason the coefficients as a whole are significant to explain the behavior of the probability of the event.

The R^2McFadden in parallel with the account R^2 are the most suitable indicators to analyze the goodness adjustment of the model. We can observe the first value obtained is equal to 0.79 which is totally acceptable for these cases , despite not being a relevant data of the model. For the case of account R^2 we obtained a value of 94.87 and we must take into account that for this value is expected a behavior above 60%. This value implies that the model is predicting correctly 94.87% of the cases. Therefore we can conclude that the goodness adjustment of the Logit model is adequate.

The coefficient associated with the variable WTA indicates the probability of accepting the labor supply decreases by 0.507% when the amount earned at least by a recycler increases from S/. 1 sol. Additionally, we observe when current productivity of the recycler increases from S/. 1 sol, the probability of the recycler accepting the labor proposal decreases by 0.424 percent. When the current recycler travels one kilometre more, the probability of accepting the labor supply decreases by 39.55 percent.
The positive sign on the coefficient for the variable DAY WORK indicate recyclers working more days are more likely to accept the job offer. Finally, the perception of the health problem is positively related with the labor proposal.

Table 4: Determinants of participation in recycling activity

Variable		Parameter estimate		z-Stat
WTA		-0.005084		-2.64607
DAY WORK		3.516134		3.320909
DISTANCE		-0.503327		-2.783587
PROD		-0.004248		-2.276223
HEALTH		-6.039835		-3.154475
C		-3.028436		-0.518837
McFadden R-squared	*0.79*			
LR statistic	*85.81*			
Prob(LR statistic)	*0*			

Productivity of Recyclers

According to the Sixth National Solid Waste Report for the Management of the Municipal and Non-Municipal Scope 2013 of MINAM (2014), the composition of urban solid wastes from the coast Region, including Lima Metropolitan is shown in figure 1. Table 4 reports only 4 types of recyclable materials.

SINIA (2016) in its environmental indicators, reports that in the district of La Victoria in 2013 a total of 126,997 tonnes of municipal solid wastes was recorded, that is, if we count the total of paper, cardboard, glass and plastic which could have been obtained in that year would have the calculation of table 8. We report the economic value of these materials at market prices with the prices of 2016, obtained from the survey applied to recyclers for these materials.
The evidence shows that for a minimum wage equivalent to S / .1,355.86 soles per month, it seems a total of S / .16,270.32 soles by year, it would have been possible to cover the annual salary of 487 recyclers (Table 5). To conclude, we observe that the estimated population registered in SIRTOD (2016) for the district of La Vitoria in 2016 concern 169,239 inhabitants, so we estimate that each recycler in this group of 488 must attend to 346.8 inhabitants of the district and thus be able to cover 100% of the area, collecting solid waste in source of origin, minimizing the use of energy, maximizing the use of recyclable materials, improving the working conditions of recyclers, generating formal employment, reducing pollution, and of this sustainable development, achieving eco-efficient self-financing of eco-efficient recycling.

Table 5: Economic value of the material recycled from 2013 (2016 price)

Category of waste	Proportion	Total Kg	Average Price 2016	Economic Value
Papel	3.79%	4´813,186	S/. 0.36	S/. 1'732,747
Paperboard	3.26%	4´140,102	S/. 0.25	S/. 1'035,026
Glass	2.88%	3´657,514	S/. 0.12	S/. 438,902
Plastic	5.56%	7´061,033	S/. 0.67	S/. 4'730,892
				S7. 7'937,566

Conclusion

With the use of a contingent valuation method and a logit model, we have estimated that a recycler from the La Victoria district would be willing to accept (WTA) a minimum monthly wage of S / .1,355.86 Soles on average. We built an indicator of recycler's monthly per capita productivity in the district of La Victoria by the amount S / .986.05 Soles at market prices.

The economic value of the average recycling activity in the district of La Victoria, estimated at S /. 7,937,566 Soles, can currently finance up to 72.72 percent of the recycler's monthly disposition to accept recycling glass, paper, plastic and cardboard in 2013 in the La Victoria district, at 2016 prices. The WTA fixed at a monthly salary of S/. 1,355.86 Soles can finance up to 488 eco-efficient recyclers. Given that the district of La Victoria currently has an estimated population of 169,239 inhabitants, each eco-efficient recycler could meet 347 inhabitants' needs for waste management. Under a future scenario of eco-efficient recycling, 100% of workforce could be financed by the value obtained from municipal solid waste in the district of La Victoria.

In addition to the willingness to pay method, the present work focused on the WTA can serve as a complementary reference for local governments, NGOs and recycling enterprises to maximizing the use of recyclable materials, improving the working conditions of recyclers, generating formal employment and achieving sustainable development goal self-financing recycling.

Acknowledgment

The authors acknowledge the participants of the 30TH IBIMA Conference in Madrid, Spain. All errors remain are our own.

References

Afroz, R., Hanaki, K., & Hasegawa-Kurisu, K. (2009), 'Willingness to pay for waste management improvement in Dhaka city, Bangladesh', *Journal of Environmental Management*, *90*(1), 492–503.

Afroz, R., & Masud, M. M. (2011), 'Using a contingent valuation approach for improved solid waste management facility: Evidence from Kuala Lumpur, Malaysia', *Waste Management*, *31*(4), 800–808.

Akhtar, S., Ahmad, A. S., Qureshi, M. I., & Shahraz, S. (2017), 'Households willingness to pay for improved solid waste management', *Global Journal of Environmental Science and Management*, *3*(2), 143–152.

Basili, M., Di Matteo, M., & Ferrini, S. (2006), 'Analysing demand for environmental quality: A willingness to pay/accept study in the province of Siena (Italy)', *Waste Management*, 26(3), 209–219.

Challcharoenwattana, A., & Pharino, C. (2016), 'Wishing to finance a recycling program? Willingness-to-pay study for enhancing municipal solid waste recycling in urban settlements in Thailand', *Habitat International*, *51*, 23–30.

Cho, S., Kim, J., Park, H.-C., & Heo, E. (2015), 'Incentives for waste cooking oil collection in South Korea: a contingent valuation approach' *Resources, Conservation and Recycling*, 99, 63–71.

Damigos, D., Kaliampakos, D., & Menegaki, M. (2016), 'How much are people willing to pay for efficient waste management schemes? A benefit transfer application', *Waste Management & Research*, *34*(4), 345–355.

Diaz, R. A., & Otoma, S. (2012), 'Effect of informal recycling on waste collection and transportation: the case of Chiclayo city in Peru', *Journal of Material Cycles and Waste Management*, 14(4), 341–350.

Ezebilo, E. E. (2013), 'Willingness to pay for improved residential waste management in a developing country', *International Journal of Environmental Science and Technology*, *10*(3), 413–422.

Gutberlet, J. (2008), 'Organized and informal recycling: social movements contributing to sustainability'. In Transactions on Ecology and the Environment (Vol. 109, pp. 223–231).

Hanemman, W. (1984), 'Welfare evaluations in contingent valuation experiment with discrete response'. *American Journal of Agricultural Economics*. 66(3), 41-332.

Hazra, T., Goel, S., & Maitra, B. (2013), 'Willingness-to-pay for solid waste management service attributes: Kolkata Municipal Corporation area, India, as a case study', *International Journal of Environment and Waste Management*, *12*(4), 406–421.

Masood, M., & Barlow, C. Y. (2013), 'Framework for integration of informal waste management sector with the formal sector in Pakistan', *Waste Management & Research*, 31(10), 93–105.

Ministerio del Ambiente. (2014), *Sexto Informe Nacional de Residuos Sólidos de la Gestión del Ámbito Municipal y No Municipal 2013*. Lima: Ministerio del Ambiente.

Rahji, M. A. Y., & Oloruntoba, E. O. (2009), 'Determinants of households' willingness-to-pay for private solid waste management services in Ibadan, Nigeria', *Waste Management & Research*, *27*(10), 961–965.

Sembiring, E., & Nitivattananon, V. (2010), 'Sustainable solid waste management toward an inclusive society: Integration of the informal sector', *Resources, Conservation and Recycling*, 54(11), 802–809.

Sistema Nacional de Información Ambiental (SINIA). (2016), *Indicadores Ambientales, Residuos Sólidos*. Lima: Sistema Nacional de Información Ambiental.

Wilson, D. C., Rodic, L., Scheinberg, A., Velis, C. A., & Alabaster, G. (2012), 'Comparative analysis of solid waste management in 20 cities', *Waste Management & Research*, 30(3), 237–254.

Free Cash Flow Potential in Assessing Financial Stability of Nonfinancial Businesses (the Case of Russia)

Neli R. Abramishvili, PhD, Associate Professor, Saint Petersburg State University, 7/9 Universitetskaya nab., St. Petersburg, 199034 Russia, E-mail: n.abramishvili@spbu.ru

Nadezhda A. Lvova, PhD, Associate Professor, St. Petersburg State University, 7/9 Universitetskaya nab., St. Petersburg, 199034 Russia, E-mail: n.lvova@spbu.ru

Natalya S. Voronova, Doctor of Science, Professor, St. Petersburg State University, 7/9 Universitetskaya nab., St. Petersburg, 199034 Russia, E-mail: n.voronova@spbu.ru

Alexander V. Kazansky, PhD, Associate Professor, St. Petersburg State University, 7/9 Universitetskaya nab., St. Petersburg, 199034 Russia, E-mail: a.kazanskiy@spbu.ru

Abstract

The article is devoted to testing the analytical potential of free cash flow in macro- and microeconomic research on the financial stability of nonfinancial businesses. Using the example of Russian companies in the transport industry, it is shown that the possibilities of applying this indicator in conditions of an undeveloped financial market are limited. An analysis of available information about Russian companies in the industry under study in the Bloomberg Professional system revealed that the FCFF to net debt ratio data, which could theoretically be successfully applied in monitoring the financial stability of the corporate sector, is not indicative. In particular, there are inaccuracies and inadequate information on companies of interest. At the level of individual enterprises, the potential for free cash flow in assessing financial stability should be generally assessed positively. For this purpose, it was proposed to apply the ratio of the company's value, estimated on the basis of the adjusted value of FCFF, and its net debt, which corresponds to the concept of assessing the corporate liabilities by Black-Scholes-Merton. It is argued that the accuracy of the assessment largely depends on the completeness of the information on the company's investment and financial plans, the possibility of their implementation, in turn, is often limited in the Russian financial market.

Keywords: free cash flow, free cash flow to firm, financial stability, corporate financial stability.

1 Introduction

Assessing financial stability of nonfinancial businesses is in demand when justifying a wide range of management decisions (Bobyleva and L'vova). Moreover, we are talking about macro- and micro-levels of analytical problems. In first case, as suggested by I. Fisher (1933, p. 341-343) and later argumented by H. Minsky (1992, p. 7-8; 2017), the financial instability of nonfinancial businesses is a factor of the financial systems' fragility, which actualizes monitoring the financial stability of the corporate sector. In the second case, the financial stability of the company, which in the most general sense is associated with an acceptable low probability of financial insolvency (bankruptcy), is analyzed by external analysts as a factor of creditworthiness, investment attractiveness, and payment discipline of the counterparty. At the same time, internal analysts are interested in a systematic assessment of financial stability in order to justify decisions on the operating, investment and financial activities of an economic entity.

The scope of practical application of the commented assessment in the context of microeconomic problems is detailed in the classic works of the bankruptcy forecasting school by W. Beaver (1966, p. 71), E. Altman (1968, p. 609), J. Wilcox (1970, p. 11), J. Argenti (1976, pp. 16-17), J. Taffler (1983, pp. 295-296, 306) and others.

It should be noted that the methodology for assessing the financial stability of nonfinancial businesses is not unified and requires development (Lvova et al, p. 682). Macroeconomic research on this issue is mainly limited to a small set of indicators. The assessment appeals to individual macro indicators (including the volume of industrial production, the volume of investments in fixed assets, the volume of direct investment) or is based on financial ratios calculated from the aggregate financial statements (Financial Soundness Indicators). Particular attention in the context of financial stability is paid to the level of the debt burden of the nonfinancial sector (Drehmann and Juselius) which is also evaluated on the basis of macro-indicators or using aggregated micro-indicators (Adrian et al, p. 30; Donets and Ponomarenko; Donets and Mogilat, Financial Position of the Largest Enterprises).

The toolkit, which can be used for microeconomic research of financial stability in this case, is more diverse. However, traditional financial ratios are generally used as benchmarks for a variety of models. In particular, despite the high importance of cash flows in assessing the financial health of enterprises (Beaver; Wilcox; Altman and Hotckiss, p. 110-115) and the priority role of assessing solvency in modern insolvency systems (Abramishvili et al, pp. 362-363), preference is given to the indicators of the balance sheet and the financial results report. Thus, the analytical value of cash flows is somewhat underestimated, which determined the general direction of the study. In this paper, we refer to the free cash flow of the firm, analyzing the analytical potential of the indicator in order to assess financial stability on the example of Russian transport enterprises.

Methodology

At the *first stage* of the research, the potential of free cash flow on the example of FCFF to net debt ratio is tested for macroeconomic analysis of the financial stability. Based on the financial meaning of the coefficient, it is assumed that if its average value for the sample is more than one, then the analyzed companies in the period under study with a common equal are characterized by financial stability. Negative dynamics of the average value of the coefficient, from the position of assessing financial stability, is undesirable.

As an example, selected Russian companies specializing in commercial cargo transportation[1], that correlate with the second stage of the study. Initially, the sample included 28 public companies, that had information about them for the query of interest are available in the Bloomberg Professional. According to the results of the company data analysis, the sample had to be reduced to 17 units, because, firstly, the economic activity of individual companies did not correspond to the investigated sector; Secondly, even for a three-year period (from 2012 to 2016) for some companies, financial reporting data was completely or partially absent; Thirdly, cases of duplication of financial data on companies in 2015 and 2016 were noted.

Information on the companies excluded from the sample is presented in tab. 1.

Table 1: The list of the companies excluded from the sample

#	Name	The reason(s) to delete from the sample	Short Description
1	Molkom	Misclassification	The Company produces a wide range of dairy products. Its products include milk, yogurt, butter, cheese and diary desserts.
2	Aviapark		The Company produces general construction works for the aviation industry.
3	UPPO		The Company, also known as Ulan-Udenskoe Priborostroitelnoe Proizvodstvennoe Obiedinenie, manufactures electro technical and electronic equipment for aviation. It also offers a variety of consumer goods, as well as industrial and

#	Name	The reason(s) to delete from the sample	Short Description
			technological products.
4	Sovfracht	No relevant financial data available	The Company provides transshipment of oil via ports and rails and provides a range of related services.
5	Koltsovo Airport		The Company operates an airport in the Urals on the border of Europe and Asia. The airport offers international air passenger transportation services.
6	Novorossyisk Grain Plant	No relevant financial data available for 2014, 2015	The Company operates a grain terminal and services related to grain cargo transshipment. Its infrastructure includes railways and roads, transport garages, mechanical workshops, power plants, and laboratories. Novorossyisk Grain Plant operates in Russia.
7	Passenger Port	No relevant financial data available for 2014	The Company provides passenger transportation and tourism related services.
8	Yakutia Railways	The data for 2016 duplicates the previous year	The Company primarily transports coal and metal ores.
9	Vostochny Port		The Company is located in the Russian Far East and provides mainly coal handling with usage of conveyer equipment. It also transports metals, timber, ore, chemical cargoes, cement, and other commodities.
10	Kuban Territory Agency of Air Transport	Misclassification; besides, the data for 2016 duplicates the previous year	The Company provides electronic services for customers and travel agencies with ability to access flight schedule information, as well as book reservation and tickets for airlines.
11	Transsignalstroy		The Company provides automatic control, teleautomatics, radio-communications, power supply, fire-alarm and protective signaling, and traffic safety equipment.

Source: Bloomberg Professional.

The final list of the analyzed companies is given in tab. 2.

Table 2: The analyzed sample

#	Name	Short Description
1	Vanino Commercial Sea	The Company offers shipping port services: loads, unloads and stores shipping containers, loads and unloads general cargo and provides other related services.
2	Uralpromaheldortans	The Company provides cargo handling and industrial rail transportation services. It manages enterprises of power industry, building materials manufactures, as well as wholesale and retail trade in Russia.
3	Transstoursevice	The Company operates a bus service in Moscow: offers rides and tours around the city, corporate transportation, renting out buses for intra- and intercity routes, airport shuttles, and bus repair.
4	TAXF	The Company operates a taxi service in Russia.
5	Taganrogsky Morskoy Torgovy	The Company operates a port facility. It loads and unloads ships; forwards freight; warehouses goods; offers customs services; moors

#	Name	Short Description
	Port	and tows ships; and loads and unloads shipping containers.
6	Omskiy Aeroport	The Company provides a full range of services including domestic and international air transportation, air traffic control, terminal management and cargo handling.
7	Omsk River Port	Omsk River Port, or Omsky Rechnoy Port, operates a port facility in Western Siberia.
8	Novorossiysk Commercial Sea Port	The Company owns and operates the Novorossiysk Port on the Black Sea. It processes, loads, and unloads cargo. Novorossiysk Commercial Sea Trade Port handles mainly crude oil but also services dry cargo such as metals, cement, sugar, grain and containers.
9	Novoroslesexport	The Company is a large universal port, located on the northeast coast of the Black Sea. It handles cargoes, with priority to container handling and transshipment of timber goods.
10	Murmansk Commercial Seaport	The Company owns and operates commercial seaport on a territory of Murmansk, Russia. It processes, loads, and unloads cargo and crude oil.
11	Kurumoch International Airoport	The Company operates the Kurumoch International Airport and offers domestic and international air transportation services, including traffic management, storage, airplane maintenance and other related services.
12	Commercial Sea Port of Magadan	The Company, also known as Magadanskiy Morskoy Torgoviy Port, provides cargo processing, storage and warehousing services.
13	Commercial Port Posiet	The Company operates a seaport and warehouse in Russia that provides shipping services and cargo processing.
14	Commercial Port of Vladivostok	The Company handles a variety of cargoes, including bulk, liquid cargo, forest products, and general cargo, including containers as well as passenger ships. The port operates an oil terminal and provides storage and transportation services.
15	Center for Cargo Container Traffic	The Company (also named as TransContainer) provides rail container transportation services: offers freight-forwarding, logistics, terminal services, container trucking, and rail transportation services.
16	Anapa Airport	The Company offers scheduled flight services. The Company serves a resort zone of the Black Sea coast of Caucasus.
17	Aeroport Tolmachevo	The Company operates an airport in the Ural Region, Russia. The Airport offers domestic and international transportation services, including traffic management, storage and airplanes maintenance.

Source: Bloomberg Professional.

In the *second stage* of the study, the potential of free cash flow is tested for microeconomic analysis. In particular, the assessment of financial stability is proposed to be carried out by the value to debt ratio, which is calculated on the basis of free cash flow and net debt of the enterprise.

In this case, we are talking about the valuation of the company on the basis of a revenue approach, one of the methods within which the DCF model, traced back to J.B. Williams (1938) and I. Fisher (1930), acts Depending on the purposes of modeling the cash flow, it can be presented to the owners of the company (cash flow to equity) or to all people that finance the company's activities (cash flow to invested capital). There is the free cash flow to equity (FCFE – free cash flow to equity), with which valuation of the company's shareholder value is associated (Lucasevich, p. 105), and free cash flow to invested capital, which can be countered by the total value of the company (FCFF – free cash flow to firm). Discounting a particular type of cash flow, we get either the value of the company's equity, or the value of the total invested capital, which must be adjusted for the amount of debt.

Following the Black-Scholes-Merton corporate liabilities model (BSM-model), net debt is proposed to be considered as the price paid to creditors by owners for the possibility of further business continuation. In the event that the value of the company as acting exceeds the corresponding price, it is advisable for the owners to satisfy the demands of creditors, which allows a positive assessment of the financial stability of the business. Positive dynamics of the indicator also positively characterizes the company being analyzed.
Note that in the original model of BSM it is not a question of net debt, but of the total debt which, moreover, in the original version of the model is represented exclusively by 'the simplest case of corporate debt' (Merton, p. 452). However, an estimate based on net debt is more correct, since, if necessary, part of the debt can be repaid by cash. In addition, it is proposed to make corrections to the formula FCFF (fig.1).

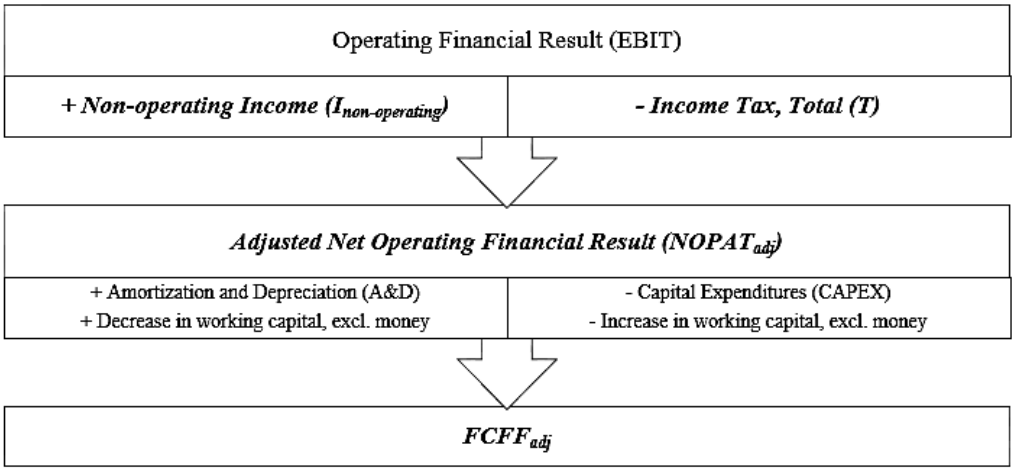


Fig 1: The model of $FCFF_{adj}$ evaluation[2]

The model is reasoned by the initial financial meaning of the indicator. Applying this approach, we can obtain the correct value of the residual income for investors. It is critical for Russian companies since they are usually characterized by the regular substantial rate of non-operating income. This situation contradicts the principles of reasonable and fair representation of financial statements. However, it cannot be ignored.

This model was tested on the example of a transport company operating in one of the major ports of the Baltic Sea. The company in question provides services for the supply and cleaning of wagons on the territory of the port, services for renting a locomotive with a crew, freight forwarding services and so on. The choice of the company is due to the growing role of the large ports of the North-West of Russia in the conditions of fulfilling the instructions of the President of Russian Federation, who ordered to export Russian cargo only through native ports. Only in St. Petersburg and Leningrad region the owners of Russian port terminals until 2025 invest in the development of capacities of more than 1 trillion rubles[3]. The fact that the industry under consideration will develop dynamically in the coming years makes it, undoubtedly, an interesting object for research.

3 Results

According to the results of the *first stage* of the study, it was revealed that the analytical potential of free cash flow for macroeconomic analysis of the financial stability is limited. Information necessary for the calculation, even with respect to public companies, is often absent (tab. 3).

Table 3: Data on FCFF and net debt of the analyzed companies

# / Y	Free Cash Flow to Firm, mln USD			Net Debt, mln USD			FCF/ND ratio		
	2014	2015	2016	2014	2015	2016	2014	2015	2016
1	*no data*	*no data*	*no data*	4.01	13.28	12.66			
2	*no data*	*no data*	*no data*	*-0.07*	*-0.08*	*-0.11*			
3	*no data*	*no data*	*no data*	0.02	0.01	0.00			
4	0.003	0.006	0.003	*-0.002*	*-0.005*	*-0.004*			
5	-0.09	0.07	0.19	0.05	0.02	*-0.19*	-1.70	4.33	
6	*no data*	*no data*	*no data*	*-0.14*	*-0.45*	*-0.23*			
7	-0.03	-0.02	-0.03	0.03	0.05	0.06	-0.81	-0.30	-0.52
8	0.34	0.38	0.45	1.76	1.43	1.40	0.19	0.27	0.32
9	*no data*	*no data*	*no data*	*-1.29*	*-3.03*	*-0.19*			
10	*no data*	*no data*	*no data*	*-2.33*	*-2.35*	*-3.42*			
11	-0.77	-3.28	-0.18	0.54	3.68	3.82	-1.41	-0.89	-0.05
12	*no data*	*no data*	*no data*	*-0.01*	1.05	1.53			
13	*no data*	*no data*	*no data*	1.86	2.65	2.52			
14	*no data*	*no data*	*no data*	0.78	0.47	1.84			
15	0.09	2.53	2.24	6.08	4.86	3.66	0.01	0.52	0.61
16	*no data*	*no data*	*no data*	0.04	-0.29	*-0.44*			
17	*no data*	*no data*	*no data*	3.09	3.91	3.11			

Notes: # – the number of a company in a sample (see tab. 2); FCF/ND ratio is calculated by the authors.
Source: Bloomberg Professional.

It should be noted that the analyzed companies repeatedly observe a negative value of net debt. This means that the FCFF / ND ratio for these companies will not be correct. Thus, conclusions about financial stability using the analyzed indicator are possible only for five sample companies, which even in this case is not indicative.

Consider the results of the *second stage* of the study.

It should be revealed how the difference in cash flow estimation can change the business value using the discounted cash flows model for the FCFF. To demonstrate the differences the authors applied the case of the company that has significant other income and expenses that reflects on the FCFF estimation. All calculations are based on retrospective analysis of financial statements and subsequent forecast. The WACC model, based on the cumulative approach, was used to determine the discount rate (tab. 4, 5).

Table 5: Business valuation using the common model

Indicator, mln RUR	2nd half-year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Post-forecast period
EBIT	47,025	90,798	94,985	98,833	102,853	107,055	
Income tax on operating	-14,836	-28,645	-29,966	-31,180	-32,448	-33,774	

Indicator, mln RUR	2nd half-year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Post-forecast period
activity							
NOPAT	32,190	62,153	65,019	67,653	70,405	73,281	
A&D	6,669	13,338	13,338	13,338	13,338	13,338	
Capital expenditures	-6,669	-14,338	-15,077	-15,755	-16,464	-17,205	
Working capital increasing	0	-1,154	-852	-782	-818	-854	
FCFF	45,528	90,983	94,285	97,528	101,025	104,678	109,389
Present value of FCFF	43,655	76,908	67,371	58,908	51,581	45,179	
Present value of terminal value	342,113						
Firm value	685,715						
Long term debt	-234,765						
Equity value	450,950						

Note: the applied discount rate is 18.3%.
Prepared by the authors

Table 6: Business valuation using the improved model

Indicator, mln RUR	2nd half-year 2015	2016	2017	2018	2019	2020	Post-forecast period
EBIT	47,025	90,798	94,985	98,833	102,853	107,055	
Other income and expenses (net)	29,707	57,359	60,004	62,435	64,975	67,629	
Income tax (T)	-15,346	-29,631	-30,998	-32,254	-33,566	-34,937	
$NOPAT_{adj}$	61,386	118,526	123,992	129,014	134,262	139,747	
A&D	6,669	13,338	13,338	13,338	13,338	13,338	
Capital expenditures	-6,669	-14,338	-15,077	-15,755	-16,464	-17,205	
Working capital increasing	0	-1,154	-852	-782	-818	-854	
$FCFF_{adj}$	74,724	147,355	153,258	158,889	164,882	171,144	178,845
Present value of $FCFF_{adj}$	71,649	124,561	109,510	95,971	84,185	73,865	
Present value of terminal value	559,339						
Firm value	1,119,08						
Long term debt	-234,765						
Equity value	884,315						

Note: the applied discount rate is 18.3%.
Prepared by the authors.

The tables show that there is the huge difference between results, getting by the alternative models. This demonstrates how it is important to estimate the FCFF correctly. In summary, we note that the traditional method of calculating the FCFF requires revising. It seems that the research results are potentially demanded to develop the methodology of financial analysis, business valuation and value-based management.

Further, for the second (correct one, from our point of view) cost calculation option, the forecast value to debt indicator was determined, which made it possible to assess the financial stability of the company in question. To do this, we used the forecast data on the schedule of repayment of the existing debt in the amount of 234,8 million rubles. In addition, information was taken into account about the lack of plans to attract new borrowings. Net debt was correlated with firm value assessed on the FCFF basis (tab. 6). The calculation results are presented below (tab. 7).

Table 7: Value to debt ratio for company

Figure	2nd half-year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Net debt	186,593	109,857	60,576	-13,991	-79,916	-131,027
Debt	234,765	198,476	135,786	80,567	38,897	10,789
Δ Debt	-	*-36,289*	*-62,690*	*-55,219*	*-41,670*	*-28,108*
Interest paid	*-26,552*	*-22,448*	*-15,357*	*-9,112*	*-4,399*	*-1,220*
FCF	*74,724*	*147,355*	*153,258*	*158,889*	*164,882*	*171,144*
Cash and equivalents	48,172	88,619	75,210	94,558	118,813	141,816
Firm value (beg. of the period)	1,119,080	1,139,246	1,187,456	1,238,068	1,291,817	1,348,885
Firm value / Net Debt	6.00	10.37	19.60	-	-	-

Prepared by the authors

Obtained results let us assume that the analyzed company is financially stable and its financial position is expected to improve. However, it also shown in the table that net debt often takes on negative values, which does not allow a correct assessment of the company's financial stability by the proposed method. This indirectly suggests that the company has limitations in attracting additional sources of financing. In addition, a significant amount of cash indicates the existence of restrictions on the available forms of investment for relatively small Russian companies. However, it is possible that, given the rapid development of this industry, the company will still adjust its investment and financial plans.

Conclusions

The study showed that the potential of free cash flow for macroeconomic analysis of the financial stability in case of the Russian nonfinancial business sector is inadequate. Although the free cash flow to debt ratio (or its modifications) is widely used in practice, in the Russian context free cash flow is often replaced by marginal profit[4], which is a very significant simplification and, accordingly, can lead to inaccurate conclusions. The reason for such a replacement is completely explained by the lack of necessary information, which was illustrated by the example of the Russian Railroads and Transportation Services Sector.

It should also be noted that the number of companies, based on the results of a detailed analysis of the sample, eligible for research, has decreased almost twofold. This situation reflects the features of the financial market, which is characterized by a low level of development of the corporate segment. The share of public companies, characterized by liquid shares, relative to the total population of companies is extremely small (Darushin et al, p. 820-821). At the same time, the level of transparency of financial information about companies is unsatisfactory, which allows to judge the high level of information asymmetry, which, in turn, is an important factor of financial instability (Mishkin, p. 6). It is also worth noting that the data of information and analytical systems requires

careful verification and, therefore, partly limits the ability to work with large data sets about companies.

With regard to the possibility of applying free cash flows to assess and forecast the financial stability of a particular company, the success of its application will largely depend on an understanding of its investment and financial plans. Thus, the assessment of financial stability using this indicator will be relevant exactly for as long as the company's plans for investments and sources of financing its activities are detailed. Equally important is the overall level of development of the financial market, which influences the implementation of the company's investment and financial plans.

Endnotes

[1] In the Bloomberg Professional, there is a combined 'Railroads, Transportation Services Sector (ICB)', which is correspondingly comprised of the 2 775 and 2 777 sectors by the FTSE Industry Classification Benchmark.

[2] Prepared by the authors.

[3] Sologub A., Kovtun N. There will be a trillion. The ports of St. Petersburg and Leningrad region for 8 years will attract more than 1 trillion rubles. Business Petersburg. June 8, 2017. URL: https://www.dp.ru/a/2017/06/07/Portitrillioneri.

[4] As an example is the review of the financial stability of the CBR, in which net debt is estimated in relation to EBITDA (Financial Stability Review, p. 13).

References

Abramishvili, N.R., Lvova, N.A., Ivanov, V.V. and Voronova, N.S. (2016) 'Prediction of Debtor Solvency: Developing Bankruptcy Framework in Russia', *Proceedings of the 27th International Business Information Management Association Conference – Innovation Management and Education Excellence Vision 2020: From Regional Development Sustainability to Global Economic Growth*, 362-370.

Adrian, T., Covitz, D. and Liang, N. (2013), 'Financial Stability Monitoring', *FEDS WP no. 2013-21*. [Online], [Retrieved August 22, 2017], URL: https://www.federalreserve.gov/pubs/feds/2013/201321/201321pap.pdf.

Altman, E. and Hotchkiss, E. (2006), 'Corporate Financial Distress and Bankruptcy'. 3rd ed., John Wiley & Sons, Hoboken, New Jersey.

Altman, E.I. (1968), 'Financial Ratios, Discriminant Analysis, and the Prediction of Corporate Bankruptcy', *The Journal of Finance*, XXIII (4), 589-609.

Argenti, J. (1976), 'Corporate planning and corporate collapse', *Long Range Planning*, September, 12-17.

Beaver, W.H. (1966), 'Financial Ratios as Predictors of Failure', *Journal of Accounting Research. Empirical Research in Accounting: Selected Studies*, 4, 71-111.

Bobyleva, A.Z. and L'vova, O.A. (2016), 'Forming the System of Stabilization and Anti-crisis Measures at Federal and Regional Level in Contemporary Russia', *Public Administration, E-Journal,* 58, 54-82. [Online], [Retrieved August 22, 2017], http://ee-journal.spa.msu.ru/uploads/vestnik/2016/issue__58._october_2016/gosudarstvennoe_upravlenie_i_antikrizisnoe_regulirovanie_ekonomiki/bobyleva_lvova.pdf.

Darushin, I.A., Lvova, N.A., Ivanov, V.V. and Voronova, N.S. (2016), 'The Russian Stock Market: Is It Still Efficient?', *Proceedings of the 27th International Business Information Management Association Conference – Innovation Management and Education Excellence Vision 2020: From Regional Development Sustainability to Global Economic Growth*, 818 – 828.

Donets, S. and Ponomarenko, A. (2015), 'The Indicators of the Debt Burden', *The Bank of Russia WP*, 5. [Online], [Retrieved August 22, 2017], http://www.cbr.ru/Content/Document/File/16736/wps_5.pdf.

Donets, S. and Mogilat, A. (2016), 'Crediting and Financial Stability of Russian Industrial Companies: Microeconomic Aspects of Analysis', *The Bank of Russia WP*, 16. [Online], [Retrieved August 22, 2017], http://www.cbr.ru/Content/Document/File/16724/wps_16.pdf.

Drehmann, M. and Juselius, M. (2012), 'Do Debt Service Costs Affect Macroeconomic and Financial Stability?', *BIS Quarterly Review*, September, 21-35.

Financial Position of the Largest Enterprises in 9 months of 2015. *The Bank of Russia*. [Online], [Retrieved August 22, 2017], http://www.cbr.ru/analytics/financial_condition/financial_condition_2015_9.pdf.

Financial Soundness Indicators and the IMF (2015), *The International Monetary Fund*. [Online], [Retrieved August 22, 2017], https://www.imf.org/external/np/sta/fsi/eng/fsi.htm.

Financial Stability Review (2016), The Bank of Russia, 1. [Online], [Retrieved August 22, 2017], http://www.cbr.ru/Eng/publ/Stability/fin-stab-2015-16_4-1_e.pdf.

Fisher, I. (1933), 'The Debt-Deflation Theory of Great Depression', Econometrica, 1, 337-357.

Fisher, I. (1930), 'The Theory of Interest as Determined by Impatience to Spend Income and Opportunity to Invest It', The MacMillan Company, New-York.

Lvova, N., Pokrovskaia, N., Abramishvili, N. and Ivanov, V. (2016), 'Developing Methodology of Monitoring Companies' Financial Stability: Abnormal Profitability Evaluation', *Proceedings of the 28th International Business Information Management Association Conference – Vision 2020: Innovation Management, Development Sustainability, and Competitive Economic Growth*, 681-688.

Lucasevich, I.Ya. (2017), 'Dividend Policy of State Companies – between the Scylla and the Charybdis?', *Financial strategy of enterprises in conditions of economic instability, Materials of the Scientific and Practical Conference*, March 15, 102-108.

Merton, R. (1974), 'On the Pricing of Corporate debt: the risk structure of interest rates', *Journal of Finance*, 29, 449–470.

Minsky, H.P. (2017), 'Stabilizing an Unstable Economy', Rozmainsky, I. (ed), Gaidar Institute Publishing, Faculty of Liberal Arts and Science (SPSU), M., SPb.

Minsky, H.P. (1992), 'The Financial Instability Hypothesis', *Jerome Levy Economics Institute Working Papers*, 74.

Mishkin, F. (1999), 'Global Financial Instability: Framework, Events, Issues', *Journal of Economic Perspectives*, 13 (4), 3–20.

Taffler, R.J. (1983), 'The Assessment of Company Solvency and Performance Using a Statistical Model', *Accounting and Business Research*, 13 (52), 295-308.

Wilcox, J.W. (1970), 'A Simple Theory of Financial Ratios as Predictors of Failure', *Working Paper № 495-70*. Alfred P. Sloan School of Management.

Williams, J.B. (1938), The Theory of Investment Value, Harvard University Press, Cambridge, MA.

Crisis management for public sector during the European financial crisis: Lessons of Estonia in 2008-2011

Raul Markus, Tallinn University of Technology, Tallinn, Estonia, e-mail: raul@optium.ee

Viljar Veebel, Tartu University, Tartu, Estonia, e-mail: viljar.veebel@ut.ee

Olga Lvova, Lomonosov Moscow State University

Abstract

The austerity implementation experience of the Estonian Government during the European financial crisis has high value both in practical terms when improving preparations for future crises, but also as a case for academic research, especially when compared with the other Baltic States and Visegrad countries. The crisis response was even more complicated as a simultaneous goal was set to fulfil Eurozone accession criteria. When studied carefully and Estonian experience is valuable from the wider future perspective as it offers experience and answers as to whether extreme austerity is an efficient solution to counter a financial crisis, the economic and social costs it includes, the best administrative practices too be suggested when implementing austerity and some hints how to implement unpopular austerity politically.

Keywords: European Union, austerity, public sector, financial crisis, management

JEL Classification: E42, E58, G18, H12.

Introduction

The economic developments, financial choices, political dilemmas and final achievements of the Baltic States in the years of financial crisis (2008-2011) offer both valuable practical experience and academic inspiration for research. These countries, while following similar goals and paths between regaining independence and accession to the European Union (EU) in 2004, have chosen in many aspects different priorities after the EU accession, which led them into different economic and political situations at the beginning of global financial crisis in the year 2008.

Comparative regional research on financial, economic and social stress management during the financial and economic crisis in 2008-2011 is extraordinarily interesting, as it includes a set of very similar states historically and economically, but these states chose rather different strategies in 2008-2011 to counter the crisis. The financial crisis management experiences in the Baltic States and Visegrad countries also offer bases for theoretical analysis in terms of transition models and strategies, as the region consists of countries following the shock-therapy model, like Estonia and Latvia, and countries following a model of gradual adaptation, like Lithuania or Poland.

From the Estonian perspective, financial crisis management provided the valuable possibility to research the social and political reaction to the “broken hopes” of long term stability and economic growth, which was expected to arrive after Estonia´s accession to the eurozone and Schengen visa-free regime as a reward for years of reforms and efforts.

Estonia´s path through the financial crisis in the years 2008-2011 was in many aspects different from the rest of the Baltic States, the Northern countries and the Visegrad states, as during the process of fiscal stabilisation, Estonia also set the goal of fulfilling the eurozone accession criteria (the Maastricht criteria) and joining the eurozone with any cost. This additional demanding goal defined clear limits to the stabilisation and rescue strategies during the hottest stages of crisis. As a result, Estonia was one of the rare societies in the EU and the eurozone where austerity was chosen by the government to combat the financial crises, and this led to strict austerity measures in the years 2009 and 2010.

But the final costs of austerity and financial stability where even higher, as joining eurozone forced Estonia to participate in financial stability mechanisms and bail-out programmes in 2013-2017. Accordingly, the Estonian experience is valuable from the wider future perspective of the European Union and eurozone, as it offers experience and answers as to whether extreme austerity is an efficient solution to counter a financial crisis, the economic and social costs it includes, and the best practices when implementing austerity.

Economic choices for radical fiscal consolidation and actual economic outcomes

There are two central research questions to be addressed in the following analysis. First, it should establish if the Estonian government can be considered as a passive policy-taker or an active policymaker during the financial crisis. And second, which were the central variables of governmental policy and strategic communication during the crisis?

The recessions in Estonia can generally be divided into two distinct periods: the first phase lasted from the second half of 2007 to the intensification of the global financial crisis in the autumn of 2008, and the second phase from the autumn of 2008 until the end of the recession by the end of 2009.

The starting economic and fiscal circumstances in Estonia in 2007 were quite specific when compared to its regional neighbours or euro area members. First, there were several positive variables easing the entrance to the crisis: there existed a tradition of balanced central budgets, small central government debt (4.4% from the gross domestic product (GDP)), and a special reserve fund for a crisis situation. There were also no government bonds issued in the whole history of re-independence.

As Estonia was using the currency board system, government was a passive actor in terms of money supply and interest rates. Additionally, the Estonian budgetary law did not allow to submit budgets even with minor deficit, even when in the EU level the Maastricht rules allowed a 3% budget deficit for the states applying for euro area membership. There were no limitations to sovereign debt, but at the beginning of the crisis Estonia did not have a tradition of national bonds. The government's ability to finance a budget deficit was also influenced by the actual interest rate asked by the commercial banks.

The first phase of the recession was relatively mild and saw a domestic demand-led adjustment that was primarily related to a deceleration in credit growth. The second phase of the recession, which started with the deepening of the global financial crisis in September 2008, saw a sharp reversal of foreign capital flows and a steep fall in exports. The austerity measures taken in Estonia in 2008–11 were triggered by the fall of foreign capital inflows and lending in the first quarter of 2008, which resulted in FDI dropping from its previous level of 2 billion euros in 2007 to 1.2 billion euros in 2008, causing an immediate drop in GDP in the second quarter of 2008 and a fall in budget revenues (Statistics Estonia, 2013a). As a reaction to the fall in budget revenues, a budget reduction was passed by the parliament of Estonia in June 2008, reducing spending for the rest of 2008 by 384 million euros, which was almost 7% of the budget.

To reduce growing expenditures, public sector wages were first reduced by around 20% in the last quarter of 2008 and investments and numerous state procurements were cancelled. Despite these austerity measures, even after the correction the total revenue side of the budget remained in deficit in 2008. The government's austerity policy caused a chain reaction where the reduction of public wages and cancellation of investments and state procurements reduced the government's tax revenues and payments to commercial banks too; as a result, the purchasing power and the ability of the private sector to service the existing debt declined. The only group which fully escaped the cuts in political reasons was pensioners, as the average monthly pension even grew by about 20% in 2008, which has been described as the government's 'insurance policy' to maintain political support among voters in an ageing society.

Table 1: Main economic indicators for Estonia, 2007–2012

Economic indicator	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
GDP (chain-linked volume growth, %)	7.5	-4.2	-14.1	2.6	9.6	3.9
Total general government revenue (EUR b)	5.843	5.961	5.978	5.841	6.269	6.831
Change in total general government revenue (%, in comparison to previous year)		*2.02*	*0.29*	*–2.29*	*7.33*	*8.96*
Total general government expenditure (EUR b)	5.46	6.44	6.251	5.813	6.088	6.872
Change in total general government expenditure (%, in comparison to previous year)		*17.95*	*–2.93*	*–7.01*	*4.73*	*12.88*
Net lending (+)/net borrowing (-)	0.383	–0.479	–0.273	0.028	0.181	–0.041
Average monthly gross salaries (EUR)	724.5	825.2	783.8	792.3	839	887
Change in average monthly gross wages and salaries (%, in comparison to previous year)		*13.90*	*–5.02*	*1.08*	*5.89*	*5.72*
Civil servants wages from average wages (%)	108	106	96	98	99	101
Monthly average old-age pension (EUR)	226.3	278.4	301.3	304.5	305.1	312.9
Change in monthly average old-age pension (%, in comparison to previous year)		*23.02*	*8.23*	*1.06*	*0.20*	*2.56*
Unemployment rate (%)	4.6	5.5	13.5	16.7	12.3	10
Consumer price index (%)	6.6	10.4	–0.1	3	5	3.9
Harmonised competitiveness indicator (%)	4.2	6.1	1.6	–2.8	1.3	–0.3

Source: Bank of Estonia, 2013.

In 2009, despite previous hard efforts Estonian budget planners had the even more complicated task of fiscal consolidation in front of them, as government decided to make drastic expenditure cuts across the board in December 2008. The latter were preferred to the targeted cuts which were not used as consensus was not reached on the priority of sectors. The majority of the expenditure cuts were seen as temporary and planned to last for two years (Government of Estonia, 2008). The cuts resulted in a central government budget deficit of 2.9% which narrowly met the Eurozone accession criteria on government budget deficit (maximum 3% from GDP is allowed), but was extraordinarily large under the current budget law (which is not allowing deficit at all).

Thus for the first time since Estonia had regained independence, a budget with deficit was planned in 2009. As a result of the drastic budget cuts Estonia experienced a fall in GDP reaching 14.1% and a decline in industrial output of 24%, while average monthly gross wages and salaries dropped by 5%

and unemployment increased by 8 percentage points. At the same time, as in 2008, pensions were not cut in 2009 but grew again by 8% from an average of 278 euros per month in 2008 to 301 euros in 2009.

Although the Estonian economy showed some signs of growth in 2010, the budget for upcoming year was planned in a conservative way. The revenue side of the budget remained in general on the same level as in 2009 at around 5.8 billion euros while spending was cut by about 7% from 2009. Spending and revenues were balanced mainly due to the government's drastic decision to halt payments into the second pillar of the Estonian pension system. Although payments were restored after two years and the state even increased its contributions to compensate for the losses, the popular belief that the pension system is firm and unshakable has not been restored. In 2010, Estonia finally fulfilled the Maastricht criteria and decided to adopt the euro and join the euro area in 2011. Seen as political success for the government, it also softened public reactions against austerity policy implemented and justified by government.

The government budget for 2011 was planned rather optimistically, based on the view that both the Estonian economy and government spending would be growing. As the Estonian economy saw growth both in terms of GDP and industrial output, a budget deficit was avoided, and revenues exceeded the expenditures by 1.2% (relative of GDP). Salaries grew together with pensions, and while the growth in the average pension was largely nominal at 1 euro per year, average salaries grew by around 5% (Statistics Estonia, 2013a). While fiscal factors began to normalize, social tensions and pressure continued, caused by the high unemployment level (12.3%), reduced healthcare accessibility, high inflation (5%) and limited credit options by private banks. As a result, labour migration especially towards Nordic countries grew (consisting both highly educated doctors and construction workers with low education).

In 2012, the GDP growth in Estonia stabilized at 3.9% and aggregate gross domestic product reached the highest level in the country's history (Bank of Estonia, 2013). Although the budget proposal for 2012 was initially planned to be in deficit with expenditures exceeding revenues by 0.68 billion euros, at 6.80 billion euros to 6.12 billion euros, in actual terms of fulfilment the budget was more balanced at 6.4 billion euros (Ministry of Finance, 2012). Both wages and pensions continued to grow as average salaries increased by 5.7% and the average monthly pension by 2.5% (Bank of Estonia, 2013).

Which were the social effects of austerity measures taken by the government in 2008–11? Despite the government's efforts, costs for social policy were also growing during the crisis, pushed by a quickly growing consumer price index and political promises to raise pensions every year. According to Organization for Economic Co-operation and Development (OECD) data, Estonian social costs grew from 12% of GDP in 2007 to 18% of GDP in 2011 (OECD, 2011). To the Estonian labour market, the influence of crisis and budget cuts was evident but arriving late. If before the crisis in 2007 the unemployment rate was 4.7%, then in 2008 it rose only to the 5.6% level since employers tended to hope that the crisis would be short and preferred temporary salary cuts instead of reducing the labour force (Statistics Estonia, 2013a). In 2009, however, unemployment more than doubled to the level of 13.8%, and in 2010 it reached the top level of 16.9%, and lowered to the 12.5% level only in 2011 (Masso & Krillo, 2011).

Average monthly wages, reached 724 euros in 2007, followed by more than 10% growth to 825 euros in 2008, a decline to 783 euros in 2009, a small growth in 2010 to 792 euros and a 5% growth in 2011 to 839 euros. What differed in the Estonian wage correction process and dynamics from the other Baltic States was that at the beginning of the crisis Estonia's public sector salaries were higher than private sector salaries, which turned in opposite way to the end of austerity (Masso & Espenberg, 2013).

Tax revenues were growing during the years of crisis – starting from 31.5% of GDP in 2007, the tax percentage grew to 31.8% in 2008 and to 35.8% in 2009 (falling slightly to 34.3% in 2010). While this level is significantly lower than the EU-27 average (39.6% in 2010) it is higher than tax levels in Latvia (27.5% in 2010) and Lithuania (27.4% in 2010). Also, the trends in both southern Baltic States and Europe-27 have been different from Estonian choices – while the Estonian government grew the tax share in terms of GDP, the EU-27 kept it stable, and Latvia and Lithuania were able to reduce it.

During the years of crisis, social pressure started to influence migration (starting from the year 2010), when emigration grew by 25% on a yearly basis. In 2011 this growth continued with the speed of 20% and reached a remarkable 80% growth in 2012 (Statistics Estonia, 2013b).

Political choices and communication during the austerity period

How did the Estonian government use the toolbox to achieve fiscal consolidation prescribed by the laws, which were the main actions indicating the government's role in initiating the austerity policy and which were the main principles of Estonian austerity policy?

To implement austerity the Estonian government chose to achieve fiscal consolidation by taking the path of across-the-board measures (Pollitt, 2010, 17–18) rather than targeted cuts. Although it is easier to achieve consensus for across-the-board measures, the targeted cuts approach would in an ideal case offer higher economic returns or less social stress. Analysing the duration of the measures (i.e. whether the cuts and the immediate burdens are being introduced as a temporary or a long-term measure), we can see that the government acted exactly according to the theory described by Rubin (1980) and started with the minimum possible cuts in expenditures across the board to compensate for the lack of revenues while hoping that the crisis would prove temporary. Later the government continued 'slicing' the costs to reach a balance, which it followed with unsuccessful attempts to increase revenues as the economic situation deteriorated and drastic cuts in spending were needed to avoid a budget deficit in 2009 and 2010. There were not many alternatives to austerity for the Estonian government. Since Estonia had a currency board at the time, the government was unable to influence money supply and interest rates.

Although there were no limitations on sovereign debt, Estonia had no tradition of issuing national bonds at the beginning of the crisis, and although the government had a legal right to change the exchange rate, in practical terms it rejected this option as it would have resulted in failure to meet the euro area accession criteria. And so austerity focused only on budget corrections. Maintaining and increasing Estonia´s investment grade was set as one main priority by the Estonian government during the crisis. At the end of 2011 Estonia had managed to keep an A1 rating by Moody´s, AA-/Stable by Standard and Poor's and A+/Stable by Fitch (which was better than Italy´s grade and equal to Span's grade). Estonian grades have also been higher than the grades of its Baltic neighbours, which both scored in the range of BB+/BBB. Despite its efforts Estonia never joined the countries with triple a AAA rating, symbolising balanced state finances and a stable economy.

With regard to long-term crisis management, the fundamental issue facing the Estonian government during the economic crisis was the question of whether fiscal consolidation should be achieved through cutting costs, increasing revenues or going for both options simultaneously. Since meeting the euro area accession criteria (the Maastricht criteria) was a parallel goal for the government alongside crisis stabilization, the Estonian political elite decided to choose the first option. In this way the Estonian experience also offers a valuable contribution to the theoretical framework of fiscal consolidation which would generally tend to support the opposite model of immediate gains through revenue-based measures, with spending cuts following only in case revenue raising proves insufficient (see Wolman & Davis, 1980).

In terms of strategic political communication the Estonian government followed the logic discussed by Katzenstein (1985) and Pierson (1996) for a small state corporatist government where the government presents itself as a policy 'taker' in a partial force majeure situation.

The government purposely took the role of partial actor (policy-taker) who merely tries to save the situation caused by a global crisis. And the government did succeed in convincing the voters that the fiscal situation was desperate and its choices were limited but that full commitment to austerity would save the situation and even if the government did not succeed, it was morally and economically the most sustainable solution.

Was austerity a necessity or the only option for the Estonian government to achieve fiscal consolidation?

In terms of macroeconomic conditions, the decline of the GDP by 14.1% in 2009 was one of the highest in the EU, but it was lower compared to the Latvian economy which dropped by −17.1% and quite equal to the Lithuanian economy decline of −14.8%. At least in the Baltic context, the Estonian GDP suffered less than the Latvian or Lithuanian GDPs (Statistics Estonia, 2014). In the Baltic context Estonia was also the most stable country in terms of budget balance. The highest deficit in Estonia occurred in 2008 reaching 2.9% only to be followed by 2% in 2009. In 2007 and 2011 the Estonian budget saw surpluses. Estonia was also the only country among the Baltic States having a special stabilization reserve for the case of economic shocks. Next to witnessing a balanced budget, also Estonian tax revenues were growing during the years of crisis – starting from 31% of GDP in 2007 and reaching 34% in 2010. While this level is significantly lower than the EU-27 average (39% in 2010) it is still higher than the tax levels in Latvia (27.5% in 2010) or Lithuania (27.4% in 2010). Estonia started the debt crisis with the lowest debt level (4.6% of GDP in 2008) in the EU and euro area; Latvian debt reached 19.5% in 2008 and Lithuania met the crisis with a debt of 15.6% in 2008. In 2009 governmental debt was growing in Estonia, in all selected reference countries and in the EU on average. While Estonia almost doubled its debt level to a mere 7.2%, Latvia reached 36% and Lithuania 29%. The average governmental debt of the European Union's member states in the same time increased from 61.6% in 2008 to 73.6% in 2009. One further indicator which can explain Estonia choosing austerity during the financial crisis is inflation. Estonian inflation increased by 6.6% in 2007 and reached 10.4% already in 2008. While there was no direct economic need to counter inflation with austerity, austerity nevertheless offered Estonia an excellent possibility to bring inflation below 3% which was the main obstacle in its way to fulfilling Maastricht criteria and entering the Eurozone.

Based on the above described indicators, it can be admitted that austerity was not the one and only fiscal choice for the Estonian government. In terms of GDP dynamics the Estonian situation was better or equal to its Baltic neighbours and in respect of the fiscal deficit and governmental debt Estonia scored the best results in the euro area and the whole European Union. Hence, the main reason for choosing austerity seemed to be the willingness of the Estonian government to reduce the inflation level in order to be able to access the euro area. When looking back to austerity choices from year 2017 and comparing Estonian post-austerity development with Latvian and Lithuanian development two specific differences are visible. First Estonia ended up with remarkably lower public sector debt (9,5% in Estonia compared to 40% in Latvia and 40% in Lithuania), but it also ended up with lower economic growth in 2013-2016, which led to the situation where former slowest economic performer Lithuania has bypassed both Latvia and Estonia in terms of GDP per capita per purchase power (27900 USD in Lithuania vs 27700 USD in Estonia).

One major argument used to legitimize austerity as a partial force majeure was the fact that in 2007–13 Estonia was allocated more than 3.4 billion euros from the EU Structural Funds and so Estonia

simply had to follow European guidelines. The need to find active support among the member states of the euro area for Estonia's entry was used as another argument.

At least the Estonian government itself considered its ability to manage the economic crisis and simultaneously maintain voters'support to be an example to follow to others – the Estonian prime minister and the government coalition have expressed the opinion that Estonia was one of the most successful EU members in combating the financial crisis and that other member states of the EU should learn from the experience of Estonia (Ansip, 2012).

Conclusion

Among the CEE countries and the Baltic States, Estonia has been often symbolizing opened, innovative, competitive economy, social shock therapy models, balanced governmental budget and low debt level. While the years of economic boom in 2004-2007 offered numerous temptations in terms of social spending and institutional investments, the following years (2008-2011) of pressure and austerity tested the hidden values of political elite, survivability of economy and preferences of population.

When Baltic States were hit by global financial crises the starting points and strategies chosen for the fiscal consolidation were different. First, the aim to join the OSCE and the Eurozone played important role for Estonia when choosing its strategy and in many aspects different tools from its` Baltic partners during the economic crisis. Second, the goal to join Eurozone was seen as a priority for any cost and fulfilling the Maastricht criteria seemed possible only through austerity and budget cuts strategy. Third, there was both political and social consensus that additional costs and loans will not be a part of the solution, rather they would destabilize the situation. Fourth, Estonia was able to choose austerity as having no pressure of long term governmental debt, no tradition of budget deficit and low cost-level for social services. During the financial crisis Estonia continued its previous practice as hard-liner in terms of social security, but added to it image of committed follower of European solidarity

Estonia and in many aspects all three Baltic states offer also a valuable example of economic recovery from very high GDP decline (in 2009 GDP decline topped with -17,7% in Latvia, -14,8% in Lithuania and -14,1% in Estonia) without devaluation, bail-out or additional loans (Raudla and Kattel 2013, 733).

Especially in financial and legal terms Estonia followed more the decisions and debates of Finland (than its Baltic neighbours), which is the only Eurozone member next to Estonia among Nordic and Baltic countries. There is also another similarity: Finland and Estonia were the only states next to Luxembourg actually fulfilling Maastricht criteria in 2010 and 2011. Second, main partner and source for Estonia of inspiration in the way towards austerity was Germany. Cooperation and relations between Baltic States however remained as formal as they were before.

When looking at the cost of austerity, then two problems have grown, which will slow Estonian development in upcoming years, first, the growth of unemployment and especially structural unemployment; second, missing investments in energy sector which have resulted in the highest energy costs per person (form GDP) in the EU.

When looking back to crisis years and Estonian government´s later comments to crisis experience, then no lesson was learned or even seen necessary. On the contrary, according to the opinion of Prime Minister (Andrus Ansip) and Minister of Finance (Jürgen Ligi), Estonia was one of the most decisive, moral and successful member states in solving problems during the crisis and the other member states should learn from Estonia. The only admitted lesson from crisis was that buffers - governmental stability funds, need to be bigger because of possibility of unexpected pressure, but no changes are needed in terms of government revenues and taxes. The philosophical debate on pro-

Thatcherism and the opposite classical welfare state model was also used to support the government's argument that austerity is the one and only strategically acceptable solution to the crisis.

Can Estonia´s austerity experience serve as an example for other CEE new-comers in Eurozone? It is possible only for the countries that have no high level of governmental debt needing renewing systematically and no tradition of budget deficit. Among the Eurozone members only Finland and Luxembourg meet these central pre-conditions. Important question to answer before following Estonia's way of austerity, is whether the measures taken supported a long term economic and social stability and growth or lowered competitiveness and social security.

References

Ansip, A. (2012), Speech in Riigikogu. Retrieved from http://valitsus.ee/et/valitsus/ peaminister-ja-ministrid/andrus-ansip/peaministri-koned-ja-seisukohad/71892/peaminister-ansipipoliitiline-avaldus-2013.-aasta-riigieelarve-%C3%BCleandmisel-riigikogule,-27.-september-2012

Bank of Estonia (2013), *Estonia's Economy in 2012*, Bank of Estonia. http://statistika.eestipank.ee/?lng=en#listMenu/1017/treeMenu/MAJANDUSKOOND

Estonian Government (2012), *Estonian government's European Union Policy for 2012-2017*

Estonian Central Office of Statistics (2013), HTTP: <http://www.stat.ee/main-indicators> .

Government of Estonia (2008), *State Budget Strategy* 2009–2012, Tallinn.

Government of Estonia (2009), *State Budget Strategy* 2010–2013, Tallinn.

Masso, J., Espenberg, K. (2013), "Baltic States' Public Sectors during the Crisis: early application of fiscal austerity measures", in D. Vaughan-Whitehead (Ed.), Public Sector Shock. The Impact of Policy Retrenchment in Europe, Edvard Elgar, pp. 84-133.

Masso, J., Krillo, K.; (2011), "Labour markets in the Baltic states during the crisis 2008-2009: the effect on different labour market groups". University of Tartu, Faculty of Economics and Business Administration Working Paper No. 79.

Ministry of Finance database on state budgets, http://www.fin.ee/riigieelarve-2012 and http://www.fin.ee/riigieelarved-2001-2010

OECD. (2011), Pro- and anti-social behavior. Society at glance 2011: Social indicators. Paris: OECD Publishing.

Pollitt, C. (2010), Cuts and Reforms—Public services as we move into a new era. *Society and Economy 32*(1), 17–31.

Raudla, R. and Kattel, R. (2013) Fiscal Stress Management During the Financial and Economic Crisis: The Case of the Baltic Countries, International Journal of Public Administration, 36:10, 732-742

Riigikogu (2010), Agreement on the terms of accession of the Republic of Estonia to the Convention on the Organization for Economic Co-Operation and Development was amended. https://www.riigiteataja.ee/aktilisa/2241/1201/0005/Agreement_terms.pdf

Staehr, K. (2010), 'The global financial crisis and public finances in the new EU countries from Central and Eastern Europe', Bank of Estonia Working Paper No. 2/2010.

Standard Eurobarometer (2009) *Public Opinion in the EU*, No.72. http://ec.europa.eu/public_opinion/archives/eb/eb72/eb72_ee_ee_nat.pdf

Wolman, H., & Davis, B. (1980). Local government strategies to cope with fiscal pressure. In Charles H. Levine & Irene Rubin (eds.), *Fiscal stress and public policy* (pp. 231–248). London: Sage Publications.

Nexus Generation Job Creators: A Review of Generational Attributes and Opportunities

Nur Afiqah Binti Mohammad Ishak[1],
Nurazariah Binti Abidin[2],
Jegatheesan Rajadurai[3]

[1, 2 & 3] College of Business & Accounting, Universiti Tenaga Nasional, Kampus Sultan Haji Ahmad Shah, Pahang, Malaysia

[1] afiqah.mohammad3@gmail.com
[2] Azariah@uniten.edu.my
[3] Jegatheesan@uniten.edu.my

Abstract

The development of modern business technology provides an opportunity for future virtual entrepreneurs to start-up a product and build their very own empires at a very low cost and no border interactivity with the consumer because the information is easily accessible. The generation with the most potential to become future virtual entrepreneurs is the Nexus generation This paper aims to present reviews of Nexus generation behaviour and analyze the reasons why the Nexus generation has the potential to become virtual entrepreneurs. Today is the era of technological advancement. Many researchers in the Social Sciences claim that Nexus is the first generation of this era of technological growth. They are well educated, confident, achievers who take advantage of opportunities and are highly technologically savvy. The stumbling blocks are the unemployment rate among the Nexus generation and the lack of opportunitiesto become entrepreneurs. Therefore, the purpose of this study is to investigate the entrepreneurial potential of the present Nexus generation graduate and to determine the qualities which contribute to them becoming virtual entrepreneurs. This study is significant because it will contribute to the development of Malaysia's growth in line with the National Strategic 2015 set by the Government.

Keywords: Nexus generation, virtual entrepreneur, graduates, Malaysia.

Introduction

Every developing country has its own vision of becoming a developed country. Malaysia is no exception. Malaysia's Vision 2020, launched in 1991, envisages Malaysia as a fully developed country economically, politically, socially, spiritually, psychologically and culturally by 2020 (By, Prime, The, & Rakyat, 2016; Yunus, 2006). In order to achieve this vision, the government has implemented several initiatives such as the National Blue Ocean Strategy (NBOS) (Economic Planning Unit, 2015). The National Blue Ocean Strategy (NBOS) involves strategic planning and operations for positive, high impact programs and services for the public. They are to be low cost to assemble and should be able to be executed quickly in order to assist the nation's growth (Economic Planning Unit, 2015; Laird, 2015).

The National Blue Ocean Strategy is divided into many strategies including creating more jobs for Nexus generation graduates. Aligned with this, the Ministry of Human Resources has provided an automated online job matching service called JobsMalaysia (United Nations, 2002). JobsMalaysia was previously known as the Job Clearing System, an electronic labour exchange (ELX). Through JobsMalaysia, the job seekers are able to search for suitable job vacancies publicly for free through the facilities of the Ministry of Human Resources (Laird, 2015). However, even though it acts as a one-stop centre for labour market information, the objective of the system is to improve and ensure manpower utilization. It optimises opportunities for job seekers but it does not apply to fresh graduates, especially from the Nexus

generation (Laird, 2015; Zulkifli, Omar, & Rajoo, 2016). Research has found that there are several reasons why companies do not hire fresh graduates. Below, Figure 1 has been adapted from http://hk.jobsdb.com/hk/en/staticcontent/hiring-survey/2013/Q2-hiring-index/fresh-graduate-employment.htm (Zulkifli et al.,2016).

Reason for NOT hiring fresh graduates	% of company
No vacancies suitable for fresh graduates	76%
Lack of experience	52%
Not stable	32%
Unable to work independently	27%
Having too high expectation on salary	18%
Unable to face difficulties with a positive mind	6%
Lack of teamwork skills	3%
Others	6%

Figure 1: Fresh Graduate Employment

Source: jobsDB, 2013
(http://hk.jobsdb.com/hk/en/staticcontent/hiring-survey/2013/Q2-hiring-index/fresh-graduate-employment.htm)

The reason that received the highest percentage for not hiring fresh graduates was because no vacancies were available (32%) (Fresh Graduate Employment, 2013). Because of these reasons, many Nexus generation graduates are unemployed. Department of Statistics Malaysia reveals that, of the total unemployed labour force, 16.7% of 65,500 graduates were unemployed (Zulkifli et al., 2016). The number of unemployed graduates increases throughout the year. Unemployment among local university graduates has become a big problem in Malaysia. Figure 2 shows the unemployment rate in Malaysia from April 2016 until Jan 2017.

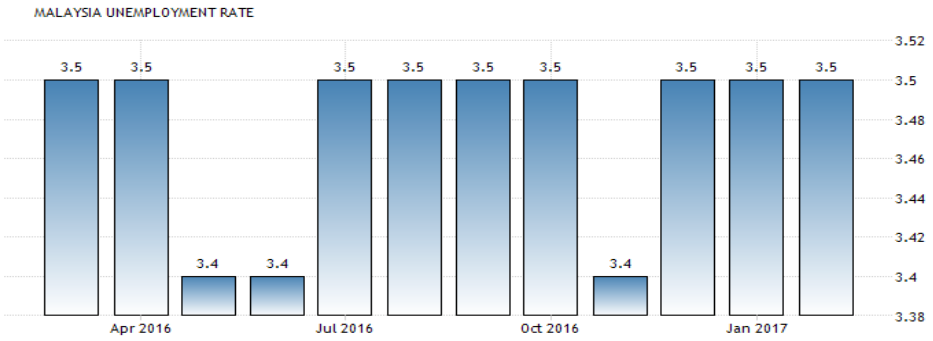


Figure 2: Unemployment Rate in Malaysia Source: Department Statistic Malaysia, 2017 (http://www.tradingeconomics.com/malaysia/unemployment-rate)

The asymmetrical growth of job opportunities and youth population presents a great challenge to many nations. At the same time, driven by the growth of high Internet usage and the disposable income in recent years, digital businesses are also becoming a hot topic among globally. Empowering youth through entrepreneurship initiatives is seen as a feasible option to ensure the development of a balanced and stable economy. Hence, the Malaysian government support for young entrepreneurs' development is very encouraging. Various services such as the business advisory, loans and funding have been offered to stimulate the interest of these young people and to encourage them to establish their own start ups (http://www.cedar.my/publications-store/64-new-gen-entrepreneur-in-malaysia-a-vibrant-economic-force.html).

Objectives

Towards 2020, The National Youth Policy, is part of the Government's policy for greater democratic participation and impartial economic and social progress for all (Secretariat, 2015). The Government aims to support youth who form the Nexus generation and is steadfast in its aim to execute the new policy for youth over the five-year time frame 2015-2020 (By et al., 2016; Laird, 2015). Hence, the main objectives of this conceptual paper are:

i. To identify the Government plan to develop job creators among the Nexus generation.
ii. To explore the characteristics and behaviours that make Nexus generation the best choice over other generations to become future virtual entrepreneurs.
iii. To identify the reasons for unemployment in the Nexus generation.

Job Creators

Nowadays, all developing countries have the issue of unemployment among fresh graduates. This makes it hard for the government to sustain the nation's economy (Yunus, 2006). The era of globalisation has made the labour market more vibrant with rapid changes in technology and the changing needs of companies (Lenhart, Purcell, Smith, &Zickuhr, 2010; Zulkifli et al., 2016). The economy of a developing country like Malaysia is directly connected to the rate of unemployment. The Malaysian economic recession in 1997 led to a massive downsizing of companies. It is a lesson that needs to be kept in mind (Zulkifli et al., 2016). The unemployment rate increased rapidly and individuals were left high and dry. During that period, entrepreneurship managed to sustain the economic lives of some of these individuals by providing an alternative source of income (Petkova, 2009; Zulkifli et al., 2016). Entrepreneurship is still needed to create new jobs as large firms are no longer creating jobs as they once did (M. Hoppe, E. Union, 2016). Large organisations are downsizing to cut costs in order to remain competitive in the market. In August 2013, the unemployment rate increased by 3.1% a month compared with previous months - 3.0% in July and in August 2012 only 2.7% (Yunus, 2006; Zulkifli et al., 2016).

Due to the issue of unemployment among local university graduates in Malaysia, the government would like to see the youth sector becoming self-employed as entrepreneurs. The Government addressed this issue by changing the position of "job seeker" into "job creator" through the National Blue Ocean Strategy (NBOS) (Laird, 2015; By et al., 2016). The Government's plan is a final five-year strategic development through the Eleventh Malaysia Plan to ultimately achieve Vision 2020 (Economic Planning Unit, 2015). The strategic development plan consists of six strategic thrusts. One of the main focuses of the six strategies is for youth, who are the nation's hope for the future as well as being an important asset. By implementing the new National Youth Policy, the Malaysian government hopes to encourage the Nexus generation through capacity building, education, skills training, entrepreneurship, sports and volunteerism (Secretariat, 2015; United Nations, 2002).

Through the National Youth Policy, the government and the Malaysian Global Innovation and Creativity Centre (MaGIC) established a one-stop centre that provides a comprehensive ecosystem for entrepreneurs

to develop the businesses and services required by entrepreneurs (New Straits Times, MaGIC Empowers Nation's Economy, 2015). Entrepreneurship is needed to create new businesses while simultaneously creating new jobs (M. Hoppe, E. Union, 2016). The Malaysian Global Innovation and Creativity Centre (MaGIC) encourages start-ups by entrepreneurs to market their products abroad using online technologies such as websites, social media and mobile applications (New Straits Times, MaGIC Empowers Nation's Economy, 2015).

In addition, the Government implemented entrepreneurship education because of the relationship between regional trade and industry development through new ventures and job creation (Entrepreneurship, 2016). The strong emphasis on economic success and job creation has indeed moved entrepreneurial education into a top position at the higher education level (Entrepreneurship, 2016; Secretariat, 2015). Malaysia's Higher Education Minister Datuk Seri Idris Jusoh stated that future graduates of institutes of higher learning will no longer need to depend on government or private sector jobs but will be able to create jobs for themselves and others (News Malaysia, 2015). This statement came as a reply to a question regarding the future of the country's higher education system, quality of graduates, lecturers and researchers at universities (News Malaysia, 2015; Secretariat, 2015).

The introduction of this policy shows the government's emphasis on the importance of integrating entrepreneurial values and cultures among Higher Education Institutions' (HEIs) graduates. At a launch in April, 2010 by the Ministry of Education (MOE), Higher Education Entrepreneurship, it became apparent that the Development Policy is the current policy concerning entrepreneurship education. The aim of this policy is to boost the development of more holistic and well organizes entrepreneurship programs (S. Shamsudin, A. Mamun, N. Nawi et al., 2016). Following the launch of the policy, the MOE as well as the HEIs gave taken a number of initiatives to implement entrepreneurial education and development to increase the number of entrepreneurs among Malaysia's younger generation.

Meanwhile, by endorsing the implementation of entrepreneurial education in the Malaysian Higher Education, as well as ensuring the aim of the Higher Education Entrepreneurship Development Policy is achieved, the Strategic Plan on Entrepreneurship Development in Higher Education (2013-2015) was launched on April, 2013 (Kementerian Pengajian Tinggi Malaysia, 2013). Specifically, the implementation of the policy aims to produce graduates from HEIs with thinking and entrepreneurial attributes as well as to increase the number or entrepreneurs among graduates who are engaged in business. This will serve as a catalyst for the achievement of an economic transformation in the country. Hence, entrepreneurship education particularly is one of the best solutions to reduce the dependency of graduates on being employed. With this in mind, it is also essential to investigate how generation evolution plays a role in stimulating job creators.

Generation Evolution

A generation can be considered a group of the population who has shared experiences and has a history that influences their thinking and behaviour (O'Keeffee, Thomson, & Dainty, 2013; William J. Schroer Principal). Each generation shares the same experiences and they remain with them as they grow up through different stages of life even though not every individual in a generation has identical personal experiences (Lifestyle, 2011).

Researchers have referenced **Jane Holroyd's Study of Generation Evolution. Baby Boomers are a generation** now approaching retirement age. The Baby Boomers are those born roughly between the years 1946 and 1964 (aged 53-71) (Lifestyle, 2015). This is the generation which has had it all, raised by parents who experienced the Great Depression but then the prosperous post-war era (http://socialmarketing.org/archives/generations-xy-z-and-the-others). Many benefited from free tertiary education and relatively low housing costs. Generally speaking, some range from being self-obsessed to "stuck in their ways". Baby Boomers' life experiences were completely different from other generations

in their attitudes, behaviors and society (http://socialmarketing.org/archives/generations-xy-z-and-the-others).

Meanwhile, **Generation X are** those who were born between 1965-1980 and are now aged 52 to 37 (Lifestyle, 2011). Generation X is a smaller population group than the previous Baby Boomer generation. Generation X is often labeled as the slacker generation and sometimes referred to as the lost generation (Moorthy, 2014; William J. Schroer Principal). This was the first generation that had lots of day care and experienced divorced parents which led them to being uncommitted and distracted. Generation X job hops several times. It is also known as the "why me?" generation (Lifestyle, 2011). While their parents grew up in the era of the Civil Rights movement, Generation X is considered as the generation that quit without trying to identify the problems or care about the social issues around them. They more likely want to keep their heads down rather than change the world. Generation X is the generation with the lowest rate of selection for participation in research compared to others generation (William J. Schroer Principal; Lifestyle, 2011; Sally Kane, 2017).

Lastly, the **Nexus generation** or **Generation Y** comprises those born between 1980s and 2000s. Nexus members are considered to be very sophisticated technology stars, resistant to most traditional marketing and sales trends because they have grown up, seen it and been exposed to it all,since early childhood (Lenhart et al., 2010; O'Keefee et al., 2013; Sally Kane, 2017). Nexus members are more ethnically different, much more segmented and have grown up quickly with Cable TV channels, satellite radio, the internet and so forth (Howe et al., 2013). The Nexus generation is not brand loyal and the rapidity of the Internet has led the group to be correspondingly flexible by varying in fashion and up to date styles and their modes of communication (Hargittai&Hinnant, 2008; O'Keeffee et al., 2013)

Nexus Generation

The Nexus generation is a group of people that was born between 1980 and 2000 and is commonly referred as Generation Y, the Millennials, eco-boomers or dot.com generation (San, Omar, &Thurasamy, 2015). Nonetheless, there is much divergence and argument concerning the age range of the Nexus generation.

In 2010, Malaysia's the Nexus generation was 40% of Malaysia's population (Barford& Hester, 2011; Howe et al., 2013; Zulkifli et al., 2016). Compared with other generations, the Nexus generation formed the major part of Malaysia's population. Malaysia's internet usage, as a percentage of the population, based on age, revealed that 38% were 15-24 years old, 26% were 26-35 years old, 23% were aged between 36-44 years old, 9% were from the age of 45-54 and 5% were aged 55 and above (San et al., 2015). Based on those statistics, the majority of the Internet population in Malaysia was the Nexus generation with 49% (San et al., 2015).

Past studies have explored the organizational needs of the Nexus generation because 66% of Nexus will lead the way in the future (Barford& Hester, 2011). As a result, the organizational expectations and needs of the generation have now been well explained. The Nexus generation tends to be self-reliant, independent and require freedom and flexibility to complete tasks at their own pace and in their own way (Howe et al., 2013; Sally Kane, 2017). They are the most technologically savvy and educated generation to enter industry (Hargittai&Hinnant, 2008; Lenhart et al., 2010; O'Keeffee et al., 2013). The Nexus generation tends to think in a short term mode and expecting direct feedback (Sally Kane, 2017). This generation is very responsible and sees work as a chance to show their skills and their significance within the organization. It is a generation that has grown up in rapidly changing surroundings in a more globalized and mobilized world and experienced technological advances such as the Internet and mobile phones (Hargittai&Hinnant, 2008; Lenhart et al., 2010; O'Keeffee et al., 2013).

Though there has been some research done on the Nexus generation around the globe, not as much research has been done on the Malaysian Nexus generation especially research that looks into their characteristics and their learning methods (Majid et al., 2016). Some recent research includes the investigation of cultural values and career goals of the Malaysian Millennials (Maimunah & Hoo, 2014), and employer rewards and Malaysian Millennials (Maznah et al., 2014). However, it is interesting to note that the few of the findings in these studies confirm that the Malaysian Nexus generation is particularly technologically savvy and that the use of web technologies is a common part of their daily routines (Majid et al., 2016).These findings confirm that the Nexus generation in Malaysia is no different from their Western counterparts in relation to technology and the use of web technologies.

Key Aspects of Nexus Generation

For the purpose of the study, the Nexus generation is considered to consist of individuals born in the 1980s and early 2000s, and are currently aged between 17 and 37 years (San, Omar, & Thurasamy, 2015). The general definition differentiates them from the generations before them such as the Baby Boomers, Generation X and the following generation referred to as Generation Z (Sally Kane, 2017). The Nexus generation made up the largest growth sector in the labour force in the 2010s with numbers estimated as high as 80 million or more and therefore, companies cannot simply ignore their needs, requirements and attitudes. Based on the previous cohort, the Nexus generation has come to be defined by the characteristics formed mainly by the world and the culture in which they grew up (William J. Schroer Principal; Paper, Fitri, & Universiti, 2016; Sally Kane, 2017).

There are a few common key aspects of the Nexus generation. However, that does not mean that all these key aspects can be found in all Millennials. The broad statements are based on an average statistical perspective. The Nexus generation is technology savvy (Lenhart et al., 2010). It grew up with technology and relies on it to perform its jobs. Growing up with smartphones, laptops and other gadgets, this generation is plugged in 24 hours a day, 7 days a week (Lenhart et al., 2010; O'Keeffee et al., 2013). It likes to communicate through email and text messaging rather than face-to-face contact and prefers webinars and online technology to traditional lecture-based presentations (Sally Kane, 2017). They were born into an interconnected world, and presume that people can and should be connected at all times (Hargittai & Hinnant, 2008). The Millennial generation grew with strong virtual friendships and communication. A great variety of social networks, such as Facebook, Twitter and other platforms are used by them to make communications easier (Hargittai & Hinnant, 2008; Howe et al., 2013; Sally Kane, 2017). The Millennials understand how to use internet technology and social media and try to show the value of these modes to their parents and older members in the workplace.

The Nexus generation is family-centric (Moorthy, 2014). Nexus members are willing to trade high pay for shorter working hours and flexible time schedules to better their work-life-balances (Moorthy, 2014; Paper et al., 2016). Other generations may view this attitude as a lack of commitment or discipline, but Nexus members of the legal profession for example have a different vision of workplace expectations. They often value family upper most and it "comes first" before work (Sally Kane, 2017). The Nexus generation sees nothing wrong with taking off early or finishing important tasks at the office rather than taking them home. In an always-connected world, Millennials do not feel the need for rigid office hours to be productive (Barford & Hester, 2011). For the Millennials, salary is in general, of secondary importance. They consider work as fun and a hobby and gaining extra free time is more important (Moorthy, 2014).

Another characteristic of the Nexus generation is that it is achievement and team oriented (Hargittai & Hinnant, 2008; Zulkifli et al., 2016). Having been nurtured and pampered by parents who didn't want to make the same mistakes as their parents, Millennials are more confident, ambitious and achievement-oriented (Solnet, Kralj, & Kandampully, 2012). They have high expectations of their job tasks. They seek

new challenges and are not afraid to question authority (San et al., 2015).The Nexus generation desires significant work and a solid learning curve (Yunus, 2006). On the other hand, Nexus members value teamwork and seek the input and commitment of others. They are loyal and committed members. They want to be included and involved in any task. They try to avoid competition and prefer situations where there is no winner or loser, but rather a good compromise (Howe et al., 2013; Yunus, 2006).

Lastly, they crave attention and continuous development for a better future (Sally Kane, 2017). Nexus members need constructive criticism and supervision. They value being kept in a group and often need repeated commendations and encouragement (W.Horsaengchai, 2011). Millennials appreciate a mentor who can help lead and expand their talents. The disadvantage of Nexus employees is that they are always looking for something fresh and better. Their way of learning is going far beyond traditional methods. Millennials are searching for new opportunities for self development and it is not uncommon for a Millennial to stay with a firm for only two to three years before moving on to a better position perceived to be better elsewhere (Hargittai & Hinnant, 2008; Yunus, 2006; Lifestyle, 2011). They are not afraid to change their place of employment several times, which is a clear difference between them and people of the older generations. On the positive side, working for several firms provides them with a lot of experiences (Sally Kane, 2017). The Nexus generation is constantly learning and is a better educated generation. Overall, when it comes to work values, the Nexus generation is seen as appreciating flexibility, leisure, innovation, more emphasis on a participatory management style, a balance between work and personal life and social value.

Nexus Generation as Virtual Entrepreneur

An entrepreneur is one who plays a major role in the economic development of a nation (Entrepreneurship, 2016; M. Hoppe, E. Union, 2016). Basically, an entrepreneur can be regarded as a person who has the initiative, the ability to express his/her ideas and implement their skills, and the motivation to set up a business or an enterprise of their own (Uyar & Deniz, 2012). An entrepreneur always looks for significant accomplishments of his own or in collaboration with a team. An entrepreneur is conduit for social change and works for the common good. Entrepreneurs will look for opportunities, identify them and seize them mainly for economic profit (Uyar & Deniz, 2012). Entrepreneurship research defines entrepreneurs as individuals who discover, evaluate, and exploit profitable opportunities (M. Hoppe, E. Union, 2016). Thus, entrepreneurs often need a new idea or knowledge, not just in a useful or tested form, but more creatively (Petkova, 2009). The characteristic of looking for opportunities, taking risks and having the courage to develop a plan through to reality, combine into a special entity that can be defined as an entrepreneur (Petkova, 2009; Uyar & Deniz, 2012).

For anyone considering starting a business, ongoing development of entrepreneurial learning is essential to ensure he/she is being exposed to the realities of entrepreneurship and is equipped with the skills to support them when he/she starts a business (New Straits Times, MaGIC Empowers Nation's Economy, 2015; Secretariat, 2015). Entrepreneurship is a dynamic and social process wherein individuals, alone or cooperatively, identify opportunities and if necessary redesign the ideas to be practical, targeted activities in social, cultural or economical contexts (M. Hoppe, E. Union, 2016). Figure 3 sets out the five levels of learning related to entrepreneurial skills and illustrates that entrepreneurship education has five levels of skills that can be developed when studying entrepreneurship (Petkova, 2009). First is the “know why” referring to attitudes, values and motivation, “know how” is identifying abilities, while “know who” are the short and long term social abilities. The “know when” refers to long-term social skills and finally the “know what” relates to knowledge of the market place and goods (Petkova, 2009).

Levels of learning	Individual	Context
Know why	Self-confidence, motivated to achieve, perseverance, acceptance of risk	Entrepreneurial spirit, sponsors, models
Know how	Technical abilities	Complex structures on both career and business levels
Know who	Ability to develop networks	Production and social networks
Know when	Experience and intuition	Industrial traditions
Know what	Encyclopaedism, institutional facts	Information networks, technical traini diversified cultural life

Figure 3: Five Levels Of Learning of Entrepreneurial Skills Source : Johannison. B, 1991)

However, few studies have been carried out on the traits of Nexus members as entrepreneurs (W. Horsaengchai, 2011). The unique situation for Nexus members as entrepreneurs is that they are the first generation to grow up with entrepreneurial role models (O'Keeffee et al., 2013; Yunus, 2006) such as Steve Jobs who developed the Apple company and Mark Zuckerberg, the social media sensation who developed Facebook. These role models have been enough to inspire them to join their ranks.

Next, the Nexus member is highly collaborative and team oriented (Hargittai & Hinnant, 2008). Nexus members will pitch ideas, gain feedback from peers and display everything for the world to see and respond to. They work better in a team rather than alone (W. Horsaengchai, 2011). The main feature of the Nexus generation is that they are highly technologically savvy (Sally Kane, 2017). They came of age at the peak of the digital revolution. The Nexus members developed a unique understanding of the inner workings of the new devices which they tried to figure out through trial and error to gain knowledge (Howe et al., 2013).

Lastly, the Nexus generation member is the type who is motivated by purpose and thinking outside the box (Barford & Hester, 2011). The Nexus member is very passionate about work but not solely about money. Nexus members are blessed with many characteristics that are unique when compared to older generations. They like thinking outside the square to learn how to do things in new and creative ways (Uyar & Deniz, 2012) Nexus members tend to be thrilled about their jobs and they will attempt to do the job efficiently. They will not easily give up and they always learn from failure (Petkova, 2009).

Meanwhile, the virtual entrepreneur or online entrepreneur is being accepted and emerging in Malaysia (San et al., 2015). A virtual entrepreneur is a technology user with the capability of filling the world with virtual objects of their own design, with the freedom to direct their virtual experiences throughout the world (Lenhart et al., 2010; San et al., 2015). A virtual economy evolves through a user's collective efforts or contributions to create virtual objects or goods. The rise of Internet dispersion in Malaysia has created new virtual entrepreneurs among the Nexus generation (San et al., 2015; New Straits Times, MaGIC Empowers Nation's Economy, 2015). The Internet has become a platform for businesses and service providers to communicate information and deliver products and services to consumers (New Straits Times, MaGIC Empowers Nation's Economy, 2015). According to Turban, et al. (2009), the Internet is a useful tool to convey information to consumers as it is flexible, open, informal, and interactive. The internet had changed the way businesses operate and the way consumers purchase goods and services (Lenhart et al., 2010). Of all the generations, Nexus is the first generation to be raised in the era of technology and social media (W. Horsaengchai, 2011; Sally Kane, 2017). Hence, the Government really needs to support the Nexus generation in becoming future entrepreneurs (Secretariat, 2015; New Straits Times, MaGIC Empowers Nation's Economy, 2015; Entrepreneurship, 2016).

Conclusion

The youth population plays an important role in this nation, so it is essential to develop and prepare our young people with attitudes, knowledge and skills necessary for Malaysia's development and economy. Furthermore, nowadays, businesses must adapt to the new realities and understand the work value of the new generation that is entering the workplace. At the same time, the digital technologies offer tremendous growth opportunities but require entrepreneurs to fully unlock their economic potential as the bases of new businesses.

To summarize, this research contributes to Malaysia's economic growth by investigating the development of job creators among Nexus members. There is growing evidence from previous studies that globally, the Nexus generation faces increasing difficulties when entering the workforce. Without the right guidance from the start, our youth will be less proficient at making choices that will improve their career scenarios and their future. The resulting effect of inadequate education, low-productivity, unemployment and the increasing poverty from one generation to the next must be identified in the Government's plan to overcome these problems (Secretariat, 2015). Hence, there is a necessity for the Malaysian government to develop strategies aimed to give young people a chance to make the most of their productive potential.

Acknowledgements

This research wishes to acknowledge the Ministry of Higher Education (MOHE) for the fund granted through the Fundamental Research Grant Scheme FRGS/1/2016/SS03/UNITEN/02/3.

References

A. Lenhart, K. Purcell & A. Smith et al (2010). Social Media and Young Adults. (pp.1-61).

A. Petkova (2009). A theory of entrepreneurial learning from performance errors.*International Entrepreneurship and Management Journal* (Vol 5(4), pp. 345-367).

A. Uyar& N. Deniz (2012). The Perceptions of Entrepreneurs on the Strategic Role of Human Resource Management. *Procedia- Social and Behavioral Sciences* (Vol 58, pp. 914-923).

C. Zulkifli, C. Omar & S. Rajoo (2016). Unemployment Among Graduates in Malaysia.*International Journal of Economics, Commerce and Management United Kingdom* (Vol IV (8), pp. 267-374).

D. O' Keeffee, D. Thomson & A. Dainty (2013). Understanding Generation Y and their use of social media: a review and research agenda. *Loughborough University Institutional Repositary* (Vol 24(3), pp. 245-267).

D. Solnet, A. Kralj & J. Kandampully (2012). Generation Y employees:An examination of work attitude differences. *Journal of Applied Management and Entrepreneurship* (Vol 17 (3), pp. 36-54).

E. Hargittai & A. Hinnant (2008). Digital Inequality: Differences in Young Adults' Use of the Internet. *Communication Research.* (Vol 35(5), pp. 602-621).

Economic Planning Unit (2015). Strengthening Infrastructure to Support Economic Expansion. *Rancangan Malaysia Kesebelas (Eleventh Malaysia Plan): 2016-2020* (pp. 1-372).

F. Yunus (2006). Youth employment and employability in Malaysia. *Youth for Nation Building* (pp. 1-15).

Fresh Graduate Employment (2013). Reason for NOT hiring fresh graduates. *Retrieved from:http://hk.jobsdb.com/hk/en/staticcontent/hiring-survey/2013/Q2-hiring-index/fresh-graduateemployment.htm*

I. Barford, P. Hester (2011). Analysis of Generation Y workforce motivation using multi attribute utility theory. *Defence Acquisition University* (pp.18).

J. Laird (2015). Malaysia Higher Education Blueprint 2015-2025. *Hobsons Education Blog* (pp. 1-25)

Kementerian Pengajian Tinggi Malaysia (2013). Pelan Strategik Keusahawanan Institusi Pengajian Tinggi 2013-2015 (pp. 5-7)

L. San, A. Omar, & R. Thurasamy (2015). Online Purchase: A Study of Generation Y in Malaysia. *International Journal of Business and Management* (Vol 10 (6), pp. 1-7).

Lifestyle (2011, July 20). Talkin' 'bout my label. *The Sydney Morning Herald. Retrieved from: http://www.smh.com.au/lifestyle/diet-and-fitness/talkin-bout-my-label-20110720-1ho7s.html*

M. Hoppe, E. Union (2016). The Entrepreneurship Concept: A Short Introduction (Vol 6(2), pp. 95 108). *Retrieved from: https://www.researchgate.net/publication/309208976_The_entrepreneurship_concept_a_short_introduction*

Majid, F. A., Muzlia, S., Mustafa, S., Roha, I., Jais, M., Nurul, W., ... Halim A. (2016). A Preliminary Study on Selected Malaysian Millennials: Their Characteristic and Its Implications on Teaching Innovation. *7th International Conference on University Learning and Teaching (InCULT 2014) Proceedings* (pp. 685-697).

Malaysia's National Blue Ocean Strategy(NBOS) (2016). Entrepreneurship. *Retrieved from:https://www.blueoceanstrategy.com/malaysia-nbos/entrepreneurship/*

N. Howe, W. Strauss & P. Center et al (2013). Generation Y values and lifestyle segments. *Journal of Consumer Marketing.* (Vol 30 (7), pp. 22-26).

National Blue Ocean Strategy (NBOS)(2015, July 13). MaGIC Empowers Nation's Economy. *New Straits Times. Retrieved from: http://www.nst.com.my/*

News Malaysia (2015, October 26). Future graduates will be job creators, not job seekers- Idris Jusoh. *Astro Awani. Retrieved from: http://english.astroawani.com/malaysianews/future-graduates-will-be-job- creators-not-job-seekers-idris-jusoh-78039*

P. Secretariat (2015). National Youth Policy Towards 2020 A shared vision for the future. *National Youth Policy Towards 2020* (pp. 1-26).

R. Moorthy (2014). An Empirical Study of Leadership Theory Preferences among Gen Y in Malaysia. *Bus. Econ. Res. Online* (Vol 3 (2), pp. 2304-1013).

S. By, T. Prime, & I The et al (2016). Speech By the Prime Minister Eleventh. *RMK11_Speech* (May 2015, pp. 1-40).

Sally Kane (2017). Common Characteristics of Generation Y. *Retrieved from:https://www.thebalance.com/common-characteristics-of-generation-y-professionals-2164683*

Shamsudin, S. F. F., Mamun, A. Al, Nawi, N. C., Nasir, N. A. M., &Zakaria, M. N. (2006). Policies and Practices for Entrepreneurial Education in Malaysia: A Review. *Mediterranean Journal of Social Sciences* (Vol 15 (4), pp. 36-41).

SyahiraSa'aban, Noraisah Ismail & Mohd Fitri Mansor (2013). A STUDY ON GENERATION Y BEHAVIOR WORKPLACE. *International Conferenceon Business Innovation, Entrepreneurship and Engineering 2013(ICOBIEE2013)* (pp. 7).

United Nation (2002). Youth in Malaysia: A Review of the Youth Situation and National Policies and Programmes. *Economic and Social Commission for Asia and the Pacific* (pp. 1-106).

W. Horsaengchai (2011). Are Millennials Potential Entrepreneurs? *Retrieved from: http://www.divaportal.org/smash/get/diva2:426723/FULLTEXT01.pdf*

William J. Schroer Principal. Generation X, Y, Z and the others. *Retrieved from:http://socialmarketing.org/archives/generations-xy-z-and-the-other*

Leveraging Big Data to Improve Customer Experience

Rdouan Faizi, ENSIAS, Mohammed V University in Rabat, Morocco, r.faizi@um5s.net.ma

Sanaa El Fkihi, ENSIAS, Mohammed V University in Rabat, Morocco, s.elfkihi@ um5s.net.ma

Abdellatif El Afia, ENSIAS, Mohammed V University in Rabat, Morocco, a.elafia@ um5s.net.ma

Abstract

In today's marketplace, businesses are increasingly realizing that a true competitive advantage lies in building a strong customer experience. Since customers have endless choices and, hence, more demanding, neither low prices nor smart advertising are enough to win their business. Nowadays, customers expect outstanding experiences more than ever before. As such, companies hoping to maintain a competitive edge should adopt innovative strategies to enhance interactions with their customers. The objective of this article is, therefore, to explore the way big data can improve customer experience. In this respect it was revealed that this data revolution can enable businesses to gain an in-depth understanding of their customers and of their needs. Big data can also allow businesses to transform customer feedback into actionable insight and customer satisfaction in real-time. Moreover, it can provide every individual customer with a customized customer experience that meets his needs and behavioral patterns. Given these opportunities, we strongly believe that big data can help companies deliver engaging customer experiences and, thus, stand out in an increasingly competitive advantage.

Keywords: big data, customer experience, customer retention, competitive advantage

Introduction

In an increasingly competitive marketplace, it is no longer sufficient to propose a reliable product or a competitive price. With modern technologies, today consumers are highly connected, well informed and digitally empowered. Accordingly, they have higher expectations and are more demanding than ever (Newman 2017). In fact, they are longing for an astounding customer experience, which many businesses ultimately fail to provide.

In that past, customer experience was a journey that had a clear beginning, middle and an end. As such, nearly all customers followed the same path. Nowadays, customer experience is non-linear and unpredictable. It is a journey that does not solely take place in a brick-and-mortar store, on an e-commerce website or when calling a support line. Rather, it encompasses instances of knowledge sharing and discussions that occur beyond a business' owned channels (Lemon & Verhoef 2016). In fact, there are massive amounts of data or big data that are generated at a rapid pace by customers and other users on social media platforms. This valuable data could be beneficially used to improve customer experience and, hence, help companies compete in an increasingly complex consumer marketplace (Newman 2015). Thus, instead of relying primarily on transactional and demographic data for strategic marketing information, businesses could extract value from these huge amounts of data (Faizi et al. 2017).

Therefore, the objective of this paper is to examine how big data could be leveraged to enhance customer experience. The remainder of the present article is organized as follows. Section Two provides a brief overview of customer experience. Section Three discusses how big data can be used to improve customer experience. Section Four concludes this paper.

Customer Experience: A Brief Overview

Customer experience refers to the sum of all interactions and experiences that a customer has with a company's products, services, people and processes throughout their business relationship. These interactions and experiences can include awareness, discovery, cultivation, advocacy, purchase and service (Singh 2016). Though customer experience can encompass a lot of constituents, it can briefly be defined as the perception the customer has of a given brand.

A customer experience can take place in a physical store, online or when communicating with a contact centre. It happens while visiting a store or a website, interacting with an employee and while receiving a shipped order. According to Richard Owen, vice president of Dell Online Worldwide, customer experience goes from the instant a customer sees an advertisement to the moment he or she accepts the delivery of a product, and beyond (Roumeliotis 2012).

Given that 21st century consumers have more power and choice than ever before, they are a mouse-click away from competitors. For this reason, customer experience has become an important and powerful part of a business strategy. Today, offering an amazing customer experience will not only help businesses build long-term relationships with their customers, but it will also create a competitive advantage and increase revenue and sales. Therefore, every organization's brand heavily relies on the customer experience it delivers.

According to a survey conducted by Gartner in 2014, 89% of the surveyed companies expected to compete mostly on the basis of customer experience by 2016 versus only 36% in 2010 (Sorofman 2014). Gartner also predicts that by the year 2018, more than 50% of businesses will implement major business model changes to enhance customer experience (Gartner 2016).

Within the same context, a study published by Walker, a customer intelligence consulting firm, stipulates that by 2020, customer experience will overtake product and price as the primary brand differentiator. For illustration consider the following figure.

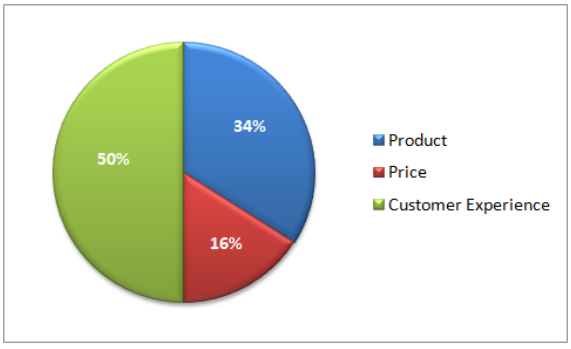


Fig. 1: Companies' ratings as to the most important Element to their business strategy by 2020

When companies that were surveyed were inquired about how important are experience, price and product are to their business strategy, the figure clearly shows that more emphasis is on the experiences that a company delivers to create a competitive advantage. This means that customer experience will be the main factor that will distinguish one company from another.

A more recent survey carried out by Econsultancy in association with Adobe also confirmed the continued dominance of customer experience in terms of the focus of marketers. In fact, 91% of the surveyed B2B brands continue to make customer experience a strategic priority in 2017 (Econsultancy 2017).

As is clear from the evidence above, customer experience continues to grow as a priority for companies in every industry. Since no business can exist without customers, companies across all industries are focusing on how to attain higher customer satisfaction rates and more importantly on how to reduce customer churn.

How Can Big Data Enhance Customer Experience?

The rapid growth in the quantity of information that has been generated in the last couple years has resulted in the emergence of a new concept termed 'Big Data' (Bakillah et al. 2014). Big data is currently one of the hottest technology trends that is used in a variety of fields for various purposes. This data revolution is expected to transform not only how companies and industries use and process data but will also reshape the face of our world (Schmarzo 2013). This data can, for instance, help in a political campaign, prevent disasters or boost a company's revenue. Big data can, thus, open up many new avenues and opportunities. Given the potential value that can be derived from big data, our purpose in this section is to examine the ways in which it can improve customer experience.

First, big data can enable businesses gain a better understanding of their customers (Marr 2016, Wang 2014). Thanks to big data technologies, companies can have access to tremendous quantities of valuable information about their customers. In fact, many businesses are not longer confined to collecting demographic information (age, gender, marital status, ethnic group, etc.) of their customers or their transactional data, namely how much, how often and which products or services they spend their money on. In addition to this traditional data, companies can better understand their customers by leveraging data generated on social media. Today, a customer's journey is not solely taking place in a physical store or on an e-commerce website. Rather, it mainly consists of instances of knowledge-sharing and discussions that are happening beyond the channels of a business. With the hundreds of various social media networks that are available, there are billions of data points that a business could tap into to get its customers' insights. On Facebook or Twitter, for instance, big data can enable businesses to get valuable information on their customers' latent interests, preferences and needs. More importantly, they can help get the customers' attitudes and perceptions towards a given brand (Voulgaris 2014). Shortly after trying a brand, a customer can hop up on Facebook or YouTube and spread the news. Never before have businesses been able to listen to what customers say to friends or to other people about a product or service. Fortunately, with big data, it is possible to quickly capture and process every comment or post that an individual makes on these social media networks. Massive amounts of data captured from Internet of Things devices can also reveal much information on how customers use products, when they use them and for how long they make use of them.

Second, big data can also help businesses convert customer feedback into actionable insights and customer delight in real-time. In fact, by retrieving the mixture of data sets that are generated from various streams and then analyzing them, businesses can identify in real-time problems that their customers are encountering with their products or services (Nasir 2015). They can, thus, see what is working and what is not and can identify patterns in their customer engagement strategies that need improvement (Newman 2017). Armed with this pertinent information, businesses can fix the problems that have been detected or at least provide customers with the immediate feedback that they usually demand. In the past, collecting and processing data before passing it to the right person to make actionable decisions or adjustments often took months. By contrast, big data can allow businesses to act as quickly as possible not only to resolve problems that customers have detected but also to fix problems

before they even happen. By being proactive, a business is able to remain in control of the user's or customer's experience at all times. Moreover, these real-time or instant interactions or feedback will ultimately drive customer satisfaction and provide a greater customer experience (Lane 2011). The faster businesses respond to requests and complaints, the better they are likely to cater to meet the needs of their customers.

Third, big data can also be used to offer a personalized customer experience (Montaño & Pal 2014). Today, customers want neither a one size fits all approach, which provides all customers with the same offers, nor any goods or services that work. They aspire to have customized offers that both save them time and take into consideration their interests or preferences. Henceforth, a customized customer experience is no longer merely wanted, but highly expected. However, if a consumer's data is stuck in silos or scattered among different departments or teams, no business will be capable of taking full advantage of this data because no one will have a total view of its customers.

However, by embracing big data technologies, businesses can aggregate all customers' data, be it structured, semi-structured or unstructured. As such, they can gain a 360-degree view of every individual customer and, thus, get deep insights into what is important to the customer (Lopez 2014). Therefore, instead of 'spamming' a customer with one needless offer after another, businesses can via big data technologies recommend goods and services that go in line with a customer's interests and preferences. In addition, big data can allow businesses to get engaged with their customers on the right channel with the right message and at the right time.

From the discussion above, it quite clear that leveraging the power of big data captured from diverse internal and external data sources can enable businesses to craft a seamless customer experience that will help them attract and retain customers and increase revenues.

Conclusion

The purpose of this paper was to examine the ways big data technologies can improve customer experience. In this vein, it was clearly shown that this valuable data can provide companies with a better understanding of their customers and can help them convert customer feedback into actionable insights in real-time. It was also demonstrated that big data can be used to personalize customer experience following customers' needs and preferences. Taking all these potentials into account, we think that big data provides businesses with an ideal opportunity to deliver strong customer experiences that will significantly increase revenue.

References

Bakillah, M., Lauer, J., Liang, S. H., Zipf, A., Jokar Arsanjani, J., Mobasheri, A., & Loos, L. (2014). Exploiting big VGI to improve routing and navigation services. *Big data techniques and technologies in geoinformatics*, 177-192.

Econsultancy (2017). Digital Intelligence Briefing: 2017 Digital Trends in B2B. Retrieved from https://econsultancy.com/reports/digital-intelligence-briefing-2017-digital-trends-in-b2b/

Faizi, R. El Fkihi S., El Afia A. & Chiheb R. (2017). 'Extracting Business Value from Big Data' in *Proceedings of the 29th International Business Information Management Association Conference - Education Excellence and Innovation Management through Vision 2020: from Regional Development Sustainability to Global Economic Growth, IBIMA 2017*

Gartner (2016). "Gartner Says Organizations Are Changing Their Customer Experience Priorities". Retrieved from http://www.gartner.com/newsroom/id/3072017 .

Lane, D. (2011). The Chief Information Officer's Body of Knowledge: People, Process, and Technology (Vol. 571). John Wiley & Sons.

Lemon, K. N., & Verhoef, P. C. (2016). Understanding customer experience throughout the customer journey. American Marketing Association.

Lopez, M. (2014). *Right-time experiences: driving revenue with mobile and big data*. John Wiley & Sons.

Marr, B. (2016). *Big Data for small business for dummies*. John Wiley & Sons.

Montaño, T. & Pal, M. (2014). Big data: Personalizing the customer experience in real time. Retrived from https://www.retailcustomerexperience.com/articles/big-data-personalizing-the-customer-experience-in-real-time/

Nasir, S. (2015). *Customer Relationship Management Strategies in the Digital Era*. Business Science Reference, an imprint IGI Global.

Newman, D. (2015).Big data may be the ultimate customer experience tool. Retrieved from https://converge.xyz/big-data-ultimate-customer-experience-tool

Newman, D. (2017). Improving Customer Experience Through Customer Data. Retrieved from https://www.forbes.com/sites/danielnewman/2017/04/04/improving-customer-experience-through-customer-data/#42d6441f4e64

Roumeliotis J. D. (2012) *Entrepreneurial Essentials: Unconventional Business Wisdom and Bold Tactics*. FriesenPress

Schmarzo, B. (2013). *Big Data: Understanding how data powers big business*. John Wiley & Sons.

Singh, A. (Ed.). (2016). Managing Public Relations and Brand Image Through Social Media. IGI Global.

Sorofman, J. (2014). Gartner Surveys Confirm Customer Experience Is the New Battlefield. *Gartner Blogs.* Retrieved from http://blogs.gartner.com/jake-sorofman/gartner-surveys-confirm-customerexperience-new-battlefield

Voulgaris, Z. (2014). *Data scientist: the definitive guide to becoming a data scientist*. Technics Publications.

Wang, J. (Ed.). (2014). *Encyclopedia of Business Analytics and Optimization*. IGI Global.

MOOCs: An Upcoming Trend for Corporate Training and Development

Rdouan Faizi, ENSIAS, Mohammed V University in Rabat, Morocco, r.faizi@um5s.net.ma

Sanaa El Fkihi, ENSIAS, Mohammed V University in Rabat, Morocco, s.elfkihi@um5s.net.ma

Abstract

Massive Open Online Courses (MOOCs) have gained popularity in the last couple of years as they enable learners to access world class education from leading universities and colleges at a low cost or even for free. MOOCs are, therefore, expected to significantly alter the traditional modes of learning. However, these online video courses will not only impact the way education is delivered in academic institutions, but will also disrupt how corporate learning is conducted. In fact, given the limitations and requirements of in-house training, MOOCs can be learning assets in the workplace. The objective of this paper is, thus, to explore the potential benefits of using MOOCs for corporate training and development. In this respect, it was revealed that MOOCs can allow employees to learn at their own pace and can help businesses reduce instruction time and, hence, boost productivity. Moreover, the use of these online learning resources can cut down training costs, improve employees' retention rates and allow employers to monitor and evaluate the learning performance of their workforce. Accordingly, they should be incorporated in all corporate training initiatives.

Keywords: MOOC, human resources, corporate training, professional development

Introduction

Massive Open Online Courses (MOOCs) have quickly grown in popularity in the last couple of years and become a favored way of interactive online learning. In fact, learners all over the world are currently opting for these online video courses to complete higher education studies from a variety of universities or colleges, or to enhance their personal and professional skills. Since no physical attendance is required, courses can be accessed by anyone at any time and from anywhere in the world just with an Internet connection.

As opposed to traditional modes of distance learning, which have basically been used for distributing text-based educational resources, a MOOC focuses more on multimedia materials such as videos and animations and uses quizzes for assessment and immediate feedback. In addition, MOOCS foster interaction amongst a varied global learning community.

Today, a large number of MOOCs taught by professionals in the field are offered by many leading universities in the world either as an additional resources or reference materials of a course or even as an independent module. Given this valuable opportunity, students and learners in general resort to these video educational resources to enhance their learning in different subjects and to explore academic topics of interest. However, the popularity of MOOCs is not only confined to educational institutions but is also extended to the business world given the growing awareness in the role MOOCs might play in workforce training.

Therefore, the objective of this paper is to explore the potential opportunities of using MOOCS in business contexts. The rest of the present article is structured as follows. Section Two gives a brief overview of MOOCs. Section Three details the reasons why MOOCs should be used in the workplace. Section Four concludes this paper.

MOOCs: A Brief Overview

Since their introduction in 2008, MOOCs have drawn a considerable amount of interest within higher education and corporate learning. These educational video resources, actually, have the potential to widen access to world class universities and to offer new and alternative routes to education and to corporate learning and development. MOOCS are, thus, likely to disrupt many of the sectors' traditional approaches and assumptions.

The MOOC acronym – massive, open, online and course – has been interpreted in distinct and sometimes conflicting ways. However, all interpretations more or less converge on defining a MOOC as a model for delivering educational content online to an unlimited number of students or participants from anywhere in the world for free or nearly free. Accordingly, MOOCs can be seen as a way to democratize and re-visualize education so that all learners, anywhere, regardless of their social status or income can have access to education (Kanani 2014).

Most MOOCs provide the usual traditional classroom material in the form of video lectures, which are often sliced into 10 or 15-minute segments. Learners enrolled in a MOOC can also read assigned materials, complete quizzes and tests and interact with instructors and other learners in online forums.

Though different types of MOOCs have emerged in the last few years, MOOCs can generally be divided up into two major categories: cMOOCs and xMOOCs (Haber 2014, Rhoads 2015).

A cMOOC is based on the learning theory of Connectivism which emphasizes the power of connecting with other learners. In a cMOOC, learning occurs through the interaction of learners with learning materials and with each other (Daniel 2012). According to George Siemens, one of the MOOCs pioneers, cMOOCs rely on the idea that learning happens within a network, where learners use social media platforms to make connections with content, learning communities and other learners to co-create and share their collective knowledge (Siemens 2012). Given that the participants in a cMOOC co-produce and share information with each other and get engaged in joint experiences and discussions, they assume the dual role of both the instructor and the learner.

Unlike cMOOCs which emphasize knowledge creation and generation, xMOOCsrely on knowledge duplication and are modeled on more traditional learning theories and teaching methods where the professor is the expert and learners are consumers of knowledge (Hai-Jew 2014, Jemni & Khribi 2016). These MOOCs are a combination of pre-recorded video lectures and assessments that are centered around a teacher rather than around a community of learners. Currently, hundreds of xMOOCs are offered to the general public via platforms such as Coursera, EdX, and Udacity. As such, they are the most common type of MOOCs.

Despite their common goal of offering open and free or relatively free education and training to learners, both categories of MOOCs have distinct structures and qualities. Each MOOC category establishes a different type of learning environment that suits specific modes of knowledge acquisition.

Why use MOOCs to Enhance Corporate Training?

When new employees are hired, they are generally offered onboarding training which enables them to acquire the skills, knowledge and behaviors needed so as to become valuable contributors to an organization. However, given that company policies, processes and product specs change over time, it is of utmost important to provide all employees with continual training so that they could stay up-to-date with the requisite skills, professional knowledge and industry trends that might benefit them at work. It is, thus, essential that employees be given access to new training courses on a regular basis. Nevertheless, given the constraints and limitations of on-site training sessions, an increasing number of employers have started incorporating MOOCs to help further train their employees. Rather than being restricted to traditional training programs (face-to-face or online), employers resort to MOOCs as a new corporate training mode for the numerous benefits that they provide (Carson 2014, Hamori 2017, Wang et al. 2017, Radford et al. 2014).

The first potential benefit of using MOOCs for corporate training is that they offer a flexible learning experience. On a 24/7 basis, employees can access training at the time and place that suit them. In fact, rather than being required to attend a three-day or a one-week training session which is oftentimes exhausting, or being obliged to wait for a scheduled session that takes into consideration all employees' needs, preferences and constraints, any individual employee can learn at his own pace and in moments that do not conflict with his own work responsibilities or personal life. As such, all staff members are likely to take full advantage of these video learning materials.

The second potential benefit of incorporating MOOCS in training is that they can help businesses reduce instruction time and, thus, boost productivity. Given that MOOCs can be accessed by any employee irrespective of time and place, the wasted time and costs associated with the employees not being at their desks during a face-to-face training session are, thus, saved (Nielson 2014). In this respect, some studies have demonstrated that the shift from on-site to e-learning training has proven to decrease the instruction time by up to 60% (Ferriman 2014) Though a lot of evidence is not yet available, the use of MOOCs can contribute to more training time savings and, thus, lead to more productivity. Before McAffe, the American global computer security software company, renewed its hiring strategy, the latter was more than 80 hours long and was composed of about 40 hours of pre-work, 5 days of on-site instruction as well as post-work to be completed at home. However, the incorporation of MOOCs as new training model enabled McAffe to save both time and generate more lucrative sales (Meister 2013).

An additional advantage of using MOOCs is that they reduce the costs related to employee training and development as they are usually offered for free or at a minimal cost (Ong & Jambulingam 2016). Following a study conducted by Bersin by Deloitte in 2014, corporate training is a $70 billion industry in the United States and a $130 billion industry worldwide (Bersin 2014). These expenses are even expected to increase in the future. However, while these are good signs that business is booming, not all companies have extra money to spend on training their employees. Therefore, one way to cut down training costs is to have recourse to MOOCs (Dodson et al. 2015). The latter do, in fact, enable businesses to deliver high-quality training at a low cost. Instead of having to pay for an on-site instructor or expert or spending money on travel, accommodation, logistics, and resource-related expenses, the incorporation of MOOCs can save an organization a lot of money. Moreover, once a MOOC is online, the course can be delivered to as many employees as possible. This means that once the first group of employees has been trained, there are no marginal costs related to the training of additional employees.

A further advantage of using MOOCs for corporate training is that they help improve employees' retention rates. Retaining employees in this competitive talent marketplace has, actually, been found out to be one of the biggest priorities and concerns for business leaders (Schawbel 2016). Given this fact, the constant access to learning materials that MOOCs can always guarantee can keep employees well

informed and can enhance their engagement. Indeed, as long as employees are enriched with the education and skills they need to carry out different daily work duties, they are more likely to thrive in the organization. In this context, A recent survey by Udemy revealed that 46% of US employees noted that limited or lack of learning opportunities is the major reason why they are bored or disengaged in their roles (Wiechers 2016). MOOCs for corporate training and development can help companies not only with retention, but also with developing their future leaders. MOOCs can make employees feel they are growing professionally and expanding their understanding of work processes. This provides the personnel with the energy and power to deal with the different challenges they might face while at work and make them feel a sense of personal satisfaction.

In addition to the above-mentioned benefits, MOOCs can also help businesses track employees' learning performance and assess the knowledge retention for corporate training efforts. Thanks to big data technologies, an employer can know which skills or information have been taught to which employees. It is also possible to identify employees who completed a specific course and how long it took them to complete it. Just by analyzing an employee's interaction behavior towards a MOOC, an employer or manager can spot which course or part of a course is easy or hard to understand and also to identify motivated employees who have acquired the desired skill sets (Faizi et al. 2017). In this way, every individual employee can be assigned a customized training experience. However, not only can MOOCs enable an organization to detect motivated employees internally, but also to find prospective employees who have the skills and experience that the company is looking for. When a company offers its MOOCs externally, it can reach out valuable candidates that might not have been found otherwise (Castellano 2014). In this respect, many companies such as Eurotunnel, SNCF and Orange have started using MOOCs not only for training purposes but for hiring decisions as well.

Conclusion

Our purpose in this article was to examine the potential role that MOOCs may play in corporate training and development. In this vein, it was found out that these online video courses can allow employees to learn at their own pace given that they can be accessed irrespective of time and place. Therefore, unlike in-house training, MOOCs can also reduce training time and, thus, boost productivity. In addition, the use of these online video courses can cut training costs, enhance employee retention rates and can help employers track and assess the learning performance of every individual employee. Given all these benefits, we believe that MOOCs are potentially an excellent solution that businesses should incorporate in their training initiatives.

References

Bersin, J. (2014). Spending on corporate training soars: Employee capabilities now a priority. *Forbes Magazine*.

Carson, E. (2014). How MOOCs are flattening corporate training and education. Retrieved from http://www.techrepublic.com/article/how-moocs-are-flattening-corporate-training-and-education

Castellano, S. (2014). MOOCs in the workplace. Retrieved from https://www.td.org/Publications/Magazines/TD/TD-Archive/2014/09/Intelligence-Moocs-in-the-Workplace

Daniel, J. (2012). Making sense of MOOCs: Musings in a maze of myth, paradox and possibility. *Journal of interactive Media in education*, *2012*(3).

Dodson, M. N., Kitburi, K., & Berge, Z. L. (2015). Possibilities for MOOCs in corporate training and development. *Performance Improvement*, *54*(10), 14-21.

Faizi, R. El Fkihi S., El Afia A. & Chiheb R. (2017). 'Extracting Business Value from Big Data' in *Proceedings of the 29th International Business Information Management Association Conference - Education Excellence and Innovation Management through Vision 2020: from Regional Development Sustainability to Global Economic Growth, IBIMA 2017*

Ferriman, J. (2014). Top 10 ELearning Stats for 2014. Retrieved from https://www.learndash.com/top-10-elearning-stats-for-2014

Haber, J. (2014). *MOOCs.* MIT Press.

Hai-Jew, S. (Ed.). (2014). *Remote Workforce Training: Effective Technologies and Strategies*. IGI Global

Hamori, M. (2017, May). The Drivers of Employer Support for Professional Skill Development in MOOCs. In *European Conference on Massive Open Online Courses* (pp. 203-209). Springer, Cham.

Jemni, M., & Khribi, M. K. (Eds.). (2016). *Open Education: from OERs to MOOCs*. Springer.

Kanani, R. (2014). EdX CEO Anant Agarwal On the Future of Online Learning. Forbes. Retrieved from http://www.forbes.com/sites/rahimkanani/2014/06/21/edx-ceo-anant-agarwal-on-the-future-of-online-learning/#20f70099838c

Meister, J. (2013). How MOOCs will revolutionize corporate learning and development. Forbes, August, 13. Retrieved from https://www.forbes.com/sites/jeannemeister/2013/08/13/how-moocs-will-revolutionize-corporate-learning-development/#366ada821255

Nielson, B. (2014). How MOOCs Can Save Your Organization Time and Money. Retrieved from http://www.yourtrainingedge.com/how-moocs-can-save-your-organization-time-and-money

Ong, D. & Jambulingam, M. (2016). Reducing employee learning and development costs: the use of massive open online courses (MOOC). *Development and Learning in Organizations: An International Journal*, *30*(5), 18-21.

Radford, A. W., Robles, J., Cataylo, S., Horn, L., Thornton, J., & Whitfield, K. E. (2014). The employer potential of MOOCs: A mixed-methods study of human resource professionals' thinking on MOOCs. *The International Review of Research in Open and Distributed Learning*, *15*(5).

Rhoads, R. A. (2015). *MOOCs, high technology, and higher learning*. JHU Press.

Schawbel, D. (2016). What Employers Will Worry About in 2017. Retrieved from http://fortune.com/2016/12/28/employers-2017-employee-retention-unemployment

Siemens, G. (2012). MOOCs are really a platform. Retrieved from http://www.elearnspace.org/blog/2012/07/25/moocs-are-really-a-platform

Wang, S., Dong, P. H., & Shao, S. (2017). Research on Influencing Factors of Employees' Acceptance of MOOC Training. In Management Information and Optoelectronic Engineering: *Proceedings of the 2016*

International Conference on Management, Information and Communication (ICMIC2016) and the 2016 International Conference on Optics and Electronics Engineering (ICOEE2016)(pp. 197-203).

Wiechers, E. (2016). Udemy Study Discovers That Lack of Learning Opportunities Leaves Half of U.S. Workers Bored or Disengaged on the Job. Retrieved from https://about.udemy.com/press-releases/udemy-study-discovers-that-lack-of-learning-opportunities-leaves-half-of-u-s-workers-bored-or-disengaged-on-the-job.

Preparation for Providing Crisis Communication During Blackout Occurrence

Alena Oulehlová, Department of Emergency Management, Faculty of Military Leadership, University of Defence, Brno, Czech Republic, alena.oulehlova@unob.cz

Štěpán Kavan, Fire Rescue Services of South Bohemia Region, České Budějovice, Czech Republic, stepan.kavan@jck.izscr.cz

Abstract

Due to the increasing threat of long-term blackout and its impact on all sectors of human activity, it is necessary to increase crisis preparedness of the public administration for such possibility. It is necessary to map the capabilities of all entities for the crisis management purposes and to check their ability to respond to the situation for the purpose of the operational processing of crisis managements plans in the crisis preparedness phase. Checking the ability to respond is carried out using risk analysis, processing planning documentation and subsequently carrying out exercises of responsible crisis management authorities. Working groups have been set up to analyze impacts on the life and health of the population, its property and environment with regards to ensure the functionality of all key stakeholders as a part of the Blackout 2017 exercise preparation in the selected region of the Czech Republic. The article focuses on the results obtained by a working communication group, with the emphasize put on providing communication between responsible authorities and providing information to the population about the situation development. Article puts emphasizes on the analysis of the mobile networks functionality as the most widely used communication and information tool.

Keywords: communication, mobile operators, area analysis, blackout

Introduction

This section should follow keywords. This section should provide background of the study and highlight research motivation. Information and communication technologies (hardware, software, netware and telecommunication) have contributed significantly to the development of globalization. Current society is going through digital age which is based on the use of the latest scientific knowledge in the field of information and communication technologies. Besides its positive consequences, such as facilitating communication, economic benefits, data archiving, etc., it also brings a negative impact in the form of latent risks such as the possibility of data misuse, cyber-terrorism and pathological addictions.

Providing timely and relevant information on the development, course and way of dealing with the crisis situation is vital to the population affected by a disaster. In the case of blackout, communication through ordinary telecommunication means is highly limited or almost impossible. Communication via mobile phones, in particular, is very vulnerable. Mobile transceivers are usually nonfunctional during disasters. For example, during hurricane Katrina, more than 70 % of mobile transceivers were malfunctioned (Nicholas, 2017). On that account, it is necessary to re-evaluate the use of mobile phones in the event of disaster. It is possible to use portable devices with battery power - Citizen Band radio, satellite phones, General Mobile Radio Service radio, Amateur radio (Nicholas, 2017). These devices have its advantages and disadvantages (such as affordability, reach, popularity among the population). In the Czech Republic,

these communication tools are not very spread among the population and the crisis management authorities. In relation to the crisis preparedness of the crisis management bodies as well as the population, it is necessary to become ready for such situation since the lack of information and the absence of communication can give rise to negative impacts, losses or damage. Negative impacts can be minimized even before the actual crisis situation occurrence by a thorough analysis of the field that maps out potential responses in the area affected. Adaptation and mitigation measures have been subsequently proposed based on the results of the analysis.

The objective of the article is to present the results of implemented analysis aimed at functioning of communication and information technologies in the South Bohemian Region serving for the needs of the exercise Blackout 2017. Based on the results of the analysis, there are identified problems areas ready for solutions. There will be proposed a way of communication between the crisis management authorities and the affected population. The results will serve to change and supplement the crisis documentation of the South Bohemian Region.

Current Situation

Crisis communication

Crisis communication is an interactive information process, verbal, visual or written between the organization and the stakeholders (Feam-Banks, 2010). Crisis communication plays crucial role in the crisis management (Zhao, 2007).

The term “crisis communication” is generally used in two ways:

- It describes communication activities of an organization or agency facing a crisis. It needs to communicate concerning the crisis within the organization, with various partners and the public.
- The term “crisis communication” is associated more often with emergency management and the need to inform and alert the public about an emergency. In this case, crisis communication might refer to the community leaders’ efforts to inform the public (Center for Disease Control and Prevention, 2014).

The second way of communication is being dealt with in the presented article. The underlying thread in both forms of crisis communication is that an unexpected and threatening emergency requires an immediate response. The content, form and timing of the communication can help reduce, sustain the harm or make the situation even worse (Center for Disease Control and Prevention, 2014).

There are currently several topics dominating the area of crisis communication:

- Characteristics of crisis communication in the social media (Sakasi et al, 2010, Muralidharan et al, 2011, Lotan et al, 2011).
- The role of media in the crisis communication (Lotan et al, 2011, Utz et al, 2013, Starbird et al, 2015).
- Organization or crisis response strategy (Yates and Paquette, 2011, Sutton et al, 2013, Rutset et al, 2014).
- Communication behaviour in the times of crisis (Xie et al, 2017, Esworthy et al, 2015).

Focusing attention on crisis communication through mass media and social media arises from their position and role in contemporary society. All these communication means require electrical power for

their operation. During the research into this topic, it was found out that, no research which would deal with the issue of providing communication in the case of blackout, has been carried out in the area of crisis communication. The authors of the article were unable to obtain information on the way in which the analysis of the area was carried out from the point of view of communication possibilities in other states. From the point of view of dealing with the crisis communication with the population affected by blackout that happened abroad, a network of amateur radios was used in Japan in 2011. Japanese radio amateurs powered their stations with car batteries or portable generators and transmitted rescue requests, information on refugee centres and availability of supplies. Similarly, the network is used in the USA during hurricanes and other natural disasters (Nollet and Ohto, 2013).

Czech Republic

The territory of the Czech Republic (CR) has not been affected by a large-scale and long-term blackout yet. The high stability of electricity supply in the Czech Republic is also evidenced by the distribution continuity indicators (Dušek, 2016). The average duration of one interruption of electricity supply for the customers in the previous year was 116.96 minutes, with an average of 2.21 interruptions (Energy Regulatory Office, 2017). Short-term local outages in the period 2000-2016 were predominantly related to natural disasters (floods, storms, snow calamities and icing) and anthropogenic dangers (transformer stations fires, unintentional damage to the facilities) caused by human factor failure. Electricity supplies to all locations were restored within 48 hours at the latest. In the context of crisis preparedness, it is necessary to take into account all aspects of life, eg. Preparedness of the population, social and healthcare facilities in relation to communication skills (Brehovska et al, 2015).

In the case of the threat analysis for the Czech Republic (Government of the Czech Republic, 2016), the risk of large-scale disruption of power supply (45.73 points out of 100) and the risk of disturbing the functionality of major electronic communications systems (32 out of 100) was assessed as an unacceptable risk. For unacceptable risks, the competent authorities of the central state administration have to create type plans. During the implementation of threat analysis for the area of regions, the risk of large-scale disruption of power supplies was identified as unacceptable risk in 13 of 14 regions of the Czech Republic (Šindlerová, 2017). On the basis of the created type plan, crisis management authorities are obliged to incorporate ways of addressing the crisis situation into the crisis plans of regions and municipalities with extended powers. Emergency communication and connection also form part of the crisis documentation, however, they are of limited use for addressing the danger of blackout.

In spite of the above mentioned facts about the supply stability, considering the increasing vulnerability of the population to crisis situations, crisis management bodies prepare themselves for the risk of long-term blackout by the form of exercises in individual regions. Exercises with blackout topic took place in the Czech Republic in 2014 in Prague, in 2015 in the South Moravian, the Olomouc and the Hradec Králové Regions and in 2016 in the Vysočina Region. In 2017 it will take place in the South Bohemian Region. Each region has approached the organization and scope of the exercise in a different way. Even one of the regions practised as if all communication channels were working, which is in fact unrealistic. The benefits of such type of exercise are highly limited.

Aim and Methodology

The aim of the paper is to carry out research into the possible ways of communication in the case of a long-term power outage in the territory of the South Bohemian Region in the Czech Republic. Partial goals are exploration of communication through mobile operators and radio communication. The basic issue addressed is thus connection and passing information between the population, crisis management bodies and integrated rescue services. The basic research method is analysis, where the analysis of the

individual communication possibilities and impacts during a long-term blackout has been performed. The information was obtained by research into the information sources and literature and in particular, by a semi-structured interview and a questionnaire given to the representatives of individual entities that provide one of the connection services. The final information has been compiled and using the deduction method, the final conclusions have been drawn while coming from assumptions to conclusions.

Results and Discussion

As a part of a preparation of the Blackout exercise in the South Bohemian Region (Czech Republic) which will be held in November 2017, 13 working groups have been created. Working groups have dealt with the key areas influenced by blackout (e.g. food, healthcare, drinking water, fuel and transport). The task of each working group has been:

1. Identify elements belonging to the topic area.
2. Determine the impacts of power failure.
3. Identify the preserved activities.
4. Decide what is necessary for emergency provision in the set area.
5. Determine how to address impacts in the affected area.
6. Select the entities for the provision of basic functions for priority electricity supplies in the affected area.

The article deals with the analysis of the area in terms of ensuring the functionality of the information and communication technologies in case of a large-scale blackout in the region. Emphasis was put on mobile operators as the number of used mobile devices is growing. The analysis of the area was carried out by the Regional Fire Brigade in cooperation with experts from the individual organizations responsible for traffic operation, postal services and telecommunications.

Identify Elements Belonging To the Topic Area

The following elements were identified in the area of communication, postal services and telecommunications within the region:

- Digital Radio Network of the Ministry of the Interior of the Czech Republic – PEGAS.
- Analogue Radio Network of the Fire Rescue Service of the Czech Republic.
- Mobile operators.
- Fixed line operators.
- Satellite telephones.
- Radio broadcasting,
- Television broadcasting,
- Internet,
- Local information systems,
- Unified system of warning and notification,
- Postal Services.

These elements are used not only by crisis management bodies and components of the Integrated Rescue System, but also by the population whose security needs to be ensured during blackout.

It was found out as a part of element identification that some entities owning such elements are part of the critical infrastructure - VI Information and Communication Systems Area under the Government Regulation of the Criteria for Determination of the Critical Infrastructure Element (Government

Regulation, 2014). Components of the Integrated Rescue System, in particular the Operational and Information Centers are dependent on receiving information to provide protection to the population. They are also components of the critical infrastructure elements.

For the elements included in the critical infrastructure, it is essential that the functionality is maintained even in the event of a large-scale, long-term power outage since the disruption may have implications for state security, economy and providing the basic living needs of the population as well as their health and property.

Determine the Impacts of Power Failure

After identifying potentially endangered elements, impacts have been identified with regard to the preparedness for dealing with crisis situations and protection of the population. The most significant problem is the limitation or complete disruption of communication between citizens, crisis management authorities, administrations authorities and business entities. Communication interruption will arise from the congested base transceiver station (BTS), discharged users‘ mobile phones, failure of mobile operators BTS which are not backed up with back-up sources). Disruption of communication on the part of the citizens affects the provision of assistance to the citizens who will not be able to reach the emergency lines for help. In addition, population will not be provided by a long-term warning via the Unified system of warning and notification (sirens) and local information systems. The provision of information to the population will be as well limited by television and local radio. This disturbs the standard communication channels used during other types of crisis situations. This may lead to increased damage to human health, the impossibility of providing pre-hospital emergency care or even the death of persons. In addition to the above-mentioned impacts on human health, the failure of communication and information technologies will have significant social impacts on the population (making access to funds through electronic banking impossible, limitation of purchases via credit cards, transport, etc.).

In the case of crisis management bodies and the components of the integrated rescue system, their telephone numbers at mobile operators can be given priority. For telephone numbers with priority calling, unlike normal phone numbers, call priority is set. Priority levels are 1+, 1, 2, and 0 depending on the particular participant in the crisis communication. In addition to the priority calls which depend on the BTS functionality time as well, components of the Integrated Rescue System can still use radio stations for making emergency communication.

Identify the Preserved Activities

A key step in the whole analysis of the territory was to identify the preserved information and communication technologies. The step was based on interviews with liaison security officers or experts of the entity, about the extent to which they are able to provide crisis communication. From the point of view of population protection, the most important is the mobile operators’ network and systems providing information for the population; this is the reason why attention is focused on them.

There are three major mobile operators in the Czech Republic - O2 Czech Republic, T-Mobile and Vodafone. Currently, O2 Czech Republic and T-Mobile share networks including the infrastructure excluding core exchanges. If the T-Mobile network is available, there is a high probability that the O2 Czech Republic network will also function. To ensure communication, it is necessary to have the whole structure of the infrastructure running from the mobile phone via the base stations, the controllers to the core exchange. The keystone for crisis communication during the blackout is BTS power. The other elements are sufficiently ensured during blackout and are described in the text below. All operators

declare their readiness to provide priority calls in the case of request for activation during an emergency or crisis situations.

O2 Czech Republic

Mobile services are made up of two core exchanges within the Czech Republic and other infrastructure (backbone network, transport network, access network, BTS). About half is backed up by batteries. Backbone networks are backed up for 4 hours and BTS for 2 hours. BTSs are not backed up in marginal locations. The operator is able to provide about 2 pieces of mobile BTS for the needs of crisis management authorities. The operator also runs fixed lines. Their use is, due to the need to power elements of data transmission and reception, most likely improbable.

T-Mobile

Mobile services are made up of four core exchanges within the Czech Republic. They are located in objects with their own motor generator and fuel for a period of min. of 24 hours. If the refuelling is provided, the operation of the core exchanges will be unlimited. Similarly, other infrastructure to the level of BTS controllers is resolved. Both operators have about 10,000 BTS in the Czech Republic area. BTS are backed up by batteries. In places with good accessibility there is a backup for about 2 hours, with poor accessibility up to 8 hours. If the BTS is located in a building with motor generator, it is usually connected to it and its functionality is maintained as long as it runs. Assuming that the way to the controllers and exchanges is maintained, the system will be functional.

Vodafone

Mobile services are made up of three core exchanges within the Czech Republic. They are located in the buildings with their own motor generator and fuel supply for min. of 24 hours. When refuelling, the operation will not be interrupted. Similarly, additional infrastructure to the level of BTS controllers is resolved. BTSs are backed up by batteries with a capacity from 2 hours to 24 hours.

It was found out during analyzing mobile operators, that a single company - HUAWEI contractually maintains the network functionality for all three mobile operators. The relationship between mobile operators is shown in Figure 1.

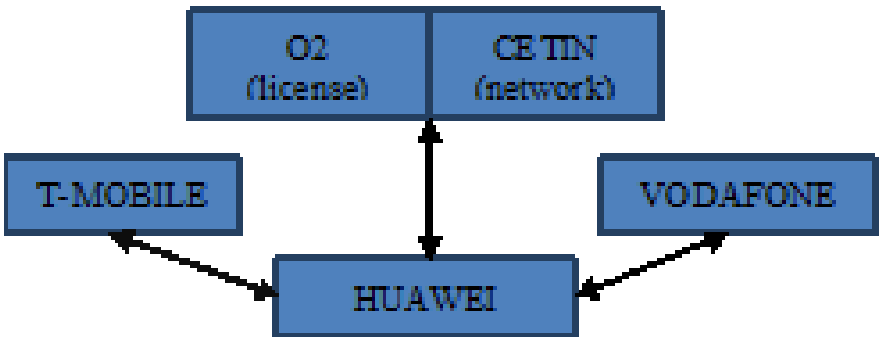


Fig 1. Maintaining the mobile operators network functionality in the Czech Republic [author‘s own source]

The production and transmission by national TV and radio broadcast providers will be maintained. The problem here is on the household side, i.e. the receivers. TV sets without a back-up power source will not work. Radios will work in passenger cars or radios with charged batteries. It is advisable to use emergency radio, which uses manual recharging or solar power. However, among the Czech population it is not a well-known product.

The created questionnaires were sent to the entities after the interviews were finished to check, complete and update the information.

The functioning of a Unified system of warning and notification, serving to alert the population in the case of emergency and crisis situations, depends on the siren type. In the case of installed rotary sirens, their dysfunction is obvious as they are permanently dependent on the power supply. Electronic sirens have backup batteries with a maximum operating time of 72 hours.

The digital radio network of the Ministry of the Interior of the Czech Republic - Pegas, the Tetrapol system, is used for the needs of the components of the Integrated Rescue System (the Czech Police, the Medical Rescue Service, the Fire Rescue Service of the Czech Republic and selected units of the Volunteer Fire Brigades of the Municipalities). On the territory of the South Bohemian Region, backup batteries for approximately 10 hours are on the 22 base stations and 10 points of radio links. For longer run, 6 base stations have a backup motor generator. However, only 2 base stations will fully provide services in two parts of districts. The remaining 4 base stations will be minimally functional, only for users who have been logged in under this cell prior to disconnection.

The fire rescue service of the South Bohemian Region and the volunteer fire brigade units of the municipality included in the coverage can moreover use the analogue radio network. It consists of transceivers, repeaters, radio controlled radio stations, base stations, receiving radio stations integrated into the operating and information centre via ErcLink, data links (IP MPLS-KI element) and base stations. There are 16 basic elements (transceivers, repeaters); most of them are backed up by batteries for about 6-24 hours. For longer maintenance of run, 5 elements have their own backup motor generator. They provide full connections for the majority of the region's territory and are connected to the Regional Operational and Information Centre. During battery backup, it is possible to communicate under the transceivers/repeaters without linking to the Operations and Information Centre. Elements that do not have their own motor generators can be connected to power generators with power consumption up to 0.3 kW.

The operation of Internet services from various providers cannot be guaranteed.

Decide what is necessary for emergency provision in the set area

From the results of the territory analysis, it is clear that in order to ensure the functionality of the information and communication technologies, the supply of electrical energy to the elements of the critical infrastructure and other important elements must be provided. These are mainly BTS, transmitters, receivers, transceivers and exchanges. Based on the survey results, a list of priority locations was created. For priority locations, power supplies should be provided mainly from back-up power sources that form part of the elements or are installed on a one-time basis. The supply of fuel and lubricants must be provided by the operator of the facility, the crisis management authorities and the components of the Integrated Rescue System to the back-up power sources. Currently, the calculation of the quantity and frequency of fuel supplies to the priority points takes place since the first deliveries will have to be realized no later than 6 to 24 hours after the blackout has occurred. Indispensable condition for refuelling the motor generators is to enable access to these elements by their owners.

Determine how to address impacts in the affected area

From the perspective of providing basic functions in the affected area and the basic needs of the population, it is necessary to thoroughly address the following issues:

- List the essential transmitters/receivers to maintain basic connections.
- Verify the possibilities of connection of a backup power source and accessibility of the location throughout all seasons.
- Provide backup power supply for transmitters/receivers and their transport to a location as well as a specialist to connect the back-up source.
- Provide fuel and lubricants for the backup power sources.
- Determine people for priority calls.
- Map the possibility of using mobile base stations which are used for commercial use.
- Use of radios in cars and possibly in mobile phones.
- Create mobile phone charging points.

Select the entities for the provision of basic functions for priority electricity supplies in the affected area

In determining bodies for ensuring basic functions in the affected area, entities have been identified in each area that play a key role in providing communication between stakeholders or providing information to the public. These were mobile operators, fixed line operators and radio and television broadcasters. In addition to individual operators, it is necessary to include entities which provide operation of these technologies. Most of these entities are privately owned, which makes implementation of preventive and mitigation measures more difficult.

Conclusion

Crisis communication between stakeholders has to be ensured regardless of the type and extent of the crisis situation.

The results of the analysis of the functionality of the information and communication technologies have shown that without the secured connection between the crisis management authorities and the components of the Integrated Rescue System, the management and dealing with the crisis situation of a long-term blackout will be limited or almost impossible. The main contribution of the article is creation of the overview of the functionality of communication and information systems on the territory of the South Bohemian Region in case of long-term electric power supply failure (blackout). This makes it much easier for the crisis management authorities to prepare for this situation by modifying the documentation and activities of the components of Integrated Rescue System. Dealing with the issue during the real blackout would reduce the operational capacity of the intervening units and assistance to the affected population. For this purpose, it will be necessary to establish "connection system islands" which will provide a basic exchange of information between crisis management bodies, components of the Integrated Rescue System, business entities and the affected population. The "connection system islands“ will only be able to be used for crisis management purposes and for the protection of life, health and property.

The article proposes six steps of how to perform the area analysis used for the preparation of blackout exercises. It presents range of relevant issues for securing communication between affected population and responsible authorities. The analysis of the territory from the point of view of communication was very time consuming.

An important problem encountered by the working group was the different willingness to provide information from owners and operators of information and communication networks. Most owners and operators are private companies and the willingness towards volunteer co-operation is low. At the same time, there is a limited range of legislation that can be used for mandatory co-operation in the area of crisis preparedness. It is obvious that this problem is not appropriate to solve from the regional level, but it is necessary to solved them from the national level. Work on creating of mitigation measures will require communication with owners and operators of information and communication networks and also funds. Co-operation with these subjects will be absolutely crucial in the real blackout occurrence.

For the reasons of information protection, it was not possible to present all the obtained information in detail, such as a specific list of priority points. To ensure communication, it is necessary to finalize the conditions for the priority calls and the lists of persons who can use such system; provide fuel and backup motor generators; create a network of charging points for mobile devices and a system for exchanging information with the affected population.

The preliminary calculation of fuel amount shows a high demand on the amount of fuel needed, its transport and a large number of motor generators for the operation of information and communication network elements which are not currently available. Other problematic area seems to be lack of a sufficient number of experts (authorized persons) who are able connect backup power sources to the required object. Similar requirements for increased supply of fuel, motor generators and experts have also come from other working groups. Furthermore, there is a high economic burden on the entities that will buy and maintain motor generators and eventually provide their delivery.

Acknowledgment

Results presented in this article were obtained as a part of the solution to the project by Technology Agency of the Czech Republic with the topic Research and Development of Simulation Instruments for Interoperability Training of Crisis Management Participants and Subjects of Critical Infrastructure (research project No. TA04021582).

References

Brehovská, L., Freitinger Skalická, Z., Šimák-Líbalová, K., and Líbal, L (2015) 'Safety Research of Population According to Population Differentiation in Czech Republic,' *International Journal of Education and Information Technologies.* volume 9, pp. 12-20. ISSN 2074-1316.

Center for Disease Control and Prevention (2014) Crisis emergency risk communication, Atlanta: CDC, 462 p.

Dušek, J. (2016) 'Společná evropská energetická politika a otázky energetické bezpečnosti,' *Vedecký obzor: recenzovaný vědecký časopis*, no. 1, pp. 25-30. ISSN 1337-9054.

Fearn-Banks, K. (2010) Crisis Communications: A Casebook Approach, 4th ed., London: Routledge, 400 p.

Edworthy, J., Hellier, E., Newbold, L. and Titchener, K., (2015) 'Passing crisis and emergency risk communications: The effects of communication channel, information type, and repetition,' *Applied Ergonomics*, vol. 48, 2015, pp. 252-262, doi: 10.1016/j.apergo.2014.12.009

Energy Regulatory Office (2017), 'Yearly Report on the Operation of the Czech Electricity Grid, ' *eru.cz*. [Online], [Retrieved June 01, 2017], https://www.eru.cz/documents/10540/462820/Rocni _zprava_provoz_ES_2016.pdf/800e5a09-a58a-4a73-913f-abc30cda42a5

Government of the Czech Republic, (2016) 'Threats analysis for the Czech republic,' 2016, 9 p. *vlada.cz.* [Online]. [Retrieved May 05, 2017], https://www.vlada.cz/assets/ppov/brs/cinnost/zaznamy-z-jednani/usn17.pdf

Government Regulation, (2014) 'No. 315/2014 Coll., Criteria for Determining Critical Infrastructure Element, ' *Collection of law*, no. 127, pp. 3964–3971. ISSN 1211-1244.

Lotan, G., Graeff, E., Ananny, M., Gaffney, D. and Pearce, I., (2011) 'The Arab Spring the revolutions were tweeted: Information flows during the 2011 Tunisian and Egyptian revolutions, ' *International Journal of Communication.* vol. 5, pp. 1375-1405.

Muralidharan, S., Rasmussen, L., Patterson, D.and Shin, J. H., (2011) 'Hope for Haiti: an analysis of facebook and twitter usage during the earthquake relief efforts,' *Public Relations Review.* vol. 37, 175–177, doi: 10.1016/j.pubrev.2011.01.010.

Nicholas, O., (2017), '4 Life-Saving Ways To Communicate When The Power Is Out,' *The Grid News.*[Online], [Retrieved July 07, 2017], http://www.offthegridnews.com/extreme-survival/4-life-saving-ways-to-communicate-when-the-power-is-out/

Nollet, K. E. and Ohto, H. (2013) 'When all else fails: 21st century Amateur Radio as an emergency communications medium, ' *Transfusion and Apheresis Science*, vol. 49, pp. 422-427, doi: 10.1016/j.transci.2013.08.002

Rutsaert, P. et al. (2014) 'Social media as a useful tool in food risk and benefit communication? A strategic orientation approach,' *Food Policy*, vol. 46, pp. 84–93, doi: 10.1016/j.foodpol.2014.02.003.

Sakaki, T. H., Okazaki M. and Matsuo, Y. (2010), 'Earthquake shakes Twitter users: real-time event detection by social sensors,' Proceeding the 19thInternational Conference on World Wide Web. (ACM), pp. 851–860, 26-30 April 2010, Raleigh, USA.

Šindlerová, B. (2017). 'Risk analysis results at regional level,' unpublished. Fire Rescue Services.

Starbird, K., Dailey, D., Walker, A. H., Leschine, T. M., Pavia, R.and Bostrom, A., (2015) 'Social media, public participation, and the 2010 BP deepwater horizon oil spill, ' *Human and Ecological Risk Assessment: An International Journal*, vol. 21, pp. 605-630, doi: 10.1080/10807039.2014.947866.

Sutton, J., Spiro, E., Butts, C., Fitzhugh, S., Johnson, B. and Greczek, M. (2013) 'Tweeting the spill: online informal communications, social networks, and conversational microstructures during the Deepwater Horizon oilspill, ' *International Journal of Information Systems for Crisis Response and Management (IJISCRAM)*, vol. 5, pp. 58–76, doi: 10.4018/jiscrm.2013010104.

Utz, S., Schultz, F. and Glocka, S. (2013) 'Crisis communication online: how medium, crisis type and emotions affected public reactions in the Fukushima Daiichi nuclear disaster,' *Public Relation Review.* vol. 39, pp. 40–46, doi:10.1016/j.pubrev.2012.09.010.

Xie, Y., Qiao, R., Shao, G. and Chen, H., (2017) 'Research on Chinese social media users' communication behaviors during public emergency events, ' *Telematics and Informatics*, vol. 34, pp. 740-754, doi:10.1016/j.tele.2016.05.023.

Yates, D. and Paquette, S. (2011) 'Emergency knowledge management and social media technologies: a case study of the 2010 Haitian earthquake,' *International Journal of InformationManagement.* vol. 31, pp. 6–13, doi: 10.1016/j.ijinfomgt.2010.10.001.

Zhao, L. (2007) Research on the relationship among the government, mass media and public in the public crisis management, Fudan University, Doctoral dissertation.

Theory and Practice of Design Thinking: Systems Approach

Eva Svirakova, Tomas Bata University in Zlín, Faculty of Multimedia Communications, Stefanikova 2431, 760 01 Zlín, Czech Republic, svirakova@utb.cz,

Abstract

The article describes the practical use of system thinking in product design. The aim of the article is to propose a set of qualitative research methods that can be used to get information about a creative project as a system and use it in practice. The article shows the gradual use of methods on a project that originated at a university in its creative workshops. The data are collected through questionnaires and interviews. The grounded theory method identifies issues from the acquired data and is further solved by the mental mapping technique. Missing parts of the system are added using the backward mapping method. The resulting model is built up using System Thinking Language and is published as a Causal Loop Diagram. This approach enabled both the visible and invisible side of the design process to be displayed. The mental model of the entire design process is very extensive, so the published model solves only one selected category. This category is "project assignment," which is the first phase of the design process. This article is intended for students of creative disciplines at the university who are ready to use systems thinking as well as design thinking. The originality of the article is that it seeks systemic solution to problems that does not have a negative retrospective effect on another part of the design process in the studio.

Keywords: backward mapping, causal loop diagram, design process, grounded theory

Introduction

The project, as designer's deliberate efforts to design a new product innovation, is a system. The visible and invisible elements of this system are interconnected by the design process activities. According to various authors (Ambrose and Harris, 2011; Hanek, 2013; Knapp, J. Zeratsky, J., Kowitz, B., 2016), there is a different number of phases, but one aspect is always common to the design process. It includes design thinking, which is a way of thinking that is customer focused. In the design process, we often create models or prototypes to verify with the customer whether the designer's ideas about the product are the same as the customer's expectations and whether they will purchase the product. We are thinking of a project that results in product innovation as a system of interconnected parts, so we are in the process of systems thinking. The article connects both types of thinking and creates a new model. Our model is mental; we cannot produce it as a three-dimensional (unlike the designer in the fashion design studio - it is a model that is the product of system design thinking). The mental model solves problems and challenges that are hidden in a particular design process and which we have systematically identified through qualitative research. The aim of the article is (1) to propose solutions to the problems we have identified and (2) to publish research methods that allow system thinking to be translated into usable practice. The article is intended for all who read the Fifth Discipline (Senge, 2006) and want to bring the knowledge about systems thinking into life. We do not claim that our mental models are the only correct ones. However, we claim that we have reached them on the basis of data collection, which we have subjected to carefully aligned research methods of analysis and synthesis. The user of the article needs to judge themselves whether our approach to mental modeling meets their expectations.

Literature Review

As Soukalová (2016) specified, an important part in the process of technology transfer, innovation and competitiveness development in the economic and social system is played by universities, particularly by their research and development centers and departments. Universities guarantee independent research and freedom of knowledge that has its rational and ethical dimension, morals and conscience shared by an independent community of teachers and students. Implementing results of research and development, thoughts and individual creativity in practice is a predisposition of continuous innovative activity and of increasing the competitiveness of national economies. Strážnický (in Soukalová, 2016), however, points out certain pitfalls of transfer of creative innovations. He claims that the basic precondition of technology transfer is (1) knowledge that relates to the functionality of the transferred solution, (2) its applicability in the market and (3) willingness of the authors to disclose supporting information when negotiating with business partners. Strážnický remarks that it is still true that design sells. That is due to the fact that most technical solutions repeat and a new design is a significant added value of a product that manufacturing companies are interested in.

Design thinking is a style of thinking that uses the ability to combine three components. (1) empathy in responding to customer needs, (2) creativity in the creation of new solutions, (3) rationality in analysis (Hanek, 2013). The design process is a combination of design thinking and system approach. At each stage of the design process, problems and challenges may arise that accelerate or slow down the design process. Ambrose and Harris (2011) define seven stages of the design process that are in line with the proposed procedures for creative project management: (1) define, (2) research, (3) ideate, (4) prototype, (5) select, (6) implement, (7) learn. The objective of this paper is to find barriers and advantages in the design process at the university and propose solution that will facilitate transfer of innovations. We consider transfer of innovations to be successful in the following cases: (1) Transfer of a product or service to the market using transfer or the relevant license to a commercial company that incorporates the product or service in its market portfolio. (2) Transfer of a product or service to the market when at least one customer buys the product or service.

We can also consider innovation to be potentially successful when the product is displayed at an exhibition, in a catalogue or presented in some other relevant ways. This definition of successful innovation is based on educational and creative mission of universities. We cannot expect every product made by students to be intended for the market. The objective of creation in studios is to make a product that is potentially innovative, interesting and valuable in its field. Such products also include models, mock-ups and prototypes. Nevertheless, for the purposes of this article, we primarily focus on the students´ outcome that has been successful in the market (if only partially).

Materials and Methods

For the analysis of the design process and design thinking, we chose to use qualitative research. We started collecting data through questionnaires in November 2016. With respect to the fact that our target group was rather peculiar, i.e. students of art studios, we used a specific graphic form. We presumed that students would find this way of expressing familiar and we would get relevant data in a more efficient way. The questionnaires did not contain any questions, but were in the form of a calendar. There were three milestones on a timeline, the first of them concerned the initiation of their common project at the faculty and the other two were check points of the project. We addressed 85 visual art students and received back 65 filled questionnaires from the following studios: graphic design, spatial design, industrial design, product and digital design, fashion and shoe design. Work of the students from these studios is capped at the end of each term by handing over a specific innovative product in 2D visualization or as a 3D mock-up, model or prototype, which is the third milestone in the calendar-like questionnaire. In our survey, we assumed that the students´ goal is to carry out the assignment of the supervisor, pass the studio exam, and receive the credit hours. We asked, for instance, the following

questions: What barriers and advantages do you see in your studio? Did you set your product target at the very start? Do you have an idea at what stage of the design process you currently are? Do you have a schedule for your further activity? How did the project assignment form suit you?

We analyzed the data from the questionnaires using Grounded Theory and open coding process. Grounded theory is a qualitative research method that is typically used as a means of developing theoretic and conceptual understanding of social and interpersonal phenomena. We classified the answers received in the questionnaires by topics. Each topic represented a certain problem or challenge. For each challenge, we grouped the relevant phrases and pieces of sentences. After completing the analysis, we selected a questionnaire filled by a student who was successful in innovation transfer and we proceeded to the second part of the survey: an interview with a selected author of a product. We decided to conduct the interview with the author of a specific design of a fashion collection. We recorded the interview and then transcribed it word for word. We analyzed the sentences from the interview in the same manner as we did with sentences in the questionnaire: we grouped them using the open coding process by topics. During the analysis of the questionnaire and interview we dealt with every single sentence, which is in line with recommended processes of Grounded Theory. We asked: What is the gist expressed with this sentence? (Corbin and Strauss, 1990). After dividing the sentences into categories, we assessed the relation between them. We wrote down the results using the mental modelling technique during which we assessed the relation between two elements: A causes B. The relation between these two elements is also expressed with the polarity of the relation. Generally, we can say: If A happens, then B is greater; or if A happens, then B decreases. We marked the polarity using the (+) or (-) sign next to the arrow.

However, events around us are more complicated. Oftentimes, they have many reasons and simplified explanation using the cause and effect is insufficient. Such thinking is referred to as linear thinking. The mental model we recorded on the basis of the assessment of primary data is imperfect. The lack of feedback suggests we need to consider wider context. However, primary data did not allow us to do so, since the student only dealt with the problems or advantages in the design process from her own perspective. Yet, this poses no problem for the survey, quite on the contrary: opinions and experience of the students were a valuable basis that we intended to gather. We continued with the analysis by applying another research method: backward mapping (Glaser and Strauss, 1967).

The backward mapping method is a strategy for the analysis of policies and their implementation that starts with the description of the desired behaviour on the lowest level of intervention, in this case with the designer or in the studio (Elmore, 1980). The analysis may continue by defining the policies, resources and support that is necessary from the highest level if the analysed problem is to be solved. Backward mapping presumes that the closer a participant is to the source of the problem, the greater his/her ability to influence it. Therefore, backward mapping method asserts that the ability to solve problems of complex systems does not depend on the hierarchical structure and system control, but rather on whether we delegate maximum powers to act at the moment when the problem occurs. Using the backward mapping method, we extended the mental model of linear thinking and “closed its loops”. With this step we arrived at a better mental model that corresponds with the technique of systems thinking (Senge, 2006). Summary of the ascertained conclusions resulting from the questionnaire and interviews was written using the Causal Loop Diagram (CLD), which contains, besides polarities, also specification of the loops (reinforcing, balancing). All the research methods we used are shown in the chart below (Figure 1).

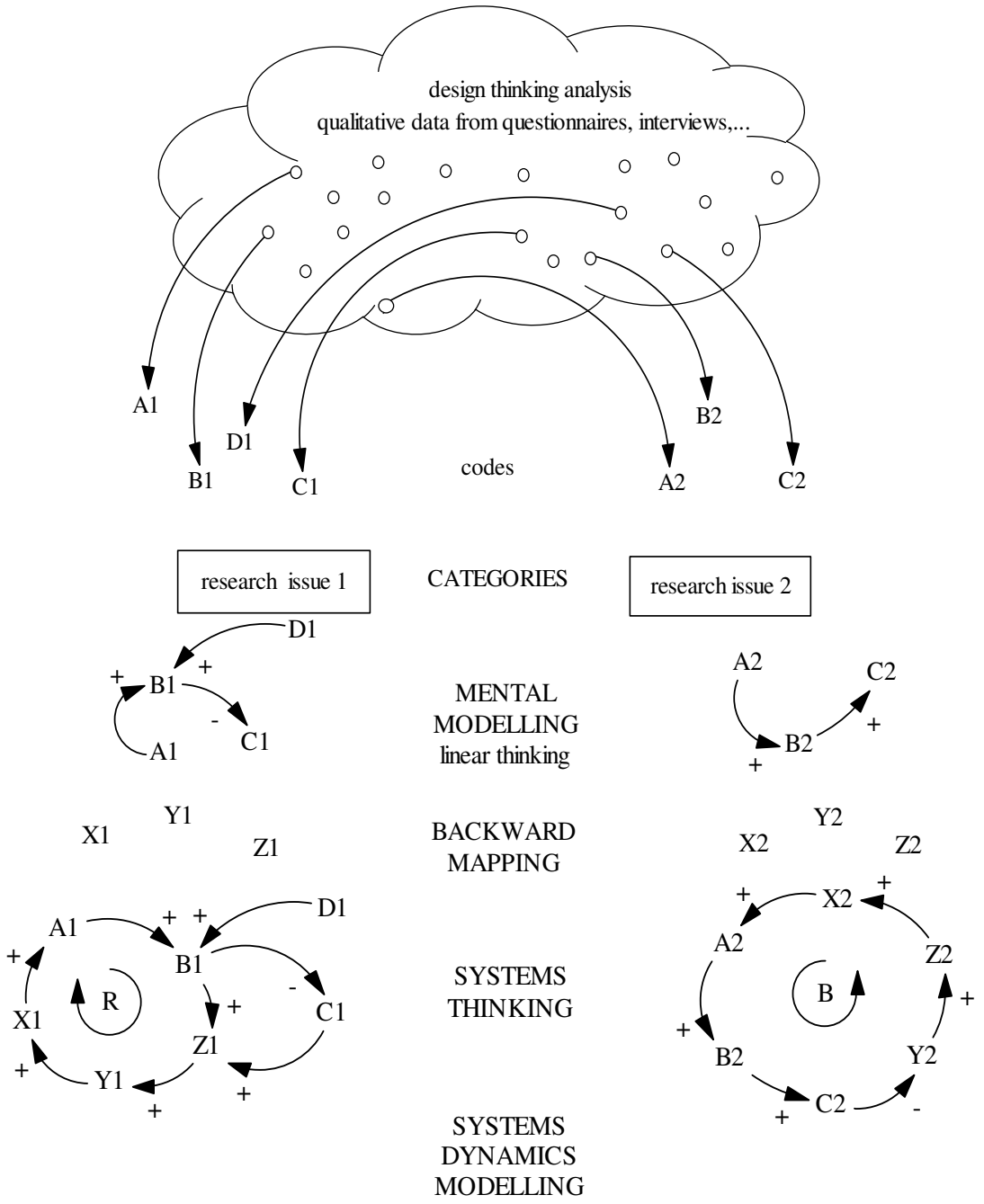


Fig. 1:Research methods, inspired by Simonsen & Friberg, 2010 (own resource, 2017)

Case study from Fashion Design Studio

Using the case study from the Water for All Project we show the possibilities of design thinking in the working process of authors creating a new innovative design. "Water for All" is a project by the Faculty of Multimedia Communication, Tomas Bata University in Zlín, which is based on the environment of cultural and creative industries. All studios under the faculty participated in it. Twelve studios, in a joint effort, dealt with "Water" as a topic of their creation from the beginning of the academic year (September 2016). Outcomes of the project are exhibitions, fashion shows, websites, a catalogue, Facebook campaign, conference and scientific publication. A partial outcome of the fashion show is a collection of dresses inspired by the problem of the Aral Sea (see Fig 2. below).

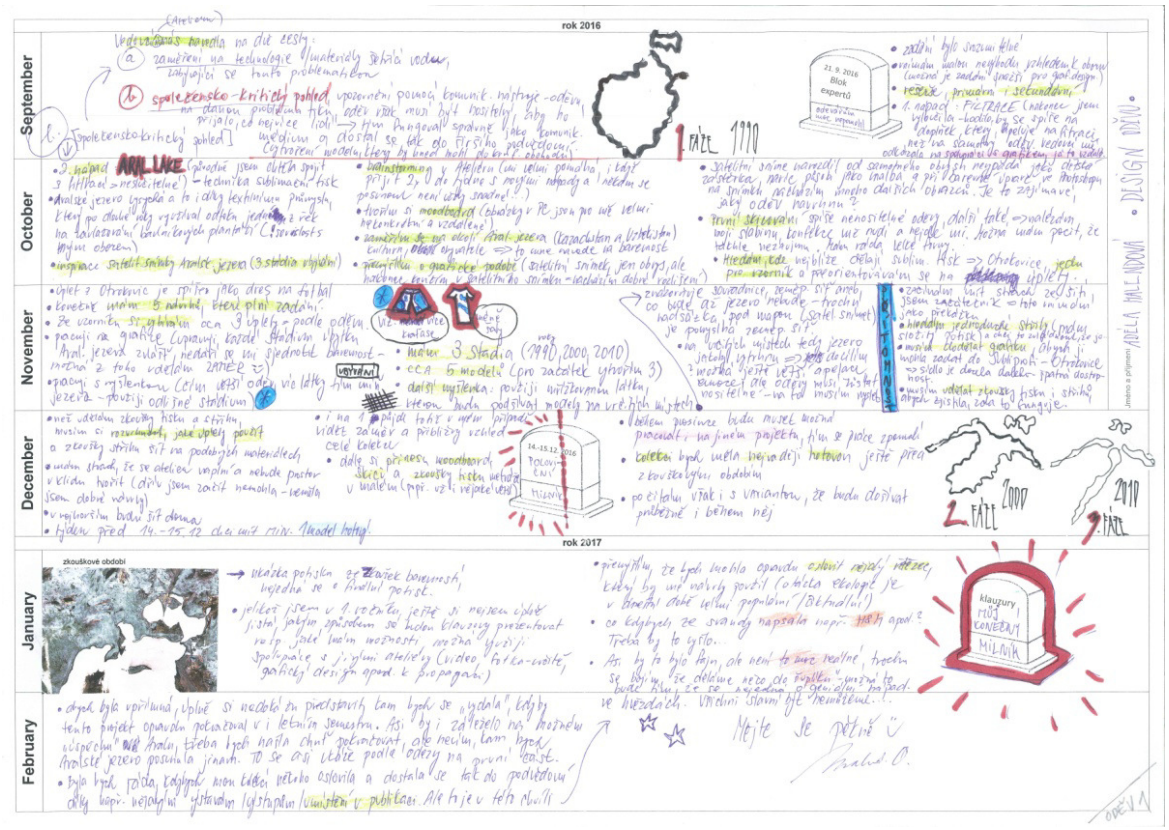


Fig. 2: Questionnaire. Aral Sea. (Adela Malendova, student, 2016)

Results and Discussion

From the primary data we identified several research problems using coding and formulated research questions. The research problems are as follows: (1) Innovations are not interesting to customers, (2) Problematic transfer of innovation to the market, (3) Negative assessment by the student of the studio. For further analysis, using the backward mapping method we selected the first of the above defined research problems. Following the experience of IDEO a design agency (Knapp, Zeratsky, Kowitz, 2016) we reformulated the problem so that is sounded rather open and optimistic. It is a good predisposition so that we do not get overwhelmed by problems that sound negativistic right at the beginning. That is why we formulated the research question in the following way: How might we get a potentially successful innovation? As it showed, the answer to this question is not obvious at first sight. Introducing a product to

the market was simplified to that extent that in our case, it is the moment when the first customer buys the product and there is demand of other customers for the same or similar product made by the same designer. If we were to solve all the research problems, our systems model would become far too extensive. We divided designers´ answers into chosen segments and grouped them under headings, as you can see below.

Quality of Assignment from the Studio

"The assignment was understandable. The leader has shown us two paths. I see a small disadvantage with regard to the field, perhaps it is easier for graphic design. The block of experts did not help the garment industry much. The supervisor asked me to work with the graphic artist, I gave up. I am a beginner. Brainstorming in the studio helps me a lot, even if coming up twice a week with new ideas and get somewhere is not always easy. "[Questionnaire - AM]

In order to compile a mental model, we need to paraphrase sentences and interviews. Paraphase: The manager of the studio increases the clarity of the assignment. An experienced designer will work better with other studios. Brainstorming increases the number of new ideas. Brainstorming also increases the quality of the assignment from the studio (supported by the studio). Against the usability of ideas, the designer's new ideas are being put under pressure by the studio's management.

Consistency Of The Idea With The Vision Of The Designer

"Clothing must be wearable. In order (for the clothing) to be accepted by as many people as possible and therefore to function properly, as a communication medium, to gain a wider awareness. To create a model that could fit into the off-the-rack shop. I think I could really reach out to a retail chain that would use my ideas. What if I wrote for fun, for example, to H&M, maybe it would be happen? Perhaps it would be nice, but it is not very real. I am a little afraid that I am doing something that will never happen, probably it's not a brilliant idea. I would love to address somebody with my collections and made my mark, for example, by exhibitions, by being in a publication. Time will tell. Not everyone can be famous. "[Questionaire - AM]
Paraphrase: The author has a vision that is customer focused and serial production for business. The better the vision, the higher the potential for success of the product. The designer doubts her ability to get the product to the customer. Doubts have a negative impact on her motivation. The designer's motivation is to be known about through her products. The more successful the product, the greater the motivation of the designer.

Record of parts from the interview, which took place four months after submitting the questionnaire (June, 2017), are next. This section talks about the past because the student has already completed her collection and evaluated her design thinking.

Designer Experience

"... I wanted to get it into the store. It did not work out. The initial enthusiasm is somewhere else, yes, I wanted to send it to some shops, but the problem is that a lot of those stores are foreign and for me it means more complications, they want to work with more familiar names." [Interview - AM]
"I'm beginning to be afraid of sewing. I'm a beginner, I see this as an obstacle. [AM - Questionnaire]
I certainly had a great graphics problem, and I could not make much choice, I needed a great resolution. So it was a problem to find an image that could then be graphically converted to be high resolution." [AM - interview]
Paraphrase: The designer's experience with communication with clothing stores is missing. An experienced designer is one who has had success with their products, the more successful the products,

the more experienced the designer. Experienced designer has a greater opportunity to acquire special abilities to communicate with clothing stores. The designer needs to increase the potential for success of their product by working with other studios.

Motivation of the Designer

"But it was certainly interesting because the dean opened the exhibition in the dress. That's the best thing that can happen. This is how we transfer something about us and something about our thinking." [Interview - AM]

Paraphrase: The higher the potential for product success, the higher we can expect the designer's motivation. The closer the product captures the original assignment, the more usable the idea and the higher the potential for success. Success is when a product purchased by a customer. If the customer is a dean of the faculty, then the product is in line with the intention of the faculty. Success is when the product is presented. When the product is (potentially) successful, it is also presented.

The mental map (Fig 3.) was made on the basis of the rephrasing of the designer´s statements. The polarity of relations between most of selected elements is positive, (+) symbol. It means that the following element has the same growth (and also decrease) tendency as compared with the preceding element. If there is the (-) symbol next to the arrow pointing at the following variable, it means that the following element has the opposite growth tendency when compared with the preceding element. Most of the elements in the figure below (Fig 3.) are linearly dependent, that means they simplify the relation between cause and effect. This mental model (Fig 3.) is only partially acceptable from the system point of view (Šusta, 2015). The model is largely open because most of the elements lack feedback loops, so it is based on linear thinking.

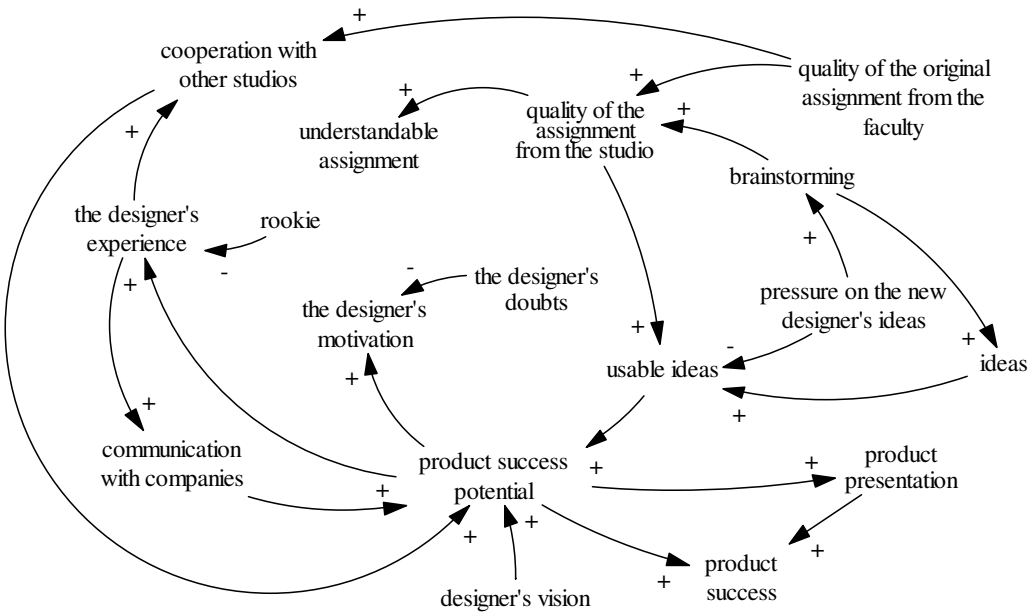


Fig. 3: Mind model according questionnaire and interview (own resource, 2017)

All the mentioned relations between elements (Fig 3.) are strictly based on the records of the questionnaire and interview with the designer. However, these opinions do not give us, for the time being, the answer to our research question: How might we get a potentially successful innovation? Systems

thinking (in another mental model Fig 4.) is comprehensive and describes more aspects of reality. Using backward mapping, we suggested the solution to the problem that is addressed by the research question. We investigated which elements and links (left-hand side of Table 1) we can include in the design process in the implementation stage and which ones we cannot (Table 1 see below right-hand side Table 1). The elements from right-hand side Table 1 we did not include in the model but they cannot solve our problem and they are beyond the possibilities of our solution implementation.

Table 1: Backward mapping method (own resource, 2017)

Activities and resources needed to gain potentially successful innovation	
Such variables we discussed and placed in the model (blue color in Fig 4). The development of variables is directly related to the findings of the research.	Such variables that we discussed but did not place in the model or left it as an explicit variable (red color in Fig 4.)
• Sorting ideas and usability of ideas and links between them • The link between the potential of a successful product and the pressure on new designer ideas • The link between the clarity of the assignment and the doubts of the designer • Link between the sorting of ideas and ideas	• Quality of the original assignment from the faculty • Designer's vision • The link between the quality of the original assignment from the faculty and the vision of the designer • Product presentation • Product success

The above-mentioned new variables and their relationships (Table 1) have helped us to close the loops and to promote the mental model to the systemic causal loop diagram. On the basis of all the findings stated above and of the backward mapping method we prepared a back-loop diagram that is shown in the figure below. All conclusions resulting from the backward mapping method were recorded into the mental model that we can call systemic, as it contains closed back-loops, see Figure 4 below. Blue dashed arrow marks added relations between elements we identified using the Backward mapping method.

We know that the Causal Loop Diagram can hardly be marked as complete at any stage. We also cannot say for certain that ours is right. Everyone has their mental model that they project into their thinking. However, the published Causal Loop Diagram (Fig 4.) is compiled according to the answers to the questionnaire and the interview. We try to analyze each sentence of primary data in order to find a suitable management policy that supports potentially successful innovations. According to Peter Senge (2006), the behavior of the system is influenced by its structure. The structure of the system is partially invisible. Using system language thinking, we reveal the structure of the system so that we could answer the research question: How can we get a potentially successful innovation?

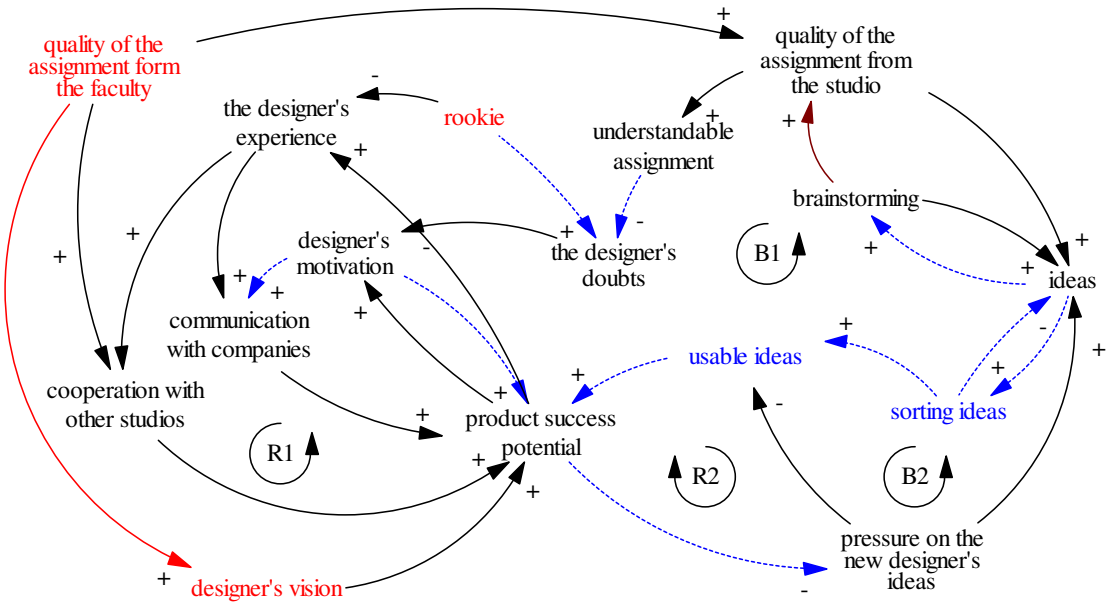


Fig. 4: Causal Loop Diagram as a new mental model (Own resource, 2017)

In accordance with the systems thinking method (Senge, 2006) and in order to make the back-loop diagram easy to understand, we marked all closed loops with two symbols: (1) with R for reinforcing, which means that with every new circulation through the loop all the elements within have the tendency to grow or to fall; (2) with B for balancing, which means that the Loop has a balancing task, or – to be precise - rather counteracting, and it contains an odd number of minuses. As these are back-loops, it does not matter from which element we start telling their story. A systematic creative project does not have any explicitly defined beginning or end.

Loop R1. If the number of potentially successful designer products increases over time, this will increase the designer's experience as it expands their portfolios. If their experience is greater, he or she can start communicating with retail chain stores, and this again increases the potential for their success in the design market. Experienced designer will also work better with other studios and this collaboration will also increase the number of potentially successful products.
Loop R2. Once a designer reaches an idea that has a high potential for success, he or she will be under the decreasing pressure of new ideas, and their ideas will be more usable as they can develop and think more. *("... even if coming up twice a week with new ideas and get somewhere is not always easy...").*
Loop B1. Increasing pressure on new ideas of a designer increases the number of new ideas that come up thanks to brainstorming technique. Brainstorming enhances the quality of the assignment from the studio, helping to make the assignments more comprehensible. The high clarity of the assignment reduces the designer's doubts and increases his / her motivation, which again will contribute to the higher product success potential.
Loop B2. Decreasing pressure on new ideas reduces the number of new ideas, which also reduces the need to sort them, and this affects fewer usable ideas, which will again reduce the potential for product success. The lower potential of product success will increase the pressure on new designer ideas.

Archetype Limits to Grow

The structure of the archetype is composed of one reinforcing loop and one balancing loop. To simplify the description of the archetype, let us assume that it consists only of loops R1 and B1. **Reinforcing loop R1**: The ongoing process is strengthening itself by creating opportunities for increased growth. A condition that must be fulfilled is that the increasing variable has the potential for success of the product. As it grows, the designer's experience is also increasing. Experienced designer is better able to work with other studios, which increases the product's success potential. **Balancing loop B1**: The slowdown occurs as a result of the balancing process that will begin to apply when the "limit" is reached. This limit is in our case the part of the system that acts on the variable pressure on the new ideas of the designer. For example, it may be the capacity of a studio that is unable to develop other designer ideas. Focusing on lots of new ideas consumes both financial and human resources and thus opposes the brainstorming. Once the brainstorming variable is reduced, the quality of the input from the studio is also reduced. When the studio does not give an explanation of the assignment, its clarity will be reduced, the designer's motivation will be reduced and the product's potential for success will be reduced.

How Might We Increase The Potential For Product Success?

It remains to answer the research question: How might we increase the potential for product success? We are looking for a solution that is given by the structure of the system. Given the fact that we have discovered the Limits to Grow archetype in the mental model (Fig 4.), we will focus on the use of the guiding principle by Peter Senge (2006). We must solve the negative effects of this archetype. We cannot see only the growth loop and the growth process. It is also necessary in the process of completing the idea to strengthen the capacity of the atelier, which is oriented towards new ideas and their appropriate sorting. As is clear from the feedback chart, the potential for product success not only increases the number of usable ideas, but also the intelligibility of the assignment and the designer's motivation. The clarity of the input increases not only the implicit variable quality of the input from the workshop but also the brainstorming.

Conclusion

An analyzed problem may be described as a system structure, which means interlinking all the components of the system. (Šusta, 2015). The only demonstration of the structure that we are able to capture using our senses are events. Qualitative research is based on the analysis of events, as we ask about what happened and we get answers. Research Question: How might we get a potentially successful innovation? We have found one strategy that we have described in the article and justified on the basis of design thinking in the language of systems thinking. Behavior that threatens our goal is to quietly reduce the product's product potential through low pressure on new designer ideas and lowering the quality of the assignment from the studio. This danger corresponds to the Limits to Growth Archetype. We will prevent it from negatively impacting the capacity of the studio to create new ideas and stay in a brainstorming process that improves the quality of the assignment from the studio. We do not give up new ideas, even if we do not implement them all, their search process increases the clarity of the designer's assignment. New ideas also deal with the choice of new communication and research approaches to design thinking. That is how we can better understand the customer, the assignment becomes clearer, and we get closer to our model, model or prototype to a successful innovation.

Acknowledgements

I would like to thank the author of the fashion collection Adéla Malendová for exemplary filling of the questionnaire and for the interview. The article was supported by Project No. 4/2017/FSR, which was financed from the strategic development fund of Tomas Bata University in Zlín.

References

Ambrose, G. & Harris, P. (2011). Grafický design: designové myšlení. Brno: Computer Press.

Corbin, J. & Strauss, A. (1990). Grounded theory research: procedures, canons, and evaluative criteria. Qualitative Sociology. 1990;13(1):3–21.

Elmore, R. F. (1980). Backward mapping: implementation research and policy decisions. Political Science Quarterly. 94(4):601–616.

Glaser, B. & Strauss, A. (1967). The Discovery of Grounded Theory: Strategies for Qualitative Research. Chicago: Aldine.

Hanek, J. (2013). Neviditelná strana designu – praktický průvodce pro studenty grafického designu. [online]. [cit. 2017-08-03]. Available: http://www.lifenetdesigning.info/data/uploads/publikace/neviditelna_strana_designu.pdf

Knapp, J. Zeratsky, J., Kowitz, B. (2016). Sprint: how to solve big problems and test new ideas in just five days. London: Bantam Press, 274 p.

Simonsen, J. (2017). Backward mapping. [online]. [cit. 2017-7-20]. http://jespersimonsen.dk/Downloads/IRIS-SCIS_keynote_Jesper_Simonsen.pdf

Senge, P. M. (2006). The Fifth Discipline. The art and Practice of the Learning Organization. New York: Doubleday/Currency.

Šusta, M. (2015). Průvodce systémovým myšlením. Praha: Proverbs, c2015, 136 l. ISBN 978-80-260-7602-5.

Soukalová, R. (2016). Design stories aneb kreativní inovace a problémy jejich transferu do praxe. Zlín: Univerzita Tomáše Bati ve Zlíně, FMK, pp. 137.

Wheat, D. (2016). Lectures, presentations. University of Bergen, Norway.

Effect of Green Supply Chain Practices on Environmental Development: Insights from ISO14001 Certified Manufacturing Companies in Malaysia

Marini Nurbanum Mohamad, School of Management, Universiti Sains Malaysia, 11800, Penang, Malaysia, and marini_nur@usm.my

Charis Samuel Solomon Koilpillai, School of Management, Universiti Sains Malaysia, 11800, Penang, Malaysia, and charissolomon89@gmail.com

Abstract

This paper investigates the effect of green supply chain practices on environmental development. There is a growing need to study the effects of green supply chain practices towards environmental development in the manufacturing industry due to the large environmental impact and the growing pressure for companies to go green. A survey was sent to 621 Malaysian ISO 14001 certified manufacturing companies. With a total of 146 usable questionnaires, the response rate was 23.51%. This study identified that green purchasing and eco-design has a positive effect towards environmental development. These results present empirical evidence of the relationship between green supply chain practices and environmental development. The adoption of green supply chain practices by manufacturing firms would be justified, not just by merely moral grounds, but also the positive effect companies gain in their performance.

Keywords: environmental development**,** green purchasing, eco-design, reverse logistics

Introduction

In recent years, the issue of sustainability and the environment has become a key managerial concern. Presently, businesses, societies and governments are giving more attention to the issue as there are escalating challenges revolving around balancing between environmental and business requirements. In view of the challenges faced by organisations, green supply chain practices has emerged as an approach that extends the environmental responsibility of organizations throughout their entire supply chain. There is a growing need to study the effects of green supply chain practices towards corporate sustainable development in the manufacturing industry due to the large environmental impact and the growing pressure for companies to go green.

Although green practices are well founded in developed nations, however, they are not well established in developing countries (Gonzales et al., 2010). Little is known about the potential of green supply chain practices towards corporate sustainable development in the Malaysian context. The increasing number of ISO 14001 certification shows that Malaysian corporations aim to endure in the current highly-competitive contemporary business setting (Rahman, 2012). Hence, this paper seeks to investigate the effect of green supply chain practices (green purchasing, eco-design, reverse logistics) towards environmental development.

Literature Review

Corporate Sustainable Development

The WCED defined sustainable development as development that meets the requirements of present-days without conceding with the abilities of the forthcoming generations to meet their essentials which is concerning the integration of economic, environmental and social impacts of development (WCED, 1987). There are various viewpoints of analysis in studies on Corporate Sustainable Development (CSD). CSD is recognised as an extensive notion because it comprises of an entire set of normative concerns associated with both the function of businesses in society and the natural setting (Sharma and Ruud 2003).

The main purpose of CSD ought to be for the achievement of a firm's economic performance at the same time considering the societal wellbeing and environmental constraints (Sharma 2002; Osterle et al., 2010). Yet, the most vital and vigorous debate related to sustainable development is the method and utility of assessment for future needs and desires by an organisation (Saaty, 2008). The requirements of upcoming generations are an attached component of the sustainable development idea (Orlitzky, 2008). Thus, the primary worry to CSD is concerning the decision for forthcoming generations' essentials, where sustainability decisions must have more than a superficial assessment of upcoming necessities, because intergenerational fairness is a difficult, vital and emotional notion that is important for corporate sustainable development dimensions (Yam, 2012).

One of the broadly recognised CSD frameworks explains the paradigms of CSD through three linked dimensions, identified as environmental, economic and social developments (Erol et al., 2009). These three extents of CSD are recognised respectively, environmental development through cooperate environmental management for refining the ecosystem, economic progress through firm value creation by refining the efficiency and effectiveness of services and products, finally, social development through corporate social responsibility in terms of increasing social wellbeing and encouraging better societies (Bansal 2005). This study adapts the works of Chow and Chen (2012) and defines CSD as the extent to which firms are willing to adopt environmental, economic and social development in their operations. This paper presents findings on the effect on environmental development.

Environmental Development

In general, the complexity in measuring environmental development is evident through the assortment of information utilized, from subjective indications, case studies, and surveys to proprietary information sources (Montabon, Sroufe and Narasimhan, 2007). Numerous researches have resolute to environmental development by utilizing a survey due to its extensive and merely perceptual view (Montabon, Sroufe and Narasimhan, 2007). But countless studies have identified a list of items to measure environmental development, such as decreasing water usage (Erol et al. 2009), recycling waste, reversing logistics and redesigning products (Prahinski and Kocabasoglu, 2006) and making green purchases (Diabat and Govindan, 2011).

This study identified the characteristics of present dimensions and measured environmental development from a rather broad and fundamental view. Numerous taxonomies depict environmental development, extending from reactive to proactive advances (Pradeep, 2012). In a majority of cases, the reactive advancement entails activities that could reduce the environmental effect of products and services through

proper waste disposal (Schianetz and Kavanagh, 2008). On the other hand, the proactive advancement entails alternate fabrication procedures that reduce waste and emissions (Bansal, 2005). Alternative processes includes, utilizing minimum conventional fuels and reducing negative effects towards animals and the natural environments (Lindgreen et al., 2009). Also, they are practices that reduce procurement of non-renewable resources, chemicals, components and decrease energy utilization (Baumgartner and Ebner, 2010).

Green Supply Chain Practices

In the 21st century, Green Supply Chain (GSC) has appeared as a significant element of the environmental and supply chain approaches in many companies. GSC practices can be defined as applied organisational activities motivated to allocate and circulate environmental management, in specific progressive environmental managing practices, through the whole supply chain, by extending relationships between large-sized buying organisations and their suppliers (Lee, 2008). In this context, supply chains attempt to preserve internal wellbeing and environmental sustainability by the ability to self-regulate based on data from the external environment (Vachon and Klassen, 2006).

As establishments that form a supply chain become conscious of customer requirements for goods and services delivered without harming the environment, administrators will make choices that support the incorporation and organisation of GSC practices along the supply chain (Vachon and Klassen, 2008). It is commonly thought that supply chains and establishments can achieve competitive advantage by being the pioneers to embrace environmental sustainability and adopt GSC practices (Green et al., 2012). This study adopts the green supply chain practices that were identified by Eltayeb (2009). They conducted a study by reviewing twenty one literatures on green supply chain practices and determined that the green supply chain practices can be categorised into three main practices, namely (1) green purchasing, (2) eco-design and (3) reverse logistics.

Green Purchasing

Green products purchasing is one of the responses towards addressing environmental concerns. As green goods are somewhat new for Malaysian industries, there are limited recognized studies about green consumers, green marketing and green product in Malaysia (Shahnaei, 2012). Previous literatures in Malaysian identified, cost reductions, marketing prospects and financial earnings from the trade of green goods, to be the key reasons organisations are implementing green practices (Eltayeb, Zailani and Jayaraman, 2009). As of current, companies are gradually dealing with their environmental performance to ensure the supplies and machinery utilized by them are environmentally-friendly and are fashioned from environmentally-friendly procedures.

Largely, green purchasing concentrates on assisting organisations attain savings in the long run by keeping them from any possible losses to their brand value (Shi et al., 2012). In a wider context, green purchasing guarantees the commitment of supply chain managers towards sustainable development by obtaining or purchasing environmental friendly inputs to address the general environmental concerns (Kumar et al., 2009). Subsequently, when the virtuous of the company overlaps with the benefit of the society in which it functions, there is a synergistic consequence. Therefore, the company would benefit from improved operations management combined with increased sales as the society shifts toward sustainability and consciousness for greener products.

In addition, green purchasing specifically addresses the environmental concerns of manufacturing firms and are intended to significantly influence environmental management (Diabat and Govindan, 2011). Also, a study by Green et al. (2012) identified that green purchasing provides enhanced economic and environmental management, this leading to enriched operating and organizational outcomes. Owing to this, businesses are aiming for green purchasing among their consumers and implementations of environmental management concepts in their manufacturing processes for sustainable development (Hajli and Hajli, 2013).

Eco-Design

Eco-design includes activities that change the resources and materials utilized throughout the manufacturing procedures to be less harmful and more environmentally friendly. The main purpose of eco-design is to reduce an item's environmental effect throughout its entire life cycle. The eco-design practise assimilates environmental features into the product designing processes, keeping in mind the complete movement of the product in its supply chain (Handfield et al., 2002).

Eco-friendly or ecological design places importance on investment recapture and is identified to positively affect environmental outcomes. This has been proven in a study by Cheng and Shiu (2012) where they identified, in the manufacturing industry, teamwork with retailers and suppliers' resulted in better environmental performance. Therefore, eco-design facilitates corporations to increase environmental performance and to close the supply chain by managing product practicality while decreasing the environmental effects of product life-cycle (Zhu et al., 2008). Hence, environmentally accountable design or eco-design is a crucial GSC practice that assists firms towards realizing their goals such as replacing harmful and hazardous materials with environmentally friendly substances, decreasing resource usage, and increasing organizational obligation towards their products.

Due to standards and consumers' increasing consciousness of environmental concerns, firms must change their daily actions from design to eco-design to remain competitive. According to Lauring and Thomsen (2009), the only manner to enhance corporate sustainable development is to improvise. That is, to move to more sophisticated types such as product differentiation and innovation through eco-design. However, a substantial reduce in environmental effect is not attained by merely including a 'green' limitation but then again environmental effect is reflected from the designing stage.

Reverse Logistics

The concept of reverse logistics has been discussed in many past literatures and was initially defined as "the function of logistics in product recovery is to decrease resources, reuse, substitute resources, recycle materials, discard waste, restore, remanufacture and amend" (Lee, 2008). This decrease in resources take account of both the reduction of resources utilized in goods and the reduction of waste and energy attained through the design of environmentally-friendly goods (Gupta et al., 2013). Previously, when the alternative of decreasing resource has been used extensively, the subsequent intention was to recycle materials, and the reusing of discards through reverse logistics. Yet in organizations, reverse logistics was typically the last option employed (Gupta et al., 2013).

Through the changes of time, in the existing business setting, companies are not solely competing on a producer to producer basis, but also on supply chain to supply chain basis. Somewhat, the real competitive encounter is between supply chains (Gupta et al., 2013). Hence, establishments globally have

started understanding the significance of reverse logistics towards corporate sustainable development. Thus, companies are required to deal with the reverted goods in an efficient fashion to gain consumer's relationship and reduce the related expenses (Yacob et al., 2012). Consequently, the encouraging findings of reverse logistics among businesses through waste management provides hope to commercialize this idea and are increase practical executed. In a quantifiable manner, reverse logistics is beneficial for the enhancement of sustainable development both at the individual businesses and supply chains level (Starostka-Patyk and Grabara, 2010).

Research Design and Methodology

A survey was sent to 621 Malaysian ISO 14001 certified manufacturing companies from the Federation of Malaysian Manufacturers (FMM) directory 2014 of Malaysian Industries (FMM, 2014). This research was carried out using a 7-point Likert scale for environmental development. The scales are from 1= a small extent to 7= a large extent. The items were adopted from Chow and Chen (2012). For green purchasing, eco-design and reverse logistics, this study uses a 5-point Likert scale. The scales are from 1= not at all to 5= very high extent. The items were adopted from Eltayeb (2009).

The questionnaires were e-mailed to the respondents. After three reminder emails, two postal mails and in-person surveys, 146 completed questionnaires were received. With a total of 146 usable questionnaires, the response rate was 23.51%. The response rate is considered adequate given the low levels of reply from mail and electronic mail surveys (Sekaran and Bougie, 2013) and generally low response rate for this sort of correlational study in Malaysia. The response rate of this study is also recognised to be satisfactory in relation to similar studies in Malaysia, such as Eltayeb (2009) whose research on green supply chain initiatives stated a 23.9% response rate and Vachon and Klassen (2006) whose research on green supply chain initiatives attained a response rate of 23%.

SPSS (Statistical Package for Social Science) software for Windows release 21.0 was used to analyse the data. The profile of responding firms are shown in Table 1. The table indicates that most organisations (32.9%) are from the electrical and electronics industry and the second highest being from the wood and furniture industry at 17.1%. The remaining percentages were distributed between the metal and machinery, chemicals, food and beverage, rubber and plastic, paper, textile and apparels and finally the other industries. From the table, it can also be observed that there are only a few newly started up organisations (5.5%) and most of the firms are well established and have been functional for more than 15 years (83.6%). Likewise, most organisations are noticeably large firms with exceeding 250 employees (75.3%).

Table 1: Profile of Responding Firms

Variable	Categories	Frequency	Percentage
Type of Industry	Electrical & Electronics	48	32.9
	Chemicals	11	7.5
	Food & Beverage	8	5.5
	Rubber & Plastic	3	2.1
	Textile & Apparels	1	0.7
	Paper	2	1.4
	Wood & Furniture	25	17.1
	Metals & Machinery	15	10.3
	Others	33	22.6
Age of Firm	Less than 5 years	8	5.5
	5 – 9 years	5	3.4
	10 – 15 years	11	7.5
	More than 15 years	122	83.6
Number of	Less than 100	14	9.6
Employees	100 – 250	22	15.1
	251 – 500	40	27.4
	501 – 1000	40	27.4
	More than 1000	30	20.5

Results and Discussion

A study by Chiarini (2013) reported that, components of social influence, environmental concern, green product knowledge, and environmental labeling are significantly related toward green purchase behavior by organizations. Therefore, towards pursuing sustainable development goals and preserving the environment, implementing green purchasing practices in organizations is essential (Su et al., 2008). Thus this study hypothesizes that:

H1. Green purchasing has a positive effect towards environmental development.

This design for "green" is sometimes referred to or defined as design for the environment. Whereby, the purpose of eco-design is to reduce products' environmental effect without causing an undesirable trade-off with other design standards, such as prices and utility for sustainability. Thus, eco- design emphasises investment recovery and will positively influence the sustainable development of organisations by decreasing the environmental effect of designs (Green et al., 2012). Thus this study hypothesizes that:

H2. Eco-design has a positive effect towards environmental development.

The concept of reverse logistics has been defined as "the part played by logistics in merchandise returns, decreasing sources, recovering, materials replacement, reuse of materials, waste removal and restoring, mending, and remanufacturing" (Lee, 2008). It is essential for manufacturers to handle the reimbursed

merchandises in an optimal manner to improve customer's relationship and reduce the related charges (Yacob et al., 2012). Reverse logistics aids the practical application of sustainable development both at individual business and supply chain levels (Starostka-Patyk and Grabara, 2010). Thus this study hypothesizes that:

H3. Green purchasing has a positive effect towards environmental development.

Regression analysis was conducted to test the hypotheses. Results of the regression analysis of green supply chain practices on environmental development are shown in Table 2.

Table 2: Multiple Regression Result: Effect of Green Supply Chain Practices on Environmental Development

Variables	DV: Environmental Development		
	Standard Beta	t-value	p-value
Green purchasing	0.215*	2.531	0.012
Eco-design	0.264**	3.070	0.003
Reverse logistics	-0.038	-0.453	0.651
F value	4.476**		
R^2	0.140		
Adjusted R^2	0.109		
R^2 change	0.127		
F change	6.721**		

Significant levels: *p<0.05, **p<0.01

Referring to Table 2, green purchasing (β= 0.215, p<0.05) showed a significant effect on environmental development. By implementing green supply chain practices, firms generally gain a competitive advantage by adapting their internal and external aspects of their firm. In this study, it has been identified that green purchasing does not only provide internal benefits to the firm but also external benefits to their suppliers. In other words, green purchasing practices in firms reflects on their suppliers, besides the focal firm. This view is supported by Rao (2006), where he stated that generally, green purchasing encourages effectiveness and cooperation amongst business partners and their main companies. In addition, green purchasing also has a significant effect on the company's commitment to the society, environmental development, decreasing waste and attaining cost savings.

This study also identified that eco-design (β= 0.264, p<0.01) has a significant effect on environmental development. Results from this study identified a significant effect between eco-design and environmental development. Eco-design, in contrary to green purchasing and reverse logistics, is an internally-focused type of green supply chain practice. This means, firms try to improvise the environmental qualities of its goods internally, with some collaboration or interface from external groups, such as suppliers and consumers. Therefore, the impact is directly linked to the internal productivity and gains to the company. A past study by Green Jr et al. (2012) recognized that effective adoption of green supply chain practices like eco-design, would lead to better environmental and social outcomes which includes enhanced operational and organizational productivity. Green Jr et al. (2012) also further stated, that eco-design targets to meet the requirements of consumers for eco-friendly products and services fashioned from green design.

The results of this study also identified that there were no significant relationships between reverse logistics towards environmental development. This finding can be explained through the fact that the government does not play the central role of a facilitator to provide structured responsibilities and obligations for the diverse components involved for environmental conservation and a better social living standard. Therefore, firms are not embracing reverse logistics wholly, instead, reverse logistics is viewed as an optional practice in firms. This finding is supported in past literature by Kersten (2008), where most firms do not embrace reverse logistics whole-heartedly because there is no strong government enforcement for reverse logistics to be practiced in all firms. Therefore, the ultimate potential of reverse logistics for the environment, society and the nation is yet to be achieved.

Conclusion

This study identified that there exists a statistically significant positive effect of green purchasing and eco-design towards environmental development. The findings of this study is supported by past literature by Chiou et al. (2011), where they determined that greening the supply chain within firms lead to noticeable benefits towards the social standpoint, environmental outcomes and added advantages to the corporation. Firms with green supply chain practices can position themselves to gain opportunities and influence the effect of environmental development by concentrating on green purchasing and eco-design, in order to meet environmental requirements encouraged by the government. Also in this research, the Natural Resource Based View theory was used to shed light concerning the current business environment and how firms seek to attain competitive advantage by implementing green supply chain practices for competence in forthcoming years. The findings of this research indicate that managers in Malaysian manufacturing companies have to comprehend that green supply chain practices have significant gains, in terms of satisfying the increasing demands of customers for greener products which can be directly reflected on environmental development. In line with this finding, managers in the Malaysian manufacturing industry are encouraged to amplify their implementation of green supply chain practices so as to lead towards corporate sustainable development.

Acknowledgement

The authors would like to express their appreciation to Universiti Sains Malaysia Research University (RU) Grant (1001/PMGT/816262) for the financial support to carry out this research.

References

Bansal, P. (2005), 'Evolving sustainably: A longitudinal study of corporate sustainable development,' *Strategic Management Journal,* 26, 197–218.

Baumgartner, R. J., and Ebner, D. (2010), 'Corporate sustainability strategies: Sustainability profiles and maturity levels,' *Sustainable Development*, 18, 76–89.

Cheng, C. C. and Shiu, E. C. (2012), 'Validation of a proposed instrument for measuring eco innovation: An implementation perspective,' *Technovation*, 32, 329-344.

Chiarini, A. (2013), 'Designing an environmental sustainable supply chain through ISO 14001 standard,' *Management of Environmental Quality,* 24(1), 16-33.

Chiou, T. Y., Chan, H. K., Lettice, F. and Chung, S. H. (2011), 'The influence of greening the suppliers

and green innovation on environmental performance and competitive advantage in Taiwan,' *Transportation Research Part E,* 47, 822-836.
Chow, W. S. and Chen, Y. (2012), 'Corporate sustainable development: Testing a new scale based on the mainland Chinese context,' *Journal of Business Ethics,* 105, 519–533.
Diabat, A. and Govindan, K. (2011), 'An analysis of the drivers affecting the implementation of green supply chain management,' *Resources Conservation and Recycling*, 55(6), 659-667.
Eltayeb, T. K. (2009), 'Adoption of green supply chain initiatives by ISO 14001 certified manufacturing firms in Malaysia: Key drivers, outcomes, and moderating effect of relationship orientation,' (Doctoral dissertation). Retrieved from USM Dissertations and Theses database. (Call No. HD38.5. T236 2009 f rb)
Eltayeb, T. K., Zailani, S. and Jayaraman, K. (2009), 'The examination on the drivers for green purchasing adoption among EMS 14001 certified companies in Malaysia,' *Journal of Manufacturing Technology Management, 21*(2), 206-225.
Erol, I., Caka, N., Erel, D., and Sari, R. (2009), 'Sustainability in the Turkish retailing industry,' *Sustainable Development*, 17, 49–67.
Gonzales, J., Sakundarini, N., Ariffin, R. and Taha, Z. (2010), 'Integrated eco-design tools for Malaysian automobile industry,' *Journal of Advanced Computational Intelligence and Intelligent Informatics*, 14(1), 47-59.
Green, K. W., Pamela J. Z., Meacham, J. and Bhadauria, V. S. (2012), 'Green supply chain management practices: impact on performance,' *Supply Chain Management: An International Journal*, 17(3), 290 – 305.
Gupta, V., Abidi, N., Bansal, T., and Jain, R. K. (2013), 'Green supply chain management initiatives by IT companies in India' *IUP Journal of Operations Management,* 12(2), 6-24.
Hajli, M. and Hajli, M. (2013), 'Organisational development in sport: co-creation of value through social capital,' *Industrial and Commercial Training*, 45(5), 283-288.
Handfield, R. B., Walton, S. V., Sroufe, R. and Melnyk, S. A. (2002), 'Applying environmental criteria to supplier assessment: a study in the application of the analytical hierarchy process,' *European Journal of Operational Research*, 141(1), 70-87.
Kersten, W. (2008) Global logistics management: Sustainability, Quality, Risks. Erich Schmidt Verlag GmbH & Co KG.
Kumar, V., Choisne, F., Grosbois, D. and Kumar, U. (2009), 'Impact of TQM on company's performance,' *International Journal of Quality & Reliability Management*, 26(1), 23-37.
Lauring, J. and Thomsen, C. (2009), 'Collective ideals and practices in sustainable development: managing corporate identity,' *Corporate Social Responsibility and Environmental Management*, 16, 38-47.
Lee, S-Y. (2008), 'Drivers for the participation of small and medium-sized suppliers in green supply chain initiatives,' *Supply Chain Management: An International Journal*, 13(3), 185–198.
Lindgreen, A., Antioco, M., Harness, D., and van der Sloot, R. (2009), 'Purchasing and marketing of social and environmental sustainability for high-tech medical equipment,' *Journal of Business Ethics*, 85, 445–462.
Montabon, F., Sroufe, R. and Narasimhan, R. (2007), 'An examination of corporate reporting, environmental management practices and firm performance,' *Journal of Operations Management*, 25, 998–1014.
Orlitzky, M. (2008) Corporate social performance and financial performance: A research synthesis. In A. Crane, A. McWilliams, D. Matten, J. Moon, D. Siegel, (Eds.), 2008, The Oxford handbook of corporate social responsibility, (112-134). Oxford, UK: Oxford University Press.
Osterle, H., Becker, J., Frank, U., Hess, T., Karagiannis, D., Krcmar, H., Loos, P., Mertens, P., Oberweis, A. and Sinz, E. J. (2010), 'Memorandum on design-oriented information systems research,' *European Journal of Information Systems*, 20(1), 7-10.
Pradeep J. (2012), 'Effect of environmental concern and social norms on environmental friendly behavioral intentions,' *Business Intelligence Journal*, 169-175.
Prahinski, C., and Kocabasoglu, C. (2006), 'Empirical research opportunities in reverse supply chains,' *Omega*, 34(6), 519–532.

Rahman, M. N. (2012), 'The effective implementation of global supply chain management in small to medium-sized companies in Malaysia: An empirical study,' *International Journal of Management,* 29(3), 2.
Rao, P. (2006) Greening of suppliers/in-bound logistics in the South East Asian context. In Sarkis, J. (Ed.), Greening the supply chain, Chapter 11, Springer, London, 189-204.
Saaty, T. L. and Peniwati, K. (2008) Group decision making: drawing out and reconciling differences. RWS Publication, Pittsburgh, PA.
Schianetz, K., and Kavanagh, L. (2008), 'Sustainability indicators for tourism destinations: A complex adaptive systems approach using systemic indicator systems,' *Journal of Sustainable Tourism*, 16(6), 601–628.
Shahnaei, S. (2012), 'The relationship between demographic characteristics and green purchasing of Malaysian consumers,' *Interdisciplinary Journal of Contemporary Research in Business*, 4(3).
Sharma, S. (2002) What really matters: Research on corporate sustainability? In S. Sharma & M. Starik (Eds.), Research in corporate sustainability: The evolving theory and practice of organizations in the natural environment (1–29). Northampton, MA: Elgar.
Sharma, S. and Vredenburg, H. (1998), 'Proactive corporate environmental strategy and the development of competitively valuable organizational capabilities,' *Strategic Management Journal*, 19(8), 729–753.
Shi, V. G., Koh, S.C. L., Baldwin, J. and Cucchiella, F. (2012), 'Natural resource based green supply chain management,' *Supply Chain Management: An International Journal*, 17(1), 54–67.
Starostka-Patyk, M., & Grabara, J. K. (2010), 'Reverse logistics processes in industrial waste management as an element of sustainable development,' *Annales Universitatis Apulensis : Series Oeconomica,* 12(2), 698-707.
Su, Q., Li, Z., Zhang, S. X., Liu, Y. Y. and Dang, J. X. (2008), 'The impacts of quality management practices on business performance: an empirical investigation from China,' *International Journal of Quality & Reliability Management*, 25(8), 809-823.
Vachon, S. and Klassen, R. D. (2006), 'Extending green practices across the supply chain: The impact of upstream and downstream integration,' *International Journal of Operations & Production Management*, 26(7), 795-821.
Vachon, S. and Klassen, R. D. (2008), 'Environmental management and manufacturing performance: the role of collaboration in the supply chain,' *International Journal of Production Economics*, 111 (2), 299-315.
WCED (1987) Our Common Future: The Brundtland Report. Oxford University Press, Oxford.
Yacob, P., Makmor, M. F. M., Zin, A. W. B. M., and Aziz, N. S. B. (2012), 'Barriers to reverse logistics practices in Malaysian SMEs,' *International Journal of Academic Research in Economics and Management Sciences,* 1(5), 204-214.
Yam, S. (2012), 'The practice of corporate social responsibility by Malaysian developers,' *Property Management*, 31(1), 76-91.
Zhu, Q., Sarkis, J. and Lai, K.H. (2008), 'Green supply chain management implications for "closing the loop",' *Transport Research Part E,* 44(1), 1-18.

Development of Agricultural Location Theory

Artem Golovin, Southwest State University, Kursk, Russia, cool.golovin2011@yandex.ru

Alexey Golovin, Southwest State University, Kursk, Russia, dr.golovin2013@yandex.ru

Marina Parkhomchuk, Southwest State University, Kursk, Russia, marinaanatollevna@yandex.ru

Abstract

Having studied the location theories developed by world scholars it was concluded that the attention paid to the location theory of agriculture was insufficient. J.Thünen is one of the few scholars who considered the issues of farming location. However, economic environment has changed significantly, transportation costs are no more the main ones, and production gravitates towards market outlets and resources. Agricultural resources include financial (the most mobile), human (less mobile) and land (not mobile) resources. Therefore, in present-day conditions there is a need for the development of the theory of location considering human resources and market outlets. Labor input in the sphere of crop farming and livestock breeding was analyzed, and on this basis, levels of farming location were offered. Implementation of the developed approach to agricultural location can ensure sustainable development of rural areas through conservation and development of human resources in rural areas and increase of efficiency due to heavy, large-size production location close to agricultural product processing centers.

Keywords: location theory, agriculture, human resources, labor cost, efficiency, Russian Federation.

Introduction

Since first theories of location appeared, significant changes have taken place both in production and people's life on the whole. Most theories were focused on a transportation constituent, which was caused by inferiority of roads, vehicles and methods of products preservation. Modern production is provided with good hard-surfaced roads, efficient freight transport and products processing providing commodities transportation over long distances. There is an adverse trend of rural depopulation in Russia. The reasons of the depopulation are rural unemployment, low level of infrastructure development, insufficient efficiency of farming and demographic problems. Development of a modern theory of agricultural location, relevant for current conditions of the economic environment, will ensure efficient use of human resources, increase efficiency of farming and provide stable conditions of the economy.

The purpose of the studies is to develop a theory of agricultural location meeting the current requirements of national economy performance.

To achieve the goal it is necessary to accomplish the following tasks:

– to study existing theories of location;

– to reveal specific features of the theory of location;

– to substantiate the choice of production location based on labor costs;

– to estimate labor costs for main branches of farming in the Russian Federation;

– to develop the location scheme of the regional farming.

The object of the research is social and economical processes mediating location of agricultural production branches.

The subject of the research is economic relations in the field of agricultural location.

Working hypothesis is in a scientific guess supposing that reasonable farming location based on labor costs will even and sustain living standards for the population of the region and provide efficient location.

Theoretical and methodological basis of the research includes some theoretical propositions, methodological approaches and philosophy, results of the research of Russian and foreign scholars in the field of production location.

The following methods were applied: abstract-logical, comparative methods, methods of grouping and case study, statistic analysis and system analysis methods. Tabulated graphical forms were used for material presentation, systematization and scientifically grounded interpretation of the empirical data.

The information - empirical base of the research includes scientific papers devoted to the problem under study, materials of the Federal Service for National Statistics of the Russian Federation, data from financial and economic reports on Russian Federation agricultural producers, results of research of regional scientific research institutions, monographic and economic research data, printed media and Internet materials.

Results and Discussion

The founder of the theory of location was J.Thünen. In his paper "The Isolated State with Respect to Agriculture and Political Economy" some patterns of agricultural location were defined (Thünen, 1826).

J.Thünen studied agricultural production location on the basis of an abstract model of the isolated state with a city in its centre which is the only market outlet and an industrial products supplier. The difference between prices for both farming and industrial products is the difference between transport costs for products transportation to the market outlet. On the basis of difference in transport costs per product unit, J. Thünen highlighted the best areas for the location of production of certain types of products. In this way J. Thünen proved the fact that the higher the productivity is, the closer to the market the production shall be located and, correspondingly, vice versa, the lower the production intensity is, the farther from the market outlet it is located.

J. Thünen developed a model of six concentric rings or areas. In the centre there is a central city, the consumer of farming and industrial products.

The first level is for a free farmstead located in the suburban area. Gardening and stabled cattle-breeding are the basis of the area. This level is characterized by high-technological and intensive production. To support soil fertility organic fertilizers are used, there are no fallows at all. It should be mentioned that there are no organized crop rotation in its pure form.

The second level is for forestry. Its proximity to the centre is accounted for by high production volumes and consequently, heavy transport costs. Large volume of consumed at that time wood was due to great demand for fire wood and timber for construction.

The third level is for crop rotation farming. The number of crops includes grain, tilled crops and perennial grass in equal proportions. Livestock is kept stabled. There are no fallows, and soil fertility is supported by organics and perennial grass in crops rotation.

The fourth level is for ranching, the land is used less intensively. More than 40% of the used land is for cattle grazing, and in the rest part of the area grain crops are grown and a considerable area is provided for fallows. Grains, livestock for slaughter, and animal products (butter, fat etc.) are transported to the market.

The fifth level is for a three-course farming system where shares for fallows, winter and spring crops are equal. The major specialization is grain farming and cattle-breeding for farmer's own needs. There are small meadows and pastures to provide animals with fodder.

The sixth level is for cattle and sheep-breeding. Farming is extensive. The most part of land is range lands and hay meadows, grains are grown for farmer's own needs. The main products are meat, wool, skins and other animal products.

Some drawbacks of Thünen's model are its abstract character, a limited number of factors, and a large number of restrictions. Nevertheless, J.Thünen laid the foundation of agricultural location and application of abstract mathematical models in economics.

W. Launhardt was another scientist who studied the issues of the theory of location. Location of an industrial plant was the main subject of his concern. He like Thünen, was focused on transportation costs. He proceeded from the abstract model where production costs are similar through the whole territory and the point of optimal location is closely connected with the weight of transported products and transport costs. As a result, he developed a location triangle (Launhardt, 1882).

Launhardt's weight or location triangle is the first model aimed at the solution of the problem of optimal location of production. The positive aspect of Launhardt's model is a great number of points of sources of raw materials in case a convex polygon is formed, and the negative aspect is the fact that only transportation costs are taken into consideration as a factor of industrial location.

The next scientist who significantly contributed to the theory of industrial location was A.Weber. In his work "Über den Standort der Industrie (Theory of the Location of Industries) (Weber, 1909) he developed J.Thünen's and Launhardt's theories.

He introduced new factors of industrial location, set a task to minimize all production costs, and classified the factors of industrial location according to the extent of their influence on production cost reduction. The following factors impacting industrial location were identified: raw material cost, labor cost and transportation cost. A. Weber excluded raw material cost from the analysis as taken into account in transportation costs. He called other factors impacting industrial location, "united agglomeration", which was the third factor of production location. Each factor was analyzed to find the optimal location for an enterprise.

To find the optimal point of transportation Launhardt's location triangle is used. Production with a significant material index is located closer to sources of raw materials; production with a low index is located closer to consumption centers.

At the next stage, location of labor is taken into consideration. A settlement attracts production to it, and production moves to it from the transportation point if labor cost saving exceeds transport cost saving.

To consider a joint impact of transport and labor orientation A.Weber offered to use isodapanes. Transport costs increase caused by the relocation of the production to the point of human resources is even in all directions. Due to this there are points with similar growth of transport costs and lines connecting these points are called isopadanes.

At the final stage of production location, agglomeration orientation of an enterprise is defined. To estimate agglomeration changes A.Weber used a saving index based on cost savings and increase in production output.

Analysis of the influence of agglomeration factors assumes exclusion of other factors impact except for transport costs. On the basis of transportation orientation, production alterations in transport points caused by the influence of agglomeration factors are found. These changes are efficient if the effect of agglomeration is higher than costs for relocation.

Location of agglomeration production takes place on the bases of drawing isodapanes around transportation points. Some isodapanes are critical ones, i.e. transportation cost over-expenditure is equal to the effect of production agglomeration. According to A.Weber, production relocation from transportation points is feasible if these producing units are not beyond their critical isodapanes connected in one place.

An indispensable condition of production location is availability of close market outlets which are concentrated mostly in settlements. Theory of industrial location with consideration for settlements availability was developed by W.Christaller. Christaller did not rely on the study of the existing system and location regularities but proceeded from the concept of ideal production location.

In his work "Central places in Southern Germany" W.Christaller proceeded from the idea of ideal conditions of location, i.e. is a valley with equally fertile soils and even distribution of population. Specialization, growth of commodity production and product range cause a gap between production centers and centers of consumption (Christaller, 1933).

Central places according to W. Christaller are production centers, providing themselves and some areas with commodities. According to the theory of central places, production distribution areas are formed as regular hexagons, which cover all the settled territory. W. Christaller explained why basic necessities shall be realized in all settlements, such goods as clothes, household goods etc. shall be disposed in middle-sized settlements and luxury goods only in large cities.

Each central place does not only provide its area (hexagon) with required products but also areas of settlements of the lower level. Therefore, a central place has a production distribution area in proportion to its rank.

W. Christaller's theory drawbacks are the abstract character of the model and difficulty of its implementation due to the fact that influence of climate and environment conditions, raw material locations, etc. is not taken into consideration. At the same time this theory should be regarded ideal, and in comparison with it recommendations for the improvement of the existing production location can be developed.

Location theory was further developed by A. Lösch. Using J.Thünen's, W. Launhardt's, A. Weber's ideas A. Lösch built his own theory of industrial location based on profit maximization. A. Lösch found out that location of enterprises in case of free competition is determined not only by profit maximization, but by the growth of the number of firms and coverage of all available territory. The optimal location of an enterprise is at the top of the regular hexagon of the "Christaller's grid".

An economic region according to August Lösch should be described as a market with boundaries determined by inter-regional competition. A. Lösch studied market areas defined by the radius of efficient production distribution, and an economic landscape, which is the highest level of the region which unites market areas (Lösch, 1940).

Lösch's significant contribution to the location theory is in the development of the theory of spatial economic equilibrium. Besides, he gave a mathematical description of the process of operation of the system of consumers and manufacturers, where each business entity is attached to a certain point in space. Functions of cost and demand are the components of the equilibrium model. Equilibrium is characterized by the following conditions:

1) market areas are of a minimum size and have the form of a regular hexagon;

2) enterprise location provides full coverage of the whole possible area;

3) stable equilibrium is provided by the going of the boundaries of market areas along indifference curves;

4) lack of surplus revenue;

5) location of every enterprise provides maximization of advantages both for consumers and manufacturers.

A. Lösch's significant contribution into the development of the location theory is in the developed by him mathematical tool, determining the location of the equilibrium point of the enterprise considering demand in a certain market area and production costs. Profit maximization and coverage of the whole area are the defining moments in the location of an enterprise. The abstract character of the theory and imperfection of the mathematical tool are the drawbacks of Lösch's theory. These drawbacks do not derogate his contribution into the spatial location theory.

The location theory was further developed in "Spatial Economy: Cities, Regions and International Trade" by Paul Krugman. He managed to formalize in the form of an economic model the idea of enterprise gravitation towards market outlets and materials suppliers, which leads to the concentration of production attracting a great number of enterprises (Fujita, Krugman, Venables, 2001).

Cumulative expansion of a region economy is possible only when it reaches a certain big size, then it starts growing on its own bases.

Stratification of regions according to the level of their development is explained by P. Krugman's "centre-periphery" theory. The center attracts labor, financial and material resources which are used for innovations.

Kruman's agglomeration model takes into consideration two types of goods: manufactured (M) and agricultural (A). Agricultural enterprises produce similar range of products and industrial enterprises produce different products. Production of manufactured goods is characterized by the economy of scale, and agriculture on the contrary is characterized by the absence of the economy scale.

P. Krugman defined two groups of factors important for taking the competitive advantages of regions. Natural resources and geographical location, i.e. factors independent of human activities belong to the first group. Some regions have significant natural resources - mineral, wood and land resources and some regions have favorable climatic conditions or are located on the international trade routes.

Factors of the second group are the result of human activity; high level of human capital assets development, economy of scale (agglomeration) and institutions providing economic development belong to this group.

It should be mentioned that a number of scientists criticize this Krugman's work, accusing him of the development of the theory on the basis of integration of other scientists achievements. However, in spite of the criticism P. Krugman's work is worthy of noticing.

On the basis of the studies of the theories of industrial location we see that only J. Thünen paid considerable attention to farming. Farming location was not the main subject of other academic economists' research.

Imperfection of the approaches to farming location and some gaps in the theories are the reasons for further development of this issue.

Recourses, processing centers and market outlets impact agricultural location. On this basis a number of assumptions for use of labor costs as a location index were defined.

Firstly, growth of transportation costs impacts labor costs for production of specific products as it is impossible to transport freights without any personnel.

Secondly, land resources are not mobile while financial resources are very mobile; therefore, production should be located considering human resources.

Thirdly, raw materials are hardly used in farming, so, production location gravitates to processing centers and market outlets related to settlements, which are sources of human resources.

Table 1 shows farming labor costs estimate and their further grouping according to the levels of location.

Table 1: Labor cost estimate and levels of location of branches of farming in the Russian Federation

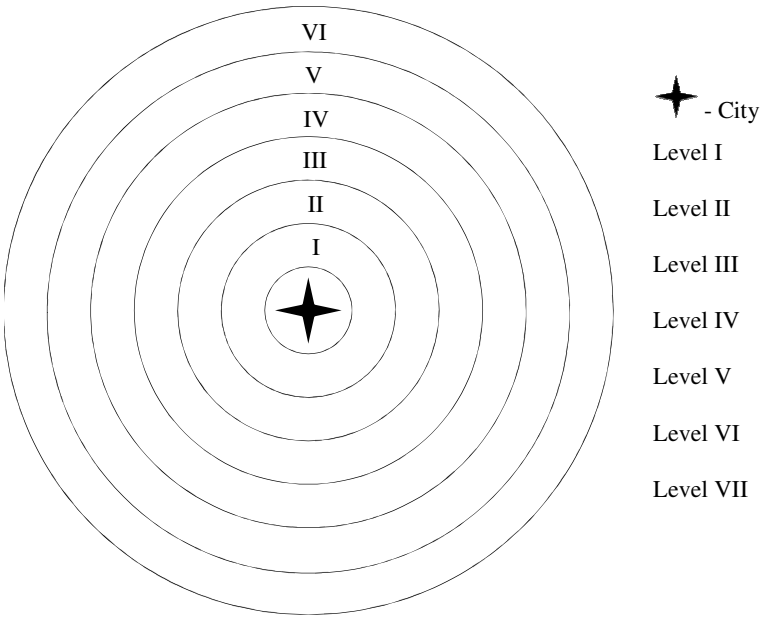
Parameter	Man-hour costs per 1 ha/1 animal unit	Level of location
Greenhouse vegetables *	25440.98	Level I
Horse-breeding	192.00	Level II
Dairy breeding	104.17	
Potato	65.24	Level III
Feeding roots and melons and gourds	44.78	
Apiculture **	33.33	Level IV
Fruit and berry crops	32.06	
Beef cattle breeding	31.23	
Field vegetables	25.20	Level V
Sugar beet	23.30	
Grain legume crops	15.65	Level VI
Maize for silage and green fodder	15.42	
Grain maize	11.01	
Soya bean	10.71	
Silage crops	10.00	
Winter cereals	9.51	Level VII
Spring cereals	9.34	
Perennial grass	8.00	
Rape	7.83	
Grain Sunflower	7.63	
Sheep and goat breeding (meat-producing)	6.88	
Grassland and pastures	5.61	
Annual grass	5.04	
Swine breeding	3.66	
Eggs	0.36	
Poultry husbandry	0.05	

Source: calculated by authors using statistical data

* – greenhouse area is represented in ha, not sq.m for relevant comparison;

** – bee-families;

Based on the conducted analysis of labor costs in farming in the Russian Federation (Table 1) there were obtained some groups; on their basis levels of agricultural location are represented in Figure 1.



Source: development of the author

Fig.1: Levels of location of farming branches

The first level is represented by greenhouse facilities and aquaculture. It is advisable to locate these types of farming production within urban territories due to the considerable labor costs. Lack of necessary information about labor costs of aquaculture facilities and difficulty of comparison of scopes of work did not allow us to include this type of activity in our research.

The second level of location is for horse-breeding and dairy breeding. It is advisable to locate these types of facilities in the suburban areas as labor costs for these activities are more than 100 man-hours per cattle. At the same time beside labor costs, dairy breeding location depends on low transportability of fresh products and high degree of processing of products.

The third level includes potato, feeding roots and cultivation of melons and gourds; high level of labor costs is caused by heavy weight of products which increases transport cost and labor cost for both cultivation and transportation.

Apiculture, beef-farming and fruit and berry crops cultivation have a high level of labor costs (31.23-33.33 man-hours, which allows us to include these types of production into the fourth level of location.

Labor costs for field vegetables and sugar beet are 25.2 and 13.3 man-hours per 1 ha of the harvested acreage respectively. They comprise the fifth level of location. It should be noted that vegetable, sugar beet and fruit and berry crops should be located in close proximity to vegetable stores, cannery and sugar plants.

The sixth level of location is for grain legume crops and feeding and industrial crops. Labor costs for these crops are 10.00-15.65 man-hours.

The seventh level is composed by crops and animal breeding which have the lowest labor costs. Grains, natural hay meadows, pastures, perennial and annual grasses, used for hay-harvesting, rape and sunflower for grains belong to the branch of plant cultivation in the seventh level of farming

location. Animal-breeding belonging to this level is sheep-, goat and swine - breeding and poultry and eggs production.

The formation of levels should be based on cluster technologies and creation of food internal regional clusters, which ensures efficiency improvement of farming due to the agglomeration effect.

Therefore, it is recommended to locate the most labor-consuming production in close proximity to settlements, which will provide rational use of human resources, including minimum migration and minimization of transport costs for population for commuting and products transportation to the centers for products realization and processing.

Conclusions

For the last century, technologies, forms and methods of farming have changed considerably; significant human resources are not required any more. These processes have led to rural population migration, reduction of the number of rural settlements, considerable part of which is by less than 60 % inhabited compared with the level of 1989, and some settlements ceased to exist. The proposed system of farming location will enable efficient use of human resources on the basis of their concentration. High concentration of population will in its turn enable decrease of migration processes and costs of state authorities for the support of underpopulated and dying out settlements. Rational peripheral farming location will provide local population with working places and decrease over-population of the regional centers.

Beside the use of labor cost in the proposed model it is necessary to apply environmental standards, soil, climate and natural conditions and take into account the state of the market.

Theoretical relevance of the research is in the development of the theory, methodological support and substantiation of measures for rational location of farming considering labor costs.

The results of academic and research work devoted to rational region farming location can be used to substantiate the trends of the development and increase of the efficiency of the farming sector of the region or the country as well as to achieve sustainable development of rural areas.

References

Christaller, W. (1933), *'Die zentralen Orte in Süddeutschland. Eine ökonomisch-geographische Untersuchung über die Gesetzmäßigkeit der Verbreitung und Entwicklung der Siedlungen mit städtischer Funktion'*

Fujita, M., Krugman, P., Venables., A. (2001), *'The Spatial Economy: Cities, Regions, and International Trade'*, 367

Launhardt, W. (1882), 'Die Bestimmung des zweckmässigsten Standortes einer gewerblichen Anlage' *Zeitschrift des Vereines deutscher Ingenieure*, v.26 (Mar), 106-115

Lösch, A. (1940), *'Die räumliche Ordnung der Wirtschaft: eine Untersuchung über Standort, Wirtschaftsgebiete und internationalem Handel'*

Thünen, J. (1826), *'Der isoli[e]rte Staat in Beziehung auf Landwirtschaft und Nationalökonomie, oder Untersuchungen über den Einfluß, den die Getreidepreise, der Reichthum des Bodens und die Abgaben auf den Ackerbau ausüben'*

Weber, A. (1909), *'Über den Standort der Industrie. Bd. 1: Reine Theorie des Standorts'*

An analysis of innovation framework conditions between Poland and the other Moderate Innovators countries

Aleksandra Zygmunt, Opole University of Technology, Opole, Poland, a.zygmunt@po.opole.pl

Abstract

Innovation stimulate economic growth. Regarding the role of innovation in adaptation of countries, regions and firms to dynamic environment and enhancing their competitiveness, it is important to explore how innovation framework conditions in Poland differ from the other the EU countries with a similar to Poland level of innovation. Thus, the particular emphasis was put on Moderate Innovators countries. Hence, the aim of this paper is to investigate how innovation framework conditions in Poland differ from the other the EU countries with a similar to Poland level of innovation. To study multivariate analysis and the zero unitarization methods were applied. These methods allowed to divide Moderate Innovators countries into four groups and to multivariate analysis of the main drivers of innovation performance external to the firm. The time period was 2009–2015 and was limited by data availability. The study was based on data from the European Innovation Scoreboard 2017 related to innovation framework conditions dimensions: human resources, attractive research systems and innovation-friendly environment. This paper contributes to the existing literature by providing new insight on understanding the issues in regard to innovation framework conditions. The analysis revealed, among others, the necessity to strengthen in Poland actions to enhance main drivers of innovation performance external to the firm. It is assumed that the obtained results may be useful for country, regions and firms in fostering competitiveness.

Keywords: innovation framework conditions, Moderate Innovators countries, the European Union.

Introduction

The circumstances of rapid changes impact on countries, regions and firms. Keeping up with changes, it seems necessary to maintain and foster the capacity to competitive advantage. In this regard, a fundamental driver of competitiveness and economic growth is innovation. The importance of innovation to enhance competiveness of countries, regions and firms has been widely argued in the economic literature (see, e.g., Huggins & Thompson, 2015, 103-128; Fagerberg *et al*., 2012, pp. 1121-1131), especially in endogenous growth theory and knowledge spillovers theory. In particular, above theories put emphasis on the linkage between competiveness of countries, regions and firms (see, e.g., Asheim *et al*., 2011, pp. 1133-1139; Huggins & Williams, 2011, pp. 909-910). When considering this issue, the essential for economic growth is create appropriate conditions for innovation (Asheim *et al*., 2016, pp. 1-19). Against this background, the particular emphasis should be put on drivers of innovation performance. Regarding the significance of the country and regional policy to support competitiveness enhancing, the crucial are innovation drivers external to the firm.

Concerning the above, it is very important to explore how the main drivers of innovation performance external to the firm differ between countries with a similar level of innovation. Hence, the aim of this paper is to investigate innovation framework conditions in Poland against the other Moderate Innovators countries.

The study was carried out under theoretical and empirical analysis of the problem based on a related literature review and data from the European Innovation Scoreboard (EIS) related to Moderate Innovators

countries (the EU countries with innovation performance below that of the EU average). The time period is 2009–2015 and is limited by data availability.

The paper is organized as follows: First part presents a short overview of the literature on innovation framework conditions. Second part provides methods of the research. Next part presents the findings. Last part concludes the paper.

This paper contributes to the existing literature by providing new insight on understanding the issues related to innovation framework conditions. In order to understand the differences between Moderate Innovators countries in context of the main drivers of innovation performance external to the firm, the zero unitarization method and multivariate analysis were applied. These methods enabled to division of Moderate Innovators countries into four groups related to the level of indicators of innovation framework conditions.

Theoretical Background and Hypothesis Development

There is a widespread agreement in the academic literature that innovation is a key factor of development of country, regions and firms (see, e.g., Asheim *et al*., 2011, pp. 1133-1139; Huggins & Thompson, 2015, 103-128). With this regard, particularly salient is cooperation between regions and firms. Hence, achieved cooperation will enhance the competitive advantage of country, regions and firms. However, for such cooperation, suitable framework conditions for stimulation innovation are required. In this context, since early to current state of literature on innovation a strong emphasis is put on innovation drivers (see, e.g., Grillitsch & Nilsson, 2015, pp. 299-321; Florida *et al*., 2008, pp. 615-649) and the importance of combination of exogenous and endogenous drivers of regional development in shaping conditions for fostering the competitiveness of country, regions and firms (Barca, 2009, pp. 1-244). As regards firm capabilities in increasing innovation performance the special attention is put, among others, on leadership practices, development of individual knowledge, employees' skills and innovativeness, support culture (Lawson & Samson, 2001, pp. 377-400), investment, innovation activity (Zygmunt A., 2015, pp. 89-92) and project and firms' management (Maj, 2016, pp. 123-130; Bębenek, 2017).

On the other hand, the circumstances of dynamic environment enhance also the role of drivers of innovation performance external to the firm. In this respect, the contribution of the national and regional innovation systems in foresting innovation and increasing competitiveness, is crucial and connected with innovation-friendly environment, attractive research systems and human resources. From this point of view, such contribution is essential for creation network between, among others, research organisations, institutional environment, universities and firm (see, e.g., Asheim *et al*., 2016, pp. 1-19). Hence, the key role played knowledge spillovers and knowledge bases. Thus, human capital as an important driver of innovation performance external to the firm, is highlighted. According to a number of theoretical and empirical studies, human capital "operates by increasing regional income and wealth" (Florida *et al*., 2008, pp. 615-649) and become "a meaningful determinant for generating business growth" (Zygmunt J., 2017, pp. 226-236). In this context, the significance is put on the quality of human capital (see, e.g., Asheim *et al*., 2016, pp. 1-19), measured, among others, by the percentage of adults in the population with a bachelor's degree and above (Lee *et al*., 2004, pp. 879-891). A wide body of empirical literature assessing also the role of attractive research system as the essential driver of innovation performance external to the firm. The argument put forward here is that research system generates knowledge necessary for stimulation innovation performance (see, e.g., Asheim *et al*., 2011, pp. 1133-1139). This requires, among others, scientific research inputs for firms (Tödtling *et al*., 2006, pp. 1133-1139) and conferences and specialized journals (Fagerberg *et al*., 2012, pp. 1121-1131). Innovation performance external to the firm depends also on innovation-friendly environment. This highlights, among others, the growing importance of opportunity-driven entrepreneurship, as the core to "access and exploit knowledge and generate innovation" (Huggins & Thompson, 2015, 103-128).

An increasing rank of drivers of innovation performance external to the firm in foresting innovation and competitiveness, requires undertake studies how the main drivers of innovation performance external to the firm differ between countries with a similar level of innovation. Hence, the following hypothesis was posed: despite Poland belongs to the group of the EU countries with a similar level of innovation, innovation framework conditions in Poland differ from the other Moderate Innovators countries.

Methods of the Research

The data of this study were extracted from the last report of the European Innovation Scoreboard (European Commission, 2017) and refers to the main drivers of innovation performance external to the firm. In this respect, the EIS contains three dimensions regarding to human resources, attractive research systems and innovation-friendly environment. These dimensions and their eight specific indicators are consistent with endogenous growth theory and knowledge spillovers theory. The study uses data concerning Moderate Innovators countries, such as: Croatia, Cyprus, Czech Republic, Estonia, Greece, Hungary, Italy, Latvia, Lithuania, Malta, Poland, Portugal, Slovakia, and Spain. The time period was 2009–2015 and was limited by data availability. The descriptive statistics of diagnostic variables (mean, standard deviation, minimum, maximum) are presented in Table 1.

Table 1: Descriptive statistics of diagnostic variables

Variables			Mean	St. Dev.	Min.	Max.
Human resources	x_{1t}	New doctorate graduates	1.24	0.67	0.30	2.69
	x_{2t}	Percentage population aged 25-34 having completed tertiary education	34.05	9.01	22.41	51.46
	x_{3t}	Percentage population aged 25-64 participating in lifelong learning	6.90	2.90	3.00	12.04
Attractive research systems	x_{4t}	International scientific co-publications per million population	451.71	166.24	201.42	763.67
	x_{5t}	Top 10% most cited publications	7.06	1.98	3.81	9.79
	x_{6t}	Foreign doctorate students	8.75	5.47	1.06	20.98
Innovation-friendly environment	x_{7t}	Broadband penetration	8.03	4.76	0.14	16.71
	x_{8t}	Opportunity-driven entrepreneurship	2.15	0.97	0.78	4.18

Source: own calculations based on data from the European Innovation Scoreboard 2017 (European Commission, 2017).

All diagnostic variables distinguish sufficient variability (coefficient of variation is higher than 0.1).

In order to investigate how innovation framework conditions in Poland differ from the other Moderate Innovators countries, the zero unitarization method and multivariate analysis were applied. These methods provides a basis for an analysis the differences between the European Union countries (Balcerzak, 2015, pp. 190-205) and "enable comparing the values of synthetic index for all years" (Balcerzak, 2015, pp. 191). Thus, four classes of Moderate Innovators countries were grouping: (i) the countries with the very high level of indicators of innovation framework conditions, (ii) the countries with the high level of indicators of innovation framework conditions, (iii) the countries with the average level of indicators of innovation framework conditions, (iv) the countries with the low level of indicators of innovation framework conditions. Such grouping was done with regard to each of the EIS innovation

dimensions related to the main drivers of innovation performance external to the firm: human resources, attractive research systems and innovation-friendly environment.

At first, the normalisation of diagnostic variables was conducted. In this regard a constant reference point (the range of the normalized variable) was calculated, according to the zero unitarization method (Kukuła & Bogocz, 2014, pp. 7):

$$R(X_{jt}) = \max_{it} x_{ijt} - \min_{it} x_{ijt} \qquad (1)$$

In order to normalise diagnostic variables the following formula was used (all diagnostic variables are the stimulants) (Kukuła & Bogocz, 2014, pp. 7):

$$z_{ijt} = \frac{x_{ijt} - \min_{it} x_{ijt}}{\max_{it} x_{ijt} - \min_{it} x_{ijt}} \qquad (2)$$

, where $z_{ijt} \in [0,1]; (i = 1,2,\dots,n); (j = 1,2,\dots,m); (t = 1,2,\dots,l)$

Subsequently, the synthetic measure was calculated in compliance with the following formula (Balcerzak, 2015, pp. 196):

$$SM_{it} = \frac{1}{m}\sum_{j=1}^{m} z_{ijt} \qquad (3)$$

, where $z_{ijt} \in [0,1]; SM_{it} \in [0,1]; (i = 1,2,\dots,n); (j = 1,2,\dots,m); (t = 1,2,\dots,l)$

Next, on the basis of the synthetic measure and assumptions for grouping the EU countries proposed by Balcerzak (Balcerzak, 2015, pp. 196), the division of Moderate Innovators countries into four groups was made:

(i) the countries with the very high level of indicators of innovation framework conditions:

$$SM_{it} \geq \overline{SM_{it}} + S(SM_{it}) \qquad (4)$$

, where $(i = 1,2,\dots,n); (t = 1,2,\dots,l)$

(ii) the countries with the high level of indicators of innovation framework conditions:

$$\overline{SM_{it}} \leq SM_{it} < \overline{SM_{it}} + S(SM_{it}) \qquad (5)$$

, where $(i = 1,2,\dots,n); (t = 1,2,\dots,l)$

(iii) the countries with the average level of indicators of innovation framework conditions:

$$\overline{SM_{it}} - S(SM_{it}) \leq SM_{it} < \overline{SM_{it}} \quad (6)$$

, where $(i = 1,2, \dots, n)$; $(t = 1,2, \dots, l)$

(iv) the countries with the low level of indicators of innovation framework conditions:

$$SM_{it} < \overline{SM_{it}} - S(SM_{it}) \quad (7)$$

, where $(i = 1,2, \dots, n)$; $(t = 1,2, \dots, l)$

Where (Balcerzak, 2015, pp. 196):

$$\overline{SM_{it}} = \frac{1}{n}\sum_{j=1}^{n} SM_{it} \quad (8)$$

, where $(i = 1,2, \dots, n)$; $(t = 1,2, \dots, l)$

$$S(SM_{it}) = \sqrt{\frac{1}{n}\sum_{i=1}^{n}(SM_{it} - \overline{SM_{it}})^2} \quad (9)$$

, where $(i = 1,2, \dots, n)$; $(t = 1,2, \dots, l)$

Above procedure allowed to investigate how innovation framework conditions in Poland differ from the other Moderate Innovators countries.

Findings

Tables 2 to 4 depict the results of multivariate analysis of innovation framework conditions between Moderate Innovators countries (in appendix). In compliance with the obtained results, the main drivers of innovation performance external to the firm differed in Poland from the EU countries with a similar to Poland level of innovation (in 2009-2015). Regarding human resources dimension, the results distinguished relatively high diversity between Moderate Innovators countries, in level of new doctorate graduates, percentage population aged 25-34 having completed tertiary education and percentage population aged 25-64 participating in lifelong learning (Table 2). Among these countries, Poland rank predominantly with average level of innovation framework conditions in the field of human resources. In this regard, Poland highlighted high similarity with such countries as Hungary and Italy. On the other hand, the results indicate in Poland decreasing level of new doctorate graduates, percentage population aged 25-34 having completed tertiary education and percentage population aged 25-64 participating in lifelong learning. This situation should be treated as negative in relation to build a competitive advantage of country, regions and firms. The results also reveal the highest diversity between Poland and Estonia,

Portugal and Spain - countries with the highest level of indicators connected with human resources dimension.

Concerning attractive research systems dimension, the results indicate location of Poland in the last place between Moderate Innovators countries (Table 3). This situation was seen in the period 2009-2015 and should be treated as negative in regard to maintain and enhance the capacity to competitive advantage of country, regions and firms. Based on the results, the high distance between Poland the other Moderate Innovators countries appeared with respect to Estonia, Portugal, Cyprus, Italy and Spain. According to the obtained results, similar to Poland, low level of international scientific co-publications per million population, top 10% most cited publications and foreign doctorate students, distinguished such countries as Malta (in 2011) and Lithuania (in 2012-2015).

Regarding innovation-friendly environment dimension, the obtained results highlight a relatively high distance between Poland and the other countries with a similar level of innovation (Table 4). Among Moderate Innovators countries, Polish firms ranked into average group (in 2009, 2013-2015) and low group of countries (in 2010-2012). This situation, in relation to relatively lack of enhancement of broadband penetration and opportunity-driven entrepreneurship should be treated relatively negative, especially in the context of enhancing competitiveness of country, regions and firms. With respect to innovation framework conditions in the field of innovation-friendly environment, Poland differed significantly from especially such Moderate Innovators countries as: Portugal, Lithuania, Italy and Estonia.

Conclusions

The results confirm that in terms of the main drivers of innovation performance external to the firm, Poland differed (in 2009-2015) from the other Moderate Innovators countries. With respect to innovation framework conditions, Poland outstand the most from the group of the EU countries with a similar level of innovation, in terms of attractive research systems dimension. In particular, Poland characterised the lowest level of international scientific co-publications per million population, top 10% most cited publications and foreign doctorate students. Such situation, against the background of decreasing level of new doctorate graduates, percentage population aged 25-34 having completed tertiary education, percentage population aged 25-64 participating in lifelong learning, and relatively low level of specific indicators depicted innovation-friendly environment, may cause an limited innovation abilities to foster competiveness of countries, regions and firms.

These findings have practical and policy implications. In this respect, the findings imply the necessity to strengthen actions to enhance main drivers of innovation performance external to the firm. This can contribute to foster country, regions' and firms' capabilities to adaptation to rapid changes and uncertainty in the environment. The findings call also for strengthening the network between universities, institutional environment, research organisations and firms.

This study is not without limitations. This paper based on indicators of innovation framework conditions and data from the European Innovation Scoreboard. It would be interesting to whether the obtained results also hold for another drivers of innovation performance external to the firm.

The complexity of innovation framework conditions requires further studies. In terms of future research, it seems important, among others, to focus on the causes of differences between Poland and the other Moderate Innovators countries in terms of main drivers of innovation performance external to the firm.

References

Asheim, B. T, Moodysson, J. and Tödtling, F. (2011) 'Constructing Regional Advantage: Towards State-of-the-Art Regional Innovation System Policies in Europe?' *European Planning Studies*, 19:7, DOI: 10.1080/09654313.2011.573127.

Asheim, B. T., Grillitsch, M., and Trippl, M. (2016) 'Regional innovation systems: past–present–future'. In R. Shearmur, C. Carrincazeaux & D. Doloreux (Eds.), *Handbook on the Geographies of Innovation.* Cheltenham: Edward Elgar.

Balcerzak, A. P. (2015) 'Europe 2020 Strategy and Structural Diversity Between Old and New Member States. Application of Zero Unitarization Method for Dynamic Analysis in the Years 2004-2013'. *Economics and Sociology*, 8 (2). DOI: 10.14254/2071-789X.2015/8-2/14.

Barca, F. (2009) 'An Agenda for a Reformed Cohesion Policy. A place-based approach to meeting European Union challenges and expectations'. *European Commission, Brussels.*

Bębenek, P. (2017) 'Effective Innovation Management In A Company - Innovation Assessment Criteria', SOCIALSGEM, 4th International Multidisciplinary Scientific Conferences SGEM2017, Social Sciences&Arts Conference Proceedings, Bulgaria.

Florida, R., Mellander, C. and Stolarick, K. (2008) 'Inside the black box of regional development—human capital, the creative class and tolerance'. *Journal of Economic Geography*, vol 8, issue 5. https://doi.org/10.1093/jeg/lbn023.

Grillitsch, M. and Nilsson, M. (2015). 'Innovation in peripheral regions: Do collaborations compensate for a lack of local knowledge spillovers?', *The Annals of Regional Science*, 54 (1). DOI: 10.1007/s00168-014-0655-8.

Fagerberg, J., Landström, H. and Martin, B. R. (2012) 'Exploring the emerging knowledge base of 'the knowledge society''. *Research Policy*, 41. DOI: 10.1016/j.respol.2012.03.007.

Huggins, R. and Thompson, P. (2015) 'Entrepreneurship, innovation and regional growth: a network theory'. *Small Business Economics,* vol. 45, issue 1. DOI 10.1007/s11187-015-9643-3.

Huggins, R. and Williams, N. (2011) 'Entrepreneurship and regional competitiveness: The role and progression of policy'. *Entrepreneurship & Regional Development*, Vol. 23. DOI: 10.1080/08985626.2011.577818.

Kukuła, K. and Bogocz D. (2014) 'Zero Unitarization Method and its Application in Ranking Research in Agriculture'. *Economic and Regional Studies*, 7(3).

Lawson, B. and Samson, D. (2001) 'Developing innovation capability in organisations: a dynamic capabilities approach'. *International Journal of Innovation Management*, 5 (3). DOI: 10.1142/S1363919601000427.

Lee, S. Y., Florida, R. and Acs, Z. J. (2004) 'Creativity and Entrepreneurship: A Regional Analysis of New Firm Formation'. *Regional Studies*, Vol. 38.8. DOI: 10.1080/0034340042000280910.

Maj, J. (2016). 'Corporate social responsibility and diversity reporting in polish companies from companies from the basic materials and oil & gas sectors listed on the Warsaw stock exchange',

International Multidisciplinary Scientific GeoConference Surveying Geology and Mining Ecology Management, SGEM.

The European Commission (2017), European Innovation Scoreboard 2017.

Tödtling, F., Lehner, P. & Trippl M. (2006) 'Innovation in Knowledge Intensive Industries: The Nature and Geography of Knowledge Links', *European Planning Studies*, Vol. 14, No. 8, DOI: 10.1080=09654310600852365.

Zygmunt, A. (2015) 'The financial sources of investment activity – a case of polish enterprises'. *AD ALTA Journal of Interdisciplinary Research*, vol. 5, issue 2.

Zygmunt, J. (2017). 'Enterprises' Development in Peripheral Regions: Patterns and Determinants'. *Problemy Zarządzania*, vol. 15, 1(65). DOI 10.7172/1644-9584.65.14

Annex

Table 2: The results of multivariate analysis of innovation framework conditions between Moderate Innovators countries – Human resources dimension (in the period 2009-2015)

2009			2010			2011			2012			2013			2014			2015		
No.	Co.	SM	No.	Co.	SM	No.	Co.	SM	No.	Co.	SM	No.	Co.	SM	No.	Co.	SM	No.	Co.	SM
Very High			Very High			Very High			Very High			Very High			Very High			Very High		
1	PT	0.7065	1	ES	0.6276	1	EE	0.7446	1	EE	0.6432	1	PT	0.6479	1	PT	0.6714	1	ES	0.6922
2	ES	0.6141	2	EE	0.6039	2	ES	0.6726	2	ES	0.6132	2	EE	0.6466	2	ES	0.6376	2	EE	0.6208
3	EE	0.5843	3	PT	0.5796	3	PT	0.6621	3	PT	0.6110	3	ES	0.6069	3	EE	0.6091	3	PT	0.5939
High			High			High			High			High			High			High		
4	CY	0.5412	4	CY	0.5333	4	CZ	0.5591	4	CZ	0.5202	4	LT	0.5209	4	CY	0.5038	4	LT	0.5510
5	LT	0.4467	5	LT	0.4551	5	LT	0.5495	5	CY	0.5048	5	CY	0.4772	5	LT	0.4953	5	CY	0.5039
6	CZ	0.4284	6	CZ	0.4187	6	CY	0.5165	6	LT	0.4925	6	CZ	0.4643	6	CZ	0.4796	6	CZ	0.4846
Average			7	SK	0.4155	Average			Average			Average			Average			Average		
7	PL	0.3127	Average			7	SK	0.4308	7	SK	0.3816	7	SK	0.3247	7	IT	0.3413	7	SK	0.4020
8	HU	0.3097	8	HU	0.2922	8	IT	0.3771	8	HR	0.3334	8	PL	0.2928	8	SK	0.3328	8	IT	0.3485
9	IT	0.2971	9	PL	0.2833	9	HU	0.3422	9	IT	0.3302	9	HU	0.2913	9	HU	0.3161	9	HU	0.3121
10	SK	0.2916	10	IT	0.2810	10	PL	0.2995	10	HU	0.3272	10	EL	0.2508	10	PL	0.2751	10	EL	0.2971
Low			Low			Low			11	PL	0.2949	11	IT	0.2502	11	EL	0.2697	Low		
11	EL	0.2016	11	EL	0.2314	11	HR	0.2776	Low			Low			Low			11	HR	0.2693
12	MT	0.1697	12	HR	0.1944	12	EL	0.2728	12	EL	0.2684	12	MT	0.2348	12	MT	0.2380	12	PL	0.2456
13	HR	0.1158	13	MT	0.1682	13	MT	0.1970	13	MT	0.1911	13	HR	0.1814	13	HR	0.2235	13	MT	0.2123

Legend: HR – Croatia, CY – Cyprus, CZ – Czech Republic, EE – Estonia, EL – Greece, HU – Hungary, IT – Italy, LT – Lithuania, MT – Malta, PL – Poland, PT – Portugal, SK – Slovakia, ES – Spain.

Source: own calculations based on data from the European Innovation Scoreboard 2017 (European Commission, 2017).

Table 3: The results of multivariate analysis of innovation framework conditions between Moderate Innovators countries – Attractive research systems (in the period 2009-2015)

2009			2010			2011			2012			2013			2014			2015		
No.	**Co.**	**SM**	**No.**	**Co.**	**SM**	**No.**	**Co.**	**SM**	**No.**	**Co.**	**SM**	**No.**	**Co.**	**SM**	**No.**	**Co.**	**SM**	**No.**	**Co.**	**SM**
Very High			Very High			Very High			Very High			Very High			Very High			Very High		
1	ES	0.8602	1	ES	0.8426	1	ES	0.8519	1	ES	0.8541	1	PT	0.8617	1	PT	0.8718	1	PT	0.8433
2	PT	0.7381	2	PT	0.7234	2	PT	0.7404	2	CY	0.8038	2	ES	0.8096	2	ES	0.8248	2	CY	0.8296
High			3	CY	0.6690	3	CY	0.7027	3	PT	0.7506	3	IT	0.7287	High			High		
3	IT	0.6450	High			High			High			High			3	IT	0.7509	3	IT	0.6588
4	CY	0.6287	4	IT	0.6221	4	EE	0.6568	4	IT	0.6242	4	EE	0.6802	4	CY	0.7280	4	ES	0.6506
5	CZ	0.5263	5	EE	0.5422	5	IT	0.6495	5	EE	0.6084	5	CY	0.6146	5	EE	0.6689	5	EE	0.6190
6	EE	0.4905	6	CZ	0.4800	6	CZ	0.4976	6	CZ	0.4740	6	CZ	0.5750	6	CZ	0.6554	6	MT	0.5918
7	EL	0.4868	7	EL	0.4363	Average			Average			Average			Average			7	CZ	0.5675
Average			Average			7	EL	0.4318	7	EL	0.4241	7	HU	0.4208	7	HU	0.3883	Average		
8	HU	0.4407	8	HU	0.4028	8	HU	0.4063	8	HU	0.3934	8	EL	0.3960	8	EL	0.3856	8	EL	0.3613
9	SK	0.3454	9	SK	0.2995	9	SK	0.2745	9	MT	0.3687	9	MT	0.3422	9	MT	0.3600	9	HU	0.2833
10	MT	0.3072	Low			10	LT	0.2203	10	SK	0.2655	10	SK	0.3194	10	SK	0.3097	10	SK	0.2649
Low			10	MT	0.1829	Low			Low			Low			Low			Low		
11	LT	0.2110	11	LT	0.1652	11	HR	0.1418	11	HR	0.1546	11	HR	0.1132	11	HR	0.1434	11	HR	0.1235
12	HR	0.1183	12	HR	0.1115	12	MT	0.0862	12	LT	0.0869	12	LT	0.0585	12	LT	0.0731	12	LT	0.0808
13	PL	0.0708	13	PL	0.0594	13	PL	0.0567	13	PL	0.0254	13	PL	0.0414	13	PL	0.0483	13	PL	0.0571

Legend: Like in table 2.

* Calculations for Greece were based on such specific indicators as international scientific co-publications per million population and top 10% most cited publications. The data about foreign doctorate students were not available.

Source: own calculations based on data from the European Innovation Scoreboard 2017 (European Commission, 2017).

Table 4: The results of multivariate analysis of innovation framework conditions between Moderate Innovators countries – Innovation-friendly environment (in the period 2009-2015)

2009			2010			2011			2012			2013			2014			2015		
No.	**Co.**	**SM**	**No.**	**Co.**	**SM**	**No.**	**Co.**	**SM**	**No.**	**Co.**	**SM**	**No.**	**Co.**	**SM**	**No.**	**Co.**	**SM**	**No.**	**Co.**	**SM**
Very High			Very High			Very High			Very High			Very High			Very High			Very High		
1	PT	0.9062	1	IT	0.6562	1	PT	0.7240	1	PT	0.9062	1	PT	0.8685	1	LT	0.8336	1	EE	0.8250
High			2	PT	0.6479	2	IT	0.6562	2	LT	0.7737	2	LT	0.7866	2	EE	0.7500	2	LT	0.7848
2	LT	0.6025	3	LT	0.6464	3	LT	0.6495	3	EE	0.7158	3	EE	0.7500	3	PT	0.7745	High		
3	ES	0.5599	High			High			High			High			4	CZ	0.6830	3	PT	0.6031
4	IT	0.5105	4	ES	0.5838	4	EE	0.5551	4	IT	0.6337	4	CZ	0.6049	Average			4	CZ	0.5018
5	EE	0.4591	5	EE	0.5487	5	ES	0.5021	5	CZ	0.5692	5	ES	0.4427	5	ES	0.3961	5	ES	0.4278
Average			6	HU	0.4642	6	CZ	0.4608	6	ES	0.4942	Average			6	SK	0.3869	Average		
6	HU	0.4023	7	CZ	0.4565	7	HU	0.4293	Average			6	HU	0.3780	7	IT	0.3755	6	HU	0.3661
7	CZ	0.3945	Average			Average			7	HU	0.4482	7	SK	0.3773	8	HU	0.3712	7	SK	0.3399
8	SK	0.3397	8	SK	0.3647	8	SK	0.3665	8	SK	0.4024	8	CY	0.2781	9	CY	0.2792	8	IT	0.2909
9	MT	0.3386	9	MT	0.3096	9	MT	0.3075	9	CY	0.3028	9	IT	0.2636	10	PL	0.2385	9	PL	0.2504
10	EL	0.3003	Low			Low			10	MT	0.2432	10	MT	0.2576	11	MT	0.2122	10	CY	0.2273
11	PL	0.2188	10	PL	0.2188	10	PL	0.2188	Low			11	PL	0.2188	Low			Low		
Low			11	CY	0.1962	11	CY	0.2004	11	PL	0.2188	12	EL	0.2019	12	EL	0.1430	11	HR	0.1250
12	CY	0.1373	12	EL	0.1836	12	EL	0.1951	12	EL	0.2030	Low			13	HR	0.0312	12	EL	0.1214
13	HR	0.1019	13	HR	0.1571	13	HR	0.1032	13	HR	0.1337	13	HR	0.0753				13	MT	0.0692

Legend: Like in table 2.

* Calculations for Malta were based on such specific indicator as broadband penetration. The data about opportunity-driven entrepreneurship were not available.

Source: own calculations based on data from the European Innovation Scoreboard 2017 (European Commission, 2017).

Evaluation of the Effectiveness of Marketing Communications in Russian Business Using the Example of St. Petersburg Enterprises

Anastasii I. Klimin, Peter the Great Saint Petersburg Polytechnic University, Saint Petersburg, Russian Federation, klimin@kafedrapik.ru

Dmitrii V. Tikhonov, Peter the Great Saint Petersburg Polytechnic University, Saint Petersburg, Russian Federation, tikhonov@kafedrapik.ru

Aleksei M. Efimov, Peter the Great Saint Petersburg Polytechnic University, Saint Petersburg, Russian Federation, efimov@kafedrapik.ru

Abstract

The proposed study is devoted to the actualization of information on the use of various tools and methods of marketing communications, the metrics used to measure marketing communications effectiveness, share of advertising expenditures from revenue at Russian enterprises. The submitted article presents the results of a survey of Russian enterprises from St. Petersburg on this topic. During the study, it was found that respondents consider the most effective advertising on the Internet and social networks, advertising at the point of sale, participation in exhibitions, sales promotions activities and direct contacts with customers via e-mail and telephone. The main problem in measuring the effectiveness of marketing communications, the participants of the study considered setting up at the enterprise a system for collecting and analyzing information on the results of advertising campaigns.

Keywords: Effectiveness of marketing communications, tools and methods of advertising.

Introduction

The problem of measuring the effectiveness of marketing communications has been and remains an actual task for strategic and operational management levels. The range of tools and methods of marketing communications is expanding, new possibilities of measuring effectiveness appear. The volume of information available to analyze the results of marketing communications is increased. The objectives of the study are to understand what means and methods of marketing communications are now considered to be the most effective at Russian enterprises, what indicators are used to evaluate the effectiveness of marketing communications, what are the ways and methods to measure effectiveness, what are the problems of measuring the effectiveness of marketing communications at Russian enterprises. The proposed study was focused on the operative level of management, associated primarily with the increase in sales volumes.

Literature Review

The effectiveness of marketing communications is a wide concept. As noted in the article by McAlister, Srinivasan, Jindal, and Cannella, (2016), the effectiveness of marketing communications relates both to the operative and to the strategic levels of organization management. The effectiveness of marketing communications includes measurements of the effectiveness of the use of advertising media (Klimin, (2011)), the effectiveness of the content of advertisements (Kutlaliev, Popov, (2006)), the impact of media planning indicators on the effectiveness of communication (Tikhonov, (2012)), the cost effectiveness of marketing communications in terms of generating additional profits (Dubolazov, Klimin, Tikhonov, (2014)). In articles of Klimin, Tikhonov (2016), Klimin, Tikhonov, Orlov (2017), Glukhov, Ilin (2014) consider impact of various social, psychological and cultural aspects of advertising slogans and illustrations on communication effectiveness.

Trofimova, Zelenina, (2015), Glukhov, Ilin, Koposov, Levina (2014), Bril, Kalinina, Ilin (2017) discuss the importance of the campaign in the organization's activities, considers the methods to assess its effectiveness, as well as models used in the calculation of the advertising budget.

Article by Novoselsky, Mozgovaya (2015) deals with methods of evaluating the effectiveness of advertising campaigns. Evaluation of the effectiveness of advertising takes into account the complex current market conditions and factors that promote or inhibit the solution of commercial problems of the enterprise.

In contemporary marketing communications much attention is paid to SMM and measuring its effectiveness (CMO survey by the Duke University, (2014)). Marketing through Social Media nowadays represents one of the most effective ways to introduce the company and its products on the market. Beqiri Gonxhe (2016) make an overview on Social Media and its impact in marketing strategy, he gives an example of marketing social media strategy.

The article of Belogorodsky (2006) focuses on measuring the effectiveness of marketing communications based on media planning indicators, such as frequency, reach, number of advertising contacts.

Advertisers, advertising agencies, research firms, Internet companies are engaged in advertising effectiveness measurement. The largest volume of statistical information is owned by firms TNS, Nielsen, Google, Facebook. This allows them to make a long-term and in-depth analysis of the effectiveness of marketing communications in various media (Wood, Poltrack, (2015)).

Research Design and Methodology

The research was conducted in the period January-May 2017 using the Internet service for surveys. The base for the survey was the Alumni Club of the Institute of Industrial Management, Economics and Trade of the Peter the Great Saint Petersburg Polytechnic University (Graduate School of Business Technologies) and the St. Petersburg International Business Association (SPIBA). 80% of respondents specifically responsible for marketing and sales in their organizations.

For the convenience of understanding figures and tables with the distribution of answers to the questions of the questionnaire, it is presented in Appendix A. The questionnaire presents classification questions (questions 1-5) and questions for the realization of the research objectives. The number of correctly completed questionnaires that were obtained during the study (120 pcs) in the most cases does not allow the division of enterprises into groups according to the classification and perform a comparative analysis of the answers to questions for the implementation of the study objectives by groups because of a significant sampling error.

In Fig. 1 shows the distribution of classification into business types of the organizations surveyed. In Fig. 2 shows the distribution of organizations by revenue size.

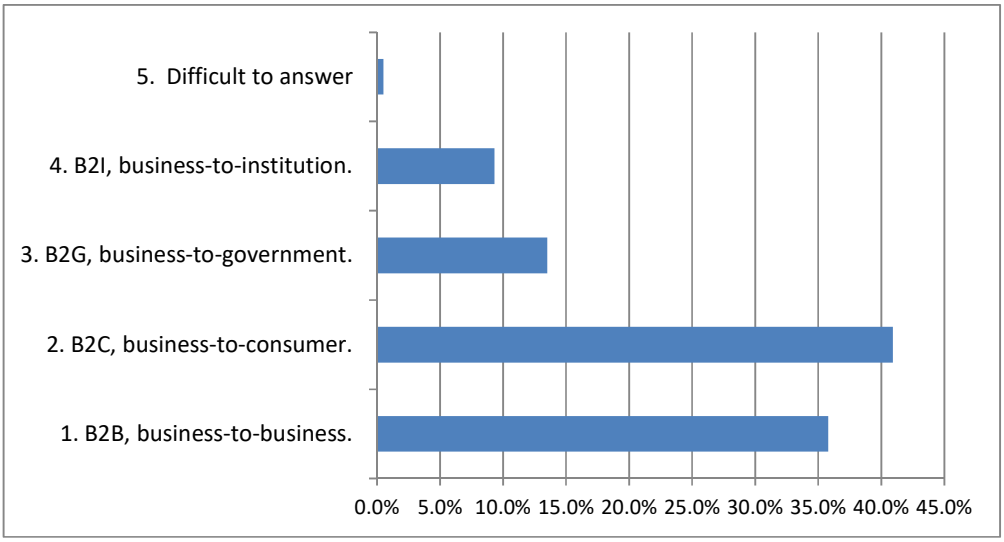


Fig. 1: Business type of organization, share of respondents, %

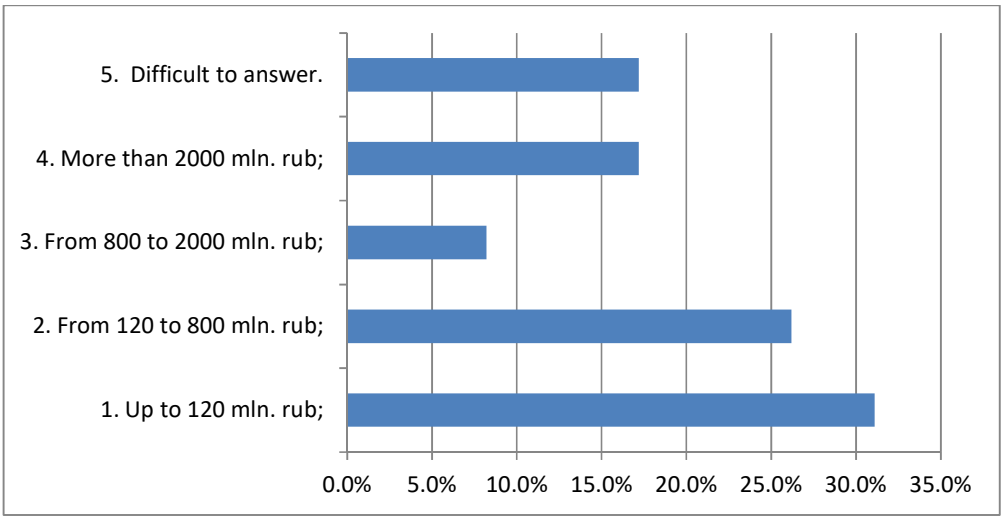


Fig. 2: Approximate turnover of organization over the last year, share of respondents, %

Results of the Study

Below is an analysis of the answers to the most interesting questions of the questionnaire about effectiveness of marketing communications. One of the important questions in the questionnaire was question 7. "Specify what percentage, in Your opinion, of the total turnover is spent on advertising in Your organization?" (Fig. 3)

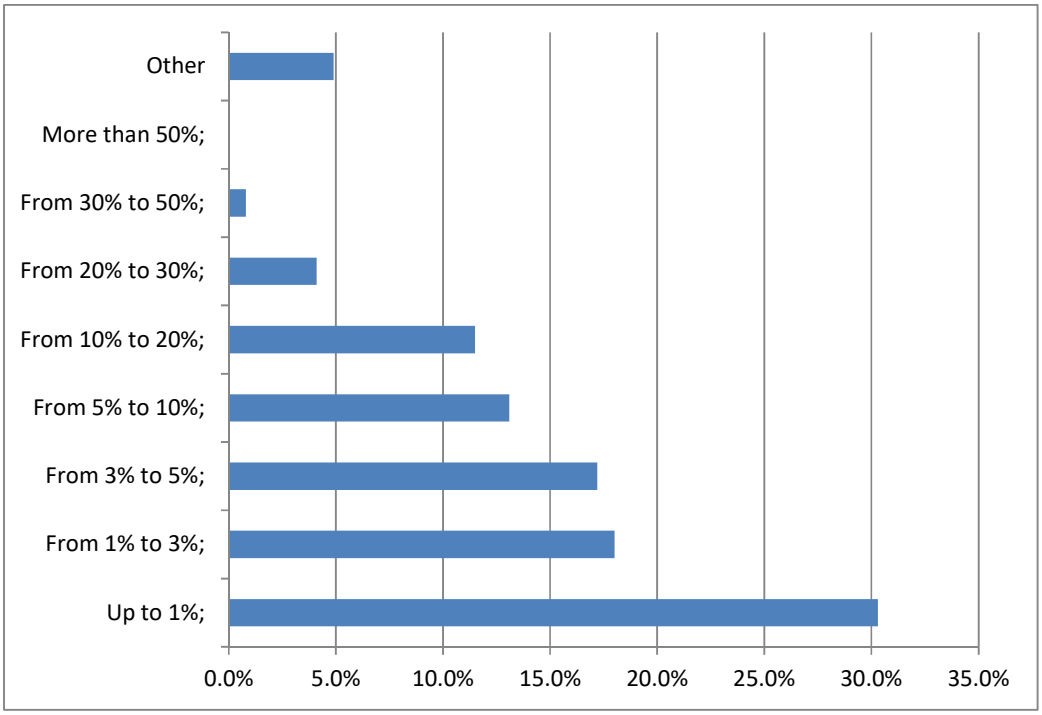


Fig. 3: Share of advertising expenditures from revenue, share of respondents, %

Table 1 presents data on the share of advertising expenditures from revenue for B2C and B2B of organizations, as well as for enterprises with different revenue per year.

Table 1: Share of advertising expenditures from revenue, share of respondents, %

Share of advertising expenditures from revenue	Type of market of organization		Volume of revenue of organization, million rubles in year			
	B2C	B2B	Up to 120	120-800	800-2000	More than 20000
Up to 1%	20	42	32	38	62	29
From 1% to 3%	24	20	16	38	12	7
From 3% to 5%	16	12	24	9	13	7
From 5% to 10%	22	12	12	5	13	43
From 10% to 20%	12	12	16	5	13	7
From 20% to 30%	4	2	0	5	0	7
From 30% to 50%	2	0	0	0	0	0
More than 50%	0	0	0	0	0	0
Weighted average	6,4	4,2	4,7	3,5	3,9	6,6

Companies with revenues of more than 2,000 million rubles a year are approaching the expenditures of advertising at a rate of 10% of revenue, as is typical for large American and European companies (CMO survey by the American Marketing Association and Duke University, (2014)).
The average score of the answer to question 9. “Rate the effectiveness of Your company's advertising media” are shown in Fig.4. Was made a calculation of the weighted indicators where the respondents

evaluated the effectiveness of the following methods of advertising on a scale from 1 to 5. The most effective means of advertising based on these results are online advertising, social media marketing, sales promotions and POSM.

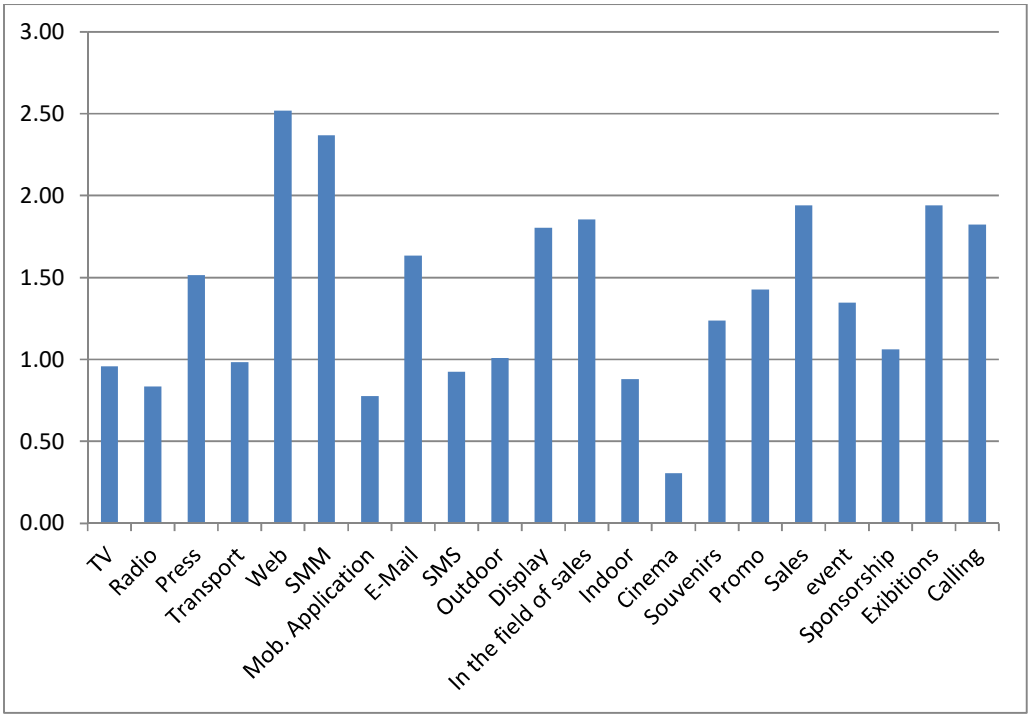


Fig.4: Effectiveness of advertising channels, points

Also presented is an analysis of what methods of advertising on the opinion of B2B and B2C companies are the most effective. (Fig. 5)

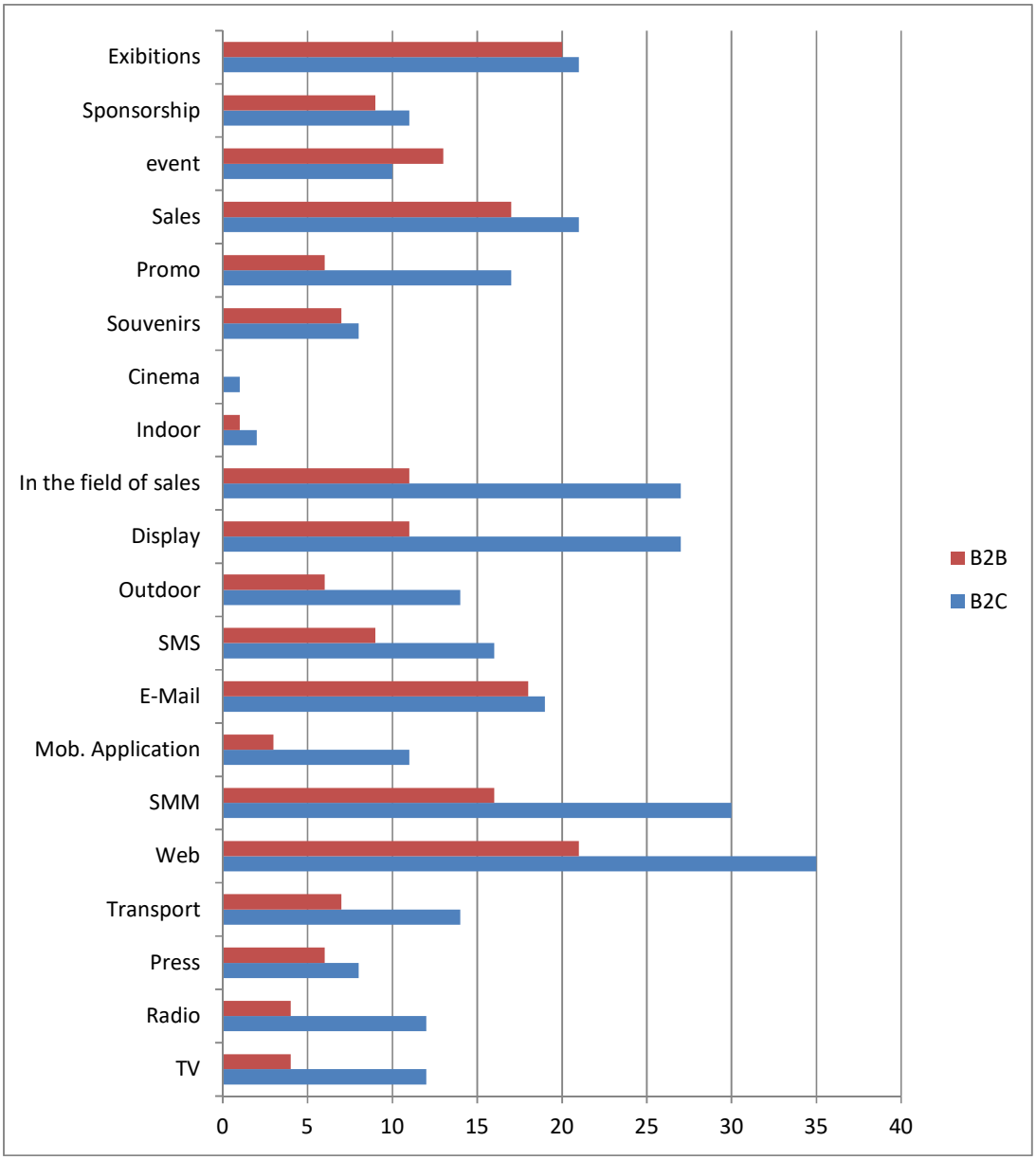


Fig. 5: Effectiveness of advertising channels among B2B and B2C, share of respondents, %

Social media has an significant impact in marketing, especially in communication and connection of businesses with their customers. There is a question 8 in the survey about using social media among Russian companies (Fig. 6). The Russian companies allocate three leaders according of SMM, it's Vk.com, Facebook and Instagram. Among the messengers has no clear leader.

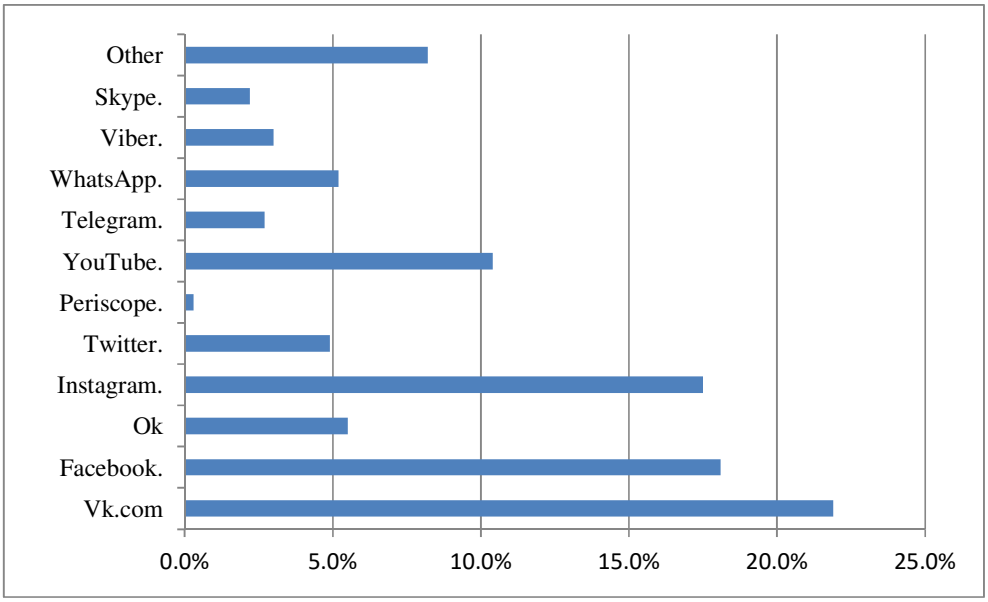


Fig. 6: Popularity of SMM platforms, share of respondents, %

In Fig. 7 are the answers to the question 10. "What are some ways Your organization evaluated the preliminary effectiveness of planned advertising and marketing activities, advertising media, advertising materials?"

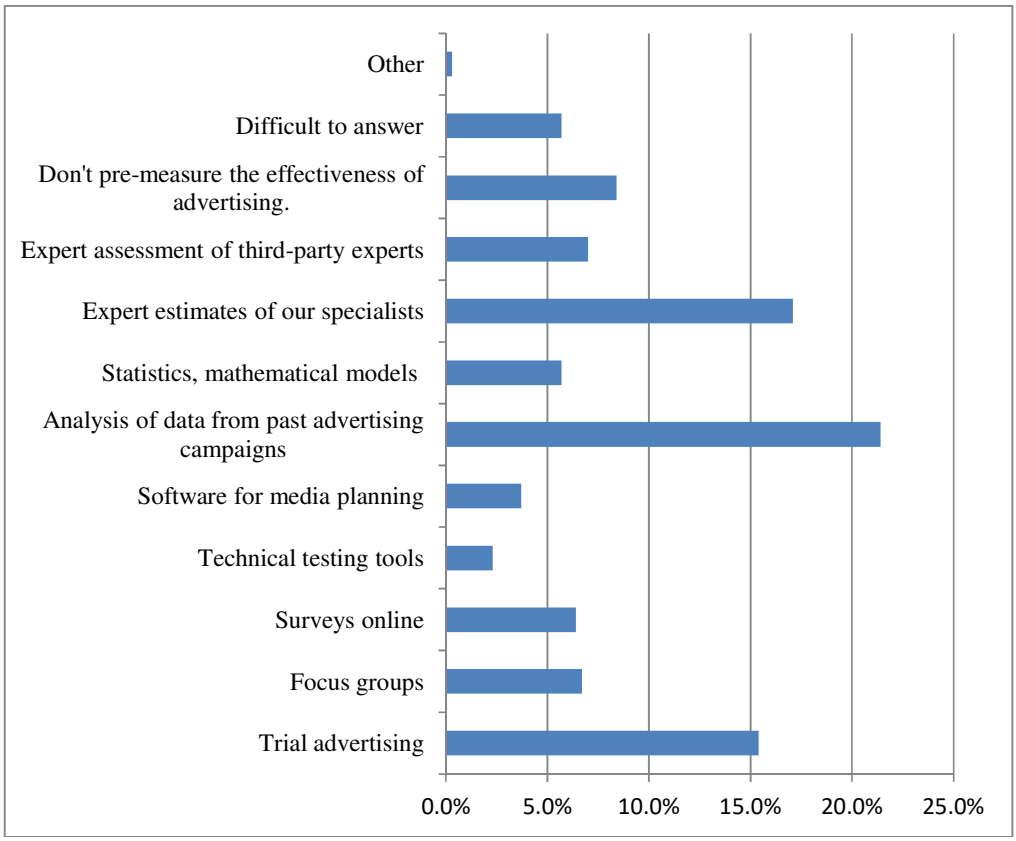


Fig. 7: Methods of the preliminary analysis of effectiveness, share of respondents, %

In Fig. 8 are the answers to the question 11. “In what ways does your organization determine the final effectiveness of advertising?”

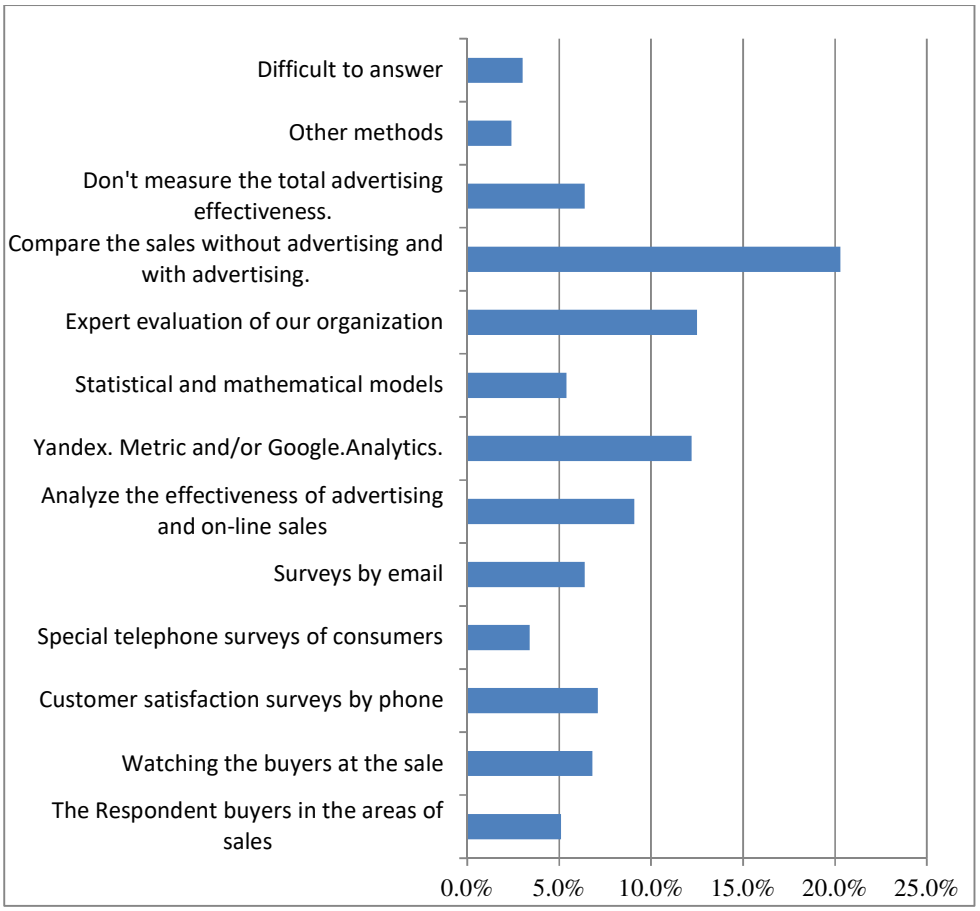


Fig. 8: Methods of the final analysis of effectiveness, share of respondents, %

In Fig. 9 are the answers to the question 12. “What are the indicators of advertising effectiveness are measured in Your organization?”

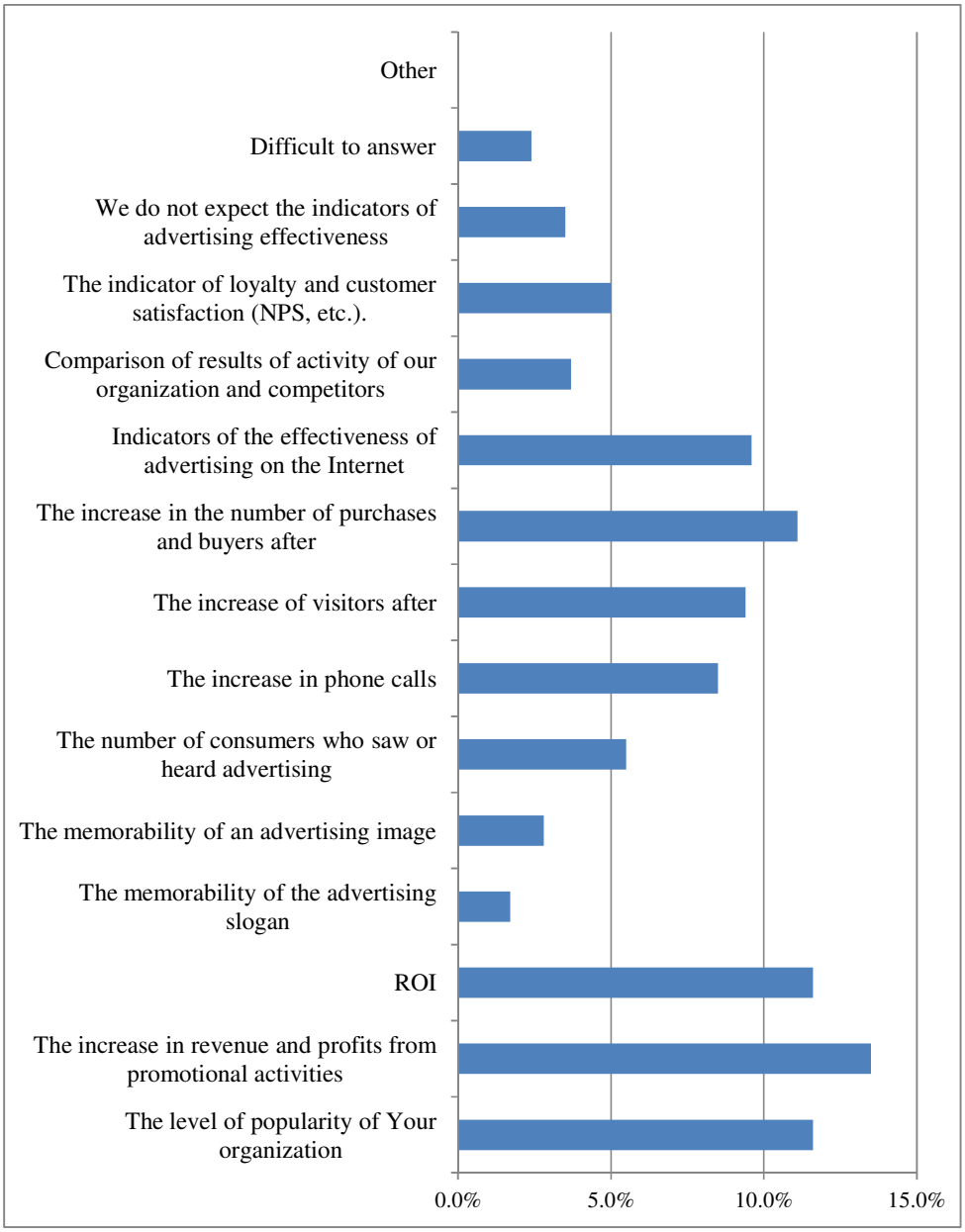


Fig. 9: Effectiveness indicators, share of respondents, %

The most popular results among the respondents are the increase of revenues and profits from promotional events, brand and organization awareness, as well as the profitability of advertising costs, that is, the ratio of profit from advertising to the advertising expenditures (ROI).

It is important that the process of performance measurement is regular, it is necessary not only to determine the timing of the advertising, but also to know the deadlines of measuring results of advertising. In Fig. 10 are the answers to the question 13. “How often do you measure the effectiveness of advertising in Your organization?”.

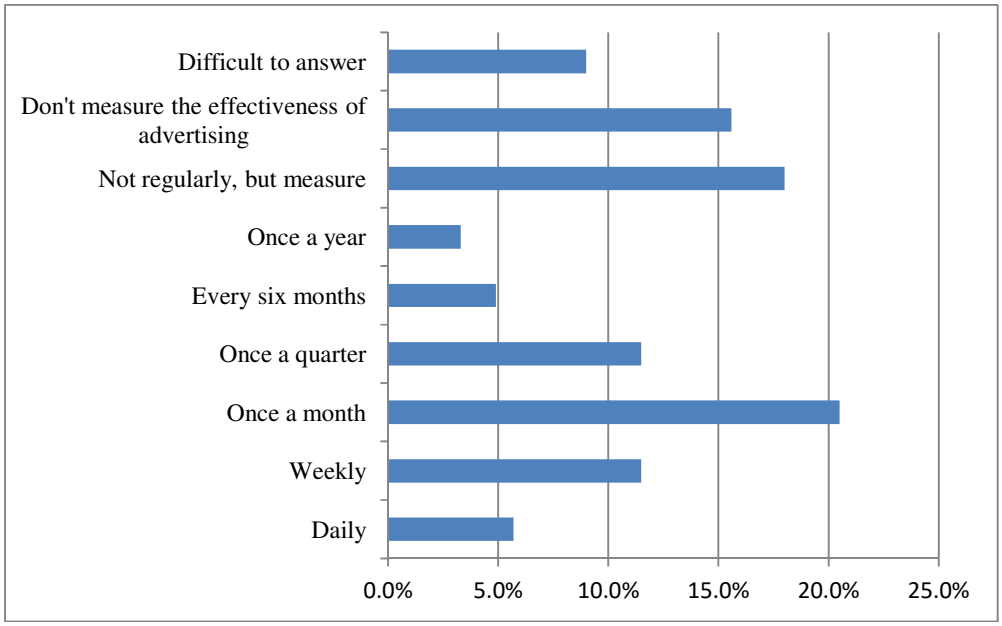


Fig. 10: Frequency of measuring, share of respondents, %

Top 3 popular answers: either not measured at all or there is no clear regularity, either measured once a month. The top 3 includes more than half of the companies participating in the survey. Only 9% of companies measure the effectiveness of weekly and 5 % daily. This indicator is very important, as it allows to evaluate an advertising campaign in the dynamics.

In Fig. 11 are the weighted answers in score to the question 14. "How often Your organization uses is in the following subjects, topics of advertising?"

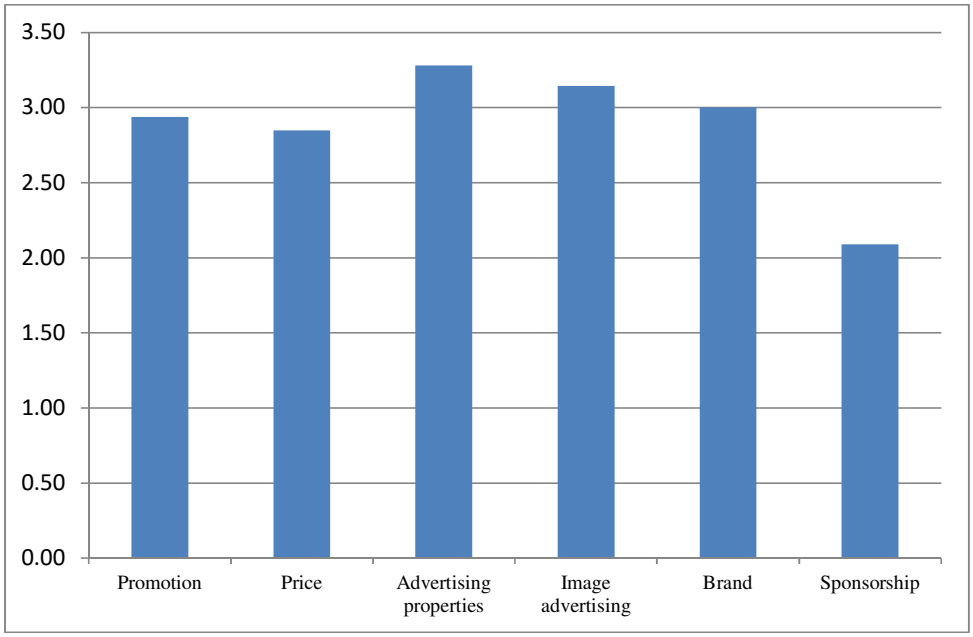


Fig. 11: Subjects, topics of advertising, points

In Fig. 12 are the answers to the question 16. “What are the challenges of measuring the effectiveness of advertising You encounter in Your organization?”

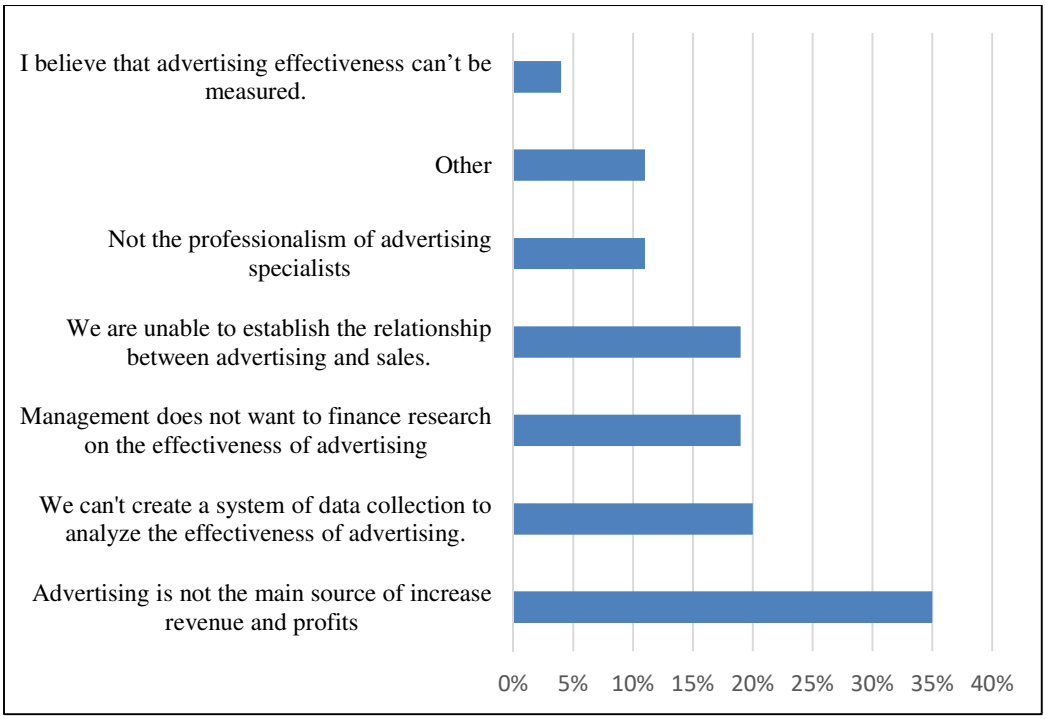


Fig. 12: Challenges of measuring the effectiveness of advertising, share of respondents, %

Discussions and Conclusions

Discussion of the results will begin with the question 16. The main problem for assessing the effectiveness of advertising (excluding answer “Advertising is not the main source of increase revenue and profits …”, which is typical for small businesses where the receipt of orders primarily associated with personal selling, personal connections and recommendations) is the establishment of a system for collecting and analyzing the necessary information, for which professionals are needed, and money, which is not inclined to allocate management for these purposes. The problem of establishing a connection between advertising and sales is also informational in nature. In this regard, the importance of creating integrated information systems for the collection and analysis of marketing information on various indicators of the effectiveness of marketing communications is increasing. The construction of integrated information and communication systems is one of the conditions for the innovative development of the enterprise as a whole. (Silkina G.Yu., (2017)). These systems should include data from call centers, CRM systems, analytical tools for Internet advertising, consumer surveys, data from social networks. For such data, the regularity of their collection and processing is important. However, according to the answers to question 13. "Only how many do you measure the effectiveness of advertising in Your organization?" only 5% of respondents said that their organization collects daily data, 9% of organizations collect data weekly.

During the study, the differences in the share of advertising costs from the revenue between B2C and B2B (weighted average 4,2%) companies, as well as between companies with different revenue levels, were confirmed. 38% of B2C companies spend on advertising from 3% to 10% of revenue, weighted average 6,4%. 62% of companies in B2B markets spend on advertising from 0 to 3% of revenue, weighted average 4,2%. For B2B market, this indicator is more stable, most of the companies have about the same indicator. Unfortunately, in Russia there is no organization that would regularly monitor the share of advertising costs in revenue for a large number of companies,

as, for example, the American journal Advertising Age (Ad Age Datacenter, (2017)). Data from the Internet in Russia on this indicator from various sites are very fragmentary and not representative.

The most effective among the means of advertising in the opinion of the respondents are advertising in the Internet and social networks, advertising at the point of sale, exhibitions, sales promotion activities and direct contact with consumers via e-mail and telephone. Thus, it can be concluded that advertising efforts are increasingly shifting to direct advertising, direct contacts with individual consumers in various ways. This corresponds to the trend of growth in the cost of Internet advertising in Russia in the first half of 2017 (Association of Communication Agencies of Russia, (2017), Table 2).

Table 2: The volume of advertising costs in Russia in the first half of 2017, billion rubles

Advertising media	The volume of advertising costs in Russia in the first half of 2017, billion rubles.	Increase in comparison with the previous half-year,%
TV	77,5-78,0	12
Radio	6,7-6,9	3
Press	8,3-8,5	-14
Out of Home (Outdoor advertising, Transit advertising, Indoore advertising, Advertising in cinemas)	20,8-21,2	10
Internet	74,0-75,0	23
Total	190,0-192,0	14

More than 85% of companies from survey use social media. Doing a bit of analysis we found that 61% of B2C companies use as a tool SMM the social network Vk.com. Probably, this is because this service is created in Russia and more people-oriented, not organization. B2B companies are using Facebook more than Vk.com (69% of the companies). 57% of B2B companies use Facebook and Vk.com together. The following were highlighted as important components of the use of social networks is to communicate to the target audience the necessary information about the company's products and to communicate, to get feedback about the product in real time from real buyers. The main question of using social media: for what purposes do we need them? This question was not asked in the study and we plan to use it in the future. Increasing sales through social networks is not the main purpose of their use. According to the study of Statista (2015), only 10% of online retailers in Germany indicated that increasing sales through social networks is the main goal of their use. 30% of respondents indicated that they use social networks to create a marketing platform, 28% - to establish a closer relationship with the client, 24% - to increase the level of recognition.

For preliminary analysis of effectiveness the majority of respondents analyze data past advertising campaigns, use an expert assessment of specialists in advertising and marketing, and conduct a trial placement of advertising in selected media. Comparison of sales volumes without advertising and with advertising is the main indicator of the final evaluation of the advertising effectiveness. This emphasizes the operational level of perception of the effectiveness of advertising by respondents in this study.

Advertisers know and apply the ROI metric in measuring the effectiveness of advertising. This suggests that accounting for the growth in sales and profits from marketing communications, as well as accounting for advertising costs in Russian enterprises in some form is being conducted.

The general conclusion: the popularity of methods and means of advertising which can show a real connection between their use and sales growth is growing.

In the future, our research team plans to continue research in the field of research methods for evaluating the effectiveness of advertising used in Russian enterprises in accordance with the questionnaire in Appendix A to track changes in the opinions of respondents.

Our research was focused on the study of indicators, ways of measuring the effectiveness of advertising at the operative level, which is primarily connected with the increase in sales volumes. In the future, we plan to expand the field of study and explore the impact of advertising on the performance of the firm at a strategic level.

References

Ad Age Datacenter (2017). [Online], [Retrieved June 20, 2017], http://adage.com/datacenter
Association of Communication Agencies of Russia (2017) [Online], [Retrieved August 30, 2017], http://www.akarussia.ru/knowledge/market_size/id7881

Belogorodsky, A.A. (2006). 'Frequency of contacts with the target audience and its influence on campaign effectiveness', *Marketing in Russia and abroad*, 2 (52).

Beqiri Gonxhi (2016). 'Social media and its impact in marketing strategy', *European journal of economics and management sciences,* 2, 3-9

Bril, A.R. Kalinina, O.V. Ilin, I.V. (2017) 'Economic Analysis of Projects in the Improvement of the HR Management System of Enterprises', Proceedings of the 29th International Business Information Management Association Conference – Sustainable Economic Growth, Education Excellence, and Innovation Management through Vision 2020. 2268-2277

Dubolazov, V.A. Klimin, A.I. and Tikhonov, D.V. etc. (2014). Modern aspects of marketing. SPb.: Publishing house of SPbPU,

Glukhov, V.V. Ilin I.V. (2014) 'Project Portfolio Structure in a Telecommunications Company', *Lecture Notes in Computer Science,* 8638, 509-518.

Gloukhov, V.V. Ilin, I.V. Koposov, V.I. Levina, A.I. (2014) 'Market risk neutral strategies: modeling and algorithmization'. *Asian Social Science.* T.10, 24 , 209-216

CMO survey by the American Marketing Association and Duke University (2014) [Online], [Retrieved June 10, 2017], https://vtldesign.com/digital-marketing/content-marketing-strategy/percent-of-revenue-spent-on-marketing-sales/

CMO survey by the Duke University (2014) [Online], [Retrieved June 10, 2017], https://cmosurvey.org/results/august-2014

Klimin, A.I. (2011) 'Optimizing the placement of a series of advertisements', *Scientific and technical statements SPbSPU. Series "Economics"*, 4, Pp 273 - 277.

Klimin, A.I. Tikhonov, D.V. (2016). 'Perception of offensive advertising: cross cultural peculiarities', Proceedings of the Cross Cultural Business Conference 2016. 19th – 20th May 2016. University of Applied Sciences Upper Austria. Steyr Campus.

Klimin, A.I. Tikhonov, D.V. and Orlov, P.A. (2017). 'Evaluation of the effectiveness of the design solution of the advertising booklet with the help of an eye tracker'. Proceedings of the Scientific conference "Strategic management of organizations: management technologies": St. Petersburg. 20-21 April 2017, 276-283

Kutlaliev A., Popov A. (2006). Advertising effectiveness: 2-nd edition. Moscow: Publishing house Eksmo

McAlister, L. Srinivasan, R. Jindal, N. and Cannella, A. (2016). Advertising effectiveness: 'The moderating effect of firm strategy', *Journal of Marketing Research,* 53(2), 207-224

Novoselsky S.O., Mozgovaya Y.S. (2015). 'Methods of estimation of efficiency of advertising canpaigns of organisations', *Politics, economics and innovation,* 2 (3), 13-14

Tikhonov D.V. (2012). Media planning. Indicators and models using the media mix. Saarbrucken: Lambert Academic Publishing

Trofimova, E.V. Zelenina, L.I. (2015). 'Classification of methods and models of estimation of efficiency of advertising activity', *Research in the field of natural sciences,* 5 (41), 8-15.

Silkina, G.Y. (2017). 'Information and Communication Technologies in Ensuring of Innovative Development'. Proceedings of the 29th International Business Information Management Association Conference – Sustainable Economic Growth, Education Excellence, and Innovation Management through Vision, Vienna, Austria 3-4 May 2017, 1165-1176.

Statista (2015).What is your company's main reason for using social media? Reasons for using social media by online retailers in Germany 2015. [Online], [Retrieved June 21, 2017], https://www.statista.com/statistics/439581/online-retailers-reasons-for-social-media-usage-germany/

Wood, L. A. Poltrack, D. F. (2015). 'Measuring the Long-Term Effects Of Television Advertising Nielsen-CBS Study Uses Single-Source Data To Reassess the "Two-Times" Multiplier', *Journal of Advertising Research*, 55-2, 123-131.

Appendix A. Questionnaire

1. What is the type of businesses of Your organization? (multiple possible answers)
1. The manufacturer of the goods.
2. Services (except wholesale and retail trade).
3. Wholesale trade organization (agent).
4. Retail trade organization.
5. Public, non-profit organization.
6. Other_____

2. In which markets of goods and services does your organization operate? (multiple choice are allowed)
1. Products/services for businesses (B2B, business-to-business).
2. Products/services for citizens (B2C, business-to-consumer).
3. Goods/services for government organizations (B2G, business-to-government).
4. Products/services for public, non-profit organizations (B2I, business-to-institution).
5. Other_____

3. What does your organization do, write in your own words: _____

4. The approximate turnover of Your organization over the past year:
1. Up to 120 million rubles.
2. From 120 to 800 million rubles.
3. From 800 to 2000 million.
4. More than 2000 million.
5. It's difficult to answer.

5. Approximately, how many employees work in your organization?
1. Up to 20 people.

2. From 20 to 100 people.
3. From 100 to 500 people.
4. More than 500 people.

6. Does Your organization have on-line sales (via website, mobile app, social networks, etc.) and what share of turnover they bring you?
1. We have no on-line sales.
2. We have no on-line sales, but we are planning to organize.
3. The proportion of turnover on-line sales to 25%.
4. The proportion of turnover on-line sales from 25 to 50%.
5. The proportion of turnover on-line sales of 50 to 75%.
6. The proportion of turnover on-line sales from 75 to 100%.
7. There are on-line sale, but the share of turnover is difficult to determine.

7. Specify what percentage, in Your opinion, of the total turnover is spent on advertising in Your organization?
1. Up to 1%.
2. From 1% to 3%.
3. From 3% to 5%.
4. From 5% to 10%.
5. From 10% to 20%.
6. From 20% to 30%.
7. From 30% to 50%.
8. More than 50%.
9. Other_____/I find it difficult to answer

8. In which social networks, messengers (short message services) does your organization (not you personally) have accounts, groups, pages for communicating with potential and existing customers?
1. Vkontakte (Vk).
2. Facebook.
3. Odnoklassniki.(OK).
4. Instagram.
5. Twitter.
6. Periscope.
7. YouTube.
8. Telegram.
9. WhatsApp.
10. Viber.
11. Skype.
12. Other _____

9. Rate the effectiveness of Your company's advertising media on the proposed scale: 1 - minimal effect, 5 - maximum effect.
1. TV.
2. Radio.
3. Press.
4. Advertising on transport, including the subway.
5. Advertising in the Internet, except social networks and mobile applications.

6. Advertising in social networks
7. Mobile app.
8. Mailings by e-mail.
9. SMS sending, send via instant messenger Telegram, WhatsApp, etc.
10. Outdoor advertising on billboards.
11. Signs, shop window decoration at point of sale.
12. Internal advertising at points of sale (posters in the trading room, etc.).
13. Internal advertising in shopping malls, business center and other public places.
14. Advertising before movies in cinemas
15. Souvenirs.
16. Promotions: tastings, product presentations, etc.
17. Promotions: discounts, sales, gifts, contests, sweepstakes, etc.
18. Event marketing (event): festivals, performances, schools for buyers, press conferences, etc.
19. Sponsorship.
20. Participation in exhibitions.
21. Telephoning potential customers.

10. What are some ways Your organization evaluated the preliminary effectiveness of planned advertising and marketing activities, advertising media, advertising materials? (multiple choice are allowed)
1. Carry out a trial placement of the advertisement in the selected advertising media with the subsequent control of effectiveness.
2. Tested advertising materials in focus groups or personal interviews with consumers.
3. Test advertising materials to consumers via surveys online, via e-mail.
4. Use technical means testing of promotional materials (eye tracker, magnetic resonance scanner, polygraph, preview of videos with a joystick "like/dislike" etc.).
5. For selecting advertising media we use a special software for media planning, the services of advertising agencies or advertising media having such programs.
6. Analyzed data from past advertising campaigns.
7. Build statistical, mathematical models of the impact of planned advertising and marketing activities on the performance of the organization.
8. Use expert judgment of our experts in marketing and advertising.
9. Use expert judgment of outside experts in marketing and advertising.
10. Other methods _____
11. We do not pre-measure the effectiveness of advertising.
12. It's difficult to answer.

11. In what ways does your organization determine the final effectiveness of advertising? (multiple choice are allowed)
1. The respondent buyers in the area of sales (Consumer surveys at points of sale).
2. Watching the buyers at the point of sale.
3. Customer satisfaction surveys by phone.
4. We conduct special telephone surveys of consumers.
5. Conduct consumer surveys on your website or by e-mail.
6. We analyze the effectiveness of advertising on the Internet through on-line sales data.
7. Analyze the effectiveness of advertising on the Internet through Yandex.Metrics and / or Google.Analytics.
8. We apply statistical and mathematical models to determine the dependence of sales volumes on advertising costs.

9. We use expert estimates of employees of our organization.
10. Compare the sales volumes without advertising and with advertising.
11. We do not measure the final effectiveness of advertising.
12. Other methods (please specify) _____
13. I find it difficult to answer

12. What are the indicators of advertising effectiveness are measured in Your organization? (multiple choice are allowed)
1. The level of publicity Your organization and brand.
2. The increase in revenue and profits from promotional activities.
3. The profitability of advertising expenditures (the ratio of profit from advertising to the expenditures of advertising).
4. The memorability of the advertising slogan.
5. The memorability of advertising illustration, advertising image.
6. The number of consumers who saw or heard advertising of Your organization.
7. The increase in the number of telephone calls to the organization after advertising.
8. The increase in the number of visitors after advertising.
9. The increase in the number of purchases and buyers after advertising.
10. Indicators of the effectiveness of advertising on the Internet (site traffic, number of purchases via the Internet, etc.).
11. Comparison of results of activity of our organization and competitors with a simultaneous comparison of advertising activity of our organization and competitors.
12. The indicator of loyalty and customer satisfaction (NPS, etc.).
13. Other indicators (to add so):_____
14. We do not calculate any indicators of advertising effectiveness.
15. I find it difficult to answer

13. How often do you measure the effectiveness of advertising in Your organization (independently or through outside organizations)?
1. On a daily basis.
2. On a weekly basis.
3. Once a month.
4. Once in a quarter.
5. Once in six months.
6. Once a year.
7. Not regularly, but we do.
8. Don't measure the effectiveness of advertising.
9. I find it difficult to answer

14. How often Your organization uses is in the following subjects, topics of advertising? Rate scale: 1 - do not use advertising at all, 5 – always use.
1. Sales promotions (discounts, gifts, contests, sweepstakes, etc.).
2.The prices of goods.
3. Advertising properties, features, advantages of the product.
4. Branding with beautiful illustrations.
5. Brand is: a name, logo, corporate motto.
6. Advertising sponsorship, philanthropy, the organization's involvement in socially significant activities, events.

7. More _____

15. On what area in Russia appears to be promoting Your organization?
1. One or several closely located settlements (local advertising).
2. In different regions, Federal districts of Russia (regional advertising).
3. In most regions of Russia (national advertising).

16. What are the challenges of measuring the effectiveness of advertising You encounter in Your organization? Choose no more than three basic problems.
1. Specialists in advertising and marketing (including research companies and advertising agencies) do not know how and what to measure, do not own methods, do not know the indicators of effect and campaign effectiveness.
2. We are unable to establish the relationship between advertising and sales.
3. We can't create a system of data collection to analyze the effectiveness of advertising.
4. Advertising is not the main source of increase revenue and profits, so the problem of measuring its effectiveness, we were not particularly interested in.
5. Management does not want to finance research on the effectiveness of advertising, does not see in this sense, does not believe in such an opportunity, does not allocate money, workers, other resources.
6. I believe that advertising effectiveness can't be measured.
7. Other (enter)_____

17. Who do you work for in your organization?
1.Senior Executive management (Director, Deputy Director, senior Manager).
2.Head of middle management (head of Department).
3.Specialist.

18. Do you work in advertising, marketing, sales?
1.Yes, these are my main job responsibilities.
2. I am related to this, but this is not my main job description.
3. No, I have nothing to do with this.

Regional Dimension of Entrepreneurship in a Developing Economy An Analysis of Polish Północno-Zachodni Region

Justyna Zygmunt, Opole University of Technology, Opole, Poland, j.zygmunt@po.opole.pl

Abstract

The aim of the paper is to investigate regional dimension of entrepreneurship in a developing economy, with a focus on Północno-Zachodni Region which represents one of NUTS-1 regions in Poland. Concentration on this region may provide a valuable insight since it embodies not only developing, but at the same time transition economy. Regional dimension of entrepreneurship in Północno-Zachodni Region was studied with fixed effects panel regression. Welch F was used to test estimated results. Panel data includes 315 observations for the 2000-2014 period. Data sources were EUROSTAT and Central Statistical Office of Poland. The main finding is that substantial for entrepreneurial activity in a developing economy is the share of high-skilled people in relation to total employment. Evidence have been provided that together with human capital growth the increase of entrepreneurial attitudes is observed. The results indicate also that a developing economy tends to follow the path of developed countries in a positive relationship between unemployment rate and the share of self-employed within total workforce. The findings may be interesting for policymakers, especially in terms of supporting entrepreneurial attitudes among high-skilled people.

Keywords: entrepreneurial activity, developing economy, regional dimension, Poland.

Introduction

A considerable amount of literature deals with the influence of various factors on entrepreneurship. It has been found that regional entrepreneurial activity is influenced by business conditions (e.g. Gries and Naudé, 2009), demographic attributes (e.g. Bosma and Schutjens, 2011), amount of human capital (e.g. Huggins *et al*., 2017). The evidence have been also provided that entrepreneurial activity in regions may be dependent inter alia on informal institution, such as entrepreneurship culture (e.g. Fritsch *et al*., 2014). But for all that, the debate on regional dimension of entrepreneurship, in particular with regard to developing economies is still incomplete.

The aim of this paper is to investigate regional dimension of entrepreneurship in a developing economy, with an emphasis on Północno-Zachodni Region which represents one of NUTS-1 regions in Poland. The focus on this region may provide revealing findings since it represents both developing and transition economy. To test for regional dimension of entrepreneurship fixed effects panel regression has been employed.

This paper contributes to the existing literature by presenting an analysis of regional dimension of entrepreneurship in a developing and at the same time transition economy. The findings may be supportive in establishing successful entrepreneurial policy in economy in question.

The remainder of the paper proceeds as follows. First section presents the theoretical background leading to the hypotheses of this paper. Second section includes method of the research. This is followed by sample and variables description. The findings are presented in fourth section. Conclusions are included in the final section.

Theoretical Background and Hypotheses Development

Regional economic development depends on heterogeneous factors. They involve inter alia innovation activity (e.g. Zygmunt A., 2015; Bębenek, 2017), companies competitiveness (e.g. Maj, 2016). Essential determinant of regional development is entrepreneurship. However, regions differ in entrepreneurial activity. Various dimensions are accountable for it. One of them is a regional economy structure. It is claimed that the structure of regional industries substantially determines entrepreneurial activity since, as emphasises Wyrwich, it impacts on "the demand for entrepreneurs, as well as the supply of entrepreneurs […]" (2012, p. 425). According to Reynolds *et al*. high share of services is accompanied with high startup rates (1995).

In entrepreneurship literature economy structure is generally measured as a share of employment in respective industries to total employment in a region/country (e.g. Fritsch and Falck, 2007). The differences in regional economies may also be assessed with Krugman specialization index. However, the effect of economy structure on entrepreneurial activity in developing regions may be ambiguous. Therefore, in this paper no clear assumption on relationship between Krugman specialisation index and entrepreneurial activity is provided. This approach is in line with other studies (e.g. Wyrwich, 2012).

Entrepreneurial activity is also determined by unemployment rate. Numerous studies provide evidence that entrepreneurship increases with the growth in unemployment rate (e.g. Wagner and Sternberg, 2004). However, this relationship seems to be intricate. For example Audretsch and Fritsch emphasise that high unemployment rate may reflect "slack growth" (1995, p. 360) which drives to dissipating of entrepreneurial attitudes, and at the same time may encourage new firm creation since "the pool of potential resources available to new entrants will tend to be higher" (1995, p. 360). It is also claimed that relationship between high unemployment rate and entrepreneurial activity represents the "refugee" effect which embodies in diminishing unemployment in subsequent periods (Thurik *et al*., 2008).

Significant for entrepreneurial activity is also knowledge. It has been found that inadequate knowledge inhibits entrepreneurship (Storey, 2016). However, relation between entrepreneurship and knowledge seems to be bidirectional, since as argue Acs *et al.*, entrepreneurial activity constitutes "important spillover mechanism[…]" (2005, p. 14) for new knowledge. Some studies have identified also that impact of knowledge creation on entrepreneurial intensions does occurs, however this linkage is not direct (Stuetzer *et al.*, 2014).

Entrepreneurial activity is associated with the amount and structure of human capital (Zygmunt J., 2017). Positive impact of human capital for entrepreneurial activity has been identified in many studies (e.g. Gries and Naudé, 2009; Storey, 2016; Huggins *et al.,* 2017). It has been observed that e.g. an enhancement of management education may be significant for nascent entrepreneurship growth (Wennekers *et al.*, 2005).

In view of the foregoing, in this paper the following hypotheses are tested:

H1 Unemployment positively affects entrepreneurial activity in a developing economy

H2 Together with growth in knowledge inflows, entrepreneurial activity in a developing economy increases

H3 Entrepreneurial activity in a developing economy is positively influenced by human capital

Method of the Research

To analyse regional dimension of entrepreneurship in Polish Północno-Zachodni Region, a panel regression was employed. The panel had one time dimension t, with t= 2000, 2005,…, 2014, and one cross-section dimension r for the regions which comprise Północno-Zachodni Region, with r = Wielkopolskie Voivodeship, Zachodniopomorskie Voivodeship, Lubuskie Voivodeship.

To test hypotheses, the estimated model was described as:

$$E_{rt} = K_{rt}\beta_1 + U_{rt}\beta_2 + R\&D_{rt}\beta_3 + HC_{rt}\beta_4 + INC_{rt}\beta_5 + GDP_{rt}\beta_6 + \alpha_r + \varepsilon_{rt} \quad (1)$$

where,
E_{rt} – entrepreneurial activity,
other variables – as defined in table 1.

F test was used to check for joint significance of differing group mean and to determine the usage of fixed effects estimation. Model's statistical significance was verified with Welch F test. To control for the autocorrelation and the heteroscedasticity, Durbin-Watson and Wald statistic were employed respectively. Lagged influence of variables was considered (with t-1, and t-2 lag). High level of collinearity[1] between variables was identified with Pearson's correlation coefficient.

Sample and Variables

For this research, Polish Północno-Zachodni Region (NUTS-1 level, PL4) was analysed. This region is one of six NUTS-1 regions in Poland. Północno-Zachodni Region consists of three NUTS-2 regions: Wielkopolskie Voivodeship (PL41), Zachodniopomorskie Voivodeship (PL42), Lubuskie Voivodeship (PL43). It represents 21% of Polish territory and 16% of Polish population[2].

The analysis of regional dimension of entrepreneurship in Polish Północno-Zachodni Region were conducted for the 2000-2014 period. Data source were EUROSTAT and Central Statistical Office of Poland. Panel data comprises of 315 observations.

Dependent variable (entrepreneurial activity) was measured as the share of self-employed within total workforce for region r and year t (E_{rt}). This approach is consistent with e.g. Gries and Naudé, 2009; Wyrwich, 2012; Fritsch *et al*., 2014.

Explanatory variables were as follows: Krugman specialization index, unemployment, inflows of knowledge, human capital. Differences in the economic size of regions were taken into account and most of the indicators of variables in question were expressed per inhabitant or to total employment in respective regions.

The control variables were included in the estimation (incomes of households and output region growth) to account for regional differences. Income of households embodies regional demand (Wagner and Sternberg, 2004) and impacts positively on entrepreneurial activity (Reynolds *et al*., 1995). Thereby, it is expected that together with income growth a tendency to self-employment increases. Output region growth is claimed to be interrelated with entrepreneurial activity (Bosma and Schutjens, 2011). Hence, it is anticipated that the enhancement of output region growth in a developed economy is followed by the rising in entrepreneurial activity.

The definitions of explanatory variables and data sources are shown in table 1.

Table 1: Definitions of explanatory variables and data sources

Variable	Definition	Data source
Krugman specialization index (K_{rt})	$$K_{rt} = \sum_{i=1}^{I} \left\| b_{irt} - \bar{b}_{it} \right\| \times 100$$ where: I – the number of economy sectors b_{irt} – the share of employment in a sector i in total employment in a region r in time t $\bar{b}_{it}$ – the share of employment in a sector i in total employment in Poland in time t	own calculation based on data from Central Statistical Office of Poland
Unemployment (U_{rt})	Unemployment rate (in %) in region r in time t	EUROSTAT
Inflows of knowledge $(R\&D_{rt})$	Intramural R&D expenditure in euro per inhabitant in region r in time t	EUROSTAT
Human capital (HC_{rt})	Share of population with tertiary education degrees in relation to total employment (in %) in region r in time t	EUROSTAT
Incomes of households (INC_{rt})	Log of income of households in euro per inhabitant in region r in time t	EUROSTAT
Output region growth (GDP_{rt})	Log of gross domestic product in euro per inhabitant in region r in time t	EUROSTAT

Source: own study based on Krugman, 1991; Bosma and Schutjens, 2011; Wyrwich, 2012; Huggins *et al.*, 2017.

Descriptive statistics of variables is presented in table 2.

Table 2: Definitions of explanatory variables and data sources

Variable	Obs.	Min	Max	SD	Mean
E_{rt}	45	13.1893	23.4715	2.4667	16.8309
K_{rt}	45	6.6000	23.0000	4.0931	12.8622
U_{rt}	45	6.0000	26.3000	6.2526	14.1444
$R\&D_{rt}$	45	4.8000	94.8000	21.0668	24.8733
HC_{rt}	45	9.8000	24.6000	4.4162	16.7089
INC_{rt}	45	8.0709	8.7796	0.2168	8.4506
GDP_{rt}	45	8.2523	9.2350	0.2799	8.7307

Source: Own estimation.

High level of collinearity between some variables was identified. Therefore, the variable GDP_{rt} was excluded from the data set and from further studies in this paper. Correlation matrix is shown in Appendix (table 3).

Findings

Table 4 reports the estimate of equation 1 with the share of self-employed within total workforce in the 2000-2014 period as dependent variable.

Table 4: Estimation results

	Model
	E_{it}
$const$	−49.1358
	(94.2254)
K_{it}	−0.0948
	(0.0613)
U_{it}	0.3418**
	(0.1415)
U_{it-1}	−0.0713
	(0.1502)
U_{it-2}	0.0972
	(0.0594)
$R\&D_{it}$	−0.0251
	(0.0185)
$R\&D_{it-1}$	−0.0345
	(0.0304)
HC_{it}	0.3843***
	(0.1137)

HC_{it-1}	0.2786*
	(0,1517)
INC_{it}	3.3925
	(6.9459)
INC_{it-1}	3.8398
	(4.4389)
$LSDV\ R-squared$	0.8943
$Within\ R-squared$	0.6243
$Welch\ F$	4.1034**

Heteroscedasticity and autocorrelation consistent. Standard errors in parenthesis. Level of statistical significance: $***p \leq 0.01$; $** p \leq 0.05$; $*p \leq 0.10$. Source: Own estimation.

The analysis does not reveal any significant relationships between Krugman specialization index and the share of self-employed within total workforce. Indeed, the results indicate that some cross-region heterogeneity in the degree of sectoral specialisation does not influence entrepreneurial activity in developing, transition regions. The results are consistent with the observation of Wyrwich, who for the former German Democratic Republic did not found any statistically significant connection between Krugman specialization index and startup rate (2012).

According to research expectations, the direct link between unemployment rate and the share of self-employed within total workforce has been found. The coefficient of the estimation confirms the anticipated contribution of unemployment on entrepreneurial activity in developing regions. The results support Hypothesis 1 and indicate the relevancy of necessity entrepreneurship. The findings confirm previous studies that have identified that the growth of unemployment leads to the enhancement of "out of need" entrepreneurship (e.g. Audretsch and Fritsch, 1994; Fritsch *et al*., 2014; Storey, 2016).

Contrary to research expectations, an attempt to identify an increasing effect of knowledge inflows on entrepreneurial activity in developing regions has not lead to any significant results. Indeed, the evidence that together with a rise in intramural R&D expenditure the growth in the share of self-employed within total workforce is observed, has not been found. These results do not correspond to Hypothesis 2, however they are in line with some of studies for developed regions, which emphasize a lack of direct relationship between regional knowledge and startup activity (e.g. Stuetzer *et al.,* 2014).

The results indicate that the contribution of human capital to entrepreneurial activity in developing regions is statistically significant. The coefficient of the estimation confirms the expected effect of the share of population with tertiary education degrees in relation to total employment on the share of self-employed within total workforce. Hypothesis 3 is supported. It is particularly interesting that the positive impact of human capital is also lagged (t-1 lag), however with significance at the 0.1% level. The results are in line with e.g. Gries and Naudé, 2009.

Unexpectedly, the results for control variable are not statistically significant. It indicates that findings corresponding to the positive impact of demand on entrepreneurial activity have not been found. The analysis does not reveal any significant relationships between income of households and the share of self-employed within total workforce. Hence, the results do not provide any support for explanations that

demand determines entrepreneurial activity, and then are not consistent with previous studies (e.g. Reynolds *et al.,* 1995).

Conclusions

This paper investigated regional dimension of entrepreneurship in a developing economy, with regard to Polish Północno-Zachodni Region. The results indicate that unemployment has positive effect on entrepreneurial activity in developing regions, which suggest its relevant consequence for nascence of entrepreneurial behaviours in these regions. However, these observations are not exclusive only for developing economies, since significant positive relationships between unemployment and entrepreneurship have been found also in developed countries (e.g. Thurik *et al.*, 2008). The findings suggest also that the focus on human capital in developing economies may contribute to an increase of entrepreneurial activity. The evidence of a positive effect of tertiary education on the share of self-employed within total workforce should encourage policymakers to establish and intensify schemes for encouraging entrepreneurial attitudes among high-skilled people.

Various shortcomings of the study presented here should be acknowledged that provide directions for further research. First, although dependent variable was proxy in line with literature, a limitation of this research is the lack of information on the self-employment in the agricultural sector in respective NUTS-2 regions, which makes impossible to learn whether dependent variable should be corrected for high employment in question (with regard e.g. to Acs *et al*., 2005). Second, despite analyzing regional dimension of entrepreneurship with a focus on principal variables, this paper does not control for regional: migration rate, foreign direct investment, density. These dimensions may reflect the level of human capital, knowledge inflows and demand for goods and services (e.g. Reynolds *et al.*, 1995; Wyrwich, 2012), therefore it seems interesting to test to what extent these factors determine entrepreneurial activity in Północno-Zachodni Region. Third, whereas this study allows to observe relationships for one of NUTS-1 regions in Poland, future discussion on entrepreneurship issues in a developing, transition economy should involve all Polish regions.

Notes

1. Pearson's correlation coefficient > 0.9
2. Data for 2016. Source: Central Statistical Office of Poland

References

Acs, Z.J, Audretsch, D.B., Braunerhjelm, P., et al. (2005), 'Growth and entrepreneurship: an empirical assessment', Papers on Entrepreneurship, Growth and Public Policy 3205.

Audretsch, D.B. and Fritsch, M. (1994), 'The Geography of Firm Births in Germany', Regional Studies, 28(4). DOI 10.1080/00343409412331348326.

Bębenek, P. (2017), 'Effective innovation management in a company – innovation assessment criteria', Socialsgem, 4th International Multidisciplinary Scientific Conferences SGEM2017, Social SciencesandArts Conference Proceedings, Bulgaria.

Bosma, N. and Schutjens, V. (2011), 'Understanding regional variation in entrepreneurial activity and entrepreneurial attitude in Europe', The Annals of Regional Studies, 47(3). DOI 10.1007/s00168-010-0375-7.

Fritsch, M., Bublitz, E., Sorgner, A., et al. (2014), 'How much of a socialist legacy? The re-emergence of entrepreneurship in the East German transformation to a market economy', Small Business Economics, 43(2). DOI 10.1007/s11187-014-9544-x.

Fritsch, M. and Falck, O. (2007), 'New business formation by industry over space and time: a multidimensional analysis', Regional Studies, 41(2). DOI 10.1080/00343400600928301.

Gries, T. and Naudé, W. (2009), 'Entrepreneurship and regional economic growth: towards a general theory of start-ups', Innovation: The European Journal of Social Science Research, 22(3). DOI 10.1080/13511610903354877.

Huggins, R., Prokop, D. and Thompson, P. (2017), 'Entrepreneurship and the determinants of firm survival within regions: human capital, growth motivation and locational conditions', Entrepreneurship and Regional Development, 29(3-4). DOI 10.1080/08985626.2016.1271830.

Krugman, P. (1991), 'Geography and Trade', Leuven University Press and the MIT Press Cambridge.

Maj, J. (2016), 'Corporate social responsibility and diversity reporting in polish companies from companies from the basic materials and oil and gas sectors listed on the Warsaw stock exchange', International Multidisciplinary Scientific GeoConference Surveying Geology and Mining Ecology Management, SGEM.

Reynolds, P., Miller, B. and Maki, W.R. (1995), 'Explaining regional variation in business births and deaths: U.S. 1976–88', Small Business Economics, 7(5). DOI: doi:10.1007/BF01302739.

Storey, D.J. (2016), 'Entrepreneurship and the new firm.', Routledge Taylor and Francis Group, London and New York.

Stuetzer, M., Obschonka, M., Brixy, U., et al. (2014), 'Regional characteristics, opportunity perception and entrepreneurial activities', Small Business Economics, 42(2). DOI 10.1007/s11187-013-9488-6.

Thurik, A.R., Carree, M.A., van Stel, A., et al. (2008), 'Does self-employment reduce unemployment?', Journal of Business Venturing, 23(6). DOI 10.1016/j.jbusvent.2008.01.007.

Wagner, J. and Sternberg, R. (2004), 'Start-up activities, individual characteristics, and the regional milieu: Lessons for entrepreneurship support policies from German micro data', The Annals of Regional Science, 38(2). DOI 10.1007/s00168-004-0193-x.

Wennekers, S., van Wennekers, A., Thurik, R. et al. (2005), 'Nascent Entrepreneurship and the Level of Economic Development', Small Business Economics, 24(3). DOI 10.1007/s11187-005-1994-8.

Wyrwich, M. (2012), 'Regional entrepreneurial heritage in a socialist and a postsocialist economy', Economic Geography, 88(4). DOI 10.1111/j.1944-8287.2012.01166.x.

Zygmunt, A. (2015), 'The financial sources of investment activity – a case of polish enterprises', AD ALTA Journal of Interdisciplinary Research, volume 5, issue 2.

Zygmunt, J. (2017), 'Enterprises' Development in Peripheral Regions: Patterns and Determinants', Problemy Zarządzania, vol. 15, 1(65). DOI 10.7172/1644-9584.65.14.

Appendix

Table 3: Correlation matrix of dependent variable and explanatory variables

	E_{rt}	K_{rt}	U_{rt}	$R\&D_{rt}$	HC_{rt}	INC_{rt}	GDP_{rt}
E_{rt}	1						
K_{rt}	-0.2313	1					
U_{rt}	0.1307	0.6186**	1				
$R\&D_{rt}$	0.4302**	-0.3422**	-0.5381**	1			
HC_{rt}	-0.2779	-0.4356**	-0.7318**	0.5298**	1		
INC_{rt}	-0.1942	-0.4680**	-0.8743**	0.6164**	0.8752**	1	
GDP_{rt}	-0.0877	-0.5406**	-0.9059**	0.7116**	0.8635**	0.9771**	1

Level of statistical significance: ** $p \leq 0.05$. Source: Own estimation.

Analysis of the Influence of the External Environment on the Development of Water Distribution System Exploitation Strategy - Case Study

Malgorzata Jasiulewicz-Kaczmarek, Faculty of Engineering Management, Poznan University of Technology, Poznań, Poland, malgorzata.jasiulewicz-kaczmarek@put.poznan.pl

Ryszard Wyczółkowski, Faculty of Organization and Management, Silesian University of Technology, Zabrze, Poland, ryszard.wyczolkowski@polsl.pl

Violetta Gładysiak, ZW-K Śmigiel Sp. Z o.o., dr Skarzyńskiego St. 6A, Śmigiel, Poland, violetta.gladysiak@dmq.pl

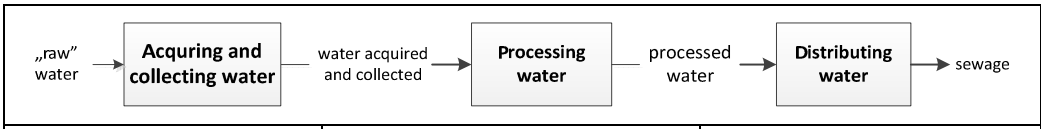
Abstract

Definition of exploitation strategy for water distribution system is determined by many factors which have different functions in the socio-economic system. The paper presents characteristics of external environment of water distribution system, which potentially influence definition exploitation policy. The research includes analysis of exploitation strategy for a small water distribution system located in the poorly urbanized area (small municipality) and comparison of importance of decision criteria considered with the criteria considered for typical urban water distribution system. The basic research question is: Do the size and character of a water distribution system strongly influence decisions on implemented water distribution system exploitation strategy?

Keywords: water distribution system, structural analysis, exploitation strategy.

Introduction

Water distribution systems constitute part of the basic elements of contemporary technical infrastructure of urban and rural areas. It is a complex engineering system composed of transmission networks and auxiliary equipment (e.g. controllers, checkouts etc.), scattered territorially over a large area. Simplified structure of a water distribution system and its functions are presented in the figure below (Fig. 1).



Acquiring and collecting	Processing	Distributing
- acquiring water from sources - transporting and collecting water in a well or a tank	- bringing water to a treatment facility - conducting required biological and physiochemical processes	- bringing water to the supply area - distributing water in the supply area

Fig. 1: Structure and functions of water distribution system

From the water distribution system operation point of view, its basic features are: functional variability and territorial dispersion. Functional variability results from the need to adjust the system

to temporary fluctuations in demand for water. Territorial dispersion on one hand allows for the realization of the basic goal of supplying water to consumers; while on the other is a serious impediment to maintenance work (inspections, repairs, etc.) as it implies the need to move people and equipment necessary to carry out the work and to ensure proper communication. It is important to note that water distribution networks are usually large assets, of the value significantly higher than the income of its operator. There is therefore no financial or technical capacity to reproduce a significant part of the network in a short period of time. Hence, it is important to adopt exploitation policy striving for maintaining the system and adjusting it to growing requirements (increasing number of customers, increase in the length of the water distribution network, changes in legal requirements, etc.), by systematic but not extensive actions (compared to the size and value of the facility being used).

The basic research question is: Does the size and character of the water distribution system significantly affect the adopted exploitation strategy? Such a question has shaped the goal of research and the method of their implementation. The paper analyzes the exploitation strategy of a small water distribution system in poorly urbanized areas (small municipality) and compares the importance of the criteria under consideration for this system and the typical urban system (Loska, 2016). The article consists of four chapters. The chapter 2 describes the STEEPVL (Social, Technological, Economic, Ecological, Political, Value and Legal) method, defining the goal of the method and the steps to its implementation. The next chapter presents the research structure. This chapter characterizes the research object and analyzes factors influencing the exploitation strategy of the water distribution system exploited by the small municipality. The MICMAC analysis (Matrice d'Impacts croises-multiplication appliquée anclassment) has been carried out, allowing for the assessment of the influence and dependence of the features and the visualization of the results. A comparative analysis of the results obtained for the large city water distribution system with the results obtained for the water distribution system exploited by the small municipality was also carried out. The last chapter is a summary and definition of directions for further research.

Assumptions of Structural Analysis

Structural analysis is a tool that enables structuring and analyzing sets including large number of factors (variables) influencing each other (Grzybowska, 2012). The first stage of its implementation is to identify the type of interaction between the pair of factors. Applying structural analysis to each pair of A and B factors will yield answers to the following questions: (i) does the A factor have a direct impact on the B factor? (ii) If so, is this impact small, medium, or crucial? For this purpose, it is necessary to determine whether it is direct and what is its strength (low, medium, high or potential). The impact is assessed in three points scale, that offers also opportunity to identify potential impact and is defined as follows:

- „0” – no impact;
- „1” – small impact;
- „2” – medium impact (crucial, but not essential);
- „3” – crucial’ P – potential impact.

The structural analysis matrix can be processed with tools such as the MICMAC, based on the algebraic Boollean logic. Application of the MICMAC program enables analysis and comparison of hierarchy of individual variables, taking into account their direct and indirect impacts, which is a rich source of information about the system being analyzed. The strength of structural analysis is in particular its ability to identify relations between variables when mutual influences are not obvious and may remain unrecognized even by experts in the field. The fundamental limitation of the method is the necessity of limiting the number of variables considered in such a way as to allow experts to determine, within a reasonable time, their mutual relations. The algorithm used in the MICMAC software is based on three fundamental stages (Ahmed et al., 2009):

- Stage 1: Determining factors that have influence on the given occurrence

- Stage 2: Describing relations between factors by building matrix and drawing direct and indirect impact graph
- Stage 3: Identifying groups of factors including crucial factors and drawing the influence-dependence chart

Structural analysis with MCMAC software enables identification of factors influencing a given research area (fig.2):

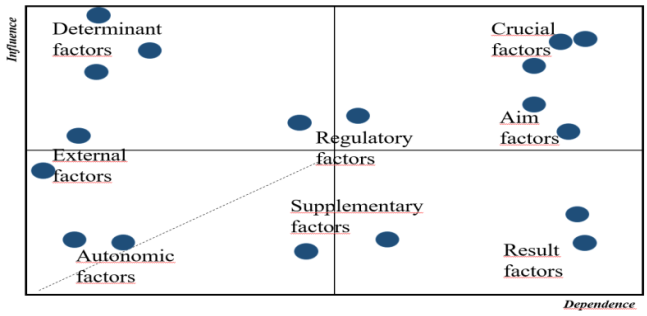


Fig. 2: Example of structure of factors influencing a given research area

(based on Nazarko et al., 2017)

The groups of factors presented in the figure 2 can be characterized as follows (Nazarko et al., 2017):

- crucial factors, which are characterized by large-scale impact and a high degree of dependency on other factors- due to high instability, these factors require critical scrutiny
- aim factors, are dependent on other factors and tend to be influenced by such factors rather than vice versa;
- result factors, are characterized by low impact and high dependency on other factors and are especially susceptible to changes in crucial factors;
- determinant factors (motorbikes, brakes) have a strong impact on the system, are characterized by a low level of dependency on other factors, and can be regarded as a driving or breaking force;
- regulatory and supplementary factors are characterized by minimal impact on the system and can prove to be beneficial in achieving strategic goals;
- autonomic factors are characterized by exerting the least impact on changes taking place in the system as a whole unit;
- external factors are characterized by having a relatively smaller impact on the system than determinant factors, but a greater impact than autonomic factors, and are not impacted upon by other variables.

Methodology

Introduction of the Object of the Research

The object of the research is a water distribution network supplying the small municipality. It is a rural municipality located in Wielkopolska (Greatpoland) region in Poland. The first plans for construction of the aqueduct were made in 1911. Currently the water distribution network extends over a total area of 185.5 km2, of which 134.3 km^2 is the rural area and 51.2 km^2 is urban area.

Currently, the company manages a system of about 190 km. Over 60% of the system are installations that were made more than 20 years ago, 20% are installations that are between 11 and 20 years old, and the remaining 20% are installations less than 10 years old. The system consists of cement-asbestos pipes (18%), PVC pipes (65%), cast iron pipes (15%) and PE pipes (2%).

The goal of the enterprise is to supply water to the consumers, providing:

- quantitative parameters, taking into account needs of customers varying in time and space,
- quality parameters, taking into account the need to adjust and maintain the water characteristics at the level defined by legal requirements.

In pursuit of such goals, the network's performance is crucial for the company, including:

- operation aspect - providing organizational and economic conditions for the efficient use of all network elements (sale of water produced to end users)
- maintenance aspect - providing technical capabilities for effective operation and efficient use of the network, by monitoring and maintaining parameters at the required level, e.g. water pressure in the network, carrying out scheduled inspections, maintenance and repairs and performing unscheduled work resulting from emergency events.

It is important for network managers to consider what external factors should be taken into account when determining the exploitation policy for water distribution network, and which of them will have the greatest impact both on the performance of the customer response and on the company's own efficiency.

Selection of factors

The research was to identify, select and organize a set of features describing the impact of the external environment on the water distribution network's exploitation policy. Due to the objective of the research, the external environment features developed by A. Loska (Loska, 2017) for the large water distribution system were used for further consideration. The identification of the external environment was carried out in the research with an expert method (involving researchers and employees of the company) using the STEEPVL model. This model includes seven criterion classes, each of which determines the selected aspect of the external environment: Social, Technological, Economic, Ecological, Political, Value, Legal. The factors can be defined as follows (Nazarko & Kuźmicz, 2017):

- **Social factors** include culture, health consciousness, population rate, age distribution and importance of safety. Trends in social factors affect the demand for products and how enterprises operate,
- **Technological factors** cover technological aspects such as R&D activity, technology incentives and the rate of technological change. They can determine barriers to entry, minimum efficient production level and influence outsourcing decisions. Technological shifts may affect costs, quality, and lead to innovation,
- **Economic factors** can relate to economic growth, interest rates or exchange rates. They have major impact on how enterprises operate and make decisions Environmental factors cover ecological and environmental aspects, which may influence enterprises. Growing awareness of the potential impact on environment affects business activity, technologies involved and final products,
- **Political factors** mean to what degree the government intervenes in the economy. They include areas such as tax policy, labour law, trade restrictions and political stability,
- **Legal factors** include different national and international regulations on different levels of government and mechanisms to monitor and ensure compliance with these laws.

The identified features for each of the criteria classes are shown in the Table1.

Table 1: The list of the factors, as a result of the analysis using the STEEPVL model (Loska, 2017)

Classes of factors	Factors
Social	(1) Level of request and consumption of water in the activity area of the enterprise. (2) Staff potential of the enterprise. (3) Staff potential of the maintenance department of the enterprise
Technological	(4) Level of modernity of the water supply system (5) Access to innovative exploitation solutions on the water supply system. (6) Level of the use of innovative methods and tools in the exploitation of the water supply
Economic	(7) Dynamics of changes in the price (cost) of water supply to consumers. (8) Expenditures for development and modernization of the water supply system. (9) Expenditures for activities of the maintenance department.
Ecological	(10) Influence of the water supply system on the environment. (11) Impact of exploitation activities for the water supply system on the environment.
Political	(12) State and region policy in the field of water management. (13) Enterprise policy for ensuring supply of water to customers. (14) Importance of the maintenance activity for the enterprise.
Value	(15) Life style and consumption patterns of the local community. (16) Level of acceptance of maintenance works of the water supply system by the local community.
Legal	(17) Legislation in the supply of water to consumers. (18) Legal requirements and standards for the exploitation of the water supply system.

The criteria and features presented in the table 1 were the subject of further research conducted by the team of experts.

Research framework

The analysis of external factors influencing the selection of the exploitation strategy of the water distribution system in a small municipality was carried out in accordance with the steps outlined in Chapter 2. The first step was to determine the relationship between the factors.For developing contextual relationships among variables, the opinion of five experts, (three from industry and two from academia) was taken. For expressing the relationship between different critical factors, four symbols have been used to denote the direction of relationship between the parameters i and j:

- V is used for the relation from enabler i to enabler j (i.e. if enabler i influences or reaches to enabler j).
- A is used for the relation from enabler j to enabler i (i.e. if enabler j reaches to enabler i).
- X is used for both direction relations (i.e. if enablers i and j reach to each other).
- O is used for no relation between two enablers (i.e. if enablers i and j are unrelated).

Based on this contextual relationship, the SSIM has been developed. To obtain consensus, the SSIM was discussed in a group of enterprise experts and based on their responses, SSIM has been finalized and is presented in table 2.

Table 2: Structural self-interactive matrix (SSIM)

Factor p_i	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1		V	V	0	0	V	V	0	0	0	0	X	V	V	A	V	0	V
2			X	0	0	A	A	X	0	0	0	0	A	A	0	0	0	0
3				0	0	X	0	0	V	0	0	0	A	X	0	X	0	0
4					A	A	0	X	0	V	0	0	A	V	0	V	0	0
5						V	0	0	A	0	0	0	V	A	0	0	0	V
6							V	X	X	0	X	0	0	A	0	X	0	A
7								A	A	A	A	A	A	0	X	V	A	0
8									V	X	V	A	X	X	0	0	A	A
9										V	X	0	A	X	0	A	0	A
10											V	0	0	0	0	0	A	0
11												0	0	1	0	0	0	0
12													V	0	0	0	V	0
13														V	A	0	0	A
14															0	X	0	A
15																V	A	0
16																	0	0
17																		0

The SSIM is transformed into a reachability matrix format by transforming the information in each entry of the SSIM into 1s and 0s in the reachability matrix. The substitution of 1s and 0s are as per the following rules (Attri et al., 2014):

- If the (i, j) entry in the SSIM is V, the (i, j) entry in the reachability matrix becomes 1 and the (j, i) entry becomes 0.
- If the (i, j) entry in the SSIM is A, the (i, j) entry in the reachability matrix becomes 0 and the (j, i) entry becomes 1.
- If the (i, j) entry in the SSIM is X, the (i, j) entry in the reachability matrix becomes 1 and the (j, i) entry also becomes 1.
- If the (i, j) entry in the SSIM is O, the (i, j) entry in the reachability matrix becomes 0 and the (j, i) entry also becomes 0.

Following the above rules, the initial reachability matrix is developed. In the next step, the team re-examined and verified the impact of each factor. As a result of the analysis, a new, verified matrix was developed, which was further analyzed (Table 3).

Table 3: Matrix after verification by experts

Factor p_i	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	0	1	0	1	0	0	0	1	1	1	1	1	1	1	0	1	0	0
2	0	0	1	1	0	0	0	1	0	0	0	0	1	1	1	0	0	0
3	0	1	0	0	0	1	0	0	0	1	0	0	1	0	1	0	0	0
4	0	0	1	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0
5	0	0	1	1	0	0	0	1	1	1	1	0	0	0	0	0	0	0
6	0	1	0	1	0	0	0	1	0	1	1	0	0	0	0	0	0	0
7	0	0	0	1	0	0	0	0	0	1	1	0	1	1	0	1	0	0
8	0	1	0	1	1	1	0	0	1	1	1	0	1	1	0	0	0	0
9	0	0	1	1	1	0	0	1	0	1	1	0	0	0	0	0	0	0
10	0	0	0	0	0	0	1	1	1	0	0	1	1	1	0	1	1	0
11	0	0	0	0	0	0	1	0	1	1	0	0	1	1	0	0	1	0
12	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1
13	0	1	0	1	0	1	1	1	1	0	1	0	0	1	0	1	0	0
14	0	1	1	0	0	1	1	1	1	1	1	0	1	0	1	1	0	0
15	1	1	1	0	0	0	0	0	0	0	0	1	1	1	0	1	0	0
16	0	1	0	0	0	0	1	1	1	0	0	1	1	1	1	0	0	1
17	0	1	0	1	0	1	1	1	1	1	1	1	1	0	0	0	0	1
18	0	1	1	0	0	0	1	1	1	1	1	1	1	1	0	1	1	0

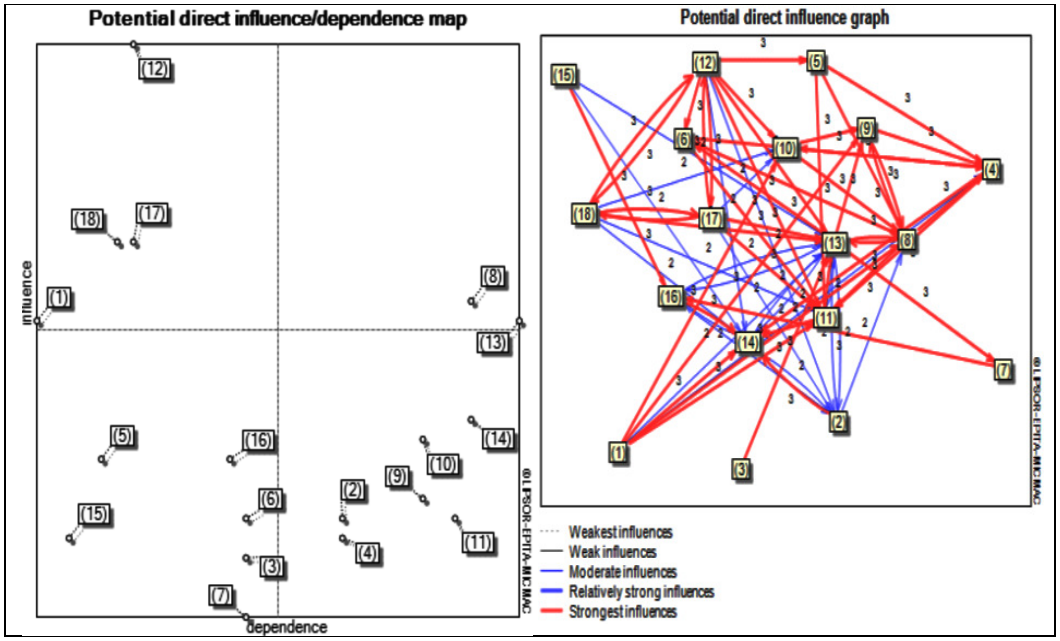
In the next step, the team assessed the impact between factors using the scale presented in the second chapter („0" – no impact; „1" – small impact; „2" – medium impact (crucial, but not essential); „3" – crucial'impact) and developed conical matrix. Conical matrix is developed by clustering factors in the same level across the rows and columns of the final reachability matrix. The drive power of a factor is derived by summing up the number of ones in the rows and its dependence power by summing up the number of ones in the columns. Next, drive power and dependence power ranks are calculated by giving highest ranks to the factors that have the maximum number of ones in the rows and columns, respectively (Table 4).

Table 4: Conical matrix

Factor p_i	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Drivers power
1	0	2	0	2	0	0	0	3	3	3	3	0	2	3	0	1	0	0	22
2	0	0	2	2	0	0	0	2	0	0	0	0	2	3	1	0	0	0	12
3	0	2	0	0	0	2	0	0	0	2	0	0	3	0	1	0	0	0	10
4	0	0	2	0	0	0	0	0	0	3	3	0	0	3	0	0	0	0	11
5	0	0	2	3	0	0	0	3	2	2	3	0	0	0	0	0	0	0	15
6	0	2	0	3	0	0	0	2	0	2	3	0	0	0	0	0	0	0	12
7	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	3	0	0	7
8	0	2	0	3	2	3	0	0	3	2	3	0	3	2	0	0	0	0	23
9	0	0	2	3	1	0	0	3	0	2	2	0	0	0	0	0	0	0	13
10	0	0	0	0	0	0	2	3	3	0	0	2	2	2	0	1	1	0	16
11	0	0	0	0	0	0	1	0	2	2	0	0	3	3	0	0	1	0	12
12	0	2	2	1	3	3	2	2	2	3	3	0	3	2	1	1	3	3	36
13	0	2	0	2	0	3	3	3	3	0	2	0	0	2	0	2	0	0	22
14	0	2	2	0	0	2	1	2	2	1	1	0	2	0	0	2	0	0	17
15	2	1	1	0	0	0	0	0	0	0	0	0	2	2	0	3	0	0	11

16	0	2	0	0	0	0	2	2	2	0	0	0	2	3	1	0	0	1	15
17	0	2	0	2	0	2	2	2	2	2	3	3	3	0	0	0	0	3	26
18	0	2	2	0	0	0	2	2	2	2	2	3	3	2	0	1	3	0	26
Dependence power	2	21	15	21	6	15	15	29	26	26	28	8	32	29	4	14	8	7	

Matrice d'Impacts croises-multiplication appliqu´e anclassment (cross-impact matrix multiplication applied to classification) is abbreviated as MICMAC (Arcade et al., 1994). The purpose of MICMAC analysis is to analyze the drive power and dependence power of enablers. MICMAC principle is based on multiplication properties of matrices. It is done to identify the key enablers that drive the system in various categories. The direct and indirect drive power - dependence power diagram is drawn as shown in Fig. 3. This figures was prepared with MICMAC software (http://en.laprospective.fr



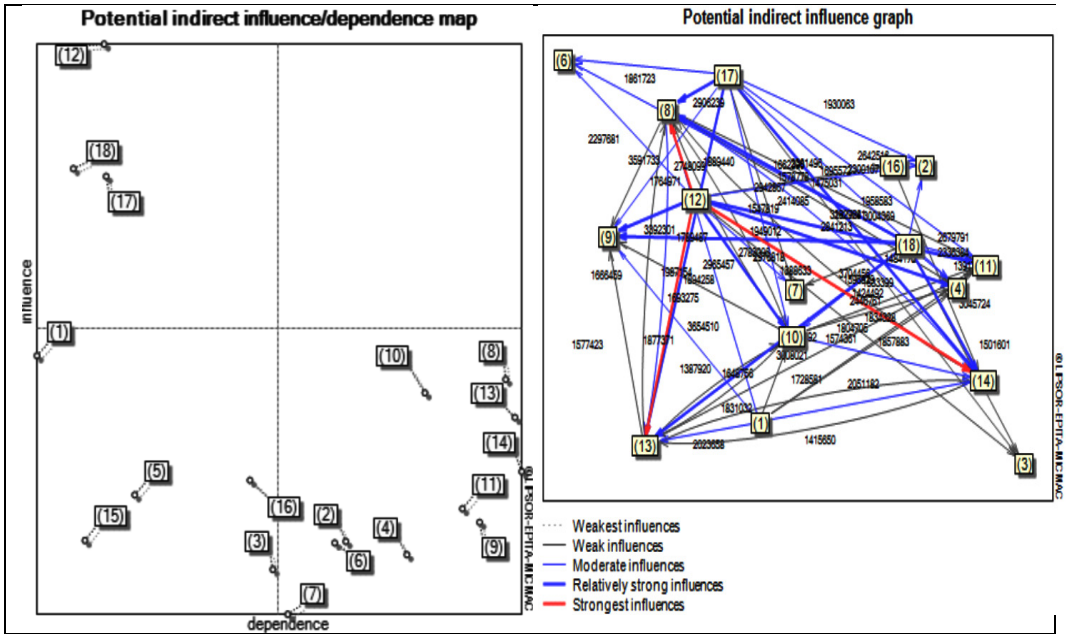


Fig. 3: MICMAC graph for water distribution system exploited by a small municipality (This figures was prepared with MICMAC software (http://en.laprospective.fr)

To answer the question: Does the size and character of the water distribution system significantly affect the adopted exploitation strategy? The results of the research should be compared with the results obtained for the large urban water distribution system located in Dolnośląskie (Silesia) region in Poland (Loska, 2016). Direct influence/dependence maps of compared waer distribution systems were presented on Fig.4 and the division of the factors of the structural analysis, based on direct impacts was presented in Table 2.

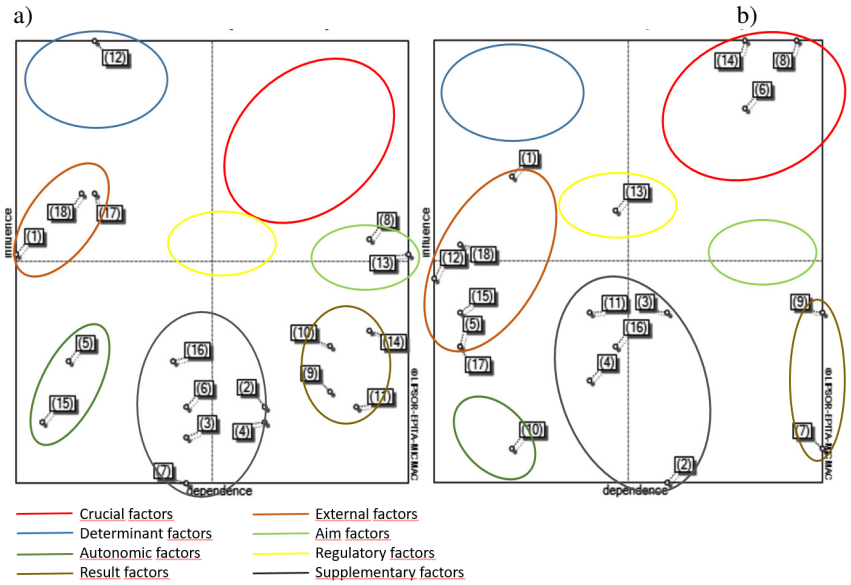


Fig. 4 :MICMAC direct influence/dependence map a) small municipality water distribution system b) large city water distribution system

Table 2: The division of the factors of the structural analysis, based on direct impacts

Groups of factors	Small municipality water distribution system	Large city water distribution system (Loska, 2016)
Crucial factors	None	(6) Level of the use of innovative methods and tools in the exploitation of the water supply (8) Expenditures for development and modernization of the water supply system. (14) Importance of the maintenance activity for the enterprise.
Determinant factors	(12) State and region policy in the field of water management.	None
Autonomic factors	(5) Access to innovative exploitation solutions on the water supply system (15) Life style and consumption patterns of the local community.	(10) Influence of the water supply system on the environment.
Result factors	(9) Expenditures for activities of the maintenance department. (10) Influence of the water supply system on the environment. (11) Impact of exploitation activities for the water supply system on the environment. (14) Importance of the maintenance activity for the enterprise.	(7) Dynamics of changes in the price (cost) of water supply to consumers. (9) Expenditures for activities of the maintenance department.
External factors	(1) Level of request and consumption of water in the activity area of the enterprise. (17) Legislation in the supply of water to consumers. (18) Legal requirements and standards for the exploitation of the water supply system.	(5) Access to innovative exploitation solutions on the water supply system (12) State and region policy in the field of water management. (15) Life style and consumption patterns of the local community. (17) Legislation in the supply of water to consumers. (18) Legal requirements and standards for the exploitation of the water supply system.
Aim factors	(8) Expenditures for development and modernization of the water supply system (13) Enterprise policy for ensuring supply of water to customers.	None
Regulatory factors	None	(13) Enterprise policy for ensuring supply of water to customers.
Supplementary factors	(2) Staff potential of the enterprise. (3) Staff potential of the maintenance department of the enterprise (4) Level of modernity of the water supply system. (6) Level of the use of innovative methods and tools in the exploitation of the water supply (7) Dynamics of changes in the price (cost) of water supply to consumers.	(2) Staff potential of the enterprise. (3) Staff potential of the maintenance department of the enterprise (4) Level of modernity of the water supply system. (11) Impact of exploitation activities for the water supply system on the environment. (16) Level of acceptance of maintenance works of the water supply

	(16) Level of acceptance of maintenance works of the water supply system by the local community.	system by the local community.

A comparison of the impact of selected indicators for both water distribution systems shows distinct differences. First of all, for the small system (Fig. 4a, Table 2 - left), crucial factors have not been distinguished, with a significant impact and a high degree of dependence on other factors. For large systems (Fig. 4b), factors (6), (8), (14), related to increasing the innovativeness of operations in the enterprise and associated financial outlays were pointed out. At the same time, on the opposite side - autonomic factors that have the least effect on the changes occurring in the system as a whole are indicated respectively (5) and (15) for the small water distribution system and (10) for the large water distribution system. This shows that for a small system, a client, a relatively small, slowly changing municipality, does not generate / enforce compliance with changing conditions because the changes are very slow and invisible. The policy pursues the preservation of the existing substance (property) in good condition, and the main external factor influencing it (determinant factors) are legal changes and regional policy. This corresponds to the placement of "expenditures for the development and modernization of the water supply system" (13) in the focus groups, i.e. those that are rather the result of activities other than the cause and represent possible corporate goals. In the result index, for a large enterprise, it is important to place an "environmental impact" in a group of autonomous factors with a low impact on the system. It seems, however, that this is not a lack of concern for the environment, but with a greater focus on the price of water sold (7) and an active policy (9) aimed at reducing its start-up - more attention is paid to maintaining this price on acceptable level by "taking care of the environment by preventing the waste of this resource.

Conclusion

The STEEPVL-based model has been developed to analyze interactions among different factors of the external environment in shaping the exploitation policy of a small municipal water distribution network. This model has been developed on the basis of consensus of experts from industry and authors of this paper.

On the basis of a comparative analysis of external factors influencing the selection of exploitation strategies in the small municipal water distribution system and in the large municipal water distribution system, significant differences in exploitation strategy formulation can be observed. Managers of small water distribution system are less interested in innovations, but they recognize the importance of innovation as a possible future goal. In addition, they consciously acknowledge the essence of shaping the activities of their own organizational units and the way water is used in relation to the environment. In contrast, in a large urban area, innovations are important and environmental elements are treated as an element of preventing excessive consumption and wastage of natural resources such as water.

Irrespective of the difference in approach to the development of exploitation policies for water distribution systems by business managers, the added value for both companies is to draw attention to the fact that strategy development requires a broad spectrum of social, economic and environmental factors. Each of these factors reflects the nature of the impact of the decisions made both on the company and its stakeholders.

References

Ahmed, MT., Saleh, M., Abdelrehim A. and Maghara, El. (2009), 'Scenario A search for Sustainability and Equity: An Egyption Case Study,' *Journal of Futures Studies* 14(2), 55–89

Arcade, J., Godet, M., Meunier, F. and Roubelat, F. (1994), 'Structural analysis with the MICMAC method & Actors' strategy with Mactor method,' AC/UNU Millennium Project Futures Research Methodology, Paris

Attri, R., Grover, S., Dev, N. and Kumar, D. (2015), 'An ISM approach for modelling the enablers in the implementation of Total Productive Maintenance (TPM),' *International Journal of System Assurance Engineering and Management*, DOI 10.1007/s13198-012-0088-7 http://tarjomefa.com/wp-content/uploads/2016/09/5193-English.pdf

Grzybowska, K. (2012), 'Supply Chain Sustainability – analysing the enablers, Environmental issues in supply chain management - new trends and applications,' P. Golinska, C. A.Romano (ed.), Springer, pp. 25-40, 2012. http://dx.doi.org/10.1007/978-3-642-23562-7_2

Loska, A. (2017), 'Scenario modeling exploitation decision-making process in technical network systems,' *Eksploatacja i Niezawodność – Maintenance and Reliability* 19 (2), 268–278

Loska, A. (2016), 'Methodology of modelling exploitation decision-making process for technical netwosk systems' (in polish), WPS Gliwice

Nazarko, J., Ejdys, J., Halicka, K., Nazarko, Ł., Kononiuk, A. and Olszewska, A. (2017), 'Structural Analysis as an Instrument for Identification of Critical Drivers of Technology Development,' *Procedia Engineering* 182, 474 – 481

Nazarko, J. and Kuźmicz, KA. (2017), 'Introduction to the STEEPVL Analysis of the New Silk Road Initiative,' *Procedia Engineering* 182, 497 – 503

Analysing the Correlation between the Quality of Visual Processing Of Marketing Information Carriers and the Perceived Quality Of Services When Searching For SMES

Radovan Bačík, Faculty of management, University of Prešov, Prešov, Slovakia, radovan.bacik@unipo.sk

Richard Fedorko, Faculty of management, University of Prešov, Prešov, Slovakia, richard.fedorko@unipo.sk

Jakub Horváth, Faculty of management, University of Prešov, Prešov, Slovakia, jakub.horvath@smail.unipo.sk

Ján Mihál, Faculty of management, University of Prešov, Prešov, Slovakia, jan.mihal@smail.unipo.sk

Abstract

This article describes research findings aimed at identifying the customer's perception of the quality of the visual processing of marketing information media in relation to the perceived quality of the offered services in the search for SMEs. The basic population for the purpose of the survey is the population of the East Slovakian region. 1055 respondents were surveyed and it was possible to include 987 respondents' answers based on the criterion of completeness of completed questionnaires. Data collection was conducted through simple random sampling in October and November 2016. To verify the hypotheses we used the StatSoft STATISTICA software. Due to the nature of the analyzed variables we used correlation analysis. Based on the research findings, respondents who prefer internet communication media to traditional ones, tend to think that a high-quality, visually-executed information carrier guarantees the quality of service. In general, there is a tendency for a visually produced information carrier to guarantee a well-served service. At the same time, we can say that there is a statistically significant dependence between the opinion on the equality of information media quality and the quality of the service provision. Also, our survey revealed that there is a statistically significant dependence on the relevance of interventional information carriers to the quality of visual processing of these information carriers. The results of our research are relevant to SMEs, which focus on the quality of the visual processing of marketing information media. Research results should help SMEs in the quality of their customer service.

Keywords: marketing communication, visual processing, marketing information carriers, quality of services.

Introduction

From a commercial perspective, success in the online environment depends in large part on company familiarity with the size, characteristics, and demands of the Internet user market. Thus, better understanding of who is using the Internet, what they demand from it and how they behave in an online context is crucial for businesses, looking to establish an effective online presence (Perju-Mitran et al. 2014). Marketing strategy and communication is not the privilege of large companies; it also plays a significant role in small and medium-sized enterprises (SMEs) (Kašík & Šnapka 2017). Companies use marketing communication to advertise various products they sell to increase their prestige and image, moreover to attract more customers and increase their profitability (Jirák & Köpplová 2009; Gavurová & Šoltés 2016). In order to succeed in the current hyper-competitive environment, the SMEs carry out

marketing communications activities (Štefko et al. 2010; Šnapka & Kašík 2012). Kotler (2007) emphasizes that for small and medium sized businesses the problem is not the communication itself but how to say it, to whom and how often. The answer to these questions is just marketing communication (Gay et al. 2007; Gburová & Matušíková 2016). In addition to the use of marketing communication tools, the quality of the visual processing of marketing information carriers is also important, which is one of these tools (Edmiston - Strasser 2009). In general, it can be said that with the Internet a new space has been opened to promote its products, services or brands. Specifically, it is a new dimension in the level of creating direct and effective relationships with the customers (Frankovský & Birknerová 2016; Svec et al. 2015; Grncay et al. 2015). Investing in marketing activities in the online environment is incomparably lower compared to the cost of other forms of promotion (Janouch 2010; Scott 2010).

Expenses on online promotion in the UK, according to the eMarketer survey (2016), amounted to 9.64 billion pounds (10.51 billion euros) in 2016. This year, these expenses are at 10.60 billion pounds (11.56 billion €). The forecast for 2020 predicts an average year-on-year rate of 2.2%. In 2020, the estimated cost of digital advertising is 13.11 billion pounds (14.30 billion euros). Based on the Marketo survey (2013), we note that 90% of the information transmitted to the brain is visual and visual information is processed 60.000 times faster than texts. There is an 85% chance that viewers or potential customers will rather buy the product after looking at a video about the product. 46.1% of the respondents said that the quality of the visual processing of marketing information carriers affects the credibility of the company.

Several authors in various disciplines, such as Klabiková Rabová (2015) in the study "Marketing communication of SMEs specialized in cosmetic industry", as well as Hwang and Lee (2017) in their study "Using an Eye-Tracking Approach to Explore Gender Differences in Visual Attention and Shopping Attitudes in an Online Shopping Environment". Another study responding to the problem is "Business information visualization intellectual contributions: An integrative framework of visualization capabilities and dimensions of visual intelligence" by Bačić and Fadlalla (2016).

Methodology

Based on the above described facts, the main goal of the research was to analyze customer perceptions of the quality of visual processing of offline and online marketing information media in relation to the perceived quality of offered services when searching for SMEs. The main objective consisted of two research questions:

- Is there a significant dependence on the visual quality of the information media and the quality of the services provided?

- Is there a significant dependence on the relevance of information media to the quality of visual processing of information carriers?

For the purposes of our survey, we proceeded from material obtained from primary sources. The basis of primary sources was based on data obtained through the realization of the survey in a questionnaire form. The basic set of respondents consists of inhabitants of the Eastern Slovak region, which can be identified as the main target group for the SMEs, operating within the region. In the survey, 1055 respondents were interviewed, and it was possible to include 987 respondents' answers based on the criterion of the fully completed questionnaires. Data was also collected electronically, using online form creation and data collection tools (the online Google Form tools). The online version of the questionnaire was sent to the respondents via the available email addresses. Data collection for the main research was conducted in October - November 2016.

Based on the questions, we identified the attitudes and preferences of the respondents in relation to the analyzed problem of our research. Specifically, the aim was to identify the relationship between the quality of the visual processing of the traditional (offline) forms of the marketing information media (i.e. the traditional information sources - Advertising Billboards, Advertising News, Advertising Leaflets, TV Advertising, Radio Advertising, Daily Press) and online forms of marketing information carriers (i.e., Online information sources - Internet sites, Online catalogs of companies, Online advertising, Community discussions, Business blogs, Social networking profiles) and perceived quality of services offered by SMEs.

Subsequently, with the use of other mathematical-statistical methods to solve the problem, a 5 and 10 degree interval scale, also referred to as the Likert scale, was used in the questionnaire. Our hypotheses have been confirmed through the StatSoft STATISTICA statistical program. Based on the size of the file and the characteristics of the primary data and the analyzed variables, the correlation coefficient Phi and Gamma was used.

48.53% of women and 51.47% of men participated in the questionnaire survey. The largest group of the respondents surveyed was a group of respondents from the age 18 to 25 with a share of 21.28%. The second most frequent group was the group of respondents from the age 26 to 30, representing a share of 13.78%. On the basis of a deeper perspective, respondents from the age 18 to 35 represent a share of 46.61%. For all other age categories surveyed, the proportion of respondents did not exceed 12%. Regarding the highest level of education, the biggest group was the ones with secondary education without a school leaving examination and their share of 31.51%. The share of respondents with a secondary education with a school leaving examination was 28.37%. The share of graduates of the first level of higher education represented 20.77%. The share of respondents who achieved the second level of higher education represented 19.35%.

Results

The first part of our research focused on detecting the extent to which traditional (offline) or online sources of information preferred by respondents believe that quality visual processing of information carriers guarantees the quality of the services provided. We used the correlation coefficient Phi to analyze this area. All of the respondents' answers were in the survey, none of them were omitted. Based on the formulated research problem, the following hypothesis was formulated:

H1: We assume a statistically significant dependence of the opinion on the equality of the quality of the information carriers and the quality of the provided services on the preference for obtaining information.

Table 1 : Crosstabulation – H1

Preferred sources of information on products and services	Allegation: Generally well-processed information carrier = quality services provided		Total
	Yes	No	
Through the Internet	558	157	715
Traditionally, without the use of the Internet	180	92	272

Based on the findings in Table 1, respondents who prefer Online communication carriers to traditional ones tend to think that a high-quality visual information carrier guarantees the quality of the service. In general, there is a tendency for a visually produced information carrier to guarantee a well-served service.

The following Table 2 gives us the exact output of the correlation analysis, and thus the extent to which the preferred channel (traditional or online) influences the view of equality of quality of services and quality of visual processing of information carriers.

To confirm or refute the above hypothesis, it is necessary to formulate partial hypotheses for testing the individual components of the files in the question:

- H0: We assume that there is a statistically significant dependence between the view of the equality of the quality of the information carriers and the quality of the provision of the services on the preferences of obtaining the information.

- H1: We assume that there is no statistically significant dependence between the view of the equality of the quality of the information carriers and the quality of the provision of services on the preferences of obtaining information.

Table 21 Symmetric Measures – H_1

Variables		Value	Approximate Significance
Nominal by Nominal	Phi	0.122	0.000
	Cramer's V	0.122	0.000
N of Valid Cases		987	

The correlation coefficient π with an output value of 0.122 tells us about the weakness of the analyzed elements. Tests depending on the dimension of the set "p" at the nominal data level and at the correlation coefficient p are not studied under standard circumstances. We consider the statistically significant dependence on an output value of 0.20, which is understood as the medium-term dependence at this coefficient. Therefore, the output of p value equals to 0.000, which suggests to accept the H0 and reject the original H1 hypothesis. Therefore, we accept a position implying our hypothesis. Moreover there is statistically significant dependence between the analyzed elements.

The second part of our research focused on the extent to which respondents perceive the relevance of traditional and Online information carriers as being dependent on the quality of the visual processing of information media. We analyzed 100% of the file data 987 respondents answered. We used the Gamma correlation coefficient with respect to the ordinal level. Based on the formulated research problem, the following hypothesis was determined:

- **H2:** We assume a statistically significant dependence of the relevance of the traditional information carriers on the quality of the visual processing of these carriers.

- **H3:** We assume a statistically significant dependence of the relevance of online information carriers on the quality of the visual processing of these carriers.

For the final evaluation of the H2 hypothesis, the following partial hypotheses are required:

- H0: We assume a statistically significant dependence of the relevance of the traditional information carriers on the quality of the visual processing of these carriers.

- H1: We do not expect a statistically significant dependence of the relevance of traditional information channels on the quality of the visual processing of these information carriers.

Table 32 : the degree of relevance of traditional information carriers

Variables		What importance do you attach to the quality of visual processing of the following types of information carriers - Traditional information carriers?					Total
		Minimal importance	Less important	I can not judge	More important	Maximum importance	
The degree of relevance of traditional information carriers	Strongly irrelevant	15	0	16	149	0	180
	Slightly irrelevant	7	48	35	144	261	495
	I can not judge	8	10	5	42	2	67
	Slightly relevant	18	20	3	29	31	101
	Strongly relevant	16	31	7	65	25	144
Total		64	109	66	429	319	987

Table 4: Symmetric Measures – H_2

Variables	Value	Asymptotic Standardized Error[a]	Approximate T[b]	Approximate Significance
Ordinal by Ordinal - Gamma	-0.109	0.034	-3.117	0.002
N of Valid Cases	987			
a. Not assuming the null hypothesis.				
b. Using the asymptotic standard error assuming the null hypothesis.				

From Table 4, with a negative correlation output value, it can be assumed that this is a negative correlation between the relevance of the traditional information carriers on the quality of the visual processing of these information carriers. The absolute value of output equals to 0.109, which is a weak correlation. Based on the above, we accept the H0 and reject the alternative of this hypothesis. Therefore, we agree with the standpoint, that the importance of visual processing of traditional information media is low to the extent that it is capable of inducing a less perceptible relevance of these information carriers.

For the final evaluation of the H3 hypothesis, the following hypotheses are formulated:

- H0: We assume a statistically significant dependence of the relevance of online information carriers on the quality of the visual processing of these carriers.
- H1: We do not expect a statistically significant dependence of the relevance of online information carriers on the quality of visual processing of these carriers.

Table 53 : The relevance of Online information carriers

Variables		What importance do you attach to the quality of visual processing of the following types of information carriers - Online information carriers?					Total
		Minimal importance	Less important	I can not judge	More important	Maximum importance	
The relevance of Online information carriers	Strongly irrelevant	3	4	8	7	2	24
	Slightly irrelevant	39	8	27	44	5	123
	I can not judge	8	17	10	24	19	78
	Slightly relevant	13	33	41	171	93	351
	Strongly relevant	8	40	29	143	191	411
Total		64	71	102	115	389	310

Table 6 : Symmetric Measures – H_3

Variables	Value	Asymptotic Standardized Error[a]	Approximate T[b]	Approximate Significance
Ordinal by Ordinal - Gamma	0.430	0.033	11.842	0.000
N of Valid Cases	987			
a. Not assuming the null hypothesis; b. Using the asymptotic standard error assuming the null hypothesis				

It can be seen from the above Table 6 that among the elements of the attributed importance of the quality of the visual processing of Online information carriers to the degree of relevance of these information

carriers is a strong dependence, as evidenced by the output value being equal to 0.430. Thus, we receive an opinion implying our partial H0 hypothesis and dismiss its alterative, the H1. There is a statistically significant dependence on the relevance of interventional information carriers to the quality of visual processing of these information carriers.

Conclusion

In a competitive environment communicating with customers is undoubtedly an important factor in the success of SMEs. Based on a well-chosen marketing communication and the quality of marketing information carriers, the company informs consumers of their products and services. Due to the development of the Internet and scientific and technological progress, the customer purchase cycle has become more complex. The development of communication media gives customers a broad access to information. This choice of the customers makes it difficult for companies to select individual communication media and compose a communication mix in line with the customer's path.

Based on the above-mentioned analyzes we can state that apart from the chosen communication media, the quality of the visual processing of these media and the individual marketing information carriers are also important. Customers who prefer Internet communication media instead of traditional ones tend to think that a high-quality, visually-executed information carrier guarantees the quality of the services. In general, there is a tendency for a visually produced information carrier to guarantee a well-served service. Our survey also confirmed that there is a statistically significant dependence on the relevance of interventional information carriers on the quality of visual processing of these information media. This dependence, however, has not been confirmed in the case of traditional information media, which, in terms of promotional activities, is considered to be a significant point of view.

The popularity of the online environment for marketing communication activities is also reflected in the advertising spending. An example for this is an eMarketer (2016) analysis of the UK market, which estimates that by 2020 we can expect an average increase in digital advertising spending of 2.2%. In particular, we can speak about an increase from the current value of 10.60 billion £ (€ 11.56 billion) to 13.11 billion £ (€ 14.30 billion) in 2020.

Based on the results of our survey, the SMEs should certainly take care of the quality of the visual processing of marketing information media. Research results should help the SMEs to provide the quality of their customer service. Implementing and correctly understanding the quality of online marketing information carriers in the context of marketing and the SME strategies over the long term, which represents an indisputable competitive advantage while improving the quality of the services offered by the SMEs. Specifically, it is to grasp current trends and practices in marketing communication with what makes easier the implementation of the future innovations.

Acknowledgment

This article is one of the partial outputs under the scientific research grant VEGA 1/0806/16 "Research on issues of consumer behaviour of a new generation of customers with emphasis on identifying preferences and usability of mobile platforms in the process of e-commerce of the subjects localized predominantly on the Central European Market" and VEGA 1/0789/17 "Research of e-commerce with relation to dominant marketing practices and important characteristics of consumer behavior while using mobile device platforms"

References

Bačić, D. and Fadlalla, A. (2016), 'Business information visualization intellectual contributions: An integrative framework of visualization capabilities and dimensions of visual intelligence,' *Decision Support Systems*, 89, pp. 77-86.

Edmiston - Strasser, D. M. (2009), 'An Examination of Integrated Marketing Communication in U.S. Public Institutions of Higher Education,' *Journal of Marketing For Higher Education*, 19(2), pp. 142-165.

eMarketer. (2016), 'UK digital ad spending, 2015-2020,' [Online], [Retrieved August 23, 2017], https://www.emarketer.com/corporate/coverage/be-prepared-UK-AdSpend.

Frankovský, M. and Birknerová, Z. (2016), 'Cognitive distortions in managerial work – Differences between male and female managers [Zaburzenia poznawcze w pracy menedżera – Różnice pomiędzy mężczyznami a kobietami menedżerami] ,' *Polish Journal of Management Studies*, 15(2), pp. 47-57.

Gavurová, B. and Šoltés, M. (2016), 'Economic aspects of social services development in Slovakia in the context of demographic changes,' *Scientific Papers of the University of Pardubice, Series D: Faculty of Economics and Administration*, 23(37), pp. 14-25.

Gay, R., Charlesworth, A. and Esen, R. (2007), Online Marketing: A Customer-Led Approach. New York: Oxford University Press.

Gburová, J. and Matušíková, D. (2016), 'Potential influence of new trends in marketing on consumer purchasing behavior, ' Proceedings of the 27th International Business Information Management Association Conference - Innovation Management and Education Excellence Vision 2020: From Regional Development Sustainability to Global Economic Growth, IBIMA 2016, pp. 2369-2374.

Grancay, M., Grancay, N., Drutarovska, J. and Mura, L. (2015), 'Gravity model of trade of the Czech and Slovak Republics 1995-2012: How have determinants of trade changed, ' *Politicka Ekonomie*, 63(6), pp. 759-777.

Hwang, Y.M. and Lee, K.C. (2017), 'Using an Eye-Tracking Approach to Explore Gender Differences in Visual Attention and Shopping Attitudes in an Online Shopping Environment, ' *International Journal of Human-Computer Interaction*, 33(10), pp. 1-10.

Janouch, V. (2010), Internetový marketing. Praha: Computer Press.

Jirák, J. and Köpplová, B. (2009), Masová média. Praha: Portál.

Kašík, J. and Šnapka, P. (2017), 'Quantification of possible level of cost reduction in enterprise as a result of intensification of production processes, ' *Journal of Applied Economic Sciences*, 12(48): 107-123.

Kotler, P. and Keller, K.L. (2007), Marketing management. Praha: Grada Publishing.

Klabíková Rábová, T. (2015), 'Marketing Communication of SMEs Specialized in Cosmetic Industry in Magazines for Women, ' *Procedia - Social and Behavioral Sciences*, 175, pp. 48-57.

Marketo. (2013), 'Why savvy marketers use visual content, ' [Online], [Retrieved August 23, 2017], https://i.pinimg.com/736x/79/d1/12/79d112f56517e0fa9fef276473918c7d--social-media-marketing-content-marketing.jpg.

Perju-Mitran, A., Negricea, C.I. and Edu, T. (2014), 'Modelling The Influence Of Online Marketing Communication On Behavioural Intentions, ' *Network Intelligence Studies Volume II*, 2(4), pp. 245-253.

Scott, D.M. (2010), The New Rules of Marketing and PR. New Jersey: John Wiley & Sons.

Svec, M., Olsovska, A. and Mura, L. (2015). 'Protection of an "Average Consumer" in the Digital Society - European Context, ' International Scientific Conference on Marketing Identity. Marketing Identity: Digital Life, Pt II Book Series: Marketing Identity, pp. 273-282.

Šnapka, P. and Kašík, J. (2012), 'A Simplified Model of an Interaction Dynamics in Work Groups, ' *Journal of Applied Economic Sciences*, 7(3): 302-311.

Štefko, R., Habánik, J. and Šindleryová, I.B. (2010), 'Marketing instrumentary in the process of project acceptation within the acceleration of back-warded regions development, ' *Ekonomicky casopis*, 58(5), pp. 512-526.

Analysis of the Perceived Usefulness of Classic Communication Tools When Searching For SMES

Radovan Bačík, Faculty of management, University of Prešov, Prešov, Slovakia, radovan.bacik@unipo.sk

Richard Fedorko, Faculty of management, University of Prešov, Prešov, Slovakia, richard.fedorko@unipo.sk

Jakub Horváth, Faculty of management, University of Prešov, Prešov, Slovakia, jakub.horvath@smail.unipo.sk

Ján Mihál, Faculty of management, University of Prešov, Prešov, Slovakia, jan.mihal@smail.unipo.sk

Abstract

The aim of this article is to identify customers' perceived usefulness of offline communication tools when searching for SMEs. The aim of this paper is to help clarify the impact the selected offline communication tools have when reaching target audiences of SMEs. The basic set for the purpose of the survey is the population of the Eastern part of Slovakia. 1055 respondents were addressed, and it was possible to include 987 respondents' answers based on the criterion of completeness of the completed questionnaires. The aim was to identify the attitudes and preferences of respondents in relation to traditional (offline) forms of marketing communication focusing on SMEs. Specifically, we focused on offline communication tools such as Advertising newspapers, Advertising billboards, Advertising leaflets, TV advertising, Radio advertising, and last but not least, an advertisement in the Daily press was analysed. Data collection was conducted through simple random sampling in October and November 2016. To verify the hypotheses we used the software StatSoft STATISTICA. Due to the nature of the analysed variables we used correlation analysis. Based on research findings, it can be noted that a total of 27.56% of respondents prefer traditional offline communication tools to get information about SMEs. Given the existence of a statistically significant dependence on the impact of online communication tools when searching for SMEs, the strongest dependency identified for Advertising leaflets and Advertising newspapers. The weakest dependency was identified in the case of Billboards. The research results are intended to assist SMEs in deciding on the strategic direction of their marketing communications.

Keywords: Marketing communication, Offline environment, Consumer behaviour.

Introduction

Communication plays a very important role among humans and it is an indispensable part of their lives. The situation is the same in the business world, where enterprises and especially small and medium-sized enterprises (SMEs) implement marketing communication activities to succeed in the current hyper-competitive environment (Lajčin et al. 2014; Šoltés & Gavurová 2010). Despite the fact that nowadays online marketing communication is undeniably important, traditional (offline) marketing communication also has its place and meaning in corporate communication (Matušíková & Gburová 2016; Fedorko et al. 2015). Kotler (2007) emphasizes that not the communication is what matters for small and medium-sized businesses but rather that what to say, how to say, to whom and how often. The answer to these questions is the marketing communication. Marketing communication with its communication methods presents the company and ultimately helps to satisfy the needs of consumers (Zamazalová 2009; Hradiská 2010; Šnapka & Kašík 2013). Nowadays, social changes as well as constant innovations in the field of

communication technologies strongly influence the marketing development as well as the marketing communication (Gerrikagoitia et al. 2015, Štefko et al. 2010, Gavurova et al. 2017). Přikrylová (2010), emphasises that one group of companies can not adapt to the rapid development of the technologies or to the market reality itself, which in most cases results in a decrease in the sale or the disappearance of the company. The second group presents companies which are open to new opportunities, which are not afraid to experiment with the new strategies and thus to reach out to target groups more effectively and flexibly (Constantinides 2014; Kašík y Šnapka 2015). The global expenditures of eMarketer advertising spending (2016a) was amounted to 571.36 billion € in 2016. A significant increase in the percentages (6%) is expected for 2017. According to foresight, these expenditures will increase by an average 5.83% year-on-year by 2019. Of the total ad spending, digital advertising spending for 2016 was 67.12 billion €, representing 35.8%. Traditional offline advertising in printed form (newspapers, magazines) is represented by 13.9%. Other traditional ad forms for people away from their homes had a 3.9% share, and ads addressed directly to potential customers had a 2.2% share of total ad spend. It is worth mentioning that on the one hand the eMarketer (2016b) predictions for traditional or offline advertising will decrease in 2017-2020, on the other hand digital advertising spending will increase year-on-year by 2.28% on average. In 2017, digital advertising spending will increase compared to television advertising in the amount of € 77.17 billion to € 67.73 billion (eMarketer 2016c). According to the foresight of the Marketing Charts portal (2017) for the period 2017-2012, the hardest hit of the media types examined, newspaper advertising is the only market expected to see a decline in revenues between this year ($16.8 billion) and 2021 ($12.2 billion). Based on the distribution of expenditure by region, our region falling under Central and Eastern Europe is at the level of spending 12.74 billion €. The eMarketer portal (2016d) predicts this year's increase of 13.09 billion, representing a 2.7% year-on-year increase.

Several authors from different industries, such as author Klabikova Rabová (2015) in the study "Marketing communication of SMEs specializing in cosmetic industry", as well as authors Khoshnodifar, Ghonji, Mazloumzadeh and Abdollahi (2016) in their study "Effect of Communication channels on the success rate of entrepreneurial SMEs in the agricultural sector ". Another study responding to the issue is the "SME practice towards integrated marketing communications" by Balboni and Gabrielli (2010).

Based on the above described facts, the main purpose of this article is to find out how customers perceive offline communication channels service providers use to communicate with their target audience in online and offline environments alike and how such communication affects behaviour of their consumers.

Methodology

For the purpose of solving the aim of our survey, we proceeded from the material obtained from primary sources. The basis of primary sources consists of the data obtained through the realization of the research in a form of questionnaire. The basic set consists of the inhabitants of the Eastern Slovak region. These respondents can be identified as the main target group of SMEs operating within the region. 1055 respondents were interviewed. Subsequently, based on the criterion of completeness of the completed questionnaires, 987 respondents' answers could be included in the analysis. Data collection was done in electronic form. Online forms for creating and collecting data were used in a questionnaire form (the online Google Forms tool). The online version of the questionnaire was sent with the consent of the respondents via the available email addresses. Data collection for the research was conducted in October - November 2016.

The aim of the questionnaire was to identify the attitudes and preferences of the respondents in relation to the analysed problem of our research. In particular, the aim was to identify the respondents' attitudes and preferences in relation to traditional (offline) forms of marketing communication (i.e., traditional information sources - Advertising billboards, Advertising newspapers, Advertising leaflets, TV advertising, Radio advertising, Daily press).

Regarding to the mathematical and statistical solution of the issue, the questionnaire questions used a 5 and 10 degree interval scale, also referred to as the Likert scale. Verification of our hypotheses was carried out through the statistical program StatSoft STATISTICA. Based on the size of the file and the characteristics of the primary data and the analysed variables, the Wilcoxon double-choice test was used.

Based on the results of the questionnaire survey, 48.53% of respondents were women and 51.47% were men. The age structure of the surveyed respondents was dominated by a group of respondents in the range of 18-25 years with a share of 21.28%. The second largest group is the age group of respondents from the age 26 to 30, representing a share of 13.78%. Within broader intentions, respondents from the age 18 to 35 represent a 46.61% share. In all other age categories in the survey, the proportion of respondents did not exceed 12%. Regarding to the highest level of education, respondents with secondary education without maturity (31.51%) dominated. The proportion of respondents with secondary education with a school leaving examination was represented by 28.37%. The share of graduates of the first level of higher education represented 20.77%. The share of respondents who achieved the second level of higher education represented 19.35%.

Results

The first part of our research focused on detecting the extent to which traditional (offline) or online sources of information preferred by respondents believe that quality visual processing of information carriers guarantees the quality of the services provided. We used the correlation coefficient Phi to analyze this area. All of the respondents' answers were in the survey, none of them were omitted. Based on the formulated research problem, the following hypothesis was formulated:

H1: We assume a statistically significant dependence of the opinion on the equality of the quality of the information carriers and the quality of the provided services on the preference for obtaining information.

Table 1: 1 Crosstabulation – H_1

Preferred sources of information on products and services	Allegation: Generally well-processed information carrier = quality services provided		Total
	Yes	No	
Through the Internet	558	157	715
Traditionally, without the use of the Internet	180	92	272

Based on the findings in Table 1, respondents who prefer Online communication carriers to traditional ones tend to think that a high-quality visual information carrier guarantees the quality of the service. In general, there is a tendency for a visually produced information carrier to guarantee a well-served service.

The following Table 2 gives us the exact output of the correlation analysis, and thus the extent to which the preferred channel (traditional or online) influences the view of equality of quality of services and quality of visual processing of information carriers.

To confirm or refute the above hypothesis, it is necessary to formulate partial hypotheses for testing the individual components of the files in the question:

- H0: We assume that there is a statistically significant dependence between the view of the equality of the quality of the information carriers and the quality of the provision of the services on the preferences of obtaining the information.

- H1: We assume that there is no statistically significant dependence between the view of the equality of the quality of the information carriers and the quality of the provision of services on the preferences of obtaining information.

Table 2: 2 Symmetric Measures – H_1

Variables		Value	Approximate Significance
Nominal by Nominal	Phi	0.122	0.000
	Cramer's V	0.122	0.000
N of Valid Cases		987	

The correlation coefficient π with an output value of 0.122 tells us about the weakness of the analyzed elements. Tests depending on the dimension of the set "p" at the nominal data level and at the correlation coefficient p are not studied under standard circumstances. We consider the statistically significant dependence on an output value of 0.20, which is understood as the medium-term dependence at this coefficient. Therefore, the output of p value equals to 0.000, which suggests to accept the H0 and reject the original H1 hypothesis. Therefore, we accept a position implying our hypothesis. Moreover there is statistically significant dependence between the analyzed elements.

The second part of our research focused on the extent to which respondents perceive the relevance of traditional and Online information carriers as being dependent on the quality of the visual processing of information media. We analyzed 100% of the file data, 987 respondents answered. We used the Gamma correlation coefficient with respect to the ordinal level. Based on the formulated research problem, the following hypothesis was determined:

- **H2:** We assume a statistically significant dependence of the relevance of the traditional information carriers on the quality of the visual processing of these carriers.

- **H3:** We assume a statistically significant dependence of the relevance of online information carriers on the quality of the visual processing of these carriers.

For the final evaluation of the H2 hypothesis, the following partial hypotheses are required:

- H0: We assume a statistically significant dependence of the relevance of the traditional information carriers on the quality of the visual processing of these carriers.

- H1: We do not expect a statistically significant dependence of the relevance of traditional information channels on the quality of the visual processing of these information carriers.

Table 3: 3 The degree of relevance of traditional information carriers

Variables		What importance do you attach to the quality of visual processing of the following types of information carriers - Traditional information carriers?					Total
		Minimal importance	Less important	I can not judge	More important	Maximum importance	
The degree of relevance of traditional information carriers	Strongly irrelevant	15	0	16	149	0	180
	Slightly irrelevant	7	48	35	144	261	495
	I can not judge	8	10	5	42	2	67
	Slightly relevant	18	20	3	29	31	101
	Strongly relevant	16	31	7	65	25	144
Total		64	109	66	429	319	987

Table 4 Symmetric Measures – H_2

Variables	Value	Asymptotic Standardized Error[a]	Approximate T[b]	Approximate Significance
Ordinal by Ordinal - Gamma	-0.109	0.034	-3.117	0.002
N of Valid Cases	987			
a. Not assuming the null hypothesis.				
b. Using the asymptotic standard error assuming the null hypothesis.				

From Table 4, with a negative correlation output value, it can be assumed that this is a negative correlation between the relevance of the traditional information carriers on the quality of the visual processing of these information carriers. The absolute value of output equals to 0.109, which is a weak correlation. Based on the above, we accept the H0 and reject the alternative of this hypothesis. Therefore, we agree with the standpoint, that the importance of visual processing of traditional information media is low to the extent that it is capable of inducing a less perceptible relevance of these information carriers.

For the final evaluation of the H3 hypothesis, the following hypotheses are formulated:

- H0: We assume a statistically significant dependence of the relevance of online information carriers on the quality of the visual processing of these carriers.

- H1: We do not expect a statistically significant dependence of the relevance of online information carriers on the quality of visual processing of these carriers.

Table 54 : The relevance of online information carriers

Variables		What importance do you attach to the quality of visual processing of the following types of information carriers - Online information carriers?					Total
		Minimal importance	Less important	I can not judge	More important	Maximum importance	
The relevance of Online information carriers	Strongly irrelevant	3	4	8	7	2	24
	Slightly irrelevant	39	8	27	44	5	123
	I can not judge	8	17	10	24	19	78
	Slightly relevant	13	33	41	171	93	351
	Strongly relevant	8	40	29	143	191	411
Total		64	71	102	115	389	310

Table 6: Symmetric Measures – H_3

Variables	Value	Asymptotic Standardized Error[a]	Approximate T[b]	Approximate Significance
Ordinal by Ordinal - Gamma	0.430	0.033	11.842	0.000
N of Valid Cases	987			
a. Not assuming the null hypothesis; b. Using the asymptotic standard error assuming the null hypothesis				

It can be seen from the above Table 6 that among the elements of the attributed importance of the quality of the visual processing of Online information carriers to the degree of relevance of these information carriers is a strong dependence, as evidenced by the output value being equal to 0.430. Thus, we receive

an opinion implying our partial H0 hypothesis and dismiss its alterative, the H1. There is a statistically significant dependence on the relevance of interventional information carriers to the quality of visual processing of these information carriers.

Conclusion

SMEs marketing communication is an important area of knowledge based on the current strong competitive environment, both domestically and globally. It should be noted that under the influence of the rapid development of information technologies, it is possible to identify changes in the target audience - customer preferences in what way they seek information about products and services. On the other hand, it is the overwhelming amount of advertising content that consumes these target audiences on a daily basis.

The current status shows that the total ad spending per year is growing and this trend will continue for the future. Digital advertising has already exceeded TV advertising in terms of spending, and even though advertising costs are rising year on year, digital advertising spends grow at a much faster rate year on year. The region of Central and Eastern Europe, which includes Slovakia, but also the neighbouring Czech Republic, estimates a share of total advertising spending worth 13.09 billion €, which is just 2%. Even though the importance of online marketing promotion is growing, we believe that traditional or offline marketing communication continues to be an importance and position in the marketing communications of SMEs and businesses in general.

The offline environment is linked to the online environment, and on the basis of advertising spending trends, online advertising costs can be expected to rise and advertising spending in daily press sharply declines in the next period, up to 2021 (Marketing Charts 2017). Based on the results of our survey, we can conclude that with regard to traditional (offline) promotion tools, people prefer to search for information via advertising leaflets and advertising newspapers. On the contrary, the least-used information sources for people in the offline environment are Advertising billboards.

The results of our research are relevant for SMEs, which are sceptical about the offline environment from the perspective of marketing communications. The research results are intended to assist SMEs in deciding on the strategic direction of their marketing communications. It is important to implement and understand offline marketing tools within SMEs marketing activities and strategies. Finally, it must be emphasized that from a long-term perspective, the proper understanding of the promotion instruments in general is a necessity in the current market environment.

Acknowledgment

This article is one of the partial outputs under the scientific research grant VEGA 1/0806/16 "Research on issues of consumer behaviour of a new generation of customers with emphasis on identifying preferences and usability of mobile platforms in the process of e-commerce of the subjects localized predominantly on the Central European Market" and VEGA 1/0789/17 "Research of e-commerce with relation to dominant marketing practices and important characteristics of consumer behavior while using mobile device platforms"

References

Constantinides, E. (2014), 'Foundations of Social Media Marketing,' *Procedia - Social and Behavioral Sciences*, 148, 40-57.

eMarketer. (2016a), 'Total media ad spending, by Region, 2014-2020,' [Online], [Retrieved March 16, 2017], https://www.emarketer.com/Article/Worldwide-Ad-Spending-Growth-Revised-Downward/1013858

eMarketer. (2016b). 'Total media ad spending share, by Media, 2014-2020,' [Online], [Retrieved March 16, 2017], https://www.emarketer.com/Article/Digital-Ad-Spending-Surpass-TV-Next-Year/1013671

eMarketer. (2016c). 'Total media ad spending worldwide, 2014-2019,' [Online], [Retrieved March 16, 2017], https://www.emarketer.com/Article/Total-Media-Ad-Spending-Growth-Slows-Worldwide/1012981

eMarketer. (2016d). 'TV vs. Digital ad spending, 2015-2020,' [Online], [Retrieved March 16, 2017], https://www.emarketer.com/Article/US-Digital-Ad-Spending-Surpass-TV-this-Year/1014469

Fedorko, R., Bačík, R., Kot, S. and Kakalejčík, L. (2015), 'The analysis of blog use as a marketing communication tool by the selected target group in the conditions of the Slovak Market,' *Journal of Advanced Research in Law and Economics*, 6(1), 66-72.

Gabrielli, V. and Balboni, B. (2010), 'SME practice towards integrated marketing communications,' *Marketing Intelligence and Planning*, 28(3), 275-290.

Gavurova, B., Virglerova, Z. and Janke, F. (2017), 'Trust and a Sustainability of the macroeconomic growth Insights from dynamic perspective,' *Journal of Security and Sustainability Issues*, 6(4), 637-648.

Matušíková, D. and Gburová, J. (2016), 'Consumer behavior of current travelers in tourism sphere. Proceedings of the 27th International Business Information Management Association Conference - Innovation Management and Education Excellence Vision 2020: From Regional Development Sustainability to Global Economic Growth, IBIMA 2016,' 2226-2232.

Gerrikagoitia, J., K., et al. (2015), 'New Trends of Intelligent E-marketing Based on Web Mining for E-shops,' *Procedia - Social and Behavioral Sciences*, 175, 75-83.

Hradiská, E. (2010), Psychológia v marketingovej komunikácii. Bratislava: Univerzita Komenského.

Lajčin, D., Sláviková, G., Frankovský, M. and Birknerová, Z. (2014), 'Social intelligence as a significant predictor of managerial behavior,' *Ekonomicky casopis*, 62(6), 646-660.

Kašík, J. and Šnapka, P. (2015), 'Modelling a system of evaluation of the efficiency of the course of a group decision-making proces,' *Journal of Applied Economic Sciences*, 10(6): 815-836.

Khoshnodifar, F., Ghonji, M., Mazloumzadeh, S. M. and Abdollahi, V. (2016), 'Effect of communication channels on success rate of entrepreneurial SMEs in the agricultural sector (a case study),' *Journal of the Saudi Society of Agricultural Sciences*, 15(1), 83-90.

Klabíková Rábová, T. (2015), 'Marketing Communication of SMEs Specialized in Cosmetic Industry in Magazines for Women,' *Procedia - Social and Behavioral Sciences*, 175, 48-57.

Kotler, P. and Keller, K. L. (2007), Marketing management. Praha: Grada Publishing.

Marketing Charts. (2017), 'Online and Traditional Media Advertising Outlook, 2017-2021,' [Online], [Retrieved July 10, 2017], http://www.marketingcharts.com/television-79007/attachment/pwc-us-ad-market-sizes-2017-2021-jul2017

Přikrylová, J. and Jahodová, H. (2010). Moderní marketingová komunikace. Praha: Grada Publishing.

Šnapka, P. and Kašík, J. (2012), 'A Simplified Model of an Interaction Dynamics in Work Groups,' *Journal of Applied Economic Sciences*, 7(3): 302-311.

Šoltés, V. and Gavurová, B. (2010), 'Modification of performance measurement system in the intentions of globalization trends,' *Polish Journal of Management Studies*, 11(2), 160-170.

Štefko, R., Habánik, J. and Šindleryová, I. B. (2010), 'Marketing instrumentary in the process of project acceptation within the acceleration of back-warded regions development,' *Ekonomicky casopis*, 58(5), 512-526.

Zamazalová, M. (2009), Marketing obchodní firmy. Praha: Grada Publishing.

Agglomeration and Network Effects in the Spatial Development of Production

Elena Vyacheslavovna Zhogova, The State Institute of Economic, Finance, Law and Technology, Gatchina, Russia, zhogova_l88@mail.ru

Olga Vitalievna Zaborovskaia, The State Institute of Economic, Finance, Law and Technology, Gatchina, Russia, ozabor@mail.ru

Tatiana Vasilievna Mokeeva, Peter the Great St. Petersburg Polytechnic University, Saint Petersburg, Russia, mokeeva_tv@spbstu.ru

Abstract

The aim of this paper is to describe the necessity of scientific background for governmental industrial policy. Existing separately, any industrial policy may lose connection between governmental aims and reality. Scientific approach represents a great number of models of isolated economic systems, which may predict economic behavior or give us an opportunity to make forecasts for the future. It seems evident, that the industrial policy of the Russian Federation needs to be based on the scientific theory. Nowadays, the idea of improving endogenous regional development via the increase of agglomeration and urbanization effects is being widely negotiated. The main idea of the growth poles theory has an evident similarity with the theories based on industrial localization. In fact, this theory is widely used in French regional planning experience and has already shown its potential. The concept of this theory is focused on estimation of leading components of the theory and benefits which can be obtained by applying it to the Russian economy.

Keywords: agglomeration, network effects, industrial policy.

Introduction

The main aim of Strategic Development for the Russian Federation is to create strong and competitive economy, which is supposed to be based on innovations and modern technologies. Nowadays, we can find out a lot of factors which need to be improved, but we have to admit that industry sector is an absolutely significant one. Coming up with ideas of industrial renovation, government may be extremely awkward in its desire of total supervision. Improving economic reality should have efficient cooperation between aims and rules. On the one hand, the government is able to use as many resources as it has, but on the other hand, it should clearly understand the market rules and take in account the location, resources and strategical development of each company. Such point of view may persuade the government to place company´s strategies and aims into the center of industrial development as a starting point. Undoubtedly, we see the growth poles theory as a necessity for implementation in the regional industry sector with the following adaptation for the whole country. Nevertheless, we have to pay attention to the drawbacks of the theory, such as a decreasing level of creativity in conditions of increasing industrial location.

Theoretical Background

According to the benchmarking analysis of the factors and institutions that determine long-term growth and prosperity, which was made in The Global Competitiveness Report 2016-2017, innovations are named as the most important factor for finding new growth engines, but laying the foundations for long-term, sustainable growth requires working on all factors and institutions identified in the Global Competitiveness Index. Leveraging the opportunities of the Fourth Industrial Revolution will require not

only businesses willing and ability to innovate, but also sound institutions, both public and private; basic infrastructure, health, and education; macroeconomic stability; and well-functioning labor, financial, and human capital markets.

Undoubtedly, innovations as a key point are vital today, but they may be just a single step to change the economic system, but not to form the structural base. To find out the routs of modern economical processes we have to explore the theoretical background and its evolution. So, a brief mentioning of the founders of economic space theories will be suitable in the frames of this article.

The content of theories of spatial development deserves a special interest, especially the study of the interrelations between the "first" generation of French economists such as of F. Perrouxand (Perrouxand, 1967) and J. Boudeville (Boudeville, 1966) and an activity of the "Association of Regional Science" (Association de Science Régionale de Langue Française (ASRDLF)), which was founded in 1961.

The data of the theory created the essential theoretical basis for M. Porter's theory of clusters (Porter, 2003). Additionally, M. Porter (Porter, 2003), in particular, refers to the fact that he relied on the ideas of A. Marshall (Marshall, 1879), representatives of the "German" and "California" schools and the Italian "school" of industrial districts, etc. One of the most curious facts is that global spreading of the Porter theory (Porter, 2003) in France led to the state program to develop the poles of competitiveness. That is why it was included into the research.

There are also Russians scientists such as: M.K. Bandman (Bandman, 2014), A.G. Granberg (Granberg, 2011), V.V. Leontief (Leontief, 1990), O.A. Lomovtseva (Lomovtseva, 2015), O.S. Pchelintsev (Pchelintsev et all, 1998), A.A. Taubaev (Taubaev et all, 2002), R.I. Shniper (Shniper et all, 1991), who have contributed a lot into the issue of research.

The matter and content of economic and social transformation were studied by A.V. Buzgalin (Buzgalin et all, 2016), P. Drucker (Drucker, 1994), K.A. Khubiyev (Khubiyev et all, 2004), and others.

Materials and Methods

The theory of spatial and industrial policy stems from the range of theories on regional development. For example, endogenous regional development theory along with the theory of production force location were also studied in our research. Research methodology deals with general approaches. It provides the principles for organizing, planning and conducting research. In carrying out the economic research, we used quantitative methods (statistics and econometrics), data analysis techniques, and training in research methods. The aim of described theories is to determine the causes of inequalities in space location for manufacturers, distributors, markets and differences in demographic processes. The vast majority of models was based on the interconnection of transport costs – time deadlines-money expenses, but globalization has changed not only described factors, but also added a number of modern ones (communication, virtual space, integration into the global economy, acceleration of economic growth). Expansion of global markets leads to dramatic differences in regional development and inspired scientists to clarify a "coordinating" infrastructure as a key point in a regional economic development. The diversification theory of regional production and formation of industrial potential is based on the growth poles theory, and was first put forth systematically by F. Perrouxand (Perrouxand, 1967) improved by J. Boudeville (Boudeville, 1966). The main idea of the growth poles theory is that economic development, or growth, concentrates in a specific pole, which may take place on the territory of one or several regions. The so-called pole moderates industrial development in a wide variety of sectors, mainly through direct and indirect effects. Direct effects are produced by dealing with suppliers and customers (upstream linked industries & downstream linked industries). Indirect effects take place when employees operate as a customer and expand economic activities in the other sectors. An agglomeration effect has an impact on

spreading new technologies, labor movements, investments and, therefore, may lead to unbalanced regional development. By dividing “poles” into two groups: global supply chain and local industrial companies, the theory shows us the correlation between the size of the company and value of infrastructure (transportation process).

For a global supply chain there are no limits in outsourcing of its activities and production in any location. The only one factor, which is really matters, is the location of resources.

Availability of resources, which is necessary for industrial development and growth, allows an industry to generate the growth in cooperating sectors and to spread the growth impulses. The impulse can be horizontal or vertical, the first contributes to the development of a new type of activity and stagnation of non-flexible industries (conservative), the second introduces innovations in the industry and creates the deformation of the related industries. The growth poles are the targeted points for launching the region's economic development, attracting investments and generating agglomeration effects, as well as expanding sales markets. At the regional level a pole is located in the urban zone or generates it by itself, at once, creating an agglomeration effect of attraction, development and expansion of coordinated industries. Boudeville (J. Boudeville, 1966) showed the transformation of processes from the macro (country) to micro (region, territory, and city) levels, in the form of a matrix of sectoral balance, investment resources, infrastructure – in his description of the pole structure.

Nowadays, the most famous theory which proves the benefits of agglomeration effect and spatial localization is a cluster approach theory. The first scientific steps to create it were taken by A. Marshall, later it was transformed into the cluster theory by M. Porter (Porter, 2003). The key factors of production which may give firms competitive advantages in the regions, according to this theory, are capital, labor and natural resources.

The cluster associations mean a group of companies which have a strong presence within the territory and occupy the related market niche in production of a similar type of goods (services). On the regional level of clusters M. Porter (Porter, 2003) identified potentially competing forces that affect the regional economy: convergence and agglomeration.

As for convergence, it leads to a decrease in the growth rate of the industry, even despite stability or the increase in economic activities. Agglomeration itself enlarges the returns on activities either from one industry (localization), or from the diversity at the regional level (urbanization) (Kudryavtseva, Rodionov, Kravchenko, Maryta, 2016), (Russian cluster observatory, 2017). It must be mentioned, that strong cluster links stimulate active growth rate of employment, the number of firms and patents in the region of the cluster location, but also in the geographically adjacent territories (Shabunina, Shchelkina, Rodionov, 2017).

Therefore, regional economy is definitely affected by both competitive forces. The cluster approach has influenced the process of development of regional strategies in European countries, as well as the regional governance in the Russian economy (Rodionov, Kudryavtseva, 2016). The new research is aimed to study the agglomeration effect as a key factor for global cities, for economic clusters and industrial complexes, as well as for international trade. It seems to be relevant as modern economic activity is increasingly concentrated in super-dense urban spaces (Ukrainskyi, 2011). E. Glaser, R. Florida, P. Krugman (Glaeser E.L.et all, 2000). It has to be mentioned, that as a result of the agglomeration effect, the world is becoming increasingly "hilly": the main national and regional locomotives of economic growth are concentrated on the sites of global and large cities, which are limited.

A significant attention is paid to the role of the agglomeration effect in the process of new knowledge creation and the innovation process, as the high-dense environment of modern large cities creates lots of talents with different knowledge, which leads to the birth of innovations. (Ukrainskyi, 2011).

The spatial expansion of the agglomeration is affected by a comparative decrease in the costs of goods transportation. This phenomenon is convincingly described by E. Glaser (Glaeser E.L. et all, 2000), on the basis of the American economy.

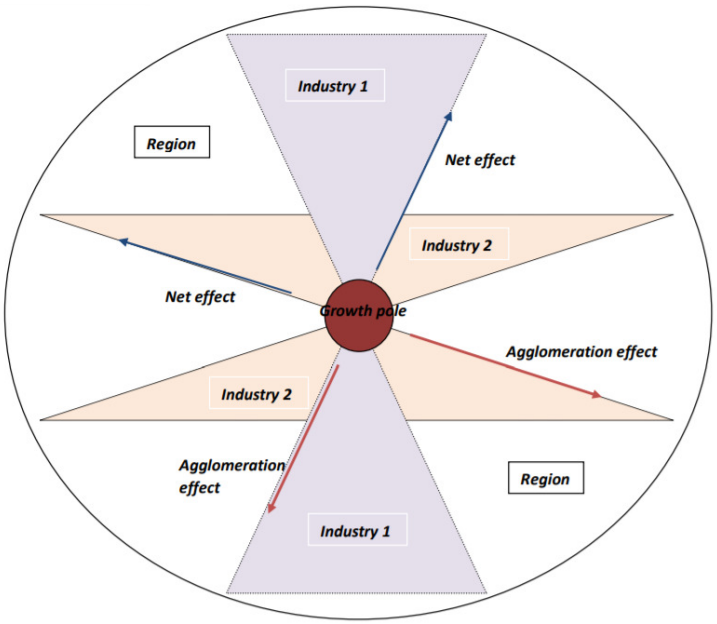
However, we must mention the less studied network effect, which is considered a controversial force of agglomeration effect. According to Ukrainskyi (Ukrainskyi, 2011) there aren't enough economists in this scientific field. An interesting conclusion of this idea is that in the future cities may just disappear, and all human activities will be dispersed in a huge number of free spaces, which would create a new era of global information networks and computer technologies.

Results and Discussions

Today, the modern economy world is under the influence of agglomeration and network effects. It is evident enough, that the agglomeration leads to the concentration of the population in the city, and causes huge problems for villages and small, medium-sized towns. It's not so obvious in small countries, but in Russia we can easily estimate the net profit which comes from using large territories.

The agglomeration creates competition, the network effect generates the creative forces and recourses for new means of communication and development of business environment in the world.

Additionally, the agglomeration effect increases productivity of any industry, as well as cuts the expenses, but there are additional challenges or obstacles for the development and industrial breakthroughs. The necessity for sustainable economic development shows that agglomeration tools and net effects can be implemented on the country's territory, taking into consideration the degree of influence in every region.



Picture 1 – Region model of growth poles

– Net effect
– Agglomeration effect

The network effect is the study of local communities and lands as a part of united network taking into account: firstly – migrants, trade and money exchange, secondly – human, natural, financial resources on a vast territory.

Conclusion

To sum up, a starting point for sustainable development and diversification of the domestic economy is the collaboration between business and governmental institutions, which would contribute to modernization processes and stimulate innovative activities of economic entities. These goals are directly related to the development of innovative territorial clusters. It would lead to the growth and localization of the leading industries that would have interaction with each other, as well as with scientific and educational organizations. The promotion of the clusters development involves the following tools: industrial, scientific, technical, educational and regional policies, which, therefore, were named as the crucial elements of the innovation state policy. The clustered regional innovation systems would lead to increasing cooperation between business entities and government, e.g. by creating forums and special web-sites, such as “windows of communications and feedbacks”.

As a result, the investment attractiveness and competitiveness of companies and regions would increase. The framework of cluster policy in Russia is established in the Concept of Long-Term Social and Economic Development of the Russian Federation. However, developing a regional industrial policy should be focused on the agglomeration and net effects. All these aspects are parts of economic process which have an enormous impact not only on individual region, but also on the country's economy. Developing strategies, the government should take into account the balance between localization processes and keeping distance. Otherwise, in the future we may have overdeveloped and overestimated urban industrial zones and with total absence of commonly needed services in distant areas.

In conclusion, as a summary of our research we should identify the following issues:
- the creation of industrial policy should be based on collaboration between business, government and other social institutes , which constitute economic environment;
- main targets of industrial policy should have scientific background and be based on location, variety of energy resources, market demand, manufacturing costs;
- the potential of industrial transformation and natural forces (such as net & agglomeration effects) should be in the equilibrium position.
-net effect should be considered within the regional policies of development and a social criteria system should be created, which will allow to maintain the balance between agglomeration and net effects.

References

Alimbaev, A.A., Taubaev, A.A., Uteshev, S.B., Akhmetov, S.N. (2002) The regional socio-economic system. TOO 'Sanat', Karaganda.

Bandman, M.K. (2014) Mark Konstantinovich Bandman. Selected works and continuation of the started. Institute of Economics and Industrial Engineering of SB RAS, Novosibirsk.

Boudeville, J.R. (1966) Problems of regional economic planning. Edinburgh University Press, Edinburgh.

Buzgalin, A.V., Kolganov, A.I. (2016) 'Critical political economy: the ‘market-centric' model of economic theory must remain in the past—notes of the post-soviet school of critical Marxism', *Cambridge Journal of Economics*, 40 (2), 575-598.

Glaeser, E.L., Clark, G., Feldman, M. and Gertler, M., (Eds) (2000) 'The new economics of urban and regional growth', *The Oxford Handbook of Economic Geography*, pp. 83-98. Oxford University Press, Oxford.

Granberg, A.G., Mikheeva, N.N., Ershov, Y.S., Kuleshov, V.V., Seliverstov, V.E., Suslov, V.I., Suspitsyn, S.A., Minakir, P.A. (2011) 'The impact of the global crisis on the strategy of spatial socio-economic development of the Russian Federation', *Regional Research of Russia*, (1) 1, 2-14.

Drucker, P. (1994) 'The Age of Social Transformation', *The Atlantic Monthly*, November 1994, 53-80.

Khubiev, K.A. (2004) 'Theoretical and practical questions of the economic growth', *Economic growth and the vector of development of modern Russia*, 25–37.

Kudryavtseva, T., Rodionov, D., Kravchenko, V., Maryta, V. (2016) 'Special economic zones as an instrument of industrial policy pharmaceutical clusters in Russia'. Proceedings of the 28th International Business Information Management Association Conference – Vision 2020: Innovation Management, Development Sustainability, and Competitive Economic Growth, 1008-1018.

Leontief, V.V. (1990) Essays in economics. Politicizdat, Moscow.

Lomovtseva, O.A., Orlova, A.V. (2015) 'Network model of the social and economic development of the region', *Scientific Result. Series 'Economic Research'*, 2, 5-11.

Manel, R., Nejib, O.M., Nejib, H. (2016) 'What Drives the Technical Inefficiency in the Tunisian Insurance Industry', *Journal of Economics Studies and Research*. [Online], [Retrieved September 1, 2017], http://ibimapublishing.com/articles/JESR/2016/126946/

Marshall, A., Marshall, M.P. (1879) The economics of industry. Macmillan and co., London.

Perroux, F. (1967) 'Note sur la ville consideree comme pole de developpement et comme foyer du progres', *Revue Tiers-Monde*, Vol. 8, No. 32, pp. 1147-1158.

Plyasov, A.N. (2009) And the last will be the first: the Northern periphery on the way to the knowledge economy. Librokom, Moscow.

Pchelintsev, O.S., Uzyakov, M.N., Suvorov, A.V., Korovkin, A.G., Vishnevsky, A.G., Ivanov, V.N., Medkov, A.A. (1998) 'The medium-term concept of Moscow's economic development', *Studies on Russian Economic Development*, 9, 215-226.

Porter, M.E. (2003) 'The Economic Performance of Regions', *Regional Studies*, Vol. 37, 6&7, pp. 549-578.

Rodionov, D G., Kudryavtseva, T.J. (2016) 'Factors of the Effective Development of the St. Petersburg Instrument Engineering Cluster', *International Journal of Economics and Financial Issues*, 6 (2), 298-306.

Schwab, K. (2016) 'The Global Competitiveness Report 2016-2017', *World Economic Forum*. [Online], [Retrieved September 1, 2017], http://www.lainformacion.com/2016/09/28/ the_global_competitiveness_report_2016-2017.pdf?hash= 87bbaef715842b097f972f6d2e8 5314dfebd 4b8a

Shabunina, T.V., Shchelkina, S.P., Rodionov, D.G. (2017) 'An innovative approach to the transformation of eco-economic space of a region based on the green economy principles', *Academy of Strategic Management Journal*, 16 (Special issue 1), 176-185.

Shniper, R., Novoselov, A. (1991) Economic diagnostics and forecasting of regional development. Institute of Economics and Industrial Engineering. Sib. Branch The USSR Academy of Sciences, Novosibirsc.

Ukrainian, V.N. (2011) 'Modern French spatial economy: the theory of proximity and typology of localized economic systems', *Spatial Economics*. Vol. 2, No. 26, pp. 92-126. [Online], [Retrieved September 1, 2017], http://economy-lib.com/frantsuzskaya-shkola-prostranstvennoy-ekonomiki-genezis-i-sovremennye-napravleniya-razvitiya#ixzz4rQIGIfc0

Zugravu G.A., Fasolă G.C.C., Rahoveanu M.M.T., Silvius S., Bondari V.V., Băcanu M.C. and Boboc P.M.G. (2017) 'Social Agricultural Services – Review', *Journal of Eastern Europe Research in Business and Economics*. [Online], [Retrieved September 1, 2017], http://ibimapublishing.com/articles/JEERBE/2017/477474/477474-1.pdf

IT Governance Inhibitors: An Empirical Study in Slovak Republic

Anita Romanová, Department of Information Management, Faculty of Business Management, University of Economics in Bratislava, Bratislava, Slovak Republic, anita.romanova@euba.sk

Vladimír Bolek, Department of Information Management, Faculty of Business Management, University of Economics in Bratislava, Bratislava, Slovak Republic, vladimir.bolek@euba.sk

Michal Zelina, Department of Information Management, Faculty of Business Management, University of Economics in Bratislava, Bratislava, Slovak Republic, michal.zelina@euba.sk

Abstract

IT Governance is a set of rules, relationships, and processes that help manage your organization so that the IT supports the organization's strategic goals to the maximum. It defines how IT/ IS supports business and covers risks. There are a number of factors affecting IT Governance and its successful implementation and management, inhibitors that inhibit its successful implementation and subsequent management. A survey carried out in the Slovak Republic shows that the most significant ones are considered to be the non-existing system of IS/IT metrics and the unclearly defined responsibilities of the company departments. The implementation of IT Governance has a positive impact on increasing the competitiveness of the organization and strengthening its market position.

Keywords: Information Technology, Information Systems, Governance, IT Governance, IT Management

Introduction

Today information systems supported by information technologies (IS/IT) can help businesses succeed in the competition, strengthen the market position, streamline work, take advantage of opportunities offered as well as identify potential threats. In today's rapidly changing business environment, leaders are deciding in conditions of uncertainty. In turbulent environments, the decision based on 80 percent of information supplemented by pervasive intuition is often better than waiting for a 100 percent of information (Ljudvigová, 2014). Zagoršek (2012) identified a high level of informatization. Based on his research he claims that information technologies impacted the product as well as organizational structure. By creating partnerships with individual stakeholder groups, businesses overcome the constraints resulting from the complexity of the business environment and the range of information technologies needed to produce a product that often goes beyond the capabilities of one enterprise. The creation of these important relationships makes it possible to share the unique capabilities of individual companies together, and also contributes to the transfer of knowledge among the partners (Gubová et al., 2017). Černý (2014) notes that the competition struggles in recent years have forced businesses to implement, as much as possible, innovative software solutions in practice or improve the existing ISs. The value of IS/IT for businesses and its implications is reflected in the increasing sensitivity of organizations to IS/IT risks, especially with regards to the size of IS/IT investments. Errors in IS/IT security and their malfunctions increase the company's dependency on IS/IT functions. IT Governance is the way to mitigate this risk. IT Governance includes a set of rules, relationships and processes that help manage your organization so that the IT supports the organization's strategic goals to the maximum. IT Governance, similar as Corporate Governance, is one of the more recently areas addressed. Over the last 10 to 12 years many definitions and approaches occurred in this area in terms of terminology. The concept of IT governance has been enforced by ISACA (Information Systems Audit and Control Association - the international association focused on the areas of audit, management, control and security of information systems) since the mid-1990s.

The main objective of the research presented in this scientific paper was to deepen and expand the knowledge of inhibitors and critical factors of IT Governance, based on foreign and domestic literature,

in order to identify the current state of knowledge in this field, to compare and synthesize the acquired knowledge based on data and information obtained through a questionnaire survey in companies in Slovakia.

Literature Review

Attention is drawn in this chapter to a critical comparison of inhibitors and critical success factors in IT Governance. We present several views of the authors on this issue, which coincide in many points but also differ in different partial views. Conformities and differences depend on the chosen angle of view as well as the degree of detailed elaboration or the level of generalization chosen.

IT Governance is a concept that emerged in the 1990s and one of the first authors who used it were Henderson & Venkatraman (1993), Venkatraman & Loh (1993) to describe a comprehensive set of intra-company relations involved in achieving the strategic linking of business activities with IS/IT.
Administration of the IS/IT area, referred to as IT Governance, is one of the basic functional governance models. IT Governance inspired by Corporate Governance aims to ensure the effective use of IS/IT with a focus on strategic alignment of IS/IT with business activities, risk management, resource management, value management and performance measurement (ITGI, 2003). The definition of IT Governance, which was conceived up by Rose and Weil, is accepted by most authors and considered to be the starting point in their work. They define IT governance as "a decision-making framework of rights and responsibilities to encourage desirable behaviour in the use of IS/IT." (Weill and Ross, 2004) The increasing amount of work on IT Governance points out that there is no single agreed definition of IT governance, but that the stated definitions differ in various aspects. Webb, Pollard and Ridley use content analysis to integrate the diversity that is reflected in many definitions of IT Governance and define it as follows: IT Governance represents strategic alignment of IS/IT with business in order to achieve the maximum value through development and maintaining an effective control, accountability, performance management and risk management in the area of IS/IT. (Webb, Pollard and Ridley, 2006). Similarly, R. Butler and M.J. Butler originated from the definition of Weil and Ross in constructing a framework for IT Governance, which considers the following three elements to be the most important: processes, structures and relational mechanisms that also appear in the works of other authors (Symons, 2005; Larsen et al., 2006; De Haes and Van Grembergen, 2008; Butler and Butler, 2010). According to Wilson and Pollard (2009) the elements of IT Governance are: structures and processes, supplemented by control frameworks, which they regard as essential tools for application, implementation and development of IT Governance.

IT Governance architectures typically focus on finding rational solutions to problems, decision-making at different levels or on other variables. By aligning decisions to address these issues, prioritizing resources and staffing capabilities, investing in strategic objectives of the company, the management of this framework can help reduce costs, streamline processes, and achieve an added value. These effects ultimately lead to increased organizational competitiveness and strengthening the company's market position. Achieving such improvements should therefore be a reason for businesses to formulate and effectively implement IT Governance (Lee et al., 2008). Ensuring consistency between IT Governance and organisation, emphasised by Gottschalk (1999), requires understanding of organizations themselves and their processes. At the same time, it emphasizes the importance of the funds allocated to the project, its adequacy and the provision of qualified human resources within the required time horizon.

Multiple factors have a significant impact on IT Governance. Some of these include the socio-technical factors, to which only limited attention is devoted in IT Governance literature. Most research focuses on IT Governance as a structure or process (Musson & Jordan, 2005). Peterson et al. (2002) and Kingsford et al. (2003) are one of the few authors to address the implications of IT Governance outside the IT Governance mechanisms and structures. Willson & Pollard (2009), with reference to Peterson et al. Indicate that focusing on tools and structures is not a sufficient guarantee of efficient IT Governance and, like Muson & Jordan (2005), they also claim that success in IT governance is dependent both on organizational and social factors as well as on the efficiency of IT Governance processes, structures and mechanisms. Bai & Lee (2003), in their study to examine the organizational factors affecting IS/IT

and the strategic planning process, suggest that a common factor that can influence the company's performance is the complexity of communication between groups of managers and stakeholders. De Haes & Van Grembergen (2005) also supported the importance of good communication strategies for IT Governance. McLeod & Smith (1996) identified two key preconditions for the effective direction of IT Governance and the IS/IT strategy: IT Governance trainings, which are perceived in terms of staff training within an IS/IT project, and external support in the form of external consultants and suppliers, which will enable to acquire the expertise required to implement internal IT Governance.

Research Objectives and Methodology

In designing a research model concept for a part of inhibitors and critical factors in IS/IT administration and management, we used the current state of knowledge. In this scientific paper we focus on the partial part of the research model, which is the issue of IT Governance inhibitors.

The research applied the general theoretical methods including analysis, synthesis, induction, deduction, comparison, analogy, generalisation; the specific methods including questionnaire survey, mathematical-statistical and analytical-logical methods; the empirical methods, in particular observation.

A questionnaire survey was selected as the basic research tool for obtaining data from company practice in Slovakia. The survey has been conducted between companies in the Slovak Republic. These are companies that are included in the extensive database of our University and cooperate with us on different surveys. The research sample included 363 enterprises with the largest share of small and medium-sized enterprises, while the small enterprises had a share of 31.40% and the medium 29.48%. The share of large enterprises was 22.87% and micro-enterprises 16.25%. In terms of sectoral coverage, the biggest shares had: industrial production 14.33%, information and communication 13.50%; wholesale and retail; repair of motor vehicles and motorcycles 12.12%. The share of the enterprises in terms of geography: the highest share solely in the Slovak Republic 37.47% and 23.14% in Europe; the lowest share only in Slovakia and the Czech Republic, namely 9.92%; and only in a certain region of the SR 10.74%. The structure of the surveyed sample according to the IS/IT customer or the IS/IT contractor is the following: 71% IS/IT customers from the business field, 23% suppliers of IS/IT products and services.

Results and Discussion

In this section, we present the views of respondents on the extent to which individual IT Governance inhibitors are considered to be more or less important. The starting point was an approach towards increasing the organization's performance, the motivation and the interest in its further enhancement. The results tell us that only 21.55% of enterprises have no motivation and interest in improving performance, of which only 3.03% with a clear opinion and 24.52% a with partial one (tab. 1). In 71.35% of organizations, we identified the existence of the motivation and the interest in increasing performance, but up to 47.38% of organizations with only a partial confirmation.

Table 1: There is no motivation and interest in increasing the organization's performance

Opinion	Micro	Small	Medium	Big	Total
a) I totally approve	0.28 %	1.10 %	0.83 %	0.83 %	3.03 %
b) I rather approve	3.03 %	8.82 %	6.89 %	5.79 %	24.52 %
c) I rather disapprove	7.71 %	14.05 %	14.33 %	11.29 %	47.38 %
d) I totally disapprove	4.96 %	7.16 %	6.89 %	4.96 %	23.97 %
e) Other	0.28 %	0.28 %	0.55 %	0.00 %	1.10 %
Total	31.40 %	16.25 %	29.48 %	22.87 %	100.00 %

Source: Authors' calculations

The lack of an effective IS/IT management and a management model are considered to be an issue by a total of 41.60% enterprises, of which only 12.12% of enterprises expressed their full approval and 29.48% partial approval. The lack of an efficient model is not considered to be an issue by as many as 55.93% of enterprises, with a partial approval 41.05% and a complete approval 14.88% (tab. 2).

Table 2: There is no effective model, or an IS/IT governance and management methodology

Opinion	Micro	Small	Medium	Big	Total
a) I totally agree	3.58 %	4.68 %	2.48 %	1.38 %	12.12 %
b) I rather agree	11.02 %	4.13 %	8.82 %	5.51 %	29.48 %
c) I rather disagree	13.77 %	4.13 %	12.40 %	10.74 %	41.05 %
d) I totally disagree	2.48 %	2.48 %	5.23 %	4.68 %	14.88 %
e) Other	0.28 %	0.83 %	0.28 %	0.00 %	1.38 %
f) They did not state	0.28 %	0.00 %	0.28 %	0.55 %	1.10 %
Total	31.40 %	16.25 %	29.48 %	22.87 %	100.00 %

Source: Authors' calculations

More than half of businesses (51.52%) consider to be an issue the unclear definition of responsibilities of IS/IT and other units for achievement of IS/IT benefits. Even in this case, however, most of the answers are found in the opinions of partial approval or partial disapproval. A clear approval of this factor was confirmed by only 12.40% of the enterprises, partially by 39.12%. A clear disapproval of this statement was confirmed by almost the same percentage of businesses as was the case with the clear approval, namely 13.50%, a partial disapproval was expressed by 32.78% (tab. 3).

Table 3: There is no clear definition of the responsibility of IT and other departments for achieving the benefits from IS/IT

Opinion	Micro	Small	Medium	Big	Total
a) I totally approve	3.03 %	1.65 %	5.51 %	2.20 %	12.40 %
b) I rather disapprove	5.51 %	14.60 %	11.29 %	7.71 %	39.12 %
c) I rather disapprove	3.31 %	12.12 %	8.82 %	8.54 %	32.78 %
d) I totally disapprove	3.31 %	2.75 %	3.31 %	4.13 %	13.50 %
e) other	0.83 %	0.00 %	0.28 %	0.00 %	1.10 %
f) They did not state	0.28 %	0.28 %	0.28 %	0.28 %	1.10 %
Total	16.25 %	31.40 %	29.48 %	22.87 %	100.00 %

Source: Authors' calculations

The cooperation of IS/IT units with other user units is not considered by the respondents to be an inhibitor in IS/IT Governance. Only 26.72% of enterprises have confirmed bad cooperation; 67.49% of enterprises do not have such a problem.

As a result of the previous findings, it can again be positively stated that most businesses have no problem with the willingness of the IS/IT units, which was confirmed 77.41%; of which with a full approval 31.13% and a partial approval 46.28%. The reluctance on the part of IS/IT departments was identified by a total of 14.60% of the enterprises as a problem, of which only completely 2.48% and partially 12.12% (tab. 5).

The poor quality of business and SLA contracts for identifying IS/IT service management issues between the provider and the customer was identified as a problem by only 4.46% of enterprises. Similarly, a low share of approving responses was also found when responding to the question of whether the quality of these contracts was problematic. Only 2.48% of enterprises clearly identified it as a problem, 19.83% of enterprises partially considered it to be a problem. Most of the responses were

reflected in the opposing positions, with a partial disapproval of 54.82% and a complete disapproval of 20.11%.

Up to 65.10% of enterprise inclined towards the opinion that a non-existing system of IS/IT management metrics is a problem. A clearly approving opinion was expressed by 14.60% of enterprises, partially by 40.50%. As many as 43.25% do not consider the non-existent system of IS/ IT metrics a problem, of which partially 33.06% and completely 10.19% (tab. 4).

Table 4: Non-existent system of metrics for IS/IT Governance and their processing system

Opinion	Micro	Small	Medium	Big	Total
a) I totally approve	4.96 %	4.96 %	2.20 %	2.48 %	14.60 %
b) I rather approve	5.23 %	12.95 %	13.22 %	9.09 %	40.50 %
c) I rather disapprove	4.13 %	11.02 %	10.74 %	7.16 %	33.06 %
d) I totally disapprove	1.93 %	2.20 %	2.48 %	3.58 %	10.19 %
e) Other	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %
f) They did not state	0.00 %	0.28 %	0.83 %	0.55 %	1.65 %
Total	16.25 %	31.40 %	29.48 %	22.87 %	100.00 %

Source: Authors' calculations

The poor quality of services of IS/ IT suppliers was clearly confirmed by only 2.48% of enterprises, a partial issue with the service quality was identified by 14.05%. Overall, there are 82.65% of enterprises with no IS/IT service quality issues, of which completely 23.42% and partially 59.23%.

The problem of inadequate work capacities of IS/IT units was confirmed by 11.29% of enterprises. Larger shares were recorded in this question with partial answers, whether agreeing or disagreeing. A partially agreeing opinion was expressed by 35.54 % of enterprises and a partially disagreeing by 33.61 %. The share of 15.70% of enterprises does not consider this factor as an inhibitor that would affect IS/IT management.

The issue of IS/IT literacy, both on the side of users and IS/IT service providers, was also monitored in the part mapping the level of IS/IT alignment with business activities. The level of preparation on the user side was also incorporated into the question by which we explored the basic IS/IT management problem areas, and precisely in this answer we recorded the highest share of all problem areas identified by enterprises, up to 27.58%. Compared to this finding, it can be considered a surprising result in assessing the lack of user preparation for applications, where only the total of 5.79% of enterprises confirmed a completely approving opinion that could be considered problematic. In this statement, the bulk of the responses concentrated into partially approving 35.54% and partially disapproving opinions 46.56%. As a clear issue it was ruled out by 11.57% of enterprises (tab. 5).

Table 5: Insufficient qualification preparation of users in relation to applications

Opinion	Micro	Small	Medium	Big	Total
a) I totally approve	1.10 %	1.93 %	1.38 %	1.38 %	5.79 %
b) I rather approve	6.06 %	11.29 %	9.37 %	8.82 %	35.54 %
c) I rather disapprove	6.34 %	15.15 %	15.98 %	9.09 %	46.56 %
d) I totally disapprove	2.75 %	2.75 %	2.48 %	3.58 %	11.57 %
e) Other	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %
f) They did not state	0.00 %	0.28 %	0.28 %	0.00 %	0.55 %
Total	16.25 %	31.40 %	29.48 %	22.87 %	100.00 %

Source: Authors' calculations

In the summary of this subchapter, our focus will be on the overall evaluation of the obtained results of the individual surveyed parameters on the basis of a summarizing view in which we have included answers to the individual questions in the approving opinions of the respondent, where they have expressed a completely and partially approving opinion. The results summarised by individual survey areas and a share of the approving opinion are shown in tab. 6.

Table 6: Summary of the approving opinion of the variables examined

Variable	Share of the approving opinion
1. Lacking motivation and interest in increasing the organization's performance	28 %
2. There is no effective IS/IT governance and management methodology	42 %
3. There is no clear responsibility of individual units	**52 %**
4. Bad cooperation of IS/IT units and user units	27 %
5. Reluctance of IS/IT units	15 %
6. Poor quality of commercial contracts and SLAs	22 %
7. Non-existing system of IS/IT metrics	**55 %**
8. Low-quality services of IS/IT suppliers	17 %
9. Insufficient working capacity of IS/IT unit	47 %
10. Insufficient qualification preparation of users	41 %

Source: Authors' calculations

The most significant IT Governance inhibitors were considered: a non-existent system of IS/IT metrics (55%) and an unclearly defined corporate responsibility (52%). Only these two variables recorded a share of over 50%, others had lower shares. The lowest shares of up to 20% were achieved by: the reluctance of IS/IT units (15%).

Conclusion

IT Governance identifies the approach and way of managing the whole IS/IT area in an organization, aligning IS/IT with the business activities and the strategy of the whole organization. Mutual compliance has a positive impact on enhancing the organization's competitiveness and strengthening the company's market position. The results of several researches proclaim that a good structure of IT Governance can positively affect the performance of companies, increase their competitiveness or strengthen their market position. According to research by Lee et al. (2008), some of the leading companies even reported an increase of almost 40% in ROA by applying the IT Governance concept that changed structures and redistributed tasks between individual business units and IS/IT units. There are a number of inhibitors affecting IT Governance, which can slow down the final effect of this approach. A research carried out in the Slovak Republic shows that the most significant ones include a non-existing system of IS/IT metrics and unclearly defined responsibilities of the company units.

IT Governance is gradually becoming an integral part of the management concept of any modern organization and is the responsibility of the top management. However, the implementation and sustainable development of IT Governance penetrates through all levels of organization management, constantly refining and achieving the benefits of this concept.

Acknowledgments

The paper was elaborated within VEGA 1/0436/17 Conceptual Frameworks of IT Governance and their impact on the competitiveness of companies in the Slovak Republic.

References

Bai, R. J. & Lee, G. G. (2003). Organizational factors influencing the quality of the IS/IT strategic planning process. *Industrial Management and Data Systems*. 103(8), 622-632.

Butler, R. and Butler, M. J. (2010), 'Beyond King III: Assigning accountability for IT governance in South African enterprises,' *South African J. Business Manager*, 41 (3), 33-45.

Černý, M. (2014). Procurement Processes of Application Software. (in Slovak: Obstarávacie procesy aplikačného softvéru). Ekonóm: Bratislava, Slovak republic.

Gottschalk, P. (1999). Implementation predictors of strategic information systems plans. *Information and Management*. (36), 77-91.

Gubová, K. et al. (2017). Importance of stakeholder groups in pursuit of sustainable development of manufacturing companies. In *AD ALTA : journal of interdisciplinary research*. Hradec Králové : Magnanimitas. ISSN 2464-6733, 2017, 7(1), p. 154-157.

Haes S. De & van Grembergen, W. (2005). IT Governance and its mechanisms. *The Information Systems Control Journal.* (1), 1-36.

Haes, S. De. & van Gremberger, W. (2008), 'Analysing the Relationship Between IT Governance and Business/IT Alignment Maturity,' Proceedings of the 41st Annual Hawaii International Conference on System Sciences, ISBN 0-7695-3075-3, 7-10 January 2008, Big Island, Hawaii.

Henderson, J. C. & N. Venkatraman. (1993). Strategic alignment: Leveraging information technology for transforming organizations. *IBM Systems Journal.* 32(1), 4-16.

IT Governance Institute (ITGI). (2003). Board briefing on IT governance. 2nd Edition. [online], [2012-03-09] Available: http://www.isaca.org/Content/ContentGroups/ITGI3/Resources1/ Board_Briefing_ on_IT_Governance/26904_Board_Briefing_final.pdf

Kingsford, et al. (2003). Information Systems, IT Governance and Organisational Culture. In IEEE (Ed.) *14th Australasian Conference on Information Systems.* Perth: Western Australia. 1-14

Larsen, M. H., Pedersen, M. K. and Andersen, K. V. (2006), 'IT governance: Reviewing 17 IT governance tools and analyzing the case of Novozymes A/S,' Proceedings of the 39th Hawaii International Conference on System Sciences, ISBN: 0-7695-2507-5, 4-7 January 2006, Kauai, Hawaii.

Lee, J. et al. (2008). Governance Inhibitors in IT Strategy and Management: An Empirical Study of Korean Enterprises. *Global Economic Review.* 37(1), 1-22.

Ljudvigová, I. (2014). The role of leadership in the creation and innovation of the business model (in Slovak: Úloha vodcovskej osobnosti pri tvorbe a inovácii podnikateľského modelu). In *Economics and Management: Scientific journal of the Faculty of Business Management, University of Economics in Bratislava.* Bratislava : Slovak republic, 2014. ISSN 1336-3301, 11(1), p. 51-64.

Loh, L. & Venkatraman, N. (1993). Diffusion of Information Technology Outsourcing: INFLUENCE Sources and the Kodak Effect. *Information Systems Research.* 3(4), 334–359.

Mcleod, G. & Smith, D. (1996). *Managing Information Technology Projects.* San Francisco, CA: Boyd & Fraser, ITP Publishing Company.

Musson, D. & Jordan, E. (2005). The Broken Link: Corporate Governance and Information Technology. *Australian Accounting Review.* 15(3), 11-19.

Peterson, R. K., et al. (2002). Information Technology Governance Processes under Environmental Dynamism: Investigating Competing Theories of Decision Making and Knowledge Sharing, In AISeL (Ed.) *Twenty-third International Conference on Information Systems.* Barcelona: Spain: 563-576.

Symons, C. (2005), 'IT governance framework – Structures, processes and communication,' *Forrester Research Inc*. 2005.

Webb, P., Pollard, C. and Ridley, G. (2006). 'Attempting to Define IT Governance: Wisdom or Folly?' Proceedings of the 39th Hawaii International Conference on System Sciences, ISBN: 0-7695-2507-5, 4-7 January 2006, Kauai, Hawaii.

Weill, P. and Ross, J. W. (2004) IT Governance, Harvard Business School Press, Boston, Massachusetts.

Willson, P. & Pollard, C. (2009). Exploring IT Governance in Theory and Practice in a Large Multi-National Organisation in Australia. *Information Systems Management*. 26, 98-109.

Zagorsek, B. (2012). Information technologies and strategies in the bank sector in Slovakia. In *Edamba 2012 : Proceedings Of The [15Th] International Scientific Conference For Doctoral Students And Young Researchers : 22Nd November 2012,* Bratislava, Slovak Republic, 1388-1396.

Impact of the CO2 Emissions Cost On Electricity Production Profitability

Anna Hnydiuk-Stefan, Opole University of Technology, Faculty of Production Engineering and Logistics, Department of Power Engineering Management, Opole, Poland, a.hnydiuk-stefan@po.opole.pl

Abstract

The paper presents the most important issues related to environmental costs in a electricity production company under the current III period of the EU Emissions Trading Scheme. In the current stage of EU ETS a clear distinction has been made with respect to free allocation of CO2 allowances for electricity generation producers and other industries. In some countries it is possible to receive free EUAs by the energy sector, however, under strict exemption from the obligation to buy the EUA at auctions, under the so-called derogation. For the purposes of this article an example of the management of CO2 emissions in the modern power unit is discussed. As part of the discussions, the possibility of receiving a free allocation of CO2 allowances (EUAs) for the installation under derogation following investment under the National Investment Plans and management of the purchase of EUA for production was analyzed. Based on the mathematical model, the costs associated with the purchase of the EUA were calculated over the years, and then the sensitivity of the level of purchase of CO2 emissions to the cost of electricity production was analyzed.

Keywords: emissions, EU ETS, CO2, electricity

1. Introduction

European Union Emissions Trading Scheme (EU ETS) operates in 31 countries which are 28 European Union members plus Iceland, Liechtenstein and Norway, from almost 12 years. However, legislative and regulatory changes are still being implemented, causing increased uncertainty, which significantly affect the costs incurred by installations that are obliged to participate in it. From the all sectors which the EU ETS covers, the electricity sector is particularly exposed to the significant costs involved in CO2 emission permissions (European Union Allowances – EUA) purchase. It is due to the large amount of CO2 by-products and the differing regulations on free allocation of CO2 allowances, as described in this article. Since the launch of the system in 2005, the installations covered by it, had to comply with a number of environmental requirements, with the biggest changes occurring at the I-II and II-III interim periods, in 2008 and 2013 years. The EU ETS is now in its third phase – significantly different from phases 1 and 2. The main changes compare to the previous phases includes, according to European Comission, a single, EU-wide cap on emissions applies in place of the previous system of national caps. Auctioning is now the default method for allocating allowances in phase 3, and it is instead of free allocation which had place in 1st and 2nd phase. Harmonized allocation rules apply to the allowances still given away for free. 300 million allowances is set aside in the NER 300 (New Entrants Reserve) to fund the deployment of innovative renewable energy technologies and carbon capture and storage through the program.

The current period, which began in 2013 year, made a clear division of the free allowances for CO2 emissions for electricity generation producers and other industries. The original premise was to completely eliminate the free allocation to all electricity generators and the rule to purchase all the EUA needed at auctions. However, exception from this rule is derogation mechanism which allow to electrical installations to receive some amount of free allocation.

Withdrawing the governmental allocation of CO2 allowances (EUAs) that had previously been granted to installations free of charge and substantially covered actual emissions, meant that the cost of participating in the system was not so significant. Moreover, the installation was not so much exposed to the risk of extremely high variability of rules in the CO2 market community.

Currently, the only way to obtain a free allocation to the power sector is derogation mechanism, which applies only to some countries in the EU ETS. Derogation mechanism means the investment in construction of a new or upgrading of an existing power plant. However, even in these privileged countries, starting from a year 2020, energy sector will not receive a free allowances even with a derogation mechanism. The auction system introduced in the third period is intended to provide an access to the primary EUA market without using exchanges or brokers. However, as the practice shows, the purchase prices of EUA units at auctions are very close to those of the secondary market. A detailed assessment of the impact of environmental costs, including mainly the purchase cost of the EUA, as these cost is the most variable and much higher than other environmental costs.

The paper presents a model of environmental cost management in an electricity generation companies. These costs have a significant impact on the cost of generating electricity and due to the large variability they should be taken into account and calculated on a continuous basis. Excessive EUA price levels may lead to unprofitable generation of electricity due to the impossibility of concluding contracts for sale at the desired price, when taking into account the cost of environmental charges. The analysis takes into account the possibility of receiving free EUA allocations that affect the cost-effectiveness of electricity production and significantly reduce the cost sensitivity associated with the compulsory purchase of EUAs.

2. Emissions Management on the Example of Coal Power Plant

Emissions management in the installation includes both the aspect of choosing the best moment to purchase EUAs, which mean at the lowest possible price and with the longest possible payment at the same time. All available market mechanisms should be used to reduce the cost of generating electricity.

2.1. Using the Derogation Mechanism

An important mechanism in the EU ETS, which is to encourage energy companies to modernize existing electricity sources or build new ones, is the mechanism for allocating free CO2 emission allowances, so called derogation mechanism. The result of that is the reduction of the obligation to pay for each tone of CO2 emitted. This voluntary mechanism was introduced in Poland, the Czech Republic, Hungary, Estonia, Lithuania, Latvia, Bulgaria and Romania. Obviously, in order to obtain such a disposable European Union Allowance EUA, significant financial resources should be invested in the modernization of electricity sources in order to reduce CO2 emissions or to build new high-efficiency sources of electricity. The CO2 emissions trading market is in the process of continuous development, where increasingly stringent CO2 emission limits are being established. In the third period of this trading system, i.e. in the years 2013-2020, consisting in particular of the purchase of CO2 emission permits through government auctions, the above mentioned derogation mechanism was introduced, which included the possibility of derogating from the purchase of CO2 emission allowances at auctions for power sector.

To estimate the best choice for managing CO2 emissions, a cost management model was developed for the actual coal-fired power station which is mandatory covered by the CO2 emissions trading scheme. The 460 MW block is classified for the derogation mechanism, so that in the first year of operation it will

receive 70% of CO2 allowances needs and in the last year of the third phase, 2020 will not receive free EUAs. This block has a high net efficiency of 43%. It should also be emphasized that the fluidized bed boiler used in the installation is currently the largest boiler in the world and technically suitable for the use of oxy-combustion process, which could be an alternative to reducing future CO2 emissions in the case of a high EUA price increase of € 52 / EUA, according to Hnydiuk-Stefan and Składzień (2017). Cost-free to operate on CO2 emissions would require an annual average of free allocation 3,000,000 CO2 emissions (EUA) per year, according to data from Community Independent Transaction. This would almost equal the allocation of real-level emissions so that the installation owner would not have to buy additional permissions in the free market. With the accession of the third period, from 2013 onwards, the power units, will not receive a free allocation of CO2 allowances like in the first and second phases of EU ETS. The only form of obtaining additional free allowances is the derogation mechanism, however, provided the investment is implemented as planned in the national investment plans. Detailed rules are set out in Article 10 (c) of Directive 2009/29 / EC concerning the possibility of transitional allocation of free allowances for the modernization of electricity generation units. Under the derogation, analyzed installation will be able to receive the free EUA quoted in Table 1.

Table 1: Maximum annual amount of free CO2 emission allowances received under the derogation mechanism

Year	Free allocation under derogation for the analyzed investment (kEUA)	CO2 emission allowances shortage (kEUA)
2013	2100	900
2014	1950	1050
2015	1800	1200
2016	1620	1380
2017	1410	1590
2018	1170	1830
2019	870	2130
2020	0	3000

Source: Own calculations based on European Transactions Log [11] and EU ETS Directive

The declining free allocation that the installation is able to obtain through investments covered by the National Investment Plan increases the EUAs shortfall, and the remaining amount is estimated in Table 1. The exact cost of the environmental fees that will be incurred by the owner of the electricity generating plant is difficult to predict as it depends on the purchase time of the EUAs. Factors influencing the EUA price levels are described in research study by Hnydiuk-Stefan (2017). For the purposes of this article, it was assumed that the cost of purchasing 1 Mg of CO2 emissions in the EU ETS market is between 5 EUR/EUA - 8 EUR/ EUA, so the cost of covering the shortage is as follows [Table 2]:

Table 2: Annual costs cover the shortage of emissions for discussed installation

Year	Cost of covering CO2 shortage at assumed CO2 price [euro]			
	5 euro/EUA	**6 euro/EUA**	**7 euro/EUA**	**8 euro/EUA**
2013	4 500 000.00	5 400 000.00	6 300 000.00	7 200 000.00
2014	5 250 000.00	6 300 000.00	7 350 000.00	8 400 000.00
2015	6 000 000.00	7 200 000.00	8 400 000.00	9 600 000.00
2016	6 900 000.00	8 280 000.00	9 660 000.00	11 040 000.00
2017	7 950 000.00	9 540 000.00	11 130 000.00	12 720 000.00
2018	9 150 000.00	10 980 000.00	12 810 000.00	14 640 000.00
2019	10 650 000.00	12 780 000.00	14 910 000.00	17 040 000.00
2020	15 000 000.00	18 000 000.00	21 000 000.00	24 000 000.00

Source: Own calculations

2.2.Methodology for estimating the impact of environmental costs on the specific cost of electricity production

The cost of the environmental charges significantly affects the profitability of electricity production. It is therefore reasonable to estimate the environmental cost each time during contracting the sale of electricity. The difference between the contracted electricity sales price and the cost of generating it will set the amount of profit or loss for the installation. The average specific cost of electricity generation can be calculated in each case using the formulas from the book by Bartnik and Hnydiuk-Stefan (2016):

$$k_{el,av} = \left\{ (1+x_{sw,m,was}) \frac{e_{fuel}^{t=0}}{a_{fuel}-r} [\mathrm{e}^{(a_{fuell}-r)T} - 1] + K_{env} + (1-u) \frac{\rho_{CO_2} e_{CO_2}^{t=0}}{b_{CO_2}-r} [\mathrm{e}^{(b_{CO_2}-r)T} - 1] + \right.$$
$$\left. + \frac{\eta_{el}}{rt_A} \left[(1+x_{sal,t,ins}) i (1-\mathrm{e}^{-rT}) \delta_{serv} + riz \left(\frac{1-\mathrm{e}^{-rT}}{T} + 1 \right) \right] \right\} \frac{r}{\eta_{el}(1-\varepsilon_{el})(1-\mathrm{e}^{-rT})} \rightarrow \min. \quad (1)$$

where:

$$K_{env} = \frac{\rho_{CO_2} p_{CO_2}^{t=0}}{a_{CO_2} - r}[e^{(a_{CO_2}-r)T} - 1] + \frac{\rho_{CO}\ p_{CO}^{t=0}}{a_{CO} - r}[e^{(a_{CO}\ -r)T} - 1] +$$
$$+ \frac{\rho_{NO_X} p_{NO_X}^{t=0}}{a_{NO_X} - r}[e^{(a_{NO_X}-r)T} - 1] + \frac{\rho_{SO_2} p_{SO_2}^{t=0}}{a_{SO_2} - r}[e^{(a_{SO_2}-r)T} - 1] + \quad (2)$$
$$+ \frac{\rho_{dust} p_{dust}^{t=0}}{a_{dust} - r}[e^{(a_{dustt}-r)T} - 1]$$

where:

a_{el}, a_{fuel}, a_{CO_2}, a_{CO}, a_{SO_2}, a_{NO_X}, a_{dust}, b_{CO_2} – controls,

δ_{serv} – annual rate of constant cost regardless of the value of investment (cost of maintenance of overhaul of equipment),

ε_{el} – internal electric load of the power plant (its value is relative to the technology applied in electric power generation),

η_{el} – gross electric power efficiency (its value is relative to the technology applied in the electric power generation),

u – ratio of the chemical energy of the fuel in its total annual use for which the purchase of additional CO_2 allowances is not required,

p_{CO_2}, p_{CO}, p_{NO_x} p_{SO_2}, p_{dust} – specific rates per emissions of CO_2, CO, NO_x, SO_2, particulate matter, PLN/kg,

ρ_{CO_2}, ρ_{CO}, ρ_{NO_x}, ρ_{SO_2}, ρ_{dust} – emission of CO_2, CO, NO_x, SO_2, per unit of the chemical energy of fuel, kg/GJ (relative to the type of fuel).

r – discount rate,

t_A – annual operating time,

T – calculated exploitation period of a power plant expressed in years (depreciation rate),

$x_{sw,m,was}$ – coefficient used to account for the cost of supplementing water, use of auxiliary materials and waste disposal,

$x_{sal,t,ins}$ – coefficient used to account for the cost of remuneration, taxes, insurance, etc.

z – coefficient expressing immobilization of capital.

3. Results of calculation examples

From the economic perspective, the most beneficial technology is the one in which the cost of power generation $k_{el,av}$ is the lowest. It is relative to: specific cost of investment i, internal electric load of the

power plant ε_{el}, its annual operating time t_A, fuel prices and their variability in time, ratio u of the chemical energy of the fuel in its total annual use, for which the purchase of additional CO2 allowances and tariff rates on the use of the environment is not required.

Table 3: Data used for specific cost of electricity production calculations

Coal fired power plant
Estimated investment i, mln EURO/MW =1.55
Annual operating time $t_{R,}$ h/year=7500
Internal electrical load: $\varepsilon_{el,}$ % =7.6
Construction period b, years =5
Specific fuel price, EURO/GJ =2.7
Exploitation period: T = 20 years
Annual rate of maintenance and overhaul δ_{serv} = 3%.
Coefficients: $x_{sal,t,ins}$ = 0.25; $x_{sw,m,was}$ = 0.02.
Discount rate r = 8%
Tariff charges on emissions: p_{CO2}=0,07 euro/Mg_{CO2}, p_{CO}=26 euro/Mg_{CO}, p_{NOx}=126 euro/Mg_{NOx}, p_{SO2}=126 euro/Mg_{SO2}, p_{dust}=83 euro/Mg_{dust}
Emission from coal combustion: ρ_{CO2}=95 kg/GJ, ρ_{CO}=0,01 kg/GJ, ρ_{NOx}=0.164 kg/GJ, ρ_{SO2}=0.056 kg/GJ, ρ_{dust}= 0.007 kg/GJ

Using the formulas (1, 2) and data in Table 3, the following calculation results are presented in Figures 1 and 2.

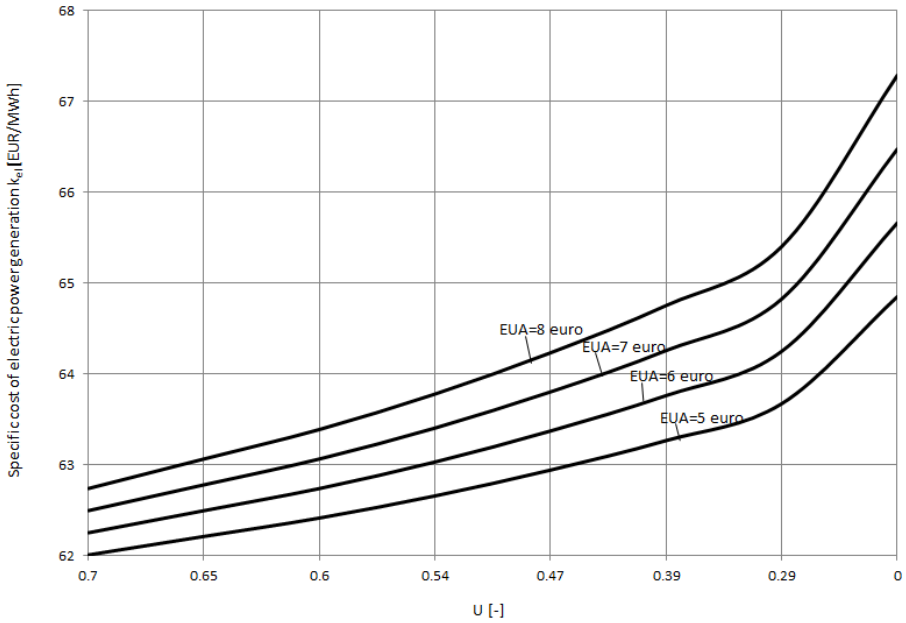


Fig 1. Impact of EUA prices and derogation mechanism based on the ratio of the chemical energy of the fuel in its total annual use for which the purchase of additional CO_2 allowances is not required U, on the

specific cost of electric power generation k_{el} for a coal-fired power plant during the pay-back period and after depreciation period.

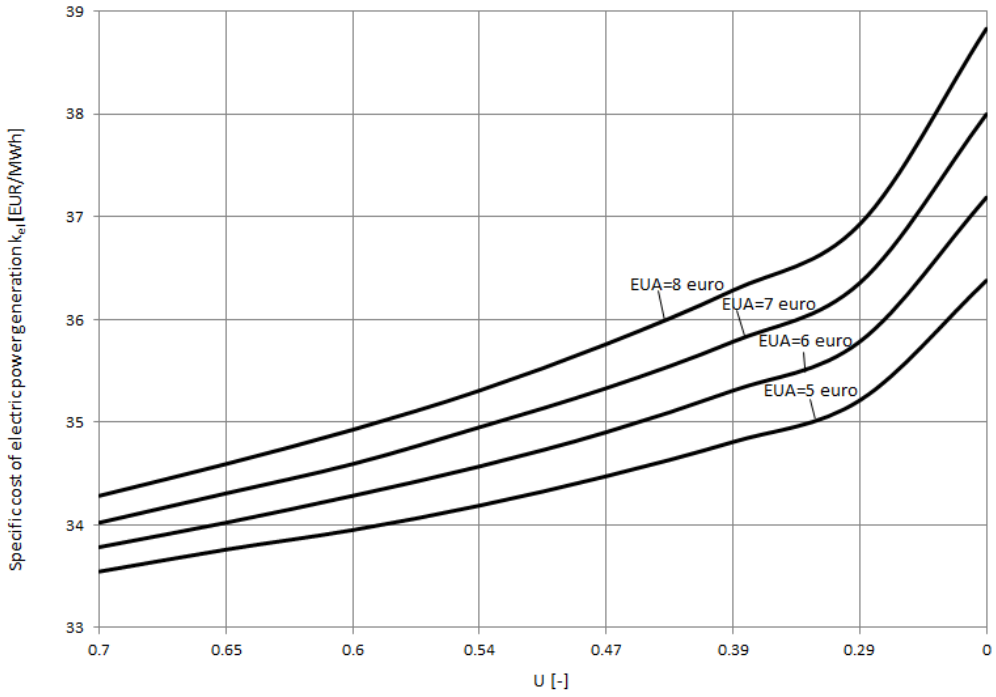


Fig 2. Impact of EUA prices and derogation mechanism based on the ratio of the chemical energy of the fuel in its total annual use for which the purchase of additional CO_2 allowances is not required U, on the specific cost of electric power generation k_{el} for a coal-fired power plant after depreciation period.

As Figures 1 and 2 presents, both factors like this related to the level of amount which is required to supplement the shortage of EUAs as well as the price of their purchase are relevant. Obtaining free EUAs in a quantity that secures even part of the production needs is important for the cost of generating electricity, as it sets different acceptable price levels for EUA purchases.

The cost of producing electricity with a 50% free allocation for one year of production and the purchase price of the rest CO2 emissions needs at 8 EUR/EUA is the same for the company as the cost of purchasing the full amount of allowances for one year at a maximum of 5 EUR/EUA. On the other hand, if the EUA is to be purchased without free allocation, which will occur in 2020 year, at a price of 8 EUR/EUA, then the electricity cost per 1 MWh will be 2.5 EUR higher compared to CO2 emissions purchase price of 5 EUR/EUA.

It is therefore appropriate to use financial instruments such as forward contracts or options to secure the future purchase price, thus eliminating the risk of EUA price increases that could lead to financial losses for the installation. However, due to the constant volatility of the EUA price levels, it is justified to keep track of market prices and to contract EUAs at a price acceptable to the company. The acceptable price means the EUA price level at which the contract price of the electricity sales is higher than the specific cost of electricity production.

4. Summary and conclusions

The analysis points to the significant environmental costs of the coal-fired power plant, mainly related to the purchase of additional CO2 emissions, which are required to keep compatibility under EU ETS. Even in the case of the construction of modern coal blocks for supercritical parameters, which are characterized by one of the lowest emission factor in using hard coal as a fuel, environmental costs are significant and can affect the cost-effectiveness of electricity generation. It is extremely important to properly plan the mandatory purchase of EUAs in order to balance the real emissions in a given year with the amount of surrender EUAs under EU ETS. The increasing level of EUA shortage should be consistently included in the price of electricity.

In order to guarantee specific prices when purchasing the EUA shortfall, the installation should use market mechanisms such as post-delivery contracts or options when an acceptable level of EUA purchase occurs on the market. With currently available financial instruments offered by the stock exchanges, the plant owner can take one of the available possibilities for CO2 buying or diversify the cost of CO2 emissions purchasing by combining all available strategies.

Contracts for the sale of electricity in futures without taking into account the cost associated with the purchase of a sufficient number of EUAs units can cause significant losses for the company due to high volatility of EUA prices. The model indicated in the paper can serve to assess current environmental costs associated with the purchase of CO2 allowances and other environmental costs such as supplemental water prices, waste disposal and charges for the other emissions to the atmosphere such as NOx, SO2, CO.

References

Bartnik R., Bartnik B., Hnydiuk-Stefan A. (2016), 'Optimum Investment Strategy in the Power Industry,' *Springer*, New York.

Hnydiuk-Stefan Anna (2017), 'Analysis of Factors Affecting the Price of CO2 Emission Allowances,' *Zeszyty Naukowe Wyższej Szkoły Bankowej w Poznaniu*, 35-43

Hnydiuk-Stefan A., Składzień J. (2017), 'Analysis of supercritical coal fired oxy combustion power plant with cryogenic oxygen unit and turbo-compressor,' *Energy*, 271-283, DOI:10.1016/j.energy.2017.04.021

Financial Knowledge of Youth in Latvia: Pilot Survey Results

Jelena Titko, The University of Economics and Culture, Riga, Latvia, jelena.titko@eka.edu.lv

Zane Veidenberga, The University of Economics and Culture, Riga, Latvia, zane.veidenberga@eka.edu.lv

Inga Shina, The University of Economics and Culture, Riga, Latvia, inga.shina@gmail.com

Abstract

Nowadays, questions related to citizens' financial literacy, their abilities to plan for future and to make sound financial decisions are considered to be critically important, because of strong relationship between the level of personal financial knowledge and skills and households' well-being. The aim of the current research is to evaluate financial knowledge of Latvian young population. The paper reflects the results of the pilot study conducted among 17-19-years-old citizens. A preliminary evaluation of their knowledge in macroeconomics was performed, using data from annual financial competition, organized by the University College of Economics and Culture. Last year students of Latvian secondary and vocational schools performed tasks and answered the questions in the field of macroeconomics and personal budgeting. The results of 94 participants were analyzed. The obvious conclusion was that the level of students' knowledge in macroeconomics is higher than the level of knowledge in personal budgeting.

Keywords: financial literacy, Latvia, youth, macroeconomics, personal budget.

Introduction

The interest to the issues related to financial knowledge and skills of citizens, as well as to the consistency between study programmes in schools and HEI and emerged needs for financial education, are prioritized at the government level of many countries, including Latvia. According to the OECD report (2015), 34 countries have been implemented first or even second (revised) National strategy for financial literacy, whereas in 25 countries a National strategy "is being actively designed". It is logically to assume that till 2017 this number has been increased.

In Latvia the National Strategy for Financial Literacy was implemented in 2014. It has been coordinated by the Financial and Capital Market Commission (FCMC) – a regulatory authority of the Latvian financial sector. The Strategy was drawn up in cooperation with strategic partners – the Ministry of Education and Science, National Centre for Education, Consumer Rights Protection Centre, BA School of Business and Finance, as well as the Association of Commercial Banks of Latvia and Latvian Insurers Association. Since 2014 many other organizations have been engaged in various kinds of activities aimed to enhance awareness of the importance of financial knowledge in the society and to increase the level of citizens' financial literacy, including the University College of Economics and Culture.

One of the projects towards promotion financial literacy in Latvia is an annual competition for last year students from Latvian secondary and vocational schools named "Financial ABC" which is organized by the University College of Economics and Culture since 2016.

This paper reflects the results of 2017 competition – achievements of students in performing financial tasks. The authors stated the hypothesis, based on the OECD report on PISA (Programme for International Student Assessment) 2012 results (OECD, 2014). Unfortunately, Latvia did not participate in PISA 2015 - financial literacy assessment of 15-year-olds' ability to apply their

accumulated financial knowledge and skills to real-life situations involving financial issues and decisions. Latvian results in PISA 2012 was 501 score (not statistically significantly different from the OECD average). The authors assumed that students will demonstrate average-level results in competition "Financial ABC 2017". To evaluate the level of knowledge, results were assigned to the Evaluation criteria for study results, i.e. to the school grades. Besides, the authors predicted that the students' knowledge in macroeconomics will be better than their knowledge in personal budgeting, because of the content of educational programmes in Latvian schools. Thus, the stated hypotheses were the following:

H1: Most of Latvian students' demonstrate average level of financial knowledge

H2: The level of students' knowledge in macroeconomics is higher than the level of knowledge in personal budgeting

Multiple-choice test data was analyzed, applying such methods, as ranking and analysis of frequencies. The received results allowed making preliminary conclusions on students' knowledge in specific financial questions. The testes hypotheses were confirmed, indicating the lack of focus on personal budgeting issues in financial education programmes realized in Latvian schools. To receive more reliable results, database should be enlarged. Considering that the project "Financial ABC" is planned to be organized on the regular basis, it is possible to continue the research.

Financial literacy

As a starting point for a comprehensive investigation of financial literacy issues was a programme initiated by OECD in 2003. Since that time the importance of financial education, and consequently, the level of citizens' financial literacy level has been recognized by many countries. Financial literacy of citizens was recognized as one of the prior task in development of the national educational programmes. High level of financial literacy allows people to succeed in their planning (Lusardi and Mitchell, 2011), to participate in financial markets and perform better on their portfolio choice (van Rooij *et al*. 2011; Chu *et al*. 2017), making sound financial decisions (Fraczek, B. and Klimontowicz, 2015), and, consequently, to improve their and their families' well-being (Behrman *et al*. 2012; van Rooij *et al*. 2012).

Since 2008 an interest to financial literacy issues extremely increased, considering a global negative impact of the financial crisis. It becomes obvious, analyzing the statistics from academic data bases. The authors made a search for scientific publications in EBSCOhost Business Search Complete, ScienceDirect and Scopus in the period 2008-2017, using the key words "financial literacy". We found 10844, 9523 and 10887 results respectively.

Financial literacy referred to (1) financial knowledge, (2) financial skills, (3) financial behaviour or a certain combination of elements (ASIC 2011; Kozup, Hogarth 2008; Atkinson, Messy 2011; Hung *et al*. 2009; PISA/OECD 2012; Widdowson, Kim 2007). The most commonly used definition was offered by the OECD: [Financial literacy is a] „combination of awareness, knowledge, skills, attitude, and behaviors necessary to make sound financial decisions and ultimately achieve individual financial wellbeing" (Atkinson and Messy, 2011).

Definitions of financial literacy, provided by various researchers and organizations, are quite different that can be explained by the multidimensionality and the comprehensive structure of the concept. Financial literacy has a number of elements, including:

- basic numeracy skills, such as the ability to calculate rates of return on investments, the interest rate on debt, and basic arithmetic ability;
- an understanding of the benefits and risks associated with particular financial decisions, including spending, borrowing, leverage and investing;

- the ability to understand basic financial concepts, including the tradeoff between risk and return, the main attributes of different types of investments and other financial products, the benefits of diversification, and the time value of money;

- the capacity to know when to seek professional advice and what to ask, and the ability to understand the advice given by professional advisers (Widdowson, 2007).

Some examples of the proposed definitions of the term "financial literacy" are summarized in the Table 1.

Table 1: Definitions of Financial literacy

Source	Definitions of the term "financial literacy"
PISA –Programme for International Student Assessment (2012)	„Financial literacy is knowledge and understanding of financial concepts and risks, and the skills, motivation and confidence to apply such knowledge and understanding in order to make effective decisions across a range of financial contexts, to improve the financial well-being of individuals and society, and to enable participation in economic life".
Kozup and Hogarth (2008)	"…a set of critical thinking skills to weigh and assess the pros and cons of a particular decision relative to one's own needs, values, and goals"
Mandel (2007)	" …ability to evaluate the new and complex financial instruments and make informed judgments in both choice of instruments and extent of use that would be in their own best long-run interests"
Atkinson and Messy (2011)	"…combination of awareness, knowledge, skills, attitude and behaviours necessary to make sound financial decisions and ultimately achieve individual financial wellbeing".
Remund (2010)	"Financial literacy is a measure of the degree to which one understands key financial concepts and possesses the ability and confidence to manage personal finances through appropriate, short-term decision-making and sound, long-range financial planning, while mindful of life events and changing economic conditions".
Worthington (2006)	"Financial literacy means different things to different people, and this is reflected most clearly in the many definitions used in the literature. For some it is quite a broad concept, encompassing an understanding of economics and how household decisions are affected by economic conditions and circumstances. For others, it focuses quite narrowly on basic money management: budgeting, saving, investing and insuring".
Hastings *et al.* (2013)	"…it [financial literacy] has been used to refer to knowledge of financial products (e.g., what is a stock vs. a bond; the difference between a fixed vs. an adjustable rate mortgage), knowledge of financial concepts (inflation, compounding, diversification, credit scores), having the mathematical skills or numeracy necessary for effective financial decision making, and being engaged in certain activities such as financial planning."

Source: Authors' compilation of the definitions

In the current paper the authors focus on financial knowledge as an integral part of financial literacy concept, because the process of data collection (multiple-choice and practical tasks for students) did not assume the assessment of other components, such as attitude and behavior. Students knowledge was measured, mainly focusing on such financial literacy elements, as numeracy, knowledge of basic financial concepts and awareness of different types of risks.

Measuring of financial literacy level is a complicated process, because the development of the measurement instrument should be performed considering all the elements. Besides, financial literacy is not only about financial knowledge, but also about skills to apply knowledge and attitude to

financial issues, i.e., readiness and willingness to solve financial questions. In assessment of the financial literacy level the experts frequently use OECD measurement scale (Hung *et al.* 2009; Krizek and Hradil, 2012), instrument applied in DNB Household Survey (van Rooij *et al.,* 2012) or American Life Panel (Heinberg *et al.,* 2010) and others.

Data about financial literacy level of Latvian citizens are available in the report from OECD/INFE International Survey of Adult Financial Literacy Competencies (OECD, 2016). First survey of financial literacy in Latvia was conducted by the FCMC and carried out in cooperation with the research centre SKDS in Q3 2014. In total, 1009 respondents aged 18 to 79 years were surveyed. The questions developed by the FCMC experts the questions from OECD base questionnaire have been included in the questionnaire for the survey. The data of the study was used for development of a new FCMC measurement system – *Financial Literacy Index.* The second stage of the survey was realized in 2015. The evaluation of financial knowledge of Latvian citizens is planned to be made on a regular basis. Besides, individual researchers conducted survey among Latvian citizens to evaluate their financial knowledge (Titko *et al.* 2015).

Methodology

Data analyzed in the current research was received from participants of the annual financial competition organized by the University College of Economics and Culture in collaboration with the educational vortal "Customer School" (*Klientu skola*) developed by the Financial and Capital Market Commission – FCMC (klientuskola.lv) and the educational portal "Money School" (*Naudas skola*) developed by the Bank of Latvia (naudasskola.lv). In 2017 107 pupils representing last year classes of 39 Latvian secondary schools and vocational schools participated in this competition.

To be representative sample size should be approximately 380 participants, considering population statistics as of 2016 in the age group 15-19 years (Central Statistical Bureau, 2017). The authors had data only from 94 participants provided qualitative responses to all the questions.

55% of participants were girls, and 45% were boys. 48% of the total number of participants represented schools of Riga (capital of Latvia).

Tasks for 2017 year competition were developed covering such fields as financial sector participants, regulation of the financial sector, factors affecting economic development and national well-being, banks and other financial services providers, investments, e-services and e-security, financial risks and insurance, personal budget, planning and others. All the tasks and questions were grouped into two content blocks: A) Macroeconomics, and B) Personal budgeting.

This paper reflects the results of the analysis of participants' answers to seventeen multiple-choice questions from the first block (A) and sixteen questions from the second block (B). To improve a visibility of the results, each question was labeled (Table 2, Table 3).

Table 2: Multiple-choice questions from block A and block B; content and labels

Block A			Block B		
Q	**Content**	**Label**	**Q**	**Content**	**Label**
1	Factors affecting the size of wages and salaries in market economy	Salary	1	Private person's liabilities	Liabilities
2	Relationship between the consumer price index and the inflation rate	Consumer price index	2	Private person's assets	Assets
3	The indicators of the standard of living in a country	Standard of living	3	Statements about deposits	Deposits
4	Purchasing power of the pension	Pension	4	Risk of investments	Investments
5	The institution regulating the activities of financial institutions	FCMC	5	Statements about loans	Loans

6	Factors affecting the lending interest rates in euro	EIRIBOR	6	Statements about the II level of pension	II level of pension
7	Factors affecting money supply	Money supply	7	Private pension funds	PPF
8	Nominal lending interest rate	Nominal interest rate	8	Statements about insurance	Insurance
9	Relationship between the nominal lending interest rate and the real lending interest rate	Real interest rate	9	Credit limit for account	Credit limit
10	Effect from the Central Bank sells state securities	CB instruments	10	Contactless payment	Contactless payment
11	Key tasks of The Bank of Latvia	The Bank of Latvia	11	Calculation of the interest with demand deposit	Demand deposit
12	What does The Bank of Latvia do with damaged euro banknotes?	Damaged banknotes	12	Calculation of the interest with term deposit	Term deposit I
13	Relationship between EUR/US dollar exchange and export and import in Latvia	Currency rate I	13	Calculation of the interest with term deposit	Term deposit II
14	US dollar rate change if American companies pay dividends to their stakeholders, foreigners, in US dollars	Currency rate II	14	Calculation of the mortgage loan payments	Mortgage loan
15	Progressive tax rates are set by:	Progressive tax rates	15	The institution holding the Credit register	Credit register I
16	Factors affecting the real wages and salaries	Real wages and salaries	16	Statements about the Credit register	Credit register II
17	The rule of 70 - inflation level	Rule of 70			

Source: Authors' contribution

For every correctly answered question (Q1-Q17) participants received 1 point. Consequently, a maximal number of points possible to receive was equal to 17, and a minimal number of points was 0. For easier interpretation of the results, points were assigned to the Latvian grading system (Ministry of Education and Science, 2017) assuming that the educational achievements are assessed in a ten-point system. Dividing 17 points into 10 equal figure diapasons, marginal grades were received to estimate participants' "grades" (Table 3).

Table 3: Interconnection between number of points and grading system

Number of points	Grade in 10-point system	Number of points	Grade in 10-point system
0 – 1,7 points	1 (very very weak)	8,6 – 10,2 points	6 (almost good)
1,8 – 3,4 points	2 (very weak)	10,3 – 11,9 points	7 (good)
3,5 – 5,1 points	3 (weak)	12 – 13,6 points	8 (very good)
5,2 – 6,8 points	4 (almost satisfactory)	13,7 – 15,3 points	9 (excellent)
6,9 – 8,5 points	5 (satisfactory)	15,4 – 17 points	10 (with distinction)

Source: Authors' contribution, based on Ministry of Education and Science (2017)

Results

First stage of the data analysis was to determine a number of participants provided correct answers, analysing the responses regarding each task separately. This number as a percentage of total number of participants is reflected in Fig. 1.

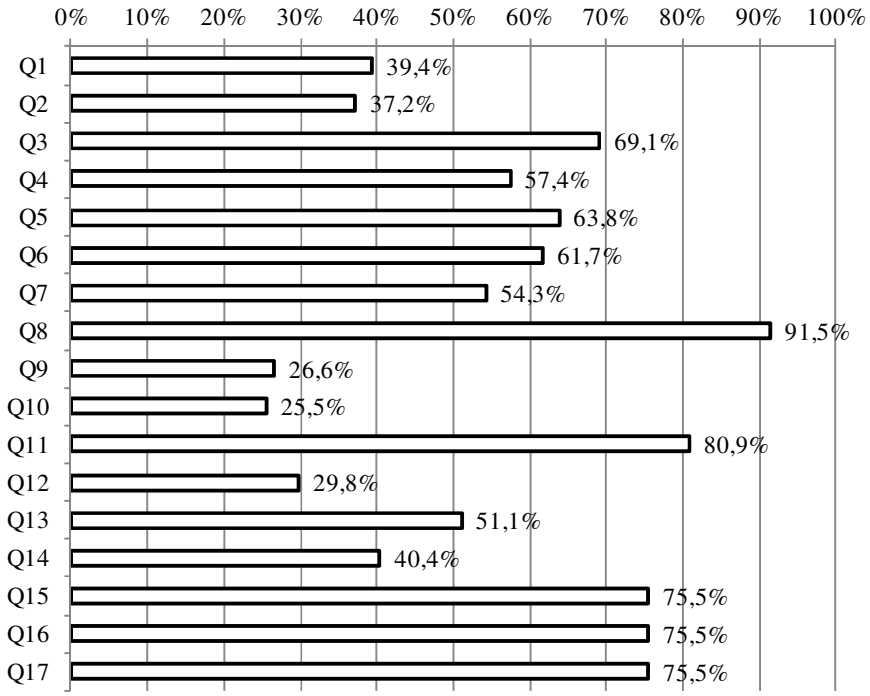


Fig. 1: Number of participants (% of total number)

correctly answered questions (block A tasks)

Source: authors' compilation of results

The authors provisionally determined 30% as a lower threshold of knowledge, whereas 70% - as a higher threshold in order to interpret results of participants. The best results the students demonstrated answering the questions Q8, Q11, Q15, Q16 and Q17 (more than 75% of participants answered correctly).

- Q8. Commercial banks set the nominal lending interest rate: (4 answer variants)
- Q11. After Latvia has joined the Eurozone, the key tasks of The Bank of Latvia are the following: (4 answer variants)
- Q15. Progressive tax rates are set by: (4 answer variants)
- Q16. On the condition that other circumstances do not change, the real wages and salaries will increase if: (4 answer variants)
- Q17. Based on "the rule of 70", how long it will take for prices to double, considering that the inflation level is equal to 5%: (4 answer variants)

The worst results the students demonstrated answering the questions Q9, Q10 and Q12 (less than 30% of participants answered correctly).

- Q9. If the nominal annual lending interest rate is 16% and the estimated inflation rate 18%, the real lending interest rate is:
- Q10. If the Central Bank sells big amount of state securities on open financial market, then its purpose is to:
- Q12. What does The Bank of Latvia do with damaged euro banknotes?

It is interesting that the most of students (57 of 94 participants or 61%) as a answer to Q12 selected the variant „sends to the European Central Bank to replace with new banknotes".

W can judge about students' awareness of Latvian financial sector, analyzing the answers on Q5 "Which institution regulates and supervises the activities of the Bank of Latvia, savings and loan associations, insurance agencies and insurance brokers, participants of financial instrument market, private pension funds, payment institutions and electronic money institutions?" The correct answer is "Financial and Capital Market Commission". However, 25% of participants answered "Ministry of Finance". It points to the fact that some questions are not highlighted within the economic subject in Latvian school. FCMC regulates the financial sector since 2001, and this information should be delivered to students.

Analyzing differences between results provided by boys and girls, the conclusion is that they are not significant. Besides, the number of participants-girls was higher that, in turn, could affect the results. Results provided by boys and girls are reflected in Fig. 2.

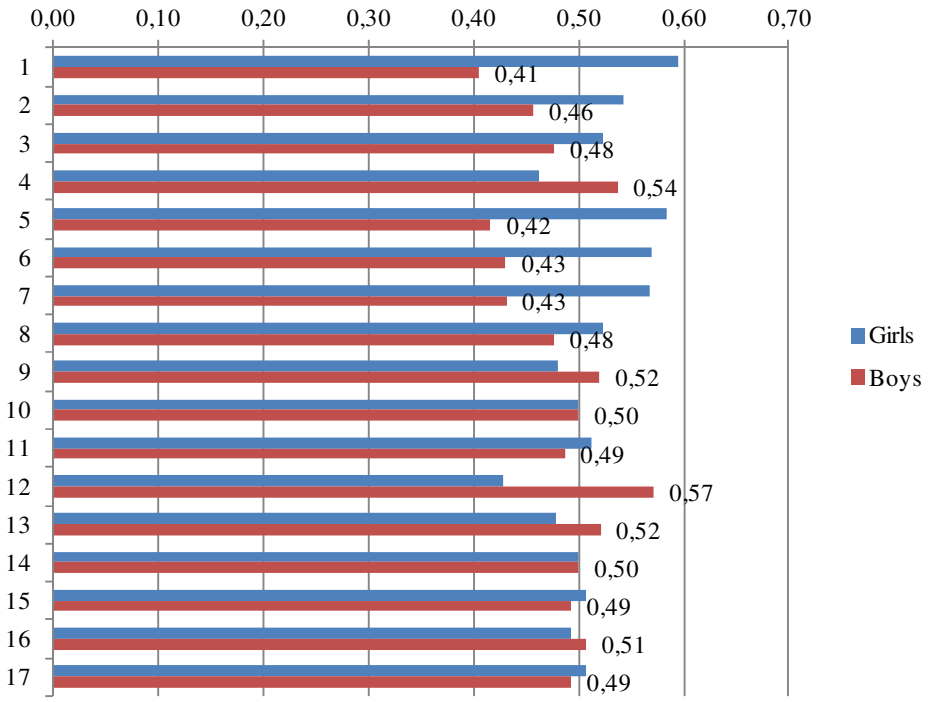


Fig. 2: Number of correct answers provided by boys and girls as a percentage of the total number of correct answers (block A)

Source: authors' compilation of results

A number of participants providing correct answers to multiple-choice questions from block B "Personal budgeting" is reflected in Fig. 3.

Best results the students demonstrated answering the questions Q11 and Q12 – 96% and 88% of correct answers respectively. The questions were aimed to check the ability of students to calculate the interest with deposits. However, it could not indicate a high level of numeracy, because the results of Q14 (calculation of monthly payment for mortgage loan) were relatively low (40% of correct answers).

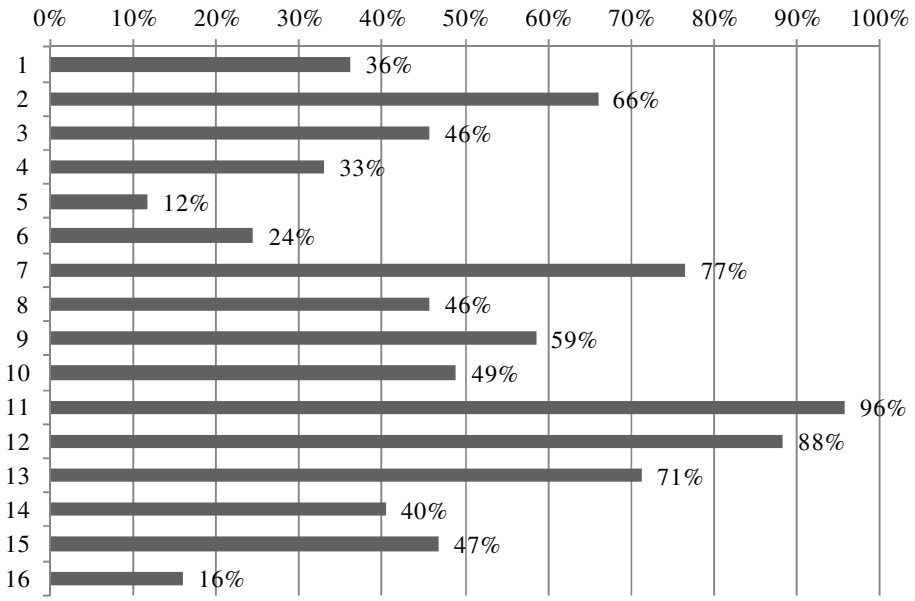


Fig. 3: Number of participants (% of total number) correctly answered questions (block B tasks)

Source: authors' compilation of results

The worst results were in Q5 and Q16 – questions about lending practices and Latvian Credit register. Students also demonstrated low level of knowledge, answering the question Q6 about the 2nd level of Latvian pension system. However, analyzing the responses of boys and girls separately, it is seen that the girls provided considerably more correct answers to questions Q5 and Q6 (Fig. 4).

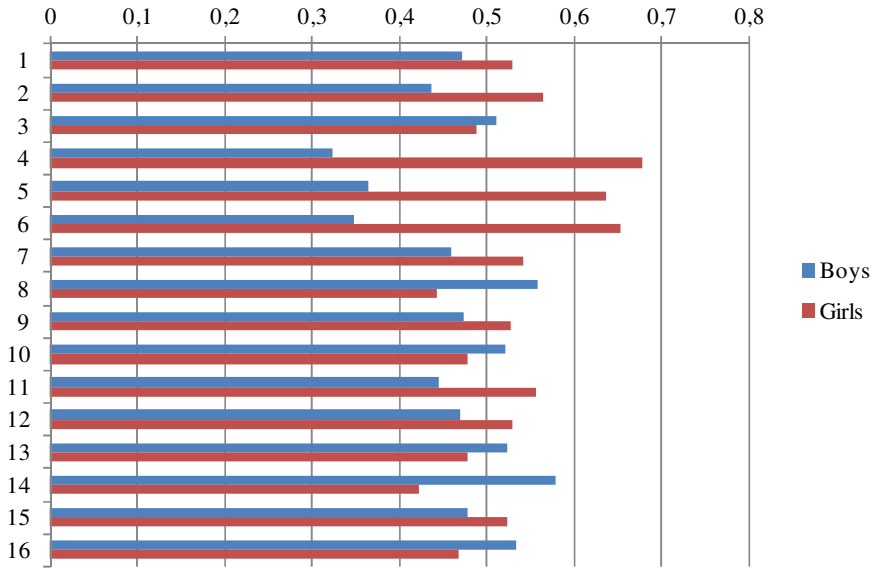


Fig. 4: Number of correct answers provided by boys and girls as a percentage of the total number of correct answers (block B)

Source: authors' compilation of results

Analyzing the results from both stages of the competition, it is obvious that the first hypothesis is confirmed. The most frequent "grade" received by the participants was 5 ("satisfactory"). About 50% of participants performed 50%-60% of tasks correctly. About 10% of students demonstrated very low knowledge (less than 30% of correctly performed tasks). The same number of students demonstrated upper level – more than 70% of correctly performed tasks.

As for the second hypothesis, it also has been confirmed. 61% of participants, answering macroeconomic questions, received high "grades" ("almost good" and better). In turn, answering the questions related to personal budgeting issues, the number of good and excellent students was quite lower (only 31%). Students "grades" are summarized in Fig. 5.

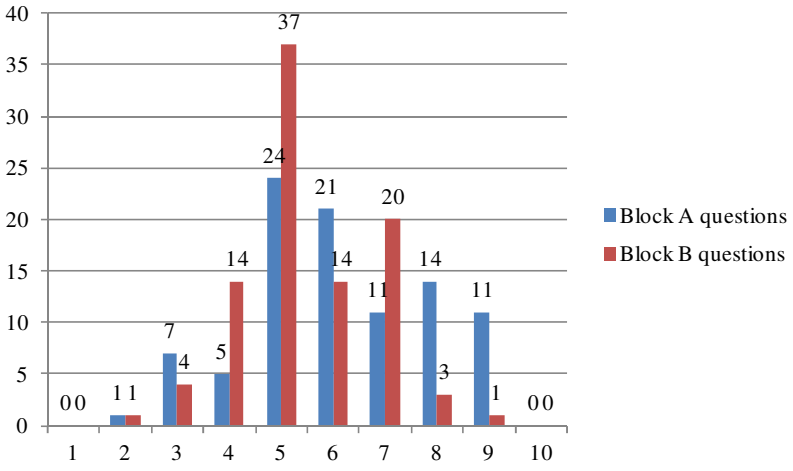


Fig. 5: Students achievements assigned to 10-point grading system

Discussion and conclusions

The given paper reflected the results of the competition "Financial ABC" between the representatives of Latvian secondary and vocational schools that was organized in 2017 by the University College of Economics and Culture in cooperation with the educational vortal "Customer School" developed by the Financial and Capital Market Commission and the educational portal "Money School" developed by the Bank of Latvia.

Two hypotheses were stated by the authors:

H1: Most of Latvian students' demonstrate average level of financial knowledge – Confirmed

Most of students performed at "5" (almost good), answering the questions related to macroeconomics and personal budgeting (Fig. 5).

H2: The level of students' knowledge in macroeconomics is higher than the level of knowledge in personal budgeting - Confirmed

Answering the questions from the block A "Macroeconomics" the students demonstrated better results. It can be explained by the content of the educational programme in Latvian schools. „Economics" is one of the obligatory courses. However, the programme is oriented to teaching such topics as money, demand and supply, employment and other macroeconomic issues. Questions in the field of consumer financial behaviour (personal budget, investments, loans and etc.) are not prioritized. Actually, such topics should be discussed within the separate course or the number of teaching hours for "Economics" should be increased.

Considering the limited number of participants of the competition, received results cannot be used as a basis for making conclusion about financial literacy level of all young citizens in Latvia. Thus, it is necessary to continue the research. The competition is panned to be organized on a regular basis and it is possible to provide a large volume of information for further analysis.

The authors of the given paper contribute to the informational base with the data about financial knowledge of Latvian young citizens. Considering that FCMC survey respondents are adults in the age of 18-79, but participation of Latvia in OECD survey among 15-years-old students is not regular, such kind of data from individual researchers and organizations allow understanding the problems in financial education in Latvia and making some steps to improving the situation.

In the future studies, the authors plan also to provide expert evaluation of the questions in order to determine their complexity. In this case, students can receive more points answering correctly more difficult questions.

References

Australian Securities and Investments Commission - ASIC, (2011), *Financial literacy and behavioural change.* [Online]. Available from: http://asic.gov.au/regulatory-resources/find-a-document/reports/rep-230-financial-literacy-and-behavioural-change/

Atkinson, A. & Messy, F.A. (2011), *Assessing Financial Literacy in 12 Countries*: *An OECD Pilot Exercise.* Discussion Paper 01/2011-0142011. [Online]. Available from: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1809679

Behrman, J. R., Mitchell, O. S., Soo, C., & Bravo, D. (2012). How financial literacy affects household wealth accumulation. *The American economic review*, 102(3), 300-304.

Central Statistical Bureau (2017), Population – Key Indicators. [Online]. Available from: http://data.csb.gov.lv/pxweb/en/Sociala/Sociala__ikgad__iedz__iedzskaits/?tablelist=true&rxid=562c2205-ba57-4130-b63a-6991f49ab6fe

Chu, Z., Wang, Z., Xiao, J. J., & Zhang, W. (2017), 'Financial literacy, portfolio choice and financial well-being', *Social Indicators Research*, vol. 132, no. 2, pp. 799-820.

Fraczek, B., & Klimontowicz, M. (2015), 'Financial literacy and its influence on young customers' decision factors', *Journal of Innovation Management*, vol. 3, no. 1, pp. 62-84.

Hastings, J. S., Madrian, B. C., & Skimmyhorn, W. L. (2013), Financial literacy, financial education, and economic outcomes, *Annual Review of Economics*, vol. 5, pp. 347-373. DOI: https://doi.org/10.1146/annurev-economics-082312-125807

Heinberg, A., Hung, a., Kapteyn, A., Lusardi, A., & Yoong, J. (2010). Five Steps to Planning Success. Financial Literacy Center, WP Series. September 2010.

Hung, A. A., Parker, A. M., Yong, J. K. (2009). Defining and Measuring Financial Literacy. Working Papers WR-708. RAND corporation.

Kozup, J. & Hogarth, J. (2008), Financial Literacy, Public Policy, and Consumers' Self-Protection—More Questions, Fewer Answers, *Journal of Consumer Affairs*, vol. 42 (summer), pp. 127–136.

Krizek, T., & Hradil, D. (2012). Financial Literacy of University Students: Methodology and Results of an Online Survey. *International Journal of Business and Social Science*, 3(22), 92-102.
Lusardi, A., & Mitchell, O. S. (2011). *Financial Literacy and Planning: Implications for Financial Well-Being.* NBER Working Paper No. 17078. [Online]. Available from: http://www.nber.org/papers/w17078.pdf

Mandell, L. & Klein, L. S. (2009), The Impact of Financial Literacy Education on Subsequent Financial Behavior", *Journal of Financial Counselling and Planning*, vol. 20, no, 1, pp. 15-24.

Ministry of Education and Science (2017), *The Education System in Latvia*. [Online]. Available from: http://www.izm.gov.lv/en/education/education-system-in-latvia

Ministry of Education and Science. (2017), *Education System in Latvia.* [Online]. Available from: http://www.izm.gov.lv/en/education/education-system-in-latvia

OECD (2014), PISA 2012 Results: Students and Money: Financial Literacy Skills for the 21st Century (Volume VI), PISA, OECD Publishing. DOI: http://dx.doi.org/10.1787/9789264208094-en

OECD (2016), OECD/INFE International Survey of Adult Financial Literacy Competencies. [Online]. Available from: http://www.oecd.org/daf/fin/financial-education/OECD-INFE-International-Survey-of-Adult-Financial-Literacy-Competencies.pdf

PISA/OECD. (2012), *Financial Literacy Assessment Framework*. [Online]. Available from: http://www.oecd.org/dataoecd/8/43/46962580.pdf

Remund, D. L. (2010), Financial Literacy Explicated: The Case for a Clearer Definition in an Increasingly Complex Economy, *The Journal of Consumer Affairs*, vol. 44, no. 2, pp. 276-295.

Titko, J., Ciemleja, G., Lace, N. (2015). Financial Literacy of Latvian Citizens: Preliminary Survey Results, In: 20th International Scientific Conference "Economics and Management (ICEM-2015)". Procedia – Social and Behavioral Sciences 213 (2015), pp. 12-17. DOI: 10.1016/j.sbspro.2015.11.396

van Rooij, M., Lusardi, A., & Alessie, R. (2011), 'Financial literacy and retirement planning in the Netherlands'. *Journal of Economic Psychology*, vol. 32, pp. 593–608.

van Rooij, M., Lusardi, A., & Alessie, R. (2012). Financial Literacy, Retirement Planning and Household Wealth. *The Economic Journal*, 122 (May), 449–478.

Widdowson, D. & Kim, H. (2007), Financial Literacy and its Role in Promoting a Sound Financial System, *Reserve Bank of New Zealand Bulletin*, vol. 70, no. 2, pp. 37-47.

Worthington, A. C. (2006). *Predicting financial literacy in Australia.* [Online]. Available from: http://citeseerx.ist.psu.edu/viewdoc/download;jsessionid=7B70625D8EF702A9B92F35C2EF0FBF2C?doi=10.1.1.841.5453&rep=rep1&type=pdf

Corporate Social Responsibility Perceived by Latvian Enterprises

Tatjana Tambovceva, Riga Technical University, Riga, Latvia, tatjana.tambovceva@rtu.lv

Jelena Titko, University of Economics and Culture, Riga, Latvia, jelena.titko@eka.edu.lv

Agnese Alksne, CSR Latvia, Riga, Latvia, agnese@ksalatvija.lv

Abstract

Corporate social responsibility (CSR) issues are still on the agenda due to the growing social needs, emerging issues faced by a global society, as well as under the pressure of local authorities and newly implemented CSR-oriented management practices. The aim of the study was get an insight into and an understanding of CSR and Sustainability, perceived by middle-sized and large Baltic companies. The current paper reflects the results of the survey conducted in 2015, and is limited to only Latvian sample data analysis. Latvian sample consisted of 59 business sector representatives. Latvian business sector representatives see CSR primarily as a corporate image driver. However, they are aware of the CSR role in improving of employee and customer satisfaction. Perceived importance of CSR is predicted to be increased in the future, but the relevant investments will not increase so much.

Keywords: corporate social responsibility, Latvia, large and middle-sized companies.

Introduction

Corporate social responsibility (CSR) and related issues are frequent topic for debates in the academic and business environment. There is an empirical evidence of the academicians' interest to CSR: search for the keywords "corporate social responsibility" in the academic data bases yielded 40185 results in ScienceDirect, 10469 results in Thomson Reuters Web of Science, and 59710 results in Scopus, applying the limitation of 30 years for publishing period, which is 1986-2016 (results of the authors' made analysis).

Modern history of corporate scandals that was started in 2001 with Enron Corporation contributed to the transformation of corporate social responsibility from theoretical concept to practical aspect of any business activities.

Companies operating in the Baltic States, as well as in other countries of the European Union, are "forced" to pay attention to the corporate social responsibility issues under the pressure of the European authorities, which is the implementation of the Directive 2014/95/EU of the European Parliament and of the Council regarding non-financial data reporting by large companies (European Parliament, 2014).

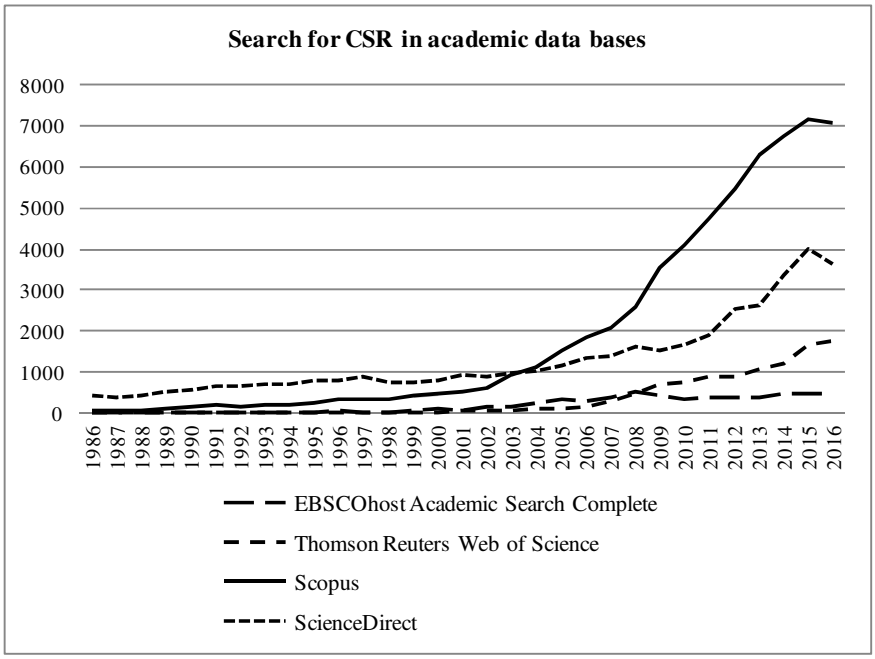
Current paper reflects the results of the large-scale study on corporate social responsibility that was conducted within the framework of the project "Comparing state of CSR in Baltics and Finland". The aim of the research was get an insight into and an understanding of CSR and Sustainability, perceived by middle-sized and large Baltic companies. The representatives of 172 companies were surveyed, using the specially designed questionnaire. Research period covered August-October of 2015. The only Latvian sample results are reflected in the given paper. Latvian sample consisted of 59 business sector representatives.

The authors of the given paper analyzed the respondents' answers on questions grouped into three main categories: (1) awareness of CSR significance, (2) CSR in practice, (3) Issues of CSR implementation and management. The data was processed with the application of descriptive statistics methods.

The results of the survey were promising. Most of respondents recognize the importance of corporate social responsibility and expect an increase of it in their companies in the next 5 years. However, the awareness of the importance of responsible business does not always result in the appropriate investments into CSR-oriented activities.

Theoretical Aspects of Corporate Social Responsibility

The interest of academicians and practitioners to the issues regarding corporate social responsibility has not been decreased over the years, but, conversely, it is still increasing. To illustrate this statement, the authors analyzed the statistics generated by the academic data bases EBSCOhost Academic Search Complete, Thomson Reuters Web of Science, Scopus and ScienceDirect. We looked for the number of published papers in each particular year in the period of 30 years (1986-2016), searching for the key words "corporate social responsibility". The results are reflected in the Figure 1.



Source: Authors' compilation based n data from EBSCOhost, WoS, Scopus, ScienceDirect

Fig. 1: Search for "Corporate Social Responsibility" in Academic Data Base

The breaking point (Figure 1) could be assigned to the Year 2001 (Enron corporate scandal). The graph of the number of the published papers devoted to CSR (at least in Scopus) demonstrates the exponential growth.

The concept emerged in 1950-s; it was introduced by Bowen in 1953. A comprehensive overview of the evolution of CSR definitions has been made by Carroll (1999), Dahlsrud (2008), who performed of a content analysis of previously developed definitions and by Ismail (2009), who focused on analysis of CSR concept through prism of management theories. Several definitions of the concept are summarized in the Table 1.

Table 1: Definitions of Corporate Social Responsibility

Source	CSR definitions
European Commission (2017)	CSR refers to companies taking responsibility for their impact on society
Chin, 2014	CSR is far from a cost, a constraint, or a charitable act, but a source of opportunities, innovation and competitive advantages. Implementations of good social responsibility make the corporation obtain more materials and human resources to gain a favourable social image and realize the corporation's long-term interests.
Crowther & Aras (2008)	[CSR] definition is concerned with the relationship between a corporation and the local society in which it resides or operates.
Ismail, 2009	[CSR] is a concept whereby business organizations consider the interest of society by taking responsibility for the impact of their activities on customers, suppliers, employees, shareholders, communities and other stakeholders as well as their environment.
Frederick et a. 1992	[CSR] a principle stating that Social corporations should be accountable for the Environmental effects of any of their actions on their community and environment
Jones, 1980	[CSR is] the notion that corporations have an obligation to constituent groups in society other than stockholders and beyond that prescribed by law or union contract, indicating that a stake may go beyond mere ownership

Analysing the concept of corporate social responsibility, different scholars and practitioners emphasize the role of various CSR components. For instance, Caramela (2016) named such SCR aspects, as (1) environmental efforts, (2) philanthropy, (3) ethical labour practices, and (4) volunteering. Mandina *et al* (2014) described SCR as (1) philanthropic project, (2) employing locals, (3) investment incentives, (4) Environmental management, and (5) adherence to the legal systems of the country- indigenization act. In turn, The World Business Council for Sustainable Development defines CSR components as "commitments and activities pertaining to:

- corporate governance and ethics;
- health and safety;
- environmental stewardship;
- human rights (including core labour rights);
- sustainable development;
- conditions of work (including safety and health, hours of work, wages);
- industrial relations;
- community involvement, development and investment;
- involvement of and respect for diverse cultures and disadvantaged peoples;
- corporate philanthropy and employee volunteering;
- customer satisfaction and adherence to principles of fair competition;
- anti-bribery and anti-corruption measures;
- accountability, transparency and performance reporting;
- supplier relations, for both domestic and international supply chains." (Hohnen and Potts, 2007)

Many researchers focused their attention on studying the motives for companies to be socially responsible (Campbell, 2007), specifically, on the investigation of the impact of CSR-oriented business activities on company's financial performance. CSR and company's performance has been studied for more than 30 years (McGuire *et al*, 1988; Pava and Krausz, 1996; Van de Velde *et al*, 2005; Nelling and Webb, 2009; Palmer, 2012).

Meta-analysis of 52 studies over 30 years allowed concluding that business social performance is positively correlated with business financial performance (Orlitzky *et al*, 2003). Palmer (2012) analyzed performance of 333 companies included in the S&P 500 in the period of 2001-2005. The conclusion was that CSR performance (expressed by MSCI ESF (Environmental, Social, and Governance) index) leads to increase in a company's gross margin. Zhang and Gu (2012) analyzed the relationship between financial performance expressed by Tobin's Q and seven CSR indices, using the sample of US companies in 2010-2011. The study revealed a positive relationship between CSR on employees and a corporate performance. Rajput *et al* (2012) conducted their analysis in the Indian market: analysis of 500 Indian companies in 2008-2009 and 2009-2010 led to the conclusion that CSR expenditure by the firm results in improved financial performance. Pan *et al* (2014) studied the link between CSR and corporate financial performance in China, using data of 228 listed companies in the period 2010-2013. General findings substantiated the impact of CSR on ROA, ROE, and EPS.

In turn, a range of studies revealed no statistically significant relationship between CSR scores and financial results of companies. Hirigoyen and Poulain-Rehm (2015), studying 329 listed companies in the United States, Europe and the Asia-Pacific region for the years 2009 and 2010, concluded that overall social responsibility score had no statistically significant impact on accounting measures of financial performance. Johansson *et al* (2015) examined 311 Swedish companies in the period 2006-2009, and found no statistically significant relationship between CSR and financial performance.

Different results are explained by the specifics of analyzed companies, diversity of the regions, and the difference of measures used as CSR proxies. Issues of measuring corporate social responsibility are studied as a separate research topic (Saveanu *et al*, 2014; Wood, 2010).

The given paper focused not on measuring corporate social responsibility in Latvian companies, but on investigation of the overall attitude to CSR demonstrated by business sector representatives. Despite the huge amount of studies on assessment of organizational attitudes towards CSR (Dzansi and Okyere, 2015; Bluhm and Trappmann, 2015; Echevarria-Cruz *et al*, 2015; Brown, 2001; Abdul and Ibrahim, 2002; Mazurkiewicz *et al*, 2006), there is a limited number of researches based on Baltic sample data.

Methodology

For large-scale survey companies were selected mainly, based on the criteria described in the Directive 2014/95/EU. Non-financial information should be disclosed by the "large public-interest entities (listed companies, banks, insurance undertakings and other companies that are so designated by Member States) with more than 500 employees" (European Commission, 2016). One thousand companies were selected in each country. Latvian sample involved also 250 largest companies in terms of turnover and number of employees. Small companies also participated in the survey. However, the response rate was rather low – only 59 companies provided full and qualitative responses.

As for companies' size, which representatives participated in the survey, the distribution in terms of the number of employees and turnover is reflected in the Table 2. National companies were represented by 45% of respondents, but Baltic and international companies – by 13% and 33%, respectively. Representatives of the companies were owners (5%) and board members (18%), as well as held the position of a middle-level manager (49%) and others (27%).

Table 2: Research sample distribution

Number of employees	Respondents	Turnover	Respondents
1	4%	0 – 0,99 mln EUR	18%
2 – 49	29%	1 – 9,99 mln EUR	20%
50 – 249	18%	10 – 49,99 mln EUR	24%
250 – 999	22%	50 – 99,99 mln EUR	13%
Over 1000	27%	Over 100 mln EUR	25%

Source: Authors' compilation of the survey results

Respondents were offered to answer 16 multiple-choice questions (Table 3) from the large-scale project „Comparing state of CSR in Baltics and Finland" questionnaire, developed by the project participants. The questions were designed, based on ISO 26000 framework, as well as on experience of the participants representing Latvian Corporate Social Responsibility Platform – CSR Latvia, Responsible Business Association of Lithuania – LAVA, Responsible Business Forum Estonia – RBF Estonia and Finland Corporate Responsibility network - FIBS. Data was collected electronically through TNS-Gallup platform.

Table 3: Survey questions

Questions	Content
Q1	How relevant is the corporate responsibility theme in your company at present?
Q2	Why is your company investing in responsibility?
Q3 Q4	Who are the driving forces behind your business, and influence most in how committed your company is in responsibility? Has your company deployed the following responsibility management practices?
Q5	Which corporate responsibility issues do you consider relevant in your company?
Q6	What measures have you taken to enhance the relevant corporate responsibility themes?
Q7	What kind of cooperation does your company practice with non-profit organisations at present?
Q8	Does your company comply with some of the following international guidelines or operational principles?
Q9	How does your company benefit from corporate responsibility?
Q10	Through which features do you follow the fulfilling of your corporate responsibility objectives?
Q11	What are the challenges to your management of corporate responsibility at present?
Q12	What do you see as the most challenging corporate responsibility theme at present?
Q13	With which stakeholder group are you having the biggest challenges in communicating/sharing your CSR values?
Q14	How would you see the significance of corporate responsibility changing in your company within the next 5 years?
Q15	How would you see the amount of your company's corporate responsibility resources to develop within the next 5 years?
Q16	Do you plan to report about CSR under EU non-financial information disclosure directive?

Source: Authors' compilation of the survey results

The authors of the given paper focused their attention on respondents' viewpoint about CSR significance, CSR-related practices in respondents' represented companies, as well as on respondent's evaluation of the issues in the process of CSR implementation and management.

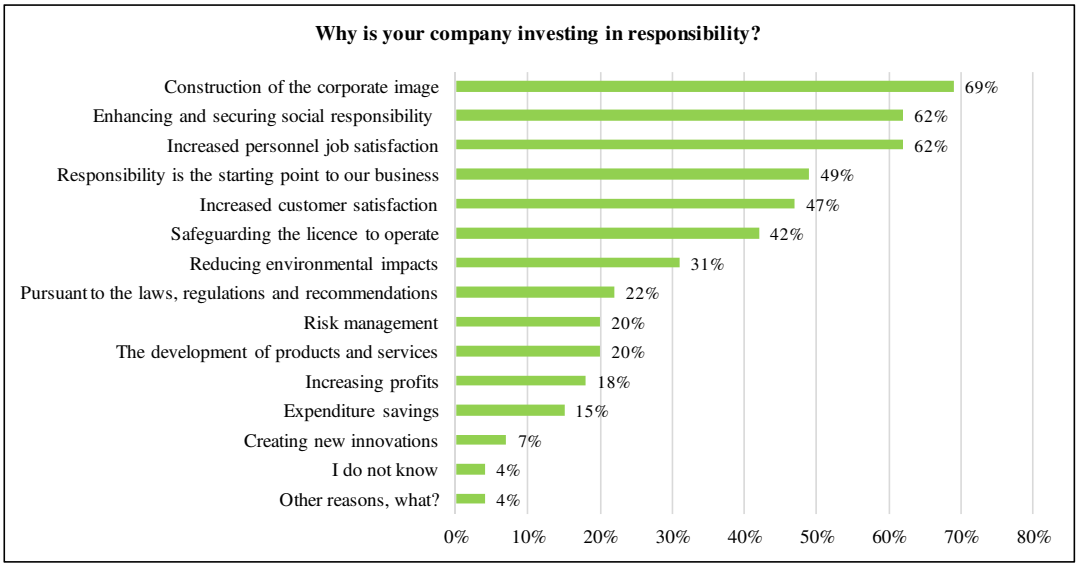
Results

Respondents were asked about the relevance of CSR activities in their companies at the current moment, as well as their vision of the CSR future importance in 5 years. 51% of companies consider CSR to be very important topic for their company at the moment. Only 11% of the respondents selected the answer "not relevant". The only 5% of the respondents assumed that CSR significance will decrease in the future. 38% of the respondents selected the answer "the significance will remain stable", whereas 55% are waiting for increasing importance of CSR in their companies.

And, accordingly, there should be a link between the change of SCR significance and amount of CSR-related investments. However, the number of respondents considering that the importance of CSR will increase in 5 next years is larger than the number of respondents predicting increase in investments (35%). 44% of the respondents stetd that "investments will remain stable", and only 7% predicted decrease in this type of investments.

As for perceived benefits from CSR-oriented business practices, most of the respondents (76%) stated that CSR "facilitates the development of sustainable corporate image". Other frequently selected statements about benefits from CSR were "aids in streamlining operations" (25%), "accommodates innovation of new products and/or services" (20%) and "aids in saving expenses" (20%).

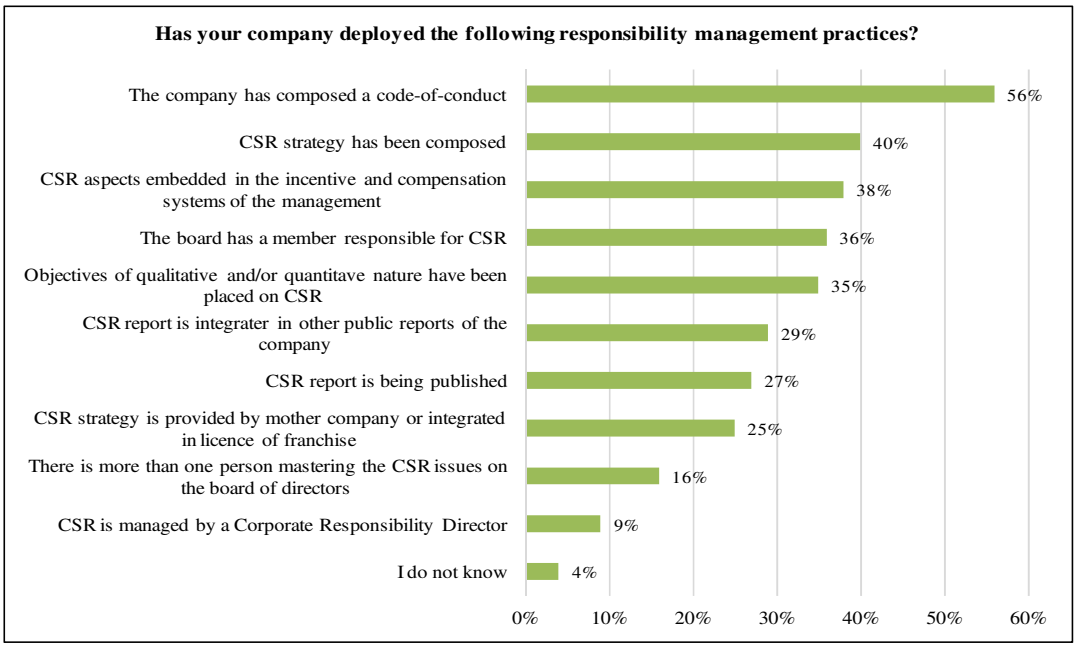
Respondents were offered to mark the reasons for investment into responsibility in their companies. Several options were possible to select. The results are reflected in Figure 2.



Source: authors' compilation of survey results

Fig. 2: Reasons for CSR investments

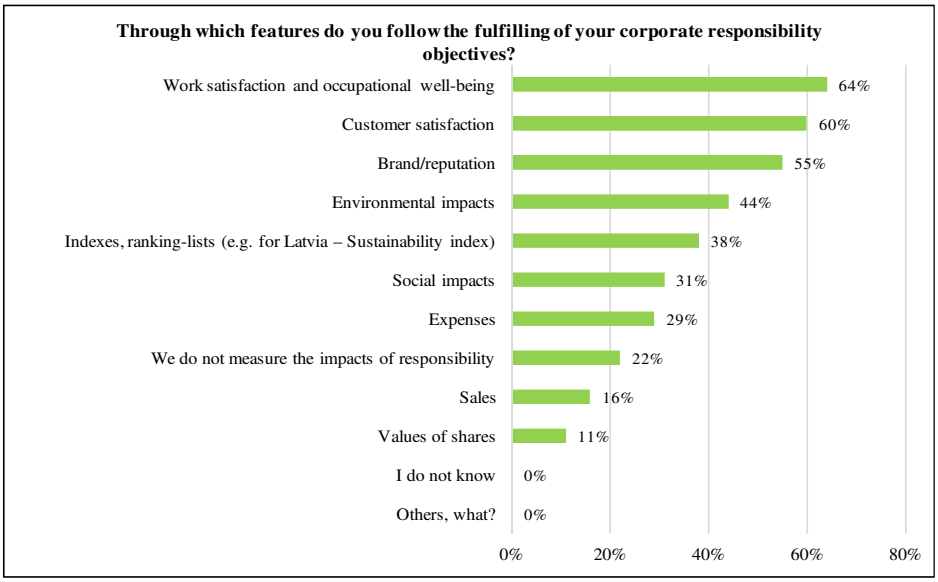
Respondents were also asked about responsible management practices in their companies. The most popular answer was "a company has composed a code of conduct" (56%). The results are summarized in the Figure 3.



Source: authors' compilation of survey results

Fig.3: CSR management practices

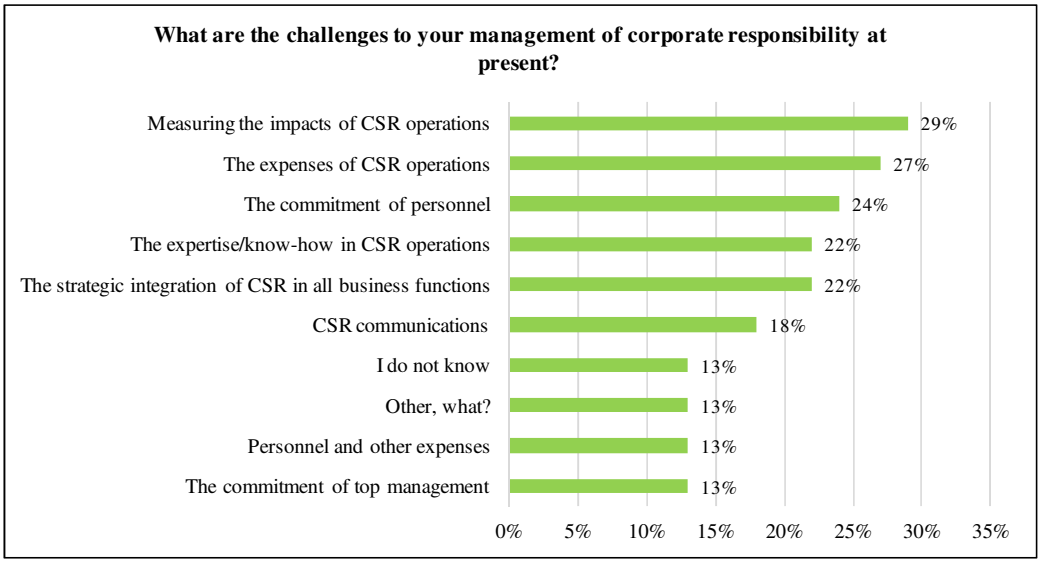
Evaluation of the process of achievement CSR objectives in the respondents' represented companies is made mostly through evaluation of "work satisfaction and occupational well-being" (64%) and "customer satisfaction" (60%). The full list of responses is provided in the Figure 4.



Source: authors' compilation of survey results

Fig. 4: Evaluation of the fulfilling SCR objectives

Most of the respondents treat measuring of the impact of CSR activities as the most challenging process on the way towards responsible business. The second place takes financial issue – "the expenses of CSR operations". Respondents' answers are summarized in the Figure 5.



Source: authors' compilation of survey results

Fig. 5: CSR management issues

Evaluating most challenging CSR-related issues for the companies at present, the respondents prioritised "fair competition and compliance to the law" (31%), as well as "managing supply chains" (29%) and "operations against corruption and bribery" (22%).

The results of the given study provide an insight into CSR perceptions in Latvian business environment, that, in turn, allow founding a basis for the following investigation of CSR practices in Latvian and Baltic companies. The survey should be iterated in the nearest future with a larger number of participants. Probably, the interest to CSR will increase with the necessity to disclose non-financial information in accordance to the Directive 2014/95/EU. At the moment, 44% of the respondents still "have no information about the directive requirements".

Discussion and conclusions

The current paper reflected the results of the survey that was conducted within the framework of the project "Comparing state of CSR in Baltics and Finland". Representatives of the business sectors of Baltic countries participated in the survey; the given paper reflects the results received within the Latvian sample.

Respondents demonstrated the awareness of CSR significance; however, they link it mostly with the construction of the corporate image. On the other hand, companies are enhancing and securing their responsibility in society, as well working to increase their reputation as good employer by increasing employees' satisfaction (62%). The tendency is promising - 49% of respondents see CSR as starting point or core for their business.

It is obvious that conclusions about companies' re-orientation towards corporate responsibility should be made not only based on declarations, but on the real situation.

The most popular responsible management practice used by the companies is the code of conduct (56% of respondents). There is an evidence that almost half (40%) of companies has at least some kind of strategy on CSR. Only one third (38%) says that the responsibility aspects are embedded in the incentive and compensation systems of the management. Only 35% of the respondents measure the CSR objectives and results, and only 27% report on results publicly. Good indicator of management involvement in strategic approach on CSR is fact that about one third of the respondents have someone responsible for CSR issues on companies' board level.

Regarding the issues in the field of corporate responsibility, management is concerned about methods to measure CSR feedback and return on investment, and how to manage the expenses on CSR operations and raise the commitment of personnel. Companies are struggling with CSR issues – such as raising the part of fair competition in industry, mapping supply chain and sharing company's values to mitigate the risks of company's corporate interests, as well as introducing the corruption and anti-bribery programs in company's operations. The biggest challenge for stakeholders is to create a common understanding and cooperation related to CSR issues with supply chain partners, shareholders and customers.

Based on the respondents' viewpoint, the importance of CSR will increase in the following 5 years; investment on the other hand – not that much.

Reliability of the research results was limited by the relatively low sample. It was assumed to be 1000 companies, including 250 large companies. However, the response rate was unexpectedly low – only 59 respondents provided full and qualitative responses. This,, in turn, predetermined the way of data processing. For example, the idea to make a correlation analysis to see any relationships between the answers and respondents' profile data was rejected, because of limited amount of data.

It is assumed by the authors that corporate responsibility topics will increase their relevance in Europe in the nearest future in any case, since the Directive of the European Parliament on non-financial information disclosure entered into force on January 1, 2017. Thus, the first reports should be prepared by large companies in 2018. It means that the survey should be repeated in 2018-2019 to see the progress and to evaluate the change in the attitude to CSR activities among business sector representatives.

The prospective further research areas could be referred to certain aspects of corporate social responsibility. For instance, tax governance as a part of CSR or CSR investments.

Acknowledgment

The paper reflects the survey results conducted within the framework of the project "Comparing state of CSR in Baltics and Finland". Nordic Council of Ministers' Grant Programme for NordicBaltic Non-Governmental Organisations' (NGO) Cooperation 2014. NGSET-239.

References

Abdul, Z., & Ibrahim, S. (2002), 'Executive and management attitudes towards corporate social responsibility in Malaysia', *Corporate Governance: The international journal of business in society*, vol. 2, no. 4, pp. 10-16.

Bluhm, K., & Trappmann, V. (2015, September), 'Corporate Social Responsibility and Executives' Attitudes in Germany, Poland and Hungary', In *Warsaw Forum of Economic Sociology*, vol. 6, no. 2, pp. 7-36. Warsaw School of Economics.

Bowen, H. R. (1953), *Social Responsibilities of the Businessman*. New York: Harper and Row.

Brown, K. (2001), Corporate social responsibility: Perceptions of Indian business, *Maratha Mandir's Babasaheb Gawde Institute of Management Studies.* [Online]. Available from: http://csmworld.org/wp-content/uploads/2009/03/social_respons.pdf

Campbell, J. L. (2007), 'Why would corporations behave in socially responsible ways? An institutional theory of corporate social responsibility'. *Academy of management Review*, vol. 32, no. 3, pp. 946-967.

Caramela, S. (2016), What is Corporate Social Responsibility? [Online]. Available from: http://www.businessnewsdaily.com/4679-corporate-social-responsibility.html#sthash.xAcOW9m4.dpuf

Carroll, A. B. (1999), 'Corporate social responsibility: Evolution of a definitional construct'. *Business & society*, vol. 38, no. 3, pp. 268-295.

Crowther, D., & Aras, G. (2008), *Corporate social responsibility*. Bookboon.

Dahlsrud, A. (2008), 'How corporate social responsibility is defined: an analysis of 37 definitions'. *Corporate social responsibility and environmental management*, vol. 15, no. 1, pp. 1-13.

Dzansi, D. Y., & Okyere, F. (2015), 'Attitude of South African small businesses towards business social responsibility (BSR): an exploratory study', *Journal of Problems and Perspectives in Management*, vol. 13, no. 2, pp. 470-481.

Echevarria-Cruz, S., Vaduva, S., Fotea, I., & Neagoie, D. (2015), 'Business Ethics And Corporate Social Responsibility Attitudes Among Sme Leaders In Romania', In *Proceedings of the International Management Conference, v*ol. 9, no. 1, pp. 830-839. Faculty of Management, Academy of Economic Studies, Bucharest, Romania.

European Commission. (2016), Non-Financial Reporting. [Online]. Available from: http://ec.europa.eu/finance/company-reporting/non-financial_reporting/index_en.htm

European Commission. (2017), Corporate Social Responsibility. [Online]. Available from: http://ec.europa.eu/growth/industry/corporate-social-responsibility/

European Parliament (2014), Directive 2014/95/EU of the European Parliament and of the Council (22.10.2014). *Official Journal of the European Union*, L330/1, 15.11.2014.

Frederick, W., Post, J., & Davis, K. E. (1992), *Business and Society. Corporate Strategy, Public Policy, Ethics* (7th ed.). London: McGraw-Hill.

Hirigoyen, G., & Poulain-Rehm, T. (2015), 'Relationships between Corporate Social Responsibility and financial performance: What is the Causality?' *Journal of Business & Management,* vol. 4, no. 1, pp. 18-43.

Hohnen, P., & Potts, J. (2007), *Corporate Social Responsibility. An implementation guide for business.Manitoba:* International Institute for Sustainable Development

Ismail, M. (2009), 'Corporate social responsibility and its role in community development: An international perspective'. *The Journal of International Social Research*, vol. 2, no. 9, pp. 199-209.

Johansson, S., Karlsson, A., & Hagberg, C. (2015), The relationship between CSR and financial performance: A quantitative study examining Swedish publicly traded companies. [Online]. Available from: http://www.diva-portal.org/smash/get/diva2:839031/FULLTEXT01.pdf

Jones, T. M. (1980), 'Corporate social responsibility revisited, redefined'. *California Management Review*, vol. 22, no. 2, pp. 59–67.

Mandina, S. P., Maravire, C. V., & Masere, V. S. (2014), 'Effectiveness of Corporate Social Responsibility in Enhancing Company Image'. *European journal of Business and Management,* vol. 6, no. 5, pp. 46-61.

Mazurkiewicz, P., Elms, H., & Marinovic, N. (2006), 'Business Perspectives about Corporate Social Responsibility, Attitudes and Practice in Serbia and Montenegro', *World Bank, Development Communication Division*. [Online]. Available from: http://siteresources.worldbank.org/EXTDEVCOMMENG/Resources/CSRinSerbiaandMontenegro.pdf

McGuire, J. B., Sundgren, A., & Schneeweis, T. (1988), 'Corporate social responsibility and firm financial performance'. *Academy of management Journal*, vol. 31, no. 4, pp. 854-872.

Nelling, E., & Webb, E. (2009), 'Corporate social responsibility and financial performance: the "virtuous circle" revisited'. *Review of Quantitative Finance and Accounting*, vol. 32, no. 2, pp. 197-209.

Orlitzky, M. (2005), 'Social responsibility and financial performance: Trade-off or virtuous circle'. *University of Auckland Business Review*, vol. 7, no. 1, pp. 37-43.

Orlitzky, M., Schmidt, F. L., & Rynes, S. L. (2003), 'Corporate social and financial performance: A meta-analysis'. *Organization studies*, vol. 24, no. 3, pp. 403-441.

Palmer, H. J. (2012), Corporate Social Responsibility and Financial Performance: Does it Pay to Be Good? CMC Senior Theses. Paper 529. [Online]. Available from: http://scholarship.claremont.edu/cgi/viewcontent.cgi?article=1502&context=cmc_theses

Pan, X., Sha, J., Zhang, H., & Ke, W. (2014), 'Relationship between corporate social responsibility and financial performance in the mineral Industry: Evidence from Chinese mineral firms'. *Sustainability*, vol. 6, no. 7, pp. 4077-4101.

Pava, M. L., & Krausz, J. (1996), 'The association between corporate social-responsibility and financial performance: The paradox of social cost'. *Journal of business Ethics*, vol. 15, no. 3, pp. 321-357.

Rajput, N., Batra, G., & Pathak, R. (2012), 'Linking CSR and financial performance: an empirical validation'. *Problems and Perspectives in Management*, vol. 10, no. 2, pp. 42-49.

Saveanu, T., Abrudan, M. M., Giurgiu, A., Mester, L., & Bugnar, N. (2014), 'Measuring Corporate Social Responsibility Practices of Micro And Small Enterprises–Pilot Study'. In *Proceedings of The 8th International Management Conference "Management Challenges For Sustainable Development* (pp. 826-837).

Shin, K. Y. (2014), *Corporate social responsibility reporting in China.* Springer.

Van de Velde, E., Vermeir, W., & Corten, F. (2005), 'Corporate social responsibility and financial performance'. *Corporate Governance: The international journal of business in society*, vol. 5, no. 3, pp. 129-138.

Wood, D. J. (2010), 'Measuring corporate social performance: A review', *International Journal of Management Reviews*, vol. 12, no. 1, pp. 50-84.

Zhang, X., & Gu, P. (2012), On the Relationship between CSR and Financial Performance: An empirical study of US firms. [Online]. Available from: http://www.diva-portal.org/smash/get/diva2:530678/fulltext01.pdf

Hysteresis of Gender Inequality in the Duration of Unemployment: Evidence from the European Union, Spain and Switzerland

Marina Faďoš, Comenius University in Bratislava, Faculty of Management, Bratislava, Slovakia, marina.fados@fm.uniba.sk
Mária Bohdalová, Comenius University in Bratislava, Faculty of Management, Bratislava, Slovakia, maria.bohdalova@fm.uniba.sk

Abstract

The paper examines hysteresis of gender inequality in durations of unemployment. Spain, Switzerland and the European Union were compared and we found out that women tend to stay longer in unemployment than men, which causes higher inequality with rising durations of unemployment in Spain and the European Union, while in Switzerland gender inequality didn't exist. Analysed series were computed with our new method of gender inequality calculation and were tested for hysteresis with linear univariate unit root tests, both without structural break and with structural break. Cross dependence was tested with Pesaran CD test and hysteresis in full panel was tested with IPS, LLC and Moon Perron test. Stationarity was proven in all series of Switzerland, while some series of Spain and the European Union were non-stationary, meaning that gender inequality there depended on time.

Keywords: duration of unemployment, gender, inequality, unemployment

Introduction

Gender inequality on the labour market has been a major concern of policy makers during the last decades. Women are still unemployed more than men. Women also tend to be unemployed longer than men, while we have almost equality among those who are unemployed for less than three months, with increasing of time inequality is occurring in disadvantage of women (Eurostat, 2017). In this paper, we introduce new method of gender inequality in unemployment calculation and check for hysteresis in gender inequality in durations of unemployment. Paper is valuable because compares gender inequality in durations of unemployment in Spain, Switzerland and the European Union and explains differences between them. Spain is country with turbulent unemployment rates, who were both very high and low in various times, while Switzerland is a country with very low unemployment rates. Our motivation is to discover how time influences changes of gender inequality in unemployment.

Paper is structured as follows. First, we introduce a literature review of gender inequality research during the last years. Afterwards, new method of gender inequality in unemployment calculation was described and methods of unit root testing were listed. In section Results, gender inequality in unemployment series of Spain, Switzerland and the European Union were presented. Results from linearity test and univariate tests of the series were presented next. Afterwards, the results of cross dependence and unit root tests in territories panel were presented. Finally, we give our conclusions.

Literature Review

Gender inequality was researched since recently, after 2000. Azmat, Gűell and Manning (2004) and Queneau and Sen (2007) were the first one who were devoted to gender inequality investigation. They

calculated gender gap as the difference between the unemployment rate of females and males and as a ratio of unemployment rates of women to men. Koutentakis (2015) analysed gender inequality by constructing a steady state of the gender gap from job finding rates and job separating rates. Others, such as Ollikainen (2006), Theodossiou and Zangelidis (2009), Gokulsing and Tandrayen-Ragoobur (2014) and Baussola, Mussida, Jenkins and Penfold (2015), implemented probability analysis to outflows and inflows to unemployment, in order to discover how unemployment by genders behaves.

Stationarity of unemployment rates was analysed by many authors, among them are Ayala, Cunado and Gil-Alana (2012), Camarero, Carrion-i-Silvestre and Tamarit (2008), Garcia-Cintado, Romero-Avila and Usabiaga (2015), Fallahi and Rodriguez (2015) and Marques, Lima and Troster (2017). While there is still a lack of stationarity analysis of gender inequality in unemployment. Queneau and Sen analysed gender inequality in unemployment using augmented Dickey Fuller (ADF) test (2007) and using Phillips Perron test (2009), which lead them to conclude that gender inequality is disappearing with time but is still persistent. Bakas and Papapetrou (2014) confirmed that gender gaps are persistent using the ILT unit root test. Sahin, Song and Hobijn (2010), Peiro, Belaire-Franch and Gonzalo (2012) and De la Rica and Rebollo-Sanz (2017) discovered that in times of crisis, unemployment rate of men is increasing faster than the unemployment rate of women, which decreases gender inequality, but this is only a temporary effect which disappeared quickly after the crisis.

Women are usually longer in unemployment than men, according to Pašic, Kavkler and Boršič (2011). Economic crisis prolongs duration of unemployment, according to Bachmann and Sinning (2016). Flek, Hála and Mysíková (2015) discovered that the duration of unemployment is higher among youth. They also discovered that the probability of finding a job is decreasing for the people unemployed for more than one year. Böheim, Horvath and Winter-Ebmer (2011) discovered that people who are long term unemployed have a misleading perception of wages on labour market, which leads them to expect higher wages and reject wage which don't meet their expectations, which prolongs their duration in unemployment. Duration of unemployment can be decreased through training programmes which are designed to help unemployed to find jobs faster, it was also discovered that women who finish this training find jobs faster than men (Arellano, 2010).

We contribute to literature of gender inequality researching, by proposing a new method of gender inequality calculation from quantitative data of the duration in unemployment. Gender inequality series were then tested for stationarity, cross dependence and stationarity in full panel.

Data and Methodology

We have used annual data about the duration of unemployment (thousands) from the Eurostat database (2017), of Spain, Switzerland and the European Union for the sample period 1996-2016. These time series were then modified as follows.

Let $P_m^* = (d^*/D^T) \times 100$ resp. $P_f^* = (d^*/D^T) \times 100$, where P_m^*, P_f^* is proportion of men resp. women unemployed in each duration category (d^*) from the total unemployed people (D^T). Then we multiply P_m^*, resp. P_f^* by unemployment rate of men (u_m) resp. women (u_f) to obtain weighted proportions p_m^* resp. p_f^*. Weighted unemployment gender inequality rate (u_t^{wi}) was subsequently calculated as

$$u_t^{wi} = u_t^i \times \frac{u_t}{100}, \tag{1}$$

where u_t is the average unemployment rate and u_t^{wi} was calculated as

$$p_m^* = p_f^* \Longrightarrow u_t^i = 0, \tag{2}$$

$$p_m^* > 0 \ \wedge \ p_f^* = 0 \Longrightarrow \ u_t^i = -1, \tag{3}$$

$$p_f^* > 0 \ \wedge \ p_m^* = 0 \Longrightarrow \ u_t^i = 1, \tag{4}$$

$$p_f^* < p_m^* \Longrightarrow \ u_t^i = \left(\left(p_f^*/p_m^*\right) - 1\right) \times (-1), \tag{5}$$

$$p_m^* < p_f^* \Longrightarrow \ u_t^i = \left(p_m^*/p_f^*\right) - 1. \tag{6}$$

Finally, series of gender inequality rate u_t^{inq}, denoted as

$$u_t^{inq} = u_t^{wi} \times 100, \tag{7}$$

were computed and analyzed in this paper.

To prove, that gender inequality doesn't depend on time and don't follow the random walk we need to prove that the computed series are stationary, resp. that series' characteristics such as mean, variance, auto-correlations doesn't change over time, that is, they are constant (Lyócsa, et al., 2011). In this paper, we employ both individual and full panel–linear univariate unit root and stationarity tests. We test stationarity of each series using individual unit root test for each country.

We decide to analyze the stationarity of our series using Philips-Perron Unit Root test (PP), Augmented Dickey Fuller test (ADF) and Kwiatkowski Phillips Schmidt Shin test (KPSS). We also employ Phillips-Perron Unit Root test with the presence of one structural break to obtain better results.

Note, that the series may appear as non-stationary in the PP test if the structural break is present in the series (Queneau & Sen, 2007).

Stationarity was tested on Dickey Fuller type regressions (Dickey & Fuller, 1979):

With trend and intercept: $$\Delta y_t = \hat{\alpha} y_{t-1} + \hat{\beta} t + \hat{\mu} + \sum_{j=1}^{k^*} \hat{c}_j \Delta y_{t-j} + \hat{e}_t \tag{8}$$

With intercept: $$\Delta y_t = \hat{\alpha} y_{t-1} + \hat{\mu} + \sum_{j=1}^{k^*} \hat{c}_j \Delta y_{t-j} + \hat{e}_t, \tag{9}$$

where Δy_t stands for the first difference of y_t denoted as $\Delta y_t = y_t - y_{t-1}$. $\sum_{j=1}^{k^*} \hat{c}_j \Delta y_{t-j}$ stands for an additional correlation in the time series, $\hat{e}_t$ stands for estimated error of regression. Number of lags *k* was determined by Newey-West method.

The stationarity was tested by:

1) Perron's modified *t-statistic* (Phillips & Perron, 1988):

$$Z_t = \left(\frac{\hat{\sigma}^2}{\hat{\lambda}^2}\right)^{1/2} \cdot t_{\alpha=0} - \frac{1}{2}\left(\frac{\hat{\lambda}^2 - \hat{\sigma}^2}{\hat{\lambda}^2}\right) \cdot \left(\frac{T \cdot SE(\hat{\alpha})}{\hat{\sigma}^2}\right). \tag{10}$$

2) Augmented Dickey-Fuller *t-statistic* (Dickey & Fuller, 1979):

$$t_\alpha = \frac{\hat{\alpha}}{SE(\hat{\alpha})}. \tag{11}$$

3) Kwiatkowski Phillips Schmidt Shin *LM-statistic* (Kwiatkowski, et al., 1992):

$$LM = \sum_t S_t^2 / \hat{\sigma}_\varepsilon^2 \tag{12}$$

In stationarity, statistics $\hat{\sigma}^2$ and $\hat{\lambda}^2$ are consistent estimates of the variance parameters $\sigma^2 = \lim_{T\to\infty} T^{-1} \sum_{t=1}^{T} E[u_t^2]$ and $\lambda^2 = \lim_{T\to\infty} \sum_{t=1}^{T} E[T^{-1} S_T^2]$ where $S_T = \sum_{t-1}^{T} u_t$ and $u_t = y_t - y_{t-1}$, $SE(\hat{\alpha})$ is a coefficient standard error, t_α is *t*-ratio of α.

To test stationarity of the computed series when structural break is included, we employ Phillips-Perron unit root test (Perron, 1997) with break-point for the regression:

$$\Delta y_t = \hat{\mu} + \hat{\theta} DU(T_b)_t + \hat{\beta} t + \hat{\gamma} DT(T_b)_t + \hat{\delta} D(T_b)_t + \hat{\alpha} y_{t-1} + \sum_{i=1}^{k^*} \hat{c}_i \Delta y_{t-1} + \hat{e}_t, \tag{13}$$

where DU_t stands for intercept-break dummy, and it is equal to one if $t > T_b$, zero otherwise. DT_t stands for slope-break dummy and equals to one if $t = T_b$ and $t - T_b + 1$ if $t > T_b$, zero otherwise. D_t stands for dummy variable which equals to one for $t = T_b$ and zero otherwise. T_b $(1 < T_b < t)$ stands for break-date. Only one break-date is allowed in this test. k regressors in $\{\Delta y_{t-j}\}_{j=1}^{k^*}$ stand for additional correlation in the time series according to Queneau and Sen (2009). Break date T_b has been chosen as the date that minimizes Dickey-Fuller *t-statistic*.

Cross-dependence, for the null hypothesis that series are independent, was tested using Pesaran CD test (Bakas & Papapetrou, 2014)

$$CD = \sqrt{\frac{2T}{N(N-1)} \left(\sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{\rho}_{ij} \right)}, \tag{14}$$

where $\hat{\rho}_{ij}$ is the average of the pairwise correlation coefficients from the ADF regressions residuals.

Stationarity of highly dependent panel data was tested using Moon Perron test (Moon & Perron, 2004) for the AR(1) model

$$y_{i,t} = (1 - \lambda_i)\mu_i + \lambda_i y_{i,t-1} + u_{i,t} \tag{15}$$

$$u_{i,t} = \delta_i' F_t + e_{i,t}, \tag{16}$$

where δ_i' is a vector of coefficients corresponding to the common factors F_t $(k \times 1)$, $e_{i,t}$ is cross-sectional uncorrelated idiosyncratic error term.

Two statistics t_a^* and t_b^* were considered as

$$t_a^* = \frac{\sqrt{N}T(\hat{\lambda}^* - 1)}{\sqrt{\frac{2\hat{\varphi}_e^4}{\hat{\omega}_e^4}}} \xrightarrow[T,N\to\infty]{} N(0,1) \tag{17}$$

and

$$t_b^* = \sqrt{N}T\left(\hat{\lambda}^* - 1\right) \sqrt{\frac{1}{NT^2} tr(Y_{t-1} Q_{\hat{\Delta}} Y_{t-1}')} \left(\frac{\hat{\omega}_e}{\hat{\varphi}_e^2}\right) \xrightarrow[T,N\to\infty]{} N(0,1) \tag{18}$$

where $\hat{\lambda}^*$ is pooled least squares estimate of λ, $\lambda = 1$ for the null unit root hypothesis, $\hat{\varphi}_e^4$ is a cross-sectional average of $\hat{\omega}_e^4$, $\hat{\omega}_e^4 = \hat{\varphi}_e^4$, $\hat{\omega}_e^4$ is the long run variance of e_{it} (Khraief, et al., 2015).

Stationarity of independent panel data was tested using:

1) Levin, Lin and Chu (LLC) test, where the null hypothesis is that panels contain unit roots ($\rho = 0$) against the alternative hypothesis that all panels are stationary. Following *t* statistic was used

$$t_\rho^* = \frac{t_\rho}{\sigma_T^*} - NT\hat{S}_N \left(\frac{\hat{\sigma}_{\hat{\rho}}}{\hat{\sigma}_{\hat{\varepsilon}}^2}\right)\left(\frac{\mu_T^*}{\sigma_T^*}\right), \tag{19}$$

where $\hat{S}_N$ is average of long-run toward short-run variances individual ratio, $\hat{\sigma}_{\hat{\rho}}$ is the standard deviation of slope coefficient, $\hat{\sigma}_{\hat{\varepsilon}}^2$ is the standard deviation of the error term, μ_T^* and σ_T^* are tabulated values of the test for time *T* (Khraief, et al., 2015).

2) Im, Pesaran and Shin (IPS) test, which presume that all panels contain unit roots (null hypothesis) against the alternative hypothesis that some panels are stationary.

$$Z_{t\ bar}(p;\beta) = \frac{\sqrt{N}[t\_bar_{NT} - E(t_{iT})]}{\sqrt{V(t_{iT})}}, \tag{20}$$

where t_bar_{NT} is the standardized statistic of individual ADF statistic limiting distribution (Khraief, et al., 2015).

Results

In Spain and the European Union, gender inequality was decreasing in all series. While in Switzerland, women and men were equally represented in the unemployment duration categories, or inequality was low. Highest inequality was among those who were unemployed for more than 18 months, in disadvantage of women. While the lowest inequality was among those who were unemployed for less than three months. From this we can conclude, that women tend to be unemployed longer than men. If women don't find job within 6 months, it is very probable that they would stay unemployed longer than men. Crisis in 2008 caused an increase of the number of men in long-term unemployment, both in Spain and the European Union. Which resulted in shifting all series towards equality, and suddenly men were unemployed longer than women in the European Union and Spain (Figure 1).

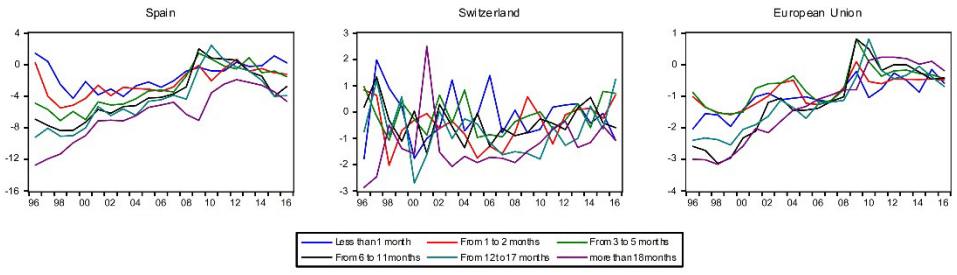


Fig 1: Inequality among genders in selected unemployment durations during period 1996-2016

Source: Own calculations

Before we checked if gender inequality depends on time, or there are other factors who influence it, we check for linearity of data. According to results from linearity test, we found all series being linear (Table 1).

Table 1: Linearity test results

Duration of unemployment	*W-stat*	*p-value*	Result
Spain			
Less than 1 month	0.0588	0.8085	Linear
From 1 to 2 months	0.5471	0.4595	Linear
From 3 to 5 months	0.1087	0.7416	Linear
From 6 to 11 months	0.0241	0.8766	Linear
From 12 to 17 months	0.2363	0.6269	Linear
More than 18 months	0.8394	0.3596	Linear
Switzerland			
Less than 1 month	1.2177	0.2698	Linear
From 1 to 2 months	1.0201	0.3125	Linear
From 3 to 5 months	0.0572	0.8110	Linear
From 6 to 11 months	0.0242	0.8763	Linear
From 12 to 17 months	0.7102	0.3994	Linear
More than 18 months	0.3712	0.5424	Linear
European Union			
Less than 1 month	0.6771	0.4106	Linear
From 1 to 2 months	0.8700	0.3509	Linear
From 3 to 5 months	0.7392	0.3899	Linear
From 6 to 11 months	0.0929	0.7606	Linear
From 12 to 17 months	0.0149	0.9029	Linear
More than 18 months	0.0051	0.9428	Linear

Source: Own calculations

We used stationarity tests (10), (11) and (12) for linear data. All series of Switzerland were stationary, while only gender inequality among those unemployed for less than 3 months in Spain and less than one month in the European Union, were stationary (Table 2). Non-stationarity in Spain and the European Union could be caused by neglecting the influence of structural breaks. The series could be stationary, but because structural breaks were not included, false non-stationarity was concluded.

Table 2: Stationarity test results

Type of test	*With trend and intercept*			*With intercept*		
Spain						
Test	**ADF**	**PP**	**KPSS**	**ADF**	**PP**	**KPSS**
Less than 1 month	-3.627*	-5.360****	0.137*	-2.050	-2.378	0.268
From 1 to 2 months	-5.675****	-6.387****	0.116	-2.179	-2.609	0.386*
From 3 to 5 months	-2.143	-2.482	0.099	-1.089	-1.105	0.445*
From 6 to 11 months	-1.354	-1.738	0.107	-1.213	-1.304	0.412*
From 12 to 17 months	-1.126	-1.377	0.110	-1.563	-1.654	0.422*
More than 18 months	-1.226	-0.941	0.142*	-2.191	-2.530	0.499**
Switzerland						
Less than 1 month	-5.025****	-5.669****	0.111	-5.031****	-5.571****	0.129

From 1 to 2 months	-3.401*	-3.699**	0.153**	-3.293**	-3.446**	0.176
From 3 to 5 months	-4.898***	-5.423***	0.149**	-4.924***	-5.239***	0.158
From 6 to 11 months	-4.351**	-4.744***	0.147**	-4.477***	-4.756***	0.159
From 12 to 17 months	-3.575*	-3.921**	0.141*	-3.756**	-3.999***	0.141
More than 18 months	-4.127**	-4.540***	0.081	-4.265***	-4.586***	0.129
European Union						
Less than 1 month	-4.455**	-5.185***	0.119	-2.493	-2.599	0.516**
From 1 to 2 months	-3.004	-3.178	0.106	-1.598	-1.519	0.457*
From 3 to 5 months	-2.809	-2.908	0.102	-1.907	-1.889	0.417*
From 6 to 11 months	-1.886	-2.062	0.118	-1.318	-1.312	0.467**
From 12 to 17 months	-2.157	-2.256	0.104	-1.489	-1.497	0.477*
More than 18 months	-0.949	-1.225	0.126*	-1.182	-1.265	0.505**

Source: Own calculations

To discover, if series of the European Union and Spain were non-stationary, we performed stationarity test (13) with one break. Obtained results were better. All series of Switzerland were also stationary. By including a structural break in the analysis of stationarity, all series of Spain, except those who were unemployed for more than 18 months, were stationary. Stationarity was also proven in inequality series of the European Union, among those who were unemployed for less than 1 month and from 6 to 18 months. Structural breaks had only a temporary effect on gender inequality, and the consequences from it, quickly disappeared (Table 3).

The null hypothesis of cross-dependence test (14) was rejected for Spain and the European Union, meaning they are highly dependent, while for Switzerland couldn't be rejected, no dependence was proven (Table 4).

Table 4: Cross-dependence results

	Spain		**Switzerland**		**European Union**	
	t-stat	*p-value*	*t-stat*	*p-value*	*t-stat*	*p-value*
Pesaran CD	4.1132	0.0000	1.0039	0.3154	5.0868	0.0000

Source: Own calculations

Since data of Spain and the European Union were highly dependent, stationarity in them was tested using Moon-Perron test (17) and (18), which couldn't be used for data of Switzerland, because they were independent. Stationarity in panel data of Switzerland were therefore tested using LLC (19) and IPS test (20). Stationarity in panel data was proven for all three territories (Table 5).

Table 5: Panel unit root test results

t-stat	**Swiss**	**Spain**	**European Union**
LLC	-7.7696***		
IPS	-7.3520***		
Moon-Perron t_a		-6.8125***	-7.5814***
Moon-Perron t_b		-5.8563***	-6.6096***

Source: Own calculations

Table 3: Results for stationarity test with break

Source: Own calculation

	Length of unemployment	T_b	k^*	$\hat{\mu}$	$\hat{\theta}$	$\hat{\beta}$	$\hat{\gamma}$	$\hat{\delta}$	$\hat{\alpha}$	σ^2	R^2	t	HL_ρ
Spain	Less than 1 month	2000	0	3.140** (2.72)	-0.217 (-0.29)	-2.639*** (-4.63)	2.996*** (4.88)	1.853** (2.91)	-0.154 (-0.74)	0.562	0.913	-5.579**	4.145
	From 1 to 2 months	2011	5	-4.742*** (-6.54)	2.016 (1.69)	0.266*** (4.67)	-0.638** (-2.43)	-0.861 (-0.72)	0.125 (0.89)	0.796	0.845	-6.306***	5.885
	From 3 to 5 months	2009	3	-15.497*** (-5.28)	8.661*** (5.10)	1.093*** (5.99)	-1.721*** (-6.55)	-3.413** (-2.58)	-1.233** (-2.94)	0.458	0.983	-5.321**	0.476
	From 6 to 11 months	2008	5	-11.975** (-4.14)	7.136*** (8.04)	0.710** (3.66)	-0.983** (-4.48)	-5.713*** (-6.97)	-0.682 (-2.01)	0.480	0.990	-4.960*	0.605
	From 12 to 17 months	2009	0	-10.966*** (-5.57)	9.138*** (5.60)	0.551*** (4.81)	-1.753*** (-6.08)	-4.667** (-2.85)	-0.171 (-0.88)	0.749	0.961	-6.026***	3.696
	More than 18 months	2007	5	-58.403** (-4.39)	-1.874 (-1.79)	4.414** (4.35)	-2.186** (-3.87)	2.511* (2.35)	-4.425** (-3.73)	0.742	0.955	-4.573	
Switzerland	Less than 1 month	2002	0	2.772*** (3.82)	2.202*** (3.19)	-0.908*** (-4.13)	0.847*** (3.78)	-1.232 (-1.52)	-0.249 (-1.49)	0.689	0.594	-7.490***	2.421
	From 1 to 2 months	2004	1	-1.522** (-3.25)	-2.199*** (-4.10)	0.187 (1.56)	0.052 (0.39)	1.217* (1.97)	-0.565** (-2.46)	0.489	0.721	-6.814***	0.833
	From 3 to 5 months	2004	0	-0.420 (-0.99)	-1.222** (-2.51)	0.040 (0.42)	0.102 (0.98)	1.977*** (3.39)	-0.200 (-1.09)	0.497	0.538	-6.565***	3.106
	From 6 to 11 months	2000	0	2.738*** (3.37)	-0.092 (-0.16)	-1.311*** (-3.54)	1.372*** (3.69)	0.866 (1.47)	-0.363* (-1.77)	0.518	0.592	-6.648***	1.537
	From 12 to 17 months	2010	0	-0.033 (-0.06)	-0.499 (-0.43)	-0.153* (-2.14)	0.577** (2.39)	-0.221 (-0.18)	-0.335 (-1.31)	0.903	0.423	-5.206**	1.699
	More than 18 months	2007	4	-4.613** (-3.28)	-5.727*** (-3.94)	-0.005 (-0.02)	0.665** (3.14)	1.104* (2.33)	-3.854*** (-6.84)	0.311	0.968	-8.612***	0.661
European Union	Less than 1 month	2004	1	-3.934*** (-5.38)	-0.318 (-1.29)	0.317*** (4.09)	-0.200** (-2.94)	0.234 (0.81)	-0.976** (-2.85)	0.239	0.821	-5.769***	0.186
	From 1 to 2 months	2010	3	-2.745*** (-4.61)	0.488 (1.69)	0.143*** (4.44)	-0.151** (-2.73)	-1.109** (-3.25)	-0.886* (-2.211)	0.190	0.894	-4.705	
	From 3 to 5 months	2014	5	-8.149** (-4.56)	5.039* (2.77)	0.512*** (4.75)	-1.910** (-3.05)	-3.449* (-2.51)	-5.449** (-3.98)	0.284	0.906	-4.708	
	From 6 to 11 months	2013	4	-12.841*** (-5.66)	4.313** (3.45)	0.968*** (5.84)	-1.999*** (-4.60)	-2.830** (-2.63)	-3.617*** (-4.66)	0.278	0.952	-5.949***	0.721
	From 12 to 17 months	2009	1	-3.879*** (-6.12)	1.997*** (5.16)	0.205*** (5.21)	-0.340*** (-5.18)	-1.251** (-3.03)	-0.433** (-2.27)	0.248	0.946	-6.529***	1.222
	More than 18 months	2013	0	-3.258*** (-3.83)	-0.031 (-0.07)	0.222*** (4.09)	-0.319* (-2.08)	0.015 (0.04)	0.055 (0.23)	0.197	0.979	-4.009	

Conclusion

Women were unemployed longer than men, with increasing of time in unemployment gender inequality is increasing in disadvantage of women. We introduce a new method of gender inequality in unemployment calculation, which consist of a ratio between the unemployment rate of women and men and is weighted with an average unemployment rate. Series computed with this method were then tested for linearity and since they were all linear we used linear univariate unit root tests to check for hysteresis in them. To obtain better results we used three methods which we compared. Only gender inequality series of Switzerland were stationary in all cases. Number of a stationary series increased in Spain and the European Union when a structural break was included, but there were still some inequality series that depended strictly on time. Structural breaks had only a temporary effect on gender inequality series, and consequences from them disappeared very quickly. When analysing for dependence on territory panel, only Switzerland series were independent. When testing for hysteresis on territory panel, we used proper tests depending on results from the cross-dependence test, and according to tests used, all series were stationary in territory panels. Even when it looks that gender inequality in durations in unemployment is disappearing, it is still persistent and further analysis is needed.

Acknowledgment

This paper was produced as a part of the SYLLF research abroad program, financed by the Nippon foundation, which we gratefully acknowledge.

References

Arellano, F. A., 2010. Do training programmes get the unemployed back to work? a look at the spanish experience. *Revista de Economia Aplicada,* 18(53), pp. 39-65.

Ayala, A. L., Cunado, J. and Gil-Alana, L. A., 2012. Unemployment Hysteresis: Empirical Evidence for Latin America. *Journal of Applied Economics,* 15(2), pp. 213-233.

Azmat, G., Gűell, M. and Manning, A., 2004. *Gender Gaps in Unemployment Rates in OECD Countries.* London, Centre for Economic Performance.

Bachmann, R. and Sinning, M., 2016. Decomposing the Ins and Outs of Cyclical Unemployment. *Oxford Bulletin of Economics and Statistics,* 78(6), pp. 853-876.

Bakas, D. and Papapetrou, E., 2014. Unemployment by gender: Evidence from EU countries. *International Advances in Economic Research,* 20(1), pp. 103-111.

Baussola, M., Mussida, C., Jenkins, J. and Penfold, M., 2015. Determinants of the gender unemployment gap in Italy and the United Kingdom: A comparative investigation. *International Labour Review,* 154(4), pp. 537-562.

Böheim, R., Horvath, G. T. and Winter-Ebmer, R., 2011. Great expectations: Past wages and unemployment durations. *Labour Economics,* 18(6), pp. 778-785.

Camarero, M., Carrion-i-Silvestre, J. LI. and Tamarit, C., 2008. Unemployment Hysteresis in Transition Countries: Evidence using Stationarity Panel Tests with Breaks. *Review of Development Economics,* 12(3), pp. 620-635.

De la Rica, S. and Rebollo-Sanz, Y. F., 2017. Gender Differentials in Unemployment Ins and Outs During the Great Recession in Spain. *De Economist,* 165(1), pp. 67-99.

Dickey, D. and Fuller, W., 1979. Distribution of the Estimators for Autoregressive Time Series With a Unit Root. *Journal of the American Statistical Association,* 74(366), pp. 427-431.

Eurostat, 2017. *Eurostat.* [Online] Available at: http://ec.europa.eu/eurostat/data/database [Referred. 10 07 2017].

Fallahi, F. and Rodriguez, G., 2015. Structural breaks and labor market disparities in the Canadian provinces. *Journal of Economic Studies,* 42(2), pp. 322-342.

Flek, V., Hála, M. and Mysíková, M., 2015. Duration dependence and exits from youth unemployment in Spain and the Czech Republic. *Ekonomska Istrazivanja,* 28(1), pp. 1063-1078.

Garcia-Cintado, A., Romero-Avila, D. and Usabiaga, C., 2015. Can the hysteresis hypothesis in Spanish regional unemployment be beaten? New evidence from unit root tests with breaks. *Economic Modelling,* Volume 47, pp. 244-252.

Gokulsing, D. and Tandrayen-Ragoobur, V., 2014. Gender, education and labour market: evidence from Mauritius. *The International Journal of Sociology and Social Policy,* 34(9/10), pp. 609-633.

Khraief, N., Shahbaz, M., Heshmati, A. and Azam, M., 2015. *Are Unemployment Rates in OECD Countries Stationary? Evidence from Univariate and Panel Unit Root Tests.* [Online] Available at: http://ftp.iza.org/dp9571.pdf

Koutentakis, F., 2015. Gender unemployment dynamics: Evidence from ten advanced economies: Gender unemployment dynamics. *Labour,* 29(1), pp. 15-31.

Kwiatkowski, D., Phillips, P., Schmidt, P. and Shin, Y., 1992. How sure are we that economic time series have a unit root?. *Journal of Econometrics,* 54(1992), pp. 159-178.

Lyócsa, Š., Výrost, T. and Baumöhl, E., 2011. *Unit-root and stationarity testing with empirical application on industrial production of CEE-4 countries.* [Online] Available at: https://mpra.ub.uni-muenchen.de/29648/ [Referred. 20 06. 2017].

Marques, A. M., Lima, G. T. and Troster, V., 2017. Unemployment persistence in OECD countries after the Great Recession. *Economic Modelling,* 64(2017), pp. 105-116.

Moon, H. R. and Perron, B., 2004. Testing for a unit root in panels with dynamic factors. *Journal of Econometrics,* 122(2004), pp. 81-126.

Ollikainen, V., 2006. Gender Differences in Transitions from Unemployment: Micro Evidence from Finland. *Labour,* 20(1), pp. 159-198.

Pašic, P., Kavkler, A. and Boršič, D., 2011. Gender Disparities in the Duration of Unemployment Spells in Slovenia. *South East European Journal of Economics and Business,* Vol. 6, pp. 99-110.

Peiro, A., Belaire-Franch, J. and Gonzalo, M. T., 2012. Unemployment, cycle and gender. *Journal of Macroeconomics,* Vol. 34, pp. 1167-1175.

Perron, P., 1997. Further evidence on breaking trend functions in macroeconomic variables. *Journal of Econometrics,* 80(1997), pp. 355-385.

Phillips, P. and Perron, P., 1988. Testing for a unit root in time series regression. *Biometrika,* 75(2), pp. 335-346.

Queneau, H. and Sen, A., 2007. Evidence Regarding Persistence in the Gender Unemployment Gap Based on the Ratio of Female to Male Unemployment Rate. *Economics Bulletin,* Vol. 5, pp. 1-10.

Queneau, H. and Sen, A., 2009. Regarding the unemployment gap by race and gender in the United States. *Economics Bulletin,* 29(4), pp. 2749-2757.

Sahin, A., Song, J. and Hobijn, B., 2010. The unemployment gender gap during the 2007 recession. *Current Issues in Economics and Finance,* 16(2), pp. 1-7.

Theodossiou, I. and Zangelidis, A., 2009. Should I stay or should I go? The effect of gender, education and unemployment on labour market transitions. *Labour Economics,* 16(5), pp. 566-577.

Comparison of Using Social Networks for Seeking Employment in Italy and Slovakia

Miloš Hitka, Technical University in Zvolen, Faculty of Wood Sciences and Technology, Zvolen, Slovakia,email: hitka@tuzvo.sk

Silvia Lorincová, Technical University in Zvolen, Faculty of Wood Sciences and Technology, Zvolen, Slovakia, email: silvia.lorincova@tuzvo.sk

Lenka Ližbetinová, Institute of Technology and Business České Budějovice, Faculty of Corporate Strategy, České Budějovice, Czech Republic, email:lizbetinova@mail.vstecb.cz

Abstract

Social networks are one of the current modern methods of employee recruitment. For every person, finding and getting an adequate job is an important life step. Equally, it is also very important for an enterprise to get the right candidates. Therefore, in the process of employee recruitment, enterprises use different ways that depend on many factors. In addition to the classic methods used by businesses in the process of recruiting and selecting employees, modern methods have gradually evolved. These methods allow faster contact between the employer and the potential job seeker. One of these options is the use of social networks. The aim of paper is to define the perspective and usability of social networks for employers of small and medium-sized enterprises within recruiting employees. The survey was focused on students and graduates from Slovak and Italian universities. Research has shown that respondents have been using social networks to search for work only exceptionally, but they see the benefits and potential for them in the future. In order to attract potential job seekers, we recommend employers to publish job offers also with the help of modern technologies.

Keywords: employee recruitment, social networking, employee search, HRM.

Introduction

Nowadays, information technologies have a significant impact on all areas of our society, its development and the overall development of society (Vetráková, Smerek, 2016). Thanks to this trend, businesses have become more interested in modern technology (Hada, Gairola, 2015). Different types of people use modern technology, which means that businesses have an impact on a large number of potential job seekers. The innovations and development in field of internet and social networks require new trends as well as an adequate approach to human resource management (Pozo-Rico, Gilar, Castejon, 2016). In today's job search, social networks are a very effective channel of communication, which is also declared by research of Topolovec-Vranic and Natarajan (2016) or Amadoru and Gamage (2016). These authors share the view that the use of social networks has grown over the last 10 years. Social networks provide access to information about potential job seekers, can quickly disseminate job offers and provide feedback (Jere, et al. 2017). Services, provided by social networks within the Internet, represent an expanding social phenomenon. Today, especially students perceive social networks as a space for expressing their own personality.

The main goal of the recruiting process is to obtain the right employees at the lowest possible cost with adequate quality of the job potential of the candidates at the optimum time. We understand employees' work potential as knowledge, experience, skills, talent or some specific personality characteristics needed to meet the desired goals and missions of a particular business (Kachňáková, Nachtmannová, Joniaková, 2008). Factors from the outside environment of the organization may also affect the process of recruiting employees. These include, for example, demographic, economic, technological and legal conditions. These factors cannot be influenced but should be taken into account when deciding on concrete steps in the process of recruiting.

Material and Methods

Different methods are used to recruit employees. With rapidly changing times and trends, the methods are changing, too. Print media has been in use since the 17th century, when the first newspapers began to appear in Europe, later in the 18th century in America. Newspapers had an impact on almost every household, which caused the later boom of print media. Therefore, the company, the company that used this resource to advertise the job, had the highest chance of reaching as many potential candidates as possible. After the arrival of television and radio, some companies have also started to use these methods to offer a job. We have observed the greatest change in the use of different methods since the onset of the internet phenomenon. Companies follow trends in the use of different media by their potential candidates. Without costly studies, they noticed that the internet and especially today's popular social networks were the best place to attract potential employees. There are two main social networking functions in the labour market. The first one is to provide information on job offers and the second one is to present information on employee productivity and quality. In this way, both employed and unemployed people receive job vacancy information and each individual is in touch with others. Employees do not use job offers for themselves but they inform their unemployed friends. Therefore, the number of working friends determines the amount of available job vacancy information and increases the possibility of finding a job (Cappellari, Tatsiramos, 2015).

Nowadays, there are many social networks and they include Twitter, Facebook, LinkedIn, Instagram, WhatsApp, Google+, YouTube, Skype, Pokec and ICQ and others. They offer solutions not only for students and graduates but also for all who are looking for a job. Data from social networks can help many job seekers. On the other hand, social media are helpful to companies in finding a suitable employee. Using large data social networking options is the biggest opportunity for students. More and more businesses and businesses agree that processing large volumes of social data is an opportunity for both students and businesses. Students who succeed are not the ones who have the most to put on the Internet. Successful students know best to use these data. Social networks provide a stepping stone in finding jobs and obtaining information easier that could contain unique and valuable employment information (Fieseler, Meckel, Müller, 2014).

The job search process begins by creating profiles on Twitter, LinkedIn, Google+ and Facebook. Social media and websites allow them to connect with potential companies or other employers (Batagan, Boja, 2015). Through the social media, it is easier to get the full background of a candidate with detailed references that staffers need. Most companies have their own web portal. In most cases, these companies also have their profiles on social networks. Specialized personnel agencies have found that internet communication or communication using social networks was much more effective than regular ads for specific professions or groups of people. The main reason for lower printed media preference is that young people less read daily press and spend more time on social networks. Another advantage is that the information spreads very quickly and has an impact on many people in a very short time (Potkány, Hajdukova, 2015). The research of Melanthiou et al. (2015) also points to the many benefits provided by social networks. Social media allow users to present themselves in different ways. For example, one of the options is through participation in expert groups or in groups that are connected with companies interested in job seekers. Nowadays, most people agree that the job search process can be a long and time-consuming process (Nikolaou, 2014). The combination of formal and informal job searching is the most successful way to find a job.

Table 1: Composition of the research sample

Data to identify respondents		Italy		Slovakia	
		Absolute frequency	Relative frequency	Absolute frequency	Relative frequency
Gender	Male	51	48	103	41
	Female	56	52	186	59
Age	Up to 20 years	9	8	11	3
	21 – 25 years	64	60	232	73
	26 – 29 years	34	32	55	17
	30 years and more	0	0	18	6
Completed education	Secondary education	46	43	163	52
	Higher education of I. degree	32	30	103	33
	Higher education of II. degree	29	27	47	15
	Higher education of III. degree	0	0	3	1

Source: authors

We have used the descriptive statistics and the chi-square test of the good match based on the contingency table for producing the results. The contingency table presents the frequency distribution of the two categorical variables simultaneously. It claims that the expected and observed frequencies are equal, which means that the nominal variables are independent. The rejection of the zero hypothesis means that the difference between the observed and expected frequencies in the table is so great that it cannot only be random and therefore there is a relationship between the nominal variables. We determined the statistical significance of the difference between the respondents using the level of significance p on the sample of Italian and Slovak students and graduates ($p > 0.05$ among countries is not statistically significant difference; $0.01< p <0.05$ between countries is a small statistically significant difference; $0.001< p <0.01$ among countries is a statistically significant difference; $p < 0.001$ between countries is a very significant statistical difference) (Rimarčík, 2007).

In research, there was a questionnaire used by Potkány, Hajduková (2015). The aim of the questionnaire survey, which we conducted in 2017, was to define the perspective and usability of social networks in recruiting employees for small and medium-sized enterprises. The survey was designed for students and graduates of Italian and Slovak universities. In total, 423 respondents were involved (107 from Italy and 316 from Slovakia) in the structure according to Table 1.

Results and Discussion

Based on the results of analysis of the use of different types of social networks, we can state that most respondents from Italy use the social network WhatsApp (89.72%). Facebook is used by 83.18% of Italian respondents. Instagram and YouTube are represented similarly to Italian and Slovak respondents. 57.94% of respondents use Instagram and 41.12% of respondents prefer YouTube. Also, 99.37% of respondents from Slovakia have a profile created on the social network Facebook. More than half of respondents say they use the Instagram social network (53.16%). YouTube is the third most common social network, which is used by 42.72% of respondents.

Italian respondents use social networking to find employment in 49 cases from the total of 107 respondents. Slovak respondents are most often connected to social networks anywhere via mobile devices (exactly 190 out of 316 respondents). The answer “at home” was the second most frequent answer selected by 119 respondents out of a total of 316. Slovak respondents use Social Networks to find employment in 146 cases out of a total of 316 respondents.

Italian respondents most prefer the option to look for work over the Internet, up to 87.85% of respondents. The second most common answer was to find a job with personal contact. More than half (57.94%) of Italian respondents chose this option. The way of looking for work through the Office of Social Affairs and Family was preferred by 38.32% of respondents and 35.51% of Italian respondents chose to work through social networks. The Internet as a way of seeking employment holds a dominant position among Slovak respondents (76.58%). The second most frequent response was with the known (64.56%) and 46.84% of the respondents choosing the option through social networks. The way of looking for work through the Office of Labour of Social Affairs and Family is used by 37.97% of the Slovaks interviewed.

Consequently, we determined how many respondents use social networks to find employment. The respondents had a choice of more options and the main question was whether they use or not use social networks for that purpose. The observed results do not indicate any statistically significant difference. The participants in both surveys said they were using social networks as a tool for finding employment. This option was marked by 91.59% of Italian respondents and 89.24% of Slovak respondents.

Table 2 Comparison of differences within job search

	Chi-squared	Degrees of freedom	p-level
Pearson's chi-squared	0.4826791	df=1	p=0.48721
M-V chi-squared	0.5008238	df=1	p=0.47914

Source: own research

Furthermore, we investigated what kind of social network respondents used. Italian respondents are seeking job most through specific social networking sites of enterprises (67.29%). The looking for employment through special applications on social networks is the second most common option for them (for exactly 40.19% of respondents surveyed by Italy). Most of the Slovak respondents use social networks to find employment through friends' recommendations (67.41%). On the other hand, 42.72% of Slovak respondents are looking for employment on specific pages of enterprises within social networks.

There is a statistically significant difference in the view of respondents in terms of social perceptions as a credible tool for finding a job (Table 2). 30.84% of Italian respondents see social networks as an untrustworthy way of seeking employment, while Slovak respondents perceive social networks as a trusted tool (up to 50% of the respondents identified this possibility).

Table 3 Comparison of differences in assessing the reliability of social networks

	Chi-squared	Degrees of freedom	p-level
Pearson's chi-squared	86.41233	df=3	p=0.0000
M-V chi-squared	77.03946	df=3	p=0.0000

Source: own research

In the context of analysing the benefits of social networks in finding employment, the statistically significant difference was not confirmed by the opinions of Italian and Slovak respondents. In both cases, respondents indicate that social networking services have benefits in finding a job. This view is presented by 90.65% of respondents from Italy and 90.19% of respondents from Slovakia (Table 3).

Table 4 Comparing differences in benefits of social networks

	Chi-squared	Degrees of freedom	p-level
Pearson's chi-squared	0.0196889	df=1	p=0.88841
M-V chi-squared	0.0198306	df=1	p=0.88801

Source: own research

Italian respondents argue that the greatest benefit of social networks in finding a job is a large amount of information in one place (58.88%). The benefit of rapid feedback is also very significant for Italian respondents (51.40% of respondents indicated this possibility). The "comfort" option was marked by 49.53% of respondents from Italy. More than half of Slovak respondents see the biggest advantage in time-consuming social networks (53.80%). The second significant advantage for Slovak respondents is a large amount of information on social networks. Italian respondents (79%) see potential in the social networks for looking for employment, in the future. In contrast, 21% of Italian respondents claim that social networks have no potential for the future. In Slovakia, 67% of respondents see the potential to job seeking in the future. Another 24% of respondents do not see the potential for the future.

Social media and the Internet are widely used in the recruitment process by both human resources and job seekers. Personnel managers use social and Internet technology to access a large amount of information about job seekers. Their aim is to avoid negligence in hiring and discover the real person of the applicant. Personalists continue using social media in the process of recruiting even though they are still considered socially irresponsible and violating privacy. This can lead to negative impacts on company reputation and disputes between job seekers and companies. Also, the reliability and validity of information obtained from social media are debatable. On the other hand, job seekers know that their social media profiles are likely to be checked by potential employers. Many of them even believe that employers have the right to control the profiles of applicants for social media. In spite of this, many jobs seekers do the so-called "posting paradox" when they publish and share content that is inappropriate to be seen by their potential employer. This paradoxical behaviour opens a key question about the factors that predict the behaviour of potential job seekers in the social media, (irrespective of suitability or inappropriateness, especially with regard to their awareness of potential employers) (Ouirdi *et al.*, 2015b).

In addition to psychological openness, employers expect to find some other personality features that are considered important when deciding to be recruited in relation to the use of social media. For example, how candidates use social media, their dependence on social media and possibly low self-control. When using social media to a greater extent, it is expected that shared content could potentially be detrimental to their career or job search. We can observe this fact among Facebook-dependent people and frequent Facebook users with a clear negative impact on their work or study. People with a greater need to be more frequent on the Internet are more likely to share potentially problematic material. It is also assumed that people with low self-control would disagree with the use of social media when deciding employers to take up employment (Drouin et al., 2015).

Employers control several things related to the personal lives of employees or potential employees that could endanger the business or the enterprise itself. It is very easy to harm a business by someone who has undesirable behaviour. Multi-national or multicultural societies are oriented towards extremists or employees with racist views that could be expressed on social networks and could endanger the enterprise. According to the Eurocom Worldwide Global PR Network survey, two of the five technology companies (nearly 40 percent) view profiles of potential employees on social networks such as Facebook or LinkedIn. This is just another example of the fact that very personal photos or information published on social media websites may seem like a good idea but can affect the future career of an employee (Bawaba, 2011).

Study results of Ouirdi et al. (2015a) demonstrate the sensitivity of younger users to social impacts. The reason could be that younger users are more sensitive to pressure from friends and are using social media in general. This could also be transferred to the workplace. Younger people show a stronger interest in relationships with other people, including co-workers. In comparison with older workers, younger workers have stronger motives for growth in terms of new learning, education and development. Therefore, they could be more sensitive to the perception of social impact on the workplace and to accept innovation and progress in their careers. Highly educated people are more motivated by community interests, inclusion in society and reputation. It is possible that highly educated people are increasingly exposed to social influence in the profession and are more vulnerable to this pressure.

Based on the research results, we have come to the conclusion that Slovak personnel should focus on social networks such as Facebook, Google +, YouTube and Instagram, in search of potential employees. They should include these networks in the classic way of looking for job seekers, because they are among the most used in Slovakia. Volkova et al. (2017) present similar facts. The results of their research claim that Facebook is the most successful tool used in the recruitment process. Searching for potential employees also depends on the type of user on social networks. The survey showed that most respondents actively use social networks. These two studies show that the place, where respondents are joining social networks, has changed significantly. Nowadays, there is no problem connecting to the Internet, almost anywhere. Operator coverage increases each year and almost everybody has the internet on the phone. Our respondents are most often connected using mobile devices. Methods used by potential job seekers in finding an employment are equally important.

The survey found that Slovak respondents mostly use the Internet, personal acquaintances, and social networks to find employment. The possibility to look for employment through social networks is more often used than the results from previous years according to the above-mentioned surveys it is important to take into account factors such as basic salary, working environment and the possibility of career growth (these factors are a priority for Slovak respondents) so that job seeker is interested in the job offer. If respondents choose to use social networks to find employment, they will follow the recommendations of their friends.

The level of trustworthiness of social networks has improved from the point of view of Slovak respondents. In research of Bartaková, Brtková, Gubiniová and Hitka (2017), which was carried out on a sample of 211 students and university graduates from Slovakia and 181 from abroad, social networks were evaluated as a less trusted tool for finding employment. In our research, Slovak respondents have already perceived social networks as a credible tool for finding employment.

Further, we investigated what social networks had benefits for potential employees. The Slovak respondents see their advantages, especially in the timelessness. We can conclude that the use of social networks, as a modern job search tool, has seen an increase in Slovakia. The respondents see the potential in this modern method, and they will use it more in the future, given the current trend of growth. Therefore, it is very important for employers to have their profiles on social networks with attractive job offers attractive to potential job seekers.

Conclusion

The reality of the present affirms us how quickly the world around us changes. Competitive struggle is a very important factor that significantly shapes the environment around us and affects the competitiveness of the business on the market, at the same time (Stacho et al., 2015; Potkány, Stachová, 2015; Nedeliaková et al., 2017; Smerek 2017; Smolková et al., 2016; Urbancová, Urbanec, 2012). Therefore, in the field of human resource management, there is a great deal of attention devoted to the emerging generation, especially today's university students. They bring a different view of the world, other habits and ideas about the working environment and often have their own innovative views (Kucharčíková et al. 2016). The survey's priority (which we have addressed to students and university graduates in the form of questionnaires) was to find out if they are using

social networks when looking for jobs in Italy and Slovakia and what will be the trend of social networks in recruiting employees in the next period. From our survey, we estimate that social networks, as a modern job search tool, have great potential in the future and have the opportunity to become a full-fledged way of looking for an employment. Authors Gelinas et al. (2017) share the same view.

Acknowledgements

This research was supported by VEGA 1/0024/17.

References

1. Lorek, L. A., (2003), "Buyers catch on to online shopping,' *San Antonio Express-News*. [Online], [Retrieved December 22, 2003], http://web.lexis-nexis.com/universe/document
2. Sabri, EH and Beamon, M. (2000), 'A Multi-Objective Approach to Simultaneous Strategic and Operational Planning in Supply Chain Design,' *Omega: an International Journal of Management Science* 28 (1), 581-598.
3.
4. Amadoru, M. and Gamage, C. (2016), ´Evaluating effective use of social networks for recruitment,´ Proceedings of the 2016 ACM SIGMIS Conference on Computers and People Research, SIGMIS-CPR 2016, 125-133.
5. Bartakova, G.P., Brtkova, J., Gubiniova, K. and Hitka, M. (2017), ´Actual trends in the recruitment process at small and medium-sized enterprises with the use of social networking,´ *Economic Annals –XXI*, 164, 3-4, 80-84.
6. Batagan, L. and Boja C., (2015), ´Social networks and students' future jobs,´ *Bucharest University of Economic Studies.* [online]. [Retrieved December 02, 2015], 386-393, http://www.conference.ase.ro/pdf/52.pdf
7. Bawaba, A., (2011), ´Firms check job seeker's profile on social before hiring,´ *Gulf News* [online]., [Retrieved July 07, 2017], http://search.proquest.com.sldk.tuzvo.sk:8080/docview/878746431/28DA144CF08744F8PQ/5?accountid=49283
8. Cappellari, L. and Tatsiramos K., (2015), ´With a little help from my friends? Quality of social networks, job finding and job match quality,´ *European Economic Review,* 78, 55-75.
9. Drouin, M., Kimberly W. O'Connor, Gordon B. Schmidt, D. and Miller A., (2015), ´Facebook fired: Legal perspectives and young adults' opinions on the use of social media in hiring and firing decisions,´ *Computers in Human Behavior,* 46, 123-128.
10. Fieseler, Ch. et al., (2014), ´With a little help of my peers. The supportive role of online contacts for the unemployed,´ *Computers in Human Behavior*. 41, 164-176.
11. Gelinas, L., Pierce, R., Winkler, S., Cohen, I.G., Lynch, H.F. and Bierer, B.E., (2017), ´Using Social Media as a Research Recruitment Tool: Ethical Issues and Recommendations,´ *American Journal of Bioethics,* 17(3), 3-14.
12. Hada, B.S. and Gairola, S., (2015), ´Importance Of Social Networking Sites,´ *E-Recruitment. International Journal Of Technology Enhancements And Emerging Engineering Research*, 3(7), 91-95.
13. Jere, S., Jayannavar, L., Ali, A. and Kulkarni, C., (2017), ´Recruitment graph model for hiring unique competencies using social media minig,´ AMC International Conference Proceeding Seriec Part F128357, 461-466
14. Kachňáková, A., Nachtmannová, O. and Joniaková, Z., (2008), Personálny manažment, Iura Edition, spol. s.r.o., Bratislava
15. Kucharčíková, A., Konušíková, L. and Tokarčíková, E., (2016), ´Approaches to the quantification of the human capital efficiency in enterprises,´ *Communications - Scientific Letters of the University of Zilina*, 18, (1), 49-54.

16. Mariam El Ouirdi, Asma El Ouirdi, Segers J. and Pais I., (2015a), ´Technology adoption in employee recruitment: The case of social media in Central and Eastern Europe,´ *Computers in Human Behavior.* 57, 240-249.
17. Mariam El Ouirdi, Segers J., Asma El Ouirdi and Pais I., (2015b), ´Predictors of job seekers' self-disclosure on social media,´ *Computers in Human Behavior,* 53, 1-12.
18. Melanthiou, Y., Pavlou, F. and Constantinou, E., (2015), ´The use of social network sites as an e-recruitment tool,´ *Journal of transnational management*, 20(1), 31-49.
19. Nedeliaková, E., Panák, M. and Šipuš, D., (2017)., ´Innovative trends in process-oriented quality management within railway transport,´ *Periodica Polytechnica Transportation Engineering*, 45 (2), 84-89.
20. Nikolaou, I., (2014), ´Social Networking Web Sites in Job Search and Employee Recruitment,´ *International Journal of Selection and Assessment,* 22 (2), 181-189.
21. Potkány, M. and Hajdukova, A., (2015), ´Social networks and their importance in job searching of college students,´ *Business: Theory and Practice,* 16 (1), 75–83.
22. Potkány, M. and Stachová, K., (2015), ´Required skills and abilities of facility manager on strategic level of managing in Slovak companies,´ *Economic Annals-XXI*, 3-4 (1), 55-59.
23. Pozo-Rico, T., Gilar, R. And Castejon, L., (2016), ´A virtual learning community supporting the emotional competence program in higher education,´ 10th International technology, education and development conference. Pages: 5864-5873. 2016. ISSN: 2340-1079, Spain.
24. Rimarčík M., (2007), ´Štatistika pre prax.´
25. Smerek, L., (2017), ´Changing the Corporate Culture Towards the Human Resources Development,´ *Issues of Human Resource Management, InTech*, 3-20.
26. Smolková, E., Štarchoň, P. and Weberová, D., (2016), ´Country-of-origin brands from the point of view of the Slovak and Czech consumers,´Proceedings of the 27th International Business Information Management Association Conference - Innovation Management and Education Excellence Vision 2020: From Regional Development Sustainability to Global Economic Growth, IBIMA 20162016, 2119-2130.
27. Stacho, Z., Gubiniová, K. and Bartáková, G. P., (2015). ´Selected components of pricing strategies of organizations and their perception by customers in Slovak Republic,´ *Economic Annals-XXI,* 9-10, 78-82.
28. Topolovec-Vranic, J. and Natarajan, K., (2016), ´The use of social media in recruitment for medical research studies: A scoping review,´ *Journal of Medical Internet Research*, 18 (11), 286
29. Urbancová, H. and Urbanec, J., (2012), ´Internal factors influencing the knowledge continuity ensuring,´ *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 60 (4), 387-396.
30. Vetráková, M. and Smerek, L., (2016), ´Diagnosing organizational culture in national and intercultural context,´ *E a M: Ekonomie a Management*, 19 (1), 62-73.
31. Volkova, E., Michie, J., Corrigan, C., Sundborn, G., Eyles, H., Jiang, Y. and Mhurchu, C. N., (2017), ´Effectiveness of recruitment to a smartphone-delivered nutrition intervention in New Zealand: analysis of a randomised controlled trial,´ *BMJ Open*, 7(6).

Generation Y in Parent´s Business – Their Motivation

Ondřej Hradský, University of Economics, Prague, Czech Republic, ondrej.hradsky@vse.cz

Tomáš Sadílek, University of Economics, Prague, Czech Republic, tomas.sadilek@vse.cz; sadt00@vse.cz Department of Retailing and Commercial Communication, Faculty of International Relations, University of Economics, Prague, Czech Republic

Abstract

The goal of this article is to identify how working expectations and motivations of generation Y working in parent's businesses varies from the working expectations and motivations of whole generation Y. We proceeded a qualitative research design to gain opinions of generation Y members working in parent's businesses. Three main dimensions of the working motivation were surveyed: (1) Reasons for entering a family business, (2) What does work in a family business mean? and (3) Their general working motivation. Main findings of the article are the importance of work-life balance, flexibility, possibility of career development and own will to continue his or her family tradition for generation Y members working in parent's businesses.

Keywords*:* Motivation, Generation Y, Succession, Family Firms

Introduction

Family businesses are important actors of the Czech economy. In the Czech Republic was the tradition of family business restored after the collapse of the totalitarian regime. These regimes did not allow free enterprise; therefore, family business was not even the subject of scientific research. However, nowadays the issue of family business in the Czech Republic is receiving more attention. According to Machek (2017), it is a young, but popular and rapidly developing science discipline in management. Similarity can be found with topic of youth employment, especially with theme of generation Y-members and their work motivation.

Generation Y are the individuals born from 1980 to 1995 (McCrindle, 2014). This term includes people who are currently completing their university studies or are economically active for a relatively short period of time. Statistically, this represents 21% of citizens of the Czech Republic (CSO, 2016). Thanks to historical events, they have a different view on the world than previous generations. Therefore, it can be expected that their access to family businesses have specific features than previous generations. Members of the Y generation enter the labor market and at the same time enter these individuals into family businesses. This contribution focuses on those whose parents are doing business and they can become their potential successors. The aim of this article is to find out whether the work expectations of members of the generation Y whose family are owning business differ from the motivation of the whole generation Y. The article should help to understand motivation and preference for young people to enter into companies owned by their family.

Due to lack of statistical data, the research was carried out using the method of qualitative research. The article is structured in the following way. In the first part Literature review are presented the work motivation and preference of the Y generation. Then the way of data acquisition is explained. Finally is presented a summary.

Literature Review

Generation Y is characterized by certain specificities. Compared to previous generations, it is characterized by a high degree of individualism, openness, willingness to experiment and liveliness for the thing (Twenge, Campbell, 2012). It is referred to as the most technically skilled, having the best access to education and more individualistic than the previous generation (Eisner, 2005). This is due to continuous contact with state-of-the-art technologies, which the most important is the Internet. Attempting to achieve their personal and work goal is leading members of this generation to find

meaningful work in a working group that is similarly set up. This generation differs with access to money, which it does not perceive as the most important criterion for choosing a profession. Important features in deciding about profession gives gen Y to character of work, the opportunity to work, while enjoying life and contributing to the creation of a satisfied human society (Allen, 2004).

A typical characteristic of generation Y is multitasking. This feature brings many benefits, such as the ability to work on multiple different tasks at once. Lewis (2003), on the other hand, states that they often use technology not only to fulfill their tasks but also to personal issues (such as watching videos, sending messages or reading on forums) at the workplace.

The examined generation Y is often perceived as one of the first globally interconnected generations. Therefore, it is being researched worldwide regardless of nationality. Due to this fact, the Czech environment was examined (Šilerová, Flodrová, 2011), which did not show significant differences of motivation from the results of obtained by global surveys. Differences can be seen in cultural affairs. However, cultural topic is not explored in this text. Generation Y seeks a job position from which it can develop and grow. And it has much greater emphasis on flexibility and self-development than previous generations. It also wants to step up in the career ladder if they are offered that opportunity. Otherwise, members of this generation set up their own business (Sheahan, 2005, Twenge, 2010). Consultancy company's surveys focused on defining gen´s Y work motivations and preferences in choosing a profession can be used. They are up-to-date and applicable for the purposes of this research.

Characteristics of the generation Y are influenced by factors and criteria by which its members decide while choosing a future profession. The propensity for individualism to some extent explains the importance of a work-life balance that is rated as key factor. Other key criteria for choosing a job are flexibility, development and career growth, meaningful work, financial rewards (Deloitte, 2017, Universum Global, 2014, Pwc, 2016, Harward Business Review, 2016, Manpower, 2016).

The work-life balance is one of the most important criteria for generating Y to decide on accepting a job offer. Leisure, family, and career development even favor this generation before financial rewards. Up to 34% of respondents from the global survey with more than 16,000 respondents said the managerial role was not attractive to them, as they were worried that they would take too many hours a day and would not have enough time for their free-time activities. (Universum, 2014)

Another incentive factor is flexibility. Like the previous work-life balance, it stems from individualism and openness. (Twenge, Campbell, 2012) Flexibility is reflected in adapting to working life. Typical is the optional working time, the freedom to decide on working conditions and associated possibility of home office. (Deilotte, 2017) Generation Y members want to create their individual surroundings and timetable for their work to suit their lifestyle. (Kubátová, 2004)

Willingness to learn new things to support own personal growth, is another typical stimulating feature of the generation under studies. Education contributes to personal development, which leads to self-worth, and consequently helps to achieve own goals. This is supported by the already mentioned individualism. This is another factor of motivation - career growth. Generation Y is entering the labor market and expects to rise rapidly in career rankings and is generally not willing to stay at the same job for too long period. (Universum, 2014)

Surveys were conducted among members of the generation Y, but notwithstanding their preferences regarding the type of ownership of the company. Due to the differences between family and non-family businesses, these research questions arise:

1) What motivates members of the Y generation to work in their parents' businesses?
2) Do these reasons differ from the results of the whole generation?

Methodology and data

Selected statistical databases focus on issues of generation Y and factors affecting career choices. However, there is no diversion between the companies that are selected by the Y generation, following their form of ownership. The absence of a wider statistical database leads to the creation of

this qualitative article. Its empirical part is created based on in-depth unstructured interviews with twenty representatives of gen Y.

These interviews were conducted in the first half of year 2017 at neutral public places so the interviewees were not exposed to any environmental pressures and their ideas could be fully demonstrated. Each interview lasted about two hours. Respondents were selected based on several criteria. They had to be members of generation Y, people born between 1980 and 1995. Their parents must have a family business and be active in both statutory and executive positions for at least 5 years. The family business has a turnover more than 20 million crowns and employs between 12 and 250 employees. Business ownership is only in the hands of the family or wider family. Important condition was the active working participation of the interviewee within the family business.

Eight women and eleven men were interviewed. Examined family businesses operate in following areas: food (6), engineering (5), services (4), agriculture (2), textile (2) and construction (1). These companies are owned by either one of the parents or parents and someone else from the family (most often the founder).

Interviews were based on a pre-prepared scenario. To verify the reliability of the statements, questions were raised on each topic several times, but each time at a different time and with other words. The aim was to answer the above questions. That is why the interviews concerned the following topics:

- Reason for entering a family business.
- Work duration in a family business.
- What does the work for their family mean?
- Overall work motivation.

Reasons for entering family business

The first part of the interview was conducted to find out the real reason for entering a family business. From the nature of the defined goal, the answers will differ from the answers of people who do not have the opportunity to enter their parents' family business. However, it is important to get better understanding of the possible differences of Y generation representatives in family businesses than others. Responses can be divided into three types.

Typical reason for ongoing family businesses is tradition. The continuation of the family tradition as a reason to enter the family business has given a corresponding part. Another respondent admitted that she had no choice but to get into a family business after they had finished their education. From such responses, it can be concluded that parents in these cases developed some pressure and that their child was not exposed to a choice.

The third type of answers showed the fact that respondents was given the opportunity to arbitrarily decide. They entered the family business at their own discretion. Most respondents were in the third category of responses. They decided on their own, based on experience or discretion. These interviewees also reported different length of time in the family business. For the first two types of responses, interviewees engage in family business either during their training or immediately after their termination. Also, the subject in which the interviewee was educated informed him whether he was preparing for work in a family business or not. No respondent who entered family business because of tradition or necessity was educated in another field.

Respondents admit that they are dealing with the resistance of parents and workers who prevent changes in the processes involved. They see this as a frustrating factor, but also on the other hand as a challenge that makes them work harder and do more.

What does the work for their family mean?

In third part interviewees were asked to find out what the work for their family mean. Focus was made to capture mainly different responses than the generation Y, which does not work in family businesses. Relationships with parents have been mentioned in a different form. One praised that

relations with parents had improved with their entry into the family business. Communication has improved, clarification has been made of the relationship and way of working in the company's hierarchy.

On the other hand, the involvement of offspring can also lead to a deterioration of family relationships. For example, three respondents said they sometimes feel that their parents would rather see someone else's place at their work place.
Per respondents is also more difficult to distinguish working hours from their free time. Most of them said often think about work at weekends and does not even know when they work and when they do not work. They also admit that they try not to think about working by relaxation, but it is not easy.

An interesting insight brought answers to the field of work with modern technologies. Respondents mostly talked about technologies as something quite common to them, but not as common to others. There was complete agreement among respondents on the use of modern technologies. They marked themselves as advanced users and maybe the most active on the Internet from the whole family business.

Overall work motivation

Main part of the interviews was conducted to identify the factors that led respondents to enter and continue working in their parents' family business. From the interviews of all interviewees, it can be stated that the crucial role of continuing their work is to meet the need to combine working life with personal.

The interviewees said that their work in a family business allows them to organize time per themselves. That was, per most of the respondents, one of the key factors that motivated them to enter the family business. This is associated with another often-mentioned benefit - flexibility. Organization of work per their selves, but also the possibility of switching to another job and the opportunity to try everything. Without bureaucratic impediments and internal regulations, it is easier for them to quote.

Another reason was the possibility of self-development. Respondents recognize that they are educated in their fields. In their words, they have access to less information, so they are more actively searching for them. Their parents are more easily allowed to learn more than they would in a non-family business.

Like the previous stimulus, career growth has been mentioned. Answers on this subject depended on the job position the examiner found when entering the company, compared to his current situation. Everyone who saw a certain career shift mentioned this thing as important for staying in a family business.

Another reason for joining the family was the effort to maintain a family tradition. The responses all agreed that they have a big emotional attitude to the company and want to act at least if their parents. Tradition is, per their words, unrelated to the organization of their business affairs, but it motivates them to stay in the company.

Conclusion

By comparing the results of the surveys and the actual examination, many conclusions can be drawn. Studies show that for members of the generation Y are particularly important in their working life work-life balance, flexibility, personal development and career growth, meaningful work, and financial rewards. Within the investigation, itself, these factors have also emerged as important. Other factors that decide to enter or work in a family business are their own will to continue family tradition.
Per the survey, work-life balance is achieved. The organization of working time by one's own person leads to the fulfillment of both work-life balance and flexibility. Career growth is not planned in more

detail in the surveyed companies, but one can see a gradual approach to the target position. The meaningfulness of Y's work is that their work is beneficial to the environment and the people their parents employ. These factors coincide with the results of generational surveys. Financial reward is an important aspect, but its weight has not been sufficiently verified. Therefore, it can not be stated whether it can be categorically included among the main motivational factors.

The limitation of this research is that it can not be determined whether the present generation entering the labor market is significantly different from other generations. The result of this investigation can only be applied to a limited part of the population and there is no possibility of comparison with past generations. Further research could therefore be dealt with by other generations and their reasons.

In conclusion, generations Y enter their parents' businesses on the same criteria as non-family companies, but with the added incentive to maintain tradition. It has been shown for gens Y are particularly important in their working life to combine work and private life, flexibility, personal development and career growth, meaningful work, and a continuation of family tradition. This motivation factor distinguishes the investigated person from the rest of their peers. It should therefore be considered in any further work with the Y generation in family businesses.

References

Allen, P. (2004). *Welcoming Y.* Benefits Canada, 28(9), 51(3).

Armstrong, M. (2016). *A Handbook of Human Resource Management Practice*. 14thed. London: KoganPage

Czech Statistical Office (2016). Věkové složení obyvatelstva – 2015. [online] ČSÚ. Available on: https://www.czso.cz/csu/czso/vekove-slozeni-obyvatelstva. [cit. 19. 7. 2017].

Deloitte (2017). Millennial Survey. Winning over the next generation of leaders. [online] Deloitte. Avaiable on: https://www2.deloitte.com/global/en/pages/about-deloitte/articles/millennialsurvey.html?id=gx:2or:3pr:4milsur16:5awa:6abt:millennailsurvey17# [cit. 22. 7. 2017].

Eisner, Susan P. (2005) Managing Generation Y. S.A.M. *Advanced Management Journal.* Corpus Christi 70.4: 4-15.

Harward Business Review (2016). What Millennials Want from a New Job. [online] HBR Avaiable on: https://hbr.org/2016/05/what-millennials-want-from-a-new-job. [cit. 2. 7. 2017].

Lewis, K. R. (2003). *Managing multiple generations in the workplace can be a challenge*. Washington: Newhouse News Service.

Machek, O. (2017). *Rodinné firmy*. Prague: C. H. Beck.

Manpower Group (2016). Mileniálové a kariéra: Vize 2020. [online] Manpower. Avaiable on: https://manpower.cz/media/milenialove.pdf. [cit. 8. 3. 2017].

McCrindle, M. *The ABC of XYZ: Understanding the Global Generations* 3rd edition. Bella Vista: McCrindle Research Pty Ltd.

Pricewaterhousecoopers (2016). Millennials at Work-Reshaping the Workplace [online] Pwc. Avaiable on: https://www.pwc.com/m1/en/services/consulting/documents/millennials-at-work.pdf. [cit. 3. 6. 2017].

Sheahan, P. (2005). *Generation Y: Thriving and Surviving with Generation Y at Work*. Victoria, Australia: Hardie Grants Book

Šilerová L., Flodrová T. (2011) Generace Y a její cílová skupina. [online] IPSOS. Dostupné na: http://www.ipsos.cz/generace-y-jina-cilova-skupina/ [cit. 19. 7. 2017].

Twenge, J. M. (2010). A review of the empirical evidence on generational difference in work attitudes. *Journal of Business Psychology*, 25, 201-210.

Twenge, J. M., & Campbell, S. M. (2012). Who are the Millennials? Empirical evidence for generational differences in work values, attitudes and personality. *Managing the new workforce: International perspectives on the millennial generation*, 152-180.

Universum Global (2014). Millenials an six-part series. Part One - Six. [online] Universum. Avaiable on: http://universumglobal.com/millennials [cit. 26. 12. 2016].

Is Growth In The European Union Countries Green?

Armand Kasztelan, University of Life Sciences, Department of Economics and Agribusiness, Lublin, Poland, armand.kasztelan@up.lublin.pl

Abstract

The aim of this paper is to analyze the level of 'greening' growth in European Union countries. Research was carried out based on the taxonomic linear ordering method, which enabled multidimensional comparative analysis of multi-featured objects. It is based on indicators related to economic, social, and environmental issues, according to the OECD methodology. The adopted method made it possible to evaluate the studied phenomenon as a whole, providing grounds for assigning the 21 selected countries into five groups, characterized by similar levels of green growth. The conducted analysis shows that Germany was characterized by the highest level of 'greening' growth, while Poland received the lowest rating. Generalizing the results of the study, it can be stated that the degree of greening the economic growth of EU countries is insufficient, especially in the context of pursuing the long-term goal which is the entrance to the path of sustainable development.

Keywords: green growth; sustainable development; taxonomic linear ordering method.

Introduction

In the past decade governments of EU member states have been under pressure to present a credible exit strategy to address the financial and economic crisis (2007-2008). Paradoxically, the crisis also provided a chance to revive activities aiming at a low-emission economy. It contributed to verification and reforms of such sector policies which so far had been both costly and harmful to the environment. (Huhtanen, 2010, s. 91–92; OECD, 2009b)

In the age of 'bootstrapping', the recommendations of OECD concerning resolution of both climatic issues and other environmental challenges at minimum cost seem current and adequate. Many countries use the crisis as an opportunity to implement the ecological tax reform which, as a source of additional budget receipts, at the same time will reduce labour tax burdens (OECD, 2009a, p.2). Mechanisms such as environmental taxes and tradable allowances systems help relieve tax burdens (or at least a part of such burdens) from corporate and personal income tax and social insurance contributions. Taxes on energy and CO2 emissions can also become a natural element of a broader budget consolidation package providing an attractive alternative to increasing taxes on payroll or revenues from economic activity and to cutting down on public expenses (OECD, 2011b, s.4).

The implementation of reforms in OECD countries commenced in the first place under the so-called green growth strategy. Recently, the term 'green growth' has rapidly encroached on the international public debate. The concept was rolled out in 2005 by the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) as a way of finding options for introducing a low-

emission model of sustainable development for fast developing Asian countries (Satbyul, Ho, Yeora, 2014, s. 37–38; ESCAP, 2005).

As a consequence of the last financial crisis interest in green growth has increased among politicians and scientists. The term that was rarely used before 2008 is now a leading discussion point for many international institutions. The World Bank together with five other multilateral development banks agreed to implement the concept of green growth (The World Bank, 2012; OECD, 2012). In turn, the Organization for Economic Cooperation and Development (OECD) developed the assumptions of Green Growth Strategy (the Strategy) consisting of four documents: Towards Green Growth, Towards Green Growth: Monitoring Progress – OECD Indicators, Tools for Delivering on Green Growth and Towards Green Growth: A summary for policy makers (OECD 2011a, b, c, d). In addition, a new international body – the Global Green Growth Institute, supported by many governments, was set up. Its mission is providing respective countries with advice related to the implementation of the assumptions of the concept. Moreover, a decision to organize cyclic meetings at the highest level and to create a cooperation network was made (Global Green Growth Forum, Green Growth Leaders). During G-20 summits in France and Mexico in 2011 and 2012 the world's largest economies made a commitment to promote the idea of green growth (Jacobs, 2012, s. 4).

In 2012, under Mexican presidency, the G20 forum introduced a term 'inclusive green growth', that is, green growth fostering social inclusion as a cross-section priority of the G20 development agenda. During the meeting in Seoul on 19–20 March 2012 the necessity to concentrate activities for the sake of inclusive green growth was emphasized, indicating that it was the key element of achieving long-term sustainable development (OECD, 2015).

Generally, two main conditions that determine the dynamic development of the green growth concept can be identified. First, there is a growing fear of environmental instability of conventional paths of economic growth and the related risk of irreversible change in the fundamental environmental base required to maintain the achieved level of economic welfare. The increasing awareness of imminent climatic crisis brought attention to the fact that environment and economy cannot be treated separately any longer. The existing hazards point to the need for considerable modification of consumer behaviour, structure of industry and technologies in use.

Secondly, the financial and economic crisis created a field for formulating agendas encouraging reconstruction of growth on more ecological and socially sustainable grounds. The high level of economic stagnation means that the alternative cost of 'green' investments is temporarily limited, so the fiscal stimulus packages introduced by governments in response to the crisis contain many measures oriented in particular at 'green' growth. Emphasis was put on the necessity for a strategic approach in order to ensure that upon exit from the crisis and at the following stage the implemented policies are most adequate in terms of economic efficiency, environmental integrity and social justice and are consistent both at a national and international level (OECD, 2010, s. 13; Reilly, 2012, s. S86).

Also, a third reason is given (although not officially) for increased interest in the green growth concept, namely the recently decreasing impact of the sustainable development concept on the development of economic policy. Immediately after the Earth Summit in 1992 the principle of sustainable development was commonly adopted by governments and in many countries it had a significant impact on priority treatment of environmental goals. In the 1990s a sudden 'abundance' of regulations concerning environmental protection, and in the business sector – procedures related to implementation of

environmental management – could be observed. However, at the beginning of the new millennium the global trend towards sustainable development slowed down significantly. What is more, it turned out that practical measures undertaken by states in that respect were not sufficient enough to prevent global changes in the environment. Sustainable development became just one of many obligations of governments. Simultaneously, they realized that in a world where the increase in GDP (and the employment it generates) remains the main driving force for voters and businesses and a priority of government policy, it would be a mistake to focus environmental discussion only on the existing barriers and costs and the related need for restraining economic growth. This is particularly significant with reference to issues of climatic changes where the main care point is the economic costs of mitigating climatic changes and international negotiations concerning the global distribution of associated burdens. Therefore, the fundamental assumption of the green growth concept is departing from the negative and politically unattractive perception of environmental issues in economy (Stern, 2007; Jacobs, 2012, s. 6).

It should be also remembered that green growth, despite being a separate category, is not in opposition to the assumptions of sustainable development. According to a manual prepared by the European Commission, the concept of green growth was developed in order to supplement the concept of sustainable development (European Commission, 2012). With regard to the position of UNO, it can be stated that green growth is seen as an efficient tool to ensure long-term sustainable development. In addition, taking into account the goal we should be aiming at, that is, a 'green' economy built on solid grounds, the following definition of green growth can be proposed: economic growth which takes into account rational utilisation of natural capital, prevents and reduces pollution, and creates chances to improve the overall social welfare by building a 'green' economy, making long-term sustainable development possible. Such a treatment makes it possible to emphasize the integrity of the trio: green growth – green economy – sustainable development (Kasztelan, 2015b; 2017a).

Literature most often quotes the definition proposed by OECD, being the institution most involved in promoting this concept throughout the world. According to the report of the OECD (2017), 'green growth is about fostering and development, while ensuring that natural assets continue to provide the resources and environmental service on which our well-being relies'. Green growth strategies developed at the national level are to encourage businesses and consumers in environmentally friendly behaviours, to improve the optimal reallocation of jobs, capital, and technology toward greener activities, and to provide motivation for the development of eco-innovation (OECD, 2011a; Kijek, 2013; Kijek and Kasztelan, 2013).

The OECD proposed a set of indicators for defining and tracking changes towards green growth. In 2011, the first OECD report was published, showing the conceptual framework, the initial proposal of a set of 30 key indicators of green growth and the results for selected indicators from the OECD database. (OECD, 2011b). In 2014 the second version of the report was published, based on the national sets of green growth indicators ((Federal Statistical Office, 2013; Havranek and Sidorov, 2011; Hak et al., 2014; Statistics Korea, 2012; Statistics Netherlands, 2011 and 2013). A new report proposed 41 core indicators grouped around four main objectives: establishing a low carbon, resource-efficient economy; maintaining the natural asset base; improving people's quality of life; and implementing appropriate policy measures and realizing the economic opportunities that green growth provides. In addition, in order to facilitate communication with decision makers, media, and society, it was decided to develop a representative set of six key indicators. They will allow monitoring several key elements of the concept of green growth,

that is, carbon and material productivity, environmentally adjusted multifactor productivity, a natural resource index, changes in land use and cover, and population exposure to air pollution (OECD, 2014).

The latest report was published in June 2017. It updates but also extends the set of indicators presented in the previous editions of the document. In comparison to 2014, methodological changes include: indicators taking into account in economic efficiency measures the degree of natural resources consumption and the scale of pollutant emissions; revised indicators of technological innovativeness and the level of environmentally harmful subsidies used; improved indicators of human exposure to air pollution and related economic costs (OECD, 2017).

In the updated OECD database, 99 detailed green growth indicators can be extracted, based on the experiences of the member states. However, there is no one synthetic metric that would allow one to evaluate and compare the phenomenon at an international level. Green growth of a given country can be measured but expressing it with one universal meter requires application of a proper method. This amounts to the formation of an aggregate indicator, also called a synthetic variable, which is the basis for structuring examined objects by the level of multi-feature phenomena.

Related surveys carried out so far covered, among other things, an evaluation of green growth in 21 selected OECD countries and were based on Hellwig's model. Analyses involved 33 indicators of green growth for the years 2010-2014 (Kasztelan, 2017b). In addition, in South Korea surveys aimed at utilising 12 OECD framework indicators for comparing green growth strategies implemented in 30 countries. (Satbyul, Ho, Yeora, 2014).

The main goal of this paper is to evaluate the green growth of selected EU countries, based on the set of OECD indicators and taxonomic linear ordering method enabling multidimensional comparative analysis of multi-featured objects. This type of analysis provides answers to the following questions: (1) At what stage are the individual countries placed in terms of implementing the green growth assumptions? (2) What is the overall situation of EU countries according to the studied phenomenon? (3) What are the weak points of greening growth in the analyzed countries? For the purposes of implementing the main research objective, the article utilises the literature method, comparative method, and deductive reasoning. The article concludes with a summary identifying the areas for further research.

Research Methodology

The assessment of the degree of "greening" the economic growth has been carried out based on the taxonomic linear ordering method (taxonomic classification) (Hellwig 1968). Taxonomic procedures are used in the study of complex phenomena that cannot be measured directly (e.g. green growth of countries). For this purpose synthetic measures are constructed. Each of the multidimensional spatial objects (e.g. country) is assigned a metric value that allows for their linear ordering (Kijek, A. 2013). Taxonomic analysis provides an estimate of the level of diversity of objects (e.g., countries) described by a set of statistical characteristics (e.g., indicators). Linear ordering is used to establish a hierarchy of individual objects based on their distance from a reference (e.g., the country for which a particular index is a reference). In a linear hierarchy the maximum degree is 1 (Łogwiniuk, 2011).
Evaluation of the green growth of the EU countries was conducted based on five groups of indicators (table 1). The reference years 2011–2015 were chosen due to the rule of the last available year. Diagnostic variables defining the level of green growth for particular countries were adjusted in an

attempt to meet two criteria: substantive and formal. Substantive indicators selection was based on literature studies, first of all strategic documents of the OECD (2011 b, c, d; 2014) and review of OECD databases. On this basis, 27 countries (EU members, no data for Cyprus) and 99 diagnostic variables were chosen.

The next step was to check if they meet formal criteria, that is, whether they are measurable, complete, and ensure comparability. Firstly, from the database minor and difficult comparable indicators were eliminated. At this stage, the number of indicators was reduced to 73. In the next step, after analyzing the initial data matrix, the following countries were eliminated due to large information gaps: Bulgaria, Croatia, Malta, Romania, Latvia and Lithuania. Furthermore, given the lack of data for the individual indicators, their number was limited to 50.

Ultimately, 21 countries and 50 diagnostic variables were selected for the green growth analysis (table 1). Among the selected variables, twelve were considered to be smaller-the-better (de-stimulants) reducing the synthetic measure of green growth, whereas the rest were regarded as larger-the-better (stimulants) characteristics having a positive influence on the measure.

Stimulants (selected indicators) are explanatory (independent) variables whose increased values cause an increased value in the dependent variable (green growth of countries), while de-stimulants are explanatory variables whose increased values induce a decrease in the value of the dependent variable. Since the set of independent variables (metrics) contains variables that cannot be aggregated directly using appropriate standardization, normalization formulas were applied. Among the normalization formulas, unitarization methods were selected based on the interval of a normalized variable. This was dictated by the fact that it can be used for three types of variables: stimulants, de-stimulants, and nominants. The zero unitarization method was used as follows (Kijek A., 2013; Kukuła, 2000):

– For stimulants:

$$z_{ik}^{t} = \frac{x_{ik}^{t} - \min\limits_{t}\min\limits_{i}\{x_{ik}^{t}\}}{\max\limits_{t}\max\limits_{i}\{x_{ik}^{t}\} - \min\limits_{t}\min\limits_{i}\{x_{ik}^{t}\}} \tag{1}$$

– For de-stimulants:

$$z_{ik}^{t} = \frac{\max\limits_{t}\max\limits_{i}\{x_{ik}^{t}\} - x_{ik}^{t}}{\max\limits_{t}\max\limits_{i}\{x_{ik}^{t}\} - \min\limits_{t}\min\limits_{i}\{x_{ik}^{t}\}} \tag{2}$$

where:

z_{ik}^{t} is the normalized value of the *k*th characteristic in the *i*th object in the *t* period (t = 1, 2, ..., T)

x_{ik}^{t} is the initial value of the *k*th characteristic in the *i*th object in *t* period

Diagnostic features normalized in the abovementioned way take the value from the interval [0; 1]. The closer the value to unity, the better the situation in terms of the investigated feature, and the closer the value to zero, the worse the situation.

Among the methods for creating synthetic metrics, a non-reference method with the system of constant weights was selected, which was influenced by the previously used normalization method of the investigated features. Taxonomic metrics of green growth for the respective periods were built as follows:

$$z_i^t = \frac{1}{k}\sum_{k=1}^{m} z_{ik}^t \tag{3}$$

Table 1: Selected indicators of green growth

Indicators group	Indicators sub-group	Indicator symbol	Indicator name
ENVIRONMENTAL AND RESOURCE PRODUCTIVITY	CO_2 productivity	x_1	Production-based CO_2 productivity, GDP per unit of energy-related CO_2 emissions (US dollars per kilogram, 2010)
		x_2	Production-based CO_2 emissions, Index 2000=100
		x_3	Demand-based CO2 productivity, GDP per unit of energy-related CO2 emissions (US dollars per kilogram, 2010)
		x_4	Demand-based CO2 emissions, Index 2000=100
	Energy productivity	x_5	Energy productivity, GDP per unit of TPES (US Dollar, 2010)
		x_6	Energy intensity, TPES per capita (Tonnes of oil equivalent)
		x_7	Total primary energy supply, Index 2000=100
		x_8	Renewable energy supply, % TPES (Percentage)
		x_9	Renewable electricity, % total electricity generation (Percentage)
	Non-energy material productivity	x_{10}	Non-energy material productivity, GDP per unit of DMC (US dollars per kilogram, 2010)
		x_{11}	Biomass, % of DMC (Percentage)
		x_{12}	Municipal waste generated, kg per capita (Kilograms per capita)
		x_{13}	Municipal waste recycled or composted, % treated waste (Percentage)
	Environmentally adjusted multifactor productivity	x_{14}	Environmentally adjusted multifactor productivity growth (Percentage points)
		x_{15}	Contribution of natural capital (Percentage points)
NATURAL ASSET BASE	Freshwater resources	x_{16}	Total renewable freshwater per capita (Cubic metres per capita)
	Land resources	x_{17}	Forest, % total land area (Percentage)
	Forest resources	x_{18}	Forests under sustainable management certification, % total forest area (Percentage)
ENVIRONMENTAL DIMENSION OF QUALITY OF LIFE	Exposure to air pollution	x_{19}	Mean population exposure to PM2.5 (Micrograms per cubic metre)
		x_{20}	Percentage of population exposed to more than 10 micrograms/m3
		x_{21}	Mortality from exposure to PM2.5 (Per 1 000 000 inhabitants)
	Access to sewage treatment and drinking water	x_{22}	Population connected to public sewerage, % total population (Percentage)
		x_{23}	Population with access to improved sanitation, % total population (Percentage)
		x_{24}	Population with access to improved drinking water sources, % total population (Percentage)
ECONOMIC OPPORTUNITIES AND POLICY RESPONSES	Technology and innovation: Patents	x_{25}	Development of environment-related technologies, % all technologies (Percentage)
		x_{26}	Relative advantage in environment-related technology (Ratio)
		x_{27}	Development of environment-related technologies, % inventions worldwide (Percentage)
		x_{28}	Development of environment-related technologies, inventions per capita

	Technology and innovation: R&D	x_{29}	Environmentally related government R&D budget, % total government R&D (Percentage)
	International financial flows: Official Development Assistance	x_{30}	Environmentally related ODA, % total ODA
		x_{31}	ODA - all sectors - biodiversity, % total ODA
		x_{32}	ODA - all sectors - climate change mitigation, % total ODA
		x_{33}	ODA - all sectors - climate change adaptation, % total ODA
		x_{34}	ODA - all sectors - desertification, % total ODA
		x_{35}	ODA - renewable energy sector, % total allocable ODA
		x_{36}	ODA - water supply and sanitation sector, % total allocable ODA
		x_{37}	ODA - environment sector, % total allocable ODA
		x_{38}	Net ODA provided, % GNI
	Environmental taxes and transfers	x_{39}	Environmentally related taxes, % GDP
		x_{40}	Environmentally related taxes, % total tax revenue
		x_{41}	Petrol tax, USD per litre, 2010
		x_{42}	Petrol tax, % end-user price
		x_{43}	Diesel tax, USD per litre, 2010
		x_{44}	Diesel tax, % end-user price
		x_{45}	Total fossil fuel support, % of total tax revenue
SOCIO-ECONOMIC CONTEXT		x_{46}	Real GDP, Index 2000=100
		x_{47}	Real GDP per capita (US Dollar, 2010)
		x_{48}	Population density, inhabitants per km^2
		x_{49}	Labour tax revenue, % GDP
		x_{50}	Labour tax revenue, % total tax revenue

Source: own elaboration based on OECD database.

The procedure chosen for evaluating the green growth provided multidimensional comparative analysis, allowing comparison of multi-featured objects. Taxonomic meters were applied, which replaced research description using a set of diagnostic features with one aggregate volume that is a synthetic variable. It allowed a comparison between selected member states of the EU providing grounds for classifying them into uniform groups characterized by similar levels of green growth. According to the values of the z_i indicator the EU countries were assigned to one of the five groups with regard to their level of green growth. Group I consisted of member states with the highest while group V was with the lowest level of green growth.

Results

The level of green growth in the selected 21 European Union countries was evaluated based on 50 variables, and the outcomes of the analysis were presented in Table 2. The conducted analysis shows that Germany was characterized by the highest level of 'greening' growth. The taxonomic metric of this country was estimated at 0.4873. Five classes of countries were distinguished that differ in the level of green growth. Besides Germany, Group I included: Denmark, Great Britain, Sweden and France. The lowest evaluation of the studied phenomenon among all 21 member states was Poland for which zi indicator amounted to a mere 0.2906. It is worth noting that none of the examined countries recorded at least an average level (0.5000) of a synthetic green growth meter.

Table 2: Classification of 21 EU member states according to the value of the synthetic measure describing the level of green growth

Group number	The number of countries in the group	The level of green growth	OECD countries
I	5	above 0,4501	Germany (0.4873), Denmark (0.4866), United Kingdom (0.4865), Sweden (0.4796), France (0.4769)
II	4	from 0,4001 to 0,4500	Finland (0.4272), Italy (0.4082), Ireland (0.4076), Belgium (0.4075)
III	7	from 0,3501 to 0,4000	Spain (0.3978), Portugal (0.3836), Luxembourg (0.3758), Hungary (0.3754), the Netherlands (0.3729), Austria (0.3635), Slovak Republic (0.3539)
IV	4	from 0,3001 to 0,3500	Slovenia (0.3375), Czech Republic (0.3303), Estonia (0.3294), Greece (0.3173)
V	1	below 0,3000	Poland (0.2906)

Source: author's calculation.

An extended analysis of respective indicators showed that in all studied countries only 14 (28%) indicators presented outstanding (higher than 0.5000) standardized average values. The worst case recorded was the development of environmental technologies (0.1080) and certain indicators referring to international financing cash flows for the benefit of environment protection: % of total allocable ODA on environment sector (0.1529), % of total allocable ODA on renewable energy sector (0.1808) and % of total ODA on biodiversity (0.1862).

Foreign sources of funding, both public and private, may be particularly useful for those countries that have problems acquiring the national funds. Official development assistance (ODA) is an important source of government-funded international financial flows. It can help catalyze investment for pro-environmental projects and technologies, thus realizing also general development goals. It is also an important factor for the flow international know-how (OECD, 2017).

The results of surveys also indicate that the EU member states have low environmental taxes, including in the first place fuel taxes. This is testified by the values of standardized average taxes on diesel (0.1714) and petrol (0.1750) calculated as USD/litre, as well as the low share of environmental taxes in overall tax revenues (0.2059). In comparison to regulation instruments such as emission limits or mandatory technology norms, application of environmental taxes contributes to achieving environmental goals by polluters at minimum cost. In addition, revenues from ecological taxes foster financial consolidation and reduction of other burdens (e.g. taxes on labour and capital).

On the other hand, if we wish to identify areas with reference to which high standardized average values of synthetic indicator measures were recorded, without any doubt we should mention indicators describing the percentage of population having access to wastewater treatment plants and good quality drinking water (more than 0.8000). Other standardized and averaged values of synthetic measures of the indicators did not exceed 0.7000 and ranged from 0.2241 to 0.6804.

Conclusion

The proposed activities which put economic development and environmental quality together as alternatives can lead to considerable controversies. On the other hand, progress towards green growth offers a chance of a wider consensus and acceptance in that respect. At the time when many governments face increasing environmental hazards, apart from constant pressure to generate economic development, the green growth policy provides societies with chances to achieve the maximum return on investment in economic and environmental progress.

The results of the study show that much still remains to be done in sustainable greening of the economic growth in EU countries. The results of the research presented in this article were based on green growth indicators selected from the OECD database. The use of the taxonomic linear ordering method in the research, which belongs to the group of multidimensional taxonomic methods, allowed the classification of the selected EU countries into one of five groups identified based on their green growth level. Taking into account the adopted research methodology it can be stated that none of the countries surveyed is even half way to achieving fully green growth.

The obtained results support the usefulness of synthetic metrics for evaluating the level of green growth at the national level. It should be stressed, however, that the research was based on 50 out of 99 indicators included in the OECD database. There is, therefore, a significant information gap with regard to specific indicators. Due to better data availability, it would be possible to expand the set of indicators for the analysis, as well as the number of countries, which in turn would lead to more comprehensive evaluation of green growth.

References

ESCAP (2005), 'State of Environment Asia and the Pacific 2005,' Bangkok.

European Commission (2012), 'Connecting Smart and Sustainable Growth through Smart Specialisation. A Practical Guide for ERDF Managing Authorities,' Publications Office of the European Union, Luxembourg.

Federal Statistical Office (2013), Test of the OECD Set of Green Growth Indicators in Germany 2012, Wiesbaden.

Hak, T., Sidorov, E. and Hajek, M. (2014), 'Green Growth in the Czech Republic. Selected Indicators 2013,' Czech Statistical Office, Prague.

Havranek, M. and Sidorov, E. (2011), 'Green Growth in the Czech Republic. Selected Indicators,' Czech Statistical Office, Prague.

Hellwig, Z. (1968), 'Application of the Taxonomic Method to the Countries Typology According to their Level of Development and the Structure of Resources and Qualified Staff' (in Polish), *Przegląd Statystyczny* 4, 307–326.

Huhtanen, T. (2010), 'Europe and Green Growth: The Key to Recovery?' In: State of the Union 2010. Schuman Report on Europe, Springer-Verlag France, Paris.

Jacobs, M. (2012), 'Green Growth: Economic Theory and Political Discourse,' Centre for Climate Change Economics and Policy, "Working Paper", No. 108, Grantham Research Institute on Climate Change and the Environment, "Working Paper" No. 92.

Kasztelan, A. (2015b), 'Zielony Wzrost jako Nowy Kierunek Rozwoju Gospodarki w Warunkach Zagrożeń Ekologicznych,' *Studia Ekonomiczne*, No 2 (LXXXV), 185-208, DOI: 10.1515/mgrsd-2015-0010.

Kasztelan, A. (2017a), 'Green Growth, Green Economy and Sustainable Development – Terminological and Relational Discourse,' *Prague Economic Papers*, 26(4), 487–499, https://doi.org/10.18267/j.pep.626.

Kasztelan, A. (2017b), 'The Use of the Hellwig's Pattern Model for the Evaluation of Green Growth in OECD Countries,' Proceedings of the 29th International Business Information Management Association Conference: Sustainable Economic Growth, Education Excellence, and Innovation Management through Vision 2020, 3-4 May 2017, Vienna Austria, pp. 1035-1044, ISBN: 978-0-9860419-7-6.

Kijek, A. (2013), 'Ryzyko Sektorowe Przemysłu Przetwórczego. Modelowanie i Ocena,' Wydawnictwo UMCS, Lublin.

Kijek, T. (2013), 'External Conditions Influencing the Implementation of Eco-Innovations in European Enterprises,' *Rocznik Ochrona Środowiska - Annual Set The Environment Protection*, vol. 15, No. 1, 659-670.

Kijek, T. and Kasztelan, A. (2013), 'Eco-Innovation as a Factor of Sustainable Development,' *Problemy Ekorozwoju-Problems of Sustainable Development*, vol. 8, no 2, 103-111.

Kukuła, K. (2000), 'Metoda Unitaryzacji Zerowanej,' PWN, Warsaw.

Łogwiniuk, K 2011, 'Zastosowanie Metod Taksonomicznych w Analizie Porównawczej Dostępu do Infrastruktury ICT przez Młodzież Szkolną w Polsce', *Economy and Management*, 1/2011, pp.7–23.

OECD (2009a) 'From Grim to Green,' OECD Messages on Green Growth, [Online], [Retrieved August 15, 2017]. Available: http://www.oecd.org/greengrowth /47411244.pdf.

OECD (2009b) 'OECD and Green Growth,' OECD, Paris.

OECD (2010) 'Interim Report of the Green Growth Strategy: Implementing our Commitment for a Sustainable Future,' Meeting of the OECD Council at Ministerial Level 27–28 May 2010, C/MIN(2010)5.

OECD (2011a) 'Towards Green Growth,' OECD, Paris.

OECD (2011b) 'Towards Green Growth: Monitoring Progress - OECD Indicators,' OECD, Paris.

OECD (2011c) 'Tools for Delivering on Green Growth,' OECD, Paris.

OECD (2011d) 'Towards Green Growth. A Summary for Policy Makers,' OECD, Paris.

OECD (2012) 'Inclusive Green Growth: For the Future We Want,' OECD, Paris.

OECD (2014) 'Green Growth Indicators 2014,' OECD Green Growth Studies. OECD, Paris.

OECD (2015) 'A Toolkit of Policy Options to Support Inclusive Green Growth, Submission to the G20 Development Working Group by the AfDB, the OECD, the UN and the World Bank, [Online], [Retrieved January 11, 2015]. Available: http://www.oecd.org/greengrowth/toolkit.pdf.

OECD (2017) 'Green Growth Indicators 2017,' OECD Publishing, Paris, [Online], [Retrieved August 28, 2017]. Available: http://dx.doi.org/10.1787/9789264268586-en.

Reilly, J.M. (2012), 'Green Growth and the Efficient Use of Natural Resources, '*Energy Economics*', Vol. 34, S85–S93.

Satbyul, K.E., Ho, K. and Yeora, C. (2014), 'A New Approach to Measuring Green Growth: Application to the OECD and Korea,' *Futures,* vol. 63, 37–48.

Statistics Korea (2012), 'Korea's Green Growth (based on OECD Green Growth Indicators),' Statistics Korea, Daejeon.

Statistics Netherlands (2011), 'Green Growth in the Netherlands,' Statistics Netherlands, Hague.

Statistics Netherlands (2013), 'Green Growth in the Netherlands 2012,' Statistics Netherlands, Hague.

Stern, N. (2007), 'The Economics of Climate Change: the Stern Review,' Cambridge University Press, Cambridge.

The World Bank (2012), 'MDBs: Delivering on the Promise of Sustainable Development,' The World Bank, Washington D.C., [Online], [Retrieved April 15, 2016]. Available: http://www.worldbank.org/en/news/feature/2012/06/19/mdbs-delivering-promise-sustainable-development.

Takaful vs. Conventional Insurance from the Risk and Solidarity Perspective

Rusni Hassan
Professor and Deputy Dean at IIUM Institute of Islamic Banking and Finance (IIiBF), International Islamic University Malaysia. hrusni@gmail.com

Syed Ahmed Salman
Research Scholar at IIUM Institute of Islamic Banking and Finance (IIiBF), International Islamic University Malaysia. salmaniium@gmail.com

Abstract

In conventional insurance, the basis of the contract is not mutual help where each of the policy holders contribute money to help one another when they face difficulties; rather the insured transfers their risks onto the insurer, who in return transfers the same risks onto the reinsurance operators. Hence, the contractual relationship in conventional insurance is not based on risk sharing where each and every one supports and helps the other, but instead on risk transfer which fosters an atmosphere of selfishness in protecting each individual party. Furthermore, the conventional insurance practice is embedded with unethical elements, which include but are not limited to: investment in *Shari'ah* non-complaint elements, gambling, uncertainty, and usury. In essence, it is some of the practices related to insurance that are against *Shari'ah*, not the concept of insurance itself. When something is not in conformity with *Shari'ah*, unethical consequences arise. In an effort to avoid the unethical and *Shari'ah* non-complaint issues in insurance practices, one practical solution is to replace conventional insurance with a *Shari'ah* compliant version known as Takaful. To ensure the preservation of a harmonious society, *Shari'ah* aims to mould our conducts in all aspects of our rituals and daily life activities. Takaful operators need not to be anxious of loss of profits since *Shari'ah* compliance does not equate to financial loss because Islam actually encourages business activities and trade where transactions are also compliant within the boundaries of *Shari'ah*. With Takaful functioning as an alternative counterpart to conventional insurance, solutions will be drawn up for many problems. For instance, major prohibited elements which include uncertainty, usury, and gambling will be eradicated. Additionally, prohibited business activities are steered away from Takaful scheme. What makes Takaful contracts totally unique compared to conventional insurance contracts is that the latter is based on the exchange of risk whereas the former is based on the concept of risk sharing. Setting aside the financial gains, moral and societal gains are also expected from Takaful where solidarity among the society is promoted with the concept of mutual cooperation put into action throughout the community.

Keywords: Risk Sharing, Solidarity, Takaful & Insurance

Introduction

Conventional insurance is based purely on the element of interest, whether it is life or general insurance (Salman, 2014; Salman & Htay, 2014; Ali et al., 2014; Kasim et al., 2015). The main objective of the insurance company is to generate interest income by investing its funds in traditional investment instruments. The policyholders have to pay surcharges if they fail to pay their premium on time. Moreover, when life insurance policy reaches its maturity or death claim, the amount payable under such policy is much more than the amount received by way of premium. Both in general and life insurance, the insurance funds are invested in instruments which are interest based (Qaiser, 2014).

Conventional insurance is based on the uncertainty whether it is life or general insurance (Htay & Salman, 2014; Kasim et al., 2015), whereby the policyholders pay the premium with the expectation that they will be able to claim in the case of misfortune and future loss. In this situation, it is not clear for what the policyholders are paying. The future loss is not sure, and hence, there exist uncertainty of the substance for which the policyholders are spending their money (El- Gamal, 2000; Kasim et al., 2015). Insurance involves gambling because it is the game of gain or loss. If the policyholders make the claims, it will be the loss for the insurance companies, and if there is no claim, the insurance companies make a profit and the policyholders will get nothing and lose their premium (Salman & Htay, 2014). Also, Actuaries use the statistical method to estimate the probability of gain for the insurance companies, and then the underwriting process and premium is determined. Hence, it is trying to ensure that insurance companies are in the upper hand to benefit more from the game (Kasim et al., 2016). When the insurance operator receives the premium, it will be invested in income-generating activities such as investment in short-term deposit or companies by buying the shares. The investment revenue is generated out of prohibited activities such as investing in the interest-bearing loan or liquor business. Conventional insurance operators are not currently restricted on where they can invest. They can invest anywhere regardless of Shari'ah compliance (Salman, 2014).

The practice of insurance involves interest, uncertainty, gambling and involvement in prohibited elements. Thus, Shari'ah scholars unanimously agreed on the prohibition of insurance and the Muslim scholars introduced *Takaful* to replace the conventional insurance. Therefore, this paper shows how Takaful is free from prohibited elements and based on risk sharing and solidarity.

What is Takaful: A Brief Introduction

If the history of takaful is examined, it can be traced back to Prophet Muhammad (PBUH). The concept of Al-Aqīlah was established by the Prophet (PBUH) in the decision given in a dispute among two women from the tribe of Huzail (Hassan, 2011; Salman et al., 2015 Salman et al., 2015). Al-Aqilah is a concept of mutual assistance by the members in the society whereby they jointly contribute for the payment of compensation the in the event that any of the member committed murder and has to pay compensation to deceased family. The notion and concept of takaful initiated from the idea and concept of Aqīlah and it has been experienced since the Prophet's (PBUH) through to the present day (Htay & Salman, 2013; Salman et al., 2017; Salman et al., 2017).

It is obvious that nowadays insurance has become a necessity rather than a luxury. Overall, the growth of the insurance industry is tremendous due to employment and regulatory requirements, which force us to buy it (Salman et al., 2017). The concept of insurance is against Islamic principles and also with ethical perspective (Htay & Salman, 2014). In Islam, something is not in line with Shari'ah, it will incur unethical consequences from the Islamic perspective. The objective of Shari'ah is to moul our conducts in all aspects of our ritual and daily life activities in order to ensure that we can stay in the harmonious environment and society.

For insurance to be a perfect tool, it should be transformed into Takaful. Since Takaful has been introduced as an alternative to conventional insurance. Takaful is an insurance product which is free from prohibited elements.

Takaful is based on the principle of *Taʿāwun* (cooperation) and *Tabarru* (mutual help) where the risk is shared collectively by members of a policy (Billah, 2002; Maysami & Williams, 2006; Usmani, 2007; Htay & Salman, 2013; Faruk & Rahaman, 2015; Htay & Salman, 2015).

The contract used in Takaful differs completely from conventional insurance because the former is based on risk sharing while the latter is based on the exchange of risk. The policyholders in Takaful are helping one another by mutually giving the protection in the event that anyone of them have met with a misfortune. With that, Takaful will be able to promote the solidarity and brotherhood among the society as well as practice of mutual and cooperative concept in the community.

Moreover, Takaful is based on mutual-cooperation which can bring the society together, inject the harmonized atmosphere, consider the needs of society for the long-term success and sustainability of the insurance operators. Consequently, unfairness and unethical practices can be minimized to some extent.

Regarding surplus distribution, surplus is profit in insurance and the insurance operators take it without sharing with the policy holders. However, in Takaful, the surplus is shared among the participants, and so it is a good and unique practice. Takaful contribution is structured in such as a way that some portion of the contribution is allocated to the risk sharing fund from which the claims are paid. This fund is based on the concept of risk sharing among the participants under the supervision of Takaful operators to help the financial needs of the participants according to the terms and conditions of Takaful contract. It can be assumed to be the unique features of Takaful because, in the conventional insurance, the policy holders pay the premium and consequently, it will be the revenue for the operators, and when there is any claim, it is recognised as expenses for the operators. Thus, in the later practice, there is no concept of risk sharing.

Takaful is not a religious product, but rather, it is a commercial product. It is suitable for anyone, regardless of religion. Its importance and significant role in the finance industry is tremendous. It can be remarked that takaful has a more value-added substance than insurance and it is the ultimate solution for anyone who is seeking financial protection for their potential misfortune.

Conclusion

Like insurance, takaful can provide financial assistance while remaining free from the prohibited elements involved in the insurance practices. In addition, Takaful is known as ethical insurance. It is based on the concept of mutual help and cooperation and it fosters solidarity and brotherhood among the participants.

References

Ali, M.M., Hassan, R. and Hasan, S.M., 2015. An Exploratory Study of Shari'ah Issues in the Applicationof Tabarru' for Takaful. *Global Review of Islamic Economics and Business*, *1*(3), pp.164-174.

Billah, M.M.S., 2001. Takaful (Islamic insurance) premium: A suggested regulatoryframework. *International Journal of Islamic Financial Services*, *3*(1).

El-Gamal, M.A., 2000. *A basic guide to contemporary Islamic banking and finance* (Vol. 1). Houston, TX: Rice University.

Faruk, O. and Rahaman, A., 2015. Measuring Efficiency of Conventional Life Insurance Companies inBangladesh and Takaful Life Insurance Companies in Malaysia: A Non-Parametric Approach. *Management Studies and Economic Systems*, *2*(2), pp.129-144.

Hassan, R., 2011. *Islamic Banking and Takaful*. Pearson Custom Publishing.

Htay, S.N.N. and Salman, S.A., 2013. Viability of Islamic insurance (takaful) in India: SWOT analysis Approach. *Review of European studies*, *5*(4), p.145.

Htay, S.N.N. and Salman, S.A., 2013. Introducing Takaful in India: An Exploratory Study on Acceptability, Possibility and Takaful Model. *Asian Social Science*, *10*(1), p.117.

Htay, S.N.N. and Salman, S.A., 2015. Future Outlook of Takaful (Islamic Insurance) in Canada. *Banking & Finance Law Review*, *30*(3), p.541.

Kasim, N., Htay, S. N. N., & Salman, S. A., 2015. Risk-Sharing and Shared Prosperity ThroughTakaful.*Middle-East Journal of Scientific Research* 23 (11).

Kasim, N., Htay, S.N.N. and Salman, S.A., 2016. The Religious Perspective of Takaful as Ethical Insurance. *Mediterranean Journal of Social Sciences*, *7*(4), p.96.

Maysami, R.C. and Williams, J.J., 2006. Evidence on the relationship between Takaful insurance and fundamental perception of Islamic principles. *Applied Financial Economics Letters*, *2*(4), pp.229-232.

Qaiser. R., 2014. Islamic Insurance. Retrieved January 20, 2012. http:// www. Niapune .com/Research/TAKAFUL%20INSURANCE.pdf.

Salman, S.A., 2014. Contemporary Issues in Takaful (Islamic Insurance). *Asian Social Science*, *10*(22), p.210.

Salman, S.A., Ab Rashid, H.M. and Htay, S.N.N., 2017. Viability of Introducing Takaful (Islamic Insurance) in India: Views of Politicians. *Banking & Finance Law Review*, *32*(2), p.389.

Salman, S.A., Rashid, H.M.A. and Hassan, R., Awareness and Knowledge of Insurance and Takaful in India: A survey on Indian n Insurance Policy Holders. *Man In India*, *97*(11), pp.127-140.

Salman, S.A., Rashid, H.M.A. and Htay, S.N.N., Takaful (Islamic Insurance): When We Started and Where We are Now. *International Journal of Economics, Finance and Management Sciences*, 3(5-2): 715.

Salman, S.A., Rashid, H., Majdi, A. and Htay, S.N.N., 2015. The Policy holders' knowledge onInsurance and Takaful: An Exploratory Research in India. *International Journal of Research in Commerce & Management*, *6*(6).

Usmani, M.J., 2007. Takaful paper presented at securities and exchange commission of Pakistan. In *Takaful conference in Karachi*.

The Acceptability and Possibility of Takaful in a Conventional Environment: A Case Study in Non-Muslim Countries

Rusni Hassan
Professor and Deputy Dean at IIUM Institute of Islamic Banking and Finance (IIiBF), International Islamic University Malaysia. hrusni@gmail.com

Syed Ahmed Salman
Research Scholar at IIUM Institute of Islamic Banking and Finance (IIiBF), International Islamic University Malaysia. salmaniium@gmail.com

Abstract

Whether it relates to personal life or business transactions, one of the main factors that make human being unsafe is misfortune. It has become custom that people who wish to transfer or mitigate the consequences of misfortune do so through the purchase of insurance premiums, which serve to compensate misfortune with financial aid when the conditions of such insurance coverage occur. There is no doubt that insurance is part and parcel of practices in all types of human societies as witnessed all over the globe. However, some negative elements, such as the uncertainty, usury and gambling, are often included into the practices of conventional insurance. Due to the unfair ethical nature of these aforementioned practices, conventional insurance is sometimes rejected since these practices are against the teachings of Islam. In order to benefit from insurance and steer away from such practices, an alternative form of insurance known as Takaful has been recommended by experts in Islamic finance. Since its introduction, Takaful seems to have gained momentum not just in Muslim majority lands but also in the non-Muslim countries. Hence, this study aims to discover to what extent has Takaful been accepted in the countries where Takaful products are presently offered, and to what extent is it potentially possible to introduce Takaful in non-Muslim countries. The sample countries included in this paper are Singapore, India, Canada, the USA, and Australia. By looking at the literature review, it was revealed that the availability of Islamic Banks in the non-Muslim countries is quite limited compared to those in Muslim majority countries. Furthermore, there is a huge potential to introduce and disseminate Takaful throughout India which is home to a Muslim population of 180 million people. By looking back at the existing and potential development of Takaful, the presence of significant numbers in the Muslim communities is one main factor that facilitates the potential expansion of Takaful into future market. Furthermore, it can be said that Takaful has the huge potential for growth with the existing Islamic banks in non-Muslim countries serving as jump boards for future Takaful products. Thus, the findings conclude that there is higher level of acceptability and possibility of Takaful in the conventional systems of Singapore, India, Canada, the USA, and Australia.

Keywords: Acceptability, Possibility, Takaful, Conventional Insurance

Introduction

Human activities and transactions are always vulnerable to error and mistake, which makes them exposed to risks. Risks may be minor, but all too often these risks may affect property, business transactions, and even lives in the form of hurdles and wounds. With such risks arising, the question on how to assist such unfortunate people is posed; with one of the solutions to tackle such situations is through insurance policies. The most sublime form of insurance aims at distributing liability among the concerned parties through understanding and mutual co-operation; hence potential victims can have peace of mind from such dangers and unforeseen risks can be steered away from.

Albeit beneficial, elements such as gambling, usury and uncertainty are entwined into the fabric of conventional insurance, which are deemed as unethical and prohibited under certain belief systems, including Islam. As noted by Billah (2007), specialists in Islamic finance proposed an alternative unconventional insurance, known as Takaful and based on ethics and fairness, mainly due to the fact that contemporary scholars of Islam concluded that conventional insurance is Islamically prohibited.

Takaful is based on the concept of Tabarru' and Taʿāwun (cooperation) where each and every member of the insurance policy collectively share the risk (Billah, 2002; Maysami & Williams, 2006; Usmani, 2007; Htay & Salman, 2013; Faruk & Rahaman, 2015; Htay & Salman, 2015).

Acknowledging its great benefits, Takaful is not exclusively for the Muslims. In addition to offering the assurance and protection that conventional insurance does, Takaful includes additional attractive features particularly the fact that Takaful is free from uncertainty, usury, and gambling. This makes Takaful more attractive compared to conventional insurance. Furthermore, Takaful opens the door to potential Muslim customers because some Muslims steer away from conventional insurance due to the prohibited elements, whereas Takaful is halal-certified, making it acceptable in Islam. Another unique feature of Takaful as compared to conventional insurance is that when there is a surplus then all parties, including the insured, are expected to share it with the Takaful operators. Htay and Salman (2013) reckoned that this additional benefit serves as a criterion between Takaful and conventional insurance.

The Milliman Research Report (2017) informs of a 13% to 14% growth per annum in the total contributions of the overall global Takaful market for the period of 2012-2015. Despite its strong growth, compared with the global insurance the market share of Takaful is comparatively low. However, this can be justified by acknowledging the fact that the Takaful industry is relatively new with only 35 years of presence in the market as compared to conventional insurance which dates back to more than a millennium.

The researchers are motivated to observe to what extent Takaful is accepted and possible to be introduced into conventional environment markets with ethics being a central part of Takaful. This study aims to examine the acceptability and possibility of introducing Takaful in Singapore, India, Canada, the USA, and Australia, as case studies to carry out this research.

Case studies of Takaful in Non-Muslim Countries

Singapore

The year 1995 marked the first time when Takaful products were first offered in Singapore where the Monetary Authority of Singapore (MAS) spearheads the role of regulating Takaful under the same framework as conventional insurance. Lian (2008) stated that this is the case because supervisory oversight and prudential concerns are largely common to both forms of insurance. To ensure a level playing field between conventional insurance and Takaful, MAS works closely with industry players to make sure that regulatory and tax incentives for both conventional products and *Shari'ah* compliant products are treated alike. This leads Muslim respondents in Singapore who observe Shari'ah compliance in financial products to be aware of the existence of Takaful (Maysami & Williams, 2006).

India

India offers a multitude of factors that attract the introduction of Takaful products. As observed by the IRDA Annual report (2010-2016) there is a decline in life insurance offices with a low life insurance penetration rate, serving as evidence for a diminishing demand for life insurance policies among Muslims in India. Surprisingly, India's investment in the Saudi Arabian market has been a success with Takaful

investment in the form of the Saudi Indian Company for Cooperative Insurance (SICCI), which is owned by an Indian public company called the LIC. This success ought to encourage the Indian government to consider and encourage the introduction of Takaful throughout India. Another factor found by Htay and Salman (2013) is related to demographics in India, whereby the second highest Muslim population in the world are based in India[i]. Most Muslims are reluctant to participate in forms of insurance which are prohibited in Islam given there is no Takaful alternatives in India. Adding to this argument, Salman et al. (2015) states that not only is India home to the second largest Muslim population in the world after China, India is also the second most populous country in the world with a population of 1.27 billion people[ii] providing huge potential to Takaful provider.

Canada

Many factors make Canada a fertile place for Takaful schemes, with some of these being: the highest growing rate in Canada being within the Muslim population, the acceptance of mutual insurance, favourable GDP growth in Canada, and the current existence of concept and faith based insurance practices, with the potential to integrate the concept of Takaful into the practice of Christian faith based insurance companies in addition to commercialized insurance companies (Htay & Salman, 2015). Ethics are enshrined in Takaful which makes it favourable in Canada, keeping in mind the diversity of Canada in its religious and cultural backgrounds. To curb the current moral hazard and adverse selection in some insurance policies, as revealed by Htay and Salman (2015), Takaful products serve as a good venture to consider, giving Canada much potential to serve as a hub for Islamic finance in North America.

The USA

Two elements that make the USA attractive to Takaful schemes is the potential for increased demand in the US and the stability of Islamic investments. Being a country of immigration, Takaful offers yet another opportunity for American Muslims to assimilate in the fabric of society at their own terms, acknowledging the need for a comprehensive policy on regulating the Takaful industry therein and encouraging future growth in the US market. The sense of second generation American Muslim's identity has dissolved into the American fabric but is retained in the form of religious adherence. While the US market has traditionally focused on three separate sectors of securities, banks, and insurance, Hashmi (2016), observed that the global growth of Islamic finance in these three areas has also occurred, where the researcher found that securities insurance policies in the form of Takaful in the form of Sukuk are among the fastest growing sectors and the US market can benefit greatly from these two.

Australia

Despite the small percentage of Muslims in Australia compared to other developed nations, Islamic financial services are growing and on the rise in the Australian market, which includes Takaful. Although the industry consisted of mutual operators in Muslim majority countries, the relative success of these schemes has lead these Islamic financial services to be introduced into developed non-Muslim countries with a growing involvement in the market. Despite this penetration, Australia poses certain challenges to Takaful providers. Jamie Reid (2008), predicts that if the Muslim population of Australia continues to grow then the viability of introducing Islamic financial services in Australia will become viable, both to mutual and profit financial institutions. Jalaluddin (2015) took the stance that Takaful services have the potential to create jobs for all Australians, Muslims and non-Muslims, and hold a high ability to generate profits since Australian Muslims are a segment of society that require ethical alternatives in insurance services to protect their properties and belongings.

Conclusion

In this paper, a few developed countries have been selected as case studies to project the potential of the Takaful industry as an alternative form of insurance. Bearing in mind that Takaful is suitable for both Muslim customers and non-Muslim due to ethical issues conventional insurance is steered away from by Muslims, Takaful appeals to a wider range of customers promising excellent potential and high rapid growth due to this wider coverage. Furthermore, the distribution of surplus among all the parties in a Takaful scheme, including the insured, makes it more attractive compared to conventional insurance. Parallel to Takaful, the increasing growth rate of Islamic banking also offers a field for Takaful operators because Islamic banks need protection for their depositors. Another opportunity for Takaful industrial players to penetrate the market is considering societies with a high growth of Muslims. As is the case of India and Singapore, countries with high Muslim populations where Islam is not the official religion and that they are the minority, offers a potential mass market for Takaful schemes, serving to saturate the urgent need of Muslims in these countries in the form of Islamic compliant financial products, particularly Takaful services. With high demand and low supply, more Islamic financial institution should be set up in these countries due to the limited number of Islamic financial institution therein, serving as a call to the major Takaful operators to take the initiative to explore these virgin markets that are yet to be given their full potential.

References

Billah, M.M.S., 2001. Takaful (islamic insurance) premium: A suggested regulatoryframework. *International Journal of Islamic Financial Services*, *3*(1).

Faruk, O. and Rahaman, A., 2015. Measuring Efficiency of Conventional Life Insurance Companies inBangladesh and Takaful Life Insurance Companies in Malaysia: A Non-ParametricApproach. *Management Studies and Economic Systems*, *2*(2), pp.129-144.

Hashmi, A.T., 2016. *Islamic finance in the United States: Adoption and adaptation* (Doctoral dissertation,The University of Texas at Dallas).

Htay, S.N.N. and Salman, S.A., 2013. Viability of Islamic insurance (takaful) in India: SWOT analysisApproach. *Review of European studies*, *5*(4), p.145.

Htay, S.N.N. and Salman, S.A., 2013. Introducing Takaful in India: An Exploratory Study on Acceptability, Possibility and Takaful Model. *Asian Social Science*, *10*(1), p.117.

Htay, S.N.N. and Salman, S.A., 2015. Future Outlook of Takaful (Islamic Insurance) in Canada. *Banking& Finance Law Review*, *30*(3), p.541.

IRDAI., Annual report., 2015-2016. Retrieved on 20th May 2017 fromfile:///C:/Users/Syed%20Salman/Downloads/Annual%20Report%202017 15%20(2).pdf.

Jalaluddin, A., 2015. Potentials for Takaful (Islamic Insurance) in Australian Financial Market.http://www.amust.com.au/2015/03/potentials-for-takaful-islamic-insurance-in Australian financial-market.

Jamie, R., 2008. Takaful insurance an introduction. http://www.finity.com.au/wp/wpcontent/uploads/2011/08/Takaful-Insurance.

Lian, T. S., 2013. 4th IFSB Seminar on The Regulation of Takaful, Singapore, Monetary Authority of Singapore. http:// www. Mas . gov . sg / news -and – publications /monetary -policy statements -and – speeches/2008/opening-address-by-teo-swee-lian-dmd-mas-at the-4th-ifsb-seminar-on-the-regulation-of-takaful.aspx

Maysami, R.C. and Williams, J.J., 2006. Evidence on the relationship between Takaful insurance andfundamental perception of Islamic principles. *Applied Financial Economics Letters*, *2*(4), pp.229232.

Milliman Research, Global Takaful Report., 2017. Market trends in family and general Takaful.http://www.milliman.com/uploadedFiles/insight/2017/Takaful-2017-full-report.pdf.

Salman, S.A., Rashid, A., Majdi, H., Htay, N. and Nu, S., 2015. This is the Time to Offer Takaful (Islamic Insurance) in India. *Journal of Islamic Banking & Finance*, *32*(4).

Salman, S.A., Rashid, H.M.A. and Hassan, R., Awareness and Knowledge of Insurance and Takaful inIndia: A survey on Indian Insurance Policy Holders. *Man In India*, *97*(11), pp.127-140.

Salman, S. A., 2015. Insurance as the Backbone of Risk Management. *International Business Management*, 9 (1): 54-59.

Usmani, M.J., 2007. Takaful paper presented at securities and exchange commission of Pakistan. In *Takaful conference in Karachi*.

Endnotes

[i] http://www.mapsofworld.com/world-top-ten/world-top-ten-countries-with-largest-muslim-populations-map.html

[ii] http://www.indiaonlinepages.com/population/india-current-population.html

An Analysis of Local Search Engines in Europe With a Focus on the Czech Market

David Prantl, author, Plzeň, Czech Republic, prantld@kmo.zcu.cz

Abstract

There are numerous search engines on the Internet, thanks to which users can quickly access information from all over the world. One of the world's best-known search engines is Google; however, in Europe it has two local competitors – Yandex and Seznam.cz. This paper focuses on the Czech search engine, Seznam.cz, and an evaluation of its position in the Czech market as well as, on a wider scale, the European market. The analysis of the economic performance of Seznam.cz revealed that the company has excellent financial results. The two main search engines used by Czech Internet users are Seznam.cz and Google. Market research has indicated that while in the past the most widely used search engine was Seznam.cz, in recent years its share has been rapidly dropping, and since 2016 the majority of Czech Internet users have been using Google. The Seznam.cz Company has recently been transforming into a media empire and news server. With respect to the wide range of its services, the company can be expected to grow despite a decrease in its search engine market share.

Keywords: search, engines, Seznam.cz, local

Introduction

Search engines are a type of Internet website (Kotler, 2007). Tonkin (2016) considers Google to be the most successful one in the world. It uses very advanced algorithms for sorting websites, which can offer relevant results even for complex key phrases. Developing such an algorithm is very difficult. Google is one of the most valuable companies in the world (Levy, 2012). Search services sort information and are essential in today's society. It is very difficult to compete with such a large and valuable company. Despite this fact, several local search engines are faring well. In the article, we will focus on the search engine of the Seznam.cz Company, which for years has surpassed Google in the Czech market.

The Analysis of Search Services in European Countries

Google clearly dominates among web search services in the European market. The only exception is Russia, where the Yandex search engine is used more frequently. This is confirmed by statistics provided by the Alexa.com tool, which has been recommended as a suitable tool for evaluating website traffic by a number of studies (Bruce, Sedhain, 2006, Vaughan, Yang, 2013, Fishkin, 2015). The Yandex search engine also has a strong position in Ukraine, Belarus and Kazakhstan, although according to Alexa.com (2016), Google is the most widely used search engine in all these countries. However, according to Similarweb.com (2016), the most frequently used search engine in Kazakhstan and Belarus is Yandex. The Yandex Company also operates in the Turkish market, although its position there is the weakest among the countries mentioned above.

In most European countries, Google is not only the most widely used web search service, but also the most visited Internet website in general. According to Alexa.com (2016), only in Albania, Russia and Malta does a the most frequently visited website differ. In Russia, the top website is the social media site VK. In Albania, according to Alexa.com (2016), the most visited websites are local news servers. However, these statistics are not confirmed by Similarweb.com (2016), which names Google as the market leader in these countries.

Google's dominant position is strongest in Western European countries, where the second most frequently visited Internet website is often YouTube.com, also owned by Google. Third on the list is

Facebook.com. The most visited websites in Western Europe also include Amazon.com. Mainly in smaller European countries, local news websites and e-auction portals also rank high. This is due to the fact that in these countries global companies are not interested in having a strong market share (no local representation exists).

The prominent web search engines used in European countries are Google, Yandex and Seznam.cz (Table 1). The last of these has a strong position in the Czech market. No other web search service has made it to the top 5 most frequently visited websites in any European country (Alexa.com, 2016). According to Alexa.com (2016), the Seznam.cz search engine is the third most frequently visited website in the Czech market. The first two places are held by Google.com and the video portal YouTube.com. The same position of the Seznam.cz search engine in the Czech market is also confirmed by the service Similarweb.com (2016).

Table 1: List of European countries where Google is threatened by a local search engine

Country	Local search engine	Estimated total number of visits in September 2016 to the local search engine	Estimated total number of visits in September 2016 to Google
Russia	Yandex.ru	**2,415 million**	1,419 million
Ukraine	Yandex.ua	237 million	**421 million**
Czech Republic	Seznam.cz	178 million	**192 million**
Belarus	Yandex.by	**81 million**	69 million
Kazakhstan	Yandex.kz	**50 million**	35 million

Source: Similarweb.com (2016)

Apart from the Google search engine and the local search engines mentioned above, also operating in the European market is Microsoft's global search engine, Bing, as well as the Yahoo search engine. However, both of these search engines have a rather low market share in European countries (Rosoff, 2014).

According to a study (Paananen, 2012), Yandex's higher position compared to Google is attributed to the more advanced use of the Russian language (better knowledge of synonyms, declination, etc.) However, since 2012 Google has significantly improved its algorithms for foreign languages and thus a new study is needed. A study (Raddad, 2013) from 2013 already prefers Google to Yandex. The study conducted by Bihun (2017) compared the speed of the Google and Yandex search engines. Google displayed the results faster and thus received a higher rating. The main reason for the dominant position of Yandex over Google in Russia lies in the marketing activities of Yandex and the overall advantage of the fact that it operates on home turf (users tend to prefer local services).

No scientific study comparing Seznam.cz and Google has been conducted. Technical literature has not dealt with this search engine. The author of this paper will be one of the first researchers to focus on the Seznam.cz Company and its search engine in the following text.

Brief information about ICT in the Czech Republic

The Czech Republic is a country in the Central Europe with population of 10.56 million. The gross domestic product is USD 192,9 billion, inflation 0,7 % and unemployment 5,5 % (CSO, 2017). ICT has played an increasingly important role in economics growth.

The table no 1 presents the basic data about households, individuals and enterprises and ICT.

Table 1: Households, individuals, enterprises and ICT in the Czech Republic

Items	Percent (2016)
Households with a computer in the Czech Republic	75,6
Households with Internet access in the Czech Republic	76,1
Mobile phones in households	98 (2015)
Individuals in the Czech Rep. using the Internet	76,5
Individuals in the Czech Rep. using Internet banking	47,4
Individuals in the Czech Republic purchasing over the Internet	26,7
Individuals in the Czech Republic reading on-line news	62,2
Enterprises in the Czech Rep. with the Internet	93,6
Enterprises in the Czech Republic with a Website	82,2

Resource: CSO (2017)

In the behavior of the population groups, however, are differences. For example: Individuals in the CZ using the Internet, age group 16 – 24 group = 96,3 %, Individuals in the CZ using Internet banking, age group 35 – 44 = 71 % and Individuals in the CZ purchasing over the Internet, age group 25 – 34 = 72 % (in the last 12 months).

For the purpose of our article, it is also worth mentioning that in the Czech Republic it is a good level of information technology education at schools (Eger, 2015, Rambousek, Štípek, Wildová, 2015) and ICT is used also in company training and lifelong learning (Eger, Egerová, 2013).

The Networked Readiness Index, that comprises four components which measures the environment for ICT, the readiness of a society to use ICT, the actual usage of all main stakeholders and the impact that ICT generate in the economy and in society, was 4,7, rank 36 (World Economic Forum, 2016).

The Czech Republic has one of the most dynamic ICT markets among Central European Countries. The ICT development index 2016 for the CZ was 7,20, rank 32 (LTU, 2017). The Czech Republic is one of Europe' s top locations for ICT investments. The list of successful investors in the country involves Microsoft, Skype, DHL, Tieto, Red Hat, SolarWinds, IBM etc. Two of the world's few antivirus-software providers, AVAST and AVG, grew out of this environment. Of all the countries where the Latin alphabet is used, the Czech Republic is the only one whose domestic web search provider, Seznam.cz, is challenging Google on the local market (CzechInvest, 2015).

The history of the Seznam.cz Company

The Czech portal Seznam.cz was first presented on April 30, 1996, by its founder, Ivo Lukačovič (Peterka, 2016). At that time, the Czech Internet had only recently been established and had few users. It was often available only to the academic sphere, where it was used by students to create websites aimed at providing entertainment. Then student Ivo Lukačovič was no exception when in 1995 he created a fun website about Jára Cimrman (a fictitious figure of a Czech genius, created as a practical joke by Jiří Šebánek and Zdeněk Svěrák and now a prominent phenomenon in Czech culture). With his website dedicated to Jára Cimrman, Ivo Lukačovič realized the major problem of a website not being indexed by a search engine, which made it very difficult to find on the Internet (Peterka, 2016). There was no search engine on the Czech Internet and for the small number of Czech websites, it would have been quite useless and very difficult to create. Moreover, the authors of Jára Cimrman's character forbade Lukačovič to continue developing his seemingly official website about the fictitious figure (Seznam.cz, 2017).

Instead of the fun website, Ivo Lukačovič decided to create a sort of website catalogue, Seznam.cz, which was to contain, in an organized fashion, references to all websites on the Czech Internet and be a kind of portal for Czech users of the Internet (Peterka, 2005). He modeled Seznam.cz on the American website Yahoo and his website received a favorable response. A year later, Ivo Lukačovič added the site's own search engine to Seznam.cz (originally, users of full text search were redirected

to the AltaVista website), which searched and indexed Czech websites. Seznam.cz quickly continued to add further services, following the model of Yahoo. These included, for example, email and an entertainment site.

At the beginning, Seznam.cz was not very profitable (Zeman, 2004). Advertisers purchased advertising on Seznam.cz out of friendship and as financial support. At the time, there were very few Internet users and companies did not yet understand this medium. Advertising on the Seznam.cz homepage cost a mere CZK 4,800 per month (Zeman, 2004). Ivo Lukačovič created custom websites for others and used any profits to further develop Seznam.cz. A major improvement in the financial situation came with the arrival of other people in the company, who helped to build up a business plan. Seznam.cz launched sites dedicated to the sale of cars or real estate over the Internet and intensified the effort to explain to companies the advantages of online advertising. Already in 1998, the 100,000 visits a day mark was exceeded, and in the same year Seznam.cz became the most visited Czech website (Seznam.cz, 2017).

In 2000, Seznam.cz became a joint-stock company and the Swedish company Spray Ventures bought 30% of the company's shares for USD 2 million (Seznam.cz, 2017). This major investment helped the Seznam.cz Company to achieve major growth. In 2001, due to large investments in new services, Seznam.cz found itself in the red, though in 2002 the investments resulted in further growth. In 2002, Seznam.cz generated a profit of CZK 27 million and defended its position as the market leader of the Czech Internet. A substantial part of the revenue came from targeted advertising displayed with search results. Conventional banner advertising made up only 25% of the revenue.

In late 2003, the monthly traffic on the Seznam.cz homepage was, according to iAudit statistics, 2,265,566 actual users (Seznam.cz, 2017). What helped to increase the website traffic was the newly added news section of the portal. At that time, Seznam.cz had 146 employees, which represented a year-on-year increase of almost 200%. In 2004, the revenue doubled to more than CZK 500 million, and the number of users also grew. At the end of that year, the monthly traffic approached 3 million actual users. In 2005, Seznam.cz invested substantial resources in the development of new full-text web search (until then, the company depended on other companies, for a short period of time in 2002 also on Google). With its own web search service and advertising in it, in 2006 Seznam.cz achieved a revenue of over CZK 1 billion. In the coming years, Seznam.cz continued to grow thanks to acquisitions of other companies, adding new services and improving existing ones. In 2007, the company became an investor in the Stream.cz video-sharing website, a competitor to YouTube in the Czech market. As of 2010, Seznam.cz modified its websites to give them a responsive design (the design of a large number of services underwent a complete overhaul).

In 2016, Seznam.cz launched its own news portal called Seznam Zprávy (Seznam.cz, 2017). This news site focuses primarily on video news coverage and the editorial office is made up of prominent Czech journalists (Lupa.cz, 2016). Seznam.cz is thus becoming more of a media empire and responds to the drop in its search engine's market share compared to its competitor, Google.

Financial Results

The development of financial indicators between 2006 and 2015, according to Justice.cz (2017), is summarized in Figure 1. The revenue from sales of the company's products and services grew from CZK 1 billion in 2006 to nearly CZK 3.5 billion. The graph clearly shows that since 2011 the growth has not been as substantial as between 2006 and 2011. The company was profitable the entire time. In 2015, the company achieved its largest pretax profit of CZK 1 billion.

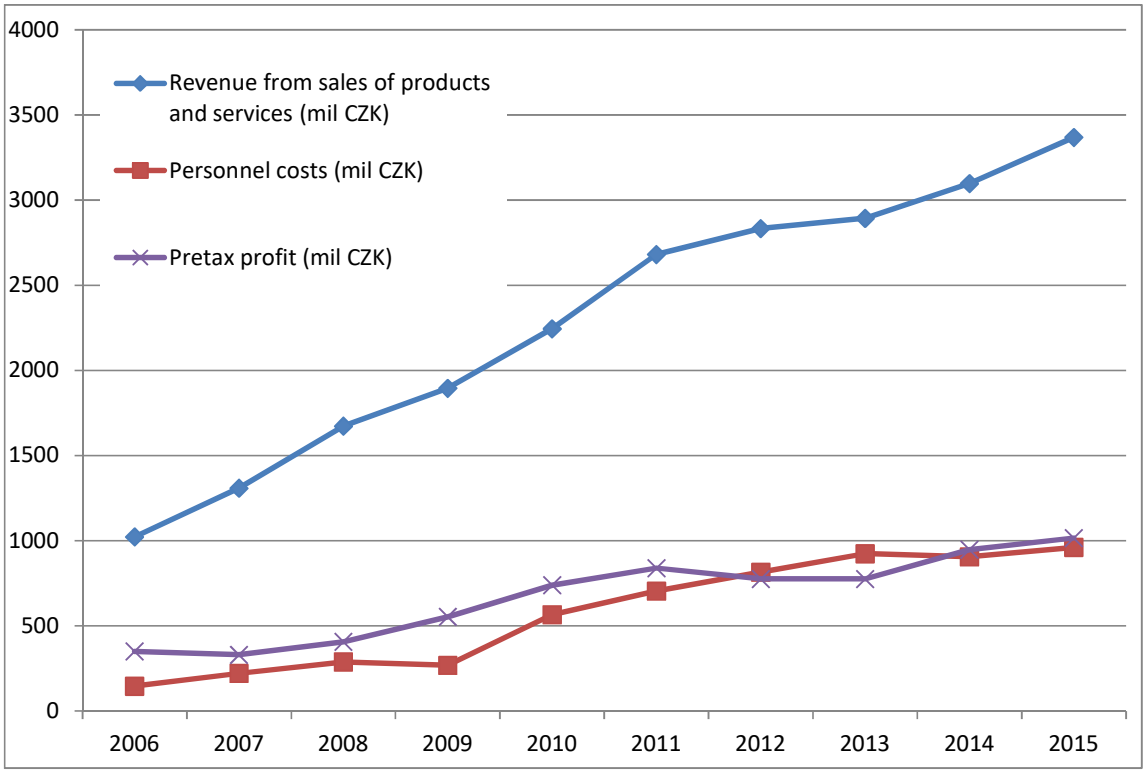


Figure 1: Selected financial indicators of Seznam.cz between 2006 and 2015

Source: Justice.cz (2017)

The development of the number of staff from 2006 to 2015 is shown in Figure 2. The substantial increase between the years 2009 and 2010 was caused by the merger of the sales department with the entire Seznam.cz Company. Since 2012, the company has had more than 1,000 people on staff and the number continued to grow gradually until 2014. In 2015, the number of employees slightly dropped.

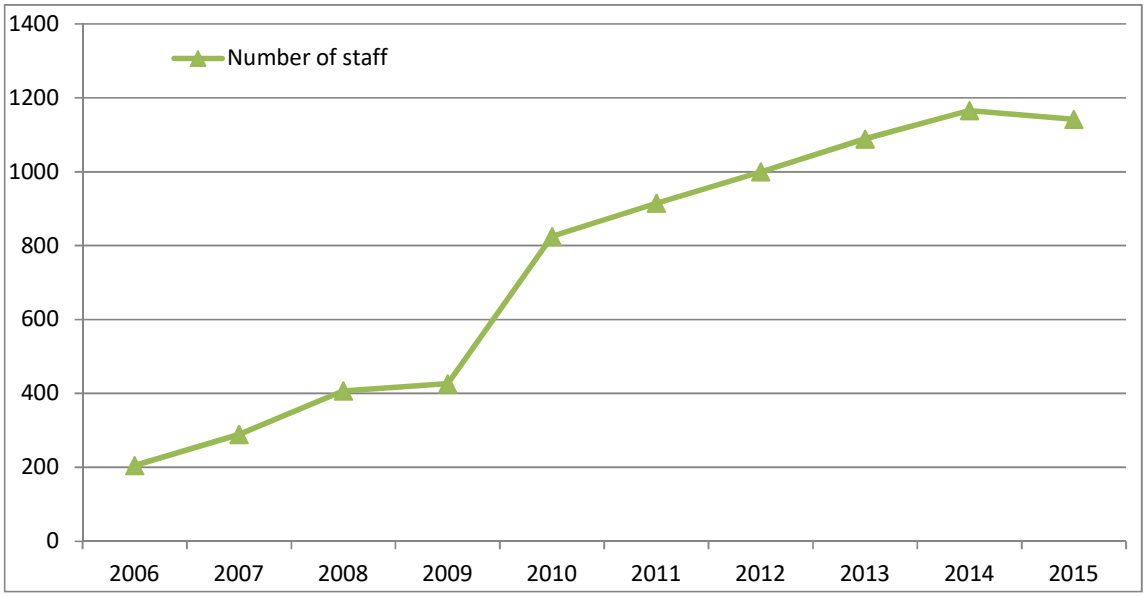


Figure 2: Development of the number of staff in Seznam.cz from 2006 to 2015

Source: Justice.cz (2017)

Website Traffic to Seznam.Cz Sites

Apart from the search engine, the Seznam.cz domain currently encompasses several other services. These include e-mail, weather information, a TV guide and a dictionary. According to Netmonitor (2016), in September 2016 the Seznam.cz domain registered 385 million visits. The number of actual users that month was 6 million. Most users visit the Seznam.cz homepage, while approximately 35% of visitors use the webmail service. The weather information site is displayed by about 4% of the visitors, the TV guide by fewer than 2% and the dictionary is used by 1% of visitors.

The Seznam.cz Company is one of the co-owners of the popular news server Novinky.cz, which in September 2016 registered 107 million visits. Also popular is the online tabloid magazine Super.cz, with 80 million visits in September 2016. Another widely-read site is the sports news service Sport.cz, with website traffic of 41 million visits. Other essential services for Seznam.cz include the companies register at Firmy.cz and the maps at the Mapy.cz domain. These two services combined had website traffic of 30 million visits in September 2016. The last major website run by Seznam.cz is the video sharing portal Stream.cz, with website traffic of around 14 million visits. Unprofitable services of the Seznam.cz Company include the social media sites Lide.cz and Spoluzaci.cz. The traffic to these websites, which enjoyed a prominent position in the market between 2006 and 2010, i.e., before the arrival of Facebook, has been dropping continually.

Table 2: List of the most visited websites owned by Seznam.cz, source: Netmonitor (2016)

Website	Visits in September 2006 (millions)	Visits in September 2016 (millions)	Change between 2016 and 2006
Seznam.cz	126	386	306 %
Novinky.cz	33	107	324 %
Super.cz	23	79	343 %
Lide.cz	15	5	-300 %
Spoluzaci.cz	7	1	-700 %
Sport.cz	7	41	586 %
Mapy.cz	6	18	300 %
Firmy.cz	x	12	x
Stream.cz	x	14	x

A Comparison between the Seznam.Cz and Google Search Engines in the Market

Neither Seznam.cz nor Google provide exact statistics about the number of search queries or statistics regarding visitor traffic to the websites with their search engines. This makes it difficult to compare the two services, and the exact values of the market shares of these two search engines vary. Moreover, their market shares change over time, so it is necessary to conduct research regularly.

For the purpose of this article, its author chose two data sources to assess the market shares of the Seznam.cz and Google search engines in the Czech market. The first source is the visitor traffic to the popular weather portal www.in-pocasi.cz, which does not have a narrowly defined target group and thus can capture the situation in the entire market. The other source is the statistics of the Toplist.cz (2016) portal, which collects data from hundreds of different (mostly small) websites in the Czech Republic. Subject to the assessment was the traffic directed to the target websites from the two search engines, which is their primary function, and which will conveniently illustrate the overall visitor traffic to (and popularity of) the search engines tested.

The research data from the Czech weather portal www.in-pocasi.cz are summarized in Table 3. A total of 71 million visits between the years 2007 and 2017 were included in the research. From 2007 to 2010, is Seznam.cz has a clearly dominant position in terms of visitor traffic directed to the weather site from this search engine (in 2007 it was approximately seven times as much compared to Google). Between 2011 and 2014, there is a noticeable stagnation, with more or less stable market shares. However, since 2015 the market share of the Seznam.cz search engine has been dropping constantly, with Google taking over the dominant position. This is related to the current efforts of the Seznam.cz portal to transform itself into a media service.

Table 3: Development of the shares of the Google and Seznam.cz search engines in the overall organic traffic to the Czech weather portal

Year	Google's share	Seznam.cz's share
2007	12%	88%
2008	16%	84%
2009	24%	76%
2010	35%	65%
2011	45%	65%
2012	40%	60%
2013	40%	60%
2014	44%	56%
2015	48%	52%
2016	55%	45%
2017*	60%	40%

* Statistics available only for the first half of the year

Source: Google Analytics (2017)

Table 4 summarizes the situation in the Czech market based on data from Toplist.cz (2017), which provides search engine share statistics for the past two years. These statistics also confirm the current dominant position of Google in the Czech market, roughly to the same extent as the previous analysis.

Table 4: Development of the share of traffic from the Google and Seznam.cz search engines, according to Toplist.cz statistics

Year	Google's share	Seznam.cz's share
2016	60%	40%
2017*	65%	35%

* Statistics only for the first half of the year

Source: Toplist.cz (2017)

Conclusion

The major local search engines in Europe are Yandex and Seznam.cz. Seznam.cz ranks among the most prominent companies in the Czech market. Over the past twenty years, it has grown from a one-man project to a company with over 1,000 employees. The Seznam.cz portal currently offers a wide range of services, from its search engine, entertainment and news sites, to a classifieds site. Such a wide range of services allows the portal to dominate the Internet and generate a pretax profit of around CZK 1 billion. The revenue from sales of the company's own products and services grew from CZK 1 billion in 2006 to almost CZK 3.5 billion in 2015. Based on the analysis of the company's economic results, Seznam.cz is considered a financially sound and strong company. The position of Seznam.cz in the European market is unique. Over the past 10 years, Seznam.cz and Yandex have been the only companies in Europe that have managed to outperform Google in terms of market share.

The portal's main source of income is the advertisements displayed with search results. Between 2000 and 2010, Seznam.cz was the most widely used search engine in the Czech Republic and was way ahead of its competitors (particularly Google). Thanks to Google's investments in the Czech market and its higher-quality web search technology, the primacy of Seznam.cz has gradually decreased over the years. Since 2015, the most frequently used search engine in the Czech market is undoubtedly Google. The market share of Seznam.cz has significantly dropped to approx. 35-40%. The remaining 60-65% share is that of Google. No other search engine has a share of more than 1% in the Czech market. In recent years, Seznam.cz has been transforming itself into a media empire. Seznam.cz makes up for the decrease in income from its web search services by developing other services, and despite the expectation of a further drop in revenues from advertising associated with the search engine, the company's future is not threatened.

References

Beránek, J. (2016). Seznam dál přetahuje z velkých redakcí. Další jméno je Jindřich Šídlo. [Online], [Retrieved June 12, 2017]. Available at: https://www.lupa.cz/clanky/seznam-pretahuje-z-velkych-redakci-dalsi-jmeno-je-jindrich-sidlo/

Bihun, O., & Miłosz, M. (2017). Porównanie algorytmów wyszukiwania Google i Yandex. *Journal of Computer Sciences Institute, 4*, 128-130. Available at: http://jcsi.pollub.pl/jcsi2017/volume4/jcsi4(2017)128-130.pdf

Eger, L. (2015). Is Facebook a Similar Learning Tool for University Students as LMS? *Procedia, Social and Behavioral Sciences.* 203, 233-238.

Eger, L., Egerová, D. (2013). e-Learning trends in Central Europe: The case of the Czech Republic.Knowledge *Management & E-Learning*, 2013, 5(3), 375-387.

Fishkin, R. (2015). The Traffic Prediction Accuracy of 12 Metrics from Compete, Alexa, SimilarWeb, & More. [Online], [Retrieved June 20, 2017]. Available at: https://moz.com/rand/traffic-prediction-accuracy-12-metrics-compete-alexa-similarweb/

Ji, W. S., Choi, Y, Ryu, M. H. (2016). The economic effects of domestic search engines on the development of the online advertising market. Telecommunications Policy, 40, 982-995.

Kotler, P. (2007). Moderní marketing : 4. evropské vydání. Praha: Grada.

Levy, S. (2012). Jak myslí Google. Grada Publishing a.s.

LTU (2016). ICT Development Index 2016. Available at: http://reports.weforum.org/global-information-technology-report-2016/networked-readiness-index/

Morrar, Y., & Raddad, A. M. (2014). Search Engines Explicit and implicit Comparative Study Search Engines-Comparative Study Explicit and implicit differences. Available at: https://www.researchgate.net/publication/261027281.

Paananen, A. (2012). Comparative Analysis of Yandex and Google Search Engines. Available at :https://www.theseus.fi/handle/10024/46483

Peterka, J. (2016). Od Járy Cimrmana k miliardovému byznysu. Seznam.cz zapsal rekordní rok. [Online], [Retrieved June 20, 2017]. Available at: http://byznys.lidovky.cz/rekordni-rok-seznam-cz-jara-cimrman-miliardy-f3j-/firmy-trhy.aspx?c=A160518_123100_firmy-trhy_sm

Peterka, J. (2005). Historie českého Internetu: Seznam. [Online], [Retrieved June 20, 2017]. Available at: http://www.earchiv.cz/b05/b0811002.php3

Rambousek, V., Štípek, J., Wildová, R. (2015). ICT competencies and thein development in primary and Loir—secondary schools in the Czech Republic. *Procedia, Social and Behavioral Sciences*, 171, 535-542.

Rosoff, M. (2014). Here's How Dominant Google Is In Europe. [Online], [Retrieved June 22, 2017]. Available at: http://www.businessinsider.com/heres-how-dominant-google-is-in-europe-2014-11

Tonkin, S., Whitmore C., Cutroni J., (2016). Výkonnostní marketing s Google Analytics. Computer Press, Albatros Media a.s.

Vaughan, L., Yang, R. (2013). Web traffic and organization performance measures: Relationships and data sources examined. *Journal of Informetrics*, *7, 699-711*, ISSN 1751-1577, http://dx.doi.org/10.1016/j.joi.2013.04.005.

W.N. Lo, B., & Sedhain, R. S. (2006). How reliable are website rankings? Implications for e-business advertising and internet search. *Information Systems, 2*, 233-238. Available at: http://iacis.org/iis/2006/Lo_Sedhain.pdf

Zeman, M. (2004). Ivo Lukačovič: Seznam dělají neznámí lidé. [Online], [Retrieved July 20, 2017]. Available at: https://www.lupa.cz/clanky/ivo-lukacovic-seznam-delaji-neznami-lide/

Alexa. (2016) . [Online], [Retrieved December 12, 2016]. Available at: https://www.alexa.com/topsites/countries

CzechInvest (2015). ICT. Available at: http://www.czechinvest.org/en/ict

Czech Statistical Office (2017). Information Society in Figures 2014 – 2016. Available at: https://www.czso.cz/csu/czso/information-society-in-figures-2014-2016

SimilarWeb - Digital Market Intelligence. (2016). [Online], [Retrieved December 10, 2016]. Available at: https://www.similarweb.com/

Seznam.cz - O společnosti. (2017). [Online], [Retrieved June 12, 2017]. Available at: https://onas.seznam.cz/cz/o-firme/historie-firmy/2000/

Netmonitor - Online data. (2016). [Online], [Retrieved December 12, 2016]. Available at: http://www.netmonitor.cz/online-data-ola

TOPlist - audit návštěvnosti webových stránek zdarma. (2016). [Online], [Retrieved December 12, 2016]. Available at: http://www.toplist.cz/

Justice.cz - sbírka listin. (2016). [Online], [Retrieved December 5, 2016]. Available at: https://or.justice.cz/ias/ui/vypis-sl-firma?subjektId=526277

World Economic Forum (2016). Networked Readiness Index. Available at: http://reports.weforum.org/global-information-technology-report-2016/networked-readiness-index/

A Framework for Parallel Boyer-Moore-Quick Search Algorithm (P-BM-QS)

Khalid Mohammad Jaber, Faculty of Science and Information Technology, Al-Zaytoonah University of Jordan, Amman, Jordan, k.jaber@zuj.edu.jo

Dyala R. Ibrahim, Faculty of Science and Information Technology, Al-Zaytoonah University of Jordan, Amman, Jordan, dyala.angel90@gmail.com

Asma H. Al-Sanhani, Faculty of Science and Information Technology, Al-Zaytoonah University of Jordan, Amman, Jordan ,asma.hussein.san@gmail.com

Nesreen A. Hamad, Faculty of Science and Information Technology, Al-Zaytoonah University of Jordan, Amman, Jordan , nesreen.hamad@zuj.edu.jo

Abstract

The significant growth in biological data has driven computer scientists to create fast, efficient and accurate algorithms for searching databases at the fastest possible search responses, in order to assist the biologists to retrieve the existing information quickly from any biological database. Furthermore, the trends in parallel programming models have also encouraged the computer researchers to improve the searching approaches to cope with this exponential increase. This research provides a comprehensive summary of some searching methods, as well as the state-of-the-art for the Parallel Boyer-Moore-Quick Search Algorithm (P-BM-QS). The results of the literature review show that the hybrid technique of P-BM-QS will improve the searching speedup in comparison with one direction algorithms. It could be concluded from the literature review that the proposed P-BM-QS is appropriate for large data sets, in terms of searching time.

Keywords: String Matching, Boyer-Moore Algorithm, Quick Search Algorithm, Bidirectional Algorithm, Parallel Computing, OpenMP, Windows Thread.

Introduction

The tremendous increasing in the amount of Biological data draws the attention of the researchers to investigate the best approaches to reduce the search response time in order to extract meaningful information from the biological sequence in an accurate way. One of these approaches is to develop efficient and speed string matching algorithms. A string matching algorithm can be defined as: a class of string algorithms that attempts to find the occurrence(s) of a string Pattern (P) within a Text (T) over some alphabet ($\sum$) where T is longer than P (Al-Mahasneh, 2014). Such algorithms are considered as one of the most significant studied area in computer science. They are widely used in many applications including information retrieval, web search engines, library systems, DNA sequencing, signal processing, error correction, pattern recognition and in many other fields (Naser et al., 2012).

Despite the fact that the development of processors technology and other advances have reduced search responses to negligible times, string matching problem still remains a useful area of research and development for a number of reasons. Firstly, as the size of data continues to grow, sequence searches will become increasingly taxing on search engines. Secondly, pattern matching still remains an integral part of faster matching algorithms, typically comprising the final part of a search. Lastly, researchers have to understand the classical methods of pattern matching to develop new efficient algorithms. With the developments of new string matching techniques, efficiency and speed are the main factors in deciding among different options available for each application area. Each application

area has certain special features that can be used by string matching technique which is suited for that area (Kouzinopoulos and Margaritis, 2010).

Accordingly, one of the areas that can be combined with string matching algorithms in order to speed them up is parallel computing. Parallel computing can be defined as: multiple processors that work simultaneously in order to accomplish one task. Parallel computing can be classified into two basic architectures depending on the way the communication between the processing elements occurs: the distributed memory architecture and the shared memory architecture (Hussain et al., 2010a). The most widely used Application Programming Interface (API) for shared memory parallel processing is Open Multi-Processing (OpenMP) which is set of directives, runtime library routines and environmental variables that is supported on a wide range of multicore systems, shared memory processors, clusters and compilers. OpenMP consists of a set of specifications for parallelizing programs on shared memory parallel computer systems without the explicit need for threads management. To parallelize an existing algorithm, the parallel parts it contains must be identified; the speed-up to the execution will then be proportional to the level of the algorithm's parallelism (Rao et al., 2013).

In this paper we merged one of the most two popular matching algorithms; Boyer-Moore and the Quick Search Algorithm, in addition to utilizing parallel computing in order to obtain a fast string matching algorithm that is called Parallel Boyer-Moore-Quick Search Algorithm (P-BM-QS). The proposed algorithm can reduce the number of comparisons performed by using the idea of searching from both sides (from right to left by using Boyer-Moore and from left to right by Quick Search algorithm) to combine them in one algorithm.

This paper is organized as follows. Section 2 presents the background of the Boyer-Moore and Quick search algorithms, in addition to the related works of matching algorithms. While Section 3 presents our proposed algorithm. Section 4 provides the conclusion remarks along with the future works.

Related Works

In this section a basic description of the Boyer-Moore algorithm and Quick search algorithm is presented. Furthermore, we introduce some of the related works that used Boyer-Moore algorithm and quick search and other algorithms to tackle the problem of string matching.

The Boyer-Moore algorithm is a fast exact pattern matching algorithm that was published by Boyer and Moor in 1977 (Sheik et al., 2004 ; Jaber et al., 2013; Al-Mahasneh, 2014). This algorithm with its variations is based on comparing a pattern from its rightmost end. In addition, it jumps along the text instead of searching every single character in that text. Additionally, it allows for larger shifts which can be pre-computed from the pattern. The best-case complexity of this algorithm is: O (n / m), this is due to the reason that a pattern of length (m) can be aligned (n / m) times with a text of length (n). If there is no match between P and T, (n / m) is the amount of comparisons necessary to determine that P does not occur in T (Cantone and Faro, 2003). This algorithm is based on three basic concepts; the right to left scan, the bad character shift rule and the good suffix shift rule. Together, these concepts lead to a method that typically examines fewer than (m + n) characters (an expected sublinear-time method) Hussain et al. (2010a).

On the other hand, Quick Search Algorithm (QS) is an algorithm that scans the pattern (P) from left to right, when a mismatch character is encountered; the pattern is always shifted to the right by at least one character, but never by more than (m) characters. Additionally, this algorithm is considered to be simple and practical. Also, it can be coded, debugged and executed quickly. It is very easy to implement and scans the pattern in the most natural forward order (Hussain et al. 2010b). The Quick Search is an efficient algorithm when using large alphabets with a short pattern during the text search Hussain et al. (2010b), but show less efficient behavior for small alphabets with a long pattern Naser et al. (2012).

One of the researches that compared Boyor-Moore algorithm with other matching algorithms is the work done by Diwate and Alaspurkar (2013). This work discussed the techniques, complexity and

efficiency of pattern matching algorithms. Also, they presented an analysis and made a comparison among four different pattern matching algorithms; Naive, Rabin Karp Algorithm, Boyor-Moor and Kunth-Morris Pratt They concluded that Boyor-Moore and Kunth- Morris Pratt algorithms are the most effective for searching, where Knuth-Morris Pratt algorithms having less time complexity and Boyor-Moore algorithms has less preprocessing time complexity.

Another work by Al-Mahasneh (2014) presented a new string matching algorithm to improve the pattern matching technique. The algorithm scans the text from two sides simultaneously using two windows. All the processing of this algorithm depends on the pre-processing phase in Boyor Moore and the Quick search algorithms on the left and right windows respectively on the text. They concluded that the performance of the proposed algorithm is much better than that of the traditional algorithms including Boyer-Moore algorithm because it reduced the number of comparisons needed.

Based on two factors, the number of comparisons performed, and the search time needed; a comparison between Boyor-Moore and its improved versions in order to investigate which one is better was presented by Choudhary et al. (2012). This work explained the Boyer-Moore(BM) algorithm and then explained its improvement as Boyer-Moore-Horspool (BMH), Boyer-Moore-Horspool-Sundays(BMHS), Boyer-Moore Horspool-Sundays2(BMHS2), improved Boyer Moore-Horspool-Sundays (improved BMHS), Boyer-Moore improvement (BMI) and composite Boyer-Moore(CBM). They concluded that; in terms of the number of comparison performed, the performance of BM, BMH and BMHS are almost the same. Furthermore, the improved BMHS outperformed BMHS as number of comparison decreased. BMI and BMHS2 performed even better than Improved BMHS. On the other hand, in terms of search time, BM and BMH performed almost the same but BMHS search time increased, Improved BMHS search time is less than that of BM, BMH and BMHS. In BMI searching is faster than the above four algorithms and BMHS2 search time is even less than BMI. According to this, BMHS2 is the best among all six algorithms as search time and number of comparison both are less than all other algorithms.

Additionally, there have been many works to improve Bidirectional algorithms. One of these works is the one presented by Hussain et al. (2013) where it improved a Bidirectional exact pattern matching algorithm to solve the problem of exact pattern matching. The researchers solved this problem by comparing the character of a pattern to selected text window (STW) from two sides (right and left). The improved algorithm time complexity of preprocessing phase is O(2m), and O(mn/2) for the searching phase. According to the researchers, there is one drawback for the proposed algorithm which is the need to improve the shift decision of the preprocessing phase of exact pattern matching problems, to move pattern to the right of selected text window with long distance.

Cantone and Faro (2003) presented a variant algorithm for Boyor-Moore string matching algorithm called Forward-Fast search algorithm. This algorithm achieved good results when dealing with very short or small alphabets. The improved algorithm applied repeatedly the bad-character rule until the last character of the pattern is matched correctly at the end of matching phase. Also, it computed the shift advancement as a function of the matched suffix pattern, and the first character of the text past the current window (forward good suffix rule), the space complexity of this improved algorithm is O $(m.|\sum|)$ and time complexity O $(m.max(m.|\sum|))$.

Quick search algorithm plays a significant role in real-time applications, therefore Hnaif, et al. (2009) presented a parallel Quick search algorithm to speed the packet content filtering for Network Intrusion Detection System (NIDS). This work parallelized the Quick search algorithm using OPEN/MP and Pthread. The improved algorithm was used in NIDS to enhance the speed of matching process between incoming packets contents and snort rule sets. The process of packet filtering is speeded up by 40% using the proposed method.

Rao et al. (2013) presented an evaluation study for string matching problems with parallel approaches. Their work was based on the recent developments of parallel string matching, and the main idea of each algorithm and its complexity. In this study, they investigated the problem of sequential and parallel approaches in the context of string matching. This works presented the performance of the different algorithms and their effectiveness. Additionally, they developed a

parallel string matching with JAVA Multi-threading with multi core processing, and performed a comparative study on Knuth Morris Pratt, Boyer-Moore and Brute force string matching algorithms based on the running time. This study showed that the Boyer-Moore string matching algorithm is the most efficient one among the three string matching algorithms with multicore processing in comparison with earlier versions of these algorithms.

Parallel Boyer-Moore-Quick Search Algorithm (P-BM-QS) Framework

This section presents the Parallel Boyer-Moore–Quick Search Algorithm (P-BM-QS) framework. All of the literature reviews that were discussed in the previous section have one main objective which is to reduce the computation time for the searching algorithm. In this section, the proposed method that is used to achieve this objective is discussed.

To clarify the problem area, Figure 1 shows the main steps and the framework of the proposed P-BM-QS method.

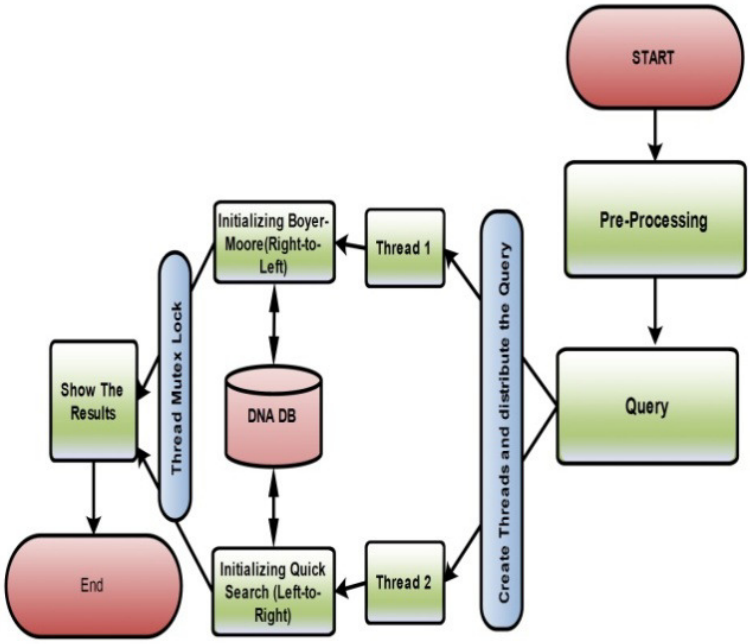


Fig.1:The proposed P-BM-QS method

The proposed method contains four main phases, each phases is described in details as follows:

1) Pre-Processing the DNA datasets: The aim of this phase is to prepare the representation of the data sets that will be stored in the databases. This phase is carried out in one step. In this step the data is retrieved from a text file by opening the file, then reading the data line by line. Each line that has been read is cleaned by removing the wild-card characters such as N and X, accession number (ID), family name and so on.

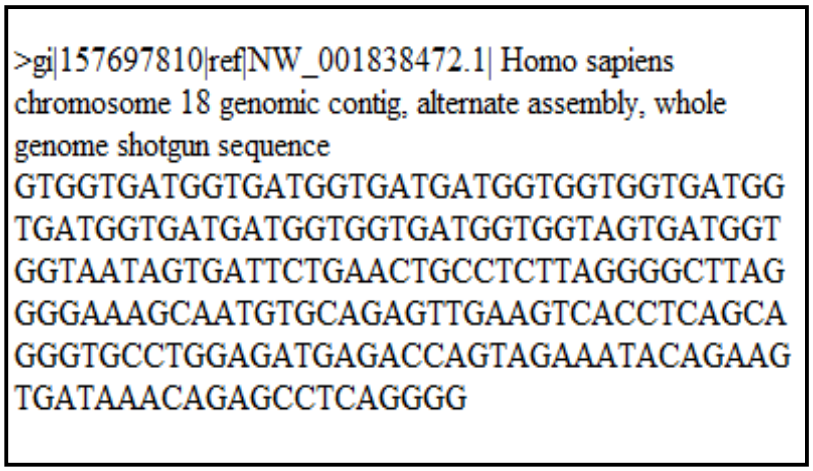


Fig.2: An Example of DNA Sequence

2) Search Queries in Data Sets: The second phase of this framework involves the searching process. The searching process of this work could be:

- **a.** Enter the query (Q) or queries.
- **b.** Search the query in the DNA Database (Figure 2 shows an example of a DNA sequence in the DNA database).

3) Initializing the Windows Threads API: The P-BM-QS was implemented using Windows Threads or shared memory programming model. Threads are light weight processes; it is quite easier to write threaded programs because the applications which are threaded and run on a single machine can also run on multiple machines without major changes. The master thread will create one thread for Boyer-Moore algorithm which is working from left to right. After this, another thread is created for the quick search algorithm. However, the two threads are working simultaneously.

4) Joining the results: Finally, synchronization is needed before the results are combined and all threads are terminated. To accomplish synchronization, the thread lock is used between the threads to obtain the final results and terminate all threads. However, it waits for all threads to be completed and then detaches the threads. Afterwards, it joins all the final results.

Conclusion

In this paper, we highlighted the problem of the high computational demands of searching algorithms. We conducted a review of many published state-of-the-art approaches, which hope to form the direction of future research in the area. We also proposed in this paper, the parallel Boyer-Moore–Quick Search Algorithm (P-BM-QS). The need for further investigations in utilizing parallel computing methods to solve this problem is still needed. Future efforts can be possibly directed to the implementation of parallel techniques such as hybridization between distributed and shared memory models, hybridization between GPU and CPU methods.

References

Al-Mahasneh, M M. (2014) ‘An Enhanced Boyer- Moore Algorithm’, Master’s thesis, Middle East University, Amman, Jordan.

Cantone D. and Faro S. (2003) ‘ Forward -Fast-Search: Another Fast Variant of the Boyor -Moore String Matching Algorithm’ Proceedings of the Prague stingology conference 03, 22-24 September 2003, Prague, Czech, 2003, 10-24.

Choudhary R.,Rasool A. and Khare N. (2012) 'Variation of Boyer-Moore String Matching Algorithm: A Comparative Analysis,' *International Journal of Computer Science and Information Security*, 10(2), 95-101.

Diwate R. and Alaspurkar S J. (2013) 'Study of Different Algorithms for Pattern Matching,' *International Journal of Advanced Research in Computer Science and Software Engineering*, 3(3), 615-619.

Hnaif A A., Alhalaloah M., Abouabdalla O., Ramadass S. and Kadhum M M. (2009) ' Parallel Quick Search Algorithm To Speed Packet Payload Filtering In Nids,' *Journal of Engineering Science and Technology*, 4(2), 220 – 230.

Hussain, I., Ali, I., Zubair, M. and Bibi, N. (2010a) ' Fastest Approach to Exact Pattern Matching' In the 2010 International Conference on Information and Emerging Technologies, 14-16 June 2010, Karachi, Pakistan,1-5.

Hussain I., Zubair M., Ahmed J. and Zaffar J. Bidirectional (2010b) 'Bidirectional Exact Pattern Matching Algorithm' In the 2010 International Conference on Modern Problems of Radio Engineering, Telecommunications and Computer Science *(TCSET),* 23-27 February 2010, Lviv, Ukraine, 293-293.

Hussain I., Kazmi S H., Khan I A. and Mehmood R.(2013) 'Improved-Bidirectional Exact Pattern Matching,' *International Journal of Scientific & Engineering Research*, 4(5), 659-663.

Jaber K M., Al-Khatib R M., Taghizadeh A. and Asef Al-Khateeb A. (2013) 'Efficient Extraction Method for Biological Data Using Boyer-Moore Search Algorithm' In the 22nd International Business Information Management Association (IBIMA) Conference*,* 8-9 November 2013, Rome, Italy, 13-14.

Kouzinopoulos C S. and Margaritis K G. (2010), Parallel Implementation of Exact Two Dimensional Pattern Matching Algorithms using MPI and OpenMP [online] Parallel and Distributed Processing Laboratory, Greece: University of Macedonia, [Accessed 21/9/2017] Avalilable at : https://www.researchgate.net/publication/265994238_Parallel_Implementation_of_Exact_Two_Dimensional_Pattern_Matching_Algorithms_using_MPI_and_OpenMP

Naser M A., Abdul Rashid N. and Aboalmaaly M F. (2012) 'Quick-Skip Search Hybrid Algorithm for the Exact String Matching Problem,'*International Journal of Computer Theory and Engineering*, 4(2), 259-265.

Rao C S. , Raju K B. and Dr. Raju S V. (2013) ' Parallel String Matching with Multi Core Processors-A Comparative Study for Gene Sequences,' *Global Journal of Computer Science and Technology Hardware & Computation,*13(1), 27-42.

Sheik S S., Aggarwal S K., Poddar A., Balakrishnan N. and Sekar K. (2004) 'A FAST Pattern Matching Algorithm,' *Journal of Chemical Information and Modeling* ,44, 1251-1256.

Management of Meso-, Micro- and Nano-Level Entities on Criteria for Providing Sustainability of Development

Olga V. Artyomova, Ural Socio-Economic Institute Branch of Academy of labor and social relations, Chelyabinsk, Russia, na02@yandex.ru

Olga V. Zubkova, Ural Socio-Economic Institute Branch of Academy of labor and social relations, Chelyabinsk, Russia, Aknozama78@mail.ru

Svetlana V. Voronina, South Ural State University, Chelyabinsk, Russia, voroninasv@susu.ru

Sergei V. Aliukov, South Ural State University, Chelyabinsk, Russia, alysergey@gmail.com

Abstract

Ensuring the sustainable development of economic entities of all levels is a priority task of their management, both at the state, and at the regional and corporate levels. The diversity of existing approaches to the definition of the term "sustainable development entity" and the numerous approaches to determining the sign of such development complicate the evaluation of the phenomenon. The aim of the research is the development of a universal tool that allows us to identify and assess the level of sustainable development of such economic entities as a region, enterprise, individual entrepreneur; this tool should be based on the criteria predetermined by the logic of economic processes. A balanced scorecard was chosen as a tool for achieving the goal. Research methods include comparison, financial and economic analysis, and expert method. The results of the research allow firstly to identify the uniformity of the criteria of sustainable development for economic entities, meso-, micro - and nanolevel, and secondly, the admissibility of usage to assess the level of sustainable development of static and dynamic indicators that reflect the income and resources of the final results of the operation to the original, receipts, payments, commitments to their own resources, thirdly, to develop options for the development strategy of economic entities depending on the combination of the results obtained and the type of business entity.

Keywords: sustainable development, business entity, balanced system of indicators, development strategy.

Introduction

Functioning of economic entities of macro-, meso-, micro - and nanolevel (whether integrated Union of countries, region, industry, holdings, enterprise and even individual entrepreneur) is carried out on the basis of such economic principles as self-sufficiency and self-financing.

First, the business entity needs resources to ensure the purpose of its functioning, these resources are characterized by a certain value and are not always their own. This circumstance requires the provision of such operating results that would be able to cover (recoup) the costs spent for achieving the purpose of the business entity resources. The principle of self-repayment mainly characterizes the operational (current) level of management of business entities.

Self-financing characterizes an ability of a business entity to provide self-development from its own sources of financing. The principle of self-financing concerns mainly the strategic level of management of the business entity.

Nevertheless, the analysis of the correspondence of the operational results of functioning of economic entities to their strategies often reveals their complete inconsistency.

The objectives of functioning of economic entities are formed under the influence of the interests of a wide range of stakeholders. Thus the purposes can have both economic and noneconomic nature. All mentioned above predetermined the relevance of the study of sustainable development of subjects at different levels of management and the development of a methodological tool for assessing the level of their sustainable development.

Approaches of the Defining the Term “Sustainable Development” And Its Criteria of A Business Entity

In 1987 the Brundtland Commission published its report "Our common future" to link the problems of economic development and environmental stability, in which the term “sustainable development” was presented as "development that meets the needs of the population without compromising the ability of future generations to meet their own needs" (Report, 1987). As early as the beginning of the twentieth century, A. Pigu considered the approach of his predecessors in the development of Welfare theory as insufficient due to "market failures" or non-market ties, as well as the existence of monopoly and monopolistic competition, which inevitably cause a gap between public and private interests (Pigou, 1920). Thus, the precondition for the emergence of the concept of sustainable development, firstly, is the welfare theory, and secondly, the stakeholder theory. There are many approaches to defining the essence of sustainable development.

So the definition given in analyzed literature (Cerin, 2017; Dernbach, 1998; Dernbach, 2003) is a broad definition, which does not limit the volume of stability. The definition reflects the need to preserve resources for future generations, defining it as one of the main features that distinguish sustainable development from traditional environmental policies. The overall goal of sustainable development is the long-term stability of the economy and the environment; this would be achievable through integration and solution of economic, environmental, and social problems during the decision-making process. In applying this definition of sustainable development, one aspect concerns the sustainability of capital (Emas, 2017). The author believes that there are several types of capital: social, natural, and artificial, which predetermines two approaches to the definition of sustainable development. The "weak" definition of sustainable development implies that artificial or manufactured capital can become an alternative to natural capital. The "strong" definition of sustainability reflects the exceptional characteristics of natural resources that cannot be replaced by manufactured capital. Most ecologists and environmentalists are supporters of a strong definition of sustainability (Stoddart, 2011). An important step in promoting the concept of sustainable development was the declaration on environment and development (Rio Declaration, 1992), which consolidated the general principles of this concept: long-term sustainability; the principle of compensation payments for environmental pollution; precautionary principle; principle of common and differentiated responsibility.

In Russian economic science the most common formulation of sustainable developmentis the development that meets the needs of the present, but it does not put at risk the ability of future generations to meet their own needs (Mazunina, 2009).

R. Kolmanovsky and N.N. Renkas emphasize that the most important criterion of sustainable development is achievement of strategic balance between human activity and the maintenance of reproducing possibilities of the biosphere, which is especially important for regional development (Kormanovskaya, 2006).

Principles of sustainable development, according to the approach of A.P. Zakharov, include:
1) improving the quality of life;
2) guaranteed health of people;

3) satisfaction of the basic life needs of both the population and future generations;
4) fight against poverty;
5) rational patterns of production and consumption;
6) rational environmental management;
7) conservation of ecosystems, protection of the climate and ozone layer;
8) ensuring environmental safety;
9) elimination of all forms of violence against man and nature (prevention of wars, terrorism and ecocide);
10) global partnership (Zaharov, 2011).

We are of the opinion that sustainable development of business entity is the state of permanent efficiency and stability of development, strict implementation of all commitments, under the condition of independence in decision-making.

Balanced Scorecard as a Tool for Assessing the Level of Sustainable Development of a Business Entity

Since we have identified four principal components in the definition of sustainable development, it was logical to use such a tool as a balanced system of indicators for the purposes of assessing the level of sustainable development. A balanced system of indicators was proposed for the wide use by D.P. Norton and R.S. Kaplan (Kaplan, 1992; Kaplan, 1993; Kaplan, 1996). A balanced system of indicators can be used to manage the activities of economic entities, both state and municipal (Rohm, n.d.), and also corporate levels (Epstein, 1997; Hahn, 2001).

Traditionally, a balanced scorecard consists of four key prospects – "Finance", "Customers", "Internal business processes" and "Learning and growth". However, this basic set of perspectives can be adapted to the specifics of a particular industry, enterprise or economic phenomenon, in particular, the "sustainable development of the entity".

Stacey Barr notes that high-performance organizations gain a higher return on initiatives and improvements (Barr, n.d.). And as factors providing a higher yield, she noted factors such as: "leverage of influence", "understanding problems", "knowledge", "truth". Each factor has its own evaluation instruments: for the factor "leverage of influence" such instruments are the ability and the efficiency of their use, for the factor "understanding the problems" they are reports, for the factor "knowledge" they are results of analysis of the situation; for a factor of "truth" it is the speed and accuracy of the data.

Assessment of the level of sustainable development of industrial enterprises and small business enterprises (manufacturing) is proposed to carry out with using a balanced scorecard (BSC) that includes the following components:

1) evaluation of the effectiveness of the operation;
2) assessment of the stability of development;
3) assessment of the degree of fulfillment of obligations;
4) evaluation of independence in decision-making.

The functioning of the economic system (enterprise) is the process of refining (converting) the enterprise of natural resources in manufacturing products, satisfying social needs in material goods (products, services). In the categories of a particular economy, functioning of the economy is a process of transforming resources (through their spending) into the results of activities, characterized by a certain level of efficiency. Resources and efficiency are considered as means of achieving a goal – the result.

Obligations of enterprises, from an economic point of view, are related to the definition of financial solvency – the capacity to repay loans and payables in time and in full volume. Independence in decision-

making is largely determined by the capital structure and the specifics of building relationships with contractors of the enterprise. Assessment of the processes and phenomena is proposed to be carried out using the following groups of indicators.

The assessment of the performance of activities is based on the DuPont equation for economic and financial profitability.

The DuPont formula for economic profitability shows the relationship between indicators of economic profitability (Rk), net profit ratio (Rt) and the coefficient of business activity (turnover capital) (Ktc):

$$\mathrm{R\kappa} = \mathrm{Rt} \times \mathrm{Ktc}, \quad (1)$$

where $\mathrm{R\kappa} = \frac{\mathrm{Qs}}{\mathrm{K}} \times 100\%$ – economic profitability – the ratio of profit from sales (Qs) to the average capital of a company (K), expressed as a percentage;

$\mathrm{Rt} = \frac{\mathrm{Qs}}{\mathrm{Qr}} \times 100\%$ – net profit ratio (sales) – the ratio of profit from sales (Qs) to revenue (Qr), expressed as a percentage;

$\mathrm{Ktc} = \frac{\mathrm{Qr}}{\mathrm{K}}$ – coefficient of business activity – the ratio of revenue (Qr) to the average capital of enterprises (K).

The formula reflects the efficiency of using company's capital. All the components of the DuPont formula should have a positive growing trend; growth indexes should be greater than one.

The DuPont formula for financial profitability shows the dependence between the indicators of financial profitability (Rfp), rate of return (Nrr), the coefficient of the business activity (capital turnover) (Ktc) and financial leverage (FL):

$$\mathrm{Rfp} = \mathrm{Nrr} \times \mathrm{Ktc} \times \mathrm{FL}, \quad (2)$$

where $\mathrm{Rfp} = \frac{Qs\ clear}{OC} \times 100\%$ – financial profitability - net profit ratio (Qs clear) to the company's average annual net worth (OC), expressed as a percentage;

$\mathrm{Nrr} = \frac{\mathrm{Qs\ clear}}{\mathrm{Qr}} \times 100\%$ – profit ratio (profit margin) is the ratio of net profit to revenue, expressed as a percentage;

$\mathrm{FL} = \frac{\mathrm{K}}{\mathrm{OC}}$ – financial leverage – the ratio of the average of the company's capital to the average annual equity.

All the components of the DuPont formula for financial profitability should also have a positive trend. Estimation of stability of development is based on mapping the dynamics of capital and financial results with the "Golden rule of business":

$$\mathrm{IQ_{s\ clear}} > I\ \mathrm{Q_s} > I\mathrm{Q_r} > IK > 1.0 \quad (3)$$

Decoding of this rule is more reasonable to start from the right:

I – indicator of index growth;

IK > 1.0 – the constant growth of capital invested in the activities of the enterprise, which should ensure the development of its business;

IQr > IK > 1.0 – a growing business should generate a significant increase in financial results at the enterprise, the growth rates of which should exceed the growth rate of investments;

IQs > IQr > IK > 1.0 – the company should ensure the priority in the growth rates of the final financial result (profit) compared to the growth of the economic result (sales revenue);

IQs clear > IQs > IQr > IK > 1.0 – the growth rate of net profit exceeding the growth rate of gross profit should be provided by an increase in other revenues and a decrease in other expenses of the enterprise.

Estimation of the degree of fulfillment of obligations can be realized on the basis of the "Golden Financing Rule":

$$\mathrm{Ivc} > \mathrm{Ici} > Ip > 1.0, \quad (4)$$

The value of capital can be determined by the formula [19]:

$$VC = \sum_{t=o}^{N}(CI_t - P_t) \times q^{-1}, \quad (5)$$

where VC – value of capital – the difference between discounted receipts (CI) and payments (P) over a number of periods [8, p. 77];
CIt – cash inflow in the period t
Pt – payments in the period t;
N – number of periods;
t – current period index (t = 0, ..., N);
q – discount factor (1 + i);
i – interest rate expressed in decimal fractions ir ⁄ 100;
ir – interest rate, %.

The "golden rule of self-financing" is fulfilled under conditions 1 and 2:
Condition 1: IQr > IQoc, at which revenue should grow faster than the total cost of the enterprise (Qoc).
Condition 2: IQr < IQoc, at which revenue grows slower than the total costs of the enterprise, but accounts receivables grow slower than creditor indebtedness.

The lack of efficiency in the formation of financial results and costs can be compensated by improving the efficiency of working capital management of the enterprise.

The assessment of independence in decision-making is primarily assessed by indicators of financial and market stability, which can also be grouped in the Golden Rule of sustainability:

$$\mathrm{I_{wc}} > \mathrm{I_{Cfi}} > \mathrm{I_{Lpc}} > 1.000, \quad (6)$$

where WC – working capital (the difference between permanent capital and non-current assets);
Cfi – coefficient of financial independence shows how much equity owns in the entire capital of the enterprise;
Lpc –level of permanent capital of the enterprise, which shows the share of its own financial resources in the composition (asset) of the liability. The higher the indicator, the higher the financial and market stability of the enterprise will be.

For the integral evaluation of the level of sustainable development of the enterprise these indicators should be estimated on the basis of a system of criteria and endowed with weight. The use of integral indicator of sustainability assessment will allow comparative analysis of both enterprises and holding structures.

The stages of formation of the balanced scorecard are:
1) determination of the composition of indicators and their evaluation, for example, on a three-point scale;
2) weighting of the indicators within each component. In this case, the sum of the weights of the component indices must be equal to 100%.
3) selection of four evaluation indicators (one for each component);

4) determination of the weight of each component, the sum of the weights of all components being 100%;
5) conducting a final assessment of the level of economic sustainability of an enterprise on the basis of an integral indicator.

The use of the balanced scorecard, as well as their scoring, allows you to give a set of indicators to a single system of assessment, integrate them into the overall criterion of sustainable development, according to which there is a possibility of comparative analysis of the level of sustainable development of enterprises.

Criteria for scoring of indicators and linkages methods for the assessment of the level of sustainable development for the industrial enterprises and small business enterprises are presented in Table 1.

Table 1: criteria for scoring indicators and interrelations of methods for assessing the level of sustainable development of an enterprise

Indicators	Criteria for scoring indicators, ballpoints		
	1	2	3
Assessment of efficiency of functioning			
Economic profitability	<0	0-d, I>1, I<1	>cr, I>1
Net profit ratio	<0	>0, I<1	>0, I>1, when a positive value appears
Activity ratio	I<1	I=1	I>1
Dynamics of DuPont equation for economic profitability $I_{R\kappa} > I_{Rt} > I_{Ktc} > 1.000$	Not performed	Partially performed	Performed
Financial profitability	<0	0-d, I>1,<1	>dep, I>1
Rate of return	<0	>0, I<1	>0, I>1
Finance leverage	>2	<2, I>1	<2, I<1
Dynamics of DuPont equation for financial profitability $I_{Rfp} > I_{Nrr} > I_{Ktc} > I_{FL} > 1.000$	Not performed	Partially performed	Performed
Stability evaluation			
Net profit	<0	>0,I<1	>0, I>1, when a positive value appears
Sales profit			
Revenues from sales	I<0,5	I<1	I>1
Capital in the mid-annual measurement	I<1	I>1	I=1
The Golden Rule of Business $I_{Qs\ clear} > I_{Qs} > I_{Qr} > I_K > 1.0$	Not performed	Partially performed	Performed
Assessment of the degree of fulfillment of obligations			
Value of capital	<0	>0, I<1	>0, I>1
Cash inflow	I<0.5	I<1	I>1
Payments			
The Golden Rule of Financing $I_{vc} > I_{ci} > I_p > 1.0$	Not performed	Partially performed	Performed
Evaluation of independence in decision-making			
Working capital	<0	>0, I<1	>0, I>1

Coefficient of financial independence (equity ratio)	<0.5	>0.5, I<1	>0.5, I>1
Level of permanent capital of the enterprise	<0.6	>0.6, I<1	>0.6, I>1
The Golden Rule of Sustainability $I_{wc} > I_{Cfi} > I_{Lpc} > 1.000$	Not performed	Partially performed	Performed

An assessment of the level of sustainable development of a meso-level entity – region management is carried out using the static values of indicators, as well as their growth indices.

The evaluation of the effectiveness of the functioning will be estimated by DuPont's formula for economic profitability, determined by the indicators of the total number of enterprises in the region [21].

Evaluation of stability of development analogous to the "Golden Business Rule" built for the regional level on the basis of a comparison of the indexes of growth in profits, revenue and assets of a set of enterprises in the region (The central database, n.d.).

Assessment of the degree of fulfillment of obligations should be based on the volume of revenues and expenditures of the consolidated budgets of the regions (Russian regions, 2010-2014).

Evaluation of independence in decision-making should be carried out in terms of the level of absolute value and indices of growth of own circulating assets and the autonomy ratio of the aggregate of enterprises of the region (Russian regions, 2010-2014). The criteria for scoring indicators are presented in Table 2.

Table 2: criteria for scoring of indicators and linkages methods for the assessment of the level of sustainable development of the region

Indicators	Criteria for scoring indicators, ballpoints		
	1	2	3
Assessment of efficiency of functioning			
The economic profitability of the enterprise population of the region	<0	0-d, I>1, I<1	>cr, I>1
The profitability of turnover (sales) of the enterprise population of the region	<0	>0, I<1	>0, I>1, when a positive value appears
The coefficient of business activity of the enterprise population of the region	I<1	I=1	I>1
Dynamics of DuPont equation for financial profitability of the enterprise population of the region $IR_К > IRt > IKtc > 1.000$	Not performed	Partially performed	Performed
Stability evaluation			
Sales profit of the enterprise population of the region	<0, I<0.5	>0, I<1, I<1	>0, I>1, when a positive value appears I>1

Revenues from sales of the enterprise population of the region			
Assets of the enterprise population of the region	I<1	I>1	I=1
The golden rule of business of the enterprise population of the region IQs clear > IQs > IQr > IK > 1.0	Not performed	Partially performed	Performed
Assessment of the degree of fulfillment of obligations			
Surplus (+) / Deficit (-) of income and expenses	<0, I>1	<0, I<1	>0, I>1, I<1
Incomes of the consolidated budgets of the region	I<1, I<1	I≥1, I≥ $(1+t_{inf})$	I≥$(1+t_{inf})$, I≥1
Expenses of consolidated budgets of the region			
The golden rule of financing Ivc > Ici > Ip > 1.0	Not performed	Partially performed	Performed
Evaluation of independence in decision-making			
Working capital of the enterprise population of the region	<0	>0, I<1	>0,I>1
Coefficient of financial independence of the enterprise population of the region, %	<50.0	>50.0, I<1	>50.0, I>1
The golden rule of sustainability Iwc > ICfi > ILpc > 1.000	Not performed	Partially performed	Performed

The Testing Of the Proposed Methodical Approaches to Assessment of the Level of Sustainable Development of Economic Entities of Different Levels

Approbation of author's method of assessing the level of sustainable development of business entities is conducted at the meso-level – as an example Chelyabinsk region was taken (Table 5), the micro-level on the example of machine-building enterprises of the Chelyabinsk region, PAO "Chelyabinsk forging plant" (Table 3) at the nanoscale – for example, small business and trading company LLC Verevkin Chelyabinsk (Table 4).

Table 3: the results of the assessment of the level of sustainability of the development of the industrial enterprise of PAO "CHKPZ" during 2014-2016

Indicators	Indicator value			Growth index		Weight of indicators, %	Evaluation score, ballpoints		Weighted estimate	
	2014	2015	2016	2015/2014	2016/2015		2015	2016	2015	2016
Economic profitability, %	8.9	8.9	10.5	1.004	1.178	3.571	2	3	0.071	0.107
The profitability of turnover, %	9.7	10.2	9.4	1.055	0.924	3.571	3	2	0.107	0.071
The coefficient of business activity, turnover per year	0.916	0.873	1.113	0.952	1.275	3.571	1	3	0.036	0.107
Financial profitability, %	10.3	8.8	9.4	0.856	1.060	3.571	2	3	0.071	0.107

Rate of return, %	3.0	2.6	2.2	0.880	0.843	3.571	2	3	0.071	0.107
Finance leverage	3.812	3.894	3.843	1.022	0.987	3.571	1	1	0.036	0.036
Dynamics of DuPont equation for financial profitability						3.571	2	2	0.071	0.071
Assessment of efficiency of functioning						25.000			0.464	0.607
Net profit, mln. rub.	141.7	126.5	144.0	0.893	1.139	5.000	2	3	0.100	0.150
Sales profit, mln.rub.	465.2	497.4	620.9	1.069	1.248	5.000	3	3	0.150	0.150
Revenues from sales, mln.rub.	4800.3	4867.6	6576.2	1.014	1.351	5.000	3	3	0.150	0.150
Capital in the mid-annual measurement, mln.rub.	5237.8	5576.4	5910.3	1.065	1.060	5.000	2	2	0.100	0.100
Implementation of the golden rule of business						5.000	2	2	0.100	0.100
Stability evaluation						25.000			0.600	0.650
Value of capital, mln.rub.	10.7	138.8	-94.8	12.920	-0.683	6.250	3	1	0.188	0.063
Cash inflow, mln.rub.	8767.8	10359.2	10694.3	1.182	1.032	6.250	3	3	0.188	0.188
Payments, mln.rub.	8757.1	10220.4	10789.1	1.167	1.056	6.250	3	3	0.188	0.188
Implementation of the golden rule of financing						6.250	3	1	0.188	0.063
Assessment of the degree of fulfillment of obligations						25.000			0.750	0.500
Working capital, mln rub.	2446.8	2570.9	2981.1	1.051	1.160	6.250	3	3	0.188	0.188
Coefficient of financial independence	0.262	0.257	0.260	0.979	1.013	6.250	1	1	0.063	0.063
Level of permanent capital of the enterprise	0.709	0.669	0.720	0.944	1.076	6.250	2	3	0.125	0.188
Implementation of the golden rule of sustainability						6.250	1	2	0.063	0.125
Evaluation of independence in decision-making						25.000			0.438	0.563
Integral assessment of the level of sustainable development of the enterprise						100			2.252	2.320

Increasing the level of sustainability of development in 2016 compared with 2014-2015 is due to the strengthening of assessments on the components: efficiency of functioning (+0.143 points), independence in decision-making (+0.125 points), stability of development (+0.05 points).

It is obvious that a state order for products is the driving factor in ensuring and improving the sustainability of development of the industrial machinery business in the conditions of crisis trends in the economy.

Table 4: the results of the assessment of the level of sustainability of the development of the trading company LLC Verevkin Chelyabinsk for 2014-2016

Indicators	Indicator value			Growth index		Weight of indicators, %	Evaluation score. ballpoints		Weighted estimate	
	2014	2015	2016	2015/2014	2016/2015		2015	2016	2015	2016
Economic profitability, %	235.9	213.3	190.7	0.904	0.894	3.571	2	2	0.071	0.071
The profitability of turnover, %	21.6	17.4	13.6	0.804	0.780	3.571	2	2	0.071	0.071
The coefficient of business activity, turnover per year	10.910	12.270	14.060	1.125	1.146	3.571	3	3	0.107	0.107
Financial profitability, %	356.2	307.5	204.7	0.863	0.666	3.571	2	2	0.071	0.071
Rate of return, %	18.2	14.6	10.9	0.802	0.748	3.571	2	2	0.071	0.071
Finance leverage	1.793	1.715	1.331	0.957	0.776	3.571	3	3	0.107	0.107
Dynamics of DuPont equation for financial profitability						3.571	1	1	0.036	0.036
Assessment of efficiency of functioning						25.000			0.536	0.536
Net profit, thousand rub.	3715.0	3040.0	2189.0	0.818	0.720	5.000	2	2	0.100	0.100
Sales profit, thousand rub.	4412.0	3616.0	2716.0	0.820	0.751	5.000	2	2	0.100	0.100
Revenues from sales, thousand rub.	20402.0	20804.0	20022.0	1.020	0.962	5.000	3	2	0.150	0.100
Capital in the mid-annual measurement, thousand rub.	1870.0	1695.5	1424.0	0.907	0.840	5.000	1	1	0.050	0.050
Implementation of the golden rule of business						5.000	1	1	0.050	0.050
Stability evaluation						25.000			0.450	0.400
Value of capital, thousand rub.	-104.0	-41.0	28.0	0.394	-0.683	6.250	1	3	0.063	0.188
Cash inflow, thousand rub.	21341.0	19843.0	20839.0	0.930	1.050	6.250	2	3	0.125	0.188

Payments, thousand rub.	21445.0	19884.0	20811.0	0.927	1.047	6.250	2	3	0.125	0.188
Implementation of the golden rule of financing						6.250	3	1	0.188	0.063
Assessment of the degree of fulfillment of obligations						25.000			0.500	0.625
Working capital, thousand rub.	1043.0	988.5	1069.5	0.948	1.082	6.250	2	3	0.125	0.188
Coefficient of financial independence	0.558	0.583	0.751	1.045	1.288	6.250	3	3	0.188	0.188
Level of permanent capital of the enterprise	0.558	0.583	0.751	1.045	1.288	6.250	3	3	0.188	0.188
Implementation of the golden rule of sustainability						6.250	2	2	0.125	0.125
Evaluation of independence in decision-making						25.000			0.625	0.688
Integral assessment of the level of economic security						100			2.111	2.248

Improving the sustainability of the development in 2016 compared to 2014-2015 is due to the strengthening of assessments: the degree of implementation of commitments (+0.125 points) and independence in decision-making (+0.063 points).

It is obvious that in a small business in terms of reducing the volume of sales, ensuring regular payment discipline and increase of own financial sources is a reliable protection against crisis phenomena in the economy.

Table 5: the results of the assessment of the level of sustainable development of the Chelyabinsk region for 2013-2015

Indicators	Indicator value			Growth index		Weight of indicators, %	Evaluation score, ballpoints		Weighted estimate	
	2013	2014	2015	2014/2013	2015/2014		2014	2015	2014	2015
Economic profitability of the enterprise population of the region, %	2.30	2.85	5.54	1.239	1.944	6.25	2	2	0.125	0.125
The profitability of turnover (sales) of the enterprise population of the region, %	4.76	13.48	14.85	2.832	1.102	6.25	3	3	0.188	0.188
The coefficient of business activity of the enterprise population of the region, turnover per year	0.483	0.353	0.373	0.731	1.056	6.25	1	3	0.063	0.188

Dynamics of DuPont equation for financial profitability						6.25	1	2	0.063	0.125
Assessment of efficiency of functioning						25			0.438	0.625
Sales profit of the enterprise population of the region, bln. rub.	73.5	213.1	258.3	2.898	1.212	6.25	3	3	0.188	0.188
Revenues from sales of the enterprise population of the region, bln. rub.	1544.8	1581.0	1739.2	1.023	1.100	6.25	3	3	0.188	0.188
Assets of the enterprise population of the region, bln. rub.	3197.1	4477.0	4662.0	1.400	1.041	6.25	2	2	0.125	0.125
Implementation of the golden rule of business						6.25	2	3	0.125	0.188
Stability evaluation						25			0.625	0.688
Surplus (+) / Deficit (-) of income and expenses, bln. rub.	-11.8	-4.1	-2.5	0.346	0.624	6.25	2	2	0.125	0.125
Incomes of the consolidated budgets of the region, bln. rub.	132.1	142.5	153.5	1.079	1.077	6.25	2	2	0.125	0.125
Expenses of consolidated budgets of the region, bln. rub.	143.9	146.6	156.1	1.019	1.065	6.25	2	2	0.125	0.125
Implementation of the golden rule of financing						6.25	2	2	0.125	0.125
Assessment of the degree of fulfillment of obligations						25			0.375	0.375
Working capital of the enterprise population of the region, bln. rub.	744.6	1562.0	1348.9	2.098	0.864	8.33	3	2	0.250	0.167
Coefficient of financial independence of the enterprise population of the region, %	39.60	47.05	40.61	1.188	0.863	8.33	1	1	0.083	0.083
Implementation of the golden rule of sustainability						8.33	1	1	0.083	0.083
Evaluation of independence in decision-making						25			0.417	0.333
Integral assessment of the level of sustainable development of the region						100			1.854	2.021

Increasing the level of sustainability in 2015 compared to 2014-2013 is due to the strengthening of unit assessments: effective functioning (+0.187 points), assess the stability of development (+0.063 points). Dynamics of assessments of these components reflects the high dependence of the region's indicators on those of large industrial enterprises.

Nevertheless, there are significant trends in the level of sustainable development at both the meso- and micro- and nanoscale levels.

Conclusion

In this study the author's definition of the sustainable development of the business entity is formulated as a state of permanent efficiency of functioning, ensuring the stability of development, rigorous fulfillment of all obligations, subject to independence in decision-making.

An approach is proposed for assessing the level of sustainable development of the economic entity of the meso-, micro- and nano-level using a balanced system of indicators adapted to the level of management.

The approbation of the author's method of evaluation in relation to the region, and industrial engineering enterprises and small trade business was carried out based on the development of the scoring criteria for the components of the BSC and the analysis of financial and economic indicators of business entities.

The results of the approbation made it possible to identify the level of sustainable development of the business entity and determine the reasons for its positive dynamics. At the same time, the factors specific for economic entities of each level, which have a predominant influence on the level of their development stability, have been identified, which makes it possible to develop management decisions of a strategic nature aimed at strengthening the positive influence of these factors and weakening, if any, their negative influence in the long term.

Acknowledgment

The work was supported by Act 211 Government of the Russian Federation, contract № 02.A03.21.

References

Andersen, H., Lawrie, G. and Savič, N. (2004). Effective quality management through third-generation balanced scorecard. International Journal of Productivity and Performance Management, 53(7), pp.634-645.

Barr, S. (n.d.). Measure what matters. [online] p.3. Available at: http://www.balancedscorecard.org/Portals/0/PDF/White%20Paper%20-%20Measure%20What%20Matters.pdf.

Cerin, P. (2017). Bringing economic opportunity into line with environmental influence: A Discussion on the Coase theorem and the Porter and van der Linde hypothesis. Ecological Economics, pp.209-225.

Dernbach, J. (1998). Sustainable development as a framework for national governance. . Case Western Reserve Law Review, pp.1-103.

Dernbach, J. (2003). Achieving sustainable development: The Centrality and multiple facets of integrated decision-making. Indiana Journal of Global Legal Studies, pp.247-285.

Emas, R. (2017). The Concept of sustainable development: definition and defining principles. [online] Available at: https://sustainabledevelopment.un.org/content/documents/5839GSDR%202015_SD_concept_definiton_rev.pdf

Epstein, M. and Manzoni, J. (1997). The balanced scorecard and tableau de bord: Translating strategy into action. Management Accounting, 79(2), pp.28-36.

Hahn, D. and Hungenberg, H. (2001). PuK : Planung und Kontrolle, Planungs- und Kontrollsysteme, Planungs- und Kontrollrechnung : Wertorientierte Controllingkonzepte. Wiesbaden: Gabler.

Kaplan, R. and Norton, D. (1992). The Balanced Scorecard – Measures That Drive Performance. Harvard Business Review, pp.71-79.

Kaplan, R. and Norton, D. (1993). Putting the Balanced Scorecard to Work. Harvard Business Review.

Kaplan, R. and Norton, D. (1996). The Balanced Scorecard: Translating Strategy into Action. Boston: MA.: Harvard Business School Press.Report of the world commission on environment and development: Our common future. (1987). United Nations General Assembly, Development and International Co-operation: Environment. Oslo, Norway, p.43.

Kormanovskaya, I. and Renkas, N. (2006). Assessment of the effectiveness of management of sustainable development of the region. Bulletin of Novgorod State University, (37), pp.10-13.

Mazunina, M. and Skryabina, E. (2009). Theoretical and methodological basis for assessing the sustainable development of the region. Entrepreneurship, 5, pp.23-26.

Pigou, A. (1920). The Economics of welfare. London: Macmillan and Company.

Rio Declaration on Environment and Development. (1992). United Nations Conference on the Human Environment. Rio de Janiero, Brazil.

Rohm, H. (n.d.). Q&A: Strategic Management for State and Local Government. [online] Available at: http://www.balancedscorecard.org/Portals/0/PDF/Strategic%20Management%20for%20State%20and%20Local%20Govt.pdf

Russian regions. Socio-economic indicators. (2010-2014). Moscow: Rosstat, p.997.

Stoddart, H. (2011). A Pocket guide to sustainable development governance. Stakeholder Forum.

The central database of statistical data of the Federal State Statistics Service. [online] Available at: http://cbsd.gks.ru/.

Zaharov, A. (2011). Information security as a component of building a sustainable regional socio-economic system. Penza: LLC Scientific and Publishing Center "Sotsiosfera".

Sectoral Factors of Formation of Tax Revenues In Subsidized Regions of Russia

Elena Dzhurbina, North-Caucasian Federal University, Pyatigorsk branch, Pyatigorsk, Stavropol Territory, Russia, e-mail: Dem0608@mail.ru

Irina Prosvirina, South Ural State University, Chelyabinsk, Russia, iprosvirina@mail.ru

Sergei Aliukov, South Ural State University, Chelyabinsk; Russia, alysergey@gmail.com

Dmitry Fateev, North-Caucasian Federal University, Pyatigorsk branch, Pyatigorsk, Stavropol Territory, Russia, e-mail: Dem0608@mail.ru

Lyudmila Shirshikova, South Ural State University, Chelyabinsk, Russia, shirshikovala@susu.ru

Abstract

The article presents the results of the analysis of the influence of the industry factor on the dynamics of tax revenues in the subsidized regions of the North Caucasus Federal District. It is proved that the low level of tax revenues is determined by the deformed structure of the economy with simultaneous heterogeneity of the actual sectoral tax burden. Based on the results of the study, tactical and strategic measures of economic policy aimed at increasing the fiscal efficiency of subsidized regions are revealed.

Keywords: tax revenues, sectoral structure, gross regional product, tax burden, sectoral disproportions.

Introduction

One of the attributive features of Russia's current tax system is the growing imbalances in the dynamics of the formation of tax revenues by individual regions (Dzhurbina, 2016), which in turn neutralizes the positive effects of fiscal federalism and contributes to the preservation of the depressed economic state of some subjects of the federation. Analysis of the industry specific tax revenues in the context of extremely low activity of subsidized regions to develop their own tax base will allow developing concrete proposals for improving economic and fiscal policy.

Literature Review

In international practice, the problem of sufficiency of tax revenues is investigated in relation to developing countries. In particular, in the work of economists of the World Bank it is proved that the level of the tax burden of states with low per capita GDP is usually lower than the potential one, which creates difficulties in adequately financing the needs of society and slows economic growth. (Minh Le et al., 2011). This statement can also be projected onto the regional level of large federal states, whose territorial subjects are quite differentiated both in terms of socio-economic development indicators and in terms of the level of their own tax opportunities.

The traditional quantitative approach to the comparison of regions and countries in terms of average per capita tax revenues or the tax burden (as a percentage of GDP/GRP), in our opinion, is not sufficiently correct, since it does not take into account the structural features of the economy, as well as the institutional characteristics of the tax system. (Alfirman, 2003) In order to assess the influence of structural factors in the process of econometric modeling of tax revenues, additional explanatory

variables are used, such as: the share of the industrial sector (Eltony, 2002), the share of agriculture in GDP (Gupta, 2007), the share of the natural resource sector (Botlhole et al, 2012), etc.

Empirical studies show that this group of factors refers to a universal characteristic of the sectoral structure of the economy that corrects the aggregate tax potential of a region or state, calculated on the basis of a basic macroeconomic indicator, for example, GDP/GRP. For example, the materials of the scientific work carried out on the actual data of Turkey confirm the positive influence of increasing the share of industry and the negative - of agriculture, on the dynamics of tax revenues, and this statement is valid for a long time interval. (K. Karagoz, 2013).

At the same time, the use of the regression approach does not allow analyzing tax receipts in the context of the entire variety of economic sectors due to the multicollinearity between the regressor factors, as well as a significant increase in the requirements for the number of initial observations. That is why in the modern studies of tax systems, the industry approach finds limited application. However, its application in the framework of traditional statistical procedures, in our opinion, opens additional opportunities for analyzing the fiscal opportunities of taxpayers, as well as the scientific justification of the priorities of the structural economic policy of the regions, aimed at reducing the subsidy of their budgets.

Comparative Structural Analysis of Tax Revenues in Subsidized Regions

It is advisable to start studying the branch specificity of tax revenues in subsidized regions from a comparative structural analysis in the context of the most important sectors of the regional economy. This makes it possible to quantify the actual proportions of the economic complex of a particular region and to specify the initial factual basis for their "decomposition" into determinants of a more particular order.

The sectoral structure of aggregated tax revenues in the subjects of the North Caucasus Federal District and Russia as a whole, calculated on the basis of official statistics for 2015, is presented in Table 1.

Table 1: sectoral structure of gross tax revenues in the regions of the North Caucasus Federal District in 2015, %*

Region	Branch of national economy										
	A**	B	C	D	E	F	G	H	I	J	K
Republic of Dagestan	-	5,2	20,8	6,9	5,5	7,1	7,9	2,9	21,1	16,6	6,0
Republic of Ingushetia	0,5	10,5	1,2	4,4	9,9	4,1	3,9	2,8	36,0	19,9	6,8
Kabardino-Balkar Republic	1,6	0,2	34,7	8,4	2,4	6,7	3,5	6,2	16,3	13,7	6,3
Karachay-Cherkess Republic	1,9	4,9	18,6	11,4	4,2	12,5	4,7	4,9	18,3	11,1	7,5
Republic of North Ossetia	0,7	0,5	17,70	8,5	7,1	9,3	3,5	9,9	23,5	12,9	6,4
Chechen Republic	0,3	32,5	1,6	-3,4	1,7	3,2	4,8	2,8	36,3	15,1	5,1
Stavropol Territory	4,9	7,2	16,5	7,7	7,0	15,5	9,2	9,1	6,9	10,1	5,9
Russian Federation (by the sum of regions)	0,6	30,9	18,7	3,0	4,9	10,9	6,4	10,4	2,9	4,0	7,3

* Source: calculated by the authors according to (Finances of Russia, 2016).

** Legend (hereafter in the tables): A - agriculture, hunting, forestry, fishing, fish farming, B - mining, C - processing industries, D - electricity, gas and water production and distribution, E - construction, F - wholesale and retail trade; repair of vehicles, motorcycles, household products, G - transport and communications, H - real estate transactions, rental and provision of services, I - public administration and military security; social insurance, J - education, health and social services, K - other activities.

According to the data in Table 1, the composition of tax revenues in the whole country is characterized by a rather low sectoral diversity. In particular, the sectors "Extraction of minerals" and "Processing

industries" generate more than 50% of tax revenues; trade, household services and real estate transactions provide about 20% more.

The sectoral proportions of the formation of tax revenues in the regions of the North Caucasus Federal District differ significantly from the Russian Federation as a whole. This statement, first of all, is true for extractive industries, whose role in the formation of tax revenues is extremely low and varies from 0.2% in the Kabardino-Balkar Republic to 10.5% in the Republic of Ingushetia. Only in the Chechen Republic, the share of the natural resource sector in fiscal payments is at the level of average Russian indicators. The exceptionally low contribution of processing industries to tax revenues takes place in the poorly industrialized economies of the Chechen Republic and the Republic of Ingushetia (1.2% and 1.6% respectively).

A distinctive feature of the sectoral disproportions of tax revenues in the regions of the North Caucasus Federal District is the expressed priority of the sphere of tertiary non-market services. For example, the sector "Public Administration and Ensuring Military Security" generates 6.9% of total tax revenues in the Stavropol Territory to 36.3% in the Chechen Republic (with an average for Russia of 2.9%). At the same time, in four regions of the okrug this type of activity absolutely dominates the structure of tax revenues. If we take into account its aggregate fiscal "contribution" taking into account the spheres of education and healthcare, the share of the tertiary non-market sector exceeds 30% of the total fiscal revenues in the Karachay-Cherkessia and Kabardino-Balkar republics, 52.2% and 56.0% in the Chechen Republic and republic of Ingushetia respectively.

It is symptomatic that the aggregate share of the tertiary market sector (transport and communications, real estate transactions, financial activities, hotels and restaurants) is significantly lower than the corresponding average Russian indicators. This is due both to the insignificant role of these activities in the structure of regional added value (as will be further emphasized) and to their transition to the "shadow" sector.

Thus, the structure of tax revenues by sector is determined by the territorial features of distribution and the level of development of the productive forces of each region. It will be further shown that the sectoral heterogeneity of the fiscal productivity of the regions can be explained by the complex and non-linear influence of economic, administrative and territorial factors creating a unique structure and dynamics of tax revenues.

Disproportions of Regional Economy and Decrease in Its Tax Capacity

The determining factors of differentiation of subjects of the federation according to the criterion of generated tax revenues are of an objective nature and are determined by the unequal potential of certain sectors of the economy to the formation of fiscal obligations. For their characterization it is expedient to analyze the structure of gross added value in the regional context (Table 2).

Table 1: sectoral composition of the gross regional product in the regions of the North Caucasus Federal District in 2015, %*

Region	Branch of national economy										
	A*	B	C	D	E	F	G	H	I	J	K
Republic of Dagestan	14,1	0,4	3,6	2,2	20,5	25,8	6,5	2,6	7,0	9,7	7,6
Republic of Ingushetia	6,4	1,7	6,1	3,8	14,1	18,0	5,4	2,8	23,3	15,1	3,3
Kabardino-Balkar Republic	16,2	0,1	14,2	5,9	7,2	18,5	5,3	3,5	11,2	14,8	3,1
Karachay-Cherkess Republic	19,2	1,5	13,3	8,4	8,0	9,8	4,4	5,5	14,8	12,6	2,5
Republic of North Ossetia	15,6	0,3	8,5	5,4	8,5	18,3	6,6	3,6	16,0	13,6	3,6
Chechen Republic	7,2	1,7	2,7	1,9	15,4	17,1	5,6	4,4	19,0	19,5	5,5

Stavropol Territory	15,1	0,7	11,8	5,3	7,7	17,9	9,4	6,2	9,2	12,5	4,2
Russian Federation (by the sum of regions)	5,0	10,6	17,4	3,7	7,0	19,0	9,3	11,5	5,8	7,6	3,1

* Source: calculated by the authors according to (Finances of Russia, 2016).

These tables give grounds for stating that there are significant differences in the GRP structure of the subsidized subjects of the NCFD from the average Russian proportions, which is determined by historically established approaches to the location of the productive forces and by the lack of valuable minerals produced on an industrial scale.

Characterizing the features of the development of the economic complex in the subjects of the North Caucasus Federal District, one should emphasize negative deindustrialization processes that were accompanied by the replacement of released niches by trade, mainly by "shadow" agriculture, including private households, as well as public sector hypertrophy (education, healthcare , public administration).

The prevalence of agriculture observed in most of the regions of the okrug, whose share varies from 6.4% in the Republic of Ingushetia to 19.2% in the Karachay-Cherkess Republic (with an average Russian value of 5% GRP), appears to be the most important factor in reducing tax revenues due to a lowered level Tax burden in this area. The significant role of agriculture in the structure of the economic complex is an indirect indicator of weak urbanization, which in turn initiates negative effects for effective implementation of fiscal procedures and rules: low level of wages and incomes of the population, labor migration, high share of the informal sector.

Negative impact on the taxability of the constituent entities of the district is provided by the extremely low level of development of the manufacturing industry, which on the national scale ranks second in the generation of fiscal revenues, but in the regions under consideration it forms between 2.7% and 14.2% of the gross value added (at an average Russian rate of 17, 4% GRP). The actual replacement of the manufacturing industry with the service sector and trade, on the one hand, is in line with current trends in the strengthening of the role of the tertiary sector, but on the other hand it leads to an expansion of the horizons of informal economic activity and a reduction in the tax capacity of the subsidized regions.

Analysis of the structure of value added across the regions of the Russian Federation allows us to come to the conclusion that the subjects forming tax revenues within the national average are characterized by a diverse composition of GRP, in which the shares of processing industries and trade are approximately at the same level. In general, the existing sectoral disproportions determine the low volume of fiscal revenues generated by the economy, and also substantially limit the strategic opportunities for their increase without a purposeful financial "recharge" from the federal center.

Sectoral Tax Burden and Its Impact on the Aggregate Fiscal Productivity of Regions

The Russian tax system, declaratively establishing the principle of fairness of taxation, actually contributes to the uneven distribution of fiscal pressure on various sectors of the economy. The reasons for the heterogeneity of the sectoral tax burden are determined by the existence of an objective diversity in the structure of operating expenses, differentiation of the level of profitability, and also by different initial possibilities for legal and illegal minimization of fiscal obligations. The listed reasons are exceptionally bright in the regional context, contributing to the strengthening of the territorial heterogeneity of sectoral fiscal pressures (Table 3).

Table 3: share of tax payments in value added industries (tax burden) in the regions of the North Caucasus Federal District, 2015, %

Region	Branch of national economy										
	A*	B	C	D	E	F	G	H	I	J	K
Republic of Dagestan	-0,04	63,0	27,7	15,1	1,3	1,3	5,8	5,3	14,4	8,1	5,3
Republic of Ingushetia	0,52	37,8	1,2	7,1	4,3	1,4	4,4	6,2	9,5	8,0	7,4
Kabardino-Balkar Republic	1,02	21,7	25,4	14,9	3,4	3,8	6,9	18,4	15,1	9,6	13,1
Karachay-Cherkess Republic	0,91	30,9	13,2	12,9	4,9	12,1	10,1	8,6	11,7	8,4	8,5
Republic of North Ossetia	0,38	13,4	17,4	13,2	6,9	4,2	4,4	23,0	12,3	7,9	9,8
Chechen Republic	0,35	141,2	4,3	-13,5	0,8	1,3	6,3	4,8	14,1	5,6	6,6
Stavropol Territory	4,22	134,2	18,1	18,9	11,8	11,2	12,7	19,1	9,7	11,1	10,6
Russian Federation (by the sum of regions)	2,31	60,3	22,3	16,9	14,7	11,9	14,3	18,8	10,7	11,3	20,0

The tax load indicators presented in Table 3 show its pronounced sectoral heterogeneity: the maximum burden - more than 60% of the value added - "carries" the mining sector, at the other extreme (about 2%) is the agricultural sector characterized by an unstable financial situation.

Regional indicators of the tax burden of the subjects of the North Caucasus Federal District in most cases "lag" behind the average Russian values. For example, payments of the extractive sector outstrip the national average in only three constituents of the region where oil and gas are extracted and transported, while in other regions the tax burden is relatively small.

The effectiveness of taxation of agriculture is also extremely low, both due to the traditionally low profitability of activities, and because of the production of a substantial part of the output on personal farmsteads, in fact excluded from controlled economic turnover.

Attention is drawn to the tax burden in the construction sector, fiscal obligations of which range from 0.8% in the Chechen Republic to 11.8% in the Stavropol Territory (the average Russian value is 14.7%). This is due to the high share of the shadow economy in this sector, as well as the use of budgetary resources to finance socially important facilities.

The tertiary sector of public services (health, education, public administration) objectively has a limited fiscal capacity, represented primarily by the personal income tax. The revenues of this tax, in turn, are determined by extremely inertial determinants of wages and the number of employed in the public sector.

A comparative analysis of the data in Table 3 allows us to conclude that the public sector demonstrates a higher level of fiscal discipline compared to commercial economic entities. This statement is especially true for such areas as wholesale and retail trade, construction, production and distribution of electricity, gas and water. It is necessary to emphasize that the current situation should not be unambiguously interpreted only from the point of view of informal activity, since the financial results and profitability of the above sectors lag behind the average Russian values.

In general, in all regions of the region (with the exception of the Stavropol Territory), the lower sectoral tax burden has a negative impact on the dynamics of budget revenues. Unused reserves for increasing fiscal discipline are observed in the wholesale and retail trade sectors (from 0.2% to 2.0% of the produced added value), processing industries (from 0.7% to 3.7%), and construction (from 2, 9% to 13.9%).

Discussion of Results and Findings

The sectoral aspect of regional differentiation of tax revenues is determined by the different ability of certain sectors of the economy to form and execute tax obligations, which in turn are formed under the influence of two most important factors.

First, the subjects of the federation are diverse in the branch structure of the gross regional product: in the subsidized regions, it is shifted in favor of agriculture, administration and trade. At the same time, the "donor" regions specialize in the extraction of minerals, industrial production and financial intermediation.

Secondly, the indicators of the actual tax burden of the economic sectors indicate that the maximum share (about 60%) is generated by the "Mining" industry, while agriculture is widely represented in the subsidized subjects of the Russian Federation (due to unstable financial condition) and trade (Due to the presence of a large informal sector) generate tax payments of 2.3% and 11.9% of value added, respectively. The current situation is determined by the unique structure of expenditures, the heterogeneous level of profitability, and the initiation of opportunities (including illegitimate ones) to minimize fiscal obligations.

The study of tax revenues of the subsidized regions of the North Caucasus Federal District from the point of view of the sectoral approach makes it possible to conclude that the insufficient fiscal efficiency of these entities is determined both by structural imbalances in the produced added value and by pronounced fluctuations in the actual sectoral tax burden, Factors is highly differentiated.

Thus, the influence of the low sectoral tax burden, which itself is an indicator of the unstable financial state of taxpayers, as well as the presence of "failures" in the implementation of administrative procedures, is most clearly manifested in the republics of Ingushetia, North Ossetia, Kabardino-Balkaria and Karachaяu-Cherkessia In order of decreasing importance of this factor). In the Stavropol Territory, on the contrary, actual seizures in the sectors "Mining" and "Agriculture" are much higher than the average Russian values, however their positive effect is offset by the presence of other sectoral imbalances.

The negative impact of the structural factor, primarily due to the low level of industrialization with simultaneous activation of the non-profit sector of the tertiary sector (public administration, security) is most pronounced in the Chechen Republic. The deformity of the regional economy is also the reason for the extremely low tax efforts of the Republic of Dagestan, whose basic sectors (trade, construction, agriculture) are traditionally characterized by a significant "shadow" component.

Conclusion

The reasons for the insufficient fiscal performance of the subsidized entities of the North Caucasus Federal District are concluded both in an objective sectoral imbalance of the regional economy whose dominant sectors are immanently low in tax capacity and in weak administration of tax revenues.

Sectoral variations in the tax burden, acting in concert with the heterogeneous geographical distribution of the branches of the national economy, contribute to the non-linear strengthening of regional inequality by the criterion of fiscal productivity.

Current measures to increase tax revenues should be oriented towards "pulling" the level of tax burden in agriculture, construction and manufacturing to the average Russian level. This implies not only a tactical intensification of the control activities of the tax authorities, but also a set of measures of an institutional nature to remove "from the shadow" of the agricultural, construction and industrial sectors.

The system economic policy of the regions should take into account the fiscal component, the priorities of which at the initial stage are the structural reorganization of the economic complex of regions in favor of the "tax-intensive" sectors: secondary (manufacturing industry) and commercial tertiary (financial activities, transport and communications). Undoubtedly, this will require considerable financial support from the federal center both through the mechanism of conditional transfers, and through the tools of program-targeted and project financing.

Acknowledgment

The work was supported by Act 211 Government of the Russian Federation, contract № 02.A03.21.

References

Alfirman, L. (2003). Estimating stochastic frontier tax potential: Can Indonesian local governments increase tax revenues under decentralization // Center for economic analysis Working Paper, no. 03-19, 35 p.

Dzurbina, E.M., Fateev, D.I. (2016). Regional Heterogeneity of Income Tax in the Russian Federation: The Experience of the Quantitative Analysis and Regulatory Issues // International Review of Management and Marketing, vol 6, special issue (S5), pp. 143-148.

Eltony, M.N. (2002). Determinants of tax effort in Arab countries // Arab Planning Institute, Working Paper, no. 207.

Finances of Russia. (2016), Appendix to the collection (information in the context of the subjects of the Russian Federation). Moscow: Rosstat. Access mode: http://www.gks.ru/free_doc/doc_2016/pril-fin.rar.

Gupta A.S. (2007). Determinants of tax revenue efforts in developing countries // IMF Working Paper, no. 07/184, 41 p.

Kadir Karagöz. (2013). Determinants of Tax Revenue: Does Sectorial Composition Matter? // Journal of Finance, Accounting and Management, vol. 4, no. 2, pp. 50-63.

Minh Le, Moreno-Dodson, B., Bayraktar, N. (2011). Tax Capacity and Tax Effort Extended Cross-Country Analysis from 1994 to 2009 // World Bank Policy Research Working Paper 6252.

Regions of Russia. (2016). Socio-economic indicators: a statistical compilation. Moscow: Rosstat.

Integrated Organizational Management Model In Overcoming Challenges of Sustainability

Dalia Susnienė, Kaunas University of Technology, Lithuania, dalia.susniene@ktu.lt

Daiva Žostautienė, Kaunas University of Technology, Lithuania, daiva.zostautiene@ktu.lt

Abstract

Diminishing natural resources, environmental pollution and persistent social inequalities in many countries clearly indicate that the current economic model is increasingly inconsistent with public expectations. Corporate interests are increasingly determining economic globalization, and the development of the private business interests are increasingly at odds with the public ones. Due to the negative effects of economic development on social and environmental aspects private business successfully exploit free-market ideology. In order to change the destructive direction of established practice, it is necessary to involve business into the decision process of the world's most pressing issues, and work together to create a sustainable future of the world. The paper aims to develop a conceptual integrated organizational management model expanding it upon the relationships among organizational management system and stakeholder management in pursue of sustainability. This paper makes several contributions: extends discussions on the development of stakeholder management issues and enhances theoretical foundation disclosing interdependencies among organisational sustainability, social responsibility and stakeholder management. As a result an organizational management model is presented that offers guidelines how to integrate these three important issues in management practice. The discussions on conceptual level have been stimulated and reasoned from theory on stakeholders and their relationships management, corporate social responsibility and sustainability by revealing these interfaces in organizational management.

Keywords: sustainability; stakeholder management; social responsibility; organizational management; integrated management system

Introduction

New trends in economic development, the usage of information technologies and globalization of the world economy present new challenges not only for business community in different countries and governments, but also for the humanity as the whole. Unprecedented global environmental, social and economic issues require innovative solutions from different world-view and perspective. Diminishing natural resources, environmental pollution and persistent social inequalities in many countries clearly indicates that the current economic model is increasingly inconsistent with public expectations.

Macro issues consist of aggregate micro problems. Due to the negative effects of economic development on social and environmental aspects, private businesses are given a particular attention, especially large global corporations which gained more power by successfully exploiting free-market ideology. Corporate interests are increasingly determining economic globalization, and the development of the private business interests are increasingly at odds with the public ones. In order to change the destructive direction of established practice, it is necessary to involve business into the decision process of the world's most pressing issues, and work together to create a sustainable future of the world, based on ecological sustainability, social justice, peace, human rights, democracy, prosperity, consciousness and similar values.

Long-term organizational success depends on how they are able to integrate sustainability aspects into the organizational environment and feel the mood and expectations of stakeholders in order to meet their needs and create socially responsible cooperation.

Management system exists in every organization, which includes the environmental management system, occupational health and safety, and financial management as well as quality management system if the organization has developed and implemented it. Organization management system includes organization's business policies together with goal setting and their achievement system, and is a way of managing organizations. In order to implement social responsibility initiatives, the most important consideration should be given to the organization's internal systems integration.

In pursuit to ***answer the guiding research question, the objective of the article*** is to introduce the modern attempts in the development and validation of the scientific and practical problem presenting a conceptual integrated organizational management model with the focus on the relationships among organizational management system, social responsibility and stakeholder management in pursue of sustainability.

The goal pursued allows highlighting the ***scientific problem of the paper***: how to integrate corporate social responsibility (CSR) principles into the organizational management model adjusting the interests of stakeholders and enterprise in a more effective way.

The ***methods of the research include*** comparative structural analysis and synthesis of scientific literature. The theoretical arguments possess intuitive appeal based on systematic comparative and logical exploration of empirical studies as well as scholarly insights.

The scientific novelty of the research lies in the presentation of research disclosing wider perspective and incorporating stakeholder management issues and disclosing a systematic and proactive approach to organization where these three components can be managed and the problems envisaged. Since the very idea of trying to view social responsibility and sustainability as complementing each other is not new, however framing the former into the enterprise value-based change principles promoting CSR through specific action points is a new standpoint for the academic research. In result, the relations among organizational sustainability, social responsibility and stakeholder management are emphasized and an all-embracive organizational management model is presented. A model takes into consideration theoretical aspects of social responsibility, stakeholder relationships management and sustainability disclosing interfaces and how these three dimensions can be incorporated and managed as a system. The benefits of the model of an integrated management system in organization are reasoned and it might be used to explain actual behavior of organizations regarding their aspirations for sustainability. The chapter also contributes to the expansion of knowledge about stakeholder management.

Considerations on Social Aspect of Sustainability

Previous theories on business and its place usually concentrated on its economic role whereas sustainable development ideas gave emphasis on business environmental dimension from the perspective of politics, research and practice. Today the modern understanding of sustainable development became wider and encompassed one more important aspect - social dimension. (Dagiliene *et al*., 2014). Sustainable enterprise aims at minimizing trades and maximizing synergies between economic, social and environmental aspects. All economic activities must create enough value in everybody's life do not harm our ecological system and insure the survival of future generations without exposing to danger global sustainability. Issues of global sustainability and organizations activities are interdependent and must be important to all types of organizations (Garvare & Johannson, 2010; Scherer & Palazzo, 2007).

The analysis of academic literature has shown that in understanding the relations among three spheres of sustainable development, social actions are more consistent with the concept of sustainable development than others.

Early definitions of sustainable actions emphasized the importance of relating business responsibility to power, more recently the importance of balancing the multiplicity of interests represented by internal and external groups emerged. Consequently, businesses found that they disregard their responsibilities because consumers, employees, national government bodies, international organizations (such as European Union) demand business to act in more socially responsible manner (Fairbrass, *et al*., 2005).

In recent years, scientists studying the implementation of the principles of sustainable development, in most cases relate it with social responsibility of organizations (Ebner & Baumgarther, 2006; Engel, 1997; Rego & Cunha, 2008; Garvare & Johansson, 2010). In response to numerous demands for corporations to play a more active role in the overall welfare of society, many businesses have paid considerable attention to the social impact of their economic activities in recent years (Hingley, 2010; Wildes, 2008).

Corporate social responsibility may be defined in different ways regarding expected obligations or other ethical behavior. While earlier understanding of CSR often had a local, person orientated philanthropic focus, modern notion of CSR is comprehensive and diverse integrating social and environmental interests in business and in its relationships with the stakeholders on a voluntary basis (González-Rodríguez *et al*., 2013; Wettstein, 2012 b; Wood, 2010). Other authors (cf. Wettstein, 2012 a, b; Scherer & Palazzo, 2007, Crane *et al*., 2008) refer to CSR as an "umbrella term" because business responsibilities and its role in society include subfields such as business and society, business ethics, or stakeholder theory. With regard to the terms "business social responsibility" and "corporate social responsibility", they are often treated as synonymous ones; however, the concept of corporate social responsibility is narrowed to a specific enterprise-level by integrating social responsibility principles into its activities.

Thus, CSR can be treated as a companies' commitment to take into account wider social impacts of their activities regarding different stakeholders. Often companies must use their resources to bring benefit to the society by demonstrating their commitment and participating in the community life as well as contributing to its initiatives, independent of direct firm profits. From this scenario, it follows that any company not only displays a range of negative and positive impacts on society through its profit-seeking activities but also meets certain obligations to contribute to the management of those impacts, wherever they levy external costs or harms on others (González-Rodríguez *et al*., 2013; Daszynska-Zygadlo *et al*., 2016). It is obvious that stakeholder management and corporate social responsibility share relevant and potential synergies, but this topic is underdeveloped in scientific works.

Stakeholder Paradigm in Socially Responsible Corporate Management

It is difficult to imagine business without stakeholders and relationships with them. The only issue is how purposely, ethically and considerately these relations are managed. All businesses have wide range of different stakeholders and their groups (owners, shareholders, customers, employees, suppliers, partners, communities, etc.) and companies need to satisfy their needs and balance their and organizational interests. Therefore, communication and relationships with stakeholders should always be on a daily agenda. The question is whether all businesses, or in other words their leaders and managers, have a planned strategy to guide these relationships? Do they have a set of values to guide and maximise the potential of these relationships? Or is this managed in an ad-hoc basis when there is a threat? Or do they take actions without having clear strategy and only from economic self-interest?

Changes in economic development, national or local security, and expectations of society influence how social performance is defined and how it involves stakeholders and thus the performance of a corporation. It is evident that the pressure for corporate accountability is increasing (Beurden & Gossling, 2008; Orlitzky *et al*., 2015; Zaharia & Grundey, 2011). Considering company's operation on micro level, it involves understanding of stakeholder needs and expectations with the intention of achieving medium and long-range success, and thereby demonstrating sustainability.

Two very clearly expressed respects emerged associated to stakeholders in the beginning of 21st century. First - the aim to respond to the demands by the interest groups – employees, suppliers, dealers, local communities and even nations. The second – attention to broad and complex issues as unemployment, racial discrimination, pollution, and poverty - commonly defined as actions that aim to social betterment (Holmqvist, 2009). The notion of 'stakeholder management' for organizational sustainability has been described as an organization behaving in such a way as to satisfy the needs and expectations of its stakeholders. According to Garvare (2010) and Habisch (2011), the aim of organizational sustainability will be accomplished if organizations act to maximize the quality of their products to customers, subject

to meeting the wants and expectations of non-customer stakeholders. This viewpoint reflects a new paradigm in the conventional understanding of organization purpose; furthermore, it offers an important improvement in the quality of organization management.

Stakeholder management from corporate social responsibility and sustainability approach has demonstrated to business its strategic opportunities, i.e. a company that knows or anticipates legitimate expectations of stakeholders and is ready to satisfy or balance those expectations, in the course of time will gain a competitive advantage over its rivals in the market.

Benefits of Stakeholder Relationships for Organization

Organizations and namely top management are well aware that organizations have their stakeholders though how to deal with the interdependent network of these relations between organization and stakeholders it is not always clear. Stakeholders and their groups are unique in every organization. Stakeholders can be internal or external and their interests are closely interrelated with organization's wealth as they face a common risk as well as probable benefits or losses depending on organization's performance. It is not enough to acknowledge the importance of stakeholders and their interests in organization management but it is often difficult and not clear how to implement effective stakeholder relationships. Very often business give preference to the focus on profit, results not paying enough attention on people and their relationship management. But current trends in the global business world manifest the significance of people in striving for success.

Value of stakeholder relationships should not be ignored and must be regarded as being developing, and mutually defined (Figure 1).

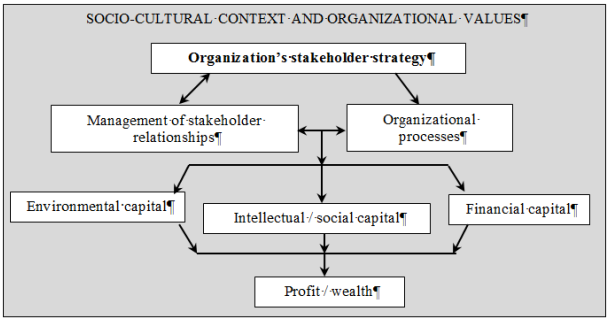


Fig. 1: Value of stakeholder relationships for organization (source: the Authors)

A collaborative model of stakeholder relationships can be a source of opportunity and competitive advantage (Buchanan, 2013; Ebner & Baumgarther, 2006; Fairbrass *et al.*, 2005; Post, 2013). The benefits of the relationships are evident in turbulent and very competitive business environment and can offer stability to certain extent, possibility of influencing circumstances, capacity expansion in addition to increased organizational effectiveness. Such holistic approach creates synergies as effective relationships with one stakeholder or group can bring benefit to another stakeholder or group, e.g. sustainable relations with local community has positive effect on customers as well.

This encompasses all activities in an organization starting from research and strategy development alongside of creation and implementation of business processes and demonstrates how stakeholders and relationships have impact on organization's activity. The relationship model discloses systematic approach to organization in a society where companies can have or experience both active and passive interrelationships with their stakeholders. Organization-stakeholder relationships reveal a multidimensional nature of the phenomenon and are under permanent development, mutual dependence and should be controlled by direct and indirect agreements. These agreements are often tacit, subjected to ongoing negotiation and indicate the expectations of both parties from their relationships as well as possible gains in return. . Therefore, organizational wealth as final output of its performance and stakeholder strategy is given emphasis over the profit. The modern approach focuses on wealth maximization rather than profit maximization. This gives a longer term horizon for assessment, making

way for sustainable performance by businesses. Finally, according to Adam Smith – a businessmen in order to fulfil their profit motive in turn benefits the society as well. Maximization of wealth is more modern approach and is treated as more advanced to profit maximization. Profit maximization represents a short-term perspective as compared to wealth maximization. Wealth maximization entails corporate benefit while profit maximization entails shareholders' benefit. Wealth maximization therefore ensures a more stable, larger market share, greater financial market performance in terms of value of stocks, more long-term financial benefits for stockholders this therefore makes wealth maximization of greater benefits compared to profit maximization. Wealth maximization also maximizes the achievement of other objectives. Wealth can be derived in many different ways by creation of employment, payment of wages and salaries, and purchasing products because the new products create new jobs. People prosper when they get profit from their investments; they have wealth when they use their achieved profit for creating value for themselves, families, community.

It is claimed that stakeholder relationships can be seen as being the vital spark of the organization. It is just as if we people live in an interdependent and synergetic relationship with the environment, not excepting organizations. Relationships with the stakeholders are source of energy and information, assets and supplies that are vital to the existence. These relationships provide companies with social, intellectual, environmental, and financial capital that assures company sustainable development in a long-term perspective. The numerous researchers (cf. Marrewijk, 2003; Mattingly & Berman, 2006; Porter & Kramer, 2006; Godfrey & Hatch, 2007; Juscius & Snieska, 2008; Garcia-Castro *et al*., 2008; Matten, & Moon; 2008; Dahlsrud, 2008; Juscius, & Jonikas, 2013; Rangan *et al*., 2015) claim that CSR is beneficial to organizations in creating consistent social networks and social capacity. Corporate activity that plays important and positive role in the community life can generate social participation and positive attitudes towards the business, and can be a significant factor in economic success and sustainable development (Silberhorn & Warren, 2007). Most of the carried research (Wood, 2010; Saeed and Arshad, 2012; Porter & Kramer, 2006; Aupperle, *et al*.,1985; Griffin & Mahon, 1997; Orlitzky *et al*., 2003; McWilliams & Siegel, 2000; Waddock & Graves, 1997) link CSR to profitability and conclude that CSR investments bring better financial gains to organizations, both in marketing and accounting actions (Boutelle, 2004) and finally assures mutual value (Figure 2)

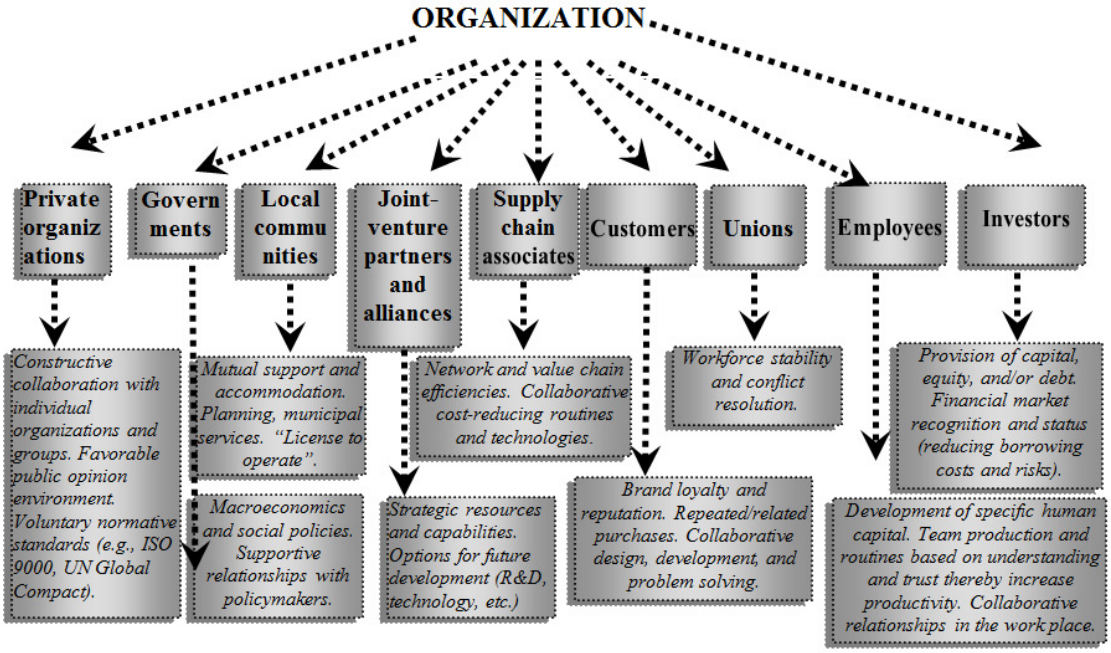


Fig. 2: Contribution of stakeholders to value creation

(source: the Authors)

Considering stakeholder influence to organization, the organization is seen as a relationship network where different individuals or groups and their interests meet and, depending on the achievement of organization's goals, everyone can contribute and/or get benefit. Reciprocal relationships help to achieve competitive advantage and provide exclusive attributes and elements to organization that are impossible to copy. It is hardly possible to imitate relationship model as it is very sophisticated, distinct and exclusive process. The organizational advantages can be achieved in the long run are as follows:

- Enduring recognition.
- Cost reduction.
- Positive image.
- Employee job satisfaction and positive motivation.
- Synergy from stakeholder relationships.
- Greater competitiveness, and
- Increased trust.

The analysis of stakeholders relationships in organization reveal different beneficial aspects not only to organizations operations but also to organizations' wealth where combination of tangible and intangible factors (economical, technological and social) make organization balanced and sustainable. Therefore, stakeholder approach offers better understanding and wider perspective of the organization.

Theoretical Framework of Integration of Social Responsibility and Stakeholder Issues in Organizational Management

There is growing understanding that there is a need for transformation in order to reduce harmful environmental and societal impacts created by our currently unsustainable business practices. Therefore, sustainable development deals with the diverse social, environment, and economic issues and raises a number of important questions on balancing present material needs against those of the future ones or the ways of balancing environmental protection with poverty relief. Economic sustainability is a foundation for corporate success, without financial success it won't survive. Social sustainability express philanthropic and people orientated business context encompassing very important issues as education, health care, poverty, income and gender inequality, human rights, people with special needs. This approach focuses more on external stakeholder needs such as harmonization of community and business interests in a mutually beneficial way, philanthropy and voluntary participation in community and society initiatives. Environmental sustainability in business reflects its influence on environmental issues, natural resources or global warming. It emphasizes the importance of knowledge on the environmental laws and their enforcement, effective and responsible use of enterprise resources, reduction of pollution, brownfield revitalization, "green" products (suitable for processing that consume fewer resources during the manufacturing process to promote more economical use of energy and other resources), etc. The same key issues are highlighted in the United Nations Global Compact which is an important document identifying the milestones for global corporate social responsibility and consist of ten principles that cover such topics as labor, human rights, environmental protection, and anti-corruption. These vital themes could not be handled without including 21st-century corporations and setting for them new values, strategy and responsibility. Generalizing in a sentence and summarizing what was said above it might be concluded that the term sustainability must be used involving careful analysis that goes far away beyond a single enterprise entity: integrating public expectations and enterprise value-based change CSR is promoted through five principles and five so called corresponding interactive action points (Idowu, 2016, p. 307):

- principle of resource perpetuation;
- principle of worthy contribution - both correspond to defining scope of influence and catalyst;
- principle of benefit stacking;
- principle of qualitative management – both above transform into motivation;
- principle of strategic satisfaction – review of the process.

"Nowadays business orientation to socially responsible business is determined by common tendency when both individual persons and participators of collective activity realize their responsibility for all those people who are influenced by results of their activity " (Bernatonytė& Simanavičienė, 2008, p. 502). Stakeholders evaluate how well the organization has met their expectations and/or how organizational strategy has affected the groups and organizations in the external business environment (Holmqvist, 2009; Aggerholm et al., 2011). Managers can both lead and serve by practicing CSR in the everyday workplace and in the boardroom as well (Wildes, 2008). Employees are no longer defined within a Tayloristic notion of humans as raw materials, but recognized as meaning-making corporate citizens. Communication is no longer merely understood as a tool in solving a specific problem but recognized as constitutive of the organization in terms of dialogical processes, complex discursive formations and interpretation of meaning among the organizational stakeholders (Alvesson, 2002; Aggerholm *et al*., 2011; Stuart, 2011).

It is difficult to imagine corporate social initiatives not involving employees in them. Different surveys on CSR indicated that employees were inseparable and one of the most important stakeholder groups in organization, and management should start exercising their social responsibility in a company from them. It is more than evident that organizations both depend on a high degree of employee commitment to their corporate moral brands and expect a high degree of employee commitment because of their corporate moral brands (Morsing, 2006). Consequently, matching expectations and involving employees in CSR initiatives increases production, stimulates improvements in services, and enhanced performance (Dahlrsud, 2008). Furthermore, employees feel loyal to companies that take their interests into account and treat them well. This results in lower employee turnover and helps to save intangible cost of training and development. The efficient and responsible management of the company reflects the ability to maintain profitability, contribution of business operations to sustainable economic development, socially responsible marketing, financial risk management, financial reporting, etc.

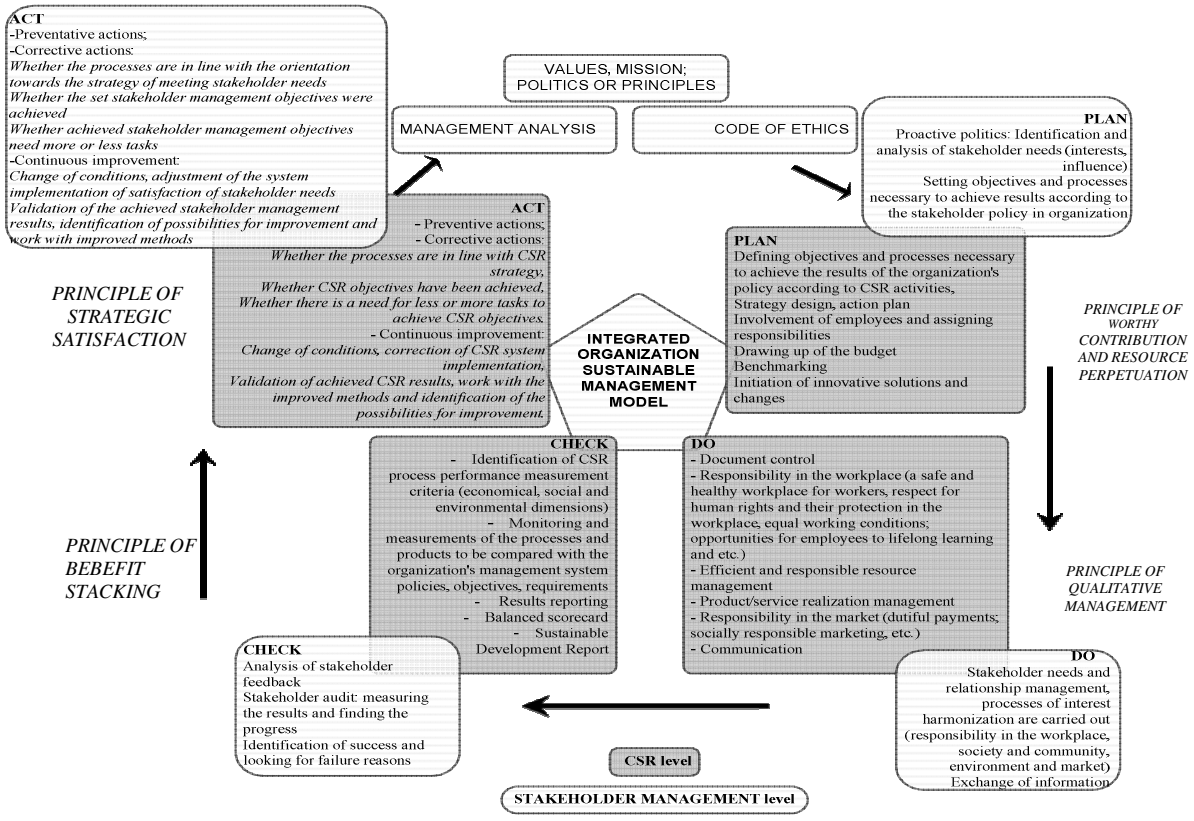


Fig. 3: Integrated management model for CSR and stakeholder management

(source: the Authors)

In order to implement social responsibility initiatives, the most important consideration should be given to the integration of internal systems in organization. Other authors provide the integration of management systems as a way to achieve operational excellence. Integrated management system is a term denoting a management system that can meet the requirements of many standards and other specific objectives of the organization. The organization must be an integrated system in which the responsible persons harmonizes the relations between the individual elements and integrates the objectives of the whole. It can be argued that an organization has implemented an integrated management system (including quality management, environmental management, social responsibility management, occupational safety and health at work and other management systems) that meets the requirements of international standards, and it can be treated as one of the alternative measures facilitating the integration of social responsibility and management system (Figure 3).

Integrated social responsibility management system can be a tool to manage social responsibility issues. After the development and implementation of an integrated management system, the organization is run as interrelated and interacting processes system, in which each process is controlled as system of interrelated and interacting processes operated by P - D - C – A cycle approach. Empirical studies have demonstrated that in many cases the CSR programs are treated favorably as their necessity is understood, but only part of them aims to make social responsibility an integral part of organization's values (Hingley, 2010). Organizations, in assessing the social responsibility with the same criteria as they use for evaluation of its performance and strategic perspectives, can make sure that the CSR is not the additional costs or charitable behavior; it naturally might be considered as opportunities for innovation and competitive advantage.

Results and Concluding Remarks

Diminishing natural resources, environmental pollution and persistent social inequalities clearly indicate that the current economic development model of nations in general is increasingly inconsistent with public expectations.

Naturally, the social and economic issues require innovative solutions from different perspectives ensuring that development take into account the needs of the present generation but at the same time does not hinder future generations from the ability of to meet their own needs. This is what sustainability is "about". Therefore, long-term organizational success depends on how they are able to integrate sustainability aspects into the organizational environment and management. We argued that application of effective management system creates the prerequisites for sustainable and successful operation of the company. From this perspective, the paper developed and validated the scientific and practical problem presenting a conceptual integrated organizational management model and expanded upon the relationships in organizational management system, social responsibility and stakeholder management in pursue of sustainability. Thereby special emphasis on the social dimension comes into play as a very important aspect for company sustainable development and strengthening company's strategic position on the market. Furthermore, majority of scholars agree that inclusion of social responsibility activities in organization strategy creates intangible assets and can even increase the firm's profitability and competitiveness. This viewpoint can be reasoned and approved as the construction of CSR integration model helps to understand the importance of the relations with stakeholders and rationalize their potential influence in the process of CSR implementation. Productive relationships with stakeholders can provide different benefits in a form of tangible and intangible resources and information necessary to survival. In that way relationships help to generate social, intellectual, environmental, and financial capital. The organizations get benefits not only in growth and long-term sustainability but assure mutual value as well disclosing mutual interdependence where everyone can provide and have benefit depending how successful the organization is in the achievement of its goals. This approach offers new perspective for corporate purpose together with more up-to-date quality criteria for management.

This paper makes several contributions: extends the existing understanding and discussions on the development of social responsibility and stakeholder management issues. The theoretical discussions have been inspired and deducted from theory on stakeholders and their relationships management, corporate social responsibility and sustainability by revealing these interfaces in organizational management.

Secondly – it enhances theoretical foundation in analysis of relations between organisational sustainability and stakeholder management. As a result an organizational management model is presented. The standpoint is evident and implies that, with the intention to meet the needs of all stakeholders and create value, the company must manage these processes in an efficient way. Therefore, guidelines and model of integrating these three very important elements -stakeholder relationships management, sustainability and social responsibility - can generate fluent implementation of these issues starting from strategic level and ending at tactical one. This encompasses various and different organizational processes: from research and strategy development to the design and implementation. Furthermore, the view of organization as a system closely related to society and engaged in array of different rapport with stakeholders reveals the perspective for generating wealth from these interrelationships.

The research suggests practical implications as well. As far as integration and implementation of stakeholder management, social responsibility is a multidimensional process; the issue is treated from organizational aspect and is limited to organizational management processes. Integrated social responsibility management system can be a practical tool to manage social responsibility issues. After the development and implementation of an integrated management system, the organization is run as interrelated and interacting processes system, in which each process is controlled as system of interrelated and interacting processes operated by P (plan) - D (do) – C (check) – A (act) cycle approach. The benefits of the model of an integrated management system in organization are reasoned and it might be used to explain actual behaviour of organizations regarding their aspirations for sustainability. Organizations, in assessing the social responsibility with the same criteria as they use for evaluation of its performance and strategic perspectives, can verify that the CSR is a competitive advantage rather than additional costs or charitable behaviour.

Although this study makes several contributions, it also has several limitations that provide perspectives for future theoretical and empirical refinement. We view this as the starting point for more detailed and empirical research agenda, which can be refined from different aspects. Owing to the study's exploratory character, the findings of our study stress the need for additional theoretical and empirical research in the area of management by upgrading the model with the expert and practitioners opinion and then testing it on real data taken from empirical research.

References

Aggerholm, H.K., Andersen S.E., &Thomsen, C. (2011). Conceptualizing employer branding in sustainable organizations. *Corporate Communications: An International Journal*, 16(2), 105 – 123. http://dx.doi.org/10.1108/13563281111141642

Alvesson, M. (2002). Understanding Organisational Culture. London: SAGE Publications.

Aupperle , K ., Carroll, A., & Hatfield, J. (1985). An empirical examination of the relationship between corporate social responsibility and profitability. *Academy of Management Journal*, 28 (2), 446 – 443.

Beurden, P. & Gossling, T. (2008). The Worth of Values – A Literature Review on the Relation Between Corporate Social and Financial Performance. *Journal of Business Ethics,* 82(2), 407-424. http://dx.doi.org/10.1007/s10551-008-9894-x

Boutelle, J. (2004). Understanding Organizational Stakeholders for Design Success// Proceedings of the 2004 conference on Designing interactive systems: processes, practices, methods, and techniques, ACM Press New York, NY, USA.

Buchanan Mark A. (2013). CSR and the Social Contract: New Lenses for Stakeholder Analysis and Strategic Management Proceedings of 8th Asian Business Research Conference, Bangkok, Thailand.

Bernatonytė, D., Simanavičienė D. (2008). Case study of corporate social responsibility In Lithuania's business society: *Business and Managenet 2008*, 5-th International Scientific Conference, 16-17 May, Vilnius, 501–505.

Crane, A., Matten, D. & Moon, J. (2008). Corporations and Citizenship, Cambridge, UK: Cambridge University Press.

Dagiliene L., Leitoniene, S., & Grencikova ,A.(2014). Increasing Business Transparency by Corporate Social Reporting: Development and Problems in Lithuania. *Inzinerine Ekonomika-Engineering Economics* 25(1), 54–61. http://dx.doi.org/10.5755/j01.ee.25.1.2356.

Dahlsrud, A. (2008). How Corporate Social Responsibility is Defined: an Analysis of 37 Definitions. *Corporate Social Responsibility and Environmental Management*, 15 (1), 1–13. http://dx.doi.org/10.1002/csr.132

Daszynska-Zygadlo, K., Slonski, T., & Zawadzki, B. (2016). The Market Value of CSR Performance across Sectors. *Inzinerine Ekonomika-Engineering Economics,* 27(2), 230-238. http://dx.doi.org/10.5755/j01.ee.27.2.13480

Ebner, D., & Baumgarther, R., J. (2006). The relationship between sustainable development and corporate social Responsibility. Corporate Responsibility Research conference, Dublin.

Engel, P. (1997). The social organization of innovation: a focus on stakeholder interaction. Netherlands

Fairbrass, J., O'Riordan, L., & Mirza, H. (2005). Corporate Social Responsibility: Differing Definitions and Practices. Business Strategy and the Environment Conference, University of Leeds, Yorkshire.

Garcia-Castro, R., M. A. Canela and M. A. Arino. (2008). Over the Long Run? Short-Run Impact and Long- Run Consequences of Stakeholder Management. *Business and Society*, doi:10.1177/0007650308315493.

Garvare R. & Johansson, P. (2010). Management for sustainability – A stakeholder theory. *Total Quality Management & Business Excellence*, 21:7, 737-744.

Godfrey, P. C., & Hatch, N.W. (2007). Researching Corporate Social Responsibility: An agenda for the 21st Century. *Journal of Business Ethics*, 70, 87–98. http://dx.doi.org/10.1007/s10551-006-9080-y

González-Rodríguez, M. R., Díaz-Fernández, M. C., Pawlak, M., & Simonetti, B. (2013). Perceptions of students university of corporate social responsibility. *Quality and Quantity* 47(4), 2361–2377. http://dx.doi.org/10.1007/s11135-012-9781-5.

Griffin, J. J., & Mahon, J. F. (1997). The Corporate Social Performance and Corporate Financial Performance Debate. *Business & Society,* 36(1), 5–31.

Habisch, A, L. Patelli, Pedrini, M., & Schwartz, C. (2011). Erratum to: Different Talks with Different Folks: A Comparative Survey of Stakeholder Dialog in Germany, Italy, and the U.S. J*ournal of Business Ethics* 100(3), 381–404. http://dx.doi.org 10.1007/s10551-010-0686-8.

Helen Joyce Stuart, (2011) "An identity-based approach to the sustainable corporate brand", Corporate Communications: An International Journal, Vol. 16 Iss: 2, pp.139 – 149. http://dx.doi.org/10.1108/13563281111141660

Hingley, M. (2010). Networks in socially embedded local food supply: the case of retailer co-operatives. *Journal of Business Market Management,* 4 (3). 111-128. http://dx.doi.org/10.1007/s12087-010-0036-2.

Holmqvist, M. (2009). Corporate Social Responsibility as Corporate Socio Control: The Case of Work-site Health promotion. *Scandinavian Journal of Management*, 25, 68 - 72.

Idowu S.O. *(editor)*.(2016). Key initiatives in Corporate social Responsibility. Global dimesion of CSR In Corporate Entities. 2016. Springer, 2016, 443. ISSN 2196-7083.

Juscius, V., & Jonikas, D. (2013). Integration of CSR into Value Creation Chain: Conceptual Framework. *Inzinerine Ekonomika – Engineering Economics*, 24(1), 63–70. http://dx.doi.org/10.5755/j01.ee.24.1.2016

Juscius, V., & Snieska, V. (2008). Influence of Corporate Social Responsibility on Competitive Abilities of Corporations. *Inzinerine Ekonomika – Engineering Economics*, 58(3), 34–44.

Matten, D., & Moon, J. (2008). Implicit and explicit CSR: A conceptual framework for a comparative understanding of corporate social responsibility. *Academy of Management Review*, 33 (2), 404–424. http://dx.doi.org/10.5465/ AMR.2008.31193458

Mattingly, J. E., & Berman, S. L. (2006). Measurement of Corporate Social Actions: Discovering Taxonomy in the Kinder Lydenburg Domini Rating Data. *Business and Society*, 45(1), 20–46.

McWilliams, A., & Siegel, D. (2000). Corporate Social Responsibility and Financial Performance: Correlation or Misspecification? *Strategic Management Journal*, 21, 603–609.

Morsing, M. (2006). Corporate moral branding. *Corporate Communication*: *An International Journal* 11(2): 97-108. http://dx.doi.org/10.1108/13563280610661642.

Orlitzky, M., Louche, C., Gond, J.P., & Chapple, W. (2015). Unpacking the Drivers of Corporate Social Performance: A Multilevel, Multistakeholder, and Multimethod Analysis. *Journal of Business Ethics* p. 1-20. http://dx.doi.org/10.1007/s10551-015-2822-y

Orlitzky, M., Schmidt, F., & Rynes, S. (2003). Corporate Social and Financial Performance: A Meta-Analysis. *Organization Studies,* 24, 403–441.

Porter, M. E., & Kramer, M. R. (2006). Strategy & Society. The Link Between Competitive Advantage and Corporate Social Responsibility. *Harvard Business Review*, 84 (12), 78–92.

Post, J. E. (2013): The United Nations Global Compact: A CSR Milestone. *Business & Society*, 52(1), 53–63. doi:10.1177/0007650312459926

Rangan, K., Chase, L., & Karim, S. (2015). The big idea. The truth about CSR, *Harvrd Business Review*, 93 (1/2), 40–49.

Rego, A., & Cunha, M. P. (2008). Organisational Citizenship Behaviours and Effectiveness: An Empirical Study in two Small Insurance Companies. *Service Industries Journal,* 28 (4): 541–554. http://dx.doi.org/10.1080/02642060801917695.

Saeed M.M., & Arshad, F. (2012). Corporate social responsibility as a source of competitive advantage: The mediating role of social capital and reputational capital. *Marketing & Customer Strategy Management*, 19, 219 – 232. http://dx.doi.org/10.1057/dbm.2012.19

Scherer, A. G., & Palazzo, G. (2007). Toward a Political Conception of Corporate Responsibility: Business and Society Seen from a Habermasian Perspective. *Academy of Management Review,* 32(4): 1096–1120. http://dx.doi.org/10.5465/AMR.2007.26585837.

Scherer, A.G. & Palazzo, G. (2007). Towards a Political Conception of Corporate Responsibility: Business and society from a Habermasian perspective. *Academy of Management Review*, 32: 1096-1120.

Silberhorn D., & Warren, R. C. (2007). Defining corporate social responsibility: A view from big companies in Germany and the UK. *European Business Review,* 19 (5): 352-372. http://dx.doi.org/10.1108/09555340710818950

Van Marrewijk, M. (2003). Concepts and Definitions of CSR and Corporate Sustainability: Between Agency and Communion. *Journal of Business Ethics*, 44 (2/3), 95–105. http://dx.doi.org/10.1023/A:1023331212247

Waddock, S. A. & Graves, S. B. (1997). The Corporate Social Performance – Financial Performance Link. *Strategic Management Journal,* 18(4), 303–319.

Wettstein, F. (2012a). Corporate Responsibility in the Collective Age: Toward a Conception of Collaborative Responsibility. *Business and Society Review*, 117(2), 155- 184.

Wettstein, F. (2012b). CSR and the Debate on Business and Human Rights: Bridging the Great Divide. *Business Ethics Quarterly*, 22(4), 739–770. http://dx.doi.org/10.5840/beq201222446.

Wildes, V. J. (2008). How can organizational leaders really lead and serve at the same time? *Internatinal Journal Of Contemporary Hospitality Management*, 20(1), 67-78. http://dx.doi.org/10.1108/09596110810848587.

Wood, D. (2010). Measuring corporate social performance: a review. *International Journal of Management Reviews,* 12(1), 50-84. http://dx.doi.org/10.1111/j.1468-2370.2009.00274.x.

Zaharia, R. M., & Grundey, D. (2011). Corporate Social Responsibility in the Context of Financial Crisis: A Comparison between Romania and Lithuania. *Amfiteatru Economic Journal 29*: 195-207.

Development of Organizational-Economic Relations as a Condition of Enterprise Viability

T.A. Korkina, South Ural State University, Chelyabinsk, Russia, alysergey@gmail.com

S.I. Zakharov, South Ural State University, Chelyabinsk, Russia, alysergey@gmail.com

E.V. Golovanov, South Ural State University, Chelyabinsk, Russia, alysergey@gmail.com

S.V. Aliukov, South Ural State University, Chelyabinsk, Russia, alysergey@gmail.com

Abstract

The relevance of the topic of the article is due to the acceleration of the pace of changes occurring in the external environment of the enterprise and the need to ensure the functioning and development of enterprises under these conditions. At the same time, the applied scientific and methodological base is not sufficiently focused on raising the level and dynamics of the enterprise's viability, taking into account the dynamic nature of the environment. The purpose of the article is to substantiate the necessity of priority development of organizational and economic relations between the subjects of the enterprise in order to ensure its viability. The approach outlined in the article is based on a comparison of the level and dynamics of labor productivity in different countries, a comparative analysis of the essence of viability in various sciences, an analysis of the economic performance of domestic enterprises, a generalization of the practical activity of enterprises in the development of organizational and economic relations. The viability of an organization is understood as the ability to function independently and develop under the influence of unfavorable external factors on the basis of self-organization. It is proved that successfully developing enterprises in modern conditions achieve sustainable economic indicators mainly due to the transformation of organizational and economic relations, which are understood as a complex system of relations arising in the process of production and labor activity between employees and employers regarding the definition, establishment and performance of functionals, and also the allocation of resources for their implementation. Progressive and balanced types of organizational-economic relations are distinguished. Under the progressive one, it is suggested to understand the organizational and economic relations that are oriented and ensure the readiness of the subjects of these relations to achieve results that exceed the requirements of the market environment. Under the balanced one - organizational and economic relations, characterized by mutual satisfaction of the interests of employers and employees. The conditions are determined, observance of which allows forming progressive and balanced organizational and economic relations.

Keywords: organizational and economic relations, enterprise viability.

Introduction

In modern conditions, the acceleration of changes, increasing their depth and scale, makes enterprises more sensitive to the emergence of new challenges, increasing the risk of loss of viability. These changes are caused by political, economic, social, technical and technological, institutional, organizational and other factors. The acceleration of changes is manifested at all levels of the economy - from the economy of the household to the economy of the country. At the household level, an example of accelerating change may be a reduction in the average life span of household appliances - in 10 years since 2004, the overall level of replacement has almost doubled.

At the microeconomic level, there is also an increase in dynamism and instability. So, from 1982 to 2001, the share of executive directors on the Fortune 300 list, which occupy this post for more than six years, has almost halved, since 1935. By 2016, the average life span of companies in the S&P500 rating has decreased 6-fold (from 90 to 14 years) (Meyer, 2003; Anthony, 2016). An increasing number of enterprises are becoming unviable, that is, they are not able to function independently and develop in a dynamically changing, unstable competitive environment.

The dynamics of the environment at the level of macroeconomics can be traced through economic cycles, price fluctuations, etc. For example, according to analysts' estimates in early 2000, the economic situation in Russia is characterized by significant positive changes: since 1998, the GDP has grown by an average of 7% per year, and the country has moved from 72 to 53 in the world in terms of well-being; following the rapid increase in wages, the growth of disposable income of the population reached the level of 26% per year (Smirnov, 2009). However, under the influence of the global financial crisis that began in 2008, positive trends have been replaced by significant negative results - by 2017, according to various sources, Russia ranks 57-60 in the ranking of countries in terms of living standards. This shows that the Russian economy as a whole and individual economic entities are not sufficiently stable. According to experts, economic growth until 2008 was mainly associated with the loading of available free capacities. In the current conditions of aggravation of competition in the labor and capital markets, the need to increase the efficiency of the use of resources and labor productivity as the most important condition for the viability of the enterprise becomes more evident.

Globalization has a significant impact on the acceleration of change. Obviously, domestic economic entities compete not only among themselves, but also with foreign enterprises. At the same time, the pace of development of foreign enterprises, and, consequently, their viability, is much higher. According to the Organization for Economic Co-operation and Development (OECD), labor productivity per working hour in Russia in comparison with the economically developed countries of 1995 was more than 4 times lower. By 2015, the gap has narrowed somewhat, but still remains very significant - about 3.5 times (Figure 1).

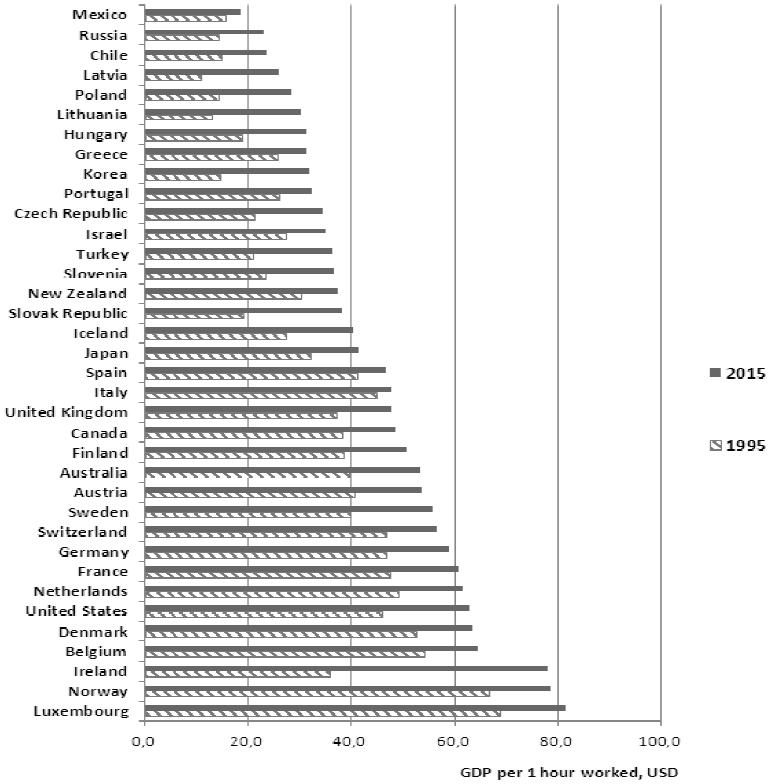


Fig.1. Labor productivity in different countries of the world (GDP per 1 worked hour, USD, 1995-2015) (calculated according to [4])

A comparison of the dynamics of labor productivity over the past 10 years between countries shows that the highest growth rates - more than 2 times - are shown by countries such as Ireland, Korea, Lithuania and Latvia. The lowest growth rates in Italy - about 6%. In Russia for the years 1995-2015 the labor productivity increased 1.6 times, which is somewhat higher than the average for the countries in question (47%) (Figure 2).

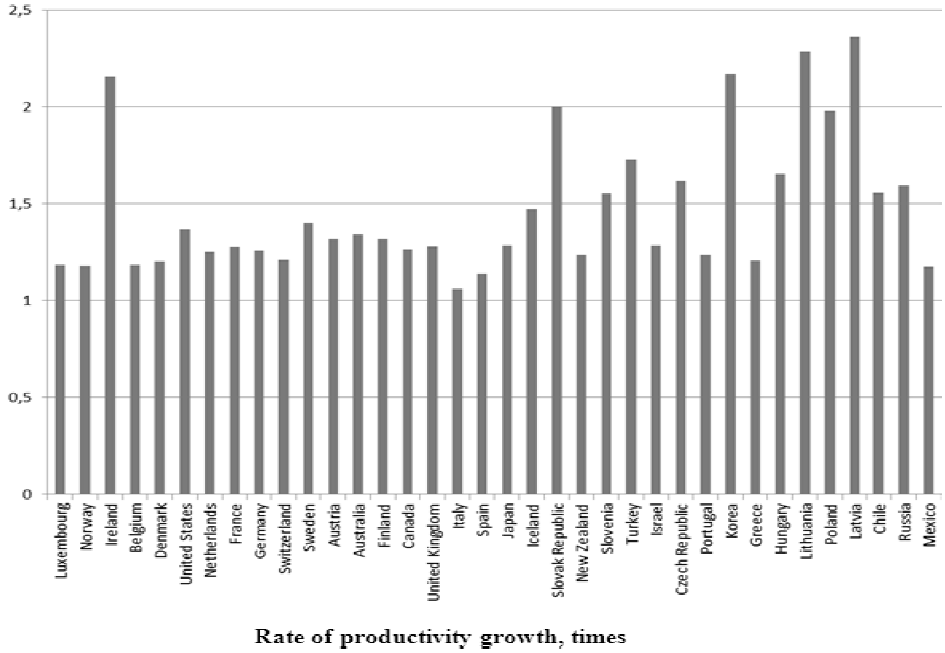


Fig. 2: Dynamics of labor productivity in different countries of the world for 1995-2015. Calculated by (Organization, 2017; Economist, 2013).

Acceleration of the processes of change, and as a result of the high turbulence of the external and internal environment of the enterprise, exacerbates the need to study the factors and conditions for ensuring the viability of the enterprise.

What is viability?

The term "viability" is the subject of study of the biological, sociological, psychological and economic sciences. In biology, viability is understood as the ability of an individual or population to maintain its existence under changing conditions. Regarding social systems, viability is seen as the ability to work together to overcome conflicts and unfavorable internal factors. In psychology, a person who is able to adapt, realize self-regulation and development, constructing a constructive relationship is considered to be viable. Applied to organizations, this concept is used relatively recently - from the end of the 20th century, and in recent years the interest of both Russian and foreign researchers to this phenomenon has been increasing (Bhamra, 2012; Gittell, 2006; Kerr, 2017; Lengnick-Hall, 2011; Richtner, 2014; Blagutin, 2014; Makarov, 1997). Summarizing different points of view, under the viability of the enterprise we will understand its ability to independently function and develop under the influence of unfavorable external factors on the basis of self-organization.

Self-organization means the process of ordering the structure of a dynamic system, taking place without external organizational influences. Self-organization is based on certain relations between the subjects of

the system. Within the framework of the enterprise, such relations are organizational and economic - it is a complex system of relations that arise in the process of production and labor activity between employees and employers (or owners of the enterprise) regarding the definition, establishment and performance of functionals, and the allocation of resources for their implementation.

Role of Organizational-Economic Relations in Ensuring the Viability of an Enterprise

A comparative analysis of the performance of a number of mining enterprises showed that the change in labor productivity in the period 1990-2000. It is primarily due to an increase in the capacity of the main equipment (Figure 3).

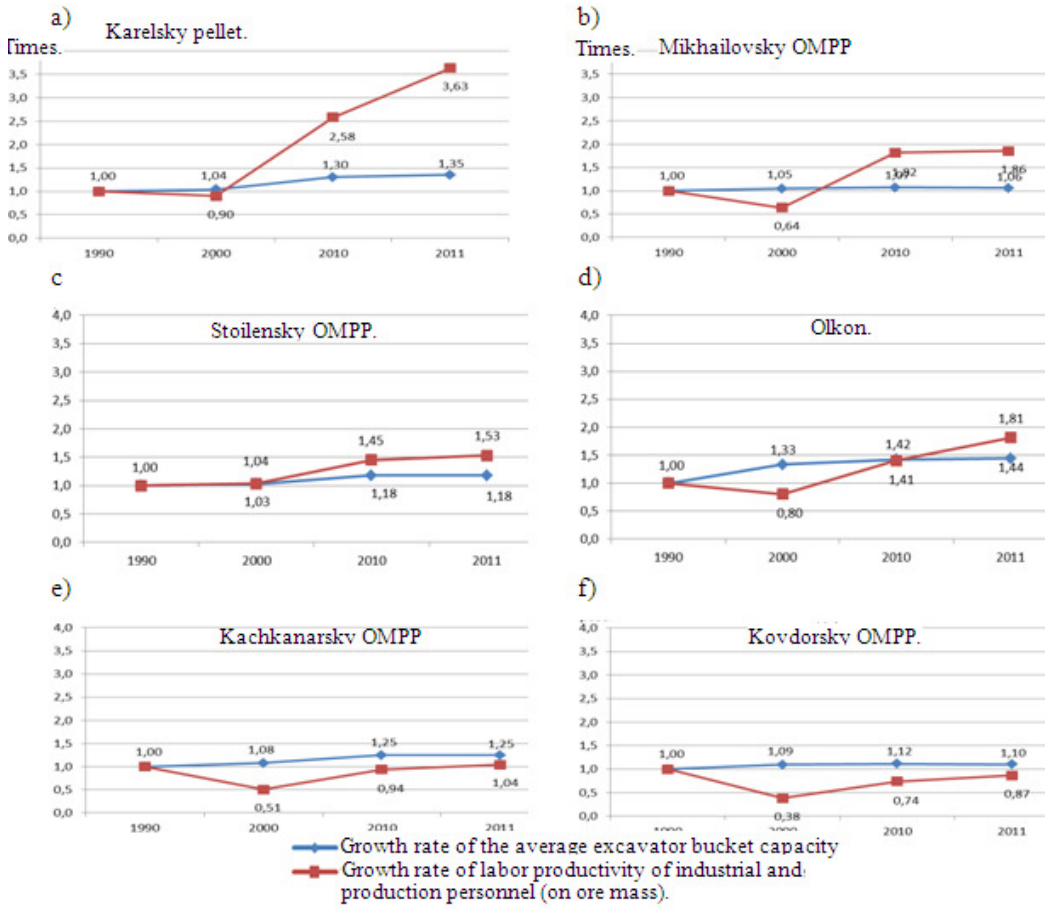


Fig. 3: Dynamics of labor productivity and excavator capacity at Russian mining enterprises for 1990-2011. Calculated by (Technical, 2012)

The increase in labor productivity in the subsequent stage (2000-2010) is associated with successfully developing enterprises (Figures 3 a, b, c), mainly with the implementation of organizational transformations and the transformation of organizational and economic relations, including a reduction in the number through the outsourcing of services (works), optimization of the number of auxiliary and maintenance personnel.

Other enterprises (Figures 3 d, e, f) retain the orientation toward increasing the capacity of the equipment while increasing labor productivity. The conducted researches show that the workers of the above-

mentioned enterprises have mastered and reproduce this way of increasing labor productivity, without seeking to change the system of organizational and economic relations. This is confirmed by the results of the questionnaire survey - the majority of respondents connect the prospects for the development of production with technical re-equipment, and not with improving the organization of labor, production and improving the state of jobs.

The conducted time-keeping observations and subsequent calculations revealed that 20-60% of working time losses is caused by uncoordinated interaction and insufficiently high level of development of organizational-economic relations. These losses of working time lead to a rise in the cost of a unit of labor, which is unprofitable both for the employer and for the employee, because the profit and the stimulating role of wages are declining.

The dependent position of the personnel in relation to the increase in labor productivity is maintained by the institutions operating at the enterprises (rules, regulations, instructions) regulating the procedure for rationing, organization and payment of labor. This is manifested in the lag in the rates of growth of labor productivity from the wages of the average worker, which can reach 2-3 times during the years.

The quality of organizational and economic relations determines the coordination of interaction between employees and the readiness for self-organization of the collective. The basis of any relations of subjects, including organizational and economic, is exchange as an act of mutual satisfaction of needs or a process of obtaining mutual benefits. Proceeding from this, the sustainable viability of the enterprise can only be achieved if the interests and responsibilities of employees and employers are balanced (Figure 4).

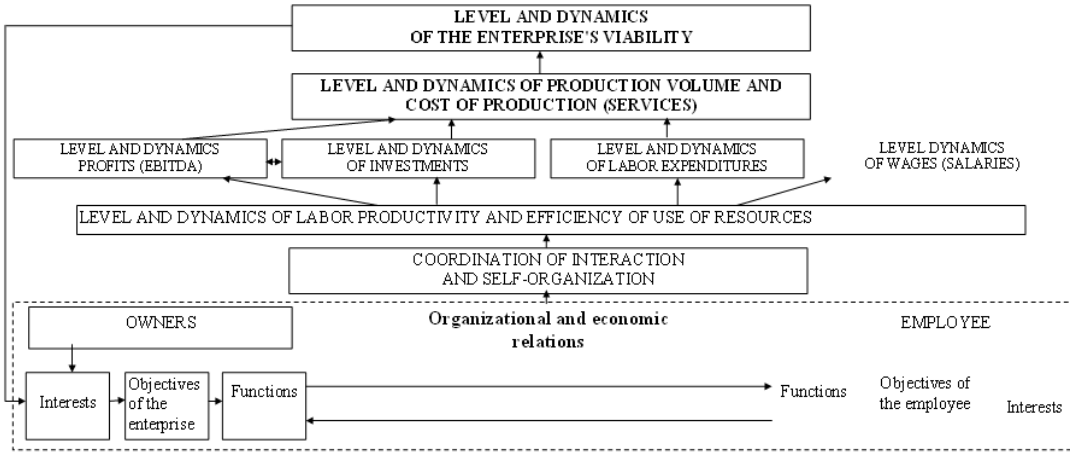


Fig. 4: Influence of organizational-economic relations on the viability of an enterprise

The main economic interest of the owner of the enterprise is the receipt of profit, the employee - pay for the function performed. Therefore, in order to balance the interests and responsibilities of business entities in the context of ensuring its viability, certain conditions must be met: 1) the volume of investments does not exceed the amount of EBITDA received; 2) the level of efficiency of the use of resources and wages is not lower than the industry standard; 3) the growth of labor productivity must outpace the growth of wages.

Ensuring the viability of the enterprise is impossible without the development of production, which is achieved on the basis of investment. The inflow of investments is determined by the attractiveness of the enterprise and is achieved on the basis of increasing the efficiency of the use of labor. The investment attractiveness of an enterprise depends on how much its employees have effectively worked in the past period. This is confirmed by the results of a correlation analysis of the efficiency of labor utilization expressed by the specific volume of profit before deduction of interest expenses, taxes and accrued

depreciation per employee (EBITDA) and the specific volume of investments with a time lag of one calendar year that showed a high degree of tightness of communication These indicators - the coefficient of pair correlation was 0.67-0.8 (Figure 5).

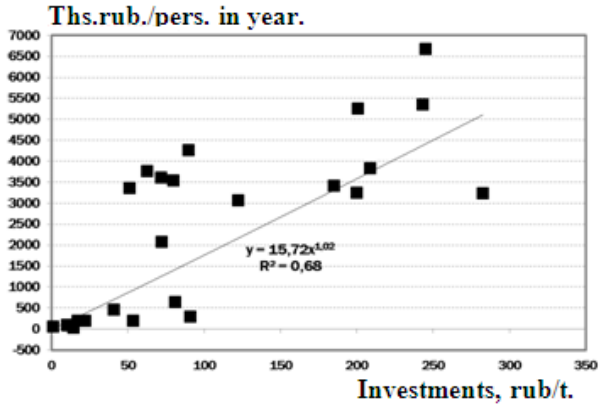


Fig.5: Connection between investments and EBITDA in Russian coal-mining enterprises (2003-2015).

Types of Organizational and Economic Relations

Compliance with the above conditions makes it possible to form progressive and balanced organizational and economic relations. By progressive understand organizational and economic relations, oriented and ensuring the readiness of the subjects of these relations to achieve results that exceed the requirements of the market environment. Balanced organizational and economic relations are characterized by mutual satisfaction of the interests of owners (employers) and employees (Table).

Table 1 : interrelation of organizational and economic relations of personnel and the viability of an enterprise

Type of organizational-economic relations	Level of viability	Characteristics of the viability level
Progressive and balanced	High - changes in the internal environment are ahead of changes in the external requirements (conditions)	The growth rate of labor productivity outstrips the growth rate of wages; Labor productivity, wages and efficiency of resource use are higher than the industry benchmark; Income (EBITDA) exceeds investment
Either progressive, or balanced	Medium - changes in the internal environment are comparable with changes in the external requirements (conditions)	Any one of the ratios is violated: the growth rate of labor productivity outstrips the growth rate of wages; Labor productivity, wages and efficiency of resource use are higher than the industry benchmark; Income (EBITDA) exceeds investment
Neither progressive, nor balanced	Low - changes in the internal environment lag behind changes in the external requirements (conditions)	Two or more ratios are violated: the growth rate of labor productivity outstrips the growth rate of wages; Labor productivity, wages and efficiency of resource use are higher than the industry benchmark; Income (EBITDA) exceeds investment

Conclusion

It should be noted some commonality in the mechanism for ensuring the viability of various systems, namely one of the basic elements of such a mechanism are the relationships within the system and with the external environment.

In economic systems, the development of organizational and economic relations should go in the direction of achieving a balance of interests and responsibility of business entities, as well as results exceeding the requirements of the market environment. The formation of progressive and balanced organizational and economic relations allows enterprises, in conditions of accelerating the dynamics of the environment, to update and achieve the goal at a faster rate, that is, to remain viable.

Acknowledgment

The work was supported by Act 211 Government of the Russian Federation, contract № 02.A03.21.

References

Anthony, S.D., Viguerie, S.P., Waldeck, A. (2016). Corporate Longevity; Turbulence Ahead for Large Organizations//Strategy & Innivation, vol. 14, no. 1, pp. 1-9.

Bhamra, R.S., Dani, S., Burnard, K. (2012). Resilience: the concept, a literature review and future directions. International journal of Production Research, vol.49, no. 18, pp. 5375-5393.

Blagutin, M., Keller S., Price, K., Tochin A. (2014). Viability of the organization. McKinsey Bulletin http://vestnikmckinsey.ru/organizational-models-and- Management-systems / Zhiznesposobnost-organizatsii-1, no. 31.

Economist. (2013). [Electronic resource] http://www.economist.com/blogs/graphicdetail/2013/02/focus3.

Gittell J.N., Cameron, K., Lim, S., Rivas, V. (2006). Relationships, layoffs, and organizational resilience airline industry responses to September 11. The Journal of Applied Behavioral Science, vol.42, no. 3, pp. 300-329.

Kerr, H. (2017). Organizational Resilience: Harnessing experience, embracing opportunity [Electronic resource] / https://www.bsigroup.com/LocalFiles/en-GB/organizational-resilience/whitepaper-harnessing-experience-embracing-opportunity.pdf.

Lengnick-Hall, C.A., Beck, T.E., Lengnick-Hall, M.L. (2011). Developing a capacity for organizational resilience through strategic human resource management. Humane Resource Management Review, vol.21, no. 3, pp. 243-255.

Makarov, A.M. (1997). Russian coal mining enterprise: from existing to sustainable, Ekaterinburg: UrB RAS, 110 p.

Meneghel I., Martinez I., Salanova M. (2016). Job-related antecedents of team resilience and improved team performance. Personnel Review, vol.45, no. 3, pp. 505-522.

Meyer, C., Davis, S. (2003). It's Alive: The Coming Convergence of Information, Biology, and Business Crown Business, 288 p.

Nestik, T.A. (2016). Viability of the group as a socio-psychological phenomenon. Social and economic psychology, vol.1, no.2. [Electronic resource], http://soc-econom-psychology.ru/engine/documents/document214.pdf.

Organization for Economic Co-operation and Development. [Electronic resource]: http://stats.oecd.org/Index.aspx. DataSetCode=PDB_LV (reference date: 20.05.2017).

Richtner, A., Löftsen H. (2014). Managing in turbulence: how the capacity for resilience influences creativity. R&D Management, vol.44, no.2, pp. 137-151.

Smirnov, S.P. (2009). Practical methods of increasing labor productivity, St. Petersburg, 42 p.

Technical and economic indicators of mining enterprises for 1990-2011. (2012). Eaterinburg: IGD UrB RAS.

Key Data and Information Quality Requirements for Asset Management in Higher Education: A case Study

Faisal Syafar, Computing and Information Systems Research Centre, Department of Electronics, Universitas Negeri Makassar, Makassar, Indonesia, email: faisal.syafar@unm.ac.id

Halimah Husain, Department of Chemistry, Faculty of Mathematical and Sciences, Universitas Negeri Makassar, Makassar, Indonesia, email: halimah_husain@unm.ac.id

Ridwansyah, Computing and Information Systems Research Centre, Department of Electronics, Universitas Negeri Makassar, Makassar, Indonesia, email: ridwansyah@unm.ac.id

Sabran Harun, Computing and Information Systems Research Centre, Department of Electronics, Universitas Negeri Makassar, Makassar, Indonesia, email: sabran.fharun@unm.ac.id

Saharuddin Sokku, Computing and Information Systems Research Centre, Department of Electronics, Universitas Negeri Makassar, Makassar, Indonesia, email: saharuddin.sokku@unm.ac.id

Abstract

Data and information quality (DIQ) is a critical issue for effective asset management in modern higher education (HE) sectors. Managing DIQ is essential to any asset management program. Problems with data quality can result in a number of unpredictable negative consequences. Several studies have provided strong evidence to indicate that most of HE institutions have DIQ problems. DIQ has recently been brought to the forefront and has become a pressing issue. This is particularly important in an environment where HE institutions begin to share their information systems with their stakeholders such as suppliers and business partners. Moreover Universities have millions of digital assets, thousands of users, hundreds of policies, many departments and stakeholders, and just one goal that is easy, affordable digital asset management that works the way everyone expects it to work. In such an environment, knowledge on how to manage the quality of the information asset has become very crucial in order to support the HE development. This paper describes a study, which explores DIQ problems with existing HE's asset management system, and identifies key factors that impact on DIQ. The study applies a DIQ issues for asset management in a preliminary case study of a large HE institution in Makassar, Indonesia. The findings of the study suggest that the importance of DIQ issues for effective asset management in HE needs to be widely understood. The paper also provides recommendations that may be useful to HE managers/practitioners.

Keywords: (DIQ), (HE)

Introduction

Assets management is an important part of university management, so the assets management has significant impacts on universities' teaching and scientific research. With the deepening university reform, assets management has become a vulnerable link in university management and badly harmed the harmonious development of higher education (HE). To understand the current conditions and shortcomings of university assets management and to enhance the efficiency of university assets

management will be meaningful for the benefits of university assets (Wang, 2015). Data quality issues are at the heart of effective asset management. Managing data quality is essential to any asset management program as there are enormous benefits to be gained from ensuring the quality of data, e.g. information integration, interoperability, reduced costs, quality decision support, institutional integration, process innovation, knowledge management, and ability to reuse data. There is a growing need to address the issue of DIQ of asset management systems of HE institutions, by analyzing existing practices and providing current DIQ problems and its solutions to assist engineering enterprises to capture, process and deliver quality data and information. It is essential to ensure quality of data in monitoring systems, control systems, maintenance systems, procurement systems, logistics systems, and range of mission support applications to facilitate asset availability, readiness, reliability, effectiveness, and management. Therefore, when enterprises are managing their valuable engineering assets, it is critical that DIQ issues are placed in high priority.

In managing physical assets through the entire asset life cycle, large amounts of data is needed for long term performance and reliability prediction, as well as informing the decision making process on how and when to retire an asset. Although very large amounts of data are being generated from condition monitoring systems, little thought has been given to the quality of such generated data. Thus the quality of data from such systems may suffer from severe quality limitations (Saunders 2004). This paper aims to explore DIQ problems with existing asset management systems in HE sectors, to identify the issues that are particularly relevant in the asset management domain, and to understand what differences may exist in the data quality critical factors that exist in the management of physical assets.

Data and Information Quality in Higher Education

Asset management in Indonesian HE institution is not considered as a core business activity therefore they depend on the traditional organizational information sources to manage engineering assets. These traditional sources represent tacit and implicit knowledge of engineers, operators, and information contained in information systems, which have been primarily designed to increase productivity rather than improving efficiency of the processes involved in production. A unified and modern assets management system has not been established. Therefore, university assets management is still in a dispersed state, without realizing the centralized management, which harms the assets management and the long-term development of universities. An imperfect management system will inevitably cause the misty of responsibilities. Although some Indonesian top universities try to reform the assets management system, the phenomena of unclear responsibilities are still common and tend to be severe. In many universities, the assets are usually jointly managed by different agencies. For instance, university dormitories, canteens, cafes and other real estate are chiefly managed by the logistics, while the monetary assets by financial department. University assets are respectively managed by different agencies. This assets management mode seems accomplishing the specialized management. However, it usually results in the unclear of responsibilities. Wang (2015) emphasize that once there is a problem raised, it is not easy to determine who is responsible.

At the same time, a variety of operational and administrative systems exist in asset management, which not only control and manage the operation of asset equipment but also provide maintenance and administrative support throughout the entire asset lifecycle. In practice, data is collected both electronically and manually, in a variety of formats, processed in isolation, stored in a variety of customized and off the shelf legacy systems, shared among an assortment of operational and administrative systems across faculties, study programs and other departments, communicated through a range of sources and to an array of business partners and sub contractors. Data captured and processed by these systems is not comprehensive and is process dependent, making it difficult to be reused for any other process or process innovation (Syafar et al., 2015).

Most importantly, there has always been a degree to which data has been obtainable, sometimes due to

lacking data acquisition standards (Syafar & Gao 2013, Syafar et al., 2014), sometimes due to university culture, and sometimes due to the inability of a head of asset manager to judge what data is important. One such example is that of out door devices, which have mainly been used to monitor the condition of asset equipment (Syafar et al., 2013, Syafar et al., 2014a). Whereas, such information could provide the engineering asset manager with vital failure and maintenance trends (Syafar et al., 2014; 2014a), and coupled with financial information it could provide decision support for budgetary constraints, asset improvement, and planning and scheduling to support academic and students activities.

Research Method

For this research, two large Australian Institutions were selected as case sites. Case study research is used to study the contemporary phenomenon in its real-life context (Yin, 1994) and it can be used where the research and theory are at their early, formative stages (Benbasat *et ul.,* 1987). As data quality for asset management has received little attention in the research community, there is a need to examine whether the data quality is a critical issue to any asset management program and what the key factors are to ensure data quality in managing assets. Therefore, case study research appeared to be appropriate for this study.

In data quality studies, four types of stakeholders have been identified by Strong et al. (1997); Wang (1998):

1. data producers;
2. data custodians;
3. data consumers; and
4. data managers.

To apply this stakeholder's concept into an asset management environment:

1. Data producers are those who create or collect data for asset management system.
2. Data custodians are those who design, develop and operate the asset management system.
3. Data consumers are those who use the asset information in their work activities.
4. Data managers are those who are responsible for managing data quality for asset management systems.

Data was collected using semi-structured interviews with key stakeholders of asset management systems. Each interview included questions about the background of the organization, as well as its asset management practice, the participants' roles, and their views about data quality issues in managing assets. Additional information was obtained from secondary data including reports and internal and external documents. The purpose of the case study was to investigate what was actually happening in real-world Institutions in relation to data quality issues associated with engineering asset management within engineering enterprises.

Preliminary Research Findings

Selected case study of HE institution (mentioned as institution A in this paper) is a nationally recognized of public (government) university that has 887 university lecturers, 720 administrative staffs and provides services to approximately 31.000 students within 11 faculties and more than 100 study programs.

DQ problems

Institution A used multiple systems to process various functions of asset management. It used MainPac only for electrical and mechanical assets management, and PC Works for work management that had a lot of checks and validation rules built into the system. The main focus was about quality rather efficiency. To improve the speed and efficiency, Institution A decided to use Maximo to replace some of its legacy systems. The current Maximo is actually help educational institutions thrive the asset management

solution with:

- Visibility to respond faster and make better decisions. Complete, real-time visibility improves responsiveness and supports high-level, integrated use of information technology for effective, adaptive and mobile operational capability.
- Control to maximize return on investments and reduce risk. Built on a cost-effective, robust, secure and agile foundation, the solution delivers higher-quality services for improved customer satisfaction.
- Automation to streamline processes, accelerate growth and build greater agility into business operations. This reduces operational cost, risk and complexity by integrating business and IT services across the enterprise.

However, the change of system has caused several problems. Users of the Maximo package do not find it easy: the work management tool used for work scheduling is perceived as inappropriate for recording, as well as accessing the detailed information for assets, for example time and location. It is perceived as tedious to do combination for job allocation for different people in work planner. Consequently it appears that people are becoming less diligent in recording information. As one interviewee commented ***"Now we are worse off particularly from the data quality point of view".*** It was indicated that a trial period should have been taken place before the adoption of the new system, so that difficult issues are resolved. In addition the User Interface needed to be much easier and simpler to use by the workers.

Field people communication

Out door person within Institution A can produce unreliable data. In this Institution, the task of collecting the data is accomplished under adverse environmental conditions by a variety of personnel skill levels. The format for data collection vary considerably, as there is no set method for the accomplishment of such, and the data desired may be different for each system. One of the causes for data errors overtime has been due to the lag between out door data collection and entry into the computer. The longer the time lag, the less the chance there is for cleaning up the data to make it useful. Therefore, the earlier the data is recorded, the earlier it can be validated for possible future analysis. Possible reasons for this lag are laziness and a lack of awareness of the importance of the data on the part of those who collect the data. Another cause for data errors is the use of paper based collection technique. The need to write things down means, that the out door workers are less interested and motivated in recording the data. The lack of information feedback subsystem for data collection also proves to be another cause of error. Overtime, out door workers realized that the whole process was simply pointless as they perceived that no follow ups were made and hence lost interest and motivation. The data collection subsystem must not only incorporate the forms for recording the right type of data, but must consider the personnel factors (skill levels, motivation, etc.) involved in the data recording process. The person who must complete the appropriate data form(s) must understand the system and the purposes for which the data are being collected. If the person is not properly motivated to do a good thorough job in recording events, the resulting data will of course be highly suspect.

Data Collection Technology

To better aid the out door people in data collection, data recording technology should be improved such that it will not discourage the collection process. Ways of achieving this include better interface design and the replacement of paper based techniques. Several ideas have been thought in order to improve the quality of the collected data in Institution A. The Institution has identified a need for developing a wireless mobile device system to assist the out door workers for receiving real-time job details and making job entries at the place where the job is conducted. This application will use smart phone with GPS based data for locating a particular asset and allow the users to update the asset location data using

location identification feature.

Discussion

DQ Problems

There are often different types of operational and administrative systems in engineering enterprises, which not only control and manage the operation of asset equipment but also provide maintenance and administrative support throughout the asset life cycle (Syafar et al., 2013, Syafar et al., 2014a). In practice, data is captured both electronically and manually, in a variety of formats, distributed over large and complex communication networks, shared among an assortment of off the shelf and customized operational and administrative systems, communicated through a range of sources and to an array of business stakeholders. The problem of data quality becomes crucial when huge amounts of data are exchanged and distributed in such an intensive way as in these contexts. What is more, more often these assets operate in unstable environments and consequently generate maintenance demands hitherto unseen. In such circumstances, incomplete and historic information hampers the ability of a plant manager to make far-reaching decisions on asset operation; maintenance scheduling, planning and execution; and asset disposal (Syafar et al., 2015).

Wang et al. (1994), Tayi and Ballou (1998), and Orr (1998), term data quality as 'fitness for use'. The brevity of this definition covers most important aspects of data usage. Orr (1998) argues that the issue of data quality is intertwined with how users actually use the data in the system, since the users are the ultimate judges of the quality of the data produced for them. In engineering asset management, the issue of data quality has it roots in multiplicity of data acquisition tools and methodologies, and the exchange of the data thus captured within an assortment of systems. Therefore, according to Syafar and Gao (2013a) conforming to user requirements is extremely difficult.

Integration of Asset Management Systems

Most HE institutions today purchase specialized systems from difference suppliers. The asset management systems used to not only for controlling and managing the operation of asset equipment but also to provide maintenance and administrative support throughout the asset life cycle. Some of these systems include: reliability assessment systems, operational data historians, enterprise asset maintenance systems, asset capacity forecasting systems, and physical asset data warehouse systems. Normally these systems are bought from multiple vendors and each is specialized to accomplish its task. Such disparate systems can often lead to an extremely difficult integration job for the end-user. However, to be effective to all levels of decision-makers in an university, physical asset management systems need to be integrated. Integration is required in order in implementing condition-based maintenance (CBM), since CBM-enabled enterprise asset maintenance systems rely on condition monitoring systems to notify them of the need for maintenance.

Data Exchange

There is a need for data exchange between asset management applications for seamless access to information across heterogeneous systems and different departments/study programs within a university. The life cycle performance data of the various assets are kept in individual uncoordinated databases. The numerous information systems and databases for todays engineering asset management in HE institutions run with little or no interaction. However, there is a lot of information that must be communicated across departments/study programs and among different users, and the existing systems do not offer this functionality. Therefore, providing the enterprise personnel (service and operation, back-office, management) with the seamless access to information is crucial to academic success.

There exist IT systems that support to some extent the institutional goal to optimally manage their assets, such as condition monitoring applications and computerized maintenance management systems. The former focus on an asset and its process data; they are usually closed systems, physically linked to an asset, and providing no interface to other asset systems; finally, their output is usually convenient and understandable for equipment specialists only. The latter are typically back-office applications, having no verification data link to the out door (i.e., asset themselves).

Data Cleaning

Data cleaning is a labor-intense, complex, and costly task. Data quality problems that are addressed by data cleaning can roughly be divided into two categories, such as single source and multi source problems, each of these two categories is further divided into two sections, i.e., schema and instance related problems (Rahm & Do, 2000). Schema level problems may replicate in instances, and can be resolved at the schema level by an improved schema design, schema translation and schema integration. Instance level issues signify data errors and inconsistencies not visible at the schema level. Generally, the most common examples of dirty data (Hurwicz 1997; Jake et.al. 2003) are: format differences, information hidden in free-form text, violation of integrity rules (e.g., in the case of redundancy), missing values, schema differences. There will be a need for data cleaning in HE asset management to develop.

Training

From a data and information quality perspective, training in real world cases has not been addressed enough. Managing assets requires all aspects of training as well as appropriate documentation of the system. It was found that selected university tended to focus more on the 'hardware' part of the systems' development process, putting less effort on the 'soft' part, that is, the training of how to operate, manages the system. The people's skills, people's abilities to use the system efficiently are very critical to ensure data quality in asset management system. If people do not have the skills and knowledge to control the system, then even the perfect system would not be able to produce high quality information. Lack of training can cause serious damage and have an adverse impact on information quality. It is easy for Institutions to find reasons/excuses for avoiding adequate training for the staff and management. According to Syafar et al. (2015) education and training is vital for everyone who will use the new system. It's because the system does not just about know the minimum necessary to access data and information, but the system will improve business process, achieve operational efficiencies and increase collaborative-shared information in real-time. Therefore, effective and quality training should aim to improve the critical mode of knowledge held by different data roles (data collector, data custodian, data consumer) in a data production process work with more focus on enhancing data collector's know-why knowledge for high data quality.

Conclusions

This case study provided a better understanding of data and information quality issues for HE asset management as well as providing useful practitioner findings from real-world practice. Key data quality issues discussed should help HE institutions obtain a better understanding of data quality issues throughout the process leading to activities which will help ensure information quality. Although the university may not have controls on those factors, this HE institution can actively manage those changes. Institutions could use external pressures to accelerate a whole of internal academic information quality management.

University has not established complete assets evaluation mechanism, which causes confused assets management, resulting in serious losses of assets. Currently, the phenomenon of "emphasis on purchase over management" is common in Indonesia university assets management. The lack of regulations makes multiple aspects of management out of control. Many universities are even not clear about their assets, let

alone the complete assets management. In addition, the losses of university assets caused by changes of original utility of assets have become increasingly prominent. Interests drive human, which is the classical theory of economy. University assets managers are no exception. According to the university assets management conditions, we hope that they can increase DIQ in order to ensure the normal teaching and scientific research, and the assets managers' awareness of assets appreciation can be enhanced significantly.

Acknowledgement

This research was supported by the non-tax state revenue (PNBP) of Universitas Negeri Makassar, Indonesia [grant number 1272/UN36.9/PL]. The support of PNBP of the year 2016 is gratefully acknowledged.

References

Benbasat, I., Goldstein, D.K., and Mead, M., (1987), The case study research strategy in studies of information systems, *MIS Quarterly,* 11, pp. 369-386.

Hurwicz, M (1997), Take Your Data to the Cleaners, *BYTE,* January, 1997.Jarke, M, Lenzerini, M, Vassiliou, Y, Vassiliadis, P (2003) *Fundamentals of DataWarehouses.* 2ndEdition,

Rahm, E, and Do, HH (2000) Data Cleaning: Problems and Current Approaches, *IEEE Bulletin of the Technical Committee on Data Engineering,* 24(4).

Saunders, D., 2004, *Innovation in Asset Management: Achieving a Nexus of Cost and Capability*, UDT Pacific, Hawaii, USA.

Syafar, F & Gao, J (2013). Mobile collaboration technology in engineering asset maintenance - What technology, organisation and people approaches are required? Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics).

Syafar, F., & Gao, J. (2013a). Mobile Collaboration Technology In Engineering Asset Maintenance: A Delphy Study. Paper presented at the 2013 IEEE 17th International Conference on CSCWD, Whistler, BC, Canada, 27-29 June.

Syafar, F., Gao, J. and Du, JT (2015). Mobile Collaboration Technology to support Maintenance Enterprise Systems in Large Industry: A Delphy Study. Paper presented at the 2015, 21th Americas Conference in Information Systems, Puerto Rico, US, 27-29 June.

Syafar, F., Gao, J., & Du, T. (2014). Refereed proceedings of the 18th Pacific Asia Conference on Information Systems (PACIS): Mobile-Enabled Collaborative Maintenance. Chengdu, China.

Syafar, F., Gao, J. and Du, JT (2014a). Current Mobile Technology Roles to support Collaborative. Proceedings of the 24th International Business Information Management Association Conference - Crafting Global Competitive Economies: 2020 Vision Strategic Planning and Smart Implementation.

Syafar, F., Gao, J., & Du, T. (2013). Refereed proceedings of the 17th Pacific Asia Conference on Information Systems (PACIS): Applying The International Delphi Technique In A Study Of Mobile Collaborative Maintenance Requirements. Jeju Island, Korea.

Strong, DM, Lee, YW, and Wang, RY (1997) Data Quality in Context, *Communications of the ACM,* 40(5), pp. 103-110.

Tayi, GK, and Ballou, D (1998) Examining Data Quality, *Communications of the ACM,* 41(2), pp. 54-57.Orr, K, (1998), Data Quality and Systems Theory, *Communicationsof the ACM,* 41(2), pp. 66-71.Woodhouse, J, Asset Management, The Woodhouse Partnership Ltd (2001) online accessed on April 10, 2004 at http://www.plant-maintenance.com/articles/AMbasicintro.vdf

Wang, J (2015) Approaches of Improving University Asset Management Efficiency. International Journal of Higher Education, 4(4), pp. 235-238.

Wang, RY (1998) A product perspective on total data quality management, *Communications of the ACM,* 41(2), pp. 58-65.

Wang, RY, and Strong, DM, and Guarascio, LM (1994) Beyond Accuracy: What Data Quality Means to Data Consumers, Technical Report TDQM-94-10, *Total Data Quality Management Research Program,* MIT Sloan School of Management, Cambridge, MA.

Xu, H (2000) Managing accounting information quality: an Australian study, *Proceeding of the International Conference on Information Systems (ZCIS 2000),* Brisbane, Australia.

Yin, PK (1994) *Case Study Research: Design and Methods,* 2nd ed., Sage.

Life-cycle Risk Management Methodology of European-Funded Projects

Nicoleta Daniela Ignat, University POLITEHNICA of Bucharest, Bucharest, Romania,
nicoleta_ignat@yahoo.com,

Abstract

The purpose of this paper is to create a unitary risk management framework for projects funded from European non-reimbursable funds in Academia as beneficiary in order to ensure a reduction in exposure to losses.The paper briefly presents a risks management methodology developed by analyzing a range of 40 projects focused on the development of human capital and implemented in Academia.There are methodologies to approach and manage the risks occurring at Beneficiaries but different notions and concepts are applied. Moreover, it should be noted that they are developed with the organization as starting point, the elements directly affect the organization and universities are public institutions in which a wider range of activities (both didactic and research activities) are carried out, thus a risk approach is required at the project level.Following the analysis of the projects implemented in Academia over the last five years, it was found that project managers in Academia do not have project management expertise, therefore guidance to properly manage projects is needed.
In this paper, a qualitative risk analysis was proposed by using the risk matrix. Exposure to risk is directly related to the probability of materializing the risk. Using the proposed methodology, a qualitative risk analysis can be carried out from internal or external factors that directly or indirectly affect the achievement of the objectives assumed at each project level. This methodology can be transposed and correlated with existing risk management methodologies in Academia.
The risks management methodology also includes a risks register.

Keywords: Risks, risk management methodology, projects funded by European funds

1. Introduction

In terms of innovation, but also due to the challenges of globalization, projects are constantly subject to constraints (Alhawari, et al., 2012; PMI 2013) and risk management is of interest for Academia.

Practices in project management are increasingly needed as a thorough identification and management of risks can be provided.

Also, using project management practices can ensure better communication between project partners, thus facilitating decision making and prioritization to achieve the objectives (Marcelino-Sádaba et al., 2013).

Risks are classified according to one of their characteristics, without taking into account the interactions that may arise between the risks that may occur concurrently. In fact, the project manager often faces risks from different groups / categories that occur at the same time (Marle, F., 2011; Vidal et al., 2009).

To manage the risks, there are project management models, but management models that are tailored to project types and organizations are required because not all of these models can be transposed into different types of projects (Turner et al., 2010).

Uncertainty represents an event with unknown probability which is not susceptible to analysis (Kolisch, 2010). Throughout the life cycle of the project, project managers must identify risks and uncertainties that can not be evaluated (Ward and Chapman, 2003).

2. Risk Management - Approach to Projects

Risk management is a complex process of identifying, analyzing, and responding to possible risks that may arise over the life cycle of a project. Thus, the risks can occur at the project design stage, in the implementation phase and in the sustainability period.

Thus, by monitoring the implementation of projects (internal control), risk management is directly ensured.

Achieving a coherent risk management involves:

- preliminary analysis of all risk exposures, the identification of risk sources being fundamental and determinant in the proper assessment of risks;
- identifying significant / strategic risks that may affect the effectiveness and efficiency of activities related to specific objectives,
- defining the degree of tolerance / acceptable level of exposure to risks;
- assessing the likelihood that the risk materializes, the impact assessment and its exposure;
- establishing the strategy (control measures) for the management and monitoring of risks.

The key word in terms of risk management is the term "systematic". We do not have to deal with the consequences of any events that have occurred, because this does not improve the causes. Therefore, a proactive management style must be adopted, which means that it is necessary to design and implement measures aimed at identifying possible risks before they materialize and produce unfavorable consequences on the set objectives.

Throughout the lifecycle of the projects, especially during their implementation, universities interact with other entities (partners, authorities, public institutions, etc.). In this environment there are threats and opportunities that can condition / endanger / promote the achievement of the objectives assumed by the projects and implicitly at the level of the university. Interaction of public institutions with the external environment is inherently one that assumes the acceptance of uncertainty as a standard variable of management activity.

If uncertainty is a daily reality, then the reaction to it must be a permanent practice.

Risk management involves addressing a proactive management style:

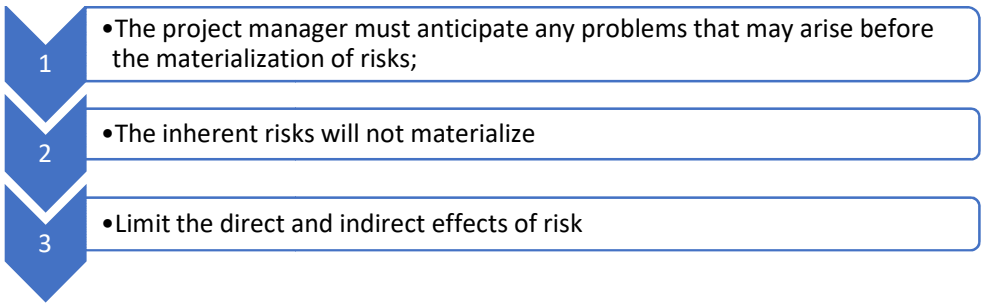


Fig 1: Risk management involves addressing a proactive management style

Risk management provides an efficient and effective organizational framework for achieving the goals assumed at the Academia.

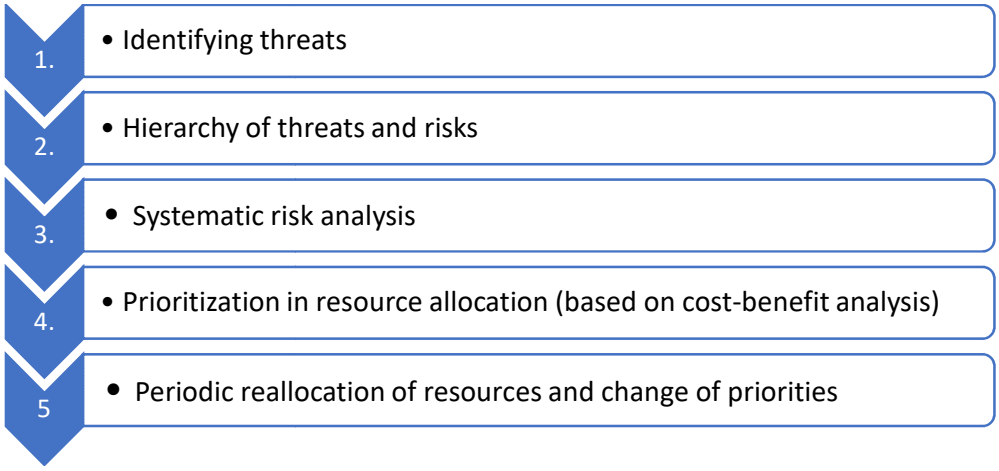


Fig. 2: Risk Management - Organizational Framework in Achieving Objectives

3. Risks management methodology at projects level

In the first stage, each project should identify the risks that might arise over the life cycle of the project. In the second step for each identified risk, a more detailed description must be made, identifying at the same time the causes that have favored their emergence.

Therefore, the risks management methodology is the basis for identifying and assessing risks; the establishment of control measures, in order to diminish the possibility of their defense, as well as to mitigate the consequences of the products as a result of their materialization.

3.1 Identifying the risks that may arise over the life cycle of projects

These can be identified by looking at both internal factors - the vulnerabilities of the project and the external ones that can lead to unwanted effects having a direct impact on project objectives and indirectly on the Academia.

In order to identify the factors that can lead to risks, the project and their documents will be analyzed in detail. Risk factors identified by the analysis will be quantified in a risks register.

Table 1: Risks register

Objectives /Activities	Risk	Causes for risk	Inherent risk			Suggested solution	Residual risk		
			Probability	Impact	Exposure		Probability	Impact	Exposure

3.2 Risks description and risk exposure assessment

Exposure to risk is a probabilistic concept, being directly related to the probability of materializing the risk. It is the significance just before the occurrence of the risk. Exposure to risk operates with an implicit hierarchy of identified risks.

For risks assessment, in this methodology, the risk is mathematically expressed according to the following formula:

Risk = Impact x The probability of occurrence of an event

The formula used presents the risk calculated as a product between impact and probability.

Exposure to risk is a combination of probability and impact, being a two-dimensional, matrix type indicator.

A matrix for exposure to risk can consider the levels: very low (VL), low (L), moderate (M), high (H), very high (VH) for both impact and probability, which results in risk such as VL -VL, L - VL, M -VL, etc.

Considering that this analysis will be done step by step, we propose the use of a 5-step staircase to obtain a risk exposure matrix. These values can be both qualitative and quantitative.

In order to be able to apply the methodology presented at the level of the project management team, a high managerial capacity at the project level is required which is quantified as follows: Each risk will be classified at the level of the analyzed project using a subjective scale for probability and impact. This creates a risk matrix in which color codes will provide a way to assess the risks in terms of impact on the project.

Table 2: Risk matrix - exemplary with a degree of tolerance matrix defined in according to the project parteners

Impact					
0.8	0.08	0.24	0.40	0.56	0.72
0.4	0.04	0.12	0.20	0.28	0.36
0.2	0.02	0.06	0.10	0.14	0.18
0.1	0.01	0.03	0.05	0.07	0.09
0.05	0.01	0.02	0.03	0.04	0.05
	0.1	0.3	0.5	0.7	0.9

Probability

Table3: Color code contrains and Relation between the project risk impact

Color Code Constrains		**Project impact**
Between: 0.00 and 0.05		Low
Between: 0.06 and 0.14		Moderate
Between: 0.15 and 1		High

All risks that have an exposure level above the accepted risk tolerance limit require control measures to make these risks residual.

Establishing the risk tolerance limit is an act of managerial accountability, as it has important implications for the costs associated with control measures and the costs of exposure to risk.

Conclusions

The methodology will be a working tool that will be used to implement projects at Academia. Taking into account the fact that the development of projects proposals, their implementation and ensuring sustainability are done by the project teams with the administrative support of the Academia, it is

necessary to have a risks management methodology at the level of the projects that can be made available to the project teams and adapted to each project proposal.

The role of this methodology was to provide a unitary risks management framework for projects funded by European funds (proposed and implemented by Academia).

At the same time, the methodology will also be useful in the reporting process at the level of the Beneficiaries who will apply it at institutional level.

The reasons behind the development of this methodology are:

- at the level of Beneficiary, the risks are managed by the management team of each project on the basis of the experience of the project manager / without a unitary approach as to how to identify, evaluate and manage the risks that occur at the level of the projects;
- substantial terminological differences in the methodologies used at national level in the management of different types of risks;
- substantial differences in establishing the criteria on the basis of which the impact of different types of risks is assessed;
- differences at national level regarding the assessment of the impact of certain risks.

Acknowledgement

This work has been funded by University POLITEHNICA of Bucharest, through the "Excellence Research Grants" Program, UPB – GEX. Identifier: UPB–EXCELENȚĂ–2016 "Managementul riscurilor în cadrul proiectelor finanţate prin Programul Operaţional Sectorial Dezvoltarea Resurselor Umane, Contract number: 105/26.09.2016.

References

Alhawari, S., Karadsheh, L., Talet, A. N., Mansour, E. (2012), 'Knowledge-Based Risk Management framework for Information Technology project', *International Journal of Information Management* 32, 50-65.

PMI, (2013), 'A Guide to Project Management Body of Knowledge: PMBoK Guide', Fifth Edition ed. Pensylvania - USA: Project Management Institute, Inc;

Marcelino-Sádaba, S., Pérez-Ezcurdia, A., Echeverría Lazcano, A. M., Villanueva, P. (2013), 'Project risk management methodology for small firms', *International Journal of Project Management*: 32, 327-340.

Marle, F. (2011), 'Interactions-based risk clustering methodologies and algorithms for complex project management. International Journal of Production Economics. 142 (2), 225-234.

Vidal, L.A., Marle, F., Bocquet, J.C. (2009), 'Interactions-based clustering to assist project management'. *Proceedings of the International Conference on Engineering Design. Design Society, United States of America*, Stanford.

Turner, J.R., Ledwith, A., Kelly, J. (2010), 'Project management in small to medium-sized enterprises: matching processes to the nature of the firm'. *International Journal of Project Management* 28 (8), 744–755.

Kolisch, R. (2010), 'Managing project uncertainty–advances in project management', by D. Cleden. *International Journal of Production Research*: 48, 5537-5537.

Ward, S., Chapman, C., (2003), 'Transforming project risk management into project uncertainty management', *International Journal of Project Management*: 21, 97-105.

New Method of Monitoring a Creative Project and its Use in Practice

Eva Svirakova, Tomas Bata University in Zlín, Faculty of Multimedia Communications, Stefanikova 2431, 760 01 Zlín, Czech Republic, svirakova@utb.cz,

Abstract

The objective of this paper is to design new methods of creative project management and verify whether they are practically applicable by the means of Water for All Project, a case study of product innovation. Our effort is based on the method of Earned Value Management, which we modify so that it can be used in a creative environment and we use a universal unit for measuring the planned as well as implemented value. This unit comprises difficulty points assigned to the project products. Through our own procedure we define an exact reference mode of the project so that we can complement it with a simulated process using dynamic modelling. This allows us to compare on the model the planned and actual development of the project with the simulated development that also contains forecast of the further advancement of the project. The simulation includes elements such as fatigue during the project, team members´ motivation and quality of the work done. We describe the use of new methods step by step on the case study of the Water for All Project.

Keywords: Culture and creative industries, system dynamics, systems thinking, creative project management

Introduction

Monitoring the progress of a certain project is a challenging managerial task. Unless it is defined what the project wants to achieve before it actually starts, it is impossible to assess the degree of deviating from the original intentions and whether the project has been successful or not. In the project portfolio in the field of cultural and creative industries we keep facing the same problem over and over again: cultural creativists often don´t have an idea how their project will advance and how many resources they are going to need in order to implement it. This means that project managers in this environment don´t have relevant plans for their projects. They manage their creative projects intuitively and underestimate the importance of planning. This implies that they are not able to monitor its actual implementation. Their argument for such an attitude to planning is that traditional methods are not practically applicable. The reason is as follows: a creative process is hard to predict, which means that during the project implementation many unexpected situations that cannot be planned will arise. However, sponsors and customers who order this type of projects require objectively verifiable information to be able to conclude whether their assignment has been fulfilled and whether the project achieved the goals expected. Therefore, managers in cultural and creative industries have to know at what stage of a project they are at a given moment so that they could inform the sponsor accordingly. Managers of creative projects need to know the reasons why projects get into trouble, how such problems can be prevented and how they can improve their project management. If we offer them suitable methods of monitoring project development so that they could use them without any administrative obstacles, we will increase the efficiency of their decision-making when managing projects. The objective of this paper is to design new methods of creative project management and verify whether they are practically applicable by the means of Water for All Project, a case study of product innovation.

Literature Review

We design new methods for cultural and creative industries. We first had to define clearly the environment. According to Guntern (in Steiger and Lippmann, 2012; Bačuvčík 2012), a creative product is a product that meets four criteria: it has to be original, unique, valuable for users in terms of its functions (a product must function as it is supposed to) and formally perfect (in other words, a product must be beautiful). Creative project management is a method of creating a new value which is based on the unique talent of the creator aspiring to create a high-quality product within pre-defined limits. The way of creating new value consists in setting relevant processes for creative project management. In addition to the processes of project management, a project manager of a creative project also needs to take into account the talent of the creator and uncertainty of future achievements that are based on the invention of the author of the design. A creative project is a temporary organization that is formed with the view to deliver original and formally perfect products that contain intellectual property and are delivered in accordance with the objective and within limits that have been mutually agreed in advance (Svirakova, 2014).

Bartoška (2011), Lacko (2004) and Rehacek (2015) note that in management of actual projects, regardless of the industry, we can find a lot of incorrect approaches that are the root cause of not adhering to the budget, not meeting deadlines or failing to deliver the scope of the project and its objectives. Wrong decisions made by managers resulting from incorrect assessment of the situation in a project result in losses. An unsuccessful project is a result of managers´ insufficient knowledge of the actual development of the project as compared with its plan. Taraba (2015) points out that the appropriate use of project management methods under the supervision of a competent project manager can be one of the key success factors of the company. Simon Collyer and Clive M. J. Warren (2008) focus on the issue of projects in a dynamic environment. They claim that an appropriate approach to monitoring the scope of a project is to divide it into stages that are easier to plan and manage. Other authors deal with project monitoring using the tools of system dynamics: several significant studies on project management were written on this topic by Cooper (1980), Richardson and Pugh (1981), Morecroft and Abdel-Hamid (1983), Abdel-Hamid (1984), Ford and Sterman (1998), Lyneis et al., (2001), Park and Pena-More (2003), more recently by Bérard (2010) and Ghaffarzadegan, Lyneis and Richardson (2010), Cosenz (2017). These authors focus, among others, on simulated monitoring of the currently earned value according to the EVM method (Earned Value Management). They compare the value created with the plan in relation to the approaching scheduled date of completion and point out the rising level of stress. Their models simulate a situation when a project is behind schedule while the deadline is approaching.

The value-added method, which is often used in the Czech environment by its English equivalent Earned Value Management, as well as its abbreviation (EVM), is an important part of the International Project Management Institute (PMBoK, 2013). The EVM method can be characterized as a systematic project process for finding deviations in a project based on a comparison of the work done and the planned work. However, as stated in Skalický (2016), the EVM method, although it has the word "management" in the name, does not control the project but only supervises it. Project control is based on calculated indices - deviations and performance. Therefore, it is questionable whether we can use the EVM method to track the actual course of a project if we want to manage the project as a system (Skalický, 2016).

This article comes up with new methods for monitoring the development of a project in a cultural and creative environment. It uses the Earned Value Management method by applying its principle and then modifies it, which leads to the creation of a new method called CREA TRACK, which is the first stage of a more advanced method CREA TRACK PLUS. Results of CREA TRACK can be presented with MS Excel, which is common software. CREA TRACK PLUS enables its users to predict the development of a project: the prediction is based on system dynamics modelling and it requires simulation software (e.g. Vensim, iThink, Stella etc.). It allows for including some system elements for future project development that would be omitted in CREA TRACK such as: the quality of the project team, lack of time for completing the project in the entire scope and lack of communication within the project.

Materials and Methods

The objective of the research is to verify whether the new methods, i.e. CREA TRACK and CREA TRACK PLUS, are applicable to projects in the creative environment. We verified the use of the methods on the Water for All Case Study. At the beginning of the research, the following two research questions (RQ) were asked:

RQ1: Can we alternatively apply the Earned Value Management (EVM) method using the assignment of points to the difficulty of outcomes so that the objective of the research is met?

RQ2: Can we use the system dynamics model for quantifying the problematic behaviour of a project and predict its future development?

So that the research is complete and provides the framework necessary for defining the problem and relevant solution, we used two methodologies:

1. Quantitative research – project content analysis based on predicting the difficulty as an alternative to Earned Value Management (EVM). The indicators that we measure by data quantification are the following: (1) The planned value (PV) of the project, which corresponds to PV under the EVM method, when we quantify the effort that is planned to be expended over a given time in order to ensure the desired outputs of the project. (2) The actually earned value (EV) of the project, which corresponds to EV under the EVM method, is quantification of the actually achieved value of the output at a given moment. (3) The actual costs (AC) of the project, which corresponds to AC under the EVM method, the units are difficulty points calculated from the budget in the given currency. (4) Planned costs (PC) of the project – a new indicator that is modified and prepared in accordance with the planned budget of the project, the units are difficulty points converted from the budget in monetary units at a given time. The indicator is abbreviated as PC meaning Planned Costs of the project at a certain moment.

2. Qualitative research – interview as input information for system dynamics modelling. Managers/members of the management team who participated in the project preparation and implementation were interviewed. The key elements that are the cause of a problematic behaviour of a project are determined on the basis of an interview with the project manager and members of his/her team. Questions for the interview are formulated in advance so that the researcher has the opportunity to be initiative. It is a semi-structured interview with narrative elements: the interviewer adjusts to the project type and knowledge of the interviewee during the interview. Such interviews give the interviewer the possibility to be initiative and explore in a detail issues that may arise during the interview. The interview is recorded with the consent of the interviewee. The recording is then transferred in a written form for the purpose of further analysis.

Case study Water for All Projects

Using the case study from the Water for All Project we show the possibilities of design thinking in the working process of authors creating a new innovative design. Water for All is a project by the Faculty of Multimedia Communication, Tomas Bata University in Zlín, which is based on the environment of cultural and creative industries. All studios under the faculty participated in it. Twelve studios, in a joint effort, dealt with “Water” as a topic of their creation from the beginning of the academic year (September 2016). The Water for All Project has two main objectives. The first one is systematic work with the general public. Students came up with a warning that concerned the gradual depletion of water on the Earth. They accentuated that the problems does not only concern developing countries, but also the Czech Republic and it needs to be addressed. The second objective is to instigate cooperation not only between the studios, but also between the faculty and companies that can help students implement their design drafts that concern the “Water” issue. Outcomes of the project are exhibitions, fashion shows, websites, a catalogue, Facebook campaign, conference and scientific publication.

Formulation of dynamic hypotheses

We see correct formulation of dynamic hypotheses by the model creator as a part of the methodology for system dynamics modelling. When formulating them, so-called thought mapping is used, in particular its effective tool, causal loop diagrams. These diagrams allow for clear description of the system elements and their mutual bounds. In the preparatory phase, we focus not only on hard data that can be obtained from the content analysis of the project, see the first part of the research methodology (quantitative research), but also on soft data that can be classified as behavioural information about the project. The concept of system thinking (Senge, 2006) is a suitable method of expressing dynamic hypotheses. The tool for displaying this type of thinking is the feedback loop diagram thanks to which we can display relations between causes and consequences in the systems researched as well as feedback impacts of various decisions on the future development of variables that we could include in the model.

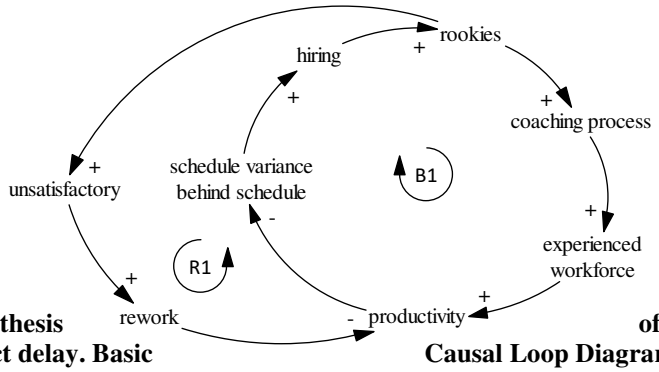


Fig. 1.: Main hypothesis of the project problem: Decrease project delay. Basic Causal Loop Diagram - CLD. (Svirakova, 2017).

The main hypothesis of the problem we want to solve by modeling corresponds to the System Archetype Limits to Growth (Senge, 2006). The problem is the delay in delivery of the project products compared to the plan. We deal with the delay by extending the project team to new members. We need newcomers (rookies) in the team, but at the same time they cause another delay in the project, because their performance is not first-rate and they cause a greater need for reworking of the project's partial products. The following solutions are offered: Training rookies faster so that they could be swiftly relocated to experienced team members who make fewer mistakes. Strengthening the coaching process is one of the scenarios to improve project productivity and reduce the delay over the plan.

System Dynamics Project Model

On the basis of dynamic hypothesis H1 that is shown in the picture above (Fig. 1.) we compiled a basic system dynamics model that contains a cycle of reworking unapproved (low-quality) outputs of the project. This model (Fig. 2.) was complemented by data from the reference mode, which is the data obtained in quantitative research of the project.

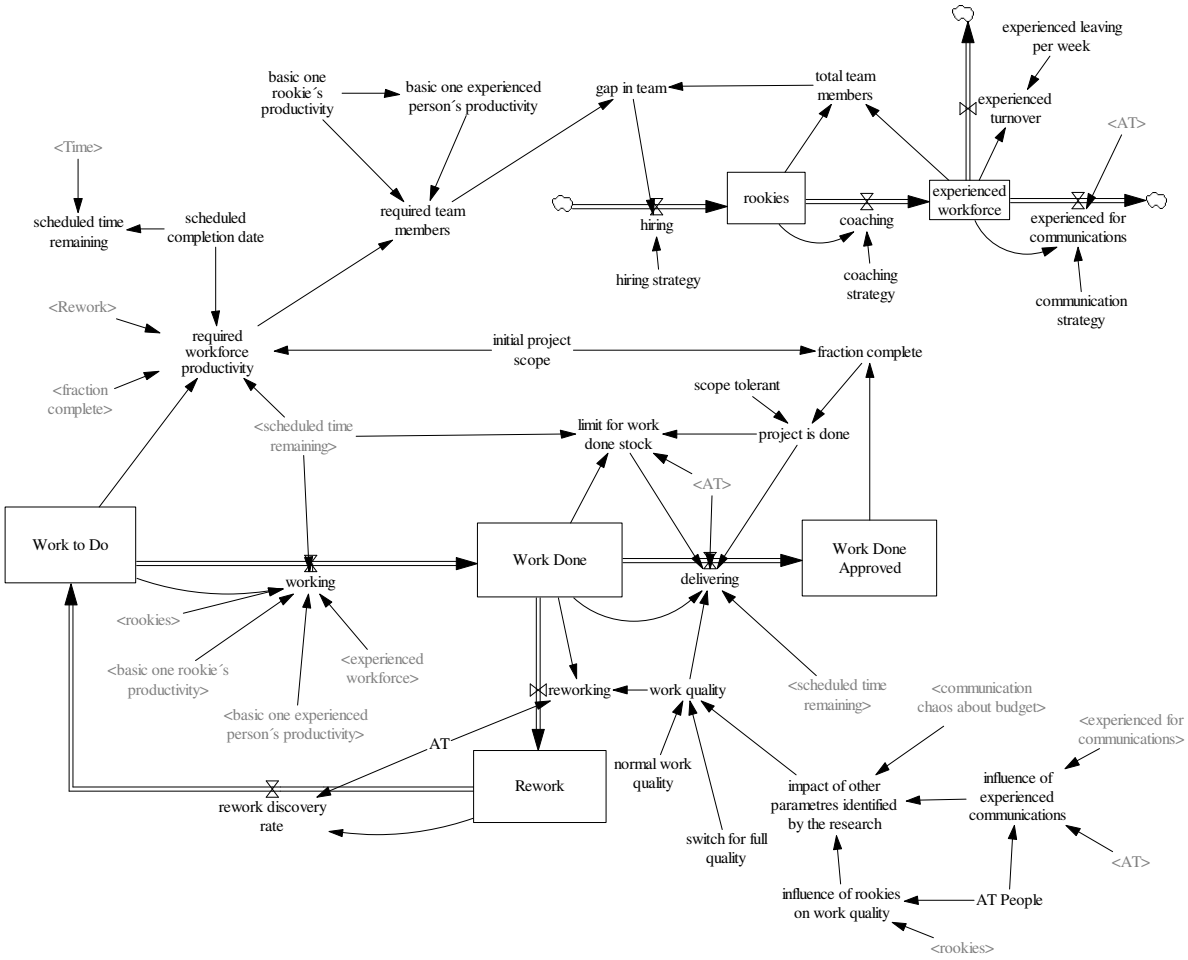


Fig. 2. Basic model – Stock and Flow Diagram - SFD: rework cycle. (Svirakova, 2017).

Analysis of conversation and causality search

Qualitative research aims to use its results to refine the system-dynamic model. Its basic elements are set according to the dynamic hypothesis, in which the basic project cycle of reprocessing of non-approved project products is displayed (see Fig. 1, Fig. 2). In addition, part of the interview with the project manager and its analysis is recorded. Relationships between selected elements of the system are briefly characterized by the language of system thinking.

Report of a part of the interview with Project Manager Water for All Project Project Manager: *"The main problem of the project ... for sure communication and distribution of information, both to each other and to the head of the studio, and of course also to the students of the project. ... I know there is a delayed realization and, in general, the whole organization mainly of websites that were to be ready by the end of December and will be ready by the end of January. The only thing I have (to track the actual course of the project, note: the interviewer) is a schedule that we put together at the beginning of the project, in which we have set deadlines for fulfillment, but I have never implemented them ... I mostly use my head and my diary. Interviewer: "Do you think the problem can be avoided and in what way?" Project Manager: "I think the problem can be partially avoided. I think, for example, setting reserve in terms of time is an effective helper. Another prevision should be personal meetings of the team and mutual motivation, support of other members, such "psyching up" to work. And especially COMMUNICATION. COMMUNICATION. COMMUNICATION. Let each other know when something goes wrong and find the cause. Ask for help. Talk about problems and slips within deadlines. Speak. Speak. Share it. I think that is crucial: when the problem is known, it can be solved."*

Paraphrased in the language of system thinking and the new hypothesis: A less experienced team manager means a reduced continuous check of the implementation of the project timetable (+>), the communication of monitoring progress in the project is reduced (+>) leading to a longer delay of the project than the plan (->).

In addition, the elements and links between them follow the main dynamic hypothesis: the more emphasis on the recruitment of new members to the team (+>), the more newcomers in the team (+>) and after a certain coaching process, the more experienced members of the team (+>). The odd number of arrows is changed by the negative polarity in the loop. The loop is counterpart. New Hypothesis 1 (NH1): More experienced team members lead to a better ongoing control of the timetable, which leads to a reduction in project delay compared to the plan.

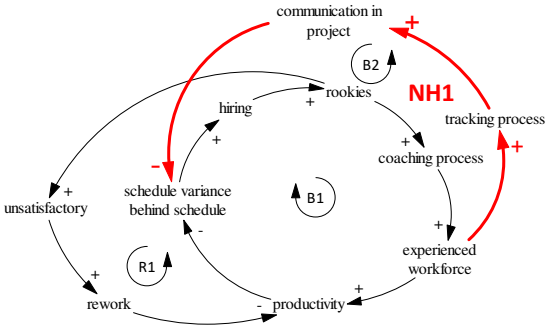


Fig. 3: Incorporation of the new NH1 hypothesis into the basic feedback loop diagram. (Source: own processing, 2017)

Based on an analysis of the interview with the project manager Water for All Project, we first extended the main dynamic hypothesis in the feedback loop diagram against Figure 1 (Fig. 1 Formulation of Dynamic Hypotheses). The result of this extension is the structure shown above (Fig. 3). According to the concept of the whole model, elements that represent new dynamic NH1 hypotheses are added to the main

hypothesis. These new elements are linked by feedback loops with relevant elements of the Basic CLD for the Water for All Project (Fig. 1, Fig. 3). The base model uses black thin arrows. Added loops are highlighted in color and highlighted by a stronger line.

Results and Discussion

The project started in July 2016, its duration scheduled for the end of 2017, i.e. the planned duration of the project is 72 weeks. The graph (see below) is set to 75 weeks for the duration of the project, leaving 3 weeks as a time reserve. In the initial weeks of the project, its actual course (EV - red dotted curve, Fig. 4) is the same as planned, and approximately until the 18th week (PV - blue full curve, Fig. 4, Fig. 5). After this period, the project actually begins to delay the plan, and at the end of the period under review, which is the 52th week of the project, the plan is worth 1335 points of difficulty (EV - red dotted curve). The chart also includes the development of planned cost values (PC - green intermittent curve) and actual cost over time (AC - Gray curve). Values were determined by quantitative research, data analysis of the project and evaluated using difficulty points, a modification of the EVM method we named as the CREA TRACK method. The values in the table are the reference framework of the system (project) with which we work in system dynamics models. This is how we find out what interests us most in the project: whether the project is behind schedule, whether the project is actually more expensive than we planned. The unit for comparison is the difficulty points. Problems in the project that may contribute to deviation from the plan have been identified by qualitative research and are simulated in the project model. The project reference frame is embedded in a system-dynamic model, although MS Excel can also be used for its graphical expression. The aim of our article is not only the use of the modified EVM method, the CREA TRACK method, but also the full implementation of the CREA TRACK PLUS method, so we only use Vensim outputs rather than MS Excel (see Figure 4 below). We can now comment on whether the proposed methodology has met the research goal of verifying the practicality and usability of system dynamics modeling for projects in a creative environment.

Research Question 1 (RQ1): Can an universal "point of difficulty" unit for project scope determination be used as part of project tracking and use the modified EVM as a reference framework for a system dynamics model

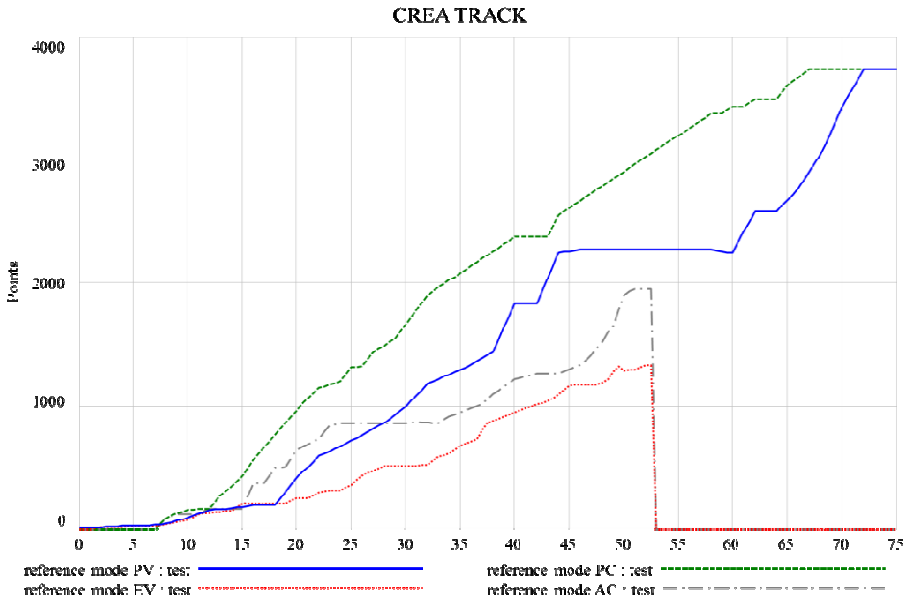


Fig. 4: Comparison of all four measured values from the CREA TRACK method. Source (own processing, 2017).

The answer is: Yes, we have applied the project reference frame in the system dynamics model, see the research result (Fig. 5.) above in all four project performance parameters: planned PV value, generated EV value, planned PC costs and actual costs at a given time AC. All of these curves are ready to be compared with the simulated course of a project in a system dynamics model because we have been placed in the Vensim software using the graph function. The graph shows the state of the project at the 52th week: the material extent is behind the plan, but the cost is higher. So we actually created fewer outputs for more money. Planned costs are not exceeded, even until the 52th week of the project, the planned project financing has a higher dynamics at the beginning of the project, so a slower cost drawdown is planned in the last approximately 10 weeks of the project.

Research Question 2 (RQ2): Can we use the system-dynamic model to quantify the problematic behavior of the project and estimate its future development?

The answer is: Yes, the problematic behavior has been described and it is demonstrable that the problems in the project exist, see the report from the interview with the project manager as a output of qualitative research. The parts of the interview were analyzed, translated and paraphrased by system thinking, and we processed the results of the analysis into an extended causal loop diagram (Fig. 3). Through qualitative research, we have identified the need to add new variables that have not yet been included in the basic model: the quality of tracking process quality, communication in project. We have quantified these variables for system dynamics modeling. An increasing tendency in the number of experienced workforce, that is, the Experienced Workforce variable, causes the interest in controlling the implementation of the project schedule to be increased, and the measured delay in the project is more communicated in the team, thus reducing the project delay compared to the plan, which confirms the new NH1 hypothesis. The model shows the advantage of a computer simulation: a managerial decision is without risk, the organization does not bear the negative consequences of its incorrect assessment of the situation. However, it is important to note that the implementation of management decisions is not easy and will probably bring with it another negative backward impact on the development of the project. For example, if we decide to shorten the time for adapting newcomers to the team, we need to hire new coaches and not burden experienced team members with these processes, which would lead to further delays in the project. Efficiency of scenarios can also be judged by their economic impact or the financial advantage of deploying the chosen strategy.

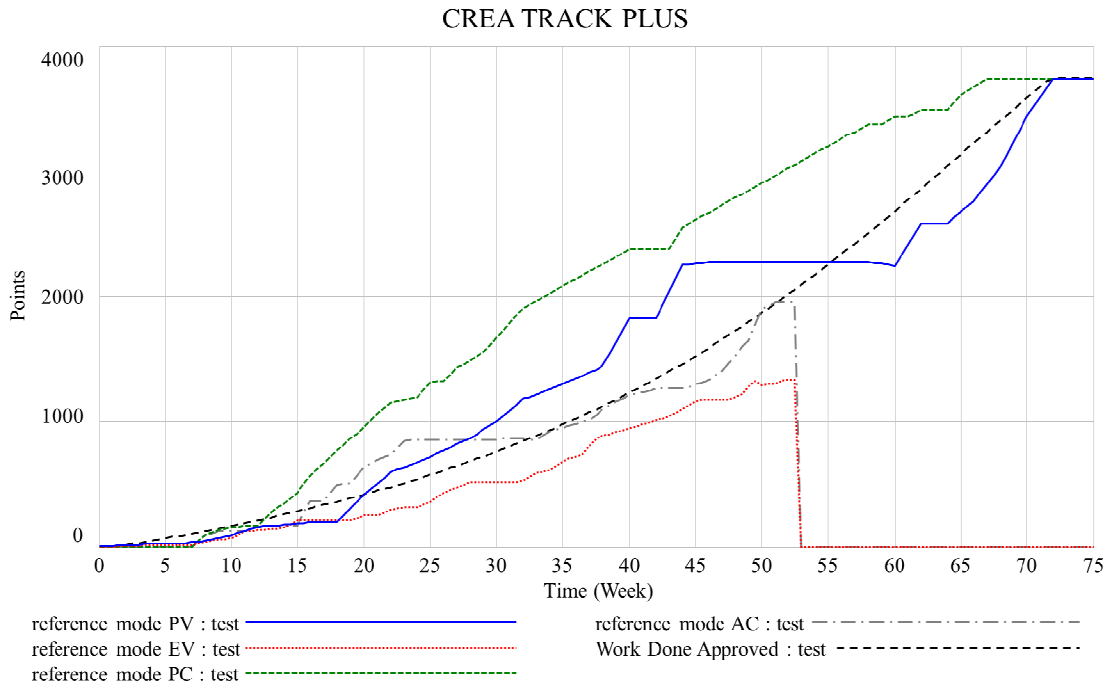


Fig. 5: CREA TRACK PLUS - comparison of the reference frame and dynamic simulation of the Water for All Project. Source (own processing, 2017)

Conclusion

The data for CREA TRACK were processed by the EVM method under the standard A Guide to the Project Management Body of Knowledge (PMI, 2013). However, the method differs from the EVM methodology (as it is actually applied), with its units that make reports and work with project monitoring that is part of control process significantly simpler. Thanks to the reference mode that we used when applying the CREA TRACK method we know where exactly we are in the project implementation and how much we have deviated from the plan. We focus our research on the actual project development and we want to find out what are the reasons that result in schedule variance. We processed these causes in a system dynamics model so that we could predict further development of the project and what the chances are it will meet its goals. The fact we used CREA TRACK had one positive side-effect: it made us naturally prepare background documents for the final report on the fly.

With CREA TRACK we contribute to emphasising the importance of planning in a creative environment and we offer an easily accessible method for monitoring the actual development of project implementation without ineffective use of project team members´ labour costs as a unit. Labour costs (planned and consumed) are measured by the PC indicator as Planned Costs and by the AC indicator as Actual Costs and we can process them and show the project development in a graph following the same principles on which the CREA TRACK method is based.

We called the other method based on dynamic simulation of the project CREA TRACK PLUS, because it is an extended version of the CREA TRACK method. We extended the model that simulates the probable course of project development by adding other variables that either slowed down or accelerated the work on the project outputs. For this step, we first obtained relevant data from our research. We could compare

the simulated development of the project with its actual development thanks to the reference mode of the achieved value of the project.

Both methods, CREA TRACK and CREA TRACK PLUS, are in line with the new requirements that concern project management, i.e. going beyond the boundaries of technical and engineering disciplines and create a procedure that will be in line with transdisciplinary and integration approach (Saynisch, 2010). Cultural and any other creative or scientific projects of the 21st century cannot be based on intuitive management or on bureaucratic processes that leave very little space for changes to the plan. A creative environment must remain dynamic and it has to keep offering new challenges including the integrated possibility of making changes to the planning process. The advantage of CREA TRACK consists in simplifying the units of measure through which we can quantify the progress of the project plan and its implementation. The advantage of CREA TRACK PLUS is the prediction of further development of the project, testing of various scenarios and policies for decision making of managers. However, this method can only be implemented if there is an experienced project supervisor who can use software for system dynamics modelling.

The objective of the research, i.e. verifying whether the CREA TRACK and CREA TRACK PLUS methods are suitable for monitoring project implementation and thus for increasing the effectiveness of project managers´ decision making, has been met. Both methods can be practically applied, which has been proved by the research of the Water for All Project Case Study.

Acknowledgements

I would like to thank project manager Eva Gartnerová for providing an interview on the issue of managing the Water for All Project. The article was supported by Project No. 4/2017/FSR, which was financed from the strategic development fund of Tomas Bata University in Zlín.

References

Abdel-Hamid T.K., (1984). The Dynamics of Software Development Project Management: An Integrative System Dynamics Perspective. *Doctoral thesis,* MIT, Cambridge, MA.

Bartoška, J., Svobodová, R. and Jarkovská, M. (2011). IPMA Standard Elements and Feedback in Project Management Teaching, *Journal on Efficiency and Responsibility in Education and Science*, Vol. 4, no. 3, pp. 142-153.

Bérard, C. (2010). Group Model Building Using System Dynamics: An Analysis of Methodological Frameworks. *The Electronic Journal of Business Research Methods*, Volume 8 Issue 1, 2010. (pp. 35 - 45), Retrieved from www.ejbrm.com

Collyer, S and Clive M. J. Warren. (2008). Elsevier LtD and IPMA. *Internationl Journal of project management,* doi:10.1016/j.ijproman.2008.04.004

Cooper, K.G. (1980). Naval ship production: A Claim settled and framework built, *Interfaces,* 10(6).

Cosenz, F. (2017). Supporting start-up business model design through system dynamics modelling, *Management Decision*, Vol. 55 No. 1, pp. 57-79.

Ford, D. N., and Sterman, J.D. (1998). Dynamic modeling of product development processes, *System Dynamics Review*, Vol.14 No.1, (spring).

Ghaffarzadegan, Lyneis and Richardson. (2010). *System Dynamics Review*, vol 27, No 1, DOI: 10.1002/sdr.442

Lacko, B. (2004). The Risk Analysis of Soft Computing Projects In: *Proceedings International Conference on Soft Computing – ICSC 2004, (*p. 163-169). European Polytechnical Institute Kunovice.

Lyneis et al., (2001). Strategic Management of Complex projects: a case study using system dynamics, *System Dynamics Review*, Vol. 17, No. 3, pp. 237-260.

Morecroft, John, D.W., and Abdel-Hamid, Tarek, K. (1983). A Generic System Dynamics Model of software Project management, *SDS literature collection*, MIT, MA.

Park and Pena-More Feniosky. (2003). Dynamic Change management for construction: introducing the change cycle into model-based project management, *System Dynamics Review,* Vol.19, No 3 pp213-242.

PMBoK. (2013). *A Guide to the Project Management Body of Knowledge* (PMBOK® guide). Fifth edition. Pennsylvania: Project Management Institute

Rehacek, P. (2015). Organization Forms for Project Management. *Proceedings of the 25th International Business Information Management Association Conference* (pp. 2092-2101), Amsterdam.

Richardson and Pugh. (1981). *Introduction to System Dynamics Modeling with Dynamo.* MIT Press, Cambridge, MA.

Saynisch, M. (2010). Beyond frontiers of traditional project management: An approach to evolutionary, self-organizational principles and the complexity theory-results of the research program. *Project Management Journal.* vol. 41, issue 2, p. 21-37. DOI: 10.1002/pmj.20159.

Senge, P. M. (2006). *The Fifth Discipline. The art and Practice of the Learning Organization.* New York: Doubleday/Currency.

Skalický, J. (2016). Řízení systému projekt a metoda řízení dosažené hodnoty (EVM). *Aktuální rizika a možnosti jejich uchopení systémovým inženýrstvím* (pp. 229), Praha.

Steiger, T. and Lippmann, E. D. (2012). *Psychologie pro manažery: jak ovládnout umění vést.* Brno: BizBooks.

Sterman, J. (2000). *Business dynamics: systems thinking and modeling for a complex world.* Boston: Irwin/McGraw-Hill, xxvi.

Svirakova, E. (2014). System dynamics methodology: application in project management education. In: *Proceedings of the 10th International Conference on Efficiency and Responsibility in Education* (pp. 813-822), Prague.

Svirakova, E. (2017). Methods for Project Tracking in Creative Environment. In: *Acta Informatica Pragensia*, 2017 Vol. 6 (1) (pp. 32 – 54).

Taraba, P. et al. (2015). Project Risks in Enterprises in the Czech Republic. In: *Proceedings of The 25th International Business Information Management Association Conference* (pp. 814-821), Amsterdam.

Assessment of the Suitability of the Use of Foreign Exchange Interventions by the Czech National Bank for the Fulfillment of Monetary Policy Objectives

Ing. Martin Pernica, Ph.D.
Institute of Finance, Faculty of Business and Management, Brno University of Technology, Brno, Czech Republic, martin.pernica@gmail.com

Ing. Helena Hanušová, CSc.
Institute of Finance, Faculty of Business and Management, Brno University of Technology, Brno, Czech Republic, hanusova@fbm.vutbr.cz

Abstract

The Czech National Bank adopted a foreign exchange rate commitment to keep the exchange rate of the Czech crown at 27 CZK to € 1 in November 2013. The purpose of weakening the Czech currency was to avoid the risks of deflation and to support the competitiveness of the Czech exports by making goods cheaper on foreign markets. Higher demand for Czech goods should lead to a drop in unemployment and stimulate the Czech economy. The main goal of the article is to compare selected instruments of the monetary policy of the Czech National Bank in achieving the inflation target – open market operations, minimum reserve requirements, forward guidance, quantitative easing, negative interest rates and foreign exchange interventions. An evaluation of the economic development of the Czech Republic is performed at the end. The main interest rates of the Czech National Bank reached a level of technical zero. The potential of conventional instruments of monetary policy has ran out. The usage of negative interest rates faces legislative barriers and would lead to erosion of the profitability of the banking sector. Foreign exchange intervention helped to increase exports. Prolonged weakening of the Czech currency leads to an increase in the difference between the artificially weakened Czech currency and its real market potential which represents a risk to the entire economy.

Keywords Foreign Exchange Interventions, Forward Guidance, Negative Interest Rates, Quantitative Easing

1 Introduction

The last two decades of the 20th century were characterized by a gradual reduction of inflation and reduction of price fluctuations in most important world economies. This development has created conditions to reduce interest rates and to support an economic growth. A monetary policy began to be very important. Central banks affect the liquidity of the banking sector through short-term interest rates. This economically very successful period, which is known as the Great Moderation, resulted in the emergence of the crisis on the US mortgage market in 2007 (Stock & Watson, 2002). The global financial and economic crisis has changed monetary policy. The interest rates were close to technical zero (zero lower bound, ZLB) and could not fall (Swanson & Williams, 2014). Transmission mechanism, which has been supplying liquidity to banks, collapsed (Svensson, 2013). Central banks, including the Czech National Bank, had to use untested monetary policy instruments.

In early November 2013, the Czech National Bank (CNB) began to intervene in the foreign exchange market to weaken the exchange rate of the Czech crown to the level 27, - CZK per 1 €. The importance of this action was to meet the inflation target at 2 %, which the bank has set and a support the competitiveness of the Czech export. A weaker Czech crown leads to cheaper domestic production on foreign markets, which creates a presumption for increasing sales. Higher sales lead to the growth of production by companies that focus on exports and thus contribute to the growth of real output and employment. Depreciation of the Czech crown, on the other hand, brings an increase of prices of imported goods, which reduces household consumption and is leading to higher prices of

inputs, on which the Czech economy depends, as it has a minimum of natural resources. CNB faces to considerable criticism. Some legal experts assess foreign exchange intervention as illegal (Lazarevič, 2013). The economists criticize foreign exchange intervention because they threaten the consumer demand (Brožka et al., 2013).

Status and activities of the Czech National Bank regulates the constitutional act no. 1/1993 coll., Constitution of the Czech Republic, and act no. 6/1993 Coll., on the Czech National Bank. Under Article 98 of the Constitution of the Czech Republic and in line with EU primary law, the primary objective of the CNB is to maintain price stability. Achieving and maintaining price stability, i.e. creating a low-inflation environment in the economy, is the central bank's ongoing contribution to the creation of conditions for sustainable economic growth. (Czech National Bank, 2017a) The Czech legislation does not specify conditions for achieving this goal. The European Central Bank, which defines "quantitative definition of price stability", defined price stability as follows: "*Price stability is defined as a year-on-year Increase in the Harmonised Index of Consumer Prices (HICP) for the euro area of below 2%.*" (European Central Bank, 2016)

The inflation target at 2 % is consistent with the characteristics of price stability of the European Central Bank (Czech National Bank, 2013).

2 Theoretical Solutions

2.1 Open Market Operations

The most commonly used tool of conventional monetary policy are open market operations and automatic facilities, i.e. the deposit facility and the marginal lending facility.
The figure 1 demonstrates the development of the two-week repo operations - 2W repo rate, the deposit facility - discount rate and the marginal lending facility - Lombard rate of the CNB in the period 2008-2017.

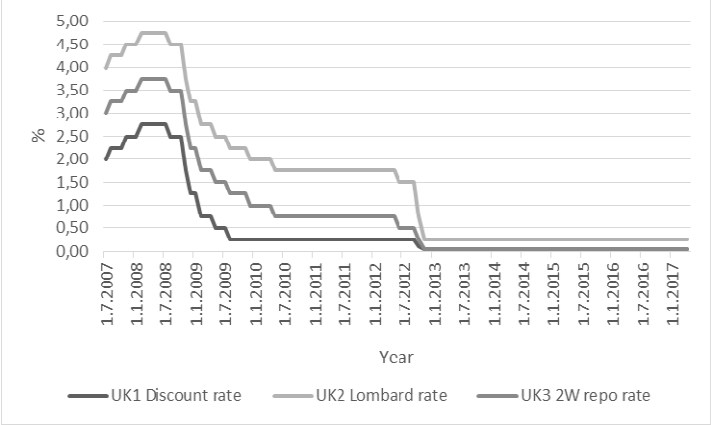


Fig. 1 – Development of the two-week repo operations - 2W repo rate, the deposit facility - discount rate and marginal lending facility - Lombard rate of the CNB in the period 2008-2017. Source: Authors' interpretation based on the data of Czech National Bank, 2017b

The potential of most frequently used monetary policy tools ran out, as both main rate - the 2W repo rate and the discount rate reached in November 2012 the zero lower bound. The Lombard rate reached a level of 0.25 %. Banks in the Czech Republic have too much liquidity. The usage of the marginal lending facility is rather exceptional.

The last possible standard instrument by which the central bank influences the volume of free resources in the banking system are Minimum reserves. Minimum reserves were previously used as

an instrument for covering waves of deposit withdrawals by commercial bank clients. It is unlikely that there will be a sudden outflow of deposits from banks, unless the CNB reports negative rates. The Minimum reserves are currently used to smooth over interbank payments.

2.2 Forward Guidance

Forward guidance (FG) is the central bank's communication strategy, which consists of publishing information about monetary policy (Klíma & Komárek, 2014). The opportunity to influence the exchange rate in a situation ZLB first appears in the record of the meeting of Bank Board dated 19. 12. 2012 (Czech National Bank, 2012). The determination of the CNB to influence the exchange rate of the Czech currency is apparent from other records of the meetings of CNB Bank Board on 28 3. 2013, then on 2. 5. 2013 and on 27. 6. 2013. The record of the meeting of CNB Bank Board on 1. 8. 2013 shows that the CNB Board accepted to initiate foreign exchange intervention as the instrument for further easing of monetary conditions and finally decided not to use this instrument (Czech National Bank, 2013). The initiation of foreign exchange interventions dated 7. 11. 2013 surprised political representation, entrepreneurs and the ordinary people. Raiffeisenbank analyst Michal Brožka commented on this: *"We did not count with the beginning of foreign exchange interventions in view of the ongoing revival of the Czech economy."* (Brožka, 2013) CNB did not manage forward guidance at all.

2.3 Negative interest rates

Negative deposit rate affects the commercial banks for holding an excess of liquidity. It stimulates them to a higher economic activity – such as investment money lending, offering mortgages, etc. Negative interest rates were used in 2009 by the Swedish National Bank for the first time (Severiges Riksbank, 2009). Sveriges Riksbank was later followed by the Bank of Japan and the European Central Bank.

The usage of negative nominal interest rates in the Czech Republic is a legal and economic problem. In terms of economic theory, the interest is a form of reward for lending money. E.g. Jurečka defines this idea as follows: "*Interest is income for depositing money in a bank, is expressed in monetary units*" (Jurečka, 2010). In the Czech legislation, there is no precise definition of the concept of interest. General business conditions of commercial banks reflect the economic concept of interest on which Czech legislation is based.

The balance sheet of the Czech banking sector reached by the bank statistics at the end of March 2017 the amount of 7,106,000 million CZK. The most important item of the asset side are loans provided to residents. Their volume amounted to 5,104,000 million CZK. The volume of deposits of residents, which constitutes the most significant item of liabilities of banking sector amounted to 4,043 ,000 million CZK (Czech National Bank, 2017c).

The figure no. 2 and no. 3 of the development of the assets and liabilities of commercial banks in the period 2008-2016 is below.

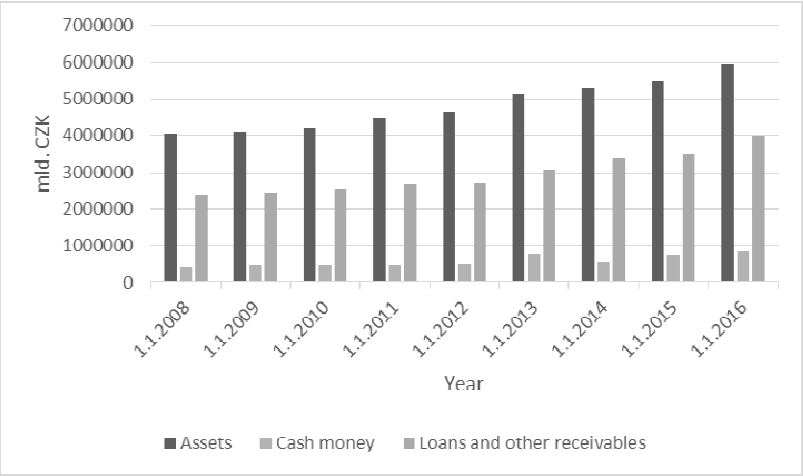


Fig. 2: Development of assets of commercial banks in the period 2008-2016. Source: Czech National Bank, 2017c

With regard to the policy of interest rates of commercial banks in the Czech Republic, it is not convenient for households to leave the money "appreciate" in the form of deposits in savings accounts, even though the central bank still did not use negative interest rates.



Fig. 3 : Development of liabilities of commercial banks in the period 2008-2016. Source: Czech National Bank, 2017c

With regard to the interest rate policy of commercial banks in the Czech Republic, which reflects their over-capitalization, it is not very convenient for households to "capitalize" on money in the form of deposits on savings accounts or on time deposits. This despite the fact that neither the central bank nor the commercial banks have used negative rates.

2.4 Quantitative easing

Through quantitative easing, the amount of money in the economy increases. This arises from the fact that the central bank purchases securities in the financial market. Most of them are the least risky assets. These are, above all, government bonds, which reduce their profitability. More money in the economy leads to a decrease of interest rates. Low interest rates lead both to rising inflation and to

increasing liquidity (money supply) of commercial banks, which contributes lower interest rates and leads to higher demand for corporate loans (Rejnuš, 2015).
Quantitative easing was used for the first time by the Japanese Central Bank at the turn of the millennium. Later, during the financial crisis in 2008-2012, it was also used by other central banks - the US Fed, the Central Bank of England and the European Central Bank.

2.5 Foreign exchange intervention

When the Czech National Bank decided to use foreign exchange intervention, it used the study by Professor McCallum (Tomšík & Vlček, 2015). McCallum´s model is based on Hicks' IS-LM model, which shows the interaction of real output, interest rates and money (Hicks, 1980). This model proves that an open economy with a low inflation rate in the situation ZLB can support inflation by weakening the exchange rate of foreign ex-change intervention. McCallum´s model of monetary policy in a situation ZLB is based on Taylor´s rule and can be expressed as follows (McCallum, 2015).

The rule of monetary policy in the ZLB:

$$s_t - s_{t-1} = \mu_0 - \mu_1(\Delta p_t - \pi^*) - \mu_2 E_{t-1}\tilde{y}_t + e_t$$

where

$s_t - s_{t-1}$ the change of the nominal exchange rate

Δp_t the change of prices

π^* the targeted inflation rate

μ_n constant

$E_{t-1}\tilde{y}_t$ the product gap

e_t the white noise - uncorrelated random variables with zero mean and constant variance

The model assumes a very open, export-oriented economy and very low inflation rate. The foreign exchange interventions devalue currency exchange rate. The central bank buys foreign assets - foreign currency and sells domestic assets - the local currency. The central bank as the issuer of the domestic currency may carry out foreign exchange intervention indefinitely. Inflation expectations lead to a real increase of prices, which performs additional inflationary expectations. The depreciation of the real exchange rate of the domestic currency increases the demand for "cheaper" domestic goods in foreign markets and brings a fall of demand of "expensive" foreign goods. The context can be expressed as follows.

The relationship of the real exchange rate:

$$R_{D/F} = E_{D/F} \times P_F / P_D$$

where

$R_{D/F}$ represents the share of price level in abroad and domestic price level

$E_{D/F}$ represents the number of units of domestic currency, for which you can buy foreign currency unit (e.g. 27 CZK/€)

P_F is the price level of foreign currency

P_D is the price level of the domestic currency

The drop of real exchange rate lasts until the nominal exchange rate reflects the influence of interventions on the domestic market.

3 Objectives And Methodology

The aim of this article is to assess the suitability of using various instruments of the monetary policy to achieve the inflation target. Another objective of this article is to evaluate the economic development of the Czech Republic in the period before the start of CNB interventions and to evaluate the success in fulfilling the inflation target, which CNB has set before the intervention started. Key foreign studies were presented for the purpose of assessing foreign exchange intervention – "Theoretical analysis regarding a ZLB on nominal interest rates" by McCallum and Svensson's "bulletproof" monetary policy recommendation at zero interest rates. Logical methods are used to process the paper. In particular, induction and deduction, analysis, synthesis, and comparison. In order to assess the dynamics of the economic development of the Czech Republic in the period before and after the start Czech National Banks´ foreign exchange interventions, the time series prepared for the period 2008 - 2016 will be used. Economic growth dynamics will be assessed through macroeconomic policy objectives – development of Gross Domestic Product, Foreign Trade, Unemployment and Inflation Rate. The article was prepared using data from the Czech Statistical Office, the European Statistical Office and the Ministry of Labour and Social Affairs of the Czech Republic.

4 Results

Analysis of the economic situation of the Czech Republic in the period before and after the weakening of the Czech crown is described in following chapters.

4.1 The Development Of Gross Domestic Product

In the days before start of CNB interventions, Czech economy faced to the economic downturn, stagnation of foreign trade, high unemployment and zero growth in consumer prices - inflation.
Below is an overview of the development of GDP in the period 2008 – 2016.

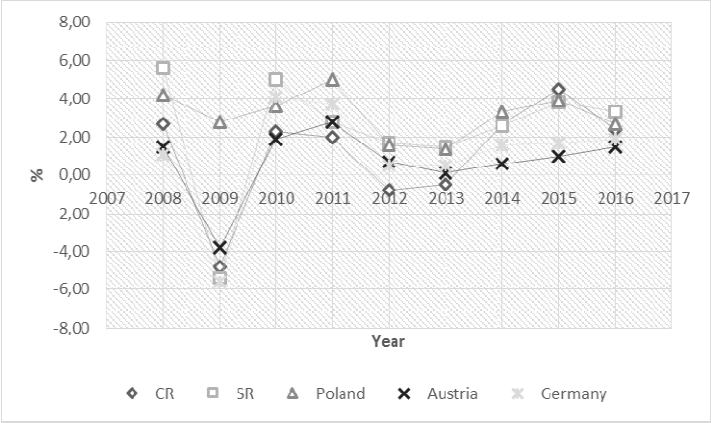


Fig. 4 : Development of GDP in the period 2008-2016. Source: Authors' interpretation based on the data of Eurostat, 2017

Development of the Czech economy follows the economic development of the entire Eurozone. In the last ten years, there were two falls. The first fall was caused by the global financial and economic crisis, in the years 2008 and 2009. The second fall in the years 2013 and 2014 was caused mostly by the Eurozone debt crisis, which was escalated by problems of public budgets of some indebted countries – especially Greece and Spain. The GDP of the Czech Republic reached to -0.8 % in 2012 and in the year 2013, it reached to -0.5 %. The GDP of Slovak Republic was +1.7 % in 2012 and +1.5

% in 2013. The slump of the Czech economy at that time was deeper in comparison with other countries of Central Europe. Any other economy had negative economic growth in 2012 and 2013. The reason was mostly restrictive government policy, which significantly weakened domestic demand, consumer and business confidence in the Czech economy.

There were elections in the Czech Republic in 2013. The new government conducted a number of changes to support the economic growth. The Czech Republic obtain more grants from the EU Structural Funds. The Czech government increased the minimum wage and reduce some taxes. The Czech economy reached economic growth of +2.7 % in 2014 and +4.5 % in 2015.

4.2 Competitiveness Of Foreign Trade

The Czech economy has a positive trade balance since 2005. The Czech Republic has only a small internal market and it is fully dependent on imports of raw materials. For the successful development of the Czech economy in the long-term, it is crucial to increase the volume of exports, especially the difference of export and import.

The development of Czech foreign trade of goods in the period 2008 - 2016 is illustrated in Figure 5.

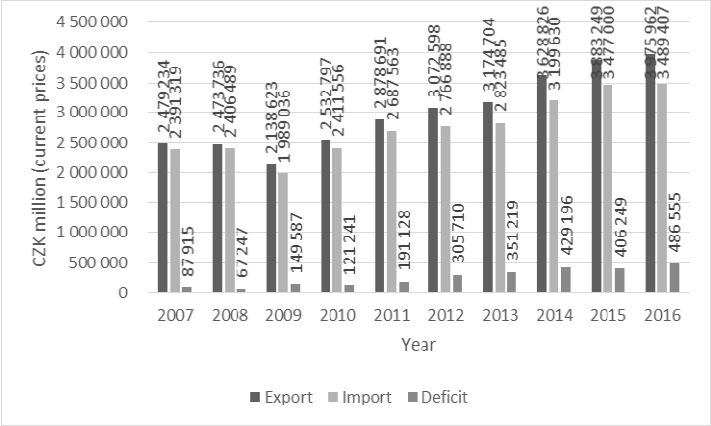


Fig. 5: Development of Czech foreign trade of goods in the period 2008-2016. Source: Authors' interpretation based on the data of Eurostat, 2017

In the years, 2012 and 2013 there was a rise in exports only about 102,106 million CZK. The trade balance during the same period increased by only 45,509 million CZK.

Foreign exchange intervention helped particularly to firms that export to foreign markets and are not dependent on manufacturing inputs procured in Euros. A significant increase in Czech exports occurred immediately after the initiation of foreign exchange intervention. Czech exports in 2014 rose by about 500,000 million CZK compared to 2013. In 2015, export growth was not significant, because traders already had enough time to adjust prices in response to the strong Euro currency. Foreign exchange interventions of the Czech National Bank helped to increase the competitiveness of Czech goods in foreign markets through its lower price. In 2014, exports increased by 13% and imports by 12%. In 2015, exports grew by 6.7% and imports by 7.8%. The competitiveness of our economy, measured by exports, has not diminished and imports have not slowed down.

4.3 Development of unemployment

There was a significant rise of unemployment in the Czech economy since 2008. Unemployment reached a peak in 2010 and 2013. The number of job seekers registered by the Labor Office in those years approached the limit of 600,000 (Ministry of Labor and Social Affairs, 2015).

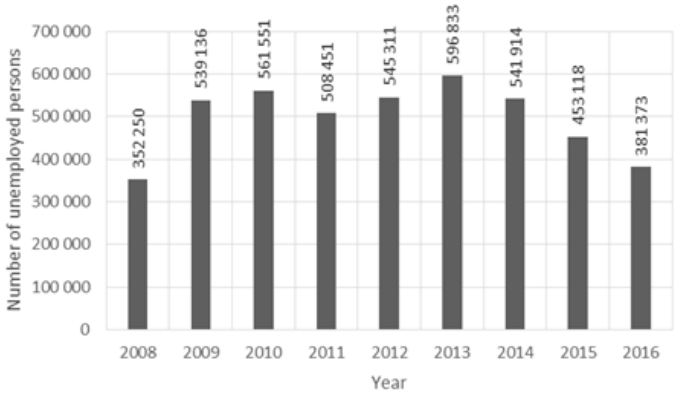


Fig. 6 : Development of the number of registered unemployed persons by the Labor in the period 2008-2016. Source: Ministry of Labor and Social Affairs, 2017

In 2013, the number of unemployed persons registered by the Czech Labor Office was two times higher compared to the state of the year 2008.

Since 2013, the number of unemployed persons is steadily declining.

4.4 Inflation

CNB's monetary policy reacts to monetary policy inflation, which is based on general inflation but it does not include the impact of indirect taxes.

The development of consumer price and monetary policy inflation in the period 2008 – 2016 is illustrated in Figure 7.
The limited growth of prices in 2012 and 2013 was caused primarily by the decline of the Czech economy.

There was a reduction in household consumption and investment. In 2013 there was a significant fall of fuel prices. Conversely, there was an increase in food prices and regulated prices due to the increase of contributions to renewable energy sources. Inflationary impact had also the fiscal government policy.

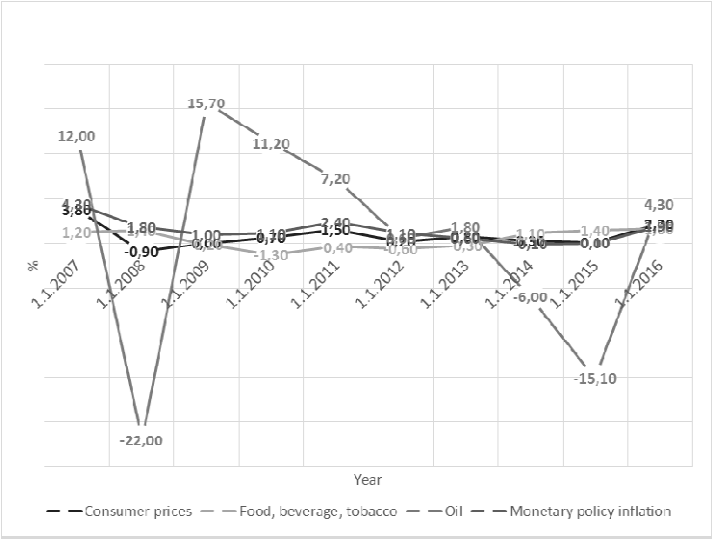


Fig. 7 : The development of consumer price inflation and monetary policy in the period 2008 - 2016. Source: Czech National Bank, 2017d

The low growth of prices in 2012 and 2013 was due to a decline of the Czech economy, a decrease in household consumption and investments. Fuel prices fell significantly in 2013. On the contrary, food prices and regulated prices increased as a result of the increase renewable energy sources. On the contrary, the government supported inflation by increasing indirect taxes.

5 Discussion

All of the main CNB interest rates reached the zero lower bound. The potential of the most commonly used conventional instruments of monetary policy ran out.

The central bank discussed badly its monetary policy that was based on foreign exchange interventions. Forward Guidance has not been managed well. CNB even after more than three years did not achieve the inflation target. CNB forecast of 17. 12. 2013 expected the end of interventions at the beginning of 2015.

The negative nominal interest rates are connected with economic risks. Probably the most significant is the loss in profitability of commercial banks. Commercial banks in the Czech Republic have enough money in the form of deposits in savings accounts, therefore the interests on deposit accounts are close to zero. Negative interest rate used by commercial banks could cause an outflow of deposits.

The Czech economy does not suffer from lack of money, using of "quantitative easing" to maximum extent does not seem appropriate.

6 Conclusion

The effect of foreign exchange interventions reduces several facts. In the ZLB situation (zero interest rate) does not operate the transmission channel of interventions to the exchange rate. The revenues from short-term domestic bonds, that are in the case of CNB especially treasury bills and revenues from deposit money are almost the same. These assets can be considered as substitutes. Interventions

will not affect the nominal interest rate and monetary supply. Interest rate channel, which is very important, therefore, cannot be considered. The effect of interventions on the exchange rate must be carried out through other channels - signaling channel, channel portfolio balance and coordination channel. McCallum´s study does not specify how to calculate the volume of interventions, that would weaken the currency. Since the launch of interventions regime in November 2013 to September 2016, the CNB intervened in the range of approximately 900,000 million CZK. This is significantly more than CNB expected at the beginning of the intervention.

The Czech economy is closely linked with the economies of the Eurozone countries. Czech government managed to restore consumer and business confidence in the Czech economy, which had a positive impact on economic growth. CNB in the form of foreign exchange interventions applied a little-tested instrument of monetary policy. A weakening of domestic currency is a simple step. Closing intervention regime could be much harder. CNB since mid-2015 was forced to intervene more frequently and in larger volumes of money to defend the exchange rate commitment before foreign exchange speculators. The use of interventions over a longer period would increase the difference among artificially weakening domestic currency and its real market potential, which carries a risk to the entire economy. Despite all the negatives mentioned above, the intervention regime was better solution than the use of negative interest rates. The competitiveness of our economy, measured by exports, has not diminished and imports have not slowed down. The Czech economy has a long-term positive trade balance. Foreign exchange interventions have increased the competitiveness of Czech products by cheapening them on foreign markets. In the long run, however, it is not possible to establish the competitiveness of Czech goods on foreign markets, mainly on its price.

References

1. Brožka, M., Dufek, P., & Vaníček, M. (2013, November 07). ČNB zahájila intervenci proti koruně. Nemáme omezení, prohlásil guvernér. Retrieved January 14, 2017, from https://www.novinky.cz/ekonomika/318539-cnb-zahajila-intervenci-proti-korune-nemame-omezeni-prohlasil-guverner.html
2. Czech National Bank. (2017a, April 04). About CNB. Retrieved April 04, 2017, from http://www.cnb.cz/en/about_cnb/index.html
3. Czech National Bank. (2017b, May 27). Financial sector – interest rates. Retrieved May 27, 2017, from http://www.cnb.cz/cnb/STAT.ARADY_PKG.VYSTUP?p_period=3&p_sort=2&p_des=50&p_sestuid=41549&p_uka=1%2C2%2C3&p_strid=FBC&p_od=200704&p_do=201704&p_lang=EN&p_format=4&p_decsep=.
4. Czech National Bank. (2017c, March 04). Banking statistics. Retrieved May 26, 2017, from https://www.cnb.cz/cs/statistika/menova_bankovni_stat/bankovni_statistika/bank_stat_komentar.html
5. Czech National Bank. (2017d, May 28). Monetary policy publications – Inflation Reports. Retrieved May 28, 2017, from https://www.cnb.cz/en/monetary_policy/inflation_reports/index.html
6. Czech National Bank. (2013). 8th Situation Report on Economic and Monetary Developments. Retrieved March 04, 2017, from https://www.cnb.cz/miranda2/export/sites/www.cnb.cz/en/monetary_policy/bank_board_minutes/2013/download/tk_08sz2013_aj.pdf
7. Czech National Bank. (2012). 8th Situation Report 2012. Retrieved December 30, 2016, from https://www.cnb.cz/en/monetary_policy/bank_board_minutes/2012/grip_121219.html
8. Czech National Bank. (2013, August 01). Minutes of the Bank Board Meeting on 1 August 2013. Retrieved December 19, 2016, from http://www.cnb.cz/cs/menova_politika/br_zapisy_z_jednani/2013/cmom_130801.html

9. Czech Statistical Office. (2017, April 22). Real GDP growth rate. Retrieved April 22, 2017, from http://apl.czso.cz/pll/eutab/html.h?ptabkod=tec00115
10. Czech Statistical Office. (2017, May 28). External trade in goods in the cross-border concept. Retrieved May 28, 2017, from https://www.czso.cz/csu/czso/vzoph_cr
11. European Central Bank. (2016). Definition of price stability. Retrieved March 04, 2017, from https://www.ecb.europa.eu/mopo/strategy/pricestab/html/index.en.html
12. Lazarevič, A. (2014, January 13). Právník: „ČNB nedodržuje ústavu". Může ČNB dostat sankci? Retrieved January 03, 2017, from http://trhy.mesec.cz/clanky/pravnik-cnb-nedodrzuje-ustavu-muze-cnb-dostat-sankci
13. Hicks, J. (1980). IS-LM: an explanation. Journal of Post Keynesian Economics, 3(2), 139-154. http://dx.doi.org/10.1080/01603477.1980.11489209
14. Jurečka, V., Březinová, O. (2010). Mikroekonomie. Praha: Grada. 359 s. ISBN 978-80-247-3259-6.
15. Klíma, M., Komárek, L. (2014): Forward guidance - jako další nástroj centrálního bankovnictví? Česká národní banka, Globální ekonomický výhled, leden 2014.
16. McCallum, B. T. (2000). Theoretical analysis regarding a zero lower bound on nominal interest rates. Journal of Money, Credit and Banking. Vol. 32, No. 4, Part 2 Monetary Policy in a Low-Inflation Environment. pp. 870-904. http://dx.doi.org/10.2307/2601148
17. Ministry of Labour and Social Affairs. (2017, May 09). Statistical Yearbook - Unemployment. Retrieved May 28, 2017, from http://portal.mpsv.cz/sz/stat/stro
18. Rejnuš, O. (2015). The Importance of Interest Rates Under Contemporary Conditions of World Economy Crisis Management. Scientific papers of the University of Pardubice Series D, Faculty of Economics and Administration. 35/2015.
19. Stock, J. H., & Watson, M. W. (2002). Has the business cycle changed and why? NBER macroeconomics annual, 17, 159-218.
20. Severiges Riksbank. (2015, November 30). Repo rate cut to 0.25 per cent. Retrieved February 02, 2017, from http://www.riksbank.se/en/Press-and-published/Press-Releases/2009/Repo-rate-cut-to-025-per-cent
21. Svensson, L. E. O. (2003). Escaping from a Liquidity Trap and Deflation: The Foolproof Way and Others. Journal Of Economic Perspectives, vol. 17, no. 4, pp. 145-166. http://dx.doi.org/10.1257/089533003772034934
22. Swanson, E. T., & Williams, J. C. (2014). Measuring the effect of the zero lower bound on medium-and longer-term interest rates. The American Economic Review, 104(10), 3154-3185. http://dx.doi.org/10.1257/aer.104.10.3154
23. Tomšík, V., & Vlček, J. (2015, March 17). SPECIÁL: Devizové intervence a jejich konzistence s cílováním inflace. Retrieved December 04, 2016, from http://bankovnictvionline.cz/banky-finance/special-devizove-intervence-jejich-konzistence-s-cilovanim-inflace

The Importance of Information Security Management System in Slovak E-business

František Korček, Department of Information Management, Faculty of Business Management, University of Economics in Bratislava, Bratislava, Slovak Republic, frantisek.korcek@euba.sk

Mojmír Kokles, Department of Information Management, Faculty of Business Management, University of Economics in Bratislava, Bratislava, Slovak Republic, mojmir.kokles@euba.sk

Anita Romanová, Department of Information Management, Faculty of Business Management, University of Economics in Bratislava, Bratislava, Slovak Republic, anita.romanova@euba.sk

Abstract

Information security management is still very little known and definitely underused in the conditions of enterprises which are active in the electronic market. There is a lack of adequate security awareness against IT security threats that relate to the growth of ICT. In terms of business size, it is generally assumed that the smaller the enterprise is, the less the enterprise is concerned with information security. However, vulnerable information assets need to be secured in any enterprise that sells products and services electronically, as the consequences of risks could be existential. The paper presents the results of a survey focusing on the current state of information security management in Slovak e-business and evaluates a correlation between the costs incurred for information security and the level of information security in the examined enterprises.

Keywords: Information security, e-business, assets, threats

Introduction

Information is a central concept of today's society, which we acquire through efficient data-linking using information and communication technologies (ICT). Because information is too large, it needs to be processed, sorted, analyzed, compared, but especially selected and saved. If we assign meaning to information, we gain knowledge that is of great importance to society as it brings a certain advantage to its owner. As this benefit is visible in the society, there are always enemies who want to get it for themselves. The owner's job is to protect crucial information and knowledge. Enterprises also overlap with information through all stages of their life cycle and a transformation process. Protecting important knowledge, confidential information and other information assets is their duty. If an enterprise acquires knowledge, it gains a competitive advantage and can overtake its opponents. On the other side, the opponents are trying to gain such advantage by performing various information security attacks. Information security management system (ISMS) helps businesses successfully address threats and protect confidential information and knowledge at an appropriate level.

The introduction and active use of e-commerce is undoubtedly a modern way of offering goods and services and one of the fastest growing spheres of the economy (Skitsko & Ignatova, 2016). Securing business environment, devices, business processes, business secrets and supplier relationships against information security threats can be rapidly obsolete because of the constant and rapid development of ICT (Bolek, 2015). If the business processes are supported by ICT, new information security risks and the possibility of leakage or loss of confidential information will still arise. This leakage or loss causes disclosure of business secrets, investigation, lost working time, additional time to repair vulnerabilities, additional financial costs, loss of competitive advantage, opportunities, reputation, reduction in work efficiency, existential problems and many others. It is essential to protect enterprises against threats, ideally by suitably applied information security management system. This system introduces a procedural approach to information security, thus ensuring constant improvement of the quality protection of enterprises's information assets. This paper is a partial output of the survey focused on the current state of ISMS in Slovak e-business.

Literature Review

Computerization encourages businesses, regardless of their size or focus, to quickly acquire standards of information assets' security. From a historical point of view, large businesses were first to deal with information security because they processed a large amount of data on daily bases. Larger and richer businesses had enough resources to invest in asset security. Small and medium-sized enterprises (SMEs) thought that cyber threats target only large businesses. However, more and more attackers focus on SMEs because they do not adequately protect their sensitive data (Král, 2011). According to Ernst & Young, there are five main reasons why businesses should deal with information security (EY, 2014):

- Constant changes in the business environment,
- The ecosystem of digitally linked objects, people and data,
- Making the internet available for traditionally closed operating technologies (e.g. critical infrastructure, internet of things),
- Cloud,
- Mobile technologies and customer orientation.

Businesses are increasingly experiencing the risk of information security disruption, but many do not respond when a security incident occurs (Huo, Meng & Chen, 2015). As a result of the expansion of computer networks and the internet, businesses are more susceptible to attacks on confidential information, data, information systems (Bolek, Korcek & Beňová, 2015), ICT and employees. Protecting business information against threats is the domain of information security management, which is defined as follows:

- ISO/IEC 27001 standard defines ISMS as a system that protects confidentiality, availability and integrity of information by introducing a risk management process and providing confidence to stakeholders that the risks are sufficiently managed (STN ISO/IEC 27001, 2014),
- ESET (2014) considers ISMS to be the basis for risk management to establish, implement, operate, monitor, revise, maintain and improve information security in organizations,
- According to ENISA (2015), ISMS represents a system that achieves required qualitative characteristics of information security (confidentiality, availability, integrity) in services offered by organizations,
- Singh et al. (2013) claim that ISMS is a system of balanced intersection of technical, managerial and human aspects of information security in an organization,
- Ondrák, Sedlák & Mazálek (2013) perceive ISMS as an effective documented management system of information assets aiming to eliminate their potential loss or damage.

Based on the definitions above, we consider ISMS to be a comprehensive system within the overall organization management system that protects information from risks. By maintaining this system, the organization becomes trustworthy from the point of view of all stakeholders, such as employees, suppliers or customers. The introduction, implementation, monitoring and improvement of ISMS consists of many activities that need to be performed at regular intervals.

The availability of cheap mobile devices and the expansion of the internet have become key factors of the increasing use of the internet (Yazdanifard, Edres & Seyedi, 2011). E-business is growing in proportion to the expansion of the internet (Wu, Zhou & Yuan, 2012). Enterprises' success depends on the effective use of ICT (Prakash, Soni & Mittal, 2014). New electronic markets are emerging wherever the internet is available. E-commerce is on the rise, as evidenced by the Eurostat (2017) and countries such as China and the United States, which multiply their revenues from electronic sales of goods and services annually (Cohen, 2016). Slovakia also confirms the upward trend (Dvorský, 2016). The annual increase in the number of e-businesses and the progressive computerization of society (e-government, e-health) indicate that the development of e-business in Slovakia will continue. However, the development will not be possible unless businesses observe basic dimensions of information security (confidentiality, availability and integrity of information assets). At the time

of a large number of threats, offensive methods and techniques, the e-businesses can not afford to ignore information security. We are convinced that the right way is to apply a process approach to ISMS which guarantees adequate information security of e-business by minimizing the consequences of risks.

Access to information security in e-business is different for each business size category. From the point of view of governance and enforcement of information security, microenterprises and SMEs have a specific environment compared to large enterprises. The smaller the enterprise, the bigger differences are between them (Dekýš, 2010):

- SMEs and microenterprises have little or no security team,
- Information security management is performed by the IT department,
- Budget for security is either part of an IT budget or does not exist,
- SMEs and microenterprises have a lower range of financial, time and human resources allocated to information security,
- SMEs and microenterprises generally use open-source projects to minimize expenditures.

Unlike microenterprises and SMEs, large enterprises can more easily allocate resources to create a separate IT security unit, also because of the risk of greater consequences of security incidents. Moreover, they are more aware of the legal requirements in the field of information confidentiality and are of interest for ISMS professional consulting companies, which they are easier to cooperate with (SHREDIT, 2017). Large enterprises can focus on more sophisticated security solutions due to much larger budget than SMEs and microenterprises. Large businesses have more processes, employees, larger IT infrastructure, so they need to secure far more information assets than SMEs and microenterprises.

Research Objectives and Methodology

The main objective of the paper is to evaluate the perception of ISMS's importance in e-business on the Slovak electronic market. Successful achievement of the main goal is based on meeting the following partial objectives:

- To evaluate the survey focused on information security management in enterprises operating on the Slovak electronic market,
- To review enterprise-rated variables and analyze the variables in terms of business size,
- To evaluate relationships between the examined variables using the correlation analysis,
- Assess the dependence between information security costs and the level of information security in the researched enterprises according to the following hypothesis and based on studies by Černý (2014), Singh et al. (2013), Stehlíková & Horovčák (2012):

    - H_0: There is no statistically significant correlation ($r < 0.3$) between the costs spent on information security and the level of information security provided by the enterprises,
    - H_1: There is a statistically significant correlation ($r > 0.3$) between the costs spent on information security and the level of information security provided by the enterprises.

The objectives of the paper are achieved using statistical methods and general methods of scientific work. When examining the structure of the data set we used descriptive statistics and the Kolmogorov-Smirnov test (K-S test) to verify the normal distribution of the data. When examining dependencies between the variables in the case of normal distribution, we used Pearson correlation coefficient and, in the case of other distributions, Kendall's Tau-c and Spearman's correlation coefficient. The following table lists the variables whose values are input into data analysis.

Table 1: Research variables

ISMS – Information Security Management System	
ISMS1	Necessity of dealing with ISMS within e-business
ISMS2	Possibility to protect e-business without ISMS
ISMS3	Possibility of ISMS to improve e-business results
ISMS4	The need for ISMS in the e-business of the respondent
ISMS5	Practice of ISMS in the enterprise
ISMS6	Share of information security costs from total costs
ISMS7	Sufficiency of financial resources for information security
ISMS8	Satisfaction with the information security level in the enterprise
ISMS9	The level of information security in the enterprise

Source: Authors' own work

A data collection was carried out in the form of an electronic questionnaire distributed in Slovak e-businesses from October 2016 to January 2017. The number of respondents is 91, which we consider to be a representative sample with respect to data sensitivity and the number of e-businesses in Slovakia. This number reached 9355 in 2015 with the year-on-year increase of 1105 e-businesses in (Heureka, 2015). The survey variables are continuous and measured on a scale from 0 to 100 points. The following table shows a structure of the data set by economic activity (NACE Rev. 2).

Table 2: Structure of the data set by economic activity

Economic activity according to NACE Rev. 2	%
A – Agriculture, forestry and fishing	5.49 %
C – Manufacturing	2.20 %
F – Construction	2.20 %
G – Wholesale and retail trade; repair of motor vehicles and motorcycles	50.55 %
H – Transportation and storage	1.10 %
I – Accommodation and food service activities	1.10 %
J – Information and communication	2.20 %
K – Finance and insurance activities	1.10 %
M – Professional, scientific and technical activities	6.59 %
O – Public administration and defence; compulsory social security	1.10 %
P – Education	2.20 %
R – Arts, entertainment and recreation	2.20 %
S – Other service activities	21.98 %
∑	**100.00 %**

Source: Authors' calculations

The most surveyed enterprises come from the G section (50.5%), the S section (21.98%) and the M section (6.59%). The results confirm that most e-businesses are focused on retail or wholesale. In terms of business size, 73.63% of microenterprises, 23.08% of SMEs and 3.30% of large enterprises were involved in the survey.

Results and Discussion

The ISMS survey in businesses that trade on the Slovak electronic market has brought a number of valuable insights that reveal the current perception of importance and attitude towards ISMS. Descriptive statistics of the examined variables are listed in Table 3.

Table 3: Descriptive statistics of the ISMS variables

Variable	Min	Max	Kurtosis	Skewness	Mode	Median	M	SD
ISMS1	0	100	-0.73	-0.51	100	70	**64.89**	**30.02**
ISMS2	0	100	-1.03	0.23	50	49	**45.02**	**30.23**
ISMS3	0	100	-0.79	-0.09	50	50	**51.75**	**29.38**
ISMS4	1	100	-0.74	-0.41	100	60	**61.26**	**29.33**
ISMS5	0	100	-0.70	0.66	0	24	**30.08**	**28.59**
ISMS6	0	77	4.64	2.04	5	6	**12.63**	**15.11**
ISMS7	0	100	-1.03	0.48	–	29	**36.95**	**32.15**
ISMS8	1	100	-0.54	-0.61	50	70	**66.63**	**27.09**
ISMS9	1	100	-0.68	-0.52	80	70	**62.93**	**27.68**

Source: Authors' calculations

The variable named ISMS1 determines whether it is necessary to deal with ISMS within e-business on a scale from 0 points (definitely not) to 100 points (certainly yes). Data shows that businesses (M = 64.89, SD = 30.02) claim that ISMS should be addressed in e-business. Median represents 70 points, while up to 25% of respondents rated the variable by more than 93 points. E-businesses are aware of the importance of ISMS. Since the results of the K-S test at a significance level of $\alpha = 0.05$ confirm that the data are distributed normally ($Z = 1.16$; $p = 0.120$), we assume that with 95% reliability the interval for the mean value of ISMS1 is between 58.64 and 71.14 points.

Another variable is the possibility of protecting e-business without ISMS (ISMS2). We examined whether e-business could be protected against risks without the comprehensive ISMS, where 0 points mean "definitely not" and 100 points mean "certainly yes". The results show the indecision of business representatives in this issue (M = 45.02, SD = 30.23, Modus = 50, Median = 49), although more respondents are skewed (0.23) to lower values. Only 10 % of respondents reported more than 88 points. These respondents argue that securing e-business is certainly possible without the ISMS. The data is normally distributed (K-S test, $Z = 1.00$, $p = 0.269$), so we can determine the 95 % confidence interval for the mean value of the normal distribution (38.73, 51.32).

The ISMS3 variable studies whether the established ISMS can improve the economic performance of an e-business on a scale from 0 (definitely not) to 100 points (certainly can). In this case, the results are again indecisive (M = 51.75, SD = 29.38, Modus = 50, Median = 50). Respondents can not judge whether ISMS affects the business performance or not. The data are flatter (-0.79), slightly sloping to smaller values (-0.09) and normally distributed (K-S test, $Z = 0.86$, $p = 0.465$). The 95 % confidence interval for the mean value of the statistical population is between 45.63 and 57.87 points.

The fourth variable (ISMS4) measures the need to introduce, deploy, maintain and continually improve ISMS in an e-commerce business on the same scale as the previous variables. 50 % of the respondents rated ISMS4 more or less than 60 points. The most common value is 100 points and there is 15.38 % of such businesses. On average, the survey participants lean towards the need for perfecting the ISMS in their business (M = 61.26, SD = 29.33). 75 % of respondents reported more than 46.5 points. According to the K-S test's results at the significance level of $\alpha = 0.05$, the data are normally distributed ($Z = 0.89$; $p = 0.407$). Therefore, we can assume that the mean value is between 55.16 and 67.37 points with 95 % reliability.

The ISMS5 variable examines whether businesses establish, implement, maintain, and improve ISMS in their environment. The variable is specific because it was categorized into four intervals the respondents were familiar with. Values were divided into categories from 0 to 25 % (enterprises establish the ISMS), up to 50 % (establish and implement the ISMS), up to 75 % (establish, implement and maintain the ISMS) and up to 100 % (improve the ISMS). 0 % means that businesses do not perform any ISMS activity. Figure 1 shows the shares in the given categories.

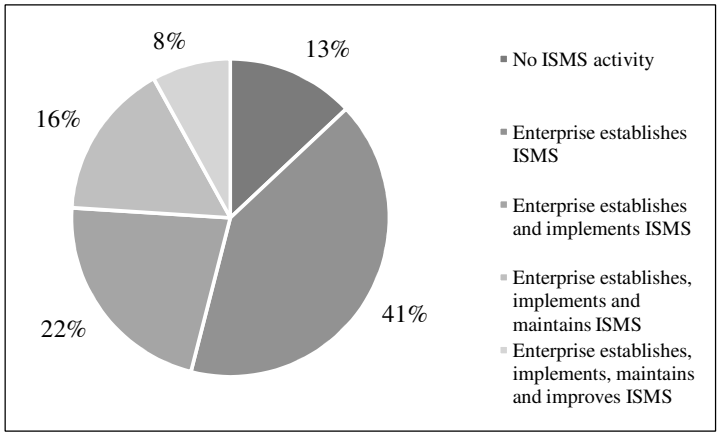


Fig. 1: Share of enterprises practicing ISMS

Source: Authors' calculations

Most enterprises are only in the initial phase of ISMS (41 %). However, up to 13 % of e-businesses do not carry out any activity in this area. Interestingly, 8 % of the researched enterprises already have the ISMS established, implemented and are improving the system. On average, e-businesses reach M = 30.08 points; SD = 28.59 points. 75 % of the values are up to 50 points. These data show that businesses do not implement and are paying little attention to the ISMS. Because the data are not distributed according to the normal distribution (K-S test, Z = 1.47, p = 0.018), the 95 % confidence interval of the mean value can not be reliably determined.

The share of information security costs from total business costs (ISMS6) measured in percentage follows. On average, enterprises invest 12.63% of total costs in information security (M = 12.63, SD = 15.11). An overview of costs in terms of business size is shown in Figure 2. SMEs invest no more than 18.86% of total costs followed by microenterprises (10.81%) and large enterprises (9.67%). We consider the cost shares of all business sizes to be surprisingly high, but the results may be distorted by a low number of respondents in the SMEs and large enterprises' categories, as well as a few high values in the data set. The most of e-businesses use 5 % of information security costs. Half of the values are less or more than 6 %. It is visible in the descriptive statistics that the data are not normally distributed. This is confirmed by the K-S test (Z = 2.49; p <0.001). According to the statistics, we can see that the relatively high mean value is affected by several high values. The mode and the median show a more realistic data layout. Therefore, we claim that the e-businesses allocate to information security around 5 % of their total costs, which we consider to be appropriate.

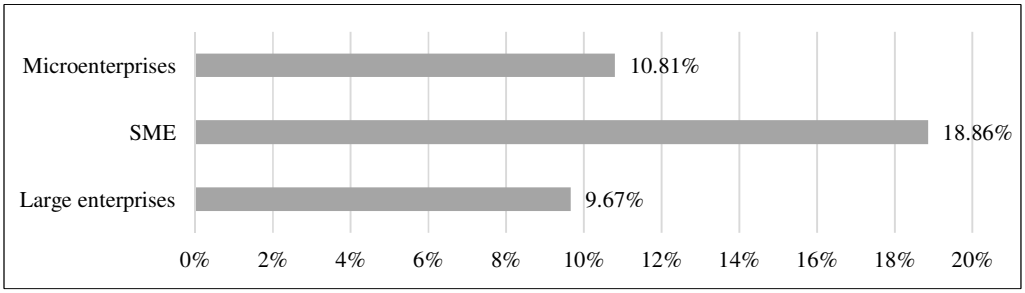


Fig. 2: Share of information security costs from total costs by business size

Source: Authors' calculations

By ISMS7 we studied, if an enterprise has enough funds for adequate protection of its information on a scale from 0 (definitely not) to 100 points (certainly yes). The mode represents 29 points. According to kurtosis, the data set contains more extreme values (-1.03), but skewness shows smaller values (0.48). On average, the respondents determined that the enterprises do not have sufficient financial resources for information security (M = 36.95, SD = 32.15). The average values by business

size are shown in Figure 3. According to assumptions, large enterprises have the most free funds, averaging 51.33 points, followed by microenterprises (37.33 points) and SMEs (33.67 points).

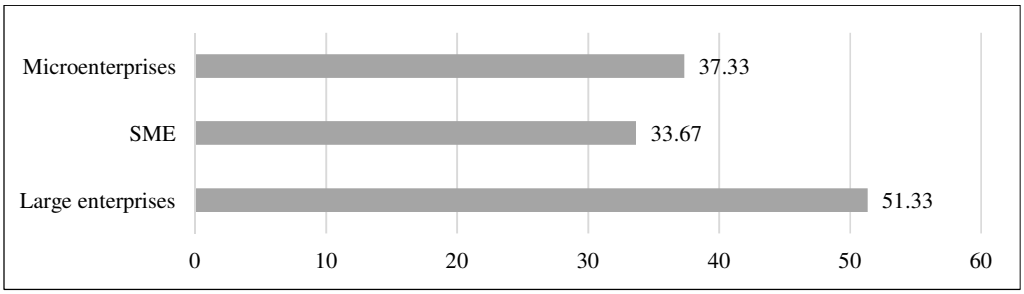


Fig. 3: The average amount of financial resources for information security measured in points
Source: Authors' calculations

In our opinion, the ideal interval for evaluating the sufficiency of financial resources is 75 points or more. However, only 19 % of the e-businesses reported such figures. Only 25 % of the enterprises have rather enought resources, more than 59 points. Up to 10 % of the respondents selected values of 0 or 1. This means that around one tenth of the e-businesses do not have enough resources to secure enterprise information. 95 % confidence interval can not be determined because the data are not normally distributed (K-S test, Z = 1.33, p = 0.043). The mode can not be calculated due to two values with the highest frequency (1 and 50).

The ISMS8 variable examines the extent to which e-businesses are satisfied with securing their information assets. The respondents assessed the variable on a scale from 0 points (definitely not satisfied) to 100 points (certainly satisfied). On average, the business representatives are rather satisfied (M = 66.63, SD = 27.09). Up to 50 % of the values are over 70 points. Kurtosis determines more flat data (-0.54) which are skewed to the right (-0.61). According to the K-S test, the data do not meet the condition of normal distribution (Z = 1.33; p = 0.043). In summary, most enterprises are rather satisfied with their level of information security.

The variable of enterprise's information security level (ISMS9) is linked to the previous variable (ISMS8) because it measures the perceived security level on a scale from 0 (minimum) to 100 points (maximum). The mean value is M = 62.93 points; SD = 27.68 points. The enterprises claim that their level is sufficient. We argue that the level should be much higher because of the current threats' danger. The information security level determined by the respondents and grouped by business size is shown in Figure 4.

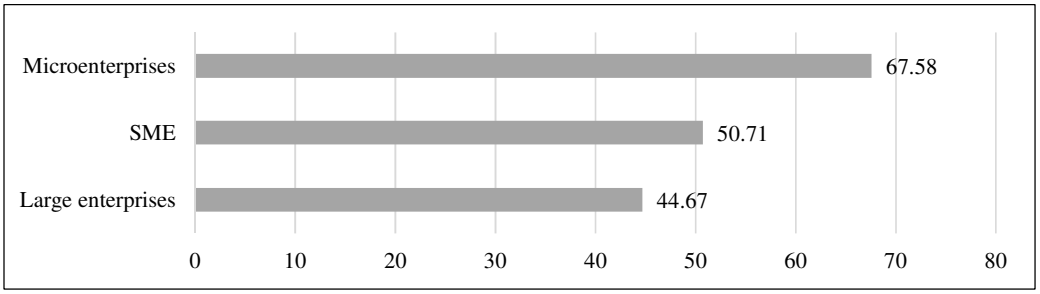


Fig. 4: The level of information security determined by enterprises
Source: Authors' calculations

Microenterprises have the highest observed information security level among other business sizes, averaging 67.58 points. SMEs follow with 50.71 points. The information security level of large enterprises is rather insufficient (44.67 points). The large enterprises are more aware of the need to protect information than businesses of other sizes and thus identify their shortcomings more. In addition, they need to secure many more areas, systems and processes than other enterprises. The

respondents most often rated the information security level at 80 points. Only 25 % of the e-businesses have the level of less than or equal to 47.50 points. The data are not normally distributed (K-S test, Z = 1.63, p = 0.006). The values of the information security level can be explained in two ways. Either the level is really sufficient and the results reflect the real situation, or the enterprises lack security awareness and education while the respondents believe that the level of information security is good enough. We refer to the second part of the claim.

Correlation Research of the Information Security Management System

In the previous section, we found that the interval variables (scales) ISMS1, ISMS2, ISMS3 and ISMS4 are normally distributed by using the K-S test. Therefore, correlations between these variables are identified by the Pearson correlation coefficient whose results are found in Table 4.

Table 4: Correlation matrix of variables with normally distributed data

		SY01	SY02	SY03	SY04
ISMS1	Pearson Correlation	–	0.24	0.39	0.42
	Sig. (2-tailed)		0.020	0.000	0.000
	N		91	91	91
ISMS2	Pearson Correlation	0.24	–	0.00	-0.24
	Sig. (2-tailed)	0.020		0.966	0.022
	N	91		91	91
ISMS3	Pearson Correlation	0.39	0.00	–	0.39
	Sig. (2-tailed)	0.000	0.966		0.000
	N	91	91		91
ISMS4	Pearson Correlation	0.42	-0.24	0.39	–
	Sig. (2-tailed)	0.000	0.022	0.000	
	N	91	91	91	

Source: Authors' calculations

The ISMS1 scale correlates with ISMS2 (r = 0.24; p = 0.020) and ISMS3 (r = 0.39; p <0.001) just weakly. The strength of these scales' interdependence is small. There is a medium correlation between ISMS1 and ISMS4 (r = 0.42; p <0.001). It means that the variables have a moderate relationship. There is no correlation between the ISMS2 and ISMS3 scales (r = 0.00, p = 0.966). This represents that the possibility of protecting e-business without ISMS and improving the economic performance of e-business through ISMS are unrelated. The scales of the ISMS2 and ISMS4 variables, r = -0.24; p = 0.022, as well as the ISMS3 and ISMS4 scales, r = 0.39; p <0.001, correlate weakly. Because the values of ISMS5, ISMS6, ISMS7, ISMS8 and ISMS9 are not normally distributed according to the K-S test results, we used the Spearman's and Kendall's Tau-c coefficients to examine the correlations. The results with higlighted values of more than weak correlations are shown in Table 5.

Table 5: Results of Spearman's correlation and Kendall's tau–c

	Statistic	ISMS 1	ISMS 2	ISMS 3	ISMS 4	ISMS 5	ISMS 6	ISMS 7	ISMS 8	ISMS 9
ISMS 5	Kendall's tau–c	0.16	0.08	0.11	0.22	–	0.31	0.30	0.05	0.18
	Spearman Correlation	0.22	0.10	0.14	0.30		**0.42**	**0.41**	0.05	0.26
ISMS 6	Kendall's tau–c	-0.06	-0.01	0.08	0.07	0.31	–	0.18	-0.09	0.06
	Spearman Correlation	-0.10	-0.01	0.11	0.11	**0.42**		0.24	-0.13	0.08
ISMS 7	Kendall's tau–c	0.05	0.15	0.01	0.12	0.30	0.18	–	0.12	0.22
	Spearman Correlation	0.09	0.21	0.02	0.16	**0.41**	0.24		0.17	0.32
ISMS 8	Kendall's tau–c	0.03	0.13	-0.04	-0.01	0.05	-0.09	0.12	–	**0.51**
	Spearman Correlation	0.04	0.18	-0.06	-0.04	0.05	-0.13	0.17		**0.68**
ISMS	Kendall's tau–c	0.14	0.12	0.15	0.07	0.18	0.06	0.22	**0.51**	–

	Statistic	ISMS 1	ISMS 2	ISMS 3	ISMS 4	ISMS 5	ISMS 6	ISMS 7	ISMS 8	ISMS 9
9	Spearman Correlation	0.20	0.18	0.24	0.11	0.26	0.08	0.32	**0.68**	

Source: Authors' calculations

According to Spearman's correlation coefficient, the ISMS5 scale correlates moderately with the scale of ISMS6, r = 0.42, and ISMS7, r = 0.41. The Kendall's Tau-c results do not confirm such strength of interdependence in both cases. The ISMS5 scale with SY06 (τ = 0.31) and ISMS7 (τ = 0.30) correlates only weakly. We are inclined to the Kendall's Tau-c results due to lower coefficient values. The level of ISMS establishment, implementation, maintenance and improvement in e-businesses is only weakly related to the costs incurred for information security and also to the perceived sufficiency of financial resources to adequately protect business information assets.

Other combinations of the scales, except for the satisfaction with the information security level in the enterprise (ISMS8) and the level of information security in the enterprise (ISMS9), are weakly correlated. The scales of ISMS8 and ISMS9 correlate moderately as evidenced by Spearman's rho (r = 0.68) and Kendall's Tau-c (τ = 0.51). The satisfaction with the information security level in the enterprise is moderately related to the level of information security in the enterprise. In general, only some of the scales have medium linear dependence (ISMS8 and ISMS9, ISMS1 and ISMS4). The correlation of other ISMS scales is only weak or possibly nonexistent (e.g. ISMS2 and ISMS3).

Testing the Hypothesis

The basis of the hypothesis is that the amount of funds spent on information security relates to the level of information security determined by e-businesses. If an enterprise spends more, it perceives higher level of information security, or from the other point of view, if the e-businesses perceive the high level of information security, they also have higher information security costs. We test the hypothesis by the correlation analysis of the share of information security costs from total costs (ISMS6) and the level of information security in the enterprise (ISMS9). Because the results of the K-S test for ISMS6 (Z = 2.49; p <0.001) and for ISMS9 (Z = 1.63; p = 0.006) prove that the data are not normally distributed, we selected Spearman's correlation coefficient and Kendall's Tau-c to measure the correlation. The results are shown in Table 6.

Table 6: Results of the interdependence of ISMS6 and ISMS9 variables

	Category	Statistic	Value	Asymp. Std. Error	Approx. T	Approx. Sig.
Symmetric measures	Ordinal by Ordinal	Kendall's tau–c	0.06	0.07	0.78	–
		Spearman Correlation	0.08	0.11	0.72	–
	N of Valid Cases	–	91	–	–	–

Source: Authors' calculations

The Spearman's correlation coefficient (r = 0.08) and the Kendall's Tau-c (τ = 0.06) are very low and close to zero, which reflects the trivial mutual linear dependence of the studied variables. Because of these results we accept the null hypothesis. The relationship between the costs spent on information security in the e-businesses and the level of information security set by the e-businesses is minimal. There is no statistically significant correlation between the variables. The minimal correlation of the variables is shown in Figure 5, where the points are randomly distributed.

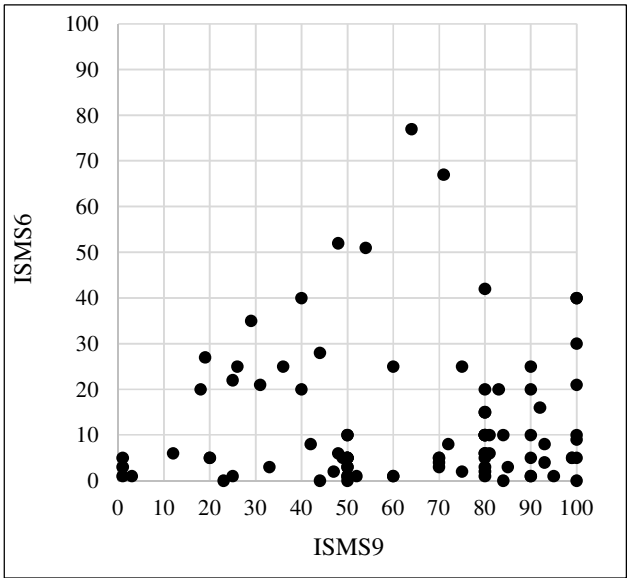


Fig. 5: Correlation diagram of ISMS6 and ISMS9 variables

Source: Authors' calculations

It is possible to explain this knowledge from the point of view of dividing security measures into technical and organizational measures. While technical measures are costly, organizational measures do not necessarily mean additional costs, although they also contribute to raising the information security level. For example, if an enterprise develops, publishes and adheres to an information security policy, which is not a technical control, it will significantly increase the perceived level of information security with little or no additional costs. Therefore, investing in information security does not affect the perceived level of information security in e-businesses.

Based on the results of the ISMS variables, we note that businesses operating e-commerces on the Slovak electronic market have only a basic overview of the information security and are prepared for information security threats at the basic level. The enterprises agree that the ISMS needs to be addressed in e-business. They are aware of the ISMS importance. They also advocate that the ISMS should be implemented in their environment. However, the e-businesses do not pay enough attention to the ISMS. Most enterprises claim that they establish the ISMS (41 %), which means that they use at least basic security measures (e.g. antivirus software, firewall, TLS protocols). On the other hand, up to 13 % of the surveyed enterprises do not perform any ISMS activity. Additionally, the e-businesses are rather satisfied with their level of information security which they consider sufficient. We are attributing such unfavorable condition to the perception of the information security level based on the application of only basic security measures and due to low security awareness. We exclude the impact of the lack of financial resources due to the nonexistent correlation between the costs spent on information security and the level of information security in the e-businesses.

Conclusion

To conclude, we found out that e-businesses are aware of the importance of ISMS and incline to the need to improve it, but they do not introduce the ISMS. E-businesses are rather satisfied with their level of information security, which they see as sufficient. We also identified that businesses only have a basic overview of information security and are prepared for information security threats only at the minimum level. Considering the hypothesis, we researched whether the information security costs out of total costs (ISMS6) and the level of enterprise information security (ISMS9) depend on each other at least at a moderate level ($r > 0.3$). Because the Spearman's correlation coefficient ($r = 0.08$) and Kendall's Tau-c ($\tau = 0.06$) are close to zero, we have accepted that a zero hypothesis is true. The linear correlation of the examined variables is trivial. There is no statistically significant

correlation between the information security costs and the information security level. Unlike Singh et al. (2013), Černý (2014), Stehlíková & Horovčák (2012), we have not confirmed the dependence between the information security costs and the information security level in e-business.

Acknowledgments

The research described in the paper was financially supported by the Slovak Grant Agency (VEGA) under grant No. 1/0436/17.

The research described in the paper was supported by the Project of Young Researchers and Full-time PhD Students at the University of Economics in Bratislava No. I-17-109-00.

References

Bolek, V. (2015). Faktory vplývajúce na výskyt rizík informačnej bezpečnosti: Factors influencing the occurrence of information security risks. Manažment informačnej bezpečnosti v malých a stredných podnikoch: [recenzovaný] zborník vedeckých statí. EKONÓM, Bratislava, 24-32.

Bolek, V. Korček, F. and Beňová, M. (2015). Information security risk management in Slovak enterprises. CER Comparative European Research 2015: proceedings of the 4th biannual CER conference, ISBN 978-0-9928772-8-6. Sciemcee publishing, London, United Kingdon, 13-16.

Cohen, K. (2016). Global ecommerce sales, trends and statistics 2016. [Online]. Remarkety.com. [Retrieved September 22, 2017]. Available: https://www.remarkety.com/global-ecommerce-trends-2016.

Černý, M. (2014). Prístup k informačnej bezpečnosti v malých a stredných podnikoch. [Online]. Itnews.sk. [Retrieved December 5, 2015]. Available: http://www.itnews.sk/2014-06-24/c163829-pristup-k-informacnej-bezpecnosti-v-malych-a-strednych-podnikoch.

Dekýš, P. (2010). Správa informačnej bezpečnosti v malej a stredne veľkej spoločnosti. [Online]. Eset.com. [Retrieved September 22, 2017]. Available: http://www.eset.com/sk/firmy/services/clanky/sprava-informacnej-bezpecnosti/.

Dvorský, J. (2016). Internetový predaj na Slovensku. [Online] Bezpecnynakup.sk. [Retrieved August 26, 2017]. Available: http://www.bezpecnynakup.sk/storage/file/ts_19_10_16.doc.

ENISA. (2015). The ISMS Framework. [Online]. Enisa.europa.eu. [Retrieved September 22, 2017]. Available: https://www.enisa.europa.eu/activities/risk-management/current-risk/risk-management-inventory/rm-isms/framework.

ESET. (2014). Systém riadenia informačnej bezpečnosti. [Online]. [Retrieved September 22, 2017]. Available: http://static1.esetstatic.com/uploads/media/System_riadenia_informacnej_bezpecnosti.pdf.

EUROSTAT. (2017). E-commerce sales. [Online]. [Retrieved September 22, 2017]. Available: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=isoc_ec_eseln2&lang=en.

EY. (2014). Cyber Threat Intelligence – how to get ahead of cybercrime. [Online]. Ey.com. [Retrieved September 22, 2017]. Available: http://www.ey.com/Publication/vwLUAssets/EY-cyber-threat-intelligence-how-to-get-ahead-of-cybercrime/$FILE/EY-cyber-threat-intelligence-how-to-get-ahead-of-cybercrime.pdf.

HEUREKA. (2015). Obrat e-commerce 2015. [Online]. Heurekashopping.cz. [Retrieved September 22, 2017]. Available: https://www.heurekashopping.cz/resources/attachments/p0/3/heureka-obrat-2015.pdf.

Huo, C., Meng, L. and Chen, K. (2015). Research on the University Network Information Security Risk Management Model Based on the Fuzzy Sets. International Conference on Automation, Mechanical Control and Computational Engineering AMCEE, ISBN 978-94-62520-64-6, 2015, Atlantis Press, Ji´nan, China, 89-93.

Král, D. (2011). Information Security in Small and Medium-Sized Companies. *ACTA VŠFS*. 5 (1), 61-73.

Ondrák, V., Sedlák, P. and Mazálek, V. (2013). Problematika ISMS v manažerské informatice. CERM, Brno, Czech Republic.

Prakash, S., Soni, G. and Mittal, S. (2014). Information Risks Modeling in e-business Supply Chain using AHP. Proceedings of 2014 RAECS UIET Panjab University Chandigarh, ISBN 978-1-4799-2991-8, 6 – 8 March 2014, Chandigarh, India.

SHREDIT. (2017). Security Tracker – Australia. [Online]. Shredit.com. [Retrieved September 22, 2017]. Available: https://www.shredit.com.au/getmedia/a4a2f8e5-6f4c-4368-bffe-4e1e557267cd/Shred-it_Security_Tracker_AUS.aspx?ext=.pdf.

Singh, A. N. et al. (2013). Information Security Management (ISM) Practices: Lessons from Select Cases from India and Germany. *Global Journal of Flexible Systems Management*. 14 (4), 225-239.

Skitsko, V. and Ignatova, I. (2016). Modeling the Process of Purchase Payment as a Constituent of Information Security in E-commerce. *Operations Research and Decision*, 26 (3), 83-99.

Stehlíková, B. and Horovčák, P. (2012). Manažment informačnej bezpečnosti v malých a stredných podnikoch. [Online]. Security Revue. [Retrieved December 1, 2015]. Available: http://www.securityrevue.com/article/2012/06/manazment-informacnej-bezpecnosti-v-malych-a-strednych-podnikoch/.

STN ISO/IEC 27001. (2014): Informačné technológie – Bezpečnostné metódy – Systémy riadenia informačnej bezpečnosti – Požiadavky. Úrad pre normalizáciu, metrológiu a skúšobníctvo SR, Bratislava, Slovakia.

Wu, X. F., Zhou, J. and Yuan, X. (2012). The Research of Factors which Effect B2C E-commerce Trust - Based on the Mechanism of Process. *Advanced Material Research*, vols. 591-593, 2583-2586.

Yazdanifard, R., Edres, N. A. H. and Seyedi, A. P. (2011). Security and Privacy Issues as a Potential Ris for Further Ecommerce Development. International Proceedings of Computer Science and Information Technology. [Online]. [Retrieved March 28, 2017]. Available: http://www.ipcsit.com/vol16/5-ICICM2011M008.pdf.

Financial Analysis of Distressed Companies in Emerging Countries: Methodological Approaches

Olga Lvova, PhD (Economics), Associate Professor, Lomonosov Moscow State University, Moscow, Russia, E-mail: Lvova@spa.msu.ru

lvova.oa@gmail.com

Abstract

The paper considers the development of methodological approaches to financial analysis of distressed companies considering certain specifics of emerging economies within framework of sustainable development of global economy. The research explains reasonability of shift from "accounting" approach to "flexible market analysis model" of distressed companies' at emerging markets and provides concrete methodological approach based on cash flow analysis, comparative interfirm analysis, comprehensive transactions investigation, concerning presence (absence) of distressed company's intention to continue activity. This approach to financial diagnostics contributes to proactive crisis management and to the transformation of insolvency model from liquidation towards restructuring of distressed business.

Keywords: financial analysis, cash flows, bankruptcy prediction, insolvency, bankruptcy

Introduction

Problems of business insolvency and bankruptcy, assessment of distressed companies' restructuring possibilities or reasonable assets appraisal during corporate liquidation are currently important for all countries. However, in emerging markets bankruptcy threat usually concerns much wider range of companies. Financial distress of companies from fast-growing economies (India, China, etc.) can be partially related with unsustainable growth rate[1] of some companies, i.e. such growth which outperforms the possibilities of funds raising. In long-established, but currently stagnating market economies some businesses suffer from lack or insufficient government support (both direct financial injections and indirect lightening of taxation and lending).

Issues of monitoring the opportunities for a business rescue, choosing corporate rehabilitation procedures, determining of market value of distressed companies have extremely high importance in emerging countries with short history of market economy (Russia, Ukraine, Belorussia, Kazakhstan, etc.). Insolvency institute in these countries does not provide appropriate solutions for above-mentioned problems due to its imperfection: positive experience of business recovery within bankruptcy procedures is practically absent (Table 1), "grey schemes" for delaying terms of proceedings and assets stripping tend to become a common practice, illegal seizures of distressed enterprises are used by means of insolvency procedure for property repartition, creditors' claims during liquidation are satisfied at the low level. For example, in Russia according to official statistics of Unified Federal Register of Bankruptcy Information (UFRBI) in 2016 the share of settled debts decreased in comparison with 2015 – from 5% to 3,2%.

Table 1: The amount of insolvency proceedings in the last ten years in Russia (number of cases)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Accepted applications on insolvency (bankruptcy)	83068	30015	27032	35545	33270	27422	33226	27351	35583	41040
Financial rehabilitation	39	33	48	53	91	94	92	67	58	68
debt repaid	8	3	6	2	6	7	3	4	4	0
External administration	947	752	579	604	908	986	922	803	817	882
solvency restored	31	41	40	11	14	13	25	15	18	14
Composition	106	126	126	127	255	376	563	585	598	651

Source: Unified Federal Register of Bankruptcy Information (UFRBI).

Nevertheless, in such countries pre-conditions for shift from prevailing liquidation of distressed business towards focusing on its rehabilitation became to develop. This process should be accompanied by closer attention to analytical instruments of assessment of distressed companies' perspectives. The development of methodological approaches to financial analysis of distressed companies considering certain specifics (that is so-called "creative accounting" (Griffiths, 1986), deliberate bankruptcy with systematically repeating financial schemes of debt settlement avoidance) is an important economic and legal problem.

Hypothesis of the research is reasonability of shift from "accounting" approach to "flexible market analysis model" based on cash flow analysis, comparative interfirm analysis, comprehensive transactions investigation, concerning presence (absence) of company's intention to continue activity. Necessity to take into account of economic and political factors makes this potential methodic difficult to formalize, so it is possible to develop only methodological approaches.

Literature Review

Financial diagnostics is a critical condition of proactive crisis management. So, financial analysis of distressed companies is traditionally considered by specialists in two main aspects – predicting insolvency (proactive activity) and analysis of already insolvent firms (reactive crisis management to reveal main problems and suggest solutions).

Methods of predicting corporate distress were initially suggested by Altman (1968), then by Conan & Holder (1979), Taffler & Tisshaw (1977), Taffler (1982), Jones (1987), Zmijewski (1984), Platt (1990), Beaver (1998, 2005), etc. Many further models developed discriminant analysis approach and were based on economic statistics of certain (usually – developed) country collected during certain period of economic cycle and not always suitable to contemporary emerging markets.

There are also papers examining analysis methods in financial distress, which "is, in short, the dynamic process towards corporate failure" (Fawzi et al., 2015). It should be argued that financial distress is not equal entering to liquidation (Grice & Dugan, 2001), but is a turning point in corporate life cycle: so, financial analysis can help to reveal main problematic issues and design recovery plan.

Practice of management of already insolvent companies under bankruptcy proceedings in different jurisdictions, including emerging economies, has been studied by many national specialists (Wessels, 2006; Lowitzsch (ed), 2007; Giorgini & Vallens (ed), 2015; Lvova & Bobyleva, 2012; Lvova, 2014; Karelina & Erlikh, 2012; Lai, 2016).

In 2008 Ministry of Economics of the Russian Federation started a mutual project with European Bank of Reconstruction and Development (EBRD) on development of Federal standards of financial analysis as guidelines for insolvency administrators. This work was not completed but widely criticized for the lack of consistency, complexity of financial analysis and concrete analytical methodic not corresponding with the current level of bankruptcy institute development in Russia.

So, today scientific and practical works on financial analysis methodology for distressed companies in emerging economies are still practically absent; most of papers on bankruptcy are usually devoted to the legal framework examining whereas economic aspects of insolvency proceedings, including financial analysis issues, are undercharacterized. This determines the choice of the paper topic.

The Possibilities of a Common Methodology in Emerging Countries

In Russia financial diagnostics of distressed companies under bankruptcy proceedings is regulated by two special legal acts: "Rules of financial analysis for insolvency administrator" (approved by the Government Decision of the Russian Federation at 29 June 2003 №367) and "Temporary rules of identification of deliberate and fictitious bankruptcy by the insolvency administrator" (approved by the Government Decision of the Russian Federation at 27 December 2004 №855). These provisions did not fully meet their objectives from the moment of coming into force. During the last years their limitations, impossibility of performing main goals became more obvious due to adoption of new Federal Law "On accounting" (Law at 06 December 2011 №402-FZ), changing of financial and economic conditions in Russia and insolvency institute by itself.

Irrelevancy of these documents and their insufficiency to creditors' and court's requirements were discussed among academics and practitioners for several times at Subcommittee of crisis management of Chamber of Commerce and Industry and in scientific papers (Bobyleva, 2010). Among disadvantages of applicable rules the following are usually considered: prevailing of "accounting" type of analysis, choice of inconclusive and even incorrect ratios. In a whole, these Rules on analysis have the following limitations:

- do not orient at deep financial analysis to make relevant decisions;
- do not aim at revealing of key success factors of the company, main drivers of business recovery, do not allow to evaluate the scale of crisis, discover factors of its development;
- assessment of capability of breakeven activity does not include widespread methods of managerial control (direct-costing analysis, factor analysis, risk management);
- main attention is usually paid to current operating activity of the distressed company while financial and investment activities are not considered.

The implementation of traditional methodology of analysis and diagnostics also gives the possibilities to use creative accounting and benefit from it. For example:

- overvaluation of assets by: intentionally not writing off bad accounts receivable, gathering illiquid inventories, recognition of loans issued as «financial investments» in assets;
- artificial improving of financial results by recognition bad receivables in sales revenue enlarging financial results;
- formal filling of Cash flow statement as it usually has no sense, because tax authorities are not interested in it and banks giving loans also check this statement in a formal way.

So, it can be concluded, that a company shows "bad" ratios, when it lost the hope for recovering or if deliberate or fictitious bankruptcy took place.

The imperfection of the methodology and its creative implementation are not the only reasons for the fact that the analysis does not recognize insolvency. In emerging economies the number of bankruptcies is connected with economic conditions only partially (Figure 1). In identical economic conditions in Russia in the period of 2005–2007 the amount of insolvency proceedings differed in 2-3 times. The big number of applications in 2006 can be explained by the easy procedure of

application for the "missing debtors" bankruptcy and so-called "assetless companies". In 2007 the procedure became more complicated and the number of insolvency proceedings sharply reduced. Another example is crisis of 2008–2009: paradoxically it has not caused strong increase in bankruptcies. The amount of bankruptcies in 2008 even decreased to 90% of the 2007 level.

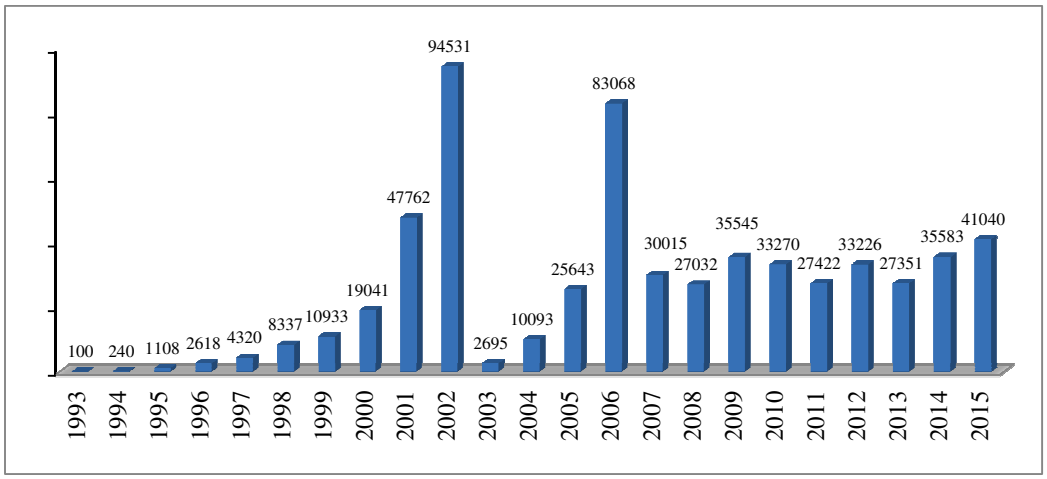


Fig 1: The amount of insolvency proceedings opened by the court in 1993-2015

The volatility of the amount of initiated cases shows, from the one hand, the immaturity of the Russian insolvency system and, from the other hand, to a certain degree can be explained by direct governmental support of "strategic" enterprises in crisis despite the financial analysis results. For example, in spite of low efficiency and "bad" ratios, according to "Anti-crisis Government Program for 2010", PJSC "AvtoVAZ" received 25 bln rubles. It gave short-term effect but in 2015 the company received net loss of 74 bln rubles, the loans were restructured with the help of government.

Another typical situation was with OJSC "Transaero Airlines". By 2015 the company has accumulated debt approximately 1,1 bln Euro which it was unable to repay and so went bankrupt. The loans have been approved because the company had "good" financial ratios for a long period before (in particular it was achieved by creative accounting – overestimation of intangible assets). The creditors took into consideration that the company was "too big to fail", had close relationships with national aviation authorities. So, they continued crediting the company while the government made the decision not to support air carrier.

These examples demonstrate that financial analysis based on certain ratios calculation can not show the real situation within the company, especially taking into account specifics of public protection of selected companies. Financial diagnostics of such companies needs special methodological approaches according to their legal status and belonging to a group of strategic ones.

In this regard, the question arises if financial ratios can be useful for bankruptcy prediction in emerging countries. As it is known, world widespread bankruptcy prediction methods can be divided on subjective (A-methods) and objective (Z-methods). A-methods are based on expert opinion, which considers both firm's goodwill, personality of director, competitiveness, etc. Z-methods include calculation of financial ratios and their linear combinations, use statistical method to assort such classifying measures variance of which between considered groups would be maximal but within these groups – minimal (multiple discriminant analysis, MDA). The most popular models are suggested by E. Altman (USA), J. Conan and M. Holder (France), R. Taffler and H. Tisshaw (England), H. Platt and M. Platt (USA), W. Beaver. These models have different number of ratios which vary significantly in dependence on subjective view of analyst and used data in the specific period of time in the certain country. It can be concluded that simple transfer of, for instance, American model at Russian conditions is unacceptable. Using of "alien" models in emerging markets is incorrect also due to the next reasons:

- ratios used in the model for advanced market economy are not always possible to find in financial reporting of companies working in emerging economy;
- calculated ratios can be incorrect due to falsification of accounts, its "creative" character, i.e. understatement of sales revenue, profit, assets;
- financial statements of companies from emerging economies imperfectly corresponds with IFRS and GAAP what makes impossible standard interpretation of financial analysis results.

There are some national bankruptcy predicting models, in particular for Russia (Kovalev & Volkova, 2000; Zaytseva, 1998; Sayfullin & Kadykov, 2003; Davydova & Belikov, 1999), but they also should be applied carefully: proposed sets of ratios seem controversial; suggested ratios gravities are poorly proved. Disadvantages of these models are objective: transitionary proportions in Russian economy do not allow to derive normative values, results of empirical studies for gravities' determining give highly volatile results.

So, one of our conclusions is that in emerging countries existing methodology of bankruptcy diagnostics and prediction for the future based on financial statements gives few information about company's present situation.

Modern "Market" Approach to Financial Analysis of Distressed Companies

Existing "accounting" approach to analysis based on financial statements, taking into account above-mentioned limitations and specific features of companies' activity in emerging economy, makes implementation of new 'market' methodological approach to analysis essential. Market model of analysis is hard to formalize because of many possible scenarios in prejudice of alignment of approaches. It has so called "cloud character", i.e. stipulates goals and tasks of analysis, its stages, methodical approaches, but leaves freedom of concrete options choice.

In the same time, the financial analysis of debtor is considered by the court as one of evidences within official bankruptcy procedure and it should give explicit conclusions about: (a) financial standing of the debtor; (b) possibility (impossibility) of conducting breakeven activity by the debtor; (c) availability (unavailability) of solvency restoration.

This approach is a basis of the Russian Federal Standard Draft of "Rules of financial and economic analysis of the debtor" which has been developing by the group of specialists since 2015 and now is at the validation phase[2] (Bobyleva, Lvova et al., 2015). Standard considers obligatory conducting of *basic* financial analysis of the debtor which can include one or two stages and parallel analysis of presence (absence) of evidences for transactions' voidance (Figure 2).

First stage is aimed at verification whether the debtor was indeed carrying out of its general business activity and (or) there was absence of intention (reasonability) to continue such activity. If the fact of main activity absence was established, the first stage is terminated. As a result, there is substantiation of further liquidation procedure.

Second stage is conducted while the fact of presence of general business activity or intention to continue was established. The result of second stage is conclusion about possibility (impossibility) of conducting breakeven activity by the debtor, availability (unavailability) of its solvency restoration, substantiation of further appropriate bankruptcy procedure opening.

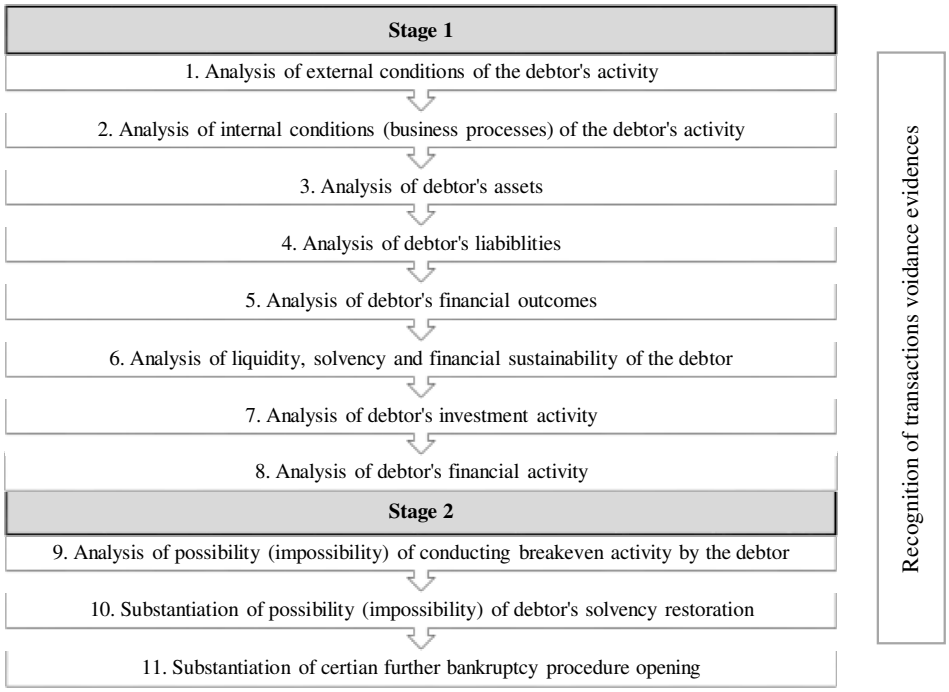


Fig. 2: Order of basic analysis of financial analysis of the debtor

Analysis of external conditions is aimed at recognition of influence of macroeconomic, regional and industrial factors at the debtor's financial standing. It should be noticed that flexibility of such model of analysis implies, that insolvency administrator considers not all but relative to debtor's business factors from Table 2.

Table 2: Analysis of external conditions of the debtor's activity

Description of factors	Tasks of analysis
1. Macroeconomic factors	
1.1. Geographic location, economic conditions of the region	To recognize the influence on debtor's activity of natural, seasonal, environmental factors, investment climate, taxation regime, specifics of region where the debtor acts
1.2. Inflation in the country and within certain region	To recognize the influence on debtor's activity of inflation level
1.3. Medium interest rates for similar scale and industry business	To compare credit conditions for debtor's business with mid-market ones
1.4. Currency rate	To learn correlation between currency rate changing and fluctuations in prices of the debtor's goods and services if it used import raw materials and other units bought for foreign currency
1.5. Other external factors related to debtor's business	To recognize the influence on debtor's activity of tariffs, stock exchange indexes, etc.
2. Specific market factors (according to debtor's business)	
2.1. Specifics of industry public regulation	To learn specific issues of government control of debtor's business industry which usually has significant importance at emerging markets
2.2. Market of debtor's commodities (services)	To determine influence of competitive environment, consumer demand and prices. Analysis should include such

	categories as debtor's consumer groups; sales volume in dependence on types of goods sold and domestic / foreign market distribution; methods of payment, debtor's market share, main competitors in relation to types of goods sold, prices dynamics, presence of substitutes
2.3. Purchase of supplies	To recognize the influence on debtor's financial standing of changing in raw materials prices, corresponding volume of deliveries (for example, price increase, reduction in requirement of raw materials, etc.)
2.4. Terms of bank credit	To analyze the influence of interest rate, credit terms, credit scoring of debtor's business by the bank

As the result of external conditions analysis, the influence on debtor's business activity of above-mentioned factors should be recognized, the main damaging factors for debtor's financial standing should be emphasized, the possibility of necessary business adaptation to these factors should be assessed. Investigation of voidable transactions can be considered as an element of deliberate bankruptcy analysis.

Characteristics of indebted company itself (block №2 within Stage 1 at Figure 2) includes analysis of internal features which should allow to propose following conclusions about:

- change in the assortment, volumes of production and sales of goods (services) and the reasons of it;
- change of costs' structure, level and reasons of it;
- reasonableness of purchasing prices at supplies, their correspondence with market prices, law and good business practices;
- correspondence of prices for goods (services) sold to market prices;
- opportunity and reasonability to save certain types of debtor's activity;
- organizational and production structure and their correspondence to main business types, goals and tasks of the debtor's activity;
- interconnections of the debtor's firm within group of companies (if applicable);
- dynamics of number of employees, payroll, incentive rewards relatively certain employees' categories, and reasons of changes in these measures;
- quality of financial accounts and statements, tax compliance;
- debtor's strategy: existence of business plans, current budgets, extent of their elaboration, implementation opportunities and possible risks.

The next step is Assets analysis (block №3 within Stage 1 at Figure 2) which should contain the following information:

- book value of all debtor's assets as at the last reporting date including explanation of main elements;
- assets classification into 4 groups: (1) assets, without which the main debtor's business activity would be impossible; (2) assets, sale of which would be problematic; (3) asset, which could be sold to cover creditors' claims, court expenses and insolvency administrator remuneration; (4) assets, which are impossible to sale;
- possible estimated market value of debtor's assets;
- value of pledged assets (book and collateral);
- transactions and actions of debtor's supervisory bodies, conducted within explored period of time, resulted in illegal disposal of debtor's assets.

Analysis of debtor's liabilities (block №4 of Stage 1) serves to discover reasons of significant change in debt to equity proportion, reveal voidable liabilities, find opportunities for due dates restructuring and suggest the conclusions about:

- constitution and structure of debtor's liabilities;
- liabilities dynamics (separately at each type of liability), reasons of their change and consequences for the debtor's activity;
- reasons of past-due debt arising and its types;
- reasonableness of liabilities and its classification;
- liabilities which come due in the next month, two months, quarter, half year, year;
- debts which can be settled by instalment;
- constitution and size of claims by creditors' classes, debt volumes and duration;
- opportunities and conditions of debt restructuring according to due dates by making agreement with certain creditors.

Financial outcomes block (№5 of Stage 1) includes the analysis of sales revenue, cost of goods sold, distribution and administrative expenses, non-operating gains and losses, gross profit, operation profit and pretax profit, net profit. After this step, analysis of liquidity, solvency and financial sustainability (block №6) follows. At these stages of analysis widespread financial ratios are still used, but, taking into account all their limitations, they are accompanied by cash flow analysis as suggested by Fawzi, Kamaluddin & Sanusi (2015). Nevertheless, this approach is also imperfect due to difficulties in relevant information obtaining.

Investment activity analysis (block №7) has attracted not enough attention till now. Nevertheless, it reveals sources of investment projects financing, examines whether it would be necessary to continue existing investment projects (or terminate them), to restore solvency and achieve breakeven activity by the debtor. Analysis of financial activity (block №8) is aimed at determining the level of credit and other financial instruments usage.

If at the Stage 1 it was found that the debtor has not both performed current activity and planned it for future, conclusion about impossibility of solvency restoration should be done. In his case the analysis is considered as enough evidence to commence liquidation procedure. If the analysis lead to opposite conclusion that the debtor has indeed performed current entrepreneur activity, the Stage 2 of analysis begins.

Breakeven activity is considered as possible (block №9 of Stage 2 at Figure 2) if future sales revenue will exceed costs, potential gains exceeding losses.

Analysis of possibility (impossibility) of debtor's solvency restoration (block №10) is based on conclusions of block 9 (possibility of breakeven activity). The tasks here are to examine each bankruptcy procedure and provision to choose suitable for debtor's solvency restoration; to calculate the value of claims to cover under rehabilitation procedures; to determine potential amount due (positive cash flow) by the debtor. If this amount due exceeds calculated value of claims, the conclusion about positive opportunity of debtor's solvency restoration within terms set by Bankruptcy Law is provided. So, if analysis in block 9 and 10 had positive results, concrete rehabilitation measures should be specified, cost-benefit and potential performance analysis should be provided, certain time limits should be set.

In parallel with general basic analysis the specific transactions analysis is to be conducted. This process is also difficult to formalize because the legal provisions of each emerging economy set different meaning and grounds of transactions voidance evidences. Methodological approach considers the following elements of such analysis:

- choosing of transactions for detailed investigation by examining of contracts content in comparison with their actual performance, materials of court and other inspections; credit contracts, etc.;
- classification of received data by voidable transactions categories: interested-party transactions; significant transactions; credit contracts, pledges, surety contracts; guarantee agreements; transactions with debtor's assets; suspicious transactions made

within main debtor's business activity; suspicious transactions at bank accounts of the debtor; inconsistent salaries payments including incentive bonuses;
- transactions from this sample are classified at ones made before bankruptcy proceeding opening (not less than 3 years before) and at others made under court procedure;
- legal grounds for transactions voidance should be formed and the juridical possibility of voidance should be assessed.

In Russia, according to the Bankruptcy Law, there are three types of voidable transactions and special indicators ("red flags") should be investigated within this type of analytical activity (Table 3).

Table 3: Recognition of transactions voidance in Russia: types of deals and "red flags"

Type of voidable transaction	"Red flags"
1. transactions with unfair counter-performance	– undervaluation or overvaluation of prices of sold (purchased) goods in comparison with market level; – inherently unprofitable for the debtor terms and (or) forms of payment for sold and purchased items; – any forms of disposal or encumbrance of debtor's assets without proportional decrease in liabilities.
2. transactions intended to causing harm to creditor's interests	– unilateral transaction made by the debtor having sighs of insolvency or insufficiency of assets; – transactions with interested parties; – other conditions of transaction (assets or liabilities within transaction have value more than 20% of book value of debtor's assets; debtor changed his address in anticipation of transaction and did not inform creditors, abolished documents or damaged assets, etc.).
3. transactions giving preference to one creditor prior to others	– transaction can lead to change in priority of lien; – usually: transactions between indebted company and banks, demanding more security of pledged immovable property.

As the result calculation of losses for creditors' claims satisfaction from suspicious transactions should be provided taking into account the proportion of decrease in value or size of debtor's assets.

Conclusion

The current study has successfully confirmed hypothesis established in the introduction: distressed companies in modern emerging economies should be analyzed by applicable "market" approach while accounting ratios have certain limitations. Implementation of suggested "flexible market analysis model" based on cash flow analysis, comparative interfirm evaluation, comprehensive transactions investigation, concerning presence (absence) of company's intention to continue business activity will allow to assess possibilities of business rescue in reasonable way.

Market model of analysis will, first of all, help to shift concentration from consequences of crisis in distressed or indebted company (i.e. negative change of assets and liabilities, losses arising, etc.) to discovery of external and internal factors of unsuccessful performance, searching of conditions to recover business.

If liquidation procedures are more appropriate for a certain debtor this methodological approach to analysis would help better appraisal of debtor's assets value, the amount of bankruptcy estate.

Though suggested model was developed for Russia, it can be adjusted for other emerging economies while basic conditions are quite common.

Endnotes

[1] Opposite to Sustainable Growth Rate (SGR). Concept of SGR was originally developed by R.C. Higgins in 1977 and implies the maximum rate at which company sales can increase without depletion financial resources. (Higgins, 1977; Platt et. al, 1995; Ross et. al, 2008).

[2] Author of this paper is a member of this Federal Standard project design team.

References

Altman, E. (1968), 'Financial ratios, discriminant analysis and the prediction of corporate bankruptcy', *The journal of finance*, 23(4), 589-609.

Beaver, W. (1998), Financial Reporting: An Accounting Revolution. 3th Prentice Hall International.
Beaver, W., McNichols, M., & Rhie, J. (2005), 'Have financial statements become less informative? Evidence from the ability of financial ratios to predict bankruptcy', *Review of Accounting Studies*, 10(1), 93-122.

Bobyleva, A. (2010), 'Modernizatsiya instituta bankrotstva kak klyuchevoy faktor povysheniya effektivnosti rynochnoy ekonomiki' [Modernization of insolvency institute as key factor of market economy effectiveness increase], *Vestnik Moskovskogo universiteta [Bulletin of the Lomonosov Moscow State University],* 21, 39-76.

Bobyleva, A., and Lvova, O. (2014), 'Insolvency Regulation in Russia: Current Issues and Prospects for Reform', *Norton Journal of Bankruptcy Law and Practice*, 23(5), 583-603.

Bobyleva, A., Lvova, O., Zhavoronkova, E., and Kholina, M. (2015), 'O kontseptsii provedeniya arbitrazhnym upravlyayushchim analiza finansovo-ekonomicheskogo sostoyaniya dolzhnika' [On concept of conducting financial economic analysis of the debtor by insolvency administrator], *Imushchestvennyye otnosheniya v Rossiyskoy Federatsii [Property relations in the Russian Federation]*, (10 (169)).

Conan, J. and Holder, M. (1979), Variables explicatives de performances et contrôle de gestion dans les PMI. Universite Paris Dauphine.

Davydova, G., and Belikov, A. (1999), 'Metodika kolichestvennoy otsenki riska bankrotstva predpriyatiy' [Methods of quantitive assessment of bankruptcy risk for enterprise], *Upravleniye riskom [Risk management]*, 3, 13-20.

Fawzi, N., Kamaluddin, A., and Sanusi, Z. (2015), 'Monitoring Distressed Companies through Cash Flow Analysis', *Procedia Economics and Finance,* 28, 136-144.

Federal Law №127-FZ at 26.10.2002 'On insolvency (bankruptcy)' (last amendment at 03 July 2016).

Giorgini, G., and Vallens, J. (ed) (2015), Etude comparative des procédures d'insolvabilité.
Grice, J., and Dugan, M. (2001), 'The limitations of bankruptcy prediction models: Some cautions for the researcher', *Review of Quantitative Finance and Accounting*, 17(2), 151-166.

Griffiths, I. (1986), Creative Accounting: How to make your profits what you want them to be. Unwin Paperbacks.

Higgins, R. (1977), 'How Much Growth Can a Firm Afford?', *Financial Management*, 6(3), 7-16. Retrieved

Jones, F. (1987), 'Current techniques in bankruptcy prediction', *Journal of accounting Literature*, 6(1), 131-164.

Karelina, S., and Erlikh, M. (2012), 'Rol' arbitrazhnogo upravlyayushchego v mekhanizme razresheniya konflikta interesov' [Role of insolvency administrator in conflict of interests resolution], *Pravo i ekonomika [Law and Economics]*, (3), 25.

Kovalev, V., and Volkova, O. (2000), Metody teorii prinyatiya resheniy. Analiz khozyaystvennoy deyatel'nosti predpriyatiya [Methods of decision-making theory. Analysis of enterprise's financial and operational activity], Moscow, Russia.

Lai, L. (2016), 'Main and ancillary proceedings in the light of the EU Insolvency Regulation 1346/2000 on international insolvency law and innovative companies', *Przedsiębiorczość Międzynarodowa*, 2(2), 121-128.

Lowitzsch, J. (ed) (2007), The Insolvency Law of Central and Eastern Europe. Twelve Country Screenings of the New Member and Candidate Countries of the European Union: A Comparative Analysis. INSOL Europe, 2.

Lvova, O. and Bobyleva, A. (2012), 'Russian Insolvency Law Modernization: Changes That Make Russia Closer to Europe', Proceedings of the INSOL Europe Academic Forum Annual Insolvency Conference 'Substantive harmonisation and the convergence of laws in Europe', ISBN 978-0-9570761-2-9, 21-22 September 2011, Venice, Italy.

Lvova, O. (2014), 'Russian Insolvency Law: The Mechanism for the Creditors' Protection or the Opportunity to Raid the Company?', Proceedings of the INSOL Europe Academic Forum Annual Insolvency Conference 'European Insolvency Law – Current Issues and Prospects for Reform', ISBN: 978-0-9570761-6-7, 10-11 October 2012, Brussels, Belgium.

Platt, H. and Platt, M. (1990), Development of a class of stable predictive variables: the case of bankruptcy prediction', *Journal of Business Finance & Accounting*, 17(1), 31-51.

Platt, H., Platt, M. and Chen, G. (1995), 'Sustainable growth rate of firms in financial distress', *Journal of Economics and Finance*, 19(2), 147-151.

Ross, S., Westerfield, R. and Jordan, B. (2008), Fundamentals of corporate finance. Tata McGraw-Hill Education.

Sayfullin, R. and Kadykov, G. (2003), 'Prognozirovaniye bankrotstva s ispol'zovaniyem faktornykh modeley' [Forecasting of bankruptcy by factor models], *Ekonomika i zhizn' [Economics and life]*, (41), 11.

Taffler, R. (1982), 'Forecasting company failure in the UK using discriminant analysis and financial ratio data', *Journal of the Royal Statistical Society*, Series A (General), 342-358.

Taffler, R. and Tisshaw, H. (1977), 'Going, going, gone–four factors which predict', *Accountancy*, 88(1003), 50-54.

Unified Federal Register of Bankruptcy Information (UFRBI), https://bankrot.fedresurs.ru/

Wessels, B. (2006), International insolvency law (Vol. 2). Deventer.

Zaytseva, O. (1998), Antikrizisnyy menedzhment v rossiyskoy firme [Crisis management in Russian firm], Novosibirsk, Russia.

Zmijewski, M. (1984), 'Methodological issues related to the estimation of financial distress prediction models', *Journal of Accounting research*, 59-82.

Preferred Stocks as Instrument for Sustainable Development: Valuation Aspects

Tamara V. Teplova, Higher School of Economics – National Research University, Moscow, Russia, e-mail: tteplova@hse.ru
Pavel G. Shabalin, Higher School of Economics – National Research University, Moscow, Russia, e-mail: pgshabalin@edu.hse.ru

Abstract

Preferred stocks are used both to raise funds for investment projects and lock-in control in the company. On the one hand, the founder is able to retain control in a company using preferred stocks to select better investments projects, on the other hand he is able to finance ones with newly issued preferred stocks i.e. preferred stocks should be treated as instruments for sustainable development of a company.
However, conflicts of interests may occur between common shareholders and preferred stock owners. Accurate valuation of common and preferred stock can resolve the agency conflicts, improve financial stability of a company in the market and overcome financial crisis in the business.
The paper studies the determinants of the price difference between voting common shares and nonvoting preferred shares in the four largest preferred stock markets: Brazil, Germany, Russia and South Korea. In these countries, preferred shares are treated as equity type securities and dual-class share structure with preferred shares as inferior equity class is widely used. The paper presents determinants of the dual-class premium across the markets: control contest, inferior liquidity of preferred shares, corporate governance, company ownership structure and value of shareholder voting rights provided by each stock class estimated through option prices technique.

JEL: G13, G32

Keywords: sustainable development, corporate control, preferred shares

Introduction

The concept of sustainable development requires to take into account the interests of all groups: common shareholders, debt providers and owners of hybrid securities (preferred stocks, convertible securities). Conflicts of interests may occur between common shareholders and preferred stock owners, shareholders and bondholders due to market imperfections. One of the methods to deal with agency conflicts is the valuation methodology of different financial assets of a company which can be used to improve financial stability of a company in the market and overcome financial crisis in the business. Our paper is devoted to characteristics of preferred stock market and valuation of preferred stocks as long as explaining the price difference between common and preferred shares.

The paper studies the determinants of the price difference between voting common shares and nonvoting preferred shares in four countries: Brazil, Germany, Russia and South Korea. In these countries preferred shares are treated as equity type securities and dual-class share structure with preferred shares as inferior equity class is widely used. Those markets are the largest ones of preferred stocks as equity type securities. Preferred stocks in Russia were firstly introduced in the early 1990-s after completion of privatization process. In South Korea preference shares were used by Korean conglomerates as instrument for deleveraging in 1980-s. The history of preferred stock issuances in Germany and Brazil is longer. However, in all four markets preference stocks provide similar set of rights to shareholders.

The paper presents determinants of the dual-class premium across the markets: control contest, inferior liquidity of preferred shares, corporate governance, company ownership structure and value of shareholder voting rights provided by each stock class estimated through option prices technique.

Literature Review

Private benefits of control are not attributable to minority shareholders but to the controlling ones. Meanwhile value of voting rights owned by minority shareholders is going to increase in case of control contests among management teams. In turn the lower the difference between ownership stakes of largest and second largest shareholders the higher the probability of control contest. It implies no one shareholder owns control stake in a company. It also means that each minority vote might be decisive in contest for control. Non-voting stock in such case will be irrelevant and its value will not be affected by increase in probability of control contest. Therefore observed voting premium depends both on value of private benefits of control and probability of control contests (Rydqvist (1987), Zingales (1995), Chung and Kim, (1999)). If there is a shareholder who owns control stake in a company control contests probability ceases and voting premium decreases.

Liquidity is the second determinant that explains preference stock discount. On the one hand «bid-ask» spread is treated as a proxy for asset liquidity (Amihud and Mendelson, (1986)). On the other liquidity measure based on trading volume can be used (Amihud (2002)). Both measures are widely used in empirical studies. We use relative trading volume of common and preference shares as a proxy for liquidity differences. Liquidity effect is more pronounced in some extreme cases like one in Norway where significant impact of the liquidity of certain market segment on the voting premium was observed. In Norway foreign investors could invest only in non-voting shares, therefore non-voting shares were traded at a significant premium to the voting shares (Ødegaard (2006)).

The protection of minority shareholders depends on the efficiency of corporate governance as mentioned by La Porta et al. (2000). When shareholder rights are better protected by law, minority shareholders are willing to pay a higher price for the company shares (La Porta et al. (2002)). Thus the likelihood of expropriation of non-voting minority shareholders depends on the level of corporate governance in the company. The lower the legal protection for minority shareholders, the higher the private benefits of control (Zingales, (1994), Zingales, (1995)) and vice versa (Nenova (2003)). Legal environment determines the institutional framework for all companies in a country, while level of corporate governance in certain company may vary significantly. Companies may embed special provisions in the corporate charters to protect rights of minority shareholders better. In order to evaluate level of corporate governance several proxies can be used. A corporate governance index introduced by Gompers, Ishii, Metrick (2003) includes a range of corporate governance quality variables. In this paper we estimate corporate governance quality using ADR dummy variable and free-float variable. In order to list ADR on its shares a company has to increase the level of corporate transparency in terms of information disclosure. ADR issuance can be treated as a signal to the market participants about company aims to improve quality of corporate governance as mentioned by Matos (2017). Doidge et al. (2009) proposed the higher the level of private benefits of control in a company, the lower the propensity to cross-list its shares on a foreign exchange. There is empirical evidence that cross-listing decreases voting premium (Coffee, (1999), Doidge (2004)). Free-float proxy for corporate governance was used in paper (Wang, Xu (2004)).

A higher level of ownership concentration reduces the likelihood of control contests, so the voting premium will be lower. The presence of controlling shareholder diminishes the magnitude of control contests. The type of controlling shareholder is extremely important. According to Caprio and Croci (2008) the premium will be higher, if a family owns a significant stake in a company or controlling block of shares. Maintaining control in a company for a family is more important than for other types of shareholders. A family is more prone to expropriate minority shareholders. Similar findings on the Brazilian market regarding the influence of the family on the size of the premium were derived by Saito, Di Miceli da Silveira (2010). In line with this we test the same hypothesis using dummy variable equals one if significant stake in a company is owned by a family and zero otherwise. The premium becomes lower when change of control is unexpected, that is typical for companies where

the control stake is owned by the government. Thus, we used dummy variable equals one if ownership stake of 20% or more is owned by the government and zero otherwise.

There is no clear evidence of significance and expected sign of leverage as an explanatory variable for voting premium as mentioned in paper of Barclay and Holderness, (1989). Jensen, (1986) showed on the one hand the higher degree of leverage, the more difficult access to free cash flow for managers thus there should be inverse relation between leverage and the premium. The presence of debt disciplines the managers limiting investments in bad projects. Threat of bankruptcy and obligation to repay debt force managers to adhere shareholders' interests. On the other hand effective control of management over company assets is higher with debt thus there should be direct relation between leverage and the premium (Harris, Raviv, (1988)). The disciplining role of leverage can be changed as a result of amendments of legal environment (Kang, Kim (2006)). We also incorporate in our model ROA and natural logarithm of market capitalization as a proxy of company size. These variables can explain the probability of control contests.

The difference in shareholder rights of each stock class can explain significant portion of dual-class premium. As a rule unlike common stock, preferred shares are not granted with voting rights. However preferred stock receives voting rights when dividend payments are omitted and lose it when dividend payments are resumed. Unlike previous literature we proposed a new explanatory variable of the dual-class premium - a market value of corporate voting rights attached to a common stock. The empirical estimates of the new explanatory variable were derived from option prices using put-call parity relation based on procedure proposed by Kalay et al. (2014).

We presented main papers trying to explain price difference between common and preferred shares in Brazil, Germany, South Korea and Russia in the table below.

Table 1: Key empirical research papers on preferred stock discount in Brazil, Germany, South Korea and Russia

Country	Authors	Period	Methodology	Number of companies in the sample
Brazil	Carvalhal A., Subrahmanyam A.	1994, January - 2004, December	1. event-study; 2. panel regression (GLS)	141
	Saito R., Di Miceli A.	1995-2006	1. pooled regression; 2. FE model	87
	De Souza V.F., Fernandes M.	2003, June - 2013, July	1. RE model; 2. FE model	48
Germany	Fatemi A., Krahnen P.	1990-1993	1. pooled regression	58
South Korea	Chung H. Kee, Kim Jeong-Kuk	1992-1993	1. OLS	119
	Lee I.	2000, January - 2010, November	1. OLS	113
Russia	Muravyev A.	1997-2005	1. FE model; 2. OLS	71 in FE; 99 in OLS

Source: Authors' analysis

As it's seen from the table above research methodology used in these papers based primary on panel regressions with fixed-effect estimator. It should be noted that the determinants of the price difference between common and preferred shares mentioned in the table 2 below are not sufficiently tested in Russia, Germany and Korea. Confusing results were obtained on determinants like

ownership structure, liquidity, and the proportion of voting shares in total shares outstanding. In addition, the most recent sample period is limited by 2013.

Table 2: Frequency analysis of the studies devoted to determinants of price spread between common and preferred stocks

	Total	Russia	Brazil	Germany	Korea
Overall	7	1	3	1	2
Liquidity	6	1	3	1	1
Dividends	7	2	3	1	1
Corporate governance	6	1	5	-	-
Ownership structure	12	-	8	4	-
Shareholders rights	7	3	4	-	-
Accounting measures of performance	7	-	6	-	1
Control contests	7	3	1	1	2

Source: Authors' analysis

The impact of value of shareholder voting rights on the price difference has not yet been evaluated. Thus, a new study of the determinants of the spread is required, that allows to test the significance of the determinants in key preferred stock markets in the world.

Institutional Framework

Despite the similarity of preferred stock in Brazil, Germany, Russia and South Korea there are some unique features of preferred stock in each market.

Issuance of preferred stock in Brazil were allowed in 1976. Instead of elimination of preferred shares from the market as an asset class the reform of 2001 granted preferred shareholders with higher level of protection and benefits. Today companies in Brazil have to choose one of three privileges for preferred shareholders: a minimum dividend of 3% of the book value of the share; a higher dividend rate than for ordinary shares (higher by 10%); the right to sell shares at a price of at least 80% of the price of the controlling stake in the M&A deal (tag-along right). Preferred stock holders are granted with voting rights if dividends are not payed during three consecutive years.

There are three main features of preferred stock in Germany. First preferred stock provides small advantage in terms of dividends privileges in comparison with common stock embedded in the corporate charter. For instance, according to corporate charter of BMW preferred stock dividend is assumed by 0.02 euro higher compared to common stock dividend. Corporate charter of Volkswagen provides 0,06 euro more per preferred share compared to common stock. Second dividends on preferred stock are cumulative and there is no upper bound for preferred stock dividends. And third preferred stock holders are granted with voting rights if dividends are not payed during two consecutive years. Unlike US where only common stock are listed in Germany both stock classes are listed. The maximum share of preferred stocks as a percent of total shares outstanding is 50% by law and as a rule most companies in Germany issued exactly 50% of shares outstanding as preferred shares that is higher than in US market.

In Russia, the maximum share of preferred stocks as a percent of total shares outstanding is 25% by law. The legislation provides three approaches to calculate dividends: fixed amount, as a percent of nominal value of shares, special procedure for dividends calculation. Most Russian firms approves in its corporate charters special procedure for dividend calculation that is based on 10% of net income in accordance with Russian accounting standards divided by the number of preferred shares outstanding which is 25% of shareholder capital. Another important provision embedded in corporate charter of Russian firms provides dividends for preferred stock not lower than ones on common stocks. If calculated value of preferred stock dividends is lower than one on common stock final dividend for preferred stock should be at least as high as dividend on common stock.

In South Korea, preferred stock market developed gradually. Before 1986 the national authority allowed to issue preferred stock treated as more debt than equity type security. Dividends for preferred stock was guaranteed at the level of national key rate. Preferred stock dividend was cumulative. In 1986 preferred stocks without voting rights and dividends equal to dividends for commons stock plus 1% were introduced. These types of preferred shares are called «old preferred» and most common in the market nowadays. Due to absence of other provisions apart from higher dividends to compensate lack of voting rights these preferred shares became less popular among market participant and devalued strongly. Because of that national market authority implemented amendments into corporate law in order to better protect preferred shareholders. In October 1996 after amendments were implemented into Commercial Act companies were allowed to issue new preferred stock. Minimum threshold level of dividends for such stock must be embedded into corporate charter. New preferred shares could be converted into common stock in one-to-one ratio after definite period of time. And dividends for new preferred stock were cumulative. Despite the availability of new type preferred shares for issuance in the market old type preferred are still actively traded in the market. Moreover, most of the preferred stock in Korean market are old-type preferred. The maximum share of preferred stocks as a percent of total shares outstanding is 25% by law like in Russia.

Data and Sample Description

The main source of data is Thomson Reuters and DataStream databases. We have additionally checked ownership data in ORBIS database, provided by BUREAU VAN DIJK, as well as in the CAPITAL IQ database provided by McGraw Hill Financial agency. The sample includes companies incorporated in Brazil, Germany, Russia and South Korea and issued preference shares in exchanges of the countries. As long as preferred stocks are not granted with voting rights by rule we exclude preferred shares with voting rights («Voting Rights Per Share» is set to zero). Financial companies (banks, insurance companies) were excluded from the sample. We excluded «new preferred» type shares in Korea. «New preferred» shares have cumulative dividend payments and can be automatically converted into ordinary shares after the expiration of the time specified in the company's charter. Having such provision doesn't allow to compare market price spread of these preferred shares with the spread of market values in other countries. In order to select only «old-type» preferred shares, we relied on the special designation of shares of an old type in the KRX ISIN SYSTEM. «Old-type» preferred name includes «P» symbol while «new-type» - «PB». In Brazil, several companies issued several types of common stock (for instance, «Altus Sistema»). We excluded the class of common shares without voting rights. Some brazilin firms have several classes of preferred stocks («A» and «B» classes). In such cases we included more liquid class in the sample.

In order to estimate the basic model of dual-class premium we examine more than 200 listed firms that have both common and preferred shares throughout the period from 2007 to 2017. We exclude companies with incomplete information, as well as shares that are not traded on the exchange in the period 2007-2017.

The sample consists of 213 companies from four countries: 69 in Brazil, 19 in Germany, 49 in Russia and 76 in South Korea. As it presented in the table below most of the companies that issued both common and preferred stocks operate in utilities (half of the market in Russia), consumer cyclicals and basic materials sectors. However institutional organization of national economies has a significant impact on the distribution of companies in terms of industry breakdown. Utilities preferred stocks prevail in Brazil and Russia, while there are only one company in Germany and none in South Korea in this sector. It is also should be mentioned that technology and telecommunication companies do not usually use preferred stock.

Table 3: Industry breakdown of companies with preferred stock in Brazil, Germany, South Korea and Russia

	Brazil	Germany	Russia	South Korea
Total	69	19	49	76
Healthcare	-	3	-	6
Consumer Cyclicals	17	4	3	10
Industrials	10	6	4	15
Basic Materials	14	2	6	15
Technology	-	1	-	9
Consumer Non-Cyclicals	2	2	1	17
Utilities	21	1	24	-
Energy	2	-	7	4
Telecommunications Services	3	-	4	-

Source: Thomson Reuters, Authors' estimates

The numbers of dual-class companies with preferred stock as a share of all companies in domestic market are as follows: 19% (2%, 10% and 4%, respectively. The share of companies in the sample by market capitalization: 18%, 12%, 10% and 34%.

Number of companies newly issued preferred stock by markets is presented in the table below.

Table 4: Quantity of new preferred stock issues in Brazil, Germany, and South Korea and Russia

	Brazil	Germany	Russia	South Korea	
				Old-type	New-type
Total for the period 2007-2017	7	-	33	7	8
2007	2	-	3	3	3
2008	-	-	6	-	-
2009	-	-	2	1	-
2010	-	-	3	-	1
2011	2	-	15	1	1
2012	1	-	3	-	-
2013	-	-	-	1	1
2014	-	-	1	-	-
2015	1	-	-	-	1
2016	-	-	-	-	1
2017	1	-	-	1	-

Source: Thomson Reuters, Authors' estimates

Apart from Russia newly issued preferred stocks in Brazil, Germany and Korea are rare. To explain such anomaly, we looked at the average age of companies in the sample. As shown in the table below the oldest preferred stock issuers are incorporated in Germany. It is in line with data in previous table. No one company issued preferred stock in Germany in the sample period.

Table 5: Descriptive statistics of companies age that issued preferred stock in Brazil, Germany, South Korea and Russia

	Brazil	Germany	Russia	South Korea
Average	60	107	52	47
Median	57	105	51	49
Min	11	21	9	-
Max	145	259	166	93

Source: Thomson Reuters, Authors' estimates

Research Methodology

We use panel data regression with fixed-effect estimator as main research tool. Summary of variables used in the model are presented in the table below.

Table 6: Summary of research variables, definitions, and coefficients' signs

Variable	Meaning	Description	Expected sign
DCP	Market price spread	The difference between common and preferred stock prices, divided by preferred stock price as of the last trading day in each quarter	Explanatory variable
CTRL_FIGHT	Proxy for control contests	The difference between stake of the largest and second largest shareholder as of the last day of each quarter	-
DIV	Dividend differences	The difference between dividend on preferred share and one on common share divided by the price of preferred share	-
LIQ	Liquidity differences	Natural logarithm of trading volume ratio: preferred stock volume in numerator, common one in the denominator	-
SIZE	Company size	Natural logarithm of company market capitalization	?
ROA	Assets profitability	Earnings before interest and taxes (EBIT) divided by Total Assets	?
LEVERAGE	Leverage	Total Liabilities divided by Total Assets	?
FREE_FLOAT	Share of stocks owned by market participants	Number of free-float stocks owned by market participants divided by total shares outstanding	-
ADR	Company issued ADR on its stocks	Dummy variable ADR=1, if company issued ADR on its shares, 0 otherwise	-
GOV	Company is owned by the government	Dummy variable GOV=1, if the government owns more than 20% of voting shares, 0 otherwise	-
FAM	Company is controlled by family	Dummy variable FAM=1, if family owns more than 20% of voting shares, 0 otherwise	+
VR	Value of voting rights	Value of corporate voting rights estimated based on put-call parity relation	+

We use new valuation technique to determine corporate voting rights value on the basis of synthesizing non-voting stock using put-call parity for market prices of options. We use the most liquid options on common stocks in Brazil, Germany, Russia and South Korea (sample used for option based calculations is different from the sample used in the basic model of dual-class

premium). Synthetic common stock $\hat{S}(T)$ is constructed using market values of call option c, put option p and present value for their common strike X:

$$\hat{S}(T) = c - p + PV(X) \quad (1)$$

Accordingly, the market value of corporate vote can be described as the difference between market values of common stock S and synthetic common stock $\hat{S}(T)$:

$$Vote(T) = \frac{S-\hat{S}(T)}{S} \quad (2)$$

The holder of an option on common stock can't vote on underlying unless he or she exercises the contract. As such he or she doesn't have a right to vote at a shareholder meeting. Because of that synthetic stock doesn't vote until option has expired so the difference between the values is a measure of corporate voting rights value.

In order to implement new technique in purpose of voting rights value calculation in emerging markets we need first carefully study financial contracts specifications. For instance, most of the options traded on exchanges are American but not European. Therefore, early exercise premiums EEP_{call}^{div} and EEP_{put}^{div} due to expected dividends must be considered. Accordingly, for American style options value of corporate voting rights is estimated as follows:

$$\hat{S}(T) = c - EEP_{call}^{div} - p + EEP_{put}^{div} + PV(X) + PV(Div) \quad (3)$$

It should be taken into account increasing relation between voting rights value and time to options expiration. In order to eliminate time dependence of voting rights value we annualize data. First, we obtained implied discount factor using the equation:

$$Vote = \frac{S-\hat{S}(T)}{S} = \frac{S-S*e^{-d_y T}}{S} \quad (6)$$

where $e^{-d_y T}$ – implied discount factor.

Hence:

$$d_y = -\frac{\ln(1-Vote)}{T} \quad (7)$$

And annualized voting rights value:

$$AVote = 1 - (1 - Vote)^{\frac{365}{T}} \quad (8)$$

In order to get reliable estimates, we calculate median estimates of corporate voting rights value in each country and then use given estimates as an explanatory variable for overall dual-class premium in each country for the last 30 trading days to better fit results with current market environment.

Conclusion

Preference share market provides opportunity for companies in Brazil, Germany, Russia and South Korea to raise funds in the market and lock-in control in the company as long as such instruments are not granted with voting rights. However, preference shares in the countries are quite different from ones in other stock markets.

We explained key determinants of the dual-class premium across the markets: control contest, inferior liquidity of preferred shares, corporate governance, company ownership structure and value of shareholder voting rights provided by each stock class estimated through option prices technique.

Taking into account key determinants influenced price difference between common and preferred stocks the national authorities should implement amendments to corporate law to better protect preferred shareholders using provisions and thus boost the popularity of preferred stocks among markets participants.

References

Amihud, Y. and Mendelson, H. (1986), 'Asset Pricing and the Bid–Ask Spread,' *Journal of Financial Economics,* 17 (2), 223–249.

Amihud Y. (2002), 'Illiquidity and stock returns: cross-section and time-series effects,' *Journal of Financial Markets,* 5, 31–56.

Barclay, M.J. and Holderness, C.G. (1989), 'Private Benefits from Control of Public Corporations,' *Journal of Financial Economics,* 25(2), 371–395.

Caprio, L. and Croci, E. (2008), 'The determinants of the voting premium in Italy: the evidence from 1974 to 2003,' *Journal of Banking and Finance*, 32(11), 2433-2443.

Carvalhal da Silva A. and Subrahmanyam A. (2007), 'Dual-class premium, corporate governance, and the mandatory bid rule: Evidence from the Brazilian stock market,' *Journal of Corporate Finance*, 13, 1–24.

Chung H. Kee, and Jeong-Kuk, K. (1999), 'Corporate ownership and the value of a vote in an emerging market,' *Journal of Corporate Finance*, 5, 35-54.

Cofee, J. (1999), 'The future as history: the prospects for global convergence in corporate governance and its implications,' *Northwestern Law Review*, 93, 631-707.

De Souza V.F. and Fernandes M. (2014), 'Voting Premium in the Brazilian Equity Market,' *Brazilian Review of Econometrics*, 34(1), 79-96.

Doidge, Karolyi, Lins, Miller and Stulz (2009), 'Private Benefits of Control, Ownership, and the Cross-Listing Decision,' *The Journal of Finance*, 64(1), 425-466.

Fatemi A. and Krahnen J.P. (2000), 'On the valuation of common and preferred shares in Germany: New evidence on the value of voting rights,' *Managerial Finance*, 26(10), 42-54.

Gompers P., Ishii J. and Metrick A. (2003), 'Corporate Governance and Equity Prices,' *The Quarterly Journal of Economics*, 118(1), 107-155

Grossman, S. and Hart O. (1988), 'One Share-One Vote and the Market for Corporate Control,' *Journal of Financial Economics*, 20, 175–202.

Harris, M. and Raviv A. (1988), 'Corporate control contests and capital structure,' *Journal of Financial Economics*, 20, 55-86.

Jensen, M. (1986), 'Agency costs of free cash flow corporate finance and takeovers,' *American Economic Review*, 76, 323-350.
Kalay A., Karakas, O. and Pant, S. (2014), 'The market value of corporate votes: theory and evidence from option prices', *Journal of Finance*, 3, 1235-1271.

Kang J. and Kim J.-S. (2006), 'Private benefits of control and firm leverage: An analysis of Korean firms', *Review of Quantative Financial Accounting*, 27, 439-463.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A. and Vishny, R. (2000), 'Investor protection and corporate governance,' *Journal of Financial Economics*, 58, 1–27.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A. and Vishny, R. (2002). 'Investor protection and corporate valuation,' *Journal of Finance*, 57, 1147–1170.

Lee I. (2011), 'Explaining the Price Anomaly of KRX Preferred Stocks,' *KCMI Capital Market Perspective*, 3(2), 45-55.

Muravyev A. (2009), 'Dual Class Stock in Russia: Explaining a Pricing Anomaly,' *Emerging Markets Finance and Trade*, 45(2), 21–43.

Matos, P. (2017), 'An Assessment of Dual-Class Shares in Brazil. Evidence from the Novo Mercado Reform', *Darden School of Business University of Virginia, CFA Society of Brazil*

Nenova, T. (2003), 'The Value of Corporate Voting Rights and Control: A Cross-Country Analysis,' *Journal of Financial Economics*, 68(3), 325–351.

Ødegaard, B.A. (2007), 'Price differences between equity classes. Corporate control, foreign ownership or liquidity?,' *Journal of Banking and Finance*, 31, 3621–3645.

Rydqvist, K. (1996), 'Takeover bids and the relative prices of shares that differ in their voting rights,' *Journal of Banking and Finance*, 20, 1407–1425.

Saito R. and Di Miceli da Silveira (2010), 'The Relevance of Tag along Rights and Identity of Controlling Shareholders for the Price Spreads between Dual-Class Shares: the Brazilian Case,' *Brazilian Administration Review*, 7(1), 1-21

Wang F., Xu Y. (2004), 'What Determines Chinese Returns?,' *Financial Analyst Journal*, 60(6), 65-77.

Zingales, L. (1994). 'The Value of the Voting Right: A Study of the Milan Stock Exchange Experience,' *Review of Financial Studies*, 7(1), 125–148.

Zingales, L. (1995), 'What Determines the Value of Corporate Votes?,' *Quarterly Journal of Economics*, 110(4), 1047–1073.

The Effect of Oil Taxation on Investment Activity of Companies and Economic Growth in Russia

Alla Bobyleva, Doctor of Sciences (Economics), Professor, Lomonosov Moscow State University, Moscow, Russia, E-mail: Bobyleva@spa.msu.ru

Abstract

The results of Russian public policy in oil industry taxation are examined and serious challenges are identified: although the reforms have positive macroeconomic effect on Federal Budget revenues, growth in extraction and primary distillation, some problems still require the solution – oil industry tax burden increases, results of oil extraction at fields with high capital expenditures decrease. Today the Russian Government is put in a dilemma either strengthen long-term sustainability by implementation of strategic tax maneuver – the introduction of Excess profit tax (successfully applied abroad) and create conditions for industry development or pursue a goal of short-term filling of the Budget because of difficult economic period for Russia. Strategic tasks and the main focus of further tax regime reforming for improving the sustainability of the Russian economy are emphasized in the paper.

Keywords: oil industry tax regimes, investment opportunities of oil companies, tax maneuver, excess profits tax, tax on financial result, Russia

Introduction

Oil industry is the main income-producing sector of the Russian economy. From 2006 oil & gas revenues provide about 40-50% of Russian consolidated budget (Ministry of Finance, 2016). Any changes in this industry (including taxation) may have great multiplying economic effect not only in Russia but all over the world since Russia is one of the world leaders in oil reserves, its production and export.

Nowadays the following trends in the Russian oil industry development should be emphasized:

- despite oil extraction increase, depletion of oil fields is rising;
- the quality of new geological discoveries decreases and therefore the capital intensity of the development of complex and remote fields is growing;
- export's geography is changing: there is decline of oil & gas deliveries to Europe and growth to region of Asia/Pacific;
- new entrants appear at the international market;
- many countries shift to alternative energy sources and develop energy-saving technologies;
- taking into account the dependence of Russia on equipment's import and foreign loans, current sectoral sanctions encourage delay of some investment projects' execution;
- recession in Russian economy slows down the growth of fuel and energy domestic demand and reduces investment activity within fuel and energy complex.

All these serious challenges need an adequate response. One of the main steps within solution of oil industry problems (and, hence, problems of oil-depending Russian economy) is formation of adequate tax regime, which would allow, from the one hand, to provide completion of budget and performing of social functions by the State, and to meet needs of long-term development of this leading branch of economy – from the other.

Thus, the goal of the research is an assessment of the existing oil tax regime's performance and justification of its development key indicators to improve the sustainability of the Russian economy.

Methodology

In the research we assessed the effect of tax system on Russian budget and on the investment activities of the largest Russian and foreign oil companies in 2010-2016. The selection of companies is determined by their significant role in the oil world production and export. The study period 2010-2016 is selected due to the possibility of observing the influence of dramatic changes in oil prices in 2014.

The effect of changes in oil tax revenues for the Russian budget was evaluated in Russian currency and in dollar equivalent taking into account purchasing power parity. The analysis of the dynamics of companies' tax burden was made in the following areas:

- the resulting indicators of activities (sales, assets, EBITDA);
- the tax burden by types of taxes;
- the share of taxes in revenue;
- the tax burden per barrel of oil equivalent.

The Results of Tax System Modernization during the Last Years and Perspectives for Further Reforms

Contemporary tax regulation system has been forming from the late 2002. The important part of reforms in the beginning of 21st century was the introduction of mineral extraction tax (MET) in 2002. Then taxation reforms of 2007 (Spilimbergo, 2007), 2013-2014 and many other adjustments took place. As the result, taxation system became more transparent and close to international practice, completeness of the budget has increased together with the growth of extraction and refining activities.

As far as the effect of modern tax system on oil companies is concerned, the research shows that the share of the total tax burden in the Russian companies' revenue remains high and is much more than the largest of the foreign oil companies. For example, in 2016 the maximum percentage of taxes in the revenue was observed in "Bashneft" – 60% of total revenue, the minimum - in "LUKOIL" (19% of total revenue). Among observed foreign companies the maximum share of taxes in revenue was in "EXXON" – 20%. It is also interesting to notice that in Russian oil companies a high proportion of taxes in revenue is the consequence of high "industry" taxes (MET, export duties, excise duties). In the largest foreign oil companies the share of "industry" taxes in revenue is small – about 1-2% (except EXXON where it is about 20%).

Thus, it can be concluded that the tax regulation in the Russian oil industry is still based on gross revenues from extraction, refining and export: it allows to administer taxes in relatively effective way and to fill the budget, but it neither stimulates the development of oil companies' investment potential nor provides correlation between financial results of companies and paid taxes.

Nowadays the strategic tasks of further tax regime reforming are the following:

- establishing of stable and predictable terms of taxation;
- nature rent withdrawal without sacrificing of financial sustainability and investment attractiveness of efficient companies of fuel and energy complex;
- efficient allocation of revenues generated by fuel and energy sector between the State and business (determination of optimal tax burden);
- attraction of investments to hard-to-reach reserves' extraction, exploitation of small, depleted oil and gas fields.

An important part of tax regime strategic reform in Russia can become an introduction of widely used in developed oil producing countries supplementary charges – Excess profits tax (EPT) and Tax on financial result (Alexeev & Conrad, 2009; Lvova, 2015). These taxes implementation provides tax differentiation depending on concrete oil extraction conditions, acceptable level of net revenue in case of availability of operational profit. All tax mechanisms based on such excess profits taxes has significant advantages in comparison with prevailing using of mineral extraction tax (MET): they reduce opportunities for selective approach to taxation of certain oil projects, stimulate investments to discovery new fields since the tax does not apply until the full payback of capital expenditures. This

reform can substantially bring together conditions for development of Russian and foreign companies, increase the competitiveness of Russian producers.

In 2016 the concept of Tax on financial result was developed together by Ministry of Finance and Ministry of Energy of Russia, which implies pilot adoption of this new tax in 2018. In parallel export duty will gradually decline to balance internal and external oil prices.

Nevertheless, in contemporary Russia the shift to EPT has also weaknesses and certain threats. Our SWOT-analysis (Bobyleva, 2015) evolved the following:

- complexity of establishing new system of cost control and tax administration, providing true recording of production, investment and financial measures. In Russia it is difficult to build because of practice of "creative" accounting, transfer pricing;
- many project, price and currency risks should be assumed by the State, which can lead to decrease of budget incomes.

Conclusion

Thus, the threats of dramatic tax maneuver for Russia seem quite serious. After EPT implementation budgetary revenues can diminish, in particular, because many projects of hard-to-reach reserves' extraction will be under construction in the coming years and have relatively low profitability. In a whole, systematic approach to reformation of oil industry tax regime should consider concrete stages (road map) of such tax shift to achieve balance between the society's interests and oil companies. Long term milestones and road map should exclude the possibility of frequent and random law adjustments and give oil companies and the State an opportunity to plan for a long perspective.

Currently, the process of global shocks in oil industry continues (high volatility of prices, the reduction in demand and its geographic change, sanctions against Russia). This is the reason why this research is in progress.

References

Alexeev, M., & Conrad, R. (2009), 'The Russian Oil Tax Regime: A Comparative Perspective', *Eurasian Geography And Economics*, 1 (50), 93-114.

Bobyleva, A. (2015), 'Gosudarstvennaya strategiya regulirovaniya neftyanoy otrasli Rossii: evolyutsiya sistemy nalogooblozheniya' [State Strategy regulation of the oil industry in Russia: evolution of the tax system], *Vestnik Moskovskogo universiteta. Seriya 21 'Upravlenie (gosudarstvo i obschestvo)' [Moscow University Bulletin: Management (State and Society)]*, 4, 3-24. In Russian.

Lvova, O. (2015), 'Balans interesov gosudarstva i biznesa v sovremennykh sistemah nalogooblozheniya neftyanogo sektora' [Balance of interests of the State and business in oil indusrty taxation systems], *Gosudarstvennoe Uprablenie. Elektronniy Vestnik [Public Administration. E-Journal],* 50, 65-88. [Online], [Retrieved August 15, 2017], http://e-journal.spa.msu.ru/uploads/vestnik/2015/vipusk__50._ijun_2015_g./ekonomitcheskie_voprosi_upravlenija/lvova.pdf

Ministry of Finance of the Russian Federation. Annual report on the consolidated budget execution at 27.12.2016. [Online], [Retrieved August 1, 2017], http://old.minfin.ru/en/index.php?id_56=25648

Nalogovyj kodeks Rossiyskoy Federatsii [Tax Code of the Russian Federation].

Spilimbergo, A. (2007), 'Measuring the Performance of Fiscal Policy in Russia, *Emerging Markets Finance And Trade,* 6 (43), 25-44.

Russian Foreign Energy Policy within The Conditions of Credibility Gap

Igbal Guliyev, Deputy Director, International Institute of Energy Policy and Diplomacy, Moscow State Institute of International Relations (MGIMO-University), Moscow, Russia, E-mail.: guliyev@miep-mgimo.ru

Abstract

The research motivation is based on the transformation of the external energy strategy of Russia in the conditions of sanction regime. For sure these limitations approved by world leaders made swing the domestic energy policy of the Russian Federation. The special attention is paid to the current trends in the sphere of international energy relations (with emphasis on Europe). The author investigates the new goals of Russia's new energy paradigm given unfavorable external economic conjuncture. In the article special attention is also paid to the issue of political motivation of anti-Russian sanctions directed at impeding Russia's development and its Fuel & Energy Complex, in particular. Today, against the background of the current political situation, the energy strategy of Russia is exposed to adjustment. In order to develop the theme, the author specifies current tendencies, describes the action of Moscow at international energy market and as a result gives a forecast. Russia has the important task of ensuring technological independence on the energy sector on the basis of import substitution of the equipment, broad diversification of the directions of export of energy resources, preservation of leading positions in the world market of peaceful nuclear energy, stabilization of world oil prices etc. The author concludes that the external energy strategy of Russia is important part of foreign policy strategy of the country, and it is focused on practical cooperation with all countries and is aimed at protecting interests of the state.

Keywords: international relations, cooperation, energy policy, sanctions.

Introduction

Energy interests traditionally play a huge role in Russia's international policy. Relevant tendencies of foreign relations, acute contradictions between states and transnational companies as rivals at energy markets, battle for establishing total control of transit corridors – all these factors influence Russia's foreign and domestic energy policy. Given that international relations have become the zone of confrontation, with economics and energy sector being hostages of the geopolitical games. External energy ties have to be adjusted to dynamically changing rules of international cooperation. Unfortunately, the standards of peaceful world's existence are devastating including vigorous violation of international laws, evasion of Security Council resolutions etc., that are not solving interstate tensions and contradictions.

This state of affairs is not enough for the USA administration that clearly set the goal to expand its hegemony to new capacious markets. Evidently the energy EU market is a great base for that. But there is a big problem: it is occupied by energy companies of Russia. So "the winter is coming" for the whole country. The US initiated a broad campaign against Russian threat, blocked Ukraine for secure transit deliveries to Europe, implemented sanctions against Moscow, calls for blocking advantageous for the EU project Nord Stream 2. As the main partner of the USA, Europe supported anti-Russian restrictions. US/EU companies are forbidden from participating in technology-intensive Arctic deep-water, shale, and heavy oil projects. Russian companies, however, are used to relying on foreign partners and do not yet have the capabilities for solo exploration and development in deep-water. As West Siberia - the bedrock of the Russian oil industry - continues to mature, venturing into frontier projects will be essential for maintaining stable output [1]. But the American international policy is not the subject of this article. Ultimately we are interested in Russia's energy policy in the

context of above-mentioned conditions. As a result, Russia found itself between a rock and a hard place (on the one hand – sanctions, one the other hand – low oil prices), within the condition of credibility gap. Energy sector suffered the greatest losses: embargo concerns high-technology equipment, important investment programs were squeezed, joint programs of Arctic oil and gas fields' exploitation were frozen, Russian energy giants – Gazprom, Gazpromneft, Rosneft, Transneft etc. were deprived of cheap borrowings. The sanctions against Russian energy sector, and Russian counter-sanctions in 2014-2017, are listed in Table 1.

Table 1: western sanctions against Russian energy sector, and Russian counter-sanctions in 2014-2017

Year	Country	Sanctions against Russian energy sector	Russian counter-sanctions
2014	USA	*April 11* – sanctions against Crimean company "Chernomorneftegaz" *July 16* – sanctions against: Russian energy companies ("Rosneft", Russia's largest independent gas producer "Novatec") and Feodosia oil terminal; Russian banks ("Vnesheconombank", "Gasprombank") – prohibition of debt financing for more than 90 days *September 12* – restrictions on cooperation with Russian energy companies ("Gasprom Neft", "Lukoil", "Gasprom", "Surgutneftegas", "Transneft", "Rostech")	*March 28* – mirror sanctions lists against USA, EU, Canada *August 7* – one year import restriction on certain goods from countries that imposed sanctions (list included products, raw materials and food country originaing from the United States of America, European Union countries, Canada, Australia and Norway) *August 11* – restrictions on government procurement of foreign goods of light industry
	EU	*May 12* – asset freeze of 2 Crimean companies (Chernomorneftegaz and Feodosia) *August 1* – restricted access to EU capital markets for Russian state banks ("Sberbank", "VTB", "Gasprombank", "Rosselhosbank", "Vnesheconombank"); prohibition of the export from EU of goods for a number of projects in Russian oil industry (in particular, several types of pipes and drilling tools) *September 12* – the same sanctions against others Russian enegry companies ("Rosneft", "Transneft", "Gasprom Neft"); european companies are prohibited to provide Russian partners with exploration and production services of deepwater and Arctic oil, as well as for projects of shale oil *December 20* – a large expansion of the list of goods and technologies of energy sector that can't be exported to Crimea and for the use in the Crimea (oil and gas exploration and production)	
	Canada	*April 12* – sanctions against Crimean company "Chernomorneftegaz" *April 29* – sanctions against Russian banks ("Rosenergobank", "Expobank") *July 24* – sanctions against Russian energy companies (in particular, "Vnesheconombank", "Gasprombank", "Novatec") – cessation of financing to energy companies and financial institutions from "the black list"	
	Ukraine	*May 26* – general joining to the EU sanctions against Russia *August 14* – adoption of Sanctions law that permits the termination of transit of energy resources through Ukraine	
	Albania Iceland Liechtenstein Montenegro Norway	*October 15* – general joining to the EU sanctions against Russia	
	Australia	*June 19* – sanctions against several Russian companies (including "Chernomorneftegaz") *September 1* – prohibition of export of weapons and equipment for the oil and gas sector to Russia; access of Russian state banks to the Australian capital market; investments into / trade with the Crimea	

	Japan	*August 5* – sanctions against Crimean companies "Chernomorneftegaz" and "Feodosia"	
2015	USA	*July 30* – sanctions against subsidiaries of "Vnesheconombank", "Rosneft"	Mirror extension of the sanctions lists against countries that imposed sanctions to Russia *June 24* – a one-year renewal of special economic measures against the Western countries from August 6, 2015 to August 5, 2016 *July 29* – order on waste disposal of products under embargo (enterded into force August 6, 2015) Food embargo against Albania, Montenegro, Iceland, Liechtenstein and Ukraine
	EU	*March 14* – sanctions renewal against Russian companies until September 15, 2015 *June 22* – economic sanctions renewal until January 31, 2016	
	Canada	*February 18* – sanctions against Russian oil company "Rosneft" *June 29* – sanctions against "Gasprom", "Gasprom Neft", "Surgutneftegas", "Transneft"	
	Ukraine	*December 30* – import prohibition related to all the goods originating from the Russian Federation	
2016	USA	*September 1* – sanctions against subsidiaries of "Gasprom"	*June 29* – renewal of the food embargo from August 6 2016 until December 31, 2017
	EU	*July 1* – sanctions renewal against Russian companies until January 31, 2017	
	Ukraine	*July 6* – renewal of import prohibition related to all the goods originating from the Russian Federation (until December 31, 2017)	
	Montenegro Albania Norway Liechtenstein	*October 15* – general joining to the EU sanctions against Russia	
2017	USA	*January 13* – sanctions renewal for one year *June 20* – restrictions for Sergey Nazarov, Deputy Minister of economic development of the Russian Federation *August 3* – tightening of the sanctions regime against Russia; restrictions on the transfer of American technology to exploration and production of Russian oil, for deep water, Arctic offshore and shale formations (not only for companies under sanctions, but for all oil and gas projects); restrictions on the supply of technologies and services required for the construction of pipelines and on energy companies financing from USA. Persons investing in the energy sector in Russia, can also fall into the black list. U.S. policy should among other things be to oppose the construction of the pipeline "Nord stream — 2".	*June 30* – conter-sanctions renewal until December 31, 2018

The Key Development Vectors of Modern Russian Energy Policy in the Context of Western Sanctions

In this article the author used mainly sources and domestic media in Russian language (Energy strategy, Energy companies press releases, CDU TEK, Ministry of Energy of Russian Federation) with adding statistic data from official foreign Internet editions (Cambridge Econometrics) and news agencies (Reuters, Financial Times). The article highlights experts' opinions (Bloomberg and McKinsey) on the range of relevant issues.

Research question is "What are the key development vectors of modern Russian energy policy in the context of Western sanctions?" In order to answer this question (research design), the author gives good grounds for modifying old Energy strategy of Russia, specifies current tendencies, describes the action of Moscow at international energy market and as a result gives a forecast, with using the methodologies of system and analytical approach, synthesis, review, benchmarking assessment and deduction.

Although this research was carefully prepared, the author is still aware of its limitations and shortcomings. It's impossible to take into account all factors in the multiple international energy landscape. One single action or a law can change the world energy balance, so the author has to make certain assumptions based on real facts all other things constant.

Granting geopolitical background in the world, policymakers of the Russian Federation modify the National Energy Strategy, adopted in 2009. In order to optimize goods structure of exporting energy resources and to decrease dependence of the federal budget on world oil prices, Russian government implemented "tax maneuver". It really reduces oil products export duties and increases production tax [2].

Another step of domestic changes in the National Energy Strategy is the technological one. Russia places greater focus on technological independency of Fuel & Energy Complex based on import substitution of the "illicit" equipment. In theory that should reanimate the range of Russian enterprises and stimulate economic development.

Home energy policy heavily tied to its foreign component. Russia is bound to diversify export directions of energy sources, with maintaining and reinforcing energy cooperation with its traditional partner – Europe, despite current political confrontation. Energy sphere inevitably will be the center of seeking for touch points between Russia and Europe. It is notorious that the European Union plans to decrease energy dependence on Moscow through expanding its list of energy resources suppliers and transiting to Renewable Energy Sources, innovative initiatives etc.

But we are supposed to see the results of these processes on a long-term horizon. Nowadays notwithstanding the European anti-Russian rhetoric, the figures of interstate energy cooperation show sustainable growth, with Russian oil and gas companies at the top-list of biggest energy resources suppliers [3].

The Europe's dependence on foreign oil supply (mainly including Russian companies) increased from 76% in 2000 to more than 88% in 2016 and this demand is still in growth. Russia is a main Europe's supplier of oil products with more that 30% share [4]. Rosneft and Lukoil lead the list of biggest oil exporting companies.

Natural gas is also a weak point of the EU in terms of suppliers' diversity. Russia (mainly Gazprom) remains the leader of gas deliveries to the Old World; Norway takes the second place in this field. At year-end 2016 Gazprom is reported to intensify its influence on Europe natural gas market with increasing its share in import by 2,5 % to 33,5% [4]. Despite this tendency of growth Gazprom's export monopoly is considerably challenging both legally and practically by new producers, with several producers lobbying the regime for more flexibility when it comes to the issuance of export licenses.

After the project “South stream” being frozen, Gazprom was continuing to look for appropriate alternatives, one of that has become “Turk Stream” [5]. The offshore part of the pipeline will cross the Black Sea bed. Maximal depth along the route will reach 2,200 m. The length of the offshore part will amount to 910 km.

As planned, the Turk Stream pipeline will surface on the shore of the European part of Turkey near Kıyıköy with gas delivery point at Lüleburgaz for the Turkish customers, and a border crossing between Turkey and Greece in İpsala serving as delivery point for the European customers. Construction of the Turk Stream gas pipeline was commenced on May 7, 2017 in the Black Sea near the Russian coast. On June 23, 2017, the docking of the shallow and deep-water parts of the Turk Stream gas pipeline took place and the laying of the deep-water section started [6].

Another ambitious project of Gazprom - Nord Stream 2 gas pipeline (fig 2) is suggested to extend from the Russian coast of the Gulf of Finland to the German coast at Greifswald. Many analysts believe that this project has attracted undue attention, as it is merely a commercial undertaking. Moreover, Nord Stream 2 has been found by Europe’s legal services to be consistent with existing European law. Other experts continue to express concerns about the increasing of the Gazprom’s monopoly and non-fulfilment of planned diversification of the EU energy supplies and supply routes. There is a skeptical approach among European policymakers, so the project’s proponents and opponents are unlikely to agree on a joint assessment of the project any time soon.

According to the competent American edition Bloomberg, "The United States government," the last Senate anti-Russian sanction bill says, "should prioritize the export of United States energy resources in order to create American jobs, help United States allies and partners, and strengthen United States foreign policy"[7]. It seems aimed against Nord Stream 2 that proves above-mentioned suggestions about the US intention of gaining European energy market.

The key goal of Nord Stream 2 consists in bypassing unstable Ukraine from gas transit corridor. In the past the unpleasant incidents initiated by Kiev have already expose Europe to danger of being frozen. The European Union has to choose between its own energy security and both the wish to please the United States administration and support Ukrainian authorities.

Contradictory relations with Europe make Russia look for other vectors of external energy partners. In this regard Moscow is trying to become an active participant of energy space in Asia-Pacific Region that is correlating with Russia’s international economic policy. Russia possesses necessary possibilities for “east expansion” – vast territories, favorable geographic position, enormous resource potential required by neighbors, external policy based on non-interference in internal affairs of other countries. But there are some difficulties: inveterate distrust in relations, intense competition for conquering perspective Asian markets, lack of Far East region’s infrastructure development and the necessity of its correlating with regional transport arteries. For establishing conditions of intensifying export-import relations with Asian states Moscow can participate in creating trade corridors within such projects as “Eurasian initiative” and “Silk Road Economic Belt”.

Russian atomic industry maintains leadership at the world market of peaceful nuclear development. The key projects of this sector are Busher-2 in Iran, Kudankulam in India, Tianwan Atomic Power Station (APS) in China, Ruppur in Bangladesh, Paksh-2 in Hungary, Hanhikivi in Finland and Akkuyu in Turkey [8]. Moscow is interested in expanding export geography of high-tech solutions, which are able to bring not only economic dividends but political ones too. For example, an APS built by specific technology will require further maintaining by country of origin and concrete fuel for ensuring the function security. That is all can confine the possibility of sanction and other discriminating measures.

Moscow continues consistently to pave the way for maintaining the federal budget, benefiting from oil production cuts up till March 2018. The Cartel and other non-OPEC countries have vowed to rebalance the global market after the halving of oil prices since 2014 decimated the budgets of oil-

dependent producers [9].

Prior to the agreement, Russia had also reached a new post-Soviet oil peak, surpassing expectations from abroad. The ramp-up has been partly driven by development of condensate-rich gas fields in the Urengoi area. Brownfields have also experienced better decline rate management and more investment [10].

For Russia this agreement is a victory of energy diplomacy, because this means the more or less stable oil prices, consequently a ruble's solid rate of exchange and a permanent budget revenue. While the government previously admitted that it had higher hopes for the agreement, expecting oil prices to stabilize at around USD55-60/bbl., it has no regrets in backing OPEC and believes the market situation has improved. If the deal is extended, it will be hard for participating companies in Russia to withdraw. This gives them the opportunity to focus on exploration efforts and grow their resource base while the market rebalances.

Conclusion

Russia's economy has stabilized after the dramatic drop in the price of oil in 2014 and 2015, but the future of Russia's Fuel & Energy Complex, and its precise interaction with global energy actors, are hard to predict. What is clear, given the importance of energy sector to the Russian economy and given Russia's leading role on the global oil and gas landscape, is that the fate of these industries in Russia will significantly determine the country's economic trajectory. In turn, understanding Russia's oil and gas future will be essential for an understanding of broader global energy markets.

To sum up it's necessary to underline that even in the context of credibility gap Russia is ready to hold a dialogue on the energy agenda. Moscow is modifying its energy strategy to maintain and expand external markets and in the meantime the biggest country in the world is trying to modernize economics, technically re-equip its production and increase immunity to menaces and challenges.

Endnotes

[1] Nikitina A. (May 2017), "Russia's role in the OPEC supply cut agreement", *Energy Insight by McKenzie*. [Online], [Retrieved August 31, 2017], https://www.mckinseyenergyinsights.com/insights/russia-s-role-in-the-opec-supply-cut-agreement.

[2] Federalnyy zakon "O vnesenii izmeneniy v chast vtoruyu Nalogovogo kodeksa RF i otdelnye zakonodatelnye akty RF" ot 24 noyabrya 2014 g.№ 366-FZ [The Federal Law "On the Modification of Part Two of the Tax Code of the Russian Federation and Separate Legal Acts of the Russian Federation" of November 24, 2014 no. 366-FL]. [Online], [Retrieved August 29, 2017], http://publication.pravo.gov.ru/Document/View/0001201411250011.

[3] Top-suppliers of oil and gas to Europe (%, the end of 2016) [Online], [Retrieved August 31, 2017], http://2celsius.net/80-of-eu-oil-imports-supplied-by-non-european-companies/

[4] Energeticheskaya politika Rossii: yevropeyskoye napravleniye [Energy policy of Russia: European direction]. (February 2017), [Online], [Retrieved August 29, 2017], http://www.mnenie.lv/enjergjetichjeskaja-politika-rossii-jevropjeijskoje-napravljenije?action=print.

[5] Kobzeva O., Alissa de Carbonnel. (August 2017), "Russian gas pipelines to go ahead despite U.S. sanctions", *Reuters*. [Online], [Retrieved August 30, 2017], https://www.reuters.com/article/us-russia-sanctions-gazprom-analysis-idUSKBN1AJ1AN

[6] "The Turk stream Project is aimed to provide security of supplies to Turkey and European countries", *Official web-site of Gazprom*. [Online], [Retrieved August 31, 2017], http://www.gazpromexport.ru/en/projects.

[7] Bershidsky L. (June 2017), “European leaders suspect the senators were pursuing U.S. economic interests at Europe's expense”, *Bloomberg View*. [Online], [Retrieved August 30, 2017], https://www.bloomberg.com/view/articles/2017-06-16/u-s-russia-sanctions-punish-europe-too.

[8] Rossiya zanimaet pervoe mesto po stroitelstvu AES za rubezhom. Rossiyskie proekty za rubezhom [Russia gas a world lead in the building of Atomic Power Station abroad. Russian projects abroad] (July 2017), *Energynews*. [Online], [Retrieved August 31, 2017], http://energynews.su/29021-rossiya-zanimaet-pervoe-mesto-po-stroitelstvu-aes-za-rubezhom-rossiyskie-proekty-za-rubezhom.html

[9] Shappard D., Raval A. (May 2017), “OPEC agrees to extend oil supply cuts into 2018”, *Financial Times*. [Online], [Retrieved August 30, 2017], https://www.ft.com/content/babd5544-4132-11e7-82b6-896b95f30f58.

[10] Nikitina A. (May 2017), “Russia’s role in the OPEC supply cut agreement”, *Energy Insight by McKenzie*. [Online], [Retrieved August 31, 2017], https://www.mckinseyenergyinsights.com/insights/russia-s-role-in-the-opec-supply-cut-agreement.

References

Bershidsky L. (June 2017), “European leaders suspect the senators were pursuing U.S. economic interests at Europe's expense”, *Bloomberg View*. [Online], [Retrieved August 30, 2017], https://www.bloomberg.com/view/articles/2017-06-16/u-s-russia-sanctions-punish-europe-too

Bolks S.M., Al-Sowayel D. (2000) How long do economic sanctions last? Examining the sanctioning process through duration, N.Y.

Dvorkovich: privatizatsiya “Rosnefti” vozmozhna v 2016 g., esli budet nayden pravilnyy sposob [Dvorkovich: Privatization of “Rosneft” Is Possible in 2016 if the Correct Way Is Found] (2016). *Rambler.novosti*, [Online], [Retrieved August 30, 2017], http://news.rambler.ru/business/33130600/?track=latest_newslist

Energeticheskaya politika Rossii: yevropeyskoye napravleniye [Energy policy of Russia: European direction]. (February 2017), [Online], [Retrieved August 29, 2017], http://www.mnenie.lv/enjergjetichjeskaja-politika-rossii-jevropjeijskoje-napravljenije?action=print

Energeticheskaya strategiya Rossii na period do 2030 goda: (utverzhdena Rasporyazheniem Pravitelstva RF ot 13 noyabrya 2009 g. № 1715-r [Energy Strategy of Russia for the Period Till 2030: (Approved by the Order of the Government of the Russian Federation on November 13, 2009 no. 1715-r)]. [Online], [Retrieved August 29, 2017], http://minenergo.gov.ru/activity/energostrategy

Escriba-Folch A. (2008), Economic sanctions and the duration of civil conflicts, Barcelona.

Global Energy Dialogue: Rusian Oil and Gas. (June 2017), *SIPA Center on Global Energy Policy*. [Online], [Retrieved August 31, 2017], http://energypolicy.columbia.edu/sites/default/files/energy/CGEPRussianOilandGasGED0717.pdf

Guliev, I.A., Litvinyuk, I.I. & Mekhdiev, E.T. 2016, "The newest tendencies of the world market condensed natural gas: Preconditions expansions of export potential Australia, Canada, Russia and the USA", *SOCAR Proceedings*, № 2, 56-66.
Guliyev, I., Litvinyuk, I. 2017, "Issues for long-range projection of international energy markets through the prism of sustainable development", *International Journal of Energy Economics and Policy*, vol. 7, № 2, 296-303.

Guliyev, I.A., Mekhdiev, E.T. 2017, "The role of fuel and energy sector in the Eurasian economic community integration process", *International Journal of Energy Economics and Policy*, vol. 7, № 2, 72-75.

Hufbauer G., Schott J.J., Elliott A. (1991) Economic Sanctions Reconsidered: History and Current Policy Paperback. N.Y.

Kashulin D, Kuznetsov I. (2016), "Energy strategy of Russia in the conditions of economic crisis", Science Journal of VolSU (History. Area Studies. International Relations), Vol. 21, № 4, 143-150.

Kaplan R. (2016), Gryadushchaya anarkhiya v Evrazii [Eurasia's Coming Anarchy]. *Rossiya v globalnoy politike* , № 3, 111-123.

Kobzeva O., Alissa de Carbonnel. (August 2017), "Russian gas pipelines to go ahead despite U.S. sanctions", *Reuters*. [Online], [Retrieved August 30, 2017], https://www.reuters.com/article/us-russia-sanctions-gazprom-analysis-idUSKBN1AJ1AN

Mastepanov A.M., Shafranik Yu.K. (2014), "Rossiyskaya energetika: vybor razvitiya v novykh usloviyakh" [Russian Energy Sector: Choice of Development in the New Conditions], *Energeticheskaya politika*, № 5, 21-31.

Minfin SShA obyasnil tsel sanktsiy protiv Rossii [The Ministry of Finance of the USA Has Explained the Purpose of Sanctions Against Russia] (March 2016), *RIA Novosti*. [Online], [Retrieved August 31, 2017], http://ria.ru/economy/20160330/1399658127.html

Nikitina A. (May 2017), "Russia's role in the OPEC supply cut agreement", *Energy Insight by McKenzie*. [Online], [Retrieved August 31, 2017], https://www.mckinseyenergyinsights.com/insights/russia-s-role-in-the-opec-supply-cut-agreement/

Official Journal of the European Union. (2014) European Commission, Brussels.

Prezident Litvy podpisala pismo protiv proekta "Severnyy potok-2" [President of Lithuania Has Signed the Letter Against the Nord Stream-2 Project] (March 2016), *RIA Novosti*. [Online], [Retrieved August 31, 2017], http://ria.ru/world/20160317/1391684908.html

Proekt Energostrategii Rossiyskoy Federatsii na period do 2035 goda (red. ot 17.02.2017) [The Project of the Energy Strategy of the Russian Federation for the Period Till 2035 (amend.of February 17, 2017)]. [Online], [Retrieved August 29, 2017], http:// minenergo.gov.ru/node/1920

Rossiya zanimaet pervoe mesto po stroitelstvu AES za rubezhom. Rossiyskie proekty za rubezhom [Russia gas a world lead in the building of Atomic Power Station abroad. Russian projects abroad] (July 2017), *Energynews*. [Online], [Retrieved August 31, 2017], http://energynews.su/29021-rossiya-zanimaet-pervoe-mesto-po-stroitelstvu-aes-za-rubezhom-rossiyskie-proekty-za-rubezhom.html

Shappard D., Raval A. (May 2017), "OPEC agrees to extend oil supply cuts into 2018", *Financial Times*. [Online], [Retrieved August 30, 2017], https://www.ft.com/content/babd5544-4132-11e7-82b6-896b95f30f58

Sulakshin S. (October 2014), MVF: snimaya masku [International Monetary Fund: Unmasking]. *Tsentr Sulakshina*. [Online], [Retrieved August 30, 2017], http://rusrand.ru/analytics/mvf-snimaja-masku

The Office of the United States Trade Representative (USTR). (October 2015) Summary of the Trans-Pacific Partnership Agreement. [Online], [Retrieved August 29, 2017], https://ustr.gov/about-us/policy-offices/press-office/press-releases/2015/october/summary-trans-pacific-partnership

The Turk stream Project is aimed to provide security of supplies to Turkey and European countries, *Official web-site of Gazprom*. [Online], [Retrieved August 31, 2017], http://www.gazpromexport.ru/en/projects

Treasury's Office of Foreign Assets Control. (2014) Sectoral Sanctions Identifications List, Washington D.C.

Trenin D. (December 2014) Konets soglasiya: chego khochet Evropa ot Rossii [End of Consent: What Europe Wants From Russia]. *RosBiznesKonsalting*. [Online], [Retrieved August 31, 2017], http://rbcdaily.ru/politics/562949993171112

Legal Aspects of Corporate Management within the Pre-Bankruptcy Period in the Context of Russian Bankruptcy Legislation Reforms

Elena Pirogova, Associate Professor, National Research University Higher School of Economics, Moscow, Russia, e-mail: pirogova-el@yandex.ru
Yulia Zhukova, Associate Professor, National Research University Higher School of Economics, Moscow, Russia, e-mail: julia-jukova@yandex.ru

Abstract

The present paper is aimed at identifying legal barriers to effective organization of a corporation's crisis management within pre-bankruptcy period. At the moment, there is a lack of legal regulation of interaction between corporate management bodies in case when temporary financial difficulties can be overcome due to efficient management policy. Reformation of bankruptcy legislation reflects search for the best model of distribution of rights and obligations within a corporation at the stage of bankruptcy predication. However, the conducted study shows that the proposed model is not logical enough. The analysis of the recently introduced innovations reveals that bankruptcy legislation still does not take into account the subtleties of corporate legislation and the specifics of the position of sole executive body (or the "head of the debtor" in the terminology of the Bankruptcy Act) in the corporate management system. The authors discover insufficiently clear definition of the subjects of responsibility for late submission of bankruptcy petitions. Besides the reforms leave out of account the difference in the issues of convening an extraordinary general meeting in different types of corporations. The research covers the issues of protective mechanisms encouraging a corporation's managers to adopt proactive bailout measures.

Keywords: Crisis management, bankruptcypredication, obligation to file a bankruptcy petition, bankruptcy

Introduction

Economic unsteadiness nationwide causes the increase of incidents of financial instability at the "micro level": numerous commercial entities which used to function successfully before face a crisis period. Finding themselves on the verge of bankruptcy can be typical for many companies, even if it occurs due to an unfavorable coincidence of temporary circumstances. In such cases it is a matter of vital importance not to aggravate the situation by negative consequences of corporate conflicts. In its turn, taking into consideration the specifics of bailout measures, the absence of detailed legal regulation leads to the development of individual approaches to the standards of due behavior of the members of the management bodies, in the period when they have to take risky decisions in the interests of a corporation. Meanwhile, these decisions are not always taken under the conditions of unanimous consent. In connection with this, the present study is supposed to identify the main legal barriers to the implementation of effective antirecession policy as well as outline the prospects for optimizing the regulation of actions of a corporation's managers within the pre-bankruptcy period.

Literature Review

The notion "pre-bankruptcy period" is not regarded as a full-fledged legal term, while economic content does not correspond to the content of bankruptcy signs under «The Insolvency (Bankruptcy) Act» (hereinafter - the Bankruptcy Act). The theory of crisis management distinguishes four stages of pre-bankruptcy, from emergence of financial instability to the bankruptcy itself (Zharkovskaya et

al., 2011). Unlike economic ones, legal signs of insolvency are based on the fact of the existing unpaid debt. Only the actual inability to meet creditors' claim for a certain sum within a certain period, regardless of economic reasons, is important for initiating a bankruptcy case (Art. 2 of the Bankruptcy Act).

The heterogeneity of the concept of "pre-bankruptcy period" causes the need for complex studies at the interface between economics and law, but currently it is difficult to talk about full-fledged interaction of representatives of these sciences. Studies in the field of crisis management and financial diagnostics of enterprises are very extensive. It is important to mark out the role of academic works of the following scientists: Bobyleva A. (Bobyleva et al., 2015, Bobyleva and Lvova, 2016), Lvova O. (Lvova and Bobyleva, 2014), Zaytseva O. (Zaytseva, 1998), Goncharov M. (Goncharov, 2001), Zharkovskaya E. (Zharkovskaya et al., 2011), Korotchenkov A. (Korotchenkov, 2016), Kochetkova A. (Kochetkova and Kochetkov, 2017) etc.

Yet, taking into account instability and often inconsistency of legal regulation of the period of taking bailout measures, it should be recognized that current legal studies in this field do not cover significant aspects. However, profound regulation could favor effective implementation of the achievements of scientists in the field of crisis management. Until July 2017 there had been no development of legislation regulating the activities of the debtor as well as founders, members of management bodies, creditors, etc. during pre-bankruptcy period. Accordingly, legal studies in specified this area are not numerous.

In the area of bankruptcy prevention, it is worth to mention articles by Karelina S., Professor of the Department of Entrepreneurial Law of the Moscow State University, reflected in the section References (Karelina, 2013, 2011). Besides, significant contribution was made by the researchers of Perm University, who prepared a number of articles on legal framework of bankruptcy prevention (Golubtsov et al., 2014; Zhukova and Kondratieva, 2012).

As for studies on specifics of a corporation’s management at the pre-bankruptcy stage, interaction of management bodies and correlation of corporate and bankruptcy legislation, it is necessary to emphasize the deficiency of scientific research on these issues. The matters of corporate management during the crisis period haven’t been examined in details yet. Sufficient attention is paid to the issues of liability for committing unlawful acts on the threshold of bankruptcy. However, in view of the legislation’s rapidly changing it is still impossible to assert existence of a profound theoretical foundation.

Data and Methodology

The methodology of the presented study is based on the analysis of the current provisions of Russian bankruptcy legislation in correspondence with corporate one and the results of the latest reform of bankruptcy law, which is devoted directly to rights and responsibilities of participants in corporate relations on the threshold of bankruptcy. Furthermore we have studied materials of court practice on the issues of bringing the head of the debtor to liability for failure or untimely submission of a bankruptcy application during the last 3 years in order to identify trends in the increase of cases of using subsidiary liability mechanisms for the benefit of meeting of creditors’ claims.

Research Questions

As it has been mentioned above, the pre-bankruptcy period can be conventionally divided into two stages from the legal point of view. Although at the first is the stage "economic" signs of bankruptcy already exist, there are no formal legal signs of bankruptcy, and, therefore, the grounds for the creditor's appeal to the court. At the second stage the signs of bankruptcy appear according to Article 3 of the Bankruptcy Act. The first stage falls only under partial regulation by the Bankruptcy Act and is referred to as "bankruptcy predication". The predication of bankruptcy is interpreted as the debtor’s awareness of inability to meet the obligations that will occur in the future (Telukina, 2004: 126).

Thus, the moment when it should become obvious exactly for the debtor's head is of significant importance.

The procedure of carrying out bailout measures and their composition are not duly regulated yet. The Law only indicates the possibility of taking measures aimed at restoring the debtor's solvency (Articles 30-31 of the Bankruptcy Act). In the absence of such regulation, those responsible for the corporation's sustainability have to be guided only by the general framework of current legislation. No special regime provides benefits and / or a special procedure for taking bailout measures. Adequacy of legal regulation depends on the ability to encourage managerial actions aimed at achieving financial sustainability without unreasonable risk of qualifying such actions as misbehavior.

It is worth notifying that on July 29, 2017 the Bankruptcy Act was significantly amended, and to some extent the amendments concern the complexity of a corporation's structure as well as the division of powers between its bodies. Until then, the provisions of the Bankruptcy Act focused mainly on the debtor's CEO and his |her duties in the situation of threat or real signs of insolvency, whereas proper attention was not paid to the role of other bodies. Meanwhile, other management bodies frequently consider it necessary to avoid the initiation of bankruptcy proceedings and to use all available means to improve the situation without drawing someone's attention to it.

Results and Discussion

Formally, in the presence of any of the circumstances listed in Article 9 of the Bankruptcy Act, the CEO is authorized and simultaneously obliged to file bankruptcy petition regardless of the approval of the appropriate collegial management body. This was fixed in the Decree of the Plenum of the RF Supreme Court №29 of 15/12/2004. Moreover, the CEO is obliged to apply "*in the shortest term,* but not later than in a month from the date of occurrence of relevant circumstances" (Par. 2 of Article 9 of the Bankruptcy Act).

Until 29/07/2017 a non-appeal to the court in the presence of formal grounds entailed only the chief manager's personal responsibility. Presently the composition of those responsible for initiating the bankruptcy process has been expanded. According to clause 3.1 of Article 9 of the Act, "if the debtor's head did not apply to the arbitration court with an application of the debtor within a specified period and the grounds for the appeal were not eliminated, within ten calendar days from the expiry of this term, those who are entitled to initiate the convening of an extraordinary general meeting of shareholders of the debtor, or others controlling the debtor, are obliged to demand a meeting of the debtor's management body entitled to initiate liquidation of the debtor, in order to take a decision to appeal to the arbitration court with a bankruptcy petition. The meeting must be held in no later than ten calendar days from the day the claim for its convocation is filed. This body is obliged to take a decision to appeal to the arbitration court if the relevant circumstances are not eliminated by the date of its meeting". In its turn, the Article 61.12 now provides subsidiary liability for the failure or untimely filing of the debtor's application for all those obliged to apply to the court, as well as for those responsible for convening a meeting to make a decision on filing applications of the debtor to the arbitration court, and / or adoption of this decision.

The purpose of the research is to evaluate the potential effectiveness of these innovations for the purpose of optimizing a corporation's management during the crisis period. In fact, the most valuable amendment is joint responsibility of all those who have the opportunity to influence application to a court. The introduction of joint responsibility, undoubtedly, allows to reduce risks of the actual pressure on the CEO by the shareholders and the board of directors in order to prevent the filing of an application and the transfer of all responsibility for such failure to the CEO. Nonetheless, it should be noted that "pitfalls" still remain, so further attention will be focused on them.

The Scope of Obligated Persons

First of all, the introduced rule does not clarify the composition of those who are obligated to convene a general meeting. Those entitled to claim for convocation of an extraordinary general meeting, for example, under the Law "On Joint-Stock Companies", include a revision committee, an auditor, and shareholders possessing at least 10% of voting shares. At the very least, they should be somehow informed about the transformation of their right to claim for convocation of a general meeting into an obligation. How are they offered to learn about the circumstances referred to in Article 9 of the Act, and, moreover - about the expiry of the term of the sole executive body's obligation to apply to the court? It seems that the Bankruptcy Act in the present edition does not distinguish the body responsible for holding a general meeting, including an extraordinary one, and those entitled to apply to this body for convocation of an extraordinary general meeting. Furthermore, the Law "On Joint-Stock Companies" claims that in case when the relevant body fails to meet the requirements for convening a general meeting, those who require its convocation have the right to apply to the court with a claim for compulsory conduct of the meeting. The Bankruptcy Act does not specify whether this right transforms into obligation, and whether the 10-day period is relevant in this case. It would be more logical to point out the obligation of the relevant body to initiate an extraordinary meeting.

Thus, in a corporation where the presence of the board of directors is mandatory (i.e. public joint stock company), those responsible for non-convening or untimely convening of an extraordinary general meeting must be members of the board of directors. In the event that the decision is not adopted at the convened general meeting, according to the logic of the Act, responsibility must be born by shareholders. Speaking about a limited liability company, where, as a general rule, it is the sole executive body that is responsible for convening a general meeting, the obligation in case of violation of his own duty to file an application becomes pointless because of the coincidence of the obligated individuals in one person. Yet, if the meeting has been convened, for instance, at the request of another authorized person, but shareholders have not taken a positive decision, then, respectively, the liability extends to them.

Moment of Creation of Obligation to File a Bankruptcy Petition

A number of controversial issues is connected with the definition of the moment of "activation" of the authorized body's obligation to convene an extraordinary general meeting. The expiry date of the term of filing a petition by the CEO which is the beginning of a 10 day period for convening an extraordinary meeting, appears to be clearly undetermined. One of the reasons for this is the uncertainty of occurrence of the initial CEO's obligation to apply to the court.

It is significant to underline the unambiguity of the date of creation of the circumstances specified in Article 9 of the Bankruptcy Act, or the date when they should become obvious to the chief manager. Meanwhile, subsequent qualification of the CEO's conduct as illegal depends on the definition of this moment. The courts consider this moment as the date of summing up the results of financial and economic activities during the calendar year, or the date of the formation of the balance sheet. In addition, creditors or insolvency officers refer to the date of the court decision to collect the debt, or the date of bringing to the tax liability, in short, the dates to which the company's obligation to pay off the debts with a particular creditor is related to. Yet, the moment of creation of the obligation is not identical with the moment of acknowledgement of impossibility to execute it.

So according to the Bankruptcy Act there is no time for the sole executive body to coordinate filing of an application with other management bodies of the corporation. Any initiatives resulting into loosing of time are more likely to lead to CEO's further possible personal responsibility in the event of insufficiency of assets. Court decisions usually contain statement that the debtor's head, having been informed about the company's financial condition, could not fail to realize the need to apply to the court ('Consultant Plus', 2017). The fact of shareholders' pressure is not of legal significance. The absence of the collegial body's consent, or even the need to raise this issue and get approval are unacceptable excuses for CEO's omission.

Interlacing the corporate bodies' competences when deciding whether to file a bankruptcy petition

It appears that the legislator adheres to a somewhat contradictory logic, pointing out that the decision of a corporation's supreme management body is mandatory only in case when the sole executive body has not applied to court on his own initiative. The secondary nature of the general meeting's decision and the absence of its necessity in case of a sole decision taken by the CEO, do not fully coincide with the basic rules of corporate law, which provide for a strict separation of bodies' competence and accountability to each other. Current civil and corporate law do not stipulate cases of alternative competence of the shareholders' general meeting and the sole executive body. The issue still requires clarity whether a decision by the supreme management body is necessary or not. And in case it is necessary, it would be reasonable to begin the initiation of the bankruptcy process with the convocation of an extraordinary meeting. This sequence of order seems to be much more logical, not only in the view of correlation with the basic rules of building a management system in a corporation, but also in terms of distribution of responsibility. It is impossible to exclude the situation of putting pressure on the chief manager during the period when the latter is already legally required to apply to the court. At the same time the board of directors or shareholders may be planning to take rehabilitation measures, such as profitable bargains, negotiations with the creditor on debt restructuring, etc. As a result, the chief executive officer will still be responsible if the bankruptcy petition is filed by the creditor, since the first person who has an obligation and courts assume the CEO's initial knowledge of the company's financial condition. Besides, the sole executive body in the joint-stock company is not authorized to claim for a convocation of an extraordinary general meeting. Joint responsibility may not occur, considering the indistinctness of the moment of time when the obligation to convene an extraordinary meeting for those who are entitled to this arises. Also, members of the board of directors can formally fulfill their obligation to hold the meeting after gaining time, and, thus, relieve themselves of liability. It is also possible that the obligation to convene the meeting is fulfilled, but the required quorum simply is not gathered, with all the ensuing consequences provided for by corporate legislation. In all these cases the head of the debtor remains the only liable person.

Current legislation does not stipulate any protective mechanisms for the head of the debtor against actual pressure put by controlling shareholders, which is still a gap. It is unlikely for the CEO to take such a radical decision on behalf of the corporation regardless of the opinion of the shareholders' opinion in standard business practice. A voluntary appeal to the court does not always lead to bankruptcy, and in this case the CEO is likely to lose his / her position. Moreover, Par. 2 of Article 61.13 claims that "if the debtor's application is submitted in case of the debtor's ability to meet the creditors' claims in full, or the debtor has not taken measures to dispute the applicant's unreasonable claims or claims made by creditors in the bankruptcy case, the debtor, the debtor's head and other individuals controlling the debtor shall be liable to creditors for damages caused by committing bankruptcy proceedings or unreasonable recognition (undisputable) of creditors' claims".

Thus, at the crucial moment the head of the debtor carries both the risk of failing the company, having hurried up with the application (and, therefore, most likely, losing the position), and the risk of being brought to further liability for a possible revealed failure to fulfill the obligation of applying to court. The CEO has "shortest time" to resolve this dilemma. Under such circumstances, especially in the context of a corporate conflict, it is not surprising that the CEO's decision may turn out to be unreasonable, according to the terminology of Article 53.1 of the Civil Code of the Russian Federation, Article 71 of the Federal Law On Joint Stock Companies, the Decree of the Supreme Arbitration Court of the Russian Federation №. 62. There is no need to establish the CEO's unconscionability for qualification his / her behavior as unlawful in order to demand compensation for the company's losses caused by such a decision, or to bring him / her to subsidiary responsibility in case of bankruptcy. Unreasonableness of his / her actions is enough.

The designated risk generates the risk of mismatch of management bodies' actions in the period of bankruptcy predication. The current Bankruptcy Act does not take into account the specifics of the debtor's head's position in the corporate management system and lack of his | her competence for making some strategic decisions. Despite the amendments, the Act still requires to take corporate decisions separately, regardless of the position of other management bodies, which potentially

reduces the effectiveness of crisis management at the corporate level.

Furthermore, in accordance with the new edition of paragraph 1 of Article 30 the debtor's head as well is obliged "to take all reasonable measures to prevent the bankruptcy of the debtor in reasonable time". It seems to be illogical that this responsibility falls solely on the CEO if speaking about a corporation. The CEO's obligation to notify other bodies and shareholders has been excluded, while the obligation to immediately publish information and whereas the obligation to solely take urgent bailout measures has been enrolled. These amendments seem to be, at least, rather controversial.

Conclusions

It is supposed that, in order to optimize the interaction of a corporation's management bodies for sorting out anti-crisis issues, it is necessary to consolidate the obligation of the head to send firstly an official notification both to the members of the board of directors, if any, and to the shareholders. Perhaps, this action should be bound to the moment when the debtor obtains the right (but yet not the obligation) to file a petition. Meanwhile, considering the terms of corporate procedures, it is not entirely fair to limit the CEO's obligation by "the shortest period". If the Act establishes the possibility of taking measures to restore the corporation's solvency, there is a certain need to provide a time space within which non-appeal to court with a petition will not be qualified as unlawful omission.

The decision to apply to court with a bankruptcy petition is proposed to be made initially at the level of the supreme corporate management body. Therefore, in case of a complex corporate structure of the company, the members of the board of directors should be primarily responsible for ensuring the timely decision. It is rational to establish the CEO's obligation to officially inform the body responsible for convening a general meeting and, accordingly, to impose subsidiary liability only in the event of its non-performance. We believe that the one-month period, currently provided for to the head of the debtor to file the application could be sufficient to convene a general meeting. In accordance with the decision of this meeting the chief manager must apply to court. The requirement to convene a general meeting just after the head of the debtor misses the time term for applying to court is undoubtedly illogical, since it can be convened immediately after revealing of relevant circumstances, without violating the corporate subordination of the supreme management body and the chief executive officer.

Considering that the bailout measures are not regulated either, and these measures are implemented outside of judicial control, taking most of these measures is always followed by risk of further liability. In this connection, amendments to the Bankruptcy Act providing the obligation to take measures solely for the chief manager are not completely constructive. The obligation to act in the corporation's favor reasonably and in good faith, and therefore - to care for its financial stability, is assigned to all members of management bodies, regardless of the pre-bankruptcy period. The imposition of additional obligations requires their detailed specification, as well as giving legal significance to actions taken to fulfill this particular obligation, in order to avoid mentioned risks. Additional regulation is needed for a corporation's management at each stage of the pre-bankruptcy period. The importance of legal tools for optimizing crisis management should not be underestimated, since gaps and contradictions in the legal regulation of activities within the pre-bankruptcy period give rise to vulnerability of key participants of the crisis management process and the potential threat of the invalidity of their activities.

References

Bobyleva, A., Zhavoronkova, E., Karelina, S., Lvova, O., Molotnikov, A., Peganova, O., Pokrytan, L., Prokhina, E., & Shitkina, G. (2015), 'Antikrizisnoe upravlenie: mekhanizmy gosudarstva, tekhnologii biznesa' [Crisis managemenr: state mechanisms, business technologies], Moscow, Russia. In Russian.

Bobyleva, A. & Lvova, O. (2016), 'Formirovanie sistemy stabilizatsionnyh I antikrizisnyh mer na federalnom v regionalnom urovne v sovremennoi Rossii' [Formation of the system of stabilizing and anti-crisis measures on federal and regional level in modern Russia], Gosudarstvennoe upravlenie. Elektronnyi vestnik (Elektronnyi jurnal) [State administration. E-bulletin (E-journal], 58, 54 – 82. In Russian.

Civil Code of Russian Federation №51-FZ at 30.11.1994, Part 1. (last amendment at 29 July 2017). 'Consultant Plus', database, Professional Version, Section 'Court practice'. (last renewal at 31 August 2017).

Federal Law №127-FZ at 26.10.2002 'On insolvency (bankruptcy)' (last amendment at 29 July 2017).

Federal Law №14-FZ at 08.02.1998 'On limited liability companies'(last amendment at 29 July 2017).

Federal Law №208-FZ at 26.12.1995 'On joint-stock companies' (last amendment at 29 July 2017).

Golubtsov, V., Kondratieva, K.,& Syropyatova, N. (2014) , 'Obespechenie balansa chastnopravovogo i publichno-pravovogo regulirovaniya v processe preduprejdeniya bankrotstva s ispolzovaniem mer, naptavlennyh na stimulirovanie doljnika k nadlejashemu ispolneniu obyazatelstv' [Provizion of balance of civil and public regulation in the process of bankruptcy prevention including measures stimulating due performance of the debtor's obligations], Vestnik Permskogo universiteta. Yuridicheskie nauki [Bulletin of The University of Perm. Legal sciences], 2, 62 – 74. In Russian.

Goncharov, M. (2001), 'Antikrizisnoe upravlenie: strategicheskiy put' obnovleniya i razvitiya ekonomiki Rossii' [Crisis management: strategic way of renovation and development of Russian economics], Doctoral thesis, St. Petersburg State University of economics and finance, St. Petersburg, Russia, 310p. In Russian.

Karelina, S. (2013), 'Mekhanizm preduprejdeniya nesostoyatelnosti (bankrotstva): mif ili realnost' deistvuushego zakonodatelstva?' [Mechanism of insolvency (bankruptcy) prevention: a myth or reality of current legislation?], Predprinimatelskoe pravo [Business law], 3, 47 – 51. In Russian.

Karelina, S. (2011), 'Pravovye pronlemy preduprejdeniya nesostiyatelnosti (bankrotstva)' [Legal problems of insolvency (bankruptcy) prevention], Predprinimatelskoe pravo. Prilojenie Biznes I pravo v Rossii i za rubejom [Business law. Addendum Business and law in Russia and in foreign countries], 3, 4 – 9. In Russian.

Kochetkova, A. & Kochetkov, P. (2017), 'Antikrizisnoe upravlenie. Instrumentariy' [Crisis management. Tools], Moscow, Russia. In Russian.

Korotchenkov, A. (2016), 'Sanatciya predpriyatiya v otrasli' [Bailout of the enterprise in the industry], Moscow, Russia. In Russian.

Lvova, O., & Bobyleva, A. (2014) 'Insolvency regulation in Russia: Current issues and prospects for reform', Norton Journal of Bankruptcy Law and Practice, 23, 5, 583–603.

Telukina, M., (2004) 'Osnovy konkursnogo prava' [Basis of bankruptcy law], Moscow, Russia. In Russian.

Zaytseva, O. (1998), Antikrizisnyy menedzhment v rossiyskoy firme [Crisis management in Russian firm], Novosibirsk, Russia. In Russian.

Zharkovskaya, E., Brodskyi B.,& Brodskiy I. (2011), 'Antikrizisnoe upravlenie: uchebnik" [Crisis management: textbook], Moscow, Russia. In Russian.

Zhukova. T., & Kondratieva, K. (2012), 'Osobennosti sovershenstvovaniya poryadka normativno-pravovogo regulirovaniya sanatsii kak sposoba obespecheniya finansovoi ustoichivosti dolzhnika' [Peculiarities of perfection of the order of legal regulation of out-of-court recovery as a method of provision of the debtor's financial sustainability], Vestnik Permskogo universiteta. Yuridicheskie nauki [Bulletin of The University of Perm. Legal sciences], 3, 101 – 106. In Russian.

Mitigating Energy Poverty at Emerging Markets: Review of Policies and Institutional Frameworks

Igbal Guliyev, Deputy Director, International Institute of Energy Policy and Diplomacy, Moscow State Institute of International Relations (MGIMO-University), Moscow, Russia, e-mail: guliyev@miep-mgimo.ru

Igor Litvinyuk, Senior Analyst, Centre for Strategic Research and Geopolitics in Energy, International Institute of Energy Policy and Diplomacy, Moscow State Institute of International Relations (MGIMO-University), Moscow, Russia, e-mail: litvinyuk@miep-mgimo.ru

Abstract

This study examines institutional arrangements that are deemed necessary for planning, coordinating and implementing energy access policies and programs for emerging markets and developing economies. The article discusses modalities for energy access partnerships, and reviews various strategies to mobilize financial resources to bridge the energy access gap, based on the examples from several developing economies.
With expanding policy dialogue, knowledge sharing, relevant partners' engagement and financial resources mobilization being considered as prerequisites to ensure universal energy access, a sector-wide development approach to energy access is proposed as key element for longstanding and substantial engagement of governmental agencies and development donors. In conclusion, the authors come up with recommendations for future financing mechanisms, and discuss the role of Sustainable Development Goals as the opportunity to increase the level of technical, financial and human resources, and achieve one of its targets – universal access to modern energy services.

Keywords: energy access financing, institutional framework, international energy cooperation, sustainable development

Introduction

Sound institutional frameworks and timely, effective intergovernmental coordination are prerequisites for channeling donor funding, planning development strategies and cooperating on cross-border power trade, as well as regulating efforts towards long-term sustainable development through competent and responsive national institution, accountable for delivering results in terms of reliability, quality and timeliness. These criteria are interrelated and depend on governmental actions and policies. For instance, reliability and quality depend on actions taken to augment capacities of grid operator, potential mini-grid operators and household system installers. Reliability and quality of service provided by grid also depend on actions taken to add and maintain adequate generation capacity and maintain network.

To satisfy country-specific development priorities, national governments should effectively manage funds and resources for targeting national development goals. Prioritization and regional initiatives could resolve competition between sectors for limited public funding. A positive and open environment for dialogue and cooperation with development partner community to finance national electrification programs, as well as knowledge exchange to help governments carry out sector reforms will strengthen institutions and improve sector performance and efficiency.

Strengthening institutional capacity involves:

- Reviewing the mandates of relevant government sectors to identify their constraints, as well as technical and financial capacities;

- Streamlining the government sectors to promote cooperation and coordination;
- Promoting collaboration between governments in planning and implementing;
- Ensuring appropriate legislative frameworks;
- Establishing appropriate regulatory framework; developing legal and institutional framework; and
- Formulating policy frameworks.

Literature Review

Engaging relevant stakeholders to build partnerships is critical, as suggested by various assessments by international organizations and development agencies, – as there are multiple roles to play and each stakeholder must be responsible for the tasks for which they have a comparative advantage. Existence of different stakeholders with clear roles and mechanisms for interaction and coordination across the value chain is key factor in building partnerships. It has been repeatedly underscored that leveraging business as much as possible to increase energy access (EA) should be a priority, as this allows it to be directed towards reaching the "last mile".

Stakeholders' Engagement

Governments play a central role in planning, regulating, measuring, policymaking and implementation, but the private sector or public institutions also balance the costs and revenues at affordable levels and ensure long-term operation of systems. For example, ESCOs in Fiji are allowed to adjust tariffs to ensure that reliable performance is viable on a site-by-site basis and to ensure that adequate financial incentives are in place for expansion of supply in rural areas.

Participation of local communities, investors and consumers in design and delivery of energy services is essential. A success factor identified in the Vietnamese rural electrification effort has been the building of effective partnerships among the state utility, local authorities and communities, specifically through sharing of costs and responsibilities. In some cases, introduction of new actors or networks such as cooperatives and associations further intensifies cooperation and initiates coherence with the larger community in the area. Building partnerships with communities ensures provision of appropriate energy services, promotes community ownership and responsibility, increases contributions of labor, time and other resources, and encourages participation in decision-making, planning and implementation. It is also critical for daily operation and maintenance. Engaging local stakeholders can make it possible to reach poor, difficult-to-reach communities with modern energy and offer opportunities for scale-up. A growing number of entrepreneurs are demonstrating – often at a relatively small but rising scale – that profitable ventures can be built in low-income markets. Local small and medium-sized enterprises (SMEs), social enterprises, non-governmental organizations (NGOs) and conglomerates are succeeding in selling modern lighting and cooking devices, off-grid electrification and, to a smaller degree, grid extension services to the poor.

Institutional development of Alternative Energy Promotion Centre (AEPC), established in Nepal in 1996 with the objective of developing and promoting renewable/alternative energy technologies, may illustrate this. Working with external development partners and domestic stakeholders, AEPC has emerged as capable and strong governmental institution for rural energy development. Initially, AEPC worked with donors on institutional development and programme implementation. The Energy Sector Assistance Programme, funded by the Danish and Norwegian governments, the Rural Energy Development Programme, funded through UNDP and the World Bank, and the Renewable Energy Programme, funded by the European Union, built up the institutional capacity of AEPC to manage sizable energy programs. After implementation of a few projects, the Government of Nepal and development partners entrusted AEPC to manage the National Rural and Renewable Energy Programme, a $170 million multi-donor-funded programme for promotion and expansion of rural energy services in remote areas.

Nowadays, AEPC supports project developers (communities, households, manufacturers, installers and distributors) in preparing bankable projects. AEPC has succeeded in establishing the Central

Rural Energy Fund as a financial institution to select banks to administer subsidies and facilitate soft credit to developers for rural and renewable energy promotion. AEPC pre-selects subsidy applications and is responsible for technical verification before submitting to the handling bank for financial verification and payment in accordance with the government's Subsidy Policy and Delivery Mechanism. Currently, AEPC is working to develop its development plan to respond to increasing demand for expanding energy services.

AEPC has earned recognition as an apex body for renewable energy technologies promotion. As a result of AEPC's efforts, nearly 3.5 million households in Nepal have benefited from various kinds of energy technologies: it has contributed to around 30MW of electricity generation through micro-hydro systems, and installation of 700,000 solar home systems and 350,000 biogas systems. Moreover, these programs have been successfully registered as Clean Development Mechanism (CDM) projects that generate revenues from carbon trading. At a broader level, Nepal has developed good policy and institutional frameworks, introducing the Rural Energy Policy 2006, Renewable Energy Subsidy Policy 2013 and Renewable Energy Subsidy Delivery Mechanism 2013, which describe technical standards for various technologies. The Government of Nepal is prioritizing renewable energy sector and attracting more external development partners to scale up renewable energy technologies in various locations.

Strategies to Mobilize Financing

Due to high initial investments and low returns associated with EA investments, governments have either directly financed EA efforts or used regulatory instruments and incentive frameworks to encourage EA investments by energy utilities. International development agencies, as well as philanthropic and impact financing, have all contributed in varying degrees to increasing EA.

Government resources, even augmented by loans, carbon finance and development assistance, will not be enough to provide such high levels of investment and there is a role for private finance to play. To engage the private sector, countries need:

- Strong financing institutions and ecosystems that can develop and implement EA projects;
- National finance architecture, consisting of national development banks, commercial banks, capital markets and structures to lower the risks of investments; and
- Progressive policy and regulatory frameworks that encourage private sector participation and investment.

The role of the private sector in EA has been generally limited to electricity generation through independent power producers or as equipment manufacturers and suppliers. The sector has been less involved in transmission and distribution verticals of electricity sector, yet being useful in making distribution infrastructure investments in areas with high concentrations of consumers, where the return on investments is likely to be better. This is challenging, however, for electrifying peri-urban and rural locations, where the concentration of households and commercial/industrial consumers is likely to be lower, and electricity demand levels are low, leading to low return on investment prospects and discouraged participation of the private sector. The government's role is to provide incentive frameworks, such as performance-based subsidies that encourage private sector electricity distribution companies to invest in electricity distribution infrastructure to provide EA to that segment of customers for which there is no clear business case.

Existing Mechanisms for Public Sector Financing

The major initiatives in EA have been supported through public finance from governments, often targeted at large-scale electrification and transition to LPG. Governments have historically used their budgets to support rural electrification, but progress has been slow. Public finance through government budgets is often the only financing option available for EA. The experiences in China and Indonesia, for example, show that EA can be achieved using a mission mode supported by public finance at scale. However, public finance may not be sufficient for addressing the EA challenge.

Domestic borrowing has played an important role in the energy sector; infrastructure bonds issued by governments and public bonds issued by institutions such as the Renewable Energy Certificate (REC) in India have been used to finance rural electrification. These bonds often have a long tenure and low returns but also low risks. Some of the bonds were tax-free. Such incentives have resulted in high investment interest – the 20-year $100 million bond with a return of 7%, issued by REC in 2015, was oversubscribed by 400%. However, domestic borrowing to finance EA has been limited to countries where bond markets and regulatory frameworks are established.

External borrowing from development agencies offering concessional and large-scale financing has been one of the key financing sources for EA. Multilateral financial institutions have been major financiers for EA. In least-developed countries (LDCs) and Small Island developing states (SIDS) in particular, where availability of local finance is limited and of low creditworthiness, special funds provide long-term, low-interest finance. Bilateral development agencies also provide financial resources but are often conditional, with the source of equipment and services limited to country providing external finance.

Development assistance initiatives through multilateral development agencies, bilateral development agencies, NGOs, etc. has also supported EA in the form of grants and technical assistance. Some of the development assistance focuses on policy and capacity-building aspects that enable environment for promoting EA and build human and institutional capacity. Others support projects and programs through which electrical or thermal EA was provided to communities. For example, Global Environmental Facility (GEF) has financed the incremental costs (additional costs for pursuing a low-carbon EA technology or approach compared to the baseline business-as-usual approach) for a number of EA projects that supported renewable energy-based EA. Also, Climate Investment Fund finances low-carbon development and climate change adaptation initiatives, offering resources to support renewable energy-based EA projects. In particular, the Scaling up Renewable Energy Programme (SREP) currently supports renewable energy investments in countries such as Maldives, Nepal, Solomon Islands and Vanuatu in the Asia-Pacific region, with plans to support other low-income countries. However, due to limited availability of resources, development projects and programs have mostly concentrated on piloting and demonstrating specific technologies, models and approaches.

Climate finance has played a significant role in supporting EA initiatives through renewable energy development. Through CDM, many countries received revenue from Certified Emission Reductions (CERs) to improve financial viability of a number of EA projects before 2012, the final year of the first commitment period of Kyoto Protocol. The Programme of Activities was instrumental in bundling small projects together to obtain financing from sale of CERs. A voluntary carbon finance market exists to offset emission reductions at institutional and individual levels through Verified Emission Reductions (VERs); however, the combined demand for CERs and VERs is currently at a low level, which limits the ability of carbon market to influence EA efforts.

Existing Mechanisms for Private Sector Financing

The private sector role has been limited primarily to manufacture and supply of systems and equipment for energy services. However, a number of initiatives have encouraged the sector to go beyond this role. Governments and development agencies have employed a number of mechanisms to attract private finance for EA, such as subsidies, tax incentives, soft loans, guarantees, etc.

Yet it is stated that more than four-fold increase from the current annual investments in EA will be needed to achieve universal EA targets under Sustainable Development Goal 7, which would require major changes in current finance architecture. The emphasis of EA financing so far has been primarily on electrification and not enough investments are being made in non-solid fuel access for thermal energy use, and progress on this has lagged behind. The level of investment in EA to non-solid fuel remains the biggest financing challenge, as this investment needs to increase by a factor of 44. A major bottleneck for financing non-solid fuel is that the current business models and financing

mostly focus on supporting cooking and space heating devices at a smaller scale than large-scale service or fuel sales-based models.

A number of developing countries have low credit ratings, limiting the ability of their governments to raise resources that are low-cost and long-term, which affects investments available for EA. Absence of local finance ecosystem that includes microfinance institutions, rural and agricultural development banks, and local debt and equity markets, constrains the ability of both public and private sectors to raise local finance for infrastructure investments. Both are particularly challenging for SIDS and LDCs.

The role of private sector and the leverage of private finance for EA investments have been limited. The private sector and public-private partnerships (PPPs) have been leveraged in electricity generation as independent power producers (IPPs) but not significantly in electrification and non-solid fuel access. Capability for developing and structuring EA projects that can attract direct private finance or PPPs will be important to reach financial resource mobilization requirements to achieve universal EA. While a number of innovations have been attempted to engage private sector investments in EA, these haven't been scaled up or replicated to significant levels.

A number of lessons may be observed from existing experience in financing EA. Domestic public finance and government subsidies are the major sources of EA finance investments in the region, followed by external borrowing assistance from MDBs, development assistance and climate finance. Public finance through subsidies and grants is limited by government budgets and not sustainable in the long term. External financial sources such as loans, development aid and climate finance have played an important role in demonstrating technologies and business and financial models and in providing policy support.

Given wide range of government and public sector capabilities, local financial institutions, private sector capabilities and local finance ecosystems, the type of resource mobilization models required in countries is likely to vary. The role of private sector needs to increase significantly; however, low returns from such investments and absence of a progressive policy and incentive framework have constrained the role played by private sector. Its participation and finance in EA can be increased through lowering risks for these investments and improving financial returns and capital recovery. Risk transfer instruments such as guarantee funds, as well as mechanisms such as incentives, soft loans, etc. to improve the investment prospects have been used and hold promise. Under the right conditions, PPPs could play an increased and highly significant role in enhancing EA. There appears to be a need to look beyond existing structures, business models and financing mechanisms to scale up finance for achieving universal EA by 2030. Alternative and innovative financing mechanisms may offer possibilities.

Alternative and Innovative Financing Mechanisms

A number of alternative and innovative approaches are being tried out to finance and implement EA initiatives, some of which may offer potential for application to scale up EA finance. Some of these are discussed below.

Crowd funding

Crowdfunding uses contributions from a large number of people. It has been in existence for a considerable period of time, but in the past few years, Internet platforms have been used to expand reach, increase transparency and reduce transaction costs. Depending on project details and finance demand, investors commit to providing equity or loans. When the financing target is met, the funds are made available to the promoter for the project to be implemented. Upon successful completion of the project or initiative, the promoter pays returns to the equity investors or pays back the loans with interest. It is estimated that the volume of global crowdfunding in 2015 was $16 billion, of which the share for renewable energy was $170 million, supporting more than 300 projects.

Increasingly, crowdfunding platforms are also supporting clean energy and EA issues. Many of such platforms are based in Europe and the United States, such as Trillion Fund, Abundance, Village Power, Solar Schools, etc., which mainly fund energy projects in the countries where they are located. However, there are sites like SunFunder, which focus on off-grid solar for renewable energy and have raised $7 million of investment in 58 loans supporting 368,000 people. The $700 million invested in Kiva microloans, which support microloans in developing countries, also offers green loans that include solar lighting and home systems and clean cook stoves. The financial regulatory frameworks for crowdfunding are emerging.

While the crowdfunding platforms are growing as an alternative means of finance for projects and initiatives, which may not be supported by commercial banks, crowdfunding share of EA projects so far has been quite small. However, crowdfunding of EA projects and initiatives could be a significant prospect for the future. Small-scale financiers could use such platforms to support EA projects in their countries. Private sector entrepreneurs and public sector agencies will determine the role of crowdfunding and, if integrated into policy and institutional frameworks for EA, crowdfunding could provide significant supplementary resources to support universal EA.

Carbon finance

Carbon finance in the form of CER and VER revenues did support a number of EA projects. But given the current low demand and low price scenario after 2012, few projects are being supported by carbon finance. The outlook for carbon markets is unclear, although the Paris Agreement has established a new market-based mechanism that will come into effect after 2020. This new mechanism may create demand for Internationally Transferred Mitigation Outcomes. The impact of the proposed mechanism will depend on demand and rules that will be developed but, in the short term, voluntary carbon market for VERs may provide some limited finance for EA projects.

Paris Agreement aims at limiting increase of global average temperature to well below 2°C above pre-industrial levels. It is committed to mobilizing $100 billion/year to support climate change mitigation and adaptation in developing countries by 2020, with a bigger resource mobilization goal by 2025. Carbon finance has already mobilized over $10.5 billion for strategic priority areas including energy. The funding can be accessed by organizations through a “direct access” route and by private sector through Private Sector Facility. It also uses a range of financial instruments – grants, loans, equity and guarantees – to support climate change projects in developing countries. Electricity access and non-solid fuel access initiatives using renewable energy and low-carbon energy sources such as LPG have the potential to benefit at scale. The emergence of carbon finance could be of importance to LDCs and SIDS, as there will not be a cap on resources that are allocated to smaller countries. However, accessing large-scale resources for EA will require mobilization of strong national institutions including private sector and ability to structure and develop a pipeline of projects.

Green Bonds

Green bonds are debt instruments for raising financial resources from the markets for “green” projects. Bonds have traditionally been used by both public and private entities to finance infrastructure projects, including EA projects. Green bonds constitute a new global effort to establish a labeling system by a number of organizations such as Climate Bonds Standard and Ceres Green Bond Principles, as well as national regulators such as China Central Bank’s green bond guidelines. It is estimated that only 11% of bonds that could be classified as “green” are actually labeled and the major locations where bonds are green-labeled are in Europe and North America. Multilateral development banks have issued green bonds, as have private companies, commercial banks and municipalities.

Green bonds represent a small segment of global bond market: “green” projects being supported by proceeds of green bonds totaling $65.9 billion include energy, buildings and industry, transport, water and waste management. However, there are no obvious financial advantages to be gained by

labeling a bond "green," although it may attract environmentally conscious investors. Existing green bonds targeting renewable energy investments are consistent with the global trend. It is possible that proceeds of green bonds issued by World Bank, ADB, KfW, etc. are supporting EA projects. Indeed, it is possible to label local currency and foreign currency-denominated bonds that target renewable energy-based EA projects as green bonds. If such green bonds result in additional foreign or local currency resources and increase the scale of resources mobilized, they could augment the financial resources needed for universal EA. Green bonds are more relevant in countries that are creditworthy and have strong financial ecosystem and are more challenging in LDCs and SIDS, although it is possible for bilateral development agencies to use green bonds from the European and North American markets to support EA projects in Asia-Pacific's LDCs and SIDS. A similar approach is applicable to bilateral development agencies from countries such as Australia, Japan and Korea, which may use domestic or internationally issued green bonds to support EA investments in other countries including LDCs and SIDS.

Another mechanism to finance and implement EA initiatives is Pro-Poor Public-Private Partnership (5P) Model approach, championed by Economic and Social Commission for Asia and the Pacific (ESCAP). It is an innovative approach for widening access to energy services for rural development. Drawing on the logic of traditional PPPs, the 5P approach aims at mobilizing private sector financing to develop rural energy utilities that are technically sustainable and ultimately financially self-sustaining. In this regard, 5P lies between profit-oriented PPPs and socially oriented grant-based projects. The 5P model differs from a traditional public-private partnership in three ways:

1. It is participatory and involves a broad number of stakeholders;
2. While profit is not disregarded, the core of the 5P approach is rural development through livelihood enhancement of the rural poor;
3. 5P is inherently cooperative rather than competitive.

Rural communities are not viewed solely as consumers of energy utility, but also as partners, through utility co-ownership and management. These partnerships are characterized by sharing investment, responsibilities, risks and rewards among partners. The role of the public sector is to facilitate these partnerships through enabling policy frameworks.

However, rural energy projects are still perceived as high-risk investments, typically with high up-front costs and low rates of return. To diminish the perceived risks in rural energy, 5P attempts to redefine the roles of energy project stakeholders, focusing on community participation and management, ownership and enterprise development. Beyond the private sector, community mobilizers, NGOs and civil society, among others, can be engaged to assist the project stakeholders in understanding the potential income-generating activities gained from productive energy use and to support livelihood development and sustainability of the energy utility.

Community-based management of rural energy utilities is not a novel concept. However, lack of appropriate training for operation and maintenance, along with minimal monitoring, has often led to long-term equipment failure, particularly in micro-hydro plants. The risk of long-term utility failure creates a large disincentive for rural energy investment. The 5P approach attempts to alleviate this risk, by engaging the private sector beyond the role of investor, as a key stakeholder in the project. A private sector stakeholder has incentive to ensure the long-term operation of the energy utility in order not to jeopardize the potential revenue generated.

Discussion

In most countries public finance alone would be insufficient to achieve universal EA by 2030, as required by SDG 7, and there is a need to leverage private finance using appropriate structures including PPPs. Governments need to establish progressive policy and regulatory frameworks to engage private sector and international finance and raise the level of resources in order to achieve the target. Integration of SDG 7 and use of Sustainable Energy for All (SE4All) tools could enable governments to attract development finance to support national plans in EA.

There is a need to improve governance, regulation and management of the electricity sector in order to increase the level of financing available to achieve universal EA by 2030. Investments in expanding existing electrical grids will likely involve governments and energy utilities playing a central role. Providing electricity access to meet Tier 1 of the Multi-Tier Framework requirements of 12Wh/day may only require relatively low levels of resources providing electricity access; however, Tier 2 requirements of 200Wh/day and higher would require much higher levels of resources. A critical factor in the financing of grid-based electrification would be the creditworthiness of the electric utilities. Many of the electricity utilities, which are often vertically integrated, are financially and operationally inefficient. Many utilities operate like government departments, often at a loss or with low return on their investments owing to low levels of bill collection and high levels of losses. The high levels of losses for utilities result from a combination of technical losses due to poor quality equipment and unchecked pilferage and theft of electricity at the distribution network level. Another reason for operational losses for energy utilities is that electricity tariffs do not reflect the cost of supply and investments. In order to ensure that electricity tariffs are cost-reflective, electric utilities are financially sustainable and the interests of all other stakeholders are balanced, there must also be an independent electricity regulator. Adequate capacity of government and regulatory agencies is important to ensure that policy and regulatory frameworks ensure financial viability of electricity utilities, thereby enhancing the creditworthiness of the utilities and associated stakeholders.

More effort is needed to develop business models and financing structures for a transition to non-solid fuels for thermal energy. The financing challenge is likely to be significant in this effort due to limited government policies and the absence of models and track records in this area.

Conclusion

SDGs provide a significant opportunity to increase the level of technical, financial and human resources for achieving EA, as well as an opportunity for development assistance agencies to increase their investments in EA projects. It is therefore important to put policies in place that ensure national efforts towards EA by governments and private sector are aligned with SDGs, and try to leverage development assistance. This is particularly relevant for LDCs and SIDS. Countries may also utilize various tools available under the SE4All framework, such as Rapid Assessment and Gap Analysis, development of country action agendas and development of investment proposals. Preparations using the SE4All tools could help countries take advantage of international and development assistance to achieve universal EA.

SDG 7 also calls for enhanced international cooperation on clean energy research and technologies that offer an opportunity for countries to collaborate. This presents an opportunity to collaborate in the area of financing mechanisms and business models for EA. International organizations and development agencies could play a facilitating role in such international cooperation efforts.

References

Akhtar Sh., Susantono B., Xu H., Rankine H., Basu S.R., Gui-Diby S.L., Sirimaneetham V., Weinberger K., Canales C., Ichimura M., Rasheed N., Uji K., Price T., Puliyel G., Han Ch.O., Rodriguez D., Karazhanova A., Tulinov S., Litvinyuk I.I., Paddison O. et al. Asia-pacific sustainable development goals outlook, United Nations, Asian Development Bank, United Nations Development Programme. Bangkok, 2017.

Asian Development Bank. (2013). Same energy, more power: accelerating energy efficiency in Asia. [Online]. ADB. [August 29, 2017]. Available: https://www.adb.org/sites/default/files/publication/30289/same-energy-more-power.pdf

Asian Development Bank. (2015). Fossil fuel subsidies in Asia: Trends, Impacts and Reforms: Integrative Report. [Online]. ADB. [August 29, 2017]. Available: https://www.adb.org/sites/default/files/publication/182255/fossil-fuel-subsidies-asia.pdf

Guliev, I.A., Litvinyuk, I.I. and Mekhdiev, E.T. (2016) 'The Latest Trends at Global Liquefied Natural Gas Market: Preconditions for Expansion of Export Potential of Australia, Canada, Russia and the USA' *SOCAR Proceedings*, 2, 056-066.

Guliyev, I. and Litvinyuk, I. (2017) 'Issues for long-range projection of international energy markets through the prism of sustainable development' *International Journal of Energy Economics and Policy*, 7(2), 296-303.

Guliyev, I.A., Mekhdiev, E.T. (2017) 'The role of fuel and energy sector in the Eurasian economic community integration process' *International Journal of Energy Economics and Policy* 7(2), 72-75.
International Finance Corporation. (2012). From Gap to Opportunity: Business Models for Scaling Up EA. IFC. Washington, D.C.

Sovacool, B.K. (2016), 'The history and politics of energy transitions', WIDER Working Paper, No. 2016/81. Helsinki: United Nations University World Institute for Development Economics Research. Available: https://www.wider.unu.edu/sites/default/files/wp2016-81.pdf

United Nations Economic and Social Commission for Asia and the Pacific. (2017). Asia Pacific Energy Portal. [Online]. UNESCAP. [August 29, 2017]. Available: http://asiapacificenergy.org/#en
World Bank. (2016). State and Trends of Carbon Pricing. World Bank. Washington, D.C.

World Bank. (2017). Global Tracking Framework 2017: Progress Towards Sustainable Energy. [Online]. World Bank. [August 29, 2017]. Available: http://www.worldbank.org/en/topic/energy/publication/global-tracking-framework-2017

Capstone - Experience with Experiential Learning Project Course at Institute of Business Management (IoBM)

Marium Mateen Khan, Lecturer, Marketing Department, Institute of Business Management, Karachi Pakistan, marium.mateen@iobm.edu.pk

Mohammad Ekhlaque Ahmed, Assistant Professor, Marketing Department, Institute of Business Management, Karachi Pakistan, ekhlaque.ahmed@iobm.edu.pk

Abstract

The case study aims to highlight the importance, process and framework of the Capstone Project Course (Experiential Learning) that has been initiated by Institute of Business Management (IoBM). The case provides detailed analysis of how the Project is executed by the students under the guidance of the Faculty and industry supervisors assigned to each group of students. The project entails various methods to monitor the performance of the task at hand and the students input and efforts in the duration of both Capstone 1 and Capstone 2 Projects (3 credit hours each). This initiative taken by the university highlights the different aspects of experiential learning processes and how it benefits the academia as well as the company in the industry. It is a cost free project carried out by students to enhance their learning and exposure into the corporate sector first hand. This kind of projects from multiple disciplinarians has proven to be a milestone for the students and the University in the learning with concrete outcomes for the industry as a whole.

Keywords: Capstone Assessment, Experiential Learning, Capstone Circular, Capstone Pathway

Introduction

The word Capstone is used for a final achievement which is built upon the past works and encircles those past works. Capstone projects are often included in engineering curricula in order to integrate functional, operational and other multidisciplinary areas. Capstone projects are also used to inculcate professional skills amongst the students, which are difficult to impart in a traditional form of lecture based class or a course (Ward, 2013).

According to (Ward, 2013) Capstone projects serve as a medium that facilitates students in transitioning from academic phase to a professional life. Such projects have a direct effect on university's ranking and reputation in the industry and its students' employability. Hence, it is worthwhile to introduce and continue such experiential learning projects at university level.

Capstone projects are designed in a way that encompasses all the areas and aspects of an undergraduate student's experience through the application of student's skills and breadth of knowledge learned throughout the undergraduate program. The aim behind these projects is to develop the students and their skills for their professional career. Capstone projects aim to develop a student's skills which include; multi-disciplinary team-work, application of theory, data interpretation, problem solving, design, communication skills, and ethics. Generally, these objectives are specified in the outcomes of the program and for university's assessment for accreditation (Ward, 2013).

Successful and effective capstone projects are of immense value to the employers, as they rely on these projects to equip the graduates with knowledge, skills and experience to bring success to their respective organizations. Hence, it is important to enlist the elements that contribute towards the success and effectiveness of a capstone project (Ward, 2013). (Howe and Wilbarger, 2005) documented such

elements for engineering capstone projects, which include; duration, faculty involvement, organizational structure, funding sources, project sourcing and industry sponsorship. These elements can be used by other universities belonging to other domains around the world.

Capstone Business Curricula

Mintzberg, (2004) asserted that the professors who teach MBAs overemphasize the sciences of management while ignoring its art. Mintzberg, (2004) argues that after graduation MBA students have inflated views about their ability and competence to be successful. He emphasizes that for effective management many essential skills can only be learned through the personal experience and suggested major changes in the management education which will encompass more experience based learning before a student graduates and transitions to a professional life.

Kolb & Fry, (1974) developed an experiential learning model based on four elements; concrete experience, observation and reflection, formation of abstract concepts, and testing in new situations. They argued that the learning cycle can begin at any one of the four points. Thus, the model should be envisioned as a continuous spiral.

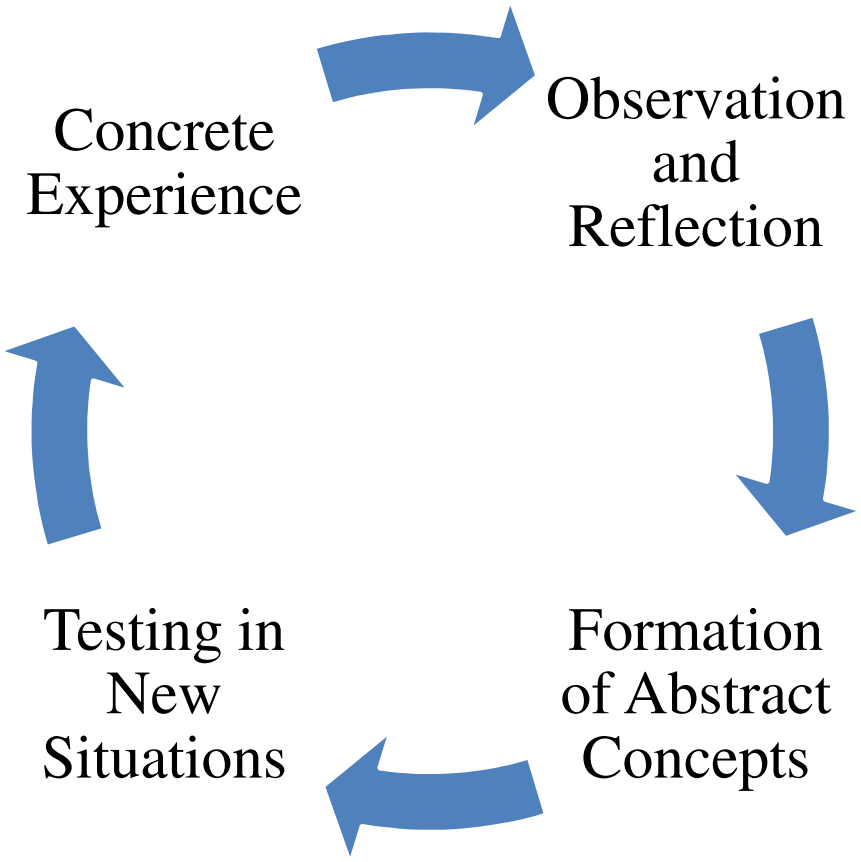


Figure 1: Kolb & Fry, 1975

In the model given in Figure 1 two important aspects can be seen; use of concrete experience for testing ideas and the use of feedback in order to change theories and practices Kolb, (1984). The model emphasizes that experience plays a vital role in learning Smith, (2001). Some of the critics have argued that the model given by Kolb is too simplistic. However, Tennant, (2006) stated that the framework provides an excellent guideline for planning of teaching and learning activities.

Incorporating Job Shadowing into a Business Course

According to McCarthy and McCarthy, (2006) in order to follow the experiential model, business programs should begin with job shadowing. However, Paris and Mason, (1995) defined job shadowing as an option to gain a work experience where students learn about a job by walking through the work day as a shadow of a competent worker. Job shadowing is a work experience that is temporary, unpaid exposure to the workplace in an occupational and functional area of interest for the student. Students get to witness firsthand work environment, employability and occupational skills in practice, the value of professional training and potential career options. Job shadowing is designed to increase career awareness, help in modelling student behavior through examples and reinforce in the student the link between classroom learning and work requirements. Almost any and every workplace is a potential job shadowing site.

Capstone Project Course at Institute of Business Management (IoBM) - Methodology

The objective of Capstone Project Course at IoBM is to provide the students of MBA program an opportunity to work on real world issue and connecting it with the conceptual framework using the most modern management tools. The project engages the students with real world complexities and helps them enhance their competencies and skill related to strategic thinking, communication, managing information and choosing among alternatives.

Projects on corporate issues involving multiple functional areas e.g., marketing, finance, supply chain, operations etc. are provided by the industry experts and the students carry out those projects. The level of efforts required by each project is at least 900 man-hours for each group comprising of 5 students. Each student groups is assigned a faculty supervisor that becomes a liaison between the academia and the industry and to support and guide the students throughout the project.

After the project has been completed a presentation is given to the top management of the firm from which the project came from. During the presentation students provide their insights to the top management along with their recommendations. In many firms those suggestions and recommendations have already been implemented or are in the process of being implemented. The evaluation of the work done by the students is not just in the hands of the faculty supervisor but also by the industry expert.

Initial Capstone Pathways

The Capstone project consists of two initial pathways that is provided to the students i.e. Firstly an Organization oriented Projects, wherein the company from various industries are approached to identify the cross functional issue for the students to study, analyze and recommend alternative solutions through guidance. The second Pathway includes an industry Research Projects where students are involved in the identification and selection of a significant industry topic with practical applications in multiple organizations. These industry researches revolve around the dimensions of the progress made in Pakistan and through facilitations by Faculties, the data gathered would conclude consolidated results.

The project is monitored through different methods which include documents and Forms to be filled on a regular basis or the number of times the students visit the corporations. Some of the documents entail

Capstone Logging forms, Capstone checklists and Capstone Project Plan on how it would be executed with the prescribed timeline. This helps in record keeping of the project for both the Organization and the University **(See Annexure 1).**

Steps for Initiation of a Capstone Project

In order to receive a project from a company following steps are carried out:

1) Sending of invitation for capstone project to a company **(Annexure 1)**
2) Receiving a feedback from the company about the project
3) Arranging a meeting with the top management of the company
4) Acquiring project from the company; company fills the registration form **(Annexure 2)**
5) Registration of students for Capstone project course
6) Formation of student groups for the project (3-5 members, depending on the project)
7) Allocation of projects to the student groups based on their specialization (subject majors)
8) Providing a faculty supervisor to each group to act as a monitor and liaison
9) First meeting of the student group with the company/industry supervisor who will be monitoring the project progress
10) In the first meeting briefing is given about what the company expects from the students and what is desired by the end of the project is required. The company provides the list of deliverables and deadlines to the students
11) Students start working on the allocated tasks, and weekly updates are provided to the company. Students are constantly in touch with the company and make changes as per the feedback of the company **(Annexure 3)**
12) After all the deliverables are completed a final presentation is made by the students on the analysis of their findings. The presentation is first delivered to the Capstone project lead and the Dean. After approval from both after changes if required, the presentation is given to the top management of the company that gave the project
13) After the completion of many projects the findings and recommendations are implemented by the companies
14) Many companies gave more projects after the completion of the first project. Some companies extended the project to second phase as well
15) Students of the projects were also provided with a job offer by some of the companies

Assessment and Grades

Capstone Projects are executed through three hour per week sessions with the assigned supervisors at a scheduled time and day of the week. Attendance of these sessions are recorded which help students to discuss their weekly progress of the project at hand. These sessions may also include lectures, peer reviews, student presentations and ono-to-one clinics with academic staff. The combinations of these sessions conclude with a refined problem which may need further exploration and establishment. The analysis of the data and a well-argued based report is presented which addresses the company specific/ industry related problems. At the end of the semester, a grade is assigned to the student with regard to their performance in the project in both Capstone 1 and Capstone 2.

Details on the assessment as rubrics is provided and discussed by the Faculty Supervisor at the beginning of the course to give students information before commencing the project. Each group will establish a portfolio that would contain all the project artifacts related to the entire duration of the project consisting of (but not limited to) proposal, plans, interim progress reports, notes on each individual item referred in secondary research, scheduling and notes of all primary research activities such as pictures, screenshots, transcripts, sketches of incremental development of ideas, and preliminary results and other analyses.

Grades are given by the faculty (60%), Head of department (20%) and industry supervisor (20%). Assessment forms used in this regard are given in **Annexure 5**.

Capstone project course was started in summer of 2015 at IoBM. In the first semester IoBM received 9 projects from different companies belonging to different industries. Students were able to carry out all 9 projects successfully. In the next semester (Fall 2015), IoBM received 19 projects in total. Some companies gave more than one project during this semester, while some companies extended their projects for second phase by the IoBM students. From then onwards IoBM has done over 100 projects with more than 50 national and international companies (**See Annexure 6 for List of Sample Projects**).

Corporate Feedback

The industry supervisors were a part of the projects given by their companies and played the counterpart role of the faculty supervisor in monitoring of the project progress throughout the project. After the projects were finished at the end of each semester industry experts highly appreciated the work done by the student groups for their respective companies. The recommendations made by the students were also implemented in some of the companies and some companies even offered jobs to the students. The detailed feedback of the industry experts is present in **Annexure 8.**

Student Feedback

After the first semester students requested the expansion of Capstone projects on more functional and operational basis along with the availability of projects for each major specialization area of the students (Marketing, Human Resource, Finance, Supply chain). On the basis of this feedback more projects were acquired falling in different functional and operational aspects and areas of specialization. Detailed feedback of the students is present in **Annexure 9**.

Conclusion

Currently IoBM is not charging anything from the companies for the research services being provided by its MBA students. The experience of capstone project course benefits not just the students but also the company through the provision of new and unbiased market insights gathered by the students on behalf of the company. The students deliver in-depth analysis and recommendation for company's decision making on the designated task. At the same time Capstone Project provides an opportunity to the students to engage with real world complexities, enhance individual competencies and develop lasting skills most importantly in thinking and analysis, communication, managing information and decision making. This also helps the students to review current understanding and assess alternate approaches to the identified problem applying theoretical and conceptual framework (well researched) and demonstrating a capacity for evaluation and critical thinking. IoBM has started to receive consultancy projects from different companies because of Capstone project course. Furthermore, IoBM is planning to open a consultancy center for the graduates and companies to collaborate.

References

Howe, S., Wilbarger, J., 2005. National Survey of Engineering Capstone Design Courses, in: Proceedings of the 2006 ASEE Annual Conference and Exposition. pp. 18–21.

Kolb, D., 1984. Experiential Education: Experience as the Source of Learning and Development. Englewood Cliffs, NJ: Prentice Hall.

Kolb, D.A., Fry, R.E., 1974. Toward an Applied Theory of Experiential Learning. MIT Alfred P. Sloan School of Management.

McCarthy, P.R., McCarthy, H.M., 2006. When Case Studies Are Not Enough: Integrating Experiential Learning into Business Curricula. J. Educ. Bus. 81, 201–204.

Mintzberg, H., 2004. Managers, not MBAs: A Hard Look at the Soft Practice of Managing and Management Development. Berrett-Koehler Publishers.

Paris, K., Mason, S., 1995. Planning and Implementing Change for School-to-Work Transition. Madison Univ. Wis. Cent. Educ. Work.

Smith, M.K., 2001. David A. Kolb on Experiential Learning. Infed. org.

Tennant, M., 2006. Psychology and Adult Learning. Taylor & Francis.

Ward, T.A., 2013. Common Elements of Capstone Projects in the World's Top-Ranked Engineering Universities. Eur. J. Eng. Educ. 38, 211–218.

Annexure 1

November 8, 2016
Mr. ABC
Head Product Development
XYZ Company
Karachi

Final Year MBA Capstone Project on an Industry Issue

Dear Sir/Madam,

CBM's MBA program is focused on developing a real life understanding of problems and issues of industry and organizations in Pakistan through experiential learning projects. The final year project of the MBA students provides them with an intensive real life exposure of studying and resolving an issue or problem faced by an industry organization. Your organization can benefit from the deployment of one or more of our student groups for a project requiring research, fieldwork, analysis and alternatives.

IoBM invites you to engage one or more of our student groups to conduct an in-depth analysis of an issue that your company would like to investigate and present their findings and recommendations. Please note that the final year MBA Capstone Project is spread over two semesters with an expected student effort of 1500 man-hours. Each project will be assigned to a student group who will complete project under the close supervision of IoBM Faculty.

This experience will benefit the company through the provision of new and unbiased market insights gathered by the students on behalf of the company. The students will also deliver in-depth analysis and

recommendation for company's decision making on the designated task. At the same time Capstone Project provides an opportunity to the students to engage with real world complexities, enhance individual competencies and develop lasting skills most importantly in thinking and analysis, communication, managing information and decision making. This will also help them to review current understanding and assess alternate approaches to the identified problem applying theoretical and conceptual framework (well researched) and demonstrating a capacity for evaluation and critical thinking. . Please also note that information obtained during the completion of each project will be treated as highly confidential.

We are currently in the process of registering new Capstone projects for the coming semester (Spring 2017), which will commence from January 2017. For this purpose we would like to invite your organization to provide us with a project. We hope that this proposal will be of immense interest to you. We are enclosing a Project Proposal form which may be filled from your side and sent to us as soon as possible.

The list of projects done so far by the students of IoBM with their project details is attached. During the period from summer 2015 till date (Fall 2016) the students of IoBM have completed over 100 projects with around 60 national and international companies.

Should you need any further information on this subject, please feel free to contact our Capstone Project Coordinator, Ms. LMN, (lmn@institute.com Cell# xxxx-xxxxxxx).

Sincerely yours,
EFG (Lead Capstone Projects, OPQ institute)

Annexure 2

INSTITUTE OF BUSINESS MANAGEMENT
CAPSTONE COURSE FOR MBA PROGRAM
PROJECT PROPOSAL 2017

1- Name of the Company:

2- Name of the Contact Person(s): (Names, designations, cell no, email id)

3- Name of the Project Owner: (Name, designation, cell no, email address).
The Project Owner must be different from the Contact Person)

4- Project Description: (Please describe project in brief, giving objectives, details of the issue(s), stakeholders, departments affected, scope of work, expected outcome and any other related information)

Note: If you wish to propose more than one project, please use separate form for each project. Please send the form to the following project supervisor / faculty of the Institute at your earliest.

Annexure 3

Capstone Meeting Log Form

Semester _____ Registered: □ Y □ N

Student Name: _____ Reg. No: _____ Area of Research: _____	Form No Version: Last updated: Procedure # Document #

Date & Duration	Assignment	Progress	Signature of Supervisor

Annexure 4

Capstone Project Plan Form for Organization: __

_____

Project Name		
Student Name/Ph #	1. 2. 3.	4. 5.
Contact Person Name Designation/Ph#/Email		
Project Objective/ **Problem Statement/** **Decision Requirement**		
Deliverables and Deadlines:	**Deliverable**	**Deadline**
	1.	
	2.	
	3.	
	4.	
	5	
Research Methodology	1. 2. 3. 4. 5.	
Secondary Research Sources	1. 2. 3. 4.	

Primary Research population/sample	Population: Sample: Sampling Strategy:
# and Type of Interviews, Questionnaires, Focus groups & methodology	
Research Questions	1. 2. 3. 4. 5.

Annexure 5

Capstone Presentation Assessment Scoring Sheet (Group Grading)

Date: _____

Group Project Name: _____ Evaluator Name: _____

Evaluator Affiliation: ☐Project Supervisor ☐IoBM Expert Panel ☐Project Client ☐External Expert

Term: ☐SPRING ☐SUMMER ☐FALL Year: - _____

☐ Capstone I ☐ Capstone II

Directions:	1) Mark assessed level. 2) Sum the total for each section (I, II..) in the **Score** column 3) Add all scores to get **Total Score**. ***Awarded score will be calculated out of 25 for final grade.***				
1	**Communication Skills**	Fails to Meet Criterion	Meets Criterion	Exceeds Criterion	**Score**
	I. Speaking				
	A. Team spoke clearly and distinctly throughout	1	2	3	
	B. Team spoke with confidence and with appropriate tempo	1	2	3	
	II. Delivery				
	A. All team members remained attentive and engaged with the audience, even when not presenting	1	2	3	
	B. Delivery medium chosen was appropriate and effective	1	2	3	
	C. Team listened effectively to adequately address questions	1	2	3	
2	**Content**				
	III. Organization / Preparation				
	A. Introduction effectively communicated presentation goals	1	2	3	
	B. Topic was well focused & appropriate	1	2	3	
	C. Project deliverables were clearly explained	1	2	3	
	D. Conclusion summarized ideas well	1	2	3	
	IV. Project Deliverables				
	A. Project work addressed the business problem at hand	1	2	3	
	B. Project deliverables account for the time spent on the project	1	2	3	
	C. Project delivered value to the client organization	1	2	3	
	D. Evidence of research and fieldwork available and well documented	1	2	3	
	E. Evidence of research and fieldwork available and well documented	1	2	3	
	F. Overall Performance of Team	1	2	3	
	Total Score				

Evaluator Signature:_____ **Date:**_____

Student Performance Evaluation (To be filled by Project Supervisor Only)

Student Name: _____ Supervisor Name: _____

Student ID: _____ Organization: _____

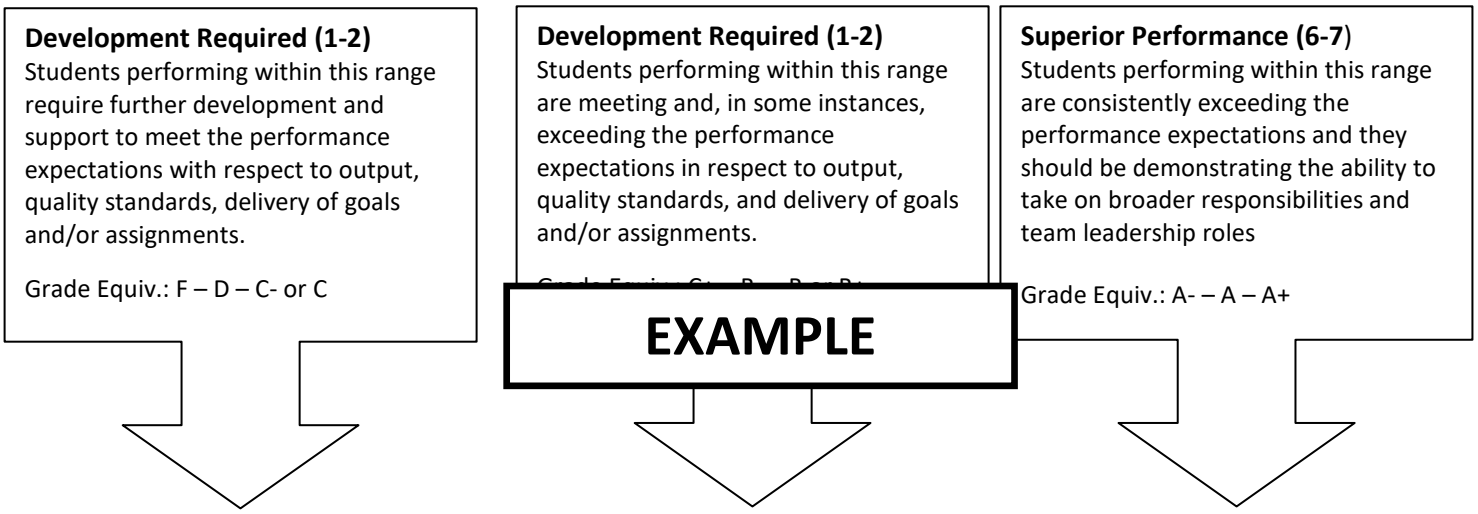
Date: _____

Term: ☐SPRING ☐SUMMER ☐FALL Year: - _____

☐ Capstone I ☐ Capstone II

Guidelines

The scales measure the behaviours and abilities that all capstone students are expected to progressively attain and refine through the capstone projects



Problem Solving. Ability to analyze problems or procedures, evaluate alternatives, and select best course of action			
① ②	③ ④ ⑤	⑥ ⑦	Not Observed
Developing Performance Can make routine decisions but needs ongoing guidance and checking	**Good Performance** Can be relied upon to make good decisions, requires limited guidance	**Superior Performance** Independently manages complex tasks and makes good decisions for work without guidance	

1. Interest in Work. The degree to which the student pursues goals with commitment and takes pride in accomplishments.			
① ②	③ ④ ⑤	⑥ ⑦	Not Observed
Developing Performance Shows little enthusiasm for assigned work, infrequently requests additional tasks	**Good Performance** Enthusiastic about their assignments/work, agreeable to new responsibilities, asks for new tasks	**Superior Performance** Displays enthusiasm for work that is beyond their job requirements; proactively seeks new tasks and responsibilities	
2. Ability to Learn. The extent to which the student becomes proficient with job duties and work processes.			
① ②	③ ④ ⑤	⑥ ⑦	Not Observed
Developing Performance Sometimes slow to become proficient at new tasks or work processes	**Good Performance** Quick to become proficient at new tasks	**Superior Performance** Exceeds expectations in the complexity and difficulty of work they are able to successfully complete	
3. Quality of Work. The ability of the student to set high standards for own personal performance; strive for quality work; put forth extra effort to ensure quality work (includes oral and written communication).			
① ②	③ ④ ⑤	⑥ ⑦	Not Observed
Developing Performance Work does not meet expectations, has more than the expected number of errors	**Good Performance** Work is usually very thorough and well done, few errors	**Superior Performance** Work is always very thorough and of excellent quality, few if any errors	
4. Quantity of Work. The volume of work produced by the student, along with his or her speed and consistency of output.			

① ②	③ ④ ⑤	⑥ ⑦	Not Observed
Developing Performance Does not always complete work within time limits	**Good Performance** Completes the majority of work within specified deadlines	**Superior Performance** Consistently completes work ahead of schedule; seeks additional tasks	
5. Problem Solving. Ability to analyze problems or procedures, evaluate alternatives, and select best course of action			
① ②	③ ④ ⑤	⑥ ⑦	Not Observed
Developing Performance Can make routine decisions but needs ongoing guidance and checking	**Good Performance** Can be relied upon to make good decisions, requires limited guidance	**Superior Performance** Independently manages complex tasks and makes good decisions for work without guidance	
6. Teamwork. The degree to which the student works well in a team setting			
① ②	③ ④ ⑤	⑥ ⑦	Not Observed
Developing Performance Can make routine decisions but needs ongoing guidance and checking	**Good Performance** Can be relied upon to make good decisions, requires limited guidance	**Superior Performance** Independently manages complex tasks and makes good decisions for work without guidance	
7. Response to Supervision. The manner in which the student responds to direction and constructive criticism			
① ②	③ ④ ⑤	⑥ ⑦	Not Observed
Developing Performance Sometimes disregards direction and feedback from supervisor	**Good Performance** Integrates feedback from supervisor into their work to improve productivity & efficiency	**Superior Performance** Takes the initiative to follow through on all feedback from supervisor and to continuously improve	
8. **Resourcefulness.** The student's ability to develop innovative solutions and display flexibility in unusual circumstances.			
① ②	③ ④ ⑤	⑥ ⑦	Not Observed
Developing Performance Unsure how to approach new or stressful situations; has difficulty adjusting to changing priorities	**Good Performance** Responds appropriately to new or stressful situations; can adjust to changing priorities and	**Superior Performance** Generates effective resolutions to new or stressful situations; readily adjusts to changing	

and circumstances	circumstances with guidance	priorities and circumstances

Project Supervisor's Comments – Please comment on student's overall performance:

Evaluation Discussed With Student: ☐YES ☐NO
☐NOT APPLICABLE

Do you want to supervise the student in Capstone II? ☐YES ☐NO
☐NOT APPLICABLE

Supervisor's Evaluation 30% (Individual Score)	Weekly Progress Report 25% (Individual Score)	Panel's Evaluation 25% (Group Score)	Client's Evaluation 20% (Group Score)

Overall Grade Awarded to Student: _____

Supervisor's Signature Capstone Project Head Signature Dean's Signature

Company Evaluation of Work Report (To be filled by Industry Supervisor Only)

Company Name: _____ Evaluator Name: _____

IoBM Supervisor Name: _____ Date: _____

Term: ☐SPRING ☐SUMMER ☐FALL Year: - _____

☐ Capstone I ☐ Capstone II

As a requirement of the Capstone Project programs, students have been tasked with working towards solutions for your identified business needs. During this process, students are required to coordinate and provide you with periodic work reports. Work Reports are marked by both the Industry Supervisor (YOU) and the IoBM nominated Project Supervisor. To receive credit for the report, a student must receive acceptable or higher from both markers. Providing appropriate feedback on the subject matter of the report can be difficult for the university evaluator since the content is normally related to the work environment. Therefore, we request your assistance in this area.

Your input is greatly appreciated!

Quality of Subject Matter	Poor	Average	Good	Outstanding
Team's Work Ethic & Commitment to the Project				
Command on Technical Aspects of the Project				
Team's Ability to Add Value to the Organization				
Overall Feedback				

Industry Supervisor's Comments – Please comment on group's overall performance:

Do you want to continue with IoBM's Capstone Program? ☐YES ☐NO
☐NOT SURE

Overall Marks Awarded to Group: ____/20

Annexure 6
Sample Capstone Project List

Capstone Projects Summer-2015			
S.No	**Company Name**	**Department**	**Project Description**
1	Dalda Foods (1)	Marketing	Brand Strategy Development
2	Dalda Foods (2)	Marketing	Gap identification and Downstream Innovation
3	Abbott Pakistan	Marketing	Model transformation from Product to Category Communication
4	Pharmevo	Supply Chain	Improving Supply Chain/Channel Integration
5	Engro	HRM	Public welfare development project to hire disabled people.
6	Hashwani Group	HRM	Process mapping of different activities of different depts. and preparing SOPs and JDs.
7	Leopards Courier Pakistan	HRM	Issues with Job satisfaction of Senior Managers and how to improve it.
8	CDC	Finance	Reasons for low investor base in capital markets of Pakistan.
9	GSK	Supply Chain	Supply chain SOP for inventory and ware housing.
10	GETZ Pharma	Marketing	Develop strategies for successful penetration for health care market for existing OTC products.
11	TCS E-Com (Pvt.) Ltd	HRM	Recommendation of best HR practices being followed by local and international companies.
12	Express News	Media Industry Research	To identify the net reach of the Channel.
13	Ehtesham Packages (1)	Marketing	Feasibility report for a reel to reel Label Printing machine with online additional option.
14	Pharma Industry	Supply Chain	Issue of local production of raw materials for pharmaceutical industry.
15	Qindeel Academy	Process Improvement	To develop a donor-social action plan, and develop awareness campaigns.
16	HBL	Finance/Audit	To evaluate/gauge the effects of traditional audit practices in Banking Industry.
17	Alpha container industries Pvt. Ltd	Process Improvement	Suggestions for proper placement of workforce.
18	Engro Foods Limited	Marketing	New channels' identification and Market proposition for new product.
19	Lucky Cement	Supply chain	Suggestions for the appropriate disposal of coal ash.
20	JS BANK	Finance	Impact of JS Group on Economy of Pakistan.

Annexure 7

Capstone Checklist

Company Name: _____ **Faculty Supervisor: _____**

Group Members:

S.NO.	Item	YES/NO
1	Minutes of Meetings	
2	Logs for Allocation of Meetings	
3	Field Notes	
4	Meeting Notes	
5	Capstone Project Form for Organization	
6	Capstone Meeting Log Form	
7	Attendance for each Corporate Meeting	
8	Gantt Chart	
9	Timeline Plan for each Deliverable	
10	Report for each Successful Deliverable Submitted to the Company	
11	Report for each Deliverable in case of any lagging in Deliverable Submission	
12	Interim Final Report	
13	Final Report	
14	Interim Presentation	
15	Final Presentation	

Annexure 8

Industry Experts' Comments

Nutralake Healthcare

It is a wonderful experience to work with final year MBA students of IoBM. I think it is a win-win situation and more productive for the students. The project makes the students aware of real situation handling in life project with the company. I really appreciate the excellent efforts.

Abbott Laboratories Pakistan Limited

The group performed well against the set guidelines whereas the delivery was also observed timely. Despite being lacked on some research aspects, they covered the shortfall in a quick succession hence their performance in the last duration of the project timeline was exemplary.

Their field work commitment considering the difficult timing w.r.t. pharmaceutical sector needs to be commended especially the females in the group as they demonstrated the conformance to the appointments and also to the interviewing principles at par with their male colleagues.

Lastly their presentation as a group was also very well appreciated at Abbott's desks where they not transported the real and unedited insights but also showed their citizenship towards the company as a group.

Wavetec – Vendi

The group showed good commitment to the project, I would be interested in working with them for phase 2 and implementing some of their suggestion during part 1 to judge the results in a more practical environment

Digitz Pvt. Ltd

The group worked really hard in getting all the research done, full marks on that. Another noticeable thing was that they took initiatives when needed. However, their submission was not on time and the project was delayed. But all in all, it was a good effort made.

Dalda Foods (Pvt.) Ltd

The quality of research work put up by the students is commendable. We were able to cull insights from the data shared, which will serve as a part of key inputs for our business. Great job! Great effort!

Online Distributions

The team did a tremendous job. They have submitted a comprehensive report with well-defined each and every aspect of the work given. We are planning to float this SOP through them to our partners.

PharmEvo (Private) Limited

We acknowledge the efforts of students in delivering the task assigned to them, and interacting with different group of people to analyze the causes of given state of problem and then suggesting practical solutions.

Overall the students were able to develop and suggest a plan to reduce lead time involved in delivery of Pharmaceutical products.

We wish them best of luck in their future endeavors.

Premier Agencies

We acknowledge and appreciate the efforts of students in exhibiting the professional knowledge over the task provided to them. Overall Student's group was able to develop an insight for potential categories and the linkages between consumer buying patterns.

We wish them good luck for their project and corporate career.

Zong

Overall good effort by the group, they took the time to learn industry dynamics before conducting the research. Data collected by the students was comprehensive and useful for the brand

Engro Tarang

They have done hard work, they know their stuff, they have talked to the people to gain insights. Iam liking what I am seeing so far done by them. I like some of the recommendations made by the students and I am looking forwards towards implementing them at Engro.

Engro PWD

The students owned the project since the start. They went in explored the areas and found far beyond what I had expected from them. The things they have highlighted are now being worked on. I wish all the student a best of luck for the future.

UBL

The IoBM students have done a tremendous job. The insights revealed in this phase were theoretical, now in the next phase we expect them to go on the practical side of the key areas highlighted.

Hashwani Group

I showed the Org Charts and Performance Appraisal documents you developed for us to the Director HR and she really liked your work and wishes me to convey her commendations. I am happy that employees at all level cooperated a lot and you handled the meetings meticulously.

We look forward to your project presentation and recommendations. It was a pleasure working with you in Capstone: 1 and are happy to continue the project to Capstone 2. The TORs you have sent look good and we look forward to doing more work with you.

China Overseas Port Holding Company

On behalf of COPHC Management. We highly appreciate the great amount of efforts put in by IOBM dedicated faculty and knowledge yearning students. Experiential Learning philosophy, initiated by IOBM, is undoubtedly a very effective mean of transferring knowledge and experience to students. We take pride in collaborating with IOBM in executing this mission.

We really appreciate the amount of hard work and research work that IOBM students have demonstrated during their CAPSTONE.

We certainly welcome more such project and want to be part of IOBM agenda of shaping Business Education for future generation!

Premier Agencies

I'm very much satisfied with the efforts of students. They all have been wonderful students and a great team. I wish I had you all again in Capstone 2 for my projects!

I was surprised and delighted to see students handle the challenges of conducting surveys with the sales reps in even remote areas and present their in-depth analysis. I am particularly impressed by the integration of the Blue Ocean Strategy concepts in your analysis which has been very interesting and very informative.

Dabur Pakistan

The group should add more value in terms of Research & way forward to launch Fem in Pakistan.

Annexure 9

Student Feedback

Positive points	Points need to be Worked on
Was Capstone Project Course helpful for you and in what manner?	
Ability to learn a lot of new things which could only be learned while on job	Should be done in BBA as it will be more beneficial to students aspiring for a career. .
Broadened the learning horizons. Also learned how to process ideas and communicate effectively	More projects of Marketing, HR and Supply chain and lack of projects on Financial areas
A complete learning by experience, provided vast knowledge of the field and practical world experience	Capstone project field work was a hassle for working students.
Which other skills were developed through Capstone Project Course?	
Stress management skills as we have to handle a lot of pressure in this project. Along with improvement in self-confidence, communication and analytical skills	Project-job incompatibility
How has the experience influenced your critical thinking and problem solving skills/abilities?	
Both skills have greatly improved along with time management and coming up with alternative solutions	An employed student like me finds it very difficult to balance capstone, job and MBA altogether
Please share a specific example of how your experience impacted, if at all, your transition to workplace and how this specific example impacted your career?	
I am getting diverse experience and I am now more confident and have enhanced analytical skills. I was able to arrange training sessions on my own after this experience. Also helped in transition to new work place	Even though capstone project helped in certain areas I still think it's a burden on students who are working and have to meet deadlines of capstone project too
How can the mentoring sessions be improved?	
Our mentor was extremely helpful during the project. He has been a great luminary. He assisted us, guided us and motivated throughout. I really enjoyed being mentored by him	Work should be acknowledged when it's done right. Timings of interaction for capstone should be made feasible for students specially those who work

Digital Strategy of Telecommunications Development: Concept and Implementation Phases

Andrey Polyanin, Central Russian Institute of Management, Branch of RANEPA, Orel, Russian Federation, polyanin.andrei@yandex.ru

Tatyana Golovina, Central Russian Institute of Management, Branch of RANEPA, Orel, Russian Federation, golovina_t78@mail.ru

Irina Avdeeva, Central Russian Institute of Management, Branch of RANEPA, Orel, Russian Federation, i-avdeeva-i@yandex.ru

Irina Dokukina, Central Russian Institute of Management, Branch of RANEPA, Orel, Russian Federation, irenalks@mail.ru

Yulia Vertakova, Southwest State University, Kursk, Russian Federation, vertakova7@ya.ru

Abstract.

Prime objective of Russia modern information society development in the conditions of digital economy establishment is mainstreaming of information and communication technologies, particularly massive adoption of technologies BigData. This information society development objective determines priorities in modern information technologies application in the Russian Federation. Particularly this problem is vital for telecommunication branch, where it is necessary to develop and implement digital development strategy. Foreign countries that already financing digital technologies obtain essential advantages and possess competitive advantages in the world market that is significant in the globalization conditions.

Formation of principally new digital strategy of communication development will present new digital platform on practical realization of digital solutions in this sphere and provide increase of competitive performance of all economy branches absolutely and improving population life quality.

The necessity of development of scientific-methodological approaches to the definition of digital strategy concept in the sphere of telecommunications is provided with integrative and globalizational processes, which dictate the necessity to search modern methods, tools and technologies of innovations promotion.

Keywords: digital economy, telecommunications, development strategy, technologies BigData.

Introduction.

Modern development of global space is impossible to imagine without development of information and communication technologies, the Internet of things and thus, development of telecommunications in the conditions of digital economy formation. This problem is of interdisciplinary character, because to solve it is necessary to attract knowledge of informatics, electronics, sociology, economy and all complex of special management forms (strategic, finance, innovative, investment, etc.). Scientific works of the following scientists and professional associations: Don Tapscott (Tapscott D., 1999), Gates B. (Gates B., 2001), Kupriyanovsky V. (Kupriyanovsky V.P., 2016), Dobrynin A. (Dobrynin A.P., 2016), Boston Consulting Group (Boston Consulting Group, 2011), Boston Consulting Group (Boston Consulting Group, 2015), Boston Consulting Group (Boston Consulting Group, 2016), International Bank for Reconstruction and Development (International Bank for Reconstruction and Development, 2016) made particular contribution to the research of information society, formation of new technological paradigm, electronic business models, digital technologies

implementation and digitalization development. However in existing publications and scientific research results the digital economy development problem is examined mainly in general without specific character of methodology formation of development management of digitalization processes in some economic spheres. They don't pay adequate attention to digital strategy of telecommunications development and its implementation phases.

Now Russia implements information branch development strategy up to 2025, but, unfortunately in this strategy there is no word mentioned about digital economy, digital methods and digital solutions. Foreign countries at present realize digital conversions in all branches of national economy to increase their Global Competitiveness Index and formation of Industry 4.0 (realization of the fourth industrial revolution), which covers complete digitalization of business-processes.

In 2016 January, 1 the President of the Russian Federation Putin Vladimir Vladimirovich in his message appealed to: «I suggest starting large-scale system program of economy development of new technological generation so called digital economy». This suggestion was taken up by the Government of the Russian Federation and in February 2017 started the work over development of general strategy of digital economy implementation in Russia.

There is one more problem, which is the absence of clear definition of «digital economy» on the legislative level in Russia.

Research objective is to ground the digital strategy of telecommunications development and its implementation phases to transfer Russia economy to a totally new level of technological development and increase global competitive ability.

Main research results. The authors proved that telecommunications branch is grounding for formation of the platform including digital ecosystem, accelerates the pace of its development. At the moment, telecommunications endure sufficient global changes.

We present in figure 1 global tendencies of telecommunications development in the conditions of digital economy development.

Russia market of mobile communication differs greatly from other economy branches, because it consists of foreign and Russian companies, and the state penetration is not so deep. Notably Russian stockholders possess more than ¾ of the market.

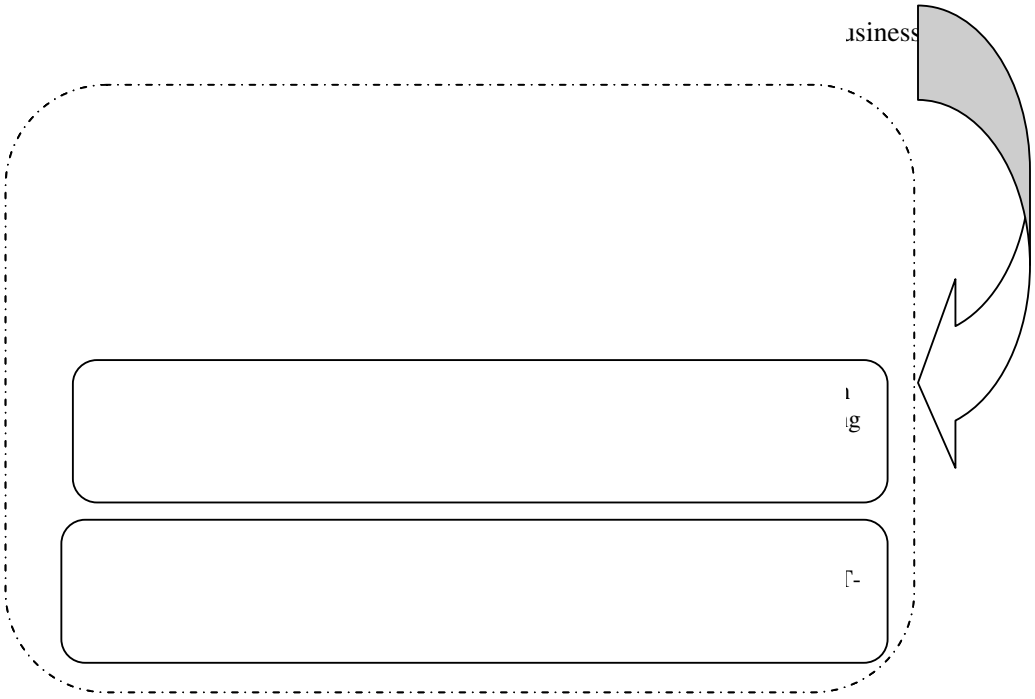


Fig 1. Global tendencies of telecommunications development in the conditions of digital economy development (compiled by the authors)

We present in figure 2 the structure of the Russian market of mobile communication in 2016.

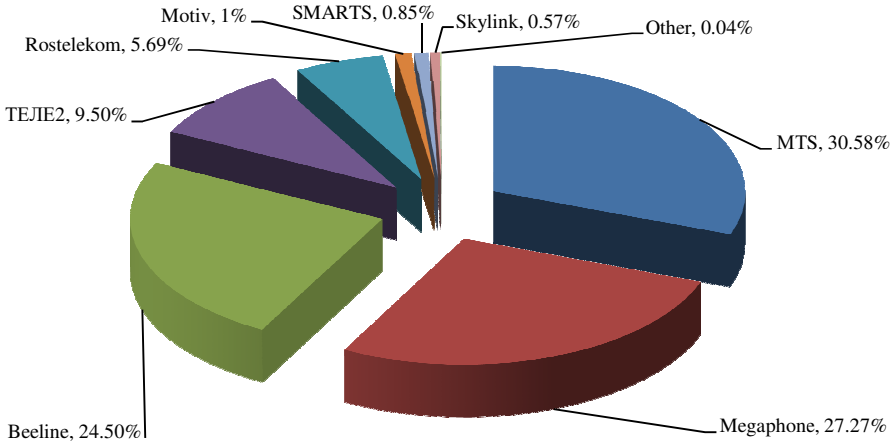


Fig 2. Structure of the Russian market of mobile communication in 2016 [The BostonConsultingGroup, 2016]
Amount of telecommunications market in 2016 is 1,6 bln. rub.

We resent in figure 3 structure of the telecommunications market of Russia in figure 2 (2016).

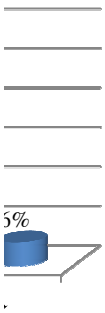


Fig 3. Structure of the telecommunications market of Russia in 2016 [The BostonConsultingGroup, 2016]

The market structure analysis displays that the maximum share at the telecommunication market in Russia is occupied by mobile communication. Let us analyze the telecommunications market segment.

Nowadays the main tendency is geometrical increase of mobile communication subscriber number in Russia. Thus, for 2015 mobile communication subscriber number has increased by 627,11%. We present in figure 4 the corresponding tendency of mobile communication subscriber number in Russia change for 2009-2015 (bln. people).

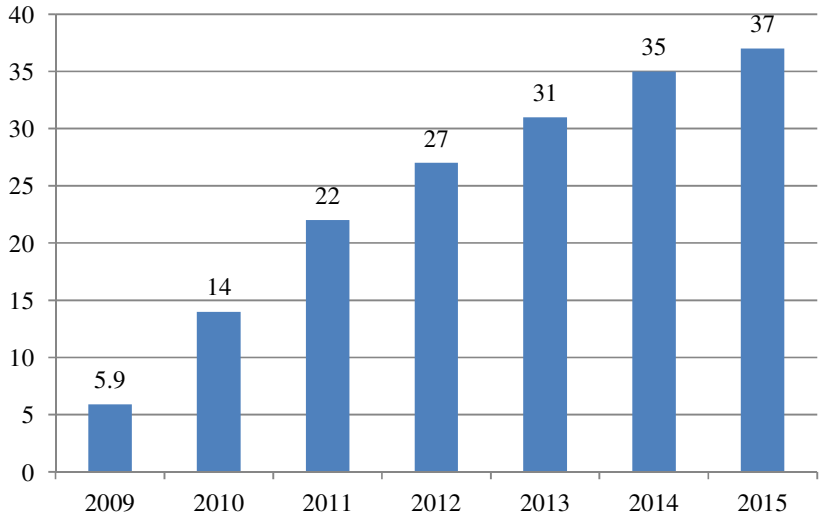


Fig 4. Tendency of change of the number of mobile communication subscriber in Russia for 2009-2015 (bln. people) [The BostonConsultingGroup, 2016]

At present, the tendency of growth and fast development of informedia not only at the Russia market but also especially at the world market is observed. Thus, in comparison with 2012 market volume has increased by 4,8% in 2015.

In 2015 the software market is in the order of four hundred billion dollars of the USA. It is more than 4,3% — growth, marked in 2012. IDC expects that this middle-positive script will be saved for the next following years [Ahmad N., 2016].

Software market (SW) is developing according to five trends: mobility, «clouds», social networks, processing of big data and fast solution adaptationи. Cumulative turnover of top-100 of the world IT-companies has decreased by 1% (in comparison with 2012) up to $693 bln. in the fourth quarter of 2015.

Turnover decrease for all 2015 also corresponds to 1%. Meanwhile, considering two last years, sales volume in 2015 was more about by 3% in comparison with 2014.

IDC divides common software market into three main segments: applications, software tool, system and infrared software.

Among these three segments the market of system software was nearly 23% from consolidated revenues in 2015 and became the most growing, from 5,6% growth indicator in comparison with 2014.

Software tool segment growth mostly was conditioned with improvement of indictors on directions: «Management of structured data» (+ 7,3%) and «Software for analysis and data transfer» (+ 6,0%). Besides, companies began to pay more attention to analytics and «big data» (Big Data), that is why popularization of solutions of type «Analytic platforms» and «Software for data bases management» [Dobrynin A. P., 2016; Inc. Copyright, 2013] has become one of the basic market trends.

In application segment which is 50% from total revenues, the growth in 2015 was 5,5% in comparison with the preceding. The market growth of corporative and content-applications was 10%.

Corporative application market motto has become outspreading of corporative social networks and applications for teamwork. Content application market motto has become search and content analytics, the market that has increased by 13,2% in comparison with the previous year. Trend on big data analytics influenced significantly on the market development [Taylor E., 2016].

In segment «System and infrared software», which was in 2015 27% from total revenue and grew up by 5,5% in comparison with 2012, secondary segment «System software» grew up by 8% in connection with Windows 8 output, and also with spreading of virtualization and cloud technologies.

At the same time today at the Russian market, the solutions on US-communications that can not compete with key market players production are not presented.

Meanwhile Russian companies have potential for development of already existing complex solutions on telecommunications networks design and their functional extension.

Positive forecasts and high growth paces of the world market VoIP and UC-solutions allows speaking about vitality of complex solution development, uniting all accessible mode communications [International Bank for Reconstruction and Development, 2016].

With market development it is possible to observe appearance of C niche segments (UC-solutions on increase of improvement of operational efficiency of employees, solutions integrated with business applications, etc), which can occupy new products from Russian designers.

The following business strategies at the information sphere enterprises are realized in international companies [Avdeeva I.L., 2013]:

– growth strategy;

– franchising strategy;

– emerges and acquisition strategy;

– foundation of joint venture strategy.

We do strategic analysis of telecommunications market on the ground of five competitive forces analysis of Michael Porter's model (figure 5).

To develop general strategy of telecommunications market development is necessary to do SWOT-market analysis.

Particularly it is necessary to estimate the effect and degree: «strong points – possibilities», «strong points-threats», «weak points – possibilities», «weak points – threats».

We present in figure 6 the results of SWOT-telecommunications market analysis.

The carried out strategic analysis of telecommunications branch proves the necessity to work out digital strategy of its development.

Digital strategy is a strategy of implementation of new technologies for transferring organizations of telecommunications sphere and their services to a new level of efficiency and customer focus. All the services must be digital by default, easy to apply and advisably personalized. Digital strategy should be clear, but at the same time flexible. It should help to coordinate the activity between subdivisions, connecting points to organize more effective approach to application of digital platforms.

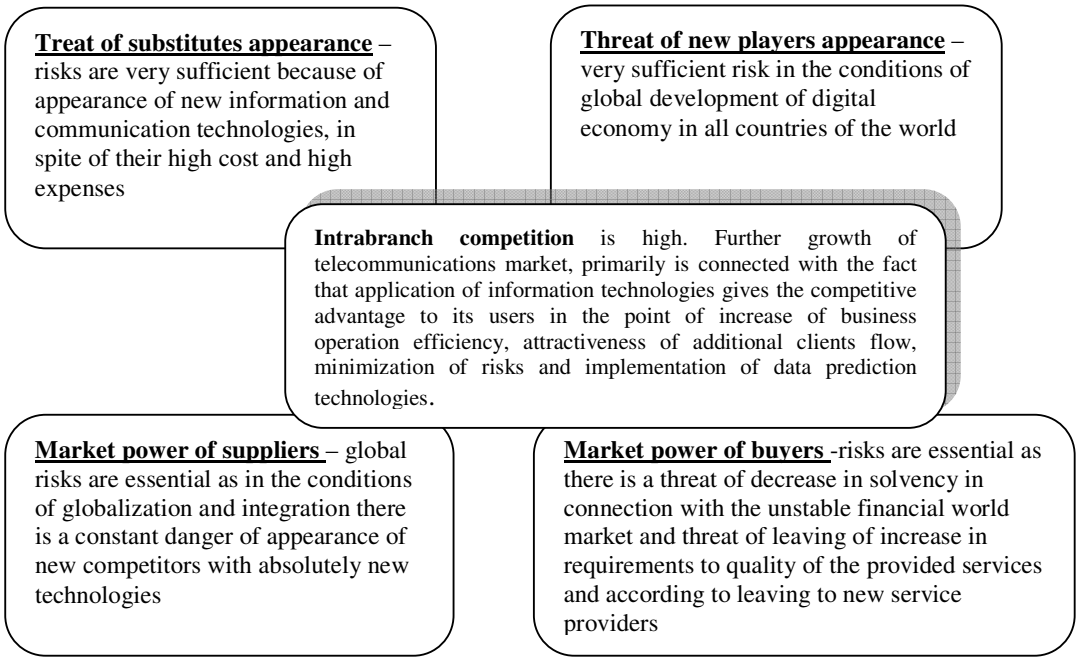


Fig 5. Strategic analysis of telecommunications market on the ground of five competitive forces analysis of Michael Porter's model (compiled by the authors)

Promising trend of realization of digital strategy of telecommunications development is creation of platform on the ground of concept BigData. Technology BigData implies processing of structured and unstructured data of big amounts to obtain useful and intelligible for business entities results.

STRONG POINTS - POSSIBILITIES	STRONG POINTS - THREATS
–segment Big Data in Russia is at the phase of formation, but the demand for these technologies is increasing from year to year; – absence of big data analysis experience, it decreases considerably analytics in the telecommunications area. Suggested strategy**: Growth strategy**	– unstable development of the world finance market creates barriers of telecommunications market entry; – absence of implementation experience of technologies Big Data results in decrease of information potential of the suggested projects in the telecommunications area. Suggested strategy: **Emerges and acquisition strategy**
WEAK POINTS - POSSIBILITIES	**WEAK POINTS - THREATS**
– low paying capacity of consumers results in recession in demands for services; – understudied modern informational technologies decrease the pace of branch organization development. Suggested strategy: **Strategy of inner growth of branch enterprises**	–low percent of investment in connection with high risks and the world economy; – absence of strategic view in branch development results in slow growth of Suggested strategy: **Strategy of limitation of strategic development**

Fig 6. Results of SWOT-analysis of telecommunications market (compiled by the authors)

This technology can be useful for solution of the following tasks: market situation forecasting, marketing and solutions optimization, effective clients segmenting, goods and servicing improving, making more sufficient managerial decisions on the base of BigData analysis, optimization of investment portfolio, increase in labor productivity, effective logistics, condition monitoring of fixed capital.

We present in figure 7 components and directions of development of technology BigDataв of the modern economy.

In this new phase of Big Data development, such technologies as DSSD, Apache Spark and GemFire will be so important as Hadoop.

The underlined components give platform BigData possibility to do creative and effective analysis of all available data in preparation of managerial solutions in the conditions of digital strategy formation. Herewith it is necessary to stress that the components can be included as structured and unstructured and thread specific data.

The formation process of platform BigData is quite difficult because since difficult problems are solved using vast almost monumental data arrays. Herewith preferred directions, used for implementation big data, usually developed with considering application flexibility. They are not commercial products; they have lower level of support and servicing. They are not created as ready solutions of definite problems. Exactly because of their flexibility reason, they can be difficult and complicated in expansion.

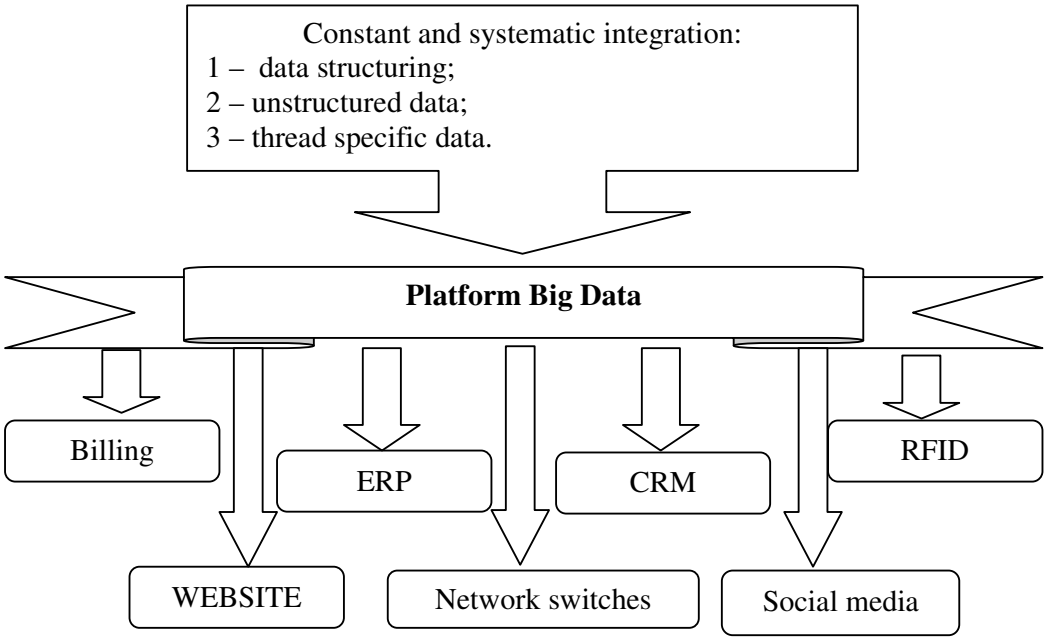


Fig 7. Components and directions of technology development BigData (compiled by the authors)

Development of platform BigData suggests simultaneously new and common ways of data application aiming at influencing on events, when they occur. This gives new opportunities for telecommunications in wide scales.

In order to translate analytics in memory into reality two events must take place. At first, supporting technologies should get the necessary development to provide adequate memory to allocate massive data assembly. More than that, it is necessary to think about how efficiently data should be moved between large objective archives and systems fulfilling analyses in memory. These two elements operate in principally different modes, and it is necessary to create special conditions for IT groups, to transfer the data back and force with necessary rate and transparent to users. Works are carried out; new object archives, special flesh arrays for rack mount and also special technologies that can unite them into one system. Initiatives with open code will play important role in search the answer to this challenge.

Secondly, massive computing environments in memory require stability and dynamics of data. The problem is in the following, providing data persistence, any of their defects become stable. As a result, in 2016 storage systems for environments doing data processing in memory start to appear. They will provide services of deduplication, snapshots, tired storage, randomizing, replication, and possibility to determine the last state when data were true, and system operated correctly. These functions will be extremely important as far as transfer to analytics in real time, when more safe technologies of data processing in memory will become commercial.

Thus, the formation phases of digital strategy of telecommunication development is:

1 – development of technology of processing and data transfer;

2 – active implement unto the world industry concept 4.0;

3 – intellectual systems rapid development;

4 – data management and formation of new direction «data management»;

5 – «clever» changers and constant controlling data integration ;

6 – data integration.

This direction realization requires development of methodology of management system of digital telecommunications strategy. Its realization mechanisms should be organizational, legal and finance constituents:

- creation of necessary infrastructure for development of progressive digital technologies in telecommunications, including system of examination, developing promotion, information application, etc.;

- creation of innovative partnership of scientific, industrial enterprises, higher educational establishments to form complex approach to digital strategy realization;

- creation of attractive investment conditions for increasing innovative activity, including development of public-private partnership mechanisms;

- improvement of managerial improvement of innovative projects in the sphere of digital technologies, based on implementation at all levels of process project management with personalization of responsibility throughout project portfolio to its decomposed elements;

- selection and promotion of competitive digital and pervasive technologies, business stimulation, implementing innovations, by means of creation of industrial parks and branch centers of technologies, which will provide attraction of investments, development and support of telecommunications;

- development of standards directed to widening of digital technologies application in telecommunications.

Digital technologies projecting should be based on detailed approach to pre-project processes and phases of Research and Advanced Development.

The authors suggest procedure of estimation of viability of digital technology choice on the functional model ground, which is based on cognitive analyses method and expert estimation of digital strategy realization problem.

Digital technology quality is determined with quality of data management, of used resources and implemented mechanisms.

Dependences estimation due to the specificity of digital technologies suggests application of expert estimation, particularly to estimate data management quality, information and communication resources.

Quality change of one of the indicators of digital technology results directly or indirectly to quality change of other processes, including digitalization process via the feedback system.

In this connection, to estimate the influence of dynamics of digital technology quality on the separate processes condition or digital strategy realization quality is rational to use special technology of distribution of technological processes in communications.

Conclusions.

It is proved that viable mechanisms of telecommunications digitalization are considered as essential feature of digital economy organization in Russia, consisting in transfer into new technological level at the sake of information and telecommunication technologies implementation on all stages of creation of value-added chain.

Organizational managerial approaches to development of digital technologies should have strategic character; determine directions of digital economy development and main approaches to its implementation phases.

The suggested phases take into consideration challenges and emerging opportunities for telecommunications in the digital economy era.

The primary phase of digital strategy implementation should become maintaining of interaction processes among all digitalization participants, business allows structures to unite potential possibilities, harmonize technological interests, and decrease the innovative risk level. As a result, it will provide increase of their innovative activity and creation of advanced base for further telecommunication development.

The investigated digitalization processes are in the ground of development of digital strategy concept of telecommunications development that provides selection of parties forming science and industrial base of digital business in the given sphere, digital technologies promotion, finance, information and consultative support. The central point of digital strategy of development is a client and his quickly changing demands.

The research result is possibility of practical application of strategy and mechanisms of its phase-by-phase implementation for further development and active implementation of digital telecommunications by means of creation of scientific and research and experience and practical knowledge base through powerful sector of research and development activities.

Directions for future research.

Formation of digital strategy of telecommunications development particularly and economy in general is a complex issue on transfer to a new technological level at the account of implementation of information and telecommunication technologies at all stages of value-added chain. In this connection, the further scrupulous investigations and development should be:

1. Development of methodic approaches to management of economy development digital strategy.

2. Formation of integration mechanisms of Russia and its leading digital segments into digital economy space of states-members of Eurasian Economic Union by means of attraction of state-private partnership and concession on Eurasian digital assets development.

3. Solution of problems of activity regulation in Russia of global digital companies and regulatory framework creation for labor market functioning in the conditions of digital economy.

In this connection, it is necessary to have methodic approaches to risk management, connected with employee displacement and personnel adaptation to new work conditions.

4. Further research is necessary to devote to questions of creation and realization of educational programs and innovative projects with application of e-learning technologies for elite specialists education, those who possess engineering interdisciplinary approach to innovative tasks solution in the conditions of digital economy development.

References

1. Avdeeva, I.L. (2013) 'New forms of functioning and development of economic systems in the globalization conditions', *Economic analyses: theory and practice*, № 32 (335), 38-44.

2. Ahmad, N., Schreyer, P. (2016) 'Are GDP and Productivity Measures Up to the Challenges of the Digital Economy? ', *Int. Product. Monit.* № 30, 4 - 27.

3. Big Data Analytics For Dummies, Alteryx Special Edition John Wiley & Sons, Inc. Copyright © 2013

4. Gates, B. (2001) Business with thought rate, *M.: Eksmo-press*, 480 p.

5. Golovina, T.A, Avdeeva, I.L., Parakhina, L.V. (2014) 'Application of digital and mobile innovations for development of enterprises of regional internet-market', *Problems of modern economy*, № 3., 6.

6. Dobrynin, A. P. (2016) 'Digital economy – different ways to effective application of technologies (BIM, PLM, CAD, IOT, Smart City, BIG DATA etc.)', *International Journal of Open Information Technologies*', T. 4., №. 1., 4-11.

7. World development report 2016. Digital dividends. Review. International Bank for Reconstruction and development / World bank 2016. http://wwwwds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2016/01/13/090224b08405bbc0/1_0/Rendered/PDF/World0developm0l0dividends0overview.pdf

8. Domrachev, A.A., Evtushenko, S.N., Kupriyanovsky, V.P., Namiot, D.E. (2016) 'About innovative initiatives of the states-members of EEU in the sphere of global digital economy', *International Journal of Open Information Technologies,* №9, 24-33.

9. Izmalkova, S.A., Golovina, T.A. (2015) 'Global technologies application «BigData» in economic system management', *News of Tula State University. Economic and law sciencs*, № 4-1, 151-158.

10. How to start digital transformation, BCGReview. The Boston Consulting Group, 2015

11. Kupriyanovsky, V. P., etc. (2016) 'Digital economy: data models, big data, architecture, applications?',*International Journal of Open Information Technologies*, V. 4, №. 5.,1-13.

12. Kupriyanovsky, V. P., Namiot, D. E., Sinyagov, S. A. (2016) 'Cyberphysical systems as a base of digital economy' *International Journal of Open Information Technologies*,V. 4, №. 2, 18-25.

13. Kupriyanovsky, V. P. etc. (2016) 'Digital economy and the Internet of things –data silage overcoming' *International Journal of Open Information Technologies*,V. 4, №. 8, 36-42.

14. Lygina, N.I., Rudakova, O.V., Bardovsky, V.P. (2015) 'Russia and Russian enterprises in global economy' *Middle Russian Bulletin of social sciences,* № 2 (38), 163-171.

15. Makarova, Yu.L., Polyanin, A.V. (2015) 'Specialized technological centers as economic ground of development of entrepreneurial business infrared structure' *Middle Russian Bulletin of social sciences,* № 2 (38), 157-162.

16. Polyanin, A.V, Gretchin, V.V. (2013) 'Information technologies place in modern management' *In collection Actual problems of economic development and legal regulation of social economic relations. Materials of round table. Orel branch of the Russian Presidential Academy of National Economy and Public Administration*, 72-75.

17. Russia on-line: Influence of the Internet on Russian economy. The Boston Consulting Group, 2011.

18. Russia on-line: catch impossible lag. The Boston Consulting Group, 2016

19. Tapscott, Don. (1999) 'Electronic digital society: Pluses and minuses of the epoch of network intelligence' / Transl. from English Igor Dubinsky; under the editorship Sergey Pisarev// Kiev : INT Press; Moscow: Relf buk., 432 p.

20. Vidas-Bubanja, M., Bubanja, I. (2016) The Future of Digital Economy in some SEE Countries (Case study: Croatia, Macedonia, Montenegro, Serbia, Bosnia and Herzegovina). 2016 39th International Convention on Information and Communication Technology, Electronics and Microelectronics (mipro), 1515 - 1520.

21. Taylor, E. (2016) Labor in the Global Digital Economy: The Cybertariat Comes of Age. Radic. Philos, 60 - 62.

22. Vertakova, Y., Klevtsov, S. and Klevtsova, M. (2015) Technology of Fixed Assets Assessment in Investigating the Stability of the Industrial Complex of the Region, *26th International Business Information Management Association Conference*: Madrid, Spain, 3230-3236

23. Vertakova, Yulia; Polozhentseva, Yulia; Klevtsova, Maria (2015) The Formation of the Propulsive Industries of Economic Development Acting as the Growth Poles of Regions, International Conference on Applied Economics (ICOAE), Kazan, RUSSIA *Procedia Economics and Finance* , 24,750-759

A Solution to Combat Cyber security Threats Involving Big Data Analytics in the Hadoop Ecosystem

Martin Lněnička, University of Pardubice, Faculty of Economics and Administration, Pardubice, Czech Republic, martin.lnenicka@gmail.com

Jan Čapek, University of Pardubice, Faculty of Economics and Administration, Pardubice, Czech Republic, capek@upce.cz

Jitka Komárková, University of Pardubice, Faculty of Economics and Administration, Pardubice, Czech Republic, jitka.komarkova@upce.cz

Renáta Máchová, University of Pardubice, Faculty of Economics and Administration, Pardubice, Czech Republic, renata.machova@upce.cz

Ivana Čermáková, University of Pardubice, Faculty of Economics and Administration, Pardubice, Czech Republic, ivana.cermakova@upce.cz

Abstract

Information and data security have become the biggest concern for almost all organizations. At the same time, new security challenges emerge constantly as networks become more highly distributed and virtualization architectures are adopted. Big data analytics promises to deliver opportunities for prevention and detection of advanced cyberattacks using internal and external big security data. The increase of these streamed and stored data together with the development of distributed analytical systems has led to rapid increase in demand for big data analytics integration in in the field of cybersecurity. Therefore, this paper attempted to discuss these practices. A literature review was conducted and the most suitable components were identified with the aim to propose a conceptual model, which should help to combat cybersecurity threats involving big data analytics in the Hadoop ecosystem. By implementing this model, organizations may be able to detect threats, create more defense mechanisms, and improve security of their infrastructure.

Keywords: Cybersecurity, big data analytics, Hadoop ecosystem, conceptual model.

Introduction

The exponential growth in Information and Communication Technologies (ICT) has caused major changes to society over the past decades. ICT systems have become almost obligatory in all kinds of sectors. However, as the ICT revolution unfolds, it will indeed bring benefits, but it will also bring risks and challenges (World Economic Forum, 2015). Over the few past years, cybercrimes have increased rapidly with cybercriminals continuously exploring new ways to circumvent security solutions to get illegal access to ICT systems and networks. Therefore, threats to ICT systems are on the rise, and the type and frequency of cyberattacks are increasingly more sophisticated (Aradau and Blanke, 2015; Donaldson et al., 2015; Mahmood and Afzal, 2013). These attacks could be from hackers, viruses or internal employees, and it is very clear now that this would lead to lose a large amount of money, time and other resources (Rabai et al., 2013). Most times, cybercriminals would modify the existing malware signatures to exploit the flaws exist in the new technologies (Jang-Jaccard and Nepal, 2014). Leuprecht et al. (2016) argued that these solutions to the rapidly growing problems associated with cybersecurity and new ICT require a more balanced understanding.

As a result, various security monitoring systems are being employed to protect the network and resources from the cyberattacks (Mahmood and Afzal, 2013). The big network datasets that are generated in this process by security monitoring systems need an efficient design for integrating and processing them at a faster rate using various parallel and distributed computing platforms (Aradau and Blanke, 2015; Donaldson et al., 2015; Marchal et al., 2014; Kambatla et al., 2014). To address these issues, large scale security monitoring is recognized as a promising technology, which can enhance the security of networks in characterizing, monitoring, detecting, and mitigating cyber threats in a timely manner. It aims to provide critical information on the network activities for decision making processes, protect against infiltration and manipulation of data, ensure network resilience, and defend against cyber threats (Donaldson et al., 2015; Marchal et al., 2014; Yu et al., 2013).

According to Chen et al. (2016), at first, it is challenging to quantify the impact of threats as they may come from various sources. Second, it is difficult to detect threats because the detection system has to inspect various data sources, which are always in large-scale with different formats and semantics. Monitoring different applications and detecting threats can be characterized as high volume data streams and real-time processing requirements. Rahman and Esmailpour (2016) stated that the volume of data and the amount of corresponding traffic are increasing at such a high velocity that the architecture of traditional data centers is no longer sufficient to handle the network traffic. Therefore, the efficient storing and processing of such big data to ensure security and efficient operations become a challenging and urgent issue (Aradau and Blanke, 2015; Chen et al., 2016; Jang-Jaccard and Nepal, 2014; Rahman and Esmailpour, 2016).

New big data technologies such as the Hadoop ecosystem, stream pattern mining, complex-event processing, and NoSQL databases are enabling the analysis of large-scale, heterogeneous datasets at unprecedented scales and speeds (Alguliyev and Imamverdiyev, 2014; Mazumder, 2016; Storey and Song, 2017)). Hadoop is actually not a single technology but an ecosystem of a number of components (or frameworks) most of which are part of the projects developed by open source communities under Apache Software Foundations. The components in Hadoop ecosystem are in various states of maturity and are continuously evolving. Most of the components of the ecosystem, which are widely used today, are part of Apache top-level-projects, where as many are brewing as Apache Incubator Projects (Mazumder, 2016; Storey and Song, 2017).

Big security data can be stored in a dedicated repository which can also combine and analyze real-time data together with historical data (Cárdenas et al., 2013; Mahmood and Afzal, 2013). Big data analytics then aims to obtain beneficial information from large-scale and complicated data (Lněnička, 2015). The related technologies allow extending traditional information security systems by facilitating the storage, maintenance, and analysis of security data to detect known patterns to stay ahead of malicious activities or intruders (Terzi et al., 2015). Therefore, the main aim of this paper is to propose a conceptual model to combat cybersecurity threats involving big data analytics in the Hadoop ecosystem.

The rest of this paper is organized as follows: Section 2 describes the research methodology and methods. Section 3 is focused on the theoretical background. A conceptual model and its components are proposed and described in Section 4. It is followed by the discussion and future research. The final section presents the major conclusions.

Methodology and Methods

Efficiently storing and processing large-scale big security data is a challenging issue. Also, as big data are typically processed in a distributed manner over a set of nodes, being distributed considerably increases the potential threats to the system and increasing the complexity of security measures needed to combat those threats. For this purpose, the main aim of this paper is to propose a solution for organizations

dealing with cybersecurity threats, which will involve big data analytics in the Hadoop ecosystem. In contrast to Yu et al. (2013), this solution explores all the options offered by the Hadoop ecosystem and related platforms. It should help efficiently collect, integrate, transmit, store, and retrieve security-related big data. The Hadoop ecosystem was chosen because of the fact that the big data analytics movement was primarily started and still primarily fueled by the open source platforms, tools, and services and also because of the more experience and the public domain information available around them.

The literature reviewed was selected based on its novelty and discussion of important topics related to big data analytics and cybersecurity, in order to serve the purpose of this research. Methods of decomposition, aggregation, and criteria comparison were used. The ecosystem perspective applied then provided a framework within which most other aspects represented by big data analytics can be incorporated. In this regard, the role of conceptual modeling for big data analytics was accepted as defined by Storey and Song (2017).

Literature Review

Cyber security and its key aspects

Cybersecurity refers to the technologies, processes and methodologies designed to protect computers, networks and data from unauthorized access, vulnerabilities, and attacks. The goals of cybersecurity are: 1) securely obtain and share information for accurate decision-making, 2) find and deal with vulnerabilities within applications, 3) prevent unauthorized access, and 4) protect confidential information. The cybersecurity process involves following a coherent set of best practices to protect all assets of value within a particular organization (Shoemaker and Conklin, 2012). Cyber defenses then must focus on protecting the confidentiality, integrity, and availability of data and the ICT systems that process those (Donaldson et al., 2015).

Current Intrusion Detection Systems (IDSs) analyze several protocols and data and events observed by them are correlated by Security Information and Event Management (SIEM) in order to detect intrusions. One shortcoming is that current solutions realizing in-depth packet analysis are not scalable and adaptable to big network producing high quantity of data (Marchal et al., 2014). In the last few years, IDSs have tried to leverage cloud-based approaches to optimize their detection capabilities. Cloud-based approaches allow for the collection of information from a very large pool of users and data analysis at a central point (Virvilis et al., 2014). This recent trend towards using clouds introduces similar vulnerabilities. If organizational data are stored in a cloud, their transfer from organizational systems to the cloud creates a potentially vulnerable channel. A failure of cloud providers' systems or an injunction served on them for an unrelated matter may also prevent continuing access to these data (Leuprecht et al., 2016; Storey and Song, 2017). This issue was addressed by Rabai et al. (2013) who explored a user-centered measure of cybersecurity, and demonstrated how this measure can be used to analyze cloud computing as a business model. They offered a quantitative model of security measurement that enables cloud service providers and cloud subscribers to quantify the risks they take with the security of their assets.

Big Data Analytics Technologies and Systems

The continuity of big data technologies is exemplified by such concepts as parallel, distributed, grid computing and, most recently, cloud computing. These architectures maximize storage, networking, and computing power for data-intensive applications. This progress was enabled by framework innovations in cluster computer systems, which consist of many nodes, each having their own processors and storage, all connected by high-speed networks (Kambatla et al., 2014; Liu, 2013; Lněnička, 2015). Big data analytics is in active use in several fields and, in recent years, has attracted the interest of the security community for its ability to analyze and correlate security-related data from a wide range of data sources across significant time periods and at unprecedented scale (Cárdenas et al., 2013; Terzi et al., 2015; Virvilis et

al., 2014). It plays an important role in detecting advanced threats and insider threats. Monitoring systems can potentially minimize false alarms by providing big data analytics and improving threat detection (Virvilis et al., 2014).

In this regard, big data analytics can be used to assist systems in collecting internal data by merging with relevant external data to detect known patterns to stay ahead of malicious activities or intruders (Kambatla et al., 2014; Marchal et al., 2014). Many big data platforms, tools, service, and also techniques have emerged that can handle the volume, velocity, and variety of machine-generated and network-related data (Lněnička, 2015). Hence, these big data systems are being part of a cyber defense strategy for every organization to meet the needs of complex and large-scale big data analytics (Jang-Jaccard and Nepal, 2014; Mahmood and Afzal, 2013). The anomaly detection, intrusion detection, fraud detection, advanced persistent threats (APT) detection, and forensics from big data has been accomplished by examining the logs, system events, network traffic, website traffic, SIEM alerts, cyberattack patterns, business processes, and other information sources (Jang-Jaccard and Nepal, 2014; Mahmood and Afzal, 2013; Terzi et al, 2015).

Surveys, studies and related components of the ecosystem

Surveys such as that conducted by Mahmood and Afzal (2013) presented the application of big data analytics techniques to cybersecurity. Authors stated that big data provide the following unique features for cybersecurity: a more agile decision-making approach for networks managers with surveillance and monitoring of real-time network streams; dynamic detection of both known and previously unknown suspicious/malicious behavior, usage, access pattern, transaction or network traffic flow in real-time; and appropriate big data hardware and software to cope up with the aforementioned requirements. Alguliyev and Imamverdiyev (2014) addressed these challenges to realize the true potential of big data analytics for cybersecurity: privacy-preserving big data applications, APT detection by big data analytics, high-performance cryptography, big datasets for security research, data provenance problem, security visualization, and skilled personnel. Ten et al. (2010) conducted a comprehensive survey on cybersecurity of critical infrastructures and proposed a supervisory control and data acquisition security framework with the following four major components: 1) real-time monitoring, 2) anomaly detection, 3) impact analysis, and 4) mitigation strategies. In addition, they developed an attack-tree-based methodology for impact analysis, which is based on power system control networks.

Another study conducted by Virvilis et al. (2014) described the importance of offline analysis along with the real-time data in threat detection. Although analyzing the offline data causes a delay in the attack detection, it is equally important to consider the time the attackers spend in reaching their objective. Jang-Jaccard and Nepal (2014) then discussed new attack patterns in emerging technologies such as social media, cloud computing, smartphone technology, and critical infrastructure to understand how malware utilizes the unique characteristics to proliferate itself. In this regard, the cyber system forms the backbone of a nation's critical infrastructures, which means that a major security incident on cyber systems could have significant impacts on the reliable and safe operations of the physical systems that rely on it (Ten et al., 2010).

A cloud computing based architecture for conducting cybersecurity situation awareness was proposed by Yu et al. (2013). Particularly, they leveraged the cloud infrastructure with a cost-effective data storage and investigate efficient stream processing techniques to reduce operational delays. By using the parallel computing techniques, they also discussed a parallel cloud based threat detection, which integrates both signature-based detection and anomaly-based detection. Similarly, Chen et al. (2016) proposed a cloud computing based network monitoring and threat detection system to make critical infrastructure systems secure. It consisted of three main components: monitoring agents, cloud infrastructure, and an operation center. They used both Hadoop and Spark to speed up data processing by separating and processing data streams concurrently. Marchal et al. (2014) proposed a solution to cope with the tremendous amount of

data to analyze for security monitoring perspectives. The application domain of such a system is mainly network intrusion detection and prevention, but can be used as well for forensic analysis. Data correlation schemes are proposed and their performance is evaluated against several well-known big data framework including Hadoop and Spark.

Development and Description of the Proposed Model

As demonstrated in the literature review, the exponential growth of data has created opportunities for world-wide web-based information sharing, but also led to the proliferation of cyberattacks (Yu et al., 2013). As a result, the challenge these days is less about defending access to the network and the devices on it, and more about big data analytics and preventing access to them (Aradau and Blanke, 2015). Furthermore, there is an increasing number of end user devices distributed in the organization network and a large amount of data stream collected from different applications, operating systems, and network equipment for the cybersecurity analysis (Yu et al., 2013). However, traditional security solutions are not capable anymore of encompassing the real-time big data network streams using traditions tools and techniques for long-term and large-scale analytics (Cárdenas et al., 2013; Mahmood and Afzal, 2013).

In this regard, to conduct the cybersecurity situation awareness, a large volume of data streams from monitored devices needs to be efficiently stored and processed in real-time (Yu et al., 2013). The Hadoop framework and other big data platforms are now commoditizing the deployment of large-scale, reliable clusters and are enabling new opportunities to process and analyze big security data (Cárdenas et al., 2013). One big problem of Hadoop is that it wasn't built with security in mind. It was developed solely to address massive data storage and faster processing (Spivey and Echeverria, 2015). There has been research on the development of fully distributed IDSs to address the limitations of central and hierarchical systems; however, only small-scale implementations have been realized (Virvilis et al., 2014). Therefore, these issues was considered and solved in a new conceptual model.

A cybersecurity analytics model using distributed infrastructure is depicted in Figure 1. It consists of three main components: big security data sources, data collection and transport, and distributed infrastructure including security layer for authentication and authorization. It follows the concept mentioned by Cárdenas et al. (2013) and Mahmood and Afzal (2013), where big security data can be stored in a dedicated repository, which can combine and analyze real-time data together with historical and external data.

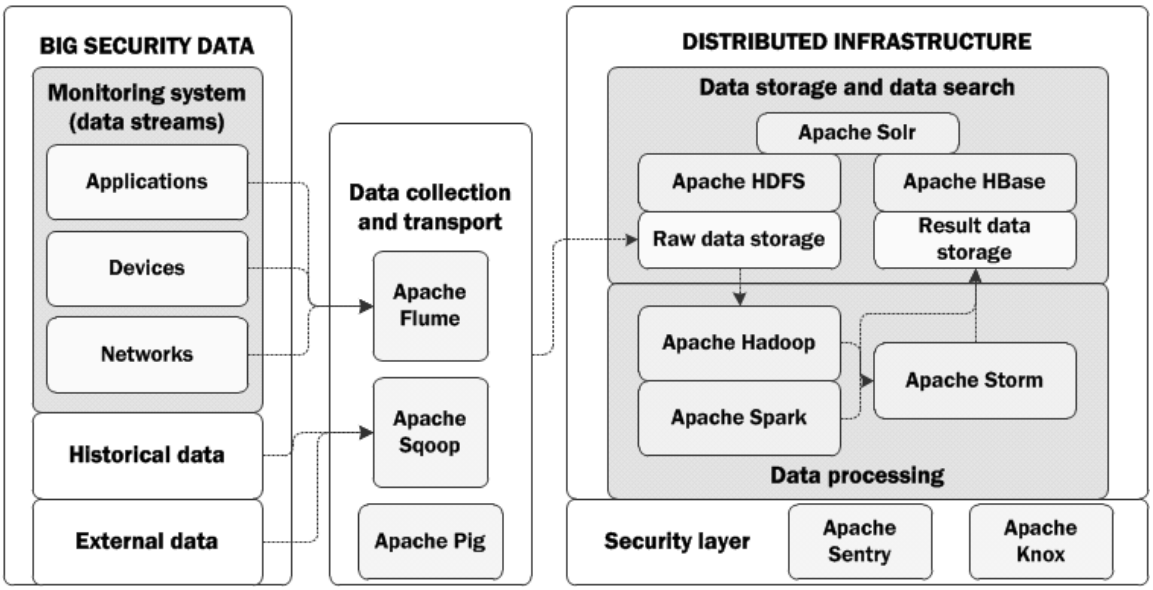


Fig. 1: Cyber security analytics model using distributed infrastructure with the Hadoop ecosystem

Data collection and transport component was proposed with the use of Apache Flume, a distributed, reliable, and available service for efficiently collecting, aggregating, and moving large amounts of log data, and Apache Sqoop, a tool designed for efficiently transferring bulk data between Hadoop and structured datastores such as relational databases. Apache Pig is a platform for analyzing large data sets that consists of a high-level language for expressing data analysis programs, coupled with infrastructure for evaluating these programs.

A distributed infrastructure was leveraged to develop a cost-effective storage. Distributed architecture may be implemented using cloud computing. With a large number of servers in a data center, a cloud infrastructure is a distributed system, which provides large data storage space and high computation facilities. The real-time monitored stream of data can be fed and stored in the storage server waiting for threat analysis and detection (Chen et al., 2016). For this purpose, as presented in Patrikakis et al. (2013), the OpenStack solution can be used, because, in contrast to VMware cloud and Microsoft's Hyper-V, it is free of charge, is also able to supports high availability of resources, as well as scalability and interoperability.

To conduct the cyber threats, the monitoring and threat information needs to be effectively collected and transmitted to the cloud for security analysis. Apache Hadoop and Spark-based data processing was used to improve data storage efficiency, speed up access to data, increase the efficiency of threat monitoring and detection, and eliminate operational delays concurrently. Since Spark has its own cluster management computation, it uses Hadoop for storage purpose only. Otherwise, instead of Apache Hadoop, Apache Storm was used as a free and open-source distributed real-time computation system. Storm makes it easy to reliably process unbounded streams of data, doing for real-time processing what Hadoop did for batch processing (Mazumder, 2016). Apache Hadoop File System (HDFS) was used as a raw data storage and Apache HBase was used a result data storage, where can be the results easily retrieved and used for detection and visualization purposes. Apache Solr is the open source platform for searches of data stored in HDFS in Hadoop.

Taken these components together, big security data can now be stored in a dedicated storage, which can

not only accommodate internal or external data but also combine and analyze real-time data together with historical data. As stated by Kambatla et al. (2014), since these analyses typically operate in closed systems (i.e. much of the data, infrastructure, and analyses are performed within the same security domain), issues of privacy and security in analyses are easier to handle. Therefore, a security layer with Apache Sentry and Apache Knox was proposed. Apache Sentry is a granular, role-based authorization module for Hadoop. Sentry provides the ability to control and enforce precise levels of privileges on data for authenticated users and applications on a Hadoop cluster. Sentry currently works out of the box with Apache Hive, Apache Solr, Impala, and HDFS (limited to Hive table data). The Apache Knox Gateway is a system that provides a single point of authentication and access for Hadoop components. Apache Sentry is then designed to be a pluggable authorization engine. It allows to define authorization rules to validate a user or application's access requests for Hadoop resources. Sentry is highly modular and can support authorization for a wide variety of data models in Hadoop.

Discussion and Future Research

Big data technologies are complex and evolving. They are needed to address many issues related to web, mobile, social, cloud, and big data analytics, as these continue to mature. Hadoop ecosystems are also evolving. However, despite the hype, Hadoop has had a rather slow acceptance rate. Spark, however, is rapidly dominating real-time parallel processing (Storey and Song, 2017). The proposed model took this into account and although the solution used both these platforms, Spark was preferred. On the other hand, there are also other big data analytics platforms, tools, and services that can be deployed, see Lněnička (2015) or Lnenicka and Komarkova (2015). Clarke (2016) stated that although the big data literature, academic as well as professional, has a very strong focus on opportunities, far less attention has been paid to the threats that arise from repurposing data, consolidating data from multiple sources, applying analytical tools to the resulting collections, drawing inferences, and acting on them. Therefore, the conceptual model considered the existence of historical as well as external data through their lifecycle phases ensuring that the whole process is designed to combat cybersecurity threats.

Aradau and Blanke (2015) also claimed that while critical scholars have drawn attention to the social, political, and legal challenges to these practices, the debates in computer and information science have received less analytical attention, hence, they developed a critical intervention into the public controversies concerning data-driven security and digital surveillance. A key component to arriving at a robust security architecture for a distributed system is to understand the threats that are likely to be present, and to be able to categorize them to better understand what security mechanisms need to be in place to help mitigate those threats (Spivey and Echeverria, 2015).

Future research will be focused on the implementation of this model. The main purpose will be to show the practical applicability of the components defined in the new model solution. There have been several MapReduce and Hadoop based algorithms implemented to monitor network traffic such as Lee and Lee (2013), Liu et al. (2014) or Narang et al. (2014).

Conclusion

Big data analytics for cybersecurity is an emerging area that requires extensive new research. The comprehensive literature survey reported in this paper has identified the lack of research in some areas. A new conceptual model offering high storage capacity, flexible deployment, more computation resources, and less expensive infrastructure investment was proposed to deal with the cybersecurity threats involving big data analytics in the Hadoop ecosystem. Finally, the issue of cybersecurity in the emerging big data technology space needs to be supplemented by the understanding of how kinds of data are produced through their lifecycle. The proposed threat monitoring and detection model can effectively collect, store, and process big security data in real-time as data streams as well as historical data.

References

Alguliyev, R. and Imamverdiyev, Y. (2014), 'Big Data: Big promises for information security,' *Proceedings of 2014 IEEE 8th International Conference on Application of Information and Communication Technologies (AICT)*, ISBN: 978-1-4799-4120-9-2, 15-17 October 2014, Astana, Kazakhstan, 1-4.

Aradau, C. and Blanke, T. (2015), 'The (Big) Data-security assemblage: Knowledge and critique,' *Big Data & Society*, 2 (2), 1-12.

Cárdenas, A.A., Manadhata, P.K. and Rajan, S. P. (2013), 'Big Data Analytics for Security,' *IEEE Security & Privacy*, 11 (6), 74-76.

Chen, Z., Xu, G., Mahalingam, V., Ge, L., Nguyen, J., Yu, W. and Lu, C. (2016), 'A Cloud Computing Based Network Monitoring and Threat Detection System for Critical Infrastructures,' *Big Data Research*, 3, 10-23.

Clarke, R. (2016), 'Big data, big risks,' *Information Systems Journal*, 26 (1), 77-90.

Donaldson, S.E., Siegel, S.G., Williams, C.K. and Aslam, A. (2015). *Enterprise Cybersecurity: How to Build a Successful Cyberdefense Program Against Advanced Threats*, Apress, New York.

Jang-Jaccard, J. and Nepal, S. (2014), 'A survey of emerging threats in cybersecurity,' *Journal of Computer and System Sciences*, 80 (5), 973-993.

Kambatla, K., Kollias, G., Kumar, V. and Grama, A. (2014), 'Trends in big data analytics,' *Journal of Parallel and Distributed Computing*, 74 (7), 2561-2573.

Lee, Y. and Lee, Y. (2013), 'Toward scalable internet traffic measurement and analysis with Hadoop,' *ACM SIGCOMM Computer Communication Review*, 43 (1), 5-13.

Leuprecht, C., Skillicorn, D.B. and Tait, V.E. (2016), 'Beyond the Castle Model of cyber-risk and cyber-security,' *Government Information Quarterly*, 33 (2), 250-257.

Liu, L. (2013), 'Computing infrastructure for big data processing,' *Frontiers of Computer Science*, 7 (2), 165-170.

Liu, J., Liu, F. and Ansari, N. (2014), 'Monitoring and analyzing big traffic data of a large-scale cellular network with Hadoop,' *IEEE Network*, 28 (4), 32-39.

Lněnička, M. (2015), 'AHP Model for the Big Data Analytics Platform Selection,' *Acta Informatica Pragensia*, 4 (2), 108-121.

Lnenicka, M. and Komarkova, J. (2015), 'The Impact of Cloud Computing and Open (Big) Data on the Enterprise Architecture Framework'. *Proceedings of the 26th International Business Information Management Association Conference (IBIMA)*, ISBN: 978-0-9860419-5-2, 11-12 November 2015, Madrid, Spain, 1679-1683.

Mahmood, T. and Afzal, U. (2013), 'Security Analytics: Big Data Analytics for Cybersecurity: A Review of Trends, Techniques and Tools,' *Proceedings of the 2013 2nd National Conference on Information Assurance (NCIA)*, ISBN: 978-1-4799-1288-9, 11-12 December 2013, Rawalpindi, Pakistan, 129-134.

Marchal, S., Jiang, X., State, R. and Engel, T. (2014), 'A Big Data Architecture for Large Scale Security Monitoring,' *Proceedings of 2014 IEEE International Congress on Big Data*, ISBN: 978-1-4799-5057-7, 27 June-2 July 2014, Anchorage, AK, USA, 56-63.

Mazumder, S. (2016), 'Big Data Tools and Platforms,' *Big Data Concepts, Theories, and Applications*, 29-128.

Narang, P., Thakur, A. and Hota, C. (2014), 'Hades: a Hadoop-based framework for detection of peer-to-peer botnets,' *Proceedings of the 20th International Conference on Management of Data*, 17-19 December, 2014, Hyderabad, India, 121-124.

Patrikakis, C. Z., Kalantzis, S. A., Toumanidis, L. and Zisimos, F. (2013), 'Supporting Lab Courses Using OpenStack,' *E-Democracy, Security, Privacy and Trust in a Digital World*, ISBN: 978-3-319-11710-2, 5-6 December 2013, Athens, Greece, 93-102.

Rabai, L. B. A., Jouini, M., Aissa, A. B. and Mili, A. (2013), 'A cybersecurity model in cloud computing environments,' *Journal of King Saud University - Computer and Information Sciences*, 25 (1), 63-75.

Rahman, M.N. and Esmailpour, A. (2016), 'A Hybrid Data Center Architecture for Big Data,' *Big Data Research*, 3, 29-40.

Shoemaker, D. and Conklin, W. (2012). *Cybersecurity: The Essential Body of Knowledge*, Course Technology, Cengage Learning, Boston.

Spivey, B. and Echeverria, J. (2015). *Hadoop Security: Protecting Your Big Data Platform*, O'Reilly Media, Inc., Sebastopol.

Storey, V.C. and Song, I.Y. (2017), 'Big data technologies and management: What conceptual modeling can do,' *Data & Knowledge Engineering*, 108, 50-67.

Ten, C. W., Manimaran, G. and Liu, C. C. (2010), 'Cybersecurity for critical infrastructures: attack and defense modeling,' *IEEE Transactions on Systems, Man, and Cybernetics-Part A: Systems and Humans*, 40 (4), 853-865.

Terzi, D.S., Terzi, R. and Sagiroglu, S. (2015), 'A Survey on Security and Privacy Issues in Big Data,' *Proceedings of 2015 10th International Conference for Internet Technology and Secured Transactions (ICITST)*, ISBN: 978-1-908320-52-0, 14-16 December 2015, London, UK, 202-207.

Virvilis, N., Serrano, O. and Dandurand, L. (2014), 'Big Data Analytics for Sophisticated Attack Detection,' *ISACA Journal*, 3, 1-5.

World Economic Forum. (2015). *The Global Information Technology Report 2015: ICTs for Inclusive Growth*, SRO-Kundig, Geneva.

Yu, W., Xu, G., Chen, Z. and Moulema, P. (2013), 'A cloud computing based architecture for cyber security situation awareness,' *Proceedings of 2013 IEEE Conference on Communications and Network Security (CNS)*, ISBN: 978-1-4799-0895-0, 14-16 October 2013, National Harbor, MD, USA, 488-492.

Identity Management Maintenance for Ex-Ante and Ex-Post Governmental Policy Analysis

Madalina Ecaterina Popescu, The National Scientific Research Institute for Labor and Social Protection; The Bucharest University of Economic Studies, Bucharest, Romania, madalina.andreica@gmail.com

Ion-Petru Popescu, The Bucharest University of Economic Studies, Bucharest, Romania, ion.petru.popescu@gmail.com

Catalin Alexandru Barbu, The Bucharest University of Economic Studies, Bucharest, Romania, catalin.barbu.alexandru@gmail.com

Abstract

The key for conducting reliable ex-ante and ex-post governmental policy analysis relies on the accessibility to relevant and accurate databases, which becomes a must for the government institutions in order to take informed decisions and assess the impact of the past macro-economic policies. Thus, in this paper we develop a solution for dealing with these issues by adopting a comprehensive set of identity management maintenance steps, including data governance, data migration and unified reporting mechanisms. Because analysis cross-government database system is such a resource intensive task, continuous data maintenance identity management is a must. This is achieved via program governance specific activities that should not change when there are changes at political level. The data maintenance process should be continuous and should have the objective of insuring that the links between relevant systems are kept. Moreover, having a good identity management practice gives the benefit of offering personalized government services to the population.

Keywords: *identity management, maintenance, data governance program, government policy*

Introduction

One for the main objectives of all governments is taking measures in reducing unemployment and making sure that most of the available workforce in the country is engaged in taxable activities. In order to achieve those objectives there is a constant need for relevant and accurate data that will enable the government institutions to both take informed decisions and to measure the impact of the past macro-economic policies.

However, when it comes to informed decision making, especially inside state owned agencies, there is often the issue of having to deal with databases and systems that are either incompatible, unsynchronized, un-linked or all of the above taken together. Moreover, there is a known reticence between agencies to collaborate with each other for various reasons. The fact that most of the state institutions have their own budgets and autonomy to implement the IT systems they see fit, without having to synchronize with other possible involved parties (like other ministries or congruent agencies that are having activities in intersecting or same fields) only complicates the matter at a macroeconomic policy level (see, among others, Roman and Popescu, 2015; Pirciog et al., 2015; Militaru, 2015, Avram et al., 2013).

This is why, the main purpose of this paper consists in presenting a solution for dealing with these issues by adopting a *comprehensive set of identity management maintenance steps, including data governance,*

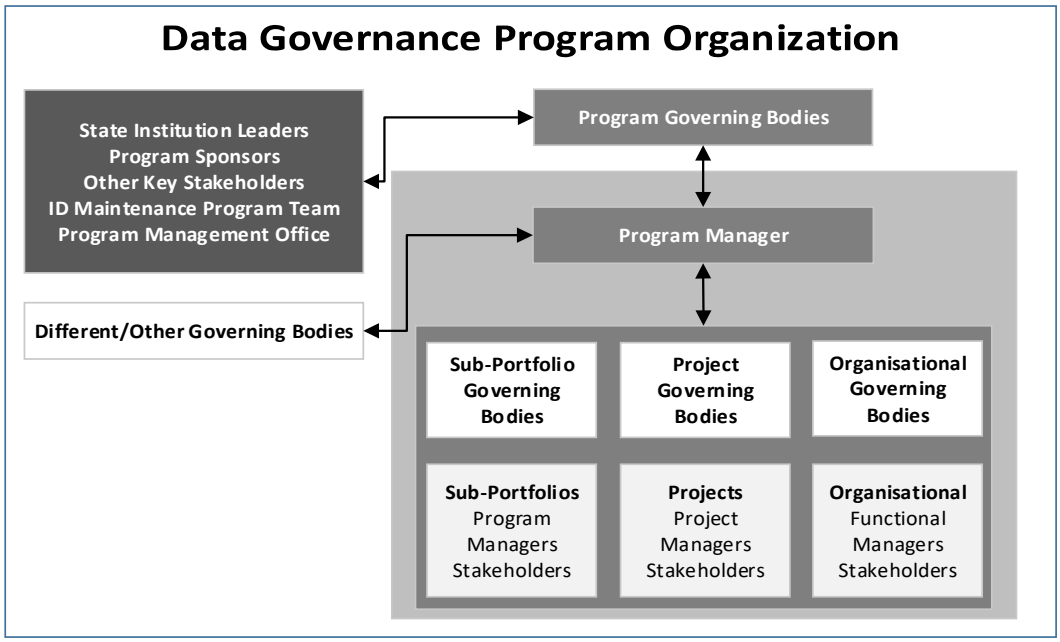
data migration and unified reporting mechanisms so that the decision makers can, in fact, have some sort of reliable datasets about the population and the impact of ex-ante and ex-post measures taken.

The proposed comprehensive set of identity management maintenance steps will be presented further below, by considering the logical data flow from recurrent and continuous data governance activities to data management practices and reporting mechanisms. Thus, the structure of the paper is the following: section 2 is dedicated to the cross-project (nation-wide program) data governance flow, while the data migration / transformation flow will be presented in section 3. Section 4 describes the reporting and data analysis process, while the last section concludes.

The Data Governance Flow

The reason that it always comes to data program wide governance practices is the fact that state IT systems are usually very vast and will be in a constant state of change. This means that if one needs to have a good overview over individual identities (companies, persons, employees, etc.) with data spread across multiple IT systems, one needs to make sure that this data is always aligned as per agreed principles.

So as to meet governmental strategic and operational goals in the field of maintenance of identity (ID) management, the government agencies should implement nation-wide data governance programs. This higher function should be established so as to provide control over high level data management tasks. At program level, the governance functions and processes are very distinct from the usual functional management activities (e.g. projects taken at the individual level, non-project work related activities and eventual subprograms) (see fig. 1).



Source: authors' adaptation from PMI (2016). *Governance of Portfolios, Programs and Projects: A Practice Guide,* Newtown Square, PA: Project Management Institute

Fig. 1: Data Governance Program Organization

Data governance at program level should focus on decision making guidelines for general ID management tasks so that it can deliver the value needed to meet national strategic and operational goals – like lowering the unemployment rate by a targeted margin. This is very important at the macro-economic level, as the results can be in turn used not only to estimate and measure but also for publicity and image purposes in future election campaign activities.

As defined by the PMI (2013) a program is "a group of related projects, subprograms and program activities that are managed in a coordinated way to obtain benefits not available from managing them individually. Data governance programs comprise various components, primarily subprograms and individual projects within the program. Non-project components or program activities are needed to manage the program itself such as training, operations, and maintenance."

The "program governance" refers to the sum of the elements that comprise the governance activity, each having functions, processes and sub-programs (including implementation projects). The governance function means, basically, grouping processes related to each other and across governance domains in order to support the portfolios, the programs and the projects that the government wants to implement.

All of these functions are structured as control, integration, oversight and decision making activities.
The reason why the data governance activity is to be taken into account is that one needs some sort of overseeing body to manage cross-organizational identity data (in our specific case a program will always be meant to obtain a unified view over data related to entire classes active populations). In this way there is always a degree of control over what is happening at cross platform level and integration between databases and systems remains feasible over long periods of time.

The Data Migration / Transformation Flow

In the process of maintenance identity management over a multitude of very large, national, state-wide systems, the normalization is a very complex process with exponential business complications. This is due to the fact that different state agencies implement systems that best serve their particular interests (like social security, medical insurance, active teaching systems and requalification programs, military drafting, census specific databases, electronic voting counters, etc.) One can imagine that usually the data dimensions will never be easily comparable between those systems.

In the following sub-section we will present a general case study using as an example data migration and transformation practices with SAP legacy specific systems from multiple sources into one new unified destination.

The 6 Step Approach for Data Normalization and Migration

The data migration in complex identity management projects will usually follow several steps that are most of the time repeating themselves. All data is usually stored into a common dedicated destination source (called form here on data warehouse DWH). Depending on the complexity of the task and the government objective, several other, intermediary steps can be added in-between. The list below describes the steps taken during the program in order to finalize the data migration process and reaching a unified data modelling and reporting process. Each step will be further on described in some high detail level.

- Data Readiness Evaluation
- Data Normalization
- Data Extraction
- Validating Techniques
- Data Transformation and Loading Process

- *Data Readiness Evaluation*

During the data preparation phase, there are a number of tasks that need to be done before real data migration takes place, activities like installation and configuration of the specific data normalization tools (in SAP case the Data Services tools), creation of the data migration design templates, SDS standards, and also the determination of the data objects in scope (for example all data related to income measurement). This has been captured in the data migration object list. Furthermore, in this phase the high level data migration and cleansing approach have to be clearly stated and delivered.

Installation and configuration of the SDS tools will be the data warehouse (DWH) responsible. The DWH team will be responsible for data templates and the finalizing of the data object list and the data migration along with the cleansing approach.

Table 1: Correspondence between activities, deliverables and responsible parties

Activity	***Deliverable***	***Party Responsible***
Create Functional Design	Functional Design Documentation	DWH owner
Create ETL document	ETL documentation	DWH owner/Implementation Program Team
Create Mapping Document	Data Mapping Documentation	DWH owner
Build data structure and content not available in the original systems	New data structures created	Implementation team

Source: authors own contribution

➢ *Data Normalization*

Data normalization is a repetitive task that will be done in close cooperation with the all related governmental agencies that have source data. The actual normalization should fall under the program implementer's activities. The DWH team will supervise the data cleaning process and even be involved in the program's governance.

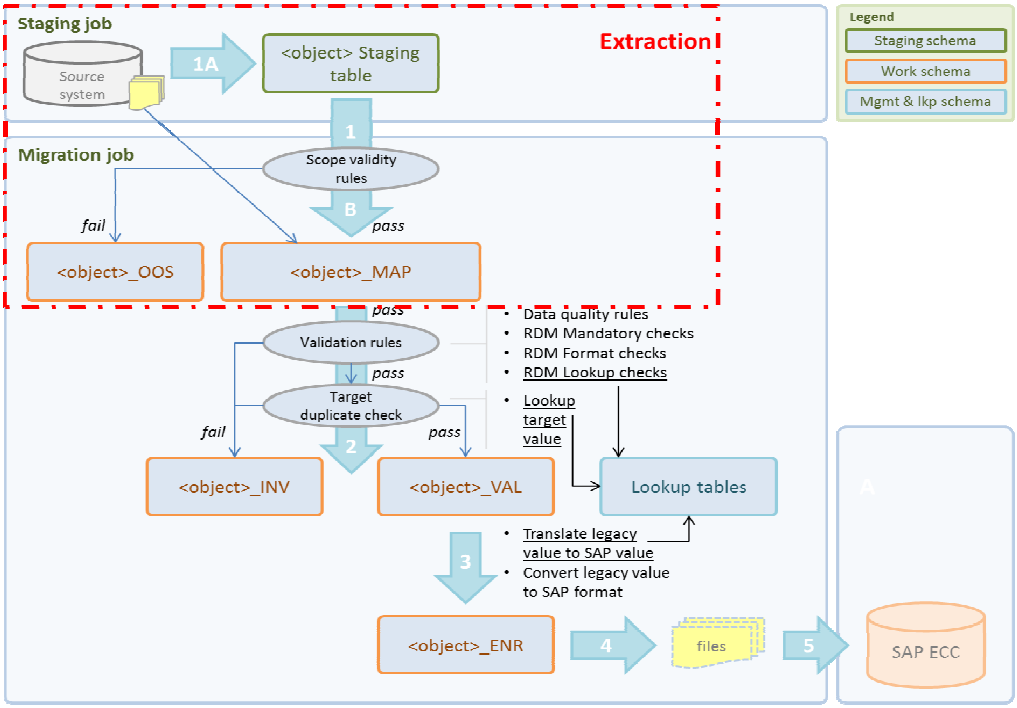
Before the start of the data accuracy related tests the presumption is that the newly data placed in the DWH is 100% clean. Therefore verifications and normalization of data process is iterative until the data is accepted as being fully cleaned so it can be used for Identity Management analysis. In some countries, where data access can be done only by the government agencies themselves Identity Management and Maintenance is not even relevant since the population will never access these source systems and do interrogations or ask for online services according to their level (like printing the tax return forms, or asking for online reports on their personal financial statements and at-level taxation levels).

➢ *Data Extraction (from source systems) and Validating Techniques*

Usually there are 2 sub-steps to be considered at this level:

Step 1 (in the picture presented below) is the extraction of relevant (raw) data from the source systems and store them in the staging tables in DWH. In this first step there is no specific logic, however, the data will be taken over from the source system in a 1:1 ratio. When the data gets extracted from the source system there is a **Step 2** in the extraction process where all the validation will take place and the data will be stored in two kinds of tables:

1) _ERR tables containing data from the staging tables that does not comply with the validity rules
2) _MAP tables containing data from the staging tables that passed the validity rules and can now be used for reporting and analysis.



Source: authors own contribution

Fig. 2 : Extraction process from multiple source systems

➢ *Data Transformation and Loading Process*

The data transformation represents data enrichment, normalization and aggregation. It is a crucial step that will basically bring the data from several sources to a level that can be used in analysis, reporting and decision making. It is described in fig. 2 being associated with steps 4 and 5.

Reporting and Data Analysis

Having now all the Identity data with all the needed attributes linked to it, deep analysis activities can be performed by state institutes regarding aspects and patterns observed on the active population. Nationwide measures can be now taken using extensive unified reporting mechanisms that will try to help in the decision making process, implementation of combating poverty (see Avram and Militaru, 2016) and income inequalities (see Popescu and Militaru, 2017), coaching and educational initiatives across entire classes of individuals (Roman and Popescu, 2015) and so on.

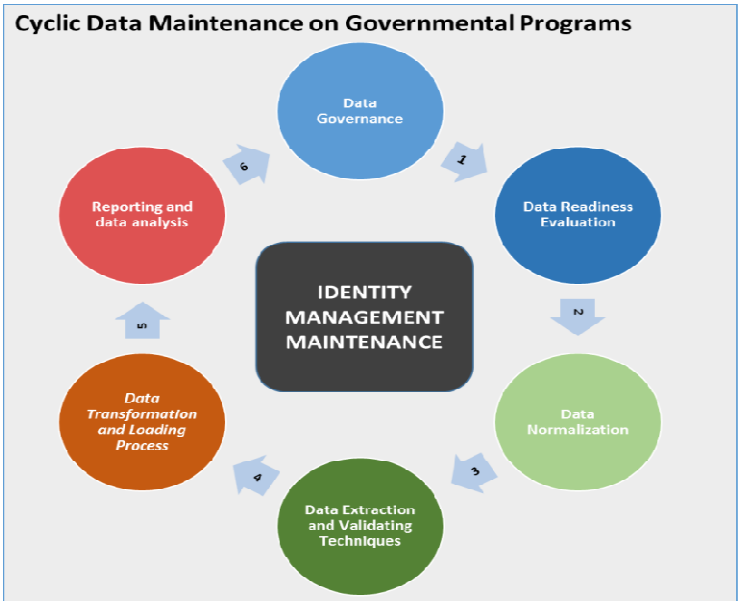
There is however an aspect that is often neglected and this is the *reporting process of the maintenance of ID management itself*, not the reporting on the impact and results of the governmental measures. With having controls implemented over the data, we propose a fully cyclic view that will close the circle and restart the entire process over and over. Of course that over the years, the data requirements will change, while more and more information will be needed to be linked to an identity.

This means that with every cycle, during the governance phase, additional analysis and decisions need to be considered so as to meet the newly formulated requirements and challenges. This is achieved by implanting general metrics that will give an indication on how and what needs to be done and will show the current situation in regards to the entire set of data.

The scope of the article is not to go into detail over how data status is to be reported on but as a program management recommendation we can give the following fields where special attention needs to be given:

- **Time needed to both get and analyze the data** – For each system an allocated time needs to be put forward. This should include data analysis, transformation and loading.
- **Data cost** – This includes monetary values of both man-hours and other resources needed to get the needed data sets but also hardware and software costs, legal fees and so on.
- **Data quality (DQ)** – On this we propose that a comprehensive set of metrics need to be taken into consideration that will reflect correctly the DQ status during all phases of the program
- **Actions Needed** – This included not only the decisions taken but also the time by which then need to be implemented, the responsible parties, the controlling entities and a detailed step-by-step description that will lead to the materialization of the objectives

We propose that these points can be followed by using a combination of good practices and specialized tools like SAS and SAP reporting tools (see, for instance, Eslinger, 2016).



Source: authors own contribution

Fig. 3: The Data Maintenance Cycle

Conclusions

Because analysis cross-government database system is such a resource intensive task, continuous data maintenance identity management is a must. This is achieved via program governance specific activities that should not change when there are changes at political level. The data maintenance process should be

continuous and should have the objective of keeping the links between systems (unified keys, data transformation rules, relevant reports) always relevant.

Moreover, if this is achieved, then personalized government services to the population can be offered since reaching and maintaining data unification cross systems will enable the population to log into the state systems from exposed interfaces and use their private IDs to perform various tasks like paying taxes online, filing complaints over the internet, checking tax situation from their mobile telephones, etc. Moreover, all these activities can be linked to specific persons, along with their other relevant data and based on these electronic identities, the government can take active measures, implement various programs, verify the results, launch internet campaigns and, in the end, help their citizens by taking informed decisions.

References

Avram, S., Figari, F., Leventi, C., Levy, H., Navicke, J., Matsaganis, M., Militaru, E., Paulus, A., Rastrigina, O., Sutherland, H. (2013). The distributional effects of fiscal consolidation in nine EU countries, *EUROMOD Working Paper* EM2/13, University of Essex, Colchester.

Avram, S., Militaru, E. (2016). Interactions Between Policy Effects, Population Characteristics and the Tax-Benefit System: An Illustration Using Child Poverty and Child Related Policies in Romania and the Czech Republic, *Social Indicators Research*, no. 128(3), 1365-1385.

Eslinger, J. (2016). *The SAS Programmer's PROC REPORT Handbook: Basic to Advanced Reporting Techniques*, Cary, NC, USA: SAS Institute Inc.

Militaru, E. (2015). The redistributive effect of the Romanian tax-benefit system: A microsimulation approach, *Journal of Applied Quantitative Methods*,10(1).

Pirciog, S., Ciuca, V., Popescu, M.E. (2015) The net impact of training measures from active labour market programs in Romania – subjective and objective evaluation, *Procedia Economics and Finance*, 26, 339–344.

PMI (2016). *Governance of Portfolios, Programs and Projects: A Practice Guide*, Newtown Square, PA: Project Management Institute

PMI (2013). *The Standard for Program Management* – Third Edition. Newtown Square, PA: Project Management Institute

Popescu, M.E., Militaru, E. (2017). Wage inequalities in Romania under successive adjustments in minimum wage levels, *Theoretical and Applied Economics*, 2 (611), 213-220.

Roman, M., Popescu, M.E., (2015). The Effects of Training on Romanian Migrants' Income: A Propensity Score Matching Approach, E*conomic Computation and Economic Cybernetics Studies and Research*, 43(1), 85-108.

Consumer Perception of Online Grocery Shopping in Karachi, Pakistan

Mariam Saleem, Institute of Business Management, Karachi, Pakistan, Email: std_13656@iobm.edu.pk

Marium Mateen Khan, Lecturer, Marketing Department, Institute of Business Management, Karachi, Pakistan, Email: marium.mateen@iobm.edu.pk

Mohammad Ekhlaque Ahmed, Assistant Professor, Marketing Department, Institute of Business Management, Karachi, Pakistan, Email: ekhlaque.ahmed@iobm.edu.pk

Sanober Ali, Institute of Business Management, Karachi, Pakistan, Email: std_11521@iobm.edu.pk

Neha Shah, Institute of Business Management, Karachi, Pakistan, Email: std_11281@iobm.edu.pk

Saad Rafiq Surti, Institute of Business Management, Karachi, Pakistan, Email: std_11856@iobm.edu.pk

Abstract

This research plays a role to comprehend the attitude and behavior of Pakistani consumers towards online grocery shopping. It helps to identify factors (Product/service quality, Product guarantee, Convenience, Product/service cost, Product varieties, Perceived risk, Social norms and Website design) that can influence customers to switch to online grocery shopping and adopt online shopping as their prime mode of purchase. Findings indicate that high perceived risk is the most important and significant factor as compared to all other factors. Consumers who are less familiar with technological devices, find it difficult to trust today's technology, which includes, domestic housewives. Whereas young generation is relatively excited about the emerging medium. Purposive and snowball sampling techniques were used collect the data using questionnaires. The results show that lack of variety and overpriced products also appeared to be the major factor when choosing online grocery as the prime source of shopping. This research not only finds out the existing online shopping trends and perception of people towards online grocery but also provides an insight into the future scope of online grocery shopping in Pakistan.

Keywords: Online grocery, Karachi, Pakistan, future scope of online shopping, attitude and behavior, online grocery awareness

Introduction

Internet plays an important role in connecting to information and people. It has significantly helped shortening the distance between people and their prospects, hence given birth to online services and ventures. Online shopping is trending in the world giving increased output every year. Virtual marketplaces are catering to all kinds of consumer needs be the needs be tangible or intangible, standardized or general and durable or perishable (Datamonitor, 2010). Computer appliances, books and accessories lead the market share for online shopping being the standardized goods. Whereas products like groceries are still struggling to attain popularity among online consumers (Grewal, Iyer, Levy, & Michael, 2004).

Grocery products are the edible commodities that are bought from supermarkets on the continuous basis, usually at regular intervals of time. Traditionally, groceries are bought in set-up where the consumer can

inspect the product before buying (Klein, 1998). The sense of touch, smell and sight directly effects buying decision of consumer. Also, the marketplaces are not limited to the perishable products but also accommodate durable eatables (such as canned and packet food) and non-food goods such as household appliances (Schuster & Sporn, 1998). Hence, grocery shopping becomes an actual expedition where physical activity is undertaken and strong senses help determine the choice.

Online grocery shopping looks promising when compared to other products available online but it faces rather different challenges of its own for its buyer as well as sellers. Benefit of doubt increases where a buyer takes sensory attributes involved in the traditional process. Also, delivery/transportation of fragile items become a delicate problem. In some cases, the buyer is just not interested to leave their deep-rooted shopping habits and switch to new ones; regardless of how much of their time and money is saved. It is crucial to explain the variables that influence buyers towards the purchase of grocery products online (Liao & Cheung, 2001).

It is important to note that online shopping takes more than just the desire to act. Although it does not involve traveling, carrying heavy weight or work-hour restriction, the presence of certain resources is mandatory that make the transaction possible (Chu, Arce-Urriza, Cebollada-Calvo, & Chintagunta, 2010). Thus it is important for buyers to be well equipped and aware of the technicalities of online shopping so that their experience is without any hindrance (Shim et al., 2001). Individuality of each potential customer also plays an important role in defining sales. A person with more internet exposure will tend to shop more than the person who has less experience with internet (Frambach, Roest, & Krishnan, 2007).

There is a lot of potential for online grocery trade as Generation Y and their predecessors use technology frequently to save time and seek convenience as compared to the previous generations who are accustomed to buying groceries from brick and mortar stores. The grocery shoppers of new age are identified as better educated and risk taking individuals who try new things and opt for easier solution to problems. From the research related to internet usage of people, findings conclude that complex decision making of consumers is based on social cognition of individuals.

This research aims to identify the factors that are important to increase the adoption of online grocery, what consumers want from a grocery store and what are their current attitudes towards the concept. Furthermore, the research aims to identify the pain points of consumers that need to be catered in order to increase the adaptability of online grocery shopping.

E-commerce has greatly evolved over the past few years, creating differentiation between the leaders and laggards in most industries. The worldwide expansion of the internet has resulted in the transformation of the e-commerce market. E-commerce statistics state that 40 percent of worldwide internet users have bought products or goods online via desktop, mobile phone, tablet or other online devices (Statistica, 2014). As per Express tribune, (2014), the e-commerce industry is booming throughout the Asian region, with India leading the e-commerce websites. Pakistan, although a late entrant to the world of e-commerce, has recorded a massive rise in online shopping trends and other e-commerce businesses. Pakistan's e-commerce market is expected to surpass $1 billion in five years. Currently valued at over $60 million, the country's e-commerce sector is doubling in size every year i.e. it is growing at a compound annual growth rate (CAGR) of over 100%.

The market share of online grocery in Pakistan is around $25 million (Arshad, 2015). Pakistan's e-commerce market is expected to reach over US$600 million by 2017 (Ahmad, 2015). To further facilitate the adoption of online grocery, analysis of consumer needs and their behavior is crucial. The study layouts consumer perception and readiness towards online grocery shopping. It further highlights the pain points that are need to be eradicated in order to increase the rate of acceptance of this new medium.

Literature Review

Researchers have worked a lot on online grocery, how consumer adopts a new buying behavior and what compels them to change their behavior. One such research group is Hartman. According to Hartman, (2015), the attempt of selling grocery online in 1990's appeared to be failure but, now online shopping is taking over the shift. Unquestionably, consumers are now more interested in buying packaged goods that can be stored for days. This is also aiding the online grocery trend. The increasing scope of digital has got many brick and mortar stores worried for their digital presence as new digital players are taking away their consumer share of wallet and is making presence in the consumer mind. Many stores are now planning to enter into the digital era and create their presence online (Hartman Group, Forbes, 2015).

Hartman group, (2015) is of an opinion that, Brick & Mortar stores will not completely get off the market but few shoppers are getting over the conventional notion of doing grocery. Important point to ponder over is the idea that, will online grocery shopping become acceptable and provide share of wallet from good number of consumer? Hartman Group, (2015) report states that online grocery shopping helps early adopters save around 39% of their time, 36% of money and around 27% fuel.

In order to widen the scope online grocery need to focus on under stated areas:

- Target Households: young urbans and families
- Meet Underserved Needs: highlighting convenience
- Look for Cultural Hooks: try to get monthly subscriptions etc.

Online grocery shopping helps buyers eliminate the activity of physically visiting the stores, providing convenience to get things delivered on a single click, no standing in long lines and no carrying of heavy bags. They also reduce unnecessary shopping habits and picking extra items while shopping in a store. It will quickly grab the attention of consumers who are procrastinators and are not fond of visiting the stores. While people who visit physical stores in terms of outing and for fun will still prefer brick and mortar stores. Unless, they find some super quick delivery or discounts or coupons or other order processing conveniences. However, considering the food culture it is evident that digital food will make its place and technology will help earn greater shares. (Hartman Group, Forbes, 2015).

Nielson group investigated five factors to know about online grocery shopping, which are:

1. Consumers love online grocery shopping but it will take them time to get comfortable with it. The supply side needs to make shopping experience easy by making user friendly interface of the web or app. It must be easy to navigate and provide time saving and efficient delivery service.
2. Online store should provide maximum number of listings and product options to choose from as it is different to buy online than offline. The e-store should have good number of packages and categories available.
3. Consumer perception and behavior while buying online is affected in various ways. It is important to provide an easy to use platform. Greater variety would help buyer choose and make comparisons.
4. Online shopping has greater transparency, price visibility, extensive distribution and customization available.
5. It is important to build proper marketing strategy to align your store with the best marketing strategies to increase interactions and link customers with your brand. Create excite, bring innovative ideas and build relationship on social media platforms along with spreading awareness.

Court, Elzinga, Mulder and Vetvik, (2009) researched about the process consumer goes through while making a decision. According to them, marketing has one goal**,** and it is to reach consumers at the moments that most influence their decisions. Marketing has always sought those moments, or touch points, when consumers are open to influence. For years, touch points have been understood through the metaphor of a "funnel" consumers

start with a number of potential brands in mind (the wide end of the funnel), marketing is then directed at them as they methodically reduce that number and move through the funnel, and at the end they emerge with the one brand they choose to purchase.

In modern times, the funnel concept fails to capture all the touch points and key buying factors resulting from the explosion of product choices and digital channels, coupled with the emergence of an increasingly well connected and well-informed consumer. The situation calls for a more sophisticated approach which is less linear and more complicated than the funnel suggests to help marketers navigate in these complex times. The new approach is called *consumer decision journey.* This concept is applicable to any geographic market that has different kinds of media, Internet access, and wide product choice, including big cities in emerging markets (Court, Elzinga, Mulder and Vetvik, 2009).

This approach was developed by examining the purchase decisions of almost 20,000 consumers across five industries and three continents. The research showed that the proliferation of media and products requires marketers to find new ways to get their brands included in the initial consideration set that consumers develop as they begin their decision journey. It was also found that because of the shift away from one-way communication—from marketers to consumers—towards a two-way communication, marketers need a more systematic way to satisfy customer demands and manage word-of-mouth. In addition, the research identified two different types of customer loyalty, challenging companies to reinvigorate their loyalty programs and the way they manage the customer experience. Moreover, the research reinforced the general belief in the importance not only of aligning all elements of marketing—strategy, spending, channel management, and message—with the journey that consumers undertake when they make purchasing decisions but also of integrating those elements across the organization. When marketers understand this journey and direct their spending and messaging to the moments of maximum influence, they stand a much greater chance of reaching consumers in the right place at the right time with the right message (Court, Elzinga, Mulder and Vetvik, 2009).

The new model by Court, Elzinga, Mulder and Vetvik, (2009) suggests that the decision-making process is a more circular journey, with four primary phases representing potential battlegrounds where marketers can win or lose: initial consideration; active evaluation, or the process of researching potential purchases; closure, when consumers buy brands; and post purchase, when consumers experience them. The qualitative part of the research, consumers told us that the fragmenting of media and the proliferation of products have actually made them reduce the number of brands they consider at the outset. Faced with a plethora of choices and communications, consumers tend to fall back on the limited set of brands that have made it through the wilderness of messages. Brand awareness matters: brands in the initial-consideration set can be up to three times more likely to be purchased eventually than brands that aren't in it.

In today's decision journey, consumer-driven marketing is increasingly important as customers seize control of the process and actively "pull" information helpful to them. The research found that two-thirds of the touch points during the active-evaluation phase involve consumer-driven marketing activities, such as Internet reviews and word-of-mouth recommendations from friends and family, as well as in-store interactions and recollections of past experiences. A third of the touch points involve company-driven marketing. Traditional marketing remains important, but the change in the way consumers make decisions means that marketers must move aggressively beyond purely push-style communication and learn to influence consumer-driven touch points, such as word-of-mouth and Internet information sites. When consumers reach a decision at the moment of purchase, the marketer's work has just begun: the post purchase experience shapes their opinion for every subsequent decision in the category, so the journey is an ongoing cycle (Court, Elzinga, Mulder and Vetvik, 2009).

As mentioned earlier, the research also identified two kinds of loyalties. Of consumers who profess loyalty to a brand, some are active loyalists, who not only stick with it but also recommend it. Others are passive loyalists who, whether from laziness or confusion caused by the dizzying array of choices, stay with a brand without being committed to it. Despite their claims of allegiance, passive consumers are open to messages from competitors who give them a reason to switch. All marketers should make expanding the base of active loyalists a priority, and to

do so they must focus their spending on the new touch points. That will require entirely new marketing efforts, not just investments in Internet sites and efforts to drive word-of-mouth or a renewed commitment to customer satisfaction (Court, Elzinga, Mulder and Vetvik, 2009).

Developing a deep knowledge of how consumers make decisions is the first step. For most marketers, the difficult part is focusing strategies and spending on the most influential touch points. In some cases, the marketing effort's direction must change, perhaps from focusing brand advertising on the initial-consideration phase to developing Internet properties that help consumers gain a better understanding of the brand when they actively evaluate it. Other marketers may need to retool their loyalty programs by focusing on active rather than passive loyalists or to spend money on in-store activities or word-of-mouth programs. The increasing complexity of the consumer decision journey will force virtually all companies to adopt new ways of measuring consumer attitudes, brand performance, and the effectiveness of marketing expenditures across the whole process.

Four kinds of activities can help marketers address the new realities of the consumer decision journey.

- Prioritize objectives and spending
- Tailor messaging
- Invest in consumer-driven marketing
- Win the in-store battle

In many companies, different parts of the organization undertake specific customer-facing activities—including informational Web sites, PR, and loyalty programs. A number of executives are responsible for each element, and they don't coordinate their work or even communicate. These activities must be integrated and given appropriate leadership.

But the full scope of the consumer decision journey goes beyond the traditional role of CMOs, who in many companies focus on brand building, advertisements, and perhaps market research. These responsibilities aren't going away. What's now required of CMOs is a broader role that realigns marketing with the current realities of consumer decision making, intensifies efforts to shape the public profiles of companies, and builds new marketing capabilities.
Marketers have long been aware of profound changes in the way consumers research and buy products. Yet a failure to change the focus of marketing to match that evolution has undermined the core goal of reaching customers at the moments that most influence their purchases.

Hansen conducted a research on to investigate whether consumers who have adopted online grocery buying perceive this way of shopping differently from other online consumers. The study investigated whether already established online grocery buyers can be discriminated from other internet users or not? For this purpose data were collected from an online (web-based) survey of US consumers using self-administered questionnaires.

Hansen, (2005) elucidated 3 types of innovation a) discontinuous innovation b) dynamically continuous innovation c) continuous innovation. Online buying represents a discontinuous innovation as it includes technological advances as well as changes in consumer behavior. In order to understand the diffusion of such innovations, how such innovation is adopted is crucial to understand.

Rogers suggests five factors that increase the rate of acceptance and diffusion of innovations:

1. **Communicability** is the ease with which the innovation can be observed or communicated among potential adopters.
2. **Triability or divisibility** refers to the possibility of trying the innovation without huge investments
3. **Complexity** refers to the potential adopter's perceived complexity of the innovation or of using the innovation.

4. **Compatibility** is the degree to which the innovation is consistent with existing values and past behavior.
5. **Relative advantage** is the degree to which consumers perceive the innovation as superior to existing alternatives.

In addition to this, **perceived internet grocery buying risk** should also complement stated 5 factors by Rogers. To investigate the ability of these factors to discriminate between various types of consumer adoption behavior three online consumer segments were considered.

a. **Segment 1:** non-adopters of online shopping
b. **Segment 2:** online shopping adopters (excluding groceries)
c. **Segment 3:** online shopping adopters and online grocery-shopping adopters

Analysis of the research suggests that consumers who have adopted online grocery buying attach higher compatibility, higher relative advantage, more positive social norms, and lower complexity to online grocery shopping when compared with consumers who have never bought anything on the internet yet and consumers who have purchased goods/services on the internet but not groceries. The results also suggested that household income per year is higher among online grocery adopters than among non-adopters (Hansen, 2005).

Hansen, (2005) suggested that online grocery retailers should adapt themselves to the daily life of consumers. Consumers should not be expected to compromise their existing shopping needs and habits in order to carry out online grocery shopping. Online retailers should also make sure that online grocery shopping is easy to understand. They should market the relative advantages of online grocery shopping (possibilities for saving time and money) to the entire household.

Conceptual Framework

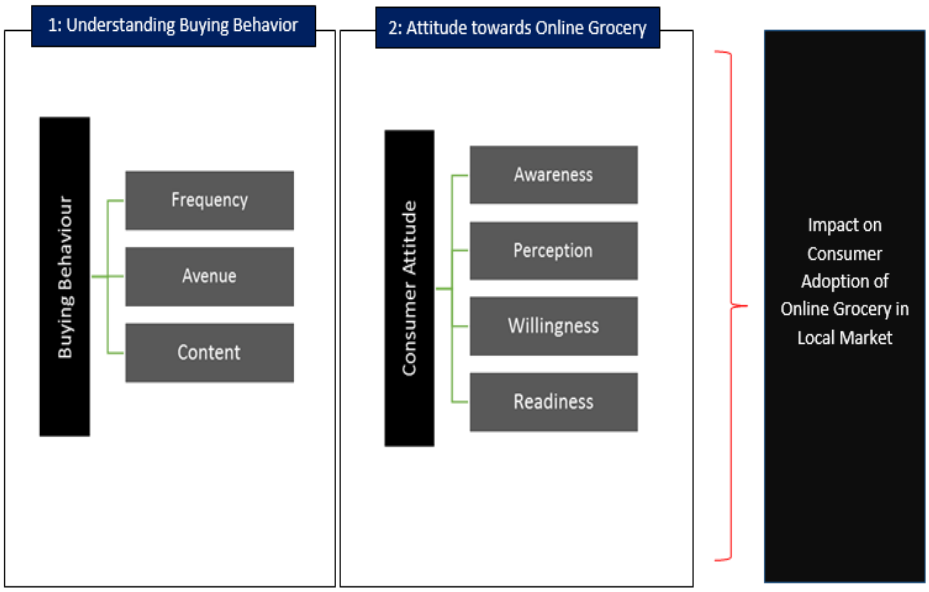


Figure 1 : Conceptual Framework - Online Grocery Shopping

The conceptual framework, studies the impact that the pre-established buying behaviors have over the attitude towards online grocery buying. Both; the buying behaviors of grocery shopping and the attitude towards grocery shopping; are further analyzed through few factors which are discussed in the following section:

The conceptual framework initially studies generic buying behavior of a consumer towards buying grocery. The intention is to analyze whether the current buying behaviors of local consumers are deeply rooted or not? In an actual market setting, the factors and behaviors associated with buying grocery are immense. However, in order to narrow down our research to focus on few significant behaviors we intend to study three main factors associated with buying grocery, which are as follow;

- **Frequency:** Frequency refers to the number of visits done to a grocery shop in a said time period. For instance - daily visits, weekly visits, bi-monthly visits or monthly visits.

- **Avenue:** Avenue refers to the situational context of a grocery store. We intend to study what a consumer prefers in terms of size and location of the store. Is a local consumer satisfied going to a small general store to buy groceries, situated at the end of his street? Or does he prefer to visit super stores and does not mind taking out his car for that?

- **Content:** Content refers to the things that make on a consumer's grocery lists and are purchased on a regular basis.

- As mentioned above, the conceptual framework intends to gauge the extent to which the buying behaviors towards grocery shopping are rooted in our local consumers. The higher the frequency, the higher the acceptance towards different grocery avenues and higher the list of items purchased – would translate into deeply rooted buying behaviors which are hard to overcome since they come naturally to consumers.

The given state of buying behavior and the established extent of its strength has a direct impact on a consumer's attitude towards online grocery, which is the second part of our conceptual framework. The four primary factors which can be studied in order to gauge the consumer attitude towards online grocery are as follow;

- **Awareness:** Are the local consumers even aware of such a concept of buying groceries online?
- **Perception:** How do the local consumers perceive online grocery?
- **Willingness:** Are the local consumers willing to try online grocery?
- **Readiness:** On what readiness stage are the local consumers on in terms of online grocery buying? (Buying Readiness Stages: Awareness, Interest, Desire and Action)

Attitude towards online grocery buying can be said positive if the aforementioned four factors are high/positive. Which means for an attitude to be positive a local consumer should have acceptable levels of awareness, positive perception, and positive willingness and should be at least interested in doing groceries online.

Since the concept of online grocery is of novel nature in local market - thus, online grocery model can only be adopted by local consumers if attitude towards online grocery is positive and it does not adversely interplay with the pre-established grocery buying behaviors (Ali et al., 2017).

Methodology

The purpose of the study is to identify the factors that have an impact on adoption of online grocery as their prime shopping mode and to know the behavior of Pakistani consumers towards online grocery shopping. The research targets the sample population of consumers drawn from Karachi who have or do not have any previous experience of online grocery shopping.

Sample size for the study was 90 individuals and it employed purposive and snowball sampling techniques to get data from the respondents who were best suited for the research at hand. Data was collected primarily using questionnaire technique. The research questionnaire caters to five section of questions designed to know different aspects of consumer behavior. Section one includes questions related to demographic profile of respondents such as gender, age, relationship status, education etc. Section two consists of questions that relate to general online shopping and awareness of online grocery and grocery stores in Pakistan. Section three focuses on questions regarding their perception towards online grocery, their willingness to buy and the factors that refrains them to buy online grocery. Section four consist of Likert scale questions to assists in knowing the opinion of people regarding online grocery shopping, their preferences and value proposition they are looking for. Sections five consist of questions that gauge consumer readiness towards online grocery shopping.

We distributed our questionnaire to respondents who are aged 18 years or above. The questionnaires were further divided into 3 target markets.

A) Domestic household consumers
B) Professionals

In process of our research we identified a new target market and included it as part of our research i.e. lives alone, Students and young professionals who live alone in Karachi.

Research Questions

1. What is the current understanding of online grocery in Pakistan?
2. What is the general attitude of consumer towards online grocery?
3. What factors are important to increase the adoption of online grocery?
4. What value a consumer wants an online grocery store to offer?

Hypotheses

H_1: Local consumers are not aware of online grocery shopping in local market

H_2: Local consumers don't have positive perception towards online grocery shopping in local market

H3: Local consumers are not willing to experience online grocery shopping in local market

H_4: Local consumers are not ready to adopt online grocery shopping in local market

Analysis and Discussion

The internet phenomenon is providing a new mode to do business in Pakistan. With E-commerce expected to become a $1 Billion industry by 2020 (Tribune, 2015), the future outlook is bright with immense potential in all areas for this yet untapped market of 200 Million people of Pakistan. This massive transformation is leading a behavioral change in consumers as to how they shop for products and services across the board ranging from grocery items to automobiles. The focus of this paper will be on grocery products.

On our fact finding journey, we further conducted a thorough research and survey analyses pertaining to the Pakistani market. The idea was to understand the different consumer perspectives as to how they view the online grocery model in Pakistan. For the purpose of simplicity we have categorized the respondents into three groups which are as follows:

1) **Domestics:** This segment is comprised of the local households of Karachi including both men and women. Traditionally women in domestics lead all the major purchase decisions for their households and have deep rooted cultural preferences as to what and where to buy from. It is a planned purchase for them, which occurs on a monthly basis, mostly at super markets and large retailers. Although they share the same touch point as professional women but are slightly more complex in their selection of products. An important aspect is their lack of awareness for the online model coupled with their ability to access computers and doubts about online buying of goods. For them, understanding of the model and addressing their fears is the first step towards their road to online shopping. Simple questions ranging from the time taken to deliver goods to the quality of the products supplied need to be promoted through well advocated channels. Furthermore the responses also uncovered that the use of single products in the initial phase to encourage trials.

2) **Professionals:** These respondents were women belonging to the age bracket of 20-29. For them grocery shopping is an experience which they enjoy; particularly if it involves going to the supermarkets like Naheed or Aghas. They make informed and planned purchase decisions unlike the live alone. For them, variety is important and becomes an important factor in choosing the shopping venue as well. Despite low awareness to the online model, 53% of the respondents favored towards giving the online model a try. This reflects that the segment does have a potential but needs to be pitched across the right touch points. Again, to tap this segment we need to align the product simultaneously on convenience and variety which will in turn be a determinant of how

price sensitive they (professionals) become to that offering. But one obstacle identified in the responses was the physical inspection of the product, the answer to which lies in '360 degree' display of products on the webpage along with clear photography to make the products vivid and more observable to the users. Factors like quick delivery, promotional offers and discounts coupled with authentic brand portfolio is what they are looking for. However despite the odds, the working women are willing to pay 5-8% premium if they are able to get the right product at the right moment. Bundle offers from multiple brands under one roof, can again come in handy to attract such visitors over the website.

3) **Live Alones:** As the name suggests, this class of respondents are people who are living single-handedly for education or job purposes in Karachi. With more than 70% being male and falling in the age bracket of 20-29, they have a high preference for home cooked meals and are the decision maker when it comes to grocery buying. Normally the 'live alones' don't have a planned purchasing pattern but they do make weekly purchases based on their need. Although only 20% of the respondents were familiar with the online model for grocery but willingness to try was higher, making them a viable target to pursue. Being a highly price sensitive audience and significant preference for convenience, bundle offers is the ideal way to attract 'live alones' for online grocery shopping. By capitalizing on the need for convenience and properly positioning the offers to their budget, the 'live alones' can serve to be regular and loyal customers. The focus should be on how flexible the model can be for them in a time saving manner.

Strategic Findings

- Young people falling in the age group of 20-29 years of age are more likely to purchase online, while their older counterparts are less prone to shop for groceries online
- 72% respondents purchased groceries on monthly basis, while only 19% purchased on weekly basis and only 9% purchased on fortnightly basis
- 59% respondents did not feel the need to purchase anything after they had purchased for the entire month, while 41% did feel that there still was the need to shop for certain things even after their monthly purchase was done
- Only 10% respondents were used to purchase groceries online while 61% respondents said that they would try online grocery shopping in the near future. However, 75% respondents purchased groceries from the supermarkets (Figure - 3)
- When asked about the factors that influence purchase of groceries online, the respondents stated that online grocery shopping provided convenience of sitting at home or office and order the needed things without any hassle, while prices and variety were the second and third most important factor that influenced online purchase of groceries (Figure - 4). The respondents further elaborated that while purchasing online they were able to compare the rates and number and type of variants available on other online grocery shopping platforms which gave them an assurance that the purchase they were doing was worth their money
- The respondents stated that they avoid online grocery shopping because it lacks the element of physical examination by the buyer, and the chances of forgery is also present along with the possibility of security risk that the buyer's personal and financial information might be misused (Figure - 5)

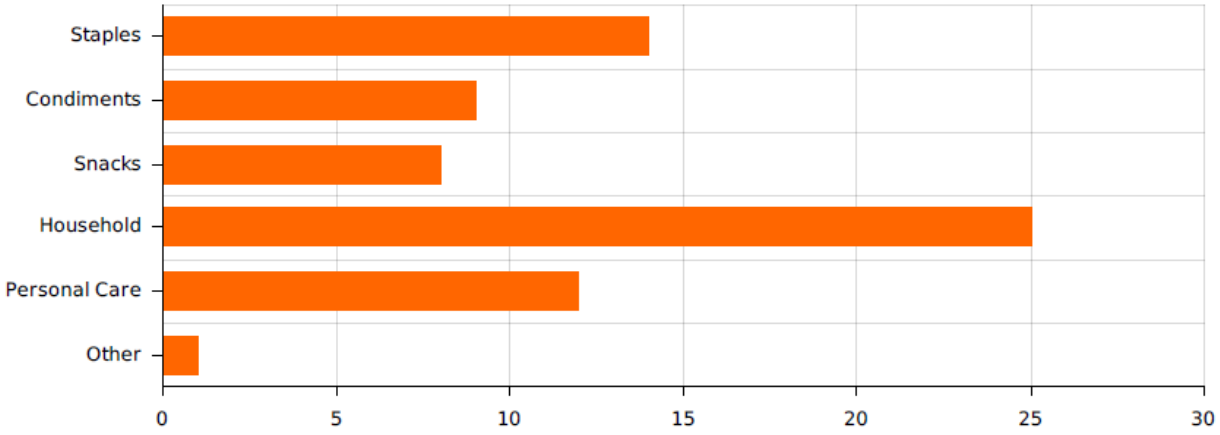


Figure 2: Purchase Items mostly bought in Groceries



Figure 3 : Typical Mediums of Shopping

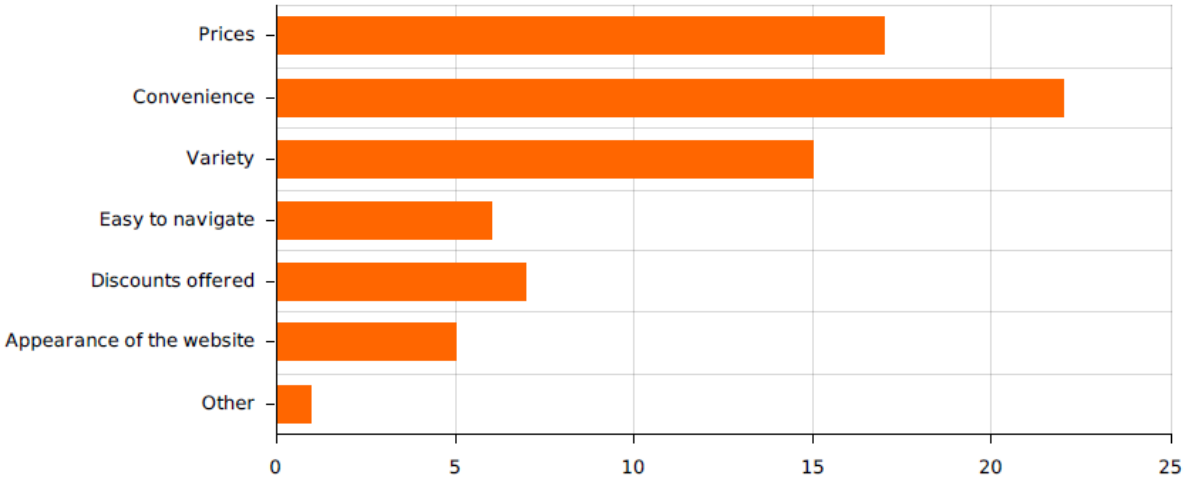


Figure 4: Factors Influencing Online Grocery Shopping

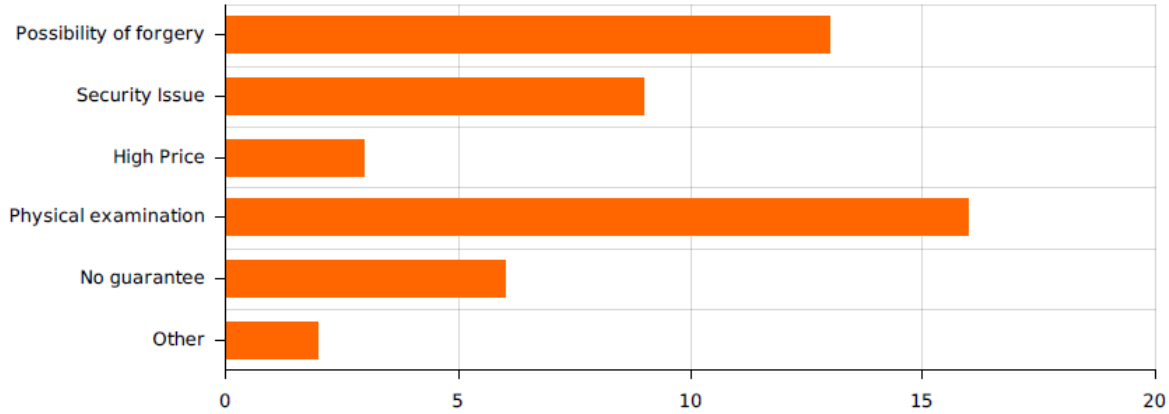


Figure 5 : Reasons for Avoiding Online Grocery Shopping

Conclusion and Recommendations

From the above analyses, it is clear that there is a long road to fully penetrate the market. Our analyses identified that there is a significant image problem for the online model, coherent across the three segments of respondents. Buying from retailers is a norm and disruption of any norm is not easy and nor is it always welcomed. Instead of positioning it as an alternative, we need to position the online grocery as something which can go hand in hand with the traditional model. The idea is to slowly encompass the user to accept the new way of shopping. Equally important is the fact as to how to create awareness amongst people. At the start we need to focus on users who will be the core drivers of growth for this industry like the live alone or professionals who actually can feel the need for this model.

The next step is to how relevant the offerings are to the audience. As correctly pointed out in the survey, respondents were unclear as to what products can they actually buy over the internet. This shows that there exist a gap in communication which need to be filled comprehensively so that the consumer expectations can be set at the right level. Equally important is the availability to house multiple brands.

Consumer have deep associations with brands and would want to buy only their favorite brands. This brand power can be used to encourage those consumers to shop online, who face shortage of authentic brands.

Last but the least is the intrinsic aspect of shopping. Pakistan is experiencing a dynamic shift from general trade to modern trade. By every passing time, bigger retailers are opening up like Naheed etc., which indicates the new trend pertaining to the shopping experience. To cultivate a similar response we need to offer the consumers something equal in value. This value can vary across the three segments we have identified above. Each segment has its own needs and preferences and the best way is to have a step by step approach.

References

Ahmed, J., 2015. The encouraging future of e-commerce in Pakistan. Retrieved June 26, 2016, from http://tribune.com.pk/story/975430/theencouraging-future-of-e-commerce-inpakistan/

Ali, S., Saleem, M., Ahmed, M. E., Khan, M. M., Shah, N., & Rafiq, S., 2017. Models for Online Grocery Shopping–A Study of Pakistani Online Market. *Journal of Internet and e-Business Studies.* 2017(1), 1-15.

Arshad, A., 2015. Online and onwards. Retrieved June 26, 2016, from http://aurora.dawn.com/news/1140744

Baloch, F., 2014. Online grocery shopping looking to find a way in. Retrieved July 9, 2016, from http://tribune.com.pk/story/680751/online-grocery-shopping-looking-to-find-a-way-in/

Boyer, K. K., & Hult, G. T. M., 2005. Extending the supply chain: Integrating operations and marketing in the online grocery industry, *23*, 642–661. http://doi.org/10.1016/j.jom.2005.01.003

Breugelmans, E., Campo, K., & Gijsbrechts, E., 2007. Shelf sequence and proximity effects on online grocery choices. *Marketing Letters*, *18*(1–2), 117–133.

Castaneda, L., Villegas, N. M., & Müller, H. A., 2014. Personalized Web-Tasking Applications: An Online Grocery Shopping Prototype. In *2014 IEEE World Congress on Services* (pp. 24–29). IEEE. Retrieved from http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=6903239

Chu, J., Chintagunta, P., & Cebollada, J., 2008. A Comparison of Within-Household Price Sensitivity Across Online and Offline Channels. *Marketing Science*, *27*(2), 283–299.

Dada, H., 2016. Online grocery shopping becoming famous in Pakistan Retrieved from http://www.moremag.pk/2016/01/27/online-grocery-shopping-in-pakistan/

Danaher, P. J., Wilson, I. W., & Davis, R. A., 2003. A comparison of online and offline consumer brand loyalty. *Marketing Science*, *22*(4), 461–476.

Dawes, J., & Nenycz-Thiel, M., 2014. Comparing retailer purchase patterns and brand metrics for in-store and online grocery purchasing. *Journal of Marketing Management*, *30*(3–4), 364–382.

De Kervenoael, R., Yanık, S., Bozkaya, B., Palmer, M., & Hallsworth, A., 2016. Tradingup on unmet expectations? Evaluating consumers' expectations in online premium grocery shopping logistics. *International Journal of Logistics Research and Applications*, *19*(2), 83–104.

Gevaers, R., Van de Voorde, E., & Vanelslander, T., 2011. Characteristics and typology of last-mile logistics from an innovation perspective in an urban context. *City Distribution and Urban Freight Transport: Multiple Perspectives, Edward Elgar Publishing*, 56–71.

Grewal, D., Iyer, G. R., & Levy, M., 2004. Internet retailing: enablers, limiters and market consequences. Journal of Business Research, 57(7), 703-713.

Hanif, A., 2016. Do Pakistan's online grocery stores deliver what they promise? We find out. Retrieved July 9, 2016, from http://www.dawn.com/news/1242498
Hans, P. P., 2013. Selling groceries online is catching up in India. Retrieved July 9, 2016, from http://www.businesstoday.in/moneytoday/smart-spending/online-grocery-shoppingvegetables-new-trend-inindia/story/197141.html

Hansen, T., 2005. Consumer adoption of online grocery buying: a discriminant analysis. *International Journal of Retail & Distribution Management*, *33*(2), 101–121.

Hong, W., Thong, J. Y., & Tam, K. Y., 2004. The effects of information format and shopping task on consumers' online shopping behavior: A cognitive fit perspective. *Journal of Management Information Systems*, *21*(3), 149–184.

Mazhar, A., 2014. Pakistan's Youth Bulge: Human Resource Development (HRD) Challenges: Islamabad Policy Research Institute. Retrieved June 26, 2016, from http://www.ipripak.org/pakistans-youthbulge-human-resource-development-hrdchallenges/#sthash.ymlpRqDi.dpbs

Milkman, K. L., Rogers, T., & Bazerman, M. H., 2010. I'll have the ice cream soon and the vegetables later: A study of online grocery purchases and order lead time. *Marketing Letters*, *21*(1), 17–35.

Niu, T., 2008. Strategies for success in the e-grocery industry. Retrieved from http://scholarworks.rit.edu/theses/388/Online grocery shopping looking to find a way in. (2014, March 9). Retrieved July 9, 2016, from http://tribune.com.pk/story/680751/online-grocery-shopping-looking-to-find-a-way-in/

Park, A. C. W., Iyer, E. S., Smith, D. C., Iyer, E. S., & Smith, D. C., 1989. The Effects of Situational Factors on In-Store Grocery Shopping Behavior: The Role of Store Environment and Time Available for Shopping. *Journal of Consumer Research*. *15*(4), 422-433.

Pozzi, A. (2012). Shopping cost and brand exploration in online grocery. *American Economic Journal: Microeconomics*, *4*(3), 96–120.

Pozzi, A. (2013). The effect of Internet distribution on brick-and-mortar sales. *The RAND Journal of Economics*, *44*(3), 569–583.

Retail, G. T., & Survey, C., 2015. Total Retail 2015 (February). Statistica. (2016). ECommerce. Retrieved June 26, 2016, from https://www.statista.com/markets/413/ecommerce/U.S. Census Bureau News. (2016). Retrieved from http://www.census.gov/retail/mrts/www/data/pdf/ec_current.pdf

Tribune., 2015. By 2020: Pakistan's e-commerce market to surpass $1 billion. Retrieved May 23, 2017, from https://tribune.com.pk/story/1016706/by-2020-pakistans-e-commerce-market-to-surpass-1-billion/

Wharton., 2015. Online Groceries in India: Will Consumers Bite? Retrieved July 9, 2016, from http://knowledge.wharton.upenn.edu/article/online-groceries-in-india-will-consumersbite/

Integrated Assessment of Socio-Economic Differentiation: Cross-Country Comparison

Yulia Vertakova, Southwest State University, Kursk, Russia, vertakova7@yandex.ru

Yulia Polozhentseva, Southwest State University, Kursk, Russia, polojenceva84@mail.ru

Maria Klevtsova, Southwest State University, Kursk, Russia, klevtsovam@mail.ru

Irina Ershova, Southwest State University, Kursk, Russia, ershovairgen@yandex.ru

Abstract

Severe structural maladjustments conditioned by the process of globalization, the effects of sanctions and the migration policy as well as a high degree of territorial differentiation throughout the world's economic space have become the essential features of the present-day global economy. Inequalities in the development of territories, the inconsistency of national and regional economies within the global socio-economic space, the common practice of setting strategic priorities without due consideration of the effects of globalization result in further growth of the spatial disparities in the levels of socio-economic maturity and living standards. Those factors and trends also lead to slack in the global economy in general and loss in competitiveness for national economies. It is obvious, that the dynamics of a number of indicators which would be representative of the quality of economic space requires thorough analysis. It would also provide a possibility to conduct a valid measurement of the degree of the differentiation among territories in the aspects of their socio-economic development and the standards of living and consider the ways of its regulation. The present research work engages some theoretical and empirical methods, the techniques of analysis and synthesis as well as the methods of mathematical modeling in economics for the basic socio-economic indicators of the development of territories.

Keywords: differentiation, inequality, socio-economic development, economic space, composite indicator, state regulation.

Introduction

Currently, the spatial transformations of Russian economy essentially involve systemic changes in the administrative and territorial structure of the country. Alongside with the processes of integration within the national economic space under way, there is an evident aggravation of the contradictions in the inter-budget relations and a growing economic disparity among the regions as well as a worsening downward course of interregional expansion and monopolization. As a consequence, a number of political and economic risks arise, which deteriorates the investment climate due to growing uncertainty in business. The enforcement of interregional competition for the funds available for investment, human resources, technologies and institutional assets is conflicting in nature; therefore, it requires careful scientific analysis as part of the study of the integration mechanism which engages all the entities within the national economic space.

At present, the main problem we face while assessing the level of socio-economic development of a region and the degree of differentiation among the regions is to select sets of primary indicators which would be representative of particular aspects in regional economic and social activities. Both Russian and foreign literature proposes various approaches to forming sets of valid primary indicators describing the degree of spatial differentiation.

A number of Russian and foreign economic scientists have addressed the issues of identification, measurement and regulation of disparities in the development of territories; in particular, foreign experience of state regulation of territorial differentiation is considered in the research works by A. Pigou, D. Bell, D. Miller, A. Swift, J. Poterba, S. Slesnick, D. Cutler, L. Katz, B. Meyer, D Sallivan, G. Becker, N. Thomes, Caporale, G.M. and Spagnolo, N. (Caporale & Spagnolo, 2012), Chen, J.-H. and Chen, Y. (Chen & Chen, 2015), Gehringer, A. (Gehringer, 2014) and some other authors.

Results and Discussion

The effects of interregional socio-economic differentiation are ambivalent, which is presented in Table 1.

Table 1: the effects of territorial economic differentiation on socio-economic development of a region

Favorable effects	Unfavorable effects
1. interregional economic inequality boosts most complete fulfillment of the potential of a particular region; 2. provides the possibility to enter into competition within the global economic system; 3. gives rise to highly developed regions with a great proportion of advanced industries and enterprises which become drivers to the growth of the country's economy and provide resources to support the lagging territories; 4. gives rise to clusters, areas of advanced development and special economic zones.	1. wide wealth disparity among the population; 2. growing maladjustments in the structure of the national economy; 3. emergence of struggling regions with a relatively low level of real incomes of the people, high unemployment, weak investment activity of the economic entities, insufficient fiscal capacity because of a low rate of self-sustainability of the region, etc. 4. redistribution of the federal financial resources (which are rather limited) to support the lagging regions.

The source: prepared by the author

The Russian Federation is the world's largest country in area (Table 2), so, as a consequence, territorial socio-economic differentiation has existed throughout history.

Table 2: dynamics of the indicators of the quality of economic space

Rank	Country	Area, sq. km	Population density*, pers. per sq. km	Overall population*, thousand people	GDP per capita**, $	
					Year 2015	Year 2016
1	Russia	17 075 400	8	146495,53	23700	8838
2	Canada	9 984 670	3	35985,751	45900	42319
3	China	9 596 960	140	1374220,0	14300	8261
4	USA	9 372 610	33	322613,0	56300	57294
5	Brazil	8 547 000	23	205463,0	15800	8587
6	Australia	7 686 850	3	24020,6	65400	51593
7	India	3 287 590	361	1282790,0	6300	1719
8	Argentina	2 760 990	15	43590,4	22400	12425
9	Kazakhstan	2 717 300	6	17651,3	24700	7138
10	Sudan	2 505 810	16	39598,7	4500	2381
11	Algeria	2 381 740	15	40400,0	14400	4129
12	DR Congo	2 345 410	29	85026,0	6800	473
13	Saudi Arabia	2 218 000	10	32248,2	54600	19922
14	Mexico	1 972 550	55	122273,5	18500	8699
15	Indonesia	1 919 440	124	258705,0	11300	3636

*as of 2016; ** as of 2015 and 2016

Socio-economic development of any country depends on the standards and the quality of living. The problems related to the performance of the economic system as well as to providing the adequate standards of living for all remain acute. Those challenges we have been facing are conditioned by a dramatic degree of differentiation throughout the global economic system in the context of territorial development. At that, in most countries the mobility of resources and technologies is pretty low (Vertakova et al., 2016).

Thus, the dynamics of the key indicators which are representative of the living standards in a number of countries requires careful analysis. Besides, the factors of the differentiation among the countries in the context of the standard of living as well as the main mechanisms which would facilitate the development of an effective social policy are to be considered. The literature presents various quantitative and qualitative approaches to measure the inequalities in living standards; most of them rest upon the indicators proposed by UN we will focus on in this study.

The Gini coefficient (or a normalized Gini index) represents the degree of inequality in the actual distribution of the cumulative income (or consumption) of the nation's population. It may vary from zero to one (or 0% to 100%); the higher the value, the more severe the inequality of income and wealth is.

However the use of Gini coefficient as a measure of actual income inequality has some limitations. Its strengths and weak points are presented in Figure 1.

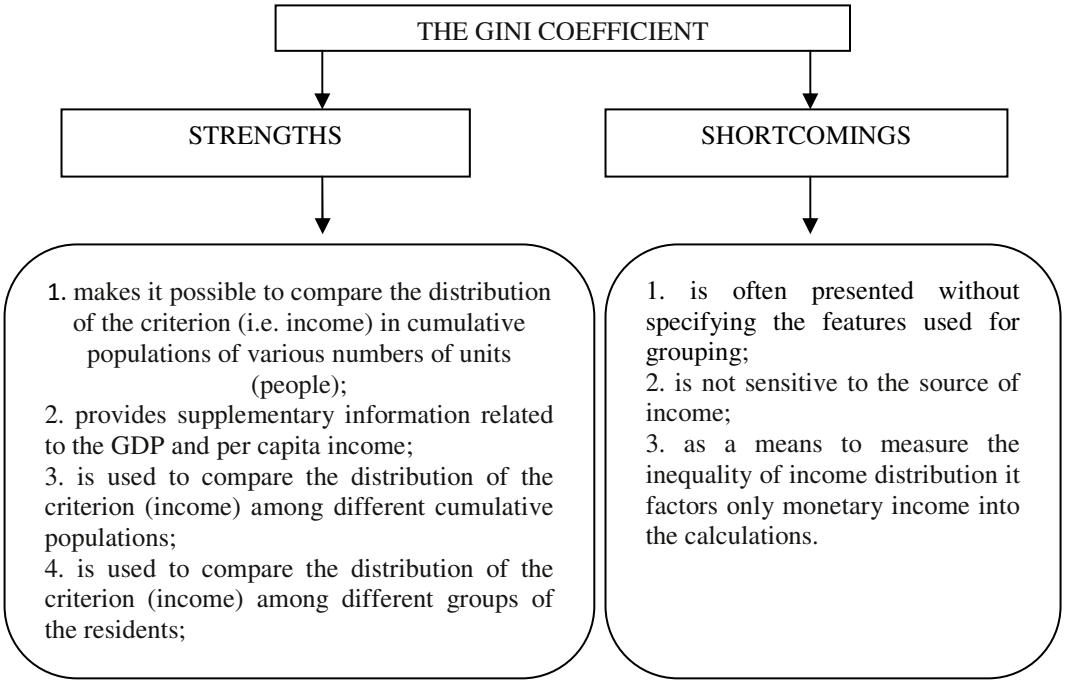


Fig. 1 The Gini coefficient

The ranking of the countries according to the values of the index of income concentration (the Gini coefficient) in dynamics over years 2000, 2005 and the period of 2010-2015 is presented in Table 3.

The data analysis shows that since 2011 the 1-st position in the ranking of the countries has been occupied by the South African Republic, where the Gini coefficient was 63,1% in 2011 (63,4% in 2015). However, compared to year 2013, when the coefficient value reached its maximum of 65%, it tends to decline. In 2015 Brazil, Chile, Mexico, Bolivia, Macedonia, Nigeria, the Philippines, Israel, Angola became the top ten leading countries. Russia was ranked 14 (41,3%), standing down China (42,1%), but

outstripping the USA (41,1%). For Russia, the coefficient value also tends to decline, although slightly, compared to 2010 when it reached 42,1%.

Table 3: dynamics of the values of the index of income concentration (the Gini coefficient, %) over years 2000, 2005 and the period of 2010-2015

2000			2005			2010			2011		
Rank	**Country**	**Value**	**Rank**	**Country**	**Value**	**Rank**	**Country**	**Value**	**Rank**	**Country**	Value
1.	SAR	59,3	1.	Bolivia	60,1	1.	Angola	58,6	1.	SAR	63,1
2.	Brazil	59,1	2.	Brazil	58,0	2.	SAR	57,8	2.	Angola	58,6
3.	Bolivia	58,9	3.	SAR	57,8	3.	Bolivia	57,2	3.	Bolivia	56,3
4.	Chile	57,5	4.	Chile	57,1	4	Brazil	55,0	4	Brazil	54,7
5.	Mexico	51,9	5.	Mexico	49,5	5.	Chile	52,0	5.	Chile	52,1
6.	Nigeria	50,6	6.	Philippin es	46,1	6.	Mexico	51,6	6.	Nigeria	48,8
7.	Philippin es	46,2	7.	China	44,7	7.	DR Congo	44,4	7.	Mexico	47,7
8.	Georgia	44,7	8.	Ниге- рия	43,7	8.	Philippin es	44,0	8.	DR Congo	44,4
9.	Kirgizia	44,1	9	Turkey	43,6	9.	Nigeria	42,9	9.	Macedon ia	43,2
10.	Turkey	41,5	10.	Kirgizia	42,2	10.	Macedon ia	42,8	10.	Philippin es	43,0
12.	USA	40,8	12.	USA	40,8	12.	Russia	42,1	11.	China	42,5
14.	China	40,3	14.	Russia	40,5	13.	China	41,5	12	Russia	41,7
16.	Russia	39,6				16.	USA	40,8	14.	USA	40,8
2012 г.			**2013 г.**			**2014 г.**			**2015 г.**		
Rank	**Country**	**Value**	**Rank**	**Country**	**Value**	**Rank**	**Country**	**Value**	**Rank**	**Country**	**Value**
1.	SAR	62,4	1.	SAR	65,0	1.	SAR	64,5	1.	SAR	63,4
2.	Rep. of Haiti	60,79	2.	Bolivia	56,3	2.	Columbi a	53,9	2.	Brazil	52,9
3.	Hondura s	57,4	3.	Brazil	54,7	3.	Panama	51,67	3.	Chile	50,5
4	Columbi a	53,54	4	Chile	52,1	4.	Brazil	51,48	4-5.	Mexico	48,1
5.	Brazil	52,67	5.	Nigeria	48,8	5.	Chile	51,3	4-5.	Bolivia	48,1
6.	Panama	51,9	6.	Argentina	44, 5	6.	Mexico	50,7	6.	Macedon ia	44,1
7.	Costa- Rica	48,61	7.	DR Congo	44,4	7.	Hondura s	50,64	7-8.	Nigeria	43,0
8.	Paraguay	48,17	8.	Mexico	43,6	8.	Guatema la	48,66	7-8.	Philippin es	43,0
9.	Mexico	48,07	9.	Macedon ia	43,6	9.	Costa- Rica	48,53	9.	Israel	42,8
10.	Bolivia	46,7	10.	Philippin es	43,0	10.	Bolivia	48,4	10.	Angola	42,7
18.	China	42,16	12.	China	42,1	13.	China	46,9	12.	China	42,1
19.	Russia	42,0	13.	Russia	41,9	20.	Russia	41,6	14.	Russia	41,3
24.	USA	41,1	14.	USA	41,1	22.	USA	41,1	15.	USA	41,1

The source: prepared by the authors according to the data provided by Russian Federal State Statistics Service

Among the socio-economic indicators the Human Development Index (HDI), which is commonly viewed as an index of "potential human development" (PHDI), is deemed particularly representative of the actual level of socio-economic development of a country (or a region). It is a composite statistic which reports not only mere economic advancement, but also the social environment for human life and development. It is often used as a synonym for "human well-being" or "quality of living".

The value of the Human Development Index varies from 0 to 1; the closer the value is to one, the higher is the level of human development; consequently, the shorter is the way for the country (or region) to make in order to achieve certain desirable targets.

The dynamics of Human Development Index for different countries over the period of 2010-2015 is presented in Table 4.

Table 4: dynamics of human development index for different countries over the period of 2010-2015

2010			**2011**			**2012**		
Rank	**Country**	**Index value**	**Rank**	**Country**	**Index value**	**Rank**	**Country**	**Index value**
1.	Norway	0,938	1.	Norway	0,943	1.	Norway	0,949
2.	Australia	0,937	2.	Australia	0,929	2.	Australia	0,935
3.	New Zealand	0,907	3.	Netherlands	0,91	3.	USA	0,922
4.	USA	0,902	4.	USA	0,91	4.	Netherlands	0,915
5.	Ireland	0,895	5.	New Zealand	0,908	5.	New Zealand	0,914
6.	Liechtenstein	0,891	6.	Canada	0,908	6.	Ireland	0,912
7.	Netherlands	0,89	7.	Ireland	0,908	7.	Germany	0,911
8.	Canada	0,888	8.	Liechtenstein	0,905	8.	Sweden	0,91
9.	Sweden	0,885	9.	Germany	0,905	9.	Switzerland	0.908
10.	Germany	0,885	10.	Sweden	0,904	10.	Japan	0.907
65.	Russia	0,719	66.	Russia	0,755	61.	Russia	0,771
89.	China	0,663	101.	China	0,687	101.	China	0,691
2013			**2014**			**2015**		
Rank	**Country**	**Value**	**Rank**	**Country**	**Value**	**Rank**	**Country**	**Value**
1.	Norway	0,955	1.	Norway	0,944	1.	Norway	0,944
2.	Australia	0,938	2.	Australia	0,933	2.	Australia	0,935
3.	USA	0,937	3.	Switzerland	0,917	3.	Switzerland	0,930
4.	Netherlands	0,921	4.	Netherlands	0,915	4.	Denmark	0,923
5.	Germany	0,92	5.	USA	0,914	5.	Netherlands	0,922
6.	New Zealand	0,919	6.	Germany	0,911	6-7.	Germany	0,916
7.	Ireland	0,916	7.	New Zealand	0,910	6-7.	Ireland	0,916
8.	Sweden	0,916	8.	Canada	0,902	8.	USA	0,915
9.	Switzerland	0,913	9.	Singapore	0,901	9-10.	Canada	0,913
10.	Japan	0,912	10.	Denmark	0,900	9-10.	New Zealand	0,913
55.	Russia	0,788	57.	Russia	0,778	50.	Russia	0,798
101.	China	0,699	91.	China	0,719	90.	China	0,727

The source: prepared by the authors according to the data from UN Development Program

The analysis of the statistics presented above provides the following evidence:

Since 2010 the 1-st position is occupied by Norway with the HDI of 0,938 (0,944 in 2015). In 2015 Australia, Switzerland, Denmark, Netherlands, Germany, Ireland, USA, Canada and New Zealand became the top ten leading countries. Russia was ranked 50-th.

According the annual rating of the human development potential the countries are roughly distributed into four main groups. For 2015 they were rated as follows:

- the countries with a very high HDI value, where it varies from 0,944 (Norway – 1-st position) to 0,802 (Montenegro - 49-th position);

- the countries with a high HDI value, where it varies from 0,798 (the Republic of Belarus ranked 50-th) to 0,702 (Samoa ranked 105-th). Among those are Russia (which shares the 50-th position with Belarus) and some countries – member states of the former USSR, such as Kazakhstan (ranked 56-th) with HDI of 0,788; Georgia (ranked 76-th) with HDI of 0,754; Azerbaijan (ranked 78-th) with HDI of 0,751; Ukraine (81-th) with HDI of 0,747; Armenia (85-th) with HDI of 0,733. China with HDI of 0,727 (ranked 90-th) is also included into this group;

- the countries with a medium HDI value, where it varies from 0,698 (Botswana ranked 106-th) to 0,555 (Cambodia, 144-th), Moldova (ranked 107-th, with HDI of 0,693), Turkmenistan (109-th, with HDI of 0,688), Uzbekistan (114-th, with HDI of 0,675), Kirgizstan (120-th, with HDI of 0,655), Tajikistan (129-th, with HDI of 0,624);

- the countries with a low HDI value, where it varies from 0,548 in Kenia (145-th) to 0,348 in Niger (188-th).

Among all the member states of the former USSR only Baltic countries entered the first group of the states with a very high level of potential human development: Estonia ranked 30-th with its HDI of 0,861, Lithuania (37-th position, HDI of 0,839) and Latvia (46-th position, HDI of 0,819).

According to 2015 statistics Russia kept ahead of the field among other BRICS members, the group of the largest countries with high-growth economies, whereas Brazil was rated 75-th, China – 90-th, SAR – 116-th and India – 130-th.

The five so-called failed states of Africa south of the Sahara (Burundi, the Republic of Chad, Eritrea, the Central African Republic and Niger) tail the list. Despite a partial turn to the better which has been observed over the recent years, the life expectancy in those countries remains extremely low (40 to 50 years), the socio-economic environment is greatly unfavorable, the literacy rate is unsatisfactory (no more than 30% of the population are able to read and write), and the income per capita is estimated less than 1000 USD a year.

The rates of violence, murder, discrimination and civil conflicts do not always report of the actual rate of crime in a particular country, basically because crime is not always associated with direct danger to life. However, the related statistics is assembled (on the basis of the data contributed by the users) and reported annually at free access on www.numbeo.com, which provides the world's largest database.

Table 5 presents the statistics which report of the rates of crime and safety in different countries over the period 2012-2016.

As shown in Table 5, Venezuela had the highest crime rate in 2012 (84,74%) and in 2016 (84,44%). In 2014 Afghanistan (82,51%) came up to the 1-st position, and in 2015 South Sudan (85,32%) headed the list. The reported safety rates in those countries were the lowest. Besides, in 2016 South Sudan, SAR, Papua New Guinea, Honduras, Nigeria, Trinidad and Tobago, Salvador, Brazil, Kenia made "the top ten" among the countries which had extremely high crime rates. In 2016 Russia was ranked the 50-th among the 117 countries (the crime rate of 47,31%). However, Table 5 provides evidence to the fact that the rate of crime in Russia became lower from year to year.

Table 5: crime and safety statistics by country over the period of 2010-2016

2012				2013			
Rank	**Country**	**Crime index**	**Safety index**	**Rank**	**Country**	**Crime index**	**Safety index**
1.	Venezuela	84,74	15,26	1.	Venezuela	85,70	14,30
2.	South Africa	78,12	21,88	2	Guatemala	84,87	15,13
3.	Puerto Rico	73,06	26,94	3.	Trinidad and Tobago	83,65	16,35
4.	Malaysia	70,88	29,12	4.	South Africa	76,68	23,32
5.	USA	64,93	35,07	5.	Kenia	74,30	25,70
6.	Algeria	64,84	35,16	6.	Honduras	72,97	27,03
7.	Mexico	62,54	37,46	7.	Uzbekistan	72,27	27,73
8.	Peru	60,94	39,06	8.	Puerto Rico	70,53	29,47
9.	Lebanon	59,90	40,10	9.	Malaysia	67,75	32,25
10.	Bangladesh	59,69	40,31	10.	Costa-Rica	66,69	33,31
20.	Russia	50,57	49,43	31.	USA	53,44	46,56
30.	China	44,47	55,53	35.	Russia	52,39	47,61
-	-	-	-	100.	China	26,87	73,13
2014				**2015**			
Rank	**Country**	**Crime index**	**Safety index**	**Rank**	**Country**	**Crime index**	**Safety index**
1.	Afghanistan	82,51	17,49	1.	South Sudan	85,32	14,68
2.	Venezuela	81,5	18,5	2.	Venezuela	84,07	15,93
3.	Guatemala	79,31	20,69	3.	Guatemala	79,34	20,66
4.	Kenia	78,9	21,1	4.	South Africa	78,44	21,56
5.	Trinidad and Tobago	78,69	21,31	5.	Afghanistan	77,34	22,66
6.	South Africa	78,53	21,47	6.	Guyana	76,88	23,12
7	Nigeria	77,86	22,14	7.	Nigeria	76,6	23,4
8.	Haiti	72,5	27,5	8.	Trinidad and Tobago	75,28	24,72
9.	Jamaica	71,03	28,97	9.	Honduras	74,91	25,09
10.	Bolivia	68,97	31,03	10.	Bahama Islands	72,93	27,07
38.	Russia	52,67	47,33	51.	Russia	51,33	48,67
44.	USA	50,15	49,85	54.	USA	50,01	49,99
107.	China	30,13	69,87	91.	China	41,75	58,25
2016							
Rank	**Country**	**Crime index**	**Safety index**				
1.	Venezuela	84,44	15,56				
2.	South Sudan	81,32	18,68				
3.	South Africa	78,43	21,57				
4.	Papua New Guinea	77,58	22,42				
5.	Honduras	76,43	23,57				
6.	Nigeria	74,14	25,86				
7.	Trinidad and Tobago	72,6	27,4				
8.	Salvador	72,04	27,96				
9.	Brazil	71,23	28,77				
10.	Kenia	69,49	30,51				
42.	USA	48,87	51,13				
50.	Russia	47,31	52,69				
88.	China	32,08	67,92				

The source: prepared by the authors (as reported by Numbeo.com)

This encouraging trend is conditioned by the economic advancement, growing employment and education rates and increased professionalism of the law enforcement authorities.

As reported on Numbeo.com, the following countries have the lowest crime rate: Taiwan (21,21%), Hong Kong (20,85%), Japan (19,34%), Singapore (15,81%), South Korea (14,31%).

A large extent of spatial economic and social differences determines a state policy which would work towards consistent lowering of the territorial differentiation within the country. The state intervention in the regional development is regulated by the Constitution and by special laws. State regulation of the economy is implemented through all the state institutions.

We have carried out careful analysis of a number of scientific studies as well as program, normative and legal documents which provided a basis for classifying the main standard instruments of the regional policy towards reducing the degree of socio-economic differentiation and defining the scope of their possible application (Table 6).

Table 6: classification of the instruments of the regional policy towards reducing the spatial differentiation among the regions

Instruments	Scope of possible application
Budget transfer	Redistribution of funds (budget revenues) between budgets of different levels (both vertically and horizontally) by means of inter-budget transfers
Territory administration	Amalgamation, aggregation or disaggregation of territorial administrative units; integration of border areas
Investment	Creation of favorable market environment to encourage investments in the lagging regions
Innovative	Development of new industrial enterprises on the basis of the regional innovation programs
Claster	Development of the priority clusters and growth areas in the lagging regions to foster their economic advancement
Free economic areas	Allocation and organization of free economic zones in the lagging regions by reference to its specifics
Infrastructure	Exploitation of the unemployed comparative infrastructural advantages of the region
Resource	Exploitation of the spare "idle" resources and the resource-based competitive advantages of the region
Institutional	Improvement of the regional business climate
Fiscal	Employment of the fiscal mechanisms for the purposes of regulation and reauthorization as to revenue budgeting between the Centre and sub-federal entities

The source: prepared by the authors

The analysis of the main commonly used instruments to reduce the degree of territorial socio-economic differentiation exposed the interdependence of those instruments and the above-mentioned types of spatial differentiation as well as appropriateness of their classification according to the scope of their possible application in current terms.

Transfer payments as the instrument of the state regulation remains most widely used in this country. A great number of studies and statistical surveys show that the commonly applied way to support regional budgets and close the budget deficits by means of manual redistribution of funds from the self-sustainable regions to the lagging ones has significantly negative effects on both the donor and the recipient.

Conclusions

The potential possibilities for fiscal instruments of the state regulation of the national economic system (in particular, of the socio-economic development of the regions) were considered by a great number of Russian and foreign economic scientists, beginning with the founders of theoretical economics.

State regulation of spatial differentiation with a purpose to improve the living standards and well-being of the population of the regions should be premised on the following principles:

- the reduction of the disparities in the socio-economic development among the regions should be intended to ensure the economic advancement in every particular region;

- the state should provide support not only to the lagging regions, but also should create a favorable environment for raising the standards of living in other regions;

- interregional redistribution of the resources should be intended to improve the standards of living in the regions;

- both short-term and long-term national economic security interests have priority over the regional interests.

Thus, we can highlight the following basic lines of the state regulation as a policy intended to reduce the disparities in the economic and social development of the regions:

1. state investment in the real sector of the economy and the infrastructure of the regions with a purpose to boost their economic growth;

2. encouragement of the national large businesses to invest into regions;

3. maintaining the equilibrium of the labor markets;

4. carrying out a redistributional policy intended to smooth out the income inequalities among different regions by means of social-oriented transfers and investments in the human capital.

Acknowledgments

The research is financed by the RF President Grant for young Russian researchers MK-831.2017.6 “Governmental regulation of the differentiation of the economic space by means of new regional policy tools”.

References

Bhanumurthy, N.R. and Singh, P. (2013) ‘Financial sector development and economic growth in Indian states’. *International Journal of Economic Policy in Emerging Economies*, 6 (1), pp. 47-63. doi: 10.1504/IJEPEE.2013.054472

Caporale, G.M. and Spagnolo, N. (2012) ‘Stock market, economic growth and EU accession: Evidence from three CEECs’. *International Journal of Monetary Economics and Finance*, 5 (2), pp. 183-191. doi: 10.1504/IJMEF.2012.048736

Castiglione, C., Infante, D. and Smirnova, J. (2015) ‘Environment and economic growth: is the rule of law the go-between? The case of high-income countries’. *Energy, Sustainability and Society*, 5 (1), art. no. 26, p. 7.

Sultanova, A.V. and Chechina, O.S. (2016) ‘Human capital as a key factor of economic growth in crisis’. *European Research Studies Journal*, 19 (2 Special Issue), pp. 71-78.

Chen, J.-H. and Chen, Y. (2015) 'New industry creation in less developed countries - The case of the Taiwanese flat panel display industry'. *Innovation: Management, Policy and Practice*, 17 (2), pp. 250-265.

Choi, K.-H. and Shin, S. (2015) 'Population aging, economic growth, and the social transmission of human capital: An analysis with an overlapping generations model'. *Economic Modelling*, 50, pp. 138-147.

Dowlah, C. (2015) 'International trade, competitive advantage and developing economies: How less developed countries are capturing global markets'. *International Trade, Competitive Advantage and Developing Economies*, 145, pp. 1-260.

Gehringer, A. (2014) 'Financial liberalisation, financial development and productivity growth: An overview'. *International Journal of Monetary Economics and Finance*, 7 (1), pp. 40-65.

Zeira, J. and Zoabi, H. (2015) 'Economic growth and sector dynamics'. *European Economic Review*, 79, pp. 1-15.

Database Numbeo. Free access: https://www.numbeo.com/crime/rankings_by_country.jsp

National Bureau of Statistics of China // Free access: http://www.stats.gov.cn/english/

Vertakova, Yulia and Kryzhanovskaya, Olga (2015) 'Improving the strategic management of business communication operators'. *2nd International Multidisciplinary Scientific Conference on Social Sciences and Arts (SGEM 2015) Albena,* , pp. 747-754

Vertakova, Y, Polozhentseva, Y, Klevtsova, M and Leontyev, E (2016) 'Government Support Tools for Small Business: Russian and Foreign Experience'. *Innovation management and education excellence vision 2020: from regional development sustainability to global economic growth*, VOLS I – VI, pp. 1134-1144

The Main Approaches to the Implementation of Technical Re-Equipment of the Industrial Enterprises during Realization of State Economic Policy

Yulia Vertakova, Southwest State University, Kursk, Russia, vertakova7@ya.ru

Tatyana Babich, Southwest State University, Kursk, Russia, tanybabich@mail.ru

Abstract

Each country needs an effective government economic policy to achieve the strategic goals of economic and social development. The most important task of state economic policy is to ensure growth of living standards of the population. One of the tools to achieve this goal is to increase the efficiency of industrial production. The purpose of the study is justification of approaches to the implementation of technical re-equipment of industrial enterprises. These approaches allow forming the mechanism of realization of technical upgrading in the implementation of the directions of state economic policy. The methodological basis is the key methodologies and approaches presented in the works of foreign and domestic scholars in the study of technical re-equipment of industrial enterprises. The study also used statistical methods and comparative analysis of countries by level of development. The result of this study is the proposed implementation mechanism of technical re-equipment of the industrial enterprises in the implementation of directions of the state economic policy and the formation of the state support measures in its application. Also established seven basic approaches to the implementation of technical re-equipment, which allow us to achieve operating, economic and social efficiency. In General, this process may promote technological upgrading of industries. Practical significance of the research is that the authors formulated the conclusions and recommendations can be applied in industrial enterprises for a more qualitative assessment of economic efficiency of projects of technical re-equipment.

Keywords: State economic policy, economic growth, modernization, approaches to the implementation of technical re-equipment

Introduction

The current economic situation is quite complicated. But it creates the conditions for various types of human activity. Directions and tasks that can solve the economy depend on its construction and organization.

In modern conditions the government plays an important role for the functioning of any economic system. It performs certain functions in the sphere of economy through the implementation of public policy.

One of the directions of realization of the state economic policy of any country is the implementation of innovative technological development. Moreover, this trend has a global reach. This is due to the necessity of transition to new sixth technological way. According to experts its formation is predicted to 2020, and by 2040 it will enter into a phase of maturity. For comparison, in the US 5% of the productive forces belong to the sixth phase and about 60% to fifth. In Russia the majority of the productive forces is in the fourth technological way, and about 10% in the fifth. Therefore, the development of industry and the transition to new sixth technological order are the main directions of state economic policy of Russia.

To implement these measures, the following goals and priorities of Russia's scientific and technical development are proposed: industrial modernization, energy efficiency improvement, import substitution.

Moreover, the modernization of industry is based, among other things, on the technical re-equipment of enterprises. This circumstance led to the actualization of research related to the development and improvement of tools and methods for managing this process, aimed at increasing the economic efficiency of development.

It should be noted that the studies of voiced problems in different periods of development are devoted to works both foreign (H. Grubel, Krugman Paul R. , etc.), and domestic researchers (AG Semenko, V.A Plotnikov, O.Yu. Mamedov, etc.). But, despite a large number of scientific publications on the problems under consideration, there remain questions that need to be solved. Such problems include: justification of approaches to the implementation of technical re-equipment of industrial enterprises and ways of state support of this process. In this regard, the development of scientific and practical recommendations in this field of research is of practical importance for effective economic development.

Results and Discussion

Any state economic policy (GEO) should have specific goals, priorities and draw on a strategy that can ensure their achievement.

The objectives of economic policy can be quantitative (for example, GDP growth of 3%, a decrease in inflation by 2%, etc.) and qualitative (improving living standards, access to education, etc.), as well as short-, medium- and long-term.

Table 1 presents the results of the comparative analysis of Russia and selected countries of the world in achieving some applied goals of implementing the state economic policy for 2016.

Table 1: Ranks of selected countries of the world to achieve some targets for the implementation of the GEO in 2016

Country	GDP per capita (thousand dollars), 2016.	Rank by GDP per capita	Unemployment rate, 2016.	Rank by unemployment rate	Inflation rate, 2016	Rank by inflation rate	Industrial production growth (%), 2016.	Rank on industrial production growth
Russia	26100	8	8,2	7	7,2	10	0,7	10
Belarus	17500	10	0,7	1	14	13	-3	13
Germany	48200	2	4,3	4	0,4	5	1,5	7-8
India	6700	13	8,4	8	5,6	9	7,4	1
Poland	27700	7	9,6	10	-0,8	1	4,2	4
United Kingdom	42500	3	5,1	6	0,5	6	0,3	12
USA	57300	1	4,7	5	1,3	7	2,1	5
Turkey	21100	9	9,8	12	8	11	4,5	3
Ukraine	8200	12	10	13	13,5	12	2	6
France	42400	4	9,7	11	0,3	4	1	9
Chine	15400	11	4,2	3	2,3	8	6,1	2
Japan	38900	5	3,2	2	-0,1	2	0,5	11
European Union (EU)	37800	6	9,5	9	0,1	3	1,5	7-8

The source: Calculated by the authors on the basis of data [https://gks.ru] and [https://total-rating.ru]

According to Table 1 of the countries represented, the United States ranks first in terms of GDP per capita, at the last - India. Russia in this indicator takes 8th place, the EU - at 6th place, China - at 11th.

It is known that it is possible to achieve full employment at the level of natural unemployment from 1.5 to 4%. In 2016, only Japan was able to reach this interval. In the remaining countries under consideration (except for Belarus), the unemployment rate is higher: Russia is on the 7th place (8.2%), the USA - by 5 (4.7%), China - by 3 (4.2%), the European Union - by 9 (9.5%).

In 2016 there was a decrease in the level of inflation in Poland and Japan. In general, a slight increase in inflation was in the EU (3rd place), in France (4th place). The United States in this indicator was on the 7th place, Russia by 10, China by 8. Belarus is on last place.

The maximum growth in industrial production was observed in India (7.4%), the lowest in Belarus (-3%). Russia in the growth of industrial production from the countries in question was in 10th place in 2016, the USA - by 5, the EU and Germany occupied 7 and 8 places (with the same level), China - by 2.

In general, in order to increase the effectiveness of achieving the above-mentioned goals of the GEO, Russia needs a transition to an innovative and technological development path. This requires modernization of the country's economy. So you can talk about the modernization of individual enterprises, but then it is customary to use the term "technical re-equipment".

The main problems hampering the innovative development in Russia are: the gradual loss of high-tech industries, the raw material orientation of development, the substantial physical and moral wear of fixed assets that do not meet modern requirements, especially in the face of growing competition in world markets for goods and services, and so on.

The features of Russian industry, including the raw material orientation of the economy, influenced the structure of the state fixed assets as a whole. As a result, the value of fixed assets in the extractive industry has increased from 2008 to the value of fixed assets in the manufacturing industry.

It should be noted that the material and technical base of the Russian economy is characterized by a low level of labor productivity (in 2015 the index was only 96.8% compared to the previous year), the introduction of resource-saving technologies and information systems, although this problem was repeatedly considered at the level leadership of the country [9]. One of the main reasons for this trend is the non-temporary structure of fixed assets).

In Russia, the high level of wear and age of machines and technological equipment remains. According to Rosstat, the average age of equipment is on average 20 years. The share of equipment older than 15 years exceeds 40%, and many enterprises use machines older than 30 years. The pace of renewal of engineering, determining the pace of development of the entire economy of the country, is 2 times lower than in industry as a whole.

As for innovation activity at industrial enterprises in Russia, its level remains low after falling several times during the crisis period. Also, the mechanisms of pro-movement in the production of promising developments are inefficiently applied. These problems have been repeatedly understood at different levels of management, since machine-building is the basis for the innovative development of the entire economy, its technical re-equipment and reconstruction. So, Russia ranks 31st in the world in the number of filed patent applications, 30th in terms of R & D expenditures (they make up 1.1% of GDP), which is much lower than the analogous indicators of the leading countries of the world [2].

Thus, one of the main factors of raising the labor productivity of the country's economy with a view to ensuring its sustainable development is the growth of the technological level of industry, which can not be achieved without large-scale technical re-equipment of industrial enterprises.

Technical re-equipment is a complex form of renewal of basic production assets, which involves a qualitative change in the enterprise, leading to socio-economic results.

Analyzing the types and methods of technical updating, as well as the approach proposed in [5], we have formed the main approaches to the implementation of technical re-equipment in industrial enterprises (Table 2). The peculiarity of these approaches is: first, a strategy is chosen for the development of the enterprise, which sets the target benchmark that the enterprise strives to achieve when implementing technical re-equipment; then a selection criterion is selected for selecting the appropriate approach.

Table 2: The main approaches to the implementation of the technical re-equipment of an industrial enterprise

Approach	Development strategy	Target milestone	Content	Selection criteria
Optimization	Increasing the competitiveness of an enterprise while optimizing costs	Optimality of development	Replacement of equipment using the optimization criterion "price-performance-quality"	Multi-criteria choice of a variant of technical re-equipment "price-performance-quality"
Imitation	Strategy – follow the leader	Orientation on the main competitor	Technical update is carried out at the level of the main competitors	Technological level of the main competitor
Operational	Cost minimization strategy	Operating costs	Selection of the most simple operational equipment	Minimum operating costs
Temporary	Maintaining a stable current functioning	Replacement of equipment as soon as possible	Purchase of equipment in stock at the supplier's premises	Speed of technical re-equipment
Conservative	Maintaining the technological level of production at the existing level	Replacement of equipment without resistance to changes	It acquires something that is familiar and does not change technology	Minimum costs for implementation and maintenance
Minimizing	Cost minimization strategy	Minimum costs	Choosing the cheapest equipment	Minimal costs
Functional	Innovative development	Growth of enterprise competitiveness and innovative development	Selection of the most modern equipment	Growth of enterprise value

The source: compiled by the authors

The most effective way, which gives the most efficiency, is the functional approach, however, in practice, currently the percentage of its use in industrial enterprises is limited to 3%, while the other business entities prefer the other approaches mentioned above, which do not fully reflect the social-economic essence of technical re-equipment.

Formed approaches make it possible to justify the mechanism of technical re-equipment at an industrial enterprise, the logic of which is presented in Fig. 1.

According to the proposed mechanism, the participants in the technical re-equipment process are: the state, the banking sector, investors and the industrial enterprise.

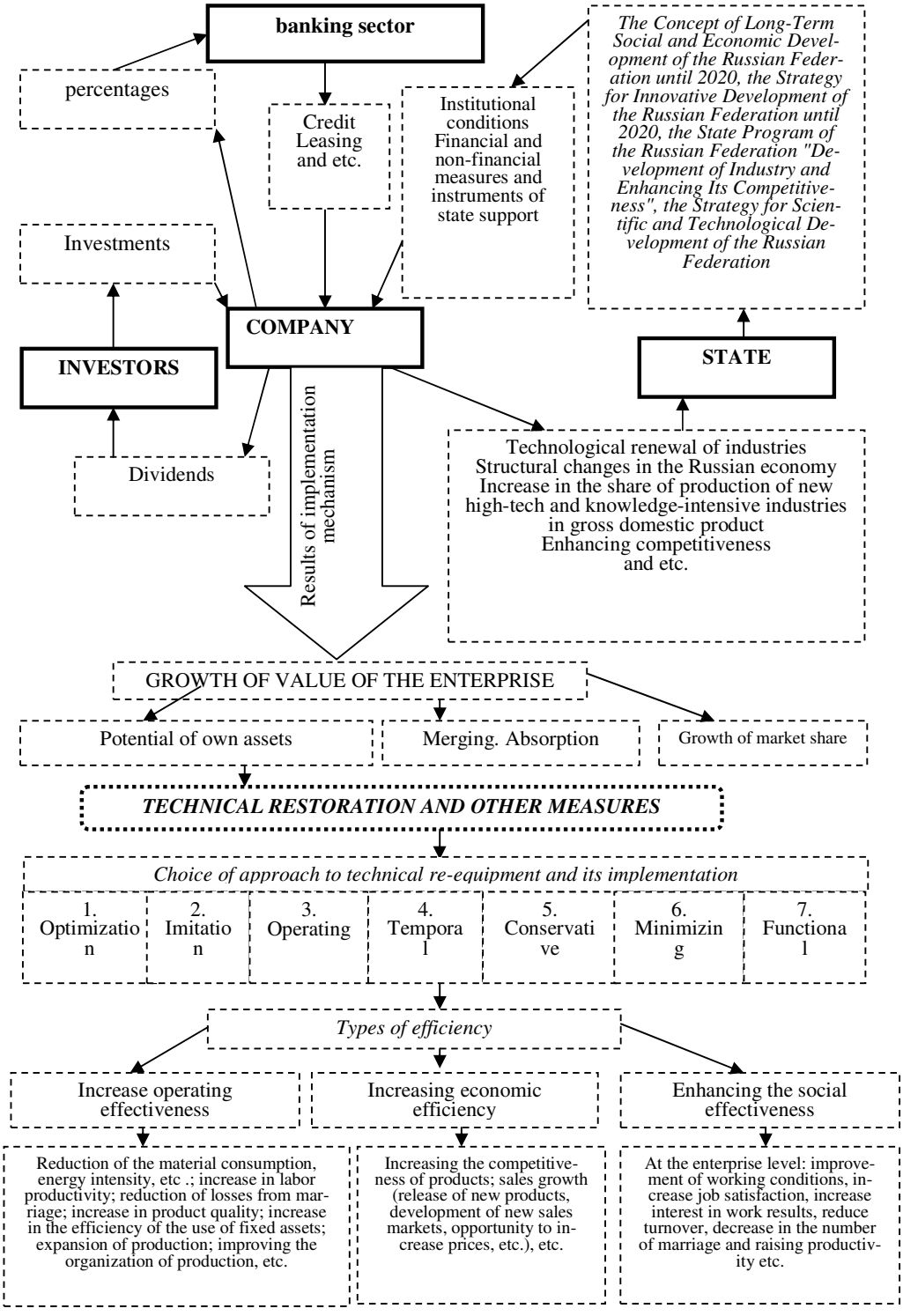

banking sector
percentages
Credit
Leasing
and etc.
Institutional conditions
Financial and non-financial measures and instruments of state support
The Concept of Long-Term Social and Economic Development of the Russian Federation until 2020, the Strategy for Innovative Development of the Russian Federation until 2020, the State Program of the Russian Federation "Development of Industry and Enhancing Its Competitiveness", the Strategy for Scientific and Technological Development of the Russian Federation
Investments
COMPANY
INVESTORS
STATE
Dividends
Results of implementation mechanism
Technological renewal of industries
Structural changes in the Russian economy
Increase in the share of production of new high-tech and knowledge-intensive industries in gross domestic product
Enhancing competitiveness
and etc.
GROWTH OF VALUE OF THE ENTERPRISE
Potential of own assets
Merging. Absorption
Growth of market share
TECHNICAL RESTORATION AND OTHER MEASURES
Choice of approach to technical re-equipment and its implementation
1. Optimization
2. Imitation
3. Operating
4. Temporal
5. Conservative
6. Minimizing
7. Functional
Types of efficiency
Increase operating effectiveness
Increasing economic efficiency
Enhancing the social effectiveness
Reduction of the material consumption, energy intensity, etc .; increase in labor productivity; reduction of losses from marriage; increase in product quality; increase in the efficiency of the use of fixed assets; expansion of production; improving the organization of production, etc.
Increasing the competitiveness of products; sales growth (release of new products, development of new sales markets, opportunity to increase prices, etc.), etc.
At the enterprise level: improvement of working conditions, increase job satisfaction, increase interest in work results, reduce turnover, decrease in the number of marriage and raising productivity etc.

Figure 1. Structure of the technical implementation mechanism rearmament at an industrial enterprise *(compiled by the authors)*

The state on the basis of certain normative documents realizing the direction of state economic policy (for example, the Concept of Long-Term Social and Economic Development of the Russian Federation until 2020, the Strategy for Innovative Development of the Russian Federation until 2020, the State Program of the Russian Federation "Industry Development and Increase its competitiveness, the Strategy of scientific and technological development of the Russian Federation from 2016, etc.), creates institutional conditions, and applies certain measures of state support (financial and non-financial) incentives for enterprises to carry out technical re-equipment.

The main instruments of support at present can be the measures proposed by the Ministry of Industry and Trade of Russia [6]:

1) financial measures and instruments (subsidizing interest rates, project financing, supporting R & D, subsidizing pilot lots of equipment, supporting regional programs, techno-parks and clusters, encouraging leasing, supporting export lending, partial reimbursement for engineering costs, manufacturing and export, financing development institutions);

2) non-financial measures and instruments (special investment contracts, exhibitions, fairs, conferences, promotion on foreign markets, protection of interests of Russian producers abroad, regulation of state purchases of industrial products, support of project consortia, development of engineering centers, standardization and technical regulation).

Enterprises for the implementation of the mechanism may attract borrowed funds. To do this, they can develop business plans (or a feasibility study for the project), which they can then send to the banking sector in order to obtain loans, leasing, etc., as well as investors. As a result, the enterprise, having implemented the technical re-equipment, can increase the value of its business, as it has been repeatedly proved that the growth of own assets directly increases the cost of the enterprise itself.

To realize technical re-equipment, the industrial enterprise chooses the approach to its implementation, proposed in Table 1. Depending on the results of this choice, it can receive a certain efficiency. The greatest result is given by the functional approach, in the implementation of which the enterprise can improve the operational, economic and social efficiency.

Conclusion

1. It is established that the world development trends dictate the implementation of innovation and technological development as one of the directions for implementing the state economic policy of any country.

2. To ensure the creation of modern production technologies, technical re-equipment of industrial enterprises is necessary.

3. Technical re-equipment of industrial enterprises is a sequential, purposeful and cyclically repeating process that ensures the renewal of equipment and technologies, the mastery of production of modern technological level products on the basis of a new way of thinking of labor resources, predetermined by retraining, retraining and re-training personnel for the purpose of working with new technology and production technologies.

4. Authors based on the rationale for the enterprise development strategy setting the targets for its development proposed approaches to the implementation of technical re-equipment of industrial enterprises (optimization, simulation, operational, temporary, conservative, minimizing, and functional). It was found that the most preferable is the functional approach, which is aimed at increasing the competitiveness of the enterprise and its innovative development, mediated by the choice of the most modern equipment, the value of the enterprise, which ultimately provides broad functionality, increased energy efficiency, efficiency, etc.

5. The proposed approaches allowed to substantiate the structure of the mechanism of technical re-equipment of industrial enterprises, realizing which the business entity can achieve operational, economic and social efficiency.

Acknowledgements

Research is executed on the basis of the Russian President's grant on the state support of the leading schools of sciences Scientific School-9726.2016.6 "Implementation of the state economic policy by means of development of instruments of strategic and indicative planning"

References

Grubel H. (2003) The Empirical Measurement of Intra-lndustry Trade. Cheltencham (UK): An Elgar Collection.

Klimovich K.P. (2014) 'Problemy i perspektivy razvitiya mashinostroitel'nogo kom-pleksa Rossii v usloviyah rynochnoj ehkonomiki [Problems and prospects of development of machine-building complex of Russia in conditions of market economy],' *EHkonomicheskij zhurnal [Economic journal]*, 4 (36), 16-27.

Krugman Paul R. and Obstfeld Maurice (2009) International economics: theory and policy, Bos-ton: Pearson Addison-Wesley. - 706 p.

Mamedov O.YU. (2011) '«10 min zamedlennogo dejstviya», ili perezhivyot li rossijskaya ehkonomika svoyu modernizaciyu? [10 time bombs," or survive, the Russian economy modernization?],' *TERRA ECONOMICUS*, T.9, 2, 77-85.

Mamontov V.D. (2011) 'K voprosu o neobhodimosti tekhnicheskogo perevooruzheniya promyshlennyh predpriyatij [To the question about the necessity of technical re-equipment of industrial enterprises],' *Social'no-ehkonomicheskie yavleniya i process [Social-economic phenomena and processes]*, 12 (034), 163 – 167.

Ogorodnikov E. and Manturov D. (2017) '«My tochno ne obezdolennye» [We're not exactly destitute],' *EHkspert [Expert]*, 3 (16-22), 22- 26.

Plotnikov V.A. and Rukovichnikov YU.I. (2007) 'Razvitie promyshlennogo proizvodstva v Rossii [The development of industrial production in Russia],' *Uchenye zapiski Sankt-peterburgskogo universiteta tekhnologij upravleniya i ehkonomiki [Scientific notes of Saint-Petersburg University of management and Economics]*, 2(16), 137-142.

Semyanko A.G. and Terekhin D.V. (2010) 'Formirovanie sistemnogo podhoda k obosnovaniyu social'no-ehkonomicheskoj ehffektivnosti tekhnicheskogo perevooruzheniya [The formation of a systematic approach to the justification of socio-economic efficiency of technical re-equipment],' *Vesti vysshih uchebnyh zavedenij CHernozem'ya [News of higher educational institutions of Chernozem region]*, 1, 80-86.

Sokolov A.V. (2010) 'Problemy razvitiya promyshlennosti Rossii v postkrizisnyj pe-riod [Problems of development of Russian industry in the post-crisis period],' *EHkonomika i upravlenie [Economics and management]*, 11(72), 128-134.

Vorob'ev V.P. and Tihomirov N.N. (2016) 'Problemy perevoda ehkonomiki Rossijskoj Federacii na shestoj tekhnologicheskij uklad minuya pyatyj: metodicheskie aspekty [Translation problems of the Russian economy to the sixth technological way of bypassing the fifth: methodological aspects],' *Izvestiya Sankt-Peterburgskogo gosudarstvennogo ehkonomicheskogo universiteta* [*Bulletin of Saint-Petersburg state economic University*], 3(99). [Online], [Retrieved October 10, 2017], http://cyberleninka.ru/article/n/problemy-perevoda-ekonomiki-rossiyskoy-federatsii-na-shestoy-tehnologicheskiy-uklad-minuya-pyatyy-metodicheskie-aspekty

Approaches to the Implementation of Strategic Innovation and Investment Projects for Development Industry of the Territory

Yulia Vertakova, Southwest State University, Kursk, Russia, vertakova7@ya.ru

Artur Kurbanov, Southwest State University, Kursk, Russia, kurbanov-83@yandex.ru

Vladimir Plotnikov, Saint-Petersburg State University of Economics, Saint-Petersburg, Russia, plotnikov2000@yandex.ru

Abstract

Investment activity from the state or private investors is a necessary condition for the innovative development of economic systems. The purpose of the study is to develop approaches to the procedure for multi-criteria selection and coordination of interests of interested economic entities in the selection of innovative investment projects. The result of the study is the development of a mechanism that provides methodological support for the adoption of managerial decisions at the federal and regional levels. And also it is shown that innovative and investment projects aimed at financing promising areas of activity will allow not only to ensure the production of new types of products, but also create conditions for the development of the organization in the long term.

Keywords: strategic innovation, industry, territory, investment projects.

Introduction

Orientation only for export of raw materials, trade and development of the service sector will not allow Russia to achieve a high financial and economic situation in the modern world. To do this, it is necessary, first of all, a stable industry, focused on the production of high-tech products. In the Strategy for Innovative Development of the Russian Federation for the period up to 2020, it is pointed out that Russia is setting ambitious but achievable long-term development goals that are to ensure a high level of the population's well-being and to consolidate the geopolitical role of the country as one of the leaders. The only possible way to achieve these goals is the transition of the economy to an innovative socially-oriented development model (Vertakova et al, 2015).

Many scholars have studied the innovation-investment aspects of the economy, including Hadas Schwartz-Chassidima, Joachim Meyerb, Yisrael Parmeta, Efrat Rogatkaa, Ohad Amzalega, Phaal R (Phaal, Paterson, Probert, 1998), (Schwartz-Chassidim, Meyer, Parmet, Rogatka, Amzaleg, 2014).

With insufficient level of institutional environment effectiveness, lack of financing, underestimation of the role of investments in the process of production functioning, it is possible to encounter a situation where all competitive advantages of the enterprise (or even the industry as a whole) will be lost. In its turn, innovative activity is understood as a set of measures to create fundamentally new or new consumer properties of products, to create and develop new or modernize existing production methods (technologies), to distribute and use the corresponding products, to apply innovations (innovations) that ensure cost savings or creating conditions for it (Zagodarchuk, Plotnikov, 2014), (Kozin, Yakovlev, 2016).

Similar projects, in view of their special significance for the country's economy, are usually carried out within the framework of state innovation policy.

Results and Discussion

The world practice of development and implementation of the state strategy of innovative development of the national economy and development of production in the sphere of modern high-tech products and competitive technologies testifies to the formation by all developed and successfully developing countries of a list of priority areas of science and technology and industries where, with the maximum possible participation of national science and industry, Training and preparation of own personnel of specialists and workers, long-term programs and major innovative projects and programs.

In turn, Russia has not yet developed enough mechanisms for state regulation and control over the implementation of state programs and innovative projects to create conditions for attracting investments, for measures to preserve competitiveness and the development of domestic science and industry to create primarily in their country, new jobs with a high level of wages. A specific feature of the Russian economic structure is that Russian large enterprises are developing against the backdrop of weak development of small and medium-sized businesses. In Russia, small businesses are mainly engaged in trade and intermediary activities (Kotlyarov, 2016).

Over the past 25 years, the domestic industry has accumulated a whole range of systemic problems that affect its further innovative development. We shall name and characterize the main ones.

1. The financial situation of many industrial enterprises and scientific organizations remains complex. 2. The general wear and tear of machines and equipment in many branches of industry is 48.7%. At the same time, the average age of equipment in the active part of fixed assets is 11.2 years (Burkov et al, 2002).

The aging equipment leads to a decrease in the quality of the products. 3. Completely lost the production of a number of components. 4. Another serious problem of the domestic industrial sphere is the human factor. Today, the average age of workers in production (the so-called "blue collar") is 55 years. These negative trends in recent years have caused a disruption in the process of the reproduction of knowledge - there is no one to transfer experience accumulated by veterans. 5. As practice has shown, innovation-active enterprises introduce mainly product innovations aimed at expanding the range, improving the quality of products, using more efficient components and materials. At the same time, new production methods, the so-called technological innovations, which, along with the release of new products, reduce material costs in production, are not introduced everywhere.

At the first stage, a database is being created, into which the existing innovation investment projects and programs should be included, the implementation of which is planned by economic entities located in the region or planning to implement its project on this territory.

At the second stage, the projects are ranked according to the descending or increasing of some criterion (for example, the repayment time of the loan, the amount of tax revenues to the budget for the planning period, economic or social efficiency, etc.). The evaluation of projects is carried out by experts who have knowledge and experience in the relevant field of activity. This allows choosing the most promising innovation and investment projects, the implementation of which will help improve the state of innovation infrastructure, promote the innovative development of the region and enhance the intellectual potential of the population. Local authorities should select the most effective projects by all criteria, which will allow selecting those projects that will receive state guarantees. Financing can be organized with partial attraction of means of subjects of economic relations within the framework of public-private partnership. Particularly relevant is the use of this approach in the context of the policy of import substitution (Kozin, Yakovlev, 2016). In case there are many criteria for evaluating the project, it is possible to conduct several stages of selection.

It should be noted that there are probably two types of procedure for ranking innovation-investment projects. The first is when projects are evaluated according to several criteria (economic effect from their implementation, social and other types of effects) that are interrelated. In this case, increasing the value of one of them increases the values of the others. The ranking process is simplified and has the form of a one-source agreement on the interests of economic operators. The second kind is that when an improvement in the value of one criterion leads to its deterioration by another criterion.

The presence in the database of a significant number of options determines the need to reduce them. For this purpose, first, options are selected that satisfy the existing constraints. Then among them there remain variants corresponding to restrictions, but having different degree of conformity to the given criteria. The analysis of compliance with criteria allows for the third stage to negotiate the values and leave one option (or a small number). The final decision must be taken by the official (body) planning the project's implementation.

The procedure for reducing the number of options for innovative investment projects used within the framework of the proposed mechanism requires detailed elaboration. Decision-making should be carried out using a scientific approach.

Let a priori given constraints: L - the total costs and {Li} - the minimum values of the estimates by the criteria (for convenience, we will assume that the advantages of subjects of economic relations are reflected in the desire to increase project estimates by all criteria). In this case, the variant (some set of projects) will be acceptable if it is characterized by total costs not exceeding R, and estimates by all criteria, not less than the corresponding minimum values {Li}. To generate a set of acceptable variants, you can use the procedure for building a network in which the branching of the "tree" of options corresponds to adding or removing one of the projects from the set of realized ones, and the criteria for cutting off unnecessary options is either exceeding the maximum possible amount of expenditure, or reducing the estimate for at least one of the Criteria to the minimum allowable.

For the selection of the most effective projects, the economic and social effects that can be obtained as a result of their implementation should be assessed. Based on the results of processing the completed questionnaires available in databases, the arithmetic mean of the two types of effects is calculated.

The expert group, using the appropriate criteria (Table 1), scores the expected effect (in our case, a five-point scale will be used) from the implementation of innovation and investment projects aimed at achieving the strategic objectives of the industry in the region. We confine ourselves to two types of effects - economic and social, each of which will contain four indicators. In practice, depending on regional specifics; the state of innovation infrastructure, the level of industrial development, the goals to be realized in the strategic development of the region, and other factors [3, 5], indicators, as well as the effects, can be much larger. The number of possible innovation-investment projects available in the database is also unlimited.

In practice, there is a relatively high predictive efficiency of the use of capital in the implementation of innovative investment projects, characteristic of some territories (regions) of the Russian Federation. To a large extent, it can be caused by a well-developed system of control measures by the regional authorities, as well as by placing funds in highly liquid projects that do not require long payback periods.

Consider the option in which funding will require three projects. They can be implemented either simultaneously, or two of them, or one. It all depends on budget constraints. The initial data for carrying out the necessary calculations are presented in Table. 2.

Table 1: criteria of expert evaluation of the effectiveness of innovation and investment projects (option for reporting data for project A)

Accepted indicator	Evaluation Criterion	Score
1	2	3
1. Economic effect of project A		
1.1. Increase the filling of regional and local budgets	B_b	4
1.2. Receiving additional benefits through the commercialization of intellectual property	D_k	3
1.3. Development of infrastructure for innovative support of enterprises for providing information, consulting, marketing, financial and other services	R_{in}	5
1.4. Growth of volumes of realization of the national science-intensive products and high technologies	R_n	2
2. The social effect of project A		
2.1. Increase in the number of jobs in production using modern technologies	M_r	3
2.2. The possibility of introducing the results of intellectual work	W_{it}	4
2.3. The possibility of using the results of project implementation by the population	V_n	2
2.4. Raising the standard of living of the population to standards adopted in developed countries	U_l	4

Source: developed by the authors

Table 2: initial data on the implementation of innovative investment projects (option for reporting data for projects A, B and C), taking into account Received economic and social effect (assessed in points)

Effect type	Project and costs required For its implementation, thousand rubles.		
	A	B	C
	2000	1500	3300
1	2	3	4
Economic effect (E_e)	14	11	15
Social effect (E_s)	13	8	10

Source: calculations carried out by the authors

Variants of project support, as well as the value of expenditures and estimates by criteria are given in Table. 3. In total, eight possible combinations of the implementation of the projects were obtained. Let's pretend that L = 3500 rub. In this case, variants 6, 7 and 8 are excluded from the total aggregate, the total implementation cost of which exceeds the established limit on the amount of financing. The first option, in which none of the possible projects is implemented, with zero value of all indicators from the settlement table is also subsequently excluded. However, in practice this situation is quite possible due to lack of funding.

Table 3: grouping of all variants of innovative and investment projects

№ п/п	Project			Expenses, Thousand Rubles	The resulting types of effects (Estimated in points)		$\sum E_i$
	A	B	C		E_e	E_s	
1	2	3	4	5	6	7	8
1				0	0	0	0
2	+			2000	14	13	27
3		+		1500	11	8	19
4			+	3300	15	10	25
5	+	+		3500	25	21	46
6	+		+	5300	29	23	52
7		+	+	3800	26	18	44
8	+	+	+	6800	30	31	61

Source: calculations carried out by the authors.

The application of the rule of the Pareto-dominant variants allows to exclude from the whole set of variants that do not enter into 20% with a maximum sum by two criteria. To exclude 80% of the projects, it is proposed to rank the sum for the two effects (economic and social) and exclude projects, for this sum, referring to the 0-80% interval. Applying the Pareto rule to a certain set allows you to exclude 80% of the options that will not provide the maximum effect.

The application of the Pareto rule to a set of possible options makes it possible to select only those projects whose implementation efficiency should exceed 80%. In our example, the only variant of the grouping that satisfies the restrictions on the amount of expenses and the corresponding conditions of the Pareto rule is the first option, which provides for the implementation of project A (Table 4).

The example of the calculations carried out within the framework of the proposed mechanism for the implementation of innovative investment projects aimed at achieving the strategic objectives of industrial development in the region demonstrates that in the multi-criteria problem that is being solved, the final decision is very sensitive to the choice of the priority system that determines the procedure for multi-criteria selection.

When deciding whether to support projects, it is necessary to harmonize the interests of stakeholders who have the ability to influence the final decision and advocate an increase in estimates based on certain criteria. The procedure for reconciling interests can be described by solving the task of motivational management.

Table 4: grouping of selected options for implementation of innovative investment projects based on the application of the Pareto principle

№ п/п	Project			Expenses, Thosand/Rubles.	The resulting types of effects (Estimated in points)		$\sum E_i$
	A	B	C		E_e	E_s	
1	2	3	4	5	6	7	8
1	+			**2000**	**14**	**13**	**27**
2		+		1500	11	8	19
3			+	3300	15	10	25
4	+	+		3500	25	21	46

Source: calculations carried out by the authors

Consider a system consisting of n subjects evaluating m options for supporting projects. The utility of the *i-th* entity from the implementation of variant *j* is *hij, i = 1¯, n, j = 1, m*. We fix the two variants *j* and *k*, we define the "gain" of the i-th subject from the "transition" from the implementation of variant j to the variant *k*:

$$\Delta_i(i,k) = h_{ij} - h_{ik}, i \in I = \{1,2,\dots,n\}, \quad (1)$$

At the same time Δ_*i (i, k)* is the total gain of all subjects from this transition:

$$\Delta(i,k) = H_0(j) - H_0(k), \quad (2)$$

Where

$$H_0(j) = \sum_{i=2}^{n} h_{ij}. \quad (3)$$

The function $H_0(j)$ can be the objective function of a "system" with *n* subjects. It is consistent with the Pareto rule in the following sense: if the variant *j* Pareto prevails variant *k* (in terms of utility level for the subjects, and not the number of points obtained as a result of multi-criteria selection), then $H_0(j) > H_0(k)$.

The governance model under consideration requires the introduction of a governing body, for example, regional authorities. Motivation management corresponds to the introduction of the incentive system$\{\sigma_{ij}\}$, on the basis of which the objective function of the *i-th* subject acquires the following form:

$$f_i(j) = h_{ij} - \sigma_{ij}, \ i \in I. \quad (4)$$

The interaction of the subjects turns out to be dependent on the matrix$\sigma = \|\sigma_{ij}\|$. Let's assume that the budgetary constraint C for the total amount of funding appears in the motivation management task under consideration.

First, we examine the coordination of interests of subjects in the absence of a budget constraint $(C = +\infty)$. We fix two arbitrary variants *j* and *k*.

According to the results obtained in [2, 12], the use of the incentive system by local authorities allows making sound management decisions

$$\sigma_{(.)} = \begin{cases} \Delta_i(j,k) - \delta_i, i = k \\ \sigma_i^H, i \neq k \end{cases}, \quad (5)$$

Where i = k support by the *i-th* economic entity of the *k-th* variant $\sigma_i^H = max$;

h_{ij}- Strategy of discouraging the economic entity for evasion *k-th* option; $\delta_i > 0 > 1$ Is an arbitrarily small positive constant, which forces us to support variant *k*.

In formula (5), the first mode corresponds to the transfer of utility, and the second mode is the disincentive for individual deviations. If the utility transfers correspond to an internal constraint that is,

closed in the set of subjects then the transfer amount must be negative. If regional authorities need to attract external funds or use their own funds in the amount of $C \geq 0$, the budget constraint is transformed.

$$\sum_{i=1}^{m} \sigma_i (j,k) = \Delta(j,k) = H_0(j) - H_0(k) \geq -C. \quad (6)$$

Thus, on the one hand, in the framework of a closed set of subjects (for $C = 0$), expression (6) is a condition for the positive balance of transfers, and on the other, as noted above, this is a sufficient Pareto condition, the dominance of variant *k* over variant *j*.

To consider the role of the budget constraint, it is expedient to fix an arbitrary variant of *k0* and to determine the set of options that can be supported by subjects of economic relations (taking into account balanced motivational management by local authorities) as an alternative to option *k0*:

$$P(k_0, C) = \{j\Delta(k_0, j) \leq C\}. \quad (7)$$

A set of P (C) options that can be supported as alternatives to any other options:

$$P(C) = \bigcap_{k_0} P(k_0, C) = \{j|H_o(j) \geq max(H_0(i) - C)\}. \quad (8)$$

When regional incentive systems are used by the regional authorities (4) any point of the set (8) is Pareto significant. In addition, the rating of Pareto variants is determined. Given a budget constraint L, any variant of the set (8) can be realized.

Implementation of the presented mechanism in practice in the current circumstances requires the involvement of significant administrative and financial resources. This circumstance determines the high role of the state in the implementation of innovation and investment projects aimed at achieving the strategic objectives of the development of industry in the region.

Conclusions

Summing up, we can draw the following conclusions:

To ensure sustainable economic growth in Russia, it is necessary to implement an effective state policy on key areas for ensuring national security and innovative and investment development of all major sectors of the country's national economy;

On the effectiveness of the selected mechanisms and tools for selecting and implementing innovative investment projects aimed at achieving the strategic objectives of the industry in the region, socio-economic development of Russia depends, including on the competitiveness of the main types of domestic products, goods and services, on raising the standard of living of the population, quality of education, science, high-tech industry, health and culture. First of all, it is necessary to ensure the priority development of industries that are of particularly important strategic importance for Russia and its regions - points of growth aimed at achieving a powerful synergetic effect;

A transparent mechanism should be established to monitor the activities carried out within the framework of real state support of priority innovation and investment projects for the renewal of technologies and funds of the processing industries of the country's economy in order to ensure the production of competitive products for Russia's domestic market in Russia.

Acknowledgments

This paper is an output of the science project of the government task of Ministry of education and science of the Russian Federation № 26.3546.2017/PCH "Development fundamentals of analysis and prediction of structural and dynamic parameters of the regional economy are based on the integration of the Russian and world experience of management of territorial development and modern scientific doctrines".

References

Malle, S. (2013) 'Economic modernisation and diversification in Russia. Constraints and challenges'. *Journal of Eurasian Studies*, Volume 4, Issue 1, pp. 78-99

Phaal R., Paterson C.J., Probert D.R. (1998)'Technology management in manufacturing business: process and practical assessment'. *Technovation*, Volume 18, Issues 8–9, pp.588-589

Schwartz-Chassidim H., Meyer J., Parmet Y., Rogatka E., Amzaleg O. (2014) 'Perceived density of road maps'. *Original Research Article Applied Ergonomics*, Volume 45, Issue 6, (2014), pp.1579-1587

Vertakova, Yu. V., Polozhentseva, Yu. S., Nepochatykh, O. Yu. (2017) 'The method of selection of enterprises-recipients of budgetary support in the implementation of state industrial policy'. *Bulletin of Transbaikalian State University*. Volume 23, no. 2, pp.106-118.

Gorfinkel, V. Ya., Popadyuk, T. G. (2012) 'Innovative management'. Moscow: Infra-M.

Zagodarchuk, I. V., Plotnikov, V. A. (2014) 'Specificity of innovative development in the military-economic sphere'. *Institutes and mechanisms of innovative development: world experience and Russian practice: a collection of scientific articles of the 4th international scientific-practical conference*. pp. 162-166.

Ivantsov, P.I. (2012) Innovative economics. Minsk: Dikta.

Kozin M.N., Yakovlev S.S. (2016) 'State regulation of innovative development of the country: optimal ways and prospects'. *Criminal-executive policy and questions of execution of criminal punishments: a collection of materials of the international scientific-practical conference* November 24-25, Ryazan, pp. 1156-1160.

Kotlyarov, I.D. (2016) 'Localization of production as an instrument of import substitution'. *ECO*, no. 8 (506). pp. 128-140.

Kurbanov, T.Kh., Kurbanova, Z.K. (2016) 'Optimality of production processes (on the example of dairy enterprises)'. *Management of entrepreneurial activity: a collection of scientific papers on the materials of the 14th International Scientific and Practical Conference on April 7, 2016: Simferopol:* pp. 128-130.

Kurbanov, A. Kh., Knyaznedelin, R.A., Plotnikov, V.A. (2017) 'Outsourcing: achievement of competitive advantages or a trap?'. *Russian Entrepreneurship*. Volume 18, no. 2, pp. 185-192. DOI: 10.18334 / rp.18.2.37362.

Burkov, V.N., Zalozhnev, S.V., Leontiev, S.V., Novikova, D.A., Chernyshev, R.A. (2002) 'Mechanisms for financing regional development programs' Moscow: IPP RAS. 55 p.

Vertakova, Yulia; Polozhentseva, Yulia; Klevtsova, Maria (2015) 'The Formation of the Propulsive Industries of Economic Development Acting as the Growth Poles of Regions', International Conference on Applied Economics (ICOAE), Kazan, RUSSIA. *Procedia Economics and Finance* , 24, pp.750-759

Characterization of Software Development Methodologies in the Telecommunication Industry of South Africa

Olebogeng Helen Nojila, North West University, Private Bag X2046, Mmabatho, 2745, South Africa, olebogenghellennojila@gmail.com
Nehemiah Mavetera, North West University, Private Bag X2046, Mmabatho, 2745, South Africa, Nehemiah.mavetera@nwu.ac.za
Chipo Getrude Mavetera, North West University, Private Bag X2046, Mmabatho, 2745, South Africa, Chipo.mavetera@nwu.ac.za

Abstract

In South Africa, there are numerous telecommunication service providers which include; Vodacom, Cell C, MTN and Telkom. These companies provide wireless, mobile and cable telecommunication services (SA Info 2015 and Deloite 2014). In order for this services to be provided, software services as part of infrastructure are needed. Software development is therefore a requirement and software development methodologies (SDMs) must be in place to enable this. The telecommunication industry however, does not have a well-documented list of the SDMs that are used to fashion these software products.

This study investigated the software development methodologies used in the telecommunication industry of South Africa. A qualitative-interpretive approach and a case study method were used to find software development methodologies used in different companies. Four leading telecommunication companies were identified and using semi-structured interview techniques, a total of eight case data were collected from these companies. Then a cross analysis method was utilized to identify similar patterns among the findings.

The results indicated that software development life cycle and agile methodologies are used in the telecommunication industry. However, in their formalized (espoused) state, these software development methodologies do not fully address the telecommunication requirements, therefore they tailor them into methods-in-action(methods-in-use) to best suit their needs. The results also indicated scanty knowledge of SDMs from some telecommunication companies.

Keywords:Telecommunication, software development methodologies, telecommunication companies, software development, information technology.

Introduction

Telecommunication industry contributes significantly to the gross domestic product (GDP) in South Africa (SAI 2015). The industry offers services and products that connects the world (Mazengera 2009 and The Editors 2012). As such, quality technologies which include mainly their software need to be developed for better management and delivering their expected services (Lemétayer 2010). It is therefore imperative to assess the use of software development methodologies (SDMs) that maybe in use to guide their software development tasks.

Though SDMs maybe generally used, every software development project brings new views to software development which can either be weaknesses or strengths (Jeff 2012; Preeti et.al 2014 and Deepak et al. 2010). This suggests that there is no single methodology solution that addresseses the development of different software solutions. (Preeti et.al 2014 and Deepak & Pooja 2010).

The telecommunication industry is complex in nature and has its own specific requirements that are not always properly handled by current information technology techniques (Plunkett Research 2015; Patel 2002; Jared 2013 and SAI 2015). The imminent compexity of programming and new softaware developments bring extra challenges for information technology practitioners to sustain the management requirements as well as organisational technical needs (Haigh 2010 and Jared 2013).

Numerous SDMs have genrally been created to aid software development, therefore it is necessary to align certain SDMs to specific software projects (Preeti et.al 2014). The telecommunication industry has numerous software solutions that need to be implemented, however there is a lot of uncertainity as to which SDMs are suitable for each project (Jared 2013; Deloite 2014 and TE 2012). Pressman (2007) and Preeti et.al (2014) suggest that not employing SDMs in software development is bound to result in project failure.

In line with challenge of assessing suitable SDMs for the telecommunication industry the researcher identified research objectives as follows;

- to investigate SDMs used in telecommunication industry
- to identify the SDMs used in the telecommunication industry;
- to specify requirements for SDMs suitable for the telecommunication industry and
- to justify the significance of SDMs in the software development process

Literature Review

Description of Software Development Methodology

According to Centers for medicine & medicate services (2008) software development methodologies refers to a framework that is used to structure, plan, and control the process of developing an information system. Avison & Fitzgerald (2006) state that software development methodologies are a general collection of procedures, tools and techniques, and documentation which assist developers to structurally develop a software. According to Huisman & Livari (2006) refer to software development methodologies as a combination of a systems development approach, a systems development process model, a systems development method and a systems development technique. Over the years, numerous authors have provided different definitions for software development methodologies, however there are comparable elements within the definitions that are mutual. These include; philosophy, procedure, method, tools and techniques. For the purpose of this study SDMs are regarded as a structural procedure to develop software solutions with the use of a paradigm, approach, methodology, methods, tools and techniques, and also support telecommunication software solutions requirements which are; reliability flexibility, security and adaptability.

The Software Crisis

The instigation of SDMs followed after software crisis which took place in the 1960s (Fitzgerald,1996). The concept “software crisis” referred to software projects which did not meet user’s requirements, were above budget and or were not finished within the estimated time (Fitzgerald 1996). As a result most information technology practitioners proposed the use of formalized methodologies to minimize the negative outcome of software crisis (Fitzgerald 1996). The creation of SDMs came as a solution to guide software developers through the software development process (Malik & Siew 2009 and Preeti & Saru 2014). The use of SDMs in an organization is perceived by many information technology practitioners as a good tool to reduce project failure (Klimeš & Procháska 2006; Preeti et.al 2014; Avison & Finformation technologyzgerald 2008; Yahya et al. 2002 and Saini,Saini & Gupta 2009).

Justifying the use of SDMs

To date, software development methodologies have been adopted as the main tool that drive software development (Fitzgerald 1996 and Preeti & Saru 2014). Avison & Fitzgerald (2006) and Preeti et.al (2014) emphasise that software development methodologies are of essence for almost all software development endeavors. It is for these reasons that the anticipation of software development failure still prevails in cases where SDMs are not employed (Avison & Fitzgerald 2006 and Preeti et.al 2014). It common however that some organizations still do not implement the use of software development methodologies to develop software solutions, yet they still produce successful project.

Benefits Of Software Development Methodologies

The use of SDMs in software development has shown great improvement in the end product (Mihailescu & Mihailescu 2009; Griffin & Brandyberry 2008; Huisman & Livari 2006; Yahya, Yahya, Yusof & Omar, 2002 and Masrek, et al. 2008). When software development methodologies are put into practice they make the development process manageable and easy to control (Jeff 2012 and Yahya, et al. 2002). Continuous use of SDMs ensure that there is sufficient communcation among all the stakeholdrs involved in the software devlopment project, more specifically, communication between developers and users (Futrel, Shafer & Shafer 2002; Mihailescu et.al 2009 and Preeti et.al 2014).The use of SDMs also ensures standardization of the development process (Jeff 2012; Avison & Fitzgerald 2008 and Futrell et.al 2002). This is achieved through the nature of SDMs structure which have predefined guidelines (Leem & Kim 2002 and Meso, Madey, Troutt, & Liegle 2006).

Challenges Of Software Development Methodologies

Some companies still do not employ the use of SDMs for reasons such as them being time consuming and costly (Wetherbe 2001; Pieterse 2006 and Griffin & Brandyberry 2008). Other organisations are concerned that SDMs do not capture the unique nature of every project (De Vries 2004; Avison & Fitzgerald 2002; Yahya, et al. 2002 and Fitzgerald & Russo 2002). The use of SDMs have not been fully accepted in the business world. This is so because sometimes information technology practitioners find it hard to encourage their use, especially in cases where there is lack of evidence of their success (Griffin & Brandyberry 2008; Mihailescu et.al 2009; Siau & Tan 2005). Research also highlight that SDMs do not take much consideration of the human aspects during the development process, but rather focus more on the technical aspects, this in turn results in unsatisfied users (Yardley 2002).

Telecommunication companies in South Africa

Major telecommunication companies that operate in South Africa include MTN, VODACOM and Cell C. These were targeted for data collection through interviews. These companies also operate internationally, however this research was only foused on factors that affect the local branches in Sourth Africa. In South Africa telecommunication is one a major business that grows at an exponetial rate, ranging from mobile telephony, broadband connectivity, wireless and satellite communication (SAI 2015), South Africa has the most developed telecommunication infrastructure in network in Africa (SAI 2015).

Sdms Specifically For Telecommunication Industry

Some of the prominent researchers on SDMs specifically for telecommunication industry identified in this research are Mansurov (2000) & Modatel (2003). The telecommunication industry is one of a kind industry with its own unique software challenges (Deloite 2014). The nature of this industry is that it is unpredictable and fast paced in terms of advancements of software development. It is therefore

encouraged that there should be use of SDMs that specifically address the telecommunication industry software development challenges. These SDMs should be reliable, flexible, secure and adaptable (Jared 2013). Some SDMs were identified in this study that specifically address software development challenges for the telecommunication. These SDMs involve the breakdown of the software development projects into controllable tasks, define outputs throughout the development process and they function in the science paradigm. The identified SDMs include, Model Driven Methodology (MODA-TEL), Mansurov's Accelerated Development Methodology and Mobile D

Research Methodology and Design

Theoretical foundation

The theoretical foundation for this research is based on the Actor Network Theory (ANT). ANT in summary considers human and non-human actors as they interrelate to form a network to achieve a specific goal. This study looked at how targeted actors for this study contributed to the development of software solutions. Figure 1 below illustrates a network of actors in the telecommunication industry.

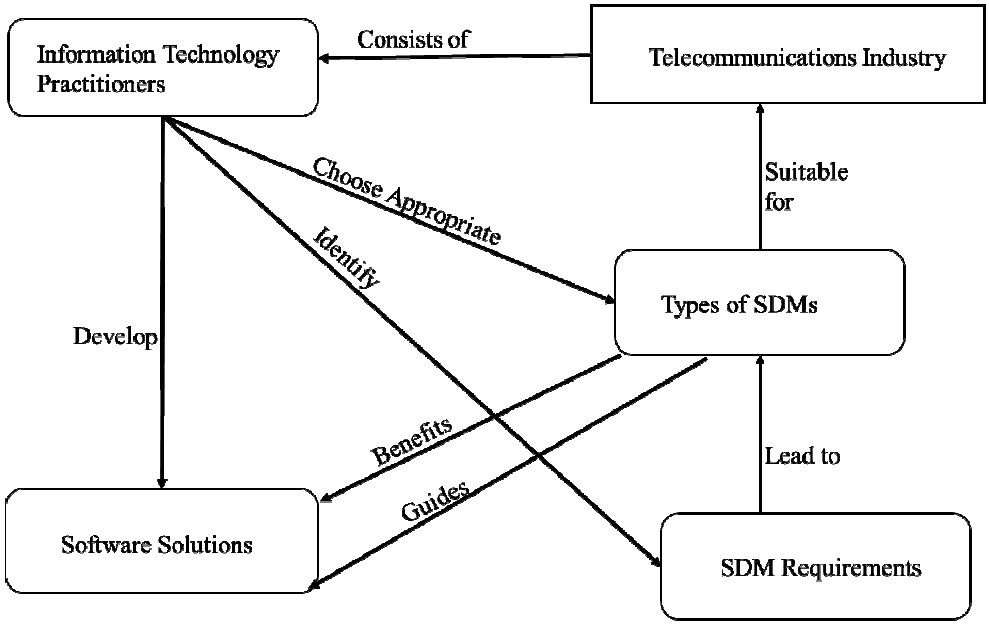


Figure 1: Theoretical foundation of the study: Based on the actor network theory

Figure 1 above depicts the theoretical foundation based on the ANT and displays the relationships among the actors of the telecommunications industry for this study. This depiction assisted the researcher with formulating the research questions.

Research Paradigm

According to the foundation as depicted in figure 1, this study was suitably interpretive in nature because it targeted the views of information technology pravtitioners in the telecommunication industry. This meant that the results of the study were therefore subjective. However, but engaging the interpretive

research paradigm allowed the researcher to comprehend and interpret the use of SDMs in the telecommunication industry with less bias (Collinson 2012; Anderson 2013; Douglas 2015 and Thushara 2014).

Research Approach

The researcher managed to attain comprehensive interpretations which also qualified the study as a qualitative research (Goran 2012;Snape & Spencer 2003; Van Wyk 2012 and Occupy Theory 2014). The telecommunication industry software development processes are not very easy to grasp, therefore the conveniences of the qualitative approach assisted the researcher to attain a clear understanding of the environment in an attempt to generalize the results and help to sustain contextual focus (Goran 2012 ; Mason 2002 ; Van Wyk 2012 and OC 2014).

Research Design

Data Collection strategy – Case Study

A case study strategy was preferred as the appropriate approach that provided a structured way to collect data, examine it, attain results and compile a report (Hancock 2002; Rowley 2001 and Van Wyk 2012). The researcher had no control or influence in the telecommunication industry, the case study strategy served as an appropriate approach for an outside individual to get data in a non-interfering way (Van Wyk 2012).

Data Collection method - Interviews

To acquire the desired information on SDMs in the telecommunication industry, it was vital that the researcher personally get involved with participants by interviewing them. This assisted the researcher to understand the participants' perception, experiences, roles and responsibilities in the environment (Van Wyk 2012). Through the interviews, the researcher attained multiple viewpoints from information technology practitioners in the targeted telecommunication companies. Semi-structured interviews were used to collect deep and expressive data from the respondents.

Interview appointments were scheduled in advance between the researcher and individual interviewees and electronic copies of the interview questions were e-mail in advance to allow them to prepare for the interview sessions. The researcher attended each session with paper based interview questions to guide the interview process. Interview discussions were captured on a digital recorder with the approval of participants. Each interview session lasted for about 30 minutes on average.

Sampling

Target population: The targeted participants for this study were information technology practitioners that are involved in software development such as programmers and software designers and analysts in the telecommunication industry.

Sampling method: The focused and purposeful sampling techniques was used because it does not involve choosing participants randomly but targets experts in a particular field (Patton 2002; Hancock, et al. 2007 and Van Wyk 2012).

Sample: A sample of four major telecommunication companies in South Africa namely Vodacom, Cell C, MTN and Telkom was chosen to make up four cases for this study. From these four cases, eight (8) interviews were done, where there were two (2) interviewees form each case.

Data Analysis

A cross case analysis was done as a form of data analysis in order to assist the researcher to identify the similarities and differences among the cases (Denscombe 2003 and Freed 2001 & Lamnek 1995). Through cross case analysis, associations among variables and features of phenomena studied were also identified (McGuiggan & Lee 2008). This method of analysis was preferred because it is inexpensive, fairly quick and is the best tool that can explain the real life relations that a survey cannot (McGuiggan & Lee 2008). To assist the researcher with interpretation coding was used to identify each case for example**,** cases A B C and D and each interviewee was coded according to their case code for example, A1, A2 and so on.

Ethical Consideration

Even though the targeted cases were mentioned in this study, an anonymity agreement was done between the researcher and the targeted cases. The researcher therefore cannot align the codes to the actual case as identified by name to respect the agreement.

Research results and findings

To address the problem statement and the objectives of the study, the results focused on the following measured aspects:

- Software development methodologies currently applied in the organization:
  - Three out of the four cases studied (A, B and C) reported that they are using SDMs and in all three case the software development life cycle SDLC was the main methodology.
  - All four cases (A, B, C and D) reported that they are using agile SDMs including scrum and lean methodology, but the first three cases (A, B and C) are using them to a lesser extend as compared to the fourth case (D).
- Software development methodologies satisfaction:
  - Case A and C indicated that they are less satisfied with the use of the SDLC as a software development methodology as it has proven overtime to result in many software projects failing through delays and exorbitant costs.
  - Case B emphasized that the SDLC sometimes result in successful software development solutions provided that the processes is followed prescribed.
  - Case C and D reported that they are satisfied with the SCRUM and mean methodologies in terms of cost. They added that SCRUM help them understand their team members much better, provides them with proper priority management, mitigating priority inversions, transparency and correct deadline estimations.
  - All four cases (A, B, C and D) are satisfied and prefer the use of agile methodologies because these methodology is more reactive and flexible.
- Software development methodologies effectiveness:
  - the results from all four cases indicated that SDMs are effective in a manner that they provides team members with a sense of accountability, provides a better communication channel and ensures that software solutions are delivered on time, within budget and meet user's needs.
  - SDMs are efficient in providing better software development management, proper costing, verification and quality control. Software development methodologies ensure information technology governance, software governance and company governance.
- Software development methodologies modification:

- Results from three cases (A, B and C) indicated that they are not flexible to choose and follow agile methodologies at will, they only adapt their use whenever the need arises.
- All four cases agreed that when they employ the use of agile methodologies, they do not always necessarily use them as prescribed, they make adjustments to them as necessary.
- In all four cases results show that SDMs do not always suit every environment nor do they suit every project, therefore making changes is part of successful implementation of most SDMs.
- Cases (A, B and C) outlined that combining of the software development life cycle and agile methodologies has proven to be working for them sometimes. They scale down the process of the SDLC into smaller processes so that they can apply aspects of agile methodologies especially for small projects.

- Criteria to choose methodology:
  - All four cases reported that they choose the SDMs based on project requirements, team size, project size and whether the team accept the methodology.
- Willingness to adopt a methodology:
  - All four cases agreed that they are willing to accept the use of SDMs provided they addresses their daily struggles and makes it easier or better for them to tackle software development.
  - Case D however emphasized that is reluctant to adopt any more SDMs as their current ones meets the bare minimum requirement in their environment. They mentioned that adopting new SDMs is costly and time consuming.
- Software solution project success rate:
  - All four cases reported that they have experienced more project success than failure. This means that most projects were completed within stipulated time frame, budget and meet users requirements

Table 1 below presents the tabular view of the results as highlighted in section 5 above and as discussed in section 6 below.

Table 1: Tabular presentation of research results

	Experience with SDMs	SDMs Being Used	Perception with regards to use of SDMs	Readiness to adopt new SDMs	Criteria for telecommunications industry SDMs	Challenges with using SDMs
A1	5 Years	SDLC, Agile RUP, Agile SCRUM, modified agile steps	less satisfied with the use of the SDLC - prefer the use of agile methodology	willing to adopt the use of new SDMs	- based on project requirements	only allowed to adapt their use whenever the need arises
A2	3 Years	SDLC, XP, , Agile RUP, Agile SCRUM, modified agile steps	SDMs are effective, provide sense of accountability, better communication - software delivery on time, within budget and meet user's needs.	willing to adopt the use of new SDMs	flexible, adaptable, reliable and save time	costly and consume a lot of their time
B1	9 Years	SDLC, XP, RAD, JAD, modified agile steps	prefer the use of agile methodology	willing to adopt the use of new SDMs	flexibility and adaptability	SDMs do not always suit every environment nor do they suit every project
B2	7 Years	SDLC, XP, RAD, JAD, modified agile steps	- better software development management, - proper costing, verification and quality control - ensure software governance	willing to adopt the use of new SDMs	proper structure, verification, correction	need more time and training team members
C1	11 Years	SDLC, modified agile steps	less satisfied with the use of the SDLC	willing to adopt the use of new SDMs	quality control, accountability, quick delivery,	many information technology practitioners are less informed about SDMs
C2	5 Years	SDLC, modified agile steps	satisfied with the SCRUM and other lean methodologies	willing to adopt the use of new SDMs	measure performance and manage team members	the telecommunication industry has to adjust SDMs to better accommodate their needs
D1	15 Years	SDLC Agile RUP, Agile SCRUM, XP, derive steps	have experienced more project success than failure	reluctant adopt the use of new SDMs	proper planning, proper requirements analysis, and avoids scope creep	original SDMs are in some cases inadequate for some software projects
D2	13 Years	SDLC Agile RUP, Agile SCRUM, XP, derive steps	Absence and improper use of SDMs has resulted in high rates of software solution projects failing	reluctant adopt the use of new SDMs	make their job much simpler and controllable	SDMs increase the time frame of the development process

Results Discussions According To Research Objectives Literature and Questions

Objectives

Objective 1: to identify the software development methodologies used in the telecommunication industry

From the results acquired, it was apparent that SDLC and agile methodologies are prominent in the telecommunication industry. The SDLC is the main corporate SDM while agile methodologies are implemented internally for mostly smaller software development projects. The integration of the SDLC and agile methodologies is also practiced to attain best results. In some cases alteration of the SDLC is done. Literature has identified SDMs that are explicitly intended for the telecommunication industry, nonetheless according to the data collected, none of these SDMs are implemented in the telecommunication industry.

Objective 2: To Specify Requirements For A Sdms Suitable For The Telecommunication Industry

The results obtained indicated that it is imperative that SDMs in the telecommunication industry should be flexible, adaptable, reliable and save time to ensure better management and successful implementation of these software development methodologies.

Objective 3: to justify the significance of SDMs in the software development process

The lack of or incorrect use of SDMs has caused many software projects to fail. Presently used SDMs in the telecommunication industry has proven to be constructive and works accordingly. Nonetheless alteration possibly will be desirable since not all software development project are alike and requests different implementation processes.

Literature

Advantages of Software Development Methodologies in the Telecommunication Industry

The results indicated that the use of SDMs in the telecommunication industry is important and that the use SDMs is primary, for mitigating risks and ensuring that software project are produced within time, budget and meet users' needs. Existing SDMs have proven to be helpful as employed in the telecommunication industry.

Disadvantages of Software Development Methodologies in the Telecommunication Industry

The lack of or wrong use of SDMs has triggered software development failure in many instances. Results indicated that the use of SDMs is costly and consume a lot of their time. Since the telecommunication industry is fast paced following prescribed steps within methodologies is not practical. This will lead to tailoring of methodologies, which will need more time and training team members on the insights of the new tailored method. Tailoring the method may also require an expert who will diligently review the methodology to certify its efficiency and reliability.

The findings in line with research questions

Do telecommunication companies use SDMs during software development?

In summary the answer to this question is yes. However it is also imperative to note that many information technology practitioners are less informed about SDMs. Majority of information technology practitioners who holds a significant experience are well knowledgeable about the SDMs in theory, appreciate their role in the organization and can relate SDMs and the development process.

What SDMs are used currently in the telecommunication industry?

The SDLC and agile methodologies are the mostly used SDMs in the telecommunication industry. Agile is preferred for its qualities such as flexibility and adaptability in software development. SDLC is a primary corporate SDM in the telecommunication industry.

To what extent are SDMs followed in telecommunication industry?

In some cases the telecommunication industry has to adjust SDMs to better accommodate their needs. This is because the original state of the methodology may be inappropriate for the particular software project they have to do. The mixture of SDLC along with agile methodology has been tested and tried and works accordingly in the telecommunication industry.

What are the views of information technology practitioners about SDMs in the telecommunication industry?

The SDLC is not preferred in the telecommunication industry. It increases time frame to the development process, since rework on an enormous projects is continually necessary. The SDLC has also been confirmed over time that it is not well-matched in the telecommunication industry and has failed repeatedly. Agile methodologies are the appropriate SDMs for telecommunication industry. The use of SDMs in the development process has presented benefits such as proper structure, verification, corrections, quality control, accountability, quick delivery, measure performance and manage team members. Absence and improper use of SDMs has resulted in high rates of software solution projects failing. This is since the absence of SDMs leads to poor planning and poor requirements analysis, ultimately leads to scope creep and eventually to project failing.

Every single methodology has its welfares and may result in software development project success if implemented correctly or altered to suite the situation. Nonetheless adequate knowledge and attitude of team members plays an important role for a software development project success.

SDMs would be more advantageous in a fine structured environment in which each information technology practitioner has his/her own tasks and responsibilities. This is since SDMs are designed in a way that a team member is assigned his/her own responsibilities and tasks. This is an intimidating task if a single team member has presumed the task and responsibilities of more than two information technology practitioners. Information technology practitioners are prepared to welcome and accept SDMs, provided it will make their job much simpler and controllable. Results also stated that the environment the information technology practitioners are working in is unbalanced and dynamic, so the ideal methodology should be time conscious, reactive easy to understand and follow.

What is the criteria used by telecommunication companies to choose the SDMs for each software development project?

The project size is one aspect they take into consideration when it comes to selecting a proper SDMs to use once developing software solution. The SDLC is chosen when dealing with a huge project. Agile methodologies are chosen when dealing with a smaller projects. Another aspect they look at is the team size, they usually go agile root if the team size is small otherwise they use the SDLC root with larger teams. Another criteria is business requirements where if they are dealing with numerous and complex requirements they go agile. If the requirements are less complicated and only include an unimportant number of people then they use agile methodologies.

Conclusion and Recommendations

Conclusions

From the results acquired, this research can conclude to confirm that SDMs are practical in the telecommunication industry. Agile methodologies and the SDLC are used to support software development project. This results stipulate that SDMs are applicable and suitable in the telecommunication industry. However there is still a lot of issues to be ironed out regarding the implementation of SDMs since some information technology practitioners are not well up to speed with their use. SDMs may need to be refined looking at the special needs of the telecommunication industry, this will make easy implementation when developing software solution. It could be that there will be less modification needed with every project undertaken. In this case team members may warm up to the use of SDMs as it will be easy to understand and follow, without consuming a lot of their time during the development process.

Recommendations

Recommendation 1: The use of a proper organizational structure

The results indicated that the respondents are working in a more unstructured environment in which one person can assume the responsibilities of three people. This in turn result in confusion and low quality of work. Therefore this research recommend that the telecommunications industry review their organizational structure. A proper organizational structure will improve decision making, employee performance customer service and help streamline operations (Osmond 2016).

Recommendation 2: Awareness and training

Many respondents indicated that they are aware of SDMs in general. However many could not describe precisely how its application can be beneficial to their company. Many SDMs have been recommended and permitted, though they have not explored their contents to evaluate which one will work finest for them. Therefore this research recommends that management send their employees for proper training such as short courses on software development methodologies. This will results in better job performance.

Recommendation 3: Using a responsive methodology

All companies interviewed are using software development life cycle, nevertheless this methodology has caused some of their projects to fail. Taking into consideration the unstable nature of the telecommunication industry, the best appropriate method in this instance ought to be more responsive to

cater for the frequently changing user requirements. A responsive methodology is one that adjusts to change as it happens, forecasts future changes and provides possible answers for future occurrences.

Recommendation 4: Explore SDMs designed for the telecommunication industry

Literature has identified software development methodologies that were specifically designed for the telecommunication industry. During the interview sessions, none of the respondents mentioned any of these methods, this proves that they are unaware of them and they chose to use general software development methodologies. This study however recommends that the telecommunication companies look into these software development methodologies and explore them, as they were designed considering the complex nature of the telecommunication industry

References

Anderson, T. (2013) Research Paradigms: Ontology's, Epistemologies & Methods, University Oberta de Catalunya.

Avison, D. and Fitzgerald, G. (2006) Information Systems Development: Methodologies, Techniques and Tools. 4ed ed. United Kingdom: McGraw-Hill Education.

Avison, D. and Fitzgerald, G. (2008) Information systems development: methodologies, techniques & tools. 4th ed. London: McGraw-Hill.

Centers for Medicine amd Medicate Services. (2008), Selecting a development approach, Newyork city.

Collinson, J. A. (2012). Interpretivist Research Paradigm, Lincoln.

De Vries, M. (2004) Evaluating or selecting a suitable information system development methodology: a case study. SA Journal of Industrial Engineering , 9 (25), pp. 9-25.

Deepak, D. and Pooja, J. (2010) Enterprise Systems Development: Impact of Various Software. International Journal of Advancements in Computing Technology, 2(4), pp. 117-122.

Deloite, (2014), Telecommunication outlook, interview with Craig Wigginton. [Online], [Retrieved May 15 2015], www2.deloitte.com/us/en/pages/technology-media-and-telecommunications.articles/2014-telecommunications-outlook.html

Douglas, H., (2015). Paradigms. [Online] Available at: Dictionary.reference.com/browse/paradigm [Accessed 15 March 2015].

Fitzgerald, B. & Russo, N. L., (2002). Information systems development: methods in action. London: McGraw-Hill. 194 p., London: McGraw-Hill.

Fitzgerald, B., (1996). Formalised Systems Development Methodologies: A Critical Perspective. Information Systems Journal, 6(1), pp. 3-23.

FutrelL, R. T., Shafer, D. F. and Shafer, L. I. (2002) 'Quality software project management,' Upper Saddle River, NJ: Prentice Hall.

Göran, G. (2012) 'Pragmatism vs interpretivism in qualitative information systems research,' European Journal of Information Systems, 21(2), pp. 135-146.

Griffin, A. S. & Brandyberry, A. A., (2008) 'System development methodology usage in industry: a review and analysis,' Journal of information system applied research (JISAR), 3(19), pp. 1-18.

Haigh, T. (2010) Reconsidering the Software Crisis of the 1960s and the Origins of Software Engineering, Milwaukee: Milwaukee.

Huisman, H. & Livari, J. (2006) 'Deployment of systems development methodologies: perceptual congruence between IS managers and systems developers,' Information & management, Volume 43, pp. 29-49.

Jared, J., (2013), "Five major challenges for telecommunications providers,' [Online], [Retrieved May 12, 2015], www.telco-ott.com/opinions/2013/five-major-challenges-for-telecommunications-providers

Jeff, A., (2012), 'Information systems development methodology. [Online], [Retrieved March 15, 2015], www.myfloricacfo.com/division/dis/isdm.

Klimeš, C. and Procháska, J. (2006) New Approaches in Software Development, In Acta Electrotechnica et iNFORMATICA, 6(2).

Leem, C. S. and Kim, S, S. (2002) 'Introduction to an integrated methodology for development and implementation of enterprise information systems,' Journal of systems and software, 60:249-261., Volume 60, pp. 249-261.

Lemétayer, J. (2010) Identifying The Critical Factors In SDMs Fit, Wellington.

Malik, H. and Siew , H. O. (2009) 'Review of agile methodologies in software development,' International Journal of Research and Reviews in Applied Sciences, 1(1), pp. 1-8.

Mansurov, N., (2000). 'Formal methods for accelerated development of telecommunication software,' [Online], [Retrieved August 17, 2016], http://www.ispras.ru/groups/case/downloads/downloads/methodology.pdf

Masrek, M., Hussin, N. & Tarmuchi, N., (2008). An exploratory study on systems development methodologies for web-based applications. Information management & computer security, 16(2), pp. 137-149.

Mazengera, B. M. (2009), 'The use of agile systems development methodologies in the telecommunication industry in South Africa,' Potchestroom: North-West University.

Mcleod, S. (2014), 'The interview method,' [Online], [Retrieved July 23 2015], http://www.simplypsychology.org/interviews.html

Meso, P., Madey, G., Troutt, MD. and Liegle, J. (2006) 'The knowledge management efficacy of matching information systems development methodologies with application characteristics: an experimental study,' Journal of systems and software, Volume 79, pp. 15-28.

Mihailescu, D. and Mihailescu, M. (2009) 'Exploring the nature of information systems development methodology: a synthesized view based on a literature review,' (Proceedings of the Fifteenth Americas Conference on Information Systems. San Francisco, California, AIS Electronic Library (AISeL).

Moda-Tel. (2003), 'Consortium confidential,' Deliverable D3 .add2.

Occupytheory. (2014), 'Advantages and Disadvantages of Qualitative Research,' [Online], [Retrieved July 19 2015], http://occupytheory.org/advantages-and-disadvantages-of-qualitative-research

Osmond, V. (2016), 'What Are the Benefits of Organizational Structure?,' [Online] [Retieved September 23, 2016,

http://smallbusiness.chron.com/benefits-organizational-structure-2776.html

Pieterse, PL. (2006), 'An interpretive analysis of systems development methodology adaptation in South Africa,' Potchefstroom: North-West University.

Preeti, R. and Saru, D. (2014) 'Impact of Different Methodologies in Software Process,' International Journal of Computer Science and Information Technologies, 5(2), pp. 1112-1116

Pressman, R. (2007) Software Engineering: A Practitioner's Approach, McGraw publishing

SA Info, (2015), 'South African Telecommunication,' [Online], [Retrieved November 15, 2015], http://www.southafrica.info/business/economy/infrastructure/telecoms.htm#.VU_pllY1jFI

Saini, H., Saini, D. and Gupta, N. (2009) 'E-Business system development: review on methods, design factors, techniques and tools with an extensive case study for secure online retail selling industry,' Indian journal of science and technology, 2(5), pp. 82-90.

Siau, K. and Tan, X., (2005), 'Evaluation criteria for information systems development methodologies,' Proceedings of the Eleventh Americas Conference on Information Systems. Omaha, NE, USA.

The Editors. (2012). 'Industry Overview: telecommunications,' [Online], [Retrieved 20 August 2015], http://wetfeet.com/articles/industry-overview-telecommunications

Thushara, B. (2014) 'Understanding Research Philosophies,' [Online], [Accessed April 14 2016], http://www.slideserve.com/zarifa/research-philosophies-and-approaches

Van Wyk, B. (2012) Research design and methods part 1, University of the Western Cape

Wetherbe, TM. (2001) Information technology for management, 2nd ed. Hoboken, NJ: Wiley

Yahya, Y., YusoF, MM., Yusof, M. and Omar, N. (2002) 'The use of information system development methodology in Malaysia,' Journal Antarabangsa (Teknologi Maklumat), Volume 2, pp. 15-34.

Yardley, D. (2002) Successful IT project delivery: learning the lessons of project failure, Boston: Addison-Wesley.

Investigation of the Opportunities of Business Differencation and Economic Development of the Territories Implementing Franchise

Yulia Polozhentseva, Southwest State University, Kursk, Russia, polojenceva84@mail.ru

Maria Klevtsova, Southwest State University, Kursk, Russia, klevtsovam@mail.ru

Irina Ershova, Southwest State University, Kursk, Russia, ershovairgen@yandex.ru

Sergey Klevtsov, Belgorod University of Cooperation, Economics and Law, Belgorod, Russia, klevtsovserg@yandex.ru

Abstract

At present, it is urgent to develop various directions of regional business differentiation in order to maintain the effectiveness of its functioning. A franchise is an effective method that allows small businesses to improve their reputation and standing in the shortest possible time, and larger companies to capture additional market share. The objective of this article is to analyze Russian and foreign experience of franchise development and to identify its main types, as well as to study the opportunities of regional business differentiation and development of the territories implementing different types of franchises. The study has been carried out applying scientific methods of analysis and synthesis as well as economic and mathematical methods. The work reveals the challenges and outlines the prospects for franchise development as one of the most progressive and effective forms of business doing. An empirical research has been conducted by means of investigating European countries, the USA and Japan. The article emphasizes that franchise companies are mostly small businesses, however, currently, franchise technology is also being implemented by relatively large enterprises.

Keywords: franchise, business differencation, economic development, regions.

Introduction

When studying the importance of franchise for business development, it can be said that it is obvious to expect an increase in interest in this specific type of business doing in the future, which will be a foundation for the development of different countries' territories. The orientation towards the development of franchise companies is one of the directions of supporting any country's economy which will make it possible to increase the effectiveness of the conducted policy, to create conditions for the regional competitiveness and economic growth. The study of the opportunities of implementing franchise as a tool for business development is widely covered in scientific researches (E. Calderon-Monge (Calderon-Monge, 2017), I. Pastor-Sanz (Pastor-Sanz, 2017), P. Huerta-Zavala (Huerta-Zavala,2017), S. C. Michael (Michael,2014), E. Crawford-Spencer(Crawford-Spencer,2015), C. Atwell (Atwell,2015), etc.).

A franchise is important since its implementation creates conditions for business rapid development in the existing market and at the same time solidifies business positions. This area of research is relevant due to the fact that in the present period of economic development, a franchise is assessed as a progressive and effective type of doing business which allows introducing new ideas quickly into business processes and building business models, as well as developing the territories.

Results and Discussion

At the first stage of our study, we have analyzed the foreign experience of franchise organizing and the level of its development in the countries which are the leaders of the world economy.
Let us consider the franchises present on the market today. Thus, according to RBC (RosBusinessConsulting Holding (Russia), the most expensive franchises are the ones listed in Table 1.

Table 1: top most expensive franchises

Brand	Type of activity	Investments
Hilton Worldwide	Hotel company	from 400 mln rub
Chaihona N 1 (Чайхона №1)	Chain of restaurants	from 120 mln.rub
Fun City, Fun Kids, Fun Jump	Family Fun Parks Chain	60-100 mln.rub
IL Patio	Chain of restaurants	from 33 mln. rub
Camp David	Men's clothing trade	15-22 mln. rub
Elki-palki (Елки-палки)	Fast food chain	from 18 mln.rub
Wyndham Hotel Group	Hotel company	-
Wendham Grand	Luxury 5 stars plus	$ 225,000-275,000
Ramada	Category Business 4 stars plus	$ 70,000-90,000
RamadaEncore	Category Budget 3 stars plus	$ 55,000

The source: Data available on the websites [https://www.entrepreneur.com/franchise500] and [http://www.franchise.org] were used when compiling the table.

The main share of franchises falls on the USA, since this country considers franchising as one of the priority forms of international activities and supports the franchisors' entering foreign markets. In 2015, IFA (International Franchise Association) published a report which indicates that there were 781,794 franchise enterprises in the United States in 2015. The leaders among the franchises in the US were indicated in the IFA's Top 500 European Franchises - Ranking (Table 2).

Table 2: the US top franchises

Rank	Franchise	Number of branches	Year of company's foundation	Country	Type
1	*7-Eleven*	*53,119*	*1927*	*USA*	Food products: 24-hour shops
2	*Subway*	*43,926*	*1965*	*USA*	Fast Food
3	*McDonald's*	*36,258*	*1955*	*USA*	Fast Food
5	*KFC*	*18,875*	*1930*	*USA*	Fast Food
6	*Pizza Hut*	*14,967*	*1958*	*USA*	Restaurants
7	*Burger King*	*14,000*	*1954*	*USA*	Fast Food
9	Jani-King	12,000	1969	*USA*	Hygiene
10	Jan Pro	11,676	1991	*USA*	Hygiene

The source: Data available on the websites [https://www.entrepreneur.com/franchise500] and [http://www.franchise.org] were used when compiling the table.

Thus, the majority of franchise companies are food and catering-oriented, i.e., cover agricultural production. According to IFA, in the structure of the US franchises, the largest share was accounted for

by fast food chain restaurants (38 %), followed by real estate services (16 %), restaurant chains (13 %) and food (12 %) (Fig. 1)

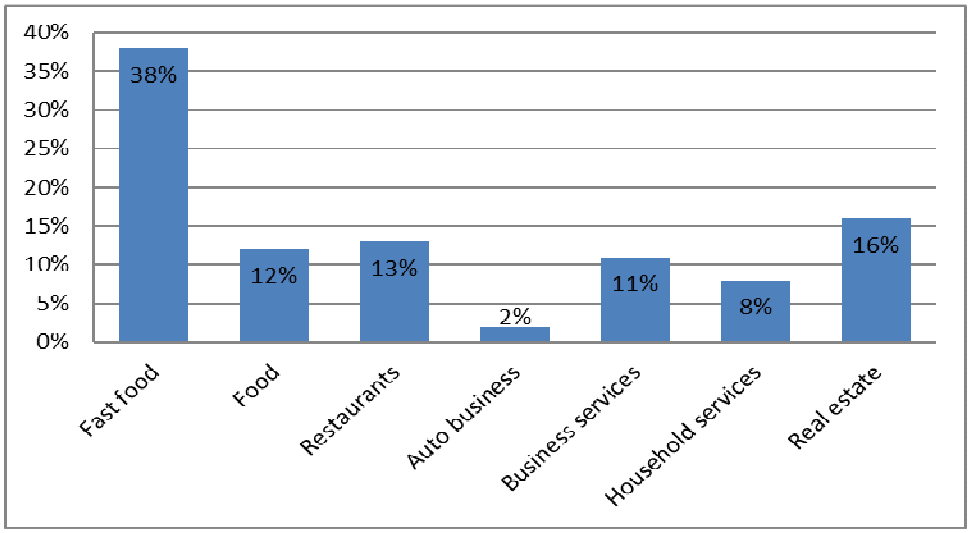


Fig. 1 The US Franchise Structure

The source: Data available on the IFA website [International Franchise Association, http:// www.franchise.org] were used when building the diagram

Since food franchises are the leading ones, this area will always be attractive for investments. In 2015, in the US, the economic performance of food-oriented franchises (fast-service restaurants, full-service restaurants and retail food) was about 341 billion dollars.

The studies conducted by AFA (American Franchise Association) showed that after two years only 15 % of newly established enterprises remain on the market, while the share of successful franchise enterprises is much higher – 85 %. The sales volume in the US franchise system is about $ 1 trillion a year; it should be noted that 40 % of retail sales fall on the share of franchise system[1].

The European Franchise Federation (EFF) assessed about 8,500 different franchise brands and 2,500 US brands functioning in the EU [Etro, 2011]. Top 500 franchises in Europe show that, although US brands are still very popular, many franchises established in European countries also became major brands across the continent and beyond[2]. Examples of the most successful European franchises are given in Table 3.

[1] Data are available on the website of American Franchise Association http://americanfranchiseassociation.com/

[2] Data available on the website of The European Franchise Federation http://www.eff-franchise.com/ were used

Table 3: the most successful European franchises

Rank	Franchise	Number of branches	Year of company's foundation	Country	Type
1	Spar	12,314	1932	the Netherlands	24-hour shops
2	Bata	6,700	1894	The Czech Republic	Retail Stores: Clothing and Footwear
3	Benetton Group	6,000	1965	Italy	Retail Stores: Clothing and Footwear
4	LCF Clubs	5,000	1985	the United Kingdom	Education: Children
5	Etam	4,200	1916	France	Retail Stores: Clothing and Footwear
6	*Dia*	*3,085*	*1979*	Spain	Food: Supermarkets
7	Ad-Autodienst	2,500	1992	Germany	Automobile goods and services
8	Swarovski	2,350	1895	Austria	Retail Stores - Jewelry
9	*Telepizza*	*1,234*	*1988*	Spain	Fast Food
10	Yves Rocher	1,600	1959	France	Beauty and Cosmetics

The source: Data available on the website of The European Franchise Federation [EFF- http://www.eff-franchise.com], as well as the website [http://www.franchisedirect.com] were used when compiling the table

Currently, franchising has a wide distribution. In France, Germany, and the UK, service-oriented franchise is very common. The analyzed countries are characterized by high growth rates in the turnover of retail trade and services. These activities are currently prevalent in the franchising market of Central and South-Eastern Europe and are the most dynamic and potentially 'broad' ones for further development.

We examined the Japanese experience of developing this form of entrepreneurship as an example of Asian franchise. Japan is a country with a well-developed economy. It ranks third in the world ranking after the US and China. It happened due to the technogenic development of the economy; among the franchisors, Japan is one of the leading countries in the world. It is worth noting the country's government's active attitude to the problem, since it is franchising that is the main contributor in the formation of the national economic policy. Japanese franchising contributes to the creation of a large number of new jobs, responds quickly enough to changing consumers' demands, and constantly offers new types of goods and services. Japan is one of the few countries where franchising procedure is not accompanied by compulsory licensing and strict statutory compliance Wright O., McAuley A., (Wright, McAuley, 2012).

The IFA Top 500 European Franchises Ranking includes only three Japanese franchises (Table 4).

Table 4: top Japanese franchises

Rank	Franchise	Number of branches	Year of company's foundation	Country	Type
1	Kumon Inst. of Education Co. Ltd.	25,384	1954	Japan	Education: Children
2	Yamaha	4,900	1954	Japan	Education: Children
3	*Beard Papa's*	*366*	*1999*	Japan	*Bakery shop*

The source: Data available on the website of The International Franchise Association [http://www.franchise.org] as well as the website [http://www.franchisedirect.com] were used when compiling the table.

JFA (Japan Franchise Association) discloses the structure of Japanese franchises. According to these data, in Japan, the most developed franchises are trade-oriented and food-oriented ones take the second place.

Each country also has its own specificity of franchise implementing, which is related to certain factors, for example, a demand for certain goods and services among the population and the trend of development of a certain economic branch.

Thus, it is the USA that has the most effective backgrounds for franchise development, including those related to the catering sector. The International Franchise Association also creates certain regulations which a company shall comply with when buying and/or selling a franchise.

In Russia, franchising is being developed in different areas. Trade-oriented franchises have the leading position – their share exceeds 50 %. In recent years, public catering and fast food franchise companies are actively developing. The Russian market is characterized by a regional distribution of franchises. After a company enters large cities, it begins its active introduction and promotion in the regions, which allows developing a franchise more dynamically.

Currently, there are about 500 franchise companies and almost 20,000 franchisees in Russia. Most of the franchise companies involve food and restaurant business, retail clothing and footwear; service industry is also widely represented among franchise companies. The share of foreign franchises in Russian market is approximately 40 % (Pizza Hut, KFC, Baskin Robbins, Burger King, Subway, as well as retail Terranova, Mango and others).

In our country, those industries in which profit margin is higher are preferred. Thus, Russian franchisors enter the sectors of public catering, trade and business services. Analysts also talk about high potential for franchise development in Russia. The professional Golden Brand 2015 Franchise Ranking includes several Russian franchises which are presented in Table 5.

Table 5: the most successful Russian franchises

№	Brand	Price
1	Invitro	from 850,000 rub
2	33 Penguins	*690,000* rub
3	TONUS CLUB	from 2,200,000 rub
4	Rosinter Restaurants Holding	from *2,000,000* rub
5	*Shokoladnica*	from *4,000,000* rub
6	Samsonite	from 3,500,000 rub
7	*CoffeeShop Company*	from *4,000,000* rub
8	*Harat's pub*	from *9,000,000* rub
9	Tochka Krasoty	from 1,500,000 rub
10	*Coffee Like*	from *500,000* rub

The source: Data available on the website of Golden Brand [http://reyting-franshiz.buybrand.ru/rating/] were used when compiling the table.

Thus, more than 40 % of world trade turnover is carried out through franchising networks of franchisee enterprises. In market economy, a developed trading network is a strategic competitive advantage. The franchise business model is effective in Russia. It is actively developing in the conditions of a high level of franchisee enterprises' 'survival'. According to the forecasts of the Russian Franchise Association, there will be about 400,000 points of sales of goods and services managed by franchisees by 2025 in Russia. Currently, in Russia there are about 40,000 points of franchises.

However, it is necessary to create appropriate conditions for franchise development. It is necessary to establish legal foundation to regulate the activities of franchise firms, in particular, when implementing protectionism policies in the agricultural sector. This measures will exclude informal relations in the franchise functioning and thereby increase its effectiveness. It is advisable to develop state government program to support small businesses and franchise development system.

Let us analyze the process of economic benefits, for the territories where franchise activities are expanding, using multi-factor econometric models.

The following factors were selected for the multi-factor function Y (GRP per capita, rub / person): X1 is the level of franchise development on the territory, X2 is the investment component.

On the basis of the technological table, the paired correlation coefficients were calculated and, taking into account the obtained data, a regression model was constructed.

$$Y = -54 + 2{,}2x_1 + 2{,}7x_2$$

The model was checked for adequacy according to Fisher's F-criterion; the parameters were checked according to Student's t-test; the obtained results showed that as a whole the model is adequate and all regression coefficients are significant.

Partial elasticity coefficients show how much the analyzed indicator changes on average with 1 % change of each factor for a fixed position of other factors: E1 = 5.1 %, E2 = 9.2 %. Thus, with an increase in the level of franchise development by 1 % on a territory, the economic benefit will grow by an average of 5.1 %, when the investment component will grow by 9.2 %, respectively, which indicates the effectiveness of implementing such a development tool as franchise entrepreneurship.

Conclusions

In an emerging market economy conditions, franchising is the fastest way to build a business using practical standards and the easiest way to make a profit in the short term. For large, well-known companies, franchising is a way to expand business; from the point of view of entrepreneurs it is an opportunity to become the owner of a profitable business under the 'all-inclusive' scheme. It is necessary, in particular, to pay attention to the development of public catering-oriented franchise entrepreneurship and to suggest that foreign companies involve Russian suppliers of raw materials, which is especially important in the context of sanctions.

Currently, in Russia there are about 500 franchise companies and almost 20,000 franchisees. Franchising is developing in different areas in Russia. The leaders are trade-oriented franchises (the share exceeds 50 %), food and restaurant businesses, whereas the share of foreign franchises in the Russian market is about 40 %. However, it is necessary to pay attention to the fact that the main share of franchises falls on the USA. The Russian Franchise Association predicts that in 2016-2017 the market will not slow down the growth rates and state companies will be included in the development of the franchise market.

Acknowledgments

The study was carried out with the support of the Russian Foundation for Basic Research No. 17-02-50127 "Management of the differentiation of the regions' economic space in the period of the formation of neoindustrialism in Russia".

References

Antipova, O.V. (2015) 'Upravlenie resursosberezheniem kak faktor perehoda k jeffektivnoj jekonomike' [Resource saving management as a factor in the transition to an efficient economy]. In: *Jekonomika: vchera, segodnja, zavtra [Economy: yesterday, today and tomorrow]* no.10. pp.10-20

Buhval'd, E.M., Valentik, O.N. (2016) 'Prioritety nacional'noj bezopasnosti i strategirovanie prostranstvennogo razvitija jekonomiki Rossijskoj Federacii' *[Priorities national security strategy development and spatial development of the Russian economy]. In: Jekonomika: vchera, segodnja, zavtra [Economy: yesterday, today and tomorrow]* no.3. pp.122-137

Etro, F (2011) 'Endogenous market structures and contract theory: delegation, principal-agent contracts, screening, franchising and tying', *European Economic Review*, Volume 55, Issue 4, pp. 463-479

Klevtsov, S.M., Klevtsova, M.G., Polozhentseva, Ju.S. (2015) 'Vyjavlenie koridorov ustojchivosti razvitija otraslevogo agrarnogo kompleksa regionov' [Identify corridors sustainable development of the agricultural industry complex regions]. In: *Jekonomika: vchera, segodnja, zavtra [Economy: yesterday, today and tomorrow]* no.6. pp.144-156

Griessmair, M., Hussain, D., Windsperger, J. (2014) 'Trust and the tendency towards multi-unit franchising: A relational governance view'. *Journal of Business Research*, Volume 67, Issue 11, pp. 2337-2345

Wright, O., McAuley, A. (2012) 'Australian franchising research: Review, synthesis and future research directions', Australasian Marketing Journal (AMJ), Volume 20, Issue 2, pp. 158-163

Vertakova, Y., Klevtsov, S. and Klevtsova, M. (2015) 'Technology of Fixed Assets Assessment in Investigating the Stability of the Industrial Complex of the Region', 26th International Business Information Management Association Conference: Madrid, Spain, pp. 3230-3236

Vertakova, Y., Polozhentseva, Y. and Klevtsova, M. (2014) 'The Development of Regional Cluster-Oriented Policy: Russian and Foreign Practice', International Multidisciplinary Scientific Conferences on Social Science & Arts. (SGEM 2014) Conference on Political Sciences Law, Finance Economics & Tourism. Conference Proceeding vol. 1. Bulgaria, pp. 399-406,Vishag Badrinarayanan, Taewon Suh,

Kyung-Min Kim (2016) Brand resonance in franchising relationships: A franchisee-based perspective. Journal of Business Research, Volume 69, Issue 10 pp. 3943-3950

Calderon-Monge, E., Pastor-Sanz, I., Huerta-Zavala, P. (2017) 'Economic sustainability in franchising: A model to predict franchisor success or failure', *Sustainability*, 9(8), p.1419

Atwell, C. (2015) 'The Franchisee as a Consumer: Determining the Optimal Duration of Pre-Contractual Disclosure', *Journal of Consumer Policy*, 38(4), pp. 457-489

Crawford-Spencer, E. (2015) 'Deriving Meaning for Social Franchising From Commercial Franchising and Social Enterprise', *Mediterranean Journal of Social Sciences*, 6(5), pp. 429-434

Michael, S.C. (2014) 'Can franchising be an economic development strategy? An empirical investigation', *Small Business Economics*, 42(3), pp.611-620

Reengineering In the System of Process Management of the Enterprise: Practice of Use in the Russian Industry

Sergey Emelianov, Southwest State University, Kursk, Russia, rector@swsu.ru

Maria Plakhotnikova, Southwest State University, Kursk, Russia, erelda@mail.ru

Yulia Vertakova, Southwest State University, Kursk, Russia, vertakova7@yandex.ru

Abstract

The article reflects the importance of technology development, reengineering of business processes in a competitive environment of global and domestic levels. Thus explains the selection of the optimal simulation environment for Russian enterprises. The author proposes an effective methodology for conducting reengineering of business processes of the enterprise, which allows you to build an effective development strategy. The paper discusses the main causes of the need for re-engineering business processes in large business enterprises.

Keywords: business process, modeling business processes, strategy, process approach,reengineering, strategic management.

Introduction

The process approach has received active development in the field of quality management regulations developed by the International organization for standardization ISO. A business process is a set of interrelated activities that convert inputs into outputs, i.e. input resources into production Komissarova M.A. (Komissarova, 2011). The idea is to present any activity in your organization, or directly the organization of the process is regarded as an axiom. It was formulated by E. Deming, the founder of quality management Deming, E. (Deming, 2011). At the moment we have enough evidence that the process approach enhances the quality and effectiveness of governance. It can be used to achieve significant cost reduction by establishing and optimizing business processes of an enterprise, it is not necessary to resort to reduction of business.

The activities of each company has the chain of processes from marketing and planning to sales and after-sales service. It is possible to allocate following features of business processes Kozlova A.A. (Kozlova, 2011):

- the owner of process – the official who is responsible for the progress and results of the process;
- resources allocated to a process can include equipment, staff, facilities, environment, transport, communications, materials, Finance, documentation, etc.;
- process parameters are the characteristics by which the owner of the process and the top management can judge the effectiveness of process execution and the achievement of planned results;
- the customer is a consumer of the results of the process, the degree of satisfaction which is an evaluation of the effectiveness of the process;
- inputs process input items (raw materials, products, equipment, information or service), which moves the execution of the project are converted into outputs of the project;
- outputs of the process are the products, information or service for which the process;
- a network of processes of an organization is an Association of interrelated and conflicting processes of an enterprise into a single system.

Each business process can be broken into additional sub-processes. All the processes of the organization can be divided into major and minor. The main processes lie in the path of the products in the form of marketing information, design and material of the object. Subsidiary have no direct relationship to production, they serve to ensure the normal functioning of the main processes, such as preparation, training and certification of personnel, document management process, assurance process.

Process approach – access to the productive idea of domestic suppliers and consumers, as real activity, added value is not carried out the individual elements of the functional hierarchy and permeates the enterprise as a set of processes. The main advantages of bottom-approach is to focus on the end result, the interest of each Executive in improving the quality not only of the final product, but its work, responsiveness to external and internal changes, streamlining the exchange of information between the functional units, the implementation of quality control in the process instead of quality control Cheremnykh, O.S. (Cheremnykh, 2015).

Compare the main features of traditional and process approaches in table 1.

Table 1: Comparison of the functional approach to management with the process

Sign	Approach	
	Functional	**Process**
The content of the approach	Enterprise management is based on the separation of structural units having a set of specific functions	The management of the enterprise is represented as a set of processes that convert the inputs and outputs of the carrying value to the consumer
Organizational structure of management	Vertical hierarchical structure	Horizontal system the definition of responsibility for each business process
Object	The division, organizational structure	Business process
The aim of the production processes	To maximize coordination between departments, based on a functional division of labor	Maximum satisfaction to internal customers
The efficiency of decision-making	The decision is directly with the problem in the production	Coordinating the timely adoption of decisions
Social policy	Training of workers in the framework of the official and functional activities	Continuous training and promotion of personnel, improvement of professional skill and competence in the field of quality
Dignity	Conflict-free decision-making process, which excludes the interdependence of decision-makers	Orientation on the final result, high efficiency, flexibility in responding to external and internal changes, quality control of process instead of product, motivation, efficiency, democratic system of government
Disadvantages	The lack of interest in the outcome, complicated the exchange of information between departments, leading to increased overheads and timing decisions, authoritarian management	The relationship of decision-makers

In the implementation of the process approach performers have greater powers, increasing their role, autonomy and, therefore, impact and satisfaction with work. The leaders are exempt from current operational issues and focus on solving the strategic, systemic issues.

Thus, the transition from functional to process management is the first stage of reorganization. For the introduction of process management will require a radical transformation. Conversion data in the literature is called reengineering.

Reengineering business processes is a strategy of business management that focuses on analyzing and designing work and business processes of the organization. It aims to help the company review its current operations in order to significantly improve customer service, reduce operating costs, enhance the competitiveness of enterprises Harmon, P. (Harmon, 2015).

Its the beginning of the re-engineering of business processes takes in 1990 when Michael hammer, a former Professor of computer science at the Massachusetts Institute of technology, published the article "Reengineering: don't automate – obliterate", which stated that the main task of managers is to reduce activities that do not add value, instead of implementing technology for their automation. This statement hints at focusing managers on the wrong issues, namely that information technology has been used primarily for automating existing processes, instead to recognize these processes obsolete. In his subsequent writings Hummer has defined reengineering as the fundamental rethinking and radical redesign of business processes to achieve significant improvements in key for modern business performance indicators as cost, quality, level of service and efficiency Hammer, M. (Hammer, 2011).

Since 1995, actively began to publish works criticizing the idea of reengineering, a wave which as a result began to fade Robson, M. (Robson, M., 2014). Since then, considering business processes as a starting point for the analysis and reorganization of business processes is a standard part of the methodology of reengineering, but is less radical than earlier proposals. Recently, the concept of managing business processes have received major attention in the corporate world, as it is actively stimulated by the desire to increase the efficiency of the process and supported by information technology. Therefore, the study and application of modern model of reengineering of business processes is an integral part of strategic planning the top management of the enterprises in the current economic environment Bardakov, A.A. (Bardakov, 2016).

Reengineering based on the concept of discontinuous thinking identifying outdated rules and fundamental assumptions underlying the work, and a definitive break with them Petukhov, V.I. (Petukhov, 2017).

There are two ways of applying the reengineering of business processes:

1. Systematic – the current process is understood, documented and analyzed to systematically create new and better processes. This type of reengineering is based on the rules of the ESIA (to destroy, to simplify, to unify, automate).

2. Reengineering from scratch – the existing process is fully utilized, and a new one is created from scratch by a fundamental rethinking of the previous one. This method reduces the risk of repeating old mistakes, but the neglect of the concepts of the previous process can lead to the neglect of knowledge and experience accumulated in the organization Zlatkin A.A. (Zlatkin, 2016).

There are standard methods and techniques applied when redesigning business process reengineering.

1. Horizontal compression of the process — merging multiple working procedures in one operation. The technique allows to reduce the number of errors and reduce the number of employees elimination of their consequences, to improve the controllability of the production with clearly distributed responsibilities among employees.

2. Vertical compression of processes — providing the artists the right to make independent decisions. The increase in the role of every employee in the company reduces delays, reduces the cost of products and services, accelerates the reaction to customer requests, etc.

3. The steps of each process in the natural order — the use, along with a linear ordering of the works parallel to their conduct, leads to a reduction in time and cost.

4. The execution of processes in various options — the process starts with testing procedures, which aim to determine which option to implement is most appropriate in a given production situation.

5. The implementation of each work where it is most appropriate — the distribution of work between departments, eliminating unnecessary integration.

6. The decrease in the number of inspections minimizing the number of approvals by reducing external points of contact and, as a consequence, the Erasure of distinctions between the functional units.

7. Authorized Manager provides a single point of contact — if the process is complex and integration is not possible, then "authorized" the Manager answers a customer's questions and solves his problems, has access to all the IP used in the process, and to all the performers.

8. The predominance of a mixed centralized-decentralized approach — the use of modern information technologies enables the company to act at the level of Autonomous units, saving them the possibility of using centralized data.

Results and Discussion

The application of reengineering business processes at the present stage is impossible without information and communication technologies.

In the last few years gaining popularity of software products for modeling business processes, designed to facilitate reengineering. Their primary purpose is the rendering of technological and managerial chains of actions, events, and functions Zlatkin A.A. (Zlatkin A.A., 2016).

The most popular software products in this group:
— ARIS Toolset;
— BPWin;
— Business Studio.

Software products of this type allow for the analysis, documentation and improvement of business processes to model action processes, determine their order, and the necessary resources. With their help you can build charts of different level and purpose. Various charts that are created in such software products reflect an overall view of the process, its relationship with the external environment, necessary resources, results, relations between processes, system components, define the sequence of operations that allow us to calculate costs, the cost of production, identify the most costly processes.

The choice of optimum tool environment of modeling business processes of the enterprise will be implemented among the six software products:

- Business Studio;
- Business engineer (Bitek);
- ORG-Master Pro;
- Bizagi BPM Modeler;
- IBM WebSphere Business Modeler.

Business Studio — business modeling allowing to build an effective organization Business Studio: business modelling (Business Studio: business modelling).
Main objectives:

- formalization of strategy and control of its achievement;
- design and optimization of business processes;
- design of the organizational structure and staffing;
- generation and dissemination among staff of regulatory documentation;
- implementation of the quality management system in accordance with ISO standards;
- the formation of Technical tasks and support the implementation of information systems.

The system allows you to design business processes using IDEF0 diagrams, IDEF3, DFD, and import the finished chart in Microsoft Visio.

Business engineer is a professional tool for the modeling of the enterprise activities and the development of regulatory documents Business engineering technologies (Business engineering technologies).

The system supports the full cycle of designing: from strategy development, key performance indicators and business processes, ending with the analysis and optimization of the organizational structure, improve the efficiency of personnel, projects, building a system of quality management, Finance and the enterprise information system.

Software product allows you to develop a business model and to form the basis of analytical reports and regulatory documentation in various areas: strategy, business processes, personnel, etc.

ORG-MASTER allows to develop a system of goals and indicators, business processes, financial, informational, organizational structure and so on Business Engineering Group (Business Engineering Group). When designing the data can be presented in a hierarchical directories, projections (reflecting the relationship between books), diagrams. For business processes supported by the development of diagrams in notations IDEF, Cross Functional Flowchart, EPC (Event-Driven Process Chain). It is possible to build organizational charts and diagrams, own the type of.

The developed diagrams can be analyzed using cost analysis, resource loading can be calculated the average execution time. The system supports the possibility of collecting and monitoring key performance indicators.

Bizagi is the BPM system developed by the same company, and is aimed at the modeling, execution, automation and analysis of business processes Business Studio: business modelling (Business Studio: business modelling) Bizagi (Bizagi). The Bizagi system includes 3 modules for full customization processes:

 Modeler is a full — featured modeling processes in BPMN notation;

 Studio is the development environment business processes;

 Engine — runtime processes that are available to users in any browser on any device.

The system supports the BPMN notation, which allows you to design business processes using diagrams that have some differences from the DFD. The last time such a notation is gaining in popularity.

IBM WebSphere Business Modeler is a software tool aimed at modeling, simulating and analyzing business processes. In addition to this IBM WebSphere Business Modeler allows you to create a list of KPIs, link them to elements of the business process and by simulating the model to predict their values IBM (IBM). Thus, monitored the achievement of strategic and tactical goals of the company.

Software product allows to describe business processes with BPMN diagrams. Information about the organization can accumulate in the form of structured directories between directories can be established relationship.

ARIS Business performance Edition supports the full cycle of business processes: from the description of the strategy to controlling.

A software module products ARIS Design Platform (ARIS Business Architect, ARIS Business Designer, ARIS Business Publisher and other) allow you to simulate, optimize and publish business processes. Supported design diagrams of the business processes in such popular notations like IDEF, Basic Flowchart, Cross Functional Flowchart, EPC, BPMN, BPEL ARIS COMMUNITY (ARIS COMMUNITY). You can also create your own chart types.

Supported simulation. Conducted cost analysis, analysis of resource loading, analysis for the presence of information gaps in the process, the semantic analysis of process, analysis of the processes supported by information systems, report on critical points in the process.

In order to select the optimal, we need to evaluate the above system and compare with required for the work criteria.

The evaluation of the position of each tool environment of modeling business processes, we have carried out among domestic and foreign software products. For this, we analyzed data on sold licenses for the products of domestic and foreign companies over the past 5 years. The results are presented in table 2.

Table 2: Number of sold licenses for software products for 2012-2016, PCs

Product	The number of sold licenses, PCs
Business Studio	300
Biznes-ingener	118
ORG-Master Pro	239
Bizagi BPM Modeler	148
IBM WebSphere Business Modeler	512
ARIS Business Performance Edition	485

Next, we divided the data modelling system business process functionality with the help of expert assessments. The results are presented in table 3.

Table 3: Evaluation of systems modeling of business processes functionality

The name of the system	Functional capacity evaluation on a five point scale (1 – least functional to 5 most functional)
Business Studio	4
Biznes-ingener	5
ORG-Master Pro	4
Bizagi BPM Modeler	4
IBM WebSphere Business Modeler	5
ARIS Business Performance Edition	5

Based on the obtained data we developed a matrix to determine the leading system in terms of sales and functionality for later selection of software products (figure 1).

Based on the obtained matrix, we conclude that leaders are Business Studio, IBM WebSphere Business Modeler, ARIS Business Performance Edition. Other systems are the closest pursuers of the leaders, which suggests that all ON some similar functionality, they are different only in popularity among customers.

The next step will carry out the selection of one system for further work with the business processes of JSC KEAZ using the method Churchmen-Ackoff. This will form the criteria which must be met by the simulation system business processes:

1. easy to install on your PC;
2. menu in Russian;
3. the convenience of the interface;
4. the low price of the license;
5. the availability of technical support;
6. integration with Microsoft Visio;
7. ease of implementation the simulation;
8. the possibility of conducting a functional cost analysis and build a strategic map.

Next, we examined 2 strategies: choosing a foreign system of modelling business processes (A), the choice of the domestic software product (In).

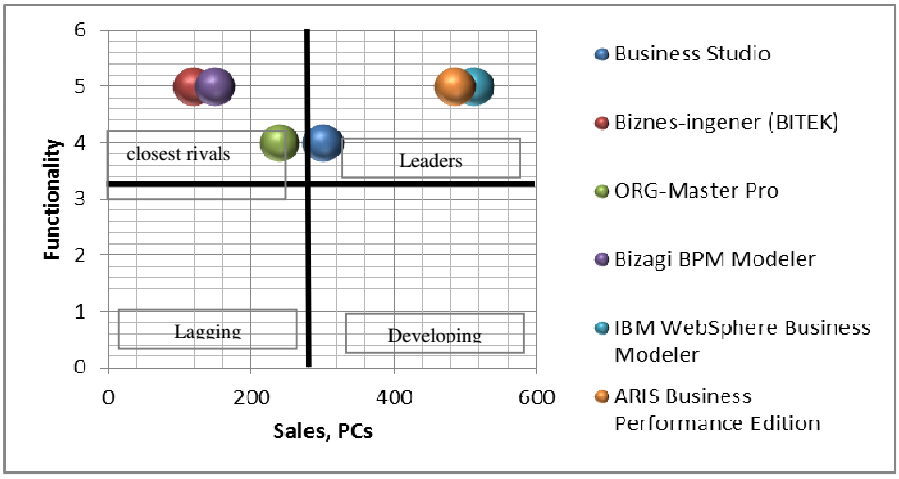


Fig. 1 Matrix for determining leadership among systems modeling of business processes

The source: compiled by the authors

The generated ranking of criteria by importance is presented in table 4.

Table 4: Ranking of criteria by importance

Goal	Rank
1.Easy to install on the PC	2
2.Menu in Russian	1
3.The convenience of the interface	4
4.Low price license	5
5.Technical assistance will be available	6
6.Integration with Microsoft Visio	7
7.Ease of implementation the simulation	8
8.The possibility of conducting a functional cost analysis and build a strategy map	3

Produce comparison purposes in table 5.

Table 5: Comparison purposes

Comparison purposes	The total value
V7<V1+V2+V3+V4+V5+V6+V8	8
V6< V1+V2+V3+V4+V5+ V8	7
V5< V1+V2+V3+V4+V8	6
V4< V1+V2+V3+V8	5
V3< V1+V2+V8	4
V8< V1+V2	3
V1< V2	2
V2	1
	36

We will assess the policies against each and the achievement of the 8 goals in table 6.

Table 6:Evaluation of strategies

Strategy / Goal	A	B
V1	0,8	0,6
V2	0,8	0,5
V3	0,1	0,8
V4	0,1	0,9
V5	0,1	0,9
V6	0,1	0,9
V7	0,1	0,7
V8	0,4	0,7

Let us calculate the utility of the strategies:
ПА=0,8*0,06+0,8*0,03+0,1*0,11+0,1*0,14+0,1*0,17+0,1*0,19+0,1*0,22+0,4*0,08=0,187;
ПВ=0,6*0,06+0,5*0,03+0,8*0,11+0,9*0,14+0,9*0,17+0,9*0,19+0,7*0,22+0,7*0,08=0,799;

Thus, we can conclude that for realization of Russian projects in reengineering, it is advisable to choose a strategy – choosing a domestic software product, as an indicator of its efficiency is much higher than the figure of strategy And choice of foreign systems of modeling business processes.
From the above matrix to determine the leadership systems of modeling business processes, we find that the only domestic software product that fall into the category of leaders is Business Studio 4.0.

Conclusions

Despite the fact that the technology of reengineering of business processes has been used for over 20 years, Russian companies are currently not developed sufficiently universal method of reengineering, taking into account the peculiarities of their functioning. Therefore, we propose the following algorithm of a phased description of the preparation and further implementation of the reengineering of key business processes of industrial enterprise (figure 2).

The proposed method consists of two major parts: determining the re-engineering and direct implementation of the reengineering of key business processes Vertakova, Y., Klevtsov, S. and Klevtsova, M. (Vertakova, Y., Klevtsov, S. and Klevtsova, M., 2015).

In the first block describes the business direction of the enterprise and major groups of business processes. Using the BCG matrix is necessary for reengineering. Next, using the model of a hammer is to assess the maturity of process management in the organization.

In the second block describes the model of key business processes "as is" and assessed for stability using Shewhart charts, is functional-cost analysis. Based on the data used for modelling business processes "as it should be," determined by the ideal values and on their basis we construct a matrix of gaps. At the last stage are eliminated gaps between the performance of models on an "as is" and "as should be".

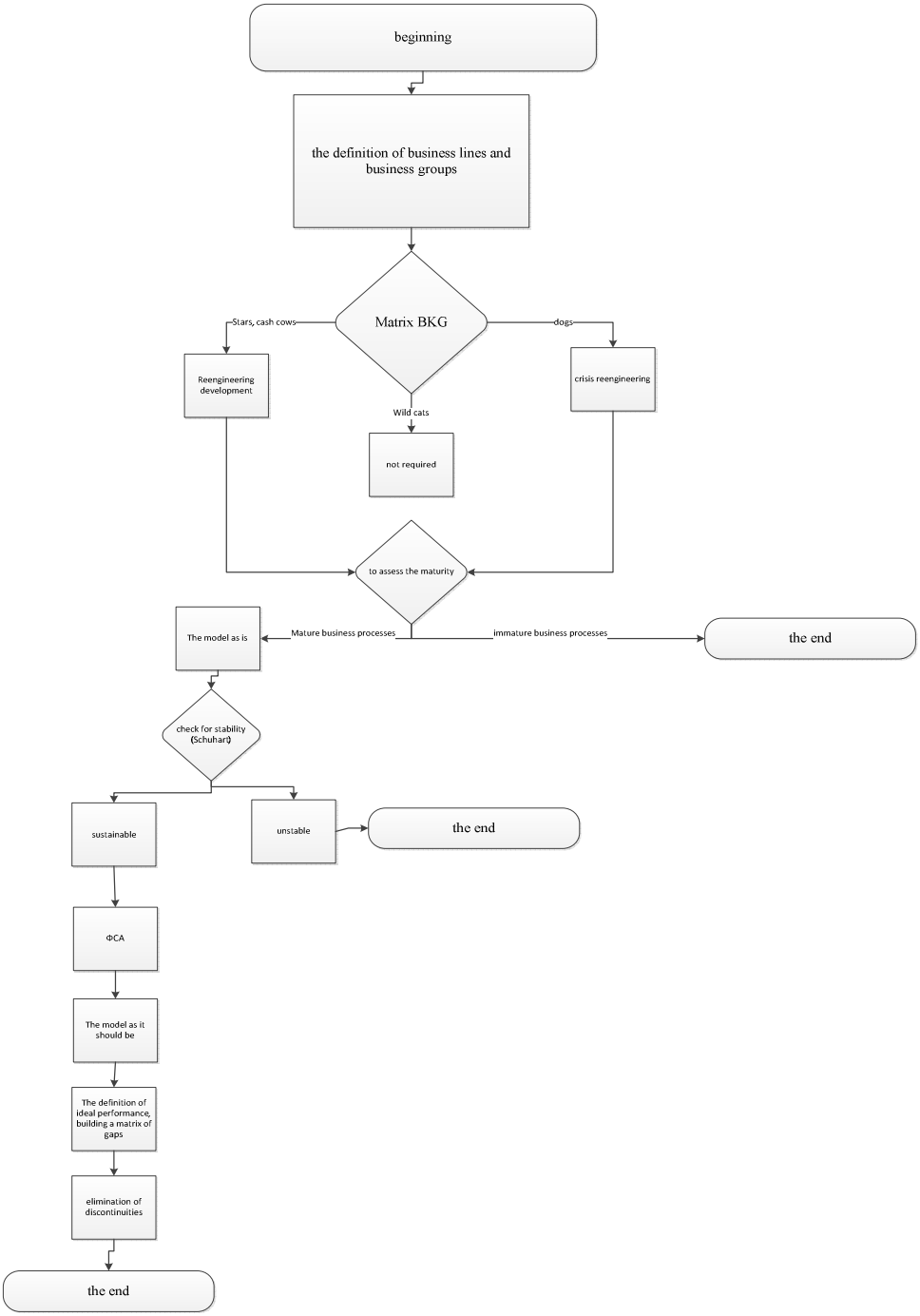


Fig. 2 Stages of the methodology for reengineering business processes

The source: compiled by the authors

Using this technique, an industrial enterprise can carry out the reengineering of business processes independently, without the involvement of external consultants, which significantly saves time and financial resources for the reengineering of the business processes of the organization.

Acknowledgments

This paper is an output of the science project of the government task of Ministry of education and science of the Russian Federation № 26.3546.2017/PCH "Development fundamentals of analysis and prediction of structural and dynamic parameters of the regional economy are based on the integration of the Russian and world experience of management of territorial development and modern scientific doctrines".

References

Komissarova, M.A. (2011) 'Vozmognosti ispolzovaniya reinginiringa kak osnovnogo instrumenta upravleniya companiyami s poziciy procesnogo podhoda' [*Opportunities of use of reengineering as a main instrument for company management for the point of view of process approach*] In: '*Kreativnaya ekonomika' [Journal of Creative economy]* no. 7. p. 10

Deming, E. (2011) 'Vyhod iz rizisa. Novaya paradigma upravleniya lyudmi, sistemami i processami' [Out of the Crisis. The new paradigm of managing people, systems and processes]. Moscow. 'Al'pina Pablisher' p. 14

Kozlova A.A. (2011) 'Osobennosti processnogo podhoda v upravlenii bisnesom' [*Features of process approach in business management*] In: '*Vestnik Orenburgskogo gosudarstvennogo universiteta'* [Vestnik of the Orenburg state University] no. 13. p. 228

Cheremnykh, O.S. (2015) 'Strategicheskiy corporativniy reinginiring: processno-stoimostnoy podhod k upravleniyu biznesom' [Strategic corporate reengineering: a process-cost approach to business management] Moscow 'Finances and Statistics' p. 36

Harmon, P. (2015) 'Process reinginiringa v bignese' [*The Process of re-engineering in business], Silhouette*. p. 15

Hammer, M. (2011) 'Reinginiring corporacii: Manifest revolyucii v biznese' [*Reengineering the Corporation: a Manifesto revolution in business*] 4th ed. Moscow: *Mann, Ivanov and Ferber*. p. 21

Robson, M., Ullah, F. (2014) Prakticheskoe rukovodstvo po reinginiringu biznes-processov [*A Practical guide to reengineering of business processes*] / Moscow: *EKSMO*. – p. 22

Bardakov, A.A. (2016) 'Stanovlenie sovremennogo reinginiringa biznes-processov promishlennih predpriyatiy, perehod ot funkcionalnogo tipa upravleniya k processnomu' [*Formation of the modern reengineering of business processes of industrial enterprises, the transition from functional management to process*] In: '*IT-Portal' [It-portal]*. no. 3. p. 2.

Petukhov, V.I. (2017) 'Problemy reinginiringa rosiyskih predpriyatiy' [*Problems of reengineering of Russian enterprises]. Monograph, Moscow, Direkt-Media.* p. 23

Zlatkin, A.A. Gegechkori, E.T. (2016) Metodologiya reinginiringa biznes-processov i tipovie priemi eye primeneniya [*Methodology of re-engineering business processes and standard methods of its application*] In: '*Omskiy nauchniy vestnik' [Omsk scientific Bulletin]*. no. 1. p 117-120

Business Studio: sistema modelirovaniya [*Business Studio: business modelling*] *Official website*. URL: http://www.businessstudio.ru

Biznenes-enginiringovie tehnologii [*Business engineering technologies*] *Official website*. URL: http://www.betec.ru

Biznes Engineering Grup [*Business Engineering Group*] *Official website*. URL: http://bigc.ru

Bizagi. *Official website*. URL: http://www.bizagi.com/en

IBM Knowledge Center. *Official website*. URL: https://www.ibm.com/us-en/?lnk=m

ARIS COMMUNITY. *Official website*. URL: http://www.ariscommunity.com

Vertakova, Y., Klevtsov, S. and Klevtsova, M. (2015) 'Technology of Fixed Assets Assessment in Investigating the Stability of the Industrial Complex of the Region, *26th International Business Information Management Association Conference*: Madrid, Spain, pp. 3230-3236

The Use of Public Private Partnership for The Development of Transport and Housing Infrastructure

Olga Lebedenko, The Russian Presidential Academy of National Economy and Public

Administration (RANEPA), Moscow, Russian, olgalebedenko22@gmail.com

Elena Agamagomedova, Belgorod State Technological University named after V. G. Shukhov, Novorossiysk, Russia, bezuglaia.e@yandex.ru)

Ekaterina Charochkina, Southwest State University, Kursk, Russia, kati-ivolga @mail.ru

Anastasia Vertakova, Saint Petersburg State University of Architecture and Civil Engineering" (SPSUACE), Saint-Petersburg, Russia, reandm@rambler.ru

Abstract

The article deals with current issues associated with the choice of instruments of economic mobilization and revitalizing sustainable economic growth. Public – private partnership for transport sector is one of the best ways to organize and control relations between the state and business, create and upgrade public infrastructure. The authors noted that one of the most controversial issues remains the problem of increasing the activity models of public – private partnerships as an alternative tool for the development of transport infrastructure. The analysis of the transport infrastructure of Russia and other countries of the world. On the basis of factor analysis a classification of the subjects of the Russian Federation by the level in the sphere of PPP. Presents the results of the rating of the Russian Federation and other countries the level of development of public – private partnerships. The possibility of implementation of infrastructure projects using the public – private partnership.

Key word: transportation infrastructure, economy development, public-private partnership, sustainable development.

Introduction

The problem of the development and implementation of different forms of public-private partnership (PPP) is important today because currently the mechanisms of PPP are a basic tool allowing implementing long-term and large-scale projects aimed at socio-economic development both at the federal and regional levels since the trend of budget spending cuts, including spending on transportation infrastructure projects, is forecast. There are many examples of successful PPP projects implementation. Currently, PPP is a well-proved mechanism to attract additional resources to the region for its development, in particular, for the development of transportation infrastructure.

Prospects and problems of interaction between business and government entities, forms and mechanisms of public-private partnership implementation, including sustainable development of regions were investigated in the works (L. Saringer (Saringer, 2004), B. Akitoby, R Hemming, G. Schwartz (Akitoby, Hemming, Schwartz, 2007), Yu. V. Vertakova, V. A. Plotnikov, (Vertakova, Plotnikov, 2012), E. Engel, R. Fischer, A. Galetovic (Engel, Fischer, Galetovic, 2014) O. Shilkina, (Shilkina, 2015), etc.).

Despite the growing interest in this subject area, many of the problems of interaction between state bodies and business entities are not fully disclosed, in particular, the issues regarding the regulatory and financing support of the authorities for PPP projects are not thoroughly examined. The same can be said about the issues relating to the system of public administration in the sphere of public-private partnership at the federal level.

In order to create conditions facilitating investments from extra-budgetary funds for more efficient use of the mechanisms of public-private partnership it is necessary to solve a number of tasks:

- To improve methodological and regulatory framework in the sphere of PPP, which will contribute to the growth of the number of models and forms of public-private partnership at the federal and regional levels;

- To improve financial mechanisms and instruments for implementing PPP projects to achieve maximum effectiveness of PPP mechanisms application;
- To create an effective support system for private partners and concessionaires;
- To form an comprehensive system of state-private partnership management.

Due to the unstable economic situation in the world and, in particular, in Russia, the basic prerequisites for the development of transportation infrastructure are to a greater extent related to the implementation of PPP mechanisms. Implementation of different forms of public-private partnership will attract additional extra-budgetary investments in that region, which has traditionally been the area of public investments.

Results and Discussion

The most pressing problem affecting the development of transportation infrastructure in Russia is driving conditions of public road network at inter-municipal and regional levels which is currently unsatisfactory; more than 50% of the roads do not meet modern road standards and regulations; there is also underfunding for roadworks in the conditions of growing traffic density.

In Russia, there are a great number of settlements which have no all year-round connection with public road network by means of hard surface roads. These roads provide not only connection with the major economic centres but also form their development potential. One of the main factors for the socio-economic development is the fact that most of these roads are far from the major rural settlement systems, which increases negative demographic processes in rural areas and, in this regard, hinders considerably the development of rural areas, causing reduced agricultural production, population outflow, extinction of villages, and towns. The current system has also led to the degradation of the system of intra-settlement roads and roads in populated areas, especially in linear settlement systems. Technical conditions of most roads can only be assessed as satisfactory; almost all regional roads require renovation and upgrading.

The main current problem of the implementation of the measures aimed at the development and modernization of transportation system is limited amount of planned investments and lack of infrastructure facilities.

The formation of the mechanisms of interaction between the state and the private sector can help solve this problem. The state and private entities should combine their efforts to reform the transportation infrastructure.

Implementation of infrastructure projects applying PPP mechanisms ensures economic growth, investment attraction, new jobs creation, which will lead to sustained growth of income per capita and the regional budget increase.

Currently, more than 1,300 PPP projects are being developed and implemented in Russia. They include:

- 15 federal projects; - 191 regional projects;- more than 1,100 municipal projects.

With regard to PPP projects in the area of transportation infrastructure, the following trends are observed (Fig. 1):

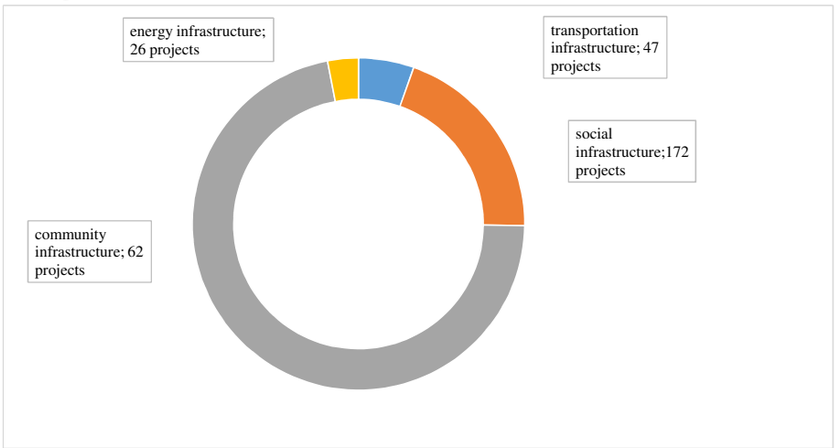


Fig. 1 Number of PPP projects in different infrastructure areas after project close stage

The source: developed by the author using data of the Ministry of economic development and trade of the Russian Federation; Federal State Statistics Service data presented on it's website (http://www.gks.ru/bgd/regl/b12_01/IssWWW.exe/Stg/d12/3-5.htm

Currently, 47 PPP projects in the transportation infrastructure sector have passed commercial close stage and are being implemented in Russia; this is equivalent to only 5% of all the projects. Municipal and regional authorities adopt experience of structuring PPP federal projects in the sphere of motor-roads. The demand for motor-road infrastructure modernization is still very high. The first projects started in the sectors of railway and public road transportation. In Russia, these are the most important PPP projects[10].

The value of the criterion "The level of public-private partnership development in the Russian Federation (RF)" is determined based on the evaluation of its component factors values:

1. Development of the institutional environment;
2. Development of regulatory basis of the RF subjects in the sphere of PPP;
3. Experience in PPP projects implementation in the RF regions.

Accordingly, the calculation of the integrated index (The level of PPP development in the RF subjects) is as follows:

$$Rj = \alpha \times Lj + \beta \times Nj + \gamma \times Ej$$

Where *j* is the ordinal number of the RF subject; *α, β, γ* are the values which determine the significance of the component factors, when $\alpha = 0{,}03$, $\beta = 0{,}03$, $\gamma = 0{,}04$; *Lj* is the value of the factor "Development of the institutional environment of the RF subject in the PPP sphere".

According to this technique, the RF subjects are divided into 5 groups according to the level of development (Table 1).

Table 1: classification of the level of PPP development in the RF subjects

No of the group	The level of PPP development in the RF subjects	
1	leaders by the level of PPP development	60-75%,
2	regions with a high level of PPP development	45-60%,
3	regions with an intermediate level of PPP development	35-45%,
4	regions with a low level of PPP development	25-35%,
5	regions with a very low level of PPP development	0-25%.

The source: developed by the author using data of the Ministry of economic development and trade of the Russian Federation Federal State Statistics Service [http://www.gks.ru].

As mentioned above, currently, more than 1,300 projects are at different stages of implementation in Russia. The cumulative private investment is 640, 3 bln rubles.

It should be noted that the ratio of private investment in infrastructure in PPP projects to the nominal RF GDP is less than 1%. In comparison to other countries with a similar volume and structure of investment in infrastructure according to PPP principles, the percentage ratio of private investment to nominal GDP volume is much higher (Fig. 2).

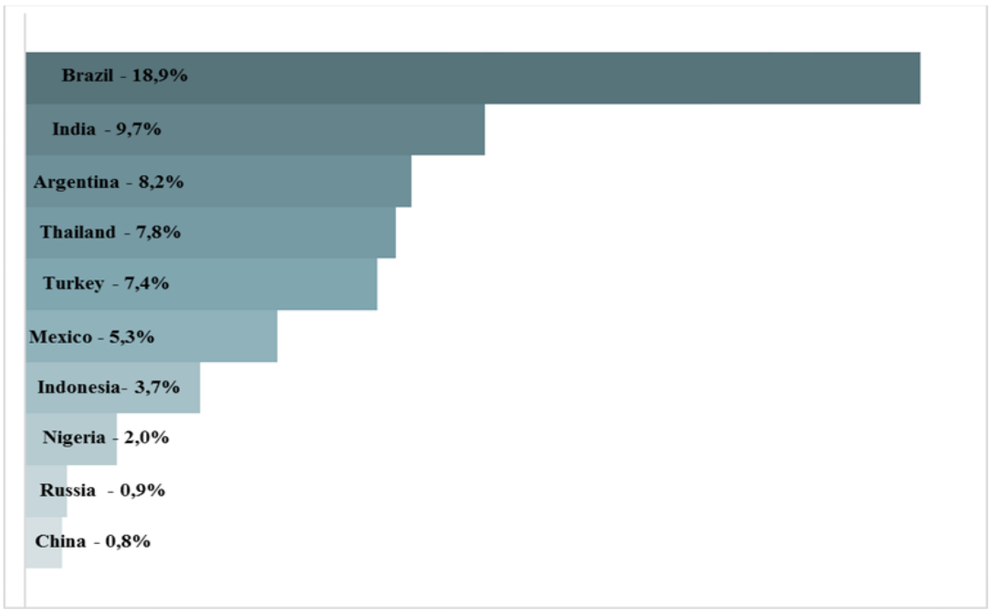


Fig. 2 The ratio of private investment in PPP projects to nominal GDP

The source: developed by the author using the data from the unified information system of public-private partnership in the Russian Federation, World Bank, Federal State Statisticse. [http://www.pppi.ru].

According to expert assessments, if this ratio is at the level of 4 - 5%, then it can be said that the process of attracting infrastructure investments into Russian economy on the basis of public-private partnership is balanced.

Conclusions

Summing up we can say the following:

- the most common investment projects with different forms of PPP in Russia are social, communal and transportation infrastructures. The practice of implementing PPP mechanisms is worked out mostly in relation to motor-roads;
- along with other infrastructure industries, transportation provides the basic social living environment being an important instrument for achieving social, economic and foreign policy goals;
- sustainable development of transportation system is a guarantee of the unity of economic space, free product and services handling, competition and freedom of economic activities, ensuring the integrity of Russia and its national security, improving the environment and living standards in the country;
- the world practice shows that successful collaboration of private sector and the state in the field of transportation infrastructure development indicates the viability and effectiveness of PPP mechanisms. In such work, the activities of regional authorities and the state as a whole are predominant. They determine the mechanisms of attracting private capital, methods of responsibilities and risks distribution, and, above all, the regulatory framework;
- public-private partnership, is certainly one of the most effective mechanisms of interaction between the state and business entities, which allows implementing large-scale and long-term projects aimed at developing the economy of the country.

References

Akitoby, B., Hemming, R., Schwartz, G. (2007) Public investment and public-private partnerships. *Questions of economy*, Volume 40, p. 30.

Engel, E.; Fischer, R.; Galetovic, A. (2014) Soft Budgets and Renegotiations in Public-Private Partnerships. Discussion Paper. *[International Transport Forum at the OECD. Paris]* no 2014-17 pp.17-20.

Filchenkov, V. A. (2007) The Concept of "Public-private partnership" and approaches to its definition. *Service plus*, volume1, pp. 47-50

Kovarda V. V. (2012) Role and Importance of Transportation Infrastructure for Socio-Economic Development of Kursk Region. *Proceedings of Southwest State University. Series Technology,* volume 2, Issue 1, pp.110-113.

Plotnikov, V. A., Vertakova, Yu.V. (2012) Public-Private Partnership on Professional Education Organization in the Interests of Russian Industry. *Economy and Management.* volume 11, Issue 85, pp. 37 - 39.

Salinger, L. (2004) a New model of investment partnership between the state and the private sector. *A world of difference*, volume 2, p. 13.

Shilkina, O. A. (2015) Public-private partnership as an effective form of partnership relations of authorities and business. *The scientific almanac. Economic science,* volume 7, Issue 9, pp. 219-221.

Vertakova, Y. V., Polozhentseva Y. S. (2012) Development of private - public partnerships in the Russian innovation environment. *Bulletin of Belgorod state University. Series: History. Political science. Economy. Informatics,* volume 23, Issue 13-1, pp. 75-82.

Vertakova Julia, Plotnikov Vladimir (2014) 'Public-private Partnerships and the Specifics of their Implementation in Vocational Education'. *Procedia Economics and Finance*, volume 16, pp 24-33

Assessing Economic Freedom: DEA-PCA Approach

Eduard Nežinský, University of Economics, Dolnozemská cesta 1, Bratislava, Slovakia, nezinsky.khp@gmail.com;

Elena Fifeková, University of Economics, fifekova@gmail.com;

Andrea Valachová, University of Economics, Dolnozemská cesta 1, Bratislava, Slovakia, andrea.valachova@euba.sk

This paper has been prepared within the project APVV 15-0765 "Inequalities and Economic growth" and VEGA 1/0431/16 "Economic growth and social and environmental impacts".

Abstract

Last decades have featured a lasting interest in economic development and its determinants by both economic theorists and empirical researchers. Besides economic factors as capital formation, natural resources, conditions in foreign trade or economic system, some socio-economic characteristics of the society such as human resources, quality of institutions, economic freedom or inequality come up to act as determinants of economic development. Multidimensionality of the assessment can present a practical problem especially in case of the multitude of cross-correlated measures. In this study we explore performance of the principal component analysis procedure in dimensionality reduction in the framework of non-parametrical DEA models employed to evaluate economic freedom of 178 countries of the world. Benchmarked against the full dimensional model, the results prove a fairly good performance of DEA-PCA technique.

Keywords: economic freedom, data envelopment analysis, principal component analysis

1. Introduction

Last decades have featured a lasting interest in economic development and its determinants by both economic theorists and empirical researchers. Leaving aside economic factors as capital formation, natural resources, conditions in foreign trade or economic system, some socio-economic characteristics of the society come up to act as determinants of economic development. Human resources or general education have been explored by a vast number of studies on human capital starting back in 90s by Romer, Barro and others. Technical know-how and technological change have been subject to as many analyses employing growth accounting based on the Solow model. Institutions have been analysed profoundly in quantitative studies of Acemoglu and Robinson, specific problems of media voter are dealt with in Alesina and Rodrick or Persson and Tabellini´s works.

Inequality and economic growth has been an issue from Adam Smith´s times. The modern data based approach initiated by Kuznets culminated in a hype brought about by Piketty´s *Capital in the 21st century*.

Lastly, economic freedom as a determinant of growth has deserved much attention since the studies of 90s.

Friedman associates higher levels of economic freedom with political freedom and prosperity. In an empirical approach it is Berggren (2003), Sturm et al. (2002), Gwartney et al. (2004), and most recently Akin (2014) who came up with the evidence of the impact of economic freedom on growth.

In Figure 1 one can see the positive correlation between the level of economic freedom and economic performance.

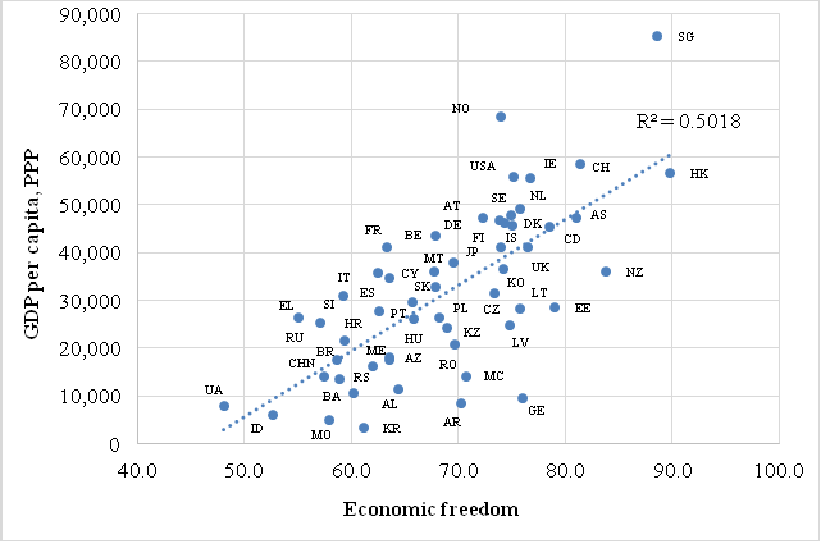


Figure 1: Economic performance and economic freedom in selected countries

Note: AL - Albania, AR - Armenia, AS - Australia, AT – Austria, AZ- Azerbaijan, , BA - Bosnia and Herzegovina, BE - Belgium, BR - Belarus, CD – Canada, CH - Switzerland, CHN - China, CZ - Czech Republic, CY - Cyprus, DE – Germany, DK - Denmark, EE- Estonia, EL - Greece, ES – Spain, FI - Finland, FR - France, GE - Georgia, HK – Hong-Kong, HR – Croatia, HU – Hungary, ID – India, IE – Ireland, IS – Island, IT – Italy, JP – Japan, KO – South Korea, KR – Kyrgyz Republic, KZ – Kazakhstan, LT – Lithuania, LV – Latvia, MC – Macedonia, ME – Montenegro, MO – Moldova, MT – Malta, NL – Netherlands, NO – Norway, NZ – New Zealand, MC – Macedonia, PL – Poland, PT – Portugal, RO – Romania, RU – Russia, SE – Sweden, SG – Singapore, , SI – Slovenia, SK – Slovakia, RS – Serbia, UA – Ukraine, UK – United Kingdom, USA – United States

Source: IMF - World Outlook Database (2017), Heritage Foundation (2017)

Generally, any attempt to quantify the impact of factors on economic growth, whether it is a regression, semiparametric or non-parametric model, starts by identifying key variables. In the considered area, fortunately or not, there is a large quantity of proposed measures available from a multitude of data sources[1] which poses a question of choosing or constructing an optimal measure.

Narrowing down the scope of the research, this study focuses on the economic freedom exploring a particular non-parametric way of measuring which is best represented by Data Envelopment analysis (DEA) modelling. DEA is a nonparametric method used to assess the performance of profit and non-profit organizations. It assumes that the input and output variables are known a priori. In each environment, there exists a huge number of input and output variables, and all the variables will serve as either input or output variable. If there are a large number of input and output variables the discriminatory power of the model reduces. To overcome this difficulty one may need to reduce the input and output variables using appropriate scientific methods.

[1] The renowned *Stiglitz Report* (Fitoussi et al, 2009) lists a multitude of welfare indicators.

Zhu (1998) suggests that principal component analysis as a complementary approach is applied to 'output to input' ratios. The idea of combining DEA and PCA methodologies to achieve dimension reduction was developed independently by Ueda and Hoshiai (1997) and Adler and Golany (2001, 2002). In these papers it is suggested that the variables can be divided into groups, based on their logical composition with respect to the production process, and then replaced with principal components representing each group separately.

In multivariate data analysis the problem of data dimensionality is of great importance. There are many techniques aimed at the reduction of the number variables used. The most common include (a) factor analysis, (b) principal component analysis (PCA), (c) variable reduction procedure based on a partial covariance (VR) or quite recently (d) efficiency contribution measure (ECM).

Factor analysis is heavily employed in regression models featuring a massive body of empirical literature. PCA has been employed in a number of areas ranging from .. to face recognition. Ueda – Hoshiai (1997) and Adler – Golany (2002) were first to employ PCA in DEA economic analysis.

VR procedure of Jenkins – Anderson (2003) presents a systematic statistical method for deciding which of the original correlated variables can be omitted with least loss of information, and which should be retained. Results reveal that even omitting highly correlated variables could have a massive impact on computed efficiency measures. Adler (2010) demonstrates that PCA - DEA provides a more powerful tool than VR with consistently more accurate results.

ECM approach proposed by Pastor et al. (2002) is based on testing the marginal contribution of each variable to the efficiency estimation based on the pair of specifications – total model and reduced model. ECM differs from VR in the role of DEA. While VR makes the variable selection using a statistical test, ECM involves DEA estimation.

We chose to employ PCA and explore statistical properties of the results benchmarked against the full dimensional DEA model constituting a measure of economic freedom. Hereafter we proceed by the description of SBM DEA model and principal component routine. In Section 3 data and results of statistical tests of seven DEA models with varying number of variables and proportion of the original variance accounted for are presented and finally Section 4 concludes and outlines the further research.

2. Measuring economic freedom

Standard measures of economic freedom typically present indexes composed as a weighted sum of subindicators describing various aspects of economic freedom such as.. The weights are set ex ante and represent certain authors´ beliefs as for the importance of the respective subindicators with regard to the total score. In this study we elaborate on the alternative way offered by data envelopment analysis (DEA) modeling. The weights would be implicitly ascribed individually in the optimization procedure.

2.1 SBM model of efficiency

Let economic subjects (which could be any economic subject transforming inputs into outputs) under examination be called DMUs (Decision Making Units) which reflects their independent economic behavior. It is assumed to have DMUs transforming m inputs into s outputs. Inputs and outputs are organized in the matrices **X** and **Y** respectively, element x_{ij} meaning amount of input i used by DMU j, and the similar way in the output matrix **Y**.

The *slacks-based* model (SBM) proposed by Tone (2001) is one of the powerful DEA developments to capture all sources of inefficiency of the DMU. The objective function ρ is meant to represent score of efficiency and features two important properties: unit invariance and monotonicity.

A function $\rho = \dfrac{1-\frac{1}{m}\sum_{i=1}^{m} s_i^- / x_{i0}}{1+\frac{1}{s}\sum_{r=1}^{s} s_r^+ / y_{r0}}$ meets the requirements of the both, moreover, it can be derived that $0 < \rho \leq 1$ which makes it easy to interpret values as efficiency scores between 0 and 100%.

From the computational viewpoint, evaluation of efficiency takes the form of a fractional program:

$\min\limits_{\boldsymbol{\lambda},\mathbf{s}^+,\mathbf{s}^-}$	$\rho = \dfrac{1-\frac{1}{m}\sum_{i=1}^{m} s_i^- / x_{i0}}{1+\frac{1}{s}\sum_{r=1}^{s} s_r^+ / y_{r0}}$		(2.1)
s.t.	$\mathbf{x_0} = X\boldsymbol{\lambda} + \mathbf{s}^-$		(2.2)
	$\mathbf{y_0} = Y\boldsymbol{\lambda} - \mathbf{s}^+$		
	$\boldsymbol{\lambda} \geq 0$, $\mathbf{s}^- \geq 0$, $\mathbf{s}^+ \geq 0$.		(2.3)

Following Tone (2001) one can arrive at a linear program

min	$\tau = t - \frac{1}{m}\sum_{i=1}^{m} S_i^- / x_{i0}$		(2.4)
s.t.	$t\mathbf{x_0} = X\boldsymbol{\Lambda} + \mathbf{S}^-$		
	$t\mathbf{y_0} = Y\boldsymbol{\Lambda} - \mathbf{S}^+$		
	$\boldsymbol{\Lambda} \geq 0$, $\mathbf{S}^- \geq 0$, $\mathbf{S}^+ \geq 0$, $t > 0$		

The dual linear program associated with (2.4) is

$\max\limits_{\xi,\mathbf{v},\mathbf{u}}$	ξ		(2.5)
s.t.	$\xi + \mathbf{v}\mathbf{x_0} - \mathbf{u}\mathbf{y_0} = 1$		(2.6)
	$-\mathbf{v}X + \mathbf{u}Y \leq \mathbf{0}$ $\mathbf{v} \geq \frac{1}{m}[1/\mathbf{x_0}]$		
	$\mathbf{u} \geq \frac{\xi}{s}[1/\mathbf{y_0}]$		

After solving linear programs formulated by (2.4) or (2.5) – (2.6), one can go back to original variables $\mathbf{s}^{0+}$, $\mathbf{s}^{0-}$, $\boldsymbol{\lambda}$ as optimal solutions of (2.1) – (2.3) and determine ρ_0 for DMU_0 under evaluation. Efficient DMUs will have values of ρ equal unit representing the *best practice* performance. The rest of DMUs are

thus inefficient scoring $\rho < 1$. For inefficient units, the models can also indicate a *peer group* of reference units whose performance is most easily achievable for the ones lagging behind. To give the model output orientation, input slacks in (2.1) are omitted. We denote the model SBM-O:

min	$\rho = \dfrac{1}{1+\frac{1}{s}\sum_{r=1}^{s} s_r^+ / y_{r0}}$		(2.7)
s.t.	$\mathbf{x_0} = \mathbf{X\lambda} + \mathbf{s}^-$		
	$\mathbf{y_0} = \mathbf{Y\lambda} - \mathbf{s}^+$		
	$\boldsymbol{\lambda} \geq 0,\ \mathbf{s}^- \geq 0,\ \mathbf{s}^+ \geq 0$		

2.2 Principal component analysis

Principal component analysis is a widely used method for reducing dimensionality of the data. Sticking to notation from the previous sections inputs and outputs from matrices **X** and **Y** would be replaced with a smaller set of new variables – principal components (PCs). PCs are determined by the following procedure:

$PC_r = \sum_{k=1}^{m} l_{kr}\mathbf{Y}_i,\ \text{ s.t. } \text{var}(PC_r) \rightarrow \max,\ \sum_{k=1}^{m} l_{kr}^2 = 1$	(2.8)

Clearly, PCs are uncorrelated linear combinations of the original data. There is at most as many principal components as the number of original variables (r= 1, 2, ..., s in case of outputs). Pursuing the goal of reducing dimensionality it is sensible to pick the least possible number of PCs while retaining maximum of the information. The researcher can state should beforehand how much of the variance in original variable should PCs account for.

3. DEA-PCA measures of economic freedom

3.1 Data and modelling

As described above, we apply DEA model to subindices of economic freedom of 178 countries of the world. The indices would enter the model in the role of outputs. Abstracting from any efforts or cost of achieving a certain level of economic freedom, we set input to unit for each country and run an output oriented model. Thus we arrive at a composite indicator resembling standard index of economic freedom. The difference consists in ascribing the optimal weight to each category so as to maximize the total score which is ensured by the program (2.1). We adopt twelve dimensions of economic freedom from Heritage Foundation (2017) as outputs in the matrix **Y**.

We measure economic freedom based on 12 quantitative and qualitative factors, grouped into four broad categories, or pillars, of economic freedom:

Heritage Foundation

- Rule of Law (property rights, government integrity, judicial effectiveness)
- Government Size (government spending, tax burden, fiscal health)
- Regulatory Efficiency (business freedom, labor freedom, monetary freedom)
- Open Markets (trade freedom, investment freedom, financial freedom)

Each of the twelve economic freedoms within these categories is graded on a scale of 0 to 100. A country's overall score is derived by averaging these twelve economic freedoms, with equal weight being given to each.

3.2 Full dimensional model

A comprehensive full dimensional model *ef12* is computed using optimization (2.7). Calculations involved determining scores for each of 178 countries in the dataset. The results comprise values of slack variables, values of dual variables determining efficiency frontier and the set of efficient countries. This can be complementarily established by filtering out countries with unit efficiency scores.

While it is not the focus of this study to bring recommendations for decision makers (though the ultimate DEA models´ purpose is exactly that) we report efficient DMUs (countries) from the *ef12* model in Table A2 in Appendix without any other values of variables involved in computations barely listing efficient countries. Other variables will be subject to the correlation analysis and do not present an interest of their own. Variables used and specification type are stated in Table 2.

3.3 Principal components and DEA

PCA was conducted following the routine of (2.8). In practical application, a covariance matrix **C** of the demeaned original variables was produced. Then eigenvectors and corresponding eigenvalues are computed and sorted in a descending order.

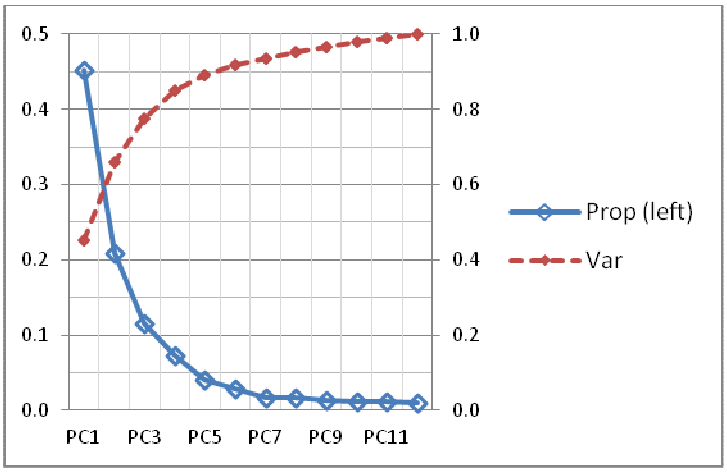


Fig. 2: Variance explained by principal components

Source: Authors´ calculations

Now it is possible to express the original data in terms of the chosen number principal components at the cost of the corresponding loss of variance of the raw data explained. In Figure 2 one can see a portion of the total variance explained by individual PCs (proportion) along with the cumulative variance. Based on the results depicted in Figure 1 we chose to explore first six principal components accounting for 90% of the total variance in the data and halving the initial number of variables.

In Table 2 models are listed along with the variables employed. All models are output oriented with constant return to scale assumption.

Table 2: Overview of the variables and models

model	type	variables						
		output						input
ef12	SBM-O-C	12 sub-indicators						1
pc1	SBM-O-C	PC1						1
pc2	SBM-O-C	PC1	PC2					1
pc3	SBM-O-C	PC1	PC2	PC3				1
pc4	SBM-O-C	PC1	PC2	PC3	PC4			1
pc5	SBM-O-C	PC1	PC2	PC3	PC4	PC5		1
pc6	SBM-O-C	PC1	PC2	PC3	PC4	PC5	PC6	1

Source: Authors´ calculations

Solving each model involves conducting 178 optimizations of the (2.7). Variables for the model *ef12* are described in the Section 3.1.

3.3 Statistical testing

Having obtained a single composite index (efficiency score) from a comprehensive ef12 model and DEA scores from reduced PCA models, the question of substitutability can be attempted to answer. First we are interested in the degree of correlation between the scores from individual models. Efficiency scores are stored as variables *sef12* (the full SBM model) and *spc1* through *spc6* models. In Table 2 correlation matrix of these variables is provided.

Table 3: Correlation matrix – scores from models

sef12	*spc1*	*spc2*	*spc3*	*spc4*	*spc5*	*spc6*	
1	0,33	0,16	0,32	0,31	0,26	0,19	*sef12*
	1	0,46	0,44	0,41	0,32	0,25	*spc1*
		1	0,85	0,78	0,65	0,51	*spc2*
			1	0,88	0,68	0,56	*spc3*
				1	0,79	0,66	*spc4*
					1	0,85	*spc5*
						1	*spc6*

Source: Authors´ calculations

From the correlation matrices it is not possible to determine whether the dependence between the variables is statistically significant. To test for that we therefore generate two series of differences between both the score and the rank from *ef12* and *pc* model. Running a regression of the differences on a constant (with a heteroskedasticity robust errors) makes clear whether the differences are of a systematic nature or not and which direction they tend.

Table 4: Correlation matrix - ranks

ref12	*rpc1*	*rpc2*	*rpc3*	*rpc4*	*rpc5*	*rpc6*	
1	0,63	0,09	0,33	0,32	0,30	0,24	*ref12*
	1	0,43	0,46	0,44	0,45	0,29	*rpc1*
		1	0,81	0,77	0,65	0,48	*rpc2*
			1	0,84	0,63	0,49	*rpc3*
				1	0,78	0,63	*rpc4*
					1	0,85	*rpc5*
						1	*rpc6*

Source: Authors´ calculations

Table 5: Differences between scores and ranks

	const	p-value			const	p-value
sd1	0,441	1,35E-52	***	rd1	-3,742	2,84E-01
sd2	0,064	5,10E-03	***	rd2	-3,657	5,05E-01
sd3	-0,136	4,08E-10	***	rd3	-3,433	4,67E-01
sd4	-0,179	1,71E-15	***	rd4	-3,230	4,99E-01
sd5	-0,275	3,33E-28	***	rd5	-2,320	6,35E-01
sd6	0,340	3,04E-36	***	rd6	-1,129	8,28E-01

Source: Authors´ calculations

Table 5 displays the results – constants from the regression and the corresponding *p*-values. It is obvious that differences in scores are systematic being positively tilted for models *pc1*, *pc2* and *pc6*. For *pc3* through *pc5* the bias appears to be significantly negative. Taking a look at the ranks reveals negative difference across all PC models, this underestimation of the full range model is not statistically significant.

4. Conclusions and further research

As institutional quality presents a proved basis for economic performance, we probed alternative method of assessing European institutions within the set of EU and OECD countries by employing SBM model and shrinking the set of variables employing PCA method. The discriminatory power of the DEA seems not to have suffered in a considerable way.

Getting more convincing results would require employing methods for identifying and possibly omitting outlying data for which a number of procedures is suggested in DEA literature. After that additional non-parametric testing could be conducted involving e.g. Mann-Whitney Rank Sum test. Some routines such

as Wilcoxon test (whether the difference between two observations has a mean signed rank of 0) are more robust against outliers and heavy tail distributions.

Some authors, e.g. Banker, Simar and Wilson or Pastor et al. propose statistical tests for measuring the relevance of inputs or outputs. as well as tests to consider potentially aggregating inputs or outputs intead of reducing dimensionality of the whole bulk of variables.

References

Adler, N., Golany, B., 2002. 'Including principal component weights to improve discrimination in data envelopment analysis,' *Journal of the Operational Research Society*, 53, 985–991.

Berggen, N. (1999). 'Economic freedom and equality: friends or foes? ' *Public Choice,* 100(3-4), 203–223.

Berlin, I. (2002). Liberty (2rd ed). Oxford: Oxford University Press.

Carlsson, F., Lundström, S. (2002). 'Economic Freedom and Growth: Decomposing the Effects,' Author(s): *Public Choice*, 112(3/4), 335-344.

De Haan, J., Sturm, J.-E. (2000), 'On the relationship between economic freedom and economic growth. *European Journal of Political Economy*,' 16(2), 215–241.

Dawson, J. W. (2003). 'Causality in the freedom–growth relationship,' *European Journal of Political Economy*. 19(3), 479 – 495.

Freedom House (2017). Freedom in the World 2017. from https://freedomhouse.org/report/ freedom-world/freedom-world-2017 (10. 5. 2017).

Fraser Institute, 2016. Gwartney, J., Lawson, R., Hall, J. (2016). *Economic Freedom of the World. Annual Report 2016.* from https://www.fraserinstitute.org/studies/economic-freedom-of-the-world-2016-annual-report (12. 5. 2017).

Gwartney, J. D., Holcombe, A. R., Lawson G. R. (2004). 'Economic Freedom, Institutional Quality, and Cross-Country Differences in Income and Growth,' *The Cato Journal*, 24(3), 205-233.

Hanke, S. H., Walters S. J. K. (1997). 'Economic Freedom, Prosperity, and Equality: A Survey,' *The Cato Journal*, 17(2), 117 – 146.

Heritage Foundation (2017). *2017 Index of Economic Freedom.* Available at http://www.heritage.org/index/download (10. 8. 2017).

International Monetary Fund (2017). *World Economic Outlook Database*. *April 2017 Edition*. from http://www.imf.org/external/pubs/ft/weo/2017/01/weodata/index.aspx.

Jenkins, L., Anderson, M., (2003). 'Multivariate statistical approach to reducing the number of variables in data envelopment analysis,' *European Journal of Operational Research*, 147, 51–61.

Murphy, M. K., Schleifer, A., Vishny, W. R. (1991). 'The Allocation of Talent: Implications for Growth,' *Quarterly Journal of Economics*, 106(2), 503-530.

North, D. C. (1990). *Institutions, Institutional Change and Economic Performance* (1st ed). Cambridge: Cambridge University Press.

Norton, S. W. (1998) Poverty, Property Rights and Human Well-Being: A Cross-National Study. *Cato Journal*, 18(2), 233-245.

Pastor, J. T. , Ruiz, J. L. , and Sirvent, I. (2002). A statistical test for nested radial DEA models. *Operations Research,* 50 , 728–735 .

Pedraja-Chaparro F, Salinas-Jimenez J, Smith P. On the quality of the data envelopment analysis model. Journal of Operational Research Society 1999; 50: 636-44.

Sturm, J. E., Leertouwer. E., de Haan, J. (2002). Which economic freedoms contribute to growth? A comment. *Kyklos*, 55(3), 403 – 416.

Kaufmann, D., Kraay, A. and Mastruzzi, M. (2010). 'The Worldwide Governance Indicators: Methodology and Analytical Issues,' Technical report, The World Bank.

Tone, K. (2001). 'A slacks-based measure of efficiency in data envelopment analysis, ' *European Journal of Operational Research*, 3(130), 498-509.

Ueda, T., Hoshiai, Y., 1997. Application of principal component analysis for parsimonious summarization of DEA inputs and/or outputs. *Journal of the Operational Research Society of Japan,* 40, 466–478.

Verner, T. (2015) The effect of Economic Freedom on National Competitiveness: Causality form a Panel of Countries. *Journal of Economics, Business and Management.*3(1), 150-155.

Zhu, J., 1998. Data envelopment analysis versus principal component analysis: an illustrative study of economic performance of Chinese cities. *European Journal of Operational Research*, 111, 50–61.

ANNEX

Table A1 : Reference set and Frequency to other DMUs

ef12		pc1		pc2		pc3		pc4		pc5		pc6	
reference	freq	reference	freq	reference	freq	reference	freq	reference	freq	reference	freq	reference	freq
Australia	0	Denmark	177	Barbados	0	Bahrain	30	Bahrain	11	Bahrain	91	Bahrain	63
Bahamas	0			Denmark	4	Barbados	1	Barbados	1	Barbados	2	Barbados	5
Bahrain	0			Finland	16	Cabo Verde	3	Bhutan	0	Bhutan	0	Belarus	0
Central Africa	0			Japan	25	Denmark	1	Cabo Verde	3	Cabo Verde	2	Bhutan	4
Congo, DR	0			Slovenia	10	Finland	1	Denmark	0	Colombia	0	Cabo Verde	1
Denmark	0			UK	120	Hong Kong	0	Eritrea	0	Denmark	4	Central Africa	0
Dominica	1					Japan	41	Finland	1	Djibouti	0	Colombia	0
Estonia	0					New Zealand	3	Hong Kong	0	Eritrea	0	Denmark	10
Finland	0					Singapore	45	Japan	88	Finland	1	Djibouti	0
Guatemala	7					Slovenia	0	New Zealand	2	Hong Kong	7	Eritrea	0
Hong Kong	134					UK	84	Singapore	90	Japan	43	Finland	0
Hungary	0							Slovenia	0	Kyrgyz Rep.	6	Gambia	3
Ireland	0							UAE	3	Maldives	3	Hong Kong SAR	6
Jordan	0							UK	17	Mongolia	5	Japan	56
Kuwait	0									New Zealand	3	Kyrgyz Rep.	1
Lithuania	3									Oman	1	Maldives	2
Luxembourg	2									Singapore	89	Mongolia	2
Madagascar	0									Slovenia	0	Namibia	3
Netherlands	0									Tonga	1	New Zealand	4
New Zealand	25									UAE	3	Oman	0
Nigeria	2									UK	13	Papua New Guinea	0
Norway	0									US	0	Saint Vincent	15
Oman	0									Brunei	1	Singapore	75
Paraguay	0											Slovenia	0
Qatar	4											Timor-Leste	1
Saudi Arabia	0											Tonga	2
Singapore	9											Uganda	3
Sudan	0											UAE	1
Sweden	0											United Kingdom	14
Switzerland	0											United States	61
Taiwan	1											Brunei	17
Turkmenistan	0												
United Arab Emirates	0												
United Kingdom	0												
United States	0												
Vanuatu	0												
Brunei	0												

Source: The autors´ computation

GP Organize: A Prototype for Final Year Project Archive Management and Student Guidance

Saadia Malik, Faculty of Information Technology & Computing in Rabigh, King Abdulaziz University, Rabigh, Saudi Arabia, smalik1@kau.edu.sa
Shaima Abdulla Al-youbi, Faculty of Information Technology & Computing in Rabigh, King Abdulaziz University, Rabigh, Saudi Arabia, shaayoom.alharbi@hotmail.com
Shaima Bandar Al-youbi, Faculty of Information Technology & Computing in Rabigh, King Abdulaziz University, Rabigh, Saudi Arabia, salyoubi0019@stu.kau.edu.sa
Ramlah Hussein, Faculty of Information Technology & Computing in Rabigh, King Abdulaziz University, Rabigh, Saudi Arabia, rhussen@kau.edu.sa
Ghadeer Dweik, Faculty of Information Technology & Computing in Rabigh, King Abdulaziz University, Rabigh, Saudi Arabia, galdweik@kau.edu.sa
Shereena Arif, Faculty of Information Technology & Computing in Rabigh, King Abdulaziz University, Rabigh, Saudi Arabia, maref1@kau.edu.sa

Abstract

Final year project (FYP) is of critical importance, as students have to achieve this last milestone to finish their degree. This paper presents the students' experiences with final year projects in the Faculty of Computing and Information Technology, Rabigh (FCITR). On the basis of its findings, a prototype is developed using the open source technology to manage projects and guide the students.

Keywords: graduation project, information systems, student guidance, project archiving.

Introduction

Capstone based FYP is a mandatory part of graduation in many curriculums in undergraduate programs of Information System (IS), Information Technology (IT) and Computer Science (CS). In this project, an integrated approach is followed to train students to manage software development by utilizing the knowledge achieved during the earlier semesters.

FYP project is an integral part of graduation in FCITR. Fifth-year students can register for the project only after completing their mandatory credit hours. It is a two-semester long activity in which the students (in a group of at least two) complete a project under the supervision of one of the faculty members. In the first semester, students form a group, choose a topic of their interest either proposed by students or by the supervisor, and work on introduction, literature survey, analysis and design of the selected project. In the second semester, the focus is on the implementation and testing. At the end, the completed project is presented for evaluation. A number of reports and forms are needed to be submitted during these two semesters within the given time frames.

Some studies have identified students' difficulties in completing their FYPs and the needs of developing such tools that can help to monitor and manage graduation projects (Bouvki, 2007; Leung et. al, 2015). The web-based FYP management system by Leung et. al. (2015) supports three types of users: the program organizers, supervisors and group members. Their system consists of five modules: project allocation module, the communication module, project management module, file sharing and repository module, and also submission and grading module. The FYP management systems by Clement and Bounds (2014) include tools to connect students with potential supervisors before the project allocation starts, while also include submission and collection of assignments, which are among the common functions in a Content Management System (CMS). Bakar et. al (2011) also reported their development and user experience of FYP management system at Universiti Kebangsaan Malaysia. Their system

consists of three major modules: user profile, project monitoring and appointment setting modules. The HKU CS Project Management System (2013) is a project management system developed in at the University of Hong Kong, Department of Computer Science. The system can show project information, news, schedules and project allocation.

Background of the Project

Currently in FCITR all the work is being done manually. Many problems are adherent to hand operated or manual systems such as loss of information, prone to errors, waste of time etc. Secondly, there is no digital archive of completed projects. With every passing year, as the number of graduates is increasing, this way of managing project reports is becoming more difficult. There is no way to check which topics have already been chosen. Searching for some particular report is also very difficult. Although the course management system is available to provide the courses add and drop procedure but it doesn't suit well to FYP's requirements.

Users & System Development

The Questionnaire

We prepared a questionnaire for collecting information regarding the preparation of the graduation projects of the students. For this purpose, a few questions were designed and were uploaded on the Google questionnaire system and there was a participation of 62 students. 95.2% of the respondents stated that they are in the graduation year. 80.6% of the students indicated that they have difficulty in communicating with their supervisors. 83.9% of the students wished to use various internet means to communicate with their supervisors, whereas the other 24.2% prefer personal communication with their supervisors. 83.9% indicated that they have difficulty in understanding the steps of the project. Only 19.4% indicated to seek resort from their supervisors in case of difficulty in understanding the project steps, meanwhile the others preferred to seek help from previous students' experience. The results also indicate that 91.9% read previous students' projects and 95.2% feel that it is a good idea to create a website for archiving students projects in the faculty. The respondents also agree that creating a website is a good idea since it will provide students a platform to benefit from the previous projects and ideas. Using these ideas, we wish to build a system, which will provide instant access to students and faculty to benefit from the experiences of the past students in minimum possible time besides providing access to all previous project reports instantly.

Review on Current Systems

We did a review on two systems namely, 1) the University of Leeds, School of Computing Undergraduate Projects Archive, and 2) the City University of Hong Kong, College of Science and Engineering.

The University of Leeds website displays titles of the projects with links to electronic copies of project reports [6]. The City University of Hong Kong, College of Science and Engineering [4] website consists of several sections, including a section for guidance and section to archive the student projects. It also includes video links to projects with subject areas and objectives for each project.

Based on the above reviews of related works and user requirements, we had outlined the criteria for the proposed system as in Table 1. It shows the main similarities and differences between our project and related work. Hence the benefits of the proposed systems are as follows:

1. Provides possibility to communicate with the supervisor of the project
2. Provides archives of previous projects
3. Provides schedule to students
4. Provides student guide in the form of templates and guidelines
5. Providing list of important external link

Table 1: Comparison between the proposed website and related work

	Related work					Our Website
Criterion			Queen's University Archives	University of Leeds	College of Science and Engineering	Senior Project Archiving and Student Guidance System For FCITR
Design		Language	English	English	English	English
		Browsers (Mozilla Firefox, Internet Explorer, Chrome)	✓	✓	✓	✓
Function	Student	Register to the Website	X	X	X	✓
		Guidance	X	X	X	✓
		Communicate with supervisor	X	X	X	✓
		Browse/Search the previous projects	✓	✓	✓	✓
	Supervisor	Register to the Website	X	X	X	✓
		Communicate with student	X	X	X	✓
		Communicate with administrator	✓	✓	✓	✓

Technology

Open Source technology was adopted for the development of the prototype. Our project use XAMPP, which is developed by Apache Friends and includes a server, database and interpreter. The fact that XAMPP is an open source cross-platform web server package makes it easy to test and deploy your web server on any operating system. It was also chosen because it includes all the features that are needed for web server setup. Other web and design tools used include Macromedia Dreamweaver, Macromedia Flash and Macromedia Photoshop.

Logical Data Model

Database design is the process of producing a detailed data model of a database. This logical data model contains all the needed logical and physical design choices and physical storage parameters needed to generate a design in a Data Definition Language. The design is used to identify relationship between the modules or tables. The term database design can be used to describe many different parts of the design of

an overall database web site. Figure 1 is referring for the database design that we used in our web based information system.

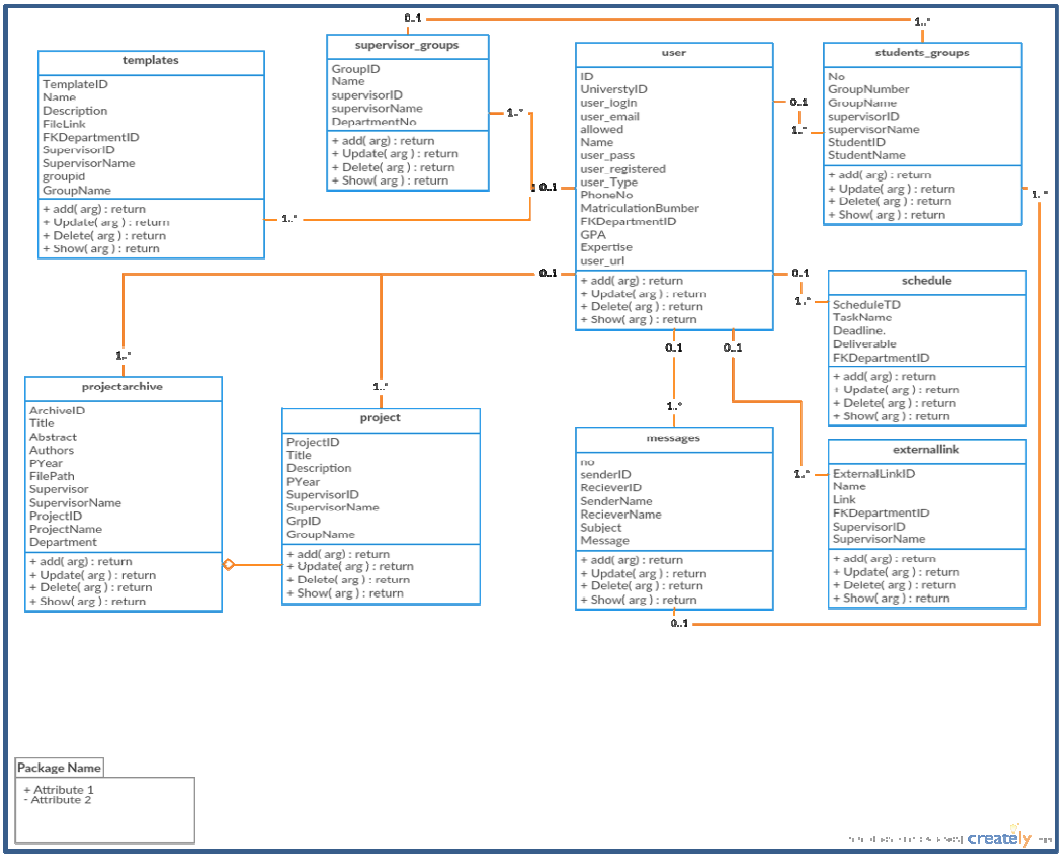


Fig. 1: Logical data model for GP Organize System

Results

Some interfaces of the developed prototype are presented in this section. Figure 2 shows the home page. After logging in, a different dashboard is presented to three types of users: student, supervisor and administrator.

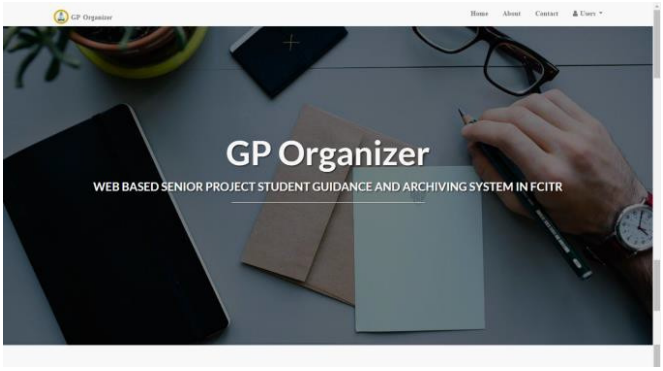


Fig. 2: The prototype's home page

A new group can be created using the screen shown in Figure 3.

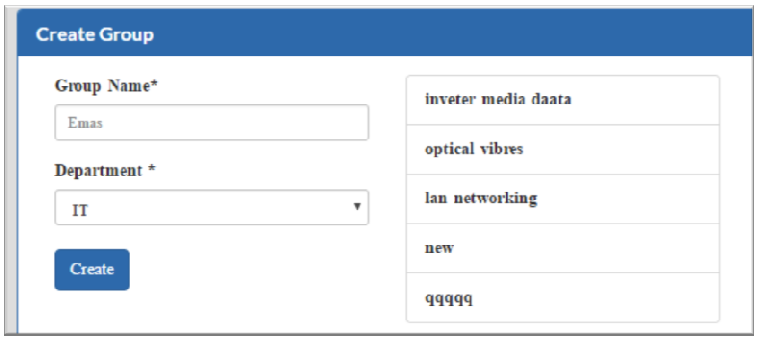


Fig. 3: Create group window

After creating groups, the available final year students are added to the group as shown in Figure 4. The supervisor can add a new project and one group can be assigned to each project as shown in Figure 5.

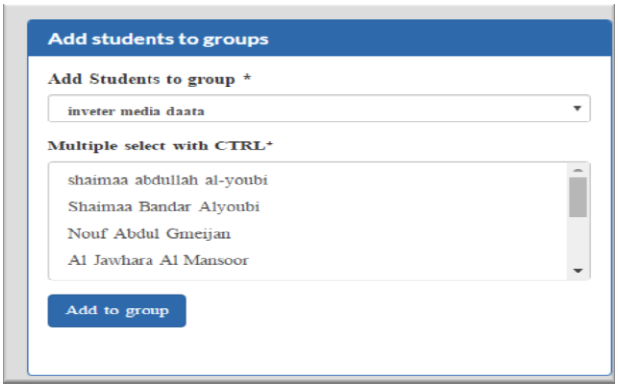


Fig.4: Screen for Adding Students to Groups

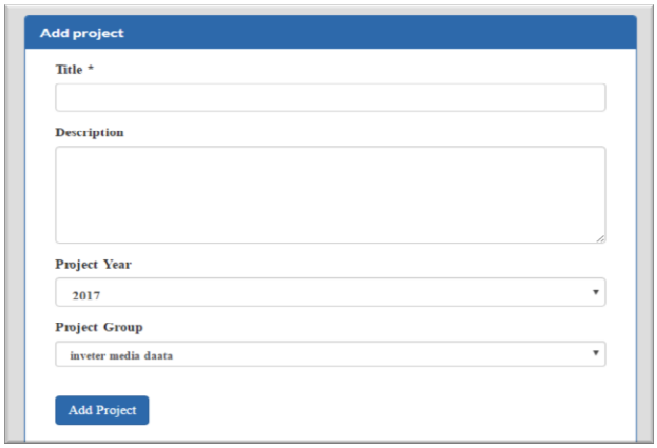


Fig. 5: Screen for Assigning a Project to a Group

On completion, project can be added to archive a shown in Figure 6.

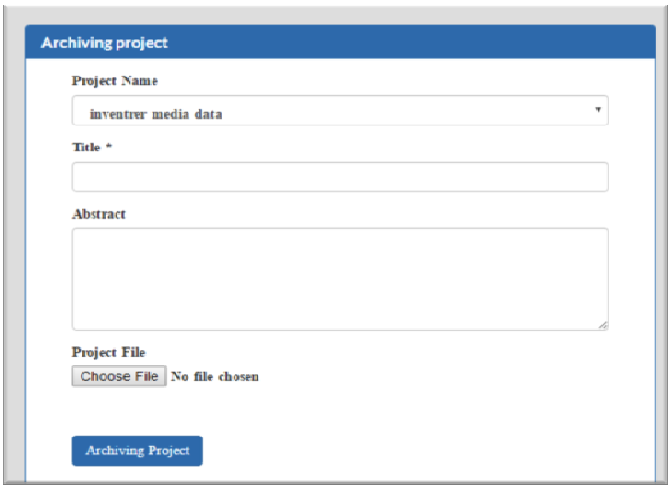


Fig .6: Window for Archiving a Project

Student and supervisor can communicate with each other. Figure 7 shows how students can send message to the supervisor.

Supervisor can add guidance for students in the form of documents, for example like templates or links to external resources which students can refer to as reference. This window can be found as in Figure 8.

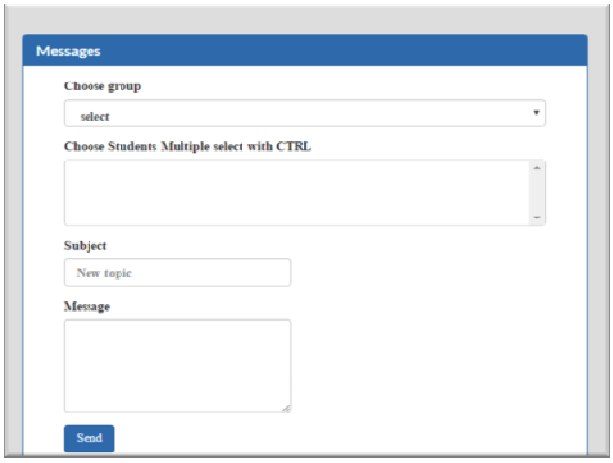


Fig. 7: Send Message to Students window

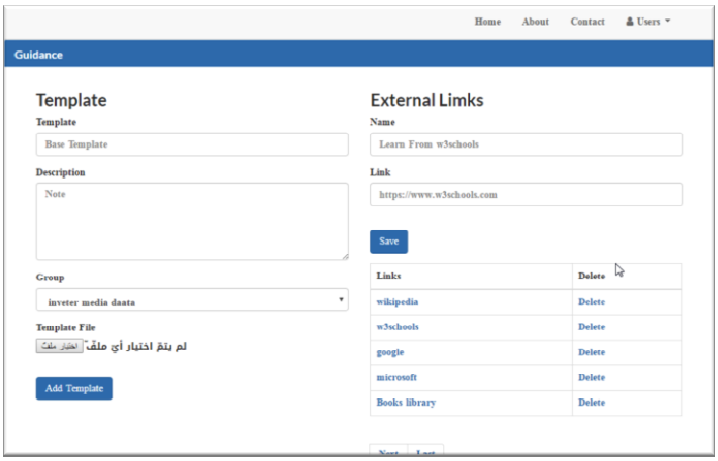


Fig. 8: Screen for Adding Guidance for Students

To add a new milestone in the schedule, information like task name, deliverables, end date, and for which department is added as shown in Figure 9.

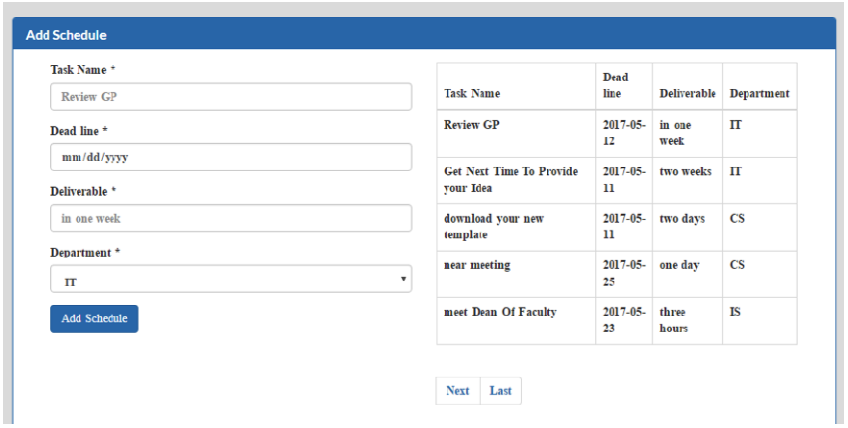


Fig. 9: Screen for Adding Project Milestone for Students

Another way of giving guidance to student is provided on one screen where templates and different documents can be downloaded. Students can access external links provided and can also view the milestones as shown in Figure 10.

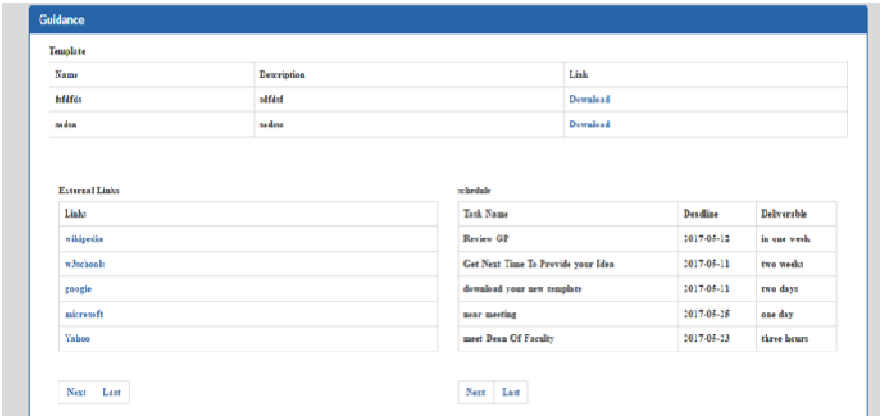


Fig .10: Screen for Giving Guidance Students

FYP archive as showed in Figure 11 gives lists of all the available projects along with their details and possibility to download the report.

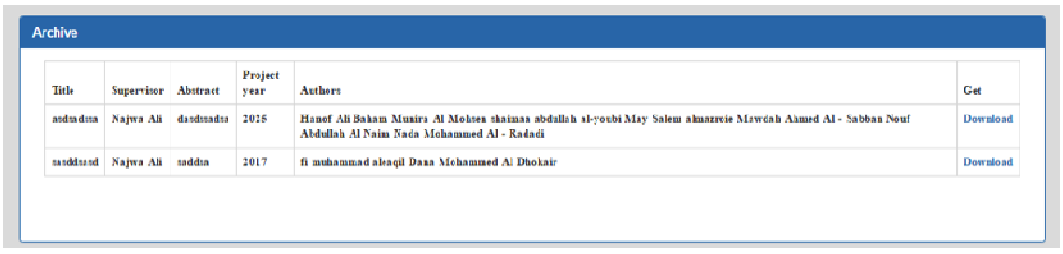


Fig. 11: Window for List of Previous Projects

Figure 12 shows the overview presented to administrator. It includes information about number of students, faculty numbers, and groups, reports in archive, schedule and guidance details.

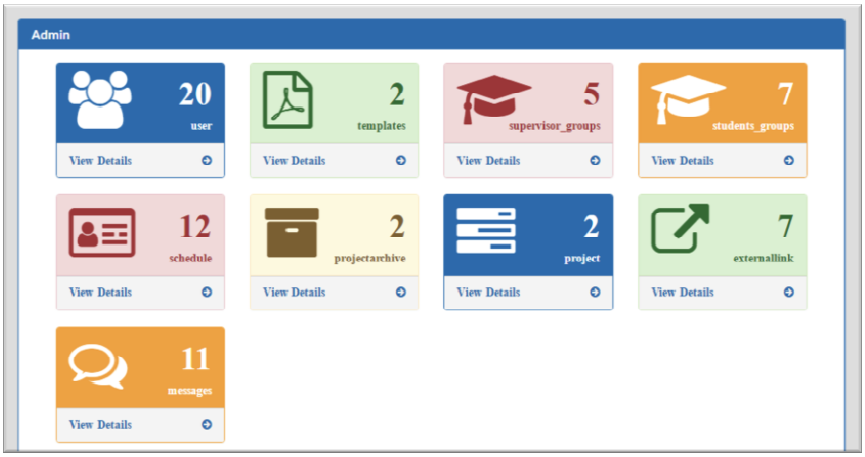


Fig. 12: Overview for Administration Window

The usability and user acceptance tests were conducted and 3 students from final year participated in these tests. Results indicated the positive feedback.

Conclusion

The project has achieved the goals and objectives that were initially set out and defined. In this section, we present lessons learnt from the project and future enhancement areas for the prototype. Lesson 1: The web based developed system provide the one point access to all the project related information. This system helps the students to understand the FYP project requirements by browsing the previous year projects and by accessing important guidelines, templates and milestones. On project completion, supervisor can move it to archive. Providing the messaging options also facilitates students' communication with the supervisor. This system helps student and supervisor to organize and manage their senior projects. Lesson 2: Requirement elicitation is a complex process. This is evident as several methods (i.e. interviews, brain storming, survey, use-cases and prototyping) has been used. The prototype approach has been used for requirement specification of future system development. Lesson 3: Open Source technology provides a quick alternative in an environment where high costs are primary impediments.

We propose three future enhancement areas for the prototype:. Enhancement 1: The system focuses on student guidance and previous projects archiving. It may extend to monitor the students by checking the assigned tasks to which percentage it is completed. Enhancement 2: Another enhancement that can be made is adding the functionality of chat. Enhancement 3: A number of questionnaires are filled in during the project by students and supervisors. On the basis of those and task completion information, grading module can also be developed.

References

Jandos, J. and Vorisek, J. (2009), 'Enterprise Web 2.0. What is it really?' Proceedings of the 13th Inernational Business Information Management Association (IBIMA), ISBN: 978-0-9821489-2-1, 9-10 November 2009, Marrakech, Morocco, 10-15.

Bakar, M. A., Jailani, N., Shukur, Z., & Mohd Yatim, N. F. (2011). 'Final Year Supervision Management System as a Tool for Monitoring Computer Science Projects'. In *Procedia - Social and Behavioral Sciences,* vol (18), 273-281.

Bouki, V. (2007). 'Undergraduate Computer Science Projects in UK: What is the point?', Proceedings of the Informatics Education Europe II Conference, ISBN: 978-960-89629-3-4, 29-30 November 2007, Thessaloniki, 176-184.

Clement, R. and Bounds, P. (2013). 'Making Connections between Final Year Students and Potential Project Supervisors'. Proceedings of the HEA STEM annual learning and teaching conference 2013: Where practice and pedagogy meet. 17 – 18 Aril 2017. Birmingham.

HKU CS: Hong Kong University Project Management System (2014), https://community.cs.hku.hk/web/cs

Leung CH. et al. (2015). 'The Development of a Final Year Project Management System for Information Technology Programmes'. Technology in Education, Transforming Educational Practices with Technology. Vol (494). Springer, Berlin, Heidelberg. 86-97

'Undergraduate Final Year Project Archive'. University of Leeds. [Online]. [Retrieved August 18, 2017], https://minerva.leeds.ac.uk/bbcswebdav/orgs/SCH_Computing/FYProj/UGreports.html.

The Study Project on Employees Creativity Effect on Innovation in a Manufacturing Company

MSc Eng. Kamila Tomczak-Horyń, Opole University of Technology, Opole, Poland, k.tomczak-horyn@po.opole.pl, r.knosala@po.opole.pl
Prof. Dr Hab. Eng. Ryszard Knosala, Opole University of Technology, Opole, Poland, r.knosala@po.opole.pl

Abstract

The article describes the importance of employee creativity in a company. The perspectives of research on creativity and the determinants of creative production space are presented. So far, no methodology has been developed to measure the creativity of workers in manufacturing enterprises and to assess the innovations introduced. For this purpose, appropriate tools and methods have been developed. The article presents the methods and tools used in assessing the innovativeness of a company and the level of innovation introduced. Also authoring tools to support the creativity of workers in production companies are described: A questionnaire of creative attitude and Sheet for work sample evaluation. The field of impact assessment of the creativity of the employees on the development of innovative solutions in the company was also presented.

Keywords: creativity, innovations, innovator, company.

Introduction

Creativity plays an important role in entrepreneurial processes. It is a factor stimulating the development of the company. Combined with the knowledge and social competences, it leads to innovation (Luecke, 2003). The innovation is a task for every employee, not just for the research and development department. It is important only to create a safe space for innovation. It fosters self-expression, experimentation, risk-taking, and admitting mistakes without the fear of punishment (Dyer, Gregersen, Christensen, 2011). Creativity should be used in all aspects of company's operations, as each of them can affect its effectiveness (Kosieradzka, 2013).

Currently, there are no tools supporting an identification of internal factors responsible for innovation and creativity in the company. This state of affairs has contributed to the development of a concept of the study on employees' creativity effect on product and/or process innovations in a company. The study will be conducted on small, medium and large innovative manufacturing companies. The first step in the study is the selection of companies by analyzing their level of innovation. Then, product and/or process innovation in the company is subject to an evaluation. The final step in the study is an evaluation of the predisposition to the creative thinking of the innovators. A number of tools described in this article have been developed to carry out the study.

1. Prospects of the study on creativity

Creativity can be analyzed from different perspectives. The popular classification is the "four P" model, i.e., the study on creativity through the prism of person, process, product and place. The first aspect concerns an identification of the creative potential of the examined person. The following tools are most commonly used for this purpose (Karwowski, 2009b):

- creativity tests allowing to determine the level of fluidity, flexibility and originality of thinking,
- techniques focused on self-description (personality questionnaires),
- interview and observation of the examined person.

In the case of creative process analysis, it is desirable to describe and understand what happens when a creative work arises. According to Necka (1995) the creative process takes place when a new and valuable result is obtained, and it is characterized by novelty and value. Analysis of the process of ideas creation is an important source of information about the examined person. Experimental tasks, most often related to problem solving, are a significant issue in the creative process examination. They seek to determine what factors are important during the creation process, and then manipulate them to verify their effect. The role of attention, stimulation and the influence of positive or negative emotions is emphasized, then they are manipulated and their effect on activity effectiveness is determined (Karwowski, 2009b).

Another approach is an analysis of the product (creative product), which also provides a lot of information about the creative capabilities of the innovator. In this case, the importance of the study should be attributed to experts' evaluation and content analysis (Karwowski, 2009b).

The last perspective of creativeness analysis concerns the study of its over-individual dimension, i.e., the analysis of "the climate in the workplace". Task of Amabile (1996) the work environment significantly affects the search for ideas and their implementation. In this aspect, it is examined whether the company and the physical place of work favor creativity and innovation. The studies in this area are conducted using questionnaires or observations (0).

2. Space for creativity in the company

Creativity requires an environment focused on an innovative development. Creative employees should be provided with an environment that will support their activities and lead to the implementation of a rationalized solution (Kosieradzka, 2013). An important element affecting innovations is the working environment and the climate in the company. An atmosphere favoring creativity concerns the characteristics of the environment, which may be a stimulant or inhibitor of creative activity. Employee-to-employee contacts and open discussions contribute to the emergence of creative ideas. They are possible due to the elimination of barriers requiring a hierarchical shift to a flattened one, where the teamwork is preferred.

There are three important approaches that develop the concepts of climate for creativity: the G. Ekvall concept developed by S.G. Isaksen and K. Lauer (Karwowski, 2009a), the view by T.M. Amabile (1996, 1997) and the concept of M. West (2002).

G. Ekvall is the author of the first questionnaire for the measurement of workplace atmosphere. According to G. Ekvall, the "climate for creativity" is a factor that supports the production and introduction of new products and solutions. It supports the development and assimilation of new, different proposals. This approach recognizes the climate as one of the variables affecting the ability of the company for modernization to continuous development. According to the author of the concept, significant elements forming the creative climate include: challenge, openness and confidence, time for ideas realization, supporting the ideas, debate and taking the risks. G. Ekvall's approach coincides with the concept of T.M. Amabile (1996, 1997). It is based on the belief that creativity within the company is affected by:

- ability to create innovation at the managerial level;
- motivation of the company to carry out activities characterized by novelty;
- resources including people, materials and time.

Such an approach was the basis for creating a tool in the form of questionnaire for the measurement of creativity climate in organizations. The questionnaire covers eight scales. In a research study by Amabile (1996, 1997) the factors that encourage creativity include the following:

- motivating for creative activity by the organization,
- encouraging the creativity by the supervisor,
- support from co-workers,
- autonomy and freedom,
- sufficient resources,

- challenging work.

Two scales describing inhibitors of creative activity, such as pressure resulting from burdens and organizational difficulties blocking and disrupting the creativity, were also included in the questionnaire.

The last approach developed by M. West (2002) refers to a climate that fosters innovation in the organization. According to the author of the concept, four elements affect the creative atmosphere: security, innovation support, clear goals, and task orientation.

3. Procedure of the study on an effect of innovators' creativity on innovation development in the company

Examination of an effect of innovators' creativity on the development of innovation in the company is conducted according to the adopted scheme (Figure 1). In a research study by Tomczak-Horyń, Knosala (2016) the first step in the study is an analysis of the level of company's innovation. It is based on a questionnaire survey and an interview with the decision maker in the company. The next step is an analysis of the documentation concerning process and/or product innovation introduced in the company. The author or authors of the innovation will be selected and evaluated at this stage. The last step is an examination of innovators' creativity. It includes an assessment of their creative attitude and evaluation of work sample.

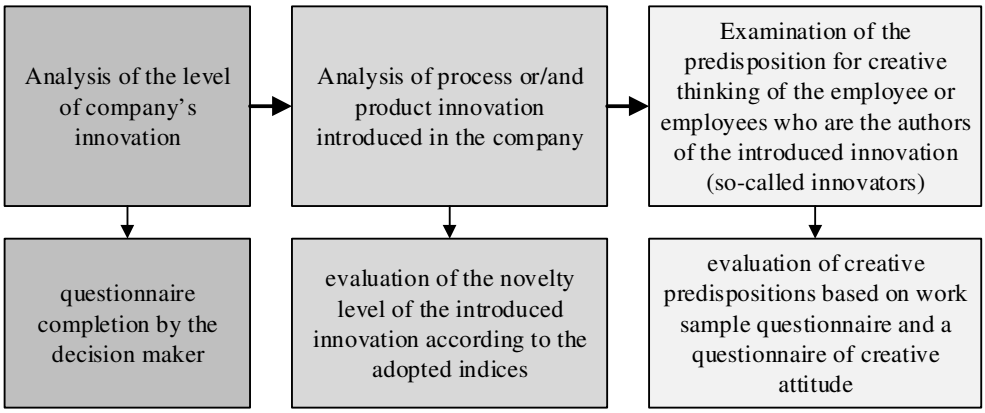


Fig. 1: Procedure of the study on an effect of innovators' creativity on innovation development in the company

Source: own elaboration

4. Methods and tools used in an evaluation of company's innovation and the level of innovation introduced

Appropriate methods and tools were used at particular stages of the study in the company (Fig. 2).

Evaluation of company's innovation

The analysis of the companies participating in the study will be based on semi-structured interview. It contains elements of structured interview, which is conducted on the basis of an individual interview with the respondent and contains specific questions. Additional questions not included in the questionnaire may appear during the interview, which may be important for the development of the study (Blandford, 2013).

In a research study by Tomczak-Horyń, Knosala (2016) a questionnaire survey is a tool used to help to evaluate the company's innovation. The questions in the questionnaire concern an evaluation of company's development identifying the economic situation, employment, investments, or employees

involvement in innovations creation. Further questions concern, inter alia, kind of innovations introduced by the company in the years 2013-2016 and the plans for the implementation of innovative processes in the years 2017-2019.

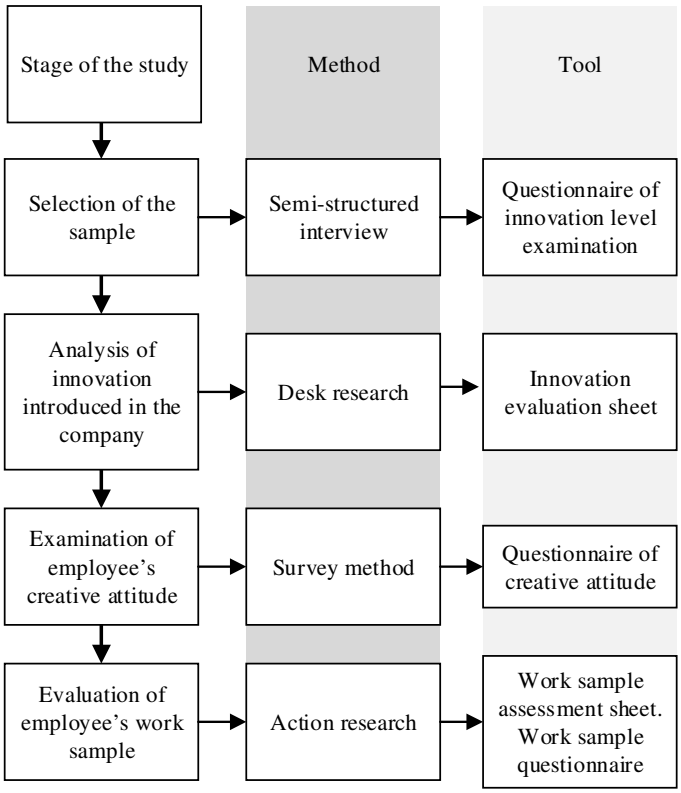


Fig. 2: Scheme of the study considering the methods and tools applied
Source: own elaboration

Evaluation of the level of innovation introduced

Determination of the level of company's innovation is followed by an analysis of the existing data on the innovation introduced. The analysis will involve an examination of the level of innovation. Innovation assessment sheet is a tool used to support the evaluation. It includes the indicators such as:

1. The degree of novelty in terms of the company - level of innovation introduced in the company scale.
2. The degree of novelty in terms of the market - level of novelty of innovation introduced in the market scale.
3. The time of introduced innovation operation - number of months of innovation using.
4. The scope of innovation - scope of innovation introduced in the company.
5. Innovation universality - areas of the company that have benefited after innovation was introduced.

The first indicator concerns the analysis of innovation within the company. It enables the division of innovation into three solutions: solution not used in the enterprise so far, solution that is a significant change in the already existing solution in the company, and a micro-solution.

The second indicator refers to the level of novelty on the market scale. This indicator adopted a commonly used classification, distinguishing incremental and radical innovations. Incremental innovations are improvements that consist in refining of the existing forms or reconfiguring them to

serve new purposes. In turn, radical innovations involve the introduction of completely new, unused solutions (Knosala, 2017).

Next indicator refers to the determination of the time of solution operation. If the idea has been implemented and works for some time then it can be assumed that it is effective. Based on the initial assumptions, the high effectiveness of introduced innovation was assumed to be its application over nine months (Knosala, Boratyńska – Sala A, Jurczyk – Bunkowska, Moczała, 2013).

The indicator concerning innovation scope informs about the number of workstations in which innovation can be applied. A high level of this indicator is reached with the solution implemented on 4 and more posts.

The last indicator concerns the universality of innovation and is measured by determination of the number of areas in the company that could be improved due to the innovation. These could be, for example, parallel improvements in OSH, logistics and manufacturing.
The indicator of innovation range and universality refers to the evaluation of process innovation.

5. Design of questionnaires used in the study of innovators' predispositions for creative thinking

In a research study by Tomczak-Horyń, Knosala (2016) the last stage of the study in the company is an examination of innovators' predispositions for creative thinking. This examination concerns the determination of the creative attitude and an evaluation of the work sample. A questionnaire of creative attitude is a tool supporting an evaluation of the creative attitude of the innovator. This is a self-assessment questionnaire. It consists of 18 statements concerning the employee's behavior in the situation of improvement and operation in the company. The examined person determines to what extent agrees with the statement on the basis of a 5 point scale. A maximum of 72 points can be obtained in the evaluation of the creative attitude. If an employee earns the sten score of 9 - 10 position, it means that he or she is characterized by a very high creative attitude. The sten score below 4 means a low creative attitude (Tab. 1). A questionnaire of creative attitude is described in Tomczak – Horyń, Knosala, 2014, 2016.

The second area of creativity evaluation is an assessment of the work sample using action research (AR) method (Coughlan, Coghlan, 2002). According to K. Lewin, AR's precursor, the method is based on the performance of the subsequent steps on a spiral basis: assumption - action - evaluation. Correct application of this method comes down to an identification of the problem and gathering facts allowing to solve it. The subject of AR interest are practical issues related to the direct problems of the group.

The method is performed in a natural environment using a qualitative view, such as a record of events and behaviors as well as observations (Tomczak-Horyń, Knosala, 2017b).

The tools supporting the evaluation include: work sample questionnaire and work sample assessment sheet. The work sample questionnaire contains six tasks concerning open-ended problems or task situations.

Table 1: Scale sten type for the creative attitude questionnaire (Tomczak-Horyń, Knosala, 2014)

Sten	Score		Creative attitude
	from	to	level
10	69	72	very tall
9	66	68	
8	63	65	tall
7	60	62	
6	56	59	average
5	53	55	
4	50	52	low
3	47	49	
2	43	46	
1	0	42	

Their purpose is to reveal the employee's ability for divergent thinking. Divergent thinking plays an important role in problems solving. It involves "breaking away" from the previously known ways of perceiving and acting. The open-ended tasks are the prerequisites for divergent processes. Divergent thinking skills are responsible for performing the tasks and solving the problems with more than one correct solution (Nęcka, 1995). In order to diversify the tasks, four versions of the questionnaire were developed: A, B, C and D. They contain different problem situations to solve, however, measuring the same abilities. An example of questionnaire construction is described in Tomczak – Horyń, Knosala, 2017b. Solution of the task is evaluated according to 4 indicators:

- Fluency of thinking – ease of making solutions to the problems;
- Flexibility of thinking – ability to change direction of thinking;
- Originality – ability to produce ingenious, unusual and distant answers;
- Elaboration – ability to complement the overall outline of plans, as well as concepts.

A comment on the assignment of points with respect to specified indicator was included in the work sample evaluation sheet (Tab. 2).

Table 2: Sheet for work sample evaluation (Tomczak – Horyń, Knosala, 2017a, 2017b)

Sheet for work sample evaluation		
Name and surname of the candidate		Problem number .....
No.	**EVALUATION OF PROBLEM SOLVING**	**Number of points**
1	**Thinking fluidity – number of solutions created in a given time period** *Determine the number of problem solutions (1 solution = 5 points)*	
2	**Thinking flexibility – diversity of solutions** *Determine the number of categories the solution/solutions of problems can be included to (1 category = 1 point)*	
3	**Originality – statistical rarity of responses** *Determine the level of problem solution/solutions originality (value of degree = number of points)*	
4	**Elaboration – details of solution/solutions** *Determine the level of problem solution/solutions elaboration (value of degree = number of points)*	
I	**SUM OF POINTS** *(sum from 1 to 4)*	

The value of the degree of originality and elaboration index is evaluated on the basis of the adopted scale (Tab. 3).

Table 3: The value of the degree (Tomczak – Horyń, Knosala, 2017a, 2017b)

The value of the degree	The name of the degree
1	very low
2	low
3	average
4	high
5	very high

The initial point scale was accepted in the evaluation of the employee's work sample (Tab. 4). The employee can earn more than 15 points. The maximum value of points that can be obtained depends on the number of problem solutions and the number of categories to which the problem solution can be addressed.

Table 4: Point scale evaluation work samples (Tomczak – Horyń, Knosala, 2017a, 2017b)

Results	Sample work evaluation
49 – higher up	very high
38 – 48	high
27 – 37	average
16 – 26	low
15– under	very low

6. The area of the study on employees' creativity effect on innovation development in the company

The study on determination of employees' creativity effect on the development of innovation in the company is still ongoing. Companies participating in the study will be selected in terms of innovation level, size, as well as type of innovations introduced. The selection of companies will be focused on different case studies, so that at least six different case study combinations would be obtained. The subject of the study will be three types of companies in terms of their size and two types when regards the innovations introduced. Small, medium and large innovative manufacturing companies will be subject to the study. Product and/or process innovations introduced in the company will be analyzed (Figure 3). The next stage of the study will involve the selection of the authors of innovation and an evaluation of their predispositions for creative thinking. The study concerns the measurement of fluid creation which is related to creativity.

So far, the study was conducted in two large manufacturing companies. The first examined company is specialized in the production of exclusive and stylish wooden furniture. The second case study is the company from food sector. The company specializes in the production of baby food and infant food as well as adult food products used in medical nutrition. The study demonstrated that both companies are undoubtedly innovative. The companies systematically introduce all four types of innovation: product, organizational, process and marketing. In both companies, the innovations were created in teams and concern product innovations. A coffee table with compartment on a tripod was introduced in the company from the furniture industry. The developed product is an innovative solution not used in the company before. In terms of the market, it is incremental innovation. This is an improvement of the existing forms or their reconfiguration aimed to serve new purposes. The

product is on sale for a year. The technology and equipment that is in the company's resources were used in its manufacturing.

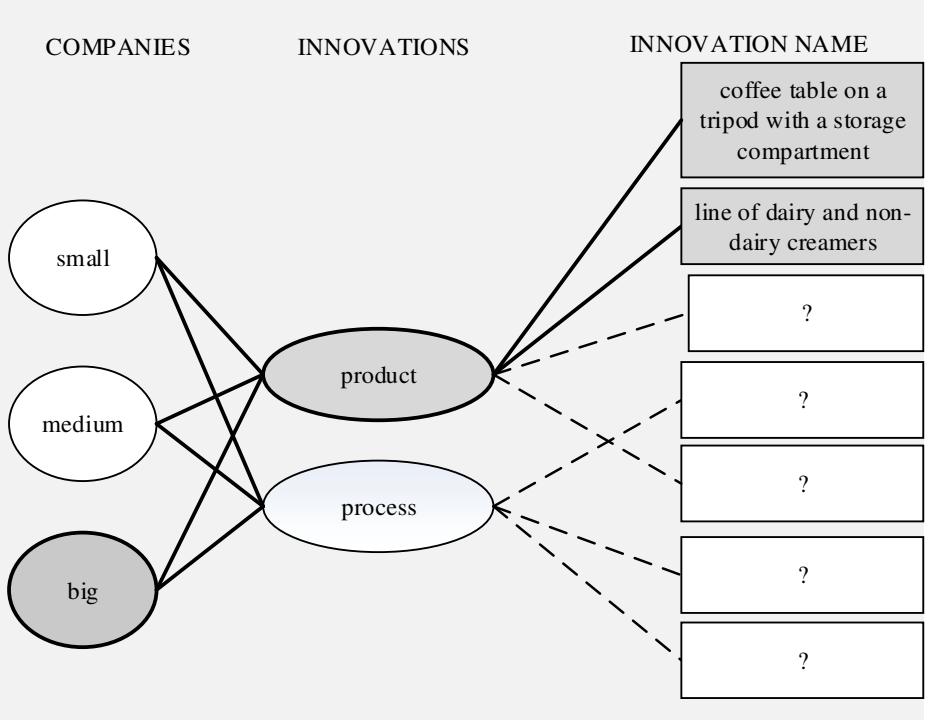


Fig. 3: Types of planned research

Source: own elaboration

A line of porridges with or without milk was introduced in the company from the food sector. The innovation is a significant change in the company's already existing solution. In terms of market, this is an incremental innovation. The product is on sale in the market over the year.

The final stage of the study was the assessment of innovators' predispositions for creative thinking. Work sample questionnaire and creative attitude questionnaire were used for this purpose. At this stage of the study it is still too early to present and draw conclusions in this regard. Proper evaluation of employees' creativity effect on the development of innovation can only be made after the obtaining of intended research sample.

7. Summary

The employees' creativity is a key competency nowadays. This contributed to the research works on employees creativity in manufacturing companies. This article presents the concept of the study on innovators' creativity effect on the development of innovation introduced in the company. The tools used in the evaluation of company's innovativeness, the level of innovation introduced and innovators' predispositions for creative thinking were described. The study using the tools described in the article was conducted in a large manufacturing company in the furniture industry and in a large food production company. The study will be carried out in companies until a differentiated research sample is obtained. The results will allow to evaluate an effect of innovators' creativity on the innovation introduced in the company.

References

Amabile, TM., Conti, R., Coon, H., Lazenb, J. and Herron, M. (1996), 'Assessing the work environment for creativity, '*Academy of Management Journal*, 39 (5), 1154-1185

Amabile, TM. (1997) 'Motivating Creativity in Organizations', *California Management Review*, 40 (1).

Blandford, A. (2013), Semi-Structured Qualitative Studies, The encyclopedia of Human-Computer interaction, Soegaard, M. and Dam, R.F. (ed), 2nd Ed. Aarhus The Interaction Design Foundation, Denmark.

Coughlan, P. and Coghlan, D. (2002), 'Action research for operations management', *International Journal of Production and Operations Management*, 22 (2), 220–240.

Dyer, J., Gregersen, H. and Christensen, C.M. (2011) The innovators's DNA. Mastering the Five Skills of Disruptive Innovators, Harvard Business Review Press.

Karwowski, M. (2009a) Climate for creativity, Wyd. Difin, Warszawa.

Karwowski, M. (2009b) Identification of creative potential, Wydawnictwo Akademii Pedagogiki Specjalnej, Warszawa.

Knosala, R., Boratyńska – Sala, A., Jurczyk – Bunkowska, M. and Moczała, A. (2013) Innovation management, PWE, Warszawa.

Knosala, R. (ed) (2017) Production engineering. Knowledge compendium. PWE, Warszawa.

Kosieradzka, A. (2013) Methods and techniques for stimulating creativity in organization and management, Wyd. edu-Libri, Kraków-Warszawa.

Luecke, R. (2003) Managing creativity and innovation, Harvard Business School Press, Boston.

Nęcka, E. (1995) Creative process and its limitations, Oficyna Wydawnicza „Impuls", Kraków.

Popek, S. (2000) Kwestionariusz Twórczego Zachowania KANH Questionnaire of Creative Behavior KANH, UMCS, Lublin.

Tomczak – Horyń, K. and Knosala, R. (2017), 'Evaluation of Employees' Creativity as a Stimulator of Company Development, ' *Procedia Engineering*, 182, 709–716.

Tomczak – Horyń, K. and Knosala, R. (2016), ' The system design of evaluation the creativity of staff in manufacturing enterprises,' *Business management*, 2, 34–39.

Tomczak – Horyń, K. and Knosala R. (2016), Selection criteria for assessing the creativity of production workers, Innovation in Management and Production Engineering, Knosala, R (ed), Oficyna Wydawnicza Polskiego Towarzystwa Zarządzania Produkcją, 1, Opole, 203 – 211.

Tomczak – Horyń, K. and Knosala R. (2017), An assessment of the work sample the innovators, Innovation in Management and Production Engineering, Knosala, R (ed), Oficyna Wydawnicza Polskiego Towarzystwa Zarządzania Produkcją, 1, Opole.

West, MA. 'Sparkling Fountains or Stagnant Ponds: An Integrative Model of Creativity and Innovation Implementation in Work Groups', *Applied Psychology: An International Review*, 51, 355-424.

Cluster Model: Knowledge Management in the Integrated System "University – School" (the article was prepared with the support of The Russian Foundation of Basic Research. Grant №16-06-00201)

Surina Olga Petrovna, Candidate of Physical and Mathematical Sciences, Associate Professor, Director of Pedagogical Institute named after V.G. Belinsky, Penza State University, Penza, Russia o.surina2013@yandex.ru

Pavlova Nataliia Anatolievna, Candidate of Pedagogical Sciences, Associate Professor, Head of the Department of Foreign Languages, Pedagogical Institute named after V. G. Belinsky, Penza State University, Penza, Russia. nataliia.pavlova@inbox.ru

Aleshina Ekaterina Yuryevna, Candidate of Historical Sciences, Associate Professor, Head of the Department of Foreign Languages and Foreign Language Teaching Methodology, Pedagogical Institute named after V. G. Belinsky, Penza State University, Penza, Russia. alcatherine@yandex.ru

Abstract

Modern information society features knowledge both as a key element of basic activities, and a framework factor of contemporary civilization. Therefore, paramount importance for estimating the efficiency of public institutions belongs to the knowledge management defined as the process of creating, sharing, using and managing the knowledge and information of an organization (Girard, J.P. Girard J.L. (2015). The system of education, particularly, higher education institutions play a central role in the development of knowledge management theory and practice in contemporary society. In its turn, the system proper also benefits greatly from the capitalization of knowledge and raising the efficiency of using the intellectual capital. One of the most important imperatives of the modern educational system is the continuity of the educational process, which necessitates creating the optimal system of higher school and secondary school interaction. This seems especially true for pedagogical education. The article is aimed at providing theoretical background of the innovative approach to organizing interaction of universities and schools, at characterizing the key principles of the interaction. The article contains comments for the definite examples of the pedagogical cluster as an instrument of the interaction between universities and schools with a view to raising the efficiency of using the intellectual capital at different levels of educational system.

Keywords: higher education, teacher education, cluster model, knowledge management, integration.

The key figure in the knowledge management system of an educational organization is a teacher, a personality possessing a complex of information, communication and social competences in information, communication, and a high level of accomplishment as well as the aspiration for improving the level of his / her pedagogical excellence with the help of implementing new technologies.

The professional tasks solved by the teacher in his/ her professional activity are a major factor of influence on the contents of teacher's instruction. The category of the teacher's professionalism includes not only a complex of knowledge and skills which present an important prerequisite for the efficiency in teaching activity (Isaeva, 2003), but also vital personal qualities alongside with experience. Modern educational environment requires a teacher to have such qualities as research skills, skills of projecting educational processes and solving pedagogical tasks, as well as the skill of planning classes in accordance with various goals.

The demands that the teacher's personality should meet in within the framework of perfecting the knowledge management comprise the following personal qualities: empathic orientation, humanitarian orientation, ability to win the children's trust, pedagogical optimism, sociability, sense of humour, creativity, emotionality, tactfulness, volitional professional powers, organizational skills,

capability of volitional impact and logic argumentation, the skill of setting and solving tasks, basic knowledge in pedagogy, psychology, sociology, multimedia teaching technologies, ability and skill of transforming the scientific material into the material of a school subject, managing the technical facilities, ability to apply and develop the system of efficient teaching methods.

Of high importance in the teacher's professionalism is his/ her education at the university. Making the education productive in accordance with the modern level of intellectual capital management and oriented to the demands of the modern labour market requires increasing efficiency in cooperation between university and school.

It should be noted that this cooperation is being implemented due to the principle of theory and practice interconnection, though the analysis of the real situation has revealed a number of problems.

The problem of cooperation between universities and schools begins with defining goals: the university's aim is to enroll the applicants with a high level of knowledge while the school views the university's mission at this stage in organizing the preparation of the senior students for entering a higher education institution (only for the process of entering, not for the training). Thus, the school is oriented to the short-term result – the percentage of prospective students. Meanwhile, the school students' personal and professional self-regulation generally remains their own and their parents' task. This occurs because of the absence of integration of educational programmes of basic and higher education and is especially visible at the level of basic education.

The second pedagogical discrepancy is connected with the school students' low motivation. Generally, university professors work with senior school students. They are least connected with primary school, which greatly restricts the potential of the universities' positive educational impact on school instruction. Despite the efforts undertaken at a senior level, the problems originating from primary and secondary school remain.

The third problem is linked to the school's not realizing the necessity of academic supervision from outside. The school administration aims at a definite practical result, therefore, they turn to science only in extreme situations: e.g. for working out the concept of the school's development, while preparing documents for the due licensure or attestation, etc.

The fourth problem concerns the best graduates of pedagogical institutes who do not intend to work in the field and graduate only for getting good humanitarian education.

Currently, there are several traditional models of creating interaction between basic and higher education. These include organization of profile (magnet) grades and school students' pre-university instruction. Still, the drawback of most of these models is their being one-sided as the school acts as a customer while the university as a contractor. After its leavers' enrollment, the school being no longer responsible for education results does not feel the need for further cooperation with university. At the same time, the university (especially a pedagogical one) requires establishing and expanding networks with schools as basic and experimental grounds. Thus, the basis for interaction between school and university should be the equal cooperation of all the parties united by the process of solving the commonly-set tasks (not only the preparation for university). In the process, the efforts of each subject harmoniously correspond to the interests and needs of others, which results in achieving the most efficient use of intellectual resources possessed by the educational system.

Quite actual today is the concept of professional and developmental teaching which has an integrative character (Zeer, 2010). The students in an educational programme of a pedagogical higher education institution should possess the knowledge of pedagogy and psychology; they should know the modern school, kindergarten, college, they should be able to be administrators and researchers. In other words, a student should more or less fully realize the activity acquired in course of tuition. A future teacher should get not only an operational experience in performing special functions in profession, but also get a social and practical experience. It will help him/ her to get integrated in the practice and

corporate environment of an educational institution and smoothly go through the social on-the-job adaptation, to reveal his/ her own creative and intellectual potential.

The core of the teacher's professional training is the idea of combining learning with practice. We regard the integration of professional pedagogical education and school internship, as said above, as a process of unification (inter-penetration and mutual enrichment) of theory and practice aimed at formation of the student's readiness for professional activity.

Integration is a peculiar reaction to the processes of separation of the unity taking place in all spheres of being and learning. The restoration of the unity occurs through transformation of the synthesis constituents and their acquiring new qualities. Degree and intensity of these transformations are mostly determined by inner capabilities of integration components as well as goal-settings defining the limits of functioning and development (Chapaev, 2007).

Organization of the efficient interaction between university and school can be based on ~~the application of~~ the cluster approach to the development of education. This approach allows for enhancing the processes of knowledge management on a more complex and integrated basis, which contributes to raising its efficiency. The pedagogical cluster as an innovative model can solve the problem of cooperation between university and school as it features the educational, methodological and research work with teachers, academic advising, scientific and methodological backing of the educational process, testing the modern educational technologies, preparation of the school-leavers for entering a higher education institution, raising the teachers' and students' scientific consciousness, providing the school's educational process with new programmes and guidelines, improving the teachers' professional skills, carrying out research into problems of education, organizing scientific and methodological seminars for teachers, providing support in holding conferences and pedagogical councils, inclusion into work with parents, etc.

The development of cluster-based education began in Europe in the 1990-s as a result of extrapolation of cluster theory and development offered by M. Porter (The Competitive Advantage of Nations, 1990; On Competition, 1998) who analyzed the experience of the Massachusetts educational cluster led by Massachusetts and Harvard Universities in comparison to other states (first of all, California) and overseas examples.

The term cluster origins from information technologies and is used to define a unity of several homogeneous elements which may be regarded as independent units possessing certain properties. This term is traditionally used in economics (Porter, 1980) but recently it has been used in Russian pedagogy which is explained by the need to unite professional forces for solving the issue of training teachers in accordance with the demands of educational organizations.

In pedagogical education a cluster is a unity of spatially located institutions and organizations interacting on the basis of agreements and participating in realization of scientific, educational and innovative goals of training specialists in education (Sokolova, 2014).

According to the researchers, the basic cluster properties include:

- specialization (the objects comprising the cluster function in one common market and use similar processes);
- plurality of participants (the clusters unite various enterprises acting in the market);
- life cycle (in its development a cluster passes stages of a life cycle – creating, development, maturity and decline);
- innovation (for maintaining the cluster's high competitive ability it requires the speeding of the innovation process) (Lapygin).

Considering the university's role in the development of modern theory and practice of cluster approach, it is possible to single out an educational cluster as a type presenting a system of modern interaction in the form of social partnership and dialogue.

Educational cluster is a unity of interconnected institutions of professional education joined on a discipline-specific principle by partnerships with enterprises from the corresponding sphere. The main functions of the educational cluster are as follows: the economic function (creating the sphere of efficient services timely meeting the needs of the sphere's needs); the social function (creating guarantees for graduates of professional institutions), the marketing function (advertising advanced educational technologies, organization of career guidance), the legal function (providing for working out the legal basis of the partnership, for the subject position of all social partners), the pedagogical function (joint projecting of the educational activity in the sphere of the specialist's instruction, providing for the content and technological part of the social partnership among all the educational cluster participants).

The case of an educational cluster is a pedagogical cluster whose main distinctive features are creating conditions for training the specialist with different levels of professional education, integration of education and science, the increased prestige of teaching as a profession).

The model of a pedagogical cluster can be presented a s a unity comprising organizational, managerial, technological and content-related levels allowing for distinctly picturing a targeted process of social partnership development, for defining the correspondence of the goal to the final result. The specificity of the pedagogical cluster is a unity of the content-related, procession and resultant aspects of implementing social partnership in the system of pedagogical education with the view of increasing the quality of professional school graduates preparation.

The analysis of cluster development experience has shown that the CIS-states environment has various types of clusters: according to activity direction (competence-oriented, scientifically-innovative, innovative-educational, socio-cultural); according to the level of organization (regional, republican, municipal, institutional, international); according to the areas of education, etc. The clusters of various types and levels of organization are regarded not as colliding, but rather as complementary.

As distinct from the traditional system, the cluster model allows for creating an innovative educational paradigm to develop along the following magistral directions: instructing qualified staff, generating new knowledge and technologies, the system of industrial and technological support, managing innovative activity, investing into socially important and technologically-intensive projects, promoting the intellectual property assets in the market.

As a number of regions (including the Penza region) are marked by a considerable disbalance between directions and the scope of training specialists in universities in the region and the economy's demands there, the cluster model is aimed at providing for training staff for the developing economic spheres linked to the innovative projects. First, it enables the students to choose the priority areas of instruction according to the current and prospective demands of the region. Second, it leads to minimizing problems with the graduates' employment. Third, a higher education institution (as a cluster innovative core) is provided by the qualified faculty. Fourth, through the process of the cluster model implementation defined are the problems of scientific research actual for the region together with the ways of their solutions. Thus, the organized interaction helps to look differently at the possibilities of the formed and potential connections of schools with different structures: higher education institutions, secondary education institutions, scientific and research organizations, public and commercial organizations as well as realize socially important projects.

Initially, we present the experience of creating pedagogical clusters on the territory of the Russian Federation. Indicative is the experience of Orsk humanitarian and technological institute (a branch) of Orenburg state university (the city of Orenburg) in creating the innovative and educational cluster which provides the students with the opportunity to continually emerge into the sphere of their future professional activity, allows for studying and generating the best practices, for fast testing of the scientific achievements, for upgrading the organization and contents of the professional instruction. In Moscow a university and school cluster is working on an experimental basis. It consists of 33 complexes comprising 220 school and kindergartens. The teachers work according to the new

paradigm of activity education. Tatarstan has recognized the cluster approach as efficient instrument of the republic's economy since 2007-2008. In March of 2006 the Cabinet of Ministers of Tatarstan approved the Concept of Formation of National Clusters. There has been recently worked out the Strategy of Development and Placement of the Productive Forces in the Tatarstan Republic until 2030 on the basis of the cluster approach. The social and pedagogical cluster is an instrument of creating an open pedagogical education of the future as seen by K. Minin Nizhny Novgorod pedagogical university. The infrastructure of the Ulyanovsk region is created on the Programme of Development of Innovative Processes in Pre-School, Secondary Education and Professional Education Organizations and Organizations of Additional Education of the Ulyanovsk Region with the independent regional educational cluster. The Programme has been realized since 1994 with the aim of providing conditions for innovative development of the system of pre-school, secondary school, basic, additional and professional education of the Ulyanovsk region. In the Archangel region a pedagogical cluster will start working in 2017 uniting the efforts of all the educational organizations in the spheres of higher, secondary professional, additional and basic education.

The Penza region has all prerequisites for realization of the project on creating a pedagogical cluster as a new educational network environment: professional institutions interested in cooperation, a higher education institution with the qualified staff realizing the tasks of professional integration of the University educational complex (Penza State University). V.G. Belinsky pedagogical institute of Penza State University is oriented to the cluster approach in staff training. Currently the cluster includes V.G. Belinsky pedagogical institute of Penza State University, the Ministry of Education of the Penza Region, the City Department of Education, and ten secondary schools.

The inclusion of educational institutions into the pedagogical cluster takes place of the principles of territorial proximity, mutual cooperation, joint usage of the facilities and resources. Designing the models of interaction between V.G. Belinsky pedagogical institute and secondary education institutions was based on the following principles of the cooperation:

– the principle of openness realized in the institutions' ability to choose the way of their development;

– the principle of adaptability providing for harmonious relationship inside the interacting teams, connections of educational institutions with social environment;

– the principle of consistency forming the ability of an educational institution to build its own educational trajectory inside and outside the institution;

– the principle of availability oriented to the nearest perspectives of the institution's development and wide access to education for students and their parents;

– the principle of cultural conformity contributing to the institution's maximum use of its environment, society and region;

– the principle of cooperation expressed in creating beneficial conditions for the self-realization and development of the intellectually gifted children and teenagers, for the dialogue in interaction.

The aims of the pedagogical cluster in the system of regional education are as follows: improvement of the quality of training teachers who would be socially and professionally mobile and competitive in the labour market; provision of the innovative character of educational, research and experimental activity of higher education institutions, enterprises and organizations in the region; integration of education, science and industry; development of the educational, material, methodological and industrial base of the institutions involved in the activities of the scientific and educational cluster.

The pedagogical cluster allows for solving the following tasks:

1) Modernization of the educational process and improvement of the educational process management (changing the organizational structure of the educational system; redistribution of the duties among its elements; formation of the new institutions of the educational system offering a wide range of educational programmes and services; transformation to the open education).

2) Improvements in the quality of students' training at all levels of instruction. Development of staff potential (implementation of new technologies; opening new profiles of instruction on the

employers' demand; designing and modernization of study plans and curricula (including the school ones) adjusted to the university's requirements; designing the joint study plans for higher education providing for continuous education for experienced and young teachers; creating conditions for close interaction of the faculty with secondary education organizations inside the cluster; attracting the necessary number of the pedagogical staff of the corresponding qualification; professional retraining of teachers.

3) Modernization of the scientific and research process and creating a methodological and material base (creating a coordination centre with a view to organizing the efficient cooperation of research staff of higher educational institutions in accordance with the potential employers' interests). The cluster will provide participation of students, professors and teachers in research work on education problems, as well as the process of getting practical skills which will improve the quality of teachers' training and simplify on-the-job adaptation. Moreover, the laboratory and technical facilities will be brought in line with the modern requirement of IT-development in education.

The pedagogical cluster based in Pedagogical Institute of Penza State University realizes the following models of interaction among organizations:

1. Information and cognitive social activity concentrated on expanding the students' knowledge about the world and about self a subject of all-civilization process of school and out-of-school activity. This model supposes the functioning of organization services: additional courses, clubs, lecture-centers, research-to-practice conferences, counselling, excursions to the Interactive museum of entertaining sciences where the guidance is done by the students of the Faculty of Physico-Mathematical and Natural Sciences.

2. The problem-related, analytical or discussion activity supposes development of social activity aimed at conceptualization and analyzing reality which includes training, workshops, problem seminars, round tables, research and project activity.

3. Social and role model comprises social activity and is committed to the senior students' pre-professional training (contests, Olympiads, conferences, project activity, subject-oriented summer physic-mathematical camp, the school of a young psychologist, etc.).

4. Play activity is targeted at various types of extracurricular work.

The main directions of developing interaction are learning and teaching (comprising working out and approbation of manuals, study guides for students and school teachers, managing academic activity in various subjects, developing contacts of school teachers with university professors with a view to exchanging experience and counseling), and research and methodological cooperation. The latter features such forms as joint round table talks on most important issues of the cooperation, methodological seminars at university departments with school teachers' participation, organization of annual student research-to-practice conferences with school students' participation, reviewing school students' research and project works by university professors, involving school teachers into participation in university conferences, organizing subject olympiads and contests for school students at university, additional courses and clubs for school students organized at university, methodological support provided by university staff with working out academic programmes, working out and publication of joint paper collections, study guides, monographs with generalizations of cooperation between the faculty and school methodologists and on results of scientific research, supervising school students' research activity, providing university facilities for school students' use (a possibility to use the university library), involving faculty into organization of regional and all-Russia contests.

Supervising the school students' research activity includes: revealing and instructing the students with enhances abilities for research work, using a system of variable tasks aimed at developing logic and creative thinking in the study process, joint instruction of school students on basic research skills (choosing a theme, goal-setting, analyzing sources, research part, scientific style, presenting results).

In this aspect the research activity contributes to the teacher's professional development, to the improvement of his/ her creative potential, as participating in research work leads to maintaining a certain status in an educational institution, research activity helps the teacher to get rid of outdated views and become more flexible in different situations.

The third direction features staff cooperation in the process of teachers' professional retraining by means of organized courses of professional development. In our university there is a centre of additional pedagogical education offering various programmes: professional development, specialists' retraining aimed at improving their professional knowledge, perfecting management skills.

Of greater importance is interaction in the sphere of career guidance preparing students for professional self-determination. There come Welcome days at university, meetings with teachers, school students and their parents on application process and regulations, presentation of the university in the form of videos and handouts, inviting school students to university events (talent contests, KVN, etc.).

The cluster form of the organization allows for creating a common innovative product and preparation of the highly-qualified staff possessing the necessary professional competences. Continuos communication of the prospective teacher with prospective students contributes to the young teacher's professional adaptation to the school environment. As a result, the school administration gets a well-trained specialist.

Nevertheless, the school realities and analysis of social and pedagogical research shows that even with the high level of readiness for pedagogical activity, the pedagogical institute graduate's personal and professional adaptation may be quite slow and complicated. The problems that a young specialist faces at the school can be grouped as follows: 1. Professional problems connected with a wide range of activity and the necessity to feel confident in the school environment; 2. Organization problems connected with managing own professional activity; 3. The problems of integration in the teaching staff, establishing interaction and understanding with colleagues and administration; 4. Emotional problems connected with acquiring a new social role.

Apart from that, the introduction of new educational standards at the school leads to additional difficulties in a beginner's professional adaptation. Thus, he/ she turns out in a situation of vagueness on the way to integration into the new educational environment which makes professional adaptation more complicated. We see the solution to the problem in managing psychological and pedagogical support to the young teachers' adaptation provided by our 'School of a young teacher' organized within the cluster's framework. This kind of cluster work comprises a complex of measures improving the qualifications of a young teacher up to the level on which he/ she would be able to model own professional activity according the the Federal Standard requirements.

'The School of a young teacher' maintains the following directions of activity:

1) diagnostic monitoring reflecting the teacher's personal development in three aspects: a) professional (studying pedagogical experience, the teacher's theoretical and methodological training, analysing the efficiency of the lesson according to the Federal Standard requirements, evaluating the level of professional maladaptation; b) behavioural (analyzing the emotional and volitional sphere of a personality, studying professional motivation); c) personal (studying self-assessment, underlying risk for psycho-emotional burnout).

2) seminars in modules given by university methodologists as well as by most advanced school teachers with a highest qualification category: psychological and pedagogical foundations of educational activity, modern teaching technologies, creative self-development pedagogy, a teacher's methodological competence, a modern teacher's image.

3) training programme (organized by university psychologists) aimed at facilitating successful social and psychological adaptation of young teachers, support with establishing an emotional contact with colleagues, creating an atmosphere of collaboration in a group of teachers,

building self-confidence, taking group decisions, practicing different types of interpersonal perception, building a teacher's awareness of own personal needs and positive change of his/ her attitude towards self and others.

A teacher's professional development becomes more successful with expanding the possibilities of his/ her self-realization in professional sphere. Becoming a professional is impossible without the skilful organization of the university educational environment which is a major factor of building a future teacher's professional competence. Required for this are the following conditions:

– the content of the subjects under study should be practice-oriented and close to reality;
– the forms and methods of activity should be clear, logically grounded and easily applied in the school reality;
– the student-teacher relationship should be build on the principles of democracy and developmental teaching;
– there should be material and technical facilities for organizing students' modern educational activity and development.

The work of base practice grounds, holding scientific and research conferences, organization of research laboratories, holding joint seminars of students, professors and school teachers will allow for creating such environment.

The efficiency of the pedagogical cluster as an instrument of school and university cooperation depends on the following factors:
– improving the work on the model "School – University – School", attracting new participants from the innovation organizations of Penza city, varying the forms of interaction inside the cluster;
– providing methodological support for young teachers (School of a Young Teacher, organizing seminars and conferences for the teachers of the Penza region);
– creating conditions in the pedagogical higher education institution for students' preparation for successful professional activity;
– maintaining the students' professional formation in the university through their creativity potential development;
– establishing relationship between the faculty and the students on the principles of mutual respect and cooperation;
– developing students' self-administration within the university;
– getting students involved into socially important projects;
– building students' social activism.

The inquiry held for the teachers from the schools included in the pedagogical cluster showed a rather level of their awareness of the essence and importance of school and university integration. Most teachers noted that the cooperation between a higher and a secondary school expands the common educational space and improves the quality of education, which is beneficial for all the participants. The university gets a real idea of the modern school students' level of knowledge and can contribute to its promotion thus getting applicants and students with good background. In this turn, the school is interested in raising its prestige and status in the educational market. The teachers can get their professional development supplementing it with new forms of activity and new kinds of knowledge. The students will get the education meeting the up-to-date requirements and standards as well as the skills of research activity. The parents will have an opportunity to learn about the requirements for university education and see if their children's professional choice was right.

Therefore, understanding the essence of and practical realization of the cluster approach create the necessary prerequisites for discovering new resources and possibilities of development of educational system improving the quality and competitiveness of education. The organized interaction allows for creating a practice-oriented educational environment which raises the competitive ability of all the cluster participants, maintains the training of highly-qualified specialists within the optimal terms and provides means for building individual educational trajectories of professional self-realization. As

seen from the experience of foreign states, different regions of Russia and also the practice of Penza State University, cluster approach can increase the efficiency of the educational axis "School-College-University-Education Authorities"; provides for the full and all-round use of the human assets which is key to the educational environment; enhances the development of not only the intellectual but also social and cultural constituents of the educational organization and brings the knowledge management in education to the new level.

References

1) Isaeva, T.E. (2003) A professor's pedagogical culture as condition and index of the quality of educational process in the higher school (Comparative analysis of the Russian and world educational processes), Rostov-on-Don, Rostov State University of Transportation.
2) Zeer, E.F. (2010) Theoretical and methodological grounds of a person's the professional and educational space in Theory and practice of professional and pedagogical education: collective monograph ed. by G.M. Romantsev, Vol.2, Ekaterinburg, Russian State Professional and Pedagogical University Press.
3) Chapaev, N.K., Vainstein, M.K. (2007) Integration of education and industry: methodology, theory, experience. Chelyabinsk, Ekaterinburg, ЧИППРО, ИРРО, 2007.
4) Sokolova E.I. (2014) 'The term "educational cluster" in the concept field of modern pedagogy'. *Continuous education: 21 century 2 (6*), 153-160.
5) Lapygin D.Yu. 'The contours of the regional educational cluster' [Online]. Available: http://journal.vlsu.ru/index.php?id=264.
6) Porter, M. (1998) On Competition. Boston, Harvard Business School.
7) Girard J.P. Girard J.L. (2015) 'Defining knowledge management: toward an applied compendium'. *Online Journal of Applied Knowledge Management. Vol. 3. # 1.,* 14

The Contribution of Territorial Marketing to Reginal Developemnt: What Role of Tourism Secteur? The Case of Tangier Tetouan Region

Mostafa Abakouy

Enseignant-chercheur à l'Ecole Nationale de Commerce et de Gestion de Tanger

(Université Abdelmalek Essaâdi)

mabakouy@yahoo.fr

Majda Khatib

Doctorante au Groupe de Recherche en Entrepreneuriat, Finance, Audit et Marketing, Ecole Nationale de Commerce et de Gestion de Tanger (Université Abdelmalek Essaâdi)

Khatibmajda2@gmail.com

Morocco

Abstract

Attractiveness is an important element in the development of a territory because it helps put it in front of the competitive scene territories, and it makes such a product to be sold to develop. It is seen, in fact, as imperative for all countries. This is facilitated in particular by adopting a territorial marketing strategy that allows you to highlight its strengths and promotes development through the provision of territorial marketing actions.
It appears to us then, the existence of a relationship between the practice of territorial marketing and regional development. Therefore we will try to demonstrate this relationship by focusing on the contribution of the tourism sector in the region Tanger Tetouan.

Keywords: marketing territorial, regional development, tourism, region Tangier Tetouan.

Introduction

In the wake of the English-speaking countries and Northern Europe, territorial marketing is now in fashion. Due to the increasing mobility of production factors, the increase in free trade agreements, but also the increasing number of offers offered to international investors, tourists and organizers of professional events, cities, regions or countries with an intensification of international competition. Similarly, existing and potential customers have increasingly personalized requirements.

What to do in such a context to defend and enhance its attractiveness? How can we attract more activities, promote territorial competences or retain our industries and jobs? What is certain is that generalist messages no longer carry. To assert itself as "a key place" at the heart of world trade,the territories must identify their elements of differentiation in relation to their competitors, whether in terms of price or specific qualities. To improve the competitive position of their territories, local officials are wondering about the ways and means of evolving their territorial offers to be more competitive.

Faced with these questions, territorial marketing offers decision makers a global approach that makes it possible to highlight the attractiveness factors of cities, intermunicipalities, departments or regions.

That said, a highly attractive territory clearly represents significant comparative advantages: job offer, investment ... and this is where the notion of development makes sense.

Previously, development was targeted by national strategies for a country as a whole, or by sectoral development strategies that target the development of each sector or industry independently of other sectors. Today, however, it has been shown that the most effective way of addressing the development problem relates to the use of an upside-down approach, from the inside to the outside, which means that Development must be triggered from regional levels and not from national levels.

Tourism not only facilitates job creation, it also plays an important role in creating equality in the distribution of wealth between regions. It reduces the funding period for new infrastructure and helps protect historical monuments that represent resources for tourism. (Morena, 2004) "Tourism is a means of individual and collective fulfillment, insofar as it fosters mutual understanding and respect between peoples and societies. Traveling for reasons of religion, health, studies and cultural or linguistic exchanges are particularly beneficial forms of tourism that deserve to be encouraged, as well as nature tourism or ecotourism "(Morena, 2004).

The choice of the city is not arbitrary. Indeed, the city of Tangier constitutes a center of concentration of most Moroccan or foreign investments and presents a fertile ground of development. The city sparks the common interest of both the state and investors in order to take advantage of its resources in several aspects.

Our study allows us to:

- Highlight the territorial marketing tools that will enable the territory to improve its attractiveness.

- To clarify the concept of regional development that is used but not in an appropriate way.

- Show how companies participate in the regional development of the Tangier-Tetouan region.

Territorial marketing and regional development: literature review

Territorial Marketing Literature Review

Definitions of territorial marketing are abundant, especially by specialized authors and researchers. These definitions range from the most restrictive, limiting the role of territorial marketing, to broad definitions that attribute to marketing territorial role in the economic development of a territory, a city or a region. Definitions include:

- Territorial marketing is an approach aimed at attracting companies to a territory, facilitating business activity and promoting a territorial image favorable to endogenous development.

- The marketing of a city can be defined as its individual or collective actions to attract new activities on its territory, favor the development of companies operating locally and globally promote a favorable image.

- Territorial marketing represents the art of positioning a village, a city, a region, a metropolis on the vase world market.

However, referring to one of the authors, namely the sociologist Michel Wieviorka, the term "territorial marketing" appeared in 1975 and since then has evolved both theoretically and practically This is related to the major concerns of space, or more precisely territories, at that time. It is not only a matter of promoting or selling the territory, but of caring for and developing its natural qualities and the potential of the regions.

Beginning in the 1980s, territorial marketing was much more associated with urban development, but it is important to emphasize in this connection that the true meaning of this neologism is conceived only through the first book by Ashworth and H. Voogd (1990) entitled "Selling the city: Marketing approaches in public sector planning" (Mendes, 2006).

Importance, practices and tools of territorial marketing:

Territorial marketing has a very important contribution to the economic development of a territory. It is a tool that attracts and retains various targets, including tourists and businesses. The latter constitute a real investment in the territory in question ,this contribute to the improvement of its quality of life and to the creation of a sense of belonging for all the players in the territory. This is how we can affirm that territorial marketing is a very important means of local development and that is expressed in a communication and a dissemination of the values of the territory.

As we have seen, the territories now use the same reasoning as companies. They even use the same tools, the same methods to differente themselves from their competitors. The challenge of the territory is to "constitute local excellence in the face of competition"

For this there are many tools like:

Knowledge tools: statistics, surveys, SWOT analysis, PESTEL analysis, etc.

➢ Management tools: strategic marketing (segmentation / targeting / positioning), marketing-mix, evaluation.

➢ Tools for action: promotion, mobilization of local actors, development, improvement of the local offer ...

However, the "copy / paste" of this practice is not systematic and should not be systematic since it leads to a certain efficiency and standardization of territorial marketing.

Regional Development and the Tourism Sector

Regional Development Literature Review

Until the 1960s, development was seen as a set of quantitative mutations and measurable progressions of products and average incomes - progress generally achieved through increasing industrialization of the economy. For a given population, this would mean access to a certain level of wealth and material well-being, estimated in terms, for example, of GNP, GDP, or per capita income. These indicators situate countries on the scale of development.

Development, as we define it here, is both economic and social. It refers to all the technical, social, demographic and cultural transformations accompanying the growth of production. It can be associated with the idea of economic and social progress, which reflects the improvement of the standard of living and the level of education, which are considered essential for the well-being of the population.

Tourism, a promising sector for the regional development of Morocco

Tourism is now regarded as the world leader in the economic sector, with a contribution of more than 10% to world GDP. In 1963, the UN Tourism Conference defined the tourist as "a temporary visitor staying at least 24 hours in the country visited, whatever the reasons for his stay" (Pasqualini & Jacquot, 1989 quoted in Dupont, 2002). In 1994, the United Nations extended the definition of tourism to include "all the activities deployed by persons on their journeys and stays in places outside their usual environments for a consecutive period Shall not exceed one year for leisure, business or other reasons not related to gainful employment in the place visited "(UNWTO, 1994).

Tourism not only facilitates job creation, it also plays an important role in creating equality in the distribution of wealth between regions. It reduces the funding period for new infrastructure and helps protect historical monuments that represent resources for tourism. "Tourism is a means of individual and collective fulfillment, insofar as it fosters mutual understanding and respect between people and societies. Traveling for reasons of religion, health, studies and cultural or linguistic exchanges are

particularly beneficial forms of tourism that deserve to be encouraged, as well as nature tourism or ecotourism.

The development of tourist destinations is strongly affected by globalization; Tourism is "an industry built around the concept of the nation-state, where each destination has its institutions, political, economic and social / cultural capital. Yet they are all competing with each other for the wealth and status that tourism can create. " Tourism competition is not limited to destinations offering identical or similar services, but can be extended to destinations offering completely different tourist offers.

Tourism is a sector that has not only an important role in the economic sphere for the creation of wealth and improvement of the quality of life of the populations of the tourist destinations; It also helps to bring people and communities in contact and to cross cultures and civilizations. It therefore has an important role to play, that of "facilitating dialogue between cultures".

From an economic point of view, tourism is the sector that produces the highest incomes, as soon as possible and with the least investment. Given the fact that many poor countries and regions in the world do not have sufficient resources to develop industrial economies, tourism becomes a relevant and rapid solution to improve living conditions and reduce poverty.

In the final analysis, the sustained development of the tourism sector is accompanied by the emergence of a new generation of national operators that contribute to the modernization and competitiveness of the sector: tourist investment funds, developers and developers of integrated stations , Operators, low cost airlines, receiving agencies ...

In turn, international tourism operators, hotel managers, tour operators and airlines, are numerous to set up in Morocco, helping to strengthen the know-how, accessibility and visibility of the sector on the international scene.

Contribution of the Territorial Marketing of the Tourism Sector to the Regional Development of the Region Tangier Tétouan

Research Methodology

The epistemological posture of our research is based on positivism, a paradigm that allowed us to explain an existing reality, the choice of the positivism paradigm goes in the sense that we try to explain the link between territorial marketing practices and regional development. The principle of causality is at the heart of our positivist paradigm, because it consists in the assertion that any event or phenomenon can be explained by a causal link . To explain this reality, we must therefore discover the simple reasons by which the facts observed are related to the causes that explain them. The path of our research is rather confirmatory than exploratory, it is a matter of confirming assumptions.

Structure of the guide interview

In order to make the analysis even more relevant, it was agreed to carry out a qualitative study of the organizations likely to contribute to the regional development of the Tangier-Tetouan region,but also 30 tourist companies including 17 hotel chains and 5 travel agencies, the remainder being divided between the rental agencies and the associations organizing events.
The aim is therefore to explore the strategy of local authorities and to see to what extent they adopt the appropriate strategy of territorial marketing.
It is in fact a direct interview with the various regional officials of the tourism sector in the region Tangier Tétouan. Indeed, we have chosen the organizations with the most authority and impact on decision-making in the sector as well as those directly attached to the Ministry of Tourism. We have therefore chosen SMIT: the Moroccan tourism engineering company, the CRT: the regional tourism council and finally the Tangier Tourism Delegation.

I: general presentation: This sheet is a collection of the data of the actors responding to our questionnaire. It gives us an overview of the characteristics of the actor allowing us to operate a

certain classification for the purposes of analysis. The organization presents its objective, its vision and its missions, this allows us to analyze the contribution of the structure in the promotion of the region and the encouragement of investments.

II: Tangier Tétouan: This field allows us to have a global view of the region Tangier Tétouan, that is to say the infrastructures of the region as well as the situation of tourism.

III: Elements relating to territorial marketing: a vision of territorial marketing by the actors. Through this third sheet, we look for the existence of a territorial marketing strategy within our field of investigation. To this end, we have structured this form around the key elements of territorial marketing, in particular the apprehension of the actors involved in territorial promotion and development activities, the attractive or repulsive factors for the actors as well as the issues related to decision-making and The brand image of the study territory.
The focus is therefore on territorial marketing practices within the organization as well as incentives for investment.

IV: Elements related to regional development: This component is devoted to the measurement of the contribution of tourist enterprises to regional development.

During these interviews, the difficulties that we encountered were mainly in contact with those responsible who were not at all available because of the tourism foundations that took place during the same period.
In spite of this, we have been able to draw a significant amount of information about the territorial marketing practices of each of them as well as their vision of regional development and to what extent one can influence the other.

Discussion of Results and Recommendations

Analysis of semi-directive interviews

In order to complete our study, we have agreed to conduct semi-structured interviews with the heads of tourism development organizations in the Tangier-Tétouan region. To do this, it was necessary to draft an interview guide to guide the discussion to the most relevant elements of the analysis.
For all the officials questioned, the main objective is to promote the destination of the region Tangier Tétouan. Indeed the 3 institutions surveyed consider that the destination Tangier Tetouan presents significant assets likely to make pillar of the sector of tourism in Morocco.

Indeed for all those surveyed, the destination Tangier Tetouan has important potentialities and unavoidable assets such as the sea fronts for the development of the seaside tourism, the spaces clothe for the tourism of nature as well as the cultural tourism with the monuments and The ancient medinas.

The situation in the sector is relatively satisfactory in view of the revival of the destination in the Vision 2020 plan and the budgets allocated for the renewal of monuments and the establishment of new attraction policies.

Based on the discussion we had with the various managers, we found that they do not have a specific territorial marketing policy because of their focus on product policy by neglecting other marketing elements that could promote The development of the region.

The results of our global analysis showed that the majority of actors attached high importance to regional development projects. This is confirmed, in particular, at the regional level by the fact that the actors consider that development projects are very important. This importance is reflected in the role played by the actors in the regional development process.

Moreover, they are proposing incentives for investors and especially for tourism that stops once the project is completed, there are no post-investment satisfaction monitoring and control measures.

This case causes an obstacle especially for the organization of events or all the work begins before and after the event.
As for territorial communication, it is a variable taken seriously by all the officials interviewed, but the latter is limited to traditional channels not sufficient to highlight the destination Tangier Tetouan.
Concerning the last component constituting the regional development, the answer of the responsible ones leads to confusion. Indeed, the notion of regional development already is not quite clear to them. Regional development is limited to economic development only and does not take into account other important variables.

However, they believe that territorial marketing contributes to the regional development of the Tangier-Tetouan region through job creation and regional wealth and the strengthening of regional budgets

Recommendations for the Implementation of a Territorial Marketing Strategy to Strengthen Regional Development

Through the analysis previously elaborated, we found that the organizations specialized in promoting the tourism sector in the region do not have a territorial marketing policy or strategy adapted to the Tangier-Tetouan region. This is why the proposal to adapt the operational marketing tools to the territorial marketing of the city is important for the development of the Region.

In an operational marketing approach, the territory is perceived as a "product" having a price and being the subject of a communication policy. It will therefore be necessary to adapt the mix marketing tools to the specificities of territorial marketing.
We propose a reflexion access on the 4P adapted to the specificities of the region Tangier Tetouan namely:

-***Product policy***:If the place of investment can be considered as a product, this product can not be considered as any product. Indeed, unlike other goods or services whose contour or components are easily identifiable, the "product region" requires a greater reflection.
Like any product policy, whose main goal is customer satisfaction, the region product must be defined according to the perception of the investor, who is not only looking for a location, but also access to new opportunities.
The product region is therefore perceived in terms of improving the competitive position that the investor is likely to achieve through a new location.
Product policy can therefore be defined as the set of actions that serve to provide as complete a range of services and sites as possible to meet all demands. Product offerings include the following steps:

- ✓ Analysis of the motivations and needs of investors in order to know the characteristics of the demand.
- ✓ The rigorous analysis of the resources present in a territory and the specific capacities of the latter, with its strengths and weaknesses.
- ✓ The choice of a positioning for the territory.
- ✓ The exploitation of the factors of the attractiveness existing within the territory.
- ✓ The adaptation or creation of new factors of attractiveness, which will make it possible to have an offer tailored to the needs of investors.
- ✓ -The diversification of the tourist offer will allow investors to better understand the territory.

-The distribution policy: Distributing products means bringing them to the right place, in sufficient quantity, with the right choice, at the right time, and with the services necessary for their sale, consumption and, where appropriate, their maintenance.
However, in the context of territorial marketing, the distribution policy aims to facilitate access to the city by improving transport networks. The road network, the rail network, ports and airports are being

renovated to meet the needs of the industry and to forecast the economic and demographic evolution of the city.

***-Price policy*. :** The price policy in territorial marketing is materialized by the creation of different incentives for the decision to set up the company so that the latter comes to settle in one territory rather than another.

Incentives are an extremely widespread instrument of attraction policy. This instrument has the advantage of being more easily manipulated by the host territories than the other elements are likely to influence the decision to implant.

According to the study done by our care we found that the main difficulty encountered by tourism companies is fiscal and financial difficulties, however we will propose some proposals likely to help companies to face this problem among these solutions we propose :

- ✓ TAX INCENTIVES: As Tax holidays or temporary tax exemptions, Tax credits and deductions for investment, Accelerated depreciation, Aid to companies in difficulty ....
- ✓ FINANCIAL INCENTIVES: Loans, advances and interest subsidies, Loan guarantees and guarantees, land grants ....

-The communication policy: In order to face the different problems of territorial marketing, territorial communication is one of the most important elements in solving and taking into account all the difficulties facing territorial marketing. It is therefore of great importance for the realization of development projects.

It facilitates exchanges between stakeholders (communities, NGOs, regional authorities, community groups, etc.) with the aim of tackling common problems of development and achieving common objectives for Community action.

Investing in territorial communication is important, if not decisive, in the development of the Tangier-Tetouan region by enhancing the Tangier Tetouan destination by using the various communication media that can have a significant impact on investors.

Conclusion

We are witnessing an area in which marketing is involved in regional development and where it guarantees the best way to approach investors, to influence their localization decisions and to convince them to come and settle in the territory, which is an advantage Shared for both parties:

- Companies benefit from the advantages offered by the territory in qualitative and quantitative terms.
- The territory benefits from the advantages linked to the installation of companies, in terms of employment, financial resources, image, ...

The contribution of territorial marketing to regional development is one that seems to be understood and taken into account by the developed countries. The link between these two aspects, which could be implemented, in our case thus marks a great importance in the development of a region. However, this does not fully agree with the Tangier Tetouan region.

At the end of this study, we can only be aware of its incomplete nature. It is clear that it still needs to be improved and expanded and that it suffers from several shortcomings, but we still believe that it has shown how marketing can be considered as a tool for territorial development.

Nowadays, economic development is an imperative for local and regional authorities, which have become responsible, at least in part, for this development must influence the main factor of this development, namely: the enterprise.

Indeed, regional development requires the establishment and presence of companies, they create jobs for the inhabitants and finance the communities through the taxes they pay.

In the Tangier-Tetouan region, more than elsewhere, territories need companies to invest in them, create jobs, pay wages and taxes, create supply and demand. Unfortunately, territorial marketing is far from being A tool for regional development, to the extent that no application is made. It is not even envisaged, as a tool favoring the installation and maintenance of businesses within the territory.

Bibliography

Gollain V. 2008. *Réussir son marketing territorial en 9 étapes*, Version 1, Club des Développeurs Economiques d'Ile de France (CDEIF), Paris.

Nigel MORGAN, Annette PRITCHARD and Roger PRIDE, 2011 (third edition), *Destination Brands. Managing Place Reputation*, Butterworth-Heinemann.

MICHALET C.A., 1999, *La séduction des nations ou comment attirer les investissements*, Economica, Paris.

Vincent GOLLAIN, 2010, *Guide du marketing territorial. Réussir son marketing territorial en 10 étapes*, Territorial Editions.

NOISETTE P., et VALLERUGU F., 1996, *Le marketing des villes, un défi pour le développement stratégique*, Editions d'Organisation, Paris.

HATEM F., 2004, *Investissement International et politiques d'attractivité,Economica*, Paris.
Nazha Benabbes TAARJI-ASCHENBRENNER, mars 2008, *Un marketing territorial pour promouvoir l'offre de l'Oriental*, Orientale.ma, n°2.

Philippe CLERC, décembre 2008, *Stratégie d'Intelligence territoriale. Enjeux et pratiques au Royaume-Uni et en Chine*, Orientale.ma, n°4.

Vincent GOLLAIN, 2012, *Identifier et valoriser ses avantages comparatifs territoriaux avec la méthode Cerise Revait®, 5ème version.*

Courlet, Claude, 2001, *Territoires et régions : les grands oubliés du développement économique*, Paris, l'Harmattan,133 pages.

Aydalot philippe (1985) *Economie régionale et urbaine* Paris, éd. Economica, 485 p.

Boyabé jean-bernard (1999) 'Marché informel' : une lecture critique du modèle d'Akerlof in *Revue Tiers-Monde*, tome XL, n°157, pp. 169-186.

Delalande daniel (1998) De nouveaux indicateurs ? Richesses et pauvreté des Nations in *Cahiers français*, n°286, pp. 78-87.

bairoch paul (1977) *Taille des villes, conditions de vie et développement* Paris, éd. de l'EHESS, 421 p.

Barbier jean-claude, delpech bernard, giraut frederic (1995) Développement et autonomie des villes secondaires dans le Tiers-Monde in *Villes en parallèle*, n° 22, Université Paris X-Nanterre, Laboratoire de géographie urbaine, pp. 16-36.

Camagni roberto (1996) Principes et modèles de l'économie urbaine Paris, éd.Economica, 382 p.

CAZES Georges. *Tourisme et tiers monde, un bilan controversé*. Paris : L'Harmattan, 2006, 207 p.

DEWAILLY Jean-Michel. *Tourisme et géographie, entre pérégrinité et chaos*. Paris: L'Harmattan, 2006, 221 p.

Raymond-Alain Thiétart, coll, « méthodologie de recherche en management », 3eme édition Dunod.

Région de Tanger Tétouan : http://www.crtt.gov.ma.
CRI de Tanger Tétouan : http://www.investangier.com.

Agence pour la Promotion et le Développement du Nord : http://www.apdn.ma

The Significance of Small Businesses in the Township Economy: A South African Perspective

Caswell M. Maloka and Mduduzi S. Dlamini

Small Enterprise Development Agency

South Africa

cmaloka@seda.org.za or mdlamini@seda.org.za

Abstract

The purpose of this paper is to examine the significance of small businesses in the township economy in the post-apartheid South Africa. The majority of townships in South Africa are confronted with numerous challenges that affect the expansion of entrepreneurship activity and establishment of small businesses. These challenges date back from the past policies of spatial arrangements and exclusion of black businesses in the development agenda of the then apartheid government. Townships in South Africa are largely characterized by the lack of resources and infrastructure crucial for business development, high levels of unemployment, poverty and inequality. The development and support of small businesses in the townships is viewed as a panacea for the aforementioned challenges. Studies have demonstrated that there is a latent potential for township businesses to contribute meaningfully to the country's economic growth given the availability of adequate business development support. The democratic South Africa has since experienced the introduction of a number of government driven initiatives and programmes designed to stimulate entrepreneurship and promote small businesses. However, these initiatives appear to be fragmented and not coordinated with diminutive focus given to small businesses in the townships in particular. This paper argues that, in order for government to curtail the ever growing rates of unemployment, poverty and inequality in the country, role players in the small business development ecosystem including the Small Enterprise Development Agency (Seda), should start working intractably close with each other to leverage resources directed to small business development. The study used the literature review to demonstrate the purpose and support the argument as indicated above.

Keywords*:* Entrepreneurship, Small business, Township Economy, Unemployment, Poverty

Introduction

According to the recent data released by Statistics South Africa (Stats SA), the official unemployment rate in the country stands at 27.7% with more than half of the population living in poverty (StatsSA, 2017). The majority of the unemployed and people living in poverty conditions reside in townships and rural areas. Entrepreneurship and establishment of small businesses in the townships are therefore seen as a fundamental solutions through which these challenges can be addressed (Charman, 2017; Lekhanya, 2015; Chili, 2015). The substantial and meaningful involvement of people living in townships into the mainstream economy through their own businesses is therefore crucial (Lekhanya, 2015). Entrepreneurship and small businesses are viewed as the vital drivers for job creation and poverty alleviation, with 90% of jobs expected to be created in the small business sector by 2030 (National Development Plan, 2012). In recent years townships have seen an emergence of entrepreneurship activities and small enterprises due to the abolishment of legislations of the then apartheid regime that prohibited and discouraged black people to participate in the mainstream economy. The Department of Small Business Development (DSBD) in its strategic plans, recognises the importance of township small, medium and micro enterprises (SMMEs) and their contribution to economic growth, employment creation and poverty alleviation. Therefore, the department has prioritised the implementation of the National Informal Business Upliftment Strategy

(NIBUS), which focus on enhancing the competitiveness of a majority of township businesses. The government is privy to the challenges facing small businesses and cooperatives within the township economy. This paper therefore seek to examine the significance of small business in the township economy in the post-apartheid South Africa using the literature review. The article is structured into seven sections. It provides the historic overview of townships, a description of the township economy as well as the characteristics of small enterprises in these area so as to provide context to this paper. Furthermore, it unpacks the significance of small businesses in the township economy and outline how government can strategically intervene to assist these businesses.

Historic Overview of South African Townships

The literature review points to the origins of townships in South Africa back from the past policies of racial segregation and apartheid government (Jürgens, Donaldson, Rule & Bähr, 2013). The term 'Township' is usually described as previously underdeveloped areas in the country designed for black population living in the outskirts of the urban centres (Charman, 2016; Matli & Jordaan, 2016). These areas were deliberately designed to provide a pool of cheap labour constituted by black people from rural areas working in industries, mining and domestic work in the urban areas (Jürgens *et al*, 2013). Therefore, the formation of townships was to enable black population easy access to and from work. They are characterised by overpopulation, high levels of poverty, unemployment, low levels of household income, poor infrastructure and commercial investment (Chili, 2015; Jürgens *et al,* 2013). The apartheid spatial planning system provided limited investment in all forms in these areas including shelter and education (Charman, 2017). Hence, black people were constrained access to capital, education, basic and social privileges (World Bank, 2014). The limited access to such opportunities obliterated the fabric that small enterprises could be established by black people in the townships (Gauteng Township Revitalisation Strategy, 2014/19; World Bank, 2014). The inheritance from these past policies affected the growth of the SMME sector in the townships and demoralised those that ventured into business by denying them of any support. These perpetuated the growing levels of unemployment and poverty as a result of growing population in these areas (Jürgens *et al,* 2013). These authors argue that the above - mentioned issues are remnants of the apartheid government and have continued in the democratic government. Nevertheless, townships have seen a gradual increase in the levels of entrepreneurship and number of small businesses; and remain home for many people in the country. According to Matli & Jordaan, (2016), South Africa has made sizeable improvement in the living standards of townships.

Understanding the Township Economy

During the apartheid administration, the township economy in South Africa functioned in isolation from the mainstream economy. However, post the democratic dispensation, the process of integration took place (Jürgens *et al*, 2013; Charman, 2017). The term township economy represents the micro-economic and related activities occurring within the townships (World Bank, 2014). It is further defined in the Gauteng Township Revitalisation Strategy (2014/19) as enterprises and markets operating within the townships. The majority of these enterprises are characterised by high levels of informality with narrow access to markets. Hence, the concept is usually associated with the informal economy (Ligthelm, 2003). Township enterprises are understood to have been established in order to meet primarily the need of the people residing in the townships (Charman, 2017). However, a large amount of the product offered by these enterprises are not produced within the townships, but in their nearest towns or cities. Worryingly, a majority of people living in the townships spent greater part of their income on goods and services outside of these areas (McGaffin, Napier and Sebina, 2015). Evidently, Thulo (2015) indicates that 25% of the money generated within the township is spent there. The township economy is largely dominated by low income households which define the buying power and the skill profile of individuals living in the townships. The household income in most of the townships is usually generated from labour obtainable in the nearest cities and towns in form of wages and salaries or through engaging in a wide variety of small-scale economic activities (McGaffin *et al*, 2015). Currently, there is no established national report which gives accurate data on the impact of the township economy. However, its contribution to economic growth and job creation is widely acknowledged by many. According to the study conducted by the World Bank (2014), South Africa's townships contribute up to R100 billion to the overall economy. Therefore, a

concerted effort need to be directed to the township economy in order to unlock its full potential, important for job creation and economic growth.

Typical Characteristic of Small Enterprises in the Township Economy

Small businesses in South African township economy are involved in a wide variety of economic activities (Matli & Jordaan, 2016). Township SMMEs are largely survivalists and micro-enterprises and mostly informal (Charman, 2017). Survivalist enterprises are described as a set of SMMEs mostly involved in activities carried out by unemployed people who are unable to find permanent jobs (Tustin, 2003). These kind of enterprises does not employ anyone and generate insignificant income with little investment in capital and skills training. Their productivity level is very low as a greater number of these enterprises are involved in service and retail activities (Chili, 2016; Charman, 2017). On the other hand, micro- enterprises mainly involve the owner and several family members. Micro-enterprises employ more than four regular workers (Charman, 2017). Entrepreneurs from township areas have basic business skills. Though a majority of these enterprises lack formality, they given appropriate support they have the potential to develop and become formal structured enterprises (Dockel 2005). Most of the township enterprises are considered to be necessity driven as opposed to opportunity driven. Examples of such enterprises include amongst others spaza shops, hair salons, car washes, back room property rentals, street vending, shabeens, minibus taxis, stokvels and mechanical services (Chili, 2016). Dockel (2005) argue that survivalist and micro enterprises tend to increase when the economy decline and decrease as the economy grow. Therefore, these businesses serve as a safeguard that provide a means of survival during economic difficulties. SMMES play most important role in the township economy since they represent between 70% and 80% of all black owned business activities in South Africa. Geographically, township small businesses can generally be found on the streets and inside (multi-storey) buildings. Some are operated from residential yards, converted garages, houses, disused factories and old office blocks. They are highly visible at traffic lights, road junctions, mini-bus taxi ranks, alongside the road, and in markets.

The Significance of Small Businesses in the Township Economy

Small enterprises continue to play a significant role towards contributing to economic growth, employment, poverty alleviation and inequality in South Africa (Marnewick, 2014; Lekhanya, 2015). This is despite being faced by numerous challenges such as fear of crime, lack of access to electricity, shortage of space and serviced business sites, high transport costs, access to finance, regulatory burdens etc. (Ligthelm, 2003; McGaffin *et al*, 2015). According to the Bureau of Economic Research (BER) SMME quarterly update report commissioned by Seda, there are currently 2.23 million business which account to 65% of the total employment in South Africa (BER, 2017). The majority of these enterprise operated in the informal sector (67%) while 29% are represented in the formal sector. This suggest that the majority of small businesses are found in the townships as these enterprise are usually characterised by informality. Fundamentally, small businesses are the drivers of employment creation to offset the impact of poverty that is rampant within township societies. Small businesses operating in South Africa offer goods and services that satisfy the needs of households living in these areas. They are vital for creating social stability and vibrant productive township economy. The significant role played by small business in the township is further recognised by government of South Africa as echoed in documents such as the National informal Business Upliftment Strategy and the Gauteng Township Revitalisation Strategy.

Government Policies and Strategies Geared towards Township Small businesses in South Africa

Township businesses in South Africa have pertinent strengths and weaknesses that require specific policy responses in order to enhance their efficiencies and competitiveness. The South African government is increasingly expected to create an enabling environment that should foster business development and growth in these areas. Through its agencies and various departments at national, provincial and local levels, the government has put in place mechanisms in order to provide support on small business development. However, the government has not fully adopted an integrated

approach implementing these strategies other role players. Fostering public and private partnerships and small business networks has been identified as critical in order to unlock fully the potential of small businesses and township enterprises in particular. It is therefore important to critically examine government policies and strategies directed towards facilitating establishment and improving business in the townships at the national government. Government policies and strategies directed to supporting township businesses are premised on the 1995 "White Paper on national strategy on the development and promotion of small business in South Africa". In 2014, the South African government showed its commitment on intensifying small business development in the country and established the Department of Small Business Development (DSBD). The DSBD was mandated to drive an integrated approach to the development and promotion of small businesses and cooperatives; through a focus on the economic and legislative drivers to contribute to radical economic transformation. The department fulfil its mandate through the two implementation agencies namely Seda and Small enterprise finance agency (Sefa). These entities respectively in partnership with various stakeholders provide non-financial and financial business development support services and programmes to entrepreneurs and small businesses in South Africa. A number of most prominent policies and strategies have been implemented over time as efforts by the government to increase the impact of the role played by township small businesses. These include amongst others:

National Small Business Amendment Act (2004)

Fundamentally, the National Small Business Amendment act led to the establishment of the Small Enterprise development Agency (Seda) which play a significant role on providing non-financial resources, capacity building services, products and services to all entrepreneurs and existing small businesses nationally. The Act promotes integrated approach to small business development. Seda to some extent has made major strides in ensuring that business development support is extended in all the provinces including township areas and is expected to intensify support to township businesses in line with the DSBD strategy. The Act mandates the Agency to facilitate, develop, coordinate and foster partnerships across all spheres of government, the private sector and relevant stakeholders that may assist it in achieving the set objectives. Township businesses remains a priority to receive business development support in order to unlock their potential to compete locally and internationally.

Broad Based Black Economic Empowerment (BBBEE) Act and Preferential Procurement Policy Framework Act

These pieces of legislation were primarily introduced to facilitate support to a majority of black owned enterprises (previously disadvantaged groups) to become actively involved in the economy and to aid small business owners particularly with access to market. In 2013, the South African government published the revised BBBEE codes of good practice that seeks to strengthen and grow successful black owned enterprises. According to the Department of Trade and Industry (DTI, 2013), in the revised codes of good practice all companies, except Exempted Micro Enterprises (EMEs) are required to comply with the five elements of the BBBEE scorecard, namely: ownership, Management Control, Skills Development, Enterprise and Supplier Development. While it is expected that corporates, State owned enterprises and big businesses will step up and adopt enterprise and supplier development to benefit small businesses particularly black owned businesses particularly in townships, it appear as if the impact of these Acts are yet to be fully realised . Critics have pointed out that these Acts benefit a minority and has done little to promote entrepreneurship and support to small businesses. However, it is expected that programmes such as the Supplier Development Programme implemented by Seda and its partners, should make a meaningful impact towards enhancing the capacity and competitiveness of township small enterprises in order to participate in the various supply chain opportunities available.

National Informal Business Upliftment Strategy

As earlier pointed out that Township small businesses are largely informal survivalists and this has an implication on the type of business development support received from both the government and private sector. From the public sector there is the National Informal Business Upliftment Strategy

which is driven by the DSBD targeted to informal businesses. It provide support to local chambers/business associations and Municipal Local Economic Development offices to deliver and facilitate to implementation of SMME development programmes focusing on informal businesses in townships (DSBD, 2015). Small businesses owned by women, youth and people living with disabilities in township areas and rural areas are the designated preferred groups for this strategy. Most importantly, the strategy take cognizance that informal business transactions cut across various economic sectors even though it prioritizes five economic sectors for intervention namely: retail, manufacturing, services, construction and maintenance which are predominant in township SMMEs. However, provinces or local municipalities are at liberty to prioritise sectors based on economic conditions prevalent in each particular region. In each of the identified sectors, the strategy facilitates for provision of a range of interventions which include: skills development (technical, business skills, computer skills etc.), marketing and branding (marketing material, brochures, signage etc.), product improvements (standards, quality etc.), technology support, machinery and equipment, basic compliance (business registrations, licensing, accreditation etc.). These interventions are demand driven and depend on assessments conducted on these businesses. However, the government is continuously experiencing some resistance from a significant number of informal enterprises who are not so keen to formalise their businesses. In instances where these businesses formally register their businesses, trends indicate that they do not continuously comply with legislative requirements leading to deregistration and ultimate closure due to penalty costs that they accumulate over time. NIBUS need to be fully adopted and be applied across the township economy in order to realise the benefits of small businesses.

Approaches for Entrepreneurship and Small Businesses Development in Townships

There is a mounting pressure for the South African government through DSBD and its agencies to upscale a meaningful small business development support directed towards township business as figures of unemployment soar and poverty threatens the socio-economic fabric in these societies. While the expected impact may not be immediate as desired by the masses, the government has an opportunity to join forces with other stakeholders from the SMME development ecosystem and work together to create a conducive environment for small businesses development in township areas. Some of the proposed approaches to make a meaningful impact to township entrepreneurship and small business growth include the following:

Establishment of Township Business Hubs

A study conducted by Seda to analyse state, needs, opportunities and challenges of small business in the township economy (2016), indicated that it is essential to establish township business hubs in order to advance a coordinated business development support to small businesses. These hubs aim to stimulate entrepreneurship and township economies and will greatly benefit small businesses in terms of business skills development fundamental to exploiting income generating opportunities. In this regard, Seda is expected to play a coordination role and partner with relevant stakeholders to establish these hubs in order to provide relevant business infrastructure (shared facilities e.g. Internet, training rooms boardrooms etc.) as well as, business development support services (e.g. administrative support, training in business development and management etc.). Most importantly, this approach require the involvement of the private sector, government and local municipalities to work together to ensure active participation of township SMMEs in the economy.

Basic Entrepreneurial Skills Development

Given that townships suffer high levels of unemployment, and as indicated by statistics that majority the unemployed is the youth, which is often forced to venture into starting some form of businesses (necessity driven) as means to survival. As a result, these businesses are without skills and contribute to the increase in number of informal businesses established in these areas. However, Informal businesses remain vital for livelihood in townships and in order to make these enterprises more sustainable and to create additional jobs; skills development is fundamental in the township economy. The Basic Entrepreneurship Skills Development programme (BESD) is a German and South African

government's initiative financed by the South African Department of Higher Education and implemented by the Department of Small Business Development with Seda. This initiative seeks to transfer basic business skills to small business owners. The implementing approach is embedded on coaching which facilitate learning and support to emerging entrepreneurs. Youth from communities are offered basic entrepreneurial skills development, network linkages with the public and private organizations. The BESD increase the sustainability of micro enterprises, improve the prospects of income generation and job creation in townships. The impact of this programme will fully be evident in the townships once its implementation is intensified across the country.

Entrepreneurship in Schools

Entrepreneurship programme or activities in schools, particularly those in townships is very significant for encouraging entrepreneurial mind-set and attitude of learners at the early stage of development. Having entrepreneurship programme entrenched and implemented throughout the entire educational system, focusing on entrepreneurial skills and not necessarily on subjects, from primary school all the way through to tertiary level, and even beyond is vital for the growth of township small businesses. Seda has since introduced the entrepreneurship in schools programme which aim to ensure that learners are equipped with entrepreneurial skills needed to start and grow businesses. This initiative is most appropriate and could be a solution to the ever-growing youth unemployment in particular, graduates and school leavers who find it difficult to find jobs when they finish their studies in township areas. Youth equipped with entrepreneurship skills lead to more creative population starting productive and innovative enterprises in townships. Government is expected to continue with establishing linkages between Universities, Technical and Vocational Education and Training (TVET) colleges and businesses as partners in order to enhance innovation and facilitate business growth. Fundamentally, internships in the area of entrepreneurship are identified as key in order to link entrepreneurial training to enterprise development.

Township Small Business Expos

The township small business Expo serve as an important platform of empowering and developing the booming township economy. The Small Business Expo is devoted to the development of small enterprises in the townships, providing an invaluable platform to market their businesses and interact with prominent business leaders and representatives from a number of corporate companies. It is the ideal platform to stimulate business growth and motivate both current and aspiring entrepreneurs. The direct engagement with small businesses and entrepreneurs exclusively active in townships great brand awareness, loyalty, sales and disseminate information on procurement opportunities.

Conclusion and Recommendations

The contribution of small businesses in South Africa is widely recognised by many including government and the private sector. While entrepreneurship levels are low and high business failure rates is predominant in townships, these businesses have the potential to become power houses and significant players in economic development. Therefore, there is a need for an integrated approach towards small business development support directed to township entrepreneurs and SMMEs implemented by all relevant stakeholders. It is vital to establish value adding strategic and implementing partnerships in order to advance fully enterprise development in townships. A focused, clear vision and coordinated approach is key to channel and leverage on resources for SMME support in townships. There is a no one size fits all approach towards SMME support, however, the commitment from all role players is vital to unlock the potential of township businesses as they are significant in the South African economy.

Reference

Bureau of Economic Research. (2016) *SMME sector Update of South Africa.* [Online] [Retrieved, October, 6, 2017]. Available from: http://www.Seda.org.za/Publications/Publications/.

Charman, A. (2017) 'Micro-enterprise predicament in township economic development: Evidence from Ivory Park and Tembisa', *South African Journal of Economic and Management Sciences,* 20(1), 1-14.

Chili, N.S. (2015) 'Township Tourism: the politics and socio-economic dynamics of tourism in the South African township: Umlazi, Durban', *Journal of Economics and Behavioral Studies*, 7(4), 14-21.

Department of Trade and Industry (1995) White Paper on National Strategy on the Development and Promotion, Government Printer, Pretoria, South Africa.

Department of Small Business Development, (2015) '*National Informal Business Upliftment Strategy'*, Government Printer, Pretoria, South Africa.

Dockel, M. (2005) SMMEs: Do they live up to expectation? *Management Today*, 20(10), 58-61.

Gauteng Department of Economic Development (2014) *Revitalisation of the township economy Strategy.* [Online], [Retrieved September 16, 2017], Available from: http://www.ecodev.gpg.gov.za.

Jurgens, U., Donaldson, R., Rules, S. & Bahr, J. (2013) 'Townships in South African cities: literature review and research perspectives'. *Habitat International*, 39, 256-261.

Lekhanya, L.M. (2015) 'Public outlook on small and medium enterprises as a strategic tool for economic growth and job creation in South Africa', *Journal of Governance and Regulation*,4(4), 412-418.

Ligthelm, A. A. (2003) 'Informal retail structures in South Africa: an explanatory study. *South African Business Review'*, 7(1): 54-63.

Matli, W & Jordaan, A. (2016) 'Growing capacities of sustainable entrepreneurship in townships: A theoretical perspective,' *Review of Contemporary Business Research,* 5(1), 126-135.

Marnewick, C. (2014) 'Information and communications technology adoption amongst township micro and small business: The case of Soweto', *South African Journal of Information* 16(1), 1-12.

Statistics South Africa (2017) *Quarterly Labour Force Survey, Quarter 2*, Pretoria, South Africa.

Thulo, L. 2015. The state of SA's township entrepreneurship. [Online] [Retrieved: September 30, 2017-01-29]. Available from: http://www.smesouthafrica.co.za/15427/The-state-of-SAs-township-entrepreneurship/.

Tustin, D. H. (2003). Skills audit of macro and very small business in Northern Tshwane: An exploratory Study. *South African Business Review*, 7(2): 36-45.

World Bank. 2014. *The economics of South African Townships*. [Online], [Retrieved September, 23, 2017]. Available from: http://www.worldbank.org/en/country/southafrica/publication/the-economics-of-south-african-townships-special-focus-on-diepsloot.

The Challenges and Opportunities of the Sharing Economy: The Case of a Developing Economy

Léonel Matar,
Université Saint-Joseph, Faculty of Management, Beirut, Lebanon, leonel.matar@usj.edu.lb

Georges Aoun,
Université Saint-Joseph, Faculty of Management, Beirut, Lebanon,
gaoun@usj.edu.lb

Abstract

Globalization, new technology and the standardization of the way of thinking in developed, emerging and developing countries give the sharing economy a huge opportunity all over the world. The economy of sharing is spreading in all domains and activities. Many economic sectors are facing challenges and competition from a new business model and new ideas based on digital platforms and spreading rapidly across all societies. The volume of this economy is increasing yearly and the defenders of the sharing praise the benefits of this phenomenon. The debate is open about the reality and the consequences of an economy evaluated to several billions of dollars and will be able to disrupt the life of millions of persons globally. In our paper, we analyze the sharing today and tomorrow, the benefits and the challenges of this economy. We explore the human implications, the assumption of sharing on the job market and on the nature of work today and in the near future. Our methodology is based on a literature review of the subject and on an analysis, using three conceptual models considered the most appropriate regarding the sharing economy: The Diffusion of Innovation Theory (DOI, Rogers), the Creative destruction (Schumpeter) and the Social exchange theory (Homans and Blau). We conduct a survey on university students in order to identify, analyze and study their motivations concerning the sharing.

Keywords: Sharing Economy, Digital Platform, New Technology, Globalization

1 Introduction

The collaborative economy changes the pattern of production and consumption of goods and services. New technologies through digital platforms disrupt the links between supply and demand. All sectors are concerned through exchange relations based on mutual trust. In addition to presenting this new economic model, our paper seeks to study the motivations of graduate and undergraduate business students concerning the concept of sharing.

Collaborative and / or sharing economy is spreading at a high speed across all northern countries, affecting all industries. This trend is no longer limited to rich and developed countries, but it is also spreading in the countries of the South, of course, following different paths. The new consumer logic, the financial crises, the proliferation of Internet and the weight of social networks open the way to new ideas for the sharing and consumption of all kinds of products and services.

Our paper aims to analyze the functioning and the new trends of this economy, which arouse interests and fears. The over-valuation of what is owned should generate new revenues for individuals bypassing most of the time the traditional exchange system. Collaborative economy is affecting several market sectors. Born among grassroots to be essentially collaborative and sharing, it gradually became a big business. The wave of collaborative economy also affects the Arab countries and Lebanon. In this article, we will study the evolution of this trend in Lebanon.

2 The Sharing Economy Yesterday and Today

2.1 Can we define the sharing economy?

Few literature and researches of collaborative economy are available. The modern foundations go back to 1978 in the writings of Marcus Felson and Joe L. Spaeth who wanted to bring answers, solutions and alternatives to the stakes of unrestrained consumption with consequences on economic, financial, social and environmental levels.The definitions of collaborative economy are varied and multifaceted, but they all come together. An economic and consumption model essentially based on the exchange, sharing, rental of goods and services[1] that favors the use rather than the ownership (Botsman, 2014). Sharing is considered as a phenomenon that connects consumers with each other in order to consume. Indeed, the new technologies through the digital platforms have come to increase the links and the contact of the people who wish to exchange all kinds of products and services. There are several words that designate this new form of consumption: "economy of sharing", "peer-to-peer economy", "collaborative consumption", "collaborative economy". The purpose of all these denominations often follows the same logic, in this case exchange and sharing, but there are differences concerning types, modalities, vocations and exchange systems.

The main characteristics of the collaborative economy are:
1- Merchant or non-market transactions between suppliers and users
2- Suppliers are individuals, professionals and non-professionals
3- The link between transactions is a digital device (platform)

2.2 The new forms of consumption

2.2.1 Collaborative economy

An economy built on the networking of people and communities with connected centralized institutions with the aim of: Transforming the way we can produce (linking inventors with companies, ex: Quirky),

Consume (optimization of the use of products through efficient models of redistribution and shared access ex: Zipcar, Airbnb, Lyft),

Subscribe to financial services (direct relationship between individuals or companies for non-intermediated loans, ex: Kickstarter, Pave),

Learning (connecting teachers and students throughout the world, democratization of teaching ex: Coursera, Skillshare)

2.2.2 Collaborative Consumption

An economic model based on the sharing, exchange, trade or rental of products and services favoring the usage rather than the ownership. This model reinvents not only what we consume, but also the way we consume. We can cite three models: the collaborative lifestyle with the exchange of the use of products and services (Zipcar, Airbnb, Lyft), the redistribution of unused or underused products (ebay) and a system of products and services, rental of clothes (Run the Runway).

2.2.3 The economy of sharing

An economic model based on the sharing of underutilized assets against monetary and non-monetary benefits. It is largely focused between individuals (Airbnb, couchsurfing, lyft, Getaround,…).

2.2.4 Peer-to-Peer Economy

The peer-to-peer economy facilitates the sharing and direct exchange of products, it is a service based on peer trust. (Airbnb, couchsurfing, lyft, UberX, Kitchsurfing, Etsy). Most of the digital platforms of the collaborative economy have emerged in the United States, the sharing economy has now spread all over the world, it has become a global phenomenon, thanks to the expansion of new technologies and platforms to other countries, as well as new ideas for consumption. Platforms are proliferating in many countries, where cities are increasingly "sharing" centers of practice. Paris, for example, has become the center of the sharing economy in Europe. Colombia, the most Anglo-Saxon country in Latin America, has become a hub for Latin America. In Asia, Seoul, which is a smart city, is considered as a very important sharing center. Last year, the Ecuadorian government launched Buen Conocer, an initiative to reinvent the economic system based on the principles of open sharing networks, open production, and an economy of common goods. Even the Arab world has started to share economies through a multiple platforms and actions that bring citizens closer to each other. According to a global online survey conducted by Nielsen, 68% of consumers are willing to share or rent their personal belongings in exchange communities or for monetary income.

3 A New Economic Model or a New Economic Theory

3.1 A new exchange model

Power is moving from centralized institutions and organizations to individual and community networks. The distribution of products and services is no longer the sole monopoly of companies, the power of distribution has radically changed. From the status of the passive consumer of the 20th century, today's consumer has become at the same time creator, collaborator, financier, producer, supplier and inventor. Collaborative economy gives a new dimension to the uses of assets, it allows valorizing a sleeping wealth and the resources underused, it creates a link between what one possesses and what the others want to use. Efficiency and trust are the basis of this economy.

Collaborative economy makes our society more horizontal and less hierarchical; peer-to-peer relationships promotes individual and collective emancipation; the transaction may seem less formal, even if sharing and information are the basis of exchange. The institutionalization of exchanges done through the intermediary of the digital platform (the website) which serves as a store or a retailer and which ensures the link for the transaction. Its virtual concept characterizes the transaction because the two parties do not know each other and then it is achieved either by the connection between the supplier and the applicant or by a meeting to exchange the good or the product, or by sending the coordinates to conclude the transaction.

The digital platforms considered the driving force of the collaborative economy must face today a supply that is becoming more professional and more demanding, their roles are:

- define the relationship between suppliers and applicants

- linking effective triangular (platform-supplier and applicant)

3.2 Old theories, New Model

3.2.1 The Diffusion of Innovation Theory: a Customer and User Analysis

The sharing economy may be analyzed in the context of the Diffusion of Innovation Theory (Rogers, 1962), because the product or the service offered to consumer, client or user is done in a new manner. Even if the finality of the consumption and the usage of the product or the service is, the same. The concept of innovation is defined as any object, idea, technology, or practice that is new. The diffusion of innovation accomplished through communication to explain how, over time, an idea or a product gains

momentum and spreads to a specific population or social system. The Diffusion of Innovation (DOI) Theory is to be applied in the case of the users or clients more than regarding offerors of the product or the service. According to DOI Theory, we can distinguish five established adopted categories: innovators, early adopters, early majority, late majority and laggards.

DOI analyses five factors that enhance and influence the adoption of innovation or new idea.

Relative Advantage - The innovation should be considered as better than the idea, service, or product it replaces.

Compatibility - The innovation must be adequate and compatible with values and demands and of the future adopters.

Complexity - The innovation should be easy to use and understandable.

Triability – The adopter likes to be sure that the new idea is already tried and experienced before adopting it.

Observability - The adopter wants serious results from the innovation in order to accept it.

The major firms of the sharing economy have gone through all the stages. Airbnb, Uber, Lyft, Blablacar, etc… experienced all these steps differently. The success (or the failure) can be analyzed through this theory because the sharing concept was considered when launched as an innovation using new channels of distribution, buying and selling products, programs and services. These offers already existed but the way of promoting and distributing is very new. Digital platforms are the fruit of technology. Rogers considers technology and innovation as synonyms, *"A technology is a design for instrumental action that reduces the uncertainty in the cause-effect relationships involved in achieving a desired outcome"*. Because all the firms of the sharing economy are essentially based on the technology and cannot work or function without a digital platform, the product or the service offered needs a high value of technology and reliability in order to be considered as new innovation. As such, the product or service is not a real innovation; the context of its diffusion gives a new futuristic aspect.

3.2.2 The Creative Destruction: Corporate and Job Challenges

Capitalism must reinvent itself all the time; otherwise, it could never ensure sustainability. The sharing economy disrupts many sectors and jeopardizes the job of millions of workers all over the world. A growing number of workers in the developing, developed and emerging economies begins to worry about the future (Sundararajan, 2016). Because we are in the globalization era, the fast spreading of this concept affects simultaneously companies and workers in developed, developing and emerging countries. The destruction of jobs is accompanying the evolution of this economy. The Creative destruction (Schumpeter, 1942) can be totally applied today to the sharing economy. The innovation of products, services and process will automatically endanger and eliminate many sectors. The collaborative economy is accused of creating precarious jobs, without social protection and escaping labor market regulations in the countries where it operates. Indeed, we may wonder whether it is really the vocation of this new economic model to create jobs or only to maximize profitability by inventing a new form of work. These criticisms and misunderstandings are merely a reflection of the change that globalization and new technologies bring to the conception of work. The labor market changes, today we are seeing a transformation of the economic system and capitalism, which primarily affects workers and employees. It is legal and legitimate to fear a new vision of work that threatens the existing order.

3.3.3 The Social Exchange Theory: Trust and Sharing

The trust is a key element behind exchange and sharing. We witness a trust on two levels: the digital platform and the providers of the product or services (Airbnb, Uber, Zipcar, ….). Our open world, globalization and technology facilitate the interaction and the trust between people and strangers; we are bypassing big corporations and traditional institutions to realize exchange. Trust is shifting away from governments and big institutions into the hands of all of the population, technology and the work wide web are enabling trust between people (Botsman). The sharing economy is opening a new trust era, the main challenge today is more about trust than technology, and the individual social exchange imposes to all of us to trust each other because our personal reputation can be positively or negatively affected. The shift in trust from institutions to individuals represents the new way of exchanging and doing business and will transform many economic sectors in the near future all over the world.

4 Survey

A survey conducted on 117 university students gave us several elements about the awareness and the perception of the sharing economy.

The main answers were as follows:

- More than 7 out of 10 of the respondents know what does the sharing economy means. This answer reveals that the awareness is high but in the same time, we can consider it as not sufficient because the majority of the university students are supposed to know this economy. The reason is the non-generalization of the phenomenon in a developing or emerging economy such as Lebanon.

- The answers concerning the knowledge of four name of branded sharing economy platforms tell us that Uber is the most well-known, the vast majority of respondents already heard about, followed respectively by Airbnb (53%), Blablacar (33%) and Couchsurfing (4%). Many reasons lay behind these answers. If 97% are aware of Uber, it is because of the presence in the media of this company, the availability of these services in most big cities all over the world and sometimes because of the controversy of these platforms. Airbnb comes in second place because it is less mediatized compared to Uber and with less worldwide problems. Blablacar, which is less present in the world than the two others platforms. As a European service and because the habit of carpooling is not so developed media, Blablacar even if it is the leader in its field, remains less well known globally than Uber and Airbnb. Couchsurfing that is the real sharing is ignored by respondents because no large organizational structure manage their operations and because the aim of the service is strictly free of charges so less incentive for offers.

- The potential of the sharing is promising, two third of the respondents plan to use these services in the future. It means that the trend is very strong especially among young persons because the majority accepts this concept.

- Trust is crucial when it comes to the sharing economy. Three out of 4 of the respondents consider trust as the main concern for this service followed. Trust remains an important criterion because the core of this economy is exchange with strangers.

- Three out of 4 estimate that these services have a future. The high rate of answers considering the sharing economy as promising reveal that people really believe in this new economic and business.

5 Conclusion

The sharing of physical objects, services and spaces will increase in the next few years. Sharing becomes today an important part of our life. This concept is rapidly spreading all over the world. People in developed, emerging and developing economies are exploring and working on new idea. In order to use goods, services and spaces more collaboratively. The economy of sharing is accompanied by the birth of a new language and vocabulary such as access, social values, exchanges, user, borrowers, lenders and contributors. This new economy disrupts the life of millions of persons across the world but, at the same time, it opens new horizons and creates opportunities for all of us. The future of the collaborative economy in emerging countries is not different from that of others markets. Four variables might influence the use of platforms by consumers: use of technology, trusting strangers, saving the service fees and looking for environment protection; these variables could be related to the age and the gender of the users. The result of this research will highlight the diffusion of innovation for services based on the sharing economy in third world country and inform the actual service providers in sectors affected by the sharing economy about the risks they will face in the near future. Entrepreneurs that might exploit this new phenomenon will benefit from this new type of business while those working in the old system will be affected and penalized if they will not adapt to this new and challenging reality. The use of platforms may seem different at times, but goals tend to meet. It is natural that the slow adoption of this type of exchange, the lack of confidence and the desire for possession, still limit the adoption of this new economy by emerging countries. Millennials born with the new technologies will welcome this type of exchange. Indeed, we note through the part in which we speak about the birth, the evolution, the challenges and the promises of the economy of sharing, a growing enthusiasm of the population.

References

Barandiaran, XE. and Vila-Vinas, D. (2017). 'The Flok Society Project,' [Online], [Retrieved August 22, 2017], http://book.floksociety.org/wp-content/uploads/2015/06/intro_JoPP_15_6_2.pdf

Bayram, AS. (2013). 'The Sharing Economy is Gaining Momentum in the Arab World,' *OuiShare Magazine.* [Online], [Retrieved August 22, 2017], http://magazine.ouishare.net/2013/10/the-sharing-economy-is-gaining-momentum-in-the-arab-world/

Botsman, R. (2015) 'The Changing Rules of Trust in the Digital Age,' *Harvard Business Review.* [Online], [Retrieved July 05, 2017], https://hbr.org/2015/10/the-changing-rules-of-trust-in-the-digital-age

Botsman, R. (2013) 'The sharing economy lacks a shared definition,' *Fast Company.* [Online], [Retrieved July 10, 2017], http://www.fastcoexist.com/3022028/the-sharing-economy-lacks-a-shared-definition

Botsman, R. (2015) 'Defining the sharing economy: What is collaborative economy - and what isn't?' . [Online], [Retrieved June 04, 2017], https://www.fastcompany.com/3046119/defining-the-sharing-economy-what-is-collaborative-consumption-and-what-isnt

Botsman, R. and Roo, R. (2011). What's mine is yours: how collaborative consumption is changing the way we live, Collins, London.

Chriss, A. (2015). 'The Disrupter Series: How the Sharing Economy Create Jobs, Benefits Consumers, and Raises Policy Questions,' *Subcommittee on Commerce, Manufacturing, and Trade of the Committee on Energy and Commerce House of Representatives.*114 (80).45-56

D'Abbundo, A. (2014) 'L'économie collaborative bouscule la vieille économie, '*La Croix.* [Online], [Retrieved July 17, 2017], http://www.la-croix.com/Archives/2014-12-16/L-economie-collaborative-bouscule-la-vieille-economie.-ENTRETIEN.-Pascale-Hebel-directrice-du-departement-consommation-au-Credoc-Les-sites-collaboratifs-permettent-surtout-de-continuer-de-consommer-malgre-la-crise-2014-12-16-1254825

Felson, M, and Spaeth, JL. (1978). 'Community structure and collaborative consumption: A routine activity approach,' *American Behavioral Scientist* 21(4), 614-624.

Graham, T. (2017). The Uber of Everything, How the Freed Market Economy is Disrupting and Delighting. Above All Press, Columbia

Guerrini, F. (2014). 'How Seoul Became One Of The World's Sharing Capitals,' *Forbes.* . [Online], [Retrieved June 12, 2017], http://www.forbes.com/sites/federicoguerrini/2014/05/25/how-seoul-became-one-of-the-worlds-sharing-capitals/#5dfc3f645def

Homans, G. (1958). 'Social Behavior as Exchange,' *American Journal of Sociology*, 63 (6), 597-606

Nielsen (2014). 'Is sharing the new buying? Reputation and trust are emerging as new currencies,' *The Nielsen Company.* [Online], [Retrieved June 18, 2017], http://www.nielsen.com/content/dam/nielsenglobal/apac/docs/reports/2014/Nielsen-Global-Share-Community-Report.pdf

Rogers, E.M. (2010). Diffusion of innovations. The Free Press, New York

Sahin, I. (2006). 'Detailed review of Rogers' diffusion of innovations theory and educational technology-related studies based on Rogers' theory,' *TOJET: The Turkish Online Journal of Educational Technology*, 5 (2), 14-23

Schor, J. (2014). 'Debating the Sharing Economy', *Great Transition Initiative: Toward a Transformative Vision and Praxis.* [Online], [Retrieved July 30, 2017], http://www.greattransition.org/publication/debating-the-sharing-economy

Schumpeter, J. (2013). Capitalism, socialism and democracy. Routledge, London and New York.

Sundararajan, A. (2016). The sharing economy: The end of employment and the rise of crowd-based capitalism. Mit Press, Cambridge, MA.

A Framework for Innovation Management Practices among Women Entrepreneurs of Small Medium Enterprise (SMES) In Malaysia

Norliza Ghazali
Centre for Diploma Studies
norlizag@uthm.edu.my

Wan Fauziah Wan Yusoff
Faculty of Technology Management and Business
fauziah@uthm.edu.my

Raudah Adnan
Centre for Diploma Studies
raudah@uthm.edu.my

Abstract

The involvements of women in business particularly in small and medium enterprises (SMEs) have received global attention including Malaysia. Despite the important role of women entrepreneurs to the economic development, participation of Malaysian women in SMEs is unequivocally rated low. In order to bridge the gap there is need for radical application of creativity in their business operations. Hence, the aim of this paper is to review the need for innovation management practice among women entrepreneurs of SMEs in Malaysia. Through review of relevant literature, the concept of innovation management in business has been explicitly discussed as well as the underpinning theories. Appraisal of the innovation management was explored through data mining in order to build a sustainable framework with a view to accelerating performance in women-owned businesses. This paper is expected to serve as a template for existing and upcoming women SMEs in Malaysia towards better entrepreneurial innovation and performance which by extension would boost GDP of the Malaysian economy.

Keywords: Innovation management, women entrepreneur, SMEs, Malaysia

Introduction

Small and medium enterprises (SMEs) have been variously acknowledged as a major source of global economic growth and employment of the entire nation. Hence, SMEs need to be managed in more effective in various aspects of their business management .Considering the need for innovation management practice of the SMEs, it is a known fact that global economic woes are expected incidents of business life which often manifest in the form of economic recession. Such is expected to pose serious threat to the survival of SMEs due to their scale, hence, in such turbulent times; effective management strategies in form of innovations will provide relief against devastating consequences of such economic downturn. Apart from this, the performance of any SMEs can be generally measured by the quantum of efforts placed on research and development (R & D) in the area of innovation management practice. Furthermore, literature has shown that the success of SMEs requires an efficient management capability of selling its goods and services and in this regard SMEs will depend on high level of effective and practicable innovations that are expected to lead to performance improvement and strength recession, recovery and peak periods of business cycles. Additionally, for SMEs to respond fast to product demand differentiations resulting from market demands in the present global industrial world there is need for a potent innovation management practice (Apak & Atay, 2014; Al-Ansari, *et. al.,* 2014; Kalay & Lynn, 2016).

More importantly, in this recent global change, innovation management is becoming one of the key drivers for change and competitive advantage within industry. Accordingly, SMEs as business concerns are required to respond rapidly to these emerging changes. This will enable it to fulfill customers' expectation and demands rapidly. Going by the nature of high involvement of women in the SMEs, there is the need to adequately explore and employ innovation management practice in order to meet the numerous challenges and expectations facing efficient delivery.

In Malaysia, the involvement of women entrepreneurs in SMEs still remained lower over the period of years. As at 2015 the percentage distribution of SMEs by ownership status between men and women showed that men-owned SMEs is in the region of 80.3% while the women-owned SMEs stood at 19.7% (Department of Statistics, Malaysia & SME Corp., Malaysia, 2015). From the same source, it was revealed that measuring the use of ICT among women SMEs only 27% have the knowledge and usage ICT which is expected to form the backbone of innovation in the area of knowledge management. Also, the statistics revealed that out of the various sectors of enterprises of SMEs women were seen flourishing in services with 91.7%; manufacturing – 7% and less than 1% in other prominent sectors like agriculture, construction, mining and quarrying among others. This is an indication that women entrepreneurs still need more to tap from innovation management practice so as to gain the capacity of competing with their male counterparts. Nevertheless, it is an understatement that women business owners contribute to the overall employment and are productive in generating good revenue (Nel, *et. al*., 2010) but it is the efficient application of the innovation management practice that will explore and exploit these potentials.As a result, the Malaysian Government has been concerned with creating and developing quality, resilient, and successful entrepreneurships which are competitive in all the potential growth sectors of the economy, and to cultivate an enterprising culture among Malaysian women.Therefore, the purpose of the paper is to identify the main drivers of innovation management practice and propose a framework that will be suitable for the improvement and better innovation practices and performance of women SMEs in Malaysia.

Women Entrepreneurs

Women entrepreneurs have been acknowledged to play critical roles for bringing their ideas and capabilities towards successful achievement of the SMEs development (Alam, *et. al*., 2012, Rani &Hashim, 2017). There are diverse definitions of women entrepreneur which depend on the context of its role. In the Malaysian context, women in business can be classified in the census under the employment classification of employer, self-employed and own-account workers (Jamilah, 1992). Based on United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) discussion paper, women in business generally fall into micro, small and medium enterprises (MSMEs), either as managers or as owners from an employer's angle (Teoh& Chong, 2008).

Some of the characteristics of women entrepreneurship as enunciated by Teoh and Chong (2008) include: women-owned businesses are no more likely to fail than man-owned; differences in initial capital and goals explain the power performance in growth and survival of women-owned businesses; women entrepreneur discussion is considered important since it is part of ongoing effort to alleviate poverty in developing countries in relation to the sustainable development goals; and the response from women entrepreneur is still considered relatively low because of low level of education, lack of capital, cultural and religious constraints (Teoh& Chong, 2008).

The performance of women entrepreneurs in their businesses has become an important area of recent policy and academic debate. Comparatively, little rigorous and in-depth research, however, has been undertaken on the issues of gender and business performance, especially in Malaysia (Alam, *et. al*, 2012). Performance is the act of doing something successfully using knowledge as distinguished from merely possessing it. However, performance seems to be conceptualized, operationalized and measured in

different ways (Srinivasan, *et. al*.2002), thus making cross-comparison difficult. Among the most frequently used operationalization are survival, growth in employees and profitability. In fact, the potential benefits inherent in women entrepreneurial outfit, women entrepreneur still face systematic barriers in the conduct of business in some part of the world (Alam, et. al, 2012; Roomi& Parrott, 2008). Also women-owned businesses are found to be more likely to fail (Bekele & Worku, 2008). Furthermore, researchers have been reporting that women entrepreneurs growth rate is comparatively low than that of their male peers (Enhai, 2011). In addition, women are likely to be pushed or pulled in the realm of entrepreneurship whereas there is a need to change the push into the pull factors (Zlatkov, 2015). Besides, there is a need to introduce and equip women entrepreneurs with women entrepreneurial orientation and required competitiveness (Mahmood&Hanafi, 2013). All these essentially call for workable innovation capabilities in order to ease off the aforementioned barriers. In fact the phenomenon of women entrepreneurship is still standing silently in the queue waiting for its turn to be acknowledged fully (Teoh & Chong, 2008, Rani & Hashim, 2017).As a result of the common constraints associated with women entrepreneurship globally and in Malaysia especially, there have been several calls for innovation management practice (IMP) as a veritable concept to enable them tap the prospects towards better performance of women SMEs. Literature has identified some of the drivers of IMP to include knowledge management, usage of ICT, capital, education, training and counseling, networks, government support, managerial skills and social security and freedom to mention a few. All these issues had constituted the main thrust of this proposed research.

Theory of Innovation Management in Women-Owned Enterprises

The new theory of innovation management that adequately explains and supports substantial value creation from radical innovation should be subjected to three fundamental criteria and tests; (1) it should comprehensively explain the history of radical and incremental innovations; (ii) successfully applied and described in many case studies over decades by real industrial businesses; and (iii) describe how value creation is driven by both tangible capital and intangible capital based on the new capabilities of people and organizations, new business models and new industry structures that form dominant design (Miller (2015) any.However, in this paper two classical theories are considered appropriate; the sociological theories and feminist concept in Business.

Theory of Social Structures on Women's Entrepreneurship

Sociological theories argue that social structures (workplace, family, and organized social life) affect women's access to entrepreneurial opportunities and may influence performance (Aldrich, 1989). Occupational segregation, underrepresentation in upper level management positions, and expectations about family roles may restrict women to certain industrial sectors, as well as affect motivations and goals for their business ventures (Aldrich, 1989). The extent to which women entrepreneurs face structural barriers in these areas will arguably have an impact on the performance of their ventures.

The degree to which these structural dimensions affect women entrepreneurs depends greatly on the country context. In particular, the perceived acceptability of women's participation in entrepreneurship varies from country to country, relative to the expectations and cultural norms for women in a given society. This indeed has been attributed as one of the major barriers to women SME performance in Malaysia (Tambunan, 2009; Ming-Yen & Siong-Choy, 2007). Research also reveals that women starting new ventures are frequently hindered by the lack of business information, advice, and access to networks and business support systems (Allen & Truman, 1993). Essentially, these differences in social structure across developed and developing countries suggest variation in individual factors affecting performance of women-owned businesses (Lerner, Brush & Hisrich, 1997). In the United States an early study conducted by Kalleberg and Leicht (1991) found that women's businesses were no more likely to fail and were just as successful as men's, which was contrary to conventional wisdom regarding women's

inferiority in entrepreneurship. It is however good to note that as a result research, global economic competition and government support and dynamism, women from negatively affected countries are increasingly accepted as equal in their entrepreneurial endeavors, making it easier for their business to grow and succeed. In order to bridge the gap thereby promoting performance acceleration, the need for innovation management practice (Lerner, Brush & Hisrich, 1997).

Feminist Concept and Analysis in Business

The feminist theory aims to bring about social change as women are seen to be very important in the structuring of society, even though women historically have been identified as disadvantaged, a situation that needs to be abolished (Calás & Smircich, 2009; Mbwilo, 2015). By producing knowledge, social change can occur, including entrepreneurship change. Feminist theory helps us to look at entrepreneurship as a social change through a feminist analytical lens and see that it brings a significant impact in economic activities. Calas *et al*. (2009) argue that women have emerged from a male- dictated structuring of society, which had to occur, and among the needed changes are the removing of the barriers to entry to public life for women and also appreciating different practices as positive inputs to society. They suggest that a female centered structure of the society is the only means to oppose patriarchal structuring. Looking through a feminist theoretical lens will enable entrepreneurship dynamics to be further noticed and seen.

Feminist studies have been conducted by numerous scholars worldwide, in different disciplines. As a strand of the modern feminist approach, the women in development (WID) approach was introduced, so as to highlight women's contribution to income generating activities (Rathgeber, 1990). Although,it was later found that only the symptoms were being dealt with instead of the core of the problem. According to Cornwall et al. (2007) "women are the poorest of poor" in Africa, although most of the work is done by women, including agricultural work, household work and all family responsibility and reproductive work. Women are being seen as just a mere picture which is there to portray a story; they are being viewed as hopeless, inactive and excluded free from development and their unsung qualities and contributions to development needs to be observed (Cornwall, 2001).Stanley (1990) argues that the peasant character has not been given enough space and gratitude, and this leads to ignoring women. "The failure to acknowledge women's roles, activities and rituals has resulted in a definite informational bias"(Stanley & Wise, 1990). Moreover it is argued that " At the root, feminist inquiry is built on the common cause of highlighting women's voices in the name of challenging patriarchy and eradicating women's oppression in the home and beyond"(Daly and Stubbs, 2007). In the late 1970s the gender concept grew up and become very important. Researchers tried to see how to conceptualize the social constructions of masculinity and femininity by applying biological perspectives to social relations between women and men (Mbilinyi, 1992).

According to Cala *et al.* (2009), analysts' attention was drawn to gender relations not because of the sex of participants as individual actors, but due to the material production of their social life and cultural production. This made gendering entrepreneurship through premises restructuring highly visible in mainstream entrepreneurship. Mbughuni (1994) states that significant attention has to be paid to gender in order to see it as a locus of discrimination, a factor like age, geographical location (rural or urban), ethnic group, and global location which distinguishes the circumstances and barriers facing different women. According to Walker (1995) gender relations in indigenous societies in Africa are characterized by misappropriation of women's hard work by men. Women being part of a male dominated society makes it very difficult for them to freely grow and operate their businesses; this makes women vulnerable and weak and as a result hinders them from making independent decisions.

Principles and Importance of Innovation Management

Innovation has long been argued to be the engine of growth regardless of the condition of the larger economy. Innovation indeed has been a topic for discussion and debate for hundreds of years (Miller, 2015).

Drucker (2015) defines innovation as "the act that endows resources with a new capacity to create wealth". He (2015) refers sources of innovation as "windows" of opportunity because each window is a distinct opportunity for innovation, but one can see certain aspects of other opportunities for innovation by looking through a single window. Drucker (2015) identified four windows within the firm – the unexpected event, incongruities, process need, changes in market structure and three windows outside the firm –demographies, changes in perception, and new knowledge. He suggested one way to recognize opportunities for innovation as applying the ones that are most relevant for use at a point in time and that each opportunity is capable of being relevant at any given time.

Considering the relevance of innovation management in any business Miller (2015) described that radical innovation is required for sustained, adequate rates of economic growth driven by improvements in productivity, quality and cost in industries such as health care, education, construction and energy. Hence, corporation must be able to adapt and evolve if only the wish to survive (Trott, 2008). Also, This is attributed to the fact why today the idea of innovation is widely accepted. It has become part of our culture – so much that it verges on becoming a cliché. But even though the term is already embedded in our language, to what extent do we fully understand the concept? Also, to what extent is this understanding shared. For instance, a scientist's view of innovation may be very different from that of an accountant or an entrepreneur even in the same organization. All these are some of the issues that prompted the choice of this research.

Drucker (2015) asserted that systematic innovation must be integral to the process of management in all organizations. In systematic innovation, there is need to adopt specific practices regarding organization, staffing and rewards for innovative activity. The new should not be forced to carry the overhead burden that is carried by the mature until the new matures and become capable of carrying these changes. This often requires physical separation of the new from the old within the organization structure. Furthermore, resource allocation should be done in accordance with the resources of people and money that an innovative project can effectively use at a given point in time. On the other hand, if a project is approaching breakthrough, the maximum among of resources it can effectively absorb should be applied. Essentially, innovations require a clear market focus as well.In applying the concept of innovation in entrepreneurial skills all the aforementioned principles must be carefully studied and followed in order to achieve best performance and by extension high profit. Against all, this change comes the increased need for entrepreneurs to be vigilant because unless we stay ahead of change we may become victims of change (Trott, 2008). The earlier changes are discerned, the earlier the opportunities they create can be converted into innovations and converting opportunities into successful innovations, the better but requires good management practices.Expatiating on entrepreneurial management

Innovation Management Drivers among Women SMES in Malaysia

In Malaysia, the importance of entrepreneurial ventures in the economic development of the nation is indisputable. Chee (1990) reports that entrepreneurial ventures tend to employ more workers per unit of capital, help increase total savings in the economy, have a favorable impact on regional development, serve as training grounds for developing the skills of industrial workers and entrepreneurs, and play an important complementary role to large firms in the economy. Tan (1990) adds that they help to sustain economic growth and stabilize the economy in periods of recession. They are also very significant contributors to the economic strength of the nation considering the

direct output of goods and services as well as the role in supplying requisite inputs to other enterprises and government undertakings. There are number of factors that become driver for innovation management for women entrepreneurs. The four divers (Figure 1) include; information technology, research and development collaboration; human capital development; and product and market strategy.

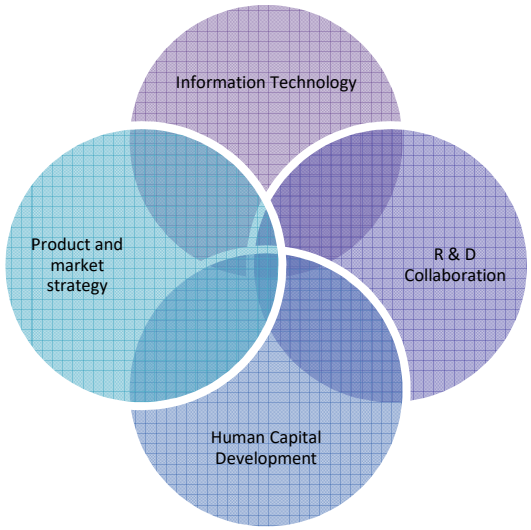


Figure 1: Four driver for innovation management

Information Technology

There is a growing understanding of how businesses should operate using IT to achieve optimal effectiveness. Implementation of IT projects, especially large IT projects, is synonymous with management of changes in an organization, be it for altering the work culture or gaining competitive advantage. When formulating effective change management strategies to support the introduction of IT, it may be useful to integrate and use concepts and practices drawn from disciplines such as traditional project management, organizational/product innovation, and change management theory and practices (Kuruppuarachchi, *et. al.* 2002). The complex interaction between the use of information technology (IT) and its changing organizational setting requires organizations to address how investments in IT/information systems should be evaluated (Patel & Irani, 1999). Since IT has a strategic significance in an information-rich economy in reducing cost, upgrading quality, improving customer service, and enhancing integration with vendors to increase the economic power of the firm(Ndubisi & Jantan, 2003; Jantan & Kannan, 1997), the Malaysian Government is bent on motivating women entrepreneurs in particular and all Malaysians in general to adopt and use IT.

In Malaysia, the increased use of information technology is the result of several factors. The mass production of computer parts has pushed the price of these products down to a very affordable level. This decline in cost has the effect of allowing even smaller firms and homes to utilize new technologies for their daily needs. Moreover, the abolition of a 10 percent sales tax on computers, software and accessories in Malaysia has helped consumers not only to possess a computer but also

increase the marketing of computers in the nation (Ndubisi & Kahraman, 2005). Since ICTs possess the unique capability to improve processes not just by transferring information efficiently but also by making it available in time to users, the Malaysian government has increasingly strived to make technology more and more affordable to entrepreneurs, especially women entrepreneurs, whose contributions to the growth of the Malaysian economy have consistently been publicly acknowledged by the government.

The relationship between technological skill and enterprise development, particularly in relation to entrepreneurship, is crucial. Peacock (1997) reports that the share of women business owners that have established a homepage for their business has tripled since last year: 23 percent now have a homepage, compared to 16 percent of male business owners; 47 percent of women business owners currently subscribe to an online service, compared to 41 percent of male business owners; 51 percent of women business owners frequently use the internet to communicate or send e-mail, compared to 40 percent of male business owners; 22 percent of women report frequent usage of the internet to conduct research, compared to 14 percent of male business owners; and 9 percent of women business owners compared to 3 percent of male business owners use the internet to review business opportunities or make bids on contracts. The research of Ndubisi&Kahraman, (2005) was aimed to investigate the extent and pattern of information and communication technology (ICT) usage by women entrepreneurs in Malaysia, as well as the impact of personal traits on usage show that slightly above 50 percent of the respondents are using seven out of the eight varieties of systems presented. Notwithstanding the effort made sofar to make IT accessible to the entrepreneurs, research has established the fact that IT knowledge among women entrepreneurs in Malaysia is still comparatively very low

Research and Development (R&D) Collaboration

Innovation is essential for an organization's growth to sustain competitive positioning and to strengthen it (Lin & Lin, 2016). At the same time, businesses are forced to find partners to benefit from innovation given rapidly changing global market conditions and increased competition (Horibe, 2003). Thus, the openness in the innovation process is becoming more prominent recently as evidenced in various academic literature (Patra& Krishna, 2015). Intensive competition in domestic markets gives a reason for firms to expand their technology into new markets overseas (Lee &Jeong, 2010). However, the uncertainty in the global marketplace has caused a fundamental change in firms' innovation strategies (Lee &Jeong, 2010; Kang, 2012). To mitigate this confusion and secure global markets, collaborative innovation has become commonplace in organizations, and needs to be studied (Lee &Jeong, 2010).

Globalization could be done simply if firms collaborated with buyers and/or distributors regardless of their size (Horibe, 2003) Furthermore, different modes of network relationships have different effects on their performance (Lin & Lin, 2016). International collaboration raises important questions regarding the relationship between R&D and innovation (Ebersberger&Herstad, 2013). Among the challenges hindering the Women SMEs from Malaysia to compete in the international markets are the low level of technological capabilities, lack of skilled human capital, and low level of research and development (R&D) (Muhammad Khalique *et al*. 2011).

Business enterprises that derive their ongoing competitiveness from innovation, both by cultivating in-house capabilities and through collaboration with experts in universities and research institutions locally and internationally are fundamental to innovation system performance and the productivity of an economy. Malaysia already compares favorably in some respects, as one of the few developing economies where the business enterprise sector is the main performer and funder of R&D. However, there is a continued need to strengthen the innovation capabilities of Malaysian businesses, especially the smaller firms, which are less prone to undertaking R&D or innovation. The establishment of the proposed

national Research Management Agency (RMA) with responsibility for the implementation and evaluation of competitive R&D grant schemes would also support the simplification and streamlining of the governance framework (Asada, Nixon &Keon, 2017). Malaysian women entrepreneurs can boost their business horizon locally and internationally through R & D collaboration in modern marketing and Technological advancement.

Human Capital Development

The human capital is one of the most important factors supporting the survival of microenterprises. The success of the enterprise depends on the relevant preparation, knowledge and education of the owner as well as the employees (Ptak-Chmielewska, 2017).Arribas& Vila (2007) introduced also the definition of accumulated human capital, which is used for summing up human capital of the owners (more than one person). They proved that enterprises owning such accumulated human capital live longer and have higher chances for success, which is also determined by better financial condition of the enterprise. Initial capital is distributed on more people so is better secured form individual failures of one of the owners.

Becker (1993) defined human capital as: studies concerning actions influencing future income material and non-material by increase of human resources, those actions are defined as investment in human capital. Those actions are: education, professional training, medical care, seeking information about prices and income. Those actions are dedicated to increasing the abilities, knowledge, and health in the goal of increasing income. Human capital is a part of the enterprise but is connected with a worker and is worker's property. Investment in human capital increases the potential of return ratio. The most important in investment in human capital is education and professional training. People with higher education level have more possibilities and chances on thelabor market. It is important to compare the costs and income from education. It is visible in case of women education. Education and training increases the worker's abilities and efficiency also in managerial abilities (Becker, 1993).

In a knowledge-based economy intellectual capital appears as the most important and critical resources for organization to thrive in a competitive environment. According to Ding & Li (2010), in a knowledge-based economy the intellectual capital is gradually replacing the physical assets in modern enterprises. It is indispensable for modern and high tech enterprises to pay full concentration not only in products innovation, marketing channels, market and services, but also they need to improve the research and development ability on market and product, and pay attention to the gardening and management of the enterprise intellectual capital (Leitner, 2011). Shaari*et al.*, (2010) and Bataineh&Zoabi (2011) argued that intellectual capital is a very important factor for the success of organizations to take competitive advantage. Human capital development is one of the surviving drivers of innovation management for women entrepreneurs in Malaysia.

Product-Marketing strategy

The growth of any enterprise is considered dependent on the product marketing strategy (Brindley, 2005). Cliff (1998) submits that it is usually an uphill task for women to adapt to changes in the market environment than men and he treated this as one of the potent barriers limiting the growth of women entrepreneurs. This also cut across new product development. For women-in-business in Malaysia to strive and ensuring steady growth, there is need to treat product marketing strategy as an innovation management tool.

Government Role in Women Entrepreneur

It is no gainsaying that government of Malaysia like other developed economies is making appreciable effort in promoting and enhancing vibrant women entrepreneurial ventures through different ways which

include provision of enabling environment, loan facilities, subsidies, training and motivation among others (Tambunan, 2009; Oly Ndubisi, & Kahraman 2005). Nevertheless, studies abound demanding more from government in order to raise the standard of women entrepreneur higher for it to compete with its counterparts in Europe, United Kingdom and U.S.A among others.

Oly Ndubisi, & Kahraman (2005) emphasized on the importance of information technology and communication (ICT) to women entrepreneurs but also pointed out the low level of their knowledge and application of ICT in their day-to-day business activities. They however, as a matter of urgency called on the Malaysia government to roll out programmed that would not only make computer accessible but as well organize training grounds for them. Ismail, et.al. (2012) corroborated this point but included it as one of motivational factors on women entrepreneurship venturing in Malaysia which government could be relevant. Also included as ways by which government could promote women entrepreneur are adequate provision of affordable credit facilities, research and development through training and adequate knowledge management (Ismail, et.al.2012; Tambunan, 2009).

Furthermore, Sarker & Palit (2014) in a proposed framework on the factors contributing to success of women entrepreneur emphasized that government could be relevant in the areas of access to technology, training and motivation, social security and freedom; financial assistance and easy regulations, family support and quality assurance. Supporting this proposition Teoh and Chong (2014) lamented absence of enabling laws especially those ones related to child care subsidies and temporary assistance for needy family (TANF) programmed to support women entrepreneurs in Malaysia. The study identified this as a critical issue for women entrepreneurs particularly single mothers with low income and who run micro-business, as they are seen to be the ones in need of most help and support. The study cited example of Singapore where self-employed parents have the privilege and are entitled to six days per year of child care leave and/or infant care leave until the year the child turns seven years old. Malaysian government has the responsibility of enacting such enabling laws for the purpose of encouraging women in business.

In conclusion, it is timely that the society changes its mindset not only to reduce the gender gaps but also to acknowledge the role of women entrepreneurs (Sandberg, 2013). Sandberg (2013) believes that equal opportunity is not equal unless everyone receives the encouragement that makes seizing those opportunities possible. Hence, support and encouragement from stakeholders especially government are requires because women entrepreneurs encounter many barriers than men to become successful. The awareness should be enhanced to empower women entrepreneurs in the world economy and to be recognized in the coming future (Bruch, 2012).

Proposed Framework for Innovation Management Practice among Malaysian Women Entrepreneurs

Based on the literature this paper has identified four important drivers of innovation management (Information technology, research and development collaboration, human capital development, and product marketing strategy). As they relate to women SMEs in Malaysia, it is worth-noting that most studies have not incorporated the role of government in the implementation of innovation management practice which is treated as an academic research gap. Hence, it is the intention of this study to add that there is need to consider the mediating role of the Malaysian government in the application of innovation in women SMEs. This has brought about the proposition of the innovation management framework as shown in **Figure 2**. The empirical aspect of the framework is to be treated in the future research. But the main thrust of the framework would be to determine the mediating role of the Malaysian government in the relationship between the innovation management drivers and women SMEs Performance.

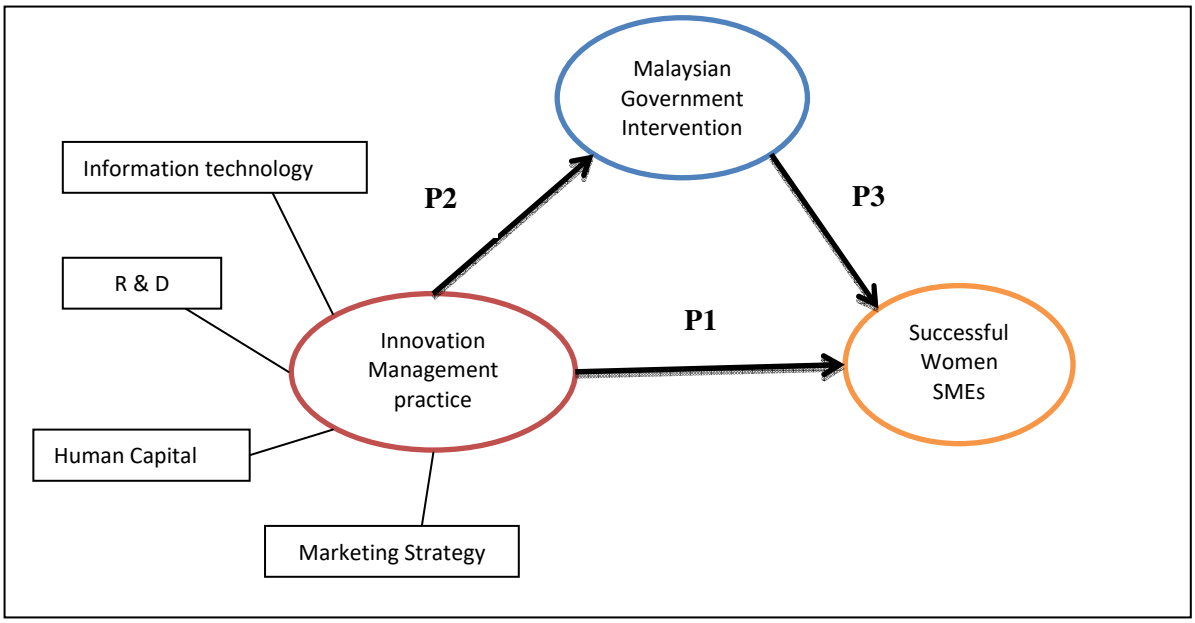


Figure 2: Proposed research assessment framework for innovation management among Malaysian Women SMEs

Marketing strategy

The increasing growth of its business by marketing and selling products of an organization taking place in new markets is closely related to the marketing strategy the organization chooses. These new markets may appear to be market segments or new geographical areas as well (Ansoff, 1957).Finding new potential market for its existing product would always be the main objective for any organization that takes the option of market development. The strategies would include identifying users in different markets with similar needs to the existing customers and also determining new customers who would use the product available in a different way. Alpha, 1957 stated that finding new geographical markets is one method of achieving this.

Information Technology

Nguyen, 2005 mentioned that there are several studies related to women entrepreneurs as one element that would make why women stay away from the corporate sector with the intention to become entrepreneurs, (Brown, 1997; Chandralekha et al, 1995; Gundry et al,2002;. Helmi, 1997; Hamilton, 1993; Stoner et al, 1990; Winn, 2005), with the adoption of information technology among women entrepreneurs' (Ndubisi and Kahraman, 2006). Meanwhile according to Schultz, 1959; Becker, 1964; Mincer, 1974, as to Human Capital; Human capital theory maintains that knowledge provides individuals with the increase in their cognitive abilities which leads to more productive and efficient potential activities.

Human capital

In addition, the businesses owners' business planning and managerial capability can only be implemented if women entrepreneurs possess human resources, capable and equipped with skills to conduct production

duties. Thus, recruiting suitable staff, providing sufficient motivation and training, building good relations with the stakeholders and monitoring workers' performance are important criteria in successful entrepreneurs.

Research and Development

A low level of education and exposure could prevent motivated entrepreneurial movement in their surroundings. Certain substructure components give the impression to make considerable impact on the entrepreneurial environment. These components include the existence of universities and research and development programs, a well-educated and technically skilled labor force and modern transport and communication facilities that provide easy access to suppliers and customers (Bruno & Tyebjee, 1982; Gartner, 1985).

Conclusion

In line with the objective of this study, the search into the related literature has revealed four (4) key innovation management drivers that will drive women-owned business towards high productivity. These identified drivers include information technology, research and development collaboration, human capital development and product marketing strategy. This study believes that women entrepreneurship in Malaysia stands the chance of competing favorably well with its counterparts globally if these drivers could be tenaciously applied. Also the study generates hypothesis that government has a mediating role to play in ensuring a positive and working relationship between innovation management practice and successful women SMEs.It is however expedient to mention that the workability of innovation is not automatic but requires radical and purposeful implementation. Nada, *et al* (2012) identified some causes of failure of innovation in business concerns to include poor goal definition, poor action alignment, poor allocation of team and resources, poor feedback of results, poor performance monitoring and poor collaboration between customers and suppliers as well as inaccurate interpretation of request from customers. This calls for holistic application of the concept.

In conclusion, the relevance of innovation management practice in ensuring physical and economic growth in women entrepreneurship in Malaysia cannot be over emphasized as empirical studies abounds to support this assertion. This study is expected to serve as a template for existing and upcoming women SMEs in Malaysia towards better entrepreneurial performance which by extension would boost GDP of the Malaysian economy.

Acknowledgement

The authors would like to express our gratitude to UniversitiTun Hussein Onn Malaysia for providing research grant **STG NoU658** for this study.

References

Alam, S. S., Senik, Z. C., &Jani, F. M. (2012). An exploratory study of women entrepreneurs in Malaysia: Motivation and problems. *Journal of Management Research*, *4*(4), 282-297.

Aldrich, H. (1989). Networking among women entrepreneurs. In O. Hagan, C. Rivchun, and D. Sexton, eds; *Women-Owned Business. New York*: Praeger, pp. 103-132.

Al-Ansari, Y., Xu, J., &Pervan, S. (2014). A study of organisational determinants and innovation practices in Dubai SMEs. *International Journal of Innovation Management*, *18*(01).

Ansoff, I. (1957), *"Strategies for Diversification,"* 1st Edt. USA: Harvard Business Review, Pp. 2-31.

Apak, S., &Atay, E. (2014). Global innovation and knowledge management practice in small and medium enterprises (SMEs) in Turkey and the Balkans. *Procedia-Social and Behavioral Sciences*, *150*, 1260-1266.

Arribas, I. & Vila, J. (2007) "Human Capital Determinants of the Survival of Entrepreneurial Service Firms in Spain", *International Entrepreneurship and Management Journal*, 3(3).

Asada, H., Nixon, S. &Koen, V. (2017) Boosting productivity in Malaysia.Economic Department Working Papers No. 1370. Accessed from www.oecd.org/eco/ecoworkingpapers on 23rd June, 2017.

Bataineh M. T. &Zoabi, M. A., (2011). The Effect of Intellectual Capital on Organizational ompetitive Advantage: Jordanian Commercial Banks (Irbid District) An Empirical Study. International Bulletin of Business Administration, No.10

Becker, G. S., 1964. *Human capital*. Chicago: The University of Chicago Press.

Becker, G.S. (1993) Human Capital. A Theoretical and Empirical Analysis with Special Reference to Education, University of Chicago Press.

Bekele, E &Worku, Z (2008). "Women Entrepreneurship in Micro, Small and Medium Entrerprises: The Case of Ethiopia," *Journal of International Women's Studies*, 10(2): 3-9.

Brindley, C. (2005). Barriers to women achieving their entrepreneurial potential: Women and risk. *International Journal of Entrepreneurial Behavior & Research*, *11*(2), 144-161.

Bruch, C. (2012) Closing the gender gap for women entrepreneurs. Available at: www.forbes.com/sites/babson/2012/12/05/closing-the-gender-gap-for-women-entrepreneurs. Accessed on the 2nd October, 2017.

Bruno, A. V., &Tyebjee, T. T. (1982). The environment for entrepreneurship. In Kent, C. A., Sexton, D. L., & Vesper, K. H. (Eds.). *Encyclopaedia of entrepreneurship*, pp. 288-315. Englewood Cliffs, NJ: Prentice-Hall.

Calas, M. B. &Smircich, L. (2009). "Feminist perspectives on gender in organizational research:. What is and is yet to be. In: D. A. Buchanan and A. Bryman (eds.) *Oganisational Research Methods*. London: Sage.

Chee, P.L. (1990), *Development of Small-Scale Business in Developing Asian Countries – Policy Environment and Institutional Infrastructure*, International Small Business Series 1,University of Göttingen, Göttingen, pp. 1-28.

Cliff, J.E. (1998), "Does one size fit all? Exploring the relationship between attitudes towards growth, gender and business size", *Journal of Business Venturing*, 13(6):523-42.

Cornwall, A. (2001). Wayward women and useless men: Contest and change in gender relations in Ado-Odo, Southwest, Nigeria. In: Hodgson, Dorothy L. and McCurdy, Sheryl A. (eds.). *'Wicked' Women and the Reconfiguration of Gender in Africa*. Portsmouth. Heinemann.Pp.67-84.

Cornwall, A., Harrison, E. & Whitehead, A. (2007).*"Feminisms in development: Contradictions, contestations and challenges*" London.Zed Books.

Daly, K. & Stubbs, J. (2007).*"Feminist theory, Feminist and anti-racist politics and restorative Justice"* UK. William Publishing, Cullompton Devon.

Ding, Y., & Li, G. (2010). Study on the management of intellectual capital. *International Journal of business and Management*, *5*(2), 213.

Ebersberger, B., &Herstad, S. J. (2013). The relationship between international innovation collaboration, intramural R&Dand SMEs' innovation performance: a quantile regression approach. *Applied Economics Letters*, *20*(7), 626–630.

Enhai, Y. (2011). Are women entrepreneurs more likely to share power than men entrepreneurs in decision-making? *International Journal of Business and Management* 6: 111-119.

Foster, R.N. (1986), Innovation, the Attacker's Advantage , Summit, New York, NY

Gartner, W.P. (1985). A conceptual framework for describing the phenomenon of new venture creation. *Academy of Management Review, 10*(4), 696-706.

Horibe, F. (2003). Innovation, Creativity, and Improvement: Working The Right Lever To Prosperity. *The Canadian Manager*, *28*(1), 20–20.

Ismail, H. C., Shamsudin, F. M., & Chowdhury, M. S. (2012). An exploratory study of motivational factors on women entrepreneurship venturing in Malaysia. *Business and Economic Research*, *2*(1).

Jamilah, A. (1992). Women & Development in Malaysia. Kuala Lumpur: Pelanduk Publications (M) Sdn. Bhd.

Jantan, M. & Kannan, S. (1997), "*Information technology deployment and competitive advantage of organisations in Penang, Malaysia*", *Proceedings of the International Conference on Business Development Strategies in Asia Pacific, Brunei Darussalam*, pp. 371-86.

Kalay, F., & Lynn, G. S. (2016). The Impact of Organizational Structure on Management Innovation: An Empirical Research in Turkey. *Journal of Business Economics and Finance*, *5*(1).

Kalleberg, A. L. and Leicht, (1991).Gender and organizational performance.Determinants of small business survival and success.*Academy of Management Journal*, 34(1):136-161.

Kuruppuarachchi, P.R., Mandal, P. and Ross Smith, R. (2002), "*IT project implementation strategies for effective changes: a critical review*", *Logistics Information Management*, 15(2):126-37.

Lee, W. J., &Jeong, A. (2010).The relationship between accuracy and attributes in students' causal diagrams, total links, temporal flow, and node positions. Proceedings of the 2010 Association for Educational Communications and Technology conference, Anaheim, CA., 1, 146-155.

Leifer, R., O' Connor, G.C. & Rice, M. (2001), ''Implementing radical innovation in mature firms:the role of hubs'', *Academy of Management Executive*, 15(3):102-13.

Leitner, K. H. (2011). The effect of intellectual capital on product innovativeness in SMEs.*International Journal of Technology Management*, *53*(1), 1-18.

Lerner, M., Brush, C., &Hisrich, R. (1997). Israeli women entrepreneurs: An examination of factors affecting performance. *Journal of Business Venturing*, *12*(4), 315-339.

Lin, F. J., & Lin, Y. H. (2016).The effect of network relationship on the performance of SMEs.*Journal of Business Research*,*69*(5), 1780–1784.

Mahmood, R., &Hanafi, N. (2013).Learning orientation and business performance of women-owned SMEs in Malaysia: The mediating effect of competitive advantage. *British Journal of Arts and Social Sciences*, *11*(11), 150-161.

Mbilinyi, M. J. (1992). Review of women's conditions and positions in Tanzania 1st ed. Dar es Salaam. Tanzania gender networking programme.

Mbughuni, P. (1994). Gender and poverty alleviation in Tanzania: Issues from and for reseach in Bagwacha, M. S. D. (eds.). Poverty Alleviation in Tanzania: Recent Research Issues. DUP Dar-es-Salaam

Mbwilo, L. J. (2015). Barriers to the success of women's income generating activities in rural Tanzania: A cultural perspective. Ph.D Thesis, University of Hull UK.

Miller, W. L. (2015) Innovation Management Theory and Practice: Part 1. *Journal of Creating Value*, 1(2):235-255

Mincer, J., 1974. *Schooling, Experience and Earnings*. New York: Columbia University Press.
Ming-Yen, T. W., &Siong-Choy, C. (2007).Theorising a framework of factors influencing performance of women entrepreneurs in Malaysia. *Journal of Asia Entrepreneurship and Sustainability*, *3*(2), 1.

Muhammad Khalique, Abu Hassan Md Isa, A. H., Shaari, J. A. R. &Ageel, A. (2011). Chalenges faced by the small and medium enterprises (SMEs) in Malaysia:An intellectual capital perspective. *International Journal of Current Research*, 3(6):398-401

Nada, N., Ghanem, M., Mesbah, S., &Turkylmaz, A. (2012).Innovation and Knowledge Management Practice in Turkish SMEs'.*Fatih University, Istanbul, Turkey, Arab Academy for Science, Technology and Maritime Transport, Alexandria, Egypt*.Ndubisi, N. O, & Kahraman, C. (2005) "Malaysian women entrepreneurs: understanding the ICT usage behaviors and drivers", Journal of Enterprise Information Management, 18(6):721-739.

Nel, P., Maritz, A., &Thongprovati, O. (2010) Motherhood and entrepreneurship: the mumpreneur phenomenon. *International Journal of Organizational Innovation*, 3 (1): 6-34.

Ndubisi, N.O. & Jantan, M. (2003), "*Evaluating IS usage in Malaysian small and medium-sized firms using the technology acceptance model*", *Logistics Information Management*, 16(6):440-50.

Oly Ndubisi, N., & Kahraman, C. (2005). Malaysian women entrepreneurs: Understanding the ICT usage behaviors and drivers. *Journal of Enterprise Information Management*, *18*(6), 721-739.

Patra, S. K., & Krishna, V. V. (2015). Globalization of R&D and open innovation: linkages of foreign R&D centers inIndia. *Journal of Open Innovation: Technology, Market, and Complexity*, *1*(1), 7. https://doi.org/10.1186/s40852-015- 0008-6.

Peacock, S. (1997), "*Women entrepreneurs embrace the internet and information technology*", Center for Women's Business Research, Washington, DC.

Patel, N.V. & Irani, Z. (1999), "*Evaluating information technology in dynamic environments: a focus on tailorable information systems*", *Logistics Information Management*, 12(1): 32-9.

Ptak-Chmielewska, A. (2017). Human Capital of the Entrepreneur – Impact on the Microenterprise's Survival.Proceedings of the 5th International Conference on innovation and entrepreneurship. The Multimedia University, Cyberjayam Malaysia, 26-27 April (pp. 123-130).

Rani[1], S. H. A., &Hashim, N. (2017).Factors that Influence Women Entrepreneurial Success in Malaysia: A Conceptual Framework. *International Journal of Research in Business Studies and Management Volume 4(1): 16-23.*
Rathgeber, E. M. (1990). "WID, WAD, GAD: Trend in research and practice". J*ournal of Developing Areas* 20(4): 489-502.

Roomi, M. A. & Parrot, G. (2008).Barriers to development and progression of women entrepreneurs in Pakistan.*The Journal of Entrepreneurship*, 17 (1): 59-72.

Sandberg, S. (2013), Lean in: Women, work and the will to lead. Wtt, Allen. London.

Sarker, S., & Palit, M. (2014). Determinants of Success Factors of Women Entrepreneurs in Bangladesh-A Study Based on Khulna Region. Business and Economic Research, 4(2), 237.

Shaari, J. A, R, Khalique M. & Isa, A. H., (2010). Ranking of Public and Domestic Private Sector Commercial Banks in Pakistan on the Basis of the Intellectual Capital Performance.Proceedings of International Borneo Business Conference (BBC2010), Vol.1.

Schultz, T., 1959. Investment in man: An economist's view. *The Social Service Review* 33(2):69-75.

SME Corporation Malaysia (2015).Official website.http://www.smecorp.gov.my/index.php/en/. Downloaded on 12th April, 2017.

Srinivasan, R., Lilian, G., &Rangaswamy, A., 2002. Technological opportunism and radical technology adoption: an application to e-business. *Journal of Marketing* 66 (3), 47–61.

Stanley, L. (1990). "Feminist Praxis: Research, Theory and Epistemology in Feminist sociology. Taylor and Francis.

Stanley, L. & Wise, S. (1990)."Method, Methodology and Epistemology in Feminist research process" Feminist Praxis: Research, Theory and Epistemology in Feminist sociology, 20-60.

Stringer, R. (2000), ''How to manage radical innovation'', *California Management Review*,42(4): 70-88.

Tambunan, T. (2009). Women entrepreneurship in Asian developing countries: Their development and main constraints. *Journal of Development and Agricultural Economics,* 1(2):027-040.

Teoh, W. M. Y. & Chong, S. C. (2008).Improving women entrepreneurs in small and medium enterprises in Malaysia: policy recommendations.*Communications of the IBIMA*, 2(5), 31–38.

Teoh, S.M.Y and Chong, S. C. (2014). Towards strengthening the development of women entrepreneurship in Malaysia. Gender in Management: An International Journal, 29(7):432-453.

Trott, P. (2008). *Innovation Management and new Product Development*. London. Pearson Education Limited. 4th Edition.

FINFLEX-CBMC: A Cost-Benefit Model Addressed to Solution Architectures Considering Uncertainty

Yeimi Peña, Universidad de Los Andes, Systems and Computing Engineering Department, Bogotá, Colombia, and yy.pena29@uniandes.edu.co
Eduardo Miranda, Carnegie Mellon University, Software Engineering Master's Program, Pittsburgh, PA, USA 15213, and mirandae@andrew.cmu.edu
Dario Correal, Universidad de Los Andes, Systems and Computing Engineering Department, Bogotá, Colombia, and dcorreal@uniandes.edu.co

Abstract

Solution architectures support the design of technology solutions that are critical for responding to companies' requirements. These architectures require that financial analysis that considers details of variables of alternatives and components. However, since most current financial models address overall IT investments, it is difficult to calculate the detailed and precise financial indicators required for solution architectures. Consequently, financial variables can be omitted, and financial indicators can have imprecise values. With this in mind, our study presents FINFLEX-CBMC, a cost-benefit model specifically for solution architectures. Adoption of the Design Science Research paradigm for definition and evaluation of FINFLEX-CBMC allows it to offer specific indicators related to alternatives and components which can reduce the risk omitting of variables while increasing flexibility for comparing alternatives and provision of support for technology investment decisions.

Keywords: Cost-benefit model, solution architectures, uncertainty, and solution components.

1. Introduction

Solution architectures are essential for companies to enable value generation and increase the efficiency of processes related to design and implementation of technology solutions [1]. As Fig. 1 shows, a technology solution's design considers solution architectures from which are derived one or more alternatives that represent different options for the technology solution [2]. An alternative has a set of solution components that represent technology functionalities such as information systems [1], [3], which in turn can have particular variables such as benefits and costs associated with them and that must be considered to calculate the alternative's financial indicators using cost-benefit models [2], [4], [5]. Financial indicators are indispensable for determining the feasibility of the technology solution, analyzing its possible risks, and for justifying any investment [5], [6]. These financial indicators must consider uncertainties derived from unpredictable events such as changes in requirements to identify positive or adverse consequences of IT investments [2], [6].

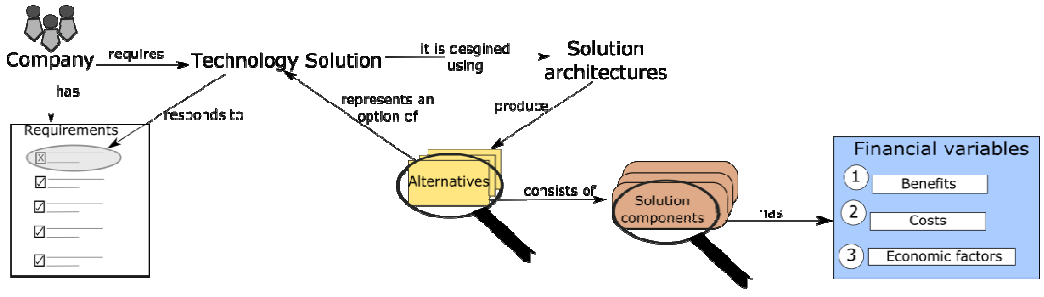


Fig. 1. Solution architecture approach

Once alternatives are defined, a company has the crucial task of selecting the one that is most convenient for implementing the technology solution [2]. To choose an alternative, companies commonly compare the alternatives' financial indicators [2], [4]. Although comparison of alternatives is valuable, it is important to consider the financial indicators at the component level because they include particular financial variables, economic factors, and unpredictable events [2] that support analyses such as comparison of the profitability between components of various alternative solutions [2].

Although there is an extensive literature about cost-benefit models addressed to technology solutions [7]–[9], most of these models are directed at overall IT investments and have a high level of granularity[i] [3], [10] that limits the detailed cost-benefit analysis required for solution architectures. Consequently, financial indicators may not accurately indicate valuation due to the omission of specific variables [3], [10], it may be difficult to identify financial indicators at the component level which could limit comparisons of components [2], and uncertainty at the component level could impact financial indicators. This study defines FINFLEX-CBMC, a cost-benefit model that supports financial analysis of alternatives and solution components in solution architectures while considering uncertainty. To define and evaluate FINFLEX-CBMC, we adopted the Design Science Research paradigm [11]. The results from evaluation of FINFLEX-CBMC indicate that it supports financial analysis of solution architectures and their alternatives and components, offers detailed data considering the uncertainty of financial variables, and supports the comparison between and among components and alternatives.

This paper is structured as follows. Section 2 describes the theoretical background. Section 3 presents related work and the objective of this research. Section 4 describes the research methodology. Section 5 describes FINFLEX-CBMC. Section 6 presents the evaluation of FINFLEX-CBMC, and Section 7 presents a discussion, future work, and conclusions from this research.

2. Theoretical Background

This section briefly describes the conceptual framework of FINFLEX-CBMC.

2.1. Financial variables

A solution component can incur specific costs [5], support materialization of different expected benefits [5], be associated with specific economic factors such as taxes and depreciation [4], and be impacted by unpredictable events that imply different uncertainties [6]. Due to these conditions, we can identify the following financial variables at the component level [2].

a. *Initial Investment* consists of acquisition costs of assets required for a component at time zero [5].
b. *Benefits* are consequences of an action that improve or promote the comfort of a company [5] and which are represented as quantified monetary profit in this study [2].
c. *Costs* consist of the purchase or rental price of a service or asset implied in a solution component [5], [12] and are represented as a quantified monetary value in this study [2].
d. *Economic factors* are relevant market and economic data that can influence the value of an IT investment [2], [5]. This study includes taxes, the inflation rate, depreciation, and salvage or rescue value.

2.2. Unpredictable events

Unpredictable events such changes in providers and new technologies [13] create uncertainty levels that must be considered in the variables of the cost-benefit analysis to determine whether the consequences for a company will be positive or adverse [2], [6]. An unpredictable event (ue) is defined in consideration of the features proposed by Vélez [13] and Neufville [6]: type (economic,

technical or regulatory), level of impact (low, medium, high), and variability (low, medium, high). To measure the uncertainty derived from the ue, we adopted the activities proposed in the Applied Information Economics model (AIE) [10], [14][ii] and the definitions of Vélez [13].

- Estimating the ranges (*low, more probable, very probable)* of the *cost and benefit* variables using expert criteria, subjective probability technique, or historical data [13], [14].
- Quantifying the uncertainty using probability distributions [9], [14]**.**
- Calculating the error of estimation using Monte Carlo Simulation. This technique depends on the number of samples: the greater the number of samples, the more accurate the estimate will be [14], [15]. If the number of simulations increases, the probability of failure has a lower error in accordance with research done at the University of Missouri [15]. Considering that, we use Equation 1 to calculate the error of estimation considering the number of samples N, the probability of failure p_f, and the quartile of standard normal distributions $u_{1-\alpha/2}$.

$$\varepsilon\% = 100u_{1-\alpha/2}\sqrt{\frac{(1-p_f^T)}{Np_f^T}}$$

Equation 1: calculation of the error of estimation applied to Monte Carlo samples [15]

- Measuring the uncertainty supported by Monte Carlo simulations [14].

2.3. Other factors

To perform the cost-benefit analysis, the life cycle of a solution component must be considered and therefore costs and benefits must be forecast [2], [12]. The life cycle comprises activities from conception (t_c) until retirement (t_d) where duration of the lifecycle is given by $t_d - t_c$ (Fig. 2) [12].

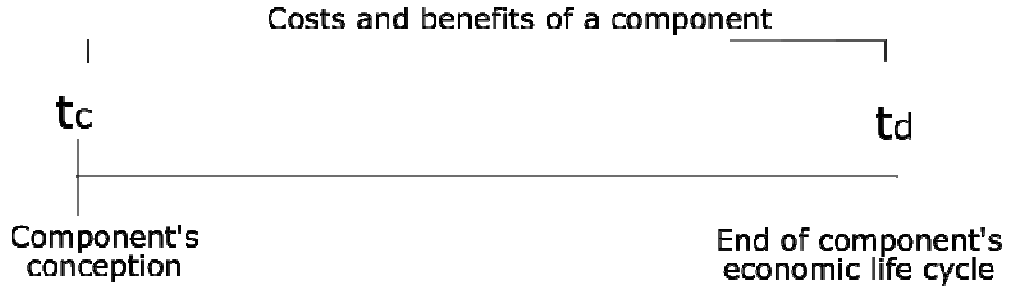


Fig. 2: Component life cycles

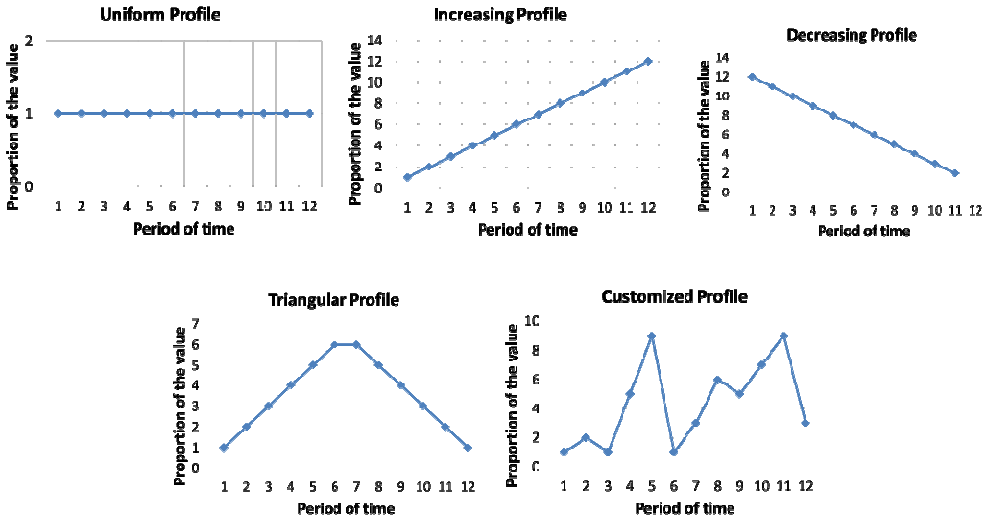


Fig. 3: Examples of profiles

To determine the cash flows that describe both output flows, the money that a company spends, and input flows, money that a company receives, during the component's life cycle, we use the five profiles illustrated with examples in Fig. 3.

2.4. Methods of Cost-benefit Analysis

Cost-benefit analysis assesses the effectiveness of budgeted investment as well as the efficiency and profitability of a technology solution[4], [2]. Cost-benefit analysis is very frequently used to analyze technology solutions [3], [6] and is supported by various methods [4], [6], [16]. FINFLEX-CBMC uses the *Expected Net Present Value* (ENPV) method [6], [16] which is an extension *Net Present Value* (NPV) method [4]. NPV (Equation 2) analyzes costs and benefits through accumulation and discounting of cash flows associated with a particular investment [4].

$$NPV\ (i) = -II + \sum_{p=0}^{n} \frac{Cf_p}{(1+i)^p}$$

Equation 2: NPV [4]

Where

Cf_p= cash flow during the period p

$-II$= initial investment

i = discount rate and refers to the opportunity cost for making a specific investment [4]

p = number of periods

ENPV is used for high-risk projects with unknown levels of uncertainty [6], and NPV is usually employed on short or certain projects [6]. While NPV is based on a single forecast of values, ENPV is based on a weighted average according to the probabilities of each of the specific NPVs. ENPV uses a variable discount rate that reflects the risks of an investment at different points of the time. Finally, unlike NPV which results in a single value [17], ENPV considers a set of NPVs to identify a range of profitability. Therefore, ENPV can consider a greater range of values with greater precision of results [6], [16]. We selected ENPV considering the specific characteristics of solution

architectures: high-risk investments, long-term returns on investments, high uncertainty levels, and changeable technology environments [13].

3. Related Work

In this subsection, we briefly describe the cost-benefit models we identified, comparisons between and among them, and the objective of this research.

3.1.Description of the cost-benefit models identified

A cost-benefit model is a mathematical representation that comprises one or several equations that are used to analyze how a business reacts to different economic situations and to calculate the outcomes of financial decisions before investments are made [4]. We identified the following cost-benefit models in the literature:

Total Value of Opportunity (TVO) is a quantitative and qualitative methodology that seeks to determine the business value of an IT investment [7], [9]. TVO supports its cost-benefit analysis on Total Cost of Ownership (TCO) [10] and supports its uncertainty analysis on the Black-Scholes Option Pricing Model [7], [9].

The *Cost-benefit Analysis Method (CBAM)* has a quantitative approach that guides stakeholders to identify costs and benefits associated with software architecture decisions that result in a system's quality attributes [8].

Total Economic Impact (TEI) is a model that aims to identify cost supported on TCO, determine the benefit related to the business value and strategic contribution, and analyze uncertainty considering the Black-Scholes model [9], [10].

Rapid Economic Justification (REJ) provides a pragmatic expression of the economic justification for an IT investment considering the alignment among its associated costs, benefits, and risks [10].

An Integrated Real Options Framework for Model-based Identification and Valuation of Options under Uncertainty [16] by Mikaelian presents an integrated real options framework (IRF) for holistic analysis of enterprise architecture projects [16]. IRF allows the evaluation of enterprise architecture alternatives through modeling of uncertainty, flexibility, benefits, and costs.

A method for valuing Architecture based Business Transformation and measuring the value of Solutions Architecture by Slot [17] presents a method to quantify the values of enterprise architecture that is financially based on business transformation [17]. The method considers costs, benefits, and management of uncertainty based on real options [17].

3.2.Problems and Objective

Table 1 compares the cost-benefit models identified.

Table 1: Comparison of cost-benefit models

	COST-BENEFIT MODELS						
	TVO [7]	CBAM [8]	TEI [10], [9]	REJ [11]	SLOT [17]	Mikaelian [16]	**FINFLEX-CBMC**
Scope	Overall IT investments	Software architectures	Overall IT investments	Overall IT investments	Enterprise Architecture	Enterprise Architecture	**Solution Architecture**
Uncertainty Measurement	Black-Scholes Option Pricing Model	Not explicit	Black-Scholes Option Pricing Model	Not explicit	Black-Scholes Option Pricing Model	Binomial lattice valuation and the Monte Carlo simulation method	**Definitions of AEI and Monte Carlo Simulations**
Granularity	High Level	High Level	High Level	High Level	Medium Level	Medium Level	**Low Level**

According to the findings presented in

Table 1, we identified the following problems:

1. Scope. Some of the models are directed to IT overall investments which could restrict the level of detail of the financial analysis of solution architectures needed for considering alternatives and solution components. The models directed toward enterprise architectures have a high level of abstraction and strategic scope that differ from the low level of abstraction of solution architectures and their technological scope.

2. Uncertainty Measurement. To measure uncertainty, some models employ the Black-Scholes Option Pricing Model. According to Hubbard, the Black-Scholes formula is not very clear about how to calculate the price of an option because there is high uncertainty in projections of option prices over time [14] while the risk rate is a constant value unlike the variable rates of a solution architecture.

3. Granularity. Four models have high granularity levels that translate to general financial indicators at the level of IT investments.

Although previous studies offer significant contributions, there is clear evidence that a specific cost-benefit model for analyzing solution architectures had not yet been developed. To respond to these shortcomings, this study aims to *define a cost-benefit model addressed to solution architectures that supports financial analysis of alternatives and solution components considering uncertainty.* To achieve our objective, we designed and evaluated FINFLEX-CBMC supported on design science research methodology.

4. Research Method for Developing and Evaluating FINFLEX-CBMC

We adopted the Design Science Research (DSR) paradigm [11] because it aims to build and evaluate artifacts that solve business needs [11]. Our research is valuable to academia and industry because cost-benefit models are valid DSR artifacts [18]. FINFLEX-CBMC is supported by the current body of knowledge [7][8] [9], [10] [17] and was designed considering the methodology proposed by Avon [19]. We followed the DSR evaluation patterns proposed by Sonnenberg and Brocke [18], and we adapted those patterns to FINFLEX-CBMC as shown in Fig. 4. The use of patterns allowed us to demonstrate, design and evaluate FINFLEX-CBMC. We explain below the three evaluation activities used for FINFLEX-CBMC.

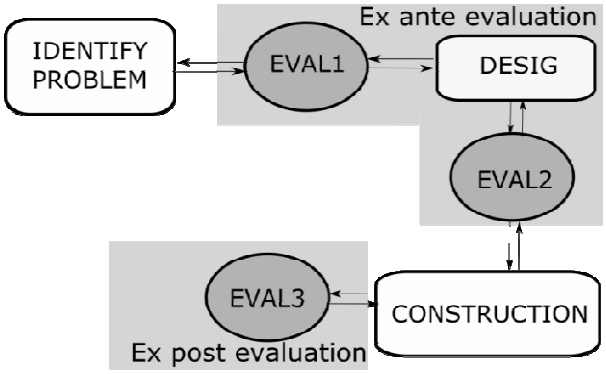


Fig. 4: DSR assesment patterns used for FINFLEX-CBMC. Adapted from [18]

1. **Identifying problem and objectives of FINFLEX-CBMC**. The first evaluation (EVAL1) justified the research problem and supported its contribution to both industry and literature. EVAL1 was completed in Sections **Error! Reference source not found.**, 2, and 3.

2. **Designing FINFLEX-CBMC**. The second evaluation (EVAL2) justified the design of FINFLEX-CBMC [18]. We designed FINFLEX-CBMC by adopting definitions from financial model of design proposed by Avon [19]. We considered the following assumptions in the design of FINFLEX-CBMC [19]:
    a. Alternatives and their components respond to the business or technology requirements that inspired them.
    b. Alternatives and their components are technically equivalents and have been technically analyzed by a company.
    c. Financial variables and economic factors of a solution component have been identified and estimated through methods previously selected by estimators.

3. **Constructing FINFLEX-CBMC**. The third evaluation (EVAL3) justified the utility of FINFLEX-CBMC (Section 6). To execute EVAL3, we first defined the cost-benefit model

(Sections 5). Then, we created a prototype of FINFLEX-CBMC to capture the required data, perform the cost-benefit analysis and present the results (Section 6).

5. FINFLEX-CBMC: A Cost-benefit Model addressed to Solution Architectures considering Uncertainty

To describe FINFLEX-CBMC, we used the generic process presented in Fig. 5. It includes the essential activities required for calculating the financial indicators of an alternative and its solution components.

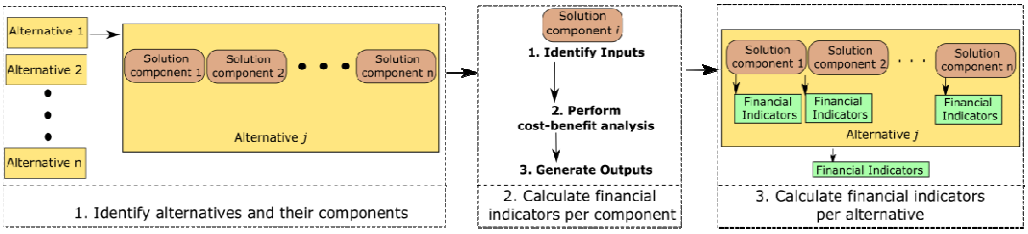


Fig. 5: Generic Process of FINFLEX-CBMC

5.1.Identifying the alternatives and their components

This activity defines the solution architecture alternatives of a technology solution and identifies the solution components of an alternative.

5.2.Calculating the financial indicators by component

The process considers the activities explained below in order to calculate the financial indicators of a component.

5.2.1. Identifying inputs

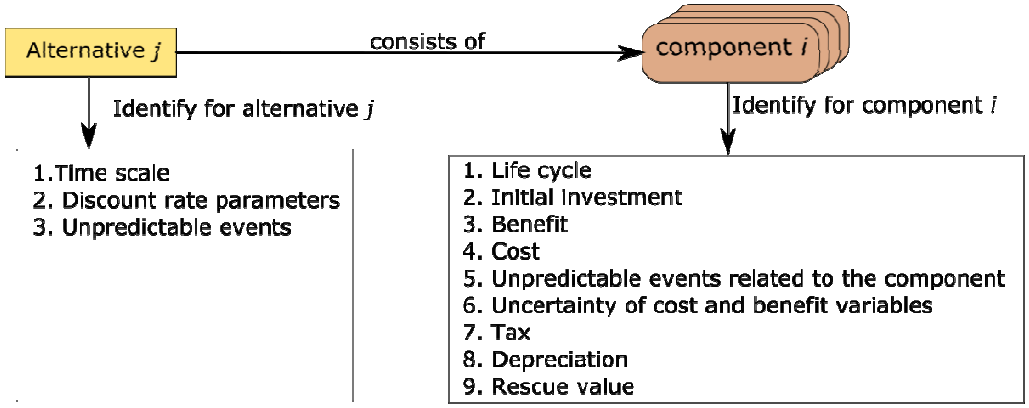


Fig. 6: Inputs required for FINFLEX-CBMC

As Fig. 6 presents, inputs have two sources: alternatives and components. The alternative's inputs are used to perform the cost-benefit analysis for all of the alternative's components while the component's inputs are particular to each component.

Input identification considers two steps:

Step 1) **Identifying inputs of alternative *j***

a. **Timescale.** Select the time scale (monthly, bi-annual, or yearly) to analyze the alternative [2].
b. **Discount rate parameters.** Identify the risk-free rate $(\mathrm{i_r})$ and the inflation rate (i_f) to calculate the discount rate .
c. **Unpredictable events**. Determine the unpredictable events $\{ue_1, ue_2, \dots, ue_n\}$ that impact the alternative [2] considering the features explained in Section 2.2.

Step 2) **Identifying inputs of component *i***

a. **Lifecycle.** Determine t_d and t_c (Section 2.3).
b. **Initial investment (II).** Identify the II (Section 2.1).
c. **Benefit.** Determine the benefit (Section 2.1) and its profile (Section 2.3).
d. **Cost.** Identify the cost (Section 2.1) and its profile (Section 2.3).
e. **Unpredictable events related to the component.** Identify the particular unpredictable events that impact a component *i* [2] using the mapping presented in
f.
g. Table **2**.

Table 2: Mapping between alternative's unpredictable events and components

	Unpredictable event (ue_j)	Component (c_i)
$Alternative_j$	ue_1	$r(ue_1, c_1)$
	…	…
	ue_n	$r(ue_1, c_n)$

Where

c_i i =1, 2, … , n are the components of A_j.
ue_j j = 1, 2, …, n are the unpredictable events of A_j.
$r(ue_j, c_i)$, represents the relationship between the components and unpredictable events.

h. **The uncertainty of costs and benefits.** Determine the range and probability distribution (Section 2.2) of costs and benefits, considering the unpredictable events related to the component *i* [2].
i. **Tax** *(Tx).* If a component *i* includes tax, it is necessary to identify its monetary values or percentages ($\{(tx_1), (tx_2), \dots, (tx_n)\}$) for the component's lifecycle.
j. **Depreciation** *(D).* If a component *i* includes the depreciation, it is necessary to identify its monetary values ($\{(d_1), (d_2), \dots, (d_n)\}$) for the component's lifecycle.
k. **Rescue value** *(Rv).* If a component has a rescue value, it should be identified as a monetary value.

5.2.2. Performance of cost-benefit analysis

To perform the cost-benefit analysis of a component, FINFLEX-CBMC executes the following activities:

1. **Calculating the number of periods** (*P*)**.** FINFLEX-CBMC calculates the number of periods ($\{p1, p2, \dots, pn\}\ where\ p1 \leq tc\ and\ pn \leq td.$) using the time scale and the life cycle.

2. **Calculating the discount rate** (i). FINFLEX-CBMC calculates i per year with inflation (i_n) using Equation 3, or i per year without inflation (i_r) using Equation 4. Once i is calculated, FINFLEX-CBMC calculates its proportion considering the timescale. As a result, i is calculated for each period $\{(i_1), (i_2) \dots (i_n)\}$.

$$\mathrm{i}_n = (1 + \mathrm{i}_r) * (1 + i_f) - 1$$

Equation 3: Nominal discount rate [4]

$$\mathrm{i}_r = \frac{(1 + \mathrm{i}_n)}{(1 + i_f)} - 1$$

Equation 4: Real discount rate [4]

3. **Calculating ENPV.** FINFLEX-CBMC calculates ENVP on the basis of 200,000iii NPVs. For each NPV, FINFLEX-CBMC performed the activities presented in Fig. 7 and explained below

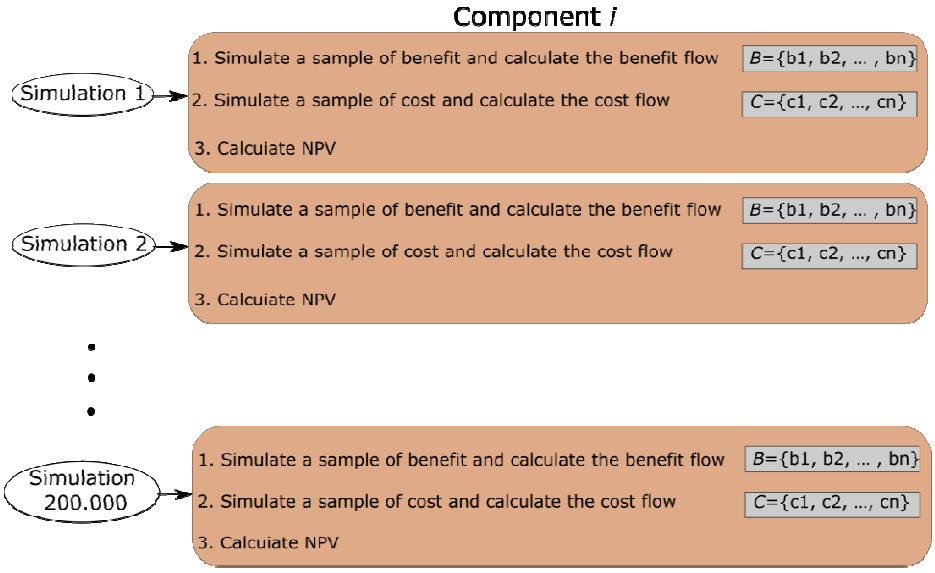


Fig. 7: ENPV calculation using Monte Carlo simulations

1. **Simulation of a random sample of benefits** through Monte Carlo simulations based on the ranges and probability distribution [14]. Then, FINFLEX-CBMC calculates the benefit flow ($\{b_1, b_2 \dots b_n\}$) of the sample considering the selected profile and the number of periods.

2. **Simulation of a random sample of costs** through Monte Carlo simulations based on the ranges and probability distribution [14]. Then, FINFLEX-CBMC calculates the cost flow ($\{c_1, c_2 \dots c_n\}$) of the sample considering the selected profile and the number of periods

3. **Calculating NPV**. FINFLEX-CBMC calculates the NPV using the approach proposed by Brealey et al. [4] (Fig. 8) on the basis of the information provided and calculated (*II, cost flow, benefit flow, D, Tx, Rv, and* i).

Period (P)	p_0	p_1	p_2	p_3	...	p_n
Initial Investment (II)	II					
Cost flow (C)		c_1	c_2	c_3	...	c_n
Benefit flow (B)		b_1	b_2	b_3	...	b_n
Depreciation (D)		d_1	d_2	d_3	...	d_n
Pretax profit(PTx)		pP_1	pP_2	pP_3	...	pP_n
Taxes (Tx)		tx_1	tx_2	tx_3	...	tx_n
Net Profit (Np)		np_1	np_2	np_3	...	np_n
Rescue Value (Rv)						Rv
Cash Flows (Cf)		cf_1	cf_2	cf_3	...	cf_n
Discount Rate (i)		i_1	i_2	i_3	...	i_n
NVP	$					

Fig. 8:Approach to calculation of NPV [4]

Utility before taxes is calculated as:

$$Pretax\ profit\ (PTx) = b_j - c_j - d_j$$

$Where\ j =$ 1,2,…,n is the period in which variables are considered.

Next, the *net profit* is calculated as:

$$Net\ profit(Np) = pP_j - tx_j$$

Then, the *cash flows* are calculated as:

$$Cash\ Flow(Cf) = np_j + Rv_j + d_j - II$$

Finally, the NPV is calculated as:

$$NPV\ (i) = -II + \sum_j \frac{Cfj}{(1+i_j)^j}$$

Once the 200,000 simulations have been run by FINFLEX-CBMC, the ENPV is represented as shown in the example illustrated in Fig. 9.

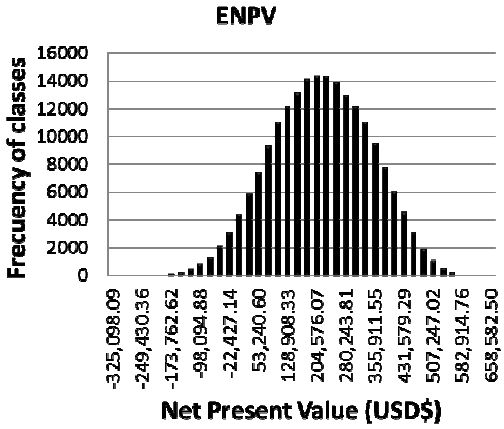


Fig. 9: Example of ENPV

5.2.3. Generating outputs

FINFLEX-CBMC generates the following financial indicators for any component i:

1. ENPV.
2. Benefit flow and cost flow as shown in Fig. 10. The benefit and cost flows are identified by calculating the mean (μ) and standard deviation (σ) of the simulated variables for each period.
3. Cash flow.

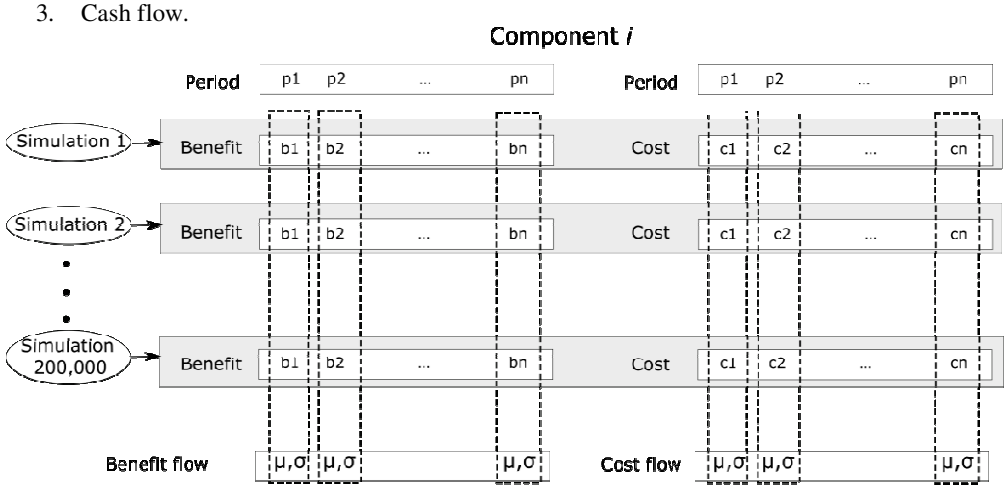


Fig. 10: Calculation of the cost and benefit flows of a component

5.3.Calculating the financial indicators for each alternative

FINFLEX-CBMC calculates the following financial indicators for each alternative:

1. Profitability of an alternative

$$Profitability\ of\ Aj = \sum_{i=1}^{n} \mu(ENPV_{component\ i})$$

2. Cost flow of an alternative

$$Cost\ of\ Aj\ (p) = \sum_{i=1}^{n} Cost(component\ i)_p$$

$Where\ p = 1,2,\ldots,n$ is the period in which the cost is considered.

3. Benefit flow of an alternative

$$Benefit\ of\ Aj\ (p) = \sum_{i=1}^{n} Benefit(component\ i)_p$$

$Where\ p = 1,2,\ldots,n$ is the period in which the benefit is considered.

Fig. 11 presents the results of the financial indicators at the component and alternative levels as calculated by FINFLEX-CBMC. This result supports the comparison between components and alternatives and provides detailed data to support investment decisions.

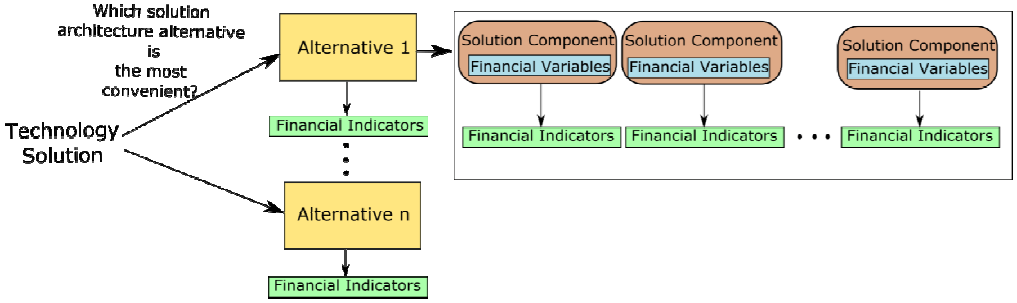


Fig. 11: Financial indicators at alternative and component levels

Finally, as
Fig. 12 shows, the design of alternatives is commonly an iterative process in which the first iteration has a high level of granularity and the last iteration has a low level of granularity. FINFLEX-CBMC can be used independently of the alternative's granularity.

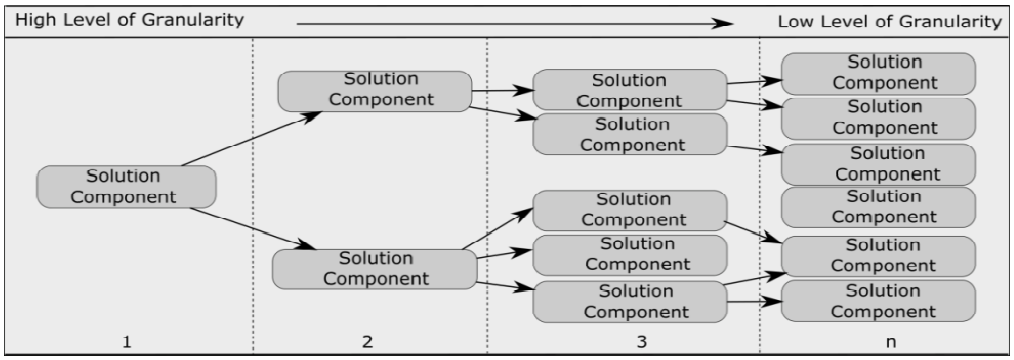


Fig. 12: Level of Granularity of alternatives

6. Evaluation of FINFLEX-CBMC

FINFLEX-CBMC was evaluated to justify its utility based on the *scenarios* method [11]. This method was selected because we evaluated FINFLEX-CBMC on the basis of six scenarios that were performed by 32 IT professionals distributed into six teams. EVAL3 was conducted between August

2016 and December 2016 as part of the Solution Architecture course offered by the master's degree in Architecture of Information Technology of Los Andes University (https://sistemas.uniandes.edu.co/en/mati-en). Each scenario represented between one and three solution architecture alternatives that responded to the requirements of a hypothetical company called CCT. CCT offers technology services based on Business Process Outsourcing within Colombia and internationally. CCT currently has difficulty managing customer data related to information traceability and consolidation. Consequent high levels of customer dissatisfaction have increased risks of losing customers and sales opportunities. **Error! Reference source not found.** presents an example of one alternative defined by one of the teams.

The evaluation methodology is presented in **Error! Reference source not found.** Due to space limitation, we have only briefly described the quantitative analysis. As Fig. 13 shows, we first designed a prototype and a guide for FINFLEX-CBMC. Then, we identified research questions to determine how FINFLEX-CBMC supports financial analysis of solution architectures. Next, we presented the prototype and the guide to the six teams in a face-to-face session. Subsequently, the teams evaluated their alternatives using FINFLEX-CBMC. Finally, we collected and analyzed the instances of the prototype with scenarios defined by the teams (A total of 12 solution architecture alternatives because some of the teams only defined one alternative for each scenario).

The objective of the quantitative analysis was to compare traditional financial indicators with the financial indicators generated by FINFLEX-CBMC. Specifically, we compared NPV and ENPV and the cash flows of these approaches. Table 3 presents the results of the financial indicators of one example for three alternatives that had a *high level of granularity*. For this reason, each alternative was analyzed as a unique component.

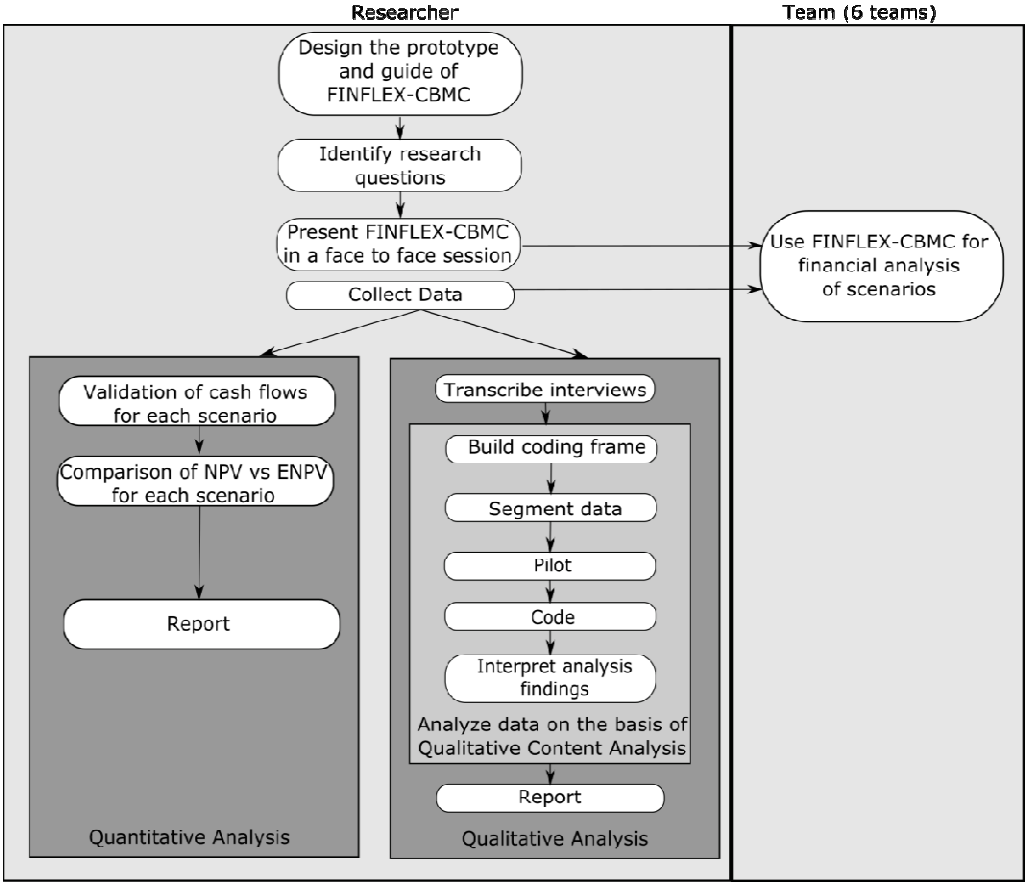
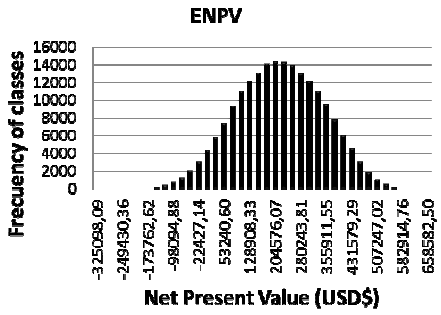
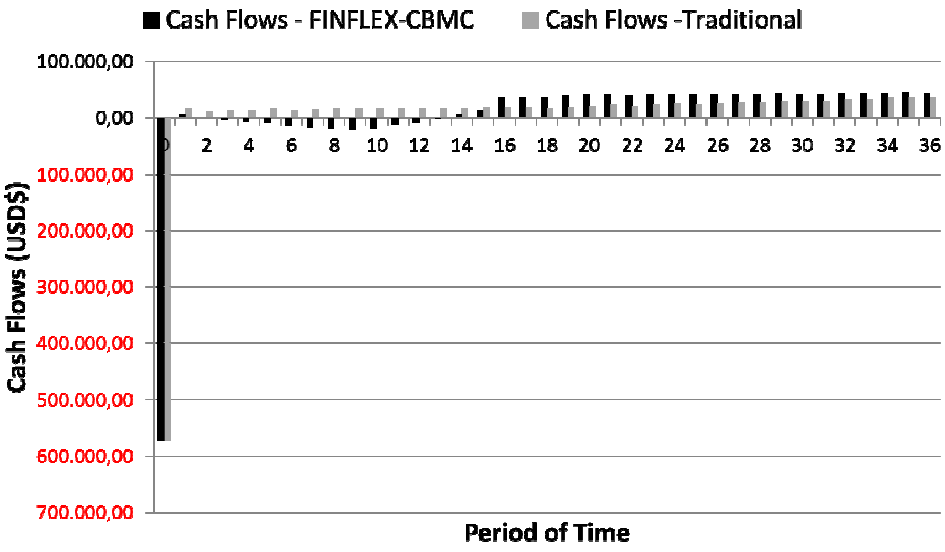


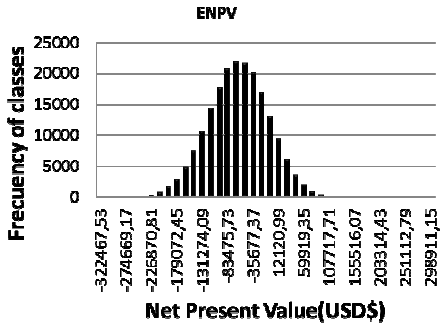
Fig. 13: Methodology for evaluating FINFLEX-CBMC

Table 3: Scenarios considered in quantitative analysis

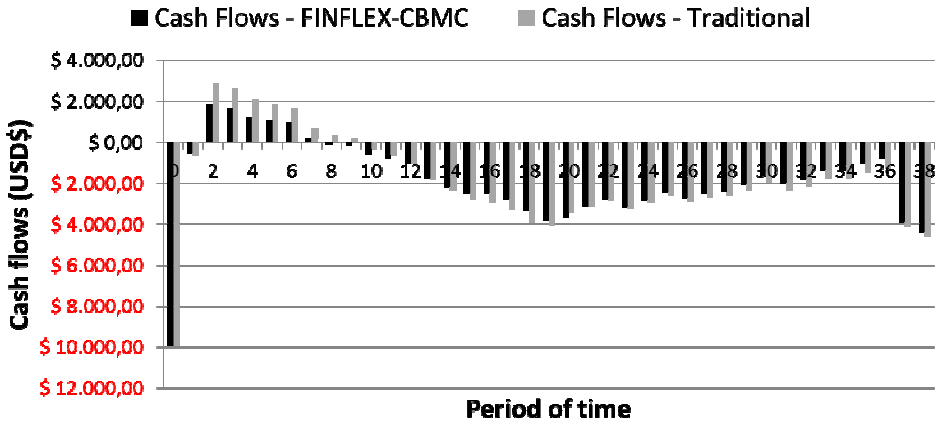
	Traditional financial indicators	FINFLEX-CBMC indicators	
Scenario 1	NPV = $ 41,630.50		Minimum value -$ 325.098,09 Q1 (Percentile 0,10) $ 111.043,94 Q2 (Mean (μ)) $ 204.023,31 Standard Deviation (σ) $ 130.437,38 Q3 (Percentile 0,75) $ 297.598,84 Q4 (Percentile 0,95) $ 373.493,98 Maximum value $ 658.582,50
			

Scenario 2

NPV = -$59,037.19

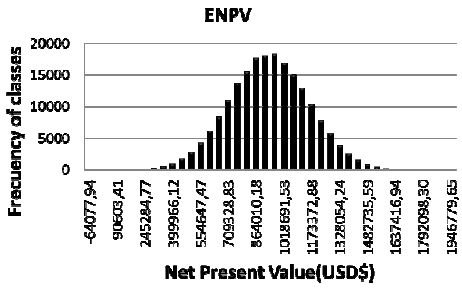


Minimum value	-$ 322.467,53
Q1 (Percentile 0,10)	-$ 109.695,32
Q2 (Mean (μ))	-$ 70.840,66
Standard Deviation (σ)	$ 82.910,88
Q3 (Percentile 0,75)	-$ 32.724,75
Q4 (Percentile 0,95)	$ 1.106,30
Maximum value	$ 298.911,15

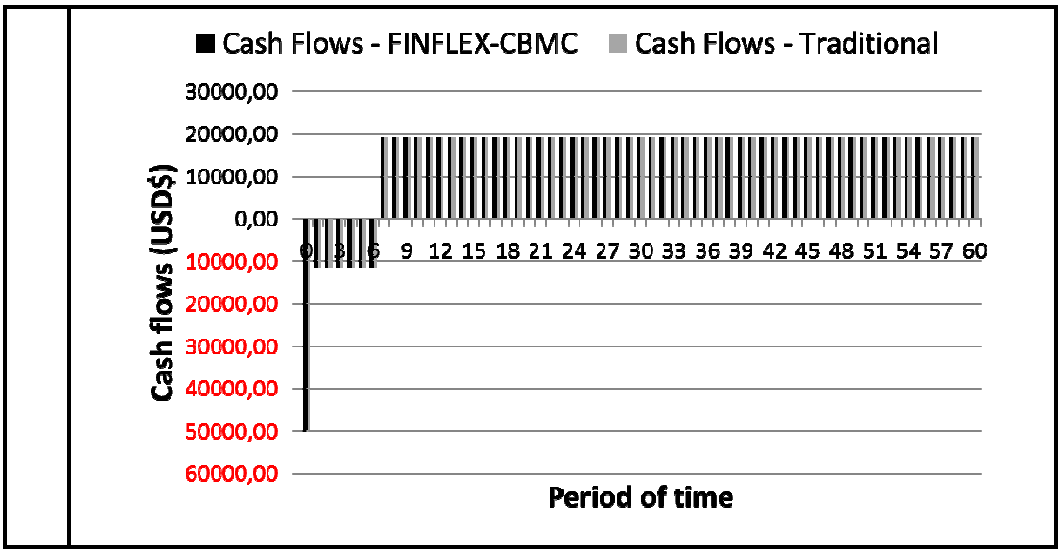


Scenario 3

NPV = $583,349.34



Minimum value	-$ 64.077,94
Q1 (Percentile 0,10)	$ 757.945,97
Q2 (Mean (μ))	$ 908.891,76
Standard Deviation (σ)	$ 223.938,40
Q3 (Percentile 0,75)	$ 1.060.613,36
Q4 (Percentile 0,95)	$ 1.196.270,64
Maximum value	$ 1.946.779,65



It can be seen from the results that, while the NPV offers a unique value for identification of the profitability of a solution, the ENPV is a rich source of data for analyzing risks and possibilities of profitability.

For example, in scenario 1, the NPV is $ 41,630.50 which could be a good basis for making a decision since it is positive. However, the NPV's value is lower than the mean (μ) of ENPV which is $204,031.30 and, since the standard deviation (σ) of ENPV is $130,437.38, profitability is likely to be nearly 50% higher than that indicated by NPV alone. ENPV can give experts more information for each percentile plus the standard deviation measures possible risks of an investment. It is also interesting to analyze the minimum and maximum profits of a solution. For example in scenario 2, the minimum profit is -$322.467, the maximum profit is $298.911, and the average profit is -$70.840. In this scenario, experts can identify the maximum and minimum possible profits as well as the risks thereby providing more robust information to support investment decisions.

The scenarios reveal some differences regarding cash flows between the traditional NPV and the ENPV which could affect identification of outflows and inflows that in turn could result in notable differences regarding investment in a particular solution. The ENPV's cash flows are the results of simulations which may provide more certainty to the analysis.

Finally, on the basis of the results of the quantitative evaluation, we concluded that FINFLEX-CBMC offers more detailed and richer financial indicators than does the traditional NPV for making investment decisions regarding solution architectures.

7. Discussion and Future Work

This paper has presented FINFLEX-CBMC, a cost-benefit model that calculates financial indicators of solution architectures on the basis of their components and alternatives. FINFLEX-CBMC contributes to the determination of unpredictable events and measurement of uncertainties to determine positive and adverse events related to an investment. FINFLEX-CBMC has a number of advantages:

- It calculates financial indicators at two levels of detail for solution architectures: alternatives and components.

- It permits comparison of financial indicators for components and alternatives and measures uncertainty associated with financial variables which can increase the accuracy of the indicators calculated.

- It consolidates financial variables and financial indicators related to solution architectures. FINFLEX-CBMC's flexibility allows performance of sensitivity analysis on the basis of the variation of the financial variables, and it supports risk analysis of IT investments on the basis of ENPV and its metrics.

Although FINFLEX-CBMC provides a complete set of calculations and supports a cost-benefit analysis of solution architectures, it does have some limitations. These include the amount of data required for the use of FINFLEX-CBMC, the performance of the FINFLEX-CBM's prototype, and absence of the experience of the architects in the interpretation of financial indicators of stochastic models like FINFLEX-CBMC. Consequently, results could be omitted or misunderstood by an interdisciplinary team.

We are considering the following activities to continue the development of FINFLEX-CBMC:

1. Implementation of the prototype on another platform that improves performance and user experience.

2. Definition of a methodology to support FINFLEX-CBMC that will offset the absence of experience interpreting financial indicators. We propose to include detailed examples and descriptions to identify the utility of the financial indicators.

3. Validation of FINFLEX-CBMC with case studies to provide more details and use of the model in real cases.

4. Analysis of historical data to support FINFLEX-CBMC and to reduce the complexity of the analysis.

Acknowledgements

The authors of this paper would like to thank the group of professionals of the Master's Degree of Architecture of Information Technologies at Los Andes University for participating in the evaluation of FINFLEX-CBMC. Their comments and scenarios have helped us identify the advantages and disadvantages of our financial model, as well as pointing towards future research to improve our work.

References

[1] M. D. Arango Serna, J. E. Londoño Salazar, and J. W. Branch Bedoya, "Solution architecture approach, mechanism to reduce the gap between enterprise architecture and implementation of technological solutions," *Dyna*, vol. 82, no. 193, pp. 117–126, 2015.

[2] Y. Pena, E. Miranda, and D. Correal, "FINFLEX-CM: A Conceptual Model for Financial Analysis of Solution Architectures Considering the Uncertainty and Flexibility," in *Advances in Computing. 12th Colombian Conference, CCC 2017, Cali, Colombia, September 19-22, 2017, Proceedings*, 2017, pp. 242–256.

[3] Y. Pena, D. Correal, and E. Miranda, "A review of the current situation, challenges and opportunities in the financial analysis of enterprise architectures," *World Rev. Sci. Technol. Sustain. Dev.*, vol. 13, no. 2, pp. 145–173, 2017.

[4] R. A. Brealey, S. C. Myers, and F. Allen, *Principles of Corporate Finance*, 10th ed. New

York, USA: McGraw-Hill/Irwin, 2011.

[5] Z. Irani, A. Ghoneim, and P. E. D. Love, "Evaluating cost taxonomies for information systems management," *Eur. J. Oper. Res.*, vol. 173, no. 3, pp. 1103–1122, Sep. 2006.

[6] R. De Neufville and S. Scholtes, *Flexibility in Engineering Design*, MIT. London, England: Massachusetts Institute of Technology, 2011.

[7] A. Apfel and M. Smith, "TVO Methodology: Valuing IT Investments via the Gartner Business Performance Framework," Gartner, USA, 2003.

[8] R. Kazman, J. Asundi, and M. Klein, "Design Decisions : An Economic Approach," Pittsburgh, PA, 2002.

[9] B. Cormier, "The Total Economic Impact Of Cisco ' s Borderless Networks," Cambridge, MA, USA, 2010.

[10] N. Mead, J. H. Allen, W. A. Conklin, A. Drommi, J. Harrison, J. Ingalsbe, J. Rainey, and D. Shoemaker, "Making the business case for software Assurance," Pittsburgh, PA, 2009.

[11] B. A. R. Hevner, S. T. March, J. Park, and S. Ram, "Design Science in Information Systems Research," *MIS Q.*, vol. 28, no. 1, pp. 75–105, 2004.

[12] M. Smit, "A North Atlantic Treaty Organisation framework for life cycle costing," *Int. J. Comput. Integr. Manuf.*, vol. 25, no. May, pp. 444–456, 2012.

[13] I. Vélez Pareja, "Decisiones bajo incertidumbre," in *Decisiones empresariales bajo riesgo e incertidumbre*, G. E. Norma, Ed. Bogotá, Colombia: Grupo Editorial Norma, 2003, p. 48.

[14] D. W. Hubbard, *How to Measure Anything Finding the value of "intangibles" in business*, 2nd ed. New Jersey, U.S.: John Wiley & Sons, 2010.

[15] Missouri University of Science and Technology, "Monte Carlo Simulation," *Probabilistic Engineering Design*, 2016. [Online]. Available: http://web.mst.edu/~dux/repository/me360/me360_lecture8.html. [Accessed: 15-Jun-2017].

[16] T. Mikaelian, "An Integrated Real Options Framework for Model-based Identification and Valuation of Options under Uncertainty," Massachusetts Institute of Technology, 2009.

[17] R. Slot, "A method for valuing Enterprise Architecture based Business Transformation and Measuring the value of Solutions Architecture," University of Amsterdam, 2010.

[18] C. Sonnenberg and J. Brocke, "Evaluations in the Science of the Artificial – Reconsidering the Build-Evaluate Pattern in Design Science Research," in *Proceedings of the 7th International Conference on Design Science Research in Information Systems: Advances in Theory and Practice*, 2012, pp. 381–397.

[19] J. Avon, *The Handbook of Financial Modeling*, 1st ed. New York, NY: Apress, 2013.

Appendix A – Example of the use of FINFLEX-CBMC

This case presents a proposal by team one for an integrated solution to meet CCT's requirements which is supported by the Oracle platform. This alternative had a *high level of granularity*, so it was analyzed as a unique component.

1. Identifying Inputs

<table>
<tr><td>Timescale</td><td>Monthly</td></tr>
<tr><td>Unpredictable events</td><td>
<table>
<tr><th colspan="5">Unpredictable Events</th></tr>
<tr><th>ID</th><th>Description</th><th>Type (economic, technical, regulatory, other)</th><th>Impact level (1-5 where 1 is low impact and 5 is high impact)</th><th>Variability over time (high, medium, low)</th></tr>
<tr><td>IN-01</td><td>Regulatory changes</td><td>Regulatory</td><td>3</td><td>High</td></tr>
<tr><td>IN-02</td><td>Failure to comply with service agreements</td><td>Technical</td><td>4</td><td>Medium</td></tr>
<tr><td>IN-03</td><td>Collapse of the systems</td><td>Technical</td><td>4</td><td>Medium</td></tr>
<tr><td>IN-04</td><td>Cost Overrun</td><td>Economic</td><td>3</td><td>Low</td></tr>
<tr><td>IN-05</td><td>Development Delays</td><td>Technical</td><td>4</td><td>Medium</td></tr>
<tr><td>IN-06</td><td>Poor architecture design</td><td>Technical</td><td>5</td><td>Medium</td></tr>
<tr><td>IN-07</td><td>Poor project planning</td><td>Other</td><td>5</td><td>Medium</td></tr>
<tr><td>IN-08</td><td>Technical failures</td><td>Technical</td><td>3</td><td>Medium</td></tr>
<tr><td>IN-09</td><td>Lack of access by clients to platforms or applications</td><td>Technical</td><td>2</td><td>Low</td></tr>
</table>
</td></tr>
<tr><td>Discount rate parameters</td><td>$i_r = 10\%;\ i_f = 6\%$ constant</td></tr>
<tr><td>Lifecycle</td><td>01/01/2017 - 01/01/2020</td></tr>
<tr><td>Initial Investment</td><td>USD$ 46,333.33</td></tr>
</table>

Benefits supported on FINFLEX-' benefit taxonomy

	95% CI Upper Bound	Most probable	95% CI Lower Bound	Probablity distribution (Normal (N), Triangular (T) Uniforme (U))	Data Profile (Uniform (U) Increasing (I) Decreasing (D) Triangular (T) Custom C))
Operational	$300,000.00	$283,333.33	$200,000.00	U	I
Managerial	$ 50,000.00	$ 43,333.33	$ 33,333.33	T	C
Strategic	$100,000.00	$ 63,333.33	$ 50,000.00	N	U
IT infrastructure	$100,000.00	$ 33,333.33	$ 26,666.67	T	D
Organizational	$ 33,333.33	$ 20,000.00	$ 3,333.33	N	I

Costs based on FINFLEX' cost taxonomy

	95% CI Upper Bound	Most likely	95% CI Lower Bound	Probablity distribution (Normal (N), Triangular (T) Uniforme (U))	Data Profile (Uniform (U) Increasing (I) Decreasing (D) Triangular (T) Custom (C))
Total Direct	$200,000.00	$99,300.00	$90,000.00	N	D
Total Indirect	$150,000.00	$ 83,666.67	$53,333.33	T	I

Taxes	N.A.
Depreciation	N.A.
Rescue value	USD$1,000

2. Performing cost-benefit analysis

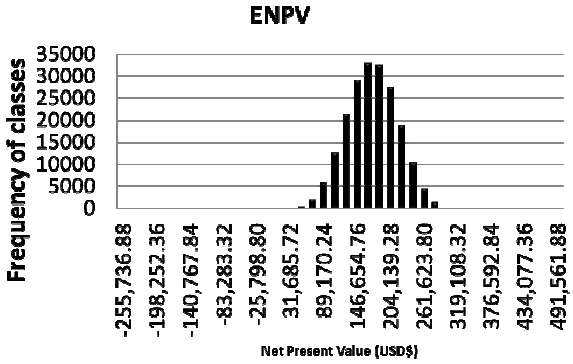
Number of periods	36 months
Discount rate	i =17% per year and i = 1.29% per month

Calculating ENPV. Example of NPV calculation for one of the simulations.

Period (P)	0	1	2	3	4	5	6	7	8	9	10
Date		01/01/2017	01/02/2017	01/03/2017	01/04/2017	01/05/2017	01/06/2017	01/07/2017	01/08/2017	01/09/2017	01/10/2017
Initial Investment (II)	$ 46,333.33										
Direct Costs		$ 9,569.12	$ 9,521.27	$ 9,473.43	$ 9,425.58	$ 9,377.73	$ 9,329.89	$ 9,282.04	$ 9,234.20	$ 9,186.35	$ 9,138.51
Indirect Costs									$ 207,91	$ 415,82	$ 623,73
Operational Benefits							$ 504,02	$ 1,008.04	$ 1,512.06	$ 2,016.08	$ 2,520.10
Managerial Benefits		$ 445.66	$ 1,336,97	$ 891,31	$ 1,336,97	$ 891,31	$ 445,66	$ 1,782.62	$ 1,336.97	$ 891,31	$ 1,782.62
Strategic Benefits											
IT Benefits											
Organizational Benefits		$ 30.05	$ 60,09	$ 90,14	$ 120,19	$ 150,24	$ 180,28	$ 210,33	$ 240,38	$ 270,43	$ 300,47
Depreciation (D)		$-	$-	$-	$-	$-	$-	$-	$-	$-	$-
Pretax profit (PTx)		$ (9,093.41)	$ (8,124.21)	$ (8,491.97)	$(7,968.42)	$ (8,336.19)	$(8,199.93)	$ (6,281.05)	$(6,352.70)	$(6,424.35)	$(5,159.04)
Taxes (Tx)		$-	$-	$-	$-	$-	$-	$-	$-	$-	$-
Net Profit (Np)		$ (9,093.41)	$ (8,124.21)	$ (8,491.97)	$(7,968.42)	$ (8,336.19)	$(8,199.93)	$ (6,281.05)	$(6,352.70)	$(6,424.35)	$(5,159.04)
Rescue Value (Rv)											
Cash Flows (CF)	$(46,333.33)	$ (9,093.41)	$ (8,124.21)	$ (8,491.97)	$(7,968.42)	$ (8,336.19)	$(8,199.93)	$ (6,281.05)	$(6,352.70)	$(6,424.35)	$(5,159.04)
Discount Rate (I)		1,29%	1,29%	1,29%	1,29%	1,29%	1,29%	1,29%	1,29%	1,29%	1,29%
Present Value		$ (8,977.78)	$ (7,918.90)	$ (8,172.11)	$(7,570.76)	$ (7,819.45)	$(7,593.83)	$ (5,742.81)	$(5,734.46)	$(5,725.40)	$(4,539.28)
NVP	$73,541.14										
Standard Deviation	$ 50,360.48										

3. Generating outputs

a. ENPV (Fig. 14)
b. ENPV – cumulative frequency (Fig. 15)
c. Cost flows (Fig. 16)
d. Benefit flows (Fig. 17)
e. Cash flows (Fig. 18)



Minimum	-$ 255,736.88
Q1 (Percentil 0,10)	$ 132,748.76
Q2 (Mean)	$ 163,156.80
Standard Deviation	$ 43,280.54
Q3 (Percentil 0,75)	$ 193,377.46
Q4 (Percentil 0,95)	$ 219,110.68
Maximum	$ 510,723.39

Fig. 14: ENPV of alternative 1

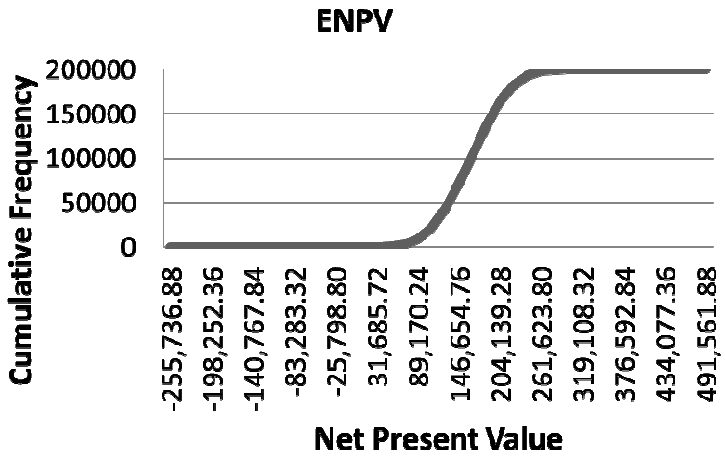


Fig. 15: ENPV of alternative 1 – cumulative frequency

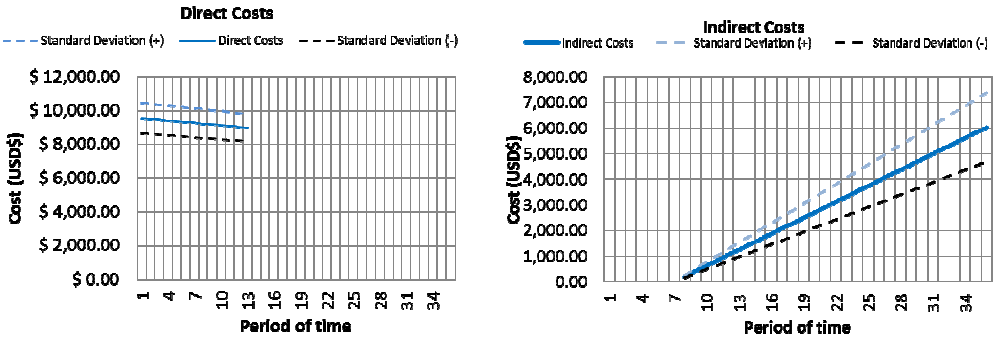
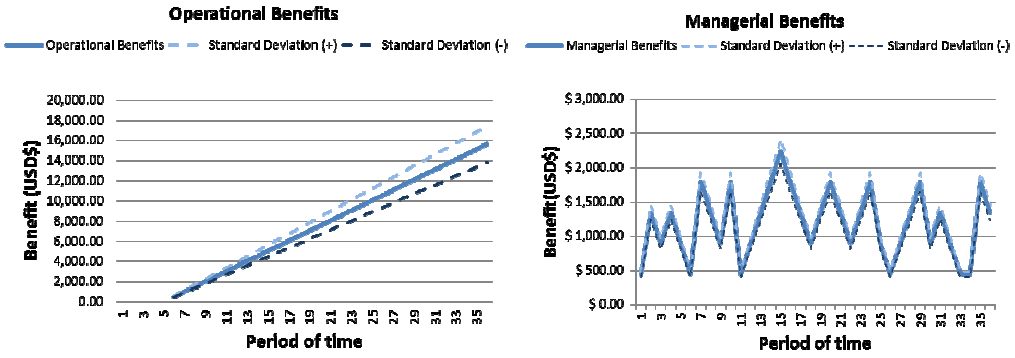
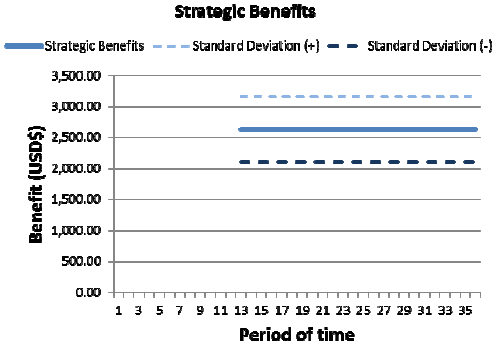


Fig. 16: Costs flow with standard deviation of alternative 1

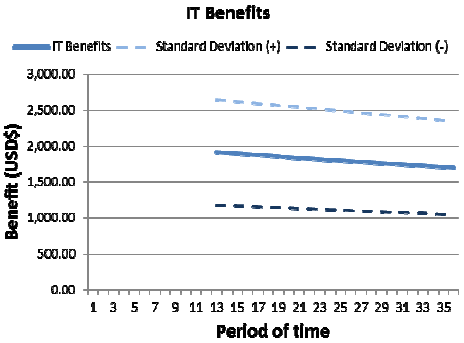


(a)

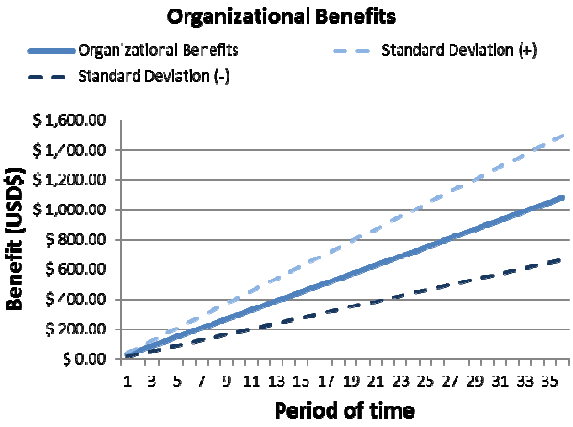
(b)



(c)



(d)



(e)

Fig. 17: Benefits flow with standard deviation of alternative 1

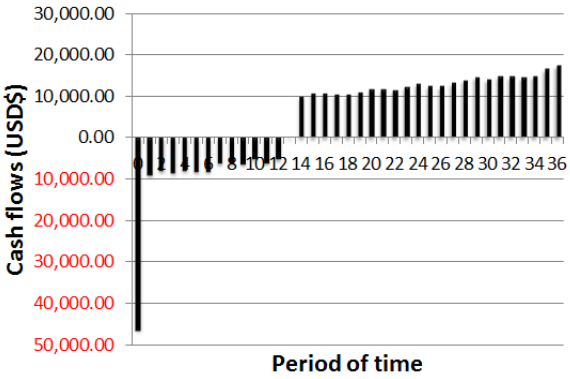


Fig. 18: Cash flows of alternative 1

[i] High level of granularity refers to estimate values considering alignment with business goals and prioritization of requirements (few details) [10], and low-level of granularity refers to decomposition of values in specific variables at the lowest practical level of understanding [10].

[ii] AIE is a rigorous quantitative methodology that presents an explicit method for measuring uncertainty at low levels of granularity and which supports more accurate valuation [10].

[iii] To calculate the number of simulations, we considered a 95% confidence level, a probability of failure of 0.001, and a 15% error of estimation to provide us with a high level of confidence in the results [15].

The Influence of Business Strategy and Top Management Support on the Effective of Management Accounting Information System and its Impact on Corporate Performance: Evidence from Indonesia

Sri Mulyani, Professor at Padjadjaran University, Bandung, Indonesia.
sri.mulyani@unpad.ac.id

Sudrajat, Universitas Padjadjaran, Bandung and Lecturer at Lampung University, Lampung, Indonesia. Email: drajat239@gmail.com

Erlynda Kasim, Universitas Padjadjaran, Bandung and Lecturer at STIE Ekuitas, Bandung, Indonesia. Email: erlynda_kasim@yahoo.com

Abstract

This research is aimed to explain the influence of business strategy, top management support (TMS) on the effective of management accounting information system (MAIS) and its impact on corporate performance. The research methodology used quantitative approach while the statistical method used SEM-PLS. Questionnaires and interviews had been done to 240 managers from 60 state owned companies in Indonesia. Result had shown that business strategy did not have any influence on the quality of management accounting information system. Top management support on the other hand, had influences on the quality of management accounting information, in addition the quality of management accounting information system had influences on the performance of the organization.

Keywords: Business Strategy, Top Management Support, Quality of Management Accounting Information System , Corporate Performance

Introduction

Since 1980s' corporate performance and all the efforts to realize it has become an interesting topic, (McAdam & Braine, 2002). One determining factor is the availability of management accounting information system that will provide accounting information which is needed to help managers in making decisions related to strategic planning and even long term goal planning, in allocating resources, controlling and doing evaluation, (Atrill & McLeny, 2009). This thing is in accordance to the statement from Fawcet et.al (1997), that accounting information systems have to be able to provide all of the information related to financial measures and other measures that can escalate long term performance.

There are still a lot of problems related to the performance of state owned company management in Indonesia. This thing is supported by the evidence from an audit on state owned companies which were done by *Badan Pemeriksa Keuangan Republik Indonesia* (BPK RI) between the period of 2014 and 2016 as follows: the company managed ineconomically over the last three years (2014-2016) with the value of ineconomis in 2016 amount to 1,378,950.28 Milion IDR increased 208 % compared on 2014. In addition, the company is also managed inefficiently or a waste of amount 11.652,169 Milion IDR on 2016. This condition indicates a decline in management performance over the last three years.

Literature Reviews

Business Strategy

Business strategy is one way that was taken by companies to set up corporate's purpose and goals for a long term while also planning on some activities which have to be done and making the allocations

of some resources needed to reach the goals (Robin & Judge, 2013). Kourdy (2003) stated that a business strategy is ideas which affect planning, decision making, and strategic analysis that eventually result in competitive results. Considine et.al (2010) stated that business strategy is how the organization makes an agreement with competitors and sets products which can be sold to the market and arranges distribution method of these products.

From the accounting perspectives, strategic mangement is activities taken by top management related to corporate's performance determination and accomplishment for a long term, (Wheelen & Hunger, 2012). According to Campbell et.al (2002), business strategy is the basis of target determination and corporate's long term goals and the applications on many actions and the resource allocations which are appropriate to reach the goals of the company.

Business strategy in this research is actions taken by management in realizing the goals of the company in a long term and implemented in the setting of company's vision and missions and also company's goals to put the company in the condition of competitive advantage.

O'Brein & Marakas (2011) classified the standard of business strategy in five dimensions which are Cost leadership strategy, Differentiation Strategy, Innovation Strategy, Growth strategy, Alliance strategy. Laudon & Laudon (2014) defined six dimensions of business strategy as follows: very good activities, new products, best service and latest business models, intimacy with customers and suppliers, increasing the decision making process, competitive advantage, business survival. In this research, business strategy was measured in qualified operational dimensions, market orientation and competitive advantage.

Top Management Support

TMS is a series of actions which appear from managers behaviour (Young and Jordan, 2008), and is also support given by managers or leaders to share knowledge about company's activities (Rahab et.al, 2011). in contrast, Kandelousi et.al, (2011) claimed that TMS can be seen in many forms for examples helping team members in problem solving, showing commitment in working and encouraging staffs and awareness in giving financial support, allocating human resources and other physical resources and also refer to project leader delegation and teams which have the power to the success of the project accomplishment. The urgent thing at the moment is top management support on the implementation of Management Accounting System, (Mulyani,2009).

Xu (2015) defined TMS as how far top managers in a company understand and support the implementation of information system. Gunasekaran and Ngai (2004) on the other hand, stated that TMS is moral support such as financial support and technical support in the information and technology to get input on management value. According to Ragu and Nathan (2004), TMS is support from management by facilitating various management operationals and the activities of strategic information technology.

In this research, TMS is defined as the awareness from top managers in providing many resources in the implementation of Management Accounting Information System to personify organization performance.

Linying, (2008) said there are two indicators to measure TMS, which are financal support and required resources, support in the form of promoting changes in accordance with company's goals. Whereas Young & Jordan (2008) used different indicators to measure TMS which are allocating time to system development which is equal to the benefits and cost that will be gained later, reviewing plans, evaluating result, and facilitating management problems by integrating Information Comunication Technology (ICT) and company's business.

In this research, TMS is measured by some indicators: resource provision, involvement in reaching the goals of the organization and the allocation of work performance incentive base.

Management Accounting Information System

Systems are a series of sub systems, components or elements which work towards the same goals to produce the expected outcome, (Mulyani, 2016). MAIS is a procedure that produces information to internal users such as managers, executives and employees/workers, (Hansen and Mowen, 2007).

Heidman (2008) said that MAIS is a formal system giving information from internal circles to the decision making. According to Belkauoi (2002), MAIS is a system that produces and spreads information which is relevant for internal decision making. The components of accounting information system consist of user, procedure, data, software, information technology and internal control (Mulyani, 2009). In accounting information system, the quality of given information is important for the success of the system which is applied in the organization as accounting standard procedures (Xu, 2009).

In this research, MAIS is defined as a process of data collection, measurement, and financial data storing which then be distributed to many sectors for decision making in the improvement of the organization performance.

The effective of MAIS can be seen from the ability of this system in producing information which has wide scope, the ability to accomplish particular work at one time and responsive to customer's complaint, (Bentley & Whitten, 2007). Delone & McLean (2003) gave dimension indicators adaptability, availability, reliability, response time and usability. Stair & Raynold (2012) measured the effectivity of MAIS with different dimensions, which are flexible, efficient, accessible, timely. In this research, the effective of MAIS is measured with usability, accessibility and timely dimensions.

Corporate Performance

Kurt & Van (2004) defined performance as a value which is made by an organization using productive assets compared to expected values by the share holders. In addition, Kurt & Van (2004) traditionally stated that corporate performance is defined in financial standard. This is a major regulation set by the authorities and auditors to reveal certain financial information. How far financial details should be revealed depends on the type of the companies whether they are private or state owned ones, on the size of the companies, or on whether they are registerred or not in stock exchange. The standard of financial performance can be devided into two major types: (1) standard based on accounting data; and (2) standard based on market which comes from market share value.

Performance is the standard of productivity using output and input, which are all the things and services including resources that are used to reach goals of the organization, and because of that the effort of improving productivity is improving performance , (Manzoni & Sardar, 2009). In addition, Peter & Savoi, (2000) also stated that performance has to do with organization efficiency. Efficiency is not only a parameter of performance but also a tool to accomplish the goals of the organization through diversity and standardization. Furthermore, Peter & Savoi (2000), claimed that performance also corresponds to result and outcome which can be realised by an organization.

In this research, corporate performance is defined as the ability to utilize all the resources owned by an organization in achieving goals in the concept of value for money which means effective, efficient, and economical by focusing on the ability to compete and regular improvement.

Tajuddin & Ahmad (2013) claimed that the parameter of traditional performance may be sufficient in the context of common industry, but may not be when it is in a more specific public sector one. In public sector, organization performance is generally seen from non-financial aspect. Output and outcome measures are highly relevant, and there are some other parties with interest and accountability relations. Then, public sector institutions adopt or adapt various plannings and technical analysis from industries in order to improve the ability to run the business. Lusthaus *et. al* (2002) measured the organization performance in some dimension: effectivity, efficiency, financial viablility. In this research, organization performance is measured from effectivity, efficiency and economical dimensions.

Theoretical Framework and Hypothetical Development

The Influence of Business Strategy on the Effective of Management Accounting Information System.

Some factors which influence the effectivity of information system are information technology, business strategy and the culture of the organization, (Romney & Steinbart, 2015). Because business strategy is a broad framework then the relation to MAIS is highly strong, (Gottschalk, 2006), in addition it cannot be denied that business strategy and the effectivity of MAIS are highly related one to another , (Laudon & Laudon, 2014).

A research linked to business strategies done by Lee & Miller (1996) concluded that business strategies significantly influence the design of accounting information system. Mulyani & Arum (2016) also stated the same, that a business strategy which was made by a competent management has a positive influence on the effectivity of MAIS. In addition, Chong & Chong (1997) showed a finding that a business strategy influences the design of MAIS. Based on theoritical analysis and previous research, can be sum up that a business strategy positively influences the effectivite of MAIS.

The Influence Of Top Management Support On The Effective Of Management Accounting Information System

MAIS will run effectively if top management gives full support in the form of either resource provision or involvement along the implementation, (Kimbal et.al, 2008). When top management gives full support either resource or finance then the application of the management accounting information system, ERP will run well, (Princely, 2008). TMS on the effectivity of MAIS can also be seen in many management activities and financial support, (Linying, 2008).

The result of research conducted by Mulyani et.al (2016) found out that TMS has a positive influence on MAIS which is implemented in an intelligent business system. Thong et.al (1993) concluded that TMS has a positive influence on the effective of MAIS. Gunasekaran & Ngai (2004) also found out that support and involvement from top management have influenced the success of information sytem in the Supply Chain Managaement. Daud & Triki, (2013) claimed that TMS has an influence on accounting information system. Young & Jordan (2008) concluded in their research that TMS has a significant influence on the application of MAIS. Based on theoritical analysis and previous research can be concluded that that TMS has a positive influence on the effective of MAIS.

The Impact of Management Accounting Information System Effective on Corporate Performance

An information system which can be implemented in RFID combined with management policy in applying JIT, TQM can significantly increase corporate performance, (Pamela et.al, 2014). A company with well managed information system ranging from input process and output for operational activities to financial record can rise corporate performance because each part can respond every need and problem immediately (Bacha,2012).

Mulyani et.al (2016) found that accounting information system has a strong influence on improving corporate performance, this is also proven by the fact that a higher performance accomplishment when a company is more interactive in applying management accounting information system, eventhough generally showing that management accounting information system has shown a positive infleunce on perofrmance , (Agbejule, 2011). In an environment with a high unpredictability, a broad scope of MAIS can give information that will increase the performance of the organization, (Chong, 2004). This finding is also supported by Cheng, (2012), where broadscope MAIS shows a positive influence in performance. The higher the broadscope with information directly used by management,

the higher the corporate performance is. Based on theoritical analysis and previous research can be concluded that the effective of MAIS shows a positive influence in corporate performance.

Based on theoritical frame that analyse the influence of Business Strategy, TMS, Effecvite of MAIS and Corporate Performance, it is illustrated in the graph of framework as follows:

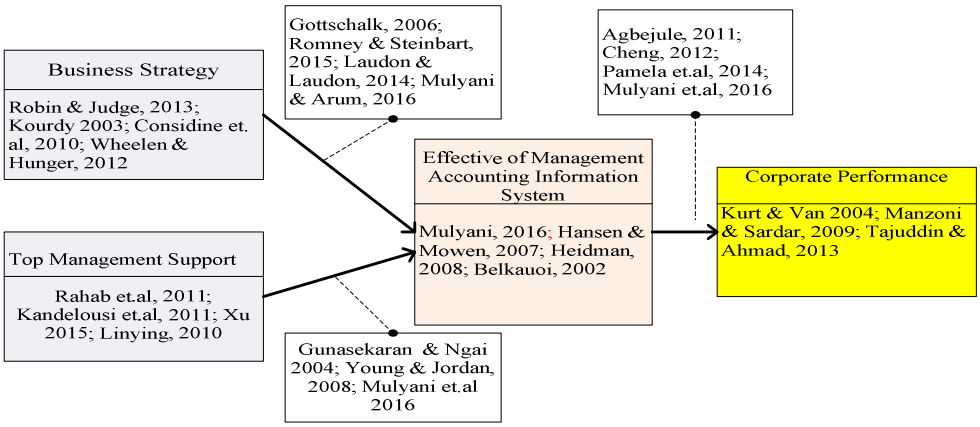


Figure 1 : Theoritical Framework

Based on research framework, hypothesis in the research are as follows:

Hypothesis 1 : A business strategy has an influence in the effective of management accounting information system.
Hypothesis 2 : Top management support has an influence in the effective of management accounting information system.
Hypothesis 3 :The effective of management accounting information system has an influence on corporate performance

Research Methodology

Population in this research was state owned companies (BUMN) running in both banking and non banking business in Lampung, Indonesia with total of 71 companies and 60 sample companies with purposive random sampling method. Selection of state owned companies because these companies operate not only focus to profit oriented but also consider the welfare factor of society. This characteristic is different from the profit oriented private company. To get a result showing a real condition then questionnaires were spread out and a direct interview was also conducted to a total of 240 middle level managers. The data were analysed using Structural Equational Model (SEM) with Partial Least Square (PLS) approach. This research used 95% confidence level, or α 5% so that t table 1,96 was generated as a parameter to accept or reject the hypothesis.

Result and Discussion

Prior to the hypothesis testing, to check the questionnaire accuracy as an intsrument to measure the proper variable then validity and reliability tests have to be made which are shown in table 1

Table 1: Validiy and Reliability Test

	Loading Factor	AVE	R Square		Loading Factor	AVE	R Square		Loading Factor	AVE	R Square		Loading Factor	AVE	R Square
X1		0.64780		X2		0.55551		Y		0.38395	0.79416	Z		0.47720	0.83883
X1.1		0.79354	0.79676	X2.1		0.83939	0.76842	Y1		0.87802	0.64915	Z1		0.66853	0.76514
x.1.1.1	0.911			X2.1.1	0.924			Y1.1	0.939			Z1.1	0.862		
X1.1.2	0.892			X2.1.2	0.908			Y.1.2	0.956			Z1.2	0.717		
X1.1.3	0.869			X2.2		0.75672	0.84419	Y2		0.69671	0.82923	Z1.3	0.865		
X1.2	0.906	0.85517	0.82074	X2.2.1	0.877			Y2.1	0.712			Z2		0.66432	0.64399
X1.2.1	0.932			X2.2.2	0.863			Y2.2	0.941			Z2.1	0.793		
X1.2.2	0.918			X2.3		0.74556	0.52802	Y3		0.79114	0.86810	Z2.2	0.836		
X1.3	0.868	0.79567	0.78365	X2.3.1	0.928			Y3.1	0.841			Z3		0.57686	0.83360
X1.3.1	0.900			X2.3.1	0.793			Y3.2	0.936			Z3.1	0.807		
X1.3.2	0.844											Z3.2	0.771		
												Z3.3	0.816		

Based on table 1, it is known that loading factor value for each indicator is 0,5 higher which means all the seen indicators in every single question is valid as a parameter and all indicators have R^2 value above 0,5 that indicates all indicators have good reliability levels. The result of hypothesis testing is presented in figure 2

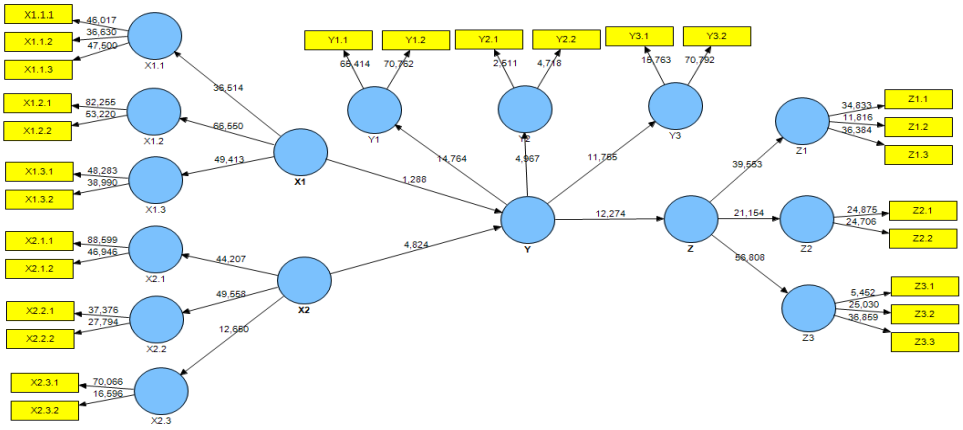


Figure 2: Hypothesis Testing Result

The Influence of Business Strategy in the Management Accounting Information System Effective

Based on the result of hypothesis testing in figure 5.1, coefficiency value of business strategy in the effective of MAIS is 1,288 lower than t count 1,96, thus the first hypothesis is turned down.
The business strategy applied in state owned companies (BUMN) have no impact on the effective of MAIS. This is because most of the policies in state owned companies (BUMN) in many districts area are regulated by the head office without considerring the real situation in the district area such as product, price and quality competition. The answers from the respondents also show that companies which still have not shown qualified business (14%), companies which are not market oriented (19%), not doing product diversification (22%), companies which cannot make product diversification (20%). This indicates that the strategy and policy applied are top-down, thus making the state owned companies in the district areas only run the system made by head office so that the branch offices only focus on operational of the company. This result cannot support the previous one done by Mulyani *et. al* (2016), Chong & Chong (1997).

The Impact of Top Management Support in the Effective of Management Accounting Information System

The direction of TMS to MAIS shows that there is an influence of TMS to MAIS, with coefficiency of 4,824. A positive value shows that every 1 unit rise of TMS can increase the quality of MAIS as much as 4,824.

Coefficiency of 4,824 higher than t table (1,96) proves that TMS has an influence in MAIS so that hypothesis 2 that states TMS has an influence in the effective of MAIS is acceptable. This thing is seen from the reality that in a tight business competition top management realise the importance of information system as a tool to win the competition. The proof of this TMS is attention and commitment to system development and the application of MAIS that is integrated in every part and the provision of required resources for the success of MAIS. The answers from the respondents also show a high commitment from management to implement a new information system (35%) and top management is willing to give fund for improving and maintaining information system (83%). This result supports the previous research done by Thong et.al (1993), Chong & Chong (1997), Gunasekaran & Ngai (2004), Ragu et.al (2004), Young & Jourdan (2008), Daud & Triki (2013).

The Influence of Management Accounting Information System Effective In Corporate Performance

Coefficiency of 12,74 shows that effective of MAIS has a significant influence in the corporate performance (t count value : 12,74 higher than t table : 1,96) thus hypothesis 3 is accepted. The condition from the field shows that all of the state owned companies have implemented integrated MAIS and can be accessed online so that every division needing information to support accomplishing the work and even decision making can be done in realtime. This condition enables all the managers to make a fast decision making and cut bureaucracy chain thus making the corporate performance increase.

Conclusion

Based on the result of the research it can be concluded that a business strategy does not have any influence on the effective of MAIS which is mainly due to the top down system implemented by the head office in all strategies in the companies. TMS has a positive influence on the effective of MAIS that is seen by a high commitment from top mangement to make improvement and maintenance of the available information system in the company. The effective of MAIS has a positive influence on the performance of the company. Many strategical decisions made by management are generally based on the information generated by the system implemented in the company.

Previous studies tested business strategy, TMS, MAIS and corporate performance in private companies, while this research was conducted on state-owned companies with non profit oriented objectives. Differences in the characteristics of the unit of analysis will affect the results of the study.

This research is still limited to state-owned enterprises in the field of banking and non banking finance while the type of state-owned enterprises in Indonesia is very diverse. Subsequent research can examine all state-owned enterprises using cluster systems to classify the types of companies or combine private companies and state owned enterprise.

References

Agbejule, Adebayo. (2011) 'Organizational Culture and Performance: The Role of Management Accounting System,' *Journal of Applied Accounting Research*, 12,.(1), 74-89.

Atrill and McLeny. (2009) Management Accounting for Decision Makers. 6th Edition. Prentice Hall

Bacha, Eliane. (2012) 'The Impact of Information Systems on The Performance of The Core Competence and Supporting Activities of A Corporate,' *Journal of Management Development*, 31, (8), 752-763.

Belkoui, Ahmed Riahi. (2002) Behavior Management Accounting, Quorum Books, Westport: Connecticut-London

Campbell et.al. (2002) Business Strategy: An Introduction. 2nd Edition, United Kingdom, Butterworth-Heinemann An Imprint Of Elsevier Sciencez.

Cheng, Min-Tsung. (2012), 'The Joint Effect of Budgetary Participation and Broad-Scope Management Accounting Systems on Management Performance. *Asian Review of Accounting*, 20, (3), 184-19.

Chong and Chong. (1997), 'Strategyc Choise, Environmental Uncertainty and SBU Performance: A Note The Intervening Role of Management Accounting Information System' *Accounting And Business Research*, 27, (4), 268-276.

Chong, Vincent K. (2004), 'Job-Relevant Information and Its Role with Task Uncertainty and Management Accounting Systems on Managerial Performance' *Pacific Accounting Review*, 16, (2).

Considine, Brett et.al. (2010). Accounting Information System: Understanding Business Process. Australia: John Whiley & Sons.

Daud and Triki. (2013), 'Accounting Information System an Environment and Tunisian Corporate Performance,' *The International Journal of Digital Accounting Research*, 13, (1), 1-35.

Delone, W.H and McLean, E.R. (2003), 'The Delone and McLean Model of Information Systems Success: A Ten Years Update,' *Journal of Management Information Systems*, 19, (4), 9-30.

Linying, Dong. (2008), 'Exploring The Impact of Top Management Support of Enterprise Systems Implementations Outcomes Two Cases,' *Business Process Manaement Journal*, 14, (2), 204-218.

Fawcet, S., Smith, S. and Cooper, M. (1997), 'Strategic Intent, Measument Capability and Operational Success: Making The Connection,' *International Journal of Physical Distribution & Logistics Management*, 12, (7), 410-421.

Gottschalk, P. (2006), 'Information Systems in Value Configurations,' *Industrial Management & Data Systems,* 106, (7), 1060-1070.

Gunasekaran and Ngai. (2004), 'Information Systems In Supply Chain Integration And Management,' *European Journal of Operational Research*, 159 (1), 269-295.

Hansen, D.R and Mowen, M.M. (2007) Managerial Accounting, 8th Edition, Thomson.

Heidman, Marcus. (2007) The Role of Management Accounting System In Strategic Sensemaking. Deutscher University Verlag *(DUV),* Gambler Edition: Winssenschaft.

Kandelousi, N and Abdollahi, A.O. (2011), 'Key Success Factor for Managing Projects,' *International Journal of Social, Behavior, Educational, Economic, Business and Industrial Engineering,* 5, (11), 1541-1545.

Kimball R., Ross M., Thornthwaite W., Mundy J. and Becker B. (2008) The Data Warehouse Lifecycle Toolkit, Wiley Publishing, Second edition.

Kuordy, Jeremy. (2003) Business Strategy A Guide For Effective Decision Making, Profile Books Ltd3a Exmouth House, Pine Street: London.

Kurt, Verweire, and Van Den Berghe Lutgart. (2004) Integrated Performancemanagement A Guide To Strategy Implementation, SAGE Publication: London.

Laudon, K. and Laudon, J. (2014) Management Information Systems, 13th Edition, New Jersey: Prentice-Hall. Inc.

Lee, Jangwoo and Miller, Danny. (1996), 'Strategy, Environment and Performance in Two Technological Contexts: Contingency Theory in Korea,' *Organization Studies*, 17, (5), 729-750.

Lusthaus, Charles.. Marie-Hélène Adrien. and Fred, Gary Anderson. (2002) Organizational Assesment-A Framework For Improving Performance. Inter Americal Development Bank, International Development Reseacrh Center.

Manzoni, Alex and Sardar M.N. Islam. (2009) Performance Measurement In Corporate Governance, Physica-Verlag A Springer Company.

McAdam, Rodney and Bailie, Brian. (2002), 'Business Performance Measurement and Alignment Impact Strategy-The Role Of Business Improvement Models,' *International Journal Of Operation And Production Management*, 22, (9), 972-996.

Mulyani, Sri. (2009) Sistem Informasi Manajemen Rumah Sakit: Analisis dan Perancangan, Abdi Sistematika, Bandung-Indonesia.

Mulyani, Sri. (2016) Analisis dan Perancangan Sistem Informasi Manajemen Keuangan Daerah, Notasi Pemodelan Unified Modeling Language (UML), Abdi Sistematika, Bandung-Indonesia.

Mulyani, Sri and Arum, Enggar Diah Puspa. (2016), 'The Influence Of Manager Competency And Internal Control Effectiveness Toward Accounting Information Quality,' *International Journal Of Applied Business And Economic Research*, 14, (1), 181-190.

Mulyani, Sri., Darma, Jufri. and Sukmadilaga, Citra. (2016), 'The Effect of Clarity of Business Vision and Top Management Support on The Quality Of Business Intelegence Systems: Evidence From Indonesia,' *Asian Jouenal of Information Technology,* 15 (16), 2958-2964.

Mulyani, Sri., Hassan, Rohail. and Anugrah, Fajar. (2016), 'The Critical Success Factor for The Use Information Systems And Its Impact on The Organizational Performace,' *International Business Management*, 10 (4), 552-560.

O'Brein, J.A and Marakas, G.M. (2010) Introduction To Information Systems, 16th Edition, New York: McGraw-Hill Companies, Inc.

Pamela J. Zelbst ; Kenneth W. Green, Jr; Victor E. Sower and Roger D. Abshire. (2014), 'Impact of RFID and Information Sharing on JIT, TQM and Operational Performance,' *Management Research Review*, 37, (11), 970-989.

Peters, B. Guy and Savoie, J. Donald. (2000) Twenty-First Century: Revitalizing The Public Service, McGill-Queen's University Press Montreal & Kingston: London.

Princely, Ifinedo. (2008), 'Impacts of Business Vision, Top Management Support, and External Expertise on ERP Success,' *Business Process Management Journal,* 14, (4), 551-568.

Ragu, Bhanu and Nathan. (2004) A Path Analytic Study of The Effect of Top Management Support for Information System Performance, Rochester Institute of Technology.

Rahab., Sulistyandari. and Sudjono. (2011), 'The Development of Innovation Capability of Small Medium Enterprises Through Knowledge Sharing Process: An Empirical Study of Indonesian Crative Industry,' *International Journal of Business and Social Science,* 2, (21), 112-123.

Robbins, Stephen P and Judge, Timothy A. (2013) Organizational Behavior, Oxford University Press.

Romney, M.B and Steinbart, P.J. (2015) Accounting Information Systems, England: Pearson Education.

Stair,R.M and Reynolds, G.W. (2012) Principles of Information System-A Managerial Approach, Course Technology.

Tajuddin, Ahmad Fadzli Ahmad and Ahmad, Syeb Zamberi. (2013), 'Impact of Environmental Scanning on The Organisational Performance of Local Authorities In Malaysia,' *Transforming Government: People, Process And Policy*, 7, (3), 342 – 363.

Thong *et.al*. (1993), 'Top Management Support In Small Business Information Systems Implementation: How Important Is It?,' *Proceedings of The 1993 Conference on Computer Personal Research*, 416-425.

Wheelen, Thomas L and J. David Hunger. (2012) Strategic Management And Business Policy, Pearson International Edition-Eleventh Edition, New Jersey: Pearson Prentise Hall.

Xu, Li Da. (2015) Enterprise Integration And Information Architecture, CRC Press, An Auerbach Book.

Young and Jordan. (2008), 'Top Management Support: Mantra Or Necessity?,' *International Journal Of Project Management*.

……., BPK RI. Ihtisar Hasil Pemeriksaan Semester I & II. 2014,

……., BPK RI. Ihtisar Hasil Pemeriksaan Semester I &II . 2015

……., BPK RI. Ihtisar Hasil Pemeriksaan Semester I &II . 2016

Linking Absorptive Capabilities and Competitive Advantage: Empirical Study of the Portuguese Textile SMES

ORLANDO LIMA RUA
Applied Management Research Unit (UNIAG), Portugal
Polytechnic of Porto/ISCAP/CEOS.PP, Portugal
orua@iscap.ipp.pt

ALEXANDRA FRANÇA
University of Minho, School of Economics and Management, Portugal (APNOR), Portugal
franca.alexandra@gmail.com

RUBEN FERNANDEZ ORTIZ
Universidad de La Rioja, Spain
ruben.fernandez@unirioja.es

Abstract

This study aims at investigating the influence that absorptive capability has on competitive advantage of Portuguese textile small and medium enterprises (SMEs). Therefore, a quantitative methodological approach was used, conducting a descriptive, exploratory and transversal empirical study, having applied a questionnaire to a sample of Portuguese exporting firms. The research results suggest that absorptive capability enhances competitive advantage in the analysed SMEs, through the acquisition (cost leadership and differentiation), assimilation (cost leadership), transformation (cost leadership) and exploitation (cost leadership and differentiation). Therefore, the findings sustain the necessity to invest in absorptive capability, which contributes to the firms' competitive advantage in foreign markets.

Keywords: absorptive capabilities, competitive advantage, SMEs.

Introduction

Small and medium-size enterprises (SMEs) are increasingly confronted by challenges and opportunities in international markets. Together with large corporations, smaller firms are among the key players in international trade. Smaller firms that belong to traditional (low-tech and labor-intensive) industries can find here opportunity for growth or challenge their survival. In fact, they are particularly vunerable to global competition, particularly from players located in low-labor-cost economies. In order to achieve competitiveness in this context, smaller firms need to develop unique, firm-specific assets (Zucchella & Siano, 2014).

Firm survival is lowest when firms are small; thus, the development of effective strategies is critical for the continuity of business (Thornhill & Amit, 2003). According to the extant literature, increasing business competitive position, particularly SMEs, is of pivotal importance for the development and renewal of national economies (O'Cass & Sok, 2014). At present, although SMEs are recognised as important contributors to modern economies, our understanding of how they thrive in an increasingly competitive environment and achieve growth is limited (Anderson & Eshima, 2013). Thus, it is urgent to understand the drivers of SME performance.

The competitive environment has long been considered one of the critical contingencies in strategic management. In essence, dynamism and complexity reflect the degree of uncertainty facing an organization and munificence signals a firm's dependence on those environments for resources (Lumpkin & Dess, 2001).

Another body of literature in the field of strategic management has focused on dynamic capabilities (see Barreto, 2010). The firms' success depends not only on its' resources and capabilities, but also the ability to adapt itself to the industry contingencies and markets in which operates. Firms may possess resources but must display dynamic capabilities otherwise shareholder value will be destroyed (Bowman & Ambrosini, 2003). It is in this context that emerges the Dynamic Capabilities View (DCV) (Amit & Schoemaker, 1993; Teece et al., 1997) to support the adjustment to environmental change. DCV is not divergent but rather an important stream of RBV to gain competitive advantage in increasingly demanding environments (Ambrosini & Bowman, 2009; Barreto, 2010; Eisenhardt & Martin, 2000; Wang & Ahmed, 2007). Monteiro, Soares and Rua (2017) defend that in versatile markets, firms' capabilities should be dynamic and managers must display the ability to ensure consistency between business environment and strategy in order to continuously renew skills.

Our study is responsive to the call of Sousa, Martínez-López and Coelho (2008) which suggests that, in the context of international markets, firms' survival and expansion, and consequent economic growth of many countries, is strongly dependent on a better understanding of the determinants that influence competitive advantage. In fact, the factors that set off SME growth (including exporting) are still in need of research (Stouraitis, Harris, Harun & Kyritsis, 2017). So, the purpose of this paper is to broad the boundaries of entrepreneurship and strategic management literature and test the following hypotheses — *does absorptive capabilities positively influence small business competitive advantage?*

Theoretical Framework

Absorptive capabilities

In modern business environment with high turbulence, knowledge has been designated as a dominant source of competitive advantage. In order to survive certain pressures, companies need to recognize, assimilate and apply new external knowledge for commercial purposes (Jansen, Van Den Bosch & Volberda, 2005). This ability, known as absorptive capability (ACAP) (Cohen & Levinthal, 1990), emerges as an underlying theme in the organizational strategy research (Jansen et al., 2005).

Cohen and Levinthal (1990) presented a definition of ACAP most widely cited by academic research, as the firm's ability to identify, assimilate and exploit new knowledge. Thus, this ability access and use new external knowledge, regarded as an intangible asset, is critical to success and depends mainly on prior knowledge level, since it is this knowledge that will facilitate the identification and processing of new one. This prior knowledge not only includes the basic capabilities, such as shared language, but also recent technological and scientific data or learning skills. By analysing this definition is found that absorptive capability of knowledge only three dimensions: the ability to acquire external knowledge; the ability to assimilate it inside; and the ability to apply it.

Zahra and George (2002) divided ACAP in Potential Absorptive Capability (PACAP) and Realized Absorptive Capability (RACAP). PACAP reflects the firms' ability to acquire and assimilate knowledge that is vital for their activities. Knowledge identification, acquisition and assimilation is related to routines and processes that permit to analyse, process, interpret and understand external information. RACAP includes knowledge transformation and exploitation, where transformation is the ability to develop routines that facilitate the integration of newly acquired knowledge in existing one. Knowledge exploitation are routines which enhance existing skills or create new ones by incorporating acquired and transformed knowledge internally.

In order to cope and enhance each ACAP dimension, Jansen et al. (2005) argue that firms need to develop organizational mechanisms which enable them to synthesize and apply newly acquired knowledge. Thus, there are coordination mechanisms that increase the exchange of knowledge between sectors and hierarchies, like multitasking teams, participation in decision-making and job rotation. These mechanisms bring together different sources of expertise and increase lateral interaction between functional areas. System mechanisms are behaviour programs that reduce

established deviations, such as routines and formalization. Socialization mechanisms create a broad and tacit understanding of appropriate rules of action, contributing to a common code of communication.

However, a challenging point for managing the firm's ACAP is that many firms fail to: a) consistently acquire and disseminate the collected information from sphere of front-line units (e.g. marketing and sales managers), b) transform or integrate this knowledge into the general market intelligence, or c) successfully apply the intelligence to increase their competitive position and/or customer value preposition, which in turn will enhance superior performance (Rakthin, Calantone & Wang, 2016)

Competitive Advantage

The different way managers interpret the same external environment leads to distinct policies formulation and differentiated actions, which, together, is reflected in organizational performance (e.g. Lumpkin & Dess, 1996; Zahra, 1993).

The increased intensity of business competition has forced firms to adopt a non-traditional management techniques and tools. Maintaining competitive advantage is a dynamic and infinite activity (Hung, Yang & Lien, 2010).

How firms achieve and sustain competitive advantage? This is the fundamental question in the field of strategic management (Teece et al., 1997). Porter (1985) considers simply a matter of creating value for customers and doing it better than competition.

Porter's model to classify firm strategies remains the most commonly supported and acknowledged framework in strategic management literature (Allen, Helms, Takeda, White & White, 2006). Porter proposed four competitive strategies: broad cost leadership, broad differentiation, cost focus and differentiation focus. While cost leadership or differentiation is defined as dominant competitive strategies, focus is not a standalone strategy and "is not sufficient for above-average performance' (Porter, 1985, p. 15). Consequently, there is a tendency in the literature to recognise two main sources of competitive advantage: a) cost leadership – reaching lower costs than competitors and b) differentiation – creating more value for customers than the average firm (Lechner & Gudmundsson, 2014). Furthermore, and according to Porter, the two logics of differentiation and cost leadership are incompatible.

Hence, we can reduce the study of competitive strategy to differentiation and cost leadership, especially if the competitive strategy is related to other strategic elements of firm's behaviour. Differentiation means to fulfil customers' needs in a unique way, based on speed, customer service and flexibility, which is consistent with innovative approaches and characteristics of entrepreneurial firms. Cost leadership requires substantial financial resources (to invest in tangible assets), is based on process innovation, learning curve benefits, economies of scale and standardization, and seems to be less appropriate for small firms, given the resource constraints (Lechner & Gudmundsson, 2014).

Sustainable competitive advantage represents firm's competitive maintenance on the long run, whose performance is above average, resisting the dynamic evolution of competition, consumers and industry (e.g. Amit & Schoemaker, 1993; Peteraf, 1993; Porter, 1985).

Hypotheses Derivation

Teece *et al*. (1997, p. 516) defined dynamic capabilities as the "firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments". Dynamic capabilities thus reflect firms' ability to achieve new and innovative forms of competitive advantage.

ACAP is a dynamic capability found in organizational processes that enables firms to reconfigure their core resources, react to environmental dynamics and build competitive advantage (Zahra & George, 2002).

H1a: Acquisition's absorptive capabilities are positively associated with cost leadership.

H1b: Acquisition's absorptive capabilities are positively associated with differentiation.

H2a: Assimilation's absorptive capabilities are positively associated with cost leadership.

H2b: Assimilation's absorptive capabilities are positively associated with differentiation.

H3a: Transformation's absorptive capabilities are positively associated with cost leadership.

H3b: Transformation's absorptive capabilities are positively associated with differentiation.

H4a: Exploitation's absorptive capabilities are positively associated with cost leadership.

H4b: Exploitation's absorptive capabilities are positively associated with differentiation.

Methodology

Sample and Data Collection

The population of this empirical study has been drawn from Portuguese textile industry firms. Questionnaires were used as primary data sources and were carried out over the period of February 16 to April 30, 2016. The identification of companies was done through the Portugal's Textile Association (Associação Têxtil de Portugal) database (ATP, 2014). So, in this study we use a non-probabilistic and convenient sampling.

A total of 247 complete and validated questionnaires accounting for 25% per cent of the population were obtained. This response rate is considered quite satisfactory, given that the average of top management survey response rates are in the range of 15%-20% (Menon & Bharadwaj, 1999).

Statistical Analysis

We used PLS-SEM path modelling to test our hypothesis, specifically the software SmartPLS 3.0 (Hair, Hult, Ringle, & Sarstedt, 2013; Sarstedt, Ringle, Smith, Reams, & Hair, 2014). We believe that the PLS-SEM path modelling is best suited to estimate our research model since: 1) this study focuses on prediction and explanation of contructs variance (in our case 2, with 5 dimensions); 2) our research model has a complex structure; 3) the relationship between entrepreneurial orientation and competitive advantage (via cost or differentiation); 4) this study uses first and second-order reflective constructs; and 5) the sample (n=247) is somewhat small.

Measures

This study uses well-validated scales from previous studies to operationalize the key constructs and adapted them to the particular context of our empirical setting.

Independent variables – According to Zahra and George (2002), ACAP construct is divided in *Potencial Absorptive capabilities* (PACAP) e *Realized Absorptive capabilities* (RACAP). To mesure this construct we use Jansen et al. (2005) scale..

Dependent variable - Competitive strategy was measured through two dimensions, differentiation and cost leadership, using Morgan et al. (2004) scale.

Results

The structural equation model is a multiple regression analysis, with reflective indicators that are presented as an image of the unobserved theoretical construct, representing observed variables or measures, with the objective of strengthening the relationship of influence between the constructs (Marôco, 2010). The simple correlation between these indicators with their construct must have a value equal to or higher than 0.707 so that the shared variance between the construct and their indicators is higher than the error variance (Carmines & Zeller, 1979).

Partial Least Squares (PLS) is a technique that best fits predictive applications (exploratory analysis) and theory development when it is not soundly established (Roldán and Cepeda, 2014). This technique, on one hand, maximize the explained variance of the dependent variables (latent or observed, or both) and estimate structural models with small samples (Chin & Newsted, 1999; Reinartz, Haenlein & Henseler, 2009). On the other hand, it estimates reflective and formative measurement models without identification problems (Chin, 2010). PLS appear to be a preferable option for researchers with samples below 250 observations (247 in this study) (Reinartz et al., 2009).

In order to verify the reliability of overall variables we estimated the stability and internal consistency through Cronbach's alpha (α). Generally, an instrument or test is classified with appropriate reliability when α is higher or equal to 0.70 (Nunally, 1978; Chin, 2010). The result of 0.937 achieved for all variables is considered excellent, confirming the sample's internal consistency (Pestana & Gageiro, 2000). Table 1 show all constructs largely achieved the required level.

Table 1: Cronbach's Alpha of multidimensional variables

	Cronbach's Alpha	***p* values**
ACAQ	0,776	0,000
ACAS	0,847	0,000
ACEX	0,897	0,000
ACTR	0,872	0,000
COST	0,900	0,000
DIF	0,940	0,000

We also use the composite reliability coefficient to assess construct validity (Chin, 1998). This coefficient reflects construct adequacy for a level higher than 0.6 using confirmatory factor analysis (Gefen & Straub, 2005), as in our case. Table 2 illustrates that the studied constructs (all multidimensional) highly exceeded the minimum required for a good fit.

Table 2: Composite reliability coefficient of multidimensional variables

	Composite reliability	***p* values**
ACAQ	0,839	0,000
ACAS	0,906	0,000
ACEX	0,921	0,000
ACTR	0,903	0,000
COST	0,930	0,000
DIF	0,950	0,000

For validity assessment, two subtypes are usually examined: convergent and discriminant validity. Convergent validity implies that a set of indicators represents one and the same underlying construct (Henseler et al., 2009). Fornell and Larcker (1981) suggest using the *Average Variance Extracted* (AVE) criterion and that an AVE value of at least 0.5 indicates sufficient convergent validity. Next table demonstrates that only entrepreneurial orientation is below the minimum required.

Table 3: Convergent validity

	AVE	***p* values**
ACAQ	0,471	0,000
ACAS	0,763	0,000
ACEX	0,661	0,000
ACTR	0,612	0,000
COST	0,770	0,000
DIF	0,705	0,000

Discriminant validity is the degree to which any single construct is different from the other constructs in the model. To have discriminant validity a construct must exhibit weak correlations with other latent variables that measure different phenomena. There are two measures of discriminant validity in PLS. The Fornell–Larcker criterion (1981) recommends that the AVE should be greater than the variance between a given construct and the other with which it shares the model. The second criterion suggests that the loading of each indicator is expected to be greater than all of its cross-loadings (Henseler et al., 2009).

We can observe the explanatory power of each variable in the model. Entrepreneurial orientation is the only purely explanatory variable and reputational resources and absorptive capacity of knowledge exploitation the explained variables. Chin (1998) distinguishes the explanatory power from moderate to substantial. Table 4 expresses the good results in terms of discriminant validity of the research model, confirming that constructs do differ significantly.

Table 4: Discriminant validity

Fornell-Larcker Criterion	**ACAQ**	**ACAS**	**ACEX**	**ACTR**	**COST**	**DIF**
ACAQ	0,686					
ACAS	0,337	0,873				
ACEX	0,381	0,645	0,813			
ACTR	0,421	0,644	0,851	0,782		
COST	0,396	0,390	0,277	0,153	0,877	
DIF	0,421	0,343	0,458	0,489	0,335	0,840

In order to determine the significance of the studied relationships and the confidence intervals of the path coefficients, we used bootstrapping technique. The weighted coefficients indicate the relative strength of each exogenous construct. According to Hair Jr., Hult, Ringle and Sarstedt (2014), relationships between constructs, with structural coefficients higher than 0.2, are considered robust. From table 5, we thus conclude that the original model does not present non-significant paths.

Table 5: Model's *Path Coefficients*

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	2.5%	97.5%
ACAQ -> COST	0,361	0,361	0,053	6,858	0,000	0,260	0,455
ACAQ -> DIF	0,258	0,259	0,058	4,462	0,000	0,130	0,375
ACAS -> COST	0,398	0,394	0,080	4,971	0,000	0,217	0,535
ACAS -> DIF	-0,002	-0,006	0,085	0,024	0,981	-0,165	0,147
ACEX -> COST	0,361	0,355	0,136	2,653	0,008	0,093	0,607
ACEX -> DIF	0,131	0,148	0,104	1,259	0,209	-0,058	0,352
ACTR -> COST	-0,562	-0,550	0,109	5,173	0,000	-0,766	-0,339
ACTR -> DIF	0,270	0,264	0,089	3,032	0,003	0,094	0,444

Figure 1 presents the final research structural model with the effects and explained variance of latent variables.

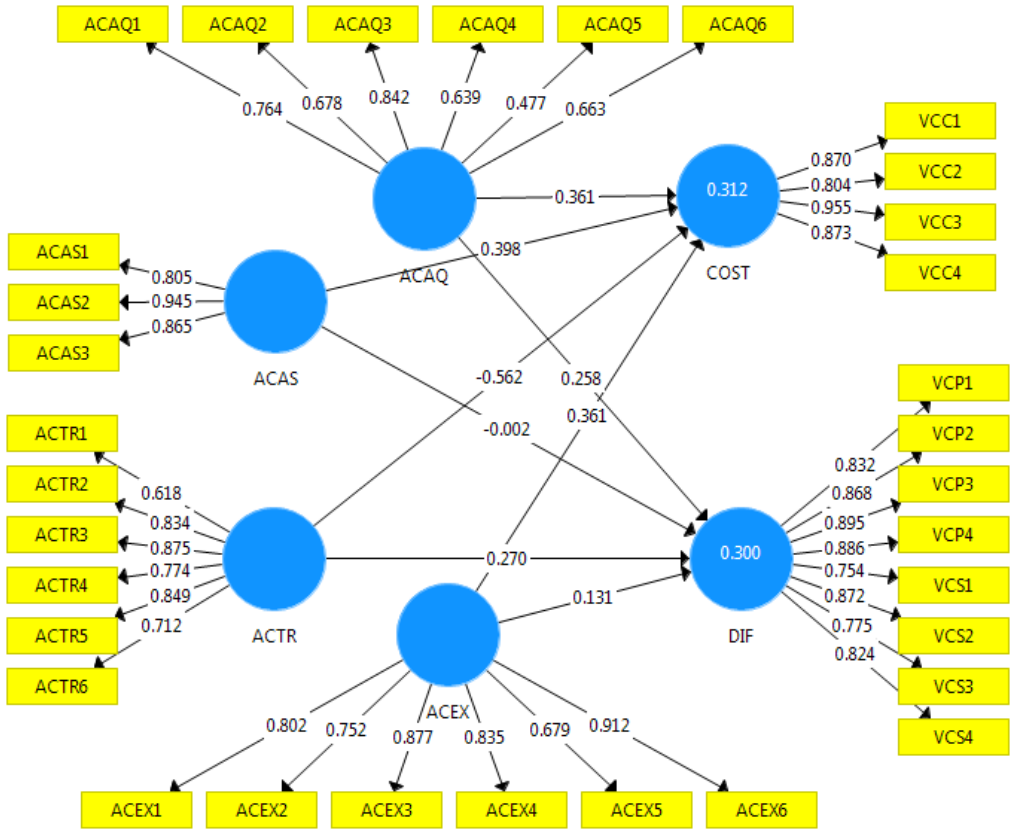


Figure 1: Research structural model

Key: ACAQ - Acquisition's absorptive capabilities; ACAS - Assimilation's absorptive capabilities; ACTR - Transformation's absorptive capabilities; ACEX - Exploitation's absorptive capabilities; VCC – Competitive advantage *cost leadership*; VCC – Competitive advantage *differentiation*.

Results from Table 5 indicate that the development, growth or investment by the management in this type of capabilities will not affect the strategy definition, but rather stimulate the development of international activities. So, H1a, H1b, H2a, H3a, H4a and H4b were supported in our model, and H2b and H3b non supported.

Discussion and conclusions

This paper seeks to contribute to the development of the literature on factors that influence small firms competitive advantage through a robust empirical study. The central context of this research is on SMEs, which constitute the vast majority of firms in Portugal, as in most word economies.

Absorptive capability has a positive and significant impact on competitive advantage (H1a, H1b, H2a, H3a, H4a and H4b supported). Teece and colleagues (1997) argue that, through dynamic capabilities, firms are able to develop, integrate, reconfigure and adapt their resources and capabilities to umpredictable markets and achieve competitive advantage. In this study it is demonstrated that our SMEs do not include dynamic (absorptive) capabilities in the formulation of their competitive strategy, as suggested Zahra and George (2002). Hence, H2b and H3b were not supported.

Small traditional firms represent a very important part of the economic system in many European countries. Their significant contribution to the gross domestic product (GDP), national exports, and job creation, makes them an important policy target (Zucchella & Siano, 2014). In fact, and according to Portugal's Textile and Apparel Association (ATP), this industry in 2016 accounted for 20% of industrial employment, 9% of GDP and 10% of Portuguese industrial exports.

We can only speculate that the Portuguese textile industry faces considerable challenges, not only regarding the economic crisis in international markets, which restricts access to resources, but also concerning consumption patterns. Furthermore, international competitiveness does not allow SMEs to develop a competitive strategy based on differentiation, changing thus their business model paradigm. Indeed, mature industries are characterized by increased competition and price deflation due to overcapacity (Parrish, Cassill, & Oxenham, 2006). As reported by the ATP (2014), globalization pressures, such as textile trade liberalization, have considerably affected the industry. The textile sector is being subjected to strong pressures in a fast-changing business environment due to market volatility and strong competition world-wide. The key success factors of the industry are related primarily with cost (labor, energy, transport), but also with geographical location (flexibility, responsiveness, proximity service), knowledge (know-how, experience, technical expertise, research and development, networking) and recognition (tradition, brands, quality). Therefore, we acknowledge that the sector is developing strong differentiation factors. Firms in these mature markets must look for ways to stay competitive and develop strategies that enables them to differentiate themselves from other firms.

Theoretical and Practical Implications

Our study is responsive to the call of Sousa et al. (2008) which suggests that, in international market context, firms' survival and expansion, and consequent economic growth of many countries, is strongly dependent on a better understanding of the strategic determinants that influence competitive advantage.

Moreover, our study confirms the important complementarity of intangible resources and dynamic capabilities, thus not diverging from RBV and DCV (e.g. Ambrosini & Bowman, 2009; Barreto, 2010; Eisenhardt & Martin, 2000; Wang & Ahmed, 2007).

We also highlight the contribution of this study to the theory of strategic management. It is known that strategy includes deliberate and emergent initiatives adopted by management, comprising resource and capabilities used to improve business performance (Nag, Hambrick, & Chen, 2007). In order to remain competitive, firms must assess which strategic determinants give them an advantage

over their competitors. The findings are a contribution to clarify the influence of entrepreneurial orientation, intangible resources and absorptive capabilities in small firms export performance.

Addicionally, our findings provide guidance to business practitioners, since they indicate that entrepreneurial orientation, intangible resources and absorptive capabilities are predictors of competitive strategies and performance. The research has also shown the positive influences of generic strategies on firm performance. So, for small firm managers, competitive strategy does matters and the development of one type of competitive advantage, alongside with firm's resources, is a major performance driver.

Firms are a bundle of resources and capabilities (Peteraf, 1993), it is essential to understand and identify which resources are relevant to gain competitive advantage and superior performance. Business owners must be able to systematically analyse the changes that arise in their target market(s) and to incorporate this knowledge into their processes, to identify the present and future needs and market trends, anticipate changes in demand and seek new business opportunities.

By building on the literature entrepreneurship and strategic management, this study aims to support the strategic development of business management policies designed to increase firms' performance in foreign markets and add value to the current context of change.

Research Limitations

While this research provides valuable insights into SMEs in the textile industry, the study is not without its limitations. First, the state of the economy might have affected our results. The low scores of willingness to take risks might be influenced by the current context of economic crisis. In fact, in a turbulent market, risk-taking is negatively associated to SME performance (Kraus et al., 2012) and is in fact related to firm failure (Lechner & Gudmundsson, 2014). Second, it would have been interesting to control our analysis. The fact that the research does not consider the effect of control variables such as age, location and target market of the respondents can be seen as a limitation. Third we used an online study to collect our data. While electronic data collection methods are becoming more common, strategies to encourage a greater response rate are lacking compared to other survey implementation methods. Finally, the fact that the sampling is non probabilistic and convenience is a limitation. Therefore we advise prudence in the generalization of results.

Future Lines of Research

Firstly, this study has been based on a mature sector, as is the textile sector in Portugal. The results obtained should be understood in this context. For this reason, new research could be done in more modern industries to test again the proposed relations. Second, given the irregular nature of business growth, a snapshot survey may not be able to capture strategy and performance variations over long periods of time. As such, further studies with a longitudinal perspective would be of added value to investigate why these differences persist. In other words, to find how and why some small exporters become highly successful while others, in the same industry, struggle to raise their export strengths.

Acknowledgments

UNIAG, R&D unit funded by the FCT – Portuguese Foundation for the Development of Science and Technology, Ministry of Science, Technology and Higher Education.

This work is funded by national funds through the FCT – Foundation for the Development of Science and Technology, I.P., in the framework of the project «UID/GES/04752/2016».

References

Ambrosini, V., & Bowman, C. (2009). What are dynamic capabilities and are they a useful construct in strategic management? *International Journal of Management Reviews*, *11*(1), 29–49.

Amit, R., & Schoemaker, P. (1993). Strategic assets and organizational rent. *Strategic Management Journal*, *14*(1), 33–46.

Anderson, B. S., & Eshima, Y. (2013). The influence of firm age and intangible resources on the relationship between entrepreneurial orientation and firm growth among Japanese SMEs. *Journal of*

Business Venturing, *28*(3), 413–429.

ATP (2014). *Plano Estratégico Têxtil 2020 – Projetar o Desenvolvimento da Fileira Têxtil e Vestuário até 2020*.

Barreto, I. (2010). Dynamic Capabilities: A Review of Past Research and an Agenda for the Future. *Journal of Management*, *36*(1), 256–280.

Bowman, C., & Ambrosini, V. (2003). How the Resource based and the Dynamic Capability Views of the Firm Inform Corporate level Strategy. *British Journal of Management*, *14*(4), 289–303.

Carmines, E. G., & Zeller, R. A. (1979). *Reliability and Validity Assessment*. Newbury Park, CA: Sage Publications.

Cohen, W., & Levinthal, D. (1990). Absorptive Capacity: A New Perspective on Learning and Innovation. *Administrative Science Quarterly*, *35*(1), 128-152.

Chin, W. W. (1998). *The Partial Least Squares Approach to Structural Equation Modeling*. Lawrence Erlbaum Associates, Publisher. Mahwah, New Jersey. London.

Chin, W. W. (2010). How to write up and report PLS analyses. In V. Esposito Vinzi, W. W. Chin, J. Henseler & H. Wang (eds.). *Handbook of partial least squares: Concepts, methods and applications*, Berlin, Germany: Springer-Verlag, pp. 655-690.

Chin, W. W., & Newsted, P. R. (1999). Structural Equation Modeling Analysis with Small Samples Using Partial Least Squares. In R. Hoyle (ed.) *Statistical Strategies for Small Sample Research*, (pp. 307-341), Thousand Oaks, CA: Sage Publications.

Eisenhardt, K. M., & Martin, J. A. (2000). Dynamic capabilities: what are they? *Strategic Management Journal*, *21*(10–11), 1105–1121.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), pp. 39-50.

Gefen, D., & Straub, D. (2005). A Practical Guide To Factorial Validity Using PLS-Graph: Tutorial And Annotated Example. *Communications of the Association for Information Systems*, *16*, 91-109.

Hair, J., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2013). *A primer on Partial least Squares Structural Equation Modeling (PLS-SEM)*. SAGE Publications, Inc.

Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of Partial Lesat Squares Path Modeling in international marketing. In R. R. Sinkovics & P. N. Ghauri (ed.). *New Challenges to International Marketing (Advances in International Marketing), 20,* Emerald Group Publishing Limited, 277-319.

Hung, R., Yang, B., & Lien, B. (2010). Dynamic capability: Impact of process alignment and organizational learning culture on performance. *Journal of World Business*, *45*(3), 285–294.

Jansen, J. J. P., Van Den Bosch, F. A. J., & Volberda, H. W. (2005). Managing Potential and Realized Absorptive Capacity: How Do Organizational Antecedents Matter? *Academy of Management Journal*, *48*(6), 999–1015.

Lechner, C., & Gudmundsson, S. V. (2014). Entrepreneurial orientation, firm strategy and small firm performance. *International Small Business Journal*, *32*(1), 36–60.

Lumpkin, G., & Dess, G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of Management Review*, *21*(1), 135–172.

Lumpkin, G., & Dess, G. (2001). Linking two dimensions of entrepreneurial orientation to firm performance: The moderating role of environment and industry life cycle. *Journal of Business Venturing*, *16*(0), 429–451.

Marôco, J. (2011) *Análise estatística com o SPSS Statistics* (5ª ed.), Pêro Pinheiro: ReportNumber, Lda.

Makadok, R. (2001). Toward a synthesis of the resource-based and dynamic-capability views of rent

creation. *Strategic Management Journal*, *22*(5), 387–401.

Marr, B., & Roos, G. (2005). A strategy perspective on intellectual capital. In *Perspectives on intelectual capital* (pp. 28–52). New York: Routledge.

Menon, A., & Bharadwaj, S. (1999). Antecedents and consequences of marketing strategy making: A model and a test. *Journal of Marketing*, *63*(April), 18–40.

Monteiro, A., Soares, A. M., & Rua, O. L. (2017). Entrepreneurial orientation and export performance: the mediating effect of organisational resources and dynamic capabilities. *Journal of International Business and Entrepreneurship Development*, *10*(1)*, 2017, 3-20.*

Nag, R., Hambrick, D., & Chen, M. (2007). What is strategic management, really? Inductive derivation of a consensus definition of the field. *Strategic Management Journal*, *955*(October 2006), 935–955.

O'Cass, A., & Sok, P. (2014). The role of intellectual resources, product innovation capability, reputational resources and marketing capability combinations in firm growth. *International Small Business Journal*, *32*(8), 996–1018.

Parrish, E. D., Cassill, N. L., & Oxenham, W. (2006). Niche market strategy for a mature marketplace. *Marketing Intelligence & Planning*, *24*(7), 694–707.

Pestana, M. H., & Gageiro, J. N. (2008) *Análise de Dados para Ciências Sociais - A complementaridade do SPSS*, 5ª ed., Lisboa: Edições Silabo.

Peteraf, M. (1993). The cornerstones of competitive advantage: A resource-based view. *Strategic Management Journal*, *14*(3), 179–191.

Porter, M. (1985). *The Competitive Advantage: Creating and Sustaining Superior Performance*. Free Press.

Rakthin, S., Calantone, R. J., & Wang, J. F. (2016). Managing market intelligence: The comparative role of absorptive capacity and market orientation. *Journal of Business Research*, *69*(12), 5569–5577.

Reinartz, W., Haenlein, M., Henseler, J. (2009). An empirical comparison of the efficacy of covariance-based and variance-based SEM, *International Journal of Research in Marketing*. 26(4), pp. 332–344.

Sarstedt, M., Ringle, C. M., Smith, D., Reams, R., & Hair, J. F. (2014). Partial least squares structural equation modeling (PLS-SEM): A useful tool for family business researchers. *Journal of Family Business Strategy*, *5*(1), 105–115.

Sousa, C. M. P., Martínez-López, F. J., & Coelho, F. (2008). The determinants of export performance: A review of the research in the literature between 1998 and 2005. *International Journal of Management Reviews*, *10*(4), 343–374.

Stouraitis, V., Harris, M., Harun, M., & Kyritsis, M. (2017). Motivators of SME initial export choice and the European Union regional effect in manufacturing. *International Journal of Entrepreneurial Behavior & Research*, *23*(1), 35–55.

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, *18*(7), 509–533.

Thornhill, S., & Amit, R. (2003). Learning about failure: bankruptcy, firm age, and the Resource-Based View. *Organization Science*, *14*(5), 497–509.

Wang, C., & Ahmed, P. K. (2007). Dynamic capabilities: A review and research agenda. *International Journal of Management Reviews*, *9*(1), 31–51.

Zahra, S. (1993). A conceptual model of entrepreneurship as firm behavior: a critique and extension. *Entrepreneurship Theory and Practice*, (1), 5–21. Zahra, S., & Covin, J. G. (1995). Contextual influences on the corporate entrepreneurship-performance relationship: A longitudinal analysis. *Journal of Business Venturing*, *10*(1), 43–58.

Zahra, S., & George, G. (2002). Absorptive capacity: A review, reconceptualization, and extension. *Academy of Management Review*, *27*(2), 185–203.

Zucchella, A., & Siano, A. (2014). Internationalization and Innovation as Resources for SME Growth in Foreign Markets. *International Studies of Management and Organization*, *44*(1), 21–41.

Financial Reporting Quality and Public Accountability in Regional Government: Analysis for the impact of Competence, Internal Control and Information Technology; Indonesia Evidence

Sri Mulyani, Professor at Padjadjaran University, Bandung, Indonesia. Email: sri.mulyani@unpad.ac.id

Erlynda Kasim, Doctoral student at Padjadjaran University, Bandung and Lecturer at STIE Ekuitas, Bandung, Indonesia. Email: erlynda_kasim@yahoo.com

Sudrajat, Doctoral student at Padjadjaran University, Bandung and Lecturer at Lampung University, Lampung, Indonesia. Email: drajat239@gmail.com

Abstract

Good Financial reporting quality of the government sector is required so as to achieve accountability objectives. Accountability is an important issue in New Public Management (NPM). Society demands a good governance government. Good quality of government financial reporting increases public accountability. This paper study how the government accountant competence, the implementation of internal controls and the application of information technology affect the quality of financial reporting and its impact on public accountability. The study was conducted in regional governments of West Java in Indonesia using survey. The results show that there were significant influences of government accountant competence, implementation of internal control and information technology on quality of financial reporting. Further, financial reporting quality also has a significant effect on public accountability.

Keywords*:* Financial Reporting Quality, Public Accountability, Competence, Internal Control, Information technology

Introduction

The development of government accounting is expected to be a solution to meet the demands of transparency of government performance in terms of accountability. Accountability is a relevant concept describing the performance of the public sector. Quality information is very important for the public sector in providing accountability of all its activities to all stakeholders. The concept of NPM (New Public Management) is a concept that is now experiencing many developments into several concepts of public accountability (Mardiasmo, 2009).

Government financial reporting is still experiencing problems. The first semester report of 2014 BPK RI (Indonesia Financial Supervisory Body) revealed from 415 audits for Local Government Financial Statements, 64% The financial statements still obtain qualified audit opinion. Bisri (2013) found weaknesses of the Internal Control System in Indonesia and non-compliance with legislation in the audit of ministry finance reports/ in the management of fixed assets and social assistance. Pamungkas (2014) revealed from 40 findings on the financial statements of 2013, 12 findings of them are internal control issues. The same problem also occurs in ministries and other government institutions in processing financial reporting due to the quality of human resources (Boediono, 2014). Others are caused by inefficiency and ineffective use of information technology (Sampurna, 2015). Another problem arising in government is the issue of public accountability (Miftah, 2016).

Public Accountability in Indonesia is a problem that still faces obstacles. Achievements at the echelon I level government officers are still low as the implementation of AKIP (Performance Accountability for Government Agencies) is not yet obligatory (Afriyadi, 2017). Another problem is the weakness of the law enforcement regarding the punishment in finance and administration violation (Afriyadi, 2017).

Several problems are causes by inappropriateness placement of human resources that manage government finance, internal control issues and also inefficient use of information technology and the existence of public accountability problems. Government accounting and financial reporting aims to protect and manage public money and discharge accountability. Financial reporting is the best index of accountability (Eivani et.al., 2012). Accountability is also an instrument for control activities, especially in achieving results on public services. In this regards, a performance evaluation is required to determine the extent to which the outcomes are achieved and the means used to achieve them. Thus, it is expected that good financial reporting quality can increase public accountability.

The purpose of this study is to examine empirical evidence of the influence of Competence of Government Accountants to the Quality of Financial Reporting, the effect of Implementation of Internal Control on the Quality of Financial Reporting, the effect of Information Technology System Implementation on the Quality of Financial Reporting and the effect of Quality of Financial Reporting on Public Accountability. Previous study was conducted in smaller region, so this study is conducted in larger region in order to strengthen the results.

The results of this study is expected to be one of the solution to the government regarding the government financial reporting problems; government should optimize accountant personnel; Government should be able to improve internal control and information technology used. The results of the study are also expected to be a source of further research reference to the issue of financial reporting quality in government sector.

Literature Review

Competence

Competence is a personal characteristic, motive, behavior, skill, or knowledge that is proven to drive superior job performance (McClelland, 1973). Competence include individual competence (individual knowledge, skills and abilities); and organizational competence (collective character at the organizational level). As a contemporary organization with the latest technology, organizations are more involved in sustainable development that demands to improve individual competence and organizational competence (Dias *et. al*, 2012).

A competence is an underlying characteristic of individuals that is causally related to criterion-referenced effective and/ or superior performance in a job or situation (Spencer and Spencer, 1993).) Characteristics of competence consist of motives, traits, self concept, knowledge, and skills (Spencer and Spencer, 1993). Competence is measured by the following dimensions: (A). Knowledge consisting of: (1) Knowledge of government accounting and financial reporting process and (2) Knowledge of technical financial reporting; (B). Skills consisting of: (3) Skills, (4) Managerial Skills, (5) Technical Skills, and (6) Social Skills.

Internal Control

Internal control is defined as an integral process of actions and activities carried out continuously by the management and all employees to provide reasonable assurance on the achievement of organizational goals through effective and efficient activities, reliability of financial reporting, security of state assets, and compliance with laws and regulations. invitation (Government Act, no 60/2008). In Indonesia, SPIP (The Government Internal Control System) is an internal control system that is run comprehensively within the central and regional governments.

According to the COSO (Committee of Sponsoring Organization), internal control defined as control that (1) Effected by an entity's board of directors, management, and other personnel; and (2) Designed to provide reasonable assurance regarding the achievement of objectives relating to operations, reporting and compliance. In this study in accordance with the COSO Framework for External Financial Reporting Purposes, internal control is measured by: (1) the Control Environment Dimension; (2) Information and Communication Dimensions; (3) Monitoring dimension.

Information Technology

Technology is part of the Information Systems. Information systems collects, processes, stores and distributes information for a specific purpose or objectives (Turban & Volonino, 2012). The function of the Information System consists of: (1) Input; (2) Process; (3) Output and (4) feedback. Information Technology is the "technology" part of Information Systems (Turban, Volonino, 2012). According to Bodnar and Hopwood (2012), Information System terminology includes the use of Information Technology, which consists of computers, and other technologies used to process information. Examples of some of the technologies used in Accounting Information Systems are bar codes, scanning devices, communications protocols, and others.

Information Technology has evolved from focusing only on data processing and regular reports in the 1970s, to support increasingly to business processes, maintaining customer relationships and suppliers (Turban & Volonino, 2012). Technology would have an impact on (a) how the information in the financial statements is used or consumed; (b) how information is communicated and (c) allowing users to search data through larger and more complex processes (Wood, 2015).

Some types of digital technology used in government accounting in Indonesia are (a) Cloud Computing: is a software application with data storage services in different locations; (b) Big Data: is the storage of more information (c) Social Computing: the social interaction based on information technology; (d) Virtual & Augmented Reality: Modeling, simulation, virtual reality and modeling of interactions between means and people; (e) Cybersecurity: With the widespread use of digital technology, it is necessary to consider also the security issues; (f) Mobile: Mobile digital technology gives us the speed of communication between several parties in the world. (g) Payment System: Internet-based software for payment systems; (h) Educational: Digital technology widely used in education; (i) Artificial Intelligence & Robotics: This technology includes the automation of routine and repetitive work; (j) Digital Delivery Services: The use of digital technology has the potential to change the efficiency and customer satisfaction (Afandi and Hoesada, 2016).

In this study the measurement of variables Information technology using dimensions: (1) Platform Information Technology; (2) Utilization of Information Technology by the organization and (3) Resource Setup in Information Technology.

Financial Reporting

The corporate financial reporting is a system of communication between the management and the user-groups of the financial statements (stakeholders); in order to report the results of the corporate enterprise and also to demonstrate the credibility, accountability and reliability of its working (Saeed, 1990). The purpose of financial reporting is to make decisions in the capacity of capital as well as debt providers (Kieso *et al*., 2016).

In this study, financial reporting is related to qualitative of characteristic: (a) Relevance; (b) Faithfull Representation; (c) Comparability; (d) Timeliness and (e) Understandability.

Public Accountability

Accountability is usually defined as a social relationship in which an actor feels an obligation to explain and justify his conduct to some significant other Bovens (2004). Democracy will only be a written rule only if those in power can not be held publicly accountable for their actions and omissions, for their decisions, their policies, and their expenses (Bovens, 2004). Hupe & Hill (2007) discusses the accountability linkages with the "street level" bureaucrats. At the level of bureaucrats who directly deal with the community, then accountability includes accountability to the community.
Since the early 1970s, public attitudes and awareness toward the public accountability in many Western societies have changed significantly (Coy *et. al*, 2001). Accountability is a social practice to pursue a particular goal, which is determined by distinctive relationships and procedures (Ranson, 2003). Accountability participates in community activities by shaping the nature of its members through perceiving, judging, imagining, and acting (Ranson, 2003). According to Coy *et. al* (2001) accountability

refers to the right to know about the conditions and performance of an organization under the responsibility of a party. Accountability and the right to access information are an important way to control abuse of power (Coy *et. al*, 2001).

(Forrer *et. al*, 2010) discusses PPPs (Public-Private Partnerships), the models for distributing services and public goods. PPPs model is expected to overcome some problems that interact with private but accountable. Public Accountability in this study is measured by dimensions (1) Strategic Planning and (2) Activity Performance Indicators.

Theoretical Framework and Hypotheses Development

Effect of Competence on Quality of Financial Reporting

Accountants who are competent and have good characteristics can certainly process financial accounting and good quality of financial reporting. Bodnar & Hopwood (2012) emphasizes the importance of user knowledge and expertise on accounting information systems. Nurhayati and Mulyani (2015) found that competence affects the success of an accounting information system. Therefore, it is assumed that there is influence of government accountant competence on financial reporting quality. Accountant Competence is an important aspect in conducting the duty. Eginiwin and Dike (2014) study that competence as one of the aspect that influence the quality of financial reporting. Abbott *et. al* (2016) also found that accountant competence affect the financial reporting quality.

The Influence of Internal Control on the Quality of Financial Reporting

Stone (2014) found that internal controls help management to protect the company's assets from loss and embezzlement as well as to maintain the accuracy of the company's financial data. The Company is required to develop internal controls in order to provide reasonable assurance that the financial statements have been fairly presented (Arrens *et. al*, 2016).

Internal control will provide a degree of confidence in relation to the reliability of financial information which improve the quality of corporate financial information (Stone, 2014). Mulyani & Arum (2016) also found a significant influence between internal control over the quality of accounting information.Doyle (2007) study the relationship of internal control and accrual level of the company. Companies with serious control problems are usually smaller in size, younger, and financially weaker. Donelson *et. al* (2016) examines how weak internal controls can increase the risk of financial reporting fraud by top managers.

The Effect of Information Technology (IT) Implementation on Quality of Financial Reporting

John (2013) examines the effect of Information Technology on financial reporting found that Information Technology is very important in ensuring the credibility of the company's financial statements. Accounting Information System produce the financial reporting with support of Information Technology. The success of Accounting Information System will lead to good (information) Financial Reporting quality (Fitriati & Mulyani, 2015). Information technology makes financial reporting more accurate, useful and better quality (Imeokparia, 2013). Information Technology increases relevance and reduces reliability of accounting information Salehi & Torabi (2012). Grant *et. al* (2008) found that weak Information Technology in controlling its control affects financial reporting.
Devaraj & Kohli (2003) found that the influence of IT is the actual usage of technology. Technology may affect (a) how information in the financial statements is used or consumed; (b) how information is communicated and (c) allows users to search data through larger and more complex processes (Wood, 2015) Chan (2004) found out that the nature and characteristics of the use of information technology in enterprise information systems will affect the company's internal control over financial reporting.

The Effect of Quality of Financial Reporting on Public Accountability

Historically, the concept of accountability is closely related to accounting. In fact, it literally comes from bookkeeping (Bovens, 2004). Accountability currently comes in many shapes and sizes. It has moved beyond the origin of bookkeeping and has become a symbol for good governance, both in society and in the private sector (Bovens, 2004).

Goddard (2005) studied the relationship between accounting, governance and accountability in local government in the UK. He found that accounting practices such as audits, financial reporting, NPM practices and governance processes are considered much more important in providing contribution to accountability and governance. Torres (2004) conducted a study by looking at how governance accounting from a cash base to an accrual basis can improve transparency, accountability and reliability that exist in financial reporting. Carlin (2005) also discusses how accrual-based government financial reporting can improve public accountability. In his study Carlin (2005) states that the presence of financial reporting movements has affected public accountability systems in several countries such as New Zealand, Australia and the UK.

Government financial reporting is created to help communities see the accountability of the government and assist decision-making (Patton, 1992). In the commercial sector, company information related to decision-making is a tool to improve the accountability of public transnational corporations (Koenig, 2004).

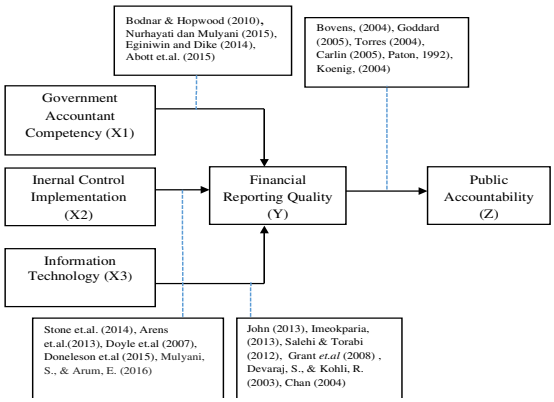


Fig. 1: Framework of Research Theory

Based on Research Framework, hypothesis in the research are as follows:

Hypothesis 1 : Accountant Competence positively affect the Quality of Financial Reporting.
Hypothesis 2 : Internal Control positively affect the Quality of Financial Reporting.
Hypothesis 3: Implementation Information Technology positively affect the Quality of Financial Reporting
Hypothesis 4: Quality of Financial Reporting positively affect to the Public Accountability.

Research Methodology

The statistical tools used to prove the hypothesis in this research is structural equation modeling (SEM) based on component or variance, known as Partial Least Square (PLS). The PLS is used because the relationship between variables is not yet based on strong theories and the number of samples are not too large. The population of the study is local cities and districts government in Indonesia. The study was conducted in regional government of West Java Province, Indonesia. West Java Province has second biggest regional income in Indonesia after the Special Capital Region, Jakarta.

The unit analysis is the cities or districts under province region, with 120 questionnaires (4 questionnaires for each districts, taken on average) distributed to accounting department personnel in 30 cities and districts in regional government using Summated Rating Method with five points Likert scale of agree to

disagree. The analysis uses the validity and reliability test data to ensure the data can be further processed. To test the Fit Model of Structural Equation Modeling (SEM) with Partial Least Square (PLS) it uses 2 assessment steps from a research model: (1) the measurement model (Outer model) and (2) the structural model (inner model) of the model studied.

Results and Discussion

The results of validity testing of User Competence (X1), Implementation of Internal Control (X2), Application of Information Technology (X3), Quality of Financial Reporting (Y) and Public Accountability (Z) obtained value *r* above 0.30 which means everything valid so that used in this research. Reliability test results show Cronbach's Alpha value of each variable above 0.70, so it can be concluded that each indicator used to measure the five variables consistent or reliable to be used as a measuring variables examined.

There are two substructure in SEM model obtained from research data and calculated using SEM approach of Partial Least Square (PLS) that is (1) structural equation model for influence of User Competence, Implementation of Internal Control and Application of Information Technology to Quality of Financial Reporting as follows: : $\eta_1 = 0.371\xi_1 + 0.388\ \xi_2 + 0.289\ \xi_3 + 0.246$; And (2) The structural equation model for the effect of Financial Reporting Quality on the Implementation of Public Accountability as follows: $\eta_2 = 0.678\eta_1 + 0.540$. Figure 5.1 is a summarized results of the path model SEM.

After analyzing the measurement model of each variable and the accuracy of the structural model, the significance test is conducted for partial influence of the exogenous variable (independent variable) to the endogenous variable (dependent variable) in accordance with the existing hypothesis. To test the proposed hypothesis, we can see the t-statistic value. The limit to reject and accept the proposed hypothesis is that if the value of t is in the range of values -1.96 to 1.96 then the hypothesis will be rejected or accept the null hypothesis (H_0).

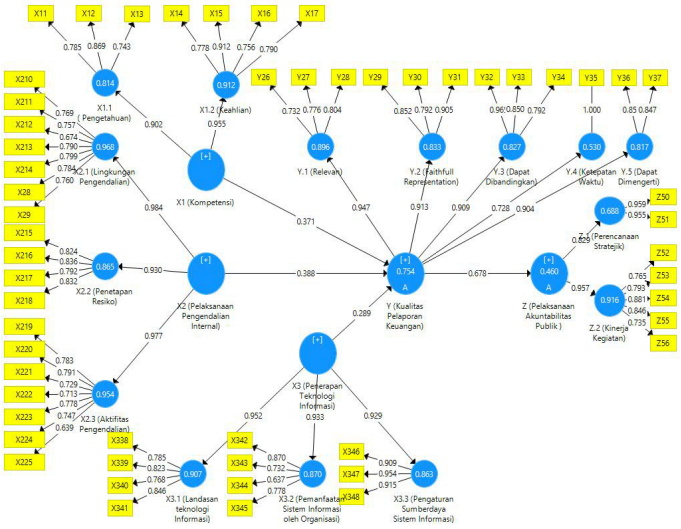


Fig 2: The SEM path model diagram with Partial Least Square (PLS)

Effect of Competence on Quality of Financial Reporting

The following test results show the significance of the hypothesis through statistical hypothesis as follows:

Ho.$\gamma 1 = 0$: Competency has no effect on Quality of Financial Reporting
Ha.$\gamma 1 \neq 0$: Competence affects positively to the Quality of Financial Reporting

Table 1: Significance Tests of the Effect of Competence on Quality of Financial Reporting

Path Coeficient	t_{ccount}	$t_{critical}$	P-value	Conclusion
0.371	2.657	1.96	0.013	Significant

Source: PLS Calculation Result

The results of the first hypothesis test show that the relationship between Competence with Financial Reporting Quality is shown by the value of path coefficient of 0.371 with a t-count of 2.657 and p-value of 0.013. The value of t-statistics obtained is greater than t-critical (1.960) and the significance (p-value) is less than 0.05. This result means that the Competence affects the Quality of Financial Reporting which means according to the first hypothesis (hypothesis 1 accepted). The magnitude of direct influence of Competence to Financial Reporting Quality is (0.371 × 0.371 × 100%) = 13.8%.

The results of the first hypothesis testing show that the relationship of competence of government accountants significantly influence the quality of financial reporting. Thus it can be said that the standard requirement of competent accountant is having sufficient knowledge and expertise in implementing the financial reporting process so that the results obtained are also qualified financial reporting.

Effect of Implementation of Internal Control on Quality of Financial Reporting

The following test results show the significance of the hypothesis through statistical hypothesis as follows:
Ho.$\gamma 2 = 0$: Implementation of Internal Control has no effect on the Quality of Financial Reporting
Ha.$\gamma 2 \neq 0$: Implementation of Internal Control affects positively to the Quality of Financial Reporting

Table 2: Significance Test of the Effect of Implementation of Internal Control on the Quality of Financial Reporting

Path Coeficient	t_{ccount}	$t_{critical}$	P-value	Conclusion
0.388	2.542	1.96	0.016	Significant

Source: PLS Calculation Result

The results of the first hypothesis test show that the relationship between variable Implementation of Internal Control with Quality of Financial Reporting is shown by coefficient value of 0.388 with t-count 2.542 and p-value equal to 0.016. The value of t-statistics obtained is greater than t-critical (1.960) and the significance (p-value) is less than 0.05. This result means that the Implementation of Internal Control affects the Quality of Financial Reporting and it supports the second hypothesis (hypothesis 2 accepted). The magnitude of the direct influence of the Implementation of Internal Control on the Quality of Financial Reporting: (0.388 × 0.388 × 100%) = 15.0%.

The results of the second hypothesis testing shows that the relationship of internal control implementation variables significantly influence the quality of financial reporting. This result also supports the second research hypothesis where the implementation of internal controls, in which the control environment determines risks and the activities of control, has an effect on the quality of financial reporting.

Effect of Information Technology on the Quality of Financial Reporting

The following test results show the significance of the hypothesis through statistical hypothesis as follows:
Ho.$\gamma 3 = 0$: Implementation of information technology has no effect on Quality of Financial Reporting
Ha.$\gamma 3 \neq 0$: The application of information technology affects positively to the Quality of Financial Reporting

Table 3: Significance Test of the Influence of Information Technology Application to Quality of Financial Reporting

Path Coeficient	t_{ccount}	$t_{critical}$	P-value	Conclusion

0.289	2.097	1.96	0.045	Significant

Source: PLS Calculation Result

The results of the first hypothesis test show that the relationship between variable information technology with Quality of Financial Reporting is shown by coefficient value of 0.289 with t-count of 2.097 and p-value of 0.045. The value of t-statistics obtained is greater than t-critical (1.960) and the significance (p-value) is less than 0.05. This result means that the application of information technology affects the quality of financial reporting which means in accordance with the third hypothesis (hypothesis 3 accepted). The direct influence Application of information technology to the quality of Financial Reporting is equal (0.289 × 0.289 × 100%) = 8.4%.

The results testing of the third hypothesis shows that the relationship of variable implementation of Information System Technology significantly influence the quality of financial reporting. These results also support the alleged or third research hypothesis in which the implementation of Information Systems Technology, has an effect to the quality of financial reporting.

Effect of Quality of Financial Reporting on of Public Accountability

The following test results show the significance of the hypothesis through statistical hypothesis as follows:
Ho.β_2 = 0: The quality of Financial Reporting has no effect on the Implementation of Public Accountability
Ha.$\beta_{21} \neq$ 0: The quality of Financial Reporting affects positively to the Implementation of Public Accountability

Table 4: Significance Test of the Effect of Quality of Financial Reporting on the Implementation of Public Accountability

Path Coeficient	t_{ccount}	$t_{critical}$	P-value	Conclusion
0.678	6.533	1.6	0.000	Significant

Source: PLS Calculation Result

The results of the first hypothesis test show that the relationship between variable of the quality of Financial Reporting with the Implementation of Public Accountability is indicated by the value of path coefficient of 0.678 with a t-count of 6.533 and p-value of 0.000. The value of t-statistics obtained is greater than t-critical (1.960) and the significance (p-value) is less than 0.05. This result means that the Quality of Financial Reporting influences the Implementation of Significant Public Accountability in accordance with the fourth hypothesis (hypothesis 4 accepted).

The magnitude of the influence of the Quality of Financial Reporting on the Implementation of Public Accountability is equal to (0.678 × 0.678 × 100%) = 46.0%. This means that the Quality of Financial Reporting gives 67.8% influence on the Implementation of Public Accountability. Fourth hypothesis test result shows that the correlation of variable of Quality of Financial Reporting has significant influence to Public Accountability. These results also support the fourth research hypothesis that is the implementation of Quality of Financial Reporting has an effect to Public Accountability.

Conclusion

The results show that it is necessary to pay attention to the accountant's competence, the implementation of internal control and adequate information technology as factors that can improve the quality of government financial reporting in Indonesia. A reliable government accountant can reduce the risk of financial misstatement; adequate internal control may reduce the risk of irregularities in financial reporting process in Government Offices. The information technology will support financial reporting process. The government needs to pay attention to this factors to improve the quality of financial reporting. Good financial reporting quality will increase public accountability and increases public trust.

The limitation of the study is that this study is only limited to the West Java Province, it is expected that further research can be upgraded to all areas in Indonesia as a whole to be able to strengthen the results of research. Other limitation is the study does not explore the problem qualitatively, so the future research is expected to be more explorative in finding out the real and problem concerning the government financial reporting and come up with the actual solutions.

References

Abbott, L. J., Daugherty, B., Parker, S., & Peters, G. F. (2016). Internal audit quality and financial reporting quality: The joint importance of independence and competence. *Journal of Accounting Research*, 54(1), 3-40.

Afandi, Joni & Hoesada, Jan. (2016). *Techtrend : Teknologi Informasi Dalam Dunia Akuntansi Pemerintahan*. Komisi Standard Akuntansi Pemerintahan (KSAP). Download at 2/1/2017 from < http://www.ksap.org/sap/id_ID/techtrend-teknologi-informasi-dalam-dunia-akuntansi-peme-tahan/> .

Arifiyadi, Teguh (2017). Konsep tentang Akuntabilitas Publik. http://www.pekalongankab.go.id/fasilitas-web/artikel/ekonomi/419-konsep-tentang-akuntabilitasdan-implementasinya-di-indonesia.html

Arens, A. A., Elder, R. J., & Beasley, M. S and Hogan, C. E. (2016). *Auditing and Assurance Services: An Integrated Approach*. Boston: Prentice Hall.

Bisri, Hasan. (2013). *BPK Temukan Kelemahan SPI Dan Ketidakpatuhan.* Download at 27/06/2017 from < http://www.antarasumbar.com/berita/nasional/d/0/296973/bpk-temukan-kelemahan-spi-dan-ketidakpatuhan-aturan.html/>

Bodnar, George H., and William S. Hopwood. (2012). *Accounting Infoimation Systems*. Pearson.

Boediono. (2014). Masalah SDM Jadi Kendala Untuk Tingkatkan Kualitas Laporan Keuangan. Download at 25/10/2016 from < http://nasional.kontan.co.id/news/wapres-masalah-sdm-jadi-kendala-untuk-tingkatkan-kualitas-laporan-keuangan-1 19 September 2011/>

Bovens, M. *Public Accountability*. (2004). The Oxford Handbook of Public Management, Oxford: Oxford University Press.

Carlin, T. M. (2005). Debating The Impact of Accrual Accounting and Reporting in The Public Sector. *Financial Accountability & Management*, Vol. 21(3), Pp 309-336.

Chan, S. (2004). Sarbanes-Oxley: the IT dimension: information technology can represent a key factor in auditors' assessment of financial reporting controls. *Internal Auditor*, 61(1), 31-34.

Coy, D., Fischer, M., & Gordon, T. (2001). Public Accountability: A New Paradigm for College and University Annual Reports. *Critical Perspectives on Accounting,* 12(1), 1-31.

Devaraj, S., & Kohli, R. (2003). Performance Impacts of Information Technology: Is Actual Usage The Missing Link?. *Management Science*, 49(3), 273-289.

Dias, Debabrata and Mukherjee, Soumya. (2012). *A Competency Mapping Framework for Indian Services Sector.*

Donelson, D. C., Ege, M., & McInnis, J. (2016). Internal Control Weaknesses And Financial Reporting Fraud. *Auditing: A Journal of Practice and Theory*.

Doyle, Jeffrey T. and Ge, Weili and McVay, Sarah E. (2007). Accruals Quality and Internal Control Over Financial Reporting. *The Accounting Review*, 82. 1141-1170.Eginiwin, Joseph and Dike, Jossy . (2014). Accounting Ethics and the Quality of Financial Reporting: A Survey of Some Selected Oil Exploration and Producing Companies in Nigeria. IOSR *Journal of Business and Management*, 16(7), 26-36.

Eivani, Farzad & Nazari, Kamran & Emami, Mostafa. (2012). Public accountability and government financial reporting. African Journal of Business Management. 6. 8475-8482. 10.5897/AJBM12.072.

Fitriati, A., & Mulyani, S. (2015). Factors That Affect Accounting Information System Success and Its Implication on Accounting Information Quality. *Asian Journal of Information Technology*, 14(5), 154-161.

Forrer, J., Kee, J. E., Newcomer, K. E., & Boyer, E. (2010). Public–Private Partnerships and The Public Accountability Question. *Public Administration Review*, 70(3), 475-484.

Goddard, A. (2005). Accounting and NPM in UK Local Government–Contributions towards Governance and Accountability. *Financial Accountability & Management*, 21(2), 191-218.

Grant, G. H., Miller, K. C., & Alali, F. (2008). The Effect of IT Controls on Financial Reporting. *Managerial Auditing Journal*, 23(8), 803-823.

Hupe, P., & Hill, M. (2007). Street-Level Bureaucracy and Public Accountability. *Public Administration*, 85(2), 279-299.

Imeokparia, L. (2013). Information Technology and Financial Reporting by Deposit Money Bank in Nigeria: An Empirical Study. *Information Technology*, 4(11).

John, A. O. (2013). The Impact of Information Technology on The Operations of Nigerian Banks. *Journal of Research in National Development*, 8(2).

Kieso, Weygandt and Earfield. (2016). *Intermediate Accounting,* Wiley, P.

Koenig-Archibugi, M. (2004). Transnational Corporations and Public Accountability. *Government and Opposition*, 39(2), 234-259.

Mardiasmo, D., & MBA, A. (2009). *Akuntansi Sektor Publik*. Yoyakarta: Andi Offiset.

McClelland, D.C. (1973). *Testing for Competence rather than for Intelligence*. *American Psychologist*, 28, 1-14.

Miftah, Thoha. (2016). *Akuntabilitas Kementerian*. Kompas. Download at 30/08/2017 from <http://nasional.kompas.com/read/2016/01/30/05350001/Akuntabilitas.Kementerian?page=all>.

Mulyani, S., & Arum, E. (2016). D. P. The Influence Of Manager Competency And Internal Control Effectiveness Toward Accounting Information Quality. *International Journal of Applied Business and Economic Research*, 14(1), 181-190.

Nurhayati, N., & Mulyani, S. (2015). User Participation on System Development, User Competence and Top Management Commitment and Their Effect on the Success of The Implementation of Accounting Information Systems. *European Journal of Business and Innovation Research*, 3(3), 56-68.

Pamungkas. Bambang. (2014). *BPK Temukan 40 Permasalahan Laporan Keuangan Banten*. Download at 16/06/2016 from < https://news.okezone.com/read/2014/06/16/340/999678/bpk-temukan-40-permasalahan-laporan-keuangan-banten>

Patton, J. M. (1992). Accountability and Governmental Financial Reporting. *Financial Accountability & Management*, 8(3), 165-180.

Ranson, S. (2003). Public Accountability in The Age of Neo-Liberal Governance. *J. Education Policy*, 18(5), 459-480.

Saeed, M. (1990). *Corporate Financial Reporting ;The Theory of Corporate Disclosure and Its Applications in Financial Reporting*. New Delhi: Anmol Publications , 237.

Salehi, M., & Torabi, E. (2012). The Role of Information Technology in Financial Reporting Quality: Iranian Scenario. *Poslovna Izvrsnost*, 6(1), 127-127.

Sampurna, Firman. (2015). *Laporan Keuangan Kemenhub 2014 Peroleh Opini WTP dari BPK*. Republika. Download at 25/08/2017 from: <http://www.republika.co.id/berita/ekonomi /makro/15/05/30/np4hf3-laporan-keuangan-kemenhub-2014-peroleh-opini-wtp-dari-bpk>

Spencer, Lyle M and Spencer, Signe M. (1993). *Competence Work: Model Superior Performance*. John Wiley and Son Inc.

Stone, John. (2014). *Internal Control Over Financial Reporting: Management's Responsibilities and Importance to The Exterenal Auditors*. South Western.

Torres, L. (2004). Accounting And Accountability: Recent Developments in Government Financial Information Systems. *Public Administration & Development*, 24(5), 447.

Turban, E., & Volonino, L (2015). *Information Technology for Management: Advancing Sustainable, Profitable Business Growth*, 10th Edition International Student Version. New York: John Wiley. Wood, Andromeda. *Role of Technology in Financial Reporting*. (2015). Download at 1/1/2017 from: http://www.ifrs.org/Meetings/MeetingDocs/WSS/WSS 2015/AP14D - Role of technology in financial reporting.pdf

……, Government Act, no 60/2008. *Government Internal Control System.* Republik Indonesia

The Role of the EU and EMU Membership in FDI Inflow to the Slovak Republic

Ing. Ľubomír Darmo, PhD., University of Economics in Bratislava, Bratislava, Slovakia,
lubomir.darmo@euba.sk

Abstract

The foreign companies produce the major part of the Slovak output. These were established as a result of the inflow of the foreign direct investment. The Slovak Republic has received many investments since the year 2000 in the form of privatization and greenfield investments. Gravity model, comes out from the Newton´s physics, provides information about determinants on foreign direct investment respectively international trade. The membership in the free trade area (as the European Union) and the use of common currency (as the European Monetary Union) is considered to be one of these determinants. Is the EU and the EMU membership really significant determinant influencing the flows of foreign direct investment? Several empirical papers deal with this question and assess the role of the EMU in inflow of foreign direct investment by the use of the gravity model. The paper analyses bilateral inflows of foreign direct investment to the Slovak Republic in the period 2000 – 2012. Mainly, it assesses the role of membership in the EU and using common European currency in influencing investment flows into the Slovak Republic. Nowadays, when "two-speed" EU is discussed, not only membership in the EU, but also adopting common currency is interrogative.

Keywords: gravity model, foreign direct investment, European Monetary Union.

Introduction

The Slovak Republic has entered the European Union (EU) in 2004 together with other transforming countries. The enlargement of the EU by 10 countries is the largest enlargement of the European Union in the history. Some of these countries have consecutive also adopted common currency Euro and became members of the European Monetary Union (EMU). The Slovak Republic has adopted Euro in 2009. The expectation were in increasing international trade, growth of the inflow of foreign direct investment (FDI) and thus increasing the Slovak gross domestic product (GDP), as well as the potential product. Another advantage has lied in no need to exchange foreign currencies what should increase the trade and tourism. Maybe for that reason, Slovak nationals were inclined for the Euro adoption. All along, the Slovak Republic has continued in the transformation process and has privatized many state-owned companies. At the same time, many greenfield investments were allocating within the Slovak Republic. General assumption on the FDI considers the membership in the EU and the EMU as the factors influencing its flows positively. On the other side, stable economic and political environment might attract FDI inflows regardless to the membership in some free trade areas or monetary union. For example, the highest FDI inflow to the Slovak Republic was in 2006, when the Slovak Republic was using own Slovak currency. Contrariwise, The Slovak Republic has adopted Euro in the time of global financial crisis and related sharp decline in FDI flows. Fundamental determinants of FDI inflow are the size of the economy (GDP, economic growth, potential output), potential demand (domestic or foreign), geographical location of country (access foreign market – export oriented production), legal system (mainly law enforcement), labour (unemployment, education or wages) and level of infrastructure. Another factors such as investment incentives, the EU and the EMU membership are considered as complementary and would not attract investments if the fundamental determinants were not satisfactory. Further analysis will be focused on the role of the EU and the EMU membership in influencing FDI inflow to the Slovak Republic. We

will assess these determinants by the use of gravity model including the EU and the EMU membership as variables into the econometric analysis.

Literature Review

The introduction and adoption of common currency affects the economy in two ways. Starting with the disadvantage, it means the abandoned the sovereign monetary policy by the particular country. As a result, country is not able to influence the monetary policy and country lost one of its economy policies. On the other way, the advantage of using the common currency is the decrease in transaction cost and decrease in the risk of exchange rate movements, which leads to the growth of international trade. However, Rose (2000) argues that exchange rates in the Europe were relatively stable also before the Euro introduction and had only small volatility, respectively many measures would be taken to moderate volatility. Monetary union makes impossible countries to compete in market competition as the economic performance of particular country in relation to economy of another country is expressed in the exchange rate, thus in the price of two currencies. However, such competition has stronger effect on the international trade and investment flows as the stable exchange rates with any volatility. For that reason, there must be another advantages for the common currency to be used within the Europe (if considering the EMU).

International relations between particular countries have several channels. The most important is the channel of investment flows, mainly FDI that is assumed to have positive and long-term effect on the host economy. Therefore, a high attention is devoted to the European Monetary Union in analysis of FDI inflow.

Empirical study by Rose uses gravity model, firstly used by Walter Isard in 1954 (Isard at al., 1998). This model analyses the size, respectively the volume of international trade between countries in relation to the factors influencing the trade. The easiest form of the model is as follows:

$$F_{ij} = G * (M_i * M_j)/D_{ij} \quad [1]$$

where: i and j is index for countries, F represents the trade flows between countries i and j, M is the GDP of countries, D is the distance between countries i and j a G is a constant. This simple equation shows that the volume of bilateral trade relates only to the GDP of countries and its distance. Several researchers have adjusted and extend or enlarged the equation about more variables more reflecting the fundamentals of trade between countries.

Rose (2000) uses the extended gravity model. He shows that the membership in monetary union and the volatility of exchange rate really influence the volume of bilateral trade. The enlarged equation has the following form:

$$lnX_{ijt} = \beta_0 + \beta_1 \ln\left(Y_i Y_j\right)_t + \beta_2 \ln\left(Y_i Y_j / Pop_i Pop_j\right)_t + \beta_3 lnD_{ij} + \beta_4 Cont_{ij} + \beta_5 Lang_{ij} + \beta_6 FTA_{ijt} + \beta_7 ComNat_{ij} + \beta_8 ComCol_{ij} + \beta_9 Colony_{ij} + \gamma CU_{ijt} + \delta V\left(e_{ij}\right)_t + \varepsilon_{ijt} \quad [2]$$

where:

- i and j is index for country and t is time,
- X_{ij} is the bilateral trade between countries i and j,
- Y represents real GDP,
- Pop is population,

- D_{ij} is distance between countries i and j,
- $Cont_{ij}$ is dummy that obtain value 1, if countries i and j have the common border and 0 otherwise,
- $Lang_{ij}$ is dummy with value 1, if countries i and j have common language and 0 if not,
- FTA_{ij} is dummy with value 1, if countries i and j belongs to the same regional free trade area and 0 otherwise,
- $ComNat_{ij}$ is dummy that obtain value 1, if countries are part of the same nation, 0 otherwise,
- $ComCol_{ij}$ is dummy with value 1, if countries i and je were after 1945 a colony of the same colonizer country, 0 otherwise,
- $Colony_{ij}$ is dummy with value 1, if the country i has colonized country j or j has colonialized i, 0 otherwise,
- CU_{ijt} is dummy representing the use of common currency, it obtain value 1, if countries i and j use the same currency in time t and it is 0 otherwise,
- $V(e_{ij})t$ is volatility of nominal exchange rates of countries i and j in time t,
- β je vector of exogenous variables,
- ε_{ij} represents error term and other factors.

An important role in the equation has parameters γ and δ. γ represents the effect of monetary union on the bilateral trade. δ reflects to the relation between the exchange rate volatility and bilateral trade. Model includes various variables that have logical justification. Higher level of GDP or higher GDP per capita and the size of the economy positively affect the level of international trade. Contrariwise, distance between countries decreases the level of international trade. These variables are statistically significant and have direction as assumed. Other variables (common border, common language and trade agreements) are also significant and increase the level of trade between countries. The paper has 33,903 bilateral trade observations for 5 years – 1970, 1975, 1980, 1985 and 1990. Among them, in 330 cases have countries use the common currency. Mostly, these countries are small and relatively poor countries. For that reason, extrapolation of the results for the EMU would not be suitable due to the dissimilarity of observed countries and those belonging to the EMU (Rose, 2000). Results of Rose paper are follows. Countries using the common currency have triple higher trade as countries using different currencies. Exchange rate volatility was low, respectively there was an effort to decrease it at zero level. Considering such situation, the international trade between countries would increase by common currency by 12 or 13%. Thus, the introduction of common currency has higher impact on the international trade than the zero exchange rate volatility.

In previous text, the model assessing the bilateral trade between countries was introduced. Now, we are going to deal with the FDI flows. FDI inflow and FDI outflow are important part of the capital movement affecting host, respectively home economies. We already know that membership in monetary union positively relates to international trade. How the common currency affects FDI flows? Paper by Aristotelous and Fountas (2012) deals with this question. They decided to analyse FDI flows instead of the international trade because the increase of the FDI in Eurozone was 469.9% in period 1990 – 2006, while it was only 184.3% when talking to the growth of international trade. They has formed the following equation:

$$FDI_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 GDPGR_{it} + \beta_3 RER_{it} + \beta_4 VOL_{it} + \beta_5 DIST_i + \beta_6 EU_{it} + \beta_7 EMU_{it} + e_{it} \quad [3]$$

Endogenous variable is FDI_{it} that represents the overall FDI inflow to the country i in time t. i is index for a country and t represent time period. Exogenous variables are:

- GDP_{it} is the real GDP (output) of country i in time t,
- $GDPGR_{it}$ is the GDP growth,

- RER_{it} is the real exchange rate expressed as the currency basket of trade partners with shares given by the volume of trade,
- VOL_{it} is the change in volatility of exchange rate, it is the standard deviation of exchange rate expressed on monthly base,
- $DIST_i$ is the distance between the capital city of host country from Frankfurt as the financial centre of the EU,
- EU_{it} is dummy variable that obtain value 1, if is country the EU member and 0 otherwise,
- EMU_{it} is dummy relating to the membership in EMU respectively using common currency, it has value 1, if is country the EMU member and 0 otherwise,
- e_{it} is error term and other factors relating to the volume of FDI inflows.

The use of exogenous variables and their assumed relation (direction) to the FDI inflow is the same as in Rose model of international trade. The goal of such expressed model is by the use of regression analysis assess the role of coefficient β_7 (economic and statistical significance). Authors assumes the positive relation of the EMU and FDI inflow, so β7 would have plus sign. To achieve the goal, data from 22 OECD countries for period 1973 – 2006 is used. The time period includes the Breton-Wood monetary system of fixed exchange rates as well as the Kingston monetary system with introducing floating exchange rates (Aristotelous and Fountas, 2012). Paper gives following results. GDP has positive and statistically significant effect on the FDI inflow. The same result is for the real exchange rate and volatility. Distance and FDI inflow relates negatively and this relation is statistically significant. To the contrary, the EU membership has only small impact on the FDI inflow. Variable, they have the highest concern, the EMU membership is significant and positively affects the FDI inflow.

Another paper that deals with the FDI inflow is the paper by Folfas (2011). He focuses on the FDI inflow within the EU27 and the role of taxation in particular economies. Regression equation of his view is:

$$lnFDI_{ijt} = \alpha_0 + \alpha_1 lnGDP_{it} + \alpha_2 GDP_{jt} + \alpha_3 lnD_{ij} + \xi Z_{ijt} + c_{ij} + \eta_{ijt} \quad [4]$$

where:

- i, j a t represents indexes for host economy, home economy and time,
- FDI_{ijt} is the FDI inflow to host economy i from home economy j in time t,
- $GDP_{i(j)t}$ is the GDP of host (home) economy in time t,
- D_{ij} is the distance between economic centres of host and home economy,
- Z_{ijt} represents another variables determining bilateral FDI inflow,
- c_{ij} represents specific effects related to the allocation of investment,
- $ɲ_{ijt}$ is the error term and random variables influencing FDI inflow.

Further on, author add to equation several variables. Among them also dummies we are the most interested such as membership in the EU, use of common currency Euro or entrance of particular countries to the EU at the same time. Another variables in model are corporate tax and dummy variable offshore financial centre. The result shows that the flows of FDI are higher between larger economies. However, in comparison with gravity model analysing international trade, coefficients are lower. The explanation of such situation lays in presently discussed phenomenon of disinvestments and high fluctuation of FDI inflow caused by unrepeatable situations (privatization, huge investment projects, mergers and acquisitions). The three variables relating to the European integration are statistically insignificant. So, the characteristics of particular countries (as the GDP) are more relevant for the decision of investors as the membership in integration area. Naturally, problem might be in use of dummy variables that do not give a true picture of constantly changing processes of integration. Variable corporate tax is statistically significant. In case of its homogeneity, the flows of FDI between countries are decreasing, but the flows with offshore centres are more intensive. Author consider offshore centres

are Cyprus, Luxembourg and Malta. To conclude, corporate tax is an important factor of country sovereignty within the integration area.

The last paper by Ledyaeva and Linden (2006) applies gravity to Russian regions. The endogenous variable is the number of companies from Belarus, Kazakhstan, Ukraine, Germany, United Kingdom and Finland allocated in 76 Russian regions. Equation of the model is as follows:

$$Y_{ij} = b_1 + b_2 GRP_j + b_3 GDP_i + b_4 DIST_{ij} + b_5 AGGL_j + b_6 NR_j + b_7 DV_j + b_8 Moscow + b_9 SKA_j + u_{ij} \quad [5]$$

where:

- b represents coefficients of the equations,
- Y_{ij} is the number of the foreign companies in host Russian region (j) from foreign (investment home) country (i) in 2002,
- GRP_j is gross regional product,
- GDP_i is the GDP of foreign country,
- $DIST_{ij}$ is distance between the capital city of foreign country and capital of particular region,
- $AGGL_j$ is agglomeration effect – the ratio of GRP to the size of a region,
- NR_j represents natural sources expressed as the ratio of mining industry to the overall industry in particular region,
- DV_j is dummy variable measuring the rate of uncertainty that potential investors are facing, it obtain the value of 1 for Belarus, Kazakhstan and Ukraine and value 0 for other countries, this variable might be also explained as the cultural proximity, and common language of these post-Soviet countries with Russia,
- Moscow is dummy with value 1 for Moscow and its regions and 0 for other regions, this variable relates to the advantages of the Moscow position as the capital city of Russian Federation,
- SKA_j is the education, it is the ratio of graduate population to total population in region,
- u_{ij} is the error term.

All variables in analysis, except for NR_j, have have confirmed the assumed relation to the endogenous variable and are statistically significant. Authors have found that the most of the FDI inflow to the Russia is market seeking. It implies the FDI dependency on the GRP of particular region. So, the GRP, as well as the GDP of investment home economy has positive impact on the FDI inflow. The same are acting variables agglomeration effect, common language and culture (DV_j), Moscow and education. To the contrary, the distance has negative effect on the FDI inflow.

Data and Methodology

To assess the role of the EU and the EMU membership in influencing the FDI inflow to the Slovak Republic, the gravity model is used. The main idea of gravity model is to capture variables influencing FDI inflow positively and those that have negative effect. It is assumed that FDI inflow is positively influenced by GDP, respectively the size of an economy and negatively by distance between countries. These prime variables are added with another variables, very often reflecting the interest of authors or the regional conditions (integration area, country, region, etc.). Our goal is to assess the role of the EU and the EMU membership in influencing the FDI inflow to the Slovak Republic.

We use gravity model with added variables indicating membership in the EU and the EMU. The data period is 2000 – 2012 as we are constricted by the availability of data on bilateral FDI inflows. The panel data is used. The cross section units are 20 countries that have allocated in the Slovak Republic the most

investments during the research period. These investments represent 98.14% of all foreign direct investments. The list of countries with their shares of FDI inflow to the Slovak Republic on total FDI inflow is given in Table 1.

Table 1: The list of countries

Country	Share of FDI inflow from a particular country on total FDI inflow
Argentina	0.39 %
Austria	11.22 %
Belgium	0.84 %
Canada	0.36 %
Cyprus	6.74 %
Czech Republic	9.69 %
Denmark	1.14 %
France	8.10 %
Germany	20.52 %
Hungary	3.06 %
Italy	11.35 %
Korea, Republic of	7.18 %
Liechtenstein	0.76 %
Luxembourg	4.04 %
Netherlands	8.66 %
Spain	0.81 %
Sweden	1.20 %
Switzerland	1.00 %
United Kingdom	0.42 %
United States	0.65 %

Source: author, OECD.Stat

Endogenous variable of the equation is bilateral FDI inflow from foreign (investment home) country to the Slovak Republic (host country). The exogenous variables are GDP of the Slovak Republic, GDP of the foreign countries, distance between the Slovak Republic and home country of investments and four dummies relating to the integration processes within the Europe. First dummy represents the membership in the EU. In this case, it obtain the value of 1 and it is 0 otherwise. Second dummy represent the membership in the EMU and using common currency Euro. Third and fourth dummies are going even deeper to the integration processes. These are EU_pair and EMU_pair. The dummies have the value 1 if both countries (partners) in country pair belong to the EU, respectively to the EMU in the same time. In other words, they represents a common membership in the EU or the EMU. The Data source is OECD and World Bank. The description of data used is given in Table 2. The descriptive statistics of data is summarized in Table 3.

Table 2: The characteristics of variables

Variable	Description	Source
$FDI_{SVK,j,t}$	bilateral inflow of foreign direct investment from foreign (investment home) country j to the Slovak Republic (host country); million USD, current prices	OECD.Stat, OECD
$GDP_{SVK,t}$	gross domestic product of the Slovak	World Development

	Republic; million USD, constant 2010 prices	Indicators, World Bank
$GDP_{j,t}$	gross domestic product of the foreign (investment home) country – origin of investment, million USD, constant 2010 prices	World Development Indicators, World Bank
$DIST_{SVK,j}$	distance between capital city of the Slovak Republic and capital city of foreign (investment home) country; kilometres	European Commission distance calculator for Erasmus programmes *

*http://ec.europa.eu/programmes/erasmus-plus/resources_en#tab-1-4

Source: author, OECD.Stat

Table 3: Summary statistics of variables

Variable	Observations	Mean	Median	Min.	Max.	Std. dev.	Skewness	Kurtosis
$FDI_{SVK,j,t}$	260	136.1120	38.88550	-679.3550	1653.8740	277.6714	1.8626	9.2246
$GDP_{SVK,t}$	13 *	75845.8210	76975.7679	55486.1097	93549.1123	13686.4615	-0.1485	1.4276
$GDP_{j,t}$	260	1606707.2414	491787.1018	2483.9531	15542161.7223	3067921.2681	3.5576	15.1389
$DIST_{SVK,j}$	20 **	2294.2943	976.6400	54.8800	11851.9700	3137.5558	1.9110	5.4073

* the Slovak GDP is used in each country pair (13 observations in 20 country pairs)

** distance does not change over time and is same for particular country (cross section unit)

Source: author, EViews

For further analysis, we have check used series for the stationarity by using Levin, Lin and Chu test of common unit root and the Im, Pesaran and Shin test of the unit root for each unit, i.e, per country. Stationarity have been tested for the $FDI_{SVK,j,t}$, $GDP_{SVK,t}$, and $GDP_{j,t}$. FDI inflow is stationary at level. The Slovak GDP and GDP of investments home countries are stationary at first difference. The result of tests is given in Table 4. Purposely, we do not make log transformation of data. If we do that, we would lose data on FDI (observations) with negative and zero values. It is the reason, why we give preference to first difference. We have not test $DIST_{SVK,j}$ due to this variable is the same for country-pair and does not change in time.

Table 4: Result of panel unit root tests

	$FDI_{SVK,j,t}$		$d\_GDP_{SVK,t}$		$d\_GDP_{j,t}$	
Method	statistic	prob.	statistic	prob.	statistic	prob
Levin, Lin and Chu t	-2.3577	0.0092	-7.9372	0.0000	-8.0777	0.0000
Im, Pesaran and Shin W-stat	-3.17247	0.0008	-3.2533	0.0000	-4.2111	0.0000

Source: author, EViews

Because of the first difference form of $GDP_{SVK,t}$, and $GDP_{j,t}$, which are stationary, we use them to formulate the equation. The equation we apply is as follows:

$$FDI_{SVK,j,t} = \beta_0 + \beta_1 \mathrm{d\_GDP}_{SVK,t} + \beta_2 \mathrm{d\_GDP}_{j,t} + \beta_3 DIST_{SVK,j} + \beta_4 EU_{SVK,t} +$$

$$\beta_5 EU\_pair_{SVK,j,t} + \beta_6 EMU_{SVK,t} + \beta_7 EMU\_pair_{SVK,j,t} + \varepsilon_{ijt} \quad [6]$$

Firstly, we will run the regression with the use all variables. If some of the variables are going to be statistically insignificant, we will omit them from the equation and run it again. After then, we will be able to decide, if the membership in the EU and the EMU has relation to the FDI inflow to the Slovak Republic.

Results

As obvious from the literature review, we assume the positive relation between FDI inflow and the Slovak GDP, as well as foreign country GDP. The Slovak GDP measures the size of the economy and thus also the potential demand. For that reason, a higher GDP induces a larger FDI inflow. Similarly, the higher the investments home economy, the more opportunities of home companies to invest the "unused" domestic sources abroad. To the contrary, a negative relation is assumed in variable distance. However, due to the very easy and fast movement of capital, the distance would not play any role. This is the difference between analysis of FDI inflow and international trade, where in the distance means additional cost of trading (e.g. transportation cost). We assume the positive effect of all four dummies on the FDI inflow. The membership in the EU and the EMU would increase the FDI inflow as the membership might be considered as the proxy for fiscal and monetary stability. The EU_pair and EMU_pair dummies would also be positive. These variables just heighten the effect of the EU and the EMU membership and are focused on assessing the common membership of countries in the EU and the EMU.

We have run regression by using all exogenous variables. The result shows that only variables $d\_GDP_{SVK,t}$ and $EMU\_pair_{SVK,j,t}$ are statistically significant. The Slovak GDP is influencing the FDI inflow positively. However, the common membership in the EMU has negative sign and is significant only at 10% level. (Table 5, Model 1). We assume that this negative sign is associated with the decrease in FDI inflow after financial crisis of 2007/2008, right when the Slovak Republic has adopted Euro in 2009 and has joined to the large group of countries using common currency. Almost half of these countries belongs to our sample. The relation between the decreasing FDI inflow after the financial crisis and the adoption of Euro by the Slovak Republic so might be wrongly considered as the negative. Other variables in the Model 1 are insignificant. For that reason, we have omit them form the equation. We presume that by omitting variables, EMU_pair lose its "very poor" significance due to significant $GDP_{SVK,t}$ will capture it. This assumption is confirmed when omitting all insignificant variables from Model 1. Result in Model 2 (Table 5, Model 2) shows that only variable measuring the economic performance of the Slovak Republic is statistically significant in attracting the FDI inflow from foreign countries. It means that only GDP of host country is determinant of bilateral FDI inflow. Variables expressing the membership and effect of the EU and the EMU membership have not significant relation to FDI inflow. We might conclude that entering the EU and adopting the common currency Euro has not impact on the bilateral FDI inflow to the Slovak Republic. Only determinant influencing the inflow is the size and potential of the economy expressed by the real GDP.

Table 5: The relation of exogenous variables to FDI inflow to the Slovak Republic

	Model 1	**Model 2**
const	80.9901 [0.2392]	97.6113 [0.0089] ***
$d\_GDP_{SVK,t}$	1.54593e-08 [0.0373] **	1.54535e-08 [0.0060] ***
$d\_GDP_{j,t}$	5.32553e-011 [0.8522]	
$DIST_{SVK,j}$	-0.000463483 [0.9867]	
$EU_{SVK,t}$	6.53699 [0.9316]	

$EU\_pair_{SVK,j,t}$	16.4405 [0.8481]	
$EMU_{SVK,t}$	54.3262 [0.3482]	
$EMU\_pair_{SVK,j,t}$	-153.155 [0.0290] **	-51.3857 [0.3223]
R^2	0.3228	0.316933
Most appropriate model	random effects	fixed effects

p-value in brackets

*** - statistical significance at 1 % level, ** - statistical significance at 5 % level, * - statistical significance at 10 % level

Source: author, EViews

Table 6: P-values of testing statistics

Testing statistics	Model 1	Model 2
F test	6.42686e-008	4.84276e-009
Breusch-Pagan LM test	3.04037e-011	1.92051e-013
Hausman test	0.400974	0.00603314

Source: author, EViews

Conclusion

The membership in the integration area or the use of common currency might induce the impression of its positive impact on the FDI inflow. However, the fundamental determinant influencing the FDI inflow is the GDP of a host country, respectively its growth. The GDP represents the size and the performance of the economy, where the investment has to be allocated. The development of the GDP is often an indicator of the economy "health". The GDP growth in a long run means the improvement of the macroeconomic variables and is associated with the economic and usually also with political stability. Contrariwise, the decrease in the GDP is regarded as potential crisis and instability. For that reason, investors are concern about this factor as the main determinant of their decision making process. The membership of a country in the EU or the EMU is not a fundamental FDI inflow determinant. Membership in the EU and the EMU is considered as the guarantee or security of fiscal, and monetary stability, as well as political stability. In present environment of uncertainty of future development of common currency Euro and the future of the European Union itself, the membership in the EU and the EMU does not play significant role in FDI inflow. In other words, the FDI inflow to the Slovak Republic does not relate to the EU and the EMU membership and is affected only by the Slovak GDP. We might conclude that the using of common currency and the membership in the European Union does not automatically increase the FDI inflow. As the result of the analysis shows, the membership of the Slovak Republic in the European Union and the European Monetary Union, as well as the membership of the country of investment at the same time in this integration areas does not induce the FDI inflow to the Slovak Republic. The only significant determinant relating to the FDI inflow so consist of the Slovak GDP as the measure of its economic performance.

Acknowledgment

This paper was supported by the Grant Agency VEGA, under project No. 1/0975/15 entitled "Macroeconomic and microeconomic effects and impacts of inflation and deflation".

References

Aristotelous, K. and Fountas, S. (2012), 'What is the impact of currency unions on FDI flows? Evidence from Eurozone countries', *South-Eastern Europe Journal of Economics,* 2 (2012), 87-98

Aristovnik, A. and Matevz, M. (2010), 'The Economic and Monetary Union´s effect on (International) Trade: the Case of Slovenia Before Euro Adoption', [Online], William Davidson Institute Working Paper Number 982, [November 10th, 2017]. Available: https://deepblue.lib.umich.edu/bitstream/handle/2027.42/132990/wp982.pdf?sequence=1

Folfas, P. (2011), 'FDI Between EU Member States: Gravity Model and Taxes', ETSG 2011 Copenhagen, 13th Annual Conference, Copenhagen Business School and University of Copenhagen, 8-10 September 2001, Copenhagen, Denmark, p. 7.

Isard, W. at al. (1998) Methods of Interregional and Regional Analysis, Ashgate Publishing Company, Vermont

Ledyaeva, S. and Linden, M. (2006), 'Testing for Foreign Direct Investment Gravity Model for Russian Regions', [Online], UEF Electronic Publications, University of Joensuu, Faculty of Social Sciences/ Department of Economics, No. 32, Joensuu, 2006, ISBN: 952-458-782-3, [November 10th, 2017]. Available: http://epublications.uef.fi/pub/urn_isbn_952-458-782-3/index_en.html

Rose, A.K. (2000), 'One Money, One Market: The Effect of Common Currencies on Trade', *Economic Policy*, vol. 15, issue 30, 7-46

Online Marketing as Part of the Internationalization Strategy An Analysis over Website Communication

Lidia Alexa, "Gheorghe Asachi" Technical University of Iași, Iași, Romania, lidia.alexa@tuiasi.ro

Silvia Avasilcăi, "Gheorghe Asachi" Technical University of Iași, Iași, Romania, silvia.avasilcai@gmail.com

Abstract

The profound changes in the higher education global environment had a significant impact over Romanian universities and so, internationalization gained a lot of importance on the political agenda as one of the strategic goals included in the 2014-2020 overall higher education strategy.
In this context, the article aims to analyze the internationalization process from a marketing perspective, by investigating the use of website communication by Romanian public universities in order to promote their educational offer and to increase the number of inbound international students.
The research methodology involved an in-depth analysis of 49 public universities' online strategies, by embedding their websites accessibility, design and interactivity, organization of content, SEO (Search Engine Optimization) results, as well as their specific content strategy in presenting their educational offer based on a list of specific terms considered relevant by prospective students in search of study abroad programs.
In the next stage of the study, the results were further analyzed against the ones obtained from applying the same evaluation on the websites of the top 10 universities ranked in the Webometrics Ranking of World Universities, in order to obtain a comparative imageUse the word "Abstract" as the title for the abstract section. The abstract should be no more than 250 words. It should capture research motivation, research Design/methodology, and main findings and implications. The abstract should provide an excellent summary of the paper.

Keywords: content analysis, higher education internationalization, online marketing strategy, university website.

Internationalization Context, Opportunity and Evolution

The concept of internationalization of higher education institutions has gained a lot of attention in the academia and so there is a vast literature discussing the conceptualization, the characteristics, the advantages and challenges of internationalization for universities and students alike. Kehm and Teichler (2007), after screening a broad range of publications on issues relating to internationalization in higher education, identified seven broad themes that have dominated the research conducted on this specific topic, namely, mobility of students and academic staff, mutual influences of higher education systems on each other, internationalization of the substance of teaching, learning, and research, institutional strategies of internationalization, knowledge transfer, cooperation and competition, national and supranational policies as regarding the international dimension of higher education.

Our research is focused mainly on two elements, specifically: mobility of students, more particularly, incoming students in Romanian universities and institutional strategies of internationalization conducted by Romanian public universities.

The study is significant due to the paradigm shift imposed by the need to align all higher education institutions strategies according to the internationalization practices and trends (Vardhan, 2015).

The impact of this paradigm shift is relevant, because, for a very long time, Romanian Higher Education Institutions have been focused solely on providing educational services to those who could meet their prescribed admission criteria and were operating in a supply-side market, which meant that their marketing efforts were limited to a number of unidirectional promotional actions. This strategy proved to be successful due to the high number of prospective students and the relatively limited number of competitors.

The decreasing number of domestic students and the increased global competition for educational services forced Romanian public universities to rethink their general strategy and to tailor their marketing efforts in order to better suit the student-customer information and communication needs. In order to do this, universities need to become more market oriented and this is by no means, an easy task, as there is a constant debate regarding the commercialization of higher education.

In this specific context, internationalization became a public policy priority also because the global number of international students rose by more than 75% since 2000, reaching 3.43 million in 2010 and is projected to reach 8 million by 2025 (WorldBank, 2011).

In terms of statistics and data accuracy, Rumbley (2012), states that the data regarding the international mobility of students are unclear and inaccurate for many reasons that range from the complexity of the phenomenon to the actual process of collecting data and so throughout the research we relayed on the Eurostat Learning mobility statistics, as shown in figures no. 1 and 2 The lack of specific statistical data for each of the Romanian universities included in the study is one of the research's limitations.

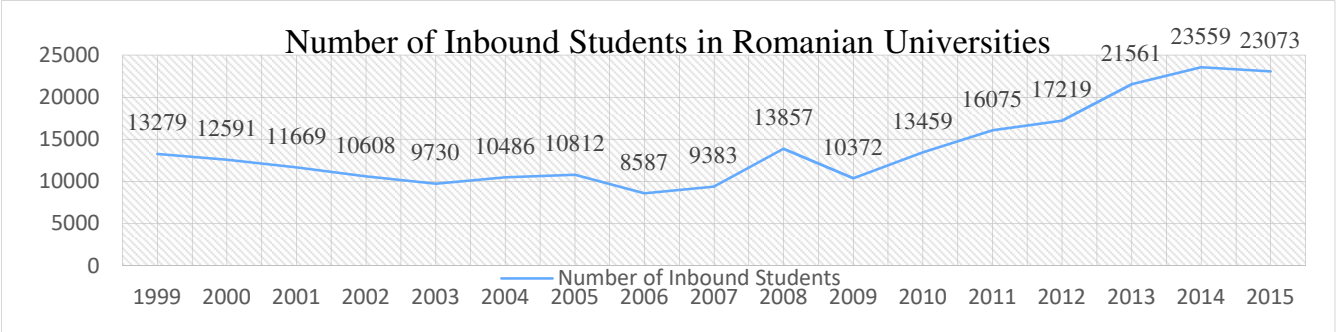


Fig. 1: The number of inbound students in Romanian Universities

The Eurostat Learning mobility statistics showed that starting with 2009 the number of students from abroad enrolled in higher education institutions in Romania has been in constant increase, with a peak of 23,559 students in 2014, out of which 8,521 in Bachelor programs, 14,534 in Master programs and 504 in Doctoral programs; however, these numbers represent less than 3% of the overall number of tertiary education graduates in 2014.

In terms of field of study, the data for 2014 showed that 42.48% of the students from abroad are studying in the" health and welfare" fields, 18.2% are in the "social sciences, business and law fields", 13.37% are in the "agriculture and veterinary fields" and 12.27% are in the "engineering, manufacturing and construction" fields.

At the same time, the inbound mobility rate has been steadily increasing as well as showing in figure 2.

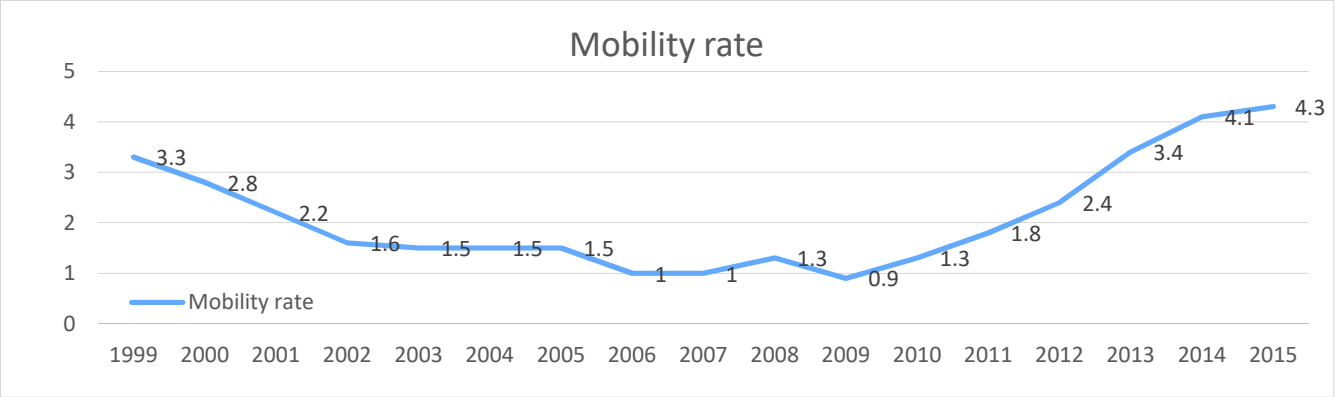


Fig. 2: Mobility rate

Although, Romanian higher education institutions are autonomous, they must comply with strict quality requirements in terms of the number of foreign students they can enroll; and while in most cases, universities indicated that they have specific targets for incoming and outgoing students, these targets did not seem to be officially adopted by the institutions since they did not present any official document (Deca L. et al, 2015).
An analysis previously conducted (Deca L. et al, 2015) highlighted that although universities would like to increase the number of incoming foreign students, the vast majority do not have a coherent strategy in place that could include advertising the institution's academic programmers, foreign language/joint degrees programs or communicating its unique selling points.

As previously stated, some of the reasons for the limited number of foreign students enrolled in Romanian universities is the lack of visibility of the English language programs and the insufficient use of online marketing instruments.

Universities Websites as Marketing Tools in the Internationalization Process

In any high involvement online purchase, such as the decision to pursue a study abroad program, providing detailed and up-to-date information and building trust with the prospective clients is essential. Urban et al. (2000) state that trust is built in a three-stage, cumulative process that establishes (1) trust in the Internet and the specific Web site, (2) trust in the information displayed and (3) trust in delivery fulfillment and service.

In order to achieve this, universities have to better understand the consumer behavior and specific information needs and expectations and act online and offline accordingly.

From a marketing perspective, websites can be seen as promotional outlets set in place in order to achieve a business or organizational goal (Apperson, 2015) and in Bishop's (2013) opinion when it comes to researching study abroad programs, the university websites often act as the first reference point. She explains that study abroad websites cater to prospective applicants by using verbal and visual imagery to engage student populations. Because websites tend to be the first choice for getting information about study abroad and hence are a crucial promotional instrument, it is important to observe and analyze the way universities are exploiting website communications in order to attract international students.

Some website scholars explain that all website communication has an ultimate goal: to "achieve positive response action from every visitor" (Sharp, 2001) and this could refer to a visitor remaining on the website for an optimum period of time, downloading content from the site, forwarding content to another person, purchasing an item, subscribing for more information, or returning to the website at a later time. From a higher education marketing perspective, when it comes to websites addressed to potential international students, the main goal should be to engage visitors so they would use the website for further direct inquiries, to apply to a study abroad program, or to share the information with other people interested in the study abroad process (Apperson, 2015).

In Quinn's (2013) opinion the university website is "the ultimate brand statement" and the homepage is a key component in the student experience that has a determining role in his further decisions and that is why it needs to be intuitive and uncluttered.

The need for a consistent and coordinated online marketing effort is confirmed by the results of the the *2014 E-Expectations Report - The Online Preferences of College-Bound High School Seniors and Their Parents* (2014) which revealed that 62% of students prefer web-based resources for learning about colleges; 40% of the respondents declared that they use a mobile device nearly all the time for web browsing while 71% said that they have looked at a college website on a mobile device.

Students and parents both rated college websites as the most influential resource for college search, with 77% of seniors and 69% of parents listing them as influential. More than half (53 %) of students listed the email as the second most influential resource, while 42 % of parents listed college planning sites as their second choice, just ahead of email (40 %).

The report also showed that when students access a university website, they look for: academic program listings (over 40%), cost (over 30%), scholarships (over 30%), financial aid (over 30%), academic program details (over 20%), housing details (over 20%), enrollment/admissions information (over 15%), and student life information (over 10%).

Another study, the 2015 mba.com *Prospective Students Survey Report* (2015) listed the school websites as the most important marketing channel and information sources prospective students use to decide on schools or programs with a Reach (percentage of prospective students who consult the source) of 83%, an Influence (percentage of prospective students who ranked the source as extremely or very influential to their decision making process) of 53% and an Impact Score (calculated response of reach and influence scaled to 100) of 100.

According to an EUROSTUDENT report (2016) students who are in the planning phase to study abroad rated the "lack of information provided by the home institution" as the second-largest obstacle to enrollment abroad (28 %).

Two other relevant elements are revealed by a research conducted by Gomes and Murphy (2003) and refer firstly, to the fact that half of the students involved in the study used search engines to locate an institutions website, which means that universities need to invest constantly in SEO (Search Engine Optimization) and secondly, 1 out of 3 students emailed the university for further details and 4 out of 5 students declared that the institution's email response influenced their choice for enrollment.

Material and Methods

Though not uncharted academic territory, the study abroad experience and the higher education internationalization process is almost never examined from a digital communication perspective, focusing on the way universities describe, promote and "sell" not only their academic services but the general international experience.

In an effort to address this particular issue, this research involved a two stage in-depth analysis over Romanian public universities online marketing strategies, regarding international students, namely the presentation websites. The first stage of the analysis focused on evaluating, with an automatic website evaluation tool, the English version of the websites of 41 public universities (6 of the public universities didn't have an English version and 2 were blocked for an external analysis with automated tools) in terms of Search Engine Optimization, Content, Design, Performance and Accessibility. This phase of the website evaluation process relayed on automated tools, namely www.site-analyzer.com. The first 10 universities ranked in Webometrics Ranking of World Universities were also analyzed using the same automated tool for comparison reasons.

Considering the purpose of the evaluation, which is to clarify the extent of online correlation with other institutions/countries or to know the ranking of a website and how much traffic it attracted (Zahran et. al 2014) the research team opted for using automatic website evaluation tools, because according to the literature, automatic website evaluation tools are fast, consistent, produce unbiased results, and obviate the shortage of experts and inconsistent results between them (Ataloglou and Economides, 2009; Dingli and Mifsud, 2011; Dominic et al., 2010, Zahran et. al). Also, these tools can offer an initial overview of the status of a website (Olsen et al., 2009). However, automation of website testing is an evolving method that cannot be considered efficient (Al Juboori et al., 2011) on its own and should not replace human evaluators, but assist them (Berntzen & Olsen, 2009; Brajnik, 2008; Dingli & Mifsud, 2011). Noruzi (2006) considers that the webometric method is an imperfect tool to measure the quality of websites while Ivory and Chevalier (2002) believe that automation is a useful complement to standard evaluation techniques.

The fact of the matter is that manual evaluations provide more details than automatic tests, which cannot capture the whole picture, so considering all the above, the second stage of the analysis focused on the content considered as essential in the decision making process of students researching study abroad programs (academic program listings, cost, scholarships, financial aid, academic program details, housing details, enrollment/admissions information and student life information).

When applied to Web-based content, the changing content can be problematic (Kim & Kuljis, 2010). However, some researchers claim that it can be overcome by rapid data collection (McMillan, 2000) and downloading websites (Koehler, 1999) and so the content analysis was conducted over a 4 week period.

The Context Unit of the analysis was the homepage and the Coding Unit was based on the eight content categories that students listed as important in their quest for information when choosing an abroad study program (academic program listings, cost, scholarships, financial aid, academic program details, housing details, enrollment/admissions information and student life information).

Data Analysis and Results

Website performance analysis

According **to** Webometrics Ranking of World Universities, which uses a ranking system based on a composite indicator that takes into account both the volume of the Web contents (number of web pages and files) and the visibility and impact of these web publications according to the number of external inlinks (site citations) they received **in 2016,** only 3 Romanian universities ranked in the first 1000 universities: "Babes-Bolyai" University Cluj-Napoca (787), University of Bucharest (860) and "Alexandru Ioan Cuza" University Iasi (879).

A previous research conducted on Romanian universities websites (Alexa et. al, 2012) revealed that 75% of all public universities had an English version of their website, while the current analysis showed that: 88% of all public universities had an English version of their website, the increased number showing a higher interest toward internationalization. Out of the 6 universities that didn't have an English version 2 had specific sections in their website for Erasmus students in English, but were not included in the analysis.

The results of the first stage of the analysis which focused on evaluating the English version of the websites of 41 public universities in terms of Search Engine Optimization, Content, Design, Performance and Accessibility are presented in table 1.

Table 1 : University website result analysis obtained from www.site-analyzer.com

	University Website	Summary	Search Engine Optimization	Content	Design	Performance	Accessibility
1	University POLITEHNICA of Bucharest	48	65.6	17.7	57.6	63.8	35
2	Technical University of Civil Engineering Bucharest	37.3	20.6	37.5	51.4	75.5	28
3	"Ion Mincu" University of Architecture and Urbanism in Bucharest	49	49.6	37.9	71	53.2	35
4	USAMV Bucharest	No English version website					
5	University of Bucharest	Blocked					
6	"Carol Davila" University of medicine and	44.5	45.5	45.6	44	53.2	35

	Pharmacy Bucharest						
7	Bucharest University of Economic Studies	36.3	46.4	24.8	32.3	53.2	24.5
8	National University of Music Bucharest	43.8	53.2	23.5	55.7	35.1	43
9	National University of Arts Bucharest	37.4	30.4	52.3	44	35.1	25.8
10	National University of Theatre and Film "I.L. Caragiale"	41.8	50.6	27.3	44	63.8	25.8
11	National University of Physical Education and Sports Bucharest	27.6	34.6	1	33.2	63.8	23.3
12	SNSPA din Bucuresti	No English version					
13	"1 December 1918" Alba-Iulia	No English version					
14	*Aurel Vlaicu University* Arad	55	59.7	64.4	55.7	53.2	35
15	"Vasile Alecsandri" University of Bacău	44.6	63.9	8.8	55.7	75.5	35
16	North University Baia Mare	No English version					
17	Transilvania University of Brasov	42.2	40.9	41.6	37.7	63.8	34.8
18	Technical University of Cluj Napoca	45.8	46.6	22.2	60.1	63.8	55.8
19	University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca	36.5	44	15.5	44	42.6	35
20	"Babeș-Bolyai" University, Cluj-Napoca	46.2	37	43.4	57.6	53.2	51.2
21	"Iuliu Haţieganu" University of Medicine and Pharmacy Cluj Napoca	48.2	41.1	33.7	71	53.2	51.2
22	"Gheorghe Dima" Music Academy Cluj Napoca	41.7	41.7	30.5	64.9	53.2	23.7
23	University of Arts and Design Cluj Napoca	No English version					
24	Ovidius University Constanta	45.4	55.2	25	49.4	42.6	51.2
25	Constanta Maritime University	46.7	45	27.6	55.7	63.8	51.2
26	University of Craiova	40.7	42.7	29.6	48	64.9	28
27	University of Medicine and Pharmacy Craiova	33.7	38.5	15.1	38.6	53.2	35
28	"Dunarea de Jos" University of Galati	62.5	55.2	80.3	49.4	75.5	59.3

29	"Gheorghe Asachi" Technical University of Iasi	47.9	67.3	42.3	44	53.2	23,9
30	The University of Agricultural Sciences and Veterinary Medicine Iaşi	36.3	31.4	36.8	37.7	53.2	31
31	"Al. I. Cuza" University of Iasi	55	61.2	32.8	63.8	50.9	64.8
32	"Gr. T. Popa" University of Medicine and Pharmacy Iasi	36.1	30	38.4	38.6	63.8	23.8
33	University of Arts "George Enescu" Iasi	Blocked					
34	University of Oradea	45.2	53.6	23.5	49.4	63.8	46.9
35	University of Petrosani	39.1	50.6	2.5	55.7	64.9	38.1
36	University of Pitesti	57.6	66	31.9	63.8	63.8	62.8
37	Petroleum-Gas University Ploiesti	42.4	50.6	38.4	44.2	53.2	23.9
38	"Eftimie Murgu" University Resita	37.2	46.4	9.6	50.3	53.2	37.8
39	"Lucian Blaga" University of Sibiu	32.8	38.5	12.1	38.6	63.8	25.8
40	University "Ştefan cel Mare" of Suceava	36.8	39.5	42.2	34.8	42.6	23.9
41	"Valachia" University of Targoviste	54	52.9	58	67.4	53.2	38.4
42	"Constantin Brancusi" University Targu Jiu	No English version					
43	"Petru Maior" University of Targu Mures	47.6	53.9	58.3	36.5	63.8	25.8
44	University of Medicine and Pharmacy of Târgu Mureş	45.7	27.2	44.4	55.7	76.6	51.1
45	University of Arts Targu Mures	42.7	42.5	28.2	56.5	66	31.2
46	Polytechnic University of Timisoara	41.4	49.6	17.9	58.7	63.8	23.9
47	Banat's University of Agricultural Sciences and Veterinary Medicine Of Timişoara	35.6	33.8	29.4	44.9	53.2	23.9
48	West University Timisoara	40.1	41	16.7	47.2	53.2	51.2
49	"Victor Babes" University of Medicine and Pharmacy Timisoara	47.7	63.3	22.1	50.3	75.5	30.7

Source: https://www.site-analyzer.com (browsed and calculated between 11-14 of July 2016)

The SEO component analyses header information, indexation, duplicate content, multimedia and networking.

The average SEO value for Romanian public universities is 46.54, compared to 51.75, the average SEO value of the top 10 universities. However, when it comes to this particular aspect of online marketing, Romanian universities seem to invest more, as the highest SEO value of 67.3 belongs the "Gheorghe Asachi" Technical University website. Also 8 Romanian universities websites registered SEO values higher than 60.5, which is the highest value for the top 10 universities. This is a positive aspect, considering that the research conducted by Gomes and Murphy (2003) revealed that half of the students stated that they use search engines to find a higher education institution website.

The Content component refers **to** content performance (Text/Code ratio), semantic and keywords. The average Content value for Romanian public universities is 31.4, compared to 43.51, the average value for the top 10 highest ranking universities, but the highest value for Content (80.3) is registered by "Dunărea de Jos" University of Galati while Cornell University has a value of 65.4.

The Design component examines standardization, layout quality, server configuration and security. The average Design value for Romanian public universities is 50.22 compared to 62.97 for the first ten universities. The highest value for Design is registered by the University of Pennsylvania website – 78.8, while the highest value for Design in Romanian websites is registered by "Ion Mincu" University of Architecture and Urbanism in Bucharest and "Iuliu Haţieganu" University of Medicine and Pharmacy Cluj Napoca – 71.

The Performance component **refers to** download and loading optimization. The average Performance value for Romanian public universities is 58.22 compared to 60.58 for the top 10 universities websites. The highest value is registered by the University of Medicine and Pharmacy of Târgu Mureș - 76.6, while Stanford University website has a value of 64,9. Eight Romanian universities registered Performance values higher than 64.9, mainly due to the fact that according to Ookla Net Index published in April 2015, the average download speed of fixed broadband connections in Romania is 72.15 Mbps, the third highest in the world, after those in Singapore and Hong Kong and nine cities in Romania are among the top 15 cities in the world with the highest download speed of fixed broadband internet connections.

The Accessibility component evaluates usability, internationalization (if content language is defined), sharing options and mobile compatibility**.** The average Accessibility value for Romanian public universities is 36.6 compared to 61.04 registered by the top 10 universities. The highest value for accessibility registered by a Romanian university is 64.8 ("Al. I. Cuza" University Iasi) compared to 93, the accessibility value of Stanford University website.

The highest difference was registered in the accessibility component, mainly due to the fact that many Romanian universities don't have mobile responsive websites.

4.1. Content analysis

Considering that manual website evaluation provides more details that automated testes, the content analysis was done manually, by accessing each one of the 43 universities websites which had an English version in order to determine if the content they publish on their website corresponds with the

information needs listed by students in the 2014 E-Expectations Report - The Online Preferences of College-Bound High School Seniors (2014).

The list resulted from the study was used as coding unit, and the research team took into consideration the different translations and adaptation for each of the terms, for example, the coding unit "academic program listings" was also presented on universities websites under "study programs", "educational offer", "academics", "academic programs", "education offer" or "study programmes". The content of these sections varied from specific academic programs addressed to English speaking students to presentations of all faculties and programs regardless of the language requirements.

The coding unit "cost" was translated as "tuition fees", "taxes", "study fees" or "tuition & fees" and included specific information regarding the fees and the ways to pay them.

The next two coding units, "scholarships" and "financial aid" were used as such with most of the websites providing no or limited information regarding those aspects, and when they did, the information was included in the menu referring to "tuition and fees".

The "academic program details" were used as such, most of the websites providing no information on homepage.

The coding unit "housing details" appeared most often as "accommodation" and included information about the university campus.

The coding unit "enrollment/admissions information" was also found under "admission information", "entrance examination" or "admittance" and it was the section included in most universities websites providing information, documents and links to governmental bodies involved in the admission process. One university presented the admission information under the menu "useful information" and another under "students". Three of the universities included in the study presented outdated information, referring to the admission for 2015 academic year.

The coding unit "student life information" was found as such or under "student info" and most often included information on students associations and on and off campus facilities.

All university's websites included a section in the main menu for research.

The extensive content research revealed that 88.4% out of the 43 English version websites included in the analysis were exact replicas of the Romanian language websites, providing the same structure and the same type of information.

Nine universities, representing 20.9 % only had the menu of the website in English or had the information presented both in Romanian and in English.

Table 2: Content analysis results

Coding unit	Academic program listings	Cost/fees	Scholarships	Financial aid	Academic program details	Housing details	Enrollment/ admissions information	Student life information
No of universities	28	10	5	1	10	4	31	14
Percent	65.1	23.3	11.6	2.3	23.3	9.3	72.1	32.6

Out of the 43 university websites analyzed, 3 covered 6 out of 8 coding units, 2 covered 5 out of 8 coding units and 8 covered 4 coding units, while the rest of 30 websites covered between 0 and 3 coding units. The websites which only had the menu in English and the subsequent information in Romanian were included in the 0 coding unit category.

Out of the 5 university websites which covered between 5 and 6 coding units, 2 are Medicine and Pharmacy Universities which is correlated with the statistical results showing that the highest percent of students from abroad are studying in the" health and welfare" fields.

In the same cluster of universities that covered between 5 and 6 coding units, 4 of them had SEO and Performance scores higher that the average value resulted through the analysis conducted with the automatic website evaluation tool, which was 46.54 for SEO and 58.22 for Performance. The result regarding the Content, in terms of the analysis conducted with the automated tool was somewhat surprising, as 3 of the university websites that cover 5 or 6 coding units, registered values under the average (31.4), proving once again the necessity to use manual evaluation alongside automated tools.

The manual content analysis conducted on the first 10 universities ranked in Webometrics Ranking of World Universities revealed that 9 of the 10 universities covered 5 or 6 coding units, and one covered 4 coding units. All universities covered "academic program listings", "financial aid" and "enrollment/admissions information" on their homepage. One relevant element in the content of the homepage was the fact that all 10 universities had a section entitled "alumni" an aspect often overlooked by Romanian universities.

Conclusions, Limitations, and Future Research

The world of higher education has dramatically changed in recent years and Internet technologies are playing a key role in this transformation. Considering the decision making process of foreign students in search of study abroad programs, the university website and the overall online marketing strategy become a key element of the enrollment process.

This particular research shows that although, the number of international students enrolled in Romanian higher education institutions has been on a steady increase for the past 7 years, there is still room for improvement in terms of online communication with prospective students.

On the positive side, the fact that 88% of all Romanian public universities have an English version of their website, shows an increased interest toward internationalization; and the fact that 19 university websites registered SEO values above the average and 8 university websites registered SEO values higher than 60.5, which is the highest value for a university website in the 10 ten ranking reveal that universities are beginning to understand the need to be visible and to perform online and invest accordingly. In terms of Content, Design and Performance 19 of the university websites analyzed registered values higher than the average for Romanian universities and in terms of Accessibility, 15 university websites were above the average.

The content analysis revealed that 88.4% of the websites were exact replicas of the Romanian version websites in terms of structure and content; plus, there are different translations of the same term, which can have a negative impact in terms of search engine optimization.

The first limitation of the research comes from the lack of specific statistical data regarding the number of international students enrolled in each university in order to be able to make explicit correlations.

The second limitation refers to the content analysis manual evaluation performed on universities websites as the websites are dynamic and can suffer consistent modifications both in structure and content since the research was conducted.

Our future research will focus on the integrated online marketing strategies implemented by public universities and will cover not only their website communication, but social media communication as well.

Acknowledgement

This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation, CNCS/CCCDI – UEFISCDI, project number PN-III-P2-2.1-PED-2016-0689, within PNCDI III.

References

Al-Juboori, A. F. M. A., Na, Y., & Ko, F. (2011), 'Web Site Evaluation: Trends and Existing Approaches', *Networked Computing (INC)*, The 7th International Conference, IEEE, pp. 155-160.

Alexa, E.L., Alexa, M., Stoica, C.M. (2012), 'The Use Of Online Marketing and Social Media In Higher Education Institutions in Romania', *Journal of Marketing Research & Case Studies*, ISSN: 2165-7009.

Apperson G. (2015), 'How University Websites Portray Study Abroad', *Elon Journal of Undergraduate Research in Communications*, Vol. 6, No. 2.

Ataloglou, M., & Economides, A. (2009), 'Evaluating European Ministries' Websites', *International Journal of Public Information Systems*, 5(3), 147–177.

Berntzen, L., & Olsen, M. (2009), 'Benchmarking E-government- A Comparative Review of Three International Benchmarking Studies', *Digital Society, ICDS'09. Third International Conference on IEEE*, 77-82.

Bishop, S. C. (2013), 'The Rhetoric of study abroad: Perpetuating expectations and results through technological enframing', *Journal Of Studies In International Education*, 17(4), 398-413.

Brajnik, G. (2008), *Beyond Conformance: The Role of Accessibility Evaluation Methods*. S. Hartmann et al. (Eds.): WISE 2008, LNCS 5176, pp. 63–80, 2008, Springer-Verlag Berlin Heidelberg.

Deca L., Egron-Polak E. & Fiţ C. R. (2015), 'Internationalisation of Higher Education in Romanian National and Institutional Contexts' in Curaj et. al (Eds.) *Higher Education Reforms in Romania - Between the Bologna Process and National Challenges,* pp. 127 – 147, Springer.

Dingli, A., & Mifsud, J. (2011), 'USEFul: A Framework to Mainstream Web Site Usability through Automated Evaluation', *International Journal of Human Computer Interaction* (IJHCI), 2(1), 10.

Dominic, P., & Jati, H. (2010), 'Evaluation Method of Malaysian University Website: Quality Website Using Hybrid Method', *Information Technology (ITSim), 2010 International Symposium, IEEE*, 1, 1-6.

E-Expectations Report - The Online Preferences of College-Bound High School Seniors and Their Parents - https://omniupdate.com/_resources/pdfs/research/2014_eexpectations.pdf accessed July 2016.
EUROSTUDENT.eu (2016), http://www.eurostudent.eu/download_files/documents/EV_IB_mobility_obstacles.pdf accessed July 2016.

Eurostat (2016), Education and training in the EU - facts and figures.

Graduate Management Admission Council - mba.com Prospective Students Survey 2015, http://www.gmac.com/market-intelligence-and-research/research-library/admissions-and-application-trends/2015-mbacom-prospective-students-survey-report.aspx accessed July 2016

Ivory M. Y. (2003), *Automated Web Site Evaluation: Researchers' and Practioners' Perspectives*, Springer Science.

Kehm B. M., & Teichler U. (2007), 'Research on Internationalisation in Higher Education', *Journal of Studies in International Education*, Vol. 11 No. 3/4, pp. 260-273.

Kim I., & Kuljis J. (2010), 'Applying Content Analysis to Web-based Content', *Journal of Computing and Information Technology* - CIT 18, 4, 369–375

Koehler W. (1999), 'An Analysis of Web Page and Web Site Constancy and Performance', *Journal of the American Society for Information Science,* 50(2), pp. 162–180.

Krippendorff k. (1980), *Content analysis: An Introduction to its Methodology*, Sage Publications, London, 1980.

Lukosius, V., Festervand T.A. (2013), 'Marketing Study Abroad Programs: A Student Recruitment Model', *American Journal Of Business Education*, Volume 6, Number 5, pp.483-493.

Mcmillan S.J. (2000), 'The Microscope and the Moving Target: The Challenge of Applying Content Analysis to the World Wide Web', *Journalism and Mass Communication Quarterly*, 77(1), pp. 80–98.

Noruzi, A. (2006), 'The Web Impact Factor: A Critical Review', *The Electronic Library*, 24(4), pp. 490-500.

Olsen, M., Nietzio, A., Snaprud, M., Fardal, F. (2009), 'Benchmarking and Improving the Quality of Norwegian Municipality Web Sites', *Automated Specification and Verification of Web Systems*, 115.

Quinn, P. (2013), 'Consistent Website Experiences with Intuitive Navigation', *Higher Education Marketing*, http://www.higher-education-marketing.com/blog/intuitive-navigation.

Rumbley, L. (2012), 'So many data, so little clarity' in J. Beelen & H. De Wit (Eds.), *Internationalisation Revisited: New dimensions in the Internationalisation of Higher Education,* pp. 125-134. Amsterdam, The Netherlands.

Sharp, L. (2001), 'Positive response action: The ultimate goal of website communication', *Journal of Communication Management*, 6(1), 41-52.

The World Bank Europe and Central Asia Region (2011), Romania Functional Review - HIGHER EDUCATION SECTOR.

UEFISCDI. (2013), *Internationalisation of higher education in Romania,* Bucharest. http://www. politici-edu.ro/wp-content/uploads/2013/10/Internationalization-of-HE-in-Romania.pdf.

UNESCO Institute for Statistics - Global Education Digest 2012- http://www.uis.unesco.org/Education/GED%20Documents%20C/GED-2012-Complete-Web3.pdf accessed July 2016

Urban G. L., Sultan F., Qualls W. J. (2000), 'Placing trust at the center of your Internet strategy', *Sloan Management Review*, vol. 42, no. 1, pp. 39-48.

Vardhan J. (2015), 'Internationalization and the Changing Paradigm of Higher Education in the GCC Countries', *SAGE Open*, Vol. 5, Issue 2.

Zahran D. I., Al-Nuaim H. A, Rutter M. J, Benyon D. (2014), 'A comparative approach to web evaluation and website evaluation methods', *International Journal Of Public Information Systems*, Vol 10, No 1, pp. 21-39.

www.webometrics.info/en/Europe/Romania accessed July 2016

Comparison of the Methods of Rating Universities

Velichenkova D.S. Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russia, velichenkova_ds@spbstu.ru
Rodionov D.G. Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russia, rodion_dm@mail.ru
Skhvediani A. E., Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russia, shvediani_ae@spbstu.ru

Abstract

Currently, the high efficiency of the university in Russia and beyond is the most important and desirable for achieving indicator. There are many ways to evaluate performance: different internal methods and international ratings. Most of the available methods are not exhaustive, and not many of them consider the effectiveness of the university from the position of the labor market. The analysis was carried out through comparison of methodologies and ratings in order to assess the effectiveness of universities. Conclusions are drawn with intention of converting the elaborations in future research more complex and reasonable models for assessment of university performance.

Keywords: efficiency, economic efficiency, efficiency of the university, ratings of universities, methods of evaluation of efficacy.

Introduction

The effectiveness of higher educational institutions is one of the most urgent topics for today, which are raised by both the scientific community and representatives of the state executive power. The quality of educational services, their correspondence to the real needs of the economy and society, the level of competitiveness of Russian education in comparison with foreign ones, the level of practical applicability of the knowledge of competencies that students receive, the social and educational functions of universities, the place of universities in the economy of cities, the country and the economy in in general, only some areas of discussion within the framework of this topic.

Since there is no consensus both in Russian and foreign literature on the method for conducting assessment of university effectiveness, we believe that it is reasonable to contribute to the scientific field comparison of different approaches in order to create in future research basis for elaboration of one methodology, which will cover all the angles.

Literature Review

This paragraph is dedicated to the description of different methods and methodologies, which are used for assessment of university socio – economic performance. This overview provides detailed information, concerning each discovered methodology.

In Russia, all universities are obliged conduct self assessment of their effectiveness. The methodology is determined annually by the Ministry of Education. There are eight main groups of indicators: educational activity, scientific activity, international activity, financial activity, salary of the teaching staff, graduate employment, student contingent and some additional parameters. These indicators are intended to describe the general activities of universities, but do not reflect the level of efficiency and effectiveness of the university.

The methodology for assessing the socioeconomic impact of the University of Birmingham applies the latter to assess the impact of the university on the city, region and country as a whole. A distinctive feature of this approach is that it is not so much an assessment of the effectiveness of the

organization's activities as an assessment of the impact of this organization on the life of the city and the region. In total, the assessment is conducted according to six main parameters: the university as a teacher; as an employer; economic effect of the university; as a research hub; as an international gate; as a neighbor.

THE World University Rankings - until 2010, a global study and the accompanying rating of the best higher education institutions of world importance. The level of achievements of universities is assessed based on the results of a combination of statistical analysis of their activities, audited data, as well as the results of an annual global expert survey of representatives of the international academic community and employers who express their views about universities. The criteria for selecting experts for the survey is scientometric analysis of productivity and citations, as well as teaching and research activities in higher education institutions for more than 16 years, the availability of at least 50 published scientific papers and other criteria. The analysis of the activities of higher education institutions consists of 13 indicators. The main evaluation criteria are international student and teaching mobility, the number of international scholarship programs, the level of scientific research.

Model of the quality management system in accordance with the international standard ISO Assessment of compliance with the expectations of the consumer in terms of the performance of the educational institution, in the context of the training of professionally trained specialists.

Model EFQM (European Foundation for Quality Management) is a model of the European Fund for Quality Management, designed to encourage organizations to improve the quality of products and quality of management. The fund was established in 1987 by 14 leading European companies.

The rating of the best universities of the world (QS World University Rankings) is the global rating of the best educational institutions of the world in terms of their achievements in the field of education and science. Calculated by the methodology of the British consulting company Quacquarelli Symonds (QS). The rating evaluates the universities in terms of the following indicators: the activity and quality of research activities, the opinion of employers and career potential, teaching and internationalization. As a result, the rating of the top 500 universities in the world is made, as well as the ratings of universities in separate disciplines. The level of achievements of universities is assessed based on the results of a combination of statistical analysis of the activities of educational institutions, audited data (including information on the citation index from the Scopus database, as well as data from the global expert survey of representatives of the international academic community and employers who express their opinions about universities

Some authors assess the effectiveness of the university as a contribution to the economy, for example, Breznitz & Feldman (2012) suggest that there are five different roles that can be implemented by the university: economic initiatives, policy development, knowledge transfer, teaching and basic research. In the course of their research, the authors tried to systematize the practice of universities in the United States, aimed at assessing their contribution to the economy.

The work of Kelly, McNicoll & White (2014), for example, was devoted to the question of assessing the impact of universities on the UK economy, including such indicators as direct incomes, expenditures, impact impacts on the economy, the additional influence of foreign students and visitors, the contribution of higher education to gross domestic product of the UK and the effectiveness of spending on higher education to ensure economic activity.

The Russian author Rivchun TE (2010) in his article suggests assessing the university by calculating the integral efficiency, identifying key areas of effectiveness.

Author Gurtov V.A. (2012) suggested to calculate the efficiency of activity of high school graduates from the standpoint of employment, taking into account supply and demand in the labor market. In Russia, this factor influencing employment has a stronger impact than in countries with developed market economies, since the infrastructure of a market economy is less developed.

Key Results

It is proposed to review the methodology and evaluation ratings from position of problem areas identification. The following parameters have been selected: assessment of the effectiveness of the university (self-examination), from the position of the person (Student, entrant, graduate), from the position of the state (how the state regulates and influences this technique), from the position of the labor market.

Analyzing the existence of aspects that affect the effectiveness of the university in connection with changes in the labor market, which is developing quite rapidly, the authors consider it advisable, since universities are modern centers of innovation, graduates have more specific skills and are able to compete in the labor market, which makes it change. The development of the market for the provision of educational services significantly increases the competition between higher education institutions. This raises the need for more effective management and use of their logistical, labor and financial resources.

The authors offer a comparative analysis of methodologies and ratings, both domestic (Russian) and international, for compliance with these parameters (Table 1).

Table 1: comparative analysis of methodologies and ratings

Method name	State	Human	University	Labor market
Methodology for assessing entrepreneurial activity of budget educational institutions (according to MV Niyazova)			+	
Methodology for assessing the organizational effectiveness of non-profit organizations (J. Gibbson, J. Ivantsevich)				+
Methodological recommendations on the evaluation of the effectiveness of budget expenditures in the field of education and monitoring of the expenditure of budget funds by managers and recipients of budgetary funds (ANO "National Agency for the Development of Qualifications")	+	+		
Higher education institutions rankings by specificity and category		+	+	
Model of the European Foundation for Quality Management (EFQM) in the modification for higher education			+	
Model of the quality management system according to the international ISO standard				
Licensing and accreditation Monitoring of accreditation indicators	+	+	+	
THE World University Rankings	+	+	+	
QS World University Rankings	+		+	
The method of calculating the integral indicator of the evaluation of the effectiveness of an educational institution (Rivchun TE)			+	
Methodology for assessing the socioeconomic impact of the University of Birmingham	+			+
"Technique and technology of measuring" quality of the university "as the basis for the system of			+	

regular rating of Moscow universities"				
Methodology for assessing the effectiveness of higher education institutions of the Ministry of Education and Science of the Russian Federation	+		+	+

Discussion

Most of the methodologies considered assess the effectiveness of the position of the university. This is almost all methods that involve rating, calculation of an integral indicator, licensing and accreditation. There is also a lack of methods that assess the effectiveness of an educational institution from the position of a person (an applicant, a student, a graduate).

It can be seen that the Russian methodologies are mainly aimed at assessing the university in terms of meeting the needs of the state, as well as the satisfaction of applicants and students. International methods encourage universities to conduct self-examination.

At the moment, there are few methods aimed at the labor market. The university is a stable operating system, however, in the conditions of developing new technological structures, when the regional economy requires more and more qualified specialists, the university needs to focus on the labor market, and labor market performance indicators should be evaluated and taken into account in the efficiency evaluation system.

Institutions of higher professional education are the main element of training personnel for building a new economy and transforming society. Their effective functioning is a necessary condition for obtaining qualified personnel whose competencies and knowledge meet modern demands of the economy.

Conclusion

On the basis of the analysis given by the authors, it becomes obvious that the existing methods of evaluation and rating are not perfect, they do not have institutionalized and tested criteria on which reliable indicators can be constructed that measure the social and economic effectiveness of the university. Therefore, it is necessary to develop a more complex methodology, which would include the evaluation of the university in terms of employing graduates. Investigating this aspect, the methodology should take into account the indicator of the employment of graduates (including in the specialty), the regional economy's need for cadres. Having such data, the university will be able to improve its efficiency by taking correct management decisions.

References

Gurtov V.A., Serova L.M., Fedorova E.A. (2012) “Efficiency of Higher Education Institutions from the Position of Employment of Graduates” *Higher Education in Russia.* № 12. P. 22-28.

Rivchun T.E. (2010) “Scientific and methodological approaches to assessing the effectiveness of the university” *Magazine Tools plus*.№3T

Rodionov, D. G., Rudskaia, I. A., & Kushneva, O. A. (2014). “How key Russian Universities advance to become leaders of worldwide education: Problem analysis and solving.” *World Applied Sciences Journal*, 31(6), 1082-1089.

Rodionov, D. G., Fersman, N. G., & Kushneva, O. A. (2016). Russian Universities: Towards Ambitious Goals. *International Journal of Environmental and Science Education*, 11 (8), p. 2207-2222.

Rodionov, D. G., Fersman, N. G., & Kushneva, O. A. (2014). "Credibility of the Russian higher education in the world: Problems and solutions." *Life Science Journal*, 10(11), 43-47.

Rodionov, D., Yaluner, E., & Kushneva, O. (2015). "Drag Race 5-100-2020 National Program." *European Journal of Science and Theology*, 11(4), p.199-212.

Rodionov, D. G., Rudskaia, I. A., & Kushneva, O. A. (2014). "The importance of the university world rankings in the context of globalization." *Life Science Journal*, 11(10), 442-446.

Managing the Architecture of Life-Cycle Processes Of Unique Technical Objects

Valery Maslennikov, Doctor of Economic Sciences, Professor, Academic department of Management theory and business Technology, Plekhanov Russian University of Economics, Moscow, Russia, vvmaslennikov@gmail.com

Irina Kalinina, Ph.D. in Psychology, Associate Professor, Academic department of Management theory and business Technology, Plekhanov Russian University of Economics, Moscow, Russia, Kalinina309@yandex.ru

Abstract

The aim of this article is to explore the approaches to to the construction of a system for managing life cycle processes of unique technical objects – space systems regarding to the constant development of complex projects operating technologies. The main attention is paid to the features of the transition from an enterprise administrating to management of a unique objects (a chain of creating space systems) creating cooperation based on life processes control of the space object. The article includes the analysis of application of normative costs calculating methods, calculated to a unit of useful result of a space system at its full life cycle stages using program facilities for processing data base and statistic material of implemented programs and projects.
Recommendations on using the methodology of life cycles system engineering to a solving of a target aim of locating methodology PLM to an object of a "system of systems" are based on studying Roscosmos and NASA experience on system engineering and life cycles of space systems strategy planning and are given in this article.
The research results are directed on solving a problem of complex space systems administration reorganization with building the architecture of financial and economic management of life cycles of space systems (including ground-based and orbital components).

Keywords: the architecture of life-cycle processes, unique technical objects, space systems, strategy planning, space systems cost.

Introduction

Space industry is having a restructuring of management now. The principal approaches to building the architecture of financial and economic management of life cycles of space systems (including ground-based and orbital components) are being reconsidered. The reason is that the problem of estimating the value of unique objects – space crafts as products/technical items of various applications has not been solved.

So when calculating the cost of the result for the state customer, specific consumptions on the volume of the transferred communication data, sq.km of shooting and other natural instruments of measuring the result parameters are not considered. For example, at increase in need for data transmission the volume of processing of of telemetric parameters of orbital SC (spacecraft) monitoring exponentially grows at the same time, and that demands new investments into the technologies of a ground-based complex of management and reception.

The problem becomes even more complicated in managing since estimation of cost of space systems (further SS) not solved.

The existing pricing methods on purchases of SC by the state:

1) do not provide effective control of cost of SC depending on the useful result of use of SC (result parameters);

2) do not provide preservation and development of assets of the enterprises and organizations creating SC;

3) do not lean on cause and effect relationships in processes of practical increase of expenses in process and following the results of implementation of the SC projects.

Relevance of the Research

The analysis of space branch from the point of view of management showed importance of two directions of researches - risk management and management of technologies, from the point of view of increase in efficiency of business operations and receiving the state support of new businesses creation [1].

Definition of basic elements of process design that has to consider the changed economic conditions in Russia and give abilities to integrate into national economy for space industry presented in publication [2, pp. 90-98]. The similar research of economic management for space industry presented in publication [3, pp. 80-89]. At the same time it is proved that the over expenditure of means negatively affects reputation of project management and it is required to minimize this effect by means of training of future managers of economic administration instruments.

Many researches are dedicated to intellectual systems and technologies. So, V.O. Karasev and V.A. Sukhanov [4, pp. 142-147] open use of intellectual systems and technologies in a modern control system of life cycle of a product on the basis of a multi-agent program system. The similar result presented in publication [5, pp. 70-79, 6, pp. 387-398]. Life cycle of a product is also investigated from the point of view of business models efficiency [7].

Research conclusions [8, pp. 271-282] concerning a problem of the choice of spacecrafts durability in the conditions of the reduced starting price and at various costs of durability models are of special interest. In a research study mention that the cost of long-term use of SC includes the increased risk of retardation of technology owing to a progressive tense of the updating of technology leading to loss of cost and competitive advantages. Practical aspects of management of life cycle of spacecrafts it is stated in material of NASA [9, 10, 11].

At the same time, the technique of more exact assessment of costs of obtaining the result, useful to the state, from use of KS (the volume of the transferred data, the areas of photographing, etc.), taking into account the decomposition of objects/works/cost on a systematic basis with coordination of an orbital and ground-based component of obtaining the set result volume from space system is necessary.

The task - to approach formation of reference books, specifications, the integrated database on SS of different function then it will be possible to use standard methods of forecast/calculation of costs of SS on unit of useful result, on all stages of its life cycle, based on use of software for processing of databases and statistical material according to already realized programs and projects is in the long term set.

Besides, it is about support of unification and standardization of space components and platforms based on which SS of different function are created. On the example of the spacecraft unification concerns, for example, the following decisions:

- the unified execution of the basic functional and structural elements;
- uptight execution of a design on the basis of cellular panels;
- providing the thermal modes with use of thermal pipes;
- high-precision provision of orientation and stabilization by means of astrodevices, a complex of the operating dynamic engines flywheels (COEF);
- use of the electroreactive engine system with a high specific impulse providing long functioning of the small space crafts (SSC) at limited stocks of mass of working fuel and high purity of own atmosphere of SS;

• use of highly effective arsenide-gallium heterostructural photoconverters for solar batteries;
• use of the command radio line compatible to the State ground-based automated complex of management of the Russian Federation.

Contents of the Study

We consider management of life cycle of unique technical objects as the actions connected with the organization of targeted transition of system from one state to another within life cycle. In relation to space industry, it means that in the management process the problem of conditions combination of stages of life cycles of orbital group with ground-based technical complexes in the conditions of uncertainty based on the feasibility study is being solved.

The scientific problem of creation of processes architecture of life cycle of unique technical objects - space systems is that the orbital complex includes the small spacecrafts (SS) and ground-based objects a part, having the essential features. So, SSC possess the life cycle consisting of the ground-based and flight stages differing in complexity of the project of creation of SSC – from the specification to creation of an object, complexity of service conditions and start of an object, impossibility of maintenance and regular repair, etc.

Life cycle of a land part passes through modernization stages that change characteristics of objects and their technical capabilities in use.

Now there is no uniform representation of understanding of system of economic management of life cycle of space systems, the technology of information support of life cycles of orbital and ground-based components is not defined.

As the customer of useful result from the state speaks on behalf of space industry is the state, and it is the owner of assets of space systems, there is a task of economic management of the useful result unit cost received from SSC on condition of preservation, modernization and development of objects of land infrastructure.

Therefore, the state customer cannot estimate objectively required expenses and terms of creation of SSC, and modernization of objects of land infrastructure now.

The solution of this problem is possible with use of intellectual PLM technology (Product Lifecycle Management). It is offered to develop actively by analogy with the technical directions having the general or chief designer of the chief architect of space systems given authority to organize a control system of life cycle of the making space systems by means of interaction of all participants of creation, operation and development of MC (managing committees) (fig. 1).

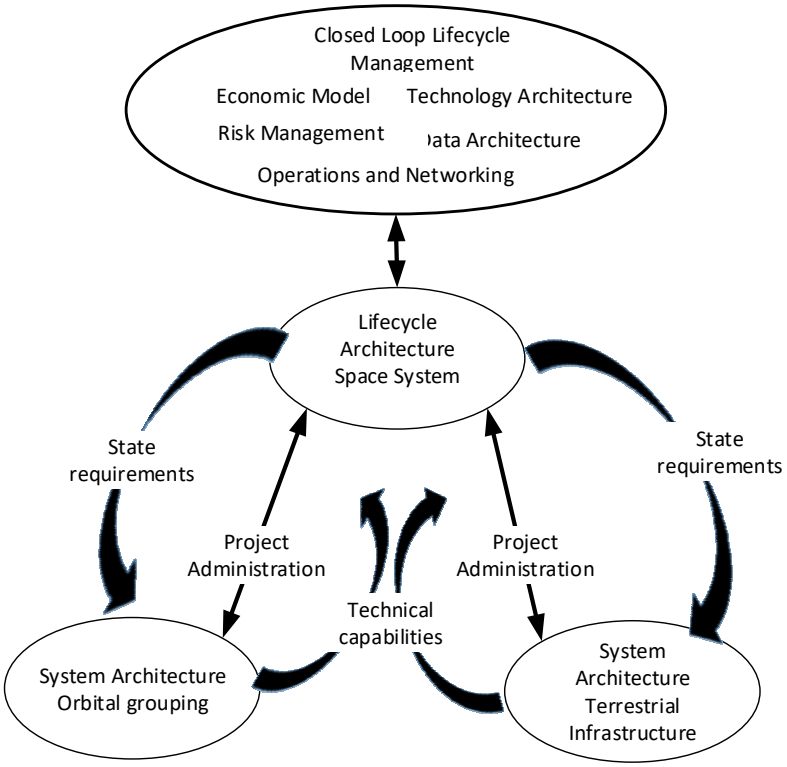


Fig. 1: Architecture of lifecycle management of space systems

Management of SS cost at all stages of its life cycle includes:

1) formation of the budget project (budget planning of the project),
2) an investment assessment in maintenance and development of the assets necessary for realization of the state purposes in space branch,
3) pricing on SS,
4) examination (check of definition reliability) of the cost of materials, knots and components necessary for SS creation,
5) cost formation of SS,
6) cost control of process of implementation of the KS project,
7) analysis of the actual expenses (SS cost).

At creation of architecture of processes of life cycle of unique technical objects - space systems it is also required to consider that technologies of management of complex projects continuously develop. In world practice the integrated teams the providing collaboration of the customer, parent organization, the contractor and producers of knots and units at a stage of development of a concept and design of unique objects begin to be applied. It allows giving more precise estimation of the cost of unique objects at early stages of their creation.

At the same time one should mean that in recent years actually there was a transition from business management to management of cooperation of creation of unique objects (a chain of creation of KS), and also transition from release of a product - to management of life cycle of an object.

1. Considering the fact that the methodology of traditional system engineering is focused on a product and a control system of life cycle of a product it is necessary to solve a target problem of localization of methodology of PLM to a "system of systems".

At the same time as a product in engineering of life cycle not the technical product – the spacecraft, and composite heteroton "System of systems - in the form of the space system (SS)" is considered. In world practice importance of study of methodologies of "System of systems" is realized, recognized on flowing the moment priority for researches and developments in hi-tech spheres of action.

2. To determine parameters of the state order for creation of SC (criterion function of the project for the state customer), for example, result for the state – the SS concrete parameters for all term of its active existence.

3. To create approach to pricing methods on SS taking into account the space and land making obtaining useful result KS (criterion function for the state customer). For this purpose to include methodology of calculation of justification of cost of services of orbital and land components in summary calculation of cost of SS.

4. In the course of government procurement to use complex contracts for the KS components determining the cost of unit of useful result for all length of life of SS taking into account the cost of services of the space and land components presented in operational architecture of space systems (by an example of NASA). For this purpose it is possible to use as examples of stages of life cycle of SC the decisions on system engineering stated in handbook of NASA and ESA (fig. 2).

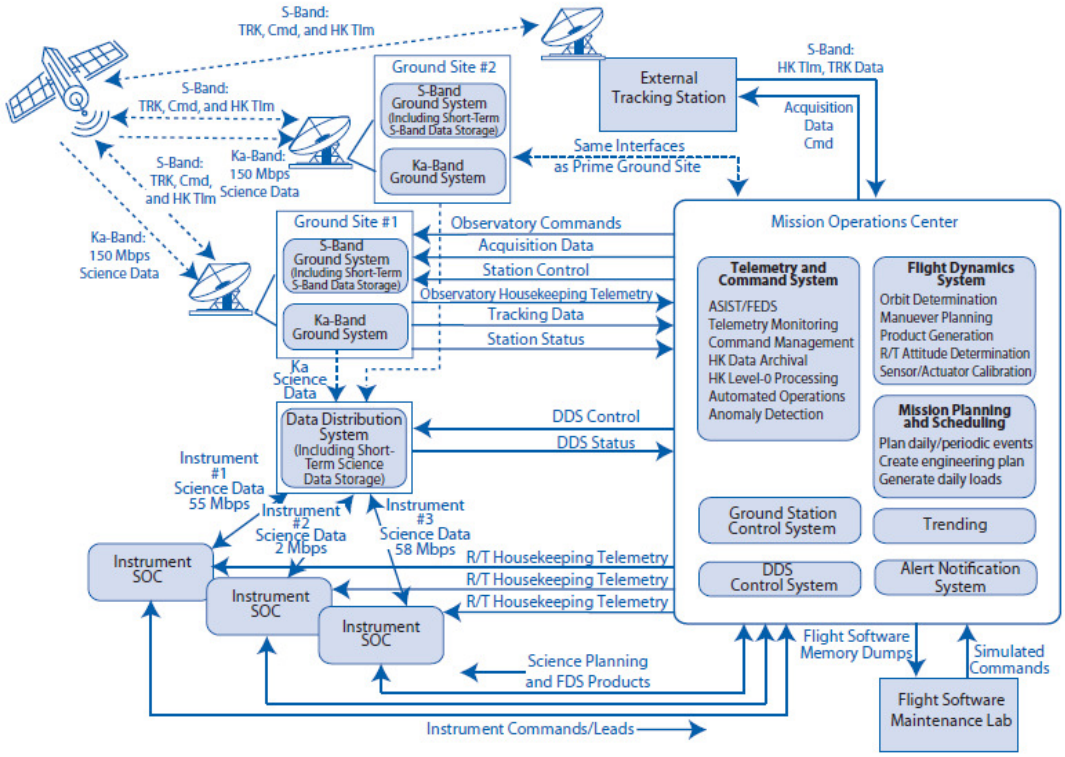


Fig. 2:Example of an associated end-to-end operational architecture [9, p. 36]

5. The end of technology of creation of processes of life cycle of unique technical objects - space systems is offered to be finished in the handbook "Architecture of System of Financial and

Economic Management of Processes of Life Cycle of Space Systems (including Land and Orbital Components)" format which turns on the following modules:

• localization of methodology of system engineering and management of life cycle in relation to the considered type of objects – space systems;

• an assessment of results of creation and use of SS on the basis of the concept "space systems cost" including grouping of spacecrafts, launch vehicles, a fairing, accelerating modules, a land part - a) the flights control center (FCC), b) reception stations + all objects necessary for correction of spacecrafts, c) other objects of a complex;

• the model/scheme of pricing on SS on unit of useful loading / useful result taking into account direct costs on creation of SS and distribution of the general expenses of orbital and ground-based complexes and their integration among themselves;

• system model of management of SS cost at all stages of life cycle of SS (process and cost design);

• procedures of coordination of decisions on pricing in space branch with a state orders for SS according to the current legislation;

6. As an expedient form the organization of the project of development of the decision to choose a form of cross-functional design group of profile specialists in a target task.

Conclusion

The carried-out analysis showed the need to develop system engineering of SS more actively that provides a solution of the problem of management of life cycle of the ground-based equipment and an orbital component of SS. For justification of a control system of life cycle of SS it is necessary to solve a problem of a combination of operating activities of SC and an assessment of a condition of a ground-based part.

The offered approach will allow proving the conclusion of contracts for purchase of the SS components for the state needs taking into account formation of technological platforms, based on the choice of the conteractors and subcontractors providing preservation and development of their assets potential. It is for this purpose possible to use a technique of the summing up sliding on time costs of the SS project at early stages of its life cycle and definition of the rest of investment before end of the project.

Besides, there is a need for further development of a scientific methodological support of creation of architecture of processes of life cycle of unique technical objects - space systems. In particular, the Agency of strategic researches [4] predicts the need for a profession "The designer of life cycle of space constructions" which can appear until 2020. This profession means activity of the specialist in design of space constructions (stations, satellites, etc.) taking into account problems of their modernization, reorganization and utilization. It is emphasized that demand for these experts arises in the next years in connection with more intensive development of near-earth space and renewal of plans for colonization of the Moon and Mars.

References

1. Naoko Kishi. Management analysis for the space industry. Review Article. Space Policy, In Press, Corrected Proof, Available online 24 March (2017).
2. Yuri Makarov, Dmitry Payson/ Russian space programmes and industry: Defining the new institutions for new conditions. Original Research Article/ Space Policy, Volume 25, Issue 2, May (2009).
3. W. Peeters, B. Madauss. A proposed strategy against cost overruns in the space sector: The 5C approachOriginal Research Article. Space Policy, Volume 24, Issue 2, May (2008).
4. V.O. Karasev, V.A. Sukhanov. Product Lifecycle Management Using Multi-agent Systems Models Original Research Article. Procedia Computer Science, Volume 103 (2017).
5. Molly K. Macauley. The supply of space infrastructure: Issues in the theory and practice of estimating costs. Original Research Article. Space Policy, Volume 24, Issue 2, May (2008).

6. Xiao Song, Bo Hu Li, Xudong Chai. Research on key technologies of complex product virtual prototype lifecycle management (CPVPLM). Original Research Article. Simulation Modelling Practice and Theory, Volume 16, Issue 4, April, (2008)
7. John Lindström, Magnus Karlberg. Outlining an overall Functional Product lifecycle – Combining and coordinating its economic and technical perspectives. Original Research Article. CIRP Journal of Manufacturing Science and Technology, In Press, Corrected Proof, Available online 9 September (2016)
8. Kailah B. Snelgrove, Joseph Homer Saleh. Toward a new spacecraft optimal design lifetime? Impact of marginal cost of durability and reduced launch price. Original Research Article. Acta Astronautica, Volume 127, October–November (2016).
9. NASA Systems Engineering Handbook. NASA/SP-2007-6105 Rev1. - National Aeronautics and Space Administration, NASA Headquarters, Washington, D.C. 20546, December 2007, p. 340.
10. NASA Strategic Management Handbook. - National Aeronautics and Space Administration, Washington, DC 20546, October 1996, p. 51.
11. NASA Systems Engineering Handbook. SP-610S. - National Aeronautics and Space Administration, NASA Headquarters, Washington, D.C. 20546, June 1995, p. 152.

Knowledge Based Design of Mechanical Engineering Products

Jakub Jirasko, University of West Bohemia, Pilsen, Czech Republic, jirasko3@kks.zcu.cz
Antonin Max, University of West Bohemia, Pilsen, Czech Republic, antoon@kks.zcu.cz
Tomas Keckstein, University of West Bohemia, Pilsen, Czech Republic, tomkec@kks.zcu.cz

Abstract

This paper deals with knowledge based designing of classic mechanical engineering products. This approach to machine design allows acceleration of the design process. Using the knowledge also reduces the number of poor quality products and reduces the time of manufacturing. In addition it saves money in all phases of the product lifecycle.An example of knowledge based (project database) designing is introduced. The example used is a press tool for serial production in the automotive industry. The strategy which is used to create a 3D CAD model is also introduced in the paper.

Keywords: Machine Design, 3D model, CAD, Knowledge engineering, Knowledge based engineering

Introduction

Designers work in multidisciplinary environments with many constraints such as functionality, manufacturability, aesthetics, etc. The work of a designer is carried out in a competitive environment where industrial companies are constantly forced to speed up the development process while lowering the price of the final product. It puts considerable demands on company processes and process management. This article focuses on the design process that fundamentally affects all the following processes such as manufacturing processes, assembly processes and the successful launch of a product on the market. To enhance the efficiency of the designers' work, it is possible to involve and integrate Knowledge-Based Engineering (KBE) and Knowledge-Based System (KBS) into the design process. Knowledge-Based Engineering (KBE) can be defined as "The use of advanced software techniques to capture and re-use product and process knowledge in an integrated way" (Stokes, 2001). A certain analogy in this way of designing can be found even in Industry 4.0 which encourages the use of machines (software and control systems) to take on repetitive and simple activities that people have done so far. "Knowledge based engineering (KBE) stands at the cross point of diverse fundamental disciplines, such as artificial intelligence (AI), computer aided design (CAD) and computer programming" (Rocca, 2012).

A 3D CAD model allows full visualization of part geometry. "Engineers can draw more details and exact shapes in 3D, enabling them to consider the design from a multi-functional perspective" (Baba and Nobeoka, 1998). It also allows digital pre-assembly and it is a data source for many different simulations, computations and manufacturing processes (FEM - Finite element method, CAM – Computer aided manufacturing, rapid prototyping, etc.).

The key for repetitive design success is reusability of enterprise knowledge. Consequently it is necessary to have management of company knowledge which is integrating known practices with new technologies. "KBE is not suitable for all design tasks but this does not mean that it is not applicable to a wide variety of products. For example, if a product's design is heavily influenced by its style, then traditional methods may be more appropriate for completing the exterior styling" (Cooper et al., 1999). Which means that KBE, or KBS, cannot be used to their full extent for each type of product, but the basic principles can be

applied. The key pillars in the presented knowledge database and designing are a finished project database with strict CAD model strategy and project design guides.

"The identification of the appropriate approach to application development depends upon the particular application requirement. However, a structured method of development in which user requirements are carefully identified and used to drive the construction of the application architecture will help to ensure success" (Cooper et al., 1999).

3D CAD Model Strategy

What is a 3D CAD model? "The product model represents the engineering intent behind the product design, storing the how, why and what of a design. The product model is an internal computer representation of the product design process and can contain information on both the product and processes that go to create the part" (Chapman and Pinfold, 2001). "According to the typical methodological approach to practice KBE, before starting with the development of any KBE application, it is required to proceed, first, with the identification, then the acquisition and, finally, the codification of the relevant knowledge that will have to be embedded in the KBE application itself" (Rocca, 2012).

It is suitable to have a large number of similar characteristics to use KBE for CAD design. In an ideal case it is possible to build the CAD model to make it work as a "program" that will only be fed by the basic parameters. In this case, it is possible to program the CAD model to work almost like a knowledge based system (KBS). The only functional requirements are fed into the generative model. "The parts can have rules and methods applied to them, rules such as costing rules, stress rules and process rules" (Chapman and Pinfold, 1999). But this can only be used on models that differ merely on a small scale. However, in the press tool industry (which is used as an example of the simplified use of KBE), many parameters are varied on the basis of customer requirements and these may vary fundamentally in some cases. Therefore, a simplified model is applied. Subroutines, constrains and control tools parameters are created in the CAD model.

Example of Knowledge CAD Design and Project Database

The model of a press tool for serial production in the automotive industry is used as an example. These tools produce acoustic parts and carpets for cars. The press tool is usually made of solid blocks of material or from casting. This semi product of the tool is machined to its final shape. The press tool contains many unified parts that do not differ or differ only in basic dimensions. An example of a press tool model assembly is shown in figures 1 and 2.

The basic model is controlled by basic specifications, parameters and values, such as:

- external dimensions (height, width, length)
- wall thickness (in relation to used material)
- type of clamping system to the press
- heating/cooling type
- insulation type and thickness
- maximum weight of tool assembly
- type of guide system

- shape type of manufactured part (flat, complex geometry, etc.)

Firstly, it is necessary to carry out tasks such as "Capturing the information in the form of knowledge by putting the data in a specific context with attached rules, processes, and instructions" (Rezayat, 2000). In the case of press tools, the geometry forming the produced part (see the example in Figure 3) must be easily editable and interchangeable. For example, see the upper and lower tool surfaces in Figure 4. This is necessary due to frequent surface design changes by the customer. Another reason is that it is easy to use an existing 3D model to reproduce a new tool by simply changing the tool work surface. The interrelationships in the 3D model must be set so that when the 3D geometry is regenerated, the geometry will not crash. Crashes lead to challenging repair and problem-solving which must be addressed by the designer. In some cases some parts of the press tool are so specific that is not possible to automate the process. In these specific cases, expression with subroutines and parameters would be too hard, with doubtful results.

The "programmed CAD model" has to be accompanied by guides and guidelines so it is possible for the design to be easily reworked by any available designer. An example of another document allowing effective design work with such a model is the database of approved designs and technologies. The manual can be in the form of a structured PDF including a 3D model in PDF format. This makes it easier for new or beginning designers.

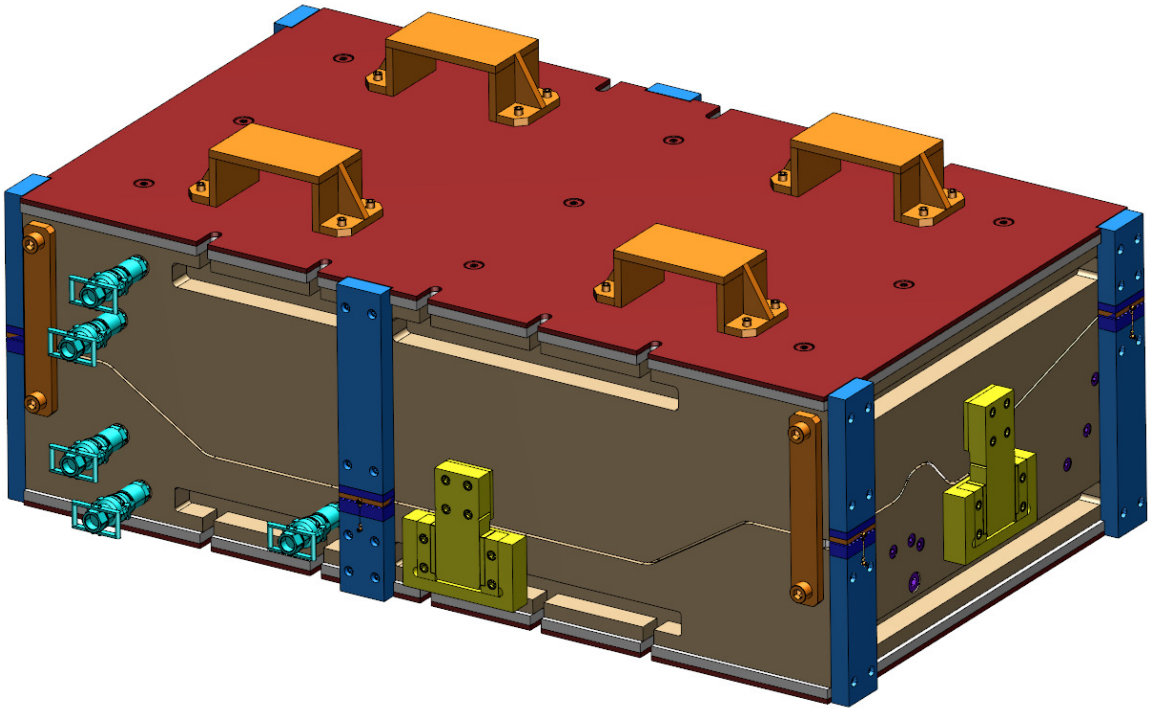


Fig. 1: Example of tool assembly

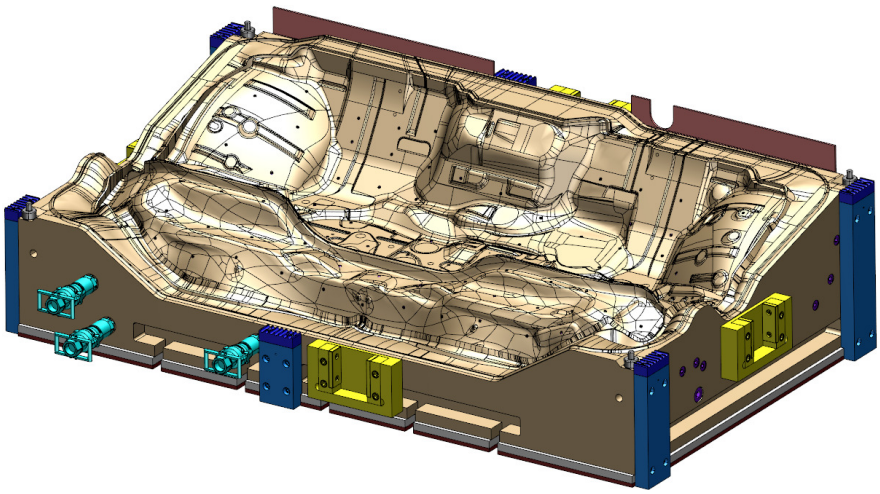


Fig. 2 :Lower part of tool assembly

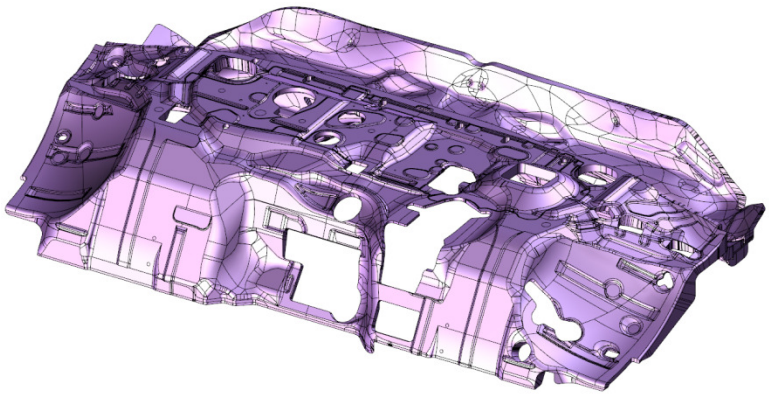


Fig.3 : Part produced by the tool

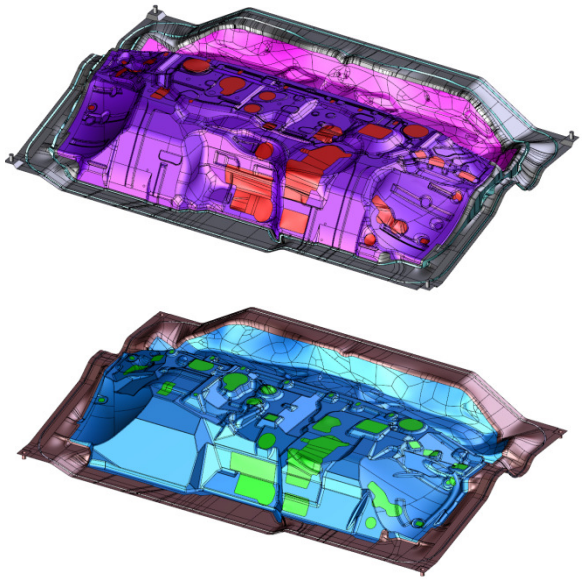


Fig. 4 :Lower and upper tool surfaces

Summary of contributions

- Accelerates the process from the beginning of the project to the production of the final product
  - It brings competitive advantages
  - Fast editing of CAD model - in all possible phases of the project
- Saves money and time
  - In integration of newcomers (designers) into the work process. Another contribution related to this topic is that "This makes the company more resistant to staff turnover" (Sandberg, 2003)
  - In learning and training of workers
  - In the design process ("Automation of repetitive and non-creative design tasks" (Rocca, 2012)
  - In the process of manufacturing and assembling
  - Reduces the number of faulty products
  - Reduces the price of product

University Project Database

These projects are mentioned in this paper as they contain some elements necessary for practicing KBE. In these projects, which are converted into study materials, students can get acquainted with know-how from practice which is very frequently "hidden". The PPD (Professionals' Projects Database) was created at the University of West Bohemia (UWB). "PPD consists of real design projects created by local engineering companies and were reworked by academics at UWB into a form suitable for learning purposes" (Hynek et al., 2014). Study materials are passed to students in the form of an interactive PDF. It is also possible to find models that were partly designed according to the principles and methods of

KBE. Study materials are described in detail by (Hynek et al., 2013). Each part of these electronic study materials is introduced there and a special focus is dedicated to the 3D models imported to the structured PDF file. The PDF is accompanied by additional related information.

Summary

Using KBE methods provides industrial companies with tangible financial savings and competitive advantages. It is not necessary to use KBE to its full extent in order to achieve benefits for the company. It is therefore up to the company to determine the extent to which these processes should be implemented. From the point of view of future development, it is obvious that these methods will play a more important role in designing components and the design process itself. The higher the level of implementation, the higher are the input costs for creating them. The economic benefits are indisputable at a suitably chosen level of implementation of these principles and methods. "Implementation of each new project or idea is based on experience and knowledge gained from previous projects" (Hynek et al., 2014). So when the knowledge is stored properly - also transferred into the CAD model rules, subroutines and constrains - each finished project could mean one developmental step which will not be lost in time or in the memory of the employees.

Acknowledgements

This paper was supported by the project SGS-2016-012 of the University of West Bohemia.

References

Baba, Y. and Nobeoka, K. (1998). Towards knowledge-based product development: the 3-D CAD model of knowledge creation. *Research Policy*, 26(6), pp.643-659.

Chapman, C. and Pinfold, M. (1999). Design engineering—a need to rethink the solution using knowledge based engineering. *Knowledge-Based Systems*, 12(5-6), pp.257-267.

Chapman, C. and Pinfold, M. (2001). The application of a knowledge based engineering approach to the rapid design and analysis of an automotive structure. *Advances in Engineering Software*, 32(12), pp.903-912.

Cooper, S., Fan, I. S., & Li, G. (1999). *Achieving competitive advantage through knowledge-based engineering: a best practice guide*. Prepared for the Dept. of Trade and Industry by Dept. of Enterprise Integration, Cranfield University.

Hynek, M., Grach, M., Votapek, P. and Bezdekova, J. (2014). Databases of knowledge at the University of West Bohemia. In Vision 2020: Sustainable Growth, Economic Development, and Global Competitiveness. International Business Information Management Association, pp. 431-436.

Hynek, M., Grach, M., Votapek, P. and Bezdekova, J. (2013). A new Concept of Study Materials for Machine Design. In: Proceedings of the 8th International Conference on e-Learning. Reading: Academic Conferences and Publishing International Limited, pp.185-192.

Hynek, M., Grach, M., Votapek, P., Bezdekova, J. and Muller, E. (2013). Electronic Learning Materials Based on interactive 3D Models. In Creating Global Competitive Economies: 2020 Vision Planning & Implementation. International Business Information Management Association, pp. 183-188.

Rocca, G. (2012). Knowledge based engineering: Between AI and CAD. Review of a language based technology to support engineering design. *Advanced Engineering Informatics*, 26(2), pp.159-179.

Rezayat, M. (2000). Knowledge-based product development using XML and KCs. *Computer-Aided Design*, 32(5-6), pp.299-309.

Stokes, M. (2001). *Managing engineering knowledge: MOKA: methodology for knowledge based engineering applications*. American Society of Mechanical Engineers.

Sandberg, M. (2003). *Knowledge based engineering: in product development*. Luleå tekniska universitet.

Perception of Working Conditions on the Quality of Working Life: Employees Linked To Health Companies in Barranquilla, Colombia

Laura Martínez-Buelvas, Industrial Engineer Department - Universidad Tecnológica de Bolívar, Cartagena, Colombia, lmartinez@utb.edu.co
Olga Jaramillo-Naranjo, School of Business - Universidad Del Norte, Barranquilla, Colombia, oljarami@uninorte.edu.co
Osvaldo Gamarra-Amarís, Industrial Engineer Student - Universidad Del Norte, Barranquilla, Colombia. gamarrao@uninorte.edu.co
Andrea Llinás-Herrera. Industrial Engineer Student, Universidad Tecnológica de Bolívar, Cartagena, Colombia. allinash@outlook.es
Fernando Jiménez-Pérez. Industrial Engineer Student, - Universidad Tecnológica de Bolívar, Cartagena, Colombia, fernando.jimenez20@outlook.es

Abstract

Working conditions and their interaction on Quality of Working Life (QWL) perception in health sector employees from Barranquilla-Colombia were studied and modeled in a sample of 333 people aged between 16 and 73 years old. Reliability analysis, exploratory factor and principal components analysis with VARIMAX rotation, and binary logistical regressions was performed. Results show acceptable internal reliability of the scale ($\alpha = 0.996$) and satisfactory adequacy of factorial matrix data (KMO = 0.934). Sixty-three items grouped into ten elements presented the factorial structure: four belong to working conditions and six to QWL. The results showed that occupational safety and psychosocial aspects positively affects the Quality of Working Life, with an overall classification rate of 92.2%. QWL in the health sector is a function of environmental variables, which can have an impact on the quality of the service and, therefore, on social welfare.

Keywords*:* Quality of working life, working conditions, Occupational Safety, psychosocial aspects.

Introduction

From the twentieth century, with the contributions made by Elton Mayo and the humanist approach to labor organizations, the perception of the man as a machine was transformed by placing greater importance on the psychological and sociological concept of the employee (Chiavenato, 2000). Since then, the aim is generate and revolutionize working conditions in order to satisfy the basic needs of workers and also raise or increase productivity rates in carrying out their duties (Boz, 2013; Rodríguez Salvá et al., 2010).

In 1927, *the Hawthorne experiment* was carried out, in which the physical conditions of the work environment were studied. In the experiment, light intensity, noise, fatigue, among others variables were evaluated. It was demonstrated how comfortable a worker can feel throughout the working day and as a result the influence of this aspect on productivity (Cubillos Rivera, Velásquez Muriel, & Reyes Nova, 2014). These standards discovered almost a century ago are those used today for employee satisfaction and good professional practices (Hart, 2012). In the 1970s, Quality of Working Life was born, in which an approach of efficiency and effectiveness of the workers was sought through the development of the systems that affect an organization (da Silva, 2006; Yeo & Li, 2011). Louis Davis was responsible for introducing the term that would ensure the health, safety and satisfaction of the employee in their duties (Gómez, 2010).

"Quality of Work Life (QWL) is defined as a planned, cooperative and evolved process that involves actions tending to create working conditions conducive to the development of people's abilities and potentialities to improve levels of job satisfaction and to strengthen worker identification with the organization" (Camacaro, 2010). QWL encompasses different heterogeneous environments in which

is conceived: possibility of future in the organization, satisfaction of the work executed, recognition for results obtained, salaries received, benefits offered, human relations in the group and in the organization, psychological and physical environments of work, freedom to decide, among others (Cardona & Zambrano, 2014; Chiavenato, 2000).

However, institutions in health sector have focused their attention on improving the quality of the service provided and consequently the functions that their employees develop (Velásquez Vásquez, Quintero, Sánchez, & Burgos Campiño, 2010). The attention given to the public is a vital factor in this sector because of its constancy. In order to improve the quality and living conditions of human beings, managing accurate diagnoses, specialized care and the highest quality in the execution of their duties it is necessary. Medical, administrative and support staff must ensure that the service can be provided under optimum conditions during the working day.

At the moment of interacting with the patient, the service can only be provided by specialist doctors, nurses, bacteriologists, internists, among other health professionals in charge of the recovery, check-up and procedures performed during patient care (Rivero & Dabos, 2017). Therefore, it is necessary for medical staff to feel satisfied with the working conditions in which they provide the service, such as, luminosity, temperature, appropriate clothing and basic utensils indispensable to perform their duties, as well as medicines for each treatment (Bernal González, Pedraza Melo, & Sánchez Limón, 2015; Kanten & Sadullah, 2012).

Cases associated with occupational safety occur constantly in health sector, where employees are exposed to conditions that in most cases are not controlled under a safety and prevention plan that can prevent injuries that affect health of the employee. Occupational safety is relevant since many of the actions performed repetitively under inappropriate conditions generate wear, labor fatigue and long-term deterioration of life; promoting occupational diseases (ILO, 2005).

The purpose of the International Labour Organization (ILO) is to raise awareness of the consequences of work-related injuries or illnesses, as well as to stimulate and support practical action at all levels. Safety at work is responsible for controlling many irregularities generated by a lack of a solid strategy to prevent accidents, injuries or occupational diseases, which leads to early retirements, loss of qualified personnel, absenteeism, as well as injury insurance premiums (ILO, 2004).

On the other hand, remuneration received by the employee is a key to satisfaction and good conditions of QWL. There are also salary incentives for services rendered and extra bonuses for some of the employee's own qualities that are used to reward performance of well-executed jobs and functions. In addition, non-salary remunerations, which stands, mentions of honor, awards for an exemplary service, among others (Saldarriaga Ríos, 2013). These practices are scarcely implemented in Colombian companies in health sector according to the results of Cañón Buitrago & Galeano Martinez (2011).

The present research aims to study and model the interaction between working conditions and quality of working life in employees linked to health companies in Barranquilla - Colombia. Particular interest in this research arises because the results can be a valuable substrate for strategies that dignify work in the sector, improve the models of Human Talent Management and, as a consequence, contribute to collective well-being.

Methodology

Participants

For the present investigation, 333 surveys were carried out to different employees of the health sector in Barranquilla - Colombia, aged between 16 and 73 years. Participants could belong to the medical, administrative or support staff, indistinctly. Regarding the distribution of participants with respect to sex, 70.3% were women, while 29.7% were men. The participation was by consent agreement. A

random sampling was carried out in companies of different sizes (SMEs, medium and large companies).

Instrument

The instrument used in this research was an adaptation of the instruments of working conditions and QWL performed by Martínez-Buelvas et al (2015). The first section is aimed to obtain a comprehensive overview of work safety, physical environment conditions and risks associated with the routine (Hayes, Perander, Smecko, & Trask, 1998). In the second section, it was asked about the principles of the QWL, that is, evaluation of the impact generated by subjective variables such as organizational or social level and wages or promotion (Casas, Repullo, Lorenzo, & Cañas, 2002).

The instrument consists of a total of 136 items: 44 from the literature of working conditions and 92 items for dimensions of QWL. Participants were required to respond on a Likert scale from 1 to 10 according to their agreement with each of the statements presented, being 1 Totally Disagree and 10 Totally Agree.

Variables

The contrast caused by the goals of production and human development was the product of what is now known as QWL, in which it is possible to improve living conditions through labor practices (Hernández, Naranjo Valencia, & Álvarez Giraldo, 2007). The study of the working conditions represents a prominent need of the work environment in which economic, political, humanistic, ergonomic and other parts are involved (Blanch, Sahagún, & Cervantes, 2010). Other variables such as safety, professional growth or burnout have been included as fundamental in the integral conception that companies must offer for the employee's quality of life.

In this research, the impact of working conditions on QWL in health sector in Barranquilla, Colombia will be studied by the following dimensions:

- Working conditions: it contains 44 items through which the worker's perception of variables such as physical load, lighting, noise, thermal environment, mental load, work safety and occupational hazards are obtained.
- Salary conditions: it contains 20 items through which the worker's perception is known for the variables salary, labor stability and schedules.
- Career development: contains 12 items through which the worker's perception is known for the variables mental ability, promotion and career, training and research.
- Subjective conditions: it contains 54 items by means of which the worker's perception is obtained with respect to the variables private sphere and labor world, individual and labor activity, individual and labor group: organizational plan; individual and work group: hierarchical plan; individual and work group: technical plan; individual and work group: social plan; support and collaboration between units; and institution and management function.

These dimensions and variables mentioned above are considered appropriated because they can help to understand physical and social environment in which employees are exposed.

Analysis

Internal consistency analysis was performed by calculating the Cronbach alpha coefficient and the construct validity evaluation was performed using exploratory factor analysis: principal components analysis with VARIMAX rotation. In order to obtain a satisfactory factorial structure, it was validated that the included items had commonalities higher than a value of 0.5. This value is considered appropriate to maintain the internal consistency of the construct or theoretical dimension. This was done by checking that the results of the Bartlett sphericity test and the KMO test were satisfactory.

Then, a reliability analysis of each component was carried out, and the correlations of each factor were calculated by r-Pearson Correlation Statistician. Finally, a binary logistic regression model was calculated using the Labor Quality of Life as the dependent variable, and the Working Conditions variables as independent variables. The analyzes were carried out with the Statistical Package for Social Sciences (SPSS), version 24.0 for Windows

Results

Reliability Analysis

Using Cronbach's alpha, it was possible to verify the consistency of the items since the values obtained were close to 1, that is, they reflect a good reliability index. As results of the univariate analysis, an average of 8.07 and a standard deviation of 2.43 were obtained.

The homogeneity of the data measured by Cronbach's alpha was greater than 0.789 in all cases. Consequently, there is statistical evidence of the high degree of reliability of the data collected; a total Cronbach's alpha of 0.968 was obtained. Table 1 lists the Cronbach's alpha and the minimum correlations for each of the variables in the scale

Table 1: Cronbach's alpha coefficients and minimum correlations for each variable. (Elaboration by authors)

Variable	αCronbach	Correlations
Thermal environment and lightning	0,855	0,419
Mental load	0,789	0,366
Psychosocial aspects	0,855	0,538
Safety standards at work	0,879	0,450
Salary	0,898	0,401
Individual and work group: Hierarchical level	0,965	0,430
Individual and work group: Technical level	0,931	0,433
Training and research	0,841	0,418
Individual and work group: Organizational level	0,881	0,388
Mental ability	0,803	0,401

Factorial Analysis

In order to evaluate impact of working condition on QWL, it was applied an exploratory factor analysis: principal components analysis with VARIMAX rotation. The result obtained from the factor matrix was satisfactory with a KMO = 0.934 and Bartlett's sphericity test was significant. To do so, factors that did not generate a significant impact in assessing QWL conditions were discarded. The study was started with 30 factors and only 10 were significant. The factorial structure was represented by 63 items scaled in 4 groups for work conditions variables, and 6 groups for QWL variables.

The following are the latent variables obtained from the reduction in the context of the analysis of working conditions:

- Thermal environment and lighting: physical conditions that set up the employee's work environment encompasses temperature and luminosity. Hence, it is necessary to evaluate how these factors impact the employee's performance, while facilitating or hindering the

levels of productivity. For this factor was obtained a Cronbach's alpha of 0,855 and a correlation of 0,419. These values show the relevancy of the thermal environment and lighting from the employee's perspective.

- Mental load: it is considered as those opportunities that employee has to create active breaks during the working day, since this allows him/her to rest or create relationships with his/her co-workers. For the individual, it is important to have this spaces that allow recreational leisure, since the Cronbach's alpha was 0,789 and the correlation was 0.366.
- Psychosocial aspects: seeks to determine how much acceptance is given to the employee for the contributions attributed to the company, and the relationship between peers. For this factor was obtained a Cronbach's alpha of 0,855 and a correlation of 0,538.
- Occupational Safety: it provides the conditions that employees require according to law, and regarding their occupational safety and health conditions. For this factor was obtained a Cronbach's alpha of 0,879 and a correlation of 0,450. These values must be evaluated since they indicate that employees respond positively when it is provided working conditions that ensure their protection in working hours.

Similarly, the variables to be considered in the analysis of the QWL were:

- Individual and work group - Hierarchical level: relationship between individual and his/her superiors or persons in charge, which allows the optimal execution of the organizational goals. It is determined by a Cronbach's alpha of 0.965 and a correlation of 0,430. These indicators show that employee demands a kind relationship with superiors or subordinates to perceive an enjoyable work.
- Individual and work group - Technical level: participation and communication that the individual has in his/her work environment by performing his/her functions and responsibilities. It justifies a Cronbach's alpha of 0,931 and a correlation of 0,433, from which it is concluded that the execution of the work in terms of work groups generate greater result when there is harmonious relationship.
- Individual and work group - Organizational level: it contemplates how the employee is related to the company's policies and his/her knowledge of each one, to make constructive the difficulties that may arise. It has a Cronbach's alpha of 0,881 and a correlation of 0,388. It is showed that this variable has a significative relevancy since every employee should be informed about his/her organizational context.
- Salary: perceived by employees as the remuneration received for a job performed. The result was a Cronbach's alpha of 0,898 and a correlation of 0,401. This indicates that salary is perceived as a good stimulant, so it must be correctly estimated to generate a substantial positive impact.
- Mental ability: it includes the competences that the individual has to carry out their daily activities. Therefore, it entails assuming roles of responsibility. The Cronbach's alpha was 0,803 and the correlation was 0,401, which indicate the relevance of studying the employee's mental abilities in the development of their tasks based on the assessment of competencies.
- Training and research: indicates the promotion of new knowledge and the culture of inquiry to try to find solutions or alternatives to common problems of the area. It obtained a Cronbach's alpha of 0,841 and a correlation of 0,418, which shows that it has a significant impact to enable the employee to progress in his academic training.

Table 2 and Table 3 present the resulting factor structure for the Working Conditions variables and for the QWL variables, respectively. Significant factor loads were found in accordance with the reliability analysis previously discussed.

Table 2: Exploratory factor analysis: principal components analysis and VARIMAX rotation for working conditions variables. (Elaboration by authors)

Item	F1: Thermal environment and lighting	F2: Mental load	F3: Psychosocial aspects	F4: Occupational Safety
The temperature in the work area is pleasant	0,85			
Ventilation and air conditioning equipment in the workplace are sufficient	0,85			
The clothing I use is adequate, relative to the temperature in the workplace	0,70			
The sources of hydration in my workplace are sufficient	0,58			
The lighting level is adequate for the activities I do in my job	0,48			
During the working day I have time to make active breaks		0,80		
I may be momentarily absent from the job without a replacement		0,74		
The spaces and times available to establish communication and relationship with my other colleagues are adequate		0,65		
The breaks or rest time are sufficient to avoid fatigue during my workday		0,67		
The company promotes and contributes to good interpersonal relationships			0,53	
The company promotes and contributes to teamwork			0,58	
I feel that I am recognized for the work			0,49	
When I do a good job, I receive the respective recognition			0,60	
In the company there is the regulation of hygiene and labor safety and this one is applied according to the established by Law				0,70
The company has programs of promotion and prevention in subjects related to occupational health and safety				0,72
I constantly pay attention to the safety regulations established by the company				0,75
I pay attention to the safety regulations and apply them as established by the company				0,64
The company provides the necessary personal protection elements to carry out my activities in a safe				0,58
The company responds quickly to situations where the safety of its workers is compromised				0,57

Table 3: Exploratory factor analysis: principal components analysis and VARIMAX rotation for QWL variables. (Elaboration by authors)

Item	**F5:** Hierarchical level	**F6:** Technical level	**F7:** Organizational level	**F8**: Salary	**F9:** Mental ability	**F10:** Training and research
The supervision and daily instructions of my immediate boss allow me to perform my activities better	0,69					
I feel the freedom to express my opinion in the company	0,49					
I clearly know the management planning of my boss	0,81					
My boss allows me to be proactive	0,86					
My boss gives me feedback on the activities performed	0,83					
My boss takes into account the suggestions and innovative ideas I have about the development of my work	0,81					
I have open communication with my immediate boss	0,87					
My boss motivates me to do my job better	0,87					
My boss shares with the team the achievements of his management	0,84					
I am heard by my boss in an eventual labor problem	0,85					
I feel support and solidarity from my boss	0,87					
The team leader maintains order and contributes to the performance of the designated activities	0,59					
My immediate boss is competent in his work	0,69					
I am happy to carry out the activities that they entrust to me		0,51				
In the organization we are able to solve problems in work teams		0,48				
I am willing to listen and collaborate with any team member when I need it		0,71				
I consult the different opinions of the working group to make decisions		0,66				
I feel support and confidence from co-workers		0,59				
I express myself well from my co-workers		0,79				
I establish fellowship, cooperation and solidarity with my colleagues		0,84				
I acknowledge the achievements of my colleagues within the company,		0,78				
I feel an important member in the company		0,46				
I expressed good company with other people		0,55				
I enjoy my co-workers		0,74				
I know who to turn to for conflict resolution			0,45			
They inform me in a timely manner of the organizational changes in the company			0,66			
They inform me in advance of an eventual error, the product of my work			0,72			

In the organization the difficulties are discussed constructively			0,64			
Disciplinary rules are applied objectively			0,68			
I receive my remuneration at time				0,52		
I feel that my salary is adjusted to my professional profile				0,86		
My salary is competitive in the sector				0,8		
I feel that my salary is in line with my job responsibilities				0,86		
I consider that my salary is enough to satisfy my basic needs				0,79		
I am satisfied with the possibilities of wage increases				0,47		
I develop activities that are related to my labor competencies					0,71	
I apply my knowledge and skills in the development of the programmed activities					0,69	
The degree of mental ability required to perform my duties is high					0,75	
I have the ability to receive more responsibilities or functions in my position					0,64	
I have equal opportunities to grow professionally in the organization						0,69
I have the opportunity of promotion as a stimulus for my job performance						0,79
The activities developed in my work are related to my profession						0,65
I have the possibility to rotate to other areas of work						0,63
I have the possibility to work in other places (external to the company) that allow me to interact with other cultures.						0,6

Correlation Analysis

Correlation is a measure of the strength of the relationships between each of the variables, thus, in order to assess the magnitude and significance of the associations between the different variables of the study, we calculated the Pearson correlation coefficients. The results exhibit positive relationships with respect to p-value less than 0.01 (see Table 4).

Table 4: Pearson Correlations Coefficients – Working Conditions Variables and QWL Variables (Elaboration by authors)

Variables	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
F1. Thermal environment	1	0,171**	0,383**	0,478**	0,244**	0,333**	0,240**	0,369**	0,188**	0,238**
F2. Mental load		1	0,424**	0,174**	0,137*	0,273**	0,233**	0,181**	0,146**	0,228**
F3. Psychosocial aspects			1	0,409**	0,283**	0,310**	0,341**	0,313**	0,319**	0,439**
F4. Occupational Safety				1	0,352**	0,332**	0,201**	0,361**	0,232**	0,215**
F5. Hierarchical level					1	0,289**	0,413**	0,324**	0,156**	0,232**
F6. Technical level						1	0,512**	0,197**	0,370**	0,307**
F7. Organizational level							1	0,201**	0,399**	0,229**
F8. Salary								1	0,169**	0,272**

F9. Mental ability									1	0,244**
F10. Training and research										1
**. The correlation is significant at the 0.01 level (bilateral).										
*. The correlation is significant at the 0.05 level (bilateral).										

The relationships found suggest:

- With the correlation coefficient of 0,413 for the hierarchical level, can be deduced that when good relations are carried out and these are in favor to the constructive development of both the individual and the workgroup, it is executed a coupled work that makes prosper all departments of a company.
- For technical level and its relationship with thermal environment, a correlation of 0,333 was obtained which reflects a positive impact of physical conditions, such as comfortable temperature and lightning, in participation and communication of employee. Optimal conditions should be provided to obtain a good technical perception.
- When Occupational Safety conditions are appropriated, the satisfaction level in variables such as psychosocial aspects and salary, is greater (r = 0.409 and r = 0.361, respectively).
- Finally, the better the training and research opportunities within the organization, the more the employee's mental state increases (r = 0,439).

Analysis of the impact of working conditions on the Quality of Working Life

The evaluation of a model to estimate the impact of the variables of working conditions on the variables of QWL, begins in the exploration of different regression models. The correlation analysis previously discussed demonstrated the existence of positive relationships between the variables associated with working conditions and variables associated to QWL. Figure 1 presents the conceptual schema of regression analysis.

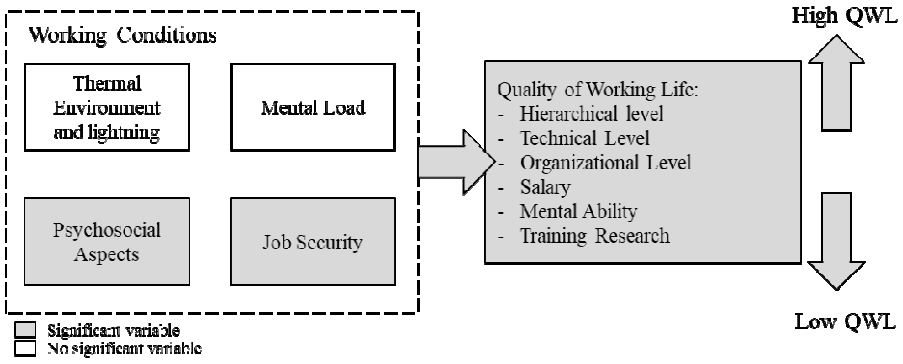


Figure 1: Conceptual frame evaluation model of the impact of working conditions in the perception of QWL. (Elaboration by authors)

The first step was to categorize the dependent variable as a dichotomous variable with levels low (0) and high (1) to achieve a better fit to binary logistic regression models. The number of final cases included in the analysis was 333 participants who had complete measurements in the study. To calculate the logistic regression model, it was used Wald's stepwise forward method, which contrasts the input based on the significance of the scoring statistic and contrasts the scoring based on the probability of the statistic. At each step, it revalues the coefficients and their significance, being able to eliminate from the model those that do not consider statistically significant. The last step of the study generated the model shown in Table 5.

The variables Occupational Safety and Psychosocial Aspects are those that impact the QWL of employees linked to companies in the health sector. The multivariate analysis suggests that both variables are significant at a level lower than 0.001. In addition, the Hosmer-Lemeshow test allows to maintain that there is enough statistical evidence to affirm that the obtained model fits well with the initial data of the sample (Chi-square: 12.43; Significance: 0.133).

The model explains between 32.5% and 58.9% of the QWL and obtained a global classification percentage of 92,2%. There was evidence of weakness in the prediction of a low QWL. The predictive value of low QWL was 58,7% while the predictive value of high QWL was 97,6%. Therefore, there is a risk that 41,3% of the times a worker's QWL is rated positive, even though their working conditions do not support this assertion. However, the sensitivity of the model is not impaired in the other scenarios in which it is applied. The model predicts well the QWL of the workers, especially when they present working conditions related to S Occupational Safety and Psychosocial Aspects from which a high QWL is perceived. The omnibus test for the proposed binary logistic regression model is significant at a level lower than 0,01. Considering these results, the model obtained is said to be acceptable.

Table 5: Regression Model for QWL variable (Elaboration by Authors)

Included variables	B	T.E.	df	Sig.	Exp(B)
Occupational Safety	0,072	0,21	1	0,001	1,075
Psychosocial Aspects	0,188	0,30	1	0,000	1,207
Constant	-6,685	1,114	1	0,000	0,001

The model is represented by Equation (1). When the probability tends to one, the perception of the quality of working life of workers linked to companies in the health sector will be positive. In this equation, the variables X and Y are Occupational Safety and Psychosocial Aspects, respectively.

$$P(QWL = 1) = \frac{e^{-6,685 + 0,072\,X + 0,188Y}}{1 + e^{-6,685 + 0,072X + 0,188Y}} \quad (1)$$

Discussion

The coefficients of the variables of working conditions show that Occupational Safety and Psychosocial Aspects positively affect Quality of Working Life. The second one does more than the first. The significance of these coefficients and of the constant was verified through the Wald statistic, determining that they are significant (see Table 5).

Quality of working life includes all policies, programs and measures that are taken to preserve the body and soul of an employee and produce their satisfaction and gratitude to the organization (Mejbel & Almsafir, 2013). Therefore, companies must ensure that the physical, mental and social conditions that occur are catalysts of their well-being.

Several studies have addressed the issues of QWL and its interaction with factors such as commitment to work (Farid, Izadi, Ismail, & Alipour, 2015), burnout and overload (Patlán, 2013), work performance (Rastegari, Khani, Ghalriz, & Eslamian, 2010), organizational culture (Valizadeh & Ghahremani, 2012), among others. The research of Mejbel et al (2013) reported that the main drivers of QWL are the systems of remuneration, benefits and compensation, professional development and communication. As a result it can be said that the QWL construct is multidimensional and structurally is composed of individual factors, the work environment, the work itself and the organization and the socio-labor environment (Patlán, 2016), from which it is explained its impact and interaction with the different elements adjacent to the employee, work and organization.

For the health sector, research has focused primarily on studying the QWL of nursing staff from the perspective of psychosocial risk (Arenas & Andrade, 2013), its consequences on patient care (Romero, Mesa, & Galindo, 2010), its intention to leave (Lee, Dai, Park, & Mccreary, 2013), among others. A conclusion from this literature is that the QWL of workers in the health sector requires special analysis since these employees are subjected to factors of work stress and burnout that are detrimental to a positive QWL (Rodríguez-Marín, 2010). According with Moradi, Maghaminejad, & Azizi-Fini (2014), assessing and improving the QWL would improve performance and reduce staff burnout linked to the health sector. In fact, these same authors report that a poor QWL in the medical support staff can cause problems such as job dissatisfaction, emotional exhaustion, burnout and rotation at work; which together could negatively affect the quality of care provide to patients.

The aim of this research was to study the impact of working conditions on the perception of QWL in 333 employees linked to health sector companies in the city of Barranquilla, Colombia. Form this, it was observed that the relationship between the two dimensions supports the continuation of the analysis of the implications of the work factors on the employee's perception of subjective conditions, job satisfaction, compensation and vocational development. Correlation analysis presented allows to consider that thermal environment and lightning are related with Occupational Safety. In the health sector, workers are exposed to risks such as physical, chemical, biological, postural, confined and inadequate space and inadequate lightning (Rodríguez-Marín, 2010); which must be controlled through Occupational Safety Plans.

The mental load has a moderate positive correlation with the variable of psychosocial aspects. Cañón & Galeano (2011) addressed the issue of psychosocial aspects and their relationship with QWL, determining that job satisfaction, intrinsic motivation and managerial support are essential in the health sector. However, the results show that the mental load and psychosocial aspects are perceived by the worker as an intra-organizational aspect related to times of care and rest, work climate and interpersonal relationships. These statements are consistent with the revision of Rodrígez-Marin (2010) regarding the high demands of work and difficulties in personal relationships for workers in the sector.

The regression analysis proposed in this research was used to show that Occupational Safety and Psychosocial Aspects are independent variables that positively influence the perception of QWL. This study demonstrated that the mechanisms offered by companies to work as a team, promote good interpersonal relationships, make recognitions; establish regulations, promotion programs, prevention and care in occupational safety and health issues; as well as the willingness of the worker to take advantage of these mechanisms, translate into a perception of high QWL.

In this sense, employees of the health sector demand to work in organizations in which the promotion of teamwork and the recognition of their own efforts are part of the organizational culture in benefit of their psychosocial conditions. Arenas et al. (2013) argue that diseases caused by work-related stress and associated with psychosocial aspects are the main concern at the public health level. The impact generated by the psychosocial aspects of work is responsible for behavior, emotions and commitment with which health workers face the workload and provide qualified service for the benefit of social welfare.

In addition, the results of this investigation show the imperative need to intervene strategically work safety conditions in the sector. The exercise of public health is subject to occupational risk factors, hygiene, medical care, legal advice, among others; which must be operated in accordance with the law, unions and workers' expectations. In this sector, employees perceive that the QWL is positively influenced when Occupational Safety conditions are favorable. The above agrees with the conclusions obtained in the study of Abd et al (2013) since it has been demonstrated that the conditions of occupational safety have an important role in the QWL. The research of Martinez-Buelvas, Oviedo-Trespalacios, & Luna-Amaya (2015) also states that Occupational Safety is a factor that makes the perception of QWL high when companies comply with the guarantees given by law.

Finally, QWL is defined as a multidimensional concept that is constructed from the complexity of the worker within the technical, hierarchical and organizational plane; his/her conformity with the salary earned, his/her mental ability and the training and research opportunities he/she have within the organization. QWL is positively influenced by the assurance of guarantees regarding safety and psychosocial well-being. Creating a high QWL for workers can improve their productivity and increase their job satisfaction (Abd et al, 2013). Also, it can allow the employee to feel motivated, committed, competent, cheerful, productive, safe, etc. (Platán, 2012, quoted by Patlán, 2016). Therefore, it should be made efforts to establish strategic policies and programs that will improve the quality of working life of employees in the sector, in order to improve collective well-being.

References

Arenas, F., & Andrade, V. (2013). Factores de riesgo psicosocial y compromiso (engagement) con el trabajo en una organización del sector de salud de la ciudad de Cali, Colombia. *Acta Colombiana de Psicología*, *16*(1), 43–56. Retrieved from http://www.redalyc.org/pdf/798/79829185005.pdf

Bernal González, I., Pedraza Melo, N. A., & Sánchez Limón, M. L. (2015). El clima organizacional y su relación con la calidad de los servicios públicos de salud: diseno de un modelo teórico. *Estudios Gerenciales*, *31*(134), 8–19. https://doi.org/10.1016/j.estger.2014.08.003

Blanch, J. M., Sahagún, M., & Cervantes, G. (2010). Estructura Factorial del Cuestionario de Condiciones de Trabajo. *Revista de Psicología Del Trabajo Y de Las Organizaciones*, *26*(3), 175–189. https://doi.org/10.5093/tr2010v26n3a2

Boz, G. (2013). Addressing Critical Business Issues through Strategic Management of Human Resources, (July). Retrieved from https://ddd.uab.cat/record/117027

Camacaro, P. R. (2010). Abordaje conceptual de calidad de vida en el trabajo. *Contribuciones a Las Ciencias Sociales*, (January 2010). Retrieved from www.eumed.net/rev/cccss/07/prc.htm%0ARESUMEN

Cañón Buitrago, S. C., & Galeano Martinez, G. (2011). Factores laborales psicosociales y calidad de vida laboral de los trabajadores de la salud de ASSBASALUD E.S.E Manizales (Colombia). *Arch. Med*, *11*(2), 114–126. Retrieved from http://www.redalyc.org/articulo.oa?id=273821489004

Cardona, D. R., & Zambrano, R. (2014). Revisión de instrumentos de evaluación de clima organizacional. *Estudios Gerenciales*, *30*(131), 184–189. https://doi.org/10.1016/j.estger.2014.04.007
Casas, J., Repullo, J. R., Lorenzo, S., & Cañas, J. J. (2002). Dimensiones y medición de la calidad de vida laboral en profesionales sanitarios, (1), 527–544.

Chiavenato, I. (2000). *Administración de Recursos Humanos*. (L. Solano Arévalo, Ed.) (5th ed.). Santa Fe de Bogotá: Mc Graw Hill.

Cubillos Rivera, B., Velásquez Muriel, F. C., & Reyes Nova, M. (2014). Plan de mejoramiento de variables del clima organizacional que afectan al desempeño laboral en una entidad del Estado. *Suma de Negocios*, *5*(10), 69–73. https://doi.org/10.1016/S2215-910X(14)70012-6

da Silva, M. (2006). *Nuevas Perspectivas de la calidad de vida laboral y sus relaciones con la eficacia organizacional*.

Farid, H., Izadi, Z., Ismail, I. A., & Alipour, F. (2015). Relationship between quality of work life and organizational commitment among lecturers in a Malaysian public research university. *Social Science Journal*, *52*(1), 54–61. https://doi.org/10.1016/j.soscij.2014.09.003

Gómez, A. M. (2010). Calidad de Vida Laboral en Empleados Temporales del Valle de Aburrá-Colombia. *Revista Ciencias Estratégicas*, *18*(24), 225–236.

Hart, C. W. M. (2012). Los experimentos de Hawthorne. *Revista Cubana de Salud Publica*, *38*(1), 156–167. https://doi.org/10.1590/S0864-34662012000100015

Hayes, B. E., Perander, J., Smecko, T., & Trask, J. (1998). Measuring Perceptions of Workplace Safety. *Journal of Safety Research*, *29*(3), 145–161. https://doi.org/10.1016/S0022-4375(98)00011-5
Hernández, G. C., Naranjo Valencia, J. C., & Álvarez Giraldo, C. M. (2007). La gestión humana en colombia: características y tendencias de la práctica y de la investigación. *Estudios Gerenciales*, *23*(103), 39–64. https://doi.org/10.1016/S0123-5923(07)70009-8

ILO. (2004). Estrategia global en materia de seguridad y salud en el trabajo. Retrieved from http://www.ilo.org/wcmsp5/groups/public/@ed_protect/@protrav/@safework/documents/policy/wcms_154865.pdf

ILO. (2005). Independent Evaluation of the InFocus Programme on Socio-Economic Security.

Kanten, S., & Sadullah, O. (2012). An Empirical Research on Relationship Quality of Work Life and Work Engagement. *Procedia - Social and Behavioral Sciences*, *62*, 360–366. https://doi.org/10.1016/j.sbspro.2012.09.057

Lee, Y. W., Dai, Y. T., Park, C. G., & Mccreary, L. L. (2013). Predicting quality of work life on nurses' intention to leave. *Journal of Nursing Scholarship*, *45*(2), 160–168. https://doi.org/10.1111/jnu.12017

Martinez-Buelvas, L., Oviedo-Trespalacios, O., & Luna-Amaya, C. (2015). Impact of working conditions on the quality of working life: Case manufacturing sector colombian Caribbean Region. *Dyna*, *82*(194), 194–203. https://doi.org/10.15446/dyna.v82n194.49293

Martínez-Buelvas, L., Oviedo-Trespalacios, O., & Luna-Amaya, C. (2016). Diseño y validación de una herramienta para medir la percepción de las Condiciones de Trabajo: Caso sector manufacturero de la Región Caribe Colombia. *Universitas Psychologica*, *15*(1), 15–24.

Mejbel, A. ellah, & Almsafir, M. (2013). The Drivers of Quality of Working Life (QWL): A Critical Review. *Australian Journal of Basic and Applied Sciences*, *7*(10), 398–405. Retrieved from http://ajbasweb.com/old/ajbas/2013/August/398-405.pdf

Moradi, T., Maghaminejad, F., & Azizi-Fini, I. (2014). Quality of working life of nurses and its related factors. *Nursing and Midwifery Studies*, *3*(2), e19450. https://doi.org/10.17795/nmsjournal19450

Patlán, J. (2016). Significado psicológico del constructo de calidad de vida en el trabajo mediante redes semánticas naturales. *Psicología Y Salud*, *26*(55), 111–127.

Patlán Pérez, J. (2013). Efecto del burnout y la sobrecarga en la calidad de vida la calidad de vida en el trabajo. *Estudios Gerenciales*, *29*(122), 177–188. https://doi.org/10.1016/j.estger.2014.09.003

Rastegari, M., Khani, A., Ghalriz, P., & Eslamian, J. (2010). Original Article Evaluation of quality of working life and its association with job performance of the nurses, *15*(4), 224–228.

Rivero, A. G., & Dabos, G. E. (2017). Gestión diferencial de recursos humanos: una revisión e integración de la literatura. *Estudios Gerenciales*, *33*(142), 39–51. https://doi.org/10.1016/j.estger.2016.12.003

Rodríguez-Marín, J. (2010). Calidad de vida laboral en profesionales de la salud. *Revista de Calidad Asistencial*, *25*(6), 318–320. https://doi.org/10.1016/j.cali.2010.09.002

Rodríguez Salvá, A., Álvarez Pérez, A., Sosa Lorenzo, I., De Vos, P., Bonet Gorbea, M. H., & Van

der Stuyft, P. (2010). Inventario del clima organizacional como una herramienta necesaria para evaluar la calidad del trabajo. *Revista Cubana de Higiene Y Epidemiología*, *48*(2), 177–196.

Romero, M. N., Mesa, L., & Galindo, S. (2010). Calidad de vida de las(os) profesionales de enfermería y sus consecuencias en el cuidado. *Avances En Enfermería*, *26*(2), 59–70. Retrieved from http://www.revistas.unal.edu.co/index.php/avenferm/article/view/12899/13659

Saldarriaga Ríos, J. G. (2013). Responsabilidad social y gestión del conocimiento como estrategias de gestión humana. *Estudios Gerenciales*, *29*(126), 110–117. https://doi.org/10.1016/S0123-5923(13)70026-3

Valizadeh, A., & Ghahremani, J. (2012). The relationship between organizational culture and quality of working life of employees. *European Journal of Experimental Biology*, *2*(5), 1722–1727.

Velásquez Vásquez, F. V., Quintero, A. V., Sánchez, F. J., & Burgos Campiño, S. (2010). Grupo corporativo eficacia, una organización que crece y hace crecer: momentos de cambio. *Estudios Gerenciales*, *26*(115), 181–200. https://doi.org/10.1016/S0123-5923(10)70119-4

Yeo, R. K., & Li, J. (2011). Working out the quality of work life: A career development perspective with insights for human resource management. *Human Resource Management International Digest*, *19*(3), 39–45. https://doi.org/10.1108/09670731111125952

Regional Analysis of Hotel Infrastructure At Russia Federation For 2016

Skhvediani A.E., Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russia, shvediani_ae@spbstu.ru
Kudryavtseva T.J., Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russia, kudryavtseva_tyu@spbstu.ru
Kravchenko V. V., Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russia, kravchenko_vv@spbstu.ru

Abstract

Development of tourist industry is one of the key directions of economic policy in Russia. In order to define the main development prospects of this industry in Russia the author conducted a regional analysis of the hotel infrastructure, as an inseparable part of tourism industry, for the year 2016. The analysis was carried out based on the results of the algorithm, which was developed and applied by the author to rank federal subjects of Russia depending on the values of two coefficients: the level of room occupancy and level of room sufficiency in a region. A conclusion was made about the development potential of tourism industry depending on the state of the hotel infrastructure.

Keywords: economic policy in tourism industry, room occupancy at the region, level of room sufficiency in a region, hotel infrastructure.

Introduction

Today the Russian Federation is pursuing state policies in terms of contributing to the development of tourism industry and domestic tourism. In particular, the following ones are implemented: state program of the Russian Federation "Development of culture and tourism" for the years 2013-2020, "Tourism development strategy in the Russian Federation for the period until 2020", Federal target program "Development of domestic and inbound tourism in the Russian Federation (years 2011-2018)" and a number of other federal and regional programs for tourism industry development in the RF.

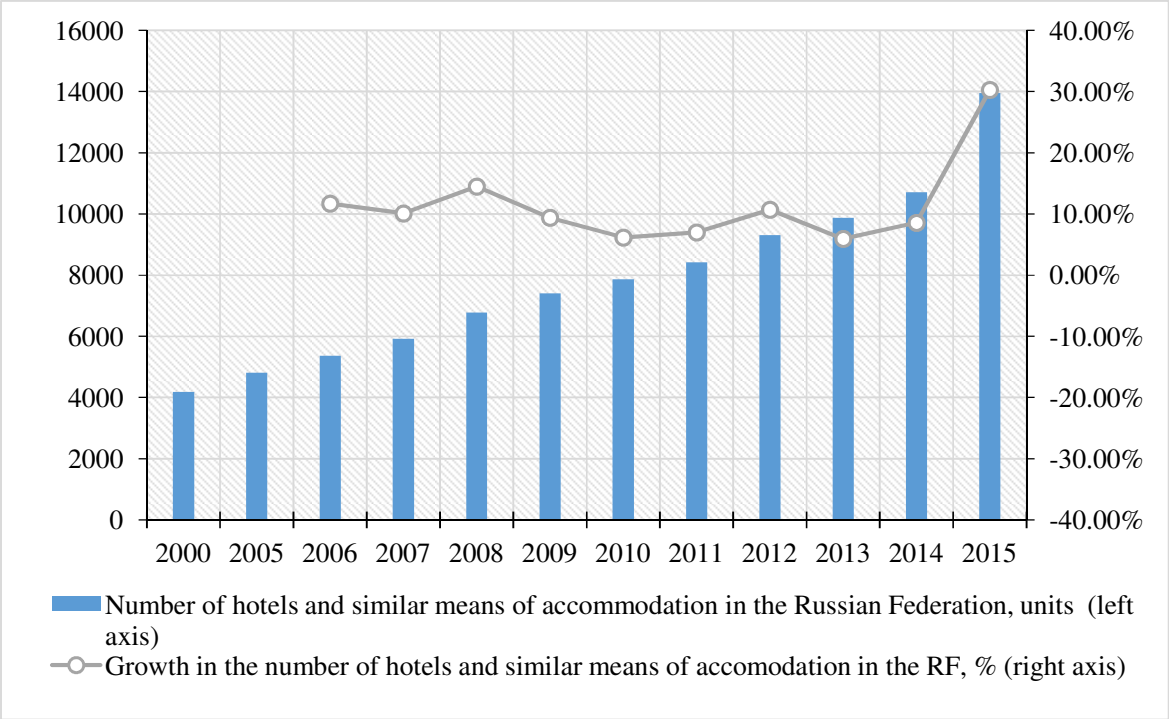


Fig. 1: Dynamics in the growth of the number of hotels and similar means of accommodation in the RF in the period from 2000 to 2016

In 2000-2015 the number of hotels and similar means of accommodation grew in the Russian Federation (see Fig.1). This growth was caused by the development of the service sector in the country, growing demand for accommodation services and legalization of the existing means of accommodation. A growth equal to 30.2% in 2015 is mostly related to the fact that the Republic of Crimea and the city of Sevastopol became the members of the Russian Federation.

So, in the context of the declaration about the need to develop domestic and inbound tourism and under the conditions of the constantly growing number of hotels and similar means of accommodation, the author finds it reasonable to analyze the level of room sufficiency in the category "Hotels and similar means of accommodation" of the RF regions over the year 2016 and conclude if the volume of the hotel infrastructure as well as the intensity of its utilization in the RF regions is adequate.

Literature Review

According to N.V. Pogorelova (2011), tourism infrastructure represents an organizational and economic system of interrelated companies and enterprises which ensure (material and sociocultural) conditions necessary for reproducing a tourist product, e.e. for performing utility functions in servicing tourists. Thus, the hotel infrastructure is an integral part of the tourism infrastructure of the city and region, since it directly ensures such a utility function of tourist services as accommodation of the users of these services.

Many researchers believe that the hotel structure in the RF is not developed enough. Thus, a team of authors - Barashok I. V., Ovcharenko N. P., Rudenko L.L. (2014) emphasize that even though the hotel infrastructure has been developing over the last two years, most cities and regions lack means of accommodation with affordable and qualitative conditions of stay. Consequently, the authors conclude about the need to grow the hotel base to meet the needs of potential customers. This

statement is supported by Khorev A.S. and Nikolskaya E.Yu. (2015), who also mark out the weak development of the tourism infrastructure and poor provision of regions with means of accommodation of mid and economy categories with the level of comfort satisfying modern standards.

Moreover, the following problems, common for the hotel sector in the RF are identified: not working competition mechanisms in the hotel services market (including unbalance of the prices and quality of hotel services), lack of trained personnel, lack of well-considered marketing policy among hotel management teams in the regions, low level of support to the hotel sector provided by regional authorities (Horev, A. S., & Nikol'skaja, E. Ju., 2015).

Thus, based on the reviewed literature it can be concluded that the development level of tourism infrastructure is directly dependent on the level of hotel infrastructure, as its constituent. Today researchers agree that in the RF this constituent of tourism infrastructure has not been developed enough, both quantitatively and qualitatively.

Metodology

Step 1. The data was downloaded from the Rosstat database for the year 2016 by the following performance indicators: population size of the federal subject, the hotel room capacity in the group "Hotels and similar means of accommodation", number of nights spent in the "Hotels and similar means of accommodation" for the year.

Step 2. Based on the obtained data, two indicators were calculated: the level of hotel room sufficiency in the RF subject and the level of hotel room occupancy in the RF subject. Both indicators were calculated by the group: "Hotels and similar means of accommodation", which include the following accommodation objects: hotels, furnished rooms, motels, boarding houses, hostels and other hotel-type organizations. The group is constructed based on the obtained data

The coefficient of hotel room sufficiency is calculated in the following way:

$$K_{\substack{hotel\ room \\ sufficiency}} = \frac{\substack{The\ hotel\ room\ capcity \\ in\ the\ RF\ subject}}{\substack{Population\ size \\ in\ the\ RF\ subject,thous.people}}, (1)$$

The coefficient of hotel room occupancy or hotel room use is calculated in the following way;

$$K_{\substack{hotel\ room \\ occupancy}} = \frac{\substack{Nights, \\ spent\ in\ the\ region\ per\ year}}{Number\ of\ beds\ in\ the\ means\ of\ accommodation*365}, (2)$$

Step 3. A five-point grading scale is used to grade the level of hotel room sufficiency and the level of hotel room occupancy for every federal subject. The correlation of the coefficient values and grades is presented in Table 1.

Table 1 : The correlation of the coefficient values and grades

The value of the hotel room occupancy coefficient	The value of the hotel room sufficiency coefficient	Equivalent grade by a five-point grading scale
1	[10;+∞)	5
[0.9;1)	[9;10)	4.5
[0,8;0,9)	[8;9)	4
[0.7;0.8)	[7;8)	3.5
[0.6;0.7)	[6;7)	3
[0.5;0.6)	[5;6)	2.5

[0.4;0.5)	[4;5)	2
[0.3;0.4)	[3;4)	1.5
[0.2;0.3)	[2;3)	1
[0.1;0.2)	[1;2)	0.5
[0.0;0.1)	[0;1)	0

Step 4. Calculation of the mean value.
Step 5. Grouping of the regions by the obtained mean value and analysis.

Table 2: The correlation of mean values and characteristics of the groups corresponding to them

Mean value by the federal subject	The group the subject will be referred to	Characterization of the group
[4;5)	1	The development level of the tourism infrastructure is high and the occupancy is close to maximal. Tourism is one of the leading industries in the federal subject. Option close to ideal.
[3;4)	2	The development level of the hotel infrastructure is high, but the hotel room occupancy is average Tourism is one of the leading industries in the federal subject.
[2.5;3)	3+	The development level of the hotel infrastructure is good. In case of system support and well-devised promotion strategy, transfer to group 2 is possible, mostly due to a larger hotel room occupancy and/or investing in construction of the hotel infrastructure.
[2;2.5)	3	
[1.5;2)	4+	The hotel infrastructure is averagely and poorly developed in comparison to the world level. The hotel room sufficiency and occupancy are not enough to ensure an average term growth of the tourism sector. Long-term investment and promotion of these regions are necessary.
[1;2)	4	
[0.5;1)	5+	The development level of the tourism in the federal subject is lower that the mean level in the country and considerably lower in comparison to the developed tourist centres of Europe. The tourism infrastructure can only develop in the region provided there are long-term investements and system suport on the part of the state.
[0;1)	5	

Conclusion

Based on the conducted analysis it is found out that despite the stable growth in the number of hotels and similar means of accommodation, the degree of hotel room sufficiency and occupancy in the regions remains unsatisfactory (see Fig. 2). The average level of hotel room sufficiency in the country in 2016 was 2.97 rooms per 1000 people, and the occupancy level– 0.36. In most federal subjects, the hotel room sufficiency is lower than 5 beds per 1000 people, living in the region and the occupancy does not exceed 40%. Moreover, even St. Petersburg and Moscow, being leaders of the tourism industry in the country, show relatively weak results. Thus in 2016 in St. Petersburg the coefficient of hotel room sufficiency was 4.04 with the occupancy coefficient equal to 0.53, whereas in Moscow they are 3.85 and 0.53 correspondingly. Furthermore, as of the year 2011, in Paris the coefficient of hotel room sufficiency was equal to 8 and in London to 12.

The most advanced regions in terms of the hotel infrastructure availability are Krasnodar Krai, where the coefficient of hotel room sufficiency is 13.3, the Republic of Altai– 8.68, the Republic of Crimea

– 13.1 and Sevastopol – 13.37. In terms of the hotel room occupancy, other leaders in the country are North Ossetia – Alania – 0.88, Kaliningrad region – 0.59 and Krasnodar Krai – 0,43.

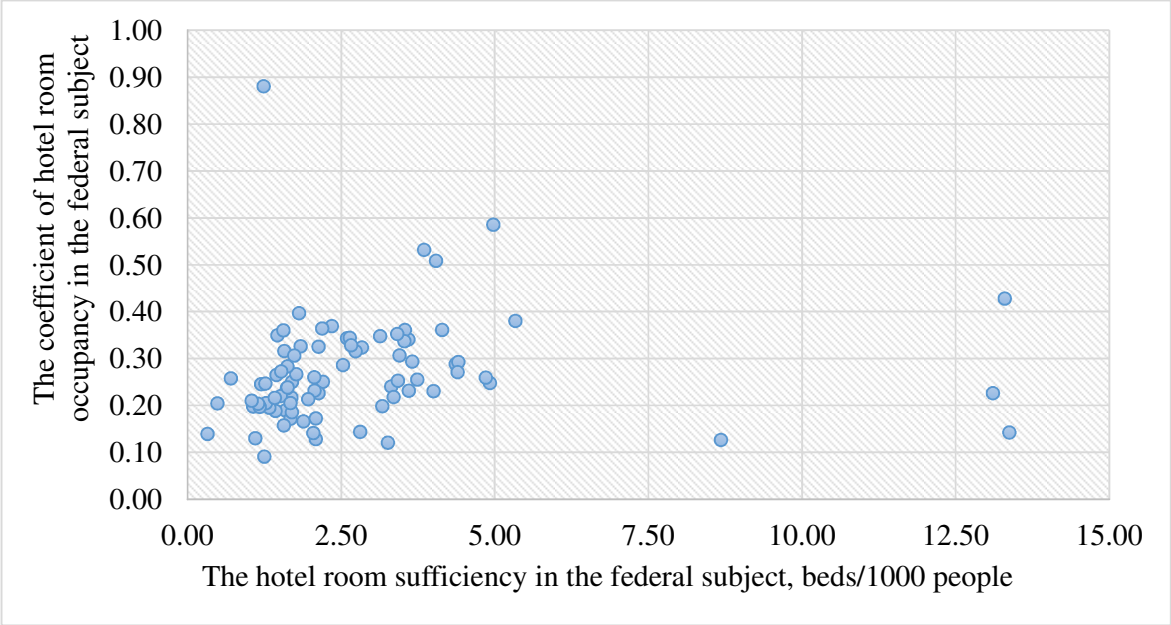


Fig. 2 : The grouping map of the federal subjects based on the hotel room occupancy and sufficiency indicators for the year 2016.

Table 3: Grouping of federal subjects accoding to the obtained mean values

The group the subject refers to	Federal subjects
1	-
2	Krasnodar Krai, the Republic of Crimea
3+	Sevastopol
3	Moscow, St. Petersburg, Kaliningrad region, the Republic of Altail, the Republic of North Ossetia - Alania, the Republic of Khakassia
4+	12 federal subjects
4	28 federal subjects
5+	33 federal subjects
5	2 federal subjects

The result of grouping of the federal subjects are presented in Table 3. This data can be used to work out development strategies for tourism industry in these subjects, transfer better experience from more successful subjects and determine the development level and intensity of use of the hotel infrastructure in the subjects. The existing potential can be exploited under the following conditions: state support of the policy of domestic tourism development, insurance of market pricing mechanisms to foster supply, corresponding to the existing financially reliable demand, including potential one, and to the modern vision of comfort stay, provision of the economy with the sufficient quantity of well-qualified staff.

The main limitation of the obtained results is a moderate number of indicators used for ranking. In further research, the author plans to widen the number of performance indicators and present a more detailed analysis, in particular, dynamic analysis of the hotel infrastructure development in the RF

subjects.

References

Barashok, I. V., Ovcharenko, N. P., & Rudenko, L. L. (2014). Gostinichnyj rynok Rossii: stanovlenie, modernizacija, perspektivy razvitija. Izvestija Sochinskogo gosudarstvennogo universiteta, (1), 29.

Goncharova S.N. (2016). Problemy konkurentosposobnosti gostinichnogo sektora v regional'nom aspekte: Materialy II mezhvuzovskoj nauchno-prakticheskoj konferencii nauchno-pedagogicheskih rabotnikov, aspirantov, prakticheskih rabotnikov, Rostov-na-Donu, 26 fevralja 2016, 108-115.

Horev, A. S., & Nikol'skaja, E. Ju. (2015). Sovremennye problemy i tendencii razvitija turistsko-gostinichnogo kompleksa. Innovacionnaja nauka, (11-1).

Pogorelova, N. V. (2011). Teoreticheskie podhody k issledovaniju ponjatija «turistskaja infrastruktura». Problemy sovremennoj jekonomiki (Novosibirsk), (5), 57-61.

Analysis of Tariff Policy in Urban Transport in St. Petersburg

Kulachinskaya Anastasia Yuryevna, Peter the Great Sp. Petersburg Polytechnic University, St.Petersburg, Russia, stucool@rambler.ru
Kravchenko Valentina Vitalyevna, Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russia, kravchenko_vv@spbstu.ru
Kuporov Yury Yurievich, Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russia, kuporov_yuyu@spbstu.ru

Abstract

In this paper, the authors consider the tariff policy of St. Petersburg from the position of two participants in transportation: authorities and passengers. The study includes a comparative analysis of the size of subsidies allocated for passenger transport by urban transport, the cost of travel and the share of travel costs in major cities of the Russian Federation and the world.

Keywords: financing, tariffs for transport, fare, share of travel expenses.

Introduction

Problems on the roads force sometimes all citizens, not only without cars but also with them, to use public transport that is why access to public transport is one of the most urgent topics of any large city nowadays. Thus, it becomes obvious that fare in urban transport affects all segments of the population.

Today, three parties are involved in the organization of passenger traffic in urban transport: authorities, which organize traffic control and tariff regulation, carriers, who carry out the transport, and passengers, who are active consumers.

The purpose of this work is to a comparative analysis of the cost of travel and diversity of tariff menu in cities of the Russian Federation and the world.

Tasks:

1. Detailed study of funding passenger transportation by urban transport in Moscow, St. Petersburg and Nizhny Novgorod in 2017.
2. Conducting a comparative analysis with the identification of deviations in St. Petersburg from other cities in question of fare in Moscow, St. Petersburg and Nizhny Novgorod in 2017.
3. The allocation of the share of travel expenses for residents of Moscow, St. Petersburg and Nizhny Novgorod.
4. Analysis of the cost of one-time tickets and daily tickets in various cities around the world in 2017.
5. The allocation of the cost of travel for residents of London, Helsinki and Lisbon.
6. Determination of positions in the tariff menu of other cities not represented in St. Petersburg.

Review of the literature

The statistical data of the Online Library of the Organization for Economic Cooperation and Development were used in writing this work (2017). It is through them the authors have analyzed the

average wages for 2016 in such cities of the world as London, Helsinki, Lisbon and the statistical services of the regions of the Russian Federation (Territorial authority of the Federal State Statistics Service in Moscow; Administration of the Federal Service of State Statistics by city Petersburg and the Leningrad region; Territorial body of the Federal State Statistics Service for the Nizhny Novgorod region). Based on data on the average wages of them it has become possible to calculate the share of monthly expenses of citizens for public transport.

The authors have given special attention to the normative legal acts of the Russian Federation regulating the formation of the budget of the regions of the country, as well as the approval of the fare.

Domestic experience was considered on the basis of a number of legislative documents of those regions that were taken by the authors as a basis for a comparative analysis of the cost of travel (Order of the Tariff Committee St. Petersburg; Order of the Tariff Committee St. Petersburg; Department of transport and development of road and transport infrastructure of Moscow).

The international experience of the cost of travel is considered on the basis of electronic resources of foreign countries (The Metropolitano de Lisboa; Helsinki Region Transport; Transport for London. Fares & payments). For example, these sources indicate not only the cost of a one-time trip, but also the cost of travel on electronic tickets is available.

The results of the literature review has showed that the problem of forming a tariff menu in the Russian Federation is not sufficiently developed in the normative literature.

Problem

In 2017, new travel documents were introduced in St. Petersburg, allowing citizens and visitors of the city to choose the most convenient and economical way for them. It was in 2017 when students of St. Petersburg had the opportunity to choose travel documents for a month (only land transport, only the underground or a unified ticket), and tourists - when purchasing temporary travel documents, which enable them to plan their travels around the city with the least costs.

Since 2017 new types of travel documents have become effective in St. Petersburg. They are monthly registered combined (tram, trolley, bus) ticket for students, monthly underground ticket for students, daily unified (tram, trolley, bus, underground) ticket (from 1 to 7 days), unified (tram, trolley, bus, underground) ticket for 90 minutes.

According to the information received by the author in the study tariff menus in various cities of the Russian Federation, ticket as “a ticket for 90 minutes” is only available in Moscow [9], St. Petersburg [5] and Nizhny Novgorod. A daily ticket is also available to residents of Nizhny Novgorod [12]. Thus, in the authors' opinion, it is expedient to consider the tariff policies of Moscow, St. Petersburg and Nizhny Novgorod as a comparison of the cost of travel in large cities of the Russian Federation, (tab.1.1 and 1.2).

The choice is based on social level of development of these cities, including the number of inhabitants, the complexity of the transport infrastructure, including the presence of the underground, and territorial distinctiveness. In the process of analysis, the Central, North-Western and Volga federal districts of the Russian Federation are considered.

Table 1.1 : Comparative analysis of passenger transportation subsidies in St. Petersburg, Moscow and Nizhny Novgorod in 2017

City	The budget of the subject of the Russian Federation, billion rubles.	The amount of subsidies for transporting passengers from the budget, billion rubles.
Moscow	1 977,00	90,00 (4,5% of budget)
St. Petersburg	554,00	28,00 (5% of budget)
Nizhny Novgorod	133,2	2,10 (1,58% of budget)

Table 1.2 Comparative analysis of the cost of travel in St. Petersburg, Moscow and Nizhny Novgorod in 2017

Travel Documents	Ticket price in 2017, rub.			Variance of the ticket price in St. Petersburg from Moscow,%	Variance of the ticket price in St. Petersburg from Nizhny Novgorod,%
	Moscow	St. Petersburg	Nizhniy Novgorod		
Monthly unified ticket	2 550,00	2 900,00	2 300,00	13,72%	26,09%
One-time fare for the underground	55,00	45,00	28,00	-18,2%	60,71%
One-time fare for ground transportation	55,00	40,00	28,00	-27,3%	42,86%
Electronic wallet (land transport)	35,00	31,00	26,00	-11,43%	19,23%
Electronic wallet (underground)	35,00	36,00	26,00	2,86%	38,46%
Monthly unified ticket for students	-	1 035,00	1150,00	-	-10%
Monthly ticket for students by underground	380,00	550,00	600,00	44,74%	-8,33%
Monthly ticket for students to land transport	250,00	485,00	600,00 (tram/ trolleybus)	94,00%	-19,17%
Monthly unified ticket for schoolchildren	-	515,00	920,00	-	-44,02%
Monthly ticket for schoolchildren by underground	380,00	-	500,00	-	-
Monthly ticket for schoolchildren to land transport	250,00	-	500,00 (tram/ trolleybus)	-	-
Ticket for 90 minutes	65,00	70,00	40,00	7,69%	75%
Ticket for 1 day	210,00	180,00	120,00	-14,29%	50%
Ticket for 3 days	400,00	340,00	350,00	-15,00%	-2,86%
Ticket for 7 days	800,00	680,00	-	-15,00%	-

Based on the information in tables 1.1 and 1.2, the following conclusions can be drawn: Moscow's budget is 3.6 times higher than the budget of St. Petersburg, while the amount of subsidies allocated for passenger transportation for 2017 in Moscow (90 billion rubles) (Law of the City of Moscow, 2016) 3.2 times the amount subsidized by urban passenger transport in St. Petersburg (28 billion rubles) (Law of St. Petersburg, 2016). The smallest share of subsidies from the budget allocated for passenger transportation by urban transport is in Nizhny Novgorod (1.58%).

The amount of subsidies for transporting passengers from the budget of Nizhny Novgorod is only 2.10 billion rubles (1.58%) (Law of the Nizhny Novgorod, 2016). Therefore, the cost of a one-month unified ticket for students is much higher than the cost of Moscow students for both types of public transport (by 520 rubles) and higher than in St. Petersburg (by 115 rubles). However, the fare for a ticket for one day is 120 rubles, while the highest price of this ticket was fixed in Moscow -210 rubles.

Thus, with a sufficiently high funding of urban passenger transport in Moscow, the cost of travel on tickets is slightly lower there than in St. Petersburg and Nizhny Novgorod.

The monthly single ticket in Moscow in 2017 costs 13.72% lower than in St. Petersburg (the difference in absolute value is 350 rubles). The ticket for students on the underground is 170 rubles lower, but the cost of tickets for schoolchildren in aggregate (380 rubles for the underground and 250 rubles for land transport) exceeds the total cost of a similar ticket in St. Petersburg by 115 rubles.

Besides, with a significant difference in the cost of tickets for 90 minutes (10 rubles), fare for daily tickets is more profitable in St. Petersburg (20 rubles per 1 day, 60 rubles - 2 days and 120 rubles - 7 days).

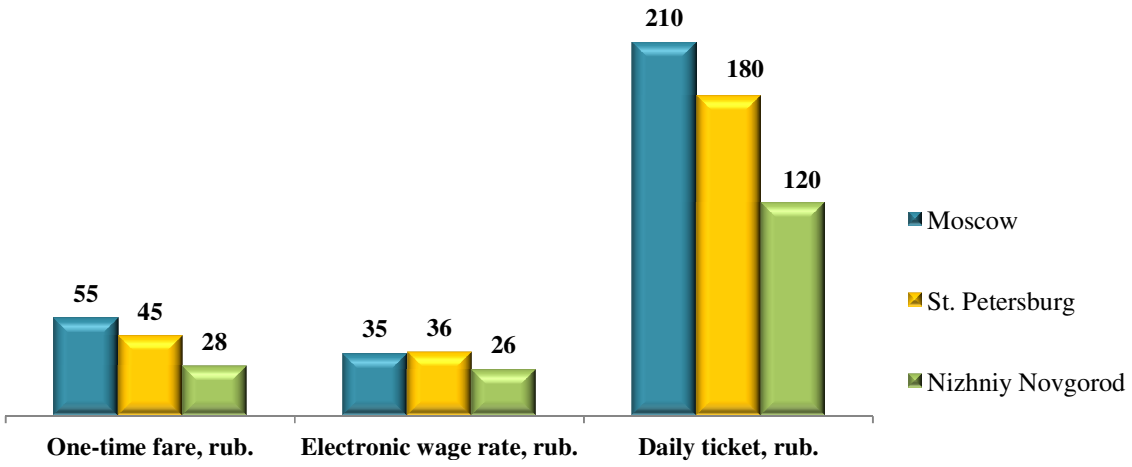


Fig.1.1 The fare for underground in Moscow, St. Petersburg and Nizhny Novgorod in 2017

Figure 1.1 shows comparative data on the cost of travel in the underground in 2017 in various cities of the Russian Federation. According to the provided information, the cheapest daily ticket belongs to

Nizhny Novgorod (120 rubles), while the most expensive one belongs to Moscow, respectively, the cost of a daily ticket in St. Petersburg can be considered one of the lowest.

The discount for fare on a travel document in relation to a one-time tariff in Moscow is 36.4%, which is 13.9% more than in St. Petersburg (20%). This is due with the size of the subsidies allocated from the budget of the constituent entities. However, at the same time, the tariff policy of St. Petersburg can not be considered unprofitable.

Based on the comparative analysis, the authors made a decision on the representation of the average nominal wage of residents of Moscow (Territorial authority of the Federal State Statistics Service in Moscow), St. Petersburg (Administration of the Federal Service of State Statistics by city Petersburg and the Leningrad region) and Nizhny Novgorod (Territorial body of the Federal State Statistics Service for the Nizhny Novgorod region) in April 2017 and the allocation of a monthly share of the costs of citizens for travel in urban transport for a monthly single pass (Table 1.3).

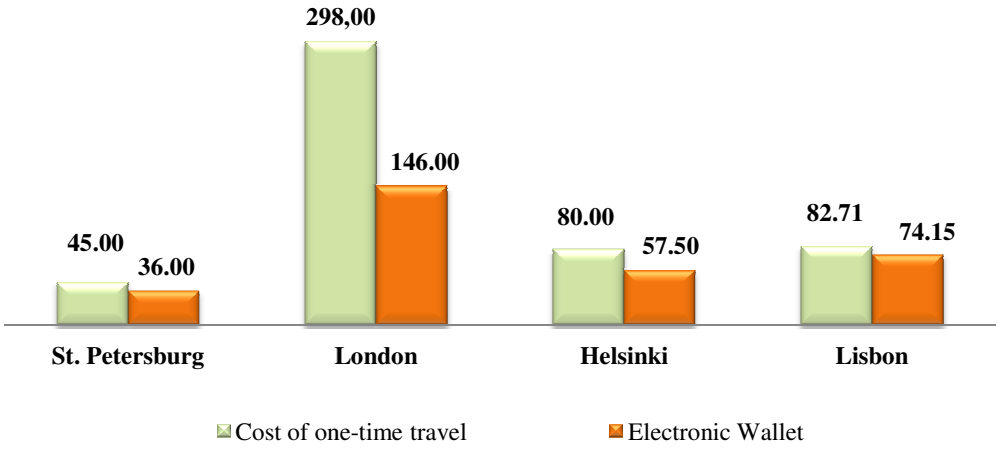
Table 1.3 Share of the costs of citizens of large cities of the Russian Federation for travel in urban transport in 2017

Index	Moscow	St. Petersburg	Nizhniy Novgorod
Average nominal wages, rubles.	86 759	53 261	30 865
The cost of a unified travel document for a month, rub.	2 550	2 900	2 300
Share of expenses for travel,%	2,94	5,44	7,45

Based on the data presented in Table 1.3, it can be concluded that the share of travel costs is much lower in Moscow. At the same time, residents of Nizhniy Novgorod have the largest share of travel costs (7.45%).

Based on the results of the study, the authors decided that it is necessary to consider the cost of travel in major cities of the world and determine the share of travel costs not only for residents of cities of the Russian Federation, but also for foreign citizens.

Based on the foregoing, a comparative analysis of the cost of one-time tickets for land transport in St. Petersburg and various cities around the world in 2017 (Fig. 1.2) and a comparative analysis of the cost of daily tickets in various cities around the world in 2017 (Figure 1.3).



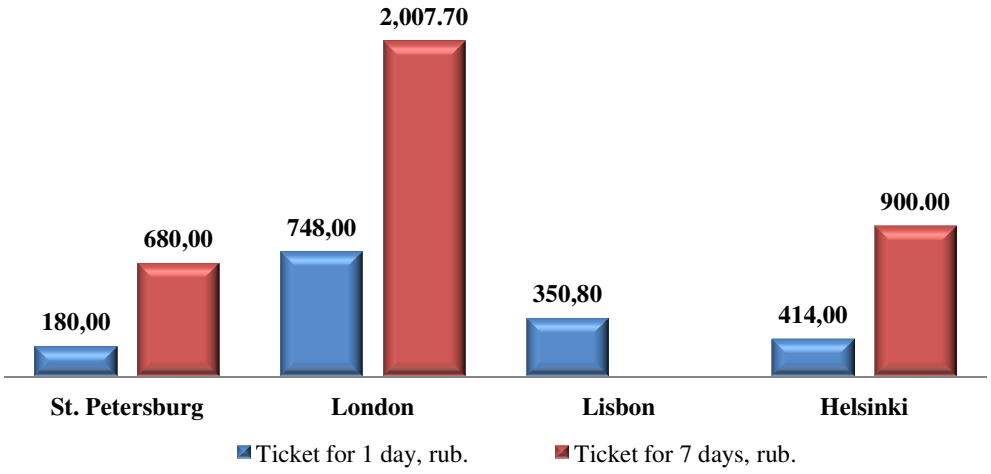
*** The cost in rubles is indicated by purchasing power parity**

Fig. 1.2 Comparative analysis of the cost of one-time tickets for underground in various cities around the world in 2017

In accordance with the information presented in Fig. 1.2, the highest unified tariff is presented in London (298.00 rubles.), further - in Lisbon (82.71 rubles.) and a one-time trip to Helsinki (80.00 rubles.). The discount for trip on a travel document in relation to a one-time fare in St. Petersburg is 20%, which is less than in London (104.1%) and Helsinki (39.13%), but more than in Lisbon (11.54 %).

However, an analysis of purchasing power parity showed that a one-time trip to St. Petersburg is one of the most economically accessible cities in all.

In addition, the authors conducted a comparative analysis of daily tickets in various cities around the world in 2017. Based on it is possible to determine what the cost of new tickets in St. Petersburg in other cities in the world, as well as to assess how far the cost of travel for this type of ticket is available for residents of the city and its guests.



*** The cost in rubles is indicated by purchasing power parity**

Fig.1.3 Comparative analysis of the cost of daily tickets in various cities of the world in 2017

Based on the data presented in Fig. 1.3, we can conclude that the highest price for travel on daily tickets is offered in London (748.00 rubles per day and 2 007.70 rubles per week).

The cost of the train in St. Petersburg remains the most socially-oriented among all cities considered by the authors, amounting to only 180.00 rubles for a day ticket and 680.00 rubles for the whole week ticket.

It is important to mention that for giving an objective assessment of the amount of fare in foreign countries it is advisable to identify the monthly share of travel costs in London, Lisbon and Helsinki (Online Library of the Organization for Economic Cooperation and Development. OECD iLibrary). However, given the availability of official data on the average wage in statistical offices of other countries only for 2016, it makes sense to indicate the share of travel costs.

Table 1.4 Share of travel costs for residents of major cities in the world in 2016

Index	London, GBP	Helsinki, euro	Lisbon, euro
Average monthly salary in 2016	2 845,2	3 434,1	1 381,2
The cost of travel by e-wallet per month	234**	54,70	36,20
Share of travel costs per month,%	8,2%	1,6%	2,62%

** counting on 2 subway journeys and 2 trips by land transport per day.

Thus, on the basis of the data presented in Table 1.4, it is concluded that the largest share of travel costs is borne by residents of London (8.2%), the lowest is by residents of Helsinki, with an average

wage of which it is only 1.6 %. However, even at such a low level of travel costs, the residents of Helsinki favor the abolition of fare for public transport (Most residents of Helsinki favor free urban transport).

Statement

While studying the nonresident and foreign experience of forming the tariff scale, the authors took into account the fact that the St. Petersburg tariff menu can rightly be considered one of the most diverse in the world, as today all the major travel tickets are available to the all citizens and visitors.

Problem solution

Based on the results of the analysis, the following conclusions can be formulated:

1. The amount of subsidies allocated for transporting passengers for 2017 in Moscow (90 billion rubles.) is 3.2 times the amount funded by urban passenger transport in St. Petersburg (28 billion rubles.). However, the smallest share of subsidies comes to Nizhny Novgorod, it is only 1.58% (2.10 billion rubles).

2. With a rather high subsidization of urban passenger transport in Moscow, the cost of travel tickets is slightly lower than in St. Petersburg and Nizhny Novgorod, and sometimes even higher. Thus, the monthly unified ticket in Moscow in 2017 costs 13.72% less than in St. Petersburg, but at the same time the cost of travel tickets for schoolchildren in the aggregate significantly exceeds the total cost of a similar ticket in St. Petersburg (115 rubles).

The share of travel expenses is much lower for citizens of Moscow (2.94%) than for residents of St. Petersburg (5.44%). At the same time, residents of Nizhny Novgorod (7.45%) have the largest share of travel costs.

3. The highest fare for a one-time ticket is presented in London (298.00 rubles.), the next one is in Lisbon (82.71 rubles.) and the cheapest in Helsinki (80.00 rubles).

An analysis of purchasing power parity showed that a one-time trip to St. Petersburg is in effect one of the most economically accessible cities in all.The most expensive whole- day tickets are offered in London (748.00 rubles for the day and 2 007.70 rubles for the week). Fare in St. Petersburg remains the most socially-oriented among all cities considered by the authors, amounting to only 180.00 rubles for a day and 680.00 rubles for 7 days.

4. The largest share of travel costs in foreign capitals of the world is born by residents of London (8.2%), the least - residents of Helsinki, with an average wage level, which is only 1.6%. In the Russian Federation, Moscow accounts for the smallest share (2.94%), followed by St. Petersburg - 5.18% and Nizhny Novgorod - 7.45%. In comparison with the cities of the Russian Federation, Moscow residents bear a smaller share of the cost of travel after city residents in Helsinki and Lisbon (2.94%). At the same time, residents of Nizhny Novgorod spend a large part of monthly incomes (7.45%) on travel, rather than residents of Moscow, St. Petersburg, Helsinki and Lisbon, but less than residents of London (8.2%).

5. There is the lack of a monthly ticket for the underground in the tariff menu of St. Petersburg. Only monthly tickets for a land type of transport (bus, tram or trolley bus by choice) are presented.

Conclusion

The authors' position is the need to introduce a working monthly ticket for the working people on the underground, the same as for students. This approach will allow residents of the city, traveling exclusively in the metro, to save money on travel without purchasing a unified monthly ticket or an electronic wallet called "Podorojnik".

Also the author considers the most interesting and potentially popular in St. Petersburg a unified ticket for 365 days, presented in Moscow and allowing Moscow residents to save about 1 517 rubles per month or 12 400 rubles a year.

Based on the conducted research, the authors adhere to the position according to which St. Petersburg is on the top level of accessibility of public transport in accordance with the proportion of the costs of citizens to travel among the major cities of the Russian Federation and the world considered. At a fairly low cost of travel, the share of costs remains stably high, second only to London.

From the point of view of the authorities, the subsidies allocated from the budget of St. Petersburg allow compensating the incomes for carriers that fall due to transportation of passengers on travel tickets. They do not cover the inter-tariff difference (the difference between an economically justified tariff and a one-time tariff for the population), since in 2017 specially approved a high one-time travel, oriented more likely not to residents, but to tourists of the city.

On the other hand, passengers have the opportunity to purchase travel documents profitable for themselves, taking into account individual needs and financial possibilities (from a one-time ticket to a "Plantain" ticket or a daily ticket), but are forced to spend a significant part of monthly incomes on public transport.

The tariff menu of St. Petersburg, in comparison with the proposals of other major cities in the world (London, Helsinki, Lisbon), seems to the author to be sufficient and diverse. However, the cost of travel, according to the presented tariff policy of the city, as a result of the analysis, can not be considered economically expedient for citizens in the same way as for the budget of St. Petersburg. In other words, in St. Petersburg, the process of subsidizing and tariff formation needs to be further improved in order to achieve a balance between the interests of such participants in passenger transport as authorities and passengers.

References

Law of St. Petersburg from 12/13/2016 № 699-113 "On the budget of St. Petersburg. Petersburg for 2017 and for the planning period of 2018 and 2019 "[Electronic resource]. - Access mode: http://www.consultant.ru/cons/cgi/online.cgi?req=doc&base=SPB&n=181099#0

Law of the Nizhny Novgorod region of December 23, 2016 No. 178-З "On the regional budget for 2017 and for the planning period 2018 and 2019" [Electronic resource]. - Access mode: https://rg.ru/2016/12/30/nizhnovgorod-zakon178-reg-dok.html

Law of the City of Moscow of November 23, 2016 No. 42 "On the budget of the city of Moscow for 2017 and the planning period of 2018 and 2019" [Electronic resource]. - Access mode: https://rg.ru/2016/12/20/moscow-zakon42-reg-dok.html

Order of the Tariff Committee. Petersburg on 12/20/2016 No. 262-r "On the establishment of tariffs for the transport of passengers and baggage by public land passenger transport by municipal and adjacent interregional routes of regular traffic and the subway in the territory of St. Petersburg. Petersburg in 2017 "[Electronic resource]. - Access mode: http://www.consultant.ru/cons/cgi/online.cgi?req=doc;base=SPB;n=183902#0

Order of the Tariff Committee. St. Petersburg from 21.12.2016 No. 268-r "On the establishment of the cost of travel documents for multiple use for travel in public land passenger transport in St. Petersburg. Petersburg and the underground for 2017 "[Electronic resource]. - Access mode: http://www.consultant.ru/cons/cgi/online.cgi?req=doc&base=SPB&n=181536#0

Territorial authority of the Federal State Statistics Service in Moscow [Electronic resource]. - Access mode: http://moscow.gks.ru/

Administration of the Federal Service of State Statistics by city Petersburg and the Leningrad region [Electronic resource]. - Access mode: http://petrostat.gks.ru/

Territorial body of the Federal State Statistics Service for the Nizhny Novgorod region [Electronic resource]. - Access mode: http://nizhstat.gks.ru/

Department of transport and development of road and transport infrastructure of Moscow. Table of tariffs [Electronic resource]. - Access mode: http://troika.mos.ru/tariffs/table/

Online Library of the Organization for Economic Cooperation and Development. OECD iLibrary [Electronic resource]. - Access mode: http://stats.oecd.org/viewhtml.aspx?datasetcode=AV_AN_WAGE&lang=en

Transport map of Nizhny Novgorod [Electronic resource]. - Access mode: https://siticard.ru/cards_tarifs

The Metropolitano de Lisboa. Information of fares [Electronic resource]. - Access mode: http://www.metrolisboa.pt/eng/customer-info/information-on-fares/

Helsinki Region Transport [Electronic resource]. - Access mode: https://www.hsl.fi/en/tickets-and-fares/

Transport for London. Fares & payments [Electronic resource]. - Access mode: https://tfl.gov.uk/fares-and-payments/

Most residents of Helsinki favor free urban transport [Electronic resource]. - Access mode: http://fontanka.fi/articles/32328/

A Study on the Impact of Taxation on the Business Environment in the EU

Țibulcă Ioana Laura, PhD. – Bucharest University of Economic Studies, Bucharest, Romania, tibulca.laura@gmail.com

Abstract

In any modern economy the business environment will be affected by taxation. The goal of this study is to look at the impact taxation has on the business environment in the European Union using business confidence as a measure for the expectations entrepreneurs have regarding the future evolution of the four major sectors of the economy: the services sector, the retail sector, the construction sector and the industrial sector. The tax burden will be used to measure the level of taxation and the impact of fiscal policies different EU countries implement. The research was done using quarterly data for the period between 1985Q1 and 2016Q3 collected from all 28 EU Member States. Several regression models were estimated which lead to individual conclusions for each Member State. These conclusions show the various effects that changes in the tax burden can have on the business environment.

Keywords: tax burden, business confidence, taxation, European Union, confidence index

Introduction

Taxation has an undeniable impact on our day to day life. If this statement holds true for people, it is equally true for companies. However it is much more difficult to pinpoint the influence taxation has on the business environment. The current study is an attempt to analyse the relationship between the business confidence index and fiscal pressure.

The business confidence index is calculated by the European Union and the OECD based on the answers managers of companies give to questions that are part of business confidence surveys. The goal is to see what the managers believe is the current state of their company and what their expectations are for the future. The confidence index calculated for a certain sector reflects the expectations of the economic agents that are active in that sector of activity regarding the evolution of that particular sector. In order to see if the expectations of managers are influenced by possible changes in taxation, I have decided to use the tax burden as a quantifiable taxation measure. The tax burden I used is calculated for different categories of taxes. Thus I have taken into account, separately, income taxes, taxes on production, sales and imports, and social security contributions.

This study is structured into three sections. The first section deals with the literature review and it contains an overview of other research previously done on this topic of interest. The second section deals with the research methodology I used throughout the entire research process. The third section contains a presentation of the results I obtained as a result of the analysis as well as the interpretation of the research results. This last section is followed by the conclusions of the research and by the references used. A more extensive presentation of all the results can be found in the tables included in the annexes.

1. Literature Review

Previous research regarding business confidence is sparse and most of the existing studies focus more on the theoretical, methodological and descriptive side of calculating various business confidence indices. The main original element of the current research is relating business confidence to taxation by using the tax burden and various business confidence indices. As far as I know, this has not been done previously.

The tax burden has been the focus of financial researchers for many decades. Different approaches towards measuring the fiscal pressure are presented, amongst others, by Musgrave and Thin (1948), Atkinson (1980), Devarajan, Fullerton, and Musgrave (1980), Auerbach and Rosen (1980), Kiefer (1984), Atrostic and Nunns (1991), Metcalf (2006). While the opinions regarding ways of measuring the tax burden have evolved and expanded, the fiscal burden has remained in the limelight of debates and research studies as a means of evaluating the impact of different fiscal policy decisions on the social and business environment.

Business confidence has also been an issue of great interest amongst researchers. Collins (2001) used the Granger Causality to analyse the relationship between business confidence surveys and stock market performance. His conclusion was that business confidence surveys are not a predictor of stock market performance, but that stock market performance is a predictor of business confidence surveys.

One of the main issues of interest regarding business confidence is exactly what business confidence reflects and what does a change in business confidence mean. Silverstone and Mitchell (2005) used panel data analysis on a company level to determine exactly what changes in microeconomic and macroeconomic variables are anticipated by changes in business confidence. Their conclusion was that the variables associated to business confidence change over time and, moreover, business confidence means different things to different companies. Herein lays one of the limitations of using business confidence indicators in any analysis: these indicators are constructed based on answers that reflect the personal view of the manager who answered the survey questions. Therefore, they contain a good dose of subjectivity. However, this can also be seen as one of the advantages of using business confidence indicators; sometimes a manager's perception can be more important than the actual truth because any decision the manager makes will be based on that perception.

This study aims to analyse the relationship between taxation and business confidence indices. I will analyse data from the European Union Member States and estimate regression models with the different business confidence indices as a dependent variables and the different types of tax burden as independent variables.

2. Research Methodology and Database

The research database contains quarterly information for the dependent and independent variables I used in the regression models. I collected information for each variable for each of the 28 EU Member States. The initial time period was 1985Q1 to 2016Q3. However, not all the Member States provided information for the entire time period and this is the reason why the number of observations differs from one Member States to the other. I do not believe that the difference in number of observations has an impact on the relevance of the research results because for many of the Member States it is to be expected that the time period will be shorter. For countries that only became EU Member States in 2004 or later, I can only consider relevant to the research on tax convergence the tax and business confidence information that they provided during the period when they were undergoing negotiations to become part of the European Union. Therefore, a shorter time period actually leads to more relevant results in the case of the Member States that I mentioned above.

The research method I used is regression model estimation. In order to shed some light on the influence that taxation has on business confidence, I estimated a series of regression models based on equation (1).

$$CI = \alpha_0 + \alpha_1 * DTR + \alpha_2 * ITR + \alpha_3 * SSC + \varepsilon \qquad (1)$$

where CI is the confidence index, DTR is the direct tax burden, ITR is the indirect tax burden and SSC is the social security burden.

A description of the variables used in the regression models can be found in Table 1. The tax burden is used as a proxy for the fiscal system of a Member State of the European Union. I considered three major types of tax burden, each corresponding to one of the major types of taxes: the direct tax

burden (DTR) calculated as direct taxes collected as a percentage of the GDP, the indirect tax burden (ITR) calculated as indirect taxes collected as a percentage of the GDP, and the burden due to social security (SSC) calculated as social security contributions collected as a percentage of the GDP. The database contains information for each of these three major tax groups, on a quarterly basis, for the period between 1985Q1 and 2016Q3. The data was extracted for the Eurostat online database.

Table 1: Description of variables

Independent Variables	
Name of Variable	*Description of Variable*
DTR	direct tax burden; calculated as direct taxes collected as a percentage of the GDP
ITR	indirect tax burden; calculated as indirect taxes collected as a percentage of the GDP
SSC	burden due to social security; calculated as social security contributions collected as a percentage of the GDP
Dependent variables	
Name of Variable	*Description of Variable*
ICI	industrial confidence index; business confidence index calculated on a national level for the industrial sector
CCI	construction confidence index; business confidence index calculated on a national level for the construction sector
RCI	retail confidence index; business confidence index calculated on a national level for the retail sector
SCI	services confidence index; business confidence index calculated on a national level for the services sector

The dependent variables in each regression model are the business confidence indices for different sectors of the economy: the industrial sector (ICI, industrial confidence index), the construction sector (CCI, construction confidence index), the retail sector (RCI, retail confidence index) and the services sector (SCI, services confidence index). These indices are calculated and reported by each Member State on a monthly basis. They are calculated using the OECD methodology based on business confidence surveys. These surveys contain multiple choice questions that the managers of companies that are active in a certain sector of the economy have to answer. The questions are aimed not only at the current state of the company, but also at what the expectations of the managers are for the future. Many of the questions ask the respondent to anticipate what the evolution of the company or the market will be in the short term (the next few months). One of the limitations of the business confidence indices comes from the fact that, though the general principles and the methodology the surveys are built on are the same, the questions and the answer choices are not standardized. However, the business confidence surveys are considered to be a good way of seeing how those involved in a certain activity anticipate the evolution of their business sector (Collins, 2001).

The data for the four business confidence indicators (ICI, CCI, RCI and SCI) that I used in this analysis was also taken from the Eurostat online database. As the data was provided on a monthly basis, I calculated a simple arithmetic average for each three months to convert the monthly data into quarterly data which could be related with the quarterly information regarding taxation.

I conducted a country-based analysis for each of the 28 EU Member States. Therefore, for each Member States, four regression models were estimated using OLS. In other words, I estimated a regression model for each of the four business confidence indicators (ICI, CCI, RCI and SCI). Some of the models were adjusted and validated, others were rejected as inappropriate. A more extensive view on the results of this research is presented in the next section of the paper.

3. Research Results

Using the database previously described, I estimated multiple regression models for each Member State of the European Union. For each EU Member State, I estimated 4 regression models using the same explanatory variables (DTR, ITR and SSC) in each model. But for each estimated model I changed the dependent variable starting with the ICI in the first estimated model, followed by the CCI, RCI and SCI respectively. Thus, I estimated 110 regression models in total for the EU Member States. Not all the regression models were validated and some were adjusted in order to be validated. We only estimated 110 regression models and not 112 because Luxembourg did not provide information for either the retail confidence index (RCI) or the services confidence index (SCI) and, therefore, those regression models could not be estimated.

The research on the impact of taxation on business confidence in the industrial sector in the European Union (please see Annexes, Table 3) resulted in the validation of regression models for 10 of the 28 Member States (the Czech Republic, Greece, Croatia, Italy, Lithuania, Luxembourg, Slovenia, Slovakia, Finland and Sweden). It should be noted that for some of these countries adjustments were made in order to validate the regression model.

The analysis conducted regarding the impact of the tax burden on business confidence in the construction sector (please see Annexes, Table 4) resulted in the validation of regression models for 8 of the 28 Member States (Bulgaria, Denmark, Germany, Croatia, Italy, Hungary, Poland and Slovenia). After analyzing the impact of taxation on business confidence in the retail sector (please see Annexes, Table 5) I validated the linear regression models for 7 of the 28 Member States (the Czech Republic, France, Cyprus, Latvia, Slovenia, Slovakia and Finland). For Ireland, Denmark and Malta there were too few observations for the estimation to have any accuracy. Of all four confidence indicators, for the RCI I found the fewest validated regression models.

As a result of analyzing the impact of taxation on the confidence of companies in the services sector (please see Annexes, Table 6), I validated 8 of the models, those estimated for Denmark, Germany, Latvia, Hungary, Austria, Poland, Slovenia and Slovakia. For Luxembourg I could not estimate the regression model because data for the SCI was not available for this country. Also, there were too few observations for Denmark and Croatia to be able to give any scientific and economic value to the results of the estimations.

Table 2: Estimation results – adjusted and validated models

	Dependent variable	R^2	Intercept	DTR	ITR	SSC	No. obs.
			(Prob.)	(Prob.)	(Prob.)	(Prob.)	
Bulgaria	CCI	0.101141			**2.507036****		50
					(0.0117)		
Czech Rep	ICI	0.072437			**43.44398*****		50
					(0.094)		
	RCI	0.201172	**0.22917*****			**-8.745065***	50

			(0.0991)			(0.0011)	
Denmark	CCI	0.080927		**7.881702*** **		**-6.201837** **	62
				(0.081)		(0.0319)	
	SCI	0.325293		**20.35751*** **	**-22.09295** **		17
				(0.0729)	(0.0308)		
Germany	CCI	0.15482	**-0.947888** **	**11.10926** **		**-38.40092***	50
			(0.0257)	(0.0424)		(0.0082)	
	SCI	0.257678		**5.686355** **	**-18.96483***	**-20.133***	50
				(0.0251)	(0.0034)	(0.0029)	
Greece	ICI	0.153106		**4.190587*** **	**-10.90063*** **		34
				(0.0862)	(0.052)		
France	RCI	0.046498	**-0.22178** **			**-9.829684** **	118
			(0.0407)			(0.019)	
Croatia	ICI	0.305652		**-5.301283** **			10
				(0.0435)			
	CCI	0.578832		**-1.025926***			10
				(0.0059)			
Italy	ICI	0.049313				**-2.617527*** **	50
						(0.057)	
	CCI	0.139498		**0.557573***		**-1.478483***	50
				(0.0027)		(0.0077)	
Cyprus	RCI	0.352879			**-64.91096***		49
					(0.0000)		
Latvia	RCI	0.034709			**10.43944** **		62
					(0.0354)		
	SCI	0.118799			**6.881972** **	**-4.664505*** **	50
					(0.0442)	(0.0902)	
Lithuania	ICI	0.080647		**-5.267237*** **			42
				(0.0594)			

Source: own calculus
Note: *significant at 1%; ** significant at 5%; ***significant at 10%

In order to have a more detailed analysis on the impact of the tax burden on business confidence, I will continue with a presentation of the estimation results of the adjusted validated regression models of each Member State. The results are summarized in Table 2.

One result that I expected to find was an indirect relationship between the business confidence indices and the different types of tax burden. And my expectations were fulfilled in the case of most Member States for which I validated regression models. However, the results vary from one country to the other; therefore I will comment on the results obtained for each Member State in turn.

In *Bulgaria*, the indirect tax policy has a direct and positive impact on business confidence in the construction (CCI). In spite of the small value of the R^2 coefficient, which was to be expected, I can conclude that an increase in indirect taxation can lead to an increase in business confidence in the

construction sector. This result can be attributed to the fact that the managers might see an increase in indirect taxation as a guarantee that direct taxation will not be increased. Also, managers might expect to be able to shift the additional indirect tax burden onto their clients and not be affected by the increase in indirect taxation.

For the *Czech Republic*, I can conclude that indirect taxation positively influences business confidence in the industrial sector (ICI). The positive value of the coefficient that determines the indirect tax burden is relatively large (43.443) and it is significant at a 10% level. This leads to a considerable influence that the indirect taxation has on business confidence in the industrial sector. Business confidence in the retail sector (RCI) is negatively influenced by the social security policy. An increase in social security contributions would lead to larger tax expenses for the company, which would cause a decrease in business confidence for the retail sector in the Czech Republic.

In *Denmark*, the social security policy negatively impact business confidence in the construction sector (CCI), while direct taxation has a positive impact on the same sector. The result for social security contributions was to be expected, but the outcome of the research for direct taxation is surprising. An increase in direct taxation leads to an increase in business confidence in the construction sector. This positive impact of direct taxation also appears when the services sector is analyzed. But for the business confidence in the services sector I also find a negative impact of indirect taxation. Therefore an increase in direct taxation is seen as favourable by the managers, while an increase in indirect taxation is seen as unfavourable. The explanation for this perception might be due to the fact that Denmark is one of the northern countries of Europe, where most of the tax income comes from direct taxation. Therefore, managers might be used to high direct taxation, but might perceive increases in indirect taxation as bad signs.

Most of the research results for *Germany* are as I expected: an increase in indirect taxation leads to a decrease in business confidence in the services sector (SCI), while an increase in social security contributions leads to a decrease of business confidence in both the construction sector (CCI) and in the services sector. The conclusion for direct taxation is, however, similar to that presented for Denmark: direct taxation positively influences business confidence in both the construction and in the services sectors. Another noticeable result is the fact that the model for the services sector in Germany is the only one where all three types of tax burden Ire retained in the final validated model. For the services sector, taxation accounts for almost 26% of the perception of managers regarding the future development for their sector of activity.

The research results for *Greece* show a positive impact of direct taxation and a negative impact of indirect taxation on business confidence in the industrial sector (ICI). The impact of indirect taxation is almost double that of direct taxation, which is not surprising in a country that relies mostly on indirect tax revenues. However, all conclusions regarding Greece must be considered with caution because for this country only 34 observations were available and this might have a negative impact on the results.

In *France*, there is a negative impact of the social security policy on business confidence in the retail sector (RCI). For this country, on the one hand I have the largest number of observations for any of the EU Member States (118 observations); on the other hand, the value of R^2 is only 4.6%, which means that less than 5% of the managers' confidence in the retail sector is based on taxation.

According to the research results, in *Croatia*, there is a negative impact of direct taxation on business confidence in both the industrial (ICI) and in the construction sectors (CCI). In spite of the high level of the R^2 coefficient for both models, any conclusion for Croatia should be drawn with considerable reservations due to the very small number of observations available for this EU Member States (only 10 observations).

In *Italy* there is a negative impact of the social security policy on business confidence in both the industrial (ICI) and the construction sectors (CCI). However, the impact is much more pronounced in the industrial sector than it is in the construction sector. What is surprising about the results for Italy is the positive impact of direct taxation on business confidence in the construction sector. This result

is similar to the results obtained for the construction sectors in Germany and Denmark. Still, the impact of direct taxation on business confidence in Italy is much less pronounced that in Germany or Denmark.

The research for *Cyprus* leads to a significantly negative impact of indirect taxation on business confidence in the retail sector (RCI). This means than even the slightest increase in indirect taxes will lead to a severe decrease of business confidence in this sector. The regression model has a R^2 coefficient of 0.35 and the research was conducted on sufficient observations, which lends credibility to the conclusions.

The results for *Latvia* show a negative impact of the social security policy on business confidence in the services sector (SCI). However, there is also a positive impact of indirect taxation on business confidence in the retail and services sectors (SCI). The explanation for these results might be similar to that previously discussed for Bulgaria. The managers might see this as the lesser of two evils (an increase in indirect taxes is preferable to an increase in direct taxes) and they might think it will be possible to shift the additional tax burden to the end-consumer instead of bearing it themselves.

Direct taxation has a negative impact on business confidence in the industrial sector in *Lithuania*. Even if the coefficient that determines the direct tax burden is significant at a level of 10%, the value of R^2 is only 8%. This value is acceptable for this study, but it shows that the influence of direct taxation on the perception of managers in the industrial sector is nevertheless limited.

In *Luxembourg*, the research results showed a strong negative impact of the social security policy on business confidence in the construction sector (ICI). Also, direct taxation has a positive impact on business confidence in the construction sector. This result is similar to those obtained for Denmark and Germany. The value of the R^2 coefficient is 19%, one of the largest for all the validated models, which leads to the conclusion that managers in Luxembourg consider taxation important when making predictions about the future of their company and their business sector.

The research results for *Hungary* revealed a negative impact of the direct taxation policy on business confidence in the construction sector (CCI). However, when I analyzed business confidence in the services sector (SCI), the estimations showed a positive impact of the social security policy. This means that an increase in social security contributions could lead to an increase in business confidence in the services sector in Hungary. This result is even more revealing when linked to the fact that the services sector accounts for more of the Hungarian GDP than any of the other sectors of the economy.

When it comes to the results I obtained for *Austria*, I could only adjust and validate one regression model. This showed a negative impact of direct taxation on business confidence in the services sector (SCI) in Austria. Therefore an increase in direct taxes could lead to a decrease of business confidence in this sector of the economy. However, it must also be noted that R^2 is only approximately 5%, which means that direct taxation only accounts for a small part of the variations in business confidence in Austria.

The data for *Poland* lead us to conclude that an increase in direct taxation could cause a decrease in business confidence in the services sector (SCI). Furthermore, the results also showed a positive impact of the indirect tax policy on business confidence in the construction sector (CCI). This is similar to the findings for Latvia, the Czech Republic and Bulgaria. The explanation might be similar: managers of companies in this sector prefer increases in indirect taxation to those in direct taxation.

Slovenia is the only European Union Member State for which I could reach conclusions for all the four sectors of the economy that I included in this analysis. The social security policy has a negative impact on all the four sectors. Therefore, any increase in social security contributions could lead to a decrease of business confidence in the industrial, construction, retail and services sectors in Slovenia.

The results for *Slovakia* were somewhat surprising: direct taxation has a negative impact on the confidence of managers in the industrial sector (ICI), but it has a positive impact on business confidence in the retail (RCI) and services sectors (SCI). This type of result underlines the

complexity of any tax policy decision. The same tax measure can be seen as a positive signal by the companies in one sector, but it might be perceived as unfavourable by other sectors of the same economy.

The research conducted on data collected from *Finland* showed a positive impact of indirect taxation on business confidence in the retail sector (RCI). This is a similar result to that present for Latvia, for the same sector of activity. As Finland relies mainly on direct taxation, perhaps managers perceive increases in indirect taxation as a signal that the direct tax burden will diminish in the future because it is being shifted to the indirect taxes.

Business confidence in the industrial sector (ICI) in *Sweden* is negatively linked to indirect taxation. The data from Greece showed the same connection for the same business sector. The value of the coefficient that determines the indirect tax burden is quite large, but this is outbalanced by the small value of R^2, less that 5%.

The overall conclusion for the European Union is that, in spite of the fact that changes in taxation levels clearly impact business confidence, I cannot establish any rules that would be valid in all the Member States. Each change in the tax burden impacts every Member State in a unique way. The only conclusions that can be drawn are for each Member State individually and not for the EU as a whole.

Conclusions

In the current study I tried to establish if managers take tax policy into consideration when anticipating the evolution of their company and of their business sector. In order to answer this research question I used regression model estimation based on business confidence indices for the industrial, construction, retail and services sectors as Ill as tax burden information for direct taxation, indirect taxation and social security contributions.

The analysis was conducted for all the current 28 Member States of the European Union. However, the results pointed to different conclusions for different countries, therefore I have no single answer for the entire European Union. I can only reach conclusions for certain groups of states and, sometimes, for only one Member State.

One group of Member States is that where, according to the results, taxation does not influence managers' perception of their business environment. This group includes: Belgium, Estonia, Ireland, Malta, the Netherlands, Portugal, Romania, Spain and the United Kingdom. I believe that there can be two possible explanations for these results: either the tax legislation is very stale, with few changes and therefore it is unlikely to cause any surprising changes in the business environment; or the opposite is true: the tax legislation is very unstable and the changes are so frequent that the managers cannot anticipate them in any way.

For all the other Member States that were not included in the first group I could reach conclusion regarding the influence of tax policy on business confidence for at least one of the sectors that I included in the analysis. In most cases an increase in taxation would lead to a decrease in business confidence: a higher direct tax burden would have a negative impact on business confidence in Croatia, Lithuania, Hungary, Austria, Poland and Slovakia; an increase in indirect taxes would negatively impact business confidence in Denmark, Germany, Greece, Cyprus and Sweden; higher social security contributions could diminish business confidence in the Czech Republic, Denmark, Germany, France, Italy, Latvia, Luxembourg, Slovenia and Finland. As an overall conclusion, the social security tax burden seems to have the greatest impact on business confidence in European countries.

The research results also showed that in some of the European Union Member States, taxation has a positive impact on business confidence in certain sectors of the economy. The dependent variables (business confidence indices) are based on qualitative data provided by the managers of companies that are active in a certain sector. Therefore, sometimes managers perceive increases in a particular

type of tax burden as favourable or perhaps they only consider it to be the lesser of two evils (e.g. the manager would rather have an increase in the indirect taxes that have one in direct taxes).

There is a clear need for more extensive research on the influence of taxation on business confidence, with more clear-cut conclusions and using a variety of research methods. The study has barely scratched the surface of establishing and describing the relationship between the tax burden and the perception of managers regarding the future evolution of their company and their business sector.

References

Atkinson, A.B., (1980) 'Horizontal Equity and the Distribution of the Tax Burden', in: Aaron, H. and Boskin, M. (ed.), *The Economics of Taxation*, Washington, D.C. Brookings

Atrostic, B.K. and Nunns, J.R., (1991) 'Measuring Tax Burden: A Historical Perspective', *Fifty Years of Economic Measurement: The Jubilee of the Conference on Research in Income and Wealth*, University of Chicago Press, pp. 343 - 420

Auerbach, A.J. and Rosen, H.S., (1980) 'Will the Real Excess Burden Please Stand Up?', NBER Working Paper no.495

Collins, D., (2001) 'The Relationship between Business Confidence Surveys and Stock Market Performance', *Investment Analysts Journal*, vol. 30(54), pp. 9-17

Darling, P.G., (1955) 'A Surrogative Measure of Business Confidence and Its Relation to Stock Prices', *The Journal of Finance*, vol. 10, pp. 442–458

Devarajan, S., Fullerton, D. and Musgrave, R.A., (1980) 'Estimating the Distribution of Tax Burdens', *Journal of Public Economics*, vol. 13, pp. 155-182

Heye, C., (1993) 'Labour Market Tightness and Business Confidence: An International Comparison', *Politics & Society*, vol. 21, pp. 169-193

Hohnischa, M. Pittnauerc, S. Solomond, S. and Stauffere, D., (2005) 'Socioeconomic interaction and swings in business confidence indicators', *Physica A: Statistical Mechanics and its Applications*, vol. 345(3–4), pp. 646–656

Jacobs, D., 'Corporate Economic Power and the State: A Longitudinal Assessment of Two Explanations', 1988, *American Journal of Sociology*, vol. 93(4), pp. 852-881

Kiefer, D.W., (1984) 'Distributional Tax Progressivity Indexes', *National Tax Journal*, vol. 37(4), pp. 497-513

Metcalf, G.E., (2006) 'Tax Incidence, Discussion Papers Series', Department of Economics, Tufts University, [Online], http://ase.tufts.edu/econ/papers/200607.pdf

Musgrave, R.A. and Thin, I., (1948) 'Income Tax Progression, 1929-1948', *Journal of Political Economy*, vol. 56, pp. 498-514

OECD (2003) 'Business Tendency Surveys: A Handbook', Statistics Directorate, Paris

OECD (2006) 'Introducing OECD Standardised Business and Consumer Confidence Indicators and Zone Aggregates', Main Economic Indicators

Quinn, D.P., (1989) 'Corporate Taxation and Corporate Economic Power: Testing Class-Power and Business-Confidence Models', American Journal of Sociology, vol. 94 (6), pp.1419-1426

Silverstone, B. and Mitchell, J., (2005) 'Insights into business confidence from firm-level panel data', Working Paper, University of Waikato, [online]

http://researchcommons.waikato.ac.nz/bitstream/handle/10289/1641/Economics_wp_0509.pdf?sequence=1&isAllowed=y

Taylor, K. and McNabb, R., (2007) 'Business Cycles and the Role of Confidence: Evidence for Europe', *Oxford Bulletin of Economics and Statistics*, vol. 69, pp. 185–208

Annexes

Annex 1

Table 3: the impact of taxation on the ICI

	Country	Intercept	DTR	ITR	SSC	R^2	No. obs.
1	Belgium	-0.222826	-0.30381	-1.82075	-1.2716	0.034	78
		(0.2733)	(0.5929)	(0.7351)	(0.6703)		
2	Bulgaria	-1.840555	-0.10249	-15.271	-13.834	0.029713	50
		(0.3997)	(0.9891)	(0.5078)	(0.654)		
3	Czech Rep	0.051785	3.416475	44.72895	30.34183	0.078671	50
		(0.9611)	(0.5861)	(0.095)	(0.1462)		
4	Denmark	0.320964	5.071845	17.28534	-0.29175	0.054881	62
		(0.3551)	(0.5117)	(0.1848)	(0.949)		
5	Germany	0.851968	-9.63508	-6.21119	5.467676	0.039728	50
		(0.4337)	(0.5275)	(0.8672)	(0.8897)		
6	Estonia	0.373092	1.893929	2.66339	3.280239	0.028299	50
		(0.4913)	(0.4092)	(0.5899)	(0.7547)		
7	Ireland	-0.022556	0.100942	0.802041	14.17996	1	4
		NA	NA	NA	NA		
8	Greece	0.177484	4.214382	-10.0102	6.454285	0.18926	34
		(0.751)	(0.0915)	(0.0816)	(0.2875)		
9	Spain	-0.315241	-0.58225	-2.22312	17.94482	0.07282	50
		(0.3136)	(0.5698)	(0.2422)	(0.0657)		
10	France	-0.141005	-0.04201	2.784669	-19.7534	0.021988	118
		(0.6261)	(0.9747)	(0.1336)	(0.1816)		
11	Croatia	0.185785	-4.59025	5.65715	6.515901	0.63583	10
		(0.4367)	(0.0809)	(0.1181)	(0.1585)		
12	Italy	-0.201138	0.612125	1.665273	-3.65498	0.084763	50
		(0.2715)	(0.3785)	(0.7343)	(0.0909)		
13	Cyprus	0.385712	-0.2929	0.794802	-1.21956	0.012846	50
		(0.3013)	(0.7294)	(0.7123)	(0.5111)		
14	Latvia	3.15E+15	3.34E+15	6.24E+16	1.84E+16	0.026981	62
		(0.3537)	(0.9227)	(0.271)	(0.7131)		
15	Lituania	-0.142275	-5.7065	4.802126	-3.47527	0.089064	42
		(0.8317)	(0.0707)	(0.6844)	(0.6659)		

	Country	Intercept	DTR	ITR	SSC	R^2	No. obs.
16	Luxembourg	-0.610204	10.75823	-3.02004	-78.0503	0.209657	50
		(0.348)	(0.0397)	(0.8656)	(0.0027)		
17	Hungary	-0.044627	1.411125	8.402435	7.011352	0.056162	62
		(0.9213)	(0.816)	(0.263)	(0.2872)		
18	Malta	-1.577108	1.766303	-8.48909	4.448305	0.024181	47
		(0.1831)	(0.6829)	(0.4081)	(0.6819)		
19	Netherlands	-0.591831	0.232906	-7.66781	-4.70253	0.034701	62
		(0.2957)	(0.9526)	(0.3532)	(0.497)		
20	Austria	-1.06236	-2.63998	-29.6281	14.25046	0.068332	50
		(0.2403)	(0.7475)	(0.423)	(0.1821)		
21	Poland	-0.177228	-0.37894	1.474969	1.353276	0.046044	50
		(0.2144)	(0.4988)	(0.4068)	(0.2512)		
22	Portugal	0.120913	0.883617	0.163454	-3.69529	0.008208	61
		(0.8279)	(0.5937)	(0.9835)	(0.6562)		
23	Romania	-0.794497	1.061246	5.592315	-1.34839	0.046575	50
		(0.2613)	(0.6046)	(0.2541)	(0.7837)		
24	Slovenia	-0.17836	-3.25727	-7.8265	-12.5901	0.123678	62
		(0.5558)	(0.2972)	(0.1578)	(0.018)		
25	Slovakia	-0.185509	-39.4577	-4.02052	-23.6758	0.074958	61
		(0.9398)	(0.0915)	(0.8757)	(0.5393)		
26	Finland	0.751463	7.141719	-13.0236	-44.1103	0.067994	62
		(0.4114)	(0.1494)	(0.5617)	(0.0481)		
27	Sweden	-0.017408	27.95147	-69.7857	9.586366	0.160078	62
		(0.9799)	(0.1175)	(0.0099)	(0.4263)		
28	UK	-1.525939	7.660251	39.86942	1.502851	0.037196	78
		(0.067)	(0.137)	(0.1802)	(0.9419)		

Annex 2

Table 4: the impact of taxation on the CCI

	Country	Intercept	DTR	ITR	SSC	R2	No. obs.
1	Belgium	-0.06759	-0.04409	0.603278	-2.43023	0.040154	78
		(0.5923)	(0.9007)	(0.857)	(0.1934)		
2	Bulgaria	-0.154513	0.234888	3.202597	-1.86189	0.17246	50
		(0.1222)	(0.4917)	(0.0034)	(0.1869)		
3	Czech Rep	-0.427752	2.238074	0.454308	-5.17866	0.06224	50
		(0.1516)	(0.2024)	(0.9506)	(0.36850		
4	Denmark	-0.334399	8.923192	-2.32076	-6.5854	0.118473	62

	Country	Intercept	DTR	ITR	SSC	R2	No. obs.
		(0.1234)	(0.0665)	(0.7728)	(0.0231)		
5	Germany	-0.981985	13.4639	-14.6219	-44.1973	0.174081	50
		(0.0215)	(0.0244)	(0.3057)	(0.005)		
6	Estonia	-0.09894	1.286172	-0.02721	1.982172	0.035656	50
		(0.6837)	(0.21380	(0.9902)	(0.674)		
7	Ireland	-0.040314	0.15766	0.43528	4.755222	1	4
		NA	NA	NA	NA		
8	Greece	-0.947553	2.455546	-7.04779	9.447983	0.118796	34
		(0.1485)	(0.3853)	(0.2798)	(0.17930		
9	Spain	0.088447	-0.2287	0.362923	0.132486	0.008867	50
		(0.6462)	(0.718)	(0.756)	(0.9821)		
10	France	-0.408434	-0.06181	-1.12718	-10.7114	0.014376	118
		(0.2662)	(0.9706)	(0.6302)	(0.5662)		
11	Croatia	0.006931	-1.02536	0.167253	0.31737	0.597265	10
		(0.8621)	(0.0341)	(0.7638)	(0.6633)		
12	Italy	-0.106205	0.648933	-1.00468	-1.71211	0.244702	50
		(0.0235)	(0.0005)	(0.4159)	(0.0023)		
13	Cyprus	-0.947263	0.549423	0.057459	0.590239	0.006064	49
		(0.075)	(0.6424)	(0.9846)	(0.8215)		
14	Latvia	-0.05103	3.371046	-5.0895	0.438055	0.097461	62
		(0.8114)	(0.1257)	(0.1574)	(0.8898)		
15	Lituania	0.500299	-1.10302	12.46054	-7.25222	0.038286	42
		(0.4658)	(0.7267)	(0.3044)	(0.3793)		
16	Luxembourg	-0.13472	-0.99144	-3.99814	-4.40321	0.095973	50
		(0.2941)	(0.3278)	(0.2594)	(0.3698)		
17	Hungary	-0.203059	-2.59834	0.570092	-2.3277	0.194419	62
		(0.0522)	(0.0639)	(0.7377)	(0.123)		
18	Malta	-5.10551	-15.6409	-40.2167	59.18653	0.059958	25
		(0.3816)	(0.6229)	(0.4163)	(0.2961)		
19	Netherlands	0.084137	-1.43249	4.023704	-2.25204	0.025375	62
		(0.723)	(0.3869)	(0.2483)	(0.4401)		
20	Austria	-11.1049	-218.39	944.683	-0.2127	0.080801	50
		(0.4621)	(0.1169)	(0.131)	(0.999)		
21	Poland	-0.082217	-0.32421	1.850772	0.632641	0.110586	50
		(0.2858)	(0.2863)	(0.0582)	(0.3203)		
22	Portugal	-0.158373	0.320178	-0.98556	-0.10636	0.027925	62
		(0.0669)	(0.2123)	(0.4192)	(0.9329)		
23	Romania	-0.619482	0.85128	1.258289	-1.67907	0.018734	50

	Country	Intercept	DTR	ITR	SSC	R2	No. obs.
		(0.0664)	(0.3798)	(0.5843)	(0.4696)		
24	Slovenia	0.181557	1.207654	1.112071	-9.06879	0.184897	49
		(0.3328)	(0.5219)	(0.7385)	(0.0046)		
25	Slovakia	-0.376208	-3.86617	-3.76778	-5.80536	0.112003	62
		(0.2551)	(0.2168)	(0.277)	(0.2663)		
26	Finland	0.638644	11.88243	-43.7543	-14.307	0.095221	62
		(0.6572)	(0.1285)	(0.2186)	(0.6794)		
27	Sweden	-0.60415	11.63151	13.36068	3.483852	0.034527	62
		(0.3998)	(0.5258)	(0.624)	(0.7797)		
28	UK	-0.516492	1.485326	-1.51828	4.823518	0.033993	78
		(0.2164)	(0.5653)	(0.919)	(0.6433)		

Annex 3

Table 5: The impact of taxation on the RCI

	Country	Intercept	DTR	ITR	SSC	R2	No. obs.
1	Belgium	-0.924469	3.766449	-61.9439	17.39831	0.044817	78
		(0.4664)	(0.2906)	(0.0686)	(0.3528)		
2	Bulgaria	0.323901	-0.35283	-2.91571	-2.54906	0.074548	50
		(0.279)	(0.7312)	(0.3556)	(0.5457)		
3	Czech Rep	0.214222	0.698951	1.026266	-8.19342	0.214155	50
		(0.1321)	(0.4009)	(0.7688)	(0.0041)		
4	Denmark	1.854971	-61.9974	9.034135	0.884023	0.107439	17
		(0.2262)	(0.2381)	(0.8347)	(0.9764)		
5	Germany	-0.277201	4.686928	-2.32657	-11.7752	0.048832	50
		(0.2218)	(0.1423)	(0.7627)	(0.1546)		
6	Estonia	0.031832	0.608662	1.005886	-0.68352	0.074932	50
		(0.81)	(0.2799)	(0.4067)	(0.7902)		
7	Ireland	0.342793	-1.38032	-3.06327	0.581122	1	4
		NA	NA	NA	NA		
8	Greece	-2.016177	4.236745	17.19578	-8.12686	0.058475	34
		(0.272)	(0.5938)	(0.3486)	(0.6779)		
9	Spain	-0.078603	0.1088	-0.79615	-1.35432	0.038591	50
		(0.6033)	(0.8266)	(0.3868)	(0.7708)		
10	France	-0.242547	-0.10203	1.063363	-15.7388	0.067184	118
		(0.0284)	(0.8389)	(0.1303)	(0.0055)		
11	Croatia	-0.616212	-5.63497	4.874162	10.64237	0.21731	10
		(0.3735)	(0.4052)	(0.6044)	(0.3955)		

	Country	Intercept	DTR	ITR	SSC	R2	No. obs.
12	Italy	-0.829316	-2.07899	13.74985	6.402049	0.02182	49
		(0.268)	(0.4589)	(0.495)	(0.4585)		
13	Cyprus	-1.391891	2.82284	-65.7629	-4.15719	0.363952	49
		(0.5507)	(0.5924)	(0)	(0.7214)		
14	Latvia	0.402834	4.271765	11.38356	-3.4633	0.099787	62
		(0.1767)	(0.1601)	(0.0241)	(0.4297)		
15	Lituania	-0.133777	1.336067	-0.52456	-2.35581	0.065114	42
		(0.6356)	(0.3076)	(0.9159)	(0.4878)		
16	Luxembourg	NA	NA	NA	NA	NA	NA
		NA	NA	NA	NA		
17	Hungary	-1.101166	-14.012	-17.9351	21.57637	0.047694	62
		(0.2602)	(0.2858)	(0.2673)	(0.1303)		
18	Malta	-4.171457	-7.75144	48.31859	10.71898	0.217746	13
		(0.2836)	(0.7561)	(0.3173)	(0.8407)		
19	Netherlands	-0.561892	2.860694	2.626256	5.606721	0.060387	61
		(0.1286)	(0.26)	(0.6207)	(0.214)		
20	Austria	-0.458039	-6.40629	30.79993	1.019982	0.066197	50
		(0.3338)	(0.1413)	(0.1164)	(0.8543)		
21	Poland	-0.223403	-1.57558	5.750717	-3.57002	0.199609	50
		(0.4298)	(0.1615)	(0.1082)	(0.1307)		
22	Portugal	-0.450645	-0.21549	-11.7588	4.238503	0.057313	62
		(0.3951)	(0.8916)	(0.123)	(0.5888)		
23	Romania	0.762916	0.23476	-0.89603	-3.57712	0.066722	50
		(0.1357)	(0.8733)	(0.7981)	(0.3138)		
24	Slovenia	0.427103	3.630665	0.68305	-12.7131	0.10597	62
		(0.2055)	(0.2944)	(0.9107)	(0.0304)		
25	Slovakia	0.814155	7.532195	-4.9659	-7.00041	0.159666	62
		(0.0297)	(0.0334)	(0.2002)	(0.2302)		
26	Finland	-0.117597	3.314373	16.71461	-1.09309	0.148372	62
		(0.6792)	(0.0336)	(0.0194)	(0.8729)		
27	Sweden	-0.324177	5.224881	-1.84544	2.531319	0.023013	62
		(0.3705)	(0.5718)	(0.8931)	(0.687)		
28	UK	-2.451271	23.62719	98.96891	9.960381	0.03665	78
		(0.3544)	(0.1521)	(0.298)	(0.8802)		

Annex 4

Table 6: The impact of taxation on the SCI

	Country	Intercept	DTR	ITR	SSC	R2	No. obs.
1	Belgium	0.578208	0.847841	19.82686	-10.833	0.050012	78
		(0.29)	(0.5788)	(0.1728)	(0.1795)		
2	Bulgaria	1.678345	2.147752	-5.29193	-22.9766	0.030377	49
		(0.3858)	(0.7444)	(0.7932)	(0.3967)		
3	Czech Rep	0.00253	0.04948	-0.13903	0.063727	0.007043	49
		(0.8994)	(0.6778)	(0.7796)	(0.8686)		
4	Denmark	-0.199071	22.5251	-20.9057	-6.70864	0.3807	17
		(0.5622)	(0.0718)	(0.051)	(0.3371)		
5	Germany	0.093077	5.392517	-18.7105	-19.4401	0.261908	50
		(0.6101)	(0.0394)	(0.0042)	(0.005)		
6	Estonia	0.089369	1.542844	0.649596	-0.60719	0.071425	49
		(0.7236)	(0.1522)	(0.7759)	(0.9002)		
7	Ireland	-0.00112	0.026244	0.073925	-0.00879	0.039855	50
		(0.9222)	(0.3322)	(0.2412)	(0.9728)		
8	Greece	0.061121	1.453761	1.440651	-5.23398	0.052887	34
		(0.9081)	(0.5305)	(0.7862)	(0.3615)		
9	Spain	-0.394781	1.648298	1.970709	-19.3035	0.104691	50
		(0.2167)	(0.1185)	(0.308)	(0.0524)		
10	France	0.279927	-0.67311	-2.46266	-3.38854	0.025269	106
		(0.4313)	(0.7041)	(0.2718)	(0.8516)		
11	Croatia	-6.681636	-91.0248	-16.6712	-93.2987	0.577219	10
		(0.1763)	(0.0777)	(0.7926)	(0.2829)		
12	Italy	0.781315	-3.11033	-7.35353	10.52604	0.025991	50
		(0.4155)	(0.3949)	(0.7758)	(0.3496)		
13	Cyprus	0.073997	0.205449	-0.15758	-1.2596	0.043978	49
		(0.703)	(0.6398)	(0.8867)	(0.1984)		
14	Latvia	-0.006229	2.924195	7.561287	-6.73027	0.149716	50
		(0.9777)	(0.2028)	(0.0309)	(0.0377)		
15	Lithuania	-0.371353	1.51026	-8.56298	0.834786	0.06107	42
		(0.3358)	(0.3956)	(0.21)	(0.8562)		
16	Luxembourg	NA	NA	NA	NA	NA	NA
		NA	NA	NA	NA		
17	Hungary	-0.038181	-6.94055	-14.8626	20.03162	0.130112	50
		(0.9519)	(0.4203)	(0.1341)	(0.0238)		
18	Malta	1.43857	-1.39292	-9.06638	-2.19918	0.092391	29

	Country	Intercept	DTR	ITR	SSC	R2	No. obs.
		(0.157)	(0.7179)	(0.2897)	(0.7981)		
19	Netherlands	-0.917782	4.986688	0.626037	2.267285	0.019701	62
		(0.3013)	(0.4186)	(0.9613)	(0.8344)		
20	Austria	0.396819	-3.95534	10.32501	2.842555	0.098903	50
		(0.0524)	(0.0349)	(0.2132)	(0.2321)		
21	Poland	0.303096	-1.55042	0.970458	0.490743	0.090732	46
		(0.1621)	(0.0708)	(0.7164)	(0.7804)		
22	Portugal	-0.616216	1.940406	-2.30314	-1.26332	0.025435	62
		(0.2619)	(0.2383)	(0.768)	(0.8761)		
23	Romania	0.415277	-0.282	0.877468	0.992305	0.01732	49
		(0.2754)	(0.7959)	(0.7354)	(0.7057)		
24	Slovenia	-0.17044	-0.00729	-1.02231	-9.19642	0.141996	49
		(0.4122)	(0.9972)	(0.7822)	(0.0092)		
25	Slovakia	0.103791	5.516681	2.483306	-0.71103	0.135228	50
		(0.6608)	(0.0207)	(0.3643)	(0.8628)		
26	Finland	0.388351	1.602946	-2.52126	-10.8455	0.015463	62
		(0.4221)	(0.5376)	(0.8316)	(0.3518)		
27	Sweden	0.491257	1.864271	-18.0866	3.560375	0.032654	62
		(0.1745)	(0.8391)	(0.1887)	(0.5691)		
28	UK	0.061368	0.640472	5.0996	3.990814	0.041007	70
		(0.6877)	(0.5004)	(0.3508)	(0.3119)		

Experimental Studies of Taxpayers Behavior in Russia: Taking Into Account Regional Differences in the Level of Shadow Economy

Dmitrii Y. Fedotov, Doctor habil. (Economics), Associate Professor, Baikal State University, 11 Lenina str., Irkutsk, 664003 Russia, E-mail: fdy@inbox.ru

Natalia V. Pokrovskaia, PhD, Associate Professor, St. Petersburg State University, 7/9 Universitetskaya nab., St. Petersburg, 199034 Russia, E-mail: n.pokrovskaya@spbu.ru

Abstract

The article focuses on assessing the differences between Russian regions in terms of shadow economy level, these are important to take into account when studying such phenomena as behavior of taxpayers, tax compliance and tax evasion. The purpose of this article is to find differences in the level of the shadow economy between the regions of the Russian Federation and to specify their impact on the methodology for carrying out experimental studies into the behavior of taxpayers. Experimental study methods of behavior of taxpayers have been widely used since the second quarter of the 20th century, but most of the described tax experiments relate to European countries and the USA, which have a relatively high level of tax compliance and tax discipline. The study of the behavior of taxpayers in countries with a different level of tax discipline, in particular in Russia, may be of interest. To take into account the differences in the scale of tax evasion and the level of the shadow economy in different regions of Russia, a methodology was developed to measure the size of the shadow economy in the regions on the basis of a comparison of statistical and tax reporting data. The data presented show the heterogeneity of the Russian regions in terms of shadow sector share, as well as the heterogeneity of entrepreneurs and the population of different regions in their tendency to evade taxes. These circumstances should be taken into account when conducting tax experiments in various regions of the country.

Keywords: tax experiment, tax compliance, tax evasion, behavior of taxpayer, shadow economy.

Introduction

Studies of taxpayers' behavior, factors influencing tax compliance and tax evasion occupy an important place in modern studies on taxation (Nevzorova et al. (2016)). At the same time, the central methodology of such a studies is tax experiments that have been actively developing since the last quarter of the 20th century.

Experience of tax experiments in Russia is rather scarce. At the same time, the potential for studying the specifics of taxpayers' behavior and honesty in terms of tax morale in Russia is quite vast and can have its application, among other things, in certain aspects of tax incentives (e.g. Koroleva, 2016: Balandina et al, 2016, Troyanskaya, 2017), including regional level (Pinskaya 2016). At the same time, it is conditioned by the scale of the shadow economy not least of all. It should be noted that the shadow economy (boundaries of which often remain blurred - Bykov et al., 2015) is an indispensable attribute of modern society. There is economic activity in every country that is banned or does not get official registration by authorities it yet exist. As can be seen from the data presented in Fig. 1, the shadow sector has bee revealed in the economies of the most economically developed countries of the world, yet to a smaller degree than in the developing countries.

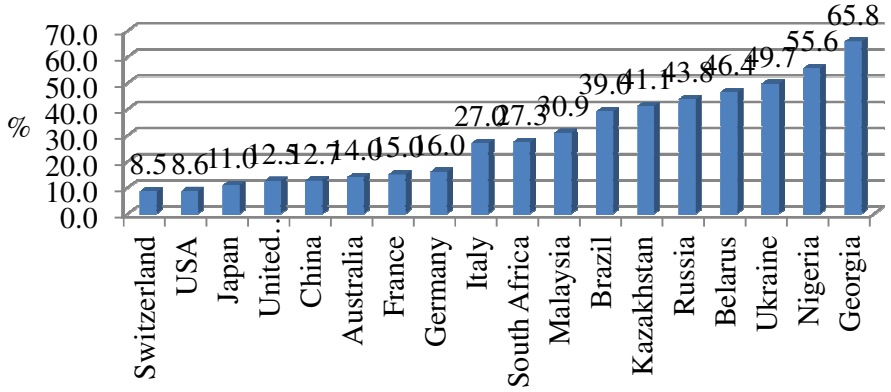


Fig. 1: Weighted average size of the shadow economy in 1999-2007, % of GDP (Schneider et al., 2010)

Schneider et al. (2010) note, that in almost all studies it has been ascertained that the overall tax burden is among the main causes for the existence of the shadow economy. At the same time, the direct connection between the size of the shadow economy and the tax burden is not obvious, which does not exclude the possibility of finding another characteristic of the tax system or even the system of public finances as a whole that affects the scale of the shadow economy. In particular, it is rather unagruable that there is a connection between shadow economy and tax evasion, and tax experiments can indirectly help to reveal the motivation to the latter.

Even though the effects of shadow economy and tax evasion are studied for the state as a whole, including such studies for international comparisons (e.g. Bykov and Frotscher (2016)), in our opinion, regional peculiarities of the analyzed phenomena can be of considerable interest. The thing is that conducting tax experiments is complicated because of different habits in terms of tax evasion in large countries, characterized by heterogeneous population and economic entities. The results of tax experiments in countries such as Russia and countries similar in their regional differences will be distorted if differences in the scale of tax evasion and the accompanying differences in the level of the shadow economy that exist in different regions of the country are not taken into account. In particular, the results of tax experiments conducted in regions with a high level of shadow economy will be unrepresentative in regions with a low shadow economy. Therefore, in order to increase the reliability of the results, tax experiments should be simultaneously conducted in regions with different levels of the shadow economy, and the obtained data should be adjusted taking into account regional differences in population's tendency to evade taxes.

The purpose of this article is to find differences in the level of shadow economy among Russian regions and to specify their impact on the methodology for carrying out experimental studies into the behavior of taxpayers.

Studying Taxpayers' Behavior in Experiments

In the second half of the 20th century, there was a significant development of studies into economic behavior under conditions of instability, a comprehension of the adequacy of the basic premise about the rationality of economic subjects. This also becomes reflected in the studies of taxpayers' behavior. In the early 1970s, theoretical models of rational behavior of taxpayers arise, the beginning of which is associated with classical works by Allingham and Sandmo (1972), as well as Yitzhaki (1974), which are soon supplemented by experimental studies of this subject, in particular, in the tax experiment that has become classic (Freidland, Maital and Rutenberg (1978)) and subsequent ones.

Modern literature extensively describes the methodology and results of various tax experiments aimed at studying the behavior of taxpayers and elucidating the factors, causes and motivations of tax evasion and tax compliance. Experiments can be combined according to different criteria. First of all,

with respect to subjects and objects studied in experiments. From this point of view, it is possible to separate experiments that consider the payment of personal and corporate taxes (it is important that the decisions taken by people are modeled anyway, therefore some researchers do not make corresponding differences). Within the framework of this article, we consider experiments related to the payment of personal income tax.

The implemented experiments are summarized in reviews and meta-studies compiled on various parameters. A. Roth in Handbook of Experimental Economics (1995) suggest experiments' classification according to "how they were motivated and to whom they were intended to be persuasive: "Speaking to Theorists", "Searching for Facts", "Whispering in the Ears of Princes". The category "Speaking to Theorists" includes experiments designed to test the predictions of well-articulated formal theories, and to observe unpredicted regularities, in a controlled environment that allows these observation to be unambiguously interpreted in relationship to the theory. They are part of dialogue between experimenters and theorists. The category "Searching for Facts" includes experiments studying the effect of variables about which existing theory may have little to say. Often these experiments are motivated by earlier experiments and are designed to isolate the cause of some observed regularity, by varying details of the way the experiments were conducted. Such experiments are part of the dialog that experiments carry on with one another. The category "Whispering in the Eras of Princes" deals with the dialogue between experiments and policymakers. These experiments might be motivated by the kind of question raised by regulatory agencies, about the effect of changes in the way some market is organized".

Togler (2002) summarizes more than 100 sources containing information on tax experiments from the categories "Speaking to Theorists" and "Searching for Facts" with main focus is on the social and institutional factors. Conclusion of this review was that holding the probability of penalty, the fine rate and taxpayer's risk aversion constant, social and institutional factors systematically matter. Tax morale and tax compliance experiments have impressively shown that many taxpayers seem to have a more refined motivation structure than that assumed by traditional economics.

Mascagni's review (2017) aims to update Torgler's review. 86 sources represent more experiments in the category "Whispering in the Ears of Princes". Moreover, Mascagni's review is contrasted with Torgler's review in the nature of the experiments: field experiments versus lab experiments.

While the general requirements for experiments in the economy were formulated at the beginning of their active use (Smith, 1992), the advantages and disadvantages of laboratory experiments (the most frequently studied are students in artificial situations; about using student subjects in experimental research in more detail see Marriott, 2014) and field experiments (real subjects who are not informed of participation in the experiment, in a real environment, but under controlled conditions) are discussed a lot. In A. Kireenko's review (2015), which represents the main trends in the development of experimental methods in taxation, it is noted that the main criticism of laboratory experiments is related to the interpretation and generalization of their results, namely, that laboratory experiments are conducted in an artificial environment that is free from external factors; in contrast to the real situation, negative behavior does not bring financial losses to the participants; the behavior of students used as a convenient experimental environment may not correspond to the behavior of real taxpayers; most significant experiments can be costly and time consuming. It is noted that due to the use of the real environment, the results of field experiments are of greater credibility and value, but their procedure becomes complex and very expensive, therefore field experiments are more rare.

The review by Hallsworth (2014), like Mascagni's review, is more focused on field tax experiments. The above chronology begins with an experiment conducted in 1967 in the USA, the next one followed in 1996, the remaining analyzed 21 experiments were conducted from 2001 to 2014. Thus, the investigation of tax behavior begins with laboratory experiments and is further supplemented by field experiments.

The experiments provided an opportunity for extensive meta-analysis of their results, in particular Blackwell (2007), based on the regression of the results of 20 experiments carried out from 1978 to

2006, including 54,588 observations (the smallest number of observations in the described experiment was 74 (Togler, 2003), the largest was 13,440 (Beck et al., 1991)), with subjects from the United States, Central America, Europe and Israel, came to the following conclusions: raising either the fine rate or the probability of audit will increase tax compliance; increasing the return received upon a public good increases tax compliance; no clear results as to the impact of raising the tax rate on tax compliance.

Hoffman et all (2017) present meta-analyses of survey studies which take into consideration the relationships between tax compliance and age, sex, education as well as income taking into account geographical regions. Results of meta-analyses support the hypothesis that older taxpayers are more compliant than younger ones; women tend to hold higher tax compliance than men; individuals with lower education tend to be more tax compliant than highly educated taxpayers; income is to be negatively related to tax compliance. Although the examined sociodemographics correlate significantly with tax compliance their predictive power is limited for age and sex, and negligible for education and income.

The study Hoffman et all (2017) highlights that the analysis of the results included a large number of countries. However, in the twentieth century description of tax experiments largely dominated by Europe and the USA (e.g. Zhang et al., 2016; Lefebvre et al., 2015; Alm et al 2017). Only in recent years, the general results included in comprehensive tax books (e.g. Kirchler, 2007) are complemented by a study of tax behavior in low- and middle-income countries, allowing researchers to draw a more global picture than ever before (see Mascagni). Tax behavior can become an important characteristic of financial systems (Lvova, 2016).

As for Russia, it is interesting that the reviewed sources contain information about local field experiments, but not the laboratory ones (at the same time, there are separate studies devoted to the perception of various aspects of taxation, e.g. Lvova et al., 2016). Conducting tax experiments, according to the "classical" methods implemented in various countries, can have a high value both for studying taxation in Russia and for characterizing the national specifics of tax compliance and tax evasion. We agree that carrying out experiments in Russia may be of interest for comparative analysis, since most of the described tax experiments concern countries with a traditionally high level of tax compliance and tax discipline. It may be interesting to compare the results of similar experiments in countries with a traditionally low level of tax compliance (Kireenko, 2015). The results of tax experiments can be applied in various aspects of taxation in Russia, e.g. for personal income tax studies and so on.

At the same time, experimental methods in taxation have one more fundamental, albeit obvious, difficulty, i.e. creating an adequate methodology. Actually, the improvement of experiments' methodology explains their rapidly growth and diversity. An important aspect of conducting a tax experiment is the representativeness of the selection being studied, which is of crucial importance for Russia territories of which have significant socio-economic differences. The advantages of conducting a tax experiment in several regions are obvious. However, this raises the question of the comparability of the data obtained, what implies the forming groups of regions or cities (Pashkus et al., 2015) with similar characteristics. In this case, the directions of the analysis can be, on the one hand, the joint examination of data in different regions with testing their homogeneity or their comparison with the results of other regions and the identification of their differences. Due to the strong negative correlation between the size of the shadow economy and the degree of the tax morale (Alm and Togler, 2005), we suggest using the indicator of the size of the shadow economy as a characteristic of regions for conducting tax experiments.

Calculation of the shadow economy in Russian regions by the tax method

There is a keen interest of researchers to study the causes and measure the scale of shadow economy. To date, economics has developed a significant number of methods for measuring the size of shadow economy. It should be noted that studies devoted to the assessment of shadow economy at the regional level are much less common than similar studies on a national scale.

The fact is that traditional methods of measuring shadow economy size at the regional level are not always able to provide a reliable data about the phenomenon due to the limited sources of information, and in some cases, a fragmented approach to the choice of the object of research.

In order to overcome these limitations of shadow economy research at the regional level, we developed a methodology for measuring the size of shadow economy in Russian regions on the basis of a comparison of statistical and tax reporting data. This methodology is described in more detail in Fedotov et al., 2016

Official information published by the Federal State Statistics Service (Rosstat) and the Federal Tax Service (FTS) is sufficient to identify the shadow share of gross regional product (GRP) in all Russian regions. We compared the aggregate GRP and its components, measured by Rosstat, to the size of the tax base for some taxes published by the Federal Tax Service, which in turn is a legal component of the GRP of the country's regions. The discrepancy between the data of national accounts and the indicators of tax reporting makes it possible to reveal the unobserved share of the GRP of a particular region of the country. A comparative analysis of these indicators was carried out for the period 2011-2015. Similar studies were conducted by O'Higgins (1989) in the UK in the previous century, however, not in the regional context but with regard to national indicators.

As an indicator measuring the size of shadow economy, we chose the share of shadow economy in the gross regional product of every region of the country. The gross regional product is calculated by the production method as the difference between output and intermediate consumption. At the same time, Rosstat, analyzing the structure of GRP from the point of view of generating income, identifies three components forming the GRP: payroll fund, gross profit and net taxes on production. In this connection, the calculation of GRP can be carried out by the following formula [1].

$$GRP = W + P + T_{prod} \quad [1]$$

GRP – gross regional product;

W – wages of employees (excluding hidden wages and mixed incomes), i.e. legal wage (without the shadow one), but increased by the amount of contributions for compulsory social insurance funds;

P – gross profit of the economy and gross mixed incomes;

T_{prod} – net taxes on production, which include property tax of organizations, transport tax and land tax paid by legal entities, license fees.

Of the three components of the GRP, the first (wage) and the third (taxes on production) are accounted for by Rosstat in its legal value. Wage (W) includes only the officially paid aggregate payroll for each subject of the Russian Federation, excluding the shadow salary paid in "envelopes" and other informal incomes. And the value of net taxes on production (T_{prod}) Rosstat calculates on the basis of the actual amount of tax revenue included in this group.

The only part of the GRP, containing the informal economy's results of the Russian regions according to the Federal State Statistics Service, is the gross profit of the economy and gross mixed incomes (P), which together represent:

1) legal profit of enterprises;
2) hidden profits of enterprises (including financial performance of the informal economy and officially unregistered enterprises);
3) hidden wages and other mixed incomes received informally.

Therefore, we get the value of shadow economy of each region of the country by subtracting its legal component from the gross profit amount. We determined the size of legal profit of enterprises on the basis of the size of tax base, based, in its turn, on corporate profit tax, presented in the Report on the tax base and the structure of accruals on corporate profit tax (Form No. 5-P), compiled and published by the Federal Tax Service. The aggregate tax base for corporate profit tax is the total amount of profit received in the reporting year by the organizations of the region for which they reported to the tax authorities. The amount of profit that is not included in these data refers to the shadow results of

the organizations of the region. The data obtained allowed us to calculate the value of shadow economy in every Russian region using one of the two interchangeable formulas [2] and [3].

$$GRP_{shad} = \frac{P - P_{tax}}{GRP} \times 100$$ [2]

где, GRP_{shad} – share of the shadow economy in the GRP of the region,%;

P_{tax} – legal profit included in the tax base for corporate profit tax;

GRP – gross regional product;

GRP_{shad} – share of the shadow economy in the GRP of the region,%;

P_{tax} – legal profit included in the tax base for corporate profit tax;

W – employees' remuneration;

T_{prod} – net taxes on production;

$$GRP_{shad} = \frac{GRP - W - T_{prod} - P_{tax}}{GRP} \times 100$$ [3]

где, GRP_{shad} – share of the shadow economy in the GRP of the region,%;

GRP – gross regional product;

W – employees' remuneration;

T_{prod}– net taxes on production;

P_{tax} – legal profit included in the tax base for corporate profit tax.

The results of calculating the size of the shadow economy in the subjects of Russia are given in Tab. 1.

Table 1: The size of shadow economy in the Russian regions in 2011-2015, calculated on the basis of deviation of taxable profit from gross profit, % of GRP

	2011	2012	2013	2014	2015
Central Federal District	**26,8**	**22,3**	**29,0**	**34,1**	**31,9**
Belgorod Oblast	43,3	53,7	55,4	60,0	59,8
Bryansk Oblast	20,6	48,7	47,6	48,4	51,7
Vladimir Oblast	36,8	37,3	33,0	36,7	35,7
Voronezh Oblast	46,7	46,8	46,1	50,0	50,4
Ivanovo Oblast	38,7	35,3	36,3	31,5	35,5
Kaluga Oblast	36,6	37,0	36,8	39,7	38,0
Kostroma Oblast	45,0	40,5	38,4	40,1	41,4
Kursk Oblast	39,5	39,9	36,6	40,0	42,0
Lipetsk Oblast	44,6	36,7	43,7	38,4	39,7
Moscow Oblast	35,3	32,9	33,2	30,6	35,0
Oryol Oblast	43,6	43,2	44,7	45,2	49,5
Ryazan Oblast	43,0	45,2	42,1	42,6	44,1
Smolensk Oblast	37,8	41,5	42,3	43,3	38,9
Tambov Oblast	52,1	52,3	54,0	59,9	60,3
Tver Oblast	40,6	37,1	39,1	39,8	42,6
Tula Oblast	42,0	38,8	40,7	41,5	44,9
Yaroslavl Oblast	40,8	38,9	40,3	41,3	42,6
Moscow	19,2	11,4	22,3	30,3	24,9
North-West Federal District	**29,1**	**31,8**	**31,6**	**37,7**	**33,9**
Republic of Karelia	30,8	32,6	43,9	38,9	40,6
Komi Republic	29,6	41,3	48,4	46,5	47,5

Arhangelsk Oblast	37,2	39,8	36,3	38,1	37,0
Vologda Oblast	37,8	38,0	43,1	47,4	45,1
Kaliningrad Oblast	42,5	43,0	44,5	47,5	47,3
Leningrad Oblast	44,6	45,2	43,0	29,3	27,6
Novgorod Oblast	37,1	35,7	36,2	46,3	49,2
Pskov Oblast	41,5	36,4	36,4	37,7	38,5
Saint Petersburg	18,1	21,0	17,4	23,8	21,4
Southern Federal District	**47,2**	**48,6**	**50,3**	**53,4**	**53,1**
Republic of Adygea	52,9	54,0	52,4	52,2	54,2
Republic of Kalmykia	47,1	51,0	52,6	55,8	55,5
Krasnodar Krai	50,3	50,8	52,9	50,7	49,4
Astrakhan Oblast	37,2	41,8	50,9	56,0	56,6
Volgograd Oblast	43,4	50,7	53,1	56,6	53,2
Rostov Oblast	46,6	44,7	43,3	45,2	46,5
North-Caucasian Federal District	**56,4**	**55,9**	**56,7**	**58,7**	**59,4**
Republic of Dagestan	74,6	74,0	75,3	76,6	76,6
Republic of Ingushetia	45,3	41,5	48,7	53,0	51,4
Kabardino-Balkaria Republic	61,7	62,2	58,7	59,4	59,8
Karachay-Cherkess Republic	54,7	50,5	53,0	50,8	51,2
Republic of North Ossetia-Alania	56,9	53,7	54,6	56,3	54,2
Chechen Republic	51,3	50,0	48,4	51,5	52,2
Stavropol Krai	42,1	42,3	42,6	45,1	48,0
Volga Federal District	**36,7**	**38,8**	**43,9**	**45,0**	**42,9**
Republic of Bashkortostan	42,4	48,0	48,3	48,4	46,3
Mari El Republic	42,7	44,1	42,4	41,9	44,7
Republic of Mordovia	40,9	43,2	22,1	46,4	46,8
Republic of Tatarstan	34,4	32,7	44,0	43,7	39,7
Udmurt Republic	29,1	27,5	37,3	40,9	38,6
Chuvash Republic	46,7	45,1	43,0	42,9	43,7
Perm Krai	33,3	40,4	41,6	48,7	43,3
Kirov Oblast	38,7	35,5	33,3	36,4	37,6
Nizhny Novgorod Oblast	36,4	41,8	40,4	42,1	38,1
Orenburg Oblast	31,4	31,4	54,3	47,1	45,7
Penza Oblast	46,2	45,9	47,5	48,4	51,3
Samara Oblast	32,7	35,5	43,0	43,8	43,0
Saratov Oblast	42,6	43,8	45,0	46,8	49,4
Ulyanovsk Oblast	45,2	41,8	44,6	43,5	40,7
Ural federal district	**20,4**	**26,2**	**50,7**	**59,5**	**61,6**
Kurgan Oblast	45,5	44,2	47,7	45,5	44,8
Sverdlovsk Oblast	38,3	36,4	38,2	37,0	39,4
Tyumen Oblast	25,5	43,9	55,8	47,6	49,2
Chelyabinsk Oblast	40,9	39,8	37,9	39,4	40,4
Siberian Federal District	**32,5**	**34,8**	**38,9**	**40,2**	**42,1**
Republic of Buryatia	43,1	43,2	42,9	43,5	44,9
Tyva Republic	27,0	26,3	27,0	28,5	28,9

Republic of Khakassia	46,0	47,5	47,9	50,3	51,7
Altai Krai	44,0	43,9	43,3	47,4	48,6
Transbaikal Krai	39,7	32,6	29,4	29,0	28,6
Krasnoyarsk Krai	19,3	26,3	36,2	36,3	46,5
Irkutsk Oblast	31,1	32,7	33,6	37,9	36,8
Kemerovo Oblast	32,8	33,5	33,7	38,1	39,0
Novosibirsk Oblast	36,0	37,8	37,6	37,8	36,6
Omsk Oblast	52,2	51,4	54,3	53,3	52,7
Tomsk Oblast	30,0	29,8	48,3	47,3	45,7
Far Eastern Federal District	**44,4**	**43,4**	**44,5**	**46,8**	**46,1**
Republic of Sakha (Yakutia)	33,9	37,0	39,1	45,4	48,6
Kamchatka Krai	27,2	26,3	22,9	21,4	22,9
Primorsky Krai	46,6	43,7	42,0	42,9	44,6
Khabarovsk Krai	32,3	29,3	33,5	33,8	31,6
Amur Oblast	33,2	31,5	31,5	34,4	38,9
Magadan Oblast	14,1	5,5	13,6	12,6	13,7
Jewish Autonomous Oblast	48,7	46,8	44,6	43,5	46,2

Prepared by the authors on The electronic supplement to the collection "National accounts of Russia in 2011-2016" URL: http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/en/statistics/publications/catalog/ doc_1135087050375 ; Report on the tax base and structure of corporate profit tax accruals (Form No. 5-P) - URL: http://www.nalog.ru/rn38/related_activities/statistics_and_analytics/ forms /.

As can be seen from data in Tab. 1, Russian regions vary significantly in terms of the level of shadow economy. If in the Magadan Region in 2015 the shadow sector amounted to 13.7% of GRP, it reached 76.6% in the Republic of Dagestan. The difference of regions according to the level of the shadow economy is illustrated in Fig. 2 where regions are grouped by the value of this indicator.

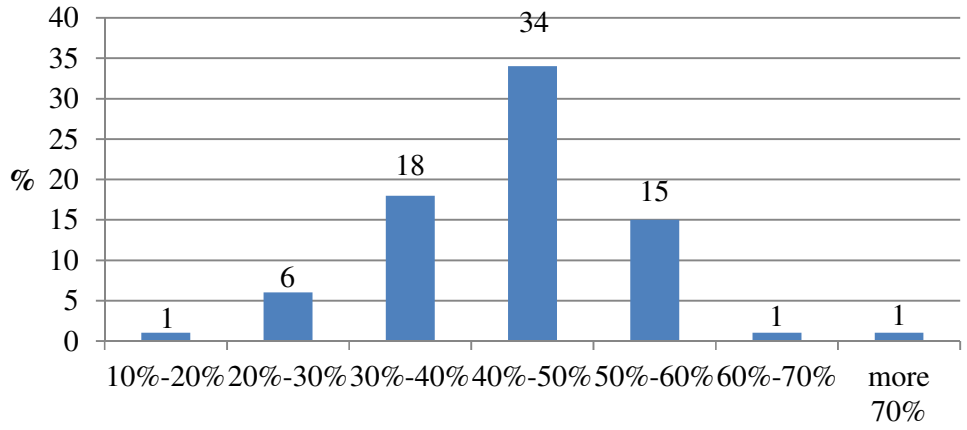


Fig.2: Distribution of Russian regions by groups depending on the level of the shadow economy in 2015

The data presented reveal the heterogeneity of the Russian regions in terms of shadow sector share, as well as the heterogeneity of entrepreneurs and the population of different regions in their tendency to evade taxes. These circumstances should be taken into account when conducting tax experiments in different regions of the country.

Conclusions

The revealed differences in the shadow economy in Russian regions are of great importance for the experimental analysis of tax compliance, tax evasion, tax morale and, in general, the taxpayers' behavior. Differences in the level of the shadow economy in regions should be taken into account when interpreting the results of tax experiments that study the behavior of taxpayers. Since opportunistic tendencies of taxpayers, revealed by tax experiments, can be caused not by objective behavioral characteristics of the population of the whole country, but by specific socio-economic conditions that have developed in certain regions of the country. In particular, the tendency towards tax evasion and the high level of shadow economy in the North Caucasus regions of Russia are to a large extent stipulated by weak economic development and low living standards of the population of these regions. "Withdrawal into the shadows" and tax evasion is a certain way to "make ends meet" and ensure the profitability of local enterprises. This is the manifestation of the social function of the shadow economy, which, according to Peruvian scientist Hernando de Soto (2002), is to ensure employment in a poorly developed economy.

Acknowledgments

The article was supported by the Russian Foundation for Humanities, scientific project 17-22-01002 а(м).

References

1. Allingham, M. G. and Sandmo, A. (1972), 'Income tax evasion: a theoretical analysis', *Journal of Public Economics*, Vol. 1, 323–338.
2. Alm, J. and Torgler, B. (2006), 'Culture differences and tax morale in the United States and in Europe', *Journal of Economic Psychology*, Vol. 27 (2), 224-246.
3. Alm, J., Bernasconi, M., Laury, S., Lee, D.J. and Wallace, S. (2017), 'Culture, compliance, and confidentiality: Taxpayer behavior in the United States and Italy', *Journal of Economic Behavior and Organization*, No. 140, 176-196.
4. Balandina, A., Bannova, K. and Rumina, Y. (2016), 'Formation of economically-effective model of tax gas producing enterprises in Russian Federation', *Proceedings of the 2016 conference on Information Technologies in Science, Management, Social Sphere and Medicine (ITSMSSM 2016)*, 366-369.
5. Beck, P.J., Davis, J.S. and Jung, W. (1991), 'Experimental evidence on taxpayer reporting under uncertainty', *Accounting Review*, No. 66, 535-558.
6. Blackwell, C. (2010), 'A meta-analysis of incentive effects in tax compliance experiments', *Developing Alternative Frameworks for Explaining Tax Compliance*, Routledge Taylor & Francis Group, 97-112.
7. Bykov, S. and Frotscher, G. (2016), 'Anti-avoidance rules in Russian and German tax law: the comparison of collision practices', *Journal of Tax Reform, Vol.* 2, No. 1, 58-94.
8. Bykov, S.S., Kireenko, A.P. and Nevzorova, E.N. (2015), 'Criminal law's reaction to shadow economy: borders, character and areas for improvement', *Criminology Journal of Baikal National University of Economics and Law*, No. 9 (3), 591-607.
9. Coleman, S. (1996), 'The Minnesota income tax compliance experiment: state tax results', MPRA Paper No. 4827, University of Munich.
10. Fedotov D.Y., Nevzorova E.N. and Orlova E.N. (2016), 'The tax method of calculating the shadow economy of Russian regions', *Finance and Credit*, No. 15 (687), 20-33.
11. Freidland, N. , Maital, Sh. and Rutenberg, A. (1978), 'A simulation study of income tax evasion', *Journal of Public Economics*, No. 10, 107–116.
12. Hallsworth, M. (2014), 'The use of field experiments to increase tax compliance', *Oxford Review of Economic Policy*, Vol. 30(4), 658–679.
13. Hoffman, E., Voracek, M., Bock, C. and Kirchler E. (2017), 'Tax compliance across sociodemographic categories: Meta-analyses of survey studies in 111 countries', *Journal of Economic Psychology*, Volume 62, 63-71

14. Kirchler, E. (2007), The economic psychology of tax behaviour, Cambridge: Cambridge University Press.
15. Kireenko, A. (2015), 'Methods of investigating taxation in today's foreign literature', *Journal of Tax Reform, Vol.* 1, No. 2-3, 209–228.
16. Koroleva, L.P. (2016), 'Tax incentives for energy efficient investments in the context of neo-industrial paradigm in Russia', European *Research Studies Journal*, No. 19 (3), 250-272.
17. Lefebvre, M., Pestieau, P., Riedl, A. and Villeval, M.C. (2015), 'Tax evasion and social information: an experiment in Belgium, France, and the Netherlands', *International Tax and Public Finance*, No. 22 (3), 401-425.
18. Lvova, N.A. (2016), 'The concept of financial systems' comparative evaluation', *Actual problems of economics*, Vol. 179, No 5, 308 – 316.
19. Lvova, N.A., Pokrovskaia, N.V. and Ivanov, V.V. (2016), 'The attitude to Islamic Taxation in Russia: Does financial ethics matter?', *Proceedings of the 27th International Business Information Management Association Conference - Innovation Management and Education Excellence Vision 2020: From Regional Development Sustainability to Global Economic Growth*, 294-304.
20. Marriott, L. (2014), 'Using student subjects in experimental research: A challenge to the practice of using students as a proxy for taxpayers', *International Journal of Social Research Methodology*, No. 17 (5), 503-525.
21. Mascagni, G. (2017), "From the lab to the field: a review of tax experiments', *Journal of Economic Surveys*, Vol. 1, 1–29.
22. Nevzorova, E., Bobek, S., Kireenko, A. and Sklyarov R. (2016), 'Tax evasion: the discourse among government, business and science community based on bibliometric analysis' *Journal of Tax Reform, Vol.* 2, No. 3, 227–244.
23. O'Higgins, M. (1989), 'Assessing the underground economy in the United Kingdom', *The underground economies: tax evasion and information distortion*. Cambridge: Cambridge University Press, 175-195.
24. Pashkus, V.Y., Pashkus, N.A., Asadulaev, A.B., and Bulina, A.O. (2015), 'Socio-cultural sphere, Governance and City branding in new economy', *Review of European Studies*, No. 7 (6), 86-92.
25. Pinskaya, M.R., Melnichuk, M.V., Frumina, S.V. and Tikhonova, A.V. (2016), 'Problems of creating a favorable investment climate in Russian regions', *International Journal of Economics and Financial Issues*, 6 (8Special Issue), 300-306.
26. Roth, A. E. (1995), 'Introduction to experimental economics', *The Handbook of Experimental Economics*, Princeton: Princeton University Press, 1-98
27. Schneider F., Buehn A. and Montenegro C.E. (2010), 'Shadow economies all over the world: new estimates for 162 countries from 1999 to 2007', World Bank Policy Research Working Paper Series. No 5356.
28. Schwartz, R. D. and Orleans, S. (1967), 'On Legal Sanctions', *The University of Chicago Law Review*, No. 34, 274–300.
29. Smith, V. L. (1982), 'Microeconomic systems as an experimental science', American Economic Review, No. 72, 923–955.
30. Soto, H. de. (2002), The other path: the economic answer to terrorism, Basic books.
31. Torgler, B. (2002), 'Speaking to theorists and searching for facts: tax morale and tax compliance in experiments', *Journal of Economic Surveys*, No. 16(5), 657–683.
32. Torgler, B. (2003), 'Beyond Punishment: A Tax Compliance Experiment with Taxpayers in Costa Rica', *Revista de Analisis Economico*, No. 18, 27-56
33. Troyanskaya, M.A. and Tyurina, Y.G. (2017), 'Contradiction of clusters taxation in Russia: Taxes as barriers and stimuli for clustering', *Contributions to Economics*, Issue 9783319454610, 3-11.
34. Yitzhaki, S. (1974), 'A note on income tax evasion: a theoretical analysis', *Journal of Public Economics*, Vol. 3, 201–202.
35. Zhang, N., Andrighetto, G., Ottone, S., Ponzano, F. and Steinmo, S. (2016), 'Willing to pay? tax compliance in Britain and Italy: An experimental analysis', *PLoS ONE*, 11 (2), e0150277

Innovative Financial Tools Used for Hedging Russian Banks' Investment Risks under the Conditions of Unstable Economy

Sergeev D.A. Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russia, tor292@rambler.ru
Marikhina V.V., Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russia, office.gifu@spbstu.ru
Velichenkova D.S. Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russia, velichenkova_ds@spbstu.ru

Abstract

The authors have analyzed the major steps in the investment process of banks, typical mistakes investors make in terms of this process, and developed methods for hedging relevant risks by complex introduction of innovative financial instruments into the portfolio (coupon bearing federal loan bonds (OFZ-PK) and federal loan bonds with indexed face value (OFZ-IN)) and by using algorithms for flexible investment horizon of other innovations.

Key words: Investments, bank, portfolio, risks, instruments

Introduction

In Russia, commercial banks are historically strong players on the stock market. By using instruments of the stock market, they form investment portfolios not only to obtain profit, but also ensure the most important and one of the main indicators of their activity – paying capacity via liquidity of their investment portfolio (security portfolio).

Today the specific weight of securities in the asset structure of a bank amounts to, on average, from 15 to 40% [1], depending on the specifics of the bank activity and its investment policy. In turn, a number of aspects concerning the theory and practice of bank portfolio investment management should be further developed and improved. Primarily, it is about accounting the normative requirements for banking and real time operation mode on open markets.

Investment activity of commercial banks in most publications is seen as a purely auxiliary tool of active operations, mainly aimed at maintaining the liquidity of banks and ensuring minimal returns on investment assets.

This approach can be seen as reasonable in the periods of relative stability of economic systems. However, in the periods of high volatility of the main parameters of national economies and crisis phenomena of global nature, even such a conservative investment strategy of banks can prove to be inefficient.

This situation, being the superposition of global economic processes starting from 2008, and political aspects, which started to aggravate at the end of 2013 – beginning of 2014, jointly resulted in the need for revising the tools and, to a large extent, methodology of investment operations of Russian banks.

Methodology (basic algorithm) of investment process

The following fundamental works by western economists should be mentioned in the context of the subject of this paper: G. Alexander, H. Markowitz, W. Sharpe, J. Mossin, J. Tobin, J. Lintner, R. Merton, M. Scholes, Z. Bodie, A. Keynes, E. Peters and among Russian economics – V Barkhatov, N. Berzon, A. Burenin, V. Milovidov, A. Shapkin, A. Abramov, V. Kazakov and other authors.

An investment process in its classical interpretation represents a decision taken by an investor about the securities in which investments are made, the amount and time of investment. The next procedure, including five steps, is the basis of the investment process:

The first step – formalization of investment policy - includes determination of the investor's goals and volume of invested money. The goals of investment must be formulated given both yield and risk.

The second step of the investment process, known as stock market analysis, includes investigation of individual types of securities (or groups of securities). One of the goals of such research is to determine those securities which seem to be wrongly evaluated at the present moment.

The third step of the investment process – formation of the security portfolio – includes determination of particular assets for investment and proportions for distribution of the investment capital between assets.

The forth step of the investment process – revision of the portfolio content – is related to the repetition of the three previous steps. I.e. after a while the goals of investment and/or quotation prices of securities may change and the current portfolio will not be optimal any more. The decision about portfolio revision depends also on the amount of transaction costs and expected yield growth of the revised portfolio.

The fifth step of the investment process – portfolio efficiency evaluation – includes regular assessment of the obtained yield and risk parameters the investor collides with. Herewith it is necessary to use appropriate yield and risk parameters and the relevant standards ("reference" values) for comparison.

No doubt, the abovementioned classical approach to the content and sequence of the investment process steps is based on generalized experience of several generations of stock market players and, in particular, its bank subset. However, core changes in the field of finances, banking and capital markets happening over the last decades and related to the complexity and globalization of the world economy urgently call for using innovative techniques, algorithms and tools of investment operations.

Russian researchers, being residents of the developing economy with all its peculiarities are, undoubtedly, interested in learning the specifics of the transitional period, especially in the conditions of global crisis phenomena. Thus, in particular, O.G. Bakatanov (2008) suggests adding the generally recognized structure of portfolio management with a step of portfolio management tactics management, which follows the formation of investment policy and precedes the step of direct financial analysis.

Portfolio tactics is formulated in the context of the chosen strategy and contains specific ways and methods to form the portfolio. It implies maximum detailing.

Portfolio tactics must contain the following elements:

- security information analysis methods,
- portfolio risk management technology,
- a decision-making model for asset purchase and sale.

The importance of portfolio tactics identification as a separate category in the theory of security portfolio management is in the fact that it is the portfolio tactics which is the core of the portfolio management process and a guarantee for achievement of investment goals. Moreover, the use of the category "portfolio tactics" allows fining a new and more efficient way to solving such important problems of the theory of portfolio management as investment risk assessment and portfolio management efficiency.

Adequate risk measurement of investments in the security portfolio seems to be the key moment in forming an efficient investment strategy. Even though different approaches to risk assessment have been elaborated, the issue of risk assessment of investments in the security portfolio must be worked out further. The existing methods of risk assessment do not fully consider some specific features of stock markets. Such specific features include short-term and long-term trends in price movement and the existence of various phases in market movement – periods of high volatility and price instability and, vice versa, periods of low volatility and reduced activity of investors.

Therefore, risk assessment in the conditions of emerging markets must be closely related to the investment goals of the investor and his investment horizon.

Risk assessment under the conditions of emerging markets and by using traditional methods results in unreasonably high estimates. For this reason, many big portfolio investors are really conservative about investing on emerging markets and limit themselves to short-term investment operations (in more detail this problem is looked into below in this paper in reference to OFZ-PK and OFZ-IN). Thus, investing money on emerging financial markets for quite long periods allows a portfolio investor to obtain all benefits from high returns on investment into financial assets of these markets and be exposed to risks which are considerably lower than commonly believed in the international investment practice.

The aforementioned is topical primarily for investors who practice conservative and moderately conservative investment strategies or strategies implying that the positions in the portfolio sustain for quite a long time, which is very common for banks as security market players. Thus, investments in the condition of developing markets on short-term investment horizons call for elaborating an active strategy for investment portfolio management.

Investment portfolio management and typical mistakes of investors

There are several most common and well-known mistakes made by investors in relation to risk. However, many investors will still make them and break the main investing principles. The main principles of long-term investing include:

- time value of money;
- sectoral diversification;
- impossibility of discrete market analysis.

Investors, as a rule, know about these principles, but regularly break them, especially in times when volatility of markets is increasing, which, in turn, make them commit one or several common (typical) mistakes listed below.

1. Volatility, forming multidirectional market vectors, decreasing the criticality level of investors' assessments.

Rather than be worried about short-term volatility, a long-term investor should concentrate on the risk which is hardly noticeable – risk of losing control over long-term goals due to excessive attention paid to short-term volatility.

2. Active search for ways to invest with minimal risk.

Every investor wishes to work with the lowest risk. However, to search for a type of investment with the lowest risk is the same as to search for the best type of a mutual fund. Everything depends on the specific goals of the specific investor.

3. Empirical calculation of the exact time for particular operations on the market.

Investors know that attempts to determine specific time for operations on the market often fail. The majority know that even very experienced professionals cannot successively foresee the market movement. But still many try to project a "lucky" moment on the market and often without any grounds.

4. Sale of assets in case of possible market decline.

In case financial markets suddenly transfer to a negative trend there is always a result. In such a case there is no need to be waiting for a sudden fall in the value of investment in order to sell assets. Otherwise, there is danger of a limited view of the market due to one's own losses. Moreover, as soon as money is lost and an asset is sold, there is no more chance to derive profit from further movements of the markets while according to a long-term assessment.

5. Purchase of "hot assets"

Only very few assets consequently appear to be productive, especially if only short-term production is considered.

One of the reasons is that as soon as a "hot asset" has been defined by market players, it will experience the pressure of investors' excessive financial means.

Another factor includes shifts on the market itself. Conditions (usually temporary ones), favorably affecting any of these types of assets in a short-term period, will, most probably, change faster than the asset will find its way to "retain" them in its market parameters.

Change in Investment Paradigm

As it was already mentioned at the beginning of this paper, at the formation stage of cumulative economic and political crisis manifestations (including the decline in the sovereign credit rating of Russia), bank investments into state bonds with fixed yield have acquired a negative dynamics, both in terms of falling yield and negative reassessment of the balance-sheet value of investment portfolios.

Dynamics of the main market parameters is given in Fig. 1:

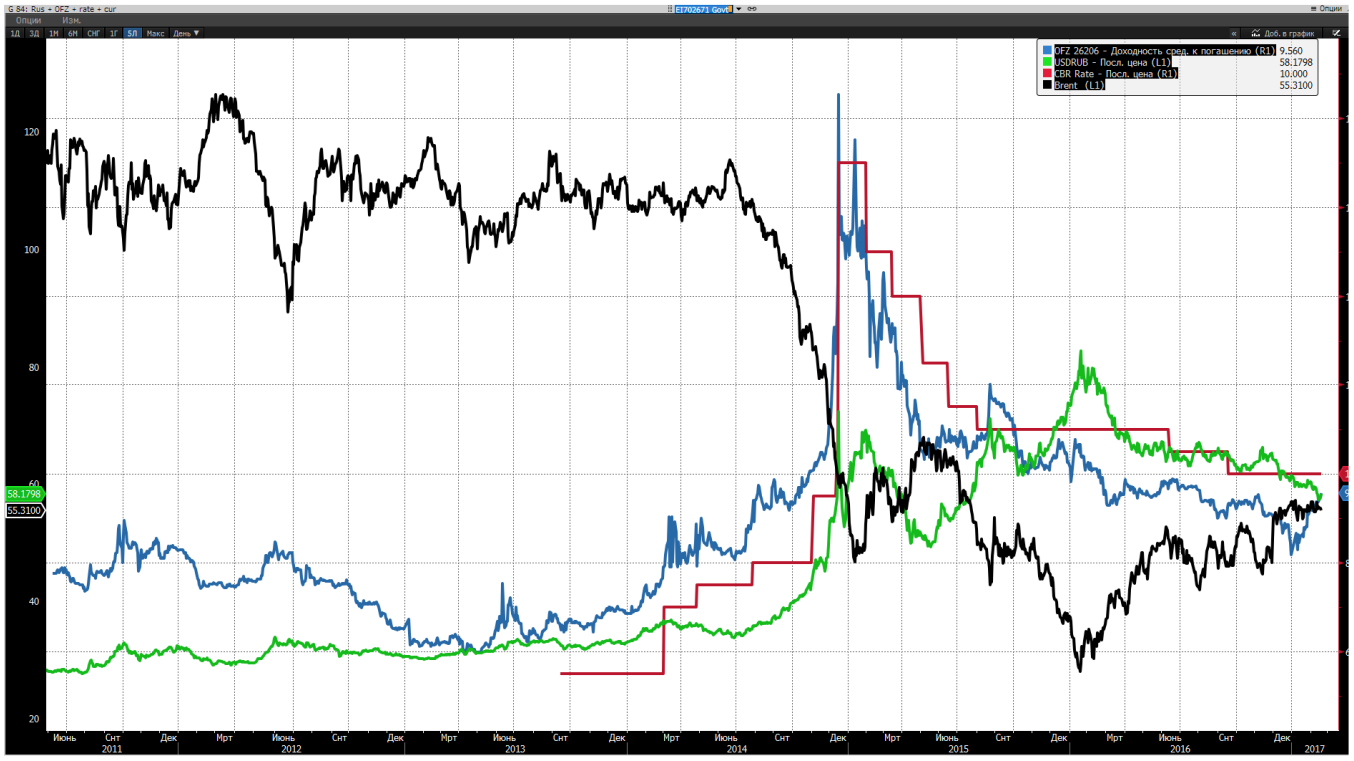


Fig.1: Dynamics of the key parameters of the Russian economy (September 2011 – February 2017)

Further development of events for every certain bank was individual, depending on the combination of several factors – general condition of the bank, specific weight of the investment portfolio in the total amount of its assets, personnel qualification, pressure on the bank exerted by the client base and its moods, decisiveness of executives and their mutual understanding with the bank's owners.

At that period, the simplest and so the most common operation algorithm of banks was to transfer a part of investments from the trade portfolio ("securities for resale") to the portfolio of "securities sustained until redemption"[1]. Nevertheless, this method resulted in the loss of the total returns on investment of the portfolio and, in addition, immobilized some amount of resources in government liabilities, without giving the bank a chance of a local maneuver for redistribution of money in the instruments with relatively high returns on investment at a certain time period (of cause, in case the level of risk was acceptable for such instruments).

In addition, the processes considered were significantly accelerated by ruble devaluation (with the excursion of fluctuation amplitude of RUR/USD pair up to 50 rubles per one US dollar over the period from June 2014 to July 2015 with absolute historical maximum of the exchange rate on December 16, 2014, equal to 80.1 rubles per one US dollar[2], on the same day the exchange value of ruble to euro reached the amount of 100.74 rubles per one euro).

Thus, the sustainable investment strategy of most universal banks proved to be insufficiently flexible and, as a consequence of this drawback, not very efficient.

[1] In terminology of regulatory documents of the Bank of Russia
[2] The next historical maximum falls on 20.01.2016 and amounts to 80.773 rubles per USD

Symmetrical Response

It should be mentioned that the reaction of specialized state institutions (the Ministry of Finances and the Bank of Russia) to this situation proved to be prompt and timely. The solution suggested to the Russian banking system had the necessary "technological" effectiveness.

In the early 2015, the Minfin issued new securities - federal loan bonds with variable coupon (OFZ-PK), whose rate was calculated based on the values of the RUONIA rate (**Ru**ble **O**ver **N**ight **I**ndex **A**verage), and federal loan bonds with indexed face value (OFZ-IN), where the face value was indexed daily in reference to the consumer price index (CPI) [1,2].

Here, undoubtedly, some comments are needed about the mentioned innovation tools and the base used in their construction.

General principles of RUONIA are the basis for defining the amount of Accumulated Coupon Income (ACI) of OFZ-PK [1,2]:

1. The indicative specific rate of one day ruble credits (deposits) called RUONIA reflects the value assessment of an unsecured loan on "overnight" conditions by a standard borrower from the number of Russian banks with a minimal credit risk.
2. RUONIA is calculated by the Bank of Russia according to the technique developed by the selfSRO "NFA" [7] jointly with the Bank of Russia based on the information about deposit deals made by the leading Russian banks from RUONIA list between each other during the entire day.

…

5. The calculation excludes the deals with signs of inconsistency or non-marketability.

Indexation of OFZ face value

OFZ-IN are the only bonds in Russia which have an "integrated" protection from inflation. For the first time they became available for market players in July 2015. The protection mechanism is implemented via determination of the current amount of the bond face value, which is indexed daily depending on the achieved level of inflation changes. Thus, if inflation has increased by some percentage, the OFZ-IN face value gets increased by the same size, herewith bond coupons are fixed and amount to 2.5% of the face value.

The level of inflation is calculated based on the Consumer Price Indes (CPI), which is updated and posted daily on the web-site of the Minfin of the RF according to the data from Rosstat.

However, the face value is recalculated not at once but with a 3-month delay. For example, if by the end of January, the CPI has increased by 2%, the OFZ-IN face value will increase by 2% only by the end of April. OFZ-IN are issued by the Ministry of Finances of Russia (Minfin) and the general emission agent is the Bank of Russia.

Parameters of primarily purchased OFZ-IN [5]:

1. Date of issue (or date of purchase) – July 17, 2015.
2. Date of redemption – August 16, 2023, i.e. total circulation period is 8 years.
3. For indexation of OFZ-IN face value, the consumer price index is used. It is published by the Minfin of the RF according to the data from Rosstat. For the date of purchase, the CPI was equal to 487.8 points. The value of the CPI affects the face value of OFZ-IN with a 3-month lag. I.e. if today the CPI has grown by 1%, the face value of OFZ-IN will grow by 1% only in 3 months. The following formula is used to recalculate the face value:

Face value		Face value		Consumer Price Index (CPI)
of	=	of	*	of current period
current period		previous period		CPI of previous period

On the date of issue the face value of OFZ-IN amounted to 1000 rubles. Now it is bigger (due to inflation growth), but on the date of redemption, the minimal value of the face value cannot be lower than the initial amount of 1000 rubles. I.e. if by the end of the circulation period, inflation should reduce dramatically (down to deflation) and the face value of OFZ-IN according to the formula will be lower than 1000 rubles, the redemption will still be carried out at 1000 rubles, but not at a lower value.

4. The coupon rate is fixed and equivalent to 2.5% per annum. The coupon is paid once every six months. The above interest is allocated on the newly indexed face value, i.e., first, depending on the CPI, the face value of a bond will be determined (according to the formula above) and then, given the obtained value, the coupon payment will be calculated. The exact schedule of coupon payments is presented in the table below.

Calculate the face value of OFZ-IN for the end of March 2017. For January 31, 2017 the face value was equal to 1100.51 RUR. As mentioned above, the CPI is taken with a 3-month lag, so to calculate the face value in March, the value of the CPI valid by the end of December 2016 will be used, i.e. 537.8 points. By the end of November 2016, the CPI was equal to 535.7 points.

- Inflation for the considered period amounts to +0.39% ((537.8/535.7)*100%-100%).
- The face value of OFZ-IN for 01.04.2017 = 1104.91 RUR = (1100.51 RUR*(537.8/535.7))
- The accumulated coupon yield = 2.88 RUR

Thus, indexed OFZ protect the investor from all risks related to inflation growth. However, there are moments when it is not profitable to purchase these securities. It implies the following. If the investor expects growth in inflation risks, i.e. there are real pre-requisites for a great increase in consumer prices, the purchase of OFZ-IN is reasonable. It will protect the capital from depreciation and, in addition, gives some premium (in the form of a 2.5% coupon). If, contrarily, the level of consumer prices is expected to decrease, it is inadvisable to purchase OFZ-IN, since the face value will fall following the decreasing inflation. In such periods, it is better to consider alternative instruments as investment vehicles.

Comparison of investment efficiency in federal loan bonds with variable coupon (OFZ-PK) and federal loan bonds with indexed face value (OFZ-IN)

It is necessary to analyze the ratio of such factors as the key rate (KR), inflation, RUONIA rate and the difference between RUONIA and KR. On Fig. 1 choose, with some allowance, the range of values of these parameters in the period when market volatility was maximal – from September 2013 to January 2016.

For easier analysis, the target values are presented in the form of two graphs (Fig.2).

Since the coupon of OFZ-PK depends on the *average* rates of the RUONIA over 6 months, the second of the presented illustrations is more informative. It clearly shows that the peak of average inflation is primary in relation to the peak of average rates, i.e. the accumulation of coupon yield of OFZ-PK lags behind the rate of inflation (it is important for correct modelling, see also item 8 below). It should be also noted that the RUONIA follows the key rate precisely (apart from short-time deviations), so for modelling it is enough to consider only the key rate. Before the shock of the mid-end 2014, the rates were a little lower than inflation. It can be assumed that with the transfer of

the Central Bank to inflation targeting, the rate will be insignificantly higher than inflation (after inflation arrives at the target parameters of the Central Bank) – it is also important for the model.

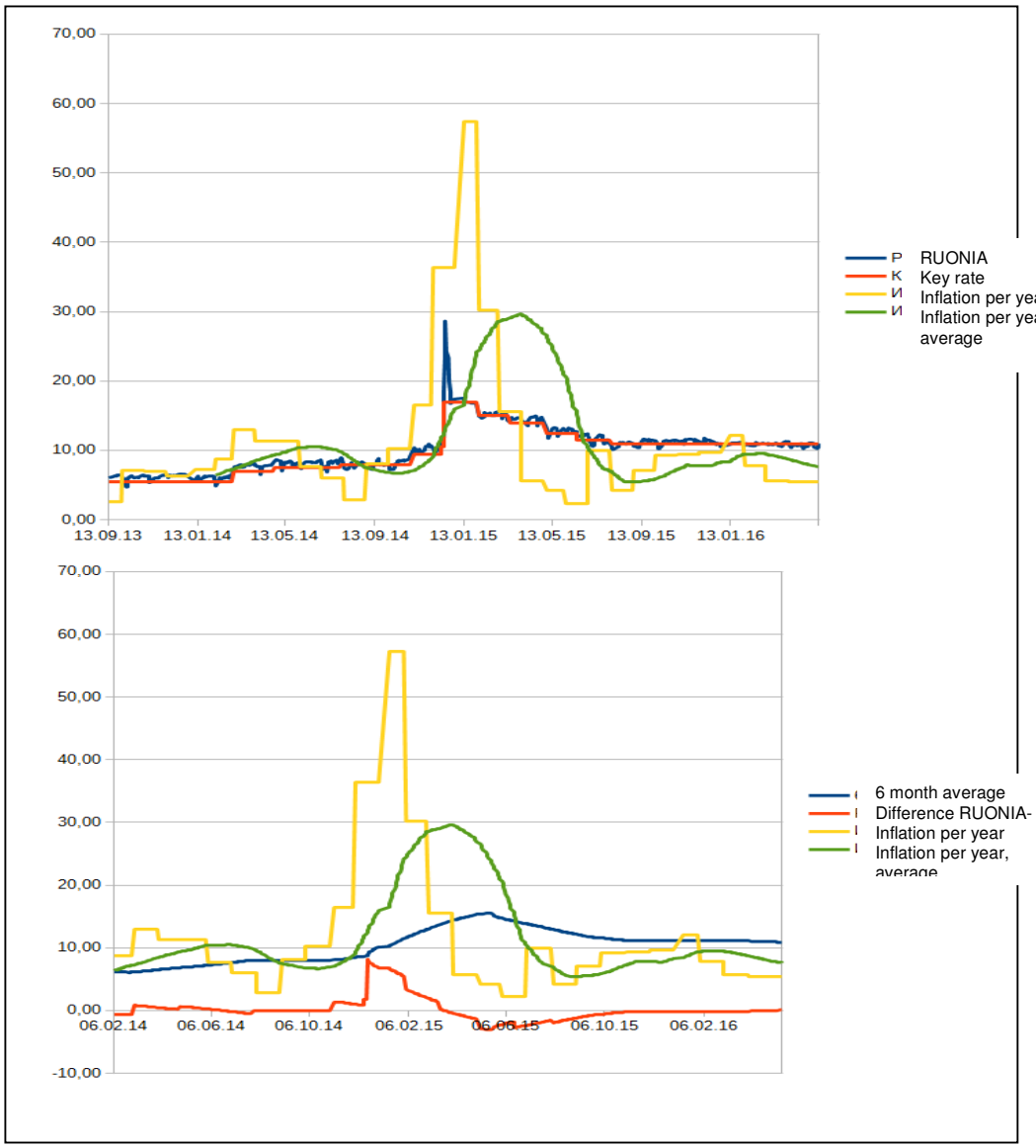


Fig. 2: Comparative dynamics analysis of the selected economic parameters

For variation analysis of the dependences considered, a support model has been developed. It is based on comparison of discounted cash flow (DCF) without reinvestment and with reinvestment. Logical price relation of OFZ-IN and OFZ-PK is calculated separately (if > 100%, then OFZ-PK must cost more than OFZ-IN, if < 100%, then OFZ-PK must cost less than OFZ-IN). In addition the DCF for bonds is calculated at the price of 100%, so in the last two periods OFZ-PK demonstrated negative cash flows (in the model considered, variable parameters are only the values of inflation and rate, values are average annual for the relevant period.).

Intermediate conclusions:

1. The main contribution in the DCF and the difference in the DCF is brought by the rate inflation ratio. The higher is the rate over inflation, the bigger is DCF for OFZ-PK. In case of "normal" rates (1-1.5-2 % greater than inflation), OFZ-IN have an advantage over OFZ-PK (which is so much more significant the smaller the difference is).

2. This advantage is especially noticeable in case coupons are reinvested. OFZ-IN are just incomparably much more profitable, especially in case of long periods.

3. Today OFZ-PK are traded more expensively than OFZ-IN, although the model demonstrates that they should be cheaper than OFZ-IN, given that the rate will lower in future. There are several possible explanations of this inconsistency:

a) Big market players do not believe in fast and sustainable reduction of rate. If the rate is considerably higher than inflation, this price is reasonable.

b) OFZ-PK prices will go down as the rates begin to decline and will come to a "normal" relationship with OFZ-IN prices.

c) Big market players use insignificantly deep analysis and, correspondingly, a short projection horizon, i.e. they live for the day and for the nearest future or do not reinvest, but just immobilize money resources for 6-12 months and remove coupon payments from the market.

At this state, it is reasonable to conclude that investors, interested in allocating money resources for 5 years or more, should reinvest from OFZ-PK in OFZ-IN right now, when the market proposes super-attractive prices for that.

4. Big and super-big investors, including professional market players (first of all, banks), who have access to cheap funding, with the instruments being investigated, can make operations according to the hedge-fund method – keep short position to OFZ-PK versus long position to OFZ-IN. However, here it is important to analyze in detail the periods of investment in order to avoid paying more for the raised money than the potential return on investment will be.

5. OFZ-PK become more preferable than OFZ-IN at the moment of "economic shocks" of the following main types:

a) Inflation shocks. The rates rise after inflation quite operatively and grow bigger than inflation and fall in a slower way (see Fig. 1 and 2).

b) Liquidity shocks. It is possible that the rates will grow not because of inflation, but because of tension in the interbank lending market (for example, as in 2007-2008, when in 2008 inflation insignificantly exceeded the level of 2007 (by 1.5% per annum) and the interbank lending rates grew exponentially at the same time.

Taking into consideration the probability of such situations, it is reasonable to implement a "back and forth" investment algorithm with a regular "withdrawal" from OFZ-IN and further investment in OFZ-PK (in the period when economic shocks are diagnosed) and then make a backward movement (reformation) of the portfolio.

6. The investor may choose between OFZ-IN and OFZ-PK, given the investment goals. Situations when coupons are removed and when they are reinvested are cardinally different. In case of coupon reinvestment, inflation bonds (OFZ-IN) are much more profitable. In case coupons are removed, OFZ-PK are more profitable.

7. It is possible to insure from shocks by combining OFZ-PK and OFZ-IN in the portfolio. If the market forecast is negative, it is possible to add OFZ-PK in the portfolio, so as to get additional returns on investment in case of shock. The ratio between OFZ-PK and OFZ-IN must be selected given the expectations of the inter-bank rate, from 100% OFZ-IN (in a relatively calm period) to 100% OFZ-PK (when there are grounds to expect market disasters). However, the investor must be utmost careful, because if the forecast does not come true, it will lead to the reduced resulting returns on investments.

8. An active investor at the moment of shocks can reinvest from OFZ-IN in OFZ-PK and back again. Or choose between purchase of OFZ-PK and OFZ-IN, given the existing conditions and nearest future projections. For this it is important to monitor carefully the interbank lending, inflation and analyze the comments of the Central Bank and Minfin, since the peak of average inflation does not coincide with the peak of average rates – here you get opportunities for making extra profits.

9. Conservative investors, in our opinion, should keep the bond part of the portfolio 100% in OFZ-IN. Shocks and risks are relatively short-term phenomena, whereas inflation is a factor of constant pressure on the market. According to the DCF model, in case of very long periods OFZ-IN with reinvestment considerably outride OFZ-PK (and bonds with fixed coupon).

Final Conclusions and Discussion

The most common concepts of capital market operation and security portfolio management, which have been elaborated in the western economic theory, are applicable in the conditions of developing and highly unstable markets with big limitations. In particular, the hypothesis of efficient markets and linear pricing paradigm of market assets, common for the western academic circles distort the real processes on stock markets. For this reason, all theoretical models worked out on this foundation, such as MPT and CAPM cannot fully satisfy people on the ground of the financial market. In application to developing markets, linear concepts are seen as even more inefficient in comparison to developed markets.

Formation of a security portfolio and its management in the conditions of highly unstable markets call for other approaches to the asset management process and risk assessment which more clearly reveals the processes happening on the developing capital markets.

The investment strategy in the conditions of unstable market must be selected given the investment horizon of the investor. Money investment for a short period in the conditions of unstable markets is associated with a significant risk. This risk reduces a lot in case of long-term investment (from 1 year).

If passive strategies are used in the conditions of instable markets, investment risk reduces considerably provided the investor has a “flexible” investment horizon, i.e. the investor can prolong the period of investment if the market situation is unfavorable and wait until security price quotations rise.

Risk assessment of non-receipt of the planned yield allows making a conclusion that with the established level of planned yield, the risk of non-receipt of the planned yield is changing insignificantly in case the investment horizon changes. The level of risk reduces if the investment horizon is long (more than 5 years).

In case the investor has a “flexible” investment horizon, i.e. when in case of unfavorable conditions, the period of investment can be prolonged, it is reasonable to assess risk with a lower degree of forecast reliability (80-90%). Such an approach will allow assessing risk in a less conservative way and form a more profitable strategy.

If investment portfolios, formed in such a way, have ,in their content, innovative financial tools, whose constructions have residentially integrated additional protection factors from manifestation of market or economic environment volatility, it will allow investors and professional market players (primarily, banks) to hedge their own investment risks efficiently in the conditions of unstable economy.

The methodological approaches stipulated in this paper can be applied in practical work of professional stock market players – primarily banks, investment and management companies, institutional investors.

References

http://www.cbr.ru/hd_base/default.aspx?prtid=ruonia
http://www.ruonia.ru/
http://moex.com/ru/derivatives/money/ruonia/

http://1prime.ru/experts/20151224/822667561.html
http://minfin.ru/common/upload/library/2015/01/main/press-reliz_ob_emissii.pdf
https://www.gazeta.ru/business/2017/02/27/10546817.shtml
http://www.nfa.ru/
Bakatanov O.G. (2008) "Portfolio Investment in the Conditions of Highly Unstable Financial Markets." *PhD thesis. Dissertation Council D 446.004.01*
Abramov A.A. (2005) "Investment Funds. "*M., Alpina*
Berzon N.I. (2011) Stock Market. *M., Urait-Izdat.*
Bodie Z., Kane A., Marcus A. (2008) "Investments. 4-th edition/Translated from English." - *M.: Publishing House Williams.*
Barkhatov V.I., Usachev M.A., Khodorovsky E.P. (2003) "Formation of an Efficient Financial Capital Market in Convertible Economy: Monography." *Chelyabinsk, Publishing house of SUSU.*.
Burenin A.N. (2015) "Futures, Forwards and Options Markets." *M., Moscow Exchange Market*
Burenin A.N. "Stock and Derivative Securities Market." - *M.: STA named after academician* 2009.
Burenin A.N. (2012) Security portfolio management. - *M.: STA named after academician Vavilov S.N.*
Milovidov V.D.(2007) "Unit Investment Funds." *M., Ankil, INFRA-M.*
Mirkin Y.M.(2002) "Securities and Stock Market." *M., Perspektiva.*
Peters E. (2000) "Chaos and Order in the Capital Market: A New View of Cycles, Prices, and Market Volatility." *M., "MIR"*
Peters E. (2004) "Fractal Market Analysis." *M., Internet-Trading*.
Kokh I.A. (2001) "Analytical Models of Security Market." *Kazan, Publishing House KFEI*, 2001.
Kokh I.A. (2009) "Portfolio Investment: Methodological Approaches. Monography." – *Kazan, Publishing House of KSU*
Kapitanenko V.V. (2007) "Investments and Hedging." *M., Infra-M,*.
Shapkin A.S. (2006) "Security Investment Portfolio Management." *M., Dashkov and K*.
Shiryaev V.I. (2007) "Neural Network Methods in Financial Market Analysis." *M., Komkniga*.
Sharp W. (2003) "Portfolio Theory and Capital Markets." *M., INFRA-M*.
Carol A. (2002) "Risk Management and Analysis." *NY, John Willey & Sons*.
Markowitz, H. M. (1987) "Mean-Variance Analysis in Portfolio Choice and Capital Markets. Basil Blackwell"
Osborne M. (1964) "Brownian Motion in the Stock Market. The Random Character of Stock Market Price." *Cambridge, MIT Press*
Jorion P. (2001) "Value-at-Risk: the new benchmark for managing financial risk." *McGraw-Hill*.
Peters E. (2003) "Simple and Complex Market Inefficiencies: Integrating Efficient Markets, Behavioral Finance, and Complexity." *The Journal of Behavioral Finance*.
Markowitz H. M. "Portfolio Selection". *Journal of Finance,* Vol. 7, Iss. 1, p. 77-91.
Markowitz H. M. (1970. 1991) "Portfolio Selection: Efficient Diversification of Investments" *Wiley, Yale University Press, 1970, Basil Blackwell, 1991.*

Using Business Intelligence Technologies for Evaluation of Road Network Organization

Oksana Yu. Iliashenko, Peter the Great Saint Petersburg Polytechnic University, Saint Petersburg, Russian Federation, ioy120878@gmail.com
Anastasia I. Levina, Peter the Great Saint Petersburg Polytechnic University, Saint Petersburg, Russian Federation, alyovina@gmail.com
Alissa Dubgorn, Peter the Great Saint Petersburg Polytechnic University, Saint Petersburg, Russian Federation, alissa.dubgorn@gmail.com

Abstract

The paper aims to assess the effectiveness of measures to improve the organization of road network (using the example of controlled intersections), determine the indicators for evaluating the effectiveness of controlled intersections, establish the role of BI systems in such tasks, and describe the project for developing a BI application for analysis of road network organization at a controlled intersection before and after optimization. The possibilities of using business analysis technologies in evaluating activities to improve the organization of controlled intersections are illustrated by a project of developing a BI application for municipal administrations. Qualitative positive effects from the implementation project both for the company-developer, and for municipal administrations are considered.

Keywords: controlled intersections, road network, BI-systems, Qlik Sense, data analysis.

Introduction

The organization of non-stop traffic is a key component of the socio-economic development of cities and regions. Actively developing technologies in the field of transport modeling and design allow solving many transport problems: optimization of traffic and pedestrian flows, public transportation, traffic management, optimization of traffic light facilities, and justification of investments in the construction of transport infrastructure. However, less attention is paid to comparing the actually obtained optimization results with the planned ones. [1] The decision makers of optimization projects, namely the heads of municipal transport administrations and their deputies, do not have the opportunity to receive operative and reliable information about the situation in the city, including what elements of the road network require immediate optimization and increased attention. A large flow of information passes through them, often in paper form, which needs long time periods to be processed. This often leads to data loss.

Effective management of the transport situation is currently impossible without full IT support of processes at all levels: from the collection of primary data on the road situation and the regulation of road infrastructure facilities to the management decisions support. In this regard, the development of intelligent transport systems and their individual components is experiencing a period of rapid development and represents a great potential for research in this field. [2-4] The intelligent transport system (ITS) provides integration of existing and prospective information and control systems in transport, automation and centralization of the processes of collecting, transmitting and processing data on the functioning and current status of all components of transport systems into an integrated hardware and software system, exchange this information, its delivery, both to the participants of the transport process, and to the managing structures, and the use in automatic and automated mode while optimizing all transport processes. [5]. Due to the complexity of its structure, the development of ITS contributes to the solution of a wide range of problems, which are typical for transport systems of modern cities. [6-8] The global goal of ITS development in a city can be seen as development of a system for monitoring and managing the city's transport system in real time to improve the quality of transport services for the economy and the population, reduce transportation costs, improve environment and safety.

Road and transport management in Russia is a traditional point of government-level focus, as the territory of the country is big and roads are the key factor of effective domestic communications. A number of federal-level projects, including state project [9] are being run at the moment. Developing and creating of ITS and its elements is regulated and supported by the number of adopted state standards [5, 10-15].

At the moment there is a wide range of software for modeling traffic at intersections, calculating delay, queue length, bandwidth and other characteristics. Also there is software that has predictive capabilities based on both static and dynamic models. These are products like HCS 3.0, PASSER V-09, SIDRA INTERSACTION, Synchro, OSCADY PRO, PTV Vissim, PTV Optima, TransInfo - Traffic Platform.

Despite the wide variety of software products for developing transport models, calculating and planning indicators, and designing road network parts, there is no solution for senior management that directly decides on the optimization of particular road network parts. Often, the decision makers of transport infrastructure development projects do not have a clear idea of its current state. There is no full understanding of which objects require special attention and which should be optimized as a matter of urgency. It is also not possible to evaluate the effectiveness of measures taken to improve the effective functioning of the traffic in general sorted by districts, cities, years or other indicators [16]. As a result, the development of transport systems is slowing, and people's lives are put at risk, problems are difficult to track, and therefore they are often left without attention.

The decision-maker should be provided with a fairly simple tool that would allow the large volumes of information received from various poorly interconnected sources to be presented in a single environment and in a form convenient for analysis and subsequent well-reasoned decision making. That is why BI-systems are an integral part of modern ITS [17].

Decision support systems have a variety type of instrumentation tools. However, the most topical solution for the top management are business intelligence systems, or BI-systems. They represent a repository of extracted relevant information from an operational database designed for actual data analysis. Their key feature is the ability to combine unstructured data in large volumes from a variety of sources into a single system, process it in a specific way, and present it in a form that is convenient for evaluation and analysis.

In order to solve the problem of poor knowledge of the top management on the state of road traffic management, it will be advisable to develop a business intelligence application that would assess the effectiveness of traffic management before and after optimization of road network parts. The road network consists of a number of elements and it makes sense to use separate applications for each of them, since the evaluation of the efficiency of traffic management optimization projects devoted to different elements of the road network has its own calculation features. Since controlled intersections make up a higher percentage of road network and have a high concentration of traffic accidents, main attention should be paid to assessing the performance of this particular element. To solve such a problem, it is necessary to develop an application that will be able to demonstrate how efficient the optimization of the elements of the road network turned out to be, and also on their basis will make recommendations for further improvement of the road network elements or their totality. Given the fact that such an application should become an assistant to senior management in the process of decision making, it would be most appropriate to use the capabilities of BI-systems that exist to solve similar problems [18].

The BI application was implemented on the basis of a company that for many years has been engaged in transport modeling and traffic planning at the sites of the road network and has the necessary tools to fill the existing gaps in the analysis of transport infrastructure. The paper describes main stages of the BI application development project.

Research Methodology

Complex Analysis of Road Traffic Management on Controlled Intersections

The road network is a system of transport and pedestrian connections between the elements of the city's

structure assigned for the organization of transport and pedestrians traffic, laying of utility systems, landscaping and capital improvement [4].

Elements of road network can be classified according to the type of traffic [19]:

1. Transport traffic:
   - road or street sections;
   - fly-over intersections;
   - gyratory intersections;
   - controlled intersections;
   - non-controlled intersections.
2. Pedestrian traffic:
   - sidewalks;
   - controlled crosswalks;
   - non-controlled crosswalks.

Controlled intersection's main characteristic is the establishment of the traffic sequence by the means of a traffic light or a traffic policeman [20]. Controlled intersections are places of greatest concentration of traffic accidents. This is due to the fact that because of the large number of so-called conflict points, the traffic becomes difficult. Providing the necessary conditions for fast, safe and convenient traffic of vehicles and pedestrians on the controlled intersections is a key task of traffic management.

To ensure road safety and reduce the number of road accidents, the following means are used: road signs, road markings, traffic lights, road barriers and guiding devices. However, the main tool that provides a consistent pass of vehicles and pedestrians across the intersection is the traffic light. Regulation of traffic through traffic lights allows identifying and eliminating the most dangerous conflict points.

However, the existing measures for the traffic management on certain elements of the road network may fail to achieve optimum effect and require further optimization. Following actions can be typified as traffic management optimization measures [21]:

- partial reconstruction of individual elements of the road network (re-planning of intersections, construction of safety islands, equipment of bus stops);
- installation of road signs, traffic lights, road markings, safety fences;
- implementation of automated traffic management systems;
- change in the timetable for the movement of scheduled passenger transport;
- various traffic restrictions (speed, entry for certain types of vehicles).

The basis for the traffic management development measures is data on the current state of traffic organization and information on the intensity, composition of traffic and pedestrian flows, service levels and other information on road traffic. This information is collected in the process of periodic surveys of traffic by organizations, responsible for optimizing the traffic organization.

Identification of places with concentration of accidents, areas with limited capacity, where delays in transport and pedestrian flows are noted, are carried out based on the data of traffic accidents statistics, traffic police information on violations of the Russian Federation traffic rules, and assessment of the capacity of individual road network elements. The work on the identification of black spots should be regularly carried out by traffic police units responsible for a specific territory or road. Investigation of road accident clusters and assessment of capacity should be carried out by the traffic police or an

organization entrusted with the implementation of traffic optimization projects. Depending on the task assigned, the project is developed for a local road network element (intersection, a section of the street) or for a city (urban area), city road or city highway as a whole.

Only a specialized project organization can manage such traffic optimization projects. The assignment for designing usually is developed by an appropriate subdivision of the local administration with the participation of a traffic police unit servicing that territory or road.

Efficiency evaluating methods for traffic management on controlled intersections

Evaluation of the traffic management efficiency on controlled intersections is the first and fundamental stage in the design of [4]:

- site plans;
- comprehensive transport schemes;
- local area development plans;
- comprehensive traffic schemes;
- traffic management plans.

In addition, the efficiency of design solutions should also be evaluated. In this regard, an important aspect is the choice of indicators that allow to assess the efficiency of traffic management. At the moment, there is no unambiguous opinion in Russia how to classify the criteria for estimating road network and to calculate them. Two different approaches are used to evaluate road network: the application of particular criteria and the use of integral criteria. First, we will consider the particular criteria classified by the tasks of the traffic management plans. They are presented in Table 1.

Table 1: Classification of road network estimation criteria based on traffic management plans

Traffic management plan point	Criteria
Traffic management state value	– Time spent on movement over the road network – The total vehicle run over the road network – Environmental characteristics (transport noise, air emissions) – Conflict loading of road network – Stability of road network operation
Identification of road network bottle-necks	– Speed of communication over the road network – The indirectness of transport connection over the MAC – Environmental characteristics – Places of concentration of road accidents (as a result of statistics analysis) – Stability of road network operation

Traffic management plan point	Criteria
Using network methods for traffic management	– Mobility plans – Road network traffic routes – Traffic load of road network – Dislocation and characteristics of traffic flows attraction objects – Throughput of main streets and roads – Intensity of pedestrian traffic – Intensity of vehicle traffic within the assumed pedestrian zone – Provision of parking places – Volume of transit traffic – Vehicle speed – Characteristics of consignees and consignors – Intensity of vehicle movement – Intensity of traffic and distribution of transit flows – Qualitative composition of transit flows

The above road network criteria can be combined into 4 groups:

- economic indicators of the traffic management state value;
- road safety indicators;
- indicators of environmental safety;
- indicators of the sustainability of road network operation.

In addition, particular criteria for assessing the road network state can be characterized by the elements of road network and the traffic types. Detailed classification is presented in Table 2.

Table 2: Classification of particular road network criteria based on network elements

Traffic type	Road network element	Evaluation criteria
Traffic flow	Road/street section	– Traffic capacity – Traffic speed
	Fly-over intersections	– Traffic capacity
	Gyratory intersections	– Traffic capacity – Number of vehicles waiting – Average delay – Total delay
	Controlled intersections	– Traffic capacity – Number of vehicles waiting – Percent of stopped vehicles – Average delay – Total delay
	Non-controlled	– Traffic capacity – Number of vehicles waiting – Percent of stopped vehicles – Average delay

Traffic type	Road network element	Evaluation criteria
		– Total delay
Pedestrian flow	Sidewalks	– Traffic capacity – Traffic speed – Pedestrian density
	Controlled crosswalks	– Average delay – Que length (territory occupied by pedestrians)
	Non-controlled crosswalks	– Traffic capacity – Average delay – Que length (territory occupied by pedestrians)

In contrast to the particular criteria, there is an integral criterion, represented by the level of service. Let us consider in more detail the particular and integral criteria for estimating traffic management at controlled intersections.

Under the traffic capacity of any element of the road network, including the controlled intersection, it is customary to understand the maximum possible traffic intensity in the area under consideration. In the HCM 2000 manual, traffic capacity is defined as the maximum sustained movement rate at which a traffic or pedestrian flow crosses a certain section of the road under a particular control mode, geometric intersection features and other specific traffic conditions. The traffic lane capacity at a controlled intersection to be measured in number of cars per hour (cars / h).

There are theoretical, practical and design capacity to be distinguished. Theoretical traffic capacity is calculated for a horizontal section of the road, assuming that the intervals between vehicles and the uniform composition of the transport stream are constant, that is, they consist only of cars. Practical traffic capacity corresponds to the capacity of road network elements having the worst conditions in comparison with the reference section. Design traffic capacity characterizes an economically viable number of vehicles that the road can skip in a unit of time in the analyzed conditions under the existing traffic management scheme.

The indicator of the average delay of one vehicle is widely used as a criterion for optimizing traffic at a separate intersection. This indicator is closely correlated with such indicators as traffic intensity, queue length, total delay, parameters of the regulatory regime.

Based on the average delay, the queue length and the total delay are determined. The total delay is defined as the delay of all vehicles for the analyzed period on the considered road network or its separate element. The total delay is more suitable for the economic evaluation of the traffic management efficiency in the whole road network or an urban area, while the average delay mainly characterizes the efficiency of servicing a single vehicle.

The number of vehicles in the queue on the road network section or its length in linear units is the definition of the queue length. Using this indicator, one can judge the degree of the road network saturation. A term “supersaturated road network” stays for the situation where the queue of vehicles at one intersection causes congestion at neighboring intersections.

As an integral indicator of the level of service of vehicles at controlled intersections, it is customary to use the value of the average delay. Table 1.3 represents which means of average delay correspond to certain levels of service and how they are interpreted.

Table 3: Controlled intersections service levels

Service level	Description	Average delay		
		May A, Tidvell J.E.	Sutaria T., Hampreys J.E.	HCM
A	Delay is absent or small	≤15	≤12,6	≤5
B	Slight controlling cycle, good coordination	≤30	≤30,1	5,1 – 15
C	Increased duration of controlling cycle, reasonable coordination	≤40	≤47,7	15,1 – 25
D	Significant duration of controlling cycle, reasonable coordination	≤60	≤65,2	25,1 – 40
E	Significant duration of the controlling cycle, poor coordination	>60	≤82,2	40,1 – 60
F	The traffic conditions are unacceptable for most drivers, the intensity at road access exceeds the capacity of the intersection	—	—	> 60

In the HCM 2000 manual, the so-called "regulatory delay" is used as a measure of service level at controlled intersections. It is defined as the delay that occurs as a result of slowing or stopping vehicles and is calculated as the difference between the time spent in driving without regulation.

In Russia, to assess the safety of traffic on the road network elements, it is necessary to identify places where traffic accidents are concentrated, also called accident clusters. The accident cluster is a homogeneous and limited to length part of the road network, characterized by a statistically stable level of accidents. Areas of traffic accident concentration are determined on the basis of accident data for a period of not less than 3 last years and a relative accident rate. The focus of road accidents in cities is a section of road network that does not exceed 400 meters, where three or more accidents occurred during the year.

Evaluation of the road traffic optimization projects is a task of business intelligence, which requires the collection, processing and analysis of large volumes of raw data. Implementation of such a task is practically impossible without using the capabilities of modern BI technologies.

Results

Development of BI Application for Evaluating the Organization of Controlled Intersections

The paper describes the project of BI application development for evaluation the organization of controlled intersections of the road network. The objectives of implementing a BI application are:

3. To increase the effectiveness of managerial decision making on the optimization of transport infrastructure facilities.
4. To aggregate data on the state of the transport system elements and optimization projects of the road network sections.
5. To provide a user-friendly and intuitive interface.
6. To simplify reporting.
7. To provide an instant analysis of the characteristics of adjustable intersections before and after optimization.

To develop such an application, it needs to:

- Identify the data sources from which information will be extracted;
- Identify key concepts, their characteristics and relationships between them;
- Transform the data for further processing;
- Formulate the basic requirements for the application functionality;
- Work out application scenarios;
- Develop application windows;
- Identify software and technical characteristics;
- Describe the order of work in the application;
- Formulate the positive effects of using the developed application.

The application should answer the following questions:

- Number / percentage of optimized road network areas by years;
- List of sites with the highest / lowest rates (per year);
- Determination of how many high / low sites have been optimized over the past year, two, etc.;
- Determination of the ratio of costs for optimization and performance indicators;
- Number of road accidents by sites and years (identification of places where traffic accidents are concentrated and the safest areas);
- Changes in indicators by years for a single site.

The implementation of the application was carried out in several stages:

Stage 1: Conceptual modeling.

To implement the application and solve the tasks, it was decided to identify 3 entities that reflect the key concepts of the subject domain:

1. Intersection. Element of the road network, which is analyzed. It consists of two intersecting streets, which can have an X-shaped or T-shaped intersection. The intersection also indicates the location, namely the area and the city. If optimization was carried out, the fact of optimization, the date, the cost of implementing the project and who was appointed as the executor is indicated.

2. Measurements before optimization. As indicators of the effectiveness of traffic management, the following private and integral indicators were selected: throughput, queue length, number of road accidents and service level. This entity reflects the values of the listed indicators for adjustable intersections before optimization, which are fixed each week.

3. Measurements after optimization. This essence reflects the values of traffic performance indicators for controlled intersections after optimization, which are recorded every week.

In the ITS database, the characteristics of the adjustable intersections are not divided into data before and after optimization. In this connection, in the application it is necessary to load these data in parts. This means that the measurements will be divided into two lists according to the date criterion. By the project completion date, optimization for a particular site will be divided into two parts. This procedure is necessary for the correct and complete presentation and analysis of data in the BI system.

Stage 2: Infological modeling of the database.

The relationships that emerged between these entities were defined:

Intersection - Measurements before optimization: the intersection can have many dimensions before optimization, in turn each measurement refers directly to one intersection, hence, the 1: M link.

Intersection - Measurements after optimization: the intersection can have many dimensions after optimization, in turn each measurement refers directly to one intersection, hence the 1: M link.

Step 3: Normalize the data.

Data was normalized to the fifth normal form.

Step 4: Datalogical Design

The next stage in the design of the application's information base is the implementation of the physical model based on the infologic data model. For each relationship obtained as a result of the design of the data model, tables were created by setting the basic properties of the relationship attributes - 6 tables in all.

Step 5: Develop a conceptual application model

The conceptual model of the database describes the objects of the domain, their attributes and the relationships between them in the volume in which they are to be directly stored in the database of the system. At this stage, the physical model of the database was designed by means of ErWin Data Modeler.

Step 6: Identify the data sources

Data on road traffic performance indicators for the application can be obtained from the local points of the traffic police or the traffic control center, if there is one in the city. As a rule, such statistics are collected by these objects. The information is stored in databases or knowledge bases of intelligent transport systems.

- Data on the state of the street-road network are collected from various devices:
- detectors of traffic flows;
- automatic road weather stations;
- a stationary and rotary camera;
- points of detection of high-speed modes.

Information on projects to optimize the objects of the road network can be obtained from local authorities, which initiate these projects. There you can get information about the composition and structureof the road network.

For the test version of the application, the data from various sources was collected in an .xls file, in which the information is stored as "directories". Directories are filled in analogy with the generated tables of the conceptual data model. There are 6 directories: City, Area, Intersection, Synthetic key, Measurements before optimization and Measurement after optimization.

Step 7: Description of application scenarios

The application scenario can be described by the following sequence of actions (in the project described in the eEPC ARIS notation):

The application is launched by the user locally or in the cloud.

The process of extracting data on the main characteristics of traffic flows at the controlled intersections of the MAC from the database of the ITS used and data on completed optimization projects stored in an .xls file is started.

The data is loaded and the previously created graphic objects are populated or updated on the application sheet.

The user selects the necessary values in the filter fields, after which the filtered information is displayed on the graphs.

Having obtained the required information, the user analyzes it and takes the necessary administrative decision.

Step 8: Select the application implementation tool

At the moment, the most current information on the state of the world market of analytical reporting systems is provided by the consulting company Gartner in the form of graphical reports called "magic quadrants". Based on Gartner's estimates for BI systems, as of 2017, software products were selected as leaders in business intelligence: Qlik, Tableau, and Microsoft Power BI. The most important criteria are chosen when choosing a system: speed of implementation, price, availability of a free version, interactive visualization, data integration, visual deepening into data, integration with GIS, modeling and analytics, development environment. As the most suitable BI platform, Qlik Sense was chosen, which has a powerful tool for visualizing data and generating analytical reporting. From an integration point of view, Qlik Sense allows you to load data from various sources, whether it be databases of corporate information systems up to user files in Excel format.

Step 9: Downloading Data

After the .xls test data has been loaded, a data model is automatically generated in Qlik Sense.

Step 10: Developing Data Marts

A Qlik document can use one or more sheets on which objects are placed. These sheets are called data marts. At each data window there are blocks of information that are not directly related to each other, but are united by a common idea. Also mandatory attribute of the showcase are the fields by which the desired values are selected. For the created application 4 sheets were created:

1. Data of an adjustable intersection.
2. Statistics of adjustable intersections.
3. Comparison of the characteristics of adjustable intersections.
4. Geographical information.

For each data showcase, the following were described:

- a set of graphical elements for analysis;
- a set of fields underlying the measurements and measures of graphic objects;
- the purpose of each graphic sheet object.

The developed application was tested using test data, the errors were not found. The application was provided with a user's instruction.

It is necessary to separately evaluate the positive effect of the implementation of the developed application for the company-developer and for city administrations [22]. The effect for the developer company is described as follows:

1. Profit from the introduction of additional functions, installation of necessary software and technical components;
2. Priority in the queue for obtaining projects for the optimization of sections of the road network for specific urban sites.

The city administration will receive the following benefits, which will improve the current transport infrastructure:

1. Increase the effectiveness of decision-making;
2. Decrease in decision-making time;
3. Increase the volume of information used for decision-making;
4. Improve the quality of information;
5. Increase in the likelihood of the results of the analysis;
6. Increase of quantitative information in comparison with qualitative information.

Conclusions and Discussions

Within the framework of the project described in the paper, the issue of applicability of BI-tools for analyzing traffic efficiency at a controlled intersection of the road network before and after optimization was examined. The paper defines the indicators that assess the effectiveness of the operation of adjustable intersections, and describes the stages of the project to develop a BI application that includes the selection of a specific tool for implementing the application. Also, the qualitative positive effects from the implementation both for the company-developer and for city administrations were considered. Analytical reporting provided by the developed application will allow improving existing methods of optimizing the elements of the road network, and will also help to use the experience more effectively when designing new road objects. The developed application can become one of the components of the BI system within the IT architecture of the city road network management system. [17]

The further research in the field of BI systems application for decision making support in the road network management can be the development of similar applications for other types of road network elements, as well as their integration within the framework of a single ITS.

References

1. Kozlov A., Gutman S., Zaychenko I., Rytova E. (2017) 'The formation of regional strategy of innovation-industrial development' Advances in Intelligent Systems and Computing, 37th International Conference Information Systems Architecture and Technology, Springer International Publishing AG, 115-126.
2. Wang, X.J. (2008) 'Review of the Process and Dynamics of ITS Research and Developments,' *Urban Transport of China*, 6 (1), 6-12.
3. Cardoso, R.M., Mastelari, N. and Bassora, M.F. (2014), 'Internet of things architecture in the context of intelligent transportation systems – a case study towards a web-based application deployment,' *ABCM Symposium Series in Mechatronics*, 6, 338-347.
4. Ling Sun, Yameng Li and Jian Gao (2016), 'Architecture and Application Research of Cooperative Intelligent Transport Systems,' *Procedia Engineering,* 137, 747 – 753.
5. GOST R ISO 14813-1-2011 'Intelligent transport systems. The scheme for constructing the architecture of intelligent transport systems. Part 1. Service domains in the field of intelligent transport systems, service groups and services'.

6. Prokhorov A.V., Il'in I.V. (2012) 'Modeling of the transport infrastructure of industrial clusters using information and analytical systems,' *Journal of St. Petersburg State Polytechnic University. Economic sciences*, 3 (149), 61-65.
7. Prokhorov A.V., Il'in I.V. (2010) 'Information-analytical systems and evaluation of economic efficiency of transport planning projects,' *Journal of St. Petersburg State Polytechnic University. Economic sciences*, 6 (112), 291-295.
8. Ilin I.V., Iliashenko O.Yu., Levina A.I. (2016) 'Application of Service-Oriented Approach to Business Process Reengineering,' Proceedings of the 28th International Business Information Management Association Conference – Vision 2020: Innovation Management, Development Sustainability, and Competitive Economic Growth, 768-781
9. Passport of the project 'Safe and qualitative roads'. Approved 2016-11-26.
10. GOST R 56294-2014 'Intelligent transport systems. Requirements for the functional and physical architectures of intelligent transport systems'.
11. GOST 24.501-82 'Automated traffic control systems. General requirements'.
12. GOST 34.401-90 'Technical means of peripheral automated traffic systems'.
13. ISO 21217: 2010 'Intelligent transport systems. Access to communications for terrestrial mobile systems. Architecture'.
14. ISO 17264: 2009 'Interfaces for automatic identification of vehicles and equipment (AVI / AEI)'. 31. ISO 17267: 2009 'Intelligent transport systems. Navigation systems. Application Programming Interface (API)'.
15. ISO 24531:2007 'Intelligent transport systems — System architecture, taxonomy and terminology — Using XML in ITS standards, data registries and data dictionaries'.
16. Zhankaziev S. V., (2016), Development of intelligent transportation systems. Tutorial. Moscow: Moscow Automobile and Road Construction State Technical University (MADI).
17. Ilin I.V., Kalinina O.V., Iliashenko O.Yu., Levina A.I. (2016) 'IT-Architecture Reengineering as a Prerequisite for Sustainable Development in Saint Petersburg Urban Underground,' Procedia Engineering, 15th International Scientific Conference 'Underground Urbanisation as a Prerequisite for Sustainable Development', 1683-1692.
18. Glukhov V.V., Ilin I.V., Iliashenko O.Yu. (2016) 'Improving the Efficiency of Architectural Solutions Based on Cloud Services Integration,' *Lecture Notes in Computer Science*, 9870, 512-524.
19. ZHankaziev S.V., Vlasov V.M., (2010) The Concept of ITS Development in Russia.
20. GOST R 32846-2014 'Roads of public use. Elements of arrangement'.
21. Zhankaziev S. V., Vlasov V. M. (2010) 'Scientific approaches to the strategy of state development of intelligent transport systems,' *Autotransportnoie predpriyatie*, 7, 2–8.
22. Rudskaia I., Rodionov D. and Degtereva V., (2017) 'Assessment of the Effectiveness of Regional Innovation Systems in Russia,' Proceedings of the 29th International Business Information Management Association Conference, 3-4 May 2017 Vienna Austria, 3437-3450.

Impact of Online Reviews on Customers' Dining Decision: An Empirical Study

Nawaz Ahmad, Assistant Professor at IoBM, Karachi, Pakistan.
nawaz.ahmad@iobm.edu.pk

Nimra Sharif, Research Assistant at IoBM, Karachi, Pakistan
nimra.sharif@iobm.edu.pk

H.M Faizan Usmani, Shaeyma Hafeez, Independent Researchers, Karachi, Pakistan.
shaeymahafeez@gmail.com

Abstract

This research is based on to identify the impact of online reviews on customers' dining decision. Five independent variables (credibility of website, number of reviews, physical environment, perceived risk, and visuals on website) have been used to identify their impact on the dependent variable (customers' dining decision). Non-probability and convenience sampling has been adopted in this research to gather the data. A close ended questionnaire of 5 point Likert scale was adopted in this survey. A total of 720 respondents were included in the questionnaire survey. With the help of SPSS software, various tests like Reliability, regression analysis and correlations were run and in the end, it was found that number of reviews, perceived risk, and visuals of website are main factors which affect a lot on customers' mind while making a dining decision.

Keywords: Customers' dining decision, Credibility of website, number of reviews, perceived risk.

1. Introduction

1.1 Background

In today's era of increased technology, internet has proven to be a vital mode of communication for everyone else. The availability of various online reviews has made people more aware about what is happening around them, how they are living in. With time people have started relying more on online reviews prior to make a purchase decision. This medium has given a platform to all those people who want to exchange information, share their experiences about a certain product/service has grown a lot as compared to traditional Word-of-mouth. With the numerous numbers of apps, it has become a lot easier for marketers to connect with their customers and reach out to masses just a few clicks away. Nowadays people do not only talk to each other, but also get to know about current affairs and unknown realities.

When it comes to having a dinner at any restaurant we always ask others about their experience of dining in that restaurant. We are afraid to go to a new place at first. And always prefer to read online reviews. People have many types of fears like (taste of food quality, dining environment, customer service etc).

From last few years, many companies have now realized that how much "word-of-Mouth" matters in making a consumer's perception about a certain product/service and how much consumer talks may affect a possible purchase intention. While consumers speak with each other, they get an idea that whether buying a certain product would help them or not? Is this the right choice they are making? People's intentions are interrupted after reading online reviews about a certain product/service.

Looking at this trend, advertisers have also started using these online forums to improvise their advertisement techniques. Not only customers, but advertising personnel are also using these online

forums for their business expansion. Without any doubt, social networking websites are the biggest forums for such purposes. Earlier the word of mouth used to happen when one person heard from the other and then they pass it over to the other, but in this era of advanced technology and electronic media has completely turned its canvas towards a different direction.

It is estimation that internet users are more than 900 million around the world and the flow of information is increasing every year. It has been established that people are very much dependent on their peer's opinions when it comes to making a purchase decision. Many researches have been made which proves that word-of-mouth is considered more credible as compared to advertisements. When it comes to electronic word of mouth people tend to have vast platform to express themselves and their opinions are reached out to masses. Online reviews are also long lasting meaning that they don't just disappear and can be found by simply scrolling down the pages. There are many factors which effect on online reviews such as the quality of the review (i.e. is it from a reliable source or just fake).

1.2 Scope of the Study

We always take a second opinion when we decide to go to a restaurant for dine-in, and for that we always check Facebook or other social websites where we can read people's reviews about a place and make our decision based on its judgement. So, this research will be about how much these reviews help or affect us on the way of our decision making.

1.3 Objective of the Research

The main objectives of this study would be how reviews on social media may help or affect your decision of dining in that restaurant. This research may also help in finding out what factors may affect customers in making reviews like the pleasant environment, food quality, customer service, food price, food quantity, cleanliness, aroma, location of the place, serving time etc.

1.4 Research Question

1. What is the impact of online restaurant reviews on our dining decision?

1.5 Hypotheses

H1: There is no impact of credibility of website on customers' dining decision.

H2: There is no impact of quantity of reviews on customers' dining decision.

H3: There is no impact of perceived risk on customers' dining decision.

H4: There is no impact of visuals on website on customers' dining decision.

H5: There is no impact of physical environment on customers' dining decision

1.6 Theoretical framework

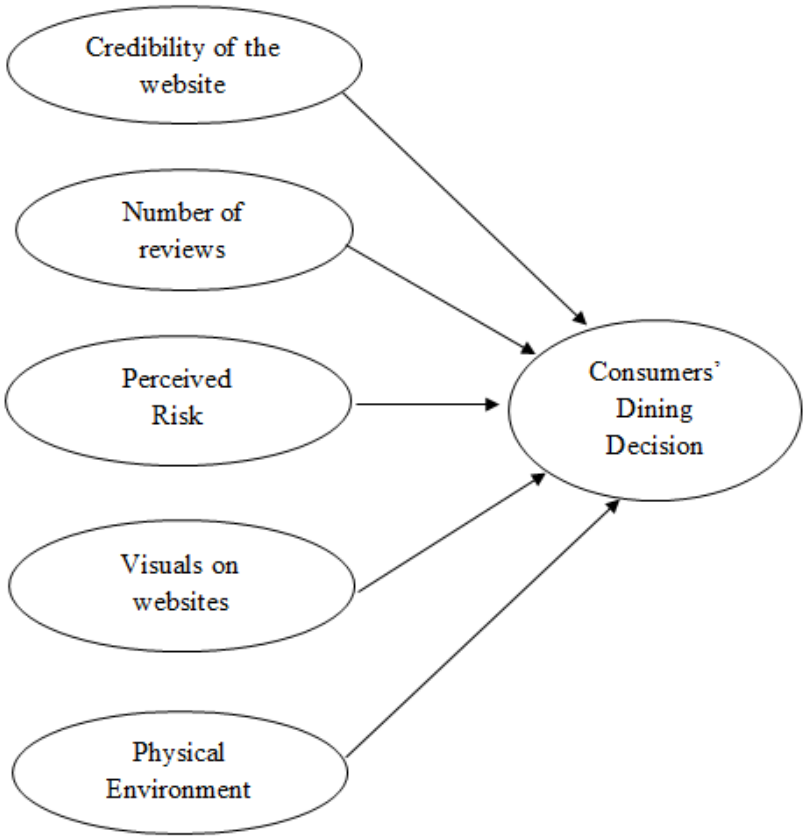


Figure1. Conceptual framework

This framework explains that customers' dining decision is dependent on these five variables which are credibility of website, number of reviews, perceived risk, visuals on website and physical environment. The framework is opted from (kim & lennon, 2013).

2. Literature Review

The reputation of an online retailer plays a vital role as an external source and influences a lot in generating consumer responses and their purchase decisions apart from the quality of website. (Kim & Lennon)

In another research, it is stated in their article that trends of unprofessional reviewers who share their experiences of various subjects is giving a tough time for experts. Internet has become a convenient forum for all such amateur reviewers and has now become a challenge for journalists because consumers have started relying more on such un professional reviews. Thus, the quality and credibility of the website and its reviews is deteriorating day by day.

(Watson, Morgan, & Pamela)
It is discussed in an article about what are the factors of customers' satisfaction through IPA (Importance–Performance Analysis). Their research showed a clean environment and proper customer service can make a restaurant famous and more likeable for customers. In general, quality

of food, customer service and a pleasant environment are those core areas which force customers to make positive reviews about a restaurant. (Liu & Jang, 2009)

Another study was conducted to identify the effects of review quality on customer's purchase intentions. The research also included that how these effects differ depending on product's type (high-quality and low quality products). Products which require an experience for evaluation like video games may influence customer's purchase decision by positive high quality reviews.
(Lee & Shin, 2014)
Researchers found that negative EWOM may decrease reviewer's interest but if the they see any response from restaurant's owner then this negative impact may be contracted because no response at all may leave interested readers in utter state if confusion and would decide not to visit that restaurant anymore. Once they see any constructive response from restaurant's management then there are chances that that specific negative review might not cause any damage. (Evans, et al., 2012)
Previous researches have also found that online reviews mainly rely on customer's perception about a product/service. (Dobele & Ward, 2002)

Another research has mentioned in their article that the information provided in online reviews may help others in making their purchase decisions especially in experience goods because these goods are difficult in assessing and such reviews on internet may help in other customers in evaluating the product through different ratings and narratives on websites. They also discussed that if the identity of the reviewer is disclosed then it may affect the quality and credibility of the review. (Kiran & Vasantha, 2015)

In one study researchers adopted The Elaboration Likelihood Model (ELM) method to find out how EWOM influences on consumer's purchase intention and found that high quality of reviews may positively influence people. It also supported the fact that the quantity of online reviews also pushes consumers into buying that product. Furthermore, results of this research suggested that people who tend to purchase high involvement products may opt "central route" per ELM and they emphasize more on the quality of the argument and people planning to purchase low-involvement products may rely more on "peripheral route" which is emphasizing more on the quantity of the reviews. The Elaboration Likelihood Model was constructed by (Petty & Cacioppo, 1986) which helps in comprehending the usefulness of persuasive communication. This model suggests that people may perceive information of online reviews in two routes that is the central route and the peripheral route. People who tend to think through central route may involve in cognitive assessment of online arguments and then form an attitude towards a product/service. On the other people who follow peripheral route might be impressed simply by the physical attractions of the website and the number of reviews. (Lee S. H., 2009)

A research was conducted to find out the impact of website quality on customer's purchase intention. The study was based on Mehrabian and Russell's Stimulus-Organism-Response model to test that customer's purchase decision is not only based on internal factors like online environment, colors, graphics, navigations etc but also on external factors like the reputation of online stores and its company may play a vital role in forcing a customer to make his mind into purchasing that product from that online store. (kim & lennon, 2013)

A research found that in this era females are more inclined towards online shopping and are more familiarized by various trends on internet as compared to men. Their results also show that negative reviews may have a strong negative impact on people especially on females because they perceive that the negative analysis of a product in a review is more useful as compared to a positive review. These negative reviews may save consumers from the perceived risk in their minds and ultimately effecting negatively on purchase decision. (Lee & Bae, 2011)

A research was conducted to find out the effect of review type and number of reviews on consumers. Their results showed that consumers examine and analyze a review on the level of their expertise and their cognitive ability. The research was hence concluded that people who are new to shop from online stores may make their purchase decision simply by looking at the quantity of reviews. On the

other hand, people who are experts in this field will involve in more reasoning and analyzing of various reviews and their types before making up their minds.
(Park & Kim, 2008)

It has been mentioned in a research that restaurants are mainly based on few important and core aspects which are fine dining, quick customer service, quality of food and separate family halls. It has been emphasized that quick service quality as the main differentiator with your competitors which helps restaurant owners making their place in a market and competing with competitors. (Dutta, Parsa, Parsa, & Bujisic, 2014)

It has been discussed in a blog that statistics show a direct relation between online restaurant's reviews and its revenues. Nowadays people especially social media users go out for dining very often and they are very addicted to posting pictures of their food and sharing experiences on social media. This creates an opportunity for restaurant owners to make sure that their chefs should work on food presentation because it's important that the presentation of food should be attractive and photogenic. This will lead other people to select your restaurant because many people are looking for places not only with great taste but also offering aesthetically pleasing environment. (Storms, 2014)

It is stated that many people have a psychology to feel the touch of a product before purchasing it. This feel-effect may demotivate many potential customers from purchasing goods online because they are not able to feel the product and evaluate its quality. Looking at this aspect, many advertisers have now given this option that people may share pictures which will help others in evaluating products because there is a lot of difference in reading a review of a product and visually looking at it. Another researcher also supported this view and said that sharing reviews along with pictures may increase people's confidence into purchasing that product provided there is no deceiving. (Alba, et al., 1997) (Chatterjee, 2001)

In this new era of SNS companies focus on how to communicate with their customers and SNS has made it possible. Facebook fan pages are the most convenient and highly used platform where various brands and their consumers meet and exchange information.
(Ahn, Kwon, & Sung, 2010)
Since restaurant pages are highly searched by users on Facebook has led many food companies to reach out to potential customers. Through such pages, companies can easily get to know what people are expecting from them and what their current position is in the market. These Facebook fan pages also creates a bond of trust between the brand and its consumers. (Lee, Xiong, & Hu, 2012)

Facebook fan pages are built up of both consumers and brands. Information which a brand shares is further enriched with reviews shared by various users of that brand. A researcher suggested that information presented on Facebook pages help users to evaluate and make better judgements about products. (Hsu, 2012) (Flavián & Guinalíu, 2006)

A research revealed results that the expectations of people about EWOM may vary from forum to forum. EWOM on forums which are sponsored by marketers are more reliable and authentic because the information shared here are from experts and professionals belonging to specific fields. On the contrary EWOM on consumer sponsored forums are more realistic and strong. When a consumer is looking for information on such forums administrator's identity influences their perception. (Liu, Dong, & Burnkant, 2013)

Previous researches show that this internet based feedback is an emerging mechanism which not only involves computer science but it includes various fields such as electronic marketing, social science, sociology, management science and psychology. This research further shows that EWOM are different than traditional WOM both on consumers and marketers end. For marketers, this can be helpful in building brand image, acquire and retain customers and build brand loyalty. Contrary to this on customer's end the information in EWOM is very helpful in making purchase decisions. (Dellarocas , 2003)

A study conducted from 2000 consumers showed that EWOM trend is based on various motives such as want for socializing, desire for various incentives and boost their self-esteem are main factors of EWOM practices. (Hennig-Thurau, Gwinner, Walsh, & Gremler, 2004)

Past research shows that consumers planning to purchase products which are expensive and are high involvement may indulge themselves in the depth of information as compared to inexpensive or low involvement products. (Heikkinen & Tudoran, 2012)

Researchers suggested through their research on quality of travel website that purchase intention is very much based on the quality of website. The quality of website may be enhanced by various website displays, website outlook, icons and web patterns which not only beautifies a web page but also encourages people to purchase. (Bai, Law, & Wen, 2008)

3. Research Methodology

Research methodology is the chapter which describes how are we going to further extend this study to reach out to our desired results. This chapter include methods which we are going to opt for this research. Since this is a quantitative research so we will collect data through a survey questionnaire.

3.1 Data

The main sources of collecting data would be primary and secondary. Primary data will be gathered from questionnaire whereas, secondary data will be obtained from different articles and websites. The tool of data collection for this research is a close-ended questionnaire. The questionnaire will consist of 5-points Likert Scale, i.e. from (1 as lowest to 5 as highest). This questionnaire will be circulated on social media (mainly Facebook) and in Hamdard University (HIMS) campus.

3.2 Variables

After establishing a literature for this research, we have selected following variables which are also used in various other researches to find out the impact of online reviews on customers' dining decisions.

3.2.1 Dependent Variable

1. Customer's dining decision

3.2.2 Independent Variables

1. Credibility of the website, (Kim & Lennon)
2. Quantity of reviews. (Lee S. H., 2009) (Park & Kim, 2008)
3. Perceived Risk (Lee & Bae, 2011)
4. Visuals on websites (Storms, 2014)
5. Physical Environmental (Liu & Jang, 2009)

3.3 Sampling Techniques

The main sampling technique which we will be using in this research would be non-probability sampling. In non-probability sampling samples are selected in a way that individuals from the population are not given equal chances of selection. Furthermore, we have selected convenience sampling to be used for collecting data because circulating questionnaires on Facebook and within

the University is more convenient for us. The sample size for gathering empirical data is of 720 Pakistani customers.

3.4 Model

Statistical tool helps us to quantify the data which has been collected in a research. The aim of analyzing data is to discover useful information and come to conclusions which may further help in making decisions.
This research is a causal research which shows us the impact of online reviews on customers' dining decisions so we will be using regression and correlation analysis for analyzing the collected data.

4. Result and Discussion

4.1 Descriptive Statistics

Table 4.1.1: Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	FEMALE	397	55.1	55.1	55.1
	MALE	323	44.9	44.9	100.0
	Total	720	100.0	100.0	

The above table shows that in this survey there were 397 female respondents and 323 male respondents.

Table4.1.2: Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	15-25 years	313	43.5	43.5	43.5
	26-35 years	139	19.3	19.3	62.8
	36-45 years	143	19.9	19.9	82.6
	46-55 years	92	12.8	12.8	95.4
	56-65 years	33	4.6	4.6	100.0
	Total	720	100.0	100.0	

The above table shows that out of 720 respondents 313 people are from the age group of 15-25 years. 139 respondents are associated with the age group of 26-35 years, 143 respondents are from the age group ranging from 36-45 years, 92 respondents were from the age group of 46-55 years and only 33 respondents belonged from the age group of 56-65 years.

Table4.1.3: Income

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below 15,000	261	36.3	36.3	36.3
	15,001-30,000	155	21.5	21.5	57.8
	30,001-45,000	126	17.5	17.5	75.3
	45,001-60,000	113	15.7	15.7	91.0
	Above 60,000	65	9.0	9.0	100.0
	Total	720	100.0	100.0	

The above table shows that majority of people (261) involved in this survey have their income level of below 15000, 155 respondents have their income level of 15,001-30,000, 126 respondents have their income of 30,001-450,000 and only 65 respondents have their income level above than 60,000.

Table4.1.4: Designation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Non-executive	244	33.9	33.9	33.9
	Officer	113	15.7	15.7	49.6
	Lower management	146	20.3	20.3	69.9
	Middle management	157	21.8	21.8	91.7
	Top management	60	8.3	8.3	100.0
	Total	720	100.0	100.0	

The above table shows that majority of people (244) involved in this survey are not employed, 113 respondents are officers, 146 respondents belong to lower management, 157 respondents belong to middle management and only 67 belong to top management in the organizations.

Table4.1.5: Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Matariculation	207	28.8	28.8	28.8
	Intermediate	98	13.6	13.6	42.4
	Graduate	212	29.4	29.4	71.8
	Masters	161	22.4	22.4	94.2
	Other _____	42	5.8	5.8	100.0
	Total	720	100.0	100.	

This table shows that 207 respondents involved in this survey have completed their matriculation, 98 respondents have passed intermediate. the highest group of people (212) involved in this survey are graduates and 161 respondents have completed their masters.

4.2 Inferential Statistics

4.2.1 Reliability analysis

Table.4.2.1 Reliability statistics

Variables	Items	Cronbach's Alpha
CDD	3	.854
COW	3	.854
NOR	3	.862
PE	3	.905
PR	3	.891
VOW	3	.840

The reliability test for this research was conducted through SPSS software. reliability for each variable is mentioned in above table and it can be observed that each variable has its Cronbach's value higher than 0.88 showing higher internal consistency.

4.2.2 Correlation Analysis

Table**4.2.2: Pearson correlation**

		COW	NOR	PE	PR	CDD	VOW
COW	Pearson Correlation	1	.729**	.566**	.532**	.524**	.472**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	720	720	720	720	720	720
NOR	Pearson Correlation	.729**	1	.704**	.618**	.610**	.509**
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	720	720	720	720	720	720
PE	Pearson Correlation	.566**	.704**	1	.722**	.654**	.547**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	720	720	720	720	720	720
PR	Pearson Correlation	.532**	.618**	.722**	1	.783**	.630**
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	720	720	720	720	720	720
CDD	Pearson Correlation	.524**	.610**	.654**	.783**	1	.734**
	Sig. (2-tailed)	.000	.000	.000	.000		.000
	N	720	720	720	720	720	720
VOW	Pearson Correlation	.472**	.509**	.547**	.630**	.734**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	720	720	720	720	720	720

**. Correlation is significant at the 0.01 level (2-tailed).

The above table of correlation shows the relation between Perceived Risk and Customer's Dining Decision. The Pearson value is near to 1 which means that there is a strong relationship between these two variables. The positive value of Pearson means if the value of one variable increases the other will also increase simultaneously. The 2-tailed value is significant at the level of 0.01 level which means that those variables are statistically significant.

4.2.3 ***Regression***

Table 4.2.3.1 :Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.849[a]	.720	.718	.717
2	.849[b]	.720	.719	.717
3	.848[c]	.719	.718	.717

a. Predictors: (Constant), VOW, COW, PE, PR, NOR
b. Predictors: (Constant), VOW, PE, PR, NOR
c. Predictors: (Constant), VOW, PR, NOR

The value of R in above table shows simple correlation and R square explains us that how well dependent variable can be explained by independent variables. The value of R is 0.849 whereas, the

value of R square is 0.720 which is very close. Thus, it indicates that there is no error in sample selection.

Table 4.2.3.2 : ANOVA[d]						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	945.332	5	189.066	367.730	.000[a]
	Residual	367.099	714	.514		
	Total	1312.432	719			
2	Regression	945.318	4	236.329	460.280	.000[b]
	Residual	367.114	715	.513		
	Total	1312.432	719			
3	Regression	943.955	3	314.652	611.409	.000[c]
	Residual	368.477	716	.515		
	Total	1312.432	719			
a. Predictors: (Constant), VOW, COW, PE, PR, NOR b. Predictors: (Constant), VOW, PE, PR, NOR c. Predictors: (Constant), VOW, PR, NOR d. Dependent Variable: CDD						

The above ANOVA table shows us the sig value of 0.000 which is less than 0.01 concluding the model's significance at 99% confidence interval. We have used backward model regression and the final F-value is 611.409 which is significantly higher than our sig value, rejecting our null hypothesis.

Table 4.2.3.3: coefficients statistics						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.197	.090		2.199	.028
	COW	.005	.031	.005	.171	.865
	NOR	.110	.035	.108	3.165	.002
	PE	.048	.030	.053	1.623	.105
	PR	.437	.031	.443	13.963	.000
	VOW	.362	.026	.368	14.016	.000
2	(Constant)	.201	.087		2.319	.021
	NOR	.113	.029	.111	3.848	.000
	PE	.048	.030	.053	1.629	.104
	PR	.438	.031	.444	14.012	.000
	VOW	.362	.026	.369	14.136	.000
3	(Constant)	.196	.087		2.256	.024

	NOR	.135	.026	.132	5.153	.000
	PR	.460	.028	.466	16.383	.000
	VOW	.366	.026	.373	14.330	.000
a. Dependent Variable: CDD						

The above table show those variables which highly affect the dependent variable i.e. Customer's dining decision. Since we have used backward regression; in first place the model included 5 independent variables i.e. Credibility of the website, Number of Reviews, Physical Environment, Perceived risk, and visuals on website, gradually eliminating Credibility of website and physical environment in next two models as they were insignificant. The final model predicts NOR, PR and VOW to be significant variables impacting more on Customers' dining decision.

4.3 Hypotheses Assessment

Table 4.3.1: Hypothesis Assessment summary

H.No.	Null Hypotheses	t	Sig Value	Status
H1	There is no impact of credibility of website on customer's dining decision.	.171	.865	Failed to Reject
H2	There is no impact of quantity of reviews on customer's dining decision.	5.153	.000	Rejected
H3	There is no impact of perceived risk on customer's dining decision.	16.383	.000	Rejected
H4	There is no impact of visuals on website on customer's dining decision.	14.330	.000	Rejected
H5	There is no impact of physical environment on customer's dining decision.	1.629	.104	Failed to Reject

4.4 Discussion

The result of this research shows how customers' dining decision gets affected by various variables like, credibility of website, number of reviews, perceived risk, physical environment, and visuals on website hence rejecting our Ho hypothesis i.e. "there is no impact of online reviews on customer's dining decision". Its backward regression model has predicted that number of reviews, perceived risk and visuals on website have a significant impact on customer's dining decision. This research has shown that visuals on website are impacting a lot on customer's dining decision which is backed up by a research which has been conducted in past has indicated in his study that various pictures of food very much attract people. Tempting food pictures may trigger people to select that restaurant and the results can practically be implicated for all restaurant owners that they should work on the presentation of food because good presentation attract eyes in the first place. (Storms, 2014)

Second result shows that number of reviews are also affecting a customer's dining decision. Eating outside is not a very high involvement procedure in which a customer spends a lot of time in evaluating options so they may go by the quantity of reviews on websites rather than quality of reviews. The result is further supported with a research which established through its results that according to Elaborated Liklihood Model (ELM) customers select "peripheral route" when they are not highly involved in making a purchase decision. Since in this survey most of the respondents belong to the age group of 15-25. So, it is clear that youngsters have a habit of dining in restaraunts

oftenly so, they are not highly involved in making a decision and would prefer to dine-in in different restaraunts getting attracted by the number of reviews. If we see the result of correlation it is clear that the value of Pearson Correlation of Perceived risk if 0.783 which states that customer's dining decision is highly correlated with the amount of risk which a customer may experience. (Lee S. H., 2009)

This research has also indicated that credibility of the website is not statistically significant on our dependent variable i.e. customer's dining decision because nowadays people are providing fake reviews, many unprofessional reviewers can post on various websites thus the quality and standard of websites are declining day by day. It has been discussed in a research that due to the increase of amateur writers on internet, the credibility of websites are negatively being affected and people are the value of professional reviews is not worthy anymore. (Watson)

5. Conclusion, limitations and recommendations

This research shows that customers' dining decision is based on three main variables which are number of reviews, perceived risk, and visuals on website. People usually go by the number of reviews when they are not highly involved into the decision process. We always decide and select that option in which we have the lowest amount of perceived risk because of the fear of something might bad happen people always prefer a look on reviews about that product. Third most factor which attract people eyes are visuals of food and restaurants. Attractive pictures may attract and force people into making a purchase decision.

5.1 Limitations

With some restraints, there were some obstacles towards effective and precise research work. The study was only restricted to the area of customers' dining decision. Limited number of only five independent variables were used in this research, so this study is very confined and the results may not be applicable on a large scale. The data was collected only through social media due to financial constraints and because it was more convenient.

5.2 Recommendations

This research can also be further conducted to find out the impact of Electronic word of mouth on customers' purchase decision of various products. Variables like customer service, taste of food, etc can be used to conduct this research in depth. Many restaurant owners can apply results of such researches to improve their weak areas of business.

References

Ahn, H., Kwon, M. W., & Sung, Y. (2010). "Online Brand Community across Cultures: A Comparison between the US and Korea", *International Journal of e-Business Management*, 34-52.

Alba, J., Lynch, J., Weitz, B., Janiszewski, C., Lutz, R., Sawyer, A., & Wood, S. (1997)." Interactive Home Shopping: Consumer, Retailer, and Manufacturer Incentives to Participate in Electronic Marketplaces", *Journal of Marketing*, 38-53.

Bai, B., Law, R., & Wen, I. (2008). "The impact of website quality on customer satisfaction and purchase intentions: evidence from Chinese online visitors", *International Journal of Hospitality Management*, 391-402.

Chatterjee, P. (2001). "Online Reviews – Do Consumers Use Them", *Association for Consumer Research*, 129-134.

Dellarocas , C. (2003). "The Digitization of Word of Mouth: Promise and Challenges of Online Feedback Mechanisms" *Management Science*, 1407 - 1424.

Dobele, A., & Ward, T. (2002). "Categories of Word-of-Mouth Referrers", *ANZMAC*, 671-677.

Dutta, K., Parsa, H., Parsa, R., & Bujisic, M. (2014)" Change in Consumer Patronage and Willingness to Pay at Different Levels of Service Attributes in Restaurants: A Study in India", *Journal of Quality Assurance in Hospitality & Tourism*, 149–174.

Evans, D., Oviatt, J., Slaymaker, J., Topado, C., Doherty, P., Ball, A., . . . Wiley, E. (2012). "An experimental study of how restaurant-owners' responses to negative reviews affect readers' intention to visit", *The Four Peaks Review*, 1-12.

Flavián, C., & Guinalíu, M. (2006). "Consumer trust, perceived security and privacy policy: Three basic elements of loyalty to a web site". *Industrial Management & Data Systems*, 601 - 620.

Heikkinen, I., & Tudoran, A. A. (2012)." ELECTRONIC WORD-OF-MOUTH: AN EXPERIMENTAL ANALYSIS OF ONLINE CONSUMER REVIEWS OF SMARTPHONES".

Hennig-Thurau, T., Gwinner, K. P., Walsh, G., & Gremler, D. D. (2004). "Electronic word-of-mouth via consumer-opinion platforms: What motivates consumers to articulate themselves on the Internet?", *Journal of Interactive Marketing*, 38-52.

Hsu, Y. L. (2012). "Facebook as international eMarketing strategy of Taiwan hotels", *International Journal of Hospitality Management*, 972–980.

kim, J., & lennon, s. (2013). "Effects of reputation and website quality on online consumers' emotion, perceived risk and purchase intention Based on the stimulus-organism-response model", *Journal of Research in Interactive Marketing, Vol. 7*(No. 1), 33-56.

Kim, J., & Lennon, S. (n.d.). "Effects of reputation and website quality on online consumers' emotion, perceived risk and purchase intention: Based on the stimulus-organism-response model". *Journal of Research in Interactive Marketing*, 33 - 56.

Kiran, P., & Vasantha, D. (2015). "Review Article - Exploring the Impact of Online Reviews on Purchase Intentions of Customer". *American International Journal of Research in Humanities, Arts and Social Sciences*, 211-215.

Lee, E.-J., & Shin, S. Y. (2014). "When do consumers buy online product reviews? Effects of review quality, product type, and reviewer's photo". *Computers in Human Behavior)*.

Lee, S. H. (2009). "How do online reviews affect purchasing intention?", *African Journal of Business Management*, 576-581.

Lee, T., & Bae, S. (2011). "Gender differences in consumers' perception of online." *Electron Commer Res*, 201-214.

Lee, W., Xiong, L., & Hu, C. (2012). "The effect of Facebook users' arousal and valence on intention to go to the festival: Applying an extension of the technology acceptance model.", *International Journal of Hospitality Management*, 819-827.

Liu, Y., & Jang, S. (. (2009). "Perceptions of Chinese restaurants in the U.S.: What affects customer satisfaction and behavioral intentions?" *International Journal of Hospitality Management*.

Liu, Y., Dong, D., & Burnkant, R. E. (2013). "Provide Consumers with What They Want on Word of Mouth Forums*",. *iBusiness*, 58-66.

Park, D. H., & Kim, S. (2008). "The effects of consumer knowledge on message processing." *Electronic Commerce Research and Applications*, 309-410.

Petty, R., & Cacioppo, J. (1986)." THE ELABORATION LIKELIHOOD. *ADVANCES IN EXPERIMENTAL.*"

Storms, D. (2014, july 31). "Social Media Influence on the Restaurant Industry." Retrieved from social media link: http://www.socialmedialink.com/blog/49-Social-Media-Influence-on-the-Restaurant-Industry

Watson, Morgan, M., & Pamela. (n.d.). "The narrative structure of on-line restaurant reviews: establishing readability and credibility."

Increasing the Involvement of Staff in the Activity of the Company as a Factor Influencing its Efficiency

Elena Kolesnichenko, Tambov state university named after G.R. Derzhavin, Tambov, Russia, ekolesnichenko@live.ru
Yana Radyukova, Tambov state university named after G.R. Derzhavin, Tambov, Russia, Radyukova68@mail.ru
Mikhail Bespalov, Tambov state university named after G.R. Derzhavin, Tambov, Russia dissovet@tsu.tmb.ru

Abstract

At present, the heads of organizations have come to realize that the leading positions for their companies allow us to occupy not only the use of high technologies, but also the personnel, which is the basis of any organization. It is exactly how much the organization's personnel is interested in accomplishing the tasks set, with what enthusiasm they start to work and the way they show their attitude to the company are key factors in the effective operation of the company. The problem of staff involvement is relevant. Many foreign and Russian companies are aware of the importance of involving staff in the activities of the organization, which is due to the direct relationship between the involvement of staff and the performance of the organization. The purpose of this article is to investigate the indicators of staff involvement and develop recommendations for improving the toolkit to increase the involvement of staff in the organization. In the article proposes recommendations for improving the involvement of staff, measures were developed to improve the development of factors of staff involvement - remuneration and recognition. The practical importance of this article consists in the possibility of using the developed recommendations on improving the toolkit for increasing the involvement of personnel in the organization's activities in the practice of functioning of commercial organizations with similar characteristics of the personnel.

Keywords: personnel management, staff involvement, tools to increase staff involvement

Introduction

Scientific and practical interest in the concept of "involvement" can be traced from the end of the 20th century - the time when a radical restructuring in the world economy began to take place, and changes in the public consciousness that influenced the structure of the organizational system began to occur.

The concept of "involvement" is a qualitative characteristic of the personnel, which consists in a benevolent attitude not only to the leaders, but also to the organization as a whole, acceptance and division of the goals, principles, mission, acting in the organization; understanding the importance of their contribution to the activities and development of the organization; the desire to grow and develop together with the organization through the manifestation of initiative and the introduction of innovations; continuous reciprocal dialogue at the level of leader-subordinate.

The important things in understanding the role of staff involvement in the activities of the organization are the results of research on the impact of involvement on the financial and economic performance of the organization. Thus, numerous studies show that the total return on investment with an involvement of 60% is more than 20%, the value of the company's shares grows by more than 12%, the increase in sales per employee increases in the year to 27 000 USD, the profit per 1 employee in Year increases to 3 800 USD, profitability from work with clients increases by 15-20%.

Tools and Methods

J. Hellevig in his researches noted, the formation and development of the involvement of the personnel in the organization are influenced by general and individual factors of involvement. A similar point of view can be found in Russian researchers. Thus, according to the Russian scientist V.N. Belkin, the analysis of the factors of employee involvement must be carried out at two levels:
- at the level of the organization (division) - the organizational level;
- at the level of each employee - an individual level.

In order to ensure the formation and development of staff involvement, good intentions and real interest are not enough. The process of creating an involvement is a systemic process in which all levels of the organization's employees participate: managers, mid-level managers, ordinary employees. According to practitioners, the effective tools for developing involvement are:

1. Development and implementation of an adaptation program for new employees, which will allow you to quickly learn about the history of the company, its goals, objectives, values, corporate culture and basic programs that enable you to develop and become an active member of the team. Heads of the organization should care about the initial impression of new employees – it should not be negative, especially they should care for the best employees - those who have many proposals from other employers.

2. Weekly spreading general information in all units in the company. You can talk about the ongoing actions, about the events held and planned - every employee must constantly be aware of the company's events.

3. Conducting conversations, ongoing interviews. These methods of involvement are an alternative to the exit interview. Many large companies believe that it is necessary to conduct the current interview not only with the employees involved (it allows managers to find out what keeps them in the company), but also with middle-staff and those who show low rates (allows the manager to notice early signs of problems).

4. Regular (optimally - monthly) holding meetings of top management executives with employees of departments, where existing problems and ways of their solution are discussed.

5. Participation of employees in project teams in various areas of perfection of processes, products, etc.

6. Participation in bright, significant projects of the company. In order to increase the involvement of the staff, most modern companies include their employees in the work on bright projects. The opportunity to participate in such projects inspires them and motivates employees, which in the future leads to increased involvement and improvement of the company's business performance.

7. Involvement of the personnel through the organization of competitions between teams in production, teams, as well as the promotion of winners.

8. Encouraging the best employees. D. Robinson believes that the involvement of the personnel can be achieved by creating an organizational environment in which positive emotions are present. For example, this is the environment in which employees are encouraged. This increases organizational efficiency, reduces staff turnover and improves staff health.

9. Assisting the leaders of their subordinates in professional development by delegating tasks, transferring existing knowledge, learning by example.

10. Training and development of employees - for this there must be effective internal training programs, if necessary; you can pay for training from external service providers.

11. Development of individual development plans. Creation of individual development plans, which reflect the personal and professional goals of employees, leads the way to increased involvement and improvement of market indicators.

Drawing up personalized development plans makes it possible to identify careers and academic interests of the best, and also to determine what actions the employees themselves and their leaders should take to achieve the goals. In the individual development plans it is recommended, besides training and programs, to include the following activities: rotation; virtual learning resources; co-teaching or mentoring by the senior manager or the first person of the company.

The presented research is based on approaches to the involvement of staff as satisfaction of needs (V.Kan, 1990). In these works, involvement as a full involvement in the performance of the work role, in which the employee directs his cognitive, emotional and physical energy to perform work tasks. Involvement as the antithesis of burnout (Maslach, Leiter, 1997). The components of involvement (high energy level, enthusiasm, sense of effectiveness) are determined through contrasting burnout components (exhaustion, cynicism, inefficiency). Investigation of the interaction of "satisfaction - involvement" (Gallup Model, 2002). Multidimensional approach to involvement (A. Saks, 2006). The theoretical significance of the presented article is that the presented conclusions and conclusions, formulated as a result of the conducted research, can find application in scientific works, studies, scientific dissertations.

Formation and development of staff involvement requires readiness for changes to all participants in this process. From the HR manager, it requires the ability to persuade, to join interests, to disclose and fix the benefits of the result of involvement.

There are various options for assessing involvement, the most common is conducting periodic written and oral interviews with the organization's employees. The involvement of staff should be studied at least 2 times a year. Research and evaluation of the effectiveness of the measures taken to increase the level of involvement are conducted for the first time at the end of the fiscal year. The analysis of the data shows how successful they were. After that, they develop a budget for the next year to implement a new plan of activities. At the end of the first half of the year, a second survey of employees is conducted. After studying the data received, adjustments are made to the plan.

As a rule, Russian organizations are invited by consulting organizations that have experience of such work to investigate the involvement of personnel.

Specifically for the diagnosis of the involvement of staff, the researchers created and implemented the following methods to measure the involvement of staff (Table 1).

Table 1: Basic methods for measuring the involvement of staff.

Name	**Indicators**
Gallup Method [http://www.gallup.ru]	A questionnaire that includes 12 questions that measure involvement through the indicators of inclusion, satisfaction and enthusiasm.
Shaufeli and Becker's method	Questionnaire, which includes 17 questions. Identification of results on the scale of involvement: vigor, devotion, immersion (absorption) activity.
E.A. Scriptunova's method	It assesses the involvement in completing corporate tasks, involvement in the work process, interest in the work as a whole, initiatives and focus on increasing the efficiency of their work and company development. The methodology for assessing the level of involvement is based on the algorithm of formation of involvement.
May, Gilson and Harter's methods [http://www-01.ibm.ru;	Their methods are based on the work by W. Kahn. This technique evaluates 3 components of involvement: cognitive, emotional, physical.

http://www.haygroup.com/ru]	
Saks's methodology	The methodology is designed to measure two types of involvement: involvement in work and organizational involvement.
Aon Hewitt's methodology [http://www.axesgroup.ru]	The questionnaire (counting about 70 questions) allows you to assess the level of involvement and employee satisfaction with 14 factors that affect involvement: brand attractiveness, top management, direct manager, career opportunities, training and development, performance management, reward and recognition, Interaction, independence, work content, conditions for success, respect and recognition, talent management and selection, balance of work and personal life. In turn, 14 factors are divided into 6 groups: people, work, career, remuneration, company activity, quality of life of workers.
Towers Watson's methodology [http://www.towerswatson.ru]	This methodology measures 3 factors: attachment to the company, the desire to apply additional efforts and achieve more; an atmosphere that is conducive to productive work and contributes to the improvement of labor performance; individual working conditions.

Evaluation of the implemented methods allowed to conclude that it is necessary to use the presented methods of Aon Hewitt and taking into account the specifics of the enterprise under investigation.

Results And Discussion

Let's consider the implementation of the toolkit for staff involvement in Russian enterprises. In Russia, large enterprises annually (for example, Rostelecom - the largest representative of the market of telecommunications) conduct research on the involvement of staff. These surveys help to get feedback from employees, which allows to understand how the personnel assess the situation in the company, how satisfied they are with the company and motivated, to identify the main factors affecting the involvement of staff, and to identify the necessary changes that will lead to increased effectiveness.

Most often, the study of the involvement of staff is carried out with the help of external providers. For example, the services of AXES Management, which is a representative of Aon Hewitt in Russia, are very popular. In the research of involvement, AXES Management closely cooperates with the international leader of HR consulting Aon Hewitt.

The results of the survey of the indicators of the level of involvement for the years 2015 - 2016 in large Russian companies are presented in Figure 1. Figure 1 shows that in 2016, as compared to 2015, there is an increase in the involvement of the personnel in Russian companies. Authors interviewed 30% of staff of branches Rostelecom in regions of the central Russia.

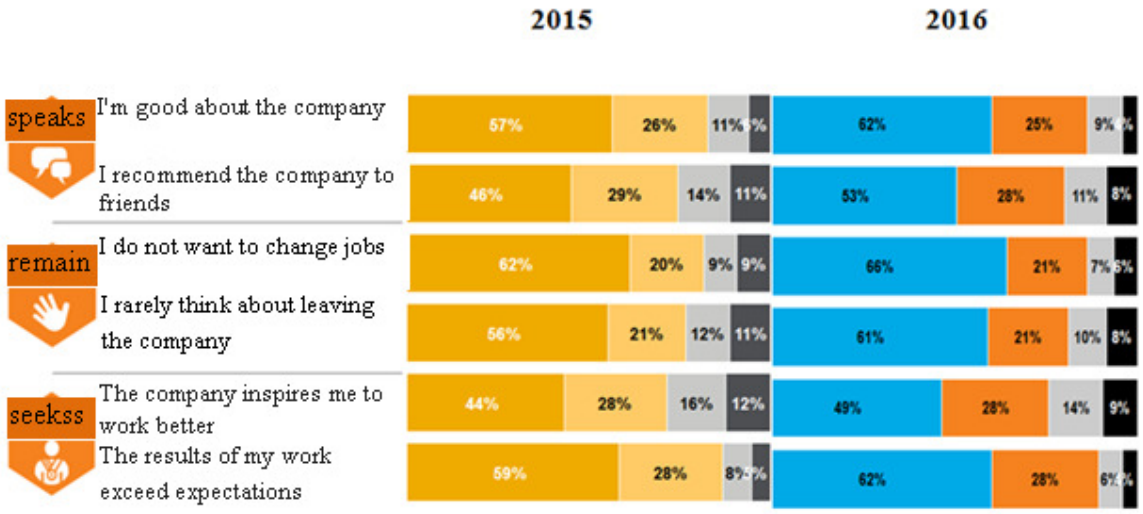
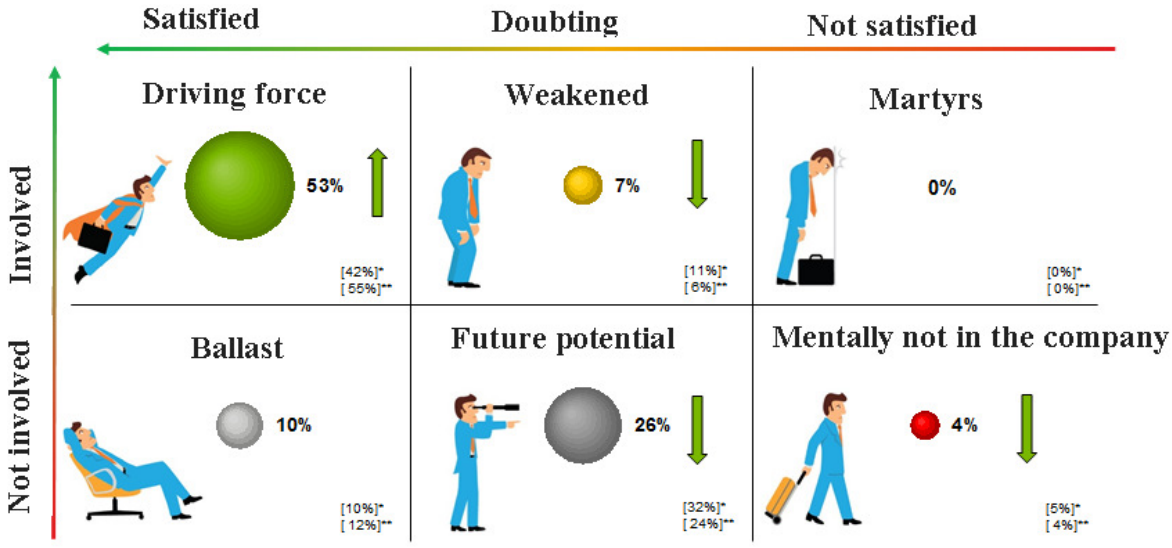


Figure 1 : Results on indicators of involvement.

In order to take into account the priorities of staff involvement, authors suggest to conduct an annual segmentation of employees in relation to the company, in which the following categories of employees are assigned: "Driving Force", "Weakened", "Martyrs", "Ballast", "Future Potential", " Mentally is no longer in the company. " The first three categories of personnel refer to the employees involved, and the next three categories to the unaffiliated employees. Results of inspection of 30% of staff of branches Rostelecom are presented on Figure 2. Authors investigated the involvement by means of a method of questioning and online – questioning.



* results of segmentation for 2016

** ideal indicators for the large enterprises

Figure 2 : Results of segmentation of personnel in Russian companies

Let us consider in more detail the characteristics of each category of personnel and the results of the research obtained. "Driving Force" are employees and managers who carry the bulk of the burden, and do it voluntarily and with pleasure. Such employees as a whole at the time of the 2016 survey amounted to about 53%. This is 11% higher than the result of last year. Employees from the category "Weakened" are involved in the work, give companies all the strength. At the same time, there are spheres in their working life that they are not completely satisfied with. Such employees in 2016 were 7%.

Compared with last year, the percentage of the personnel in this category fell by 6%. "Martyrs" are employees who are 100% involved in the work in the company, but at the same time everyone is not satisfied. At the time of the survey, such employees were not found in 2016. "Future Potential" demonstrates low involvement, and there are areas in which these employees are not happy. According to the consultants of the company, Hewitt, it is the employees of this group who can in the future replenish the ranks of the people involved in the company or in the company in the event that the actions of HR-service and company management aimed at this group will be temporary and effective. Such employees in 2016 were 26%. Compared with last year, the percentage of the personnel in this category fell by 6%. "Ballast" is a category of the personnel who are completely uninvolved in their work, but at the same time everyone is happy. They can be very loyal employees who work in the same company for years, occupying the same position (or even moving along the career ladder), but they do not put forward any ideas for the implementation of which they could take, do not take responsibility and in the performance of their work they never show special dedication. At the time of the survey in 2016, there were 10% of such employees. Compared to the previous year, the percentage of this category of personnel remained unchanged. "Mentally no longer in the company" is a category of the personnel that is not involved and there are no such spheres of working life in the company, which employees of this category would be satisfied with. There were 4% of such employees, which is 1% lower than the result of 2015.

Let's consider the results of the study of the level of involvement of the personnel in 2016 compared to 2015, which are reflected in Figure 3.

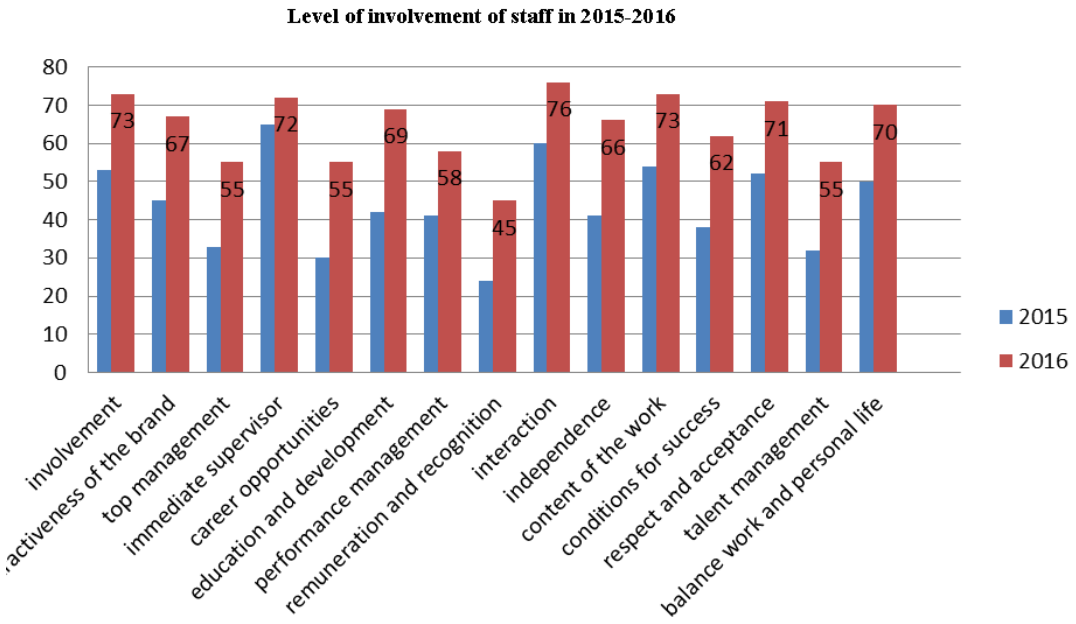


Figure 3 : Level of involvement of staff in 2015-2016.

As we can see from Figure 3 in 2016, the level of involvement has increased by 20% compared to 2015. This indicates that special measures are being implemented and they are aimed at changing the established positions of things that have contributed to the involvement of personnel in the changes taking place in the life of companies. Also, such an increase in the level of involvement indicates that employees are not indifferent to their work, and they are ready to exert additional efforts to help achieve the goals set by the company.

The analysis of the priorities of staff involvement in large Russian enterprises conducted by the authors of the article showed that, compared to 2015, in 2016 priorities have changed with which it is necessary to work in order to increase involvement:

1. *Remuneration and recognition.* The staff want to see how their contribution to the work relates to their level of wages (understanding the wages system, awareness of the system of individual bonuses), and also want to understand how the company shares financial success with them.

2. *Top management.* Employees want management to be accessible to them and interact with them.

3. *The attractiveness of the brand.* Personnel are very interested in the brand of the company, in particular: the implementation of promises given to employees, as well as the company's external and internal brand.

4. *Conditions for success.* Employees want to see effective work management, successful intra-organizational cooperation, as well as a rationally constructed organizational structure and business processes.

Conclusions

As recommendations for improving the involvement of staff, measures were developed to improve the development of 4 factors of staff involvement. "Remuneration and recognition" - involves working with material and non-material motivation of personnel, as well as the need for staff to understand the system of motivation, an objective balance of tasks and opportunities for their implementation, active application of the system of individual bonuses for personnel results of their activities. The main goal of this factor of involvement is that the employee is aware of the rules of being paid; he considers remuneration for his work fair; he has an opportunity to influence his income in one way or another. To increase the involvement of staff in this factor, the following activities are proposed for implementation:

1. Implementation of the program of bonuses and benefits, based on the type of "cafeteria" it

Will help to eliminate the main drawback of the traditional system of additional payments, when costs influence everyone, and privileges are given to the elite; to evade the "equalization" in the provision of benefits; link the provision of benefits with individual performance; individualize the motivation due to the fact that each person can independently choose the most attractive services for him.

2. Implementation of the program "Recognition". The "Recognition" program is a set of actions that are aimed at assessing the manifested qualities of employees in the performance of their immediate duties, as well as evaluating their efforts in the performance of assigned tasks, public recognition of these qualities and efforts with the delivery of the appropriate attributes of recognition and symbols of achievement.

"Top management" - involves work on building communication between employees and top management. The main goal is to inform the management of the company about the main problems of employees; to be interested in the well-being of employees; to arrange an open and sincere communication with employees. It is important for employees that the management is accessible to

them and interacts with them. To increase the involvement of staff in this factor, the "Days of Informing" project is proposed to be implemented for the purpose of delivering the most relevant and up-to-date information about the company, explaining the main activities, and also for feedback from employees.

"Attractiveness of the brand" is aimed at increasing the attractiveness of the company's brand not only as an employer, but also as a socially responsible organization. The main goal of this involvement factor is that the staff understands that the company is respected, and employees are assured of the success of the company, its reliability and sustainability. In order to increase the attractiveness of this factor, the following projects are proposed for implementation:

1. "Conditions for success" project, which assumes that the company provides opportunities for self-fulfillment and contributes to the achievement of the goals of employees. The main goal of this factor is that the employees are happy with the development of their career and understand that their career growth depends on the results of their direct work.

2. Holding a modular training program "Master of Communications". This program will give key employees the tools, knowledge, skills that will allow them to work more efficiently.

References

Bryukhovetskaya, N., Chernaya, A. (2013) Formation of the involvement of employees into work of the enterprises, *Strategy and mechanisms of regulation of industrial development*, vol. 5, pp. 3-21.

Kahn, W.A. (1990) Psychological Conditions of Personal Engagement and Disengagement, *Work Academy of Management Journal*, №33, pp. 692.

Becker, A., Demerout, E. (2012) Work, productivity and active training, *Professional behavior*, Vol. 80, pp. 555-564.

Saks, A. (2006) Prerequisites and consequences of the involvement for employees, *Administrative psychology*, Vol. 21, p. 602.

Vesnin, V.R. (2013) Practical management of personnel, M.: Lawyer, 387 pp.

Hellevig, J. (2012) Involvement of personnel in Russia; How to build a corporate culture based on involvement staff, customer orientation and innovation, Russia Advisory Group Oy, Helsinki, 126 pp.

Belkin, V.N. (2015) Organizational behavior of workers, Chelyabinsk: Encyclopedia, 116 pp.

Busarina, U., S. Morkovina and Kolesnichenko, E. (2014) Mechanisms of support of export-oriented small enterprises: the regional aspect, *Asian Social Science,* Vol, 10, № 23, pp.95-101.

Ozernikova, T.G. (2007) Metodika of diagnostics of labor motivation of personnel of the organization, *Motivation and compensation,* vol. 4, pp. 276-286.

Robinson, D., Perryman, S., Hayday, S. The Drivers of Employee Engagement (2012), pp. 243-249.

Shuck, B. (2011) Four Emerging Perspectives of Employee Engagement: An Integrative Literature Review, *Human Resource Development*, rev.XX(X), pp. 1-25.

Skriptunova, E.A. (2010) Method of calculation of the index of the involvement of personnel, *Management of human potential*, vol. 2 (22).

Sutyagin, V., Radyukova, Ya. and Kolesnichenko, E. (2017) Cost of Equity Capital in the Conditions

of Economic Instability on Emerging Markets (by the Example of Russia), *Russia and the European Union - Development and Perspectives*, Springer, pp.383-392.

Radyukova, Ya., Kolesnichenko, E., Karpunina, E. (2016) Improvement of the directions of development of personnel as an element of management, *Models, systems, networks in economy, the equipment, the nature and society*, vol. 3(19), pp. 68-78.

Vertakova, Y; Polozhentseva, Y; Klevtsova, M; Leontyev, E Government Support Tools for Small Business: Russian and Foreign Experience, 2016, Innovation management and education excellence vision 2020: from regional development sustainability to global economic growth, VOLS I – VI, pp. 1134-1144.

Regularities of the Cyclical Development of the Modern World Economy: Theory and Facts

Vladislav Sutyagin, Tambov state university named after G.R. Derzhavin, Tambov, Russia, sutyagin.vladislav@yandex.ru
Elena Kolesnichenko, Tambov state university named after G.R. Derzhavin, Tambov, Russia, ekolesnichenko@live.ru
Yana Radyukova, Tambov state university named after G.R. Derzhavin, Tambov, Russia, Radyukova68@mail.ru

Abstract

Despite the fact that almost nine years have passed since the beginning of the global financial crisis of 2008, the world economy has not reached a stable development path. Within the framework of the article it is shown that the crisis has a regular character, caused by the cyclical nature of the development of the world economy. The basis of the methodology is the analysis of the dynamics of the International Monetary Fund data, including the MSCI World integral index, reflecting the global tendency of the stock market, macroeconomic, demographic indicators, money supply indicators, etc. As a result, it was revealed that the current state of the world economy speaks about the formation of a period of transition to a new technological order, which, first of all, is determined by energy supply. The authors concluded that any technological base depends on new energy, which should significantly differ in energy efficiency. This is justified by the fact that capitalist development requires the growth of energy intensity of products, volumes of energy consumption. The efficiency of new energy resources is determined by the assessment of energy costs for extracting energy resources, the quality of energy resources, and the costs of extraction. It is obvious that the transition to a new technological order will be determined by the growing interest in biofuels, shale oil and gas. However, the energy efficiency of these fuels is low, and in recent years there has been no transition to a new energy resource.

Keywords: economic crisis, cyclical economic development, new technological ways

Introduction

2008 is characterized by the global financial crisis. By years 2010-2011 most countries had already "reported on overcoming" the consequences of that crisis. The main tool for combating the crisis was the so-called "quantitative easing" undertaken by the leading central banks of the world. In particular, the Federal Reserve, the European Central Bank, the Bank of England and the Bank of Japan - all carried out a quantitative easing policy with varying success. And apparently everything looks pretty good, especially judging by the indicators of the stock markets.

For example, the integrated index MSCI World, reflecting the global tendency of the stock market and including 1,650 shares of companies around the world, is at historic highs (Fig. 1). The situation is the dame with the indicators of individual countries. In particular, the US S & P 500 index, uniting the shares of the 500 largest US companies, is almost 60% higher than the peak pre-crisis 2008 values. And even the Russian market, despite all sanctions and counter-sanctions and the economic recession of recent years, exceeded pre-crisis levels (Fig. 2).

This study is based on the statistics of the International Monetary Fund (http://www.imf.org), as well as such portals as Investing (http://investing.com/), Finam (http://finam.ru).



Figure 1 : Dynamics of the MSCI World Index



Figure 2 : Dynamics of the MICEX index

The presented graphics and figures actually confirm the growth of the financial market and stagnation of the real sector. At first glance, the situation is paradoxical. But, obviously, this has already happened in history. All this is described by the theory of cyclical economic development, which is not very popular nowadays and which is most often associated with N.D. Kondratiev and his successors. In its economic basis, this study considered the current crisis through the prism of the limitations of the model of capitalist production described by A. Smith, K. Marx, and J. Schumpeter. The authors used theoretical ideas of J. Kitchin, Juglar, S. Kuznets, J. Arrighi, L. Badalyan - V. Krivorotova, V. I. Pantin, S. Y. Glazyev.

Results and Discussion

If we try to look at the real sector, we'll see that the economic growth of most of the largest economies is at the level of statistical error. For example, if you analyze international transport of resources, it turns out that they are at an extremely low level. In particular, the Baltic Dry Index is at levels close to historical lows (Fig. 3).



Figure 3 : Baltic Dry Index

The index reflects the cost of transporting dry goods on 20 main sea routes. The content of the index reflects the level of business activity. Moreover, we can say that the index is a leading indicator in its essence, since economic growth requires an increase in the volume of resources, and this increases the volume of their transportation. A similar situation is with the prices for oil, aluminum, copper, nickel and other metals (Fig. 4).

Low prices for oil can somehow be linked to the "shale revolution", but nothing like this happened with prices for metal.

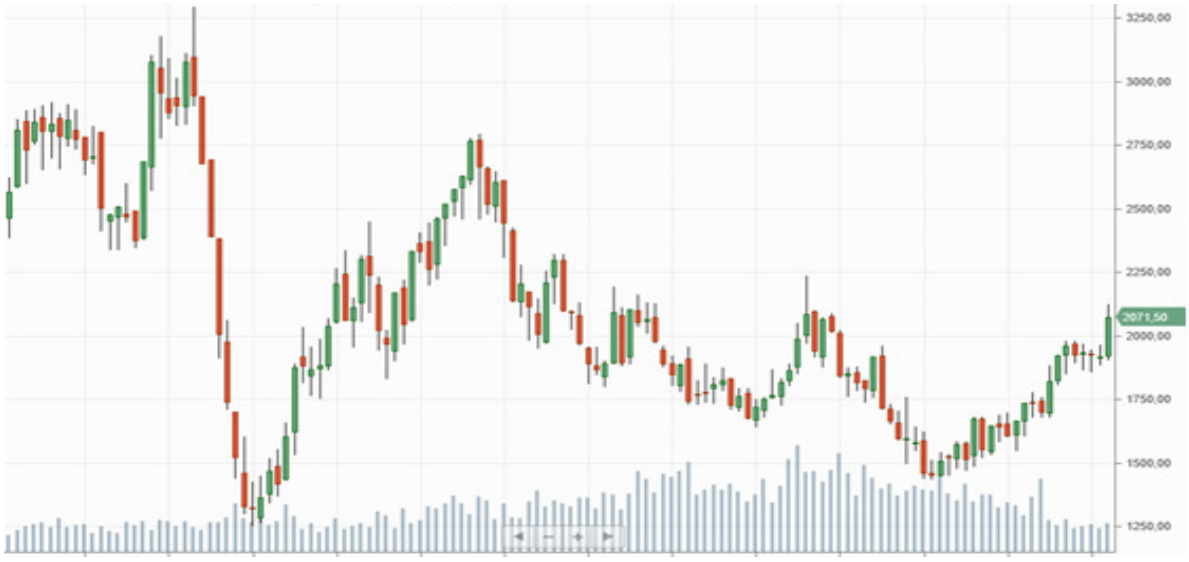




Figure 4 : Dynamics of prices for aluminum and nickel

Finally, we illustrate the situation by means of macro statistics. Let's consider the GDP indicator. For a cross-country analysis, a more correct estimate can be obtained on the basis of the Gross Domestic Product by purchasing power parity (PPP GDP later) (Table 1).

Table 1: GDP dynamics in PPP of leading world economies and PPP GDP growth rate

Country	Subject Descriptor	Units	1995	2000	2005	2010	2015	2016	2016/1995
Brazil	GDP based on PPP	Current international dollar, billions	1306,756	1579,824	2046,98	2803,368	3216,167	3141,335	240,4%
China	GDP based on PPP	Current international dollar, billions	2254,642	3698,622	6617,286	12405,881	19695,741	21291,766	944,4%
France	GDP based on PPP	Current international dollar, billions	1337,635	1678,332	2046,601	2340,155	2665,863	2733,678	204,4%
Germany	GDP based on PPP	Current international dollar, billions	2033,711	2430,427	2804,578	3279,529	3860,114	3980,282	195,7%
India	GDP based on PPP	Current international dollar, billions	1426,298	2077,843	3238,203	5312,261	8003,405	8662,35	607,3%
Indonesia	GDP based on PPP	Current international dollar, billions	849,679	958,481	1356,414	2003,959	2849,796	3032,092	356,9%

Japan	GDP based on PPP	Current international dollar, billions	2965,536	3405,45	4056,757	4485,871	5118,682	5237,79	176,6%
Russia	GDP based on PPP	Current international dollar, billions	1389,47	1635,277	2474,758	3240,905	3759,692	3799,696	273,5%
United Kingdom	GDP based on PPP	Current international dollar, billions	1224,054	1556,051	2008,467	2251,123	2700,627	2785,563	227,6%
United States	GDP based on PPP	Current international dollar, billions	7664,05	10284,75	13093,7	14964,4	18036,65	18569,1	242,3%

The source: http://www.imf.org/external/data.htm

At first glance, the growth of the world economy is obvious. However, let's look at the dynamics of GDP growth (Table 2).

Table 2: dynamics of the growth rate of GDP by PPP by the previous year

Country	Subject Descriptor	2000	2005	2010	2015	2016
Brazil	Rate of a gain (to previous year)	6,8%	6,5%	8,8%	-2,7%	-2,3%
China	Rate of a gain (to previous year)	10,9%	14,9%	12,0%	8,1%	8,1%
France	Rate of a gain (to previous year)	6,2%	4,9%	3,2%	2,4%	2,5%
Germany	Rate of a gain (to previous year)	5,5%	4,1%	5,2%	2,6%	3,1%
India	Rate of a gain (to previous year)	6,3%	12,8%	11,6%	9,1%	8,2%
Indonesia	Rate of a gain (to previous year)	7,4%	9,1%	7,7%	6,0%	6,4%
Japan	Rate of a gain (to previous year)	5,1%	4,9%	5,5%	2,3%	2,3%
Russia	Rate of a gain (to previous year)	12,6%	9,8%	5,8%	-1,8%	1,1%
United Kingdom	Rate of a gain (to previous year)	6,1%	6,3%	3,2%	3,3%	3,1%
United States	Rate of a gain (to previous year)	6,5%	6,7%	3,8%	3,7%	3,0%

The source: http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/publications/

Let's pay attention to the fact that since 2010 GDP growth rates of all countries have begun to fall, which in a compartment with a share of these economies, suggests that the global economy is slowing and this slowdown has a systemic (fundamental) reason. At the same time, we draw attention to the fact that after the years 2008-2009, there were no external signs of a crisis in the world economy. The situation is explained by the regular cyclical development of the economy.

More interesting explanation of the cyclical nature of the world economy can be gleaned from the theory of "technical and economic cenosis" by L. Badalyan - V. Krivorotov. The availability of the resource base and technology for its development form one or another socioeconomic structure (in

other words, the cenosis). Population growth at this technological level of resource development is gradually limited to a certain extent. As we approach it, the cenosis accumulates structural imbalances that result in wars, migrations, and the destruction of the social sphere. Such imbalances, arising as the population grows, are called Malthusian scissors. As a result of solving the problem of the Malthusian scissors, the techno-economic prices are being destroyed and the human population is "thin out". Then a new cenosis is formed on a new technological level.

The first signs of a new cenosis appear at the stage of financial expansion of the previous cycle of capital accumulation. Its very formation takes place at the initial stage of material expansion, when the technological structure is being formed. The latter is the basis for a new material expansion and determines the structure of the new cenosis. In general, in the development of the new cenosis, the development of "non-extinction," (the territories that were not in demand earlier because of the lack of technological access to them), is of great importance. For example, the development of steam engines and railways contributed to the fact that Britain (from the beginning in the metropolis and then the colonies) was able to master significant areas that were previously not in demand. The same story was repeated in the USA in the middle of the 20th century, when "inappropriateness" was "embroidered" with a network of highways.

On the basis of the new technological order in the material sphere, capital accumulation takes place according to the "D-T-D" scheme before the super-accumulation crisis, which begins to destroy the technical and economic cenosis. It must be said that the new techno-economic price is a skeleton of the future scheme of capital accumulation.

As it has already been mentioned, the new technological order is born during the period of the previous mode of action, mainly in the phase of its decline. The transition to a new technological order takes about 10 years. This period is characterized by the growth of a new technological order. At this stage, at the beginning, the fading effect of the old technological order on the world economy outweighs the positive impact of the new technological order. However, with the flow of capital, the positive impact of the new way outweighs and the stable economic development begins. As mass development of technologies of a new technological structure grows, growth slows down, which leads to the maturity phase. This gradually leads to a decrease in the rate of return on invested capital, which in the future will lead the technological order to decline. The decay itself can last for a long time.

Conclusions

Obviously, within a certain period there is a formed configuration of the world economy. However, this forms the limit of economic growth. Even if we consider a single global economy, its size has limits. The growth of scientific and technological progress and the increase in the level of the division of labor processes are interrelated. However, within the framework of the formed scientific paradigm there are also limits. The transition to a much higher level of division of labor requires radical changes in technology (in S. Glazyev's terms "technological change"). When the technological paradigm is replaced, the world economy is "reset": a new configuration of the world economy is being formed, production processes are being developed at a new technological level, the structure of the division of labor is changing, etc.

Without this, the world economy has a certain limit, and the economy is in a systemic (structural) crisis. Now, the timing of the crisis is not important for those who occupy a dominant position in the world economy. It is important only that the way out of it is possible on the basis of a new technological paradigm. Without this, the world economy will remain in a state of "technological stalemate", which has been more noticeable since the mid-2000s. In recent years, manufacturers of electronics, cars, household appliances do not offer new products. These are the same products, but with a new design, improved ergonomics and a bunch of small "improvements" ("upgrades").

Finally, it is worth mentioning one more aspect. Any cycle assumes a new technological base. However, any technology starts not with the mode of production, but with the energy. It is obvious that it is possible to sow and harvest crops with the help of a horse and a tractor. Of course, the

performance will be different (different technological levels). However, energy supply will be different. Thus, any technological base depends on new energy. And there are a number of explanations.

First, the logic of capitalist development leads to a reduction in the volume of labor and, on the contrary, an increase in the use of capital. This is well analyzed by K. Marx. In other words, the capital intensity of production is growing. However, any equipment requires energy, therefore, the energy intensity of the products also increases.

Secondly, with the growth of the reproductive circuit, the volumes of energy consumption, whose energy sources are limited, also grow. Gradually, readily available sources are exhausted, which leads to higher energy prices, higher production costs and, ultimately, lower rates of return.

Thirdly, the choice of a new energy resource is associated with the technological capabilities of its extraction, processing and transportation, which means that the economy should be used. Fourthly, the transition to a new energy resource is due to the fact that it is more efficient compared to the previous resource, which is associated with an increase in the energy consumption of the world economy.

The issue of energy efficiency is quite complicated. A certain idea about this can be obtained on the basis of the EROI (energy return on investment) indicator (sometimes called EROEI - energy returned on energy invested), which is the ratio of the amount of useful energy (suitable for further use) to the amount of energy spent on obtaining such energy resource . It is difficult to obtain an accurate estimate of the index.

1. The main problem is the estimation of energy inputs for extracting energy resources. The fact is that these costs are seriously different. Here, the location of the energy resource is important, as well as the technology used to extract it. This leads to the fact that even at neighboring deposits, the EROI indicator may differ significantly.

2. Quality of energy resources. It is obvious that the quality of energy resources influences the energy output. Naturally, certain standardization is possible. But since all energy resources are natural objects, and natural conditions are different, energy resources themselves will differ. This is clearly visible thanks to hundreds varieties of oil.

4. The indicator changes significantly in time. This is due to two circumstances. Firstly, the extraction of a new energy resource begins with readily available deposits, and it is necessary to move to more difficult areas. This, on the one hand, reduces the dynamics of EROI. But, secondly, the production technology is optimized (it gets cheaper), which, on the contrary, leads to an increase in EROI. However, since the resource has limited volumes, it is possible to cheapen production due to technological improvement only in a limited time frame.

5. Finally, the validity of the estimates is important. As a rule, you will not find open primary ("raw") numbers, you will see only the results. Often they are quite contradictory, and without "raw" estimates, it is impossible to verify the nature of the discrepancies.

In other words, only an approximate estimate based on the EROI indicator can be obtained.

However, this is not crucial for the transition to a new technological order.

Indeed, the new technological structure implies a new energy resource significantly different in energy efficiency. This is to ensure a reduction in production costs and to meet the sharply increasing energy needs at a new technological level. All this leads to an increase in the rate of return at this stage (at the beginning of a new technological cycle). In this case, as a rule, resources with the highest EROI are first used, if possible. As resources are depleted, they use resources with a lower EROI. However, this increases energy costs, the specificity of which lies in the fact that they "characterize" any product. The higher the degree of processing, the more energy is used in the technological process. The fall of EROI to some critical values makes the use of energy resources not

advisable. It is obvious that the energy efficiency of oil and gas has fallen significantly. For example, for the US, the indicator fell from 100 in 1930 to 14.5 in 2005.

The decline in EROI on a global scale (not in relation to companies and deposits) leads to a global economic crisis. Incidentally, the logic of this approach can be applied to the explanation of the rise and fall of individual countries. Taking into account the initial thesis about the systemic crisis of the world economy and the idea of a cyclical world economy, we can find the way out at a new technological level. The latter requires a new energy resource. However, recent years have not been marked by a transition to a new energy resource. It is obvious that the surge in interest in biofuel in the early 2000s. is hopeless, because its EROI at the initial stage is critically low. The situation with shale oil and gas is more complicated.

References

Badalyan, L., Krivorotov, V. (2010) History. Crises. Prospects: a new view of the past and future, M.: URSS, 288 pp.

Baltic Dry Index (2016), *Investing.com,* URL: https://www.investing.com/indices/baltic-dry

Dynamics of GDP growth rate by PP (2016), *Russia in figures,* URL: http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/publications/catalog/doc_1135075100641

Dynamics of prices for aluminum and nickel (2016), *www. Finam.ru*, URL: https://www.finam.ru/profile/tovary

Dynamics of the MSCI World Index (2016), *Investing.com,* URL: https://ru.investing.com/indices/mcx

GDP dynamics in PPP of leading world economies and GDP growth rate by PPP (1995-2016), *International Monetary Fund,* URL: http://www.imf.org/external/data.htm

Glazyev, S.Yu. (2012) Modern Long Wave Theory in Economic Development, *Economic Science of Modern Russia*, vol.2, pp.27-42

Marx, K. Capital: Criticism of Political Economy *(1988), The Process of Capital Production,* vol. 1, Moscow: Politizdat, 891 pp.

Murphy, D.J. (2014). Year in review EROI or energy return on (energy) invested, Annals of the New York Academy of Sciences; *Energy Analysis of Power Systems*, November, Table 2.

Sutyagin, V., Radyukova Ya., Kolesnichenko, E., Bespalov, M. (2017) Systemic crisis of the world economy or the end of the «bourgeois mode of production», *European research studies journal,* vol.XX, is.3.

Sutyagin, V., Radyukova, Ya., Kolesnichenko, E., Smagina, V., Yakunina, I. (2017) Valuation Cost of Equity Capital in the Conditions of Economic Instability on Emerging Markets (by the Example of Russia), *Russia and the European Union - Development and Perspectives*, Springer, pp. 383-392.

Evaluation of the Feasibility of Applying Reduced Social Contribution Rates in Special Economic Zones in Russia

Elena Iadrennikova, Ural Federal University named after the first President of Russia

B.N. Yeltsin, Ekaterinburg, Russia, elena.yadrennikova@mail.ru

Abstract

Special economic zones (SEZ) have seen widespread implementation in international practice and act as one of the instruments used to stimulate economic development of a country as a whole, specific regions, and areas of national economy, which is especially relevant in conditions of crisis and slowed economic development. This article considers the types of special economic zones in use in the Russian Federation and studies taxation preferences afforded to residents (participants) of Russian SEZs. Special attention is given to the investigation of preferences in wage fund taxation, in particular the amount of income tax and the rates of insurance contributions to the wage fund applied by SEZ contributors in Russia. The article will analyze indices of the activity of different types of Russian SEZs, identify problems in their performance and make conclusions about their productivity. It will also look at the feasibility of applying reduced tariffs on social contributions for different types of special economic zones, including industrial/development zones, technical/innovation zones, and recreational and touristic zones, depending on the cost structure typical for each type of SEZ. Finally the article will draw conclusions about which types of SEZ are most justified for implementing reduced tariffs on social contributions and about the perspectives of the long-term development and improvement of SEZs in Russia.

Keywords: Special economic zone (SEZ), taxation, rates of insurance contributions to the wage fund, taxation preferences, cost structure.

Introduction

Special economic zones are widespread in international practice. According to 2015 data from the UN Industrial Development Organization (UNIDO), there were around 4,500 SEZs operating in 140 countries, which employed over 65 million people (Economic zones in the ASEAN, 2015).

Thanks to its economic appeal, special economic zones are used by both developed and developing countries. However, the most impressive results on SEZ usage can be observed specifically in their implementation in developing economies. Their use facilitated the modernization of China, Malaysia, Mexico, Taiwan, and South Korea among others. For example, in Malaysia 90% of output in the electronics industry is produced in SEZs (Morgachev, 1992). The appearance of SEZs on a large scale in China not only attracted foreign investment, but also served as a catalyst for economic reform throughout the entire country (Farole and Akinci, 2011; Ji et al, 2017; Alder et al, 2016).

The development of SEZs throughout the world and in the Russian Federation occurs under the influence of international tax competition, which is aimed at stimulating the flow of foreign capital into sovereign tax jurisdictions by using favorable tax rates and tax regimes. The final goal of the international tax competition process is the strengthening of the competitive advantages of a country by the creation of effective infrastructure, clusters of certain branches of national economy, which in the end leads to growth in national income and the increase of tax revenue (Maiburov et al, 2010). Special economic

zones have a number of peculiarities, which include special customs zones, simplified investment regimes, decreased administrative barriers and preferential treatment with taxation.

In the Russian Federation, special economic zones began active development at the start of the 1990s, as the years 1990 and 1991 saw the opening of 11 of such zones in Russia, totaling 1 million sq. km (7% of the country's territory) and 13% of the population (18.5 million people) of the country. Currently more than 40 special economic zones of different types are in operation in Russia, all of which were founded between 1999 and 2016. Study of existing tax preferences, the results of SEZ performance and the cost structures typical of different types of SEZ allowed for the creation of an evaluation of the feasibility of applying reduced rates of social contributions in the wage fund in SEZs in Russia.

1 Research Methods

Various theoretical and empiric research approaches were used in the writing of this article. Research was carried out with the use of theoretical methods such as analysis, synthesis, generalization and classification. The classification of current SEZs in operation in the Russian Federation revealed the fact that several types of Russian SEZs overlap in their range of activities and have similar legal regimes for the implementation of entrepreneurial and investment activities. Analysis of current SEZs in Russia demonstrated a rather low level of performance on the part of the country's SEZs, especially taking into account budget losses due to tax losses.

The empiric methods used include observation and comparison and were used for the measurement of basic economic tendencies and the comparison between types of SEZs in order to identify the varieties of special economic zones in which the application of reduced tariffs on social contributions in the wage fund is more feasible.

2 Results and Discussions

2.1 Classification of special economic zones in Russia

Currently there are a few types of special economic zones in the Russian Federation, which are classified in table 1.

Table 1: Classification of special economic zones in Russia

Types of SEZ	
1. Special economic zones created in accordance to the federal law No. 184-FZ from 29.05.2015 "About special economic zones in the Russian Federation"	
• Industrial/development zones	SEZ Alabuga, SEZ Lipetsk, SEZ Tolyatti, SEZ Titanium Valley, SEZ Moglino, SEZ Kaluga
• Technical/innovation zones	SEZ Tomsk, SEZ Zelenograd, SEZ Dubna, SEZ Saint Petersburg, SEZ Innopolis
• Recreational and tourist zones	SEZ Baikal Harbor, SEZ Biryuzovaya Katun' (Altai Krai), SEZ Valley of Altai
• Port SEZs	SEZ Ulyanovsk-Vostochnyy, SEZ

	Soviet Harbot (Khabarovsk Krai)
2. Special economic zones created under separate federal laws	
• Special economic zone in Magadan Oblast • Special economic zone in Kaliningrad Oblast • Free economic zone on the territory of the Republic of Crimea and the City of Federal Importance Sevastopol. • Free port of Vladivostok	
3. Innovation centers	
Skolkovo Innovation Center	
4. Territories of leading socioeconomic development created in accordance to federal law No. 473-FZ from 29.12.2014	
In 2015-2016 18 of such regions were created in various regions in the Russian Federation	

Note that SEZs in Magadan and Kaliningrad Oblasts, the Republic of Crimea, territories of advanced socioeconomic development, and the free port of Vladivostok were created by a territorial principle in which preferential treatment is given to residents that exist within a defined territory. Some examples of SEZs created by this territorial principle include small states such as Lichtenstein, Luxembourg, Cyprus, Malta, and the Caribbean Basin countries among others. The remaining SEZs in the Russian Federation, as well as the Skolkovo Innovation Center, were founded on the cluster, or point, principle, which dictates that a group of neighboring interconnected companies of a separate branch and organizations tied to them are provided certain advantages under certain conditions (Kirillova, 2014). SEZs of similar type are widespread in the United States, China, South Korea and many other countries.

2.2 Taxation benefits in Russian SEZs

Widespread use of special economic zones in modern practice of government economic regulation can be attributed to the fact that the use of this form of economic activity organization provides economic interest on the side of both the government and bodies carrying out economic activity, which include individuals and legal entities that do business in special economic zones. SEZ-provided tax benefits are one of the tools used that make participation in special economic zones attractive for tenants and investors.

Because of the various regulatory potential of different taxes and fees and their varying significance in terms of their share in the total amount of tax payments in the worldwide practice of SEZ regulation, the most common tax instruments are (Maiburov et al, 2017): corporate income tax; value added tax (with regard to import VAT); turnover tax; import customs duties; capital gains tax; property taxes (land tax, real estate tax); transport tax, etc.

Although much more rarely, benefits to individual income tax (Ambroziak, 2016) and social contributions to the wage fund are still implemented.

Tax benefits provided by the Tax Code of the Russian Federation for special economic zones can be split into two categories.

1. Tax benefits provided for tenants/participants of all types of SEZ:

1.1. A decreased tax rate on profit established by federal subjects of the Russian Federation with respect to tax credited to the budget of the subjects (the duration of these benefits can be various and is applied by the law of the individual subject);
1.2. Exemption from taxation organizations' property (for a period of 10 years from the date of property registration);
1.3. Exemption from land taxation for resident organizations of SEZs (for a period of 5 years from the moment the company receives rights to a plot of land).

2. Tax benefits provided for SEZ tenants of only certain types:
2.1. Application of a special coefficient (≤ 2) to the main depreciation rate for the residents' own depreciable fixed assets in industrial/developmental zones and recreational and touristic zones;
2.2. Exemption from VAT on services in port-based SEZs;
2.3. Setting a 0% rate for corporate profit tax to be credited to the federal budget for residents of technical/innovational and recreational and touristic zones;
2.4. Reduction of or exemption from transport tax (established by the law of the subject of the Russian Federation) for industrial/development zones, technical/innovation and recreational and touristic zones and free ports;
2.5. Lowered rates of insurance contributions to the wage fund for all varieties of SEZ, except for ports and SEZs in Magadan and Kaliningrad Oblasts.

Thus, the tax preferences provided for various types of SEZ in the Russian Federation correspond to the world practice of tax regulation in special economic zones and are attractive to SEZ residents/participants.

2.3 Preferences in labor taxation in Russia's SEZs

We will take a more detailed look at the advantages that tenants/participants of SEZs in the Russian Federation receive in income taxation paid by individuals.
Note that preferences in personal income tax for tenants/participants of SEZs are not provided by legislation of the Russian Federation. This can be explained by the fact that the application of a basic rate of personal income tax (13%) in Russia is in and of itself one of the lowest income tax rates among both developed and developing countries. Besides this, the tax rate does not depend on the level of income received, since there is an absence of progression in personal income tax. This all testifies to the high competitive positions and attractiveness of the Russian tax system in terms of taxation of individuals' incomes and without the establishment of additional preferences for personal income tax in special economic zones.

Rates of social contributions on the cost of labor in Russia are at a rather high level, totaling 30%. A comparison of the amount of social tax on the wage fund in various tax jurisdictions according to worldwide-tax.com shows that many developed and developing countries, including the US, Indonesia, Mexico, India and the UK are more competitive in this parameter (the maximum rate of social taxes and fees in these countries range from 5.7% to 25%). As a result, concessions on social contributions of employers for the wage fund are provided to increase the attractiveness of SEZs in the Russian Federation. For organizations and self-employed individuals that are tenants (participants) of special economic zones and/or provide wages for individuals that work in SEZs of certain types, legislature of the Russian Federation provides reduced rates of insurance contributions for retirement, medical and social insurance (Table 2).

Table 2: Rates of insurance contributions paid by businesses distributing payments to individuals employed in various SEZs in Russia

Categories of payers			
1. Organizations and self-employed individuals distributing payments to individuals employed in technical/innovation, industrial/development, or recreational and tourist SEZs			
Name of fund	Rate size in different years, %		
	2011-2017	2018	2019
Pension Fund of the Russian Federation	8.0	13.0	20.0
Social Insurance Fund	2.0	2.9	2.9
Federal Compulsory Medical Insurance Fund	4.0	5.1	5.1
Total:	14.0	21.0	28.0
2. Organizations and self-employed individuals having tenant/participants status in a special economic zone in the Republic of Crimea and the federal city of Sevastopol, the free port of Vladivostok or a territory of advanced socioeconomic development			
Name of fund	Rate, %		
Pension Fund of the Russian Federation	6.0		
Social Insurance Fund	1.5		
Federal Compulsory Medical Insurance Fund	0.1		
Total:	7.6		
3. Organizations that are participants in the Skolkovo Innovation Center project			
Name of fund	Rate size, %		
Pension Fund of the Russian Federation	14.0		
Social Insurance Fund	0		
Federal Compulsory Medical Insurance Fund	0		
Total:	14.0		

Note the following observations.

1. The most significant preferences for the amount of insurance contributions are provided for the free economic zone of the Republic of Crimea, the free port of Vladivostok and the territories of leading socioeconomic development (with the total tariff reaching 7.6%). The mentioned SEZs were created rather recently—between 2014 and 2016—and are at the beginning stage of their development. Therefore analysis of the results of these areas' activity is currently not possible. However, judging by the size of the preferences provided to residents/participants, it is these zones that possess the upmost attractiveness to potential investors, and it is in these zones that the rate is set as the main driver of economic development in various regions of the country. At the same time, the legislature has limited the time for the use of lower rates by payers to 10 years.

2. Organizations that are participants in the Skolkovo Innovation Center project pay insurance contributions only to the Pension Fund of the Russian Federation in the form of a 14% rate. For these participants there is also a limit for the use of lower tariffs, 10 years.

3. For organizations and individual entrepreneurs that carry out payments to individuals working in industrial/development, technical/innovation and recreational and tourist zones, the total amount of the insurance contribution for a seven-year period (2011-2017) was set at 14%. Therefore tangible benefit for these types of SEZs by the size of the tariff, which affects their attractiveness for residents and investors, will only be valid through 2017.

4. Tenants of port SEZs as well as SEZs in Magadan and Kaliningrad Oblasts do not have concessions on the size of insurance contributions.

Note that in the Russian Federation there is already successful experience with the application of reduced social contributions for separate categories of payers. In particular, a reduced rate that totals 14% (such rates are currently set for industrial/development, technical/innovation and recreational and tourist zones and the Skolkovo Innovational Center) for a period of several years is applied to Russian organizations active in information technology (development, implementation, adaptation, modifications and support programs for computers and databases) when they provide income to individuals. The provision of such incentives in total with benefits to profit tax for several years has lead to the IT sector's fast rate of growth in the Russian Federation. As a result, the volume of sales and the amount of taxes paid has increased many times, many jobs have been created and currently IT is one of the fastest export-oriented sectors in the economy. Thus, in this case the provision of concession on social contributions has had a significant effect on public revenues, many times exceeding losses in state off-budget funds from the reductions of the standard rate.

2.4 The viability of the application of reduced rates of insurance contributions in SEZs

We will take a look at how justified the applications of reduced rates of insurance contributions depending on the type of SEZ. We will focus attention on SEZs created in accordance with federal law No. 184-FZ "About special economic zones in the Russian Federation", since the majority of them has rather significant concessions on social contributions and many of them have been in existence for several years, which allows for an analysis of the results of their activity.

For the period of 2006 through 2015, special economic zones attracted 472 investors (tenants) to Russia. From this total number of residents, 79 (or 18.6%) were investors who used foreign capital from 29 countries. These foreign investors chiefly came from the United States, Japan, China, Germany, France and Italy. By the end of 2016, the number of residents of the Russian Federation's SEZs reached 500. The results of their activity as of 01 Jan 2016 are given in table 3.

Table 3: Performance of SEZs in the Russian Federation as of 01.01.2016. (Russia. Special Economic Zones, 2016)

Indicators	Type of SEZ				Total
	Industrial/ development zones	Technical/ innovation zones	Recreational and tourist zones	Port SEZs	
1. Number of residents	135	264	63	10	472
1.1. By percentage of total SEZ residents, %	28.6	56.0	13.3	2.1	100.0
2. Amount of declared investment, billions of rubles	338.1	174.2	58.8	16.5	587.6
2.1. By percentage of total					

SEZ investment, %	57.5	29.7	10.0	2.8	100.0
3. Investments implemented by residents of SEZs, billions of rubles	139.451	38.99	1.654	0.513	180.608
3.1. By percentage of total SEZ investment, %	77.2	21.6	0.9	0.3	100.0
4. Share of implemented investments as a percentage of declared investments	41.2	22.4	2.8	3.1	30.7
5. Tax payments of residents to the federal and regional budgets (accumulated total), millions of rubles	12 351	8 593	65	15	21 024
5.1. As a percentage of total tax payments, %	58.7	40.9	0.3	0.1	100.0
6. Number of new working places	9 315	8 727	465	19	18 526
6.1. As a percentage of the total number of new working places, %	50.3	47.1	2.5	0.1	100.0

Source: Russia. Special Economic Zones (2016). *Annual report 2015*. [Online], [Retrieved August 1, 2017], http://www.russez.ru/, author's calculations

From the data from Table 3 the conclusion can be made that the most dynamic development among SEZ development in Russia is observed among the industrial/development and technical/innovation zones, and these are the most attractive for investors. These zones represent 28.6% and 56% of the registered tenants of SEZs, respectively. The amount of investments declared by the tenants totals 587.6 billion rubles, or an average of more than 1 billion rubles per resident. The amount of investment implemented comes to 180.608 billion rubles, or 30.7% of the declared sum. At the same time, the amount of budget investments in the creation of infrastructure totals 118 billion rubles, which puts the residents' investments at 1.5 times more than allocated by the budget. In terms of the amount of declared and implemented investments, the leaders are the industrial/development zones. This can be explained by the specific features of this SEZ type and the existing requirements for tenants regarding the size of investments in activity agreements.

In the 10-year period tenants of SEZs created 18.5 thousand job positions (of which 97.4% were created by industrial/development and technical/innovation zones). Over the course of their existence tax payments to the budget have slightly exceeded 21 billion rubles (a 99.6% share of which was generated by industrial/developmental and technical/innovational zones), which is 1/6 of the amount of budget funds invested in SEZ infrastructure. The activity of recreational and tourist and port-based SEZs is practically unseen, as evidenced by the following data: 73 residents of these zones invested a bit more than 2 billion rubles in their business, created a total of 484 jobs and paid only 80 million rubles in taxes. This could be explained by the fact that tourist zones and free ports appeared in Russia not long ago and are still in the process of formation.

In total the results of SEZ activity for the given period are positive. However, taking into account that the results are taken from a ten-year period (2006-2015), their level of efficiency is low and begs the question of their feasibility of their creation and further development. This is even without taking into account tax revenue shortfalls and other mandatory payments that were not received by the state budget as a result of tax and customs incentives provided to SEZ tenants. It can be noted that providing tax benefits to SEZ

residents has not produced a tangible economic effect. This may be due to institutional factors such as a low level of tenure security and a high level of shadow economy, corruption, etc. As in the situation with low tenure security, no foreign investor will take tax benefits as a convincing argument for investment in such a country (Maiburov et al, 2017; Cizkowicz et al, 2017). Additionally, in the coming years the effectiveness of SEZ activity will increase, since a number of large companies in SEZs are just being built or are just launching production, and the results of the activity of SEZ tenants will significantly improve in three to five years as the enterprises reach full production capacity.

2.5 The feasibility of applying reduced rates of insurance contributions for various types of SEZ

When discussing feasibility of applying reduced tariffs for various types of SEZ, the area and specific features of their activity should be taken into account. We will focus on types of SEZs whose tenants are entitled to reduced rates of insurance contributions (industrial/development, technical/innovation, and tourist zones).

Industrial/development SEZs are created with the aim of manufacturing and/or processing of products (goods) and their subsequent implementation. The advantages of this type of SEZ include the location of production in close proximity to the resource base, access to available infrastructure and basic transport arteries. The location of production in industrial/development zones allows for the increase in competitiveness of production on the Russian and international market due to lowered costs.

The main activities of residents of industrial/development zones include: machine building; automobile and car component manufacturing; petrochemicals; production of power equipment and alternative energy systems; production of medical equipment; instrument manufacturing; production of construction materials; production of home appliances and consumer goods.

Technical/innovation SEZs carry out innovation activities, the creation, production and implementation of scientific and technical products; the creation and realization of programs for computers, databases, and informational systems; and the provision of services in innovation and maintenance of these products. The locations of these SEZs in large scientific and educational centers with rich scientific histories and recognized investigative schools provide additional opportunities for the development of innovation business, the manufacturing of high tech products and output into the Russian and international market.

Recreational and tourist SEZs are created for the development of tourism in the Russian Federation, the construction of use of facilities for the tourist industry, the development of health resort facilities, medicinal rehabilitation and rest. Recreational and tourist zones are created to provide tenants with engineering infrastructure in hard-to-reach places that cannot be developed by forces of individual investors alone.

The study of the structure of costs for the creation of products (services) by types of activities that are typical for different types of SEZ (Table 4), allows us to draw the following conclusions.

Table 4: Cost structure for manufacturing, labor and services for some types of economic activity in the Russian Federation in 2015 (Statistics Russia, 2017), %

Type of activity	Types of cost					Total
	Material costs	Labor costs	Social contributions	Depreciation	Other	
1. Economic activity in industrial/development SEZs						
✓ Production of machinery and equipment	63.3	19.1	5.4	3.3	8.9	100.0
✓ Production of						

electrical and optical equipment	62.6	20.2	5.7	2.8	8.7	100.0
✓ Production of vehicles and equipment	69.2	13.6	3.9	3.1	10.2	100.0
✓ Chemical production	72.6	9.6	2.7	5.3	9.8	100.0
2. Economic activity in technological/innovation SEZs						
✓ Scientific research and development	48.6	26.8	7.0	3.0	14.6	100.0
3. Economic activity in recreational and tourist SEZs						
✓ Restaurant and hospitality business	46.2	21.6	6.1	4.1	22.0	100.0
✓ Health and social services	29.0	37.1	10.2	4.9	18.8	100.0

Source: Statistics Russia (2017). *Russian Statistics Annual Report.* [Online], [Retrieved August 2, 2017], http://www.gks.ru/bgd/regl/b16_51/IssWWW.exe/Stg/03-14.doc, author's calculations

For the type of activity carried out in industrial/development zones, the cost structure is characterized by a predominance of material expenses (62.7-72.6%), while the share of labor costs, and by extension, social contributions, is relatively low (9.6-20.2% and 2.7-5.7%, respectively). As a result the application of reduced rates by tenants of this SEZ type does not have a significant effect on the reduction of costs and the increase of competitiveness of products. At the reduced rate of 14% the amount of costs reduces to 1.4-3.0%, and at the 2018 level of 21%, only 0.8-1.7%.

In the cost structures of activities carried out in technical/innovation and recreation and tourist SEZs, the share of labor costs and social contributions is much higher (21.6-37.1% and 6.1-10.2%, respectively). Therefore, for these types of SEZ, the effect from using reduced rates of insurance contributions is considerably higher. The reduction in costs for the production of innovative hi-tech products and tourist services may amount to 3.3-5.4% in 2017, and from 1.8% to 3.1% in 2018. Thus the application of a reduced rate of insurance contributions is more justified and feasible for these SEZs.

When considering the question about the effectiveness and feasibility of providing tax concessions to participants of SEZs, including in social contributions, one must consider that the use of tax benefits lead to violation of the principle of fairness in taxation. This is because of the fact that in supporting some territories and types of activities, the government must increase the tax load on other taxpayers. This is where China is deserving of attention in its establishment of special economic zones. Thanks to a weighted and consistent policy in this area, China has managed to bring itself to a leading economic position in the world in the period of a few decades. The essential characteristic was the fact that production facilities in the country's SEZs were oriented on export and not on the supply of goods, labor, and services to the domestic market, thereby not undermining the basis for fair competition in the country (Goncharenko, 2016).

Experience of the functioning of SEZs in the Russian Federation shows that SEZs are mainly focused on attraction of local investors, which is seen in the low share (18.6%) of tenants of the country's SEZ that use foreign capital. At the same time the sales vector of goods produced in SEZs is directed mainly at Russia. For example, in SEZ Kaliningrad, which is unique in its proximity to the general European market, the direction of development on international labor cooperation and the export of Russian goods and services to Europe, the development of logistics should have become a main priority for the SEZ. However, unfortunately, it does not have (Ivanova et al, 2015). Thus, Russian SEZs' orientation of output mainly on the domestic market creates a prerequisite for the appearance of horizontal tax competition between the country's regions and violates the principle of taxation fairness.

Conclusion

Tax preferences currently granted to residents/participants in Russia's SEZs are quite adequate and attractive. However, an analysis of their activity has shown a low level of efficiency, especially taking into account losses to the budget from cut taxes. The reason for this can be institutional factors of the Russian economy, including a low level of tenure security and a high level of shadow economy and corruption.

Comparative analysis has shown that the most feasible and justified use of reduced rates of insurance contributions to the wage fund are in technical/innovation and recreational and tourist SEZs, taking into account the cost structure for these areas of activity.

Currently SEZ activity is largely focused on the domestic market, which creates a prerequisite for horizontal tax competition between regions of the country. To increase of efficiency of SEZs in the Russian Federation, it is necessary to attract investors, including foreign ones, with the general prospects of development of the Russian economy. The main factors to contribute to the development of SEZs in Russia should become the condition of infrastructure, the protection of invested capital, and the simplification of administrative procedures concerning entrepreneurial activities. At the same time, products and services produced by SEZs should largely become more export-oriented.

Acknowledgements

The work was supported by the Russian Foundation for Basic Research, contract № 17-22-21001.

References

Alder, S., Shao, L., and Zilibotti, F. (2016). 'Economic Reforms and Industrial Policy in a Panel of Chinese Cities,' *Journal Of Economic Growth*, 21(4), 305-349.

Ambroziak, A.A. (2016). 'Income Tax Exemption as a Regional State Aid in Special Economic Zones and its Impact Upon Development of Polish Districts,' *Oeconomia Copernicana*, 7(2), 245-267.

Cizkowicz, P., Cizkowicz-Pekala, M., and Rzonca, A. (2017). 'The Effects of Special Economic Zones on Employment and Investment: a Spatial Panel Modeling Perspective,' *Journal Of Economic Geography*, 17(3), 571-605.

Economic zones in the ASEAN. (2015). [Online], [Retrieved August 2, 2017], http://www.unido.org/fileadmin/user_media_upgrade/Resources/Publications/UCO_Viet_Nam_Study_FINAL.pdf .

Farole, T. and Akinci, G. (2011). 'Special Economic Zones: Progress, Emerging Challenges, and Future Direction. Washington: World Bank Inst.

Goncharenko, I.A. (2016). 'Privileged Taxation Zones in China. History of Formation,' *Laws of Russia. Experience, Analysis*, *Practice*, 4, 72-79.

Ivanova, V.I. et al. (2015). 'The Special Economic Zone in the Kaliningrad Region: the Imperfection of the Basics of the Legislative Framework,' *Economic Science*s, 6(127), 90-97.

Ji, Qi., Aliakseyeu, Yu. G., and Dudko, N. A. (2017). 'Operation of New and High-Tech Development Zone - "China-Singapore Suzhou Industrial Park".' *Science & Technique,* 16(3), 262-270.

Kirillova, T.V. (2014). 'Special Economic Zones in the Russian Federation,' *Modern Science: Actual Problems of Theory and Practice*, 12, 54-60.

Maiburov I.A. et al. (2010). Tax Policy. Theory and Practice. Moscow: IuNITI-DANA.

Maiburov, I.A. et al. (2017) Special Economic Zones. Theoretical and Methodological Aspects of Development. Vol 1. Moscow: IuNITI-DANA.

Morgachev, V. (1992). 'Other Countries' Experience in Establishing SEZ,' *Law*, 11, 46-52.

Russia. Special Economic Zones (2016). *Annual report 2015*. [Online], [Retrieved August 1, 2017], http://www.russez.ru/.

Statistics Russia (2017). *Russian Statistics Annual Report.* [Online], [Retrieved August 2, 2017], http://www.gks.ru/bgd/regl/b16_51/IssWWW.exe/Stg/03-14.doc.

Integration of Soldiers to the Labour Market In Visegrad Group Countries

Kristýna Binková, University of Defence, Brno, Czech Republic, kristyna.binkova@gmail.com

Miroslav Krč, University of Defence, Brno, Czech Republic, miroslav.krc@unob.cz

Abstract

Integration of soldiers to the labour market after the termination of their military service is the topic of this article. It deals with the issue of provided benefits associated with preparation of soldiers for a so called second career in the Visegrad Group states - Czech Republic, Poland, Hungary and Slovakia. Its aim is to describe national approaches of each country and compare them. The method of analysis of scientific literature, semi-structured interviews with employees of Ministry of Defence of each country and analysis of statistical documents were used.

Keywords: Soldier; second career; labour market; Visegrad group countries

Introduction

A person's career starts when he enters the labour market. In the role of an economically active person in the labour market, he concludes contracts and agreements, through which he carries out his profession, through which he forms his social and economic position in society. Opinions about the career concept are different and there are many of them. For some people, a career means a way of meeting basic economic needs, for some people a social status. At present, it is typical that many individuals' careers consist of multiple positions and are characterized by frequent changes and high mobility. The reason for this is the dynamism of the labour market, i.e. increasing competition, constant technological change, and new trends, the initiative of an individual, or the inevitable change of career resulting from the nature of professions. One of these professions is professional soldiers.

After the termination of military service, a "critical" period, during which it's decided about the nature and methods of soldier's adaptation in the civilian sector, begins. Poor adaptation leads to signs of negative consequences of job loss. But they can be avoided by successful start of a second career, in the shortest possible time. A second career can be defined as the next stage in the career path or in the new profession as a result of the voluntary or necessary termination of previous career. The armed forces are part of the labour market and must, therefore, fight for potential employees and seek out the best candidates for the military profession. They are a specific employer who does not have the equivalent in a civilian economy, and therefore should show an interest in former employees being successful also in civilian economic life.

The Visegrad Group, also called the Visegrad Four, or V4 is a cultural and political alliance of four Central European states – the Czech Republic, Hungary, Poland and Slovakia, which was formed in 1991 as a response to the consequences of the fall of totalitarian regimes in these states, for cooperation in a number of areas of common interest within the framework of pan-European security and economic integration. The following chapters will outline how individual members of the Visegrad group help their members of armed forces to integrate to the labour market after the termination of their service, in order to facilitate their transition to a second career, to encourage placement at civilian employers, to alleviate the negative social and psychological impacts and, last but not least, to strengthen organizational culture.

1 Overview of the issue

A professional soldier is a citizen who performs military service as a job for the nation. The employment relationship of a professional soldier is terminated by the expiration of the period for which he / she has been negotiated, or by other, statutory reasons. Soldiers leaving the military do not reach the statutory retirement age in most cases. They belong to relatively young population, most often at the age of 40, that are often at the peak of their professional career at the end of their military career and with the potential to work for another 15-30 years (Vigoda-Gadot, Baruch & Grimland, 2010). Since soldiers want to maintain a certain standard of living even after leaving the service, they try to integrate to the labour market and achieve a second career in a new, civilian job (Levinson, 1978). However, practice shows that ex-military servicemen experience serious difficulties with integration to the civilian labour market after leaving the army, and that selection of a new profession can take up to a disproportionately long time (Wing, Wolf, London & Wilmoth, 2009).

The army environment is hierarchical, based on strict rules and high division of labour. It is therefore compensated by paternalism that provides most basic living needs such as steady income, housing, or medical services (McCarthy, 1992). In the "civilian world", with a completely different culture, principles and habits, with greater autonomy (Zarecky, 2014), they often feel needless (Anderson, Goodman, 2014) and don't know how to act independently (Higate, Richard, 2001). Many of them cannot even cope with this so-called intercultural transition (Black, Westwood & Sorsdahl, 2007) several years after the termination of military service (Doherty, 1983, Ullmann 1971).

Soldiers have skills that are very little applicable in civilian environment, and after about 15 years of service, it is not very realistic for them to return to the field they have studied. They also have a problem with identifying of so-called transferable skills (Felder, 2008; Simpson & Armstrong, 2010). Their techniques of self-presentation are ineffective, and the difference between military and civilian terminology does not contribute to the problem. Employers do not understand the qualities of job seekers with military experience, and therefore underestimate them (Becker, 1957). Former soldiers belong at the labour market to disadvantaged groups.

The integration process and satisfaction of soldier during his / her integration to the civilian environment depends on many factors according to the authors. In confirmation or refutation of hypotheses of the impact of these factors on the process of soldier adaptation in the civil sector, however, researches do not take a single opinion. On the contrary, a clear positive impact had, according to previous research, early preparation for a second career, the individual's social capital, the perception of organizational policy in new job (Vigoda-Gadot, Baruch & Grimland 2010), perception of the labour market (Baruch & Quick, 2007), or personal satisfaction (Cauly, 1987).

2 Approaches to solving the issue – theory

Vigoda-Gadot, Baruch & Grimland (2010) noted: “Good retirement preparation will allow the retirees to better understand second career reality.” The preparation will affect expectations from the new organization and will enable retirees to overcome difficulties and frustrations in their new career workplaces. Fuller & Redfering show that second career planning was the only factor which had significant effect on retirement adjustment; those who adjusted well were those who had planned well. According to McNeil (1983), it is important to start planning at least one year before the termination of service. Studies show that planning and consistent preparation for a second career is the only factor that demonstrably facilitates career change. Individual responsibility and soldiers' activity is crucial, but the assistance of the state and organizations is necessary and increasingly important nowadays (Wolpert, 2000).

Figure 1 depicts a situation where a soldier at point t_1 leaves the armed forces and his income curve $y_{armforce}$ and becomes unemployed for periods t_1 to t_{1+x}. Then he has the opportunity to return to his original qualification obtained at point t_0 with a return to the y_{civ} curve which he would have been on if he did not enter the armed forces or he can reach the reception curve lying somewhere between the $y_{armforc}$ curve and the y_{civ} curve. The reason why the armed forces must try to compensate the drop of income of former soldier is not just the effort of a good image of the armed forces, i.e. the competitiveness at the labour market, but also the prevention of the escape of former soldiers whose military qualification has no civilian alternative in the form of a y_{civ} curve, or whose return to original civilian profession is problematic, to illegal activities. The environment of organized crime gives them a great opportunity to apply the special skills gained in military service and possibly to return to the course of their income given by y_{amforc} curve or even higher.

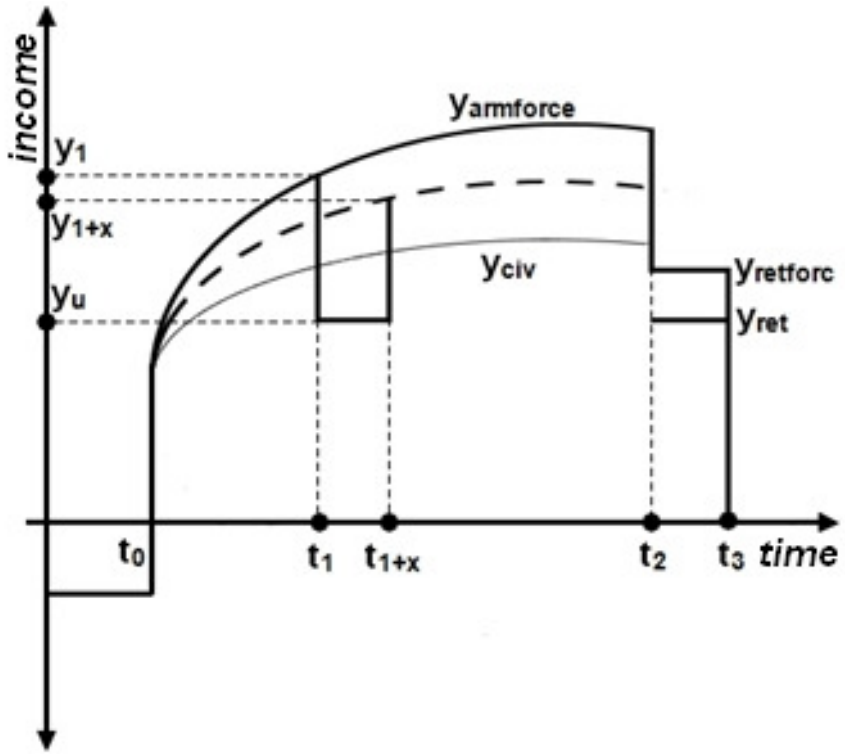


Fig 1: Income of soldier over time

Source: Pernica (2007)

According to Pernica (2007), there are three ways to limit the consequences of the former soldier's economic downturn. The first option is to offset a portion of the difference between former $y_{armforc}$ income and unemployment income, or income in civilian employment corresponding to the initial qualification of soldier in the form of retirement benefits or other benefits provided to former soldiers after termination of service. This option is called the social security for soldiers.

Another way to reduce soldier's drop of income is to enable him to obtain a qualification during the duration of service to be able to continue without major problems even in the next economic life. Further training of military personnel is even part of personal marketing. There is no cheaper advertising than a

good name in the labour market. Qualification can be made at the beginning of the service, during or at the end of the service as replenishment, incensement of qualification, or as a re-qualification.

A third way to limit the income impact of a professional soldier after the termination of service is to economically stimulate him to voluntarily leave the service by stopping the growth of soldier's income. This measure is particularly suitable for the most qualified military personnel. The interpretation of Figure 1 is that the soldier would not be interested in extending the contract at a time when the difference between the $y_{armforce}$ curve and the y_{civ} curve would increase significantly. The tool of this policy is the salary rules linked to the career order.

3 Approaches to solving the issue – practice of Visegrad Group Countries

For the notion of how powerful armies of the Visegrad Group countries are, and how important the problem of the outflow of professional soldiers is, the following table shows size of armed forces and outflow of soldiers from armed forces in 2016.

Table 1: Size of armed forces and outflows of soldiers from armed forces in Visegrad group countries in 2016

Country	Size of armed forces	Outflow from armed forces
Czech Republic	23 184	842
Poland	106 000	4 844
Hungary	19 871	800
Slovakia	12 333	660

Source: Authors' own elaboration

In all countries, the lowest decrease was recorded in the lower ranks, the most frequent reasons were the expiry of the defined period of the contract and the filing of the application for dismissal. The average age of soldiers terminating the service was 35-40 years.

In Czech Republic, a professional soldier serves for a fixed term period in the range from 2 to 20 years, which can be prolonged. Soldier must be released if he / she has reached the retirement age according to a special legal regulation. The length of military service in Poland lasts from 18 months to 6 years, with the total length of service for a soldier not exceeding 12 years. 3 months before the expiration of a certain period, soldiers may apply to extend the contract or to change it for an indefinite period. In Hungary, soldiers serve at least for a period of 3 years, which can be extended up to a maximum of 20 years. As in Poland, soldiers who meet the necessary requirements may apply for the status of a professional soldier and serve for an indefinite period of time, most notably until the age of 60. In Slovakia, the military service is based on his rank ranging from 1 year to 17 years or he or she ends up by reaching the statutory age limit, which is 55 years in all grades.

3.1 Integration of soldiers to the labour market in Czech Republic

Military retirement pay. The soldier is entitled to a retirement allowance if his/her service lasted for at least 15 years. The basic amount of the service allowance is 15% of the average monthly gross salary but no more than 55%. A soldier whose service lasted for 15 years and is also entitled to a severance pay at the amount of quadruple of the average monthly gross salary. The maximum severance pay is six times

the average monthly gross salary. A soldier whose service lasted at least 2 years is entitled to pay in the amount of 2 average monthly gross salaries. With more years in the service, the pay is increased to a maximal amount of eighteen times of monthly gross salary (Act No. 221/1999 Coll).

Military education system. Specialized training of the Defence Department in terms of usability for the second career is supported especially by the Military High School and the Higher Technical School of the Ministry of Defence in Moravská Třebová, the University of Defence and the Headquarters of Training - the Military Academy in Vyškov within their fields of study and courses. Language training in the department is focused on meeting the language skills requirements set out in accordance with the STANAG 6001 Standardization Agreement (Koncepce přípravy, 2011)

Retraining. This is a benefit for professional soldiers whose service lasted at least 5 years. Retraining is granted to soldiers on the basis of their application in the form of short-term courses. Their duration must not exceed 3 months and must end at the latest on the last day of service. Courses offered by the Ministry of Defence every year, last on average from 3 to 4 weeks. However, it is difficult for a professionally trained soldier to retrain to a different expert for such a short period of time. Moreover, courses focus only on the basic knowledge and skills needed to perform the profession in which the soldiers retrain. However, this is not in line with labour market requirements. There is no competitive advantage for soldiers and the success at the labour market is not very realistic (Bednář, Simbartl, Drábek, 2016)

Job opportunities in state companies of defence sector. VOP, LOM Prague, the Military Forests and the Farms of the Czech Republic and Volareza are state companies of defence sector that offer jobs to soldiers who terminated the service. Most often these are technical jobs, air mechanics, or chefs (Benefity pro válečné veterány, 2017).

Leave of absence. For the purpose of job searching before the termination of service, the soldier is entitled to a 2 day leave per month during the period of three months before the expiry of service (Decree of the Ministry of Defence No. 263/1999 Coll.).

Summary of the interviews: Employees of the Ministry of Defence agreed on the view that the retraining system requires changes. They have stated that it is important to educate soldiers for longer period of time, already since recruiting and direct them in preparation for a second career in civilian fields related to their military expertise. They also expressed the importance of obtaining feedback on the retraining courses and using the latest educational trends, such as e-learning. About 20% of soldiers terminating the military service are interested in retraining courses every year, and this percentage needs to be increased. A team of experts is taking steps towards change, but it is in the state of negotiations.

3.2 Integration of Soldiers to the Labour Market in Poland

Military retirement pay. If soldiers' service lasted for at least 25 years and if they have reached the age of 55 years they are eligible for military retirement pay. The basic amount is 60% of the average soldier's salary. This amount increases each year by 3%, but maximally up to 75%, which the soldier receives after 30 years of service (Emerytura, 2017).

Military education system. One form of support is a military education system. In Poland, soldiers can acquire knowledge and skills potentially applicable in the civilian sector by studying at military universities: War Studies University, Polish Air Force Academy, Military Technical Academy, Tadeusz Kosciuszka Military Academy and Naval Academy.

Counselling. The soldier may have individual consultations with experts, offering him the opportunity to meet employers, personalists selected by companies or other people who have successfully undergone a career change.

Seminars. Soldier can participate in up to 3-day seminars on the theme of retraining opportunities, start-ups, job opportunities, labour market adaptations, job search methods, rules of writing a CV and motivation letter, interviewing techniques, and employment law issues.

Training. Part of preparation for the second career is training, i.e. retraining and other courses, which are paid up to the amount that is given by: the percentage of the lowest basic salary in force as of the first day of the calendar year in which the person requires retraining, the number of years worked in active service and the date of termination of service.

Job search assistance. A soldier looking for a new job can apply for job search assistance at the appropriate military unit. He /she is provided with a wide list of vacancies within his / her place of living, which takes into account his / her needs, qualifications and requirements.

Reserved jobs in the public sector. A soldier, whose service relationship was terminated for reasons defined by law and whose service lasted for at least 10 years, has a priority in applying to positions in the area of national defence in the public sector.

Internship. Upon a decision of the Minister of Defence and with the consent of the commander of a military unit, the soldier can apply up to 6 months of internship before termination of service if it is necessary for obtaining employment in the civilian sector.

Other forms of support. Professional Activation Centers also offer business start-up assistance and organize job fairs that employers are invited to, to establish contacts for future cooperation with soldiers (Rogoń, 2017).

Summary of the interviews. The core of the integration of soldiers to the labour market is a system based on the cooperation of specialized institutions, so-called Professional Activation Centres that are in eight cities. A team of employees regularly visits military units and institutions and teaches soldiers about the possibilities of preparation for a second career. The centres provide professional counselling or seminars, personally, by telephone and online, individually and in groups. A total of 9 438 attendees participated in the year 2016. This year centres also established contacts with a total of 451 employers and received 1 273 job offers for soldiers. A total of 2 693 retraining took place, 1 256 soldiers took part in the internship, and 27 job fairs were organized. The system of integration of soldiers to the labour market is very sophisticated in Poland.

3.3 Integration of soldiers to the labour market in Hungary

Military retirement pay. In the year of 2012, the benefit of military retirement pay was cancelled.
Military education system. One form of support is the education system, the National Public Service in Budapest, which offers its military students the opportunity to gain the status of a professional soldier after five years of study, as well as knowledge in other areas of public administration (Jobbágy, 2016).
Reserved jobs in the public sector. In addition to financial compensation, the soldiers are offered an advantage in the form of preferential occupation of vacancies in two state-owned enterprises. These are the Hungarian State Railways and the Hungarian Post Office. Soldiers also have the option to transit to a police or fire-fighters, but another form of support for soldiers to integrate into the labour market does not currently exist.

Other forms of support. Until the end of 2016, soldiers who were not able to perform their military service for psychological or physical reasons not caused by their fault were provided financial compensation. Even this benefit was cancelled since January 2017. Soldiers have only the right to apply for a financial contribution to the National Public Employment Foundation for a maximum of 90,000 Forints to cope with the career change period (Kovács, 2016).

Summary of the interviews. Some forms of integration of soldiers into the labour market in Hungary existed in the past. Now there is a trend of cancelling these forms of support, and according to the interviews, this is mainly due to a significant reduction of the dismissal of soldiers for organizational reasons. Most outgoing soldiers leave for retirement, so the motivation for implementing a system of preparation of soldiers for a second-career is not too high. Therefore, no change is planned in the near future.

3.4 Integration of soldiers to the labour market in Slovakia

Military retirement pay. The retirement benefit is provided to soldiers for one to three years, depending on their length of service (at least 10, not more than 25 years) in the amount of 1% of the average monthly salary. The severance pay in the amount of half the average monthly salary is provided to soldiers whose service lasted for at least 13 years, and the amount increases with every additional year of service. If the military service of a soldier lasts at least 25 years, he / she is entitled to a so-called retirement pension, which is 37.5% of the average monthly salary. This percentage increases with further years of service (Act No. 328/2002 Coll.).

Military education system. Soldiers can acquire knowledge for a second career in the study programs of the Academy of Armed Forces Gen. M. R. Štefánika.

Counselling and seminars. Soldiers may also undergo a preparation for further employment during the notice period, which is aimed at developing soft skills in finding a new job. This training within 6 hours is provided by military psychologists at units every 2 months. This training is carried out in accordance with the Directive of the Ministry of Defence of the Slovak Republic on the performance of psychological activities. Its content is structured mainly in preparation for an interview, writing of a motivation letter and cover letter, the possibility of finding employment in the civil labour market, or the diagnosis of a suitable profession for individuals. The specific content is adjusted according to the preferences of the soldier and the psychologist. Information on outplacement is also provided by the Department of Psychological and Sociological Activities of the Personnel Office of the Armed Forces (Štammová, 2016).

Military training. In §80 of Act No. 346/2005 Coll. On State Service of Soldiers of the Armed Forces of Slovak Republic, retraining was defined and the conditions for its provision were specified. Those were the reasons for termination of employment, further specified in the law, and the length of service for at least 5 years. Retraining was provided at the cost of the state with the possible participation of a soldier. However, in the last amendment to the Act, we cannot find any mention of retraining.

Other forms of support. Soldiers are allowed to prepare for the transition to a civilian profession at their own expense during the period of notice. In practice, this is a leave in the scope of preparation for a new job, with maximal length to 30 days. In addition, soldiers are entitled to a leave from work used for searching for a new job, in the scope of half of a day per week.

Summary of the interview. The defence sector of Slovakia focuses mainly on seminars and counselling. Retraining courses have been cancelled for unspecified reasons. Because of the relatively low number of soldiers released annually, changes are not expected in the near future.

4 Comparison and Discussion

Based on the information provided by individual Visegrad Group countries, we can conclude that Poland has the most sophisticated system of integrating soldiers to the labour market, providing a range of diverse benefits. It is the only country that provides job-seeking assistance, allows internships in civilian

organizations, organizes job fairs, and also helps in starting a business. Assistance with the integration of military personnel into the labour market is a logical continuation of the personnel policy of the Polish armed forces. It is perceived as a duty of the state towards its soldiers and represents one of the strategies of preserving the prestige of the military profession and the quality of recruitment.

At a similar level, though with another benefit mix, is Czech Republic and Slovakia. The strengths of the integration of soldiers to the labour market in Czech Republic is its military education system, the career training of professional soldiers, comparable in their content to similar managerial courses in the civilian sphere, as well as language training. The retraining system has several weaknesses. Especially the length that is too short for a soldier to retrain to an expert with a completely different professional orientation than his / her military one. A significant weakness of retraining courses is also their focus on basics of professions and therefore inconsistency of the content of the courses with the requirements of the labour market. Retraining course itself cannot prepare a soldier for new conditions and a second career. In the Czech Republic, there are no consulting activities to assist soldiers with getting to know the labour market or with searching for a job. On the contrary, in Slovakia, career counselling and career seminars are organized, but the benefit of retraining courses is no more provided.

The least benefit in terms of preparation for a second career of soldiers is provided in Hungary. As the only one of the analysed countries, it does not provide military retirement pay and from other benefits, it only provides reserved jobs in some public institutions. The situation is illustrated in the following table.

Table 1: Benefits related to assistance with integration of soldiers to the labour market provided by the Visegrad Group countries

Benefits	Czech Republic	Poland	Hungary	Slovakia
Military retirement pay	x	x		x
Military education system	x	x	x	x
Counselling		x		x
Seminars		x		x
Training	x	x		
Job search assistance		x		
Reserved jobs	x	x	x	
Internship		x		
Job fairs		x		
Business start-up assistance		x		

Source: Authors' own elaboration

Conclusion

Based on the study of scientific literature analysing the transition from military service to civilian employment, the implications for human resource management can be deduced. Human resources management is more than ever the most important area of assuring capabilities of the armed forces. Due to the negative demographic development and the aging of the population, as well as the drop in

education in the technical fields, the armed forces face difficulties in replenishing the units by qualified personnel. Therefore, it should be in the interest of creating comfortable conditions for leaving the armed forces, which would have a significant effect on recruitment.

All analysed countries provide some support for professional soldiers during the transition to a second career. However, Poland has the most elaborate system of integration of soldiers to the civilian sector, which can be a good example for defence sectors of Czech Republic, Slovakia, and Hungary in terms of potential adaptation to domestic conditions. Research shows that soldiers are very sensitive to the correctness of layoffs and are significantly affected by the procedures that are used. The impact of the clarity and adequacy of the explanation of the reasons for the dismissal as well as severance, counselling and other services and benefits associated with facilitating the period of transition to the second career is significant.

It is necessary to change access to the occupation of a professional soldier as a lifelong profession, to inform soldiers of this fact as soon as they enter the army and to involve them in preparation for the transition to the civilian sector as soon as possible during their active career. Effective planning is a key aspect of integration to the labour market. Studies show that planning and consistent preparation for second career are the only factors that demonstrably facilitate a career change. The individual responsibility and activity of soldiers are crucial, but the assistance of the state and organizations is essential and increasingly important.

References

Act No. 221/1999 Coll.

Act No. 328/2002 Coll.

Act No. 346/2005 Coll.

Anderson, M.L. and Goodman J.. 'From Military to Civilian Life: Applications of Schlossberg's Model for Veterans in Transition.' *Career Planning and Adult Development Journal*. Fall 2014(3), 40-51. ISSN 0736-1920.

Baruch, Y., and Quick, J. C. (2007). 'Understanding second career: Lessons from study of U.S navy admirals.' *Human Resource Management*, 46, 471-491.

Becker, G. (1957). *The Economics of Discrimination.* Chicago: University of Chicago Press.

Black, T. G., Westwood, M. J., and Sorsdahl, M. N. (2007). 'From the front line to the front of the class: Counseling students who are military veterans.' In J. Lippincott & R. B. Lippincott (Eds.), Special populations in college student counseling. pp. 3–20. Alexandria, VA: American Counseling Association

Cauly, M. (1987). 'Adjustment modes of retired I.D.F officers to civilian jobs.' Unpublished master's thesis, Bar-Ilan University, Ramat-Gan, Israel.
Decree of the Ministry of Defence No. 263/1999 Coll.

Doherty, T. F. (1983). 'Patterns of adaptation to military retirement: An exploratory study'. Unpublished doctoral dissertation, Smith College School for Social Work, Northampton, MA.

Felder, D. (2008). 'Addressing new veterans' employment needs with e- Tools. Career Convergence.' Web Magazine. Retrieved from www.ncda.org

Emyrytury zołnierzy zawodowych. Emerytura [online]. 2017 [cit. 2017-05-01]. Avaliable at: http://piotrjuszczyk.pl/emerytura.php
Fuller, R. L. and Redfering, D. L. (1976). 'Effects of preretirement planning on the retirement adjustment of military personnel.' *Work and Occupations*, 3(4), 479-487.

HIGATE, P.R. 'Theorizing Continuity: From Military to Civilian Life.' *Armed Forces & Society* [online]. 2001, (Spring) [cit. 2017-02-05].

Interview – Bednář Z., Simbartl S., Drábek D. Ministry of Defence of Czech Republic, Prague, 24. 7. 2017.

Interview - Štammová, M, Ministry of Defence of Slovakia, Bratislava, 16. 10. 2016.

Interview - Kovács T., Ministry of Defence of Hungary, Budapešť, 20. 8. 2016.

Interview - Jobbágy Z., National University of Public Service, Budapešť, 20. 8. 2016.

Interview - Rognon R. Ministry of Defence of Poland, Centralny srodek Aktywizacji zawodowej, Warsaw. 11. 7. 2017.

Koncepce přípravy personálu rezortu MO na období 2012 – 2018. Praha: Ministerstvo obrany České republiky, 2011. Avaliable at: www.issp.acr

Levinson, D. J. (1978). 'The season's of a man's life'. New York: Alfred A. Knopf.

McCarthy, P. R. (1992). 'The military transitioner in the job search.' *Armed Forces Comptroller* 37(2), 22-24.
McNeil, J. S., Lecca, P. J. and Wright, R. (1983). 'Military retirement: Social, economic, and mental health dilemmas.' Totowa. New Jersey: Rowman &Allanheld.

Pernica, B. Profesionalizace ozbrojených sil: trendy, teorie a zkušenosti. Praha: Ministerstvo obrany České republiky, 2007. ISBN 978-80-7278-381-6.

Rekonwersja kadry i byłych żołnierzy. Wojskowa komenda uzupełnień [online]. [cit. 2017-03-10]. Avaliable at: http://radom.wku.wp.mil.pl/pl/6786.html

Simpson, A., and Armstrong, S. (2010). 'From the military to the civilian work force: Addressing veteran career development concerns.' *Career Planning & Adult Development Journal* 25, 177-187.

Ullmann, C. A. (1971). 'Second careers for military retirees.' *Vocational Guidance Quarterly*, 20, 96-102.

Vigoda-Gadot, E., Baruch, Y., and Grimland, S. (2010). 'Career transitions: An empirical examination of second career of military retirees.' *Public Personnel Management*, 39(4), 379-404.

Wing, C., D.A. Wolf, A.S. London, and J.M. Wilmoth (2009). 'Military service and later labor force outcomes: a life course approach.' Paper presented at the 2009 Annual Meeting of the Population Association of America. http://paa2009.princeton.edu/papers/91470

Wolpert, D. S. (2000) 'Military retirement and the transition to civilian life.' In J. A. Martin, L. N. Rosen, & L. R. Sparacino (Eds.). The military family: A practice guide for human service providers (pp. 103-119). Westport, CT: Praeger.

Zarecky, A. (2014). ‘How strengths-focussed coaching can help military personnel in their transition to 'civvy street'.’ *International Journal of Evidence Based Coaching & Mentoring* . Jun2014 Special Issue 8, p54-66. 13p.

Život, rodina a práce. Benefity pro válečné veterány [online]. [cit. 2017-02-08]. Avaliable at: http://benefity-veterani.cz/index.php?p=kategorie-4-ZIVOT,-RODINA-A-PRACE

Analysis of Scale Economies in a Manufacturing Company

Martha Rodríguez, Universidad de Monterrey, San Pedro Garza García, México,
martha.rodriguezv@udem.edu
Josué García, Universidad de Monterrey, San Pedro Garza García, México,
josue.garcia@udem.edu
Raúl Mata, Universidad de Monterrey, San Pedro Garza García, México,
raul.mata@udem.edu

Abstract

The presence of economies of scale allows industries and companies to have better profits. In the present study, the translog cost function of a manufacturing company in Mexico is estimated during the period January 2013 to September 2016. The elasticity of production with respect to cost is found to be 1, where increases in production lead to increases in the same proportion in costs. From this result, we analyze some aspects in which the company could improve this situation, for example, to change its accounting to the costing method ABC.

JEL classification: D22, D24, L21, M21.

Keywords*:* Economies of Scale, Manufacturing, Costs.

Introduction

According to a recent report by JP Morgan and IHS Markit (2017) on the sensitivity of the market, Mexico contributes 1.5% to the world manufacturing production, currently occupying the number fourteen place globally. This report also mentions that in the following years an increasing trend in world production is expected, and this is beneficial for the country. In Mexico, the manufacturing industry has taken an important role in the economic development since the last decade, and has positioned to the country as a leader of certain sectors. This industry has directly and indirectly participated in a large number of economic activities: generation of jobs, transferring of technology, and generation of investments. According from the Manufacturing Industry Monthly Survey (EMIM, 2017), during the period 2016-2017, in Mexico the employment of this sector registered an increase of 3.5%, while the value of production increased by 16%; however, a major concern that could reduce growth in this sector are its costs, as according to the Center for Public Finance Studies (CEFP, 2016) since the end of 2014, the average costs in this sector have increased, presenting an annual growth of 5.62% in June 2016.

For this reason, it is important to analyze the productivity and efficiency of companies in the manufacturing industry. One of the key indicators for this analysis is the determination of economies of scale, which, unlike the reduction of costs due to technological changes, is presented when there is a reduction of costs given a proportional increase in production. Although economies of scale have become a topic of study in various industries such as oil, steel, electric power, airlines, and financial, in an environment like the current one it is important to generate analyses on how companies can take advantage of economies of scale and become more efficient, providing added value to the industry of each country.

According to a report by HSBC (2016), the mechanical metal sub-sector has a value of 7 billion dollars annually in Mexico, and is made up of 23,120 companies of which 20,100 are microenterprises. The company analyzed in this study is a Mexican subsidiary of one of the largest machinery manufacturers in Japan, which belongs to this sub-sector and serves as an international provider of engineering solutions.

The hypothesis to prove is whether this company, given its structure of costs and production, incurs economies of scale for one family of products of greater sale in Mexico, being the period to be

analyzed from January 2013 to September 2016. Once the presence of economies or diseconomies at scale is determined, an analysis will be performed to determine the causes of this result and provide some suggestions.

The present work makes the following contributions to the literature: initially, it is an article that uses the translog cost function applied to one of the families of products of this company, and secondly, it analyzes the existence of economies or diseconomies of scale in its structure of production, which has not been done in Mexico at the company level.

The remainder of this study consists in five additional sections. In the first section the literature review is presented; then the methodology is described, followed by descriptive statistics. The results are found in the fourth section and in the fifth section the conclusions are found. Finally the references are presented.

1.-Literature Review

In the last decades, the efficiency of production costs has been analyzed in several industries, such as the electric energy industry. Christensen and Greene (1976), in their pioneering study of economies of scale, analyzed electric power companies in the United States by estimating a translog cost function to determine if economies of scale exist in the structure of their production. The authors used a cross-sectional database for the years 1955 and 1970 for 114 companies. The authors found that the decline in the cost of producing electricity in these years was not due to economies of scale but to technological changes in the industry. They concluded that public policies designed to promote competition in this industry do not interfere with economies of scale, so they established that it is not efficient for the production of electric power in the United States to reduce the number of companies.

Clark and Speaker (1994) used data from the income statements and balance sheets of 402 commercial banks in the United States for the year 1989. They estimated a translog cost function to determine if there are economies of scale in the banking industry. The authors found statistically significant evidence that any bank, regardless of the size or products it markets can achieve greater efficiency through economies of scale by increasing the size of its production, which means that its costs would decrease. The authors suggest that small banks should increase the size of their institution in terms of the products they offer (such as deposits and loans), thus improving the efficiency of their productivity.

In a study by Stratopoulos, Charos and Chaston (2000), 25 companies from the US steel industry were analyzed during the period 1990 to 1992. The authors used a translog cost function for their estimation; they used financial ratios as a proxy variable for the prices of the factors of production. The authors found that the profitability of steel companies is inversely related to operational efficiency, that is, as the company becomes more efficient, indicators such as net income and their respective financial ratios are lower.

Another branch of the same banking industry in which this type of efficiency analysis is carried out is that of microfinance institutions. Hartarska, Shen and Mersland (2013) used a panel database for 69 countries during the period 1998 to 2010, obtained from the MicroBanking Bulletin (MBB). The sample contains 989 observations. The authors evaluated the efficiency of the industry through the estimation of the translog cost function to determine if there are economies of scale in the production of microfinance institutions, as well as the elasticity of substitution of the inputs used in this industry (labor, financial capital, and physical capital). The results indicate that the inputs used are inelastic substitutes, that is, that a great change in the price of one is needed to be replaced by another. It was found empirical evidence that microfinance institutions, regardless of the type of products they manage (loans or investments) can generate significant savings in their costs through the expansion of their production.

Recently Bitzan and Peoples (2016) analyzed information on the costs of 61 companies belonging to the United States airline industry, according to the type of service they offer: low-cost and full-service airlines. They used data from the period 1993 to 2014 to decompose changes in costs and

identify which percentage is due to productivity, firm size, technological change, and changes in input prices (such as labor, capital, aircraft fuel and cargo equipment). The authors estimated a translog cost function and found that full-service airlines have experienced decreases of 10% in their average costs, while in low-cost airlines it has increased by 8.5%. As for the decomposition, it was found that for full-service airlines, the increase in the amount of cargo equipment, due to a merger or acquisition, further contributes to the decrease in average costs above the increase in the size of the company. On the other hand, the increase in average costs in low-cost airlines is mainly due to the technological changes used to imitate full-service companies and thus become more competitive.

2 Methodology

A traditional approach to measuring firm efficiency measured as the presence of economies of scale, as well as estimating the price elasticity of its inputs, involves estimating a function of benefits or costs. In the case of this company, it is more convenient to estimate the cost function rather than the profit function, because in some of the products the company has some market power, its prices being non-competitive, while the price of the inputs if it is determined by the market (Varian, 1984).

Economies at scale exist in the company if an increase in production results in a less than proportional increase in total cost (keeping everything else constant). The most common way of expressing economies of scale (EE) is as follows:

$$EE = 1 - \frac{\delta lnC}{\delta lnY}. \qquad (1)$$

Thus, economies of scale are calculated as 1 minus the derivative of the logarithm of costs relative to output. If the result is positive, it would indicate that the company operates under economies of scale, that is, it has increasing returns to scale; while if the result is negative, there would be diseconomies at scale, where an increase in production results in a more than proportional increase in costs (decreasing returns to scale), and finally if the result is equal to 0, there would be yields constants at scale.

The translog cost function to be estimated will take into account the 21 models of one of the company's most sold products during the period from January 2013 to September 2016[1], the initial estimation method being Ordinary Least Squares (OLS). The translog cost function to be estimated will be the one used by Bitzan and Peoples (2016), where each variable normalizes with respect to its mean, in order to obtain the first order conditions to obtain the elasticities evaluated in the mean. The function is defined as follows:

$$ln\left(\frac{C}{\bar{C}}\right) = \alpha_0 + \alpha_Y ln\left(\frac{Y}{\bar{Y}}\right) + \frac{1}{2}\gamma_{YY}\left(ln\left(\frac{Y}{\bar{Y}}\right)\right)^2 + \sum_i \gamma_i ln\left(\frac{P_i}{\bar{P}_i}\right) + \frac{1}{2}\sum_i \sum_j \gamma_{ij} ln\left(\frac{P_i}{\bar{P}_i}\right) ln\left(\frac{P_j}{\bar{P}_j}\right) + \sum_i \gamma_{Yi} ln\left(\frac{Y}{\bar{Y}}\right) ln\left(\frac{P_i}{\bar{P}_i}\right) + \ln V_i \qquad (2)$$

Variables are defined as: C is the actual total cost[2], Y is the quantity produced, Pi are the input prices: raw materials (M), labor (L), real freight cost (F), actual plant operation cost[3] (P) and administrative cost (A).

We suppose that $\gamma_{ij} = \gamma_{ji}$ and that the error term has a normal distribution with zero mean and constant variance.

According to economic theory, a homothetic production structure is restricted to being homogeneous[4] if and only if the cost elasticity with respect to production is constant (Green, 1998). For the translog cost function, the constraints to be homothetic and homogeneous are described as follows:

$$\sum_i \alpha_i = 1, \quad (3)$$

$$\sum_i \gamma_{Yi} = 0, \quad (4)$$

It is also required that the function be symmetrical in the substitution of inputs:

$$\sum_i \gamma_{ij} = \sum_j \gamma_{ij} = \sum_i \sum_j \gamma_{ij} = 0. \quad (5)$$

In order to find the best model to determine if the company operates with scale economies, or scale diseconomies, in addition to Model A (equation 2), we will additionally estimate 3 econometric models that incorporate the aforementioned constraints: Model B imposes the restriction of homogeneity, model C imposes homotheticity restriction and finally model D imposes the constraint of unit substitution elasticity.

The results obtained from the four models (A-D) present problems of multicollinearity, since the costs of the inputs are related to each other, for which it is necessary to obtain the equations of the participation of the cost of each input. To obtain these equations, it is first necessary to obtain the demand function of the factors of production, which is obtained by differentiating the function of costs with respect to the prices of the inputs. According to Shephard's Lemma this function is described as follows:

$$\frac{\delta C}{\delta P_i} = X_i \quad (6)$$

In the logarithmic form it would be as follows:

$$\frac{\delta lnC}{\delta lnP_i} = \frac{P_i X_i}{C} = S_i \quad (7)$$

S_i indicates the participation of the cost of input i in the total cost. Using the translog cost function, we can estimate the cost-sharing equation as follows:

$$S_i = \alpha_i + \gamma_{Yi}\, lnY + \sum_j \gamma_{ij} lnP_j. \quad (8)$$

When all the equations of the inputs involved are obtained, a system of equations formed by equation (2) and (n-1) cost sharing equations (equation 8) will be obtained to avoid perfect colinearity[5]. To improve the efficiency of the parameters, the estimation method will be that of Seemingly Unrelated Equations (SUR) (Green, 1998).

3. Descriptive Statistics

In order to determine whether the company operated under economies of scale or diseconomies of scale, we proceeded to estimate the translog cost function taking into account the 21 models of one of the products of which the company has the largest sale in Mexico during the period of January 2013 to September 2016. The translog cost function will be initially estimated using the Ordinary Least Squares Model.

Table 1 presents the descriptive statistics. The average total cost of the period analyzed is $26,223 dollars (base 2010 = 100) with a standard deviation of $ 22,160.6, this standard deviation is presented since the costs vary according to the weight of the model, which ranges from 25 kilograms to 1.5 tons. Production, on the other hand, presents an average of 32 units and a standard deviation of 49.

Regarding the participation of the inputs in the cost, it is important to mention that the company is an assembly company and belongs to the manufacturing industry, it is specific to the metal-mechanical subsector. Its production is carried out with the work of the operators (hours of labor) with minimal robotic intervention, the sample indicates that the participation of this input in the cost is only 2%. Raw material costs represent on average 61% of the total cost. The remainder consists of freight costs, plant costs and administrative costs and will be considered as the part of the variable costs of the technological change.

Table 1. Descriptive Statistics

Variable	Mean	Standar deviation
Total Cost ($)	26,223.0	22,160.6
Production	31.9	48.8
Participation of the inputs in the cost		
Raw material	0.611	0.067
Labor	0.020	0.014
Freight	0.061	0.011
Plant cost	0.058	0.013
Administrative cost	0.250	0.068

Source: Own elaboration with data of the company.

4.Results

The following table shows the results obtained from the four models. The results of Models B and C indicate that, because the corresponding parameters (specified in equations 3 and 4) are not significant, none of the constraints is consistent with the firm's data. In the case of the constant substitution elasticity constraint (Model D) we find that the coefficients involved in equation 5 are not significant, which was an expected result, since in the case of this company the production process is manual and costs depend largely on the price of raw materials.

Table 2. Results of the Translog Cost Function with OLS

	Models											
Parameter	**A**		**B**		**C**		**D**		**E**		**F**	
α_Y	0.99	***	0.98	***	1.01	***	0.86	***	1.01	***	1.01	***
	(0.05)		(0.00)		(0.00)		(0.03)		(0.01)		(0.00)	
α_M	1.11	***	1.21	***	1.16	***	0.80	***	0.96	***	0.96	***
	(0.12)		(0.11)		(0.11)		(0.02)		(0.02)		(0.02)	
α_L	-0.01		0.17	*	0.13		-0.15	***	-0.04	***	-0.04	***
	(0.08)		(0.06)		(0.07)		(0.01)		(0.00)		(0.00)	
α_F	0.26	*	0.13		0.13		0.15	***	0.02		0.02	
	(0.12)		(0.11)		(0.11)		(0.02)		(0.02)		(0.02)	
α_P	-0.55	**	-0.64	***	-0.63	***	-0.15	***	-0.22	***	-0.22	***
	(0.18)		(0.17)		(0.17)		(0.02)		(0.01)		(0.01)	
α_A	0.55	***	0.57	***	0.54	***	0.28	***	0.28	***	0.28	***
	(0.16)		(0.16)		(0.16)		(0.02)		(0.01)		(0.01)	
γ_{YY}	0.00		0.01	***			0.01	**	0.00			
	(0.00)		(0.00)				(0.00)		(0.00)			
γ_{YM}	0.02						0.05	***				
	(0.01)						(0.01)					
γ_{YL}	0.01	***					0.03	***				
	(0.00)						(0.00)					
γ_{YF}	-0.02						-0.05	***				
	(0.01)						(0.01)					
γ_{YP}	-0.01						-0.02	*				
	(0.01)						(0.01)					
γ_{YA}	0.00						0.00					
	(0.01)						(0.01)					
γ_{MM}	0.00		0.00		0.00							
	(0.00)		(0.00)		(0.00)							
γ_{LL}	-0.05	***	-0.05	***	-0.05	***						
	(0.01)		(0.01)		(0.01)							
γ_{FF}	0.00		0.00	*	0.00	*						
	(0.00)		(0.00)		(0.00)							
γ_{PP}	0	***	0	***	0	***						
	(0.00)		(0.00)		(0.00)							
γ_{AA}	0	***	0	***	0	***						
	(0.00)		(0.00)		(0.00)							
γ_{ML}	0.04		0.03		0.05							
	(0.05)		(0.05)		(0.05)							
γ_{MF}	-0.07	***	-0.06	***	-0.06	***						
	(0.01)		(0.01)		(0.01)							
γ_{MP}	0.07		0.06		0.09							
	(0.13)		(0.13)		(0.14)							
γ_{MA}	-0.09		-0.11		-0.10							
	(0.13)		(0.13)		(0.14)							
γ_{LF}	-0.13	**	-0.15	**	-0.14	**						
	(0.05)		(0.05)		(0.05)							
γ_{LP}	0.15	***	0.22	***	0.20	***						
	(0.04)		(0.04)		(0.04)							
γ_{LA}	0		-0.07	*	-0.07	*						
	(0.04)		(0.03)		(0.03)							
γ_{FP}	0.07		0.09		0.05							
	(0.14)		(0.13)		(0.14)							
γ_{FA}	0		0.02		0.04							
	(0.13)		(0.13)		(0.14)							
γ_{PA}	-0.01		0.01		-0.01							
	(0.02)		(0.02)		(0.02)							
α_0	-0.82	*	-0.93	***	-0.75	**	0.6	***	0.15	**	0.14	**
	(0.34)		(0.27)		(0.28)		(0.08)		(0.05)		(0.05)	
R^2	0.99		0.99		0.99		0.99		0.99		0.99	
N	536		536		536		536		536		536	

Source: Own elaboration with data of the company.

Note: Standard Errors in Parentheses

* p<0.05, **p<0.01,***p<0.001

According to these results, Model A is appropriate for this company, which will be corroborated with the likelihood ratio test when testing each Model (restricted model) against Model A (unrestricted model). The results are presented in Table 3.

Table 3. Test of likelihood ratio

Model		Statistic X^2	
Model B:		37.41	***
	Homotheticity	(0.000)	
Model C:		79.44	***
	Homogeneity	(0.000)	
Model D:		231.75	***
	Elasticity of unit substitution	(0.000)	
Model E:		371.75	***
	Homotheticity and Elasticity of unit substitution	(0.000)	
Model F:		372.02	***
	Homotheticity and Elasticity of unit substitution (Cobb-Douglas)	(0.000)	

Source: Own elaboration with data of the company.

Note: p- values in parentheses

***p<0.001

The results indicate that Model A is adequate to represent the production structure of this company, rejecting the null hypothesis.

Table 4 presents the results of the SUR Model to estimate the non-homogeneous translog cost function and does not require that the elasticity of substitution be constant (Model A). The rest of the results are presented in the appendix.

Table 4. Results of the Translog Cost Function with SUR

Parameter	Model A	
α_Y	1.00	***
	(0.004)	
α_M	0.946	***
	(0.018)	
α_L	-0.026	***
	(0.007)	
α_F	-0.012	
	(0.018)	
α_P	-0.130	***
	(0.020)	
α_A	0.201	***
	(0.017)	
γ_{YY}	0.001	
	(0.002)	
γ_{YM}	0.008	
	(0.003)	
γ_{YT}	0.008	***
	(0.000)	
γ_{YF}	-0.013	
	(0.010)	
γ_{YP}	0.002	
	(0.008)	
γ_{YA}	-0.007	
	(0.010)	
γ_{MM}	-0.002	
	(0.008)	
γ_{LL}	-0.066	***
	(0.011)	
γ_{FF}	0.008	
	(0.007)	
γ_{PP}	-0.036	***
	(0.008)	
γ_{AA}	0.0320	***
	(0.006)	
γ_{ML}	0.023	
	(0.038)	
γ_{MF}	-0.037	***
	(0.004)	
γ_{MP}	0.107	
	(0.100)	
γ_{MA}	-0.104	
	(0.100)	
γ_{LF}	-0.075	**
	(0.037)	
γ_{LP}	0.126	***
	(0.032)	
γ_{LA}	-0.057	**
	(0.027)	
γ_{FP}	-0.011	
	(0.102)	
γ_{FA}	0.031	
	(0.098)	
γ_{PA}	0.013	

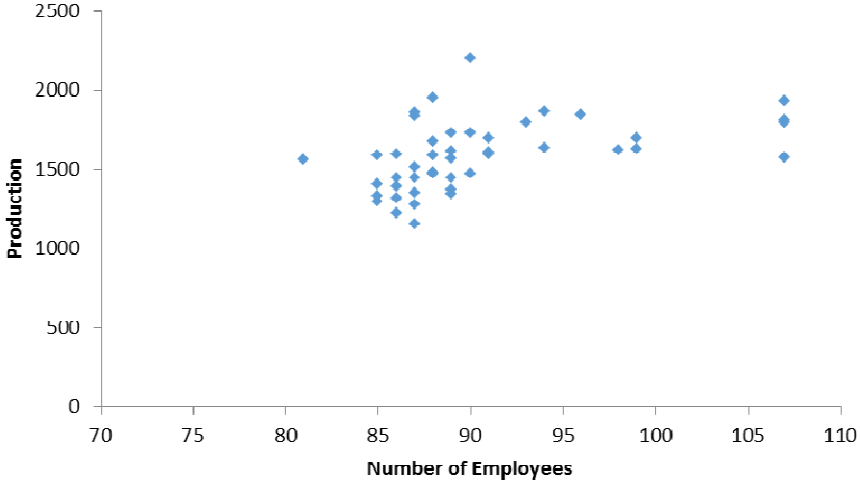
The results indicate that the estimation of the translog cost function shows a good overall adjustment, with an R squared of 99%.

It is found that if the price of raw materials increases by 1%, the total costs of the company increase by 0.95%, while if the administrative costs are decreased by 1%, the total costs would be reduced by 20%. Costs that are less than proportional are labor costs and plant costs, having a coefficient of -0.26 and -0.13 respectively. As expected, the only input that has a direct effect on output is labor. There is also complementarity in labor costs with administrative costs.

From equation (1) we find that the coefficient of lnY is 1.00 and replacing it in the formula EE is 0, which indicates that this company operates with constant economies of scale so doubling the production requires double the costs.

The ideal for any company is to operate under economies of scale, which means that the total cost begins to decrease as production increases. According to Pindyck and Rubinfeld (2013), there are 3 possible ways in which a company could operate with economies of scale: the first is that if the company operates on a large scale, workers could specialize in the activities in which they could to be more productive, for this, at least in the short term, the space of the factory and the machinery should be adequate for the workers to do their work effectively. In the case of this company, the use of machines is minimal, so it will be analyzed that the number of employees is appropriate given the physical space and also their productivity. According to the theory of production, there are an optimal number of workers that minimize costs and this occurs at the point where the marginal product must be equal to the average product.

Graph 1 shows the relationship between the total monthly production and the number of employees of the company in the period of time analyzed.



Source: Own elaboration with data of the company.

Graph 1. Production and number of employees

The graph shows that there is a linear relationship between production and the number of workers, so that as the number of workers increases, production will increase at a constant rate. This makes sense since being a company with minimal machinery intervention; its main factor of production is labor, so its capacity is not limited. In economic terms, the average product per worker is equal to the additional production that is generated by hiring an additional worker.

To obtain the average and marginal product of this company, the total production function will be estimated, that is, without considering the type of model to which the product belongs. The period

considered is from January 2013 to September 2016. It will be taken into account that as there are no workers, there will be no production, so a model without a constant will be considered:

$$y = \beta L + \varepsilon \qquad (6)$$

Variables are defined as: y is the total production of the company; L is the number of workers. It is assumed that the error term has a normal distribution with zero mean and constant variance.

The results are presented in Table 5. For each extra worker, the production increases by 17 units on average. We conclude that the marginal product and the average product are equal, and the number of employees is optimal.

Table 5.- Funtion of production

Variable	Coefficient	
Labor	17.47	***
	(0.03)	
R^2	0.98	
N	45	

Source: Own elaboration with data of the company

Note: Standard Errors in Parentheses

* p<0.05, **p<0.01,***p<0.001

The product is made in three different assembly lines, divided according to the weight of the product and classified in small (from 25 to 60 kilos), medium (from 60 to 350 kilos) and large (from 400 kilos to 1.5 tons). In the case of this company if workers perform repetitive tasks in each line of assembly is very likely to learn from accumulated experience how to perform their work quickly and efficiently, which in theory their costs should decrease with experience. To analyze if this is the case of the company, the following learning curve will be estimated for the period from January 2013 to September 2016.

$$\ln C_t = \alpha + \beta \ln n_t + \delta \ln y_t + u_t \qquad (7)$$

Variables are defined as: C is the actual total cost in month t, n is the cumulative production in month t, and y is the production in month t. It is assumed that the error term is distributed normally with zero mean and constant variance. The results are shown in Table 6:

Table 6.- Learning curve

Variable	Coefficient	
Production	1.05	***
	(0.01)	
Cumulative Production	-0.025	***
	(0.01)	
Contant	6.47	***
	(0.06)	
R^2	0.96	
N	428	

Source: Own elaboration with data of the company

Note: Standard Errors in Parentheses

* p<0.05, **p<0.01,***p<0.001

The results indicate that the parameter of unit cost elasticity with respect to cumulative production is -0.025, and indicates that for every 1% accumulated production increases, the total cost only decreases

0.025%. This would be an area of opportunity for the company, where technology intervention should be considered in terms of automating some processes that reduce costs.

According to Pindyck and Rubinfeld (2013) the second reason why a company can operate with economies of scale is that the management of a company may be able to negotiate the price of inputs for the advantage of operating higher volumes or for an efficient management of its costs. In the case of the company, the raw material is bought from a subsidiary company so there is no negotiation, since prices are determined by the market. In terms of cost efficiency, it was found that this company uses a standard or traditional cost system also known as the traditional cost absorption system. This system is a costing technique employed that seeks a way to distribute indirect costs (Skoda, 2009). Today many companies use this methodology because of their simplicity and good results, and focuses on the distribution of indirect costs (such as consumables, maintenance, depreciation, electricity, water, gas, etc.) using hours of labor or machine time, however, some of the operations can be "punished" at high costs due to this cost distribution. The traditional unit cost perspective used in standard costing is counterproductive because it tends to direct managers' attention to actions at product unit level to consider a price increase, for example, or to reduce direct labor, the materials or the processing of the machines (Cooper and Kaplan, 1991).

What is proposed to analyze whether management of the company is effective is to compare the current cost method with another method of cost taking into account the level of production of the year 2016 to determine if the company is more profitable to consider a new form of cost which gives more analysis and a perspective focused on seeing the processes individually rather than in general, as does the traditional cost system. Specifically, it will compare the rate of return on sales between both methods of costing. The proposed cost method is Activity-Based Costing (ABC). This method was developed with the purpose of improving the use of accounting information, providing management with a more complete picture, such as determining which product is the most profitable and which ones are the areas of opportunity that require supervision (Tsai, et al., 2009).

Among the main characteristics of the ABC model is the identification of the manufacturing activities and the management of consumption resources of each product. According to Tsai et. al. (2009) in the ABC model, the hierarchy of the company's activities is composed of the following categories: unit-level activities (according to the product service unit, for example machining, finishing); activities at batch level (according to batch of products or services, for example configuration, programming); activities at product level (made to benefit all units of a particular product or service, for example product design); and activities at the facility level (according to the manufacturing facility or service, for example, plant protection and management).

The form in which the mentioned categories will be taken into account will be to divide the models that are within a same line of assembly. In the company there are 3 assembly lines according to the weight of the model, which are classified as mentioned above in small (from 25 to 60 kilos), medium (from 60 to 350 kilos) and large (from 400 kilos to 1.5 tons).

It will begin with the calculation of the standard or traditional costing, for which hourly costs are used. The company calculates the total annual total cost of labor, the total annual cost of plant costs, and the total annual cost of administrative and selling expenses, each of these items being then divided by the total time to be spent to be required for annual production. First, to calculate the cost of annual labor, only the basic salary of the operators will be taken into account, without any provision or extraordinary payment, then the calculation is based on the total number of operators for their annual base salary; Second, for the costs of the plant, all its consumables are calculated on an annual basis to be able to operate. This data involves the finance department, maintenance, production, materials, quality, engineering, continuous improvement and plant management. Finally, to obtain the administration and sales expenses, the finance department meets with the department of marketing, sales and human resources to determine this expense, since it is the departments that contribute intangible resources to the organization and, therefore, independent rate for them.

Once the mentioned costs are obtained, it would be necessary to obtain the total time that will be required for the annual production. Table 7 shows the times required for each model.

Table 7.- Times required for each model

Model	Time (Hours)	Model	Time (Hours)	Model	Time (Hours)
A	1.47	H	14.23	O	23.42
B	1.93	I	14.32	P	19.34
C	2.39	J	20.46	Q	12.79
D	4.91	K	26.51	R	22.99
E	4.94	L	24.99	S	46.90
F	5.68	M	35.64	T	33.06
G	7.04	N	18.12	U	26.38

Source: Own elaboration with data of the company

Then, the required time of each product is multiplied by its volume in the year (in this case 2016) and the results are summed to obtain the total amount of available hours of this year, the formula is presented in the equation:

$$Ttotal^{6} = \sum t_i * Q_i \qquad \text{i = model} \qquad (8)$$

The result is 61,495.07 hours available.

Once the process is completed, the company determines the hourly costs for each model i of labor, plant costs and administration and sales expenses according to formulas 9 to 11. With this methodology, they make sure that the cost incurred annually is distributed and covered in each salable unit:

$$MO = \frac{\sum Maintenance\ expenses\ MO_i}{\sum t_i * Q_i} \qquad (9)$$

$$Plant\ OH = \frac{\sum Plant\ OH_i}{\sum t_i * Q_i} \qquad (10)$$

$$SG\&A = \frac{\sum SG\&A_i}{\sum t_i * Q_i} \qquad (11)$$

Derived from these calculations will obtain the costing rates for the models:

Table 8.- Costs according to the Traditional model (TAC) ($ per hour)

Assembly line	MO	Plant OH	SG&A
Model i	$ 2.00	$ 6.51	$ 25.52

Source: Own elaboration with data of the company

Considering the ABC model, the costs were distributed based on the production per assembly line (j) and the required times of each product:

$$MO = \frac{\sum Maintenance\ expenses\ \ MOj}{\sum t_j * Q_j} \qquad (12)$$

$$Plant\ OH = \frac{\sum Plant\ OHj}{\sum t_j * Q_j} \qquad (13)$$

$$SG\&A = \frac{\sum SG\&A\ j}{\sum t_j * Q_j} \qquad (14)$$

j is the assembly line according to the size of the model (small, medium and large line).

The same operations were carried out for each of the groupings, obtaining the costs presented in Table 9.

Table 9.- Costs according to the ABC model ($ per hour)

Assembly line	MO	Plant OH	SG&A
Small	$ 2.43	$ 5.78	$ 22.61
Medium	$ 1.36	$ 5.85	$ 22.29
Large	$ 2.72	$ 19.84	$ 83.52

Source: Own elaboration with data of the company

In order to analyze the difference of apportioning costs between all the models (Traditional Model) and the costs grouped according to the assembly line (ABC Model), we will compare the rate of return on sales[7] obtained for which will be taken into account the sales in 2016 and each of the costing methods. Table 10 presents the results.

Table 10.- Rate of return on sales

Assembly line	TAC	ABC	Difference
Small	10.8%	14.0%	3.1%
Medium	14.1%	18.4%	4.3%
Large	48.3%	34.2%	-14.0%

Source: Own elaboration with data of the company

The results indicate that for models that are manufactured in small and medium assembly lines, considering ABC costing would be beneficial, whereas for large assembly line models it would be the opposite, as these show little sales compared to the other models, and have very high costs, which are amortized using the traditional methodology.

The area of opportunity in this regard, is that the company usually sets its prices based on their costs plus a percentage of utility, so the price of large models would be below what it should be.

The third reason a company can operate with economies of scale is that the company must have flexibility in the use of inputs and thus organize its production process more effectively. According to the results obtained in Table 4, it is observed that there is very little substitution between labor and freight (-0.075) and between labor and administrative cost (-0.057). These results indicate do not present area of opportunity.

5.-Conclusion

The results indicate that given its cost and production structure, in 21 of the models of one of the best-selling products in Mexico during the period from January 2013 to September 2016, the company in this study operates with constant returns to scale.

The elasticities are evaluated in the average value of the sample and indicate the raw materials have a more than proportional effect because if their price increases by 1%, the costs of the company would increase by 0.95% and if the administrative costs are decrease by 1%, total costs would be reduced by 20%

According to Pindyck and Rubinfeld (2013) there are 3 reasons why a company can operate with economies of scale, which were analyzed to find the areas of opportunity for the company to reduce costs as production increases. It was found that in two of the three reasons the situation could be improved: the first is that by analyzing the relationship between the number of workers and production, it is found that the average product is equal to the marginal product, that is, the company operates with a number of efficient workers; however, the learning curve indicates that for every 1%

that accumulated production increases, the total cost only decreases 0.025%, this may be due to staff turnover, however, given the existing technology, certain processes could be automated to improve efficiency. The second reason is that the management of a company could be more effective when using the costing method ABC, which consists of identifying the manufacturing activities and the management of consumption resources of each product according to the assembly line and not in a general way as it does with the traditional costing system. It is found that with the ABC system, the rate of return in the small product line would be 14% compared to 10.8%, and the medium is 4.3% higher when compared to traditional costing.

As mentioned, the manufacturing sector has experienced sustained growth in Mexico, so that this company, as well as the many that belong to this sector, must take advantage of technological and administrative resources of the way in which they operate in the day to day, and thus lower their costs as they increase their production, in other words, operate with economies of scale.

Endnotes

[1] Corresponds to the latest available data provided by the company
[2] Base 2010=100
[3] Includes maintenance, spare parts, consumables (water, electricity, gas), depreciation, quality, etc.
[4] For a fixed level of production, the total cost must increase proportionally when prices increase
[5] $\sum_i S_i = 1$. The equation that will not be taken into account will be S_L the participation of the cost of labor.
[6] *Ttotal* refers to the total time of labor hours available
[7] The rate of return is obtained by dividing the profit on sales.

Appendix

Table 11. Results of Seemingly unrelated regression

Equation	Obs	Parms	RMSE	R-sq	chi2	P	
lnC	536	27	0.0302	0.9992	845013.81	0.000	
Sm	536	5	0.0581	0.3667	265.99	0.000	
Sf	536	5	0.1056	0.4572	476.19	0.000	
Sp	536	5	0.1030	0.3892	473.12	0.000	
Ss	536	5	0.1402	0.4796	700.16	0.000	
Variable dependent	**Variable independent**	**Coef.**	**Std. Err.**	**z**	**P>|z|**	**(95% Conf. Interval)**	
Sm							
	lnY	0.007	0.003	2.55	0.011	0.002	0.012
	lnPl	0.046	0.004	10.34	0.000	0.037	0.054
	lnPf	0.038	0.003	12.19	0.000	0.032	0.044
	lnPp	-0.035	0.006	-6.35	0.000	-0.046	-0.024
	lnPss	-0.017	0.002	-7.87	0.000	-0.021	-0.013
	_cons	1.033	0.005	199.49	0.000	1.023	1.043
Sf							
	lnY	-0.012	0.005	-2.48	0.013	-0.022	-0.003
	lnPm	0.042	0.006	7.15	0.000	0.030	0.053
	lnPl	0.130	0.008	15.58	0.000	0.114	0.146
	lnPp	-0.210	0.013	-16.74	0.000	-0.234	-0.185
	lnPss	0.021	0.008	2.8	0.005	0.006	0.036
	_cons	1.003	0.010	97.47	0.000	0.983	1.023
Sp							
	lnY	0.011	0.005	2.49	0.013	0.002	0.020
	lnPm	0.502	0.034	14.65	0.000	0.435	0.570
	lnPl	-0.075	0.008	-8.8	0.000	-0.091	-0.058
	lnPf	-0.508	0.034	-14.91	0.000	-0.575	-0.441
	lnPss	0.035	0.007	4.98	0.000	0.021	0.048
	_cons	0.950	0.010	99.42	0.000	0.931	0.968
Ss							
	lnY	-0.019	0.007	-2.86	0.004	-0.032	-0.006
	lnPm	-0.340	0.020	-17.41	0.000	-0.379	-0.302
	lnPl	-0.207	0.011	-18.78	0.000	-0.228	-0.185
	lnPf	0.240	0.020	11.95	0.000	0.200	0.279
	lnPp	0.253	0.014	18.24	0.000	0.225	0.280
	_cons	0.901	0.012	72.12	0.000	0.876	0.925

Source: Own elaboration with data of the company

References

Bitzan, J and Peoples, J. (2016). "A comparative analysis of cost change for low-cost, full-service, and other carriers in the US airline industry". *Research in Transportation Economics*, *56*, 25-41.

Centro de Estudios de las Finanzas Públicas (CEFP, 2016). *Boletín: Actividad Industrial.* [Online], [Retrieved July 27,2017], http://www.cefp.gob.mx/publicaciones/boleco/2016/becefp0202016.pdf

Christensen, L and Greene, W. (1976). "Economies of scale in U.S. electric power generation". *Journal of Political Economy*, *84*(4), 655-676.

Clark, J and Speaker, P. (1994). "Economies of scale and scope in banking: evidence from a generalized translog cost function". *Quarterly Journal of Business and Economics*, 3-25.

Cooper, R and Kaplan, R. (1991). "Profit priorities from activity-based costing". *Harvard Business Review.* 69(3), 130-135.

Encuesta Mensual de la Industria Manufacturera (EMIM, 2017). INEGI.

Green, W. (1998). Econometric analysis. Third edition. Prentice Hall.

Hartarska, V, Shen, X and Mersland, R. (2013). "Scale economies and input price elasticities in microfinance institutions". *Journal of Banking and Finance*, *37*(1), 118-131.

HSBC (2016). *Manufacturing scope in 2016.* [Online], [Retrieved July 28, 2017], https://globalconnections.hsbc.com/mexico/es/articles/panorama-de-la-manufactura-en-2016

JP Morgan y IHS Markit (2017). J.P. Morgan Global Manufacturing PMI™. [Online], [Retrieved July 28, 2017], https://www.markiteconomics.com/Survey/PressRelease.mvc/d31eaaaaec984a97b48aa1b224a3e2d2

Pindyck, R and Rubinfeld, D. (2013). Microeconomics (23-65). U.S. Pearson, Prentice Hall.

Skoda M. (2009). "The importance of ABC models in cost management." Annals of the University of Petroşani, Economics, (263-274).

Stratopoulos, T, Charos, E and Chaston, K. (2000). "A translog estimation of the average cost function of the steel industry with financial accounting data". *International Advances in Economic Research*, *6*(2), 271-286.

Tsai, W, Kuo, L, Lin, T, Kuo, and Shen, Y. (2009). "Price elasticity of demand and capacity expansion features in an enhanced ABC product-mix decision model". *International Journal of Production Research*, 48, 6387–6416.

Varian, H. (1984) "The nonparametric approach to production analysis". *Econometrica,*. 52, 579-597

The Rural Area, Land Fund and Restitution of Agricultural Land Property In Romania After 1990

Tiberiu Iancu
Banat University of Agricultural Sciences and Veterinary Medicine, Timisoara, Romania, e-mail address iancutiberiu10@gmail.com

Silvius Stanciu
„Dunărea de Jos" University of Galati, Romania, sstanciu@ugal.ro

Abstract

Romania's rural development experienced a complex evolution after the change of the political regime in 1990, being influenced by the national policies regarding the land fund field and land retrocession to former owners. The process of land investiture of the Romanian farmers was ambiguous, sinuous and difficult to apply. Land property and agricultural land property restitution constituted a process running for over 20 years, which is still not concluded. The paper analyses the evolution of the land fund and agricultural land property law after the 1990's, as well as the rural environment with regard to agricultural land. After the land retrocession law came into effect and was applied, starting with the year 1996, the percentage of privately owned land fund started to increase, reaching over 73.6% in 2007, a constant value up to the present day. The evolution was much more accelerated in the case of private agricultural land, which registered a rapid increase reaching 72 % in 1997 and over 93% in 2014. Deficiencies of the national legislation favoured unsystemised retrocessions, sometimes without complete supportive documents, which generated injustices and abuses, punished in some cases by national and international fora. The fragmentation of agricultural land, also due to the defective system of land realottment of the Romanian farmers, affected the performance of the national agicultural production and favoured the alienation of Romanian land. Measures undertaken by Romanian officials in the field of agricultural land were dictated by social criteria, economic pressure, unprofessional adherence negotiations or momentary political interests.

Keywords: agricultural land, rural, restitution, Romania

Introduction

With a total surface of 238 thousand km^2, representing almost 6% of the total European Union surface and a population of about 19 million inhabitants (circa 4 % of the European population) Romania is the second new European Union member state in terms of size, after Poland. The Romanian territory possesses a generous natural potential, with agricultural land of good quality soils, rich in land and human resources. Up to the present, these advantages observed a limited influence in generating a significant development and restructuring in agriculture and in rural areas. The reconstruction of property right on agricultural and silvan land constituted a difficult pocess in Romania, which is still not concluded. In many cases, land restitution has resulted in damage to a territorial delivery. The structures and functions of the Romanian rural area and restitution of the property right, generated social tensions and conflicts, manifestated at the territorial organization and urbanism organization. The greatest pressure at the level of land areas was felt into the territorial organizations ownership in the vicinity of urban areas, where the high value of lands was determined by the high prices and the great real estate pressure (Rusu et al, 2011). The demarcation of the land for retrocession to the old locations was made by the municipal councils of the administrative-territorial units on which the land is located, the restitution claims being

submitted to the offices of the territorial-administrative organizations. An analysis of the rural development and land restitution could not be achieved without the present territorial organization, focusing on towns, communes and villages.

Short Literature Review

Ienciu, Tudorascu and Oprea (2014), in an analysis regarding the porperty right in Romania, highlight the importance of technical topographic and cadastral expertise, in a complex paper including complex working stages carried out with adequate equipment, in difficult conditions, for the reconstruction of the agricultural property right. Gavrilescu, (1993), performs an analysis of Romania's transition to a market economy, refering to the agri-food production, mentioning the fact that it will be a complex long-term process. Van Meurs (1999), carries into effect a comparative study regarding rural policies during the inter-war, communist and post-communist period in Romania. The author concludes that, in Romania, there was always a tendency for strict state control of the agricultural production, rural environment and property right, no matter the political regimes succeeding each other during the entire 20th century. Romanian political leaders have always opted for the application of short-term solutions to social problems of the rural environment, imposed by political and social pressures, neglecting a parallel approach to the economic and technical aspects necessary for the modernization of the agricultural production. Brooks and Van Meurs (1994), based on surveys carried out in 1991 in România, describe transitional models linked to agricultural land property, comparing individual farms and private property. During the analysed period, homesteads registered a slower reaction in developing competitive markets. However, agricultural associations seemed to be even less receptive to market stimuli, compared to private farmers, slowing down the agricultural sector evolution towards a market economy.

Prosterman and Rolfe (1999), in their research regrding the development of agricultural land markets in Lithuania, Poland, and Romania analyse the legal base of agricultural land transactions, in the context of a potential adherence to the European Union. For each of the analysed countries, agriculture plays an important role in the national economy, and agricultural land represents a resource and porperty right for one- fifth of the population. At Romania's level, the authors underline less ethical aspects of agricultural land acquisition, on the basis of ex-property presumptive rights.

Mihalache and Croitoru (2011), carry out an analysis of the Romanian rural environment, highlighting evolutions as well as involutions, during a research achieved with the help of European funds, in order to promote a specific form of inclusion of persons from the rural environment on the labour market, by supporting training, professional reconversion and entrepreneurial spirit development programs, depending on the target group characteristics. Istudor and Popescu (2016), during a work meating dealing with agricultural policies, land market and property relations in agriculture, which reunited specialists of the Romanian agri-food economy field, perform a complex analysis of the agricultural land situation, major tendencies of alienation to foreign investors and of the national agricultural policies, incoherent, unadapated and inefficient in promoting the national agricultural section.

Material and Method

The research method was that of secondary data collection, published in statistical databases, magazines, magazines, newspapers, books, online portals and other sources. Data-based research has become more and more widespread. As Johnston notes, secondary data analysis is flexible and can be used in many ways, being an empirical exercise and a systematic method based on well-defined procedural and evaluative steps (Johnston, 2014).

The data refering to the approach of the Romanian land fund and rural environment issue were selected from specialty literature, public reports of Romanian bodies in the field (the Ministry of Agriculture and

Rural Development, the National Authority for Property Restitution, the National Institute of Statistics), relevant national legislative regulations, in effect in Romania. The data were processed, graphically represented and interpreted. For an optimal interpretation, where found, the obtained results were compared to relevant data from scientific literature.

The Romanian Rural Area

According ot Law 350/2001 regarding territorial organisation and urbanism, respectively Law 351/2001 regarding the approval of the National Territorial Organisation Plan, from an administrative point of view, at a NUTS 5 level, Romania's territory is organised in 320 localities (of which 103 municipalities, the most important towns), which form the urban area, and 2,861 communes, which constitute the rural area (figure 1). The commune includes one or several villages comprising rural population, and it is organized according to economic, socio-cultural and geographical conditions.

The villages, the smallest administrative-territorial unit, where the mayor office resides, are the commune villages. There are about 13,000 villages in Romania with a slight decrease in the analyzed period.

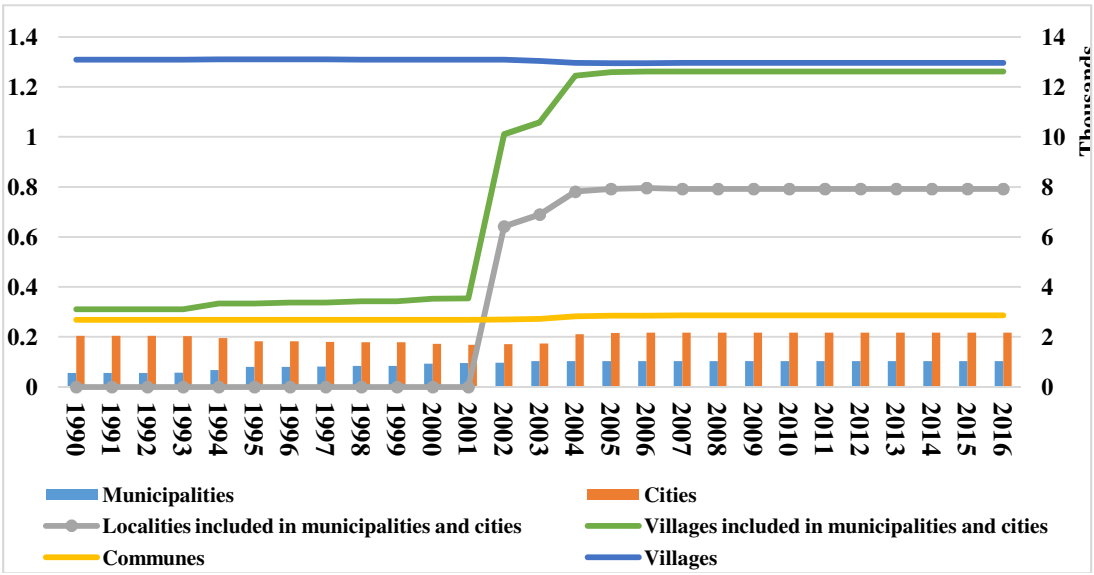


Figure 1: Locality distribution in Romania, on categories

Source Authors, by using NIS data (2017)

Communes are generally formed by several villages, with no administrative responsability. In 2016, in Romania there are 12,957 villages (Management Authority for the National Program of Rural Development AMPNDR, 2012). In order for a commune to become a town, a specific law must be approved. Towns and communes are grouped in counties (NUTS3 level), with administrative functions. The 42 counties are grouped in 8 development regions (NUTS2), with no administrative functions. The rural space represents an extremely complex concept, which generated a great diveristy of opinion regarding its definition, scope and components.

According to Bold, Buciuman and Drăghici's definition (2003), the rural includes activities developing outside the urban, and has three essential components: administrative communities (made up of relatively few members with mutual relations), pronounced poulation and collective services scattering, the special role of agriculture and forestry. Although, from an economic point of view, agriculture and forestry

occupy an important place, the rural sense is larger than agricultural or silvan, comprising other activites as well, such as rural specific industry; handcrafts, productive services refering to agricultural production and non-productive ones specific to the rural population.

After the restitution of the land properties, there is no significant evolution of the number of communes or villages in Romania. An important change can be observed in the evolution of localities included in municipalities and cities, the number of which increased by 400% between 1990 and 2016. A possible explanation of this evolution can be found in the return of agricultural land in the vicinity of towns to owners who have been converted into habitable areas.

Rural areas in Romania cover 87.1% of the country territory, encompassing 47.2% of the population, and 8.98 million inhabitants in 2011 (National Insitute for Statistics NIS, 2017). The Organization for Economic Cooperation and Development (OECD) considers rural settlements those areas, in which the density represents less than 150 inhabitants/km^2. According to this criteria, only the capital and some counties (Ilfov, Prahova, Iași) may fall under the category of urban spaces. The OECD methodology for the rurality notion allows comparisons with other member states. According to territorial distribuition, Romania's populaiton rurality level is much more pronounced than that of other Eu countries, where rural settlements are less populated and at a lower scale, generally considered as an alternative to urban concentrations. Many rural communities contribute in a small way to economic growth, but preserve their social structure and traditional way of life. In relation to the Eurostat data from 2012, citated by AMPNDR (2012), circa 45.5% of the Romanian population resides in rural areas, 43.9% in intermediary regions and10.6% in urban areas. In the context of a continuous demographic decline, the share of urban population in the total population continued to rise to the detriment of the rural population (figure 2).

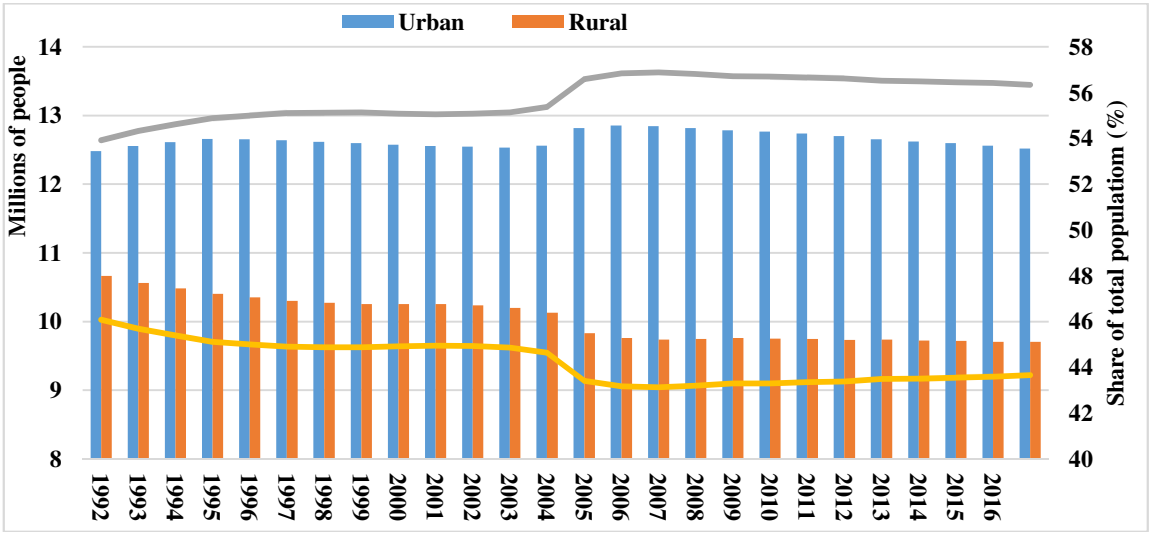


Figure 2: Romania's rural and urban population

Source Author, by using NIS data (2017)

Based on the demographic analysis, it can be seen that the restitution of agricultural land has not led to a revival of the rural population, as expected.

After the change of the political regime in Romania, changes took place in all areas of the economic, social and political life. Based on the measures destined for rural programs developed in Romania, four stages can be outlined in the development of the rural area. The first measure, during the post revolution period, was that of agricultural and forestry land retrocession to former owners, by applying the Land

fund law 18/1991, augmented by the Law 1/2000, followed by the measures undertaken during to Romania's European Union pre-adheration stages, activities towards the integration in the EU structures, and, at present, by the national rural program for the period 2014-2020.

The increase of the competition within the rural sector calls for some actions leading to the economic performance growth and market access for farms, by gaining access to the proper agricultural surfaces, modernizing and restructuring production, increasing the volume of quality agricultural production, or continual stimulation of the processing and commercialization unit modernization. Modernizing and developing the processing sector insures, on one hand, the maintenance of working places and, on the other hand, the creation of new working places (AMPNDR, 2017).

An important influence on the development of the rural environment is that of agricultural land property. Agriculture, the activity that basically defines the rural environment, is facing major problems, given by the large number of agricultural exploitations and the overwhelming percentage of those with no legal personality, wich operate on a 5 hectare surface, and are considered to be the great structural disadvantages of the Romanian agriculture.

The Restitution Of The Private Property Right On Agricultural And Silvan Land In Romania

The restitution of the private property right on agricultural and silvan land in Central and Eastern European countries aimed at creating a private agricultural and silvan sector and rural area market economy. Most ex-communist counries approached the issue of property retrocession in an open, decissive manner, right after the change in political regime and transition to a market economy. Thus, in Albania, Bulgaria, Hungary, Czech Republic and former East Germany, nationalized real estate retrocession laws were adopted before the end of 1993, in Croatia in 1996, and in Makedonia in 1998. Although in Romania, the issue of retrocession of abusive overtaken property was adressed right after the revolution, the problem is far from being resolved.

The world of the Romanian village underwent a continual transformation process after the inter-war period, which led to a change in terms of rural locality specific, as well as the population demographic, occupational and value coordinates. The traditional village went through important structural modifications during the communist regime.

The collectivization process, the massive unrbanization and industrialization of the ′50s-′70s radically transformed the economic activity, life style and customs of Romania's villages, leading to the disappearance of a traditional form of social life organization (Mihalache and Croitoru, 2011).

After the revolution from 1989, The Romanian rural environment entered a new evolution stage, characterized by a ruralization of the country, economic difficulties and the increase in rural heterogenity. The first years after the revolution represented a process of re-rualization of the country, the rural environment and agriculture representing a refuge for population segments affected by the economy restructuring. The urban-rural migration, the de-industrialisation, the overall agricultural employment of the rural population, the practice of subsistance agriculture on a large scale are specific processes for this stage.

During the last 25 years, politicians elaborated a series of laws, governement decisions and other normative acts, in the attempt to reinstate the rights of property nationalization victims of the communist era. The laws regarding land restitution and distribution were accompanied by laws regarding new organization forms in agriculture.

The process started in 1990, when the members of agricultural cooperatives gained property rights over a surface of 0.5 hectares – an increase of the traditional 0.3 hectares lots of the homesteads. This restitution was not based on a principle or law, people working the land just gained a property right for the extra surface, thus commencing the land transfer toward the private sector.

The main legislative norms, issued after the change in political regime in Romania towards the restitution of the land fund property right, were Law 18/1991 and Law 1/2000, later augmented by Law 247/2005, HG 1095/2005, HG 890/2005 and HG 240/2006, respectively Law no. 165/2013. The regulations regarding the restitution of the property right are also specified by Law 10/2001, with ulterior modifications and additons.

The main objective of the Land Fund Law no. 18/1991 was the restitution of private porperty rights regarding agricultural and silvan land. The new Land Fund Law from 1991 lay the foundation for a dual land reform mechanism, based on property right restitution to former owners whose land had been expropriated by the state after the 6th of March 1945, when the first communist regime came into power, and the restitution of land usage rights for those individuals whose land had been administered for years and decades by cooperatives and state farms (World Bank, 2007)

The law adressed cooperative members who brought land to the agricultural production cooperative or from whom the cooperative overtook land, as well as their heirs (Romanian Parliament, 1991). By issuing the law 18/1991, the Romanian peasents were reinstituted with the porperty right over limited surfaces of their land, that is for only 10 hectares, in locations decided by the commissions responsible for the application of the law. These provisions generated abuses of the commissions, who distributed the land as they liked, and a long series of trials.

The second undergoing of land property restitution was regulated by Law no. 1/2000 for the restitution of property rights on agricultural and silvan land, requested in accordance with the provisions of the Land Fund Law no. 18/1991 and Law no. 169/1997, also called Law Lupu (Romanian Parliament, 2000).

According to the regulations of Law no. 169/1997 (a part of the legal project initially proposed by PNTCD representative Vasile Lupu, and adopted with modifications three years later), the owners had to right to request restitutions of up to 50 hectares of agricultural land per family and 30 hectares of forest per family, the actual retrocession being postponed until an ulterior modification provision of the Land Fund Law. However, the law did not command the restitution of the initially owned land. Moreover, according to Digi24 (2017), instead of clarifying the situation, the Law 1/2000 introduced new difficulties in the retrocession process, especially with regard to the problem of restituting the former properties in the same locations. The regulations allowed the mayorhall commissions to decide what and where to restitute. In addition, the lack of cadastre in Romania deepened the problem, according to the former minister of agriculture, Achim Irimescu, mentioned by the quoted source.

The Law 400/2002 refered to the reduction of formalities, but allowed a rapid land investiture of thousands of people only based on lists from 1945 as well as the occurrence of uncertain retrocessions, complaints at CEDO and penal dossiers. According to Horațiu Raicu, general secretary at Agrostar, quoted by the afore mentioned source, a situation was created in which surfaces that had to be restituted became much larger than the ones owned in 1947.

In 2005, Law 247 came, which stated that forests and constructions pertaining to agricultural and silvan land were to be restituted in full, and owners on whose land investments had been placed were to be compensated.

Starting with Law 18 in 1991 until 2007, 11 laws and emergency edicts were adopted in order to regulate the land property, and the bureaucracy prevented many Romanians from getting their rights (DIGI24, 2017).

The legislation was ulteriorly augmented by Law no. 165/2013 regarding the measures for the conclusion of the resttution process, in nature or by equivalent, of the real estate property overtaken in an abusive way during the Romanian communist period. The measures were anounced by the government at the end of 2012, the law coming into effect in May 2013. For a unitary application of the law, the National Authority of Property Restitution ANRP elaborated HG no. 401/2013, which established the procedure for land restitution in the state private and public sector, as well as the procedure to capitalize it in cash the points received as a result of the compensation decision. Starting with October 2013, ANRP began to issue payment titles for the approved dossiers before Law no. 165/2013 came into effect.

A major change operated at the level of the retrocession law referd to the fact that former owners could be compensated with other goods as well, a possibility introduced by Law no. 368/2013, published in the Government Gazette, 1st Part, no. 819 from 21st December 2013 and coming into efect on the 24th of December (Oprea, 2014). Although the law foresaw as resolving deadline the 1st of January 2016, this deadline was postponed until the 1st of January 2017, when the land the local commissions were supposed to use for the finalization of the restitution process, still not restituted to the former owners, would be included in the National fund of agricultural land and other real estate (entitled the National Fund), administered by the Agency for State Property, and will be subjected to point capitalization in accordance with Law no. 165/2013.

According to public data presented by ANRP (2017) refering to the dossiers for the establishment of property right constituted in accordance with the land fund laws, as a result of the decisions taken on the level of county commissions, the Secretariate of the National Commission for Real Estate Compensation (C.N.C.I.), during 1991-2013, 30,356 dossiers were registered, constituted in accordance with the land fund laws. Among these, 21,954 dossiers were resolved, other 5,010 dossiers passing the analysis stage, and, after adding the requested documents, they will be introduced on the agende of C.N.C.I. for the issuance of the decision for compensation/partial validation/invalidation.

A number of 3.200 dossiers was sent back to the local authorities by the Secretariate, either before the occurrence of Law no. 165/2013, for documentation completion, or after the Law no. 165/2013 was issued, at the request of the dossier holders, in order to benefit from restitution in nature. For the complete dossiers, the Secretariate of C.N.C.I., comprised by A.N.R.P. councilors, proposed/will propose to the Commission compensatory measures. As for the other dossiers, with the approval of C.N.C.I, the councilors requested/will request documents which should clearly state the quality of the owner for the requested real estate property, at the date it was taken over by the state; the quality as an heir of the former owner (in the case of the owner's death); the proof of abusive property overtake by the state; the location of the reclaimed property, in order to establish its value in accordance with the notary grid.

The graphical representation of the status of the restitution requests for agricultural and silvan land at a national level is rendered in figure 3. According to the data presented below, over 70% of the filed dossiers have been resolved until the present moment.

After Law no. 165/2013 was issued, the dossiers constituted in accordance with the land fund laws were processed in the strict order of their registration. Until the moment of this documentation, according to public records, all dossiers registered until 30.06.2017 have been analysed.

The land fund property move after 1990 resulted in relatively consecutive start-ups, although without coherence relations, motivated or supported by scientific or strategic criteria. Actions in the field of the land fund market set out ulteriorly and during different periods as compared to the first post December

agrarian reform from 1991. Thus, Istudor and Popescu (2016), mention that the scond agrarian reform, from 2000, took place belatedly, after the enactment of the main actions on the land fund market - land association, leasing and sail.

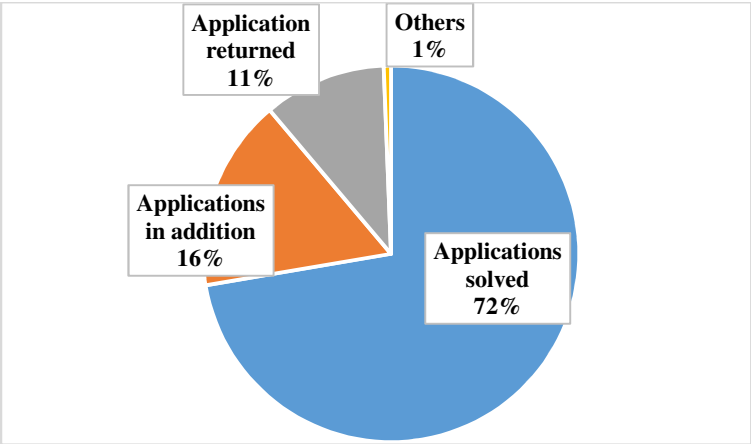


Figure 3: Agricultural land retrocessions resolved on September 1st, 2017
(according to Law 165/2013)
Source Authors, by using ANRP Data (2017)

According to Istudor and Popescu (2016), the restitution of land fund property after 1990 has been inadequate, the main limitations in configuring a durable property regime being the volatile relationing to historical truths; accepting documents for land fund property right restitution based on land measurement units without public homologation/updating; differencial management, by historic regions, of the land fund property; accepting proof with witnesses, because of the lack of public records for the individual restitution of land fund property; deficiencies determined by modifcations occuring in the agricultural landscape and the territorial locality structure; landmark dissolution between individual properties during the communist era, which made lot realignment on old placements almost impossible; occurrence in the legal text of the possibility to restitute land fund property under the formula "usually in the same location", which determined the reactivation of the land fragementation degree from periods anterior to cooperativization; restitution of land fund property only in physical dimensions, and not under the aspect of abstract traits, respectively the natural and economic land value.

These deficiencies in the restitution of land fund property took place on the backgound of preemptory slips, while attempting to solve unbalances caused by decisions based on the social market economy, while, in the Western European area, economic policies based on the neo-liberal doctrine applied. The absence of specific financial instruments which should help stimulate the local entrepreneurship (credits, interests, guaranties, etc.) for land aquisition, affected the position of Romanian entrepreneurs on the land fund market, whose investment capacity was situated under the potential of their EU correspondents.
Romania possesses a land fund surface of 23,839,071 ha, represented according to national statistic data by 14,630,072 ha agricultural land, tillable land 9,395,303 ha, pastures 3,272,165 ha and 1,556,246 ha hayland, in 2014 (figure 4).

Agricultural land represents over 61 % of the total national land fund. On the agricultural category, tillable land predominates (66%), followed by pastures (23%) and hayland (11%), according to the geographic conditions specific to the relief of our country.

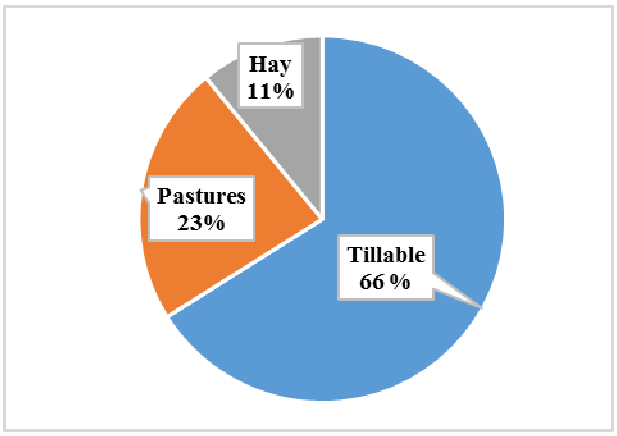


Figure 4: Distribution of the national agricultural surface on land categories
Source Author, by usind NIS Data (2017)

From the point of view of property form, in 2014 over 72% of the total land fund pertains to private property, the rest pertaining to the state (figure 5). The evolution of the land transition from state to private property observed o few main benchmarks. The period 1990-1995, when property title reinstitution represented an incipient process, is characterized by the lack of private land property, showing an insignificant percentage when compared to the state property.

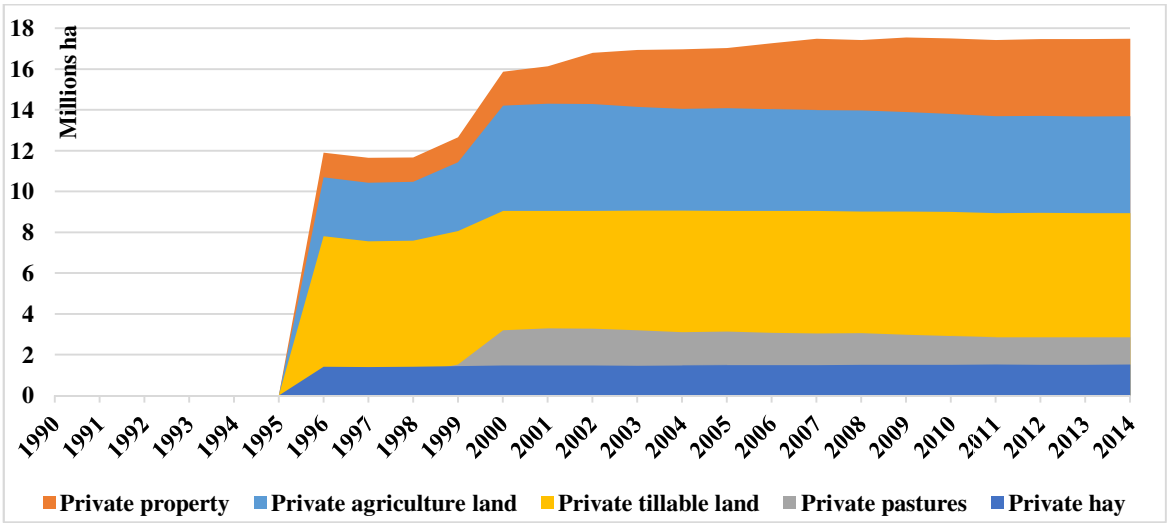


Figure 5: The land fund surface after years and usage, on private property
Source Author, by usind NIS Data (2017)

After the legislation regarding land restitution came into effect and was applied, starting with 1996, the private property percentage started to increase, ranging from 49.94 % in 1996, to 68% in 2000, respectively 73.6% in 2007, a value relatively constant until the present day. The evolution was much faster in the case of private agricultural land, which quikckly registered a 72% percentage in 1996, reaching over 93% in 2014 (figure 6).

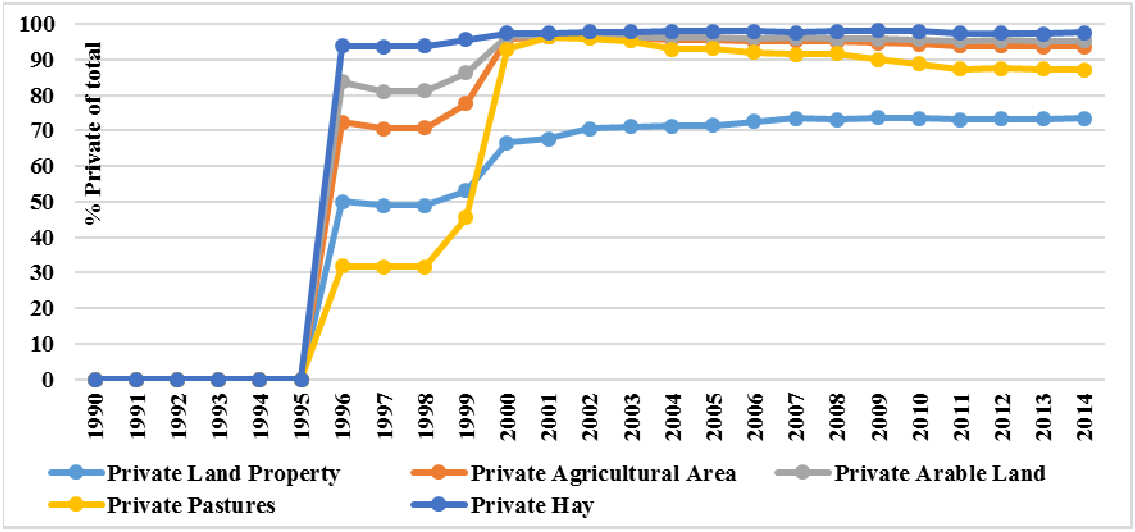


Figure 6: Percentage evolution of private property on land categories

Source Author, by usind NIS Data (2017)

The slowest privatisation process was registered in the case of pastures, whose retrocession percentage started out with 31% in 1996, only reaching 92 % in 2000.

Starting with 2000, the private percentage evolution resembles that of the other agricultural land categories, which achieved a retrocession percentage of over 90%, maintained relatively constant during 2000-2014.

Conclusions

Restitution of land fund property, especially that of agricultural land, represented a difficut process in Romania, devopled during a period of over 20 years, which is not yet concluded. Legal deficiencies favoured unsystemized retrocessions, in some cases without complete supporting documents, generated injustices and abuses, sometimes punished by national and international legal fora. The lack of unitary policies on land restitution without affecting land ownership, accompanied by permissive legislation, has facilitated the fragmentation and acquisition of land by foreign investors.

Until 1995, the restoration of the property was an incipient process.Thus, in the first five years since the change of the Romanian political regime, the private land property represented an insignificant percentage of state property. Since 2000, private property has become a majority with agricultural land. Demographic data have shown that there is a correlation between the return of farmland and development of the rural population, which continued to decline in the period 1990-2017.

As with the majority of situations registered during the last century, Romanian officials did not establish eficient ways to encourage associative forms in Romanian agriculture, protection measures for the local capital and for the growth of economic peformance in the agricultural sector, the decisions taken in the land fund field being dictated by social criteria, internal or international economic pressures or momentary political interests.

References

Autoritatea de Management pentru PNDR AMPNDR, (2012), Analiza socio-economică în perspectiva dezvoltării rurale 2014-2020 [Social-economic Analysis from the Perspective of Rural Development 2014-2020], [online], [Retrieved August 15, 2017], http://www.madr.ro/docs/ dezvoltare-rurala/programare-2014-2020/analiza-dezvoltarii-rurale-agricultura-iulie-2013.pdf.

Autoritatea Națională pentru Restituirea Proprietăților, (2017), Stadiul de soluţionare a dosarelor la data de 11.09.2017 [Dossiers Solution Status on 11.09.2017], [online], [Retrieved September 18, 2017], http://www.anrp.gov.ro/comisia-nationala-pentru-compensarea-imobilelor/38-stadiul-de-solutionare-a-dosarelor/1549-stadiul-de-solu%C5%A3ionare-a-dosarelor-la-data-de-11-09-2017.html.

Bold, I.,Buciuman, E., Drăghici, N., 2003, Spaţiul rural – definire, organizare, dezvoltare [Rural Space – Definition, Organization, Development], Timişoara, Editura Mirton, pp. 15-21.

Digi24 (2017), 1990, anul 0. Restituirea proprietăților, făcută doar pe jumătate. Cum s-a ajuns la plângeri la CEDO și anchete DNA [Property Restitution, Half Resolved. How It Came to CEDO Complaints and DNA Investigations], [online], [Retrieved August 01, 2017], http://www. digi24.ro/special/campanii-digi24/1990-anul-0/1990-anul-0-restituirea-proprietatilor-facuta-doar-pe-jumatate-cum-s-a-ajuns-la-plangeri-la-cedo-si-anchete-dna-441267.

Gavrilescu, D. (1993). Romania facing the European agrifood integration: The shock of transition. In Agricultural Development and Transition. Vilth EAAE Congress, Contributed Papers, Volume F. Stresa, Italy. pp. l5–28.

Ienciu, I., Tudorascu, M., Oprea, L., (2014), The realization of extrajudicial cadastral expertise in Romania, Proceedings of 14th International Multidisciplinary Scientific Geoconference (SGEM), Bulgaria Albena, (June 17-26, 2014), II, pp. 575-581, [online], [Retrieved August 10, 2017], https://apps.webofknowledge.com/full_record.do?product=WOS&search_mode=GeneralSearch&qid=5&SID=Y1sHjt953d9oN9R6CDL&page=1&doc=5.

Istudor, N., Popescu, G.. (coord) (2016), Probleme de politică agrară, Piața pământului. Relațiile de proprietate din agricultură. Editura ASE. București [Agrarian Policyy Problems, Land Market. Agricultural Property Relations], [online], [Retrieved September 25, 2017], http://www.rndr. ro/documente/brosuri/Piata-pamantului-Relatiile-de-proprietate-din-agricultura.pdf.

Johnston, M., (2014), Secondary Data Analysis: A Method of which the Time Has Come, Qualitative and Quantitative Methods in Libraries (QQML) 3:619 –626.

Mihalache, F., Croitoru, A., (2011), Mediul rural românesc: evoluţii şi involuţii. Contract CNCSIS Cod 045/2006 [The Romanian Rural Environment: Evolutions and Involutions. CNCSIS Contract Code 045/2006], Expert Publishing House, București.

Natioanl Institute of Statitics, (2017), Organizarea administrativa a teritoriului, pe categorii de unitati administrative, macroregiuni, regiuni de dezvoltare si judete [Territorial Adminsitrative Organisation, on Administrative Unit Categories]. Tempo online. [online], [Retrieved August 25, 2017], http://statistici.insse.ro/shop.

Oprea, M., (2014), Modificari substantiale la legea retrocedarilor. Restituirea terenurilor catre fostii proprietari a fost amanata [Significant Modifications of the Retrocession Law. Land Restitution to Former Owners Postponed], Avocat.Net.ro (January 07, 2014), [online], [Retrieved August 01, 2017],

https://www.avocatnet.ro/articol_34538/Modificari-substantiale-la-legea-retrocedarilor-Restituirea-terenurilor-catre-fostii-proprietari-a-fost-amanata.html.
Parlamentul României, (1991), Lege nr.18 din 19 februarie 1991, Legea fondului funciar, Textul actului republicat în M.Of. nr. 1/5 ian. 1998, [online], [Retrieved August 25, 2017], http://www.cdep.ro/pls/legis/legis_pck. htp_act_text?idt=1622.

Parlamentul României, (2000), Legea nr. 1/2000 pentru reconstituirea dreptului de proprietate asupra terenurilor agricole și celor forestiere, [online], [Retrieved August 25, 2017], https://lege5. ro/Gratuit/gi3domzz/legea-nr-1-2000-pentru-reconstituirea-dreptului-de-proprietate-asupra-terenurilor-agricole-si-celor-forestiere-solicitate-potrivit-prevederilor-legii-fondului-funciar-nr-18-1991-si-ale-legii-nr-169-19.

Parlamentul României [Romanian Parliament], (2013), Legea nr. 368/2013, Monitorul Oficial, Partea I, nr. 819 din 21 decembrie 2013 [Law no. 368/2013, Government Gazette, 1st part, no. 819 from 21 December 2013], [online], [Retrieved August 25, 2017], https://lege5.ro/Gratuit/gm4 domzrhe/legea-nr-368-2013-pentru-modificarea-si-completarea-legii-nr-165-2013-privind-masurile-pentru-finalizarea-procesului-de-restituire-in-natura-sau-prin-echivalent-a-imobilelor-preluate-in-mod-abuziv-in-&d=2017-05-09.

Rusu, M., Florian, V., Tudor, M., Chitea, M., Chitea, L., Rosu, E., (2011), Land related disputes and conflicts in Romania, Agricultural Economics and Rural Development, New Series, Year VIII/1:127–145.

Van Meurs, W., (1999), Land Reform in Romania – A Never-Ending Story, South-East Europe Review:109 – 122.

World Bank, (2007), România: Raport de evaluare a sărăciei, Programul de asistenţă analitică şi consiliere, Raport faza întâi, Anul fiscal 2007, Cap. IV. [Romania: Destitution Evaluation Report, Program for Analytical Assistance and Councelling, First Stage Report, Financial Year 2017, Chap. 4], [online], [Retrieved August 12, 2017], http://siteresources.worldbank.org/INTROMANIAINROMANIAN/Resources/CapitolulIV.pdf.

Brooks, K., Meurs, M., (1994), Romanian Land Reform: 1991–1993, Comparative Economic Studies, 36(2):17-32.

Prosterman, R., Rolfe, L., (1999), Review of the Legal Basis of the Agricultural Land Market in Lithuania, Poland and Romania, Strucural changing in the Farming Sectors in the Central and Eastern Europe, Second EU Accession Workshop, in the Rural Sector, Warshaw, Poland (June 27-29, 1999), pp. 110-155, [online], [Retrieved August 18, 2017], https://books.google.ro/books? hl=en&lr=&id=-MqOLgY0FsEC&oi=fnd&pg=PA110&dq=RESTITUTION +land+Romania& ots=v_QQ7FIOrD&sig=WmbKLHbqB4o-PlqswxgjbHtFSME&redir_esc=y#v=onepage&q= RESTITUTION%20land%20Romania&f=false.

Moving Towards Social Entrepreneurship In South East Europe: Can We Rate Academic Contribution?

Ivana Bilić
Faculty of Economics, University of Split
Cvite Fiskovića 5, Split, Croatia
E-mail: ibilic@efst.hr

Marina Lovrinčević
Faculty of Economics, University of Split
Cvite Fiskovića 5, Split, Croatia
E-mail: mlovrinc@efst.hr

Abstract

Although it has been introduced a long time ago, social entrepreneurship as a concept has still not been adequately addressed in theory and practice within the East European educational system. In this paper, we analyze the current state of social entrepreneurship in South East European (SEE) universities' and colleges' course syllabi and compare it with the best world practice i.e. US and UK universities. First, we explore previous surveys on social entrepreneurship education conducted in the East European Countries, the US and the UK. Next, we conduct a content analysis of syllabi (targeting both topics and pedagogical approaches) across East European Universities which will allow us to reach an unbiased conclusion on the current state and perspectives of social entrepreneurship education in the SEE region. Our research conclusion was based on the survey results, and at the level of 2% presence in academic syllabuses of SEE universities are very disappointing and showed a serious delay in contemporary entrepreneurship education in contrast to the US.

Keywords: *Social entrepreneurship, Social entrepreneurship education, Syllabi*

1. Literature Background of Social Entrepreneurship Surveys

1.1. ***Introduction***

Entrepreneurship as a concept, career choice or academic education in all post-communist and transition societies has lagged behind West European countries and the US for a variety of reasons. The introduction of entrepreneurship into the academic curricula of the South East European (SEE) countries mostly started in the 21st century with a small number of pioneers in the field. In contrast, US universities saw its introduction in the mid 50's. According to Fayolle (2000), entrepreneurship education at the university level is a rather recent phenomenon in France where it was also introduced in the 1990's. The situation is even worse at our observed research context, i.e. the SEE countries. Not only has entrepreneurship education been introduced rather late, but there is also an evident lack of academic papers regarding the content, approaches, teaching methods and/or the outcomes of entrepreneurship education. Moreover, no research on the presence of Social entrepreneurship (SE) education in the SEE has been conducted yet.

SE as a part of the curriculum was first introduced many years ago. AshokaU and Harvard University introduced SE to the US educational system in the 1970's (Fiet, 2001). Since then, the number of public and private initiatives involved in training and educating people to be more entrepreneurial has multiplied on both sides of the Atlantic (see, for example, Fayolle, 2000).

In the SEE countries, particularly post-communist and transition ones, entrepreneurship and especially SE is still insufficiently included in the society. Furthermore, it is not clear how the Croatian legislation tackles opening and running social enterprises. Although there has been improvement, owing to the Croatian accession to the EU, progress feels slow. Indeed, in 2015 the European Union (EU) commission in its report did not reveal the exact number of existing social entrepreneurs or social enterprises or the existence of a specific legal form designed exclusively for social enterprises in Croatia. When Croatia joined the European Union, the National Strategy for the Development of Social Entrepreneurship was launched in 2015 which, with the adopted legislation, helped a bit those who plan(ned) to be(come) social entrepreneurs.

Hoogendoorn et al. (2011) notice that the majority of research in the field of social entrepreneurship has focused on the definition of social entrepreneurship itself, and with an extensive literature review of the field of social entrepreneurship we discovered many definitions (see Brock et al., 2008; Peredo and McLean, 2006; Tan et al., 2005; Dess, 1998).

Business education for social entrepreneurship is an emerging area of both study and practice (Peredo and McLean, 2006). The review of academic literature shows that there is an evident lack of surveys on entrepreneurial education, and particularly on social entrepreneurship education curricula in the SEE which is the main purpose of this paper. Our paper is organized as follows: 1) literature review of social entrepreneurship education; 2) identifying key educational topics in social entrepreneurship education; 3) identifying key pedagogical and teaching methods used in social entrepreneurship education; 4) collecting social entrepreneurship curricula from the selected SEE countries; 5) content analysis of the collected curricula; 6) presentation of survey results and recommendations.

1.2. Entrepreneurship and Social Entrepreneurship Surveys

Many previous studies explored the effect of entrepreneurial intentions as a subfield within entrepreneurship research (Langer et al., 2016; Linan and Fayolle, 2015; Kruger et al., 2005; Lee and Wong, 2004; Reilly and Carsrud, 2000; Weihe and Reich, 1991; Hills and Welsch, 1986; Shapero 1984; Shapero and Sokol, 1982). Most of the researches focused on Ajzen's (1991) theory of planned behavior (TPB), which was identified as the best predictor of the respondents' future entrepreneurship behavior (Salamzadeh et al., 2013; Iakovleva et al., 2011; Engle et al., 2010; Kruger et al., 2000). Recently Rajh et al. (2016) used the TPB to explore entrepreneurial intention of students in the SEE countries and concluded that the respondents from Bosnia and Herzegovina exhibited a higher level of the entrepreneurial intent. Shaw and Carter (2007) explored the difference and the similarities between the for-profit and non-profit entrepreneurship and found that contemporary practice is similar in most of the topics.

The authors of social entrepreneurship academic papers use several important milestones in the introduction of the term social entrepreneurship: 1) in the 18th century UK industrialist Robert Owen started to protect employees through broader social context of education and inclusion (Shaw and Carter, 2007; Perić and Delić, 2014); 2) the term was introduced in the 1980's by Bill Drayton (Perić and Delić, 2014; Cukier et al., 2011); 3) it was additionally promoted by Muhammad Yunus, the Nobel Peace Prize winner from India (Perić and Delić, 2014; Cukier et al., 2011).

As a new concept in academia and the practice, SE is insufficiently surveyed (Brock and Steiner, 2009). The situation is the same in the SEE countries - entrepreneurship is insufficiently surveyed, (Perić and Delić, 2014). Cukier et al. (2011) conducted content analysis of 567 unique articles from 1987 to 2008 and revealed patterns in researches and confirmed very limited empirical data on the topic, confirming the need for a more rigorous empirical research. Hoogendoorn et al. (2011) confirmed that socially motivated entrepreneurs are less likely to survive the earliest levels of the entrepreneurial engagement. Furthermore, highly educated individuals are more likely to become social entrepreneurs. Austin et al. (2006) conducted a comparative analysis of commercial and social entrepreneurship. Vidović (2012) conducted multiple case studies and interviews with relevant actors in the supportive system, aimed to provide insights into the basic features, aspects, and roles of social entrepreneurship

Wu et al. (2013) conducted Web based survey of the content, learning and teaching methods, professional specialties of the teachers, and grading of the curricula. Salamzadeh et al. (2013) investigated awareness, intentions/support, and the contextual elements among higher education students in the University of Tehran, in order to find the gap(s) in social entrepreneurship education in Iran. Vidović (2012) found that there is an evident lack of SE education in Croatia, where there is not any full program or single curricula and SE was rarely included in general entrepreneurship education, on some universities.

Many authors agree on the manifestation of social entrepreneurship (Salamzadeh et al., 2013; Perić and Delić, 2014; Singer et al., 2011) proposed by Peredo and McLean (2006:64) in situations when an individual (or a group):

1. aim(s) at creating social value, either exclusively or at least in some prominent way;
2. show(s) a capacity to recognize and take advantage of opportunities;
3. create(s) that value ("envision");
4. employ(s) innovation, ranging from outright invention to adapting someone else's novelty, in creating and/or distributing social value;
5. is/are willing to accept an above-average degree of risk in creating and disseminating social value tolerates the risk; and
6. is/are unusually resourceful in being relatively undaunted by scarce assets in pursuing their social venture.

Wu et al. (2013) analyzed the contents of social entrepreneurship education, teaching methods, professional specialties of the teachers, and grading of the curricula. Wiley and Berry's (2015) paper reviewed 16 syllabi for courses taught in US schools of public affairs and administration, largely from schools ranked in the top 30 nationwide. Elmes et al. (2012) examined social entrepreneurship for the academic year 2010-2011 syllabi of selected US and UK universities.

2. Social Entrepreneurship Education

Drucker (2008) sees entrepreneurs as people who are committed to the systematic practice of innovation, not as specific personality. Kuratko (2004) supports the idea that entrepreneurship can be taught and learnt. McMullan (1998) emphasizes the importance of entrepreneurship education. First entrepreneurship course was introduced and offered at Harvard University in 1947 and social entrepreneurship courses were introduced in the late 1990s primarily at business schools, with Stanford, Harvard, Berkeley, Duke, and Georgetown University business schools, among others (AshokaU, 2014) leading the way. Chen et al. (1998) revealed a correlation between students' entrepreneurial intentions and the number of management courses taken by non-management students, while Varela and Jimenz (2001) saw entrepreneurial education initiated by universities as a very important factor.

According to Garavan and O'Cinneide (1994), major challenges of entrepreneurship are appropriate syllabi and training programs. Fayolle (2000) interviewed directors of French business schools and revealed that the introduction of entrepreneurship programs mostly results in 1 – 3 start-ups per year, if the school kept a record of postgraduate success. He also sees a longer history of the entrepreneurship education as an important factor for success. Except education, some other studies (e.g. Salamzadeh et al., 2013) reveal lack of experience and knowledge (63.7%) as a reason for not starting a social enterprise. It is worth mentioning that the real challenge for entrepreneurship education lies within the development of the first two dimensions, i.e. learning for entrepreneurship, rather than learning about entrepreneurship (e.g. Gibb, 2002; Honig, 2004). As a response to the previously mentioned observation, Pache and Chowdhury (2012) emphasized the need to move away from educating 'about' entrepreneurship to eventually educating 'for' entrepreneurship (Kirby, 2004; Fayolle, 2006; Kozlinska, 2011).

There are scholars who argue whether or not social entrepreneurship should be taught as a distinct field and whether it fits into the larger picture in the area of management studies (Austin et al., 2006).

Elmes et al. (2012) surveyed social entrepreneurship curricula from the perspective of place as pedagogical method, proving that an on-site approach enriches education in terms of creative thinking and leveraging the lack of resources. There is no agreement on the best way to teach entrepreneurship to students (Kuratko, 2005; Fayolle et al., 2008) and there has been limited research which has articulated the teaching proficiency associated with attending to both social and commercial focus.

2.1. Key Educational Topics in Social Entrepreneurship Education

The extensive literature review has revealed that some educational topics are typical for social entrepreneurship syllabi no matter in which country the syllabi are proposed. Most common topics are: 1) *social mission/need* (Kumar Sinha et al., 2014; Brock and Steiner, 2009; Alter, 2007; Dees, 1998); 2) *resources allocation* (Brock and Steiner, 2009; Mair and Marti, 2006); 3) measuring *outcomes* (Willey and Berry, 2015; Brock and Steiner, 2009; 4) *opportunity recognition* (Brock and Steiner, 2009; Dees and Anderson, 2003; Shane and Venkataraman, 2000; Timmons, 1999); 5) *sustainable business model* (Willey and Berry, 2015; Brock and Steiner, 2009; Hamel, 2000); 6) *innovation* (Nian et al., 2014; Worsham, 2012; Brock and Steiner, 2009; Austin et al, 2006; Haugh, 2006; Light, 2006; Mair and Marti, 2006; Alvord et al, 2004; Dees and Anderson, 2002); and 7) *social impact* (Brock and Steiner, 2009). Willey and Berry (2015) also found some other topics to be dominant in the SE curricula such as: defining SE, marketing, management, finance, and fundraising.

Fayolle (2000), for example, revealed the importance of pedagogical objectives as influencing factor on students' attitudes towards entrepreneurship. When teaching is structured around clearly identified economic objectives and is focused on the creation of new businesses and employment (the case of seven schools), the rate of new business start-ups among each years' graduating class is between 4 and 5%, as compared to less than 2% for schools favoring purely educational objectives.

2.2. Pedagogical Teaching Methods Used In Social Entrepreneurship Education

Fayolle et al. (2006) noticed the lack of research regarding educational outcomes. Dickson et al. (2008) in their analyses of studies published between 1995 and 2006 found that there is a positive correlation between entrepreneurial education and successful entrepreneurial activity.

The course instructors have a range of options of using lectures, suggested readings, case studies, and biography assignments to facilitate students to develop into social entrepreneurs and the collective use of these pedagogical techniques aids them to analyze social issues from a broader context (Smith and Woodworth, 2012). Dilts and Fowler (1999) tried to show that certain teaching methods (traineeships and field learning) were more successful than others in preparing students for an entrepreneurial career.

It is evident from previous studies that some pedagogical methods are dominant in the proposed social entrepreneurship syllabi such as: 1) *lectures* (Krishna et al., 2015; Nian et al., , 2014; Wu et al., 2013; 2015, Brock and Steiner; 2009); 2) *discussions* (Krishna et al., 2015; Nian et al., 2014; Wu et al., 2013; Brock and Steiner, 2009; Solomon, 2008); 3) *case study* (Krishna et al., 2015; Nian et al., 2014; Wu et al., 2013; Brock and Steiner; 2009); 4) *hands-on projects (interviews/shadowing),* (Krishna et al., 2015; Nian et al., 2014; Brock and Steiner; 2009) 5) *writing a business plan* (Krishna et al., 2015; Nian, Bakar and Islam, 2014; Brock and Steiner; 2009); 6) *providing expertise* (Krishna et al., 2015; Nian et al., 2014; Brock and Steiner; 2009); and 7) *volunteering in organizations* (Krishna et al., 2015; Nian et al., 2014; Brock and Steiner; 2009). In some form, service learning may be included in the curricula - Elmes et al. (2012) introduced a place where education is performed with sponsors as pedagogical method in terms of mentors or role models. Regarding the abovementioned pedagogical methods, it seems that many authors agree that experience should be included in the syllabi in different forms e.g. volunteering in organization, traineeship or service/experiential learning as an important ingredient in SE education.

3. Research Methodology

3.1. Research design and collecting social entrepreneurship syllabi for the SEE universities

In a modest effort to contribute to the social entrepreneurship educational landscape, we address the following specific research questions: 1) existence of SE syllabi at the SEE universities; 2) content of SE syllabi; and 3) pedagogical methods used in SE syllabi, with limitation of our research on the following countries: Croatia, Serbia, Bosnia and Hercegovina, and Montenegro.

In AshokaU's (2014) worldwide survey, research results reveal that only 6% of public schools have SE in its curricula. The existence of SE syllabi in educational institutions is a prerequisite for raising awareness and acquiring knowledge about the possibilities of SE, and encouraging the development of an SE eco-system. However, we need to agree with Robinson and Haynes (1991), the quality of entrepreneurship course offerings remains to be proven in terms of allocation of resources and formalization of course content, or the impact of entrepreneurship education on starting a new business. From the perspective of more developed countries, in the United States there were more than 148 institutions offering courses related to social entrepreneurship in the year 2011 (Kim and Leu, 2011).

For the purpose of this research we selected several SEE countries, namely Bosnia and Herzegovina, Croatia, Montenegro, and Serbia. Although they have been in the transition process since the 1990s they are still struggling with the perception of entrepreneurship as a career choice. Furthermore, despite the growing interest and popularity of social entrepreneurship in academia, politics or economy there is still an evident lack of surveys (Rajh et al., 2016; Perić and Delić, 2014; Vidović, 2012) on entrepreneurship in those countries. With our research, we fill the gap by providing theoretical background on social entrepreneurship education, pedagogical methods, and development of social entrepreneurship syllabi in those countries. Entrepreneurial education can certainly help to resolve the problems of low entrepreneurial activities by being the needed promotion tool (Rajh et al., 2016).

Finally, we do not know of any previous studies, which try to explore the content of SE syllabi in the SEE and pedagogical methods used similar to the one we are planning to conduct. It is only evident from previous studies that some pedagogical methods and some educational topics are dominant in the proposed SE syllabi. Therefore, in this study our efforts will be devoted to drawing attention to those observations.

3.2. Content analysis of the collected syllabi

The World Wide Web presents researchers with a powerful tool for the collection of data and the Web-based survey provides researchers with an efficient and valid method to code the data compared with costs associated with conventional surveying methods. A Web-based content analysis method was applied in order to show how social entrepreneurship is taught in SEE.

This study followed the steps of traditional approach in Web-based content analysis; McMillan (2000) suggested these five steps, (1) The researcher formulates a research question and/or hypotheses. (2) The researcher selects a sample. (3) Categories are defined for coding. (4) Coders are trained, code the content, and the reliability of their coding is checked. (5) The data collected during the coding process are analyzed and interpreted. It is evident from previous researches that some pedagogical methods are dominant in the proposed social entrepreneurship syllabi.

3.3. Research Question and Survey Results

Previous studies revealed as the most presented topics in the syllabi of SE the following topics: social mission (100%), resource allocation (80%), measuring outcomes, opportunity recognition, sustainable business model, innovation (60%), and finally scaling impact as last represented in only

33% of syllabi (Brock and Steiner; 2009). Furthermore, Brock and Steiner (2009) found service/experimental learning and guest speakers in 75% and 30% of syllabi respectively.

Our main research question examined the level of development of the SE syllabi at universities and colleges in the SEE, in line with a well-known practice in terms of educational topics and pedagogical methods. The following seven topics of each selected SE syllabi were surveyed: social mission, resources allocation, measuring outcomes, opportunity recognition, sustainable business model, innovation ad scaling impact, and pedagogical methods.

The main research objective was to analyze the current state and perspectives of the social entrepreneurship education within the selected South East European countries' educational system. For that purpose, a sample was selected – business schools and faculties, both public and private from the republics of Croatia, Bosnia and Herzegovina, Serbia, and Montenegro. These selected countries of SEE are characterized by common heritage principle and a nearly century-old history of living in one state. Moreover, these countries have similar language (once Serbo-Croatian, after the breakup of Federal Republic of Yugoslavia and formation of independent states, took different standard forms – Croatian, Serbian, Bosnian, and Montenegrin which are mutually understandable). The first step of the Web-based survey was to identify relevant institutions - business schools and faculties. For that purpose, official web pages of ministries of education (four ministries respectively) were contacted. Only accredited institutions entered the sample so a total of 106 business schools and faculties, both private and public were analyzed. It should be mentioned that far more business schools are operating in selected countries at the moment but are not all recognized by the relevant ministry of education. Together the selected countries have just under 16 million inhabitants, so 106 business-oriented higher education institutions are rather a lot. The distribution of institutions by country is given in Table 1.

Table 1: Distribution of business schools and faculties by country.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	BH	26	24.5	24.5	24.5
	CRO	35	33.0	33.0	57.5
	MNE	5	4.7	4.7	62.3
	SRB	40	37.7	37.7	100.0
	Total	106	100.0	100.0	

Source: Research results.

It can be seen that the majority of institutions are either from Serbia (37.7%) or Croatia (33%). Just under quarter of institutions in the sample are from Bosnia and Herzegovina and only 5 institutions operate in Montenegro. Nearly half of the institutions (47.2%) are publicly held while 52.8% are privately held.

Then, the orientation of institutions was identified. Two systems of business-oriented programs can be identified in the selected countries - academic and professional. Academic programs are offered exclusively by faculties (180 ECTS credits are assigned for the undergraduate university degree and 300 ECTS credits for the graduate university degree) while professional programs are offered by faculties and business schools (180 ECTS credits assigned for the professional undergraduate degree and 300 ECTS credits for the professional graduate degree). Out of 106 institutions that entered the sample, a total of 76 (71.7%) offer academic programs and 30 (28.3%) offer professional business-oriented programs.

Next, we analyzed if a specialization in entrepreneurship is offered. Out of 106 faculties and business schools, 15 (14.2%) offer a major in entrepreneurship on the undergraduate study level, 15 (14.2%)

offer a major in entrepreneurship on the graduate study level while only 4 (3.8%) offer a specialization in entrepreneurship on the postgraduate level.

The following step of our study was to identify whether social entrepreneurship course is offered and for that purpose 106 faculty and business school's curricula were analyzed. Only 2 faculties (both from the Republic of Croatia) offer a social entrepreneurship course: one on the undergraduate study level and the course is offered as a compulsory one, the other on the graduate study level and the course is offered as elective. Out of these 2 courses, only one syllabus is transparent and available through the web page (it is complete but available only in Croatian version). Course outcomes are outlined as follows:

- To analyze and quantify social entrepreneurship outcomes,
- To analyze the demands of social entrepreneurship on local, regional and national levels,
- To discuss collaboration opportunities between profit and non-profit sector,
- To understand the differences between social and traditional entrepreneurship and the differences between social entrepreneurship and humanitarian work as well,
- To propose social ventures,
- To apply techniques of creative thinking in idea generation,
- To evaluate one's own resources using effectuation theory,
- To evaluate social ventures by developing a business plan.

Teaching methods include lectures and case studies while the final grade is obtained by the exam grade and the assignment (business plan) grade. Suggested reading is in Croatian (only 5 titles) and includes two PhD thesis, two academic papers and one book published by the Government of the Republic of Croatia (NGO department).

Since we were more than encouraged by our findings, we took a step back to investigate the current state of general entrepreneurship education within curricula of business schools and faculties in the selected countries.

Table 2: Institutions offering general entrepreneurship course

BH					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	No	2	7.7	7.7	7.7
	Yes	24	92.3	92.3	100.0
	Total	26	100.0	100.0	
CRO					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	No	7	20.0	20.0	20.0
	Yes	28	80.0	80.0	100.0
	Total	35	100.0	100.0	
SRB					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	No	13	32.5	32.5	32.5
	Yes	27	67.5	67.5	100.0
	Total	40	100.0	100.0	
MNE					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	No	4	80.0	80.0	80.0
	Yes	1	20.0	20.0	100.0
	Total	5	100.0	100.0	

Source: Research results.

As it can be seen from Table 2, a vast majority of business schools and faculties in Bosnia and Herzegovina have general entrepreneurship course in their curricula (92.3%), and situation in Croatia is similar (80% of analyzed institutions have a general entrepreneurship course). There is a slightly bigger proportion of higher education institutions not offering general entrepreneurship course in Serbia (32.5%) while in Montenegro 80% of business schools and faculties do not have general entrepreneurship course in their curricula.

Next level of analysis was to determine the number of courses directly connected to entrepreneurship and the results are given in the table below.

Table 3: Number of courses directly connected to entrepreneurship

BH					
	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Number of connected courses	26	1	4	1.54	.761
Valid N (listwise)	26				
CRO					
	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Number of connected courses	35	1	33	4.54	5.873
Valid N (listwise)	35				
SRB					
	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Number of connected courses	40	1	12	2.20	2.377
Valid N (listwise)	40				
MNE					
	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Number of connected courses	5	1	4	1.80	1.304
Valid N (listwise)	5				

Source: Research results.

As it is evident from Table 3, the number of courses offered by the analyzed higher education institutions, which are directly connected to entrepreneurship, varies from minimum 1 to maximum 33. On average, business schools and faculties from the selected South East European countries offer 3 (mean value 2.79) courses directly connected to entrepreneurship. Having this in mind, our finding that only 2 institutions offer social entrepreneurship course (0.02% of all business schools and faculties in the sample) turns out to be even more disappointing. The reason the maximum number of courses (33) is offered in the Republic of Croatia is the fact that the field of entrepreneurship can be studied from undergraduate through to the PhD level, whereas in other analyzed countries only undergraduate and graduate programs are available.

As the main objective of this research was to investigate the current state and perspectives of social entrepreneurship education in the selected South East European countries, we can conclude, drawing from the presented results, that social entrepreneurship education is not adequately positioned within the analyzed curricula.

4. Recommendations, Discussion and Conslusion

The aim of this paper was to reveal the state of the art in the field of the SE education in SEE. In this survey, content analyses protocols were followed. Although the topic is more than hot in entrepreneurship education, there is an evident lack of the SE syllabi in the SEE education systems. Moreover, we can clearly notice there is a lack of introductory entrepreneurship courses. Our next step, directed to exploring pedagogical methods in SE syllabi, proved to be unnecessary as it did not reveal any representative results regarding it at this point of time. Overall, we found disappointing results on the level of introduction of SE syllabi in the SEE higher education systems.

The polygon of our research, i.e. the selected SEE countries, was definitely our first research limitation, even though when we started this research process we could not even imagine that the introduction of SE was thus neglected. We are very sure that SE as a part of entrepreneurial education will enter the next level during the process of EU accessions for three of the four observed countries.

References

Ajzen, I. (1991): The theory of planned behavior, *Organizational Behaviour and Human Decision Processes,* 50 (2): 179-211.

Alter, S.K., (2007): Social enterprise models and their mission and money relationships, in A Nicholls, ed.: Social Entrepreneurship: New Models of Sustainable Social Change, Oxford: *Oxford University Press*.

Alvord, S. Brown, L. and Letts, C. (2004). Social entrepreneurship and societal transformation: an exploratory study, *Journal of Applied Behavioral Science*, 40(3): 260-282.

AshokaU. (2014): Trends in social innovation education in 2014, Arlington, VA: Ashoka University.

Austin, J., Gutierrez, R., and Ogliastri, E. (2006). Effective management of social enterprises: Lessons from businesses and civil society in Iberoamerica, Cambridge, MA: Harvard University Press.

Austin, J., Stephenson, H., and Wei-Skillen, J. (2006). Social and commercial entrepreneurship: Same, Different, or Both? *Entrepreneurship Theory and Practice*, 30(1): 1-22

Brock, D. D. and Steiner, S. (2009) Social Entrepreneurship Education: Is it Achieving the Desired Aims? (February 16, 2009). [Accessed 7.01.2017] Available at SSRN: https://ssrn.com/abstract=1344419 or http://dx.doi.org/10.2139/ssrn.1344419

Chen, C.C., Greene, P.G. and Crick, A. (1998): Does entrepreneurial self-efficacy distinguish entrepreneurs from managers*?, Journal of Business Venturing,* 13(4): 295-316

Cukier, W. et al. (2011): Social Entrepreneurship: A Content Analysis, *Journal of Strategic Innovation and Sustainability,* 7(1): 99-119

Dees, J.G., and Anderson, B.B. (2003): For-profit social ventures, *International Journal of Entrepreneurship Education (special issue on social entrepreneurship),* 2: 1–26

Dees, J.G. (1998) The meaning of social entrepreneurship, Stanford University: Kauffman Center for Entrepreneurial Leadership, [Accessed 14.01.2017] Available at www.partnerships.org.au/Library/the_meaning_of_social_entrepreneurship.htm

Dickson, P.H., Solomon, G.T., and Weawer, K.M. (2008): Entrepreneurial selection and success: does education matter?, *Journal of Small Business and Enterprise Development,* 15(2): 239-258

Dilts, J.C., and Fowler, S. M. (1999): Internships: preparing students for an entrepreneurship career, *Journal of Business and Entrepreneurship,* 11(1): 51-63

Drucker, P.F. (2008): Clasic Drucker - Essential Wisdom of Peter Drucker from the Pages of Harvard Business Review, Harvard Business School Publishing Corporation, Boston: U.S.

Elmes, M. B. et al. (2012): Teaching Social Entrepreneurship and Innovation from the Perspective of Place and Place Making, *Academy of Management Learning and Education,* 11(4): 533–554, http://dx.doi.org/10.5465/amle.2011.0029

Elms, M. B. et al. (2012): Teaching Social Entrepreneurship and Innovation from the Perspective of Place and Place Making, *Academy of Management Learning and Education,* 11(4): 533-554, doi:10.5465/amle.2011.0029

Engle, R.L., Dimitriadi, N., Gavidia, J.V., Schlaegel, C., Delanoe, S., Alvarado, I., He, X., Buame, S.,

and Wolff, B. (2010): Entrepreneurial intent: a twelve-country evaluation of Ajzen's model of planned behavior, *International Journal of Entrepreneurial Behaviour and Research,* 16(1): 36-58
European Comission report (2015): A map of social enterprises and their eco-systems in Europe, , [Accessed 7.02.2017] Available at http://ec.europa.eu/social/main.jsp?langId=enandcatId=89andnewsId=2149
Fayolle, A. (2000): Exploratory study to assess the effects of entrepreneurship programs on student entrepreneurial behaviours, *Journal of Enterprising Culture,* 8(2): 169-184
Fayolle, A., Gailly, B., and Lassas-Clerc, N. (2006): Assessing the Impact of Entrepreneurship Education Programmes: A New Methodology, *Journal of European Industrial Training*, (30), 701-720
Fiet, J.O. (2001a): The pedagogical side of teaching entrepreneurship, *Journal of Business Venturing,* 16(2), 101-17
Garavan, T., N. and O′ Cinneide, B. (1994): Entrepreneurship education and training programmes: a review and evaluation–part 1, *Journal of European industrial training,* 18(8), 3-12
Gibb, A. (2002): Creating Conducive Environments for Learning and Entrepreneurship: Living with, Dealing with, Creating and Enjoying Uncertainty and Complexity*, Industry and Higher Education,* 16(3): 134-148
Hamel, G. (2000): *Leading the Revolution*, Boston, MA: Harvard Business School Press.
Haugh, H. (2006): A Research Agenda for Social Entrepreneurship?, *Social Enterprise Journal,* 1(1): 1–12
Hills, G. E. and Welsch, H. (1986): Entrepreneurship Behavioural Intentions and Student Independance, Characteristics and Experiences*,* FER, Babson College: Wellesley, MA, 173-186.
Honig, B. (2004): Entrepreneurship Education: Toward a Model of Contingency-based Business Planning, *Academy of Management Learning and Education,* 3(3): 258-273
Hoogendoorn, B. M van der Zwan, P. andThurik, R. (2011): Social Entrepreneurship and Performance: The Role of Perceived Barriers and Risk, Working Paper, Erasmus Research Institute of Management, No. ERS-2011-016-ORG, June 2011.
Iakovleva, T., Kolvereid, L., and Stephan, U. (2011): Entrepreneurial intentions in developing and developed countries. *Education and Training, 53*(5): 353-370
Kim, M., and Leu, J. (2011): The Field of Social Entrepreneurship Education: From the Second Wave of Growth to a third Wave of Innovation, in U. Ashoka and D. Brock, eds.: *Social Entrepreneurship Education Resource Handbook, (pp. 8-9*). Washington DC.
Kirby, D. A. (2004): Entrepreneurship Education: Can Business Schools Meet the Challenge? *Education + Training*, (46): 510-519
Kozlinska, I. (2011): Contemporary Approaches to Entrepreneurship Education, *Journal of Business Management*, (4): 205-220
Krishna, R., Kummitha, R. and Majumdar, s. (2015): Dynamic curriculum development on social entrepreneurship - A case study of TISS, *The International Journal of Management Education,* 13: 260-267
Kruger, N. F., Reilly, M. D., and Carsrud, A. L., (2000): Competing models of entrepreneurial intentions, *Journal of Business Venturing,* 15(5-6): 411-432
Kumar Sinha, P., Pathak, B. and Thomas, S. (2014): Teaching Social Entrepreneurship: Development Through the Juxtaposition of Heart and Head, *Indian Journal of Economics and Business,* 13(3): 331-339
Kummitha, R.K.R., and and Majumdar, S. (2015): Dynamic curriculum development on social entrepreneurship A case study of TISS, *The International Journal of Management Education,* (13): 260-267.
Kuratko, D. F. (2005): The Emergence of Entrepreneurship Education: Development, Trends and Challenges, *Entrepreneurship: Theory and Practice*, (29): 577-597
Langer, J. et al. (2016): Intentions and Perceptions of the Entrepreneurial Career Among Croatian Students: Initial Results of a Longitudinal Empirical Study, in D. Bögenhold et al. (Eds): Contemporary Entrepreneurship Multidisciplinary Perspectives on Innovation and Growth, Springer, pp. 213-228.
Langer, J., Alfirević, N., Pavičić, J., and Krneta, M. (2016): Intentions and Perceptions of the Entrepreneurial Career Among Croatian Students: Initial Results of a Longitudinal Empirical Study in D. Bögenhold, J. Bonnet, M., Dejardin, and D., Garcia Pérez de Lema, eds.: *Contemporary*

Entrepreneurship, (pp. 213-228). Cham: Springer International Publishing. DOI: 10.1007/978-3-319-28134-6_14
Lee, S. H., and Wong, P. K., (2004): An exploratory study of entrepreneurial intentions: a career anchor perspective, *Journal of Business Venturing,* 19(1): 7-28
Light, P.C. (2006): Searching for social entrepreneurs: Who they might be, where they might be found, what they do, *ARNOVA Occasional Paper Series*, 1(3): 13-37.
Linan, F., and Fayolle, A. (2015): A systematic literature review on entrepreneurial intentions: citation, thematic analyses, and research agenda, *International Entrepreneurship and Management Journal, 11*(4), 907-933
Mair, J., and Marti, I. (2006): Social entrepreneurship research: A source of explanation, prediction and delight, *Journal of World Business*, 41, 32-44
Nian, T.Y., Bakar, R., Islam, M., A. (2014): Students' Perception on Entrepreneurship Education: The Case of Universiti Malaysia Perlis, *International Education Studies,* 7(10), 40-49
Pache, A.-C., and Chowdhury, I. (2012): Social entrepreneurs as institutionally embedded entrepreneurs: Toward a new model of social entrepreneurship education, *Academy of Management Learning and Education,* 11(3): 494-510
Peredo, A.M., McLean, M. (2006): Social entrepreneurship: a critical review of the concept, *Journal of World Business*, (41), 56-65
Perić, J. and Delić, A. (2014): Social entrepreneurship in Croatia: Do regional disparities influence young people's perception of social entrepreneurship as a potential career path?, *Ekonomski vjesnik/Econviews,* (1), 81-92
Rajh, E. et al. (2016), Entrepreneurial Intentions in Selected Southeast European Countries, EIZ Zagreb, Working Paper, No. 1609, November 2016.
Robinson, P., and Haynes, M. (1991): Entrepreneurship Education in America's Major Universities, *Entrepreneurship Theory and Practice,* 15(3): 41-52
Salamzadeh, A., Azimi, M., A. and Kirby, D. A. (2013): Social entrepreneurship education in higher education: insights from a developing country*, International Journal of Entrepreneurship and Small Business,* 20(1): 17-34
Segal, G., Borgia, D., and Schoenfeld, J. (2005): The motivation to become an entrepreneur, *International Journal of Entrepreneurial Behaviour and Research,* 11(1): 42-57
Shane, S and Venkataraman, S. (2000). The promise of entrepreneurship as a field of research, *Academy of Management Review*, 25 (1): 217-26.
Shapero, A. (1984): The entrepreneurial event in C.A., Kent, ed.: *The environment for entrepreneurship*. Lexington: Lexington Books.
Shapero, A., and Sokol, L. (1982): Social dimensions of entrepreneurship. in C.A., Kent, D.L., Sexton, and K.H., Vesper, eds.: *Encyclopedia of entrepreneurship* (pp. 72–90). Englewood Cliffs: Prentice Hall.
Shaw E. and Carter, S. (2007): Social Entrepreneurship: Theoretical Antecedents and Empirical Analysis of Entrepreneurial Processes and Outcomes, *Journal of Small Business and Enterprise Development,* 14(3): 418–434
Singer, S., Perić, J. and Delić, A. (2011): Social Entrepreneurship in Croatia: do regional disparities influence young people's perception of social entrepreneurship as a potential career path? Adress given at the NYU Stern Conference of Social Entrepreneurship, New York University – Stern School of businesses, November 2-4, 2011
Smith, I. H., and Woodworth, W. (2012): Engaging the informal economy to educate social entrepreneurs and social innovators, Annual Meeting of the Academy of Management, Boston, MA.
Tan, W. L., Williams, J. and Tan, T. M. (2005): Defining the 'Social' in 'Social Entrepreneurship': Altruism and Entrepreneurship, International *Entrepreneurship and Management Journal*, 1(3): 353. Research Collection Lee Kong Chian School of Business
Timmons, J. A. (1999): New Venture Creation: Entrepreneurship for the 21st century, 5th edition, New York: McGraw-Hill/Irwin
Varela, R. and Jimenez, J.E. (2001): The effect of entrepreneurship education in the universities of Cali, Frontiers of Entrepreneurship Research, Babson Conference Proceedings.
Vidović, D. (2012): Social Entrepreneurship in Croatia. PhD thesis. Zagreb: Faculty of Humanities and Social Sciences, University of Zagreb
Weihe, H. J. and Reich, F. R. (1991). Entrepreneurial Interest Among Business Students: Results of

an International Study, 179-198. (not complete reference) in A., Fayolle (2000): Exploratory study to assess the effects of entrepreneurship programs on student entrepreneurial behaviours, *Journal of Enterprising Culture,* 8(2): 169-184
Wiley, L.K. and Berry, F.S. (2015): Teaching Social Entrepreneurship in Public Affairs Programs: A Review of Social Entrepreneurship Courses in the Top 30 U.S. Public Administration and Affairs Programs, *Journal of Public Affairs Education,* 21(3): 381-400
Worsham, E. (2012): Reflections and Insights on Teaching Social Entrepreneurship: An Interview with Greg Dees, *Academy of Management Learning and Education*, (11): 442-452
Wu, J-C., J. Kuo, T., and Shen, J-P. (2013): Exploring social entrepreneurship education from a Web-based pedagogical perspective, *Computers in Human Behaviour,* (29): 329–334

Research on the Assessment of the Consumer Profile of Fishery Products in Cahul, the Republic of Moldova

Mihaela Munteanu (Pila),
"Dunărea de Jos" University of Galati, Romania, mihaela_pila@yahoo.com

Silvius Stanciu,
"Dunărea de Jos" University of Galati, Romania, sstanciu@ugal.ro

Abstract

The paper aims to describe and analyse the consumption of fish and fish products in the Republic of Moldova. The results of the study can be extended and complemented in order to correspond to the national level. The traditional consumption of fish in Moldova is based mainly on catches made from natural water bodies or on the production from domestic aquaculture. A significant part of the fishery products present on the food market of the Republic comes from imports, the national sector being quite modest lately. The research was made in Cahul City, with a population of about 40,000 inhabitants, representing 1% of the republic population, on a sample of 400 persons, respectively about 0.1% of the total national population. The research shows that there are favourable conditions for increasing the national consumption of fish and for developing the domestic production, given the consumer preferences for indigenous fish species. The development of the national fisheries sector is possible and necessary in view of the natural resources available on the national territory At the same time, proper fishery production can lead to rational consumption, can cause changes in the consumer mentality and attitudes and can positively influence the health of the population. We consider the work to be useful for the academic environment, due to the scientific results obtained, for the business environment for the potential development directions of the market, as well as for the officials from the Republic of Moldova for the restoration of the national fisheries sector.

Keywords: fish, consumption, strategies, Republic of Moldova

Introduction

The fish has been part of the diet of the Romanian population since ancient times. The tradition of fish consumption continues on the national territory throughout the ages, with freshwater fish being the basic food for the population of the Romanian countries. The fisheries sector has an old tradition in Moldova and since the time of Stefan cel Mare there has been a well-developed system of ponds producing fish for consumption (The Gazette of Agriculture, 2009). In the popular gastronomy, freshwater fish was considered ordinary, inexpensive and easy-to-buy food, being frequently consumed especially by the low-income population.

The modern aquaculture of the Republic of Moldova was established in 1945. In the post-war period, almost 30,000 ha of fish-farming reservoirs were created, of which the 12,000-hectare ponds accounted for only 40% of the total. Later on, the fish pond culture became one of the main forms of aquaculture production in the republic. The Moldovan territory has a considerable natural fish potential. Thus, the rivers, lakes and other wetlands cover 95,000 ha (or 2.8% of the country), but only a small part, representing 7.5% of the natural aquatic potential, is exploited in the fisheries. At the national level, only five fish farms with indigenous capital are mentioned as significant for their production level (Zubcov et al, 2013). The vast majority of fish farms carry out an extensive system activity based on the culture of the pond in a polyculture system. Practicing polyculture fish farming is aimed especially at the growth of the carp, the phytophagous species and some species of predators such as the pike, the zander and the European catfish.

In recent years, rivers and lakes have been drained or water has been used in industry, resulting in the pollution and disruption of the biological and aquatic balance. Many species of high economic value fish, such as the shale, the carp, the plaice or the rapacious carp are in danger of extinction in the national waters and the sturgeon can virtually no longer be found (Zubcov et al, 2013). The Moldovan fishing specialists believe that the situation could be saved by building artificial breeding centres of valuable species for the maintenance and development of the natural basins in the Republic of Moldova (Usatîi et al, 2015).

The demands of the Moldovan fish market have evolved over the last period. Thus, from a consumption mainly based on indigenous fishery products, the preferences of the population started to focus on imported products, a tendency especially due to the permanent reduction of the domestic production. At present, there are over twenty enterprises active in the import of fish, processing and wholesale supply, large-scale fish import processors (Curcubet, Domanciuc and Tîmciuc, 2016).
On the market, fish products can be purchased fresh (live or fresh fish), preserved by cold (chilled or frozen fish) or processed (salted, smoked, sterilised), with specialised stores or specially designated areas in markets for the marketing of fishery products**.**

Short Literature Review

Compared to the Republic of Moldova, where there was no national program for the assessment of fish consumption, a series of studies on fish consumption and fish products were conducted in Romania at the national level. For example, the Romfish Study (2013), conducted during 2011-2013, aimed to highlight the consumption trends among the Romanian population. The research was based on a survey based on a multistage cluster, consisting of 800 respondents, with a probability selection of individuals at a tolerable error level of 3.5% and a probability of 95%. The sample was validated on the basis of INSSE 2009 and the Population Census in 2002 (Romfish, 2013). The survey found that 65% of Romanian respondents consume fish because they consider that "eating fish is an important part of a healthy diet", 27% because they think "fish is one of the few foods containing omega 3" and 25% of respondents because they appreciate that fish meat "is a dietetic meat". Nearly 19% of respondents believe that the best fish is the trout, 15% think that the best fish is the carp and only 11% of the interviewed people prefer the salmon. Of the total verified sample, the opinions on the evolution of fish consumption at the national level are balanced. Thus, 36% of respondents said that over the last year the fish consumption has decreased, while 35% of respondents consider that it has increased;

Zubcov et al (2013) presents details of the total production of catches in the natural waters of the Republic of Moldova between 1991 and 2010. The researches aimed especially at the analysis of catches in natural water reservoirs. The highest value of the catch yield was 177 tonnes in 1991 and the lowest quantity of 7 tonnes of fish which was caught in 1998.

The team of researchers directed by Curcubet et al (2016) stated that the per capita biological norm for fish consumption recommended for the Republic of Moldova has an average value of 20 kg/year, while the real consumption of the population reaches only half of this quantity, estimated at 11.9 kg/year. The study concludes that there is a need to increase the national consumption of fish by at least 1.5 - 2 times, so that at least the consumption standard recommended by nutritionists is attained. In addition, the research assessed the correlation between the promotion of aquaculture products on the domestic market and the evolution of the purchasing capacity of the population. The authors recommend, as measures aimed to increase the consumption of indigenous fishery products, to have the price of the indigenous products reduced, mainly on the basis of optimizing production costs and increasing production volumes, to diversify the supply of products produced by the national sector and also to take protectionist measures based on the introduction of special taxes for raising the price of mariculture products. In order to increase the productivity of the national aquaculture sector, researchers carried out a comparative analysis of the adaptation of carp breeds to the national culture conditions. The reduction of the production losses aimed at the use of genetic methods for the prevention of infectious diseases, created and specifically approved to increase the resistance of the cyprinid species to various limiting growth and reproductive factors.

Materials and Methods

Information on fish and fish consumption in the city of Cahul, the Republic of Moldova, was obtained through a market study conducted by the authors of the article. In this direction, a survey based on a questionnaire consisting of a set of 9 open questions was used, applying the CATI survey methodology. The target was represented by 400 questionnaires filled in by the respondents. The SMARTQUEST methodology was used for sampling, which recommended a minimum sample size of 381 respondents for a statistical population of 40,000 inhabitants, as Cahul has, in order to obtain conclusive results. The research was carried out at a tolerable error of 5% and at a probability level of 99%. The proportion of the respondents by gender was balanced (50% of women and 50% of men), respecting the male-female ratio in Cahul. The respondents' age was between 25 and 65 years of age. 2,000 questionnaires were distributed, using the face-to-face direct interview method (500 questionnaires), the mailing method (500 questionnaires), and 1,000 questionnaires were sent via the Internet (email or social networking). The average response rate was 28% (560 completed questionnaires received, of which 280 were direct interviews, 60 postal questionnaires and 220 questionnaires filled in via the Internet). Of the 560 completed questionnaires, 400 were validated. The data collected from the survey were ordered, statistically processed and presented graphically. The results obtained were compared with other data from the literature for an appropriate interpretation.

Summary Data on Fishery Production and Consumption of Fishery Products in the Republic Of Moldova

Current information on the Moldovan fishery sector was collected from the database of the National Bureau of Statistics of the Republic of Moldova, NBS (2013). According to the official statistics, the results achieved by the national economy in 2013 were very good, being materialized in the GDP Gross Domestic Product of 73.3 billion lei. Between January and September 2014, the GDP per resource categories increased by 19.5%. The largest increase was recorded in agriculture, forestry and fishing-fishery (36%), with a contribution of 11% to the GDP growth and 3.7% to the increase of the Gross Added Value (GAB).

According to the data provided by NBS (2017), the Moldovans registered an average annual consumption of fishery products between 11.7 and 16.9 kg/inhabitant during 2006-2016. The evolution of fish consumption in the Republic of Moldova registered an upward trend during 2006-2016, with slight fluctuations between 2009-2011 and 2014-2016 (Figure 1). In the top of the average annual consumption of the fishery products per capita at the European level, Moldova occupies positions higher than Romania, which registered an average of only 5 kg per capita in 2014; than the Czech Republic, with 9.5 kg or Poland, with 12 kg/capita being overtaken by Belgium with an average consumption of 25 kilograms of fish per year, Croatia, 20 kilos, France (35 kilos), Germany (14 kg), Greece (20 kg), Italy (25 kg) or Spain (42 kg). Icelanders consume most fish in Europe, with an average of 90 kilograms/year/resident and the Portuguese, approaching a consumption of 60 kg of fish per year per resident (Iancu, 2014).

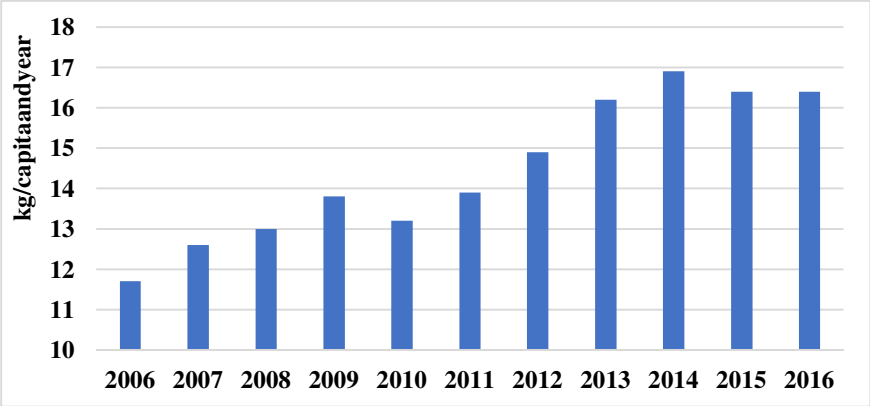


Figure 1: Fish and fish product consumption (kg/capita and year)

Source: Own research, based on the data from the National Bureau of Statistics of the Republic of Moldova, (2016)

The small number of aquaculture farms and the low production of fish farming do not allow the Republic of Moldova to export fish and fish products to other countries. Internal fishery production cannot cover entirely the domestic market, the domestic consumption being dependent on imports from Ukraine, Russia or the European Union. In 2016, the Moldovan imports of fish, crustaceans and molluscs increased by 21.8% as compared to 2015.

The Purpose of the Research

The fishery consumer survey is conducted in order to obtain additional information from the consumers in the city of Cahul about food consumption patterns related to fish consumption. It was assumed that consumers are well-informed, for whom their health and the health of people around them are very important. The paper was based on a survey which, in its turn, was based on a questionnaire interview. Questions were addressed to people who are in charge of purchasing household food and who had purchased fish or fish products in the previous three months. The target is a future consumer education company to promote the consumption of domestic fishery products and the increase of the domestic production, with a reduction in import dependency. The results obtained can be extended to the regional level of the Republic of Moldova, respectively at the national level.

Presentation of the Analysed Area

The town of Cahul is situated on the banks of the Prut River, on the border with Romania. The total area of the municipality is 3,415 ha, of which 2,000 ha of agricultural land and 37 ha of aquatic basins. The city has two small flowing water courses - the Frumoasa River, with a length of 9 km, and the Cotihana with a course of 7.4 km, but the main source of supply of lakes in the area is the Prut River, which flows nearby. The local fish production is estimated at .... tonnes/year

The city has a population of 40,000 inhabitants according to the population census in 2016. The gender share is 51.9% women and 48.1% men; the average income per capita is 5000 Moldovan lei. In terms of the level of education, 42% are people with secondary education, 32% are people with higher education and 26% are people who have completed their compulsory education.

The city has a grocery market with 2 fish areas specially designed for fish sale, a fish shop for fresh fish and fish products and a market for live fish. There is also a supermarket (Fourchette) in the city, with a special area for the sale of fishery products. The fishery products, represented by frozen fish, semi canned or canned fish, can also be purchased from the food stores in the city districts.

Although there are commercial areas specially designed for fish sale, there are fishermen or producers who prefer unfair selling methods (street trade or directly from means of transport).

The offer of fishery products on the Cahul market is generally represented by native fish species (Carp, the Bighead Carp, the Silver Carp), fresh fish (the Carp, the Crucian Carp, the Bighead Carp, the Silver Carp, the Pike, the Zander, the Bream), dried fish from the domestic production, marketed at the stall in the agro-food market and imported fish (fresh, fillet, frozen, smoked) marketed at grocery stores or at the Fourchette Supermarket.

Evolution of Fish Consumption in the City Of Cahul, the Republic of Moldova

According to the data presented in Figure 2, it has been noticed that over the past few years there have been no major changes in fish consumption for 35% of respondents, while for 29% of the consumers interviewed, the consumption has fallen due to high prices or other causes. For some 15% of consumers there has been an increase in the consumption over the last few years. 21% of consumers do not know how/want to answer this question.

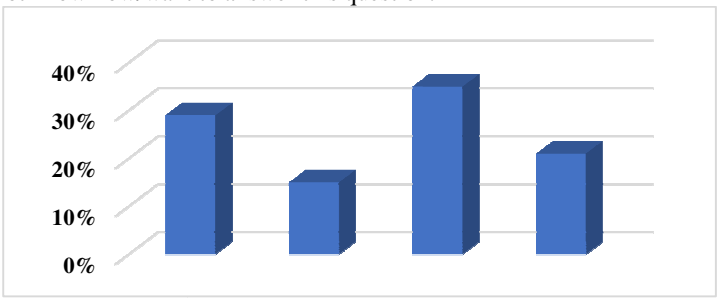


Figure 2: Fish consumption in the Cahul City, Republic of Moldova
The source: Own research.

Considering the low share of consumers who have appreciated the increase in fish consumption, we believe that concerted national efforts are needed to increase the consumption of fishery products in the Republic of Moldova, given the benefits of a fish-based diet and a better use of the potential of the national aquaculture.

Purchase and consumption of fish and fish products

To the question "Where did you last buy fish?" most of the respondents (60%) replied that they bought fish/fishery products from specialised stores (fishmonger's). Almost a quarter of the sample (28%) bought fish in the supermarket, while 9% of the respondents bought fish occasionally from the corner shop. Only a minority of respondents (3%) purchased the products directly from the producer's farm (Figure 3).

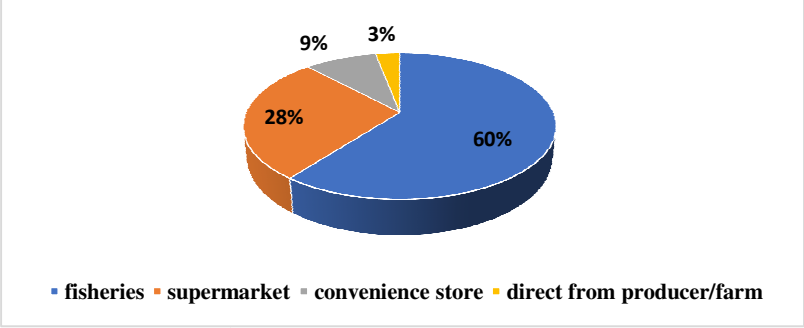


Figure 3: Types of stores for purchasing fishery products. Data for the last purchase
The source: Own research

It can be noticed that the most accessible and preferred places for purchasing fresh fish by the consumer are the specialized shops - the fishmonger's and the supermarket, where the products have adequate sales spaces, as exposure and storage conditions are concerned. The Moldovan consumer is confident in the purchase of fresh fish from specialised commercial premises where there is a control of the officials on the products/producers, the products are fresh and there is a minimum guarantee of quality.

Frequency of consumption

To highlight the consumption frequency of fishery products, the question "How often do you eat fish?" was used. According to the answers received, almost a quarter of the respondents (24%) consume fish once a week or 2-3 times a month (21%). The rest of the respondents rarely consume fish (17% only once a month and 17% less than once a month), while 8% of respondents do not consume fish at all. No respondent consumes fish daily, the diet of the inhabitants of Cahul being relatively diversified (Figure 4)

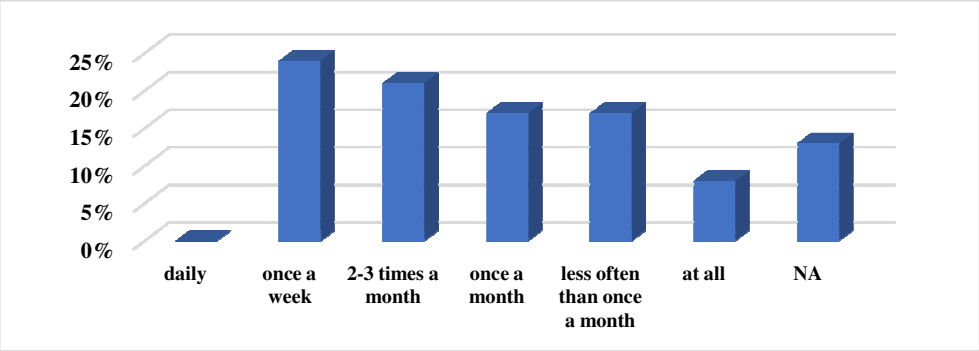


Figure 4: The purchasing frequency of fish and fishery products

The source: Own research

Types of fish commonly purchased

Figure 5 illustrates the consumption of fish and fish products by category. According to the answers received, half of respondents prefer fresh fish and if they can even alive (11%). The other respondents often buy frozen fish (21%), canned fish (9%) or smoked fish (5%). A reduced share of 4% of consumers buys only roe. Food consumption habits are influenced by culture and traditions, being transmitted from one generation to the next.

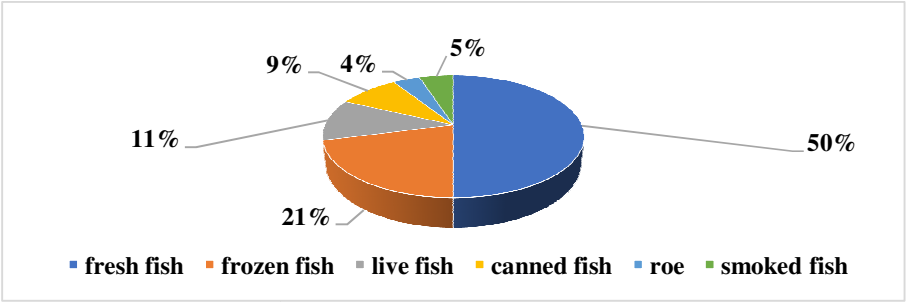


Figure 5: Preferences, habits for a certain type of fish/fishery products

The source: Own research

In the Republic of Moldova fish is consumed less than in other countries. As some consumers claim, the demand for fish and fish products on the market has declined considerably due to high prices.

The quantity of fish at a purchase

Figure 6 shows the average amount of fish purchased by Moldovan consumers in Cahul. In most cases consumers buy about 2 kg of fish per purchase (43% of respondents). Otherwise, the quantities purchased are generally based on family size or tradition, with 3kg bought by over 22% of respondents, or over 3kg by 15% of those interviewed. Quantities of fish below 1 kg are purchased by only 2 % of consumers, especially elderly people.

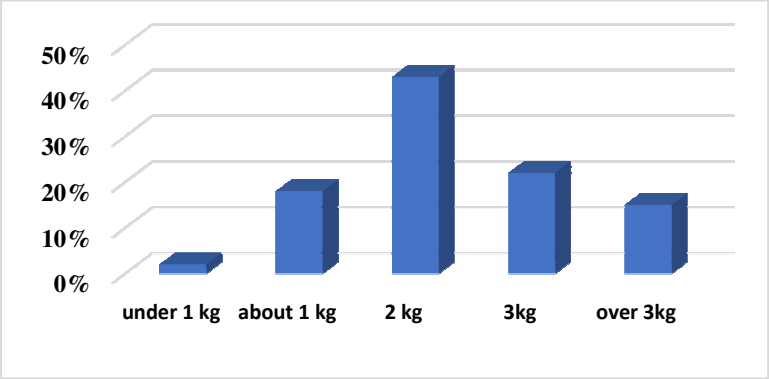


Figure 6: The average quantity of fish for a purchase

The source: Own research

Consumer Preferences for the Respondents' Gender

The largest consumers of fishery products are men, representing 64% of the interviewed sample, while female respondents represent only 36% of the frequent fish consumers (Figure 7).

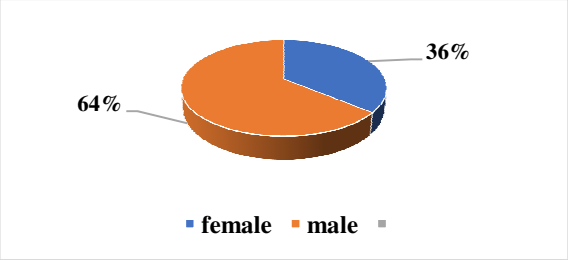
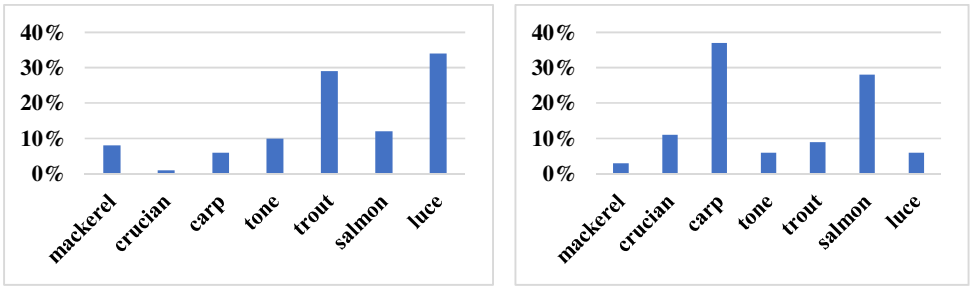


Figure 7: The weight of consumption preferences of fish and fish products by the respondents' gender

The source: Own research.

The species of fish preferred by consumers according to the gender of the respondent

Women generally prefer fish with fewer bones, such as zander, trout, salmon and mackerel. Men do not have special preferences for boneless fish species, often consuming domestically produced fish, the most preferred species being the carp, the salmon or crucian carp (Figure 8).



a) species of fish preferred by women b) species of fish preferred by men

Figure 8: Consumption preferences according to gender

The source: Own research

Consumption of Fish by Age

According to the respondents, it was observed that the interviewed consumers in Cahul had a slight increase in fish consumption with the aging, with the largest consumers being between the ages of 48 and 58 years (figure 9).

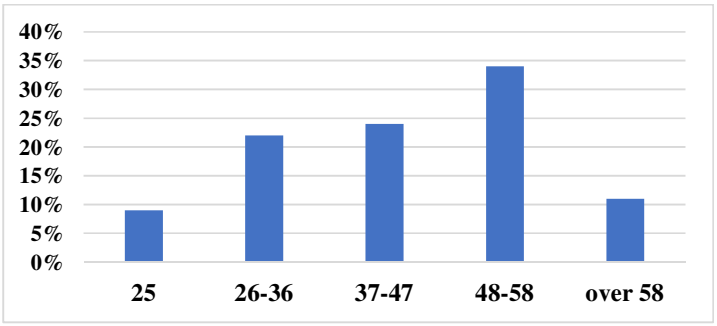


Figure 9: Fish consumption by age categories

The source: Own research

For respondents over the age of 58, a decrease in fish consumption has been observed, probably due to low incomes.

Conclusions

The research implied a market analysis in order to obtain additional information on the consumption of fish and fish products. Based on this questionnaire, information has been collected and solutions have been addressed that will influence the consumer's choice of fish products in the future. The development of production is possible by developing and implementing various new technologies and by expanding the range of fishery products available on the market of Cahul, the Republic of Moldova. Consumers in the city of Cahul prefer primarily fresh or live fish, which must be correlated with the natural resources of the region, rich in lakes, ponds or rivers (the Prut River). The average amount per purchase is about 2 kg of fish. Families in the city of Cahul have an average of 4-5 members, which limits the quantity purchased, and the availability of fresh fish on the market only requires the purchase of a single meal. The main fish consumers are men who prefer native species (carp, zander and crucian carp), while women prefer fish species without bones or less bones (sturgeon, catfish or trout) or fillet fish from the market, without bones (salmon). The age at which most fish is consumed in Cahul, the Republic of Moldova is 48 and 58 years. In most of the completed questionnaires we can see the preference for domestic fish production.

The consumer reaction has a direct impact on the supply and demand of fishery products on the market. According to the market survey carried out, it can be noticed that the interest of the consumers in the consumption of fish and fish products in Cahul town has declined lately, mainly due to the high prices and the low income of the inhabitants. Only a small part of the respondents has a direct link between the promotion and consumption of fishery products. Although it is said that advertising is the soul of trade, it seems that the Moldovan consumer is not so influenced by an excessive promotion of products on the market. This should have an impact on producers or traders, who should not allocate high budgets to the promotion of fishery products with low or unlikely effects. For developing the private sector, the Government of the Republic of Moldova must mobilizes funds from its and from foreign partners. Entrepreneurs benefiting from various grants, subsidies, credit schemes, are able to develop their business, to increase significantly the quality and the ability to export local products, thus becoming more competitive by creating new jobs. External development partners for the Republic of Moldova for the fisheries sector could be BERD, the World Bank, Austria, Switzerland, Norway, Turkey, but the main donor being EU.

It is recommended to create a national strategy to support the Moldovan fisheries sector, based on the protection of the natural fishery, to increase the share of aquaculture, to develop and implement modern technologies that will lead to the diversification of indigenous fishery products on the market and to the consumption demand. It is necessary to maintain a permanent communication between fish farmers and consumers, because correct and timely information from producers stimulates the production and directs it towards certain products demanded by the market.

The study is part of a wider research on fish consumption in the Republic of Moldova, which aims to increase domestic consumption and domestic fish production, with a reduction in import dependence, whose weight on the market of the country has increased significantly lately.

References

National Statistical Database Moldova, (2006-2016), Consumption of main food by medium, [Consumul principalelor produse alimentare pe medii], [online], [Retrieved September 21, 2017], http://statbank.statistica.md/pxweb/pxweb/ro/30%20Statistica%20sociala/30%20Statistica%20 sociala__04%20NIV__NIV060/NIV060100.px/?rxid=b2ff27d7-0b96-43c9-934b-42e1a2a9a774.

National Statistics Bureau,, (2016), Foreign trade of the Republic of Moldova in January-November. [Activitatea de comerț exterior a Republicii Moldova în ianuarie-noiembrie], [online], [Retrieved September 22, 2017], http://www.statistica.md/newsview.php?l=ro&idc=168&id= 5492&parent=0.
Curcubeț, G., Domanciuc, V., Tîmciuc, I., (2016), Aquaculture of Moldova: Evolution and potential [Acvacultura Moldovei: Evoluție și potential], Akademos 2/2016:103-108.

Food and Agriculture Organization FAO, (2002-2005), National Aquaculture Sector Overview, Republic of Moldova, [online]. [Retrieved September 19, 2017], http://www.fao.org/fishery/ countrysector/naso_moldova/en.

The Gazette of Agriculture, (2009), Fish consumtion in Romania [Consumul de pește în România], [online], [Retrieved September 19, 2017], https://www.gazetadeagricultura.info/animale/pesti/2974-consumul-de-peste-in-romania.html.

Iancu, L., (2014), Romanians consume twice less fish than in Communism and are in last place in the EU, [Românii consumă de două ori mai puțin pește decât în comunism și sunt pe ultimul loc în UE], Mediafax.Ro (December 21, 2014), [online], [Retrieved September 07, 2017], http://www.mediafax.ro/economic/romanii-consuma-de-doua-ori-mai-putin-peste-decat-in-comunism-si-sunt-pe-ultimul-loc-in-ue-13706654.

Romfish, (2013), Study-consumption habits fish and fish products, [Studiu–obiceiuri de consum pește si produse din pește], [online]. [Retrieved September 20, 2017], http://www.romfish.ro/

data/_editor/ Raport_Obiceiuri% 20consum%20% 20Peste%20 si%20produse%20din%20peste% 20partea %201.pdf.

SMARQUEST, (2017), Aplicatii de calcul. Dimensiunea esantionului, [online], [Retrieved September 19, 2017], http://www. smarquest.ro/ro/resources.html

Stratan, A., Ceban, A., Ceban, A., Tinofei, O., Popa, V., Iatiţin, T., Novac, A., Colesnicova, T., (2013), Trends in Moldova's economy, [Tendințe în Economia Moldovei], Institutul Naţional de Cercetări Economice, Chișinău, [online], [Retrieved September 22, 2017], pp 116, https://ince.md/uploads/files/1470723520_met_21_ro_site.pdf.

Zubcov, E., Usatîi, A., Curcubet, G., et al., (2013), Review of fishery and aquaculture development potentials in the Republic of Moldova, FAO Fisheries and Aquaculture Circular No. 1055/3. Rome, [online]. [Retrieved September 19, 2017], http://www.fao.org/3/a-i3326e.pdf.

Usatâi, M., Usatâi, A., Toderaș, Șaptefrați, N., (2015), Atlas, Fish of Moldova, [Atlas, Peștii apelor Moldovei], [online]. [Retrieved September 13, 2017], pp 191, https://ru.scribd.com/doc/ 306514376/ ATLAS-Pestii-apelor-Moldovei.

Knowledge Management Based on Expert Systems

Cezar Braicu, Hyperion University, Bucharest, Romania, cezar_braicu@hotmail.com

Radu Bucea-Manea-Tonis, Hyperion University, Bucharest, Romania, radub_m@yahoo.com

Rocsana Bucea-Manea-Tonis, Spiru Haret University, Bucharest, Romania, rocsense39@yahoo.com

Abstract

Knowledge management rests on information systems such as Decision Support Systems (DSS) and Expert Systems (ES). This paper focuses on ES, described as formal systems based on Well Formed Formulas (WFF), axioms and inference rules. The basic axioms gathers explicit codified knowledge like regulations, codes, processes, copyrights and patents into a knowledge database, the first component of the ES. The valid well formed inference rules are evaluated by forward chaining (if…then patterns) by the inference engine, the second ES component. Those two united components forms a deductive apparatus fueled by the organization intellectual capital.

Keywords: knowledge management, expert systems, predicate logic, rules of inference, well formed formula.

Introduction

Current technologies, the spread of internet connections, on the one hand and the limited resources (financial, natural, human), on the other hand determined the modern managers to use efficient tools in order to make decisions in real time, based on scientific knowledge management models. Over the past decades, changes have also been made in organizational management, both in managerial thinking and managerial practice. According to the new theory, the organization is a system of elements in strong interaction with the environment. Choosing the right model is not easy, but with the support of AI (artificial intelligence) had been developed inference engines that guide the managers in juggling with more and different types of variables. Expert Systems (ES) are the result of scientific research in AI in the struggle to catch the rule-based knowledge representations. ES has been used with success in the management decision support for a long time. ES are used to make it more efficient human resource management needs, production resources need, marketing (promotion and distribution) activities, accounting, finance, nutrition care process, intelligent energy-efficient green buildings etc. The managerial decision must thus maximize the effect / effort ratio to lead to greater economic effects on the total resources used.

Literature Review

It is believed that Panini is the father of the formal systems, writing his masterpiece between the 5th and the 6th century BC. Ashtadhyayi is a treatise on Sanskrit grammar in eight chapters that is generative, meaning that it is capable of expressing a potential infinity of well-formed Sanskrit sentences starting from a finite symbolic inventory. The grammar in Ashtadhyayi seems like an idealized mathematical model that reduces the logical structure to its essentials. Panini's great work was compared with Turing's Automata, making complex use of meta-rules, transformations, and recursions.(Fig.1)

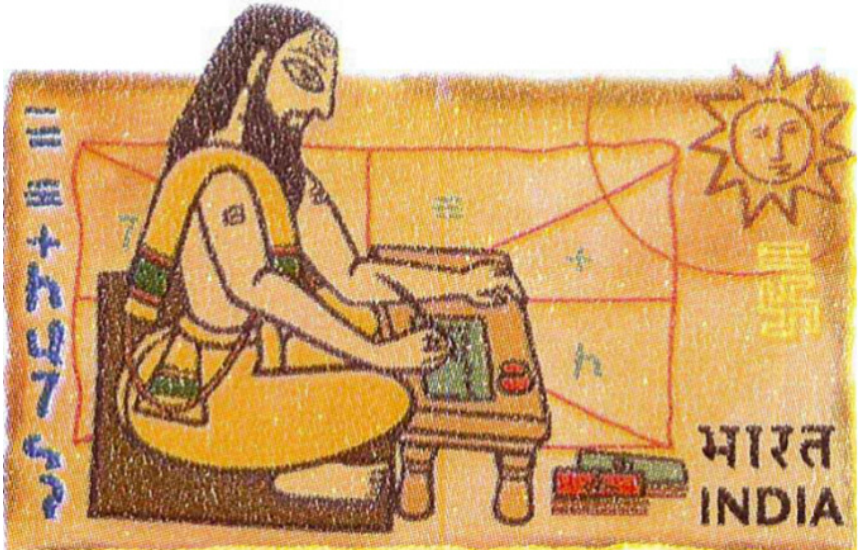


Fig.1: Panini stamp, [Satyavedism]

As Wagner observed diagnostic expert system applications continue to be the most popular [Wagner 2017]. Very efficient ES had been the result of finding solution on synthetic type problem domains such as design and planning. The spread of ES in decision making is studied by Wagner in a complex analyze on 311 ES case studies dating from 1984 through 2016 (Fig.2).

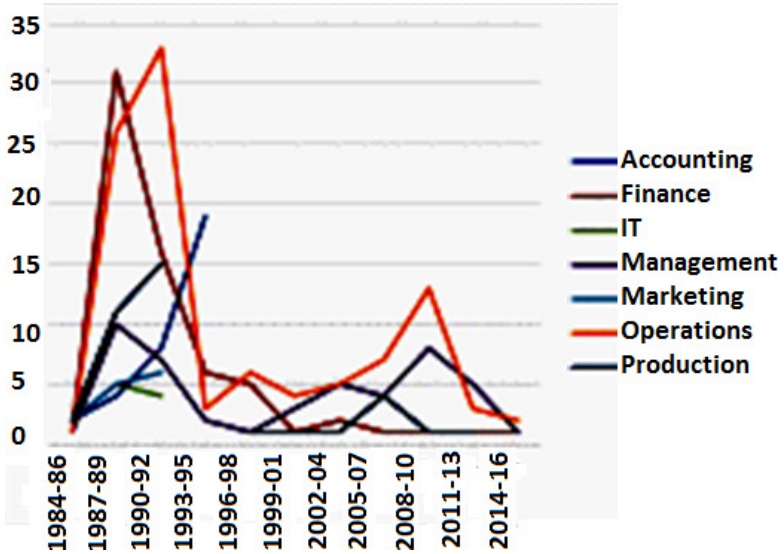


Fig. 2: ES evolution from 1984-2016 in different activity domains [Wagner 2017].

An example of tools to experts in real enterprise environments, either for evaluation of employees towards an optimal job assignment and vocational training or for recruitment processes based on a competence model (Professional, Innovative and Social competence tree) is presented in [Bohlouli, 2017].

An example for nutrition care process and planning is presented by [Cioara, 2017]. An inference engine is developed over a taxonomically organized knowledge base, providing mechanisms for evaluating defined rules for aging behavior of the elderly in the short and long term, in order to identify unhealthy food patterns and to detect the early establishment of malnutrition. The system provides personalized intervention plans covering nutrition education, diet prescription and food ordering

An intelligent energy-efficient outdoor lighting control system for green buildings based on ES is described by [Atis, 2016]. It contributes to the reduction of carbon dioxide emissions by using more conservation of electric energy and daylight more efficiently. During the evaluation period an average of 33% conservation was achieved in energy consumption.

AI technologies expand continuously over new fields of research from machine learning based on neural networks to image recognition based on hundreds of raw pictures of the given target, as may be seen in the picture bellow (Fig.3):

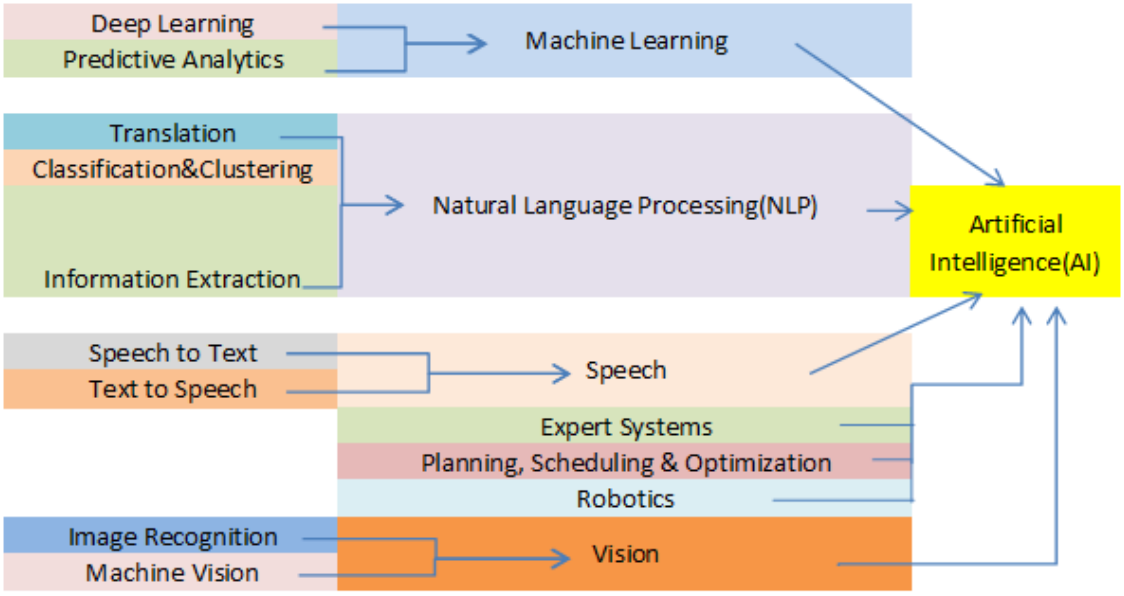


Fig.3: Artificial Intelligence: How will it affect legal practice – and when? [Martin, 2016]

The CommonKADS is the best known methodology for building knowledge-based systems and shows how knowledge analysis and knowledge-system development can be used as techniques within an overall knowledge management approach (Fig.4).

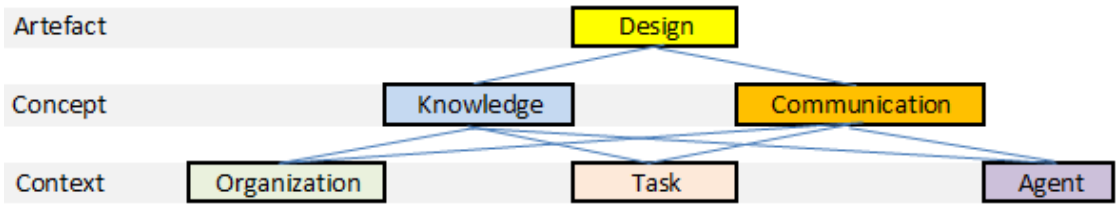


Fig. 4: CommonKADS Model Set, [Fensel, 2010]

CommonKADS uses UML notations wherever possible, in particular class diagrams, activity diagrams and state diagrams. [https://commonkads.org/]

Case study

The aim is to build a forward chaining inference engine based on predicate logic and implemented with lambda expressions. We focus on querying a knowledge base as the second subsystem of an expert system. To emphasize the importance of our research, we employ lambda expressions to implement a complex logical rule (teachers that have salary higher than their own chair's salary) and a method of grouping entities that share common features (like a hand of cards).

Inference engine by forward chaining of rules

An ES consists of a knowledge base and an inference engine. Any formal system relies on a finite alphabet, a grammar, a set of axioms, and rules of inference.

A knowledge database is a set of basic axioms corresponding to domains and tuples in the base relationships plus inference rules. Inference consists in evaluating Boolean expressions corresponding to the knowledge base relations and tuples. Inference rules are based on some basic axioms, for example:

Mother	Daughter
Ana	Maria
Maria	Ioana

If Mary is Ana's daughter and Joanna is the daughter of Mary, then Joanna is Ana's niece (or Ana is Joanna's grandmother) or

```
Grandmother = MX.Mother unde MY.Mother = MX.Daughter
```

These rules can be expressed in predicate logic as follows:

```
MOTHER_FOR(Ana,Maria)

MOTHER_FOR(Maria,Ioana)
```

An inference engine is a AI tool that parse logical rules (chaining) against a knowledge database to obtain new information. After [Eisenberg, 1997], rules denote constraints that enable procedures to seek new assertions or to validate a hypothesis. In forward chaining, rules are processed moving from if patterns towards then patterns.

A rule of inference can be formulated as follows:

```
GRANDMOTHER_FOR(Ana,Ioana)=MOTHER_FOR(Ana, Maria) AND MOTHER_FOR(Maria,Ioana)
```

or parameterized as follows:

```
GRANDMOTHER_FOR(x,z)=MOTHER_FOR(x,y) AND MOTHER_FOR(y,z)
```

Other rules can be expressed as follows:

PARENT(x,y) AND MALE(x) => FATHER(x,y)

PARENT(x,y) AND FEMALE(x) => MOTHER(x,y)

PARENT(x,y) AND PARENT(z,y) => STEPBROTHER(x,y)

PARENT(x,z) AND ANCESTOR(z,y) => ANCESTOR(x,y)

The axiom schemata and the rules of inference form a **deductive apparatus**. We must ensure that each line of derivation is merely a syntactic consequence of the lines that precede it.

WFF or the grammar of the formal system is constructed out of logical operators, for example:

non	-φ
and	(φ & ψ)
or	(φ | ψ)
If…then	(φ -> ψ)
If and only if	(φ <-> ψ)

For the basic axioms in the table below we follow the following inference rules, after [Vardi, 2006]:

Professor	**Department**	**Chair**
Ionescu	Math	Iosipescu
Popescu	Informatics	Iamandi
Radulescu	Math	Iosipescu

¬Professor (Popescu, Math, Iosipescu) => "The statement that Popescu is working at the Chair of Mathematics led by Iosipescu is false"

(Professor(x, Math, Iosipescu) ∧ Professor(z, Math, Iosipescu)) => "x and z are colleagues at the mathematics department headed by Iosipescu".

∃y.Professor (y, Math, Iosipescu) => "Someone from the mathematics chair led by Iosipescu"

∃y.∀x.Professor (x, y, Iosipescu) => "All professors in the chair led by Iosipescu"

Implementing inference of rules in Java 8

The Missing Parts in Java 8 jOOλ [Github, 2016] improves the JDK libraries, adding tuple support, function support, and a lot of additional functionality around sequential Streams. jOOλ knows a Sequential (Seq) interface that extends Stream and adds a variety of additional methods to. Let's see the

example bellow that displays the teachers who have the higher salary than the head of the chair after the fallowing logical query: t1.name ((Teachers (t1) ∧ Chairs (t2) ∧ Teacher s(t3)) ∧ ((t1.chair = t2.chair) ∧ (t2.name = t3.name) ∧ (t1.salary > t3.salary))):

```
Chairs.add(new Chair("Iosipescu","Math"));

Chairs.add(new Chair("Radulescu","CS"));

Teachers.add(new Professor("Georgescu","CS",5000,1999));

Teachers.add(new Professor("Iosipescu","Math",3000,2004));

Teachers.add(new Professor("Radulescu","CS",7000,2000));

Teachers.add(new Professor("Marinescu","Math",6000,1998));

System.out.println(Seq.seq(db.Teachers)

    .sorted((p1, p2) -> Long.compare(p1.salary, p2.salary))

    .flatMap(v1 -> db.Chairs.stream()

        .filter(v2 -> Objects.equals(v1.dept, v2.dept) && db.Teachers.stream()

            .anyMatch(t -> v1.salary>t.salary && t.name.equals(v2.name)))

        .map(v2 -> tuple(v1.name, v2.name)))

    .format());
```

The special method named flatMap() is very similar to map but expects the function received as an argument to return a functor. The result is the following, meaning that Marinescu has a greater salary then Iosipescu, the head of the chair (Fig. 5):

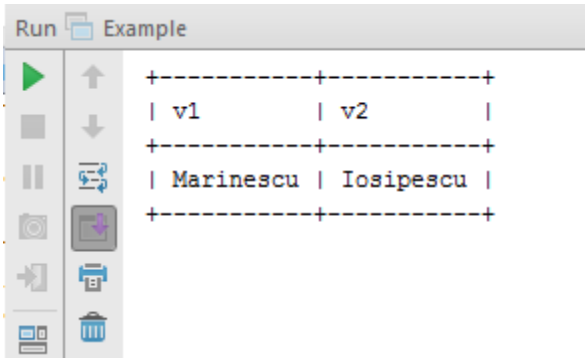


Fig.5: Intellij IDEA logical query result

For returning groups of more than two identical elements we can use the following syntax (Fig. 6):

```
Seq.seq(hand).groupBy(i -> i).values().stream().filter(u -> u.size() >=
2).collect(Collectors.toList()).forEach(System.out::println);
```

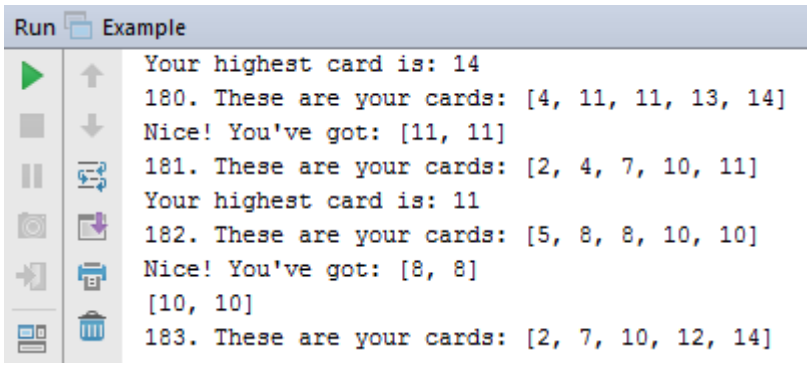


Fig. 6: Result window showing groups of identical elements

The source code as well as the model of the knowledge base can be found here: https://github.com/radubm1/test1/blob/master/Example.java

Conclusions

Since the formalization of logic (XIX century), many scientific domains are reformulating their base axioms accordingly to logical formal laws (Mathematics, Natural Language Processing, Logical programming, etc.). Fueled by the revolution of AI tools, automation of reasoning finds through logic a new horizon from where the boundary between the human brain and the computer seems dimmer than ever. Now it is the time when the art of management and particular the knowledge management should embrace fully the AI technologies to reach the level where the human error is just history.

References

Atis, S. and Ekren, N. (2016), 'Development of an outdoor lighting control system using expert system', *In Energy and Buildings*, 130, 773-786, https://doi.org/10.1016/j.enbuild.2016.08.066.

Bohlouli, M., Mittas, N., Kakarontzas, G., Theodosiou, T., Angelis, L. and Fathi M. (2017) 'Competence assessment as an expert system for human resource management: A mathematical approach', *In Expert Systems with Applications*, 70, 83-102, https://doi.org/10.1016/j.eswa.2016.10.046, ISSN 0957-4174.

Cioara, T., Anghel, I., Salomie, I., Barakat, L., Miles, S., Reidlinger, D., Taweel, A., Dobre, C. and Pop, F. (2017) 'Expert system for nutrition care process of older adults', *In Future Generation Computer Systems*, https://doi.org/10.1016/j.future.2017.05.037, ISSN 0167-739X.

Eisenberg, M. and Fischer, G. (1997), 'Rules and Rules Chaining', Winston, 1997, [Online], [Retrieved September 15, 2017], http://l3d.cs.colorado.edu/courses/CSCI5582-97/lectures/winston-ch7.pdf

Fensel D. and Siorpaes, K. (2010), 'Intelligent Systems', *CommonKADS*, [Online], [Retrieved September 22, 2017], http://liris.cnrs.fr/amille/enseignements/MasterCode/IC_IA/2012-2013/06_Intelligent_Systems-CommonKADS.pdf

Github, 2016 [Online], [Retrieved September 20, 2017], https://github.com/jOOQ/jOOL

Martin, K. (2016), [Online], [Retrieved September 12, 2017], https://blogs.thomsonreuters.com/answerson/artificial-intelligence-legal-practice/

Satyavedism A., SATYAVEDISM.COM, 'Evolution of languages, Ashtadhy ayi of Panini', Vol. 01 thru 08, [Online], [Retrieved September 5, 2017], https://www.satyavedism.com/evolution-of-languages/ashtadhyayi-of-panini-volumes-01-thru-08-and-intro-panini

Vardi, M. Y., Barland, I. and McMahan, B. (2006), 'Logic and Database Queries' [Online], [Retrieved August 25, 2017], https://www.cs.rice.edu/~tlogic/Database/all-lectures.pdf

Wagner, WP. (2017), 'Trends in expert system development: A longitudinal content analysis of over thirty years of expert system case studies', *In Expert Systems with Applications*, 76, 85-96, https://doi.org/10.1016/j.eswa.2017.01.028, ISSN 0957-4174.

Legal Provision of the Quality of the Results of Construction Works: Theoretical and Practical Problems

Vorontsova Elena Vladimirovna, Department of Financial Law, Constitutional, Civil and Administrative Proceedings FSBEI HPE «South-West State University», Kursk, Russia, proskyrinae@mail.ru

Vorontsov Andrey Leonidovich, Department of Administrative and Labor Law FSBEI HPE «South-West State University» Kursk, Russia, vorontsov.a.l@mail.ru

Annotation

The aim of the work was to analyze the problems of normative definition of the concept "quality of the result of construction work", taking into account the significance of this definition for regulating relations in the field of construction activities. In addition, much attention was paid to the problem of the legal fixing of the criteria for this quality, as well as consideration of legal guarantees ensuring the quality of the result of the work.

The study was based on comparative characteristics of the content of regulatory documents governing construction activities and the analysis of doctrinal points of view. At the same time, the methods of logical substantiation, linguistic (linguistic) interpretation, formal-legal method were used.

The content of normative sources, jurisprudence, the diversity of opinions of scientists, lead to a conclusion about the uncertainty of the very concept of "quality" in relation to construction works. The article suggests the author's version of the definition of the "quality of the result of construction works", as well as the criteria for the quality of the result of construction work, which the authors propose to fix by law.In their opinion, this will allow to overcome the existing conceptual uncertainty and will contribute to improving the quality of construction works.

The practical significance of the suggestions made by the authors is that in the event of the normative fixing of the quality criteria of the result of construction works proposed by them, the legal guarantees for its provision will increase substantially. The conclusions drawn by the authors are intended for entrepreneurs and lawyers practicing in construction activities. The results of the research will contribute to streamlining the legal regulation of relations in construction.

Keywords: construction works, result of works, quality, quality of the result of works, quality assurance

Introduction

Since the second half of the 90's.the last century, Russia is experiencing a kind of "construction boom." And if the end of the XXth century was noted, for the most part, by the unprecedented scope of individual housing construction, the first fifteen years of the twenty-first century are characterized, besides, by a significant increase in the construction of industrial facilities. The introduction of a huge number of those and others even more actualized the problem associated with the quality of the result of construction work, especially in connection with the massive attraction of low-skilled labor from the countries of near and far abroad.

However, as regards the quality of buildings and structures resulting from construction activities, a number of issues arise in the legal plan, primarily related to the definition of the very concept of "quality" in relation to construction works, or "the quality of the result of the work", as more appropriate in view of that, that similar works are carried out, as a rule, on the basis of the contract of the building contract.

In addition, the question «what are the parameters of this quality and what acts should they be installed?»is not completely clear.

And, finally, what are the legal guarantees for ensuring the quality of the result of the construction works and, accordingly, what compensation (corrective) mechanism in this case can be envisaged?
In order to regulate contractual relations in construction, the answers to these questions have a clearly expressed practical significance, nevertheless neither the legislator nor the judicial practice allows them to form a completely definite opinion on them. There is also no intelligible concept in doctrinal sources.

Results and Discussion

1. Problems of normative definition of the concept "quality of the result of construction work"

If we turn to the explanatory dictionary, then the concept of "quality" appears as "a set of essential features, properties, features that distinguish an object or phenomenon from others and give it certainty; this or that property, a sign that determines the dignity of something" (S.I. Ozhegov, N. Yu. Shvedova, 1995, p. 265).

In turn, specialized legal literature treats quality as "the ability of an object to serve its intended purpose" (V.F. Yakovleva, 1954, p. 56), "suitability for its intended use" (A.V. Ivanov, 1990, p.19).
For the legal formalization of the quality of services, the following circumstances make the complexity difficult: the creative nature of the service as an activity; direct evaluation by the consumer; the consumption of a service often occurs at the time of its provision; significant variability of individual customer requirements (E. Vorontsova, A. Vorontsov, 2016, p.869).

Based on such definitions, K.S. Maulenov formulated the legal concept of construction quality as "the ability of an object to satisfy public needs, for which the constructed object is intended" (K. S. Maulenov, p.3). However, in our opinion, this definition is too general and cannot be included in the Civil Code of the Russian Federation as normative, since it does not take into account all the factors underlying the legal value of the quality of the result of construction work.

In contrast to the above definition, the legal constructions of other authors are built on the account of several such factors. In particular A.Kh.Berbekov identifies four factors that, in his opinion, are the necessary criteria for assessing the quality of the result of construction work: 1. The result of the work performed is related to the technical parameters (characteristics, properties) that are presented to this type of work based on its subject nature and requirements, stipulated in technical norms (technical regulations); 2. the result of the performed works should not damage the environment and do not violate the rights and legal interests of other persons; 3. the result of the work performed must comply with the terms of the contract and the requirements of the law, and in the absence of such conditions - the customs of business turnover or other commonly presented requirements; 4. The result of the work must be capable of operation within the period specified in the law or by the contract (A. Kh. Berbekov, p.33).

On the basis of the unity of these factors, the concept "quality of the result of work" of the contractor was formulated, and the author proposed to introduce it in art. 721 Civil Code of the Russian Federation. However, in our opinion, some of the criteria for assessing the quality of the construction work performed by him do not meet the requirements of objective certainty, i.e. more simply, duplicate each other in meaning. So, the requirement not to violate the rights and legitimate interests of other persons, in our opinion, is obvious, it is supposed to be obligatory to comply with the requirements of the law. This can be said with respect to the requirement not to damage the environment (in terms of its compliance with Chapter VII of the Federal Law of 10.01.2002 No. 7-FZ "On Environmental Protection"). In addition, not to damage the environment as a duty logically follows from the need to match the constructed object with technical requirements (requirements of technical regulations) regarding the safety of the facility for life, human health and the environment (Article 7 of the Federal Law "On Technical Regulation").

As it seems to the authors of this article, the essential characteristic of the concept "quality of the result of construction works" can be reduced to three main indicators:

1. the result of the work must correspond to its intended purpose (that is, in this way, should corresponds to public needs);
2. the result of the work must comply with the terms of the contract (ie the result should correspond to the construction works reflected in the customer's interests);
3. The result of the work must comply with the mandatory requirements of technical regulations (technical requirements).

It seems that these components can be used as the basis for the normative definition of the "quality of the result of construction works", which, in our opinion, is worthy of placing in §1 "General provisions on the contract" of Chapter 37 of the Civil Code of the Russian Federation, and also in Art. 1 (Basic concepts used in this Code) of the Urban Development Code of the Russian Federation.
In view of the foregoing, we believe that the normative definition of the term "quality of the result of construction work" may look like this: these are the results of construction work, determined by the degree of its compliance with the intended purpose of the facility, the terms of the contract, mandatory technical requirements.

In the above definition, we deliberately used the expression "mandatory technical requirements" in place of the current technical regulations, thus creating, as we see it, a certain legal perspective for the use of this rule. The fact is that the practice of using in the construction of technical regulations has shown that they are far from being fully able to provide the required quality (necessary consumer properties) of the result of construction work. At present, loud enough voices are heard for returning to acts of technical regulation (like GOSTs, SNiPs), which very accurately determined the mandatory (normative) criteria by which it was possible to compare the results of completed construction work with the indicators that acted as a reference. In case of returning to the previously used system of technical rationing, it will not be necessary to introduce changes to the Civil Code of the Russian Federation, because the acts of technical rationing contain, in fact, mandatory technical standards (let's call them, for example, the maximum tolerances or something else: the comment of the authors).

At the same time, currently used technical regulations are fully covered by the term we proposed.

Legal criteria for the quality of construction works and legal guarantees for its provision: systemic problems of the Russian legislation

Responding to the first question we raised regarding the definition of the concept of quality of construction works, we touched in part the second question, which concerning the acts setting parameters of this quality. Indeed, the current legal framework for regulating relations in construction is far from perfect. Parameters of the quality of construction works, previously established by the system of acts of technical regulation in the form of building norms and rules (SNiP), GOSTs and technical conditions, with the introduction of technical regulations lost their mandatory importance. We can say that the legislation on construction as a result of the renewal has lost its integrity. A single normative array of building standards has "grown" according to technical regulations, which did not delay to affect the quality of construction works. From the memory of Russian citizens, tragedies in water parks and shopping complexes, caused by violations of technical norms during construction work and resulting in human casualties, have not yet erased.

Technical regulations contain technical terms that often do not receive their normative decoding. The content of these terms can only be judged by using the appropriate technical vocabularies, but the terminological interpretation presented in them is not official, and therefore provides an opportunity for subjective discretion.
In addition, in various laws there is a diversity of concepts, which also does not contribute to the normal organization of relations in construction activities. So the Civil Code of the Russian Federation uses the concept of "technical documentation", and in the Town Planning Code of the Russian Federation - "project documentation". To regard them as identical from a legal point of view

is not possible, since the concept of project documentation in normative acts receives its detailed disclosure regarding its structure, content, training rules, etc., unlike the concept of "technical documentation".

Thus, for today we do not have unambiguous normative parameters of the quality of the result of construction works. In this case it is worth, perhaps, to agree with O.G. Ershov, who, having conducted an analysis of the documents establishing technical requirements, came to the conclusion that "the legal regulation of relations in construction at the present time cannot be ensured either by construction norms and rules or technical regulations. There is reason to believe that the process of developing technical regulations will not bring the expected results because of the lack of opportunities for legal technology (O.G. Ershov, 2007, p.60). "

The lack of regulatory criteria for the quality of the result of construction works directly affects the legal guarantees for its provision. Sometimes quite difficult to correlate the customer's complaints that have occurred, guided by the requirements of previously acting technical regulations (which in their essence reflected the actual achievements of construction equipment in terms of reliability, safety, etc.) with the standards of the current technical regulations that guided the performer construction works. The problem also arises when the contractor recognizes the presence of shortcomings in the facility. On a contractual or non-contractual basis, it is obliged to eliminate them, if the demand to eliminate these deficiencies was announced after the termination of the construction contract.

The lawmaker tried to increase the responsibility of the executor of construction works by setting a requirement for the participation of persons who performed the work in a self-regulatory organization (Chapter 6.1 of the Town Planning Code of the Russian Federation). The possibility of exclusion from this organization, as well as the obligation to make contributions to the compensation fund, should, by its intention, induce executors of construction works to ensure proper quality. However, exclusion from a self-regulatory organization does not at all mean compensation for the damage suffered, and the size of the compensation fund, which limits the responsibility of the executor of works (Article 60 of the Town Planning Code of the Russian Federation), can also cover the incurred losses far from full.

It seems that a significant contribution to the development of additional legal guarantees for the quality of the result of construction work could be made by the legal centers of large construction corporations, as well as by the legal departments of higher educational institutions that have an architectural and construction faculty.

Conclusion

The significance of the issues raised in this article is not limited to the construction industry alone. Uncertainty of many basic concepts, contradictoriness and legality of legislation - are characteristic features of the Russian legal system, which, despite all the measures taken, is still very far from perfect.

As for the construction industry, the problems of legal ensuring the quality of the result of construction work determine, in our opinion, the vector of the entire development of this industry and not only, taking into account the significance of construction activities for the development of other spheres of public life. It is obvious that the current legal mechanism for ensuring this quality cannot fully cope with its functional role. To implement this role it is hampered by its own technical and legal imperfection, the elimination of which requires the coordinated work of the Russian legislator, legal academic circles and representatives of the construction business. At the same time, the lack of coherence between the interested parties leads to a limited legal capacity of the proposed legal mechanisms to ensure the quality of the result of construction work. In the opinion of the authors of the article, the way out of this situation lies in the plane of changing approaches to norm-setting activities in the construction sector, where the gap between the aspirations of representatives of the scientific community trying to present a unified scheme for the legal regulation of the quality of construction works and the aspirations of representatives of the construction industry, which are

determined by the practical needs of their activities. In this regard, it is necessary to initiate more often joint scientific and practical conferences and other events designed to coordinate the positions of all interested parties.

Acknowledgment

We express our deep gratitude to the organizers of the conference for the opportunity to speak on the very topical issue of Russian law.

References

The Constitution of the Russian Federation (adopted by popular vote on 12.12.1993) (taking into account the amendments introduced by the Laws of the Russian Federation on Amendments to the Constitution of the Russian Federation No. 6-FKZ of December 30, 2008, No. 7-FKZ of December 30, 2008, -FKZ, from 11/21/2014 N 11-FKZ). Collection of the legislation of the Russian Federation.№ 31. Art. 4398, April 2014

The Civil Code of the Russian Federation (Part Two) of 26.01.1996 No. 14-FZ (as amended on March 28, 2017) // http://www.pravo.gov.ru

Urban Development Code of the Russian Federation of 29.12.2004 No. 190-FZ (as amended on July 29, 2017) (as amended and supplemented, effective as of August 11, 2017) // http://www.pravo.gov.ru

The Federal Law No. 323-FZ of November 21, 2011 (as amended on July 29, 2017) "On the fundamentals of protecting the health of citizens in the Russian Federation" // http://www.pravo.gov.ru

The Federal Law No. 184-FZ of December 27, 2002 (as amended on July 29, 2017) "On Technical Regulation" // http://www.pravo.gov.ru

The Federal Law No. 7-FZ of January 10, 2002 (Edited on July 29, 2017) "On Environmental Protection" // http://www.pravo.gov.ru

Berbekov, A.Kh. (2007) 'Problems of determining the quality of the result of work under the contract of construction contract,' Notary, №4. P. 33-35.

Ershov, O.G. (2007) 'On Acts of Technical Regulation and Legal Regulation of Relations in Construction,' Legislation and Economics, №10.P.57-60.

Ivanov, A.V. (1990) Responsibility under the contract for capital construction: The abstract for the degree of Candidate of Legal Sciences, Moscow.

Maulenov, K.S. (1983) Legal assurance of construction quality (civil-law aspect): the abstract for the degree of Candidate of Legal Sciences, Kharkov.

Ozhegov, S.I, Shvedova, N.Yu. (1995) Explanatory dictionary of the Russian language, Moscow.
Vorontsova E., Vorontsov A. The problems of the legal ensure quality and safety products and services as a necessary prerequisite for the implementation right to health in Russian Federation // 3-rd International Multidisciplinary Scientific Conferences on Social Sciences and Arts (SGEM 2016). Book 2. Political sciences, law, finance, economics and tourism. Vol. 2. p.869-876.

Yakovleva, V.F. (1954) 'On the role of the norms of Soviet civil law in the struggle for high quality products,' Soviet state and law.No. 3.P.54-56.

Barriers to start-up a Social Enterprise

Maria Constança de Barbosa Mendonça de Morais Sarmento, University of Aveiro, Aveiro, Portugal, mariaconstanca@ua.pt

Diego Henrique Galego, University of Aveiro, Aveiro, Portugal, galego@ua.pt

Marta Ferreira Dias, University of Aveiro, Aveiro, Portugal, mfdias@ua.pt

Marlene Paula Castro Amorim, University of Aveiro, Aveiro, Portugal, mamorim@ua.pt

Abstract

Social innovation and social entrepreneurship are key elements in the development of modern societies. Whereas setting up a business and managing it towards success is commonly seen as a difficult task, the start of a social business may be even more challenging, considering its special features. This paper presents the main barriers identified by: to be managers and managers of social organizations and experts/lecturers in the field of social economy and social entrepreneurship, and other social economy stakeholders, when undertaking the mission of setting up a social enterprise. Data was collected in four European countries under the Erasmus+ Project Social Entrepreneurship Support Europe (SES-EU)[i] using questionnaires. A total of 183 stakeholders answered about the main reasons that could lead them to question the start-up of a social enterprise. The analysis was conducting based on Kruskal-Wallis H-test, the Dunn's test for post hoc comparisons and Spearman Correlation Coefficient. The findings reveal that, although realities are different across countries, the main barriers faced by social entrepreneurs tend to have a common ground. The other similarity identifies is the lack of a common framework for social enterprises. This lack represents the main challenges to overcome. Our research and results are of considers particular relevance for governments and other entities promoters of social entrepreneurship, since it points out the key areas of concern, to which special attention should be given in order to boost start-up of social enterprises.

Keywords: Barriers; Start-up; SES-EU; Social Enterprise.

Introduction

Social Entrepreneurship and Social Innovation have become important key concepts to develop solutions for current social issues, which are not entirely addressed by the government, and public sector. As societies and governments face a multitude of challenges, namely social, cultural, economic and environmental (Haugh 2005; Braga *et al.* 2014), demanding solutions, social innovation are changing paradigm as a possible solution. Encouraging interested people to set up their own organization in order to respond to social needs and to deliver better social outcomes. Societal innovation and social entrepreneurship play, indeed, an important role in our society and economy.

The process of responding to a societal problem involves a number of stages, from the identification, evaluation and exploitation of opportunities, to the creation of social value (Certo & Miller 2008). The fundamental novelty of a social entrepreneur is not focusing solely on profits, but on achieving the social aim (Austin, Stevenson & Wei-Skillern 2006). While a business entrepreneur focuses his/her attention on the economic return or profit, a social entrepreneur mission is always essentially social (Austin *et al*. 2006). Societies may see further the social results such as mutual benefits emerging from values created by people leading a social enterprise. Although social entrepreneurs may create social impact in their personal daily-life or even in the companies where they work. Considering the importance of the value, they create, it is important to understand all the process of creating such organizations.

According to Nabi and Holden (2008) the definitions for entrepreneurship highlight the importance to start up an enterprise. The authors critically emphasized the entrepreneurship not only representing the way to create an enterprise, but to translate entrepreneurial intentions into entrepreneurial activity. Despite the differences in the missions of traditional and social entrepreneurs, some difficulties when establishing social businesses might be the same (Silva, Amorim & Dias 2015).

However, there might be other additional issues of special relevance for social entrepreneurs. From the innovative and creative society point of view, the need to fulfill the gap between reality and start up an enterprise implies and requires a consensual model to qualify entrepreneurs to risk and start their own business.

Social Enterprises and their Barriers

At the heart of the social innovation and entrepreneurship movement in Europe, many initiatives took place, many of them as a response to the pressures of youth unemployment (European Commission 2014b). Social economy approaches are considered as a key pillar of societies, regarding their importance to achieve the wellbeing of the people and communities. The social enterprise movement leads to the emergence of a diversity of initiatives that address social, cultural and environmental challenges (Bikse *et al*. 2015). The last decades have been marked by a significant increase in the number of social enterprises as one of the ways to answer that proposed challenge (Bikse *et al*. 2015; Silva *et al*. 2016).

Individuals and organizations that propose innovative solutions to societal challenges typically promote social entrepreneurship. Usually this type of entrepreneurs are highly motivated towards addressing community problems and lead the identification of several possible answers (Zahra *et al*. 2009). Simultaneously, social entrepreneurs accept risks and actively seek for the necessary resources and partners to start-up their projects (Abu-Saifan, 2012).

However, social companies have just recently started to be recognized by governments and policy makers, and there is still a lot to do in what concerns their credibility among citizens and communities. Supranational entities, such as the EC or the Organization for Economic Co-operation and Development are, nowadays, aware of the added value of the social enterprises and the social economy as a whole. The European Commission (EC), has set inclusive guidelines and funding for the promotion of social entrepreneurship and to support social entrepreneurs in achieving success (EC 2013). It seems to be still difficult to set up a social enterprise in most countries – since its conceptual framework and legal status is still under development. Therefore, social entrepreneurs may face other challenges in setting-up, developing and scaling the activities of their companies besides the traditional ones, dealing with different barriers.

Hypotheses Derivation

A number of barriers are identified in the literature as the main challenges for social entrepreneurs including: the mobilization of human and financial resources, bureaucracy, the fact that it is something innovative, communication and time management, the process of decision-making and lack of credibility or inexperience in the area (Braga *et al*. 2014).

With this study, it is intended to understand, on one hand, if the barriers identified are transversal to the managers / owners of social economy enterprises; experts / lecturers in the field of social economy, entrepreneurship and management; individuals interested in setting up the social economy enterprise and VET organizations and social entrepreneurship stakeholders. As we are dealing with these heterogeneous groups, from different backgrounds, the first hypothesis (H1) is "There are differences regarding the groups of interviewees regarding the barriers in starting-up the social enterprise". On the other hand it is expected to find differences among the countries in this study, where the second hypothesis (H2) is placed as “There are differences concerning the countries in this study regarding the barriers to starting-up a social enterprise”.

It is known that poor access to funding is also highlighted as one of major concerns for social entrepreneurs to start their business (Karaphillis 2010; Kendall *et al*. 2016; Martins *et al*. 2004;

Rykaszewski *et al*. 2013). This may be similar to the difficulties faced by smaller companies to access funds in capital markets, and their dependency of external sources of finance (Martins *et al*. 2004). The lack of an established and clear framework for social entrepreneurship has also major impact in the funding issue, since it is difficult for social entrepreneurs to identify funding options for the social sector. Given the lack of framework, social entrepreneurs submit applications for other public funds, but the formulation of their applications is always a challenge, since it is more difficult for them to fulfill the requirements of such financing models.

The process of creating a social enterprise is strongly influenced by cultural and social context. The absence of knowledge regarding the role, services and mission of social enterprises, both by societies and even by the appropriate institutions, is certainly a great barrier to the development of social business (Martins *et al*. 2004). The access to social and business networks have a huge impact in the successful process of start-up social enterprises, increasing the sector opportunities dealing with social issues (Bikse *et al*. 2015).

According to this, two research questions arise. The first question, "Is there a relation between the barriers to start-up a social enterprise and the key factors to success towards implementing a social entrepreneurship idea?". To test this research question we formulate three hypotheses (H3, H4 and H5):

H3: Contextual resistance and barriers affect the ability to identify adequate instruments and sources of funding.

H4: Lack of knowledge about the concept of social entrepreneurship influences the leadership and negotiation skills of the social entrepreneur.

H5: Lack of knowledge about financial instruments and sources of funding influences familiarity with other experiences of social entrepreneurship and other business models.

The second question, "Is there a relation between the barriers to star-up a social enterprise and the key elements in the qualification of the people involved in social entrepreneurship initiatives?". To test the research question two hypotheses (H6 and H7) were formulated:

H6: Contextual resistances and barriers affect the ability to work autonomously and develop initiatives.

H7: Technical competences in the business specialty domain of the social entrepreneur are associated with lack of knowledge about the concept of social entrepreneurship.

This study aims to understand the main barriers, identified by a group of social economy stakeholders, to establish a social enterprise and investigate the relation between these identified barriers and the key factors to success towards implementing a social entrepreneurship idea and the key elements in the qualification of the people involved in social entrepreneurship initiatives.

Methods

The present article addresses the identified barriers building on evidence collected in the context of the European Project SES-EU, which was conducted in five countries, namely, Cyprus, Italy, Poland, Portugal and Romania[ii]. The Project aims to contribute to the development of critical competences in the social entrepreneurship domain, through the creation of tools, which support such apprenticeship.

The research work relies on the evidence collected from four different groups of informants, managers/owners of social economy enterprises; experts/lecturers in the field of social economy, entrepreneurship and management; individuals interested in setting up a social economy enterprise and VET organizations and social entrepreneurship stakeholders involved in the ERASMUS+ Project SES EU. The study involved the application of questionnaires that were prepared within the scope of the SES-EU project, allowing for the collection of 183 responses obtained via online and by face-to-

face application in four European countries: Cyprus, Italy, Poland and Portugal. In order to find the key difficulties to establish a social enterprise, the 183 respondents were asked to score a list of 7 items identified in literature as key barriers. They were asked to consider their impact in their hypothetical decision to give up. The list of options had 11 key factors for the successful implementation of a social entrepreneurship idea and 8 core elements in the qualification of the people involved in social entrepreneurship initiatives, using a Likert type scale to classify from 1 (extremely unlikely reason/totally irrelevant) to 5 (extremely likely reason/ absolutely necessary).

Sample Characterization

Among the 183 questionnaires collected, it was possible to count answers from 58 managers/owners of social economy enterprises, 27 experts/lecturers in the field of social economy, entrepreneurship and management, 62 individuals interested in setting up a social economy enterprise and 36 VET organizations and social entrepreneurship stakeholders. Most of the answers were collected by Poland (35.3%), followed by Portugal (28.3%), Cyprus (20.1%) and Italy (16.3%). The ages of the inquired individuals range from 22 to 64, with an average of 40 years old. The majority of the individuals holds a higher education degree, in particular, bachelors and master degrees. The average length of professional experience is approximately 14 years, which suggests relevant experience. The main business areas of the social enterprises established, or intended to be established by respondents, are agriculture, tourism, education, health and other areas connected to services.

Statistical Analysis

In order to test the differences between more than two groups regarding answers to ordinal variables the statistic non-parametric Kruskal-Wallis H test was used (Corder & Foreman 2009; Cohen 1988; Siegel 1975; Sprent & Smeeton, 2001) and Dunn's test was used when focusing on multiple comparisons. The correlation between ordinal variables was executed by using the Spearman correlation (rho). The significance considered was .05 (Howell 2013).

Results

Identified Barriers

The results show that the major barrier is the "1-Lack of knowledge about financing instruments and sources" (M=4.06, SD= 0.98, Md=4), followed by "2-Contextual resistance and barriers (e.g. regulations, norms, culture, etc.)" (M=3.89, SD= 1.08, Md=4) and a "3-Lack of understanding about the concept of social entrepreneurship" (M=3.89, SD= 1.15, Md=4). The barrier "4-Aversion to risk" shows up immediately after (M=3.85, SD= 1.11, Md=4) and so does "5-Lack of managerial experience" (M=3.64, SD= 1.27, Md=4). Lastly, "6-Lack of technical knowledge about product processes, etc." (M=3.45, SD= 1.13, Md=3) and "7-Lack of qualified and motivated staff and volunteers" (M=3.44, SD= 1.19, Md=3).

Differences concerning the four groups of interviewees regarding the barriers in starting-up a social enterprise

It is possible to observe there is no statistically significant differences between the four groups of participants and the barriers that were studied: 'Lack of managerial experience' ($H_{(3)}$=2.87, p=.412); 'Lack of understanding about the concept of social entrepreneurship' ($H_{(3)}$ = 5.53, p =.137); 'Aversion to risk' ($H_{(3)}$ = 4.34, p =.227); 'Lack of technical knowledge about products and processes'($H_{(3)}$ = 2.77 , p =.429); 'Lack of knowledge about financing instruments and sources'(H(3) = 3.45, p =.327); 'Lack of qualified and motivated staff and volunteers' ($H_{(3)}$ = 7.68, p =.053); 'Contextual resistance and barriers (e.g. regulations, norms, culture, etc.)' ($H_{(3)}$ = 2.62, p=.454). Therefore, we will focus on the four groups as a whole.

Differences concerning the four countries in this study regarding the barriers to starting-up a social enterprise

It is possible to observe that, there is statistically significant differences regarding the most expressive barriers in at least one of the four countries which take part on this study: '5' ($H_{(3)} = 10.99$, p =.012), '3' ($H_{(3)} = 21.37$, p < .001), '6' ($H_{(3)} = 11.12$, p = .011), '7´ ($H_{(3)} = 18.69$, p < .001) and finally ´2' ($H_{(3)} = 10.89$, p = .012). On the other hand, there are no statistically significant differences concerning the barrier ´4´ ($H_{(3)} = 3.25$, p = .354) and the barrier ´1´ ($H_{(3)} = 2.28$, p = .516).

In order to understand these differences, the Dunn's test for post hoc comparisons was used (see the Table 1).

Table 1: Differences between countries regarding the barriers

Barriers	Country	Mean Rank	Dunn's test	*p*
2 – Contextual resistance and barriers (e.g. regulations, norms, culture, etc.)	Italy	74	z=2.78	.033
	Cyprus	108.78		
3 - Lack of understanding about the concept of social entrepreneurship	Portugal	73.78	z=2.75	.036
	Cyprus	103.82		
	Portugal	73.78	z=3.80	.001
	Poland	109.39		
	Italy	71.72	z=-3.39	.004
	Poland	109.39		
5 - Lack of managerial experience	Portugal	79.87	z=2.89	.023
	Poland	107.28		
6 - Lack of technical knowledge about products and processes	Portugal	77.19	z=2.98	.017
	Poland	105.59		
7 – Lack of qualified and motivated staff and volunteers´	Portugal	79.75	z=3.10	.012
	Poland	109.40		
	Italy	66.32	z=-3.80	.001
	Poland	109.40		

Considering this scenario, Portugal and Poland are the countries which most differ in number of barriers among themselves. The divergence are when it comes to the lack of managerial experience, the lack of understanding about the concept of social entrepreneurship, the lack of technical knowledge about products and processes and the lack of qualified and motivated staff and volunteers, Portugal is considered to be the country that gives less importance to the barriers and Poland the one that recognizes their greater importance, even when compared to other countries.

Linking Social Enterprise Barriers with the Key Factors to Success towards Implementing a Social Entrepreneurship Idea

The major factors contributing to the successful implementation of a social entrepreneurship idea are described in Question 4 of the questionnaire (Appendix).

As a means to understand which of these conflict with the barriers previously mentioned, it was possible to see that there is a statistically significant correlation (rho=.420, N=182, p<.001) between 'Ability to identify adequate financing instruments and sources' and 'Contextual resistance and barriers (e.g. regulations, norms, culture, etc.)'. This correlation is positive and moderate and it demonstrates that, the more detailed identification of adequate financing instruments and sources there are the more difficult to clarify in this topic, since there is a more prevalent contextual resistance and barriers. In other words, for the effective success of the idea of social entrepreneurship which is the core of the social enterprise it is mandatory to identify adequate financing instruments and sources – and, in order to accomplish this, it is necessary that contextual resistances and barriers such as norms, regulations, cultural issues, among others, are clearly defined.

Concerning this issue, the study found a statistically significant correlation (rho =.411, N=183, p<.001) between the factor 'Leadership and negotiation skills of the social entrepreneur' and the barrier 'Lack of understanding about the concept of entrepreneurship'. This correlation is positive and moderate and it allows to conclude that in order for the social entrepreneur to best perform their leadership and negotiation duties – which are crucial to the success of their enterprise – the entrepreneur needs to master the concept of social entrepreneurship, which urgently requires a consensual definition in the European countries being studied.

There is also a statistically significant correlation (rho =.475, N=183, p<.001) between the success factor 'Familiarity with other social entrepreneurship experiences and business models' and the barrier 'Lack of knowledge about financing instruments and sources'. This correlation is positive and moderate and it allows us to explain that in order to recognize other social entrepreneurship experiences and business models there needs to be knowledge regarding financing instruments and sources.

Barriers of Starting-Up a Social Enterprise and Key Elements in the Qualification of People Involved In Social Entrepreneurship Initiatives

Another important result are the key elements the entrepreneur needs to improve in order to overcome the barriers of starting-up a social enterprise. According to the elements used (Question 5) it is possible to observe a statistically significant correlation (rho =.410, N=183, p<.001) between 'Ability to work with autonomy and to develop initiatives' and the barrier 'Contextual resistance and barriers (e.g regulations, norms, culture, etc.)'. This correlation is positive and moderate. It is only possible to work with autonomy and to develop initiatives if the context allows that to happen due to the absence of contextual barriers. In other words, the less resistance and barriers there are, the more initiatives will be developed, as well as a rising autonomy of social entrepreneurship.

It was still possible to observe a statistically significant correlation (rho =.405, N=183, p<.001) between 'Technical competencies in the business specialty domain' and the barrier 'Lack of understanding about the concept of social entrepreneurship'. This correlation is positive and moderate and demonstrates that when there is a good understanding of the concept of social entrepreneurship, the social entrepreneur will be more apt to develop technical competencies in the business specialty domain.

Discussion

According to the EC (2014a), there seem to be external and internal inhibiting factors that influence both the start-up and the development and growth of a social business. The present paper presented the barriers faced by social entrepreneurs when undertaking the challenge of establishing a social business.

The biggest barrier identified by the interviewees when it comes to starting-up a social enterprise is the 'lack of knowledge about financing instruments and sources', followed by the 'contextual resistance and barriers (e.g. regulations, norms, culture, etc.)' and the 'lack of understanding about the concept of social entrepreneurship´. These barriers have a huge potential to discourage social entrepreneurs to start-up a social enterprise. All these barriers are consensual among the different parts involved in the study, so the results did not meet H1. People involved in traditional business were out of the scope of this study.

When we analyze the barriers taking into account the reality of each different country, we are able to understand that only the barriers 'Aversion to risk' and 'Lack of knowledge about financing instruments and sources' are present across-the-board, i.e, in all four European countries. After this analysis it was verified that the results go towards H2, since the countries differ among them in 5 of the 7 barriers under study. Portugal and Poland are the countries, which demonstrate a contrasting number of barriers between each other. Portugal is giving less importance to these barriers and Poland is the country, which gives the most importance to these. Literature studies highlight the differences between these two countries, being one of the causes presented the evident geographic

separation between the two countries has always affected the possibility of a close relation between them (Almeida 1992). According to Delgado (2014), from 2008 to 2013, the evolution of the Portuguese and Polish economies denote how the two countries are in different stages of economic maturation and European integration. They also have reacted to the international crisis of 2008 in a very different way. However, both countries are converging to the same point, respectively, into international accounting norms (Alves & Antunes 2010).

When we raise the first question of investigation, we realize that there are barriers that clearly oppose to the success of the implementation of an idea of social entrepreneurship. As the results go towards H3, it was possible to understand it is mandatory that contextual resistances and barriers such as norms, regulations and cultural issues be overcome so that there is a successful way to identify adequate financing instruments and sources for a social enterprise.

On the other hand, and once the results achieved go towards H4, the 'lack of understanding about the concept of social entrepreneurship', the third barrier which worries the participants the most, meddles with the social entrepreneur's leadership and negotiation skills. Being a leader is central in the business world and the leadership style is one of the decisive factors that induce an individual to undertake. It is known that this skill deals with the person's preferences, necessities and personality traits (Souza, 2014), nevertheless, external influences, as the lack of understanding about the concept of social entrepreneurship can also interfere with leadership skills.

Another important aspect is that in order to have knowledge about financing instruments and sources, there needs to be a familiarity with other social entrepreneurship experiences and business models, thus the results go towards H5. Some authors report that the financial success of a company depends largely on the expertise of its entrepreneurs and on the knowledge they bring from the companies where they have been before (Aldrich & Yang 2013; Eesley & Roberts 2013; Shepherd *et al.* 2009). According to Silva and collaborators (2016), another factor that constitutes a constraint to the familiarity with this type of business is the fact that specific legal framework does not exist and consequently the European social enterprises are bounded to other existing legal forms.

In addressing the second issue of this study that focuses on the relationship between barriers and core elements in the qualification of people involved in social entrepreneurship initiatives, it is apparent that the contextual resistances and barriers of the context affect the ability to work autonomously and develop initiative, so the results go towards H6. "Social entrepreneurs often need freedom and independence to implement their visions of how to solve a social problem and/or stimulate social change" (Lumpkin *et al.* 2013:776). According to these authors autonomy can be influenced by the presence of multiple stakeholders and access to resources.

Additionally, the results of the present research offer support for H7. The social entrepreneur will be more apt to develop technical competencies in the business specialty domain, when there is a good understanding of the concept of social entrepreneurship. Probably after understanding exactly what a social enterprise is, the entrepreneur may be concerned about his or her own competency in business. The concept of social entrepreneurship lacks a rigorous definition and after a long time of conceptual exploration with important contributions there is no excuse for not having a clear definition of this concept to be used as the basis for future developments and research (Braunerhjelm & Hamilton 2012).

The results of the study constitute an alert to the institutions with responsibilities in the area of entrepreneurship and/or social entrepreneurship, which should take actions to support and provide guidelines to future social entrepreneurs concerning financing.

Given the implications of a lack of conceptual and legal framework, it seems to be evident that governments and policy makers should make decisions regarding this issue, facilitating the process of establishing a social enterprise, as well being able to scale up the activity later on. In fact, the creation of a legal form and clear policies would be of major importance not only for would-be social entrepreneurs but also for already established social entrepreneurs. A clear and transparent framework would also lead to a greater understanding and acknowledgement of the importance of the social sector by communities, in general, which would contribute to deconstruct any preconceived notions and other cultural barriers. A guidebook for public entities and governments to support social

entrepreneurs would be of great importance to promote this type of entrepreneurship and assure the creation of organizations which represent an added value to communities and their quality of life.

According to our opinion, this topic requires more coverage and understanding – otherwise, generic programs and measures that are less effective might be prescribed. This study should be seen as a first approach towards a guidance which needs further development. The definition and the framework of this type of society should have a set of European guidelines in order to promote their dissemination and implementation.

---

[i] This research has been developed in the context of the Project Social Entrepreneurship Support Europe-SES EU (http://www.ses-project.eu/en/), which has been funded with support from the ECunder the Erasmus+ Program. This publication reflects the views only of the authors, and the Commission cannot be held responsible for any use that may be made of the information contained therein.

[ii] We do not consider Romania in this data analysis

References

Abu-Saifan, S. (2012) 'Social Entrepreneurship: Definition and Boundaries,' *Technology Innovation Management Review*, 22–27.

Aldrich, HE., Yang, T. (2013). 'How do entrepreneurs know what to do? Learning and organizing in new ventures', *Journal of Evolutionary Economics,* 1–24.

Almeida, LF. (1992) "Portugal e a Polónia", Imagem da Polónia, Zielinska, M. D. and Mueznik, L. L. (ed), Instituto da Biblioteca Nacional e do Livro, Lisboa.

Alves, MCG and Eduardo, CA. (2010), 'A Implementação Das Normas Internacionais de Relato Financeiro Na Europa - Uma Análise Dos Casos Polaco E Português,' *Revista Digital Del Instituto Internacional de Costos,* 6(2), 29–48.

Austin, J., Stevenson, H. and Wei-Skillern, J. (2006), 'Social and Commercial Entrepreneurship: Same, Different, or Both?,' *Entrepreneurship Theory and Practice*, 30 (1),1–22.

Bikse, V., Rivza, B. and Riemere, I. (2015), 'The Social Entrepreneur as a Promoter of Social Advancement,' *Procedia - Social and Behavioral Sciences* 185, 469–78.

Braga, JC., Proença, T. and Ferreira, MR. (2014), 'Motivations for Social Entrepreneurship-Evidences from Portugal,' *TÉKHNE - Review of Applied Management Studies,* 12, 11–21.

Braunerhjelm, P. and Hamilton, US. (2012), ' Social entrepreneurship– a survey of current research', Swedish Entrepreneurship Forum, 1-51.

Certo, ST. and Miller, T. (2008), 'Social Entrepreneurship: Key Issues and Concepts,' *Business Horizons,* 51(4), 267–71.

Cohen, J. (1988) 'Statistical power analysis for the behavioral sciences,' Hillsdale, NJ Lawrence Erlbaum Associates.

Corder, G. and Foreman, D. (2009) Nonparametric statistics for non-statisticians: A step-by-step approach, Wiley & Sons, New Jersey.

Delgado, MSM. (2014) 'A crise económica e financeira na União Europeia: Portugal versus Polónia,' *Lisboa School of Economics & Management*, 1-38.
Eesley, C., Roberts, EB. (2013) 'Are you experienced or are you talented?: when does innate talent vs. experience explain entrepreneurial performance?' *Strategic Entrepreneurship Journal,* 6, 207–219.

European Commission (2013), Social Economy and Social Entrepreneurship - Social Europe Guide, European Commission, Luxembourg.

European Commission (2014a), 'A map of social enterprises and their eco-systems in Europe - Synthesis Report', Luxembourg.

European Commission (2014b), 'Social innovation: A decade of Changes', Luxembourg.
Haugh, H. (2005) 'A Research Agenda for Social Entrepreneurship,' *Social Enterprise Journal,* 1(1), 1–12.

Howell, D. (2013) Statistical methods for psychology, Duxbury, Pacific Grove.
Karaphillis, G. (2010) 'Financing Social Economy Organizations: Research Results and Policy Recommmendations,' *Social Enterprise in Rural and Urban Development*, 1–5.

Kendall, J., Brooks, N., and Mohan, J. (2016), 'The English Third Sector Policy in 2015 : An Overview of Perceived Barriers to Realising Impact Potential,' Available at: http://thirdsectorimpact.eu/site/assets/uploads/documentations/tsi-barriers-briefing-no-1-english-third-sector-policy-in-2015/TSI-Policy-Brief-No3.pdf.

Lumpkin, GT., Moss, TW., Gras, DM., Kato, S. and Amezcua, AS. (2013) 'Entrepreneurial processes in social contexts: how are they different, if at all?,' *Small Business Economics*, 40, 761–783.

Martins, S., Couchi, C., Parat, L., Federico, C., Doneddu, R. and Salmon, M. (2004), 'Barriers to entrepreneurship and business creation', Arouca.

Nabi, G. and Holden, R. (2008), 'Graduate Entrepreneurship: Intentions, Education and Training' *Education + Training*, 50(7), 545–51.

Rykaszewski, S., Ma, M. and Shen, Y. (2013) 'Failure in Social Enterprises,' *SEE Change Magazine*, 1–28.

Shepherd, DA., Wiklund, J. and Haynie, JM. (2009), 'Moving forward: balancing the financial and emotional costs of business failure,' *Journal of Business Venturing*, 24,134–148.

Siegel, S. (1975) Nonparametric Statistics: for the behavioral Sciences, McGraw-Hill.

Silva, H., Amorim, M., and Dias, MF. (2015), 'Education and Training Needs of Social Entrepreneurs,' 5ª Conferência Ibérica de Empreendedorismo, Oeiras, Lisboa, 1–337.

Silva, H., Caravau, H., Amorim, M. and Dias, MF. (2016), 'Social entrepreneur: Does literature match reality?' Proceedings of the 9th International Conference for entrepreneurship, innovation and regional development (ICEIRD), 23-24 June 2016, Bucharest, Romania, 199–209.

Souza, GHS. (2014) 'Inventário de Barreiras e Facilitadores ao Empreendedorismo: construção e validação de uma medida psicométrica,' *Universidade Federal de Alagoas*, 1-76.

Sprent, P. and Smeeton, NC. (2001) Applied Nonparametric Statistical Methods, Chapman & Hall/CRC.

Zahra, SA. et al. (2009), 'A typology of social entrepreneurs: Motives, search processes and ethical challenges,' *Journal of Business Venturing*, 24(5), 519–532.

Appendix

Questionnaire

Project Social Entrepreneurship Support Europe-SES EU

Project Number: 2014-1-PL01-KA202-003633

http://www.ses-project.eu/en/

This questionnaire is structured in to three parts.

The first part aims at understanding what competences you consider to be critical for developing your role as a social entrepreneur. The second part is focused in listening to your perceptions about the needs for education and training whose offer you consider that need to be improved. Finally the final part includes questions that aim to characterize your academic and professional profile and your motivations for engaging in social entrepreneurship.

Part I: Critical Competences of Social Entrepreneurs

Question 1

We first would like to know what you think are the main areas where social entrepreneurs need support and training for the effective start-up of a social enterprise.

Please rate the provided statements about knowledge and competence areas using a scale from 1(Not at all relevant) to 5 (Extremely relevant).

Knowledge and competence areas		1	2	3	4	5
Sales and marketing						
Financial planning						
Organizational development						
Leadership and human resources management						
Operations management						
Laws and regulations						
Measuring impact						
Business and strategic planning						
Recruiting and working with volunteers						
Community engagement						
Presentation skills						
Social media						
Fundraising						
Developing the people and culture of organizations						
ICT Tools						
Foreign languages						
International markets						
Other (please specify)						

Question 2

Do you believe that the education and training for social entrepreneurs in the aforementioned areas should differ from that traditionally provided to other entrepreneurs (e.g. technology start-ups, etc.)?

Please indicate how much you you agree with the statement "The education and training offer for social entrepreneurs should be different that the one provided to other entrepreneurs…." for the various knowledge and competence areas. Use a rating from 1(Totally disagree) to 5 (Totally agree).

Knowledge and competence areas		1	2	3	4	5
Sales and marketing						
Financial planning						
Organizational development						
Leadership and human resources management						
Operations management						
Laws and regulations						
Measuring impact						
Business and strategic planning						
Recruiting and working with volunteers						
Community engagement						
Presentation skills						
Social media						
Fundraising						
Developing the people and culture of organizations						
ICT Tools						
Foreign languages						
International markets						
Other (please specify)						

Question 3

Please indicate to what extent each of the following reasons would lead you to question the idea of starting up a social business.

Please use a rating from 1 (Extremely unlikely) to 5(Most likely) to classify each reason.

Reasons that may lead to question the startup of a social business		1	2	3	4	5
Lack of managerial experience						
Lack of understanding about the concept of social entrepreneurship						
Aversion to risk						
Lack of technical knowledge about products processes, etc.						
Lack of knowledge about financing instruments and sources						
Lack of qualified and motivated staff and volunteers						
Contextual resistance and barriers (e.g. regulations, norms, culture, etc.)						

Question 4

What do you consider are the key ingredients for the successful implementation of a social entrepreneurship idea?

Please rate the factors indicated in the table below using scores from 1(Totally irrelevant) to 5 (Extremely relevant)

Factors for successful development of social entrepreneurship ideas		1	2	3	4	5
Academic (technical) qualifications of the social entrepreneur in the social business area						
Management competencies and qualifications of the social entrepreneur						
Ability to identify adequate financing instruments and sources						
Relational and contact network of the social entrepreneur						
Innovative character of the social entrepreneurship idea						
Previous work experience of the social entrepreneur						
Leadership and negotiation skills of the social entrepreneur						
Personality of the social entrepreneur						
Availability of motivated volunteers and collaborators						
Ability of social entrepreneurs to develop a detailed a business plan						
Familiarity with other social entrepreneurship experiences and business models						
Other (please specify)						

Question 5

What do you believe are core elements in the qualification of the people involved in social entrepreneurship initiatives?

Please attribute a rating from 1 (Totally irrelevant) to 5 (Absolutely necessary) to classify the need for specific education and training for the social enterprise phases identified below.

Preferred training models		1	2	3	4	5
Ability to work in teams						
Awareness and sensitivity to societal needs						
Ability to work with autonomy and to develop initiatives						
Flexibility and adaptation ability						
Working experience						
Technical competencies in the business specialty domain						
Institutional commitment						
Communication abilities						
Other (please specify)						

Part II – Education and Training Needs in Social Entrepreneurship

Question 6

Please let us know your perceptions about the existing education and training offer in the knowledge and competence areas that may be required for setting up social businesses.

Complete the following table indicating your perception about the availability of education and learning offers for the stated knowledge and competence areas using a scale from 1(Not at all existing) to 5 (Extremely relevant).

Knowledge and competence areas		1	2	3	4	5
Sales and marketing						
Financial planning						
Organizational development						
Leadership and human resources management						
Operations management						
Laws and regulations						
Measuring impact						
Business and strategic planning						
Recruiting and working with volunteers						
Community engagement						
Presentation skills						
Social media						
Fundraising						
Developing the people and culture of organizations						
ICT Tools						
Foreign languages						
International markets						

Question 7

Please rate the importance of obtaining specific education and training for different phases of social enterprise development. Please attribute a rating from 1 (Totally irrelevant) to 5 (Absolutely necessary) to classify the need for specific education and training for the social enterprise phases identified below.

Social enterprise development phases		1	2	3	4	5
Inspiration and diagnose of social needs and opportunities						
Selecting and structuring and of ideas for social enterprises						
Prototyping and piloting social entrepreneurship ideas						
Achieving sustainability of social entrepreneurship initiatives						
Scaling and disseminating social entrepreneurship initiatives						
Promoting effective social impacts of social enterprises						
Assessing results and impacts of social entrepreneurship initiatives						

Question 8

What was your awareness about the existing offer of education and training for social entrepreneurs? Please rate the following statements using scores from 1(Absolutely false) to 5 (Absolutely true).

Awareness statements		1	2	3	4	5
I can easily identify several existing programs of education and training for social entrepreneurs						
I am familiarized with the syllabi and contents of existing program of education and training						

for social entrepreneurs						
I have attended some social entrepreneurship training						
I know people who have attended some social entrepreneurship training						
I'd privilege the use of the Internet for finding information about existing programs of education and training for social entrepreneurs						
I'd privilege the use of the knowledge of my friends and acquaintances about existing programs of education and training for social entrepreneurs						
I'd privilege searching for information about programs of education and training for social entrepreneurs in specific publications and newsletters						
I'd privilege searching for information about programs of education and training for social entrepreneurs with specific institutions (e.g. business schools, associations, etc.)						

Question 9

Which factors would motivate you to enroll in programs for social entrepreneurs? Please rate the following options using scores from 1(Absolutely false) to 5 (Absolutely true).

Reasons for enrolling in social entrepreneurship programs		1	2	3	4	5
Updating and recycling knowledge in my academic and professional area						
Acquisition of new knowledge and competencies						
Specialization in a specific area						
Performance improvement						
Other (please specify)						

Question 10

Which type of training model would you prefer? Please use a rating from 1 (Extremely unlikely) to 5(Most likely) to classify each reason.

Preferred training models		1	2	3	4	5
General (classroom/workshop) training						
Individual consultancy to entrepreneur/manager						
Training-action programs in the enterprise						
Out-door training						
Internships						
On-line/e-learning						
Other (please specify)						

Part III – Characterization of the Profile of social Entrepreneurs

Now, please let us know some things about you, your background and your motivation for social entrepreneurship.

Question 11

What is your main academic background?

_____

Question 12

Can you describe the type of working experience you had before enrolling in the development of a social business idea? (e.g. business owner, technician, etc.)

_____

Question 13

Can you please indicate the length of your professional experience? (e.g. in years)

_____

Question 14

What is the main business area of your social enterprise/idea? (e.g. agriculture, tourism, healthcare, etc.)

_____

Question 15

Please indicate your age: _____

Question 16

Gender_____

Question 17

Please indicate to what extent each of the following statements describe your profile and your path into social entrepreneurship.

Please rate the following options using scores from 1(Absolutely false) to 5 (Absolutely true).

Statements		1	2	3	4	5
I've collaborated in a social enterprise before developing my own business idea						
I've enrolled in specific training for social entrepreneurs						
I've enrolled in generic entrepreneurship training						
I had a good previous education and training in business and management						
I've applied to competitions on social entrepreneurship ideas						
I know, and I'm acquainted with a large number of other social entrepreneurs						
The area of my social enterprise is very much aligned with my previous academic background						
It was easy to find collaborators and volunteers with adequate qualifications for working in a social enterprise						
The social enterprise is my main occupation and means of subsistence						

Question 18

In which development phase would you say is currently your social enterprise/idea?

Please rate the following options using scores from 1(Absolutely false) to 5 (Absolutely true).

Social enterprise development phases		1	2	3	4	5
Inspiration and diagnose of social needs and opportunities						
Selecting and structuring and of ideas for social enterprises						
Prototyping and piloting social entrepreneurship ideas						
Achieving sustainability of social entrepreneurship initiatives						
Scaling and disseminating social entrepreneurship initiatives						
Promoting effective social impacts of social enterprises						
Assessing results and impacts of social entrepreneurship initiatives						

Thank you very much for your time!

Resource Productivity in a Circular Economy

Luminta Pistol, Spiru Haret University, Bucharest, Romania, luminita_pistol@yahoo.com,

Rocsana Bucea-Manea-Tonis, Spiru Haret University, Bucharest, Romania, rocsense39@yahoo.com

Abstract

Nowadays the companies face the challenge of very high competition, expensive and insufficient resources, employee demoralization due to the effects of economic crises, expensive technologies. Besides all these problems the companies has to answer the need of disruptive changes and radical innovations in the management and production activity. A business development model should be sustainable on long term and has to take into account the environment protection. Thus emerge the idea of reducing cost by recycling and reusing the wastes, having a systemic perspective.

This paper aims to get a perspective on resources consumption and productivity of the economical agents analyzing the data published by Eurostat in Environmental Data Centre on Natural Resource. The result of data analysis is a regression model that weights the factors that influence the resource productivity.

Keywords: indicators in circular economy, resource productivity, regression

Introduction

Considering the lack of resources, the high cost of implementing green management models, the high cost of technologies and the low productivity in the added value chain the European Union (EU) is now agreed on important items that go towards circular economy (CE). CE relinquishes conventional economic model 'take-make-dispose' into a newest one 'prevent-reuse-recycle-recover-dispose" pattern [Pistol, 2017] in order to mitigate the risks of a new economical global crisis. CE should not become another buzzword in the sustainable development discourse.

There are more that 100 definitions for CE [Kirchherr, 2017], but it is obvious that the focus is on economic prosperity, with the concern on environmental and waste control. A low consideration is granted to social issues. "However, CE must be understood as a fundamental systemic change instead of a bit of twisting of the status quo to ensure its impact." The twist is to obtain economic growth by making more performing products that can be used for a longer time, instead of producing, selling or offering services to increase the companies' revenues. These products should be rather maintained then replaced. [Amui, 2017] "CE suggests keeping materials available instead of disposing them, and thus closing the loop of materials within the product lifecycle, in order to reduce resource usage and energy demand". [Ritzén, 2017]. "Expectations for the circular economy are articulated as: (1) a perfect circle of slow material flows; (2) a shift from consumer to user; (3) growth through circularity and decoupling; and (4) a solution to European renewal". [Lazarevic, 2017]

The article presents a regression model that explains in what extend the factors such as *new technologies for lowering carbon dioxide levels and air purification* or *improving buildings, ensuring efficient mobility* have facilitated the increase in resource productivity.

Literature Review

'Most of the methodologies developed so far measure resource efficiency on the basis of the environmental burden of the resource relative to the value of output. However, the key point of circular economy is keeping resources within the economy when products no longer serve their functions so that materials can be used again and therefore generate more value'[Maio, 2017].

The circular economy approaches are unlikely to make further energy efficiency savings disproportionately harder to achieve. Circular economy approaches have the potential to make significant energy savings that are complementary to other energy efficiency measures and equivalent to their potential. [Cooper, 2017]

In Jul-2017 Eurostat published an interesting data-source regarding essential elements of circular economy, called: ***Environmental Data Centre on Natural Resource***. [Eurostat, 2017]. The report presents elements on carbon dioxide evolution, management of waste, the urban population exposure to air pollution, pollutant emissions from transport – Nox and so on. It also had been allocated a section for research and innovation in the circular economy field. The data collected allow creating a perspective on resources consumption and productivity of the economical agents. It also identifies the week points in the implementation of the Roadmap to a Resource Efficient Europe.

The data source contains three categories of indicators, for the year 2000, 2005, 2010-2016, for EU-28, and for each country in EU:

- lead (resource productivity)
- dashboard (material, land, water, carbon)
- theme-specific indicators (turning waste into a resource, supporting research and innovation, getting the prices right, biodiversity, safeguarding clean air, land and soils, addressing food, improving buildings, ensuring efficient mobility).

Unfortunately Eurostat does not provide data for all these indicators for the period under review. Thus it had been extract only few of them to design a model, such as. *Resource productivity (RP), Carbon (C), Safeguarding clean air (SCA)* and *Improving buildings, Ensuring efficient mobility (IB).* The model aim is to weight how resource productivity is influenced by the new regulations and implementation of ecological technologies, methods and management. Other indicators that might influence *resource productivity* are related to Eco innovation.

Eco innovation became in important issue in the circular economy statement and is measured on the base of 16 sub-indicators from five thematic areas: eco-innovation inputs, eco-innovation activities, eco-innovation outputs, resource efficiency outcomes and socio-economic outcomes. The data source offer information for Eco innovation index [EII, 2016], as a average, in 2014-2015 (Fig.1). In the figure below we may see that the leads of eco innovation in Europe are Germany, Luxemburg, Finland and Denmark (EII almost 140). At the opposite pole there are counties such as Bulgaria (EII 40), Hungary (EII 60) and Romania (EII 70). The north countries are the engine of innovation, probably because they have more financial resources. The average of EII was constant, approximately 100 for the yeas 2013-2016. The lack of data for the year 2000, 2005, 2010-2013 urges us to exclude the index from the conceived economic model.

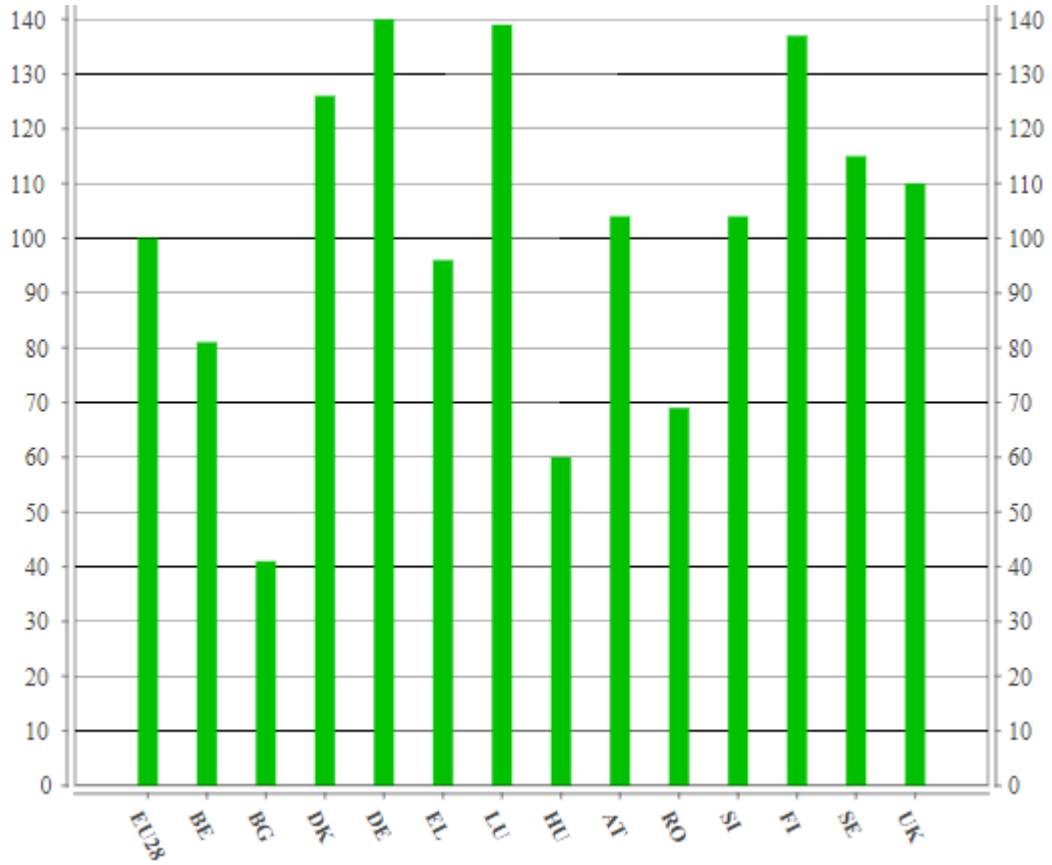


Fig.1: Eco innovation index for EU28

Research Methodology

Following the study of specialized literature and restrictions on access to data, we decided to study the evolution of resource productivity in the competitive environment of the CE. It had been designed a regression model that weight how *Carbon (C), Safeguarding clean air (SCA)* and *Improving buildings, Ensuring efficient mobility (IB)* can influence *Resource productivity (RP).*

The first step of the analysis is the studying the correlation between variables using the Pearson coefficient. This coefficient highlights the strong and positive correlation between carbon emissions - C and resource productivity (0.915 out of max 1), and between safeguarding clean air (SCA) and resource productivity - RP (0.958). This means that the more increase the first value of first variable, the more increase the second variable and at the same pace. A similar correlation can be seen between safeguarding clean air - SCA and carbon emissions (0,81). We notice that current production methods are harmful to the environment: the higher the production, the higher the carbon emissions and the more polluted the air. (Tabel 1).

Table 1: Correlation between variables (Pearon Coefficient)

Person	*RP*	*C*	*SCA*	*IB*
Resource productivity (RP)	1			
Carbon (C)	0.915994993	1		
Safeguarding clean air (SCA)	-0.958542183	-0.810805	1	
Improving buildings, Ensuring efficient mobility (IB)	-0.011940728	0.385972	0.196523996	1

The second step of the analysis: using Microsoft Eview, it had been designed a regression model, through *Least squares method.* At the beginning it had presumed that the null hypothesis is true, which asserts that the value of the coefficients of the variables will be zero (H0: coefficients = 0). The alternative hypothesis (H1) asserts the opposite of the null hypothesis: coefficients are different from zero. In other words, we start from the hypothesis that the mentioned factors (C, SCA, IB) have the value of coefficient 0, so they do not influence the resource productivity (RP).

Table 2: Regression Statistics and Coefficients – Least Squares

Dependent Variable: PRODUCTIVITY
Method: Least Squares
Date: 10/14/17 Time: 11:39
Sample (adjusted): 1 8
Included observations: 8 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IB	-0.031610	0.003314	-9.537790	0.0002
C	0.153724	0.005982	25.69801	0.0000
SCA	0.023687	0.003833	6.179719	0.0016

R-squared	0.993618	Mean dependent var	1.838500
Adjusted R-squared	0.991065	S.D. dependent var	0.220099
S.E. of regression	0.020805	Akaike info criterion	-4.627275
Sum squared resid	0.002164	Schwarz criterion	-4.597485
Log likelihood	21.50910	Hannan-Quinn criter.	-4.828201
Durbin-Watson stat	2.494027		

The role of determining the multiple **R-squared** coefficients is to indicate the meaning of the relationship of the observed values with the ones predicted by applying the regression model to the Resource productivity. Table 2 shows that R-squared is 0.99 and since its value is close to 1, demonstrates that the relationship between observed and predicted values is strong. This observation confirms the consistency of the model.

The R-squared coefficient of this model is 0.993, indicates that 99% of the *Resource productivity (RP)* variance is determined by the variation of causal variables *(Carbon - C, Safeguarding clean air - SCA , Improving buildings, ensuring efficient mobility -IB)* and only 1% of this influence can not be explained by the model. As R-squared takes values closer to 1, the regression model better adjusts the data in the sample. In this case, the value of 0.993 demonstrates the validity of the model, which means that the variables C, SCA and IB influence RP (Table 2).

Also, the **Adjusted R-squared** value (0.993) is almost equal with the value of R-squared (0.991), which proves that the influence of the independent variables (C, SCA and IB) is significant to explain variance of the dependent variable (RP) and allows the extension of the proposed regression model to the entire population surveyed. In this case, the variance of the dependent variable decreases with the difference between the two coefficients (0.993 - 0.991 = 0.002). This difference can be seen to be below 1 (Table 2).

The validity of the model is reinforces by the fact that the variation explained in the regression model (**S.E. of regression** 0.02) is greater than that of the residual variables (**Sum squared resid** 0.002)

The simplest test to highlight error self-correction is the **Durbin-Watson** test. In this case the D_W value is 2.49, included in the [2, 4] interval. The conclusion is that is no self-correction between errors.

The **Akaike criterion** (AIC) is often used in model selection for non-nested alternatives—smaller values of the AIC are preferred [Eview, 2017].. In the analyzed case AIC is very small (-4.62).

The **Schwarz Criterion** (SC -4.59) and **Hannan-Quinn Criterion** (HQ -4.82) are alternatives to the AIC that imposes a larger penalty for additional coefficients and have similar interpretation.

In order to be able to interpret the statistical significance of the regression model, it is necessary to apply Fisher test. The **Fisher** test generated validates the model and stands that the independent variables (IB, C, SCA) greatly contributes to the predictive power of regression. This statement is based on the fact that **Prob.** (the significance threshold of the model) is 0.00 for all independent variables, less than the sensitivity threshold of 0.01 (Table 2). It may be summarizes that the model correctly adjusts the data series. The probability as F test value to be due to hazard is less than 0.01.

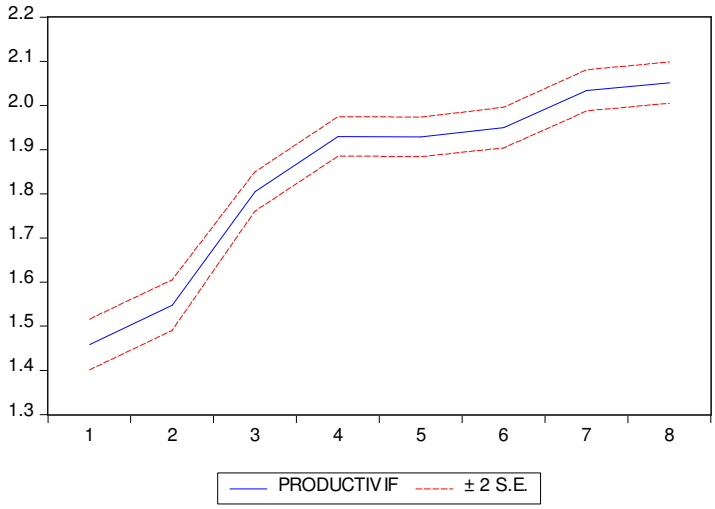
The regression equation for the model is:

$$\textbf{Resource productivity (RP)} = 0.15*C + 0.02*SCA - 0.031*IB + \varepsilon$$

Particular attention must be paid to the estimated coefficients of the regression equation (Table 2). For all independent variable (IB, C, SCA) the null hypothesis must be rejected because the significance threshold is Prob. = 0.00 <0.01. With a 99% probability and a small standard error of 0.0033, IB coefficient is -0.031. With a 99% probability and a small standard error of 0.0593, C coefficient is 0.15. With a 99% probability and a small standard error of 0.0038, SCA coefficient is 0.02.

In conclusion, the alternative hypothesis is accepted. It stands that C, SCA, IB, has the coefficient different from 0 and influences RP. The increase in resource productivity is associated with increase in Carbon emissions (C) and harming clean air (SCA). Improving buildings indicator and ensuring efficient mobility (IB) led to a decrease in productivity due to high costs.

The third step of the analysis is a forecast of resource productivity variable (fig.1). If the current trend is maintained, for the next years, it is predicted a constant increase of resource productivity. This is good news, but the unpleasant side is that increase of resource productivity is associated with increase of environment pollution. Steps have been taken to reduce pollution and protect the environment, but their share in the current context is lower, as it might be seen in the regression model (table 2).



Forecast: PRODUCTIVIF	
Actual: PRODUCTIVITY	
Forecast sample: 1 9	
Adjusted sample: 1 8	
Included observations: 8	
Root Mean Squared Error	0.016448
Mean Absolute Error	0.013311
Mean Abs. Percent Error	0.708298
Theil Inequality Coefficient	0.004445
Bias Proportion	0.000145
Variance Proportion	0.004544
Covariance Proportion	0.995311
Theil U2 Coefficient	0.126646
Symmetric MAPE	0.707390

Fig.1: Resource productivity forecast

Conclusions

Because human race extended the resource consumption above the limits making many negative footprints, they have to come up with solutions to reestablish the equilibrium. This solution seems to be CE. The companies of our century are increasingly aware of the need to adopt the eco trend. However, the cost of adopting the new economic model, of the CE is not easy to be paid, because of financial, structural, operational, attitudinal and technological barriers.

The results of the analysis made in this paper indicate that the new technologies, methodologies and managerial methods make their mark on the resources productivity. Of all the variables analyzed, it had been observed that the implementation of new technologies for lowering carbon dioxide levels and air purification have facilitated the increase in resource productivity. And the improving buildings indicator, ensuring efficient mobility, has led to a decrease in productivity due to high costs. In this respect, it is recommended to adopt new innovative models and technologies that promote sustainable development.

The model should be further developed with new variables such as: *turning waste into a resource, supporting research and innovation, getting the prices right, biodiversity, reducing land and soils footprint, addressing food, improving buildings, ensuring efficient mobility*, etc. Insufficient statistic data were provided by Eurostat.

Pointing to the future Innovation in management and technologies should offer better perspectives for both productivity and environment protection.

References

Amui, L.B.L., Jabbour, C.J.C., Jabbour, A.B.L and Kannan, D. (2017) 'Sustainability as a dynamic capability: a systematic review and future agenda toward a sustainable transition', *Journal of Cleaner Production*, 142, 308–322.

Cooper, S.J.G., Giesekam, J., Hammond, G.P, Norman, J.B., Owen A., Rogers J.G and Scott, K. (2017) 'Thermodynamic insights and assessment of the circular economy', *Journal of Cleaner Production*, 162, 1356-1367, ISSN 0959-6526, https://doi.org/10.1016/j.jclepro.2017.06.169.

ECI, 2016 [Online], [Retrieved September 3, 2017], Eco innovation index, http://ec.europa.eu/eurostat/web/environmental-data-centre-on-natural-resources/resource-efficiency-indicators/resource-efficiency-scoreboard/thematic-indicators/transforming-the-economy/supporting-research-and-innovation

Eurostat, 2017 [Online], [Retrieved September 10, 2017], http://ec.europa.eu/eurostat/web/europe-2020-indicators/resource-efficient-europe

Kirchherr, K., Reike, D. and Hekkert, M. (2017) 'Conceptualizing the circular economy: An analysis of 114 definitions', *Resources, Conservation and Recycling*, 127, 221-232, ISSN 0921-3449, https://doi.org/10.1016/j.resconrec.2017.09.005.

Lazarevic, D. and Valve, H. (2017) 'Narrating expectations for the circular economy: Towards a common and contested European transition', *Energy Research & Social Science*, 31, 60-69, ISSN 2214-6296, https://doi.org/10.1016/j.erss.2017.05.006

Maio, F., Rem, PC, Baldé, K. and Polder, M (2017) 'Measuring resource efficiency and circular economy: A market value approach', In *Resources, Conservation and Recycling*, 122, 163-171, ISSN 0921-3449, https://doi.org/10.1016/j.resconrec.2017.02.009.

Ritzén, S. and Sandström, GO. (2017) 'Barriers to the Circular Economy – Integration of Perspectives and Domains', *Procedia CIRP, 64*, 7-12, ISSN 2212-8271, https://doi.org/10.1016/j.procir.2017.03.005

Developing Entrepreneurship Education within Universities: The Italian "Contamination Lab" case

Giustina Secundo, Giuseppina Passiante, Maria Andriulo

Department of Innovation Engineering, University of Salento, Lecce, Italy,
giusy.secundo@unisalento.it; giuseppina.passiante@unisalento.it; mariandriulo@hotmail.it

Abstract

The focus of this research is to present a particular typology of entrepreneurial projects in the field of Entrepreneurship Education. The article describes the operational model of the "Contamination Lab" an innovative Laboratory aimed at developing an entrepreneurial mindset, creativity and innovation at University of Salento (Lecce, Italy) according to the learning strategy of the Entrepreneurship Education. The laboratory involves all the University's students with different backgrounds (Business, Humanities, Social science, Science, Engineering , Biology, arts etc..) through an innovative extra-curricular learning program to create an entrepreneurial awareness, mindset and capability. The final value is to grow in effectiveness and contamination of ideas, knowledge and skills within the University and the local Entrepreneurship Ecosystem according the Quadruple Helix model (Carayannis and Campbell, 2009).

Keywords: entrepreneurship education, entrepreneurial mindset, case study, quadruple helix.

Introduction and Background

In the entrepreneurial economy developing entrepreneurial capacity, competence and attitude to transform new ideas, technologies and inventions into products and services to create economic and social value through innovative business models (Allen 2009; Ratinho et al. 2015) becomes the real concern. This needs to be addressed in education, teaching and learning (Lamine et al. 2016; Henrekson and Rosenberg 2001) as a key competence to be developed by highly skilled human capital (Global Innovation Index, 2017; European Union, 2006; European Union 2016). Thus, equipping human capital with an entrepreneurial mindset could be considered as an important antecedent for developing technology entrepreneurship (Elia et al., 2017; Secundo et al, 2017): it represents the skill helping the citizenship, students at all levels of education, young entrepreneurs and start-upper to be creative and confident in whatever they undertake (European Commission, 2008) in order to react to business uncertainty, ambiguity and complexity (Gibb 2005). The entrepreneurial mindset, can be defined as the capacity to think creatively, strategically, analytically and reflectively; the confidence in one's abilities, the ability to collaborate, the well-developed communication skills and understanding of the current business context (Pollard and Wilson, 2014).

The literature claims that an entrepreneurial mindset can be developed (Kuratko 2005) and shows how schools, higher education and academic education are the most fertile ground to create this, above all university (INSEAD, WIPO, 2014). Particularly, in the academic education, Education Project Programs (EPP) are increasingly being established in an effort to equip students with the knowledge and competence needed to create economic value, but above all to create an entrepreneurial awareness (Duval-Couetil, 2013). In the last years, scholars highlighted the role of

Science and Technology Entrepreneurship Education (STEE) in promoting more entrepreneurial mind-sets in the field of advanced technologies has flourished in the academic community through a large number of initiatives (Fayolle 2008; Cassia et al. 2014; Lamine et al. 2016; Passiante and Romano 2016). In this context, University plays a fundamental role for promoting technological change and innovation (Bramwell and Wolfe 2008; Elia et al. 2017) as well as for creating favorable environments for entrepreneurship cultural development (Kirby 2004).

The entrepreneurship education has received a significant increase also within the Italian Universities even if the scholars found two problems related to the lack of effectiveness and the achievement of the desired goals. Firstly, most of the entrepreneurial education courses are present in business schools and department; secondly, the organization of courses did not innovate much traditional teaching methods (Iacobucci, Donato, Micozzi, 2012). The research shows that the real challenge is the shift from education "about" entrepreneurship to education "for" (Kirby, 2004) and "through" entrepreneurship; the approaches and methodologies to create places for entrepreneurial skills development is the shift from "traditional methods" to "innovative methodologies" (as simulations, meeting with entrepreneurs, project works, etc...) where the interactions of University' students with Industry, Institutions and Civil Society are encouraged in sustaining the Quadruple Helix Model (Carayannis and Campbell, 2009).

Against this premises, there is still the need to understand in practices which are the processes for developing an entrepreneurial mindset. With the aim to cover this gap, this paper describes a framework to understand the learning processes characterizing the entrepreneurial mindset development for innovative entrepreneurship within Italian University.

Methodology: Case study

The paper adopts a case study methodology (Eisenhardt, 1989) aimed to analyze the processes to create an entrepreneurial mindset and skills in the university's students. The case study analyzes the phases of design of an innovative EPP related to entrepreneurial education at University of Salento (Lecce, Italy) aimed at instilling in students with different background and enrolled in undergraduate, graduate and post graduate studies an entrepreneurial mindset , creativity and innovative ideas. The project named Contamination Lab of University of Salento (hereafter "CLab@Salento") has been successfully evaluated by the Italian Ministry of University and Research – MIUR. The project has been ranked third among the 25 projects submitted by the Universities located in the South of Italy; Just 7 projects will receive funds from the MIUR. The project has a duration of three years (starting on September 2017) and will organize 6 editions of an innovative EPP. The preliminary phase of design and organization of the learning and experimentation activities started in the month of September 2017. The launch of the entrepreneurship program is scheduled on November 2017 and will involve 40 students.

Preliminary Findings

This section is aimed to describe the design phase of the "CLab@Salento" a laboratory of "contamination" which involves university students from different faculties and high school students. The operational model of "CLab@Salento" can be described in five components (figure 1): 1) the programs' aim and final impact; 2) the program basic value; 3) the learning path to develop entrepreneurial mindset; 4) the stakeholders involvement in the learning strategy; and 5) the entrepreneurial mindset assessment.

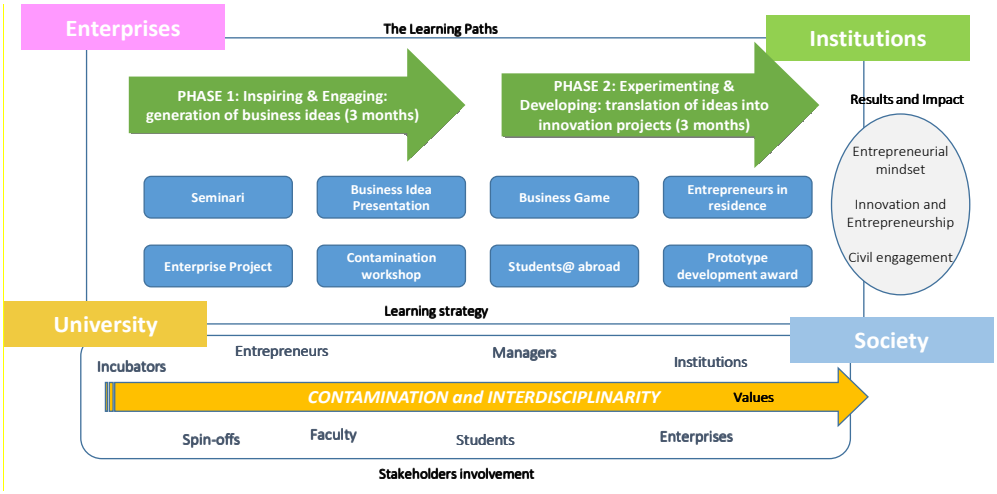


Figure 1: The Contamination Lab "CLab@Salento" Learning & Experimentation model

The program aim and final impact. The project aim is to create a virtual and physical laboratory to develop and diffuse in the University students an entrepreneurial mindset and awareness, creativity, innovation and entrepreneurial and business culture; develop "spirit of initiative and entrepreneurship", understood as the ability to translate ideas into actions; develop entrepreneurial awareness with models of learning with strong interdisciplinary connotation; integrate managerial and scientific skills for the analysis of business opportunities; develop team building skills and profitable contamination between different scientific areas. Three "pillars" in which University of Salento is involved will be taken in consideration: *smart technologies* (nanotechnologies, robotics, innovative materials, digital economy & banking, new digital tools), *bio-economy* (bio-based industries, biotechnologies, blue growth, green chemistry, etc..), *cultural and creative industries* (tourism, storytelling, cultural heritage valorization, empowerment, …). This aim will be achieved using innovative learning methodologies based on the contamination of different background, interdisciplinary teams, project-based learning activities guided by different local and international stakeholders. The final impact for the University is to achieve the third mission aim through the creation of a permanent laboratory for the diffusion of innovation at local level. The final result for the enterprise and companies participating to the activities is to develop innovative projects in collaboration with student and corporate entrepreneurship in the form of new product, services and processes. Finally, the impact for the civil society is the involvement of the institutions for the generation of social innovation and knowledge transfer.

The program basic value: includes the Interdiscipilinarity and the Contamination. The first one is related to the diversity in the students' composition: the Laboratory is a place where the sharing and collaboration among ideas of students of different degrees (from high school to doctorate) and various disciplines; the second one is the Contamination among students, between students and teachers, with the other contamination laboratory already active in Italy, with the world of entrepreneurial innovation, with the territory, with the school world, with Europe and the rest of the world. In the process of contamination, all the actors of the entrepreneurship ecosystem of the territory interact to implement a profitable contamination of ideas, knowledge and skills both for the spread of entrepreneurial culture and for the development of the territory.

The learning path to develop entrepreneurial mindset. The learning path lasts 6 months and it includes two phases (both of which lasts for 3 months). *Phase 1: Inspiring & Engaging* aimed to the development of entrepreneurial awareness and to the generation of business ideas. The learning

strategies mainly concern: *Business Idea Competition*: ideas created by students and selected to start the creation of interdisciplinary teams; *Enterprise Project Idea*: businesses present innovative ideas to be developed by interdisciplinary team; *Contamination Learning Workshops*: teachers, entrepreneurs and students discuss on selected issues; *Entrepreneurs in Residence*: entrepreneurs share their experiences in workshops. The core contents of this phase are: Communication and team building, Innovative entrepreneurship; Technological foresight; Creative thinking; Business Model Canvas; Arts and Creativity for Business; Innovation and territory empowerment.

Phase 2: Experimenting & Developing is characterized by the translation of ideas into innovation projects etc. The initiatives will mainly concern *Students@abroad*: students are selected for travelling to an international or national center; *Business Game*: on-line simulations; *Prototype development Award*: activities including the study of project feasibility and the development of prototype. The core contents of this phase are: Project Management, Design Thinking, Digital Enterprise, IPR: intellectual Property right, Communication 2.0, Business Plan and rapid Prototype development.

The stakeholders involvement in the learning strategy. The stakeholders involvement is very important for entrepreneurial learning strategy. They includes university faculty and all the actors of the Entrepreneurship ecosystem, as the regional institutions, entrepreneurs, managers, local companies, national enterprises, International Centers on Entrepreneurship and Innovation, European Universities and citizenship (Secundo, del Vecchio, Passiante,2015) which can contribute providing seminars, developing innovative projects proposed to the students.

The entrepreneurial mindset assessment. This section regards the short- and long-term impact monitoring indicators grouped by impact areas. They refer to the knowledge acquisition and theory background, the ability to apply the concept, the capacity to generate new value (Kim, 1993) and the capacity to contaminate. In particular, the indicators are related to: Relationship and Impact in territory; Interdisciplinarity; Context; Innovative Enagagement; Entrepreneurship; Training; University Contamination; Institutional and Industrial Contamination; Internationalization.

Conclusions

This paper provides a descriptive framework to show how is possible to create entrepreneurial mindset in the academic and university field, analyzing all the processes to develop (Duval-Couetil, 2013). Future research will be aimed to describe more in deep the “CLab@Salento” operational model discussing the phases of monitoring and assessment of the planned results for students and for all the stakeholders involved into the projects.

Main references

Duval-Couetil, N. (2013), “Assessing the Impact of Entrepreneurship Education Programs: Challenges and Approaches”, *Journal of Small Business Management,* Vol. 51 No. 3, pp. 394–409.

Elia, G., Secundo, G., & Passiante, G. (2017). Pathways towards the entrepreneurial university for creating entrepreneurial engineers: an Italian case. *International Journal of Entrepreneurship and Innovation Management*, 21(1-2), 27-48.

Iacobuzzi, Donato, Micozzi (2012) “Entrepreneurship education in Italian universities: trend, situation and opportunities”, *Education and Training,* Vol. 54 No. 8/9,pp. 673-696.

Kim, D.H. (1993) 'The individual and organizational learning', *MIT Sloan Management Review,* Vol. 35, No. 1, pp.37–50.

Kiry, D. (2004), "Entrepreneurship education: can business schools meet the challenge?", *Education Training,* Vol.46 Nos 8/9, pp.510-519.

Secundo, G., Del Vecchio, P., Schiuma, G and Passiante, G. (2017). "Activating entrepreneurial learning processes for transforming university students' idea into entrepreneurial practices", *International Journal of Entrepreneurial Behavior & Research*, Vol .23 No.3, pp. 465-485.

Venkataraman, S. (2004) 'Regional transformation through technological entrepreneurship'*, Journal of Business Venturing*, Vol. 19 No. 1, pp.153–167.

Accounting Information – The Indispensable Support Of The Analysis Of Fiscal Deficit Of The Romanian State Budget

Oana Bogdan, Faculty of Economics and Business Administration, West University, Timisoara, Romania, oana_bogdan26@yahoo.com, oana.bogdan@e-uvt.ro
Aura Domil, Faculty of Economics and Business Administration, West University, Timisoara, Romania, aura.domil@e-uvt.ro
Dorel Mateş, Faculty of Economics and Business Administration, West University, Timisoara, Romania, dorel.mates@e-uvt.ro
Maria Moraru, Faculty of Economics and Business Administration, West University, Timisoara, Romania, maria.moraru@e-uvt.ro

Abstract

In Romania, the taxpayer is obliged to calculate, declare and pay the contributions to the State Budget. The accounting information provided by the economic entity is very important for the state institutions because based on it they determine the fiscal policy, calculate the national income and other statistical indicators. This paper discusses the dynamics of the fiscal deficit of the Romanian Budget on the 31-st of December 2014 as compared to the same period in 2015 and 2016. We have chosen these three years because we wanted to identify the effects of reducing fiscal pressure on the level of State Budget collecting system, given that from October 1st 2014 - the employer's social insurance contribution was reduced by 5 percentage points and from January 1st 2016 VAT has fallen from 24 to 20 percentage points, and now (2017) at 19%; the research has been done on the basis of the data offered by the Romanian National Agency for Tax Administration (NAFA) on 200 companies considered as large business taxpayers. The results of the research present the level of unpaid taxes of these companies in the context of reducing fiscal pressure, the ways of collecting debts as well as the impact of uncollected debts on certain fields of activity in the public sector.

Keywords: accounting information, fiscal deficit, State Budget

Introduction

The way of organizing the society implies putting some funds at its disposal in order to fulfil its functions. Gradually the in kind incomes are replaced by monetary revenues which take the form of compulsory installments. To assure the level of returns necesary to the State and in order to mobilize and track them there has been funded a specialised agency called Revenue Office. The Revenue Office is defined as „the State Agency which establishes taxes and tolls and goes after those who do not pay up their taxes."

This paper observes the situation of the fiscal deficit correlated with the large business taxpayers and the impact of uncollected debts on the State Budget. Despite the taxpayers have a series of ways to pay up debts still they cannot pay their exigible debts and they find themselves in the position of not being able to pay all their taxes.

The state revenues have greatly diminished because of uncollected fiscal taxes and implicitly the quantity of goods and public services offered to the citizens has also decreased. A sector affected by the lack of budgetary funds is the health sector, thus hospitals are deprived of high quality medicine, equipment, medical asssistance. In many cases doctors do not have performance equipment to cure the patients in best conditions and a great number of care units do not have the European hygiene standards. Loans have been made because of uncollected funds and depending on the tax refund period the State overburdens the following generations who will have to pay back.

The Research Methodology

The research method consisted in reviewing the approaches of the specialty literature, articles and special studies published in national and international magazines. We followed a detailed approach of the dynamics of the budgetary fiscal deficit by collecting the data needed for a comparative study regarding the evolution of the Romanian fiscal deficit in the last 3 years.

I. Dynamics of the fiscal deficit of the Romanian State Budget in relatition to the large business taxpayers

Accounting information must allow both existing investors and potential ones to identify, measure, clarify, evaluate all operations and activities of an entity. Without a doubt, one of the most important products that a bookkeeper offers is the accounting information. This enables managerial decisions and appropriate investment for existing and potential investors as well, according to the reaserch made by Vătăşoiu C.I. (2010). Domnișoru S. (2011) mentioned that accounting information are part of the treasure of knowledge and of investigation of the issuing entity and of interested parties.

In the reaserch made by Andone I., Tabără N (2006) accounting information, the result of a system of principles and rules, relatively homogeneous, remains the „ace" from his sleeve, of different groups of users, providing a high degree of credibility in relation to other sources of information on the organization.

Fiscal debts represent property rights resulting from the relations of fiscal rights. From the foregoing relations we observe both the content and the amount of tax debts which represent determined rights consisting in:

a) The right to levy taxes, contributions which are considered revenue budget, the right to refund the value added tax, the right to tax refunds, contributions etc. known as main fiscal debts.
b) The right to ask for penalities for delays known as accessory fiscal debts (see also bonds).

Law stipulates that the internal revenue service is endowed to ask for the annulment of a debt and to excuse the indebt to pay a bond in the debtor's place.

Fiscal debt and correlative financial bind are both possible in case of a tax base that generates them. Fiscal deficit as well as correlative fiscal bind occur in case of a tax base that generates them. Taking into account that the Romanian fiscal system is a declarative one and implies voluntary action of each tax payer to estimate, declare and pay the due taxes. The present study is based on the data offered by the Romanian National Agency for Tax Administration (NAFA) which has to provide resources for public expenditures by collecting and managing taxes and contributions owed to the State Budget.

State Budget Deficit is formed by:

- tax on profit,
- VAT,
- income tax,
- excise duties,
- other taxes,
- interests and penalties.

On the 31-st of December 2014 and on the 31-st of December 2015 and 2016 the Romanian National Agency for Tax Administration published the lists with the unpaid fiscal debts of the large business taxpayers. From those lists it results the following:

❖ **Unpaid fiscal debts of the large business taxpayers on the 31-st of December 2014**

On the 31-st of December 2014, the unpaid fiscal debts of the large business taxpayers amounts to **4.018.099.606** lei. As can be seen in table no. 1 this amount represents the sum of the following obligations:

Table 1: Unpaid fiscal debts of the large business taxpayers on the 31-st of December 2014 - the amount expressed in lei- 1 euro at 31-st. Of December 2014 = 4,4821 lei

Nr. Crt	Obligation	Amount
1	Tax on profit	21.691.818
2	V.A.T	1.116.963.840
3	Income tax	237.206.985
4	Excise duties	65.906.388
5	Other taxes	209.403.370
6	Interests and penalties	2.366.927.206
	TOTAL	**4.018.099.606**

(Source: own interpretation after the published list of NAFA)

From the data showed in the table we can observe that in 2014 the level of interests and penalties owed by large business taxpayers is very high, namely 59%. Debts from V.A.T are second in place in the top of unpaid bonds, namely 28%. The tax on wages as well as taxes called „other taxes" contribute with sums representing 11% of the total debts owed to the State. In the budget structure we also find revenues obtained from excise duties which in this case represent 1,6% and the tax on profit which contributes with only 0,4% of the total of unpaid debts.

❖ **Unpaid fiscal debts of the large business taxpayers on the 31-st of December 2015**

On the 31-st of December 2015, the unpaid fiscal debts of the large business taxpayers amounts to 2.538.327.435 lei. As can be seen in table no. 2 this amount represents the sum of the following obligations:

Table 2: Unpaid fiscal debts of the large business taxpayers on the 31-st of December 2015 -the amount expressed in lei- 1 euro at 31-st. Of December 2015 = 4,5245 lei

Nr. Crt	Obligation	Amount
1	Tax on profit	18.441.154
2	V.A.T.	500.754.712
3	Income tax	195.608.637
4	Excise duties	188.235.872
5	Other taxes	151.417.262
6	Interests and penalties	1.483.869.798
	TOTAL	**2.538.327.435**

(Source: own interpretation after the published list of NAFA)

From the data showed in the table we can observe that in 2015 the level of interests and penalties owed by large business taxpayers is very high as well, namely 58%. Debts from V.A.T are second, namely 20%. The tax on wages, 8%, as well as taxes called „other taxes", 6%, contribute with sums representing 14% of the total debts owed to the State. In the budget structure we also find revenues obtained from excise duties which in this case represent 7% and the tax on profit which contributes with only 1% of the total of unpaid debts.

❖ **Unpaid fiscal debts of the large business taxpayers on the 31-st of December 2016**

On the 31-st of December 2016, the unpaid fiscal debts of the large business taxpayers amounts to 1.043.710.209 lei. As can be seen in table no. 3 this amount represents the sum of the following obligations:

Table 3: Unpaid fiscal debts of the large business taxpayers on the 31-st of December 2016 -the amount expressed in lei- 1 euro at 31-st. Of December 2016 = 4,5411 lei

Nr. Crt	Obligation	Amount
1	Tax on profit	162.408.307
2	V.A.T.	484.773.198
3	Income tax	25.225.525
4	Excise duties	12.877.826
5	Other taxes	82.818.793
6	Interests and penalties	275.606.559
	TOTAL	**1.043.710.209**

(Source: own interpretation after the published list of NAFA)

From the data showed in the table we can observe that in 2016 the V.A.T. level is high, namely 47%. Debts from interests and penalties are second in place in the top of unpaid bonds, namely 26%. The tax on wages, 2%, as well as taxes called „other taxes", 8%, contribute with sums representing 10% of the total debts owed to the State. In the budget structure we also find revenues obtained from excise duties which in this case represent 1% and the tax on profit which contributes with 16% of the total of unpaid debts.

Having this database, in the next figure, Figure nr.*1 The dynamics of the unpaid fiscal debts*, we can see the dynamics of the unpaid fiscal debts of these 200 comapanies, in relation to the State budget in the years subject to the analysis:

- the amount expressed in lei –

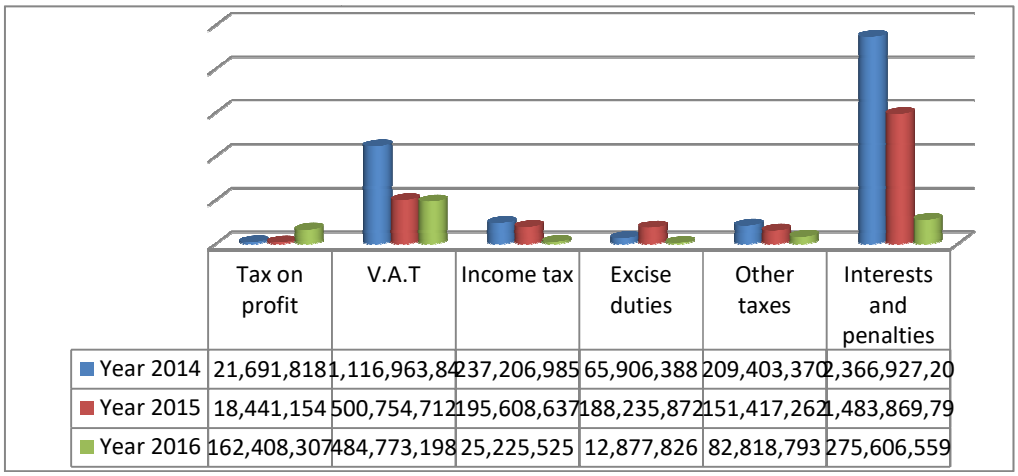


Fig. 1: The dynamics of the unpaid fiscal debts
(Source: own interpretation after the published list of NAFA)

Comparing the values registered on the 31.12.2016 with those registered in the same period of 2015 and 2014 we can observe that the level of unpaid debts of the large business taxpayers has greatly diminished. If in 2014 the debts of the large business taxpayers reached **4.018099.606** lei, in 2015

they dropped to **2.538.327.435** lei and in 2016 the dropping trend amounted the sum of **1.043.710.209** lei.

In the joint figure we can observe that from 2014 and up to 2016 the sums coming from VAT, income tax, other taxes as well as those coming from interests and penalties dropped each year. In exchange in 2016 compared with 2014 the sums coming from the tax on profit have significantly increased from 21.691.818 lei, the debt registered at the end of 2014 up to 162.408.307 lei debt registered on the 31.12.2016. The excise duties situation is opposed to that registered in the case of tax on profit. Thus if in 2014 the companies' debts due to the State reached the value of 65.906.388 lei and in 2015 the values of those debts compared to the previous year have almost tripled and by the end of 2016 the values dropped to 12.877.826 lei.

Generally the drop in debts of the large business taxpayers in 2016 compared to the previous 2 years represent a favourable difference in the actual economic context. The State has fewer uncollected debts from the large business taxpayers in 2016 compared to the same period of 2015 and 2014. Does this imply a more eficient way of collecting debts or has the activity of the companies diminished each year?

II. Means of collecting the taxes needed for public financing

To collect debts due to the State, the fiscal code stipulates the following possibilities: payment, compensation, reimbursement, debtor's insolvability, commissioning payment, enforcement, allowances and assignment of debts.

To underline the means of collecting the taxes needed for public financing we made an analysis of the 200 companies. Using the annual charts we can percentualy analyse the most used method for paying up debts.

- **Year 2014**

In 2014 the State deficit reached the value of **4.018.099.606** lei and represented the sum of restant debts of 200 companies considered large taxpayers. From the total of 200 companies, most of them are in the position in which the enforcement has started (80% of cases). In figure no. 2 Means *of paying up debts due to the State Budget in 2014,* we observe that means of collecting the debts predominates in most cases. 35 companies (17,5%) are waiting for an answer at their request for compensation and 5 companies (representing 2,5% of the 200 companies) benefit of allowances.

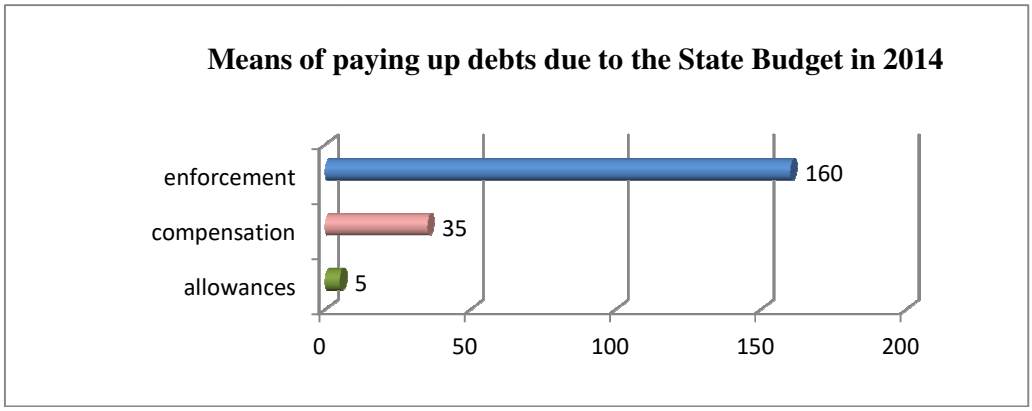


Fig.2 : Means of paying up debts due to the State Budget in 2014
(Source: own interpretation after the published list of NAFA)

❖ **Year 2015**

In 2015 the State deficit reached the value of 2.538.327.435 lei and represented the sum of restant debts of 200 companies considered large taxpayers. From the total of 200 companies, most of them are in the position in which the enforcement has started (100 companies, namely 50%), as can be seen in the figure no.3 *Means of paying up debts due to the State Budget in 2015*. 40 companies (20%) are waiting for an answer at their request for compensation, 60 companies (representing 30% of the 200 companies) are in insolvency.

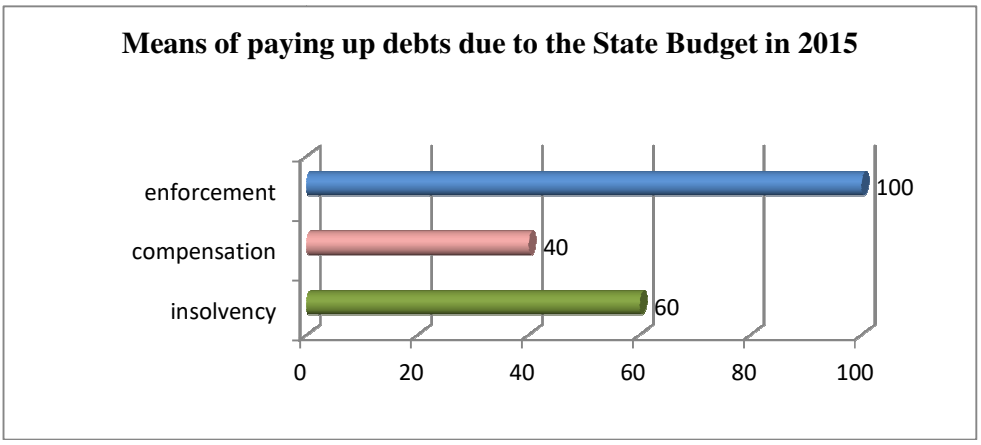


Fig. 3 : Means of paying up debts due to the State Budget in 2015
(Source: own interpretation after the published list of NAFA)

❖ **Year 2016**

In 2016 the State deficit reached the value of **1.043.710.209** lei and represented the sum of restant debts of 200 companies considered large taxpayers. From the total of 200 companies, most of them are in the position in which the enforcement has started, as we can observe in figure no.4 *Means of paying up debts due to the State Budget in 2016,* that means of collecting the debts predominate in 60% of the cases (120 companies). 50 companies (25%) are waiting for an answer at their request for compensation and 30 companies (representing 15% of the 200 companies) are in insolvency.

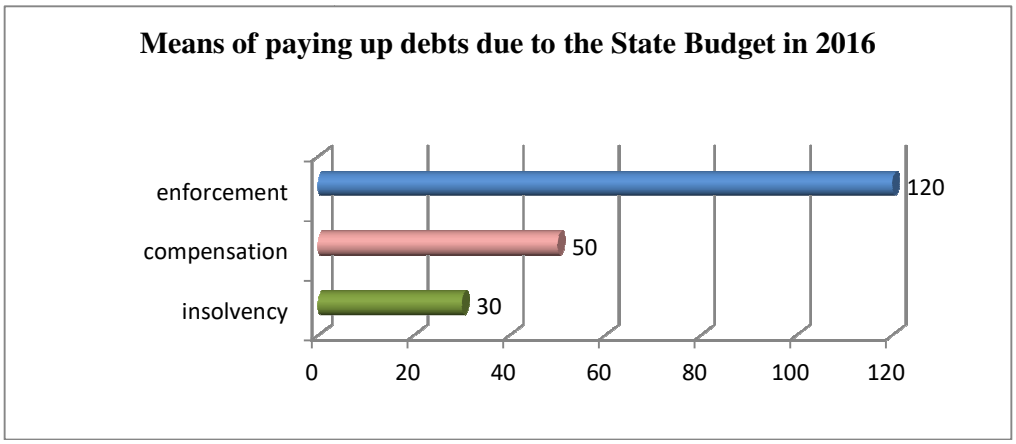


Fig. 4 : Means of paying up debts due to the State Budget in 2016
(Source: own interpretation after the published list of NAFA)

As far as can be seen from the charts, the most common mean to collect debts to the State Budget is by enforcement. But an important question remains, what happens, however, in the situation when instead of outstanding amounts, the State notes that are auctioned a stapler and a printer found at companies with huge debts to the State Budget?

Conclusions

Causes and effects of uncollected debts

Even if there are numerous ways of collecting debts, the lack of resources, the lack of available funds to pay debts block the collecting process.The biggest loss comes from the annual debts which are prescribed and cannot be collected as well as from the intrinsec loss generated by any uncollected fiscal debt which is added to the financial burden that hinders the citizens.

We may say that the effects generated by contributions and taxes payable by physical entities and juridical entities are linked to their reactions towards collecting taxes. Generally the attitude regarding taxes is not one of acceptance but an attitude of refusal of paying fiscal debts. Because of uncollected debts, the State is obliged to appeal to measures as foreign loan. In addition to the loans that have already been made from Romanian banks, the State has asked for the support of the International Monetary Fund. This loan has been conditioned by some clauses as adopting the unique wage law, cutting the budgetary jobs, cutting bonuses and incentives as well as wage freezein the budgetary sector for a certain period of time.

Allocation and effective use of public finances represent two of the most important issues for public authorities since making public expenditures is conditioned by using the resources came from taxes.

The authorities give the resources specific usages as sustaining expenditures which are consuming resources like those serving for collective utilities which cannot be obtained individually as: expenditure related to public order or purchases made for the good functioning of pubic institutions. From economic point of view these expenditures do not produce revenues but they consume resources which need to be permanently refunded. In addition to those traditional state expenditures there are other expenditures which need only advanced resources. They include investments in economic entreprises or subsidizing private companies. The result of these expenditures is focused on durable goods and economic services which can be recovered and can also be income generating. A concrete example in this case is the minimis aid offered by The Romanian Government to stimulate investements of small and medium companies and to create new jobs. Besides these expenditures, there are expenditures made with the educational system, the health system and with culture. They have a mixed character and they are financed both from public and private sector. Dual funding of expenditures represent an objective necessity taking into account that they are intended for expensive areas that demand for bigger and bigger budgetary funds. Thus the State assumes the budgetary resources, it finances primary expenditures following that high-quality services are supported in part by beneficiaries.

As it can be seen the collection of state debts is particularly important for "the good" of the whole society because otherwise the unpaid debts of entities will affect all industries and there is a risk of affecting the following types of expenses: social-cultural or defense expenditures

It can be said that symbolically the economic system can be compared to a circular chain which may break at the weakest link . Therefore there is a priority in supporting an intense economic activity which could generate jobs and by horizontal development it should lead to increasing the number of taxpayers, increasing the amount of wages owed to the state as high or substantial profits resulting in improved productivity. With countless unemployed and socially assisted persons the Stae is growing weak and increasingly impoverished. Instead the State can be strengthen by a policy of supporting the private economic sector which has demonstrated over time its ability to absorb labor and generate revenue to the budget. It goes without saying that the State should participate by paying on time the commitments negotiated with operators so that they could be able to pay taxes, fees and contributions at maturity.

Acknowledgement

This work was conducted as associate members of ECREB – East European Center for Research in Economics and Business, Faculty of Economics and Business Administration, West University of Timisoara, J.H. Pestalozzi Street, No. 16, 300115. The authors gratefully acknowledge the use of services and facilities of ECREB.

References

Andone I., Tabără N., (2006) *Contabilitate, tehnologie şi competitivitate,* Editura Academiei Române, Bucureşti,
Domnișoru S., *Audit statutar şi comunicare financiară*, (2011) vol.I, Editura Economică, București

Mateş D., Ineovan Felicia, (2010), *Contabilitate financiară. Concepte de bază. Tratamente specifice. Studii de caz. Ed. Mirton, Timişoara;*
Mateş D., Domil Aura, Artene A., Hlaciuc Elena, Grosu Veronica, Tamba A., Breban Veronica, Puşcaş Adriana, Ursachi Antonela, Socoliuc M., Bogdan Oana, (2016), *Contabilitatea şi gestiunea fiscală a entităţilor economice*, ed.Eurostampa, Timişoara;

Moraru Maria, (2005) *Bugetul general consolidat, Editura Mirton, Timişoara*
Pereş I, Bunget O., Dumitrescu A, (*2008), Control financiar, Editura Mirton, Timişoara*

Pătraşcu H., (2009) *Culegere de practică judiciară în materie fiscală,* Editura Wolters Kluwer, Bucureşti
Sasu H., Tâţu L., (2008), *Codul de procedură fiscală, comentarii şi explicaţii*, Editura C.H.Beck, Bucureşti

Vătăşoiu C.I., Gheorghe M., Motoniu, I. D. Boca, I. S., *Informaţia contabilă – baza analizei financiare în deciziile de investiţii*, Analele Universităţii „Constantin Brâncuşi" din Târgu Jiu, Seria Economie, Nr. 4, 2010
***O.M.F.P. nr. 1802 din 29 decembrie 2014 - Partea I pentru aprobarea Reglementărilor contabile privind situațiile financiare anuale individuale și situațiile financiare anuale consolidate emis de MINISTERUL FINANȚELOR PUBLICE și publicat în MONITORUL OFICIAL NR. 963 din 30 decembrie 2014;

***Ghid practic de aplicare a reglementărilor contabile privind situațiile financiare anuale și individuale și situațiile financiare anuale consolidate aprobate prin O.M.F.P. 1802/2014, Ed. CECCAR, 2015.
*** *Ordinul nr. 1.294/2007 al preşedintelui ANAF privind impozitele, contribuţiile şi alte sume care se plătesc de contribuabili în contul unic.*

*** Codul de procedură fiscală cu normele metodologice de aplicare *OG nr.28/2013*
*** Legea nr. 123/2014 pentru modificarea Legii nr. 571/2003 privind Codul fiscal (reducerea cotelor CAS pentru angajatori) publicată în Monitorul Oficial nr. 687 din 19 septemebrie 2014.

*** https://www.anaf.ro/restante/
***https://ec.europa.eu/taxation_customs/sites/taxation/files/resources/documents/taxation/vat/how_vat_works/rates/vat_rates_en.pdf

***https://www.theatlas.com/charts/HyqIqZLd

Semantic Pattern-based Automatic Annotation Process of Images Shared on Social Networks

Mariam Bouchakwa, MIR@CL Laboratory, Faculty of Economic Sciences and Management of Sfax, Sfax University, Tunisia, mariam.bouchekwa@gmail.com

Yassine Ayadi, MIR@CL Laboratory, College of Business Administration, Taibah University, Saudi Arabia, ayadi.yassine@gmail.com

Ikram Amous, MIR@CL Laboratory, National School of Electronic and Telecommunications of Sfax, Sfax University, Tunisia, ikram.amous@isecs.rnu.tn

Abstract

Nowadays, multimedia document sharing networks, in particular images, have become very popular. They enables to host a massive amount of data stocked in the databases. Therefore, the discovery of the most relevant images, which respond to the users' needs, constitutes a challenge for researchers. Thus, many research studies have been focusing on improving the images annotation process. In fact, an effective annotation helps to facilitate and optimize the images research process.

In this context, we suggest in this paper an annotation approach dedicated to the socio-tagged images. The suggested approach consists of constructing and inferring a set of semantic rules that specifies the different semantics of an image according its semantic facets pattern. These rules are presented via the logic of predicates. Experimental studies are performed on a collection of 25.000 socio-tagged images shared in *Flickr* service and the evaluation results demonstrate the effectiveness of the suggested approach.

Keywords : Socio-tagged Images, Domain Ontology, Semantic Facets Pattern, Semantic Rules, Semantic Annotation and Inference Processes, Enriched Ontology.

1. Introduction

Previously, the information research process has treated only text documents. Nevertheless, with the progress of the multimedia technologies and the emergence of the Web 2.0, the concept of document cover other content types such as image, video and audio. Accordingly, the mass information available on the web, in particular the images, has grown exponentially especially with the popularity of the social networks. Hence, the research process of the most pertinent images has become an extremely difficult task that requires adequate discovery methods adoption. In this context, we distinguish two research methods:

- **The Content-based Image Retrieval** (*CBIR*)**:** which is used to look for images based on their visual characteristics, such as shape, texture, and color (Kumar 2010).
- **The Text-based Image Retrieval** (*TBIR*)**:** which is based on the return of potentially relevant images compared to a textual research query described by a user (Zhang & al., 2005).

Nevertheless, most users prefer to use the textual queries because of semantic gap between the visual image features and the human concepts (Smeulders & al., 2000). Therefore, the images should be annotated in order to facilitate the text-based research task. The annotation process consists in associating a set of keywords to an image which will be the focus of research queries. However, the content of the annotation might represent a problem. Indeed, it is necessary in the context of images to define the description level (visual content, semantic content, etc.), the used vocabulary (structured or unstructured) and according to what facets (temporal, spatial, taxonomic, etc.).

On the other hand, the traditional methods of images retrieval are relied on manually or semi-automatically images annotation. However, the intervention of human operators during the annotation process is expensive, laborious and time-consuming task. Hence, it is recommended to automate the images annotation process.

In this context, we are interested in our work in the annotation of the images shared on social networks. In fact, these images are frequently associated with a set of tags that are introduced by the social community. However, these tags are often ambiguous because they are voluntarily introduced by amateur photographers who are not domain experts. So, they do not constitute an effective solution enabling to describe the images content by a specific and complete vocabulary. Therefore, we must concentrate efforts on automating the annotation process of the socio-tagged images by their semantic content based on a pre-defined description pattern.

The outline of this paper is organized as follows : Section 2 presents some research works dealing with the annotation of image-type documents. Section 3 presents the general architecture of the proposed approach. Section 4 presents an overview on the adopted modeling technique of the socio-tagged images semantic facets. Section 5 details the annotation and the inference processes and presents the extension of the used ontology. Section 6 presents the general algorithm of the annotation process. Section 7 presents the experiments carried out and the obtained results. Finally, we conclude this paper while suggesting some future perspectives.

2. Related works

During the recent decades, there has been extensive research in aiming to improve the images annotation and consequently to optimize the research process. These studies can be classified into two broad categories : visual content-based images annotation approaches and textual content-based images annotation approaches.

2.1 Visual Content-based Images Annotation Approaches

With the evolution of computer vision technologies, the visual content-based images annotation techniques have become very prevalent. The aim of this type of approaches is to attribute to an image a set of keywords. These keywords can be related to the visual objects of an image (*low-level features*) or to its semantic content (*top-level features*).

The annotation based on the *low-level features* of images depends essentially on objects recognition which appears in the images. The objects recognition can be often performed by the region-based segmentation technique. Thereafter, an identifier is assigned to each recognized object. The objects identifiers can be chosen from an unstructured vocabulary (Von Ahn & al., 2004 ; Von Ahn & al., 2006) or from a structured vocabulary such as ontologies (Adebayo & al., 2016 ; Preece & al., 2016 ; Lingutla & al., 2014). Although these approaches have enabled to reduce the semantic gap problem by providing a better description of the images' visual content, they are considerate subjective and may not accurately describe images content. In fact, the recognition of activities and events which appear in the images are quite negligible.

As an alternative, the oriented-semantics annotation approaches have originated. Indeed, the approaches based on the *top-level features* of images enables deducing the image's semantics in term of its visual characteristics (regions, objects, etc.) (Wang & al., 2013 ; Zomahoun & al., 2013) or in term of the spatial relationships that exist between the objects which appears therein (Ayadi & al., 2013 ; Wang & al., 2010). Though these approaches have provided considerable testing in order to generate and infer semantic descriptions for images, the expression of the semantic content of images remains partial because it is not based on a specific semantic model or pattern. In fact, some approaches have successfully described the spatial semantic content of images, however, other semantic facets such as the taxonomic, temporal and qualifying facets have been ignored.

Finally, the visual content-based images annotation techniques rely often on a semi-automatic annotation. Nonetheless, human intervention is evermore considered time consuming, tedious and laborious. Consequently, this technique is not considered effective for annotating the big collections of images.

2.2 Textual Content-based Images Annotation Approaches

The collaborative potential of the World Wide Web has not only offered the possibility to share images, but also to associate them to free textual descriptions called tags. However, the users' tags can be ambiguous, disturbing or missing (Wang & al., 2006). So, they do not make a reliable solution to annotate the images. Wherefore, multitudes research studies have carried out considerable efforts to refine the initial keywords associated to the images by automatically completing the missing tags and rectifying the noise-corrupted ones. In fact, the social images tags refinement will be able to improve the images indexing quality. In this context, some works have been based on the calculation of the semantic relationships score between the keywords and the others have been based on the richness of the structured vocabulary of external resources such as the domain ontologies.

Indeed, numerous web portals, like *Flickr* and *Delicious*, help the users to manually annotate their shared images with freely chosen tags. Due to the limits of these tags, several research studies have focused on their refinement. In this context, we can mention the annotation approaches based on semantic similarity measures (Mousselly-Sergieh & al., 2014 ; Quattrone & al., 2011) and the annotation approaches based on semantic relationships measures (Xu & al., 2014 ; Feng & al., 2016 ; Ksibi & al., 2012). These annotation approaches are purely automatic and they can be applied to annotate large collections of images. However, they are not considered effective to express the semantic content of the images because they are approximately based on static calculations unfounded on a logical reasoning.

As an alternative, a new type of approaches emerged. The main aim of these approaches is to ensure the refinement of the social tagging information based on a domain ontology in order to generate more pertinent annotations (Im & al., 2015, Im & al., 2013 ; Jeong & al., 2013 ; Liu & al., 2010 ; Jin & al., 2005). Though this type of approaches has solved the automating semantic annotation of the big collections of images problem, the expression of the semantic content of these images is considered fractional because it is not based on a predefined semantic model or pattern.

2.3 Synthesis

To synthesize, multitude research studies have carried out considerable efforts to improve the images annotation process. However, the problem of automating annotation of the big masses of images by their semantic content is not yet solved. In this context, we suggest in this paper an automatic annotation approach that is oriented towards the description of the images' semantic content. Our solution is based on a structured vocabulary, in particular a domain ontology, and a semantic facets pattern on the basis of which the semantic content will be described. Indeed, it is important that the semantics are managed on the basis of a predefined model or semantic pattern. In this example, these images are tagged with the word "*Tomate*". Thus, the semantics that can be generated are : "*Monument attraction*" and "*Festival event*". The annotation guided by a model or a semantic pattern may be a solution to resolve this conflict.

Table 1: Example of description of the images' semantic content based on a semantic facets pattern

	Semantic pattern	Generated semantic
	*Type of the attraction :*	Monument attraction
	*Type of the event :*	Festival event

3. General Approach

The automatic images annotation process is a rich study field. Its goal is to develop a set of methods that can predict, for any image, a set of relevant keywords from an annotation vocabulary. The predicted keywords can be used to suggest the semantic content of images. Thus, our work focuses on the automatic annotation of images shared on the social networks by their semantic content. The new generated information can be used to facilitate and optimize the future research system of images. The approach that we suggest is composed by three processes that can be presented by the following figure :

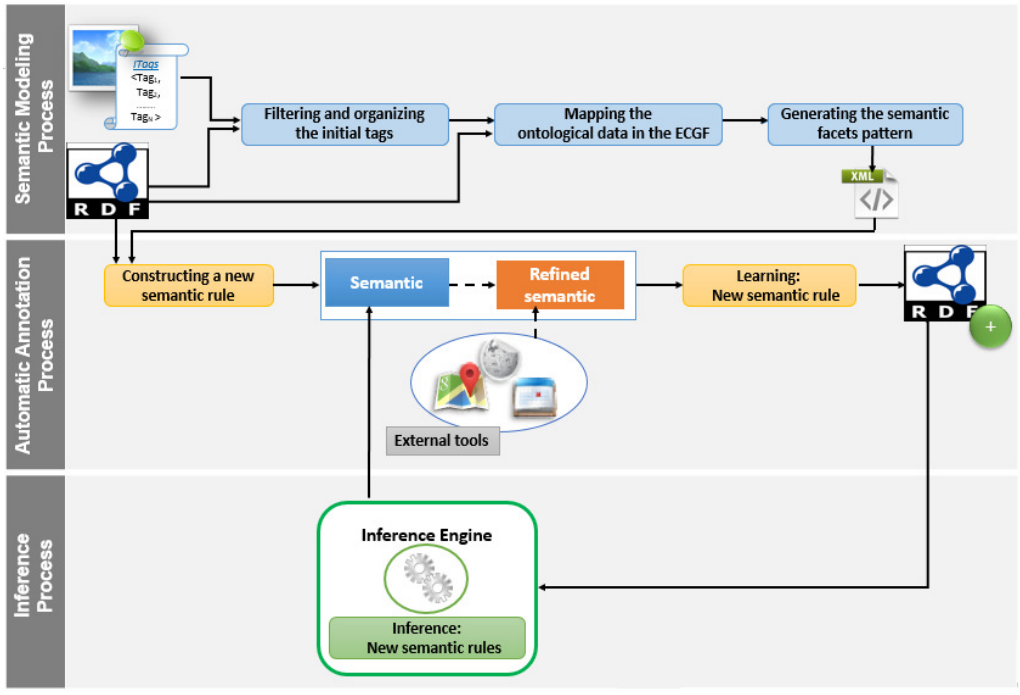


Fig 1: General architecture of the socio-tagged images modeling and annotation system

The general architecture of the proposed modeling and annotation system of the socio-tagged images can be descripted as follows :

- **Semantic Modeling Process :** It consists in treating the initial images' tagging information and projecting them on the adopted ontology in order to generate a semantic pattern. This pattern enables to identify the different semantic facets of an image based on which its semantic content can be described.
- **Automatic Annotation Process :** It consists in defining a set of semantic rules, enriching the adopted ontology by these rules and annotating new images based on the enriched ontology. Thus, the principal aim of this process is to know the structure of these rules.
- **Inference Process :** It consists in automatically generating new semantic rules. Indeed, the inference process can be defined as an action, which enables a human or a machine to widen its knowledge.

4. Overview of the Semantic Modeling Process

The images shared on the social networks are associated with a set of keywords that they are assigned to them by the social community. However, these tags do not constitute an implicit and an effective solution for annotating this type of images. Thus, our solution consists in annotating the socio-tagged images based on their semantic content. Nevertheless, a better description of the semantic content of an image requires defining, in the first step, these different semantic facets. Thus, the main aim behind of the modeling process is to generate a semantic pattern that enables to presents the different semantic facets of an image that makes a basic support for the semantic annotation process. Therefore, in our previous work (Bouchakwa & al., 2016), we have firstly classified the tags associated with socio-tagged images. These tags often express "who" and "what" and can be seen according to several views :

- **The structural view :** It presents the set of objects constituting the image and which are noticeable in the real world (towers, monuments, etc.).
- **The behaviour view :** It presents the activities carried out by the characters (sports, adventure, etc.).
- **The event view :** It presents the unfolding events in the image (festivals, parties, etc.).

Moreover, the concepts of each view can have a spatial and a temporal contexts ; likewise, they can have a set of specifications that characterize them and a set of taxonomies from which they are derive. Thus, we defined four facets from which the different concepts can be seen :

- **The temporal facet :** It allows to indicate the epoch of construction of the historical objects and the unfolding season of the events and activities.
- **The spatial facet :** It allows to indicate the location of the visual objects and the unwinding location of the events and activities.
- **The qualification facet :** It allows to describe the nature or the specifications of an object, an activity or an event that distinguishes them from other objects, activities and events.
- **The taxonomic facet :** It allows to indicate the type of a visual object, an activity that unfolds or an event.

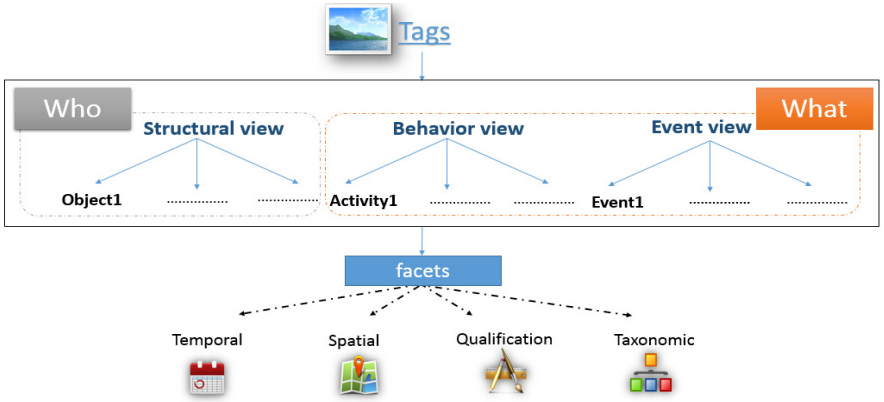


Fig. 2: General view of the different semantic facets of an image

Thereby, the images' tagging information can be used to define the semantic pattern that presents the different semantic facets of these images. Our solution is approximately based on a domain ontology following three steps :

- **Filtering and organizing of the initial tags :** It consists in projecting each tag attached to an image on the approved ontology in order to verify their membership. Thus, the tags that are contained in the ontology as classes or instances are considered as domain concepts and they will be the subject of our work.
- **Mapping the ontological data using the Extended Conceptual Graphs Formalism :** It consists in moving from the abstract level of an image towards its conceptual description level. Indeed, the conceptual description level of an image is obtained by the mapping of the ontological data, in particular the semantic relationships and the specific properties of the filtered and organized tags, on the extended conceptual graphs formalism *ECGF*. Subsequently, the various conceptual models will be drown into the same graph. It should be noted that we have extended the formalism of the conceptual graphs defined by (Sowa 1984) so that it enables to presents the concepts and the conceptual relationships as well as the conceptual features.
- **Generating of the semantic pattern of an image :** It consists in deducing the corresponding semantic pattern from the conceptual description model of an image. This pattern enables to identify the different semantic facets of such an image and helps to describe its semantic content for the future annotation system. For example, we can deduce from the start and the end date of an event its unfolding season. As we can deduce from the GPS data of a monument the location of this historical object. Also, we can deduce from the taxonomic relationships of an activity its taxonomic semantics and so on.

Figure 3 illustrates an example of the semantic facets modeling process of a socio-tagged image.

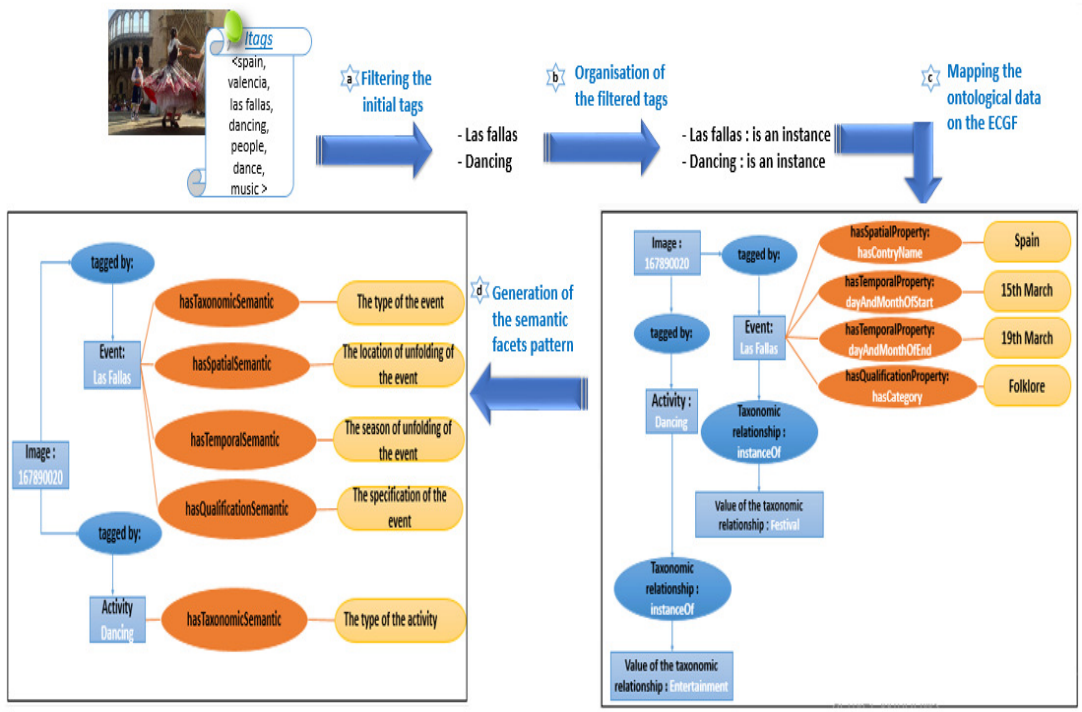


Fig. 3: An example of the semantic facets modeling process

The generated pattern is saved in XML file as presented below :

```
<?xml version="1.0" encoding="ISO-8859-1"?>
  <image id="167890020">
    <TaggedBy Event="Las Fallas" Type="Ontological_Instance">
      <hasTaxonomicSemantic> The type of the event </hasTaxonomicSemantic>
      <hasSpatialSemantic> The location of unfolding of the event </hasSpatialSemantic>
      <hasTemporalSemantic> The season of unfolding of the event </hasTemporalSemantic>
      <hasQualificationSemantic> The specification of the event </hasQualificationSemantic>
    </TaggedBy>
    <TaggedBy Activity="Dancing" Type="Ontological_Instance">
      <hasTaxonomicSemantic> The type of the activity  </hasTaxonomicSemantic>
    </TaggedBy>
  </image>
```

Fig. 4: An exemple of the semantic facets pattern saved in XML file

5. Automatic Annotation and Inference Process

The aim of the semantic annotation process consists in assigning a set of keywords to the images in order to facilitate their research afterwards. Indeed, this process is based on the construction of the semantic rules that enables to express the images content according to the tags associated with them. Subsequently, an inference process allows to generate new semantics based on the suggested inference rules. In the following subsection, we detail the suggested semantic and inference rules.

5.1 *Automatic Annotation Process*

The automatic annotation process is composed of the following steps :

5.1.1 The research of the semantic rules step

The annotation process begins with the search for the ontological semantic rules that can be applied according to the image's tags. Following a positive result, the retrieved semantic rules will be applied in order to annotate the image. A negative result means that no semantic rule found. Consequently, we move to the construction of a new semantic rule.

5.1.2 The construction of the semantic rules step

In order to provide a better interpretation of a socio-tagged image by its semantic content, we define a set of semantic rules. These rules allows to deduce the qualification, spatial, temporal and taxonomic semantics for an image. They can be formulated using concepts, relationships, instances and their properties extracted from ontology. Thus, if we consider that :

- **IB** : Base of the ontological instances
- **CB** : Base of the ontological concepts
- **PB** : Base of the ontological properties
- **PVB** : Base of the ontological properties values
- **RB** : Base of the ontological relationships
- **SRB** : Base of the ontological semantic rules

These rules can be presented via the logic of predicates as follows :

Semantic Rule 1. For a tag *t* which appears as an instance *o* on the adopted ontology *On*, this rule allows to deduce the qualification, spatial or temporal features of the visual object, the unfolding activity or event according to the ontological properties. Thus, if we consider that :

- *t* : is a tag associated with an image and its value is equal to the ontological instance *o* ;
- *o* : is an ontological instance ;
- $\{c_1, c_2, \ldots, c_{n-1}, c_n\}$: is the list of the ordered superclass of *o* ;
- *p* : is a property value that characterizes the instance *o*.

The generated semantics from this rule allows to provide a *qualification, spatial or temporal description* to the first superclass c_1 of the instance *o* through his property value *p*. Formally, this rule can be described with the general form as follows:

$$
\begin{aligned}
&\forall\ \text{IValue} \in \text{IB}\\
&\forall\ \text{InstanceOf} \in \text{RB}\\
&\forall\ \text{PValue} \in \text{PVB with PValue is a property value of IValue}\\
&\forall\ \text{P} \in \text{PB with P is a property of IValue}\\
&\forall\ \text{CName}_1 \in \text{CB with CName}_1 \text{ is the first superclass of IValue}\\
&\forall\ \text{x} \in \{\text{Qualification, Temporal, Spatial}\}\\
&\exists\ \text{x\_SR}_1 \in \text{SRB}/\\
&\quad \mathbf{x\_SR_1} = (\text{IValue, P, PValue}) \wedge (\text{IValue, InstanceOf, CName}_1) \rightarrow (\text{PValue} \oplus \text{CName}_1)
\end{aligned}
\qquad (1)
$$

It is necessary to mention that we should divide this rule into two sub-rules : the *simple rules* and the *complex rules*. In the structure of the simple rule, we use a single ontological property while in the structure of the complex rules we use more than an ontological property. The complex rule are particularly used to derive the locations that are indicated by **GPS** coordinates or the seasons that are indicated by two dates (the start and the end dates of an event for instance). The generated semantic by these rules will be refined in the next step.

Semantic Rule 2. This rule allows to generate a taxonomic semantics based on the taxonomic relationships of the tag *t* which appears as an ontological instance *o*. Thus, if we consider that :

- *t* : is a tag associated with an image and its value is equal to the ontological instance *o* ;
- *o* : is an ontological instance ;

- $\{c_1, c_2,..., c_{n-1}, c_n\}$: is the list of the ordered superclass of *o*.

In fact, the instance *o* is connected to its first superclass c_1 with the relationship "*instance-of*" and the superclass c_1 is connected to the superclass c_2 with a relationship "*is-a"*. Thus, c_1 is a specific type of c_2 and c_2 is a general type of c_1. Hence, we can add to the superclass c_2 a *taxonomic description* according to his subclass c_1. Formally, this rule can be described as follows :

$$\begin{aligned}&\forall\ \text{IValue} \in \text{IB}\\&\forall\ \{\text{CName}_1,..., \text{CName}_N\} \in \text{BC}/\ \text{CName}_1 \neq \text{CName}_{N-1} \text{ and } \text{CName}_1 \neq \text{CName}_N\\&\forall\ \{\text{ISa, InstanceOf}\} \in \text{RB}\\&\exists\ \text{Taxonomic\_SR}_2 \in \text{SRB}/\\&\quad \textbf{Taxonomic\_SR}_2 = (\text{IValue, InstanceOf, CName}_1) \wedge (\text{CName}_1, \text{ISa, CName}_2)\\&\qquad\qquad \rightarrow (\text{CName}_1 \oplus \text{CName}_2)\end{aligned} \quad (2)$$

Semantic Rule 3. Likewise, the application of this rule allows to generate a taxonomic semantics based on the taxonomic relationships of the tag *t* which appears as an ontological concept c_i. Thus, if we consider that :

- *t* : is a tag associated with an image and its value is equal to the ontological concept c_i ;
- c_i : is an ontological concept ;
- $\{c_{i+1}, c_{i+2}, c_{i+3,}, ..., c_{N-1}, c_N\}$: is the ordinate list of the superclass of c_i.

In fact, the class c_i is connected to the class c_{i+1} with the relationship "*is-a"* and c_{i+1} is connected with c_{i+2} by the same relationship ; then c_{i+1} is a specific type of c_{i+2} and c_{i+2} is the general type of c_{i+1} (with $1 \leq i \leq n$-2). Hence, we can add to c_{i+2} a *taxonomic description* according to his subclass c_{i+1}. Formally, this rule can be described as follows :

$$\begin{aligned}&\forall\ \text{ISa} \in \text{RB}\\&\forall\ \{\text{CName}_1,..., \text{CName}_N\} \in \text{CB}\\&\forall\ \text{CName}_i \in \{\text{CName}_1,..., \text{CName}_{N-2}\}\\&\exists\ \text{Taxonomic\_SR}_3 \in \text{SRB}/\\&\quad \textbf{Taxonomic\_SR}_3 = (\text{CName}_i, \text{ISa, CName}_{i+1}) \wedge (\text{CName}_{i+1}, \text{ISa, CName}_{i+2})\\&\qquad\qquad \rightarrow (\text{CName}_{i+1} \oplus \text{CName}_{i+2})\end{aligned} \quad (3)$$

5.1.3 Grammatical refinement step

The application of the semantic rule SR_i according to a tag t_i associated with a socio-tagged image *I* allows to generate a set of semantics carrying the content of the image. Therefore, the adopted grammatical form for the generated semantics is as follows :

$$\text{Adjective\_Name} \quad (4)$$

With :

- *Name* : refers to an ontological concept.
- *Adjective* : is a property value that expresses a qualification, spatial or temporal characteristic of the ontological concept or a concept that indicates the type of its super-concept.

However, the application of x_SR_1 rule allows to generate semantics which are presented by the concatenation of a property value p_k of the tag t_i and the first superclass c_1 of t_i. But, the properties may have different types in the ontologies. For example, for the ontological instance *o* that corresponds to the tag t_i, we can have a set of properties such as the spatial features that can be indicated directly by the name of the country or presented by the GPS coordinates. In order to refine the obtained results, we use different external resources such as the GPS conversion tools that transform the GPS coordinates by the country name of the location.

For example, if a tag "*TowerBridge*" is an instance of the ontological concept "*Bridge*" and its location is indicated by the properties that indicate its latitude and its longitude, the corresponding spatial semantic rule and the grammatical refinement are expressed as follows :



Tag : Tower bridge
Qualification_SR$_1$:
(TowerBridge, *InstanceOf*, Bridge) ∧ (TowerBridge, *hasLatitude*, 51°30′20″) ∧ (TowerBridge, *hasLongitude*, 0°4′32″)
Generated semantic :
51°30′20″_0°4′32″_Bridge
Refined semantic : London Bridge

5.2 *Inference Process*

The inference process allows to generate a new semantics by defining new semantic rules. Its principle is based on the front chaining. Thus, three inference rules were proposed :

Semantic Inference Rule 1. For a tag *t* which appears as an instance *o* in the adopted ontology *On*, this rule can be described with the general form as follows :

$$
\begin{aligned}
&\forall\ \{ISa, InstanceOf\} \in RB\\
&\forall\ \{CName_1,\ldots, CName_N\} \in CB\\
&\forall\ CName_i \in \{CName_1,\ldots, CName_{N-1}\}\\
&\forall\ \{x\_SR_1, SR_4\} \in SRB \text{ with } x \in \{Qualification, Temporal, Spatial\}/\\
&\quad \mathbf{x\_SR_1} = (IValue, P, PValue) \wedge (IValue, InstanceOf, CName_i) \rightarrow (PValue \oplus CName_i)\\
&\quad SR_4 = CName_i \rightarrow CName_{i+1}\\
&\exists\ x\_SR_5 \text{ a new Rule}/\\
&\quad \mathbf{x\_SR_5} = (IValue, P, PValue) \wedge (IValue, InstanceOf, CName_{i+1}) \rightarrow (PValue \oplus CName_{i+1})
\end{aligned}
\tag{5}
$$

Semantic Inference Rule 2. For a tag *t,* which appears as an instance *o* in the adopted ontology *On*, this rule can be described with the general form as follows :

$$
\begin{aligned}
&\forall\ \{ISa, InstanceOf\} \in RB\\
&\forall\ \{CName_1,\ldots, CName_N\} \in CB\\
&\forall\ CName_i \in \{CName_1,\ldots,CName_{N-2}\}\\
&\forall\ \{Taxonomic\_SR_2, SR_6, SR_7\} \in SRB/\\
&\quad \mathbf{Taxonomic\_SR_2} = (IValue, InstanceOf, CName_i) \wedge (CName_i, ISa, CName_{i+1})\\
&\qquad\qquad \rightarrow (CName_i \oplus CName_{i+1})\\
&\quad SR_6 = CName_i \rightarrow CName_{i+1}\\
&\quad SR_7 = CName_{i+1} \rightarrow CName_{i+2}\\
&\exists\ Taxonomic\_SR_8 \text{ a new Rule}/\\
&\quad \mathbf{Taxonomic\_SR_8} = (IValue, InstanceOf, CName_{i+1}) \wedge (CName_{i+1}, ISa, CName_{i+2})\\
&\qquad\qquad \rightarrow (CName_{i+1} \oplus CName_{i+2})
\end{aligned}
\tag{6}
$$

Semantic Inference Rule 3. For a tag *t,* which appears as a concept *c* in the adopted ontology *On*, this rule can be described with the general form as follows :

$$
\begin{aligned}
&\forall\ \{ISa\} \in RB\\
&\forall\ \{CName_1,\ldots, CName_N\} \in CB\\
&\forall\ CName_i \in \{CName_1,\ldots, CName_{N-2}\}\\
&\forall\ \{Taxonomic\_SR_3, SR_9, SR_{10}\} \in SRB/\\
&\quad \mathbf{Taxonomic\_SR_3} = (CName_i, ISa, CName_{i+1}) \wedge (CName_{i+1}, ISa, CNam_{i+2})\\
&\qquad\qquad \rightarrow (CName_{i+1} \oplus CName_{i+2})\\
&\quad SR_9 = CName_{i+1} \rightarrow CName_{i+2}\\
&\quad SR_{10} = CName_{i+2} \rightarrow CName_{i+3}\\
&\exists\ Taxonomic\_SR_{11} \text{ a new Rule}/\\
&\quad \mathbf{Taxonomic\_SR_{11}} = (CName_i, ISa, CName_{i+2}) \wedge (CName_{i+2}, ISa, CName_{i+3})\\
&\qquad\qquad \rightarrow (CName_{i+2} \oplus CName_{i+3})
\end{aligned}
\tag{7}
$$

5.3 Examples of illustration

In these examples, we annotate the socio-tagged images by applied the necessary semantic rules and inference rules.

Example 1

Socio-tagged image	Ontological description	Semantic rules description	
	"*BattleOfTheOranges*" is an instance of the ontological concept "*Festival*" which is in turn a sub-concept of "*Event*", and the value of its property "*hasCategory*" is "*Fruit*"	**Qualification_SR1 :**	(BattleOfTheOranges, *InstanceOf*, Festival) ^ (BattleOfTheOranges, *hasCategory*, Fruit) Generated semantic : Fruit Festival
		Taxonomic_SR2 :	(BattleOfTheOranges, *InstanceOf*, Festival) ^ (Festival, *is-a*, Event) Generated semantic : Festival Event
		Inference rules description	
		Qualification_SR5 :	**Implicit_SR4 :** Festival → Event (BattleOfTheOranges, *InstanceOf*, Event) ^ (BattleOfTheOranges, *hasCategory*, Fruit) → Fruit Event

Example 2

Socio-tagged image	Ontological description	Semantic rules description	
	"*Rafting*" is an instance of the ontological concept "*Riding*" which is in turn a sub-concept of "*Adventure*" and "*Activity*"	**Taxonomic_SR2 :**	(Rafting, *InstanceOf*, Riding) ^ (Riding, *is-a*, Adventure) Generated semantic : Riding Adventure
		Inference rules description	
		Taxonomic_SR8 :	**Implicit_SR6 :** Riding → Adventure **Implicit_SR7 :** Adventure → Activity (Rafting, *InstanceOf*, Adventure) ^ (Adventure, *is-a*, Activity) → Adventure Activity

Example 3

Socio-tagged image	Ontological description	Semantic rules description	
	"*Football*" is an ontological concept and it is a sub-concept of the concept "*TeamSport*" which also is a sub-concept of the concept "*Competition*" and "*Event*"	**Taxonomic_SR3 :**	(Football, *is-a*, TeamSport) ^ (TeamSport, *is-a*, Competition) Generated semantic : TeamSport Competition
		Inference rules description	
		Taxonomic_SR11 :	**Implicit_SR9 :** TeamSport → Competition **Implicit_SR10 :** Competition → Event (Football, *is-a*, Competition) ^ (Competition, *is-a*, Event) → Competition Event

5.4 *Enrichment of the adopted ontology*

Ontologies are used to model the concepts of a given domain. It is a formal explicit description of the knowledge domain by concepts (classes), properties of every concept describing attributes (facets) and relationships between concepts. Our work proposes a semantic annotation process of the socio-tagged images guided by a domain ontology. Therefore, to annotate this type of images, we used **TOURING** (Saeedi 2010) ontology that presents the used concepts in the tourism domain. Formally, this

ontology is presented by $\boldsymbol{On}$: ($\boldsymbol{C_{On}}$, $\boldsymbol{R_{On}}$, $\boldsymbol{X_{On}}$, $\boldsymbol{I_{On}}$, $\boldsymbol{P_{On}}$, $\boldsymbol{TP_{On}}$) where: $\boldsymbol{C_O}$, $\boldsymbol{R_{On}}$, $\boldsymbol{X_{On}}$, $\boldsymbol{I_{On}}$, $\boldsymbol{P_{On}}$, $\boldsymbol{TP_{On}}$ are respectively the set of concepts, the relationships between the concepts, the axioms, the instances, the properties, and the types of the properties that can be a string, an integer, a GPS (north and east), a date, etc.

Considering the semantic rules and the semantic description that result following their application, our approach consists in the integration of the semantic rules within the ontology by indicating their types. Thus, the formal definition of the ontology can be expanded as follows $\boldsymbol{On}$: ($\boldsymbol{C_{On}}$, $\boldsymbol{R_{On}}$, $\boldsymbol{X_{On}}$, $\boldsymbol{I_{On}}$, $\boldsymbol{P_{On}}$, $\boldsymbol{TP_{On}}$, $\boldsymbol{Rg_{On}}$, $\boldsymbol{Rf_{On}}$) where $\boldsymbol{Rg_{On}}$ is a set of rules and $\boldsymbol{Rf_{On}}$ are the facets of these rules. For example, the annotation of the image in below based on the generated semantic facets pattern can be presented as follows :



Tag : Diving
Facet name : The type of the activity
Taxonomic_SR : (Diving, *is-a*, Adventure) ∧ (Adventure, *is-a*, Activity)
Generated semantic : Adventure Activity

The extract of the RDF of the enriched ontology is presented by the Figure 5.

```
<rdfs:Class rdf:about="http://www.owltouring.org#Activity">
        <rdf:Concept_Name rdf:datatype="string"> Activity </rdf:Concept_Name>
        <rdfs:comment rdf:datatype="string">Occupation of a person or a group of persons that has a specific goal.</rdfs:comment>
</rdfs:Class>
<rdfs:Class rdf:about="http://www.owltouring.org#Adventure">
        <rdf:Concept_Name rdf:datatype="string"> Adventure </rdf:Concept_Name>
        <rdfs:subClassOf rdf:resource="http://www.owltouring.org#Activity"/>
</rdfs:Class>
<rdfs:Class rdf:about="http://www.owltouring.org#Diving">
        <rdf:Concept_Name rdf:datatype="string"> Diving </rdf:Concept_Name>
        <rdfs:subClassOf rdf:resource="http://www.owltouring.org#Adventure"/>
        <rdf:Rule> Rule36 </rdf:Rule>
</rdfs:Class>
<rdf:Description rdf:about="http://www.owltouring.org#TheTypeOfActivity">
        <rdf:Facet_Name rdf:datatype="string"> The type of the activity </rdf:Facet_Name>
        <rdf:subFacetOf rdf:resource="http://www.owltouring.org#TaxonomicFacet"/>
</rdf:Description>
<rdf:Description rdf:about="http://www.owltouring.org#Rule36">
        <rdf:Rule_Name rdf:datatype="string"> Rule36 </rdf:Rule_Name>
        <rdf:Predicats>
            <rdf:Predicat>
                <rdf:Concept_Name> Diving </rdf:Concept_Name>
                <rdf:Relation_Name> Is-a </rdf:Relation_Name>
                <rdf:Concept_Name> Adventure </rdf:Concept_Name>
            </rdf:Predicat>
            <rdf:Predicat>
                <rdf:Concept_Name> Adventure </rdf:Concept_Name>
                <rdf:Relation_Name> Is-a </rdf:Relation_Name>
                <rdf:Concept_Name> Activity </rdf:Concept_Name>
            </rdf:Predicat>
        <rdf:Predicats>
        <rdf:Semantic> Adventure activity </rdf:Semantic>
        <rdf:Facet_Name> The type of the activity </rdf:Facet_Name>
        <rdf:Multimedia> 24989418481.jpg </rdf:Multimedia>
        <rdf:Multimedia> 66897307633.jpg </rdf:Multimedia>
</rdf:Description>
```

Fig. 5: An extract of the enriched ontology

6. Socio-tagged Images Annotation Algorithm

The following algorithm presents the progress of the semantic annotation process with :

- ***HasSemanticRule*() :** allows to verify according a tag *t* if it exists in the ontology a set of applicable semantic rules.
- ***HasProperties*():** allows to specify according a tag *t* (which appears in the ontology as an instance) if a tag *t* has a set of properties in the ontology.
- ***BuildQSR1*(), *BuildSSR1*(), *BuildTSR1*(), *BuildSR2*(), *BuildSR3*() :** allows to build respectively the rules : *Qualification_SR1*, *Spatial_SR1, Temporal_SR1*, Taxonomic_SR2 and Taxonomic_SR3.
- ***ExcuteSR*() :** allows to apply a semantic rule and to enrich the ontology with the multimedia data information.
- ***FacetOfSR*() :** allows to specify the type of a rule based on the semantic facet pattern. For example, the facet « *hasQualificationSemantic* » is assigned following the application of the rule *Qualification_SR1* and the facet « *hasTaxonomicSemantic* » is assigned following the application of the rule *Taxonomic_SR2*.
- ***RefineGrammar*() :** allows to apply the necessary grammatical rafinement for the generated semantic following the application of the x_RS_1 rule.
- ***EnrichmentOntology*() :** allows to add a new semantic rule at the base of the ontological semantic rules by indicating its facet.
- ***TreatInferredRules*() :** allows to run any inferred rule, to specify its facet and to enrich the ontology.

Algorithm : Automatic annotation of the socio-tagged images

Input :

Vector ITB [] : Chain // *Set of tags indicated in the semantic facets pattern as an ontological instance*
Vector CTB [] : Chain // *Set of tags indicated in the semantic facets pattern as an ontological concept*
Vector PVB [] : Chain // *Base of ontological property value of an instance*

```
1 : Begin
2 :   for (each i in ITB) do
3 :     if HasSemanticRule(i) = true Then
4 :        ExecuteSR()
5 :     else
6 :        if HasProperties(i) = true Then
7 :          for (each SpatialValue in PVB) do
8 :                BuildSSR1(), RefineGrammar(), FacetOfSR(),
9 :                EnrichmentOntology(), TreatInferredRules()
10 :         end for
11 :         for (each TemporalValue in PVB) do
12 :            BuildTSR1(), RefineGrammar(), FacetOfSR(),
13 :            EnrichmentOntology(), TreatInferredRules()
14 :         end for
15 :        for (each QualificationValue in PVB) do
16 :           BuildQSR1(), RefineGrammar(), FacetOfSR(),
17 :           EnrichmentOntology(), Treat Inferred Rules()
18 :         end for
19 :      else
20 :         BuildSR2(), FacetOfSR(),
21 :         EnrichmentOntology(), TreatInferredRules()
22 :      end if
23 :    end if
24 :  end for
25 :  for (each j in CTB) do
26 :     if HasSemanticRule (j) = true Then
```

```
27 :        ExecuteSR()
28 :      else
29 :        BuildSR3(), FacetOfSR(),
30 :        EnrichmentOntology(), TreatInferredRules()
31 :      end if
32 :    end for
     33    End
```

7. Experimental Evaluations

In order to endorse the efficiency of the approach that we suggest, we have implemented a called prototype "*Tourism-Annotizer*" enabling to perform two principal functions. Indeed, this prototype enables to modeless the semantic facets of a collection of images initially tagged by social community. Subsequently, these images are automatically annotated by the application of the necessary semantic rules. Since there are no a specific pre-prepared collections for each interest domain, we conducted this work by the construction of a test collection of images related to the tourism filed and extracted from the social network *Flickr*. Then, we carried out a series of experiment to evaluate our modelization and annotation approach of socio-tagged images.

7.1 *Construction of a test collection*

With over billions of images and millions of users, *Flickr* is a social media service that it is rapidly evolved in recent decades. The most important reason for this attention on *Flickr* may be because it is based on the principle of tagging. In addition, *Flickr* provides of the developers a PHP API (FlickrPHP) that is available for no-commercials use.

In this context, and in order to construct a tourism images collection, we used the model provided by the RI work of (Ellen 2001 ; Chris & al., 2000). In terms of implementation, we have constructed the test collection in two steps as follows :

- Firstly, we collected n = 180 photo queries that illustrate popular tourist attractions (eg bridges, churches, historic monuments, etc.) to ensure their identification later on, by a large number of users. They are also chosen to fit in the spatial neighborhoods of other images and vice versa.
- Secondly, each photo-request is loaded on the web interface that we have developed to extract socio-tagged photos from the free database of *Flickr*. The coordinated location of each request-image was automatically extracted from its format. In addition, the web interface allows to introduce the radius of the photos recovery as well as the maximum number of photos to download (for exemple, in Figure 6, a distance of 5 km and a maximum number of 50 images have been chosen).

As a result, we ended up with a collection that contains 25,000 separate images and 15,562 unique tags.

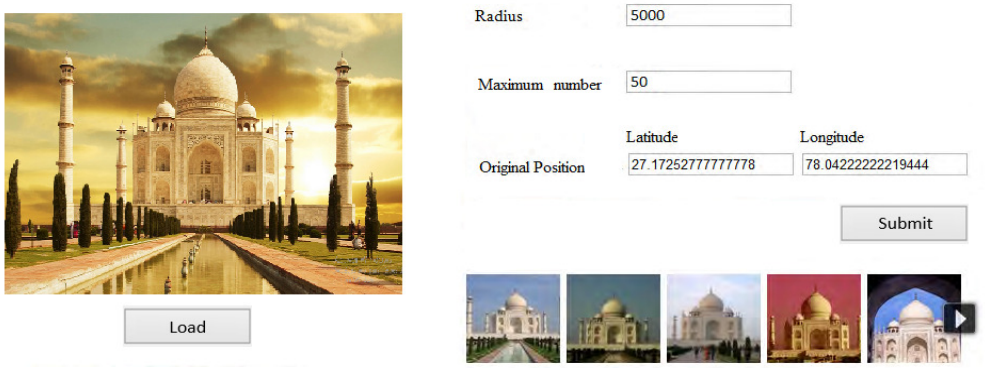


Fig. 6: The web interface developed to extract the test images collection

7.2 *Implementation of the prototype test "Tourism-Annotizer"*

The prototype "*Tourism-Annotizer*" is constituted by tow interfaces: (*i*) an interface allows to brows the test images collection and to generate for each image its corresponding semantic facets pattern that will be saved in the XML file and (*ii*) an interface for automatically annotating the modeled images.

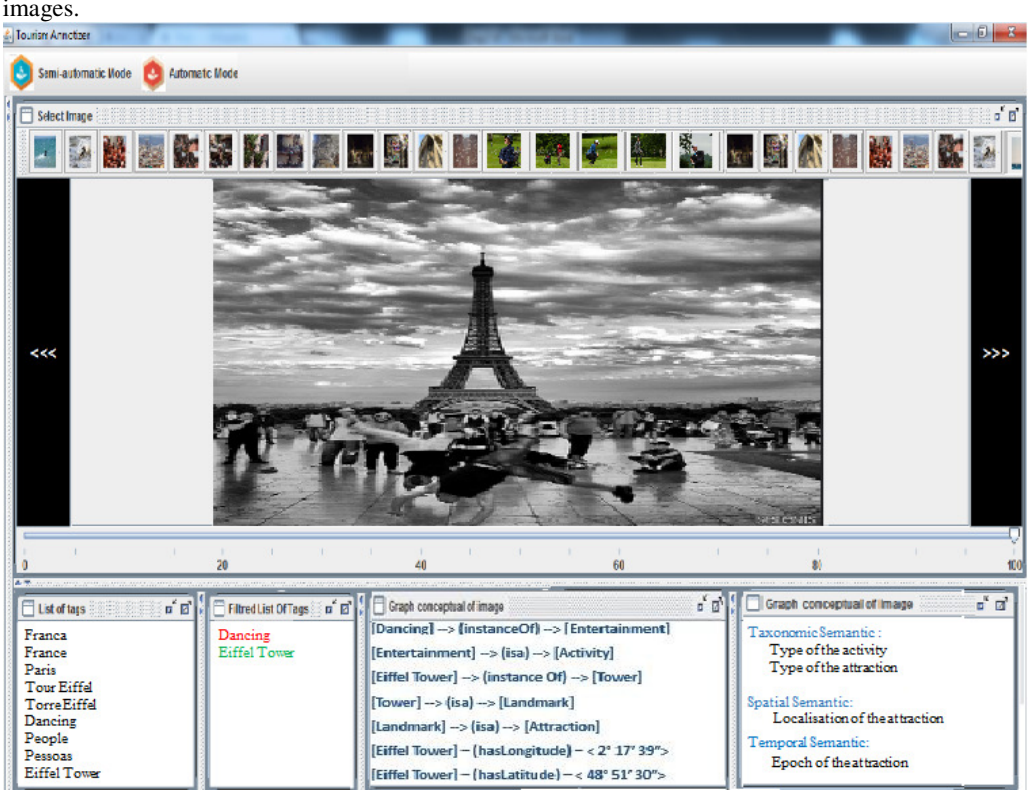


Fig. 7: Modeling interface based on the ECGF

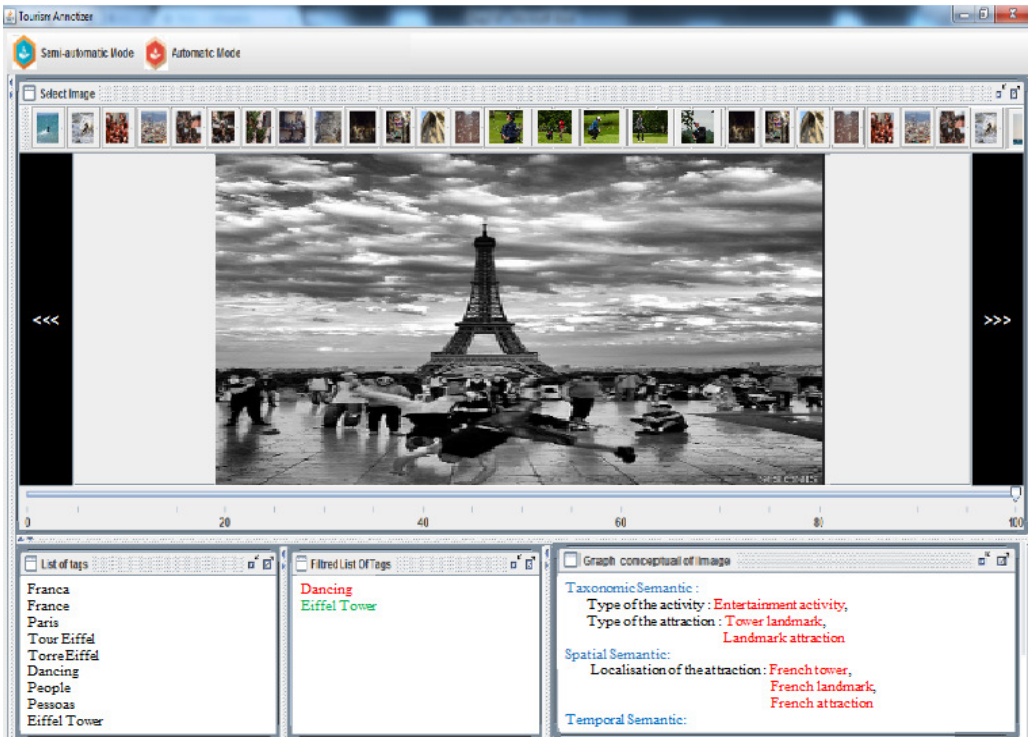


Fig. 8: Annotation interface based on the semantic facets of patterns

7.3 *Evaluation of the semantic modeling process*

In order to evaluate the results of the semantic modeling process, we have followed the method of (Im & al., 2015) for testing the big collections of data. Indeed, this method consists in selecting from each 1000 images of the test collection 100 sample images. These images will be considered as exemplary images and will be the object of the tests that will be carried out. In addition, our test procedure was guided by the technique of (Ricardo & al., 1999) intended for the results performance test in the IR systems.

In our context, experts in semiotics have concluded the relevance of the generated semantic facets for each test image and recommended the missing semantic facets. Subsequently, we measured the performance of the suggested modeling process results using precision and recall which have computed as follows :

$$Precision = \sum_{k=1}^{n} \frac{\text{Number of relevant semantic facets for a test image k}}{\text{Number of semantic facets proposed automatically for a test image K}} \quad (8)$$

$$Recall = \sum_{k=1}^{n} \frac{\text{Number of relevant semantic facets for a test image k}}{\text{Number of semantic facets proposed by the expert for a test image K}} \quad (9)$$

The results of the evaluation are of the order of 0.861 for the precision and 0.743 for the recall. Figure 9 shows the quality of the modeling process in 2500 sample images divided into five groups of 500 images each.

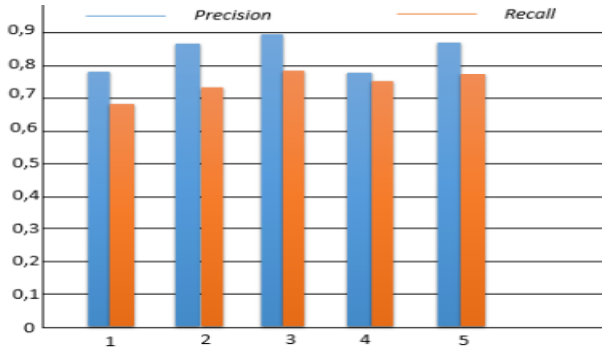


Fig. 9: Evaluation results of the semantic modeling of the socio-tagged images

These results motivated us to use the obtained semantic facets as support for the annotation process.

.

7.4 *Evaluation of the automatic annotation process*

Using the same method proposed by (Ricardo & al., 1999) to evaluate the performance of IR systems, we have presented the images previously modeled by semiotic experts and associated with their a set of semantic annotations suggested by our annotation system to domain experts. The domain experts have confirmed the relevance of the generated annotation compared to the defined semantic facets and recommended the missing semantic annotations. To evaluate the performance of the annotation process results we used the measures defined as follows :

$$Precision = \sum_{k=1}^{n} \frac{\text{Number of relevant semantic annotation for a test image k}}{\text{Number of semantic annotation proposed for a test image K}} \quad (10)$$

$$recall = \sum_{k=1}^{n} \frac{\text{Number of relevant semantic annotation for a test image k}}{\text{Number of semantic annotation proposed by the expert for a test image K}} \quad (11)$$

Figure 10 show the evaluation results carried on the groups of images that we modeled earlier.

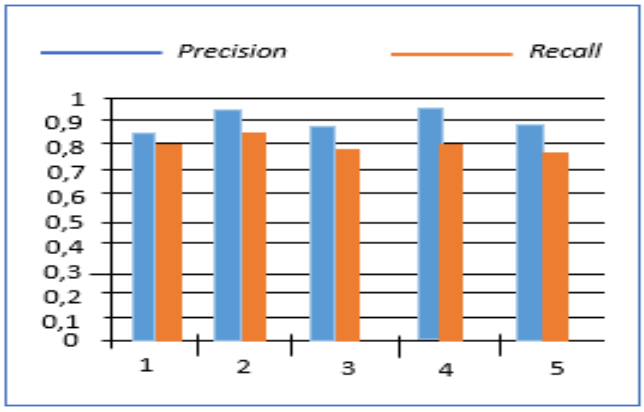


Fig.10: Evaluation results of the semantic annotation of the socio-tagged images

Indeed, the results are quite satisfactory with the average precision is high. It is a whole in the order of 87,2%.Secondly, the average recall is a little lower but it is also satisfactory compared to the results of domain experts. It is a whole in the order of 79,7%. Thus, notice that the "*Tourism-*

Annotizer" can be successfully and easily used to annotate the socio-tagged images by their semantic content.

8. Conclusion And Future Works

In this paper, we suggest to annotate the images shared on the social networks by their semantic content, according to the tags associated with them. In the first step, we have defined the semantic facets pattern based on the content of a collection's images. Thereafter, we have built a set of semantic rules which are characterized by their type. These rules are expressed by the logic of predicate. The application of any semantic rule generates a semantic that will be associated with the image. An inference engine is implemented to create new semantic rules and consequently to generate new semantic results. Thus, the initial adopted ontology will be enriched with the notion of typed semantic rules. Finally, and in order to test the suggested approach, we have developed a modeling and annotating socio-tagged images prototype. The results of the evaluation have been satisfactory.

Our future work will consist, in the first step, to reformulate the initial request sent by the user by applying the corresponding semantic rules in order to implement a semantic search system, and in the second step, to classify the annotated images using new technologies of the processing big data.

9. References

Adebayo, S., McLeod, K., Tudose, I., Osumi-Sutherland, D., Burdett, T., Baldock, R., and Parkinson, H. (2016). 'PhenoImageShare : an image annotation and query infrastructure', *Journal of biomedical semantics*, 7(1), 35-44.

Ayadi, Y., Amous, I., and Gargouri, F. (2013), 'Toward an automatic annotation approach based on ontological enrichment for advanced research', *International Journal of Engineering & Technology* (IJET-IJENS), 13(2), 80-89.

Bouchakwa, M., Ayadi, Y., and Amous, I. (2016), 'Modeling the semantic content of the socio-tagged images based on the extended conceptual graphs formalism', *Proceedings of the 14th International Conference on Advances in Mobile Computing and Multi-Media* (MOMM), ISBN : 978-1-4503-4806-5, November 2016, Singapore, 35-39.

Chris, B., and Ellen M. (2000), 'Evaluating evaluation measure stability', *Proceedings of the 28th annual international ACM SIGIR conference on Research and development in information retrieval*, 33-40.

Ellen M, V. (2001), 'The philosophy of information retrieval evaluation', *CLEFEL*, 355-370.

Feng, L., and Bhanu, B. (2016), 'Semantic concept co-occurrence patterns for image annotation and retrieval', *IEEE transactions on pattern and machine intelligence* (TPAMI), 38(4), 785-799.

FlickrPHP. [Online] [Retrieved August 2014] www.flickr.com/services/api

Im, D. H., and Park, G. D. (2013), 'STAG : semantic image annotation using relationships between tags', *Proceedings of the Information Science and Applications* (ICISA), ISBN : 978-1-4799-0604-8, June 2013, Suwon, South Korea, 1-2.

Im, D. H., and Park, G. D. (2015), 'Linked tag : image annotation using semantic relationships between image tags', *International Journal of Multimedia Tools and Applications* (MTA), 74(7), 2273-2287.

Jeong, J. W., Hong, H. K., and Lee, D. H. (2013), 'i-TagRanker : an efficient tag ranking system for image sharing and retrieval using the semantic relationships between tags', *Internatianal Journal of Multimedia Tools and Applications*, 62(2), 451-478.

Jin, Y., Khan, L., Wang, L., and Awad, M. (2005), 'Image annotations by combining multiple evidence & wordnet', *Proceedings of the 13th annual ACM international conference on Multimedia (*ACMMM), ISBN : 1-59593-044-2, November 2005, Hilton, Singapore, 706-715.

Ksibi, A., Ammar, A. B., and Amar, C. B. (2012), 'Effective concept detection using second order co-occurence flickr context similarity measure socfcs', *Proceedings of the Content-Based Multimedia Indexing* (CBMI), ISBN : 978-1-4673-2369-7, June 2012, Annecy, France, 1-6.

Kumar, K. K. (2010), 'CBIR: Content based image retrieval', *Proceedings of the National Conference on Recent Trends in information/Network Security* (NCRTNS), December 2010, 36-43.

Lingutla, N. T., Preece, J., Todorovic, S., Cooper, L., Moore, L., and Jaiswal, P. (2014) 'AISO : annotation of image segments with ontologies, *Journal of biomedical semantics*, *5*(1), 50-54.

Liu, D., Hua, X. S., Wang, M., and Zhang, H. J. (2010) 'Image retagging', *Proceedings of the 18th ACM international conference on Multimedia* (ACMMM), ISBN : 978-1-60558-933-6, October 2010, Firenze, Italy, 491-500.

Mousselly-Sergieh, H., Döller, M., Egyed-Zsigmond, E., Gianini, G., Kosch, H., and Pinon, J. M. (2014), 'Tag relatedness using laplacian score feature selection and adapted jensen-shannon divergence', *Proceedings of the International Conference on Multimedia Modeling* (MMM), ISBN : 978-3-319-04114-8, January 2014, Dublin, Ireland, 159-171.

Preece, J., Elser, J., Jaiswal, P., Kvilekval, K., Fedorov, D., Manjunath, B. S., and Carbon, S. (2016), 'Plant image segmentation and annotation with ontologies in BisQue', *Proceedings of the International Conference on Biological Ontology and BioCreative* (ICBO/BioCreative), August 2016, Corvallis, Oregon, USA.

Quattrone, G., Ferrara, E., De Meo, P., and Capra., L. (2011), 'Measuring similarity in large-scale folksonomies', *Proceedings of the International Conference on Software Engineering and Knowledge Engineering* (SEKE), July 2011, Eden Roc Renaissance Miami Beach, USA, 1-7.

Ricardo, B., and Berthier. R. (1999), 'Modern information retrieval', ACMpress, NewYork.

Saeedi, S. (2010), 'OWLTouring ', [Online] [Retrieved October 2014] http://www.owltouring.org/

Smeulders, A. W., Worring, M., Santini, S., Gupta, A., and Jain, R. (2000), 'Content-based image retrieval at the end of the early years', *IEEE Transactions on pattern analysis and machine intelligence*, 22(12), 1349-1380.

Sowa., J. F. (1984), 'Conceptual structures : information processing in mind and machine', *Addison-Wesley publishing company*, United States.

Von Ahn, L., and Dabbish, L. (2004), 'Labeling images with a computer game' *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (SIGCHI), ISBN : 1-58113-702-8, April 2004, Vienna, Austria, 319-326.

Von Ahn, L., Liu, R., and Blum, M. (2006), 'Peekaboom : a game for locating objects in images', *Proceedings of the SIGCHI conference on Human in Computing Systems* (SIGCHI), ISBN : 1-59593-372-7, April 2006, Montréal, Québec, Canada, 55–64.

Wang, H. H., Mohamad, D., and Ismail, N. A. (2010), 'Semantic gap in cbir : Automatic objects spatial relationships semantic extraction and representation', *International Journal of Image Processing* (IJIP), 4(3), 192-204.

Wang, X. J., Zhang, L., Jing, F., and Ma, W.-Y. (2006), 'Annosearch: Image auto-annotation by search', *Proceedings of the Computer Vision and Pattern Recognition, 2006 IEEE Computer Society Conference* (CVPR), ISBN : 0-7695-2597-0, Jun 2006, New York, USA, 1483-1490.

Wang, W. X., Zhang, Y., Zhou, B., and Chen, X. (2013), 'A conceptual prototype for digital media cloud', *Proceedings of the ChinaGrid Annual Conference* (ChinaGrid), ISBN : 978-0-7695-5058-9, August 2013, Changchun, China, 103-108.

Xu, Luo, X., Liu, Y., Mei, L., and Hu, C. (2014), 'Measuring semantic relatedness between Flickr images : From a social tag based view', *Scientific World Journal* (SWJ), 1-12.

Zhang, C., Chai, J., and Jin, R. (2005), 'User term feedback in interactive text-based image retrieval', *Proceedings of the 28th annual international ACM SIGIR conference on Research and development in information retrieval*, ISBN :1-59593-034-5, August 2005, Salvador, Brazil, 51-58.

Zomahoun, D. E. (2013), 'Collaborative semantic annotation of images : Ontology-based model', *International Journal Signal & Image Processing* (SIPIJ), 4(6), 71-81.

Réflexion Sur La Logique De L'évaluation De La Performance Individuelle Des Enseignants – Chercheurs Dans Le Système Universitaire Marocain

Marso Mohamed
Université Abdelmalek Essaadi, Tanger, MAROC
Doctorant Université Abdelmalek Essaadi
Centre des études doctorales : Droit, Economie et Gestion
marso_achraf@yahoo.fr

Boujettou Hassane
Université Abdelmalek Essaadi, Tanger, MAROC
Ecole Nationale de Commerce et de Gestion de Tanger
boujettou_hassane@yahoo.fr

Résumé

La réalité observée de la situation actuelle des établissements d'enseignement supérieur au Maroc est marquée par une mise en place progressive d'un certain nombre des pratiques d'évaluation. Ces pratiques sont loin de constituer un véritable système de culture d'évaluation de la performance. D'autre part, ces systèmes sont fortement orienté recherche, ce qui n'est pas sans conséquence sur les autres activités et surtout celle de l'enseignement et la formation.

L'objet de cette article est relative à l'analyse de l'impact de cette orientation recherche des systèmes d'évaluation à profil unique centré sur les publications, sur la performance globales des établissements d'enseignement supérieurs.

Mots clés : logique d'évaluation, performance individuelle et collective, régulation, réglementation.

Abstract

The observed reality of the current situation of higher education establishments in Morocco is marked by the gradual introduction of a number of evaluation practices. These practices are far from being a true system of performance evaluation culture. On the other hand, these systems are highly research-oriented, which is not without consequence on other activities and especially that of education and training.

The purpose of this article is to analyze the impact of this focus on single-profile evaluation systems centered on publications, on the overall performance of higher education institutions.

Keywords: Evaluation logic, individual and collective performance, regulation

Introduction

Depuis la fin du siècle dernier l'enseignement supérieur au Maroc a fait l'objet de réformes continues. Ces reformes ont impacté son « mode de gouvernance », « l'architecture des formations » et « les contenus des enseignements », ces réformes sont régies par les textes de la Loi 01-00 portants sur l'organisation du secteur de l'enseignement supérieur et par les orientations de la Charte Nationale d'Education et de Formation. Ce processus de réformes a imposé progressivement à la communauté universitaire des exigences nouvelles, un changement des valeurs collectives mais aussi un changement de sa propre représentation avec la prééminence d'un modèle anglo-saxon, davantage centré sur des relations contractuelles interinstitutionnelles et intra institution et qui implique plus d'autonomie et plus de responsabilisation des acteurs, ainsi la mise en place progressive d'une nouvelle gestion dont l'évaluation de la performance constitue l'un de ses piliers.

Dans ce contexte, quelques pratiques d'évaluation ont progressivement pris forme (l'auto-évaluation, l'accréditation, les classements internationaux), elles sont l'œuvre des instances de la tutelle ministérielle ou sous l'impulsion des Présidents d'universités, Conseils universitaires et d'autres forums de gouvernance, et les classements internationaux. Jusqu'à présent, ces pratiques restent insuffisantes pour doter les établissements universitaires marocains d'un véritable système de culture d'évaluation de la performance. Par ailleurs, ces pratiques semblent aussi souffrir de l'absence de l'unité de la logique de leur mise en place, car elles ont été établies par les acteurs universitaires à partir de leur capacité à problématiser la performance universitaire et aussi suivant les rapports de force entre les acteurs. En plus, les acteurs sociaux, des établissements universitaires public, confrontés aux contraintes nationales et internationale ont tendance à vouloir démontrer qu'ils sont performants ; avec cette question récurrente sur le choix entre l'option l'élitisme et la sélection ou celle de l'inclusion et de l'intégration. Au deuxième niveau le statut de l'étudiant ; client ou usager, se pose avec acuité. Il n'est pas rare de relever même dans la littérature qui ne fait que l'exégèse des textes des reformes du système universitaire marocain de constater l'absence de réponse claire à ces questionnements fondamentaux. Les pratiques d'évaluation observées flottent entre les exigences d'une « régulation contrôle »[i] multicéphale imprécise et changeante et qui est représenté au niveau national à la fois par le ministère et les hauts conseils, et parfois par la présidence des universités et leurs conseils ou par les instances locales de chaque établissement, conseil ou départements. Elle peut être aussi d'origine internationale lorsqu'il s'agit de vouloir imposer des normes inspirée par les pratiques de classement. Pour ce qui est de la « régulation autonome », elle domine les pratiques d'évaluation elle est aussi dominé par des individus ou des groupes informels d'individus, elles profitent du caractère spécifique de chaque établissement d'enseignement supérieurs. Qui sont d'ailleurs considérées par certain comme « bureaucratie professionnelle » et de la faiblesse la « régulation contrôle ».

Dans ce contexte globale, l'objet de cet article est de montrer comment les systèmes d'évaluation ont provoqué l'intérêt des individus plus vers des activités de recherche. Cette orientation n'est pas sans conséquence sur les autres activités et surtout celle de l'enseignement. En définitive, notre question centrale est relative à l'impact de cette orientation recherche des systèmes d'évaluation à profil unique et centré sur les publications, sur la performance globales des établissements d'enseignement supérieurs dans leur hétérogénéité.

Pour essayer d'apporter des éléments de réponse, la suite de cet article sera agencée en trois temps. Après avoir présenté le contexte global du système d'enseignement supérieur au Maroc[ii] (partie 1), nous allons présenter une analyse théorique sur les logiques d'évaluation de la performance individuelle (partie 2), et enfin, pour conclure nous allons relever dans la littérature les contradictions de l'évaluation dans les universités**.**

I. Contexte Globale De L'université : Réglementation Et Régulation De L'évaluation

Trois aspects fondamentaux caractérisent la mission des universités: l'enseignement, la recherche et les services à la collectivité. Elle se réalise de façon large et comprend des dimensions académique,

sociale, politique, culturelle et économique. Cette mission contribue de façon générale au développement des personnes et de la société. En outre, avec la mondialisation et l'harmonisation des systèmes d'enseignement supérieur, l'université est confrontée à un changement de paradigme, celui-ci ne concerne pas seulement l'enseignement mais l'ensemble du positionnement de la sphère universitaire dans son environnement et la façon dont l'université se doit de trouver sa place et de remplir les missions qui lui sont assignées. Par ailleurs, la mise en place des processus des réformes génère des conflits :

- Le premier niveau de conflit tient à la relation entre les organismes de tutelle et l'université en tant qu'institution. La question centrale porte sur la réalité de la liberté de manœuvre laissée aux établissements.

- Le second niveau tient aux résistances organisationnelles du niveau intermédiaire que sont les composantes (les Unités de Formation et de Recherche, Départements par exemples).

- Le troisième lieu de résistance se situe au niveau des acteurs, utilisateurs et metteurs en œuvre des réformes.

Dans ce contexte a été progressivement implanté des pratiques d'évaluation au niveau individuel, institutionnel, il a aussi été prévu la création d'une instance nationale d'évaluation et ceux sur la base d'un arsenal juridique.

Ainsi, la Loi 01 - 00 stipule :

- ***Article 8***: ... Baser l'acquisition des modules sur des évaluations régulières ...;
- ***Article 77***: Évaluation régulière du système de l'enseignement supérieur, portant sur sa rentabilité interne et externe, et touchant tous les aspects pédagogiques, administratifs et de recherche...;
- ***Article 78*** : Auto-évaluation des établissements;
- ***Article 79***: Création d'une instance nationale d'évaluation et un observatoire pour l'adéquation des enseignements supérieurs à l'environnement économique et professionnel.

Par ailleurs, la Charte nationale d'éducation recommande:
- ***Article 80*** : Asseoir le cursus des étudiants sur l'évaluation…;
- ***Article 103***: Création de l'agence nationale d'évaluation et d'orientation;
- ***Articles 127 et 129***: Deux types d'évaluation pour la recherche scientifique : interne et externe;
- ***Article 137(a):*** Critères d'évaluation pour la promotion et la gratification des enseignants;
- ***Article 155***: Évaluation des administrations centrales;
- ***Article 157***: Évaluation de l'ensemble du système éducatif.

La politique d'évaluation administrative des enseignants titulaires de l'enseignement supérieur, concerne l'avancement dans la carrière dans le cadre du même grade (de A à C) ou lors du passage du grade de Professeur Assistant au grade de Professeur Habilité, et de celui de grade de Professeur Habilité à Professeur de l'Enseignement Supérieur.

L'avancement dans la carrière dans le cadre du même grade est assuré par une commission composée des membres de la commission scientifique et des chefs de département qui délibèrent sur la base d'une grille remplie par le candidat. Cette grille retrace les travaux de recherche, les activités d'enseignement et les responsabilités dans des activités locales et internationales.

Pour le passage du grade de Professeur Assistant à grade de Professeur Habilité, et de celui du grade de Professeur Habilité à Professeur de l'Enseignement Supérieur, une commission délibère sur la base d'un examen qui s'appuie sur des grilles d'évaluation des travaux de recherche et des activités d'enseignement réalisés par le candidat et d'un entretien conduit sous forme d'un exposé et d'une discussion (Kaaouachi A. 2010).

Dans ce dispositif, la pratique du Ranking est présentée de façon explicite dans la promotion dans le même grade et elle est implicite dans l'ensemble du dispositif.

Ce dispositif réglementaire mis en place progressivement n'a pas pu combler le déficit de performance réelle et perçu. Il semble aussi négliger la logique de l'évaluation dans son expression la plus simple, pour le moins qu'on puisse dire, le dispositif réglementaire n'a pas convenablement favorisé une régulation satisfaisante.

La régulation c'est un processus complexe, selon les dictionnaires français est l'action consistant à régler, à assurer le bon fonctionnement des systèmes, notamment de systèmes biologiques.
La régulation et la règlementation sont deux notions différentes mais liées. Si généralement on peut penser que la réglementation permet la régulation (Keynes par exemple prônait l'intervention de l'État comme agent de régulation de l'économie de marché). La déréglementation constitue aussi un mode de régulation (Hayek défendait la déréglementation la plus totale pour laisser le marché faire cavalier seul).

Maroy Demailly (2004)[iii] distinguent plusieurs niveaux à l'origine des régulations: le niveau international, national, intermédiaire, local…et la manière dont elles s'articulent; les acteurs source de régulation, autrement dit les acteurs hégémoniques ou susceptibles d'hégémonie : l'État, le marché, les professions établies, les syndicats, les usagers, l'opinion publique, les experts…. Selon Lacoumes Simard (2011)[iv], les instruments utilisés pour produire, légitimer, imposer les règles peuvent être normatifs (viser directement l'orientation des pratiques) ou systémiques (favoriser, grâce à un certain nombre de supra-règles structurelles, qui jouent sur les jeux d'intérêts, l'émergence de certaines normes des conduites). L'ensemble de ces éléments et leur articulation définit un mode, une configuration particulière de régulation.

Par ailleurs, J. D. Reynaud (1988) considère la « Régulation » comme la capacité à produire des règles. « Règles » est employé au sens large et recouvre aussi bien le domaine de la règle juridique à ses différents niveaux (loi, règlement) que de la règle morale, de la norme formelle que de la norme informelle. Raynaud distingue aussi trois grands types de régulation, les « régulations autonomes », produites par les collectifs de base et les « régulations de contrôle », émises par les supérieurs hiérarchiques et/ou les responsables politiques, les tenants du pouvoir, et les « régulations conjointes » : systèmes institutionnalisés, coopératifs, et donc relativement stables, de combinaison des deux premiers types de régulation.

Enfin, les modes de régulation organisent les rapports d'hégémonie entre les acteurs qui peuvent prétendre à être coproducteurs de l'action, le Ranking comme mode de régulation constitue un exemple.

II. Logique D'évaluation De La Performance Individuels

Les transformations survenues dans le domaine de l'enseignement supérieur ont affecté non seulement les établissements, mais aussi les acteurs. En fait, avec l'évolution des systèmes d'accréditation et des classements universitaires à l'échelle internationale, les établissements d'enseignement supérieur ont adapté leurs systèmes d'évaluation en fonction de ce nouveau contexte. L'accent mis sur ces institutions est passé d'un rôle de développement à un rôle de jugement, où les mesures quantitatives sont devenues d'une importance primordiale dans l'évaluation des activités universitaires (Bogt et Scapens, 2012).

Le classement des universités est devenu un outil puissant de l'évaluation des établissements d'enseignement supérieur, mais il se concentre principalement sur la performance des activités de recherche. En conséquence, l'utilisation de leurs mesures sur la performance individuelle amène les acteurs à développer un plus grand intérêt pour les activités de recherche.

En effet, l'évaluation est le support qui oriente les actions des acteurs dans l'organisation, c'est-à-dire que les acteurs essaieront d'être performants dans le cadre des actions qui seront évaluées par l'organisation. Elle aura donc un impact important sur la performance globale de l'organisation et aussi sur la performance des acteurs, notamment en les aidant à déterminer leurs priorités d'où l'importance pour les universités de compléter leur système d'évaluation de la recherche par celle de l'enseignement et celle de l'implication dans les tâches administratives.

Pour qu'un système d'évaluation puisse bien fonctionner, il doit permettre aux objectifs des acteurs et ceux de l'institution de se rejoindre afin d'évoluer ensemble.

Bien que les classements universitaires indiquent qu'ils se concentrent également sur ces deux dimensions de l'enseignement supérieur, la recherche semble avoir gagné en importance, tant au niveau organisationnel qu'au niveau individuel.

D'un autre point de vue, les acteurs influent sur le développement de leur environnement par leurs actions. Ils définissent leur propre réalité à travers la compréhension qu'ils ont sur leur environnement. Ils appréhendent que leurs actions ne soient évaluées que si elles sont reflétées dans leur performance. En conséquence, ils apprennent à agir en fonction de ce que mesurent les systèmes d'évaluation.

Dans cette perspective, l'évaluation est un outil stratégique au service des établissements d'enseignement afin d'atteindre leurs objectifs, puisque les systèmes d'évaluation constituent un moyen de coordination entre d'un coté les objectifs et les intérêts individuels des enseignants-chercheurs (volonté d'être reconnus dans leur discipline, d'enseigner des cours qui les intéressent, etc...), et de l'autre coté les objectifs institutionnels.

III. Contradictions De L'évaluation Dans Les Universités

Le système d'évaluation est dominé par le nombre de publications, ce système ne encourage pas les individus à diversifier leurs activités, sauf par exemple pour leurs heures obligatoires des cours d'enseignement. Évidemment, le choix de concentrer l'évaluation sur les publications n'est pas totalement irrationnel puisque les classements internationaux les considèrent comme étant une mesure crédible de la production des enseignants-chercheurs (Thiétart, 2009). L'évaluation dans les universités ne prend pas en compte les trois dimensions du métier, ce qui crée, pour utiliser l'expression de Dejours (2003), des tensions entre le prescrit et le réel que les enseignants-chercheurs doivent apprendre à gérer. Par conséquent, les enseignants-chercheurs seront plus intéressés par les activités de recherche aux dépens des autres activités de l'enseignant-chercheur. Ainsi, en évaluant de manière équitable les différentes activités de l'enseignant-chercheur, cela permet une orientation équilibrée des activités des acteurs et en définitif, une adéquation entre leurs objectifs et intérêts individuels avec ceux de leurs institutions, afin d'éviter des effets pervers.

Dans cet esprit, il s'agit de mettre en correspondance ce qui est nécessaire dans le cadre d'objectifs institutionnels et ce qui est important pour que les mécanismes d'évaluation individuelle répondent à ses objectifs, en évitant des effets pervers » (Pras et al, 2010). Bref, l'importance que les universités donnent à la recherche se fait aux dépens des autres dimensions et est à la base du problème de l'évaluation dans les universités. Dans ce sens, cette contradiction montre l'écart entre ce qui est évalué et ce qui est vraiment vécu/demandé (Thiétart, 2009). Autrement dit, les systèmes d'évaluation actuels ne favorisent pas l'adéquation entre les objectifs personnels et les objectifs institutionnels. Puisque les enseignants-chercheurs auront logiquement tendance à s'investir plus dans les activités leurs permettront d'avance dans leur carrière.

« L'efficience d'un système d'évaluation se mesure à sa capacité de "générer les bonnes pratiques", c'est-à-dire à canaliser les ressources d'attention et de réflexion vers l'accomplissement des missions fondamentales de l'organisation. Une centration trop exclusive sur l'évaluation de la seule recherche au détriment des autres dimensions aura nécessairement pour effet d'affaiblir ces autres dimensions » (Eraly, 2011).

Par ailleurs, le système qui est à la base destiné à motiver les enseignants-chercheurs à publier dans les meilleures revues crée souvent le résultat inverse. Ce qui engendre les conséquences suivantes, tout d'abord les enseignants-chercheurs se concentrent plus sur les revues moins classées pour obtenir des points suffisant pour leur prochaine évaluation. Ce qui peut obérer la qualité de la recherche et qui explique la démultiplication observée des nombres des revues males classées. Toutefois, l'existence d'un classement des revues facilite la délibération leurs des évaluations de promotion. Une autre conséquence de cette quantification de l'évaluation est que les instances chargés de

l'évaluation s'en remettent quasi totalement au jugement des rédacteurs puisque ce sont eux qui permettent ou non à un enseignant-chercheur d'être publié, d'obtenir ses « points » bibliométriques, d'augmenter son « capital scientifique » et d'accéder à une promotion. Il y a donc une forme d'« externalisation » des pouvoirs d'évaluation vers les comités de lecture (Walery, 2011). Par conséquent, dans ce système, les instances d'évaluation traditionnelles se transforment progressivement en acteurs passifs.

Les établissements d'enseignement supérieur étant classés ainsi en fonction de leur capacité à « faire publier » leurs enseignants-chercheurs, plusieurs stratégies sont mises en place, lesquelles reposent sur des injonctions institutionnelles dont le système d'évaluation est la clé. C'est un système de type punitions/récompenses: cela n'est pas sans influencer nécessairement leur processus de recrutement et créer un biais vers la sélection d'enseignants-chercheurs plutôt chercheurs qu'enseignants (Durand et Dameron, 2011).

En guise de conclusion, les systèmes déséquilibrés d'évaluation amènent les enseignants-chercheurs à privilégier les critères « individuels » au détriment de collectif. Ainsi, « ils ont tendance à ne penser qu'à leur carrière « individuelle » et à publier pour ajouter une ligne de plus dans leur CV » (Deetz, 1995 ; Courpasson et Guédri, 2007). Finalement, la perversité du système d'évaluation ne peut etre contré que par le sens de devoir, de l'éthique et voir même des considérations morales. L'éthos professoral est un qualificatif qui trouve amplement sa place pour décrire cette situation.

---

[i] J. D. Reynaud (1988) considère la « Régulation » comme la capacité à produire des règles. Règles est employé au sens large et recouvre aussi bien le domaine de la règle juridique à ses différents niveaux (loi, règlement) que de la règle morale, (formelle ou informelle). Raynaud distingue aussi trois grands types de régulation, les « régulations autonomes », produites par les collectifs de base et les « régulations de contrôle », émises par les supérieurs hiérarchiques et/ou les responsables politiques, donc les tenants du pouvoir, et les « régulations conjointes » : systèmes institutionnalisés, coopératifs, et donc relativement stables, de combinaison des deux premiers types de régulation.

[ii] Nous proposons une lecture « «managerielle » loin des lectures factuelles axées sur l'exposé chronologique du processus des reformes.

[iii] Lise Demailly et Patrice de la Broise, (2009) « Les enjeux de la déprofessionnalisation », *Socio-logos*, mis en ligne le 07 mai 2009. URL : http://socio-logos.revues.org/2305

[iv] Pierre Lascoumes, Louis Simard, (2011) « L'action publique au prisme de ses instruments. Introduction », Revue française de science politique 1 (Vol. 61), p. 5-22. DOI 10.3917/rfsp.611.0005

Bibliographie

Adam Barbe, (2015), « L'université dans la mondialisation : les classements internationaux et leurs effets pervers», *Regards croisés sur l'économie*.

Akerlind, Gerlese S. (2008), « An Academic Perspective On Research And Being A Researcher: An integration of the literature realities », dans Tight, Malcolm, dir. (2011), Higher Education – Major Themes in Education, Vol. V Academic Work, Knowledge and Research, New York: Routledge.

Anni Borzeix, (2003). Autonomie et contrôle à l'épreuve d'une « rationalité externe , *in* Gilbert de Terssac, *La théorie de la régulation sociale de Jean-Daniel Reynaud* , La Découverte « Recherches »,

Azan Wilfrid *et al.*, (2012). Hyper-régulation des systèmes économiques et sociaux et déviance des comportements organisationnels, *Management & Avenir*/8 N° 58.

Berry, Michel (2009), « Les mirages de la bibliométrie, ou comment scléroser la recherche en croyant bien faire », Revue du MAUSS, Vol.33, No.1.

Charle, C. (2009) L'évaluation des enseignants-chercheurs. Critiques et propositions, *Vingtième Siècle. Revue d'histoire*, vol. 2, no. 102, pp. 159-170.

Claudia Urdari, L'impact des systèmes de mesure de la performance sur la gestion des carrières dans l'enseignement supérieur, thèse en Sciences de gestion, 2015.

Deetz, Stanley (1995), « The Social Production of Knowledge and the Commercial

Dicker, J. (2010) How should we mesure public sector performance?, Viewpoint Papers. Available online at http://clients.squareeye.net/uploads/2020/documents/Dicker_Public Sector Performance_2020PST_1.pdf [accessed on 26 January 2015].- Townley.

Durand, Thomas et Stéphanie DAMERON (2011), « Where Have All the Business Schools Gone », British Journal of Management, Vol.22.

Eraly, Alain (2011), « Les enjeux de l'évaluation. Du discours aux pratiques », dans SERVAIS, Paul (2011), L'évaluation de la recherche en sciences humaines et sociales, Louvain-la-Neuve (Belgique) : Bruylant-academia, coll. « Intellection ».

Hartmann, F., Naranjo-Gil, D. and Perego, P. (2010) The effects of leadership styles and use of performance measaures on managerial work-related attitudes, European Accounting Review, vol. 19, no. 2.

Kaaouachi A. (2004). Evaluation des acquis des étudiants dans l'université marocaine. *Prospective Pédagogique* 27.

Kaaouachi A. (2007). Assurance Qualité dans l'enseignement supérieur au Maroc : Tendances récentes et perspectives. *XXIVème congrès de l'AIPU*, 71 - 72, Montréal.

Kaaouachi A. (2007). Institutional evaluation in Moroccan higher educational system: A *International Conference of the International Society for Scientometrics and Informetrics (ISSI),* Madrid.proposed model. *The 11th*

Kaaouachi A. (2008). Les classements internationaux des universités : quels enjeux pour l'université marocaine? *Prospectives Universitaires*.

Lallement Michel, (2003). Régulation et rationalisation, *in* Gilbert de Terssac, *La théorie de la régulation sociale de Jean-Daniel Reynaud*, La Découverte « Recherches ».

Latour, Bruno (2001), Le métier de chercheur regard d'un anthropologue. 2e édition, Paris : INRA, coll. « Sciences en questions ».

Moya, S., Prior, D. and Rodríguez-Pérez, G. (2014) Performance-based incentives and the behavior of accounting academics: responding to changes, *Accounting Education: an international journal*, forthcoming paper.

Pierre Lascoumes, Louis Simard, (2011). L'action publique au prisme de ses instruments. Introduction, *Revue française de science politique ;*1 (Vol. 61). DOI 10.3917/rfsp.611.0005.

Pras, Bernard, dir et al. (2010), L'évaluation des enseignants-chercheurs en sciences de gestion, Paris : FNEGE, Février 2010.- Berry, 2009

Sacha Lussier, Les enseignants-chercheurs en gestion à l'épreuve des nouvelles injonctions institutionnelles en matière d'évaluation : Une étude France – Québec, thèse en Sciences de gestion, 2014.

Thiétart, Raymond-Alain (2009), « The research challenge of French business schools: the case of the Grandes Ecoles », Journal of Management Development, Vol. 28, No. 8.

Townley, B. (1997) The institutional logic of performance appraisal., Organization Studies, vol. 18.

WalerySerge (2011), « Productivité académique contre contribution scientifique : le cas de l'économie », L'Économie politique, Vol.51, No.3.

Willmott, H. (1995) Managing the academics: commodification and control in the development of university education in the U.K., Human Relations, vol. 48.

Social and Environmental Impacts Assessment in the Economy for the Common Good

Amparo Maset-Llaudes. Financial and Accounting Department, University of Jaume I, Castellón de la Plana, Spain, maset@uji.es
David Cabedo. Financial and Accounting Department, University of Jaume I, Castellón de la Plana, Spain, cabedo@uji.es
Iluminada Fuertes, Financial and Accounting Department, University of Jaume I, Castellón de la Plana, Spain, ifuertes@uji.es
José Miguel Tirado, Financial and Accounting Department, University of Jaume I, Castellón de la Plana, Spain, tirado@uji.es

Abstract

Traditional corporations handle their decision-making process according to a goal consisting in the generation of economic value, that is to say, the maximisation of the company value for the shareholders, maximisation of the economic added value, maximisation of profit, and so forth. Nevertheless, in recent years, a set of organisations that do not prioritise the creation of economic value have appeared, although they are not non-profits. Indeed, they pursue the generation of economic value, but at a level that guarantees their long-term viability. At the same time, their main objectives are not linked to this economic value, but are linked to the generation of positive social value or to the reduction of negative environmental impact. These "new" organisations, commonly referred to as hybrid organisations, need a tool to assess the social and environmental impacts they are generating, in order to guide their decisions concerning the goals they have set in these fields.
In contrast to the accounting area, there is no generally accepted method to quantify the social or environmental impacts of a project, an activity or an organisation. Therefore, deeper research is required in this line. In this paper, we analyse the items that the matrix of the Common Good Balance Sheet (MCGBS) requires for its calculation and classify them according to their relevance for assessing social and environmental impacts. This allows us to evaluate whether these items (and, ultimately, the MCGBS) can be used as a means to quantify the social or environmental impacts generated by an organisation.

Keywords: Social Impacts, Environmental Impacts, Economy for the Common Good, Impacts Assessment

1. Introduction

Firms, institutions, organisations and governments are showing a growing interest in the effects of their actions. Nowadays, however, everybody accepts that these effects go beyond the economic impacts and an evaluation of the social and environmental impacts is also required. Indeed, a large number of institutions have developed initiatives to assess the social impact of their actions, which is proof of how important this issue is for organisations. The diversity of the approaches used by organisations nevertheless highlights the huge complexity involved in this kind of assessment.

An organisation's efficiency is usually measured through a range of specific indicators, related to its scope and mission. This specificity undermines comparability of the information and can diminish its usefulness in decision-making processes.

The aim of this paper is to study the information available to economic organisations and, through the common good balance sheet (CGBS), analyse its value as a means to assess the social and environmental impact of their activities. To this end, we analyse the items used by the common good

matrix (CGM) to elaborate the CGBS and then rank these items according to their usefulness to measure the social and environmental impacts. By so doing, we can determine to what extent these items (and, ultimately, the common good balance sheet – CGBS) can be useful as a means to assess the social and environmental impacts generated by the organisation.

We have structured our paper in the following way: after the introduction section, the social and environmental impacts and their assessment are defined in the second section. In the third, we show the main features of the balance sheet of the economy for the common good. Subsequently (in sections 4 to 6), we classify the indexes depending on the information they provide about social, environmental or mixed impacts. The last section summarises the main conclusions of the paper, shows its limitations and proposes future research lines.

2. Social And Environmental Impacts

Over the last few years, a growing interest has been observed in the assessment of social and environmental impacts generated by both governmental organisations and private firms. It is assumed that these impacts go beyond the accounting results to cover wide areas with a large number of stakeholders involved. One definition of social impact is that provided by Eccleston (2011:172), who claims that it is linked to the effects on the human population of any private or public action that modifies the way people live, work, act, relate and organise in order to satisfy their necessities and help them in acting as members of society. These effects also include cultural impacts that imply changes in the rules, values and beliefs that guide and streamline their knowledge of themselves and of their community.

The methods currently used to assess social impacts are still in an early stage of development. Ebrahim and Ragan (2010) classify the main methods of assessment of social impacts in terms of the different approaches employed. According to these authors, we can distinguish between methods that estimate the expected return, experimental methods, logical methods, strategic approaches, participative methods, relation-based methods and experimental approaches. They also say that those responsible for organisations are facing increasing pressure to demonstrate the impact of their activities on society. This pressure has been exacerbated by the specific budgetary requirements for organisations to make the impacts of their actions public in order to attract new funding (Lyon et al 2010, Chapman et al 2010). In this regard, in the Social Economy Report (2008) and the proposal for a "Regulation of the European Parliament and of the Council on the European Social Entrepreneurship Fund", the European Commission recommends the need for organisations to develop instruments to measure and compare the impact of their investments. In this sense, Diaz et al (2012) state that social impact assessment will be a key element, both in the search for the improvement of social and economic efficiency and in providing different stakeholders with adequate mechanisms of evaluation of the fulfilment of the organisation's social objectives. This need has also directly influenced the rating agencies of non-profit entities in the United States, which in recent years have renewed the rating parameters based purely on financial indicators, tending towards the development of social indicators (Charity Navigator et al 2009).

The interest in sustainable growth in recent years has not only led to concern about the social impacts of the organisations' actions, but has increased the amount of attention paid to environmental impacts. This interest was boosted in 1987 with the publication of the Brundtland Report, where the concept of sustainable development was introduced for the first time, taking into account its three aspects: economic, social and environmental. Sustainable development has since been fostered by successive reports published by the UN World Commission on Environment and Development.

The increasing concern for sustainable growth over the last few years has led to a growing interest in not only social but also environmental impacts. The first studies on the impacts that human actions leave on the environment (Environmental Impact Assessment, EIA) can be dated back to the USA in the late 1960s and introduced the first controls and instruments to evaluate the repercussion of human actions. One definition of impact assessment can be found in Abaza et al (2004), who claim that this assessment refers to the evaluation of the repercussion of a higher project or action that affects the natural and artificial environment. The definition that the International Association for Impact

Assessment (IAIA) provides for EIA relates it to the process (undertaken before relevant decision-making and commitments) of identification, forecasting, evaluation and mitigation of the biological, social and other effects that stem from development proposals (see Vanclay, 2015). Eccleston (2011) claims that EIA can be defined as the accumulated results of a project or activity that generate changes in the environment or ecosystem over time and space.

As for social impacts, nowadays there is no method that can be used by itself for environmental impact assessment, given the variety of firms and the different kinds of actions that can generate an impact. The different methodologies for environmental impact assessment can be classified, among others, into matrix methods (such as the Leopold method), Odum's optimum pathway matrix, modelling methods or simulation techniques, and indicator methods. This last group evaluates environmental impacts through previously established indicators, to which a weighted value is assigned and a final score is set for each of them. Therefore, the MCGBS can be classified within this group of methods.

The two most widely used methods of impact assessment are Social Audit Accounting (SAA) and Social Return on Investment (SROI), the latter having received more attention in the literature (Emerson, 2003; Gair, 2002; Arvidson et al, 2009; Nicholls et al, 2012; Lingane and Olson, 2004). SROI attempts to express the social value generated by the activities carried out by entities in monetary values, based on cost-benefit principles (Flockhard, 2005; Arvidson et al, 2010; Millar and Hall, 2012). Unlike the CGBS method, it adapts itself to the project to be analysed and the interest groups will vary depending on the project. However, carrying out the CGBS is aimed at all the stakeholders that make up society. Other differences between the two methods are that the CGBS can be adapted to apply to organisations, enterprises and municipalities, and SROI is an instrument that applies to particular projects. Accordingly, an organisation can apply the CGBS to the set of all its activities and the SROI to each of them separately, so the first method will give us an overview of the performance of the entity and the SROI will offer a partial view of each of these actions.

Derived from the above and from the temporal point of view, the CGBS covers the activity of the company throughout the same period in which, in accordance with Spanish legislation, companies are required to draw up their accounting and financial reports, that is to say, an accounting year, which usually coincides with the calendar year. The SROI may cover different periods other than a year because the projects analysed by this method can have different durations (greater or less than a year). Thus, if some kind of comparative study were to be carried out between the two methods, it would be advisable for the projects analysed by SROI to also have a duration equal to one calendar year.

On the other hand, the SAA method uses quantitative and qualitative analyses, as well as ratio analysis to measure the activities carried out by the enterprise. It is an internal organisational system implemented by the company and moderated by an independent external evaluator. In contrast, the CGBS does not need interventions from outside the firm to carry out its evaluations. Another point on which the two methodologies coincide is that they are both standardised models, and so comparisons can be made between companies that adopt these methods. This implies that it is possible to show an image of the joint situation of the sector to which these companies belong. Both methods can also be applied to all kinds of organisations (profit and non-profit) and to municipalities. Furthermore, the SAA method, like the SROI, is carried out through several successive stages, although the CGBS does not need the calculations of the indicators to be ordered sequentially.

The SAA system could be placed within the orbit of the analyses based on the Triple Bottom Line[i] as it incorporates the study of commercial and financial, social and community, and environmental and society areas. This is similar to the CGBS, which incorporates indicators related to the social and environmental field into the CGM, the economic-financial field being covered by the annual accounts of the company.

When it comes to choosing the most appropriate method it is necessary to determine in advance whether the study will be directed towards the fundees or investors or whether it is focusing on stakeholders' accountability. On the other hand, and given that both the SAA and the CGBS are

methodologies that include environmental aspects, according to Gibbons and Dey (2011), the principles and application of SROI should also meet the demands of the Triple Bottom Line, including social and environmental as well as economic aspects, in order to provide verifiable and complete information about the company's activity.

3. The Common Good Balance Sheet

As regards changes in the economic model, one of the most comprehensive and innovative approaches is the Economy for the Common Good, which comprises instruments like the Common Good Balance Sheet and Matrix, which many firms have adopted in recent years. The CGBS is based on a series of indicators that make up the CGM. This is a flexible instrument that has been continuously evolving to adapt itself to the social and environmental situation since it was created five years ago. As a result, several versions have been released to date. Table 1 shows version 4.1 of this matrix:

Table 1: Common Good Balance Sheet (Matrix 4.1)

VALUE / STAKEHOLDER	Human dignity	Cooperation and Solidarity	Ecological Sustainability	Social Justice	Democratic Co-determination and Transparency
A) Suppliers	**A1: Ethical Supply Management** Active examination of the risks of purchased goods and services, consideration of the social and ecological aspects of suppliers and service partners 90				
B) Investors	**B1: Ethical Financial Management** Consideration of social and ecological aspects when choosing financial services; common good oriented investments and financing 30				
C) Employees, including business owners	**C1: Workplace quality and affirmative action** Employee-oriented organizational culture and structure, fair employment and payment policies, workplace health and safety, work-life balance, flexible work hours, equal opportunity and diversity 90	**C2: Just distribution of labor** Reduction of overtime, eliminating unpaid overtime, reduction of total work hours, contribution to the reduction of unemployment 50	**C3: Promotion of environmentally friendly behavior of employees** ctive promotion of sustainable lifestyles of employees (mobility, nutrition), training and awareness-raising activities, sustainable organizational culture 30	**C4: Just income distribution** Low income disparity within a company, compliance with minimum and maximum wages 60	**C5: Corporate democracy and transparency** Comprehensive transparency within the company, election of managers by employees, democratic decision-making on fundamental strategic issues, transfer of property to employees 90
D) Customers / Products / Services / Business Partners	**D1: Ethical customer relations** Ethical business relations with customers, customer orientation and co-determination, joint product development, high quality of service, high product transparency 50	**D2: Cooperation with businesses in same field** Transfer of know-how, personnel, contracts and interest-free loans to other business in the same field, participation in cooperative marketing activities and crisis management 70	**D3: Ecological design of products and services** Offering of ecologically superior products/services, awareness raising programmes, consideration of ecological aspects when choosing customer target groups 90	**D4: Socially oriented design of products and services** Information, products and services for disadvantaged groups, support for value-oriented market structures 30	**D5: Raising social and ecological standards** Exemplary business behavior, development of higher standards with businesses in the same field, lobbying 30
E) Social Environment: Region, electorate, future generations, civil society, fellow human beings, animals and plants	**E1: Value and social impact of products and services** Products and services fulfill basic human needs or serve humankind, society or the environment 90	**E2: Contribution to the local community** Mutual support and cooperation through financial resources, services, products, logistics, time, know-how, knowledge, contacts, influence 40	**E3: Reduction of environmental impact** Reduction of environmental effects towards a sustainable level, resources, energy, climate, emissions, waste etc. 70	**E4: Investing profits for the Common Good** Reducing or eliminating dividend payments to extern, payouts to employees, increasing equity, social-ecological investments 60	**E5: Social transparency and co-determination,** Common good and sustainability reports, participation in decision-making by local stakeholders and NGO's 30
Negative Criteria	Violation of ILO norms (international labor standards) / human rights -200 Products detrimental to human dignity and human rights (e.g. landmines, nuclear power, GMO's) -200 Outsourcing to or cooperation with companies which violate human dignity -150	Hostile takeover -200 Blocking patents -100 Dumping Prices -200	Massive environmental pollution -200 Gross violation of environmental standards 200 Planned obsolescence (short lifespan of products) -100	Unequal pay for women and men -200 Job cuts or moving jobs overseas despite having made a profit -150 Subsidiaries in tax havens -200 Equity yield rate >10 % -200	Non-disclosure of subsidiaries -100 Prohibition of a works council -150 Non-disclosure of payments to lobbyists -200 Excessive income inequality within a business -150

Source: https://www.ecogood.org/en/common-good-balance-sheet/common-good-matrix/

Although the CGBS encompasses topics beyond those related to the environment, on analysing the social effects of the firms' actions, one could consider them as a kind of EIA, since it involves an evaluation of the activities that negatively affect the environment. Therefore, this paper focuses on classifying the items in the MCGBS (Table 1) into those related to the social area, those regarding the environmental field, and those that could belong to both areas and hence cannot be separated.

4. Common Good Balance Sheet: Social Impacts

In practice, the measurement of social impact is often confined to just a series of individual indicators. As a result, the information provided does not reflect a global vision and is segmented and biased, as it fails to offer a common view of the different facets of social impact (Díaz et al, 2012). Therefore, it is necessary to analyse and determine which methods for measuring social impact are more suitable for different types of organisations, with the aim of reducing the gap that exists between the information that is currently disseminated by organisations about impact assessment and the different existing models.

Taking the CGM as an instrument for measuring impacts (see Table 1), and ignoring the way enterprises that adhere to this movement record the score when they attempt to implement the CGBS[ii], in the following sections the impacts will be classified in the three groups referred to above.

The indicators of the CGM which may be directly related to the social area are:

C EMPLOYEES, INCLUDING BUSINESS OWNERS
C1 Workplace quality and affirmative action
C1.1 Employee-oriented organisational culture and structure
C1.2 Fair employment and payment policy
C1.3 Occupational safety and workplace health promotion including work-life balance / flexible work hours
C1.4 Affirmative action and diversity

The need to achieve equality between all the people in the company and their full development as individuals is valued , with special attention given to their health. Hence, it is important to avoid the imbalances between different groups such as people with disabilities, migrants, the long-term unemployed, minorities, and so on, and to promote gender equality.

C4 Just income distribution
C4.1 Income divergence in the company
C4.2 Minimum income
C4.3 Transparency and institutionalisation

The wage differences between workers are increasing and this difference, according to Social Medicine, engenders sick societies, which suffer greater inequality and higher crime rates. To solve this issue, it would be advisable to establish a fairer distribution of the workers' income from the performance point of view.

D CUSTOMERS/ PRODUCTS/ SERVICES/ PARTNERS

D1 Ethical Customer Relations

D1.1Total extent of ethical customer relations measures (ethical marketing + sales)
D1.2 Product transparency, fair pricing and ethical selection of customers
D1.3 Extent of customer co-determination / joint product development / market research
D1.4 Extent of customer co-determination / joint product development / market research

In today's society there is a danger that the customer will be seen as a means to obtain an end, that is, as a way to increase profits by using advertising to encourage compulsive and unsustainable purchasing, when purchases should be thoughtful and rational.

D2 Cooperation with businesses in same sector

D2.1 Disclosure of information and passing on of technology
D2.2 Passing on of personnel, contracts and financial resources; cooperative market participation
D2.3 Cooperative marketing

The aim is to encourage cooperation rather than competition among companies, because this is considered to be the way to achieve a higher return.

D4 Socially oriented design of products and services

D4.1 Facilitation of access to information / products / services for disadvantaged customer groups
D4.2 Structures worthy of promotion are supported by sales policies

The level of social responsibility is evaluated from the customers' point of view. This is achieved by considering whether there are facilities that make access by disadvantaged consumers easier, since these have to be a reference for the production of goods and services.

E SOCIAL ENVIRONMENT: REGION, ELECTORATE, FUTURE GENERATIONS, CIVIL SOCIETY, FELLOW HUMANS, ANIMALS, PLANTS

E2 Contribution to the local community
E2.1 Achievements
E2.2 Effects
E2.3 Intensity

It is considered that the company can act as non-monetary contributor to the community, in a similar way to how an individual could, by trying to cover some of its deficits. This could be done through donations, foundations, etc.

N NEGATIVE CRITERIA

N1 Violation of human dignity
N1.1 Violation of ILO norms/human rights
N1.2 Products detrimental to human dignity and human rights
N1.3 Outsourcing to or cooperating with companies which violate human dignity

Companies must ensure compliance with current regulations on human rights and standards issued by the International Labour Organisation.

N2 Non-cooperative behaviour
N2.1 Hostile takeover
N2.2 Blocking patents
N2.3 Dumping prices

In relation to mergers and the acquisition of companies, this should not involve a hostile takeover, and individuals belonging to the company should be able to intervene in the acquisition agreements. With regard to the actions of companies concerning the innovation of products or processes, patents will not be used to hinder other companies from developing innovations that can modify the business *status quo* in the markets (defensive patenting). The application of dumping is also considered a negative strategy.

N4 Socially unjust behaviour
N4.1 Unequal pay for women and men
N4.2 Job cuts or moving jobs overseas despite having made a profit
N4.3 Subsidiaries in tax havens
N4.4 Equity yield rate > 10 %

There should be no gender inequality with regard to wages, and so if a company has been convicted in relation to this matter, or reliable proof of such inequality can be demonstrated, the company will receive a negative score. Dismissal of workers when the company is making a profit, business transfers and closures, and the existence of any kind of relationship with tax havens will also be considered negatively (due to the possibility of tax evasion). Further examination will also need to analyse the firm's situation as regards capital gains.

5. Common Good Balance Sheet: Environmental Impacts

Environmental impact is the effect of any human activity on the natural landscape, climate, and so forth. Environmental impacts produced by business activity can have serious consequences (especially if we are talking about industrial companies) on the health of individuals (both people linked with the company and those who do not have a direct relationship with the enterprise), as well as on the quality of the air, on the recycling of waste, on pollution, and so on. In short, we are talking about effects on the quality of life.

The CGM indicators that are seen to be related to the environmental area are:

A SUPPLIERS

A1 Ethical Supply Management
A1.1 Regional, ecological and social aspects / superior alternatives are considered
A1.2 Active examination of impact of purchased products / services and processes for ensuring goal achievement and extent and form of procedure for verification
A1.3Active examination of impact of purchased products / services and processes for ensuring goal achievement and extent and form of procedure for verification

According to this indicator, companies should take into account the ethical conditions of suppliers and products, for example by assessing precarious working conditions, fair trade, tourism services, cleaning services, etc.

B. INVESTORS

B1 Ethical Financial Management
B1.1 Institutionalisation
B1.2 Ethical / sustainable quality of financial service providers
B1.3 Investments oriented to the common good
B1.4 Corporate financing oriented to the common good

Businesses should be made aware of the effects of the financial sector (especially potentially destructive effects). However, this awareness is a little weak. In consequence, the levels of both the demand and the supply of ethical-ecological or sustainable financial products are not very high.

C EMPLOYEES, INCLUDING BUSINESS PARTNER

C2 Just distribution of labour
C2.1 Reduction of normal working time

C2.2 Increase in proportion of part-time work models and use of temporary employment (with adequate pay)
C2.3 Conscious approach towards (life-) working time

The distribution of work in today's society is highly unequal: there are individuals working a large number of hours (overtime), while others do not do so at all. From the ecological point of view, this is highly inefficient and it would be desirable for society to share working hours out more equitably.

C3 Promotion of environmentally friendly behaviour of employees
C3.1 Nutrition during working time
C3.2 Mobility to workplace
C3.3 Organisational culture, awareness raising and in-house processes

By complying with the conditions of this item the aim is to raise awareness of the need to achieve ecologically sustainable development. To this end it is considered necessary to have an awareness based on fundamental rights such as food or mobility, as well as working conditions which guarantee truly appropriate behaviour by individuals.

D. CUSTOMERS/PRODUCTS/SERVICES/PARTNERS

D3 Ecological design of products and services
D3.1 In ecological comparison to P/S of competitors or alternatives, products / services have equal utility
D3.2 Sufficiency (see excursus below): active design for ecological utilisation and sufficient consumption
D3.3 Communication: active communication of ecological aspects to customers

It is widely accepted that the production of goods and services involves a consumption of resources that exceeds the reserves that are available. The aim is to promote efficiency in the use of productive factors, beyond the actions followed in this regard to date, which are sometimes insufficient (for example, the use of renewable raw materials). For an action in this respect with effective effects on real overconsumption, it would be necessary to make clients aware of their patterns of consumption, or even reduce it as much as possible (food consumption).

E SOCIAL ENVIRONMENT: REGION, ELECTORATE, FUTURE GENERATIONS, CIVIL SOCIETY, FELLOW HUMANS, ANIMALS, PLANTS

E3 Reduction of environmental impact
E3.1 Absolute impact
E3.2 Relative impact: In sectorial comparison, as far as the state of the art and legal requirements are concerned, the company lies …
E3.3 Management and strategy

Given the extent of the influence on the environment at both national and global levels, it is necessary for companies and sectors to reduce it. This could be reflected, for example, in water consumption, recycling, reuse of materials, reduction of emissions, etc.

N NEGATIVE CRITERIA

N3 Environmental degradation
N3.1 Massive environmental pollution
N3.2 Gross violation of environmental standards
N3.3 Planned obsolescence (short lifetime of products)

The objective in this case is to minimise the effects of the destruction of natural areas. An enterprise will be given a negative score if it can be demonstrated that the firm has been sentenced in relation to such aspects or even if it causes environmental burdens.

6. The Common Good Balance Sheet: Mixed Impacts

The relationship between social and environmental impacts is now fully accepted. For example, research by Rettenmaier and Hienz (2014) has revealed a positive trade-off between socio-economic and environmental impacts. Sinha Babu and Datta (2015) claim that both areas are intricately connected and, moreover, that environmental and social factors are correlated when analysing their effects on the well-being of individuals. Thus, the effects of the programmes and actions of companies and organisations affect both individuals and the environment and, in most cases, the effects are deeply associated with each other. As indicated by RHEAS (Spanish-speaking Network for Environmental and Social Assessment) "the social component has become one of the fundamental aspects of environmental assessment". In fact, this network states that "in Legislative Royal Decree 1/2008, Spanish national law specifies that the EIA will identify, describe and evaluate the direct and indirect effects of a project on human beings, cultural heritage and their interaction with the environment".

The CGM indicators that are considered as being possibly related to both the social area and the environmental field are:

D. CUSTOMERS/PRODUCTS/SERVICES/PARTNERS

D5 Raising social and ecological standards
D5.1 Cooperation with competitors and partners of the value chain
D5.2 Active contribution to raising legislative standards
D5.3 Range, content-related scope and depth

Companies should increase cooperation and the dissemination of information on social and environmental standards (political processes, lobbying activities, quality, etc.).

E SOCIAL ENVIRONMENT: REGION, ELECTORATE, FUTURE GENERATIONS, CIVIL SOCIETY, FELLOW HUMANS, ANIMALS, PLANTS

E1 Products / services meet a basic need or serve the development of human beings / the community / the earth and generate positive use
E1.1 Pr Products / services meet a basic need or serve the development of human beings / the community / the earth and generate positive use
E1.2 Ecological and social comparison of products / services with alternatives of similar final benefit

Individuals consume goods and services because they are useful to them, but this cannot be the sole objective of consumers. The effects deriving from the actual consumption of goods and services and whether this consumption is compatible with the environment and society should also be taken into account.

E5 Societal transparency and co-determination
E5.1 Scope of CG Report
E5.2 Type of co-determination and documentation
E5.3 Scope of co-determination and stakeholder integration

The company must provide all the stakeholders with information about its actions; in other words, it must be transparent about its participation in other companies, and how its actions affect both individuals and the environment (level of pollution, recycling, and so forth).

N5 Undemocratic behaviour
N5.1 Non-disclosure of subsidiaries
N5.2 Prohibition of a works council
N5.3 Non-disclosure of payments to lobbyists
N5.4 Excessive income inequality within a business

As was the case previously with the equivalent positive indicator (C5), this item is also considered to be of a mixed nature. Any action that involves in some way a decrease in transparency will be considered an increase in the negative aspects of the company. These actions will be related to aspects discussed above, such as actions which may result in tax evasion, actions which have effects on the environment, and actions with political implications resulting from relations with certain political parties or lobby groups.

A summary of the indicators of the CGM classification, in terms of the type of impact, is shown in Table 2:

Table 2: Impact Indicators Classification

		Social Impact Indicators	Environmental Impact Indicators	Mixed Impact Indicators
A. SUPPLIERS	A1		**X**	
B. INVESTORS	B1		**X**	
C. EMPLOYEES, INCLUDING BUSINESS PARTNER	C1	**X**		
	C2		**X**	
	C3		**X**	
	C4	**X**		
	C5			**X**
D. CUSTOMERS/PRODUCTS/SERVICES/PARTNERS	D1	**X**		
	D2	**X**		
	D3		**X**	
	D4	**X**		
	D5			**X**
E. SOCIAL ENVIRONMENT: REGION, ELECTORATE, FUTURE GENERATIONS, CIVIL SOCIETY, FELLOW HUMANS, ANIMALS, PLANTS	E1			**X**
	E2	**X**		
	E3		**X**	
	E4	**X**		

	E5			**X**
NEGATIVE ASPECTS	N1	**X**		
	N2	**X**		
	N3		**X**	
	N4	**X**		
	N5			**X**

Source: Author's own elaboration

7. Conclusions

In recent years, companies are detecting changes that are leading them to accept that their activity has impacts that have not only economic, but also social and environmental effects. However, there is no system for collecting and measuring information with a level of consensus analogous to that of economics or accounting and which allows us to consider the value of the social or environmental impact of a particular project or organisation, and which favours the comparability of information for decision-making. It should be emphasised that considerable progress has been made in recent years in the measurement of impacts other than economic ones, that is, the social and environmental impacts of the projects undertaken by organisations. At this point, the contributions made by the CGBS methodology are especially significant.

According to this work, and in the light of the results obtained and summarised in the previous table, it can be stated that approximately half of the indicators and/or sub-indicators in the CGM correspond to the social area (more specifically slightly more than 45%), the environmental aspect being considered in only one third of the indicators and sub-indicators of this matrix. Thus, aspects directly related to the quality of life of individuals and their improvement are widely represented in this tool, but the effects on the environment and surroundings are less abundant. This claim does not necessarily imply that the differences in the number of second level indexes indicate differences in quality, in the items or in the instrument itself, which is backed by the results obtained and the high degree of satisfaction with its use in many companies. For these reasons, it cannot be said that the environmental area is represented only precariously in the CGM.

On the other hand, it should be noted that this is a preliminary analysis, and it would be necessary to delve into this subject with a deeper, broader and more exhaustive study. One of the possible derivations of this work would be to carry out analyses at the individual level for each organisation, and another (which is now under way) consisting in classifying the impacts according to different criteria, some of which have been pointed out previously. For example, consideration could be given to the classification of the different indicators studied according to the different points of view in the environmental area, such as the nature of the impact, the cause-effect relationship, its extension, persistence, recovery, manifestation or its interrelation with other impacts. This will allow us to obtain concepts, principles, methodologies and practices that can become balanced and reliable instruments for a better social and environmental assessment. In this respect, it should be noted that this approach (and therefore the metrics involved) has recently received a boost from the regional government through Order 2/2017, dated 21 February, of the *Conselleria de Economía Sostenible, Sectores Productivos, Comercio y Trabajo* of the Generalitat Valenciana. This example shows the growing interest of public administrations in the promotion of policies aimed at creating social and environmental value.

References

Abaza, H., Bisset, R., and Sadler, B. (2004), 'Environmental impact assessment and strategic,' http://unep.ch/etu/publications/text_ONU_br.pdf

Chapman, T., Robinson, F., Brown, J., Crow, R., Bell, V. and Bailey, E. (2010), 'What makes third sector organisations tick? Interactions of foresight, enterprise, capability and impact,' Newcastle: Northern Rock Foundation.

Arvidson, M., Lyon, F., McKay, S. and Moro, D. (2010), 'The ambitions and challenges of SROI'.. *Working Paper 40*, Third Sector Research Centre, University of Birmingham.

Charity Navigator (2017), Website: http://www.charitynavigator.org (last accessed 2 Setember 2017).

CESE, Consejo Económico Social y Europeo (2008), Informe sobre la Economía Social. Comisión Europea.

Díaz, M., Marcuello, C. and Marcuello, Ch. (2012), Empresas sociales y evaluación del impacto social, *CIRIEC* 75, 179-198.

Ebrahim, A. and Rangan V. K. (2010), 'The Limits of Nonprofit Impact: A Contingency Framework for Measuring Social Performance,' *Working Paper 10-53.* Harvard Business School.

Eccleston, C. H. (2011), 'Environmental impact assessment: A guide to best professional practices,' CRC Press.

Elkington, J. (1997), 'Cannibals with Forks: The Triple Bottom Line of 21st Century,' New Society Publishers.

Emerson, J. (2003), 'The blended value proposition: integrating social and financial returns,' *Californian Management Review* 45 (4): 35-45.

Gair, C. (2002), 'A Report From the Good Ship SROI,' (On line: REDF, http://www.redf.org/publications-sroi.htm#ship, (last accessed 25 Setember 2017).

Gibbon, J. and Dey, C. (2011), 'Developments in Social Impact Measurement in the Third Sector: Scaling Up or Dumbing Down?,' *Social and Environmental Accountability Journal* 31 (1): 63-72.

Lingane, A. and Olsen, S. (2004), 'Guidelines for social return on investment,' *California Management Review* 46 (3): 116–35.

Lyon, F., Arvidson, M., Etherington, D., and Vickers, I. (2010), 'Social impact measurement (SIM) experiences and future directions for third sector organisations in the East of England,' report for the *East of England Development Agency*, at www.the-guild.co.uk (last accessed 27 Setember 2017).

Millar, R. and Hall, K. (2012), 'Social Return on Investment (SROI) and Performance Measurement: The opportunities and barriers for social enterprises in health and social care,' *Public Management Review* 1-19.

Nicholls, J., Lawlor, E., Neitzert, E. and Goodspeed, T. (2012), 'A guide to social return on investment,' Lothian: The SROI Network.

Order 2/2017, dated 21 February. Conselleria de Economía Sostenible, Sectores Productivos, Comercio y Trabajo. Generalitat Valenciana (last accessed 2 Setember 2017).

Our Common Future: Brundtland Report. 20 March 1987. UN.

Rettenmaier, N. and Hienz, G. (2014), 'Linkages Between Socio-Economic and Environmental Impacts of Bioenergy,' *Socio-Economic Impacts of Bioenergy Production* (59-80).

Sinha Babu, S. and Datta, S.K. (2015), 'Revisiting the link between socio-economic development and environmental status indicators—focus on panel data,' *Environment, Development and Sustainability*, June 2015, 17 (3) 567–586 https://doi.org/10.1007/s10668-014-9561-6

Vanclay, F. (2015), 'Social Impact Assessment: Guidance for Assessing and Managing the Social Impacts of Projects,' IAIA.

[i] The term *Triple Bottom Line* was coined by Elkington in 1997, in the book "Cannibals with Forks...". The Triple Bottom Line measures the company's degree of social responsibility, the economic value and the environmental impact of an enterprise. Therefore, companies should include assessments about social and environmental aspects of their activities within their accounts to be able to measure the total cost of doing business.

[ii] Companies assess the impacts of their actions in the areas listed in Table 1 (more in five sub-areas that reflect the possible negative impacts) by awarding scores drawn from scales previously established. The scores reflect the level of compliance with the 22 indicators listed in the table above, (the items from A1 to E5, the negative ones, and the respective sub-indicators). The aim is to enable enterprises to assess their level of compliance, obtaining a final score. However, this is not the main objective of the evaluation of an organization from the point of view of the Economy of the Common Good. The calculation of the result of this tool is indissolubly linked to the report that will reflect the deficiencies, the objectives to be achieved in the future, and the way forward for it.

Using Scorecards and Benchmarking in Management and Development of Cities and Regions

Peter Rafaj, Comenius University, Bratislava, Slovakia, Peter.Rafaj@msconsult.sk
Lubomira Strazovska, Comenius University, Bratislava, Slovakia, Lubomira.Strazovska@fm.uniba.sk
Rozalia Sulikova, Comenius University, Bratislava, Slovakia, Rozalia.Sulikova@fm.uniba.sk

Abstract

The topic of this paper is the practical application of selected strategic management, scorecard and benchmarking systems, in the field of public administration and especially in the development of municipalities and regions. The objective of the authors was to highlight the importance of applied strategic approach in municipalities and regions as one of the important topics in the sector over the past two decades. The authors reviewed the application of scorecards and benchmarking in real conditions of The Slovak Republic in period 2005 – 2016 that were framed and started by the reform of the public administration of the Slovak Republic (1995-2005). In this paper they present real life cases and researches in 40 cities in total, representing 42% of the urban population of Slovakia. The paper provides ideas and inspiration for the development of modern management practice not only in local and regional self-government but in public administration in general.

Keywords: Municipality, Regional Development, Scorecard, Benchmarking, Territorial Marketing

Introduction - concepts and approaches

Municipalities and *regions* are the target Entities - Management Objects, which the research was focused on. We perceive these as *territorial management* and thus do not perceive them as a mere administration of territorial - administrative units. Newer theories emphasize access through the paradigm of *functional urban regions*. According to these, cities should be seen as centers of "natural regions", consisting of municipalities in the belonging area of urban and regional centers. The expression *municipality* is derived from the Latin word *municipium*, which means "city with self-government". In English, the municipality means "a city or a district with its own local government, the governing body of such a town" (Hornby 1989). *Region* is a territorial unit defined according to the classification of statistical territorial units. (EUR-Lex 2017). *Euroregion* is a territorial cooperation body composed of representatives of socio-economic partners operating at the regional and local level of neighbouring countries, established for the purpose of cross-border cooperation. *Regional development* is a set of social, economic, cultural and environmental processes and relationships that are taking place in the region and which contribute to enhancing its competitiveness, sustainable economic development, social development and territorial development, and balancing economic disparities and social disparities between regions. It is a long-term "process with a qualitative change aimed at the long-term increase in the economic wealth of the territory as well as its competitiveness" (Cajka and Rysova 2008).

In the history of *regional science* a different position and role of space can be observed. In the original theoretical considerations, space appears as a *physical barrier* to the economic and social activities within it (Tvrdon 2013). Theories that arose in the 1950s and 1960s used space as an *abstract unit*, generally corresponding to the administration units. A radical change in the view of the role of the space took place in the 1970s. The space was conceived as an *economic resource* as a *separate production factor*. In the current regional growth theory, space is understood to be a "*cognitive space*" that can use information to identify and solve problems or has the ability to transform information and knowledge into innovation and productivity growth. According to Camagni (2004), *cooperation between local actors* is also important for this understanding. Sloboda (2006, p.6) presents a summary of basic theories of regional

development from the perspective of economic theory from which it is ideologically based. The significance of space exploration since the 1990s has continued and has risen in the 21st century. In addition to the onset of the global financial crisis after 2008, it also results from the increased interest of regional policy makers, especially in relation to The European Union regional policy.

Trends in Urban and Regional Management

Trends in urban and regional management are based on general trends in public administration, nevertheless are these at the same time characterized by some specificities. The general trends include the strategic approach application, the client orientation, and the value-based service orientation. A specific trend is the shift from the perception of cities and regions as territorial units to *urban regions* as natural spatial units. In the second half of the 1980s a reform approach was developed by academics ("New Public Management", "NPM"). In the 1990s NPM was increasingly accepted as a "gold standard for administrative reform" (Kapucu 2006). In the course of a later period, it has been criticized by some authors and faced a "competition" by the "Value for Money" ("VFM") approach. The founder of the concept of public value can be considered M. Moore (1995). According to him the role of managers in public sector organizations is to create public value. A summary and comparison of selected paradigms in the development of public administration management is processed by Flynn (2007) and other authors. The 20th and 21st centuries, however, especially the outbreak of the global financial crisis after 2008, has raised serious questions about the future of the world economy and hence of access to the public sector economy as a specific component of each state (Gregusova 2016a).

Under Slovak conditions NPM-based concepts have not even been implemented to a wider extent before some scepticism emerged. In any case the NPM principles have penetrated into the public administration in Slovakia, which in essence represents the management of public affairs (Peracek 2016) and have brought and still are bringing many benefits to it. Essential fact in the author's opinion is that both NPM and VFM emphasize client's approach and effective value creation. Filko, Kiss and Odor from Institute of Financial Policy (The Ministry of Finance of the SR) and from the Council for Budget Responsibility (an independent body for monitoring and evaluating the fiscal performance of the SR) have developed a study (2016), which was adopted as a government project (Adrian 2017). The authors of study emphasize three levels of change: (1) VFM is a philosophical change, (2) institutional reform and (3) gathering and accessing data and using modern analytical tools. They consider the three most important tools: "*spending review, cost-benefit analysis, and benchmarking*" (p.5-6).

Scorecards and Benchmarking In the Management & Development of Cities / Regions

The management of organizations in a constantly changing environment requires a certain set of "navigation" tools and indicators to assess the situation from different perspectives and to monitor how organizations achieve their set strategic goals. Balanced Scorecard ("BSC") is more than a management reporting system or performance measurement system. BSC links indicators with strategy, "translates" the organization's vision, mission and strategy into a comprehensible set of performance indicators that give top management a quick but complex view of the organization. BSC goals and indicators follow the performance of the organization from four perspectives: financial, customer, internal processes and learning and growth (innovation). Individual perspectives lead to selected areas and guide strategic thinking to find causal links between them (Kaplan and Norton 2006). For non-profit organizations and the public administration sector, the perspectives system is modified: at the top is a customer perspective, which is also referred to as a civic perspective in the case of public administration (Niven 2003).

A new understanding of the role of public administration in society is inevitably linked to the application of new methods of performance evaluation and quality of service provided by the public administration. With this aim it was in 2013 SR adopted act on the electronic form of execution of competences of the public authorities (e-Government Act), whose main task is to facilitate communication with public

authorities (Gregusova 2016b). One of the most commonly used methods is *benchmarking*. The word "benchmark" means: a standard, a comparative point, or a comparative indicator. Benchmarking is a method of systematic and continuous measurement, comparison and evaluation of its own effectiveness and quality compared to others. "Benchmarking is a process in which we are so modest that we admit that someone else is in something better and then we are so smart that we will find out how we can deal with them or even overcome them." (Niznansky and Rafaj 2016).

The benchmarking method considers the best practice as a standard. In the standpoint of the standard, the institution - the self-government, which performs the best results in the provision of comparative services, performs both in terms of quality and costs incurred. The OECD countries are familiar with the various practices associated with initiatives to implement benchmarking in public administration. One approach is the *bottom-up initiative* where municipalities and public service organizations join together to improve the performance and quality of services provided. Organizations set up their own benchmarking system, looking for suitable partners for benchmarking (e.g. Ontario Provincial Initiative). If the initiative comes from self-government or other public sector bodies, then it is itself interested in knowing and using better practice, and the method contributes to improving the performance of the lagging behind. The second approach is the introduction of *mandatory benchmarking by law*, creating a competitive environment and pressure while creating the possibility of systematic control of organizations (The United Kingdom). A positive attitude towards such an approach is the full implementation of and the provision of an overview of the quality of work of organizations. To improve the performance of the lag, the tenderer is primarily interested in the performance, but may not be interested in the organization itself (Niznansky 2013).

Research on the Use of Scorecard and Benchmarking In Municipalities

The use of scorecards and benchmarking in the cities of the Slovak Republic ("SR") has been the subject of our own qualitative research. The aim of the research was to find out the extent and the way of using scorecards and benchmarking in the management and development of cities in the SR. The monitored period was 2005 - 2016, i.e. from the implementation of the first stage of the municipal reform of the SR - decentralization, which took place in 2004 to the present. The research was conducted from January to April 2017. A structured questionnaire, prepared in Microsoft Excel, was sent by electronic mail to cities in Slovakia. The questionnaire included a combination of closed and open questions. The cities were addressed directly and with the recommendation of the Association of Municipal Economists, the Association of Local Government Managers and the Communal Research and Advisory Center ("KOM").

In the Slovak Republic, there are 2 883 municipalities with local government bodies, out of them 140 have status of city. The research was carried out on a portion of the base file by a selecting 100 cities in total. The analyzed cities were clustered to following size categories: up to 10 000 inhabitants; from 10 001 to 20 000 inhabitants; from 20 001 to 50 000 inhabitants and over 50 000 inhabitants. 40 cities in total, i.e. 40% of the selection file and 29% of the base file responded. Total number of inhabitants of the responding cities amounts to 1,215 million, i.e. approximately 42% of the urban population and about 22% of the total population of the SR.

Assumptions: Use of Scorecards in the Cities

The first group of questions focused on finding out about the existence and usability, scope, method and duration of the use of the Balanced Scorecard, as well as other systems of performance indicators in the Slovak cities. The questions were drafted in order to enable differentiation of the Balanced Scorecard from other types of scorecard systems A differentiator to differentiate the relevance of the Scorecard used by the city to the type Balanced Scorecard was a set of questions aimed at detecting whether:

- Scorecard indicators are divided into four causally linked perspectives
- A scorecard is linked to city strategy or other strategic documents

- Scorecard is linked to actions - performance measurement in an organization or employee remuneration based on performance indicators.

Following types of system indicators were anticipated:
Balanced Scorecard (BSC) - a comprehensive balanced system of indicators in the sense of its generally accepted definition.
Financial - Budgeting Scorecard - reduced to the financial perspective, or just a set of basic financial or budgetary indicators.
Multi-criteria Scorecard - a scorecard containing financial and non-financial indicators across multiple areas of the scope of the city but which does not meet the Balanced Scorecard criteria.
Particular scorecard - set of indicators applied to the selected area(s).
Scorecard of Economic and Social Development - "ESD Scorecard " was not identified in any of the studied sources. However, it reflects the terminology and legislative specifics of the SR. The Economic and Social Development Plan is a document that is close to the strategy by the means of content and definition. The cities are obliged to develop and elaborate their ESD plans by the law (Act no. 539/2008 Coll. of the Slovak Republic on Support for Regional Development).

Results and discussion: Used scorecard types in the cities of the SR

The use of the definition-complete Balanced Scorecard system was not found in a sample of 40 responding cities. Thirtysix cities, i.e. 90% stated that they were using some system of performance indicators (scorecard or some type of dashboard system). Four cities, i.e. 10% of responding cities stated that they do not use a system of performance indicators or provided no response in the Scorecard questionnaire section. This fact can be interpreted in the way that the cities do not use a system of indicators but from other sources (INEKO 2017) we have the knowledge that the basic financial indicators, e.g. debts, liabilities are being monitored.

A financial scorecard, based on performance, financing, or budget indicators is being used by twenty-one cities, i.e. about a half (52.5%) of the respondents. A significant majority, 85% of these cities also stressed that it is considered sufficient to regularly assess the financial and budgetary indicators. A multi-criteria scorecard was used by 6 cities (15%) from the survey sample. The average amount of areas of the multi-criteria scorecard was totalled at 15. By the end of 2016 the ESD Scorecard, conceptually closest to the Balanced Scorecard strategic system was used in 9 cities (22.5%). The average amount of areas of the ESD Scorecard totalled at 13 and was reported by the 90% of the cities. This finding confirms that the ESD Scorecard cannot be considered a Balanced Scorecard based on the criteria of monitored perspectives. The criterion for the inclusion to the type ESD Scorecard were the ties with the city's economic and social development plan. We identified all anticipated scorecard types but BSC. The hypothesis that the use of the Balanced Scorecard system will be detected in at least 2% of cities is rejected. A summary of the used scorecards in the Slovak Republic is given in Table 1.

Table 1: Applied type of scorecard and duration of the use

Use as at 2016	**All scorecards**					**SC ESD & Multicriterial SC**		
Scorecard type	**cities #**	**share %**	**years in use**	**cities #**	**share %**	**years in use**	**cities #**	**share (%)**
Financial	21	52,5	1 - 5	2	5	1 - 5	2	13,3
Multicriterial	6	15	6 - 10	17	42,5	6 - 10	9	60
ESD Scorecard	9	22,5	not indicated	17	42,5	not indicated	4	26,7
no scorecard	4	10	no scorecard	4	10	Total	15	100
Total	40	100	Total	40	100			

Source: Own questionnaire survey

By the means of a questionnaire survey, we have identified further characteristics related to the use of scorecards in the Slovak cities:

- period and time of use,
- used support of information systems,
- scope of use within the city, city office and city-based organizations,
- use of a scorecard purposefully, in a limited range and time, within a specific project
- knowledge / awareness of indicators systems by city managers and leaders
- intentions / plans to implement the scorecard in the next period (year).

A graphical summary of the use of scorecards in the cities of Slovakia is shown in Figure 2. Further outputs will be published at a later period.

Assumptions: Use of benchmarking in the cities

The second group of research questions was aimed at finding out about the existence, usability, extent, method and time of using the benchmarking method in the Slovak cities. The questions were drafted in a way, so that differentiation of following would be possible:

- *systematic benchmarking* - long-term, regular and multi-criteria comparison and learning from the findings
- *ad - hoc benchmarking* - partial, focus - or time - limited benchmarking activities where cities compare the selected data.

The subject and objective of the survey was as follows:

- engaging in benchmarking projects and initiatives during 2005 -2016
- current involvement in benchmarking projects by end 2017
- particular (time, purpose, scope, or content) limited use within a specific project
- ad - hoc use of benchmarking
- duration of use of benchmarking
- the number of areas / subareas and the number of benchmarking indicators
- way of performing benchmarking
- using software tool support.

Results and Discussion: Use of Benchmarking In the Cities

Experiences with the practical use of benchmarking in the period 2005-2016 indicated 82.5% of the 40 responding cities. Systematic, regular and in the long run used benchmarking was indicated by 75% of cities. Most of them (85%) performed this in the form of an active annual participation in a long-term Benchmarking Project of Slovak Municipalities ("BMU Project") (Niznansky and Rafaj 2016). Overall, 26 out of the 40 responding cities (65%) were involved in the BMU Project for certain time within period 2005 - 2016. Active participation means collecting and inserting values into the web portal, for computing 160 indicators in 15 areas, participating in methodical meetings and on-line access to the database, graphical outputs, and to annual publication. The project has been a catalyst for the development of benchmarking since 2005. Furthermore, 10% of cities used benchmarking on a regular basis outside the area of the BMU Project. Using benchmarking for single / ad-hoc purpose or in the specific project reported 7.5%. The impact of experience with the BMU Project on higher return rate of the survey was approximately + 25%.

Seventeen cities (52% of 31) with benchmarking experience used it longer than 5 years in the reference period 2005 - 2016, nearly a quarter used it 10 or more years. 42% of cities said they were using benchmarking for less than 5 years. 6% did not indicate usage time.

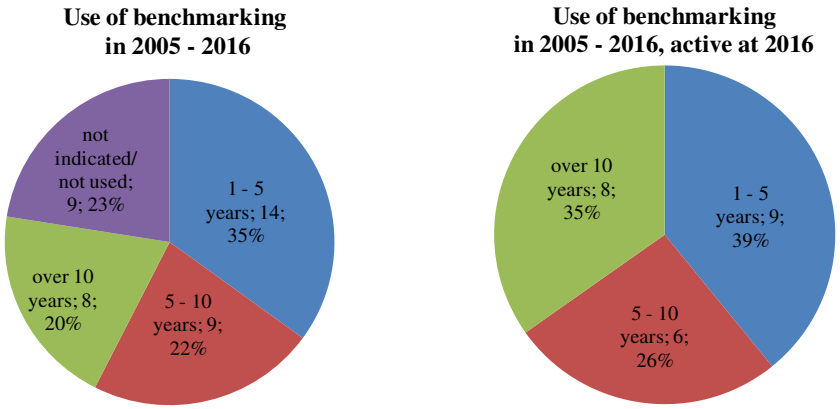


Fig. 1: Total duration of benchmarking usage

Source: Own questionnaire survey

Duration of use is shown in the graph in Figure 1. In a group of cities that actively used benchmarking to the year 2016, cities with benchmarking use 1 to 5 years (39%) are the most represented. Average duration of the use of benchmarking of active to the December 31, 2016 was 7 years. The share of cities that stopped using benchmarking is 39%, the average use in this group was 6 years. An important factor in the long life of benchmarking is the UMS and KOM initiatives that create "benchmarking culture" and quality service provision to "stimulate the demand" from cities.

Typical number of benchmarking areas amounts to 15. This was reported by 63% of the benchmarking cities. Within these, approximately 160 indicators benchmarked. This is a consequence of the fact that the BMU Project (BMU Project 2017a) has become the de facto benchmarking standard for cities. 10% of the cities have indicated less than 5 benchmarking areas. The most frequently mentioned areas of benchmarking application by respondents are shown in Figure 2. An interesting finding is that there is predominant use of benchmarking as a support for decision-making and there is no area of organizational improvements by benchlearning. Further research findings will be published at a later point in time.

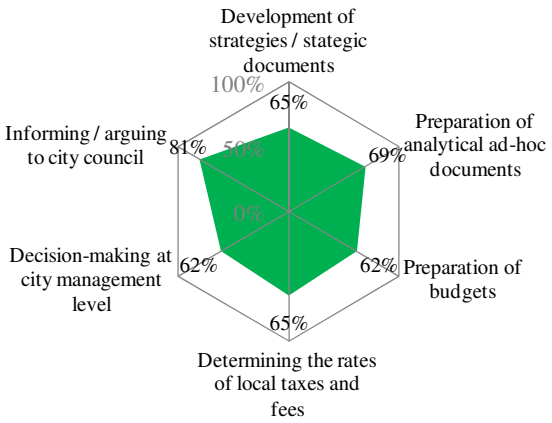


Fig. 2: Most frequently mentioned areas of benchmarking application

Source: Own questionnaire survey

Scorecard for Benchmarking and Ranking Municipalities

In order to make it easier for municipalities to find their way around complicated decisions and to benchmark each other, a set of indicators can be used *Scorecard for benchmarking and ranking municipalities* in the SR. We present its possible form, which has also been tested in practice (Niznansky 2011). As a basis for the design of the scorecard for the ranking of municipalities, we used a set of indicators for the Benchmarking project of Slovak cities. The project took place in approximately 30 cities in Slovakia between 2004 and 2016. The cities compared each other in 160 indicators in 15 areas using a specially created web-portal for this purpose (BMU Project 2017b). The portal contains a database of 11-year data sets as well as a benchmark and trend visualizations.

When selecting indicators, we focused on areas that in our opinion, most affect the quality of life in the city. We consider such areas as: (1) Effective management; (2) Quality services; (3) Quality Environment; (4) Public finance and (5) Community safety. Selecting areas and indicators were based mainly on *brainstorming*. Ideas and suggestions were collected from experts from each participating city and from the project team. Furthermore, the *cause-effect diagrams* method from Balanced Scorecard designs was used. The selection of specific indicators for the Scorecard was carried out subsequently, after 6 years of data collection in the Benchmarking project. Selection was performed by combining expert choice and examining correlations of indicator. As an example, we present a summary of the analysis of the community safety indicators (Table 2).

Table 2: Correlation coefficients in the area of community safety

Indicator - correlation	# of traffic violations (penalties)	# of violations to city regulations	# of violations to law
Coverage with cameras	0,857	-0,955	-0,502
Patrolling city cops	0,847	-0,893	-0,367
Safety spending	0,718	-0,897	-0,734
Preventive events	0,706	-0,791	-0,420

Source: Database of Benchmarking project of Slovak cities (BMU Project 2017b)

In the survey sample of 34 cities, the productivity of city policemen and community safety shows an increasing tendency in the period 2004 – 2014 with increasing cameras coverage, number of patrolling city cops and safety spending. In the Community Safety area, following indicators were selected:

- City coverage with cameras (Number of cameras per $1km^2$)
- City coverage of patrolling city policemen (Number of policemen per $1km^2$)
- Share of city police expenditure on total city expenditures (Safety cost per citizen).

Analogously, other indicators of the Benchmarking and ranking scorecard of municipalities were selected. Consequently, we have defined the ranking of the city that we consider to be the best in this indicator. The evaluation is based on the sum of the achieved scores. The description and results of the ranking according to the above criteria setting can be found in the publication (Niznansky 2011).

Scorecard of the knowledge cooperation in metropolitan region

The overall goal of the TwinRegion project (TwinRegion 2012) - was the establishment and strengthening of cooperation in the metropolitan region of Vienna - Bratislava (TwinRegion) through greater involvement of the surrounding cities and towns. The Web-scorecard is supposed to support this goal insofar as it means a system of 450 indicators:

- showing existing collaborations and cooperation potential of the TwinRegion,
- representing best practices in different fields of cooperation
- provides the search of potential partners on various topics.

Thus, the figure of the Austrian and Slovak cities of TwinRegion in a Scorecard or a performance measurement system as a central base for the establishment of collaborations are understood. Below presented fields of cooperation were identified within the TwinRegion-study as areas of high potential for cooperation:

- Information and communications platforms
- Identity and marketing of the metropolitan region
- Education networks
- Coordination of regional development plans
- Development of the business location
- Innovative and sustainable use of resources.

The scorecard consists of three main parts: (1) Basic indicators for the regional framework; (2) Basic indicators for the cities; (3) Cooperation indicators of the selected cities to six domains.

Discussion

The goal of the Web-scorecard TwinRegion is not (only) to measure and compare the performance of the cities in the "Knowledge Sharing", but to provide structured information about the cities and their cooperation in 6 selected fields to support their mutual communication and interactive information exchange. The Scorecard offers to the cities interested new cooperation opportunities and potential partners the opportunity to present their own city for knowledge collaboration. In midterm perspective, the Scorecard should support the institutionalizing of cooperation at both political and (self)government level and promoting the co-operative strategies in the metropolitan region.

Benchmarking In Operational Program of the EU in the Slovak Republic

The most important funds with a significant impact on the development of municipalities and regions are The European Regional Development Fund, The Cohesion Fund and The European Social Fund. One of the cornerstones of the *outcome-oriented approach* in the 2014-2020 programming period is the performance framework. Under *The Partnership Agreement*, "Setting up a set of indicators correctly and effectively is crucial to successful implementation of the performance framework, which includes four steps" (Government Office 2014):

- *Selection of appropriate indicators*: selected indicators should be representative, realistic, verifiable and achievable;
- *Setting the values of the objectives* of indicators to be achieved by 2023. It is recommended to "perform a Value for Money analysis" and "use recognized quantitative or qualitative methods";
- *Selection of appropriate indicators for setting of partial targets*;
- *Setting the partial targets* to be achieved..

As an example, we select and generalize the experience from the successful practice of benchmarking in the Regional Operational Program ("ROP") in the 2007-2013 programming period and in the Environmental Quality Operational Program ("OP QE") for the 2014-2021 period, in which one of this paper authors participated. The data is drawn from public sources (ROP 2014, OP QE 2017).

An applicant-recipient of non-redeemable funds is required to maintain the principle of cost-effectiveness. On the project level, it means minimizing the costs necessary to implement the project while meeting the project objectives. On the program level, it is required to maximize Value for Money. Their common characteristic is the application of the benchmarking method to determine the reference values. Benchmarking has been chosen for reasons of objectivity and practical applicability. The benchmarking process will be demonstrated by an example of identifying the relative investment intensity of building a sewerage network. This was done on the basis of statistical analyzes of historical data from the projects implemented in 2007-2013. The population of the sample was 121 projects, of which 25 were expert selection according to defined criteria selected 25, fulfilling the "standard condition" (Table 3).

Table 3: Sample of OP Quality of Environment benchmark values

Project activity	Benchmark reference value
Gravitational sewer network	425,000 €/km
Gravitational sewer network+ water supply	480,000 €/km
Pressure sewer network	250,000 €/km
Pressure sewer network+ water supply	305,000 €/km

Source: Operation Program Quality of Environment (OP QE Call 2015)

The Regional Operational Program implemented in Slovakia throughout the 2007-2013 programming period can be perceived as an example of successful benchmarking practice. Benchmarks have been applied to assess economic efficiency in over 30 calls and over 2,600 evaluated applications. A sample list of ROP benchmarks is given in Table 4.

Table 4: Sample of ROP benchmark values

Measure	Benchmark reference values
2.1 Social Services Infrastructure	Resident place 15,000 – 40,000 €/client Non-resident services 1,000 – 1,500 €/m^2
3.1 Strengthening the cultural potential of the regions	30 – 100 € /user 1,500 – 3,200 €/m^2 floor square
4.2 Infrastructure of non-commercial rescue services	Rescue stations: 133,000 – 266,000 €/project Base stations: 332,000 – 730,000 €/project
5.1 Regional roads	166,000 – 498,000 €/km.

Source: Own processing of the author from public sources (ROP 2014)

As stated at The 7th European Summit of Regions and Cities (Bratislava Summit 2016), EU funds are considered an important means of regional development of the SR and a decisive source of its funding - they accounts for up to 80% of public investments. Provision of EU funding is a comprehensive system that also introduces systems of successful practice in municipalities and regions. They significantly contribute to the dissemination of know - how in the application of scorecards and benchmarks in the SR.

Benchmarking In Marketing Communication of Municipalities and Regions

The role of the *Territory Marketing* is to identify the needs of the target groups and provide them product offers in order to satisfy their individual perceptions and at the same time support the development of the territory (Olsavsky, 2014). The aim of the research focused on the *Benchmarking of Marketing Communication* in the municipalities and regions of Slovakia was to examine selected aspects of marketing communication on the sample of functional urban regions. The survey was carried out in 2017 on the data obtained by questionnaire survey in 2015 from a larger project of The Union of Cities of Slovakia ("UMS") (UMS 2017) in cooperation with the Communal Research and Advisory Center ("KOM") (KOM 2017).

In the survey data from the four functional urban regions of Slovakia were collected and analyzed. The sample of functional urban regions contains two pairs of comparators: two regions (R1-Trnava and R2-Trencin) have an urban, industrial character, with dynamic economic development after 2000. Two other regions (L1-Turcianske Teplice and L2-Gelnica) were of mountainous character, high forest share (60-70% of land area) and stagnant industry. They have the potential to develop tourism, but transport infrastructure is in an inconvenient state. Both forest regions have comparable natural and climatic conditions, population, but different demographic characteristics. Both of urban regions have comparable demographic characteristics and slightly difference in geomorphology.

The survey was conducted using a cloud-based questionnaire accessible to the respondents on-line, with telephone support. Seventeen questions, qualitative and quantitative, were addressed in the examined functional urban regions. These were answered by 40 - 45 municipalities, depending on the question. Qualitative questions were focused on: (a) Marketing message; (b) Marketing slogan; (c) Perceived competition of municipalities / regions; (d) Target groups; (e) Strengths on which the community builds its marketing strategy; (f) Used marketing tools; (g) Importance of marketing tools in terms of success; (h) Importance of marketing tools in terms of spending; (i) Areas of cooperation of the municipalities in marketing communications and other areas. In the post, we only show the answer to the question of "The importance of marketing tools in terms of success". Further results of the research were published (Rafaj and Strazovska 2017).

The community website is considered the most frequently used tool of marketing communication - used by over 90% of municipalities. According to Niznansky and Rucinska (2015), municipalities consider the website as an information board. The lowest share of municipalities with a website was in the L1 mountain region. Other most used marketing tools include brochures and flyers (60% of municipalities) and promotional items (50% of municipalities). Cultural, social and sports events are considered as an important marketing tool by 40% of municipalities. Surprisingly low was the use of social networks as marketing tools - only by single region. At the time of writing this paper (August 2017), a survey was conducted on the social networks use in the R1 region. Within two years, around half of municipalities started to use social networking and up to about 75% of municipalities (including unofficial profiles that contribute to community marketing). A summary of the answers to the survey on the use of marketing tools is given in Table 5.

Table 5: Use of marketing communication tools

Marketing tool - region	R1	R2	L1	L2	Total
Website	100%	100%	83%	92%	93%
Brochures and flyers	62%	75%	42%	50%	56%
Promotional items	15%	63%	58%	67%	49%
Events	31%	38%	8%	100%	44%
Information boards	31%	50%	0%	50%	31%
Local press / radio	46%	38%	0%	42%	31%
Video, multimedia	0%	13%	8%	0%	4%

Source: KOM, own data processing (KOM Data 2015)

A sample of successful practice of applying scorecards and benchmarking in city marketing will be complemented by selected outputs from the Benchmarking project of Slovak cities. Figure 3 shows the trend diagram of the share of promotion expenses of the cities in relation to the total expenditure of the cities. The sample includes the data of 32 cities in 2004 -2014.

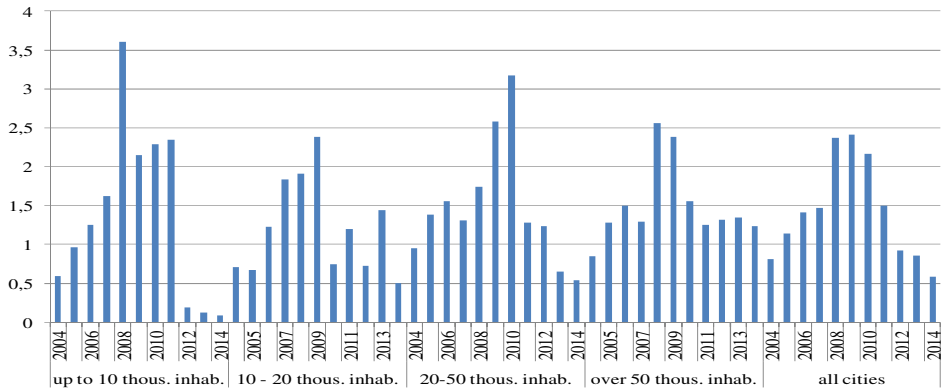


Fig. 3: Share of expenditure on promotion on total expenditure (%)

Source: KOM, own data processing (BMU Project 2017b)

Promotional spending grew in cities of all size classes until the beginning of global financial crisis. As a result, cities have moved on to more restrictive budgets since 2009, and marketing spending has fallen in all cities except for the cities with population of more than 50,000. The average value of marketing expenditures in 2014 amounted to 0.26% of the total budget. The promotion expenses in EUR per inhabitant show similar trend. In the entire sample of 32 cities, they have nearly tripled from an average of € 1.15 per capita to a maximum of € 3.20 per capita in 2008. The impact of the global financial crisis can be noted by the fall to € 1.7 per inhabitant 2013 and 2014, i.e. the initial level of 2005. In the sample surveyed in cities with over 50,000 inhabitants in 2014, they spent approximately € 2.90 per inhabitant on the promotion. The values in the sample show high scattering. Data include only directly charged promotion costs - do not include e.g. web costs, cultural events, etc.

Conclusion

Although the IMF and the OECD consider that Slovakia belongs to the most likely country among their members to carry out reforms, major regional disparities and a lack of government effectiveness persist (Adrian 2016). Slovakia's cumulative real GDP growth rate of 38% between 2004 and 2014 was the strongest of all 28 EU Member States (Eurostat 2015). In 1995 - 2005, the first phase of decentralization of public administration took place. As stated by the protagonists of the Value for Money concept (Filko, Kiss and Odor 2015) and of the public administration reforms in Slovakia (Niznansky 2005), The Union of Cities of Slovakia (UMS 2016), the application of scorecard indicators and their benchmarking appear to be one of the key success factors and transformation accelerators of public administration. In the paper we have presented a range of cases of application of scorecards and benchmarking in the development of cities and regions in Slovakia. The specificity of Slovakia is their use in the wider transformation of the social and economic system from a centrally planned regime to a liberal democracy with a market economy. In the short history of less than two decades, Slovakia has successfully applied scorecards in various areas. In Table 6 we summarize reflection of development trends by the scorecards and Benchmarks, as stated in this paper.

Table 6: Overview of scorecard and benchmarking use in Slovak Republic

Trend	Case described in paper (chapter)
From space as a physical barrier to cognitive space. Territorial Balanced Scorecard	Scorecard of the knowledge cooperation in metropolitan region
From administrative and bureaucratic approach to functional municipal regions	Scorecard for benchmarking and ranking municipalities
From financial / budget indicators to Scorecards,	Benchmarking (and Value for Money) in

Program Budgeting, NPM and VFM concepts	operational programs of The European Union
From marketing of places to integrated model of territory marketing / spatial marketing	Benchmarking in marketing communication of municipalities and regions / territories

Source: own processing of authors

The focus of this paper is the outputs of the research on the use of scorecards and benchmarking in the cities of the Slovak Republic. In the sample of 40 cities, representing 42% of the urban population of the SR, the system of financial and budgetary indicators (52%) is the prevailing type of scorecard, followed by the Scorecard of Economic and Social Development (23% of the cities). Benchmarking has been used around for about a decade in the cities of the SR. A high proportion, 80% of the responding cities stating systematic use of benchmarking, is also the result of the Benchmarking Project carried out by the Union of Cities of Slovakia in cooperation with the Communal Research and Advisory Center (BMU Project 2017a), initiated in 2005 by think-tank M.E.S.A. 10, supported by OSF.

The selected critical factors of success, verified under SR conditions, are:

- the interest of local and regional authorities and the involvement of professional association (Union of Cities, Association of Municipal Economists and Association of Municipal Managers)
- promotion, initiative, know-how transfer and leadership from think-tanks and non-governmental organizations and civic associations
- an obligation to create strategic plans of cities and regions, keep program budgeting in the SR legislation
- openness of the government sector to the application of new approaches, (e.g. Memorandum of Understanding between the Government Audit Office and the Department of Value for Money of the Ministry of Finance; starting in the autumn of 2016, the Value for Money initiative was rolled out in three additional sectors (education, environment and social issues))
- the transfer of Value for Money, indicators and benchmarking methodologies through the preparation and implementation of EU operational programs.

Although, apart from the example of the metropolitan region scorecard, we only provide Slovak Republic specific cases, examples of successful practice can be applied to other countries - not only in those in which the transformation of the economy or public administration and self-government is taking place. Vice versa, it is considered useful and appropriate to monitor the best practices of countries and regions that are champions of scorecards, benchmarking, value for money and functional municipal regions and transfer them to (not only Slovak) regions and municipalities.

References

Adrian, JF. (2017), 'Slovakia's "Value for Money" initiative', *Responsive Public Management*, No. 92 – April 2017, [Online], Institut de la gestion publique et du développement économique (IGPDE), FR, [October 12, 2017], Available: https://www.economie.gouv.fr/files/files/directions_services/igpde-editions-publications/revuesGestionPublique/IGPDE_Reactive_Slovaquie_avril_2017_En.pdf

BMU Project (2017a), Benchmarking of the Slovak Municipalities, [Online], Communal Research and Advisory Center (KOM), [August 11, 2017], Available: http://komunal.eu/sk/projekty/benchmarking

BMU Project (2017b), Benchmarking of the Slovak Municipalities, [Online], Communal Research and Advisory Center (KOM), [August 11, 2017], Access for registered participants: http://www.projektbmu.sk/

Bratislava Summit (2016), Invest and Connect: 7th European Summit of Regions and Cities to open Slovakia's EU Presidency, [Online], The European Committee of the Regions, [October 12, 2017],

Available: http://cor.europa.eu/en/news/Pages/7th-european-summit-of-regions-and-cities-to-open-slovakias-eu-presidency.aspx. 08-09 July 2016 Bratislava, SK.

Cajka, P. and Rysova, L. (2008), Regionalny rozvoj a regionalna politika v kontexte poznatkovo-orientovanej spolocnosti, Bratia Sabovci, Zvolen, SK, ISBN 978-80-89241-20-0, 240.

Camagni, R. (2004), 'Uncertainty, Social Capital and Community Governance: The City as a Milieu', Capello, R. and Nijkamp, P. (eds.) *Urban Dynamics and Growth – Advances in Urban Economics*, Elsevier, Amsterdam, NL, ISBN 978-0-444-51481-3, 121-50.

EUR-Lex (2017), Regulation (EC) No 1059/2003 of the European Parliament and of the Council of 26 May 2003 on the establishment of a common classification of territorial units for statistics (NUTS), [Online], EUR-Lex, [May 31, 2017], Available: http://eur-lex.europa.eu/legal-content/SK/TXT/?uri=CELEX%3A32003R1059

Eurostat (2015), Real GDP growth, 2004–14, [Online], Eurostat, [October 14, 2017], Available: http://ec.europa.eu/eurostat/statistics-explained/index.php/File:Real_GDP_growth,_2004%E2%80%9314_(%25_change_compared_with_the_previous_year;_average_2004%E2%80%9314)_YB15-fr.png

Filko, M., Kiss, S. and Odor, L. (2015), Najlepsí z moznych svetov. Hodnota za peniaze v slovenskej verejnej politike, 5-6.

Flynn, J. (2007), 'From New Public Management to Public Value: Paradigmatic Change and Managerial Implications', *Australian Journal of Public Administration*, 66(3), Wiley, Sydney, AU, ISSN 0313-6647, 353-366.

Government Office (2014), Partnership Agreement of the SR for the years 2014 – 2020, [Online], The Government Office of The Slovak Republic, [June 07, 2017], Available: http://www.partnerskadohoda.gov.sk/zakladne-dokumenty, 264.

Gregusova, D. et al. (2016a), 'Safeguarding obligations through securities', *SGEM 2016 Conference Proceedings, Vol. 2: Political Sciences, Law, Finance, Economics and Tourism*, STEF92 Technology, Sofia, BG, ISSN 2367-5659, 770, 22-31 August 2016, Albena, BG

Gregusova, D. et al. (2016b). 'Execution of the public authorities´ competencies electronically in the SR', *SGEM 2016 Conference Proceedings, Vol. 2: Political Sciences, Law, Finance, Economics and Tourism*, STEF92 Technology, Sofia, BG, ISSN 2367-5659, 611, 22-31 August 2016, Albena, BG

Hornby, A. (1989), Oxford Advanced Learner's Dictionary, Oxford University Press, Oxford, UK, ISBN 0-19-431136-8, 815.

INEKO (2017), Economic indicators of Slovak Cities a self-governing regions, [Online], Institute for Economic and Social Reforms (INEKO), [October 12, 2017], Available: http://www.hospodarenieobci.sk/rebricky/

Kaplan, R. and Norton, D. (2006), Alignment - systemove vyladeni organizace: Jak vyuzit Balanced Scorecard k vytvareni synergii, Management Press, Praha, CZ, ISBN 80-7261-155-0, 91.

Kapucu, N. (2006), 'New Public Management: Theory, Ideology, and Practice', Farazmand, A. and Pinkowski, J. (eds.), *Handbook of Globalization, Governance and Public Administration*, CRC Press, Boca Raton, US-FL, ISBN 978-1-4200-1933-9, 889-901.

KOM (2017), Municipal Regions Project of The Union of Cities of Slovakia, [Online], Communal Research and Advisory Center (KOM), [July 17, 2017], Available: http://komunal.eu/sk/municipality

KOM Data (2015), Use of marketing communication tools, [Online], Communal Research and Advisory Center (KOM), [February 10, 2017], Retrieved: http://komunal.eu/sk/municipality/

Moore, M. (1995), Creating Public Value: Strategic Management in Government, Harvard University Press, Cambridge, US-MA, ISBN 0-674-17557-3, 416.

Niven, P. (2003), Balanced Scorecard step-by-step for government and non-for-profit Agencies, John Wiley & Sons, Hoboken, US-NJ, ISBN 0-471-42328-9, 32.

Niznansky, V. (2005), Decentralizacia na Slovensku: Bilancia nekonecneho pribehu 1995-2005, Government Office SR, Bratislava, SK, ISBN 80-969447-1-1, 431.

Niznansky, V. et al. (2011), Benchmarking slovenskych miest 2004 - 2009, Sprint dva, Bratislava, ISBN 978-80-89393-47-3, 89-98.

Niznansky, V. et al. (2013), Benchmarking slovenskych miest. Trendy 2004 - 2011, Institut aplikovaneho manazmentu, Trencin, ISBN 978-80-89600-13-7, 9.

Niznansky, V. and Rucinska, S. (2015), Spolupraca obci v mestskom regione. Suhrnna sprava projektu, The Union of Cities of Slovakia, Bratislava, SK, ISBN 978-80-972006-2-6, 38.

Niznansky, V. and Rafaj, P. (2016), Benchmarking slovenskych miest. Trendy 2004 - 2014. Unia miest Slovenska, Bratislava, ISBN 978-80-972006-7-1, 4.

Olsavsky, F. (2014), 'Marketing uzemnych jednotiek v kontexte komunalnych volieb 2014', *Marketing Science and Inspirations*, 9(4), Comenius University in Bratislava, SK, ISSN 1338-7944, 43-57.

OP QE (2017), Operational programme Quality of Environment, [Online], Ministry of Environment of The Slovak Republic, [June 07, 2017], Available: http://www.op-kzp.sk/wp-content/uploads/2017/08/OPKZP_verzia-3.0_2017-07-12.pdf (EN version: http://www.op-kzp.sk/en/)

OP QE Call (2015), Call OP KZP-PO1-SC121/122-2015: Attachment 4 - List of eligible expenditure groups and settings benchmark values, [Online], Ministry of Environment of the Slovak Republic, [June 07, 2017], Available: http://www.op-kzp.sk/obsah-vyzvy/1-vyzva-zamerana-na-kanalizacie-cov-a-vodovody-opkzp-po1-sc121122-2015/, p.4.

Peracek, T. et al. (2016), 'Significance of the waste act in the context of the right to protection of the environment', *SGEM 2016 Conference Proceedings, Vol. 1, Book 5. Ecology and environmental protection*, STEF92 Technology, Sofia, BG, ISSN 1849-7535, 979, 22-31 August 2016, Albena, BG

Rafaj, P. and Strazovska, L. (2017), 'Survey of selected marketing aspects in functional urban regions of Slovakia', *Marketing Science and Inspirations*, 12(1), Comenius University in Bratislava, SK, ISSN 1338-7944, 41-50.

ROP (2014), Regional operational programme version 5 approved on 13.5.2014, Appendix 2, [Online], Ministry of Agriculture and Rural Development of the Slovak Republic, [July 4, 2017], Available: http://www.ropka.sk/dokumenty-na-stiahnutie/

Sloboda, D. (2006), Slovensko a regionalne rozdiely. Teorie, regiony, indikatory, metody, Konzervativny institut M.R.Stefanika, Bratislava, SK, p. 6.

Tvrdon, J. (2013), 'Odraz reality v koncepcnych pristupoch vysvetlujucich regionalny rozvoj', *Sbornik prispevku, XVI. mezinarodni kolokvium o regionalnich vedach*, Masarykova univerzita, Brno, ISBN 978–80–210–6257–3, 19-21 June 2013, Valtice, CZ, 17.

TwinRegion (2012), TwinRegion - Knowledge cooperation in the region Vienna - Bratislava, [Online], Center for Regional Development and Applied Sciences, SK, [June 29, 2017], Available: http://twinregion.kdz.eu/index.php?title=3rd_Workshop_Vienna

UMS (2017), Seminar on urban and municipal regions development, [Online], The Union of Cities of Slovakia, [July 17, 2017], Available: http://www.unia-miest.sk/vismo/dokumenty2.asp?id_org=600175&id=4769&p1=1271. 26 April 2017, Bratislava, SK.

Takaful Rules and Regulations for ASEAN Countries: Takaful player Perspectives

Wan Norhayate Wan Daud
Faculty of Economics and Management Sciences, Universiti Sultan Zainal Abidin, Terengganu, Malaysia
Corresponding author: wnhayate@unisza.edu.my

Fakhrul Anwar Zainol
Faculty of Economics and Management Sciences, Universiti Sultan Zainal Abidin, Terengganu, Malaysia
Email: fakhrulanwar@unisza.edu.my

Fauzilah Salleh
Faculty of Economics and Management Sciences, Universiti Sultan Zainal Abidin, Terengganu, Malaysia
Email: fauzilah@unisza.edu.my

Ahmad Shukri Yazid
Faculty of Economics and Management Sciences, Universiti Sultan Zainal Abidin, Terengganu, Malaysia
Email: shukri@unisza.edu.my

Suraya Ismail
Faculty of Economics and Management Sciences, Universiti Sultan Zainal Abidin, Terengganu, Malaysia
Email: surayaismail@unisza.edu.my

Associate Professor Dr. Ruzian Markom
Faculty of Law, Universiti Kebangsaan Malaysia, Selangor, Malaysia
Email: ruzian@ukm.edu.my

Nur Dalila Mukhtar
Faculty of Economics and Management Sciences, Universiti Sultan Zainal Abidin, Terengganu, Malaysia
Email: nurdalilamukhtar@gmail.com

Abstract

Each country applies their own rules and regulation and it is usually different when researcher compares one country to another. This paper intends to identify the takaful rules and regulations for Malaysia and Indonesia and to analyse the similarities and differences of takaful rules and regulations for both countries. In order to achieve these research objective, a case study on a leading takaful operator was undertaken. This study begins with the introduction of brief background of an ABC leading takaful operator. The main findings of this research include: Takaful rules and regulations of Malaysia and Indonesia are governed by Islamic Financial Services Act 2013 (IFSA 2013) and Undang-Undang No 40 (UU40) respectively; IFSA (2013) is a special Shariah compliance guidelines for financial services including takaful whereas UU40 focus on takaful and insurance service. The results of this research could provide a significant contribution to takaful operators in ASEAN countries especially Malaysia and Indonesia.

Keywords: Takaful rules and regulations, Comparative study, ASEAN, Malaysia, Indonesia

Introduction

Any organization around the world acknowledges the importance of rules and regulations to control mismanagement, increase the level of solvency and strengthen the position of the company. Therefore, each country applies their own rules and regulation and it's usually different when researcher compares one country to another. In some countries, the rules and regulations are governed by either government or independent agency.

In Malaysia, Bank Negara Malaysia (BNM) is a regulator and supervisor of the takaful operating system based on the principles of Islamic law which proves the importance of regulation in regulating takaful operators (Berkem, 2014). Meanwhile, in Saudi Arabia, SAMA (Saudi Monetary Agency), is the enforcement of the regulations issued in 2004 for small-sized insurers (Global Takaful Insight, 2014). Furthermore, Central Bank of Bahrain (CBB) is the ruling body for controlling the takaful industry in Bahrain to strengthen the solvency position of the firm, improve the efficiency of its business operations and at the same time safeguard the interests of all stakeholders or participants. This is seen as a healthy development and will enhance the financial sector, especially in the field of Islamic takaful industry (Ernst & Young, 2014).

At the present time, the practice of rules and regulations is based on the country itself. This is not in line with the requirements made by global financial regulators as a whole. Malaysia as a developing country with similarities to neighboring Indonesia, makes light-touch approaches that run periodically and gradually. At the same time, long-term regulatory principles are important events. Among them are minimum risks, creating stringent rules and maintaining high standards. However, in regulating the insurance industry in Malaysia there are some new things that change the approach. Among the new developments are the globalization and explosion of information technology, the concentration of the financial industry and the rise of consumerism (Majid, 2011).

However, the rule is an important basis and represents a milestone in the establishment of institutions and so on in their daily activities (Rosengard, 2007; Ya'u, 2013). Based on Ingram et. al (2011) if any regulation should be held, of course, the uncertainty can be reduced. On the other hand, if a regulation was not thorough and comprehensive, it probably will not be able to attract foreign investors to enter the takaful industry (Sukmana & Hidayat, 2014). This issue should be addressed by making improvements and enhancements regulations. Thus, the objective of this paper is to identify the takaful rules and regulations for Malaysia and Indonesia and to analyze the similarities and differences of takaful rules and regulations between both countries.

Literature Review

The establishment of the ASEAN Free Trade Area (AFTA) allows insurance companies from any member country to establish operations in another member country. The open market of insurance requires a set of minimum standards of rules and regulations to protect the industries from misconduct and unethical practices. ASEAN Insurance Training and Research Institute (AITRI) (2013) emphasized that it is important to build harmonized rules and regulations in the process of achieving an ASEAN Economic Community. It is hoped that deeper liberalization and integration of the insurance market will develop the financial infrastructure, harmonize the regulations as well as strengthen the national capacity.

The introduction of General Agreement on Trade and Services (GATS), requires the domestic company to have the ability to compete with world-class companies in the national market. In the context of the insurance industries, it is essential for the ASEAN countries to establish rules and regulations which an increased competitive advantage to the insurer and the insured.

The rapid growth of the Malaysia takaful industry contributes about 71% of ASEAN gross takaful contributions by country (Ernst & Young, 2014). Among the contributing factors to the progress are the enactment of Islamic Financial Services Act 2013 (IFSA 2013) and the support of Bank Negara Malaysia (BNM) as the regulator of takaful and insurance industries. BNM as the main regulator for insurance and takaful industry in Malaysia whereby it set the minimum capital requirement at RM100 million for the both life and non-life takaful operator. Simultaneously, all takaful operators are subjected to solvency regulation. In comparison to Indonesia, Malaysia has set a target capital available at the level of 130%. The perspective of policyholder protection under the Malaysia Deposit Insurance Corporation (MIDC) administers by the Takaful and Insurance Benefits Protection System (TIPS) which protects specific benefits under life and general insurance. Interestingly, foreign ownership is generally limited to 70% and the amount exceeding 70% must get the approval from BNM on case to case basis (Sivalap, Chucheep & Arunee, 2014).

Indonesia currently adopted Undang-Undang No 40 (UU40) for both takaful and insurance companies. The new act of UU40 covers the aspect of corporate governance, market conduct, consumer protection and licensing. The move is expected to reshape Indonesia takaful industry by spurring mergers as companies try to meet capital requirement for their expansion purposes. According to Sivalap, Chucheep and Arunee (2014), the regulator set the minimum capital requirement, the solvency regulation, policyholder protection and foreign ownership restrictions to protect the industry. Therefore, the Indonesia decided that the RBC solvency margin ratio of at least 100% and each takaful operator must form its own protection fund to protect the interest of participants. Additionally, in terms of foreign ownership restriction, the Indonesia's fixed that the foreign shareholders of the entity carrying Takaful activities are limited to 80% at the establishment of the company.

Based on the above discussion, the countries in ASEAN had a rules and regulations that provide by their own regulator to protect the takaful industry. The regulator is responsible for setting usually on a minimum capital requirement, the solvency regulation, policyholder protection and foreign ownership restrictions. This basically will open new opportunities in rapid growth market, especially in Malaysia and Indonesia.

Methodology

This research adopts Yin's (2003) definition of a case study as empirical inquiry that investigates a contemporary phenomenon within its real-life context when the boundaries between phenomenon and context are not clearly evident and in which multiple sources of evidence are used. This definition used to guide through the implementation of the research. Qualitative is chosen for this research since it attempts to get an in-depth opinion from participant. The objective of this research is to identify the takaful rules and regulations for Malaysia and Indonesia and to analyse the similarities and differences of takaful rules and regulations between Malaysia and Indonesia. Hence, single case study has been adopted in this research since it was more appropriate to the nature and context of this research in order to get a holistic view of the phenomenon under research.

This research uses a semi-structured interview process, non-participant observation and document analysis, where the researcher was the key instrument for data collection (Merriam, 2009). The Case Study Protocol and Implementation have been developed to express the nature of the interview and the interview questions as well as elaborate intricately on how the respondents are selected. Furthermore, content analysis has been chosen for data analysis. In content analysis, the researcher examines artifacts of social communication. Typically, these are written documents or transcriptions of recorded verbal communication (Strauss, 1987). Holsti (1969) defined content analysis as any technique for making inferences by systematically and objectively identifying special characteristics of messages. Content analysis is a powerful empirical method for analysing text and as a method that technical communicators can use in the research (Thayer, Evans, McBride, Queen & Spyridakis, 2007). It can also

expose hidden connections among concepts, reveal relationships among ideas that initially seem unconnected, and inform the decision-making processes associated with many communication practices.

The ways that the researchers choose to analyse data should stem from a combination of factors, which include the research questions, the theoretical foundation of the research, and appropriateness of the technique for making sense of the data.

Background Of The Case Study

An ABC is a leading wholesale provider of reinsurance, insurance and other insurance-based forms of risk transfer. Dealing directly and working through brokers, its global client base consists of insurance companies, mid-to-large-sized corporations and public sector clients. Their business from standard products to tailor-made coverage across all lines of business, the ABC leading Takaful operator deploys its capital strength, expertise and innovative power to enable the risk-taking upon which growth and progress depends. The ABC has operations across the globe. Their largest clients, too, have a global presence. Consequently, they are the only reinsurer with a client-centric model, that is with teams built around a client on a global basis. They reorganised office network makes them more competitive and effective, enabling them to focus on their core strengths and provide best-in-class service to their clients.

The company is committed to adhering to all applicable legal and regulatory requirements, the highest professional and ethical standards and its stated corporate values. They recognise that strong compliance provides a significant competitive advantage and is vital to securing sustainable profitable growth. Compliance assists the oversight and management bodies in discharging their respective duties to effectively identify, mitigate and manage compliance risk and encourage ethical behaviour. Ethics, integrity and compliance are integral components of the company culture and its successful performance.

Good corporate governance requires an effective system of mutual checks and balances among the top corporate bodies. The company able to fulfill this through a dual Board structure. The Board of Directors is responsible for oversight and the Executive Committee is responsible for managing operations. Their corporate governance principles and procedures are defined in a series of documents governing the organisation and management of the company. Their Board of Directors annually assesses the Group's corporate governance against recognised best practices. It receives updates on developments affecting corporate governance from selected jurisdictions and considers the relevant studies and surveys on corporate governance such as the Walker Report, a review of corporate governance in the financial services industry in the UK, for its assessment.

Findings

The findings are reported according to two research questions which are (1) What are the takaful rules and regulations for two ASEAN countries (Malaysia and Indonesia)? (2) How the takaful rules and regulations differs between two ASEAN countries (Malaysia and Indonesia)?

5.1 What are the Takaful rules and regulations for two ASEAN countries (Malaysia and Indonesia)?

Two participants involved in the interview were from ABC Company. They worked as a President and Client Manager for the general insurance and the family business. The research indicated that the current general takaful rules and regulations is IFSA 2013 in Malaysia and UU40 in Indonesia. They were further confirmed that the IFSA was on the administrative matters.

Leader X said:

> "We confirmed that the current general takaful rules and regulations is IFSA 2013 in Malaysia and Undang-Undang No 40 in Indonesia."

It was revealed that IFSA was an administrative rules and regulations for takaful operators to set up a business. However, in IFSA there was a special rules and regulations on Shariah compliance comparatively to UU40.

He also postulated that the researchers need to understand the regulatory structure of Malaysia and Indonesia. For example, in Indonesia the highest law is called *Undang-Undang Dasar*, there is only one document for the entire country. The *Undang-Undang Dasar* need to be discussed in the parliament. Based on *Undang-Undang Dasar, it has Peraturan Pemerintah* and its basically law and regulations choose by the president, and only the President can sign the *Peraturan Pemerintah*.

In Indonesia, Otoritas Jasa Keuangan (OJK) is actually Financial Service Authority (FSA) which supervise all the financial services banks and non banking. Whereas in Malaysia, BNM does all the supervisory functions including the monetary function. He also perceived that UU40 was more simple compared to IFSA 2013. The IFSA 2013 was quite thick because all the takaful rules and regulations were stated compiled of banking, takaful and money market. However, UU40 only discuss on the headlines for insurance and takaful and the explanation will be provided in the Peraturan Otoritas Jasa Keuangan (POJK).

Leader Y stated:

> "Even the Undang-Undang No 40, I think, is much thinner than the IFSA 2013."

Furthermore, they also suggested to compare chapter to chapter and also part to part of two acts to see in most areas they will be alike. Based on their perception, it was more appropriate to compare the Takaful Operational Framework (TOF) and Peraturan Otoritas Jasa Keuangan (POJK) rather than compare the IFSA 2013 and UU40. The reason behind was the IFSA 2013 and UU40 were referred to the basic and general policy of the takaful rules and regulations. The TOF and POJK will discuss on the practical part of takaful operation.

Leader X said:

> "So its mean here the perception on the operator's side when involve with issues of globalization and other factors, so we will refer to the TOF and POJK more compare to UU40 and IFSA because is based on the basic rules and very general."

5.2 Research Question 2: How the Takaful rules and regulations differs between two ASEAN countries (Malaysia and Indonesia)?

In order to address the second research question, the researchers designed questions related to differences between the two acts. They suggested to make a comparison with regards to the operational matters because it will find more differences such as the Takaful Operational Framework (TOF) and the Peraturan Otoritas Jasa Keuangan (POJK).

Leader Y stated:

> "I have the same comment with Mr. X because even in Malaysia we have Bank Negara Malaysia (BNM) at the top and we have Risk Based Capital (RBC), so for subsidiary we will have a lot of differences. So, depend on how deep you want to go, they might look at the different standard or guideline. For us, essentially, as a practitioner we do refer a lot to the Takaful Operational Framework (TOF)."

They further confirmed that there were a lot of differences regarding the operational parts of takaful rules and regulations. In Malaysia, the takaful operators were referred to the TOF as their main guidelines for operational framework. It applied same with Indonesian market, where they would follow the operational

parts based on the POJK and also the Surat Edaran Otoritas Jasa Keuangan (SEOJK). These were the immediate law which reflected the current operation of the takaful industry in Indonesia.

> Leader X said:
> "And same also in Indonesia, the practitioner will more on POJK and SEOJK. That's because the impact is an immediate on the operation. In our case also when we discuss on the law we refer to our legal person that keep an eye on the law."

Besides,the standard law for takaful rules and regulations like IFSA 2013 in Malaysia and UU40 in Indonesia, they also have the details of the law such as TOF in Malaysia and also the POJK in Indonesia. At the same time in Malaysia, they had Shariah guidelines in order to control the Shariah governance. In Indonesia, they also have the Dewan Shariah Nasional (DSN) to discuss on the Shariah compliance. Such guidelines also spell out the model and the separation of the fund. There was a difference between the BNM and Bank of Indonesia (BI). BNM would control all the financial institutions' activities in Malaysia. But in Indonesia, the Otoritas Jasa Keungan (OJK) was taken over the function of BI. In terms of similarities, the TOF in Malaysia was equal to POJK in Indonesia.

> Leader Y said:
> "So, in Malaysia, Bank Negara Malaysia is equal in Bank of Indonesia but BNM do all the supervisory functions not only do the monetary function. In Indonesia, they are not supervising banking anymore. Supervision function is taken over by OJK."

Discussion

The findings showed that the current general takaful rules and regulations is IFSA 2013 in Malaysia and UU40 in Indonesia. However, UU40 referring to takaful company and conventional insurance company was more simple and only discuss on the headlines for insurance and takaful because the further explanation of it will be provided in the Peraturan Otoritas Jasa Keuangan (POJK). Whereas, IFSA 2013 totally referred to takaful company covered all the takaful rules and regulations and also compiled of banking, takaful and money market. Inspite of making a comparison with regards to the general rules and regulations and more on administrative matters which referered to IFSA 2013 and UU40, it was suggested to compare the respected operational matters because it will find more differences such as the TOF from Malaysia and the POJK in Indonesia.

Conclusion

Takaful rules and regulations are very critical to ensure a sound takaful operations in ASEAN countries. Regulations could reduce mismanagement, increase the level of solvency and strengthen a company's position in the face of global competition. This is vital to ensure sustainability in takaful businesses. The findings of this research indicated that IFSA (2013) and UU40 are the most referred takaful rules and regulations for Malaysia and Indonesia respectively. Furthermore, IFSA (2013) is a Shariah compliance guidelines for Malaysian financial institutions and UU40 is the takaful and insurance guidelines for Indonesia.

They also further confirmed that there were a lot of differences regarding the operational parts of takaful rules and regulations for both countries such as their main guidelines for operational framework. However, since this is a case study based on a solely leading takaful company located in Malaysia, it is recommended to include more case studies to rectify this finding.

Acknowledgements

We would like to convey special thanks and appreciation to our sponsor, Universiti Sultan Zainal Abidin (UniSZA), Terengganu for providing the financial grant to this research. Our deepest appreciation also goes to the parties who participated in this research.

References

Berkem, Z. (2014) 'Effective supervision of Islamic insurance according to Malaysian experience (1984-2012),' *International Journal of Social Economics*, 41(12), 1220-1242.

Ernst & Young. (2014), '*The World Takaful report*,' Ernst & Young Global Limited.

Global Takaful Insight. (2014), '*Market Updates Growth Momentum Continues*,' EY's Global Takaful Online Survey 2014.

Holsti, O R. (1969) Content analysis for the social sciences and humanities, Addison-Wesley Pub. Co., Reading, MA.

Ingram, M. and McCord, M J. (2011) Defining "Microinsurance": Thought for a journey towards a common understanding, Micro Insurance Centre, Appleton, WI.

Majid, M. (2011), '*Regulating the insurance industry; the Malaysian approach,'* [Online], [Retrieved August 15, 2011], www.fair.org.eg/Review/Aricles/142/5%20REGULATING%20THE%20INSURANCE%20INDUSTY.pdf

Merriam, S B. (2009) Qualitative research: A guide to design and implementation, Jossey-Bass, San Francisco, CA.

Rosengard, J. K. (2007), 'In Sukmana, R. and Hidayat, S E. (2014), Challenges and Opportunities in Developing Microtakaful in Muslim Majority Country: A Case Study of Indonesia,' *The 11th Harvard University Forum on Islamic Finance*, At Harvard Law School, USA.

Sivalap, S., Chucheep P. and Arunee, P. (2014), 'Thailand Insurance Regulation: Highlights & Time to Go Ahead,' *Asian Social Science*, 10(6), 24-33.

Strauss, A. (1987) Qualitative Analysis for Social Scientists, Cambridge University Press, New York.

Sukmana, R. and Hidayat, S E. (2014), Challenges and Opportunities in Developing Microtakaful in Muslim Majority Country: A Case Study of Indonesia,' *The 11th Harvard University Forum on Islamic Finance*, At Harvard Law School, USA.

Thayer, A., Evans, M., McBride, A., Queen M. and Spyridakis, J. (2007), 'Content analysis as a best practice in technical communication research,' *Journal Technical Writing and Communication*, 37(3), 267-279.

Ya'u, A. (2013), '*Prospecting for Sustainable Micro-Takaful Business in Nigeria*.'

Yin, R K. (2003) Applications of case study research (2nd ed.), Sage Publications, United State.

Computer Information Systems Persistent Struggles for Humanism: An Antithesis. Position and Reflective Paper

Nehemiah Mavetera, North West University, Private Bag X2046, Mmabatho, 2745, South Africa, Nehemiah.mavetera@nwu.ac.za

Abstract

Computerized Information Systems (IS) have successfully been used in organizations to improve the efficiency, speed and accuracy of doing repetitive tasks. However, organizations have added more expectations to their capabilities and now expect them to completely play the roles of humans. This has not been a complete failure, neither has it been a resounding success. This lecture raises some issues that require attention when designing IS if they are to completely replace humans in organizational roles. Besides incorporating the principles of romanticism in the IS design, methods should be found that allow the inscription of consciousness, freewill and interests among a plethora of other issues into the IS artefacts. This paper is grounded more in the philosophical arguments of IS-organizational relations.

Keywords: Information Systems, romanticism, ontology, Humanism

Introduction

Every organization survives by capturing, processing and sharing data and information amongst its workforce. These processes can be enabled manually or automatically. The state of these affairs is regarded as Information Systems (IS). Currently, many organizational systems are being automated, to make processes lean, efficient and effective. This automation has so excited people to the extent that IS, instead of playing an enabling role to humans, are now being touted to replace them in their roles. With this in mind, IS practitioners are currently battling to humanize these artefacts. An example prevalent in these sectors of IS are robotics.

The Information Systems Problem

The software development problem which has been extended to be the IS development problem, was coined a 'crisis' at the first NATO software engineering conference held in Garmish, Germany, 1968 (Randell, n.d.). Despite many reasons being cited as causes for the "crisis" (Baker, 2006; Brooks, 1987; Mullet, 1999) the problem that IS artefacts are not humans has not always been fully understood.

This problem has persisted for generations. Without some concerted effort and some stroke of genius, this may continue into the unforeseen future. We are provoked to ask several questions:

- What is the "IS Problem?'
- What are its origins?
- Why is it a problem?
- What do we do about it?

For a start, the IS problems have been inherited from its origins as a discipline. Information Systems as a discipline was an offshoot of the Computer Science discipline that also had its roots in the computer engineering discipline. As an engineering discipline and strictly bounded by the functionalist philosophical paradigms (Burrell & Morgan, 1979) where objectivity and order reigned supreme, IS developers conceived a 'reality space' where Russell and Wittgenstein had dwelt, grounded in the

thinking of "logical atomism." Logical atomism, according to Bertrand Russell (1872-1970), is the belief that all truths can be deduced from a layer of atomic facts. These atomic facts lie either in simple particles forming a pattern or in multiple simple particles lying in a relation.

With this thinking, the IS development and operational space was viewed to comprise of clearly ordered artefacts that could be arranged and re-arranged to construct different artefacts from the same atomic units as long as their original natural states were preserved. In short, bigger and complex organizational patterns could be built and defined using the simpler (atomic) ones as building blocks.

Essentially, the development of IS fundamentally negated and neglected the presence of people as components to the system. People, IS asserted, bring a certain degree of complexity in organizational IS. There has been limited success in some processes and total failure in others. What then are the issues required in humanizing IS? This paper highlights issues that need to be addressed in the quest of humanizing IS.

Focusing on the objectivity and orderliness of organizational reality, where atomic patterns could be identified, IS developers borrowing from their origins, adopted reductionist principles that were used in the engineering discipline to fashion their products. They argued that IS could be developed sufficiently enough using systematic methods. As Foucault (1987) accepted, "systematizing methods produces reductive social and historical analyses, and that knowledge is perspectival in nature, requiring multiple viewpoints to interpret a heterogeneous reality" such as an organization.

Also, the problem of these reductionist tendencies has seen IS artefacts being guided and controlled by algorithms that are inscribed as programmes. This was intended to ensure IS functionality. Since time immemorial, from its birth as computing machines, to gradual growth in information processing systems, IS as a discipline has grown from just ensuring functionality of systems, optimization of information seeking and storage to information meaning. These attempts looked at a fuller actualization of the humans (Cibangu, 2015). Is this attempt good enough in the 21st century? This paper critiques the grounding principles of IS development and the origins of gaps that still need to be closed for IS to approximate human praxis. An original IS, the level one, consists of people, technology and processes. These resources comprise the social, the natural and the artificial respectively.

As captured in Mavetera (2011), there must be a link between the natural, the social world together with the artificial world of human constructions for an effective mapping of the IS artefact onto the original being of the organizational system. There must be a theory that links these three elements (Gregor, 2006). Practice has shown that all but the social element of the original system are successfully mapped in automated IS. This gap needs to be addressed.

This calls for new ways of critical thinking and looking at the nature of organizations, which dictate the way IS products are to be fashioned in the future. How does one get a characteristically human IS product when the thinking behind its design negates the presence of humans in organizational information systems? What theoretical constructs are being considered and used in building IS products? Do these constructs consider the reality space where organizations dwell? This paper postulates that many theoretical constructs that are currently used in the development of IS artefacts are incapable of mapping them to the organization's life state. Organizations and hence their systems, just like humans, are romantic. As such, a paradox exists where a romantic view of the organizational system is force-mapped onto a mechanistic view of the IS artefact. Organizational life has an infinite number of life states that can be assumed at any one given time. This is because of the presence of humans. We would like to propose also that the IS representation of the organization maps only one life state out of the several possible and available. In its whole, an organizational system has a fluid existence that can be characterized as romantic, unlike the one static mapping of IS products that is mechanistic.

Can humans then entrust the running of their organizations, their lives, their activities to automated IS artefacts? Is there sanity in abrogating our life responsibilities to these artefacts? They aren't human but artefacts is the story that needs to be expounded in this thesis.

"There is a reason why computers have not yet become fervent natural language speakers (It's not a matter of processing power and never will be): we simply are not programming them correctly."

El Baze 2005.

El Baze's (2005) comment points to the fact that although developers can perfectly implement whatever they design, IS products fail because it is the design itself that is grounded on improper assumptions. IS product designs do not take cognizance of the central role played by people in organizational information systems. El Baze (2005) therefore logically laments that "we simply are not programming them correctly." Does this gap emanate from the techniques and tools that are used during the processes of requirements engineering? Is it a logical gap on what should be elicited, specified and later designed?

IS practices have gone so far that practitioners want to "engineer" the human mind, thinking, experiences, emotions, and beliefs. They seek to clone the human mind. This engineering mechanistic world view, based fundamentally on the functionalist paradigm as previously stated, regards the world as ordered, rational and unchanging. Monod (2007) strongly blames IS practitioners' unquestioning and faithful adoption and use of this rationality principle. Why should practitioners believe that the world can be reduced to discrete functional units that can be represented as rules and algorithms? How do we deal with knowledge and information possessed by people, which is mostly tacit and intuitive? IS practitioners therefore ought to adopt development paradigms that reject extreme rationalism and technological determinism. To address this, we must accept a world view that is voluntarist, messy, chaotic and subject to human interpretation. This is the relativistic stance. This also is the humanistic viewpoint required in automated IS.

In this paper, humanism is regarded as the belief in the value, freedom and independence of human beings. Humanism by its nature is fluid and ever-evolving, hence, the evolution that we have seen in humanity must extend and enrich IS design processes. The battle amongst IS professionals is to impart IS products with these humanist qualities. The argument so far suggests that IS design principles are grounded in the objective-ordered pair of the functionalist paradigm. Contrary to this, the lived organizational state lies along the continuum through to the neo-humanist paradigm. This has created a reality paradox.

Issues for Consideration in IS fashioning

The paradox identified above has revealed a major difference between the nature and representation of organizations using automated IS. People, information systems and the environment in which organizations exist can be considered holistically as a social group of actors interacting through networks. As Ngwenyama and Lee (1997) contend, being social involves the alignment of an individual's actions to both the organizational context and the other actors involved in performing a social action. All social interaction is governed by a social culture and this culture has to be observed when implementing organizational IS.

In addition, as complex systems, organizations have requisite variety (Rosenkranz & Holten, 2007:57). Requisite variety views organizational systems as possessing several possible states, in terms of "patterns of behaviour" or "number of manifestations." The intention when implementing IS has always been to holistically capture and maintain these patterns of behaviour (manifestations). However, contrary to this, all IS when designed tend to reduce the complexity of these organizational systems, thereby reducing their requisite variety. This process is regarded as the reductionist principle. Reduction in the possible behavioural states and hence, in the requisite variety of the original system. It is the contention of this

presentation that most information systems fail to provide value to their organisations because of this reduction in requisite variety. The question then remains, how can we have ISs that have as much requisite variety as the original organizational system?

Culture in Organizations

Another aspect that contributes to the requisite variety of organizational systems is culture. Organizational culture comprises the attitudes, experiences, beliefs and values of people in an organization. It also embodies the organisation's interactional behaviour with its stakeholders. All organizations are run within certain cultural and contextual boundaries. How do we, as IS practitioners, allow IS to capture culture? Culture is a very important element in defining organizational context.

Context-building amongst organizational actors is a process of weaving together the different situational understandings of different actors, establishing threads of common understandings and of inter-subjective knowledges within a network (Goldkuhl, 2002; Dilley, 1999). Contrary to what many people think, context is not a static phenomenon and is not a given. It is not self-evident in a situation but requires a constructive machinery to mould the varying situational meanings into a common understanding. Context, therefore, is an object of study that requires some analysis to arrive at an agreed and shared understanding. Furthermore, it is within the shared meaning of some situatedness that the said context resides. Organizational context is ever changing and amorphous.

This dynamism in context poses a big challenge to IS development if one has to capture the running context of an organization. IS practitioners scramble to find methods for identifying, capturing and communicating context? In a bid to address this, Mavetera (2011) proposed an ontology-driven approach and methodology for capturing and incorporating context into IS. To support the fluidness of organizations, another lens that can be used to critique organizations is the Theory of Organized Complexity.

The Theory of Organized Complexity

According to the Theory of Organised Complexity (Checkland, 1999:78), systems in general exhibit a general hierarchy of levels in which each higher level is more complex than the level below it. Each such higher level has emergent properties that are not found at lower levels. The emergent properties are a result of system formation, in which the whole exhibits characteristics that cannot be found in the individual sub-systems that combine to form it. Checkland (1999:78) notes that "neither a one level epistemology nor a one level ontology is possible" to describe the sum total of the subsystems. Hence, in a hierarchy of systems forming the whole, each level has different, distinct epistemological and ontological views. In other words, the views of the lower levels of the system can never be the same as those of the whole system. Put in another way, the behavioural characteristics of subsystems, when added together will generate a system whole that has behavioural characteristics completely different from those of its constituents.

The interaction of its components creates some emergent properties that are a by-product of the interaction and these manifest themselves in the whole as new characteristics. Rightly so, an aggregation of mechanistic components cannot have the same behavioural properties as the whole. The principles of systematicity and system formation that IS practitioners have depended upon to build products fail to preserve the natural that is encompassed in the romantic world view. In this sense, systematicity looks at the extent to which a system can be regarded as an ordered, hierarchical arrangement of components while system formation in turn looks at the ordered, organised building up of the whole system from its components.

With this state of affairs, Aristotle's maxim that the whole is equal to the sum of its constitutive parts is negated. When the whole is broken up, it loses its requisite variety by negating some other possible states. At the same time, when the system is reassembled from the parts, the theory of organized complexity explains the introduction of emergent properties that never existed in the original whole. This now constitutes a paradox, where one cannot holistically get an organizational whole from the products of its deconstruction, that is, the constitutive parts. Another lens that can be used to have organizational diagnosis is human activity system (HAS).

Human Activity Systems (HAS)

Human beings have never been predictable. Their behaviour is always changing. It is very difficult, if not impossible, to consider all contingencies in an a priori prescription of a human action (Suchman, 1987). Rationalization of human actions a priori or a posteriori overlooks much detail that is situated in the running context, such as the detail taken during a course of action in everyday life (Roque et al., 2003).

Furthermore, Roque et al. (2003) urge IS developers to guard against neglecting variability and independence during the development of IS products. They discourage any reliance on procedural and functional descriptions of organizations and individual roles as complete accounts of the social dynamics. This narrative, together with the TOC, argue for a change in our IS practices. The third lens discussed here is the Theory of Organized Activity (TOA)

The Theory of Organized Activity (TOA)

Like the human activity system (HAS), Holt (1997) developed the theory of organized activity (TOA) that is also based on human (organized) activities. An organized activity is a dependent variable of the social interaction of people in a particular setting. We would like to postulate that more often than not, IS technical component attempts to automate these organized activities. Looking at an IS as an activity system, Cordeiro and Filipe (n.d.) view the technical aspect of IS as playing a supporting role to the organizational human activity.

They describe the human action, that is, the action performed by a human actor, as comprising of interests and actors. These interests, together with the actors, are responsible for the actions. While humans can have interests, technical machines cannot have interests and, therefore, cannot be assigned any organizational responsibilities. This results in the technical aspects of IS being unable to perform actions (Cordeiro & Filipe, n.d.).

In short, although technological artefacts may be components of an organized activity, their failure to inscribe and exhibit interests places them at a disadvantage if they are to be assigned any responsibilities for an action. The development of IS product, a technical artefact, should therefore include ways that allow them to be assigned responsibilities. This is the notion of humanizing the technical artefact. This notion is expounded in the rest of this presentation.
The three theories of TOC, HAS and TOA, as discussed herein explain very important characteristics of organizations which should be incorporated into information systems. These three theories can be used as a basis for a conceptual grounding of romantic information systems.

The Principle of Romanticism

Romanticism can be described using Gasche's (1986) notion of anti-systematic thought. This is related to the anti-positivist notion described in Mavetera (2011). Romanticism argues for the negation of

systematicity and system-formation while, at the same time, allowing the concept of "the fragmentary …" (Gasche, 1986).

The paradox that faces IS practitioners emanates from the fact that one cannot tackle IS development project without breaking it up into manageable chunks. On the other hand, the whole cannot be reconstituted from these chunks. A development approach that reduces the gap between these two poles, one that is able to reintroduce the romanticism that existed in the original system in the developed systems, has thus to be found. By assuming the romantic world view, IS developers consider a holistic view and an acceptance of the organizational system, where culture and social context play a part in the execution of tasks. In the eyes of romanticists, "processes and change" are at the forefront of system "contemplation, understanding, interpretation and feeling" (Dahlbom and Mathiassen, 1997:501). In this view, change in organizational systems is taken as "unpredictable and beyond human control, the expression of hidden and unknowable forces" (Hirschheim et al., 1995:3).

The Romantic Systems Movement

Human problem-solving resides in the interpretive and neo-humanist paradigms. IS developers should not concentrate on tractability and objectivity. Such a move effectively distances and isolates the IS artefact from the complexities of everyday social changes. To build a system, the process of requirements engineering has to be followed. It is important to leverage the requirements engineering effort on the reasons why these are needed and gathered than on the specification of what the system must do (Yu, 1997). According to Roque et al. (2003), there is more to requirements than elicitation. Requirements are an everyday social construction, in which human and non-human actors participate. The requirements engineering process forms the basis upon which IS failures and successes can be measured.

While current IS development methodologies force organizational systems to embed their business rules, organizational culture, practice and their human aspect in the technological side of IS, it is necessary to liberate the human aspects of the organization from the bondage of technology by introducing romantic information software products.

What is a Romantic Software Product?

These are IS software products that are at the epicentre as building blocks of romantic information systems. Romantic information systems (RIS) are not only limited to the dictates of syntactic machine representations. They are also based on the romantic world view that considers the "world as a unitary organism" in sharp contrast to the rational and atomistic view of the mechanistic world (Tarnas, 1991:366-7). Mavetera (2011) is the first to coin these systems 'romantic information systems.' Romantic information systems can be viewed as having "gloried in the unbounded multiplicity of realities" (Tarnas, 1991:368) that are realised in organizations as a result of the subjectivity and the divergence in perspectives of the people found in them. Romantic systems accept the notion that "reality is constructed by the mind, not simply perceived by it, and many such constructions are possible [...]"

Furthermore, these systems capture and reflect all the possibilities in organizational life states (intentions) than to concretize a single life state only as a fact. The idea for romanticism in information systems is supported by Hohmann (2007:18), who calls for a "pluralisation of our culture and the humanization of technology." In his vision, he sees a future that demands technologies that stimulate creativity and inspire thoughts, thereby reconciling the "contradictions between technology and art" (p.18) that characterize the modern era. A conceptual framework for romantic information systems is characterised by Mavetera (2011) as one:

"… that allows the development of socially-constructed systems that capture and maintain the softer elements of organizational systems such as culture, social context, and semantics and to a certain extent pragmatics. These systems must be adaptive, dynamic, evolvable and innovative."
The whole romantic world view idea has to bring some intuition, tacit information and meaning into the IS product. This characterization may seem far-fetched, but existing literature like Weber (2003), Hohmann (2007), Yu (1995, 1997), Beynon et al (2008), Soffer et al. (2001), and Mavetera (2011), have already called for a romantic framework mentioned herein and several prototypes have been tested. The romantic IS cannot be conceived if practitioners cannot design IS artefacts that can be inscribed with the romantic characteristics as specified herein. This thesis as proposed in Mavetera (2010, 2011) introduces ontologies as artefacts to fill in this gap.

The theory of IS Ontology? A Brief Description

"Ontology makes knowledge visible and accessible and enables teams to share their knowledge and profit from experience."

Sheryl Torre-Brown (In-PharmaTechnologist.com, 2005)

Ontology is a word that originated from classical philosophy as a branch of metaphysics. It is referred to as the science of being (lower-case 'b') (Ruiz & Hilera, 2006) or as the study of existence (Hacking, 2002). As a study of essence, ontology started as a way of categorizing things and establishing the nature of their existence (Corcho et al., 2006). It also deals with issues such as how people perceive the world and with general issues of the nature of things as opposed to specific theories about particular things. Checkland (1999) holds that it is a concept that deals with the nature of the world or with what it contains. This definition does not look at the individual fragments of existence but at the general. As Hacking (2002:2) argues, ontology constitutes the thought study of "What there is." It should be noted that this term, 'Ontology' written with a capital letter 'O' has an uncountable reading (Guarino, 1998). A typical example is the statement 'Ontology is the study of existence' which, in this context, refers to a specific discipline of study. The philosophical ontology is "neither reducible to, nor identical with language or its formalism" (Zúñiga, 2001:188). However, the language can be used to describe this ontology.
In IS discipline, the term ontology has assumed a countable reading (Mavetera, 2011) allowing researchers and IS practitioners to assign it a linguistic definition that can inscribe romantic characteristics in the IS artefacts. This linguistic model definition is characterized in softer terms as a:
"…model of the world that comprises of syntax, semantics, pragmatics as well as the social context of that which is represented. Despite some unavoidable informal indeterminacy in the real world view, it should allow a shared, descriptive, both structural and behavioural modelling and representation of a real world view by a set of concepts, their relationships and constraints under the open world assumption" (Mavetera, 2011).
This characterization is very important to people who work in the softer fields of IT such as information systems. It is a characterization that allows behavioural and constructivist scientists to develop frameworks that guide the subsequent development of IT artefacts by design scientists. Examples of such ontologies are domain, method, process, intentional, social and status ontologies as explained in Mavetera (2011:144).

Context of IS as a Discipline of Specialization

A specialization can be regarded as the process of concentration on and becoming of an expert to a particular subject area or skill set. In this regard, our field of specialization is information systems (not capitalized) versus Information Systems (capitalized) referring to artefacts. As a discipline, Information systems looks at the essence, the practice, the methodologies, the ethical and legal issues guiding the fashioning and use of IS products by people and for people in organizations. The author has devoted most

of his career to improving the way IS products can enhance the way business is done. Most of this work has focused on the methodologies, the pillars upon which products are developed.

Knowles et al. (2015) advocated for new information system development methodologies that are grounded in "humanistic understanding of space, place, time, language and perception." Computing, sharing and presenting human experience has always been a problem that has confronted computing professionals and the Information Systems discipline. As stated in Knowles et al. (2015), moving away from the mechanistic dictates of current computing platforms to the conceived semantic, pragmatic and humanistic position requires a gradual transition process. This calls upon IS practitioners to be aware of their theoretical positionality and the sociotechnical implications of their methodological choices. In fashioning IS products, it has become necessary to relook at the paradigmatic choices. How can IS products be improved to incorporate human-like behavioral characteristics?

Hohmann (2007) and Beynon et al. (2008) advocated for the development of intuitive systems that are easily understood by humans, at the same time increasing the productivity gains from their use. Beynon et al. (2008) argued further that marrying intuition and software development has been made difficult because researchers and developers use frameworks that are inherited from the computer science discipline. These frameworks concentrate on "stable contexts of experience that can be engineered to exhibit law-like characteristics" (Beynon et al., 2008:4) and they do not allow some degree of freedom in cognition (Tarnas, 1991).

Just like the "biblical archetypes such as Exodus, the Chosen people, and the promised land," which did not stop playing an important role in the cultural imagination of the Christians, (Tarnas, 1991:108) this paper notes that the functionalist archetypes even with new revelations of positivist weaknesses have persisted in IS developers' minds and practices. This is one linking factor, particularly impeding the advancement of the romantic worldview in IS development. This problem has been persistent in the author's efforts to solve IS problems.

Contribution of Research to Body of Knowledge

Information Systems look at the social relations amongst tools, human actors and the social environment in which they co-exist. In 2002, the author published a paper that prescribed a framework for Land Registration Organizations (LRO) of South Africa and Zimbabwe to share their information with practitioners and the citizenry (Mavetera, 2002). This was based on the fact that e-systems were beginning to be pervasive and ubiquitous in the society and business environments. The framework aimed at reducing the costs of data sharing as well as increasing its access and availability to the citizenry. The information needed to be packaged in specific formats that would ensure all users get it in the same format. The research solved the problems of inefficiencies and government systems' bureaucracies. We envisaged a system that would replace these "blood lazy and inefficient" public servants, the humans. The system worked quite well in the laboratory but failed in the operational environment. Of the issues raised, some claimed the system lacked the flexibility of querying and customization to specific individual requirements.

In Mavetera and Kadyamitimba (2003), we attempted to improve the e-systems by introducing software agents, which would assume the role of a human principal to search, choose, collect and customize requirements. This system also hit a snag because, while humans are intuitive and have interests, these agent-mediated systems were not. As developers, we could not prescribe interests to mechanistic and artificial artefacts as software agents. Having noted that system failures are not because of the technologies that are used to design, build and implement them, the focus of our problem then changed.

Between 2000 and 2003, the research focused entirely on the design and development of systems that automated the work processes of information seeking and delivery in the electronic-business era

(Mavetera, 2000; 2002; 2003a & b; Mavetera & Kadyamitimba, 2003). An attempt was made to replace the human principal in these transactions of buying and selling with software agents. The processes, however, relied heavily on the syntactic matching capabilities of technologies that had grown in computing and storage capacity. This left a big gap in the effective and efficient operations of the Information Systems as enablers of business and complementary tools to human efforts.

It must be brought to the attention of the reader that organizational problems during this time now focused on semantic rather than syntactic issues. There was a realization that humans are more about sense-making and decision-making than finding similarities. This time the idea of semantic enabled ISs started developing and being researched. It was noted that information systems, despite their intended role to replace humans, had failed to completely eradicate human beings because humans are "more flexible, adaptable, and creative." Humans are better suited to respond to varying and unexpected situations.

The period 2004-2009 focused on the idea of e-systems that could semantically run business processes. These entailed the use of ontologies (Mavetera, 2004a & b; Shawa et al., 2008 &2009; Mavetera, 2007; Mavetera & Kroeze, 2009). During the period 2010-2013, the studies started graduating from previous studies and focused on enriching IS with human traits. Again the central theme and focus point was ontologies (Kroeze et al, 2010, 2011; Mavetera & Kroeze, 2010; Mavetera, 2011a & b).

The 2014-2017 period saw the research looking at missing human elements in IS that inhibit their capabilities. Consideration of culture in e-learning systems (Chukwuere et al., 2016a & b), e-government systems (Chikerema et al., 2016) are some of the products of these studies. All these researches have been grounded in the discipline of IS development and software engineering. Methodologies and frameworks for fashioning IS products were the central theme. The central theme of developing requirements engineering frameworks that consider the incorporation of tacit knowledge and human traits of intuition, freewill and choice making in the IS products is now the current focus.

Research into the Future

As we have consistently posited, technologists are advocating for the replacement of "human-decision makers and policy makers" with automated systems. These should measure and collect data, and make adjustments automatically to correct discrepancies. The idea is to position the role of technology as replacing humans instead of supporting them. However, as discussed in Robinson (2015) (which we will quote freely), there still exists human capabilities that cannot be replaced by or abrogated to IS artefacts.

Human capabilities that cannot be replaced by computers?

There has been a very long and arduous journey in academic and industrial research that has seen computers moving from simply automating processes to imitating the human capabilities of thinking (artificial intelligence) and decision making. Talking of intelligence, let us define it as the acquisition and application of knowledge and skills. While computers can take decisions based on information gathered, there are three things that computers have failed to do (Robinson, 2015). These are understanding, judgment and empathy. Human decision making and understanding do not rely solely on intelligence but also on experience and values. Human beings, apart from making decisions and being intelligent, are also capable of setting objectives. We can group these traits under understanding.

We can, however, fashion IS artefacts to be capable of acquiring experience. Can this, however, be compared with the ability to make judgments based on values like what humans do? Major questions still arise in human nature. What constitutes decision-making? Is it making choices? As Robinson (2015) questions, where do we find values that are learned through experience? In addition, where is empathy that is derived from shared values and experiences? (ibid.)

The Ghost Finally is in the Machine

For the sake of argument, let us assume that our technology will advance to the extent of being able to make judgments and decisions. Will the technological artefacts be able to possess free will? (ibid). This is an unavoidable capability of humans. Freewill is defined by Robinson (2015) as the "ability to set our own decisions bringing with it the responsibility to deal with their consequences." But our IS artefacts are based on classical physics and logic.

Let us bring this argument closer to home. Check information systems such as e-Natis and Hanis to name but a few that have been implemented by the Republic of South Africa. These are examples of several e-government systems that are being developed and implemented for public service delivery. How successful have they been in replacing the public servant of today? Judging through the lens of syntactic matching, semantic evaluation and pragmatic performance, they might have improved the way business is done. Can they make judgments and decisions too? Do they possess free will?

Rightly so, these systems can use a recorded occurrence to eventually inform the next event. Unfortunately, they do not have capabilities for conscious decision-making. Put simply, while computers can make choices, they cannot make judgments. Judgments are based on values and these values in turn emerge from human experiences of life (Robinson,2015). Hence computers cannot ascribe values because they cannot experience life. As can be deduced from the discussion on TOA, IS artefacts cannot have interests, they cannot be assigned responsibilities and hence cannot perform actions. Future research then has to enrich the IS artefacts with enough capabilities to address these gaps.

Summary and Conclusions

Ours is not a matter of being trapped in a paradigmatic pit and then cry for God to rescue us. IS practitioners are encouraged to move their practices to include other fields such as humanities (Kroeze et al., 2010), and to investigate how IS can espouse the human societal value system. This can not be investigated from the functionalist-positivist lens but an acceptance of the interpretive-and neo-humanist positionality of organizational systems should be cherished.
For now, IS are not humans but artefatcs. Maybe, they are artefacts not humans.

References

Baker, R. (2006). What software crisis? [Online], [Retrieved November 3, 2008], tech.norable.com/2006/05/what-software-crisis.html

Beynon, M., Boyate, R. and Chan, ZE. (2008), 'Intuition in software development revisited,' Proceedings of the 20th Annual Psychology of Programming Interest Group Conference, 10-12, September 2008, Lancaster University, UK,

Brooks, F.P. (1987), 'No silver bullet. Essence and accidents of software engineering,' Computer Magazine. [Online],[Retrieved June 10, 2008], http://virtualschool.edu/mon/softwareEngineering/BrooksNoSilverBullet.html

Burrell, G. and Morgan, G. (1979). Sociological paradigms and organizational analysis, Heinemann, London.
Checkland, P. (1999). Systems thinking, systems practice: Includes a 30-year retrospective, Wiley, Chichester,

Chikerema, T., Mavetera, N. and Jantjies, M. (2016), 'A Contextual Framework for EGOV Adoption in SADC.' Proceedings of the 9th International Conference on Theory and Practice of Electronic Governance (ICEGOV), ISBN: 978-1-4503-3640-6, 15-16 September 2016, 416-419

Chukwuere, JE; Mavetera, N. and Mnkandla, E. (2016a). 'An empirical study on the success factors to consider in developing e-learning systems: A learner oriented system,' Asian Journal of Information Systems.

Chukwuere, JE; Mavetera, N. and Mnkandla, E. (2016b), 'A culture oriented e-learning system (e-LS) for higher education institutions in South Africa,' Pakistan Journal of Social Sciences.

Cibangu, S.K (2015), 'A new direction in information science research: Making information Science a human Science,' Journal of Information Science Research, 20 (3).

Corcho, O., Fernandez-Lopez, M. and Gomez-Perez, M. (2006). Ontological engineering: Principles, methods, tools and languages, In Ontologies for Software Engineering and Software Technology, Calero, C., Ruiz, F. and Piattini, M, (ed), Springer Verla, Berlin.

Cordeiro, J. and Filipe, J. (n.d), 'Language action perspective. Organizational semantics and the theory of organized activity. A comparison. [Online], [Retrieved May 4, 2008], http://ltodi.est.ips.pt/jcordeiro/documents/demo2003CordFil_Final.pdf

Dahlbom, B. and Mathiassen, L. (1997), 'The future of our profession,' Communications of the ACM, 40 (6), 499-579.

Dilley, P. (1999), 'Queer theory: Under construction,' International Journal of Qualitative Studies in Education (QSE), 12 (5), 457-472.

El Baze, N. (2005), 'Cracking software development complexity: In order to reap the benefits of progress in processor technology, we must fundamentally rethink how to write software,' Line 56-The Business Executive daily. [Online], [Retrieved March 30, 2005], http://www.partechvc.com/newspdfs/Line56_NEB.pdf.

Gasche, R. (1986) Infrastructures and systematicity, In Deconstruction and philosophy, Derrida, J. and Sallis, J. (ed), 3-20.

Goldkuhl, G. (2002). 'Anchoring scientific abstractions: Ontological and linguistic determination following socio-instrumental pragmatism,' Proceedings of the European Conference on Research Methods in Business and Management Studies (ECRM), MCIL, April 29-30 April 2002, Reading, UK

Gregor, S. (2006), 'The nature of theory in Information Systems. MIS Quarterly, 30 (3), 612-642

Guarino, N. (1998), 'Formal Ontology and Information Systems,' Proceedings of FOIS'98, Trento, Italy, 6-8 June 1998, IOS Press, Amsterdam, 3-15.

Hacking, I. (2002) Historical Ontology, Harvard University Press, London

Hirschheim, R., Klein, H.K. and Lyytinen, K. (1995) Information systems development and data modelling: Conceptual and philosophical foundations, Cambridge University Press, Cambridge
Hohmann, C. (2007), 'Emotional digitization. A reflexive examination from the view of the industry,' International Journal of Technology and Human Interaction, 3 (1), 7-29.

Holt, A.W. (1997) Organized activity and its support by computer, Kluwer Academic Publishers, Dordrecht.

In-Pharma Technologist.Com. (2005), 'Improved data dealing drives drug discovery,' [Online], [Retrieved March 30, 2005], http://www.in-pharmatechnologist.com/news/

Knowles, A.K., Westerveld, L. and Stro, L. (2015), 'Inductive visualization: A humanistic alternative to GIS,' Journal of Geo-humanities, 1 (2), 233-265.

Kroeze, J.H., LotrieT, H., Mavetera, N., Postma, D., Pfaff, M., Sewchurran, K. and Topi, H. (2010), 'Humanities-enriched Information Systems: Panel discussion (abstract)' In Proceedings of the 18th European Conference on Information Systems (ECIS), IT to Empower, 6-10 June, University of Pretoria, Pretoria, South Africa

Kroeze, J.H., Lotriet, H.H., Mavetera, N., Pfaff, M.S., Postma, D.J.V.R., Sewchurran, K. and Topi, H. (2011), 'Humanities-enriched Information Systems,' European Conference on Information Systems ECIS 2010 panel report, Communications of the Association for Information Systems Journal (CAIS), 28 (1) [Retrieved October 27, 2011], http://aisel.aisnet.org/cais/vol28/iss1/24

Mavetera N. (2002), 'An Electronic Geoinformation Supply Model for Land Registry Organizations (LROs) in Countries in Transition, South Africa and Zimbabwe (2002), FIG XXII International Congress, ISBN:87-90907-20-5 19-26 April 2002, Washington, D.C. USA, 478-479,

Mavetera N. (2003), 'A Conceptual Model for Agent-Mediation in E-Markets,' Proceedings of the South African Institute of Computer Scientists and Information Technologists, (SAICSIT) Conference, ISBN:86854-512-1, 17-19 September 2003, 15-20, , Indaba Hotel, Johannesburg, SA

Mavetera, N. (2004a), 'The use of ontologies in designing agents for e-markets: From a mechanist to a romantic approach,' Proceedings of the International Business Information Management Conference (IBIMA), 4-6 July 2004, Amman, Jordan

Mavetera, N. (2004b), 'The philosophy of ontologies: A new information systems development paradigm,' Proceedings of the International Science and Technology Conference (ISTC'04), 1-2 December, Vanderbijlpark

Mavetera, N. (2007), ' A comprehensive ontology-driven software development architecture: A holistic approach to developing romantic software products,' Proceedings of the 2007 Information Resources Management Association, International Conference in Managing Worldwide Operations and Communications with Information Technology, 19-23 May, Vancouver, British Columbia, Canada, M. Khosrow-Pour, M. (ed), Hershey, PA: IGI Publishing.

Mavetera, N. (2011), 'Towards an ontology-driven software development approach: An unended quest, PhD Thesis, Faculty of Engineering, Built Environment and Information Technology (EBIT), University of Pretoria

Mavetera, N. (2011), 'Towards an ontology-driven software development approach,' Proceedings of the 16th IBIMA Conference on e-Government, Innovation and Knowledge Management: A Global Competitive Advantage, 25June – 2 July, Kuala Lumpur, Malaysia, 1050-1057.

Mavetera, N. and Kadyamatimba, A. (2003), 'A comprehensive agent mediated e-market framework,' Proceeding of the ACM 5th international conference on electronic commerce, Pittsburgh, Pennsylvania, 50 (1) 158-164.

Mavetera, N. & Kroeze, J.H. (2010), 'An ontology-driven software development framework,' Proceedings of the 14th International Business Information Management Association Conference (14th IBIMA), Business Transformation through Innovation and Knowledge Management: An Academic Perspective, 23-24 June Istanbul, Turkey, 1713-1724.

Monod, E. (2007), 'Editorial. Special issue on philosophy and epistemology: A Peter Pan Syndrome?' Information Systems Journal, 17 (2) 133-141

Mullet, D. (1999), 'The software crisis,' [Online], [Retrieved June 9, 2008], http://www.unt.edu/benchmarks/archives/1999/july99/crisis.htm.

Ngwenyama, OK. and LEE, AS. (1997), 'Communication richness in electronic mail: Critical social theory and the contextuality of meaning,' MIS Quarterly, 21 (2) 145-167.

Randell, B. (n.d), 'The 1968 NATO software engineering reports. [Online], [Retrieved November 2, 2008], http://homepages.cs.ncl.ac.uk/brian.randell/nato/natoreports/index.html

Robinson, R. (2015), 'People, People, Technology-3; human qualities digital technology can't replace in the future economy: experience, values, and judgments,' The Urban Technologist. [Online], [Retrieved March 13, 2015], theurbantechnologist.com

Roque, L., Almeida, A. and Figueiredo, AD. (2003), 'Context engineering: An IS development approach,' Proceedings of Action in Language, Organizations and Information Systems, International Conference (ALOIS'2003), 12-13March 2003, Sweden, Linköping, 107-122.

Rosenkranz, C. and Holten, R. (2007), 'Towards measuring the complexity of information systems: A language critique approach,' Proceedings of International Resources Management Association (IRMA), 19-23 May, British Columbia, Vancouver, 57-60

Ruiz, F. and Hilera, JR. (2006). Using ontologies in software engineering and technology, Ontologies for Software Engineering and Software Technology, Calero, C., Ruiz, F. and Piattini, M, (ed), Springer Verlag, Berlin

Shawa, W. C.; Mavetera, N. and Huisman, M. (2008), ' An Ontology for Information Systems Development Methodologies, proceedings of the South African Institute of Computer Scientists and Information Technologists SAICSIT, Annual research conference on 'Riding the wave of technology'), 6-8 October 2008, Wilderness, C. Cilliers, C., Barnard, L. and Botha, R, (ed) SAICSIT M & D Graduate Symposium, Port Elizabeth

Shawa, W., Mavetera, N. and Huisman, M. (2009), 'Building language communities in organizational system development teams using ontologies,' Proceedings of the 13th International Business Information Management Association (IBIMA) Conference on Knowledge Management and Innovation in Advancing Economies, 9-10 November Marrakech, Morocco

Soffer, P., Golany, B., Dori, D. and Wand, Y. (2001), 'Modelling off-the shelf information systems requirements: An ontological approach,' Requirements Engineering Journal, 6 (3) 183-199.
Suchman, L.A. (1987) Plans and situated actions: The problem of human-machine communications, Cambridge University Press, Cambridge,
Tarnas, R. (1991) The passion of the western mind: Understanding the ideas that have shaped our world view, Pimlico, London

Weber, R. (2003), 'Conceptual modelling and ontology: Possibilities and pitfalls,' Research paper review. Journal of Database Management, 14 (3), 1-20.

Yu, E. (1995). Modelling strategic relationships for process engineering. (PhD thesis, Department of Computer Science), University of Toronto, Toronto, Tech. Report DKBS-TR-94-6.

Yu, E.K.S. (1997), 'Towards modeling and reasoning support for early-phase requirements engineering,' Proceedings of the 3rd IEEE Int. Symp. on Requirements Engineering (RE'97), 6-8 January, Washington, DC

Zúñiga, G.L. (2001), 'Ontology: Its transformation from philosophy to Information Systems,' FOIS'01, 17-19 October 2001, Ogunquint, Maine, USA.

Exploring the Relationship between the Learning Capabilities of Organization and Its Impact on Performance

Shagufta Ghauri, Institute of Business Management, Karachi, Pakistan. shagufta.ghouri@iobm.edu.pk

Dr. Aamir Firoz Shamsi, PAF Kiet, Karachi, Pakistan. aamir.shamsi@pafkiet.edu.pk

Farheen Khalid, Institute of Business Management, Karachi, Pakistan. farheen.khalid@iobm.edu.pk

Abstract

This study is a descriptive research examining the relationship between the organization learning capabilities and its impact on the firm's performance. Although it is evident in the literature that organizations that are learning are also high performing organization, the researcher hardly found any empirical study in Pakistani perspective regarding this aspect of relationship between learning organization and its impact on performance. Based on Learning Organization Questionnaire developed by Watkins, K.E. and Marsick, V.J. (2003) scale will be used to measure learning capability of a sample from big five banks namely Habib Bank Limited (HBL), United Bank (UBL), Muslim Commercial Bank (MCB), National Bank of Pakistan (NBP) and Allied Bank Ltd. Financial data is also being obtained from these banks. Methodology we have used is survey method. Result of the study show that there is no relationship between learning capability and Return of Assets, however there is a moderate relationship between learning organization and Return on Equity.

Keywords*:* Learning organization, Return on Assets & Return on Equity.

Introduction

There is an increase interest in the concept of learning organizations; the potential driving force leading to this interest is globalization and the impact of knowledge as the foundation for developing competitive advantage. Managers and consultants as substantiated by the volume of literature dedicated to the topic (Goh & Richards, 1997), they have begun to realize the immense importance to manage their human resource in order to achieve sustainable competitive advantage.

Increasing competition and availability of choices has led to the idea that only those companies can sustain profitability that focus on continuous development and growth, for which, consistent learning is critical. This objective can only be achieved through building a learning organization (Garvin, 1993).

Peter Senge (1992) in his book the Fifth Discipline, sheds light on the characteristics of learning organization such as shared vision, challenging of mental models, team learning, system thinking and experimentation are the key features of learning organizations. Later on Garvin (1993) identifies a set of situations needed to construct a learning organization through a more applied and practical approach. There had been a growing body of literature that has made effort to illustrate organizational situation and management practices that learning organization possess (Goh, 1998; Goh & Richards, 1997).

The literature has implied that learning organization is highly competitive and effective as it has the capacity to experiment with new ideas making the organization innovative and creates new knowledge and then transfers the acquired knowledge to solve critical problems successfully (Mills & Freisen, 1992; Leonard-Barton, 1992). Though has been very few or rare empirical research rather than few in depth researches that attempts to associate organizational learning to performance effect that are implied

(Simonin, 1997). There has been very modest effort made to develop metrics and measures on this subject as a result there is no large scale empirical study. Recently, Goh & Richard (1997) made attempt to capture organizational situations and management practices through scale that can help in describing the characteristics of learning organization. Organizations that score high can be described to posses' strong learning capacity as specified by the subsistence of a set of organizational situations and management practices that encourages and assist organizational learning.

Purpose of Study

The aim of this research was to link organizational learning capability by measuring through survey the performance of big five banks of Pakistan. Before we further explain the research, the conceptual underpinning hypotheses about this research are:

Literature Review

There has been a confusion on the existing literature on learning organization, distinctions are made amid "the learning organization" and "organizational learning", among "practioners approach" and "academic approach" (Schon & Argyris, 1998), among "capability" and "normative" perspective (Dibella, 1995) and amid "organizational "and " individual" learning (Weick, 1991). This healthy debate generates an impression that the thought is not clearly understood neither it is practical in application.

This research captures a normative perspective on the learning organization concept. The researcher does not argue from learning perspective that organization and individuals behave like, however the researcher argues that organizational learning is associated with the actions and experiences of organizational members. Cook & Yanow (1993, p.375) defines organizational learning as" the studying of concrete structural and procedural arrangements during which actions of organizational members are understood to necessitate learning are pursued by observable changes in the activities pattern of the organization".

Mechanics of learning organization develop the basis to understand the concept of learning organization, with the purpose to understand its structure, procedures, policies and strategies that facilitate the member and organization to learn (Lipshitz & Popper, 1998). Therefore, we can view learning organization as those organizations that rationally adopt strategies and structure to persuade learning (Dodgson, 1993). These procedural arrangements and evident institutionalized structures or organizational systems illustrate the learning organization concept. It can be synthesizing that when organization adopts these procedures and structures have greater capability to learn.

To facilitate learning, an approach is required to identify those organizational mechanisms. So as to, what kind of procedures and management practices are associated to be learning organization? What structures support learning? These Procedures and structures can facilitate in defining the learning capacity of an organization.

To respond to these question, researcher conducted this study to test the measurement tool developed by Goh & Ryan (2002) to evaluate the learning capacity of the big five banks of Pakistan and to analyze, does group and individual learning be relevant to the achievement of organizations vision and performance goal and does internal conditions and management practices hinder or help this progression (Garvin, 1993; Mills and Friesen, 1992). The study conducted by Goh & Ryan (2002) assessed and identified a set of management practices and internal conditions that lead to assess the organization's learning capacity. The researcher will use the same model to assess the banks learning capacity.

Different orientations have been developed by the literature on learning organization as to how it can be built. DeBella (1995) recognized the normative perspective of learning organizations and illustrate this approach of orientation by stating that learning is an outcome of a collective activity that takes place

under certain circumstances or conditions and organizations need to identify the essential condition to permit and foster learning to take place.

To create learning organization, deliberate intervention is necessary to establish by leaders and essential internal condition for the banks to function in a learning mode. There has been an implicit supposition that there is an organization prototype that identifies a successful learning organization, which impacts the survival, long term performance and effectiveness of the organization. According to Garvin (1993), he states that to be competitive organizations need to vigorously manage learning progression to ensure that it happens by design rather than by chance. Distinct policies and managerial practices are accountable for the success of the organization as they structure the building blocks of learning organization.

Therefore, the researcher will test those conditions that are identified by Goh & Ryan (2002) to facilitate organizational learning or conditions and managerial practices that help an organization to become a learning organization. The supposition is that organizational learning does take place, but there are certain conditions and appropriate managerial practices are required for effective learning (Von Glinow, Ulrich & Jick, 1993).

Learning Organization Strategic Building Blocks

By examining the commonalities amid diverse explanation found in extensive literature review, the model anticipated by Watkins and Marsick (1993), which represent the action strategies, is presented below.

1**. Creating ongoing learning opportunities**

Today's organizations are more complex than yesterday's; earlier organizations were more like automated machines but the present organizations are more dynamic with continuous learning environment. The complete work environment is focused towards experimentation, continuous learning, and supportive environment.

2. **Promote Dialogue and Inquiry**

In the organization, information needs to be transparent, focused, clear and fast. Communication should be cross functional and within the sub-unit boundaries of the organization. The information spread and acquired needs to adhere with the organizational opportunities and problems; this has also been cited by most of the writers, specially the capability of the organization to transfer and impart knowledge across departments and to transmit knowledge from the stakeholders (Garvin, 1993; Shaw and Perkins, 1991).

3. **Encouraging Teamwork Dynamics**

In today's competitive world individuals work needs to be designed around work teams in order to accomplish organizational goals. Organizational systems and structures needs to foster problem solving culture and encourage teamwork in order to reduce dependency on top management and the teams should possess the expertise to work cross-functionally. Knowledge can be transferred and shared when employees work in teams and gets better understanding of individuals, their work, need and also enhanced information of how work takes place in different parts of the organization (Senge 1990, 1992).

4. **Institute Systems to confine and shared learning**

Problems and issues faced by organizations always present opportunities for experimentation. Organizational justice concept needs to be practiced by the organization, the climate should be as such

that fairness and transparency exist in rewarding employees, compensation system should be solely based on performance rather than attendance and seniority. Rewards should be designed in the parameters of risk taking and innovation, behavior that challenge status quo needs to be appreciated. This managerial practice is most consistently observed in the learning organizations. Innovative work processes and freedom to pursue novel work methods are supported and encouraged in the organization (McGill, Slocum and Lei, 1993; Garvin, 1993; Senge, 1990).

5. **Empowering People on the road of collective vision**

There has to be a clearly articulated purpose for each unit and for organization as a whole. There is a need for employees to understand the purpose of the organization and how their work contributes to the attainment of the organization mission. The organization needs to have individual and organizational goal integration in order to facilitate employees' commitment to the purpose and mission of the organizational. According to other researchers and Senge (1992) states that organizations should build a "shared vision" for the desired future as ambiguity in it creates tensions as individuals are not able to see the big clear picture of organizational existence. Individuals while working in the organization understands and know the gap between the current state and the desired state of the organization that hinders in the attainment of the vision and can strive to design activities that fulfill the organization vision (Mohrman and Morhman Jr., 1995).

6. **Connecting the organization to its environment**

Learning organizations are continuously interacting with its environment and recognize its reliance on its environment; they examine the environment and use the information received to regulate work performance. There is a healthy relationship between learning organization and the social, cultural and physical environment
(Watkins and Marsick, 1993).

7. **Offering Strategic Leadership for Learning**

Leaders in the organization needs to create a culture of egalitarianism and trust, they should be approachable, committed to the organizational goals and to the goals of learning. The organizational climate by the leader should be such that mistakes are treated as learning experiences and failures are treated as an integral part of the learning process. Specifically, the leaders have the responsibility to help the employees recognizing performance gaps and help employees to set goals that encourages the thirst of knowledge to solve and narrow these performance gaps.

Virtually all writes have mentioned leadership as a significant element to foster learning climate by open criticism, having tolerance for employee expression, being in quest of feedback, empowering employees, admitting mistakes, risk taking and helping employees make decisions (McGill, Slocum and Lei, 1993; Garvin, 1993).

The survey measured these above mentioned seven strategic building blocks on the big five banks of Pakistan.

Hypothesis Testing

Ho: There is no significant relationship between Learning Organization and Return on Assets (ROA).
H1: There is a significant relationship between Learning Organization and Return on Assets (ROA).

H0: There is no significant relationship between Learning organization and Return on Equity (ROE)
H2: There is a significant relationship between Learning organization and Return on Equity (ROE)

Methodology

Sample

The participants of the study I have chosen is about 50 respondents in number, who are senior human resource managers from the big five banks namely Habib Bank Limited (HBL), United Bank Limited (UBL), Muslim Commercial bank (MCB), National Bank of Pakistan (NBP) and Allied Bank of Pakistan.

Measures

Learning Capability is being measured using survey on learning organization that measures the five strategic building blocks of the learning organization, like Clarity of Purpose and Mission, Leadership Commitment and Empowerment, Experimentation and Rewards, Transfer of Knowledge and teamwork and group solving. The overall reliability of this scale was .93 (Cronbach's alpha).

For ***financial performance*** of the big five listed banks, data is being taken from Karachi Stock Exchange (KSE), Return on Assets (ROA) and Return on Equity(ROE) for a period of five years will be obtained through Compustat Database. These values will be averaged for the five time periods 2010, 2011, 2012, 2013 and 2014.The research was analyzed using SPSS.

Results

Table 1: Descriptive Statistics

	Mean	**Std. Dev**	**Total**
DLOQ	85.80	20.708	50
ROA	3.2740	2.77092	50
ROE	17.93	9.384	50

The findings suggest that there is no correlation found amid the big five learning organization and ROA. Examining the literature and research findings, it was found that there are certain factors that criticize the concept of learning organization. Finger and Wollis (1994) argues that learning organizations cannot take benefit from a learning organization without exploiting individuals working in an organization in favor of the organization. The emphasis according to him is organizational learning and not individual learning. The complexity of new knowledge and already exiting knowledge is also subject to organization politics and environment. In such environment it is extremely difficult to develop organizational loyalty before individual zeal for self-profitability.

Table 2: A Correlation between Dimensions of Learning Organization and Return on Assets

		ROA
DLOQ	Pearson Correlation	.032
	Sig. (2-tailed)	.826
	N	50

**. Correlation is significant at the 0.01 level (2-tailed).

Table 2 shows moderate correlation between Learning Organization and Return on Assets.

The second finding of the study shows moderate relationship between learning organization and Return on Assets (ROA), the possible reason could be the behavioral aspect, when shareholders actively participate in the functioning of the organization and want to improve their organization ROA, they lay emphasis in channeling the energy of their workers in the right direction by providing a clearly articulated purpose of the organization existence and make sure that the mission is clearly communicated and understood by the employees (Goh& Ryan,2002), shareholders understand the importance of motivated workers assuming that they possess the ability to identify gap between current state and desired state and when employees see the commitment of shareholders they stop cutting corners(Mohrman and Morhman Jr.,1995).

Table 3: A Correlation between Dimensions of Learning Organization and Return on Equity

		ROE
DLOQ	Pearson Correlation	.497**
	Sig. (2-tailed)	.000
	N	50

**. Correlation is significant at the 0.01 level (2-tailed).

Table 3 depicts correlation between the learning organization and Return On Equity

Table 4: Reliability Analysis of DLOQ (Cronbach alpha)

Cronbach's Alpha	N of Items
.934	21

Table 4 depicts high reliability analysis i.e. .934 (Cronbach alpha) of the Dimension of Learning Questionnaire (DLOQ)

Discussion

According to Tsang (1997), learning organization is a structure of supreme organization that possesses the competence to flourish and to learn effectively. Progressively more literature and management research have focused on the advent of a "knowledge-based economy" (Drucker, 1993) and on the "learning organization" (Watkins and Marsick, 1993). Learning organizations all over the world are encouraged as in today's competitive world the business dynamics have changed. Initially organizations would be able to sustain their comparative advantage for multiple years. Technology, easy excess to information and globalization are some key elements which hinders organizations in maintaining their competitive position in the industry for a longer period. Due to globalization, investors also have diversified opportunities for investment. To attract investors, organizations need to achieve positive performance indicators. The organizations need to increase their profit to attract investors and solutions provided by several researchers for this problem is to create a learning organization.

The first findings suggest that there is no correlation found amid the big five learning organization and ROA. The complexity of new knowledge and already exiting knowledge is also subject to organization politics and environment. In such environment it is extremely difficult to develop organizational loyalty before individual zeal for self-profitability.

The individuals working in an organization continuously try to understand what is needed of them and how they can survive in the competitive internal environment of the organization. Dixon (1993), noted that organizations don't learn, people learn but at times individual learning is not being converted into organizational learning. From an individual's perspective, organizational job is only one sphere of their life. The other aspects of life might have different goals and objectives. Marsick and Watkins (1990) declared that individual learning does not lead to organizational learning and thus does not have an impact on organizational performance and profitability. The learning scores which are being assessed in the research can be individual learning score and does not reflect the organizational learning score.

According to Marsick and Watkins (1993) productivity is directly related to innovation. Thus only those individuals contribute to the organizations who are innovators. Paquette (1995) noted that most of the individuals hired by organizations are not innovators and do not have the capacity to learn continuously. Many empirical researches draw attention on the diminishing need of innovative individuals due to advancement in technology (Swardson, 1992). Also innovation increases cost which can reduce profitability in short run. Also many researches prove that not all innovations are profitable. The literature on learning organization promotes two types of facts: innovative and problem-solving or "detecting error" (Argyris, 1993). The problem-solving direction considers learning as persistently seeking liberty from obscurity (Prawat, 1993).

When the organization emphasizes to solve problem and product novelty, the learning is limited to technical knowledge (Habermans, 1984). At times the organizations lay more emphasizes on innovation leading to future present while letting go of current profitability. Also if organization emphasizes more on error detection then current profitability might increase but will cause future profitability to shrink. The individuals in an organization are often faced with dilemma of what to learn and where to concentrate. The organizations with high learning scores and lower profitability might be investing more on future profitability and neglecting present profits as opportunity cost. The need to continuously prove themselves as well as sow their loyalty to the organization might provide biased learning scores. Presence of learning organization and low profitability can also be due to political and economic condition of the country. High borrowing rate and cost of production can also be the reason of depressed profitability. Presence of learning organization and low profitability can also be due to political and economic condition of the country. High borrowing rate and cost of production can also be the reason of depressed ROA.

The second finding of the study shows moderate relationship between learning organization and Return on Assets (ROA), the possible reason could be the behavioral aspect, when shareholders actively participate in the functioning of the organization and want to improve their organization ROA, they lay emphasis in channeling the energy of their workers in the right direction by providing a clearly articulated purpose of the organization existence and make sure that the mission is clearly communicated and understood by the employees(Goh& Ryan,2002),shareholders understand the importance of motivated workers assuming that they possess the ability to identify gap between current state and desired state and when employees see the commitment of shareholders they stop cutting corners(Mohrman and Morhman Jr.,1995).

The shareholders do investment in the organization to promote culture that encourages egalitarianism and trust, team work and develop problem solving abilities in order to reduce the dependency on upper management. Teams are develop to work cross-functionally as in today's complex world it is difficult to accomplish organizational objectives individually (Senge, 1992; Garvin, 1993).The culture of the organization that has sustained due to the values and clear and focused communication of the owners, information shared is also cross functional, there is freedom provided to the workers to experiment with new ideas, encouragement and support is provided to the individuals who challenge the status quo (Slocum and Lei, 1993).

Conclusion

To conclude, the research finding revealed that there is no significant impact of learning organization on Returns obtained. The organizations with high learning scores did not have higher ROA. The findings are in precedence to the empirical evidences of the past. The individual learning does not ensure organizational learning. Also organization is not an absolute and stable structure. The individual constituting the framework is constantly changing, creating a shift in the organization. The individual learning is also often in conflict with organization's learning. Also accurate measurement of learning is complex due to critical self-reflection on individuals.

The findings of the study also revealed that when owners take interest in their organization and want to improve the ROE of their companies, the thirst drives them to build a culture which is the forerunner of learning organization and their commitment towards their company flourish.

The research only focused on the big five banks of Pakistan. In future, sample should be taken of different companies from all the sectors so that comparisons can be made within the industry to rule out factors which are pertaining exclusive to that sector. Also private sector should be included to note if the causal relationship has different effect on larger and smaller organizations. For future study it is recommended to view the relationship between learning organization and market capitalization.

References

Argyris, C. (1997), "Learning and teaching: a theory of action perspective", *Journal of Management Education*, Vol. 21 No. 1, 9-26.

Dixon, N. (1993). *Report on the Conference Board of Canada on organizational learning.* Report prepared for the Conference Board of Canada, Ottawa.

DiBella,A. (1995). *Developing learning organizations: A matter of perspective*. Proceedings of the 1995 Academy of Management Meeting,287-290.

Dodgson,M. (1993).*Organizational learning*:A review of some literatures. Organization Studies, 14:375-394.

Drucker, P. F. (1993). *Postcapitalist Society*. New York: HerperCollins Publishers.

Finger, M. & Woolis, D. (1994). Organizational learning, the learning organization, and adult education. *Proceedings of the Adult Education Research Conference* (pp. 151-156). University of Tennessee.

Garvin,D.(1993, July-August).*Building learning organizations*. Harvard Business Review, 78-91.

Goh,S.C. (1998).*Toward a learning organization*: The strategic building blocks. SAM Advanced management Journal,63(2):15-22.

Goh,S.C. & Richards,G. (1997). *Benchmarking the learning capability of organizations*.European Management Journal.15(50:575-583.

Goh,S.C. & Peter Ryan.(2002). Learning Orientation, Organization Factors and Firm Performance, Third European Conference on Organizational Knowledge, Learning and Capabilities, Athens, Greece, April4-6, 2002.

Habermas, J. (1984). *The theory of communicative action, Vol. 1, Reason and the rationalization of society* (T. McCarthy, trans.). Boston: Beacon Press.

Leonard-Barton,Dorothy.(1992). *The Factory as Learning Laboratory*. Sloan Management Review,Fall :23-38.

Mohrman,S.& Mohrman Jr.,A. (1995). Organizational change and learning. In j. Galbraith and E.Lawler(eds.), *Organizaing for the future: the new logic for managing complex organizations*, Jossey-Bass Publishers,87-109.

McGill, M., Slocum, Jr, J.& Lei, D.(1993). *Management practices in learning organizations*. Organizational Dynamics, Autumn; 67-79.

Mills, Daniel Quinn and Friesen, Bruce (1992). *The Learning Organization*. European Management Journal, 10(2): 46-156.

Paquette, J. (1995). Universal education: Meanings, challenges, and options into the third Millennium. *Curriculum Inquiry, 25* (1), 23-56.

Popper, M. & Lipshitz, R. (1998). Organizational learning mechanisms: *A structural and cultural approach to organizational learning*. Journal of Applied Behavioral Science,34: 161-179.

Prawat, R.S. (1993). The value of ideas: Problems versus possibilities in learning. *Educational Researcher* (August-September 1993), 5-16.

Senge,Peter (b). *The Fifth Discipline*. New York, Doubleday,1992.

Senge,P.(1990). The leader's new work: *Building learning Organizations*. Sloan Management Review, Fall: 7-23.

Shaw,R.& Perkins, D. (1991). *Teaching organizations to learn*. Organization Development Journal, Winter :1- 12.

Simonin, B L. (1997). The importance of collaborative know-how: *An empirical test of the learning organization*. Academy of Management Journal, 40(5); 1150-1174.

Swardson, R. (1995). Greetings from the electronic plantation. In T.Fenwick (Ed.), *Work and Leisure* (pp. 149-156). Toronto, Ontario: McGraw-Hill Ryerson.

Tsang, Eric W. K. Organizational learning & the learning organization: dichotomy between descriptive and perspective research. *Human Relations* (HR), 50, 73-89 .

Ulrich,et al(1993). "*High impact learning: Building and diffusing learning capability*". Organizational Dynamics, Autumn: 52-66.

Weick, K.E. (1991), "The nontraditional quality of organizational learning", *Organization Science*,Vol. 2, pp. 116-24.

Watkins,K.& Marsick,V.J.(1993). *Sculpting the learning organization*. San Francisco : Jossey-Bass.

Appendix

Fig1 Conceptual framework of Dimension of Learning Questionnaire



***Source*:** Marvin Elie Mbassana, 2014**.**

Dimensions of the Learning Organization Questionnaire

The questionnaire below is the short version of the DLOQ, based on the above model. In this questionnaire, you are asked to think about how your organization supports and uses learning at an individual, team, and organizational lev From this data, you and your organization will be able to identify the strengths you can continue to build on and the areas of greatest strategic leverage for development toward becoming a learning organization.

Please respond to each of the following items. For each item, determine the degree to which this is something that i is not true of your organization. If the item refers to a practice that rarely or never occurs, score it a one (1). If it is almost always true of your department or work group, score the item as six (6). Fill in your response by marking the appropriate number.

No.		Rarely or Never (1 Almost Always (6				
1	In my organization, people help each other learn					
2	In my organization people are given tme to support learning					
3	In my orgamization, people are rewarded for learning					
4	In my organization, people give open and honest feedback to each other					
5	In my organization, whenever people state their view, they also ask what others think					
6	In my organization, people spend time building trust with each other					
7	In my organization, teams/groups have the freedom to adapt their goals as needed					
8	In my organization, teams/groups revise their thinking as a result of group discussions or information collected					
9	In my organization, teams/groups are confident that the organization will act on their recommendations					
10	My organization creates systems to measure gaps between current and expected performance					
11	My organization makes its lessons learned available to all employees					
12	My organization measures the results of the time and resources spent on training					
13	My organization recognizes people for taking initiative					
14	My organization gives people control over the resources they need to accomplish their work					
15	My organization supports employees who take calculated risks					
16	My organization encourages people to think from a global perspective					
17	My organization works together with the outside community to meet mutual needs					
18	My organization encourages people to get answers from across the organization when solving problems					
19	In my organization, leaders mentor and coach those they lead					
20	In my organization, leaders continually look for opportunities to learn					
21	In my organization, leaders ensure that the					

A Review of the Importance on the Need of Micro Medical and Health Takaful

Fauzilah Salleh
Department of Finance, Faculty of Economics and Management Sciences, Universiti Sultan Zainal Abidin, Terengganu, Malaysia
E-mail: fauzilah@unisza.edu.my

Nahidah Mustafa
Department of Finance, Faculty of Economics and Management Sciences, Universiti Sultan Zainal Abidin, Terengganu, Malaysia
E-mail: nahidah@unisza.edu.my

Wan Norhayate Wan Daud
Department of Finance, Faculty of Economics and Management Sciences, Universiti Sultan Zainal Abidin, Terengganu, Malaysia
E-mail: wnhayate@unisza.edu.my

Ahmad Shukri Yazid
Department of Finance, Faculty of Economics and Management Sciences, Universiti Sultan Zainal Abidin, Terengganu, Malaysia
E-mail: shukri@unisza.edu.my

Puspa Liza Ghazali
Department of Finance, Faculty of Economics and Management Sciences, Universiti Sultan Zainal Abidin, Terengganu, Malaysia
E-mail: puspaliza@unisza.edu.my

Norizan Remli
Department of Finance, Faculty of Economics and Management Sciences, Universiti Sultan Zainal Abidin, Terengganu, Malaysia
E-mail: norizanremli@unisza.edu.my

Nik Ahmad Sufian Burhan
Department of Social and Development Sciences, Faculty of Human Ecology, Universiti Putra Malaysia, Serdang, Malaysia
E-mail: nikahmadsufian@upm.edu.my

Abstract

The overall aim of this paper is to discuss health care expenses incurred and borne by the government as well as the citizens. The development of Medical and Health Insurance (MHI) / Medical and Health Takaful (MHT) in Malaysia has also been reviewed accordingly in this study. Moreover, the issues and challenges raised in regard to the implementation of Health Takaful in Malaysia has been thoroughly assessed by focusing on low to moderate level individuals, specifically the hard-core poor, poor and low (B40), and moderate-income earners (M40). Therefore, the aims of the paper is to present the views of scholars on the importance of micro medical and health Takaful in daily life and to recommend framework of micro medical and health Takaful for poor people in Malaysia.

Keywords: Micro Medical and Health Takaful, Poor People.

Introduction

Malaysian Health Care Expenditure has been observed to rapidly increase on the average of 12-13% per year, with the assumption that it could exceed a total of RM20 billion by the year 2025. Previously in 2015, the government had allocated a higher budget amounting to RM23.3 billion for the purpose of providing free or almost free hospitals and clinics services to the Malaysian population. However, despite the huge allocations provided for healthcare purposes, those hospitals and clinics still having a few difficulties to accommodate and fulfil the needs of the population due to the lack number of personnel as well as medicines and supplies, which further leads the residents which include the poor to seek treatment from a health centre.

Meanwhile, in the year 2014, a high number of admissions and outpatient attendances represented by the amount of 86,237,051 patients managed to be recorded in 141 government hospitals, whereas only a total of 5,083,596 patients were found in the record of 214 private hospitals. Hence, this further indicates that most individuals are not able to afford the services provided by private hospitals due to the high cost of payment needed for personal which will cause more burden. One of the possible alternatives to overcome this problem is to buy health insurance; however, the existing health insurance is considered very expensive especially for the poor individuals in Malaysia. As a result, they will not even consider taking any health insurance scheme that can further prevent any future hospital costs. Therefore, it is deemed crucial to develop an affordable medical and health Takaful framework for the poor in order to provide them with a prompt access to medical and health services.

Literature Review

In spite of the efforts made to further understand medical and health care in society, the established studies have shown that an estimated total of 1.3 billion individuals worldwide do not have access to an affordable and effective health care. Meanwhile, more than 150 million individuals in 44 million households around the world are faced with the issue of direct financial helps every year. Other than that, recent evidence of the literature are mostly concerned with the need to validate the market penetration of medical and health insurance. According to Naseem Aliza (2012), only 11.9% to 15.7% of the whole Malaysian population have health insurance despite the high direct medical bills (Hima Gupta, 2007). Therefore, the issues that need to be addressed in this study include the number of people with health insurance as well as the reliability of medical and health insurance in providing adequate protection. It is very crucial for this scheme to be well designed and affordable. Furthermore, this scheme needs proper underwriting and effective controls, including the cost and procedure of claims that are burden free.

The importance of health care has led the underdeveloped and developing countries to introduce various insurance programs to the mass population, especially to those in the informal sector in order to achieve better accessibility of health care as well as financial protection. A few examples include the social health insurance in Africa, the National Health Insurance Fund in Tanzania, the law of national health insurance in Ghana, the New Rural Cooperative Medical Scheme (NRCMS) in China, and National Hospital Insurance Fund of State in Kenya (World Bank).

In light of this issue, India has also implemented micro insurance schemes that are mostly comprehensive by the International Labour Office which tend to put a major focus on the poor in the rural areas (ILO, 2005). In Malaysia, health care insurance offered before 1997 acted as a rider to a life insurance policy. However, life insurance companies were allowed to sell insurance policies and health care alone (stand-alone) after the upgrade of policy under the Insurance Act 1996. Hence, this further indicates that policyholder is allowed to purchase insurance and health care without buying a life insurance policy.

Generally, health insurance coverage are mainly categorized into two main groups which are the protection of health expenses and disability income protection (Treischmann et al., 2001). On top of that, it should be known that some of this coverage named as medical and health insurance are run by an insurance company. In this case, the insured is required to pay the premium to enable them to get protection on surgical and medical treatment as well as overcoming the loss of income due to accident or illness. Furthermore, it is important to note that the premium for this type of protection is expensive compared to other risk protection scheme, which is found to be extremely burdening especially for the low-income earners. Therefore, most of the poor families in developing countries such as Malaysia are left with no choice due to their inability to afford health insurance scheme despite their full awareness regarding the importance of preventing higher hospital costs (International Conference on Social Health Insurance in Developing Countries, 2005).

On top of that, it is believed that health insurance schemes in the health care will be able to produce healthy citizens among the low-income individuals. This is hoped to enroot to the aim of turning Malaysia into a developed nation by 2020, which indirectly contribute to the implementation of government's programme which tend to focus on the hard-core poor, poor and low (B40), and moderate income earners (M40). Apart from that, it is also very challenging to reduce the community's dependence on the government for healthcare purposes. Therefore, a method should be developed in helping the government to deal with this issue by allowing the interested stakeholders to partake in the contribution fee as part of their corporate social responsibilities initiatives.

3. Historical Background of Medical and Health Insurance (Mhi) / Medical and Health Takaful (Mht) In Malaysia

Similar to the function of conventional insurance in providing protection against disasters, Takaful serves as an alternative to insurance as a result of some insurance activities that are not in line with the Islamic Law (Htay, Sadzali, & Amin, 2015). The purpose of medical and health insurance/takaful is to cover the cost of private medical treatment which include the cost of hospitalisation and healthcare, provided that the insured are diagnosed with certain illnesses or involved in an accident. In this case, the cover could be on a stand-alone basis or as a supplementary contract to a basic plan (“Insuranceinfo,” n.d.).

In 1999, the Central Bank of Malaysia managed to identify MHI/MHT business as an emerging trend as well as an important sector for the future of insurance and takaful industry based on the facts that ageing population seem to require higher medical costs. In this case, the number of Malaysians aged 55 and above are expected to increase due to the increase of mortality rate for both males and females which are respectively recorded as 70 and 75 to 75 and 79 by the year 2020. Other than that, owing to the breakdown of extended family structure as well as caring family values expected and advocated by the government; hence, the old-aged parents may change in the near future. Therefore, it is highly recommended that healthcare insurance should be turned into one of the employment’s benefit to ensure employees’ loyalty and retention as well as for the purpose of personal income tax exemption (Abdul Rahman & Mohd Daud, 2010). In 1970s, the major industry players of MHI in Malaysia were foreign-based insurers such as American International Assurance, AETNA, and Prudential.

The above scenarios have resulted in a major change in 1999 with the establishment of the first national health insurance scheme known as SIHAT Malaysia. This scheme has attracted the subscription of several local insurance companies. SIHAT Malaysia is a new hospital and surgical insurance policy that incorporates a range of hospitalization plans which are able to cater to a wide segment of society (Abdul Rahman & Mohd Daud, 2010). Meanwhile, the Central Bank of Malaysia stated that the report on data collection and performance on MHT only started in 2003 which is the result of four Takaful operators being granted the licences to operate.

In Malaysia, there are Takaful operators and insurance companies that offer MHT/MHI. Apart from the hospitalisation and surgical insurance, dread disease or critical illness insurance is also considered as one of the main concerns of modern living healthcare. Generally, there are 36 critical illnesses covered by the insurance companies and Takaful operators. Table 1 below shows the most popular medical health insurance scheme offered by Takaful operators and insurance companies in Malaysia.The medical and health Takaful schemes provide a cheaper package amounting RM1,200 per year with a life time limit of RM650,000 based on the comparison between Takaful operators and insurance companies. On the other hand, an extremely expensive one-year premium payment provided by the insurance company is not affordable for the poor people despite the fact that lifetime coverage. However, the Takaful health insurance scheme of RM1,200 per year provided by TOA cannot be afforded by those with low income. This is evidenced by the market penetration for MHI and MHT recorded as 11.9% to 15.7% respectively of the population that possess health insurance (Naseem Aliza, 2012). Therefore, the micro medical and health scheme for the poor in Takaful Malaysia should be well developed.

Table 1: Comparison Table of the Medical Health Insurance Coverage

Takaful Operators /Insurance Companies	**Takaful Operators (TO)**		**Insurance Companies (IC)**					
	TOA	**TOB**	**ICA**	**ICB**	**ICC**	**ICD**	**ICE**	**ICF**
Annual premium (RM)	1,200	1,800	3,920	3,000	3,400	3,600	5,100	1,462
Rider or Standalone	Rider	Standalone	Rider	Rider	Rider	Rider	Rider	Standalone
Death & TPD amount (RM)	0	0	19,000	103,000	12,000	10,000	10,000	0
Annual limit (AL) RM	No limit	100,000 (annually subject to benefits covered)	1.5 million	1.2 million	1.6 million	No limit	No limit	No limit; per disability limit of 650,000
Lifetime limit (LL) RM	650,000 (overall lifetime)	No Limit	No limit	No limit	No limit	1.65 million	No limit	No limit

Source : Lieu, 2017;Takaful Ikhlas Berhad, 2017; AIA Public Takaful, 2017

Issues and Challenges of Health Scheme in Malaysia

The National Key Results Areas (NKRAs) under the GTP have been identified to ensure the development of socio-economic growth of Malaysians. Hence, health care has been turned into one of the main priorities of this developing country based on the concern that the lives of most Malaysians are at low to moderate level. Specifically, the low to moderate level individuals are represented in terms of hard-core poor, poor and low (B40), and moderate-income earners (M40). According to the Economic Report 2015/2016, group B40 is described as those households with the monthly income of up to RM3,855,

while the M40 (40% medium income group) are those who earn between RM3,860 and RM8,319 monthly.

Meanwhile, the Eleventh Malaysia Plan (11MP) recorded that 60% of B40 and M40 are those who come from a level lower than the middle class, which further indicates that the government must give serious and critical attention to help improving socio-economic growth. Therefore, access to health care has become the number one priority, in which the government has taken an action to increase the average health spending to 12-13% per year. The high budget provided by the Ministry of Health for health services is different each year with the allocation of RM19.3 billion in 2012, RM22.1 billion in 2014, and RM23.3 billion in 2015. Meanwhile, the Ministry of Health has established a program known as Malaysian Healthcare Travel Council (HTC) to further promote Malaysia as a world-class healthcare service provider. In light of this, the government's determination is without doubt have been for the purpose of developing health care services that are easily accessible with doctor to patient ratio of 1 : 6332 at 355 hospitals (141 governments & 214 privates), 7,832 clinics with doctors (1,031 public & 6,801 private), and 2,075 community clinics run by paramedics (Community Clinics & 1Malaysia Clinics) (MOH, 2015). According to the report provided by Ministry of Health (MoH) in 2015, the number of admissions to hospitals and special medical institutions were 2,465,727 60,478 and 60,478, respectively. On top of that, higher outpatients attendances were found at hospitals with a total of 20,260,479 patients, followed by a total of 311,952 out-patients at special medical institutions, and 38,311,223 out-patients recorded at public health facilities (Ministry of Health, 2016). The percentage of total MoH allocation in the 2016 National Budget was only 8.62% which is equivalent to RM23,031,066,400, with the breakdown for operation and development amounting to RM21,430,802,000 and RM1,600,264,400, respectively. The facilities provided at the government hospitals are limited to only 134 hospitals and nine special medical institutions, which also minimizes the services that should be made available to the public. Hence, this indicates the inadequate amount of accessible healthcare services needed in the effort of coping with the total population that is almost approaching a total of 30 million. In the year 2015, Ministry of Health recorded a total of only 5,083,596 patients for both the admission and outpatient attendances at 214 private hospitals. These figures definitely reflect that most individuals are highly dependent on government hospitals due to the affordable and almost free treatment and services provided in comparison to private hospitals. Therefore, this may be the major reason that interferes with the development of health insurance in ensuring that effective health care is affordable for the majority of population.

The Importance of Micro Medical and Health Takaful

Micro medical and health Takaful scheme provides financial mechanisms for protecting and promoting good health by ensuring middle and low-income patients to have access to healthcare. In the absence of a micro medical and health Takaful scheme, many patients within this economic group are forced to rely on public hospitals. The shortcomings of public hospitals are twofold, namely long waiting period and low quality care (Zweifel 2005). The availability of the micro medical and health Takaful scheme will be able to promote early disease prevention and treatment before the disease becomes severe. Furthermore, the Takaful scheme can also provide benefits to both individuals and the whole community. The assurance of a proper healthcare will enable a family to be both productive and healthy.

In addition, the micro medical and health Takaful also proved to reduce poverty (Hamid, Roberts and Mosley, 2011) by preventing medical impoverishment among the rural population, whereby the poverty was reduced by 8.3-13.1% (Yip W, Hsiao, 2009) and higher storage. The poverty reductions were the results of risk management strategies, namely asset sales, reduced household savings, reducing consumption patterns and home loans. Apart from that, community participation in the scheme can also reduce the net health spendings, lower unofficial loans for medical costs, and increase in non-food

consumptions. Micro medical and health Insurance also changed the perspectives ofin the use of health, health seeking behavior or healthcare access (Habib, Perveen and Khuwaja, 2016). As a result, the overall country's economy will grow with a healthy society.

Conclusion and Recommendation

Developing countries such as Malaysia are composed of three classes of individuals, namely the rich, middle, and poor. It is without doubt that healthcare is very important to everyone; however, the priority of each group varies accordingly. In most cases, those individuals who expect better health care service without minding the high cost of treatment tend to choose the best and expensive insurance plan, whereas those who can only afford low-cost treatment will pick a plan that is cheaper.

Health insurance schemes are normally provided by the governments to its citizens, especially to those that come from low and middle-income populations. The formation of Micro Takaful Medical and Health Scheme is expected to assist policy makers to demonstrate their seriousness in terms of improving the welfare of the poor and those in informal sectors. Apart from that, it is also hoped to help those who are forced to spend their money on the out-of-pocket health expenses. Therefore, further studies need to be carried out in reducing the community's dependence on the government with the involvement of the interested stakeholders on the contribution fee as part of their corporate social responsibilities initiatives.

Acknowledgments

the manuscript was supported under the Fundamental Research Grant Scheme (FRGS) from the Ministry of Education Malaysia (MOE). We would also like to thank Universiti Sultan Zainal Abidin, Malaysia for the technical support in completing the research.

References

Abdul Rahman, Z., & Mohd Daud, N. (2010). Adverse Selection and Its Consequences on Medical and Health Insurance and Takaful in Malaysia. Humanomics, 26(4), 264–283. http://doi.org/10.1108/08288661011090875.

AIA Public Takaful. (2017). A-Life Med Regular-i.

Gupta Hima (2007). Role of Insurance Industries in Health Care Management, International Journal of Health Care & Quality Assurance, Leeds University, U.K. Vol 21.1, October.

Habib SS, Perveen S, Khuwaja HMA. The role of micro health insurance in providing financial risk protection in developing countries- a systematic review. *BMC Public Health*. 2016;16:281. doi:10.1186/s12889-016-2937-9.

Hamid SA, Roberts J, Mosley P. Can micro health insurance reduce poverty? Evidence from Bangladesh. J Risk Insur. 2011;78(1):57–82. doi: 10.1111/j.1539-6975.2010.01402.x.

Htay, S. N. N., Sadzali, N. S., & Amin, H. (2015). An Analysis of the Viability of Micro Health Takaful in Malaysia. Qualitative Research in Financial Market, 7(1), 37–71. http://doi.org/10.1108/QRFM-09-2013-0030.

Insurance info. (n.d.).

ILO-STEP. (2005). Health micro-insurance schemes: Feasibility Study Guide (Geneva, ILOStrategies and Tools against social Exclusion and Poverty programme).

Kwon, S. (2009). Thirty years of national health insurance in South Korea: Lessons for achieving universal health care coverage. Journal of Health Policy and Planning, 63-71.

Lieu, C. F. (2017). Comparison Table of the Allianz, AIA, Great Eastern, Manulife & Prudential Medical Insurance. Retrieved January 23, 2017, from http://www.howtofinancemoney.com/2016/03/best-medical-card-malaysia.html.

Ministry of Health, M. (2016). Health Facts 2016.

Naseem Aliza (2012) The Importance of Health Insurance Policy on Purchase Intention/Continuance – An Empirical Study in Malaysia.

Prudential BSN. (2017). PruBSN CrisisCover.

Sekhri, N. & Savedoff, W. (2005). Policy and Practice Private health insurance : implications for developing countries. Bulletin of the World Health Organization, 010611, 127-134.

Takaful Ikhlas. (2017). IKHLASlink Comprehensive Critical Illness Benefit Secure Takaful Rider.

Takaful Ikhlas Berhad. (2017). IKHLAS link Mediplan Secure Takaful Rider.

World Development Report (1993): Investing in Health, Volume1 Published: June 1993 ISBN: 978-0-19-520890-0.http://dx.doi.org/10.1596/0-1952-0890-0.

Yip W, Hsiao WC Soc Sci Med. 2009 Jan; 68(2):201-9.

Preliminary Research Concerning the Fisheries Sector Potential of the Republic of Moldova

Mihaela Munteanu (Pila),
"Dunărea de Jos" University of Galati, Romania, mihaela_pila@yahoo.com

Silvius Stanciu,
"Dunărea de Jos" University of Galati, Romania, sstanciu@ugal.ro

Abstract

The paper aims at presenting and analyzing the natural water resources of the Republic of Moldova from the perspective of recovery for fishy production. As regards its total surface area, the Republic of Moldova has a significant natural fishy potential. Rivers, lakes and other wetlands cover 95,000 ha, or 2.8% of the country. Only 7.5% of the natural aquaculture potential is harnessed in the fishy area, with five autochthonous fish farms operating on the national territory. The vast majority of the fisheries operate extensively, based on pond culture in polyculture system. Although the national territory has significant natural resources, their exploitation is ineffective, the national food market depending on the imports of fishery products. A number of fish species from the natural environment are endangered, measures to protect them being necessary. At national level it is necessary to apply methods of Government support that encourage private initiative in the development of the fishing sector, mainly in the direction of an intensive exploitation by means of aquaculture. The access to European space pre-accession funds may represent a solution to revive the Moldovan fishy sector.

Keywords: aquacultural potential**,** strategies, fish farming, aquaculture, the Republic of Moldova.

Introduction

The Republic of Moldova is a small country located in South-Eastern Europe. The total surface area of the Republic is 33.846 km^2. In the North, East and South, it is bordered by Ukraine, and in the West by Romania. Compared to the relatively small surface area, the Moldavian territory is rich in water resources, such as ponds, rivers and lakes. The Moldovan waters are part of the Black Sea basin. The main rivers are the Dniester and Prut, which spring from the Carpathian Mountains and discharge into the Black Sea. At the South, on a small portion, the Danube represents the border between the Republic and Romania and Ukraine. There are more than 4,600 lakes in the Republic of Moldova, populated by various species of fish, of which the catfish, carp, bream, silver carp, bighead carp, grass carp and zander are of economic importance. Since fish stocks in the natural environment are limited, the aquaculture development, the understanding of aspects of reproductive biology of the different indigenous species of fish and their implementation in improvement and protection programs for the natural fish population are very important. Improvement programs must be adapted and applied depending on the species, resistance and environmental conditions, to allow an increase in fish performance. The increase in the share of aquaculture products represents a solution for the development of domestic consumption and for the reduction of the dependence of the national fish market on imports. The paper proposes an analysis of the existing data in the specialized literature, having as main objective the identification of viable strategies for the development of the Moldovan fishery sector. The increase in domestic fishery production, with the better exploitation of the potential natural habitats of the Republic of Moldova, could lead to the reduction of the dependence of the national market on imports and the revival of the consumption of domestic fish.

Short Literature Review

Data relating to the fishy potential of the Republic, the state of the environment, the existence and the use of the natural aquatic resources between 2009 and 2015 are presented in the statistical compilation „Natural Resources and Environment in the Republic of Moldova", drawn up by a team within the National Statistics Bureau, coordinated by Valcov (2016). The paper has been drawn up based on the reports submitted by the Moldovan economic operators to the national statistics, the reports containing information specific to the Ministry of the Environment and the National Agency for Land Relations and Cadastre. The monograph does not include information on the Transnistria area, a Moldovan territory located on the left side of Dniester River and Bender. The research of four indigenous breeds of crap provides useful information for the development of the national fishy sector, describing the resistance of these varieties at different infectious diseases, ways to increase productivity, the ability of the indigenous carp breeds to adapt to low water temperatures and to feed actively in different temperature ranges.

The Report of the Food and Agriculture Organization of the United Nations FAO (2017) on aquaculture in the Republic of Moldova carries out an analysis of the sector in the period 1990-2016. Until 1990, the use of intensive technologies of fish production allowed production to reach approximately 10.000 tons per year. The transition to a market economy and the difficulties arising in the organizational structure of the Moldovan food sector have led to the sharp decrease in the aquaculture production, reaching 1,042 tons in 1994. The 1994-2002 period has led to a slight increase in the quantities of fish caught, based on the production of the former State fish farms that have reached 1,643 tons in 2002, the fish produced largely coming from ponds. The estimates provided by the Moldovan fish farmers are, however, incomplete, data only covering approx. 50% of the national territory.

Bulat et al (2016), presents results of the study on the fish fauna from the Stanca Costesti Prut accumulation lake performed in 2013-2014 by a mixed team of the Zoology Institute of the Academy of the Republic of Moldova and the „Alexandru Ioan Cuza" University of Iasi, Romania. 1726 specimens from 29 different species of fish were analyzed, specific to the water basin in question. The study revealed the important fishy potential of the specified basin, the need for the involvement of the authorities of the two countries to improve the management of fish stocks and for better use and preservation of the natural biological potential.

An analysis of the use of the natural potential of the ponds in the central area of the Republic of Moldova for aquaculture in polyculture system was carried out by Lobchenko, Vedrasco and Billard (2002). The authors of the research obtained interesting results, highlighting the possibility of association in lakes of the increase in paddlefish (*Polyodon spathula*) with different species of sturgeon (*Acipenser baeri,* density 4300 ind./ha and paddlefish, density of 8300 ind./ha). Survival rates were 59% for Polyodon, at an average productivity of 432 kg/ha, and 77% for the *Acipenser baeri*to sturgeons, at a productivity of 174 kg/ha.

Rodríguez (2009), during a visit meant to monitor the management measures for the protected areas in the Republic of Moldova, presents the status of the indigenous flora and fauna, indicating the existence of 82 autochthonous fish species. In most of the aquatic basins, the number of commercially important fish species has declined (*Huso, Anguilla, Acipenser guldenstadi etc.).* At the time of the visit, the inspector specified that the status and evolution of the natural resources are not fully evaluated, being necessary to develop simple and robust monitoring systems and to implement them on a large scale.

Usatâi (2004) performs a study on the diversity of fish fauna in the catchment area of the Prut river. Research mainly focused on the lower Prut and the small rivers confluence areas, demonstrating the emergence of 37 species and subspecies of fish. Three species of fish (orfe, chop, little chop) are protected by law and are listed in the Red Book of the Republic of Moldova. Comparative analysis of fish species diversity in the water bodies assessed showed a great diversity in the middle and lower Prut. Ichthyologic studies conducted in the Prut river basin led to the identification of 44 fish species and subspecies belonging to 10 families.

Curcubet, Domanciuc and Timciuc (2016), in their work „Aquaculture of Moldova: Developments and Potential" perform an analysis of the aquaculture sector in Moldova, determining the status and prospective directions of development, the historical milestones in the development and the implications of the specialized education on sector development, the potential and the aquaculture development opportunity. Data on fish consumption in Moldova reflect the increased consumer demand, showing the methods for fish product cost reduction.

Materials and Methods

Information on aquacultural resources with fishy potential, namely the arranged fisheries and the production of the main fish product categories was collected from the FAO website. Information relating to the external trade of the Republic of Moldova in fishery products was obtained from the official statistics, presented by the National Commission for Statistics. The collected data were arranged, processed statistically and presented graphically. The results obtained were compared with other data from the literature, for a proper interpretation.

Issues on the Aquacultural Potential of the Republic Of Moldova

Climatic conditions in the Republic of Moldova are moderate-continental, the climate of the Republic being characterized by a mild, short winter and a hot, long summer with low rainfall. Therefore, the climatic conditions allow the widespread practice in the Republic of Moldova of the polyculture of carp and phytophagic fish, with the restocking of one of the predator fish species: zander, pike or European catfish, for the rational use of the biological production potential. Polyculture practice aims in particular at breeding carp, phytophagic species and some species of predators such as pike, zander, catfish. A major constraint for fish production increase is the difficulty of obtaining a good stock of biological material for breeding and pond spawn populating. According to Curcubet, Domanciuc and Timciuc (2016), the Moldovan fishy sector is one of the most developed areas of the national agriculture sector due to the economic activities carried out by specialized fisheries and individual fish farms. The freshwater native fish and the products offered come mostly from fish farming production and only 0.3% - 1.7% from the catches taken in natural water basins.

Rivers with fishy potential in the Republic of Moldova

The main rivers with fishy potential in the Republic of Moldova are the Dniester, Prut, Raut, Bic and Botnar. The total length, water catchment areas and their share in the national territory are shown in Table 1.

Table 1: Rivers with fishy potential in the Republic of Moldova

Name of the water course	Total length (km)	Length on the Moldovan territory (km)	Total area of the water basin (km^2)	Water basin area in the country (km^2)
Dniester	1352	657	72100	19070
Prut	976	695	27500	7990
Raut	286	286	7760	7760
Bic	155	155	2150	2150
Botna	152	152	1540	1540

Source: Processing of the data from the National Statistics Bureau (2016)

Brief Overview of the Rivers In Terms Of Fishy Importance

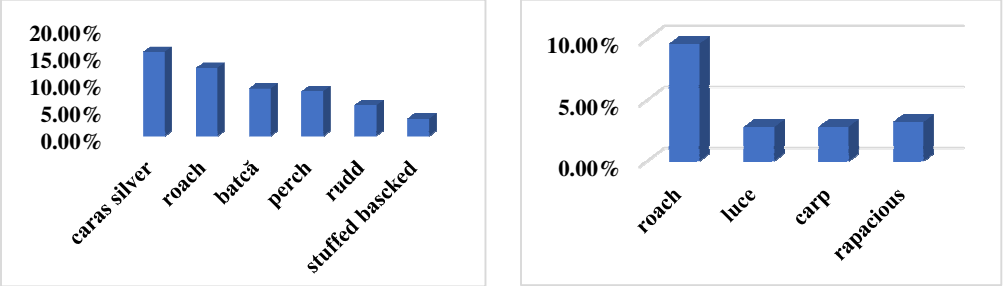
The large rivers, the Dniester and the Prut River, play an important role in the life of the population of the Republic of Moldova, but smaller rivers, such as Raut, Bic and Botna, should not be neglected, due to their significant application in industry, aquaculture, agriculture and transport. Systematic

pollution with untreated wastewater from sectors that are harmful to fish, such as agriculture, zooculture, irrigation and household sector, led to a considerable reduction in the populations of economic valuable species, such as asp, carp, zander, little beluga, pike. The depletion of swamps for the passage of land in the agricultural field had negative effects on fish species, with the destruction of aquacultural areas important for valuable reproduction and development of the spawn. The development of accumulation basins, although beneficial in energy terms, affected the development of migratory species, such as the sturgeons, herring or Black Sea shad, which could no longer reach in the traditional reproduction places. Along with these factors, poaching and irrational fishing, in some causes hard to control in the waters representing the border areas, were other causes leading to the reduced fish population in the running waters.

The Dniester River

According to the data presented by the Directorate of Environmental Quality Monitoring (2017), the Dniester River originates in the Eastern Carpathians, in Ukraine, and flows through the homonymous harbor in the Black Sea. The upper sector of the Dniester River is located on the territory of Ukraine. Within the limits of the Republic of Moldova, the river encompasses the sector from Naslavcea to Palanca, where the border of the Republic of Moldova meets again that of the Ukraine. In the middle sector, it runs through narrow and deep valleys, with a width of 1.5-3 km and strongly inclined mountains. Downstream the town of Camenca, the meadow is flooded by the waters of Dubasari accumulation lake. A special role in the formation of the riverbed is played by the emersion of the hard rocks, which contribute to the formation of steep inclinations and crossover, most notably Cosauti (Soroca region), where crystalline rocks are visible in the riverbed. The main tributaries are the left ones (Camenca, Raut, Bic). The tributaries of the river may affect the regime of the river waters only in the spring, when the snow melts. The data provided by the National Statistics Bureau of the Republic of Moldova show that about 140 fish species were identified in the Dniester River in the middle sector (from the dam of the Novodnistrovsk accumulation lake to the dam of Dubasari accumulation lake) and the lower sector (from the dam of Dubasari accumulation lake to the sea). Ichthyologic investigations of the Dniester river are long-lasting, real fishy diversity being much larger than the known one, and without such knowledge the protection of aquatic resources may not be effective. Dniester continues to be the main source of electricity, irrigation, fish farming and leisure in the region.

As regards the economic importance, the Dniester river is considered a fishy basin of higher category, including more than 100 fish species that may be of interest to catch fishing: acipenserids (beluga, sterlet, sturgeon, starry sturgeon), cyprinids (carp, bream, barbel, little beluga), clupeids (mackerel), percids (zander, Zingel streber, Lynette), other species (trout, pike, catfish). In catchments, the most dominant species are presented in figure 1.



a) Small species (54.20% of total) b) Big species (18.4% of total)

Figure 1: Ichtyofauna of the lower course of Dniester River.
Source: Author, using data from Usatai, Saptefrati and Toderas, 10 noiembrie (2015).

The native fish fauna of the Dniester river has seen a significant decline of some fish species. Almost 50% of the fish species have never been found again or are found rarely (see figure). Thus, according to national statistics, about 9% of the species are endangered (EN), over 11% are vulnerable (VU)

and more than 20% of the species are rare (R) being encountered sporadically in the river waters. The increased attention paid to endangered fish species from the river has led to their inclusion in the Red Books concerning affected fish species from Ukraine and the Republic of Moldova, respectively in the list of the International Union for Conservation of Nature.

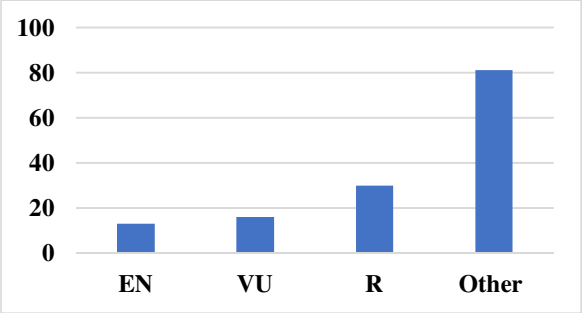


Figure 2: Fish species in the Dniester River
Source: Author, by using Usatâi et al. data (2015),

All endangered species require additional research and investigation and should mandatorily be included in the official documents relating to protection.

The Prut River flows into the Danube near Reni, in the east of the city of Galati and thus forms the border of Romania with the Republic of Moldova and partly with Ukraine. The Prut is the second river in length and importance, where approximately 44 fish species develops. The fish species are represented mainly by fish without economic value like the ablet (*Alburnus alburnus),* spined loach (*Cobitis taenia*), eel (*Misgurnus fossilis*), bitterling (*Rhodeus amarus*), bream, bleak, Black Sea shad, silver carp, asp, barbel, carp, pike, grass carp, balon's ruffe. The drainage regime is permanent. With the accession of the Danube waters, the Prut flows flooding the vast area of its meadow, which is partially swamped. This sector of the Prut river meadow represents a wonderful paradise of nature where a very rich aquatic animal world lives (fish, birds). In 2008, the cross-border project „A Living Legacy, the Prut" was drafted, performed by AquaTerra Ecologic Company in partnership with the Euribiont Public Association of the Republic of Moldova. The action was supported financially by the European Union and the Romanian Government. The project involved the research of various fish communities from the Prut river. The experts from the two organizations of the Republic of Moldova and Romania, together with the Water Quality Laboratory within the Directorate of Prut-Birlad Waters captured about 28 fish species through reversible electronarcosis. The fish were identified, measured and registered. The fish fauna of the river was thus identified, the species caught including also some species protected at European level.

The Raut River it is the third largest river, with a length of 286 km. It is the only river that flows entirely in the Republic of Moldova and is the largest tributary of the Dniester river located in the central part of the country. Raut River ichtyofauna currently is represented by less valuable species in economic terms (69%), zingel, whitebait, bleak, spined loach, sculpin and low-value species (21%), silver carp, roach, perch, rudd, only 10% representing high economic value fish: zander, bream. About 7% are species coming from other stews.

The Bic River is a right tributary of the Dniester river. The capital of the Republic of Moldova, Kishinev, lies on the bank of Bic river. It has a length of 155 km. Ichtyofauna of the Bic river includes 28 fish species and subspecies grouped in 7 families (Cyprinids, Percids, Gobiids, Esocids, Gasterosteids, Signotids).

The Botna River originates near the village of Stejareni. It is 152 km long and flows into the Dniester river. Currently, 22 fish species of economic interest can be found in the Botna river basin: pike, bream, carp, bighead carp, zander, and with low economic value: bitterling, goby, frog fish, spined loach, silver carp.

The total surface area of the water basins used for fish farming in the country is 20,507 ha. The main lakes with fishy potential in the Republic of Moldova are presented in Table 2.

Table 2 : Main artificial lakes in the Republic of Moldova

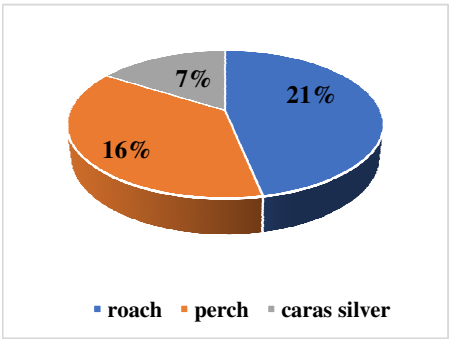
Lake name	Location (district)	Area (km^2)	Industrial fishy potential
Dubasari	Dubasari	67.5	Yes
Costesti – Stanca	Rascani	59.0	Yes
Cuciurgan	Slobozia	27.3	Yes
Taraclia	Taraclia	15.1	Yes
Ghidighici	Straseni	60.8	No – Tourist area

Source: Processing of the data from the National Statistics Bureau (2017)

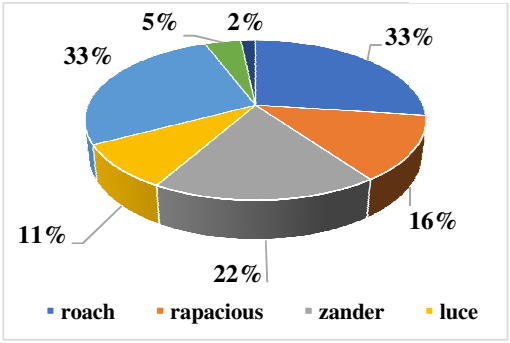
Brief Overview of the Natural and Artificial Lakes In Terms Of Fish Importance

Most natural lakes are located in the valleys of the Prut and Dniester rivers. **The Dubasari Lake** is the largest in the Republic of Moldova, having a length of 125 km and a surface area of 6,750 ha. The lake has a variety of fish species, namely, on Dubasari dam segment (the lower course of the Dniester river) in the town of Vadul-lui-Voda, there are favorable conditions for natural reproduction and increase in the number of species. In order to develop the ichthyofauna, the Fishery Service, subordinated to the Ministry of the Environment, initiated the restocking with juvenile fish such as crap, grass carp, zinger, silver carp, with more than 39,400 kg of fish.

Dubasari accumulation lake ichtyofauna includes small species (Figure 3a) and big species (Figure 3 b).



a) Small species (43.8 % of total species)



b) Big species (26.9% of total species)

Figure 3: Dubasari lake ichtyofauna.
Source: Author, using data from Usatai et al. data (2015)

The Costesti-Stinca accumulation lake is located on the middle course of the Prut river. Scientific researches were made during 2004-2014 on Costesti-Stinca lake and about 27 fish species and subspecies were found (*Cyprinids, Percids, Silurids, Acipenserids, Esocids*).

The Cuciurgan Lake is located in the lower basin of the Dniester river, in the Southeast part of the Republic of Moldova. The lake is populated with about 30 fish species, such as carp, silver carp, zander, phytophage, bream, roach, two species of perch, pike).
The Ghidighici accumulation lake is the fourth largest lake is size after the Dubasari, Costesti-Stanca and Cuciurgan accumulation lakes, with a length of about 8.5 km. It is used as a tourist area in the city of Kishinev, with low fishy importance.

Most of the accumulation lakes built on the territory of the country are private properties today and are used as fish farms or tourist areas.

The Aquaculture of the Republic Of Moldova

According to the Government data from the official statistics, aquaculture production has reached in the year 2002 a value of 2,258 tons. Of this amount, the share of large fish farming enterprises was 1,643 tons and the share of the fish breeders was 615 tons. Government database includes both information concerning fish farming ponds and the production of natural ponds used in aquaculture. By comparison, FAO statistic data only include information on the production of the fish farming ponds. Figure 4 shows the evolution of the aquaculture production in the Republic of Moldova, according to the FAO statistics:

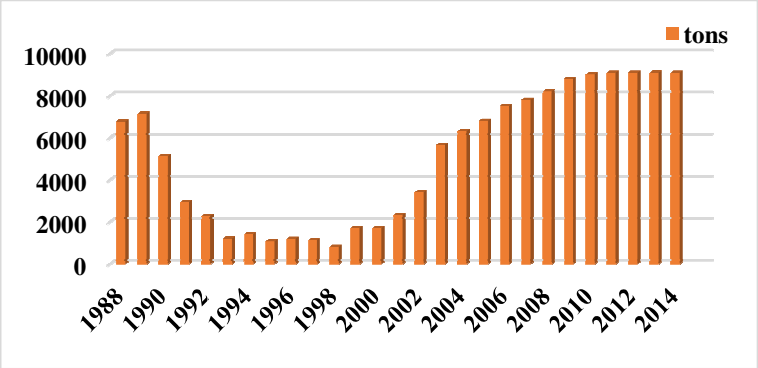


Figure 4: Total aquaculture production in the Republic of Moldova
Source: Author, using FAO Data (2017).

According to FAO statistics, fish production in 1990 was 7,141 tons, and, after 1992, there is a decline in fish production to about 2,935 tons. A slight comeback is noticeable in 2003, when production grew visibly to 3,408 tons. FAO data for 2015 announce a value of 9,080 tons for fish production in the country.

Currently, the Republic of Moldova is in a process of reorganization of the scientific and research institutes, including those dealing with aquaculture issues. In 2002, 139 farms were registered in the Republic of Moldova. In the 2003-2004 period, together with the Agency for Agricultural Consulting, more than 600 farmers were involved in the establishment and development of the capabilities for a more prosperous result. Forecasts show that, until 2010, production in these ponds will reach approximately 5,000 tons, and most of it will be consumed by the inhabitants of rural areas. Since there are 1,549 villages and settlements in the Republic of Moldova, and each rural settlement can provide over 2 tons of farmed fish per year, fish production growth may lead to a corresponding increase in fish consumption. The National Statistics Bureau (NSB) provides financial data related to economic activities for fishing and aquaculture, i.e. revenue accounts by economic activities in thousands MDL. Figure 5 shows the values recorded for the 2008-2013 period.

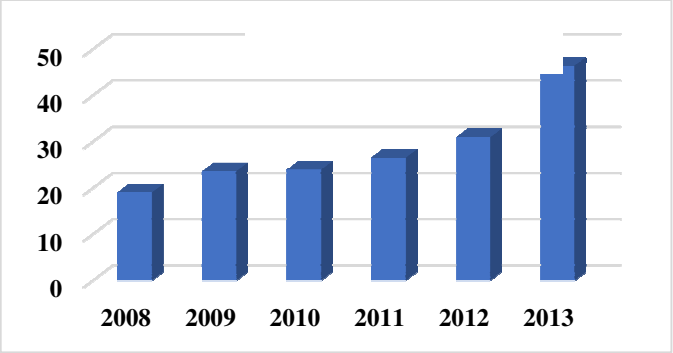


Figure 5: National accounts for fish farming and aquaculture (Mill. MDL)
Source: Author, using data from the National Statistics Bureau (2015)

Fishery products market in the Republic of Moldova

Trade balance of fishery products official transactions of the Republic of Moldova is represented in Figure 5. Data were collected from the official statistics, fishery products marketed illegally not being shown.

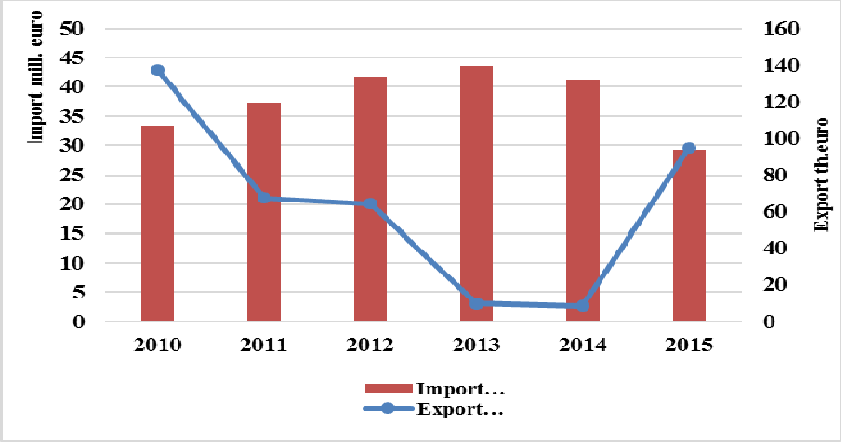


Figure 5: Fishery products trade in the Republic of Moldova
(Import Mill. of USD –Export Thousands of USD)
Source: Author, using National Statistics Bureau Data (2017)

The biological rate of fish consumption per capita is 20.0 kg/year, de facto fish consumption in Moldova represents 11.9 kg/year, of which approximately 3.0 kg of indigenous production, a fact that points to the need to increase fish consumption at least 1,5-2,0 times.

Economic operators in fishy field in the Republic of Moldova

As a business model in the fishy field in the Republic of Moldova, the following types of economic units are included:
• 1 state enterprise, consisting of a scientific and a production enterprise;
• 18 companies limited by shares (former state culture enterprises);
• 56 small to medium sized fish farms, which are included in the Fish Association.
• more than 100 small farms using ponds owned by them.
These enterprises carry out selection, reproduction and growth of fish and material storage for both their own farms and the farms of others.
A few words about the State enterprise and the most important companies/farms (5-6 altogether)

Development of research in the fishy field

There are only a few institutions for fishing and aquaculture in the Republic of Moldova:
• The Kishinev Branch of the State Enterprise for Research and Production Aquaculture of Water Bio-Resources –Moldova, of Bucharest, which is the successor of the Experimental Biological Station for Fishing (1945-1990) and the Scientific Research Station (1990-2007);
• The Zoology Institute of the Academy of Sciences of Moldova;
• The Fishery Association, which is subordinated to the Ministry of Agriculture and Food Industry;
• The Fishing Service, which is subordinated to the Ministry of the Environment;
• The Society of Hunters and Fishermen in the Republic of Moldova;
• Aquatir.

Governmental bodies involved in fishy activity

The Fishery Service in the Republic of Moldova makes an annual plan of action, achieving some objectives to reduce the negative impacts of human activity on the environment, in order to ensure fauna supervision.
- Organization and carrying out of supervision measures, as well as unannounced checks of enterprises that operate in the natural water fishing basins.
- Supervision, monitoring and survey of the works of deepening and cleaning of riverbeds from sand, gravel and various waste which would affect living flora and fauna in the Republic of Moldova.
- Organization and carrying out of actions together with the Department of Border Police in order to prevent poaching and illegal unregulated fishing.
- Monitoring water intakes, so that water from the natural pools may not be captured for other purposes: industrial, agricultural.

Programs / national or European funds allocated to the fishery sector

To access EU funds, there are restrictions at national level for foreign investors, legal entities or individuals that are not citizens of the Republic. Thus, they are required to be registered in the Republic of Moldova and to hold ownership of agricultural land. In many cases, to develop fish farms, it is necessary to build water tanks, hydro-technical installations or channels on private land, issues that hinder investment. In order to develop the private sector, the Government of the Republic of Moldova mobilizes funds from its partners and from foreign partners. Entrepreneurs benefiting from various grants, subsidies, credit schemes, are able to develop their business, to increase significantly the quality and the ability to export local products, thus becoming more competitive by creating new jobs. Various regional projects have been implemented at the national level within the PNUD company, in which small grants have been provided, which have been taken into account the physical-geographical particularities of the country, the Northern region having a hillier relief highlighted by the presence of lakes, small rivers and other geographic basins. By comparison, the Southern region is relatively poor in such natural resources. Small grant scheme has been developed in accordance with SGP – GEF. In 1994, GEF has invested 21,72 million dollars in the Republic of Moldova. In the Evaluation Report of the Country Portfolio 1994-2009, GED has fully supported the Small Grants Program in the Republic of Moldova. External development partners for the Republic of Moldova are BERD, the World Bank, Austria, Switzerland, Norway, Turkey, the main donor being EU.

Conclusions

The Republic of Moldova has a considerable potential represented by 95,000 ha of water surface. There are more than 2,500 km in rivers. There are over 4,600 lakes in the Republic of Moldova, naturally populated with a variety of freshwater fish species (catfish, crucian carp, carp, bighead carp, silver carp, zander, pike). The trend to diversify production by introducing new species of fish in the culture, thus increasing the consumption of indigenous fishery products. Nearly half of the fish species in the natural environment have no economic importance, and, of those with economic

importance, a large part is endangered. The existence of a high number of endangered species requires broad-based measures at national level to protect vulnerable fish species.

The European Union and FAO provide support to the Republic of Moldova in the development of this branch in relation to access to information and statistics, support with breeding material, developed by management programs, and the adaptation of various species to optimal quality conditions, with the recommendation of an environment compatible with the neighboring countries, respectively European. Local farmers must have patience, ambition and courage in acquiring non-refundable funds to support sustainable development of the fishing area.

References

Bulat, D., Bulat, D., Davideanu, A., Popescu, I. E., Davideanu, G., (2016), Romania - Republic of Moldova joint study concerning the fish fauna in Stânca-Costeşti reservoir, Aquaculture, Aquarium, Conservation & Legislation-International Journal of the Bioflux Society (AACL Bioflux) (6/30/2016), 9(3):550-563.

Curcubeț, G., Domanciuc, V., Tîmciuc, I., (2016), Aquaculture of Moldova: Evolution and potential [Acvacultura Moldovei: Evoluție și potential], Akademos 2/2016:103-108.

Davideanu Gr. et al, (2008), Ihtiofauna of the Prut River. The Ecological Society for the Protection and Study of Wild Flowers and Wildlife Aquaterra, [Ihtiofauna râului Prut. Societatea ecologică pentru Protecția și Studierea Florei și Faunei Sălbatice ”Aquaterra”], Societatea Bioremedierei Ecosistemelor Acvatice și Umede ” Euribiont”, Iași.

Direcţia Monitoring a Calităţii Mediului, (2017), Dniester day, [Ziua Nistrului], [online]. [Retrieved September 10, 2017], http://www.meteo.md/mold/uv1.htm.

Food and Agriculture Organization FAO, (2013), FAO Country Brief: Moldova. Review of fishiery and aquaculture development potentials in the Republic of Moldova, Rome, [online]. [Retrieved September 11, 2017], http://www.fao.org.

Food and Agriculture Organization of the United Nations FAO, (2006-2017), Fisheries and Aquaculture topics. Statistics - Introduction. Topics Fact Sheets. In: FAO Fisheries and Aquaculture Department Rome. Updated 8 July 2016, [online], [Retrieved September 10, 2017], http://www.fao.org/fishery/country sector/naso_moldova/ en.

Food and Agriculture Organization, (FAO), 2009-2011, Term Priority Framework in the Republic of Moldova, Final Draft 17 July 2009. [online]. [Retrieved September 12, 2017], ftp://193. 43.36.93/TC/CPF/Country/http://www.meteo.md/mold/uv1.htm.

Lobchenko, V., Vedrasco, A., Billard, R. (2002), Rearing Paddlefish Polyodon spathula to Maturity in Ponds in the Republic of Moldavia. International Review of Hydrobiology, 87: 553–559. doi: 10.1002/1522-2632(200211)87:5/6<553: AID-IROH553>3.0.CO;2-S

Ministry of Environment, (1993), Geography, meteorology and the environment [Geografie, meteorologie și mediu înconjurător]. [online]. [Retrieved September 12, 2017] http://www. http://mediu.gov.md.

Mocanu, I,. Orlova, E, Lungu, L., et al (2016), Natural resources and the environment in the Republic of Moldova, [Resursele naturale și mediul în Republica Moldova], Biroul Național de Statistică al Republicii Moldova, Chișinău [online]. [Retrieved September 10, 2017], http://www.statistica.md/public.

Moșu, A., Trombiţki, I., (2013), River Keepers Guide, Middle and Lower Dniester Fish, [Ghid al păstrătorilor râului, Peștii Nistrului de Mijloc și de Jos], [online]. [Retrieved September 11, 2017], Ed. Chișinău:139, http://renasterearurala.vox.md.

National Statistics Bureau, (2017), International Trade, [Comert exterior], [online]. [Retrieved September 12, 2017], http://www.statistica.md/category.php?l=ro&idc=336&

Rodríguez, D.R., (2009), Protected Areas of the Republic of Moldova. An updated review: September 2009, Report of the study visits: August-September 2009, Centro de Ciencias Humanas y Sociales -Spanish National ResearchCouncil (CSIC), [online]. [Retrieved September 01, 2017], http://www.europarc.org/wpcontent/ uploads/ 2015/02/ATS -2008_Protected-Areas-of-the-Republic-of-Moldova.pdf.

Usatâi, M., (2004), Diversity of fish fauna in the catchment area of the Prut river in Republic of Moldova, Analele Ştiinţifice ale Universităţii „Al.I. Cuza" Iaşi, s. Biologie animală, Tom L/2004: 205-2013.

Usatâi, M., Usatâi, A., Toderaș, I., Șaptefrați, N, (2011), Starea mediului în Republica Moldova în anii 2007-2010, Academia de Științe a Moldovei, Chișinău, [online]. [Retrieved September 12, 2017], pp.269, http://docshare04.docshare.tips/files/6191/61913466.pdf.

Usatâi, M., Usatâi, A., Toderaș, Șaptefrați, N., (2015), Atlas, Fish of Moldova, [Atlas, Peștii apelor Moldovei], [online]. [Retrieved September 13, 2017], pp 191, https://ru.scribd.com/doc/306514376/ATLAS-Pestii-apelor-Moldovei

The Production of Medicinal and Aromatic Plants – A Niche Business for the Romanian Agriculture

Tiberiu Iancu

Banat University of Agricultural Sciences and Veterinary Medicine, Timisoara, Romania,
iancutiberiu10@gmail.com

Silvius Stanciu

„Dunărea de Jos" University of Galati, Romania,
sstanciu@ugal.ro

Abstract

The current paper proposes an analysis of the Romanian production and trade sector for medicinal and aromatic plants. Romania possessesa rich natural potential, represented by over 800 plant specieswith medicinal potential, of which 283 with obvious therapeutic properties. Compared to other European states, the Romanian legislation in the field of medicinal plant based food supplements is not adequate for the progress registered by producers, since it must be adapted and correlated with the European regulations. The lack of efficient supportive measures by local authorities during 1990-2017 lead to the loss of an important competitive advantage on the international market in the field.The Romanian traditional knowledge and use of the medical potential of medicinal plants pertaining to the national flora positions our country on the 15th level in the world, outranking many European states. Production in the field is concentrated in a few counties, which occupy front positions when it comes to cultivated surfaces and medicinal and aromatic plant quantities harvested. The National Program for Rural Development2014-2020 offersimportant financing and business development opportunities to local farmers, in this niche segmentof agricultural production, obtaining important benefits for the Romanian economy, but governmental measures are necessary to promote and support Romanian agriculturistsin accessing European funds.

Keywords: medicinal and aromatic plants, agriculture, trade, Romania

Introduction

The purpose of the article is to analyse the Romanian market for the medicinal and aromatic plants as a potential niche for Romanian Farmers.

Romania's natural potential for producing and cultivating medicinal and aromatic plants is generous – of the 3.700 total of plant species growing in our country, the medicinal flora is represented by 800 species, of which 283 with proven therapeutic properties.

Medicinal plants have been used sinceancient times and are the basis of conventional medicine produced today.Considering the proven fact, that synthetized medicine can be harmful to the human body, triggering allergic reactions, addiction, intoxicationsandother unknown side effects, during the last years, a steady return to natural treatments was observed, especially to phytotherapy and other traditional treatment practices which thus came into the focus of current medical preoccupations.

If, during the 1980-90s, Romania was situated among the first five states in Europa regarding export and among the main seven regarding processing, during 1990-2007,the sector activity was reduced significantly, obtaining an annual production of2-3 tonnes. There ceased to be a correlation between agricultural and industrial activities regarding the product, and with the lack of great medicinal and aromatic plant consumers, the agricultural surfaces allotted to their cultivation diminished. Other causes for reducing the sector activity were the lack of local certified seed sources, the dissolution of Agricultural Research Stations or the important financial difficulties they encounter, the restriction of germplasm sources and growing costs for maintaining medicinal plant collections(Morărescu, 2015).
During 1990-2007,in Romania,the cultivation and processing activity for medicinal and aromatic plants did not represent a priority for the national agricultural policies, the development of this sector being mainly due to private entrepreneurs.Although medicinal and aromatic plant production and trade represents a relatively reduced segment of the Romanian agricultural activity, there are few data on national and local level in the field, the unofficial turn-over of this sector being estimated at circa 800-900 millionEuro.The demand is increasing, on the internal as well as international market. Although it encounters heavy competition from import products, mainly from the Asian area, the production of medicinal and aromatic plants can represent an opportunity for local agricultural farmers, to gain important benefits, considering the high efficiency of these crops while using small agricultural surfaces, and moderate initial investments.The cultivation of medicinal and aromatic plants, their processing and production of teas, cosmetics, pharmaceutics, and various food supplements became an interesting business for the Romanian business environment in recent years, a fact proven by the high number of natural product shops opened all over the country. The production and trade of medicinal plant cultivatedin thespontaneous flora has become a large economic activity, becoming an income source for producers, merchants and processors (Morărescu, 2015).

The population opts for natural products because of tradition, some acknowledged phytotherapy benefits, or advantages due to facile accessibility, with rare adverse effects, the lack of addiction, the use of natural products, perfectly assimilable which allow the association with other therapies and diets, attractive prices, compared to conventional pharmaceutical products. Today, a growing consumer segment resorts to natural treatments or various plant products for affection treatment, leading to a significant increase on international level and to opening new markets for Romanian producers. Medicinal plant cultivation may constitute an opportunity for the internal agriculture, since it requires modest funds and agricultural surfaces. What is more, a slight orientation towards ecologic production may be another advantage for the Romanian sector.

Relevant European and national legislation

Plant based traditional medicines have been officially recognized in the official European legislative framework for medicine starting with 2004, when the Directive regarding plant based traditional medicine came into force (2004/24/CE), which became part of the general European legislation foreseen in the Directive 2001/83/CE (Steinhoff, 2016). AtEuropean level, medicinal and aromatic plants and their productscan be used by consumers as medicine or food supplements, depending on use and legal situation. In order to facilitate the registration of certain plant based traditional medicines at European level, the Decision 2008/911/CE of the Commissionfromthe 21st of November 2008 established a list of plant based substances, productsandtheir mixturesto use in plant based traditional medicine,based on the scientific certification of theHerbal Medicinal Products Committee (HMPC). Applicantsmust prove beforehand the quality of the medicine they wish to register. Thus, according to the basic European directive in the pharmaceutical field, as medicine, phytosanitary products require approval in order to access the market. Documentation is required regarding the quality, safety and efficacy of plant based products, as well as the technical report of specialty experts. Phytosanitary medicine certification follows the general procedure established by the European Medicines Agency (EMA) for medicine.

Steinhoff (2005), states that European quality requirements for plant based medicine include quality criteria for raw materials (in accordance with the EuropeanPharmacopoeia, Good Agricultural and Collection Practices (GACP), Good Manufacturing Practices (GMP)and testing for potential contamination (microbiological purity, heavy metals, aflatoxins, pesticides). Regarding safety and efficacy evaluation, as a principle, pharmacological and toxicological examinations are required for all medicines, and efficacy has to be proven through clinical studies. For well-known active ingredient productsand a well-established medical use, the Directive 2001/83/CE foresees an option for the so-called "reference research".In the phytotherapeutic field, the European Scientific Cooperative on Phytotherapy (ESCOP), founded in 1989,constitutes theEuropean association for the national herbal medicine or phytotherapy associations across Europe, especially in their discussions with European medicines regulators (ESCOP, 2017). Romania, through the National Inter-Professional Organization of Associations in the Field of Medicinal and Aromatic Plants, is a member of ESCOP, alongside organisations in the fieldfromAustria, France, Germany, Hungary, Italy, Netherlands, Poland, Portugal, Spain, Switzerland, Turkey, and the United Kingdom.

ESCOP offersscientific studiesregarding the therapeutic use of medicinal plants, based on the most recent proofs and European top expertise.One of ESCOP's essential objectivesis the establishment of harmonized criteria for the evaluation of plant medicine. During the last period, sixty propositions were published regarding monographies about medicinal plant and their use, taking relevant scientific literature into consideration. The Herbal Medicine Products Working Party (HMPWP) proposed common criteria for the evaluation of plant medicine quality, safety and efficacy on European level and elaborated data bases, especially focused on the monography evaluation published by ESCOP.

According toSteinhoff, a new directive regarding the medicine used traditionally may lead to the change of the current legal framework, offeringmember states the option to establish their own registration system for traditionally used products, of sufficient quality and without proven prejudice.

In Romania, the general framework regarding the production, processingandmarket organizationfor medicinal and aromatic plants, the relationsbetween producers, processorsandmerchantsis established through the Medicinal and Aromatic Plant Law (Law 491/2003), and the Order 244/2005 regulatesmanufacturing, processingand commercialization of medicinal and aromatic plants used as such, partially processedor processed as pre-dosed food supplements. The national legislation in the field is completedby the Order 1228/2005 – for approvingtechnical norms regarding the commercialization of pre-dosed food supplements of animal and vegetal origin and/ortheir mixture with vitamins, mineralsandother nutrients, respectivelyby the Order 1946/2014 – for approvingthe Procedureregardingthe notification of finite products based on medicinal, aromatic plantsand bee products, which are notified by operatorsin the fieldand are registered as food supplements,products for internal or external use, except for cosmetics.

Law491/2003, the first to regulate this market, states that used medicinal and aromatic plantsmust occur in the national catalogue and book for medicinal and aromatic plants from the spontaneous and cultivated flora, or the official community catalogue or that of a European Union member state. The national catalogue and book for medicinal and aromatic plants from the spontaneous and cultivated flora is certified by order by the Ministry for Agricultural and Rural Development (MARD), the central public administration authorityin the field. The introduction on the market as well as the monitoring of medicinal and aromatic plant based finite products presentedas medicine/medical adjuvants (with propertiesfor the treatment or prevention of diseasesin humansoradministeredin order to re-establish, correct orchangephysiologic functions by carrying out a pharmacologic, immunologic or metabolic activity, or to establish a medical diagnosis), is accomplished in accordance with the legal provisions. What is more, the introduction of these products on the market respectsthe technical normsof productionand commercialization, elaboratedby theTechnical Committee for Medicinal and Aromatic Plants and Bee Products,the competent national authority in the field.The accordance with technical

production and commercialization norms for medicinal and aromatic plants, freshas well as processed, is established, under the law, by certifying bodies, accredited for this purpose.In order to be commercialized, medicinal and aromatic plants must be certified. In the medicinal and aromatic plant production,product quality is determined by the content of active principles, which is conditioned by ecologic factors, species zonation, crop technology, cultivar biologic value (population, variety, hybrid etc.), respectivelyby processing ways. Products obtained through the processing of medicinal and aromatic plants, with therapeutic indications, fall under the medicine category and are authorised to be introduce on the market by the National Medicine Agency. On market product monitoring is carried out by inspectors of the General Pharmaceutic Direction,Pharmacy and Medical Equipment Inspectionunder the Ministryof Health and inspectorsof the National Medicine Agency.Food supplements based on medicinal or aromatic plants are notified at the National Service for Medicinal and Aromatic Plants and Bee Products (SNPMAPS) under MARD.

During the parliamentary session due after the summer holiday, the national legislation might change in the field of food supplements. According to a law project debated by the Senate and enacted by the Deputy Chamber, the construction of a unitary legal framework is discussed for food supplements "commercializedas food products and presented as such", the implementationof some articles of the Directive 2002/46/CE, as well as carrying out the necessary legal framework for the application of Reg. (CE) 1925/2006 and Reg. (CE) 1161/2011.The project excludesfood supplements based on medicinal and aromatic plants (object of Law 491/2003, republished, which constitutesmore than half of the Romanian food supplement market) as well as any other authorities with limited attributes, but complementaryin the field of these productscontrol and monitoring (ANSVSA, ANPC, SNPMAPS/MADR, ANAD, ANAF, Customs), the Ministryof Health becoming the only competent authority in the field (Niculescu, 2017).

Materials and Methods

The information on the medicinal and aromatic plants production was taken from the MARD, from the European Medicine Agency (EMA) and from the official press releases of the County Departments of Agriculture. The National Institute of Statistics database was used for the data about agriculture areas and production. The relevant scientific information on the medicinal and aromatic plants production was taken from the site ISI Web of Knowledge and Google Academic and from the internal database of the "Dunărea de Jos" University of Galați, Romania. The data was selected, organised and statistically processed. The obtained results were graphically represented and compared with other relevant information form the domain-specific literature, for an adequate analysis. In order to assess the concentration degree, we used the methodology recommended by Săvoiu, Crăciuneanu and Țaicu (2010) on assessing market concentration and diversification by relying on the Gini-Struck Index. The calculation modality is presented in formula 1.

$$IGS=\sqrt{\frac{n\sum gi^2-1}{n-1}} \quad (1),$$

where - n represents the number of terms of the series under study

- g_i represents the weight factor of the agricultural area or crop production in the i county, related to the total authorized capacity (total agricultural area or crop production.

Registration of Medicinal and Aromatic Plant Based Products on European Level

The analysis regarding medicinal plant use worldwide, carried out under the framework of the Romanian-Bulgarian cross border projectMedPlaNet Project, code MIS-ETC 656 (2011), showed that it depends on the natural endowment of each country (total species number, due to specific geographic conditions), and especially on the local tradition in using natural alternative medicine.Thus, at a worldwide total of

422.000 plants, circa 72.000 are used medicinally, representing circa 17.05 % of the total. In the classification presented within the project,

China is in leading position, with a fund of 32,300 plant species, of which a number of4,941 species, representing circa 15.3%, are used medicinally. Romania occupiesthe 15th positionin the world classification, earned due to the relatively high number of medicinal plants used (figure 1).
Republic Korea, with 1,000 medicinal plants in use, representing 34.5% of a total 2,898 plant species occupies the first position with regard to usage percentage and knowledge of the pharmaceutical potential of their national plants.

By comparison, Romania possess a 3,700 plant species fund, of which 283 species are known for their proven pharmaceutical potential, representing only 7.6 % of the total. European Pharmacopoeia, adopted by all member states includes 98 plant species, a number which is growing due to international research and information exchange.

The European food supplement market, including medicinal and aromatic plants and their products, was worth 8.3 billion Euro in 2015, observing a significant growth as compared to the previous year, according to data from Euromonitor International, quoted by Mihalache (2016).

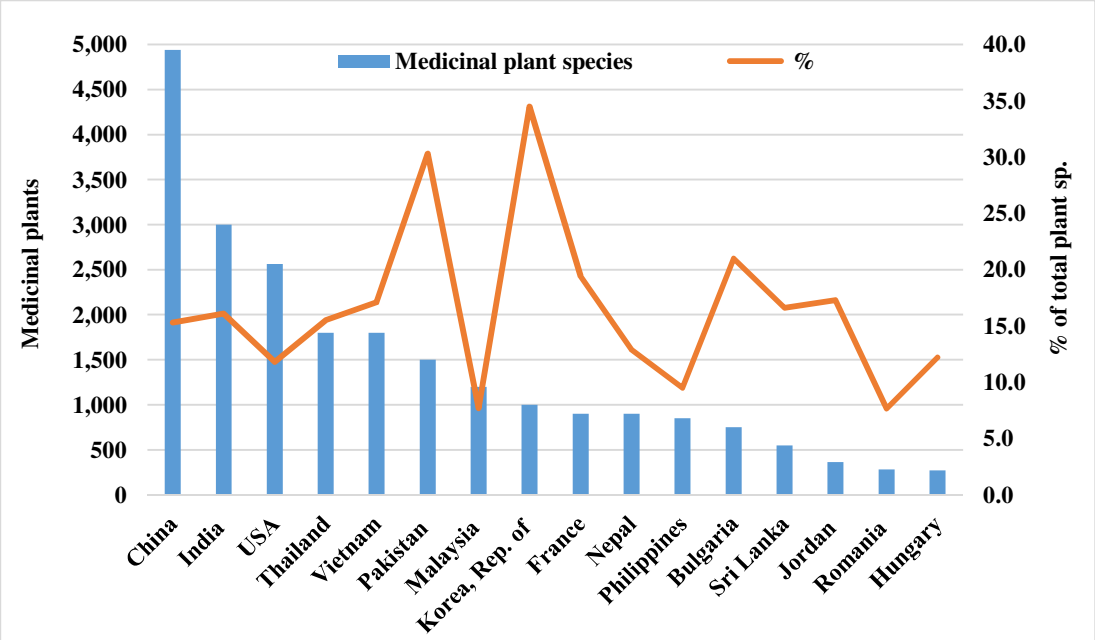


Figure 1: The global situation for the main producing countries of medicinal plants
Source: Authors, by using MedPlaNet Project data (2011)

Steinhoff (2016),observes that until the end of 2015, member stares of the European Unionapproved a total of 1,577 phytotherapeutic product registrations, most of them in the United Kingdom (344), Germany (263), Poland (197) and Austria (195). Of the 768 totalof commercialization authorizationsgranted to firms, most of them were located in Germany (278),followed by Austria (51), Poland (24), andthe Czech Republic (33).

According to data from the Herbal Medicinal Products Committee (HMPC) of the European Medicine Agency (EMA), 260 phytosanitary productsbased onplants/plant mixturesare prone to be evaluated depending on the foreseen effects on the health (figure2).

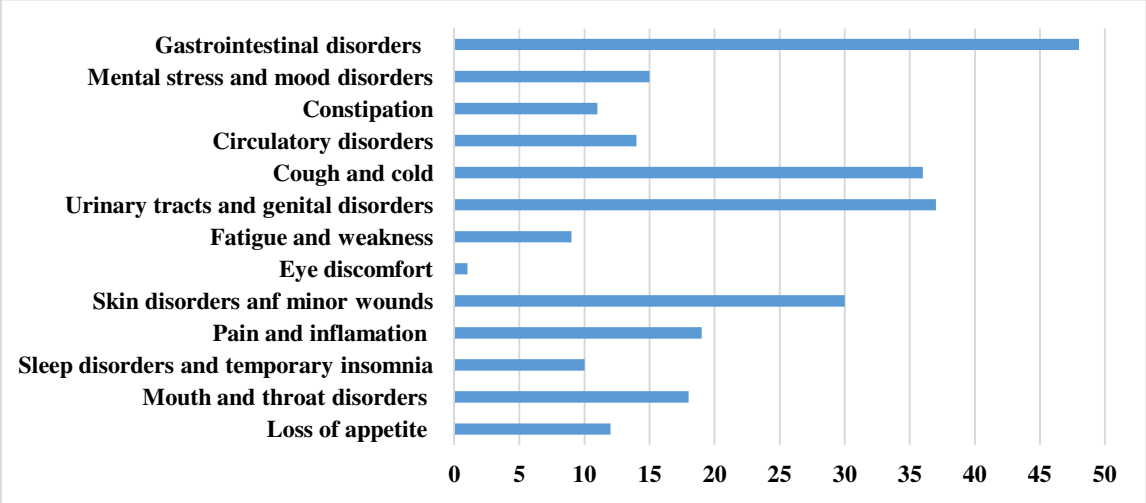


Figure2: Herbal medicines for human use based on therapeutic area

Source Author, by using EMA database (2017)

Each plant/mixturemay be in various evaluation stages. For each stage, a series of documents are associated with the substance, depending on the location of the evaluation process. The HMPC conclusions regarding the plant based substance at the end of the evaluation processcan be found in the final monography of theEuropean Union.HMPC can evaluate certain plant substances in combination. According to EMA (2017),the status of registered productscan be R (Rapporteur assigned), C (ongoing call for scientific data), D (Draft under discussion), P (Draft published), PF (Assessment close to finalisation/pre-final), F (Final opinion adopted). According to the datapresented infigure3,over 90% of the 190 registeredplants/monographiesobserved the Final opinion adopted (status F).

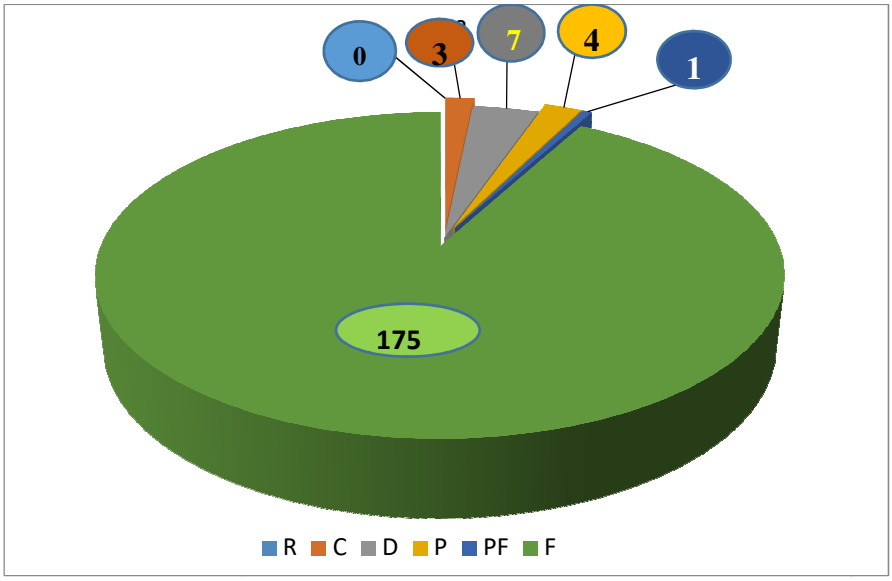


Figure3: The statusof registeredMonographies Herbal medicines for human useatEuropean level
Source Authors, by using EMA database (2017)

Registering Phytotherapeutic Products on a National Level

For the commercialization of plant based food supplements on the Romanian market, the national procedure requires for food supplements to be reported in accordance with order no. 244/401/2005toSNPMAPS Bucharest,orto Regional Centresof Public Health(CRSP) Timisoara, Iasi, BucharestrespectivelyClujNapocafor pre-dosedfood supplements of animal and vegetal origin and/ ortheir mixture with vitamins, mineralsand other nutrients notifiedaccording to Ord. 1228/244/63. Products for external use(medicinal and aromatic plant based supplements and bee products, in accordance with the provisions of law no. 491/2003 regardingmedicinal and aromatic plants, as well as bee products, republished, with ulterior changes and additionsand of Ord. no. 1946/2014 for approving the Procedure regarding the notification) are reported to S.N.P.M.A.P.S Bucharest.Of a total of 21,443 food supplements notified until December 2015, 18,122 productswere produced strictly from medicinal and aromatic plants, being reported toSNPMAPS Bucharest, while3321 pre-dosed/mixture supplements were reported to CRSP Timisoara (1,205), Iasi (237), Bucharest(38),respectivelyClujNapoca (1,841)(figure4).

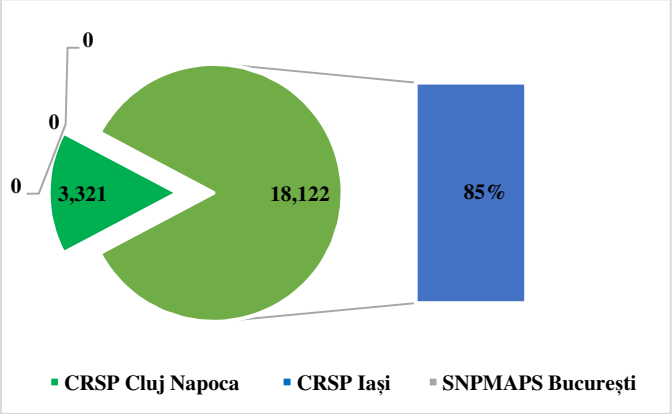


Figure4: Food supplements reported in Romania
Source Authors, by using SNPMAPS database (2017)

According to theEuromonitor study, quoted byMihalache (2016), the food supplement market in Romania hasobserved a spectacular evolution in recent years. Thus, during 2005-2015,the segment registered a worldwide growth of over 200%, with a maximum increase of 24% observed during 2010-2011, given the fact that during 2012-2014,in Central Europe,an averagegrowth of 8% was reported. At present, in Romania,there are over 18,000 natural products registered officially, intended to keep patients healthy, prevent disease or treat various affections. The study conclusions are that, in 2016, Romanians have bought natural products worth over 30 million Euro online, representing a 20 % increase as compared to the year before. A triple sum was cashed in at the counter, in pharmacies, hypermarketsandsmall neighbourhood shops, supported by a significant amount of commercials where potential healing properties are highlighted. However, consumers have no knowledge about how the products are manufactured, or about possible side effects or other aspects regarding these effects. Data revealed by the Romanian Patronageof the Food Supplement Industry, cited by Capital.ro (2016) show that food supplement publicity in Romania needs a unitary legal framework, correlatedwith the provisions of the European legislation in the field. In Romania, as well as in other EU member states, food supplement publicityis governed by the provisions of Regulation 1924/2006 of theEuropean Commissionand those of the Regulation 1169/2011 regarding statements referring tonutrition and health. At the level of self-

regulatingEuropean bodies, in 2015, from a total of circa 60,000 publicity complaints registered by EASA, approximately 180 dealt with food supplement publicity. In 2015,the Romanian Publicity Council received 121 complaints regarding 103 commercial communications, of which 18 referred to food supplement communication.

Producer groups and organizations established in Romania

Before 1990, in Romania, activitywasmonopolized by a single state capital company - Plafar. In 2016 a series private owned commercial companies were cultivating, processing and capitalizing medicinal and aromatic plants, forming numerous producer associations and groups. The main medicinal and aromatic plant producer and processor organizations from Romania, postedon the MARD site, arethe Patronage „Planta Romanica" (https://plantaromanica.wordpress.com), which reunites 25 firms (HofigalBucureşti, ExheliosTimişoara, Dacia Plant Sebeş etc.) and the NationalInterprofessionalOrganizationfor Medicinal and Aromatic Plants from RomaniaOIPMA (http://www.oipma.ro), reunitingeconomic agents in the field of medicinal and aromatic plants: the Professional Associationof Medicinal and Aromatic Plant Raw Material Producers,the Professional Associationfor Collecting and Acquiring Medicinal and Aromatic Plantsfrom the SpontaneousFlora, the Professional Association of Medicinal and Aromatic PlantProcessors, the Professional Association of Medicinal and Aromatic Plant Tea Producers, the Professional Association ofMedicinal and Aromatic Plant Tincture and Syrup Producers, the Professional Association ofMerchantsandSuppliersin the Field of Medicinal and Aromatic Plants, the Professional Association ofMedicinal and Aromatic Plant Food Supplement Producers, the Romanian Association of Phytotherapeutic Doctors, the Professional Association forResearch in the Field of Medicinal and Aromatic Plants (with member companies: Fares, Kalpo, Larix, Dacia Plant, Dobrogea Natural Farm, Radix, Santo Raphael, Rotta Natura,Vedda etc.).

Medicinal and Aromatic Plant Surfaces and Production in Romania

Following the selection and amelioration carried out at the Fundulea Research Station, 29 homologated varieties were registered (coriander, tarragon, fennel, lavender, mint, basil, thyme, poppy, Grecian foxglove, purple foxglove, chicory, camomile, artichoke, valerian, lesser periwinkle, marigold)in 2002. About 24 speciestaken over from the spontaneous flora were introduced to crops, relatively easily "domesticated", due to their remarkable ecologic plasticity; valuable populations from the point of view of active principle content (even local species) being identified in various geographic basins in the country (yarrow, angelica, belladonna, cumin, celandine, gentian, perforate St John's-worth, plantain, valerian, lesser periwinkle). Other 10 medicinal plant species which do not exist in the spontaneous florawere acclimated to crop conditions in our country (Grecian foxglove-*Digitalis lanata; Echinacea purpurea; yellow poppy – Glauciumflavum; bitter melon - Momordicacharantia, thyme – Saturejamontana*andothers). (Morărescu, 2015).

The most profitable medicinal plant crops in Romania have been in recent years those of lavender, sea berry, goji, chokeberry - aroniaanddog-rose. Medicinal plants are starting to be in great demand on the Romanian market, while already in great demand on the European market, due to the high number of requests by players of the pharmaceutical industry (Vlad, 2015).

The introduction of state support for medicinal plant producers by the Romanian Government lead to a positive evolution of cultivated surfaces and obtained production, with a maximum reached in 2010. The support came in the shape of direct payments (schema ofsingle payment per surface, redistributive payment, payment foragricultural practices beneficial for climate and environment, payment foryoung farmers, simplified schema forsmall farmers); national transitory support as foreseen by annual local budgets allotted to the Ministryof Agricultureand Rural Development, respectively state support for diesel

used in agriculture.The period 2010-2012 was characterisedbya substantial reduction of cultivated surfaces and accomplished production, which decrease to half of the amount produced in 2010.
During 2012-2016 cultivated surfacesand obtained productionreached 3-4 thousand ha and 4-5 thousand tonnes(figure5).

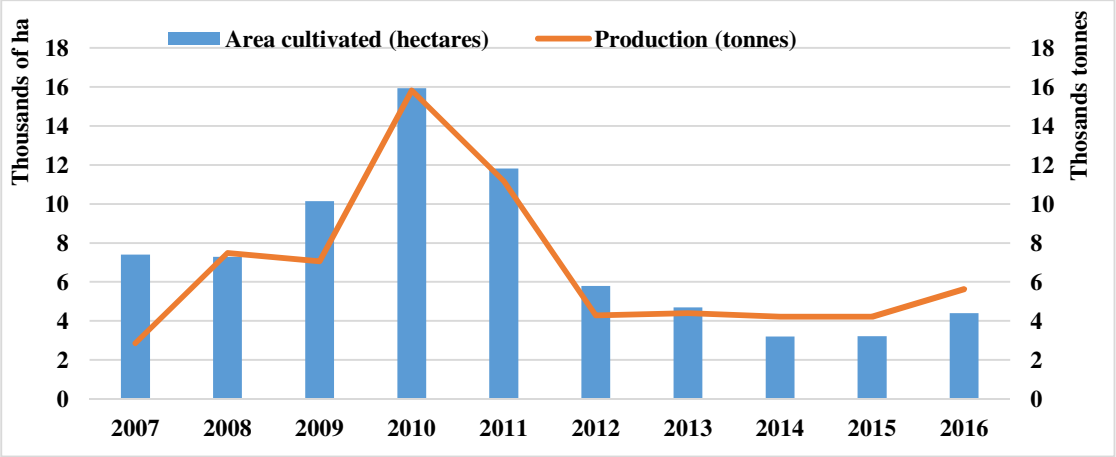


Figure 5: Medicinal and aromatic plant - cultivated area and productionin Romania
Source Author, by using MARD Data (2017)

Through the new National Program for Rural Development 2014-2020 a revival of the sector is planned, Romanian small farmers being able to get non-refundable financing of up to 100% for cultivating medicinal plants. Thus, in PNDR 2014-2020,financial measures have been planned, such as Measure 6 – Sub-measure 6.3. "Aid for the development of smallfarmers", non-refundable public aid up to 15,000 Euro, for an agricultural exploitation over a period of maximum five years, in two payments (75% – 25%).Other measures which can be accessed by the sector are Measure 11 "Ecologic agriculture", Submeasure 11.1. "Aidfor the conversion to ecologic agriculture methods, through payments for the conversion", grantedin a percentage of 100%; payments to sustain ecologic agriculture practices, or financing through Package 5 "Medicinal and aromatic plants" underSub-measure 11.1." (Morărescu, 2015).

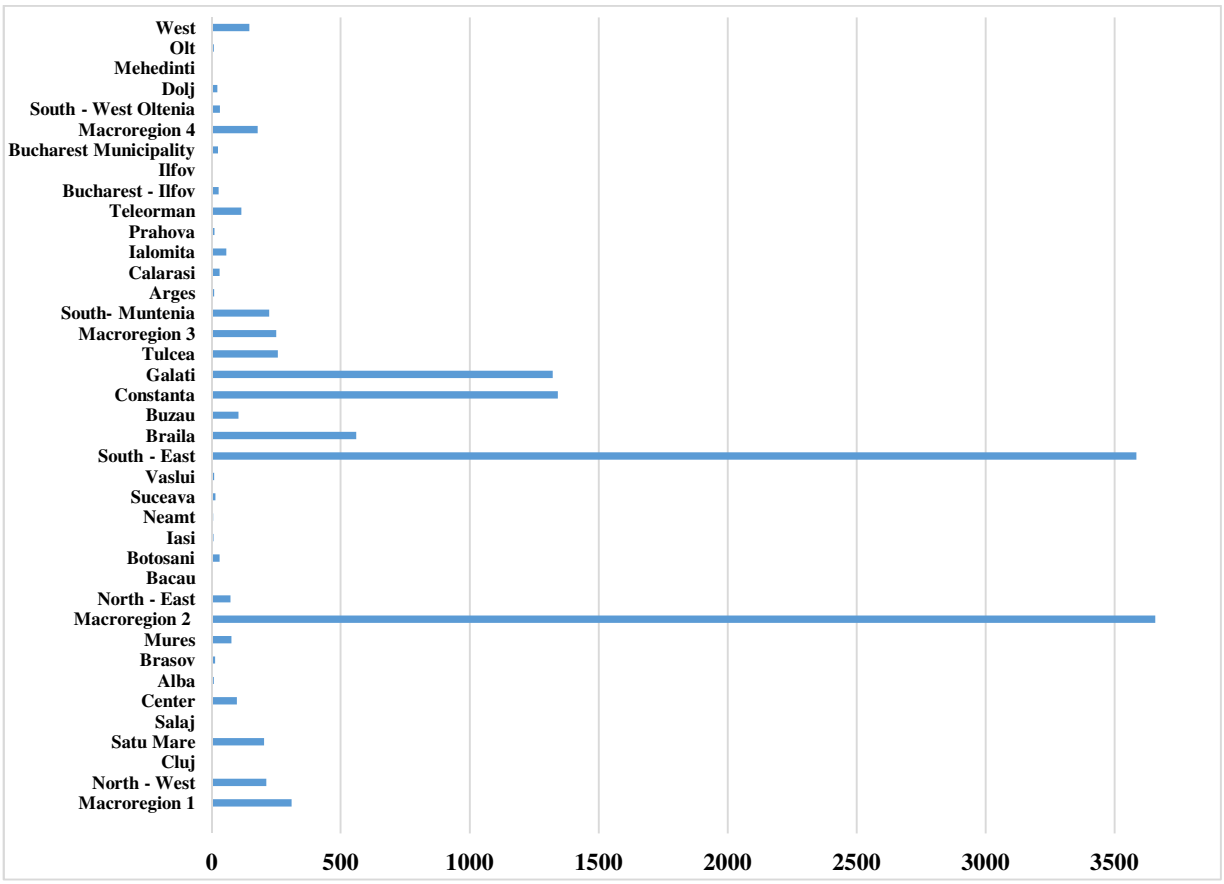


Figure 6: Distribution of medicinal plant cultivated surfaces in regionsandcounties

Source Author, by using NIS Data (2017)

The Concentration of the Agricultural Market for Medicinal and Aromatic Production in Romania

Assessment of the concentration degree of agricultural surfaces cultivated with medicinal/aromatic plants can be carried out using the method recommended by Săvoiu, Crăciuneanu and Ţaicu (2010), based on calculating the Gini Struck Concentration Index (IGS) and on the interpretation of the obtained result. The data presented in figures 4 and 5 have been processed statistically and interpreted. The results obtained by applying the mentioned methodology are presented in table 1.

Table 1: Specific parameters and the value of the Gini Struck Concentration Index (2016)

Indicator	Agricultural area (ha)	Production (tonnes)
Total	4,395	5,627
$\sum g_i^2$	2,085.028	2,183.81
n	27	27
IGS	46.531	47.6211
Concentration	**High**	**High**

Source Author, by using MARD (2017) and NIS (2017)

According to the results presented in table 1, we may notice that there is a high concentration degree of agricultural area distribution on counties. By comparison, the production presents higher values of the Gini Struck Index, proving a high degree of concentration in the Romanian counties.
The obtained results confirm a cursory analysis of NIS data, based on the comparison of surface and production distribution values in regions/counties. Thus, the South-Eastern Region,mainlycountiesConstanțaandGalațicover circa 80% of the total cultivated surfaces, respectively of the production obtained at national level (figure 7).

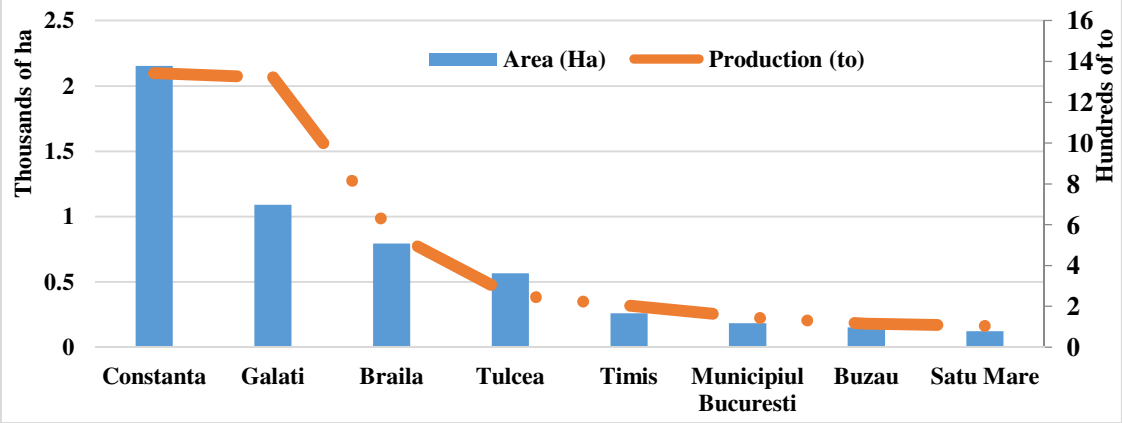


Figure7: Top counties cultivating/producing medicinaland aromatic plants
Source Authors, by using NIS data (2017)

According to the data presented graphically in figure 7, one may observe that a number of 8 counties, with agricultural surfaces allotted to the cultivation of medicinal and aromatic plantslarger than 100 ha achieve over 90% of the total production obtained at national level in 2016. One cannot make a direct correlation between relief forms or protected geographic areas and the production obtained, considering that the first 3 positions are occupied by counties in plain areas, with no ecologically protected regions,where a conventional agriculture is practiced.

Conclusions

The research highlighted a series of aspects we consider interesting for the national economy and for the internal business environment. Thus, Romania possesses an important natural potential for the medicinal and aromatic plant production, but it is not capitalized accordingly. Romania is ranked 15th in the world classification, due to the relatively large number of medicinal herbs used in traditional medicine.

National legislation is too permissive and does not sufficiently protect local producers, which face a fierce competition from import products. The national medicinal and aromatic plant production was significantly reduced after 1990 and represented substantial fluctuations during 2007-2016. There is a concentration phenomenon of the production and cultivated surfaces in the South-Eastern Region, which denotes a higher interest of local agricultural entrepreneurs in the development of business in the field. GSI values are very high, indicating a high concentration of the market and a rather difficult access to starting a new niche business.

The possible accession of funds by Romanian farmers, under the governmental support measures with European aidspecified in PNDR 2014-2020can lead to the revival of the system and to important benefitsfor the Romanian agriculture.

References

Capital.ro, (2016), Piaţaromânească a suplimenteloralimentareaajuns la 500 mil. euro [The Romanian Food Supplement Market Reached 500 mil. Euro], Capital (26.04.2016), [online], [Retrieved August 29, 2017], http://www.capital.ro/piata-romaneasca-a-suplimentelor-alimentare-a-ajuns-la-500-mil-euro.html.
European Medicine Agencies, (2017), Herbal medicines for human use, [online], [Retrieved August 15, 2017], http://www.ema.europa.eu/ema.

MedPlaNet Project, (2011), Marketing study –final report, online], [Retrieved August 15, 2017], http://medplanet.dbioro.eu/marketing_en.htm

Mihalache, G., (2016), Piaţasuplimenteloralimentareşivitaminelor s-a dublatînultimiicinciani [The Romanian Food Supplement and Vitamin Market Doubled in the Last Five Years], ZF Corporate (22.12.2016),[online], [Retrieved August 17, 2017], http://www.zf.ro/companii/piata-suplimentelor-alimentare-si-vitaminelor-s-a-dublat-in-ultimii-cinci-ani-16036386.

MinisterulAgriculturiişiDezvoltăriiRurale, (2017); Plantemedicinalesiaromatice [Medicinal and Aromatic Plants], [online], [Retrieved August 30, 2017], http://www.madr.ro/culturi-de-camp/plante-medicinale-si-aromatice.html.

Morărescu, V., (2015), Fondurieuropenenerambursabilepentrucultivareaplantelormedicinale: Ce măsuri pot accesafermieriiprin PNDR 2014-2020 [Non-refundable European Funds for the Cultivation of Medicinal Plants: What Measures Can Be Accessed by Farmers through PNDR 2014-2020], Agrointeligența (15.02.2015), [online], [Retrieved August 28, 2017], http://agrointel.ro/30289/fonduri-europene-nerambursabile-pentru-cultivarea-plantelor-medicinale.

National Institute of Statitics, 2017, Agriculture.Tempo Online, online], [Retrieved August 24, 2017], http://statistici.insse.ro/shop.

Niculescu, G., (2017), Legal Project regarding Food Supplements. Conclusions of the SAPS Seminary,RO.ALIMENT(11.07.2017), [online], [Retrieved August 25, 2017], http://www. roaliment.ro/apicole/proiectul-de-lege-privind-suplimentele-alimentare-concluziile-seminarului-saps-organizat-de-revista-ro-aliment.

Romania's Parliament], (2003), Law no. 491 from 18th November 2003 "Medicinal and Aromatic Plants Law"], [online], [Retrieved August 05, 2017], http://www.plante-medicinale.ro/pm/doc/leg_pl553_03.pdf
Săvoiu, G, Crăciuneanu, V, Ţaicu, M., (2010). A new statistic method for analysing concentration or diversification of markets (in original in Romanian), The Romanian Journal of Statistics, 2/2019, [online], [Retrieved June 01, 2017], http://www.revistadestatistica.ro/Articole/2010/A3ro_2-2010.pdf.

Steinhoff, B., (2005), Laws and regulation on medicinal and aromatic plants in Europe, ISHS ActaHorticulturae 678: III WOCMAP Congress on Medicinal and Aromatic Plants - Volume 4: Targeted Screening of Medicinal and Aromatic Plants, Economics and Law, [online], [Retrieved August 15, 2017], http://www.actahort.org/books/678/678_1.htm

Steinhoff, B., (2016), European herbal traditions and monographs, CzasopismoAptekarskie, Nr 8-9, 272-273, [online], [Retrieved August 15, 2017], http://escop.com/wp-content/uploads/2017/01/CzApt-BS.pdf
The European Parliament and of the Council, (2001), Directive 2001/83/EC of the European Parliament and of the Council of 6 November 2001 on the Community code relating to medicinal products for human use, [online], [Retrieved August 15, 2017], https://ec.europa.eu/health/sites/health/files/files/eudralex/vol-1/dir_2001_83_consol_2012/dir_2001_83_cons_2012_en.pdf

The European Scientific Cooperative on Phytotherapy EBSOP, (2017), About ESCOP, [online], [Retrieved August 15, 2017], http://escop.com/about-us.

Vlad, A., (2015). Celemaiprofitabileculturi de plantemedicinale [The Most Profitable Medicinal Plant Crops], Adevărul (23.01.2015), [online], [Retrieved August 29, 2017], http://adevarul.ro/ economie /afaceri/cele-mai-profitabile-culturi-plante-medicinale-1_54c1ef92448 e03c0f ddf873d/index.html

Drivers of Effective Corporate Tax Rate in the Baltic Countries

Radu Alin Păunescu
Department of Finance, Bucharest University of Economic Studies, Bucharest, Romania
E-mail: radupaunescu696@gmail.com

Georgeta Vintilă
Department of Finance, Bucharest University of Economic Studies, Bucharest, Romania
E-mail: vintilageorgeta@yahoo.fr

Abstract

This study takes into consideration a topic less study in the academic literature: the drivers of effective corporate tax rate (ECTR) in the Baltic financial markets. Using a sample of 40 listed companies from Estonia, Latvia and Lithuania stock exchanges we empirically tested the influence of profitability (ROA, ROE and ROIC), indebtedness and assets composition on ECTR. All the results were comparable with other well-known studies from the literature and seem to support the political cost theory. Additional we deployed other variables such as audit fees, R&D expenses, statutory rate and advertising expenses which highlighted characteristic of the Baltic companies. The results were explained from the perspective of corporate finance.

Keywords: effective corporate tax rate, firm characteristics, Baltic companies, panel data models

Introduction

The beauty of nature is driven by the evolution. But evolution itself is a continuous struggle for acquiring skills and dominant position. Similar idea can be applied to countries and financial markets. More often, the social gap between developed markets and the emerging ones is becoming almost conspicuous. There is a real endeavor for the emerging markets to obtain the status of developed market. There are many ways to study the emerging markets, and the social aspect is on interest not only for the financial analysts, but also for the broad public. Numerous factors differentiate the emerging markets from the developed ones, but in the present paper, as novelty, we focused on taxation from the Baltic stock exchanges in the context of corporate finance. The final goal for the European Union is strength by union and harmonized policies at all levels for member states, including taxation. But still there are gaps and disparities between West and East within the European Union. Estonia, Latvia and Lithuania were admitted as members in the EU in 2004 and all three countries are, in a way, interdependent all levels. With a similar history, and all three former communist countries, nowadays they represent an example of fiscal policies, but there are few academic papers about the effective corporate tax rate between these countries. Despite the fact that statutory tax rates represent taxation within the financial markets, the effective corporate tax rates (abbrev. ECTR) based on financial statements gives a proper insight on tax burden of a company. Taxation is a sensitive issue in attracting the investors and can influence a financial market and the 'developed/emerging' status. Baltic financial markets are considered emerging countries and in the present paper we set our goal to study their effective corporate tax rates from the perspective of corporate finance. The influence of the financial statements on the ECTR can be considered a starting point for new fiscal policies applied to reduce the gap from the Baltic countries and Western EU member states.

Our sample consists of Estonia, Latvia and Lithuania over the period 2000-2016, which is significant in the context of transition process to the free market economy. Being based on financial statements, the variables used includes drivers of ECTR such as indebtedness, asset composition and profitability. As a

novelty for a paper about the Baltic taxation, we included variables for audit fees and advertising expenses because these variables can capture the political power theory and also the impact of corporate governance on taxation. Corporate governance can be the link between fiscal policies within the European Union. We consider that size of the company is significant in the context of reduction of tax burden and Dyreng et al. (2017) proved that ECTRs have decreased over time (maybe as effect of transition process). The contribution of the article is in emphasizing the ECTR's influence factors as part of the new policies aimed at strengthening the EU markets. First, we contribute to the literature by adding a newer perspective on the ECTR from the Baltic region. Second, we illustrate the taxation of newer EU members and integration of the emerging stock exchanges. We found that the effective corporate tax rate from the Baltic region is influence by the classic drivers from the literature (indebtedness, asset composition, size) in line with the principles of accounting and tax deductions. The level of influence (R^2) recorded though a reduce value which means that there could be other drivers of ECTR in the Baltic countries. This can be attributed to the relative small number of companies included in the sample (only listed companies). Overall, proxies used indicate the presence of political cost theory and a diminished role of tax avoidance. Managers of the Baltic companies are more focused on the financial management than on the fiscal management. We consider that the political cost theory is due to the fact that each one of the three countries has a small population and it is more a 'solidarity cost' for the large companies.

The remainder of the article proceeds as follows. Section 2 provides a literature review. Section 3 reveals the sample and variables, along with the econometric methodology. Section 4 presents the empirical results. Section 5 is the conclusion.

1. Prior Literature and Hypotheses Development

Baltic region and its three countries, Estonia, Latvia and Lithuania, have an important role in the study of drivers of the effective corporate tax rate. All of them are similar, former communist states, but on the same time each one has its own characteristics ('idiosyncratic'). Alena et al. (2017) used cluster analysis for ECTR and observed that in each case the Baltic countries are grouped in the same clusters together with Bulgaria, Romania, Poland and Czech Republic. This cluster of the new acceding EU member states has the lowest level of ECTR among the European countries and is tax competitive.

The differences between Baltic States are important for the economist and for the financial analysts. Also, the influence factors of the ECTR based on the financial statements can be used as a benchmark for future fiscal policies necessary for the fiscal harmonization at the level of the European Union. The development gap between the EU member states is a matter of interest for the economists and it can be reduced through the channel of taxation. There are few papers on the academic literature about the Baltic countries and their effective tax rates.

Baltic stock markets are integrated on a single trading platform. Deltuvaitė (2016) used empirical analysis to study the Baltic stock markets and observed that these markets are related, but the Latvian market is more isolated. Brännäs and Soultanaeva (2011) empirically observed that Estonia and Lithuania are more affected by changes from the US and Western Europe and Latvia is influence by Russia. But for a better perspective of investors the three Baltic States decided to become one Baltic financial market and our main focus is on the Baltic stock market, and additionally on each stock exchange. Also, all three countries adopted fiscal policies designed to help the financial markets to get the emerging status and to become attractive for investors. Tax incentives have a significant impact on the effective tax burden and to attract investors. For example, according to Eurostat[1] in Lithuania the R&D expenses are deductible

[1] Taxation and Customs Union. Taxation trends in the European Union Data for the EU Member States, Iceland and Norway. Eurostat

even "[…] in a in a triple amount in the tax period when they are incurred" and the profit reported for tax purposes can be reduced with half of the value of expenses in "[…] incurred in the acquisition of investment asset". Thus, taxation is an important part in the process of becoming developed market. Statutory rates are the first info points about corporate taxation, but for the corporate finance perspective, the effective corporate tax rate has the accurate image about tax burden from a financial market. The gap between statutory rates and ECTR is another important aspect because shows how much tax deductions can be used with respect to the legal regulations. Dyreng et al. (2017) observed with empirical models that for the European countries, ECTRs and statutory rates decreased and the Baltic region are not an exception. Finkenzeller and Spengel (2004) studied the Baltic countries, among other new EU members from 2004, and they observed that these states compensate the tax incentives with tax rate reductions design to give advantage against the Western European countries. Following the study of Hanlon and Heitzman (2010), we place our study about effective corporate tax rate between taxation, corporate finance and accounting. We started from the idea that the Baltic stock exchanges are together emerging markets and new places for investing. The final goal was to study the drivers of effective corporate tax rates from the Baltic listed companies in the context of the relations between managers-shareholders and investors. The corporate income tax or effective tax rate has macroeconomic, microeconomic, politic and social impact.

1.1. Drivers of the ECTR Based on Financial Statements (academic literature)

2.2.1. The impact of profitability and size on the ECTR

There are countless computation formulas for the ECTR, but Devereux and Griffith (1998) developed the effective marginal tax rate and the effective average tax rate. The literature about the drivers of ECTR has at its core three categories of indicators based on financial statements: profitability, assets composition and indebtedness. Finkenzeller and Spengel (2004) considered that higher profitability makes the companies to search for location with lower statutory tax rates such as the Baltic region. Gupta and Newberry (1997), Lee and Swenson (2012), and Richardson and Lanis (2007) studied the drivers of effective corporate tax rates and one of the proxied used for profitability was the return of assets (ROA) which recorded a positive link with ECTR. Gupta and Newberry (1997) decomposed the formula of effective tax rate and have rewritten it with ROA included. Thus, they considered that an increase of the ROA will lead to an increased ECTR. But other authors such as Buijink et al. (2002) who studied European companies or Md. Noor et al. (2010), recorded a negative link between ECTR and return of assets. We consider that big and profitable companies are able to redirect their profitability and size in order to obtain lower levels of ECTR and thus, lower levels of tax burden. From this idea two theories derived in the academic literature: political power and political cost theories. Belz et al. (2015) obtained a negative link between firm size and the effective corporate tax rated, supporting the political power theory. In research papers political power is link usually with the firm size on the principle size is power. The opposed side of the authors see size as a weakness in front of the fiscal authorities.

Dyreng et al. (2016) considered that large companies are victims of their size and suffer from the political cost theory. With size comes visibility in front of the public authorities and society who demand good practices and that part of the profit of the companies to be shared with community.

We set as dual hypothesis for our empirical study the presence of both theories political power and political cost

H1: Presence of political power and political cost through negative/positive link between ECTR and profitability/ firm size

2.2.2 The impact of indebtedness on the ECTR

The Modigliani–Miller's theorem (1958) brought into the light the well-known link between indebtedness and taxation. The fact that interest expenses are deductible means that in theory debt reduces the level of effective corporate tax rate. Finkenzeller and Spengel (2004) considered that the tax shield of the interest deductibility is lower for countries with low levels of statutory rates such as Lithuania and Latvia. Also for Estonia interest expenses had indirect impact on tax burden since in 2004 the tax base was formed by the distributed profit so the interest expenses had a moderate effect in this context.

Gupta and Newberry (1997), Richardson and Lanis (2007), Wu et al. (2012) obtained empirical results about a negative link between long term debt and ECTR. We constructed our second hypothesis as follows:

H2: Higher indebtedness is negatively correlated with the effective corporate tax rate.

2.2.3 The impact of the structure of assets on the ECTR

Another important 'pillar' of the academic literature regarding the effective corporate tax rates is the link between ECTR and capital/inventory intensity. Gupta and Newberry (1997), Richardson and Lanis (2007) considered that capital investments have tax benefits which should lower the level of ECTR and inventory-intensive should have higher levels of ECTR. Fernández-Rodríguez and Martínez-Arias (2014) used the emerging countries and found that the inventory intensity is positively correlated with effective tax rates. Derashid and Zhang (2003) recorded a negative link between capital intensity and effective corporate tax rate. More assets mean more debt capacity and thus, more interest expenses for tax deduction, which finally means lower ECTR. Wu et al. (2012) obtained a positive link between inventory intensity and ECTR. We set as third hypothesis (dual) the following:

H3: Negative relation between capital intensity and the ECTR; negative link between inventory intensity and the ECTR.

2.2.3 Other potential drivers of ECTR

Gupta (2007) considered that corporate income tax capture a glimpse of the political aspects from financial market. Authors such as Griffith and Klemm (2004) considered that statutory rates can be a negative influence in the 'war for investors' of tax competition between countries (emerging/developed). Devereux (2006) showed that higher statutory rates are positively correlated with higher effective corporate tax rates. Thus, we deployed a variable for statutory rate and we expect to have a positive link with ECTR.

Graham et al. (2012) considered the financial statements as the main source of risk in financial reporting. Gallemore and Labro (2015) observed that lower levels of effective corporate tax rate depend on the quality of the financial reporting. Cook et al. (2008) found a positive correlation between audit fees and ECTR, but for the companies which used "Big Four" accounting firms, the correlation reversed. Mills et al. (2013) considered that big companies have the financial resources to pay for tax specialists in order to maximize their tax savings and to reduce their ECTR. Donohoe and Knechel (2014) observed positive correlation between audit fees and tax aggressiveness which is specific to US companies. However, Baltic countries have lower statutory rates, and we expect that companies with higher audit fees have a positive correlation with ECTR because more activity from the auditors means companies' inefficiency; external auditors inhibit the managers from tax avoidance practices.

Gupta and Newberry (1997) considered that research and development expenses are deductible and act as tax shield. They obtained a mix link between R&D intensity and ECTR. Richardson and Lanis (2007)

obtained a negative link between ECTR and R&D intensity. Pilinkienė (2015) revealed that the Baltic States have R&D expenditures in low technology industries with a slowly trend. Estonia has the best R&D expenditures among the Baltic countries close to the EU average.

2. Research Methodology

3.1. Data and Variable Measurement

In order to apply our empirical models, we developed a sample which comprises public companies from the three Baltic countries: Latvia, Estonia and Lithuania. The sample is covering the period between 2000 and 2016. It comprises 40 companies: Latvia 17, Estonia 7 and Lithuania 16. We chose as starting point the year 2000 because, from our perspective, represents the end of transition for the Eastern European countries and the beginning of a new financial era. Companies with more than three years of missing data or negative pretax income/negative ECTR, were excluded from the sample. We excluded the financial companies, such as banks and insurance companies, from the sample because they have other regulations for financial reporting. Data were collected from Thomson Reuters Eikon. These filters yielded a total of 680 observations.

Table 1 comprises the variables used in the empirical analysis. We used the ECTR as proxy for the corporate tax burden. We selected different variables for profitability expressed through three proxies—return on equity (ROE), return on assets (ROA), and return on invested capital (ROIC) because each one captures the perception of company's stakeholders. Other firm characteristics included indebtedness, liquidity, and solvency.

Table 1: Definition of Variables

Acronym	Variable	Definition
Dependent variable		
ECTR	Effective corporate tax rate	Income tax (total) divided by earnings before interest and taxes (EBIT). Used by Thomson Reuters Eikon in the key ratios.
Variables on firm characteristics (Independent variables)		
Corporate profitability		
ROA	Return on assets	Net income/Total assets ROA or economic profitability measures the efficiency of capital allocation in fixed assets and net current assets. Shows the percentage of profit a firm obtains relative to its full resources.
ROE	Return on equity	Net income/Total equity ROE or financial return shows the company's performance in terms of shareholders' interests. Measure the ability to increase the dividend rate and reserves with the profit made by shareholders' money.
ROIC	Return on invested capital	EBIT(1- τ) / [total equity + total long-term debt] ROIC shows how well a company is using its invested money to generate returns.
Corporate efficiency of assets		
ASTI	Capital intensity	Property, plant, and equipment (total net) divided by total assets.
INVI	Inventory intensity	Total inventory divided by total assets.

SOLV	Equity multiplier	Total assets/Total equity An indicator of financial leverage that quantifies the overall solvency risk and inability to cover all debts with assets available to the company. It measures the percentage of company's assets owned and financed by shareholders and shows the level of debt financing necessary to maintain the firm's activities.
Corporate indebtedness		
LTDA	Ratio of long-term debt to assets	Total long-term debt/Total assets A measure of the long-term financial position of a firm that exhibits the percentage of its assets financed with long-term debt.
LEV	Ratio of debt to equity	Total debt/Total equity Financial leverage that indicates the proportion of debt and equity used by the company to finance its assets.
Corporate liquidity and solvency		
LIQC	Current liquidity	Current assets/Current liabilities (short term) A measure of short-term solvency or liquidity that exhibits the firm's capacity to pay off its short-term debt commitments.
Firm-level control variables		
SIZE	Firm size	LN(total assets)
MKC	Variation in market capitalization	Year-to-year variation in market capitalization.
GRW	Annual firm total asset growth rate	[(Total assets 2001 - Total assets 2000)/Total assets 2000] Year-on-year percentage change in total assets.
Other variables (Independent variables)		
AUDF	Audit fees	Natural logarithm applied to total audit fees paid out by companies as reported by Thomson Reuters Eikon in income statements.
ADVE	Advertising expenses	Advertising expenses to net sales
RD	Innovation	Research and development to net sales
Variables on statutory rate (Independent variables)		
STR	Statutory rate	Statutory rate as reported on taxation trends in the European Union, European Commission.

Source: Author's own work.

First of all, we used three proxies for profitability (ROA, ROE and ROIC) and we expect a negative correlation contrary to other papers from the literature (see Gupta and Newberry, 1997). We expected to find a negative correlation between debt and the ECTR due to the deductibility of interest expenses. As proxies for indebtedness we used solvency/financial leverage to ensure robustness to results. Since our study is based on financial statements, many of the variables depend on efficiency of assets. Capital intensity and inventory intensity are common variables from the academic literature. We focused our research on the opposed theories of 'political power' and 'political cost'. The first theory is linked with firm size, market capitalization and firm's annual total asset growth rate. Belz et al. (2015) consider that big companies own enough financial resources to lobby for a lower tax burden, and to achieve a reduction in the effective corporate tax rate. Financial resources mean power and with power the lack of fear for penalties arises for big companies. On the other side, political costs theory is present in the case in which a large company is targeted by authorities attempting to use taxation to help support the budget. This theory is more relevant in the context of the emerging markets and the Baltic markets are aspiring at the status 'developed market'. Political cost can be considered a barrier for the development of a stock exchange. We expected to observe both theories in our sample.

Additional to these variables we deployed audit fees as part of the corporate governance because audit is a strong element for financial quality and also for testing political power theory. Auditor's reports can reduce questionable activities conducted by the big companies in order to reduce their effective tax rate. Kern and Morris (1992) observed a direct relation between the size of a company and the difference between earnings recorded in its accounting and reported taxable earnings. We expected to find a negative link with the ECTR. Advertising expenses are very important for the development of a company and can enhance the level of political power owned by a big company. We expected to find a negative link with the ECTR. Statutory rates are directly linked with ECTR and we deployed a variable in our empirical models.

3.2. Model Specification

For the empirical model we used multivariate regressions (data panel) and we deployed as estimation method generalized least squares (cross-section weights [GLS]) regressions. Gujarati (2004) indicates GLS as a method against heteroscedasticity. In order to avoid biased results, we used fixed effects and White cross-section techniques. The general regression examines the influence on the ECTR of firm characteristics, auditing fees, statutory rates, and firm-level controls, as follows:

$$ECTR_{it} = \alpha_0 + \beta_1 \times Firm\_characteristics + \beta_2 \times Other\_variables + \beta_3 \times Firm\_controls + \beta_3 \times STR + \varepsilon_{it}$$

where i = firms 1-40, t = financial years 2000-2016, ECTR = effective corporate tax rate (dependent variable), Firm_characteristics = variables regarding corporate efficiency, indebtedness, liquidity, and solvency, along with profitability (explanatory variables), Firm_controls = variables regarding firm size, market capitalization, and annual growth, Other_variables = audit fees paid out by companies (explanatory variables), advertising expenses, research and development intensity; α_0 = intercept, β_1, β_2, β_3 = regression coefficients, ε_{it} is the error term.

3. Empirical Results

4.1. Descriptive Statistics, Correlations, and Stationarity Checks

Estonia, Latvia, and Lithuania are in a continuous endeavor to attract foreign investors through their tax systems. For example, in Estonia there was the zero percent corporate income and the flat income tax rates[2]. Elschner and Vanborren (2009) and other authors observed that member states from the European Union had a decline of their statutory rates and implicitly on their ECTRs. Figure 1 confirms that the Baltic States reduced their statutory rates. Lithuania had the most striking evolution from 33% to 15%. Finkenzeller and Spengel (2004) said that Estonia in the period of pre-accession had a tax system with tax base not link to the corporate profits. In fact, the retained earnings were exempted from taxation and only distributed profits were exposed to corporate income tax. But our study is based on variables from the financial statements and we avoid this legal provision.

[2] http://www.img.ee/en/taxation-baltic-states

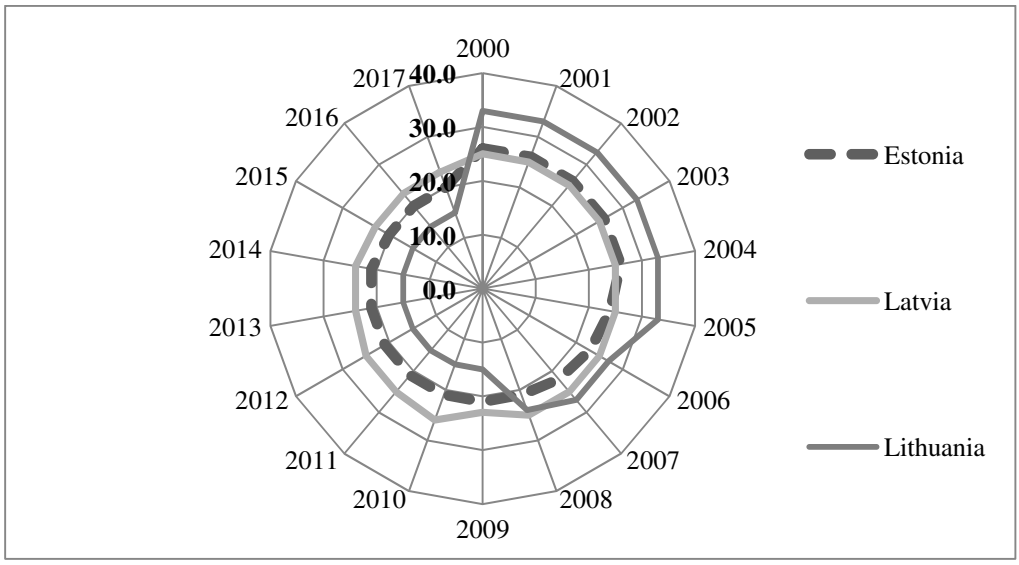


Figure 1: Statutory corporate income tax rates (including surcharges), 1995 – 2017

Source: Authors' computations. Figure 1 contains the top statutory corporate income tax rates (including surcharges) for the period 1995-2017. Data are available at: European Union, http://ec.europa.eu/taxation_customs/business/economic-analysis-taxation/data-taxation_en/.

There are some differences between the Baltic countries in term of economic development. With the lowest population (1.3 million[3]) Estonia is the most advanced. The second place is occupied by Latvia and on the last place is Lithuania with 2.9 million inhabitants (the biggest Baltic state) which try harder to attract foreign investors with lower fiscal policies. The reduction of statutory rates is connected with accession to the EU, but they can be derived from the transition process to the capitalist markets. Baltic countries have successfully implemented the international views about corporate finance, accounting standards and digitalization to obtain lower levels of effective corporate tax rates. Also, the fact that the total population combined is almost 7 million people eases the activity of the fiscal authorities and implementation of more lax tax policies. Elschner and Vanborren (2009) observed the tax differences between new member states from Eastern Europe and the older ones. They conclude that the accession fueled the gap between them as an effect of the sharp tax competition (see Davies and Voget, 2009). As it can be seen from Figure 1, after year 2004 (accession year) the statutory rates have decreased. The effective average tax rates had slightly moved over the years but are lower than the statutory rates, which means that the Baltic companies are using tax deductions and tax breaks in order to lower their ECTR. In Figure 2 there are the gaps between statutory rates and the effective average tax rates within the Baltic countries.

[3] https://ec.europa.eu/info/sites/info/files/eb024_en.pdf

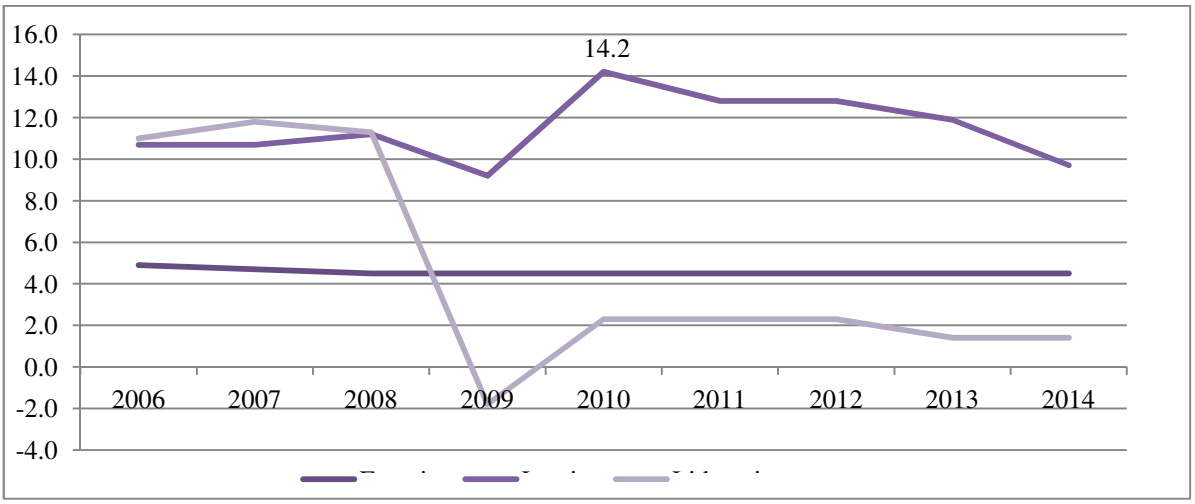


Figure 2: The gaps between (EATR) and statutory rates in Baltic countries, 2006-2016

Source: Authors' computations. Data are available at European Union, http://ec.europa.eu/taxation_customs/business/economic-analysis-taxation/data-taxation_en/.

The highest gap between statutory rate and effective average tax rates was recorded by Latvia in 2010 (14.2%) and the lowest by Lithuania in 2009 which means that EATR was higher than statutory rate. Companies from Lithuania did not cope with the shift from fiscal policies and they use fewer tax deduction. Latvia was the most affected Baltic state by the 2007 crisis and it is possible that the state allowed more tax aggressiveness for the companies to recover.

Descriptive statistics for the selected variables are presented in Table 2. It should be noted that the mean of effective corporate tax rate is 18% much smaller than US companies.

Table 2: Summary statistics (N = 680)

	Mean	Max	Min	Std. Dev.	Skew	Kurt	Obs
ECTR	0.18	5.53	-0.97	0.32	9.48	141.17	680
ROA	0.05	0.72	-0.46	0.10	0.45	14.24	680
ROE	0.08	2.69	-2.14	0.24	-0.55	43.54	680
ROIC	0.07	2.14	-3.62	0.21	-6.05	143.00	680
ASTI	0.43	0.99	-0.81	0.27	-0.72	5.15	680
INVI	0.19	1.41	0.00	0.17	2.02	10.70	680
SOLV	2.11	24.96	0.00	1.69	6.57	67.96	680
LTDA	0.12	0.60	0.00	0.14	1.18	3.83	680
LEV	0.56	15.41	0.00	0.98	7.90	99.90	680
LIQC	2.60	18.72	0.06	2.71	2.77	12.01	680
SIZE	3.53	6.98	-0.42	1.58	-0.30	2.74	680
MKC	0.24	33.20	-0.90	1.45	17.70	393.14	680

GRW	0.12	14.64	-0.79	0.76	15.22	268.72	680
AUDF	0.02	0.81	0.00	0.09	5.85	44.07	680
ADVE	0.00	0.14	0.00	0.02	4.75	25.31	680
RD	0.01	0.70	0.00	0.07	7.08	54.16	680
STR	21.13	26.00	15.00	4.26	-0.49	1.57	680

Source: Authors'computations. Data based on financial statements reported by Thomson Reuters Eikon.
Notes: For definitions of the variables, see Table 1.

About profitability ratios ROE 8%, ROA 5%, and ROIC 5%, which are low ratio, but expected for the emerging markets which were severely affected by the 2007 crisis, especially Latvia. On average, statutory rates are 21.13% which indicate a moderate use of tax avoidance and tax deductions.

The correlation matrix is presented in Table 3. Standard errors are increased by the effect of multicollinearity and lead to results that are statistically insignificant.

Table 3: Correlation matrix – Pearson

	ECTR	ROA	ROE	ROIC	ASTI	INVI	SOLV	LTDA	LEV
ECTR	1.00	-0.04	0.00	0.00	0.03	-0.01	-0.03	0.02	-0.04
ROA	-0.04	1.00	0.79	0.80	-0.02	0.04	-0.24	-0.12	-0.26
ROE	0.00	0.79	1.00	0.68	-0.02	0.00	-0.31	-0.04	-0.34
ROIC	0.00	0.80	0.68	1.00	-0.03	0.04	-0.15	-0.05	-0.19
ASTI	0.03	-0.02	-0.02	-0.03	1.00	-0.21	0.06	0.37	0.13
INVI	-0.01	0.04	0.00	0.04	-0.21	1.00	-0.08	-0.28	-0.10
SOLV	-0.03	-0.24	-0.31	-0.15	0.06	-0.08	1.00	0.31	0.91
LTDA	0.02	-0.12	-0.04	-0.05	0.37	-0.28	0.31	1.00	0.45
LEV	-0.04	-0.26	-0.34	-0.19	0.13	-0.10	0.91	0.45	1.00
LIQC	-0.03	0.13	0.05	0.07	-0.19	0.30	-0.30	-0.33	-0.28
SIZE	-0.09	0.07	0.07	0.10	0.13	-0.42	-0.02	0.09	-0.01
MKC	0.00	0.09	0.07	0.08	-0.06	0.00	-0.03	-0.05	-0.05
GRW	0.00	0.14	0.12	0.14	-0.03	-0.01	0.01	0.03	-0.01
AUDF	-0.01	0.03	0.03	0.03	0.04	0.34	-0.01	0.00	-0.01
ADVE	-0.02	-0.01	-0.01	0.00	0.16	-0.12	-0.06	-0.11	-0.08
RD	-0.04	0.00	-0.01	0.00	-0.05	-0.07	-0.08	-0.11	-0.08
STR	0.10	0.02	0.01	0.01	0.02	0.09	-0.04	0.00	-0.07

	LIQC	SIZE	MKC	GRW	AUDF	ADVE	RD	STR	
ECTR	-0.03	-0.09	0.00	0.00	-0.01	-0.02	-0.04	0.10	
ROA	0.13	0.07	0.09	0.14	0.03	-0.01	0.00	0.02	
ROE	0.05	0.07	0.07	0.12	0.03	-0.01	-0.01	0.01	

ROIC	0.07	0.10	0.08	0.14	0.03	0.00	0.00	0.01	
ASTI	-0.19	0.13	-0.06	-0.03	0.04	0.16	-0.05	0.02	
INVI	0.30	-0.42	0.00	-0.01	0.34	-0.12	-0.07	0.09	
SOLV	-0.30	-0.02	-0.03	0.01	-0.01	-0.06	-0.08	-0.04	
LTDA	-0.33	0.09	-0.05	0.03	0.00	-0.11	-0.11	0.00	
LEV	-0.28	-0.01	-0.05	-0.01	-0.01	-0.08	-0.08	-0.07	
LIQC	1.00	-0.41	0.03	-0.02	-0.10	-0.06	-0.03	0.19	
SIZE	-0.41	1.00	0.01	0.06	0.06	0.34	0.11	-0.37	
MKC	0.03	0.01	1.00	0.67	0.00	-0.03	-0.02	-0.01	
GRW	-0.02	0.06	0.67	1.00	-0.02	0.00	0.00	0.02	
AUDF	-0.10	0.06	0.00	-0.02	1.00	0.17	0.00	-0.19	
ADVE	-0.06	0.34	-0.03	0.00	0.17	1.00	0.18	-0.17	
RD	-0.03	0.11	-0.02	0.00	0.00	0.18	1.00	-0.03	
STR	0.19	-0.37	-0.01	0.02	-0.19	-0.17	-0.03	1.00	

Source: Author's computations
Notes: Values highlighted with '* and italics indicate high correlation. For definitions of the variables, Please see Table 1 for definition of variables.

Profitability variables recorded high levels of correlation but we deployed them in separate models. There is high correlation between SOLV and LEV. Also, market capitalization and assets' annual growth are correlated but we decided to keep them together since they are constructed from unrelated data.

4.2. Econometric Output

Table 4 contains the empirical results obtained with generalized least squares (GLS) estimation method.

Table 4: Coefficients estimated by generalized least squares (GLS) with White's method (cross-section weights) and fixed-effects

Var.	Eq 1	Eq 2	Eq 3	Eq 4	Eq 5	Eq 6	Sign
ROE		**0.07***			**0.08***		+
		(3.11)			**(3.15)**		
ROA	**0.21***			**0.21***			+
	(3.61)			**(3.79)**			
ROIC			**0.13***			**0.14***	+
			(3.31)			**(3.49)**	
ASTI	**-0.06***	**-0.06***	**-0.06***	**-0.06***	**-0.05**	**-0.06***	-
	(-2.15)	**(-1.97)**	**(-2.03)**	**(-2.1)**	**(-1.92)**	**(-1.99)**	
INVI							+

	0.14*	**0.11***	**0.13***	**0.14***	**0.11***	**0.14***	
	(3.83)	**(3.22)**	**(3.7)**	**(3.85)**	**(3.24)**	**(3.72)**	
SOLV				0.00	0.01	0.00	
				(-1.62)	(-1.11)	(-1.43)	
LTDA	**0.24***	**0.23***	**0.23***	**0.22***	**0.21***	**0.21***	+
	(5.06)	**(4.85)**	**(4.72)**	**(4.8)**	**(4.63)**	**(4.5)**	
LEV	**-0.01***	**-0.01****	**-0.01***				-
	(-2.37)	**(-1.77)**	**(-2.07)**				
LIQC	0.00	0.00	0.01	0.00	0.01	0.00	
	(0.27)	(0.67)	(0.48)	(0.34)	(0.75)	(0.55)	
SIZE	**0.02***	**0.02***	**0.02***	**0.02***	**0.02***	**0.02***	+
	(4.25)	**(3.65)**	**(3.61)**	**(4.35)**	**(3.71)**	**(3.66)**	
MKC	0.01	0.00	0.01	0.01	0.01	**0.01****	+**
	(1.55)	(1.39)	(1.55)	(1.68)	(1.54)	**(1.69)**	
GRW	-0.01	-0.01	-0.01	-0.01	-0.01	**-0.01****	-**
	(-1.54)	(-1.51)	(-1.61)	(-1.63)	-1.62	**(-1.72)**	
AUDF	-0.01	-0.02	-0.02	0.00	-0.01	-0.01	
	(-0.11)	(-0.13)	(-0.2)	(-0.02)	(-0.05)	(-0.12)	
ADVE	**0.4***	(0.35)**	**0.4***	**0.4***	**0.36****	**0.41***	+
	(2.08)	(1.89)	**(2.14)**	**(2.1)**	**(1.92)**	**(2.17)**	
RD	**0.15***	**0.13***	**0.14***	**0.15***	**0.13***	**0.15***	+
	(2.38)	**(2.5)**	**(2.47)**	**(2.38)**	**(2.49)**	**(2.47)**	
STR	0.00	0.00	0.01	0.00	0.01	0.00	
	(-0.16)	(-0.14)	(-0.22)	(-0.17)	(-0.16)	(-0.24)	
Weighted Statistics							
R-sq.	0.352	0.343	0.346	0.488	0.340	0.344	
Adj. R-sq.	0.298	0.288	0.291	0.486	0.286	0.289	

Source: Author's computations

Notes: Statistical significance: *, ** indicate statistical significance at the 5% and 10% significance level. The t-statistics are in parentheses. Total observations: 680. Period 2000-2016. Method: Panel EGLS

(Cross-section weights). White cross-section standard errors & covariance. For definitions of the variables, see Table 1.

For the statistical inference the coefficient of determination (R^2) is used in order to validate a model. On average, the goodness-of-fit statistic (R^2) was 37%. The low value means that only 37% of the variation of effective corporate tax rate is explained by the selected variables. In fact, there is no clear line about which variables influence the level of ECTR and there are many computation formulas for effective tax rate. We keep the formula used by Thomson Reuters because is one of the most common and spread formula from the financial analysis about ECTR. The maximum value was recorded for Eq.4 (48.8%). One possible explanation is that European States, including the Baltic ones, have lower levels of effective corporate tax rates, compared with US companies and they are less incentivized to use tax avoidance practices for reducing tax burden. This hypothesis is supported by Huizinga and Laeven (2008) who obtained empirical results about the fact that tax records is smaller in the European markets than in the United States because tax burden is less significant. Also, the quality of financial reports and the performance of the Baltic companies are at a level specific to the emerging markets and the managerial abilities of the CEOs have less impact on the ECTR.

All three proxies for profitability – ROA, ROE and ROIC – recorded a positive link with the effective corporate tax rate in all six equations. Our initial hypothesis **H1** was rejected (political power) and proved (political cost) in the same time. The results are on the same line with other papers from the literature (see Gupta and Newberry, 1997; Lee and Swenson, 2012). The logic behind this choice is related to corporate governance. We considered that they represent, in this context, the view about taxation of the most important stakeholders within a company: shareholders, managers and investors. Return on assets is considered by some authors as return of the managers; ROE is return of the managers and ROIC is return of investors. Also, they represent the financial health of the company and we expected to have a negative correlation with ECTR since a prosperous company should be able to lower its effective tax rate. Using European companies, Buijink et al. (2002) recorded negative correlation between ROA and the ECTR. ROA had the strongest coefficient (0.21) and shows the return of the managers and the positive link means that Baltic CEOs are unable or unwilling to fully use performance for reducing the ECTR. ROIC had positive link with ECTR. It is possible that lower levels of ECTR to be considered by investors questionable and to be regarded as a risky investment. Thus, companies with levels of ECTR way down above the average may not attract investors compare it with ones with higher ECTR. Efforts to increase the profitability are 'expensive' and the costs are non-deductible so more return means higher ECTR in this context. The final point is about the relation between profitability and managers. Maybe managers who are able to increase the company's profitability have more appetite for non-deductible expenses (on their own benefit or for the company). This idea is important in the context of corporate finance (the lack of protection of minority shareholders) and in the context of political power vs. political cost theories. With our empirical results, we accepted part of the hypothesis **H1** and we supported political cost theory for the Baltic companies. It could be a consequence of the fact that the Baltic States gave many deductions to the company for their struggle to become developed states and as pay back companies have to endure the political costs effect. To support even more the political cost theory, variable SIZE for firm size recorded a positive sign. Thus, we accepted half of the hypothesis **H1**. It seems that the Baltic companies are taxed more as they become bigger. Market capitalization (subject to the fact that it was statistically significant only in Eq. 6 with ROIC) recorded a positive link with effective tax rate. Companies which are successful on the capital markets and attract more investors have a lower level of ECTR, maybe as effect of the political cost theory. Because companies with high levels of market capitalization are able to attract more investors they are also able to lobby for more tax breaks. Year-to-year assets' growth recorded a negative sign which supports the political power theory (subject to the fact that it was statistically significant only in Eq. 6 with ROIC). Firm size (proxied in many ways) as driver of the effective corporate tax rate has different trends over time: as becoming bigger a company is aimed by the fiscal authorities, but after a level, when the company has enough financial resources and political

power for lobbying, it appears a reverse sense of tax-related influence – from the company to the authorities.

A positive correlation was recorded between ECTR and inventory intensity as we expected because stocks do not have tax deductions. On the other side, capital intensity recorded a negative link with effective corporate tax rate. Thus, we proved hypothesis **H3**. Intangible assets have tax deduction such as tax depreciation which lowers the level of ECTR. Stickney and McGee (1982) considered that heavily capital intensity firms and leveraged usually have lower levels of ECTR.

It is notorious that indebtedness has influence on the level of effective corporate tax rate. Variables related to debt are LTDA, LEV and SOLV which was not statistically significant. Interest expenses derived from debt are tax deductible, and is expected that ECTR for an indebted company to be lower. Variable for the financial leverage, LEV, proved this fact and recorded a negative link with the ECTR. The fact that the Baltic stock exchanges are underdeveloped, banking system remains a major source of financing. LTDA recorded a positive link with ECTR and our hypothesis **H2** was rejected. Long term debts have interest expenses but also have higher risk of bankruptcy and more control from the creditors. Thus, managers have more difficulties to search for financial resources and have more nondeductible expenses. Also, the attention of the creditors complicates the ability of the managers to use financial 'tricks' designed for obtaining a lower ECTR. Thus, for the Baltic companies and their effective corporate tax rate, indebtedness plays an important role through the fact that lowers the level of taxation, but on the long time the influence becomes opposed.

Variables for current liquidity and statutory rate were not statistically significant. This result is interesting adding the low value of R^2. It seems that for the Baltic companies, the level of ECTR is not influence in a major proportion by statutory rate established through fiscal policies, and the managers are more focused on the financial management. Nikkinen et al. (2012) studies revealed low integration between global and the Baltic stock exchanges. Thus, the Baltic countries were not incentivized to use statutory rates as a major driver of their stock exchanges and companies are more interested about profitability and financial management.

To further explore the effective corporate tax rate in the context of corporate governance, we deployed in our estimation models variables for audit fees, adverting expenses and R&D expenses. AUDF was not statistically significant and we rejected hypothesis H1. Audit fees matters for the quality of financial reports and for investors. More audit fees means that the managers are controlled and are inhibited from tax avoidance and illegal practices conducted for tax elusion. Thus, we expected that companies with higher audit fees to have higher levels of ECTR. Advertising expenses and R&D expenses were positively correlated with ECTR and we deployed these variables in our models in support of political power theory. Companies which have more advertising expenses and R&D should be more profitable and should become bigger. With size comes power. Also, some of these expenses are deductible. The positive sign indicates, again, that in the Baltic financial markets the political cost theory is present.

4.3 Supplemental Analyses

Apart the empirical analysis deployed on the Baltic countries as a sample, for further in-depth analysis we applied the estimation model for each country from the sample. Table 5 contains the drivers of ECTR for each country: Estonia, Latvia and Lithuania.

Table 5: GLS and fixed-effects results of firm characteristics on taxation, 2000-2016

	Estonia		Latvia		Lithuania		
Var.	**Eq 1**	**Eq 2**	**Eq 3**	**Eq 4**	**Eq 5**	**Eq 6**	**Sign**
ROE		0.08		0.01		**0.14***	**+**
		(1.21)		(0.25)		**(2.58)**	
ROA	0.09		0.1		**0.38***		**+**
	(0.91)		(1.24)		**(2.94)**		
ASTI	-0.02	-0.02	**-0.12***	**-0.12***	0.03	0.03	**-**
	(-0.39)	(-0.3)	**(-2.92)**	**(-2.95)**	(0.74)	(0.79)	
INVI	0.06	0.04	**0.32***	**0.31***	-0.02	0.01	+
	(0.42)	(0.32)	**(4.09)**	**(3.84)**	(-0.41)	(0.32)	
LTDA	0.11	0.07	**0.24***	**0.23***	**0.11***	0.06	**+**
	(1.52)	(0.96)	**(2.22)**	**(1.98)**	**(2.27)**	(1.12)	
LEV	0.02	0.03	0.00	0.01	-0.01	0.00	
	(0.88)	(1.14)	(-0.2)	(-0.43)	(-0.94)	(-0.06)	
LIQC	**0.02***	**0.02***	0.00	0.00	0.01	0.00	**+**
	(3.45)	**(3.73)**	(-0.62)	(-0.56)	(-0.64)	(-0.18)	
SIZE	0.00	0.00	**0.03***	**0.03***	-0.01	-0.01	**+**
	(0.05)	(0.02)	**(2.4)**	**(2.34)**	(-0.63)	(-1.07)	
MKC	**0.01****	**0.02***	0.01	0.01	0.01	0.00	**+**
	(1.91)	**(2.33)**	(1.08)	(1.1)	(0.07)	(0.22)	
GRW	**-0.03****	**-0.04***	0.04	**0.05***	0.00	0.01	**+/-**
	(-1.77)	**(-2.08)**	(1.72)	**(2.38)**	(-0.63)	(-0.47)	
AUDF	0.08	0.08	0.62	0.54	-0.01	-0.03	
	(0.19)	(0.18)	(0.8)	(0.65)	(-0.11)	(-0.26)	
ADVE	2.49	2.53	**0.52***	**0.49***	-0.63	-0.44	**+**
	(1.16)	(1.19)	**(3.34)**	**(3.2)**	-0.96	(-0.71)	
RD	0.07	0.07	-0.11	-0.18	-0.28	-0.27	
	(1.07)	(1.14)	(-0.27)	(-0.44)	(-0.67)	(-0.66)	

STR	**0.02***	**-0.01***	0.00	0.01	0.00	0.01	**+/-**
	(3.45)	**(-2.73)**	(0.91)	(1.31)	(0.47)	(0.47)	
Weighted Statistics							
R-sq.	0.332	0.335	0.403	0.405	0.162	0.157	
Adj. R-sq.	0.250	0.253	0.336	0.338	0.064	0.057	

Source: Author's computations

Notes: statistical significance: *, ** indicate statistical significance at the 5% and 10% significance level. T-statistics are in parentheses. Total observations = 1,836. Method: Panel EGLS (Cross-section weights). White cross-section standard errors & covariance and fixed effects. For definitions of variables, see Table 1. EE = Estonia, LV = Latvia, LT = Lithuania.

From Table5 it can be observed that the coefficient of determination (R^2) had the smallest values for Lithuania and we considered that Adj. R-sq. has values that indicate to eliminate these regressions. The negative economic performances from the pre-accession period (2000-2004) have affected the Lithuanian companies and losses affected the general level of the effective corporate tax rates, and there are no significant influence factors of ECTRs. Budrytė (2005) considered that despite the fact Lithuania has the lowest tax burden among the Baltic States there are some difficulties about collections and tax compliance. This can be the reason of the lack of statistically significance recorded for Lithuania in our models. Thus, for the country analysis we kept only Estonia and Latvia which had the highest R^2 (40.5%). Alena et al. (2017) refer in appreciative terms to the financial policies conducted by Estonia and Latvia. For Estonia, variable for current liquidity was positively correlated with effective corporate tax rate and this fact was expected since more liquidity means fewer loans and less interest expenses. Statutory rate had a positive link with ECTR in Eq.1 (with ROA) and a negative link in Eq.2 (with ROE). This result means that in Estonia, ECTR is influenced by the level of statutory rate and it is an indicator of the lack of tax avoidance practices from the managers. For example, fiscal authorities adopted a program named Controlled Foreign Companies (CFC) as a measure to reduce tax avoidance[4]. Managers focus more on the financial management than on the fiscal management, as year-to-years assets' growth shows: a negative sign on the link with ECTR. But, the positive sign of influence recorded for the market capitalization proves the political cost theory. The link between STR and ECTR is probably due to the fact that in Estonia statutory rates were constant over years and the managers could use them as a benchmark for ECTR. Deltuvaitė (2016) considered that Estonia and Lithuania are more exposed on the international risk than Latvia which is more exposed on the domestic risk drivers. Thus, public companies from Estonia are more depended and interested on the level of statutory rates because they are more exposed.

For Latvia, we recorded a negative link between capital intensity and ECTR. And a positive sign between inventory intensity and ECTR. These results are in line with the principles of tax deductions. Long term debt on total assets recorded a positive link with effective corporate tax rate which mean that on the long time debt brings non-deductible cost for the company. Again, the presence of political cost theory was proved for Latvia through the positive correlations between the effective tax rate and SIZE, GRW and adverting expenses. Big companies from Latvia are taxed more by the state and the idea of domestic risk drivers is supported by these results.

[4] http://ec.europa.eu/eurostat/documents/3217494/5786841/KS-DU-14-001-EN.PDF/7bec4a16-f111-4386-a4b4-8f1087be1063?version=1.0

Concluding Remarks

The maturity of the Western European markets makes investors to seek for other places of investing. An interesting place from the European Union is the Baltic regions with Estonia, Latvia and Lithuania because all these former soviet countries are trying to be attractive for investors. We conducted an empirical study of the drivers of ECTR in the Baltic countries, in the context of corporate finance, for the period between 2000-2016. As results we observe that tax deductions, based on financial statements and assets composition, follow the accounting principles (e.g. heavy capital intensity companies have lower levels of effective corporate tax rates and companies with more inventory intensity have higher levels of ECTR; indebtedness with the deductibility of the interest expenses lowers the level of ECTR but on the long term the link is reversed). The positive signs obtained for profitability proxies (ROA, ROE, ROIC), proxies for size (firm size, market capitalization, assets growth) and advertising / R&D expenses supported the presence of the well-known political cost theory. It seems that for the Baltic companies their financial success is shared with the state and population. This link is expected for small countries with small population and thus, fewer contributors. Statutory rates had results that were not significant form the statistical point of view and this results means that the managers from the Baltic companies are more focused on the financial management than on the fiscal management and tax avoidance. For Estonia (models per country), we recorded a mixed link between statutory rate and effective corporate tax rate. Unfortunately, the audit fees were not statistically significant and we could not draw a conclusion about their impact on effective corporate tax rate.

There are some limitations in our articles, derived from the small number of companies included in the sample, after we applied filters of selection. Baltic stock exchanges are underdeveloped and on the future research we propose a data base with other companies from the Baltic region, in order to capture the drivers of effective corporate tax rate from these countries.

References

Alena A., Lucia M., Slavomíra M., (2017). Meta-analysis categorization of EU countries in the context of corporate income tax. Contaduría y Administración 62 (2017) 1001–1018

Belz T., von Hagen D., & Steffens C. (2015). R&D intensity and the effective tax rate: A meta-regression analysis. Working paper. http://dx.doi.org/10.2139/ssrn.2623561

Brännäs, K. & Soultanaeva, A. (2011). Influence of News from Moscow and New York on Returns and Risks of Baltic States' Stock Markets. Baltic Journal of Economics, 11(1), 109–124. http://dx.doi.org/10.1080/1406099X.2011.10840493

Buijink W., Janssen B., & Schols Y. (2002). Evidence of the effect of domicile on corporate average effective tax rates in the European Union. Journal of International Accounting, Auditing and Taxation, 11, no. 2: 115-130. http://dx.doi.org/10.1016/S1061-9518(02)00069-1

Budryte A., (2005). Corporate income taxation in Lithuania in the context of the EU. Research in International Business and Finance, vol. 19 (2005) 200–228

Cook K.A., Huston G.R., & Omer T.C. (2008). Earnings management through effective tax rates: The effects of tax-planning investment and the Sarbanes-Oxley Act of 2002. Contemporary Accounting Research, 25, no. 2: 447-471, http://dx.doi.org/10.1506/car.25.2.6

Davies R., & Voget J. (2009). Tax Competition in an Expanding European Union. Institute for International Integration Studies Discussion, No. 276. Dublin

Deltuvaitė Vilma, (2016 Investigation of Stock Market Integration in the Baltic Countries. Economics and Business. doi:10.1515/eb-2016-0006

Derashid C., & Zhang H. (2003). Effective tax rates and the industrial policy hypothesis: Evidences from Malaysia. Journal of International Accounting, Auditing and Taxation, 12, no. 1: 45-62. http://dx.doi.org/10.1016/S1061-9518(03)00003-X

Devereux M., & Griffith R. (1998). The taxation of discrete investment choices. IFS Working Papers, No. W98/16. http://dx.doi.org/10.1920/wp.ifs.1998.9816

Devereux M.,(2006). Developments in the taxation of corporate profit in the OECD since 1965: Rates bases and revenues. University of Warwick.

Donohoe, M. P., & Knechel, W. R. (2014). Does corporate tax aggressiveness influence audit pricing? Contemporary Accounting Research, 31(1), 284-308. doi: 10.1111/1911-3846.12027

Dyreng S.D., Hanlon M., Maydew E.L., & Thornock J.R. (2017). Changes in corporate effective tax rates over the past 25 years. Journal of Financial Economics, 124, no. 3: 441–463.

Dyreng S., Hoopes J., & Wilde J. (2016). Public pressure and corporate tax behavior. Journal of Accounting Research, 54, no. 1: 147-186. http://dx.doi.org/10.2139/ssrn.2474346

Elschner C., & Vanborren W. (2009). Corporate effective tax rates in an enlarged European union. Taxation Papers, No. 14.

Fernández-Rodríguez E., & Martínez-Arias A. (2014). Determinants of the effective tax rate in the BRIC countries. Emerging Markets Finance & Trade, 50, s3: 214-228.

Finkenzeller M., Spengel C., (2004). Measuring the Effective Levels of Company Taxation in the New Member States: A Quantitative Analysis. Taxation Papers, Working paper nr.7.

Gallemore J., & Labro E. (2015). The importance of the internal information environment for tax avoidance. Journal of Accounting and Economics, 60, no. 1: 149-167. http://dx.doi.org/10.1016/j.jacceco.2014.09.005

Graham J., Raedy J., & Shackelford D. (2012). Research in accounting for income taxes. Journal of Accounting and Economics, 53, no. 1: 412-434.

Griffith, R., Klemm, A. (2004). What has been the tax competition experience of the last 20 years?. The Institute for Fiscal Studies. http://dx.doi.org/10.1920/wp.ifs.2004.0405. WP04/05

Gujarati D.N. (2004). Basic Econometrics. 4th ed. New York: McGraw-Hill/Irwin.

Gupta S., & Newberry K. (1997). Determinants of the variability in corporate effective tax rates: evidences from longitudinal data. Journal of Accounting and Public Policy, 16, no. 1: 1-34. http://dx.doi.org/10.1016/S0278-4254(96)00055-5

Gupta S.,(2007). Determinants of tax revenue efforts in developing countries. Working Paper 07/184. InternationalMonetary Fund., http://doi.org/10.5089/9781451867480.001.

Hanlon M., Heitzman S. (2010). A review of tax research. Journal of Accounting and Economics, Vol. 50, No. 2-3, p.p. 127-178

Huizinga H., & Laeven L. (2008). International profit shifting within multinationals: A multi-country perspective. Journal of Public Economics, 92, nos. 5-6: 1164-1182.

Kern B.B., & Morris M.M. (1992). Taxes and firm size: The effects of tax legislation during the 1980s. Journal of the American Taxation Association, 14, no. 1: 80-96.

Lee N., & Swenson C. (2012). Are multinational corporate tax rules as important as tax rates? International Journal of Accounting, 47, no. 2: 155-167. http://dx.doi.org/10.1016/j.intacc.2012.03.001
Md Noor R., Fadzillah N.S.M., & Mastuki N. (2010). Corporate tax planning: A study on corporate effective tax rates of Malaysian listed companies. International Journal of Trade, Economics and Finance, 1, no. 2: 189-193.

Mills L., Nutter S., & Schwab C. (2013). The effect of political sensitivity and bargaining power on taxes: Evidence from federal contractors. The Accounting Review, vol. 88, issue 3, pp. 977-1005. http://dx.doi.org/10.2139/ssrn.1621861

Modigliani F, & Miller M.H. (1958). The cost of capital, corporation finance and the theory of investment. American Economic Review, 48, no. 3: 261-297.

Nikkinen, J., Piljak, V., Äijö, J. (2012). Baltic Stock Markets and the Financial Crisis of 2008–2009. Research in International Business and Finance, 26,398–409. http://dx.doi.org/10.1016/j.ribaf.2012.03.003

Pilinkienė V., (2015). R&D investment and competitiveness in the Baltic States. Procedia - Social and Behavioral Sciences 213 (2015) 154 – 160

Richardson G., Lanis R. (2007). Determinants of the variability in corporate effective tax rates and tax reform: Evidence from Australia. Journal of Accounting and Public Policy, 26, no.6: 689-704. http://dx.doi.org/10.1016/j.jaccpubpol.2007.10.003

Stickney C. P., McGee V. E., (1982). Effective corporate tax rates the effect of size, capital intensity, leverage, and other factors, Journal of Accounting and Public Policy, Volume 1, Issue 2, Pages 125-152, ISSN 0278-4254, https://doi.org/10.1016/S0278-4254(82)80004-5.

Taxation and Customs Union. Taxation trends in the European Union Data for the EU Member States, Iceland and Norway. Eurostat

Wu L., Wang Y., Luo W., & Gillis P. (2012). State ownership, tax status and size effect of effective tax rate in China. Accounting and Business Research, 42, no. 2: 97–114. http://dx.doi.org/10.1080/00014788.2012.628208
http://www.img.ee/en/taxation-baltic-states
https://ec.europa.eu/info/sites/info/files/eb024_en.pdf

The Process of Improving Recruitment for University Studies

Petra Hollá Bachanová, University of Zilina, Žilina, Slovakia, Petra.Bachanova@fpedas.uniza.sk
Miriam Garbárová, University of Zilina, Žilina, Slovakia, Miriam.Garbarova@fpedas.uniza.sk

Abstract

Demographic development is one of the most important factors that have a consequent impact on the economy of universities across the world. In the Slovakia, it is possible to observe a drop in the total number of students in recent years. The offer of study programs of higher education institutions currently exceeds the graduates' demand of secondary schools as applicants for higher education. If a university wants to maintain its position on the market, it needs to adapt to these demographic changes. For the university, it is, therefore, necessary to ensure effective marketing communication through which it would inform potential prospective students adequately about the possibilities of studying and at the same time raised interest in the study. The Department of Communications, which is part of the University of Žilina also faces a declining trend of filing of applications for study. Therefore, focused its attention on the area of managing a continuous process of improving the recruitment of applicants for studies using new technologies and developing marketing communication using diverse forms, methods and innovative solutions. As a part of this process, it was necessary to define the criteria for selecting a college, from the point of view of potential applicants and identify the sources of information that are critical in choosing a university for the students of secondary school, and last but not least, to identify students' preferences regarding marketing communication tools. For this purpose, the survey, the results of which are presented in this paper, was conducted.

Keywords: Marketing communication, University, Student preferences, Demographic developments, Recruitment of students, Slovakia, Žilina, Department of Communications.

Introduction

In a research study by Corejova & Rostasova (2016), the importance of universities in national, regional and local systems is obvious, and the universities are aware of this impact. The higher education is nowadays for many people a way to get the necessary qualifications for employment in the labour market. Gogolova (2016) mentioned that despite the fact that the level of education increases, young people are pushed out of the labour market and are unemployed. This may be caused by the improper choice of fields of study that is affected by some factors. Many young people choose specific fields of study which interests them, respectively which they need to perform their future or current profession. However, there are also those whose decision regarding the choice of the university depends on completely different criteria. The decisive factor in this situation is that offer prevails over demand on the market of higher education institutions. Potential students, therefore, have a wide choice of study options. Each of the educational institutions must, therefore, take some care to attract potential applicants. The result of this effort is to develop marketing communication using different forms, methods and innovative solutions. Stofkova et al. (2016) mentioned that the creation of qualitative and modern tools of marketing communication is a priority for all universities to gain new students.

Overview of the number of applications filed at the Faculty of Operation and Economics of Transport and Communications (FPEDAS)

The Faculty of Operation and Economics of Transport and Communications (FPEDAS) of UNIZA currently offers study opportunities at seven departments, including the Department of Communications.

According to information from the Institute of Information and Communication Technologies of UNIZA, 1154 applications were filed to the FPEDAS in the academic year 2015/2016, representing up to 55.5 % decline since 2004/2005. The following figure demonstrates the development of the number of applications filed over the last six academic years. Based on this available data, it can be stated that the number of applications filed to the FPEDAS has been constantly decreasing since the academic year 2011/2012.

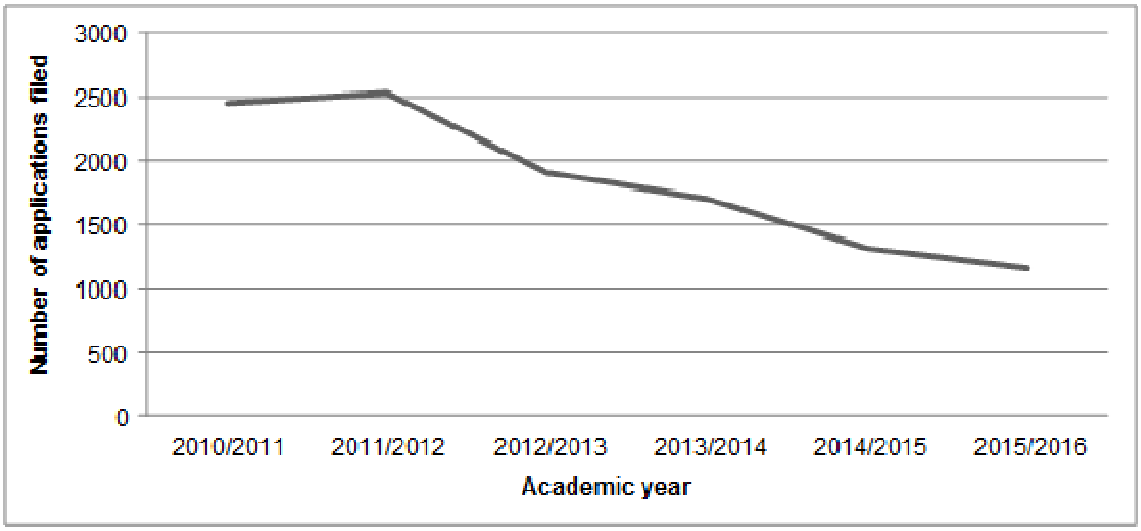


Fig. 1: the development of the number of applications filed over the last six years at FPEDAS

To solve unfavourable situation associated with the decreasing number of applicants for study it was necessary to analyse the structure of the applicants for study. Based on the analysis carried out in 2015, it was possible to further identify the structure of the candidates for study at the FPEDAS and its departments, from the point of view of the individual regions of the Slovak Republic, the districts within the Žilina Region or specific secondary schools within the Žilina Region. Available information about the structure of the applicants for study fell into the academic years from 2010/2011 to 2014/2015. The analysis showed that the highest number of applications filed at the FPEDAS came from the Žilina Region (56.00 %), followed by the Trenčín Region (17.00 %), the Banská Bystrica Region (7.00 %), the Prešov Region (6.00 %), the Košice Region 5.00 %). The number of filled applications was approximately 3 % from Trnava, Nitra and Bratislava Region.

From the point of view of the individual districts of the Žilina Region, the most filed applications were from the district Žilina (50.32 %). It was followed by the districts Ružomberok (17.00 %), Martin (9.90 %), Čadca (6.55 %), Kysucké Nové Mesto (6.08 %), Dolný Kubín (5.99 %), Tvrdošín (5.45 %), Námestovo (4.24 %), Liptovský Mikuláš (3.96 %), Bytča (2.02 %), and Turčianske Teplice (0.32 %). Based on the above data, it can be stated that the demand for study at FPEDAS is strongly concentrated in the region.

Overview of the number of applications filed at the Department of Communications

Department of Communications at the Faculty of Operation and Economics of Transport and Communications, University of Žilina is a department of higher education focused on information-

communication technologies, postal services, postal technology and electronic communications. The main aim is to educate professionals for the needs of enterprises from postal, electronic communications, financial and banking sector. Department of Communications guarantees accredited bachelor degree programs - Postal Technology and Services (PTaS) and E-Commerce and Management (EOaM) and master degree programs - Postal Engineering, E-Commerce and Management.

Based on information from the Institute of Information and Communication Technologies which manages the statistics filed to the Department of Communications, there were filed 60 applications for the PTaS study program in the academic year 2015/2016. The greatest interest in the PTaS study program was in the Žilina Region, from which came to 66.67 % of applications. From the Trenčín Region, were received 15.00 % of the applications and 8.33 % from the Prešov Region. A number of applications filed within the Bratislava, Košice and Banská Bystrica Region were smaller (from each to 3.33 %). There was no application filed from the Nitra and Trnava Region.

For the EOaM study program were filled in total 135 applications in the same academic year. Most interested in this study program were again applicants from Žilina Region (67.00 %) and Trenčín Region (15.00 %). They were followed by the Banská Bystrica Region (7.00 %), Prešov Region (4.00 %), Bratislava, Košice and Trnava Region (from each to 2.00 %) and Nitra region (only 1.00 % of applications).

Methodology

In order to manage the process of continuous improvement of recruitment of applicants for studies at the Department of Communications, it is important to propose an effective way of using marketing communication tools that would reflect the needs and preferences of potential candidates for study, in our case mainly from the Žilina region.

For this purpose, a survey was conducted to identify information the resources that applicants prefer and take into account in the decision-making process of choosing a university. The survey also looked at students' expectations from university education, at important criteria critical to the selection of a university, degree of importance of the information provided by universities from the point of view of applicants for study, as well as their perception of various forms of marketing communication.

Based on data available from the Institute of Information and Education Forecasts 13 454 students attended the 3rd and 4th year of secondary schools in Žilina region, at the time of the survey. Given that the population is less than 100 000 respondents, the sample size was determined based on the formula for a small population. Subsequently, a sample size was calculated at 374 respondents.

As a method of data collection was chosen a method of questioning. Data collection was conducted through a questionnaire consisted of 17 closed questions. Testing of the questionnaire was carried out on a sample of 10 respondents. The survey was conducted at selected secondary schools from 13. 4. 2016 to 21. 4. 2016. Students were given a questionnaire through school counsellors within the framework of teaching.

Overall, 417 were obtained completed questionnaires. The survey was attended by a total of 128 men, representing 31% of respondents and 289 women, representing 69%. Grammar school students represented a total of 191 respondents, which is 46 % of the total number of students and students of secondary vocational schools represented a total of 224 respondents (54 %).

Up to 68.9 % of the respondents were from the district of Žilina, 13.5 % of students were from the district of Martin, 11.3 % of students from the district of Kysucké Nové Mesto and 6.3 % of students from Bytča

district. These facts confirmed our assumption that the majority of the applicants come from the district of Žilina.

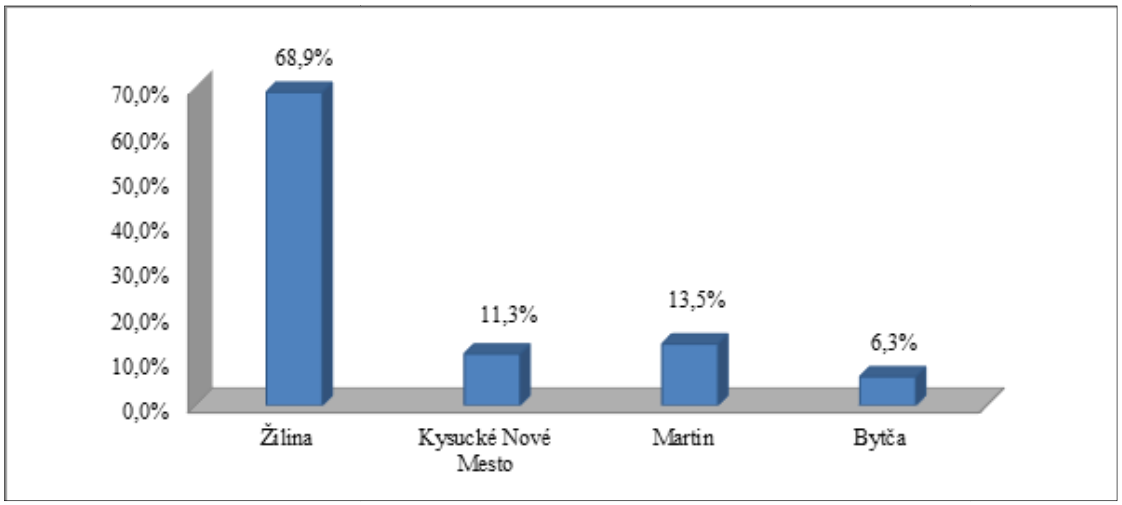


Fig. 2: The number of respondents according to individual districts of the Žilina region [%]

The survey found that half of the students (50 %) plan to study at the university after graduating from secondary school. The survey looked at the expectation of these students from the university study, and the respondents had the opportunity to select multiple options. Among the strongest motives of students for university studies belonged a greater chance of applying to the labour market (76.4 % of respondents) and acquiring a qualification in the chosen field (65.7 % of respondents). 51.3 % of students want to study at the university just to get the title. For 35.5 % of all students, a study at the university is an opportunity to gain new contacts and for the 31.3 % of them is such study a chance to extend student life.

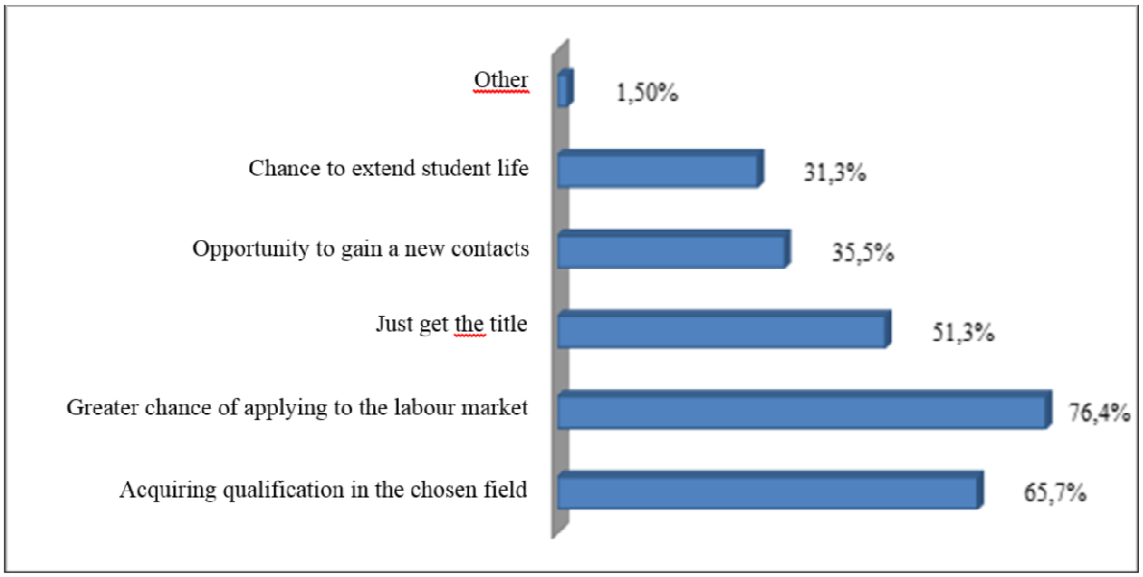


Fig. 3: The strongest motives of students for university studies [%]

The other half of students said that they did not plan to continue studying at university after leaving secondary school. The reasons for lack of interest in study at the university were varied, and the respondents had the opportunity to select multiple options.

As the most common reason, students stated that they had decided to work after leaving school (49.3 %). Following reasons such as a general lack of interest in further study (37.0 %), desire to work abroad (30.1 %) or travelling around the world (20.5 %). 17.8 % of students stated that they have not yet considered this option. 12.3 % of the students would like to take an enterprise after leaving secondary school and 8.2 % of students mentioned as the reason the unfavourable financial situation.

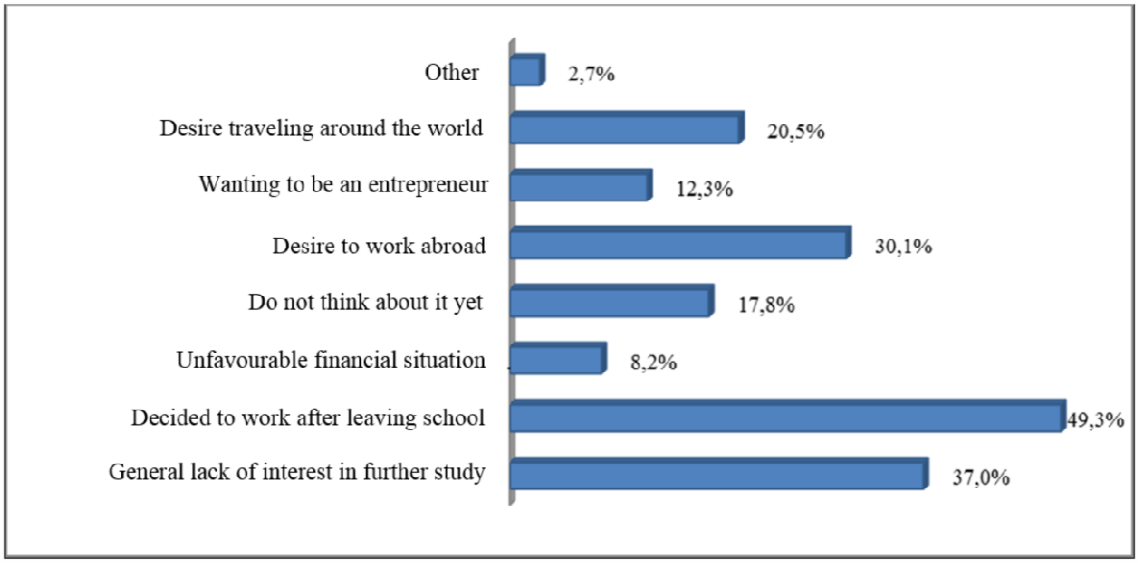


Fig. 4: The reasons for lack of interest in study at the university [%]

An important part of the survey was to determine the key criteria by which students choose a particular university. It has been found that for the choice of a particular university is most decisive especially interest in a specific field of study (for 74.9 % of students). Up to 33.4 % of students reported as a decisive factor employers' interest in university graduates. In choosing a university, students also take into account the results of various assessments and the rankings of universities (25.4 %). Many of them make decisions by recommendations from parents or friends (22.1 %). To a certain extent, their decision depends on the possibility of attending exchange study stays (17.0 %), on the offer of leisure activities of universities (7.8 %), or on the fact that they want to study, where study their friends (8.1 %). For 16.1 % of students, it is important to study at a university which is close to the place where they live. The remaining 2.4 % of respondents also stated other criteria, for example, personal interests and preferences, quality of the school, educational program, study plan, tuition or planned number of admitted applicants.

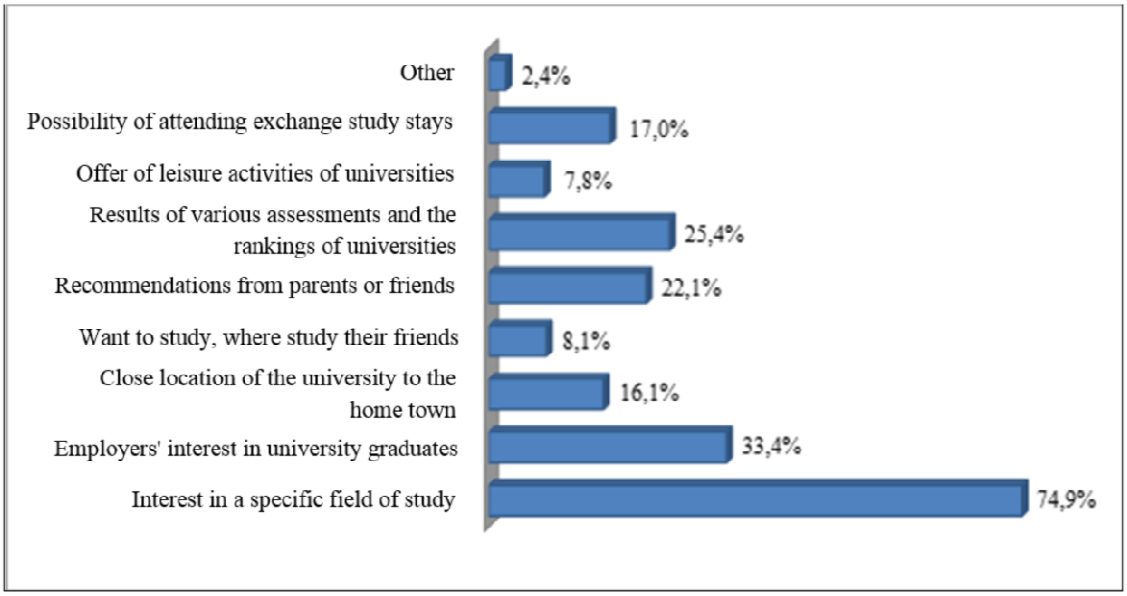


Fig. 5: The key criteria on the basis of which students choose a particular university [%]

The most frequently cited information source, from which the students obtain important information necessary to select a particular university belonged university websites (80.6 %), references from friends and acquaintances (55.5 %), the website of University portal (36.7 %) and open door day of universities (31.9 %). To a lesser extent sources such as school counsellors (18.5 %), exhibitions and fairs dedicated to education (11.3 %), social networks (10.7 %), television (10.4 %), university newspapers and magazines (8.1 %), print media (7.5 %), outdoor forms of advertising (4.8 %), radio (1.5 %), discussion forums (0.9 %) and others, were represented.

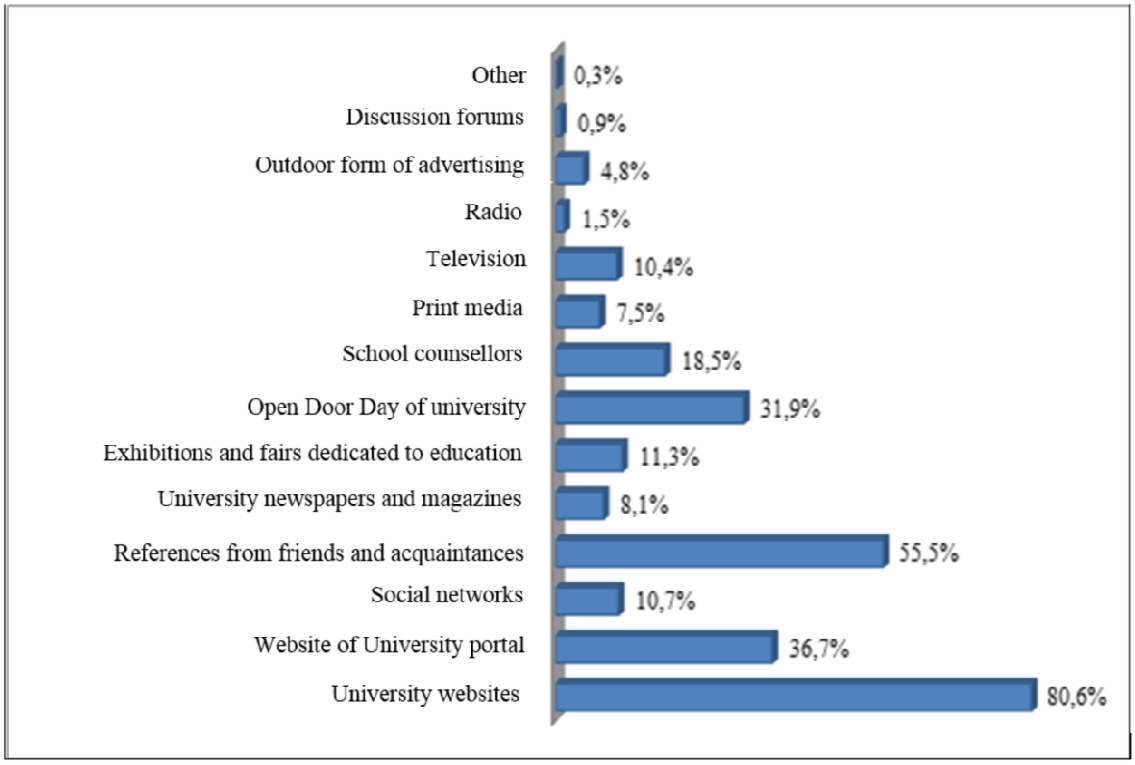


Fig. 6: The information sources for obtaining important information necessary to select a particular university [%]

The goal of the survey was also to find out which information are important for the students in the decision-making process. Students could choose from several types of information, which are regularly evaluated by the academic rank and rating agency ARRA.

The most important information in the decision-making process for choosing a university according to students are information about admission procedure (81.6 %). The following are overview of study and subjects (77.0 %), graduate employment (73.2 %), study costs (62.9 %), information about the satisfaction of students (62.0 %), graduate profile (53.2 %), universities care for students (46.4 %), successes and uniqueness of universities (44.5 %), teaching and laboratory equipment (27.2 %), foreign internship opportunities (23.9%), cultural opportunities (22.0 %), information about the teachers (18.1%), accessibility on social networks (14.0 %) and a successful graduates' club (6.4 %).

The survey showed that the respondents are most likely to be interested a combination of traditional and online communication, which was confirmed by 54.7 % of respondents. 23.1% of students prefer online marketing communications, including tools such as newsletters, online chat, internet advertising, email marketing and other online forms. On the contrary, the traditional form of communication such as promotional gifts, billboards, posters or personal contact is suitable for 22.2 % of students.

On the question “Which kind of communication can attract students in connection with the university selection?” up to 81.5 % of students answered that communication via social network Facebook. Other forms of marketing communication such as Open door day (66.0 %), meeting with alumni (62.4 %), websites of universities (61.5 %), communication with current students enriched with their advice and

study experiences (49.6 %), e-mail marketing (newsletter 49.0 %), exhibitions and fairs dedicated to education (45.7 %) and also YouTube channel (49.3 %) are also very preferred.

Conclusion

According to Achimska (2016), in the current age of globalisation, we can observe rapid development and strengthening of the international economy, especially in the EU countries. Strenitzerova & Garbarova (2016) mentioned that The impact of globalisation and labour market development very closely relate to the human resource management and personnel policy of companies. It should be emphasised that the universities significantly affect the quality of the offered labour force in the market and thus also affect the value-chain of other entities on the market.

By creating a creative marketing communication, interesting for young people, universities could attract and persuade a larger number of applicants, even those who did not think about university studies. It is important to take into account expectations of students and engagingly them present information which is important for them in the decision-making process.

In order to improve the recruitment process, it is possible to define several recommendations, based on many surveys carried out in this area as well as current technological trends that affect the needs, thinking and behaviour of potential applicants for study.

- Thinking about why university wants to recruit the students is the very important part when designing its strategy. The reason why university makes recruiting is the primary goal concerning recruitment, and also one of core missions of communication. According to Richard Levin, executive director of enrolment services and university registration at the University of Toronto in Canada, thinking about what you communicate, to whom, and how, is the key to a successful student recruitment strategy.

- Think like students**.** The messages of the communication must be clear, consistent and authentic. It is necessary to communicate what students want to hear. According to many research, highly marketable aspects are e. g. vibrant student life, history, alumni and pleasant surroundings - so those are the kind of messages which should have universities in the recruiting process to communicate. Presentation materials in a classical or virtual form should contain an accurate picture of what university is like and what it would be like to study here. When we think as students, we consider the motivations that propel them forward – things like a desire for a better job, new challenges or new skills. Knowing these motivations means that we can proactively guide students through application, enrolment, registration, graduation and, ultimately, better job outcomes by communicating the best message to them at the best time.

  According to our research, the strongest motives of students for university studies are a greater chance of applying to the labour market (76.4 %) qualifying for the chosen field of study (65.7 %) and opportunity to gain new contacts or chance to extend student life. On the other site, the key criteria on the basis of which students choose a particular university are interested in a specific field of study (74.9 %), employers´ interest in university graduates (33.4 %) and results of various assessments and the ranking of the university (25.4 %). From these facts, it is possible to formulate a marketing message that could reach potential applicants.

  The results of a survey conducted on potential students in the Zilina region, also showed that the most important information in decision-making process for choosing a university is mainly the information about admission procedure, overview of study and subjects, graduate employment, study costs as well as the information about the satisfaction of current and former students and universities care for students. These are precisely the information that the Department of communications should focus on

and mention them not only on the website but also in other forms of promotion, whether in printed brochures or events dedicated to potential applicants.

- In a research study by Madleňák & Madleňáková (2016), another important fact is that advertising, marketing and commercial activities on the Internet are the most recent trends of the last years. Internet communication is often connected with social media and especially with social networks. This phenomenon can also be seen in the sphere of education. Madleňák et al. (2015) mentioned Nevertheless that students prefer this form of communication, universities do not exploit the potential of it sufficiently still today. Prospective students are keen to engage with their university through social media channels, but students are saying that universities don't make enough use of social media in recruitment, which meant they currently didn't expect or look for information about recruitment there. Today's prospective students want to make better-informed decisions and require a greater amount of information and engagement from a university. Students want to follow, friend, tag, pin. A positive, responsive and relevant social media presence does have the potential to convert prospective students into enrolled students. Anne Whitehouse, head of marketing at Bucks New University, said: "*Social media are useful at different stages of the application process. A prospective student may not use social media for initial research, but may engage with social media to help finalise their decision."* Social networks have become a powerful tool for marketing communications, especially among the younger generation. Young people attach great importance to social network communications. Their huge potential should be used by universities to recruit new students, who are necessary or even crucial for the existence of each university. The attractiveness of social media in the recruitment process also proves the results of the survey in the Zilina region, which revealed that this form of communication attracts up to 81.5% of students in connection with the university selection.

- The survey showed that demand for education is, despite all aspects, heavily regional dependent. This is evidenced by the results of the analysis of the applications filed on university studies at FPEDAS or Department of Communications, as well as the results of the survey conducted. Based on this fact, the Department of Communications should start and direct its marketing activities primarily towards students from the Zilina region. There appears the biggest chance to get the highest number of applicants for study. This argument can be generalised as a recommendation for other universities that are trying to recruit new students. The close location of the university to the hometown of students plays an important role in the university selection process. However, it is important to note that the university should develop its recruitment activities also in other regions and, of course, also abroad, because recruiting international staff has been a crucial part of recruiting strategy as evidenced by many surveys in the world.

- Among the most important tools for online marketing is an effective and intuitive **website** which should reflect the professionalism of the institution. According to the research, the university websites are very important information sources for students to obtain information necessary to select a particular university (80.6 %). This most important source of information is followed by an electronic prospectus, references from friends and acquaintances, advertisement emails and university fairs. Websites design and the interface is proving a crucial component in how colleges and universities present themselves to prospective students. According to recent analysis "Competing Globally" (Hobsons, 2013), the homepage is a key component in the student experience and can make or break decisions about whether to attend. A university's homepage is the hub of its web presence, and in attempting to appeal to a diverse range of visitors, the challenge is staying intuitive and uncluttered, because if the visitors have to go back to homepage every time to find the content, they aren't likely to stay on the website very long. Navigation on the website is an integral component of overall site architecture which all content can flow from. The homepage must be laid out the portal to all of the content that students are looking for online. Websites often feature elements and layouts to streamline and highlight content including navigation bars, engaging visuals such as slideshows, and prominent "call to action" buttons that encourage students to action. The website experience should be strong

and inspiring for the visitor. Nowadays is important to think of responsive web design to create intuitive and easy to navigate websites that can be viewed on multiple devices and platforms. Alongside the rise of mobile technology and connected devices, colleges and universities are making greater investments in having a mobile presence. This includes not only mobile versions of websites and other content but also making a greater amount of course content mobile-friendly. According to Al-Busaidi, KA. (2006) and Stenger, T. (2008), as far as technology is concerned, it may be advisable to focus attention on search engine optimisation, web analytics, newer methods of online and technology-enhanced course delivery and CMS and CRM systems. The use of e-learning initiatives in the academic institutions has been increasing in last few years. By combining these tools, it is possible to achieve significant successes regarding the visibility of the university websites as well as to increase the chance of reaching potential students.

- Face-to-face techniques, like Open Days and fairs, are still effective methods of recruiting students, but online and e-recruitment strategies are quickly becoming the most successful ways to engage with prospective students. A recent survey found that the most effective marketing strategies for universities are nevertheless events-based and involve direct interaction with potential students. Radio, television and print media were deemed least effective, while the most effective methods of outreach were open door days and campus visit days for high school students.

Universities should integrate a range of activities including traditional media, print, and information via internet, events and social media throughout all stages of the recruitment process. The goal is to get the balance right and to be ever close to students, and responsive to their needs. With each step of enrolment cycle, such as applying, making an admissions deposit, enrolling in class there's an opportunity for communication and outreach to that student to keep them engaged. For student recruitment strategies to work, it is critical that the university not relax once a student has been admitted and enrolled. Continued proactive communication ensures that they understand the steps needed to register for future semesters or on prepare for graduation.

Acknowledgment

This paper was supported by these research grants:
- 2/KS/2017 Labor market and employment policy in Slovakia and the EU
- VEGA 1/0725/17 Startup company lifecycle research as the basis of a business startup business model

References

Al-Busaidi, KA. (2006), 'A pilot investigation of the determinants and benefits of the discussion forum use in the e-learning context' Proceedings of the 7th International-Business-Information-Management-Association Conference (IBIMA), ISBN:978-0-9753393-6-7, 14-16 December, 2006, Brescia, ITALY 283-288.

Achimska, V. (2016), 'International comparison of the liberalization of the postal sector' Proceedings of the 16th International Scientific Conference on Globalization and its Socio-Economic Consequences, ISBN 978-80-8154-191-9, 5-6 October 2016, Rajecké Teplice, Slovakia,15-24.

Corejova, T. and Rostasova, M. (2016), 'University - industry partnership in the context of regional and local development' Proceedings of the 15th international conference on Information technology based higher education and training (ITHET), ISBN 978-1-5090-0778-3, 8-10 September, 2016, Istanbul, Turkey.

Gogolova, M. (2016), 'Impact of the globalization on the young people´s level of education' Proceedings of the 16th International Scientific Conference on Globalization and its Socio-Economic Consequences, ISBN 978-80-8154-191-9, 5-6 October 2016, Rajecké Teplice, Slovakia, 483-4896.

Madlenak, R. and Madlenakova, L. (2015), 'The Differences in Online Advertising Acceptance in China and Slovakia' Proceedings of the International Conference on Management Engineering and Management Innovation (ICMEMI), ISBN:978-94-62520-45-5, 10-11 January 2015, Changsha, China, 45-49.

Madlenak, R. and Madlenakova, L. and Kianickova, E. (2015), 'Designing a social network to support e-learning activities at the Department of Communications, University of Zilina' Proceedings of the International Educational Technology Conference (IETC), ISSN 2146-7366, 3-5 September 2014, Chicago, Illinois, USA, 274-281.

Stenger, T. (2008), 'Search engine marketing: what place for marketing?' Reference case of a website, Proceedings of the 9th International-Business-Information-Management-Association Conference (IBIMA), ISBN: 978-0-9753393-8-1, 4-6 January 2008, Marrakech, Morocco, 1069-1074.

Stofkova, J. and Stofkova, Z. and Stofko, S. (2016), 'Increasing the quality of the educational process through implementation of practice requirements in the university study program' Proceedings of the 8th international conference on Education and new learning technologies (EDULEARN16) ISBN 978-84-608-8860-4, 4-6 July 2016, Barcelona, Spain, 1548-1554.

Strenitzerova, M. and Garbarova, M. (2016), 'Impact of globalization on human resource management in the information and communication sector' Proceedings of the 16th International Scientific Conference on Globalization and its Socio-Economic Consequences, ISBN 978-80-8154-191-9, 5-6 October 2016, Rajecké Teplice, Slovakia, 2143-2150.

The Influence of Culture toward Saudi's Healthcare Sector Performance

Namshan A Algarni,
Cranfield university, Cranfield, United Kingdom, n.a.algarni@cranfield.ac.uk

Dr. McLaughlin Patrick,
Cranfield university, Cranfield, United Kingdom, p.mclaughlin@cranfield.ac.uk

Dr. Al-Ashaab Ahmed,
Cranfield university, Cranfield, United Kingdom, a.al-ashaab@cranfield.ac.uk

Dr. Rashid Hamad,
University of Sharjah, UAE, h.s.rashid@cranfield.ac.uk

Abstract

The purpose of this paper is to identify the aspects that relate to performance level; including enablers and inhibitors that influence performance in the healthcare sector of the Kingdom of Saudi Arabia (KSA). Viewed through this study, the effect of culture on the performance level in this important sector can be understood and new and integrated solutions to overcome potential negative outcomes. A grounded research methodology and an action research approach that was *'issue focused'* were used to gain the perceptions of the participants from the organisational culture as an empirical data. The overall trends observed in the collected data emphasizes the important role of culture in shaping performance level. In addition, the domination of factors related to the national culture and Islamic values has appeared the greatest factor affecting leaders' decisions; it also forms their relations with subordinates as well as their commitment to the organisation. Because of the chosen research approach, the research results may lack generalisability. Therefore, researchers are encouraged to test the proposed propositions further. The paper discusses the implications of the study findings for healthcare sector managers in different levels. This paper fulfils an identified need to study how culture can influence workforce practices in healthcare organisations and to what extent can that affect the quality of services delivered to the patients.

Keywords: Healthcare sector, Saudi Arabia, culture, Islamic values

Introduction

Saudi Arabia is a country in Western Asia covering an area of 900 000 square miles. In 2015, its population was approximately 31 million people, the number of Saudi nationals being 20.7 million (66.9% of the total population) with a 1.62% annual population growth, and its foreign population was 10.24 million - 33.1% of the total population- (Saudi General Authority Statistics, 2016). The healthcare sector of Saudi Arabia is currently working intensively on comprehensive development and modernisation in order to improve performance and deliver a better service (Albejaidi, 2010). In a previous study, Walston et al. (2008) indicated that factors that affect the service of this sector; the large percent of foreign workers and the high percentage of young people of the population.

As shown in Table 1, the number of hospitals and beds in the health sectors of the KSA has gradually increased over the past five years.

Table 1 : Total Hospital and Beds in the Saudi healthcare

	Tcta. I lospitals and Becs in the Kingdom by agency 2011-2015 .									
	Table 4-17									
	2015		2014		2013		2012		2011	
	Beds	Hospitals	Beds	Hospitals	Beds	Hospitals	Beds	Hospitals	Beds	Hospitals
MOH	41297	274	40300	270	38970	268	35828	259	34450	251
Other governmental sectors	11449	43	12032	42	11414	41	11043	39	10948	39
private sector	16648	145	15665	141	14310	136	14165	137	13298	130
Total	69394	462	67997	453	64694	445	61036	435	58696	420
	Source: MOH									

In a recent study, Yusuf (2014, p. 117) stated that "The increasing population and health expenditures are forcing the government to come up with considerable changes in the healthcare system". It is estimated that by 2020 the total number of people aged 60 and above will be over 2.5 million (Yusuf, 2014). This aging of the population will increase the demand for and expenditure on healthcare.

Factors found to be influencing healthcare services have been explored in several studies. For instance, Armit et al. (2015) suggest that health and social care services must be integrated in order to meet the needs of patients, service users and communities both efficiently and effectively. Health care has to be delivered by an interdependent network of organizations and this requires leaders to work together, spanning organizational boundaries both within and between organizations, prioritising overall patient care rather than the success of their component of it (Armit et al., 2015).

This should not really be surprising to anyone, how culture plays the key role in determines the direction of the organisation performance. Culture reflects what an organization values: quality, safety, productivity, survival, power, secrecy, justice, humanity and so on (West *et al.*, 2014). Furthermore, culture can be seen as a set of shared, taken-for-granted implicit assumptions that members of an organization hold and that determines how they perceive, think about and react to things (Schein, 1996). The organizational culture reflects the values of its employees. By using these values, the members are able to make decisions when they tackle problems, address issues and seek solutions (McLaughlin et al. , 2005). According to Bass and Avolio, (1993, p. 113) "culture can affect how decisions are made with respect to such areas as recruitment, selection, and placement within the organization".

According to Mellahi (2007, p. 88), "Saudi Arabia is governed by an Islamic monarchy in which Islam makes up the civil, cultural, economic, legal, political and social fabric of the country". The role of Islam as the first tenet of Saudi culture is largely established on the basis of the Qur'an (the holy book) and the Sunna (the sayings and practices of the prophet Mohammed, peace be upon him) (Aldraehim et al., 2012).

Methodology

This study was exploratory and interpretive in nature. Hence, a grounded approach was used in order to capture the perceptions of the participants from the organisation (Glaser, Strauss and Strutzel, 1968). The interpretive paradigm and grounded theory were found to be useful for this study, in enabling the

researcher to use individuals' perceptions and meanings in order to explore, explain and describe what was going on; they enabled the researcher to construct a theory that was grounded in the data collected (Corbin and Strauss, 2014). In other words, grounded theory facilitates the understanding of social reality, and lets the data tell their story (Strauss and Corbin, 1990). An appropriate method to gather aspects controlling performance in the field study was to use some issue (Sackmann, 1991) to encourage the participants to focus their attention on a specific action. A major advantage of this method as Sakmann (1991) claims, is that it enables both the surfacing of tacit components of culture and comparisons across individuals and research settings. This method helps researchers at this stage to understand the factors that influence the organisation's culture. Identifying those specific aspects that play the key role in a field study is essential for the subsequent research process.

Table 2: Research methodology

Paradigm	**Interpretivist**		
Research Approach	**Field Study**		
Research Strategy	**Grounded Theory**		
Research Methods	**Interviews (Issue focus)**	**Observation**	**Focus Groups**
Analytic Framework	**Grounded Theory (Open Coding, Selective Coding, and Axial Coding) – Textual Analysis**		

The fieldwork for this study was to 33 interviews as shown in Figure 1. Throughout the iterative steps in data collection, theoretical sampling was followed in this study in order to determine a certain level of saturation. According to Binder and Edwards, (2010, p. 241) "The researchers kept recruiting and interviewing research participants until no new data was produced that added new insights to theory construction or no new information … about the research topic".

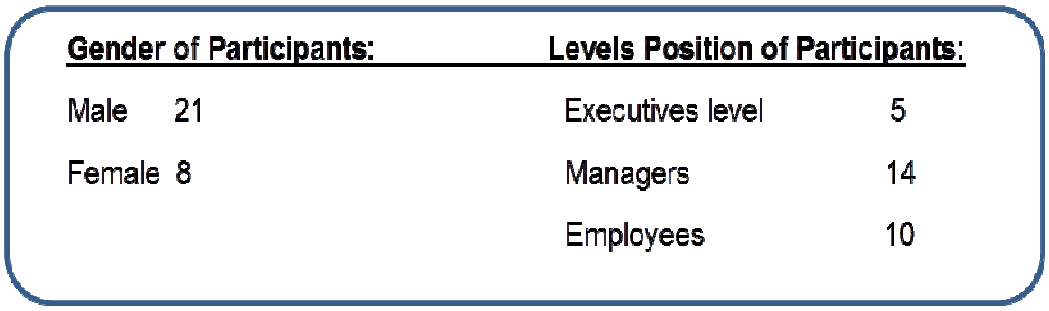


Figure 1 : participants' demographic

Face-to-face interviews took place between June and July 2015 as a first stage of data collection, lasting between 45 and 92 minutes each. Prior to data collection, the participants received an explanation of the purpose of study. All the participants approved audio taping and transcription, which produced a total of 675 minutes of speech and over 232 pages of transcripts. The interviews were conducted in Arabic, and then all the interviews were transcribed and translated into English. The major advantage of semi-structured interviews is that it allowed for a high degree of anonymity, and had a setting that encouraged participants to share their thoughts more openly.

The data management and analysis tool selected was Nvivo software. This qualitative data analysis package was used for the initial stages of coding and facilitated the coding and analytical processes. To ensure the trustworthiness of the findings and the accuracy of the coding, every response made, whether positive or negative, was considered. Data were collected over several months. Data were gathered from multiple sources at various time points during research process. Throughout the iterative steps in data collection, theoretical sampling was followed in this study in order to determine a certain level of saturation.

In the next stage of the study, Face-to-face interviews took place between December 2015 and January 2016, the participants were asked to take part in refining of the factors which emerged from the data analysed as shown in Figure 3. The data were analysed on an interview-by-interview basis. The open coding process took account of the transcript analyses line by line, word by word, and paragraph by paragraph. Cross-interview surveys then considered and compared data to identify which factors had emerged from the other interviews. In the final analysis of the findings, they were compared with those in the current literature. Constant comparisons with the literature and the collected data as well as the iterative steps of data collecting from the participants was carried out (Goulding, 2009).

The sample for the study is the health affairs of the Ministry of the National Guard in this country. The National Guard Health Affairs (NGHA) is one of the largest health organisations in the Kingdom, providing modern medical care to the employees of the National Guard and their families, as well as to Saudi nationals with tertiary health problems (Ministry of National Guard/Health Affairs, 2016). NGHA has also become well known internationally, especially with regard to the successful separation of conjoined twins; this is only one example of many high level services that have put NGHA at the heart of medicine in its own land (Geneva Health International Limited, 2016).

Results

This study provided an opportunity to advance understanding of the influences in this field study and assess how far it dominates current performance. 71 open codes had emerged in different occurrences as shown in Figure 4. The findings show that aspect ‘Islamic values’ is the most influential element in the performance of leaders and employees in an organisation, with the high frequency of 39, as shown in Figure 4. In addition, the current data highlight the fact that Islamic values affect the relationship between leaders and their subordinates and also their relationship with their organisation's environment. The second most influential factor appeared in this data was ‘fairness and equality’, with a frequency of 37.

The findings of this study pointed out the impact of ‘national culture’ on leadership performance, organisational culture and their effects in turn on employees’ job satisfaction and commitment. The frequency of this factor was 28, as shown in Figure 3. Furthermore, the study indicates that the

participants on the whole demonstrated that emotional intelligence, such as being human, honesty, initiative, cognitive skill and eagerness to develop play crucial parts as well in field study performance. Surprisingly, only a minority of participants indicated to the importance of factors such as Strategic thinking and sharing in decision making. In addition, 'Sharing in decision making' reflects the dislike of teamwork.

The main common factors among the findings were 'Combining human aspects with regulation', 'Fairness of the evaluation criteria', 'National culture difficulties', 'Openly communicating', 'Personal relationships', 'Personifying the work environment', and 'Tolerance'. The effects of these factors on performance, as shown in Figure 3, were different, scoring between 21 and 37. Other findings show how the relations between leaders and their employees can be affected negatively as a result of a decision that is taken by a leader which affects subordinates.

The study suggested that the relations between leaders and their followers need to be under the official supervision of the highest tiers of management. As number of interviewees suggested, this can provide a clear security system for both leaders and employees and protect their rights in the organisation. As one interviewee said, "Certainly, there should be something to protect and defend the employee if (sic) is right. There should be an agency to investigate the case in which an employee's evaluation is 99% and s/he does not get promoted".

One of the more noticeable findings to emerge from this study is the power of several factors which particularly affect performance in the healthcare sector of KSA; for example, help for some employees who has personal problems, Individualising employees' motivation, having moral criteria for employment, observing according to evaluation indicators, supervising the relations between managers and employees in the workplace and evaluating employees' mindset.

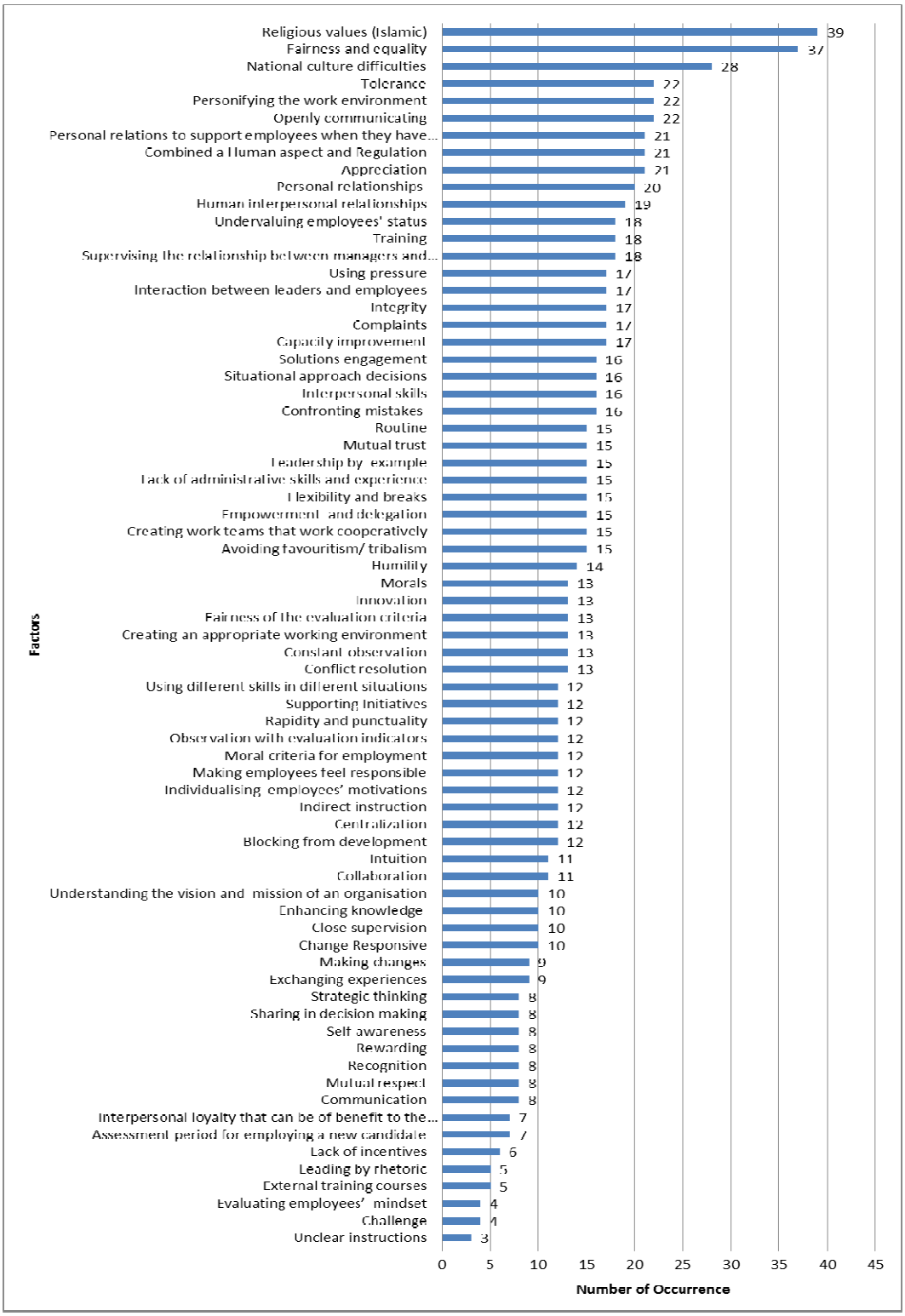

Religious values (Islamic) 39
Fairness and equality 37
National culture difficulties 28
Tolerance 22
Personifying the work environment 22
Openly communicating 22
Personal relations to support employees when they have... 21
Combined a Human aspect and Regulation 21
Appreciation 21
Personal relationships 20
Human interpersonal relationships 19
Undervaluing employees' status 18
Training 18
Supervising the relationship between managers and... 18
Using pressure 17
Interaction between leaders and employees 17
Integrity 17
Complaints 17
Capacity improvement 17
Solutions engagement 16
Situational approach decisions 16
Interpersonal skills 16
Confronting mistakes 16
Routine 15
Mutual trust 15
Leadership by example 15
Lack of administrative skills and experience 15
Flexibility and breaks 15
Empowerment and delegation 15
Creating work teams that work cooperatively 15
Avoiding favouritism/ tribalism 15
Humility 14
Morals 13
Innovation 13
Fairness of the evaluation criteria 13
Creating an appropriate working environment 13
Constant observation 13
Conflict resolution 13
Using different skills in different situations 12
Supporting Initiatives 12
Rapidity and punctuality 12
Observation with evaluation indicators 12
Moral criteria for employment 12
Making employees feel responsible 12
Individualising employees' motivations 12
Indirect instruction 12
Centralization 12
Blocking from development 12
Intuition 11
Collaboration 11
Understanding the vision and mission of an organisation 10
Enhancing knowledge 10
Close supervision 10
Change Responsive 10
Making changes 9
Exchanging experiences 9
Strategic thinking 8
Sharing in decision making 8
Self awareness 8
Rewarding 8
Recognition 8
Mutual respect 8
Communication 8
Interpersonal loyalty that can be of benefit to the... 7
Assessment period for employing a new candidate 7
Lack of incentives 6
Leading by rhetoric 5
External training courses 5
Evaluating employees' mindset 4
Challenge 4
Unclear instructions 3
Factors
0 5 10 15 20 25 30 35 40 45
Number of Occurrence

Table 3 below displays the greater 22 factors that obtained from the analysis of the data and the frequency of their occurrence as well as the descriptions. These factors represent 30 per cent of the overall factors. These factors tend to be seen in the behaviours and aspects of the cognitive and interpersonal qualities of leaders. The study found that, a number of elements emerged as essential in shaping the aspects of workforce performance, such as Islamic values, fairness and equality and the national culture.

Table 3 : The emerged factors and its descriptions

Factor	Description	Frequency
1. Religious values (Islamic)	Religious values and beliefs that influence leadership thoughts, employee relationships within an organisation.	39
2. Fairness and equality	Ensuring impartial, or non-selective management of employees, but rather conforming to laid down organisational rules and policies.	37
3. National culture difficulties	Specific aspects of national culture which potentially affect performance improvement within the organization.	28
4. Tolerance	Broad-mindedness to employee mistakes, misbehaviours, and criticisms, allowing for gradual learning and improvements.	22
5. Personifying the work environment	Kind of conflicts that potentially happens between leaders and their employees as a result of discussing any mistakes which related to the workplace.	22
6. Openly communicating	Enabling direct and unrestricted exchange of messages or information between leaders and followers within an organizational structure.	22
7. Personal relations with some employees to help support their personal issues	Some employees keen on building personal relations with leaders as strategy towards easily attaining self-gains (promotions, external training, and other incentives) within the organisation.	21
8. Combined a Human aspect and Regulation	Perceived concurrent application of both social (human) and rule-based approaches could yield better employee output.	21
9. Appreciation	Acknowledging and according value to employee attributes, and (or) outputs.	21
10. Personal relationships	Building good interpersonal relationships with, and among employees is key to improving performance, and achieving a conducive working environment.	20

11. Human interpersonal relationships	Improving performance through building a good human interpersonal relationship among employees for a more friendly, and motivated workplace.	19
12. Undervaluing employees' status	Underrating and failing to appreciate the importance of employees in an organisation, likely to yield negative performance and outputs	18
13. Training	Sequence courses and activities imported into employees to build their knowledge, skills and competence for undertaking organisational roles and responsibilities.	18
14. Supervising the relationship between managers and employees in the workplace	A formal approved duty of a designated department in the organization, which will involve observing, assess, and manages the relationship between both sides to avoid relational frictions capable of affecting normal work within the work environment.	18
15. Applying Pressure	Exerting stressful requirements on employees as a second resort to solving problems, could sometimes bring about good results.	17
16. Interaction between leaders and employees	Mutual relations and interfacing between leaders and their subordinates within the organization.	17
17. Integrity	The quality of being honest, upright, and reliable. Having strong moral principles	17
18. Complaints	Complaints within organizations are inherent and critical, and should be treated with expedition in every work environment.	17
19. Capacity improvement	Employee capacity Improvement through training and education for knowledge and skills.	17
20. Solutions engagement	Being part of solution efforts to potential problems within the workplace.	16
21. Situational approach decisions	Leadership decisions depending on situation and personal dispositions.	16
22. Interpersonal skills	Leadership personal ability to relate easily and liberally, helping them manage their work while builds relationship with employees.	16

Comparison with the literature

The study findings corresponds with Bolden and Gosling (2006) who propose that leadership benefits by sets of components, such as the traits, qualities, skills, and behaviours which encourage the teamwork, development and commitment of others in an organisational environment. (Bass and Riggio, 2006) emphasises the importance of 'fairness and equality' within the successful organizations environment.

Significantly, National culture plays an important role to shape an individual's work ethic (Yousef, 2001). In a previous study, Hunt and At-Twaijri, (1996) claim that further aspects such as friendships and personal thoughts have given more attention from Saudi managers over performance and organisational objectives. Previous studies in this context confirm that the significant impact of organisational culture on worker motivation and organisational performance is widely acknowledged (Franco et al, 2002). Schein (2004) argues that culture is a perceptual structure of underlying assumptions that have been discovered, developed, or improved by a given group as the group learns to cope with its challenges of external adaptation and internal integration. Furthermore, culture has been defined to imply a set of shared, taken-for-granted implicit assumptions held by the members of an organisation, which determines the way that they perceive, think about and respond to things (Schein, 2004). This view is supported by Rees and Althakhri, (2008, p. 124) who write that the "Saudi Arabian culture is strongly affected by Islamic and tribalism systems". The concept of the Islamic work ethic (IWE) has its basis from the Quran and the sayings of Prophet Mohammed. In a previous study, D. A. Yousef, (2001) pointed out that Islamic work ethic has an strong influence on both committed to organisation and satisfied with the job. Additionally, Ali (1987), indicated in his study to the Islam as one of the most influential factors which have shaped Arab value systems.

While the data shown that only two of the participants believed the effect of 'Strategic thinking' on their performance, (Bass and Avolio, 1993) indicated to the important role of this factor and argue that "strategic thinking helps to create and build the vision of an agency's future" (p. 119). The literature also indicated certain other factors that do not appear in the field study findings, such as having public abilities and skills, matching job needs with employees' capability or talent and technical competence (Boyatzis & Boyatzis, 2008; Yukl, 2006; Hollenbeck, et al., 2006; Bass, 1990 and Riggo, 2006). Importantly, there are several factors in findings which demonstrate what affects leadership performance which are not shown to be important in the literature. These are; helping some employees to support them in personal problems, Individualising employees' motivation, Moral criteria for employment, Observation with evaluation indicators, supervising the relationship between managers and employees in the workplace and evaluating the employees' mindset.

Discussion

This study has investigated the effect of the culture influential on leadership style and practices, on job performance in Saudi's healthcare sector. The study shows that aspect 'Islamic values' is the most influential element in the performance of leaders and employees in an organisation. The results that individuals in field study investigated are highly committed to the Islamic work values are consistent with previous research (Rees and Althakhri, 2008; Yousef, 2000,2001; Ali, 1987; Mellahi, 2007). Associating the findings of this study with those other studies, Hunt and At-Twaijri (1996) indicated that the Islamic work ethic plays a fundamental role in the commitment of Saudi leaders toward their organisational tasks and with their subordinates. In a previous study, D. A. Yousef (2001) pointed out that Islamic work ethic

has an strong influence on both committed to organisation and satisfied with the job. Additionally, Ali (1987) indicated in his study to the Islam as one of the most influential factors which have shaped Arab value systems.

The findings of this study revealed that the influence of 'national culture' and organisational culture. Similarly, Yousef (2001) indicated to that the significant role of national culture to shape an individual's work ethic. Culture has been defined to imply a set of shared, taken-for-granted implicit assumptions held by the members of an organisation, which determines the way that they perceive, think about and respond to things (Schein, 1996). In addition, Hunt and At-Twaijri (1996) claim that further aspects such as friendships and personal thoughts have given more attention from Saudi managers over performance and organisational objectives. This finding is linked with Garrido-Franco *et al.*, (2002) who argued that cultural physiognomies can the influence organisational structure decision-making processes within organizations.

This study found that the domination of fairness and equality, which appears among the factors that most affect leaders' decisions; it also determines their relations with subordinates as well as their commitment to the organisation. The results in line with Bass and Avolio (1994) who indicated to the 'transformational leadership' characteristics with the application of certain values to create effective leadership is one of the deeply-held beliefs of leaders; these values include areas such as justice and integrity (Yukl, 2002). Such factors tend to be seen from the behaviours and aspects of cognitive, interpersonal qualities of leaders. The aspects all play a key role in a leader's abilities either to inhibit or enable their own performance improvement and the performance of the workforce. The participants on the whole demonstrated that emotional intelligence, such as "being human", honesty, initiative, cognitive skill and eagerness to develop play crucial parts as well.

Yukl (2002) also finds that attention should be paid to delegating authority to staff and improving communication channels between managers and staff. Furthermore, previous studies indicate to the key role of empowerment by management to enhance the employees' participation, productivity, satisfaction and commitment (Conger & Kanungo 1988; Malone, 1997; Lok & Crawford 2004). 'Appreciation' has significantly emerged from this study as an essential factor for motivating employees. This result consistent with (Yukl, 2002 and Christopher, 2013).

While the data shown that the minority of the participants believed the effect of 'Strategic thinking' on their performance, Bass and Avolio (1994) indicated to the important role of this factor and argue that "strategic thinking helps to create and build the vision of an agency's future". According to Volz-Peacock et al (2016, p. 319) "Foremost is the fact that organizations worldwide are faced with the growing challenge of increasing the capabilities of their leaders with less time and fewer financial resources"

Importantly, there are several factors in findings which demonstrate what affects performance in the field study which are not shown to be important in the literature. These are; helping some employees to support them in personal needs, individualising employees' motivation, moral criteria for employment, observation with evaluation indicators, supervising the relationship between managers and employees in the workplace and evaluating the employees' mindset. This result suggests that organisations in the healthcare sector can benefit by giving more attention to these aspects in the future. Personifying the work environment is another finding has revealed from this study, which shows how the relations between leaders and their employees can be affected negatively as a result of a decision that is taken by a leader which affects subordinates.

These results suggest that these new areas where further research would be interesting to be investigated in the future. Specifically, interesting topics for future cross cultural research. McAlearney (2006, p. 968) indicates to the important role of management in healthcare organizations, stating that "In healthcare settings, there is often little attention given to how improve management practice, increasing the likelihood that previous mistakes will be repeated". Moreover, the literature demonstrates that the current practice of planning and developing strategies in the health sector is one-sided and only from the top, justifying the view that the KSA needs to correct the direction of its health reforms (Al-Borie and Abdullah, 2013).

Conclusions and Implications

The research applies an interpretive approach to gain a deeper understanding and a clear explanation of the performance and practices in the Saudis' healthcare organizations. The findings suggest 71 factors that can inhabit and enable improvement of performance. These factors tend to be seen in the behaviours and aspects of the cognitive and interpersonal qualities. A number of elements emerged as important in shaping the development of performance, such as Islamic values, fairness and equality and the national culture.

Taken together, these results suggest that there is an association between the study findings and the literature in the vast majority of factors. However, one of the more significant findings to emerge from this study is the domination of several factors which particularly affect performance in the healthcare sector of KSA; for example, helping some employees to support them in personal needs, Individualising employees' motivation, having moral criteria for employment, observing according to evaluation indicators, supervising the relations between managers and employees in the workplace and evaluating employees' mindset. Reviewing the literature did not indicate clearly to the importance of these factors in particular in the development of performance. However, this result suggests that it would be interesting in future studies to investigate the influence of these factors on performance extensively in healthcare sector. Because of the chosen research approach, the research results may lack generalisability. Therefore, researchers are encouraged to test the proposed propositions further.

References

Ali, A. (1987) 'Value Systems as Predictors of Work Satisfactions of Arab Executives', *International Journal of Manpower*. Saginaw Valley State: MCB UP Ltd, 8(2), pp. 3–6.

Bass, B. and Avolio, B. (1994) 'Transformational leadership and organizational culture', *The International Journal of Public Administration*. Edited by B. A. Bernard Bass. Taylor & Francis, 17(3–4), pp. 541–554.

Bass, B. M. and Riggio, R. E. (2006) *Transformational leadership*. Psychology Press.

BERNARD M. BASS and BRUCE J. AVOLIO (1993) 'TRANSFORMATIONAL LEADERSHIP AND ORGANIZATIONAL CULTURE.: SearchPoint for Cranfield University', *Public Administration Quarterly*, 17(1), pp. 112–121.

Binder, M. and Edwards, J. S. (2010) 'Using grounded theory method for theory building in operations management research', *International Journal of Operations & Production Management*, 30(3), pp. 232–259.

Bolden, R. and Gosling, J. (2006) 'Leadership competencies: time to change the tune?', *Leadership*. Sage Publications, 2(2), pp. 147–163.

Boyatzis, R. and Boyatzis, R. E. (2008) 'Competencies in the 21st century', *Journal of management development*. Emerald Group Publishing Limited, 27(1), pp. 5–12.

Conger, J. and Kanungo, R. (1988) 'The empowerment process: Integrating theory and practice', *Academy of management review*. Academy of Management, 13(3), pp. 471–482.

Corbin, J. and Strauss, A. (2014) *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Sage publications.

Franco, L. M., Bennett, S. and Kanfer, R. (2002) 'Health sector reform and public sector health worker motivation: a conceptual framework', *Social science & medicine*, 54(8), pp. 1255–1266.

Garrido-Franco, M., Ehlert, S., Messerschmidt, A., Marinkovic', S., Huber, R., Laber, B., Bourenkov, G. P. and Clausen, T. (2002) 'Structure and function of threonine synthase from yeast.', *The Journal of biological chemistry*, 277(14), pp. 12396–405.

Geneva Health International Limited (2016) *National Guard Health Affairs*. Available at: http://www.genevahealthmiddleeast.com/Saudi-Arabia/Why-Saudi-Arabia/Our-Clients

Glaser, B. G., Strauss, A. L. and Strutzel, E. (1968) 'The discovery of grounded theory; strategies for qualitative research', *Nursing research*. LWW, 17(4), p. 364.

Goulding, C. (2009) 'Grounded theory perspectives in organizational research', *The Sage handbook of organizational research*.

Hunt, D. M. and At-Twaijri, M. (1996) 'Values and the Saudi manager: an empirical

investigation', *Journal of Management*, 15(5), pp. 48–55.

Hussein Mohammed Al-Borie and Muhammad Tanweer Abdullah (2013) 'A "DIRE" needs orientation to Saudi health services leadership', *Leadership in Health …*. Available at: http://www.emeraldinsight.com/doi/pdf/10.1108/17511871311291723

Kirsten Armit, Dr Lola Loewenthal, Dr Regina Eckert, Thomas West, A. L. (2015) *Leadership and leadership development in health care*, *TheKing'sFund*. Available at: https://www.kingsfund.org.uk/publications/leadership-and-leadership-development-health-care

Malone, T. (1997) 'Is empowerment just a fad? Control, decision making, and IT', *MIT Sloan Management Review*. Edited by T. Malone. Sloan Management Review, 38(2), pp. 23–35.

McAlearney, A. S. (2006) 'Leadership development in healthcare: a qualitative study', *Journal of Organizational Behavior*. Wiley Online Library, 27(7), pp. 967–982. doi: 10.1002/job.417.

McLaughlin, P., Bessant, J. and Smart, P. (2005) *Developing an organizational culture that facilitates radical innovation in a mature small to medium sized company: emergent findings*. 1826/858. Available at: https://dspace.lib.cranfield.ac.uk/handle/1826/858

Mellahi, K. (2007) 'The effect of regulations on HRM: private sector firms in Saudi Arabia', *The*

International Journal of Human Resource Management. Taylor & Francis, 18(1), pp. 85–99.

Ministry of National Guard/Health Affairs (2016) *Ministry of National Guard/Health Affairs*. Available at: http://new.ngha.med.sa/English/Pages/default.aspx.

Rees, C. and Althakhri, R. (2008) 'Organizational change strategies in the Arab region: A review of critical factors', *Journal of Business Economics and …*. Available at: http://www.tandfonline.com/doi/abs/10.3846/1611-1699.2008.9.123-132

Sackmann, S. A. (1991) 'Uncovering culture in organizations', *The Journal of applied behavioral science*. Sage Publications, 27(3), pp. 295–317.

Saudi General Authority Statistics (no date) *General Statistics of Saudi Arbia*. Available at: http://www.stats.gov.sa/en.

Schein, E. H. (1996) 'Culture: The Missing Concept in Organization Studies', *Administrative Science Quarterly*. Sage Publications, Inc.Johnson Graduate School of Management, Cornell University, 41(2), p. 229.

Schein, E. H. (2004) 'Organizational Culture and Leadership', *Leadership*, 7, p. 437.

Strauss, A. and Corbin, J. (1990) *Basics of qualitative research*.

Volz-Peacock, M., Carson, B. and Marquardt, M. (2016) 'Action Learning and Leadership Development', *Advances in Developing Human Resources*, 18(3), pp. 318–333.

Walston, S., Al-Harbi, Y. and Al-Omar, B. (2008) 'The changing face of healthcare in Saudi Arabia', *Annals of Saudi medicine*. Riyadh: King Faisal specialist Hospital, 28(4), pp. 243–50.

West, M., Eckert, R., Steward, K. and Pasmore, B. (2014) *Developing collective leadership for health care May 2014*.

Yousef, D. (2000) 'Organizational commitment: A mediator of the relationships of leadership behavior with job satisfaction and performance in a non-western country', *Journal of Managerial Psychology*. Journal of Managerial Psychology, 15(1), pp. 6–24.

Yousef, D. A. (2001) 'Islamic work ethic – A moderator between organizational commitment and job satisfaction in a cross-cultural context', *Personnel Review*, 30(2), pp. 152–169.

Yukl, G. (2002) *Leadership in organizations*. 5, illustr edn. Edited by G. A. Yukl. Michigan: Prentice Hall.

Yusuf, N. (2014) 'Private and public healthcare in Saudi Arabia: future challenges', *International Journal of Business and Economic Development*, 2(1). Available at: www.ijbed.org

Information Approach to the Risk Evaluation Of the Intellectual Assets Portfolio

Victor S. Voronov,
Dr., Prof., St. Petersburg State University of Economics, St. Petersburg,
Russia, box864tmn@yandex.ru

Alexander V. Kazansky,
Ph.D., Ass. Prof., St. Petersburg State University, St. Petersburg,
Russia, a.kazanskiy@spbu.ru

Ivan A. Darushin,
Ph.D., Ass. Prof., St. Petersburg State University, St. Petersburg,
Russia, i.darushin@spbu.ru

Abstract

The article is devoted to the adaptation of VaR (EaR) method for the risk evaluation of intellectual assets (digital images) portfolio. We consider this method as the case of dynamic metadata analysis. The distribution of portfolio earnings random variables in a long period is investigated giving the peculiarities of market sales mechanism of this asset class. Information on sales statistics across the assets in portfolio analyzed for the first time. The hypothesis on earnings normal distribution was approved with the aid of data time scaling. Risk metrics calculated with the historical simulation method were approved by additional evaluations with the Monte Carlo methods. The adapted methodology allows to rather accurately performing dynamic quantitative portfolio risk analysis applying different time horizons with required confidence probability.

Keywords: copyright asset, intellectual assets portfolio, risk, stochastic simulation.

Introduction

In this work we consider the intellectual assets portfolio as sufficiently extensive information resource which can be described with a few levels of metadata. Knowing these metadata allows to effectively solving some different problems, such as indexing, classification and searching as of separate assets and of their categories and groups. For this so-called descriptive and structural metadata are commonly used. Deeper metadata analysis allows us to solving more complex problems such as portfolio earnings and risk evaluation. To solve these problems it is necessary to utilize the administrative type of metadata on sales frequencies and sales earnings across the assets in portfolio. Actually these metadata belongs to special category of dynamic metadata considering the current temporal observation sequence. To perform the evaluations these metadata should be processed with the aid of certain special algorithms. In this study we adopt and apply the VaR (EaR) methodology to evaluation of "Earnings at Risk" metrics of intellectual assets portfolio.

Economic literature actually presents just a few works devoted to the portfolio analysis of intellectual assets. The first reason is explained by the lack of clear theoretical approaches to the economical analysis of that asset classes. Even the 'intellectual asset portfolio' conception not always adequately met in science media. Second reason is the deficiency of well systematized observation data. At last, the assets itself may be quite diversified, related to different industries (businesses) and regulations.

The financial engineering has collected some skills in the area of patent assets risk management. There are a lot of special financial intermediaries, who deal with the patent assets of high technology corporations. Namely for this reason the term Economics of Intellectual Property usually associated in literature with economics of patents. But the copyright assets are significantly differing, and there is very limited number of research works in this area.

First part of this article is devoted to methodological approach for the risk evaluation of copyright assets portfolio. In the second part we analyze the information on sales distribution across the digital images portfolio with renewed statistics of 2016. Third part shows the non-parametric approach for quantitative evaluation of risk metrics including stochastic simulation methods. In the fourth part we compare the evaluations made as by non-parametric and parametric methods. Summary and conclusions are in the final part.

Methodological approach

In our previous work we analyzed, at first, the peculiarities of financial models of microphotostock companies (Voronov and Ivanov, 2016). Secondly, VaR (EaR) method of financial engineering was adapted and applied for the risk analysis of digital images portfolio (Voronov, Ivanov and Darushin, 2016).

Parametric VaR (EaR) models for the risk evaluation of securities and foreign currencies usually consider normal or lognormal distribution of returns (Hull, 2011). However, there are no research works, approving this assumption for the earnings distribution in assets of our interest. Usually in those cases may be applied any non-parametric models, where the random value distribution may be found empirically. For example, the earning distribution curve may be plotted based on statistical observation data across the portfolio for the long period (historical simulation), or with the aid of stochastic simulation (Monte Carlo methods). These methods are popular and useful because the empirical data already contain all the information on random value (i.e. earning) distribution character and dynamics, and what is quite important – on correlation among assets. But the accuracy of these methods critically depends of the information sufficiency.

The VaR methodology was used in the loss risk evaluation for lending against high valuable fine art as collateral (McAndrew and Thomson, 2007). The historical simulation method was applied here for constructing the sales distribution of French Impressionists paintings brought to the biggest world auctions from 1985 to 2001. The most important conclusion authors made was that final hammer prices distribution for a long period is well similar to lognormal. From this we have got at least indirect confirmation of analogy with return distribution curves inherent to stock values and other financial assets. Also the distribution received by authors lies in positive zone (as our too) simply ‘since prices cannot be negative’. Our work also shows that due to the market mechanism peculiarities of selling assets, the earnings cannot be negative, and the right shoulder of the distribution is most interesting for quantitative estimations. As quite understandable, we began with non-parametric methods, considering that earning distribution automatically counting for mutual correlation among assets may be found only empirically (Voronov, Ivanov and Darushin, 2016).

Portfolio statistics

Initial data set for the sales of individual copyright asset was demonstrated in our previous article. Here for the first time we present sales distribution data across the portfolio at whole. Interesting, that our analysis confirmed some general features, characteristic to other intellectual asset classes (i.e. patents). Fig. 1 shows the distribution of sales numbers across the portfolio bins. In particular X-axis show that zero-bin contains assets, which had no sales at all. Next bin presents the number of assets sold from 1 to 5 times etc. In the Table 1 the same bins shown in percents.

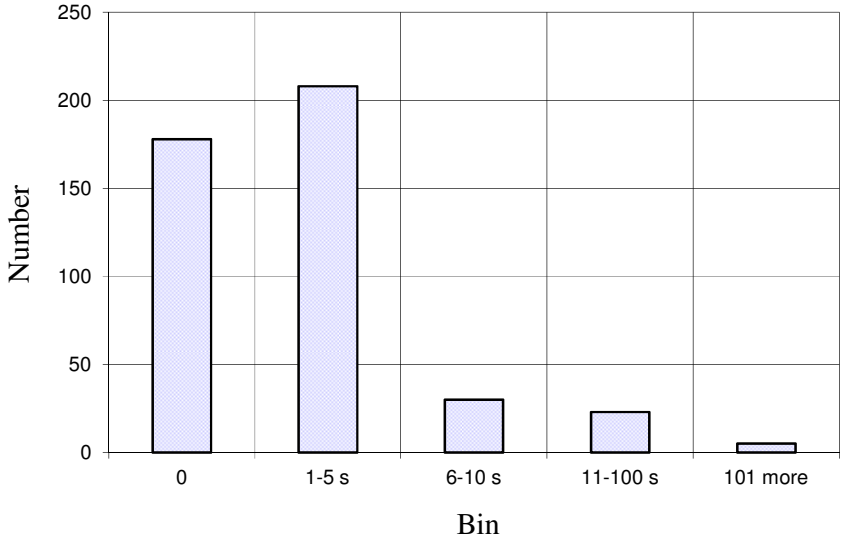


Figure 1: Distribution of sales numbers across the portfolio bins.

Table 1: Sales numbers across the portfolio bins.

№	Bins	Works number	% of total
1.	No sales	178	40,09
2.	Sold 1 - 5 times	208	46,85
3.	Sold 6 - 10 times	30	6,76
4.	Sold 11 - 100 times	23	5,18
5.	Sold 101 and more times	5	1,13
	Total:	444	100

The total distribution shows that about 40% of assets had no sales for all the portfolio exposition time (see Fig. 1 and the first bin in Table 1). During the same period about 50% of assets were sold just one time or at the best, from one to five times (see Fig. 1 and the second bin in Table 1). So, first two massive bins (summary 86,9% of total portfolio) contain assets, giving very small financial return, especially considering the prices on microphotostocks. By analogy with patent bases such assets usually called as 'ballast' (one can remember also the definitions like 'worthless patents' etc.).

The rest 12-13% images in three bins present the biggest worth as every one of them was sold tens and hundred times. However, let's note among them the worthiest, which in summary are just of 6%, but namely they brought more than 80% of total portfolio sales. Here we can remember the words of N. Myhrvold who said that just 1-3% of all patents generate a profit for their inventors (Myhrvold, 2010). More optimistic corporate and government evaluations usually not exceed 5-7%.

The last fifth bin of Table 1 is so attractive, that many microphotostocks exhibiting these works in special virtual galleries of most popular images, or so called 'records galleries'. These galleries are subject of especial interest of critics, analytics, authors-photographers and competing companies (Glückler and Panitz, 2013). They all try to understanding the reasons of every image success, revealing current trends of demand, and if possible, consider its all in their work. Quite often these images become the subject of serious artistic analysis. For this reason putting the image into the records gallery, at first, confirms authors certain creative level.

Secondly, record works performing some kind of signaling function, and may serve as sales activators as they involuntary attracting the attention of designers and other purchasers to the author's portfolio at whole. In its turn, raised attention potentially may improve the other images sales. We suppose this mechanism is quite realistic to revealing the effect of fuzzy positive correlation of this assets class in portfolio.

Some other kind of positive correlation may reveal in local groups of images united by common theme. We can connect it with the images, related, for example with great celebrations like Xmas or Easter. Designers beginning to purchase these images in advance, for a few months, considering production cycles and amounts of serial printed items (cards, calendars, package etc.). Knowing it, authors intentionally raise the numbers of images with needed themes. All this improves the sales activity inside local groups.

We already presented the sales statistics of one record work (S – image) from analyzed portfolio. By the end of 2016 its total sales increased up to 780 times, and total earnings exceeded $400. Renewed diagram on Fig. 2 gives a clear view on the sale rates for subscription and other types of sales (mostly On Demand). Corresponding rates of earnings, related to these types of sales are presented on Fig. 3.

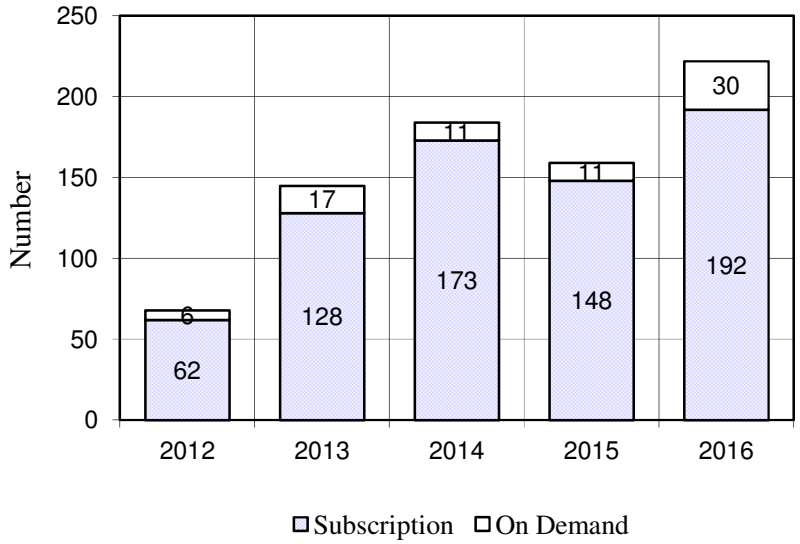


Figure 2: The number of sales of S-image in 2012-2016.

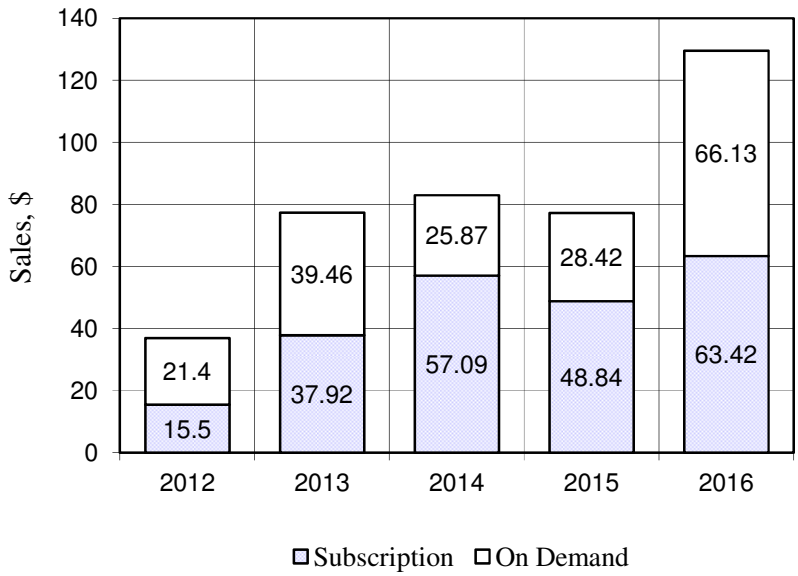


Figure 3: Sales revenue of S-image in 2012-2016.

As shown for this image, the average share On Demand in total sales is a little over 9%. On the other hand, due to higher price, sales On Demand make significant contribution to the total earnings over the same period. Their earning share for this image is about 46%, what is close to an average total value at Shutterstock (around 50%). It can be noted for this image, an average one tens share of sales On Demand yield almost half total earnings.

Non-Parametric approach

The first earnings distribution for our portfolio was received by historical simulation method. Scenario table was filled by statistical observation data with daily horizon and retrospective depth of 500 days. Initial observation data was used in rough type, i.e. without any kind of previous sorting. The first distribution histograms were visually bimodal, which is explained by different frequency and sales earnings in two categories of sales described above. The difference of these categories is well seen on Fig. 3. Rough histograms were distinctly asymmetric. Nevertheless these histograms were very useful in defining previous EaR metrics at a first approximation. It was done by the method of sorting the values of daily total earnings from all scenarios in ascending order. On the next stage the observation data was sorted in two price brackets and separate, more symmetric distribution was constructed for only subscription based daily sales.

This distribution data allowed calculating more interesting weekly forecasts. For this the observation data in sorted array was grouped so that every calendar week was presented by the single average value of sales revenue. Here is worth remember that in contrast to securities, asset trading of researched class goes on in e-commerce systems continuously 24 hours a day 7 days a week. For this reason our 500 days retrospective set is equivalent just to 72 weeks, unlike 100 weeks for securities market.

The new scenario table was constructed from the sorted data for 72 weeks, but now, every line in it reflected one corresponding calendar week. As on previous stage, scenario data was used to construct and analyze empirical sales earnings distribution renewed for weekly horizon. Different criteria testing confirmed this distribution as quite close to normal. Thus we have got a possibility, at first, to use the earnings expected values and standard deviations for the next stage – stochastic simulation by Monte Carlo method. Secondly, it allowed testing empirical evaluations in a classic parametric model and the same time – testing co called Square Root Rule (SRR) for time scaling of risk metrics.

In the first version of stochastic simulation the parameters of normal distribution of sales earnings were used to programming the random numbers generator of MS Excel tools. In fact, the random number parameter, tuned in this generator allows to programming the depth of retrospective in historical simulation. We need just consider which namely horizon to be modeled. For our weekly horizon every one scenario corresponded to one certain calendar week.

By the aid of this generator we have performed few series of ten tests with different scenario number and normal distribution preprogrammed. Then we founded percentile values for confidence probabilities of 99% and 95%, maximum and minimum random values, and other parameters to average data in each series and plotting required histograms. The distribution typical to stochastic simulation methods with sufficient scenarios amount is shown on Fig. 4. In particular, our histogram for 1000 scenarios and weekly observation horizon shows nearly quite conformity to programmed kind and parameters of normal distribution, and risk metrics found by previous method differs no more then for 2-5%.

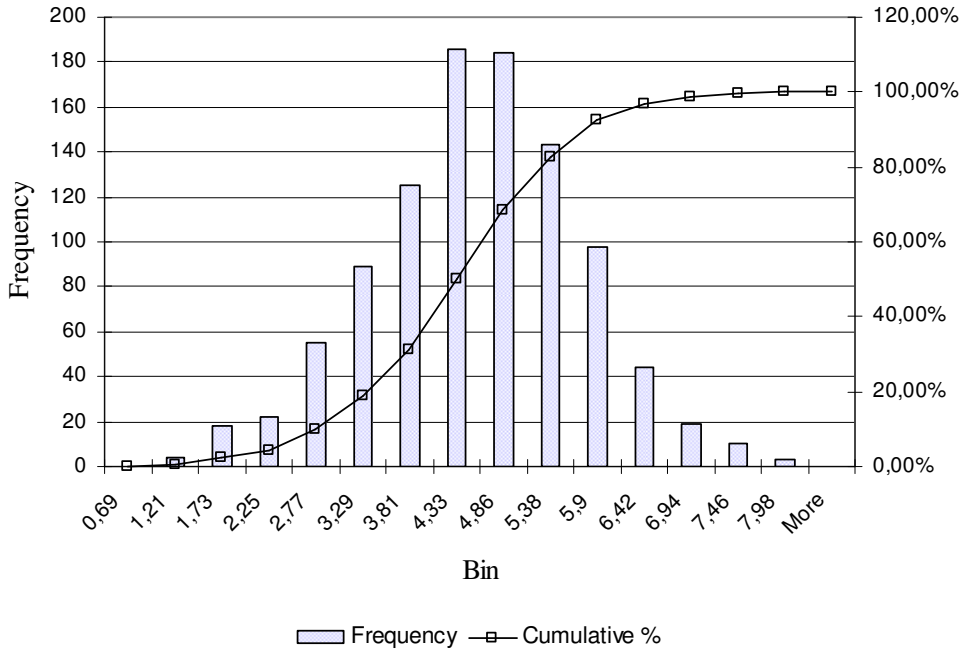


Figure 4: Stochastically simulated random earnings value distribution for 1000 scenarios and weekly horizon.

Nevertheless, as frequently noted in literature, the real market returns of financial instruments show systematic distortion from normal distribution (Hall, 2011). Actually all liquidity market empirical returns distributions show more excessive histograms with fat tails, than should be for normally distributed values especially in short periods. To consider it and modeling distribution maximally closer to empirical one, we tried next version of stochastic simulation known as Bootstrapping. In this version the standard of random number distribution is not programmed a priori, and the distribution itself is constructed based on full set of historical data. During each testing the special algorithm makes so called resampling, i.e. takes values from initial empirical distribution. The result is more accurately simulated fat tails and peak values, quite comparable with empirical distribution. For example, on Fig. 5 we show the histogram, which expected value and standard deviation equal to the same, used in classic algorithm, but strict difference is seen in tails.

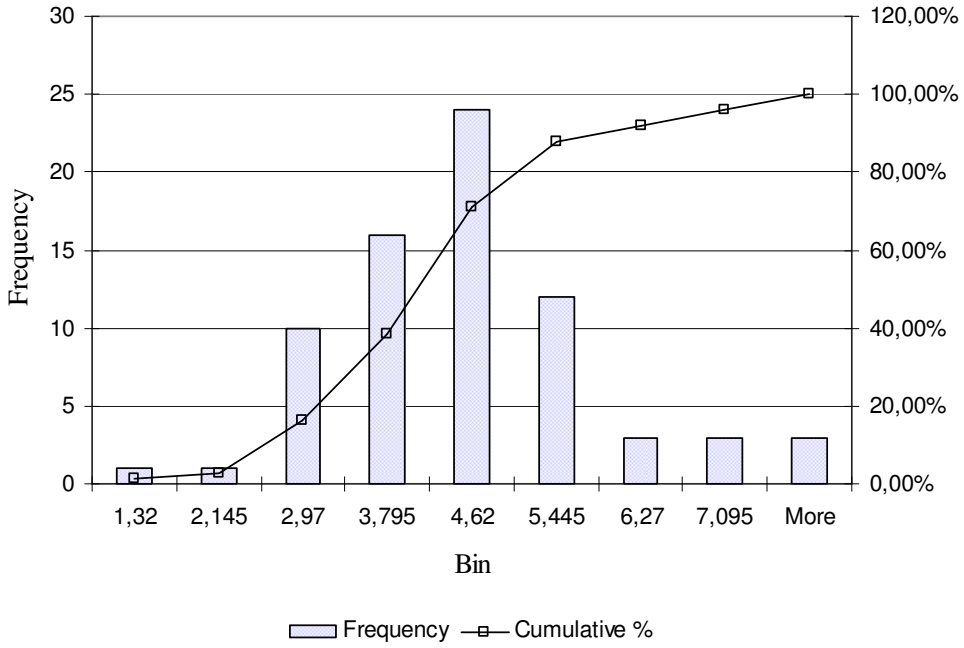


Figure 5: Random earnings value distribution stochastically simulated with resampling procedure.

Thus, more precise risk evaluations made with different non parametric models show close conformity. Worth note, it was made just after the normal distribution of earnings random numbers was approved for longer, weekly horizons.

Parametric approach

Approving the previous distribution as normal allowed us to apply parametric models for the risk evaluations as well. As the earnings expected values and standard deviation were previously received by processing our initial data, then we could compare risk evaluations made as by non-parametric and parametric methods. In this work we assumed that the standard deviation measure for our case is the same as for earnings value per portfolio and defines a certain standard root-mean-square interval of random values, which is symmetric for an expected average earnings value (Siegel, 2011). Based on received earnings expected values and standard deviation, giving the confidence probability levels of interest we received the risk metrics, differing just for 5-8% from the evaluations made by non-parametric methods.

The result was much worse when we tried to time scaling of risk evaluations by standard Square Root Rule (SRR). The first reason of this is that daily (short horizon) distribution of random earnings value is not quite normal (Voronov, Ivanov and Darushin, 2016). Secondly, this approach at whole hardly conforms the economic sense of price risk, as the risk value in SRR for the long horizons always equals the daily value multiplied by some numerical constant (Ivanov et al., 2016). Our calculation show that risk metrics made by the SRR may differ up to 30-40% of empirically received numbers.

Summaries and Conclusion

The goal of this work is to further developing methodology of intellectual assets risk evaluation. On this stage next tasks were performed. First, the background data set for the risk analysis of researched portfolio was substantially renewed. For the first time we presented the quantitative analysis of sales

distribution across the assets in portfolio. Previous assumptions on possible mechanism of correlation among these assets are discussed.

Next, initial data subjected to time scaling were used to stochastic simulation of earnings distribution. In the first version the earnings random value scenarios were produced by the random number generator based on fixed expected values, standard deviations and normal distribution function. Then the risk metrics for the corresponding confidence probabilities were found. In the second version of stochastic simulation we applied statistical bootstrapping method. The risk metrics performed in previous and present works were compared with the calculations by simple parametric model and also used to testing Square Root Rule commonly used to time scaling.

Thus, our empirical analysis approved by further evaluations confirmed that dynamic metadata processing allows to accurately forecasting 'Earnings at Risk' metrics within different time horizons and confidence probability.

Our further work will include the modeling of major aspects of intellectual assets portfolio metadata and providing a semantically defined representation of dynamic portfolio risk metrics.

References

Hull, J.C. (2011), Options, Futures & Other Derivatives. 8th Edition, Prentice Hall.

Glückler, J. and Panitz, R. (2013), *Survey of the Global Stock Image Market 2012. Part I: Players, Products, Business*. Heidelberg: GSIM Research Group.

Ivanov, V. et al. (2014), Sovremennye Finansovye Rynki [Modern Financial Markets], V. Ivanov (ed.), Prospect, Moscow.

McAndrew, C., and Thomson, R. (2007), 'The Collateral Value of Fine Art' *Journal of Banking & Finance*, 31, 589-607.

Myhrvold, N. (2010), 'Funding Eureka!' *Harvard Business Revue*, March, 40-50.

Siegel, A.F. (2011), Practical Business Statistics. 6th Edition. Academic Press.

Voronov, V., Ivanov, V., and Darushin, I. (2016), 'The Risk of Creativity: EaR for the Intellectual Assets Portfolio'. Proceedings of the 28th International Business Information Management Association (IBIMA), ISBN: 978-0-9860419-8-3. 9-10 November 2016. Seville, Spain, 2088-2097.

Voronov, V., and Ivanov, V. (2016), 'The Rise of Cyber Market for Stock Art: Assets Aggregation and the Wealth of Mass Creativity'. Proceedings of the 27th International Business Information Management Association (IBIMA), ISBN: 978-0-9860419-6-9, 4-5 May 2016, Milan, Italy, 537-545.

The Importance of Human Resources Management in Business Practice in Slovakia

Milota Vetráková
Matej Bel University in Banská Bystrica, Faculty of Economics
Department of Tourism and Hospitality, Tajovského, Slovakia
e-mail: milota.vetrakova@umb.sk

Lukáš Smerek
Matej Bel University in Banská Bystrica, Faculty of Economics
Department of Corporate Economics and Management, Tajovského, Banská Bystrica, Slovakia
e-mail: lukas.smerek@umb.sk

Mária Seková
Matej Bel University in Banská Bystrica, Faculty of Economics
Department of Corporate Economics and Management, Tajovského, Banská Bystrica, Slovakia
e-mail: maria.sekova@umb.sk

Abstract

We suppose that enterprises are run by competent managers who have a clear vision, knowledge, good will, and they are able to achieve it. Competence of managers is a prerequisite for the development and efficient utilization of the funds invested in the realization of the products demanded by the market. Successful fulfilment of this goal depends on the ability of managers / owners to acquire exploit and develop all enterprise resources, including human resources. Human resource management is the reflection and outcome of managerial work. It is not enough to highlight the importance of employees, it is important to look for them, to support those who are strategic and high performing for the enterprise. It is thus essential to create an environment that motivates employees to work better and change their behavior. Verification of the above axiom will not be undertaken without conducting a survey that moves our considerations on human resource management further. The aim of the paper is to present the views of domestic and foreign experts on the importance of human resources in management processes, to recommend best practice approaches in the management of successful enterprises. Theoretical knowledge is the subject of comparison with the results of sociological inquiry in a questionnaire made in 2017 with 381 respondents responsible for personnel work in selected enterprises in Slovakia. The result of the study is the proposal of the personnel work system in enterprises.

Keywords: human resources, processes, management system, human resources management.

Introduction

The recognition of employees with their knowledge, skills, experience and work motivation as the most important source of enterprise existence and development is the basic attribute of human resource management. We consider human resource management to be an integral part of the management work of each manager (Vetráková et al. 2011) just like Kachaňáková (2001), Koubek (2007), Storey (2007), Rogers (2011), Armstrong, Taylor (2015), Wilton (2016) and others do. Human resource management is characterized by the application of a strategic approach to management, it focuses on the external factors of the work and formation of the workforce, stresses the commitment of the employees of the company, applies a complex and internally interconnected system of mutually supportive employment policy and

practice, emphasizes a strong corporate culture, performance and employee development, prefers transparent remuneration taking into account executive and competent employees. Employee relationships are based on high confidence; teamwork, management decentralization, creativity, flexibility and customer orientation are encouraged.

One of the main reasons for examining the importance of managing human resources in Slovak enterprises is to determine whether systems, established policies and procedures are designed to create and maintain a high level of employee engagement and performance. This idea is also supported by examples of best practice in human resource management (Hinkin, Tracey 2010), which are based on the assumption that there are universally applicable practices for employee work guidance to improve the performance of an enterprise. On the other hand, "best fit" approach (Šikýř, 2014) highlights the need to adapt the principles and practices of personal work to the specific situation and conditions in an enterprise. Anyway, both approaches highlight the importance of human resources in achieving business performance.

Managers' orientation towards employees as human resources points to their excellence, especially the ability to bring higher added value to their basic value. Only people can find ways to discover something new, find, create and utilize technology and other resources, increase quality or improve management. Some experts (Bach, 2005; Drucker, 2012; Prescott – Rothwell, 2012; Hitka et al., 2015 and others) support the opinion that technology can be bought and funds can be borrowed, but it's nothing valid unless there are productive employees identified with the objectives and intentions of the enterprise.

The implemented management system is effective if it creates an environment in which employees want to work, they know what to do, what the expectations are and what their rights and responsibilities are. The established system (Armstrong, 2007) is not a guarantee of employee satisfaction, if managers and employees are not aware of the reason for its initiation; no personal activities (processes, functions) and responsibility for their implementation are determined; there is a lack of procedures and standards of personnel work; employees are not informed about the possibilities of participation in achieving the objectives of the enterprise and their subsequent stabilization. The personnel work system includes all personnel activities that are associated with the employment. It means:

- identifying and selecting qualified and competent employees (job analysis, human resource planning, searching, selecting and recruiting) and releasing those who are unable to perform at the expected level and behave properly,
- providing work assignments (human resource strategy and policy, adaptation, education and development, work motivation, employee and job evaluation, HR services, PIS services, personnel controlling, human resources audit),
- retaining competent employees (career development, talent management, work performance management, remuneration and employee benefits, occupational health and safety, employment relationships, employee care, internal mobility).

In addition to system approach, the description of elements (activities) of personnel work through functions and processes can be found in the human resource management theory. According to Hittmar – Veselý (2011), this term results from the mission and the purpose of human resource management. Personnel activities, that take place on a regular basis, meet the attributes of the process because inputs (resources) are transformed into outputs in accordance with the needs of the employer and/or the employee.

We believe that it is not essential to designate elements of a human resource management system through personal activities, processes or functions. The differences in conceptual designation of human resource management elements stem from selected approaches and insights into personnel work and are related to

the scope, significance, and periodicity of the performance of the work activities. They take into account the system, process, and functional approach of exploration. It is essential that every human activity, the process, must be planned, organizationally, financially, materially and personally secured, continuously controlled to demonstrate functionality and justification. The result of investing in human resource development is to increase the competence of employees at the workplace and, above all, to increase the performance of the enterprise. If business management applies appropriate human resource management practices, it can influence work performance and thus the performance and stability of an enterprise.

Material and Methods

Personnel work has undergone significant changes after 1989 generated by the transformation of the economy and the democratization of society. During this period, a new generation of managers and other employees able to work in a market environment and multinational companies was formed. Experience in managing the market economy, new forms of work organization are used not only by multinational but also by local enterprises. Occupational management practices, traditional organizational structures are gradually changing. Employing an enterprise is no longer life-long process. The importance of human resources and their management in the enterprise is declared. Validation of the above mentioned axiom is the subject of sociological inquiry that has been conducted since 1997. We are interested in the procedures and principles of employee selection, training and development, their evaluation and motivation connected to performance. While examining this, we assume that progressive human resource management practices are applied in most of the surveyed enterprises. Sociological questionnaire survey in 2017 involved 381 businesses, 88% of which operates in the private sector and 12% in the public sector.

Table 1: Size of surveyed enterprises

Sector	Number of employees				
	< 10	10 - 49	50 - 249	> 250	total
private	85	99	80	73	337
public	2	11	24	7	44
total	87 (22.89%)	110 (28.95%)	104 (27.11%)	100 (21.05%)	381 (100%)

There is a more balanced representation of enterprises in the private sector with the predominance of small enterprises (54.6%), while in the public sector there are enterprises with a number of employees from 50 to 249, which corresponds to the structure of private and public sector enterprises. The size of enterprises according to the number of employees is characterized by the level of personnel work. It is expected that the level of personnel work is higher in large enterprises comparing to the small and medium-sized enterprises.

Personnel work in surveyed enterprises is mainly in responsibility of HR (37.1%), economic department administrators (31.3%), owners (29%) and senior managers (16.8%). Its realization, especially in small enterprises, is in the hands of line managers (5.5%) and assistants (3.42%). There is a compliance between the size of the enterprises and the professional running of human resource management. In the surveyed enterprises (73.42%), mostly apart from other work, the individual processes of personnel work are carried out by one employee (46.58 %) and two employees (26.84 %). The emphasis on personnel work is increasing in enterprises with a larger number of employees, where the workforce is divided between 5 (5.79%) and more employees (12.11%). On average, three (5,79%) to four (2,89%) employees participate in individual work activities on average, especially in medium-sized enterprises.

The questionnaire was created both in printed and electronic form and contained 24 questions related to human resource management processes. The data were obtained from human resource departments or employees responsible for personnel work in the enterprise. We have gained the views of managers and/or human resource administrators on management processes through personal meetings with the use of trained surveyors. We were also interested in the most common personnel work problems and possible proposals for change. The survey was evaluated by applying descriptive statistics using the Microsoft Excel software.

Results and Discussion

The survey conducted in 2017 revealed different findings that affect the most common problems of managers with the implementation of personnel work, compared to sociological inquiries in 1997 and 2009. According to the majority of respondents (77.16%), there is a shortage of qualified job seekers and employees who are willing and able to work. Insufficient job discipline and communication, falling reliability and accountability, dissatisfaction with remuneration, increasing employees' demands are reflected in declining employee performance and increasing fluctuations. Instead of conceptual questions of personal work, managers have to deal with everyday work problems. The order of importance of human resource management processes according to managers is as follows (in%):

Selection of employees	90.79
Recruitment and adaptation of employees	86.58
Training, development	82.63
Welfare	79.47
Performance evaluation and management	79.21
Personnel administration	78.16
Optimization and planning of employees	71.84
Work analysis	56.05
Redundancies	51.58
Creating strategies, policies and plans	49.74
Personnel controlling and auditing	41.58
Job evaluation	36.32
Talent management	17.89

We have identified responsibility for various human resource management processes, and the survey has shown that top managers and human resource managers are mainly responsible for generating strategies, policies and human resource management plans, placing the employees, performance management and evaluation. Human resource departments and people responsible for personnel work are more concerned with administrative, methodological and analytical activities in management processes. The work of human resource administrators is facilitated by a functional personal information system. From an economic point of view, there is an efficient self-service personal information system, which is used by 20.53% of respondents.

Outsourcing enables enterprises to concentrate on core business activities and the other ones can be done by external experts specialized in personnel work. Nevertheless, only 26.84 % of respondents have a positive experience with outsourcing in personnel work and 6.05% have negative experience while 67.11% have never used outsourcing services. Outsourcing is mostly used in recruiting process and in organizing thematically oriented training.

Efficiency of personnel work by personnel control is assessed by 41.58% of enterprises. Operative controlling (36.05%), in particular indicators, statistics and standards of personnel work, are the most significant.

The effectiveness of other human resource management processes depends in many respects on the professionalism of employee selection, adaptation to the work and social environment of the enterprise. The most popular way to attract job seekers in the surveyed companies is to advertise electronically (63.16%), through friends and acquaintances (59.74%), direct address (34.24%), printed advertisement (32.89%). There are 28.16% of applicants from the Labor and Social Affairs Office and 18.42% of the respondents.

An analysis of the jobseeker's file is the basis of each selection procedure. In practice, it is used by 80% of respondents. Other unstructured (47.37%) and structured interviews (43.68%), expertise testing (34.47%), competence testing (31.32%), personality testing (16.32%) and intelligence testing (8.16%) are used. The use of the diagnostic method of complex evaluation of the candidates, called assessment center, was reported in 6.32% enterprises. Managers pointed out the need to improve the techniques of staff selection and change of adaptation. They recruit employees without complicated competitions and the statutory adaptation period, if necessary to fill a position, especially during the season. The reason is to ensure the operation mainly in shops, services and production.

All the businesses under review reported experience with the job descriptions and specification of the employee requirements. What is different is the level of job descriptions, the definition of job contents, because they focus on the overview of work responsibilities (83.16%), the purpose of the work (78.95%), the responsibility (72.37%) and the demands on work performance (58.16%), less attention is paid to work tasks, the use of resources and tools at work, workplace facilities, communication and collaboration with other people, job profiles and competencies. 28.42% of enterprise with the number of jobs up to 50 report the work descriptions and other documents of personnel work, 48.68% of respondents with a structure ranging from 91 to 100. The specification of the requirements for the employees and the knowledge of the job description are essential for the execution of the personnel work.

The work success rate is a work performance characterized by the results of the work and the behavior of each individual. 25% of enterprises have introduced a system of performance evaluation and management. There is an informal assessment (43.95%) based on employee observation at work and a combined assessment (31.05%) conducted as needed. In the context of the evaluation process, we reviewed the regularity of the assessment and found that 21.58% of managers rated employees by monthly performance, which can be considered as a monthly wage, once a year (24.21%), half yearly (13, 42%), quarterly (9.21%) and irregular or not at all 31.58%. The results of the evaluation are mainly reflected in remuneration (78.68%) and education (42.11%).

Table 2 : Impact of evaluation results on human resource management processes

Processes	Sector (%)		
	Public	Private	Together
Remuneration	80.95	61.36	78.68
Training and staff development	41.07	50.00	42.11
Deployment of staff	26.79	18.18	25.79
Personal planning	19.35	22.73	19.74
Analysis of jobs	17.86	18.18	17.89
Others (employee care)	0.89	0.00	0.79

While employee assessment focuses on work performance, management focuses on what and how to achieve it. It emerges from the findings that 75% of enterprises do not notify their employees with the tasks and goals they are intended to achieve and do not create an incentive environment that promotes compliance of responsibility, behavior, competencies and capability with expected employee

performance. Evaluating and managing performance is predominant in financial terms. Employees, their performance is usually examined only if staff costs increase and labor productivity decreases. Long-term declines in the work of individuals lead to a decision to reduce the number of employees. This measure does not systematically result in the stabilization of executive employees and the long-term development of the company. A more effective measure is the internal restructuring of all processes and the adoption of measures to implement and operate the system of work with human resources.

A well-established system of personnel work reflected in all processes will increase the level of human resource management, but it does not mean that it will also solve all the problems of employers in gaining and stabilizing quality workforce. One of the tools of stabilization is to support employees in their education and development. From the survey, we found that the amount for education in 2016 increased to 42.37% of enterprises. The average amount per employee ranged from 0 to 100 € (68.95%) and from 101 to 200 € (31.05%). Classical methods prevailed in education, namely lecture (60.79%), instruction , (48.95%), model situations (27.63%), as well as coaching (31.58%), e-learning (19.21%) and role play (5.53%). 51.84% of the managers reported their support for the training. At the same time, we were interested in the managers' view of the conditions under which it is possible to characterize the talented employees who are the most valuable source of the company. According to the replies, highly valued is the employee with the long-term high performance (36.58%), the key job holder (26.05%), the employee with the potential for future growth (16.05%), the long-term stabilized (12.89%), loyal (5.79%) and an employee who knows what to do, is able, inventive and has the potential for progress (3.42%).

The survey showed that human resources management has impact on the achievement of the company's results (63.22%). With the current workforce system, 33.3% of managers are satisfied and do not think of any changes. The positive finding is that 66.7% of managers want to improve the atmosphere and workplace communication, streamline the adaptation process, expand the education and awareness of employees, change the quality of working life towards employees, look after employees more, place emphasis on increasing control workplace, reduce fluctuation and stabilize executive employees, implement examples of good practice for domestic and foreign companies, more motivate, improve the search and selection system, introduce a more efficient way to evaluate and manage work performance, develop a human resource management strategy, and introduce personnel control.

Conclusion

Despite the declared importance of human resources for gaining success and competitive advantages on the market, the personnel work in the conditions of Slovakia does not receive the declared attention. Managers and business owners focus on material, technical and financial security, and underestimate care for the acquisition, development and utilization of employees' potential. They do not realize that it is the level of personal work that distinguishes the best and most successful businesses from the others. Employees are looking for businesses that have a reputation and are financially stable. On the other hand, not every employee belongs to those who perform the expected performance. Based on foreign studies (Branham, 2009), according to work performance achieved and access to duties and work, employees are ranked in top-performing (about 10%), high-performance (20-30%), with stable average performance (40-50%) and with low power (15 - 20%). From a stabilization point of view, it is important to find a way to keep executive employees. This will be done if the processes and processes of human resource management are transparent and established. Excluding staffing exceptions, different rules, and maintaining low-performance employees are detrimental to work ethics and discipline.

References

Armstrong, M. (2007) Řízení lidskýchzdrojů. Grada Publishing, Praha.

Armstrong, M., Taylor, S. (2015) Řízení lidských zdrojů.Grada Publishing, Praha.

Bach, S. (2005) Managing Human Resources. Personnel Management in Transition. Blackwell Publishing, Oxford.

Branham, L. (2009) 7 skrytých důvodů, proč zaměstnanci odcházejí z firem. Grada Publishing, Praha.

Drucker, P. F. (2012) To nejdůležitější z Druckera v jednom svazku. Magnet Press, Bratislava.

Hinkin, T. R., Tracey, J. B. (2010) What makes it so great? Ananalysis of human resources practices among Fortune's best companies to work for. *Cornell Hospitality Quarterly*, 51(2), 158-170.

Hitka, M. et al. (2015) Qualitative indicators of employee satisfaction and their development in a particular period of time, Drvna industria. 66 (3) Universita Zagreb, 235-239.

Hittmár, Š, Veselý, J. (2011) Personálne riadenie. Žilinská univerzita v Žiline, Žilina.

Kachaňáková, A. (2001) Riadenie ľudských zdrojov. Ľudský faktor a úspešnosť podniku. SPRINT, Bratislava.

Koubek, J. (2007) Řízení lidských zdrojů. Základy moderní personalistiky. Management Press, Praha.

Prescott, R. K., Rothwell, W. J. (2012) The Encyclopedia of Human Resource Management, Pheiffer, San Francisco.

Rogers, D. (2011) Human Resources Management. In Prescott, R. K. (2011) The Encyclopedia of Human Resource Management, Pheiffer, San Francisco, 275-278.

Stachová, K. (2011) Personálny manažment – praktikum, crr.sk, Bratislava.

Storey, J. (2007) Human Resource Management. A Critical Text, Thomson Learning, London.

Szarková, M. et al. (2010) Personálny marketing a personálny manažment, EKONÓM, Bratislava.

Šikýř, M. (2014) Nejlepší praxe v řízení lidských zdrojů, Grada publishing, Praha.

Vetráková, M. et al. (2011) Ľudské zdroje a ich riadenie, Ekonomická fakulta UMB, Banská Bystrica.

Wilton, N. (2016) Human Resource Management, SAGE, London.

Disruptive Innovation and Knowledge-intensive Entrepreneurship: A neo-schumpeterian view on the role of Key Enabling Technologies

Pasquale Del Vecchio, Giustina Secundo, Valentina Ndou, Giuseppina Passiante
University of Salento - Department of Innovation Engineering, 73100 Lecce, Italy
Email addresses:
pasquale.delvecchio, giusy.secundo, valentina.ndou, giuseppina.passiante @unisalento.it

Abstract

The paper aims to contribute at the debate on disruptive innovation theory by focusing on the knowledge intensive entrepreneurship as key process to address the technological development towards innovation in the market and society. Framed into a neo-schumpeterian stream of research, the paper offers a theoretical contribution at the comprehension of the disruption innovation associated to the diffusion of key enabling technologies as pervasive and knowledge intensive solutions impacting on the current structure of market and society. Furthermore, the study contributes to the debate on knowledge-intensive entrepreneurship as driver of the knowledge-economy and core process to address the knowledge advancement on technical domains into valuable innovation. The study offers an original contribution at the contextualization of disruptive innovation theory on those knowledge intensive and pervasive technologies while implications for policy makers are identifiable into the deepen comprehension of the meaning of knowledge intensive entrepreneurship as driver for the competitiveness of regions and national systems.

Keywords: Knowledge-intensive entrepreneurship, Key Enabling Technologies, Disruptive Innovation, Technology-driven Entrepreneurship.

Introduction

The disruptive innovation represents one of the most debated topic in the field of the innovation management (Schmidt and Druehl, 2008; Markides, 2006). Since its first theorization by Clayton Christensen (1997), the theory of disruptive innovation has attracted scholars and researchers aimed to comprehend the ways, the measure and the reasons at the basis of the disruptiveness caused by innovation (Schmdt and Druel, 2008). The primary definition of Christensen (1997) focused on technology as disruptive element impacting on products and processes, but it is in 2003 that definition of disruptiveness embraced the innovation in its larger definition of services, business and organizational models (Yu and Hang, 2010). The theory of disruptive innovation has so been used to explain the different forms of innovation by losing the primary focus on technology and causing a misunderstanding in its conceptualization (Markides, 2006; Danneels, 2004). The focus on the technological perspective assumes a new challengeable dimension at the light of the new knowledge-intensive technologies, also defined as Key Enabling Technologies (KETs), which are causing radical innovation in market and society. Those technologies have been identified into the Micro-nano electronics, Nanotechnology, Advanced Materials, Photonics, Industrial Biotechnologies and Advanced Manufacturing Technologies (EC, 2009). All them are characterized by cross-industries profiles of application; their pervasiveness is determining rapid innovation cycles and calls for continuous updating of competencies at both at individual and organizational level (Romano et al., 2016; Foray, et al., 2011). Their usage is nurturing a highly skilled employment demand and presents large potentialities in for the socio-economic development of society, in reason of their contribution at the solution of societal and market needs.

All this highlights the need of a deeper comprehension of the disruptive innovation theory based by KETs as well as to identifying the drivers able to sustain their full exploitation of creating sustainable innovation in market and society. In a neo-schumpeterian view, technologies are the determinants of the profile that characterizes the society. Accordingly, the knowledge intensive nature of KETs suggests the knowledge-intensive characterization of the current socio-economic context as well as its definition of entrepreneurial economy (Audretsch and and Thurik, 2001). This evidence suggests the need of new interpretative and organizational models able to manage the potentialities of KETs as well as to make possible their full exploitation towards the sustainable innovation.

Framed in the above premises, the paper intends to contribute at the debate on disruptive innovation theory by focusing on the knowledge intensive entrepreneurship as key process to address the technological development for innovation in the market and society (Malerba, 2010). Accordingly, the paper aims to shed new light on the comprehension of the disruption innovation associated to the diffusion of KETs. The comprehension of the disruptiveness associated to the KETs is in this paper strictly linked to the knowledge-intensive entrepreneurship. This is because it is the entrepreneurship to make possible the full exploitation of KETs and to address the advanced technical know-how into valuable innovation (Romano, et al., 2016; Romano, et al., 2014; Foray et al., 2011).

Accordingly, the paper is structured as follows: the first section presents the KETs as enabling factor of the configuration of the knowledge economy as entrepreneurial economy; the second section provides a synthesis of the literature on disruptive innovation aimed to comprehend how KETs can be assumed as elements for disruptive innovation; the third section presents a conceptualization of the knowledge-intensive entrepreneurship as strategic process for exploiting the potentialities of KETs and to create valuable disruptive innovation; finally in the conclusions the main features and implications for theory and practice are highlighted.

1. Key Enabling Technologies and Entrepreneurial Economy

The social and economic systems are currently interested by several structural changes due at the impact of technological knowledge. The process of advancement of knowledge in the different technological domains is experimenting an exponential growth; its intensity is increased by the ubiquity of information made available by the Information and Communication Technologies (ICTs). In accordance to the so-called “structuralist-evolutionary” model and in the frame of the neo-schumpeterian research streams, the economy can be conceived as an expression of its technologies (Arthur, 2009, 1999; Lipsey, et al., 1998; Schumpeter, 1934). This means that changes occur constantly over time as far as the technologies evolve and that the characteristics of society in a certain time will be depending by the nature of technologies of the present (Romano et al., 2013). The process of technology evolution impacts and transforms the present economic structures by causing a process of continuous destroying of the old schemas to create new socio-economic scenarios (Arthur, 2009; Schumpeter, 1934). The technologies of our days can be identified into a wide large family of knowledge-intensive and pervasive technologies. Also defined as key enabling, they have been classified by the EC (2009) into the Micro-nano electronics, Nanotechnology, Advanced Materials, Photonics, Industrial Biotechnologies and Advanced Manufacturing Technologies. KETs are the main forces behind the structural changes characterizing the current socio-economic scenario. These technologies present a knowledge intensive profile; their pervasiveness is determining rapid innovation cycles and calls for continuous updating of competencies at both at individual and organizational level, by nurturing a highly skilled employment demand (Romano, et al., 2016; EC, 2009). In an analysis performed by the European Commission, the economic impact of KETs in global market is estimated to be more than EUR 1 trillion by 2015. According the European Competitiveness Report (2013), KETs will generate a trend of growth of 10 – 20% per year. This is expected to generate new employment opportunities, to reinforce firms’ competitiveness and to achieve reindustrialisation, and to create sustainable and intelligent industries.

The knowledge intensive nature of the aforementioned enabling technologies is one of the elements at the basis of the characterization of the current socio-economic context as knowledge economy (Arthur, 2009; Romano et al., 2014, 2016). In this context, the competitiveness of individuals, organizations and regions results to be more and more depending by their knowledge assets as well as by their attitude to merge internal and external knowledge contributions (Lerro & Schiuma, 2013). In this scenario, technical knowledge related to KETs is assumable as the most strategic asset (Arthur, 2009).

Several studies have attempted to describe the main characteristics and trends of the knowledge economy, also through its comparison with the economy of the certainty and stability, typical of the last century and classified as managed economy (Romano et al. 2016; Secundo et al., 2016; Audretsch and Thurik, 2001). The managed economy has so been described as based on the intensive usage of the labor, capitals and natural resources. All these assets are limited in their stocks and not renewable; this makes the managed economy subjected to the law of decreasing returns (Romano, et al., 2014; Audretsch, et al., 2006). Knowledge is instead a renewable and appropriable resource, that grows exponentially respect to its usage. This is sufficient to comprehend that the knowledge economy is governed by the law of the increasing returns. In terms of innovation attitudes, the managed economy focused on continuity, the search for incremental innovation, trajectories of competencies and technological development oriented to the compatibility with existing firms' and industry's equilibriums. The knowledge economy is instead grounded on the radicalness of the innovation, on disruptive paths of competencies and technological development (Asheim & Coenen, 2005).

The demand and offering of products and services in the managed economy has been characterized by stability and homogeneity, and firms' competition was based on specialization. While, in the knowledge economy, turbulence and diversity are the main features of the external environment that calls for firms to promptly and continuously reconfigure (Audretsch and Thurik, 2001). The model of governance of firms in the managed economy leverage on controls and transactions, economies of scale play a strategic role, and competition was alternative to cooperation. Differently, in the knowledge economy firms' competitiveness is based on motivation, at individual and organizational level, on market exchanges and flexibility, while competition and cooperation are complementary perspectives.

In the managerial economy, public policy has an essentially constraining nature (antitrust policy, regulation and public ownership, concerns about excess profits and abuses in terms of market dominance). In the entrepreneurial economy, governmental policy aims at creating an environment suitable for supporting the success and sustainability of firms (Mazzuccato, 2015; Audretsch and Thurik, 2001. The linkages between innovation and competencies of the human capital arises so as a necessary condition for the success in the entrepreneurial economy, this because the human capital with its competencies foster innovation, by generating, new knowledge that is finalized towards radical innovation; adopting or adapting existing ideas and technologies and by this facilitating the processes of incremental innovation; reinforcing the social capital and the innovation networks; diffusing the knowledge within the organizations and enhancing a process of knowledge absorption within the components of the human resources into the organizations (Romano et al., 2014).

The elements of turbulence, continuous change, and innovation due to the diffusion of KETs, in causing the creative destruction of pre-existing equilibriums, are the distinctive features of an entrepreneurial configuration of the knowledge-economy and the driver for the creation of disruptive innovation in market and society

2. Key Enabling Technologies and Disruptive Innovation Theory

The nature and characteristics of KETs previously described highlight their relevance into the debate on disruptive innovation, as the theory made popular by Christensen (1997; 2006) to describe the process of new market development and new functionalities creation that generates a disruption with pre-existing market conditions (Yu and Hang, 2010). Since the first theorization of Christensen (1997), and in the frame of a consolidated stream of studies inspired to the Schumpeterian perspective, disruptive innovation is considered a process resulting from the technological advancement and it is the disruptive nature of technologies to create the conditions of a disruptive innovation in market and society. In the locus of their first concretization, disruptive innovations are reserved to niches markets able to value the not common and accepted performances (Yu and Hang, 2010). In 2003, Christensen and Raynor, reviewed the theory on disruptiveness by replacing the technologies with innovation with the aim to include disruptive innovation phenomena in business model, services and organizational features. Furthermore, studies on disruptive innovation theory have largely explored the process of innovation by demonstrating the relativeness of the process as depending on several variables as the timing and market of innovation (Christensen, et al., 2006; Schmidt & Druehl, 2008) or the size and profile of companies, in terms of incumbents versus startups (Ahuja & Lampert, 2001; Yu & Hang, 2010), that disruptive doesn't necessarily mean radical or destructive (Van Orden et al., 2008). The theory of disruptive innovation has so been used to explain the different forms of innovation, incremental or sustaining and radical (Schmidt & Druehl, 2008). Additionally, a disruptive innovation has been practically defined as a "simpler, more convenient and lower cost innovative solution (Innosight, 2005) According to Markides (2006) and Danneels (2004), the larger configuration of the theory and its widespread usage by academics and practitioners have caused a misunderstanding in what a disruptive innovation is, by highlighting the need of deeper studies. On this venue, Schimdt & Druel (2008) developed a conceptual framework aimed to clarify the misinterpretations arose around the topic and focused on the concept of low-end encroachment. At this purpose, they identified three scenarios that in offering a synthesis of different studies could also suggest more practical implications for managers.

In coherence with the low-end disruption of Christensen and Ryanor (2003), a first scenario occurs when the innovation doesn't open a new market but covers a limited portion of existing demand; a second scenario is instead related to the identification of a limited demand, only incrementally different from the low-end; and finally a third scenario is instead characterized by the creation of a new demand, with needs completely different from the existing low-end market. All those scenarios are coherent with the nature of KETs and mainly rely on their capacity to create new market demands, niches and large mass, as well as on positioning firms' value propositions on low-end or high-end existing or nascent demands.

The focus on the technological perspective assumes a new challengeable dimension at the light of the new knowledge-intensive technologies, also defined as KETs, that are causing radical innovation in market and society. Those technologies are characterized by cross-industries profiles of application; their pervasiveness is determining rapid innovation cycles and calls for continuous updating of competencies at both at individual and organizational level (Romano et al., 2016; Foray, et al., 2011). Their usage is nurturing a highly skilled employment demand and presents large potentialities in for the socio-economic development of society.

KETs are determining structural changes in all the components of the economic system: physical capital, human capital, organization of production facilities, labor practices, managerial and financial

organization of firms, geographical allocation of industries, industrial concentration, infrastructures, private-sectors financial institutions and financial instruments (Lipsey, et al. 1998). The level and the scale of these changes, which differ greatly from one technology to another, can produce some evolutionary effects. The main can be identified into the renewing of traditional sectors, through higher value added activities and new market niches; differentiating technologically from existing specialization into related fields; starting new economic activities, through radical technological changes and breakthrough innovations; and taking advantage of new forms of innovation, such as open and user-centric innovation, social innovation and service innovation (Romano, et al., 2016; Weber & Schaper-Rinkel, 2016; Freemann, 2009).

KETs feed into many different industrial value chains and sectors, in heterogeneous ways (Romano, et al., 2014). Their multidisciplinary profile describes trends of convergence and integration across different industries and knowledge domains. This is the reason behind their contribution of catalysis expected for strengthening and modernizing of the industrial bases, as well as for driving the development of entirely new knowledge intensive industries (Romano et al., 2016; EC, 2009).

In this view, KETs can be assumed as disruptive technologies in accordance with the primary definition of Christensen (1997) and as basis for the creation of disruptive innovation in terms of products, processes, and organizational models, as resulting by the advancement on the theory (Christensen & Raynor, 2003).

3. Knowledge-intensive Entrepreneurship: towards an exploitation of KETs into valuable disruptive innovation

Starting from the role of KETs in the characterization of the entrepreneurial economy, this section offers a throughout literature review on the knowledge-intensive entrepreneurship with the aim to demonstrate how it can be assumed as key process to exploit KETs into innovation for market and society.

Knowledge intensive entrepreneurship is a crucial process for economic growth, productivity and employment (Wennekers and Thurik, 1999) and for regional development (Venkataraman, 2004). It embraces all the activities and conditions at individual, organizational and system level to realize the shift "from idea to market", to convert a technology-based idea into a business opportunity and a successful venture capable to generate economic and social value, can also be characterized as an individual attribute (e.g. Byers et al., 2010), a capability (e.g. Hindle and Yencken, 2004), a strategy (e.g. Hitt, et al., 2001) and a system (e.g. Abetti, 1992).

Since the key role of the KETs for generating disruptive innovation, knowledge intensive entrepreneurship can be interpreted as technology entrepreneurship. This is in line with the fact that technologies reveal as really important factors for stimulating and activating the innovation process (Schumpeter, 1934). Byers et al. (2010) defined technological entrepreneurship as a style of business leadership that involves identifying high-potential, technology-intensive commercial opportunities, gathering resources such as human capital and financial capital, and managing rapid growth and significant risk using principled decision-making skills. Technology ventures exploit breakthrough advances in science and engineering to develop better products and services for customers Differently from a traditional or market-driven entrepreneurship a technology-driven one moves from the primary identification of a technology toexplore a market need toward which the technical know-how can be exploited (Gemmell at al., 2011; Scott, et al., 2007). Overcoming the temporal sequences of the actions at the basis of the two different entrepreneurial processes, the main differences emerging by comparing the two stereotypes are identifiable into their familiarity they have with technological knowledge. The first

bases the competitiveness of the entrepreneurial venture on the technical know-how by which to explore an unknown market's demand, while the second bases on the market knowledge the ground for the development of the entrepreneurial venture and later will operate to identify technological solution for satisfy the market's demand (Scott, et al. 2007).

By highlighting the importance to cope with uncovered opportunity and uncertainty and to learn from uncertain and complex technologies, knowledge-intensive entrepreneurship arises as a learning process that needs to be sustained continuously at individual, organizational and system level (Cope, 2005, Rae, 2006; Gemmell, et al., 2011; Erdélyi, 2010). At individual level, the continuous learning process allows entrepreneurs to develop and grow (Kenworthy & McMullan, 2013; Corbett, 2005). At corporate/organisational level, entrepreneurial organisations "Technology intensive" can be distinguished by non-entrepreneurial firms because they are likely to use creativity based learning as well as unlearning and experiential learning since they operate in dynamic and complex environment. Finally, at system (and network) level (Abetti, 1992), it is necessary to consider the learning dynamics and knowledge integration phases among all the inter-dependent stakeholders (individuals, entrepreneurs, companies, research centers, universities, financial operators and institutions) operating within an entrepreneurial ecosystem for influencing potentially the economy as a whole (Iansiti and Levien, 2004).

(Minniti and Bygrave, 2001). The comprehension of the main characteristics of knowledge intensive entrepreneurship suggests the need of shifting from a static perspective, i.e. a trait-based approach, to a dynamic and non-linear view, i.e. a learning-based approach (Cope, 2005, Rae, 2006; Gemmell, et al., 2011; Erdélyi, 2010; Wang and Chug, 2014). Accordingly, knowledge-intensive entrepreneurship is a permanent learning process that continuously needs to be enhanced (Cope and Watts, 2000). Learning is a strategic and central process in knowledge intensive entrepreneurship, given the growing significance of science technology innovation in new venture creation or in renewing existing companies. The literature allows to characterize different profile of Knowledge intensive entrepreneurs, that present some common elements such as the creativity and deepen knowledge of technological domains complemented by the risk taking, pro-activeness and goal attainment, around the categories of emergent young, academic, former, family entrepreneurs and intrapreneurs (Secundo, et al., 2016; Giacon, 2008). All this makes evident the strict link existing between KETs and knowledge-intensive entrepreneurship. In a cause-effect perspective, it is possible to say that one doesn't exist without the other. And that the full disruptive exploitation of the KETs into valuable innovation requires the creation of competencies and behaviors in the field of knowledge-intensive entrepreneurship.

The figure 1 offers a synthetic representation of the role assumed by the knowledge-intensive entrepreneurship in exploiting areas of entrepreneurial opportunities emerging from the convergence of KETs' potential applications and emerging needs from market and society.

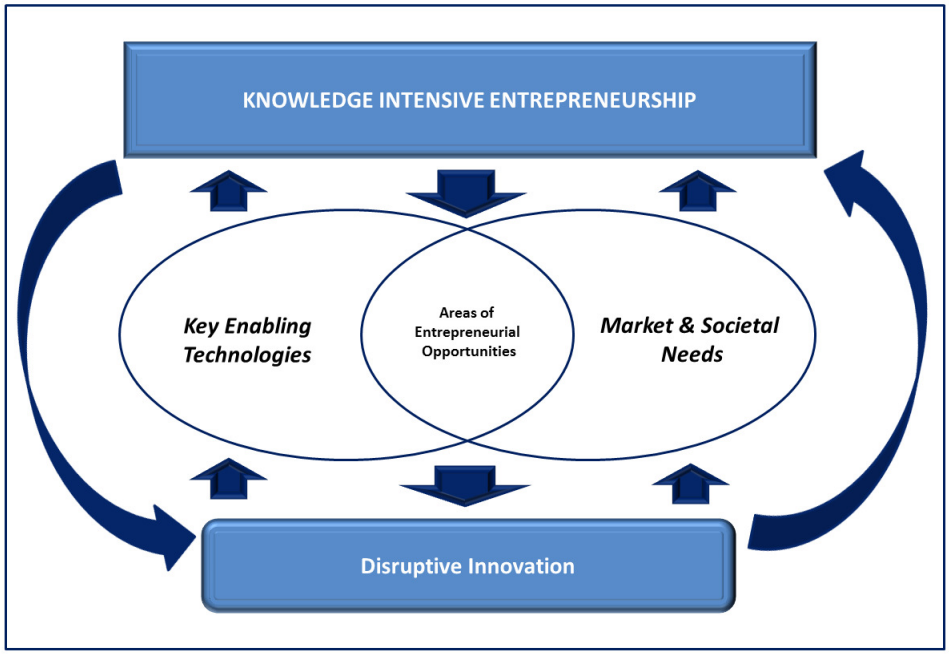


Figure 1: From Knowledge-intensive Entrepreneurship to disruptive innovation

The figure 1 represents the overlapping area between KETs and Market and societal needs that constitutes the zone where disruptive innovation opportunities can arise. Here, the needs of the society are analyzed with the lenses of KETs, to find out how it is possible to create new products, services and tools that could better satisfy new market and society needs. The Knowledge Intensive entrepreneurship process will guide the converting of a technology-based idea into a business opportunity and a successful venture capable to generate economic and social value opportunities, resulting so in the disruptive innovation.

Forms of disruptive innovation resulting from the process of knowledge intensive entrepreneurship applied to areas opportunities could be identified in:

- new products, services, processes and organizational models, in other words corporate entrepreneurship (Christensen, 2004);
- creation of new companies by individuals which industrializes/commercializes a new product, process or service or is positioning on low-end market, known as individual entrepreneurship (Ghoshal and Bartlett, 1999);
- start-up or spin-off company which valorizes the results of a given research conducted in a scientific-technological domain, capitalizes distinctive know-how and competencies, or realizes technology transfer processes and matching university-company, known as academic entrepreneurship, (Giacon, 2008).
- entrepreneurial initiative primarily devoted to the creation of social value, instead of profits and economic advantages for company's holders and investors, known as social entrepreneurship (Haugh, 2005; Martin & Osberg, 2007).

It is worth to note that the disruptive innovation generated by the knowledge-intensive entrepreneurship is a virtuous process of nurturing both the domain of KETs and market and societal needs, this is because the innovations achieved offer twofold contributions in terms of new opportunities and advancement of research in the technological domains covered by KETs as well as the creation of new market niches. This impacts positively on the creation of larger and new areas of entrepreneurial development in a continuous and positive process of socio-economic wellness.

Conclusions

With the aim to contribute at the advancement of the debate on the disruptive innovation associated to the emergence of KETs, the paper has presented a conceptualization of the knowledge-intensive entrepreneurship, as core process and attitude enabling the full exploitation of the advanced technical know-how into valuable innovation. In a neo-schumpeterian perspective, the paper referred to the current socio-economic context as knowledge economy, in reason of the knowledge-intensive nature of KETs, as well as to the entrepreneurship as primary process to concretize innovation. In reason of their inter-sectorial and knowledge intensive profile, KETs present the potentialities of changing the present configurations of market and society, by causing new industrial configurations and the enhancement of productiveness. They are expected to create new products and services, to create new industries and innovate the existing ones, by allowing to satisfy the global social and economic challenges.

As result of the virtuous combination of intellectual and entrepreneurial capital (Romano, et al., 2014), capacity of managing under uncertainty and risk-taking, and ability to identify and exploit previous unexplored opportunities (Secundo et al., 2016; Byers, et al, 2010, knowledge-intensive entrepreneurship is the process that makes concrete the exploitation of KETs into valuable innovation for market and society. The emergence of new demands of goods and services, as result of the major knowledge expressed by the market or conditioned by enhancement of the expectation of life, will cause a strong acceleration into the diffusion of knowledge-intensive entrepreneurship. Its relevance in a disruptive innovation perspective is due to the contribution. However, the full achievement of those objectives requires new conceptual and behavioral models. The nurturing of knowledge-intensive entrepreneurship, as theorized in this paper, will be necessary to allow the full exploitation of KETs and their valorization into sustainable innovation. The future moves towards scales that are more and more reduced in terms of space but faster and accelerated under a temporal perspective.

Implications for theory and policy makers. Two main kinds of implications arise. A first one can be identified for theory into the need of deepening the centrality of knowledge-intensive entrepreneurship focused on KETs in the debate on disruptive innovation, also through the empirical studies and comparative analysis referred to different industries, geographical contexts and families of technologies. Secondly, a practical implication arises for the agenda of policy makers. The study highlights the importance of investing in policies and instruments to sustain the development of knowledge-intensive entrepreneurship, unique lever for the full exploitation of the technical know-how available. However, the recent experience of European countries and regions involved into structured process of creation of new enterprises and startups suggests the primary need of creating a favorable entrepreneurial socio-economic context, in order to avoid the failure of policies focused on the entrepreneurial development (Del Vecchio & De Maggio, 2016; Mazzuccato, 2015).

References

Abetti, P.R. (1992). Planning and building the infrastructure for technological entrepreneurship. International Journal of Technology Management, 7(1-2): 129-139.

Allen, K., (2009). Entrepreneurship for Scientists and Engineers. Upper Saddle River, NJ: Prentice Hall.

Arthur, W.B. (2009). The Nature of Technology: What It Is and How It Evolves, Allen Lane, London.

Arthur, W. B. (1999). Complexity and the economy. science, 284(5411), 107-109.

Asheim, B. T., & Coenen, L. (2005). Knowledge bases and regional innovation systems: Comparing Nordic clusters. Research policy, 34(8), 1173-1190.

Audretsch, D. B., Keilbach, M. C., & Lehmann, E. E. (2006). Entrepreneurship and economic growth. Oxford University Press.

Audretsch, D. B., & Thurik, A. R. (2001). What's new about the new economy? Sources of growth in the managed and entrepreneurial economies. Industrial and corporate change, 10(1), 267-315.

Ahuja, G., & Morris Lampert, C. (2001). Entrepreneurship in the large corporation: A longitudinal study of how established firms create breakthrough inventions. Strategic Management Journal, 22(6-7), 521-543.

Byers, T.H., Dorf, R.C. and Nelson, A.J. (2010) Technology Ventures: From Idea to Enterprise, New York, NY: McGraw-Hill.

Christensen, C. M., Baumann, H., Ruggles, R., & Sadtler, T. M. (2006). Disruptive innovation for social change. Harvard business review, 84(12), 94.

Christensen, C. M., & Raynor, M. E. (2003). The Innovator's. Harvard Business School Press, Massachusetts. Solution.

Christensen, C. (1997). Patterns in the evolution of product competition. European Management Journal, 15(2), 117-127.

Christensen, K. S. (2004), A Classification of the corporate entrepreneurship umbrella: labels and perspectives, Int. J. Management Development, Vol. 1, No. 4, pp. 301-315.

Cope, J. (2005). Toward a dynamic learning perspective of entrepreneurship. Entrepreneurship theory and practice, 29(4), 373-397.

Cope, J., & Watts, G. (2000). Learning by doing-An exploration of experience, critical incidents and reflection in entrepreneurial learning. International Journal of Entrepreneurial Behavior & Research, 6(3), 104-124.

Danneels, E. (2004). Disruptive technology reconsidered: a critique and research agenda. Journal of product innovation management, 21(4), 246-258.

Del Vecchio, P., & De Maggio, M. (2016). Technology-driven entrepreneurship within the framework of regional development policies. In Creating Technology-driven Entrepreneurship (pp. 273-299). Palgrave Macmillan UK.

EC - European Commission, (2009), "Preparing for our Future: developing a common strategy for Key Enabling Technologies in the EU" (Brussels, 30 Sept. 2009), available online at

http://www.horizon2020news.it/wp-content/uploads/2014/01/Developing-a-common-strategy-for-key-enabling-technologies-in-the-EU.pdf

Erdélyi, P. (2010). The matter of entrepreneurial learning: a literature review.

Foray, D., David, P.A. & Hall, B.H. (2011). Smart specialization from academic idea to political instrument, the surprising career of a concept and the difficulties involved in its implementation. MTEI Working Paper, École Polytechnique Fédérale de Lausanne.

Freeman, C. (2007). 8 A Schumpeterian renaissance?. Elgar Companion To Neo-Schumpeterian Economics, 130.

Gemmell, R. M., Boland, R. J., & Kolb, D. A. (2012). The socio-cognitive dynamics of entrepreneurial ideation. Entrepreneurship Theory and Practice, 36(5), 1053-1073.

Giacon, P. (2008). The rising of the new generation of high-tech entrepreneurs: an exploratory study. In: The 16th Annual High Technology Small Firms Conference : May 22-23, 2008, University of Twente, Enschede, The Netherlands.

Ghoshal, S. & Bartlett, C. A. (1999) The Individualised Corporation. HarperCollins Publishers, USA.

Haugh, H. (2005). A research agenda for social entrepreneurship. Social enterprise journal, 1(1), 1-12.

Hindle, K. & Yencken, J., (2004). Public research commercialization, entrepreneurship and new technology based firms: an integrated model". Technovation, 24(10): 793-803.

Hitt, M. A., Ireland, R. D., Camp, S. M., & Sexton, D. L. (2001). Strategic entrepreneurship: Entrepreneurial strategies for wealth creation. Strategic management journal, 22(6-7), 479-491.

Iansiti, M. & Levien, R. (2004). Strategy as ecology. Harvard Business Review, 82(3): 68-79.

Innosight (2005). Disruptive Innovation Primer. Available at https://www.innosight.com/leadership-agenda/navigating-disruption/

Lerro, A., & Schiuma, G. (2013). Intellectual capital assessment practices: overview and managerial implications. Journal of Intellectual Capital, 14(3), 352-359.

Lipsey, R. G., Bekar, C., & Carlaw, K. (1998). 8 The Consequences of Changes in GPTs. General purpose technologies and economic growth, 193.

Kenworthy, T. and McMullan, W. E. (2013). Finding Practical Knowledge in Entrepreneurship. Entrepreneurship Theory and Practice, Vol. 37, pp. 983–997.

Malerba, F. (2010) Knowledge-intensive Entrepreneurship and Innovation Systems. Evidence from Europe. Routledge. London/New York.

Markides, C. (2006). Disruptive innovation: In need of better theory. Journal of product innovation management, 23(1), 19-25.

Martin, R. L., & Osberg, S. (2007). Social entrepreneurship: The case for definition. Stanford social innovation review, 5(2), 28-39.

Mazzucato, M. (2015). The entrepreneurial state: Debunking public vs. private sector myths. Anthem Press.

Minniti, M., & Bygrave, W. (2001). A dynamic model of entrepreneurial learning. Entrepreneurship: Theory and practice, 25(3), 5-5.

Newbert, S., Walsh, S., Kirchhoff, B., & Chavez, V. (2006). Technology-driven entrepreneurship: Muddling through and succeeding with the second product. Entrepreneurship: The Engine of Growth, 3, 291-312.

Rae, D. (2006). Entrepreneurial learning: A conceptual framework for technology-based enterprise. Technology Analysis & Strategic Management, 18(1), 39-56.

Romano, A., Passiante, G., & Del Vecchio, P. (2016). The Technology-Driven Entrepreneurship in the Knowledge Economy. In Creating Technology-Driven Entrepreneurship (pp. 21-48). Palgrave Macmillan UK.

Romano, A., Passiante, G., Del Vecchio, P. & Secundo, G. (2014). The innovation ecosystem as booster for the innovative entrepreneurship in the smart specialisation strategy. International Journal of Knowledge-Based Development, 5(3), 271-288.

Schmidt, G. M., & Druehl, C. T. (2008). When is a disruptive innovation disruptive?. Journal of Product Innovation Management, 25(4), 347-369.

Schumpeter, J., (1934). The Theory of Economic Development. An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle. Harvard: Harvard University Press.

Secundo, G., Ndou, V., & Del Vecchio, P. (2016). Challenges for Instilling Entrepreneurial Mindset in Scientists and Engineers: What Works in European Universities?. International Journal of Innovation and Technology Management, 13(05), 1640012.

Venkataraman, S. (2004). Regional transformation through technological entrepreneurship. Journal of Business Venturing, 19(1): 153-167.

Yu, D., & Hang, C. C. (2010). A reflective review of disruptive innovation theory. International Journal of Management Reviews, 12(4), 435-452.

Wang, C. L. & Chugh, H. (2014). Entrepreneurial Learning: Past Research and Future Challenges. International Journal of Management review, Vo. 16, pp. 24-61.

Weber, K. M., & Schaper-Rinkel, P. (2016). European sectoral innovation foresight: Identifying emerging cross-sectoral patterns and policy issues. Technological Forecasting and Social Change.

Wennekers, S., & Thurik, R. (1999) Linking entrepreneurship and economic growth. Small Business Economics, 13: 27-55.

Analyzing the Relationship between Open Innovation Adoption and Innovation Performance

Antonello Cammarano, Dipartimento di Ingegneria Industriale, Università degli Studi di Salerno, Via Giovanni Paolo II, 132, 84084 Fisciano (SA), acammarano@unisa.it

Mauro Caputo, Dipartimento di Ingegneria Industriale, Università degli Studi di Salerno, Via Giovanni Paolo II, 132, 84084 Fisciano (SA), mcaputo@unisa.it

Francesca Michelino, Dipartimento di Ingegneria Industriale, Università degli Studi di Salerno, Via Giovanni Paolo II, 132, 84084 Fisciano (SA), fmichelino@unisa.it

Abstract

This work enters the debate on open innovation by analyzing the effects of its adoption on innovation performance, distinguishing between two different open innovation strategies - joint development and R&D outsourcing - and considering the mediating role of context-related issues. The research is performed on patents of a sample of worldwide top R&D spending companies from the technology hardware & equipment industry. Results show that open innovation adoption - in particular R&D outsourcing - positively affects innovation performance.

Keywords: Innovation performance; open innovation; R&D outsourcing; patent data.

Introduction

The open innovation (OI) paradigm (Chesbrough, 2003) has found a ready audience amongst scholars, business people and policy makers who recognize new opportunities to innovate in the access to external sources of knowledge and technology.

This work enters the debate on OI by analyzing the effects of OI adoption on innovation performance, distinguishing between two different OI strategies - joint development and R&D outsourcing - and considering the mediating role of context-related issues. Figure 1 displays the relationships under investigation.

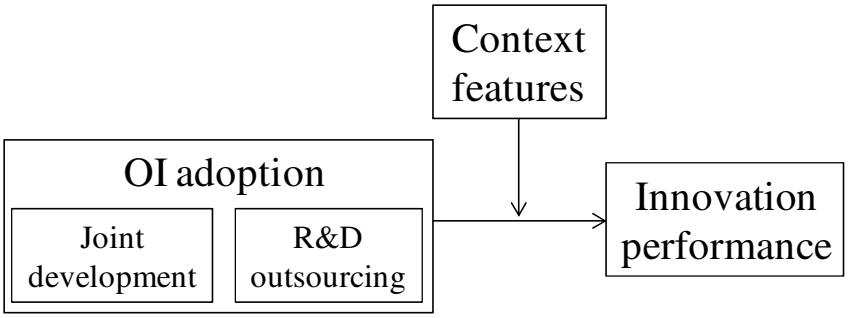


Fig. 1: Theoretical framework

In summary, the following research questions are posed:
RQ1: *How does OI adoption relate to innovation performance?*
RQ2: *Which are the differences among OI strategies in terms of effects on innovation performance?*
RQ3: *How do context features mediate the effects of OI on innovation performance?*

Methodology

Patent data are employed to assess both OI adoption and innovation performance.
The research is performed on patents of a sample of worldwide top R&D spending companies from the technology hardware & equipment industry. The sampled firms are selected from *The EU Industrial R&D Investment Scoreboard.*

PATSTAT database is used as the source of patent data and a PHP based software was developed to support data collection. For each company, the list of subsidiaries is extracted from consolidated annual reports. Thereafter, the names of both the parent company and its subsidiaries are searched in the assignee field, i.e. firms are assumed to have a patent portfolio consisting of the current granted patents of both parent companies and subsidiaries. Only claimed priorities related to already granted technologies are examined, since these are considered to be the high-value applications (Johnstone *et al.*, 2012).

The year of analysis is 2005, given the need of evaluating an *ex-post* patent quality indicator, being 2005 the latest period for which information is available in the PATSTAT 2013 version. Indeed, data from 2006 to 2013 are employed to investigate forward citations received from external parties (i.e. self-citations are excluded), which are used as a proxy of **innovation performance**. As a matter of fact, when a patent is cited within future applications, a higher technical importance can be presumed: patents that are cited are more relevant, influent and innovative than disregarded ones (Albert *et al.*, 1991; Alcácer and Gittelman, 2006; Dahlin and Behrens, 2005; Lahiri, 2010; Mazzucato and Tancioni, 2012; Miller *et al.*, 2007; Rosenkopf and Nerkar, 2001). Fleming and Sorenson (2004) argued that the number of forward citations of a patent highly correlates with its technological importance. In order to ensure consistency, the analysis is confined to citations received from patents filed at the USPTO, since the propensity to cite prior art varies among offices. As a matter of fact, when applying to the USPTO, applicants have a so-called "duty of candor" in dealing with the office, which includes a duty to disclose any knowledge of prior art to the examiner, and the same examiners tend to add other references deemed relevant (Bakker *et al.*, 2016).
The variable FWD_CIT is thus defined as the number of external forward citations received by the patent.

As to **OI adoption**, three categories of patents are defined according to the innovation strategy adopted by the focal company to obtain it:

- patents developed with the use of only internal resources, without engaging external actors;
- patents developed with the use of external partners. When the focal firm is found as the only assignee, but some inventors do not belong to it, it is reasonable to suppose that a part of the development process was outsourced to third parties;
- co-patents, jointly developed by the focal company with one or more organizations/coassignees, after a collaborative perspective.

In order to gauge such categories, different steps are followed. Before starting the analysis, any inventor disclosed in the assignee field was removed, so that only organizations were reported as assignees. After this intervention, all the patent documents disclosing the focal company in the assignee field are analyzed. If two or more assignees are uncovered in the assignee field, the patent is labeled as joint, according to many scholars (Al-Ashaab *et al.*, 2011; Kim and Song, 2007; Michelino *et al.*, 2017). Otherwise, the inventors' affiliation is detected. For each inventor, following Cammarano *et al.* (2017a; 2017b), information is detected in order to uncover whether companies absorb knowledge from external inventors by outsourcing part of the development of the focal technology. Hence, the inventors' affiliation in 2005 was detected by analyzing their *curriculum vitae* extracted from websites and platforms like Linkedin, Xing, Zoominfo, Academia, Research Gate, Google Scholar, Scopus, etc. Therefore, we assume that the existence of inventors belonging to firms different from the focal company is a proxy of R&D outsourcing services provided by their organizations to the patent owner, signaling OI adoption.

Accordingly, four dummy variables are defined: CLOSED, OUTSOURCING and JOINT_DEV - depending on the patent category registered - and OPEN, which includes patents deriving from both outsourcing and joint development.
Furthermore, the following **context features** are analyzed:

- the AGE of the focal company;
- the SIZE of the patent portfolio of the focal company, signaling its potential innovative capacity;
- the R&D intensity (RD_INT) of the focal company, i.e. the ratio of R&D expenditure on net sales, as the effort put in place for innovation.

Results

Results are obtained as to 12,090 patents applied by 82 companies in the technology hardware & equipment industry. Only 0.7% (86) of the analysed patents were jointly developed, whereas R&D outsourcing is far more widespread, with 13.7% (1.660).

Regression analyses of the innovation performance variable FWD_CIT using OI adoption and strategies as predictors are respectively shown in Table 1 and 2. For each of them five models are introduced: the first without context features, the following three by introducing one context feature at time, and the last simultaneously considering all of them.

OI adoption - in particular R&D outsourcing - positively affects innovation performance. Both firm age and the size of patent portfolio have a negative moderating effect on it, whereas R&D intensity is a positive moderator.

Table 1. Regression models for innovation performance as dependent from OI adoption and context features

Model	Model 1			Model 2			Model 3			Model 4			Model 5		
Model summary	Adj. R^2	F	Sig.	Adj. R^2	F	Sig.	Adj. R^2	F	Sig.	Adj. R^2	F	Sig.	Adj. R^2	F	Sig.
	0,000	5,000	0,025	0,002	12,397	0,000	0,014	84,296	0,000	0,006	34,241	0,000	0,015	44,952	0,000
Independents:	B	t	Sig.	B	t	Sig.	B	t	Sig.	B	t	Sig.	B	t	Sig.
Constant	4,839	69,621	0,000	5,245	45,726	0,000	5,731	58,398	0,000	3,873	28,257	0,000	5,202	23,221	0,000
OPEN	0,409	2,236	0,025	0,381	2,084	0,037	0,376	2,072	0,038	0,377	2,032	0,042	0,416	2,255	0,024
AGE				-0,008	-4,448	0,000							-0,001	-0,558	0,577
SIZE							0,000	-12,788	0,000				0,000	-10,396	0,000
RD_INT										0,081	7,864	0,000	0,039	3,396	0,001

Table 2. Regression models for innovation performance as dependent from OI strategies and context features

Model	Model 1			Model 2			Model 3			Model 4			Model 5		
Model summary	Adj. R^2	F	Sig.	Adj. R^2	F	Sig.	Adj. R^2	F	Sig.	Adj. R^2	F	Sig.	Adj. R^2	F	Sig.
	0,000	2,945	0,053	0,002	8,632	0,000	0,014	56,533	0,000	0,006	23,675	0,000	0,015	36,418	0,000
Independents:	B	t	Sig.	B	t	Sig.	B	t	Sig.	B	t	Sig.	B	t	Sig.
Constant	4,839	69,620	0,000	5,247	45,738	0,000	5,731	58,400	0,000	3,864	28,171	0,000	5,194	23,178	0,000
OUTSOURCING	0,445	2,382	0,017	0,421	2,255	0,024	0,415	2,234	0,025	0,439	2,318	0,020	0,475	2,517	0,012
JOINT_DEV	-0,293	-0,382	0,702	-0,399	-0,521	0,602	-0,365	-0,480	0,632	-0,802	-1,051	0,293	-0,693	-0,912	0,362
AGE				-0,008	-4,472	0,000							-0,001	-0,571	0,568
SIZE							0,000	-12,792	0,000				0,000	-10,380	0,000
RD_INT										0,081	7,930	0,000	0,040	3,457	0,001

References

Al-Ashaab, A., Flores, M., Doultsinou, A. and Magyar, A. (2011) A balanced scorecard for measuring the impact of industry-university collaboration, Production Planning & Control, 22(5-6), 554-570.

Albert, M.B., Avery, D., Narin, F. and McAllister, P. (1991) Direct validation of citation counts as indicators of industrially important patents, Research Policy, 20(3), 251-259.

Alcácer, J. and Gittelman, M. (2006) Patent citations as a measure of knowledge flows: the influence of examiner citations, Review of Economics and Statistics, 88(4), 774-779.

Cammarano, A., Caputo, M., Lamberti, E., Michelino, F. (2017a) Open innovation and intellectual property: a knowledge-based approach, Management Decision 55(6), 1182-1208.

Cammarano, A., Michelino, F., Lamberti, E., Caputo, M. (2017b) Accumulated stock of knowledge and current search practices: the impact on patent quality, Technological Forecasting and Social Change 120, 204-222.

Chesbrough, H. (2003) Open Innovation: The New Imperative for Creating and Profiting from Technology, Harvard Business School Press, Boston.

Dahlin, K.B. and Behrens, D.M. (2005) When is an invention really radical? Defining and measuring technological radicalness, Research Policy, 34(5), 717-737.

Fleming, L. and Sorenson, O. (2004) Science as a map in technological search, Strategic Management Journal, 25(89), 909-928.

Johnstone, N., Haščič, I., Poirier, J., Hemar, M. and Michel, C. (2012) Environmental policy stringency and technological innovation: evidence from survey data and patent counts, Applied Economics, 44(17), 2157-2170.

Kim, C. and Song, J. (2007) Creating new technology through alliances: an empirical investigation of joint patents, Technovation, 27(8), 461-470.

Lahiri, N. (2010) Geographic distribution of R&D activity: how does it affect innovation quality?, Academy of Management Journal, 53(5), 1194-1209.

Mazzucato, M. and Tancioni, M. (2012) R&D, patents and stock return volatility, Journal of Evolutionary Economics, 22(4), 811-832.

Michelino, F., Cammarano, A., Lamberti, E., Caputo, M. (2017) Open innovation for start-ups: a patent-based analysis of bio-pharmaceutical firms at the knowledge domain level, European Journal of Innovation Management 20(1), 112-134.

Miller, D.J., Fern, M.J. and Cardinal, L.B. (2007) The use of knowledge for technological innovation within diversified firms, Academy of Management Journal, 50(2), 308-326.

Rosenkopf, L. and Nerkar, A. (2001) Beyond local search: boundary-spanning, exploration, and impact in the optical disk industry, Strategic Management Journal, 22(4), 287-306.

Economic and Legal Instruments of Labour Integration of Unemployed Persons in Slovakia

Gabriela Beresova, Comenius University, Bratislava, Slovakia, gabriela beresova@fm.uniba.sk

Daniela Novackova, Comenius University, Bratislava, Slovakia, daniela.novackova@fm.uniba.sk

Abstract

In the process of globalization and European integration the values and structure of the society is being changed at present. The rapid economic growth, the Slovak economy openness and the development of investment instruments have brought the new challenges also into the area of employment policy. Nonetheless, the active assistance of a state is needed so that the future of sustainable development and of life in dignity for every citizen would not be endangered. This article analyses the current problems of labour integration of unemployed people in Slovakia. The aim of this article is to identify legal provisions regulating the economic support of labour integration of unemployed persons. This article also mentions conditions for establishment of social enterprises of labour integration, which represent the significant subjects of social economy.

Keywords: unemployed persons, social enterprise**,** de minimis aid, legal act,

Introduction

The United Nations Organisation from its establishment accentuates inter alia also the protection of rights of citizens of its Member States. This international organisation in its International Bill of Human Rights of 10th December 1948 bound its Member States to guarantee the right of everyone to work, to free choice of employment, to just a favourable conditions of work and the protection against unemployment. Everyone who works has the right to just and favourable remuneration ensuring for himself or herself and his or her family an existence worthy of human dignity, and supplemented, if necessary, by other means of social protection. (Resolutions adopted by the General Assembly.) Several Member States have incorporated these rights to their legal systems. Besides the United Nations also the European Union adopted the Charter of Fundamental Rights of the European Union regulating the protection of social rights of citizens of its Member States. (OJ EU C 30. 3. 2010) In the Constitution of the Slovak Republic the right to work and employment for all citizens that want to work is stipulated. All Member States of the United Nations consider the policy of employment and creating the well suited legal and economic conditions as their priority, because the people are creating the profile of their personality in his or her active interaction with the real life context. It is the long life process of building and development of preconditions for the individual in order to realize himself or herself as the creative, mature and socially capable personality. (Schavel, 2016) The employment has the irreplaceable position in the life of every person. It represents the vital precondition of his or her dignified existence, it brings not only the material benefits, but also gives the feeling of self-realisation and social utility. (Buchtová, 2002). This scientific study is composed in such a way to clarify the system of legal and economic instruments that are influencing the labour integration of unemployed persons. At the same time we have focused also on the basic principle of labour relationships, which is the prohibition of discrimination. In the larger context we have clarified the subject of social economy – the social enterprise, which is the suitable instrument for the labour integration of unemployed persons.

Objectives and Methodology

The goal of scientific study is to present the current the legal framework concerning the labor integration of unemployed persons in Slovakia and economic instruments which support employment and social innovation in Slovakia. In this scientific study variety of scientific methods were applied. The main method of the study is the analysis, which was used for the analysis of the contemporary legislation related to the finance aid instruments aimed at the integration of unemployed into the work process inclusion, as well as the analysis of the selected social enterprise in Slovakia. The attention was focused on the quantification of the financial resources for creating new work position using public finance resources for this purpose.

Basic theoretical starting points

One of the biggest current social problems of the market economy in the Slovak Republic is the unemployment. The unemployment in the market economy can be characterised as the non-realised offer of labour in the labour market. It takes place in a moment, when the offer of labour force in the market is higher than the demand for it. (Hetteš, 2013) Referring to the mentioned arguments the definition of the unemployment of the International Labour Organisation have to be highlighted which defines unemloyment in a following way: *unemployment covers people who are: out of work, want a job, have actively sought work in the previous four weeks and are available to start work within the next fortnight; or out of work and have accepted a job that they are waiting to start in the next fortnight*. (ILO, 2017) It causes the serious economic problem to a state and at the same time it causes the unemployed individuals the social and health problems. (Žatkovičová, Dóci, 2012) The unemployment has economic and social consequences for the unemployed persons. Among economic consequences of unemployed can be ranked: rising costs connected with the elimination of unemployment and its of consequences, the necessity to pay the unemployment support and social allowances to unemployed persons, the losses in the tax area and in the area of social insurance which represent the burden of the state budget, the unemployment support and social allowances which reduce the revenue side of the state budget, the reduction of salaries in case of allocation to the job with lower remuneration, the loss of production and income, wasting of financial resources of the state, increasing the state budget deficit, drop in the Gross Domestic Product, loss of qualification and the costs of requalification, non-using the potential of labour force, lack of using the concrete abilities, skills and knowledge of individuals, the devaluation of the value of human capital. As the social consequences of unemployment are considered: social exclusion, increase of social tension, disruption of social reconciliation, marginalisation of groups of unemployed persons, inability to develop social, cultural and spiritual activities as the consequence of lack of financial resources, reduction of incomes, reduction of living standard of unemployed person and his or her family, material shortage and the inability of the family to ensure the everyday running of the household and to satisfy the basic life needs of the members of the family. „Pilot iniciative of the European Investment Fund – Social Impact Accelarator (SIA) started to satisfy the growing need of equity finance supporting social enterprises. It promotes social inclusion by a) providing alternative sources of employment to marginalised social groups, and b) contributing to growth." (Saxunova, 2015) „The risk situations such as loss of employment, in many cases affects in a negative way the self-evaluation of a person, reduces his self-esteem, and leads to a feeling of inferiority.“ (Treľová, 2014)

Legal and Economic Instrument of Labour Integration Unemployed Persons

One of the most pressing problems of the current global society is the labour integration of the unemployed persons. The task of the market policy is to ensure the conditions so that every inhabitant could enforce this right. States are adopting various legal instruments to this end. The Slovak Republic adopted several legal and economic instruments to support the labour integration of unemployed persons.

The problematic of the employment and labour relations are regulated in the Act No. 311/2001 coll. Labour Code. In addition to this complex legal norm the Act No. 5/2004 Coll. on the Services of Employment as amended regulates the right to access to employment. The right to access to employment is the right of every citizen who wants to work, is able to work and is searching for the job – for services aimed at assistance and support of his or her access to the labour market, as well as the continuance of the disadvantaged applicant for job in the labour market for minimum period of six following calendar months. The legislation already approved also contains economic instruments of the state making an access to the employment easier. Within the framework of employment policy the employers have to treat the employees in accordance with the principle of equal treatment that is stipulated in the Act No. 365/2004 Coll. on Equal Treatment in Some Areas and on the Protection Against Discrimination as amended. In addition to this legal norm also the Constitution of the Slovak Republic – the Constitutional Act No. 460/1992 Coll. as amended in its article 12 paragraph 2 guarantees the fundamental rights and freedoms to everyone regardless of sex, race, colour, language, belief and religion, political affiliation or other conviction, national or social origin, nationality or ethnic origin, property, descent or any other status. The Act No. 311/2001 Coll. Labour Code stipulates in its Article 6 of its fundamental principles that women and men have the right to equal treatment as regards the access to employment, remuneration and career at work, vocational training and working conditions. The Labour Code prohibits the discrimination of employees on the grounds of sex, marital status and family status, sexual orientation, race, colour of skin, language, age, unfavourable health conditions or disability, genetic properties, belief, religion, political or other conviction, activity in trade unions, national or social origin, affiliation in the nationality or ethnic group. According to article 13 of the Labour Code if the employer would infringe the principle of equal treatment the employee has the right to file the complaint on the grounds of infringement of equal treatment principle. The employer is obliged to reply to this complaint without unnecessary delay, to remedy the situation, to stop continuing such action and to remove of its consequences. The principle of equal treatment is specifically elaborated in paragraph 13 of the Labour Code, which stipulates the obligation of the employer to deal equally with all his employees. This is already a prohibition of discrimination in labour relations. (Treľová, 2015). It is obvious that in Slovakia the favourable conditions for employment are created not only for citizens of the Slovak Republic, but also for foreigners. In comparison to other Member States of the European Union there is high level of unemployment in Slovakia, however, it has decreasing tendency comparing to the previous years.

From the legal point of view the free movement of workers covers all phases of the performance of job starting with the searching for the job, its performance, the stay of worker in one member state for the purpose of searching for the new job. (Barancová, 2010) According to Morabito and Sergi „migration requires a systemic approach and qualified control“ (Morabito, Sergi, 2016) and Saxunova adds „rules of financing", as well. (Saxunová, 2016) The EU needs to establish a demand-driven labor immigration policy to ensure its future prosperity and economic growth."

The part of the legislative instruments is the Act No. 358/2015 Coll. on Adjustment of Certain Relations in state aid and de minimis aid and on amendments and supplements to certain acts. The Act on the state aid dealing with the issues of certain relations in the area of the aid *de minimis* and the latest amendments in the legislation. The state aid is provided to the selected subjects from the public resources. It is provided to the regions that are achieving results below 75 % of GDP average per capita in the EU. The regulation constitutes the terms of providing the state aid and the terms for the aid *de minimis.* Recepients of the aid *de minimis* do not have the obligation to report the aid accepted after 1 January 2016. According to the paragraph 13.1 of the Act on the state aid the provider of the state aid is obliged to report to the Central register the date on the aid provided, the data on their recipients utilizing electronic formular within 5 days after the aid is received. The unemployment directly influences the behaviour of individuals, as well as the social relations. The social consequence of unemployment of individual is the reduction of his or her living standard, social isolation, the loss of working habits, skills and professional abilities. The accompanying phenomenon of long-term unemployed persons is also their exclusion to the margin of society.

According to the statistics of the Central Office of Labour, Social Affairs and Family in December 2016 the level of recorded unemployment was 8,76 %. If we take into account the data from the year 2015, where the level of unemployment was 10,63 %, it means certain decrease. (Ministry of Labour, Social Affairs and Family of the SR, 2017) The situation in the area of long-term unemployment is being improved as well. The negative side of the employment policy is the fact that among unemployed persons there are more often persons with university education. From among graduates of 2nd degree university education the biggest proportion of unemployed graduates was in September 2016 in the area of social sciences, sciences and services I and II (32,91 % and 25,63 %) and technical sciences I (12,28 %). On the contrary, the lowest portion in the overall number of unemployed graduates were noted in the same period in the areas of sciences about art with 2,53 %, medical and pharmaceutical sciences with 3,09 %, military and security sciences with 4,41 %, agricultural and forest and veterinary sciences with 5,19 %, natural sciences with 6,77 % and technical sciences II with 7,18 %. (Ministry of Economy of the SR, 2017)

The Act on the Services of Employment enables to provide economic support from the state budget to creating the new jobs. According to article 51a of the Act on the Services of Employment in the year 2016 the financial support to create the new job was provided to 3087 young employees (until 29 years of age) in the overall amount of 12.978.320 EUR. In the interest of the development of local and regional employment on the basis of article 50j of the Act on the Services of Employment in the year 2016 were supported 2087 disabled job applicants in the overall amount of 7.803.741 EUR. The abovementioned factors suggest that in the Slovak Republic the economic instruments to support the employment are being used. (Ministry of Labour, Social Affairs and Family of the SR, 2017).

The state aid represents the economic instrument for starting the business for soleproprietors, in 2016 (§ 49) there were 8 249 299 EUR provided as the state aid to them and 1951 new jobs created. It is a part of the scheme of the aid *de minimis*, the scheme DM – 16/2014 is for supporting employment. It is complied to the aforementioned Act 358/2015 Coll. To ensure that aid is proportionate and limited to the amount necessary, the Commission Regulation (EU) No 1407/2013 of 18 December 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to *de minimis aid* (OJ EU L 352, 24. 12. 2013) is applied. The primary legislation EU, the Article 107(1) of the Treaty on the Functioning of the European Union (TFEU) lays down the principle that State aid is prohibited. Article 107(1) TFEU has the ultimate goal of ensuring the compatibility of national policies with the EU's objective of achieving an internal market. It has therefore been pointed out that the „*Treaty requires that the application of State aid rules must never produce a result which is contrary to the Treaty rules governing free movement*." (Biondi, Farley, 2011) In certain cases, however, such aid may be compatible with the internal market on the basis of Articles 107(2) and 107(3) TFEU. To follow the interest of cohesion policy in Slovakia there is also attention paid to the social economy. The social economy is something of a contested concept, and intra-national differences in terminology and usage make it difficult to derive a consistent definition. There is however some consensus, particularly among continental European countries, that the social economy includes co-operatives, associations, mutuals and foundations. This derives from the French legalistic approach to defining the social economy, first employed in the 1970s (Monzon, Chavez, 2012). Social economy is not developed yet in Slovakia althought it contributes to the unemployment elimination and just wealth distribution.

The legal instrument in Slovakia supporting the employment is the institute of social enterprise regulated in article 50b of the Act on the Services of Employment. According to that legal regulation the social enterprise of labour integration is considered the entity that is employing employees who prior to their admission to employment were disadvantaged applicants for employment in the amount representing at minimum 30 % from the overall number of its employees. The status of social enterprise of labour integration is recognised by the Central Office of Labour, Social Affairs and Family by its decision on the basis of the written application of the legal entity or natural person, if the conditions are met.. The

activities of these social enterprises of labour integration serve to provide the job to citizens who were the disadvantaged applicants for job, are employed in the social enterprise of labour integration and are taking part in its activities in the position of its employees. The social enterprise of labour integration provides the temporary employment to them, within which they can develop their labour skills and thus it becomes the „prep" for their access to the open labour market – for the employment in the ordinary enterprise. (Social Enterprise of Labour Integration, Manual 2017) The social enterprise of labour integration represents one of the instruments of social economy which could potentially ensure the creation of new jobs inter alia for those groups of applicants who face problems in finding job in the labour market, such as long-term unemployed persons. Social economy is not developed in Slovakia, it could potentionally support creating a new working positions. The social economy employs over 11 million people in the EU, accounting for 6 % of total employment. (EU, 2009)

Briefly the social enterprise could be defined as the bridge of social inclusion. In comparison to other entities in the market the main aim of social enterprise is not to achieve profit, but in particular to pursue some social goal. In addition to its social purpose, which is the creating the new jobs for disadvantaged job applicants, the social enterprise of labour integration pursues also the economic goal, which is the ensuring the income through the sale of products or providing services. The state supports from the public resources the functioning of social enterprises of labour integration. As of 1st August 2017 there were 7 enterprises of this type registered in Slovakia in the portal of the Central Office of Labour, Social Affairs and Family of the Slovak Republic. The number of the Slovak social enteprises rapidly decreased. According to the study the social economy in the European Union assessed the share of the population involved in social entrepreneurship as 4,1 % in Belgium, 7,5 % in Finland, 3,1 % in France, 3,3 % in Italy, 5,4 % in Slovenia and 5,7 % in the United Kingdom. (EU, 2009)

Such an example in Slovakia there is the social enterprise Nezábudka, which obtained the status of the social enterprise in May 2009. It is not a profit organization. It is the business which provides the social services for seniors in the region. The organization employs 35 full-time employees (by December 2016). The enterprise received 203.520 EUR subsidy from the state, which is 36,51 % from the overal budget and the contribution from the local municipal government 50.700 EUR. (Annual Report, Nezábudka, 2016). This social enterprise generates profit in its own operations, receives gifts from sponsors etc. Emplyees are pure enthusiasts because their monthly salary is lower than 800 EUR. From the pespective of contemporary theory there are social services of general interest, which are those that respond to the needs of vulnerable citizens, and are based on the principles of solidarity and equal access. Social services of general interest: these include social security schemes covering the main risks of life and a range of other essential services provided directly to the persons that play a preventive and socially cohesive/inclusive role. (Implementing, 2006). The threshold of the social enterprise is „an enthusiastic entrepreneur not driven by profit", often with personal experience of the kind, has the needed psychological knowledge about the quality of the people with mentioned barriers, empathy for those people, who have the idea and take on potential employees without work experience or employees who are limited by their disabilities. The managers running these businesses emphasize that for the success of social enterprises the specific approach is crucial which includes a) no underestimating their workers and b) sustaining a determined marked focus. (Nízka, Saxunová, 2011)

We believe that the problematics of the social enterprise that is regulated only in the Act on the services of the employment should be regulated by the particular Act on social businesses as it is in other states such as Finland (2003), Lithuania (2004) and Italy (2005). We think that Slovak legislation should define the social business more precisely, because the social business is the subject of social economy, which main aim is not to create profit for its owners, but to achieve positive social influence. Its activity consists in service providing and the profit generated is used in social goals accomplishment.

In Slovakia also Regulation (EU) No 346/2013 of the European Parliament and of the Council of 17 April 2013 on European social entrepreneurship funds is applied. (OJ L 115, 25. 4. 2013) The regulation is compulsory for Slovakia and all business entities must fully apply it. This regulation is creating a favourable climate for social enterprises, key stakeholders in the social economy and innovation. The regulation was accepted following the Social Business Initiative (2011) and objectives set in the Europe 2020 Strategy. It constitutes the common framework of the rules related to applying the designation „EuSEF" for qualified social entrepreneurship funds. On the European Union level there has been a legal instrument approved for the social business regulation operating on the territory of the EU. Based on this regulation there is a social investment market created, partially created by investment funds targeting social undertakings that provide funding to these social undertakings.

Conclusion

Having in mind the positive development in the Slovak labour market and with respect to the mutually interconnected system of strategic support (economic and legal) of employment, there is high degree of unemployment. The inflow of foreign investors supports the regional and local employment. Providing the financial support on the basis of the Act on employment represents the effective solution for the creation of new jobs. In the concrete examples we have shown that there exist several economic and legal instruments that provide for the preconditions of labour integration of unemployed persons. Within the framework of the employment policy we think it is right that in providing the financial means from the state budget the focus should be on the effectiveness. By the introduction of legal construction of social enterprises of labour integration the Slovak labour legislation obtained the legal tool of supported labour market. They help to eliminate the unemployment and integrate people handicapped, or not qualified sufficiently or with other barriers (drug addicts, prisoners etc.). Social businesses are the stimulus of social changes. To support social business development European Union has adopted Regulation (EU) No 346/2013, which establishes uniform rules applicable to qualifying social entrepreneurship funds. A preventive approach would be favourable in terms of efficiency and effectiveness. Prevention and activation measures mainly focusing on the start of the unemployment period should be strengthened and, where necessary, complemented. (Council Recommendation 2016/C 67/01) With regard to the stipulated aim of this study it can be clearly stated that the unemployment is the special feature of economies of transition, however, it is manifested also in the developed states. The unemployment directly influences the behaviour of individuals, and also the social relations. The social consequence of unemployment of individual is the reduction of his or her standard of living, social isolation, the loss of working habits, skills and professional abilities. The accompanying feature of long-term unemployed persons is their exclusion to the margin of society. The unemployment also influences the development of economy as well as the public finances. The unemployment represents inter alia one of the significant factors of successful economic development of country or region. Every state and society are seeking to achieve the full employment. From the point of view of economic variables the generally acceptable rate of unemployment represents around 4 %.

References

Annual Report on Activity and Management of Non-profit Organization „Nezábudka" Záhradnícka 2, 98 601 Fiľakovo Within a Year 2016. (2017) [Online] Available at: http://www.nezabudkafi.sk/dokumenty/vyrocne_spravy/nezabudka_vyrocna_sprava_2016.pdf[Accessed 9 Sept. 2017].

Barancová, H. (2010). European labor law. Flexibility and Security for the 21st Century. Bratislava: Sprint dva, p. 69. ISBN 978-80-89393-42-8

Biondi, A. and Farley, M. (2011). The Relationship Between State Aid and the Single Market. In: Erika Szyszszak (ed), European Handbook on State Aid Law (Cheltenham: Elgar, 2011) 277-92, at 282, with Reference to eg Case Commission in Italy (Sovraprezzo) Case 73/70.

Buchtová, B. et al. (2002). Unemployment. Psychological, Economic and Social Problem. Praha: Grada, p. 55. ISBN 80-247-9006-8

European Union (2009). CIRIEC The Social Economy in the European Union 2009, p. 48. [online] Available at: https://www.google.sk/search?q=European+Union+%282009%29.+CIRIEC+The+Social+Economy+in+the+European+Union+2009 [Accessed 6 Sept. 2017].

European Union (2010). Charter of Fundamental Rights of the European Union. OJ EU C 83.30.3.2010

European Union (2010). Treaty on the Functioning of the European Union, OJ EU C 83.30.3.2010

European Union (2012). EESC Social Economy in the European Union. (CIRIEC). [online] Available at: http://www.eesc.europa.eu/resources/docs/a_ces11042-2012_00_00_tra_etu_sk.pdf [Accessed 6 Sept. 2017].

European Union (2013). Commission Regulation No 1407/2013. OJ EU L 352, 24. 12. 2013. [online] Available at: http://ec.europa.eu/competition/state_aid/legislation/de_minimis_regulation_en.pdf [Accessed 6 Sept. 2017].

European Union (2013). Regulation (EU) No 346/2013 of the European Parliament and of the Council of 17 April 2013 on European Social Entrepreneurship Funds. OJ L 115, 25. 4. 2013, pp. 18-38.

European Union (2016). Council Recommendation 2016/C 67/01. [online] Available at: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32016H0220%2801%29 [Accessed 6 Sept. 2017].

Hetteš, M. (2013). Employment and Social Work (Selected problems of Work and unemployment for the Social Workers). Bratislava: Publisher: St. Elizabeth University of Health and Social Sciences, p. 25. ISBN 978-80-8132-089-7

Implementing the Community Lisbon Programme: Social Services of General Interest in the European Union (COM(2006) 177 final of 26 April 2006). (2006). [online] Available at: http://www.eur-lex.europa.eu/legal-content/EN/TXT/ [Accessed 6 Sept. 2017].

Intenational Labour Organization. (2017). [online] Available at: http://www.prospects.ac.uk/cms/ShowPage/Home_page/Main_News_and_information/Graduate_Market_trends/Definitions_of_International_Labour_Organization [Accessed 6 Sept. 2017].

Ministry of Economy of the Slovak Republic. (2017). Report of the Business Environment in the Slovak Republic. [online] Available at: http://www.rokovania.sk/File.aspx/ViewDocumentHtml/Mater-Dokum-205828?prefixFile=m_ [Accessed 31 Aug. 2017].

Ministry of Labour, Social Affairs and Family of the Slovak Republic. (2017). Information on the Fulfillment Evaluation of the National Employment Strategy of the Slovak Republic until 2020 Inclusive

of Proposal for its Updating. [online] Available at: http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=26693 [Accessed.6 Sept. 2017].

Monzon, J. L. and Chavez, R. (2012). The Social Economy in the European Union. CIRIEC, Liege. [online] Available at: http://www.socialeconomy.eu.org/IMG/pdf/executive-summary-for-publication_en.pdf [Accessed.6 Sept. 2017].

Morabito, G. and Sergi, B. S. (2016). Migration and International Business Analysis on the Economic Implications of the Linkage. In: Proceedings from International Conference: Billateral Academic Forum Slovakia – France in the Perspective of International Policy of Slovak Republic. Prague: Wolters Kluwer, pp. 91-99. ISBN 978-80-7552-541-3

National Council of the Slovak Republic. Act no. 311/2001 Coll. Labour Code.

National Council of the Slovak Republic. Act no. 5/2004 Coll. on the Services of Employment as Amended Regulates the Right to Access to Employment.

National Council of the Slovak Republic. Act no. 358/2015 Coll. Act No. 358/2015 Coll. on Adjustment of Certain Relations in State Aid and De Minimis Aid and on Amendments and Supplements to Certain Acts

Nízka, H. and Saxunová, D. (2011). The Potencial of Social Services. In: FAIMA Business & Management Journal. Vol. 3, Iss. 3, pp. 60-71.

Saxunová, D. (2015). Innovative Trends of Financing in Global Environment – Experience of Slovakia and its Inspiration for Namibia. In: First International Conference ABEM“, Proceedings. Windhoek, Winnipeg: Academy of Business and Emerging Markets, August 3-4, 2015, pp. 48-64.

Saxunová, D. (2016). Management of Migration and Opportunities of its Financing. In: Proceedings from International conference: Billateral Academic Forum Slovakia – France in the Perspective of International Policy of Slovak Republic. Prague: Wolters Kluwer, pp. 220-233. ISBN 978-80-7552-541-3

Schavel, M. (2016). The Secondary Consequences of Social-Economic Problems of Clients. In: Secondary Social Problems conditional on Unemployment. Rimavská Sobota: Association for Social Development and Support of the Slovak Republic Citizens, pp. 14-30. [online] Available at https://www.vssvalzbety.sk/userfiles/VEDA/Zbornik-SekundarneSocialneProblemyPodmienenenеZamestnanostou.pdf. ISBN: 978-80-972352-1-5

Social Enterprise of Labour Integration. Manual. (2017). [online] Available at: http://www.upsvar.sk/...2017/Socialny_podnik_pracovnej_integracie__Manual_maj_2017.rtf [Accessed 6 Sept. 2017].

Treľová, S. (2014). Instrument Supports Integration of Persons with Disabilities at the Labour Market. In: Legal-Economic Aspects Long-unemployment. 2014. Bratislava : Comenius University in Bratislava:pp. 114-119. ISBN 978-80-716-388-7

Treľová, S. (2015).Basic Principes of Slovak Labour Code. In: Principles in Law. Bratislava: SAP, pp. 249-255. ISBN 978-80-89607-34-1

United Nations Organization. (1948). International Bill of Human Right. /1949. [online] Available at: https://documents.un.org/doc/resolution/gen/nr0/043/88/img/nr004388.pdf?openelement [Accessed 31 Aug. 2017].

Žatkovičová, K. and Dóci, J. (2012). Psychiatric, Psychological, Social and Economic Aspects of Unemployment. No 1, pp. 17-24. [Online] Available at: http://www.psychiatria-casopis.sk/files/psychiatria/01-2012/ppp1-2012-cla3.pdf. ISSN 1338-7030

Leveraging organizational performance and innovation Via knowledge management strategies in Turkey: Evidence from the İstanbul Stock Market

Yakup Akgül, Ass.Prof.Dr.
Alanya Alaaddin Keykubat University, Faculty of Business, Alanya, Antalya/TURKEY
yakupakgul@gmail.com

Abstract

The purpose of the present study is to examine the relationships among knowledge management strategies (codification and personalization), innovation, and organizational performance in the İstanbul Stock Market businesses. Research suggests that knowledge management strategies are essential capabilities for effective innovation and organizational performance. Through analysis of surveys collected from 203 mid-level managers, the present model under the study was empirically tested using the Partial Least Squares (PLS) method for the model assessment and analysis of the relationships among constructs. Our results show that knowledge management strategies had a statistically significant and direct positive effect on innovation and organizational performance. Most outstandingly, the results indicate that knowledge management strategies had a positive and statistically significant effect on organizational performance through the partial mediation effect of innovation. Also, findings demonstrate a different effect of KM strategies on diverse dimensions of organizational performance. Conclusions of the present study may help academicians and managers in implementing knowledge management strategies for the purpose of enhancing the innovation, effectiveness, efficiency, profitability and in improving organizational performance.

Keywords: Knowledge management strategies, Innovation, Organizational performance, BSC, Istanbul Stock Market

1. Introduction

Due to the fact that knowledge has been highlighted as a key strategic resource to create corporate value by academicians and practitioners (Abou-Zeid, 2003; Bhatt, et al., 2005; Choi and Lee, 2002; Conner and Prahalad, 1996; Drucker, 1993; King, 2001; Kogut and Zander,1992; Ndlela and du Toit, 2001; Wu and Lin, 2009; Zack, 1999), enterprises striving to develop knowledge to the maximum level in view of achieving corporate goals and competition. However, whether an enterprise can effectively utilize and develop knowledge determines the pros and cons of knowledge management capabilities (KMC) (Grant, 1996; Tanriverdi, 2005; Zack, 1999). Gold et al. (2001) further indicated that the key contributions of KMC are improved ability to innovate, improved coordination of efforts, and rapid commercialization of new products (Gold et al., 2001). Understanding a firm's KMC is essential to both providing competitive advantages and increasing firm performance (Andrew , 2005; Tanriverdi, 2005).

KM strategies have become a primary issue for many companies (Alavi and Leidner, 2001). Numerous studies have shown that Knowledge Management (KM) strategies are able to help achieve or maintain success of contemporary organizations. Indeed, the implementation of KM strategies is said to be the best way to improve organization's ability in various aspects such as innovation capacities (Brachos et al., 2007; Chang and Lee, 2008; Jiang and Li, 2009; Liao and Wu, 2010; Sáenz et al., 2009) and organizational performance (OP) indicators (Asoh et al., 2007); Bierly and Daly, 2007; Choi et al., 2008; Ho, 2011; Kim and Gong, 2009; Liao et al., 2009; Yang et al., 2009; Zack et al., 2009). KM strategies are broadly recognized that knowledge is a momentous resource for strategic organization in enhancing innovation and improving OP (Rhodes et al., 2008). Despite the increasing importance of knowledge as being a resource of strategic perspective, there is still lack of understanding the critical factors for the implementation of KM strategies (Garavelli et al., 2004; Hwang, 2003; Maier and Remus, 2003). Although there are a large number of KM strategies frameworks, organizations still face difficulty with this part due to a lack of an integrated framework of its implementation (Chong et al., 2007; Chong et al., 2009).

On other hand, a number of studies have noted that KM strategies could play a major role in increasing innovation (Darroch and McNaughton, 2002; Forcadell and Guadamillas, 2002; Rhodes et al., 2008). However, there are limited empirical studies that investigate the relationship between KM strategies and innovation (Rhodes et al., 2008). Therefore, there is an existing gap in the literature on KM strategies and its influence on innovation (Majchrzak et al., 2004; Rhodes et al., 2008). Correspondingly, several studies have indicated that KM strategies could play a major role in higher OP (Bierly and Daly, 2007; Choi et al., 2008; Chong et al., 2009; Schulz and Jobe, 2001; Shih and Chiang, 2005; Turner and Bettis, 2002). Nevertheless, there is still a lack of studies that attempt to analyze the effect of KM strategies on OP (Choi et al., 2008). In this regard, very few studies have investigated the relationship between KM strategies and the Balanced Scorecard (BSC) indicators (Chen and Mohamed, 2008; Lee and Lee, 2007; Yu and Liying, 2009). Therefore, there is also an existing gap in the literature on KM strategies and its influence on OP (Yang et al., 2009; Zack et al., 2009. That gap is consistent with Kalling's (2003) remark that "there are relatively few knowledge management texts that make an explicit connection between knowledge and performance." (Kalling, 2003).

From the gaps listed above, the issue of the relationships among successful implementation of KM strategies, innovation, and OP is still unclear, and there are very limited studies in this area. Therefore, present study contributes to the previous studies by proposed theoretical framework which explains the relationships among KM strategies, innovation, and OP from the holistic theory of knowledge and learning and knowledge-based view (RBV) perspectives. Fig. 1 shows graphically the research model and summarized the hypothesis that will be tested in the present paper.

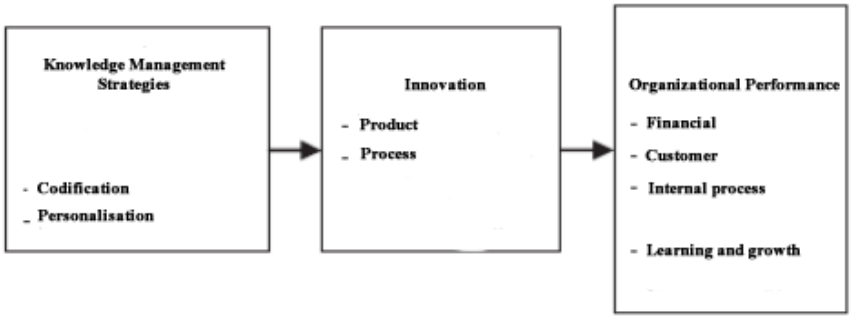


Figure 1: Theoretical framework.

The relationship between KMSs and innovation, as well as the relationship between KMSs and OP have been developed based on RBV and KBV theories. Within theoretical perspective of RBV and KBV, knowledge has become the main strategic significant source for all successful organizations and not land, labor, capital or the production of other elements. The success of organizations is argued to depend on the efficient management of internal and external knowledge sources to adapt to the change that occurs in the environment. The ability to adapt to these changes is purported to enhance innovation and superior performance (Asare, 2008; Kiessling et al., 2009; Pathirage et al., 2009). Figure 1 shows the theoretical framework of the relationships among study's variables.

As contributions to the body of knowledge, the theoretical framework of the present study is developed based on RBV and KBV theory perspectives. The proposed theoretical framework shown in Figure 1 describes the causal relationships among three variables of the KMSs, innovation, and OP. Undoubtedly, the independent variables in this framework is the KMSs (i.e. codification and personalization). Moreover, the dependent variable is and OP (i.e. financial perspective, customer perspective, internal process perspective, and learning and growth perspective). On the other hand, innovation (i.e. technological innovation, administrative innovation, radical innovation, and incremental innovation) acts as the mediating variable between the KMSs and OP.

2. Research Methodology

2.1. Data collection and sample

This is a quantitative cross-sectional study that utilized the survey questionnaire as the main instrument for the data collection. Hence, a self-completion, well-structured questionnaire was developed based on previous literature and was then distributed to a random sample where participation was completely voluntary. Sekaran (2003) stresses the importance of choosing the questionnaire language that approximates the level of understanding of the respondents. Given that the majority of the Turkish are communicating in Turkish language, questionnaire items of the study have been translated into Turkish language. The English version of the questionnaire has been translated into Turkish language by two independent translators. The Turkish version which has been translated by the first translator has been translated back to English by the second translator. The same was repeated to the second translator's version. The two versions in both languages have been compared to resolve any differences. The final version following the amendments was then used for the data collection.

The descriptive statistics of the sample showed that 53% of the respondents were male and 47% were female. Respondents aged between 25 and 35 years formed the largest age group and represented 49.26% of the sample. The majority of respondents were bachelor degree and represented 76.31%

2.2. Items Measurement

The variables of this research are measured using multi-item scales tested in previous studies. Items for KM strategies are based on (Choi and Lee, 2002; Choi and Lee, 2003). The two measures of KM strategy developed by Choi and Lee (2002) and Choi and Lee (2003) were used: codification and personalization. Codification strategy was a four-item seven-point scale measuring how their firms manage knowledge about knowledge codification, knowledge acquisition from codified forms, documentation, and knowledge sharing through codified forms. Personalization strategy was a four-item seven-point scale measuring how their firms manage knowledge about knowledge acquisition from experts and co-workers, face-to-face help by experts, informal dialogues for knowledge sharing, and knowledge acquisition by one-to-one mentoring. Innovation scale were adopted from (Singh and Smith, 2004; Prajogo and Sohol, 2003). Finally, performance measures are based on balanced scorecard outcomes (learning and growth, internal process, customer satisfaction and financial performance) were adopted from Blackmon's (2008) study and created by the researcher according to Niven's (2006) book. The major advantage of BSC is that it retains financial performance and supplements it with measures of the drivers of future potential. As knowledge management is an activity that penetrates the whole organization, and we consider BSC to be more appropriate to measure firm performance. Firm performance (FP) is measured on three dimensions: (i) financial performance encompassing marketing performance (growth, profitability, and customer satisfaction); (ii) process performance which refers to quality and efficiency; (iii) internal performance relating to individual capabilities (employees' qualifications, satisfaction and creativity). The items that measure the Conceptual model were structured on a five-point Likert-type scale that ranged from 1 (strongly disagree) to 5 (strongly agree).

3. Data Analysis and Results

PLS is a component-based approach that is widely adopted in the IS field, and has several advantages: PLS is able to deal with reflective and formative constructs, and latent constructs under non-normal conditions, it is also able to handle more minimal demands on sample size than other methods (Urbach and Ahlemann, 2010). Therefore, PLS is appropriate for the analysis of our survey samples (N=203). In the data analysis section, the first step examined the measurement model in order to check the reliability and validity of the constructs, and the second step attempted to test the relationship between the latent constructs and hypotheses. In this study, SmartPLS 2.0 M3 software

(Ringle et al., 2005) was used in order to assess both the measurement model and the structural model.

3.1. Measurement Model

In order to validate the measurement model, internal consistency reliability, and the validity of convergent validity and discriminant validity were assessed. Internal consistency reliability was examined using composite reliability (CR) values. As shown in Table 3, all of the composite reliability values were above 0.7, ranging between 0.94 and 0.98, which satisfies the commonly acceptable level, as recommended by ((Fornell and Larcker, 1981). The results showed that all CR values were reliable. Convergent validity was assessed using two criteria (Fornell and Larcker, 1981; Hair et al., 2010): (1) all factor loadings should be significant and greater than 0.5 (Wixom and & Watson, 2001), and (2) average variance extracted (AVE) from each construct should exceed the threshold value of 0.5, as this indicates that 50% or more of the variance is explained by the indicators of the latent variable (Chin, 1998a). As shown in Table 1, all factor loadings exceed 0.6, the AVE values ranged between 0.58 and 0.91, and all values were above the acceptable level of 0.5. All the factor loadings and AVEs support the convergent validity of the constructs. As such, content validity, reliability, and convergent validity of the measurement instrument are all satisfactorily met in this research. As for discriminant validity, it is actually established when the square root of the AVE from the construct is greater than the correlation shared between the construct and other constructs in the model (Chin, 1998b). The discriminant validity of the measurement instrument is confirmed in this study given that the square root of the AVE from each construct is larger than all other cross-correlations with other constructs (see Table 2).

Measurement reliability was assessed prior to data analysis. To assess the reliability of the measures, the Cronbach alpha coefficient was used. As shown in Table 1, the results showed that all the constructs had Cronbach alpha values greater than 0.7, indicating an acceptable level of measurement reliability (Nunnally, 1978). As the results of the test were satisfactory, all the items were retained for the survey.

Table 1: Measurement model results.

Construct	Range of Factor loadings	Number of Items	AVE	CR	Cronbach's alpha
Codification	0,895-0,942	4	0,838	0,954	0,935
Personalization	0,889-0,918	4	0,820	0,948	0,927
Innovativeness	0,804-0,904	14	0,740	0,975	0,973
Learning and Growth	0,802-0,915	12	0,647	0,955	0,945
Internal Process	0,608-0,909	12	0,699	0,965	0,960
Customer Satisfaction	0,790-0,869	12	0,577	0,939	0,925
Financial Performance	0,954-0,964	4	0,914	0,977	0,968

[a]Average variance extracted (AVE)=(summation of the square of the factor loadings)/{(summation of the square of the factor loadings)+(summation of the error variances)}.
[b]Composite reliability (CR)=(square of the summation of the factor loadings)/{(square of the summation of the factor loadings)+(square of the summation of the error variances)}.

Table 2: Correlation of constructs and the square root of AVEs

	COD	CS	FP	INN	INTP	LEAR	PER
COD	1,00						
CS	0,84	1,00					
FP	0,80	0,79	1,00				
INN	0,90	0,89	0,84	1,00			
INTP	0,80	0,88	0,78	0,86	1,00		
LEAR	0,85	0,86	0,83	0,92	0,87	1,00	
PER	0,86	0,82	0,75	0,90	0,82	0,86	1,00

Note: The square roots of the constructs' AVE values are shown in the diagonal line (in bold); non-diagonal elements are latent variable correlations.

3.2. Structural Model, Hypotheses Testing and Discussion

This study follows Hair et al.'s (2003) five-step approach to measure structural model; that is, (1) collinearity assessment among the constructs, (2) structural model path coefficients, (3) coefficient of determination (R2 value), (4) effect size f2, and (5) predictive relevance Q2 and blindfolding. The details of each step appear below.

The proposed hypotheses were tested using the bootstrap resampling estimation of PLS, as suggested by (Chin, 1998a). The test of the structural model consisted of path coefficients (β) and the coefficients of determination (R-square value). Path coefficients demonstrated the strength of the relationships between the dependent and independent constructs. Diamantopoulos and Siguaw (2000) classify path coefficients that are below 0.30 as (causing) moderate (effects), from 0.30 to 0.60 as strong, and above 0.60 as very strong. Table 3 shows the results of the hypothesis testing and structural relationships. R-square values indicated that the amount of variance is explained by the independent constructs. This study uses a resampling bootstrap method with 5000 along with each bootstrap sample containing the same number of observations as the original sample (i.e., 203 bootstrap cases) to generate standard errors and t-values (Chin, 1998a; Hair et al., 2013). The study assesses estimated path relationships among the latent variables in the model through the sign and magnitude of path coefficients. The findings support H1, H2, H3c, H3d, H4a, H4b and from H5a to H5d. With H1, we examined the relationship between codification KM strategy and innovation. The result showed that codification KM strategy has a significant impact on innovation (β 0.46, t-value=8.60, $p < 0.01$), which supports H1. In H2, we focused personalization KM strategy, and the findings supported H2; that is, the positive effect of personalization KM strategy on innovation was significant (β 0.50, t-value=9.55, $p < 0.01$). Yousif et al (2013) showed that knowledge management strategies had a statistically significant and direct positive effect on innovation. Yousif et al (2014) found that midlevel managers could play a critical role in insuring the successful implementation of knowledge management strategies. Regarding the relationship between codification KM strategy and organizational performance described in H3a, H3b, H3c and H3d, a positive relationship only existed between codification KM strategy and customer satisfaction (β 0.21, t-value=2.52, $p < 0.05$), financial performance (β 0.26, t-value=2.17, $p < 0.05$), which supports H3c and H3d. Regarding the relationship between personalization KM strategy and organizational performance described in H4a, H4b, H4c and H4d, a positive relationship only existed between personalization KM strategy and learning and growth (β 0.13, t-value=1.70, $p < 0.1$), internal process (β 0.19, t-value=1.70, $p < 0.1$), which supports H4a and H4b. Regarding the innovation between and organizational performance described in H5a, H5b, H5c and H5d, a positive relationship existed between innovation and learning and growth (β 0.71, t-value=7.88, $p < 0.01$), internal process (β 0.60, t-value=4.69, $p < 0.01$), customer satisfaction (β 0.65, t-value=6.60, $p < 0.01$) and financial performance (β 0.72, t-value=5.48, $p < 0.01$), which supports H5a, H5b, H5c and H5d. Duy and Tuan (2014) showed that kms seen as playing an important mediating role in innovation between strategic knowledge management and firm performance. For example, Lopez-Nicolas and Mero˜no-Cerdan (2011) showed that the two knowledge management strategies of codification and personalization are mechanisms through which companies manage to achieve greater effectiveness and performance. Yousif et al. (2011) found that core requirements of knowledge management implementation (including critical successes factors of knowledge management, knowledge management strategies and knowledge management processes) can be in place to pave the way to ensure the successful implementation of knowledge management, which is reflected in the organizational performance improvement. Yousif et al. (2013) indicated that knowledge management strategies had a positive and statistically significant effect on organizational performance through the partial mediation effect of innovation. Ordonez (2002) attempted to identify how KM strategies affect organizational performance. She applied Bierly and Chakrabarti's typology of generic KM strategies to analyze a cross-section of Spanish firms. A significant relationship between KM strategies and non-financial performance was found. Pai (2005) empirically investigated 20 Taiwanese integrated circuit (IC) design firms from 1997 to 2002, and categorized them into discoverers, discretionists, external learners, internal exploiters, and overall creationists – emphasizing both learning from external sources and exploitation from internal sources. It was found that the internal exploiters were the best performers, while the discoverers were the worst in terms of ROA and ROE. Choi and Jong (2010)

extended previous work by showing an empirical relationship between KM strategy announcements and stock prices. Authors found that investors expected future benefits to a firm's performance as a result of system- and human-oriented strategy implementation. Our results enable managers to measure the effects of KM, and help them make decisions on the issue of KM strategies and KM-related investment priorities. Liao (2011) indicated that when firms emphasize personalization strategy, the use of behavior control will enhance firm performance. In contrast, when firms emphasize codification strategy, the use of output control will make firm performance better. If personalization and codification strategy were emphasized simultaneously, firms would not use single HRM control system to better performance. Finally, it helps to explain the relationships between certain specific strategies of knowledge management and the high performance work systems, from the perspective that they contribute to firm performance (Chen and Huang, 2009; Ling, 2013; Snell, Youndt, 1995).

In addition, the R-square values of all the variables were exceeded 10%, indicating substantive explanatory power (Bock et al., 2006; Falk and Miller, 1992; Hsu and Chang, 2014). As in Table 3, The R^2 value for each endogenous latent construct (i.e. innovation, learning and growth, internal process, customer related performance and financial performance) demonstrate an acceptable prediction level in empirical research. The coefficient of determination R^2, which is the central criterion for the structural model's assessment (Klarner et al., 2013), has a high value of 0.870 for this study's key target construct; i.e. innovation. This value of R^2 which is above 25% demonstrates a highly acceptable prediction level in empirical research (Gaur and Gaur, 2006; Griffith, 1996). Indeed, the high R^2 proves the model's predictive validity (Hair et al., 2012). Codification and personalization km strategies variables together explained 87% of the variance in innovation. All three variables together explained 86% of the variance in learning and growth, 75% of the variance in internal business performance, 80% of the variance in customer-related performance and 71% of the variance in financial performance (see table 3). The literature suggests that R^2 values of 0.67, 0.33, and 0.19 are substantial, moderate, and weak, respectively (Chin, 1998). Following the rules of thumb, the values of R^2 of variables are substantial. In the end, we examined predictive relevance (Stone-Geisser Q^2) (Stone, 1974), using the blindfolding procedure in SmartPLS with an omission distance set to 8 (Chin, 1998a; Geisser, 1975). All of the cross-validated redundancy Q^2 were considerably above zero (Tenenhaus et al., 2005), which indicates that the constructs of our model possessed predictive relevance regarding the reflective endogenous latent variables (see Table 3).

This study calculates the f^2 and q^2 effect sizes. The values of effect size f^2 and q^2 of 0.02, 0.15, and 0.35 appear as small, medium, or large (Chin, 1998a), which is similar to Cohen's implementation. Changes in R-square were explored to investigate the substantive impact of each independent construct on the dependent constructs, carrying out the effect size technique by rerunning three PLS estimations, excluding in each run one of the explaining latent constructs. Understanding that a small f^2 and q^2 do not necessarily imply an unimportant effect is crucial. "If there is a likelihood of occurrence for the extreme moderating conditions and the resulting beta changes are meaningful, then it is important to take these situations into account" (Limayem et al., 2001).The results of the effect size test presented in Table 3.

Table 3: Hypotheses testing results and f2 and q2 effect size.

Hypothesis	**Path (relationship)**	**Path coefficient**	**Effect size[1] f^2**	**Effect size[2] q^2**	**Standard error**	**t-Statistic[a]**	**R^2**	**Q^2**	**Decision**
H1	Cod→Inn	***0,461***	0,42	0,11	0,053671	8,597***	0,87	0,638	Supported
H2	Pers→Inn	0,505	0,5	0,13	0,052828	9,551***			Supported
H3a	Cod→Learning and	0,101	0,013	0,002	0,084217	1,194	0,86	0,543	Not supporte

	Growth								d
H3b	Cod→Internal Pro	0,094	0,007	0,002	0,100376	0,932	0,75	0,514	Not supported
H3c	Cod→Customer	0,215	0,039	0,007	0,085179	2,523**	0,80	0,447	Supported
H3d	Cod→Financial	0,262	0,041	0,03	0,120760	2,174**	0,71	0,646	Supported
H4a	Per→Learning and Growth	0,129	0,028	0,006	0,076063	1,699*			Supported
H4b	Per →Internal Pro	0,193	0,027	0,008	0,113321	1,701*			Supported
H4c	Per →Customer	0,053	0	0	0,078822	0,667			Not supported
H4d	Per →Financial	-0,130	0,01	0,008	0,118292	1,102			Not supported
H5a	Inno→Learning and Growth	0,715	0,46	0,11	0,090698	7,880***			Supported
H5b	Inno →Internal Pro	0,601	0,19	0,08	0,128163	4,691***			Supported
H5c	Inno →Customer	0,645	0,26	0,05	0,097840	6,596***			Supported
H5d	Inno →Financial	0,719	0,23	0,17	0,131238	5,479***			Supported

[a] t-values for two-tailed test:
* 1.65 (sig. level 10%).
** 1.96 (sig. level=5%).
*** t-value 2.58 (sig. level = 1%) (Hair et al., 2011).
Notes:***p<0.01, **p<0.05, *p<0.1
effective size: 0 – none, 0.02 – small, 0.15 - medium, 0.35 – large (Cohen, 1988).
Effect sizes calculated using the following formulas
[1]f^2= R^2included - R^2excluded / 1- R^2included (1)
[2]q^2 = Q^2included - Q^2excluded / 1- Q^2included (2)

Regarding model quality, Wetzels et al. (2009) provide a global fit (GoF) measure for PLS path modeling and derive a GoF measure with effect sizes for R^2 by substituting the minimum average AVE of 0.50. The GoF measures have been suggested as baseline values for validating the PLS model globally (the cut value of GoF_{small}=0.1, GoF_{medium}=0.25, and GoF_{large}=0.36) (Tenenhaus et al., 2005; Wetzels et al., 2009). The research model obtained a GoF value of 0.75044, which is greater than the cut-off value of 0.36 and is considered an adequate GoF. These results demonstrate this model performs well.

Table 4: Structural Model

Fit measures	Endogenous construct	Final Model
R^2	Innovation	0,870
	Customer-related perf.	0,795
	Internal business perf.	0,749
	Learning and growth	0,856
	Financial perf.	0,713
GoF		0,750
Note. GoF = √ Average Communality x Average R^2		

4. Conclusion

Our research finds and explains the importance of the KMSs in relation to enhance innovation and improve OP. Empirical evidence is provided about the consequences of codification and personalization strategies on innovation and performance, developing previous researches in the field of KM where the link has been proposed quite often, but with scarce empirical support. Now, academics and companies are aware of the implications that KM and its strategy may have. Consequently, present study contributed to the previous studies through a proposed theoretical framework, which were based on both of RBV and KBV theories. The framework explains the direct relationship between KMSs (consisting of codification and personalization) and OP (consisting of financial perspective, customer perspective, internal process perspective, and learning and growth perspective metrics) and indirect relationship between KMSs and OP through investigate the intervening role of the innovation (consisting of product and process innovations).

As revealed from the research results, the present study shows that KMSs had a statistically significant and direct positive effect on innovation and OP. Furthermore, the present study represents the empirical investigation of the role of innovation in the relationship between KMSs and OP under RBV and KBV theories' perspectives, especially in the İstanbul Stock Market. To recap, these results provide evidence of mutually beneficial for both the theoretical and practical implications of the study and will help both academics and the practitioners in the KM area.

Certainly, the present study has contributed to the KMSs field. The results of the present study have theoretical and practical contributions. As such, the current attempt has managed to fill in gaps that existed in the KMSs literature. However, the present study faced generalizability limitation. The present study was limited to the İstanbul Stock Market. In this sense, results may be extrapolated to other Turkish sectors and other countries. Therefore, the study can be replicated in different countries or sectors, as this would most likely strengthen and validate the results of hypotheses. In this case, further studies are necessary to confirm these results and incorporate the other variables that may have influenced the results. Therefore, the future is wide open for more empirical research in this area.

References

Abou-Zeid, E. (2003). Developing business alignment knowledge management strategy, In E. Coakes (Ed.), Knowledge Management: Current Issues and Challenges, p. 157-173, Hershey: Idea Publishing Group, Hershey, PA.

Alavi, M. and Leidner, D.E. (2001) "Review: knowledge management and knowledge management systems: conceptual foundations and research issues", *MIS Quarterly,* 25 (1), 107–136.

Andrew,L.S.G., (2005) "Harnessing knowledge for innovation:an integrated management framework", *J.Knowl.Manage*.9(4),6–18.

Asare, A.K. 2008. The role of the supplier in marketing process innovation and value creation, unpublished doctoral dissertation, University of Massachusetts, Amherst, MA.

Asoh, D. A., Belardo, S., & Crnkovic, J. (2007) "Assessing knowledge management: Refining and cross validating the knowledge management index using SEM Techniques", *International Journal of Knowledge Management*, 3(2), 1-30.
Bhatt, G.,Gupta,J.N.D.,Kitchens, F. (2005) "An exploratory study of groupware use in the knowledge management process", *J.Enterp.Inf.Manage*.18(1/2), 28–46.

Bierly, P.E. and Daly, P.S. (2007) "Alternative knowledge strategies, competitive environment, and organizational performance in small manufacturing firms", *Entrepreneurship Theory and Practice*, Vol. 31 No. 4, 493-516.

Blackmon, V. Y. (2008). Strategic planning and organizational performance: An investigation using the balanced scorecard in non-profit organizations. Doctoral Dissertation, Capella University, Minneapolis.

Bock, G. W., Kankanhalli, A., & Sharma, S. (2006) "Are norms enough? The role of collaborative norms in promoting organizational knowledge seeking", *European Journal of Information Systems*, 15(4), 357-367.

Brachos, D., Konstantinos, K., Soderquist, K. E., & Prastacos, G. (2007). Knowledge effectiveness, social context and innovation", *Journal of Knowledge Management*, 11(5), 31-44.

Chang, S. C., & Lee, M. S. (2008) "The linkage between knowledge accumulation capability and organizational innovation", *Journal of Knowledge Management*, 12(1), 3-20.

Chen, C. J., & Huang, J. W. (2009) "Strategic human resource practices and innovation performance – The mediating role of knowledge management capacity", *Journal of Business Research*, 62, 104–114.

Chen, L., & Mohamed, S. (2008) "Contribution of knowledge management activities to organisational business performance", *Journal of Engineering, Design and Technology*, 6(3), 269-285.

Chin, W. W. (1998a). "The partial least squares approach to structural equation modeling" *Modern Methods for Business Research*, 295(2), 295-336.

Chin, W.W. (1998b) The partial least squares approach for structural equation modeling, in Marcoulides, G.A. (Ed.), Modern Methods for Business Research, Lawarence Erlbaum Associates, pp. 295-336.

Choi B. and Jong, A. M. (2010) "Assessing the impact of knowledge management strategies announcements on the market value of firms", *Inform Manag*. 2010; 47, 42-52.

Choi, B.&Lee, H. (2002) "Knowledge management strategy and its link to knowledge creation process". *Expert Systems with Applications*, 23(3), 173–187.
Choi, B., & Lee, H. (2003) "An empirical investigation of KM styles and their effect on corporate performance", *Information & Management*, 40(5), 403–417.

Choi, B., Poon, S.K. and Davis, J.G. (2008) "Effects of knowledge management strategy on organizational performance: a complementarity theory-based approach", *Omega*, Vol. 36 No. 2, pp. 235-251.

Chong, C. W., Choy, C. S., & Wong, K.Y. (2009) "Is the Malaysian telecommunication industry ready for knowledge management implementation?", *Journal of Knowledge Management*, 13(1), 69-87.

Chong, C.W., Choy, C.S. and Wong, K.Y. (2007) "Implementation of knowledge management strategies in the Malaysian telecommunication industry an empirical analysis", *VINE*, Vol. 37 No. 4, pp. 452-470.

Conner, K.R. and Prahalad, C.K. (1996) "A Resource-based Theory of the firm: Knowledge versus opportunism", *Organization Science*, 7 (5), 477-501.

Darroch, J. and McNaughton, R. (2002) "Examining the link between knowledge management practices and types of innovation", *Journal of Intellectual Capital*, Vol. 3 No. 3,210-222.

Diamantopoulos, A., & Siguaw, J. A. (2000). Introducing LISREL. London: SAGE Publications.

Drucker, P. F. (1993). Postcapitalist Society. New York: HerperCollins Publishers.

Duy, Nguyen Quoc and Tuan, Vu Hong. (2014) "Strategic Knowledge Management, Innovation and Firm Performance: An Empirical Study in Vietnamese Firms", *Journal of Economics and Development*, Vol.16, No.1, 60-73

Falk, R.F., & Miller, N.B. (1992). A primer for soft modeling. Akron, OH: Univ. Akron Press.

Forcadell, F. J., & Guadamillas, F. (2002). "A case study on the implementation of a knowledge management strategy oriented to innovation", *Knowledge and Process Management*, 9(3), 162-171.

Fornell, C., & Larcker, D. F. (1981) "Evaluating structural equation models with unobservable variables and measurement error", *Journal of Marketing Research*, 18(1), 39-50.

Garavelli, C., Gorgoglione, M., & Scozzi, B. (2004) "Knowledge management strategy and organization: A perspective of analysis", *Knowledge and Process Management*, 11(4), 273-282.

Gaur, A. S., & Gaur, S. S. 2006. Statistical methods for practice and research: A guide to data analysis using SPSS. Sage.

Geisser, S. 1975. The predictive sample reuse method with applications. Journal of the American Statistical Association, 70(350): 320–328.

Gold, A.H., Malhotra, A.,Segars, A.H. (2001) "Knowledge management: an organizational capabilities perspective", *J.Manage.Inf.Syst.*18 (1), 185–214.

Grant, R. M. (1996) "Towards a knowledge-based theory of the firm", *Strategic Management Journal*, 17(10), 109–122.

Griffith, D. A. (1996). Some guidelines for specifying the geographic weights matrix contained in spatial statistical models. Practical Handbook of Spatial Statistics, 65–82.

Hair, J. F., Sarstedt, M., Ringle, C. M., & Mena, J. A. (2012) "An assessment of the use of partial least squares structural equation modeling in marketing research", *Journal of the Academy of Marketing Science*, 40(3), 414–433.

Hair, J., Black,W., Babin, B., & Anderson, R. (2010) Multivariate data analysis: A global perspective. New Jer: Pearson.

Hair, J.F., Jr., Hult, G.T.M., Ringle, C., & Sarstedt, M. (2013) A primer on partial least squares structural equation modeling (PLS-SEM). Inc: SAGE Publications.

Ho, L. A. (2011) "Meditation, learning, organizational innovation and performance", *Industrial Management & Data Systems*, Vol. 111 Iss: 1, 113 – 131

Hsu, M. H., & Chang, C. M. (2014) "Examining interpersonal trust as a facilitator and uncertainty as an inhibitor of intra-organisational knowledge sharing", *Information Systems Journal*, 24 (2), 119-142.

Hwang, A. S. (2003) "Training strategies in the management of knowledge", *Journal of Knowledge Management*, 7(3), 92-104.

Jiang, X., & Li, Y. (2009) "An empirical investigation of knowledge management and innovative performance: The case of alliances", *Research Policy*, 38(2), 358-368.

Kalling, T. (2003) "Knowledge management and the occasional links with performance", *Journal of Knowledge Management*, 7(3), 67-81.

Kiessling, T.S., Richey, R.G., Meng, J. and Dabic, M. (2009) "Exploring knowledge management to organizational performance outcomes in a transitional economy", *Journal of World Business*, Vol. 44 No. 4, pp. 421-433.

Kim, H. and Gong, Y. (2009) "The roles of tacit knowledge and OCB in the relationship between group-based pay and firm performance", *Human Resource Management Journal*, 19(2), 120-139.

King, W.R., (2001) "Strategies for creating a learning organization", *Information systems management*, Winter, 12–20.

Klarner, P., Sarstedt, M., Hoeck, M., & Ringle, C. M. (2013). "Disentangling the effects of team competences, team adaptability, and client communication on the performance of management consulting teams", *Long Range Planning*, 46 (3), 258–286.

Kogut, B. and Zander, U. (1992) "Knowledge of the firm, combinative capabilities, and the replication of technology", *Organization Science*, 3 (3), 383-397.

Lee, Y. C., & Lee, S. K. (2007) "Capability, processes, and performance of knowledge management: A structural approach", *Human Factors and Ergonomics in Manufacturing*, 17 (1), 21-41.

Liao, C. H., Chen, C. W., Wu, H. C., & Cheng, M. H. 2009. "Grey relational analysis of operational performance for mobile telecommunications companies in Taiwan". International Conference on Communications and Mobile Computing, 348-352.

Liao, S. H., & Wu, C. (2010) "System perspective of knowledge management, organizational learning, and organizational innovation", *Expert Systems with Applications,* 37(2), 1096-1103.

Liao, Yao-Sheng. (2011) "The effect of human resource management control systems on the relationship between knowledge management strategy and firm performance", *International Journal of Manpower*, Vol. 32 Iss: 5 pp. 494 – 511.

Limayem, M., Hirt, S., and Chin, W. (2001) "Intention Does Not Always Matter: The Contingent Role Of Habit On IT Usage Behavior", The 9th European Conference on Information Systems: Global Co-operation in the New Millennium, June 27-29, 2001, Bled, Slovenia

Ling, Y.H. (2013) "The Influence of Intellectual Capital on Organizational Performance - Knowledge Management as Moderator", *Asia Pac J Manag,* 30:937–964

Lopez-Nicolas, C., & Mero˜no-Cerdan, A. (2011) "Strategic knowledge management, innovation and performance", *International Journal of Information Management*, 31, 502–509.

Maier, R., & Remus, U. (2003) "Implementing process-oriented knowledge management strategies", *Journal of Knowledge Management*, 7(4), 62-74.

Majchrzak, A., Cooper, L.P. and Neece, O.E. (2004) "Knowledge reuse for innovation", *Management Science*, Vol. 50 No. 2, pp. 174-188.

Ndlela, L.T. and du Toit, A.S.A. (2001) "Establishing a knowledge management program for competitive advantage in an enterprise", *International journal of information management*, 21, 151–165.

Niven, P. R. (2006) Balanced scorecard step-by-step: Maximizing performance and maintaining results. New York, NY: John Wiley & Sons, Inc.

Nunnally, J. C. (1978). Psychometric theory. New York, NY: McGraw-Hill.

Ordonez de Pablos, P. (2002) "Knowledge management and organizational learning: typologies of knowledge strategies in the Spanish manufacturing industry from 1995 to 1999", *Journal of Knowledge Management*, 6 (1), 2002, 52–62.

Pai, D.C. (2005) "Knowledge strategies in Taiwan's IC design firms", *Journal of American Academy of Business*, Cambridge 7 (2), 73–77.

Pathirage, C.P., Amaratunga, D.G. and Haigh, R.P. (2007) "Tacit knowledge and organizational performance: construction industry perspective", *Journal of Knowledge Management*, Vol. 11 No. 1, 115-126.

Prajogo, D. I. and Sohol, A. S. (2003) "The relationship between TQM practices, quality performance, and innovation performance: An empirical examination", *International Journal Quality & Reliability Management*, 20, (8), 2003, 901-918.

Rhodes, J., Hung, R., Lok, P., Lien, B.Y.H. and Wu, C.M. (2008) "Factors influencing organizational knowledge transfer: implication for corporate performance", *Journal of Knowledge Management*, Vol. 12 No. 3, 84-100.

Ringle, C., Wende, S., & Will, A. (2005) SmartPLS 2.0. URL http://www.smartpls.de.

Sáenz, J., Aramburu, N., & Rivera, O. (2009) "Knowledge sharing and innovation performance: A comparison between high-tech and low-tech companies", *Journal of Intellectual Capital*, 10 (1), 22-36.

Schulz, M., & Jobe, L. A. (2001) "Codification and tacitness as knowledge management strategies: An empirical exploration", *Journal of High Technology Management Research*, 12(1), 139-165.

Sekaran, U. (2003) Research method for business: A skill building approach. New York: John Wiely and Sons.

Shih, H.A. and Chiang, Y.H. (2005) "Strategy alignment between HRM, KM and corporate development", *International Journal of Manpower*, 26 (6), 582-602.

Singh, P. J. and Smith, A. (2004) "Relationship between TQM an innovation: An empirical study", *Journal of Manufacturing Technology Management*, 15, (5), pp 394-401.

Snell, S. A., & Youndt, M. A. (1995) "Human resource management and firm performance: Testing a contingency model of executive controls", *Journal of Management*, 21(4), 711–737.

Stone, M. (1974) "Cross-validatory choice and assessment of statistical predictions", *Journal of the Royal Statistical Society: Series B (Methodological)*, 111–147.

Tanriverdi, H. (2005) "Information technology relatedness,knowledge management capability,and performance of multibusiness firms", *MISQ*, 29 (2),311–334.

Tenenhaus, M., Vinzi, V. E., Chatelin, Y. M., & Lauro, C. (2005) "PLS path modeling", *Computational Statistics & Data Analysis*, 48(1), 159-205.

Turner, S. F., & Bettis, R. A. (2002) "Exploring depth versus breadth in knowledge management strategies", *Computational & Mathematical Organization Theory*, 8(1), 49-73.

Urbach, N., & Ahlemann, F. (2010) "Structural equation modeling in information systems research using partial least squares", *Journal of Information Technology Theory and Application*, 11(2), 5-40.

Wetzels, M., Odekerken-Schroder, G. and Oppen, C.V. (2009) "Using PLS path modeling for assessing hierarchical construct models: guidelines and empirical illustration", *MIS Quarterly*, Vol. 33 No. 1, 177-195.

Wixom, B. H., & Watson, H. J. (2001) "An empirical investigation of the factors affecting data warehousing success", *MIS Quarterly*, 25(1), 17-41.

Wu, I., & Lin, H. (2009). "A strategy-based process for implementing knowledge management: An integrative view and empirical study", *Journal of the American Society for Information Science and Technology*, 60 (4), 789–802.

Yang, C. C., Marlow, P. B., & Lu, C. S. (2009) "Knowledge management enablers in liner shipping", *Transportation Research Part E*, 45(2), 893-903.
Yousif, Laith Ali and Shahizan Hassan, Al-Hakim. (2011) "The Relationship Between Core requirements of Knowledge Management Implementation and Organizational performance", *World Journal of Management*, Vol. 3. No. 2, 12-29

Yousif, Laith Ali and Shahizan Hassan, Al-Hakim (2013) "Knowledge management strategies, innovation, and organisational performance: An empirical study of the Iraqi MTS", *Journal of Advances in Management Research*, Vol. 10 Iss: 1, 58-71

Yousif, Laith Ali and Shahizan Hassan, Al-Hakim. (2014) "Who are the Crew Members on Implementation of Knowledge Management Strategies to Enhance Innovation and Improve Organizational Performance", *Journal of Resources Development and Management*, Vol.3, 54-63.

Yu, C. and Liying, Y (2009) "Performance evaluation of service innovation strategy implementation in enterprise based on BSC", *Proceedings of International Conference on Management Science and Engineering*, 300-304.

Zack, H. (1999) "Developing a knowledge strategy", *Calif.Manage.Rev*. 41 (3), 125–145.

Zack, M. H., McKeen, J., & Singh, S. (2009) "Knowledge management and organizational performance: An exploratory analysis", *Journal of Knowledge Management*, 13(6), 392–409.

Differences in the Organization and Planning of Corporate Education in Medium-Sized and Large Companies in the Czech Republic

Zdeněk Caha, Mgr., MBA, PhD., Department of Management, Institute of Technology and Business, České Budějovice, Czech Republic, E-mail address: caha@mail.vstecb.cz

Michal Ruschak, Ing. Faculty of Corporate Strategy, Institute of Technology and Business, České Budějovice, Czech Republic, E-mail address: ruschak@mail.vstecb.cz

Abstract

Effective and systematic corporate education, as a part of the overall company strategy, shows to be a key aspect for the maintenance of competitiveness in the present economy of knowledge. The aim of this paper is therefore to find out by means of a questionnaire survey to what extent large and medium sized companies in the Czech Republic apply a systematic approach to education, which is among others linked to the existence of long-term and annual education plans and also to the fact that education is organized systematically by the personnel department or by a dedicated staff department focused on education. We set two hypotheses. The first one was, that at least 70 % of large companies and 50 % of medium sized companies deal with education within the personnel department or within a separate staff department focused on education, and the second one was, that at least 70 % of large companies and 50 % of medium sized companies have a long-term education plan in place and also an annual education plan. Although none of the hypotheses was confirmed, a fact has been proven, that large companies after all approach to corporate education more systematically than medium-sized ones.

Keywords: corporate education, companies, planning, Czech Republic

Introduction

The goal we set in this paper was to ascertain by means of a questionnaire survey whether more than a half of large and medium companies in the Czech Republic apply the systematic approach to education, which is among others linked to the existence of long-term and annual education plans and also to the fact that education is organized systematically by a personnel department or by a dedicated staff department focused on education. We set the two following hypotheses, which we tried to confirm by means of mathematical-statistic methods:

H1 At least 70 % of large and 50 % of medium-sized companies deal with the education within the personnel department or within a separate staff department focused on education.

H2 At least 70 % of large and 50 % of medium-sized companies have a long-term education plan in place and also an annual education plan.

Literature Review

Employees are definitely one of the most important resources of a possible competitive advantage. It is therefore important to educate and develop employees systematically and effectively (Blahuš 2011, Vaníčková and Kmecová 2014). Bencsik and Sólyom (2011) also claim that the more a company is able to maintain, develop and utilize the knowledge of its employees the more it is able to achieve business success, as knowledge becomes a resource of long-term competitiveness and an advantage from the business strategy point of view. According to Armstrong (2014) strategic education and development, like strategic HR management plays a key role in the achievement of success of an organization. Koubek (2015) presents that education of employees of an organization is most effective if it has a cyclical character, is based on the education strategy and policy in the particular organization and is in compliance with the overall strategy of the organization. The basic cycle of the systematic education of employees of an organization actually consists of the identification of the need for education for the employees of an organization, planning of education, the implementation of the education process and

an assessment of the education programme results and effectiveness. Němec (2014) claims that systematic education of employees and conceptional planning and management of their career serves for the achievement of the organization strategic goals and contributes to long-term competitiveness of a company. Barták (2011) also underlines the importance of the strategic planning of corporate education by claiming that the cost of education should represent a profitable investment, which is why education planning should be based on an analysis of the present situation, taking into account the future needs and demands for the individual work positions. According to Hroník (2017), the presence of specialists in development and education is an indication of strategic approach, particularly in medium and large companies.

According to the results of an international survey of 2010 (ČSÚ 2013) only less than a third of companies reported written education plans or similar education programmes, only less than a half reported a budget for these activities. Estimations made by the International Labour Organization (2011) show that a one-per-cent growth of the number of days spent on education leads to a productivity increase of 3 % in a company. Quality training enable people to develop their capacities and to exploit social opportunities, it improves productivity of employees and a company as a whole, it contributes to future strengthening of innovation and development, it encourages domestic as well as international investments – and therefore also creation of jobs, it reduces unemployment, leads to higher pays and reduces social inequality. Collier et al. (2011) claim on the base of their own research that companies that systematically educate their employees have 13 % higher probability that they will survive. They also say that more studies researching into the long-term impact of education or human capital on a company performance in general are necessary. Kitching and Blackburn (2002) confirm the positive impact of the strategic approach to education. Korenková (2014) is convinced that people are the factor that mostly distinguishes one company from another at present. Employees are those, who decide whether a company will be successful or not by their active and creative approach to innovation and to customers themselves. Support for education is therefore crucial for the maintenance of the competitiveness. Staff education and development should be a part of the overall company strategy and policy, and it should be a coherent and systematic process. Korenková moreover claims that particularly large companies prefer an active and systematic approach to education, while a random approach prevails in medium-sized companies and a passive approach to employee education definitely dominates in small companies. This certainly depends on the funds available to a large extent. Small companies mostly invest into innovation and improvement of technologies and they leave education on the employees themselves. Tej, Sláviková and Hrvolová, M. (2010) divide companies into three categories according to the approach to education they choose, namely companies without an education strategy, companies with a non-systemic strategy and companies with a positive systemic strategy. They hold the view that companies achieve competitive advantages through their employees. Although the effectiveness of the money invested into education is often hardly enumerable, education is an investment that certainly pays off to companies. Cagáňová et al. (2014) characterize the level of the orientation of companies active in the field of education and employee development in Slovakia and present the results of a research carried out with 340 companies in 2012. They came to a conclusion that the need for education and a complex approach to education belong to the characteristics of innovative organization. Organizations should become the so-called learning companies with the aim to achieve permanent education focused on the improvement of the performance not only on short-term, but also on long-term basis.

Methodology of the Statistical Processing

We had results from a questionnaire survey from 164 medium-sized companies (50-249 employees) and 123 large companies (250 or more employees) available for the processing. The survey was carried out among companies in the Czech Republic in the second part of 2017.

In the first phase of the assessment we prepared a table of the absolute and relative fre-quencies of the companies according to the way how they deal with the education for em-ployees. On the base of the results we prepared an interval estimation, which covers the real proportion of the companies that deal with the education within the personnel department or within a separate staff department focused on education with the confidence of 95 %. This way we ascertained in what limits the real value of this proportion may fluctuate.

In the second phase, we prepared tables of the absolute and relative frequencies of the companies in dependence on the fact whether they do or do not have a long-term education plan, on the base of the questionnaire data. As we are interested in whether a company has a long-term education plan in place, we unified the answers "yes" and "yes but it is not ad-hered to" into one answer "yes". We logically assigned "no" to the companies that had not replied to the question at all. From the frequencies obtained this way we also prepared a 95 % interval estimation, which covers the real proportion of companies with a long-term edu-cation plan.

In the third phase, we analogically copied the processing procedure for a question dealing with the annual education plan. We examined the real proportion of the companies that have an annual education plan in place.

The tables were prepared by means of MS Excel, the interval estimations by means of R statistical software.

The Results of the Statistical Processing

a) The frequency of the companies that deal with the education within the personnel department or within a separate staff department focused on education.

Table 1: Dealing with the company education – absolute numbers

Company size	Dealing with the company education			
	not systematic	at the owner/manager	staff department	total
Medium companies	22	83	59	164
Large companies	16	16	91	123

Source: authors

Table 2: Dealing with the company education – relative numbers

Company size	Dealing with the company education		
	not systematic	at the owner/manager	staff department
Medium companies	13%	51%	36%
Large companies	13%	13%	74%

Source: authors

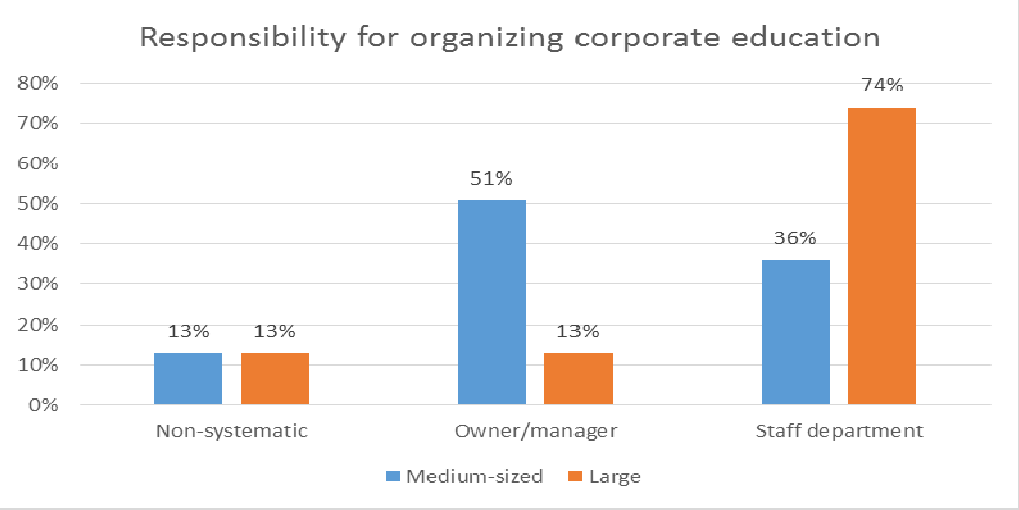


Fig. 1: Dealing with company education - absolute numbers

Source: authors

Table 3: Interval estimations for the proportion

	Interval estimation
Medium companies	(0.290; 0.436)
Large companies	(0.656; 0.809)

Source: authors

The results show that the proportion of the companies that deal with the education within the personnel department or within a separate staff department focused on education is significantly lower among medium sized companies than that among large companies. The questionnaire survey shows 36 % among the medium and 74 % among the large companies. The interval estimation then indicates that the real proportion of companies should oscillate be-tween 29 – 44% among the medium companies and between 65 – 81% among the large companies after rounding.

b) The frequency of the companies that have a long-term education plan in place

Table 4: Long-term education plan in place – absolute numbers

Company size	The company has a long-term education plan in place		
	no	yes	total
Medium companies	75	89	164
Large companies	34	89	123

Source: authors

Table 5: Long-term education plan in place – relative numbers

Company size	The company has a long-term education plan in place	
	no	yes
Medium companies	45.7%	54.3%
Large companies	27.6%	72.4%

Source: authors

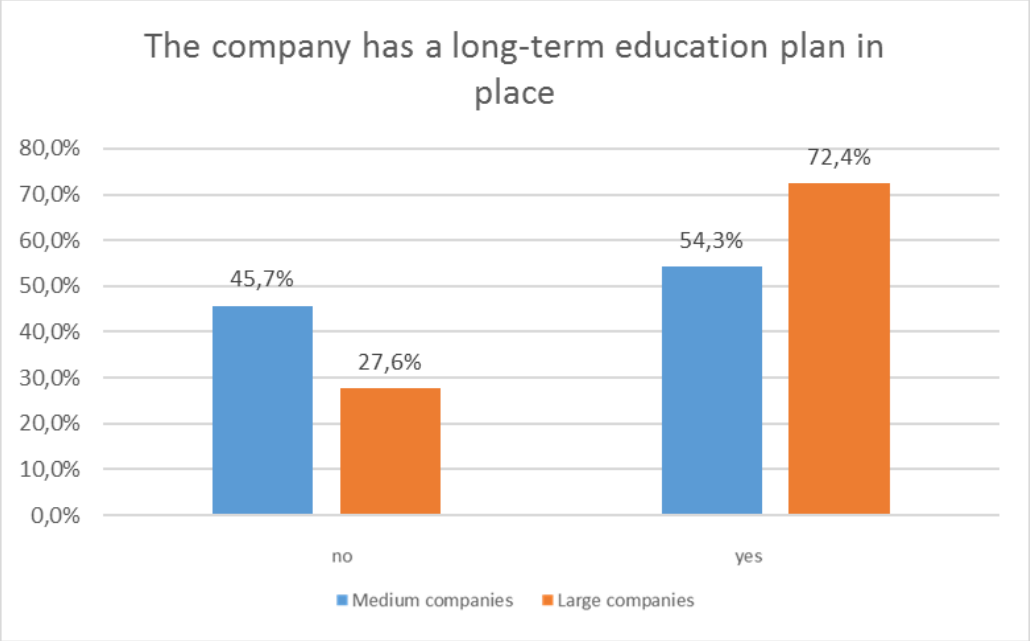


Fig. 2: Long-tern education plan in place – relative numbers

Source: authors

Table 6: Interval estimations for the proportion of long-tern education plan in place

	Interval estimation
Medium companies	(0.466; 0.617)
Large companies	(0.639; 0.795)

Source: authors

The proportion of the medium companies that have a long-term education plan in place is significantly lower. The proportions ascertained by the questionnaire are 54.3 % in the group of the medium companies and 72.4 % in the group of the large companies. If we look at the interval estimations we can see that they do not overleap at all, so the difference in the frequency of the companies that have a long-term education plan is statistically significant. The real proportion of the companies that have a long-

term education plan in place can be expected between 47 – 62 % among the medium companies and between 64 – 80 % among the large companies after rounding.

c) The frequency of the companies that have an annual education plan in place

Table 7: Annual education plan in place – absolute numbers

Company size	The company has an annual education plan in place		
	no	yes	total
Medium companies	91	73	164
Large companies	108	15	123

Source: authors

Table 8: Annual education plan in place – relative numbers

Company size	The company has an annual education plan in place	
	no	yes
Medium companies	55.5%	44.5%
Large companies	87.8%	12.2%

Source: authors

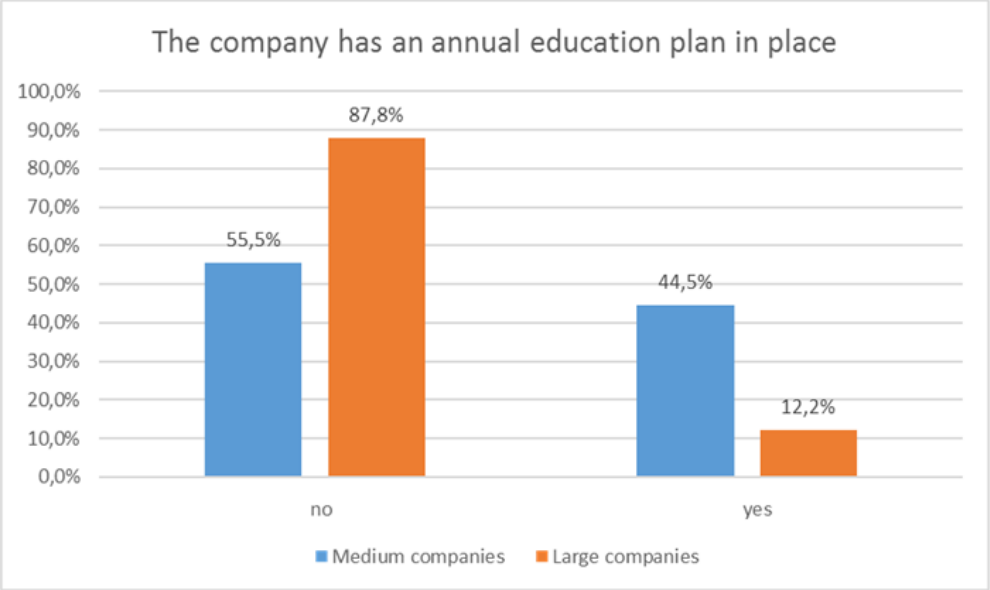


Fig. 3: Annual education plan in place – relative numbers

Source: authors

Table 9: Interval estimations for the proportion of annual education plan in place

	Interval estimation
Medium companies	(0.478; 0.629)
Large companies	(0.809; 0.925)

Source: authors

The difference between the medium and the large companies is even higher in terms of the annual education plan. The proportion of the companies with an annual education plan in place is 55.5 % among the medium companies, while the interval estimation indicates a possible position of the real proportion between 48 – 63 % after rounding. The proportion ascertained among the large companies is 87.8 %, while the interval estimation indicates a possible position of the real proportion between 81 – 93%. The two intervals do not overleap and there is the difference of 18 % between the upper and the lower limits of the interval estimation, so the real difference will probably be even higher.

Conclusion

Despite of the fact that the set hypotheses were not confirmed, the results of the research have shown a significant difference between the medium-sized and the large companies in most of the monitored aspects.

The proportion of the medium-sized companies that deal with the education within the personnel department or within a separate staff department focused on education is substantially lower (36%) than that of the large companies (74%). The interval estimation then indicates that the real proportion of companies oscillates between 29 – 44 % among the medium companies and between 65 – 81 % among the large companies.

The questionnaire survey has brought an interesting finding, that 13 % of the medium-sized companies and the same percentage of the large companies do not deal with education systematically within one department, and that among the medium-sized companies education is in the competence of the owner/head of the company in more than a half of them (51 %).

The research has also proved that systematic long-term planning of education is significantly lower among the medium sized companies than among the large companies. The proportions found out by means of the questionnaire are 54.3 % for the group of the medium-sized companies and 72.4 % for the group of the large companies. The interval estimations have shown that the difference in the frequency of the companies that have a long-term education plan in place is statistically significant. These proportions are between 47 – 62 % among the medium companies and between 64 – 80 % among the large companies.

The difference between the medium-sized and the large companies is even more remarkable in terms of the annual education plan. The proportion of the companies with an annual education plan in place ascertained by the questionnaire is 55.5 % among the medium-sized companies, the estimation indicates the real proportion between 48 – 63%. Among the large companies the proportion ascertained by the questionnaire is 87.8 %, while the interval estimation indicates the position approximately between 81 – 93%.

In general, we can conclude that a relatively high percentage of companies, particularly the medium-sized ones, still do not plan their education either on long-term or short-term basis, which shows that these companies do not approach the education for their employees systematically and do not perceive it as one of the key personnel activities, which may influence the company performance and competitiveness to a significant extent.

References

Armstrong M. (2014). *Armstrong's handbook of human resourece management practice*. United Kingdom: Kogan Page.

Barták, J. (2011). *Personální řízení, současnost a trendy*. Praha: UJEP.

Bencsik, A. and Sólyom, A. (2011). Education and Training Practice Strategies in Small and Medium Sized Enterprises. *Proceedings of the 6th International Conference on Management and Artificial Intelligence (IPEDR)* [online], Indonesia: Bali, pp. 65-69. From: http://www.ipedr.com/vol6/14-A10004.pdf [2017-04-20].

Blahuš, R. (2011). Experiential Education as a Part of Human Development in Czech Republic Business Companies. *Proceedings of the 7th European Conference on Management Leadership and Governance*, France: Antibes, pp. 467-476.

Collier, W., Green, F., Kim, Y.-B. and Peirson, J. (2011). Education, Training and Economic Performance: Evidence from Establishment Survival Data. *Journal of Labor Research* [online], 32(4), 336-361. From: https://www.econstor.eu/bitstream/10419/50617/1/588114138.pdf [2017-04-20].

ČSÚ (2013). *Další odborné vzdělávání zaměstnaných osob v roce 2010 (CVTS)* [online]. From: http://www.czso.cz/csu/2013edicniplan.nsf/publ/3311-13-n_2013 [2017-04-19].

Daft, R.L. (2001). *Organizational theory and design.* Mason, OH: South-WesternCengage Learning.

Hroník, F. (2007). *Rozvoj a vzdělávání pracovníků*. Praha: Grada.

International Labour Organization (2011). A Skilled Workforce for Strong, Sustainable and Balanced Growth: A G20 Training Strategy [online]. pp. 40. From: https://www.oecd.org/g20/summits/toronto/G20-Skills-Strategy.pdf [2017-04-06].

Kitching, J. and Blackburn, R. (2002). *The nature of training and motivation to train in small firms.* London: Dept. for Education and Skills. From: https://core.ac.uk/download/pdf/4154524.pdf [2017-04-20].

Korenková, M. (2014). *Vplyv regionálnych rozdielností na možnosť vzdelávania sa zamestnancov v podniku.* Proceedings of the 17th International Colloquium on Regional sciences [online]. Brno: Masarykova univerzita, pp. 264-269. From: http://is.muni.cz/do/econ/soubory/katedry/kres/4884317/48596005/032_2014.pdf [2017-04-20].

Koubek, J. (2015). *Řízení lidských zdrojů*. Praha: Management Press.

Němec O. at al. (2014). *Řízení lidských zdrojů.* Praha: Vysoká škola finanční a správní.

Tej, J., Sláviková, G. and Hrvolová, M. (2010). *Vybrané kapitoly z manažmentu ľudských zdrojov*, Dubnici nad Váhom: Dubnický technologický inštitút v Dubnici nad Váhom.

Vaníčková, R. and Kmecová, I. (2014). Firemní školení a vzdělávání zaměstnanců. In *Rozvoj lidských zdrojů ve vědě a výzkumu*. 1. vydání. Liberec: Sympozium: Inovační a technologické centrum při VÚTS a.s., Svárovská 619, 460 01 Liberec XI, 2014. s. 51 - 56, 6 s. ISBN 978-80-87184-46-2.

The Antecedents and Consequences of Consumer Engagement in Social Networking Sites

F.Zeynep Özata, Porsuk Technical School, Anadolu University, Eskişehir, Turkey, E-mail: fzozata@anadolu.edu.tr

Abubakar Lujja, Graduate School of Social Sciences, Anadolu University, Eskişehir, Turkey, E-mail: abbysa9@outlook.com

Abstract

Consumer engagement is increasingly becoming one of the important issues in the competitive business environment. Both researches and practitioners are focusing on how consumer engagement can be enhanced through different channels. The emergence of social networks has significantly caused a shift in consumer behaviors and brand relationships. With its unique features and structure, Social Networking Sites (SNS) offer an upper advantage to build consumer brand relationships and instant consumer engagement. Although researchers and practitioners are giving so much importance to consumer engagement, there is still a need to understand what influences engagement and how engagement affects consumer behavior.

Therefore, this study set out to determine the antecedents and consequences of consumer engagement in SNS. It further viewed consumer engagement as a multi-dimensional concept comprising behavioral, cognitive and emotional dimensions and as such the hypotheses were aimed at determining how each of the three dimensions of consumer engagement is affected from the customer related antecedents (involvement, satisfaction, commitment and trust) and affect the individual consequences of consumer engagement such as brand loyalty and word of mouth. Research model is designed based on the model used by Malciute (2012).

The study used a quantitative research design and developed a model that was based on the hypotheses developed for the study. It used a questionnaire survey to collect data from University students. Facebook is chosen as a case for this study. 400 questionnaires were collected and the analyses were conducted with the 387 valid questionnaire. The research data was analyzed by using SPSS and Lisrel programs. First a confirmatory factor analysis was conducted to test the measurement model and then the structural model was tested.

The results suggest that emotional, behavioral and cognitive consumer engagement dimensions were significant predictors for brand loyalty. On the other hand only the emotional and cognitive consumer engagement dimensions were significant predictors for word-of-mouth. Involvement and commitment were found to be significant predictors for all engagement dimensions. Satisfaction predicts both emotional and end cognitive dimensions of engagement, whereas trust only predicts emotional

consumer engagement. In sum, the study suggests satisfaction, involvement, commitment and trust to be possible antecedents of consumer engagement and brand loyalty and word-of-mouth to be possible consequences of consumer engagement in an online platform such as Facebook in our case.

Keyword: Consumer Engagement, Social Networking Sites, Involvement, Loyalty, Trust, Satisfaction, WOM, Commitment.

Determinants of Capital Structure – Evidence from Karachi Stock Exchange 30-Index

Farheen Khalid, Institute of Business Management, Karachi, Pakistan. farheen.khalid@iobm.edu.pk

Bilal Ali Zafar, Applied Economics & Research Center, Karachi, Pakistan. bilalalizafar@gmail.com

Syed Aqeel Ahmed, Iqra University, Karachi, Pakistan. Syedaqeelahmed6@yahoo.com

Abstract

In this study to analyze Karachi Stock Exchange listed companies with respect to determinants of capital structure. This study is focused on KSE-30 index companies which provide the benchmark for the stock price performance over the time period. Data has been analyzed for the period 2006-2010 by using OLS regression with five variables i.e. firm size, growth rate, earning rate, debt service capacity and degree of operating leverage. For examining determinants of capital structure Pecking order theory and Trade-off theory are pertinent theories. Results show that firm size, earning rate and operating leverage have negatively significant on leverage and growth and debt service capacity have positively significant on leverage.

Keywords: Capital Structure, KSE 30 Index, Pecking Order Theory, Trade-off Theory, OLS Regressions.

1. Introduction

Financing of capital structure with refers to relationship between long term and short term with various modes such as share capital, bonds, banks, and debenture and equity capital. In other words, to attend the firm goals and to maximize its overall value, it must be to set targeted proposition by mixing equity capital and debt capital. Different thoughts of schools promulgate different theories of capital structure. Two extreme approaches, net income approach of capital structure publicize by David Durand in 1952, this approach defined the relationship between financial leverage, value of firm and cost of capital on overall basis, means a single change in the financial leverage or debts that directly effect on the firm value and total capital cost, because this have a corresponding relationship with each other, where as net operating approach contrary to net income approach means change in financial leverage will not directly effect in the value of the firm.

Traditional approach of capital structure promoted by Ezta Solomon and Fred Weston in 1963, this approach is treated as middle approach between operating approach and net income approach, according to this theory an appropriate combination of equity and debts will always lead to maximize market value the firm. This approach acknowledged that financial risk perceived by equity shareholders and expect premiums for the risks undertaken. This theory also responded that after a debt level in the structure of capital, the equity cost of capital increases.

Modigliani Miller approach 1958 (MM, 1958), widely known as Modern approach of capital structure, MM approach supported the net operating approach and go along with the fact that the cost incurred on investment (cost of capital) is self-determine of the degree of leverage and at any mix of debt-equity proportions. This approach was theoretically very sound but on the base of some assumption equal business risk among firms, similar operating environment, market without arbitrage opportunities means perfect capital market and without tax, accepted in the real world which has not been possible.

(Modigliani and Miller 1963), encompassed the capital cost of firm and its value due to the effect of tax, challenge that, with the existence of tax effect, firm value altered with the alteration of the debts utilization because of benefit of tax on bill of interest (Baral, 1996).

KSE-30 index provides the benchmark for the stock price performance over the time period which provides the knowledge to people who wants to finance in the specific firm, that how much organization applies to the purchase of full shares in Pakistan equity market. Thus, KSE-30 index gauges the various economic activities of different sectors similarly as other indicators i.e. Gross National Production (GNP), Gross Domestic Product (GDP), Consumer Price Index (CPI) etc.

The methodology of free float of index building is one of the best techniques followed globally by Standard & Poor's (S&P), Modern Index Strategy Indexes (MSCI), Financial Times Stock Exchange (FTSE), have adopted same technique to provide index building. KSE-30 Index is also applying methodology of "Free-Float Market Capitalization" because it is the better way of calculating capitalization of the market as it provides exact market movements reflections. By using Free-Float methodology, the level of index value of these 30 organizations is reflected to the base period at any point of time.

2.1 THEORETICAL BACKGROUND

In analyzing the firm capital structure four main theories must be focused which are Static Tradeoff theories, pecking order theory, Signaling Theory and Agency Theory

2.1.1 Static Tradeoff theory

Trade off theory of capital structure originally emphasizes on the relation of cost and benefit of leverage where as Modigliani and Miller in 1963 introduced the tax advantage of leverage into this theory. By using trade off theory, optimum capital structure can be determined. Firstly, component of cost of debt is considered typically bankruptcy cost of debts; which includes direct and indirect bankruptcy costs.

95% of the study gives the impression of contradiction between shareholders and managers in this area. The other gives the impression of argument share holders and debt holders. Therefore, these two theories are equally important to describe how trade-off theory is associated with agency theory.

2.1.2 Pecking order theory

This theory describe that firm proceed with the hierarchy for financing decisions in establishing capital structure. Internal financing i.e. retained earnings and the impact of depreciation is used on the first priority, before using any form of external funds, no flotation cost has been incurred by using internal funds and has not required any additional disclosure of financial information i.e. quotas and targets, sales and overhead volume, profit margin, budget etc. that could effect on of competitive advantage and more severe market discipline. Following order of financing sources preferable when a firm use external funds: leverage or debts, securities which are convertible, common and preferred stock. Motivations of the manager finance has been reflected by following order to keep hold on the firm, lower the agency costs of equity, and keep away from predictable harmful reaction of market to an declaration of issuance of new equity. (Hawawini and Viallet, 1999).

2.1.3 Signaling theory

Ross (1977) introduced Signaling theory, this theory explain, for any organization debt is assumed to be a symbol of assurance in the capital structure, organization facing problem in managing their cash flows will manage by of debt. Large size of debt is trustful for management of organization. This theory also support Pecking Order Theory concept of equity under pricing. Investor feel negative sign, managers may issue the equity on overpricing because they are mostly well up to date regarding the information of the company.

2.1.4 Agency Theory

Agency Theory is another explanation to decide on capital structure of an organization. The approach of difference in shareholders and managers is acknowledged by Jensen and Meckling (1976). The purpose of this approach is to study the behavior of manager of an organization who is just like agent of shareholders, who unnecessary increase the rate of debt of an organization and invests in doubtful projects.

This approach is similar with the approach of Myers' working (1997), in his approach gearing ratio of an organization would be low due to incomplete or unrecognized information for that graph of overall worth of the organization is also decreasing, utilization of free cash flows by managers in their own benefit whose stake is less than 100 percent in the organization.

3. Research Methodology

3.1 Data and Sample

In this study we have used time series data. The secondary source of data is the State Bank of Pakistan, listed companies of Karachi Stock Exchange 2006-2010" and "Balance Sheet Analysis of the Companies, This study has focused on the all 30 companies in Pakistan, listed in Karachi Stock Exchange-30 index.

3.4 Hypothesis

Following hypothesis has been tested in this study to analyze the relationship between the capital structure of listed companies in KSE-30 index and described variables.
H_1: There is significant relationship between the firm size and financial leverage.
H_2: There is significant relationship between the growth and financial leverage.
H_3: There is significant relationship between the earning and financial leverage.
H_4: There is significant relation between the debt service capacity and financial leverage.
H_5: There is significant relation between the operating leverage and financial leverage.

Model

Relationship between variables affecting factor, this study estimate the determinants of capital structure that is financial leverage dependent variable and size of firm, rate of growth, earning rate, debt service capacity and degree of operating leverage independent variable of companies in Pakistan, listed in KSE-30 index.

$$FL = \alpha + \beta_1 FS + \beta_2 GR + \beta_3 ER + \beta_4 DSC + \beta_5 OL + \varepsilon$$

Where
FL = Financial Leverage, FS = Firm Size, GR = Growth Rate[1], ER = Earning Rate,
DSC = Debt Service Capacity[2], OL = Degree of Operating Leverage, ε = error term

4. Empirical Results

Parameter Estimations disclose in given Table of each variable which is the major part of regression model; it shows various values like Constant (α), Coefficients (β), P-values, T-Value, F-value, value of Durbin Watson (DW), value of Adjusted R^2 and Model significance. The model is analyzed at 95% confidence interval.

Table 1 : Result Summary

Variables	**Beta**	**t-stats**	**Probability**	**VIF**
Constant	2.256	7.659	(0.0000)	-
Firm Size	-0.482*	-7.570	(0.0000)	1.096
Growth Rate	0.164*	0.028	(0.0001)	1.091
Earning Rate	-3.145*	-3.875	(0.0022)	1.198
Debt Service Capacity	0.079*	3.730	(0.0029)	1.072
Operating Leverage	-0.001*	-3.381	(0.0055)	1.005
Adjusted R-square 0.9735		**Correlation LM test F-stat** 0.8629		
Durbin Watson 1.1059		**Probability** (0.45110)		
F-Statistics 111.3229				
P value (0.0000)				

*Significance level at 5%
Source: Author's estimation

The result achieved from the regression analysis are shown in the Table 1, the Adjusted R-Square value (0.9735) confirm that five independent variables i.e. Firm Size, Growth Rate, Earning Rate, Debt Service Capacity and Operating Leverage respond approx 97% of variation with dependent (response) variable

[1] Result extract after taking log of Growth Rate Values

[2] Result extract after taking log of Debt Service Capacity values

Financial Leverage. Value of DW (1.1059) is totally justified by Correlation LM test F-stat is (0.8629) and P-value (0.4511) that there is no serial correlation. The Coefficients (β) values demonstrating the contribution of every Predictor variable in the model, Firm Size, Earning Rate and Operating Leverage are showing Negative relation with Leverage where as Growth Rate and Debt Service Capacity are Showing Positive relation with Leverage. Level of significance is tested by P-value at 5% and overall results are significant which is witness by P-value is less then (0.05).

Table 2: Expected and Observed Relationship

Determinants	Measure	Expected Relation with Leverage		Observed Relationship
		Pecking Order Theory	Static Tradeoff Theory	
Firm Size	Log of sale	Negative	Positive	Negative
Growth Rate	$\sqrt[n]{\frac{TA_n}{TA_0}} - 1$ [3]	Positive	Negative	Positive
Earning Rate	EBIT divided by Total Assets	Negative	Positive	Negative
Debt Service Capacity	EBIT divide by Total Interest Charge	Positive	Positive	Positive
Operating Leverage	[4] $\frac{\left[\frac{(E_t - E_{t-1})}{E_{t-1}}\right]}{\left[\frac{(S_t - S_{t-1})}{S_{t-1}}\right]}$	Negative	Negative	Negative

Source: Author's estimation

The result obtained show the value of coefficients (β) for Firm Size is (-0.4829), this is the sign of negative relationship with Leverage which describe that profitable companies in KSE-30 are prefer equity financing and not interested to finance from borrowing. This result is backed by Pecking Order theory consistent with Rajan and Zingales (1995), in his views less asymmetric information related to large firms, suggested that issuance of new equity will not be under priced and thus more equity will issue by large firms and this results are contradict with Static Tradeoff approach which were supported earlier by Titman and Wessels (1988).

[3] TAn=Total assets at the end of the observed period
TAo=Total assets at the beginning of observed period
n=Number of observed period

[4] E= EBIT
S= Net sale at the end of observed period
t= Financal year (time)

Positive relationship exists between Growth Rate and Leverage, coefficient values of Growth rate is (0.1644). Growing companies in KES-30 index are using more debts instead of internal financing, in order to meet the need of huge cash flow growing companies relying on debt financing. However, this result support by broaden version of pecking order theory, as per this theory funds generated by growing firms from their internal sources may not be sufficient therefore they may prefer external financing. Similar results are obtained by Baral (2004) and Shah and Hijazi (2004).

Results of Earning Rate are showing negative relationship, a value of coefficient of Earning rate is (-3.1456). Profitable companies in KSE-30 index maintain low rate of debts. Obtained result is supported by Pecking order theory that worth full and high profitable firms first prefer equity financing funds before increasing the ratio of debt financing. Obtained outcome is backed by Titman and Wessels (1988) and Shah and Khan (2007), as describe by Frydenberg (2001b) most important source of internal financing is retained earning.

The coefficient value of Debt service capacity is (0.0797) is positively related with ratio of leverage , which statistically showing significant. This result recommend that companies are in debt as per their debt service capacity and companies have an ability to repay the debts borrowed from other sources ,this study is supported by empirical study of Baral (1996) conducted in Nepal for the enterprises of the public sector

Negative relationship exists between Degree of Operating Leverage and Financial Leverage as supported by both agency cost theory and bankruptcy cost theory, Beta values of Degree of Operating Leverage is (-0.001). Utilization of fixed cost in manufacturing process can affect capital structure of firm. The total cost in manufacturing process over the period of time with higher rate of fixed cost and higher rate of operating leverage can expend the instability in the earning of future time period. Results showing that no autocorrelation exist between the predicting variables which is justify by value of Durbin Watson (1.1059) and Correlation LM test F-stat. (0.8629) and Probability (0.4511). The diagnosis of multi-co linearity among predictors in the regression model generated by SPSS revealing that to identify existence of correlation among independent variables as Firm Size, Growth Rate, Earning Rate, Debt Service Capacity and Degree of Operating Leverage in this model. As a rule of thumb, values of variance inflation factor (VIF) justify by value of significance which is less then 10.

Conclusion

In this study we analyzed companies listed in Karachi Stock Exchange-30 index and their determinants of capital structure, time series data has been collected from published data of SBP and companies Financial Statements. Data has been analyzed by applying pooled regression model. We found that growing companies in KSE-30 Growth Rate are positively correlated with Financial Leverage which is supported by extended version of Pecking Order Theory. The suggestion in this regards is that growing companies relying on debt financing because of managing cash flows and fund generated by internal sources not sufficient for growing companies so another option would external financing. Debt Service Capacity is also showing positive relationship with leverage showing that companies have an ability to pay off the debts which they have borrowed for managing their capital structure. Thus the result backed by recognized theory presented earlier. Therefore we accept our first hypothesis.

Firm Size, Earning Rate and Degree of Operating Leverage is negatively correlated with Leverage.
Larger Firms with higher rate of profitability interested in internal financing before given preference to borrowing money. Bigger firms relying on their profit and retained earnings for investment in profitable projects so they can earn more with it and be far away from bankruptcy because relying on their internal funds. Thus the result reject the approach of Static Tradeoff Theory and support the approach of Pecking

Order Theory. Similar results obtained in studies of Titman and Wessels (1988) and Shah and Khan (2007).

References

Ahmejd, N, Ahmed, Z, Ahmed, I. (2010), " Determinants of Capital Structure: A Case of Life Insurance Sector of Pakistan", European Journal of Economics, Finance and Administrative Science, 1450-2275

Amidu, M. (2007)" Determinants of capital structure of Banks in Ghana-an empirical approach" baltic Journal of Management Vol. (2), 67-79

Ayesha, M and Nasr, M. (2006), "Determinants of Capital Structure decisions: Case of Pakistani Owned and Private firms", Internal Review Of Business Research Papers, Vol. (6), 446-458

Baharuddin, N.S, Khamis, Z, Mahmood, W.M.W.M and Dollah, H. (2011), " Determinants of Capital Structure for Listed Construction Companies in Malaysia", Journal of Applied Finance & Banking, Vol.(1), 1792-6580

Baral, K.J. (2004), "Determinants of Capital Structure: A Case Study of Listed Companies of Nepal", The Journal of Nepalese Business Studies, Vol. (I), 13-26

Eriotis, Vasiliou and Neokosmidi (2007), "How Firms Characteristics Affect Capital Structure", Managerial Finance, Vol. (33), (5), 321-331

Fakher, B, Kenbata, B. (2005), ""Determinants of Capital Structure Evidence from Libya", Research Paper Series Management School University of Liverpool, 1744-0718

Frank, M.Z and Goyal, V. (2007), "Capital Structure Decisions: Which Factors are Reliably Important?" , American Finance Association, Vol.(II), 79-90

Hijazi, S,T, and Tariq, Y.B.(2006), "Determinants of Capital Structure: A Case for the Pakistani Cement Industry", The Lahore Journal of Economic, 63-80

Jean-L, V. (2008), "Capital Structure Determinants : an empirical study of French Companies in the Wine Industry", International Journal of wine business research, Vol. (20) (2), 171-194

Patrick, B. (2004), "Determinants of capital structure – empirical evidence from the Czech Republic" Czech Journal of economice and finance, 54, 1-2

Rafiq, M, Iqbal , A, Atiq, M. (2008), " The Determinants of Capital Structure of the Chemical Industry in Pakistan", The Lahore Journal of Economics, Vol. (13:1), 139-158

Saeed, A. (2007), "The Determinants fo Capital Structure in Energy Sector (A Study of Pakistani listed frims)", Bleling Institute of Technology School of Management, (371-379)

Shah, A. and Hijazi S. (2004), "The Determinants of Capital Structure in Pakistani Listed Non-Financial Firms," The Pakistan Development Review, VoL.43 (II), 605-618

Shah, A. and Khan, S. (2007), "Determinants of Capital Structure: Evidence from Pakistani Panel Data", International Review of Business Research Papers, Vol. (3), 55-67

Shumi A. (2005), “The determinants of capital structure for Australin Multinational and Domestic Corporations” Australian Journal of Management, Vol. 30, (2), 340-361

Singhania, M, and Seth, A. (2010) “Financial Leverage and Investment Opportunities
In India”, International Research Journal of Finance and Economics Euro JournalsPublishing, 784-793

Sunder, L.S, and Myers, S.C (1998), “Testing static trade against pecking order models
of capital structure”, Journal of Financial Economics, 187-221

Titman, S, and Tsyplakov, S. (2005), "A Dynamic Model Capital Structure," SSRN Working Paper Series, 4-14

Wanzenried, G. (2002), “Capital Structure Dynamics in UK and Continental”, The Journal of European Business Studies, 1-29

Yan, Y, Shi, X, Barry, P, Paulson, N, Sherrick, B. (2008), " The Structure Model Based Determinants of Capital Structure: A Seemingly Unrelated Regression Model”, The American Agricultural Economics Association, Orlando, 147-176

Zaheer, Z, Saeed, A, Mir, A.S. (2011), " Determinants of Capital Structure: A Comprehensive Study of Textile Sector of Pakistan”, International Journal of Academic Research , Vol. 3 (5), 323-329

Some Aspects Of System Dynamics Application In Czech Defence Strategic Management

Antonín Novotný, Ph.D., University of Defence in Brno, Czech Republic antonin.novotny@unob.cz

Dalibor Procházka, CSc. University of Defence in Brno, Czech Republic dalibor.prochazka@unob.cz

Abstract

The article deals with the topic of system dynamics application in strategic management. After several years of reducing of the Czech defence budget there is a reversal and the Czech Ministry of Defence begins to manage the increased budget. This represents a new challenge and opportunity. One of the instruments, how to reach new capabilities, is application of system dynamics. The application of systemic dynamics to the problem of military capabilities is given by the very nature of the process of building military capabilities. Some aspects of capability and equipment life cycles and human resources or personnel development are discussed. Application of system dynamics to military personnel career policy is demonstrated by means of simulation in Vensim application.

Keywords: Strategic Management; Defence Policy; Dynamic System; Vensim.

Introduction

The Czech Republic´s defence is based on the responsible approach of the Government, and the other public administration authorities, to ensure the national defence system; on the development of the requisite defence capabilities within the framework of NATO´s collective defence; an on involvement of Czech citizens in defence activities in the event of a serious threat to the state. An important aspect in proper functioning of these three pillars is to strengthen motivation and create a clear legal framework as well as real opportunities for the preparation of citizens in performing their duties as part of national defence (MoD. Defence strategy of the Czech Republic, 2017).

Establishment Of The Defence Policy And Strategy

By joining NATO in 1999 and joining the European Union in 2004, the Czech Republic joined the group of countries sharing the same values, freedom, peace and security. From this point of view, it is natural that the Czech Republic, as a member state of both these organizations, cannot be excluded from any activities and fulfilment of the commitments it has made.

In addition, it was also necessary to adapt development of the Armed Forces and their main component - the Army of the Czech Republic. The basis for this process, in addition to strategic development documents, is an adequate and predictable resource framework for defence spending, a problem faced by the Ministry of Defence for more than a decade. Meanwhile, the situation has changed. Under the agreement on the increase of the Czech Republic's defence budget, signed in September 2014, the MoD budget will gradually increase to 1.4% of GDP by 2020 (army.cz 3.9.2014). Since 2015, therefore, the opposite trend occurs and the budget of the Ministry of Defence should work with a total of CZK 460 billion by 2025 (The Long Term Perspective for Defence 2030). However, the increase in the budget should not be self-serving, but must be linked to its most efficient spending, because simple increase in defence spending does not yet ensure the development of military capabilities or their direction. The Czech Republic and its allies must be ready for predictable and prepared for unexpected situations once it comes to safeguarding of their defence and security (Procházka, Dyčka and Landovský 2016).

The framework for fulfilling the political and military ambitions of the Czech Republic represents document The Long Term Perspective for Defence 2030. It serves as a guideline for defence planning, particularly in developing five-year medium term plans. Based on an analysis of trends in the strategic environment, it outlines the basic direction for military capabilities development and provides guidance for the Concept of the Czech Armed Forces Development 2025, and other conceptual documents. The aim of Concept of the Czech Armed Forces Development 2025 is to define the frame and means of the capability development which are indispensable to fulfil tasks and commitments of the Czech Armed Forces in the horizon of 2025.

The philosophy of this document:

- is completed on the basis of Act No. 219/1999 Coll., on the Armed Forces of the Czech Republic;
- takes into consideration national security interests, principles of collective defence and prediction of the development of security environment;
- evaluates current status of capabilities and defines frame and means of the key capability development;
- provides base for strategic planning forms frame for concepts of lower grades;
- addresses a peace time structure.

The Long Term Perspective for Defence 2030 stems from the legal system and the strategic policy documents of the Czech Republic, and takes into account the principles of NATO and EU security policies and military documents.

The National Defence System is a part of the Security System of the Czech Republic as defined in the Security Strategy of the Czech Republic. The core function of the National Defence System is to prepare, manage, coordinate and support the activities of relevant authorities, forces and assets in ensuring he defence of the Czech Republic, including early identification and prediction of the development of threats and their assessment. The National Defence System is intertwined with NATO's environment. Control over the National Defence System is exercised by the President of the Czech Republic, the Parliament of the Czech Republic, the Government with its relevant working bodies, Ministries, and other central administrative authorities. The Ministry of Defence is responsible for the process of planning of national defence and coordinates the implementation of planned measures. During a state of national emergency or a state of war, special structures are formed to provide direct control over national defence. The Armed Forces serve as the principal executive element of the National Defence System, in conjunction with other state administration, regional and local government bodies as well as legal entities and individuals to the extent defined by law.

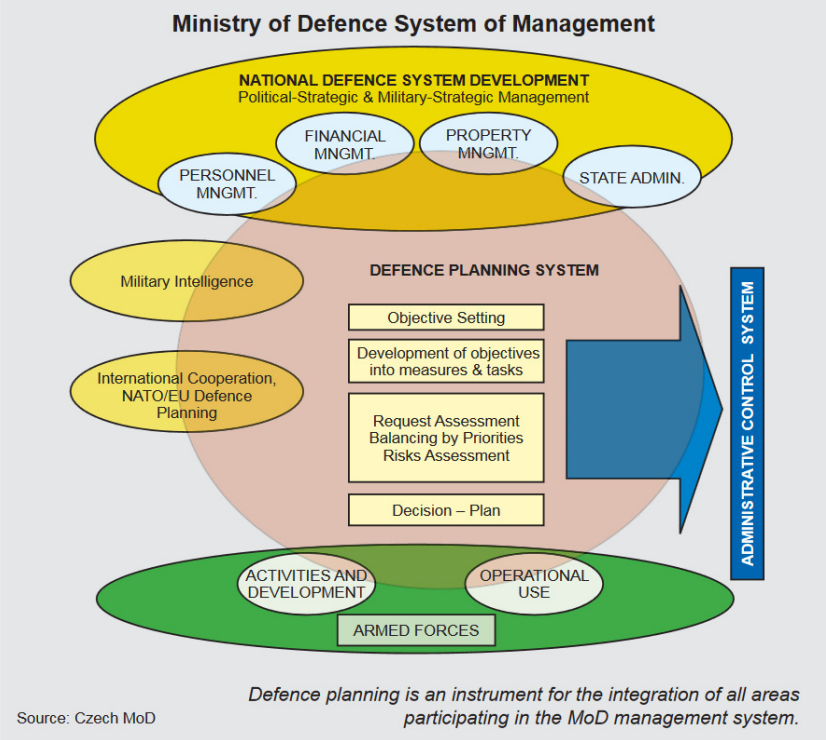


Fig. 1: Ministry of Defence System of Management

Source: White Paper on Defence. Prague 2011.

The Government of the Czech Republic and all local government bodies are responsible for safe-guarding, within their respective spheres of authority, the security of the population, the defence of the country's sovereignty and territorial integrity, and the preservation of all constituent elements of the democratic rule of law. A comprehensive and functioning security system continuously adapting to the current security situation in the Czech Republic and worldwide provides the institutional means to attain this end. The Security Strategy of the Czech Republic presents the approaches, tools and measures that safeguard the security, defence and protection of the population and of the state. Due to the nature of the present security challenges, the security policy can no longer be strictly segmented by security concerns. To effectively safeguard the Czech Republic's security, it is vital to have an institutionally as well as physically coherent and coordinated set of tools.

The Ministry of Defence has undertaken structural reform of the acquisition system, including open competition in public contract area, and asset management. This reform is based on the following principles: transparent, directed and target-oriented planning; clearly designated responsibilities of users for appropriately and factually defined needs and requirements; and professional management of the acquisition process in the system of central purchasing. This system operates under a qualified and independent technical and legal monitoring.

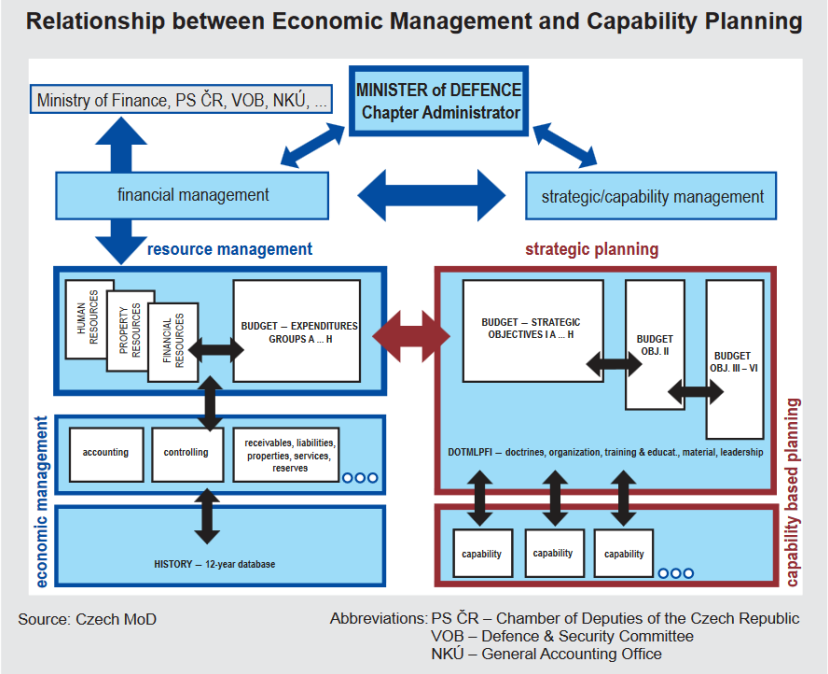
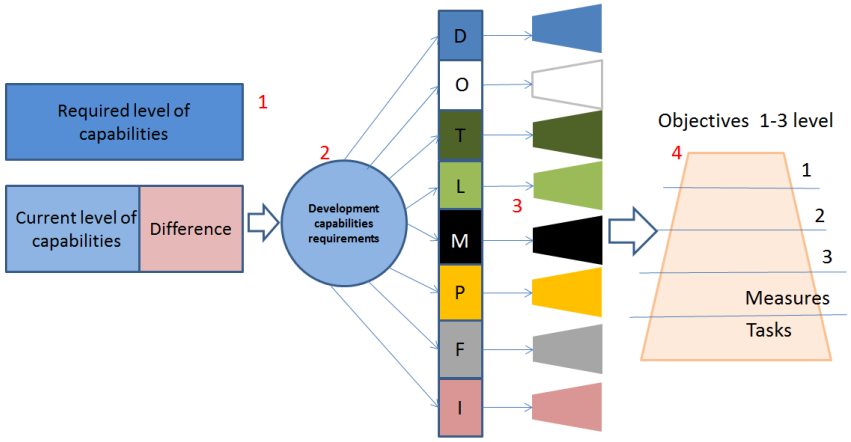


Fig. 2: Relationship between Economic Management and Capability Planning

Source: White Paper on Defence. Prague 2011.

Evaluation of a capability is important for capability planning and building processes. It provides a base for the Czech Army's capabilities building as well as for inputs to international activities. According to DOTMLPFI methodology (Doctrine, Organisation, Training, Material, Leadership, Personnel, Facility, Interoperability), during the planning processes, functional areas capabilities are considered. This facilitates comprehensive structured description of required changes of the existing state. It is obvious that the capability evaluation has a multi-criterial character, but as a simplification, we assume that the capability level can be characterized by a non-negative value.



Source: Authors

Fig. 3: Planning by objectives

Czech National Political And Military Ambitions

The Success of the Czech national political and military Ambitions is reliant on:

- The Medium-term financial perspective of the resource framework for the defence budget and an adequate annual budget;
- A stable environment for the Czech Armed Forces personnel development;
- Support to the Czech defence industry and utilization of the research, development and innovation outcome, which in turn will help the Czech Armed Forces to achieve its required capabilities.

There are three pillars of the Czech Republic´s defence:

Pillar 1: responsible approach by the state to the defence of the Czech Republic, and NATO and EU membership commitments;

Pillar 2: Capable Armed Forces;

Pillar 3: The civil duty of national defence (MoD. Defence strategy of the Czech Republic, 2017).

To achieve military capabilities following prerequisites are necessary:

Defence Budget And Budget Outlook

The approved 2017 MoD Budget ensures essential resource framework for implementation of The Concept of the Build-up of the Armed Forces of the Czech Republic 2025 agreed and ratified by the Czech Government on 21th December 2015. This key strategic defence document outlines the scope and achievability of the identified capabilities vital to the politico-military ambitions and all the tasks and commitments of the Armed Forces up to 2025 in the context of collective defence. The implemented priorities are defined in the Minister´s Guideline for planning the MoD operation and development in 2018-2022 with specification for 2017.

The 2017 MoD Budget will cover primarily:

- non-discretionary expenditures related to personnel with the anticipated personnel number growth;
- strategic projects expenditures;
- expenditures related to the fulfilment of commitments towards NATO, represented by the adopted capability targets (CT 2013) implementation, in the area of defence planning;
- commitments resulting from the membership of the Czech Republic in international organizations;
- ACR troops deployment abroad expenditures.

MoD budgetary limit for 2017 is higher by CZK 4,751.907 million compared to the year 2016. The Mid-term outlook framework for the year 2018 is set in the amount of CZK 57,770.485 mil. and CZK 62,654.100 mil. for the year 2019 (MoD. Budget, Facts & Trends 2017).

Personnel Development

A key factor in achieving the capabilities of the armed forces is personnel, and implementation of adequate legislative measures. Recruitment, education and training of highly qualified military servicemen and civilian personnel and welfare are a priority. From the available demographical analyses, it is evident that in the next ten years the number of citizens of the ideal recruitment age, 18 to 25 years, will decrease. It is therefore important that the MoD is perceived as a responsible, reliable and attractive employer able to compete in the labour market (MoD. The Long Term Perspective for Defence 2030).

Defence Industry And Research

The Czech Republic, given its small size, has a relatively strong arms industry, with several historic defence brands, a well-developed production base, sizeable local workforce, and advanced technological expertise in a range of specialist areas. It is specially focused in the areas of aerospace, military electronics, SALW and heavy transport trucks (EDA, 2016). The Czech defence industry´s largest production centres focus on air systems and military logistic vehicles, with a range of full platforms successfully marketed for export abroad including the L-39 jet trainer, L-159 light attack aircraft, TATRA T6x6 and 8x8 military transport trucks and tactical heavy vehicles. Other key capabilities at the system, sub-system and component level include aerospace structures, radiolocation system, IT and simulation equipment, military electronic, small arms and ammunition. Czech firms are also active in maintenance, repair, upgrade and other services, including training and demilitarisation.

Czech defence firms are represented by the Defence Security Industry Association (DSIA). The association has 113 members, of which 67 per cent are involved in manufacturing and 55 per cent have R&D capability (DSIA, 2016).

The appropriate application of system dynamics methods can also contribute to assessing the effectiveness and efficiency of development of the Czech Armed Forces military capabilities.

Using Of System Dynamics In Military Capabilities Development

The application of systemic dynamics to the problem of military capabilities is given by the very nature of the process of building military capabilities, which involves both the process of accumulation of resources and their transformation in ability and potential loss of ability, for example due to wear out and obsolescence of technology or loss of personnel and so on.

System dynamics has been used in strategic management and decision making processes since mid-1950 and it was developed as a discipline by Jay W. Forrester (Forrester, 1991). The original system approach dedicated to technical systems has been applied to soft problems, allowing successful qualitative modelling and has been applied to systems with complex structure and many parameters, which

are often very difficult to formally describe (e.g. social systems). The main idea is to describe a system by its structure, information couplings and feedback loops. The primary assumption of the system dynamics paradigm is that the persistent dynamic tendencies of any complex social system arise from its internal causal structure (Papageorgiou, 2011). Models developed by system dynamics methodology do not provide forecast, but possible patterns of behaviour and it is important to interpret results of simulation in this sense. The applicability of system dynamics to defence strategic management is given by nature of decision problems. The main application areas concerning strategic problems are capability development, life cycle management and personnel management.

Capability development covers a whole bunch of sub problems and it needs to be structured to reach a specific problem solution. The capability if described by functional areas DOTLMPFI and a capability can be considered within its life cycle (Baxa, 2017). Phases of the capability life cycle, i.e. development, sustainment, reduction and termination and influencing factors are in Figure 4.

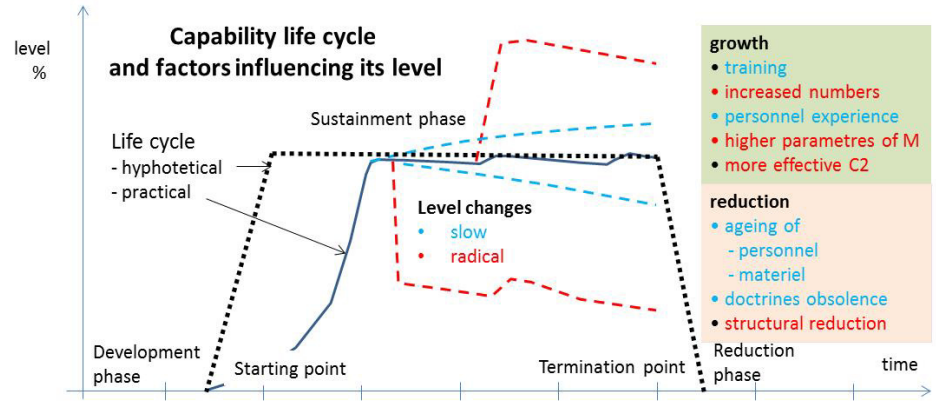


Fig. 4: Capability life cycle with influencing factors

Source: BAXA, Fabian. Translation of Capability Requirement Into Management by Objectives Environment.

A generic capability system dynamics model is in Figure 5. The model is simplified; nevertheless, the goal seeking feedback structure of the model is obvious. In accordance with Figure 3, the negative feedback is created by comparing the actual level of *Capability* with *Capability Requirement*. In case of deficiency *Resources Requirement* is generated and transformed into *Resources* that form *Resources Flow,* considering *Effectivity* of transformation resources into a capability increment.

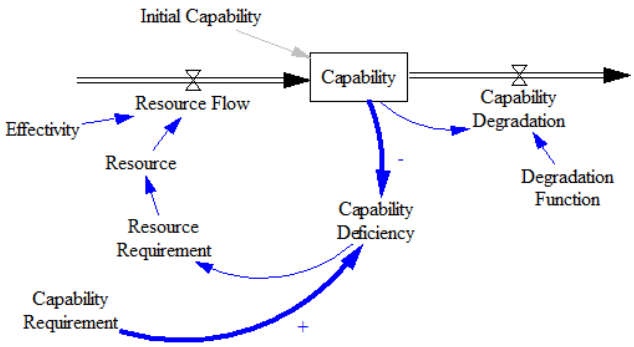


Fig. 5: A system dynamics model of a generic capability

Source: Authors

To gain concrete results, it is necessary to deal with a specific capability, model the capability using functional areas (not all need and can be modelled) and feed the model with relevant data.

Life cycle management is a problem where system dynamics has been applied, e.g. Zhi-Chao Liu (LIU, JIANG, ZHANG, 2012). Although functionality of any military system is a key requirement when a new system is procured, dealing with economical restrictions, which always present, the Life Cycle Costing is another factor which must be considered. The issue is considering not only the initial acquisition price but in-service phase cost in all supposed operation modes, which regards to the most important phase of a system life cycle, i.e. operating it.
The Life Cycle of a military system is divided into six phases: concept, development, production, utilization, support and retirement. The utilization and support phases concern operation of a system and they run parallel. The phases of Life Cycle are in depth described in *Methods and Models for Life Cycle Costing* (RTO NATO, 2007).

Dealing with the LCC analysis, the system dynamics is beneficially used in case of many factors influencing price and long-time period of life cycle. A generic system dynamics model of a helicopter LCC estimate has been developed. The utilization and support phases were further decomposed and modelled. Simulation results supported comparison of cost depending on various operation modes of helicopters (Novotný, Procházka, 2017).

Human resources or personnel development, what can be a synonym dealing with military staff, is another area where system dynamics is applied (Mehmmood, 2007). Human resources policy in the armed forces differs from the one in a private company mainly due to requirements on personnel training and education, fixed contract period and requirements on promotion. The Czech Ministry of Defence worked up a new military career concept. Application of a system dynamics to provide some what-if scenarios supporting strategic management is discussed in following paragraphs.

The military force structure is a hierarchic structure given by military ranks, number of positions for each rank and a promotion chain. The Ministry of Defence has developed new rules for military career. The law sets only boundaries, but for effective human resources management clear policies must be established in order to provide motivation and widely accepted rules. To support development of these policies, the system dynamics approach was applied.

Due to political and budget changes, the military structure has been changed relatively often. The model can support the structure change policy development and implementation to minimize financial or social impacts.

The hierarchical structure of military staff is created by a rank hierarchy. There are six categories: Men, sergeants, warrant officers, junior officers, senior officers, generals. Enrolments for men, warrant officers and officer categories are mostly new recruits, so these categories are almost independent. The paper deals with officers only, but the approach is fully applicable to other categories.
Changes of the structure were driven mostly by budget restrictions in past. Taking into account the main criterion, i.e. economy of financial resources, it was difficult to optimize the structure from the human resources point of view (individual qualities, experience, education etc.) in the same time. The military career was not clearly defined, the period of service in a concrete rank was not limited in general and a military career was driven by a contract that was usually signed from 2 to 6 years.

The new regulations introduce following rules:

- Maximal service period in one rank (promotion or retirement at the end).
- Promotion is not possible until minimal service period at the rank is accomplished.

- Necessary condition for a given rank can be an obligatory career course completion for given ranks, university bachelor or master degree and a language (STANAG 6001 SLP English) proficiency level.

There are main features and limitations above that must be reflected by the model. Thus, a rank is characterized by its attributes:
Service period – maximal time that is an entity allowed stay in a position. It differs for positions in a rank – 4 year period for commanders, 5 year period or staff officers and 7 year period for specialists. It is allowed to change position in the rank, so maximum stay in the rank is from 8 to 14 years, and then the person has to be promoted or retired from the service.

Minimal service period – minimal service time in the rank before promotion is possible.
Rank Capacity - number of entities in the rank. The number cannot be exceeded. *In practice, a soldier can be on hold for 3 or 6 months not appointed to a position in the structure, but it is an extraordinary measure.*

The simulation model created in Vensim application consists of a rank chain, where the first rank corresponds to the 2nd Lieutenant (2LT) rank and the last one to the Colonel rank. Each rank is represented by a structured accumulation, where the inflow consists of entities promoted from the lower rank (enrolment for 2LT) and the outflow consists of promoted or retired entities. The internal structure enables to differentiate number of entities within the rank by time spent in the rank, so there is no age solving within the ranks. Parallel coflows (Sterman, 2000) were created to calculate rank age characteristics. Other parameters to be analysed as language skills levels and career courses required for promotion are modelled as well. As for courses, their capacity and duration are essential; for language courses a success probability as a critical parameter for each course has been added.

Promotion is allowed only to the nearest higher rank. Ranks are (bottom-up): 2nd Lieutenant (2LT), 1st Lieutenant (1LT), Captain (CPT), Major (MAJ), Lieutenant Colonel (LTC), and Colonel (COL). Promotion chain, enrolment and retirement are simulated by corresponding flows.

Initial and planned (required) ranks ate given in the Table 1. The requirements given there were originally declared as obligatory to a given date (3 and half year). It means that e.g. a captain has to pass through Senior Officer Course (SOC) and hold STANAG 6001 SLP level 3322 certificate or better to be promoted. To be promoted in colonels, requirements are General Staff Course (GSF) and SLP level 3333. Moreover, a person who will not meet the requirement will be retired.

Those parameters of the system were used in the model and various scenarios were simulated. The most important values used for simulation are given in the Table 1. The initial values were taken from the information system and slightly variated not to deal with sensitive data. The model was set as a discrete time one with simulation step one quarter (3 months) and it was supposed that the promotion takes place every 2 quarters.

Table 1: Requirements on ranks and values for simulation

Rank	Initial Number	Required Number	Min Service Time	Course		STANAG 6001 SLP	STANAG SLP 6001 SLP Meeting – initial state		
				Required	Meeting	Required	SLP2	SLP3232	SLP3
2LT	756	985	2			2222	248	72	42
1LT	1273	1509	3			2222	466	116	109
CPT	1375	1571	3		349	2222	493	146	148
MAJ	930	1117	3	SOC	717	3322	358	101	168
LTC	709	768	3	SOC	6	3322	197	100	189
COL	286	256	2	GSC	115	3333	73	50	104

Source: Authors

Simulations Results And Discussion

Optimistic scenario. In this scenario, we suppose enrollment according to requirement and language capable recruits accomplishing all SLP 2222, 20% of them SLP 3322 and 10% SLP 3333. Retirement is supposed only due to reaching the service time limit within a rank without possibility to be promoted. The deadline for the obligatory criteria meeting is not applied.

The **pessimistic scenario** differs from the optimistic one just with more active retirement. The actual rate of officers retired from the service was taken and applied to the model. The simulation results are given in Figures 6 – 14, where letters *a* and *b* correspond to optimistic and pessimistic scenarios respectively. The optimistic scenario presents in general a sustainable system where all ranks tend to be full at a reasonable level with some disturbances that could be possibly corrected by proper management. The problem is the time when the above declared requirement could be fulfilled. The originally declared aims in language skills are unreachable within 4 years. As for language skills, the scenarios do not differ substantially. The pessimistic scenario simulation shows potential risk. As can be seen in the Figures 6b and 7b, the ranks are not filled according to requirements. Critical ranks are 1st Lieutenant and Major. The deficiency in 1LT is given by improper ratio of positions in 2LT, 1LT and CPT ranks. Comparing Figure 15a to 15b, service time in ranks shortens in pessimistic scenario. The problem with the Major deficiency is given by limited capacity of the Senior Officer Course that blocks possible promotion of Captains, see Figure 12a and 12b. Moreover, the peak of retired Captains in Figure 15 in 14-15 year is given by reaching maximum service time without possibility to be promoted due to missing SOC. The model reflects only key features of officer career, it does not deal with military branches, different qualifications, knowledge and skill required within and across ranks, but further decomposition of the career model would bring about more restrictions on a promotion process, and thus worse results can be expected.

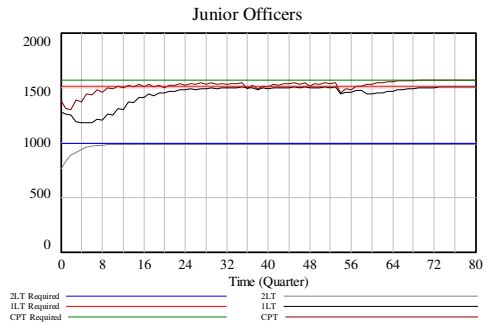
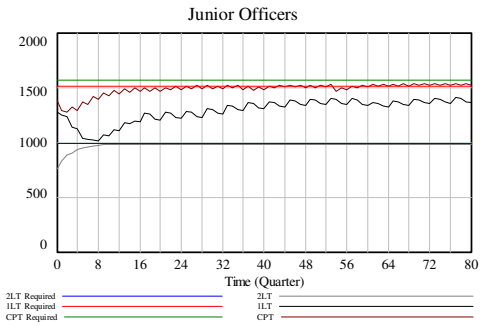
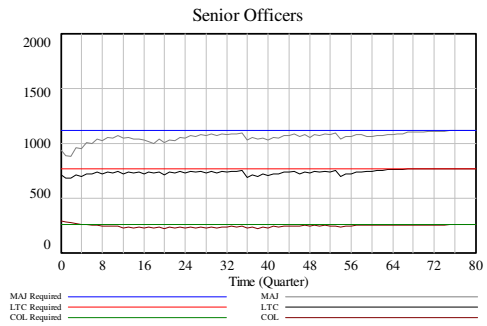
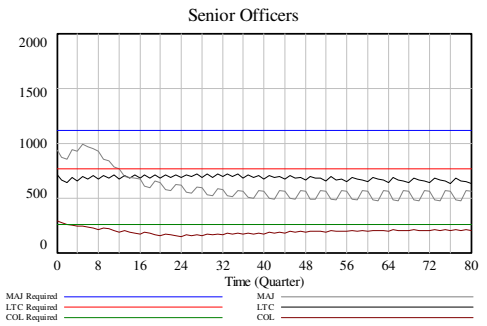
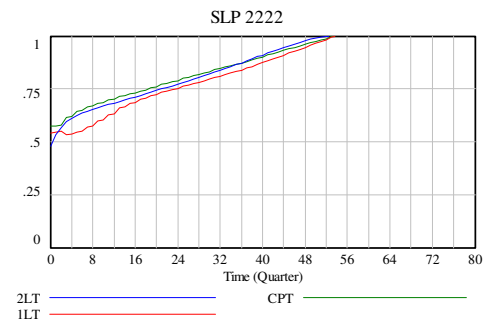
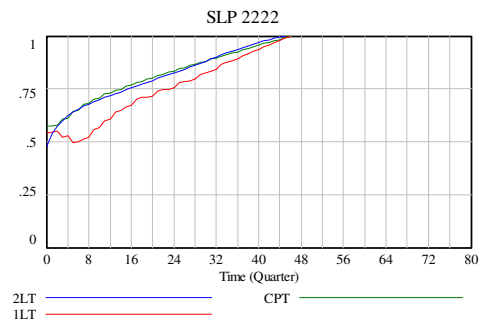
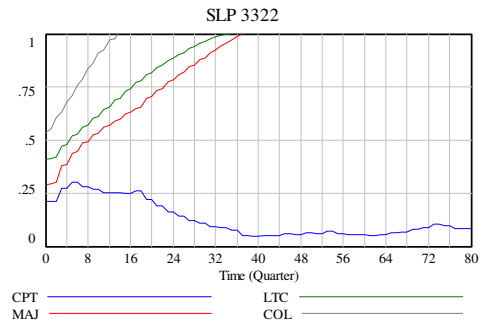
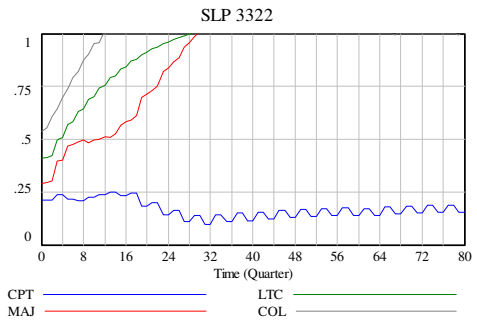
Optimistic Scenario	**Pessimistic Scenario**
Fig 6a.	Fig 6b.
	
Source: Authors	Source: Authors
Fig 7a.	Fig 7b.
	
Source: Authors	Source: Authors
Fig 8a.	Fig 8b.
	
Source: Authors	Source: Authors

Fig 9a.



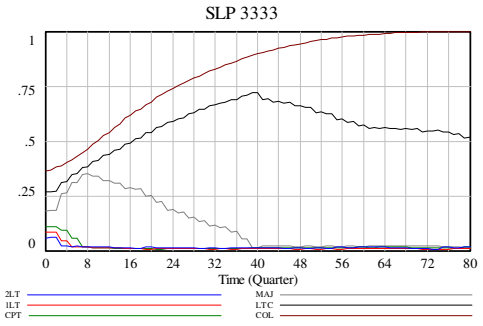
Source: Authors

Fig 9b.



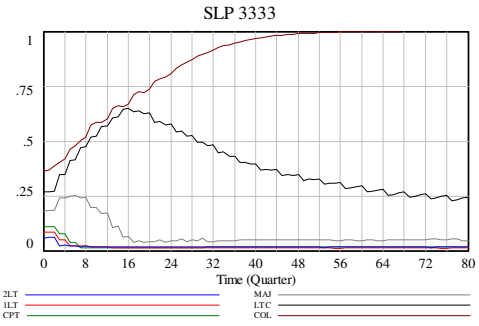
Source: Authors

Fig 10a.



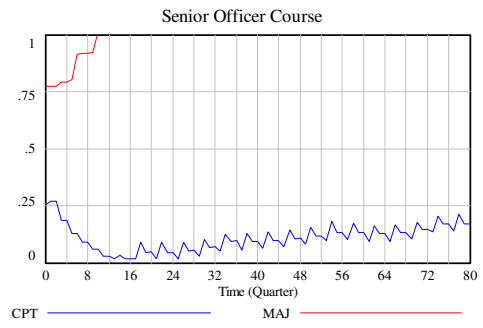
Source: Authors

Fig 10b.



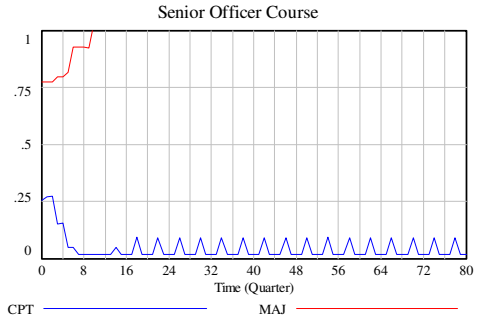
Source: Authors

Fig 11a.



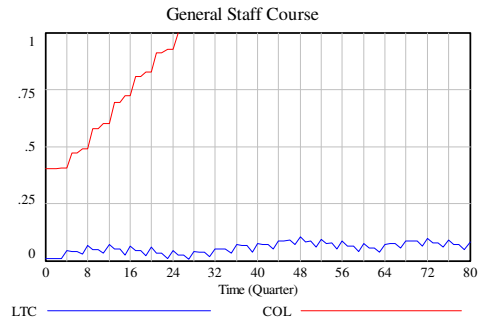
Source: Authors

Fig 11b.



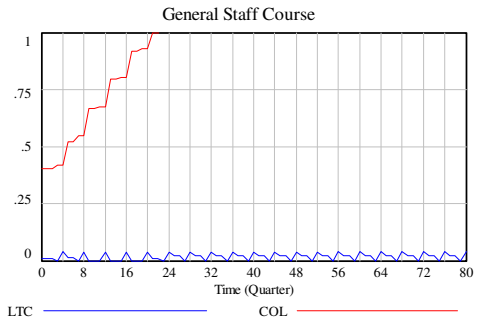
Source: Authors

Fig 12a.



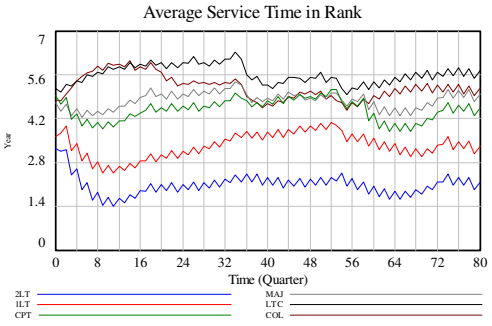
Source: Authors

Fig 12b.



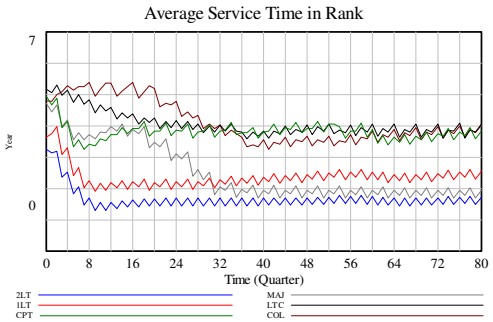
Source: Authors

Fig 13a.



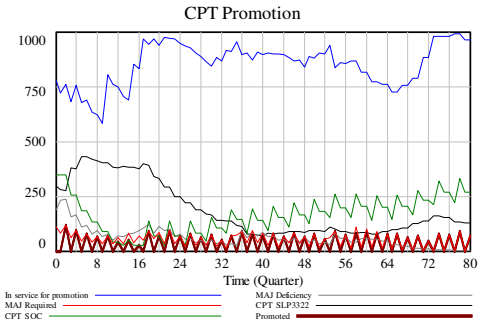
Source: Authors

Fig 13b.



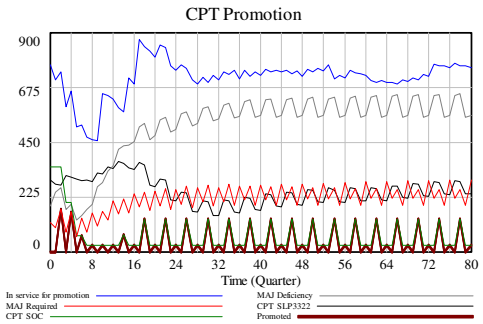
Source: Authors

Fig 14a.



Source: Authors

Fig 14b.



Source: Authors



Source: Authors

Fig. 15: Retired officers per year – pesimistic scenario

Conclusions

Common security cannot be identified with the absence of a military conflict, but current security is a much wider phenomenon. It covers much more aspects including purely civilian, non-military or until recently, completely outside the security perceptions. When building modern armed forces, much more emphasis is put on their interoperability, flexibility, professional performance and technical superiority. The security and defence of the state is ensured by the creation and implementation of the security policy, which is given by the internal security, economic, foreign and defence policy. The objectives of the state's political policy are to create a political mandate for the use of the armed forces and to define the tasks for their further development and construction as an integral part of the state's security system. In order to meet the political objectives, it is therefore necessary to realize the development of the armed forces, generating a corresponding military potential, consisting of the synergic effects of its conceptual (doctrine, regulations, standard operating procedures), moral (motivation, effective leadership, competent organization and development) physical components (combat power given by the quality and quantity of human and material resources). The task of the state is to define its interests and objectives in the construction of the military potential and to release the necessary resources and to create the necessary conditions for their fulfillment. The interests and goals of the state should be real (in line with the state's resources) and in relation to the construction and development of the armed forces, as well as permanent (not limited by the length of the electoral period of the elected political party). One of the instruments supporting strategic decision making processes is an application of system dynamics. Using modelling and simulations enables to test strategies prior to their implementation.

References

Army.cz, 3. 9. 2014. *Czech governmental coalition sign agreement on progressive increase of the defence budget*. [Online]. [Retrieved October, 9, 2017].Available: http://www.army.cz/en/ministry-of-defence/newsroom/news/czech-governmental-coalition-sign-agreement-on-the-progressive-increase-of-the-defence-budget-101455/

BAXA, Fabian. Translation of Capability Requirement Into Management by Objectives Environment. In: *International conference KNOWLEDGE-BASED ORGANIZATION*. Sibiu: De Gruyter, 2017, 23(1), DOI: 10.1515/kbo-2017-0058. ISSN 2451-3113. [Retrieved October, 9, 2017]. Available:http://www.degruyter.com/view/j/kbo.2017.23.issue-1/kbo-2017-0058/kbo-2017-0058.xml

Czech MoD. *Defence strategy of the Czech Republic*. [Online]. Prague, 2017. [Retrieved October, 9, 2017]. Available: http://www.army.cz/images/id_8001_9000/8503/DefenceStrategy2017.pdf

Czech MoD. *The Long Term Perspective for Defence 2030.* [Online]. Prague, 2015. [Retrieved October, 9, 2017]. Available: http://www.army.cz/images/id_8001_9000/8503/THE_LONG_TERM_PERSPECTIVE_FOR_DEFENCE_2030.pdf

Czech MoD. *Concept of the Czech Armed Forces Development 2025*. [Online]. Prague, 2015. (Only in Czech, public version). [Retrieved October, 9, 2017]. Available: http://www.mocr.army.cz/images/id_40001_50000/46088/KVA__R_ve__ejn___verze.pdf

Czech MoD. *White Paper on Defence*. [Online]. Prague 2011. [Retrieved October, 9, 2017]. Available: http://www.army.cz/assets/en/ministry-of-defence/whitepaperondefence2011_1.pdf

Czech MoD. *Budget, Facts & Trends 2017*. [Online]. Prague, 2017. [Retrieved October, 9, 2017]. Available: http://www.army.cz/images/id_100001_200000/130198/Budget2017.pdf

DSIA. *Charter of defence and security industry association of the Czech Republic*. [Online]. Prague, 2015. [Retrieved October, 9, 2017]. Available: http://www.aobp.cz/_new/wp-content/uploads/2014/12/DSIA-Charter-2015-eng.pdf

EDA. *Central and Eastern European countries: measures to enhance balanced defence industry in Europe and to address barriers to defence cooperation across Europe.* [Online]. Rand Europe, April 2016. [Retrieved October, 9, 2017]. Available: https://eda.europa.eu/docs/default-source/documents/rr-1459-eda-central-and-eastern-europe-report---technical-annex---final.pdf

FORRESTER, Jay W. *Industrial dynamics*. Waltham: Pegasus, 1991. ISBN 1-883823-36-6.

LIU, Zhichao, Qiuhong JIANG a Hongchao ZHANG. Life Cycle Assessment Model: Recent Development and Future Tendency. In: *Proceedings of the 10th International Conference on Frontiers of Design and Manufacturing*. Chongqing, China, 2012.

MEHMOOD, Arif. Application of System Dynamics to Human Resource Management of Canadian Naval Reserves. In: *25th International Conference of the System Dynamics Society 2007*. Boston, Massachusetts, USA: System Dynamics Society, 2007, s. 2927-2946. ISBN 978-1-60423-924-9.

Methods and Models for Life Cycle Costing: RTO TECHNICAL REPORT TR-SAS-054. F-92201 NEUILLY-SUR-SEINE CEDEX: RTO NATO, 2007. ISBN 978-92-837-0072-2.

Ministry of Foreign Affairs. *Security strategy of the Czech Republic*. [Online]. Prague, 2015. [Retrieved October, 9, 2017]. Available: http://www.army.cz/images/id_8001_9000/8503/Security_Strategy_2015.pdf

NOVOTNÝ, Antonín a Dalibor PROCHÁZKA. *Czech Armed Forces and Some Aspects of Helicopters Acquisition*. In: *International conference KNOWLEDGE-BASED ORGANIZATION*. Sibiu: De Gruyter, 2017, s. 107-112. DOI: 10.1515/kbo-2017-0096. ISSN 2451-3113.

PAPAGEORGIOU, Papageorgiou. Strategic Management via System Dynamics Simulation Models. *International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering*. 2011, 5911, 1331-1336.

PROCHÁZKA, Josef and Lukáš DYČKA, Jakub LANDOVSKÝ. *Czech Defence Policy Response to Dynamics in Security Environment Development.* [Online]. Czech Military Review, 2016, 25. pp. 3-17. [Retrieved October, 9, 2017]. Available: http://www.vojenskerozhledy.cz/kategorie-clanku/bezpecnostni-a-obranna-politika/reakce-ceske-obranne-politiky

STERMAN, John D. Business dynamics systems thinking and modeling for a complex world. Boston: Irwin/McGraw-Hill, 2000. ISBN 007238915X.

Vensim. [Online]. [Retrieved October, 9, 2017]. Available: http://vensim.com/vensim-software/

Impact of Brownfields on the Real Estate Prices: A Case Study From Three Locations in The Moravian Silesian Region (Czech Republic)

Kamila Turečková, Department of Economics and Public Administration, Silesian University, School of Business Administration, Univerzitni Nam. Czech Republic, tureckova@opf.slu.cz

Stanislav Martinát, Department of Economics and Public Administration, Silesian University, School of Business Administration, Univerzitni Nam. Czech Republic, martinat@opf.slu.cz

Jan Nevima, Department of Economics and Public Administration, Silesian University, School of Business Administration, Univerzitni Nam. Czech Republic, nevima@opf.slu.cz

Jaroslav Škrabal, Silesian University, School of Business Administration, Univerzitni Nam. Czech Republic, O150482@opf.slu.cz

Petra Chmielová, Silesian University, School of Business Administration, Univerzitni Nam. Czech Republic, O150454@opf.slu.cz

Abstract

Presented contribution deals with the problem of impacts of brownfields on prices of surrounding real estates, thus, the aim of the paper is to investigate how and why unused sites and buildings reduce prices of real estates located in the proximity of brownfields. This assumption has been surveyed and confirmed by primary research that was done in the area of three municipalities (Karvina, Orlova and Detmarovice) in the Moravian-Silesian Region (the Czech Republic). Respondents of the survey also expressed their opinions and attitudes about factors and characteristics of brownfields that are of key importance from the point of view their negative impact on the prices of real estates. Primary research has been conducted by means of the questionnaire survey in the second half of 2016 and beginning of 2017. The results from questionnaire survey are also comparing to each other with the aim to find out the differences between respondent´s answers in particular municipalities.

Keywords: Brownfields, Czech Republic, Property, Real Estate Price.

Introduction

The National Brownfield Regeneration Strategy (2008) or previously Alker (2000) define brownfield as the real estate property (land, building or ground) that is insufficiently utilized, neglected and might be also contaminated. These properties occur as remnants of industrial, agricultural, residential, military or other activities. It is obvious that nowadays when plenty of global economic, social and environmental challenges that are linked to the sustainable spatial development of cities and municipalities are being solved, the problem of regeneration and re-use of brownfields might at least partially contribute to the solution of these problems (Krzysztofik et al, 2016). One of those primary problems is to reduce the undesirable increase of extent of built-up areas on city limits to the account of the open landscape when brownfields in inner cities are being abandoned and left unused (Maly and Mulicek, 2016). Indeed, boosting support for brownfield regeneration might also contribute to more sustainable development of cities and rural municipalities from the perspective of their physical compactness, generally to increase of social responsibility for our behaviour (Tagaia, 2016) and to follow environmentally friendlier tendency to prefer utilization of existing properties over those that are being built on greenfields (De Sousa, 2003).

The aim of this contribution is to present research results on the problem of influence of brownfields on real estate prices in neighbourhoods. It can be assumed that immediate proximity of neglected, abandoned and decaying grounds causes a decrease of prices of real estates (primarily privately owned) that are located around these brownfields. Reasons behind this hypothesis lie for example in the lower level of aesthetic quality that is usually connected to abandoned or neglected brownfields. Next reason could be linked to possible contamination of these sites, their bad technical state or occurrence and concentration of socio-pathological phenomena in these buildings (like homelessness, high level of criminality etc.). Our findings are based on primary research that has been conducted in the area of three municipalities in the Moravian-Silesian (Czech Republic) in 2016 and 2017. Specifically, we worked in two cities (Karvina – population 54.4 thousand in 2017, Orlova – population 29.2 in 2017) and one rural municipality (Detmarovice – population 4.2 in 2017). All three selected municipalities are typical by the occurrence of brownfields. In the following text, the comparison of research results among individual municipalities will be conducted. Explanations and interpretations of differences will be based on results of a questionnaire survey that has been performed in the three municipalities.

1. Methodology and data

As a first step of the presented research, a detailed literature retrieval was performed to understand the problem of the regeneration of brownfields. A study of this phenomena assumes a utilisation of transdisciplinary approaches, as the usage of limited methodologies of individual disciplines might deform the meaningful perspective of the results interpretation. According to the knowledge of authors, it is not possible to perceive the multilayer problem of brownfields just from the economical, sociological or geographical point of view, it is necessary to combine these perspectives to get better results.

The phases of conducted research were performed simultaneously in two cities (Karvina, Orlova) and one rural municipality (Detmarovice) of the Moravian-Silesian Region in 2016 and 2017. The data were gathered by means of the questionnaire survey that contained 12 questions. A number of respondents that participated in the research was 347 in total (158 respondents from Karvina, 120 respondents from Orlova, 69 respondents from Detmarovice). All respondents were selected to match with socioeconomic, demographic, educational and gender structure of the population of given municipalities, all respondents were older than 18 years. The share of returned questionnaires that were distributed by trained university students on the streets of three municipalities was very high (almost 99 %). As a method for completion of questionnaires, semi-structured interviews were utilized. Such face to face communication with respondents minimized the level of refusals to participate in the survey. The aim of the questionnaire survey was to ascertain opinions and attitudes of the local population on the issue of the influence of brownfields on prices of neighbouring real estates. Factors behind were also determined to ensure why and how the occurrence of brownfields affects the value of real estates.

2. Description of the selected locations

Karvina, Orlova a Detmarovice are municipalities on the LAU 2 level that are located in the Czech Republic in the northern part of the Moravian-Silesian Region (former Karvina District – LAU 1) by borders with Poland (see Figure 1). The Statutory city of Karvina has population 54.4 (in 2017) and covers area of 57.48 km^2. Discovery of black coal in Karvina in the second half of the 20th century caused a decisive turn in the economic development of the whole region and significantly contributed to the economy of the Austria-Hungary Monarchy. The mining sector has been gradually complemented by engineering and metallurgy that constituted the backbone of the traditional economy. Karvina is also known for a spa that utilized local rich sources iodobromic ground water. Orlova is also specific by mining and heavy industry whose tradition goes back to early 18th century. Orlova (population 29.2 thousand) covers an area of 24.67 km^2 and is typical by mildly sloping terrain that was accented by visible surface effects of mining. Detmarovice (population 4.2 thousand on 13.76 km^2) are located on important railway track from Bohumin to Slovakia (Zilina) and Poland

(Katowice). On the area of Detmarovice, electrical power station with an installed capacity of 800 MW is a location that belongs to the largest in the wider region.

Brownfields that are located in the Moravian-Silesian Region are specific as for their origin. We can find a huge set of such sites that occurred as result of the decay of traditional industries and mining (Kaderabkova and Piecha, 2009, s. 72). According to the Regional Development Agency (2016), 38 brownfields were located in Karvina district. Out of them, 24 were without any contamination, 12 were mildly contaminated and 2 of them contained strong contamination soil beneath. 19 brownfields were owned by private owners, 17 were owned by public bodies, only 2 brownfields have the status of mixed ownership.

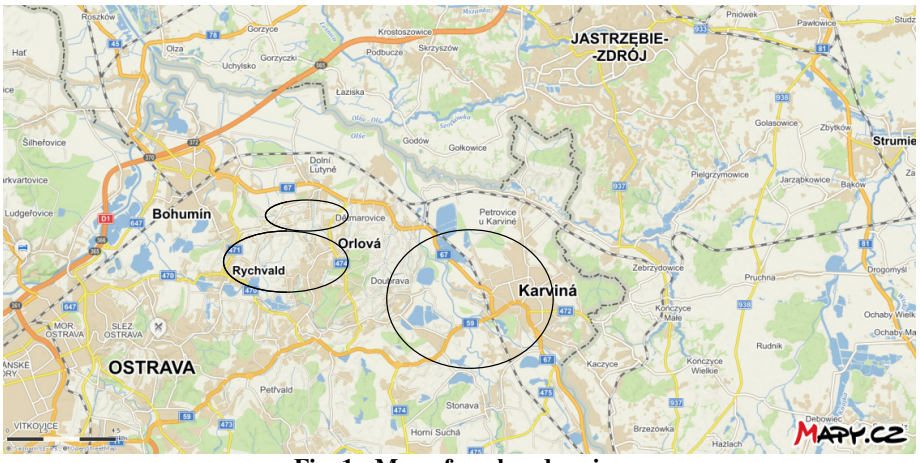


Fig. 1 : Map of analysed region

Source: 'Mapy.cz', adjusted by authors

Within three case study municipalities, eighteen brownfields were located in Karvina, eight on the area of Orlova and eleven on the area of Detmarovice. If we focused on the extent of these brownfields, the largest one could be found in Karvina (former military base and building of former industry company Kovona). Majority of brownfields in Karvina is located in close proximity to housing. Exceptional are brownfields in the eastern part of the city (five brownfields) that are connected to mining (Sovinec, former Gabriela mine, Jindrich mine, Barbora mine, area Above Barbora). Next examples of brownfields in Karvina are former panel factory, former gardening, former school, water tower, the Larisch stables, abandoned houses on the main square or former housing with name Vagonka. The total area of brownfields in Karvina is over 180 hectares.

Majority of brownfields in Orlova are linked to decay of mining that has been taking place here gradually since the middle of the 1990s. Some brownfields have already been renaturalised (technical and biological renaturalisation has been already done here), other brownfields are still waiting for such intervention. The total area of brownfields in Orlova is 5.000 hectares (former aqua park and minigolf, buildings and lands of former Lazy mine, Vaclav mine (boiler building, engine buildings, administration buildings, Doubrava mine, Zofie mine, a heap of Zofie mine, the area of Floating pit no. 2, neglected pool).

In Detmarovice, the majority of brownfields is located in the proximity to the main railway station or in the proximity of the power station (abandoned storages). Besides it, three building of former civic facilities, four abandoned buildings after industry, three neglected houses and abandoned agricultural farm. The total area is around 0.5 hectares.

3. The Influence of Brownfield's on The Real Estate Prices

During our research, it was found that living in the neighbourhoods of brownfields would be problematic for more than 70 % of respondents (see Figure 2). The Even higher rate was measured in

case of Karvina (80 %). This result and differences among individual municipalities can be explained rather as consequence of negative phenomena that are connected to the occurrence of brownfields (crime, homelessness etc.). Extreme values in case of Karvina might be interpreted a result of the stronger occurrence of previously mentioned phenomena.

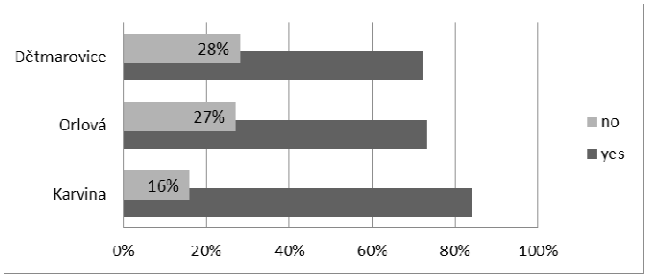


Fig. 2 : Unwillingness to live in the neighbourhoods of brownfield

Source: own survey (2017)

Dramatic differences were found in an answer to the next question in our survey. We asked respondents to identify if they live within distance of 500 meters (5 minutes walk) from the abandoned location. It was ascertained that in Detmarovice just quarter of respondents answered positively, in case of Orlova and Karvina is was much more respondents (around 80 %). This is caused by the location of brownfields in individual municipalities. In Detmarovice brownfields are more located to distant parts of the municipality, in case of Orlova and Karvina brownfields could be found directly just next to housing. It is obvious that population of Orlova and Karvina are more aware of the existence of brownfields and consequences that are connected with life in their proximity.

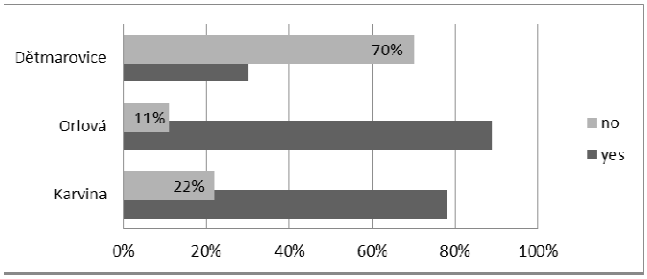


Fig. 3: Housing in the neighbourhoods of brownfield

Source: own survey (2017)

Opinions of respondents, how the real estate prices are affected by the occurrence of brownfields in their proximity, are more clearly defined in case of Karvina. In this case, 44 % of respondents stated that due to the occurrence of brownfields the real estate prices are lower than 50 % in comparison to another part of the city (without brownfields) (see Figure 4).

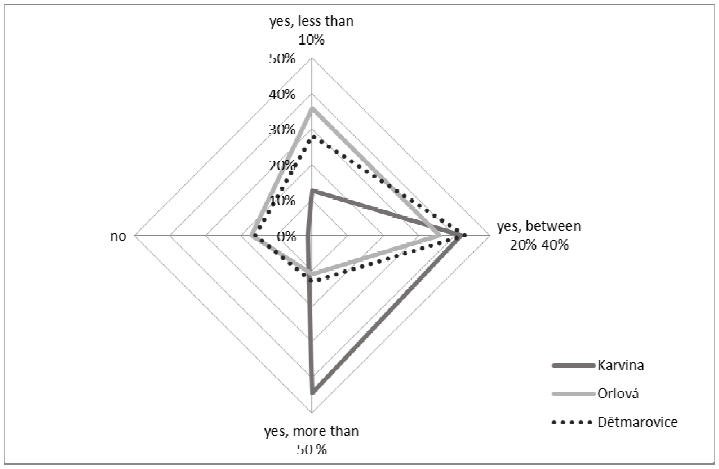


Fig. 4 : Influence of brownfields on values of neighbouring real estates

Source: own survey (2017)

If we took all three case as one whole, the most frequented answer was that brownfield decrease prices of real estates in their neighbourhoods by 20-40 %. On the other hand, almost one fifth of respondents from Detmarovice and Orlova think that there is not the explicit influence of brownfields on the real estate prices (in case of Karvina it was opinions of just 2 persons that means 1 % of respondents). Reasons behind this difference might be explained by using results presented in Figures 6 and 7 that can be interpreted as a hypothesis that population of Karvina is more clearly defined as for their relation to brownfields than the population of other two case studies. This might be caused by the dense occurrence of brownfields in Karvina and everyday experiences of the local population with life with brownfields and consequent occurrence of socially problematic phenomena.

This enquiry has rather negative replies among respondents from Karvina. Only 9 % of them were open to buy real estate in the immediate proximity of brownfield if its price was by one fifth lower than it is usual (see Figure 5). On the other hand, respondents from Orlova were not so negative in their answers and more than 40 % would be opened to buy such real estate. If samples from surveys from three municipalities are counted as a whole, more than 77 % refused possibility to buy the real estate in the proximity of brownfield if the price was by one fifth lower than it is usual for given type of real estate. Based on this finding, we can assume that value of real estates in proximity of brownfields is lower by 30 – 40 % (as perceived by respondents – see Figure 4)

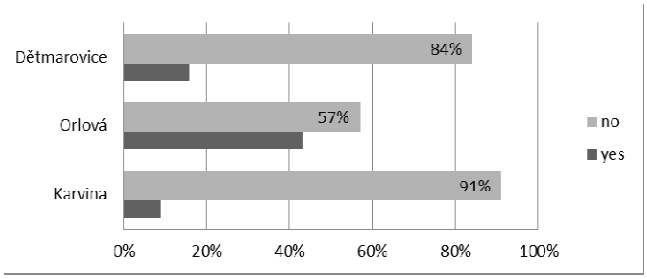


Fig. 5 : Willingness to buy real estate in immediate proximity of brownfield if price is lower by 20 %

Source: own survey (2017)

In the next step of our research, we tried to determine factors that are closely linked to the occurrence of the abandoned site (brownfield). We asked respondents to identify key factors that they find as decisive while thinking about the influence of brownfield on prices of neighbouring real estates. Respondents could select out of six answers. Shares of positive and negative answers are graphically displayed in Figure 6. Generally, it was found that that population of Karvina connects occurrence of

brownfields much more strongly to negative consequences than it is in case of the population of Orlova or Detmarovice. Our hypothesis that population of Karvina perceives brownfields differently (as also showed in case of other questions) seems to be confirmed. The only issue that was in Karvina identified differently than expected, was a case of possible contamination of soils under brownfields. We found that such concerns are more frequented by the population in Orlova.

The largest share of respondents (around 84 %) is convinced that brownfields as an abandoned site are problematic and rather dangerous which is the fact that reduce prices of neighbouring real estates. Main reasons for such argument were identified in the concentration of socially pathological phenomena in brownfields (like homelessness, higher rates of criminality, drug dealing, vandalism etc.). The second factor that was found as important (around 60 %) were environmental and health risks (occurrence contamination of soils and pollution) that might affect the health of the population that is living in the neighbourhoods. This factor might be interpreted as some kind of distrust that majority of contaminations have been removed or cleaned-up.

The population was quite unsure that these contaminants are safe and do not bear any health risks. The technical state of brownfields was identified as a third important factor (around 56 %). Respondents were expressing their fears that brownfields are dangerous as for the bad quality of their technical infrastructure, and not usually secured against the intrusion of people who should not be there. They perceive that risks connected to bad statics and neglected maintenance of individual buildings, or failures of concrete structures due to corrosion of materials are very high. Reasons why brownfields negatively influence the price of neighbouring real estates are for 43 % of respondents connected to uncertainty concerning future use of the site. They usually argued that it is not sure what will be built on a particular brownfield in future and how the site will be used. Only 34 % of respondents perceived brownfields as barriers for the further development of the city. We can say respondents were not so optimistic when thinking about the future development of their city. It seems that this distrust towards future reduces demand for housing within the city and indirectly it noticeably reduces the value of local real estates. The same share of respondents (34 %) believes that lower real estate prices of buildings in proximity to brownfields are connected to aesthetics of brownfields. These sites are usually abandoned and neglected, sometimes aesthetically unsightly with peeled façade or are ruined, covered by weed or walls are damaged by graffiti etc.

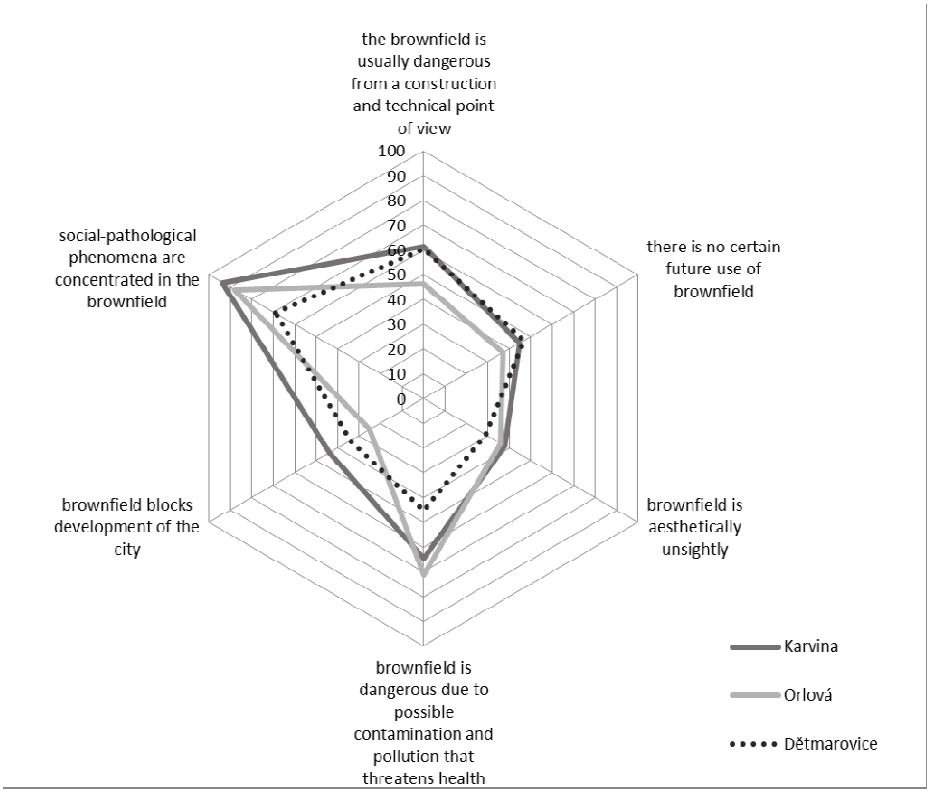


Fig. 6 : Reasons why brownfields have significant influence on the real estate prices in their neighbourhoods

Source: own survey (2017)

Respondents were asked to evaluate the possibility to buy the real estate in the proximity of brownfield. Just 17 % of them claimed that occurrence of brownfield does not influence their decision to buy real estate, 9 % of them expressed their opinion even stronger (absolutely no influence). On the other hand, as might be clearly seen in figure 7, the population of Karvina strongly refuse to buy real estates in the proximity of brownfields (64 %). This results of quite surprising due to the fact that majority of the population of Karvina lives in proximity of brownfields. These respondents argue that they would buy the real estate only of its location was in larger distance than 500 meters from brownfield. On the other hand, respondents in Orlova were not so strict and admit that they are willing to buy the real estates in closer proximity of brownfields.

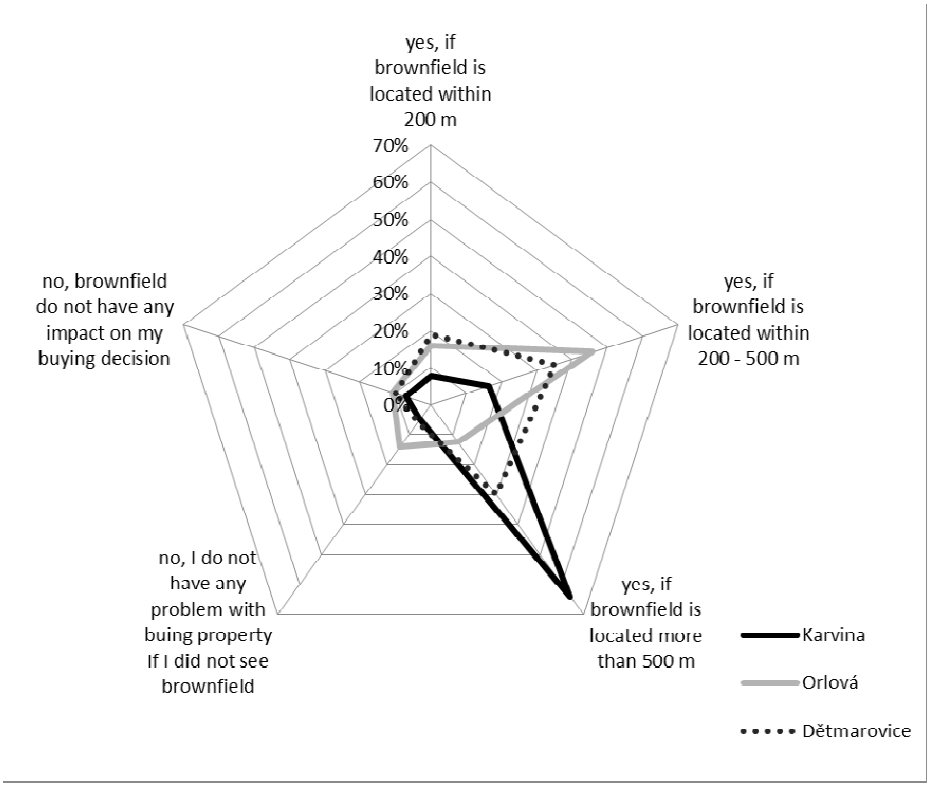


Fig. 7: Influence of brownfields on real estates buying behaviour of respondents
Source: own survey (2017)

Conclusion

The occurrence of brownfields is usually perceived as weak aspect and threat for future development of cities, towns and municipalities. On the other, they might also be considered as an opportunity for development. Nowadays, in case of cities and municipalities that are significantly affected by the decay of mining and heavy industry, where plenty of unused brownfields could be found today, these sites are usually perceived as a threat to the health of the population, they disturb urban landscape and create barriers to urban planning. These sites are usually unsightly and aesthetically do not meet requirements of the local population how the city should look like. The occurrence of brownfields in the proximity of housing reduces the quality of life of the local population. Brownfields also reduce prices of the real estates that are located in their proximity. Systematic regeneration of brownfields might significantly contribute to improvement of life in these cities and municipalities and might contribute

The aim of the contribution was to present preliminary results of a survey that was focused on the issue of perception of the impact of brownfields on prices of neighbouring real estates. By means by of the questionnaire survey that has been conducted among a population of Karvina, Orlova and Detmarovice hypothesis was confirmed that the occurrence of brownfields is perceived quite negatively (88 %) since they reduce prices of real estates. Respondents in their majority (77 %) claimed that they would not buy the real estate in the proximity of brownfield even if the price was reduced by on fifth in comparison other locations within the same city or municipality. Factors that the most significant influence such decision is a concentration of socially pathological phenomena and risks connected to possible contamination of brownfields and health risks for the local population. When results of surveys in three municipalities were compared, it was ascertained that population of Karvina perceive brownfield the most negatively than the population of Orlova or Detmarovice. The reason behind this difference in perception of brownfields might be identified in

the spatial distribution of brownfields in Karvina where these sites might be found practically everywhere (eighteen brownfield sites could be found in the area of Karvina), while on other two municipalities the location of brownfields is different (primarily on the margins of municipality). In Karvina majority of the population lives their everyday lives in close contact with brownfields and negative phenomena that are connected to brownfields (homelessness, a higher level of criminality, vandalism etc.) significantly affect their opinions about brownfields.

Acknowledgment

This paper was kindly supported by the project with title Brownfields in urban and rural space: geographic, economic, historical, legal contexts and their importance for regional development (BURAN) (SGS/21/2016).

References

Alker, S., Joy, V., Roberts, P and Smith, N. (2000). The definition of brownfield, *Journal of Environmental Planning and Management*, *43*(1), 49-69.

De Sousa, C. A. (2003). Turning brownfields into green space in the City of Toronto. *Landscape and urban planning*, 62(4), 181-198.

Kadeřábková, B. and Piecha, M. (2009). *Brownfields: jak vznikají a co s nim*i. Praha: C. H. Beck. ISBN 978-80-7400-123-9.

Krzysztofik, R., Tkocz, M., Sporna, T and Kantor-Pietraga, I. (2016). Some dilemmas of post-industrialism in a region of traditional industry: The case of the Katowice conurbation, Poland, *Moravian Geographical Reports*, *24*(1), 42-54.

Maly, J. and Mulicek, O. (2016). European territorial cohesion policies: Parallels to socialist central planning?, *Moravian Geographical Reports*, *24*(1), 14-26.

Tagaia, G. (2016). The territorial dimension of social exclusion in East-Central Europe. *DETUROPE – The Journal of Regional Development and Tourism*, 8(2), 58-71.

The National Brownfield Regeneration Strategy (2008). *Národní strategie regenerace brownfieldů Ministerstva průmyslu a obchodu*. [Online] [Retrieved August 23, 2017], http://czechinvest.org/data/files/strategie-regenerace-vlada-1079.pdf.

Web portal '*Dětmarovice*,' [Online] [Retrieved August 20, 2017], http://www.detmarovice.cz.

Web portal '*Oficiální stránky statutárního města Karviná*,' [Online] [Retrieved August 23, 2017], www.karvina.cz.

Web portal '*Orlová*,' [Online] [Retrieved August 18, 2017], http://www.mesto-orlova.cz.

Web portal '*Regional development agency*,' [Online] [Retrieved September 1, 2017], https://arr.cz/files/74/Studie_Brownfieldy%20v%20MSK_2016.pdf.

Web portal '*Územně analytické podklady obce s rozšířenou působností Orlová*,' [Online] [Retrieved August 19, 2017], http://www.mesto-orlova.cz/soubory_clanek/13405_1.pdf.

Perception of Influence of the Brownfields on the Value Property: Case Study of Town Orlova, Czech Republic

Petra Chmielová, Silesian University, School of Business Administration, Univerzitni Nam. Czech Republic, O150454@opf.slu.cz

Kamila Turečková, Department of Economics and Public Administration, Silesian University, School of Business Administration, Univerzitni Nam. Czech Republic, tureckova@opf.slu.cz

Stanislav Martinát, Department of Economics and Public Administration, Silesian University, School of Business Administration, Univerzitni Nam. Czech Republic, martinat@opf.slu.cz

Jan Nevima, Department of Economics and Public Administration, Silesian University, School of Business Administration, Univerzitni Nam. Czech Republic, nevima@opf.slu.cz

Jaroslav Škrabal, Silesian University, School of Business Administration, Univerzitni Nam. Czech Republic, O150482@opf.slu.cz

Abstract

This article focuses on the issue of brownfields the Czech Republic with the special attention on the town of Orlova, where eight local brownfields were studied from the point of view of their influence on values on neighbouring properties (real estates). In the framework of the primary research, a questionnaire survey was conducted among the inhabitants of the town Orlova. Thus, the aim of the questionnaire survey was to find out the views on the influence of brownfields on the perceived value of the neighbouring properties (real estates) in Orlova. The collection of information through questionnaires took place between autumn 2016 and spring 2017 and a total of 120 completed questionnaires has been gathered. Based on the questionnaire survey, the most of the population of Orlova perceives brownfields rather negatively, which naturally reduces the value of neighbouring properties. Respondents have the greatest concern about the occurrence of socially pathological phenomena, most commonly of homelessness and drug addicts. The second most frequented reason for concern was possible contamination and pollution; the third most frequently cited reason was worsened building-technical aspects of brownfields and consequent fears of the inhabitants of possible accidents. Residents do not want to live near brownfields, and for most respondents, the decisive factor in buying a property is a distance a minimum of 500 m from brownfields. Even the decline in the purchase price would not convince many respondents to buy such property.

Keywords: Brownfields, Czech Republic, Town Orlova, Property, Real Estate Price.

Introduction

The existence of brownfields is a global problem that reduces the competitiveness of municipalities (Kurtovic et al., 2015). It is also clear that the occurrence of brownfields significantly affects the sustainable development of cities, towns and municipalities where such sites are located. Regeneration of brownfields might be also considered as a contribution to sustainability a global scale (Wdding and Crawford-Brown, 2007). For the sake of designating dilapidated and unused buildings, the brownfield for the first time has been used since the 1970s. According to Zamarsky et al. (2011, p. 57) brownfields represent real estate (land, premises, building) that are underutilized, neglected or abandoned and can be dangerous and dangerous. A regeneration process is required for effective use of these sites (Doleželová, 2015, p. 6).

Brownfields that have occurred on the territory of the Czech Republic are a problem that has been discussed by both researchers and practitioners for the last 25 years. In particular, in the Czech Republic, this issue began to be tackled only around 1997 as a consequence of the delayed restructuring of the Czech economy after 1989. One reason for the creation of a large number of brownfields was the return of real estates to the original owners by means of the restitution process. The occurrence of brownfields is also the consequence of privatization processes in the early 1990s when industrial brownfields began to appear. On the other, it has to be stressed that abandoned buildings and complexes have already occurred in the past too. In modern history, we can meet them as consequence of the first industrial revolution in early 18th century (Stasakova and Kulla, 2016). In addition, great impacts on the occurrence of brownfields occurred in the early 20th century (World War I, economic crisis, World War II). A great milestone in the occurrence of abandoned complexes and buildings is the period from 1948-1989 when the former Czechoslovakia significantly focused on the development of heavy and manufacturing industry. These sectors of the economy have lost their competitiveness after the fall of the Iron Curtain and economic restructuring in the 1990s (Krzysztofik et al., 2016). According to estimation, more than ten thousand brownfields have recently appeared as a result of above-mentioned processes.

The aim of this article is to present the results of research focused on the influence of brownfields on the perceived value of surrounding properties from the perspective of the inhabitants of the town Orlova. The main prerequisite is the lowering of the value of private properties occurring in the immediate vicinity of neglected, abandoned and dilapidated buildings, complexes and other objects. The cause of the decline in the value of the private real estate that is located near brownfields can be, for example, soil contamination affecting the health of the population or poor technical condition of the buildings and a relatively high incidence of socio-pathological phenomena (Tagaia, 2016). The findings are based on the primary research that was carried out in 2016 and 2017 on the territory of the town Orlova (population 29.2 in 2017), located in the Moravian-Silesian Region in the eastern part of the Czech Republic.

1. Theoretical Background

The concept of brownfield can be from the ontological point of view interpreted as a "brown field", i.e. site that was created by humans is not now viable without external intervention (as a contrary to word greenfield). In the recent years, this term has been used in Czech terminology and it can be said that these are mainly abandoned buildings, areas or often devastated areas of various previous use that have been abandoned or underused. According to Novák (2012, p. 5), brownfields can represent large areas of industry, military barracks, surplus areas of railways and former socialist agricultural areas (agricultural farms), which are mainly located on the outskirts of municipalities.
The first brownfields originated in the mining of raw materials, which had a decisive influence on the industrial development during the industrial revolution in the second half of the 19th century. In this period also the mass creation of factories took place. In the 20th century, brownfields originate primarily as a result of structural change. In the developed countries, brownfields have been dealt with since 1970.

The Czech Republic has begun to respond to brownfields issues late. Although the massive growth of brownfields in our territory occurred in the 1990s, this issue began to be explored only in 2004, when brownfield expansion was underway. The government responded even later when the National Brownfield Regeneration Strategy was defined in 2008. In the Czech Republic, this issue is addressed by the CzechInvest government agency, which also has a number of programs to support unused areas or complexes. To map out the number of brownfields in the Czech Republic, the last mapping of abandoned buildings in cooperation with CzechInvest was carried out in 2005-2007. A total of 2,355 brownfields were located. The exact number of those objects cannot be 100% mapped and recorded. According to the Czech web portal (www.ceskovdatech.cz) approximately 10 000-12 000 brownfields are located in the Czech Republic and occupy an area of 25 000 to 35 000 hectares.

Brownfields are a problem for all municipalities as they are part of them. Some cities can deal better with the brownfield question, some worse. The emergence of brownfields and the establishment of

businesses on newly created areas must solve a number of problems. One of them is the emergence of social, economic and environmental problems in the field of brownfields and the degradation of land (greenfields) that is covered by new developments. In addition, dilapidated brownfields reduce the attractiveness of the city for investors and thus also a competitive advantage over other cities that try to regulate the number of brownfields in their territory. Another phenomenon that occurs in connection with the emergence of brownfields is the "dying of the centre of the city" (Malý and Mulíček, 2016). The non-use of brownfields can be seen as a reduction of available resources and the associated costs to the public budget. Brownfields are perceived negatively by the population and are associated with the image of the decline of the territory (Kadeřábková and Piecha, 2009, p. 2). Nowadays, most cities in the Czech Republic and abroad are confronted with brownfield problems and their reuse. Successful regeneration of brownfields is known throughout the world and it is possible to draw inspiration from them when deciding on their new use (Hollander et al., 2010). There are several ways to use abandoned and dilapidated areas and buildings. Each brownfield is specific and therefore it is necessary to choose the most suitable way of new use. Brownfields can be used, for example, for housing, commercial purposes, light industry, recreation, etc. In the Czech Republic, topic of brownfields has been covered by authors like Klusáček et al. (2011); Vojvodíková et al. (2011); Doleželová et al. (2014); Kunc and Tonev (2015); Osman et al. (2015), etc. The research focused on brownfields on the territory of the Moravian - Silesian Region may include authors such as Turečková et al., (2016); Škrabal et al. (2016); Martinat et al. (2015).

2. Methodology and Data

The basis for analysing the perception of the impact of brownfields on the value of surrounding plots was the primary and secondary sources of information. Expert publications and articles have been used to retrieve information from secondary sources. Due to the demandingness of up-to-date information, Internet resources were also used. A field survey was also carried out to collect primary information through questionnaires and a personal visit to brownfield sites in town Orlova. Survey of brownfield sites in the town of Orlova was carried out in cooperation with Orlová City Council, Environmental Department of the town hall and Cadastral Office.

In the first phase of the research, a literature search on brownfields was carried out. Based on the understanding of the topic, a questionnaire survey was carried out among the inhabitants of the town of Orlova. The aim of the questionnaire survey was to find out the views on the influence of brownfields on the perceived value of neighbouring properties from the point of view of the inhabitants of town Orlová. The collection of information through the questionnaires took place between autumn 2016 and spring 2017 and was attended by 120 respondents. The return of the questionnaires was 100% due to face-to-face communication with individual respondents.

Respondents of the survey were selected based on a residence located at a distance of no more than 500 m from the selected brownfields. Only in the case of the Orlová - Lazy brownfield, this criterion was not met due to the location of the brownfield in the periphery of Orlova with low population density. Only 13 respondents (11 %) said they did not live in close proximity to any brownfield. The remaining 107 respondents (89 %) live within 500 meters of brownfields.

In order to analyse the influence of brownfields on the value of surrounding lands and real estates, interviewing was carried out in the form of personal meetings of the experienced interviewer with the respondents that are living near selected brownfields in the town of Orlova. In order to obtain the necessary information, a questionnaire consisted of 12 questions that were divided into two parts.

The first six questions relate to the opinions of respondents on brownfields and their impact on the value of neighbouring real estates, six further questions relate to identification data of the respondents themselves and include gender issues, age, place of residence and education. Within the questionnaire survey, women's responses (62%) over men's responses (38%) prevailed. The age structure of the respondents is the most common in the range of 26 - 45 years (51%). Most respondents are surveyed by respondents with a secondary school without a school leaving certificate, a total of 47% that is in line with the educational structure of the population of Orlova. More than half of respondents were

employed (53%) or retired (18%), while the remaining options were a small percentage of respondents. A total of 50% of respondents live in their own family house. The following table 1 shows the detailed structure of the respondents in the questionnaire survey.

While questions about respondents were closed and allowed only one answer, questions about the perception of the impact of brownfields allowed more answers or were open.

Table 1 : Structure of the respondents of questionnaire survey

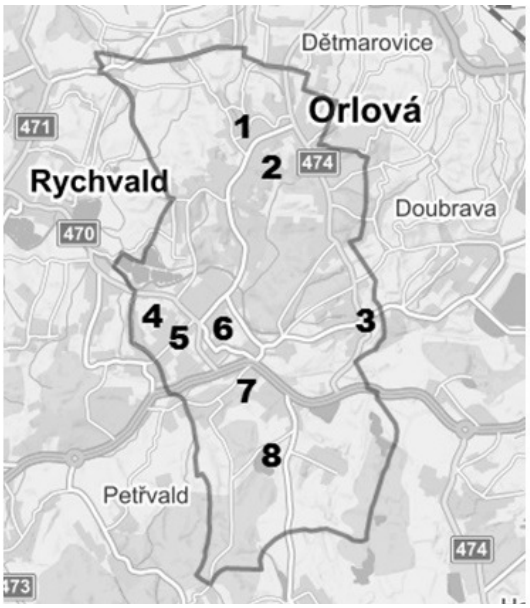
Gender	Female	62 %
	Male	38 %
Age	18-25 years	13 %
	26-45 years	51 %
	46-65 years	30 %
	65 and more years	6 %
Education	Elementary school	7 %
	Secondary school with final exam	16 %
	Secondary school without final exam	47 %
	University	30 %
Social status	Students	8 %
	Employees	53 %
	Entrepreneurs	5 %
	Unemployed	8 %
	Retired persons	18 %
	Persons on maternal/parental leave	8 %
Housing	Private family house	50 %
	Rented family house	0 %
	Hostel	13 %
	Own flat	0 %
	Cooperative apartment	18 %
	Rental apartment	19 %
City part	Lazy	12,5 %
	Orlová - Town	8,3 %
	Poruba	32,5 %
	Lutyně	36,7 %
	Doubrava	10 %

Source: own survey (n=120)

3. Description of the Town Orlova

Orlova is a Silesian town located in the eastern part of the Czech Republic on the area of the Moravian-Silesian Region. The city covers an area of 24.67 km^2 and has about 29 000 inhabitants. Orlova is specific by mining and heavy industry, which has a tradition of more than 200 years. Both sectors are nowadays declining as well as population numbers of the town.

There are a large number of brownfields in the Orlova, the total number is not recorded by the town administration. Within this research, eight brownfield sites were selected and described in the town. These brownfields can be seen in the following figure 1. Most of the brownfields in the town of Orlova were created due to a reduction in coal mining.



1. Swimming pool Kaplicka
2. Aqvapark
3. Mine Doubrava
4. Areal Vaclav
5. Part of the mine Žofie
6. Areal Žofie
7. Floating pit no. 2
8. Orlová - Lazy

Fig. 1 : Brownfield´s in town Orlova

Source: 'Mapy.cz', adjusted by authors

4. Perception of Influence of the Brownfields on the Value Property

In the framework of the questionnaire survey, 99 respondents (83 %) believe that brownfields negatively affect the value of surrounding properties. Furthermore, 18 % believe that abandoned buildings and complexes do not affect the price and perceived value of the surrounding properties.

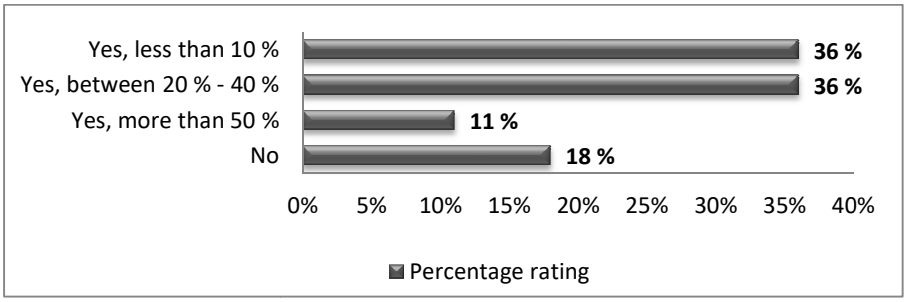


Fig. 2 : Do you generally think that "abandoned areas and areas" reduce the value of neighbouring real estate (houses, flats, land, building plots, etc.)?

Source: own survey (n=120)

The following question was focused on whether respondents would be disturbed to live near brownfields. A total of 87 respondents (73 %) would be disquiet to live near brownfields due to the occurrence of socially pathological phenomena (the occurrence of homeless and drug addicts etc.), due to the imminent danger of injuries, due to worsen aesthetics, contamination, unclear future use and concern from the loss of peaceful surroundings. The remaining 33 respondents (27 %) said they would not mind living in the neighbourhood of the abandoned brownfield.

The next question asked whether respondents would buy a property in the neighbourhood of a brownfield if the property price was lower by 20 %. A total of 68 respondents (57 %) said they would not buy the real estate. A further 52 respondents (43 %) would buy the property for the following reasons: a favourable offer, depending on the type of brownfield, for investment and future sale, to ensure a quiet living.

In addition, respondents had to classify the reasons for the negative impact of brownfields on the surrounding property in their opinion. The individual options assigned a weight of 1 to 6, where number 1 marked the most important reason and number 6 was the least important. The average value, modus, and median were calculated from the resulting values assigned to individual reasons. These values can be seen in Table 2 below.

Table 2 : Do you think that the proximity of brownfields has a bad effect on the value/cost of surrounding properties, please state the reasons why do you think so? (Rank according to importance from 1 to 6; 1 = most important ... 6 = least important)

	Average value	Mode	Median value
Construction-technical aspect (risk of injury)	3,23	3	3
Uncertain future use	3,78	5	4
Aesthetic aspect	3,84	6	4
Contamination and pollution	2,86	2	2
Limiting the development of the town	4,5	6	5
Concentration of socio-pathological phenomena	2,79	1	2,5

Source: own survey (n=120)

From the average values listed in Table 2, the reasons for the negative impact of brownfields can be classified according to their importance in this order - concentration of socio-pathological phenomena, contamination and pollution, construction and technical aspects, uncertain future use, aesthetic aspect, limitation of community development. By concentrating socially pathological phenomena, respondents most often assigned number 1 and therefore considered it the most important reason for the negative impact of brownfields on surrounding properties. As the least important reason, the respondents perceive the aesthetic aspect and limit the development of the city, which most often assigned number 6. Median determines the mean value of all responses. Modus expresses the most commonly referred value.

The following query in the questionnaire survey focused on respondents' views of how far the presence of brownfields would play a role in buying a property (see Figure 3). For 89 respondents (74 %) the presence of brownfields is a decisive factor in the purchase of real estate. A total of 31

respondents (26 %) would not mind brownfield. Specifically, 19 respondents (16 %) consider the distance from the brownfield up to 200 m, 55 respondents (46 %) consider the decisive distance between 200-500 m, 15 respondents (12 %) would consider buying the property if brownfields were located Even more than 500 meters from the property, and 18 respondents (15 %) did not mind the presence of brownfields if they did not see the site and 13 respondents (11 %) would not have the brownfield presence at all.

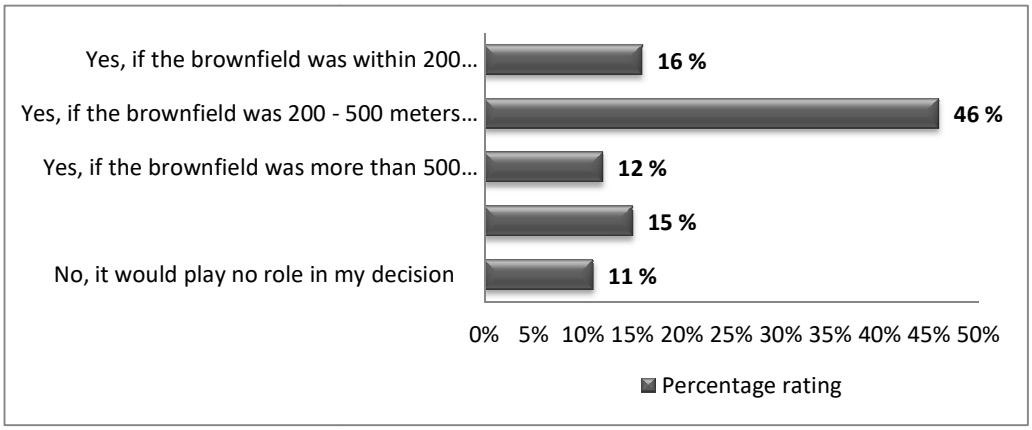


Fig. 3: If you would buy a property in Orlova, would the presence of a brownfield land play a role in your purchasing decision?

Source: own survey (n=120)

5. Conclusion

Based on the evaluation of the answers from the questionnaire survey carried out between autumn 2016 and spring 2017, it can be stated that inhabitants of town Orlova perceive the negative impact of brownfields on the value of neighbouring properties. It has to be stressed that according to opinions of respondents of the survey, local brownfields affect health condition and quality life of the local population and this problem needs to be seriously addressed. As the most important concern of local population, the occurrence of socio-pathological phenomena in neighbourhoods of brownfields were identified. Particularly, the homelessness and drug dealing was mentioned quite frequently. Another frequent reason for concern was contamination and pollution of the sites; the third most frequently cited reason was worsened building-technical aspects of brownfields and the fear of the inhabitants of possible accidents. Residents do not want to live near brownfields, and for most respondents, the decisive factor in buying a property is a distance of up to 500 m from an abandoned area. Even the decline in the purchase price would not convince many respondents to buy such property. The reasons for the negative impact of brownfields on the value of surrounding plots can be eliminated by regeneration of brownfields and ensuring their reuse. Revitalization and regeneration of brownfields are an important activity contributing to sustainable development. Abandoned spaces like brownfields have significant potential for new use. New homes, social amenities, new businesses, urban greenery, and so on can be built on their site and suitably contribute to the improvement of the quality of life of the local population.

Acknowledgment

This paper was kindly supported by the project with title Brownfields in urban and rural space: geographic, economic, historical, legal contexts and their importance for regional development (BURAN) (SGS/21/2016).

References

Doleželová, l., Hadlač, M., Kadlecová, M., Martinát, S., Polednik, M., (2014). Redevelopment potential of brownfields: A-B-C model and its practical application. E+M Ekonomie a management, 2014, vol. 18, iss. 2 (in print). ISSN 1212-3609.

Hollander, J. B., N. Kirkwood and J. L. Gold, (2010). *Principles of brownfield regeneration: cleanup, design, and reuse of derelict land*. Washington: Island Press. ISBN 978-1-59726-722-9.

Kadeřábková, B. and M. Piecha, (2009). Brownfields: jak vznikají a co s nimi. Praha: C. H. Beck. ISBN 978-80-7400-123-9.

Klusáček, P., Krejčí, T., Kunc, J., Martinát, S., Nováková, E. (2011). The post-industrial landscape in relation to local self-government in the Czech Republic. Moravian Geographical Reports, Vol. 19, No. 4, p. 18–28.

Krzysztofik, R., Tkocz, M., Sporna, T., & Kantor-Pietraga, I. (2016). Some dilemmas of post-industrialism in a region of traditional industry: The case of the Katowice conurbation, Poland. *Moravian Geographical Reports*, *24*(1), 42-54.

Kunc, J. and P. Tonev, (2015). Průmyslová brownfields v české republice: vznik, vývoj, odvětvové a regionální rozdíly. *XVIII. mezinárodní kolokvium o regionálních vědách. Sborník příspěvků.* Brno: Masarykova univerzita, pp. 540-545. ISBN 978-80-210-7861-1.

Kurtovic, S., Talovic, S., & Dacic, L. (2015). Global Competitiveness Indicators as a Determinant of Brownfield Investments in Serbia: Generalized Linear Model. *Research in World Economy*, *6*(3), 1.

Malý, J., & Mulíček, O. (2016). European territorial cohesion policies: Parallels to socialist central planning?. *Moravian Geographical Reports*, *24*(1), 14-26.

Martinat, S., Kunc, J., Klusacek, P., Krejci, T., Navratil, J., Vnenkova, J and Cernik, J. (2015). 'Spatial relations and perception of brownfields in old industrial region: case study of Svinov (Ostrava, Czech Republic),' *Geographia Technica*, *10*(2), 66-77.

Osman, R., Frantal, B., Klusacek, P., Kunc, J and Martinat, S. (2015). 'Factors affecting brownfield regeneration in post-socialist space: The case of the Czech Republic,' *Land Use Policy*, *48*, 309-316.

Škrabal, J., V. Benda, K. Turečková and S. Martinát, 2016. *Perception of brownfields by local population: Some implications for public administration.* In Sevilla. Vision 2020: Innovation Management, Development Sustainability, and Competitive Economic Growth. University of Seville. ISBN 978–0–9860419–8–3.

Stasakova, G., Kulla, M. (2016). Sights of industrial heritage and their importance for developing tourism in Slovakia. Geographia Cassoviensis 10 (2), pp. 159-174

Tagaia, G. (2016). The territorial dimention of social exclusion in East-Central Europe- Deturope – The Central European Journal of Regional Develoment oand tourism, *8*(2), 58-71.

The National Brownfield Regeneration Strategy (2008). *Národní strategie regenerace brownfieldů Ministerstva průmyslu a obchodu.* [Online] [Retrieved August 23, 2017], http://czechinvest.org/data/files/strategie-regenerace-vlada-1079.pdf.

Turečková, K., J. Škrabal, V. Benda and S. Martinát, (2016). Re-use of brownfields in Karvina: The challenge for local urban development. In: *Sevilla. Vision 2020: Innovation Management, Development Sustainability, and Competitive Economic Growth*. Sevilla: IBIMA, 2436-2447.

Vojvodíková, B., Potužník, M., Bürgermeisterová, R., (2011). The database on brownfields in ostrava (Czech Republic): Some approaches to categorization. Moravian Geographical Reports, vol. 19, iss. 4, pp. 50-60. ISSN 1210-8812.

Wedding, G. C., & Crawford-Brown, D. (2007). Measuring site-level success in brownfield redevelopments: A focus on sustainability and green building. *Journal of Environmental Management*, *85*(2), 483-495.

Zamarský, V., J. Tylčer and T. Střelec, (2011). Regenerace průmyslových ploch. Ostrava: VŠB–TU Ostrava. ISBN 978–80–248–2132–0.

Web portal *'Orlová'* [online] [vid.25.August 2017], http://www.mesto-orlova.cz/

The Complexity of Requirements Engineering Approach as a Potential Critical-Success Factor of Software Project

Igor V. Ilin, Peter the Great Saint Petersburg Polytechnic University, Saint Petersburg, Russian Federation, ivi2475@gmail.com

Anastasia I. Levina, Peter the Great Saint Petersburg Polytechnic University, Saint Petersburg, Russian Federation, alyovina@gmail.com

Aleksandr A. Lepekhin, Peter the Great Saint Petersburg Polytechnic University, Saint Petersburg, Russian Federation, lepekhinalexander@gmail.com

Abstract

Managing a software project and delivering the right product are considerably complicated and complex tasks in modern business environment. The "right" product means that it suits the needs of all stakeholders and helps the company to achieve strategic business goals. In order to visualize this "right" product and engage all the parties around it, all the requirements need to be defined and managed properly. This issue has to be addressed systematically with use of suitable requirements engineering (RE) approach. The applicability of RE approach for the particular project context is controversial and requires conceptual investigation under the prism of complexity theory. This study aims to reveal whether the applicability of RE approach for the particular project context could be potentially influential on the project outcomes. The goal of the research is to understand also whether the complexity of core problem could give a hint about the RE approach, which would be the most suitable in a particular case. The analysis of different software projects revealed the importance of approach complexity being compatible with the problem level and its influence on the project outcomes.

Keywords: requirements engineering, software project, complexity, RE approach, problem level, project success.

Introduction

The topic of requirements engineering attracts the interest of researchers in software engineering over the past decades (Schön, Thomaschewski, & Escalona, 2017). This interest could be potentially inspired by importance of overall requirements topic for the project success as well as comprehensiveness of business architectures, which dictate requirements (I. Ilin, Kalinina, Iliashenko, & Levina, 2016). The Table 1 provides the analysis of how different researches emphasize requirements as an important aspect of project success.

Table 1: The linkage between requirements and project success

Requirements and project success	Reference
"Project met all specification requirements" as Internal criteria of Success dimension	(Patanakul, Iewwongcharoen, & Milosevic, 2010)
12 requirements basics for project success with supporting information, suggestions, and recommendation	(Young, 2006)
"Functional, performance, and reliability requirements and scope are not documented" as a failure factor	(Kappelman, McKeeman, & Zhang, 2006)

"Meeting system requirements" as a measure of success	(DeLone, Espinosa, Lee, & Carmel, 2005)
Requirements as a "Product success" part	(Bannerman, 2008)
"Meeting user requirements" as a project success criteria	(Müller & Turner, 2007)
Conformance of requirements as a key aspect of quality of conformance, which is admitted as a part of project success	(Dalcher, 2009)

It can be seen from the table that requirements are constantly addressed as important issue for the software project, which makes the way of their systematic discovery, delivery and management an important part of overall software project management. It was discovered, though, that the way how Requirements Engineering could be potentially organized in order to cause maximum value for the project, is not that univocal. The same aspect of RE is found to be positively related to the successful project results or performance efficiency, but probably opposite in another. It is particularly controversial, for example, in business processes reengineering field of study (I. V. Ilin, Iliashenko, & Levina, 2016). The examples of the contradictory aspects can be user-involvement (Dvir, 2005), RE model (Cataldo, Wagstrom, Herbsleb, & Carley, 2006) and utilization of requirements engineering tools (Ji & Sedano, 2011).

This could potentially be the result of poor context addressing, when proposing the way how RE should be organized. It has already been emphasized that different methodologies could be appropriate for different projects depending on the context of the problem (Fernandez & Fernandez, 2008b). In addition, the context awareness was proposed to be a tool for project manager to act appropriately in different types of situations (Snowden & Boone, 2007).

This study seeks to understand better whether the choice of contextually-appropriate approach could be the factor, which influences the overall project success. The structure of the research is the following. Next section provides and overview of requirements engineering research area and described the approach to this research. The Results section gives an overview of empiric results and their summary. The last section compares empiric results with the existing literature and proposes the directions of further researches.

Literature Review and Research Methodology

Requirements engineering is the process of discovering, documenting and managing the requirements for a computer-based system. The goal of requirements engineering is to produce a set of system requirements which, as far as possible, is complete, consistent, relevant and reflects what the customer actually wants (Sommerville & Sawyer, 1999).

There are different ways of RE organization. The conceptual schema of requirements engineering, as seen traditionally, is represented in the Figure 1. It is also addressed in the literature as "Waterfall" model of RE (Balaji & Murugaiyan, 2012). It is seen as a sequence of steps in which the output of each stage becomes the input for the next.

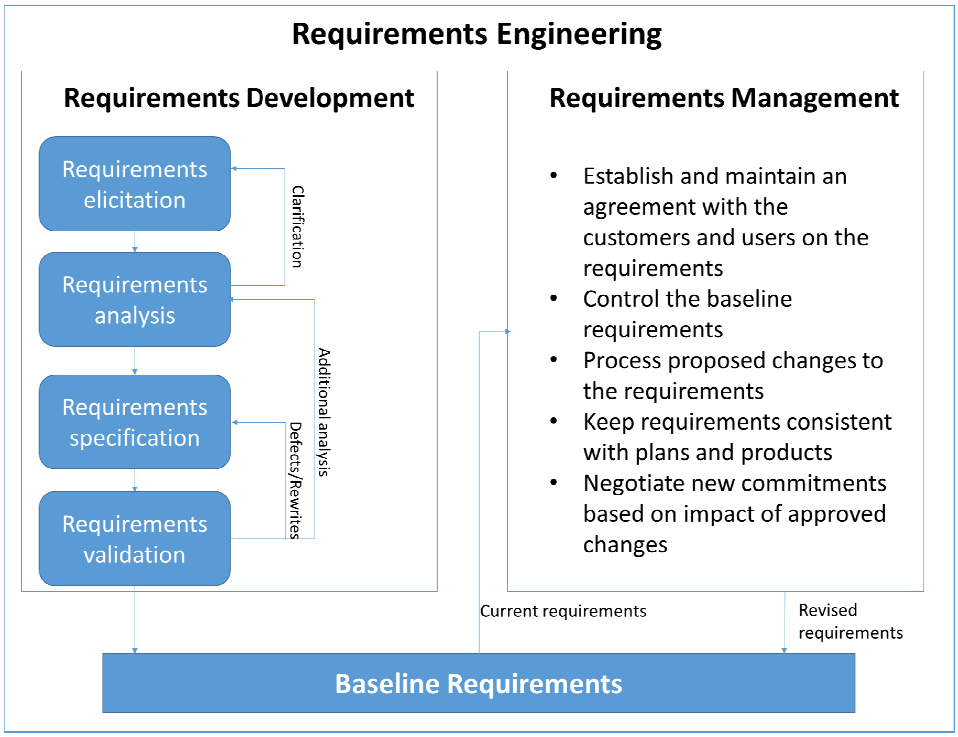


Fig. 1: Conceptual schema of traditional RE

There is another type of RE, which is "agile way" of RE. This type of RE approach is based on Agile principles, such as flexibility by cordially receiving changes (Bang, 2007). The requirements are initially defined with the customer and listed in a customer wish list format; every couple of weeks they are discussed and reprioritized, to define the scope of the next iteration (Inayat, Salim, Marczak, Daneva, & Shamshirband, 2015).

The researches argue that there is a number of advantages of Agile RE over the Traditional one: ability to cope with dynamic context of software industry (Ramesh, Cao, & Baskerville, 2010) and lower effort and schedule overruns (Molokken-Ostvold & Jorgensen, 2005). Despite that, some studies indicate that there are also weak points of this approach, such as lack of attention to architectural design issues, indicated in the research of (Falessi et al., 2010) and (Breivold, Sundmark, Wallin, & Larsson, 2010).

As long as different approaches have their own advantages and disadvantages, the issue of their mindful choice within the specific context could potentially be considerably influential on the project outcomes. The need for addressing problem's context when choosing the software project management approach has been constantly raised in the existing literature (Cheng & Atlee, 2007). There is a highly cited framework for addressing this issue – the Cynefin framework of decision-making (Snowden & Boone, 2007). The framework defines five different types of contexts, based on the nature of cause-effect relationships and the issues leaders are facing. Four of these – simple, complicated, complex, and chaotic – require leaders to diagnose situations and to act in contextually appropriate ways. The fifth – disorder – applies when it is unclear which of the other four contexts is predominant (Snowden & Boone, 2007).

The description of the problem types, proposed on Cynefin framework, is represented in the **Error! Reference source not found.**.

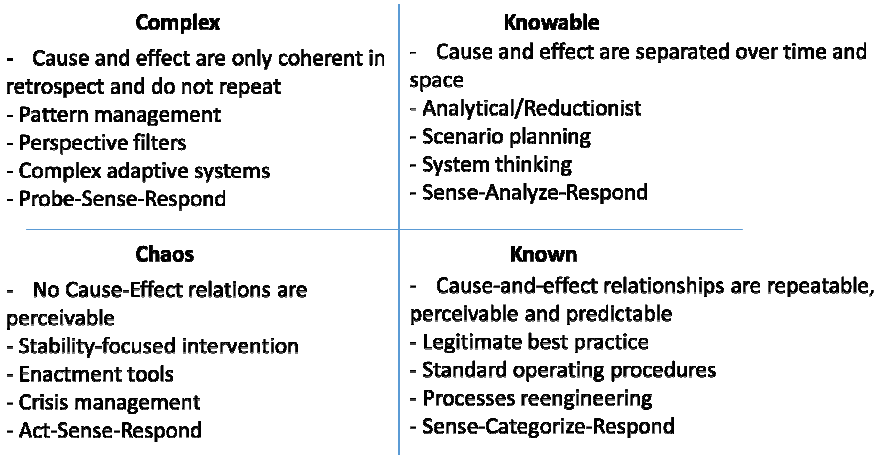


Fig. 2: Types of problems in Cynefin framework

Based on this framework, (Cockburn & Highsmith, 2001) argued that Agile development excels in exploratory problem domains - extreme, complex, high-change projects. (Fernandez & Fernandez, 2008a) proposed a mapping of different types of problems and problem-solving strategies with specific focus on software engineering field of study (Figure 3).

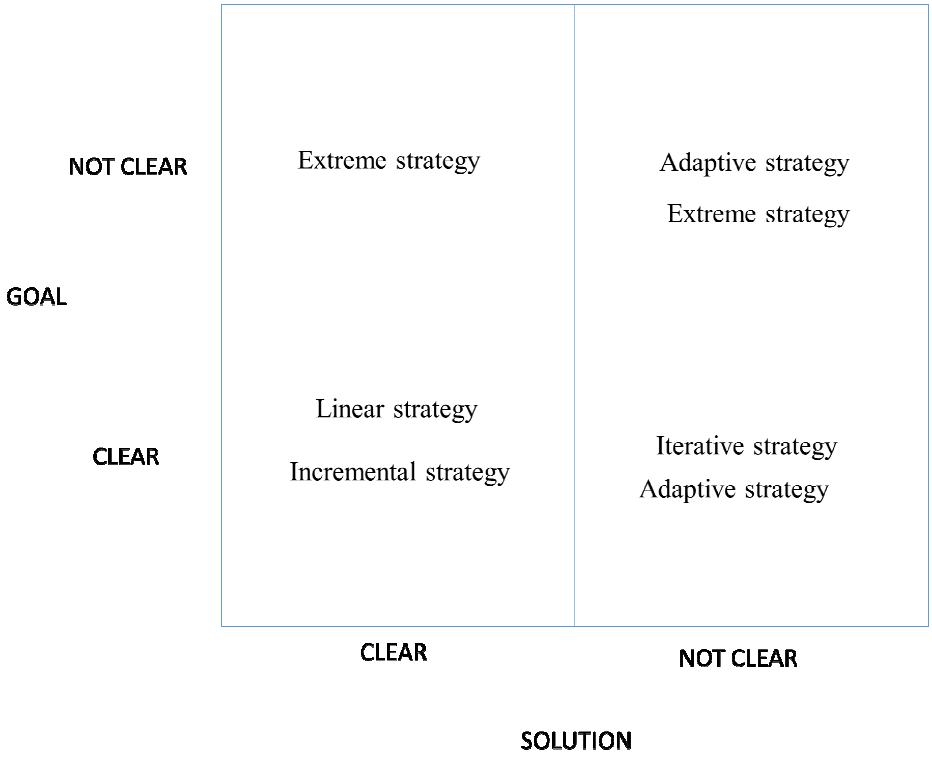


Fig. 3: The framework for solution categorization (adapted from (Fernandez & Fernandez, 2008b))

Each strategy has certain characteristics:

- Linear strategy – traditional strategy that consists of dependent, sequential phases that are executed with no feedback loops. The project solution is not released until the final phase.
- Incremental strategy – identical to a Linear strategy except that each phase of the project releases a partial solution, the business value is delivered prior to the final stage.
- Iterative strategy – a number of repeated phases that include a feedback loop after a group of phases is completed. The last phase of a group may include a partial solution if the customer desires.
- Adaptive strategy – similar to an Iterative except for that with an Adaptive strategy each iteration's feedback adjusts the next iteration so that the next solution will be grown upon.
- Extreme strategy – similar to adaptive strategy except that instead of adjusting with each iteration to coverage upon a solution, the goal of the project must also be discovered and converged upon. An Extreme strategy differs from Adaptive mainly by unclearness of the goal.

In scopes of the current research 6 project were analyzed based on the studies of (Fernandez & Fernandez, 2008b) and (Snowden & Boone, 2007). Each project was classified by the problem domain, which had become the core of the project. The requirements engineering approach, adapted in scopes of each research was also classified by 5 strategies, indicated above. Further, the mapping between the actual problem domain and adapted RE approach (problem-solving strategy) was provided in order to reveal whether the RE approach choice could potentially be influential on the project outcomes.

Results

The empiric data was gathered from 6 projects, executed by 5 companies. The table below summarizes the projects.

Table 2: Projects overview

Project ID	Problem description	RE approach	Results
C1P1	Software – Supplier Relationship Management system Customer – Large Stone production company Supplier – internal IT department Description – system development and implementation in scopes of the implementation projects portfolio dedicated to the complex change of the old software in the company. Cause and effect of implementation are separated in time – Knowable context	• Baseline solution was implemented at once on production based on the high level requirements of top-management • Further development was done based on the users' requests on a daily basis • Deployment as soon as the task is ready • Prioritization of tasks was decided in the team and tasks were tracked in the simplest tools.	Admitted to be successful
C2P1	Software – Enterprise Resource Planning Customer – Large Oil and Gas production company Supplier – internal IT department Description – system development and implementation in scopes of the implementation projects portfolio dedicated to the complex change of the old software in the company. The effect from the system implementation has been perceived over long period of time – Complex context	• Implementation is strictly regulated • Implementation consists of a number of steps, executed one by one with a set of closing documentation at the end of each stage. • Gathering all the business requirements at once in the beginning. • The changes were strictly regulated	Admitted to be close to failure
C3P1	Software – Accounting system Customer – Large Paper production company	• Rapid implementation of baseline solution • Customization based on the constant users'	Admitted to be successful

	Supplier – external team from IT company Description – implementation of the standard solution with basic functionality for certain purposes of accounting processes, the customer previously worked with the paper and Office applications without any software. Cause and effect of implementation perceivable and predictable – Known context	feedback • Continuously working with end users on a daily basis without any pending tasks	
C3P2	Software – Enterprise Resource Planning Customer – Medium Machinery production company Supplier – external team from IT company Description – customization of the existing software, which was already launched into production, but did not cover the needs of the customer. The current problem is not clearly linked to the software system, no perception of cause and effect – Chaos context	• Requirements were provided by the key stakeholder • The requirements did not change significantly • The cooperation with end users was very difficult, because they were poorly allowed to provide their own requirements • The software customization was organized by steps with periodic demonstration of result	Admitted to be total failure
C4P1	Software – Integration platform Customer – Large retail company Supplier – external team from IT company Description – development and implementation of the software in order to integrate different systems and increase their efficiency. Cause and effect of implementation are separated in time –	• It was decided to use Kanban in order to speed up • Use of physical Kanban board • Everything was done on production environment • High and intensive development. • The end product was documented afterwards.	Admitted to be successful

	Knowable context		
C6P1	Software – Website platform Customer – Large retail company Supplier – internal IT department Description – development of the software from scratch in order to use it further for expanding business. The software was aiming to be able to produce websites for the distributers in a short period of time. Cause and effect of implementation are separated in time – Knowable context	• Combination of Waterfall and Agile approaches. • The waterfall was utilized in order to get the minimum viable product based on the baseline requirements to the product. • More concrete requirements are formulated by the users after MVP delivery and executed in sprints. • RE continues after the launch into production to evolve the product.	Admitted to be successful

Each project was analyzed based on its baseline problem type. It was afterwards mapped into one of four quadrants, which represent different types of problems. The project C2P1 was admitted to have Complex type of problem based on its characteristics analysis and Cynefin framework comparing. The project C3P2 was proposed to have Chaos type of problem. Projects C4P1, C6P1 and C1P1 were admitted to have Knowable type of problem as a baseline. The project C3P1 had Known type of problem in the core. The failed projects or those, which have finished out of scopes, are indicated with orange. The projects, highlighted with blue, are admitted as successful in scopes of analyzed research.

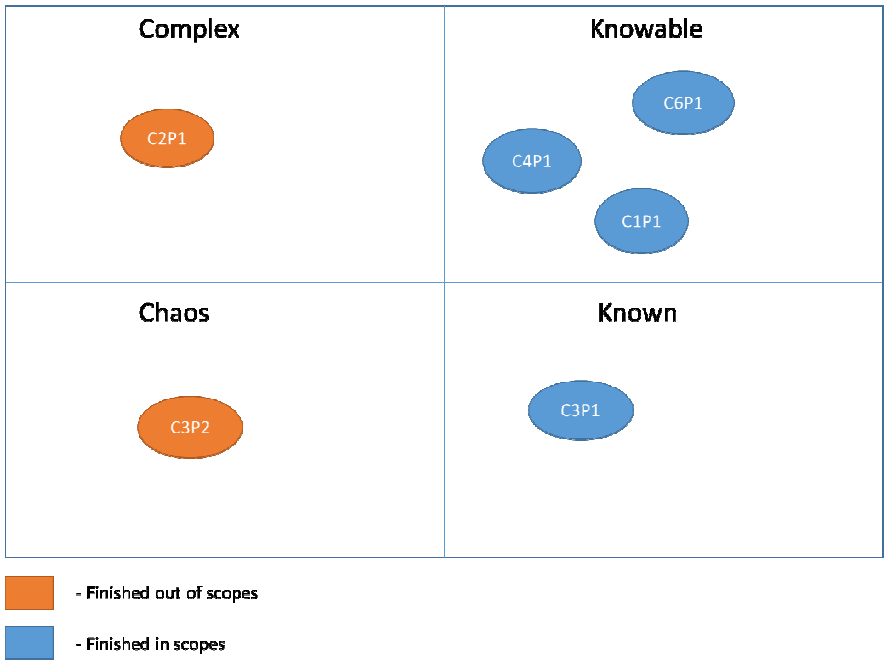


Fig. 4: The domains of projects' complexity

The next step of analysis was dedicated to the investigation of actual approach to RE, utilized by the teams within each specific project. The analysis of approaches is based on the 5 strategies, proposed by (Fernandez & Fernandez, 2008b). It was found that the characteristics of the approach, utilized in the project C2P1, are the closest to the Linear strategy. The approach of C3P2 project was admitted to be Incremental strategy. C4P1, C3P1 and C1P1 used Adaptive strategy. The project C6P1 was managed by Iterative strategy. It can be proposed that the actual approaches are not linked to the types of projects, from which they are theoretically originated. For example the Linear strategy, which was adapted within the Complex problem of the C2P1 project, is actually recommended to be suitable for the Known problem domain.

The approaches, which were utilized by the companies within each specific project, are represented with grey circles. They were mapped to those domains, in which they are theoretically admitted to be suitable, in order to demonstrate the mismatching of problem and problem-solving approach in some of the studied projects.

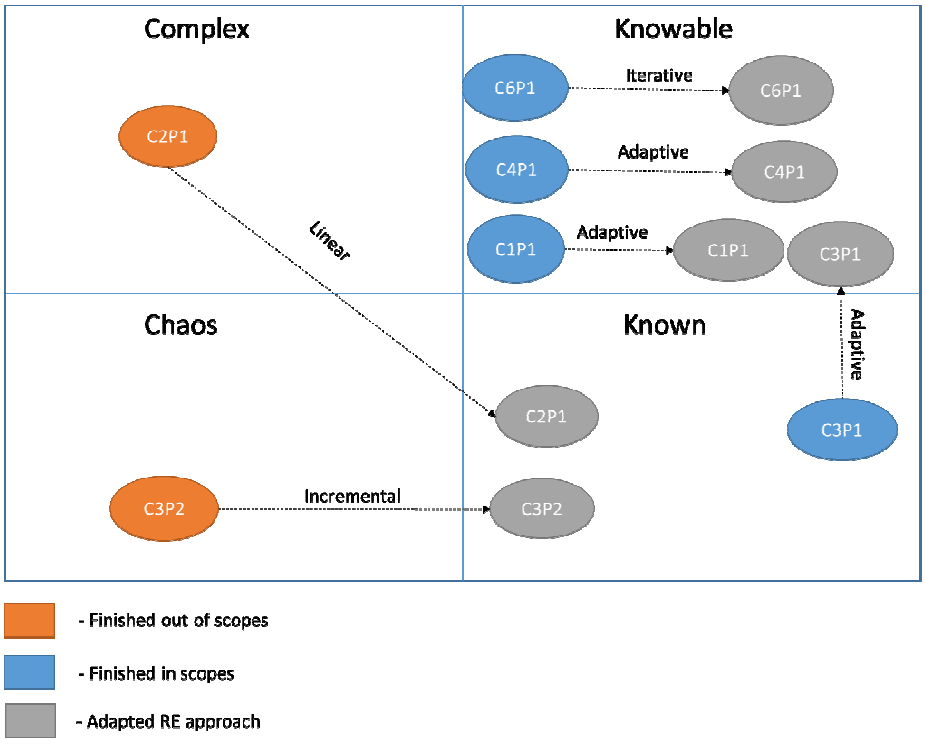


Fig. 5: Projects' RE approaches analysis

The analysis of empiric data suggests that matching of problem type and problem-solving strategy could be potentially influential on the project results. The most successful companies within the analyzed sample are likely to choose the strategy, which is compatible with the problem level, or they choose the one more complex, which still leads to the success. The projects, which have resulted in failure, have been run with use of easier RE approach, then the problem required. The results analysis propose that the software development projects are more likely to fail, if the problem-solving approach the team has chosen to use is originally intended for problems with lower levels complexity.

Conclusions and Discussions

The need for adaptation of problem-solving styles, based on problem complexity level, are highlighted in a number of researches, indicating it as a factor of sustainable development in business environment (Serrat, 2009). In addition, the question of mindful approach choice is also constantly highlighted in different studies (Glukhov, Ilin, & Levina, 2015). The research result supports the previous findings on the importance of alignment between problems and solution complexity level in order to act effectively (Wingo & Tanik, 2015). On the contrary, the described alignment of problem and solution domain was indicated only for the knowable problem type, while there is serious mismatch in complex or chaos problem domains. This could be explained by overall lack of maturity of the companies to tackle complex and chaos problems in a suitable way, which was indicated in the latest Chaos report, where the failure rate increases with growth of projects complexity (Hastie & Wojewoda, 2015). It was indicated that the more complex the project is, the bigger risk of failure.

The issue of problem underestimation could be critical for the company in terms of finishing project in agreed scopes. The Ashby's Law of Requisite Variety postulates that to obtain a desired outcome, the system must match the number of states in the input with at least an equivalent number of states in the regulatory process (Ashby, 1991). For the software engineering research it means that a solution cannot control an environment of greater complexity (Sheard & Mostashari, 2009).

The research has a number of limitations. First of all, the size of the research sample is considerably small, which reveals the need for further testing of the final theoretical propositions. The geographical location of the companies also affects the abstract level of results. All the companies are situated in one city and, possibly, some external contextual factors could have been influential. The listed limitations could be potentially overcome in the future researches.

References

Ashby, W. R. (1991). Principles of the self-organizing system. In Facets of Systems Science (pp. 521–536). Springer.

Balaji, S., & Murugaiyan, M. S. (2012). Waterfall vs. V-Model vs. Agile: A comparative study on SDLC. International Journal of Information Technology and Business Management, 2(1), 26–30.

Bang, T. (2007). An agile approach to requirement specification. Agile Processes in Software Engineering and Extreme Programming, 193–197.

Bannerman, P. L. (2008). Defining project success: a multilevel framework. In Proceedings of the Project Management Institute Research Conference (pp. 1–14). Citeseer.

Breivold, H. P., Sundmark, D., Wallin, P., & Larsson, S. (2010). What does research say about agile and architecture? In Software Engineering Advances (ICSEA), 2010 Fifth International Conference on (pp. 32–37). IEEE.

Cataldo, M., Wagstrom, P. A., Herbsleb, J. D., & Carley, K. M. (2006). Identification of coordination requirements: implications for the Design of collaboration and awareness tools. In Proceedings of the 2006 20th anniversary conference on Computer supported cooperative work (pp. 353–362). ACM.

Cheng, B. H., & Atlee, J. M. (2007). Research directions in requirements engineering. In 2007 Future of Software Engineering (pp. 285–303). IEEE Computer Society.

Cockburn, A., & Highsmith, J. (2001). Agile software development, the people factor. Computer, 34(11), 131–133.

Dalcher, D. (2009). Software project success: moving beyond failure. The European Journal for the Informatics Professional, 10(1), 42–50.

DeLone, W., Espinosa, J. A., Lee, G., & Carmel, E. (2005). Bridging global boundaries for IS project success. In System Sciences, 2005. HICSS'05. Proceedings of the 38th Annual Hawaii International Conference on (p. 48b–48b). IEEE.

Dvir, D. (2005). Transferring projects to their final users: The effect of planning and preparations for commissioning on project success. International Journal of Project Management, 23(4), 257–265.

Falessi, D., Cantone, G., Sarcia, S. A., Calavaro, G., Subiaco, P., & D'Amore, C. (2010). Peaceful coexistence: Agile developer perspectives on software architecture. IEEE Software, 27(2).

Fernandez, D. J., & Fernandez, J. D. (2008a). Agile Project Management —Agilism versus Traditional Approaches. Journal of Computer Information Systems, 49(2), 10–17. https://doi.org/10.1080/08874417.2009.11646044

Fernandez, D. J., & Fernandez, J. D. (2008b). Agile project management—agilism versus traditional approaches. Journal of Computer Information Systems, 49(2), 10–17.

Glukhov, V. V., Ilin, I. V., & Levina, A. I. (2015). Project management team structure for internet providing companies. In Conference on Smart Spaces (pp. 543–553). Springer.

Hastie, S., & Wojewoda, S. (2015). Standish Group 2015 Chaos Report-Q&A with Jennifer Lynch. Retrieved, 1(15), 2016.

Ilin, I., Kalinina, O., Iliashenko, O., & Levina, A. (2016). IT-architecture Reengineering as a Prerequisite for Sustainable Development in Saint Petersburg Urban Underground. Procedia Engineering, 165, 1683–1692.

Ilin, I. V., Iliashenko, O., & Levina, A. (2016). Application of Service-Oriented Approach to Business Process Reengineering (pp. 768–781). Presented at the 28th International Business Information Management Association Conference – Vision 2020: Innovation Management, Development Sustainability, and Competitive Economic Growth, Spain, Seville.

Inayat, I., Salim, S. S., Marczak, S., Daneva, M., & Shamshirband, S. (2015). A systematic literature review on agile requirements engineering practices and challenges. Computers in Human Behavior, 51, 915–929.

Ji, F., & Sedano, T. (2011). Comparing extreme programming and Waterfall project results. In Software Engineering Education and Training (CSEE&T), 2011 24th IEEE-CS Conference on (pp. 482–486). IEEE.

Kappelman, L. A., McKeeman, R., & Zhang, L. (2006). Early warning signs of IT project failure: The dominant dozen. Information Systems Management, 23(4), 31–36.

Molokken-Ostvold, K., & Jorgensen, M. (2005). A comparison of software project overruns-flexible versus sequential development models. IEEE Transactions on Software Engineering, 31(9), 754–766.

Müller, R., & Turner, R. (2007). The influence of project managers on project success criteria and project success by type of project. European Management Journal, 25(4), 298–309.

Patanakul, P., Iewwongcharoen, B., & Milosevic, D. (2010). An empirical study on the use of project management tools and techniques across project life-cycle and their impact on project success. Journal of General Management, 35(3), 41–65.

Ramesh, B., Cao, L., & Baskerville, R. (2010). Agile requirements engineering practices and challenges: an empirical study. Information Systems Journal, 20(5), 449–480.

Schön, E.-M., Thomaschewski, J., & Escalona, M. J. (2017). Agile Requirements Engineering: A systematic literature review. Computer Standards & Interfaces, 49, 79–91. https://doi.org/10.1016/j.csi.2016.08.011

Serrat, O. (2009). Understanding Complexity. Knowledge Solutions.

Sheard, S. A., & Mostashari, A. (2009). Principles of complex systems for systems engineering. Systems Engineering, 12(4), 295–311.

Snowden, D. J., & Boone, M. E. (2007). A leader's framework for decision making. Harvard Business Review, 85(11), 68.

Sommerville, I., & Sawyer, P. (1999). Requirements engineering: a good practice guide. Chichester, Eng. ; New York: Wiley.

Wingo, R. S., & Tanik, M. M. (2015). Using an agile software development methodology for a complex problem domain (pp. 1–8). IEEE. https://doi.org/10.1109/SECON.2015.7132890

Young, R. R. (2006). Twelve requirements basics for project success. CrossTalk The Journal of Defense Software Engineering, 19(12), 4–8.

The Quality of University Teachers as One Of the Tools of Image Building

Josef Kocourek, Tomas Bata University, Zlín, Czech Republic, kocourek@utb.cz

Romana Čočková, Tomas Bata University, Zlín, Czech Republic, cockova@utb.cz

Abstract

Branding is crucial aspect of company because it is the visual voice of the company. The brand is important for creating prestige and reputation of an university and it is difficult to influence it. The quality of teachers is an important factor of the success rate of an university and is also one of the most important decision-making attributes when choosing a university. This study deals with marketing research realized at the Faculty of Multimedia Communications of Tomas Bata University focusing of the faculty by applicants.

Keywords: brand building, image, quality of Universtiy Teachers.

Brand

There is a number of definitions for theoretical understanding of the term "brand" which set the experts apart. Many leading global brand specialists such as Aaeker, Keller, Adamson, Haig, use the brand definition that includes the relation of customer´s mind to brand. In many cases, the presence of a brand in the mind of the customer is associated with brand distinction. Differentiation is a feature that gives the brand certain individuality. "A brand is something that's settled in the head. It is a promise that connects a product or service with a consumer." (Adamson, 2011) Customer's mind and brand are closely linked, but it is necessary to add a secondary attribute to the brand. This can be a logo, because the logo is a part of the brand and with other characteristics makes a whole. From history, it can be seen that the logo and its initial use originated in distinguishing one product from the others.

Image

Image is an important psychological process that leaves an impression of a given company in minds of customers. The resulting effect in the form of a positive or negative attitude is a result of a variety of tools that shape the overall image. It consists of the individual experiences that the customer is exposed to in connection with the brand, which can also lead to a distorted image of reality. It is clear that image building is an important component of a complex brand. This is a specific and long-term path that will never be achieved by a hundred percent, because there is a certain group of customers that is changing for each subject. However, it is important to build a positive image mainly with the target group of the brand. "A positive brand image is created by marketing programs that combine strong, positive, and unique associations with the brand." (Keller, 2007) An important milestone of the image is the realization of reality. This is the only relevant image of the brand on the market. In the case of psychological processes that happen in customers' heads, there may be many distorted information that the customers evaluate on the basis of information that is currently available to them and which is available at the moment. This can often result in a situation where the customer, without any close encounter with the brand, due to negative and inaccurate information about it, creates a negative image of the brand.

Branding

The essence of branding is activities that aim to gain a desired brand position in the minds of its customers - creating positive customer attitudes towards the brand. It is one of the key and irreplaceable marketing activities that fundamentally influence product image and desirable attitudes

in the community of customers and people interested in products or services. "Branding equips the product (products and services) with brand strength. Its point is creating differences. It involves creation of mental structures and helps consumers to sort out their knowledge of products and services to facilitate their decision-making. "(Keller, Kotler, 2007) Branding of universities is a very important activity, which is currently done only by a small percentage of Czech schools. On a European scale, the situation is similar. Only a fraction of universities has a developed communication strategy, defined their own vision and mission. Those educational institutions that recognize the importance of effective communication and brand building are among the leaders in the education market. The quality of teaching, the readiness of future graduates to practice, and the scientific performance of school teachers are features that can add value to a university. It is a value that gives schools prestige, recognition, which can be one of the decisive factors for potential applicants. If a university does not function as a credible, high-quality, well-functioning enterprise, its position on the Czech market is complicated. Prestige of a university, a long-term building of a high-quality, scientific and compact entity is a guarantee of a well-established and built brand.

University Image

The brand is not only important for consumer goods but it also plays a role in creating prestige and reputation of a school. Perceived value, prestige, reputation, quality, communication and overall position of the given school within the overall system of educational institutions functioning in the Czech Republic is very important. Nowadays, at many points mentioned, the situation is very poor, and potential failure at some points may be fatal in time.

There are many risks that are important to the functioning of the university. Their disrespect may result in different forms. The situation in higher education is complicated, for many reasons. One of these is the drop in funding to education. Reputation of many universities was damaged by affairs that have been publicized in the past, and in addition to that applicability of graduates decreases each year. It is therefore a question when will universities lose meaning and many unattractive study fields will completely disappear. On the contrary, what is the way to the strengthening of study fields that are important for society, for functioning of the basic state authorities, companies and other entities that directly affect the running of the state itself. As a result of the above mentioned reasons, it is clear that universities are forced to resolve a competitive struggle for students. A strong and stable brand of a university will play an important role in decision of applicants on their further studies. Decrease in a number of applicants is a threat that can have a major impact on the existence of higher education institutions.

In the field of higher education, creating image is a very important activity that can be difficult to influence. Universities provide education to many students and the course of their studies is varied. For high-quality students who are doing well and without complications, image creation is easier because their loyalty is higher. In such cases, the school can only hardly interfere with students' opinions, but the elimination of negative information should be an important component in image building (Banyar, 2010). It is clear that image building is an important component of a complex brand.

Methodology

Within the framework of image and brand building of a university as a tool of competitiveness, a number of marketing researches was carried out at the Faculty of Multimedia Communications of Tomas Bata University (further referred to as FMC). Annually conducted research includes research focusing on perception of FMC by a target group of applicants. This research is carried out annually, and this study will involve interpretation of data from the turn of 2014/2015 with 496 respondents and the turn of 2015/2016 with 616 respondents. Respondents were interviewed as part of an Open Door Day, or during participation in an entrance examination.

Statistical Analysis

In the framework of statistical testing, the study focuses on the year-on-year comparison of the research carried out between 2014/2015 and 2015/ 2016. The quality of teachers is there a factor important not only for the overall perceived success rate of the Faculty of Multimedia Communications but also as one of the most important decision-making attributes when choosing a university.

Ordinal median or the mean value of research conducted at the turn of 2014 and 2015 shows that respondents are clear about perception of the quality of teachers. Low values of dorvar in variables confirm that students have relatively the same ideas about FMC's success and expertise. The quality factors were rated by the respondents on the Likert scale, where they evaluated from 1 - the worst to 5 - the best. In total, FMC was rated as rather successful, median shows that the reality is even closer to the value the most successful. A similar situation is with FMC's expertise. Mostly FMC was rated as rather professional. An ordinal median of 4.13 with a relatively low dispersion of values indicates that the mean value is shifted towards the "totally expert" value. The low dispersion values for the last two monitored scale variables indicates significant stability in the respondents' views, which is reflected in an estimated confidence interval, which calculates the real proportion for the total population by the inductive mathematical approach (the percentage of those who have chosen 2 or 4 respectively), but it can be estimated at 5% risk of potential error for all students, or it can be related to the relevant public).

Table 1: Values for statistical testing from research conducted at the turn of 2014 and 2015

	Educators	**Successful/unsuccessful**	**Professional/unprofessional**
Modus (the most frequent)	5	2	4
OR (ordinal median - the middle)	**4,384**	**1,774**	**4,13**
Dorvar (discrete ordinal variance = dispersion)	1,275	**0,838**	**0,972**

Table 2: Values for statistical testing from research conducted at the turn of 2015 and 2016

	Educators	**Successful/unsuccessful**	**Professional/unprofessional**
Modus (the most frequent)	**5**	**2**	**4**
OR (ordinal median - the middle)	**4,428**	1,758	4,199
Dorvar (discrete ordinal variance =	1,143	0,672	0,807

Ordinal median, or mean value from the second research conducted at the turn of 2015 and 2016 confirms the results of the research from the previous year. The median value has even shifted further

to point 5, which illustrates the highly positive opinion of respondents on teacher quality and success. Repeatedly low dorvar values in the variables confirm that the students have relatively uniform ideas about FMC's success and expertise, which are repeated every year. Even in contrast to research at the turn of 2014 and 2015, dorvar values are even lower, as evidenced and confirmed by the fact that FMC is a successful and professional school in the minds of respondents.

The most frequent occurrence of the FMC's success value was "4" for both conducted research, which meant evaluation as a rather successful. Median then proves that reality is even closer to the value of completely successful in both cases. A similar occurrence of values was also in the case of FMC's expertise. In both years the ordinal median value of the research was over 4 at relatively low variance. Even in the 2015 and 2016 research, the value approaches 4.2 which illustrates a high level of expertise perceived by respondents.

In the next part of statistical testing a statistical hypothesis was determined to confirm or reject the dependence of two variables. A zero hypothesis was determined for statistical testing: H_0: *There is no dependence between the variable "general perception of pedagogical expertise" and the variable "FMC expertise".*

The hypothesis was tested in both years and completes the coherence between the perceptions of teachers' expertise and the perception of FMC's expertise as a whole. For multidimensional statistics, we assume a symmetrical distribution of values. Deviations can be followed by chi quadratic statistics, respectively by results in a p-value if the value is less than 0.05. In this case, we can talk about a dependency relationship between variables. The test results are shown in the following tables.

Table 3: Contingency table of FMC´s expertise from research

conducted at the turn of 2014 and 2015

Professional/ unprofessional	The worst	Bad	Neutral	Good	The best	Total
Completely unprofessional		1		5	1	7
Rather unprofessional	1	1		3	12	17
Cannot judge	5	10	9	24	48	96
Rather professional	11	13	15	62	75	176
Completely professional	23	6	11	44	81	165
Total	**40**	**31**	**35**	**138**	**217**	**461**

X-squared = 28.7341, df = NA, p-value = **0.02859**

Table 4: Contingency table of FMC´s expertise from research conducted at the turn of 2015 and 2016

Professional/ unprofessional	The worst	Bad	Neutral	Good	The best	Total
Completely unprofessional	0	0	0	2	2	4
Rather unprofessional	0	1	2	3	5	11
Cannot judge	8	6	13	23	26	76
Rather professional	13	12	24	94	117	260
Completely professional	11	12	12	54	106	195
Total	**37**	**34**	**56**	**195**	**294**	**616**

X-squared = 22.267, df = NA, p-value = **0.1452**

Based on the p-value, the hypothesis H0 was rejected. It can be said that there is a relationship between the variables. For both tested hypotheses, it was confirmed that the p-value is below 0.5 indicating that there is a relationship between the variable competence of the educators and the variable expertise of FMC as a whole. The asymmetric distribution can be seen in the contingency tables attached. For both investigations, there are higher values at the bottom right in the matrix. The findings can be interpreted in such a way that students who see educators more in the direction good-to-the-best perceive FMC more as rather-completely professional and vice versa. This fact was confirmed in the second survey by the same group of respondents. Among the most important findings of the two surveys there is a fact that the public brings together the quality of the teachers with the faculty's expertise, which has a positive impact on image building of the brand. From the attached tables it is clear that only a few individuals chose "contradictory" in the sense of - the highest rating for teachers and at the same time a completely unprofessional faculty or the lowest grade for teachers and completely professional faculty.

Conclusion

The high competition of universities in the Czech Republic forces the schools themselves to think more about thinking of their potential applicants, secondary school students. It is important for universities to understand the priorities of high school students, to examine their thinking, the ways in which they choose a university, and also to analyze the brand of the university itself. Long-term research carried out at the FMC proves that the quality of teachers is high on a long-term basis. Respondents regard FMC as a quality school with quality educators. This is the main conclusion of the presented study, but it is important to perceive this fact in a wider context. The primary attribute of brand building should be to clearly define the mission of a university which would be based on the actual focus of the educational institution and which would be acceptable both for the target group - the applicants, and to the general public. The results of research at FMC are a source of strategic management that leads to the sustainability of a quality education process and the competitiveness of the university. Another important attribute is strategic goals, which should ideally be a quantifiable indicator and should mirror the set values. Brand values, their definition, work with them and effective analysis are prerequisites necessary to be aware of, to work with them and to modify them on the basis of current data. These are the long-term objectives of the research carried out at the

FMC, their ongoing analysis and adjustment will lead to a more effective FMC branding on the market. Other activities of the faculty contribute to this. In 2016, the faculty realized a large and socially significant project to present water as an exhaustible resource. The current situation around water management is not good and the work of students, teachers and their presentation at various exhibitions should serve as an education for the general public. Social issues are another way that adds to the positive perception of FMC on both the Czech and European markets.

References

Adamson, A. P. (2011) Jednoducho značka Brand Simple: ako najlepšie značky stavili na jednoduchosť a uspeli, Eastone Books, Bratislava.

Banyar, M. (2010) Logo, jeho výrazové a vyjadrovacie prostriedky, REKLAMA 10. Zborník vedeckých štúdií z oblasti histórie, teórie reklamy a public relations, Hornak, P. a Vopálenská, E. (ed.), Bratislava.

Keller, L. K. (20 07) Strategické řízení značky, Grada Publishing, Praha.

Kotler, P. and Keller, K. L. (2007) Marketing management, Grada, Praha.

Design for Manufacturing of a Hip Endo-prosthesis Stem, Using Additive Technologies

Ulmeanu Mihaela-Elena, University POLITEHNICA of Bucharest, Bucharest, Romania, mihaela.ulmeanu@upb.ro

Doicin Cristian-Vasile, University POLITEHNICA of Bucharest, Bucharest, Romania, cristian.doicin@upb.ro

Semenescu Augustin, University POLITEHNICA of Bucharest, Bucharest, Romania, augustin.semenescu@upb.ro

Costoiu Mihnea-Cosmin, University POLITEHNICA of Bucharest, Bucharest, Romania, mihnea.costoiu@upb.ro

Motorga Roxana, University POLITEHNICA of Bucharest, Bucharest, Romania, roximotorga@yahoo.com

Abstract

Femoral stems come in a variety of shapes and sizes, but all of them are assembled with the hip-bone using the same method. Current hip implants are fixed into place by hammering them down into the femoral bone, procedure which can lead to the fracture of the femoral neck. The current paper develops a new concept for a hip implant which can diminish some of these problems through its' unique shape and fixing system. The purpose of this research is to propose a design methodology for manufacturing a new hip endo-prosthesis stem using additive technologies. The numerical CAD model and simulation was undertaken in order to assess the endurance properties and performance of the new hip endo-prosthesis stem concept model. Rapid prototyping was done for functional fitting and surgical procedure validation. The technological transfer possibility was considered through cost analysis, by establishing the total EBM manufacturing costs for one part.

Keywords: additive manufacturing, custom hip implant, product design, manufacturing cost

Introduction

According to a study by Global data released in 2016 the World Health Organisation (WHO) estimates half a million total hip replacements per annum in 2030. Due to a growing number of injuries and the subsequent demand for surgeries for the required correction, the global market is expected to be worth US$9.1 bn by the end of 2024 as compared to US$6.5 bn in 2015, in conformity with the Hip Replacement Implant Market - Global Industry Analysis, Size, Share, Growth, Trends, and Forecast 2016 – 2024 Study published in 2017. The same study shows that between the forecast period of 2016 and 2024, the global market is estimated to expand at a CAGR of 3.9%. There are many disabilities involving the hip joint, as presented in a research study by Mirza et al (2010), starting from degenerative diseases such as arthritis, femoral head tumours, and femoral neck trauma when bone continuity is lost. The market is based on and will be driven by the rising prevalence of osteoarthritis and the rising aging population, as well as the increasing indications where total hip replacement is used. Current hip replacement surgeries aim to replace or, rather, strengthen the femoral neck. Currently used prostheses in day-to-day operating theatre have a longer stem that reaches all the way inside of the femoral canal, as presented by Aitchison et al (2009) and Parker et al (2010). In order to insert them into the femoral canal a wider resection of the femoral neck is needed, moreover, as McTighe et al (2015) presents in a recent study, high surgical dexterity is necessary to implant them in a position that does not lead to prosthesis dislocation. Falez et al (2015) and Rawal et al (2011) show that short stem implants have also been developed in the recent years in a variety of configurations and are used in the surgical practice due to their advantages in specific cases. Although they are better suited due the minimal invasion of the implantation area, the implants are

still assembled with the femoral neck through repeated shock delivery. To avoid all major identified complications, the paper proposes a study regarding the design for manufacture, using Electron Beam Melting (EBM) technology, of a new endo-prosthesis femoral stem concept. In a study by Cronskär et al (2013) it is mentioned that in recent years EBM technology has been shown to bring several significant advantages over conventional machining in the production of hip implants. The novelty of the design concept of the hip stem is given by its' unique shape, which allows assembly with the femoral head by screwing the stem into place, rather than hammering. The main advantage of the new endo-prosthesis stem, proposed by the authors, is that a maximum amount from the hip bone and especially from the femoral neck is kept, as shown by Moga et al (2015) in a recent patent application. Only the used volume of the femoral head is resected. The new prosthesis has an innovative fastening system, combining a non-cemented system with a cemented one. The cement does not get to fill all the bone, after screwing and initial fixation, the cement is used to further fix into place the prosthesis. On top of a cylindrical connector an intermediary part is placed to ensure contact with the rest of the prosthesis.

Methods and Materials

CAD modelling and simulation development

The numerical model, CAD renders and simulations were undertaken using SolidWorks 2016 software package. The hip endo-prosthesis stems' unique design is due to the necessity of lowering some of the complications of existing hip implants. Developed features are presented in Figure 1 and include: main stem, cylindrical fixation flange, cylindrical connector, hexagonal hole, helical fillet, main cement delivery internal channel and secondary delivery internal channels. Overall dimensions were defined for an *80 kg* male patient and were set to *40L x 40l x 63H mm*. The hip endo-prosthesis main stem is shorter than other concepts and has a helical fillet which enables an easy screwing through the hip joint. A constant pitch helix was defined with a *41 mm* height and *3.3* revolutions. Following the CAD modelling several steps are entailed in order to develop accurate simulations, namely: Define material properties; State simulation hypotheses; Identify and define stress distribution; Set mesh properties; Set initial chart characteristics; Run simulations for the implicit analysis.

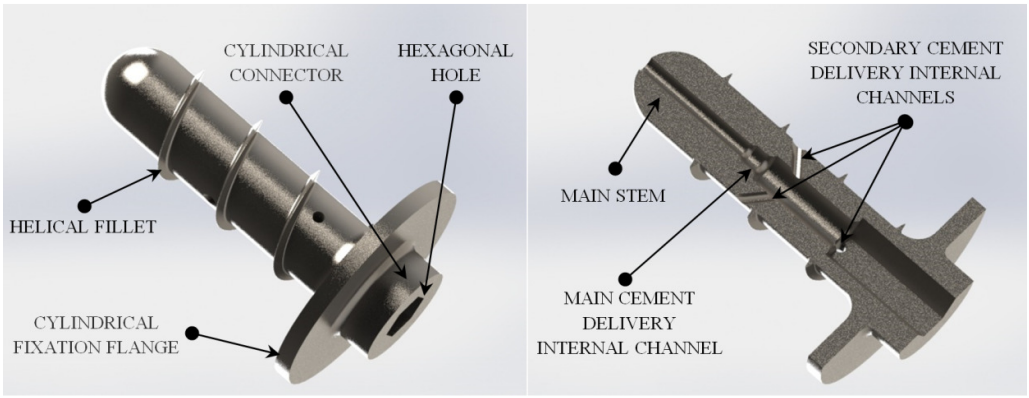


Figure 1: Main features of the hip endo-prosthesis stem

Accurate material definition is crucial to the realistic results of the simulation and thus, to the optimisation of the final endo-prosthesis stem. Electron Beam Melting (EBM) will be used to additive manufacture the hip endo-prosthesis stem on Arcam Q10 equipment from Ti–6Al–4V titanium alloy. Characteristics of the alloy are set using SolidWorks material data base, as seen in Figure 2.

Three hypotheses have been developed for the simulation of the hip endo-prosthesis stem in accordance with two states of its existence: fitting and operation. Stress load values were considered,

for all three hypotheses, in accordance with ISO 7206-4 (1989) standard for determination of endurance properties and performance of stemmed femoral components.

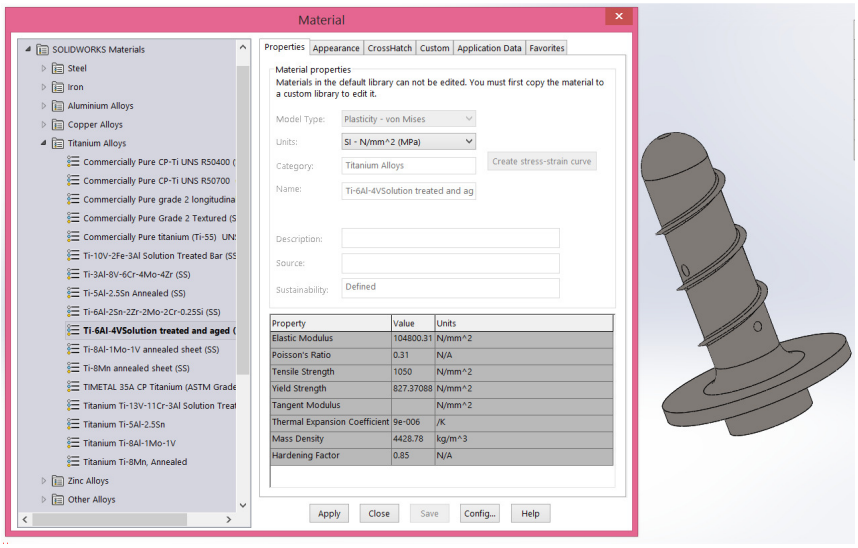


Figure 2: Ti–6Al–4V material characteristics set-up using SolidWorks material data base

The first hypothesis is defined for the fitting of the endo-prosthesis stem in the surgical theatre. The procedure is done by the orthopaedic surgeon using tools from the regular hip replacement surgical tool kit. Stresses were defined by taking into consideration the main stages of the hip replacement procedure, namely: femoral head resection; intermediary CT data control; hip prosthesis position and screw; cement insertion and hardening; final CT data control. Classic hip prosthesis are usually hammered into place, leading to bone damage such as micro fissure, chipping and even fracturing of the femoral neck. In these cases the stresses are usually present as forces delivered in shocks. In order to diminish these common complications, a different fixation technique is proposed for the studied endo-prosthesis. Using a hexagonal key the endo-prosthesis stem is screwed into place and secured with bone cement. Fixation is achieved when the cement delivered through the internal channel structure of the endo-prosthesis stem is hardened. Using this surgical technique a different stress distribution is achieved. A torque of 11 *Nm* is defined all throughout the hexagonal hole, as the product between the pressing force (F = 200 *N*) and the length of the hexagonal key (L = 55 *mm*). The second hypothesis is defined for regular usage and a force of *1550 N* is applied, in accordance with a study by Dharme and Kuthe (2016). The third hypothesis is defined for usage in case of shocks and high weight of the patient, therefore a force of *2300 N* is applied, in accordance with ISO 7206-4 (1989). Computer aided design models were built to simulate the ISO7206-4 loading, which determines the endurance properties and performance of stemmed femoral components. According to the description of ISO7206-4 (1989), the stem is fixed in cement distally and proximally is unsupported. The cement holds the distal end of the stem starting at 35 mm from the center of the femoral hex hole. In addition, the model of the stem was oriented in adduction of 10^0 and flexion of 9^0 (Figure 3). As the cement dimensions are not indicated by the standard, a cylinder of diameter *ø40 mm* and height *35 mm* was defined.

Loads and fixtures were defined for all three hypotheses and the centralised data is presented in Figure 4.

Contact sets were defined as bounded between the cement cylinder internal cavity and the body features of the hip endo-prosthesis stem on a *30 mm* distance. Meshing was undertaken using the characteristics given in Table 1. In accordance to the book by Radostina (2015), several types of studies were defined for each of the three hypotheses, as follows: Von Misses stress; URES: Resultant Displacement; UX, UY, UZ: Displacement on X, Y, Z directions; ESTRN: Equivalent Strain. All initial charts were set to show an automatic deformed shape with a superimposed

transparent model. Number formats were set to scientific and the legend had an automatically defined minimum and maximum values. No errors were found when meshing the assembly.

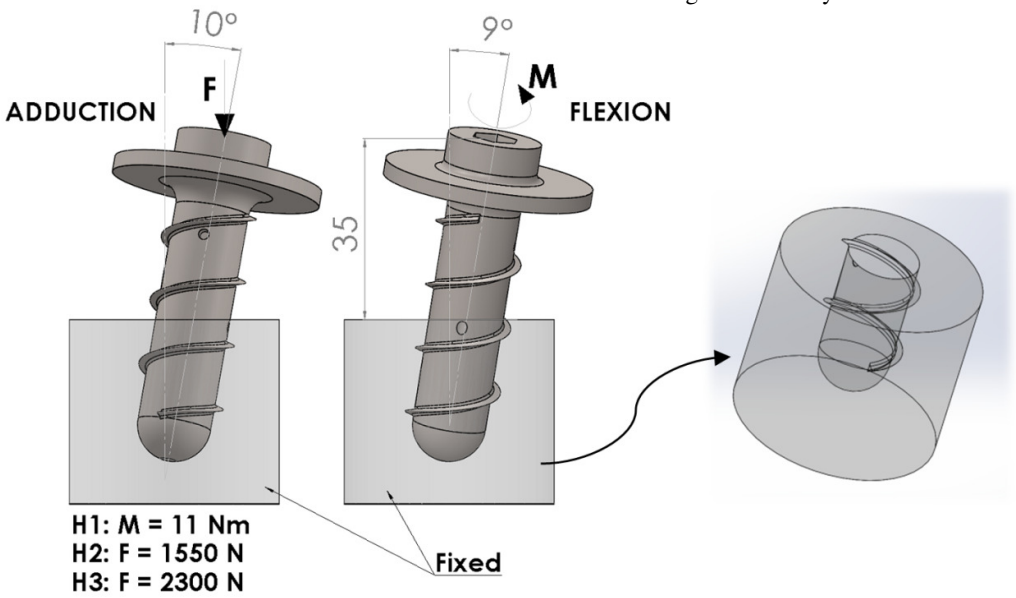


Figure 3: The stem position and boundary conditions of the CAD model.

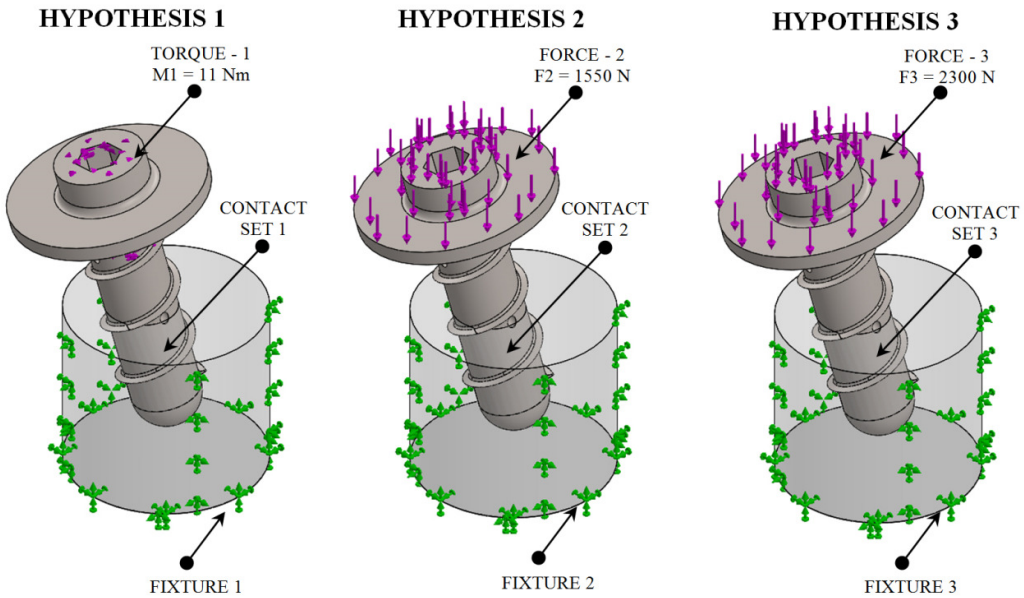


Figure 4: Loads and fixtures of the CAD models for three hypotheses

Table 1: Mesh characteristics

Mesh type	Solid Mesh	Total Nodes	21473
Mesher Used:	Standard mesh	Total Elements	14080
Automatic Transition	Off	Maximum Aspect Ratio	58.992
Include Mesh Auto Loops	Off	% of elements with Aspect Ratio < 3	82.1
Jacobian points [Points]	4	% of elements with Aspect Ratio > 10	4.37
Element Size [mm]	3.7337	% of distorted elements (Jacobian)	0
Tolerance [mm]	0.186685	Time to complete mesh (ss):	19
Mesh Quality	High	Remesh failed parts with incompatible mesh	On

Rapid Prototyping

One of the most challenging geometries to manufacture was helical fillet with a peak radius of R0,1 mm, which is the key feature that gives the endo-prosthesis stem its novelty and advantages over pre-existing hip replacement devices. Due to the required precision of the study, prototyping was done on a Projet 1500 3D printer. The equipment uses Film Transfer Imaging (FTI™) technology that allows parts to be built much quicker than other methods of_rapid prototyping. A film is coated in UV curable photopolymer. This resin is then transferred from the film to the build platform and is cured by a flash of light from a DLP projector. The process is repetitive, building layer over layer until the part is entirely built. By curing each layer with a single flash of projected light, instead of tracing each layer with a laser or ejecting material in specific locations, parts can be built quickly, accurately and with fine resolution. The VisiJet® FTI-Ivory material was chosen for the final concept models, due to its specific material characteristics, which brought visible benefits. VisiJet® FTI materials created durable plastic concept models with excellent, high resolution detail that were tough enough for functional testing and snap-fit applications. The characteristics of the photopolymer composite material allowed an accurate representation of the proposed hip endo-prosthesis stem.

Table 2: Main FTI™ 3D printing stages

Stages	**Prototyping sub-stages**
1. Analysis and redesign	FTI™ technology characteristics identification
2. Prepare, orientation and position	Print job layout using PJP3P software
	Support generation using PJP3P software
3. 3D Printing	Machine preparation
	3D printing
	Component cooling
4. Post-processing	Part removal
	Ethylic alcohol part cleaning
	Part UV Curing
	Removal of support structures
	Sanding of support witness marks
	Silicone based solution spraying
	Part drying

Printing the concept model of the implant lasted for two hours and 23 minutes. The main characteristics of the print job are summarised in Table 3.

Table 3: Print job characteristics for the hip endo-prosthesis stem prototype

PRINT JOB CHARACTERISTICS		VALUES	UNITS
Surface Area		6074.8936	mm^2
Part Volume		9661.7246	mm^3
Weight of Part		0.00481	Kg
Weight of Support		0.00177	Kg
Number of Triangles		6226	-
EXTENTS INFORMATION [mm]			
	Min	Max	Total
X	92.8688	132.8308	39.9621
Y	64.2937	104.2748	39.9810
Z	64.2937	104.2748	39.9810
BUILD PLATFORM EXTENTS [MM]			
X: 228.6		Y: 171.45	Z: 203.2

Functional tests and measurements were undertaken for validation purposes of the 3D printed prototype.

Cost Analysis

The global implants (hip and knee) market reached $8.6B in 2016 and had a constant annual growth rate of 6% from 2009 to 2016, according to a study by Global data released in 2016. In order to commercialize the proposed hip stem, a thorough technology transfer strategy must be put into place. Cost analysis is undertaken as a first initiative in this direction, with the goal of series production of the endo-prosthesis stem. In order to properly calculate all manufacturing costs of a custom endo-prosthesis stem the following characteristics must be set: main technology manufacturing stages; mechanical properties of the used material; unit production costs; manufacturing speed; post-processing treatment; energy consumption; workforce; salaries. The custom hip endo-prosthesis will be manufactured using the Electron Beam Melting (EBM) additive technology on the Arcam Q10 equipment. The main EBM manufacturing stages are summarized in Table 4.

Table 4: Speciffic EBM manufacturing stages of the hip endo-prosthesis

EBM Stage	**Intermediary stages**
S1. 3D Modelling	*IS 1.1.* CAD modelling
	IS 1.2. Material properties definition for Ti–6Al–4V
	IS 1.3. *.STL file compilation
S2. Prepare, orientation, positioning	*IS 2.1.* Support structure generation using a specialised software package
	IS 2.2. Print layout for one manufacturing cycle
S3. 3D printing using EBM technology	*IS 3.1.* Equipment preparation
	IS 3.2. EBM 3D printing
	IS 3.3. Printing chamber cooling
S4. Post-processing	*IS 4.1.* Part removal
	IS 4.2. Part cutting from the metal support plate
	IS 4.3. Cutting of the support metal structures
	IS 4.4. Grinding and polishing of the contact points
	IS 4.5. Preparation of the work-piece: washing and pickling
	IS 4.6. Hydroxyapatite coating
	IS 4.7. Curing and drying

The material used to manufacture the custom implant is Ti-6Al-4V titanium alloy. An extras of the material mechanical properties are shown in Table 5.

Table 5: Mechanical properties of Ti–6Al–4V

Material	*E* (GPa)	*YS* (Mpa)	σ_f (Mpa)	%EL	BF × 10^{-3}
Ti–6Al–4V	105	900	550	13	5,2

E = Young's modulus, *YS* = yield strength, σ_f = fatigue strenght, BF = biofunctionality = σ_f /*E* %EL = elongation.

With a production cost below 2€/cm^3, Arcam Q10 has a construction speed of 15cm^3/h for complex structures with a pore size up to 400µm. To estimate the production costs of the hip endo-prosthesis, it is necessary to know the volume of the CAD model. Figure 5 shows the weight and volume definition using SolidWorks Premium 2016 Design Software.

The post-processing treatment is proposed to be carried out using the immersion coating method in hydroxyapatite solution, with the chemical composition shown in *Table 6*. The hydroxyapatite based solution covers homogeneously metal surfaces with layers of thicknesses between 0.05-0.5 mm.
The first stage of manufacture will be carried out by a design engineer, and the next three stages will be carried out by a specially qualified technician. Considering that the financial remuneration of an engineer is 1.7820 €/ h, and of a technician is 1.7004 €/ h, it is necessary to define the time frame of the intermediary stages of the manufacturing process for the labour calculation. This has been done taking into account the following: the technical book of the machine, the technical sheet of the material, recommendations from the literature, the experience of the technician and the designer. Energy consumption was set according to the technical documentation available for each piece of equipment. Calculations and interpretations are given in the following chapter.

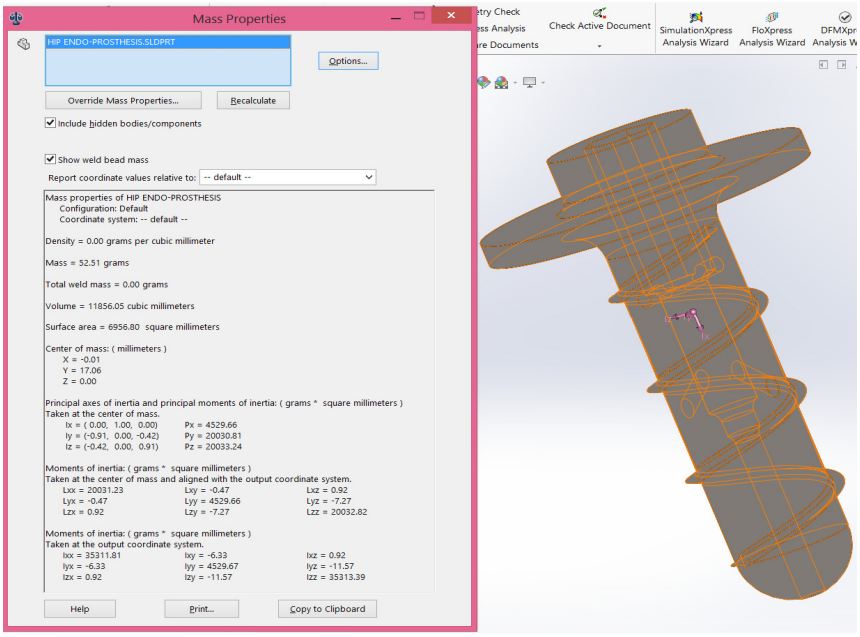


Figure 5: Hip endo-prosthesis stem mass properties using SolidWorks Premium 2016

Table 6: Chemical composition of hydroxyapatite base solution (wt%)

Pure Hydroxyapatite	Water	Ethylic Alcohol	Polyethylene Glycol	Glycerol
7,3	16,7	66,5	2,8	6,7

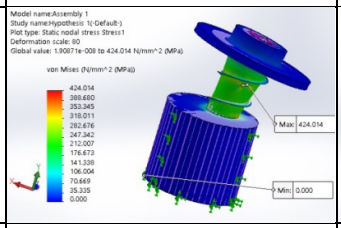
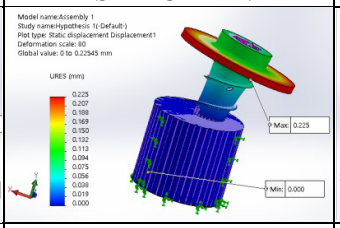
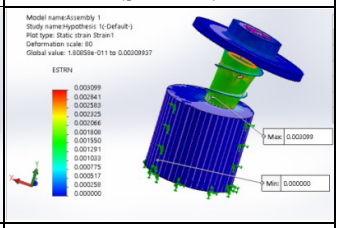
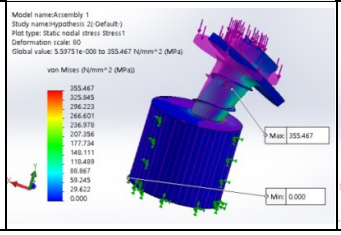
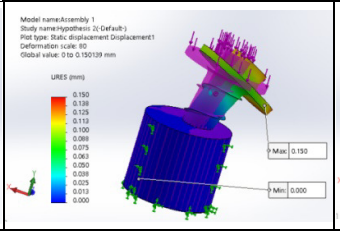
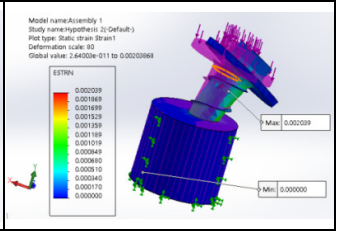
Results Interpretation

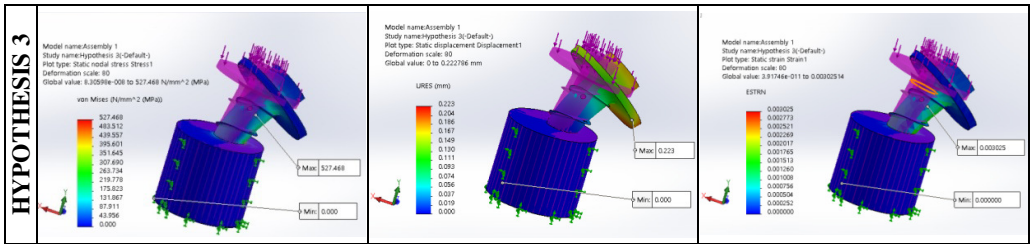
Simulation Results

Simulation results were analysed considering the following stages: Mesh compilation; Study simulation with integrated solver; First evaluation of simulation results; Optimise chart characteristics; Generation of the simulation reports; Interpretation of results; Simulation conclusions regarding the endo-prosthesis stem concept model. Mesh was compiled with the characteristics presented in Table 1 and no errors were given by the mesh solver. Several studies were undertaken for each of the three defined hypotheses, as follows: Von Misses stress; URES: Resultant Displacement; UX, UY, UZ: Displacement on X, Y, Z directions; ESTRN: Equivalent Strain. Simulations were run after mesh compilation and a first evaluation of the results led to the optimisation of chart plots characteristics. The deformation scale was adjusted from *automatic* to 80 units for all plots and the superimposed model on the deformed shape was set to translucent single color (bright pink) with a transparency factor of 0.5. Value units were changed from N/m^2 to MPa and a floating number format with three decimals was set. Simulation results are summarised in Table 7.

The von Misses Stress (Table 7) distribution obtained by FEA states weather the assembly will withstand the design load. Compilation of hypothesis 1 load distribution leads to a minimum value of $1.90871 \cdot 10^{-8}$ MPa, in mesh node 1012, and a maximum load of 424.014MPa in node no. 1567. For hypothesis 2 the minimum stress value was $5.59751 \cdot 10^{-8}$ MPa, generated in mesh node 1012, and the maximum stress was obtained in node 8266 with a value of 355.467 MPa. Results of hypothesis 3 shown a maximum von Misses stress value of $8.30598 \cdot 10^{-8}$MPa in node number 1012, and a maximum value of 527.468 MPa in mesh node 8266. Comparing the obtained values with the yield strength of the material used to manufacture the eno-prosthesis stem, it is clear that the assembly did not fail under the designed load distribution. All von Misses stress simulation results are situated below the yield point value of Ti-6Al-4V which is 827.3708 MPa.

Table 7: Simulation results for a Ti-6Al-4V stem: vonMisses, URES and ESTRN

	VON MISSES STRESS	URES: RESULTANT DISPLACEMENT	ESTRN: EQUIVALENT STRAIN
HYPOTHESIS 1			
HYPOTHESIS 2			



URES study is used to determine how the CAD model moves under the defined loads. The Resultant Displacement (Table 7) generates the magnitude of the resultant (compounded from the X, Y and Z directions) reaction force. ISO 7206-4 standard allows a ±3 mm deflection for vertical and horizontal displacements. Stress distribution in hypothesis 1 generated a resultant displacement with a minimum value of $1.0 \bullet 10^{-30}$ mm in mesh node 1 and a maximum value of 0.22545 mm in node no. 2109. Deployment of hypothesis 2 led to a resultant displacement with a minimum value of $1.0 \bullet 10^{-30}$ mm in mesh node 1 and a maximum value of 0.150139 mm in the 1783rd node. For the last hypothesis the simulation results shows a resultant displacement with a minimum value of $1.0 \bullet 10^{-30}$ mm in node 1 and a maximum value of 0.222786 mm in node 1783. As it can be observed, all displacement values are situated under the standard ±3 mm deflection limit.

In order to provide additional safety measures, further displacement studies were undertaken for all three hypotheses to evaluate the magnitude of the reaction forces on the X, Y and Z individual directions. Simulation results are summarised in Table 8 and they clearly show that the ISO 7206-4 standard deflection value is not exceeded.

The equivalent strain was used to measure the geometric response and the change in shape (deformation) due to applied forces for the three defined load scenarios. ESTRN: equivalent strain is computed as the rapport between the maximum triaxial stress and the Elastic Modulus. In order for the assembly to withstand the design load, ESTRN values (Table 7) should be less than the coefficient given by the ratio between the Yield Strength and the Elastic Modulus. As the Elastic Modulus for Ti-6Al-4V has a value of 104800.31 MPa, all simulation results values will be compared with a 0.0079 coefficient. According to hypothesis 1 the ESTRN global values range from $1.80858 \bullet 10^{-11}$ (node element 428) to 0.00309937 (node element 3105). Hypothesis 2 shows simulation results with ESTRN values from $2.64003 \bullet 10^{-11}$ (mesh node 428) to 0.00203868 (mesh node 2535). ESTRN values in hypothesis 3 are situated between 3.91746, in mesh node 428, and 0.00302514, in mesh node 2535. Comparing the results analysis with the set coefficient, it can be observed that the design load does not cause any failures in any of the three hypotheses.

Table 8: Displacements simulation results for a Ti-6Al-4V endo-prosthesis stem

	UX: Displacement (X direction)		UY: Displacement (Y direction)		UZ: Displacement (X direction)	
	Minimum value [mm]	Maximum value [mm]	Minimum value [mm]	Maximum value [mm]	Minimum value [mm]	Maximum value [mm]
HYPOTHESIS 1	-0.222	0.221	-0.051	0.051	-0.222	0.222
HYPOTHESIS 2	-0.091	0.001	-0.136	0.036	-0.001	0.082
HYPOTHESIS 3	-0.134	0.002	-0.201	0.054	-0.001	0.122

Comprehensive simulation results have shown that the hip endo-prosthesis stem assembly is compliant with standard endurance properties and performances. Considerring the abovementioned, the proposed CAD model is appropriate for first prototype manufacturing and testing.

Prototyping – FTI

Several prototyping stages need to be taken into consideration as a part of the surgical planning strategy: 1. Bone density is evaluated from the CT scan images using Mimics Research software; 2. The optimum cutting line is analysed when resecting the acetabular cup; 3. The *.STL files for the femur anatomical model are created and exported to 3-Matic Research software for further processing; 5. *.STL files are analysed for accuracy using Gaussian curvature analysis, maximum curvature analysis, wall thickness analysis and Extrema analysis; 6. An anatomical model of the patients' femur is 3D printed; 7. The hip endo-prosthesis stem prototype is 3D printed; 8. Functional tests and fittings are undertaken; 9. Surgical procedure is planned. Following these stages, a surgical procedure can be easily planned if there is the availability of locally manufacturing the endo-prosthesis. Prior to 3D prototyping fit tests were undertaken using a virtual simulation software (Figure 6).

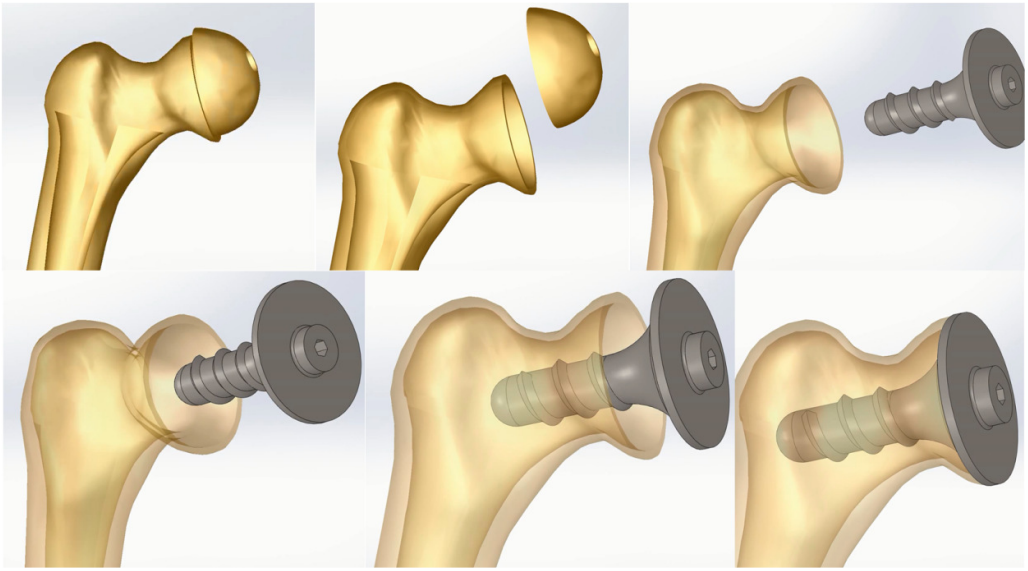


Figure 6: Simulation of surgical procedure and fit test of Hip endo-prosthesis stem with femoral neck from DICOM patient anatomical data

A CT scan of the patient was imported into Mimics Research software and DICOM data images were first processed into mask files and then into *.STL files. These were analysed and the final model presented in Figure 6 was created. Together with the CAD model of the designed hip endo-prosthesis stem, the *.STL of the femur was imported into 3-Matic Research. Fitting and surgical procedure were simulated in order to evaluate the compatibility of the CAD model with the anatomical data of the patient. As it is presented in Figure 6, a perfect fit was achieved at the interface of the cylindrical fixation flange with the femoral neck.

3D printing of the hip endo-prosthesis stem prototype was undertaken considering all criteria detailed in the previous chapter. A full 3D printing job lasted two hours and 23 minutes with intermediary times adding up to almost four hours. FTI technology implies that the part is in continuous contact with the photopolymer, thus the 3D printed prototype comes out of the machine with a viscous coating (Figure 7) which requires cleaning. The hip endo-prosthesis stem prototype was washed in an isopropyl alcohol recipient and left 10 to 15 minutes to degrease. In order to obtain the optimum mechanical characteristics, the degreased prototype was fully hardened and dried in a UV Projet curing unit (Figure 7). Due to its size, the prosthesis stem was UV cured in one cycle of 30 minutes. The UV post-processing was used to improve scratch and solvent resistance and facilitate superior bonding of the material. Other post-processing steps included: removing the support structures, sanding down the contact points of the supports, sanding any rough edges of the model and silicone spraying.



Figure 7: Stages of 3D printing the hip endo-prosthesis stem prototype using FTI™ technology: 3D printing, Component cooling, Part UV Curing, Post-processing

Surgical procedure and fit testing of the hip endo-prosthesis stem was deployed using a high quality PVC femur anatomical model (Figure 8). Assembly was done by screwing the dip endo-prosthesis into the femoral neck of the hip-bone model. As the internal structure of the model replicates a spongy bone tissue, the fitting was done fairly easy. Some of the main feedback from the fitting tests was as follows: improvement of helical fillet section shape should be considered in terms of thickness and peak radius; a smaller radius should be considered between the stem body and the cylindrical fixation flange; the cylindrical fixation flange should have a higher thickness for stability reasons; the main cement delivery internal channel must be provided with an occlusion device; secondary cement delivery internal channels should be distributed equally all throughout the length of the stem body and should have an increased number; the cylindrical connector must be elongated and tapered. The results of the surgical procedure and fit tests will be taken into consideration for further research and improvement of the hip endo-prosthesis stem concept model.

After FEA simulations, rapid prototyping and functional tests, the next step is to calculate the total manufacturing cost of the implant, as a first initiative in the technological transfer of the



Figure 8: Surgical procedure and fit test of Hip endo-prosthesis stem with HQ PVC femur anatomical model

Cost Analysis

Compiling all the input data given in chapter 2.3 of the current paper, the production costs for a custom hip endo-prosthesis stem manufactured on the Arcam Q10 equipment from Ti-6Al-4V titanium alloy are computed and summarized in Table 9.

Manufacturing costs for hip implant range from 60 € up to 300€ depending on the processes and steps necessary to produce the final device. The cost analysis undertaken by the authors showed that the proposed concept model can be manufactured in the low price range.

Table 9: Manufacturing costs for a hip endo-prosthesis stem, using EBM on Arcam Q10

Interim stages	Time [min]	Material [€]	Labour [€/min]	Electrical energy			
				Consumption [kW/h]	Unit price [€/kW]	Cost [€/h]	Total consumption [€/int-stage]
IS 1.1.	240		7.128	0.70	0.09	0.060942	1.12
IS 1.2.	10		0.297	0.70	0.09	0.060942	0.05
IS 1.3.	10		0.297	0.70	0.09	0.060942	0.05
IS 2.1.	40		1.134	0.70	0.09	0.060942	0.19
IS 2.2.	25		0.709	0.70	0.09	0.060942	0.12
IS 3.1.	30		0.850	4.00	0.09	0.348242	0.80
IS 3.2.	270	11.8561 cm^3 * 2 €/cm^3 = 23.712 €	7.562	7.40	0.09	0.644249	2.90
IS 3.3.	30		0.850	4.00	0.09	0.348242	0.80
IS 4.1.	5		0.142	-	-	-	-
IS 4.2.	20		0.567	0.50	0.09	0.04353	0.07
IS 4.3.	50		1.417	0.50	0.09	0.04353	0.17
IS 4.4.	10		0.283	0.50	0.09	0.04353	0.03
IS 4.5.	60		1.700	-	-	-	-
IS 4.6.	135	52.51g *0.48 €/g = 25.205 €	3.826	-	-	-	-
IS 4.7.	30		0.850	1.00	0.09	0.087061	0.20
TOTAL	**755**	**48.917 €**	**27.702 €**				**3.68 €**
TOTAL MANUFACTURING COST - **80.299 €**							

Conclusion

The research paper proposed a design process of a hip endo-prosthesis stem obtained with EBM additive technology. Three main stages were used in the development of the new concept model of the hip implant: CAD modelling and simulation, rapid prototyping and fit testing, cost analysis of EBM manufacture. Result simulations for several studies were analysed in three main hypotheses, which were stated in correspondence with applicable standards. The following studies were undertaken for each of the three hypothesis: von Misses Stress; URES: Resultant Displacement; UX, UY, UZ: Displacement on X, Y, Z directions; ESTRN: Equivalent Strain. All simulation values fell within imposed limits, thus, no necessary redesign optimisation stages was needed. Rapid prototyping was done using FTI additive technology on a Projet 1500 3D machine, using VisiJet® FTI-Ivory material. Fitting and surgical procedure were simulated in order to evaluate the compatibility of the CAD model with the anatomical data of the patient. Fit testing of the hip endo-prosthesis stem with a high quality PVC femur anatomical model led to some optimisation recommendations, the most important being the modification of the secondary cement delivery internal channels structure. A step towards technological transfer was made through cost analysis of an EBM manufacture implant stem. Total production costs for one stem was 80.299 €, value which is situated in the low price range of similar medical devices.

Research results validated a new concept model for a hip endo-prosthesis stem, future research including: manufacture of the improved stem endo-prosthesis from titanium alloy, deployment of in vivo and in vitro studies and development of in vivo research protocols.

Acknowledgment

This work has been funded by University Politehnica of Bucharest, through the "Excellence Research Grants" Program, UPB – GEX 2017, Identifier: UPB- GEX2017, Ctr. No. 50/ 2017 (BIOSHIELD)".

References

Aitchison, GA., Hukins, DWL., Parry, JJ., Shepherd DET. and Trotman, SG. (2009), 'A Review of the Design Process for Implantable Orthopedic Medical Devices', *The Open Biomedical Engineering Journal*, 3, 21–27

Cronskär, M., Bäckström, M. and Rännar, L-E. (2013), 'Production of customized hip stem prostheses - A comparison between conventional machining and electron beam melting (EBM)', *Rapid Prototyping Journal*, DOI: 10.1108/RPJ-07-2011-0067, 19(5), 365-372

Dharme, M. and Kuthe, A. (2016), 'Fatigue Testing Of Hip Implants With The Iso 7206 Standards: A Review', *International Journal Of Pure And Applied Research In Engineering And Technology*, 4 (9), 317-325

Falez, F., Casella, F. and Papalia, M. (2015), 'Current Concepts, Classification, and Results in Short Stem Hip Arthroplasty', *Orthopedics*, March Supplement 2015, DOI: 10.3928/01477447-20150215-50, 38(3), S6-S13

Global Data (2016), 'Hip and Knee Implants - Market Forecast 2016'

Hip Replacement Implant Market (2017), Global Industry Analysis, Size, Share, Growth, Trends, and Forecast 2016 – 2024

ISO7206-4 (1989), 'Implants for surgery: partial and total hip joint prostheses', *International Organization for Standardization*

McTighe, T., Brazil, D. and Warwick, B. (2015), 'The Hip: Preservation, Replacement, and Revision', Chapter 14: Metallic Alloys in Total Hip Arthroplasty, Data Trace Publishing Company, ISBN 9781574001495

Mirza, SB., Dunlop, DG., Panesar, SS., Naqvi, SG., Gangoo, S. and Salih, S. (2010), 'Basic Science Considerations in Primary Total Hip Replacement Arthroplasty', *Open Orthopaedics Journal*, 4, 169–180

Moga, M., Semenescu, A., Costoiu, MC., Mateș, IM., Călin, CI., Amza CG., Patent application No. A 2015 00551, application date 29.07.2015, Title: 'Short femoral stem cervical endoprothesis'

Parker, MJ., Gurusamy, KS., Azegami, S. (2010), 'Arthroplasties (with and without bone cement) for proximal femoral fractures in adults', *Cochrane Database of Systematic Reviews,* DOI: 10.1002/14651858.CD001706.pub4., Issue 6. Art. No.: CD001706.

Radostina VP. (2015), Introduction to Static Analysis Using SolidWorks Simulation, CRC Press, Taylor & Francis Group, LLC., Broken Sound Parkway NW, Boca Raton, FL.

Rawal, BR., Ribeiro, R., Malhotra R. and Bhatnagar N. (2011), 'Design and Manufacture of Short stemless Femoral Hip Implant based on CT Images', *Journal of Medical Sciences*, 11, 296-301

New Tracheostomy Device Concept: An Additive Manufacturing Challenge in Reducing Late Clinical Complications

Ulmeanu Mihaela-Elena, University POLITEHNICA of Bucharest, Bucharest, Romania, mihaela.ulmeanu@upb.ro

Ulmeanu Liviu, Emergency University Hospital of Bucharest, Bucharest, Romania, liviu_ulm@yahoo.com

Doicin Cristian-Vasile, University POLITEHNICA of Bucharest, Bucharest, Romania, cristian.doicin@cont-edu.pub.ro

Rennie Allan E.W., Lancaster University, Lancaster LA1 4YW, United Kingdom, a.rennie@lancaster.ac.uk

Lupeanu Elena, National Institute of Gerontology and Geriatrics "Ana Aslan", Bucharest, Romania, elenalupeanu@yahoo.com

Abstract

The application of additive manufacturing technologies for the development of invasive airway devices may enhance the quality of life of tracheostomy patients. The current research is intended to reduce clinical long-term complications that appear in the frequent use of classic tracheostomy tubes in airway management. The development of a bespoke tracheostomy device aims to improve functional ability, social anxiety and overall patient satisfaction. The study was conducted in four stages: preconception, patient specific design, additive manufacturing of the new endotracheal tube prototype and testing. Using patient specific data a new concept was designed with appropriate CAD software, while implementing the findings from deploying functional analysis. Starting with a cuffed tracheostomy tube for needs analysis, three new CAD models were generated. The initial functional prototypes were developed, with the main innovations brought to the tracheal fixing system, neck plate and obturator, and were enabled by the advantages of additive manufacturing technologies. Initial tests were undertaken on an explanted pigs' trachea with the aim of identification of any surgical technique or concept shape related problems. The current research presents an integrated approach for developing a new tracheostomy device concept, fabricated using AM technologies. The advantages of AM were used to enable the design and manufacture of customised, unique features that target the reduction of late clinical complications of tracheostomy tube users.

Keywords: endotracheal tube, patient specific design, additive manufacturing, functional analysis

Introduction

Sobotta (2011) describes the tracheostomy as a surgical opening in the anterior wall of the trachea, also known as a tracheal stoma, made with the aim of facilitating ventilation. As presented by Morris and Afifi (2010) a tracheostomy can be temporary or permanent and leads, in both cases, to respiration bypassing the upper airways. Wilkinson et al (2014) shows that in the majority of cases (95.8%), the airway is managed using an endotracheal (tracheostomy) tube, immediately prior to tracheostomy. Tracheostomy tubes are available in a large variety of sizes and styles, as shown in research conducted by Morris and Afifi (2010), Wilkinson et al (2014), De Leyn et al (2007) and Fikkers et al (2013). Fisher et al (2014), De Leyn et al (2007) and NHS (2007) conclude that the main categories include cuffed or un-cuffed, single or dual cannula and continuous or fenestrated tracheostomy tubes. Morris and Afifi (2010), Wilkinson et al (2014) and Apfelbaum et al (2013) state that in order to select the best tube for a particular patient, physicians with specific training must accurately understand and set the primary goals.

The complications associated with tracheostomies and placement of a tracheostomy tube can be grouped into three main categories by their main causes: failed surgical procedures; tube misplacement; and improper postoperative stoma and tube care. Timeframe related complications can be immediate, early and late. As presented by Sobotta (2011), Wilkinson et al (2014), NHS (2007) and Muralidhar (2008) the most numerous and frequent complications occur later, after the tracheostomy procedure is conducted. Amongst these, the most significant, noted in the literature research cited above, are: cuff leak, trachea-esophageal fistula and trachea-innominate fistula, due to overinflating/ underinflating of the cuff; dislodgement of tracheostomy tube, due to poor airway management protocols; obstruction of tracheostomy tube and obstruction of permanent stoma mucus plugs or thick secretions, mostly due to humidity deficit in the airways; stoma infections, due to poor positioning or post-operative care; stomal stenosis, stomal granulation tissue, tracheomalacia, tracheal stenosis, mediastinitis, tracheocele; tracheoinnominate hemorrhage, due to improper positioning or poor choice of the tube. Research conducted by Morris and Afifi (2010), NHS (2007), Apfelbaum et al (2013) and NCEPOD (2009) shows that less frequent long-term complications may also include vertebral erosion pneumonia and sometimes, even death.

Morris and Afifi (2010), Wilkinson et al (2014), Fisher et al (2014) and De Leyn et al (2007) conclude that in some cases, current designs of tracheostomy tubes facilitate and maintain the occurrence and, sometimes, worsen the evolution of complications.

The current study presents the development of a new tracheostomy device concept proposed for the reduction of long-term clinical complications of temporary and permanent tracheostomies. Given the importance of personal anatomical features for the outcome of such surgical procedures, as presented in their research by Santos et al (2012) and Zenikos et al (2012), various authors who developed the Wohlers (2015) report consider additive manufacturing (AM) the most appropriate technology to utilise for the proposed research.

Methods

Ulrich and Eppinger (2012) claim that the design processes commence with the preconception phase. For this specific phase, the authors developed a structured procedural approach which is made up of four stages: 1. Identification of challenges in airway management by usage of an endotracheal tube; 2. Identification of specific late clinical complications and their causes, strictly related to the design of the endotracheal tube; 3. Definition of the needs that arise from prior identified causes; 4. Function definition of the endotracheal tube.

Challenges And Complications That Influence The Design Of An Endotracheal Tube

The idea behind this procedural approach was that patients with a tracheostomy encounter many challenges due to specific complications. The tracheostomy tube concept must perform all the identified functions in order to satisfy the needs generated by late complications, thus reducing airway management related challenges (Fig 1).

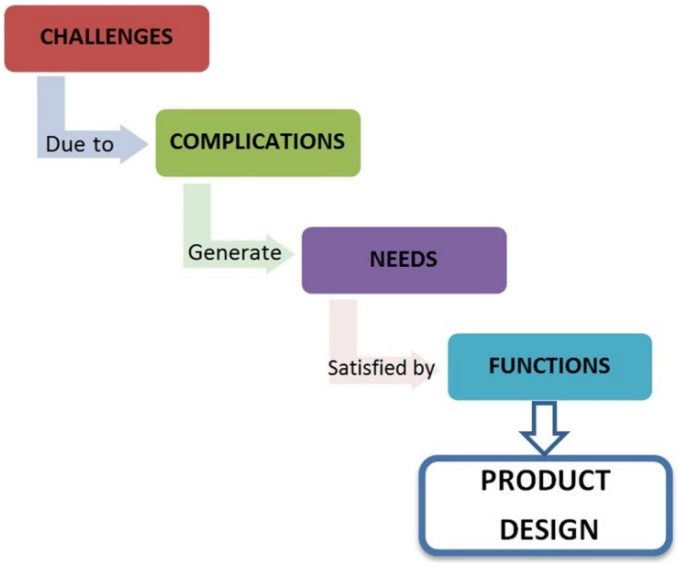


Fig. 1: Structured procedural approach for product design of TrachyLight

To validate dimensions and anatomical feature proportions of the concept, the models are developed for a real patient. Hereafter, the new tracheostomy device concept is referred to as TrachyLight (TL). Research conducted by Morris and Afifi (2010), Fisher et al (2014), De Leyn et al (2007), Fikkers et al (2013), NHS (2007), Apfelbaum et al (2013), Muralidhar (2008), NCEPOD (2009) and Engoren (2004) identify the main challenges involved in the airway management of patients with a fitted endotracheal tube in the following areas: communication; swallowing and nutrition; stoma care; tracheostomy tube management; suction; and humidification. NHS (2007) shows that in relation to tracheostomy tube design, the difficulties in communication can occur when the type and the size of the tube are not chosen properly for the anatomical specificities and condition of the patient.

Commonly, speaking valves are required to improve communication. Morris and Afifi (2010), Fikkers et al (2013) and Apfelbaum et al (2013) show in their research that speaking valves can be safely used with un-cuffed tracheostomy tubes or with a fully deflated cuff.

Swallowing difficulties can occur due to compression of the oesophagus from an inflated cuff, as presented by De Leyn et al (2007), Fikkers et al (2013), NHS (2007), Apfelbaum et al (2013) and Engoren (2004). Swallowing may also be difficult for the patient if an improper tube is used or the tube is poorly positioned or fixed. In the same time, stoma care needs to be undertaken in order to reduce the risk of infection. Stomas are a potential route for respiratory tract infection and potential site of peristomal infection. Fikkers et al (2013), NHS (2007) and Apfelbaum et al (2013) conclude that in order to avoid these risks, some tracheostomy tubes are designed with soft flanges such that a dressing between the tube and the skin is not always required. Tracheostomy tube management involves: individual assessment of the most appropriate tube; care, change and removal protocols; compliance with manufacturing recommendations for each type of tube. Research conducted by Fisher et al (2014) and NHS (2007) shows that improper usage of inner cannulae was shown to reduce the lumen of the outer tracheostomy tube, thus increasing respiratory effort. Suctioning is of great importance for patients that are unable to cough and cannot eliminate secretions in a natural way. Some complications of the current procedure involve tissue damage and hypoxia, mainly due to the shape of the tube and misuse of equipment. According to research undertaken by Morris and Afifi (2010), Fisher et al (2014), Fikkers et al (2013), Engoren (2004) and Ham (2010) the lack of proper humidification in tracheostomy patients has been also shown to cause a series of complications from thick secretions, loss of ciliary action, deterioration of pulmonary function and increased risk of infection. Moreover, heated systems can result in water vapours cooling and collecting in the tubing. The weight of different humidification systems can pull on tracheostomy masks causing increased

risk of airway obstruction when a cuffed tube is in situ. Thus, a proper design must ensure safe positioning of the tube.

The aforementioned challenges develop due to either individual or common late complications. Amongst these, the authors identify the most important as being: stoma, trachea and respiratory tract infections; haemorrhage; stoma and tracheal stenosis; thick, tenacious, crusted secretions; excessive sputum production; impaired pulmonary function; pressure sores; irritated/ damaged airway mucosa; aspiration and swallowing problems; tracheostomy tube occlusion and displacement; cuff leaks; formation of granulation tissue.

Considering the principles of needs analysis, described by Ulrich and Eppinger (2012), and the complications reported by physicians and patients, the main identified needs that require focus in terms of tracheostomy tube design are stated. Thus, the tracheostomy tube must: 1. Diminish or prevent the risk of infection; 2. Facilitate wound healing; 3. Be positioned and fixed properly; 4. Maintain correct position after fitting; 5. Be compliant with patient anatomy; 6. Provide/allow proper humidification of airway; 7. Be minimally invasive over the trachea; 7. Allow proper guidance for suction equipment. The functional expression of these needs was analysed with technical functional analysis (TFA) and translated into specific targeted functions.

A customized tracheostomy tube might reduce some of the aforementioned long-term clinical complications associated with the design of these devices. With AM technologies being more and more available to the medical industry, in terms of capabilities, materials, applications and costs, the authors consider a viable option to be research into the design and manufacture process for a new tracheostomy device.

Technical Functional Analysis (TFA)

To identify the main functions of the product, Technical Functional Analysis was undertaken, in correspondence with the stages mentioned by Ulrich and Eppinger (2012) in their research. The main function of the tracheostomy tube is to ensure and maintain an access stoma (hole) through the trachea, allowing a constant airflow and pressure throughout the breathing and deglutition process.
Function Analysis System Technique (FAST) was deployed, as a tool of TFA, in order to properly identify the main functions of the tracheostomy tube (Fig 2).
FAST was deployed to determine the four level functions of an endotracheal tube used in current surgical practice. Four levels of functions were sufficient for the current research study, but if necessary the analysis could be more detailed. Each individual function must be materialised into the final CAD concept as a particular element or shape. TFA has several other stages for cost and value evaluation of products. Further research of the endotracheal tube concept will consider such analysis by integrating all other states of existence.

Computer Aided Design of TrachyLight concept models

Given the large variety of tracheostomy tubes and their diverse applications, the redesign process was undertaken starting with a properly defined existing tube (Fig 3). The customization of the proposed concept was made according to a male patients' anatomy.

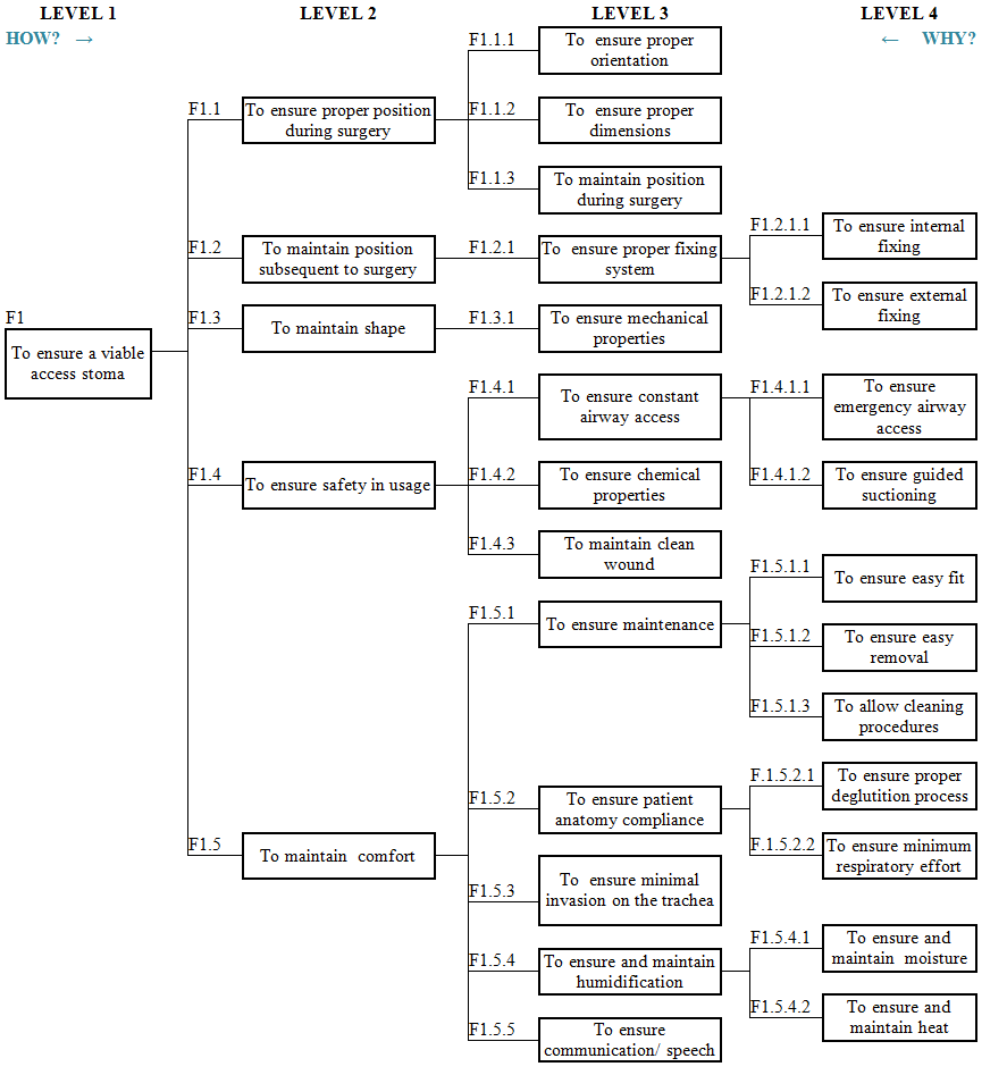


Fig. 2: FAST analysis for usage of the tracheostomy tube

The patient was selected considering that he should fit into the average of the following criteria: tracheal width, which was set according to restrictions provided by Chunder et al (2010) and Brodsky et al (1996); gender frequency tracheostomy occurrence, selected in accordance with research conducted by Wilkinson et al (2014) and Brodsky et al (1996); average demographics (age – excluding infants and children under 16, height, weight), criteria discussed in their research by Morris and Afifi (2010), Wilkinson et al (2014), De Leyn et al (2007), Fikkers et al (2013) and NHS (2007); principal diagnosis (respiratory disease), described in their research by Morris and Afifi (2010), Wilkinson et al (2014), Fikkers et al (2013) and Apfelbaum et al (2013). The average values were those mentioned in specialist literature.

A 68 year old male patient was submitted to the emergency room showing acute respiratory failure and other symptoms. An emergency Computer Tomography (CT) procedure was performed to establish the cause. It was established that the upper airway of the patient was partially obstructed due to a hypopharyngeal tumoral mass that was pushing against all surrounding tissue structures causing difficulties in breathing.

Upper airway intubation was not a viable option due to the shape and position of the tumor. The patient was respiratory stabilised using an emergency tracheostomy. He was fitted with a cuffed, single lumen tracheostomy tube with an internal diameter of 7 mm and a guiding obturator (Fig 3). Once the stoma was established, artificial ventilation was not necessary.

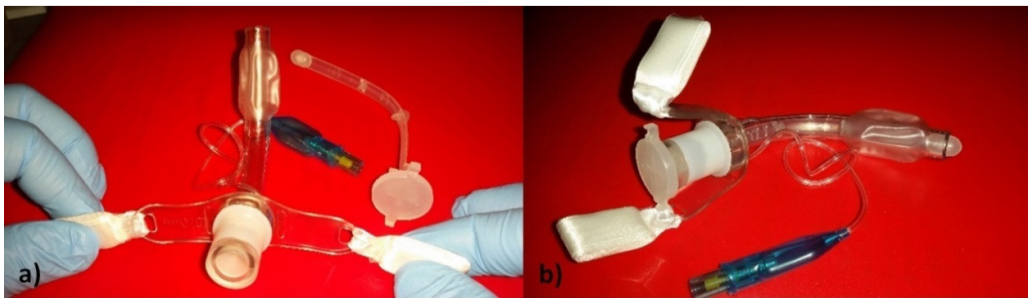


Fig. 3:Cuffed tracheostomy tube with a size of ID 7mm: a) front view; b) lateral view (Courtesy of the Emergency University Hospital of Bucharest, Emergency Room)

A cuffed tracheostomy tube was taken as a starting point for the needs analysis. The design process for the TrachyLight concepts was targeted at fulfilling the specific identified functions. Three main components, each tackling a group of functions, were designed: 1. The body of the tube, measured from the connector with the mechanical ventilators up to the trachea anterior wall; 2. The tracheal fixing system; 3. The neck plate. The obturator and adapter did not undergo any modifications.
For the design of the TrachyLight body tube**,** the following functions were taken into consideration for compliance: F1.1.1 To ensure proper orientation; F1.1.2 To ensure proper dimensions; F1.1.3 To maintain position during surgery; F1.2.1.2 To ensure external fixing; F1.3 To maintain shape; F1.4.1 To ensure constant airway access; F1.5.2 To ensure patient anatomy compliance.

In order to determine the exact dimension of a tracheostomy tube body several criteria need to be taken into consideration, apart from the anatomical dimensions of the patient. Amongst the specific criteria, some can be mentioned as follows: the position and nature of the respiratory impairment, position of the incision point, type of surgical incision and curvature of the tracheostomy tube used. According to Sobotta (2011), Morris and Afifi (2010) and Muralidhar (2008) the most common site of a tracheostomy is between the 2nd and 4th or 3rd and 5th tracheal rings. Within this area, different types of incision can be used in order to ensure the proper stoma. Airway management protocols must be used throughout the intervention and post-operative care, precisely as described by Fikkers et al (2013), NHS (2007) and Apfelbaum et al (2013). For the 68 year old male, the tomography showed that the hypopharyngeal tumoral mass was partially obstructing the larynx, thus the surgical procedure was undertaken between the 3rd and 5th tracheal rings. For the curvature of the tracheal tube, several design recommendations are noted from the research of Sobotta (2011) and Roe (1962) and a curvature of 60^{0} was assigned (Fig 4). As an added feature, the body of the tube can be manufactured with a length adaptor (Fig 4). The step was set at 3 mm between two consecutive cylindrical elements, creating a supplementary length of 18 mm. Accurate position of the cylindrical element ensures the orientation of the endotracheal tube during and after surgery. In connection with the neckplate it also ensures fixation and maintenance of the position during and after surgery. The internal diameter of the TrachyLight tube is 7 mm, the same as those used by surgeons in the surgical theatre. The adaptor was designed with a 15 mm external diameter, so that it connects with all general types of tubing from ventilators, humidifiers and speaking valves. Thus, the adaptor caters to the following functions: F1.5.4 To ensure and maintain humidification; F1.5.5 To ensure communication and speech.

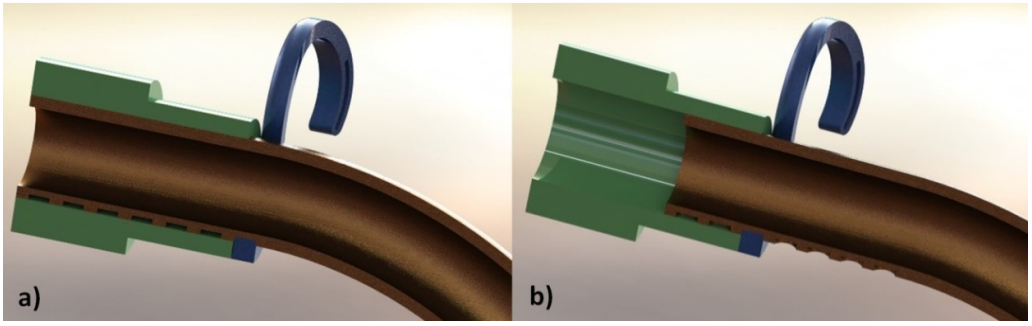


Fig. 4: Detail of the length adjustment feature (3mm step) for two different soft tissue dimensions: a) 21 mm; b) 33 mm (sagittal section view)

The TrachyLight concept was designed with a new tracheal fixing system by taking into consideration the following functions: F1.1 To ensure proper positioning during surgery; F1.2.1.1 To ensure internal fixing; F1.5.1 To ensure maintenance; F1.5.2.1 To ensure proper deglutition process; F1.5.2.2 To ensure minimum respiratory effort; F1.5.3 To ensure minimal invasion on the trachea; F1.5.4.1 To ensure and maintain moisture; F1.5.4.2 To ensure and maintain heat.

Considering the aforementioned functions, the innovative fixing system that was proposed consists of a spherical/toroidal surface (Fig 5).



Fig. 5: Main three concepts for the spherical surface tracheal fixing system: a) SFS 1 - full lateral gripping elements; b) SFS 2 - lateral gripping elements with model driven micro-perforations; c) SFS 3 - structural shaped lateral gripping elements

The dimensions of the sphere were compliant with the patient's anatomy. Studies undertaken by Chunder et al (2010) and Brodsky et al (1996) have shown that the average tracheal width for women is 17 mm (range = 13-25 mm) and for men is 22mm (range = 13-25 mm). The age range for the patients was 13 to 82 years. Situated within the average, the patients' CT shows he has a 20 mm tracheal width. For accuracy, the measurements were taken both in the sagittal and transversal plane from data series and details. Thus, three different concepts were proposed for the spherical fixing system (Fig. 6) and were presented to surgeons for feedback and validation. The first spherical fixing system (SFS 1) was designed with full spherical lateral gripping elements. The second concept of the fixing system (SFS 2) presents lateral gripping elements with model driven micro-perforations for extra grip. The third concept (SFS 3) was designed with structural shaped lateral gripping elements in order to reduce the overall weight of the concept. All three concepts were designed for a 20 mm diameter (tracheal width on both sagittal and transversal plane). In order to mimic the effects produced by a cuffed tracheostomy tube, the spherical surface fixing system can be manufactured with the upper surface of the sphere covered. Thus, a half closed sphere will totally disconnect the upper airway.

The neck plate was designed in accordance with the following functions: F1.2.1.2 To ensure external fixing; F1.3 To maintain shape; F1.4.3 To maintain clean wound; F1.5.1 To ensure maintenance; F1.5.2 To ensure patient anatomy compliance. The overall dimensions of the neck plate are 18.5 mm

by 37 mm, with a thickness of 2 mm. The arch of the part (Fig 6) follows the anatomical shape of the patients' neck and is guided by a circle of 28 mm radius. Three concepts of the neck plate were developed (Fig 6) to fulfil the functions identified previously.

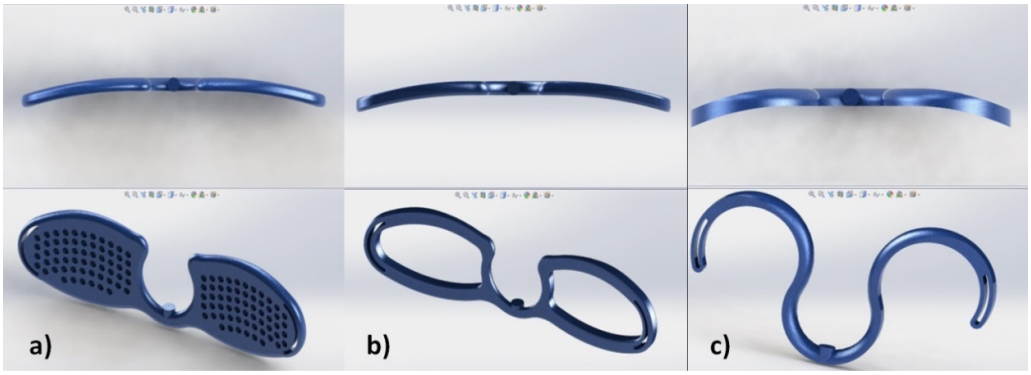


Fig. 6: Main three concepts of neck plate: a) NP 1; b) NP 2; c) NP 3

All the concepts have a common cylindrical section in the middle that fits perfectly on the outer diameter of the body tube. Also, an embossed cylinder was provided in order to orient and fix the neck plate onto the tracheostomy tube. Once in place, the shape of the neck plate indicates the orientation of the tube subsequent to surgery. It makes adjusting the TrachyLight easy and comfortable at any moment. The first concept of the neck plate (NP1) offers the most support, whilst providing skin ventilation through custom made curve driven perforations. These perforations can have any shape in a specific dimensional limit, without affecting the structural integrity of the part. Sideways NP1 is provided with appropriate slots for fixing with an ordinary neck strap. The second concept of the neck plate (NP2) is designed for medium support and has a light weight construction. Prolonged contact with skin will not cause any complications due to the wireframe structure. The shape of the third neck plate concept (NP3) ensures minimal skin contact whilst ensuring light support for patients that have a healed stoma. These patients often need to wear a tracheostomy tube for longer periods of time. The neck plate is the most adaptable component of the TrachyLight, as long as it maintains several mandatory features: the fixing and contact cylinder and the side slots.

A fully functional concept of the TrachyLight was assembled in SolidWorks, using the following components: 15mm adaptor, SFS 3 and NP 3 (Fig 7). Any combination of the designed components is possible as they are interchangeable and adaptable with standard medical devices used in care and management of tracheostomies.

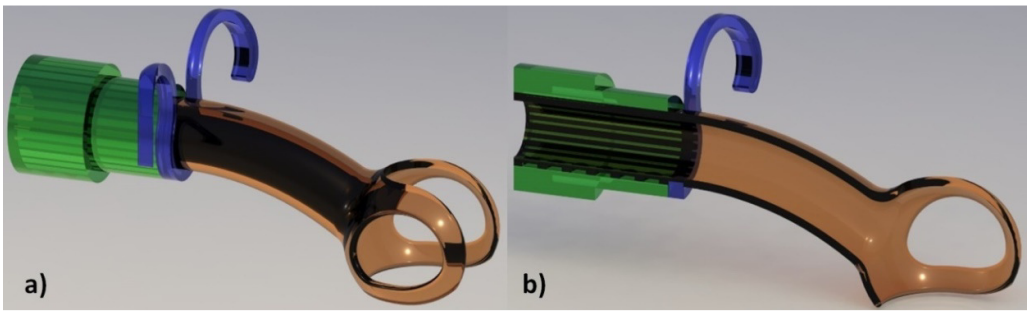


Fig. 7: New tracheostomy device concept (ID 7 mm): a) Isometric view; b) Section view through the sagittal plane

Results and Discussions

Manufacturing of Trachy Light prototypes using 3SP™ technology

The TrachyLight concepts were manufactured with an industrial additive manufacturing machine from EnvisionTECH, the Ultra 3SP™. The used *.stl files had the following input parameters: deviation tolerance 0.00332345 mm; angle tolerance 0.5 degrees; output as binary; metric unit system. The print job was designed with Perfactory™ software and loaded on the machines built-in computer. Seven components were included in one build operation, as follows: three concepts of the tracheostomy tube with the different spherical surface tracheal fixing system, six parts of neck plate (two of each concept) and one 15 mm adaptor (Fig 8). The voxel size depth was set to 50 µm. The entire batch was printed in 10 hours and 35 minutes. In order to fully cure the parts, they were placed in a UV curing unit. All the parts were sprayed with a silicone based solution for a better surface finish and left 12 hours to rest. After all post-processing and secondary treatments were finished, the parts were paper dried and fitted together in order to assess assembly functionality.

The TrachyLight concept prototypes, manufactured using the 3SP technology, are presented in Fig 8. The assembly of the three neck plate concepts with the other three tube concepts was done randomly.

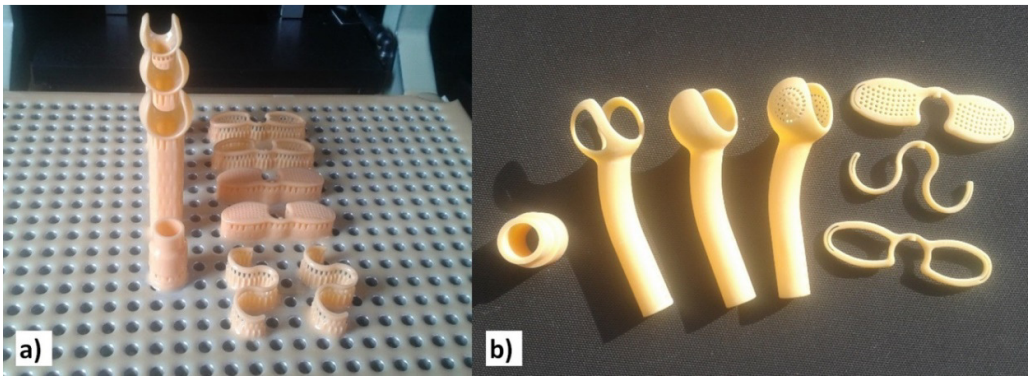


Fig. 8: TrachyLight concept prototypes manufactured with 3SP technology: a) prototypes with supports on the build platform of the machine; b) post processed prototypes

Functional Tests

Functional tests were required in order to identify any surgical technique and concept shape related problems. An emergency room suture kit was used to perform the surgical procedure (Fig 9a). The prototypes were tested on a pigs' trachea of 20 mm diameter (Fig 9b) in order to identify any functional issues. A window type incision was used to access the tracheal lumen (Fig 9c), as it is the most common method employed, presented in the research conducted by Wilkinson et al (2014). The tests were conducted by a surgeon in an appropriate medical facility. The following criteria were assessed: ease of insertion, ability to orient during the procedure, ability to maintain position subsequent to the procedure, compliance with the shape of the trachea, existence of appropriate pressure on the trachea. During the surgical procedure, it was observed that the LightTrachy tube could be inserted with ease. The concept with SFS3 was the easiest to be inserted into the trachea, due to the lateral shavings of the sphere. The surgeon concluded that if a different type of incision was used in the surgical procedure, the TrachyLight concepts could have some issues with insertion. The orientation was made instinctively, due to the shape of the spherical fixing system and the presence of the cylindrical fixing element on the lower side of the prototype. After insertion of the TrachyLight in the trachea, the shape of the fixing system made it quite easy to be snapped into position. The orientation was once again checked visually with the cylindrical elements. Position was maintained due to the shape of the spherical fixing system and the 60^0 angle of the tube body.

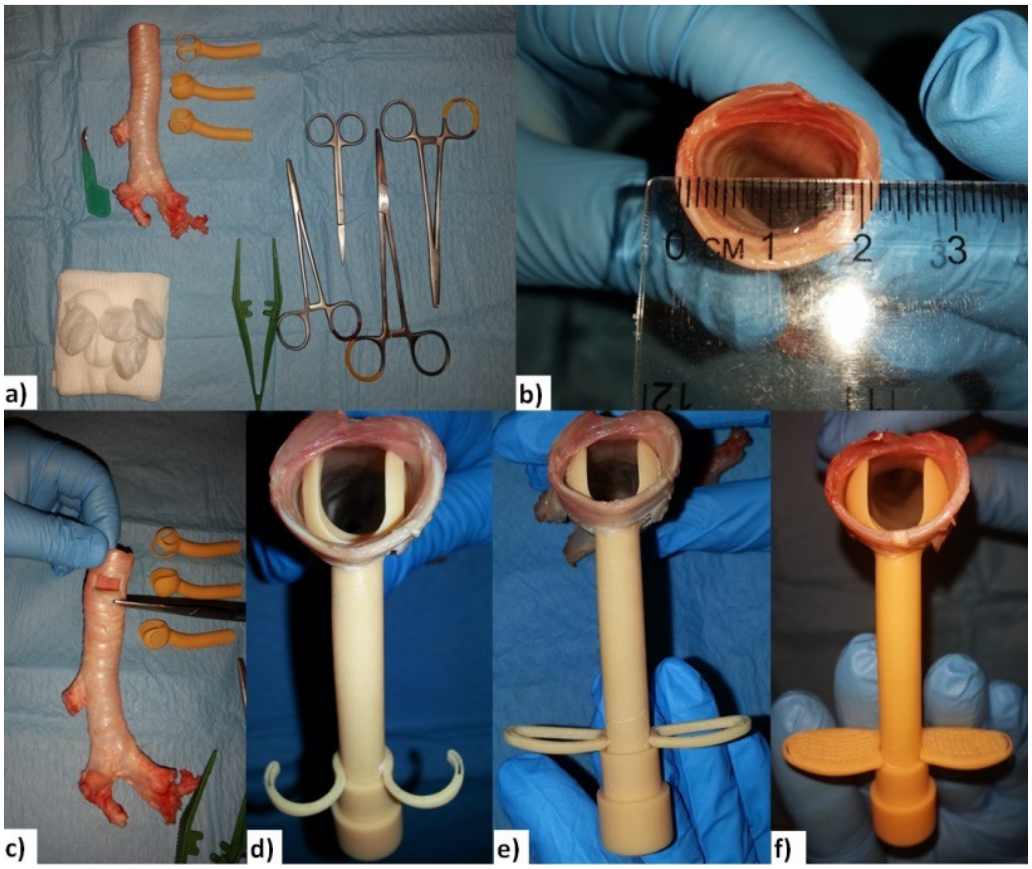


Fig 9. Functional tests on an explanted pigs' trachea: a) materials; b) 20mm trachea; c) fenestrated window; d) fit test for SFS 3 & NP3; e) fit test for SFS 2 & NP 2; f) fit test for SFS 1 & NP1

The pressure on the contact surface meant the trachea maintained a slightly tense position, with no bulges or deformations of the trachea (Fig 9 d, e, f). It was concluded that the slight tension was due to the fact that the concepts were not designed in compliance with the anatomy of this specific trachea. Out of the three concepts, SFS 3 presented minimal impact over the tracheal lumen. The most stable concepts were SFS 1 and SFS 2, both gripping securely onto the tracheal wall. Taking this into consideration, the authors will conduct future studies regarding the optimal shape of the fixing system. Concepts with a toroidal surface will be developed, as the contact surface with the trachea would be wider, thus generating more stability. It was also observed that for fitting and fixing the neck plates and the adaptor, the tube needs to be secured in place with one hand. In this particular instance, the shape of the neck plate concepts became an advantage, due to the clip-on feature.

Recommendations and Feedback

The CAD concepts generated, along with the prototypes and the results of the functional tests, were sent to a team of medical/surgical specialists for initial feedback.

Some suggestions were made for future studies, amongst which can be mentioned: 1. The wall of the trachea must always overpass the diameter of the devices' central cavity diameter; for this reason, special care must be given to the insertion, fixation and maintenance of the device in the proper position; 2. An easy removal must be ensured at all times and some concerns were stated in relation to the bulbous end if used together with a different type of incision; 3. The shape of the neck clips

could be further improved; specialists choose concept model no. 3 as a more "appealing" solution; 4. In vivo concept testing is strongly recommended after the final bio-compatible material is chosen.
The main contributions brought about by the TrachyLight can be summarised as follows: improvement of the deglutition process; limited invasion of the trachea; customised features with patient anatomy compliance; ease of orientation, fixation and overall fitting; and controlled pressure on the tracheal lumen. Depending on the final manufacturing material, the TrachyLight will be impregnated with an antibiotic solution. Due to the porous surface roughness, an inherent feature of AM technology, the antibiotic will be absorbed deeply into the material structure of the device.

After undergoing the present research, several conclusions were made: 1. For short-term users of the TrachyLight, it is better that the devices are available in several standardised dimensions of the tube and spherical fixing system. The CAD model can be parameterised with appropriate software tools and the device could be manufactured in a large scale production; 2. For long term or permanent users of the TrachyLight device, it is best that the design process should take into consideration the specific dimensions and shapes of the patients' trachea informed by CT data.

In this context, some recommendations are given for possible adaptation of the TrachyLight device for permanent tracheostomy and laryngectomy patients: the spherical fixing system is intended to be manufactured from biocompatible rubber-like material to facilitate removal by the patient themself; an easy guiding system should be designed to allow the patient to insert the TrachyLight safely and in a proper position; an ergonomic tracheostomy shield is considered for customisation. These recommendations constitute a basis for future research.

Conclusions

The current research presents an integrated approach for developing a new tracheostomy device concept, fabricated using AM technologies. The advantages of AM were used to enable the design and manufacture of customised, unique features that target the reduction of late clinical complications of tracheostomy tube users. The proposed structured approach covered the following research areas: identification of challenges and complications in airway management for tracheostomy patients; definition of specific needs; identification of targeted functions of the new tracheostomy device concept; development of CAD models for several concepts that fulfill the identified functions; manufacture of the first prototypes of the new tracheostomy device concept; deployment of functional tests on a pig's trachea; evaluation and feedback from a team of medical specialists; recommendations for usage of the new tracheostomy device concept. The research results were encouraging, thus future research will be undertaken for further development of the TrachyLight concepts.

Future research includes designing an ergonomic adaptable shield to improve speech, device and stoma protection, and physical appearance when the TrachyLight is not connected to ventilation equipment. Cleaning or sterilisation will be considered when choosing the material for manufacturing the final TrachyLight device. All the medical practitioner feedback was taken into consideration and will be given special attention when designing and testing the final prototype. In vivo tests will be conducted in a rigorously designed and managed experiment.

Acknowledgment

This work has been funded by University Politehnica of Bucharest, through the "Excellence Research Grants" Program, UPB – GEX 2017, Identifier: UPB- GEX2017, Ctr. No. 50/ 2017 (BIOSHIELD)".

References

Apfelbaum, JL., Hagberg, CA., Caplan, RA., Blitt, CD., Connis, RT. and Nickinovich, DG. (2013), 'Practice Guidelines for Management of the Difficult Airway', An Updated Report by the American Society of Anesthesiologists, Task Force on Management of the Difficult Airway, *Anesthesiology*, 118 (2), 251-270

Brodsky, JB., Macario, A. and Mark, JBD. (1996), 'Tracheal Diameter Predicts Double-lumen Tube Size: A Method for Selecting Left Double-Lumen Tubes', *Anesthesia & Analgesia*, 82, 861-864

Chunder, R., Nandi, S., Guha, R. and Satyanarayana, N. (2010), 'A morphometric study of human trachea and principal bronchi in different age groups in both sexes and its clinical implications', *Nepal Medical College Journal*, 12(4), 207-214

De Leyn, P., Bedert, L., Delcroix, M., Depuydt, P., Lauwers G. and Sokolov Y. (2007) 'Tracheotomy: clinical review and guidelines', *Eur J Cardiothorac Surg,* 32(3): 412-421

Engoren, M., Arslanian-Engoren, C. and Fenn-Buderer, N. (2004), 'Hospital and Long-term Outcome After Tracheostomy for Respiratory Failure', *CHEST Journal*, 125(1), 220-227

Fikkers, BG., Breedveld, P., Delwig, H., Dongelmans, D., van der Hoeven JG. and Spijkstra, JJ. (2013), 'Tracheostomy on the intensive care unit for adult patients', Protocol elaborated collaboration with the committee "Guidelines Tracheostomy", 1-20

Fisher, DF., Chenelle, CT., Marchese, AD., Kratohvil, JP. and Kacmarek, RM. (2014), 'Comparison of Commercial and Noncommercial Endotracheal Tube-Securing Devices', *Respiratory Care*; 59(9): 1315-1323

Ham, ST. (2010), Mapping the Medical Device Development Process, California Polytechnic State University

Morris, LL. and Afifi, MS. (2010), Tracheostomies – The complete guide, Springer Publishing Company, ISBN 978-08261-0518-9

Muralidhar K. (2008), 'Tracheostomy In ICU: An Insight into the Present Concepts', Special Article, *Indian Journal of Anaesthesia*, 52(1): 28-37

NCEPOD (2009), Adult Tracheostomy: Patterns and problems with tracheostomy in UK hospitalised adults, Protocol

NHS (2007), Caring for the patient with a tracheostomy: Best Practice Statement, NHS Quality Improvement Scotland, ISBN 1-84404-453-X

Roe, BB. (1962), 'Bedside tracheostomy', *Surgery Gynecology and Obstetrics Journal*, 115, 239-241

Santos, ICT., Gazelle, GS., Rocha, L. and Tavares, JM., (2012), 'Medical device specificities: opportunities for a dedicated product development methodology', *Expert Review of Medical Devices,* 9(3), 299-311

Sobotta (2011), Atlas of Human Anatomy, Vol. 3: Head, Neck and Neuroanatomy, Editors Paulsen F. and Waschke J., 15th Ed., Elsevier Urban & Fischer, ISBN 978-0-7234 -3733-8

Ulrich, K. and Eppinger, S., (2012), Product Design and Development, 5th Edition McGraw Hill Education, New York, USA

Wilkinson, KA., Martin, IC., Freeth, H., Kelly, K. and Mason, M. (2014), On the Right Trach? A review of the care received by patients who underwent a tracheostomy, National Confidential Enquiry into Patient Outcome and Death, ISBN 978-0-9926184-1-4

Wohlers T. (2015), Wohlers Report 2015: Additive Manufacturing State of the Industry Annual Worldwide Progress Report, Wohlers Associates, Inc., Colorado, USA

Zenikos, S., Makover, J., Yock, P., Brinton, TJ., Kumar, UN., Denend, L. and Krummel, TM. (2012), Biodesign – The process of Innovating Medical Technology, Cambridge University Press, 6th Edition, ISBN 978-0-521-51742-3

Agricultural land prices development in the Czech Republic and the latest legal development

Ivan Soukal, University of Hradec Kralove Faculty of Informatics and Management Department of Economics, Hradec Kralove, Czech Republic, ivan.soukal@uhk.cz

Agnieszka Tarnowska, Wroclaw University of Economics Department of Management and Food Economy, Wrocław, Poland, agnieszka.tarnowska@ue.wroc.pl

Abstract

Agricultural land is the rare resource of strategic importance and its market in the Czech Republic underwent significant development in the last decade. A continuous trend of price increase in the last decade resulted in prices that are higher 3.5 times now compared to the year 2006. However the trend was not the same over time and the year 2014 brought even higher price increase than ever before due to legal changes, non-agricultural investors and the end of the economic crisis. Tested hypothesis confirmed that there is statistically significant difference in price development before and after 2014. Legal changes concern the right of first refusal which allowed reaching more easily broader range of potential buyers. Long and medium-term non-agricultural investors were seeking the opportunity of high yield and low risk investments. However the situation may change since the share of non-agricultural investors on total purchase slowly decreases as the costs in the investments increases. Also the re-introduction of the right of first refusal will have a negative impact on the market. Similar negative effect will have CZK appreciation against EUR and USD because of higher costs for foreign investors from Germany, Austria, Netherlands and Belgium. The last significant factor is the increase of the key interest rate which may continue in the future and which increases the costs of credit used for the agricultural land purchase.

Keywords: agricultural land, price, right of first refusal, Czech Republic.

Introduction

Agricultural land is the rare resource of strategic importance for any country that cares about the food security of its citizens and it participates on GDP as a factor of production. The agricultural land market went through many changes during the last few decades. It changed from the era of "under-developed" market where less than 0.5 % (Vrbová, Němec, 2005) agricultural land fund traded per year to more than 2.3% traded per year (Ministry of Agriculture, 2015) and with a land as highly demanded investments. With the development of civilization this resource will decrease (Piwowar, Dzikuć, 2015), and its price will rise. The last ten years show that the last part of the sentence is more than precise – the land prices are 3.5 times higher than ten years ago. Such increase attracts the attention of not just investors but mainly of farmers themselves and government as well.

One of the ways how government can influence the agricultural land price development is through legal system although within the limits of EU legal system only. One of the legal means is the right of first refusal which can significantly delay or sometimes even prevent the agricultural land purchase. Unlike Poland in the Czech Republic is a lot of land in co-ownership. Co-owners had general right of first refusal to other co-ownership shares till the 31st December 2013 accordingly to the Civil code. In 2014 the Civil code Act no. 89/2012 Coll. commonly known as New Civil code (hereinafter referred to as NCC) became active and the right of first refusal was not a general principle anymore, its extended was limited. Also at the same time non-agricultural investors became dominant purchase power on the market since agricultural land offered high yield carrying only low risk. Another important feature of 2014 was that this year ended the economic crisis.

We are going to analyze the price development to find out whether the year 2014 and its two major factors were strong enough to change the price development. We are going to test a hypothesis on a sample of price before and after the change (the right of first refusal, non-agricultural investors became main buyers on the market, end of crisis). Also we will describe the latest development including recent NCC novelization. NCC implemented change concerns Act no. 460/2016, Coll. bringing re-introduction of the right of first refusal.

Methods

Data for the analysis were obtained from two sources Czech Statistical Office and Farmy.cz. The first source provides the data based on real-estate transfer tax return analysed for the whole tax payer population per year. The second source's methodology is based on monitoring market prices under a condition that both sides are well-informed and participate voluntarily in trade. We did not separate arable land from permanent grassland and so land prices per hectare are average prices per year of all agricultural land. Typical sources of these data are the land auctions. Standard inflation adjustment was performed on all land prices with a base year 2006. All prices are converted into EUR by year average exchange rates. Due to a foreign exchange market intervention of Czech National Bank are prices calculated in purchase parity power exchange rates (hereinafter referred to as PPP) as cross-parity from USD/CZK and USD/EUR rates.

Mann–Whitney test (also known as Wilcoxon–Mann–Whitney test) is a suitable method capable of testing ranked data with wider usability range than parametric tests (such as t-test). This method is widely used in social sciences for ranked data, see e.g. Bargagliotti (2009) or Aryal and Gabrielli, (2013) who employed Mann–Whitney test price development comparison under different conditions. Mann–Whitney test is a nonparametric test of the null hypothesis that it is equally likely that a randomly selected value from one sample will be less than or greater than a randomly selected value from a second sample. The both samples have to be independent of each other and the values have to be ordinal. The hypothesis tests if variable X from sample A with $n1$ observations and the variable Y from the sample B with $n2$ observations got the same distribution i.e. the distributions of both populations are equal. All observations got the rank. Let R_A bet the sum of the ranks from A sample and R_B the sum of ranks from the i sample. Test value is the U_{min} from:

$$U_A = n_1 \cdot n_2 + \frac{n_1 \cdot (n_1 + 1)}{2} - R_A \tag{1}$$

$$U_B = n_1 \cdot n_2 + \frac{n_1 \cdot (n_1 + 1)}{2} - R_B \tag{2}$$

$U\ (\alpha,n1,n2)$ is the critical value of Mann–Whitney test for selected α.
If $U_{min} > U\ (\alpha,n1,n2)$ then the hypothesis of distribution match cannot be rejected.
If $U_{min} < U\ (\alpha,n1,n2)$ then the hypothesis of distribution match can be rejected.
Hypothesis 1: the distribution of land areas trade per year is equal for years before and after the liberalization.
Linear regression described e.g. by Hebák (2005) or Bowerman and O'Connel (1997) is based on least square method. It solves the problem of finding a linear function that best fits a set of data points. Let us have a set of n pairs of observations $\{yi,xi\}$. The linear function represents the relation of value of the dependent variable Y to the values of an independent one X. This function describes in other words the relation between the data set and the prediction. With one variable and a linear function, the prediction is given by the following equation:

$$\hat{Y} = a + bX \tag{3}$$

This equation involves two parameters which specify the intercept and the slope b of the linear regression function. The least square method defines the estimate of these parameters as the values for which the sum of the squares between the dataset and the prediction (observed yi and the predicted yi) is the least one possible. The minimization problem is given by the following equation:

$$\sum_{i}^{n} \varepsilon^2 = \sum_{i}^{n} (y_i - \hat{y}_i)^2 = \sum_{i}^{n} (y_i - a - bx_i)^2 \quad (4)$$

The estimation of the parameters is obtained by derivation of (4) with respect to a and b and setting them to zero.

Results

Legal changes

Co-owners had general right of first refusal to other co-ownership shares till the 31st December 2013 accordingly to the Civil code. The only exception was a transfer to the close person. Close person is a legal construct describing a situation when two persons are so close to each other that a detriment or harm to one of them, the other would felt as detriment or harm to one's own (generally a close relative, a spouse, a registered partner, a sibling, or any other person who would reasonably be harmed by another person's detriment). The general right of first refusal was applied to both immovable and movable property. The New Civil code became active from the 1st January 2014 and general right of first refusal was not applied anymore. The regulation of selling a real estate share became liberal almost abolishing general right of first refusal although agricultural plant co-ownership had a special treatment. Agricultural plant was a new legal construct representing a set of assets created by entrepreneur and being used to perform farming. The right of first refusal was kept valid concerning agricultural plant but only for a specific case when co-owners got their share under the conditions when they could not influence their rights and obligations from the beginning. This covered mainly a situation such as if the co-ownership was based on the acquisition by previous owner's death (by the last will, by inheritance agreement). However, at the same time another exception was involved. Co-owners could not apply right of first refusal if the share transfers was a co-owner and another co-owner, his or her spouse, sibling or a direct relative. The right of first refusal was applicable also in case that a transfer was a voluntary conveyance to prevent right of first refusal evasion. Although the right of first refusal was kept valid for agricultural plant in much wider range than for other property types, extend was significantly narrower.

The situation changed due to a recent New Civil code novelization by Act no. 460/2016, Coll., namely article I. § 1124, 1125 of NCC. The amendment of the New Civil code re-introduced the general right of first refusal. As of 1st January 2018 the general right of first refusal will be applied again on all real estate. Therefore, if the co-owner transfers his or her share, the other co-owners can apply right of first refusal. An exception will be again concerning close person and so transfer to a close person cannot be blocked by the right of first refusal. Co-owners will have the right to redeem the seller's share of ownership according to the size of their shares, unless they agree otherwise. Unlike before the exception will not be applicable on the co-owner-to-co-owner transfers and so even in this case the right of first refusal has to be taken into consideration. This extends the right of first refusal into a general principle. The latest amendment of NCC treats co-ownership in almost the same way as Act no.140/2014, Coll. from Slovakia (valid from 1.6.2014). This shows continuing legal similarities in former Czechoslovakian territory.

Price development

The year 2006 was selected a base year for inflation adjusted prices per hectare. Prices were converted by EUR/CZK for both average year exchange rate and average year exchange rate in PPP. See the price development on the fig. 1 below. As mentioned earlier, a significant legal change in land market became active in January 2014. Therefore a mark divides a price development chart below into the part with the general right of first refusal (till 2013) and without (2014-2016).

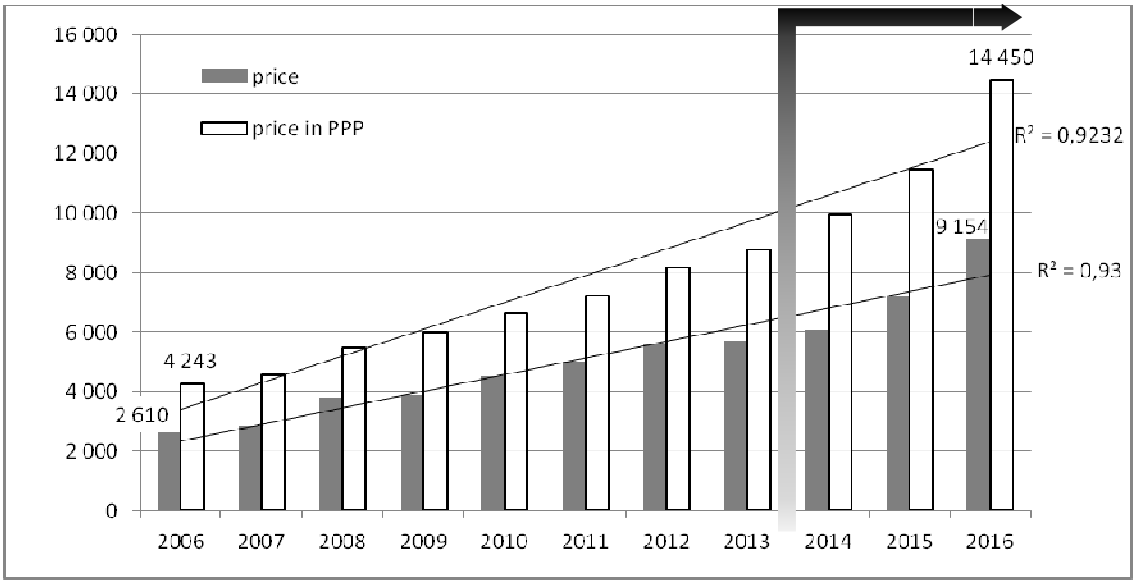


Fig. 1: Development price per hectare in EUR, own calculation based on (Farmy.cz, 2017; Czech Statistical Office, 2017; OECD, 2017; Ministry of Agriculture, 2009).

The chart shows continuous increase in land price per hectare in both expressed in EUR and in EUR in PPP. The increase is described with regression function for prices in EUR $y = 559{,}62x + 1769{,}6$ $x \in \{2006, 2007, \ldots, 2016\}$ and with regression function for prices in EUR in PPP $y = 900{,}54x + 2496{,}1$, $x \in \{2006, 2007, \ldots, 2016\}$. Both functions show very high index of determination suggesting that the slopes are good price lead in the surveyed period. The prices per hectare rose by a bit more than 350 % regarding the EUR and by a bit more than 340% from 2006 till 2016.

The hypothesis regarding the price development before the year 2014 and after was tested with the test criterion 0 below the tabled critical value for Mann–Whitney test 2 for alpha 0,05 (two-tailed). We managed to reject the hypothesis that the prices of two samples were from the same distribution.

The year 2014 brought not just a legal environment change but also an approach of agricultural investors changed and created highly competitive environment. Farmers often profited from excellent knowledge of a local situation and relatively low local demand and achieved favorable land purchase. This situation was a typical one in the previous decade. However as the land became more and more attractive to nonagricultural investors and so opportunities for local favorable land purchase became much less frequent. Agricultural buyers had to compete with investors who are capable and willing to pay the seller real market prices on a new platforms such as land market auctions seeking adequate return on investment which is safer than other means of investment. Large share of long and medium-term non-agricultural investors arose also due to an expected increase in demand of various churches. Regular compensation for the land that cannot or will not be returned to church was a part of restitution process

closure in 2013. Churches are spending money from compensation also on land acquisition. Long and medium-term non-agricultural investor does not have an advantage in excellent knowledge of a local situation and cannot use the same means of addressing thousands of land owners by mail or newsletter campaign. This is what speculative investors try and serious investor seeking long-term or at least would only discredit oneself by such campaign. Serious investors compete by better price bid and they are successful because they became almost a half of effective demand. However their share very slowly decreases during the last years, see the fig. below. All groups contain homeland as well as abroad buyers. However foreign buyers are focused almost only on greater parts of land and it is very rare that they buy parts below 5 hectares. Most of foreign investors come from Germany, Austria, Netherlands and Belgium.

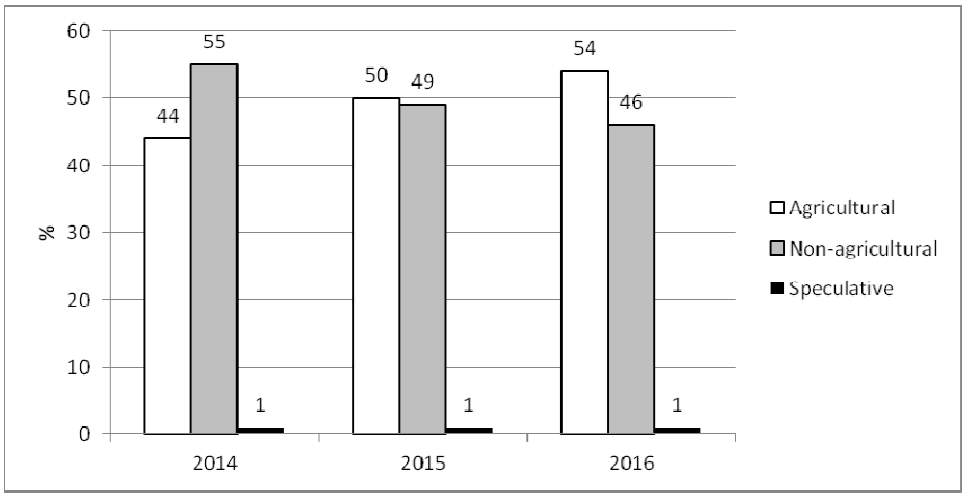


Fig. 2: Development of shares on total year agricultural land purchase, own elaboration based on (Farmy.cz, 2015; Farmy.cz, 2016; Farmy.cz, 2017).

In 2014 speculative investors (very short-term investment or direct resale) intensified considerably their campaign and a lot of landowners received a bid with disadvantageous conditions or significantly below the market price. Existing or emerging companies are trying to buy a land from owners without up-to-date land price information. However, they are not able or willing to pay the real market price in case of greater number of competitors or an auction. Although this group of investors is not generally successful its activities also contribute to market price increase because they reduce the overall supply of agricultural land on the market.

The recent market situation is that in 2016 was the most common interval of agricultural land purchase (5.549; 9.248) EUR per hectare and that is (8.759; 14.598) EUR in PPP per hectare. Year to year average land price per hectare rose by 25.5% in CZK and 26,7% in EUR due to CZK appreciation. This rate of change is the highest one for the last fifteen years. The price in the fig. 1 do not include the real estate acquisition tax of 4% from the tax base which is the higher price of the purchase or appraisal one. Generally are the prices in the last year even higher by 4% because the tax burden was in 2016 moved to buyer.

Discussion

We managed to reject the hypothesis that the prices of two samples were from the same distribution. This means that the price development before and after 2014 are not the same. Since the trend is easy to identify it is natural that ranked based non-parametric test was negative. If the trend curve is used on the time series 2006-2013 it is less steep than trend curve that would be for years 2014-2016. The difference

in slope for prices calculated in EUR is as high as more than 300%. 2014 was the year of change but we are not able to distinguish whether the factor of easier and faster agricultural land purchase or high interest of non-agricultural investors in land purchase or the end of the economic crisis was the main cause. It is likely that it is a combination of these three factors and that one strengthened the other one. In the next years 2015 and 2016 were all these factors still present increasing the price up to 9.154 EUR per hectare and 14.450 EUR per hectare in PPP.

The fig. 1 shows significant price increase trend which became even greater in the last three years. Agricultural land market prices increased by almost 65% during the last three years. The trend of price increase doubled the level of market prices over a period of only 6 years (from 2010 to 2016). This made the agricultural land one of the highest yield investment with very low risk. However the market situation can change. Continuing demands of the Agrarian Chamber of the Czech Republic and the Agricultural Committee to establish the right of the first refusal for lessees as well may succeed in the future. However it is less probable that the rest of the demand, extend the right of the first refusal for farmers from the municipality where the land is being sold and for state as well, will succeed. This would be too strict market intervention and could be seen as infringement of common EU market. However, generally any further extension of the right of the first refusal would have an impact on price. The group of non-agricultural investors would have more limited access to land purchase which would reduce competition on the demand side. At the same time, all owners would lose the opportunity to offer their land to wide range of buyers and we are not considering the time factor. Although we do not expect any further changes soon because of the parliament elections in the October 2017. It is almost impossible to approve such changes before the elections and after the elections it always takes a few months before the ministries start working properly again due to a government negotiations.

Although further legal change is highly improbable we presume the present one will be enough to slow down the price increase. Re-introduction of the right of the first refusal was known from the spring of 2016. This stimulated both the demand and supply to make a deal before the new regulation will come into force. The re-introduction creates a problem of co-owned asset liquidity increasing mainly time needed for trade. Also asset consolidation will be more demanding task because the amendment of the NCC brought the right of the first refusal even in case of transfer between two co-owners. Due to these two mentioned factors in the paragraph we except lower amount of land traded in the next year.

The next events with an impact on the market will be the monetary policy of the Czech national bank. Since both groups agricultural and non-agricultural investors contain abroad companies the exchange rate interventions or appreciation of CZK would increase their costs on land acquisition making the investments lees profitable. The CZK continues its steady value increase against EUR and USD due to both transparent and well-managed end of an asymmetric foreign exchange commitment regime and moreover due to excellent performance which Czech economy shows during the last few years. With the lowest unemployment rate in the EU and stable GDP growth we expect CZK to appreciate even more during the next year up to the EUR/CZK 25.5. Another factor which could cool down the market we see again in the monetary with increase of the interest rate. Czech national bank recently increased key interest rate 2T REPO from 0.05% to 0.25%. In case of overcoming of the inflation target another increase is possible. This would certainly lead to increase of market interest rate on credit. This would not just only decrease the number of possible buyers but mainly it could increase installments of already provided credit at the end of their fixed interest period. It is possible that some debtors would not be able to pay the installments anymore and their land would be offered on the auction. All effects mentioned in this paragraph got effect on the slowdown of observed long-term price increase.

Conclusion

The agricultural land market development showed significant and steady trend of price increase in the last decade. The price increase was as significant as 350%. Average land market price went from 2.610 to

9.154 EUR per hectare. If the calculation takes into account PPP the amount are even higher: from 4.243 to 14.450 EUR in PPP per hectare. The market changed significantly in the year 2014 and the price increase trend is steeper than before. Our hypothesis that the development before and after the year 2014 was rejected. The main factors of change in 2014 were legal aspects, demand from the side of non-agricultural investors and the end of economic crisis.

The legal aspects allowed landowners on co-ownership to sell their share to much wider range of buyers. The fact that they could reach more buyers without the obstacle in form the right of the first refusal increased the competition and resulted in price increase. The remaining factors had also price increase effect. Increased number and purchase power of non-agricultural investors (long and medium-term ones) became greater than the numbers of agricultural investors. High yield carrying only low risk was the main feature that brought the attention of investors on the agricultural land market. The end of crisis removed not just pessimistic expectations but mainly increased the agricultural business turnover and yield motivating and allowing farmers to invest in a new land acquisition. Although the price rise continued in 2015 and 2016 the share of non-agricultural investors dropped by almost 10% as the costs of land acquisition became higher decreasing an investment yield.

We do not expect strong price rise to continue on the contrary we expect certain market cool down. The factors are mainly legal and macroeconomic ones. The legal factor concerns the novelization of the NCC which re-introduces general right of the first refusal. The amendment of the NCC comes into force at the beginning of 2018. There are only very specific exceptions from right of the first refusal (transfer to close person) which means that agricultural land for purchase will reach narrower range of potential buyers or it will take more time. CZK appreciation against both EUR and USD will increase the costs of an investment for foreign investors that are part of both agricultural and non-agricultural group. Key interest rate increase will increase the costs of credit limiting the demand for agricultural land purchase.

References

Aryal, G., Gabrielli, M. F. (2013). Testing for collusion in asymmetric first-price auctions. *International journal of industrial organization*. 31(1), 26-35. DOI: 10.1016/j.ijindorg.2012.10.002

Bargagliotti, A. E. (2009). Aggregation and decision making using ranked data. *Mathematical social sciences*, 58(3), 354-366. DOI: 10.1016/j.mathsocsci.2009.07.006

Bowerman, B. L. & O'Connel, T. (1997). Applied statistics: improving business processes. Chicago: Irwin.

Czech Republic. (2012) Act no. 89/2012 Coll. Civil code.

Czech Statistical Office. (2017). Macroeconomic indicators. Retrieved August 21, 2017, from: https://www.czso.cz/csu/czso/hmu_cr

Farmy.cz. (2015). ZPRÁVA O TRHU S PŮDOU. Retrieved August 10, 2017, from: http://www.farmy.cz/dokumenty/ZPRAVA-o-trhu-s-pudou-FARMYCZ-leden-2015.pdf

Farmy.cz. (2016). ZPRÁVA O TRHU S PŮDOU. Retrieved August 10, 2017, from: http://www.farmy.cz/dokumenty/ZPRAVA-o-trhu-s-pudou-FARMYCZ-leden-2016.pdf

Farmy.cz. (2017). ZPRÁVA O TRHU S PŮDOU. Retrieved August 10, 2017, from: http://www.farmy.cz/dokumenty/ZPRAVA-o-trhu-s-pudou-FARMYCZ-leden-2017.pdf

Hebák, T. (2005). *Vícerozměrné statistické metody (vol. 2).* Prague: Informatorium.

Ministry of Agriculture. (2009). Summary report 2009. Retrieved August 28, 2017, from: eagri.cz/public/web/file/94705/SZ_2009_EN.pdf

Ministry of Agriculture. (2015). Zelená zpráva 2015. Retrieved September 23, 2017, from: http://eagri.cz/public/web/mze/ministerstvo-zemedelstvi/vyrocni-a-hodnotici-zpravy/zpravy-o-stavu-zemedelstvi/zelena-zprava-2015.html

OECD. (2017). PPPs and exchange rates. Retrieved August 25, 2017, http://stats.oecd.org/index.aspx?DataSetCode=SNA_TABLE4

Piwowar, A., Dzikuć, M. (2015). Wyłączenia gruntów rolnych na cele nierolnicze w Polsce w aspekcie ekonomicznym i ekologicznym [in:] Ekologia na pograniczach (eds. W. Wawrzyniak, T. Zaborowski). Poznań: Instytut Badań I Ekspertyz Naukowych w Gorzowie Wlk., 47-55.

Slovakia. (2014). Act no.140/2014, Coll. on the acquisition of the ownership to the agricultural land.

Vrbová, E., Němec, J. (2005) Land market development in the Czech Republic. Agricultural economics. 5(2005) 216–220.

Customer Service Standards In Authorized Dealer Stores - Blueprinting Technique

Associate Professor Katarzyna Hys, Opole University of Technology, Opole, Poland
k.hys@po.opole.pl

Abstract

Purpose – analysis of the customer service standards applied in stores of authorised dealers of passenger cars from Ford, development of the blueprinting map for the process. **Design/methodology/approach –** The process of customer service in authorised car dealer stores was studied using the mystery shopping method in 21 authorised dealer stores in the period of X-XII 2016 in Voivodship, i.e. Opolskie, Dolnośląskie, Śląskie. The obtained results were elaborated on and the results of the analysis were used to develop the blueprinting map in the scope of the customer service standard in accordance with the methodology described by L Shostack. **Findings –** The key findings concern the identification as well as cause and effect arrangement of the customer service process elements, development of the executed activities with division to service provider and customer. **Research limitations/implications –** The sample size was restricted to 21 authorised car dealers located in 3 Voivodships of southern Poland. This might limit generalizability. **Practical implications** – The study provides managers with insight on the potential opportunities and weaknesses related to customer service. **Originality/value –** Research of the customer service standards in the authorised car dealer market is a relatively new area of study. Majority of the studies on this topic concern other aspects, i.e. economic, technical, amongst others. The purpose of the article is to specify the required customer service standards to be targeted by the managers and towards which their strategies should evolve.

Keywords: blueprinting, buyer-seller relationships, customer service standards, process design service.

Introduction

In economic terms, the improvement of humankind's well-being worldwide is reflected, amongst others, in the formation and development of the services sector. An analysis of the subject structure of the Polish economy demonstrated that 76.8% of the companies registered in the REGON[1] system is comprised of companies from the services sector. Simultaneously, the contribution of the services sector in the growth of the gross value added and GDP amounts currently to 63.8% (Poland 2015 Report). It is estimated that the sector employs every other Pole of working age. It is therefore possible to state that the services sector is a key component of the Polish economy. Hence, the structure of the Polish economy draws near to the composition of OECD states, in which the average share of the services sector in the growth of the gross value added and GDP amounts to 70% (others include industry and agriculture).

Due to the above, it is justified to conduct scientific analyses in the scope of the services sector. The service activity is developing dynamically and the decision-makers expect solution proposals that will support effective decision-making in the economic sense. This paper will be focused on the issue of customer service standards based on the example of authorised passenger car dealers (Johri and Petison, 2008; Jung-Wan and Tai, 2009; Grosse, 2016).

[1] The register REGON fulfils the function of the national Register of National Economy Entities in Poland.

Literature Review

The review of literature on the paper's topic will consider, amongst other, the following aspects: term and attributes of service, customer service standards and the blueprinting method - enabling the service visualisation process.

The "product" as an economic category has a very broad meaning, however it does not always mean the same. When making the division of market offers based on the share of (in)tangible value, L. Shostack has defined "the product tangibility spectrum" (Shostack,1977). This means that the products are a combination of tangible and intangible attributes. Similarly, Ph. Kotler noticed a lack of precision in the product specification and proposed the concept of "product-service continuum". Depending on the content of (in)tangible features, the market includes the following groups of products: classic tangible good, the so-called clean product, product with associated services – it is a mixed offer, in which the most important role is played by a hybrid product, i.e. offer consisting of an equal share of (in)tangible elements, service with associated products and lesser services, classic service, the so-called clean service (Kotler and Keller, 2012).

The "continuum" and "spectrum" theories indicate the existence of a continuity between the product and service (Figure 1).

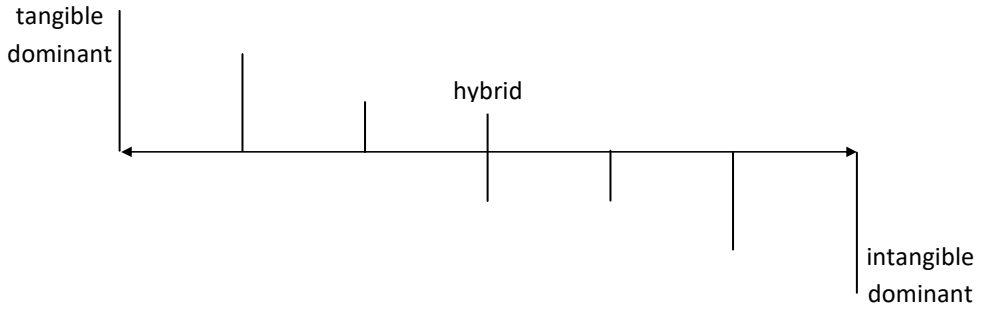


Fig. 1: The product (in)tangibility spectrum/ the product-service continuum

In practice, this means that the product-services boundaries are fluid and depend on the degree of dominance of the (in)tangible features. This paper will focus on the group of service with associated products and lesser services (Phongpetra and Johri, 2011).

In the subject literature, services are defined, amongst other, as follows: activity, benefit, activities, or actions taken by service providers for the benefit of the customers to provide them with specific benefits and/or meet their needs (Groonross, 1994; Parasuraman *et al.*, 1991; Kotler and Keller, 2012; Alam, 2013; Hys, 2016). In contrast to ready-to-use tangible products - services require special attention to their specificity. Aside from such attributes, as: heterogeneity, inseparability and instability, the primary feature of services is their intangibility.

The intangibility of services means that they cannot be seen, tasted, felt or heard prior to purchase (Hill, 1999; Bowen and Ford, 2002). The customer purchases a certain process which is a result of the service provider's knowledge, experience and competencies. On the other hand, the service provider present a ready-to-use service or measure the level of customer satisfaction prior to its provision (Parasuraman *et al.*, 1985; Oliver, 1993). When providing the service, the service provider relies only on arrangements

with the customer. The more accurate they are, the higher the level of customer satisfaction after the service is provided (and vice versa).

Heterogeneity means that the service can be perceived by service providers and customers in various ways. This dependency was defined and described in the gap model (Parasuraman *et al.*, 1985). When broadening the researchers' interpretation of services, it is possible to notice that depending on the adopted customer segmentation criteria (geographic, demographic, psychographic, or concerning their behaviours, amongst others), the expectations and perception of customers and service providers can differ. Factors, amongst others, such as: place of residence, traditions, customs, religion, level of innovation, Internet access, wealth of the given society (and other) affect the customer's knowledge and experience, hence his expectations and perception of the service. Similar dependency exists in the case of the service provider. Depending on the type of customers identified in the segmentation process, services can be provided by employees with various competencies and at the level of various service provision standards (Jung-Wan and Tai, 2009). This process features the asymmetry of information, which means the existence of differences in the level of information concerning the service in possession of both parties in the market transaction. The service provider usually has more information about the service offered by him in the market than the customer. Furthermore, the highly diversified nature of services results from the heterogeneity of particular service products. Due to its nature, the exact same service is never created twice. The emotional state and psycho-physical disposition of the service provider and customer differ at the time of service provision/consumption every time, hence the service itself is always different. This reveals the problem of lack of possibility of standardising the service provision process (Khmel'nyts'ka and Swift, 2010; Macintyre *et al.,* 2011). On the other hand, inseparability means the simultaneity of service provision and consumption - in practice, this means that the service provision process features simultaneous participation of the service provider and customer. The service product may not exist outside the process of its provision and consumption may take place during the time of its provision.

The last feature mentioned is instability, i.e. fleetingness of services. This feature evokes most controversy among researchers. They are raising the issue of lack of possibility to warehouse the services or stocking them. Despite the fact that services (in the sense of intangible values) cannot be stored, moved in space and time or stocked strictly speaking, all of these activities can be executed with the so-called service effect or outcome (Gadrey, 2000; Hys, 2016).

Knowledge concerning the term and attributes of a service is essential for making effective managerial decisions. The primary purpose of each market transaction is the effective exchange of the service for other value (usually expressed in payment units). The service provider aims at meeting the customer's expectations, and the customer seeks a service provider who is able to meet his expectations. However, in the service process, the service provider and customer make decisions taking into consideration, aside from the service costs/price, the customer service standards.

Customer service standards are defined as an organisation's ability to meet the needs and desires of its customers. When aiming at gaining the long-term loyalty of the customers, the decision-makers should design the customer service standards. These standards should especially be adapted to the changing social and cultural, technical and technological as well as economic conditions of the customer (Li *et al.,* 2001, Hoecht and Trott, 2014). The purpose of designing a service is to obtain the optimal level of customer satisfaction with the provided service. In countries in which customers become increasingly wealthy, their expectations and requirements in terms of service standards also increase (Parasuraman *et al.*, 1991). S.M. Walton summarised the market situation in the credo of his company as follows:

> There is only one boss, and whether a person shines shoes for a living or heads up the biggest corporation in the world, the boss remains the same. It is the customer! The customer is the person who pays everyone's salary and who decides whether a business is

> going to succeed or fail. In fact, the customer can fire everybody in the company from the chairman on down, and he can do it simply by spending his money somewhere else.
>
> Credo from Sam Walton the owner and CEO of Wal-Mart – an international chain of department stores and the most successful company in retailing in the world.

Due to the above, the cycle of developing the customer service standards is executed using the following activities:

1. Analysis of the needs and preferences of current and potential customers.
2. Development of the customer service standards.
3. Development and exercise of the work standards by employees in the following scope: company value, aims, operating tasks and roles, effect assessment methods, activities preventing the loss of customers.
4. Provision of services meeting the service standards.

Blueprinting is a tool intended for supporting the service designing process. Blueprinting is a tool used to record the entire service provision process in a graphic form. The visualisation of the service process according to a specific methodology allows to increase employee awareness in the scope of the executed work. A correctly designed service using a blueprinting map allows the decision-makers to identify areas that do not meet the identified customer needs. By adapting these areas to customer requirements, it is possible to significantly affect the perceived service standards. It is recommended to use blueprinting in the modelling of the service process' components (Shostack,1977; Randall, 1993).

In the other words, blueprinting is an optical process recording that presents an image of communication between the exchanging parties. Shostack's arguments were accepted by scientists and a lot of analysts demonstrated the advantages of this method. In the subject literature, the positive contribution of blueprinting is being raised for: internal marketing, service development process, parking behavior, monitoring of the customer preferences, services innovation, services efficiency, process effectiveness, business processes and first of all for management and control of already existing customer service processes. The use of blueprinting known from the literature regards to specific services such as for example: non-profit, pro-health education, industry or the hotel industry (Hys *et al.*, 2014; Li, 2014).

Research Methodology

This study is exploratory and descriptive, and uses the case study strategy (Linker, 2004; Gibbert *et al.*, 2008). For the purpose of this study, it was decided to use the case study strategy and the qualitative data concerning the strengths of this approach with respect to the study's aims (Sroka, 2012; Guillen and Garcia-Canal, 2012; Grosse, 2015; Thomé et al., 2016). The techniques guaranteeing the quality of this research, identified by Yanow and Schwartz-Shea (2015) and detailed in Table I, were carefully observed to avoid the potential threats to the inherent quality of this approach.

The study was conducted in eight stages specified in Table I and included 21 authorised Ford dealer stores in the period between X-XII 2016 in 3 Polish Voivodships, i.e. Opolskie, Dolnośląskie, Śląskie.

Table 1: Research steps

First Stage	Literature studies	Identification of the state of knowledge in the subject literature. Searching for research gaps and prerequisites for conducting studies.
Second Stage	Research design	Review of the relevant literature and its analysis embracing domestic and foreign references, and Internet sources. Specification of the aim and scope of research. Aim - answering the question: What is the customer service standard in the authorised Ford dealer stores in Poland? Scope: substantive - development of a visualisation of the customer service standard in the authorised Ford dealer store in Poland. geographic - 21 stores in the Opolskie, Dolnośląskie and Śląskie Voivodships.
Third Stage	Research strategy	Analysis of the Ford brand dealer market in Poland. Selection of entities for study execution: Opolskie (3 stores), Dolnośląskie (5 stores), Śląskie (13 stores).
Fourth Stage	Study	Study using the mystery shopping method and observation. Scenario: purchase of a new Ford Focus car.
Fifth Stage	Data collection	Recording of observation results and filling out the mystery shopping form.
Sixth Stage	Data analysis	Analysis of the obtained data and reconstructing the actions taken by the service providers and customers. Development of the blueprinting map for the customer service standards in authorised Ford dealer stores using the L. Shostack methodology.
Seventh Stage	Findings	Drawing conclusions and specification of the study's limits.
Eighth Stage	Future research/ limitations	Developing future research paths and questions.

The obtained results were elaborated on and the results of the analysis were used to develop the blueprinting map in the scope of the customer service standard. Based on the obtained study results, the visualisation of the customer service process was developed in accordance with the methodology described by L. Shostack. The blueprinting map was divided into five topical parts: physical evidence,

customer activities, frontline employee activities, backline employee activities and the support process. These parts were further divided as follows: material aspects, interactions between the customer and frontline employees, visibility – area of interaction between frontline and backline personnel, and internal interaction, showing the relations of the backline personnel and the persons executing works aimed at supporting the entire working organisation (Figure 2).

The blueprinting map was developed for the authorised car dealer following the stages provided below (Zeithaml *et al.,* 2006; Sirikrai and Tang, 2006):

- Specification of primary events and typical sequences (flowchart).
- Modelling the customer service process from the customer's point of view.
- Modelling the activities of the frontline and backline employees, as well as the material aspects.
- Establishment of direct and indirect communication connections.

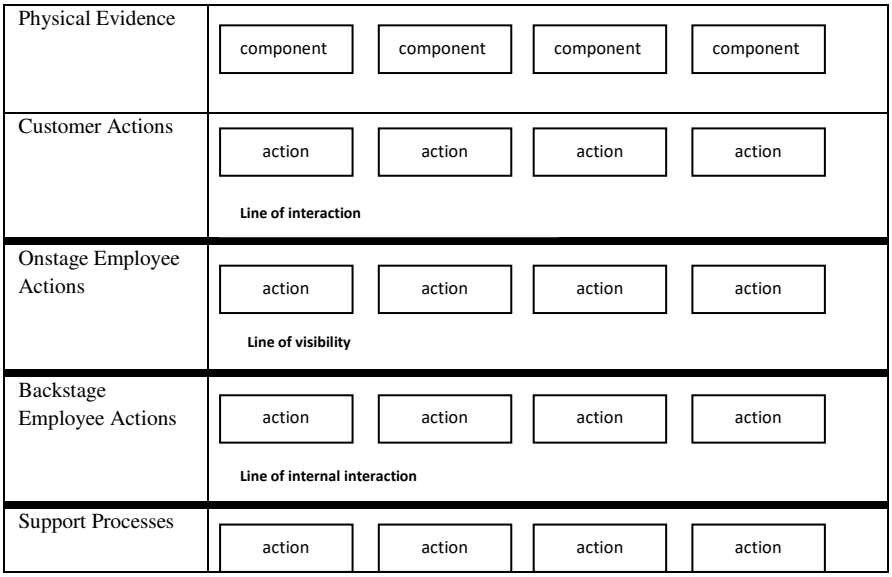


Fig. 2: The blueprinting map

Findings and Discussions

In general, according to the data analysed by the Harvard Business School, researchers demonstrated the following customer focuses: taste (1%), touch (1.5%), smell (3.5%), hearing (11%) and vision (83%) (Wen, 2015; Stolovitch and Keeps, 2002). This information is especially important for the service designing process. It puts the decision-makers' attention on the key aspects of the service, thus allowing the determination of priorities in this process. The first contact of the customer with the service provider can take place via various channels. Contact is usually established via the dealer's website, a telephone conversation or by directly visiting the store of the authorised Ford dealer.

The study conducted at the authorised Ford dealer would allow identifying the key elements for the level of physical evidence. These elements were grouped into five key topical groups. These include: online visits/telephone contact, convenience/accessibility, employees, additional customer services and interior design. Specific elements were identified as part of these groups. If the given reality is evaluated by the service provider at the degree of 83%, the designing of all aspects of "physical evidence" should be

executed with due diligence of the decision-makers. The evaluation of the appearance of the store and its employees performed by potential customers affects their latter purchase decisions. The decision-makers are aware of the above fact. Thus, services are designed in a manner that ensures that the customers' rating for the identified elements of "physical evidence" is a high as possible.

The material aspects of the service design determine only the external image of an authorised car dealer. These aspects are evaluated by customers, but the main point of car selling is the process of customer service, including direct contact with employees. The actions taken by the frontline employees of an authorised car dealer constitute a mirror image of the customer's actions. This means that the customer executes specific actions that are matched by designed reactions of employees. The activities executed by the customers and store employees were divided into three stages: first contact: service provider-customer, visit to the Ford dealer store, using other service points in the store and, additionally, the support processes for all activities in the store were determined (Table 2).

Table 2: Area of customer's and service provider's responsibility

AREA OF CUSTOMER'S RESPONSIBILITY		**AREA OF SERVICE PROVIDER'S RESPONSIBILITY**		
No.	**Activities taken by** the customer	**No.**	**Reactions of/ activities taken by** the employees	**Type of employee:** Frontline (F), Backline (B), Support (S)
STAGE 1. First contact: service provider-customer				
1	Analysis of information about the dealer and his products/services specified on the website	1	Regular updates of information on the dealer's website.	B, S
2	Contact with the service provider via an online form, telephone and other forms of communication	2	Professional management of communications with the customer.	F, B, S
STAGE 2. Visit in the Ford dealer store				
3	Personal visit of the customer in the store: greeting, initial conversation with the employee	3	Customer reception: greeting, identification of needs and preferences, creation of needs	F
4	Contact with the employee, evaluation of the customer service standards, including:	4	Contact with the customer - presentation of the offer, including:	F
4 A	Evaluation of the employee's appearance, including, amongst others, the following: outside appearance, clothing, tidiness, jewellery and other attributes	4A	Evaluation of the customer's potential via analysis and assessment of his or her appearance and obtained information, including, amongst other, the following: appearance, clothing, jewellery and other attributes	F
4 B	Evaluation of the method of having a conversation (the ability to articulate own needs, focusing on the customer, commitment)	4B	Ability to have a conversation with the customer - ability to obtain information from the customer concerning his or her needs, appealing presentation of the car, providing substantive	F

			information about the car	
4 C	Evaluation of the employee's interpersonal features, such as: communicativeness, personal culture, ability to inspire trust	4C	Building relations with the customer - invitation to the service office to have a conversation about the offer's details, presentation of information and advertisement materials, proposing a beverage	F
4 D	Review and determination of the conditions of the preliminary car purchase offer	4D	Review of the conditions and preparation of the car sale agreement	F
5	Recording of the time of next visit/car collection Manner of saying goodbye	5	Determining the time of next visit/car collection Manner of saying goodbye	F
STAGE 3. Using other service points in the store				
6	Other agreement conditions:	6	Other agreement conditions:	F, B, S
	review of the conditions of agreement with the consultants in terms of the financial/credit/lease and insurance service			
7	Using other service points available at the store:	7	Serving the customer in terms of using other service points available in the store:	F, B, S
	including, amongst other, the following: technical support, spare parts sales point, gastronomic point, company souvenir and gadgets sale point			
Support processes				
8	Updating the drafts of documents according to the headquarters' guidelines in terms of the agreement conditions and other formalities			B
9	Vehicle exhibition: maintaining the cleanliness of rooms, cars Service standards and infrastructure in other service points: technical support, spare parts, gastronomy, company gadgets sale point			B, S
10	Advertisement, operation and office materials: designing, delivery, updating			B, S
11	Feedback - introduction of changes as result of recommendations, reported demands (redefining the offer, customer service standards)			F, B

It is necessary to be aware that the preparation of a sale consists of many stages. The customer sees the finished product in its original packaging in the store. However, customer service is a multi-dimensional process and consists of many tangible and intangible elements. The results of the conducted studies and observations was elaborated on in the form of a map illustrating the customer service process in the authorised Ford dealer stores (Figure 3).

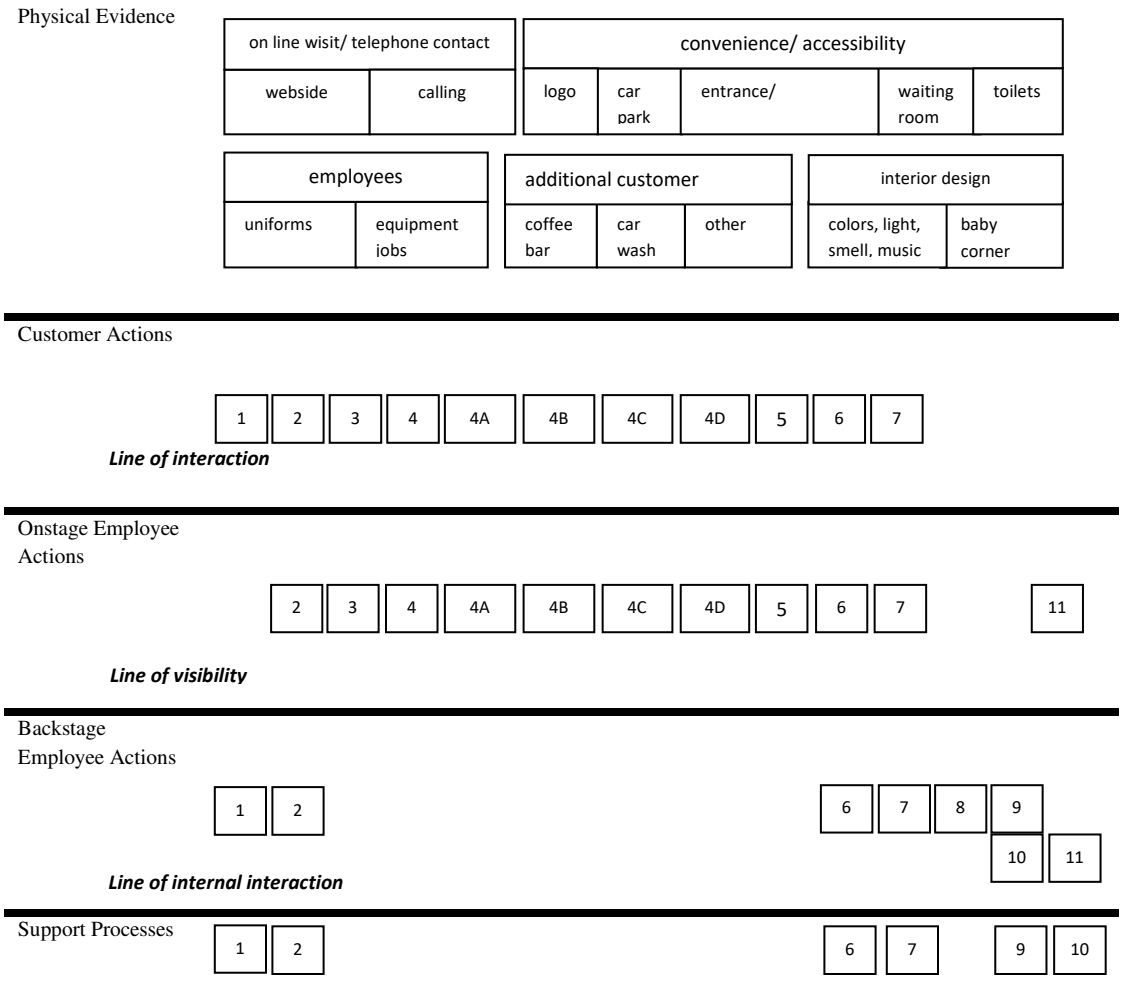


Fig. 3: Blueprint map for authorized Ford dealer stores

Its purpose is to affect the customer's decision on buying a car. All tangible and intangible properties, which constitute parts of an image, are previously arranged and organised by the managerial and support staff. The employees are properly motivated, and the effects of their work are subject to monitoring and assessment. The result of the interactions are amending and preventive activities, which are aimed at working out of the best customer service standards. Related activities are not directly visible to the customer. This is the reason they are situated beyond visibility - in practice, it means that they are not directly available to a customer. Customers use the results of work of many people without even getting to know them.

However, it would be impossible to meet the customer service standards without these activities. These required activities are executed by the backline employees at the strategic, tactical and operational level. In order to ensure the effectiveness and efficiency of the delivery, it is essential to prepare a professional sales offer. In practice, it means using all of the store's attributes to delay and/or eliminate the competition.

The customer deems the lines of interaction and visibility as most important. These lines determine the zones of service process, in which the client directly participates in and assesses the results of any management and operational activities taken at all company levels, including the material aspects, which are assessed by the results of the organisation's activity support procedures. When the customer visits the car store, he or she assesses all available elements, including the material aspects of its surroundings. The materials aspects are all attributes available for the company and used in everyday work. These elements constitutes parts of the company's organisational culture (Randall, 1993; Adkisson, 2014). The material aspects also enable creating the image of the organisation, which is important from the customer's point of view, especially in comparison to the competition. The components of an authorised car dealer surroundings include tangible and intangible aspects. These aspects constitute the customer service standards, on the one hand, and on the other hand, they are evaluated by the customer and affects his or her shopping decisions.

The visualisation of each stage and activity executed by the customers themselves or with the assistance of a customer service representative constitutes the basis for modelling the blueprinting map. The main aim of this modelling is communication, analysis and control of the executed activities (Coderre et al., 2009). All of the above elements contribute to continuous improvement. Each meeting with the customer is different due to the nature of the services. It is however possible to plan the most essential element of the service process – each subsequent service element is to be provided by employees who are expected to behave in a professional manner []. The blueprinting map visually demonstrates the sequence of events in a two-dimensional system. It is necessary to note that the activities taken by the customers are essential for the mapping, because they determine the entire mapping system. The horizontal axis presents the chronological schedule of activities taken by the costumer and employees. The vertical axis constitutes the second dimension of the analysis. This means that it categorises the activities based on their type and role in the service process. Two groups are visible here: customers - in the role of potential buyers, the employees - in the role of first contact persons, and the support of activities implemented in the entire process. The division of particular groups of stakeholders is additionally marked by the lines isolating each zone of influence. The following lines are considered: interaction, visibility and internal connections (Shostack, 1987). They correspond to the following relations respectively: customer and frontline employee, frontline employee and backline employee, as well as backline employee and other employees.

The blueprinting map illustrates one more element, i.e. the service's tangible properties (Zeithaml *et al.,* 2006). The customer evaluates the service's tangible elements during the entire service process. Despite the fact that the customer is not always aware of this evaluation, it affects his or her perception of the service. All of these components create the blueprinting map, which consists of lines and sequences of the activities of the process participants who establish interactions between each other. The conducted studies allowed answering the following research question: What is the customer service standard in the authorised Ford dealer stores in Poland? Conducting the study in 21 stores allows developing a universal blueprinting map, thereby specifying the existing customer service standards applied in the authorised Ford dealer stores.

Conclusions

Despite the dominant role of services in modern economies, and their rapid growth worldwide, the small quantity of research, number of methods and techniques addressing the unique market challenges is surprising.

Blueprinting is a useful tool which allows designing the customer service process with special consideration of the customer's point of view. The visualisation of the service process provides information concerning the purposefulness, logicality and effectiveness of the activities executed in the customer service process. The blueprinting map subject to an in-depth analysis of professionals from various departments of the given company can be the basis for developing optimal customer service solutions. The skilful use of the opinions of experts, analysis of the adaptive capabilities of the service organisation to the specified needs can substantially affect the customers' evaluation.

My hope is that by capturing what is already known about blueprinting and sharing our experiences and relevant case studies, I will be able to inspire a broader adoption of this technique and its creative extensions to further enhance its value to service managers and researchers from various fields.

Limitations and Future Research Directions

The primary limit of the study is the number of authorised Ford dealer stores in which it was conducted. There is 125 stores in Poland and the study was conducted on 21 of them. This fact simultaneously constitutes the basis for determining the direction of further research. The study should be conducted for all other stores and the obtained results should be compared to the existing ones. Such broadening of the research would allow conducting complete studies and would constitute the basis for executing further research purposes.

Referencing published research within text

Adkisson, R.V. (2014), "Quantifying culture: problems and promises", *Journal of Economic Issues*, Vol. XLVII No. 1, pp. 89-107.

Alam, I. (2013), "Customer interaction in service innovation: evidence from India", *International Journal of Emerging Markets*, Vol. 8 No. 1, pp. 41-64, DOI 10.1108/17468801311297273.

Bowen, J. and Ford, R.C. (2002), "Managing service organizations: does having a 'thing' make a difference?", *Journal of Management*, Vol. 28 No. 3, pp. 447-69.

Coderre, S., Woloschuk, W. and Mclaughlin K. (2009), "Twelve tips for blueprinting", *Medical Teacher*, Vol. 31. DOI 10.1080/01421590802225770.

Gadrey, J. (2000), "The characterization of goods and services: An alternative approach", *Review of Income and Wealth*, Vol. 46 No. 3, pp. 369-87.

Gibbert, M., Ruigrok, W. and Wicki, B. (2008), "What passes as a rigorous case study?", *Strategic Management Journal*, Vol. 29 No. 13, pp. 1465-74.

Groonross, Ch. (1994), "Strategic Management and Marketing in the Service Sector", *Studentlitteratur, Chartwell-Bratt,* Lund, p. 19.

Grosse, R. (2015), "Emerging Markets: Strategies for Competing in the Global Value Chain", Kogan Page, London.

Grosse, R. (2016), "How emerging markets firms will become global leaders", *International*

Journal of Emerging Markets, Vol. 11 No. 3, pp.274-87, DOI 10.1108/IJOEM-07-2015-0138.

Guillen, M. F. and Garcia-Canal, E. (2012), "Execution as strategy", *Harvard Business Review, October*, Vol. 90 No. 10, pp. 103-107.

Hill, P. (1999), "Tangibles, intangibles and services: a new taxonomy for the classification of output", *Canadian Journal of Economics-Revue Canadienne D Economique*, Vol. 32 No. 2, pp. 426-46.

Hoecht, A. and Trott, P. (2014), "How should firms deal with counterfeiting? A review of the success conditions of anti-counterfeiting strategies", *International Journal of Emerging Markets*, Vol. 9 No. 1, pp. 98-119, DOI 10.1108/IJOEM-02-2011-0014.

Hys, K. (2016), *"Inter mundus* – designing the quality of hotel services: prospect of customer and manager"*, in Economics & Tourism,* International Scientific Council of SGEM, Albena, Bulgaria, *Book 2*, Vol. 5, pp. 393-400, DOI 10.5593/SGEMSOCIAL2016/B25/S07.051.

Hys, K., Hawrysz, L. and Kozel, R. (2014), "The use of blueprinting to assess the quality of services in automotive industry*", Moderní matematické metody v inenýrství česko-polský seminář (3MI)*, Technická Univerzita Ostrava, Czech Republic, pp. 46-50, DOI 10.13140/RG.2.1.1519.8166.

Johri, L. M. and Petison, P. (2008), "Value-based localization strategies of automobile subsidiaries in Thailand", International Journal of Emerging Markets, Vol. 3 No. 2, pp. 140-162, DOI 10.1108/17468800810862614.

Jung-Wan, L. and Tai, S.W. (2009), "Determinants of product quality perceptions and their application to marketing standardisation: The case of the automobile in Kazakhstan", *International Journal of Emerging Markets*, Vol. 4 No. 2, pp. 119-36, DOI 10.1108/17468800910945765.

Khmel'nyts'ka, O. and Swift, J.S. (2010), "Beer in the Ukraine: consumer choice criteria", *International Journal of Emerging Markets*, Vol. 5 No. 1, pp. 78-101, DOI 10.1108/17468801011018275.

Kotler, Ph.T. and Keller, K.L. (2012), "Marketing Management (14th Edition)", *Prentice Hall*, New Jersey, pp. 356-8.

Li, E.Y., Zhao, X. and Lee, T. (2001), "Quality management initiatives in Hong Kong's banking industry: a longitudinal study", *Total Quality Management,* Vol. 12 No.4, pp. 451-67.

Li, S. (2014), "Predicting productivity gains from parking behavior", *International Journal of Emerging Markets*, Vol. 9 No. 4, pp. 462-70, DOI 10.1108/IJoEM-07-2014-0100.

Linker, K.J. (2004), "The Toyota Way: 14 Management Principles from the World's Greatest Manufacturers", *McGraw-Hill*, New York, NY.

Macintyre, M. (eds.), (2011), "Service Design and Delivery", *Service Science: Research 19 and Innovations in the Service Economy*, © Springer Science+Business Media, LLC, DOI 10.1007/978-1-4419-8321-3_2.

Oliver, R.L. (1993), "A conceptual model of service quality and service satisfaction: compatible goals, different concepts", *Advances in Services Marketing and Management,* Vol. 2, pp. 65-85.

Parasuraman, A., Berry, L.L. and Zeithaml, V.A. (1991), "Understanding customer expectations of service", *Sloan Management Review, Spring,* pp. 39-48.

Parasuraman, A., Zeithaml V.A. and Berry L.L. (1985), "A conceptual model of service quality and its implications for future research", *Journal of Marketing,* Vol. 49, pp. 41-50.

Phongpetra, V. and Johri, L.M. (2011), "Impact of business strategies of automobile manufacturers in Thailand", *International Journal of Emerging Markets*, Vol. 6 No. 1, pp. 17-37, DOI 10.1108/17468801111104359.

Poland 2015. Report on the state of the economy, Ministry of Economy, Warsaw, pp. 203-4.

Randall, L. (1993), "Perceptual blueprinting"*, Managing Service Quality*, Vol. 3 No. 4, pp. 7-12.

Shostack, G.L. (1977), "Breaking free from product marketing", *Journal of Marketing*, *April*, Vol. 41, pp. 73-80.

Shostack, G.L. (1987), "Service Positioning Through Structural Change", *Journal of Marketing*, Vol. 51 No. 1, pp. 34-43.

Sirikrai, S.B. and Tang, J.C.S. (2006), "Industrial competitiveness analysis; using the analytic

hierarchy process", *Journal of High Technology Management Research,* Vol. 17, pp. 71-83.

Sroka, W. (2012), "Cooperative strategies and their benefits – theory vs. research results", *Management: Science and Educations*, Vol. 1 No. 1, pp. 44-8.

Stolovitch, H. and Keeps, E. (2002), "Telling Ain't Training", *Baltimore, Victor Graphics, Inc.*, p. 20.
Thomé, K.M. and Medeiros, J.J. (2016), "Drivers of successful international business strategy: Insights from the evolution of a trading company", *International Journal of Emerging Markets*, Vol. 11 No. 1, pp. 89-110, DOI 10.1108/IJoEM-09-2012-0120.

Wen, Y. (2015), "Combined Material Recycling Study with Aesthetic of Entropy and Place Making**",** *Scientific World Journal*, DOI 10.1155/2015/208342.

Yanow D. and Schwartz-Shea, P. (2015), "Interpretation and Method: Empirical Research Methods and the Interpretive Turn", Routledge, Taylor & Francis Group.

Zeithaml, V., Bitner, M.J. and D. Gremler, D. (2006), "Services Marketing: Integrating Customer Focus Across the Firm", 4th edition, *Boston, MA: McGraw-Hill*, pp. 267-276.

Cluster Analysis of the Motivating Factors

Grațiela Dana Boca, Technical University of Cluj Napoca, Romania, bocagratiela@yahoo.com

Diana-Cezara Toader, Bucharest University of Economic Studies,
Romania,diana_toader@gmail.com

Diana Ighian, Technical University of Cluj Napoca, Romania, dianaighian@yahoo.com

Cezar Toader, Technical University of Cluj Napoca,, Romania, cezartoader@cunbm.utcluj.ro

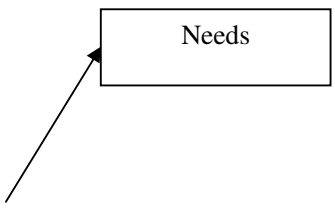
Abstract

The area of motivation reward and perception of employees toward the motivation effects area is unknown area yet. The motivational factors choose for research are: organizational climate, industrial relationships, leadership style, financial rewards, promotion conditions and personal needs. In this paper we presented the statistical analysis of clusters using Ward's method to identify the motivation. The correlations between motivational factors and the hierarchical cluster analysis were realized using Ward's method. The statistical instrument used were the survey to identify the factors which influence the motivational attitude and perception of staff to the motivational potential of managers. This article also present and analyzed the proximity matrix, for that reason it was calculated the optimal number of cluster grouping the 24 motivational factors that cover the motivational factors which permit to group theme into clusters. Each cluster allowed the identification of maximum and minimum motivation influence on the staff level. The proposed analysis of motivational factors according to their influence on the degree of motivation can be used in every company and served as a positive effect for improving the human resources relationship. Also the analysis can be used as a potential instrument used to develop and implement like a program to correct the motivational factors found in the clusters and identify comprising factors with minimal influence on the degree of motivation of human resources.

Keywords: cluster, factor, influence, motivation, dendogram, analysis

Introduction

There have been many theories developed by researchers surrounding the area of motivation.
Armstrong & Stephens (2005) design a typical motivation model or process and establish that is comprised of four parts or steps, these being needs, establish goals, taking action and attending goals (Figure 1).
Motivation is usually brought about by the acknowledgement of unsatisfied needs, that's why according to Armstrong (2012, p.182) there are two types of motivation.
These are intrinsic and extrinsic motivation. According to Ryan & Deci (2000, p. 57-60) intrinsic motivation can be viewed as carrying out an activity for the satisfaction that derives from doing such an activity and job done rather than the rewards offered for doing it.
While extrinsic motivation develops from the connection between carrying out an activity with the aim of attaining a distinguishable outcome.



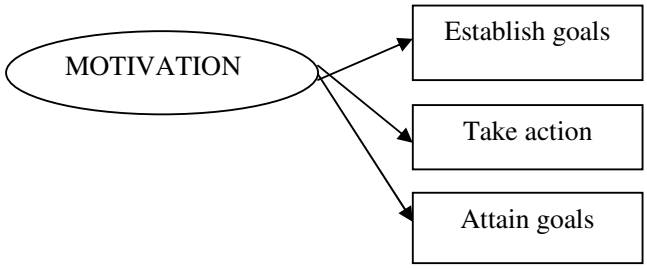


Fig.1: Motivation process

Source: Adapted after Armstrong & Stephens, 2005, p.70.

Flynn (2013) in his research about an exploratory analysis of the role of motivation within the workplace observed that in order for motivation to be effective, it is necessary for the organization to call on motivations from all five categories.

Of course, formal motivations will register the most frequent and intense usage, being established by the organization's strategy and policies and for which certain managerial and economic methods and techniques are addressed.

The motivational potential of informal motivations should not be underestimated, especially those moral and spiritual. For the latter, there is a greater sensitivity to most employees, presenting the great advantage that they have no financial cost or very little, indirectly. Regarding informal economic motivations, their use is recommended to be approached with great care, under strict observance of laws and morals of society in each country.

Appealing to codes and protocol dinners are relatively common ways practiced by companies in developed countries, obviously subordinated to clearly defined objectives and under certain conditions, according to the pre-established regulations and procedures.

The range of motivations used in modern organizations is particularly comprehensive and varied. To facilitate the perception and their usage, the general picture of motivations which can be used in companies, is structured in multiple categories and it is presented in Figure 2 (Nicolescu, 2008, p.304).

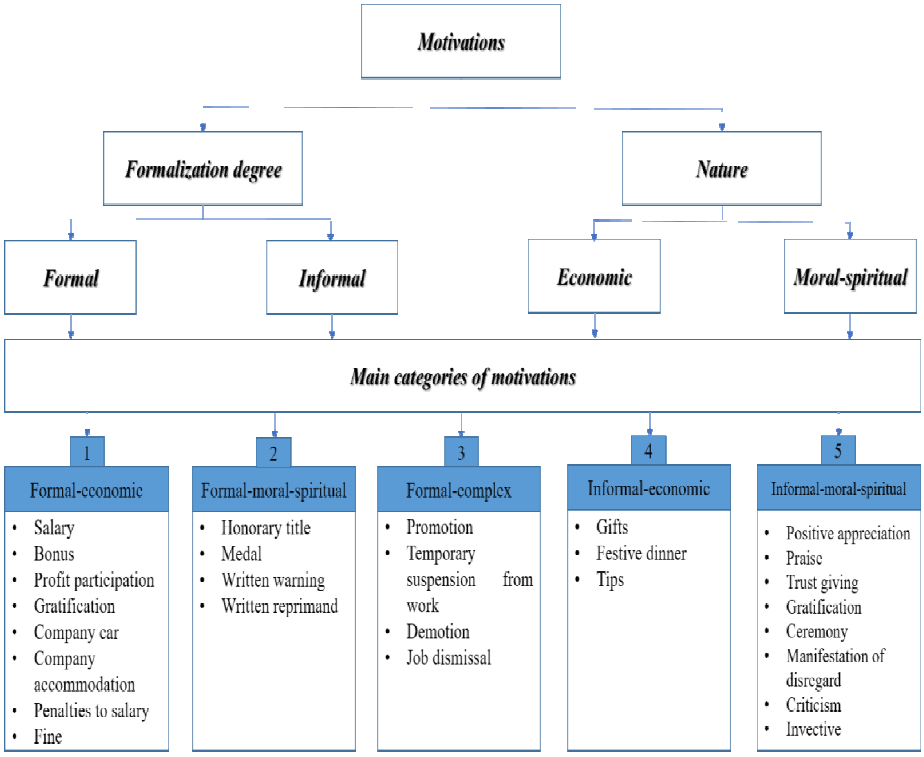


Fig. 2: Types of motivations

Source: Nicolescu, 2008, p.304

Instead, tips should be avoided as they distort the system of values, attitudes and behaviors of employees, with considerable negative impact on organizational culture, functionality and firm's performance. (Nicolescu, 2008, p.303)

Motivations design those elements, formal and informal, economic or moral-spiritual that owners and managers utilize towards employees, satisfying their specific individual and group needs in order to determine through their attitudes, efforts, decisions, actions and their behavior to contribute to the accomplishment of the activities of the organization and to the fulfillment the objectives of the organization.
According to Beardwell & Claydon (2007, p. 496) and Fully"(2013), there are three main factors that individuals may deliberate on when choosing the level of effort to put into work behavior:

1. ***Valence:*** The level that the anticipated outcome is attractive or otherwise.
2. ***Instrumentality:*** The belief that a certain level of performance will result in attaining coveted rewards.
3. ***Expectancy:*** The scale in which an individual believes that a certain level of effort will lead to a certain level of satisfactory performance, will that level of effort

Stephen Flynn (2011, p.12) created a direct link between motivations and maturity levels within the organization.

1. The first one relates to the compliance management which relies almost entirely on extrinsic motivations, money being the main motivator, capable of solving the problems of workers.
2. For the second maturity level, process management, money is still present along with the generation of goals with external influence, hygiene factors (sense of security), perception of equity (horizontally and vertically), encouraging supervision of employees.

3. Regarding the third level, this refers to the capability management, in which all the motivations presented before are also available at this level, along with the presence of clear opportunities for career that provides the possibility of achieving a social position that is valued within the organization.

Also, due to the job enlargement, the tasks are more varied and the use of Key Performance Indicators for measuring performance also enhances the employees' goals regarding their professional development. The last maturity level, strategic management, encompasses all motivations found at lower levels along with intrinsic motivations that encourage individual control and the perception of equity at horizontal, vertical and personal level.

2. Case Study

The study take in consideration the motivation of employees, staff and human relationship between employees and managers.

A total number of 100 employees from Eaton Production Company an economical agent from Maramures County was the target of our research. Another element taking in consideration was the top position of company in Maramures market because it is a successful company and a model from quality point of view.

The instrument used in research activities was the survey.

The survey was structured in 24 questions with possibility select an option using a Likert scale from 1(not agreed) to 5 (strongly agreed). Each question was created to identify the motivational factors and their impact upon the employees.

Because motivation it is a complex phenomenon we can include here many factors of influences which require attention. As literature review show, there are numerous theories develop on motivation and how employees are motivated, however for this research on the simplest way we ask employees what motivates them.

Taking in consideration Nicolescu (2008) and Flynn (2013) classification of motivation, for our study we select the following factors for employees: OC= organizational climate, IR=industrial relationships, LS= leadership style, FR=financial rewards, PC=promotion conditions and PN= personal needs (Figure 3).

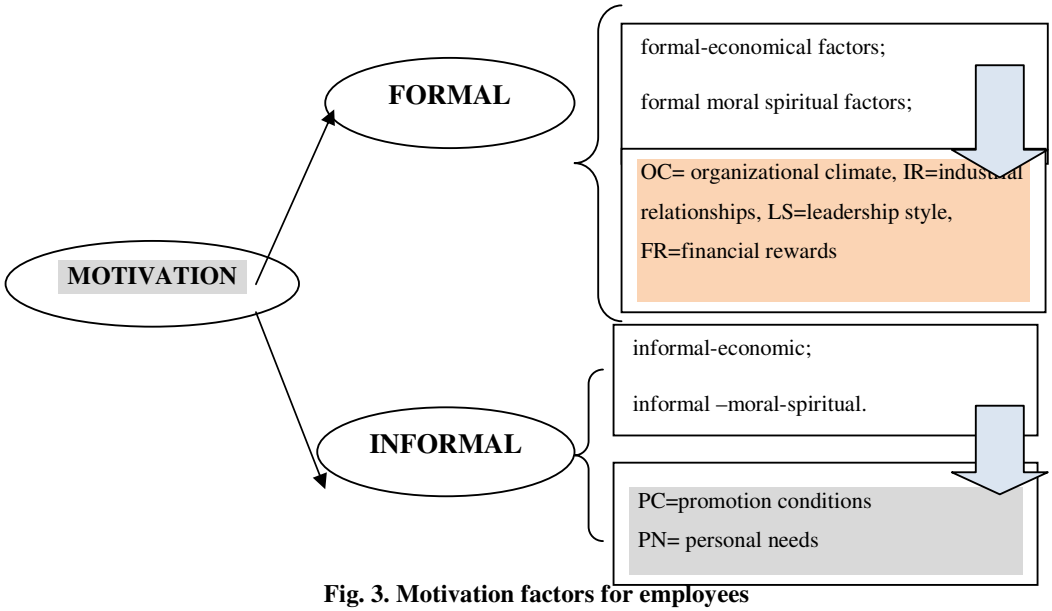


Fig. 3. Motivation factors for employees

Source: By authors

Method of Research

To be able to realize an analysis it was used the SPSS program database that includes the results of questionnaires of 100 employees for the six groups of motivational factors, formal motivation OC, IR, LS and FR and informal motivation factors PC and PN.
For statistical analysis of clusters, it was used the Ward's method in SPSS, in order to examine similarities between motivational factors, in order to group them as clusters with elements as similar as possible within the same class and as different as possible between them if these elements belong to different classes.
Subsequently, it was examined the validity of the results of the questionnaire, it was presented the proximity matrix comprising the Euclidean distances and there were identified the minimum distances with a view to grouping the motivational factors in clusters.

Results

3.1. Hierarchical cluster analysis through Ward's method

It was computed the Ward distance between clusters that comprise motivational factors, which aims to compute the cumulative intra-cluster variability.
Following, the merger of two clusters will seek to obtain the maximum homogeneity at the level of clusters identified for grouping the motivational factors.
The ranking of motivational factors based on the sum of scores given for each motivational factor from the questionnaire present that the first motivational factor ranked is PN2 (personal needs).
As we can observed the safety as a motivation factor it is the most important factor for employees in 85% percent with a score of 5 and for 13% percent with a score of 4 from maximum 5 (Figure 4).

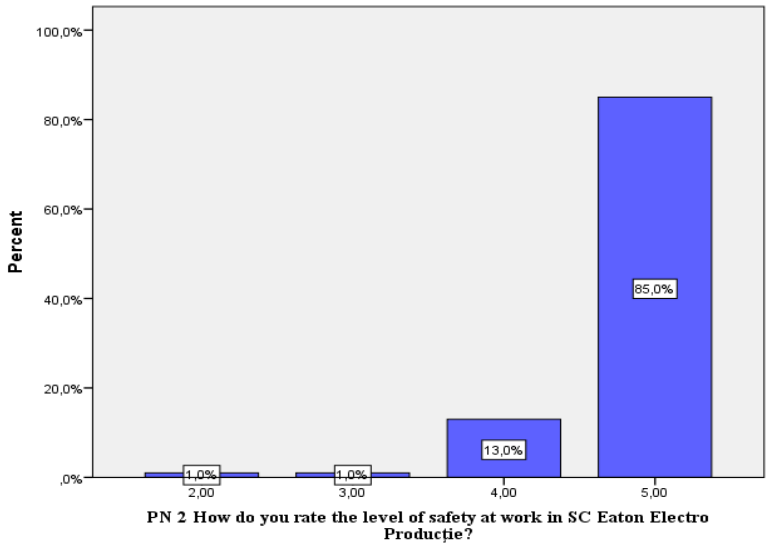


Fig. 4 : The employees perception upon safety as motivation factor

Personal needs as safety needs is the most important motivational factor, while the factor with the lowest score is OC3 (organization climate).

The Proximity Matrix, which is a symmetrical matrix that contains the Euclidian distances for all 24 motivational factors it is presented in Table 2.

Table 2: Proximity Matrix

Euclidian distance: $d = \sqrt{\sum_{i=1}^{v}(p_{1i} - p_{2i})^2}$

Matrix File Input

Case	IR 3 How do you consider the relationships with your colleagues in SC Eaton Electro Producţie?	IR 4 How do you assess the way of solving conflicts at the workplace by managers?	LS 1 How do you rate the leadership style of managers in SC Eaton Electro Producţie?	LS 2 How do you assess the way of solving problems by managers of SC Eaton Electro Producţie?	LS 3 How do you assess the involvement of employees from SC Eaton Electro Producţie in the decision making process?	LS 4 How do you assess the ability of managers from SC Eaton Electro Producţie to motivate employees?	FR 1 How do you assess the financial reward package in SC Eaton Electro Producţie?	FR 2 How motivating is the provision of a private pension?	FR 3 How do you appreciate the satisfaction degree of your necessities by your monthly salary?	FR 4 How motivating is the provision of a private medical insurance?	PC 1 How do you consider the promotion conditions of personnel in SC Eaton Electro Producţie?	PC 2 How do you appreciate the way of communicating the promotion conditions within SC Eaton Electro Producţie?	PC 3 How do you appreciate the conditions for professional development within SC Eaton Electro Producţie?	PC 4 How do you rate the correctness of the establishment of jobs hierarchy within SC Eaton Electro Producţie?	PN 1 How do you rate the degree of appreciation of the work you are performing within SC Eaton Electro Producţie?	PN
IR 4 How do you assess the way of solving conflicts at the workplace by managers?	8,367	,000	8,367	9,747	9,274	7,746	8,367	9,274	9,165	9,055	8,544	8,544	9,165	9,000	7,746	
LS 1 How do you rate the leadership style of managers in SC Eaton Electro Producţie?	9,055	8,367	,000	9,000	7,874	7,746	8,246	9,165	9,055	7,211	7,810	8,544	7,616	8,307	8,246	
LS 2 How do you assess the way of solving problems by managers of SC Eaton Electro Producţie?	8,544	9,747	9,000	,000	7,937	8,185	9,539	7,810	7,937	9,539	8,832	8,367	9,327	9,798	8,660	
LS 3 How do you assess the involvement of employees from SC Eaton Electro Producţie in the decision making process?	8,000	9,274	7,874	7,937	,000	7,071	7,746	7,746	6,928	6,782	7,416	6,856	6,928	7,280	8,124	
LS 4 How do you assess the ability of managers from SC Eaton Electro Producţie to motivate employees?	7,616	7,746	7,746	8,185	7,071	,000	6,928	8,602	7,746	6,481	6,856	7,416	7,211	7,000	6,164	
FR 1 How do you assess the financial reward package in SC Eaton Electro Producţie?	7,874	8,367	8,246	9,539	7,746	6,928	,000	8,944	9,487	6,481	5,745	7,416	5,831	**4,796**	7,483	
FR 2 How motivating is the provision of a private pension?	6,481	9,274	9,165	7,810	7,746	8,602	8,944	,000	8,124	9,165	9,000	6,245	9,274	9,110	8,602	
FR 3 How do you appreciate the satisfaction degree of your necessities by your monthly salary?	8,124	9,165	9,055	7,937	6,928	7,746	9,487	8,124	,000	8,832	8,660	7,810	9,381	9,220	8,602	
FR 4 How motivating is the provision of a private medical insurance?	8,944	9,055	7,211	9,539	6,782	6,481	6,481	9,165	8,832	,000	6,557	8,062	5,292	6,403	7,616	
PC 1 How do you consider the promotion conditions of personnel in SC Eaton Electro Producţie?	7,810	8,544	7,810	8,832	7,416	6,856	5,745	9,000	8,660	6,557	,000	7,616	6,245	6,481	7,416	
PC 2 How do you appreciate the way of communicating the promotion conditions within SC Eaton Electro Producţie?	6,856	8,544	8,544	8,367	6,856	7,416	7,416	6,245	7,810	8,062	7,616	,000	7,681	7,746	7,937	
PC 3 How do you appreciate the conditions for professional development within SC Eaton Electro Producţie?	8,246	9,165	7,616	9,327	6,928	7,211	5,831	9,274	9,381	5,292	6,245	7,681	,000	5,196	7,348	
PC 4 How do you rate the correctness of the establishment of jobs hierarchy within SC Eaton Electro Producţie?	8,062	9,000	8,307	9,798	7,280	7,000	**4,796**	9,110	9,220	6,403	6,481	7,746	5,196	,000	7,937	

Regarding the number of training programs for employees are valid in a proportion of 100%. For employees with a 65% percent the training programs are score with 4 and 21 % percent from employees gives a score of 3 from maximum 5 (Figure 5).

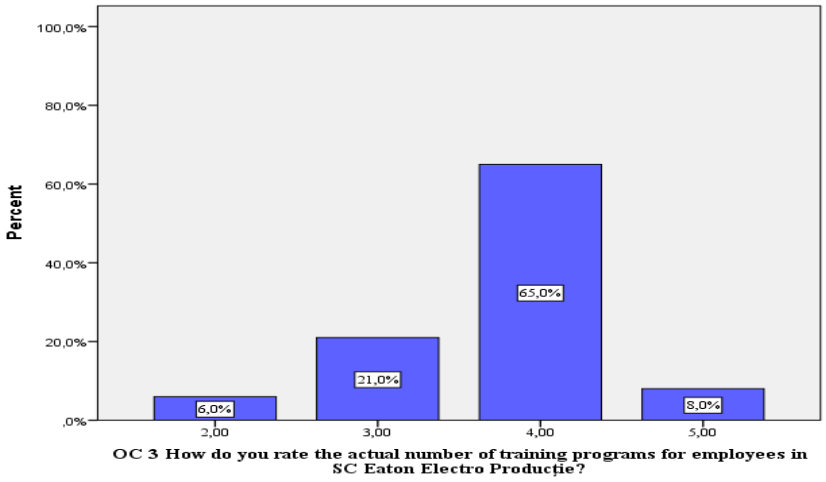


Fig. 5: The employee's perception upon training as motivation factor

Figure 6 present a 57% percent from respondents considered reward package very important with a score of 5, they consider motivation from financial point of view, different bonus for encouragement in traveling tickets or weekend treatment ticket as sign of appreciation for their work. Euclidian distance between ''How do you access the financial reward package in your company ?'' and ''How do you rate the coerciveness of the establishment of job hierarchy within your department ?'' has the greater value 4,796.

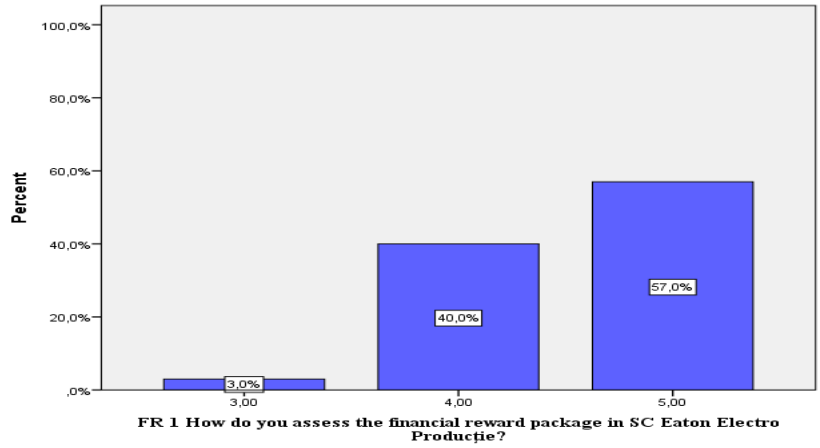


Fig. 6: The employee's perception upon reward package as motivation factor

We can observed that the minimum distance d=4,796 is found between motivation factor variable 13= FR1 (financial reward package) and PC4 (variable 20- correctness of the establishment of jobs hierarchy). Because 99% percent from employees give a score between 4 and 5 to the correctness in job hierarchy, we can consider that the department of human resources applies a good strategy (Figure 7).

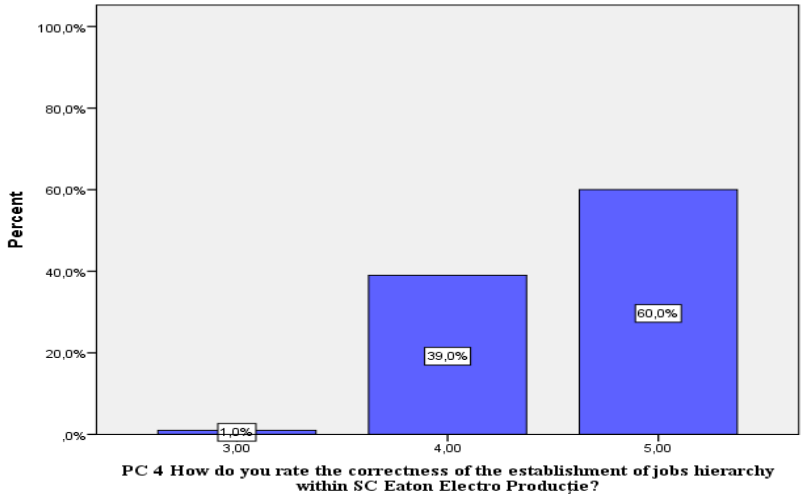


Fig.7: The employee's perception upon correctness job hierarchy as motivation factor

These variables form the closest pair and they will be the first to be joined, as it can be seen in the Dendogram (Figure 8), as well as in the Agglomeration Schedule.

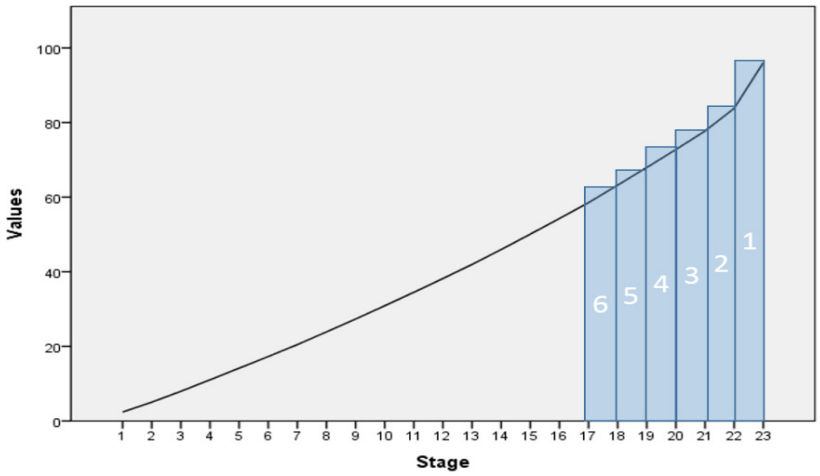


Fig. 8: The degree of change in agglomeration coefficients

In order to validate the hierarchical cluster analysis and to determine the appropriate number of clusters, we can observe the degree of change of coefficients in the agglomeration schedule.

Thus, Figure 8 indicates that cluster 1 would mean perfect heterogeneity, as it can be seen a higher change in the value of coefficients.

Two distinct clusters also represent a heterogeneous solution, but often 2 clusters may not be the ideal and meaningful solution, as it can be seen that the degree of change in coefficients is constant. Thus, due the fact that 24 motivational factors were involved, the optimal number of clusters chosen for our analysis it is 6. Table 3 presents the Agglomeration Schedule in which the coefficients represent the Ward's linkage coefficients that are calculated in respect to the cluster and not to motivational factors, this is why they differ from the distances in proximity matrix. They represent the amount of heterogeneity that we observe between the 6 clusters.

Table 3: Agglomeration Schedule

Stage	Cluster Combined		Coefficients	Stage Cluster First Appears		Next Stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	13	20	2,398	0	0	5
2	16	19	5,044	0	0	11
3	22	23	7,959	0	0	19
4	12	21	11,041	0	0	10
5	2	13	14,157	0	1	11
6	14	18	17,279	0	0	8
7	5	17	20,481	0	0	14
8	7	14	23,886	0	6	20
9	11	15	27,350	0	0	15
10	6	12	30,890	0	4	18
11	2	16	34,500	5	2	12
12	2	4	38,202	11	0	17
13	3	24	41,977	0	0	20
14	1	5	45,959	0	7	17
15	10	11	50,096	0	9	21
16	8	9	54,279	0	0	18
17	1	2	58,541	14	12	19
18	6	8	63,234	10	16	22
19	1	22	67,969	17	3	23
20	3	7	72,777	13	8	21
21	3	10	77,732	20	15	22
22	3	6	83,805	21	18	23
23	1	3	96,073	19	22	0

Source: By authors processing in SPSS

The result of the clustering analysis made is a hierarchical structure of the motivational factors grouped in 6 clusters, as it can be seen in the dendogram, from figure 9

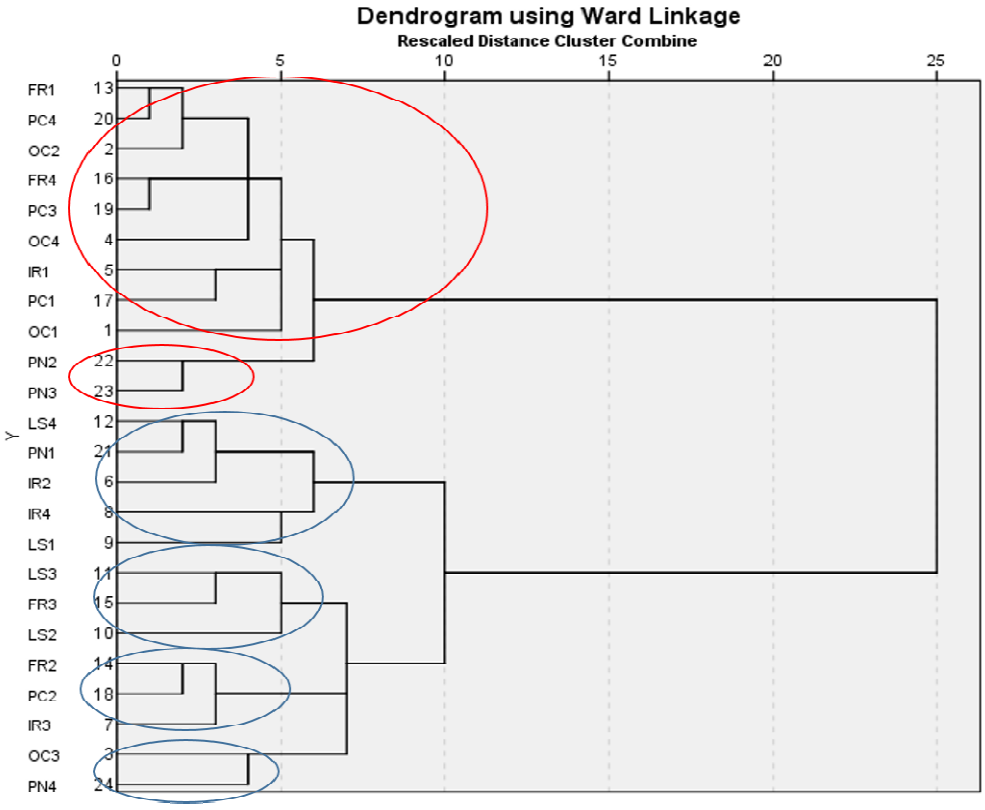


Fig. 9: The Dendogram for cluster membership

Source: By authors processing in SPSS

To sum up, clusters 1 and 6 comprise motivational factors with the highest influence on the level of staff motivation in companies. The maximum values are for personal needs PN2 and personal needs PN3, from cluster 6.
Cluster 2 includes organizational climate OC3 and personal needs PN4 motivational factors with a minimum positive influence on the degree of motivation of human resources.
Knowing the results of the analysis at the level of companies, it can be implemented as a program of motivation of human resources based on the level of influence of motivational factors, knowing clusters with maximum and minimum influence on the degree of motivation.
Many companies cannot function without commitment and cooperation of the employees to carry out the set ask and objectives of the organization.
The research explore the area surrounding the how employees were positively motivated by employee reward and the perception of these employees towards the motivating effects of reward and benefits.

3.2. A proposed Model for Motivation factors

Taking into account the information provided by the Cluster Membership and the dendogram, we can establish a model for motivation factors and obtain the clusters:

1. internal environment (organization environment);
2. individual environment;

3. management environment (employee-staff-manager);
4. social environment (reward, promotion);
5. leader style;
6. personal needs.

Cluster 1	FR1	Financial rewards	INTERNAL ENVIRONMENT
	PC4	Promotion conditions	
	OC2	Organization climate	
	FR4	Financial rewards	
	PC3	Promotion conditions	
	OC4	Organization climate	
	IR1	Industrial relationship	
	PC1	Promotion conditions	
	OC1	Organization climate	
Cluster 2	OC3	Organization climate	INDIVIDUAL ENVIRONMENT
	PN4	Personal needs	
Cluster 3	LS4	Leader style	MANAGEMNT ENVIRONMENT
	PN1	Personal needs	
	IR2	Industrial relationship	
	IR4		
	LS1	Leader style	
Cluster 4	FR2	Financial rewards	SOCIAL ENVIRONMENT
	PC2	Promotion conditions	
	IR3	Industrial relationship	
Cluster 5	LS3	Leader style	LEADER STYLE
	FR3	Financial rewards	
	LS2	Leader style	
	LS3		
Cluster 6:	PN2	Personal needs	PERSONAL NEEDS
	PN3		

Conclusions

Hierarchical cluster analysis using the Ward motivational factors allows identifying groups of motivational factors with great influence on the degree of motivation and suggest ways of improving motivation in companies.

The program can be implemented in order to correct motivational factors from the cluster with minimum influence on the degree of motivation of human resources in companies.

The hypothesis is also confirmed, such that there is a similarity between the motivational factors that determine their grouping into clusters with minimal variability depending on the results of the respondents.

Thus, the company should pay attention to the clusters with minimal influence of the staff motivation level in order to implement corrective measures to increase the number of trainings for personnel, both qualified and unqualified, as well as to improve their socio-professional integration level in the company, these being the factors with the lowest scores.

The proposed research model for the analysis of motivational factors according to their influence on the degree of motivation can be used to develop programs in order to increase the efficiency of management in companies and to identify motivational strategies in order to increase company's performance.

The case study undertaken in companies in Maramureș County, Romania, showed that elements considered motivating by employees which stimulate them in the activities carried out are: job security, salary growth, awards for performances at work, advancing to a superior position, relationships with colleagues and superiors.
A very important aspect in companies of Maramureș County is knowing and complying with the conduct rules which bring benefits at work, improving the working climate, increasing employees' morale and creating a favorable image of the company.

Acknowledges

The research was realized under the project nr: TR01 -KA203-034520-UNINANO- Universal Nanotechnology Skills Creation and Motivation Development.

References

Armstrong, M. (2012) *Armstrong's Handbook of Human Resource Management Practice* 12th Edition London: Kogan Page Ltd.

Armstrong, M. Stephens, T. (2005), *Employee Reward Management And Practice.* 1st Edition London: Kogan Page Ltd.

Baldwin, C., Garza-Reyes A.R., Kumar, V., Rocha-Lona L., (2014) Personal development review (PDR) process and engineering staff motivation A case study investigation in a manufacturing firm. *Journal of Manufacturing Technology Management*, Vol. 25, Issue 6, pp. 827 – 847.

Bocean, C.G.,(2015). *Managementul resurselor umane*, București: Editura Pro Universitaria.

Buzea, C., (2010) *Motivatia. Teorii și practici*, Iași: Institutul European.

Constantin,T., (2004) *Evaluarea psihologică a personalului*, Iași: Editura Polirom.

Crumpton, A.M., 2013. " Keeping the motivation going ", *The Bottom Line*, Vol. 26, Iss 4, pp. 144 – 146.

Dessler, G., 2013. *Human Resource Management*, Thirteenth Edition, New Jersey: Pearson Prentice Hall.

Flynn, S., 2011. Can you directly motivate employees? Exploding the myth, *Development and Learning in Organizations: An International Journal,* Vol. 25, Issue 1, pp. 11 – 15, 2011.

Flynn, S., 2013, An exploratory analysis of the role of motivation within the workplace [Online].

Available from:. http://trap.ncirl.ie/889/1/robertflynn.pdf [Accessed 17 September] https://www.noexperiencenecessarybook.com/Nx5bn/an-exploratory-analysis-of-the-role-of-motivation.html

Hersey, P., Blanchard, K.H., Johnson,. D.E., 2001. *Management of organizational behavior-Leading Human Resources*, Eight Edition, New Jersey: Pearson Prentice Hall.

Ionescu, Ș.I., 2015. Clusterizarea ierarhică cu aplicații în analiza financiară, *Revista Română de Statistică – Supliment*, nr. 8, pp. 3-14.

Lage Monteiro de Castro, M., et al., 2016. Values, motivation, commitment, performance and rewards: analysis model, *Business Process Management Journal*, Vol. 22, Issue 6, pp. 1139 – 1169.

Landsberg, M., 2008. *Motivarea*, Bucureşti: Editura Curtea Veche.

Lefter, V., Deaconu, A., Marinaș, C., Puia, R., 2008. *Managementul resurselor umane-Teorie si practică*, Bucureşti: Editura Economică.

Lepak, D., Gowan, M., 2010. *Human resouces management-Managing employees for competitive advantage*, New Jersey: Person Education.

Manolescu, A., Lefter, V., Deaconu, A., 2007. *Managementul resurselor umane*, Bucureşti: Editura Economică.

Micle, I.M., Săucan, D.Ș., 2009. *Motivarea personalului-Ghid pentru manageri*, București: Editura Tribuna Economică.

Mullins, L.J., 2010. *Management & Organizational behaviour*, Ninth Edition, Essex: Financial Times Prentice Hall.

Nicolescu, O. coordonator, 2004. *Managerii şi managementul resurselor umane*, Bucureşti: Editura Economică.

Opariuc-Dan, C., 2011. *Statistică aplicată în Ştiinţele Socio-umane. Analiza asocierilor şi a diferenţelor statistice*, Sibiu: Editura Arhitip Art.

Pânișoară, G., Pânișoară, I.V.,2005. *Motivarea eficientă*, *Ghid practic*, Iași: Editura Polirom.

Pivovarov, S.E., Tarasevich, L.S., Rakhmatov, M.A., 2011. *International Management, Fourth Edition*, Saint Petersburg: Piter Publishing House.

Ryan, R. and Deci, E. (2000) 'Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions' Contemporary Educational Psychology 25, pp. 54-67 [Online]. Available from:

http://mmrg.pbworks.com/f/Ryan,+Deci+00.pdf [Accessed 25 August 2017].

Sirota, D., Mischkind, L.A., Meltzer, M.I., 2010. *Motivarea angajaţilor, Cum creşte performanţa companiei odată cu entuziasmul oamenilor*, București: Editura All.

Toader, D.C., 2016. *Bachelor Thesis, the Bucharest University of Economic Studies*

Institutional Structures Influence on the Technological Development of the Economic System

Sergey Bodrunov, Institute of New Industrial Development n.a. S.Y. Vitte,
Saint-Petersburg, Russia, e-mail: sergbod@mail.ru

Vladimir Plotnikov, Saint-Petersburg State University of Economics,
Saint-Petersburg, Russia, e-mail: plotnikov_2000@mail.ru

Abstract

Technological development is one of the key factors in the competitiveness of the national economy. Its achievement requires an appropriate state economic policy. The effectiveness of this policy can not be achieved without its coordination with the institutional structure. Institutions, especially informal ones, have a high degree of inertia. Therefore, if economic policy comes into conflict with them, it leads to inefficiency. At the same time, institutions can gradually change if economic reforms are carried out purposefully and systematically. Failure to meet these requirements (this is shown on the example of the experience of the 30-year transformation of the Russian economy) leads to stagnation in the economy and degradation in the social sphere. The ideological and methodological reason for the low success of reforms is the reliance on inadequate economic models. The authors distinguish two approaches to their construction. The first approach is based on the concept of universalism. The second approach is based on the consideration of national specifics. The article proves that the second approach is more effective. Countries that have chosen a second approach to reform (for example, China) have made significant progress. The governments of these countries manage to ensure long-term economic growth. Based on this approach, the authors recommend modernizing Russia's economic policy. It is suggested that the institutional features of the three subsystems allocated in it be more fully taken into account in the measures of state regulation. This is traditional-conservative; liberal-market; the new model of the mixed Russian economy. Such an approach will allow: to stimulate the development of industry, re-industrialize, accelerate technological development, reduce the technological gap with developed countries.

Keywords: institutional structure; national economic development; economic policy; economic reforms; technological level of the economy.

Introduction

In economic science, as in science generally, there is a certain opposition between the unique and universal elements. This opposition, of course, has origins in philosophy. Note that the proponents of the universalism of economic theory, represents the mainstream, triumph in education (Komlos, 2015). Standard textbooks in microeconomics and macroeconomics operate with abstract categories. These abstractions are far from the real events of economic life. However, their value is undeniable. They allow to generate economic thinking (Browne, Hoag and Boudreau, 1995; Caldwell, 1988; Enste, Haferkamp and Fetchenhauer, 2009; etc.). This standardized way of thinking, in accordance with the provisions of institutionalism, reduces transaction costs and increase economic efficiency.

Representatives of universalism in economic science say: "No Italian (Chinese, Brazilian, Russian, etc.) mathematics (physics, chemistry, etc.)". In this regard, can not be specific (national) economic theory. Economic theory, like any other science, universal in its essence. We can partly agree. Indeed, the basic methodological approaches in any science should be unified. At the same time, the use of abstract models in scientific analysis connected with the problem of adequacy in modeling. In the process of formation models, the researcher simplifies reality. The goal of this process is the selection of the most significant elements of the modeled phenomenon. This approach allows us to identify important common features not only of this phenomenon, but also a whole class of similar phenomena. Abstract economic models, when they are reflected in the mind of a person, typify reality. This leads to its monotonous understanding. As a result, collective agreed economic behavior

is formed. This behavior contributes to the reduction of decision-making time, reduces the uncertainty of the business environment, makes possible the conclusion of contracts based on incomplete information of the parties.

On the other hand, the presence of models does not change the economy itself. Simulation only makes it easier to understand as a complex system. In this regard, direct use of the results of modeling in economic practice is not always possible. Important features of the real economic system, the specific economic behavior of specific people in abstract models are not taken into account. Therefore, another approach to the discovery of the essence of economic phenomena and processes was widely adopted. It is based on emphasizing the national (geographical, cultural, religious, etc.) specifics of economic systems. An example of such specific economic theories is the German Historical School of Economics (for example, Grimmer-Solem, 2003, Peukert, 2001, Senn, 2005, Steiner, 2003), Eurasianism (for example, Bassin, Glebov and Laruelle, 2015, Maksimtsev, Miropolsky and Tarasevich, 2016) and other. An attempt to construct a system of specific economic theories, united by unified (few) basic principles, is essentially done within the framework of this approach.

The strength of specific approaches to the comprehension of economic phenomena and processes is, in our opinion, not in their ideological underpinnings (often pointed out by critics), but in a more practical direction. In this sense, such a specific approach is very much in line with the methodological position of the institutional direction in economic science (see, for example, Hultén, 2005). For this reason, there is no contradiction with mainstream. There is only a discussion about the priority of certain groups of institutions. Supporters of universalism note the priority of universal (global) institutions that regulate economic processes. Adherents of specificity point to a more important role of local institutions.

The last position has serious empirical study. It is sufficient to point out the negative effects in the socio-economic development of post-Soviet countries during their transition from socialism to a market economy. They were related to ineffective implantation of the institutions of the Western-European economic culture . These, contrary to the system prevailing informal norms, institutions were rejected. As a result, instead of economic growth have been major transformational recession in the economy. In addition, there was a decrease in law-abiding society, the growth of social nihilism and conflict, increasing corruption, etc. On the contrary, China, which has chosen a gradualist model of institutional development, has achieved impressive results in socio-economic development.

We hold the view that economic science should adequately reflect not only the fundamental principles, but also the specificity of a particular economic system. To achieve practical usefulness of theoretical developments it is possible only so. Taking this position into account, the article considers the influence of the institutional structure on the technological development of Russia's economic system.

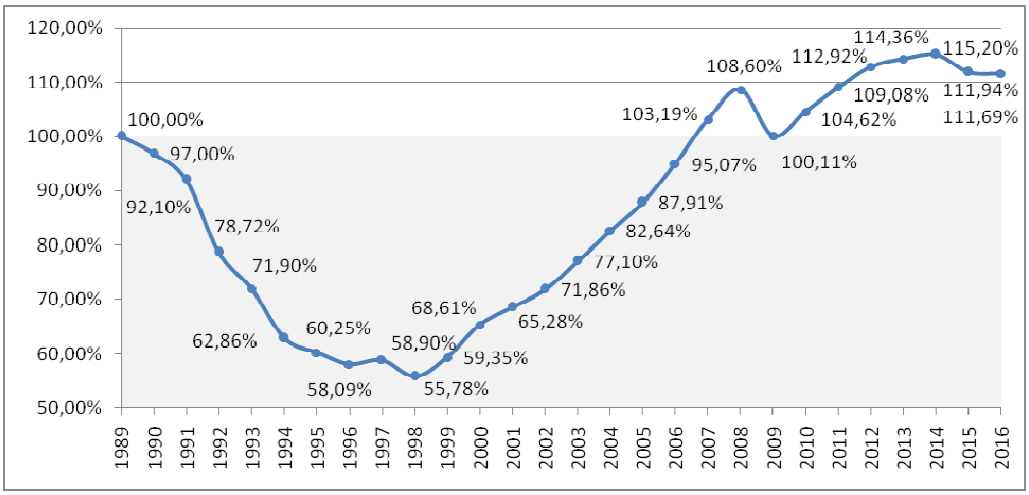
Characteristics of the Russian Economic System

Russia was in a difficult historical situation. Its economy for a long period of time was in a state of transition: the collapse of the old economic system and the formation of a new one. The duration of this transition period is about 30 years. Obviously, from the viewpoint of life-cycle theory, any economic system eventually collapses, and a new one comes to replace it. But the transition period itself is characterized by incompleteness, lack of integrity, coexistence of elements of the new and old economy. The period between two mature states includes, on the one hand, the emergence of a new economic system, on the other hand, the descending development of the old system (Grinberg and Rubinshtein, 2000).

Incompleteness, lack of integrity of economic systems in transition can lead to economic decline. As Russian experience shows, in the transition period, due to institutional incompatibility (rejection of new institutions and the destruction of old institutions) institutional voids are formed. Developing process of primitivization of production, deintellectualization of labour and degradation of the social structure. There is a massive poverty, increases social inequality. Economic policy of the state carried out the formation of new economic relations in the direction not corresponding to the current material, economic and socio-cultural backgrounds. The economy responded to the uncertainty and

distortion of economic signals contraction in demand and, consequently, production, the shortening of the planning horizon when making economic decisions and the rejection of long-term investment and high risk projects.

The long-term dynamics of the Russian economy is reflected in Figure. From the Figure, we can see that immediately after the start of market reforms (1989), Russia's GDP began to fall precipitously. These reforms were accompanied by a radical breakdown of the national institutional structure. The bottom was reached in 9 years (1998). During this period, GDP fell by almost half, by 44.22%. To restore the GDP to the level of 1989 it took another 9 years. Only in 2007 the pre-crisis level was exceeded by 3.19%. This happened after 18 years of institutional transformation. The conclusion about the ineffectiveness of reforms is obvious. The efficiency was extremely low, negative. If we sum up the results of the country's development in 27 years (until 2016), it can be determined that the Russian economy has nevertheless grown. The average growth rate for this period was 0.41%. This is a very small value. At the same time deindustrialization and destruction of technological potential occurred in the country (Bodrunov, 2016).



Calculated and compiled by V. Plotnikov according to the data of World Bank (http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators#).

Fig.1: Long-term dynamics of Russia's GDP (1989 - 100%).

De-industrialization and technological lagging block sustainable economic growth. Because for growth can not create an infrastructure basis in the form of modern real physical assets. The importance of industrial development is high. This conclusion is based on both historical examples and facts from the current state of the world economy. It was the transition to machine and industrial production that led the countries of Western Europe (and then the US, Japan, etc.) to the position of leadership in the world economy. Prior to this, the leaders were China and India. Industrial monopoly for a long time ensured first Britain and then the West as a whole a dominant position in the world economy and in world politics, allowing for a long time to derive direct material and financial benefits from this provision.

However, it is not just about the past. Despite all the changes in the GDP structure, the "core" of the world economic system is those countries that were the first to pass along the road of industrialization. They hold the first positions in the world not because of the service sector, but because of their technological leadership. Therefore, those states that are successfully moving towards overcoming economic backwardness (Republic of Korea, Taiwan, China, Brazil, Malaysia, etc.) have chosen industrial development as an economic revival strategy. The industrialization of the economy allowed these countries to rapidly build up their economic potential, created prerequisites for the development of high-tech industries.

Now these countries face a very difficult task: to challenge the scientific and technological monopoly of the most developed countries. But without industrialization, raising the question of the formation

of an independent national scientific and technological core of the economy would be a utopia. Studies have shown that only with the developed industry the necessary material base is provided, the necessary ground for industrial innovations is created and real demand for corresponding scientific research and development is formed. Now the countries that have chosen as a priority the pursuit of industrialization as the main driver of economic development, demonstrate impressive successes in industrial growth, raising the standard of living. They increase spending on education, training of qualified personnel, on research and development. That is, in addition to success in the economy, these countries are also developing the social sphere (Polozhentseva, 2016).

The above arguments, facts and their description show that when implementing reforms in Russia, the wrong methodology was chosen. It was based on the universalist liberal-market model. This model rejects the existence of national specifics in the economic system. It is built on a misconception about the institutional structure. Countries that have taken into account national institutional specifics in economic policy, for example, China, have achieved much greater results in socio-economic development. In this regard, it is necessary to consider the current institutional structure of the Russian economy in order to take it into account in the state economic policy.

Analysis of the Institutional Structure of the Russian Economic System

In our opinion, economic policy should not be based on the universalist concept of economic science. A more preferable paradigm is the consideration of national-state specifics in economic policy. Among the key ideas of economic policy aimed at the formation of a sustainable model of Russia's development, in our opinion, the following should be attributed:

The first, the recognition of the need for advanced development of modern material production. It should be built on the basis of technologies typical for 4 and 5 technological orders. The provision of these production facilities with research and development and highly qualified personnel should be carried out.

The second, carrying out re-industrialization with the fullest possible consideration of the civilizational specifics of Russia.

The third, the creation of an economic policy based on a thorough analysis of the real structure and contradictions of the existing economic system in Russia.

The fourth, it is necessary to take into account the fact that in transformational economies, politics and ideology have a significant impact on the implementation of economic strategies.

The structure of the economic system of Russia can be described on the basis of the allocation of its key subsystems. These subsystems reflect both the historical stages of the formation of the Russian economy and the levels of its development. The analysis was carried out by us on the basis of the separation of technological, socio-economic, legal, civilizational and socio-cultural factors. We identified three institutionally separate subsystems of the Russian economic system.

(1) *The traditional-conservative subsystem* includes:

- Traditionally important, but often conservative role types of economic activity. Here we include agrarian production and other "old" branches of material production growing from the 19th to the beginning of the 20th century; technological systems based on manual and poorly industrialized labor; machine production of products of low degree of processing, which includes the raw materials sector.
- Market relations burdened with survivals of subsistence economy, patriarchal relations and state-bureaucratic protectionism and paternalism.
- Traditional Russian civilizational invariants that gravitate towards the ideology of conservatism.

(2) *The liberal-market subsystem* includes:

- Predominantly assembly industries that are part of a network of transnational corporations; service, trade, finance, other spheres of intermediary business.
- Close to the classical, although substantially modified by Russian specificity, market-capitalist economic relations and institutions.
- Predominantly liberal-Western ideology.

(3) Elements of *the new model of the mixed Russian economy*. This model presupposes the priority development of high-tech production on the basis of socially-oriented regulated economic development. This system must be critical, overcoming the main vices of the past (deficit, bureaucracy of directive planning, equalizing distribution), use the experience of the Soviet economic system and its achievements so far (in particular, in the defense industry) and use the experience of countries such as China, Vietnam, etc. This emerging subsystem includes:

- High-tech industries, are typical of the 5th and 6th technological orders, and clusters combining manufacture, research and education (Kryzhanovskaya at al., 2016).
- Programming and selective regulation of the market economy, public-private partnerships and similar mixed forms of economy that integrate the advantages of the market and state regulation.
- The ideology of advanced development based on the critical integration of civilizational achievements of the West and traditional Russian values.

The main sector of the Russian economy should be the third, based on the joint use of market elements and the plan (hierarchy). The mixed economy of Russia should be based on the system of informal institutions inherent in the country. The failure of this circumstance led to negative consequences in the past. The available data on the structure of the economy reflect the negative trends that characterize the structural shifts in the Russian economy.

In the structure of Russia's GDP (Table 1), even during the favorable economic situation in the 2000s (see Figure), there was a reduction in the share of processing industries, and the country's food security, based on domestic agricultural production, was weakened. At the same time, the proportion of mining operations, financial activities and real estate transactions grew. The branches on which the strengthening of human potential depends, were characterized by sluggish tendencies towards recovery after the failure of the 1990s. In particular, the share of education remained at the same low level, and health care only slightly (by a percentage share) increased.

Table 1: Russia's GDP structure, %

Indicator	2002	2012	Change 2012 to 2002
GDP at market prices	100	100	-
Agriculture, hunting and forestry	5.3	3.1	-2.2
Fishery, fish farming	0.3	0.2	-0.1
Mining	5.9	9.3	3.4
Processing industries	15.2	13.0	-2.2
Electric power and other	3.2	3.0	-0.2
Building	4.7	5.5	0.8
Wholesale and retail trade; repair of motor vehicles, motorcycles, household products and personal items	20.2	16.9	-3.3
Hotels and restaurants	0.8	0.8	0
Transport and communication	9.0	7.0	-2.0
Financial activities	2.6	3.7	1.1
Real estate, lease	9.4	10.1	0.7
Public administration and military security	4.5	5.6	1.1
Education	2.6	2.6	0
Health care	3.0	3.3	0.3
Other social services	1.7	1.4	-0.3
Net taxes on products	11.5	14.5	3.0

Calculated and compiled by S. Bodrunov according to the data of the Russian Federal State Statistics Service (http://www.gks.ru).

The same tendencies are also traced in the analysis of the distribution of investment in fixed assets by types of economic activity (Table 2). The observed distribution of investments fixes the existing inefficient structure of the Russian economy, and is not aimed at improving it. Such a structure freezes the technological backwardness of the Russian national economy.

Table 2: Structure of investments in fixed assets in Russia, %

Indicator	2008	2009	2010	2011	2012
Investments in fixed assets	100.0	100.0	100.0	100.0	100.0
Agriculture, hunting and forestry	11.2	10.1	9.6	12.92	11.6
Mining	0.2	0.4	0.2	0.58	0.5
Processing industries	27.7	21.5	13.4	23.23	28.8
Production and distribution of electricity, gas and water	10.3	8.4	11.0	12.09	17.1
Building	1.5	0.7	1.0	1.09	0.6
Wholesale and retail trade; repair of motor vehicles, motorcycles, household products and personal items	1.4	5.5	1.8	3.47	1.8
Hotels and restaurants	0.4	0.3	0.3	0.69	0.6
Transport and communication	14.8	13.7	24.2	18.14	14.1
Financial activities	1.5	1.5	1.9	1.53	1.8
Real estate, lease	8.6	9.9	19.9	10.01	9.4
Public administration and military security; social insurance	5.4	4.2	4.7	2.51	1.9
Education	2.7	3.8	2.0	2.64	4.1
Health care and social services	5.4	10.6	6.5	5.57	3.8
Other community, social and personal service activities	8.9	9.5	3.6	5.52	3.9

Compiled by S. Bodrunov according to the data of the Russian Federal State Statistics Service (http://www.gks.ru).

Directions of Economic System Development Taking into Account its Institutional Structure

We believe that the main attention should be paid to the development of the third of the subsystems we have identified. It is capable of providing technological leadership, sustainable economic growth, improving the quality of life and stability of the socio-political system. This does not mean that Russia's prospects should be exclusively connected with the development of the third of the subsystems that we have identified. Substantial corrections are needed in all blocks of the Russian economy.

(1) *The traditional-conservative subsystem*. Here, it is necessary to reduce production costs in the agrarian and fuel and raw materials sectors, sharply increase innovation activity - in order to provide the necessary infrastructure base for the other two subsystems. An important role is played by factors of economic security (ensuring food independence, high importance of revenues from fuel and raw materials exports for the long term). In addition, it is desirable to combine the impulses of development with the stabilizing role of patriarchal and conservative traditions.

(2) *The liberal-market subsystem*. This subsystem requires the restoration of mass production (naturally, in the industries demanded by the market), the overall growth of small and medium-sized businesses, ensuring the availability of credit, financial, insurance and other services for business, debugging competitive institutions and institutions for protecting property rights, using the spirit of personal initiative positively.

(3) Elements of *the new model of the mixed Russian economy*. We propose a priority development of high-tech production on the basis of socially-oriented regulated economic development. As we have already noted, the Russian economy is characterized so far only by the elements of the third subsystem. However, it is based on the mobilization of intellectual and social capital of the nation, should ensure the implementation of positive functions of the first two subsystems through the formation of a constructive, innovative, focused institutional environment. An effective policy of re-industrialization is possible only in such an institutional environment.

The existing experience of development in this direction requires studying both positive and negative experience of joint participation of business and state structures. Analysis of this experience allows us to conclude that the implementation of the tasks of the development of the third subsystem is

possible, but it will require a significant change in the system of economic relations, institutions, economic policies and cultural and ideological stereotypes.

At the level of the technological foundations of the economy, the positive historical heritage of Russia is the tradition of developing, first of all, the basic branches of material production. These industries used raw materials and other natural sources of the country for the progress of machine building, aircraft building, nuclear energy, space and related industries, as well as other high-tech spheres of the economy. Especially typical for Russia is the priority development of the economic foundations of the country's defense power and the corresponding high-tech industries. It is this tradition, in our opinion, that can and should be extended to the future. To this end, Russia has a potential for development that has been preserved to this day, a certain revival of which began in recent years.

This trend fully meets the defining civilizational codes of Russia, which presuppose the priority of the whole, the powers in relation to private interests, but with the active use of private initiatives of entrepreneurs in case they meet the tasks of the country's revival. We do not undertake to assert that this should be the trajectory of the development of the empire, but we insist that the economic system should ensure the development of such material production that will ensure the country's complete economic, technological, military and other security.

We believe it significant that the development of high-tech industry involves the revival of the system of industrial integration that was destroyed over the years of reform, with science and education. This should be implemented at a new level and in fundamentally new economic forms that use the potential not only of the state, but also of the market and private property, which should have some independence, being oriented not only to solving the problems of production development, but also to solving the fundamental problems of development technologies and human qualities, solving social and environmental problems.

Conclusion

Economic transformation in Russia proved to be ineffective due to mistakes in the formation of institutions. These mistakes are due to the excessive enthusiasm of the reform leaders in the universalist paradigm of economic theory. Experience has shown that it is necessary to take into account nationally specific institutions. Their failure leads not only to the economic decline, but also to technological backwardness, the destruction of the moral foundations of society. These errors must be taken into account in the new model of economic policy. In the perspective directions of Russia's development, changes in the systemic quality must occur. These include the development and implementation of long-term programs and medium-term indicative plans, as well as the implementation of an active industrial policy.

These changes will not impede the expansion of the market initiative (this possibility is indicated by the adherents of the universalist economic paradigm), but will also contribute to it, providing state support for the most modern and advanced national productions and hindering parasitic mediation and excessive expansion of transnational capital into the Russian economy. The latter preserves the technological backwardness of Russian industry and reduces the level of the country's security against external political and economic challenges.

An important tool for linking the plan and the market into a single system can and should be private-state partnership (PPP). PPP is based on a stable system of institutions that guarantee private business opportunities for long-term investment in R&D and technological re-equipment of production. The taxation and crediting of the real sector, especially the high-tech sector, should be built accordingly. They are called upon to ensure the stimulation of the development of these industries and their innovative potential. Finally, the government should provide a moderate level of social differentiation (Galbraith, 2011). Variations in personal incomes should depend mainly on the real contribution of individuals to the development of the economy.

The formation of a new vision of development presupposes reliance on a more complete account of the country's institutional specifics. This should be taken into account in the strategy for creating a new model of the economic system and technological development. This is due to the implementation

of economic policy, which should be combined with social, educational, scientific and cultural policies.

References

Bassin, M., Glebov, S., Laruelle, M. (eds) (2015) Between Europe and Asia: The Origins, Theories, and Legacies of Russian Eurasianism. Pittsburgh, University of Pittsburgh Press. 118 p.

Bodrunov, S.D. (2016) 'Re-industrialization: socio-economic parameters of reintegrating production, science and education'. *Sotsiologicheskie issledovaniya* [*Sociological Studies*], 2, 20-28.

Browne, M.N., Hoag, J.H., Boudreau, N. (1995) 'Critical thinking in graduate economic programs: A study of faculty perceptions'. *Journal of Economic Education*, 26 (2), 177-181.

Caldwell, B.J. (1988) 'Hayek's "The Trend of Economic Thinking"'. *The Review of Austrian Economics*, 2 (1), 175-178.

Enste, D.H., Haferkamp, A., Fetchenhauer, D. (2009) 'Differences in thinking between economists and laymen - Explanations for the improvement of the economic policy advice' [Unterschiede im Denken Zwischen Ökonomen und Laien - Erklärungsansätze zur Verbesserung der Wirtschaftspolitischen Beratung]. *Perspektiven der Wirtschaftspolitik*, 10 (1), 60-78.

Galbraith, J.K. (2011) 'Reducing poverty-what might we learn'. *European Journal of Development Research*, 23 (4), 537-540.

Grimmer-Solem, E. (2003) The Rise of Historical Economics and Social Reform in Germany 1864-1894. Oxford, Oxford University Press.

Grinberg, R.S., Rubinshtein, A.Y. (2000) Economic sociodynamics. Moscow, ISE Press.

Hultén, S. (2005) 'Historical school and institutionalism'. *Journal of Economic Studies*, 32 (2), 169-178.

Komlos, J. (2015) What Every Economics Student Needs to Know and Doesn't Get in the Usual Principles Text. N.Y., Routledge.

Kryzhanovskaya, O., Sevriukova, L., Plotnikov, V., Vertakova, Y. (2016) 'The prospects for the implementation of industrial policy in countries in the Medium Term'. Proceedings of the 27th International Business Information Management Association Conference - Innovation Management and Education Excellence Vision 2020: From Regional Development Sustainability to Global Economic Growth, IBIMA 2016, 845-856.

Maksimtsev, I.A., Miropolsky, D.Y., Tarasevich, L.S. (eds.) (2016) Eurasian political economy: coursebook. SPb., SPbGEU publising, 767 p.

Peukert, H. (2001) 'The multifaceted balance of the concept of staatswissenschaften in the Tradition of the Historical School'. *European Journal of Law and Economics*, 12 (2), 113-122.

Polozhentseva, Y. (2016) 'Inequality in social standard of living in the international context'. *Economic Annals-XXI*, 157 (3-4), 15-18.

Senn, P.R. (2005) 'The German historical schools in the history of economic thought'. *Journal of Economic Studies*, 32 (3), 185-255.

Steiner, P. (2003) 'Durkheim's sociology, Simiand's positive political economy and the German historical school'. *European Journal of the History of Economic Thought*, 10 (2), 249-278.

Technological Development as a Factor of Ensuring the National Security

Sergey Bodrunov, Institute of New Industrial Development n.a. S.Y. Vitte, Saint-Petersburg, Russia, sergbod@mail.ru

Vladimir Plotnikov, Saint-Petersburg State University of Economics, Saint-Petersburg, Russia, plotnikov_2000@mail.ru

Yulia Vertakova, South-West State University, Kursk, Russia, vertakova7@ya.ru

Abstract

The high technological level of the economy is one of the conditions for the effectiveness of economic growth. This level in the article is proposed to be considered from two sides. On the one hand, it ensures the sustainability of economic development. On the other hand, it creates prerequisites for technological and, in general, economic security of the country. Due to the crisis development (since 2008), the authors suggest to consider the second direction as a priority. Technological development is seen as a factor in ensuring national economic security. A promising economic model is built on the ability to generate innovations, develop and introduce new technologies into production. These abilities must be realized within the country. This avoids its dependence on external actors. In support of this idea, the authors have established a correlation between national competitiveness, the level of socio-economic development of the country and its technological level. A technological innovation requires the formation of a national innovation-technological ecosystem. This ecosystem covers the real sector of the economy, as well as the social sphere (education, culture, health, etc.). To form such an ecosystem, national re-industrialization is necessary. Reindustrialization requires measures for its resource, methodological and ideological support. The article substantiates the composition of such measures (the use of national financial reserves, the expansion of the practice of program management, the legal provision of re-industrialization, ensuring the availability of credit resources for the modernization of the fixed capital of industrial enterprises, etc.) and the positive consequences of their implementation.

Keywords: national economic security; technological backwardness; technological development; state regulation of the economy; economic policy; industrial policy; re-industrialization.

Introduction

In our opinion, from the standpoint of a systems approach, management tasks in the economy can be divided into two large groups. The first group is connected with economic development. The second group is concerned with ensuring security, i.e. with ensuring the existence of a managed system. The priorities and interrelationship of these tasks in different periods of time can be different.

Since 2008, the world economy and the system of international relations have entered a period of turbulence. The observed facts of this are: crisis phenomena in the economies of large countries, the growth of interstate contradictions in the economy and politics (a bright example of this is the BrExit), an increase in the level of protectionism in international economic relations, the expansion of international economic sanctions regimes, etc. It is possible, therefore, to assert that the level of economic security of individual countries and territories, and of the world economy as a whole, is declining. As a result, it is difficult to solve the tasks of social and economic development.

When solving the tasks of ensuring economic security, it is necessary to take into account not only the current threats to the normal functioning of the economic system (in particular, the government's anti-crisis policy is directed at this), but also the long-term risks associated with its dynamics. One of the main vectors of development today is the formation of an innovative model of the economy. Technological breakthroughs can devalue already existing competitive advantages. These

breakthroughs can also fundamentally change the situation in the sphere of ensuring economic security. For this reason, technological development should be seen as a factor in ensuring the country's economic security.

The Short Literature Review

The technological development is traditionally considered by economists as a key driver of economic growth. In particular, Nobel laureate Robert Emerson Lucas (1988) believed that one of the main models of economic growth is a model emphasizing the physical capital accumulation and technological change. Chief Economist and Senior Vice President of the World Bank Paul Romer (1990) believes that economic growth is driven by technological change. Robert Hall and Charles Jones (1999) in the article "Why do some countries produce so much more output per worker than others?" say that the reason for this is the differences in physical capital and educational attainment. The authors point to the key role of technological development in ensuring high labor productivity. This is a factor of economic growth and high efficiency of resource use. Similar opinions are also heard by other specialists (Brandaõ Santana et al., 2015; Frishammar et al., 2015; Miller et al., 2017; Shrivastava et al., 2016; Teletov et al., 2017; Vertakova and Plotnikov, 2016; and other). At the same time, the influence of technological development on ensuring economic security in the literature is considered poorly.

The scientific community recognizes the urgent issue of economic security. A number of authors (Barry, 2007, Gasparatos and Gadda, 2009, Hacker et al., 2014, Jizhong and Guoyu, 1992, Zhang, and Zhang, 2004; and other) analyze this phenomenon in detail, both in general and in relation to specific countries, regions, sectors and types of security (food, social, technological, etc.). We note the great importance attached to ensuring economic security by the governments of the world's leading countries. The weakening of the economic security of the partner country, on the contrary, is viewed in foreign policy as a way of exerting international pressure on its government. Suffice it to mention in this regard the international economic sanctions imposed by the United Nations against North Korea, Iran and other countries. As well as unilateral economic sanctions, which are regularly resorted to by governments of developed countries to achieve their own political and economic goals. Economic sanctions are introduced to weaken national economic security and block economic development (Halberstam and Stein, 2009; Marinov, 2005; Shin, Choi and Luo, 2016; and other).

The Impact of Technological Development on Competitiveness

A promising model of the economy is called innovation, information, knowledge-based, post-industrial, etc. The crucial point is that this economic model is built on the ability to generate innovations, develop and introduce new technologies into production. A country with such a property becomes a source of technology for other countries. As a result, they fall into technological dependence. This allows the country - the technology leader - to influence the economic and political decisions in the country - the technological donor.

There is a significant correlation between the levels of socio-economic and innovative development of countries. Table 1 shows the indicators of GDP per capita, PPP (current international $) and Rank in the Global Innovation Index of the countries leading in these indicators in the world. In the Table 1, countries are ordered according to the GDP per capita indicator. The richest countries in the world include innovative leaders and oil exporting countries. At the same time, high positions of innovative countries are provided not by natural conditions, but by knowledgeable and intellectually intensive resources created in the country. That is, their competitive advantage is more stable.

These countries have sustained revenues from technology trade and exports of innovative industrial products. At the same time, this trade itself is an indicator of the "health" of the world economy. This is evident from a comparison of indicators of the dynamics of world GDP and world high-tech exports (Figure 1). World figures of High-technology exports (current US $) and GDP (current US $) from 1999 to 2006 grew at a similar pace. But in 2006, two years before the crisis, the innovative and technological development of the world economy began to slow down. This was reflected in the change in the dynamics of the two indicators considered. After the fall in 2009, the growth of both indicators resumed. At the same time, the growth rates of the High-technology exports indicator

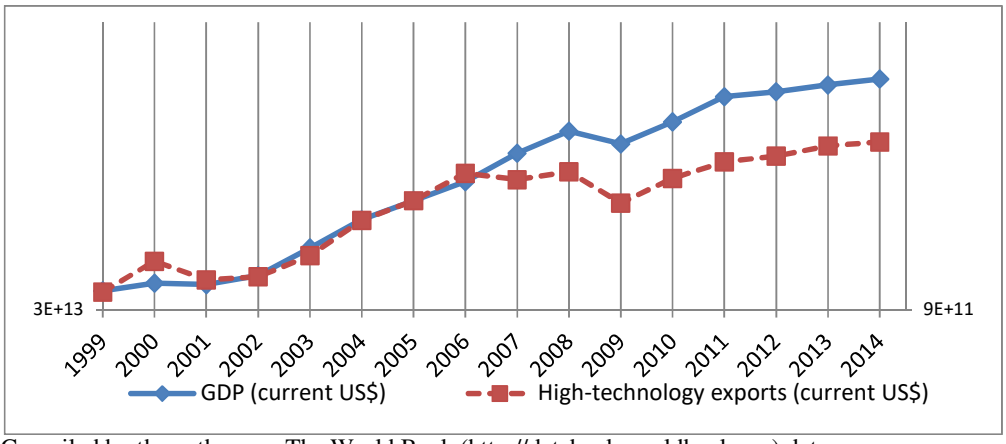
(current US $) have become outstripping. In our opinion, this testifies to the restoration of the economy, in terms of its technological structure.

The importance of the technological factor is not reduced to the cost accounting of its direct contribution to economic growth. The qualitative component of this contribution is also important. It is determined by the creation of prerequisites for future development. "Innovation is making innovations." New technologies change social reality. They form a new foundation for the industry. The lack of national development technologies and their inaccessibility (economic or physical) for acquisition on the world market can preserve the country's socioeconomic backwardness.

Table 1: Leading countries of economic and innovative development

Country Name	GDP per capita, PPP (current international $), 2016	Global Innovation Index 2017 rankings
Qatar	127523	
Luxembourg	105888	
Macao SAR, China	104169	
Singapore	87856	7
Brunei Darussalam	77441	
United Arab Emirates	72419	
Ireland	68883	10
Switzerland	62881	1
Norway	59302	
Hong Kong SAR, China	58553	
United States	57467	4
Saudi Arabia	54431	
Iceland	51399	
Netherlands	50898	3
Austria	50078	
Denmark	49696	6
Sweden	49175	2
Germany	48730	9
Australia	46790	
Belgium	46383	
Canada	44025	
Finland	43053	8
United Kingdom	42609	5

Compiled by the authors on The World Bank (http://databank.worldbank.org) and Global Innovation Index (https://www.globalinnovationindex.org) data.



Compiled by the authors on The World Bank (http://databank.worldbank.org) data.

Fig. 1: Dynamics of changes in indicators of High-technology exports (current US $) and GDP (current US $), logarithmic scale.

We give an example from the field of microelectronics. In June 2017, Forbes magazine reported that IBM has created a process for manufacturing electronic chips with a topology of 5 nm. This twice exceeds the most advanced for today development (10 nm). It is implemented by Qualcomm in the processor Snapdragon 835, which is installed in the smartphone Samsung Galaxy S8. According to expert estimates, the characteristics of the new chip will allow a 2-4-fold increase in the battery life of smartphones and other mobile devices. This development was carried out in cooperation by IBM, Samsung and GlobalFoundries. According to the plans of the developers, the production of new chips can be launched from 2020.

At the same time, the modern minimal topological size for mass production of commercial products is 14 nm (from 2014-2015). For comparison, in Russia the minimum mastered technology is 65 nm. Such chips are made by Micron company. It also develops a chip with a topology of 45 nm. At the same time, the government decided to set up the production of chips using 28 nm technology. This will require financing in the amount of more than $ 1 billion (only for the construction of the plant). In May 2015, the Russian company Baikal Electronics released a prototype of the processor using 28 nm technology. The processor is developed in Russia, but is produced at the TSMC plant in Taiwan. And this development is not entirely Russian. Baikal Electronics licensed a number of blocks from the British company Imagination Technologies.

This example is convincing. Developed by one country, even economically developed enough (according to the World Bank, in terms of GDP, taking into account the PPP, Russia is ranked 6th in the world in 2016, accounting for 2.83%), modern technology in the field of microelectronics is very difficult. And while blocking access to foreign technology, this can not be done. And it's not just about financial costs, but about time. In the development of microelectronics, Russia, like many other countries in the world, is in the "catch-up" position. Overcome the existing lag is theoretically possible, but during this time, the leading countries will also increase the initial gap. As a result, technological dependence is formed on foreign supplies, which weakens the national competitiveness. This import dependence is a threat to national economic security.

Measures to Reduce the Technological Gap and Increase the Level of Economic Security (on the Example of Russia)

The term "technological boundary" is used in the construction of innovative technological forecasts. It assesses the level of advanced technologies that have a decisive influence on the main parameters of the economic system. According to the calculations of the Higher School of Economics (Russia), while maintaining the current pace of technological development, the country will reach the current technological frontier of advanced countries by 2050. During this time these countries will make a further breakthrough. As a result, most likely, the existing gap will not decrease, but will increase. It can be concluded that an attempt to reduce the technological gap in all areas is ineffective. It is necessary to use a selective approach.

We should choose certain priorities in technological development. In the future, on their achievement, most of the available resources should be concentrated. This step is fulfilled in Russia. The Decree of the President of the Russian Federation of 07.07.2011 # 899 "On the approval of priority directions for the development of science and technology in the Russian Federation and the list of critical technologies of the Russian Federation" was adopted and entered into force. The list of 8 priority directions for the development of science and technology, as well as 27 critical technologies has been officially announced. Efforts of state (and with state participation) scientific, innovative and production organizations are focused on their development. Private business is involved in the implementation of these priorities through the system of indicative planning and state programming.

Experience shows that development only in priority areas is not enough. A technological innovation requires the formation of an innovation-technological ecosystem. This ecosystem covers most branches of the economy, as well as the social sphere (education, culture, health, etc.). The latter circumstance ensures the formation of innovative human capital. To form such an ecosystem, national re-industrialization is necessary, as one of the authors has repeatedly pointed out earlier in his speeches and scientific developments (Bodrunov, 2016). Thus, today it is necessary to

reindustrialize the economy on a new technological basis, focused on advancing technological development.

Now the next technological revolution is beginning in the world. Today's technological leaders will be the economic leaders in the future world. There is a transition of advanced countries from 5 to 6 technological order. Russia is in 4 with elements of the 5 technological order. Therefore, the country has risks in the sphere of economic and national security. These risks are critical. In this regard, it is necessary to stimulate international innovation-technological and production cooperation, support cross-border technology transfer. This requires the creation of special institutional conditions, as well as the adjustment of state economic policy.

As a model, the experience of state support of automobile production in Russia can be used here. The government provided the world's automakers with a special legal regime for working in Russia - the "industrial assembly regime". It was established by the Decree of the Government of the Russian Federation of March 29, 2005, # 166 "On Amending the Customs Tariff of the Russian Federation with respect to Automotive Components Imported for Industrial Assembly". As a result, the Volkswagen Group, Renault-Nissan, Ford, Toyota and others opened their enterprises in Russia. Following the production of finished products (cars), in order to reduce the tax burden and achieve competitive prices, the localization of the production of auto components began in the country. As a result, for example, the overall level of localization of Nissan cars produced in Russia is 64%. We can talk about reducing import technological dependence in this area. Following the production of the final products, modern automobile clusters were created in a number of regions of the country (St. Petersburg, Leningrad, Kaluga, Kaliningrad regions). They include a significant number of supporting industries, the infrastructure of training, service, sales, R&D, etc.

The task of searching for a new model of economic growth and, perhaps more broadly, the new economic doctrine is facing the economic community and political authorities. For a long time, the country was pursuing an economic policy that nominally had the right strategic goals for creating a modern social market economy that provides a modernization strategy for development. However, the tools that were chosen to achieve it (a combination of the ideology of "market fundamentalism" and the practice of "manual" government) caused the stagnation of the economy. The implementation of the liberal-monetary model of economic development led to a decline in production, a decrease in the stability of the economy, an increase in the level of dependence of the economy on foreign capital, technology, products, consumer goods. The economic security of the country was weakened.

A major problem that has a negative impact on the state of the economy and, in particular, on the development of industry, is the outflow of capital from Russia. This problem was exacerbated in 2014. According to the Central Bank of Russia, the outflow amounted to $ 151.5 billion, which is almost 2.5 times more than in 2013 - $ 61 billion. This exerted additional pressure on both the national currency and on the dynamics of financial markets. Together with anti-Russian sanctions, this has reduced the sources of "long money" for Russian companies. And along with this, the country has accumulated excessive international reserves (Table 2). These reserves continue to grow.

Table 2: International Reserves of the Russian Federation, $ million

Date	Total	Including foreign exchange reserves	Including		
			Foreign currency	Special Drawing Rights	Reserve position in the IMF
September 01, 2017	423 978	350 478	340 669	6 824	2 985
September 01, 2016	395 198	330 488	320 610	6 725	3 154

Source: Central Bank of the Russian Federation (http://www.cbr.ru/hd_base/?PrtId=mrrf_m).

The minimum sufficient amount of national reserve assets is established (in accordance with world practice). It should correspond to the value of imports of goods and services for 3 months. In Russia,

this indicator is much higher (Table 3). Over the past 10 years, the country is in the top 10 in terms of volume and sufficiency of international reserves in the world.

Such volumes of reserving resources in conditions when the national industry, including its high-tech sector, do not have enough funds for development, are groundless. The authors believe that the amount of resources "frozen" in reserves can be significantly reduced. This will not lead to macroeconomic instability or other negative consequences. How large are the reserves that can be used to stimulate technological development? Let's consider this issue in more detail.

Table 3: Assessment of the sufficiency of international reserves of Russia

Date	Level of sufficiency of reserves, months of import (optimal - 3)	The world's position on the sufficiency of reserves	The world's position on the volume of reserves
January 01, 2011	18	2	4
January 01, 2012	14	4	4
January 01, 2014	13	9	5
January 01, 2015	11	11	7
January 01, 2016	16	8	7

Compiled by the authors on Central Bank of the Russian Federation (http://cbr.ru/statistics/print.aspx?file=credit_statistics/res_import.htm) data.

Decree of the Government of the Russian Federation of April 15, 2014 # 328 "On the approval of the state program of the Russian Federation "Industry Development and Enhancing its Competitiveness" for 2013-2020 provides for the amount of funding from the federal budget is 1059 billion rubles. At the current exchange rate (on September 01, 2017 - 58,5454 RUR / USD) this is about $18 billion. This is only 4.27% of the gold and foreign exchange reserves accumulated on the relevant date (see Table 2), which are planned to be spent for 8 years. In terms of a year - about 0.5%. This is an insignificant amount. It is at the level of natural fluctuations in the volume of reserves (over the past year they increased by 7.28%).

We believe that it is necessary to more actively attract reserves for financing re-industrialization programs, modernization of industry, its innovative and technological development, etc. For this, an appropriate political decision is needed. The main trend of the new economic policy is reindustrialization based on the priority development of high technologies. To solve this task, we must concentrate available resources. One declaration is not enough. Without resource support, reindustrialization is impossible. It is not so much the restoration of Soviet industry that is required (although in some cases these steps are necessary), but a qualitative update of the technological basis of production. The solution of this task should be concentrated available resources: not only financial, but also managerial, intellectual and human.

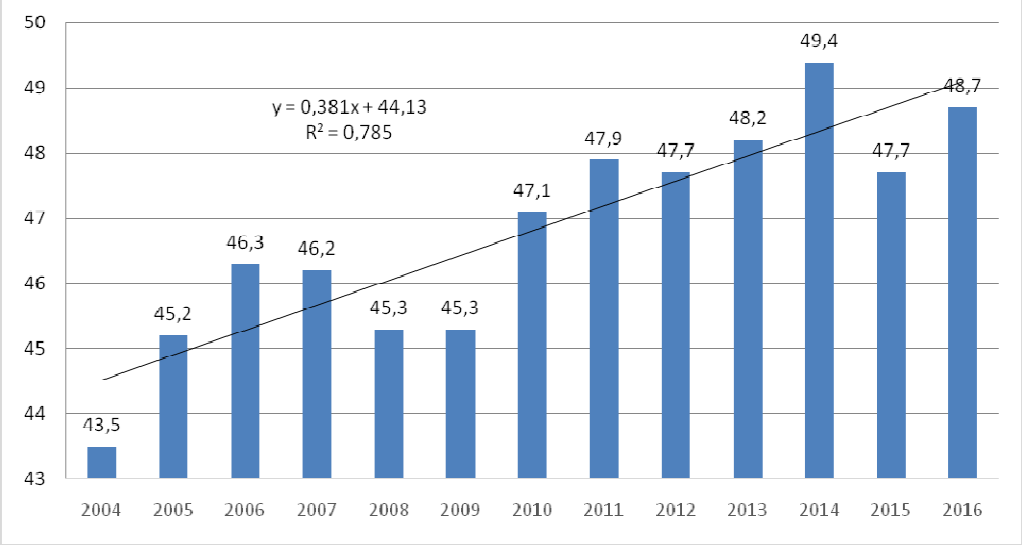
The task of creating a qualitatively new technological base for the industry should be solved on the basis of the wide use of technologies of the 5th and 6th technological orders, informatization, miniaturization, individualization and network organization of production, wide use of the creative potential of workers (Kharlamov et al., 2015, Polozhentseva, 2016; and other), etc. One can not speak of the current re-industrialization, in the "classical" sense, as the industrialization of the economy of a retrospective period. The goal of reindustrialization as an economic policy, which is a set of concrete measures, should be the restoration of the role and place of industry in the country's economy as part of its structural adjustment as a basic component, and the priority development of the real sector of the economy on the basis of a new, advanced technological order.

One of the consequences of deindustrialization in Russia is the diminishing effectiveness of Russia's integration into the world division of labor. Deindustrialization processes have occurred over the past decades in the economies of the United States, United Kingdom and other developed countries. But they developed differently. Industrial production was transferred to developing countries. At the same

time, technology development, R&D units, management and financing centers remained in developed countries. This made it possible for their companies to extract a greater specific income per unit of invested resources. In global value chains, developed countries have high-yielding links.

In Russia the situation is reversed. National companies tend to participate only in the initial stages of global value chains. This not only generates import dependence on a number of basic products and technological dependence on developed countries, but also reduces the level of economic security. One of the goals of re-industrialization is to occupy a fundamentally different niche in the world division of labor than the one that now belongs to Russia. We must avoid specialization in the production and supply to the international markets of low-grade products: natural gas, oil, ferrous and non-ferrous metals, potash fertilizers, etc. But not by building up the high-tech exports already in existence (it is mainly connected with armament and military equipment), but by entering new markets with new products (information and communication technologies, transport systems, including the Arctic, nuclear energy, materials production with given properties, etc.).

In the future world, those economies that will be able to take the leading positions in the sphere of development and application of high technologies will be competitive and ensure the quality of human capital that can realize them. Technological modernization of production is the main factor in ensuring the solution of this problem. But in order to achieve technological leadership, it is necessary to update production capacities, modernize the fixed capital of enterprises. This is confirmed by data on the degree of depreciation of fixed assets of Russian enterprises (Figure 2). This indicator stably exceeds 40% and has a stable growth trend with a linear trend. It is obvious that it is impossible to produce innovative products on physically and morally obsolete equipment.



Compiled by the authors according to the Federal State Statistics Service (http://gks.ru).

Fig. 2: Dynamics of depreciation of fixed assets of Russian enterprises, %.

Is the solution to the task of updating the equipment of the industry on a national scale realistic? The authors believe that yes. Under the current management system, when business in Russia is predominantly private, it is necessary to solve this problem by developing partnerships between the state and business. The state should not only pursue a strategic goal-setting (an example is the implementation of the state program of the Russian Federation "Development of Industry and Enhancing Its Competitiveness"), but also to establish a system of indicators of technological development coordinated with the interests of private business and create institutional conditions (administrative support, interest rate subsidies on credits, tax incentives, etc.) for the technological re-equipment of industry. Forms of state support are described in the Federal Law "On Science and State Science and Technology Policy" of 23.08.1996 # 127-FZ. But, unfortunately, they are not being used actively enough.

In the Concept of Long-Term Social and Economic Development of Russia for the Period to 2020, the strategic goal is to make Russia one of the global leaders in the world economy. An innovative model of economic growth presupposes the ability not only to produce new knowledge embodied in new technologies, but also to effectively introduce the latter into production using appropriate types of new technology. Only an innovation that has passed from a full life cycle - from the germination of an idea to diffusion, complete "dissolution" in economic practice, turning into a traditional routine technology - can give impetus to development. This requires a developed industrial base. It is not accidental that in the innovative economy countries with developed industrial potential are leading, first of all - with modern machine building and instrument making. These industries are the nucleus of national innovation systems: on the one hand, they themselves form a steady demand for technological innovation, and on the other hand they promote their practical development in production processes and in the social sphere.

At the same time, the phase of production of final consumer and investment demand using new technologies and technical means can be carried out outside the national territories (production outsourcing). But the owners of technological knowledge and integrators of the production of the corresponding types of new technology, and consequently, the recipients of innovative rent, remain, and increasingly become, companies - innovative leaders. In the future economy, new conditions are proposed for the development and maintenance of competitiveness, based on advancing technological growth. Only such growth can ensure national economic security. Not only the scale of industrial potential, but also its innovativeness, ability to technological renewal play a primary role in maintaining the competitiveness and development of both a particular business and the national economy as a whole.

The essence of the modernization of the Russian economy is the renewal of its industry on a qualitatively new technological basis, in the transition from technological to meta-technological leadership. When implementing such a modernization strategy, it is advisable to take into account that the policy of stimulating the innovation-technological leap must be implemented through the re-industrialization of the economy in the context of the need to solve import substitution problems. Starting with a phased, "layer-by-layer", deepening from simple to complex import substitution, continued with the appropriate restructuring of exports, Russia can deploy the country's re-industrialization. This should form the basis of industrial policy.

Conclusion

The level of technological development in the perspective model of the economy is not only a factor of competitiveness, but also as a factor in ensuring national economic security. Providing technological leadership, in this regard, is becoming one of the key tasks of state policy. International competition is exacerbated in this sphere. Without the active support of business, the state can not achieve technological leadership. In particular, this is true for catching countries, for example, Russia. To stimulate economic growth, increase the quality of life of the population and ensure national economic security should be integrated. This can be done by accelerating technological development. The state economic policy should be concentrated on the solution of these problems.

References

Barry, J. (2007) ‘Towards a model of green political economy: From ecological modernisation to economic security’. *International Journal of Green Economics*, 1 (3-4), 446-464.

Brandaõ Santana, N., Rebelatto, D.A.D.N., Périco, A.E., Moralles, H.F., Leal Filho, W. (2015) ‘Technological innovation for sustainable development: An analysis of different types of impacts for countries in the BRICS and G7 groups’. *International Journal of Sustainable Development and World Ecology*, 22 (5), 425-436.

Bodrunov, S.D. (2016) ‘Re-industrialization: socio-economic parameters of reintegrating production, science and education’. *Sotsiologicheskie issledovaniya* [*Sociological Studies*], 2, 20-28.

Frishammar, J., Söderholm, P., Bäckström, K., Hellsmark, H., Ylinenpää, H. (2015) 'The role of pilot and demonstration plants in technological development: synthesis and directions for future research'. *Technology Analysis and Strategic Management*, 27 (1), 1-18.

Gasparatos, A., Gadda, T. (2009) 'Environmental support, energy security and economic growth in Japan'. *Energy Policy*, 37 (10), 4038-4048.

Hacker, J.S., Huber, G.A., Nichols, A., Rehm, P., Schlesinger, M., Valletta, R., Craig, S. (2014) 'The economic security index: A new measure for research and policy analysis'. *Review of Income and Wealth*, 60 (S1), S5-S32.

Halberstam, D., Stein, E. (2009) 'The United Nations, the European Union, and the King of Sweden: Economic sanctions and individual rights in a plural world order'. *Common Market Law Review*, 46 (1), 13-72.

Hall, R.E., Jones, C.I. (1999) 'Why do some countries produce so much more output per worker than others?' *Quarterly Journal of Economics*, 114 (1), 83-116.

Jizhong, Z., Guoyu, X. (1992) 'A new economic power dispatch method with security'. *Electric Power Systems Research*, 25 (1), 9-15.

Kharlamov, A.V., Kiselkina, O.V., Kharlamova, T.L., Vunotropidi, A.F. (2015) 'The increasing of quality requirements of state regulation of economy in solving of social tasks'. Social Sciences and Interdisciplinary Behavior - Proceedings of the 4th International Congress on Interdisciplinary Behavior and Social Science, ICIBSOS 2015, 425-428.

Lucas Jr., R.E. (1988) 'On the mechanics of economic development'. *Journal of Monetary Economics*, 22 (1), 3-42.

Marinov, N. (2005) 'Do economic sanctions destabilize country leaders?' *American Journal of Political Science*, 49 (3), 564-576.

Miller, A.E., Kuznetsov, S.V., Rastova, Y.I. (2017) 'Instruments to assess efficiency of implementation of the strategy of scientific and technological development of the Russian Federation'. *Espacios*, 38 (33), 16.

Polozhentseva, Y. (2016) 'Inequality in social standard of living in the international context'. *Economic Annals-XXI*, 157 (3-4), 15-18.

Romer, P.M. (1990) 'Endogenous technological change'. *Journal of Political Economy*, 98 (5), S71-S102.

Shin, G., Choi, S.-W., Luo, S. (2016) 'Do economic sanctions impair target economies?' *International Political Science Review*, 37 (4), 485-499.

Shrivastava, P., Ivanaj, S., Ivanaj, V. (2016) 'Strategic technological innovation for sustainable development'. *International Journal of Technology Management*, 70 (1), 76-107.

Teletov, A., Nagornyi, Y., Letunovska, N., Shevliuga, O. (2017) 'Competitive and sustainable technological development: Focus on business enterprises'. *Journal of Security and Sustainability Issues*, 6 (3), 491-500.

Vertakova, Y., Plotnikov, V. (2016) 'Innovative and industrial development: Specifics of interrelation'. *Economic Annals-XXI*, 156 (1-2), 37-40.

Zhang, J., Zhang, J. (2004) 'How does social security affect economic growth? Evidence from cross-country data'. *Journal of Population Economics*, 17 (3), 473-500.

Fostering Community Engagement through Crowd sourcing: Case Studies from the Czech Republic

Barbora Haltofová, Tomas Baa University in Zlín, Faculty of Management and Economics, Zlín,

Czech Republic, haltofova@utb.cz

Abstract

Crowdsourcing in urban governments is defined as the use of new technologies in order to take advantage of citizen knowledge to find solutions to municipal problems. Driven by the constant technological advances and ubiquitous Internet connection, the crowdsourcing platforms are proving to be valuable tools for triggering and engaging the public towards active participation and the collection of citizen knowledge through crowdsourcing has become commonplace. In this article we present the emerging role of crowdsourcing in public administration and systematically review existing crowdsourcing initiatives deployed in the Czech Republic. We first introduce the overall challenge of information collection in public projects. Then, we identify two crowdsourcing usage types: crowdsourcing for participatory budgeting and crowdsourcing for environmental data collection, and illustrate with examples of case studies from the Czech Republic that crowdsourcing leads to deeper civic engagement.

Keywords: Civic Engagement, Crowdsourcing, Participatory Budgeting, Environmental Data Collection.

Introduction

Citizen´s engagement is considered as one of the important dimensions for the development of smart city (Boukhris, Ayachi, Elouedi, Mellouli et Amor, 2016), which is a new city model resulting from the rapid development of new technologies and innovation processes. According to Gooch et al. (Gooch, Wolff, Kortuem, et Brown, 2015), smart cities must focus on people rather than on technologies, or better, as stated by Desouza and Bhagwatwar (2014), to use the potential of technologies to foster citizens´ engagement by deploying of technology-enabled participatory platforms for civic engagement.

In this context, the notion of wisdom of the crowds (Surowiecki et Silverman, 2007) has gained the importance. Crowdsourcing enable public officials to work outside the traditional structures (Dirks et Keeling, 2009) and engage citizens in innovative ways such that local issues are resolved without causing much strain in their resources (Desouza et Bhagwatwar, 2014).

Here we present different crowdsourcing initiatives deployed in the Czech Republic, focusing on participatory initiatives organized in Czech cities, such as participatory budgeting and environmental data mapping through crowdsourcing. In this article, we explore the role of participatory budgeting and volunteered geographic information in encouraging citizens to contribute to important local issues through crowdsourcing.

Crowdsourcing to Foster Community Engagement

Crowdsourcing is a term coined by Howe 2006) referring to the process of outsourcing a task to the crowd – an unknown group of individuals, non-experts or experts, acting as volunteers. Despite this

concept has primarily been developed in the field of business, it can be used as a particular form of citizen participation in the public policy process (Brabham, 2008) (Brabham, 2009).

Citizen e-participation in urban governance is defined by Silva (2014) as the ubiquitous use of information and communication technologies to support citizen involvement in the urban policy process, in its different stages, without limits of time and space, through processes of information, consultation or active participation, being crowdsourcing in urban governance a specific mode of active e-participation. As stated by many scholars (Macintosh, 2004), (Fung, 2006), (Albrecht et al, 2008), the value of e-participation is closely linked to the level of citizen engagement.

The move from off-line and paper-based urban governance to a mode based largely on digital and online environments requires new working methods and new tools (Silva, 2014) such as innovative Web 2.0 applications (Casey et Li, 2012), user generate content applications, citizen consultation platforms, central portals for petitions, social computing platforms, geo-visualization and geo-location technologies (Anttiroiko, 2012), and mobile applications (Sundstrom, 2012). Although these tools are now opening new channels and possibilities for communication between citizens and government, offering new possibilities for data collection, information and consultation in urban governance, many scholars (Moody, 2007), (Sieber, 2008) agree that they should not be seen as a replacement of conventional modes of citizen participation in urban governance, but should be seen rather as a complement to traditional participatory methods and tools.

Although in most cases e-participation is part of a wider participatory process that also includes non-virtual and off-line activities, the tendency seems to be for public officers to use little by little the new e-participation tools as they allow simpler, inexpensive, less time-consuming and more effective way of interaction with citizens, and thus foster citizen engagement in urban governance (Silva, 2014).

In the remainder of this paper we outline how different crowdsourcing tools are used to foster community engagement in the Czech Republic. This is presented using case studies.

Crowd sourcing for Participatory Budgeting

Participatory budgeting (PB) is a form of active civic engagement that enables citizens to participate in budgetary decision-making processes. It serves as an instrument by means of which citizens are capable of deciding on the projects in which the public money will be invested (Boukhris et al, 2016), and thus directly influence the allocation of public financial resources. As PB empower citizens by providing them with the mechanism to express their preferences and opinions, it contributes to civic engagement (He, 2011). This is confirmed by Garcia et al (2011) who states that as people feel their suggestions and demands are heard by the government, their actual desire to participate will increase.

Simultaneously, many scholars agree that PB has the potential to change the relationship between local government and citizens in favor of the latter. In the context of PB, citizens have greater feelings of access to a local government, and better understanding of the complexities of spending public funds. This leads to more positive view of government officials, and bolsters the legitimacy of local government (Swaner, 2017). Citizens not only become familiar with public finances´ operations, but also exercise control over local authorities which helps bridge the distance between them (Soltysiak et Suraj, 2016). PB is viewed as an instrument for introducing local democratization as well (He, 2011). According to Brun-Martos and Lapsley (2017), the idea of PB has the potential to enhance both democratic accountability and effective city management through transparency. It allows the enhancement of social inclusion, and thus the development of civil society (Soltysiak et Suraj, 2016).

Participatory budgeting in Czech communities is still in its infancy. However, there are some city leaders who decided to modernize the established practice and provide citizens with greater transparency by inviting them to the budgetary activities. One such as city where PB is operating is Prague-Zbraslav. The case study will be presented within the next chapter.

Crowd sourcing for Environmental Data Collection

Researches (González, Gilmer, Foley, Sweeney et Fry, 2008), (Bugs, Granell, Fonts, Huerta et Painho, 2010) show that crowdsourcing can be used as a support in environmental data collection. Recent advances in Geographic Information Systems (GIS) as well as in Web 2.0 technologies provide new ways of creating and sharing of georeferenced user-generated contents which may complement traditional spatial data sources. The availability of Global Navigation Satellite Systems (GNSS) and sensors in smartphones, as well as geo-browsers or location-based social networks enable to produce the novel type of geographic information, commonly referred to as a Volunteered Geographic Information (VGI) (Goodchild, 2007). This novel source of information collected by way of crowdsourcing is becoming especially important where authoritative geographic information is lacking, therefore institutions use it as a mechanism to build local capacity to support collaboration, supplement traditional data sources, and inform decision-making (Fast et Rinner, 2014).

As a result of the use of VGI, sophisticated Web and smartphone mapping applications are created. Through these apps emphasizing the role of citizens as volunteer sensors (Goodchild, 2007), citizens can report various types of non-emergency civic issues helping the local authorities to find out and map problems in their surroundings.

Usually, when citizens tap into an illegal waste dump or any other civic issue they want to complain their municipality about, they have two options. They either go personally to the city hall, or they visit the municipality´s website where they look for the contact information of the officer responsible for an issue. As it may be confusing and time-consuming procedure, they are not motivated and usually forget about their claim. This way of traditional reporting leads to a decrease of the interaction between authorities and citizens willing to report the issues. Therefore, a faster and easier way is needed (Alikhani, 2011). The web/smartphone application through which citizens report civic issues simply by choosing the category for the issue, pointing the position on the map, and optionally add a photo with some details about the issue, is the solution which leads to the greater civic participation. As stated by Bugs et al (2010), these geo-crowdsourcing apps not only strengthen social interactions between the citizens and their municipalities, but also improve the public participation.

The GIS-based crowdsourcing mobile applications taking advantage of geographical information provided by the crowd deployed in the Czech Republic can be divided into two groups according to their provider: those which are provided by the third, usually commercial party, and used by multitude of municipalities (e.g. apps Dej tip, Lepší místo, ZmapujTo, etc.); and those which are created by city IT specialists, and used exclusively in one municipality. One such as app is Plznito developed and deployed in Pilsen which will be presented within in next chapter.

Case Studies

In this chapter, two case studies will be presented. One dealing with the participatory budgeting practice in city district Prague-Zbraslav, second dealing with the use of mobile application for reporting civic issues in Pilsen city.

Participatory Budgeting in Prague-Zbraslav

City district Prague-Zbraslav joined the pilot project called the "Participatory Budgeting – an Innovative Tool for City Hall Dialogue with Citizens" in 2015. The initiative was successful. Therefore, one year later the city representatives decided to build on the experience of the pilot year, set more courageous goals, and allocate 1% of the municipal budget (1 million CZK) to projects designed by community members. As the city representatives wanted to make it easier for participants to share ideas about the projects, enable community feedback, ensure safe registration, and give the opportunity to vote online, they have used the D21 digital voting system.

The city hall at first launched the information campaign through the Internet, local newspaper and outdoor promotional areas. The aim of the campaign which culminated on September at a public meeting was to explain what is expected and how to proceed with the process of drafting and submitting proposals. By the end of October, citizens could submit their ideas either electronically, or in a paper form to the registry office of the City Hall. In total, 19 proposals were submitted, each being analyzed with respect to their feasibility and expensiveness. The public discussion, during which all feasible proposals were presented to the public, was next. Finally, the public vote through the voting application was realized. The application was accessed through the web, where all the proposals were described in detail. The voters were able to vote during February for any proposal, each having four positive and two negative votes. Citizens without Internet access were able to vote physically with the help of the public officers at the City Hall. Voting results were published at the web, further via other media, and send by e-mail to those who leave their e-mail address in the voting application. Immediately after announcing the winning projects, the City Hall started in cooperation with the designers, to prepare the realization itself (Agora-CE, 2017).

In total, 1 556 citizens were involved in the vote, and they have chosen 5 from 13 originally submitted proposals (see Table 1 – The Submitted Projects). Concerning the voters, only one quarter declared that they live and work/study in Prague-Zbraslav, while 47, 8% of voters live in Prague-Zbraslav but work/study elsewhere. The most represented age group were citizens aged from 31 to 40 years (31, 9%), followed by 41 – 50 (21, 5 %) and 21 – 30 (17, 4%) years old. The number of female voters (56%) predominated.

Tab. 1: The Submitted Projects

	Votes in total	*Positive votes*	*Negative votes*	*Costs (CZK)**
Outdoor workout course	**684**	**709 (46%)**	**25 (2%)**	**250 000**
Fixing community road	**470**	**557 (36%)**	**87 (6%)**	**248 000**
Outdoor table tennis tables	**419**	**473 (30%)**	**54 (3%)**	**186 000**
Public park water fountain	**411**	**440 (28%)**	**29 (2%)**	**50 000**
Children's playground	**295**	**341 (22%)**	**46 (3%)**	**250 000**
Restoration of historical bell tower	245	282 (18%)	37 (2%)	128 241
Barrier-free entrance to the senior club KLAS	244	319 (21%)	75 (5%)	136 750
Planting out the centre Záběhlice	176	253 (16%)	77 (5%)	250 000
New benches near market place	145	310 (20%)	165 (11%)	100 000
Community composter	144	218 (14%)	74 (5%)	40 000
Clock on children's playground	87	194 (12%)	107 (7%)	163 000
Public weather station	17	155 (10%)	138 (9%)	30 000
ProzoMAT**	- 222	71 (5%)	293 (19%)	100 000

*Price including VAT
** ProzoMAT is kind of outdoor jukebox with regional Zbraslav prose and poetry

Source: Demokracie 2.1 (Demokracie 2.1., 2017)

The most successful project was the construction of the outdoor workout course, which received 684 positive and 25 negative votes. The statistics shows that while 46% of citizens voted for the winning project, only 2% declared against this project. The second winning project was fixing of about 350 meters long damaged community road. This project received 470 positive (represented by 36 % of voting citizens), and 87 (represented by 6% voting citizens) negative votes. Third most successful project was construction of two outdoor table tennis tables decided by vote of almost one third (419) of voting citizens (D21, 2017).

The total costs of realized projects was 984 000 CZK. The city representatives, who earmark 1 million CZK for the participatory budgeting initiative, were satisfied with the results. As stated by Filip Gaspar, the Deputy Mayor of Zbraslav: "Not only record number of projects was submitted, but twice as many people joined the poll than last year." (Joachymstál, 2017) Moreover, as the number of citizens involved into the project doubled comparing to the previous year; the city representatives state that the participative budgeting initiative has been a great success.

Civic Issue Monitoring Application Plznito

The city of Pilsen, in its endeavor to simplify communication between the citizens and the municipality officers, has developed a web and a mobile application which enables citizens to communicate actively with the office through the website or by means of their smartphones (MPMP, 2015). The Plznito is an e-participation application online and mobile platform, available for iOS, Android and Windows operating systems, which improves the communication between municipality officers and inhabitants of Pilsen

allowing them to report almost any kind of non-emergency issues in their neighborhood. With Plznito, citizens can report defects and damage to urban property, such as overfull litter bins, damaged benches or non-functioning public lighting lamps, in easy way by couple of clicks.

With Plznito, Pilsners have several possibilities how to inform their city officials about civic issues. They can either use the web portal, or download a free mobile application to their smartphones directly form the web page www.plznito.cz, or via Google Play, Apple Store or Microsoft Store.

Once having installed the application, a citizen only needs to select the exact location on the map (the smartphone pinpoints the position thanks to its GPS location), select the category (car wreck; road sign; pavement; sewer system; benches and banisters; waste and waste dump; sandpit, playground and playing field, roads and cycle tracks; public green; street lighting and public transport stop), and take a photo of the issue being reported. Then, the report is sent to the official responsible for the resolution of the problem. Citizens not having the smartphone can alternatively use the web and report via an online interactive form which can be opened in a computer with a common web browser.

Each report is verified by an administrator and sent to the official assigned to the issue. He/she processes the report directly in its administration interface, by changing the status of the reported issues to inform the users, and leaving the comments with feedback on state of the problem handling (MVČR, 2017). In case he/she needs more information about the issue, he/she can ask the citizen once filled his/her e-mail address. At the same time, the report appears on the interactive map with detailed information. The Pilsners can therefore track the processing of their reports. Moreover, all citizens can easily look into the interactive map and see what is happening in their municipality.

The Plznito was launched in April 2015. Since, more than 3 000 reports have been submitted, from which 2 604 have been successfully resolved. As stated by city representative, the city had noticed the increased public participation since the deployment of the app (Smetanová, 2016).

Conclusion

This paper´s assumption is that crowdsourcing help to develop alternative ways for public participation, encourage open communication between citizens and decision makers, and thus foster civic engagement. The goal of this article was to outline how some of the Czech municipalities, namely Prague-Zbraslav and Pilsen, interact with their citizens by way of crowdsourcing. We explored the potential role of crowdsourcing technologies, namely voting and mapping websites and mobile apps, in encouraging citizens to contribute to important local issues such as participatory budgeting and mapping non-emergency civic issues by providing an effective computational support to participatory collective decision-making.

The results of first case study show that participatory budgeting not only open new channels of communication among residents and local officials but also forge a collective communal identity among those who participate. What is more, it has been shown that the participatory budgeting can be more creative than normal urban bureaucratic process.

In addition, it has been indicated that geo-crowdsourcing could help citizens as well as public officials to spatially visualize and understand where the problems are located allowing these two groups to communicate more effectively. Moreover, it has been recognized that geo-crowdsourcing is able to provide significant benefits in public participation and enhance opportunities to not only to involve the public but also to identify spatial data about the potential problems that either had not been considered, or had been hard to identify in a tradition way.

The outcome of this article, based on two case studies from The Czech Republic, suggested that crowdsourcing could facilitate participative processes and has the potential to significantly contribute to the openness and accountability of decision making. The results obtained from both case studies show that the crowdsourcing initiatives have been able to foster civic engagement and provide useful input data not only to public officers, but also to citizens themselves.

Acknowledgment

The research reported in this paper is financed by the IGA/FaME/2016/Využití crowdsourcingu v e-governmentu Project initiated by the Department of Management and Economics, Tomas Bata University in Zlín.

References

AGORA-CE. 2017. Společně pro Zbraslav (translated as Together for Zbraslav) [Online]. www.participativni-rozpocet.cz. Available: http://www.participativni-rozpocet.cz/praha-zbraslav/o-projektu/ [Accessed 13.7.2017 2017].

ALBRECHT, S., KOHLRAUSCH, N., KUBICEK, H., LIPPA, B., MÄRKER, O., TRÉNEL, M., VORWERK, V., WESTHOLM, H. & WIEDWALD, C. 2008. eParticipation-electronic participation of citizens and the business community in eGovernment. Study on Behalf of the Federal Ministry of the Interior (Germany), Division IT, 1.

ALIKHANI, M. 2011. A GIS-based crowdsourcing iPhone Application to Report Neccessities, Civic Issues, and Public Events. University od Gavle, Faculty of Engineering and Sustainable Development.

ANTTIROIKO, A.-V. 2012. Urban Planning 2.0. International Journal of E-Planning Research (IJEPR), 1, 16-30.

BOUKHRIS, I., AYACHI, R., ELOUEDI, Z., MELLOULI, S. & AMOR, N. B. 2016. Decision Model for Policy Makers in the Context of Citizens Engagement: Application on Participatory Budgeting. Social Science Computer Review, 34, 740-756.

BRABHAM, D. C. 2008. Crowdsourcing as a model for problem solving: An introduction and cases. Convergence, 14, 75-90.

BRABHAM, D. C. 2009. Crowdsourcing the public participation process for planning projects. Planning Theory, 8, 242-262.

BRUN-MARTOS, M. I. & LAPSLEY, I. 2017. Democracy, governmentality and transparency: participatory budgeting in action. Public Management Review, 19, 1006-1021.

BUGS, G., GRANELL, C., FONTS, O., HUERTA, J. & PAINHO, M. 2010. An assessment of Public Participation GIS and Web 2.0 technologies in urban planning practice in Canela, Brazil. Cities, 27, 172-181.

CASEY, C. & LI, J. 2012. Web 2.0 Technologies and Authentic Public Participation: Engaging Citizens in Decision. Citizen 2.0: Public and Governmental Interaction through Web 2.0 Technologies: Public and Governmental Interaction Through Web 2.0 Technologies, 197.

D21. 2017. Společně pro Zbraslav 2017, Participativní rozpočet MČ Praha-Zbraslav (translated as Together for Zbraslav 2017, Participatory budget of city district Prague-Zbraslav) [Online]. www.vote.d21.me. Available: https://vote.d21.me/vote/NkoDzaYTZ/results?view=results&type=detailed [Accessed 13.7.2017 2017].

DEMOKRACIE2.1. 2017. Společně pro Zbraslav 2017: Participativní rozpočet MČ Praha-Zbraslav (translated as Together for Zbraslav 2017, Participatory budget of city district Prague-Zbraslav) [Online]. Available: https://vote.d21.me/vote/NkoDzaYTZ/results?view=results&type=cummulative.

DESOUZA, K. C. & BHAGWATWAR, A. 2014. Technology-enabled participatory platforms for civic engagement: the case of US cities. Journal of Urban Technology, 21, 25-50.

DIRKS, S. & KEELING, M. 2009. A vision of smarter cities: How cities can lead the way into a prosperous and sustainable future. IBM Institute for business Value, 8.

FAST, V. & RINNER, C. 2014. A systems perspective on volunteered geographic information. ISPRS International Journal of Geo-Information, 3, 1278-1292.

FUNG, A. 2006. Varieties of participation in complex governance. Public administration review, 66, 66-75.

GARCIA, A. C. B., VIVACQUA, A. S. & TAVARES, T. C. 2011. Enabling Crowd Participation in Governmental Decision-making. J. UCS, 17, 1931-1950.

GONZÁLEZ, A., GILMER, A., FOLEY, R., SWEENEY, J. & FRY, J. 2008. Technology-aided participative methods in environmental assessment: An international perspective. Computers, environment and urban systems, 32, 303-316.

GOODCHILD, M. F. 2007. Citizens as sensors: the world of volunteered geography. GeoJournal, 69, 211-221.

GOOCH, D., WOLFF, A., KORTUEM, G. & BROWN, R. Reimagining the role of citizens in smart city projects. Adjunct Proceedings of the 2015 ACM International Joint Conference on Pervasive and Ubiquitous Computing and Proceedings of the 2015 ACM International Symposium on Wearable Computers, 2015. ACM, 1587-1594.

HE, B. 2011. Civic engagement through participatory budgeting in China: Three different logics at work. Public Administration and Development, 31, 122-133.

HOWE, J. 2006. The Rise of Crowdsourcing - Forget outsourcing. The new source of cheap labor is everyday people using their spare cycles to create content, solve problems, even do RD. Wired., 14, 176.

JOACHYMSTÁL, M. 2017. Na Zbraslavi si z participativního rozpočtu postaví venkovní posilovnu i novou silnici (Translated as The workout court and new road will be build up in Prague-Zbraslav thanks to the participatory budget) [Online]. www.mc-zbraslav.cz. Available: http://www.mc-zbraslav.cz/o-

mestske-casti/tiskove-zpravy/na-zbraslavi-si-z-participativniho-rozpoctu-postavi-venkovni-posilovnu-i-novou-silnici-1375cs.html [Accessed 14.7. 2017].

MACINTOSH, A. Characterizing e-participation in policy-making. System Sciences, 2004. Proceedings of the 37th Annual Hawaii International Conference on, 2004. IEEE, 10 pp.

MOODY, R. 2007. Assessing the role of GIS in e-government: A tale of e-participation in two cities. Electronic Government, 354-365.

MPMP. 2015. Hlášení závady z aplikace PLZNITO v projektu Správa (Translated as Problem reporting in mobile application PLZNITO) [Online]. Mapový portál města Plzně (Translated as Mapping portal of the Pilsen City). Available: http://mapy.plzen.eu/aktuality/hlaseni-zavady-z-aplikace-plznito-v-projektu-sprava.aspx.

MVČR. 2017. Dobrá praxe - Plzeň - mobilní aplikace úřadu (Translated as Best practice – Pilsen – mobile application of the city office) [Online]. www.kvalitavs.cz. Available: http://www.kvalitavs.cz/dobra-praxe-plzen-mobilni-aplikace-uradu/ [Accessed 15.7. 2017].

SIEBER, R. Participatory Geoweb: A research agenda. Proceedings of the Spatial Knowledge and Information Canada Conference (SKI-Canada), 2008.

SILVA, C. N. 2014. Open Source Urban Governance: Crowdsourcing, Neogeography. Open Source Technology: Concepts, Methodologies, Tools, and Applications: Concepts, Methodologies, Tools, and Applications, 209.

SMETANOVÁ, V. 13.12.2016 2016. RE: Využití crowdsourcingu v e-governmentu (Translated as: Using crowdsourcing in e-government). Type to HALTOFOVÁ, B.

SOLTYSIAK, M. & SURAJ, M. 2016. Engagement of Local Community Members in Terms of Participatory Budgeting Based on Municipality of Rzeszow. Proceedings of 14th International Scientific Conference: Economic Policy in the European Union Member Countries, Pts 1 and 2, 629-637.

SUNDSTROM, L.-M. 2012. i-Government: Interactive Government Enabling Civic. Citizen 2.0: Public and Governmental Interaction through Web 2.0 Technologies: Public and Governmental Interaction Through Web 2.0 Technologies, 297.

SUROWIECKI, J. & SILVERMAN, M. P. 2007. The wisdom of crowds. American Journal of Physics, 75, 190-192.

SWANER, R. 2017. Trust Matters: Enhancing Government Legitimacy through Participatory Budgeting. New Political Science, 39, 95-108.

Enhancing Economic Growth through Innovation in Russia: Identifying Key Incentives for Innovation

Gamidullaeva Leyla Ayvarovna, Penza State University, Penza, Russia, gamidullaeva@gmail.com

Chernetsov Michael Vladimirovich, Penza State Technological University, Penza, Russia, oksana_chernecov@mail.ru

Vasin Sergey Mikhailovich, Penza State University, Penza, Russia, pspu-met@mail.ru

Taktarova Svetlana Viktorovna, Penza State University, Penza, Russia, staktarova@yandex.ru

Abstract

The purpose of presented research is to confirm the hypothesis that the reduction or elimination of internal innovation environment barriers in the economic system and, as a consequence, the stable innovative growth of the Russian economy can be achieved by increasing the value-added of businesses. The current paper examines the link between value-added created by regional industries (Gross Regional Product) and innovative activity of organizations in the region (different indicators). Most importantly, the study finds that most of these innovation indicators are considerably linked with regional economic growth. It has been determined that increase of value added share in the total revenue structure is motivating factor for owners and employees of enterprises to innovate. Hence, in the context of Russian regions the relationship between value-added and innovative activity of organizations is statistically confirmed. Allegedly, management of innovation system should be aimed at formation of efficient institutions for innovation development, identifying main directions of development, and promotion of interaction among all stakeholders. The main contribution of this research is the understanding that there is simultaneous relationship between regional innovation effectiveness and value added created by organizations. The policy implication of this study is that countries should recognize the key internal motives for innovations' reproduction in the economic system.

Keywords: innovation system, value added, innovation system development, management concept

Introduction

The economic balance of the world's economy power has also been changing during recent decade. The Russian economy is exhausted; growth rates are falling. Russia is attempting to speed-up economic growth. The escalation of geopolitical tension, objectively determined by structural changes that accompany the occurring shift of techno-economic paradigm, is strengthening by the low efficiency of the Russian economic system. Along with competent political decisions, there is an urgent need for a new economic policy. This innovative scenario of economic development is recognized to be the only possible one by the most number of leading researchers. The geopolitical crisis and the policy of sanctions pressure towards Russia have opened many implicit problems that exacerbated by the fall in oil prices, as well as the suddenly unfolding policy of import substitution and economy modernization. It is noteworthy that the reverse side of the current crisis can be the generation of a powerful momentum for the mobilization of hidden reserves for development and realization of potential possibilities of the national innovation system. The last year has shown that to solve the problems of innovation system management, the existing approaches, tools and mechanisms, which are not considering features of the current crisis and behavior of the leading factors of the economic system, are insufficient. We have to state that the antimonopoly regulation and competition have exhausted themselves, there are new challenges that require fundamentally different methodological approach to the analysis and scientific comprehension of principles and innovative system management tools at the macro, meso and micro levels. In order to

overcome these problems and take into consideration the current economic, political, environmental, social and technological frameworks there is a need for a development model, that takes into account all those mentioned above perspectives and considers the adoption of long term view for achieving innovation system effectiveness. In Russia, as well as in other similar macro-economic systems, government intervention is required in economy and innovation processes as a generator of incentives for innovation, which neither the market nor the current poorly developed institutional environment are able to insure. It is necessary to realize that the implementation of the innovation system model, which has successfully established itself within the framework of other socio-economic systems, leads to unpredictable results, because the existing institutional environment is not ready to accept and adapt the implemented principles and mechanisms of management. In Russian economic conditions the overcoming «path dependence» can be achieved, in our view, by taking into account the key patterns and principles of innovative economic growth and development. A number of leading scholars have assumed that path dependence is one of the fundamental features of the economic system (Walker, 2001; Margolis, Anon, 2016). Building on these studies as well as the frameworks of innovation system concept, described by C. Freeman, B.-A. Lundvall and R.R. Nelson, we propose the necessity of the coherence and correlation of socioeconomic and innovation state policy. We draw on the thesis that innovative activity should be integrated, inherently presented in the economic mechanism of all economic entities, it also should be carried out without any barriers. Hence, the principal point is to reveal the key internal motives for the reproduction of innovation in the economic system and effective governance of which will facilitate their dissemination and self-development of innovative systems as a whole. It has to be admitted that the antimonopoly regulation and competition, which worked effectively in an industrial economy, have exhausted itself. There are new challenges that require completely different management approaches. According to O.G. Golichenko (2011) "In the economy, where most of the institutions have long been obsolete, it is impossible to create a modern national system". For developed countries, the positive effects of innovations on the economy take place when economic agents effectively operate on the market and the owners of the enterprises have high propensity to reinvest its profits productively, that leads to the active private sector development. This leads to the investment attractiveness in the short term and provides the basis of the expanded reproduction in the economic system. One of generally recognized indicators that assess the effectiveness of innovation, as it is known, is the innovative activity of the enterprises. It is obvious that in the economic sector of our country has developed a practice when the innovative activity of the enterprises has been extremely low (Table 1).

Table 1: Innovative activity of the enterprises (the proportion of organizations implementing technological, organizational and marketing innovations in the reporting year, in the total number of organizations surveyed)

Industries	The proportion of organizations implementing technological, organizational and marketing innovations in the reporting year, in the total number of organizations surveyed (percentage)				
	2012	2013	2014	2015	2016
Altogether	10,3	10,1	9,9	9,3	8,4
Extracting industries	8,2	7,6	7,5	6,9	7,4
Processing industries	13,4	13,3	13,6	13,3	13,3
Production and distribution of electrical energy, gas and water	5,6	5,3	5,1	4,9	4,8
Communications	13,3	14,2	12,2	13,3	12,2
Activity connected with the use of computer facilities and information technologies	13,3	14,2	12,2	13,3	12,2
Research and development	13,3	14,2	12,2	13,3	12,2
Providing other services	13,3	14,2	12,2	13,3	12,2

Compiled by the authors according to the data of Russian Federal State Statistics Service. URL: http://www.gks.ru/

Thereby, the innovative activity of the enterprises in Russia has been at a low level in recent years. Meanwhile, according to the level of this index, the Russian economy is noticeably inferior to not only leading developed countries (Germany – 70%; Canada – 65%; Belgium - 60%; Ireland, Denmark and Finland – 55–57%), but to the most of Central-Eastern European Countries, where the figure is in the range of 20–40%. In addition, Russia lags significantly behind in terms of the export of high-tech products on international market. Russia's share in this market is only a quarter percent (Gohberg, 2011). It is necessary to identify the underlying reasons for these negative economic consequences, in order to use them in the management practices. The copying of forms, methods and innovation management models, had been successfully implemented in most of foreign countries and had a great impact through the contribution in innovation development, did not work in Russia. These attempts have been undertaken for a long time and, obviously, have not led to the expected results that is statistically confirmed.

Literature Review

In this paper, we specifically look into the linkage between innovation and economic growth in the selected Russian regions. Awareness of the significance of innovation in economic development is correlated with the growing interest in this issue within the academic community. In parallel, awareness of the phenomena of innovation and accumulation of empirical data in this area are increasingly growing. Innovations even more often are described as a process endowed with special properties, the combination of which determines the need for the simulation an approach going beyond the classic "mainstream", that is, beyond the paradigm that recognizes the existence of a superrational representative agent. There is a need for conducting the analysis of research questions directly and indirectly related to the problem of innovation system development. The relevance of the innovation was recognized already in the 18th century. A. Smith in his famous work “An Inquiry into the Nature and Causes of the Wealth of Nations”, mentioned about the new generation of specialists who would increase productivity through knowledge. J. Schumpeter highlighted that innovation is a huge force of the economic activity (2008). A brief analysis of innovation is made by Jon Sundbo (2003). He presented the development of the innovation theories, various approaches to the concept starting from the papers which treat this subject based on the definition of Schumpeter, in a classical way, to the modern studies published after 1970 when the innovation started to be considered a priority theme. Moreover, approaches from the narrowest to the broadest definition can be found. Abernathy and Utterback distinguished the radical innovation and incremental innovation in 1978. L.D. McLean’s paper presents a review of the existing literature, the major contributions on organizational culture and creativity and innovation, supports and impediments to organizational innovation (2005). Long years, the neoclassical economical approach has been criticized for its failure to include institutions into their theories and models (Nelson, 1993). Partially, as a response to this challenge, scholars invented the National Innovation System concept. Notoriously, the innovation system conceptual framework appeared in the late 1980s and came from researchers like C. Freeman, B.-A. Lundvall and R.R. Nelson. According to this framework innovation system is consist of such sectors as government, university, industry and their environment. It focuses on the relationships between all sectors as the reason that explain the performance of innovation system. This approach offered a new rationale to explain the technological gaps and competitiveness, that led to numerous debates among the scholars. According to R.R. Nelson, national innovation system can be defined as «a set of institutions whose interactions determine the innovative performance of national firms» (Nelson, 1993). The concept of innovation systems focuses on the complex web of relationships and interactions among the various actors in the processes of knowledge creation, distribution and utilization. This approach allows us to analyze the most important issue of "innovative activity" to capture the phenomena more comprehensively, with a focus not only on result - innovations, but also on the processes leading to them, and the diversity of actors involved in the creation of these innovations. Innovation systems approach is based on the knowledge and conceptualization of thesis that an innovation process is non-linear process and it involves different actors with their own interests, engaged in coevolutionary processes. The academic literature is quite extensive on issues concerning determining the most suitable scale to sustain innovation system (local, regional, national, international levels etc.). We should to state, scientists more and more often have been perceived the region as a locus of innovation. Regional innovation system

(RIS) is a concept assumed that interactive relations between the RIS organizations are regarded to be of central importance (Cooke, 2001, Asheim and Gertler, 2005). An institutional approach to the problem of innovation effectiveness has played a significant role in understanding the mechanism of innovation, focusing on the adoption and adaptation of new ideas and practices, showing that in the process of diffusing innovation, the interaction between people takes a leading role. The institutional approach has largely been developed within the framework of economic and juridical disciplines and has revealed objective patterns in the functioning of society, as well as in the nature and content of the existing social order. Russian scientist, economist and sociologist V. V. Radaev (2002) implies that, from the viewpoint of modern institutionalism, institutions are considered not as a rigid frame, but as a flexible supporting structure which changes under the influence of practice and has typical ways of acting Institutions simultaneously regulate human interaction and are governed by them. More accurately, according to Menard and Shirley (2008), "Institutions are written and unwritten rules, norms and constraints that humans devise to reduce uncertainty and control their environment. These include written rules and agreements that govern contractual relations and corporate governance, constitutions, laws, rules that govern politics, government, finance, and society more broadly, and unwritten codes of conduct, norms of behavior and beliefs. One more significant question is what are the main incentives to innovate under the current socio-economic conditions? In this sense, it will be important to consider the link between Gross Domestic Product (GDP) and innovation effectiveness. It is assumed that innovation helps in the economic growth by enhancing it. Nekabashi et al. (2013) have highlighted that the institutional quality affects the innovation standard. Authors have also mentioned in their study that the stimulation of innovation with institutional quality enhancement often leads to higher growth. Galindo and Picazo, (2013) worked on studying economic growth, innovation and entrepreneurship. Authors have assumed that innovation plays a central role in the economic growth process and the entrepreneur is the vehicle to introduce the new technologies to improve the firms' activity and to obtain higher profits. Other studies published in the last decade by Rosenberg (2004); Castellacci (2005); Fagerberg (2004, 2006), Cameron (2010) have also found that the innovation is the engine of the growth, an important element of the development achievements. R. M. Goodwin (2008) developed a tri-dimensional model to study the interaction between the business cycles and economic growth. P. Romer worked in the field of the theory of growth and innovation. G.M. Grossman (1991) contributed to the growth theory by indication the role of the innovation in the growth: he revealed the resources which provide the long term economic growth. In the last period, the number of studies that explain and introduce the role of innovation in socioeconomic transformation of developing countries has been growing increasingly. They proposed that the innovation activities in developed and developing countries must be treated in a different manner. Despite the rising interest of scientific community with regard to the problem of innovation development effectiveness, the issue is still unsolved concerning what reasons determine that implementation of innovation system model, which successfully established itself in the management practice of some countries, leads to negative results within the framework of certain socioeconomic systems.

Hypothesis and Methodology

Smith argues (1995), that an innovation performance of an economy depends not so much on how institutions perform, but on how they interact with each other. Precisely, the key problem is an ability to utilize knowledge, that is abundant. In our previous work we found out, that innovation system lacks a very important element of the knowledge assimilation. Thereby we concluded, the subsystem of mechanisms of knowledge assimilation must be presented in the innovation system. It will allow to realize the innovative potential of the domestic companies through the formation of the primary ideas - the driving force in the development of innovative systems, indicating the need for new innovations in the company. Hence, for effective exploring fundamental knowledge in the country and in the world we need to create an effective system of its assimilation within entities (Vasin and Gamidullaeva, 2015). Thereby, the main question within this study is what are the main incentives for introduction of knowledge assimilation mechanisms into the companies' management systems? The essence of innovation manifested in growing instability in the existing enterprise communications and relations, and as a consequence in the growth of overall costs at intermediate stages of the innovation process. Hence, it

resulting in low innovation activity of economic entities, that can be explained by relatively high rate of innovation costs, which for the most part made up of transaction costs (mainly due to the need of the collaboration and networking) rather than of transformational (related with the transformation, a change of inputs). This occurs because an innovative product is transferred to a new system of B2B (business-to-business), and its realization is usually carried out in the B2C sector (business-to-consumer). This, in its turn, makes it impossible to use only governing approaches to innovation system management. The lack of mutual awareness between economic agents in Russia causes high risks of doing business, as a result, for instance, – an inadequate high cost of bank loans. Accordingly, in the absence of access to "long term" money, companies are forced to narrow the scope of investment activity, which subsequently almost completely reduces motivation to create and implement innovation, being reflected in the country's economic development. Monopolization is likely to have a similarly negative impact on innovation development. It leads to the fact that at this level of competition among Russian enterprises, the straightening of innovative activity is useless for owners of businesses and carried out in most cases under the condition that it is necessary step towards the publicly funded. As a result, we can observe a growing disparity between the cost of the state on innovation development and the level of innovation activity of Russian enterprises. We should to state, that the level of budgetary expenditure on research and development in the Russia is quite high and is ahead of countries such as USA, Japan, Israel and China. At the same time, the percentage of organizations carrying out technological innovation, has been steadily decreasing. The Russian practice of shaping innovation infrastructure where the majority of budgetary resources are mobilized, is developed de facto following the logic of industrialization, primarily for replication of industrial and infrastructure projects. Basically, in our view, a clear understanding that without the creation motives for the innovative development of economic agents, the innovation process is likely to continue to be mainly a rare phenomenon in the Russian economic system, giving way to a reduction in competitiveness and economic slowdown. We absolutely agree with the point of view of scientist L.I. Abalkin (2002), who formulated the essential precondition for the progress in science and technology. He argued that scientific and technological progress and the associated high culture of production and labor will be of great benefit and in demand if this would yield the revenue exceeding potential cost savings on salaries expenses. It logically follows therefore that the overall growth of incomes of workers, which constitute a substantial share of the enterprise's costs, is inevitable when the enterprise is engaged in innovation activity. In fact, the practice proves that the enterprise involvement in innovation activity does not always have a positive impact on the business in terms of enhancing economic efficiency. All of the above determines the following conclusion: the owner of the company will be motivated to innovation, provided that the effectiveness of such innovative projects will exceed the loss of the benefits of saving money on the qualifications and quality of labor resources. This, in turn, confirms the following thesis that without the creation of motivations and drivers for the market players to innovative development, the innovation supply would not match with the innovation demand and innovative development remain a rare phenomenon. Thus, the fundamental question is to determine the key internal stimulus for the reproduction of innovation in the economic system. Their management would in fact enhance the diffusion and dissemination of innovations. We argue that as the main element, that it is reasonable to optimize in the process of macroeconomic policy should be considered value added and its structure. Along with the significance of tax policy, competition, etc., it should be noted that low pay levels and added value created, provide the inability of mass diffusion and application of innovation within certain economic system. To increase added value we need to use not only the innovation potential of the enterprises, but also of institutional factors, which are seen in the current economic conditions of Russia more effective than others, in particular the demand factors. In order to stimulate enterprises to be actively involved in the innovation process, there is a need in institutional support of the process in terms of the creation of appropriate institutions at the micro level. In this process, the government' efforts could affect only indirectly. The initiative must come from the owners and managers of enterprises which want to maintain its competitive advantage and to remain competitive in the innovation economy. In our opinion, the development and improvement of institutions at the meso and macro levels of the innovation system will likely to have a positive impact in the form of the institutionalization of innovation at the micro level of economic system. The study hypothesis is the following: the reduction or elimination of internal innovation environment barriers in terms of the

existing economic system and stable innovative growth of the Russian economy can be reached by achieving the growth of value-added of businesses and, as a consequence, innovative development of certain regions and the country as a whole. GDP is the market value of goods and services produced within a country. It is known that GDP comprise of different sectors composition such as agriculture, manufacturing and services. Each country has a different percentage of agriculture, manufacturing and service % in the GDP. Some countries have largest share of services and other have manufacturing or industry among sectors for GDP. This together gives an indication of the economic health of a country. GDP has a great impact on the citizens of the country. Almost, all sectors of business get benefits because of good economic growth. Standard of living can be raised with the economic development of a country. For determining a level of country's innovation performance there are some generally accepted indicators. In the first instance should be mentioned the Global Innovation Index (GII). This is an indicator that ranks countries for having environment for innovation and the output of innovation. GII is a formal model which responded to innovation challenges and applied to the worldwide context. Moreover, it is provided as a very useful tool to help business leaders and policymakers to identify challenges, to improve competitiveness and innovation. Several studies assess the innovativeness of countries. Both INSEAD and the Innovation Capacity Index use a comprehensive methodology to measure and rank the innovativeness of approximately 130 countries. Both use a combination of around 60 variables that cover both enablers and output of the innovative power of countries. INSEAD's Global Innovation Index is the most comprehensive of the two as it, in addition to technological innovation, also includes business and social innovation. The Global Innovation Index (GII) by INSEAD Business School is based on innovation input and innovation output each calculated from different pillars. Its input index covers institutions, human capacity, ICT uptake and infrastructure as well as market and business sophistication. The output index measures scientific and creative outputs and social well-being. Furthermore, each pillar is divided into sub-pillars and each sub-pillar is composed of individual indicators. Both studies largely use hard data instead of surveys that are subject to perceptions. Data is drawn from sources like the World Bank, the United Nations and the International Monetary Fund. The Global Competitive Index (GCI) by the World Economic Forum is determined by a weighted average of 12 pillars: institutional environment, infrastructure, macroeconomic environment, health and primary education, higher education, goods market efficiency, labor market efficiency, financial market development, technological readiness, business sophistication, innovation. At the same time, it should be underlined that we are primarily interested in in innovation system at the meso-level (regional innovation system) in close connection with the innovation system of enterprises. Definitely, that the regional innovation system (RIS) operates and develops within a single state and is open to international cooperation. However, in our study we try to focus directly on the regional context of the innovative development and management. It is obvious that the disparities in the development level of different regions will always exist. All differences in socio-economic situation of the regions, especially in such a large and diverse countries as Russia, in parallel with the development of market economy will only get worse. According to international ratings of innovative activity and the competitiveness their level in the Russian Federation is extremely low (Table. 2).

Table 2: International ratings of innovative activity and competitiveness of some countries by the method of INSEAD and GCI WEF *

Countries	Global Innovation Index INSEAD, 2015		The Global Competitiveness Index WEF 2015-2016	
	The total score	Rating	The total score	Rating
Switzerland	68,30	1	5,76	1
Sweden	62.40	3	5,43	10
UK	62.42	2	5,43	9
Netherlands	61.58	4	5,50	8

USA	60.10	5	5,61	3
Finland	59.97	6	5,45	4
Hong Kong	57.23	11	5,46	7
Singapore	59.36	7	5,68	2
Russia	***39.32***	***48***	***4,44***	***53***

Compiled by the authors

In this paper the relationship between Gross Regional Product and innovation activity of enterprises is examined. The research hypothesis was tested with correlation analysis between the three international indexes using Pearson correlation coefficient. According to the Constitution, Russian Federation consist of 85 Subjects of the Federation. To assess the level of innovation activity of the Russian Federation subjects we considered it appropriate to draw upon ratings of innovative development of regions, which were calculated by Higher School of Economics (NRU HSE) in the period from 2008 till 2015 as well as official statistical indicators in the same period. Russian regions vary greatly in the level of innovation activity. Lagging regions consist mainly of national territories, especially the republics of the North Caucasus, while the innovation-active regions are located in Central Russia. This may be due to the proximity to the sales markets, the multinational composition of the population living in these regions, which provides a variety of ideas and approaches to solving the problems of life. Innovation activity at the regional level is characterized by extremely high volatility.

Results

We started by testing the normality of the samples through Kolmogorov-Smirnov Test. In case the data follows a normal distribution, it means that we can use Pearson correlation coefficient and in case this does not occur, we should use correlation coefficient Spearman Rho. Both these correlation coefficients evaluate the intensity of the relationship between ordinal variables and indicate the strength of linear association between independent and dependent variable. The correlation coefficient may be positive, if dependent variable tends to increase when independent variable increases, and negative - in the opposite case.

Kolmogorov-Smirnov Test was used and the significance levels are all greater than 0,05. It shows that all distributions are normal so we can use Pearson correlation coefficient to test our hypothesis.
The results of Pearson correlation test are presented in Table.

The Table 3 shows the correlation between the regional GRP level and individual indicators that characterize the innovative activity of organizations (the average values of these indicators):
1) Volume of innovative products, works and services (*Volume*);
2) Level of costs of enterprises in the region for technological innovation (*TechInn*);
3) Share of organizations implementing technological innovations in the reporting year, in the total number of surveyed organization (*ShareOrg*);
4) Ratings of innovative development of regions (*InnIndex*);
5) Innovative activity of organizations (*InnAct*).

Table 3: Pearson correlation coefficient between GRP and individual indicators of regional innovation activity

Correlations								
		GRPpercap	Volume	InnAct	InnIndex	ShareOrg	GRP	TechInn
GRPpercap	Pearson Correlation	1	,314	,176	,289	,137	**,876****	**,591****
Volume	Pearson Correlation	,314	1	,616**	,058	,055	,231	,145
InnAct	Pearson Correlation	,176	,058	1	,647**	,994**	,305	,281
InnIndex	Pearson Correlation	,289	,616**	,647**	1	,665**	**,397****	,346
ShareOrg	Pearson Correlation	,137	,055	,994**	,665**	1	**,362****	,302
GRP	Pearson Correlation	,876**	,231	,305	**,397****	**,362****	1	**,872****
TechInn	Pearson Correlation	**,591****	,145	,281	,346	,302	**,872****	1

**. Correlation is significant at the 0,01 level (2-tailed).

Therefore, the strongest association (high correlation) is between GRP and Level of costs of enterprises in the region for technological innovation (0,872), and also there is a noticeable association with the Ratings of innovative development of regions (0,397) and the share of organizations implementing technological innovations in the reporting year, in the total number of surveyed organization (0?362). Therefore, in the context of Russian regions the relationship between value-added and innovative activity of businesses is statistically confirmed.

Identifying Key Barriers to Innovative Development in Russia

Considering value added as the main goal of optimization, should refer to its structure, which in general consist of profits and wages intended to be distributed among managers and salaried workers, who are the source of its creation at the enterprise. Therefore, the maximization of value added requires increasing profits and salaries. Growth in profits from innovation, in turn, may be provided by a decrease in the level of transaction costs related with innovation activity. And therefore, increasing labor income - by increasing the share of value added, created by the intellectual capital, through its motivation for innovation. It is clear from the above considerations that the main barriers in the internal environment of innovation are the high transaction costs, related with innovation activity, and the low staff motivation to innovate. It should be clarified that under the minimization of transaction costs, we understand not reduce them down towards zero, but the optimization in the normal range, as they are objectively necessary for the functioning of economic systems. Stable innovative growth of the Russian economy can be reached by achieving the optimal level of transaction costs, which is a prerequisite for innovation development within individual regions and the country as a whole. In the frameworks of transactional approach, innovative activity of economic entities is considered as a set of transactions carried out with the aim of achieving a temporary competitive advantage. We agree with most of the critics of neo-institutionalism, as well as institutionalism as a whole, that the main problem of this theory is the vagueness of the terms and definitions. Indeed, there is currently no universally accepted definition of transaction costs, despite the fact that the representatives of these theories actively employ such terms in its conclusions and recommendations for policy makers. As a consequence, we encounter problem of evaluation, because you can not properly assess what has no unambiguous definition. According to A. Shastitko (1997) the growth of transaction costs is compatible "with increased efficiency and economic growth." The reduction of transaction costs at the macro level theoretically will provide increased demand for transaction services, and as a consequence, the growth of total transaction costs at the meso level, determined by an increase in the complexity of the economic system by improving co-operation processes, division of labor and of responsibilities between the various actors etc. According to a synergistic approach increasing the

economic complexity presuppose the increase in diversity of types of collaborations, occurring cyclically, being a "necessary condition for sustainable economic development" (Saviotty, 2001). At the same time in parallel with the increase in complexity of the system increases the difficulty of reconciling the operation of its individual elements, and, as a consequence, it results in increasing the value of the transaction costs. We can conclude, therefore, that the increase in transaction costs in the economic system is a reflection of the complexity of the processes of economic cooperation between business entities and economic agents. It is assumed that the institutions would not reduce the overall transaction costs, but only unit costs on separate operations. Thus, transaction costs – this is an objective indicator of the economic system.

Discussion and conclusion

We consider that the management of innovation development should be embedded in the management system, in a way that the control mechanisms would be coherent with mechanisms and patterns of self-organization and self-management. All participants of the innovation process must be able to interact without obstruction, build up experience in the implementation of joint innovation projects. Therefore, management of innovation system should be aimed at developing and implementing a strategy providing the formation of structure-attractors, attracting innovative trajectories of development, identifying the main directions of development, and promotion of interaction between all stakeholders. As attractors, we consider an innovative environment institutions, which have the greatest potential to reduce transaction costs related with innovation activity and optimization of the volume and value-added structure, generated by economic agents.

Based on the analysis it was found that the dual nature of innovation, which is manifested in the growth of instability and uncertainty in the existing communications and relationships for innovative enterprises, and as a consequence, increase the transaction costs of activities at the intermediate stages of innovation process, results in a low level of innovation activity of economic agents in the Russian economic conditions. It has been determined that increase the share of value added in the total revenue structure will be able to motivate the owners and employees of enterprises for innovation. Such increase is achievable on condition of promoting collaborative processes, encouraging active participation of key actors in the innovation system, the accumulation of experience in the implementation of joint projects. All these processes occur, as a rule, simultaneously with the growth of trust among the population (both interpersonal trust as well as trust to government agencies). Consequently, a priority task of the state is to create a favorable institutional environment for the development of these processes by creating mechanisms to reduce transaction costs of innovation. It is important to realize that in the innovation systems management should be used their ability to self-organization and self-development. Further, the key point is identifying structure-attractors. They could include certain institutions of innovative environment that have the greatest potential to reduce transaction costs of economic agents and optimize the value added created by them, which, presumably, should attract innovative trajectories of the region's development. The results are in line with previous studies. In the work of J. Bichler established and illustrated the relationship of 120 countries between an innovation index and their GDP per capita. The link between the innovation index and the GDP per capita is strongly correlated with a Pearson correlation coefficient of 0.80. Countries which innovation capacity is growing at the same pace as GDP may be characterized by well-balanced development and they move along the regression line in their economic development. Countries above the regression line are able to generate a higher GDP per capita than can be explained by their innovation capacity. This is basically due to natural resources and favorable geographic position. For example, many oil-exploiting countries like United Arab Emirates or Qatar are experienced such a development (Bichler, 2012).

Theoretical and practical contribution

The main contribution of this research is the understanding to be aware of the simultaneous relationship between regional innovation effectiveness and value added of economic entities. Despite limitations of the study, it contributes towards the critical question of revealing the main incentive of economic entities to innovate. Our findings can be crucial both for policy and managerial practices, as they suggest that innovation policies, strategies and practices should pay great attention to the growth value added of businesses. Our results will allow to identify the key internal motives for the reproduction of innovation in the economic system. Due to the effective governance of these motives it is expected to provide their dissemination and self-development of the innovation system as a whole, as well as to ensure predictability of the management decision-making and selection mechanisms for the implementation of management actions, which are especially significant in conditions of current geopolitical situation, sanctions policy and occurring shift of techno-economic paradigm. Expectedly, this research may help to further work on these field with the purpose of gathering future knowledge on the innovation system effectiveness.

Limitations and suggestions for future work

In our view, we might propose the following hypothesis as a subject for future research: there is a two-way relationship between the level of transaction costs, value-added and innovative activity that has qualitatively and quantitatively determined optimal boundaries beyond which there is a decrease in the efficiency of the economic system. Stable innovative growth of the Russian economy can be reached by achieving the optimal level of transaction costs, which is a prerequisite for innovation development within individual regions and the country as a whole. Additionally, there is some controversy concerning the reliability of the indexes used in this research.

Acknowledgment

The research results were obtained while working on order of the Ministry of Education and Science of the Russian Federation.

References

Abalkin, L.I. (2002) The logic of Economic Growth. Moscow: Institute of Economics

Anon, (1995), The "National System of Innovation" in historical perspective. *Cambridge Journal of Economics.* [Online], [Retrieved November 12, 2016], http://dx.doi.org/10.1093/oxfordjournals.cje.a035309.

Archibugi, D. and Pianta, M., (1992), 'Conclusions,' *The Technological Specialization of Advanced Countries*, 146–152. [Online], [Retrieved November 17, 2016], http://dx.doi.org/10.1007/978-94-015-7999-5_11.

Bichler, J. (2012) 'The Chinese Indigenous Innovation System and its Impact on Foreign Enterprises,' Munich Business School Working Paper. [Online], [Retrieved September 12, 2017], http://www.munich-business-school.de/fileadmin/MBS_Daten/Dateien/Working_Papers/MBS-WP-2012-01.pdf

Bye, R.T. (1935), 'COMMONS, JOHN R. Institutional Economics,' *The ANNALS of the American Academy of Political and Social Science,* 178(1), 200–202.

Cameron, G., (2010), 'Classical economics and economic growth. Economic Growth'. [Online], [Retrieved November 12, 2016], http://dx.doi.org/10.1057/9780230280823_3.

Carlsson, B. and Stankiewicz, R. (1991), 'On the nature, function and composition of technological systems,' *Journal of Evolutionary Economics*, 1(2), 93–118.

Carlsson, B. et al. (2002), 'Innovation systems: analytical and methodological issues,' *Research Policy*, 31(2), 233–245.

Castellaci, F. et al. (2005), 'Advances and Challenges in Innovation Studies,' *Journal of Economic Issues*, 39(1), 91–121.

Cooke, P. & Morgan, K., (1998), 'The Associational Economy: Introduction,' *The Associational Economy*, 1–8. [Online], [Retrieved November 12, 2016], http://dx.doi.org/10.1093/acprof:oso/9780198290186.003.0001.

Cooke, P. (2001), 'Regional Innovation Systems, Clusters, and the Knowledge Economy,' *Industrial and Corporate Change*, 10(4), 945–974.

Coriat, B. & Weinstein, O. (2002), 'Organizations, firms and institutions in the generation of innovation,' *Research Policy*, 31(2), 273–290.

Edquist, C., (2006), 'Systems of Innovation: Perspectives and Challenges,' *Oxford Handbooks Online,* [Retrieved October 23, 2016], http://dx.doi.org/10.1093/oxfordhb/9780199286805.003.0007.

Etzkowitz, H., (2008). The Triple Helix. [Online], [Retrieved October 23, 2016], http://dx.doi.org/10.4324/9780203929605.

Fagerberg, J. 'What Do We Know About Innovation and Socio-economic Change? Lessons from the TEARI Project,' *National Innovation, Indicators and Policy,* [Retrieved October 28, 2016], http://dx.doi.org/10.4337/9781847201645.00013.

Fagerberg, J., Feldman, M.P. and Srholec, M., (2012), 'Technological Dynamics and Social Capability: Comparing U.S. States and European Nations,' *SSRN Electronic Journal*. [Retrieved October 27, 2016], http://dx.doi.org/10.2139/ssrn.2046936.

Feldman, M.P. and Audretsch, D.B. (1999), 'Innovation in cities,' *European Economic Review*, 43(2), 409–429.

Freeman, C., A Hard Landing for the "New Economy"? Information Technology and the United States National System of Innovation. Systems of Innovation and Development. [Online], [Retrieved November 12, 2016], http://dx.doi.org/10.4337/9781781009895.00013.

Galbraith, J.K., (1973), 'Technology in the Developed Economy,' *Science and Technology in Economic Growth*. [Online], [Retrieved October 23, 2016], http://dx.doi.org/10.1007/978-1-349-01731-7_2.

Gamidullaeva, L. A. et al. (2015), 'Conceptual issues of innovation system management,' *Russian Journal of Management*, 3(4), 342–351.

Gamidullaeva, L., A. (2016), 'Institutions in the Development of Innovation Systems,' *Journal of Economic Regulation,* 7(1), 93–103.

Gamidullaeva, L.A. (2015), 'Modeling of innovative cluster management system,' *Creative Economy,* 9(2), 224-25.

Golichenko, O.G. (2011) The main factors of development of the national innovation system. Moscow: Science.

Hamel, G. (2001), 'Leading the revolution,' *Strategy & Leadership*, 29(1), 4–10.
L., H.J. & Veblen, T. (1925), 'The Theory of the Leisure Class,' *Economica,* (13), 95.

Lundvall, B.-A. ed. (2009) National Systems of Innovation. [Online], [Retrieved November 12, 2016], http://dx.doi.org/10.7135/upo9781843318903.

Margolis, S.E., 'Path Dependence and Public Policy: Lessons from Economics,' *The Evolution of Path Dependence*. [Online], [Retrieved November 17, 2016], http://dx.doi.org/10.4337/9781848449268.00014.

McLean, L.D. (2005), 'Organizational Culture's Influence on Creativity and Innovation: A Review of the Literature and Implications for Human Resource Development,' *Advances in Developing Human Resources*, 7(2), 226–246.

Nakabashi, L., Elisa Gonçalves Pereira, A. and Sachsida, A., (2013), 'Institutions and growth: a developing country case study,' *Journal of Economic Studies*, 40(5), 614–634.

Nelson, R. (1993) National Innovation Systems: A Comparative Analysis, New York: Oxford University Press

Nill, J. and Kemp, R. (2009), 'Evolutionary approaches for sustainable innovation policies: From niche to paradigm?' *Research Policy,* 38(4), 668–680.

Radaev, V. (2001), 'New Institutional Approach: The Construction of a Research Scheme,' *Journal of Economic Sociology*, 2(3), 5–26.

Rosenberg, N., (2006), 'Innovation and Economic Growth,' *Innovation and Growth in Tourism*. [Online], [Retrieved November 14, 2016], http://dx.doi.org/10.1787/9789264025028-4-en.

Saviotti, P.P., (2001), 'Variety, growth and demand,' *Escaping Satiation*. [Online], [Retrieved November 12, 2016], http://dx.doi.org/10.1007/978-3-662-04528-2_8.

Schumpeter, J. (2006) Capitalism, Socialism and Democracy. [Online], [Retrieved November 12, 2016], http://dx.doi.org/10.4324/9780203202050.

Shastitko, A. (1997), 'Transaction costs (the content, evaluation and correlation with the problems of transformation),' *Questions of the economy*, 7, 36-45

Shinn, T. (2002), 'The Triple Helix and New Production of Knowledge,' *Social Studies of Science*, 32(4), 599–614.

Smith K. (1995), 'Interactions in knowledge systems: Foundations, policy implications and empirical methods,' *STI-Review,* 16, 69–102

Smith, A. 'An Inquiry into the Nature and Causes of the Wealth of Nations,' *Readings in Economic Sociology*. [Online], [Retrieved November 12, 2016], http://dx.doi.org/10.1002/9780470755679.ch1.

Stern, S., Porter, M. and Furman, J. (2000), 'The Determinants of National Innovative Capacity,' [Online], [Retrieved November 12, 2016], http://dx.doi.org/10.3386/w7876.

Steuer, M.D. and Leamer, E.E., (1987), 'Sources of International Comparative Advantage, Theory and Evidence,' *Economica,* 54(214), 269.

Sundbo, J., (2015), 'Innovation,' *Theory of. International Encyclopedia of the Social & Behavioral Sciences*. [Online], [Retrieved November 12, 2016], http://dx.doi.org/10.1016/b978-0-08-097086-8.32075-x.

Taylor, M.S., Grossman, G.M. and Helpman, E., (1993), 'Innovation and Growth in the Global Economy,' *Economica,* 60(239), 373.

The Business School for the World (INSEAD). [Online], [Retrieved October 12, 2016], http://www.globalinnovationindex.org

The Global Innovation Index by the Boston Consulting Group. [Online], [Retrieved November 15, 2016], http://www.bcg.com.

Vasin, S.M. and Gamidullaeva, L.A., (2015), 'Development a Basic Model of the Innovation System,' *Review of European Studies*, 7(11). [Online], [Retrieved November 12, 2016], http://dx.doi.org/10.5539/res.v7n11p175.

Vasin, S.M. and Gamidullaeva, L.A., (2015), 'Increasing the Efficiency of State Institutional Aid to Small Innovative Enterprises,' *Review of European Studies*, 7(11). [Online], [Retrieved November 12, 2016], http://dx.doi.org/10.5539/res.v7n11p77.

Vasin, S.M. and Gamidullaeva, L.A., (2015), 'Methodical Approach and Tools to Improve the Efficiency of Managing of the Innovation Potential in the Context of Economic Globalization,' *Review of European Studies*, 7(3). [Online], [Retrieved October 12, 2016], http://dx.doi.org/10.5539/res.v7n3p124.

Walker, R.A., The Geography of Production. A Companion to Economic Geography, pp.111–132. [Retrieved December 22, 2016], http://dx.doi.org/10.1002/9780470693445.ch8.

World Economic Forum. The Global Competitiveness Report 2013-2014. [Online], [Retrieved October 12, 2016], http://www.weforum.org/issues/global-competitiveness.

Characterization, Classification and Assessment of Non-Energy Benefits of Energy Efficiency Measures

Michael C. Krutwig, Bucharest University of Economics Studies, Romania, michael@krutwig.com

Kejo D. Starosta, Bucharest University of Economics Studies, Romania

Abstract

Non-energy benefits (NEBs) have become an overwhelmingly important factor in the calculation of energy efficiency measures (EEMs). Often the share of these benefits even outweighs the calculated energy savings. Nevertheless, these NEBs rarely find their way into practical application in the performance of energy audits and operational energy management. The consideration of NEBs can be regarded as a quality factor in energy management. With the emergence of mandatory energy audits for large companies in the European Union, the issue of quality is taking on a new dimension. Is punishment avoidance the right motivator for good energy management? The dissemination of energy efficiency is the goal of every audit program. The dissemination of knowledge about NEBs can be a great help here.This paper contributes to a better understanding of NEBs by presenting the development of a characterization scheme and thus supports an improved evaluation. In addition, it presents a concept for an extensible classification for NEBs with the intention of facilitating the transfer of research into practice. The classification provides an initial framework for implementation in the form of an online NEB database. By suggesting an extensible mapping matrix, we use the relation between NEBs and EEMs as a supporting tool for the determination and assessment of consumer NEB within an energy audit. With this, the discovery and calculation of NEBs can be systematized in the energy audit. In addition, the introduction of the concept of non-measures related energy investments (NREI) can open a new door for further research activities in the field of EEM calculation.

Keywords: energy efficiency, non-energy benefits, co-benefits, energy audits, non-measures related energy investments

Introduction

The Directive 2012/27/UE of the European Parliament (EED) (Parliament, 2012) has given a new face to the character of energy audits. Energy audits have been supported by a wide variety of regional, national and international programs for decades, but participation has always been voluntary. The EED has lifted *mandatory* energy audits out of the cradle, which have been incorporated into national legislation by the member states and which obliges all non-manufacturers to carry out an energy audit at least every four years. A comprehensive overview of all national implementations of this audit obligation is provided (Commission, 2012). One common feature of all national laws on mandatory energy audits is the voluntary decision to implement energy efficiency measures. To this day, no one can be forced to make an investment. Rather, the efficiency measures that have been detected and calculated are intended to arouse companies' interest in investments.

In addition to the previous motivations, such as energy cost savings, environmental protection, or productivity advantages, the penalty avoidance has now become a new motivation for companies. In Germany, this obligation is enshrined in the *Energiedienstleistungsgesetz* (EDL-G) (Bundestag, 2010), whereby the (BAFA, 2017) prescribes supplementary regulations, including, for example, the procedures according to which the efficiency measures (EEM) must be calculated. The classical static and dynamic methods of investment calculation (Blesl & Kessler, 2013) and life cycle cost (LCC) models (Greene & Shaw, nd) are specified for the economic calculation (BAFA, 2017). Mostly chosen is the net present value or the payback period of an investment.

The biggest problem is the lack of quality in mandatory audits. The requirements for the efficiency calculation are not able to prescribe rules for the inclusion of non-energy benefits (NEBs), the financial and non-financial advantages of energy efficiency measures beyond energy cost savings. To achieve the highest possible adoption rate, these NEBs should always be included even though it's practically impossible to formulate concrete rules. The calculation of the NEBs is very specific; often, numerous assumptions have to be made. More knowledge of NEBs will help us to find solutions to this quality problem. According to a survey about an audit program (Harris, Anderson, & Shafron, 2000), the rate of adopters from all recommendations is around 80% for the more than 1000 companies. An average of six EEMs is proposed per audit, five of which are implemented. Although this is a very positive example, one can without a doubt assume a rather low adoption rate for mandatory audits.

The concept of the advantages of EEM, which are beyond energy conservation, has many names in the literature. The following variations were found during this work (each with one exemplary source): "non-energy benefit" (NEB) (Mills & Rosenfeld, 1996), "productivity benefit" (Worrell, Laitner, Ruth, & Finman, 2003), "ancillary benefit" (Jakob, 2006), "non-energy impacts" (Skumatz & Gardner, 2005), "co-benefits" (several energy and non-energy related papers e.g. (Mayrhofer & Gupta, 2016), "synergy effects" (Kasprowicz & Schulz, 2015), and "multiple benefits" (Ryan & Campbell, 2012). (Rasmussen, 2014) brings clarity to these concepts. We follow her suggestion for the use of "non-energy benefits" (NEB), as this appears to be the most appropriate term.

(Skumatz & Gardner, 2005) provide many uses of NEBs such as cost analysis, measuring barriers to adoption of programs, program design, program targeting and marketing for programs. As a result, the NEB factor should be a decisive adoption criterion for EEM. (Boyd & Pang, 2000) analyzed ‘best practice’-companies and indicated a correlation between productivity and energy efficiency. This reveals that those EEMs that influence productivity have a particularly high NEB.

Numerous studies and research works show how drastically the computation of energy efficiency option (EEO) improves by including NEBs in the calculation. (Worrell et al., 2003) showed in an evaluation of 52 case studies that in 63% of cases, NEB had an equal or even higher portion of savings than the energy benefits (EB). The average energy payback was reduced from 4.2 to 1.9 years when the NEB was included. According to an evaluation of interviews on an energy efficiency program in (Dennis Pearson, 2002) NEB's share of the savings is 40%. The average NEB per EEM was 1.03 (in a range from 0.33 to 3). This study names the industries office, hotels, manufacturing, warehouses and potentially medical business as the sectors with the highest NEB content. (Pye & McKane, 2000) expound that EEM and environmental friendliness increase shareholder value. They show how to generate persuasive arguments through profit analysis. (Kluczek & Olszewski, 2017) highlight the importance of NEBs and give many examples, but NEBs are not mentioned in the presented tools and calculation examples.

Despite these advantages, NEBs are still not included in the programs. (Freed & Felder, 2017) provide insight into the barriers to the consideration of NEBs in policy and programs. While energy power indicators (Patterson, 1996) (EnPIs) are required to measure the savings effect in retrospect (BAFA, 2017), NEBs are still ignored in calculating those effects prior to the investment. Key figures are an important indicator, but neither (16247-1:2012, 2012) nor (BAFA, 2017) establish binding guidelines for specific EnPIs in the context of mandatory audits. Additionally, energy intensity should not necessarily be used to measure efficiency (Proskuryakova & Kovalev, 2015).

Why is an efficiency measure not being carried out even if the calculation of the measure has proven its economic advantage? This so-called "energy paradox" is well explained in (Shama 1983) using a framework for the diffusion of innovation. The paradoxical behavior is because of the energy analysis, which does not include a critically relevant behavioral perspective of the decision-maker in the analysis of energy and efficiency measures. The discrepancy between actual and potential energy efficiency can be described using five types of "optimality" (Jaffe & Stavins, 1994): the “economist’s economic potential,” the “technologist’s economic potential,” the “hypothetical potential,” the “narrow social optimum”, and the “true social optimum.” One of the largest barrier for energy

efficiency is the low priority of energy issues (Thollander, Danestig, & Rohdin, 2007), so the promotion of NEBs can contribute to faster dissemination and a greater adoption rate for this type of company.

1. Methodology

This work aims to improve EEM's cost and thereby support the dissemination of energy efficiency. For this purpose, a comprehensive literature search on non-energy benefits was carried out as well as a partial search for the calculation of EEM. By analyzing the character of NEBs and their calculation, a discussion arose about a NEB counterpart called NREI, which is presented here as a new concept.

From the viewpoint of benchmarking, the schematization of EEM supports cross-audit evaluation (Andersson, Arfwidsson, Bergstrand, & Thollander, 2017); but owning to the impossibility of generalizing NEBs, these can never be taken into account. There exists nothing such as "non-energy performance indicators (Non-EnPIs)" that would be suitable for benchmarking. At least, a characterization of NEBs can support these types of evaluation.

The presented scheme for the characterization of NEBs results from numerous use cases mentioned in the literature. According to the idea of (Fleiter, Hirzel, & Worrell, 2012) an attempt is being made to characterize the NEBs in the form of a morphological box (Zwicky & Wilson, 1967) in order to be able to provide a better structure for further research. Additional non-referenced samples were provided by an evaluation of more than 4,500 EEMs from the database of an online tool for the preparation of energy audits, which were created in the period 07/2015 to 09/2017 and stored in a structured manner. As this database does not contain any information specifically on NEBs, the analysis was supplemented with telephone interviews on about 50 energy audits with questions specific to the NEB.

A structured and schematic investigation of NEBs is also important in order to include them in generalized models for EEM planning. The connection between factory planning and energy management (Müller, Poller, Hopf, & Krones, 2013) and in particular the schematization of EEM (Krones & Müller, 2014) for this exemplary field of application shows the potential for further research work. As a result of this methodology, the user receives a set of suitable EEMs.

(Krones & Müller, 2014) have recognized that a theoretical characterization is not sufficient; in practice, methods are needed to provide the solutions. During our analysis of existing classifications of NEB, the question of their usefulness arose. It became clear that different classifications with exemplary NEBs were not intended or suitable for extension. Therefore, we have developed a classification concept that can provide the basis for a comprehensive NEB database. The huge challenge of non-existent calculation standards for NEBs is addressed by the presentation of an extensible matrix in which the relationship between EEM and NEB is illustrated and used in order to identify the potential for NEBs. The online tool mentioned above was helpful to determine and supply a set of commonly working EEM categories. This classification including a methodology of use not only serves the purpose of research about the gradual limitation of the calculation problem. It also helps to with finding and calculating NEBs in practice.

2. A scheme to characterize NEBs

In (Fleiter et al., 2012) a scheme in the form of a morphological box (Zwicky & Wilson, 1967) was developed for the characterization of EEM, in which the NEBs appear as a characteristic with the attributes "negative", "none", "small" and "large". We continue this approach in the same methodology for the characterization of NEB. In our development, however, the adoption rate is

irrelevant. NEBs are about their detection and their ability to calculate, not about their adoption. The characteristics of this scheme derive from thorough literature research on NEBs. The chosen characteristics must affect at least one of the three properties: identifying, classifiability and the ability to calculate. Distinctness is not a selection criterion, the selected characteristics can overlap.

A breakdown into the beneficiaries "utility system benefits", "participants benefits" and "societal benefits" can be found in the layer cake model of (Lazar & Colburn, 2013), also earlier used in (Skumatz & Dickerson, 1997) and others. The cake takes into account six sub-categories under each main category, which are too specific for a generalized characterization and which do not cover the main category completely. Our schema uses “consumer” as a synonym for “participant” which is mainly used in papers related to programs. In our scheme, we’ve added a “main” to exclude multiple choices.

The social level characteristic follows the typology of (Ryan & Campbell, 2012) and distinguishes between the individual, sectoral, national and international level, where a higher level always includes the lower levels. According to (Rasmussen, 2014), it should be noted that at the international level the term NEB is to be replaced by co-benefit or ancillary benefit.

NEBs can also be classified as monetary and non-monetary benefits, the former influencing a direct investment decision. The saving of raw materials is an apparent monetary NEB. The non-monetary benefits usually flow into an investment decision when generating strategic justifications. (Small, 2006) illustrates this behavior using the example of investment decisions in AMT (advanced manufacturing technologies). The evaluation of energy efficiency projects in (Cooremans, 2011) yields competitive advantage as the dominant motivation for the adoption of measures. Other examples of strategic objectives include risk minimization, improving comfort and better reputation. (Cooremans, 2012) reveals that the strategic character of energy efficiency measurements is a significant factor for adoption. Non-monetary incentives can also be used to achieve reductions in peak demand, as (Ankit, 2016) shows in modeling the effect of non-cash incentives using utility functions. The environment is also a significant motivation: only 9% of companies taking part in the audit program survey disagreed to the question about the 'importance of environmental considerations' in the investment decision progress (Harris et al., 2000). Better working conditions are another instance of non-monetary NEB (Thollander & Ottosson, 2008).

The outcome delay differs between direct and indirect outcomes from energy efficiency. Often, improvements in health, working conditions or production improvements are also made directly with the implementation of a measure. On the other hand, it is the indirect effects that make NEB so difficult to calculate. These occur with a delay, in the worst case even after the evaluation of the measure has been completed. Lower energy prices, owing to lower peak loads, lower maintenance costs and improvements in energy security, are examples of indirect outcomes.

The next two characterizations and attributes are taken from (N Martin, 2000) who divides the benefits into three areas: productivity benefit, product quality benefits and other benefits. In our scheme, the class "other" from the original source has been omitted.

A striking characteristic of a NEB is its correlation with energy saving: Higher energy saving = higher NEB? For some NEBs, the utility value is a fixed value in an EEM cost estimate, regardless of the size of the calculated savings. The next characteristic measures the value of the NEB in comparison to energy saving. Numerous studies have reported that NEBs have exceeded the actual energy benefit. The attributes smaller, equal and greater are roughly classified in this respect and are an indicator of the attractiveness of a NEB. This can be answered with a simple yes (it correlates) or no.

For the key measurement method, (Skumatz, 2014) offers three basic techniques for assessing NEBs: engineering or model-based estimates (M1), incremental incidence (M2) or specialized comparative (M3). M1 covers all input-out-models, economic and climate change models; M2 uses marginal

estimations including factors and can combine measurements and factors from literature; and M3 is based on statistical methods and surveys. If none is applicable, a “N/A” helps out.

In most cases, assumptions have to be made when calculating NEBs in order to quantify the benefit. Only rarely can a NEB be measured without a presumed factor (attributes "None"). The number of these assumptions is an indicator of the complexity and the resulting precision of the calculation.

NEB-Characteristics	Attributes			
Main Beneficiaries	Consumer	Utility System	Societal	
Societal Level	Individual	Sectoral	National	International
Monetary effect	Monetary	Non-monetary		
Outcome delay	Direct	Indirect		
Productivity benefit	None	Compelling	Significant	
Product Quality Benefits	None	Compelling	Significant	
Relative to energy saving	Yes	No		
Compared to energy benefit	Smaller	Equal	Greater	
Key Measurement Methods	Estimates	Incremental incidence	Specialized comparative	N/A
Assumptions to calculate	None	One	More	Unknown

Figure 1: Characterization scheme for non-energy benefits (Source: authors)

3. A classification concept for consumer NEBs

Numerous, always incomplete classifications of NEBs appear in the literature. These are mostly based on evaluations of funding programs for a specific target group such as households (Skumatz & Dickerson, 1998). The approach is justifiable, as it is practically impossible to take full account of all NEBs. An incomplete list of literature with NEB classifications is (Fleiter et al., 2012; Lazar & Colburn, 2013; Lung, McKane, Leach, & Marsh, 2005; Mills & Rosenfeld, 1996; Pye & McKane, 2000; Ryan & Campbell, 2012; Skumatz & Dickerson, 1997, 1998; Skumatz & Gardner, 2005; Skumatz, 2014; Worrell et al., 2003). Discussions of classifications can be found in (Trianni, Cagno, & Donatis, 2014) and (Rasmussen, 2014).

But what is the usefulness of these classifications, beyond the scientific evaluation? We claim that the main benefit of classification has to be an easier identifying of NEBs when considering energy efficiency measures. Therefore, we do not only want to offer another incomplete classification, but rather a classification concept consisting of a relationship matrix between EEM and a proposed methodology for the implementation of this matrix in order to maintain the desired utility value. We restrict ourselves to the main category of consumer benefits, because their calculation is the most difficult (Skumatz & Gardner, 2005) and skip NEBs for utility system and societal.

When considering an energy efficiency measure, the user should be given a set of as many as possible NEBs matching the selected measure, each of them supplemented by remarks on the calculation of these NEBs complemented by their characteristics. This requires a growing knowledge base and contribution from many sides. If further EEMs and NEBs are evaluated, these findings must be

incorporated into the matrix. We propose to make this system available in the form of an online database to a wide range of users and scientists.

The calculation of the NEBs can only be schematized on a relatively abstract level, for example using the key measure methods (Skumatz, 2014). The calculation is too specific for individual NEBs, as the example of the increased availability of the machine as a NEB of an EEM (Kasprowicz & Schulz, 2015) shows. (Jakob, 2006) demonstrates another example of countless use cases of how fast the NEB calculation gets a high complexity in specific areas. It remains the realization that it will be necessary for each NEB to have one or more concrete references to the calculation.

		building envelope	combined heat and power	compressed air systems	drives and electric motors	heat recovery	heating system	ICT	lighting	organisational	production	pumps	refrigeration systems	renewable energies	transport	VAC	other
Waste	NEB_1	★										★					
	NEB_2									★							
	…																
	NEB_m																
Emiss.	NEB_1					★	★										
	NEB_2					★											
	…																
	NEB_m																
O&M	…																
	…																
	…																
	…																
Product.	…																
W.Envir.																	
Other																	

Table 1: Matrix scheme for NEB classification

(Source: Authors)

(Mills & Rosenfeld, 1996) show a first approach for an EEM-NEB mapping, which contains specific use-cases in both dimensions and probably might become too complex in an extendable system. The approach of (Trianni et al., 2014) envisages individual EEMs as an open extendable set for a framework, but the NEBs are not clearly delineated here. Our approach reduces the EEM itself to a fixed and manageable set of EEM classes and stretches the extensibility to individual NEBs. As there

is no uniform standard for EEM classification, we adopt the scheme of the online-tool *energiesparbericht.de* consisting of 15 categories (+ "other") for consumption areas and measures, as this has evolved through practical evolution and has proven itself in more than 4,500 measures: building envelope, combined heat and power, heating system, pumps, lighting, ventilation and air conditioning (VAC), refrigeration systems, compressed air systems, drives and electric motors, information and communication technology, renewable energies, production. The selection of the six NEB categories (waste, emissions, operation and maintenance (O&M), production, working environment and others) were taken from (Worrell et al., 2003). These serve for a better overview within the matrix, the arrangement of the NEB within these categories is arbitrary.

Table 1 shows the matrix concept. The EEM categories and the NEB categories are fixed and the entries of the individual NEBs can be expanded line by line. The star symbol documents the relationship between NEB and EEM and contains a text entry, consisting of notes and references to calculation methods. Every time a NEB has been detected and examined for an EEM, it can be entered into the database. This entry extends the matrix either by one line or, if the NEB exists, it extends the entry by another star or a further note on the calculation. A suggestion for supplementation is to add the characteristics of each NEB as suggested in the previous section. In (Cagno & Trianni, 2012) various energy efficiency opportunities are ranked in top lists according to various criteria such as industry, company size or payback period. This ranking idea is included in our concept: the more incidents are recorded for a NEB, the more references the matching star contains.

The proposed classification concept is intended as a template for implementation as an online database similar to the existing databases of implemented EEM[1]. If an EEM is considered by a user, the online service can provide all associated known NEBs including calculation scheme and characteristics to support a more precise calculation. It is possible that a finer subdivision of the EEM headings may be necessary in the future.

Let's pick (Mikulcic, Klemeš, Vujanovic, Urbaniec, & Duic, 2016) as example project in the context of the cement industry to validate the concept. This paper's focus on the reduced emission of greenhouse gas is not a consumer NEB and therefore not intended to be included in our scheme. But a closer look reveals an EEM by using replacement of cement in concrete or mortar with alternative materials. This measure also brings up a consumer NEB that we can add to our matrix: We now place a new line in the section "production" with a specific NEB "cement replacement in concrete or mortar with recycled materials" and place a matching star in the column of "renewable energy". In this "star dataset", we note the paper as a reference for further calculation instructions.

4. Non-measures related energy investments (NREI)

The following question drives us to introduce the concept of non-measures related energy investments (NREI): What is contradictory to a NEB? Two obvious answers could be the energy benefit (EB) or the negative NEB. However, NEBs are not the opposite of EBs. Both are rather a decisive - but not completely - disjoint class of benefits. For example, reduced maintenance costs for a machine can be included in the amortization of the measure, provided that they can be quantified exactly. NEBs are often characterized by the factor "unexpected" or "incalculable." This incalculability results from the unclear possibility of assigning benefit shares to a specific EEM. For instance, the improvement of working conditions owing to the implementation of a more modern air conditioning system can hardly be quantified in figures. Moreover, one NEB can be a long-term result of several EEM. The benefit of an individual EEM often remains unclear in case of doubt; the precise calculable measures remain in place. Also the negative NEBs (Skumatz & Gardner, 2005) cannot be the opposite, because depending on the estimation of unknown calculation magnitudes, the

[1] One example is the Database of the Industrial Assessment Centers (IAC), see https://iac.university

NEB calculations can assume a positive or negative value. In the quest for the opposite, we have to change the page from output (benefit) to input (investment).

Similar to NEBs we find such incalculable influencing factors on the calculation of EEM, which are often not taken into account in the investment calculation, as they cannot be (accurately) mapped to the measure. Non-measures related energy investments (NREIs) denote investment costs in energy efficiency, which cannot be clearly assigned to an individual energy efficiency measure. These costs are because of the general energy strategy. Although NREIs are not directly involved in the calculation of individual measures, they should at least be considered pro rata in investment decisions. Examples of NREI are:

- Energy audits costs (internal and external)
- External consulting
- Training of employees
- Costs for management systems (ISO 50001), including software for monitoring and controlling
- Costs for metering Equipment

These cost factors are often not taken into account in EEM cost because their costs were incurred already at the time of the cost estimate. They are therefore not part of the investment decision. However, these costs should be taken into account in the evaluation of individual EEMs, because a separate evaluation of these NREIs does not make sense because of the lack of a benefit factor.

(Fresner, Morea, Krenn, Uson, & Tomasi, 2017) evaluated energy audits of 280 European companies. With 499 energy efficiency options, the number of measures per audit results in 1.78. According to the SME program *Energieberatung Mittelstand (EBM)* (Ausfuhrkontrolle (BAFA), 2017) the number of measures per company is 2.5 (Harris et al., 2000) and even reports on five implemented measures per audit in an Australian program. According to this factor, the total audit costs must be included in each measure on a pro-rata basis: (Mai et al., 2014) have figured out that the initial consultations in EBM cost about €1,600 and detailed consultations €7,760 on average. For consulting and training, an average daily rate of €800 can be calculated. The introduction of a management system compliant with ISO 50001 until certification is usually beyond €10,000. The problem here is that investment decisions for measures are often made in isolation, so it is not always known when calculating the first measure how large the NREI share for a measure will be.

5. Conclusions

The presented characterization scheme is a result of the literature review, combined with the analysis of numerous use cases from an EEM database. It is intended to support the structured analysis of NEB and this initial approach has certainly not yet reached its full maturity. The concept of the non-measures related energy investments (NREI) completes the discussion of EEM calculation and is also intended to provide impulses for further research work.

The presented concept for the classification of NEBs using an extensible matrix focuses on the user value. The concept offers a template for implementation as an online database. It is designed to provide auditors and energy managers a compass through the NEB jungle when using the future intended tool. NEBs will be identified easier and EEM can be calculated more accurately. Program developers can include such an instrument in the design of their programs to achieve a maximum adoption rate, which promotes dissemination of energy efficiency. This concept must undoubtedly be refined and a finer subdivision of the EEM headings may be necessary in the future. Semantic methods can also be helpful in the generalization of similar and synonymous NEBs in order to avoid multiple inputs for the same NEB. We recommend the implementation of such a matrix as a publicly accessible online tool, as a broad participation in the completion is required. A structured recording

of as many existing and future applications as possible leads to a continuous improvement of this tool.

The presented work is of particular relevance for mandatory audits. In contrast to voluntary audits, in which the project is restricted and staffed by experts, mandatory audits must cover the entire energy balance of a company. The auditor has to be a universal expert for all business areas and processes, so he can hardly calculate all possible EEMs in detail or know their NEBs. (Sardianou, 2008) and (Duflou et al., 2012) consider the lack of knowledge about energy efficiency opportunities and NEB as a strong barrier to efficiency.

Acknowledgments

The authors are grateful to Prof. Dr. Bernhard Kölmel at the Pforzheim University and to Prof. Dr. Marieta Olaru and Prof. Dr. Dr. Adrian Dumitru Tanţău, both from the Bucharest University of Economic Studies, for their helpful support.

References

16247-1:2012, D. E. (2012). 'Energieaudits - Teil 1: Allgemeine Anforderungen; Deutsche Fassung EN 16247-1:2012'.

Andersson, E., Arfwidsson, O., Bergstrand, V., & Thollander, P. (2017). 'A study of the comparability of energy audit program evaluations', *Journal of Cleaner Production*, 142, 2133–2139, Elsevier BV. doi: 10.1016/j.jclepro.2016.11.070.

Ankit, P. (2016). *Towards Data-Leveraged Behavioral Policy Design for Alleviating Peak Electricity Demand*, University of Waterloo.

Ausfuhrkontrolle (BAFA), B. für Wirtschaft und. (2017, January). 'Bericht 2016/2017', Bundesamt für Wirtschaft und Ausfuhrkontrolle (BAFA).

BAFA. (2017). 'Merkblatt für Energieaudits nach den gesetzlichen Bestimmungen der §§ 8 ff. EDL-G', Bundesamt für Wirtschaft und Ausfuhrkontrolle (BAFA).

Blesl, M., & Kessler, A. (2013). *Energieeffizienz in der Industrie*: *Springer Berlin Heidelberg*. doi: 10.1007/978-3-642-36514-0.

Boyd, G. A., & Pang, J. X. (2000). 'Estimating the linkage between energy efficiency and productivity', *Energy Policy*, 28: 5, 289–296, Elsevier BV. doi: 10.1016/s0301-4215(00)00016-1.

Bundestag, D. (2010). 'Gesetz über Energiedienstleistungen und andere Energieeffizienzmaßnahmen (EDL-G)', *Bundesministeriums der Justiz und für Verbraucherschutz*, Deutscher Bundestag.

Cagno, E., & Trianni, A. (2012). 'Analysis of the Most Effective Energy Efficiency Opportunities in Manufacturing Primary Metals, Plastics, and Textiles Small- and Medium-Sized Enterprises', *Journal of Energy Resources Technology*, 134: 2, 021005, ASME International. doi: 10.1115/1.4006043.

Commission, E. (2012). 'A Study on Energy Efficiency in Enterprises: Energy Audits and Energy Management Systems', *Official Journal of the European Union*, European Union.

Cooremans, C. (2011). 'Make it strategic! Financial investment logic is not enough', *Energy Efficiency*, 4: 4, 473–492, Springer Nature. doi: 10.1007/s12053-011-9125-7.

Cooremans, C. (2012). 'Investment in energy efficiency: do the characteristics of investments matter?', *Energy Efficiency*, 5: 4, 497–518, Springer Nature. doi: 10.1007/s12053-012-9154-x.

Dennis Pearson, L. S. (2002). 'Non-Energy Benefits Including Productivity, Liability, Tenant Satisfaction, and Others - What Participant Surveys Tell Us about Designing and Marketing Commercial Programs', *Proceedings of the 2002 Summer Study on Energy Efficiency in Buildings*.

Duflou, J. R., Sutherland, J. W., Dornfeld, D., Herrmann, C., Jeswiet, J., Kara, S., … Kellens, K. (2012). 'Towards energy and resource efficient manufacturing: A processes and systems approach', *CIRP Annals*, 61: 2, 587–609, Elsevier BV. doi: 10.1016/j.cirp.2012.05.002.

Fleiter, T., Hirzel, S., & Worrell, E. (2012). 'The characteristics of energy-efficiency measures – a neglected dimension', *Energy Policy*, 51, 502–513, Elsevier BV. doi: 10.1016/j.enpol.2012.08.054.

Freed, M., & Felder, F. A. (2017). 'Non-energy benefits: Workhorse or unicorn of energy efficiency programs?', *The Electricity Journal*, 30: 1, 43–46, Elsevier BV. doi: 10.1016/j.tej.2016.12.004.

Fresner, J., Morea, F., Krenn, C., Uson, J. A., & Tomasi, F. (2017). 'Energy efficiency in small and medium enterprises: Lessons learned from 280 energy audits across Europe', *Journal of Cleaner Production*, 142, 1650–1660, Elsevier BV. doi: 10.1016/j.jclepro.2016.11.126.

Greene, L. E., & Shaw, B. L. (n.d.). 'The steps for successful life cycle cost analysis', *IEEE Conference on Aerospace and Electronics*, IEEE. doi: 10.1109/naecon.1990.112942.

Harris, J., Anderson, J., & Shafron, W. (2000). 'Investment in energy efficiency: a survey of Australian firms', *Energy Policy*, 28: 12, 867–876, Elsevier BV. doi: 10.1016/s0301-4215(00)00075-6.

Jaffe, A. B., & Stavins, R. N. (1994). 'The energy-efficiency gap What does it mean?', *Energy Policy*, 22: 10, 804–810, Elsevier BV. doi: 10.1016/0301-4215(94)90138-4.

Jakob, M. (2006). 'Marginal costs and co-benefits of energy efficiency investments', *Energy Policy*, 34: 2, 172–187, Elsevier BV. doi: 10.1016/j.enpol.2004.08.039.

Kasprowicz, R., & Schulz, C. (2015). 'Availability-based Payback Method for Energy Efficiency Measures', *Procedia CIRP*, 29, 710–715, Elsevier BV. doi: 10.1016/j.procir.2015.01.067.

Kluczek, A., & Olszewski, P. (2017). 'Energy audits in industrial processes', *Journal of Cleaner Production*, 142, 3437–3453, Elsevier BV. doi: 10.1016/j.jclepro.2016.10.123.

Krones, M., & Müller, E. (2014). 'An Approach for Reducing Energy Consumption in Factories by Providing Suitable Energy Efficiency Measures', *Procedia CIRP*, 17, 505–510, Elsevier BV. doi: 10.1016/j.procir.2014.01.045.

Lazar, J., & Colburn, K. (2013). *Recognizing the Full Value of Energy Efficiency*, The Regulatory Assistance Project (RAP).

Lung, R. B., McKane, A., Leach, R., & Marsh, D. (2005). 'Ancillary Savings and Production Benefits in the Evaluation of Industrial Energy Efficiency Measures'.

Mai, M., Gruber, E., Holländer, E., Roser, A., Gerspacher, A., Fleiter, T., … Schlomann, B. (2014). 'Evaluation des Förderprogramms „Energieberatung im Mittelstand“ Schlussbericht', Institut für Ressourceneffizienz und Energiestrategien GmbH (IREES) and Fraunhofer-Institut für System- und Innovationsforschung ISI.

Mayrhofer, J., & Gupta, J. (2016). 'The politics of co-benefits in India’s energy sector', *Environment and Planning C: Government and Policy*, 34: 7, 1344–1363, SAGE Publications. doi: 10.1177/0263774x15619629.

Mikulcic, H., Klemeš, J. J., Vujanovic, M., Urbaniec, K., & Duic, N. (2016). 'Reducing greenhouse gasses emissions by fostering the deployment of alternative raw materials and energy sources in the cleaner cement manufacturing process', *Journal of Cleaner Production*, 136, 119–132, Elsevier BV. doi: 10.1016/j.jclepro.2016.04.145.

Mills, E., & Rosenfeld, A. (1996). 'Consumer non-energy benefits as a motivation for making energy-efficiency improvements', *Energy*, 21: 7-8, 707–720, Elsevier BV. doi: 10.1016/0360-5442(96)00005-9.

Müller, E., Poller, R., Hopf, H., & Krones, M. (2013). 'Enabling Energy Management for Planning Energy-efficient Factories', *Procedia CIRP*, 7, 622–627, Elsevier BV. doi: 10.1016/j.procir.2013.06.043.

N Martin, J. T. E Worrell M Ruth L Price R N Elliott A M Shipley. (2000). 'Emerging energy-efficient industrial technologies', Lawrence Berkeley National Laboratory.

Parliament, E. (2012). 'Directive 2012/27/UE of The European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC', *Official Journal of the European Union*, European Union.

Patterson, M. G. (1996). 'What is energy efficiency?', *Energy Policy*, 24: 5, 377–390, Elsevier BV. doi: 10.1016/0301-4215(96)00017-1.

Proskuryakova, L., & Kovalev, A. (2015). 'Measuring energy efficiency: Is energy intensity a good evidence base?', *Applied Energy*, 138, 450–459, Elsevier BV. doi: 10.1016/j.apenergy.2014.10.060.

Pye, M., & McKane, A. (2000). 'Making a stronger case for industrial energy efficiency by quantifying non-energy benefits', *Resources, Conservation and Recycling*, 28: 3-4, 171–183, Elsevier BV. doi: 10.1016/s0921-3449(99)00042-7.

Rasmussen, J. (2014). 'Energy-efficiency investments and the concepts of non-energy benefits and investment behaviour', *eceee Industrial Summer Study Proceedings : Retool for a competitive and sustainable industry* (Vol. 2, pp. 733–744), Linköping University, Business Administration.

Ryan, L., & Campbell, N. (2012, March). 'Spreading the Net: The Multiple Benefits of Energy Efficiency Improvements', Organisation for Economic Co-Operation and Development (OECD). doi: 10.1787/5k9crzjbpkkc-en.
Sardianou, E. (2008). 'Barriers to industrial energy efficiency investments in Greece', *Journal of Cleaner Production*, 16: 13, 1416–1423, Elsevier BV. doi: 10.1016/j.jclepro.2007.08.002.
Skumatz, L. (2014). 'Non Energy Benefits/Non Energy Impacts (NEBs/NEIs) and Their Role and Values in Cost-Effectiveness Tests: State of Maryland', Skumatz Economic Research Associates, Inc. (SERA).
Skumatz, L. A., & Dickerson, C. A. (1997). 'Recognizing all program benefits: estimating the non-energy benefits of PG&E's Venture Partners Pilot Program (VPP)', *Energy Evaluation Conference, Chicago, IL*.
Skumatz, L. A., & Dickerson, C. A. (1998). 'Extra! Extra! Non-energy benefits swamp load impacts for PG and E program!', *1998 ACEEE Summer Study on Energy Efficiency in Buildings, Pacific Grove, CA (US), 08/23/1998–08/28/1998*.
Skumatz, L. A., & Gardner, J. (2005). 'Methods and results for measuring non-energy benefits in the commercial and industrial sectors introduction : NEBs as omitted effects', *ACEEE summer study on energy efficiency in industry: cutting the high cost of energy. New York: West Point; 2005. p. 163–76*.
Small, M. H. (2006). 'Justifying investment in advanced manufacturing technology: a portfolio analysis', *Industrial Management & Data Systems*, 106: 4, 485–508, Emerald. doi: 10.1108/02635570610661589.
Thollander, P., Danestig, M., & Rohdin, P. (2007). 'Energy policies for increased industrial energy efficiency: Evaluation of a local energy programme for manufacturing SMEs', *Energy Policy*, 35: 11, 5774–5783, Elsevier BV. doi: 10.1016/j.enpol.2007.06.013.
Thollander, P., & Ottosson, M. (2008). 'An energy efficient Swedish pulp and paper industry – exploring barriers to and driving forces for cost-effective energy efficiency investments', *Energy Efficiency*, 1: 1, 21–34, Springer Nature. doi: 10.1007/s12053-007-9001-7.
Trianni, A., Cagno, E., & Donatis, A. D. (2014). 'A framework to characterize energy efficiency measures', *Applied Energy*, 118, 207–220, Elsevier BV. doi: 10.1016/j.apenergy.2013.12.042.
Worrell, E., Laitner, J. A., Ruth, M., & Finman, H. (2003). 'Productivity benefits of industrial energy efficiency measures', *Energy*, 28: 11, 1081–1098, Elsevier BV. doi: 10.1016/s0360-5442(03)00091-4.
Zwicky, F., & Wilson, A. G. (1967). 'New methods of thought and procedure: Contributions to the symposium on methodologies', Springer Science & Business Media.

Concept of Creating Innovative Mechanism of Human Resource Development in Russia

Olga V. Kalinina, professor, Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russia, olgakalinina@bk.ru

Irina M. Zaychenko, associate professor, Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russia, imz.fem.spbpu@mail.ru

Svetlana S. Gutman, associate professor, Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russia, svelanka@mail.ru

Abstract

The scientific feasibility study of innovative mechanism for education system arrangement and its human resource management is approved. The focus an online learning resource developed based on practical application of the Triple Helix concept adjusted to Russian environment is made. Successive stages of formation of academic broker system are shown.

Keywords: human resource management, human resource development, innovation, mechanism, concept, Russia, education system.

Introduction

Changes in the Russian economy directly affect the sphere of education. Education reforms (introduction of autonomous management of educational institutions (Federal law of the Government of the Russian Federation, November 03, 2006), passage of the Law on Education (Federal law of the Government of the Russian Federation, December 29, 2012), transition to test system for performance measurement and two-cycle system of higher education etc.) aim to increase responsibility of educational institutions and specific specialists, to promote wider application of IT technologies in educational institutions, to adopt continuing education principles for the economic sector etc. Despite reforms in the social sphere, there is currently no unified system (at federal, regional and municipal levels) of education management, forming the background of human potential system in macrolevel, and education performance is measured separately at each level (preschools, primary schools, intermediate schools, secondary schools and universities). In this regard the purpose of this study is to suggest a justification of the necessity of the formation of human resource development mechanism through the system of academic brokering.

Recent Research and Publications Analysis

A significant number of researches have been published on the subject of human resources development. The majority of works which study this aspect of human resource management Bril et al (2017), Chapman et al (2016), Chukreeva (2015), Jacobs (2017), Kalra (2004), McLean (2013), Hedayati Mehdiabadi and Li (2016), Rodionov et al (2016), Zaitseva (2009), Zaychenko et al (2016), Zolotareva (2016) share the view that human resources are the source of sustained competitive advantage and that the high-performance work system created by certain human resource development (HRD) and human resource management (HRM) practices leads to greater firm performance.

In the work performed by K. McDonald and L. Hite (2015) a strategic framework that demonstrates the role of career development within the human resource function is offered, the key topics of HRD from the perspective of the individual and from the economic perspective are viewed.

Detailed analysis of global and national aspects of HRM and HRD is provided in Borisova (2012), Budhvar et al (2017), Dyrin (2008), Garavan et al (2016), Kalinina and Vasilieva (2016), Mizintseva et al (2016), Viatkina and Zakharova (2016), Zelenova (2010).

The problems devoted to the connection of HRD and education system are considered in works by Russian and foreign economists such as Averin (2017), Guzakova (2006), Homma et al (2014), Kadiresan (2015), Podyraev et al (2016), Salleh and Sulaiman (2015), Sotnikova et al (2014), Tasdiyanto (2017), Volkova (2016), Glukhov et al (2014), Ilin et al (2016) and others. The work performed by M. Akdere and T. Egan (2013) describes the relationships between higher education and community partnerships and what strategies the field of HRD may offer to advance such collaborative efforts. The role of school education system is analyzed by E.A. Nazarova and S.S. Ushakova (2012), A. Seezink and R. Poell (2011), O.V. Rogach (2009) and others.

The new approach to HRD through e-learning education is described in works by M.V. Dzhigan (2015), I. Ilin et al (2017), H. Nawotny et al (2003), A.N. Sergeev (2009), E.S. Spiro et al (2013) O.I. Tarasova (2013), and others. The paper by M. Gharibpoor et al (2013) presents a comparison between e-learning and traditional training methods; both are used by small and medium-sized enterprises. In such case efficiency measured using data envelopment analysis and eventually came to the conclusion that e-learning is more efficient than traditional education.

Problem Formulation

Education system is one of the key elements required to create scientific and innovative environment as it is the main source of human resources for the economy and as innovative breakthrough in the technical and social spheres depends on the quality of education in the country. Achievements of modern information and communication technologies should be taken into account when establishing a new education system and education management structure. Such technologies allow reduction of transaction costs for information search and conclusion of an informal contract between students or their representatives and an educational institution and other parties concerned. Development of the innovation system is not possible without education reforms, at the same time development of the education system is not possible without introduction of innovations in education.

Such innovations in education may be of the following types:

- Process innovations which affect education process structuring, education management at various levels etc.;
- Product innovations which provide for the use of modern technologies in education;
- Radical innovations which directly affect and significantly alters the way education services are provided;
- Incremental innovations which do not affect the essence of educational services at various levels but rather improve the quality of such services;
- Micro-innovations which are implemented in respect of a certain educational institution and a certain process in an educational institution.

Problem Solution

Modern education system is a consolidation of competing interests, which makes it impossible to come to a consensual decision. Mediators may be engaged in order to arrange a productive dialogue between the participants of the system that cannot come to a consensus (mediators draft scenarios of education process depending on selected conditions which form cross-level paths for students: school – college – university – postgraduate education – professional training).

In order to improve the economy, the social sphere, state administration, science and education it is necessary for the education system to be aimed at training well-educated specialists who can make rational and effective decisions and who in terms of their competence meet the requirements set for graduates of prestigious universities in leading countries. At the same time it is important to trace return on capital investments in education made under existing government projects and programmes

(Federal Targeted Programme for Education Development for 2016-2020, State Programme of the Russian Federation for Education Development for 2013-2020, Development Strategy 5-100-2020 etc.), as well as to determine capital capacity and return on capital in respect of education.

Certain problems related to the lack of proper regulation in the social sphere may be resolved by providing open access to information. One of the options which make it possible to resolve some of the described problems is the use of innovative mechanisms for human resource development in a company, a region or the economy taken as a whole, for example, the concept of education mediation (academic brokering, unified electronic learning platform). By human resources the authors mean an aggregate of competences, skills and knowledge of employees of a company and an aggregate of human resources of the companies which are incorporated in a region's or a country's human resources. An innovative mechanism aims to improve efficiency and transparency of interaction between government, private business, public organisations, as well as educational and scientific institutions.

An academic broker is a self-developing organisation which is characteristic of the post-industrial world (network economy, Web 4.0. and Web 5.0.) the main purpose of which is to produce, transfer and apply knowledge; to connect researchers (theoreticians) to those who practically apply knowledge. Such resource should be a unified (but not the only) source of reliable information in the Internet. A term "knowledge broker" is also used in foreign publications. A knowledge broker, in its turn, is described in scientific literature as an organisation which provides remote education services and manages education system elements. By an academic broker the authors, in their turn, mean an information system for management of education at various levels. An academic (knowledge) broker may become a basis for a unified electronic learning platform.

Academic brokering is tightly connected with the Triple Helix concept. The Triple Helix elements in Russia differ from the traditional model introduced by Henry Etzkowitz (Etzkowitz, 2008) and commercial element here is not as high as in western countries (Table 1 and Figure 1).

Table 1: The main parties concerned, their roles in the traditional Triple Helix and in the thesis (prepared by the authors)

Traditional Triple Helix	Triple Helix in Russia
Government	
- Sets rules; - Manages society; - Provides resources required for promotion of R&D and innovation activities at the universities	- Sets requirements to education (establishes standards, federal and regional components of educational programmes etc.); - Develops programmes and arranges events related to education and healthcare; - Provides resources required for promotion of R&D and innovation activities at the universities
Educational institutions	
- Practically apply knowledge; - Use research findings in new disciplines	- Arrange training programmes for healthcare specialists; - Responsible for education process
Business	Employers
- Establishes subdivisions at scientific parks of research universities; - Engages students in research	- Implement social functions of the government and satisfy the needs of population in healthcare services; - Rationally distribute available resources; - Participate in scientific activities

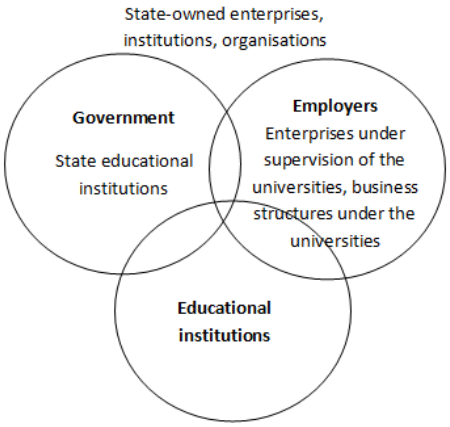


Fig. 1: Application of the Triple Helix concept in Russian environment

(Prepared by the authors)

An academic broker may be of use in the sphere of professional training and human resource development in the national economy industries due to the gap between expectations and reality of interaction between participants. Secondary school graduates and students who enter the universities do not always have a clear understanding of educational programmes they select, key competences, knowledge and skills they will obtain or positions which they will hold after graduation. At the admission stage selection of an educational institution is not always well-thought-out. Employers, in their turn, are willing to obtain well-trained specialists who can adjust to the work environment with minimum transformation and transaction costs and are not willing to pay attention to the adaptation process.

An online learning resource may be developed using several directions:

1) As consolidation of best practices in educational institutions and practical application of achievements;
2) As establishment of an "over-level" for educational institutions which has additional characteristics and allows their application to improve education at municipal, regional and federal levels.

The government sets out goals and priorities but not always determines measures to be taken to achieve them. Only in 2013 the government of the Russian Federation passed a Resolution on Approval of the Rules for Setting Reference Figures for Educational Institutions to Enrol Students for Professions, Qualifications and Directions of State-Accredited Education Programmes of Professional and Higher Education Funded by the Federal Budget (Decree of the Government of the Russian Federation, April 17, 2013; Decree of the Government of the Russian Federation, April 08, 2015). For the first time a regulation incorporates the position of experts in respect of enrolment in the universities based on potential demand for various specialists in medium-term and long-term perspectives. Furthermore, the Agency for Strategic Initiatives has prepared an atlas of emerging jobs which includes over 180 new jobs (including state-private partnership specialist for the social sector and government authority communication platform moderator) and about 50 endangered jobs which will become obsolete (www.atlas100.ru).

As Russia is integrating in international organisations (for example, EEU, transition to two-cycle education system similar to the Bologna process etc.), application of information learning resource may ensure transparent alignment of our system to the education systems of other countries, establishment of open boundaries in the education system and easier benchmarking process for national and regional innovation systems.

The project provides for development of an information resource similar to a social network with elements of organisation, coordination and control functions, i.e. with options of formal and informal communication, exchange of experience and resolution of relevant issues.

The academic broker has two main elements, namely education (formal) and communication (informal) elements. The formal element is meant to solve the issue of inefficient official channels used to distribute information and division of responsibilities between the student and the teacher which has developed lately. In accordance with the concept of the entrepreneurial university, professors are viewed as innovative scientists and education is reduced to training during practical scientific and business activities. Education should be incorporated into innovation activities and develop entrepreneurial skills. At the same time, any economy needs not only entrepreneurs (managers and directors), but also executors who are ready to accomplish assigned tasks. Development of the innovation system may fail to reach its goal but rather liquidate existing advantages of the Russian education system.

The communication element (platform) should include discussion of professional topics, issues indirectly related to education and education as such, for example, generation of ratings and rankings. The communication element is also meant to create online scientific communities of researchers from various parts of the Russian Federation and other countries.

General analysis of the rate of interest shown by the Triple Helix participants is based on cumulative rates of interest of the Triple Helix participants in the unified information resource, which makes it possible to ensure coordination and continuity of education and practice, to implement continuing education process, to automate designing of individual educational paths which include individual personal and educational growth opportunities at various stages.

Identification of the rate of interest of each Triple Helix participant in the resource is based on the results of the opinion poll with breakdown by groups taking as an example the sphere of healthcare personnel training (Figure 2).

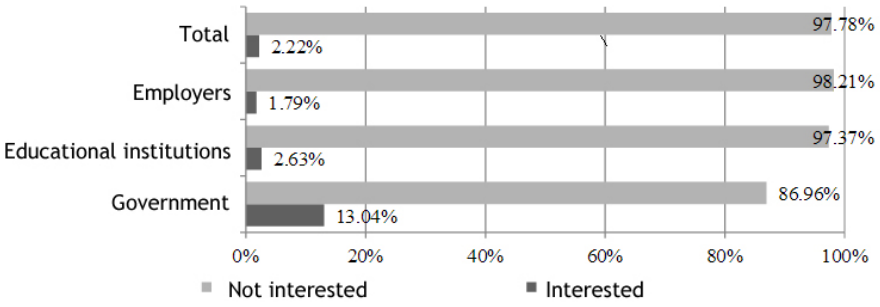


Fig. 2: Assessment of the rate of potential users' interest in the resource

(Prepared by the authors)

As reflected in the assessment results, government bodies are more interested in such resource (or "government" if we use the term of the Triple Helix theory) – 13.04%. It is necessary to take into account the way the results were obtained: government bodies show more interest as they are legally obliged to reply to all requests. On the whole, the pollsters show little interest in such resource (2.3%). At the same time each group has its potential growth engine.

It should be noted that all segments are not active users of information resources or common programmes (e.g. email). Therefore, our analysis has an indirect but rather important result which shows that government bodies, educational institutions and employers rarely use internet communication, which shows low involvement of information and communication technologies in their activities.

Scientists actively discuss the need to develop information learning systems, however, the research results show that there are not many signs favouring active development of such resource.
Such resource may resolve several issues:

1. To provide the basis for monitoring of problems faced by different students;
2. To apply information distribution models for prompt solution of problems;
3. To arrange more flexible information exchange system (diagrams, rules of answering to requests received by various educational institutions).

Currently part of information at the universities which is sometimes rather big is distributed informally and does not correspond to the facts. A unified resource should make it possible to obtain answers, more promptly resolve arising problems and search for similar situations. The time needed to obtain answers may vary and certain questions may already become irrelevant.

Using the Internet as an environment for development of the learning platform will have the following advantages (Sergeev, 2009, Glukhov et al, 2015):

- Purposefulness, motivation and efficiency of individual and common activities;
- Collaborative setting of goals, involvement in goal setting process;
- Enhanced tendencies of isolation and consolidation of community members as a condition for establishment of individual and collective subjectivity;
- High intensity of online communication, possibility and demand for direct interaction between participants;
- Cooperation, support, open development of own resources available for other participants of an online community;
- Various forms of group activity;
- Competition between participants of an online community, self-improvement;
- Development of internal rules of conduct specific to a certain online community.

Internet technologies may be actively applied in the education sector by using existing social networks or developing new networks. Comparison of these options is given below (Table 2).

Table 2: Advantages and disadvantages of an academic broker as an innovative mechanism for human resource development by using existing social networks or developing new networks (prepared by the authors)

	Existing networks	**New network**
Advantages	1. Users already exist 2. Certain (not all) ideas may be implemented 3. Experience in development and user acquisition 4. No need to fight competition 5. No costs	1. All ideas may be implemented 2. Experimental integrity 3. Territorial project (St. Petersburg)
Disadvantages	1. Not possible to start from scratch 2. Need to accept the rules used by existing platforms 3. Difficult (or impossible) to separate St. Petersburg as a territorial unit for the pilot project	1. Need to fight competition, to develop new means to acquire users 2. Possible territorial limitation for the pilot project

Comparative characteristics of two directions of active using the Internet technologies have shown the possibility of selecting both the first and the second options. Regardless of existing disadvantages of two considered variants they both have good prospects for development.

Such projects already exist in various forms:

- Social networks (general or specialised),
- Continuing medical learning platforms,
- Electronic resources for advanced training etc.

One of the problems of modern education is low motivation of students who do not view education as a process of acquiring knowledge but rather a formal obtaining of a university degree. The system of seminars and lectures is becoming outdated as it does not meet modern requirements of professional education oriented to audiovisual representation, especially using information and communication technologies. Innovative education projects to a large extent support visualisation of education.

The novelty of the education in Russia regardless of the branch of economics is the necessity to train specialists who can work both with state-of-the-art technologies and equipment and with obsolete outdated technologies and equipment, which means that they need not only to know what measures to take and in which order, but also to know how to determine at which stage problems arise and how to solve them. Furthermore, theoretical background should be at the highest level and at each level of education students should learn how to apply obtained knowledge and assume responsibility for their decisions.

The scheme of the academic broker development in St. Petersburg provides for measures to be taken at each project stage (Figure 3).

<table>
<tr><th colspan="2">Project concept development</th><th>Development of a selected model</th></tr>
<tr><th>Development of a prototype based on existing social networks</th><th>Development of a new platform</th><th>Functional enhancement, search for business opportunities</th></tr>
<tr><td>Creation of a group in a social network</td><td>Creation of a new platform if interested persons are identified at the first stage</td><td>Functional enhancement (addition of functions, attraction (guest access) of students and researchers, specialists)</td></tr>
<tr><td>Identification of interested parties at the universities and scientific institutions, possibility of their participation and coordination of work</td><td>Arrangement of work separately for the platform and for the group (duplication of information and possible functions). The platform will have more functions</td><td rowspan="2">Appointment of the project coordinator to transfer management functions. When the goal to improve efficiency of interaction between the universities and students is achieved, it is necessary to achieve a goal of education efficiency improvement. It is preferable to transfer the project to scientific or non-government organisations in order to ensure its non-commercial and autonomous nature</td></tr>
<tr><td>Determination of the group structure depending on possibilities and interested persons</td><td>Selection of a more efficient instrument between existing social networks and a separate platform</td></tr>
</table>

Fig. 3: Components of the academic broker development scenario with breakdown by stages (prepared by the authors)

The main steps to be taken to introduce the academic broker are currently as follows:

1. Identification of interested parties in government bodies as potential employers such as educational institutions, municipal (public) and business organisations in current economic and

geopolitical environment are ready to follow guidelines but not ready to show initiative. Government plays the lead role in education development. It is the government that sets the rules in the sphere of education in Russia.

2. Identification of interested parties among employers and educational institutions. It is necessary to determine key competences through open discussion with employers and educational institutions with their further inclusion in the federal state educational standard of next generation. Such changes were made for certain qualifications in 2014. It is necessary to provide this information to students and other parties concerned in order for them to have an understanding of knowledge, competences and skills to be obtained as a result of education and opportunities for self-education.

3. Application of career guidance mechanisms to improve the rate of interest of the secondary school graduates, possibility to identify their strengths, abilities and interests, development of individual education paths depending on preferences.

Conclusion

The academic broker differs from existing Internet resources which offer various education services as it creates a unified universal information resource (virtual learning platform) which combines interests of the Triple Helix participants as a basis for an online community and continuing education in modern Russia. It is meant to supplement traditional education, to provide wider opportunities for education in terms of selection of subjects and institutions, as well as to promote communication on up-to-date topics. Under current conditions when communication via the Internet is starting to prevail, information, communication and computer technologies should form an integral part of the education process, as well as supplement but not replace traditional education. The unified electronic learning platform for various levels of education should become a mechanism for implementation of continuing education concept and ensure human resource development as a component of Russian human capital.

References

Akdere, M. and Egan, T. (2013), 'Examining higher education-community partnerships through human resource development: implications for innovation and technology management,' *International Journal of Innovation and Technology Management*, 10 (4), 1350008.

Averin, A.N. (2017), 'Rol' vysshego obrazovanija v razvitii chelovecheskogo potenciala,' [The role of higher education in human development], *Gosudarstvennoe upravlenie i razvitie Rossii: modeli i proekty* [Governance and development in Russia: models and projects], IGSY RANHiGS, 9-13.

Borisova, A.A. (2012) Organizacija dejatel'nosti sluzhb upravlenija personalom (rossijskaja praktika) [Organization of activity of personnel management (Russian practice): Monograph], NGTU, Novosibirsk.

Bril, A.R., Kalinina, O.V. and Ilin, I.V. (2017), 'Economic analysis of projects in the improvement of the HR management system of enterprises,' Proceedings of 29-th International Business Information Management Association Conference – Vision 2020: From Regional Development Sustainability to Global Economic Growth, Vienna, Austria, 2268-2277.

Budhwar, P., Tung, R.L., Varma, A. and Do, H. (2017), 'Developments in human resource management in MNC's from BRICS Nations: A Review and future research agenda,' *Journal of International Management*, 23 (2), 111-123.

Chapman, E.F., Sisk, F.A., Schatten, J. and Miles, E.W. (2016), 'Human resource development and human resource management levers for sustained competitive advantage: Combining isomorphism and differentiation,' *Journal of Management and Organization*, 1-18.

Chukreeva, N.V. (2015), 'Chelovecheskij potencial v upravlenii kachestvom biznes-processov,' [Human development in business processes quality management], *Standarty i kachestvo* [Standards and quality], 2 (932), 94-95.

Decree of the Government of the Russian Federation, №285, April 08, 2015. Ob utverzhdenii Pravil ustanovlenija organizacijam, osushhestvljajushhim obrazovatel'nuju dejatel'nost', kontrol'nyh cifr priema po professijam, special'nostjam i napravlenijam podgotovki i (ili) ukrupnennym gruppam professij, special'nostej i napravlenij podgotovki dlja obuchenija po obrazovatel'nym programmam srednego professional'nogo i vysshego obrazovanija za schet bjudzhetnyh assignovanij federal'nogo bjudzheta, a takzhe o priznanii utrativshimi silu nekotoryh aktov Pravitel'stva Rossijskoj Federacii [About approval of Rules of the educational activity organizations of citizens reception for professions, specialties and areas of training for teaching in state-accredited educational programs of secondary professional and higher education for account of Federal budget appropriations and about the recognition become invalid for some acts of the Government of the Russian Federation], *Sobranie zakonodatel'stva Rossijskoj Federacii* [Collected legislation of the Russian Federation], 14, paper 2128.

Decree of the Government of the Russian Federation, №350, April 17, 2013. Ob utverzhdenii Pravil ustanovlenija organizacijam, osushhestvljajushhim obrazovatel'nuju dejatel'nost', kontrol'nyh cifr priema grazhdan po professijam, special'nostjam i napravlenijam podgotovki dlja obuchenija po imejushhim gosudarstvennuju akkreditaciju obrazovatel'nym programmam srednego professional'nogo i vysshego obrazovanija za schet bjudzhetnyh assignovanij federal'nogo bjudzheta [About approval of Rules of the educational activity organizations of citizens reception for professions, specialties and areas of training for teaching in state-accredited educational programs of secondary professional and higher education for account of Federal budget appropriations], *Sobranie zakonodatel'stva Rossijskoj Federacii* [Collected legislation of the Russian Federation], 16, paper 1977.

Dyrin, S.P. (2008) Upravlenie personalom: mnogovariantnyj harakter sovremennoj rossijskoj praktiki [Personnel management: multivariate character of the modern Russian practice: Monograph], Petropolis, Saint-Petersburg.

Dzhigan, M.V. (2015), 'Sopostavlenie obrazovatel'nogo processa v setevom obshhestve i «obshhestve znanija»,' [Mapping of the educational process in the network society and "knowledge society"], *Vestnik Leningradskogo gosudarstvennogo universiteta im. A.S. Pushkina* [Bulletin of the Leningrad state University], 2, 1, 108-118.

Etzkowitz, H. (2008) The Triple Helix: University-Industry-Government Innovation in Action, Routledge, London.

Federal law of the Government of the Russian Federation, 174-FZ, November 03, 2006. Ob avtonomnyh uchrezhdenijah [About the Autonomous institutions], *Sobranie zakonodatel'stva Rossijskoj Federacii* [Collected legislation of the Russian Federation], 45, paper 4626.

Federal law of the Government of the Russian Federation, 273-FZ, December 29, 2012. Ob obrazovanii v Rossijskoj Federacii [About the Education in the Russian Federation], *Sobranie zakonodatel'stva Rossijskoj Federacii* [Collected legislation of the Russian Federation], 53, 1, paper 7598.

Garavan, T.N., McCarthy, A.M. and Morley, M.J. (2016) Global human resource development: Regional and country perspectives, NY: Routledge, New York.

Gharibpoor, M., Sargazi, S. and Aref, M. (2013), 'Efficiency evaluation of e-learning compared to traditional education in human resource development (Case study: Small and medium enterprises in

Shiraz),' Proccedings of the 2013 7-th Conference on e-commerce in developing countries: With Focus on e-Security, ECDC, 6556736.

Gloukhov V.V., Ilin I.V., Koposov V.I., Levina A.I. Market risk neutral strategies: modeling and algorithmization. Asian Social Science. 2014. T. 10. № 24.C. 209-216

Glukhov, V.V., Ilin, I.V. and Levina, A.I. (2015), 'Project management team structure for internet providing companies,' *Lecture Notes in Computer Science*, 9247, 543-553.

Guzakova, O.L. (2006), 'Rol' obrazovanija v razvitii chelovecheskogo potenciala v regione,' [The role of education in human development in the region], *Problemy strategii i taktiki regional'nogo razvitija* [Problems of strategy and tactics for regional development], 1, 125-129.

Hedayati Mehdiabadi, A. and Li, J. (2016), 'Understanding talent development and implications for human resource development: an integrative literature review,' *Human Resource Development Review*, 15 (3), 263-294.

Homma, N., Hayashi, Y.-I., Katashita, T. and Sone, H. (2014), 'Development of human resources in hardware security through practical information technology education program,' IEEE International Symposium on Electromagnetic Compatibility, September, 6899071, 764-767.

Jacobs, R.L. (2017), 'Knowledge work and human resource development,' *Human Resource Development Review*, 16 (2), 176-202.

Ilin I.V., Kalinina O.V., Levina A.I., Iliashenko O.Yu. Approach to Organizational Structure Modelling in Construction Companies // MATEC Web of Conferences. 5th International Scientific Conference on Integration, Partnership and Innovation in Construction Science and Education, IPICSE 2016. 2016. Article number 05028

Ilin, I., Levina, A., and Iliashenko, O. (2017), 'Reengineering of high-tech and specialized medical care delivery process for telemedicine system implementation,' Proceedings of the 29th International Business Information Management Association Conference – Vision 2020: From Regional Development Sustainability to Global Economic Growth, Vienna, Austria, 1822-1832.

Kadiresan, V., Selamat, M.H., Selladurai, S., Charles Ramendran, S.P.R. and Mohamed, R.K.M.H. (2015), 'Performance appraisal and training and development of human resource management practices (HRM) on organizational commitment and turnover intention,' *Asian Social Science*, 11 (24), 162-176.

Kalinina, O.V. and Vasilieva, M.N. (2016), 'Analiz celesoobraznosti razrabotki innovacionnogo mehanizma razvitija kadrovogo potenciala v sisteme obrazovanija: formirovanie koncepcii,' [Analysis of the feasibility of an innovative mechanism of human resources development developing in the education system: the formation of the concept], *Innovacionnoe razvitie jekonomiki* [Innovative development of economy], 6 (36), 25-32.

Kalra, S.K. (2004), 'Upravlenie chelovecheskim potencialom: prishlo vremja otkazat'sja ot koncepcii upravlenija kadrovymi resursami?' [Human resources management: is it time to abandon the concept of human resources management?], *Menedzhment Dajdzhest* [Management Digest], 1, 85-91.
McDonald, K. and Hite, L. (2015) Career development: A human resource development perspective, Taylor and Francis, Aralik.

McLean, G.N. (2013), 'International human resource development: learning, education and training for individuals and organizations,' *European Journal of Training and Development*, 38 (1-2), 150-153.

Mizintseva, M.F., Sardarian, A.R., Komarova, T.V., Yakubova, T.N. and Vergara, E.J. (2016), 'Human resources in the Russian Federation: Assessment and forecast of development,' *Journal of Economic Sciences*, 11 (7), 1253-1264.

Nawotny, H. Scott, P. and Gibbons, M. (2003), '«Mode 2» Revisited: The New Production of Knowledge,' *Minerva: A Review of Science, Learning & Policy*, 41, 185-186.

Nazarova, E.A. and Ushakova, S.S. (2012), 'Razvitie chelovecheskogo potenciala i social'noj integracii v sisteme shkol'nogo obrazovanija: problemy i perspektivy,' [Human development and social integration in the school system: problems and prospects], *Chelovecheskij capital* [Human capital], 9 (45), 104-107.

Podyraev, Ju.V., Harin, A.A. and Harina, O.S. (2016), 'Razvitie chelovecheskogo potenciala predprijatij na baze sovmestnyh nauchno-obrazovatel'nyh kompleksov s obrazovatel'nymi organizacijami vysshego obrazovanija,' [Human development of enterprises on the basis of joint scientific-educational complexes educational institutions of higher education], *Innovacii* [Innovations], 8 (214), 20-24.

Rodionov, D.G, Nikolova, L.V, Velikova, M.D and Kalubi R.D.M. (2016), 'Competitive strength of a concession integration model of labour market to education market interaction,' Proceedings of the 28-th International Business Information Management Association Conference - Vision 2020: Innovation Management, Development Sustainability, and Competitive Economic Growth, Seville, Spain, 2016, 689-700.

Rogach, O.V. (2009), 'Rol' shkol'nogo obrazovanija v razvitii chelovecheskogo potenciala Rossii,' [The role of school education in the development of human potential], *Social'naja politika i sociologija* [Social policy and sociology], 5 (47), 263-274.

Salleh, K.M., Sulaiman, N.L. (2015), 'Technical skills evaluation based on competency model for human resources development in technical and vocational education,' *Asian Social Science*, 11 (16), 74-79.

Seezink, A., Poell, R. (2011), 'The role of schools perceived human resource policies in teachers professional development activities: A comparative study of innovations toward competence-based education,' *Asia Pacific Education Review*, 12 (1), 149-160.

Sergeev, A.N. (2009), 'Setevoj obrazovatel'nyj proekt kak sposob sozdanija setevogo obrazovatel'nogo soobshhestva,' [On-line educational project as a way create an online educational community], *Grani poznanija* [Facets of knowledge], 4 (5), 47-50.

Spiro, E.S. and Butts, C.T. (2013), 'Extended structures of mediations: Reexamining brokerage in dynamic networks,' *Social Networks*, 35, 132-136.

Tarasova, O.I. (2013), 'Setevye obrazovatel'nye struktury v perspektive informacionnogo obshhestva,' [Network educational structures in the future information society], Proceedings of the conference 'Teoreticheskie i prikladnye voprosy nauki i obrazovanija' [Theoretical and applied problems of science and education], Tambov, Russia, 115-116.

Tasdiyanto (2017), 'Harmony in the environmental and forestry policy case study: Human resource development in the implementation of environmental impact assessment through education and training,' *Advanced Science Letters*, 23 (3), 2573-2575.

Upravlenie chelovecheskimi resursami v uslovijah reformirovanija sistemy obrazovanija, (2014) [Human resource management in the conditions of reforming the education system: Monograph], ed. by S.I. Sotnokova, Novosibirsk state university of economics and management, Novosibirsk.

Viatkina, E.R. and Zakharova, L.N. (2016), 'Osobennosti realizacii kompetentnostnogo podhoda v upravlenii personalom organizacii: zarubezhnyj opty i rossijskaja praktika,' [Features of realization of competence approach in the organization personnel management: foreign experience and Russian practice], *Jekonomika ustojchivogo razvitija* [Economics of sustainable development], 3 (27), 109-115.

Volkova, E.S. (2016), 'Razvitie chelovecheskogo potenciala v sovremennyh uslovijah obrazovanija,' [Development of human potential in modern conditions of education], Proceedings of the conference 'Pedagogicheskie problemy v obrazovanii: teorija i praktika' [Pedagogical problems in education: theory and practice], Dimitrograd, Russia, 170-172.

Zaitseva, T.V. (2009), 'Motivacionnyj potencial instrumentov po upravleniju chelovecheskimi resursami,' [Motivational potential of the tools for human resources management], *Vestnik Moskovskogo universiteta. Serija 21: Upravlenie (gosudarstvo i obshhestvo)* [Moscow University Bulletin. Series 21: Management (state and society)], 4, 55-68.

Zaychenko, I.M., Kalinina, O.V. and Gutman, S.S. (2016), 'Labor resources of the Far North territories: Problems and prospects,' Proceedings of 28-th International Business Information Management Association Conference – Vision 2020: Innovation Management, Development Sustainability, and Competitive Economic Growth, Seville, Spain, 758-767.

Zelenova, O.I. (2010), 'Sistema upravlenija personalom v rossijskih kompanijah (itogi rossijskoj chasti mezhdunarodnogo issledovanii praktik upravlenija personalom Cranet),' [Personnel management system in Russian companies (results of the Russian part of the international study of personnel management practices of Cranet)], *Upravlenie chelovecheskimi resursami – osnova razvitija innovacionnoj jekonomiki* [Human resources management – the basis of innovative economy development], 2, 25-29.

Zolotareva, M.E. (2016), 'Upravlenie chelovecheskim potencialom i organizacionnaja struktura upravlenija innovacijami,' [Human resources management and organizational structure of innovation management], *Upravlenie innovacijami: teorija, metodologija, praktika* [Innovation management: theory, methodology, practice], 17, 26-35.

Brownfields in Context of Property, House and Real Estate Price in Dětmarovice (Czech Republic)

Jaroslav Škrabal, Silesian University, School of Business Administration, Univerzitni Nam. Czech Republic, skrabal18@opf.slu.cz

Kamila Turečková, Department of Economics and Public Administration, Silesian University, School of Business Administration, Univerzitni Nam. Czech Republic, tureckova@opf.slu.cz

Stanislav Martinát, Department of Economics and Public Administration, Silesian University, School of Business Administration, Univerzitni Nam. Czech Republic, martinat@opf.slu.cz

Jan Nevima, Department of Economics and Public Administration, Silesian University, School of Business Administration, Univerzitni Nam. Czech Republic, nevima@opf.slu.cz

Petra Chmielová, Silesian University, School of Business Administration, Univerzitni Nam. Czech Republic, E-mail: chmielova@opf.slu.cz

Abstract

This article deals with the issue of the influence of brownfields on the price and value of the given properties in the municipality of Detmarovice. These municipalities are located in the Moravian-Silesian region. There are 180 abandoned complexes and facilities in the mentioned region. There are 11 brownfields in the village that were previously used primarily for industrial activities. The purpose of this article is to determine whether brownfields affect the price or value of real estate in Detmarovice in some way. In the framework of this article, marketing research was developed, where a structured questionnaire was created. Respondents were asked to comment on their views, factors, and characteristics of brownfields that are of key importance in terms of their negative impact on property prices. Marketing research ran from autumn 2016 to spring 2017. The research focused on the views of respondents and their more detailed segmentation. According to the findings, most of the populations did not want to live in the vicinity of the brownfield. In addition, the addressed residents did not buy property that is located near the abandoned real estate. Subsequently, it was found that among the most serious reasons why brownfields reduce value or price is the occurrence of pathological phenomena and dangerous from the point of view of the construction-technical conditions.

Keywords: Brownfields, Dětmarovice, marketing research, respondents, real estate,

Introduction

The definition of brownfields varies between countries. According to Novosak and Bednar (2011), a country with a relatively low population density and thus sufficient open areas for new uses place emphasis on site contamination as key aspect in the definition of brownfields (like USA, Denmark, Sweden, Norway). On the contrary, countries with a relatively high population density highlight the development aspect of the concept of brownfields in their definitions (like the Great Britain, the Netherlands). At the beginning of the 21st century, the term brownfield came also into Czech terminology. There are three ministries in the Czech Republic (Ministry of Industry and Trade, Ministry for Regional Development and Ministry of the Environment) whose competencies are at least somehow linked to regeneration of brownfields. In the Czech Republic, the issue of brownfields has become a major concern in early 2000s. According to the National Brownfield Regeneration Strategy (2008), 2 355 abandoned buildings and sites were located in the Czech Republic. However,

this number is only indicative. Experts estimate the occurrence of 10 000 - 12 000 brownfields that occupy an area of 25 000 to 35 000 hectares. The definition of brownfeilds according to the Ministries of Industry and trade and the CzechInvest Agency can represent real estate that is under-utilized, neglected and eventually contaminated. These objects and places are mainly created as industrial, agricultural, residential, military or other activities.

The origins of brownfields on the territory of the Czech Republic can be dated to the 19th century, which was significantly affected by the first industrial revolution. The reasons for the abandonment of industrial sites might be found during the First and the Second World War and the great economic crisis (1929). In recent years the occurrence of brownfields has been caused by the return of property to the original owners when the socialist era ended (1945-1989). Owners either ceased to be interested in the property or did not have sufficient funds to repair buildings and other objects. Nowadays there are plenty of abandoned buildings, whole occurrence is mainly cause by competition forces. Reason behind this process is the fact that smaller business units do not survive pressure of competitors and therefore become abandoned. It is also a drop of industrial production when the premises are not used after the previous production ends. Last but not least, it is the creation of brownfields after former public amenities.

The issue of brownfields is nowadays very important. Abandoned buildings and sites create threat for local population that lives nearby. The occurrence of brownfields can also significantly affect the development of the city or community. An important solution is brownfield regeneration and reuse. There are several brownfield regeneration strategies in the Czech Republic on the regional level. The most interesting strategies have been developed for regions that the most affected by the occurerence of brownfields (the Liberec Region, the Ústecký Region and the Moravian-Silesian Region). These strategies should help these regions to regenerate abandoned buildings and sites and to help business units to reuse these objects, thereby reducing employment and improving living standards in the affected areas.

The purpose of this article is to determine whether brownfields affect the price or value of real estate in Detmarovice in some way. It is expected that the value of properties near abandoned buildings and sites will be somehow reduced or affected by dilapidated buildings. From a subjective point of view, it can be assumed that residents will not want to live in these buildings because they pose a danger both from the construction and technical condition and from soil contamination, which can affect the health of the population.

The assumed structure of this article is as follows: After an introductory part short theoretical framing of study follows, which describes brownfield issues according to experts who deal with the issue. The theoretical part is followed by part Methodology and data, where marketing research was carried out, when a structured questionnaire was created and gathered among inhabitants of Detmarovice. The third chapter focuses on the location of brownfields in the given village. Most abandoned buildings are located near residential or family homes. The next chapter deals with the evaluation of the questionnaire survey, where the most important questions from the structured questionnaire were selected. Finally, the most important findings from this article and the analysis are evaluated.

1. Theoretical background

The term brownfield appears for the first time in the 1970s in the USA. Later on, this concept is widely discussed in Great Britain and even later in continental Europe. Under the notion of brownfield, as noted in the introduction, each country presents something quite different. In the Czech Republic, this term means mainly abandoned buildings, areas or often devastated industrial areas that have lost their original use. This is particularly visible in the large industrial-mining conurbations (Krzysztofik et al 2016). Brownfields can be a large area of military barracks, unused areas of railways or areas former socialist agriculture (former cooperative) that are located mainly on the outskirts of villages (Novák, 2012). Gradually, the range of brownfields began to expand in relation to buildings that were formerly used for agricultural production or transport infrastructure or abandoned military areas (Syms 1999; Litt, Burke 2002; Dixon 2006; Thornton et al 2007; Wedding,

Crawford-Brown 2007). Due to this broad territorial coverage social exclusion has many aspects that differentiate between countries of East Central Europe. Particularly employment, housing and education are those dimensions in which risks associated with social exclusion are higher in countries with more disadvantaged socioeconomic conditions (e.g. Albania, Bulgaria, Kosovo, Serbia) than in those states which have more favourable position (Czech Republic, Slovakia, Slovenia) (Tagai, 2016).

An important step in eliminating brownfields is their regeneration or reclamation and reuse. The potential for brownfield redevelopment is in many cases reduced by the location of brownfields in inner cities (Doetsch, Rüpke, 1998). Such a location tends to be connected with a limited space for firm expensed and with complicated transport accessibility (e.g. Koll-Schretzenmayr, 2006). This situation reduces the redevelopment potential of brownfields because transport infrastructure is an important location factor in the decision-making process of developers (Holl, 2004). Moreover, it is noteworthy that city centres and suburban areas are regarded as morphogenetic zones with the most evident changes in the functional-spatial structure of post-socialist cities (Sýkora, 2003). Thus, the potential of brownfield redevelopment in inner cities is further affected.

In the Czech Republic, brownfields deal with scientific disciplines and scientists such as Vojvodíková et al. 2011; Klusáček et al. 2011; Chrysochoou et al., 2009; Doleželová et al., 2014; Martinát et al., 2015). The above-mentioned researchers deal with the collection of data on abandoned obsoletes and sites, the creation of databases and the prioritization or classification of brownfields. The concepts that are related to the given issue are urbanization, which is the expression of the percentage of inhabitants living in the city on the total population of the territory (Harmáček, 2016). An important term is also suburbanization, where the term can be interpreted as moving people, commercial and other entities from the nucleus to their periphery (Kuráž and Mansfeldová, 2011). Nowadays, the phenomenon of moving to the outskirts and building new neighbourhoods and new industrial zones is becoming a phenomenon in the Czech Republic. In the centres of smaller towns (Karvina) and the big ones (Olomouc), there are abandoned buildings and former industrial sites. The brownfield issue in Karvina was dealt with in a case study (Turečková et al., 2016)

It is important to take brownfields not as a threat but as an opportunity. Cities should rather grow to be compact and not cover the open fields on the city margins. Each particular urban system involves a specific arrangement of territorial interdependencies reflecting, among many other factors, political strategies articulated in the form of planning doctrines and policies. Spatial planning can be therefore regarded as an important 'platform' translating essentially political concepts of territorial cohesion into the worlds of everyday urban activities (Malý and Mulíček, 2016).

2. Methodology And Data

The survey was conducted from autumn 2016 to spring 2017. The questionnaire was distributed to residents of the village Detmarovice (population 4.2 thousand, located in the Moravian-Silesian Region), and further was placed on the social network and the internet to cover balance of all social groups for our survey. The total amount of respondent was reached 69. Respondents were selected to be older than 18 years and live or work in Detmarovice (large power plant in Detmarovice is decisive employer in the municipality). The return of questionnaires was 100 % that was caused by targeting querying of individual respondent. The aim of the questionnaire survey was to ascertain the views of population of the village Detmarovice on the impact of brownfield on the real estates that occur in the vicinity of brownfields and how the existence of brownfield sites is affecting the surrounding real estates.

The questionnaire survey consisted of twelve questions that were divided into two parts. The first section dealt with the respondents' views on the issue of brownfields. Key question was if brownfields that are located in the vicinity of another real estate, affect the prices of real estates. The second part of the questions was focused on more detailed segmentation of the surveyed population. The questionnaire survey was answered by 61 % men and 39 % women. Within the age, the structure is greater than residents aged 26-45 years (48 %). At the occupation of the respondents, the most

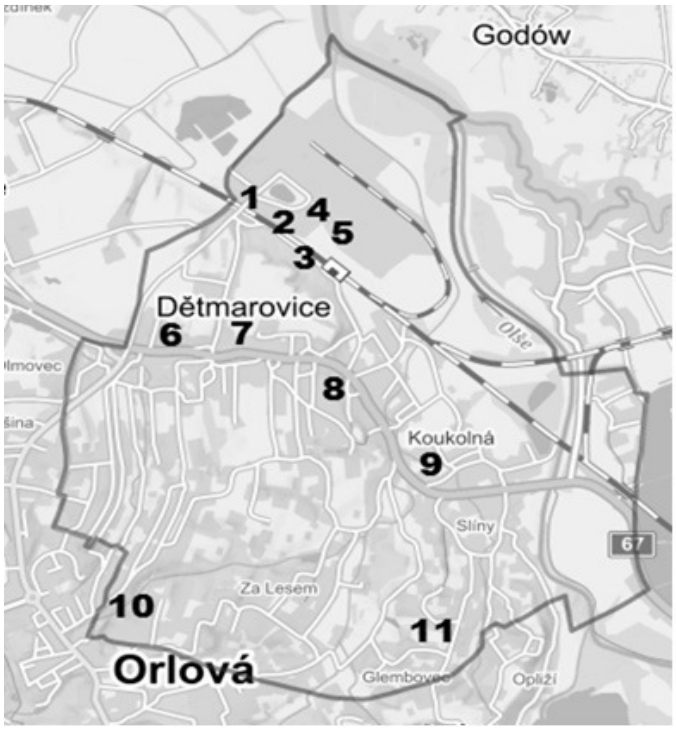
dominate residents who are employed, where in the context of the relative frequency was 59 %. Another question related to the highest achievable education polled the residents. The majority of respondents reported that the high school with school-leaving exam (45 %). The following question in the framework of the questionnaire survey was the focused type of housing surveyed residents. Most respondents said that they live in their own family house. It was about 81 % of the respondents. The last question in the second part of the research was focused, in what part of the village Detmarovice lives. Here, respondents indicated that live outside the centre of the village, where it was about 57 % of the polled population. The table below shows the detailed segmentation of the respondents in the questionnaire survey.

Table 1 : Structure of the respondents of questionnaire survey
Source: own survey (n=69)

Gender	Female	61 %
	Male	39 %
Age	18-25 years	22 %
	26-45 years	48 %
	46-65 years	24 %
	65 and more years	6 %
Education	Elementary school	7 %
	Secondary school with final exam	23 %
	Secondary school without final exam	45 %
	University	25 %
Social status	Students	13 %
	Employees	59 %
	Entrepreneurs	10 %
	Unemployed	2 %
	Retired persons	10 %
	Persons on maternal/parental leave	6 %
Housing	Private family house	81 %
	Rented family house	9 %
	Hostel	2 %
	Own flat	1 %
	Cooperative apartment	4 %
	Rental apartment	3 %
City part	Around the municipal office	20 %
	Near to the railway station	14 %
	Koukalna	9 %
	Elsewhere	57 %

3. Brownfields in Detmarovice

On the territory of the municipality of Detmarovice 11 brownfields is located. The figure 1 below shows their location. Most abandoned buildings are located near the train station in the premises of the power plant Detmarovice. Most of the brownfield sites have been used in the past for industrial use. The following most numerous group of their use is ex-amenities and housing. As for potential environmental burden it can be said that in four brownfield sites the possibility contamination is very limited. In case of six brownfield sites we can say that they occur near residential areas. It is obviousthat, that certain way can affect the prices of surrounding real estates.



1. Unused warehouse
2. Unused warehouse
3. Unused warehouse
4. Former supermarket
5. Unused warehouse
6. Barred barn
7. Ruined house
8. Broken building
9. Ruined house
10. Former pub
11. Former supermarket

Fig. 1: Brownfield's in Detmarovice

Source: www.mapy.cz, adjusted by authors

4. The influence of brownfields on the prices of surrounding properties

Based on a questionnaire survey that was carried out it can be said that majority of respondents indicated that brownfields generally reduce the value or price of the property (84 % respondents). Only minimal response appeared to statement that the abandoned objects and facilities do not affect the price and value of real estate. The Figure 2 shows the results on a given question.

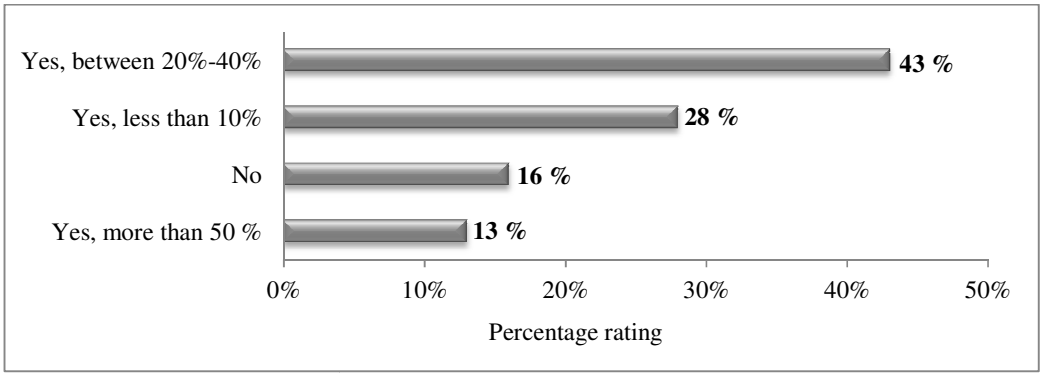


Fig. 2: Do you generally think that "abandoned areas and areas" reduce the value of neighbouring real estate (houses, flats, land, building plots, etc.)?
Source: own survey (n=69)

The following question was focused on question whether the inhabitants perceived problems while living in the proximity to brownfield. In a higher relative value (72%), housing was not in the vicinity of the abandoned area or building. The remaining 28% did not mind living in the vicinity of the brownfield. Another question was aimed to find out if the people are living within approximately 500 meters of a brownfield. As a result, 70% of respondents do not live in an abandoned building or area. The remaining 30% are within 500 meters of the brownfield. The question that asked "Would you buy a real estate in close proximity to the "brownfield area" if its price was about 20% lower than the usual price?", Respondents in a relative number of 84 % said they did not.

The following Figure 3 shows the results for questions why respondents think that brownfields are reducing the value or price of real estate. These questions asked respondents to assign values from one to six, where value one was considered the least important, and value six was very important. Average values were constructed as follows: Within each question, the number of respondents ranged from one to three and four to six. The mean value of the question was also drawn.

The biggest reason why brownfields reduce the value of real estate is the occurrence of dubious existence, or drug addicts and homeless people. Relative frequency is 69 % of the addressed population. The second most serious problem is that abandoned buildings are dangerous from their construction and technical condition. This option had a relative frequency of 60 %. The next option was that we do not know the future use of the brownfield. This is 47 % of the people addressed. The remaining questions were below 50 %, so they were not considered as a serious problem. To other residents, other options did not come as a problem when brownfields can affect the value of the surrounding property.

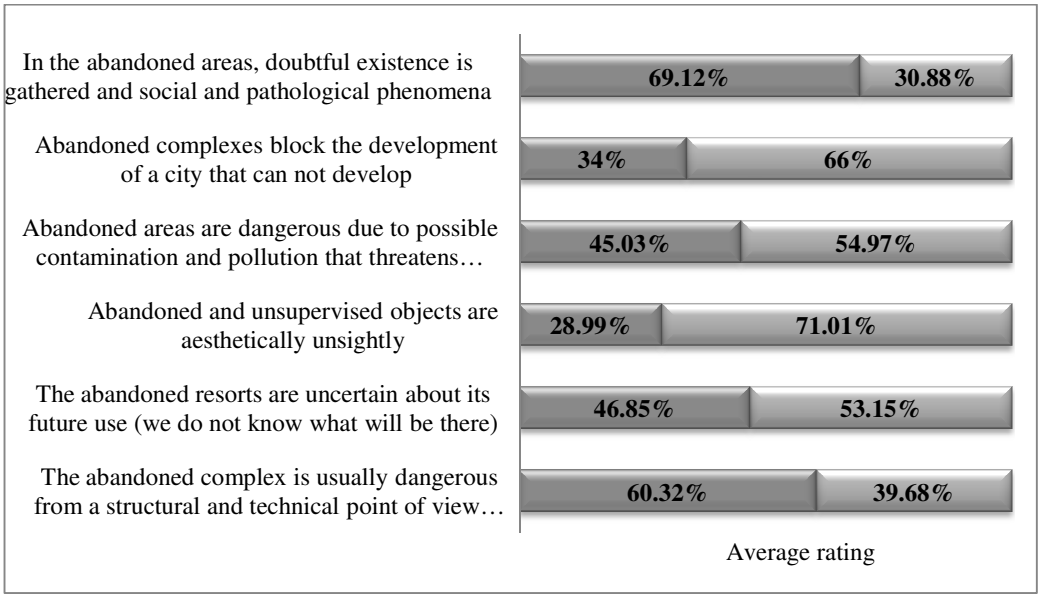


Fig. 3: Evaluate questions about the reasons why brownfields reduce the value or price of real estate.

Source: own survey (n=69)

Next question of the survey was focused on whether respondents would buy a property within a certain distance from the brownfield. The largest share of respondents would potentially buy real estate if it was 200-500 meters away from the brownfield. This is a relative frequency of 35 % of the populations addressed. Furthermore, 30 % of the population would consider a potential purchase if the distance from the abandoned building and the premises are more than 500 meters. Subsequently, the third option of buying a property within 200 meters of brownfields was reported by 19 % of respondents. The last two options were a small percentage.

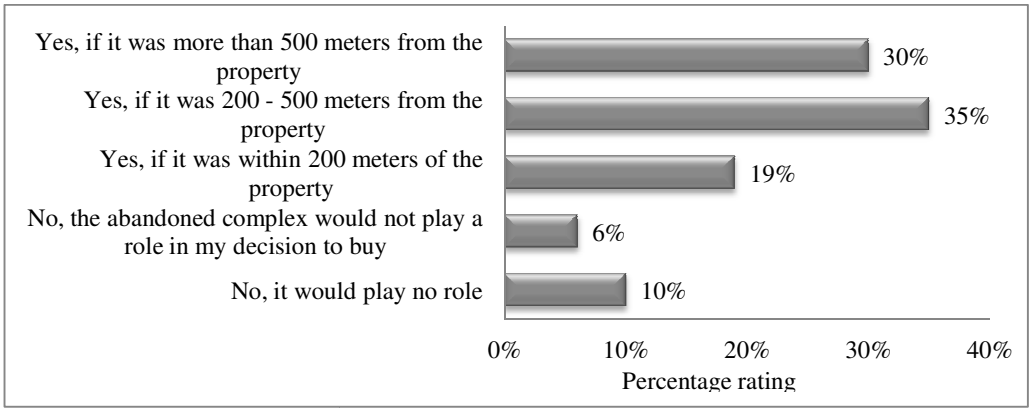


Fig. 4: If you buy real estate in Karvina, would the brownfield presence play a role in your purchasing decision?

Source: own survey (n=69)

5. Conclusion

Brownfields are a very current topic today. Abandoned buildings and sites are a weak point and a threat to the cities and municipalities where they occur because they reduce the development possibilities of the regions, especially they burden the public budgets. On the other hand, it can be added that properly exploited brownfields, which have a certain potential, can contribute to the development of the regions and increase not only economic and living standard, but also might help environment.

The aim of this contribution was to interpret the results of the survey that was focused on brownfield issues and to study their impact on the value or price of surrounding properties. In the framework of the primary research, a structured questionnaire was produced that was distributed to the inhabitants of the village of Detmarovice. The result is that brownfields have an impact on the value and price of properties that occur near abandoned objects and real estate. The results show that 84 % of the respondents believe that brownfields reduce the value of surrounding properties. Among the most serious reasons that affect the price of the neighbouring real estate is the occurrence of socially pathological phenomena. This is thought by 69 % of respondents. The next reason is that brownfields are dangerous from a construction and technological points of view. According to the relative frequency, 60 % of the respondents are concerned.

According to the survey, it has been confirmed that brownfields are threatening the price of real estate in Detmarovice. Residents do not want to live in abandoned buildings and areas because they are dangerous, can cause health problems and in some way affect the living standards of the community.

Acknowledgment

This paper was kindly supported by the project with title Brownfields in urban and rural space: geographic, economic, historical, legal contexts and their importance for regional development (BURAN) (SGS/21/2016).

References

Doleželová, L., Hadlač, M., Kadlecová, M., Martinát, S., Polednik, M., (2014). Redevelopment potential of brownfields: A-B-C model and its practical application. E+M Ekonomie a management, 2014, vol. 18, iss. 2, p. 33-77. ISSN 1212-3609.

Doetsch, P., Rüpke A., (1998). Revitalisierung von Altstandorten versus Inanspruchnahme von Naturlfache. Berlin, Unweltbundesamt, 580 pp.

Harmáček,J., (2016). Teorie, realita arozvoj ekonomického růstu v nejméně rozvinutých zemích. Olomouc:UP Olomouc. ISBN 978-80-244-3962-4.

Hercik J., Šerý O., Toušek V., (2011). Post-military areas in the Czech Republic and their revitalization – examples of the towns of Hodonín and Uherské Hradiště. Geographica 42(2): 107–119. Palacký University Olomouc, Olomouc Dixon T., (2006). Integrating sustainability into brownfield regeneration: Rhetoric or reality? – An analysis of the UK development industry. Journal of Property Research 23(3): 237–267.

Holl, A. (2004). Manufacturing location and impacts of road transport infrastructure: empirical evidence from Spain.Regional Science and Urban Economics, Vol. 34, No. 3, p. 341–363.

Klusáček, P., Krejčí, T., Kunc, J., Martinát, S., Nováková, E. (2011). The post-industrial landscape in relation to local self-government in the Czech Republic. Moravian Geographical Reports, Vol. 19, No. 4, p. 18–28.

Krzysztofik, R., Tkocz, M., Sporna, T and Kantor-Pietraga, I. (2016). 'Some dilemmas of post-industrialism in a region of traditional industry: The case of the Katowice conurbation, Poland,' *Moravian Geographical Reports*, *24*(1), 42-54.

Kuráž, V. a A. Mansfeldová, (2011). Construction on brownfields. Praha: České vysoké učenné tecchnické v Praze. ISBN 978-0-01-04732-3.

Litt J. S., Burke T. A., (2002). Uncovering the historic environmental hazards of urban brownfields. Journal of Urban Health 79(4): 464–481.

Martinát, S. et al., (2015). Spatial relations and perception of brownfields in old industrial region: case study of Svinov (Ostrava, Czech Republic). *Geographia Technica*, 10(2), 66-77.

Novák, P. (2012). Ekologické aspekty v územním plánování. Brno: Vysoké učení technické v Brně: ISBN 978-80-214-4647-2.

Novosák, J. a P. Bednář (2011). Hodnocení rozvojových předpokladů brownfeilds. Žilina: Goerg. ISBN 978-80-7248-793-6.

Sýkora, L. (2003). Suburbanizace a její společenské důsledky. Sociologický časopis, Vol. 39, No. 2, p. 217–233.

Syms P., (1999). Redeveloping brownfield land. The decision-making process. Journal of Property Investment & Finance 17(5): 481–500.

Tagaia, G. (2016). The territorial dimension of social exclusion in East-Central Europe. *DETUROPE – The Journal of Regional Development and Tourism*, *8*(2), 58-71.

Thornton G., Franz M., Edwards D., Pahlen G., Nathanail P., (2007). The challenge of sustainability: incentives for brownfield regeneration in Europe. Environmental Science & Policy 10(2): 116–134.

Turečková, K., J. Škrabal, V. Benda and S. Martinát, (2016). Re-use of brownfields in Karvina: The challenge for local urban development. In: *Sevilla. Vision 2020: Innovation Management, Development Sustainability, and Competitive Economic Growth*. Sevilla: IBIMA, 2436-2447.

Vojvodíková, B., Potužník, M., Bürgermeisterová, R., (2011). The database on brownfields in ostrava (Czech Republic): Some approaches to categorization. Moravian Geographical Reports, vol. 19, iss. 4, pp. 50-60. ISSN 1210-8812.

Wedding G.Ch., Crawford-Brown D. (2007). Measuring site-level success in brownfield redevelopments: A focus on sustainability and green building. Journal of Environmental Management 85(2): 483–495.

Web portal CzechInvest [online] [vid.1.September 2017] Available from: http://www.czechinvest.org/brownfieldy.

Web portal Národní strategie brownfieldů [online] [vid.23.August 2017] Available from: http://www.czechinvest.org/nsrbf.

Web portal Obec Dětmarovice [online] [vid.23.August 2017] Available from: https://mapy.cz/zakladni?x=18.4679224&y=49.8900454&z=13&source=muni&id=4603&q=obec%20d%C4%9Btmarovice.

Analysis of Cloud-Based Tools Adaptation Possibility within the Software Development Projects

Igor V. Ilin, Peter the Great Saint Petersburg Polytechnic University, Saint Petersburg, Russian Federation, ivi2475@gmail.com

Oksana Yu. Iliashenko, Peter the Great Saint Petersburg Polytechnic University, Saint Petersburg, Russian Federation, ioy120878@gmail.com

Alexandra D. Borremans, Peter the Great Saint Petersburg Polytechnic University, Saint Petersburg, Russian Federation, alexandra.borremans@mail.ru

Abstract

Nowadays, to maintain a competitive business, a company has to adjust to the pace of globalization and rapidly changing market needs. Companies, involved in software development projects, are more commonly working with territorially distributed and international teams and remote customers. It happens that in order to maintain effective and rapid work on such projects, cloud are used. But despite these positive aspects of cloud-based tools, some companies and project teams more prefer physical tools instead of cloud. Such contradiction raises the need for reasoning what are the cases for cloud tools usage in software development projects in order to diagnose whether the tool would be useful in the specific case or activity. The goal of this work is to understand better how companies use cloud technologies to support their software development projects. Moreover, based on gathered data, the framework of companies' behaviour was proposed. The results obtained in this work can be used by companies in order to understand their behavioural type, assess their readiness to the cloud adoption and pick up a set of cloud-based tools for conducting their software development projects.

Keywords: cloud computing, cloud services, cloud-based tools, software development projects, project management.

Introduction

Nowadays science, society and business are rapidly changing and becoming more global. IT companies are a prime example of such globalization. Increasingly, software development is becoming international and territorially distributed, outsourcing specialists from all over the world start working on projects (Glukhov et al., 2015). It means that additional tools are needed to maintain high pace and quality of development (Eckstein, 2013).

There is large amount of software development tools, which could potentially support different essential project activities (for instance, business process modelling (Ilin et al., 2017). This could be due to the assumption of some researchers that tools utilization can be considered as an important factor for the team efficiency. But as long as the business globalization gains momentum, the stand-alone software becomes potentially more and more inutile, because of strong need in distribution of data through Internet (Bompani et al., 2000).

The history of the term "cloud" has long routs into the past of technologies and the first ideas emerged in the air in early 1960s with further rapid and aimed development in alignment with society growing needs (Jadeja and Modi, 2012). Cloud computing is a type of internet-based computing, that provides shared computer processing resources and data between devices on demand (Buyya et al., 2010). In other words,

it is technology, in which a computer infrastructure can be seen as a "cloud". It makes possible for businesses and individuals to use applications from anywhere on demand (Glukhov et al., 2016).

In some studies it was indicated that the use of cloud could potentially affect the efficiency of project activities: documentation storage, communications, planning, budgeting, remote and parallel work (Rozman et al., 2017). It was even proposed that there is possibility of cost reduction as a result of utilization of "pay as you go" model and scalability of cloud-based services (Hashmi et al., 2011). It was also argued that geographic issues, linguistic and cultural challenges could be potentially overcome by cloud due to its ability to be customized and easy accessed.

Despite the identified strengths of using cloud-based tools to support software development, some software development teams still use stand-alone or physical tools (Azizyan et al., 2011). This research seeks for better understanding of cloud-based tools usage are used and factors around it. The structure of the research is the following. The second section of current paper addresses the analysis of previous literature and description of chosen research process and methodology. The third section contains the gathered data analysis and results of conducted research. In the last section the conclusions and discussions are presented.

Literature Review and Research Methodology

Cloud computing is defined as a technology of distributed data processing in which computer resources, capacities and services are provided to external users on demand over the Internet (Foster et al., 2008).

Reuven Cohen, the expert on ICT, defines cloud computing as "Internet centric software", where the possibility of distributing processes through the Internet will make the software development more global and perspective (Geelan, 2008). In the same research Praising Gaw, argues that cloud is the "concept of using the Internet to allow people to access technology-enabled services". Finally, Jeff Kaplan proposed that the concept of cloud computing can be defined as "broad array of web-based services".

Current cloud "State of art" is represented in the Figure 1, in which the ranking of cloud vendors is amazed based on the Gartner's Magic Quadrant 2014 for Cloud Services. The cloud services' providers can be distinguished into four groups:

- "Leaders" – the companies, which are well established and promising (Amazon, Microsoft);
- "Visionaries" represents the vendors, which have huge perspectives in the future, but do not yet execute well (AT&T).
- "Niche Players" vendors are focused on a small segment and do not out-innovate others (IBM, Rackspace, HP);
- "Challengers" describe the companies, which do not catch the market direction, even if they execute well (Google).



Fig. 1: Gartner's Magic Quadrant 2014 for Cloud Services

These vendors provide users with a wide range of cloud solutions. In order to provide reader with existing solutions of these vendors, the overview of the most popular services of Amazon, Microsoft and Google is presented below:

- Amazon Simple Storage Service (Amazon S3) is an online web service offered by Amazon Web Services, providing the ability to store and retrieve any amount of data, at any time from anywhere in the network, the so-called file hosting ("Amazon Simple Storage Service (S3)," 2017). In case, presented by (Nasuni, 10.14), the experiment on a massive amount of data (12 TB) transmission from one cloud service to another was organised. Three huge vendors were participating: Amazon S3, Windows Azure and Rackspace. According to the results, researchers admitted that the best rate of data recording was for Amazon S3, the transfer of data from two other services took only 4-5 hours, while the data transfer to Rackspace took a little less than a week, and in Windows Azure - 40 hours.

- Microsoft Office 365 is a set of services, which allows users to access to various programs and services based on the Microsoft Office platform, business-class email, functionality for communication and document management ("Office 365," 2017). It was reflected by (Rahimi et al., 2014) that Office 365 is a SaaS model of cloud computing, which provides customers to direct access to services and application.

- Google Drive is a cloud-based data warehouse, which allows users to store their data on servers in the cloud and share them with other users on the Internet ("Google Drive," 2017). In the study of mobile cloud storage (Huang et al., 2013) admitted that Google Drive offers to users convenient software for devices based on different platforms, with different interfaces and with different operational systems.

In order to analyse different cloud-based tools and aspects of their application in companies as well as types of companies' behaviour in this context, the research was structured in the following way:

1. Choosing the companies based on the following criteria:
   - The companies run IT software development projects;
   - The companies are located in Saint Petersburg;
   - The companies are ready to share information about their operations.
2. Forming questionnaire for interviews. The interview questions were designed accordingly with the research questions and aimed to highlight the aspects of running software projects, connected with tools usage and project results in order to highlight the possible relation within these aspects. The design of the questions for the interview was organized in a spiral manner and the questions were revised several times after receiving feedback. The feedback was provided by an external reviewer with practical background and research experience. The initial approach towards the interview questions formation was based on the practical and research experience. The questions were formulated based on the listed aspects, and put in a chronological order, derived from the project activities sequence. Literature was studied mostly after the interviews and the results analysis in order to formulate scientifically-based research results and compare them with the existing knowledge of the topics. All the questions were formulated as open-ended questions. The key motivation for this choice was the interest towards getting a vast amount of information about the companies and provoking discussion if possible. Different companies have their own definitions in scopes of analysed topics, which also came out to be a factor for choosing the open-ended questions to avoid pushing the interviewee into the frames. It will help avoid restriction on their opinions about different aspects.
3. Holding interviews with the companies' representatives (Table 1).

Table 1: interviews overview

Interview number	Code	Representative title
1	C1P1	Developer
2	C3P1	Lead business analyst
3	C4P1	Process Orchestration, Process Integration analyst
4	C3P2	Business analyst
5	C5P1	Business analyst
6	C6P1	Technical product manager

4. Transcribing interviews' records.
5. Analysing the set of tools, utilized within each project.
6. Defining the 1st order concepts from original quotations out of the transcribed data from the six interviews.
7. Formulating the 2nd order themes based on Grounded theory-like approach (Strauss and Corbin, 1967).
8. Aggregating themes into dimensions to formulate the key findings. The steps above are presented on Figure 2.

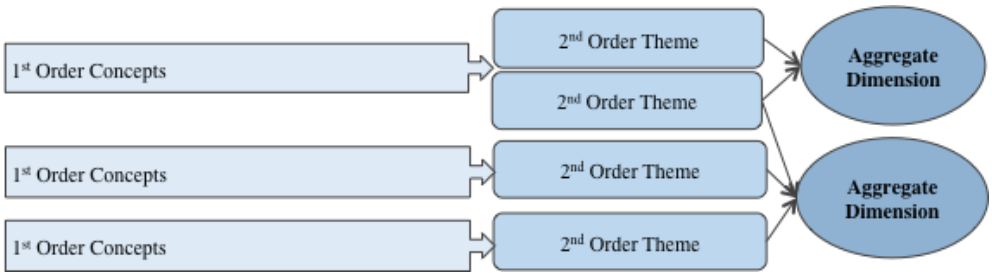


Fig. 2: Analysis process

The overall research process is presented in the Figure 3.

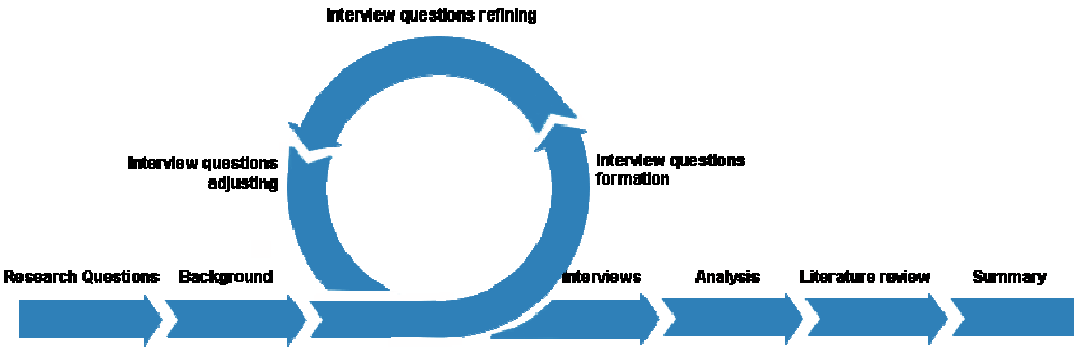


Fig. 3: Research process

Results

In order to understand the way how the companies use cloud-based tools in the software development project activities, the gathered empiric data was further analysed. Cloud-based tools distribution among the projects is represented in the **Error! Reference source not found.**4.

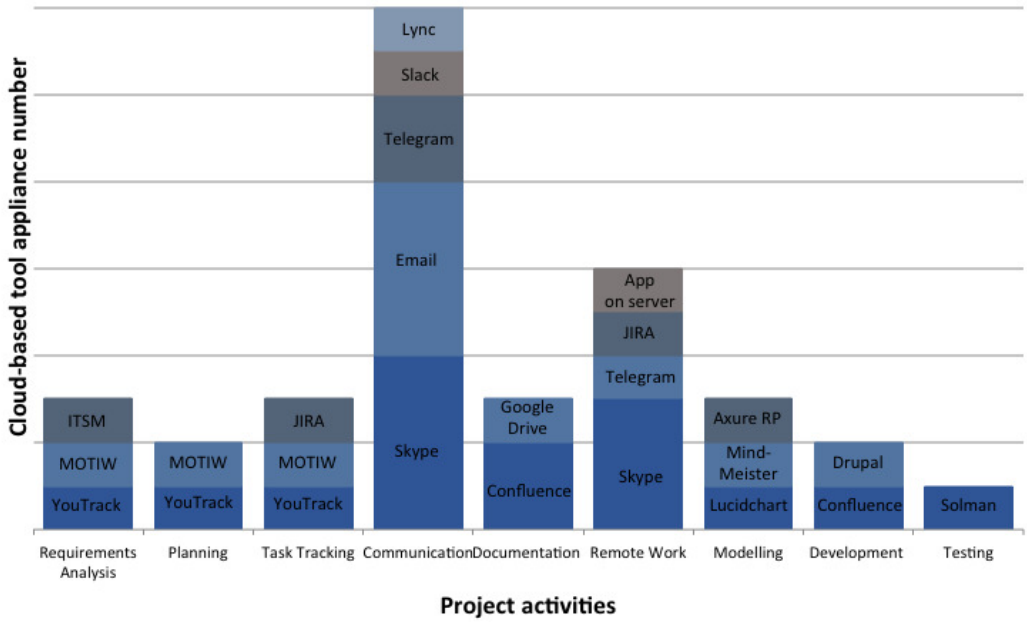


Fig. 4: Cloud-based tools distribution among the projects

This figure displays information in the context of project activities and represents which tools are used in the surveyed companies. Based on the gathered data, it can be seen, that for external and internal communication Skype was utilized almost in every project. Emailing services were probably as popular as Skype for communication process support.

Based on the gathered data, it can be noted that there are tools, which were used for several activities within the project. This might be potentially important aspect. The following tools were mentioned for several activities:

- YouTrack: task-tracking, planning and requirements analysis.
- Atlassian JIRA: managerial activities and remote work.
- MOTIW: planning, task-tracking and requirements analysis.

This phenomenon can be a potential indicator of the difference between the ways how the companies choose and use cloud-based tools, which aspects they are seeking for.

To reveal the potentially influential factors on the way how tools were adapted within each project, further analysis was conducted. Based on the interviews' transcription, the 1st order concepts and the 2nd order themes were formulated. Then they were grouped into the aggregate dimensions connected to cloud-based tools adaptation. These dimensions are presenting three different types of companies. The companies can be divided into 3 categories by the cloud-based tools adaptation influence: enhancing, disputable, intuitive refusal.

Enhancing Adaptation Type

The recognition indicators based on representative's quotations and 2nd order themes are the following:

- Willingness for processes improvement

  - "Company buys video tutorials for coding improvement and system optimization" (C1P1).
  - "We always have meeting to see how we can act better" (C5P1).
  - "We combine different approaches to act effectively" (C6P1).
- Clear tasks' management
  - "Tasks management was done by Architect and Project Manager" (C4P1).
  - "Tasks were shared according to competency of each team member" (C4P1).
  - "We do not have the hours, but the value of the task S, M, L, XL" (C5P1).
- Willingness for high-quality delivery
  - "Code review is done by developers, technical leader, internal testers from agency, external team review functionality, managers test final interfaces" (C1P1).
  - "Philosophy says that the documentation is not the first, the main thing is the collaboration and working high quality product" (C6P1).
- Focus on fast delivery
  - "We had several deployments per day" (C4P1).
  - "On Fridays, customers have the news instead of the desktop that we changed something, attached there are links to the instructions" (C5P1).
- Taking advantage of tools
  - "With JIRA risks to make mistakes are much less, everything is clearly defined" (C4P1).
  - "For tasks, we use the YouTrack task-tracker, which is sharpened to work in Agile" (C6P1).
- Right methodology in the right place
  - "We used Kanban to easily manage tasks to simplify the process" (C4P1).
  - "Conditionally, we can say that we work on flexible methodologies, but the first iteration is waterfall, to get at least a minimal valuable product" (C6P1).

Disputable Adaptation Type

The recognition indicators based on representative's quotations and 2nd order themes are the following:

- No planning habit
  - "They had no planning. Only when I came I've created Excel with daily and weekly plans" (C3P1).
- Cheapest is the dearest
  - "The whole project was led by one programmer (not an analyst, not an architect). And I was there to help her. They did not want to invest" (C3P1).
- Initial understanding of the failure
  - "It was immediately clear that the project will fail" (C3P1).
- Overconfidence in processes
  - "The decided to take the processes as it is. They were just correct by default" (C3P1).

Intuitive Refusal Adaptation Type

The recognition indicators based on representative's quotations and 2nd order themes are the following:

- Round-the-clock team
  - "In the morning we got up and went to the factory. Then we came from the factory, gathered in one room and continue to work further" (C3P2).
  - "We just had a fairly cohesive team, and the responsibilities were clear" (C3P2).
- Full availability of the team
  - "We had our own office in the factory, we had our own phone, everyone knew it" (C3P2).

- Intuitive team decisions and processes
    - "We analysed the requirements only within the team, by brainstorming" (C3P2).
- Choosing appropriate tools and techniques
    - "We had a notebook with special notes, who does what. We planned only for a week ahead" (C3P2).

Taking everything mentioned above into account, each type of company behaviour can be shortly summarized and characterized:

- Enhancing adaptation type describes the companies, which are ready for changes and follow Agile principles. In this companies high management maturity and contextual intelligence of the team can be noticed. The companies of this type are potentially able to take advantages of cloud-based tools in order to improve their processes.
- Disputable adaptation type of company's behaviour indicates overall unwillingness for changes, management immaturity and as a consequence team low motivation. This type of companies is likely to have difficulties in running software projects, which are result of poor managerial skills. They have low chances to benefit from cloud technologies as the overall project surrounding is poorly established.
- Intuitive refusal adaptation type of companies can be considered as specific one, because it represents the companies, which are close to Enhancing type, but the key difference here is that the project teams are collocated with users. Another important aspect here is that the team has considerably high level of contextual intelligence, which lets them run the project based on their professional experience and intuition, banking on face-to-face communication.

The types of companies' behaviour are presented in framework (Figure 5).

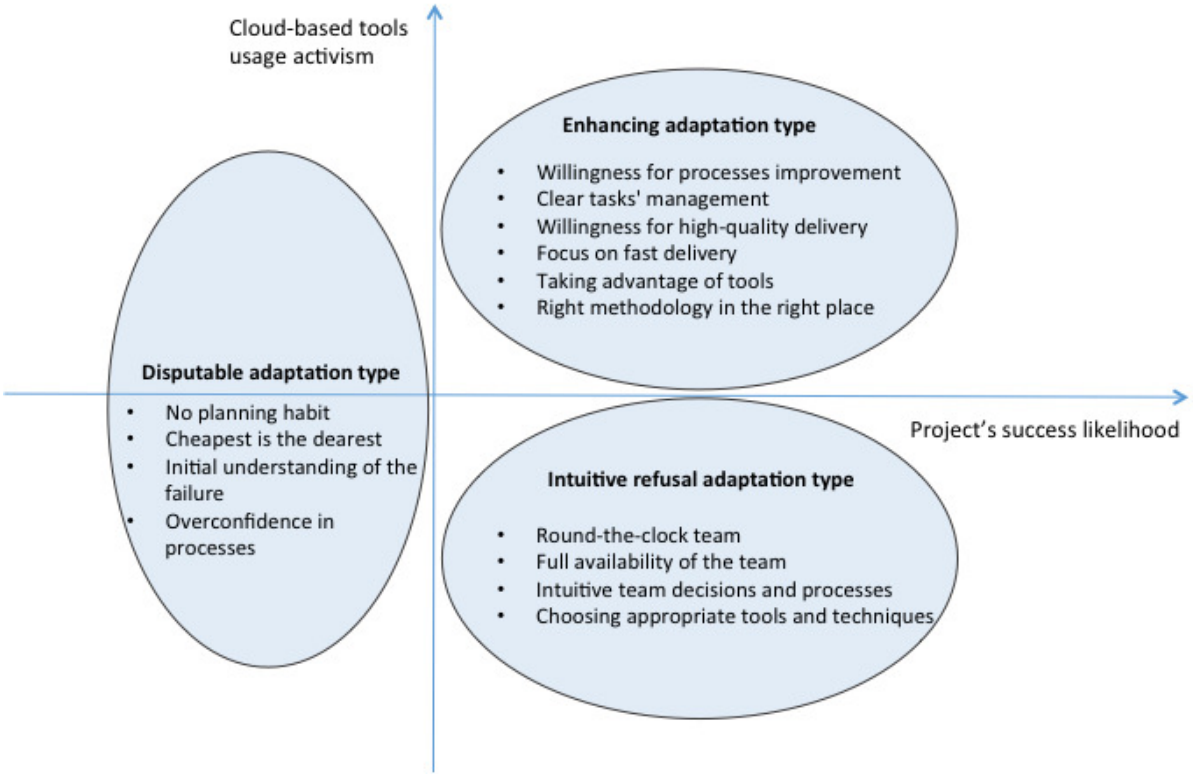


Fig. 5: Companies' behaviour framework

Conclusions and Discussions

In scopes of the current research different software project were analysed by the ways how the teams are adapting cloud-based tools. It was argued that there could be potentially 3 types of adaptation of "cloud" within the project: enhancing adaptation type, disputable and intuitive refusal. In the core of indicated types there were a number of concepts, which characterise them and appear to be the baseline for their difference: attitude to changes, team motivation, team collocation and contextual intelligence.

The topic of resistance and rebelling for changes was reflected by many researches. Based on previous research, the case of Total Quality Management (TQM) implementation was presented (Glenny, 1994). According to this research, such implementation has been successfully adopted by the vast number of companies. Nevertheless, author presents the projects, where process improvement was met by scepticism and rejection, what leaded to TQM realization and project's failures. Readiness or resistance for changes influence on any company's development and improvement. In current research resistance for changes and unwillingness of improvement also appeared to be influential on project outcomes.

According to the conducted research, low motivation of project team can result not only in unsuccessful cloud-based tools adaptation, but also in project failure. The influence of team motivation on project success was frequently mentioned in previous studies. The linkage between individual's motivation and project success can be reflected (Markus, 1983). In this study the case of management information systems was described. It was argued that low project team motivation leads to implementation project failure.

Previous researches emphasize that there are a number of aspect of team collocation, which potentially positively influence the process of running the project: informal contact; short communication lines; ability to receive opinions and feedback immediately; simplified Project Managers duties; usage of physical tools ("wall and paper") (Rafii, 1995). In scopes of the current research, it was proposed that such teams are likely to succeed if the members of the team are high experienced, ready to communicate, opened towards discussion.

It was assumed that successful cloud-based tool adaptation is inextricably linked with the CI of project team, managers and company (specifically, the ability to adjusting to circumstances, Agility, readiness for changes and management maturity). The CI is actually viewed as a wider phenomena in other researches, specifically its aspects are addressed as potentially important within complex tasks (Ilin et al., 2016). It encompasses the following skills: ability of influence on others; interpreting the changing environment and adjusting to it; critical thinking; understanding the future perspectives and opportunities and others (Kutz, 2017). Potentially, "Interpreting the changing environment and adjusting to it" can be viewed in prism of "Cloud-based tools adaptation" among the companies, as it was done in the current research, but the topic can be admitted as still poorly discovered.

The baseline limitation of the current research is the number of analyzed companies. It could be broadened in scopes of further researches in order to provide stronger judgements about the types of companies' behavior. In addition, the research raised new questions for the future researchers, which are linked to cloud-based tools usage for particular project types and discovering the potential difference between these types (product development, vendor's software implementation, continuous development projects and others).

References

Amazon Simple Storage Service (S3) [WWW Document], 2017. . Amaz. Web Serv. Inc. URL //aws.amazon.com/s3/ (accessed 5.28.17).

Azizyan, G., Magarian, M.K., Kajko-Matsson, M., 2011. Survey of agile tool usage and needs, in: Agile Conference (AGILE), 2011. IEEE, pp. 29–38.

Bompani, L., Ciancarini, P., Vitali, F., 2000. Software Engineering and the Internet: A Roadmap, in: Proceedings of the Conference on The Future of Software Engineering, ICSE '00. ACM, New York, NY, USA, pp. 303–315. doi:10.1145/336512.336582

Buyya, R., Broberg, J., Goscinski, A.M., 2010. Cloud Computing: Principles and Paradigms. John Wiley & Sons.

Eckstein, J., 2013. Agile Software Development with Distributed Teams: Staying Agile in a Global World. Addison-Wesley.

Foster, I., Zhao, Y., Raicu, I., Lu, S., 2008. Cloud Computing and Grid Computing 360-Degree Compared. IEEE, pp. 1–10. doi:10.1109/GCE.2008.4738445

Geelan, J., 2008. Twenty Experts Define Cloud Computing. Cloud Comput. J. SYS-CON Media Inc.

Glenny, T., 1994. When You Hit a Brick Wall. TQM Mag. 6, 15–17. doi:10.1108/09544789410062731

Glukhov, V.V., Ilin, I.V., Iliashenko, O.J., 2016. Improving the Efficiency of Architectural Solutions Based on Cloud Services Integration, in: Galinina, O., Balandin, S., Koucheryavy, Y. (Eds.), Internet of Things, Smart Spaces, and Next Generation Networks and Systems. Springer International Publishing, Cham, pp. 512–524. doi:10.1007/978-3-319-46301-8_43

Glukhov, V.V., Ilin, I.V., Levina, A.I., 2015. Project Management Team Structure for Internet Providing Companies, in: Balandin, S., Andreev, S., Koucheryavy, Y. (Eds.), Internet of Things, Smart Spaces, and Next Generation Networks and Systems. Springer International Publishing, Cham, pp. 543–553. doi:10.1007/978-3-319-23126-6_47

Google Drive [WWW Document], 2017. URL www.google.com/intl/en-GB_ALL/drive/ (accessed 5.28.17).

Hashmi, S.I., Clerc, V., Razavian, M., Manteli, C., Tamburri, D.A., Lago, P., Di Nitto, E., Richardson, I., 2011. Using the cloud to facilitate global software development challenges, in: Global Software Engineering Workshop (ICGSEW), 2011 Sixth IEEE International Conference on. IEEE, pp. 70–77.

Huang, D., Xing, T., Wu, H., 2013. Mobile cloud computing service models: A user-centric approach. Ieee Netw. 27, 6–11.

Ilin, I., Kalinina, O., Iliashenko, O., Levina, A., 2016. IT-architecture Reengineering as a Prerequisite for Sustainable Development in Saint Petersburg Urban Underground. Procedia Eng. 165, 1683–1692. doi:10.1016/j.proeng.2016.11.910

Ilin, I.V., Frolov, K.V., Lepekhin, A.A., 2017. From Business Processes Model of the Company to Software Development: MDA Business Extension. Presented at the Proceedings of the 29th International Business Information Management Association Conference – Sustainable Economic Growth, Education Excellence, and Innovation Management through Vision 2020, pp. 1157–1164.

Jadeja, Y., Modi, K., 2012. Cloud computing - concepts, architecture and challenges. IEEE, pp. 877–880. doi:10.1109/ICCEET.2012.6203873

Kutz, M., 2017. What Is Contextual Intelligence?, in: Contextual Intelligence. Springer International Publishing, pp. 9–20. doi:10.1007/978-3-319-44998-2_2

Markus, M.L., 1983. Power, politics, and MIS implementation. Commun. ACM 26, 430–444.

Nasuni, 10.14. White Paper: Bulk Data Migration in the Cloud [WWW Document]. Nasuni Corp. URL http://www6.nasuni.com/rs/nasuni/images/Nasuni-White-Paper-Bulk-Data-Migration-in-the-Cloud.pdf (accessed 5.27.17).

Office 365 [WWW Document], 2017. . Microsoft. URL (accessed 5.27.17).

Rafii, F., 1995. How important is physical collocation to product development success? Bus. Horiz. 38, 78–84. doi:10.1016/0007-6813(95)90107-8

Rahimi, M.R., Ren, J., Liu, C.H., Vasilakos, A.V., Venkatasubramanian, N., 2014. Mobile cloud computing: A survey, state of art and future directions. Mob. Netw. Appl. 19, 133–143.

Rozman, T., Stjepanovič, T.K., Raspor, A., 2017. An Analysis of Web-based Document Management and Communication Tools Usage Among Project Managers: Int. J. Hum. Cap. Inf. Technol. Prof. 8, 1–24. doi:10.4018/IJHCITP.2017010101

Strauss, A., Corbin, J., 1967. Discovery of grounded theory.

Improvement of Employee Engagement through Interaction between Distributive Justice, Procedural Justice and Islamic Work Ethics

Halimah Tusa'diah,
Magister of Management, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia
ima.thahirah@yahoo.co.id

Heru Kurnianto Tjahjono
Faculty of Economics and Business, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia
E-mail: herukurnianto@umy.ac.id

Fauziyah
Faculty of Economics and Business, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia
E-mail: fauziyah@umy.ac.id

Majang Palupi
Faculty of Economics, Universitas Islam Indonesia, Yogyakarta, Indonesia
E-mail: majang_palupi@uii.ac.id

Abstract

This study aimed to examine the effects of distributive and procedural justice, and Islamic work ethics on employee engagement. The study involved 171 employees of a private company under Islamic foundations. The analysis was performed using hierarchical multiple regression. The results showed that distributive and procedural justice plays a positive role in improving employee engagement while Islamic work ethics play a role to moderate the effects of distributive and procedural justice on employee engagement. The interaction of distributive justice and Islamic work ethics plays a role in explaining employee engagement. Similarly, the interaction of procedural justice and Islamic work ethics affects employee engagement. The contribution of the main effects in this study is 0.631 while the contribution of the interaction effect is 0.056.

Keywords: Employee engagement, Distributive justice, Procedural justice and Islamic work ethics

Background

In the last 10 years, the term 'employee engagement' has become crucial in the business world (Andrew & Sofian, 2012). Employee engagement is one of an organization's important outcomes and plays an important role in supporting sustainable competitive advantage. A study conducted by Saks (2006) shows that employee engagement can improve in accordance to the increment in employee's perception of justice. Studies on organizational behavior explain that employees are involved in building long-term prosperity with the organization so that they are concerned with justice (Tjahjono, 2011). Thus, distributive and procedural justice becomes significant determinants in explaining organizational outcomes such as employee engagement (Colquitt et al., 2001; Colquitt, 2001; Palupi et al. 2014; Swenney & McFarlin, 1993). This way, it is important to consider fair management in improving employee's positive attitudes and behavior in the organization (Tjahjono, 2010).

Another important issue is from the aspect of an employee's personality that are closely related to attitude and behavior in the organization. An employee's personality are shaped from internalized values in employee's long-term attitudes and behavior. In Islamic organizations, Islamic values are developed to build an employee's positive attitudes and behaviors. The Islamic values that are adapted into the work

environment then forms Islamic work ethics. This research was conducted to investigate any efforts to improve employee engagement of employees at Islamic universities through fair management and Islamic work ethics.

Employee Engagement in Islamic University of Riau

Due to the fact that many Islamic universities do not execute the rules of ethics of Islamic work in their work, we chose to apply the Islamic work ethics variable. In the Personnel Performance Report Quarter I (January-March) 2016 that was produced by the University itself described issues as below;

- Lack of communication between departments and parties related to it resulting in less harmonious relationships. If the relationship among these employees are not handled more seriously it can cause the deficiency of employee engagement which ultimately affects their declining performance.
- Organization and employment have no meaning for employees, rendering the employee-organization relationship unfavorable. The impact that arises from the lack of a sense of belonging of the employees in the organization makes their contribution less. Thus, the employee has not found the meaning of the work and the organization in which he/she works.
- Dishonesty of employees in carrying out their tasks and responsibilities.

Universities need to measure Employee Engagement as part of the HR planning and management system as an effort to increase employee productivity in order to contribute positively to universities. This needs to be done because the increased effectiveness and efficiency of an organization is highly dependent on the willingness of people in the organization to contribute positively in responding to change (Bogler and Somech in Widodo and Sami'an, 2013). Measurement of Employee Engagement in universities is conducted to determine the conditions that need to be the focus of improvement in an effort to improve the level of college performance.

Literature Review and Hypothesis

Employee engagement describes the forms of employee engagement towards his/her works so it could devote positive feelings towards their work (Brown et al*.,* 2016). Schaufeli (2002) and Saks (2006) emphasized the presence of three important dimensions namely vigor, dedication and absorption. Vigor is a form of employee's mental resilience in doing work. Dedication is a form of employee engagement in tasks that generates a sense of belonging to the organization and other positive emotional feelings towards the organization such as pride. Absorption is the level of concentration that employees are investing without interruptions or distractions so that they are not aware of the time passing by during their working hours. This way, organizations believe that employee engagement is an important outcome that encourages sustainability of organizational performance. A number of empirical studies indicate the importance of organizational justice effects on employee's positive responses such as employee engagement. At the beginning of the development of justice studies, distributive justice played a central role and became the focus of various researches on organizational justice. The perception of distributive justice was related to result allocation. On the other hand, the perception of procedural justice was related to the mechanism or procedure of generating allocations. The perception of procedural justice was complementary to the perception of distributive justice that could not be separated in assessing justice (Thibaut & Walker, 1978). In further developments, organizational justice that is believed to be dominant as a predictor of outcomes within an organization is distributive and procedural justice (Tjahjono, 2011). Empirically, the opinion that both distributive and procedural justice are an important reference for employees to show attitude and behavior has been proven in various studies (Folger & Konovsky, 1989; McFarlin & Sweeney, 1992; Tjahjono, 2010; Palupi, 2013; Palupi & Tjahjono, 2016).

H1: Distributive justice positively affects employee engagement

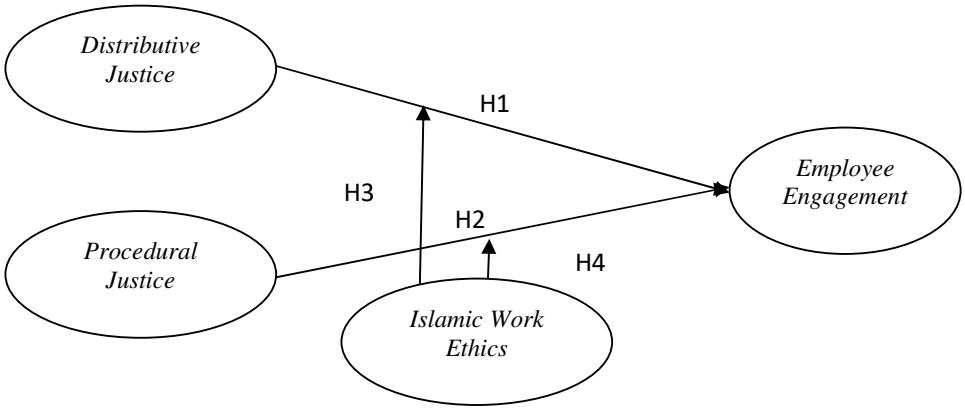
H2: Procedural justice positively affects employee engagement

Islamic work ethic encourages hard work and creativity as an element of personal achievement and happiness. Values in Islamic Work Ethics come from the initial intentions instead of only the results. The most interesting aspect of Islamic Work Ethics is the value that encourages people to be honest in their

work and forbidding them from conducting otherwise. Therefore, each member of the group begins to facilitate others to uphold the values and ethics; this then guarantees prosperity for individuals and organizations (Yousef, 2001; Ali, 1988; Khadijah et al., 2015). Employee's Islamic work ethics will distinguish an employee's attitude and behavior (Palupi & Tjahjono, 2016). Those with substantial Islamic work ethics have a tendency to have better employee engagement with their works. On the other hand, those who have low Islamic work ethics are closely related to being selfish and less sensitive towards any efforts to build social harmony in their environment.

H3: Islamic work ethics moderates the effects of distributive justice on employee engagement.

H4: Islamic work ethics moderates the effects of procedural justice on employee engagement.



Research Method

The study was carried out at a privately-owned organizations under Islamic foundation called the Islamic University of Riau. This study used an entire population of 171 employees of the selected location. The total response rate was 87.72%. The results of validity and reliability test showed valid and reliable results. The analysis used was hierarchical regression. The first step was to include the main effects namely distributive justice, procedural justice, and Islamic work ethics. The second step was to include the interaction between Islamic work ethics with distributive justice as well as Islamic work ethics with procedural justice. Lastly, to include the interaction among the three elements, namely distributive justice, procedural justice and Islamic work ethics in explaining employee engagement.

Findings and Discussion

Based on gender, the ratio of women and men is 32:68. Meanwhile, the working period and hierarchy of working rank are relatively equally distributed. The descriptive statistics shown in table 1 shows that the perceptions of distributive justice, procedural justice, and Islamic work ethics are in moderate category. Meanwhile, employee engagement falls in a relatively high category.

Table 1: Descriptive Analysis of Research Variables

Variables	Mean	Categories
Distributive Justice	3.32	Moderate
Procedural Justice	3.37	Moderate
Employee Engagement	3.55	High
Islamic Work Ethics	2.87	Moderate

Source: Analyzed Data, 2017

Table 2 illustrates the results of hierarchical multiple regression analysis, describing 3 steps of regression. The result of the regression analysis in the first step shows that distributive justice, procedural justice and Islamic work ethics have positive effect on employee engagement. The contribution of the main effect is 0.631, seen from adjusted R square. In the second step, the interaction between distributive justice and Islamic work ethics plays a role in explaining employee engagement. Similarly, the interaction between procedural justice and Islamic work ethics plays a role in employee engagement. The contribution in this second step shows that both interactions are significant by 0.687.

Table 2: Estimation Result of Regression

No	Model	Regression Coef.	t statistic	Sig	Sig. F	Adjusted R Square
1	Step 1 Distributive Justice (X1) Procedural Justice (X2) Islamic Work Ethics (Z)	 0.489 0.615 0.152	 8.866 9.842 2.901	 0.000 0.000 0.004	0.000	0.631
2	Step 2 Moderate 1 Distributive Justice x Islamic Work Ethics Moderate 2 (X1Z) Procedural Justice x Islamic Work Ethics (X2Z)	 0.080 0.168	 2.188 3.575	 0.030 0.000	0.000	0.687

Dependent Variable: Employee Engagement (Y)
Source: Analyzed Data, 2017

More specifically, distributive justice has a positive effect on employee engagement with a regression coefficient of 0.489. This way, an increase in distributive justice is followed by an increase in employee engagement. On the other hand, lower distributive justice is related to lower employee engagement. This result supports the first hypothesis.

In relation with the second hypothesis, the result shows a positive effect of procedural justice on employee engagement. The regression coefficient of 0.615 indicates that higher perception of procedural justice is associated with higher employee engagement. This result supports the second hypothesis.

In addition, the interaction between distributive justices with Islamic work ethics affects employee engagement. The regression coefficient of 0.08 indicates that variations in the interaction between distributive justice and Islamic work ethics are associated with a change in the variations in employee engagement. This result supports the third hypothesis.

Lastly, the interaction between procedural justices with Islamic work ethics affects employee engagement. The regression coefficient of 0.168 indicates that variations in the interaction between procedural justices with Islamic work ethics are related to a change in the variations in employee engagement. This result supports the fourth hypothesis.

The fact that the four hypotheses are supported shows that the research model can well describe the phenomenon of employee engagement in private companies in Indonesia. Adjusted R square of 0.687 indicates that the model can well explain the phenomenon of employee engagement of private company employees.

The results show that Islamic work ethics plays a significant role in explaining employee attitudes and behavior in private companies under Islamic foundation in responding to company policies. However, the results do not explain the specific impacts of the interaction among distributive justice and procedural justice with Islamic work ethics in explaining employee engagement.

Conclusion

Based on the results of the analysis, the conclusion are as follows. First, distributive and procedural justice have positive effects on employee engagement. Second, Islamic work ethics moderate the effects of distributive and procedural justice on employee engagement. However, the interaction among the three variables, namely distributive justice, procedural justice and Islamic work ethics, does not significantly influence employee engagement.

In the context of employees of private company under Islamic foundation, descriptive statistics explain that the perceptions of distributive and procedural justice fall into moderate category. Islamic work ethics are also in moderate category. On the other hand, the level of employee engagement of private company employees is relatively high.

Limitation of Study

This study has described that Islamic work ethics moderate the effects of distributive and procedural justice on employee engagement. However, the interaction among the three variables does not specifically explain its effect on employee engagement. Experimental studies are more appropriate to build the interaction among the three variables and their impacts on employee engagement. Such limitations allow chances for future studies in order to develop and improve the studies on the model of distributive justice, procedural justice, Islamic work ethics, and employee engagement.

References

Ali A. (1988). Scaling an Islamic work ethics. *Journal of Social Psychology.* 128(5), 575-83.

Andrew, O.C. & Sofian, S. (2012). Individual factors and work outcomes of employee engagement. *Procedia-Social and Behavioral Sciences*, 40, 498-508

Brown, D., Callen, A. & Robinson, D. (2016). *The relationship between total reward and employee engagement*. London:NHS Employers.

Folger, R. & Konovsky, M.A. (1989). Effects of procedural and distributive justice on reactions to pay raise decisions. *Academy of Management Journal*, 32(1):115-130

Khadijah, A.M., Kamaluddin, N. and Salin A.S.A.P. (2015). Islamic Work Ethics (IWE) Practice among Employees of Banking Sectors. *Middle-East Journal of Scientific Research* 23 (5): 924-931.

McFarlin, D.B. & Sweeney, P.D. (1992). Distributive and procedural justice as predictors of satisfaction with personal and organizational outcomes. Academy of Management Journal, 35(3):626-637.

Palupi, M. (2013). Pengaruh keadilan kompensasi, kebijakan rotasi karyawan dan komitmen afektif pada perilaku retaliasi PNS kantor ”X” di Yogyakarta. *Jurnal Riset Manajemen dan Bisnis*, 8(1): 15-24.

Palupi, M., Tjahjono, H.K. & Nuri, R. (2014). Pengaruh keadilan distributif karir dan keadilan prosedural karir terhadap perilaku retaliasi karyawan swasta di Daerah Istimewa Yogyakarta (DIY) dengan kepuasan karir sebagai variabel pemediasian. Jurnal Universitas Paramadina, 11(2): 1095-1109.

Palupi, M. & Tjahjono, H.K. (2016). A model of religiousity and organizational justice: the impact on commitment and dysfunctional behavior. The 27th International *Business Information Management*

Association Conference Proceedings.

Sweeney, P.D. & McFarlin, D.B. (1993). Workers' evaluation of the "Ends" and the "Means": an examination of four models of distributive and procedural justice. *Organizational Behavior and Human Decision Processes*, (55):23-40.

Thibaut, J. & Walker, L. (1978). A theory of procedure. *California Law Review*, 66: 541-566.

Tjahjono, H.K. (2008). Pengaruh keadilan organisasional pada perilaku retaliasi di tempat kerja. *Buletin Ekonomi Jurnal Manajemen, Akuntansi dan Ekonomi Pembangunan*, 6 (1):

Tjahjono, H.K. (2010). The extension of two-factor model of justice: hierarchical regression test and sample split. *China-USA Business Review*, 9. 39-54.

Tjahjono, H.K. (2011). The configuration among social capital, distributive and procedural justice and its consequences to individual satisfaction. International *Journal of Information and Management Sciences*, 22 (1): 87-103.

Yousef, D. A. (2001). Islamic Work Ethic: A moderator between organizational commitment and job satisfaction in a cross-cultural context. *Personnel Review,* 30 (2), 152-169.

Interaction Between Social Capital and Organizational Justice in Explaining Employee Engagement

Syarifah Fira Novianti
Magister of Management, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia
syarifahfira03@yahoo.com

Heru Kurnianto Tjahjono
Faculty of Economics and Business, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia
E-mail: herukurnianto@umy.ac.id

Fauziyah
Faculty of Economics and Business, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia
E-mail: fauziyah@umy.ac.id

Majang Palupi
Faculty of Economics, Universitas Islam Indonesia, Yogyakarta, Indonesia
E-mail: majang_palupi@uii.ac.id

Abstract

The purpose of this study is to investigate the interaction between social capital and organizational justice such as distributive justice and procedural justice in explaining employee engagement within higher education institution. The context of this study is the study of organizational behavior in private organization. The respondents were employees of private organizations amounting to 150 employees. The testing of variable and data analysis used hierarchical multiple regression analyses using SPSS. The result of regression to empirical data found that distributive justice has a positive effect on employee engagement. Likewise procedural justice positively affects employee engagement. Social capital in the model is able to explain the differences in employee attitudes and behaviors within the organizations. The results showed that social capital moderates the effects of distributive justice on employee engagement. Other result showed that social capital moderates the effect of procedural justice on employee engagement.

Keywords: employee engagement, distributive justice, procedural justice, social capital

Background

Studies on employee engagement are getting more important in understanding the phenomenon of the relationship between employees and organization. Employee engagement becomes one type of relationship that a company prefers as it plays an important role in supporting a sustainable competitive advantage. Employee engagement has a close relationship with employee's perception of justice (Saks, 2006). A study conducted by Tjahjono (2011) explains that organizational justice is the most important step in developing transactional patterns between employees and companies. The results of several studies on justice using meta-analysis technique by Tjahjono (2008a) shows that distributive justice and procedural justice play a dominant role in explaining employee attitudes and behavior. These study results are supported by many studies that distributive justice and procedural justice are important predictors - organizational outcomes such as employee engagement (Swenney & McFarlin, 1993; Colquitt et al., 2001; Colquitt, 2001; Palupi et al., 2014). Thus, studies on organizational justice are increasingly meaningful to improve employees' positive attitudes and behavior in organizations (Palupi & Tjahjono, 2016).

Social capital is an important concept that describes individual property. The concept of social capital plays a role in explaining employee attitudes and behavior in responding to organizational justice (Tjahjono, 2011). Social capital is present in this model as employees' social capital can distinguish

them when perceiving a policy and regulation as well as influence how they respond to justice and injustice (Tjahjono, 2011). Social capital can also influence employees in their involvement in a job, if an organization has justice then the social capital of employees will increase which causes employee involvement in a job also increases. Individual social capital differences will differentiate how they perceive justice.

Literature Review and Hypothesis

In general, employee engagement describes the forms of employee engagement to his works so he could devote positive feelings to his works (Brown et al*.,* 2016). Further, Schaufeli (2002) and Saks (2006) explain the presence of three important dimensions namely vigor, dedication and absorption. Vigor is a form of employee's mental resilience in doing a work. Dedication is a form of employee engagement in work that generates a sense of belonging to the organization and other positive emotional feelings towards the organization. Absorption is the level of concentration on work so that employees are not aware of the time used for the work. Based on these three dimensions, employee engagement is an important outcome that encourages positive dynamics and promotes sustainability of organizational performance.

The results of empirical studies have revealed that organizational justice positively affects employee's positive attitudes and behaviors such as employee engagement. In the studies on organizational justice, two types of justice that develop rapidly are distributive justice and procedural justice (Lind & Tyler, 1988). These two types of justice still play a more dominant role compared to the others (Tjahjono, 2011). In its development, procedural justice is complementary to distributive justice (Thibaut & Walker, 1978). Many empirical studies reported that distributive justice and procedural justice are important reference for employees in showing attitude and behavior in regard to a number of managerial policies within an organization (Folger & Konovsky, 1989; Tjahjono, 2010; Palupi, 2013; Palupi & Tjahjono, 2016; Badawi et al., 2017). When employees have high perceptions of justice in their organization, they are also more likely to feel obliged to be fair in how they perform their roles by giving more of themselves through greater levels of engagement (Ghost *et al., 2014;* Cropanzano and Mitchell, 2005; Biswas *et al.,* 2013)

H1: Distributive justice positively affects employee engagement

H2: Procedural justice positively affects employee engagement

The concept of social capital is a broad and abstract concept (Adler & Kwon, 2002). This concept can be observed from various analysis levels including national, organizational, group and individual level (Akdere, 2005). Social capital can be observed as an individual property which contains values that are oriented towards building social harmony from structural, cognitive and relational dimensions (Tjahjono, 2011). Such explanation is in line with the structural, cognitive and relational dimensions stated by Nahapiet & Ghosal (1998). Social capital strengthens social relations in its environment (Cendani & Tjahjaningsih, 2015). In addition, the first reason for the presence of social capital into the model of organizational justice is the limited information that leads employees to use subjective judgments (Tjahjono, 2011). The second reason is that social capital can distinguish between attitudes and behaviors in responding to managerial policies (Tjahjono, 2011). The third reason, social capital refers to the relationships between employees and social networks, norms and beliefs within an organization that can affect individual and group productivity (Carina and Harjanti, 2017)

H3: Social capital moderates the effect of distributive justice on employee engagement.

H4: Social capital moderates the effect of procedural justice on employee engagement.

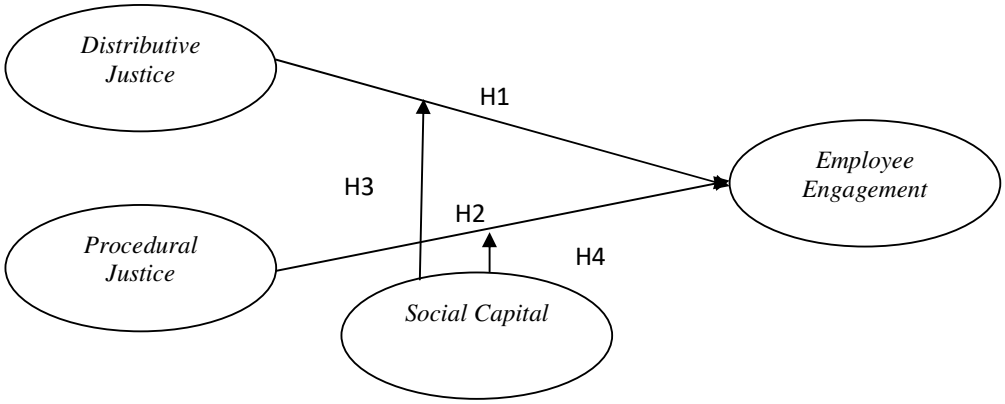


Figure 1 : Model of Interaction Between Social Capital And Organizational Justice In Explaining Employee Engagement

Research Method

The study was conducted to a population of employees of private organizations in Yogyakarta Special Region. The data were obtained from 150 employees. The results of validity and reliability tests of the research instrument showed valid and reliable results. Then it was followed by hierarchical regression analysis. The first step was to include the main effects namely distributive justice, procedural justice, and social capital. The second step was to include the interaction between social capital with distributive justice as well as social capital with procedural justice. The third step was to include the interaction among the three elements, namely distributive justice, procedural justice and social capital in explaining employee engagement.

Findings And Discussion

The descriptive data indicate that the comparison of gender-based employees is relatively balanced 60:40. The descriptive data also indicate that the working period and hierarchy of working rank are also equally distributed. Such relatively balanced comparison is beneficial in reducing bias associated with the prominence of certain aspects, for example when employees are dominated by those who are preparing for retirement, it may disrupt the analysis if the respondents were dominated by employees under 30 years old. Given the balance of each segment, the researchers found it unnecessary to use control variables in the initial step in the hierarchical multiple regression test.

Table 1: Descriptive Analysis of Research Variables

Variables	Mean	Categories
Distributive Justice	3.32	Moderate
Procedural Justice	3.37	Moderate
Employee Engagement	3.55	High
Social Capital	2.86	Moderate

Source: Analyzed Data, 2017

Table 1 shows the mean of each variable, i.e. distributive justice, procedural justice, social capital and employee engagement. These descriptive statistics indicate that the perceptions of distributive justice,

procedural justice and employee's social capital are at a moderate level. Meanwhile, employee engagement is at a high level.

Table 2: Estimation Results of Regression

No	Model	Regression Coef.	t statistic	Sig	Sig. F	Adjusted R Square
1	Step 1 Distributive Justice (X1) Procedural Justice (X2) Social Capital (Z)	 0.477 0.621 0.129	 8.649 9.889 2.519	 0.000 0.000 0.013	0.000	0.626
2	Step 2 Moderate 1 Distributive Justice x Social Capital Moderate 2 (X1Z) Procedural Justice x Social Capital (X2Z)	 0.076 0.155	 2.178 3.324	 0.031 0.001	0.000	0.674

Dependent Variable : Employee Engagement (Y)
Source: Analyzed Data, 2017

The result of hierarchical multiple regression analysis in the first step shows that the main effects including perception of distributive justice, perception of procedural justice and social capital have positive effect on employee engagement. The contribution of the main effects is 0.626, seen from adjusted R square. The second step in the form of the interaction between distributive justice and social capital plays a role in explaining employee engagement. Similarly, the interaction between the perception of procedural justice and social capital plays a role in explaining employee engagement. The contribution in this second step shows that the interaction between the two is significant, amounting to 0.674. On the other hand, the contribution in the third step shows that the interaction among the perception of distributive justice, procedural justice and social capital does not have any significant effect on justice model and employee engagement.

More specifically, distributive justice has a positive effect on employee engagement with a regression coefficient of 0.477. In other words, an increase in distributive equity is followed by an increase in employee engagement. In contrast, lower distributive justice is associated with lower employee engagement. This result supports the first hypothesis.

In relation with the second hypothesis, the result shows a positive effect of procedural justice on employee engagement. The regression coefficient of 0.621 indicates that higher perception of procedural justice is associated with higher employee engagement. This result supports the second hypothesis.

On the other hand, the interaction between distributive justice with social capital affects employee engagement. The regression coefficient of 0.076 indicates that variations in the interaction between distributive justice and social capital are associated with a change in the variations in employee engagement. This result supports the third hypothesis.

Lastly, the interaction between procedural justice with social capital affects employee engagement. The regression coefficient of 0.155 indicates that variations in the interaction between procedural justice with social capital are related to a change in the variations in employee engagement. This result supports the fourth hypothesis.

The fact that the four hypotheses are supported shows that the research model can well describe the phenomenon of employee engagement in private companies in Indonesia. Adusted R square of 0.674 indicates that the model can well explain the phenomenon of employee engagement of private company employees.

The results show that social capital plays a significant role in explaining employee attitudes and behavior in private companies in responding to company policies. (Folger & Konovsky, 1989; Tjahjono, 2010; Palupi, 2013; Palupi & Tjahjono, 2016; Badawi et al., 2017) In general company policies are appercieved as moderate (see table 1). This show that from Distributive and Procedural justice as still important to be inproved. According to study by (Tjahjono 2011, 2014) Social capital has stronger role during in Justice organization environment. Nevertheless, the results do not explain the specific impact of the interaction among distributive justice and procedural justice with social capital in explaining employee engagement.

Conclusions

Some key points to conclude this study are, first, in general, organizational justice is an important predictor of engagement. In particular, distributive justice and procedural justice have a positive effect on employee engagement. Second, social capital has a role as a moderating variable in the research model. Social capital moderates the effects of distributive justice and procedural justice on employee engagement. However, the interaction among the three variables, namely distributive justice, procedural justice and social capital, does not significantly explain employee engagement.

In regard with these private company employees, descriptive statistics report that the perception of organizational justice both the perception of distributive justice and procedural justice falls into moderate category. Similarly, social capital is also in moderate category. On the other hand, the level of employee engagement of private company employees is relatively high.

Limitation Of Study

The results of this study report that social capital moderates the effects of distributive justice and procedural justice on employee engagement. The interaction among the three variables does not specifically explain its effect on employee engagement. Future research is expected to accommodate the objectives to gain specific interaction between organizational justice and social capital. Approach using experimental studies is more appropriate for building the interaction among the three variables and their impacts on employee engagement.

References

Adler, P., & Kwon, S. (2002). Modal sosial: Prospects for a new concept. *Academy Management Review*, 27(1), 17–40.

Akdere, M. (2005). Social capital theory and implications for human resource development. *Singapore Management Review*, 27(2):1-23.

Badawi, Tjahjono, H.K., Muafi. (2017). The role of corporate reputation moderation of banking services. *Polish Journal of Management Studies*, 15(1): 15-25

Biswas, S., Varma, A., dan Ramaswarni, A. (2013). Linking Distributive andKeadilan Prosedural to Employee Engagement Through SosialExchange: A Field Study in India. The International Journal of HumanResource Management, Vol. 24, No. 8, 1570-1587

Brown, D., Callen, A. & Robinson, D. (2016). *The relationship between total reward and employee engagement*. London:NHS Employers.

Carina dan Harjanti, D. (2017). Analisis Penerapan Modal sosial pada PT. Indrayasa Migasa. *AGORA*, Vol. 5, No. 1

Cendani, C., dan Tjahjaningsih, E. (2015). Pengaruh Employee Engagement dan Modal sosial terhadap Kinerja Pegawai dengan OCB (Organizational Citizenship Behavior) sebagai Mediasi (Studi pada Bank Jateng Kantor Pusat). *Media Ekonomi dan Manajemen*, Vol. 30, No. 2, 149-160.

Cropanzano, R. and Mitchell, M. (2005), "Social exchange theory: an interdisciplinary review",*Journal of Managemen*t, Vol. 31 No. 6, pp. 874-899

Cropanzano R, et al. (2007). "*The Management of Organizational Justice*".Academy of Management Perspective, 34-38.

Ghosh, P, Rai, A dan Sinha, A. (2014). Organizational justice and Employee Engagement : Exploring the linkage in public sector banks in India. Personnel Review Vol. 43 No. 4, 2014 pp. 628-652
Ghosh, P, Rai, A dan Sinha, A. (2014). Organizational justice and EmployeeEngagement : Exploring the linkage in public sector banks in India.Personnel Review Vol. 43 No. 4, 2014 pp. 628-652

Lind, E.A. & Tyler, T.R. (1988). *The Social Psychology of Procedural Justice.* New York:Planum

Palupi, M. (2013). Pengaruh keadilan kompensasi, kebijakan rotasi karyawan dan komitmen afektif pada perilaku retaliasi PNS kantor "X" di Yogyakarta. *Jurnal Riset Manajemen dan Bisnis*, 8(1): 15-24.

Palupi, M., Tjahjono, H.K. & Nuri, R. (2014). Pengaruh keadilan distributif karir dan keadilan prosedural karir terhadap perilaku retaliasi karyawan swasta di Daerah Istimewa Yogyakarta (DIY) dengan kepuasan karir sebagai variabel pemediasian. *Jurnal Universitas Paramadina*, 11(2): 1095-1109.

Palupi, M. & Tjahjono, H.K. (2016). A model of religiousity and organizational justice: the impact on commitment and dysfunctional behavior. The 27th *International Business Information Management Association Conference Proceedings.*

Nahapiet, J., dan Ghoshal, S. (1998). Social Capital, Intellectual Capital, and the Organizational Advantage. *The Academy of Management Review*, Vol. 23, No. 2, 242-266.

Sweeney, P.D. & McFarlin, D.B. (1993). Workers' evaluation of the "Ends" and the "Means": an examination of four models of distributive and procedural justice. *Organizational Behavior and Human Decision Processes*, (55):23-40.

Thibaut, J. & Walker, L. (1978). A theory of procedure. *California Law Review*, 66: 541-566.

Tjahjono, H.K. (2008). Pengaruh keadilan organisasional pada perilaku retaliasi di tempat kerja. *Buletin Ekonomi Jurnal Manajemen, Akuntansi dan Ekonomi Pembangunan*, 6 (1):

Tjahjono, H.K. (2010). The extension of two-factor model of justice: hierarchical regression test and sample split. *China-USA Business Review*, 9. 39-54.

Tjahjono, H.K. (2011). The configuration among social capital, distributive and procedural justice and its consequences to individual satisfaction. International *Journal of Information and Management Sciences*, 22 (1): 87-103.

Tjahjono, H.K. (2014). The Fairness of Organization's Performance Appraisal Modal sosial and The Impact Toward Affective Commitment. Organisasi International Journal of Administrative Science & Organization
Tjahjono, H.K. (2014). The Fairness of Organization's Performance AppraisalModal sosial and The Impact Toward Affective Commitment. OrganisasiInternational Journal of Administrative Science & Organization

Evaluating Marginal Excess Burden of Taxation in Russia and the USA

Chernogorskiy S., SPbPU, St. Petersburg, Russia, chernog_sa@spbstu.ru

Kuporov Ju., SPbPU, St. Petersburg, Russia, kuporov_yuyu@spbstu.ru

Shvetsov K., SPbPU, St. Petersburg, Russia, shvetsov@inbox.ru

Abstract

Any public expenditures include not only cash costs, but also an additional excess burden of the higher taxes that are used to finance the necessary expenses. As a result, the society not only pays for public expenditures financed due to tax collection, but also incurs additional losses. The assessment of these losses, called excess burden of taxation, must be taken into account when defining the tax burden and analyzing the options for improvement of the tax system. The general equilibrium model with taxes is considered in the paper. In the proposed model, the economy is described using a general equilibrium model in which one product is produced and one type of labor is used. This model includes three types of economic agents: producer, household and state. This problem is widely discussed in scientific literature. We assume that the rate of one of the taxes varies and each household receives additional income from outside, which allows maintaining the initial level of utility in equilibrium. Excessive tax burden is the difference between additional compensating income and increase in tax collections. The ratio of excessive tax burden to the increase of tax revenues is called the marginal excess burden of taxation for this tax (if its rate change is small).

Keywords: marginal excess burden of taxation, profit tax, value added tax, personal income tax, contributions to extra-budgetary funds.

Introduction

At present, increase of taxation is being discussed in Russia. Although this increase is planned only in 2018, after the election of the President, now it is necessary to understand what consequences for society can be expected and whether the government will achieve the desired results. Knowing the marginal excess burden of taxation of various taxes is necessary for the economic justification of tax reforms, i.e. the effects of reducing one tax against raising another tax, considering the total tax revenue as constant. Of the tax system also plays a role in determining an economically efficient tax system. This paper assesses the marginal excess of taxation burden in the Russian Federation and in the United States.

The work by Hicks (1941) is the main one in the theory of excess burden of taxation. Consider the equilibrium state in the general equilibrium model with taxes. In the work by Diamond and McFadden (1974) assumed to be that the rate of one of the taxes changes and each household receives an additional income from outside, which maintains the initial level of utility in equilibrium, i.e. it compensates change in utility caused by additional tax charges. Further on the English abbreviation (Additional Compensating Income) is used in the text instead of the term "additional compensating income". The difference between the value and increase in tax collections is an excess burden of taxation. The work Ballard et al (1985) is dedicated to the study ratio to the increase of tax revenues is called the of this tax, if the rate change is small. The essence of the proposed definition is that households are considered to be consistently rational: when assessing their losses and value, they take into account the potential impact on the equilibrium state. Precisely this would be necessary to maintain an unchanged level of utility.

The calculation method of marginal excess burden of taxation[1]

The method used has the following steps:
1. Definition of the economic-mathematical model for describing the economic system.
2. Definition of the marginal excess burden of taxation concept.
3. Definition of the economic system equilibrium after taxes are changed and obtaining an expression to calculate the n (in case the revenues received by the state are spent on its own consumption).
4. Bogdanova et al (1999) obtaining an expression for the in case tax revenues are redistributed.
5. Calculation of in the RF and the USA economies.

Hereinafter, the following notation will be used to denote basic taxes: PT - profit tax; VAT - value added tax; IT - income tax; PRT (Payroll Tax) – contributions to extra-budgetary funds. In the book by Debreu (1982) considered a competitive economy model. Works by Rodionov et al (2014), Kalinina (2016), Churkin and Kalinina (2016) are dedicated to the study Arrow-Debreu model. Model includes three participants: a representative household, a producer and the state. All products are aggregated into one. All types of labor are also aggregated. This means that there are two markets in the model: product market and labor market. We assume the price of the product is equal to one.

The household chooses its consumption C and working time L so as to maximize its utility, i.e. it solves the following problem:

$$U(C, L) \to \max ,$$

where U - utility function; C - household consumption; L - labor time (labor).

It is assumed that the utility function does not depend on public goods, it grows with increasing C and goes down with increasing L. Consumption C (or a budget limitation) is expressed by the following formula:

$$C = (1 - \tau)(wL + D) + n + e^0 , \quad (1)$$

where C – household consumption; τ - income tax rate; w - wages for a unit of labor time (wage rate); L - labor time; D - dividends paid to the household; n - net transfers; e^0 - any types of property.

It is assumed that any type of property is not taxed, and the labor time L is positive with any wages and any tax rate. The producer maximizes net profit, i.e. profit remaining after all taxes are paid. Profit is defined as the difference between revenue without VAT, excises and similar payments and prime cost, i.e. production costs, including the unified social tax PRT.

In this paper we analyze only a one-period model. Since the capital in this model is fixed, the producer plans to obtain maximum profit in the form of solution to the following task:

$$\Pr(L) = (1 - \alpha)\left[(1 - \beta)F(L) - (1 + \gamma)wL\right] \to \max , \quad (2)$$

where $\Pr(L)$ - after-tax profit; α - PT rate; β - VAT rate; γ - PRT rate; $F(L)$ - productive function that determines the volume of a net product, or the added value; w - wages for a unit of labor time (wage rate); L - labor time.

[1] This section is stated in accordance with Chernogorskiy S. Mathematical models of optimization of parameters of the state tax system: Ph.D thesis in economics: 08.00.13, 08.00.14 : SPb., 2002 158 p. RGB OD, 61:03-8/1690-X

The productive function $F(L)$ increases with a growth of L. The producer can reinvest the obtained profit and use it to develop production, or can pay out dividends to shareholders. We confine ourselves to the case when all disposable income is paid to the household in the form of dividends, then

$$D = \Pr(L^{\Pr}), \tag{3}$$

where D - dividends; $\Pr(L^{\Pr})$ - after-tax profit; $L^{\Pr}$ - solution of the profit maximization problem by the producer (2).

The process of tax rates adjustment requires legislative decisions and, therefore, takes a long time. Hence, we will consider tax rates as fixed, and government expenditures G will be equal to tax charges (at least in the short term prospects). If the state budget is balanced (it is assumed so), then government expenditures can be found from the following expression:

$$G + n = \tau_w w L^C + \gamma_w w L^{\Pr} + \beta F(L^{\Pr}) + \tau_D D + \frac{\alpha \Pr(L^{\Pr})}{1-\alpha}. \tag{4}$$

On the right side of the equation, the state budget revenues from the collected taxes are shown: IT, PRT, VAT, PT. Net transfers n are considered as fixed.

The equilibrium state in this taxation system $t = (\alpha, \beta, \gamma, \tau)$ is defined by vector $E(t) = (w^0, C^0, L^C, L^{\Pr}, G^0)$, where (C^0, L^C) is a solution (1), $L^{\Pr}$ is a solution (2), G^0 satisfies (4) and labor and product markets are balanced. This means that relations (1) and (2) are satisfied for the same amount of labor time. Mathematically, this is expressed by the relation $L^C = L^{\Pr} = L^0$. Also, the relation $C^0 + G^0 = F(L^0) + e^0$ is satisfied, i.e. the total expenditures of the household and the state are equal to the income from the production of the goods in the system and income on any types of property. We call an additional compensating income ACI such a change in any type of household property e^0 that ensures the invariability of its utility level before and after the change in tax rates. Let the tax rates at first be defined by a vector t^0, then they change to a value t. Denote the utility function in the equilibrium state with tax rates t^0 as $U(C^0, L^0) = U^0$ and add the requirement of invariability of utility, i.e. mathematically $U(C, L) = U^0$. Additional compensating income is defined by relation $ACI = e - e^0$. The government expenditures G also change when the tax rates change, where difference $G - G^0$ determines the increase in tax collection. The value $(e - e^0) - (G - G^0)$ is called an excess burden of tax changes $t - t^0$ for a given taxation system t^0.

The marginal excess burden MEB is a ratio of excess burden to the increase in tax collections, when the change in tax rates is small. More precisely, it is written as follows

$$MEB = \lim \frac{(e - e^0) - (G - G^0)}{G - G^0}, \text{ when } t \to t^0.$$

We should note that excess burden is associated with the given taxation system. In the theory of optimal taxation, on the contrary, government expenditures are set and taxes are chosen so as to maximize utility. Based on the obtained MEB expressions for the four considered taxes, we can write the following inequalities:

$$MEB(PT) < MEB(VAT) = MEB(IT) < MEB(PRT).$$

This expression allows you to determine ways to improve the taxation system by changing the rates of various taxes, reducing excess burdens. The MEB value does not depend on the use of tax revenues. Bogdanova et al (1999) mentioned regardless of whether these revenues are used for government

expenditures or are transferred to households, economic agents lose an amount equal to the value from changed tax rates per each ruble of additional tax revenue. The model has to be transformed to use statistical data and make calculations. A household income consists of wages in production, net transfers, including pension payments, and income from any type of property. The household uses its income to consume and save. In a research study by Chernogorskiy (2007) is considered that the pension fund and extra-budgetary funds are consolidated with the state budget.

The actual MEB value can be quantified using the statistical data and the following formula:

$$MEB = \frac{dn}{de} = -\frac{\theta\omega r}{L}\left[1+\frac{\theta\omega r}{L}\right]^{-1},$$

where $\frac{\theta\omega r}{L} = -T\frac{L_0 - L}{L(1+h)(C+S-n-e)}$, T - tax revenues from four taxes: PT, VAT, IT, PRT; h - an average of the values for different time periods; C – household consumption; L - labor time; L_0 - time for work and rest; S - savings; n - net transfers; e - any types of property.

Statistical data contains information on the parameters C, S, n, components T, as well as information on the size of economically active population and the number of unemployed. The labor time L can be calculated from these data.

Actual values of marginal excess burden in Russia and the USA

We should note the following assumptions and limitations of the model.
1. We consider a one-period model with fixed capital. The model includes three participants: the household, the producer and the state, all products and all types of labor are aggregated into one, the product price is equal to one.
2. The following taxes are considered: *PT; VAT; IT; PRT*. Extra-budgetary funds are consolidated with the state budget.

3. Any types of property are not taxed.
4. All profits received by the producer are paid to the household in the form of dividends.
5. The state budget is considered balanced, and taxes are the only source of state revenue.
6. Formula for the *MEB* is obtained based on a assumption that production function *F(L)* is linear.
7. When the model is transformed to use statistical data, it is considered that the economy is in equilibrium in each period of time.

In the paper by Goulder and Williams (2003) stated that ignoring general equilibrium effects leads to biases in estimating the excess burden. However, on the basis of this model it is possible to obtain a numeric expression for the marginal excess burdens, having rather scarce statistical data on minimal time and labor costs. Table 1 shows the actual *MEB* values, calculated for Russia and the USA for the period from 2010 to 2015.

Table 1 : the actual MEB value, calculated by an indirect method (by statistical data) on four taxes: *VAT*, *IT*, *PT*, *PRT*

State	2010	2011	2012	2013	2014	2015
USA	0.19	0.20	0.20	0.21	0.21	0.20
Russia	0.28	0.22	0.22	0.21	0.20	0.17

The *MEB* calculations in Table 1 show that the real *MEB* value in 2015 in Russia is 0.17, which means that the Russian economy in addition loses 17 kopecks per every ruble of tax collections. The Russian *MEB* value is almost equal to the *MEB* value for the United States.

Conclusion

The greatest distortions, as shown in the mathematical model, are caused by the *PRT* which is paid by employer and/or employee. Russia must continue reformation of contributions to non-budgetary funds, included in the *PRT*. These are the most difficult Russian problems.

To achieve this goal, we recommend the following set of measures.
1. It is necessary to lower the *PRT* rate down to 20-25%. In the paper by Myasnikov et al (2010) mentioned this will reduce the cost of manufactured products, increase the real demand of the population and reduce the excess burden, and the utility of households will increase more than the amount of contributions will decrease.

2. It is necessary to lower the *VAT* rate down to 15-16% (not to raise to 20% as planned). This will revive the demand by reducing both prices and excess burdens.

3. A slight increase in the income tax rate is possible, but at the same time, it is necessary to free from taxation the profits invested in innovation, expansion and modernization of production, and to exclude from the tax base all documented and substantiated expenses related to doing business.
According to the authors, the proposed set of measures will contribute to a growth of real incomes of the population, thereby reviving production and demand.

References

Ballard, Ch., Shoven, J. and Walley, J. (1985) 'General equilibrium computations of the marginal welfare costs of taxes in the United States,' *American Economic Review*, 75 (1), 128-138.

Bogdanova, M.S., Krupenina, G.A. and Movshovich, S.M. (1999) Estimation of excess burden of taxation in the Russian economy, Moscow, RPEI Eurasia Foundation. (in Russian)

Chernogorskiy, S.A. (2007) 'Nominal values of marginal excess burden of taxation in Russia and the USA,' *Proceedings of SPbSTU,* 503 (2), 2007, 2-24. (in Russian)

Churkin, V.I. and Kalinina, O.V. (2016) 'Estimation of excess burden of labor taxation in Russia,' *Actual Problems in Economics*, 184, 278-282.

Debreu, G. (1982) Existence of competitive equilibrium, in: Arrow, K.J. and Intriligator, M.D. (eds.), Handbook of Mathematical Economics, North-Holland, Amsterdam.

Diamond, P. and McFadden, D. (1974) 'Some uses of the expenditure function in public finance,' *Journal of Public Economy*, 3, 3-21.

Goulder, L. and Williams, R. (2003) 'The Substantial Bias from Ignoring General Equilibrium Effects in Estimating Excess Burden, and a Practical Solution,' *Journal of Political Economy,* 111 (4), 898-927.

Hicks, J. (1941) 'The rehabilitation of consumer's surplus,' *Review of Economic Studies*, 9, 126-137.

Kalinina, O.V. (2016) 'Universal approach to building the progressive scale for income taxation,' *Actual Problems in Economics*, 176, 387-400.

Myasnikov, A.K., Chernogorskiy, S.A. and Shvetsov, K.V. (2010) 'Mutual interaction of the fiscal and personnel potential of the region, *St. Petersburg State Polytechnical University Journal. Economics*, 6 (112), 75-80. (in Russian)

Rodionov, D.G., Rudskaia, I. A., & Kushneva, O. A. (2014) 'The importance of the university world rankings in the context of globalization,' *Life Science Journal*, 11(10), 442-446.

The Adoption of e-Procurement within the Moroccan Health Sector

Yousra Elbelkacemi, Al Akhawayn University, Ifrane, Morocco, y.elbekacemi@aui.ma

Wafa ElGarah, Al Akhawayn University, Ifrane, Morocco, w.elgarah@aui.ma

Dr. Ibrahimi, Azzedine, Mohamed V University, Rabat, Morocco, a.ibrahimi@um5s.net.ma

Abstract

Fighting corruption and enhancing integrity is a major challenge facing developing countries today. The adoption of ICT mainly in the procurement process in the public sector seems to be one of the ways used by some countries to fight corruption and enhance clean business. This research in progress examines the role of transparency, trust and risk perception in the adoption of e-procurement systems within the Moroccan healthcare sector.

Keywords: TAM, Transparency, Trust, Risk.

Introduction

Corruption has been one of the main factors hindering economic and social development in Morocco. According to the Corruption Perception Index (CPI) of 2015, Morocco's position has slightly worsened as it ranked 88 out of 168 countries compared to 2014 where it ranked 80 out of 175 countries. In an attempt to reduce corruption, the Moroccan government has initiated several reforms in law and launched several awareness campaigns. In fact, in March 2016, the government revealed an ambitious country-wide strategy to fight corruption. This strategy adopts a sectorial approach which, based on previous similar experiences, has proven to be more effective. One of the sectors targeted by this strategy is the healthcare sector.

The healthcare sector is often cited as one of the sectors affected most by corruption. One of the mostly affected functions in this sector is the procurement process. Fraud and corruption happens most at the acquisition of medical equipment and medication especially during the tendering process. Given the fact that corruption in the public sector is often linked to procurement, several countries have adopted e-Procurement systems as a way to improve transparency in the process and hence fight corruption.

Many developed and developing countries have adopted new information technology initiatives in order to improve their procurement process especially within the health sector (Al-Jaghoub, Al Yaseen, & Al-Hourani, 2010). E-procurement systems have proved to be an effective tool in enhancing transparency in the procurement process. Accordingly, the main objective of this research is to identify the main factors that affect the adoption of e-procurement systems within public hospitals in Morocco. Of interest to us is the role transparency, trust and risk perception play with the TAM theoretical model.

Research Model and Hypotheses

The purpose of this study is to identify factors affecting the adoption of ICT in the procurement process of the Moroccan Health sector. There are several theories that have been used to study the adoption of IT. The most widely used ones are Technology acceptance model (TAM) (Davis, 1986), Diffusion of Innovation (DOI) (Rogers, 1995), and Theory of Planned Behavior (TPB) (Ajzen, 1991). In this study

we will be using TAM as it is both a parsimonious and strong model which assesses the user's acceptance behavior toward the use of information technology (Gefen et al., 2003). TAM provides an attitudinal explanation of how individuals adopt or reject an information system (Horst, Kuttschreuter, and Gutteling, 2007).

In this research the TAM model is augmented by three constructs namely transparency, trust and risk perception that have been proven as important factors affecting adoption in different studies (Gefen, Karahana, and Straub, 2003; Al-Jabri and Roztocki, 2015). Our objective is to see the impact of these constructs on the TAM model within the e-procurement in the healthcare sector in Morocco. Figure 1 presents the research model.

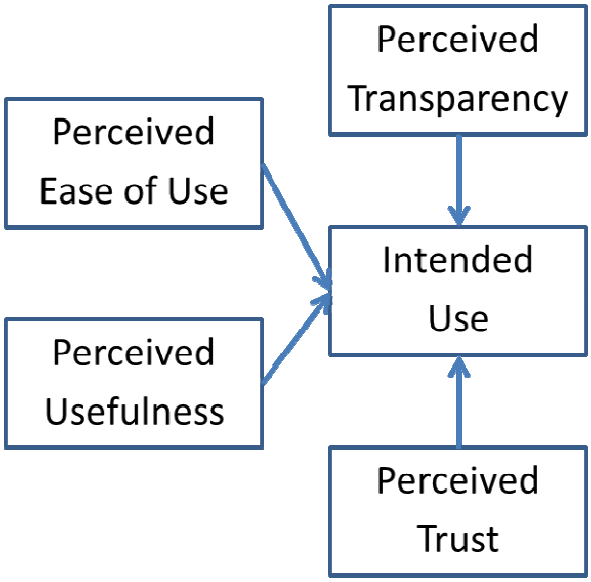


Fig. 1: Research Model

TAM and E-Procurement

Public procurement plays a paramount role in the evolvement of countries accounting for somewhere between 10 to 15% of GDP. In Morocco, this ratio is estimated to be even higher than 20% (La logistique du commerce et la compétitivité du Maroc, 2016). Thus, the flow of this process should be done in the most efficient way in order to maximize the value generated from it. Indeed, a proper functioning of the public procurement process goes hand in hand with a flow based on transparency, accountability, and integrity (Public procurement in Zambia, n.d). Therefore, many governments are nowadays trying to enhance their business processes by adopting new information communication systems that ensure the efficiency, openness, accountability, and transparency of their services (Al-Jaghoub, Al Yaseen, & Al-Hourani, 2010).

E-procurement is the use of ICT typically over the internet to conduct procurement transactions between organizations and their suppliers. It streamlines and integrates all the steps in the procurement process from the tendering to the payment process and beyond. Similar to other countries, the adoption of e-procurement within the Moroccan health sector would be a paramount step toward a more transparent, accountable, and efficient process flow.

E-procurement is an information technology innovation and therefore the user adoption of it can be explained by TAM. Several empirical research studies have demonstrated that TAM is a robust and parsimonious model compared to other innovation adoption and use models (Taylor and Todd, 1995; Geffen and Straub, 2000). The two main constructs in TAM are perceived ease of use (PEOU) and perceived usefulness (PU). According to Davis (1989), PEOU is defined as "the extent to which an individual believes that the use of a specific system will not require a lot of efforts" whereas PU refers to the degree to which a person is willing to use a specific system in order to enhance his or her performance. Though TAM is often used at the individual level, several studies have used it in organizational setting (Davis et al., 1989; Matheison, 1991; Gefen et al. 2000). Hence we hypothesize the following:

H1: PEOU will positively affect intention to use e-procurement systems

H2: PU will positively affect intention to use e-procurement systems

Perceived Transparency and E-Procurement Intended Use

Transparency refers to the ability to have access to the information anytime and anywhere, and the integration of all the data through the whole process flow (McManus, 2006). According to Sturges (2004), a transparency environment must be open, protects the public interest, has a clear transparent auditing process as well as free journalism investigation that detects and reveals all misconducts that could affect the public interest.

Today, with the advancement of information technology, transparency is becoming easier to implement. As a matter of fact ICT has been often cited as an effective tool in improving transparency and reducing corruption. Transparency is improved through transaction traceability, information availability and accessibility. Transparency has been shown to have a negative effect on corruption. By making processes more transparent and clear, accountability becomes easier and information becomes readily available.

Information systems such as E-procurement systems help streamline processes, enhance information transparency through information availability and hence improve decision making. Street and Meister (2004) posits that information transparency has two main dimensions within an organization. The first dimension is the internal transparency that refers to degree to which information is streamlined and can be easily accessed by employees. The second dimension is the external transparency which is defined as the exchange of information between parties outside the organization. Additionally, transparency tends to become an extremely regarded subject since it contributes in the enhancement of a fair participation, empowered decision making, and integration of information with the public (Cullier and Piotrowski, 2009; Mulgan, 2007; Quinn, 2003; Reylea, 2009; Shuler et al., 2010). Al-Jabri and Roztocki (2015) empirically showed that perceived information transparency has an effect on adoption of ERPs. Their findings suggest that ERP users appreciate the information made available by the systems in terms of tracking activities, accessibility and sharing of information about the organization performance. Hence we hypothesize the following:

H3: Perceived transparency is positively related to the intention to use e-procurement system

Perceived Trust and E-Procurement Intended Use

Trust is a pre-requisite to any business or economic transaction. It is a complex multidimensional construct. The concept of trust does not deal only with the personal interaction but also with the electronic environment. Perceived trust is based on the integrity, and trustworthiness of the whole information system including people, procedure, and the system (Gefen et al., 2003). From this standpoint we can point out that perceived trust is another critical factor which determines the customers' intention

to adopt information system. Zuboff (1988) suggests that the adoption and usage of information technology are both affected by customers' trust. Therefore, trust is a drastic predictor of IT adoption which has a strong influence on the consumer's behavior. Additionally, customers' trust determines whether the adoption of an information will be successful or not. Furthermore, Rea (2001) claimed that enhancing the awareness and the understanding of electronic processes is a way to promote trust. Likewise, there are several factors which have substantial impact on the customer's trust toward adopting information communication technology (Al-Ghaith, Sanzogni, & Sandhu, 2010). These factors appear in terms "the functionality of the system, the security standards, and the structural aspects" (Al-Ghaith, Sanzogni, & Sandhu, 2010). The latters have a significant impact on the customers' intention and adoption of ICT.

In the same stream of research, Gefen et al. (2003) in their influential study reveal that trust depends on some specific factors. End users build trust when they believe that the system has strong security tools that will enable them to use it in a safe way. Moreover, trust is enhanced when the system has an easy to use interface (Gefen et al., 2003). Given the above, we trust that perceived trust will have an important impact on the adoption of information communication technology within the procurement process of the health sector in Morocco. Thus we hypothesize the following:

H4: Perceived trust towards the e-procurement system positively affects its adoption.

Methodology

To examine the relationships between the different variable and to test the hypotheses, the survey method will be used. We will use the standard TAM instrument to measure PU and PEOU from Davis (1989). These items were previously validated in different contexts. To measure transparency we will adopt Bertot et al (2010) instrument. The items will be adapted to the e-procurement context of the healthcare sector. Data will be collected from public hospitals' procurement managers and employees. We are in the data collection stage and hope to have some preliminary results to share at the conference.

Conclusion

This study will attempt to extend our understanding of the role of information transparency, trust and risk perception in the context of e-procurement systems intention to use. As the Moroccan government is trying to fight against corruption, e-procurement seems to be an effective tool to enhance transparency. This research will help shed light on the factors that affect the adoption of e-procurement systems among procurement employees within the healthcare public sector.

Acknowledgment

This research is funded by Al Akhawayn Center for Business Ethics in the framework of the Siemens Integrity Initiative

References

Al-Ghaith, W., Sanzogni, L., & Sandhu, K. (2010) 'Factors influencing the Adoption and Usage of Online Services in Saudi Arabia.' EJISDC, 40, 1-32.

Al-Jabri, I., & Roztocki, N. (2014) 'Adoption of ERP systems: Does information transparency matter?' Telematics and Informatics, 300-310.

Al-Jaghoub, S., Al Yaseen, H., & Al-Hourani, M. (2010) 'Evaluation of Awareness and Acceptability of Using e-Government Services in Developing Countries: The Case of Jordan,' Electronic Journal Information Systems Evaluation, 13(1), 1-8.

Bertot, J. C., Jaeger, P. T., & Grimes, J. M. (2010) 'Using ICTs to create a culture of transparency: E-government and social media as openness and anti-corruption tools for societies,' Government Information Quarterly, 27(3), 264-271. doi: 10.1016/j.giq.2010.03.001

Brown, S.A., Massey, A.P., Montoya-Weiss, M.M., Burkman, J.R. (2002), 'Do I really have to? User acceptance of mandated technology,' European Journal of Information Systems. 11 (4), 283–295.
Cullier, D., Piotrowski, S.J. (2009) 'Internet information-seeking and its relation to support for access to Government Records,' Government Information Quarterly. 26 (3), 441–449.

Davis, F. (1989) 'Perceived usefulness, perceived ease of use, and user acceptance of information technology,' Management Information System, 1-22. Retrieved from http://iris.nyit.edu/~kkhoo/Spring2008/Topics/TAM/PercieveUsefulness_MIS.pdf

Erat, P., Desouza, K.C., Schäfer-Jugel, A., Kurzawa, M. 2006 'Business customer communities and knowledge sharing: exploratory study of critical issues,' European Journal of Information Systems, 15 (5), 511–524.

Gefen, D., Karahana, E., Straub, D.W. (2003) 'Trust and TAM in online shopping: An integrated model,' Management Information Systems Quarterly, 27, 51-90.

Hill, C.W.L., Jones, T.M., (1992) 'Stakeholder-agency theory,' Journal of Management Studies, 29 (2), 131–154.

Horst, M., Kuttschreuter, M., Gutteling, J. (2007) 'Perceived usefulness, personal experiences, risk perception and trust as determinants of adoption of e-government services in The Netherlands,' Computers in Human Behavior, 23(4), 1838-1852.

La Logistique du Commerce et la Compétitivité du Maroc. (2006) 'Ministère De L'Equipement Et Du Transport,' Retrieved from http://www wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2009/03/17/000334955_20090317061346/Rendered/PDF/367870ESW0FREN10BOx0338860B1PUBLIC1.

Lazarus, H., McManus, T., (2006) 'Transparency Guru: an interview with Tom McManus,' Journal of Management Development, 25 (10), 923–936.

Martinez, T. (2014) 'Combating Corruption Through Transparency: How Have e-Government Investments Affected Levels of Accountability in Brazil?' Proceedings of the 8th International Conference on Theory and Practice of Electronic Governance, 1-4.

Pavlou, P., & Featherman, M. (2002) 'Predicting E services adoption: A perceived risk facets perspective,' International Journal of Human-Computer Studies, 59, 4, 451-474

Public Procurement System in Zambia A case for procurement monitoring. (n.d.). Retrieved from http://www.csprzambia.org/images/documents/CSOProcurementMonitoring.pdf

ea, T. (2001) 'Engendering Trust in Electronic Environments: Roles for a Trusted Third Party In C. Castelfranchi & Y.-H. Tan, (Eds.), Trust and Deception in Virtual Societies. 221-236. Netherlands: Kluwer Academic Publishers.

Street, C.T., Meister, D.B. (2004), 'Small business growth and internal transparency: the role of information systems,' Management Information Systems Quarterly, 28 (3), 473–506.

Sturges, P. (2004) 'Corruption, transparency and a role for ICT?' International Journal of Information Ethics, 2. Available at http://www.ijie.org

Zuboff, S. (1988) In the Age of Smart Machine: The Future of Work and Power. Oxford: Heinemann Professional Publisher.

University Attitude to the Applicability and Solution of the Society-wide Problem of Water Management

Martina Juříková, Tomas Bata University, Zlín, Czech Republic, jurikova@utb.cz

Abstract

Management of each university is currently dealing with qualitative parameters to withstand high national or international competition. Various university evaluation metrics – such as international ranking (QS World University Rankings, U – Multirank, etc.), as well as national indicators – often linked to the financing of individual universities – have been developed to monitor it. Significant indicators include, among other things, image of the university perceived by its stakeholders, built on communication of the educational process quality, scientific and creative activities, as well as the readiness of the graduates to practice. At present, qualitative indicators are more often related with society-wide overlap of activities where universities build image on the basis of activities resembling CSR in companies. Universities become places for discussion, prevention, but also for conceptual or realizable solutions to social problems and issues. Therefore the presented paper deals not only with the analysis of secondary data, but particularly with the results of primary surveys analyzing the impact of graduates' applicability on the perceived image in two periods and in a subsequent project "Water for All" of the Faculty of Multimedia Communications. The project reflected needs of practice and the whole society and at the same time analyzed the perception of university students of the problem of water management in a pilot survey at Tomas Bata University. The focus of interest was to find out whether young people are aware of the problem of water management rather in a local or global context.

Keywords: water management, students, water for all, CSR.

Introduction

In the existing global and competitive environment that universities are exposed to nowadays, universities must present themselves as service (products) providers to their customers. According to the marketing approach, it should identify, analyze, but also predict and meet the requirements of its customers. Hutyra ranks amongst university customers not only students and employers, but also society for which universities should look for new solutions, innovations, but also to analyze impacts and look for solutions to various societal problems or opportunities.

Table 1: University target groups and their needs, Source: (ČESKÁ SPOLEČNOST PRO JAKOST, Z.S., © 2009–2017)

Product	Characteristics	Customer	Customer requirements
Bachelor, Master, Doctoral Education	Acquired qualification	Students	Readiness for practice, prerequisites for gaining profitable jobs
		Employers	Eligibility for work classification performance
		Society	Compliance with development plans

Lifelong Learning	Deepening or changing qualification	Attenders	Possibility of growth and career change
		Employers	Employee development
Research and Scientific Activity	Looking for new principles and solutions	Society	New principle, implementability of solutions
Cooperation with Practice	Solutions to particular assignments	Companies	Usable solutions, efficiency of solutions

The quality of universities is then described by so called **outputs**, not only by a number of graduates, statistical criteria, but also by their knowledge, skills, which should represent one of the benefits of the studying, and at the same time of the goals. These outputs are then compared in the field, within the state and internationally. (Witzany, 2002). The quality of implementation processes is to a decisive extent given by **management quality**. Implementation of the customer approach and social context in university management seems necessary. In the Czech Republic (but also in many European countries) current systems of university management are based on the principles of "customary law", which over the years of operation does not always correlate with the current requirements of a dynamically developing society. At the level of faculties, institutes or departments, the topic of quality improvement was and remains a standard topic and it is reflected in particular outputs, such as: updating the content of individual subjects, as well as whole study programs, preparation of new teaching aids, involvement in research activities, outputs of which will be used in teaching too, engaging in international projects results of which are again reflected in teaching.

The limitation of quality assurance and assessment is mainly the lack of personnel capacities and qualified human resources for relevant processes and their management. Enlargement of quality assurance and assessment systems into all tertiary education institutions is also inadequate. In terms of personnel and organization one of the challenging areas of quality is cooperation with practice during the studying and the subsequent applicability of the graduates, which can be the decisive factor in choosing a university. In the Czech Republic The Higher Education Act does not strictly command cooperation of universities with practice, and in several of its provisions it creates the conditions for its implementation. However, a number of regulations lay down requirements for interconnection with practice (in particular, preparation for the exercise of regulated professions). With the increase in the number of students who have gone through Czech universities over the past twenty years, most of them has removed a mandatory requirement for operational (diploma) practice from its curriculum. According to the Framework for Higher Education Development by 2020 (MŠMT, © 2013 – 2017), "a number of schools was aware that they were unable to provide practice to all their students (from the side of practice, opinions that they were burdened by practitioners, that there is a threat of information leak etc., appeared and are appearing). In the cases that faculties or individual workplaces tended to a mandatory requirement of practice application, they are aware that this process is administratively demanding (contract terms, work safety, insurance, etc.). "

Other forms which can be considered a cooperation of university with practice:

- the inclusion of various professional excursions as part of study programs,
- involving professionals from practice in teaching,
- to a limited extent, the realization of professional experience abroad,
- awarding various analyzes, studies, research projects by the people from practice, e.g. in a form of competitions,
- education programs (lifelong learning) offered for practice, which can take several forms: short-term professional courses, various educational programs according to the specific directions of the contracting authority (effectuated at schools or at the premises of the contracting authority), long-term educational programs such as MBA etc.

In recent years the process of differentiation among subjects of practice can be seen. Successful businesses (regardless of ownership – both domestic and foreign) actively seek cooperation and they often come with offers of various forms and long-term collaboration with universities – e.g. in a form of involvement of top managers in scientific councils, councils of doctoral degree programs, etc., in a form of presentations of interesting topics in lectures, offering topics for bachelor or diploma theses or by providing financial means for equipment, student professional activities, by sponsorship of professional conferences, seminars, workshops, recently also by support of start-ups emerging at faculties or innovation centers, etc.

The second group includes various businesses and institutions that are aware of the potential of universities to solve their problems. These assign university departments various analytical or research studies or offer students different collaborative programs, common denominator of which is selection of suitable student candidates for their jobs. According to results of the PWC study (PricewaterhouseCoopers PwC. PwC, © 2017.), in the Czech Republic more than half (59 %) of companies plan to increase the number of employees this year and another more than quarter of them (27 %) at least maintains the current state, the unemployment rate belongs to the lowest in Europe. Managers of Czech companies are worried about not having people with necessary knowledge and skills. Lack of people is perceived even as the greatest threat to business. 95 % of 114 CEOs is worried about it. Companies are looking for a way to differentiate, engage attention and be a wanted employer. A total of 98 % of respondents stated that for this year their investment priorities are investments in the company's reputation, whether it would be marketing or social responsibility, last year it was 75 % of companies. Many companies (97 %) plan to get new employees via cooperation with schools, and here we see an increase in the comparison with last year (69 %).

A good reputation must be taken care of by universities too. The reputation with all target groups of a university is created by a number of factors: the quality of teaching, the applicability of graduates, the scientific performance of university educators and others. These parameters form not only quality but also added value. It is a value that gives the universities prestige recognition, which can be one of the decisive factors for potential applicants. There are currently 44 private, 26 public and 2 state universities in the Czech Republic. It is a total of 72 organizations trying to win study of Czech and foreign university applicants (MŠMT, © 2008-2010). In this highly competitive environment, for example, the social responsibility of universities, preventing or solving a community problem, or using potential opportunities for innovation, the sustainability of the country, etc., can be an added value. But do young people think that it is important to get a post-graduate job, or to ensure that schools (and universities in particular) take care of social responsibility of their students? This paper is looking for these answers.

Methodology of study

The Faculty of Multimedia Communications at Tomas Bata University in Zlín is a faculty where you can study Multimedia and Design or Marketing Communications. This unique combination is also a competitive advantage of the school, which still has relatively high number of applicants compared to the accepted students. The management of the faculty is still interested in the factors that create the positive image of the faculty, whether the young people perceive the applicability of the graduates as an important factor, the extent to which they want to solve the social themes within the individual subjects etc. Therefore a research team lead by the author of this article has been carrying out questionnaire surveys of the applicants for several years, in which perceived image and the development of the individual factors that create the image is measured. As part of the third role of universities, FMC management also decided to solve a society-wide topic across study fields and specializations, which proved to be a very effective way of linking ateliers (Glass Design, Shoe Design, Fashion Design, Graphic Design, Product and Spatial Design, Audiovisual Arts) and future marketers in creation of innovations, communication campaigns for water management prevention, as well as a pilot research on water management among young Czechs.

Findings

The research of secondary studies shows that the applicability of the graduates in practice is one of the basic indicators of the image of the university and therefore its perception by the applicants has become a basic premise for determining the hypothesis of the survey of the applicants, which has been implemented at FMC for the third year. Currently we have results from three periods: 2015/16, 2016/17 and 2017/18 applicants. Therefore it is possible to observe trends and to test the development of the image parameters of the university, respectively of the faculty. For example, a zero hypothesis was determined for the survey.

H_o: There is no dependence between a variable "The importance of graduate applicability" and the variable "FMC is an elite school".

Note: These variables were measured on a scale from 1 to 5 where 1 = low importance of applicability, respectively the perception of FMC as a school "for everyone", and 5 = the high importance of applicability, perception of FMC as an elite school.

Table 2: Statistical indicators to the variable "Importance of graduates applicability" in different years

Applicability	15-16	16-17	17-18
Modus (the most frequent)	5	5	5
OR (ordinal median – the middle)	4,682	4,643	4,658
Dorvar (discrete ordinal variance = dispersion)	1,267	1,224	1,134
Number of respondents	411	236	334

Table 3: Statistical indicators to the variable "FMC is an elite school/for everyone" in different years

Elite/ for all	15-16	16-17	17-18
Modus (the most frequent)	3	3	3
OR (ordinal median – the middle)	2,998	3,035	3,032
Dorvar (discrete ordinal variance = dispersion)	1,034	1,094	1,046

The table shows that applicants perceive post-study applicability as crucial to their decision-making, but they are not entirely sure whether FMC is an elite school that is the market leader. This may be due to the fact that the applicants do not have enough materials to assess the image of the school and / or are interested in "only" a rational argument on applicability.

A Chi-quadrate test was used for testing to assess whether the assumptions about equal distribution had been contravened.

Year 2015: X-squared = 12.7672, df = NA, p-value = 0.6931

Year 2016: X-squared = 24.788, df = NA, p-value = 0.07479

In all years it turns out that the question of elite status is for most applicants "insoluble". Applicants do not seem to know how or according to which factors they should judge the elite status of the school; therefore they opt for neutral value – 3. On the other hand, in terms of applicability, they perceive its importance to the maximum; most often they evaluate it with the mark 5. The data found are dispersed minimally in both cases. The dependence analyzed via chi-quadrate test is probably contravened by the "controversy" of the question "For whom is FMC intended," whether it is for everyone or whether it is an elite, unique school.

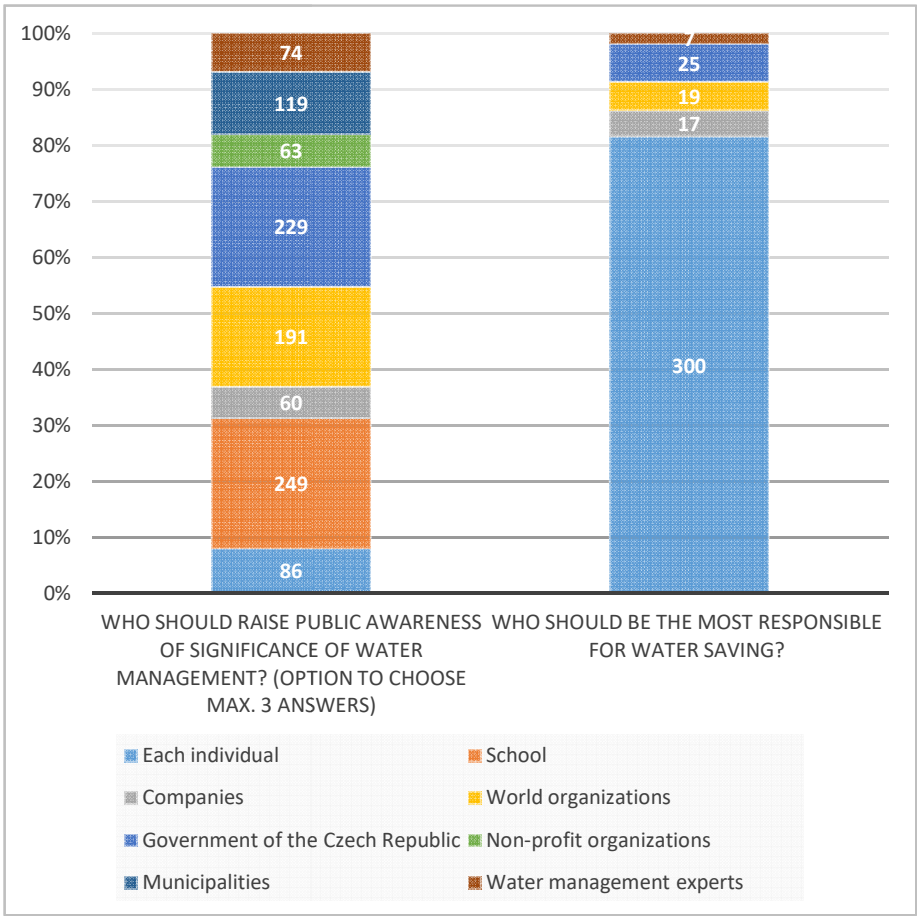


Figure 1: Responsibility and respondents attitude to water management (N = 370)

The p-value > 0.05, therefore H0 is not rejected, which means that the variables "importance of applicability" and "perception of school prestige" are independent of each other, and therefore the applicability as a rational reason for choosing a given school to study is more intelligible. Nevertheless, the university management should find a way to strengthen the image and perception of elite status of the university.

The increase in prestige of the school and creation of a positive image can be caused, for example, by the "society-wide projects" of the university, where it is possible to initiate a public discussion, to communicate with external entities during the analysis or solving a society-wide problem.

FMC TBU in Zlín, as was mentioned above, was also devoted to such activities, in academic year 2016/17 students worked on the topic "Water for All". Students of design have invented prototypes of water management products; marketing communications students have created water campaign communication concepts, among others with the headline: "Hold Water!" and have conducted a pre-

test of survey among university students to find out how they manage water in households, what do they think about this issue, who should deal with it, etc.

Besides other things, the results of the survey show that while more than 80% of 370 respondents declare that they feel personal responsibility for the water saving; in their opinion the public awareness should be mainly the focus of schools (from kindergarten to university), government and world organizations. More detailed results are shown in the following graphs.

Young people perceive the issue of water management very actively and independently of gender. Their perception is slightly more sensitive to the prevention of water spill from nature in the Czech Republic. 5 % of respondents mentioned companies and corporations as organizations responsible for water management, 5% mentioned the world's organizations, 7 % government of the Czech Republic and the appropriate ministries. Most of them, however, determined themselves being responsible, or more precisely each individual, in 81 % of cases. A key factor in our adaptation to changing environments will therefore be the ability to change people's thinking. History is known for civilizations that have had to cope with the change of their environment during two generations. Thilo Lehmann from the Vienna City Hall talked about change of mindset at the "Water Conference". According to him, the change of mindset, took place mainly at the municipality itself. In 2011 and 2014, Vienna suffered heavy rain that caused great damage. "Certainly, more capacity for sewerage could be built. But it is very expensive and people are annoyed when the city is dug up," says Lehmann. And so the municipality decided to simply not let the rainwater into the sewer, except for the historic center, where the spatial possibilities simply do not allow for another solution. (Martin Mach Ondřej, © 2017). A survey of people on a representative sample could bring inspirational ideas not only for organizations and cities that deal with management but the results will be used to educate and motivate these people to take interest in this society-wide problem and for proposals for its prevention or solution.

Conclusion

The key factors in the selection of university included employability of graduates, quality of teachers, space for personal development and success of students and graduates, confirming that it is not important to report "hard" data but also "soft" data, emotional stories on the real achievements of students, graduates and educators, who are not only a source of competitive advantage but also a reference to a given university. A possible solution is also fulfillment of the third role of the universities, i.e. the principles of social responsibility of the school by engaging in prevention and solving society-wide problems. One such project is The Water for All project which took place at the Faculty of Multimedia Communications at TBU under the patronage of the Ministry of the Environment and which had two main objectives. The first was to increase the awareness of the need for water management and to raise a debate on the subject with the general public. The second objective, which is also reflected in the name of the project, was cooperation, not only between the students themselves, but also between the Faculty and the city of Zlín, the production and non-profit sectors and the general public. The project involved 450 faculty students and created 360 unique outputs: a collection of clothes with print inspired by satellite images of drying Aral Lake, mobile applications that show users the source of drinking water in nature; a series of posters that highlight the necessity of water management, as well as architectural modifications of the river Dřevnice and Kudlov dam. Students of the department of Marketing Communications worked on a pilot survey, the partial results of which are the essence of this paper. The selected outputs of the project can be viewed at www.vodaprovsechny.cz.

From the above mentioned results of the surveys carried out at the FMC, it is clear that it is possible to build a positive image of the university based on the communication of "hard data", among others about the applicability of the graduates, which is very important for the applicants, but also by engaging in social projects where the young people think that the school should be the initiator of a discussion of all stakeholders, a place for innovation, as well as the analysis and creation of communication channels and tools to prevent or even solve this problem.

References

Arno, P. and P. Benneworth (2007) Understanding the regional contribution of higher education institutions: A lite rature review. A report prepared for the OECD Institutional Management in Higher Education Programme contribution of higher education to regional development.

Association for Quality Assurance in Higher Education, 2005, Helsinky. In: [online]. [cit. 2017-08-13]. Available: www.bologna-bergen2005.no/Docs/00Main_doc/050221_ENQA_report.pdf

Education Criteria for Performance Excellence. In: [online]. [cit. 2017-08- 13]. Available: www.baldrige.nist.gov

Framework for Higher Education Development by 2020. Ministerstvo školství ČR. In: [online]. [cit. 2017-08- 13]. Available: http://www.msmt.cz/vzdelavani/vysoke-skolstvi/ramec-rozvoje-vysokeho-skolstvi

Hutyra, M. Kvalita ve vzdělávání a její zabezpečování v prostředí vysokých škol – II. In: [online]. [cit. 2017-08- 20]. Available: http://www.csq.cz/res/data/000198.pdf

IPN Kredo (2015) Třetí role českých vysokých škol. Výzkumná zpráva. In: [online]. [cit. 2017-08-09]. Available: http://kredo.reformy-msmt.cz/vyzkumna-zprava-treti-role-cr-vs.

Laredo, P. (2007). Main transformations, challenges and emerging patterns in Higher Education Systems, UNESCO research seminar for the Regional Scientific Committee for Europe and North America, Paris 5-6 March 2007.

Mach, M. O. (2017) Hospodaření s dešťovou vodou. Ekolist.cz. In: [online]. [cit. 2017-08- 19]. Available: Http://zelenenoviny.cz/hospodareni-s-destovou-vodou-podle-odborniku-bude-nejtezsi-zmenit-mysleni-lidi/

OECD (2007) Higher education and regions: Globally competitive, locally engaged. Paříž, OECD publications.

PWC, Czech Republic (2017) Český průzkum generálních ředitelů. In: [online]. [cit. 2017-08- 19]. Available: http://www.pwc.com/cz/cs/temata/cesky-pruzkum-nazoru-generalnich-reditelu-2017.html

Standards and Guidelines for Quality Assurance in the European Higher Education Area. European
Tisdell, C. (2001) Globalisation and sustainability: environmental Kuznets curve and the WTO. Ecological Economics, 39(2), 185–196.

Witzany, J. (2002) Příspěvek k diskusi o kvalitě studia. Česká konference rektorů, In: [online]. [cit. 2017-08- 13]. Available: http://crc.muni.cz/documents/witzany.html

Theoretical Approach Regarding Corporate Entrepreneurship

Sebastian- Ion Ceptureanu, The Bucharest University of Economic Studies, Bucharest, Romania,
sebastian.ceptureanu@man.ase.ro

Abstract

Over the past several decades corporate entrepreneurship has been widely touted by executives and researchers alike as an effective means for revitalizing companies and improving their performance. But what do we really know about corporate entrepreneurs? Most of the evidence regarding corporate entrepreneurs is based on studies that focus on psychological behaviours. In an attempt to improve our understanding of this issue, this article present main types of corporate entrepreneurs, based on relevant academic literature.

Keywords: corporate entrepreneurship, entrepreneur, classical manager

Introduction

Sharma and Chrisman (1999) define corporate entrepreneurship as the process whereby an individual or a group of individuals, in association with an existing organization, create a new organization or instigate renewal or innovation within that organization.Zahra and Covin's (1995) depict some possible determinants and effects of the corporate entrepreneurship phenomena of corporate venturing and strategic renewal. Their approach is very general in that it does not distinguish between the causes and effects of these two entrepreneurial phenomena that, they argue, constitute corporate entrepreneurship's domain. Importantly, Burgelman (1983) consider corporate entrepreneurship as a set of phenomena that exist separate from organizational strategy.

The specific corporate entrepreneurship phenomena of internal corporate venturing and strategic renewal are Burgelman's (1983) and Floyd and Wooldridge's (1999) approach, respectively. Both are process-focused. That is, they depict how the venturing and renewal processes manifest themselves within organizations, with a particular focus on the roles and behaviors of various levels of management within the entrepreneurial phenomena of interest. Why the entrepreneurial phenomena of venturing or renewal come about as well as their ultimate effects are not of particular concern in these conceptualizations.

An alternative representation of the domain of corporate entrepreneurship is adopted by Dess & Beard (1984) who focused on how knowledge is created through four types of corporate entrepreneurship activity. Specifically, rather than adopting Hansen and Wernerfelt (1990) categorization scheme of corporate venturing and strategic renewal for describing the phenomena of corporate entrepreneurship, Kuratko *et al.* (2001). base their corporate entrepreneurship approach on the four forms of corporate entrepreneurship proposed by Covin & Slevin (1989)- namely, sustained regeneration, organizational rejuvenation, strategic renewal, and domain redefinition. The Churchill (2003) approach outlines how acquisitive and experimental learning processes mediate the relationships between the aforementioned corporate entrepreneurship forms and the emergence of specific types of knowledge (i.e., technical, integrative, and exploitive) and is tightly focused on exploring the causal interrelationships between specific corporate entrepreneurship forms and organizational learning.

Types of Corporate Entrepreneurs

To better explain the concept of corporate entrepreneurship, Kuratko *et al.* (2001) developed a typology of managerial characteristics of a corporate entrepreneur, as follows:

Initiater: is the individual or individuals who trigger the entrepreneurial activity. This is accomplished either through the analysis of the driving forces which help to change the external business environment, or by pursuing the innovative initiatives.

Sponsor/Facilitator: is the individual or group of individuals who support the activities of the initiator by managerial and financial aid. The sponsor/facilitator can be an entity within or outside an organization, such as a government agency, an association or a private financier.

Champion/manager: is the individual or individuals who help facilitate the project and take the initiative in all stages of the project.

Supporter of the team: plays a role in providing expertise, intelligence, marketing, and/or other management functions in order to support the concept or initiative.

Reactor: Has the role of "devil's advocate" in indicating weaknesses and threats to the concept or initiative. Provides information and managerial support in strengthening in consolidating the power of initiative.

Kuratko (2001) believe that the champion/manager and sponsor/facilitator play a crucial role in the entrepreneurial development within an organization. The authors argue that the champion/manager plays a key role in developing, facilitating and monitoring the entire entrepreneurial process within an organization.

Further, in order to highlight the best characteristics of a corporate entrepreneur, Pinchot highlights a clear difference between classical manager and a corporate entrepreneur:

Table 1: The difference between classical manager and corporate entrepreneur

	Classical manager	Corporate entrepreneur
Primary reasons	He wants promotion and reward from the organization. It is motivated by power.	He wants access to power and resources of the organization. He is goal-oriented and motivated, but also enjoys the rewards and recognition from the organization.
Decision	He agrees with those who hold power. He delays a decision until he understands what the superiors exactly want.	Try to persuade others to agree with their vision.
Orientation in time	Reply to quotas and budgets; weekly, monthly, quarterly, annual planning and follows the next promotion or transfer.	Achieve their goals within 3-15 years, depending on the business and the risks it entails. He is motivated to respect the timetable imposed by him and the organization.
Action	Delegates action. Supervision and delegation of tasks require more energy.	He likes to take part in the action. He knows how to delegate tasks but he involves when needed.

Courage and destiny	Considers others responsible for his fate. He can be strong and ambitious, but fears the ability of others to do harm to him.	He is confident in his capabilities and he is brave. Many corporate entrepreneurs have a cynical approach regarding the system, but are optimistic and confident in their abilities to deceive the system.
Attention	He focuses on events occurring within the organization.	He focuses on the events taking place inside and outside the organization.
Risk	Pays attention to risk.	Assumes a moderate risk. He is not afraid to be fired.
Market research	He did market research to discover customer needs and to guide product design.	Performs market studies and then evaluates them based on intuition.
Status	Takes into account the status other people have.	Considers the traditional hierarchies a joke - appreciates the symbol of freedom and equality.
Failure and surprises	Tries to avoid mistakes and surprises. Defers recognition of failure.	He does his best to look tidy, organized in the organization, so tries not to disclose risky projects, thus learning from mistakes without exhibiting failure in public.
Who serves whom	Pleasing others.	He is pleasing himself, customers and sponsors.
The attitude towards the system	He sees a prosperous system and seeks his position within it.	He is against the system, but learns to manipulate it.
Abilities	Professional management. Often he has an economic education. He holds analytical, political and human resources management abilities.	He has more economic skills than political or managerial. Often, he has a technical education and needs help to flourish.
Style to solve problems	Solves problems that occur , according to the system.	Solves problems that occur according to the system or bypasses it.
Family history	Family members have worked in large organizations.	Family members have entrepreneurial initiative, developing a business.
The relationship with parents	Independent from mother, in good relations with father - slightly addicted.	Pretty good relations with the father dad, but stormy.
Socio-economic background	He comes from the middle class.	He comes from the middle class.
Educational level	Very educated.	Often highly educated, especially in the technical field.
Relationship with others	Basic relationship - hierarchy	Transactions with hierarchy.

Source: Pinchot, 1985

Pinchot (1985) has also composed in his work a list of ten rules corporate entrepreneurs should follow to assess their ideas by the company where they work. He believes that if employees follow these tips, they will experience success within the organization.

Pinchot's rules can be called "the ten commandments on the path to success":

- Works everything to achieve your project regardless of the job description.
- Make your merit recognized in a wise manner.
- Remember, it's much easier to ask forgiveness than permission to someone.
- Go to work every day prepared to be fired.
- Seek advice from someone before asking for resources.
- Follow your intuition about people; create a team from the best.
- Create your ideas in an intimate environment, premature advertising leads to the failure of many ideas.
- Never bet on a race unless you participate in it.
- Be honest with your ideals, but realistic in terms of their achievement.
- Honour your sponsors.

Entrepreneurship and corporate entrepreneurship: advantages and disadvantages, similarities and differences

The importance of innovation in developing new products, processes and services to the market is widely recognized. Amo & Kolvereid (2005), Jennings & Lumpkin (1989), Ceptureanu SI *et al.* (2017) noted the link between innovation and entrepreneurship (Antoncic, 2001). According to Davis (1999), when the economy stagnates, entrepreneurs motivated by profit will innovate to increase productivity and thus increase profits.

Despite the increased interest in the concept of entrepreneurship there is no universally accepted definition, as we have seen in the first chapter of this work (Antoncic& Hisrich, 2003; Ceptureanu EG *et al.,* 2017). The concept of entrepreneurship has taken different meanings over time. Various writers consider the concept of entrepreneurship from slightly different perspectives (Jennings & Seaman, 1990; Zahra & Garvis, 2000).

To include all types of entrepreneurial behaviour, there is a rather broad definition according to which entrepreneurship is the process through which it is created something different, with value by dedicating time and effort and by taking financial, psychological and social risks. The reward of this process lies in the monetary and personal satisfaction. (Zahra & George, 2000; Molina & Callahan, 2009).

For people starting a business on their own, the experience is full of excitement, frustration, anxiety and hard work. There is a high failure rate due to low sales, intense competition and lack of capital (Miller, 1983).

Due to risks and increased costs arose a new form of entrepreneurship called corporate entrepreneurship (Pinchot, 1985). Corporate entrepreneurship is nothing but entrepreneurship, which happens this time in an existing organization.

So, we remark that it is not always necessary to set up a company to implement new ideas. Great potential also lies in applying the principles of entrepreneurship within existing organizations. In the conditions of a dynamic, this thing requires each company structure to be subject to constant changes that start, but this time, from within the firm.

Corporate entrepreneurs have new ideas and develop them in solid, functional and profitable businesses (Lehn & Makhija, 1996; Dixit & Pindyck, 1994). They have the same entrepreneurial spirit as entrepreneurs, but unlike them, they act in an existing organization. Thus, the corporate entrepreneur is the revolutionary in the organization, he fights for change and renewal of the system from the

organization. This may generate some conflicts within the organization, so it needs respect in order to constructively channel these conflicts (Jones & Butler, 1992).

Why are corporate entrepreneurs suddenly more important nowadays than before? The world is changing more rapidly under the influence of new technologies (Ghoshal & Bartlett, 1994; Ceptureanu *et al.*, 2017). Competition which takes place globally hinders our work. It is not sufficient to impose yourself over competitors simply by competition, but you must always come with something new on the market (Hitt & Ireland, 2002). Here comes into play corporate entrepreneurs, which help the firm (existing or newly created) to engage in new businesses and enter new markets (Hambrick, 1981).

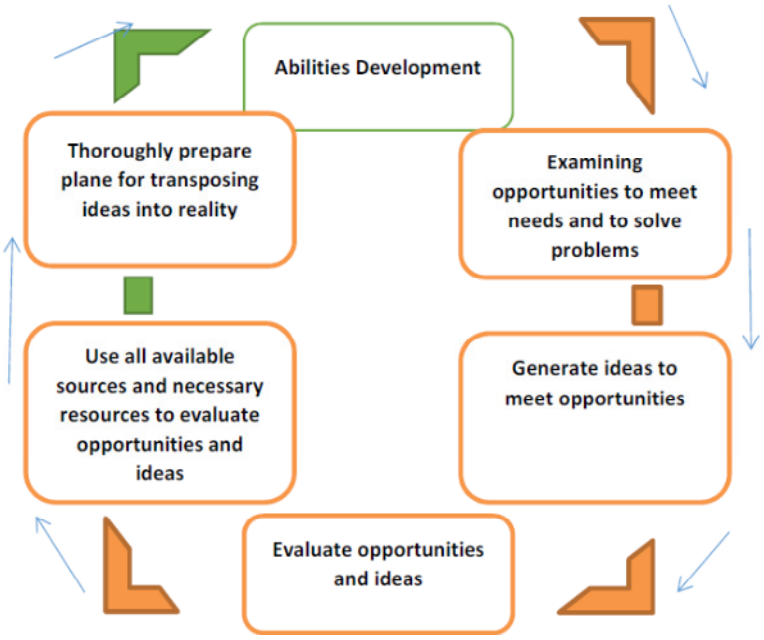


Fig.1: Cycle followed by corporate entrepreneur

To give an answer to this question, it is necessary to analyse the advantages and disadvantages of the two concepts. The table below is meant to help us to decide what type of business best suits us.

Table 2: Advantages and disadvantages of entrepreneurship and corporate entrepreneurship

ENTREPRENEURSHIP	
Advantages	**Disadvantages**
• You are your own boss – Independence • Revenues grow - financial reward • Freedom to choose - you can establish working hours, choose employees etc. • Opportunity to freely use imagination - originality • Have some adventure	• Pressure on money - giving up on the safety of a secure wage • Fewer benefits because of the novelty of business • Bankruptcy risk • Long working hours • Mistakes are magnified

• Less routine • There are plenty of opportunities to show what you can do • Advantage of salary - decide alone on the salary you deserve • Job security - do not live with the of being fired • Respect for your own person - personal satisfaction	• Stress • Financial risk • All decisions must be made by yourself - great responsibility
CORPORATE ENTREPENEURSHIP	
• Possibility to stay in a friendly and well known environment. • The chance to practice your skills in an organization - lower risk • Using the resources of the company, its reputation and knowledge • Access to clients and infrastructure	• Often the reward does not meet expectations • Innovation is not properly appreciated • Can be innovative, but to a certain limit – you are not your boss.

Among advantages that corporate entrepreneurship has over entrepreneurship, we include: access to customers and infrastructure; benefit from the knowledge of organization and lower risks than in the case of entrepreneurship (Merrifield, 1993; Lumpkin & Dess (1996)).

Among the disadvantages that the corporate entrepreneurship has over entrepreneurship, we include: short-term mentality; bureaucracy within the organization; lack of passion and way of reward for innovation (Levesque & Minniti, 2006).

Entrepreneurship involves innovation, ability to assume risk and creativity so that an entrepreneur will always be able to look at things in different ways. He sees risk-taking and failure acceptance as some incentives that help him learn and understand things. A corporate entrepreneur thinks like an entrepreneur and he is looking for opportunities that will bring profit to the organization. Corporate entrepreneurship is a new way to increase the competitiveness of organizations by giving employees freedom of imagination and entrepreneurial thinking. We conclude that the stimulation of corporate entrepreneurs is beneficial for any organization. Corporate entrepreneurship is an important method that helps organizations to reinvent themselves and improve their performance.

Morris *et al.* (1988) points out that in the literature it is often made the confusion between the similarities and differences between entrepreneurship and corporate entrepreneurship. Regarding the similarities between entrepreneurship and corporate entrepreneurship, the authors focus on:

- Both involve recognizing and defining opportunities
- Both require a unique business concept that takes the form of a product, process, or service.
- Both are led by a person working with a team to meet the proposed concept.
- Both involve concepts that are very vulnerable during training, and require adaptation in time.
- Both involve certain opportunities in which the concept can be successfully exploited.
- Both are based on value creation and responsibilities towards customers.
- Both involve risks and require risk management strategies.
- Both require the entrepreneur to develop creative strategies for resource mobilization.
- Both involve ambiguity.
- Both require strategies for collection and capitalization of ideas.

Regarding the differences between entrepreneurship and corporate entrepreneurship, Kazanjian et al. (2001) highlighted the following:

- In the case of entrepreneurship, the entrepreneur is the one who assumes the risk while in the case of corporate entrepreneurship, the company.
- In the case of entrepreneurship, entrepreneur masters the concept and the business, while at corporate entrepreneurship, company is holding the concept and has all the intellectual property rights, the corporate entrepreneur having little or no rights.
- The rewards received by entrepreneur are theoretically unlimited in the case of entrepreneurship, while in the case of corporate entrepreneurship, the rewards that corporate entrepreneur employees receive are limited.
- An hesitation, a mistake could mean instant failure in the case of entrepreneurship, while corporate entrepreneurship offers greater flexibility in terms of management errors.
- In the case of entrepreneurship, the entrepreneur is subject or susceptible to external influences, while for corporate entrepreneurship, the organization is protected from these external influences.

Besides the aforementioned differences, the biggest is constituted, in the opinion of Zahra & Garvis (2000), by the following: problems of flexibility in terms of planning; prioritization of innovative ideas; speed of the decision-making process; risk and safety issues; organizational behaviour practices (individuals and corporate culture); strategic planning and resource allocation (size and scope).

Also, other well-known authors have highlighted some differences between corporate entrepreneurship and entrepreneurship, namely:

- Corporate entrepreneurs take risky decisions using the resources of the company, whereas entrepreneurs take risky decisions using their own resources (Grant, 1996).
- Corporate entrepreneurship manifests itself among employees within organizations, while entrepreneurship primarily focuses externally (Dyer & Singh, 1998).
- Entrepreneurs prefer to develop tacit knowledge, in new organizations, instead of using procedures or mechanisms from other companies. On the other hand, corporate entrepreneurs are working in organizations that have policies, procedures and their own bureaucracy (Gulati, 1995).

Corporate entrepreneurship and entrepreneurship can be distinguished from each other as shown in the following table (Istocescu, 2006):

Table 3: Comparison between Entrepreneurs and Corporate Entrepreneurs

Criteria	Entrepreneur	Corporate entrepreneurs
Motivations for action	Profit, independence, ability to create, design and innovate.	Independence and the opportunity to benefit from the rewards of large companies (prestige, recognition, trade relations etc.)
Orientation in time	Survival of the company and its development over a period of 5-10 years.	Orientation mainly on long term (3-5 years), depending more or less on the imperative character of the fixed group obligations or of themselves.
Participation in the production processes	Strong direct involvement.	Average direct involvement.
Risk taking	High risk.	Moderate risk.
Failures and errors	Accept failures and possible errors.	Avoid projects that may cause failures before their launch.
Relations with third parties	The main relationships are determined by transactions and agreements.	The main relations take place within the company.

Conclusions

In conclusion we can say that both entrepreneurship and corporate entrepreneurship represent means to achieve a goal and not the goal itself. Corporate entrepreneurs through their innovations are trying to help an organization to compete, whereas entrepreneurs try through the businesses they develop to change their lives and satisfy the market needs. It doesn't always happen to find profitable opportunities but to own the gift of turning problems into profitable opportunities is extremely important for society.

Both entrepreneurs and corporate entrepreneurs do not easily accept failure being characterized and motivated all time by the fact that anything is possible and there is a solution for everything. When they feel they cannot cope with a situation, both prefer to withdraw because for them to fail when trying to do something is ridiculous and represents a failure. This does not mean, however, that both are always successful, but they have an optimistic thinking and they are very determined to transform their dreams into reality.

Unlike entrepreneurs, corporate entrepreneurs operate within an existing organization. Due to organizational culture, corporate entrepreneur does not have total liberty to implement his ideas and must comply with the rules set by management. In practice, corporate entrepreneurs often act before asking for permission or they are trying through an autocratic manner to make their ideas known. Entrepreneurship, on the other hand, thrives because the entrepreneur has the freedom to take all measures necessary to achieve success because he does not have to report to anybody and his decisions are not constrained by any organizational culture.

The entrepreneur is seen as the revolutionary in an organization that pushes the organization to change that is to change its system or culture. If a consensus is not reached on solving these problems, it can lead to misunderstandings within the organization. Entrepreneurs on the other hand, affect external organizations. They attempt to find alternative ways to create greater value for existing products that no longer meet consumer needs or they are trying to make a difference by creating new products.

One advantage of corporate entrepreneurs lies in the fact that he benefits from the resources of the organization. This is very important if we consider that in order to be effective a project should be tested several times, which means additional consumption of resources, resources that are made available by the organization. With the resources, funding and necessary human resources, the results will occur.

We can summarize the following: an entrepreneur takes important risks being an owner and operator of a new business because he does not have the safety of profit generated by his business. Conversely, an corporate entrepreneur is an individual employed by an organization so he has a certain remuneration. This remuneration may vary depending on the success the unit he is responsible for has. Corporate entrepreneurs share the same traits as entrepreneurs such as belief, enthusiasm for what they do and understanding. However, an corporate entrepreneur is successful only if the organization motivates him and support him in realizing his ideas. If he does not receive the necessary support from the organization, he is likely to leave the organization and to start his own business.

Whenever we find innovation in firms, we find behind them corporate entrepreneurs enabling the emergence of these innovations. According to Covins & Slevin (1986), innovation, large or small, requires certain courage, a vision, a desire to maintain control and to get things moving. Continuous persistence and practical imagination of the intrapreneur are essential for the success of any new idea. Therefore, the key of corporate entrepreneurship is hiring and keeping the right people, developing a results-based reward system that encourages and supports individual initiative, generation and development of new ideas. Companies need a corporate entrepreneurship culture if they want to grow and prosper. This suggests that firms do not have these skills automatically, but they require people who are willing to be exposed to situations with uncertain outcomes, who enjoy new and interesting activities, but

at the same time risky, who do not get tired easily towards challenges and have the ability to persuade others to help them to achieve their goal (Coff, 2002; Ceptureanu *et al*., 2017). This does not mean, however, that firms which have one corporate entrepreneurship leader are more oriented to entrepreneurial activities. It is needed for the leader to be innovative and charismatic, but perhaps more importantly is to instil a corporate entrepreneurship philosophy to all employees irrespective of the position they hold in the organization.

Therefore, within a corporate entrepreneurship organization, innovative persons should be considered examples, and their efforts should be rewarded accordingly so that the need to be innovative and to explore new approaches in the future to be part of the organizational culture. In other words, all employees should embrace new ideas and to be extremely active in generating new approaches and new ways of solving problems, willing to take the risk and to experience new things (Bartlett & Ghoshal, 1989; Ceptureanu *et al.,* 2012) . Typically, firms have a lot of ideas, but they are worthless if they are not used properly. The corporate entrepreneur is the one who is exploiting those ideas, who rejects bureaucracy and takes full responsibility for processing ideas within the organization and putting them on the market (Popa *et al*., 2009; Radu *et al*., 2017). Corporate entrepreneurs can be creative or innovative, but they are always dreamers who turn an idea into a profitable reality and therefore, it is extremely important to recognize their efforts.

How employees are rewarded have a strong influence on their motivation and it can be of various kinds, namely financial incentives, social incentives, incentives linked to work or incentives arising from the organizational culture.

Despite the lack of conclusive evidence on the motivational impact that monetary reward has on employee performance, many managers see the money as their main motivational factor (Lieberman & Montgomery, 1988). Although financial rewards play a decisive role in attracting talented, motivated and creative employees in the firm, Lengnick-Hall (1992) believe that these rewards have only a short term motivational impact on employees. Employees feel more motivated if the merits of their work are recognized, so (Leana & Van Buren, 1998) believes that recognizing and rewarding employees' work, which is a social incentive motivates employees more than financial incentives.

Social incentives are very important for employees as one of the most common needs expressed by them is the desire to be accepted (Morris, 1998). Social incentives may include verbal recognition of their merits, as well as encouragement and appreciation of their efforts. Although many managers proclaim that employees are key to the firm's success, many of them fail to offer their employees the necessary recognition, which is extremely important because employees who find their work challenging and rewarding might feel motivated by the simple nature of the work they perform (Ceptureanu EG *et al*., 2017).

Incentives related to the work are according to Honig (2001) those reward methods which include autonomy at work, career development and growth by recognizing individual performance. Shenkar & Zeira (1992) believe that these incentives are as important as the financial and social ones, because managers often use rewards such as offering an attractive position in the company to increase efficiency and employees' performance. More autonomy and assumption of a greater responsibility increase employees' motivation.

Employees can also find incentives in other aspects of internal organizational environment, such as firm size, organizational structure and management style. For example, the organizational structure of a company can influence motivation and employees' satisfaction in the sense that employees who prefer to work in a dynamic environment would be very frustrated if they were put to work in a bureaucratic environment, while employees who like structure and rules would find difficult to work in companies with a flexible organizational structure (Birkinshaw & Hood, 1998; Ceptureanu *et al*., 2017).

All these incentives can be seen as part of the reward system of a company, although Ceptureanu *et al.* (2016) believes that companies which decide to stimulate the corporate entrepreneurship behaviour have difficulties in finding the right mix between the financial and non-financial rewards.

The desire of employees and their ability to engage in corporate entrepreneurship activities are primarily influenced by how they are rewarded. Therefore, rewarding plays an important role in creating a favourable climate for these types of activities.

References

Amo, BW. and Kolvereid, L. (2005), 'Organizational strategy, individual personality and innovation behavior', *Journal of Enterprising Culture*, 13(1), 7-19

Antoncic, B. (2001), 'Organizational processes in intrapreneurship: a conceptual integration', *Journal of Enterprising Culture*, 9(2), 221-35

Antoncic, B. and Hisrich, RD. (2003), 'Clarifying the intrapreneurship concept', *Journal of Small Business & Enterprise Development*, 7- 24

Bartlett, CA.and Ghoshal, S. (1989), Managing across borders: The transnational solution, Boston, MA: Harvard Business School Press

Birkinshaw, J.and Hood, N. (1998), 'Multinational subsidiary evolution: Capability and charter change in foreign-owned subsidiary companies', *Academy of Management Review*, 23, 773- 795

Burgelman, RA. (1983), 'A process model of internal corporate venturing in the diversified major firm', *Administrative Science Quarterly*, 28, 223- 244

Burgelman, RA. (1983), 'Corporate entrepreneurship and strategic management: insights from a process study', *Management Science* 29, 1349- 1364

Ceptureanu, EG., Ceptureanu, SI., Orzan, MC., Bordean, ON and Radulescu, V. (2017), 'Empirical Study on Sustainable Opportunities Recognition. A Polyvinyl Chloride (PVC) Joinery Industry Analysis Using Augumented Sustainable Development Model', *Sustainability*, 9(10), 1779

Ceptureanu SI., Ceptureanu, EG., Tudorache, A. and Zgubea F. (2012), 'Knowledge Based Economy Assessment in Romania', *Economia Seria Management*, 15(1), 70- 87

Ceptureanu, EG., Ceptureanu, SI., Luchian, CE. and Luchian, I. (2017), 'Quality management in project management consulting. A case study in an international consulting company', *Amfiteatru Economic*, 19(44), 215- 230

Ceptureanu, EG., Ceptureanu, SI. and Popescu, D. (2017), 'Relationship between Entropy, Corporate Entrepreneurship and Organizational Capabilities in Romanian Medium Sized Enterprises', *Entropy*, 19(8), 412

Ceptureanu, SI., Ceptureanu, EG., Orzan, MC and Marin, I. (2017), 'Toward a Romanian NPOs Sustainability Model: determinants of sustainability', *Sustainability*, 9(6), 966

Ceptureanu, SI., Ceptureanu, EG., Simion-Melinte, C and Borisov, D. (2016), 'Capabilities of SMEs in Romanian Clothing Industry', *Industria Textila*, 67(4), 265- 269

Ceptureanu, SI., Ceptureanu, EG and Visileanu, E. (2017), 'Comparative analysis of small and medium enterprises organizational performance in clothing industry', *Industria Textila*, 68(2), 156- 162

Ceptureanu, SI., Ceptureanu, EG and Marin, I. (2017), 'Assessing role of strategic choice on organizational performance by Jacquemin- Berry entropy index', *Entropy*, 19(9), 448

Cheney, PK., Devinney, T. and Wirier, RS. (1991), 'The impact of new product introductions on the market value of firms', *Journal of Business*, 64(4), 573- 610

Churchill, NC. (2003), Reserch issues in entrepreneurship , in Antoncic, B and Hisrich, R, D, 'Clarifying the intrapreneurship concept', *Journal of Small Business & Enterprise Development*, 7- 24

Coff, R W. (2002), 'Human capital, shared expertise, and the likelihood of impasse in corporate acquisitions', *Journal of Management*, 28, 107- 128

Covin, JG. and Slevin, DP. (1986), The development and testing of an organizational-level entrepreneurship scale. In R. Ronsradt, J.A. Hornaday, R. Peterson, and K.H. Vesper, eds., Frontiers of Entrepreneurship Research, 1985. Wellesley, MA: Babson College, 628- 639

Covin, JG. and Slevin, DP. (1989), 'Strategic management of small firms in hostile and benign environments', *Strategic Management Journal* 10(1), 75- 87

Davis, KS. (1999), 'Decision criteria in the evaluation of potential intrapreneurs', *Journal of Engineering & Technology Management*, 295- 327

Dess, GG. and Beard, DW. (1984), 'Dimensions of organizational task environments', *Administrative Science Quarterly* 29, 52- 73

Dixit, AK. and Pindyck, RS. (1994), Investment under uncertainty, Princeton, NJ, Princeton University Press

Dyer, JH. and Singh, H. (1998), 'The relational view: Cooperative strategy and sources of interorganizational competitive advantage', *Academy of Management Review*, 24, 650- 679

Floyd, SW. and Wooldridge, B. (1999), 'Knowledge creation and social networks in corporate entrepreneurship: The renewal of organizational capability', *Entrepreneurship Theory and Practice*, 23(3), 123- 143

Ghoshal, S. and Bartlett, CA. (1994), 'Linking organizational context and managerial action: The dimensions of quality of management', *Strategic Management Journal*, 15(Summer Special Issue), 91- 112

Grant, RM. (1996), 'Toward a knowledge-based theory of the firm', *Strategic Management Journal*, 17(Special Issue), 109- 122

Gulati, R. (1995), 'Social structure and alliance formation patterns: A longitudinal analysis', *Administrative Science Quarterly*, 40, 619- 652

Hambrick, DC. (1981), 'Strategic awareness within top management teams', *Strategic Management Journal* 2, 263- 279

Hansen, G. and Wernerfelt, B. (1990), 'Determinants of firm performance: the relative importance of economic and organizational factors', *Strategic Management Journal* 10, 399- 411

Hitt, MA. And Ireland, RD. (2002), 'The essence of strategic leadership: Managing human and social capital', *Journal of Leadership and Organizational Studies*, 9(1), 3- 14

Honig, B. (2001), 'Learning strategies and resources for entrepreneurs and intrapreneurs', *Entrepreneurship Theory and Practice*, 26(1), 21- 35

Istocescu, A. (2006), Intreprenoriat şi intraprenoriat în România, ASE Publishing House

Jennings, DF. and Lumpkin, JR. (1989), 'Functionally modeling corporate entrepreneurship: an empirical integrative analysis', *Journal of Management* 15, 485- 502

Jennings, DF. and Seaman, SL. (1990), 'Aggressiveness of response to new business opportunities following deregulation: an empirical study of established financial firms', *Journal of Business Venturing* 5, 177- 189

Jones, GR. And Butler, JE. (1992), 'Managing internal corporate entrepreneurship: An agency theory perspective', *Journal of Management*, 18, 733- 749

Kazanjian, RK., Drazin, R. and Glynn, MA. (2001), Implementing strategies for corporate entrepreneurship: A knowledge-based perspective, In M. A. Hitt, R. D. Ireland, S. M. Camp, & D.

Kuratko, DF., Ireland, RD. and Hornsby, JS. (2001), 'Improving firm performance through entrepreneurial actions: Acordia's corporate entrepreneurship strategy', *Academy of Management Executive*, 15(4), 60- 71

Leana, CR. and Van Buren, HJ., III. (1998), 'Organizational social capital and employment practices', *Academy of Management Journal*, 42, 538- 555

Lehn, K. and Makhija, AK. (1996), 'EVA & MVA as performance measures and signals for strategic change', *Strategy & Leadership*, May/June, 34- 38

Lengnick-Hall, CA. (1992), 'Innovation and competitive advantage: what we know and what we need to learn', *Journal of Management* 18(2), 399-429

Levesque, M. and Minniti, M. (2006), 'The effect of aging on entrepreneurial behaviour', *Journal of Business Venturing*, 21(2), 177- 194

Lieberman, MB. and Montgomery, DB. (1988), 'First mover advantages', *Strategic Management Journal* 9, 41-58

Lumpkin, GT. and Dess, GG. (1996), 'Clarifying the entrepreneurial orientation construct and linking it to performance', *Academy of Management Review*, 21, 135- 172

Merrifield, DB. (1993), 'Intrapreneurial corporate renewal', *Journal of Business Venturing*, 383- 389
Miller, D. (1983),' The correlates of entrepreneurship in three types of firms', *Management Science* 29, 770- 791

Molina, C. and Callahan, JL. (2009), 'Fostering organizational performance. The role of learning and intrapreneurship', *Journal of European Industrial Training*, 33(5), 388- 400

Morris, MH. (1998), Entrepreneurial intensity. Westport, CT, Quorum Books
Morris, M., Davis, L. and Ewing, J. (1988), 'The role of entrepreneurship and marketing in established firms', *Industrial Marketing Management* 17, 337- 346

Pinchot, G.(1985), Intrapreneuring. New York, Harper & Row

Popa, I., Dobrin, C., Ceptureanu, S. and Ceptureanu, E.(2009), 'The Positive Impact on SMEs Activity of Romania's Integration in the European Union', IACSIT-SC 2009- Spring Conference, ISBN: 978-0-7695-3521-0, Singapore, 340- 344

Radu, AM., Orzan, M., Ceptureanu, SI. and Stoica, I. (2017), 'User Satisfaction Regarding Healthcare Education Services Financed Through the European Social Fund', *Economic Computation And Economic Cybernetics Studies And Research*, 51(1), 89- 102

Sharma, P. and Chrisman, JJ. (1999), 'Toward a reconciliation of the definitional issues in the field of corporate entrepreneurship', *Entrepreneurship Theory and Practice*, 23(3), 11- 27

Shenkar, O. and Zeira, Y. (1992), 'Role conflict and role ambiguity of chief executive officers in international joint ventures', *Journal of International Business*, 23, 55- 75

Zahra, SA. and Covin, JG. (1995), 'Contextual influences on the corporate entrepreneurship–performance relationship: A longitudinal analysis', *Journal of Business Venturing*, 10, 43- 58

Zahra, SA. and Garvis, D. (2000), 'International corporate entrepreneurship and company performance: The moderating effect of international environmental hostility', *Journal of Business Venturing*, 15, 469-492

Zahra, SA. and George, G. (2002), International entrepreneurship: The current status of the field and future research agenda, In M. A. Hitt, R. D. Ireland, S. M. Camp, & D. L. Sexton (Eds.), Strategic entrepreneurship: Creating a new mindset, 255–288. Oxford, UK: Blackwell

Models of Corporate Entrepreneurship

Eduard- Gabriel Ceptureanu, The Bucharest University of Economic Studies, Bucharest, Romania,
eduard.ceptureanu@man.ase.ro

Abstract

Our knowledge of corporate entrepreneurship continues to expand. However, this knowledge remains quite fragmented and non-cumulative. Herein, we try to develop theory by presenting concepts regarding corporate entrepreneurship factors and models. We discuss how these models contribute to the corporate entrepreneurship literature and distinguish between models, and identify challenges future corporate entrepreneurship research should address.

Keywords: entrepreneurship, corporate entrepreneurship, models

Introduction

The concept of corporate entrepreneurship, consisting of intra-corporate and entrepreneurship arose due to Gifford Pinchot and Elizabeth S. Pinchot, when they were studying at the "School of Entrepreneurs" in New York ("I will call this class of entrepreneurs intra-corporate, intrapreneurs", Elizabeth S. Pinchot).

After Pinchot (1985), there were other authors who have expressed their opinion on this concept, so that the variety of scientists' opinions as well as the complexity of this concept led us to study in detail the importance of corporate entrepreneurship for the economy.

The global economy undoubtedly creates profound and significant changes for organizations around the world, so that the role that the entrepreneur plays in each country's economic growth should not be ignored. Technological progress leads to continuous development of existing businesses and at the same time generates new businesses, constituting a decisive factor in acquiring new knowledge and thus in increasing productivity.

Entrepreneurship continues to thrive in nearly every corner of the world so that globally, one person from eleven decides to start a business. Entrepreneurs are reshaping the business environment, creating a world in which their companies play an important role in the vitality of the global economy. Their businesses have introduced innovative products and services, have removed technological barriers, have created new jobs, have opened the doors to foreign markets and have offered to the founders the freedom to do what they love most.

Defining the concept

Despite the increased interest in the concept of corporate entrepreneurship, academics have not reached a consensus on this concept. Scientists use terms like corporate entrepreneurship (Kuratko *et al.*, 1990), internal organizational entrepreneurship (Schollhammer, 1982; Sharma, 1999), corporate societies (Birkinshaw, 1999; Floyd and Lane, 2000), and new businesses (Myers, 1977; Cheney *et al.*, 1991) to refer to different aspects of organizational entrepreneurship.

Some researchers believe that corporate entrepreneurship is a concept that should be limited to creating new businesses within an existing organization (Floyd & Wooldridge, 1999; Ceptureanu E.G. *et al*. 2017). But others argue that the corporate entrepreneurship should include the fight for renewal, which is carried by big firms, through new methods of combining the resources it holds (Chung & Gibbons, 1997; Hitt & Ireland, 2000).

Sharma & Chrisman (1999) considers organizational entrepreneurship as a process by which firms commit to diversification through internal development. Such diversification requires new combinations of resources for expanding business activities in areas not related to the current field of competence.

Zahra *et al.(*1999) presents corporate affairs as marketing of a product or service that the parent company did not previously commercialize and requiring the use of new equipment, people and knowledge. Although both definitions describe the process of corporate entrepreneurship, the authors use different terms to describe it. On the other hand, Lumpkin & Dess (1996) considers corporate entrepreneurship as the term used to describe entrepreneurial behaviour in an existing large organization.

Corporate Entrepreneurship Factors

Corporate entrepreneurship has been a research subject for a period longer than two decades. Research in the renewal fields of the company, innovation, risk taking and creating of new businesses fall under the umbrella of the spirit of corporate entrepreneurship (Birkinshaw & Hood, 1998; Lumpkin & Dess, 2001; Ceptureanu *et al.*, 2016). Interest in this topic has increasingly grown because companies have to deal with a turbulent and competitive environment. Due to this complex and turbulent business environment, managers have been in constant search of new ways of managing the company. This has fuelled corporate entrepreneurship studies on the subject (Zahra *et al*., 2000; Popa *et al*., 2009). The studies in this field focused mainly on organizational factors that influence the spirit of corporate entrepreneurship, such as freedom, organizational limits and support from management (Nadler & Tushman, 1989; Shenkar & Zeira, 1992).

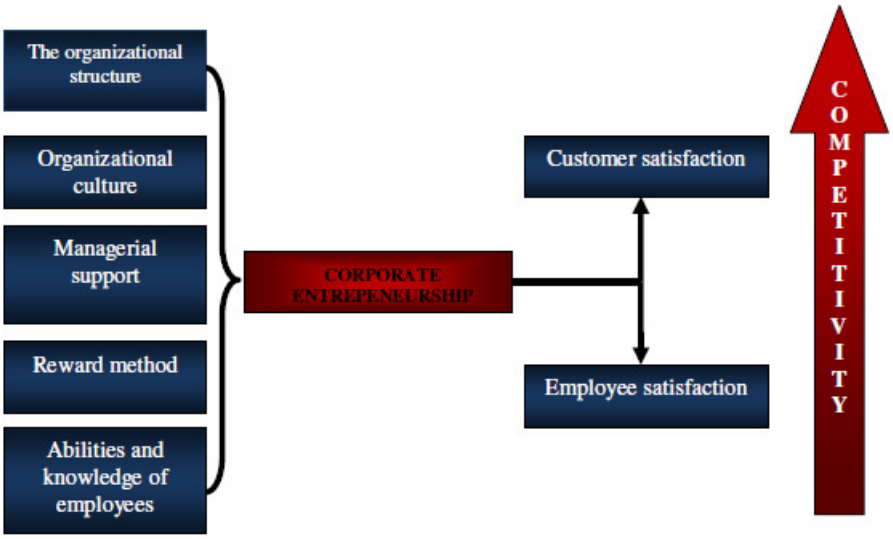


Fig. 1: Premises and the corporate entrepreneurship result

Corporate entrepreneurship has the potential to renew the existing firms (Covin & Miles, 1999; Kuratko *et al*., 1990; Pinchot, 1985). This process of renewal occurs through innovative activities that offers the company access to skills, capacities and new resources (Ceptureanu et al., 2017). In this case, innovation consists of the creation, development and implementation of ideas and a new behaviour.

Previous studies in corporate entrepreneurship have focused on several key organization areas that influence the intrapreneurial spirit. First, the level of decentralization in an organization impacts on corporate entrepreneurship (Geletkanycz & Hambrick, 1997; Pinchot, 1985). Researchers generally agree that a decentralized organization has the power to use effective intrapreneurial behaviour, while in a centralized organization employees are not given the freedom to behave like entrepreneurs.

Fierce competition between employees tends to block the implementation of new ideas that arise. This competition can also prevent employees to help colleagues who come up with new ideas, due to the envy on their future success.

Cooperation between departments of a company is an essential element when new and innovative products need to be developed. Quite often, the lack of communication leads to delayed development of new products. In order not to reach to this problem and the new product development to arise as naturally as possible, the company's departments must work in a climate of cooperation.

Also, the freedom of intrapreneurs to act is extremely essential. The intrapreneur should be responsible for his ideas and be able to develop and implement them in the organization (Pinchot, 1985). Therefore, a firm with too many rules and regulations have a negative effect on corporate entrepeneurship.

As it can be seen from literature, corporate entrepreneurship is characterized by a set of organizational attitudes and behaviors (Covin and Miles, 1999). Intrapreneurial organizations demonstrate skills such as recognizing of opportunities, organizational flexibility and the ability to measure, encourage and reward innovative behavior (Zahra *et al*., 2000).

Several researchers have tried to understand the factors that stimulate or affect corporate entrepreneurship so that during investigations, they have identified a number of organizational and external factors (Guth and Ginsberg, 1990; Kuratko *et al*., 1990).

Reviewing the literature on the concept of corporate entrepreneurship, we noticed that a group of researchers have highlighted the importance that the organizational factors have on corporate entrepeneurship. Based on previous research, variables such as support from management and its behavior (vision, commitment), organizational culture, structure and mode of action may affect corporate entrepreneurship (Hitt & Ireland, 2000).

Corporate entrepeneurship is seen as a strategy for economic growth and an effective way to gain competitive advantage (Pinchot, 1985). Kuratko *et al.* (1990) defines corporate entrepreneurship as a process of organizational renewal. Zahra *et al*., (2000) states that corporate entrepreneurship includes activities designed to create new businesses in existing firms through innovations of products and processes.

Intrapreneur is according to Pinchot (1985) the key actor in corporate entrepreneurship. The intrapreneur is the one who recognizes an opportunity, seeks and exploits it and hopes that the exploitation of new opportunities in a way, that deviates from previous practice, will be successful and will help to achieve the organization's objectives.

The individual decision to act intrapreneurially is based on organizational and individual experiences, when an event pushing a person to behave intrapreneurially (Zahra *et al*., 2000). The external

environment (technological opportunities, industry growth, competitiveness etc.), is also considered an important determinant of corporate entrepreneurship (Zahra *et al*., 2000).

As organizations become more complex and competitive, they embrace increasingly more corporate entrepeneurship in order to remain profitable (Zahra *et al*., 2000), to reinvent themselves from a strategic point of view (Guth and Ginsberg, 1990), to develop their innovative spirit and acquire knowledge to achieve future revenue flows.

Researches in the field of corporate entrepreneurship indicate that mainly individual, organizational environmental factors influence the entrepreneurial behavior within an organization (Covin and Slevin, 1991):

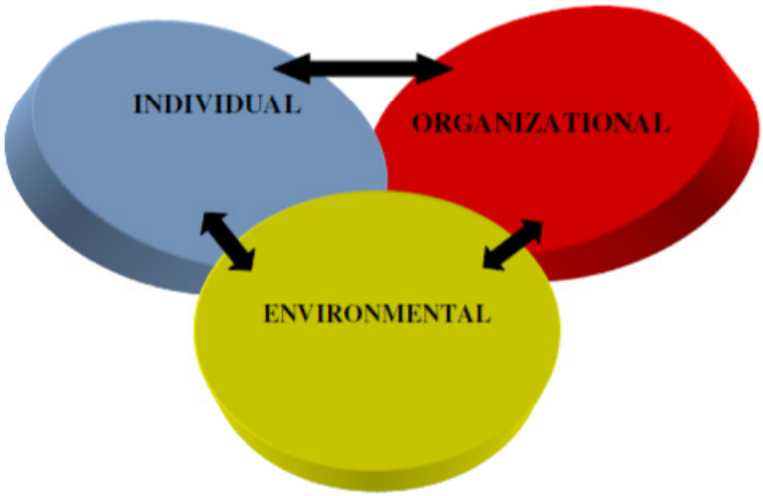


Fig. 2: The relationship between the individual, the organizational and environmental factors

- The tendency to act intrapreneurially is a function of motivation (Shenkar & Zeira., 1992) which in turn is a function of the individual's innate personality (Birkinshaw, 1999; Ireland *et al*., 2001; Ceptureanu SI *et al*., 2017). The individual levels focus on the individual characteristics of the intrapreneur (Kuratko *et al*., 1990). The recognition and support of intrapreneurs is also within this area of interest. Some research in this area emphasizes the vital role of managers in creating an environment that encourages innovation and entrepreneurial spirit (Kuratko *et al*., 2001; Ceptureanu *et al*., 2017). Intrapreneurs are seen as people who take responsibility for innovation within the firm (Pinchot, 1985).
- Different authors believe that entrepreneurial activity is a function that relates to the organizational framework (Birkinshaw, 1999; Morris, 1998). Birkinshaw (1999) defines the organizational framework as a set of administrative and social arrangements that shape the behaviour of individuals within the organization on whom top management has influence. The essence of the definition of Birkinshaw (1999) is that entrepreneurial initiative, as any behavioral trait is a function of the environment in which it is conducted, and that, in an organization many of the key factors of intrapreneurial success are under the influence and direct and indirect control of top management. Thus, corporate entrepeneurship is influenced by the characteristics and organizational values (Kuratko *et al*., 2001). A particular importance is granted to the intrapreneurial strategy and to its influence on the company (Kuratko *et al.*, 2001). Moreover, entrepreneurial strategy can be regarded as a potential source of competitive advantage for the company, being the way in which existing firms can develop skills essential for their success.

- Environmental factors refer to the argument brought by Birkinshaw (1999) that the behavior of employees in an organization is shaped not only by the administrative factor. Covin and Slevin (1991) saw the external environment as a determinant of entrepreneurial activity, both at the individual and organizational level. Researchers who are trying to build a model to explain corporate entrepeneurship and predict its results, are taking into account, in addition to a set of internal variables, also the external variables related to the environment. (Sharma & Chrisman., 1999). Kuratko et al. (2001) considers that in order to support the concept of corporate entrepreneurship there must be considered the following factors: reward, managerial support, resources, including availability towards time, organizational structure and risk acceptance.

Using **rewards** as a motivating factor is very common in the literature (Chung& Gibbons, 1997; Covin& Miles, 1999; Ceptureanu *et al.,* 2012). To be effective, a system of rewards that promote corporate entrepeneurship must take into account the objectives, individuality and performance-based rewards. Using an appropriate reward system can increase a person's willingness to take entrepreneurial risks associated with the company.

Managerial support, the desire of management to facilitate or promote entrepreneurial initiatives is also included in the literature (Ireland et al., 2001; Guth & Ginsberg., 1990; Ceptureanu *et al*., 2017). Managerial support can take many forms, including encouraging innovative ideas and institutionalizing entrepreneurship within the company.

Availability of resources and time is the third prerequisite for promoting corporate entrepeneurship. Employees must perceive the availability of resources for innovative activities (McGrath, 1999). Weak resources encourages experimentation and risk taking (Hitt *et al*., 1999).

The fourth condition is the **organizational structure** (Grenadier & Weiss, 1997). An organizational structure supporting corporate entrepreneurship provides certain administrative mechanisms that allow ideas to be evaluated, selected and implemented (Zahra & Covin, 1995; Radu *et al*., 2017).

Risk-taking is the final condition that occurs constantly as a necessary support for corporate entrepeneurship. Employees and managers must be willing to take the risk and have a tolerance for failure (Ghoshal & Moran, 1996).

Models of Corporate Entrepreneurship

As we could observe during the study of the concept of corporate entrepreneurship, we could figure out that many of the theories on this concept are rooted in the study of the concept of entrepreneurship (Oviatt & McDougall, 1999). Contemporary theories on entrepreneurial behaviour highlight the interaction between an individual's personality and environment (Morris, 1998). These theories include models of different authors whose fundamental idea underlies many subsequent publications. Among the most important models, we state: Guth and Ginsberg's model, Covin and Slevin's model, Zahra's model, Lupkin and Dess' model, which are presented below.

Guth and Ginsberg's model

Guth and Ginsberg (1990) developed a model based on the idea that they had done on the concept of corporate entrepreneurship. These authors consider corporate entrepreneurship as a combination of two phenomena:

- developing new business within an existing organization, or
- converting an existing organization through renewal.

Those authors substantiated their idea on corporate entrepreneurship through a model where the influential factors and their consequences are interconnected with corporate entrepreneurship. In their model, Guth and Ginsberg (1990) argue that: the environment, strategic leadership, organizational form / behaviour and organizational performance influence the intrapreneurial spirit and the latter in turn influence the company's performance.

- The environment influences corporate entrepreneurship. In this regard, Guth and Ginsberg (1990) related to the following:
  (a) the impact of major environmental changes - such as deregulation - can influence changes in business strategy;
  (b) the more dynamic and hostile the environment is, the more intrapreneurial the firms will be;
  (c) industry structure affects the opportunities to develop successful new products.

Clearly, changes in industry structure and the underlying technologies affect corporate entrepreneurship. Opportunities for new products and services result from development of new technologies and /or commercialization of technologies developed by others. In an industry that is trying to find new combinations of resources aimed at a competitive advantage, the potential of the company and of its competitors create both opportunities and problems.

- Strategic Leadership influence corporate entrepreneurship. Guth and Ginsberg (1990) included the following factors: (a) the management style of top managers affects the performance of new businesses; (b) the effectiveness of middle management in building coalitions among colleagues and senior managers to support their entrepreneurial ideas affect the degree of success in their implementation; (c) banks that are more innovative are managed by teams with deeper and higher education and which have some diversity on their areas of functional expertise. Many believe that entrepreneurial behaviour within an organization depends on the characteristics, values/beliefs, visions of the strategic leader.
- Type of organization/behaviour influence corporate entrepreneurship: Guth and Ginsberg (1990) refer here to two factors: (a) companies pursuing growth strategies through acquisitive procedures have lower levels of intensity in terms of research and development than companies pursuing internal growth strategies through innovation; (b) creating new business units within the firm does not affect the sales of new products. Many researchers in this field have observed a relationship between business strategy and innovative spirit.
- Organizational performance influences corporate entrepreneurship. In this category, Guth and Ginsberg (1990) included: (a) successful companies bring more frequent and radical innovations in terms of product or process than those who are not successful; (b) firms that are experiencing a decline in performance tend to develop new practices and change the strategic directions only after this prolonged decline led to the change of top management. Innovation and radical change can be triggered when firms have excess of resources that allow them to capitalize on the opportunities that arise.
- Corporate entrepreneurship influences the firm’s performance: Guth and Ginsberg (1990) considered three factors in this category: (a) the introduction of new products affects performance; (b) independent start-ups get to breakeven two times faster and end up twice more profitable than corporate start-ups; (C) early market entry does not affect the performance.



Fig. 3: Guth and Ginsberg's model on corporate entrepreneurship

Although the model of Guth and Ginsberg (1990) is meant to be generic, its drawback is its lack of mutual recognition between the component factors, except of the organization's performance. There is an unjustified presumption that environmental factors, strategic leadership and organizational culture influence corporate entrepreneurship, but without taking into account the influence that the latter has on them.

However, the model of Guth and Ginsberg (1990) is the starting point for many models which study the subject of corporate entrepreneurship, among the most important we recall the model of Covin and Slevin (1991) and the model of Zahra (2002), which are presented below.

Covin and Slevin's model

Covin and Slevin (1991) developed an integrative model that attempts to explain the association between entrepreneurial company and the environment, the strategy which it adopts, internal factors and organizational performance. According to them, corporate entrepreneurship involves increasing competitiveness and expanding opportunities generated through the combination of new resources within the firm.

Their model shows a less generic image on corporate entrepreneurship and focuses on behaviour at the firm level. The model seeks to improve the model of Guth and Ginsberg (1990) in at least two aspects:

- interpretation of the feedback loop between the intrapreneurial factors and corporate entrepreneurship;
- avoid clearly specifying the type of corporate entrepreneurship

Advantages of the model are:

- consider corporate entrepreneurship as behaviour of a firm;
- their model contains the company's success as the last dependent variable;
- external variables such as environmental factors are also included in the model;
- finally they take into account the direct and moderate effects within the model.

Key factors underlying this model are the external environment, strategy and internal factors. According to this model, the entrepreneurial orientation influences in a weaker manner the external environment, strategy and internal factors, but is closely related to firm performance. The three key factors have according to the model a moderate effect on the relationship between performance and entrepreneurial orientation.

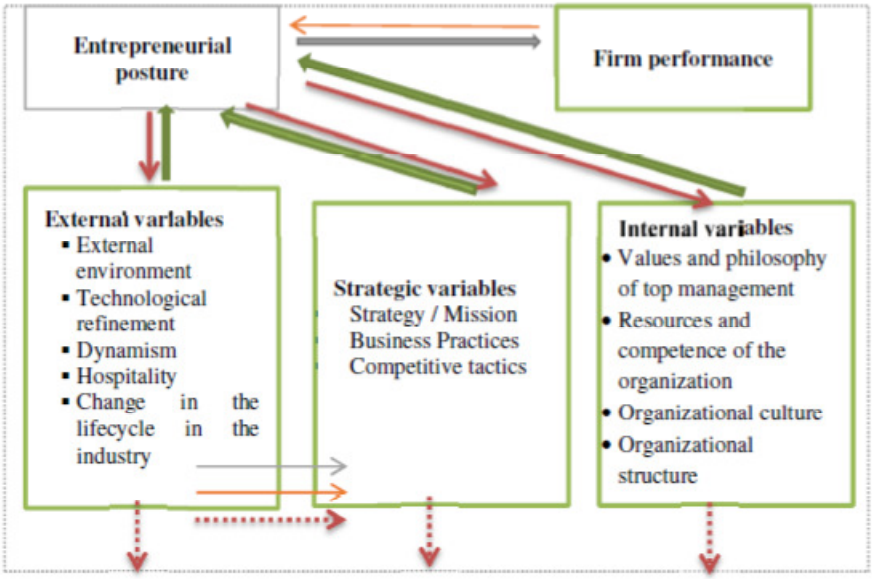


Fig. 4: Covin and Slevin's model on corporate entrepreneurship

Neither this model has got away with criticism. Zahra (2000) criticizes Covin and Slevin's model on the basis that they do not take into account the possibility that various entrepreneurial positions unevenly influence the various dimensions of performance and can even in different times.

Zahra's Model

Zahra (2002) presents a more compact model. He removes the technological complexity as a separate factor, including it in the dynamism of the environment.

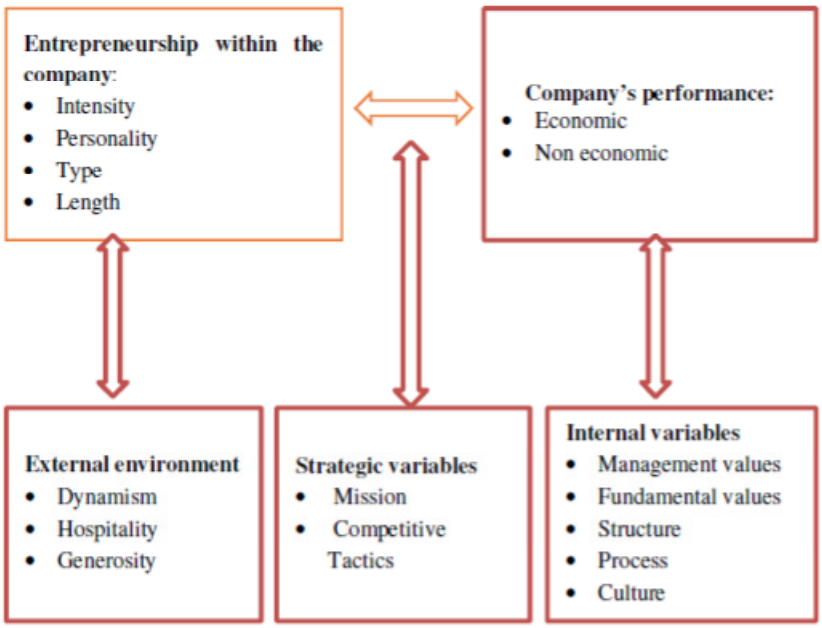


Fig. 5: The Zahra's model on corporate entrepreneurship

This author recommends using a concept encompassing aspects of the life cycle of the industry. In defining the entrepreneurial behaviour, Zahra (2002) emphasizes the need to consider entrepreneurial activities that are occurring domestically and internationally. Finally, Zahra (2002) argues that managerial values, organizational structure, management process and organizational culture should be considered in developing models on corporate entrepreneurship.

Lumpkin and Dess's Model

The authors describe the entrepreneurial orientation in terms of five dimensions: autonomy, innovation, risk taking, proactivity and aggressive competitiveness. According to Lumpkin & Dess (2001), entrepreneurial orientation refers to the processes, practices and decision-making activities designed to help a new entry on the market. The authors state that a new market entry is done by entering the market with new products and services. In this context, a new market entry is the idea behind this concept.

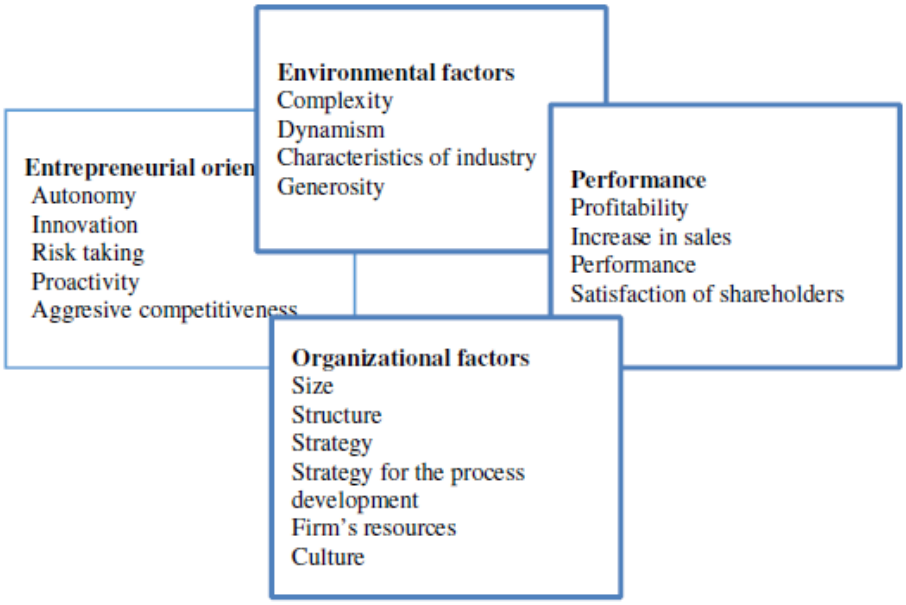


Fig. 6: Lumpkin and Dess Model

Lumpkin & Dess's model (2001) differs from the model of Covin and Slevin (1991), because it indicates that both environmental factors and organizational ones influence the relationship between entrepreneurial orientation and firm performance. The model does not provide whether the company's performance influences the entrepreneurial orientation.

Conclusions

We believe that our paper contributes to the growing literature on corporate entrepreneurship in several ways. First, it brings specificity to the concept of corporate entrepreneurship literature, a concept that is inconsistently depicted, ambiguously described, and quite often, simply undefined in the academic literature (Ceptureanu EG *et al*., 2017).

Second, our depiction of corporate entrepreneurship has two important implications for corporate entrepreneurship research and practice. Thus, the paper implies that fit between different pairs and collectively among all of the elements of a corporate entrepreneurship is a prerequisite to success. In this sense, the elements of entrepreneurial vision, pro-entrepreneurship organizational architecture, and entrepreneurial processes and behavior represent the core *work* associated with use of corporate entrepreneurship.

Also, greater understanding of corporate entrepreneurship will emerge as scholars complete empirical studies examining the phenomenon. The propositions associated with our article are possible sources for empirical studies. Effectively dealing with the sample and measurement challenges inherent to this topic will be critical to obtaining valid insights from empirical work.

To conclude, this paper offers a comprehensive analysis that depicts the "workings" of corporate entrepreneurship on international literature.

References

Birkinshaw, J. (1999) 'The determinants and consequences of subsidiary initiative in multinational corporations', *Entrepreneurship Theory and Practice*, 24(1), 9- 36

Birkinshaw, J and Hood, N. (1998), 'Multinational subsidiary evolution: Capability and charter change in foreign-owned subsidiary companies', *Academy of Management Review*, 23, 773- 795

Ceptureanu SI., Ceptureanu, EG., Tudorache, A. and Zgubea F. (2012), 'Knowledge Based Economy Assessment in Romania', *Economia Seria Management*, 15(1), 70- 87

Ceptureanu, EG., Ceptureanu, SI., Luchian, CE. and Luchian, I. (2017), 'Quality management in project management consulting. A case study in an international consulting company', *Amfiteatru Economic*, 19(44), 215- 230

Ceptureanu, EG., Ceptureanu, SI. and Popescu, D. (2017), 'Relationship between Entropy, Corporate Entrepreneurship and Organizational Capabilities in Romanian Medium Sized Enterprises', *Entropy*, 19(8), 412

Ceptureanu, SI., Ceptureanu, EG., Orzan, MC and Marin, I. (2017), 'Toward a Romanian NPOs Sustainability Model: determinants of sustainability', *Sustainability*, 9(6), 966

Ceptureanu, SI., Ceptureanu, EG., Simion-Melinte, C and Borisov, D. (2016), 'Capabilities of SMEs in Romanian Clothing Industry', *Industria Textila*, 67(4), 265- 269

Ceptureanu, SI., Ceptureanu, EG and Visileanu, E. (2017), 'Comparative analysis of small and medium enterprises organizational performance in clothing industry', *Industria Textila*, 68(2), 156- 162

Ceptureanu, SI., Ceptureanu, EG and Marin, I. (2017), 'Assessing role of strategic choice on organizational performance by Jacquemin- Berry entropy index', *Entropy*, 19(9), 448

Ceptureanu, EG., Ceptureanu, SI., Orzan, MC., Bordean, ON and Radulescu, V. (2017), 'Empirical Study on Sustainable Opportunities Recognition. A Polyvinyl Chloride (PVC) Joinery Industry Analysis Using Augumented Sustainable Development Model', *Sustainability*, 9(10), 1779

Cheney, PK., Devinney, T. and Wirier, RS. (1991), 'The impact of new product introductions on the market value of firms', *Journal of Business*, 64(4), 573- 610

Chung, LH and Gibbons, PT. (1997), 'Corporate entrepreneurship: The roles of ideology and social capital', *Group and Organization Management*, 22, 10- 30

Covin, G. and Slevin, DP. (1991), 'A conceptual model of entrepreneurship as firm behaviour', *Entrepreneurship Theory and Practice*, 16, 7-25

Covin, JG and Miles, MP. (1999), 'Corporate entrepreneurship and the pursuit of competitive advantage', *Entrepreneurship Theory and Practice*, 23(3), 47- 63

Floyd, SW and Lane, PJ. (2000), 'Strategizing throughout the organization: Managing strategic renewal and strategic role conflict', *Academy of Management Review*, 25, 154- 177

Floyd, SW and Wooldridge, B. (1999), 'Knowledge creation and social networks in corporate entrepreneurship: The renewal of organizational capability', *Entrepreneurship Theory and Practice*, 23(3), 123- 143

Geletkanycz, MA and Hambrick, DC. (1997), 'The external ties of top executives: Implications for strategic choice and performance'. *Administrative Science Quarterly*, 42, 654- 681.

Ghoshal, S and Moran, P. (1996), 'Bad for practice: A critique of the transaction cost theory', *Academy of Management Review*, 21, 13- 47

Grenadier, SR and Weiss, AM. (1997), 'Investments in technological innovations: An option pricing approach', *Journal of Financial Economics*, 44, 397- 416

Guth, W and Ginsberg, A. (1990), 'Guest editor's introduction: corporate entrepreneurship', *Strategic Management Journal*, 11 (special issue), 5-16

Hitt, MA and Ireland, RD. (2000), The intersection of entrepreneurship and strategic management research. In D. L. Sexton & H. Landstrom (Eds.), Handbook of entrepreneurship, 45- 63, Oxford, UK: Blackwell

Hitt, MA., Nixon, RD., Hoskisson, RE. and Kochhar, R. (1999), 'Corporate entrepreneurship and cross-functional fertilization: Activation, process and disintegration of new product design team', *Entrepreneurship Theory and Practice*, 23(3), 145- 167

Ireland, RD., Hitt, MA., Camp, SM. and Sexton, DL. (2001), 'Integrating entrepreneurship and strategic management action to create firm wealth', *Academy of Management Executive*, 15(1), 49- 63

Kuratko, DF., Ireland, RD. and Hornsby, JS. (2001), 'Improving firm performance through entrepreneurial actions: Acordia's corporate entrepreneurship strategy', *Academy of Management Executive*, 15(4), 60- 71

Kuratko, DF., Montagno, RV. and Hornsby, JS. (1990), 'Developing an Intrapreneurial Assessment Instrument for an Effective Corporate Entrepreneurial Environment', *Strategic Management Journal*, 11, Special Issue: Corporate Entrepreneurship, 49- 58

Lumpkin, GT. and Dess, GG. (1996), 'Clarifying the entrepreneurial orientation construct and linking it to performance'. *Academy of Management Review*, 21, 135- 172

Lumpkin, GT. and Dess, GG. (2001), 'Linking two dimensions of entrepreneurial orientation to firm performance: the moderating role environment and industry life cycle', *Journal of Business Venturing*, 16.

McGrath, RG. (1999), 'Falling forward: Real options reasoning and entrepreneurial failure', *Academy of Management Review*, 24, 13- 30

Morris, MH. (1998), Entrepreneurial intensity, Westport, CT: Quorum Books

Myers, SC (1977) 'Determinants of corporate borrowing', *Journal of Financial Economics*, 5(2), 147-175

Nadler, DA. and Tushman, ML. (1989), 'Beyond the charismatic leader: Leadership and organizational change', *California Management Review*, 32(2), 77- 97

Oviatt, B. and McDougall, P. (1999), A framework for understanding accelerated international entrepreneurship. In R. Wright (Ed.), International entrepreneurship: Globalization of emerging businesses. Research in Global Strategic Management, Stamford, CT, JAI Press

Pinchot, G (1985), Intrapreneuring, New York: Harper & Row

Popa, I., Dobrin, C., Ceptureanu, S. and Ceptureanu, E.(2009), 'The Positive Impact on SMEs Activity of Romania's Integration in the European Union', IACSIT-SC 2009- Spring Conference, ISBN: 978-0-7695-3521-0, Singapore, 340- 344

Radu, AM., Orzan, M., Ceptureanu, SI. and Stoica, I. (2017), 'User Satisfaction Regarding Healthcare Education Services Financed Through the European Social Fund', *Economic Computation And Economic Cybernetics Studies And Research*, 51(1), 89- 102

Schollhammer, H. (1982), Internal corporate entrepreneurship. In C.A. Kent, D.L. Sexton, and K.H. Vesper, eds., Encyclopedia of Entrepreneurship, Englewood Cliffs, NJ, Prentice Hall

Sharma, A. (1999), 'Central dilemmas of managing innovation in large firms', *California Management Review*, 41(3), 146- 164

Sharma, P. and Chrisman, JJ. (1999), 'Toward a reconciliation of the definitional issues in the field of corporate entrepreneurship', *Entrepreneurship Theory and Practice*, 23(3), 11- 27

Shenkar, O. and Zeira, Y. (1992), 'Role conflict and role ambiguity of chief executive officers in international joint ventures', *Journal of International Business*, 23, 55- 75

Zahra, SA. and Covin, JG. (1995), 'Contextual influences on the corporate entrepreneurship- performance relationship: A longitudinal analysis', *Journal of Business Venturing*, 10, 43- 58

Zahra, SA. and Nielsen, AP. (2002), 'Sources of capabilities, integration and technology commercialization', *Strategic Management Journal*, 23, 377- 398

Zahra, SA., Ireland, RD. and Hitt, MA. (2000), 'International expansion by new venture firms: International diversity, mode of market entry, technological learning and performance', *Academy of Management Journal*, 43, 925- 950

Zahra, SA., Neubaum, DO. and Huse, M. (2000), 'Entrepreneurship in medium-size companies: Exploring the effects of ownership and governance systems', *Journal of Management*, 26, 947-976

Zahra, SA., Nielsen, AP. and Bogner, WC. (1999), 'Corporate entrepreneurship, knowledge, and competence development', *Entrepreneurship Theory and Practice*, 23(3), 169-189

Zahra, SA. and George, G. (2002), 'Absorptive capacity: a review, reconceptualization, and extension', *Academy of Management Review*, 27

A Model of Motivational Factors Influence On the Motivation Degree

Diana-Cezara Toader, Bucharest University of Economic,Romania,diana_toader@gmail.com

Grațiela Dana Boca, Technical University of Cluj Napoca, Romania, bocagratiela@yahoo.com

Cezar Toader, Technical University of Cluj Napoca,, Romania, cezartoader@cunbm.utcluj.ro

Diana Ighian, Technical University of Cluj Napoca, Romania, dianaighian@yahoo.com

Rita Toader, Technical University of Cluj Napoca,, Romania, cezartoader@cunbm.utcluj.ro

Abstract

In this paper we presented a model of the influence of motivational factors on the degree of motivation. The theme chosen for this papers is a highly topical issue at the moment because managers are increasingly concerned about employees' motivation. The paper contains the case study regarding the research conducted in 100 companies from Maramureș County in order to analyze the motivational factors and their influence on the degree of staff motivation. We have analyzed the motivational factors and their influence on the degree of motivation also we presented data processing and analysis comprising the analysis of the internal consistency of the questionnaire, the analysis of correlations between motivational factors.

Keywords: Analysis, factors, model, motivational, influence, degree, correlations

Introduction

Motivation, in a narrow sense, based on a classic vision regarding management and organization, takes into consideration only the employees of the organization.
Motivation in a narrow sense consists in developing a link between the needs, aspirations and interests of personnel with the fulfillment of goals and exercising the tasks, competencies and responsibilities assigned to them.

Motivation, in a broad sense**,** emphasizes a modern vision regarding management and organization, consisting in all decisions and activities which determine the stakeholders to directly and indirectly contribute to the achievement of functionalities and an increased performance, by correlating their interests in the approach and achievement of organizational objectives (Nicolescu, 2008, p.291).
Lefter et al. (2008, p.171) focus on two meanings of the concept of motivation:

- from the economic point of view, motivation represents the assembly of factors that determine the behavior of an economic agent;
- from the psychological point of view, motivation represents the action of conscious or unconscious forces that determine the behavior of the individual.

Motivation in the work context can be defined as the availability degree of the employee to get involved and to constantly put effort in order to achieve professional objectives, as they are defined at individual or organizational level (Constantin, 2004, p.170).

According to Pivovarov (2011, p.549), motivation of personnel represents one of the cornerstones that ensures the stability of the business as well as its efficiency.

According to Baldwin et al. (2014, p.829), motivation is the driving force that energizes, encourages and changes the behavior of employees in order to persist in pursuing their goals, leading to the fulfillment of their needs as well as to an improvement in the performance of the organization. Also, the efficiency of personnel is enhanced and they manifest positive feelings regarding the organization.

The main problem faced by the current economic environment is motivation.

The success of any company depends on the decisive extent of the performance of its employees. Thus, managers must develop creative methods to focus their attention in a productive way.

For Lage Monteiro de Castro et al. (2016, p.1140), motivation is considered beneficial for the organization, as it triggers human resources to act upon their work objectives, leading to the fulfillment of the organizational goals, workforce stability, employee commitment as well as improved performance and productivity.

Moreover, Baldwin et al. (2014, p.828) put emphasis on the fact that motivation provides support for employees in order to succeed, thus fostering innovation within a positively perceived work environment that attracts dynamic, creative and high-caliber personnel.

The performance of employees is directly proportional to the company's performance. Considering these things, the concern regarding employees must be as important as that for customers.

If there are dissatisfied employees, there will certainly be unhappy customers. Thus, motivation is a key and present issue. Crumpton (2013, p.145) focused on the active role of managers and supervisors in the motivation of personnel, who should provide positive feedback, publicly recognize the efforts of employees, active listen and show empathy, lead by example.

The authors considers that the provision of best motivation can be achieved by identifying the concerns that influence the employees within the work environment.

Case study

An Analysis of motivational factors

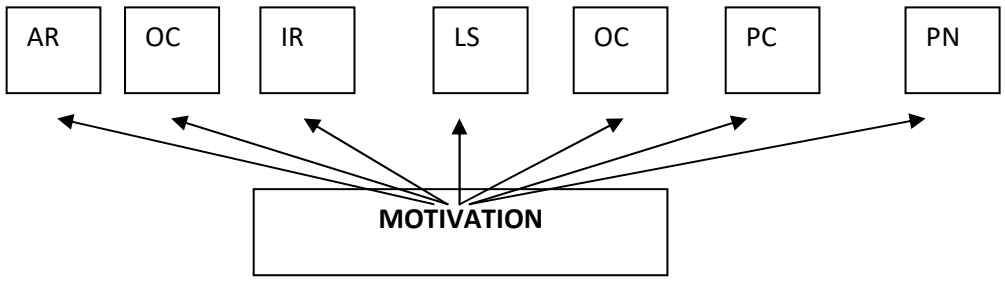
The general objectives of the research were the identification of motivational factors having an influence on the motivation degree of employees in companies from Maramureș County, Romania, and the proposal of improvement measures of the motivational system. The specific objectives were aimed at analyzing the motivational factors, testing the internal consistency, measurement accuracy and reliability of the 24 questions of the questionnaire, establishment of the correlations between the factors analyzed. The chosen motivational factors for the research are: organizational climate, industrial relationships, leadership style, financial rewards, promotion conditions and personal needs like in equation below where MD –represent the motivation degree (1):

$$\mathbf{MD\ (AR, OC, IR, LS, FR, PC, PN)} \qquad \mathbf{(1)}$$

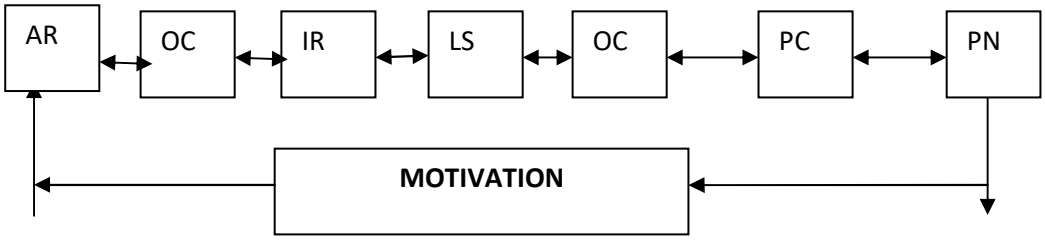
The motivational factors chosen for investigation are: AR-age respondents (experience), OC – organizational climate; IR – industrial relationships; LS– leadership style; FR – financial rewards; PC – promotion conditions; PN – personal needs.

The hypotheses established in this research are:

Hypothesis 1: There is a significant relationship between the motivational factors: **AR**-age respondents, **OC** - organizational climate, **IR** - industrial relationships, **LS-** leadership style, **FR** – financial rewards, **PC** – promotion conditions, **PN** - personal needs and the motivation degree



Hypothesis 2: There is a correlation between motivational factors analyzed.



Given the research purpose and established objectives, a questionnaire was developed comprising 24 closed questions, requiring respondents to rank the answers according to their preference.

For each motivational factor OC organizational climate; IR – industrial relationships; LS– leadership style; FR – financial rewards; PC – promotion conditions; PN – personal needs were designed four questions.

The respondents choose on a Likert scale between 1 (very unsatisfied) to 5(strongly satisfy) the personal answer. The questionnaire was structure in the following items:
Item 1: personal characteristics (age, type of training, work experience);
Item 2: organization climate as a motivational factors (OC);
Item 3: motivation on market of production products as industrial relation (IR),
Item 4: leadership style and relation staff-manager (LS);
Item 5: motivation from manager to staff as a financial reward (FR);
Item 6: motivation on organization hierarchy a promotion condition (PC),
Item 7: identify the personal needs of managers (PN);

The content of questions it was focused on the influence of motivational factors, in order to analyze and improve the motivational system in companies from Maramureș County.

The investigated population consists of 100 managers with various types of training and age, in order to identify the influence of motivational factors on the degree of staff motivation.

Data processing and analysis was statistically carried out by using the software IBM SPSS Statistics. Descriptive statistical procedures were applied for organizing, summarizing and communicating numerical data in order to draw conclusions about the population investigated based on a data sample. In order to analyze the internal consistency of the whole sample Cronbach's coefficient alpha (α) was computed, while for the correlations between variables, Pearson correlation coefficient was calculated.

Results

Item 1: Personal characteristics

The sampling type is probabilistic stratified random sampling, the population being grouped in layers by age categories and for each layer of age category, a simple random sampling was made. The age groups of the investigated population are: 20-30 years old, 30-40 years old, 40-50 years old, 50-60 years old. Each investigated group will include 25 employees investigated.

Item 2: Assessment of the work motivation factors: OC= Organizational climate

The organizational climate was analyzed in the questionnaire through the questions OC1, OC2, OC3 and OC4, the possibilities of response being: 5-very satisfied, 4 satisfied, 3- neutral 2 unsatisfied, 1-very unsatisfied. For 46% percent respondents gives a score of 5 to the organization climate from satistaction work environmenr point of view (Figure 1).

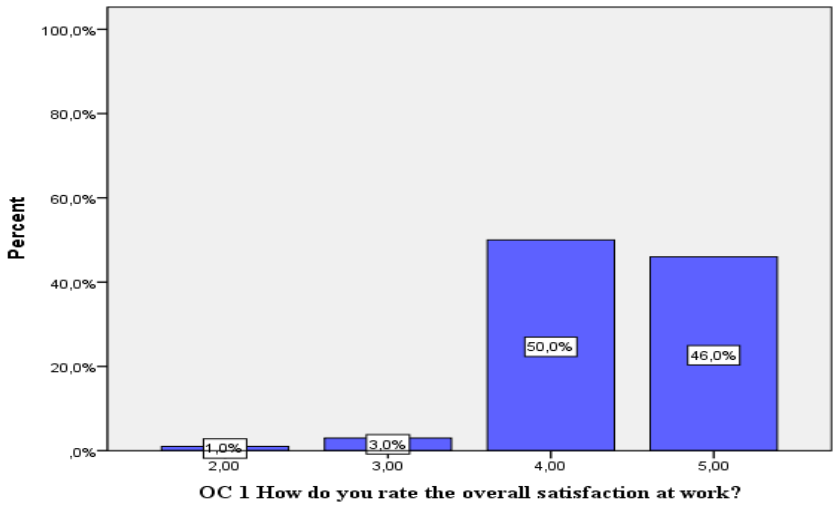


Fig. 1: Organizational climate and satisfaction at work. Source: By authors using SPSS processing

Another motivational factor taking in consideration was the atmosphere and environment work, which can infuence the employees attitut and behaviour(Figure 2).

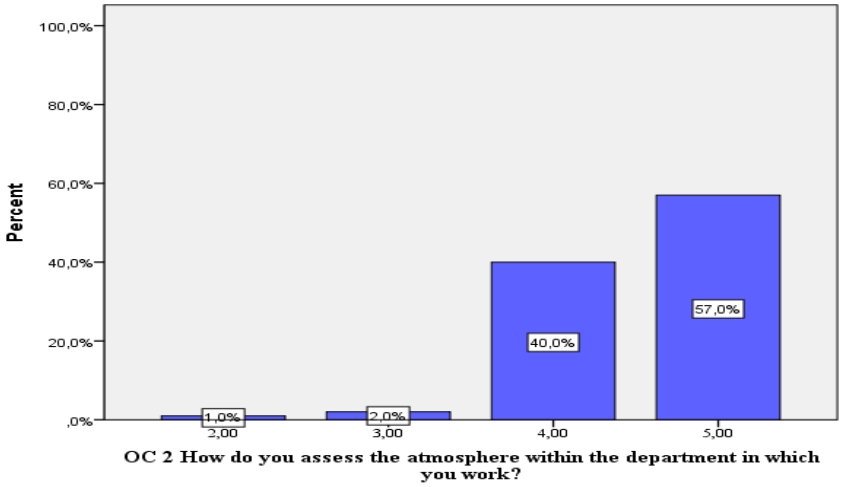


Fig. 2: Environment atmosphere at work . Source: By authors using SPSS processing

For 57% the atmosphere at work it is very important with a score of 5. Managers with 40 % percent give a score of 4.

In conclusion majority of managers consider that the internal environment in organization it is very important and it is a motivation factor for employees.

These results show that management in companies from Maramureș County succeed to provide very good working conditions to the employees of the companies, so that there was no discomfort for the employees which could have affected the production process.

Moreover, there are ensured ergonomic conditions of jobs within the company: proper lighting, suitable temperature and humidity conditions, cleaning and ventilation system.

Item 3. IR= Industrial relations

From the analysis of the four factors regarding the industrial relations , presented in the Figure 3.

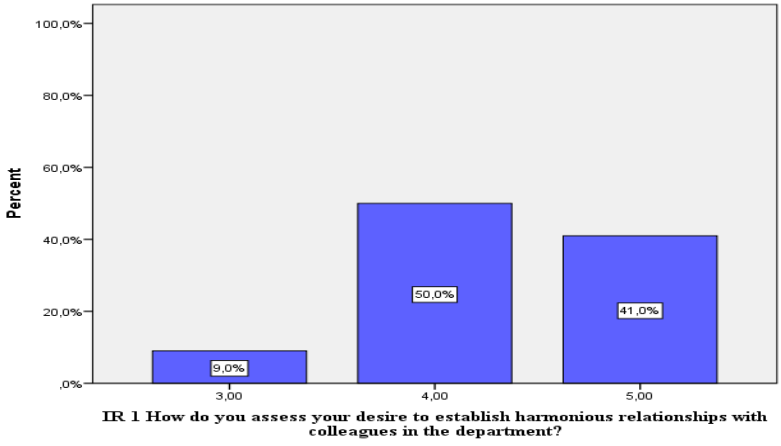


Fig. 3: Manager-employee relationship as motivation factor (IR). Source: By authors

We can conclude that the industrial relations are very good in companies from Maramureș County. For 91% percent the relationship between employees-superiors and superiors- employees, has a positive impact and show an aspect of the motivational process within the company.

Only for 9% the both relationship are not important and receive only a score of 3 from a 5 maximum value.

Another factor which can influence and motivate employees it is the financial rewards (Figure 4). The efficient resolution of conflicts within the company has a great influence in creating a harmonious working climate that encourages cooperation for 80% of respondents.

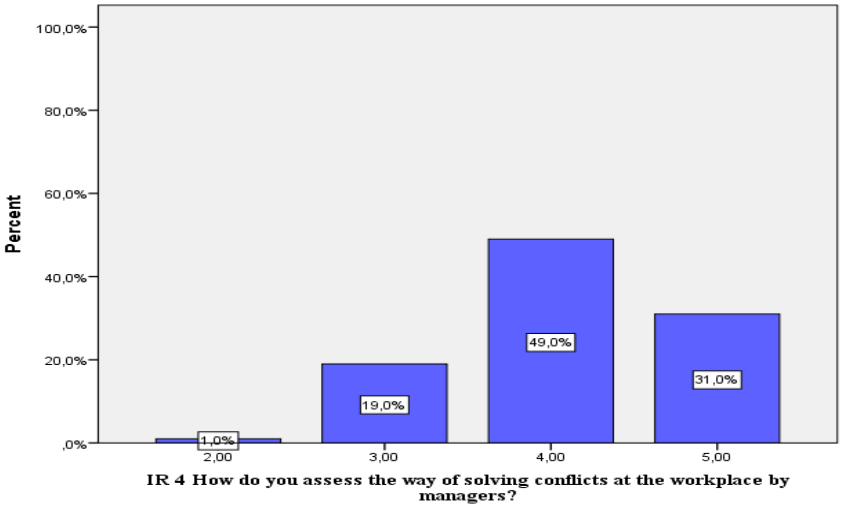


Fig. 4: Solving conflicts as motivation factor (IR).Source: By authors

Item 4. FR= Financial rewards.80 % percent from managers appreciate that the monthly salary of their employees covers their necessities (Figure 5).

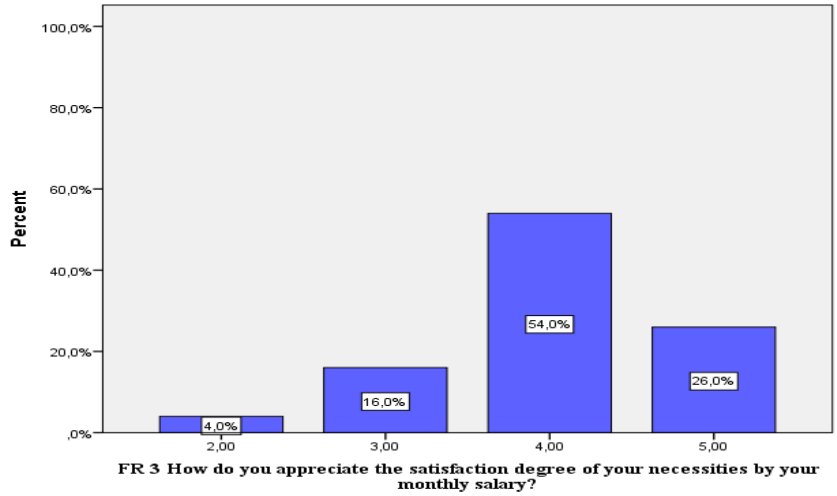


Fig.5: Financial rewards (FR). Source: By authors

The results of the respondents indicate that employees of companies from Maramureș County are very interested in financial rewards, thus management of the company should pay increased attention to the needs of employees regarding their salary, provision of private pensions and of private health insurances, which will be a positive aspect for the staff motivation and it will increase the interest of employees for achieving high quality standards and productive work.

The research apply Vroom's Expectancy Theory as a mean of providing evidence that reward will positively motivate employee.

MOTIVATION =

Item 5. PN=Personal needs. The answers of the respondents regarding their personal needs show that the company must focus on providing a safety environment that encourages and stimulates performance and recognizes employees' achievements, as well as on ensuring the assimilation of people at work to adapt them to the needs of the group to which they belong (Figure 6).

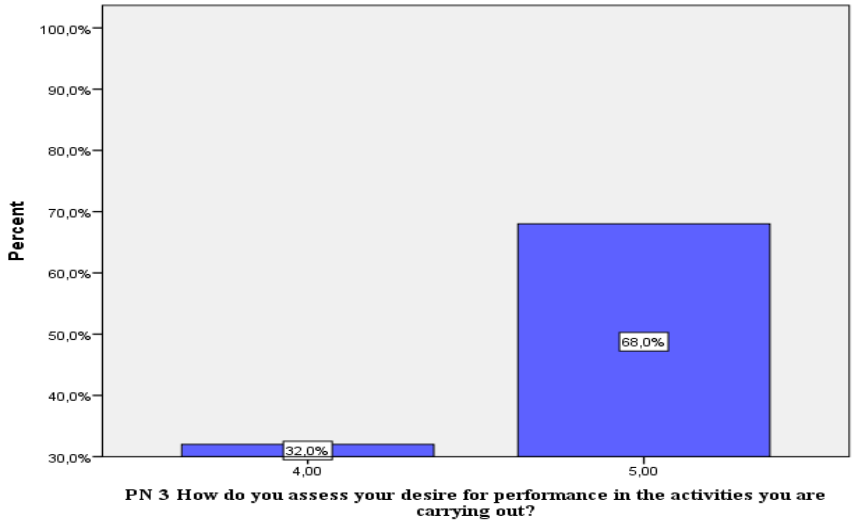


Fig. 6: Personal needs (PN)

This shows us that managers who receive employee benefits are involved 68% in their business and are responsible for their activities performance. Only 32 % select a score of 4 which present a large field of activities in their management act.

Professional integration (Figure 7) it is another factor which present the manager mentality with score 5 maximum value for 31% percent and 37% with score 4.

The results put in evidence that managers are involved in social environment of organizations and they are good specialists and en to the new market provocation.

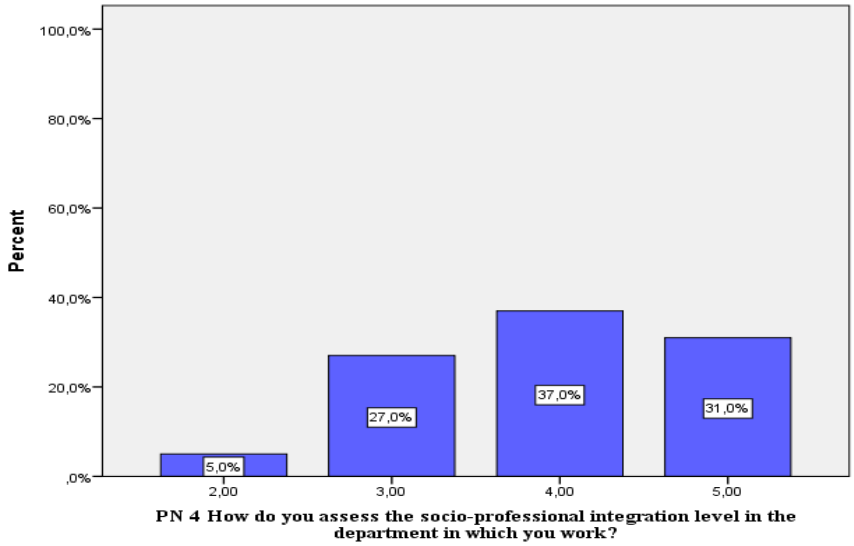


Fig. 7: Professional integration (PN)

Analysis of the internal consistency of the questionnaire

The internal consistency, measurement accuracy and reliability of the 24 questions based on Likert scale were tested using Cronbach alpha coefficient (α).

The test was performed for the whole set of questions which focus on the following motivational factors: OC-organizational climate; IR-industrial relationships; LS-leadership style; FR-financial rewards; PC-promotion conditions and PN-personal needs. Cronbach coefficient of the internal consistency can take values in the interval [0; 1].

The formula for computing this coefficient that is based on the number of items and inter-item correlation mean is presented below (Opariuc-Dan, 2011, p. 299):

$$\alpha = \frac{nx\,\bar{r}}{1+\bar{r}(n-1)} \quad (2)$$

where α – represent Cronbach alpha correlation coefficient, n – the number of items and $\bar{r}$ – the mean of inter-items correlation. In order to analyze the internal consistency of the scale "Motivation degree", out of 100 responses, none was excluded, thus Cronbach alpha coefficient was calculated based on a total of 100 valid responses, as it can be seen in Table 1.

Table 1: Cronbach Alpha coefficient for internal consistency
After calculating the coefficient for all 24 questions, the value of 0.917 sustain that the results can be taken in consideration.

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.917	0.914	24

The value is very close to one, which means that the instrument measures the actual score, the random errors being eliminated and shows that motivational factors are correlated with each other and the internal consistency of the instrument is excellent.

Based on the analysis performed up to this point, we have concluded that the scale is accurate, given the value of Cronbach alpha coefficient.

Table 2 shows that the scale consists of 24 items and has an average of 103.1700 points with a standard deviation of 9.27477 points.

Table 2: Scale statistics

Mean	Variance	Std. Deviation	Nr. of Items
103.1700	86.021	9.27477	24

Analysis of the correlation

Table presents the mean and standard deviation regarding the age of respondents and the 6 groups of motivational factors based on the answers of 100 managers questioned.

Table 3: Descriptive statistics

	Mean	**Std. Deviation**	**N**
Age of respondent	39.6200	11.63570	100
Mean Organizational climate	4.2575	.40116	100
Mean Industrial relations	4.2200	.49400	100
Mean Leadership style	4.1875	.47457	100
Mean Financial rewards	4.2700	.52426	100
Mean Promotion conditions	4.4725	.46723	100
Mean Personal needs	4.3850	.36136	100

Source: Processing in SPSS

Employees are essential to everyday good running of organizations and as we proven in our research when they are rewards for the attainment of organizational goals employees become motivated and increase the productivity and efficiency for the organization. As we can observed the hypothesis 2 was verify in conclusion the data and the proposal model can be take into consideration.

Table 4: Correlations between the means of motivational factors

		Age of respondent	Mean OC	Mean IR	Mean LS	Mean FR	Mean PC	Mean PN
Age of respondent	Pearson Correlation	1	.638**	.743**	.708**	.835**	.817**	.714**
Mean OC	Pearson Correlation	.638**	1	.571**	.523**	.693**	.732**	.637**
Mean IR	Pearson Correlation	.743**	.571**	1	.571**	.678**	.735**	.624**
Mean LS	Pearson Correlation	.708**	.523**	.571**	1	.756**	.715**	.506**
Mean FR	Pearson Correlation	.835**	.693**	.678**	.756**	1	.840**	.639**
Mean PC	Pearson Correlation	.817**	.732**	.735**	.715**	.840**	1	.725**
Mean PN	Pearson Correlation	.714**	.637**	.624**	.506**	.639**	.725**	1
**. *Correlation is significant at the 0.01 level (2-tailed).*								

Source: Processing in SPSS

From the analysis of table 4 we can observe that there is a good correlation between the motivational factors. The best correlation of * 840 (84%) is registered between the FR (financial rewards) and (PC) promotions conditions. Also the experience it is very important for the good understanding of staff and employee's and the knowledge assimilates in production and management, present that the correlation (FR) financial rewards and (AR) age respondents has the second value of * 835.

Conclusions

Motivation at workplace in companies from Maramureș County is very important both from individual point of view, reflecting the employee's attitude towards work, as well as collectively. From the conducted case study we concluded that the first hypothesis is confirmed.

Thus, there is a significant relationship between the degree of motivation and the motivational factors: OC - organizational climates, IR - industrial relationships, LS- leadership style, FR - financial rewards, PC – promotion conditions, PN – personal needs.

Through the analysis of Pearson coefficient, the second hypothesis is confirmed, regarding the existence of correlation between the motivational factors analyzed in the 6 clusters.

Motivation of employees within companies from Maramureș County will raise along with the increase in personal responsibility, recognition, respect of employees, which will increase their involvement.

A fair reward system based on performance will motivate staff to efficiently work and will have a positive impact on their morale.

The company is permanently concerned to improve the working conditions in order to increase employees' performance in obtaining products with higher quality and reduced costs.

This can be seen in the development of a Lean department, concerned with applying the lean manufacturing principles, regarding continuous improvement, elimination of waste, ensuring continuous operation of the machines, standardized work, programming of production based on actual demand, continuous flow, performance of operations that add value to the customers, reduction of dead times, prevention of errors.

Thus, the company had a low share of material sanctions for errors and deviations. The implementation of an efficient motivation model in companies from Maramureș County, Romania, will increase the performance of human resources.

Besides the frequent usage of formal motivations, companies from Maramureș County should capitalize on the motivational potential of informal motivations, especially moral and spiritual ones, which represent a sensitive issue for most employees, having a great influence in improving their job satisfaction.

Acknowledges

The research was apply under the Erasmus + project nr: TR01 -KA203-034520-UNINANO- Universal Nanotechnology Skills Creation and Motivation Development.

References

Baldwin, C., Garza-Reyes A.R., Kumar, V., Rocha-Lona L., 2014. Personal development review (PDR) process and engineering staff motivation. A case study investigation in a manufacturing firm. *Journal of Manufacturing Technology Management*, Vol. 25, Issue 6, pp. 827 – 847.

Bocean, C.G., 2015. *Managementul resurselor umane*, București, Romania: Editura Pro Universitaria.

Buzea, C., 2010. *Motivatia. Teorii și practici*, Iași: Institutul European.

Constantin,T., 2004. *Evaluarea psihologică a personalului*, Iași: Editura Polirom.

Crumpton, A.M., 2013. " Keeping the motivation going ", *The Bottom Line*, Vol. 26, Iss 4, pp. 144 – 146.

Dessler, G., 2013. *Human Resource Management*, Thirteenth Edition, New Jersey: Pearson Prentice Hall.

Flynn, S., 2011. Can you directly motivate employees? Exploding the myth, *Development and Learning in Organizations: An International Journal,* Vol. 25, Issue 1, pp. 11 – 15, 2011.

Forsyth, P., 2007. *Cum să motivezi oamenii*, Ediţia a doua, Bucureşti: Rentrop&Straton.

Hersey, P., Blanchard, K.H., Johnson,. D.E., 2001. *Management of organizational behavior-Leading Human Resources*, Eight Edition, New Jersey: Pearson Prentice Hall.

Ionescu, Ș.I., 2015. Clusterizarea ierarhică cu aplicaţii în analiza financiară, *Revista Română de Statistică – Supliment*, nr. 8, pp. 3-14.

Lage Monteiro de Castro, M., et al., 2016. Values, motivation, commitment, performance and rewards: analysis model, *Business Process Management Journal*, Vol. 22, Issue 6, pp. 1139 – 1169.

Landsberg, M., 2008. *Motivarea*, Bucureşti: Editura Curtea Veche.

Lefter, V., Deaconu, A., Marinaș, C., Puia, R., 2008. *Managementul resurselor umane-Teorie si practică*, Bucureşti: Editura Economică.

Lepak, D., Gowan, M., 2010. *Human resouces management-Managing employees for competitive advantage*, New Jersey: Person Education.

Manolescu, A., Lefter, V., Deaconu, A., 2007. *Managementul resurselor umane*, Bucureşti: Editura Economică.

Micle, I.M., Săucan, D.Ș., 2009. *Motivarea personalului-Ghid pentru manageri*, București: Editura Tribuna Economică.

Mullins, L.J., 2010. *Management & Organizational behaviour*, Ninth Edition, Essex: Financial Times Prentice Hall.

Nicolescu, O. coordonator, 2004. *Managerii și managementul resurselor umane*, Bucureşti: Editura Economică.

Opariuc-Dan, C., 2011. *Statistică aplicată în Ştiinţele Socio-umane. Analiza asocierilor şi a diferenţelor statistice*, Sibiu: Editura Arhitip Art.

Pânișoară, G., Pânișoară, I.V., 2005. *Motivarea eficientă*, *Ghid practic*, Iași: Editura Polirom.

Pell, A.R., 2007. *Managementul resurselor umane*. Bucureşti: Editura Curtea Veche.

Pivovarov, S.E., Tarasevich, L.S., Rakhmatov, M.A., 2011. *International Management, Fourth Edition*, Saint Petersburg: Piter Publishing House.

Poole, M., Warner, M. (editors), 1998. *The IEBM Handbook of Human Resource Management*, London: International Thomson Business Press.

Sirota, D., Mischkind, L.A., Meltzer, M.I., 2010. *Motivarea angajaților, Cum crește performanța companiei odată cu entuziasmul oamenilor*, București: Editura All.

Toader, D.C., 2016. *Bachelor Thesis, The Bucharest University of Economic Studies*

Factor Mapping and Modeling for Production Planning

Ing. Pavel Kábele, University of West Bohemia, Department of Industrial Engineering and Management, Univerzitní 22, 306 14, Pilsen, Czech Republic, pkabele@kpv.zcu.cz

Ing. Michal Bochinský, University of West Bohemia, Department of Industrial Engineering and Management, Univerzitní 22, 306 14, Pilsen, Czech Republic, bochinsk@kpv.zcu.cz

Ing. Josef Babor, University of West Bohemia, Department of Industrial Engineering and Management, Univerzitní 22, 306 14, Pilsen, Czech Republic, baborj@kpv.zcu.cz

Abstract

Assuming continuous development and growing competition, high emphasis is placed on effective planning. Accurate planning makes timely claims and customer satisfaction is growing. In order for the planning to be based on optimal data, it is necessary to fully map the production processes and determine the exact value. This value is the basic tool for creating metrics for the evaluation of the production process. This idea is also engaged in practical study that analyzes the factors that affect time requirement of the operation. In the theoretical part of this study are presented the knowledge gained from technical literature from the field of industrial engineering. In the analytical part, precise operations´ time requirements were measured and these measured values were processed. A process map of the entire production process has been created. From these values, a calculator, which is verified in practice, has been compiled.

Keywords: Production parameter, time study, process, efficiency.

Introduction

Nowadays, it is increasingly important for the vast majority of companies to improve their production and make it more efficient. This is done by various older and modern methods of standardization and rationalization of work. Thanks to this knowledge, companies consolidate their place in the marketplace, acquire new customers and increase their competitiveness. It has been proven that production parameters have a significant impact on capacity planning and contract generation. If these parameters change due to optimization or rationalization, production control is faster and more accurate (JIE ZHANG, 2017).

According to (DASHCHENKO, 2006), time analyzes of operations are necessary for the creation of a precise planning system. The more accurate the time analysis, the better the date, which can be further processed in the planning system. This gives an absolutely accurate production planning.

In this publication, an analysis of influencing factors for the manufacturing process is made. Initial analysis and data collection were carried out in the form of time studies and the evaluation led to the design of the calculation model for production time requirements.

Factors Affecting Productivity

The main objective was to perform a production process mapping that led to the identification of all the key parameters that affect the time-consuming nature of operations in the production process. Thanks to analyzes of images of production operations it is possible to analyze the production processes. These

materials are designed to create a calculator that is able to calculate the resulting parts production times according to the specified parameters.

The cornerstone of production is production activity. This is the process of offering certain services or creating new products. This is the transformation of the material into the product and takes place from the insertion of the material into the machine until it is removed from the machine as a product. This also applies to products that are still being processed or modified in the company. The resulting product is one that the business can sell and get the desired revenue from it. (EDL, KUDRNA, 2013)

Production process means the transformation of the material and the semi-finished product into the final product. If the production process is properly and thoroughly processed it minimizes losses during production, which is most evident in mass and serial production. You can divide the manufacturing process individually into: (BOTEK, ADAMEC, 2004)

- Operation - a part of the manufacturing process that is performed by one worker on one machine, has a continuous duration and is properly terminated.

- Operations section - A part of the operation that is executed by one tool at a single clamp and in one place.

- Action - a simple work activity that is inseparable from the point of view of organization (turning on the machine, clamping the item, etc.)

- Movement - part of the act that is the smallest and measurable. This is the simplest move of a worker which has been finished.

Time analyzes

To achieve the highest possible work efficiency and lowest cost, the methods of continuous improvement of production processes are used. This improvement is called the rationalization of work. Standardization work is the activity that defines labor standards. For the continuous growth of production based on the growth of labor productivity, it is necessary to create conditions that can maintain a high level of production process. (MAŠÍN, VYTLAČIL, 2000)

In order to continue the project, it was necessary to map the current situation. These are the status of workplaces, operations, activities performed, types of material and other important parameters entering the production process. The greatest benefit of taking and analyzing images at individual workplaces is to get information and to map the current state of the company. This information can provide managers with enough space to improve production and increase profits. These results can be achieved by various rationalization methods. It is also possible to maximize the use of machines or increase employee productivity. (MAŠÍN, VYTLAČIL, 2000)

Objectives and Benefits of Mapping Factors in the Production Process

One of the goals of the project was to map individual processes and become familiar with its parts. Therefore, it was necessary to go through the entire production process, from saws to finish, and see how production takes place. Thanks to this activity, the parameters entering the production process and the factors that have influenced the production process were determined. For example, there is a description of the Cutti workplace analysis.

There are a lot of effects on the time consumption of the saw operations. First of all, it is a semi-finished material from which pieces are carved. There is a variety of types of material used, and a certain range of cutting speed is prescribed for each material. All these parameters must be set on the computer that controls the saw. The operator also adjusts the cutting program, depending on what shape the saw will cut. The workload of this worker before cutting, except for the program of the saw, is also to place the semi-finished products on the exact position for the material arrival. Additionally, the semi-finished product must be adjusted just before the cutting process. When the semi-finished product ready for cutting is received and serviced, the top plate of the saw is started up to the blank and the operator can start the cutting process on the computer.

In the first place, before the saw begins to cut pieces, it automatically cuts and aligns the front of the workpiece so that it can still be cut in exact dimensions. After that, the process of cutting individual pieces is already taking place. Additional parameters such as the shape of the individual pieces, whether they are to be cut straight after each other, or how many pieces can be cut out of the blank can be entered now. Specifically, the number of sharp edges, rounding of the walls and, in particular, contour length play a role in the shape demands of the work.

These parameters significantly affect the cutting time of one piece. The saw at each sharp edge must be correctly aligned and one sharp edge takes about 1 second at any cutting speed. Contour length is of course the most striking factor in cutting one piece. The cutting time can be roughly calculated from the total length of the cut contour circumference and the cutting speed that depends on the type of material.

Tab. 1: Workplace parameters

Parameters	Units
Material	-
Cutting speed	m/s
Program adjustment	s
Setting	s
Travel material	s
Straightening material	s
Flip over upper plate	-
Turn on cutting program	s
Front face cutting	s
Difficulty of shape cutting	-
Number of pieces	piece
Number of cut edges	Number/piece
Rounded faces	-
Contour length	m
Travel	YES/NO
Turning program	YES/NO
Knife travel	s
Lift of upper plate	-
Outgoing material	s
Piece and residue separation	s
Piece stocking	s



Fig. 1: Work with control unit



Fig. 2: Manipulation inside Cutti

With the analysis of the operations images, it was possible to determine the exact times of the individual operations. Analyzes were progressively modified to the desired table formats that served to continue the project.

Method of imaging

The imaging was mostly done by camera-shooting. The movie snapshot method has been chosen because of a large number of parameters. Some operations were performed very quickly, and others took longer. Short operations were another reason to use film shots and to capture even the shortest operations. Some operations could be measured by moment observing method. As a result of all analyzes of the measured images, tables, where the times of individual operations in the workplaces are captured, were created. These partial times together give the total time value of one piece. The tables were created in Excel for each workplace separately.

CUTTI

Date	16.11.2016	Company				
Workplace	Cutti					
Company	Company					
Name	Kábele	Total time for one piece	04:06,8			
Analyzer	Kábele					
		Cutting material				
Measurement		Raid of material	Departure of the material	Cutting material	Preparation for production	Cutting sharp edges
1		01:20,9	00:15,7	01:20,1	01:01,1	00:00,8
2		01:23,5	00:15,2	01:19,9	01:00,6	00:00,8
3		02:00,8	00:20,8	01:41,3	00:55,2	00:00,9
4		01:25,7	00:14,3	01:23,8	00:37,9	00:00,9
5		01:33,2	00:21,3	01:34,5	00:34,1	00:00,9
6		01:55,4	00:18,2	01:22,9	00:49,2	00:00,8
7		01:29,1	00:14,5	01:28,0	01:02,3	00:01,0
8		01:20,5	00:17,2	01:25,6	00:50,8	00:01,0
9		01:37,7	00:15,9	01:23,1	00:41,2	00:00,9
10		01:33,5	00:15,7	01:22,5	00:46,1	00:00,9
Average		01:33,0	00:16,9	01:26,2	00:49,8	00:00,9

Fig. 3: Process analyse CUTTI

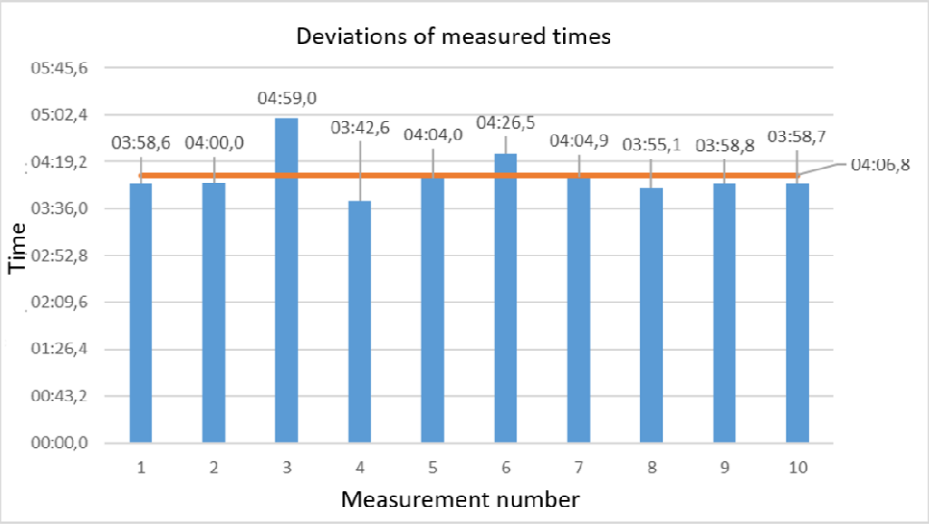


Fig. 4: Graph Cutti

Material removal and cutting of sharp edges do not have significant differences between them because they are performed by the machine itself. Edge cutting depends on the size of the cut surface. Deviations from the graph show that in addition to the 3rd and 4th measurements there were not significant variations, but the biggest difference is higher by 52.2 seconds.

System Design

The MS Excel spreadsheet editor, which uses the data entered and drawn for the calculations, was chosen to implement the system. While making calculations, it was necessary to take into account all the tasks that are included in the operation. These operations have been analyzed to fit the formula for calculating the production time. As a data source for calculations, a sheet of values was created from the time analysis tables. At the Cutti site, this is the most complex operation, so it was necessary to define a really complex formula, see equation, which includes all the described factors and technological times determined by time analyzes.

$$t = \frac{t_m}{Q_p} + \frac{t_s}{Q_p} + Q_z * t_z + \frac{O_k}{v} + \frac{D_p}{v} + t_o + Q_{zo} * t_z + \frac{O_{ko}}{v} + \frac{D_{po}}{v}$$

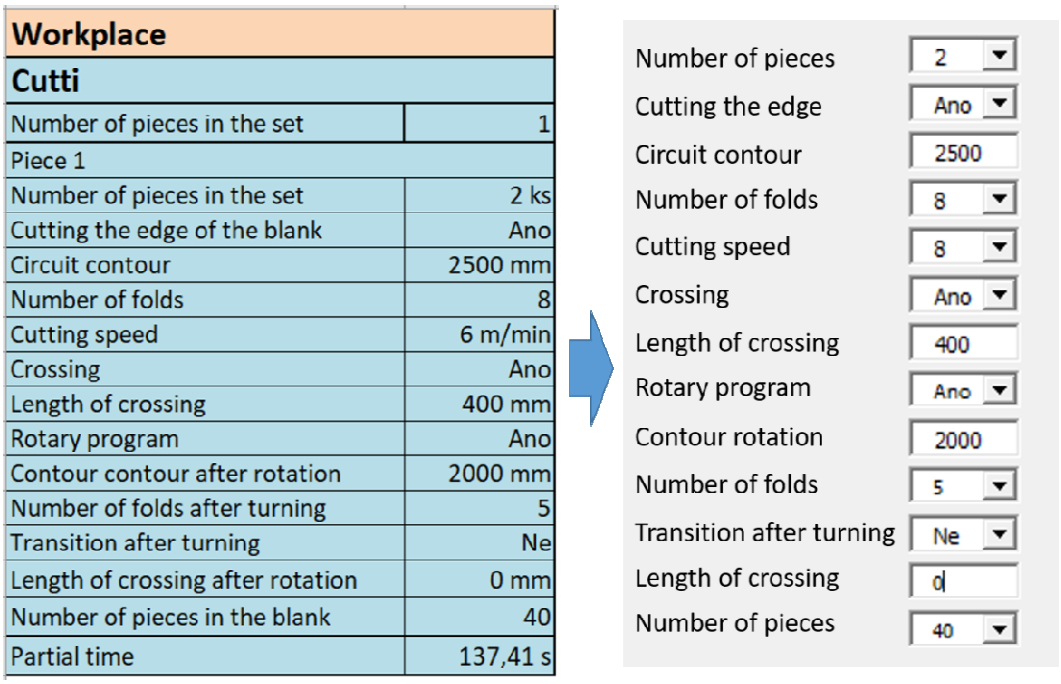
tm .. Time of manipulation
Qp .. Number of pieces in the semi-finished products
ts .. Edge trimming time
Qz .. Number of folds
tz .. Average retention time in the fold
Ok .. Contour circumference
v .. Cutting speed
Dp .. Length of crossing
to .. Turning time
Xyo .. After turning

```
=KDYŽ(B7=0;0;((Hodnoty!$E$2+Hodnoty!$F$2)/Formulář!B17+KDYŽ(Formulář!B6=Hodnoty!$B$2;((
2000*6)/(100*Formulář!B9))/Formulář!B17;0)+Formulář!B8*Hodnoty!$H$2+(Formulář!B7*6)/(100*
Formulář!B9)+KDYŽ(Formulář!B10=Hodnoty!$B$2;(Formulář!B11*6)/(100*Formulář!B9);0)+KDYŽ(
Formulář!B12=Hodnoty!$B$2;Hodnoty!$G$2/Formulář!B17+(Formulář!B13*6)/(100*Formulář!B9)+
Formulář!B14*Hodnoty!$H$2+KDYŽ(Formulář!B15=Hodnoty!$B$2;(Formulář!B16*6)/(100*Formulář!
B9);0);0))*Formulář!B5)
```

Workplace	
Cutti	
Number of pieces in the set	1
Piece 1	
Number of pieces in the set	2 ks
Cutting the edge of the blank	Ano
Circuit contour	2500 mm
Number of folds	8
Cutting speed	6 m/min
Crossing	Ano
Length of crossing	400 mm
Rotary program	Ano
Contour contour after rotation	2000 mm
Number of folds after turning	5
Transition after turning	Ne
Length of crossing after rotation	0 mm
Number of pieces in the blank	40
Partial time	=KDYŽ(B7=0;(

Fig. 5: Background program

All described workplaces and parameters are the basis of the submission form. The form was created in the Visual Basic for Applications programming language. The main function of the form is to insert data into the cells under which the calculations are performed. The goal in formulating the form was primarily factuality, uniqueness and user-friendly input of values and parameters. Label, textbox, combobox, and button were used to create the final form. Three other forms can be opened during the entry, in which you can define the parameters at the Cutti a workplace and formatting and cutting departments of workplace XI.



Workplace	
Cutti	
Number of pieces in the set	1
Piece 1	
Number of pieces in the set	2 ks
Cutting the edge of the blank	Ano
Circuit contour	2500 mm
Number of folds	8
Cutting speed	6 m/min
Crossing	Ano
Length of crossing	400 mm
Rotary program	Ano
Contour contour after rotation	2000 mm
Number of folds after turning	5
Transition after turning	Ne
Length of crossing after rotation	0 mm
Number of pieces in the blank	40
Partial time	137,41 s

Fig. 6: User inrteface datatransmission

The study used techniques that aim to eliminate the most common mistakes, eliminate unnecessary movements, and assess the working position and the duration of individual operations. These incentives were based on time studies and production planning.

The biggest problem in the processing of the analysis were paradoxically the workers. Instead of working together to map the actual component production time to build an effective planning model that is a good helper against growing competition, they made the study more complicated by their negative reactions.

Most of the workers who were observed then worked above their average pace. Therefore, in the analysis it was difficult to determine 100% of the employee's workload. This was done using the basis and MTM and MOST analysis. The comparison of the acquired and analyzed procedures with the average employee productivity record in the company has created a sufficient springboard to successfully collect data for the compilation of the production calculator.

The assessment of the production plan is usually done on the basis of cost, capacity, quality, continuous production time and customer requirements, which are the basic common evaluation criteria. Quality is assessed as a limiting condition for this methodology and it is assumed that all proposed variants meet the quality requirements.

Conclusion

The basic and most significant part of the proposed methodology is the implementation part, in which, with the help of the given procedure, we create the calculator of the production plan in the processes of the company. Numerous measurements and analyzes of parameters influencing the production time have been carried out at all workplaces. After evaluation analyzes, calculations were made, including the observed values and dependencies. Subsequently form was created in Visual Basic for Applications,

which is perfectly connected to the calculation base. As a result of the calculations, the resulting table with partial times and the total production time of the entire production process was created. The calculator is able to ensure that the entire production process is nanomorphic by simply entering parameters that depend on the shape, purpose, and complexity of the product. Initial functional verification and training of the responsible employee has already taken place in the company. Input by a trained worker takes about two to five minutes depending on the complexity of the product, while standardization of the individual process segments by the standardizing worker would take up to a dozen hours for each axle product.

Acknowledgment

This paper was supported by the Internal Grant Agency of the University of West Bohemia, project No. SGS-2015-065 - "Developing parameters for a sustainable production system."

References

DASHCHENKO, A. I. Reconfigurable manufacturing systems and transformable factories. New York: Springer, c2006. ISBN 3540293914.

EDL, M., KUDRNA, J. Metody průmyslového inženýrství. Plzeň: SmartMotion, 2013. ISBN 978-80-87539-40-8

MAŠÍN, I., VYTLAČIL, M., Nové cesty k vyšší produktivitě – metody průmyslového inženýrství, 1. vydání, Liberec : Institut průmyslového inženýrství, 2000. ISBN 80 - 902235 - 6 - 9.

M. Ing. Ph.D. BOTEK a L. Ing. Ph.D. ADAMEC, Sbírka příkladů z inženýrské ekonomiky a managementu, Praha: Vydavatelství VŠCHT Praha, 2004.

ZHANG, Jie. Multi-agent based production planning and control. ISBN 9781118890066.

Click Activists of the New Era, Slacktivists: An Exploratory Research to Define Slacktivist Typologies

Hatice Ozbas, Anadolu University, Eskisehir, Turkey, ozbashatice@gmail.com

F. Zeynep Ozata, Anadolu University, Eskisehir, Turkey, fzozata@anadolu.edu.tr

Abstract

Most of the events which have taken place in the last decade prove that thinking independently of the 21st century activism apart from internet and social media isn't possible. This digital era provides people joining online signature campaigns, changing profile pictures to promote an idea or campaign and sharing content on social media. All these practices cause a rise of a concept called "slacktivism" which combines the words "slacker" (lazy) and "activism" has a meaning as to support a cause with minimum performance or without action.

Generally, concept of slacktivism takes part in the literature as a negative word which has no or little effect on social issues. In another respect, recent studies show that perhaps not a single slacktivist, but the collective power arisen by the combination of slacktivists have the potential to show a significant presence. Therefore, slacktivists play an important role in promoting awareness and support of campaigns which aim to raise social welfare or wellbeing of society. However, studies in the literature on slacktivism or slacktivists are still very limited although those have the main roles in the spread of social messages. From this point of view, this research aims to describe the main subject of slacktivism, who is slacktivist, and slacktivists' profiles. In addition to present typological features of the slacktivists in terms of differences and motivations, it will be tried to understand what the slacktivists think about impacts and effectiveness of their slacktivist behaviors.

In-depth interviews with 10 participants from 4 different generations (Baby Boomers, X,Y and Z generations) are conducted to collect data. Miles and Huberman model is used to analyze qualitative data to explore the main codes related to the typological features of slactivists. Different motivations and values are determined that differentiates various types of slacktivists. Participants are seperated from each others such as motivation of using social media platforms, their feelings after slacktivist behaviours or the effect of these behaviours on their activist practices. On the other hand, participants' point of view about slacktivist behaviours mostly resembles each other.

This study was supported by Anadolu University Scientific Research Projects Commission under the grant no: 1609E679

Keywords: Slacktivism, Digital Activism, Clicktivism, Slacktivist, Typology of Slacktivists

The Impact of Monetary Policy on Bank Lending Rate in Kenya

Wairimu Wanjaiya

phd jomo kenyatta university of agriculture and technology, nairobi, kenya
wwanjaiya@gmail.com

Abstract

Monetary policy is an activity of The Central bank that controls the availability of money and credit in a country's economy Cecchetti, (2009). Tight monetary policies raise the nominal interest rate and reduces long run output such as the supply of bank loans, leading to a rising lending rate, thus discouraging bank-dependent borrower's activities. In the condition of easing, more liquid money is available for banks, thus as the supply of money increases the interest rate decreases. The study centered on the impact of monetary policy on bank lending rate in Kenya. In terms of methodology, the study employed secondary data to study the relationship between monetary policies and bank lending interest rates in Kenya. Currently, Kenya has 43 commercial banks. This study used time series data averages for all the variables as provided by the Central Bank of Kenya (CBK) as a representation of all the 43 banks so as to avoid the sampling bias problem. Quarterly time series data for the period 2000 to 2014 was used. The study revealed that Central Bank Rate and Treasury Bill Rate were both positive and significant Monetary Policy instruments in explaining bank lending interest rates. Reserve Requirement was found to be a negative and insignificant Monetary Policy tool in impacting Bank's Lending Rates. The study recommends that the Central Bank of Kenya should adopt the TBR and CBR more in their efforts of implementing the Monetary Policy Committees decision.

Introduction

The general public views their respective Central Banks as the solution to economic downturns such as inflation, exchange rate fluctuations and depreciation of their currency or as the quickest way to stabilize the economy. The Central Bank's overall role is to stabilize the economy from macroeconomic shocks (i.e. Exchange rates fluctuations, Inflation pressures as well as excess liquidity in the market) through the use of both fiscal and monetary policies. Economists view monetary policy by Central Banks as the readiest of tools that can be used to arrest economic downturns.

The most prominent change in the management of the Kenyan economy after Kenya got her independence was the application of the structural adjustment programs (SAPs), which were introduced around the 1980/1981 financial year. The SAPs consisted of a set of economic policies designed to generate rapid and sustainable economic growth while eliminating fiscal and external imbalances with macroeconomic stability. In trying to stabilize the Economy in the earlier years the government used SAPs so as to liberalize prices and financial markets as well as the well instill changers in the financial sector, integrate international trade reforms, and make sense of the budgeting process (MPAC 2005). Several studies done in the 90's (Ikiara 1990, Mwega and Ndulu 1994, World Bank-UNOP1993, Swamy 1994) found that the structural adjustment programs have had some negative effects on the economy, such as inflationary pressures and increase of government debt.

Owing to the negative effects derived from the SAPs the government sought other ways of stabilizing the economy in terms of exchange rates volatility, the depreciation of the shilling, the runaway debt pressures of the government. The government through the CBK established the Monetary Policy Advisory

Committee (MPAC) which was mandated to stabilize the economy against macroeconomic shocks. The Monetary Policy Advisory Committee in 2008 through gazette notice 3771 on 30th April 2008 changed to the current Monetary Policy Committee (MPC).

The MPC in its objective of stabilizing the economy has also achieved other success such as Financial Inclusion by enabling credit access to majority of the Kenyans as well as transformation in terms of Mobile Money transfer.

Literature Review

The Central Bank of Kenya's (CBK's) Bank Supervision Annual Report (2014) showed a reduction in the Central Bank Rate (CBR) which impacted positively on short-term interest rates. A steady decline in the average 91-day Treasury bills rates was also witnessed. The reduction in interest rates was not replicated in commercial banks average lending rate during the period. There has been a systematic reduction of the CBR over the last three years, from 19.7% as at 1st December 2012, 17.9% in 2013, to an average of 15.3% - 16.8% in 2014. The pass through rate reduction in the CBR has only been reflected marginally in the lending interest rates by banks which in turn has heightened the cost of credit above the reach of many potential borrowers. The CBK issues monetary policy rates every two months meant to guide the direction commercial banks take in their lending rates.

In acknowledging the role played by the CBK, several studies have been conducted about the banking sector. The studies however, have mainly focused on the financial performance of Banks, Monetary Policy transmission mechanisms, how monetary policy affects the real economy and the impact of money supply on current account.

According to Misati et al, (2010) interest rates play a significant role as a link to other macroeconomic variables, mainly output that also forms one of the overall goals of any monetary authority. The theoretical basis of this study was embedded to the traditional Keynesian view which suggests that monetary policy influences the real cost of borrowing by setting a nominal short-term interest rate. Changes in nominal interest rate are expected to influence real rates and eventually have an impact on investment and consumption both of which are key components of economic output.

Kashyap and Stein, (2007) and Cecchetti, (2008) considered national concentration ratios in their analysis of the effectiveness of monetary policy in Europe. Both studies used three and five-firm absorption ratios respectively, as tools of bank size in their association between monetary transmission and competition in their overview of the subject. Empirical studies using European data confirmed the existence of the bank-lending channel and found that the operations were similar to those in the U.S.

Adams et al. (2005), studied the effect of local banking market structure on the bank lending channel of monetary policy. The study used Community Reinvestment Act (CRA) data that measured the volume of loans originated from 1996 to 2002, collected annually for six years. The study tested the theory of Structure-Conduct-Performance which posits that greater market concentration leads to less lending and higher loan rates. The dependent variable was the volume of loans originated in each market Kashyap and Stein (2007).

A study by Mohammad (2010) on the impact of money supply on current account based on the extent of Pakistan rupee evaluated the effects of money supply on current account, that is, the empirical association among money supply on current account, exchange rate, and industrial production .Time series data from 1975 to 2008 was collected and a multivariate model applied. The study found that the monetary policy

system has an important influence on the domestic variables, for instance, output and inflation; therefore central bank should target the domestic (producer) inflation when issuing the monetary policy.

Somoye and Ilo (2009), in their study spanning (1998 -2015) sought to undertake the impact of macroeconomic instability for the period on banking sector lending behavior in Nigeria using time series data the Central Bank of Nigeria of quoted commercial banks operating in Nigeria. Other data on bank lending activities and other bank characteristics were obtained from the annual published financial statements of the banks and the fact book published by the Nigerian Stock Exchange. The study hypothesized that bank's lending behavior was generally influenced by the environmental factors particularly the regulatory and macroeconomic.

Buigut (2010) assessed the importance of the bank lending channel in the transmission of monetary policy in Kenya. Annual time series data the period from 1979 to 2008 sourced from the International Financial Statistics was analyzed. The study suggested that a monetary tightening directly constrains the ability of banks to make new loans, therefore forcing dependent bank borrowers to reduce investment. It was also suggested that restrictive monetary policy works not only by raising interest rate but also by restricting bank credit directly. Five variables, namely the real GDP, inflation, real private sector credit, lending rate, and a short-term interest rate (Treasury bill rate) were tested. The results showed that a shock to the policy instrument only affects the prices and real output with a lag. The effect on the loan quantity is a permanent decline that settles about two years to a long term effect of around 8.2 basis points below the baseline. Taken together, the decrease in loan quantity and the increase in the lending rate suggest a dominance of the lending channel over the interest rate channel in Kenya.

Mature, et al (2006), conducted a study on how monetary policy shocks influence the level of macroeconomic performance in Kenya. Twelve-month percentage change in the Consumer Price Index (CPI) was analyzed focusing the analysis on variability of the data series over time beginning 1997.The study used the structural vector auto-regression model and proposed that monetary policy is transmitted through many channels including the money supply, credit channel, the interest rate channel represented by the 91-day Treasury bill interest rate, bank lending interest rate and the exchange rate channel.

There have been several studies done in Kenya in this and related areas. Some of these include: A study by Bett, (2010) which examined the financial performance of banks and non-banking institutions over a period of 5years (2004 - 2009), A study by Mutwiri (2007), which focused on factors affecting bank failure, such as liquidity and poor management. Mature, et al (2006), conducted a study on how monetary policy shocks influence the level of macroeconomic performance in Kenya for the period 1997 – 2010 and a study by Mohammad (2010) which examined the impact of money supply on current accounts for a time period 1975 – 2008.These studies and many more, however, do not address the influence that monetary policy has on bank lending rates.

Research Methodology

The study centered on the impact of monetary policy on bank lending rate in Kenya.

Research Design

The study employed secondary data to study the relationship between monetary policies and bank lending interest rates in Kenya.

Target Population

Currently, Kenya has 43 commercial banks. This study used time series data averages for all the variables as provided by the CBK as a representation of all the 43 banks so as to avoid the sampling bias problem. Quarterly time series data for the period 2000 to 2014 was used.

Model Specification

To examine the relationship of monetary policy on bank lending interest rates, the study used the ordinary least squares model (OLS). Under this approach, it needs to be considered that the OLS's main assumption is that the errors must be uncorrelated.

$y_t = \alpha + x'_t \beta + \varepsilon_i$

Consistent with, Brooks, (2008), the econometric model is specified;

Model Specification

$$LIR_t = \alpha + \beta_1 \Delta CBR_t + \beta_2 \Delta TBR_t + \beta_3 \Delta RR_t + \varepsilon_t$$

Where,

LIR_t = Lending interest rates at time, t

CBR_t = Central Bank rate at time, t

TBR_t = Treasury Bill Rate at time, t

RR_t = Reserve requirement at time, t

t = time

ε_t = Error term is presumed to be normally and independently distributed with mean zero and constant variance, t

α_t = captures all other explanatory variables that affect monetary policy, but were not captured in the model.

$\beta_1, \beta_2, \beta_3$, are the coefficients of monetary policy, measured with respect to CBR, TBR, and RR, respectively. Previous studies have shown that OLS is a suitable model to quantify the relationship between monetary policy and lending interest rates Espinoza & Prasad, (2010).

Conceptual Framework

The study adopted a conceptual framework to examine the relationship between monetary policy and bank lending rates in Kenya. The study utilized the following independent variables as a measure of monetary policy: the Discount Window Operations, Open Market Operations and Reserve Requirements; and the dependent variable as bank lending rates in Kenya.

Discount Window Operations

The CBK may provide short-term secured loans to commercial banks on overnight basis at the Central Bank Rate (CBR) in its capacity as a lender of last resort, thus restricting banks to seek funding in the market resorting to Central Bank only as a last resort. This arrangement is known as discount window operations of the Central Bank. The CBR is reviewed every two months, and its movements are a signal of the intended direction of change of money market interest rates.

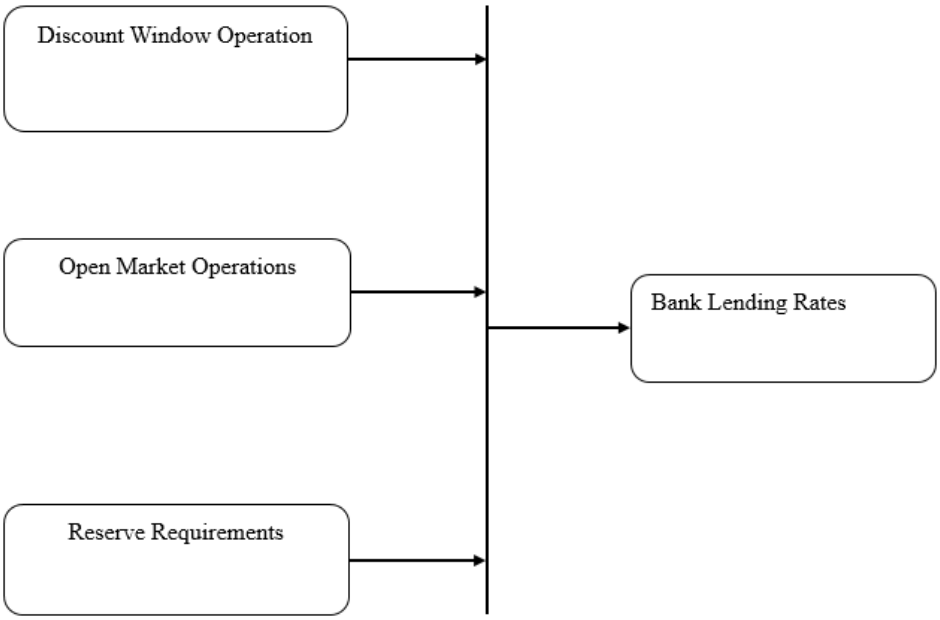
Open Market Operations

According to Akhtar (2007), Open Market Operations objectives are that the government sells government-backed securities to the economy to mop up excess liquidity. The Central Bank alters the Central Bank Rate, which impacts the short term interest rates as witnessed by a steady decline in the average 91-day Treasury bills rates CBK, (2012).

The government in instances of excess liquidity in the markets, high inflation rates and or a spiraling depreciation of the Kenyan shilling, employs open market operations which are a tightening monetary policy. The object of OMO is to mop up excess liquidity, therefore the government will sell off government backed treasury bills at the risk free rate in the economy to mop up the excess liquidity and achieve the desired level of reserves Bogdan and Bilken, (2009).

Reserve Requirements

Central Banks are empowered to demand a certain proportion of commercial bank's deposits held as non-interest bearing deposits. This is used to influence some of the loans that banks can advance the public and thus affecting the supply of money. According to CBK (2013), the volume of liquidity in circulation influences the levels of interest, as well as the value of the Kenyan shilling against other currencies. Bank reserves are kept very close to the required levels since banks generally do not earn a return on reserve assets. The cash ratio is a direct credit control instrument, which works by enhancing or reducing the ability to create credit out of a given deposit base.



Source: Researcher, 2015

Fig. 1: Monetary Policy Instruments

Effects of Monetary Policy

Introduction

This section covers the empirical analysis of the sampled secondary data regarding the variables under consideration in the study. The data was tested for stationarity of the variables and the residual, correlations, and Cointegration. Regression analysis was done for the same sample covering the period 2000-2014. E-views, econometric software were used to analyze the data.

Diagnostic test for normality

The characteristics of the distribution of the variables are presented in table 4.1 below.

Table 5.2: Descriptive statistics

	LIR	CBR	TBR	RR
Mean	17.40527	11.34518	6.28987	9.44583
Median	15.25742	11.301	5.25754	10.89710
Maximum	24.08909	15.19075	21.09633	12.77380
Minimum	8.48497	5.26509	8.13243	8.49087
Std. Dev.	6.00547	1.76049	7.56981	5.67532
Skewness	0.04001	0.07810	0.09105	0.24661
Kurtosis	1.83000	1.78355	2.42820	1.32187
Jarque-Bera	2.46410	2.69492	0.64520	2.48139
Probability	0.29169	0.2599	0.72426	0.06453
Observations	60	60	60	60

From the test, the distribution probabilities for LIR is 0.292, CBR is 0.2599, TBR is 0.724, RR is 0.0645 (for a normal distribution, the probability should be greater than 0.1). Therefore, all variables are normally distributed. The statistic for Kurtosis (K) shows, LIR, CBR, TBR, and RR are platykurtic, suggesting that their distributions are flat about the normal. Skewness (S) for LIR is 0.04, CBR is 0.0781, TBR is 0.091, RR is -0.247 (for normal distribution, skewness: S=0). From the results LIR, CBR TBR and RR were all positively skewed. The Jarque-Bera test was used to determine whether monetary policy instruments and Bank lending rates follow the normal probability distribution. It utilizes the Skewness and kurtosis measures and uses the following formula;

$JB= n [S^2/6 + (K-3)^2/24]$

Where n= sample size;

S= skewness coefficient; and

K= Kurtosis coefficient.

The JB normality test is a joint hypothesis that of skewness (S) and kurtosis (K) (for a normal distributed variable, S=0 and K=3). Therefore we conclude that all the variables in our study are not normally distributed since there is no variable whose distribution has S=0 and K=3.

The standard deviation is a measure of variability from the mean. From the test, we find that LIR has the greatest variability (6.0075) while CBR has the smallest variability (1.7605) from the mean. The minimum, maximum, median and the mean, shows the smallest growth rate, the maximum growth rate, the middle growth rate and the average growth rate for each variable respectively.

Test for Stationarity

When estimating a model that includes time series variables, it is necessary to ensure that all time series variables in the model are stationary, which means that they were integrated of the same order. This was done by conducting a unit root test on each variable to find the order of integration. A stationary variable has a time-invariant mean and covariance. Estimation based on non-stationary variables may lead to

spurious results with high R^2 and t-statistics, but without any coherent economic meaning and inconsistent parameter estimator. This is called spurious regression.

An I (0) series is a time series that is stationary at level. An I (1) series contains one unit root and is a time series that is stationary at first difference. If the time series data is non-stationary, and y_t is differenced d times before it became stationary, then it is said to be integrated of order d. We write $y_t \sim I(d)$. So if $y_t \sim I(0)$ then $\Delta dyt \sim I(0)$. If the variables in the regression model are non-stationary, that is, not integrated of the same order and then, the analysis will call for the error correction model to be run. However, if stationary, that is, integrated of the same order, then, we go ahead with our analysis using the OLS.

In this study, Augmented Dickey- Fuller (ADF) test was used to test for unit roots. The results are as shown in the table below. The decision criterion involves comparing the computed ADF statistic values with the Mackinnon critical values for the rejection of a hypothesis of unit root. If the computed ADF Statistic is smaller compared to the critical values, the null hypothesis of non-stationarity in time series variables is rejected and vice versa. In our case (Table 4.3), the computed ADF test-statistics are smaller than the critical values at 1%, 5%, 10% significant levels, therefore, we can reject Ho. It means the time series does not have unit root problem, and the series is stationary at 1%, 5% and 10% significant level. In our case (Table 4.3), the results show that LIR is stationary at level i.e. I (0) at 5% significance. CBR is stationary at level i.e. I (0) at 10% significance while TBR and RRR are stationary at level; I (0) at 1% significance.

Table 5.3 ADF Unit-Root Test (at zero difference) Results

Variable	t-Statistic	Test critical values			Remark	Order of Integration
		1% level	5% level	10% level		
LIR	-3.899718	-4.186481	-3.51809	-3.189732	Stationary	I(0)**
CBR	-3.428392	-4.205004	-3.526609	-3.194611	Stationary	I(0)*
TBR	-4.081079	-3.596616	-2.933158	-2.604867	Stationary	I(0)***
RR	-4.761063	-4.205004	-3.526609	-3.194611	Stationary	I(0)***

*Notes:*Significant at 10 percent ** Significant at 5 percent, *** Significant at 1 percent; H_0: there is a unit root*

Cointegration Test

If all variables are integrated of the same order, the second step is to estimate the model, also called a "Cointegration equation," and test whether the residual of the model is stationary, in which case the model defines a long run equilibrium relationship among the co-integrated variables. This was done by generating the residual series using Eviews 7 Software, and the residuals were subjected to an ADF Test.

The computed values were compared with the critical values as shown in Table 4.4. The results show that there is the existence of co-integration. It shows that there is a linear combination between the dependent variable Lending Interest Rate (LIR) and the independent variables Central Bank Rate, Treasury Bank Rate and Reserve Ratio requirements.

Table 5.4 Unit Root Test for residual results

Variable	t-Statistic	Test critical values			Remark	Order of Integration
		1% level	5% level	10% level		
Residual	-6.390081	-3.596616	-2.933158	-2.604867	Stationary	I(0)***

*Notes: ** Significant at 5 percent, *** Significant at 1 percent; H_0: there is a unit root*

The results indicate that these residuals are stationary, at 1% significance (i.e. I (0)). The linear combination of the variables of the model is stationary, and they are co-integrated which shows the presence of a long-run relationship between the dependent and independent variables.

Correlation Analysis

Correlation analysis is a statistical technique employed to analyze the relationship between the variables used in the study. Column 2 shows the relationship between the dependent and independent variables. From the results CBR and TBR, are directly correlated to LIR (note the positive) while RR is inversely correlated to the same (note the negative sign). Columns 3, 4, 5 show the relationship among the explanatory variables. The correlation matrix shows that all the variables are not highly correlated (for high correlation, the coefficients are above 0.8). As a result, the problem of multicollinearity brought about by a high correlation between the variables was avoided. This outcome gave the researcher the green light to run the OLS, model.

Table 5.5 Correlation Matrix

	LIR	CBR	TBR	RR
LIR	1.00000	0.17925	-0.31476	0.28948
CBR	0.17925	1.00000	0.11386	0.17806
TBR	0.31476	0.11386	1.00000	-0.31356
RR	-0.28948	0.17806	-0.31356	1.00000

Testing the OLS Model

The tests determine the impact of independent variables on the dependent variable by comparing the results of the model. In this study, the test was to govern the impact of MPC i.e Central Bank Rate (CBR), Treasury Bank Rate (TBR) and Reserve Requirements (RR) on Bank Lending Rates (LIR).

Table 5.6 OLS analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-25.08526	4.20929	-5.95950	0.00000
CBR	0.23530	0.13026	1.80642	0.07880
TBR	0.35839	0.04146	8.64362	0.00153
RR	-0.00492	0.07049	0.06981	0.94470
LIR (-1)	-0.00556	0.15004	-0.03708	0.06735

R-squared	0.741075	Mean dependent var	14.40527
Adjusted R-squared	0.704086	S.D. dependent var	6.00547
S.E. of regression	3.298606	Akaike info criterion	5.21680
Sum squared resid	380.80820	Schwarz criterion	5.42159
Log likelihood	-103.16110	Hannan-Quinn criter.	5.29232
F-statistic	20.03487	Durbin-Watson stat	1.87511
Prob(F-statistic)	0.00000		

Discussion of results and Comparison with other Findings

An examination of the econometric results shows that the overall fit is satisfactory with an R-squared (R^2) of 0.741075 or 74%. It implies that LIR, CBR, TBR and RR explained about 74% systematic variations of Bank Lending rates (LIR) over the observed years in the Kenyan economy while the remaining 26% variation was explained by other determinant variables outside the model. The value of Durbin-Watson is 1.88 for the model. This fell within the determinate region and implies that there is a positive first order serial autocorrelation among the explanatory variables in the model.

The potency of CBR in explaining LIR in the country is positive and is statistically significant at 10 percent significance level (p-value < 0.1). Which can be interpreted to mean that one percent (1%) increase in CBR will cause LIR to increase by 0.23530 percent, ceteris paribus. The result is consistent with the works of Misati et al, (2010), Kashyap and Stein, (2007) and Cecchetti, (2008) who found that the Central Bank rate was the greatest determinant of bank lending rates. A plausible interpretation of these results is that an increase in the CBR will automatically lead to an increase in the LIR through the increase in KBRR + bank specific margins.

TBR was also found to be an important determinant of Bank Lending rates at 1% significant level (p-value < 0.01). This implied that a one unit increase in TBR would lead to increase in LIR by 0.35839 units. It can be inferred TBR ratio has a positive impact on LIR in Kenya. The result is consistent with the works of to Somoye et al. (2009), Akhtar, (2007), Adams, et al. (2005) and Kashyap and Stein (2007). A probable interpretation of these results is that an increase in the TBR, which guides the economic environment in terms of the approximate prevailing risk-free rate of return for the next three months. An increase in the TBR rates will lead to a significant increase in the LIR since banks will view this as a sign of increase investment. Borrowers will borrow more, and there will be excess money supply to counter this the govt will use monetary policy instruments to mop up the excess liquidity and hence an increase in LIR.

Reserve Requirement ratio was not an important determinant of Bank lending rates at 1% significance level (P-values > 0.1). This implied that a one unit increase in reserve requirements will lead to a decrease in GDS by 0.00492 units. It was inferred to mean that Reserve Requirements have a negative and

insignificant impact on LIR in Kenya. The result is consistent with the works of Mohammad (2010), Somoye and Ilo (2009), Hancock and Passmore, (2006) and Buigut (2010).

A probable interpretation of these results is that Reserve Requirements are used as a means of the last result by the CBK in trying to arrest excess liquidity. The Reserve requirements makes the commercial banks have less liquid money for lending /loan purposes and as such will lead to an increase in the LIR. Further to this, the study found a negative relationship to this which was consistent with other works. A plausible explanation would be that the CBK hardly uses it as an MPC tool unless in instances of spiraling shilling depression and high bank lending rates and hence the negative and insignificant relationship to LIR.

Comparison of Findings with other Local Studies

This study sought to investigate the impact of Monetary Policy Instruments as drawn up by the Monetary Policy Committee of the Central Bank on Commercial Bank's Lending Interest Rates in Kenya. The study found that the Central Bank Rate (CBR) and Treasury Bill Rate (TBR) were both positive and significant monetary policy instruments that influenced bank lending interest rate (LIR) in a manner that advances the Monetary Policy Committee stance. The study however, found Reserve Requirements to be negative and insignificant as a monetary policy tool in helping the Monetary Policy Committee's cause.

The results from this study are supported by a study titled *"Bank Rate and the Transmission Mechanisms of Monetary Policy in Kenya"* done by (Mwega 2013), who was a member of the Monetary Policy Committee at the time. The study found that CBR and TBR as instruments frequently used by the CBK for monetary policy were effective but often with a lag of several months as opposed to immediate. The study found that an increase in the CBR, TBR and lending rates does not reduce private sector credit amounts until from the third month after the change.

This study results were also further supported by a study titled *"The choice of Optimal Monetary Policy Instruments for Kenya"* done by (Gichuki, Odour and Kosimbei 2012). Using time series data sets for the period 1994 to 2010 and an Error Correction Model the study established that both TBR and CBR rates resulted in minimal losses in output compared to Reserve Requirements/ Money when used as monetary policy instruments. The study was also seeking to see which among the two instruments; (TBR, CBR i.e. interest rates) and Reserve Requirements/Money when used individually or simultaneously were most effective. The study established that a combination of the instruments minimizes losses from equilibrium output better than the other two instruments taken independently. The study recommended that the CBK should adopt a pure interest rate instrument policy i.e. (CBR and TBR). It went further to suggest that there was need for the CBK to construct a monetary policy conditions index which would help in the implementation of a combination instrument policy.

Conclusion

The first objective of the study was to establish the extent to which discount window operations increase bank lending rates of commercial banks in Kenya. The variable was operationalized by use of CBR as a variable most suited to represent the discount window operations. The findings indicated that CBR rate has a positive and significant effect on Bank's Lending Interest rate. This implied an upward increase of the CBR will see the banks revise their Lending interest rates upwards, *ceterius paribus*.

The second objective of the study was to establish the influence of open market operations on commercial bank's lending rates in Kenya. The variable was operationalized by use of TBR as a variable most suited to represent the open market operations. The findings indicate that TBR had a positive and significant

effect on Bank's Lending Interest Rates. This implies that an increase in the TBR would signal an increase in the banks will further push holders of loans to default hence an increase in the non-performing loans.

The third objective of the study was to establish the effect of Reserve Requirements on Banks' Lending Interest Rates of commercial banks in Kenya. The objective was operationalized by use of RR ratio as a variable most suited to represent the discount window operation. The findings indicate that reserve requirement ratio was negative and insignificant in explaining the Lending Interest Rate in commercial banks. This implied that fluctuations in the ratio required by the CBK regarding commercial banks did not affect bank's LIR, this was elucidated by the fact that the CBK tends to use Reserve Requirement ratio as a measure of last resort in trying to arrest macroeconomic shocks as well as runaway depreciation of the shilling

Recommendation

The study sought to provide more information to the Central Bank, and Managers of commercial banks on the impact of the different monetary policy instruments/ tools as used by the Central Bank of Kenya. Following the conclusions drawn from the study findings, it is recommended that the Central Bank of Kenya should play a more active role in ensuring that they use the CBR and TBR as a first measure for trying to communicate its desired stance on Bank Lending Interest Rates (LIR) and maintain economic stability. The CBK through the monetary policy committee should also implement measures that act in concert such as reserve requirements coupled with the introduction of the CBR liquidity measures as it tries to arrest the liquidity risk in the market since the banking system is less sensitive to changes in CBR rates that are supposed to reflect the lending interest rates.

Suggestions for Further Research

The Impact of Monetary Policy Instruments on Bank Lending Interest rates is a research area where not much research has been carried out and also varying results have been published on the same in Kenya. As such, it would be a great area of research for scholars and other stakeholders alike.

References

Akhtar, M. A. (2007). *Understanding Open Market Operations,* Public Information Department, Federal Reserve Bank, New York NY.

Allen, F., and Santomero A. M. (2009). *Journal of Banking & Finance* No. 21 1461-1485, The Wharton School, University of Pennsylvania, Philadelphia, PA 19096, USA.

Benston, G.J., and C.W. Smith (2002). A Transaction Cost Approach to the Theory of Financial Intermediation. *Journal of Finance* 31, no. 2 (1976): 215-32.

Bernanke, B.S (2010). Credit in the macroeconomic. *Federal Reserve Bank. Quarterly Review,* NY, 18 pp 50-70.

Bett, K.A. (2011). *Financial Performance of Banking Sector: A case of the Kenyan Banks and Financial Institutions,* MBA Research Project, UON.

Black, T. and Daniel, D. (2008). *Money and Banking Contemporary Practices, Policies and Issues (6th ed.),* Business Publications Inc., Texas, USA.

Buigut, S. (2010), Is There a Bank Lending Channel of Monetary Policy in Kenya? International. Research Journal of Finance and Economics, Issue 45, Euro Journals Publishing, Inc., http://www, euro journals. Com/finance.htm, retrieved on 27th September 2014.

Ccechetti, S. G., (2008). Money Banking and Financial Markets, 2nd Ed., McGraw Hill Companies Inc., 1221 Avenue of Americas, New York NY 10020.

Central Bank of Kenya, (December 2010). Monetary Policy Statement, at http://www.centralbank.go.ke, retrieved on 11th May 2011. Cecchetti, Stephen G. (1999). Legal Structure, Financial Structure, and the Monetary Policy

Central Bank of Kenya, (December, 2009).Monetary Policy Statement, at http://www.centralbank.go.ke.

Central Bank of Kenya, (2012). Bank Supervision and Annual Report,. http://www.centralbank.go.ke.
Central Bank of Kenya, (2013). Bank Supervision and Annual Report, retrieved on 15th September 2013 from: http://www.centralbank.go.ke.

Central Bank of Kenya, (August, 2014). The Monthly Economic Review, prepared by the Central Bank of Kenya retrieved from the internet at: http://www.centralbank.go.ke, site opened on 15th September 2014.

Central Bank of Kenya, (September, 2010). Developments in the Kenyan Banking Sector Bulletin,: retrieved on 17th November 2010 form http://www.centralbank.go.ke.

Crowley, J. (2007/ Interest Rate Spreads in English speaking Africa, IMF Working Paper, April 2007, 123 - 145.

Dale, S. (2007). Interest rates and the channels of monetary transmission; Some Sectoral Estimates, European Economic Review, 39 pp.1611-1626

Ferreira, C, (2011). The bank lending channel transmission of monetary policy in the EMU: A case study of Portugal, The European Journal of Finance, 13(2) pp. 181-193.

Fisher, J.D.M. (2009). Credit Market Imperfections and the Heterogeneous Responses of Firms to Monetary Shocks ", Federal Reserve Bank of Chicago, Working Paper No. 96, pp 23.

Fofack, H., (2005). Ghazali, N. A. and Ali, K.A.M. (2002). The Effect of Open Market Interest Rates on Malaysian Commercial Banks' Interest Rate Spread: An Empirical Analysis. HUM Journal of Economics and Management 10, no. 1,The International Islamic University Malaysia.

Hancock, D. and Passmore, W., (2006). The Bank Lending Channel of Monetary Policy and Its Effect on Mortgage Lending, Public Information Department the Federal Reserve System, New York NY.

Haug, A. A., O. IC, and Ranchold, S., (2008). Monetary policy transmission mechanisms and currency unions: A Vector error correction approach to a Trans-Tasman currency union, Journal of Policy Modeling, 27(1) pp. 55-74.

Johansen, S. (2010). Statistical Analysis of Co-integration Vectors, Journal of Economic Dynamics and Controls, 12 (2-3) pp. 231-254

Kahn, C, George P., and Ben S. (2010). Bank Consolidation and Consumer Loan Interest Rates, Consumer Transactions and Credit, the Federal Reserve Bank of Philadelphia and Wharton Financial Institutions Center Conference.

Kobayashi, T. (2009). The Relationship between Short- and Long-Term Interest Rates, International Finance Journal, 7(2):261-286.

Kuhnmiinch, G. and Beller, S. (2005). Distinguishing between causes and enabling conditions. Cognitive Science, 29, 1077-1090.

Lucey, T., (1992). *Quantitative Technique.* The Guernsey Press Co. Ltd, Vale, Guernsey C.I. UK.

Matthews, K., and Thompson J. (2008). *"The Economics of Banking",* Chichester Wiley Publishers, UK. Chapter 2, 3 and 9 - section 9.2., pp.35 and 36.

Maturu, B.O., Kethi K. and Maana I, (2006). *A New Keynesian Phillips Curve for Kenya,* Central Bank of Kenya Working Paper Series, Working Paper WP/06/02, at http://wvvw.centralbank.go.ke/publications/swp/index.html.

McCallum, B., and Nelson E. (2006). An Optimizing IS-LM Specification for Monetary Policy and Business Cycle Analysis, *Journal of Money, Credit and Banking,* 31 (3):296-316.

Misati, R. N., Njoroge L., Kamau A., and Ouma S. (2010). Financial Innovation and Monetary Policy Transmission in Kenya, *International Research Journal of Finance and Economics,* EuroJournals Publishing, Inc. 2010.

Mohammad, S.D., (2010). Impact of Money Supply on Current Account: Extent of Pakistan, *European Journal of Scientific Research,* Vol.41 No.2 pp.314-322, http://www.euroiournals.com/eisr.htm opened on 20th December 2010.

Mugenda O, & Mugenda A. (2003). *Research Methods: Qualitative & Quantitative Approaches,* ACTS Press, Nairobi, Kenya.

Mutwiri, M. (2007). *Use of 6C's Credit Appraisal Model and its Relationship with the Level of Non-Performing Loans of Banks in Kenya,* MBA Research Project, UON.

Madura, J., (2003). *Analysis and Evaluation of the Eurex Repo Market Model*. Unpublished MBA thesiss Institution / College Leopard-Franzens University, Innsbruck (Banking and Finance)

Markus K. B., (2009), Deciphering the Liquidity and Credit Crunch 2007–2008. *Journal of Economic Perspectives*—Volume 23, Number 1—Winter 2009—Pages 77–100

Morris, C. S and Sellon, G. H. (2005). Bank Lending and Monetary Policy: Evidence on a Credit Channel, *Economic Review*, Second Quarter 1995, 59-75.

Nwankwo, G. O. (1990). *Prudential Regulation of Nigerian Banking*, Lagos: University of Lagos Press.
O'Hara, L. (2005) *the implementation of monetary policy in Australia an examination of interest rate targeting and the endogeneity of liquidity*. Unpublished thesis University of Western Sydney

Olivei, Giovanni P. (2002). Switzerland's Approach to Monetary Policy. *New England Economic Review*, Federal Reserve Bank of Boston (Second Quarter), 57–60.
Thailand. Chulalongkorn University.

Poole, W. (1970). "Optimal Choice of Monetary Policy Instruments in a Simple Stochastic Macro Model", Quarterly Journal of Economics, 84, pp 197-216.

Somoye, R., Olukayode, C, and Ilo, B. M. (2009). The Impact of Macroeconomic Instability on the Banking Sector Lending Behavior in Nigeria, Journal of Money, Investment and Banking,IssueNo.7,EuroJournals Publishing, Inc. at http://www.euroiournals.com/JMIB.htm. Transmission Mechanism, Federal Reserve Bank of New York Economic Policy Review, 5(2), pp. 9-28.

Souleles, N. S. (2001). Consumer sentiment: its rationality and usefulness in forecasting expenditure
Stever, R., Wilcox, A., 2007. Regulatory discretion and banks'pursuit of ―safety in similarity‖. BIS, *Unpublished working paper*.

Stiglitz, J. E., and Weiss, A. (2001). Credit Rationing in Markets with Imperfect Information, *American Economic Review*, June, 393-410.

Usman, S. (2005, Jan- March). Bank Regulation and Supervision in Nigeria, The Nigerian Banker, 7-9.

Analysis of the Education Structure of the Population of the Slovak Republic In Relation To Buying Behavior

Jaroslava Gburová, Prešov University, Faculty of Management, Prešov, Slovakia,
jarkagburova@gmail.com

Martina Marchevská, Prešov University, Faculty of Management, Prešov, Slovakia,
martina.marchevska@unipo.sk

Abstract

Article presents an executive summary of primary and secondary data on the situation of the economically active population, the unemployed in Slovakia, with an emphasis on educational structure. Consumer behavior affect the different personal characteristics such as sex, education, income, lifestyle, personal attitude of consumers. The high prices of goods and services, high prices for housing, low income and unemployment represent significant restrictions for the purchasing decisions the population of the Slovakia. All these and many other factors have an impact on economic growth and its impact on social well-being and quality of life. The article offers an analysis of the factors affecting the consumer decision making with regard to the educational structure of the population. The present text allows you to understand the importance of human resources in terms of the nature and importance of education and the need for support from the State in the field of employment.

Keywords: educational structure, economic activity of population, Slovak republic, unemployment.

Introduction

Human resources have traditionally been considered primarily with regard to the educational structure. Well-educated people able to work with information and knowledge are less threatened by unemployment and have higher wage ratings (Ježek, 2007). Mitríková (2008) defines the general concept of retail trade as a summary of all the activities related to the sale of products or the provision of services directly to end consumers. Retailers expressed some form of distribution, in which the consumer acquires a range of (goods) as a final consumer in order to meet the needs of retailers. When customers have to choose not only catalogue of goods and services, but also to the place of purchase, or sales. Consumers shop at those places where their purchase reaches a maximum efficiency with minimum effort (Lajčin, Frankovský, Štefko 2012; Mudrík, Fedorko, 2010). Localization is the process of site selection (of the region) for the particular socio-economic activity. Every region has certain resources and each activity is characterized by the same needs. The best location is where the resources are optimal for a given socio-economic activities. I tis therefore possible to agree with the view that the location is the most important topic of the examination with a focus on the use of space (Ježek et al., 2007). Similar themes are explored by the authors: Batistova (2013); Vavrek et al. (2014); Coad, Nielsen, Timmermans (2017); Fedorko, Kakalejčík (2015); Storey, David J. (2016).

Literature Review

Consumers make a substantial number of purchase decisions every day. These decision are being examined by companies to see consumers' behavior – what to buy, in what amounts and how often, when and why (Bartáková et al., 2007; Gburová, Bačík, 2014). Anyone who buys any goods or services is a consumer. A consumer is a unique entity with its own opinion which should be respected by any entity that wants to sell its product or maintain its customers (Hes et al., 2008). Consumer in making the

purchasing decision is influenced by a number of elements. External factors, respectively external have link to the environment in which the consumers live and the way they live. This group includes such determinants as culture in which an individual is born, the income, age and social status. Other important variables among consumers are their internal specifics that result from the different psychological characteristics such as personality traits, motivation or degree in consumer learning. These internal characteristics are called internal factors, respectively. They are psychological impact. External and internal factors of consumer behavior to interact and collectively shape the decision-making process on the consumption of goods and services (Richterová et al., 2015).

The primary factors in the decision making process of consumers are purchasing (awareness of the needs, evaluation of alternatives, product selection, after-shopping review usefulness) and consumption, which are mostly obvious and observable acts (Kita et al., 2005). The shopping behavior of consumers represents a vibrant interaction between people and the environment because it is containing emotions, cognition, action, through which people carry out exchanges, in order to satisfy your benefit (Richterová et al., 2005). Highly satisfied customers generally remain loyal, buy more goods, talk about the brand and its products in front of others, are less receptive to the brand's competitors and their prices, provide their ideas. Moreover, selling goods and providing services to loyal customers is cheaper since the whole purchasing process has become a routine for both sides (Kotler and Keller, 2013).

„The economic situation in the sectors and industries in Slovakia is not the same. Similarly, the economic situation is not identical in different regions and there are recorded the regional disparities, while the other EU countries compared with the Slovak Republic have also different economic results. In the current dynamic period is not possible to assess the economic level of countries and propose measures to improve the situation without taking account of these disparities. In general, we can define several factors that contribute to the quality of economic life and competitiveness of the country and have a decisive impact on them. The three most significant changes that have affected the nature, strength and performance of the national economy might include: the transformation from a centrally planned economy to a market economy, the integration of the Slovak Republic to the European Union and the implementation of structural reforms"(Kotulič et al., 2015). The Slovak Republic, at the time a candidate state for EU membership, participated in the meeting and received guidance for implementing economic policies promoting the inclusion of disadvantaged groups. Slovakia's response was to develop a set of policies and guidelines that addressed poverty by promoting employment, called the *2004-2006 National Action Plan on Social Inclusion* (NAPS). The NAPS seeks to address poverty by promoting independence in an attempt to reduce government expenditure on welfare. The central strategy is to assist individuals to become economically self-sufficient via engagement in the paid labor market. Following the perceived success of welfare-to-work programs in reducing expenditure on welfare in countries like the United States, Slovakia. Similarly sought to reduce its spending on welfare by requiring an individual to participate in the labor market in order to receive welfare benefits. (Gould & Parker Harris, 2017).

Methods and Methodology

The social expression of individual processes, i.e., economic activity of the population or unemployment in individual regions has led to significant differences and social inequalities, which in the previous homogeneous society are accepted inconsistently. Economically active inhabitants are a source of labor in the Slovak Republic, resulting in an increase in household consumption, a higher living standard of the population and, ultimately, a reduction in social inequalities in society. The following (Table 1) represents the sum of the economically active population from the point of view of the educational structure in Slovakia.

Table 1: Economically active population by education and sex in thous Persons (2012–2016)

	2012	2013	2014	2015	2016
Males and females total					
Level of education total	2 706,5	2 715,3	2 721,8	2 738,3	2 758,1
Basic	158,2	158,5	154,4	158,4	154,5
Secondary education without maturity	82,7	80,4	.	.	.
Secondary education with maturity	875,1	929,9	893,0	910,1	916,4
University - Bachelor degree	67,7	70,6	88,6	80,5	70,3
University - Master degree	421,2	447,8	457,9	489,2	531,7
University - PhD. Degree	11,4	10,5	16,0	19,3	16,2
No schooling	0,2	-	0,3	0,3	0,1

Source: SU SR (2016), own processing

The most frequent group of economically active population was represented by persons with secondary education with graduation, 54% (2016) of the total number of economically active, followed by University - Master graduates, 31.4% (2016). The share of University - PhD. degree was 1% of the total number of economically active.

Unemployed by education

Education is a priority in terms of securing positions in the market, the higher the income, the lower the possibility of job loss, or lower the degree of threat against long-term unemployment.

Table 2: Unemployed by education and sex in thous Persons (2012 - 2016)

	2012	2013	2014	2015	2016
Males and females total					
Level of education total	377,5	386,0	358,7	314,3	266,0
Basic	70,4	67,1	68,5	61,0	49,5
Secondary education without maturity	10,5	12,6	.	.	.
Secondary education with maturity	91,0	100,5	83,4	78,5	64,8
University - Bachelor degree	6,2	7,4	8,2	6,3	6,0
University - Master degree	28,1	30,0	26,9	29,1	28,6
University - PhD. degree	0,5	0,6	1,0	0,2	0,4
No schooling	0,2	-	0,1	-	-

Source: SU SR (2016), own processing

Unemployment in education is the largest group of population with Secondary education with graduation, 43.40% (2016) of the total number of unemployed. Followed by basic education 33.15% (2016) and education on the University - Master degree, 28.6% (2016). As can be seen from the perspective of unemployment with Secondary education with graduation is critical and there are several reasons. Ignorance of foreign languages, no practice in the field, inability to present themselves on the labor market, unwillingness to travel for work, etc. From the point of view of Higher – Mater degree, there may be an inappropriate selection of study departments, which are in the market enough. Every year,

education at universities in Slovakia successfully completes more than 45,000 students and more than a quarter of them find themselves in employment offices.

The aim of the presented article was to fulfil the established goal, it means, an analysis of the differences in preferences, shopping habits within the purchasing process. The basic set is formed by the respondents divided according to the basic characteristics-from the education of the respondents. The object of research are consumers living in Eastern Slovakia (Prešov region). The significant sample-resource of the primary information-is formed by 418 respondents. The research was realized in November 2015 - January 2016. Respondent´s (consumers) answered in the form of closed questions in the questionnaire.

Primary data obtained were then processed in a statistical program Statistica. On the confirming or rejecting the established hypotheses were used methods Pearson Chí-square test and Pearson pivot coefficient. To achieve the objective we set out to research the following hypotheses:

H_1: Assume that the purchase of the consumers in the Presov region limits largely the amount of income (earnings) for consumers with lower levels of education.

Survey Results

Hypothesis 1 predicts that the consumer buying in the Presov region limits largely the amount of income (earnings) off consumers with lower levels of education. The survey results have shown that low income is one of the most obvious reasons for restrictions when buying consumers in supermarkets. Carried out a survey focused on educational inequality, which points out the differences in levels of education and study of the factors influencing purchases respondents to the limitations of the goods and services in supermarkets.

Hypothesis 1 predicts that the consumer buying in the Presov region limits largely the amount of income (earnings) off consumers with lower levels of education. The survey results have shown that low income is one of the most obvious reasons for restrictions when buying consumers in supermarkets. Carried out a survey focused on educational inequality, which points out the differences in levels of education and study of the factors influencing purchases respondents to the limitations of the goods and services in supermarkets.

Table 3: Factors of consumer decision making according to the educational inequality

	Please indicate which of the above mentioned factors are limiting you in your purchase in retail network							
education		a)	b)	c)	d)	e)	f)	
		No answer	The high prices of goods and services	Low income	High prices for housing	Unemploy-ment	Other	∑
	basic education	0,00%	28,57%	38,10%	4,76%	23,81%	4,76%	100,00%
	secondary education without maturity	6,12%	16,33%	36,73%	12,24%	28,57%	0,00%	100,00%
	secondary education	6,67%	24,00%	33,33%	14,67%	20,00%	1,33%	100,00%

	with maturity							
	university degree I.	9,45%	6,30%	43,31%	35,43%	5,51%	0,00%	100,00%
	university degree II., III	17,12%	36,30%	36,99%	6,85%	2,74%	0,00%	100,00%
∑		10,77%	22,25%	38,28%	17,46%	10,77%	0,48%	100,00%

Source: SU SR (2016), own processing

From the survey we can assess that educational inequality refers to the differences in the levels of education achieved and factors affecting the purchase behavior of the respondents to the limitations. The resulting inequalities in education affect the employment and income of the people. The unemployment rate for respondents is concerned with lower levels of education than among respondents with a university degree.

H1: The level of significance ($\alpha = 0.05$), is less than what is that hypothesis (H0) may be rejected. The test revealed a statistically significant relationship.

Table 4: Chi-squared

chi-squared distribution H1			
	the value	df	p- the value
Pearson chi-squared	122,606	20	0

Source: own processing

Hypothesis 2 anticipates that the purchase of the consumers in the Presov region limits largely the amount of income (earnings) multiple consumers with higher age.

The results of the survey showed that respondents in all tested age structures for the most important reason the restrictions when buying in supermarkets are considered low income. Unemployment in shopping behavior restricts in particular 36.73% of respondents aged 18-30 years old, which may stem from the inability to work due to insufficient qualifications, professional experience and expertise. In the case of 32.98% of respondents aged 51-60 years reported as the most common factor in purchasing restrictions, high prices for housing (rent, energy, transport and other). The survey showed that 20% of respondents at the age of 61 years or more troubled by the high prices of goods and services in comparison with other age structures. At the same age as limiting factor when buying in supermarkets 30% of respondents said high prices for medication.

Conclusion

The high prices of goods and services, high housing prices, low income and unemployment are important indicators for the population and has a major impact on quality of life. A key indicator - employment in the examination of standards of living of the population is employed, which allows an individual to provide a higher standard of living. The results of the present article shows that in spite of the higher education it is not clear that an individual receives the coveted job, which will ensure him a better life. People should not hesitate to invest themselves, whether linguistic, or disciplining professional skills. The shopping decision making in supermarkets, affects a lot of other factors, such as: high prices of goods and services, housing, the lack of jobs in individual regions of Slovakia. That's why I need to be aware of the

importance of promoting the creation of new jobs with regard to Secondary education students with graduation and University-Master degree.

Acknowledgement

This article is one of the partial outputs under the scientific research grant VEGA 1/0789/17 "Research of e-commerce with relation to dominant marketing practices and important characteristics of consumer behavior while using mobile device platforms." VEGA 1/0806/16 “Research on issues of consumer behaviour of a new generation of customers with emphasis on identifying preferences and usability of mobile platforms in the process of e-commerce of the subjects localized predominantly on the Central European Market.”

References

Batistova, O. I. (2013). Social and cultural factors of current global and national economic development. In G. V. Zadorozhniy, O. I. Davydov (Eds.). *Spiritual and cultural factors of social and cultural dynamics.* Kharkiv: Tochka (in Ukr.).

COAD, A., NIELSEN, K. & TIMMERMANS, B. (2017). *My first employee: an empirical investigation.* Small Business Economics. 48.1: 25-45.

Fedorko, R., Kakalejčík, L. (2015). Search Engine Optimization and its Importance in the Purchase Process. Central European conference in finance and economics (CEFE 2015), ISBN 978-80-553-2467-8, 30 September – 01 October, Herľany, Slovakia, 155-163.

Jandos, J. and Vorisek, J. (2009), ‘Enterprise Web 2.0. What is it really?’ Proceedings of the 13th Inernational Business Information Management Association (IBIMA), ISBN: 978-0-9821489-2-1, 9-10 November 2009, Marrakech, Morocco, 10-15.

Gburová, J., Bačík, R. (2014). *Marketingový mix.* Bookman, s.r.o. Prešov.

Gould, R. & Parker Harris, S. (2017). Welfare Reform and Disability in Slovakia: exploring neoliberalism, social justice and employment policy.

Ježek, J. et al. (2007). *Budovaní konkurencieschopnosti měst a regionu v teorii a praxi*. Západočeská univerzita v Plzni. Plzeň.

Kita, J. et al. (2005). *Marketing*. IURA EDITION. Bratislava.

Kotler, P., Keller, K. L. (2013). *Marketing management*. Grada Publishing. Praha.

Kotulic, R., Huttmanova, E., Vozarova, I. K., & Nagy, J. (2015). The structural analysis of the sectors of Slovak economy and employment in times of global change and the subsequent development. *Procedia Economics and Finance*, *23*, 1590-1595.

Lajčin, D., Frankovský M. & Štefko, R. (2012). *Possibilities of Predicting the Behavior of Managers When Coping with Demanding Situations in Managerial Work.* Ekonomický časopis. No. 8.

Mitríková, J. (2008). *Geografické aspekty transformácie maloobchodu a nákupného správania sa na Slovensku.* University of Presov.

Mudrík, M., Fedorko, R. (2010). Business Via Google - New Possibilities and the Future. Management 2010: Knowledge and Management in times of crisis and ensuing development, ISBN 978-80-555-0257-1, 21-22 October, Prešov, Slovakia, 448-455. Storey, David J. (2016). *Understanding The Small Business Sector*. Routledge, 2016.

Richterová, K. et al. (2005). *Spotrebiteľské správanie*. Ekonóm. Bratislava.

ŠU SR (2016). http://www.statistics.sk/pls/elisw/MetaInfo.explorer?obj=41&cmd=go&s=1002&sso=2&so=15

Vavrek, R., Kotulič, R. & Adamišin, P. (2014). *Topsis method and its application to the local self-government of the Slovak republic.* Journal of applied economic sciences. Vol. 9, no. 3, s. 505-513

Effectiveness of Investment on the Example of Selected Woodworking Plant

Kornelia Polek-Duraj, Opole University of Techmology, Opole, Poland, k.polek-duraj@po.opole.pl

Abstract

Sawmilling industry in both the wood sector and Polish economy plays a special role. This is mainly due to the fact that it functions mainly due to natural and renewable domestic raw material base. This does not require relatively high energy requirements for wood processing. At the same time it has the opportunity to recover and dispose of wood waste. These elements largely represent the ecological nature of wood products, which is important in terms of achieving sustainable and sustainable development. Therefore, the need to invest in this industry is great. The article describes the reconstruction and expansion of a large sawmill located in the south-western part of Poland. An attempt was also made to show the effectiveness of the changes.

Keywords: sawmill industry, investment, efficiency

Introduction

Polish woodworking industry in the national economy occupies an important place being one of its pillars. Its share of national production is approximately 10% on average. Much of this is influenced by its production based on rich and renewable domestic raw material base, an export volume and positive balance in foreign wood products trade. In addition, about 40% of wood material from Polish forests in various forms (especially construction timber) is sent abroad. Export of Polish wood ranging from furniture, sawn wood, veneer, plywood, windows and doors, round wood and unprocessed wood in the structure of Polish exports accounts for almost 10% and 2% of domestic gross domestic product (GDP)[1]. Currently the best results are achieved on the sale of woodwork to the European Union countries. In 2016, second year in a row, Poland was the leader of woodwork exports, outstripping Germany by over 2%[2].

Sawmilling industry is an area of generally low involvement of foreign companies in Poland. Low interest of foreign investors in that particular industry has a number of reasons, among the most serious is mentioned the process of privatization of the industry. Woodworking plants belonging to the State Treasury were subjected to direct privatization in which participated employees of these entities. In many cases, this method of ownership transformation was not effective (among others due to the lack of sufficient funds of new owners and lack of organizational and marketing skills), therefore many of them failed to find themselves in new economic conditions.

The paper presents the role of sawmill industry in the woodworking industry and the importance of acquisition of a plant by a foreign investor in terms of improving its efficiency.

[1]Lasy Państwowe http://www.lasy.gov.pl/pl/drewno/polski-przeboj [22.08.2017]

[2]http://www.drewno.pl/artykuly/10819,polska-utrzymala-pozycje-europejskiego-lidera-w-eksporcie-stolarki-otworowej.html [22.08.2017]

Polish Sawmilling Industry as a Particular Branch of the Woodworking Industry

The woodworking industry[3] despite its unusual characteristics resulting from both internal and external factors (e.g. poor working conditions, obsolete machines, lack of major foreign investment) plays an important role in the national economy. Its particular role stems mainly from the fact that it operates on natural, yet renewable domestic raw material base (according to the Central Statistical Office, the forest area in Poland was 9196.9 thousand hectares at the end of 2015, corresponding to the forest cover of 29.4% of the country, which allows to obtain approximately 25-26 million m^3 of wood per year, while retaining other non-production functions of forest4). Therefore, this branch of industry does not require relatively large demand for the energy needed to process the wood. At the same time, it has the opportunity to recover and recycle wood waste. These elements fundamentally determine the ecological character of the woodworking industry, being important in terms of sustainable development**.**

Every year, Polish forests supply large quantities of wood in the form of round wood to the domestic market. Raw material is divided into several main assortment groups, purchased by separate branches of the wood industry, among them the sawmill industry[5] dominates, it has the largest share in these purchases (about 38% of total harvest), the value of which is majority of wood sales in Poland realized by the State Forests National Forest Holding (more than 50%). After 2009, the dynamics of marketed production is also significant, despite many unfavorable factors in sawmill industry (Table 1). The dynamics of average employment in sawmill industry (Table 2), which does not differ significantly from the dynamics of total industry and industrial processing, remains important.

Table 1: Dynamics of marketed production in the woodworking industry on the background of the industry in total in the years 2008-2015

specification	2008	2009	2010	2011	2012	2013	2014	2015
Previous year = 100%, fixed proces								
Industry in total	103,5	97,0	109,0	106,6	100,7	102,2	103,4	105,2
Industrial processing	104,2	97,8	110,4	107,2	101,0	102,5	104,9	106,4
Woodworking industry	89,6	88,8	110,1	120,1	111,2	102,9	112,6	102,6

source: CSO data adopted from the study Nakłady i Wyniki Przemysłu 2008-2015.

[1] sawmill industry as sawmill products (according to PKD section C 16.1)

[3] Woodworking industry in this sense includes the production of sawmill (PKD 16.1) and production of wood products, cork, straw and wood used for firing (PKD 16.2)

[4] Lasy Państwowe 2016, Centrum Informacyjne Lasów Pańswtowych, Warszawa 2017, p.3

[5] Sawmill industry covers the production of sawmill products (PKD16.1)

Table 2: Dynamics of the average employment in the woodworking industry on the background of the industry in total in 2008-2015

specification	2008	2009	2010	2011	2012	2013	2014	2015
Previous year = 100%, fixed proces								
Industry in total	102,6	94,2	98,3	101,1	99,0	99,2	101,4	102,0
Industrial processing	103,1	92,7	97,9	101,3	99,3	101,0	102,8	103,3
Woodworking industry	101,5	79,1	99,0	117,8	93,9	94,7	102,2	104,1

source: CSO data adopted from the study Nakłady i Wyniki Przemysłu 2008-2015.
[1] sawmill industry as sawmill products (according to PKD section C 16.1)

Sawmilling industry is a peculiar market. There are a number of problems, ranging from financial ones (usually lack of financial liquidity allowing for necessary investments and upgrades, including improvements in work mainly it involves unpopular material work environment, lack of full mechanization of machining operations and obsolete machine park) to non-compliance with OSH regulations of employers and employees (employers do not always attach due importance to occupational safety training, workplace hazards and awareness of the need to use personal protective equipment, but employees often do not see the need for e.g. usage of personal protective equipment).

Economic changes introduced in the 1990s, affected the entire woodworking industry, triggered complete reorganization of the sawmill industry in Poland. Until then, the market was dominated by approximately thirty powerful enterprises, grouping a dozen of wood processing plants located in one voivodeship, and their centralized management did not allow for rational economy since the funds earned by profitable plants, instead of increasing their production and investment capacity and introducing required modernization, were directed to plants less profitable or even unprofitable, which did not bring visible benefits to either party. After closure of the centrally planned economy, enterprise from woodworking industry were left unaided and failed to introduce reforms and lift the burden of restructuring (most of them were on the verge of bankruptcy or collapsed) (Polek 2004:339). Currently operating sawmills are plants with limited production volume (200-300 m^3 per month). Most of them were based on plants previously run by wood industry or other rural production sites (e.g. old brickworks). These are generally small and medium-sized establishments, mainly located in villages and small towns. According to the National Business Registry Number (REGON), the number of entities operating in this sector following the privatization period (late 1990s) first fell sharply and then increased more than 12% and has remained relatively stable for a couple of years (about 8600-8700). At present, the actual number of sawmills operating in the market is steadily stable, oscillating within 1200-1400, while the basic core is about 700 companies (Polek-Duraj 2016:59). They are mainly small entities, only 3% of them employ more than 49 people. A small percentage are large corporations. The majority of sawmills are located in the northern and western part of Poland. The Opole region has relatively weak position in terms of the number of operators from this particular branch of industry, and the number of companies is the lowest in the country. This situation of Polish sawmills, is caused, inter alia, by the economic difficulties of plants, high costs generated by the purchase of wood (the cost of raw materials in the structure of generic costs is about 55%), the specificity of the product, the level of export, low possibility of self-financing of investments and pursuing required modernization and low interest of foreign capital in this sector.

The main supplier of wood in the Polish market is the State Forests National Forest Holding, under the control of which is the 90% of harvested in the country timber[6], so that it has a significant effect on the structure of the wood market primarily by shaping the supply of material. The final price, since 2006, is set on the E - drewno portal, where the wood from forest districts across Poland is being sold. In this form, sale consists of three stages. In the first two stages, forest districts offer a particular type of wood with fixed minimum price below which it cannot be sold, and the entities place orders giving their price offer. Here, while dividing the timber, the history of the purchase of raw material is taken into consideration, which means that the best chance for the purchase have plants operating for some time on the market, already benefiting from this form of purchase. The situation is different in the third stage of the electronic auction, where one can buy timber that have not been sold yet. Here, the price fixed during the auction determines who would be the buyer. Consequently, the price at the third stage is much higher than in the first and second stage, but anyone who wants to purchase timber, and has adequate resources, can do it. The accepted form of sale significantly differs from the current practice, which is characterized by a specific allocation, at prices set by the State Forests National Forest Holding. Is it better? It is difficult to say, it can only be inferred that it is not a factor encouraging new entrants to this market.

The sawmilling industry in the wood processing chain occupies a special place. This is due to the fact that the first and basic raw material unit is wood. The product of sawmill industry is an indispensable base for the production of other industries (e.g. construction business, furniture industry). It is also worth noting that by-products of sawmills are of great importance in the country's energy balance as they are a source of renewable energy (e.g. in the combination of electricity or heat in the power industry). This industry does not require high-skilled workers. The main characteristic of sawmilling is its location mainly in small towns or villages near forests. Most of them are small and medium-sized businesses (often family businesses) with low timber processing potential. It is worth noting, however, that the sawmill industry is functioning quite steadily, yet relatively intensively.

In Poland, as in other European countries, woodworking workers and furniture carpenters are listed among the occupations with highest risk of work accidents. The greatest number of accidents is recorded while operating the circular saw, planer and milling machines. Major injuries resulting from accidents at these posts are: hand and abdominal injuries.

Characteristics of the wood industry plant in Murow in the aspect of foreign investment

The wood industry plant in Murow was a part of a joint-stock company of the Opole Wood Industry OPDREW S.A until December 2006. The company was established on the basis of an entity that had been established on January 1, 1950 by the then Minister of Forestry and Wood Industry by separating wood processing plants from the economic organization of the State Forests. From the very beginning the plant was one of the largest sawmills in Poland. Its annual processing reached 150,000 m^3 of wood in the best years. It was the second largest factory in Poland.

Throughout its operation, the plant was focused on modernizing production processes, increasing labor productivity and economic efficiency to the extent adequate to capital and organizational capacity of its owners and on improving working conditions.

The period of economic transformation forced the company to take measures to adapt its business to market economy rules. These actions were completed with legal liquidation of the enterprise. In April 1997, its assets, i.e. 14 plants (one of the most modern and largest sawmills in Poland - in Murow) were taken over from the state treasury by the Opole Wood Industry Joint Stock Company "OPDREW" for lease. Unfortunately, this was not a successful transaction, because less than four years later the company declared bankruptcy. This largely contributed to the strategic investor who used the company for its own purposes, rarely coinciding with the business interest. After the

[6] Lasy Państwowe http://www.lasy.gov.pl/pl/drewno/skad-sie-bierze-drewno [19.08.20017]

bankruptcy announcement, all sawmills were put up for sale. The sawmill in Murow was in the best situation as it was bought from the receiver by Zakład Przemysłu Drzewnego Sp. z o.o in 2002. Thanks to that it functioned without unnecessary downtime caused by the bankruptcy of the previous company. The purpose of economic activity was production of sawn timber (i.e. floors, soffits, construction timber, paneling, balcony boards, garden system components, etc.). Annually, approximately 45,000m^3 of sawmill wood was processed there. The contractors of the plant, apart from individual customers, were also foreign companies (German, Belgian, Dutch). Unfortunately, the following years showed that it did not function well enough to be able to develop properly and bring expected profits. This was due to the lack of adequate financial liquidity enabling necessary modernization of the plant and new investments. Consequently, the company's management decided to take an offer of Stora Enso, a Swedish-Finnish company, which decided to invest in the plant's modernization and thus promote the development of the regional industry.

Foreign investments in the sawmill industry (case study)

The first and so far the only foreign investment in the Opole region (in this region, it mainly invests in the production of construction materials, food products, chemicals and plastic products (Bernat 2016:47) in the sawmill industry took place in December 2006. At that time Stora Enso finalized the purchase of the wood industry plant in Murow (it acquired 100% of shares). Thus the Murow plant became part of the Stora Enso Timber Central European Production Group, including sawmills in Austria, the Czech Republic, Germany and Poland. The unit consists of 27 wood processing plants and is one of the leaders in the world market of wood processing.

Stora Enso Corporation is an integrated wood processing company that produces paper, industrial packaging and wood products. Its products are of the highest quality produced in accordance with international standards. Currently it is the second largest producer of lumber and timber products in the world. Stora Enso group employs approx. 29.000 people in more than 35 countries on five continents[7]. The company's annual production capacity is 13.1 million tons of paper and 7.5 million cubic meters of sawed wooden products.

The choice to invest in sawmill in Poland was not accidental, as the area of our country is characterized by very good wood material and high quality sawmill wood. The experience of the Swedish-Finnish consortium on many markets and the capital base provide great opportunities for the development of the company.

The new investor has committed to carry out modernization of the plant and its further development. It is especially important for the local community of the municipality of Murów where unemployment reaches 19% and is higher than average in the region, with a low level of industrialization of the municipality.

Characteristics of the Project and Its Benefits

The purpose of the company's management is to create a modern wood processing facility in Murow, which will significantly improve the economic situation not only in the district but also throughout the region. Professionally functioning sawmill will not only provide jobs, but will also be a chance of development for a number of transport companies involved in logging and service. In addition, activities designed to improve working conditions are planned. For this purpose, the plant was redeveloped in autumn 2014. The investment costed 27 million Euro and was the largest sawmilling industry in Poland. The official opening after the modernization took place in September 2016.

As part of undertaken measures, new technology halls, social rooms and machines were designed. The sawmill site has been hardened with new bitumen and concrete slabs. All the actions have been

[7]http://www.grupalokalna.pl/wiadomosci/tartak-w-murowie-na-swiatowym-poziomie [20.08.2017]

carried out using the latest technical solutions, taking into account both high quality requirements as well as OSH and environmental protection rules. Among the most serious changes are the following:

1. Instalment of the new line woodworking with sorting function with a length of 400.
2. Creation of a new line for the processing of soft wood.
3. Construction of a new workshop, boiler room and transformer station.
4. Liquidation of re-sorting hall and building new sorting hall.
5. Setting modern planer hall, further processing hall and warehouse.
6. Introducing a modern system of transport and storage of sawdust.
7. Transfer of administrative work to a modern office.
8. Change of land infrastructure – i.e. from the remaining material of the site's equalization, the embankment was docked at the border with neighboring plots acting as a limitation of visibility for outsiders.
9. Building of a car park in the vicinity of a new office for customers and employees, and entry to the premises equipped with a toll booth.
10. Focus on periodic training of workers in the field of health and safety regulations, which were previously not carried out regularly and often in an incomprehensible way, which did not fulfill its task. The company attaches great importance also to the use of protective equipment necessary for the various positions and compliance with working time.
11. The possibility for the employees to participate in various job trainings and free courses of German or English (foremen and administrative staff of all departments) in order to improve communication with the management from Austrian and foreign clients.
12. The annual family festival at the end of the vacation, a so-called Family Day.

All production facilities are equipped with automated lines imported among other from Austria. Most of the work is done by a device that is supervised by a person.

It is also worth emphasizing that all implemented solutions are environmentally neutral, which means that they do not adversely affect both protected and endangered habitats and species of plants and animals, and at the same they do not impact on functioning of refuge under Natura 2000 in the Opole Voivodeship[8].

In coming years the sawmill in Murow is to be responsible for the accounting of Stora Enso Timber Central European Production Group.

The company's head of management, when deciding to modernize the plant, assumed primarily a significant improvement in its functioning, both in production, sales and working conditions. The official opening of the plant after implementation of changes was held in September 2016.

In 2016, in a reference plant a number of surveys were conducted and company's statistics on occupational hazards, accidents, number of finished goods, employee productivity and efficiency were analyzed. The purpose of the survey was to acquire the respondents' opinions on the working conditions, their motivation, their involvement and their perception of the organizational culture of the company. 85 people participated in the survey, which accounted for 50.3% of the total crew. Respondents were randomly selected.

Based on the analysis of surveys and statistical data it can be concluded that since beginning of 2007 when the implementation of the new rules of operation and modernization works were carried, significant changes have been noted both for the organization and its crew. Among the favorable changes are the following:

1. Employment growth of 146% in relation to the number of employees at the time of purchase.
2. Improvement of working conditions (modernization of machines and tools, systematic training on occupational hazards, observance of working time, provision of personal protective equipment and awareness of their use).

[8] On the basis of the document of the company Information Card of the project "Reconstruction and expansion of sawmill in Murów" Murów 2016, p. 11

3. Decrease in the number of accidents at work (in 2007 - 10 accidents, 2008 - 6, 2009 - 8, 2010 - 5, 2011 - 4, 2012-2013 - 0, 2014 - 1, 2015 - 2, 2016-1)
4. Increased efficiency of business activity (increase of raw material purchase by 190%, which increased the abrasion by 150% - compared to 2007).
5. Improvement of the company's image (social activities for the local community e.g. financing construction of a sports hall - PLN 100.000, modernization of roads or repairs of municipal facilities).
6. Better competitiveness on both domestic and foreign markets (increase of sales of sawn timber by 129% - compared to 2007).
7. Workers' training trips to foreign institutions (Austria and Czech Republic).
8. Acquiring new customers (e.g. Chinese buyers - export of wood in containers) and deepening loyalty (preferential terms of sale for permanent, long-standing customers).
9. Daily, short information training, before start of work for the employees in the scope of basic principles of occupational health and safety.
10. Introduction of the so - called Observation Card, every employee can record noticed both proper and improper activities/actions from particular departments they work in.
11. Increase of motivation and employee engagement (opinion of 81% of respondents).
12. Higher level of organizational culture (opinion of 79% of respondents).
13. Improvement of interpersonal relations on the line employee- superior (opinion of 85% of respondents).
14. Resignation from work on a chord, while raising basic salaries, which according to employees (opinion of 80% of respondents) turned out to be more beneficial.
15. Decrease of municipality unemployment by 50%[9].
16. Increase in municipality tax revenues (estimated at 1 million).

It should also be noted that most of the employees of the sawmill are residents of the municipality and surrounding districts. The exception is a few people from Austria and the Czech Republic, who have been temporarily outsourced from their wood processing plants to streamline their work organization, for example in the area of modern wood shredding. Unlike many companies in the Opole region, the company has no problem with acquiring new employees (Kubiciel-Lodzinska 2017: 486) (last year it was 100 people). This may be due to relatively good working conditions (eg fixed and full-time jobs) and a high unemployment rate in the municipality (about 15%[10] at the regional average of 10.1% (Statistical Yearbook Opolskie Voivodship 2016) at the time of the sawmill expansion.

In general, 78% of the respondents expressed a positive opinion.to the question "How do you assess actions taken by the new owner in terms of production growth, employment, wage increases and improvement in working conditions?

In addition, the change of the owner directly influenced the change of the recipient to whom company's offer is addressed. Previously, they were mostly individual customers, now they are construction, development and service companies. This change is primarily a result of the strategy implemented in all countries where the plants are located and as a consequence of the scale of production carried out in the concern plants, the alignment of the machinery park to the customer. The resignation of individual customers creates opportunities for other small sawmills both in Murow and in the region.

The capital of the Murow plant exceeds PLN 8.5 million. It is the largest sawmill in Poland. The plant is equipped with modern, highly advanced production line. At present, it is capable of processing over 800,000 m^3 of wood per year. The foreign investor successively pursues the goal,

[9] On the basis of data obtained at the Municipality Office in Murow in April 2017

[10] On the basis of data obtained at the Municipality Office in Murow in April 2017

currently approx. 40 000 m^3 of wood per month is rubbed there. Compared to the pre-acquisition period (45 000 m^3 per year) it is a major step forward.

The fact that the investor is not a financial institution focused on further sales of shares, i.e. speculative goals, but a well-established company, with a long tradition and firm position on the European and global markets, is also a positive aspect of the acquisition.

Summary

The actions undertaken by Stora Enso so far, indicate that the objectives adopted by the new investor are progressively implemented (e.g. increase in employment rate, increased production, education and training, improvement of working conditions). The plant develops dynamically and is becoming increasingly competitive in the wood processing market.

The investment of the company, with years of experience in the wood processing industry, having a solid capital base, creates the conditions for a sawmill in Murow to become a viable link, thereby benefiting both the investor and the community (and not just local), leading to a decline in unemployment rate, an income growth and raise of living standards. These are significant premises since the plant is a particularly important place of work not only for the inhabitants of the municipality but also for the region of Opole, Kluczbork and Namysłów.

Expansion of the company, growth of employment and income are crucial factors in socio-economic development. The investment also provides prospects for decent work for young people, which in the near future may be reflected in the decline of intensive foreign labor migration of municipality inhabitants.

Foreign investments in the sawmill industry both at district and voivodship level are necessary, as due to an influx of capital the desired changes in the industry can be achieved (including an increase in economic efficiency, increase in use of modern techniques and technologies, protection and improvement of the natural environment and working conditions), which may be an incentive to increase its domestic and international competitiveness.

References

Bernat, M. (2016) 'The Role of Foreign Capital Investment In the Form of Foreign Direct Investment In the Economy of the Opole Voievodship In the Years 1990-2015,' *Barometr Regionalny*, 14 (1), 43-51. Wyższa Szkoła Zarządzania i Administracji w Zamościu.

Qutlays and Results in Industry in 2008, gus warszawa 2009.

Qutlays and Results in Industry in 2009, GUS Warszawa 2010.

Qutlays and Results in Industry in 2010, GUS Warszawa 2011.

Qutlays and Results in Industry in 2011, GUS Warszawa 2012.

Qutlays and Results in Industry in 2012, GUS Warszawa 2013.

Qutlays and Results in Industry in 2013, GUS Warszawa 2014.

Qutlays and Results in Industry in 2014, GUS Warszawa 2015.

Qutlays and Results in Industry in 2015, GUS Warszawa 2016.

http://www.grupalokalna.pl/wiadomosci/tartak-w-murowie-na-swiatowym-poziomie [Retrieved August 20, 2017]

http://www.drewno.pl/artykuly/10819,polska-ut rzymala-pozycje-europejskiego-lidera-w-eksporcie-stolarki-otworowej.html [Retrieved August 22, 2017]

Information card of the project "Reconstruction and extension of the sawmill in Murów"Murów 2016.

Kubiciel-Lodzińska, S. (2017), "Employment of foreigners in Poland from the point of view of entrepreneurs - Opole Voivodeship study", *Management, Entrepreneurship and Sustainability* [online], [Retrieved August 24, 2017], http://imes.vse.cz/wp-content/uploads/2015/08/Conference_Proceedings_IMES_2017.pdf

Lasy Państwowe 2016, Centrum Informacyjne Lasów Pańswtowych, Warszawa 2017.

Lasy Państwowe *http://www.lasy.gov.pl/pl/drewno/skad-sie-bierze-drewno* [Retrieved August 19, 2017]

Lasy Państwowe http://www.lasy.gov.pl/pl/drewno/polski-przeboj [Retrieved August 22, 2017]

Polek, K. (2004), Zarządzanie bezpieczeństwem i higieną pracy w przedsiębiorstwach przemysłu drzewnego, Komputerowo zintegrowane zarządzanie – tom II, Knosala, R. (ed), WTN, Warszawa.

Polek-Duraj, K. (2017) 'Social responsibility as a determinant in the improvement of organizational competitivness (case study),' *Olsztyn Economic Journal* , 12 (2), 213-223.

Polek-Duraj, K. (2016) "Społeczna odpowiedzialność jako czynnik wzrostu konkurencyjności organizacji w ujęciu regionalnym na przykładzie przemysłu tartacznego", *Przegląd nauk stosowanych.* [online], [Retrieved September 5, 2017], http://pns.po.opole.pl/pns/PNS_12.pdf

Statistical Yearbook Opolskie Voivodship 2015, GUS Warszawa 2016.

LAGs as a Way to Rural Area Development in the Region of South Bohemia

Ing. Petra Pártlová, Ph.D., Institute of Technology and Business Department of Management, České Budějovice, Czech Republic, e-mail: partlova@mail.vstecb.cz

Abstract

Local Action Groups are important for participating of the citizens, entrepreneurs and municipalities in the process of support for regional development. In the long term, they have proved that people living in Czech rural areas have never been indifferent to both the tradition and the future. That is why the local action groups are sometimes called “local action groups as a way of rural development”. The paper focuses on a closer look at the period of the past (2007-2013) in the region of South Bohemia. The author focused on the extent of support from South Bohemian LAGs from public funds through the Leader program to the development of rural municipalities. An evaluation of the functioning of the LAGs was carried out taking into account the period 2007-2013 and the prediction of the new programming period of 2014-2020. The research used several methods, including content analysis of important documents (especially different community-based strategies) followed by an analysis of the distribution of implemented projects within the scope of the LAG. In addition, a questionnaire survey was carried out. All the chief executives of LAGs in the region of South Bohemia were asked. The last method used interviews with experts and representatives of the South Bohemian Region and all sample LAGs.

Keywords: LAG, rural regions, local, LEADER, rural development

Introduction

The paper discusses common issues that are met by a majority of rural municipalities in the Czech Republic. In connection with this, it deals with the possibilities that these municipalities have encountered after the accession of our republic to the European Union. It is primarily focused on a possible solution of the problems of rural municipalities through using the financial support of the European funds and the national funds. The most important topic of the paper is a phenomenon called a "local action group", which is also included in the program document of the "Rural Development Program" (RDP), which is funded by the European Agricultural Fund for Rural Development (within the EU Common Policy). A Local Action Group is a kind of group of rural actors from different sectors (public, civil and private), whose aim is the joint development of the territory supported by the EU funds. The aim of this paper is to assess whether the local action group can really be important in dealing with the problems of rural municipalities on the example of a detailed analysis of the development of South Bohemian LAGs.

Literature Review

Rural areas generally involve a really diversified structure of interest groups with different importance and potential influence on the policy making process. It includes the rural population, municipalities, micro-regions and local action groups, agricultural and non-agricultural businesses, academic sphere, NGOs, etc... (Falkowski, 2013), (Pělucha, 2015). In the case of rural development, there are various forms of cooperation and different organizations that are supposed to deal with the problems of municipalities. These organizations include: Association for Rural Reconstruction, Union of Towns and Municipalities of the Czech Republic, Healthy Cities of the Czech Republic, The Czech National Rural

Observatory, National Network of Local Action Groups in the Czech Republic (Woods 2003; in Gorlach, Lošťák, Money 2008, Binek, Gavlasová, et al., 2012). The local action groups are in the EU within the LEADER method (see also Woods, 2011). By Larsson (2002; in Dargan, Shucksmith 2008), the original purpose of this Community initiative was to develop innovative ideas for a rural development model that would be useful in other areas, too. Ray (2000; in Marsden, Sonnino 2008) describes the LEADER as a programme that helps the socio-economic viability of the site and promotes innovative approaches to rural development at local level through the use of local resources, both physical and human.

A properly working local action group, which wants to fully exploit the potential of its territory, applies mainly the features of networking and cooperation (Faludi 2006), (Putnam, 1995) (Bosworth, 2015). It also uses new approaches and practices to guide the local development of the territory (Coleman, 1988). The aim of the local action groups is not making a profit as it is in case of the private sector, to but to create a synergy effect. It is therefore more difficult to assess the efficiency of LAGs compared to the private sector.

Material and Methods

The research was carried out in a sample of 17 active LAGs in the region of South Bohemia. The data were surveyed mainly from questionnaire surveys and managed interviews, data from the National Network of Local Action Groups of the Czech Republic (referred to as NN LAGS of the Czech Republic), individual LAGs and ministries of Agriculture and Local Development, data from questionnaire surveys, managed interviews and also from the author's archive.

In the paper, the sample included only such LAGs and projects meeting the binding criteria. The Local Action Group can only receive EU funding if it fulfils the criteria set out in the Development Program document. The most important criteria include:

(1) The LAG must establish appropriate partnerships between the private and the public sectors, where at least 50% of the participants must be from the private sphere (farmers, people from rural municipalities).

(2) The LAG must have mandatory bodies that are able to manage public funds, ensuring the implementation of the partnership for the implementation of the LEADER Strategic Plan.

(3) The area covered by the LEADER Strategic Plan must be coherent, offering sufficient critical mass of human, financial and economic resources to support a sustainable development strategy.

(4) LAG members must have either their permanent or legal address or business premises in the area of the LAG or be territorially competent in the territory.

(5) The LAG must present a quality LEADER Strategic Plan for a given programming period according to the binding outline, including the definition of the areas of support under the Rural Development Program.

(6) The LAG may use only one source of European Union funding for its eligible (acceptable) expenditure.

LAGs started in the Czech Republic in 2003. In the region of South Bohemia, the first LAGS were founded a year later, in 2004.

During this year, twelve local action groups were officially founded, a full 70 % of all LAGs that have been active so far in the region.

The following year, two local action groups were established and in 2006 a single LAG was founded. The next two years meant a difficult journey to win support for their operations from the Rural Development

Programme 2007–2013. However, even after this period, the efforts were made to expand the LEADER method in Czech Republic. The result of these efforts was the creation of a stimulating environment for the emergence of other local action groups. In the case of South Bohemia's, it meant a helping hand meant for establishing two other LAGs. In total, the number of ranged to 17.

The seventeen LAGs take a considerable part of the area of the region of South Bohemia. Similar situation applies for number of residents living in the area of LAGs in the region of South Bohemia. A total of 601 municipalities of the region are incorporated into LAGs. Due to the fact that there are 623 municipalities in the region of South Bohemia, it is obvious that LAGS comprise the vast majority of the region (see figure 1).

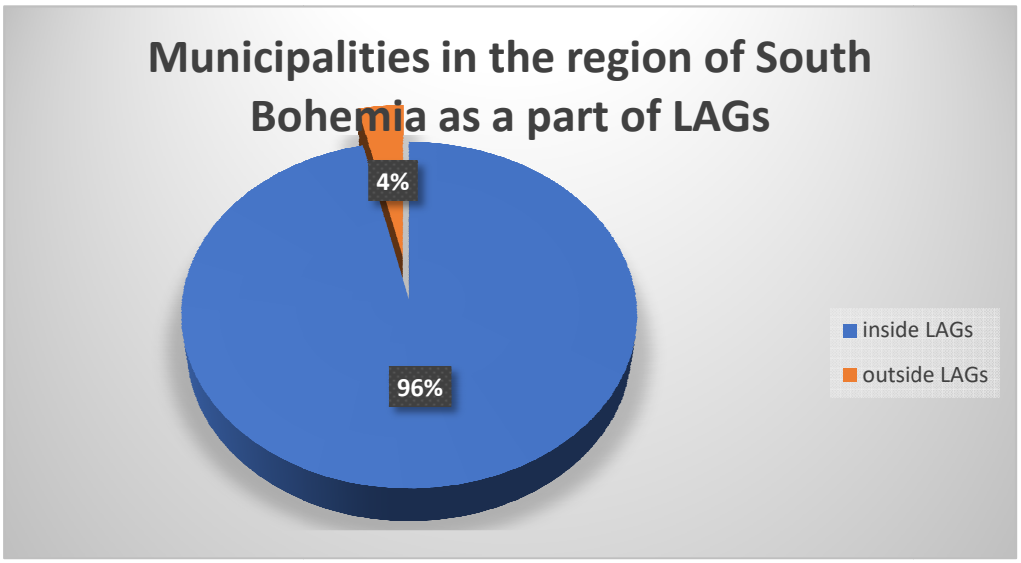


Fig. 1: Municipalities in the region of South Bohemia as a part of LAGs

The area of the above mentioned 601 municipalities is 9 402km2 (as of 1. 1. 2014). This is a major part of the South Bohemian region, as its total area was 10,057 km2 (CSO 2014).

Based on the data verification, it is possible to say that there was a total population of 455,626 inside the area of LAGs on January, 1st 2014. This was 71.6% of the total population of the region of South Bohemia. Moreover, after deduction of the 3 towns with the populations over 25,000 inhabitants, the LAGs cover 96.3% of the population. This means that local action groups occupy more than 90% of the region regarding its size, number of municipalities and the number of inhabitants (with respect to the limits of the RDP).

Results and Discussion

The beginnings of the LEADER method and its application

The majority of Czech LAGs started in 2004. In 2004, the first support programme of the LEADER method was designed. LEADER CR was approved by the Minister of Agriculture on December, 16th 2004 on the basis of the law on state budget of the Czech Republic for 2004. LEADER CR was created under the Ministry of Agriculture. The total of 294 098 000 CZK was allocated from its budget between 2004 and 2008. This represents the support of almost 59 million CZK for each year that could have been used by the LAGs. The programme was set up to support the local economy, service jobs, but also the cultural and social life, and thus helped alleviate the depopulation trends. It gave the opportunity to

support local action groups´ projects by consensus of the public, business and non-profit sectors considered important for the development of its territory.

During the programme period, the programme administered 201 applications for support to LAGS, including 31 in 2004, 41 in 2005, 64 in 2006 and 57 in 2007 and 8 in 2008. It meant support to 451 projects and 98.5% of the allocated budget. For LAGs, this meant the first experience with the distribution of funds in their regions. Based on the developmental strategies for the LAGs and after the conclusion of the implementation of delegated activities each local action group started to perform its administrative activities that set the transparent distribution of funds. It was necessary to ensure the receipt of applications from the area they controlled and to select those that would be supported. They were also included in the ex-ante, interim and ex post control of projects on the spot. It was the Leader Czech Republic, programme which was completely covered from national sources and the LAGs gained experience so essential to their future activities.

In the region of South Bohemia, there were nine active local action groups within the Leader CR Programme; thanks to whose activities a total of 70 projects could be supported. As can be seen, when counting the total number of 13 regions in the Czech Republic (Region Prague could not be supported due to the limits of the LEADER programme in the Czech Republic), such number of supported projects in the region of South Bohemia is undoubtedly an important success, also regarding the fact that this area is the second largest region.

Number Of Projects Implemented By Lags

Local Action Groups administered, implemented or participated in implementation of a large number of projects in the previous years (2007-2015, following the rule of N+2). The total of 1,313 as reported by the NN LAGs of the Czech Republic is not necessarily the total amount. The number of projects implemented under the measures of IV.1.2. and IV.2.1 (Local action group, Implementing local development strategy), can be exactly reported. The total number of other projects is more or less indicative. Based on data from National Network of Local Action Groups in the Czech Republic, it is highly likely that some LAGS did not report all the projects which they participated in. An example might be a large number micro-project annually organized by the National Rural Network together with the LAGs. As already mentioned, this difference would not be crucial for documenting the benefits of LAGs, because we focus primarily on the RDP 2007 - 2013. The complete list is presented in the figure below.

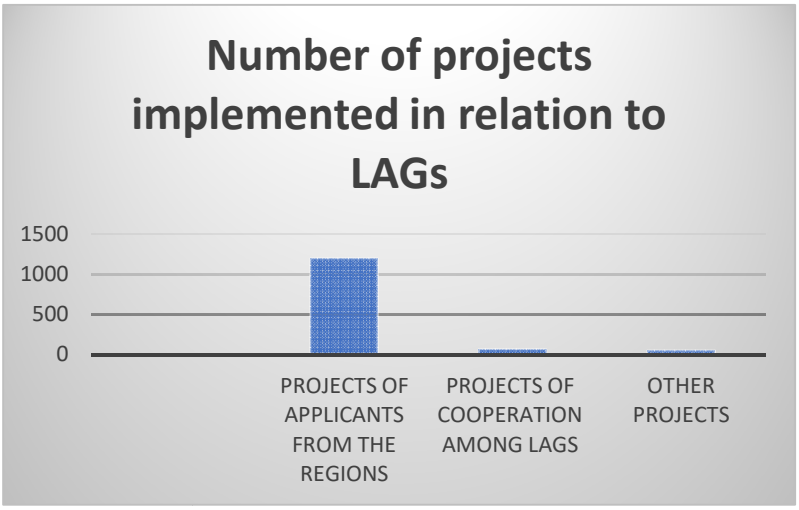


Fig. 2: Number of projects implemented in relation to LAGs

In the strategic plans of the LEADER, Local Action Groups supported 1,196 projects in total as submitted by regional applicants.

On this basis, it is necessary to calculate what amount of support to these projects and the average allocation for each project. In the case of IV.1.2 (Implementing local development strategy) measure under which LAGs´ calls were supported, an allocation of 413,719,892 CZK was used through the South Bohemian LAGs under the RDP 2007-2013. The average grant per a project amounted to more than 345,919 CZK. This means that most common support was granted to projects supported by less than a half a million CZK.

The total allocation only represents the expenditure on each project of the final applicant in the sum of all applicants in the South Bohemia's LAGs. However, if considering the overall benefit, therefore, in layman's terms how much money came into the region in general, we should add two amounts to this; at least. The first is the sum of the allocations to individual projects implemented in cooperation of the LAGs. It is a wide range of projects, whose aim was to establish ties not only to promote cooperation in South Bohemia but in the whole country, and sometimes internationally. In any case, you can legitimately claim that allocation used by the LAGs for these projects meant further support of the area, as the results of the projects might have been the costs for suppliers or directly the purchase of less expensive assets. Similarly, it is also possible to consider the case of expenditure on measures IV.1.1 (IV.1.1. Local action group). Within this measure, the Local Action Groups were reimbursed for expenses on their activities. In the period 2007 - 2013 100% of eligible expenditure of LAGs was bailed out under the RDP. As the name suggests, they were also some of the ineligible expenses that were not bailed out. These expenditures to the benefit of South Bohemia are also included. The only thing omitted are the resources used by the LAGs for Other projects and it is precisely for this reason that it is impossible to determine exactly how many of these allocations were actually brought by LAGs, not only involved in the effort to obtain them. Ultimately, the total amount of funds was 547,230,158 CZK.

Discussion

In average, more than 91 million CZK were added to the budget of South Bohemia due to the Lags´ activities in 2007-2013. The financial support was used to many issues within the RDP 2007-2013, axes I-III. It was possible to support agricultural and forestry enterprises, but also the development of

communities and improving their civic amenities, education, tourism and, ultimately, to draw funds for rescuing the cultural heritage of the country. As revealed, it is evident that very important areas of rural life were supported. The LAGs have contributed to the improvement of villages and small towns, but also to the development of business, in agriculture, forestry, tourism and elsewhere.

The contribution of South Bohemian LAGs to their region and is basically a higher sum than what the region used to ensure the allocation of the Rural Renewal Programme (hereinafter RRP of South Bohemia). This grant program was created in the South Bohemian region following previous village renewal program as approved by the Government of the Czech Republic on 29th May 1991 and by the Czech Government Resolution dated November 11th, 1998, no. 730.) The above-mentioned statement is based on comparison with the published costs of the RRP of South Bohemia. See the table for details.

Table 1: Real expenditures in RRP of South Bohemia (CZK)

Real expenditures in RRP of South Bohemia (CZK)							
2008	2009	2010	2011	2012	2013	2014	2015
67 740 833	70 732 744	77 770 245	84 759 706	83 935 700	89 339 605	91 774 136	90 157 294

Source: Czech Statistical Office, own processing

To make it complete, we should say, that the RRP of South Bohemia is not is the only form of support used for the development of the South Bohemian countryside.

Conclusion

Local action groups have shown a direct connection with the development of the South Bohemian rural area in the implementation of all their projects. All these projects amounting to about CZK 0.5 billion have played an important role in rural development, but also in other areas such as the development of SMEs in the rural area, but also the development of tourism, significantly influencing the whole region.

As reported by the research, it is primarily clear that the successful implementation of the community-led local development strategies is particularly crucial for the LAGs. Such activity should bring the greatest amount of financial resources (up to CZK 1.5 billion) for the development of the region of South Bohemia in the next few years.

As the new programming period means a significant increase of the complexity of the process of distribution of resources to the regions, it is very useful to maintain and deepen the cooperation of all active LAGs both in region of South Bohemia, and nationally.

Working together and sharing the experience is a possible prerequisite for smooth functioning of the LAGs. Otherwise, the LAG would experience a significant reduction of resources for rural development and the threat to their very existence. LAG cooperation is also a guarantee of a stronger negotiating position for the LEADER method and LAGs in general. The negotiating position is absolutely crucial for the future of the LEADER in the Czech Republic.

Cooperation with the South Bohemian Region is proved to be truly crucial regarding the South Bohemian LAGs, being a very important synergic element for the development of the region of South Bohemia.

In addition to its core mission of intermediary agencies, the LAGs have shown that they also have the ability of a broad creative cooperation and the effort to maximize support for the development of the

whole South Bohemia. This cooperation needs to be further developed, including a possible extension of LAGs´ activities (small subsidy title to local and regional cultural events and community development, conceptual support for education, etc.). The LAGs can also provide the region with a much-needed information service on the state of their territory free of charge because they have fairly accurate statistics on their territory. The results show that LAGs are a very important element of rural development and it is the most desirable to keep them in operation.

References

Binek, J. at.al. (2012). Přístupy k posílení spolupráce a synergie ve venkovských mikroregionech. *Metodika s osvědčením č. 1/2012 o uznání uplatněné certifikované metodiky v souladu s podmínkami „Metodiky hodnocení výsledků výzkumu a vývoje. "* Brno: GaREP, spol. s r.o., 20.

Capello, R. (2007). Regional economics, Oxon: Routledge.

Coleman, J. (1988). Social Capital in the Creation of Human Capital, *American Journal of Sociology,* 94 (1) 95–120.

Falkowski, J. (2013). Political accountability and governance in rural areas: Some evidence from the Pilot Programme LEADER in Poland, *Journal of rural studies*, 32, 70-79.

Faludi, A. (2006). From European Spatial Development to Territorial Cohesion Policy, *Regional Studies*, 40(6), 667-678.

Gorlach, K., Lošťák, M., Money, P. H. (2008). Agriculture, communities, and new social movements: East European ruralities in the process of restructuring, *Journal of Rural Studies*, 24(2), 161-171.

Larsson, L. (2002): EU in the village: LEADER II, governance and rural development. In: Dargan, L., Shucksmith, M. (2008): LEADER and Innovation, *Sociologia Ruralis*, 48(3), 274-290.

Pělucha, M., (2015). Teorie a realita podpory územní soudržnosti v politice rozvoje venkova EU v ČR ve střednědobém horizontu let 2004-2013. Praha: NF VŠE.

Putnam, R. D. (1995). Bowling Alone: America's Declining Social Capital. Journal of Democracy, 6(1), 65 – 78.

Ray, C. (2000): The EU LEADER programme: rural development laboratory. In: Marsden, T., Sonnino, R. (2008): Rural development and the regional state: Denying multifunctional agriculture in the UK. *Journal of Rural Studies*, (24), 422-431.

Newbery, R., Bosworth. G. (2014), The character of rural business relations. In *Rural cooperation in europe*: In *search of the 'relational rurals'*, 29-48.

Woods, M. (2011). Rural. Routledge: Taylor&Francis Book.

Priorities of diversification in forest complex

Morkovina Svetlana, Voronezh State University of Forestry and Technologies named after G.F. Morozov, Voronezh, Russia, E-mail: tc-sveta@mail.ru
Drapalyuk Michael, Voronezh State University of Forestry and Technologies named after G.F. Morozov, Voronezh, Russia, michael1@yandex.ru
Sibiryatkina Irina, Voronezh State University of Forestry and Technologies named after G.F. Morozov, Voronezh, Russia, i-sib@mail.ru
Torzhkov Ivan, Voronezh State University of Forestry and Technologies named after G.F. Morozov, Voronezh, Russia, ivantorzhkov@gmail.com

Abstract

The article substantiates that development of forest complex of the Russian economy is not possible without implementation of its structural reform and emphasizes diversification of forestry as the most important sectoral segment. An assessment of the level of diversification of the most important areas of forest complex made it possible to draw a conclusion about low level of its diversification. It has been established that woodworking and deep wood processing sectors are characterized by high diversification, logging is distinguished by specialization with delayed diversification, and forestry is a low diversified branch. The prerequisites for diversification of forest complex are developed, including: disproportions in the development of technological chain - forestry-logging - woodworking; technological, territorial and economic disconnection of forestry, logging and processing enterprises and industries; infrastructure and economic barriers; low level of development of science and industrial innovation at all stages of technologically related industries. The specific nature of diversification in forestry complex is in incompleteness of the processes of horizontal integration in forestry. It is determined that diversification in forestry reduces the time of cultivation of target timber and reduces costs of growing forest. Positive direction of diversification in the country's forestry complex is creation of industrial forest plantations on forest lands.

Keywords: diversification, forest complex, diversification index, priority strategies

Introduction

Diversification is an important part of the structure of modern market economy, which has a significant impact on the division of labor, competition and even the efficiency of production in the industry segments. In the most general sense, diversification is associated with expansion of variety and modifications of products for the most complete satisfaction of the needs of consumers [1].

The issues of diversification of enterprises and industries have a long history. Kenneth Andrews was one of the first in 1951 who formulated the concept of diversification as an extension of nomenclature of goods produced by individual enterprises and associations [2]. A number of studies have being conducted in developed countries to explain the relationship between diversification strategies and organization effectiveness [3, 4].

Questions about the need and benefits of diversification for sectors and economies remain not fully understood [5]. The researchers are unequal in the assessment of diversification and its effectiveness [6, 7].
At the same time, statements about the need for diversification in industries and complexes are not always justified, primarily because of the lack of theoretical and practical research base of the process of diversification itself [8]. Considering diversification as a development mechanism, Pablo de Andrés (2017) notes that not only the increase in assets, but also new growth opportunities are positive ones [9].
Understanding the fact that development of sectors and complexes of the Russian economy is not possible without implementation of their structural reform in the interests of improving social and

economic indicators of the development of society as a whole, allows us to consider diversification as one of the factors contributing to the achievement of this goal.

Moreover, scientific community has a unity of opinions on diversification as a strategic alternative to the development of an economic entity having its own purpose and objectives [10, 11]. If, for the enterprise, the strategic goal of diversification can be connected with increase in incomes, then, for sectors and complexes of the economy, it is aimed at ensuring their competitiveness in the regions and even countries, and its achievement is possible by coordinated implementation of a set of tasks, interrelated in terms, resources and results.

The type of diversification strategy depends on specific nature of the activity and involved resources. At the same time, most of the problems of industries and complexes of the national economy in the context of their diversification are reflected in the state of enterprises. Russian forest complex, which is included in the list of eight major industrial complexes of the country, is not an exception.

Methods

In the theory of economic analysis, there is a system of quantitative and qualitative indicators that allow one to assess the level of economic concentration: market share, concentration ratio, Herfindahl-Hirschman index, Lind coefficient, Lerner's index and others. Each of these indicators has certain advantages and disadvantages, which are described in the economic literature. To estimate the level of diversification, value, which is converse to the concentration coefficient, Herfindahl-Hirschman index was used.

Herfindahl-Hirschman index was defined as the sum of the squares of the sales shares of each enterprise in the industry:

$$HHI = S^2_1 + S^2_2 \ldots + \ldots S^2_n \quad (1)$$

S_1, S_2 — company's sales in the industry expressed as percentage, defined as the ratio of sales to the volume of all sales in the industry.

$$C_{div} = \frac{1}{HHI} \quad (2)$$

The values of determination coefficient may be within the limits:

$$0 < C_{div} < 1 \quad (3)$$

At the same time, the higher its value, the higher the level of diversification in forest sector, the more uniform development can be seen in the different sectors of forest complex. Indices of sectoral diversification were calculated by us for 260 production enterprises of Russian forest complex.

Results and Discussion

Forest complex is an integrated system of forestry, woodworking, pulp and paper and wood chemical industry, machine building and other industries.

The activities of branches of forest complex of the Russian Federation are based on the use of renewable natural resource - forest, and all other industries, linked by an unbroken technological chain, use related technologies, materials and wood raw materials. At the same time, due to low degree of development of production facilities for deep processing of timber, the activities of forest complex do not currently meet economic interests of the state as the owner of forest fund. The share of forestry enterprises accounts for 1.7% of the gross output of the Russian economy, less than 3% of industrial output, and 2.1% of foreign currency earnings from Russian exports.

Diversification leads to better use of material and intangible resources of the enterprise, including better use through synergy. At the same time, diversification, although it reduces the risk by eliminating dependence of enterprise on any single product or market, it increases it, since there is a risk which is typical only for diversification.

Then, considering diversification within forest complex, understanding of the necessity of restructuring all the industries entering into it should become the starting point. Horizontal diversification is widely represented in forest complex and implies growth in existing market due to new products requiring new technology different from that is used now and based on the integrated use of wood raw materials and recycling. Vertical diversification, involving expansion and branching of components, consists in building a complete production chain of already existing "product" (Fig.1).

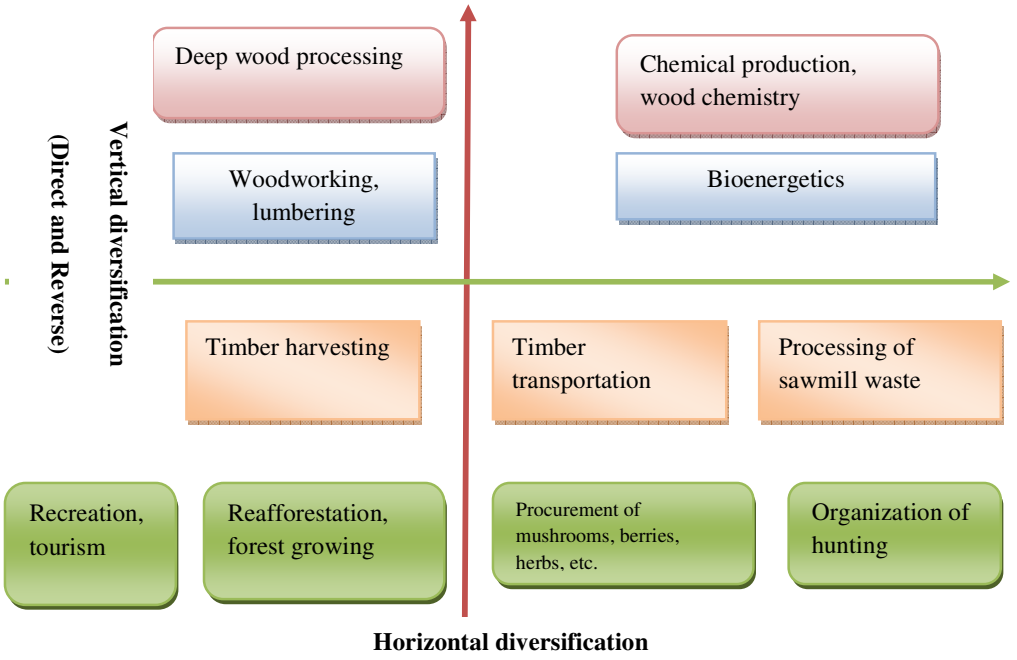


Fig. 1: Types and forms of diversification in forest complex

In total, there are 165 pulp and paper mills in Russia, 10-15 of them can be considered large - and 15 forestry concerns. The pulp and paper industry in Russia has a pronounced export orientation. More than 80% of the produced market pulp and about 50% of paper and cardboard are supplied to the foreign market. The production of pulp, paper and paperboard is limited to low volumes of logging. It should be noted that their specialization played a huge role in the crisis of the Russian pulp and paper industry in the mid-1990s. In the light of the shrinking demand for paper, greater use of diversification strategies is needed.

Using the coefficient of diversification, it is possible to estimate the retrospective dynamics of the change in the specific structure of production in forest complex of the country, by calculating it for each considered year. An assessment of the level of diversification of the most important areas of forest complex made it possible to draw a conclusion about the low level of diversification of forest complex in Russia (Fig.2).

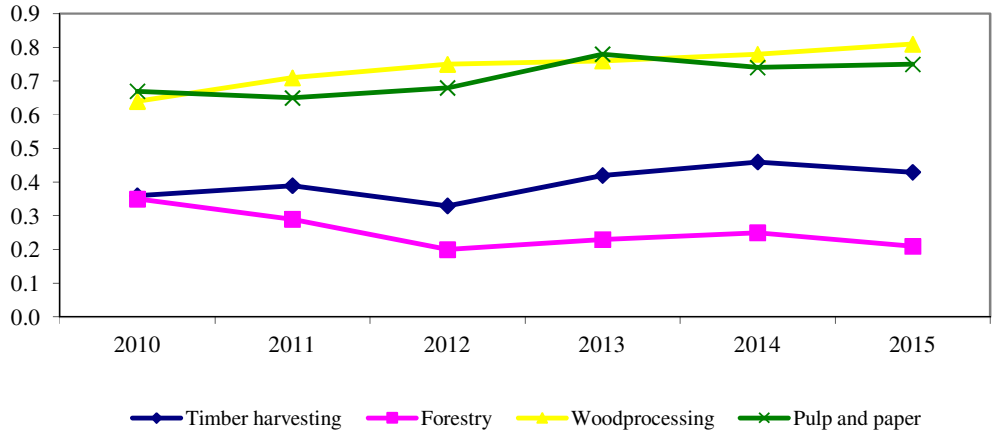


Fig. 2 : Level of diversification in forest sector

It can be seen from the diagram that for the period from 2010 to 2015, the majority of enterprises in forest sector have increased the level of diversification of production structure. In this case, we can distinguish two main trends of sectoral diversification:

1) High degree of diversification is characteristic for the sphere of wood processing and deep processing of wood. First of all, this is deepening of territorial division of labor, increase in assortment groups, and creation of new industries and diversification of existing activities. Such a mechanism of diversification has less impact on risks, profitability and financial stability of enterprises. Creation of effective structure of enterprises of deep processing of wood in the form of vertically integrated structures is one of the measures for removing forest sector from crisis, mobilizing resource potential of enterprises.

2) Harvesting sector is distinguished by specialization and concentration of industries. The analysis of indicators characterizing the work of logging enterprises, presented in Table 1, let us to make a conclusion.

Table 1: The main performance indicators of harvesting enterprises

	2010	**2011**	**2012**	**2013**	**2014**	**2015**
Number of organizations (at the end of the year) [1)], thousand.	15.6	13.6	12.2	11.4	10.6	10.2
Average annual number of employees [2)], thousand people	156.6	144.4	134.3	119.2	107.1	103.4
Balanced financial result (profit less loss)[3)], million rubles.	-5420	-3769	-3818	-8465	-17652	-6591
Profitability of products (work, services) [3)], percent	-0.9	-0.6	-2.8	-3.6	-0.8	4.2
Production of untreated wood, million dense m^3	117.3	122.7	121.8	119.8	123.4	126.7

Firstly, this type of activity is characterized by a constant decline in the number of enterprises. Secondly, there is a decline in the production of forest resources. If growth took place until 2011, on average by 4% annually, then from 2012 there is a decrease in this indicator. Third, there is a decrease in the number of people employed in the forest business. Moreover, since 2005, by 2014, this figure has decreased in 5 times. Fourth, the share of unprofitable enterprises in harvesting (logging) industry makes up more than 50% of the total. In our opinion, the typical reasons of lag behind of Russian forest complex in terms of diversification are:

Firstly, disproportion in the development of technological chain - forestry-logging - woodworking;
Secondly, technological, territorial and economic disconnection of forestry, logging and processing enterprises and industries;

Thirdly, infrastructure and economic barriers, in the absence of support for basic production;
A significant part of the timber stock is located in remote, inaccessible areas, with undeveloped or absent transport infrastructure. For one thousand km^2 forests in Russia there are only 1.2 km of forest roads [15]. Weakly developed production and road transport infrastructure limits the possibilities for integrated and complete development of operational forests.

Fourthly, low level of development of science and innovation at all stages of technologically related industries.

In relation to other branches, logging industry lags behind in terms of diversification, in spite of the fact that 35% of logging enterprises are vertically integrated holdings integrated under the principle of vertical diversification. Vertical diversification was typical for forestry enterprises, in 1990-2000.Logging companies proved to be objects of accession and takeover by the producers of final products - pulp and paper mills and woodworking enterprises, which act as initiators and leaders of integration.

3) Diversification of forestry is characterized by low level of development. The total forest area in Russia is 1073.4 million hectares, while 20.7% are leased to enterprises. The main type of forest use is logging, with 31 to 135 thousand hectares of forest land annually without reforestation, which creates an imbalance in the forestry of the country [12]. The development of multipurpose forest management, the transition to the reproduction of forests on the basis of plantation afforestation is the main directions of diversification in forestry.

In recent years, diversification has become a strategy of competition among forestry enterprises primarily with foreign producers in the direction of reducing dependence on purchased raw materials and equipment. [13] The specific nature of diversification in forest complex lies in the incompleteness of horizontal integration processes in forestry.

The low level of diversification in forestry is associated with features of forestry production, its high labor intensity, riskiness due to the length of forest growing processes. In this regard, the goal of diversification is transition to technologies that allow shortening the period of growing timber as a whole, or its target assortments.

Diversification reduces the time of target wood growing and reduces the costs of forest growing and therefore makes sense for enterprises. Positive direction of diversification in the country's forest complex is creation of industrial forest plantations on forest lands [14].

Conclusion

Forest complex of Russia has trends of lagging behind and disproportions in the development of industries and interprises. Considering forest complex, it is possible to single out a number of targets for diversification:

1) Elimination of disproportions in the development of forest complex areas on the basis of balance of disposal and reproduction of forests;
2) Increase of capacity utilization at the enterprises of deep processing of wood;
3) Increase of efficiency of use of forest fund plots;
4) Access to new commodity markets, without making harm to ecosystems;
5) Increase in the number of enterprises engaged in forestry;
6) Growth of investment attractiveness of forest business with industry risks reduction;
7) Decrease in the cost price of production due to effective logistics;

8) Transition to new resource-saving technologies and integrated use of raw materials in conditions of increasing wood deficit.
Key directions of diversification of activities in forest complex:
- Horizontal diversification (logging - integrated waste treatment);
- Vertical diversification - logging and woodworking, or logging and forestry.

References

[1] Zolotogorov V.G. Economics Encyclopaedic dictionary. Mn. Book house. 2004. 720 p.

[2] Kenneth Andrews. The Concept of Corporate Strategy. Homewood, Homewood University Press, 1971. – 498 p.

[3] Bettis, Richard (1981), Performance Differences in Related and Unrelated Diversified Firms, Strategic Management Journal 2, pp.379-93.

[4] Chatterjee, Sayan and Birger Wernerfelt (1991), The Link Between Resources and Type of Diversification: Theory and Evidence, Strategic Management Journal Vol.12, No:1, pp.33-48.

[5] Nouf Alsharif, Sambit Bhattacharyya, Maurizio Intartaglia. Economic diversification in resource rich countries: History, state of knowledge and research agenda. *Resources Policy*, *Volume 52*, *June 2017*, *Pages 154-164.*

[6] Don P. Clark, Luiz Renato Lima, W. Charles Sawyer Stages of diversification in Africa *Economics Letters*, *Volume 144*, *July 2016*, *Pages 68-70* Don P. Clark, Luiz Renato Lima, W. Charles Sawyer

[7] Manapol Ekkayokkaya, Krishna Paudyal A trade-off in corporate diversification *Journal of Empirical Finance*, *Volume 34*, *December 2015*, *Pages 275-292.*

[8] Stéphane Blancard, Jean-Philippe Boussemart, Jean-Paul Chavas, Hervé Leleu. Potential gains from specialization and diversification further to the reorganization of activities. Omega, Volume 63, September 2016, Pages 60-68.

[9] Pablo de Andrés, Gabriel de la Fuente, Pilar Velasco. Does it really matter how a firm diversifies? Assets-in-place diversification versus growth options diversification. *Journal of Corporate Finance*, *Volume 43*, *April 2017*, *Pages 316-339.*

[10] Tor-Erik Bakke, Tiantian Gu Diversification and cash dynamics Journal of Financial Economics, Volume 123, Issue 3, March 2017, Pages 580-601.

[11] Alex Kwaku Gyan, Rayenda Brahmana, Abdul Karim Bakri Diversification strategy, efficiency, and firm performance: Insight from emerging market. *Research in International Business and Finance*, *Available online 8 July 2017.*

[12] Morkovina S., Cluster approach to basis of forms of cooperation of the state and entrepreneurship in the forestry management of the sparsely wooded region/ Morkovina S.// Life Science Journal № 11(10s) 2014; P.423-427.

[13] Vertakova, Y., Polozhentseva, Y. and Klevtsova, M. (2014) The Development of Regional Cluster-Oriented Policy: Russian and Foreign Practice, *International Multidisciplinary Scientific Conferences on Social Science & Arts. (SGEM 2014) Conference on Political Sciences Law, Finance Economics & Tourism. Conference Proceeding* vol. 1. Bulgaria, pp. 399-406,

[14] Marris, E. Planting the forest of the future. 2009.Nature, 459: 906–908.

[15] Morkovina S.S., Sibiryatkina I.V., Konovalova E.M., Bourtsev D.S. Investigation of entrepreneurial structures forest management performance of forestry system in sparsely forest-poor region / Asian Social Science. 2014. V. 10. № 23. P. 20-27.

Dividend Policy of Russian Companies at the Present Stage

Lukasevich Igor, Doctor of Economics, Professor, Financial University under the Government of the Russian Federation, Russian Federation, Moscow, e-mail: lukas1963@yandex.ru

Sukhorukova Daria, Lecturer, Financial University under the Government of the Russian Federation, Moscow, Russian Federation, e-mail: DVSuhorukova@fa.ru

Abstract

The article considers main theoretical and practical aspects of the dividend policy in Russian companies in the post-crisis period as well as the peculiarities of its implementation in modern conditions. The research contains the results of analysis of more than 1000 Russian companies for the period 2009-2015, whose shares are traded on the MICEX. We have singled out the key factors that influence the dividend policy in Russia and given a description of the main stages of its development.

Keywords: dividend policy, dividend analysis, post-crisis period

Introduction

The maximization of business value and its value to owners is the main goal of management. Therefore, it is not surprising that financial relationships with owners, whether it is a sole proprietor or millions of shareholders of a large corporation, have a significant impact on the development strategy of any firm. In economic practice the adoption of management decisions in this area is carried out within the framework of the dividend policy.

Theoretical aspects of dividend policy are quite various and complex, however, the following questions are considered to be the main ones: do the decisions on payments to owners affect the firm's value and what should their optimal value be? Despite numerous studies in this field abroad these issues remain the subject of debate among scientists and practitioners: Lintner (1956), Miller et al (1961, 1985), Fama et al (1968), Ofer et al (1987), Boeheme et al (2002).

This article will consider the main theoretical and practical aspects of the dividend policy of Russian companies, as well as the features of its implementation in modern conditions.

Less than three decades ago, the absence of dividend policy was quite typical for Russian enterprises. A few cases of dividends payment did not play a special role because of the insignificance of the announced amounts. Since 2001, the situation has begun to change dramatically, when many large corporations that were interested in raising capital from financial markets, increasing their reputation and quality of management and forming a positive image in the eyes of foreign investors began to pay dividends on a regular basis. Later in the charters and corporate codes of the leading domestic companies, a paragraph or a separate document appeared that was revealing the content of their dividend policy.

Studies have shown that during the evolution of the dividend policy of domestic companies we can distinguish three periods (stages): "birth" (1994-1998); "formation" (2001 - 2007); "maturity" (2009 - up to the present).

It is not difficult to see that the given periods coincide with the financial crises of recent decades.

The peculiarities of the dividend policy of Russian companies in the first two stages were reflected in a number of publications and were considered in a research study by Lukasevich (2007).

That is why below we will present the results of the study of dividend policy in modern conditions, i.e. during the post-crisis and "sanctions" period of the development of the Russian economy.

Results

The analysis shows that the specific features that are characteristic of the dividend policy of domestic companies can be grouped according to two directions that are closely interrelated:

1) exogenous, conditioned by macroeconomic and foreign policy conditions as well as institutional factors;
2) endogenous, caused by internal factors and the microenvironment of the activities of the companies themselves.

The most significant factors of the first group include:

⇒ uneven growth and disproportions in the development of separate sectors of the economy;
⇒ the composition of owners that is based on the specifics of the mechanism of privatization of the Russian enterprises, as a result of which a significant proportion of their shares belongs to the state, a small number of people or management;
⇒ economic sanctions of Western countries, which significantly restricted the access of the Russian companies to the world capital markets;
⇒ transparency and clarity of legislation in this sphere.

The current stage of the development of the Russian economy is characterized by considerable sectorial disparities. In addition, the most intensive development in recent years has occurred in the oil and gas sector, metallurgy and telecommunications. The uneven development of various industries and sectors affects both the revenues received by enterprises and their distribution. The table below shows the dividend yield of the MICEX sectorial stock indices in 2015-2016.

Table 1: dividend yield of the sectorial indices of the Russian Federation[1]

Stock	Stock payment (rub)	Payment yield	Capitalization (mln $, US)
MICEX index	142.94	5.71%	522855.12
MICEX index Telecoms	23.91	9.49%	18626.08
MICEX index Metals	270.84	6.47%	99864.48
MICEX index Consumer sector	74.21	5.13%	27820.95
MICEX index Oil and Gas	327.32	4.98%	247349.55
MICEX index Chemicals	89.98	4.86%	20080.08
MICEX index Utilities	0.0852	3.73%	31136.25
MICEX index Finances	3.08	2.79%	76512.48
MICEX index Machine industry	0	0%	2477.04

As we can see from the table above, the largest dividend yield is demonstrated by the companies of the telecommunications sector. The payments of high and stable dividends by telecom companies are connected with both the intensive growth of the industry in recent years and the level of corporate governance that practically meets world standards. This dividend policy is also explained by the composition of the shareholders of the companies in this sector, including many institutional foreign investors and by the circulation of a number of shares in the form of depositary receipts on international stock exchanges - NYSE, LSE, etc.

In terms of payments oil and gas and metallurgical companies are traditionally the leaders, as together they account for more than 65% in the Russian stock indices. A significant share of dividend payments (60.9% and 14% respectively) in these sectors is based on both high incomes and significant need for additional investments. The desire to attract external investors, including somebody from abroad, forces the companies of these sectors to implement a transparent dividend policy.

At the same time machine-building enterprises practically do not pay any dividends because of the low profitability and unsustainable financial position that has been rapidly deteriorating in recent years.

A significant, if not the main, impact on the dividend policy of domestic companies is provided by the composition of shareholders. The structure of the composition of shareholders of Russian enterprises is presented in Table 2.

Despite several stages of privatization, the state still remains one of the largest owners. In Russia there are even special stock indices of companies with public ownership and regulated activities, which include shares of 34 leading Russian companies, a large part of which are monopolists or main players in their markets.

Being a majority or controlling shareholder the state directly affects the dividend policy of these companies, in fact determining its parameters. At the same time, the goals of such a shareholder may be very far from economic.

Table 2: structure of shareholders in the Russian federation[2]

Type of owner	Share
Authorities (incl. regional)	20.6%
Insiders (owners, management and people connected with them)	37.6%
Strategic investors	13.5%
Share of negotiable stocks (free float)	28.3%
Stock market as a whole	100%

It should be noted that at the initial stages of dividend policy development in the Russian Federation the owner in the person of the state received an extremely low level of dividend income. According to statistics the share of dividends in the total amount of non-tax revenues at the beginning of 2005 was no more than 7%, the number of joint-stock companies with a stake in the charter capital of the Russian Federation, which accrued certain dividends, has not exceeded 17% of the total number since 2001, more than 80% of the dividend income of which was provided by only 15 joint-stock companies.

In order to overcome these negative trends in 2005 the Ministry of Economic Development and Trade developed a draft resolution of the Government of the Russian Federation on the dividend policy of state companies. The draft presupposed annual payments of dividends equal to 10 – 20% of net profit. Since 2012, joint-stock companies with public ownership were supposed to allocate at least 25% of net profit for dividends without taking into account the income from revaluation of financial investments. Starting from 2015 the bar was raised to 50% because of the problems of financing the state budget.

Despite rather ambiguous results (in practice, the dividend yield of state companies in 2015-2016 ranged from 0 to 100%), the directive intervention of the state in the dividend policy of the controlled companies will have a serious impact on the general situation in this sphere in the near future.

The dividend policy of private Russian companies and the amount of payments allocated for these purposes also significantly depends on the composition and motives of majority shareholders that are often represented by a narrow circle of interrelated persons or by management.

Depending on the need the owners of such companies can significantly limit dividend payments or not implement them at all. Through various manipulations (for example, through transfer prices or

withdrawal of profits to subsidiaries) their official profit is understated, and the income of controlling shareholders settles on the accounts of affiliated intermediaries or in offshores. At the same time, enterprises can work on the verge of balance sheet losses, while their main owners are flourishing. Russian enterprises can also pay record-high dividends, if majority shareholders are interested in it.

For example, in the context of the financial crisis of 2008-2009 and in the post-crisis period, majority shareholders of well-off companies actively applied the practice of calculating interim dividends that were used to repay loans or for other projects. Thus, in 2009 two large companies – "TNK-BP" and "VimpelCom", which are co-owned by Alfa Group, decided to pay interim dividends. The group needed the funds to pay off VEB loan that was taken for refinancing of the loan of Deutsche Bank. At the same time, TNK-BP allocated almost 100% of net profit received for 9 months to the interim dividends.

Dividend payments are also often used by majority shareholders for financing of other businesses that are not related to the main activity of the controlled entity.

The economic sanctions imposed by Western countries in 2014 had a significant impact on the dividend policy of Russian companies. At the same time, studies show that the results of their impact are quite controversial.

Deteriorating financial conditions, a sharp increase of the exchange rate, the interest rates and the inflation led to a decrease or a halt in dividend payments in many sectors. We are going to give a number of examples of companies that were forced to make adjustments to their dividend policy taking into account the tightening of creditors' claims.

On the other hand, successful companies that have adapted to the new conditions not only increased dividends, but also began to actively introduce the practice of intermediate payments (once a quarter or half a year). The main reason for this phenomenon – the presence of majority shareholders who are actively withdrawing funds from business to finance other needs or companies – has already been analyzed. We would only like to note that as a result in the Russian Federation in 2015 – 2016 there was a record for dividend payments, which amounted to 1.3084 and 1.224 trillion rubles respectively. Given the increased demand for dividends from the state, we can expect that this record will be beaten in the nearest future.

The most important institutional factor affecting the dividend policy of domestic enterprises is legislation. It should be noted that the legal framework in this area is constantly being improved, gradually approaching the world standards and practices of developed countries. In 2014-2016, significant amendments were made to the Russian legislation aimed at protecting the rights of shareholders, clearly defining the basis, the terms of announcing and paying dividends and the basic rights of holders of ordinary and preferred shares.

Summarizing the intermediate results we should note that the considered endogenous factors have a direct effect and largely determine the content and consequences of the effects of factors of the other group, i.e. endogenous.

The most significant factors of this group are:

- ⇒ an increase in the number and volume of operations for buy back;
- ⇒ growth of the aggregate dividend yield of the Russian stock indices;
- ⇒ mass companies transfer to payments of interim dividends;
- ⇒ significant debt burden of a number of companies and individual industries, consideration of creditors' interests in dividend policy;
- ⇒ complexity and intricacy of the calculation base methods, which hinders the forecast of dividends;
- ⇒ dividend payments on the residual principle, the lack of a clear dividend policy for many Russian companies and as a result, the unpredictability of decisions on dividend payments and their volumes for many Russian companies

It is known that the payment of dividends can be carried out in various forms, each of which has its own advantages and disadvantages. The most common forms include:

- ⇒ payments in cash (cash dividends);
- ⇒ automatic dividend reinvestment plans;
- ⇒ payment of shares (stock dividends);
- ⇒ stock split;
- ⇒ repurchase of treasury shares (stock repurchase / buy back), etc.

The main form of dividend payments that is widely used in practice throughout the world is the monetary one. Scoter et al (1996) and Chan et al (2007) mentioned that in developed countries the repurchase of shares has been widely used. As an illustration, below there are the results of a comparative analysis of the forms of dividend payments considered for US companies that are part of the well-known stock exchange index S&P500.

Table 3: shares purchase and dividends of American companies for 2011-2015 (US $ bln)[3]

Determinant	2015	2014	2013	2012	2011
Aggregate volume of redemption	587.07	579.56	503.53	399.25	449.30
Yield of redemption	3.09%	3.13%	3.16%	2.98%	3.72%
Total amount of dividends	417.23	381.60	333.44	305.23	255.90
Dividend yield	2.19%	2.06%	2.09%	2.28%	2.12%

Because of such operations, the number of shares in circulation decreases, and earnings per share (EPS) increase. This gives an opportunity to automatically increase the amount of profit for the remaining shares and increase the dividend payout ratio in the forthcoming period. In addition, the purchase of treasury shares usually leads to an increase in their rate, which brings additional income to shareholders in the form of capital gains.

Bought out shares are called treasure stock and can be realized once again among existing or new owners, used for motivation programs of managers, reserved for the issue of convertible bonds or placement in foreign markets (for example, as part of ADR and GDR programs), or redeemed.[4]

The redemption of shares reduces excess cash and also increases financial leverage and can lead to a more efficient capital structure. Finally, it is one of the ways of protection against unfriendly takeovers.

In general, the repurchase of shares is a positive signal for the market. Analysis shows that such a policy is becoming increasingly common among domestic companies.

Large-scale programmers for redemption of treasury shares were sold by “Lukoil”, “Surgutneftegaz”, “MTS”, “Polus Gold”, “Severstal”, “LSR”, “Norilsk Nickel”, “Uralkali” and other companies. The aggregate indicators of shares redemption and dividend payments for Russian companies included in the RTSI index for the period from 2011 to 2015 are presented below.

Table 4: shares redemption and dividends of Russia companies for 2011-2015. (US $ bln)[5]

Determinant	2015	2014	2013	2012	2011
Aggregate volume of redemption	0.92	3.08	10.55	8.21	11.38
Yield of redemption	0.25%	0.77%	1.62%	1.21%	1.68%
Total amount of dividends	62.90	32.42	25.80	27.46	15.08
Dividend yield	17.25%	8.08%	3.95%	4.05%	2.22%

Despite the growth in the popularity of such transactions, in terms of their number and volumes the Russian market is significantly inferior to the markets of developed countries. At the same time as the macroeconomic and political situation improves, the number of such transactions will increase.

As we can see from the table, in the post-crisis period there has been a rapid growth in the dividend yield of domestic indices, which significantly exceeds this figure in developed countries.

A similar trend is being observed with respect to the dividend payout ratio (PR). If in 2011 companies, whose shares are included in the MICEX index, sent only 14.3% of net profit for dividends, then in 2013 this figure amounted to 38.3%.

Along with the growth in overall dividend payments, another reason for this situation, in our opinion, is the devaluation of the ruble. Indirect confirmation of this opinion is the reduction in 2016 of the dividend payout ratio to 31.2% due to the companies' lack of surplus profits from the devaluation of the ruble.

We have already discussed the main reason for the transition of many companies to intermediate dividend payments. Other motives that should also be indicated include the desire of companies to attract additional investors, especially institutional investors, for whom such a policy is very attractive.

The main consequences of the global financial crisis of 2008 and the introduction of international sanctions are the growth of indebtedness of Russian companies and the problems of its refinancing. Together with the aggressive borrowing policy pursued by many Russian companies in the pre-crisis and post-crisis period, this led to the need for changes in the dividend policy, in order to take into account the covenants of creditors and control the level of the debt burden. This trend is most pronounced in the metallurgical industry.

Below you can see examples of key parameters of dividend policy (calculation base and allocation coefficient) of a number of Russian companies after the revision of the policy.

Table 5: parameters of the dividend policy of Russian companies[6]

Company	Calculation base for the dividend payments / Payment ratio
'Norilsk Nikel'	It is recommended to allocate for dividends 60% EBITDA, if the ratio Net debt/EBITDA for the end will be less than 1.8 and 30% EBITDA – if it is more than 2.2.
'Severstal'	There is the payment of quarter dividends of not less than 50% of net profit, which is calculated according to IFRS in case the ratio Net debt/EBITDA is less or equal to 1. If the ratio Net debt/EBITDA is more than 1, the company will pay dividends of 25% of net profit.
'NMLK'	There is the payment of dividends on the quarter base in the following range: 1) if the ratio Net debt / EBITDA is less or equal to 1.0: the level of dividends will be in the range of the borders - 50% of net profit and 50% of free cash flow; 2) if the ratio Net debt / EBITDA is more than 1,0: the level of dividends is in the range of the borders - 30% of net profit and 30% of free cash flow.
'Megafon'	The company pays to shareholders the bigger sum out of two: either 50% of net profit, or 70% of free cash flow. At the same time the debt burden after the payment of dividends should be between 1.2 and 1.5 OIBDA.

The desire of many companies to increase the flexibility of the decisions made in this sphere and to limit dividend payments led to the development of "smart" methods for calculating the dividend base,

as well as to vague formulations of the possible payout ratio values, which is often specified as a range of values, or with the wording "no less".

For example, a well-known Russian company Gazprom publishes three types of reporting: RAS (Russians Account Standard) consolidated under RAS and consolidated under IFRS. At the same time, in accordance with the law, RAS accounts are used when calculating dividends. The dividend policy of Gazprom implies payments of 17.5% to 35% of net profit. At the same time the calculation of the base is made according to the following scheme: part of the net profit of 10% is directed to payment of dividends; part of the net profit of up to 75%, but not less than 40% is reserved for use for investment purposes of the company; the remaining part of the net profit is channeled equally for the payment of dividends and reservation for use for investment purposes.

The dividend policy of a number of companies allows the use of both the RAS standard and IFRS for calculating the base. For example, in 2013, 'Rostelecom' directed 25% of RAS profit for dividends, and by the end of 2014 – 25% of profits under IFRS.

It is also known that the financial result of the company's activities can significantly differ, even be the absolute opposite one, depending on the use of one or another standard. For example, the dividend base can be significantly influenced by the results of revaluation of foreign currency assets and liabilities, etc.

Finally, many Russian companies do not have a clearly formulated dividend policy at all. It might seem like a paradox but the best examples here are representatives of retail trade.

For example, the board of directors of "M.Video" while determining the dividend recommended to the general meeting of shareholders is guided by the group's net profit under IFRS. The decision on the distribution of profits is made based on such factors as: the amount of net profit, indicators of financial and economic plans, the structure of working capital, debt burden.

Conclusion

The study also showed that currently about 40% of domestic enterprises, whose shares are listed on the MICEX and RTS, do not pay dividends at all. Many of them still remain closed in terms of information and are not ready to share their income with shareholders.

Summing up the results it should be noted that many problems in the field of dividend policy center on corporate ethics and are not always subject to legislative or economic regulation.

Modern features of the dividend policy of domestic companies should be taken into account in the process of making both investment and financial decisions by all the concerned parties.

Notes

[1] Source: www.dohod.ru, calculations are done by the author.
[2] Source: SPARK.
[3] Source: Bloomberg.
[4] According to the Russian legislation treasury stocks don't give the right to vote, they are not taken into account during the vote, there are no dividends for them and they can be included in the balance of the company for not more than a year.
[5] Source: Bloomberg.
[6] Source: companies' websites

References

Boehme, R.D. and Sorescu, S.M. (2002) 'The long-Run Performance Following Dividend Initiations and Resumptions: Underreaction or Product of Chance?', *Journal of Finance*, 57, 871-900.

Chan, K., Ikenberry, D. and Lee J. (2007) 'Do Managers Time the Market? Evidence for Open-Market Share Repurchase', *Journal of Banking and Finance*, 31, 2673-2694.

Fama, E.F. and Babiak, H. (1968) 'Dividend Policy: An Empirical Analysis', *Journal of the American Statistical Association*, 63(324), 1132-1161.

Lintner, J. (1956) 'Distribution of Income of Corporations among Dividends, Retained Earnings and Taxes', *American Economic Review*, 46, 97-113.

Lukasevich, I. (2007) 'Dividend policy: theoretical aspects and peculiarities in Russia', *Corporate finance management*, 4, 228-241.

Miller, M. and Modigliani, F. (1961) 'Dividend policy, growth and the valuation of shares', *Journal of Business*, 34, 411-433.

Miller, M. and Rock, K. (1985) 'Dividend policy under asymmetric information', *Journal of Finance*, 40 (4), pp. 1031-1051.

Ofer, A.R. and Siegel, D. (1987) 'Corporate financial policy, information and market expectations: An empirical investigation of dividends', *Journal of Finance*, 42 (4), 889-911.

Scoter, D., Brigham, E. and Evanson, P. (1996) 'The Dividend Cut Heard 'Round the World': The Case of FPL', *Journal of Applied Corporate Finance*, 9, 4-15.

The Effects of Digital Technology on Organizational Behavior

Ulrike Stefanie Foerster-Metz (Foerster-Pastor), ulrike.s.foerster@web.de[1]
Katrin Marquardt, muellerka@hotmail.de[2]
Nina Golowko, golowko@ninagolowko.de[3]
Andreas Kompalla, andreas.kompalla@gmx.de[4]
Christian Hell, ch.hell@t-online.de[5]
[1) 2) 3) 4) 5)] The Bucharest University of Economic Studies, Bucharest, Romania,

Abstract

The history shows, that the world is subject to constant technical changes, starting with the 1st industrial revolution to the point of the actual ongoing 4th industrial revolution. It also is unarguable that the world changes faster and innovation cycles decrease with the time as the technical development advances. The digitalization is one of the key drivers of our century and has a conspicuous influence on society and economy. A lot of researches on this topic focus mainly on the technological side and disregard the effects on organizational behavior. Therefore, and based on the actuality of the topic the authors decided to analyze the effects of the digitalization on Organizational Behavior whilst focusing on the impact it has on employees as well as leadership. The article is based on a vast literature review and structured in three parts: first of all the definition of Organizational Behavior and digitalization were reviewed to establish a theoretical framework, followed by the analysis of the effects of the digitalization on leadership and employees. Finally the findings are summarized in a structured scheme clustered by technologies.

Keywords: Organizational Behavior, Digitalization, Leadership, Employee

Introduction

Against the backdrop of digitalization, globalization, demographic changes and shortage of resources it is important for companies to understand the impacts and effects associated with these mega trends and to prepare their self for the future. Due to new technologies, algorithms, interconnectedness and big data storage the world is becoming more and more digitalized and transparent for all stakeholders. It is no longer only about a marketing strategy to influence consumers, company branding to retain employees or to identify ways to improve processes or automate the manufacturing. Nowadays not only the integration and utilization of innovative technologies and business models matters, it is essential to understand the interdependencies and impacts on the fundamentals of organizational behavior namely the interaction between the two determinants technology and people. Therefore and because of the actuality of the topics the authors decided to study and summarize the impacts of digitalization on leadership and employee workforce to proactively manage the necessary change to ensure the companies sustainability and to maintain or extend their position on the market. By means of an explorative literature review the goal of this research was to study the main technology drivers of digitalization and their effects on leadership and employees' behavior. Starting by understanding the fundamentals of the Organizational Behavior theory, followed by summarizing the technology brought up by digitalization and combining this with the impact on leadership and workforce the following research questions should be answered:

- What are the main technologies drivers related to digitalization?

- What are their effects on leadership and employees?

In literature, extensive definitions of the study of Organizational Behavior can be found, however for the purpose of this paper the authors´ will use the definition of DuBrin (2002, pp.3-6) who describes Organizational Behavior as the systematic approach to understand the behavior of individuals within organizations – starting from individuals as smallest entity of study to big organizations and their interaction with the environment. In addition, it is important to understand the interrelations of human behavior with other variables such as technology which together cover the whole organization (Mullins, 1990). In literature, three major factors can be found that affect Organizational Behavior. These are people, structure and technology, which constantly interact with the environment that surrounds them within and outside an organization (Richards, 2017). Figure 1 describes the factors and the interaction within an organization.

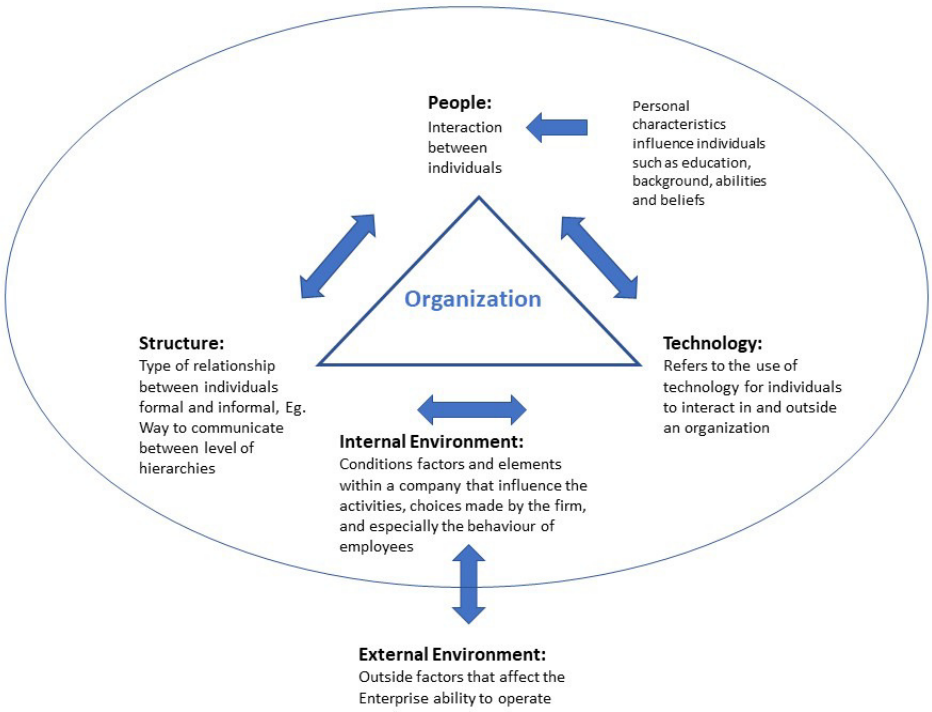


Figure 1: Factors affecting Organizational Behavior
Source: Authors' own contribution based on Richards (2017)

The influence of technology on work environments and workflows is an important determinant of Organizational Behavior science as changes in technology may not only affect the individual characteristics of the workforce but as well the organizational structure of enterprises. The way technology is implemented or used within a company may affect the company's inner culture as well as their behavior towards stakeholders. Furthermore, the implementation of modern technology may bring along a gradual change in the composition of the workforce. For example, younger, better educated, more mobile as well as more technologically versed generations will enter companies in greater numbers as in the past resulting in a changeover within organizations that may as well bring along a new set of values, attitudes and concerns that affect the Organizational Behavior within companies (DuBrin, 2002).

Understanding the meaning of Digitalization

Over the last decades the digitalization and interconnectedness has shifted the economy from a mainly physical to software controlled economy and the information technology has become a fundamental part of our industry and society. In this context buzzwords like digitalization, Internet of Things (IoT), big data, robotics, automation, mobility and others are ubiquitous, they are discussed in social media, by politics and economy. But what do these terms mean, how are they interlinked with each other and in which ways do they change our whole work and life environment?

The omnipresence of the words digitalization and digital transformation and their obvious interconnection to all the other terms induced the authors to have a closer look to their definitions, characteristics and impact on leadership and employee workforce. According to Ernst & Young (2011) digitization means the conversion of analogue information to digital (computer-readable) information. From the middle of the 20th century onwards, after the invention of the transistor and microprocessor the technologies of digitization enabled the conversion of traditional media such as picture, paper, sound, video or signal into bits and bytes (ones and zeros) of computer storage (Press, 2015). Since the beginning of the 21st century, with the emergence of social media, social networks and by the improvement of the sensor technology, additional information is being recorded, digitalized and shared such as social life activities and physical data of life like location, temperature, force, weight, blood pressure and stress. Today, non-digitalized products are more and more digitalized as they receive for example tracking sensors to locate them or network connections to deliver status information. The numbers published by BMWi (2016) show that the amount of digital information has increased dramatically, in 1993 it was just 3% and in 2007 it reached already 94% of the worldwide information (see also figure no 2).

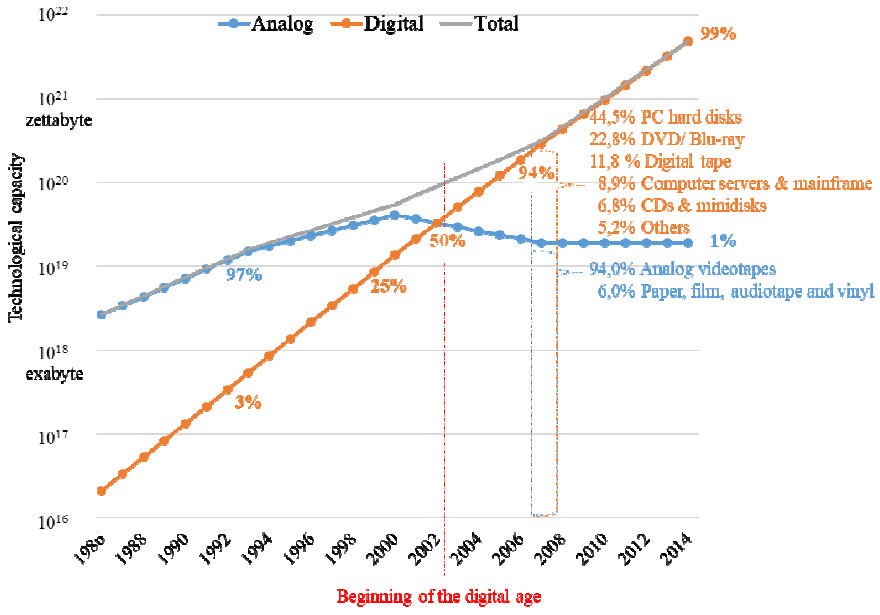


Figure 2: Development of the global information storage capacity
Source: Authors' design based on Hilbert (2015)

The last years have shown that the digital transformation of economic processes and transactions and human interactions became an inescapable megatrend in ways never been anticipated years ago and it is

still the beginning. This growing dependence on the ubiquitous technologies and solutions combined with the demographic changes, declining availability of resources, globalization of the markets and growing international competition, and the increasing customer demands request innovative ways of thinking and acting to identify and deal with the related opportunities and challenges (Marquardt, 2017).

To provide an overview and to gain a common understanding, the authors have summarized and grouped in table number 1 the most significant digital technologies and solutions based on their main purpose and included examples.

Table 1: Overview digital technologies

TECHNOLOGY	**EXPLANATION /** ***EXAMPLES***
INTERCONNECTEDNESS & AVAILABILITY	
MOBILE & IOT & CLOUD (COMPUTING)	**Mobile** is the generic term for cellular communication and mobile computing with wireless networking / *Smartphone, tablet, laptop* **IoT** is the connection from on and off switchable devices to the internet. They get a virtual presence and can connect to other objects and database data (Morgan, 2016) **Cloud** is the provisioning of IT infrastructure (e.g., networks, servers, storage, applications, services) over the internet on demand / *Software-as-a-Service (SaaS), Platform-as-a-Service (PaaS), Infrastructure-as-a-Service (IaaS)*
INFORMATION & INTELLIGENCE	
BIG DATA & ANALYTICS	**Big Data** is the synonym for vast and complex data volumes which differs by their size, diversity and rapid pace of change (Plattner, 2016) **Analytics** is the process of examining Big data to uncover patterns, correlations, market trends, customer preferences and other useful information (Rouse, 2017a)
AUTOMATION & EFFICIENCY	
ROBOTICS & AUTOMATION & ROBOT PROCESS AUTOMATION (RPA) & INTELLIGENT AUTOMATION (IA) & ARTIFICIAL INTELLIGENCE (AI)	**Robotics** is the interdisciplinary branch of engineering and science that deals with the design, construction, operation, and use of robots (Rouse, 2017b) **Automation** is the technique of making a machine, a process, or a system to be operated automatically with no or reduced human intervention. It can be done by various means like mechanical, hydraulic, pneumatic, electrical, electronic devices and computers (ISA, n.d.) **Robot Process Automation** is the fully automated processing of structured business processes (repeatable and predictable interactions) by software robots or by using artificial intelligence (AI) **Intelligent Automation** is a nascent and high cost technology which enables automating non-routine tasks such as those involving intuition, judgement, creativity, problem solving, etc. based on dynamic information (Deloitte, 2017) **Artificial Intelligence** is part of computer science bringing human capabilities and characteristics to machines like understanding language, learning, reasoning, solving problems, etc. (McKinsey, 2017)

	/ *Digital assistant Siri, Alexa, Cortana or Echo*
COMMUNICATION & COLLABORATION	
SOCIAL (MEDIA)	is the collective of online communications channels dedicated to community-based input, interaction, content-sharing and collaboration (Rouse, 2016a) / *Facebook, Twitter, Instagram, Pinterest, Snapchat, YouTube*
PRIVACY & SECURITY	
NEXT-GENERATION SECURITY	is a new generation of intelligent, highly scalable security products and platforms which includes both cybersecurity and physical security and with a more proactive and adaptive approach (Rouse, 2016b)

All the above listed technologies and solutions have and will have a growing and powerful effect on economy, environment and society. They provide new functionalities, increase productivity and efficiency, give higher flexibility and diversity and allow more reusability, parallelism and duplication. Additional they will change the business models and production processes, the way of working and collaborating, permit more mobility, enable faster decision making and delivery, support higher standardization, customization and prosperity. On the other side, they can also be related to negative impacts as for example unemployment, immiseration, pressure, always-on mentality, ever-increasing exhaustion, despair, higher complexity and social isolation. Therefore, it is important to be aware of these impacts, either positive or negative, and to deal with them from the very first beginning. In this connection and interlinked with the digital transformation terms like work 4.0, management 2.0, and leadership 4.0 came up, and their meaning will be reviewed in this article.

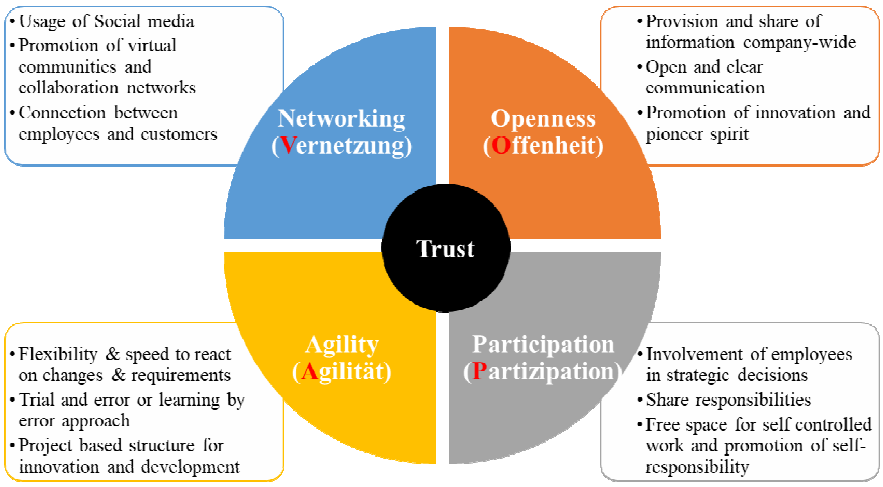
Modern Leadership and the effects of Digitalization

Understanding how digitalization is affecting and changing leadership practices in organizations is essential because today digitization is taking place in almost all sectors of the economy at a very fast pace and in a very deep manner. Manufacturing, financial services, customer service, health, agriculture, retail and logistics, all of these sectors are using big data, new technologies and solutions to drive their business forward and to survive on the highly competitive market. This not only implies changes in the economy and work system, it also implies changes in leadership management, thinking and acting. To support this digital transformation the companies, need to shift from their traditional, hierarchical structure to a flexible, decentralized organization with a team/project-oriented leadership to keep pace with the complex and fast changing environment (digital-centric business) and the increasing customer requirements (customer-led market). Additionally, the generation change from the baby boomer and generation X to the digital natives (Generation Y and Z), which have unique characteristics and capabilities in comparison to past generations, will require new working structures and leadership.

The new leadership, digital leadership or leadership 4.0 means not only usage of the new digital media for collaboration and communication, it also requires the adaption of the leadership strategies and methods to the digital reality. The future leader should be able to utilize the new technologies and solutions, to adapt himself fast to changes and manage them, to have a pioneer spirit, be able to learn quickly, be contextual and emotionally intelligent and trustworthy, lead democratically and share responsibilities, decide situational and participative, control and promote networks, trust and motivate employees, and give them regular feedback (Sattler, 2016). From the authors' viewpoint, the so-called VOPA leadership model (see figure no. 3) designed by Buhse (2014) combines all those characteristics and can be used as the basic model for the digital leadership by covering all the central elements for a

successful corporate and management culture in the digital age, also reflecting the demands from the new generations.

The core of the digital leadership built on trust is not new because "trust" is one of the significant emotions in human relationships. The leader needs to trust in the management and the employees need to trust in the leader and vice versa, only then the right decisions can be made and the required actions can be taken within the time of increasing complexity, insecurity and speed. All the other four points support the establishment and maintenance of trust. Openness and transparency take away fear and uncertainty, give a clear view and gain understanding. Participation and involvement give the possibility to actively engage, modify and assume accountability. Agility allows to react faster and context based and networking enables and support the sharing, collaborating and improving. Leaders need to have a direct and personal engagement with all employees and especially to the new talents from the next generations, because they are the



incubators of change in the digitalized world (Ernst and Young, 2011).

Figure 3: VOPA plus model for digital leadership

Source: Authors' design based on Buhse (2014)

The new digital technologies and solutions are not just stimulating the need for change, they also enable and support the change itself. Here are some examples: big data in combination with learning algorithms enable organizations and leaders to better predict and control their processes and applications, allow to optimize the work such as material flows, targeted marketing activities, decide on employee's performance or tasks. Likewise, the integration of social media platforms can support the engagement with many more employees in distributed organization as it was possible before with standard meeting structures. Here the leaders can share information, give regular updates, foster understanding and create conviction to the spread workforce at the same time. Furthermore, the usage of data-enabled talent-management systems (based on algorithmic data analysis) can rise the number of employees meaningfully evaluated against their knowledge and competencies, increase the precision of these evaluations and free up the leadership to concentrate on the personal relationship (Feser et al., 2017). But it must be kept in mind that the way technology takes over or interferes in some of the managerial activities. It also bares the risk that the creative adaption to a problem might decrease, the historical background gets lost and the organizations will be increasingly dependent on the providers of these new technologies as they most likely lack internal resources with the capability to program and run this system. Hence it is important for the managers and leaders to analyze their business and market situation first, decide which will be the right strategy and structure and to involve their employees in the digital transformation.

Impact of Digitalization on Employees

The continuous change that the digitalization of things is bringing along is having major impact on the workforce at various levels such as rationalization, knowledge, performance, efficiency, skill set, etc. Hereafter the authors summarized the impact based on an extended literature review.

Digital learning platforms can improve the company's internal education by hosting tailored trainings and development programs for employees and leaders, where they can attend the training in alignment with their work schedules, matched with their self-pacing and choice of topic. This new training methods support the acquisition of skills based on the strategies organizations follow and where educational systems fail to deliver. However, this on the contrary demands from employees to be able to continuously learn to be able to keep up with the advancements of technology and avoid rationalization in the long run (Gow and MacDonald, 2006).

Until now the rationalization of workforce due to digitization has majorly affected those employees with low qualifications due to the automation of production processes. However, the advancements in intelligent automation and artificial intelligence start to cast a shadow over higher qualified resources. Having a formal qualification is no longer a guarantee for a lifelong secured career. This is due to the fast changes in technology that can no longer be secured by the educational system. Nowadays, specially endangered are those professions in which precision and routine make a high portion of the daily job activity as these can easily be automated and replaced by computer algorithms such as sales agents in call centers, clerical workers, packers, pilots and even judges. It is argued that these fight an unequal competition against autopilots and algorithms which can navigate flawlessly and are sly decision takers. On the other hand, jobs that require a higher amount of creativity, social intelligence as well as entrepreneurship seem to be more sustainable (Rinne and Zimmermann, 2016). This said, the future of work based on a digitalized economy also requires a new skill set which will enforce a sustainable working future. For example, the outsourcing industry has started to demand specific hard and soft skills related to the advancements in technology to be able to deliver added value services which will allow to win the competition against artificial intelligence and algorithms (Foerster-Metz & Golowko, 2017).

Within higher qualified jobs in the digitized world a new working space is created that allows new collaborative working models due to cloud computing platforms. The software industry is one of the trendsetters regarding this working model which is based on agile development such as Scrum with principles of Lean Production. This new type of collaborative working on clouds permits quick development sprints which constantly and in real time allow to test the performance of each delivered work package. Furthermore, it enables to take decisions and work direction at a higher speed as well as to make the work performance of each team member transparent. Consequently, each team gains more empowerment however it shows also the tendency of simple execution as in an "assembly line" (Boes et. al., 2016).

Due to the digitalized world employees are no longer limited to work only from the office and for only one employer. This has brought changes in how workforce is being contracted. Many individuals today chose to work as digital freelancers, so called "crowd worker", who can work from everywhere through mechanisms like clouds, skype, teleconferences, etc.[i] They offer their work and skills through virtual crowdsourcing platforms in which organizations can outsource and post specific work packages. Because of this flexible work organization flexible work time models, home office and variable time schedules will continue to increase due to the limited availability of qualified workforce. Through this trend entrepreneurial risks are shifted from employer to employee. Instead of strict work instructions new civil arrangements come to place. Flat hierarchies as well as performance based remuneration gain more significance. Employees turn into entrepreneurs which consequently demands entrepreneurial thinking as a key competence for the future work market place. In addition, work compensation is reduced to work

packages so that costs last for the time of an assignment and hidden cost reserves of permanent employees can be reduced. Through these virtual platforms also the workforce turns global and is exposed to higher competition. On the downturn, these "employees" have no sense of affiliation to companies requiring higher effort to motivate and engage them towards the values, vision and mission of companies. At the same time contractors are not protected by syndicates or similar and do not have codetermination rights. They fall out of the labor law agreements as they are independent entrepreneurs. Furthermore, freelancers are often not integrated by law to the social security systems if the government has not foreseen any protection (Rinne and Zimmermann, 2016; Staab and Nachtwey, 2016).

Performance surveillance has taken a new shape through the digitization of work steps as for example the logistics industry in which pickers hold a hand scanner enabled with cameras and microphones which are able to transfer movement data of the workforce. Companies can use this information to define performance profiles, measure and compare the performance of diverse workforce. In addition to having a performance surveillance also a high technical process control is enabled through this hand scanners as these provide the employees with consecutive work steps to maximize workflow efficiency. Resulting in an almost gapless system automation reducing the workforce autonomy to structure their work place and creativity for innovative solutions. This trend can also be found in higher qualified jobs such as developers, sales agents and analysts within the tertiary sector. This is possible through individualized performance review based on analysis of big data and control related software. For example, through the analysis of big data it is possible to determine if a sales man ordered enough products for a specific selling period as well as to analyze how many client contacts have been realized and which was the duration and outcome of the meeting (Staab and Nachtwey, 2016; Boes et al, 2016). Performance measure through target setting also takes on a new dimension as companies start to use mobile apps with which their employees can document their target accomplishments on daily basis. These apps create an elevated level of transparency as they allow to make the individual performance transparent to everyone in the company. Platforms like Twitter allow to "follow" colleagues and inform about alterations in their work activities. As a result, communities can be used to track, measure and influence the social behavior of employees.

Dissolution of boundaries regarding time and work place started in the 80s with telework possibilities. In course of the years due to the increased digitalization of work through the possibility of taking work everywhere with smartphones, tablets and laptops, work has become a constant companion in many countries and especially for higher qualified jobs. It has become a normality to work on weekends, vacations, trains and airplanes, etc. However, still not all companies allow their employees to make use of this possibilities as despite advance possibilities of performance surveillance they fear not to have enough control over their employees and the expected work results. On the other hand, those employees that are enabled with this work technologies started complaining about higher expectations of constant reachability. In this case some EU countries are struggling to find the right labor law mix that will cope with this new work environments. At the same time, flexible and boundary free work requires a high level of self-organization and time management from the individuals (Carstensen, 2016).

Company information which in the past was only accessible to higher leadership - as it often implied higher printing and informational costs - can now be shared with employees through diverse digital technology like sharing platforms, chatting rooms, intranets, etc. This allows employees to have a higher awareness about the company and its activities permitting organizations to become more transparent and open towards employees. Because of greater transparency improvements in decision-making, employee confidence and internal networking have been achieved (Francis and Scheers, 2013). However, increased transparency implies new code of conducts to protect information from leaking (Schildt, 2017).

In addition, companies need to deal with the fact that the increased digitization of information generates informed employees, consumers and partners that have real time access to competitive pricing and

product information which increases pricing transparency. Digital platforms allow peer recommendations by consumers which can be on the one hand frightening as these put major pressure on the control of the branding message and on the other hand it gives the opportunity of employees to engage with consumers as ambassadors for the brand. Latter ones are called "prosumers". In this sense, a new two-way communication has been enabled between consumer and brand which bares opportunities and risks. New collaborative approaches towards stakeholders are required to keep the engagement up. Companies have started to use this new digital communication to test in communities' innovations, receive and provide feedback on issues of problems with products, etc. However, this active communication with the stakeholders also requires a new way of thinking and culture within organizations that is more than ever service oriented (Ernst and Young, 2011).

Conclusion

Cloud computing, advanced algorithms, artificial intelligence are all interrelated and have a major effect on how individuals are changing their way of acting within and outside organizations. The digitalization has shown that it has majorly changed the workforce population, the skill set needed, the way to interact and collaborate as well as to communicate within an organization, not only from employee side but also from the leadership side. Table 2 provides a summary of how the analyzed technologies are having an impact on the factor people within an organization.

Table 2: Summary of Findings

TECHNOLOGY	IMPACT ON WORKFORCE	IMPACT ON LEADERSHIP
INTERCONNECTEDNESS & AVAILABILITY		
MOBILE / IOT / CLOUD	Changes in contracting form of Workforce: Crowd sourcing Flexible work models in time and space Free space of self-controlled work Entrepreneurship and empowerment at the risk of simple execution Exposure to higher global workforce competition Reduction of sense of affiliation of the workforce Lose of social security protection	Flat Hierarchies Implies agility and speed in decision taking Enforces collaborative approach Requires higher motivation of employees due to the externalization of work packages and personal distance to the contractor Middle Management loses importance as managers can cover larger departments and locations
INFORMATION & INTELLIGENCE		
BIG DATA & ANALYTICS	Higher performance surveillance Lose of creativity due to higher and detailed process structure Higher amount of performance based remuneration	Optimization of processes Increased evaluation of employees, frees up management from their surveillance role as analytics start to take over the decision Dependency of providers due to lack of programming knowledge
AUTOMATION & EFFICIENCY		

ROBOTICS / AUTOMATION / ROBOT PROCESS AUTOMATION / INTELLIGENT AUTOMATION / ARTIFICAL INTELLIGENCE	Rationalization of workforce for higher qualified and lower qualified jobs Reduction of workforce autonomy, creativity and innovation	Level of hierarchies becomes flat Loss of creative adaption to problems and historical background
COMMUNICATION & COLLABORATION		
SOCIAL MEDIA	Transparency Knowledgeable workforce Increased need for service orientation toward client Enforces collaboration and knowledge sharing	Demand for collaborative and transparent leadership Open and clear communication Provision and share of information company wide at low cost Enforcement of engagement Influence social behavior of employees
PRIVACY & SECURITY		
NEXT-GENERATION SECURITY	Risk of leakage of personal employee data	Development of new codes of conduct

Through the authors' analysis it has become clear that the workforce of tomorrow will have to think and act interconnected and will need to focus on innovation and creativity to be able to cope with structural changes the technological development has brought along. Still questions are open such as at what pace further rationalization will take place or which efforts are being undertaken by the environment to get along with the skill need of rationalized workforce.

[i] For a detailed description of "crowd worker" consult Boeckler Impuls, 2016

References

Anon., (2016): Die digitalen Tageloehner, *Boeckler Impuls* [online], Available at: <https://www.boeckler.de/64443_64455.htm>, [Accessed: 31.08.2017].

Boes, A. et. Al.., (2016): Digitalisierung und „Wissenarbeit“, *Aus Politik und Zeitgeschichte*, (66/18-19), pp. 32-39.

Buhse, W., (2014): Management by Internet: Neue Führungsmodelle für Unternehmen in Zeiten der digitalen Transformation. Kulmbach: Börsenmedien AG. ISBN: 978-3864701726.

Carstensen, T., (2016): Ambivalenzen digitaler Kommunikation am Arbeitsplatz, *Aus Politik und Zeitgeschichte*, (66/18-19), pp 39-46.

DuBrin, A.J., (2002): Fundamentals of Organizational Behavior An Applied Perspective, 2nd ed. New Yoork: Pergamon Press Inc..

Feser, C., Nielsen, N., Rennie, M., (2017): What’s missing in leadership development?. [online] Available at: <http://www.mckinsey.com/global-themes/leadership/whats-missing-in-leadership-development> [Accessed 04.08.2017].

Förster-Metz, U.S. and Golowko, N., (2017): Employability skills for the Romanian Outsourcing Industry, In: 2017 The 11th international Conference on business excellence – Strategy, Complexity and energy in changing times, March 30-31, Bucharest, Romania. ISBN: 978-60692299-2-7. pp. 259-260.

Francis, J. & Scheers, C., (2013): The future workplace of young Europeans, *European View,* (12/2), pp 199–204.

Gow, K., & McDonald, P., (2006): Attributes required of graduates for the future workplace. Journal of Vocational Education & Training, 52, 373–396.

Hilbert, M., (2015): The World’s Technological Capacity to Store, Communicate, and Compute Information. [online] Available at: <http://www.martinhilbert.net/WorldInfoCapacity.html/> [Accessed 27.07.2017].

Marquardt, K., (2017): Smart Services – Characteristics, Challenges, Opportunities and Business Models. Proceedings of the International Conference on Business Excellence, 11(1), pp. 789-801. doi:10.1515/picbe-2017-0084.

Morgan, J., (2016): A Simple Explanation Of 'The Internet Of Things'. [online] Available at: <http://www.forbes.com/sites/jacobmorgan/2014/05/13/simple-explanation-internet-things-that-anyone-can-understand> [Accessed 28.07.2017].

Mullins, L. J., (1990): Management and Organizational Behaviour.2nd ed., London: Pitman Publishing.

Plattner, H., (2016): Big Data. [online] Available at: <http://www.enzyklopaedie-der-wirtschafts-informatik.de/lexikon/daten-wissen/Datenmanagement/Datenmanagement--Konzepte-des/Big-Data> [Accessed 28.07.2017].

Petry, T., (2016): Erfolgreiches Führen im digitalen Zeitalter. [pdf] Available at: <https:// www.izgs.de/app/download/13864564096/thorsten petry erfolgreiches führen.pdf> [Accessed 03.08.2017].

Press, G., (2015): A Very Short History of Digitization. [online] Available at: <https://www.forbes.com/sites/gilpress/2015/12/27/a-very-short-history-of-digitization> [Accessed 27.07.2017].

Richards, L., (2017): Factors affecting Organizational Behaviour, *ehow* [online]Available at: <http://www.ehow.com/info_8131521_factors-affecting-organizational-behavior.html>, [Accessed 28.08.2017].

Rinne, U. & Zimmermann, K.F., (2016): Die Digitale Arbeitswelt von heute und Morgen, *Aus Politik und Zeitgeschichte*, (66/18-19), pp. 3-9.

Rouse, M., (2016a): Social Media. [online] Available at: <http://whatis.techtarget.com/definition/ social-media> [Accessed 28.07.2017].

Rouse, M., (2016b): Cybersecurity. [online] Available at: <http://whatis.techtarget.com/definition/ cybersecurity> [Accessed 29.07.2017].

Rouse, M., (2017a): Big data analytics. [online] Available at: <http://searchbusinessanalytics. techtarget.com/definition/big-data-analytics> [Accessed 28.07.2017].

Rouse, M., (2017b): Robotics. [online] Available at: <http://whatis.techtarget.com/definition/ robotics> [Accessed 28.07.2017].

Sattler, A., (2016): Leadership 4.0. [pdf] Available at: <http://zeitschriften.haufe.de/ePaper/ personalmagazin/2016/429B08E0/files/assets/common/downloads/publication.pdf> [Accessed 03.08.2017].

Schildt, H., (2017): Big data and organizational design – the brave new world of algorithmic management and computer augmented transparency, *Innovation: organization & Management*, (19/ 1), pp. 23–30.

Staab, P. and Nachtwey, O., (2016): Digitalisierung der Dienstleistungsarbeit, *Aus Politik und Zeitgeschichte*, (66/18-19), pp. 24-31

***BMWi, (2016): Bechtle Magazin Zukunftsstark 2017. [pdf] Available at: <https://www.bechtle-update.com/assets/Digitalisierung-2/Innovation-Labs/bechtle_magazin_zukunftsstark_2017.pdf> [Accessed 27.07.2017].

***Deloitte, (2017): Automate this - The business leader's guide to robotic and intelligent automation. [pdf] Available at: <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/ process-and-operations/us-sdt-process-automation.pdf> [Accessed 28.07.2017].

***Ernst & Young LLP, (2011): The digitisation of everything. [pdf] Available at: <http://www.ey.com/Publication/vwLUAssets/The_digitisation_of_everything_-

_How_organisations_must_adapt_to_changing_consumer_behaviour/$FILE/EY_Digitisation_of_everything.pdf> [Accessed 27.07.2017].

***ISA (n.d.): What Is Automation?. [online] Available at: <https://www.isa.org/about-isa/what-is-automation/> Accessed 28.07.2017].

***McKinsey, (2017): Smartening up with artificial intelligence. [online] Available at: <http://www.mckinsey.com/industries/semiconductors/our-insights/smartening-up-with-artificial-intelligence> [Accessed 28.07.2017].

A Study on the Influence of Final Consumption Expenditure of Households and Foreign Trade on the Gross Domestic Product – Case of Romania and Five European Union Countries with Highest GDP

Mihai Păunică (corresponding author), Professor, Audit and Accounting Department, Faculty of Accounting and Management Information Systems, The Bucharest University of Economic Studies, mihai.paunica@cig.ase.ro

Alexandru Manole, Professor, Finances - Accounting Department, Faculty of Finances and Accounting, "ARTIFEX" University of Bucharest, alex@artifex.org.ro

Cătălina Motofei, Ph.D., Economic-Financial Analysis and Evaluation Department, Faculty of Accounting and Management Information Systems, The Bucharest University of Economic Studies, cmotofei@yahoo.com

Abstract

In this paper, the authors analyze the influence of some factors on the economic growth at the level of the European Union. The factors selected for the evaluation are indicators corresponding to the group of countries that recorded the most significant amounts of Gross Domestic Product since 2007Q1, and of Romania. We consider two types of analysis, as detailed in the main body of the paper, and we use a dedicated econometric analysis to substantiate the estimation of our parameters, meant to help measure the impact of factors on the main variable selected.

Keywords: Gross Domestic Product, final consumption, foreign trade, influence, regression

Introduction

The impact of two growth factors, the final consumption (as final consumption expenditure of households) and the foreign trade, on the economic evolution, measured by the most significant indicator used in the quantification of macroeconomic outputs and growth, which is the Gross Domestic Product, makes the subject of this article.

Our study includes a presentation of the research methodology and datasets subjected to processing, analysis and interpretation. Then, we present the results and comment the value achieved for the processed parameters. The conclusions outline the most important findings in the scope of our paper.

We consider that the final consumption and foreign trade influence both the values of GDP, but also its evolution, thus our analysis pursues these two coordinates: a size-based analysis, together with an econometric study on the relationship between factors and GDP, including an evaluation of its intensity.

Research Methodology and Data

Our methodology is based on the principles that govern the accumulation of the Gross Domestic Product according to the expense method. According to this method, the relationships between these macroeconomic indicators follow the balance pattern. We shall pursue the treatment proper to this method, which requires the study of evolutionary trends in a comparative approach, between the main indicator and the factors, and then we will resort to the econometric (regression) techniques, to identify the factual impact over time posed by the factors considered.

The datasets are extracted from official statistical sources, EUROSTAT, and cover the following dimensions:

a) Time: from 2007, Quarter 1, to 2017, Quarter 1;
b) Space: three members, namely the EU28, the five main contributors to the EU28 total GDP (they were selected according to hierarchy for total contributions across the time: Germany, France, United Kingdom, Spain, Italy, grouped under the acronym SIG5) and Romania;
c) Indicators: Gross Domestic Product (market prices, unadjusted data), which is the main indicator and final consumption expenditure of households (current prices, unadjusted data), export and import (also, current prices, unadjusted data), which assume the role of factors.

Data Analysis, Results and Discussions

As stated in the previous section, the analysis of data pursued the following stages:

- The comparative analysis between the evolution of the main indicator and the factorial variables, grouped according to the space (geographical) dimension;
- The regression analysis, which synthesizes the influence of the factors on the main indicator, across the entire period considered. We shall use both simple and multiple regressions, as we have three factors in our dataset.

For the Gross Domestic Product analysis, we apply the balance method, knowing that the values for Romania and the group of five countries will be considered factors for the GDP at EU28 level.
The graphic below describes the comparative evolutions of the three indicators:

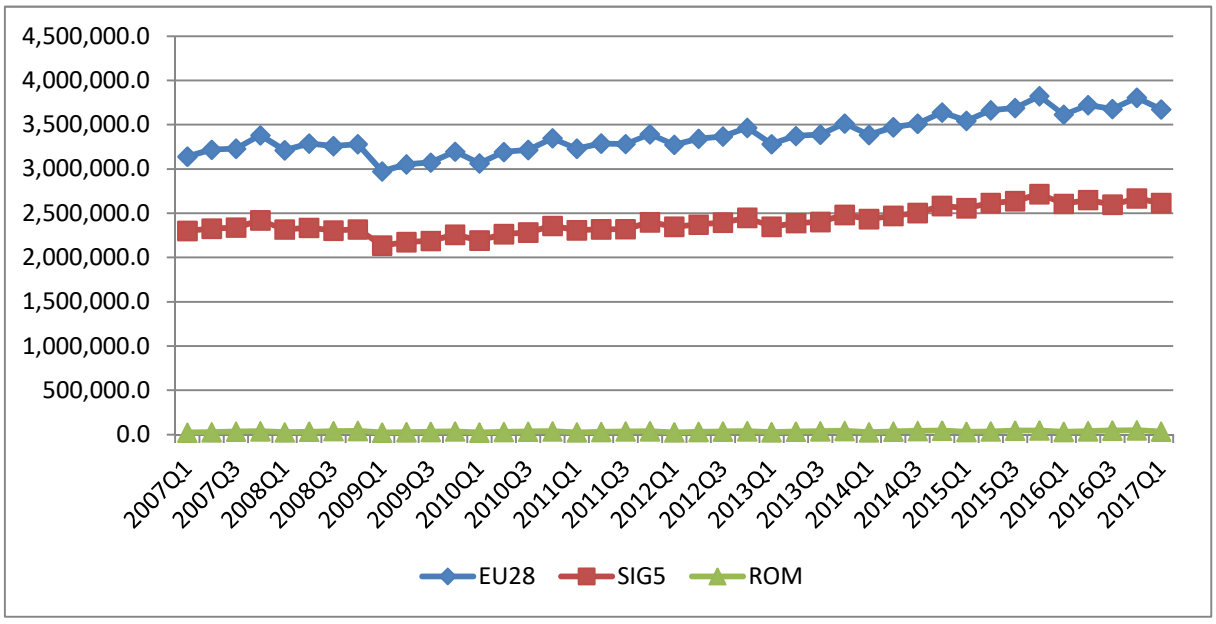


Fig. 1: Comparative evolution of Gross Domestic Product for selected geographic dimensions

Data source: Eurostat Database, *GDP and main components (output, expenditure and income) [namq_10_gdp]* **,** item *Gross domestic product at market prices,* retrieved 03.08.17, measurement unit *Current prices, million euro*, Unadjusted data (i.e. neither seasonally adjusted nor calendar adjusted data), graphical representation by the authors.

It can be easily observed that the evolution of the EU28 Gross Domestic Product is largely influenced by the movement of the SIG5 level, while Romania poses a less visible evolution. For the entire interval subjected to analysis, the overall amount of SIG5's GDP covers more than 71.25% of the entire EU28 group, while the quota of Romania is slightly above 0.10%.

To collect additional information on the correlation between the evolutions of Gross Domestic Product grouped by geography, we selected the multiple regression model, which would allow us to measure the impact of SIG5 and Romania's GDP modification on the EU28's GDP.

The expected equation should have the following form:

$$EUG = \alpha + \beta 1 * SIGG + \beta 2 * ROMG \qquad (1)$$

where:

α = the free term of the model;
EUG = EU28's Gross Domestic Product;
SIGG = Gross Domestic Product cumulated for the SIG5 countries;
ROMG = Gross Domestic Product of Romania.

We have imported the datasets for the three variables within dedicated econometric software, which provided the following estimations for our regression model:

Dependent variable: EUG

	coeficient	eroarea std.	t-ratio	p-value	
const	116504	57746,2	2,018	0,0507	*
SIGG	1,28904	0,0293019	43,99	3,32e-034	***
ROMG	4,52235	0,640757	7,058	2,05e-08	***

Mean dependent var	3378797
S.D. dependent var	214640,3
Suma pătratelor reziduurilor	1,55e+10
Eroarea standard a regresiei	20218,00
R-pătrat neajustat	0,991571
Adjusted R-squared	0,991127
F(2, 38)	2235,115
P-value(F)	3,89e-40
Log-likelihood	-463,1062
Akaike criterion	932,2125
Schwarz criterion	937,3532
Hannan-Quinn	934,0844
rho	0,534291
Durbin-Watson	0,793711

Fig. 2: Estimation for the multiple regression model

Therefore, the equation of the model can be written as follows:

$$EUG = 116504 + 1.28904 * SIGG + ROMG * 4.52235$$

The values of the parameters display favorable influences for the EU28's Gross Domestic Product on behalf of both factors, SIGG and ROMG. However, it can be seen that Romania exerts a stronger influence on the main indicator, meaning that for a unit increase (1 Euro) of Romania's GDP, the Gross Domestic Product for the European Union tends to increase by more than 4.5 Euro. Regarding the SIG5 countries, when their total GDP (counted as a single, cumulated variable in the scope of our analysis) increases by 1 Euro, the results is likely to indicate the increase of the main indicator by more than 1.28 Euro.

The tests associated with the model offer relevant information for the significance of the parameters estimated. Therefore, as both *R-squared* and *Adjusted R-Squared* are higher than 0.991, we consider that the model describes in accurate manner the correlation between the three variables. The free term, expression of the evolution of the main indicator when all regression factors are null, is significant (some 25 times higher than the β2 parameter), indicates also a favorable influence of factors that are not yet included in our model.

Next, our research will focus on the impact of the GDP accumulation factors on the Gross Domestic Product itself, for two geographical dimensions selected (SIG5 countries and Romania).

For Romania, we have defined the appropriate dataset, covering the specified time period, and the variables that are to fulfill the following econometric model:

$$ROMG = \alpha + \beta1 * RCF + \beta2 * REX + \beta3 * RIM \qquad (2)$$

where
ROMG = Gross Domestic Product;
RCF = final consumption expenditure of households;
REX = export;
RIM = import.

The graphical representation of the indicators' evolution is drawn in the figure below:

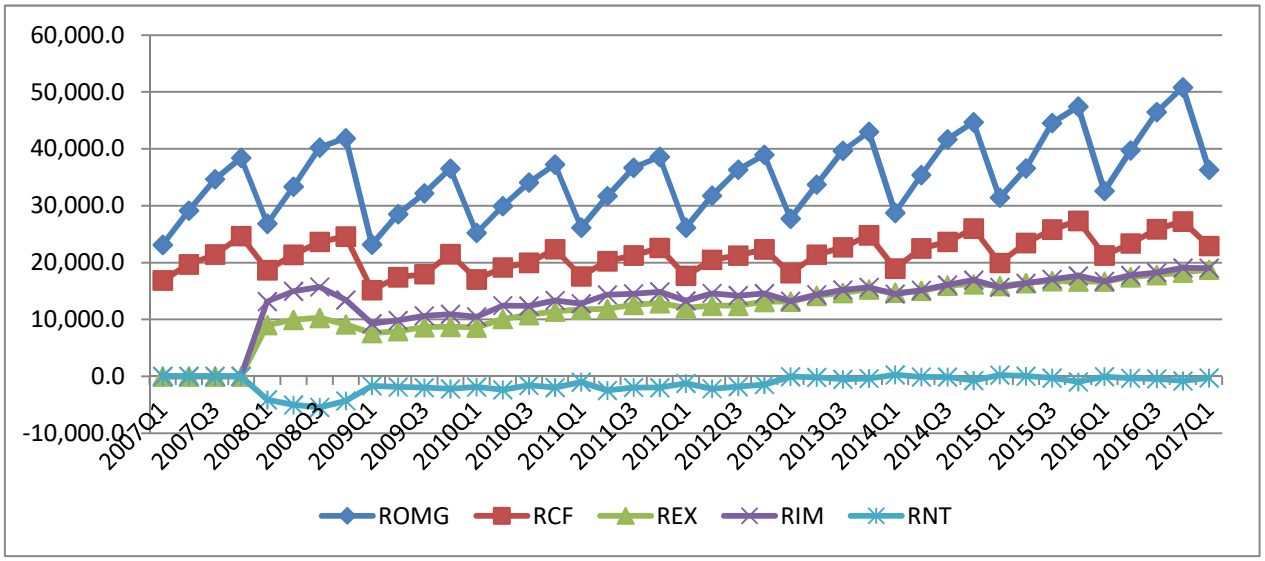


Fig. 3: Evolution of Romania's GDP and its influence factors

Data source: Eurostat Database, *GDP and main components (output, expenditure and income) [namq_10_gdp]* **,** item *Gross domestic product at market prices,* retrieved 03.08.17, measurement unit *Current prices, million euro*, Unadjusted data (i.e. neither seasonally adjusted nor calendar adjusted data), graphical representation by the authors.

The above figure presents a symmetrical evolutionary trend for all indicators considered by our analysis. It can be seen that the less significant values belong to the export factor, with the final consumption having the highest values in the set of factorial indicators. To be noted, the net value of the foreign trade,

the RNT parameter in figure 3 is most of the time negative, which clearly outlines a less than favorable situation that is the predominance of imports over exports.

Next, we shall apply an econometric regression model based on the three factors, with the Gross Domestic Product as the main indicator. We have used the same econometric analysis software for all the estimations in this paper, to ensure a higher level of cohesion for our results. Therefore, after preparing the four datasets and uploading them, the estimation generated the results presented in the figure below:

Dependent variable: ROMG

	coeficient	eroarea std.	t-ratio	p-value	
const	−11823,7	2068,73	−5,715	1,53e−06	***
RCF	2,12244	0,104563	20,30	1,20e−021	***
REX	−0,137751	0,198435	−0,6942	0,4919	
RIM	0,231451	0,197721	1,171	0,2492	

Mean dependent var	35154,03
S.D. dependent var	6799,006
Suma pătratelor reziduurilor	1,15e+08
Eroarea standard a regresiei	1760,400
R-pătrat neajustat	0,937988
Adjusted R-squared	0,932960
F(3, 37)	186,5539
P-value(F)	2,20e−22
Log-likelihood	−362,4772
Akaike criterion	732,9544
Schwarz criterion	739,8087
Hannan-Quinn	735,4504
rho	0,251818
Durbin-Watson	1,466370

Fig. 4: Model estimation for the case of the Romanian economy

The equation of the Romanian model can be written as such:

$$ROMG = -11823.7 + 2.12244 * RCF + (-0.137751) * REX + 0.231451 * RIM$$

The β coefficients for the three factors reveal their influence on the Gross Domestic Product's evolution in the case of Romania. The final consumption expenditure of households and the import have favorable influences, while the export has a negative impact, and its coefficient is smaller, in absolute value, than the other two βs. If the financial consumption expenditure of households records an increase by 1 Euro, the Gross Domestic Product of Romania shall increase by 2.12244 Euros. A unit modification of the imports is susceptible to lead to a GDP growth of 0.231451 Euros. The model estimation produced a value of the free term which is significantly higher than the three βs, and is negative, which means that there are other factors, not considered in our model, whose influence on the GDP evolution is both major and not favorable.

Considering the tests associated with the estimation, as seen in fig. 3, the *R-squared* and *Adjusted R-squared* are higher than 0.932, which provides confidence in the reliability of the model and the possibility to use it in further studies on similar topic.

The evolutionary trends of the indicators that characterize the SIG5 group are detailed in figure 5:

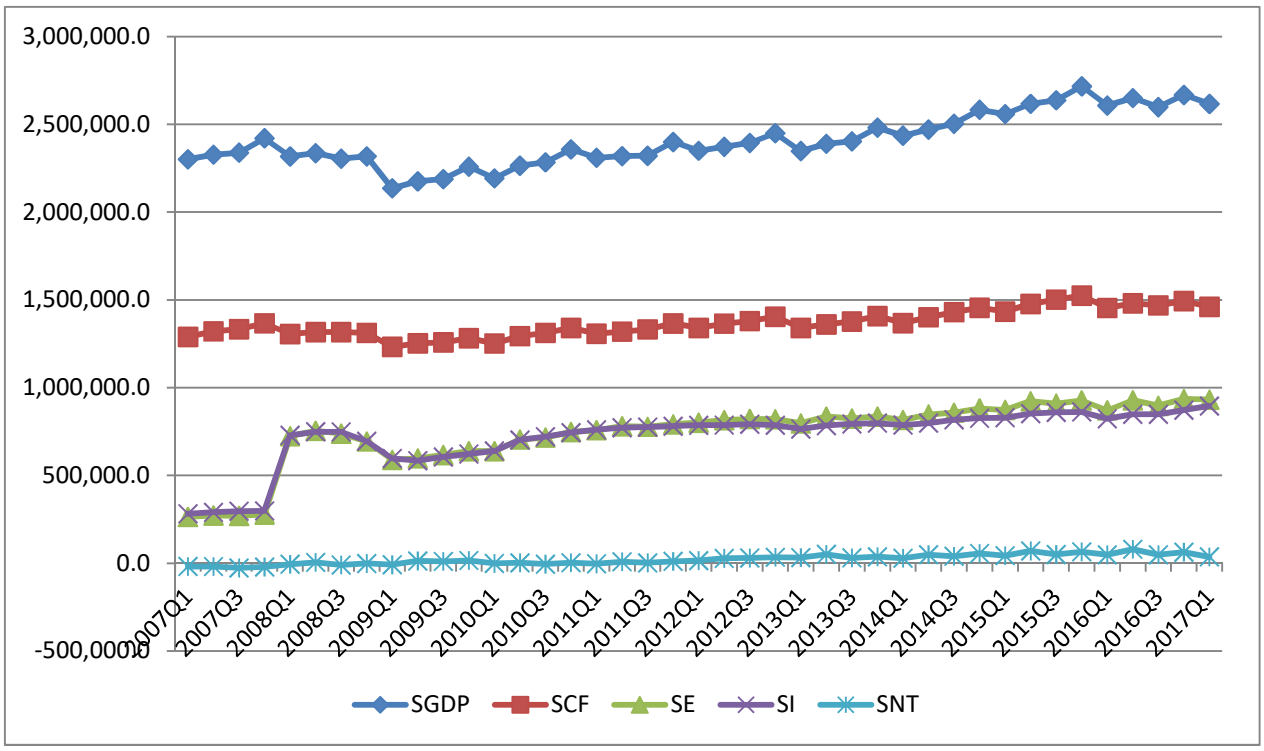


Fig. 5: Evolution of GDP and its influence factors for SIG5 economies

Data source: Eurostat Database, *GDP and main components (output, expenditure and income) [namq_10_gdp]* **,** item *Gross domestic product at market prices,* retrieved 03.08.17, measurement unit *Current prices, million euro*, Unadjusted data (i.e. neither seasonally adjusted nor calendar adjusted data), graphical representation by the authors.

Also, in the above figure, the major influence of the final consumption is visible, then the export, followed by import. We conclude that the net value of foreign trade, the net export presents a more favorable situation than in Romania

In the case of the most significant states in the European Union, the model estimation is based on the following core equation:

$$SGDP = \alpha + \beta 1 * SCF + \beta 2 * SE + \beta 3 * SI \quad (3)$$

where
SGDP = Gross Domestic Product;
SCF = final consumption expenditure of households;
SE = export;
SI = import.

The results of the estimation are presented in the figure below:

Dependent variable: SGDP

	coeficient	eroarea std.	t-ratio	p-value	
const	-264764	98780,7	-2,680	0,0109	**
SCF	1,97225	0,0720732	27,36	3,74e-026	***
SE	-0,0175274	0,246323	-0,07116	0,9437	
SI	-0,0140170	0,264568	-0,05298	0,9580	

Mean dependent var	2407461
S.D. dependent var	148676,7
Suma pătratelor reziduurilor	1,44e+10
Eroarea standard a regresiei	19742,94
R-pătrat neajustat	0,983689
Adjusted R-squared	0,982367
F(3, 37)	743,8045
P-value(F)	4,19e-33
Log-likelihood	-461,5847
Akaike criterion	931,1694
Schwarz criterion	938,0236
Hannan-Quinn	933,6653
rho	0,314290
Durbin-Watson	1,280138

Fig. 6: Model estimation for the case of the SIG5 group of economies

The regression model can be transcribed in the following form:

$$SGDP = -264764 + 1.197225 * SCF + (-0.0175274) * SE + (-0.0140170) * SI$$

The interpretation of the regression parameters reveals a single factor with positive influence, that is the final consumption expenditure of households, whose modification by one unit leads to a likewise modification by more than 1.19 units of the Gross Domestic Product. The other two factors are characterized by non-favorable influences, even if the β quotients are slightly below 2%. To be noted, the *R-squared* and *Adjusted R-squared* coefficients associated with the model have significant values, giving evidence on the reliability of the model. Like in the case of Romania, the free term indicates a major influence of factors that are not specified in this scenario, with an overall unfavorable impact.

Conclusions

Econometric methodology is an useful tool for the measurement of correlations between the evolutions of macroeconomic variables. The analyses we have performed within this article revealed the major influences on macroeconomic growth at the level of geographic regions. Thus, even if in absolute value the Romanian GDP poses a small contribution to the EU28 amount, the regression model displayed a stronger influence, characterized by a parameter greater than 4.5. Another set of useful results characterize the influence factors of GDP growth in Romania and within the group of five countries. The estimated models outlined the positive influences of final consumption expenditures made by households, and mixed situations in the case of foreign-trade related factors. The final consumption proved to be the most significant factor (as absolute value) in the evolution of Gross Domestic Product indicators studied. The models presented can be extended across the dimensions that govern the grouping of values for various indicators, which is the possibility to analyze data for an extended interval, for a larger set of measures, and more countries. The results are useful for analysts and decision makers, as they outline the impact of important factors on the economic situation and evolution of the country. The final consumption is a key factor of GDP analysis, as it refers the inclination of people towards consumption, while the performance of the foreign trade affects the position of the country in the international commerce system.

References

Albu, L. L. (2016), '*Trends in the relation between regional convergence and economic growth in EU'* (working paper No. 161101), Institute for Economic Forecasting, Romanian Academy, available: http://www.ipe.ro/RePEc/WorkingPapers/wpiecf161101.pdf

Anagnostou, A., Kallioras, D., and Kollias, C. (2016), 'Governance Convergence Among the EU28?', *Social Indicators Research*, 129(1), 133-146.

Anghelache, C., Manole, A., Prodan, L., Baltac, A. G. and Dinca, Z. (2014), 'Aspects Regarding the Multiple Regression Used in Macro-economic Analysis', *Romanian Statistical Review Supplement,* 62(1), 99-106.

Bartolj, T., Murovec, N., and Slabe-Erker, R. (2017), 'Development of a Household Sustainable Consumption Index and Its Application to EU-28', *Sustainable Development*, doi: 10.1002/sd.1689.

Capros, P., De Vita, A., Fragkos, P., Kouvaritakis, N., Paroussos, L., Fragkiadakis, K., Tasios, N. and Siskos, P. (2015), 'The impact of hydrocarbon resources and GDP growth assumptions for the evolution of the EU energy system for the medium and long term', *Energy Strategy Reviews*, 6, 64-79.

Ferreira, P. and Dionísio, A. (2016), 'GDP growth and convergence determinants in the European Union: a crisp-set analysis', *Review of Economic Perspectives*, 16(4), 279-296.

Motofei, C. (2017), 'Vectors of economic growth in the eastern area of the EU', *Theoretical and Applied Economics*, 24(1 (610), Spring), 215-226.

Motofei, C. (2017), 'Foreign Trade Evolutions in the European Union', *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 7(2), 156-163.

Puślecki, Z. W. (2015), 'Foreign Trade Policy in Realisation of Economic and Political Interests', *Applied Finance and Accounting,* 2(1), 19-29.

Ștefănescu-Mihăilă, R. O. (2015), 'Social Investment, Economic Growth and Labor Market Performance: Case Study—Romania', *Sustainability*, 7(3), 2961-2979.
ec.europa.eu/Eurostat, online database

A New Classification of the Risks of the Quality Processes

Daniel S. Demidenko, Department of Finance, Institute of Industrial Economics and Management, Peter the Great St. Petersburg Polytechnic University, Russian Federation, demidenko11@rambler.ru

Alexander M. Malinin, Department of Regional Economics and Nature Management, The St. Petersburg State University of Economics, Russian Federation, Department of Regional Economics and Nature Management**,** Department of World Economics and Management, International Banking Institute, Saint-Petersburg, Russian Federation, alexmalinin46@mail.ru

Alexander N. Litvinenko, Department of economic security and management of socio-economic processes, Saint-Petersburg University of the Ministry of Internal Affairs of Russia, Lanfk@mail.ru.

Abstract

The factor of the quality process is the general economic situation, which can be conditionally expressed by two states of the economy: growth or decline. In the case of growth, the quality process develops, in the event of a recession, it brakes and damps. If quality improvement is viewed as one of the most important areas of socially significant process aimed at meeting social needs, then changing demand, supply and corresponding changes in market prices for products are risk factors for this process.
There are many approaches to analyzing and determining risks, but, in accordance with the approach developed by the authors, the risk can be considered as "insufficiency" for all factors of the quality process. Insufficiency means the deviation of the actual factor value of the quality process from the required or expected value. For example, inadequate supply and demand for products of improved quality, inadequate production factors, inadequate investment in projects or income from investments, or both. Having determined, therefore, the quality process, we further assume that all factors of the process are risk factors at the same time. The article presents a new classification of the risks of quality processes.

Keywords: Quality process. Risk classification. New risk's factors.

Introduction

Let us consider that the possibility of realizing each process is determined by the inherented factors, and the effectiveness of implementation is the effectiveness of applying these factors. So, the production process can be successfully implemented only if all the factors of this process are realized - the factors of production, which are determined as (materials, labor, production technology, equipment process control system, other factors can be allocated). This is true fact of any process, and therefore we can talk about the factors of any process. From this point of view, the process of creating quality (Hackman & Wageman, 1995, Biazzo & Bernardi, 2003), (let's call the "quality process"), if it is fair to consider it separately from the process of creating or producing products, is also determined by the action and effectiveness of the application of the factors of this process, which we henceforth call "quality factors".

The innovative component always plays a central role in the processes of quality (Crosby, 1980, Nikolova & Rodionov, 2015). The improvement in quality leads to an improvement / change in the properties of the product, and as a result it is possible to talk about a new product with new properties. Commercialization plays an important role in the process of improvement the quality of the products (Flynn et al., 1995); ensuring the effective demand for products of improved quality. Improving the quality of the product cannot be ensured without it, it will slow down the process of quality and it may finally stop, the quality improvement will not be achieved, the quality of the

product will return to the previous level (Stevenson & Hojati, 2007, Sokolitsyn, Ivanov & Sokolitsyna, 2016).

The economic model of the described process is as follows: with an increase in the quality of the demand curve in terms of the quantity of product / product price shifts to the right parallel to itself. The process of improving quality is represented by a set of parallel functions of demand for a product. But the increase in effective demand for foodstuffs encounters a decline in effective demand in the conditions of economic recession. This can be graphically represented as a price increase due to quality improvement with a fixed amount of product. In a broad sense, the increase in the price of a product with the growth of quality is the mechanism of inhibition of the quality process, since an increase in price reduces demand. In the conditions of economic recession the slowdown effect of the quality process is exacerbated by the likely possibility of reducing the supply on the market due to the slowdown in production rates.

This situation is equivalent to a shift in the supply curve to the left parallel to itself. At the same time, the increase price will be even more intensive.

Problem Statement and Research Objective

There are many approaches to the analysis and identification of risks, but, in accordance with the approach developed by us, the risk can be considered as "insufficiency" in all factors of the quality process. Insufficiency means the deviation of the actual value of the factor of the quality process from the required or expected value. For example, the lack of demand and supply for products of improved quality, inadequate production factors, inadequate investment in projects or income from investments, or both. (Nikolova & Rodionov, 2017, Sweeney et al., 1999)

In the economic literature, there are different points of view regarding the numerical definition of the magnitude of the risk. It is normally to consider the value of the parameter which characterizes the risk factor (in this case the quality factor), the random and normally distributed quantity, whether to evaluate as the risk factor the "second half" of the distribution, because the excess of the actual yield over the expected or planned is not a risk of loss but the additional effect. The author's point of view is that this deviation should still be viewed as a risk and not as a "gift of fate", since in this case the overall financial balance in the economic system is violated, there are disproportions of financial plans, which requires their correction and the implementation of additional corrective measures, possibly requiring additional resources, and can also lead to a change in the timing of the implementation of plans and obtaining the required results. From the point of view of risk management processes, including the quality process, two main tasks can be distinguished:

1. To determine the composition and classification of risks, i.e. identify them, as well as know their quantitative value. Here the main thing is the definition of the composition of risks, their description and classification.

2. According to the authors, any types of risks can be quantified. The simplest method for quantifying process risks is an "expert evaluation" of the magnitude of the risk, which is the most accessible in practice, but also the least justified because of subjectivity assessments.

Key Results

Let us outline the author's approaches to solving these problems. Let's consider a conditional economy- an economic system in which, within the quality process, we will allocate "n" directions of investment investments, the implementation of which corresponds to the corresponding needs existing in the economic system or in society. Let us consider that the satisfaction of any social needs, other than the current consumption of goods, requires "long" investments or costs from a financial point of view.

As part of the quality process, "open" investment projects are considered in certain areas that meet public needs, but with unlimited (or limited in a wide range) investment / capital investments in each direction.

To optimize investment activity in the economic system, "linear" optimization tasks can be used. As it is known, the duality property is inherent in linear optimization problems: the direct problem (as a rule, the problem of optimization of the production plan in the wide sense) always corresponds to the dual problem (as a rule, to determine estimates, parameters of the optimal production plan). Hereinafter, the term "production plan" is considered by us within the framework of the quality process, although it can be used for any process.

If the dual optimization task formulated in accordance with the established mathematical rules and it is difficult to find a meaningful economic interpretation, this may be an indication of the erroneousness or incorrectness of the formulation of the direct optimization problem. In the author's opinion the existing notion that a dual task does not need to have a meaningful interpretation could be considered erroneous.

Let's formulate the direct problem of optimization of the production plan (for the quality process):

$$\widehat{I_1} \times x_1 + \widehat{I_2} \times x_2 + \cdots + \widehat{I_n} \times x_n \to max$$

$$\begin{array}{ll} x_1 + x_2 + \cdots + x_n \le \lim & (y_1) \\ x_1 \le \overline{x_1} & (y_2) \\ \ldots & \\ x_n \le \overline{x_1} & (y_3) \end{array}$$

Where: $\hat{I}$- the expected or "normative", projected return on investments in the areas: $(x_1, \ldots, x_n)$- the size of investments in the economic system in the directions; lim - the available limit of the amount of investments, capital investments in the system for all directions, $\overline{x}$ - - the amount of investment in areas reflecting public needs; $(y_1, \ldots, y_n)$– - variables of the dual problem.

The discussed optimization problem is linear, a solution can be obtained by a simplex method of linear programming. Variable values of the problem are the size of investment in socially significant areas (($x_1 \ldots x_n$).).

The economic meaning of the task is to determine the size of the investment (investment plan) for the economic system in areas reflecting social needs, which ensures maximum return on investment with appropriate restrictions. In a wide sense, one could also talk about the usefulness of investments in these areas.

Let us formulate the dual problem. By definition, the dual task is always the task of determining the estimates or prices of the optimal plan obtained as a result of solving a direct problem. It is always the maximizing of the objective function for the direct task and minimizing of the objective function for the dual problem.

$$y_1 \times lim + y_2 \times \overline{x_1} + \cdots + y_{n+1} \times \overline{x_n} \to min$$

$$\begin{cases} y_1 + y_2 \ge \widehat{I_1} \\ \ldots \\ y_1 + y_{n+1} \ge \widehat{I_n} \end{cases}$$

The economic meaning of the dual task is to determine the estimates of the parameters of the investment plan, under which the costs of attracting financial resources are minimized for the implementation of the investment plan:

• The price of capital in the discussed economic system (% rate on the financial market- y_1);

• the price of capital investments risk in socially significant investment directions ($y_2 \dots y_{n+1}$), considers the risk of non-fulfillment or failure to ensure the required effectiveness of investment.

In general, it is required to minimize the costs of attracting financial resources for the implementation of the social needs at the available risks It will be equal to the price of investment resources and payment for the risk of dissatisfaction with public needs.

We will explain the last component. In the left-part of all inequalities, there is a "payment for the investing risk " and since the risk of investing in areas reflecting the public needs is singled out as a separate component, it is logical to assume that the price of capital in the economic system (the interest rate in the financial market-) reflects the risk-free interest rate (otherwise there could be a double risk accounting). In the left part - the market price of investments in the directions taking into account the risk (risk-free interest rate and risk premium). According to the principle of "duality", the market price of attracting investments in all directions simultaneously reflects the amount of required return on investment. Thus, the constraints of the dual problem express the necessary condition: "the actual return on investments in risk-oriented areas should be greater than the" normative "yield"". This excess can be used to compensate for losses from investment risks in the directions. If the condition is not fulfilled, the required return on investment will be more practically achievable and the optimization condition will not be met - the costs of attracting financial resources to the system will not be minimal, and the quality plan will be optimal. However, additional costs may be required to implement the plan.

If we transfer the risk-free interest rate to the right side of the inequality, we get the value of "added value" per unit of each direction of investment - the normative return on investments in the direction minus the interest rate: $y_{n+1} \geq \hat{I}_n - y_1$.

At the same time, for each direction of investment, the added value should not be more than the "risk price".

The described new type of systemic risk can be defined as "the risk of a suboptimal financial solution" - , the risk of making a decision to attract financial resources to the economic system for the quality process.

The risk caused by investment activity in the economic system can still be described as a "temporary risk", because investment processes always develop in time. This risk is also present in the quality processes, since these processes are unrealizable without attracting investments. It can also be attributed to financial risks, since the use of the time factor is an important point of financial analysis (as opposite to economic analysis). Let us show what is behind the definition of the numerical value of the "risk of a suboptimal financial solution".

Consider the simplest scheme of investment analysis: first, one-time investment costs are realized, after which an equal cash flow "CF" income can be obtained from the investment during a certain period of time "n". The invariable amount of income is used to exclude the influence of the income factor in the numerical analysis of risks. In accordance with the rules of investment analysis, we determine the current value of the total income from investments for the whole period - PV: $V = CF_1 \times DF_1 + CF_2 \times DF_2 + \cdots + CF_n \times DF_n$, , where $DF_{1\dots n}$denoted discount factor for the corresponding year at the risk-free rate r.

Here we will consider a specific type of investment risk: a decrease in the return on investment (CF) over time - the further away the income from the moment of one-time investment, the lower the amount of expected income. It is assumed that in each subsequent period of time the forecasted revenue decreases by a relative amount $0 \leq \alpha \leq 1$. Under such conditions the current income PV after period "n" is equal $PV = CF_1 \times (1-\alpha)^0 \times DF_1 + CF_2 \times (1-\alpha)^1 \times DF_2 + \cdots + CF_n \times (1-\alpha)^{n-1} \times DF_n$.

Let us see the following:

$$PV = \frac{CF}{1+r} \times \left(\frac{(1-\alpha)^0}{(1+r)^0} + \frac{(1-\alpha)^1}{(1+r)^1} + \cdots + \frac{(1-\alpha)^{n-1}}{(1+r)^{n-1}} \right)$$

Let' $1-\alpha/1+r = \beta$, then $PV = CF/1+r \times (1+\beta+\beta^2+\beta^3+\dots+\beta^{n-1})$.

According to the rules of arithmetic, the sum of such a series will be equal to $^{1}/_{1-\beta}$.. Taking into account these conditions, the current income of PV is equal to after the algebraic transformation: $PV = {}^{CF}/_{1+r} \times \left(\frac{1}{1-\left(\frac{1-\alpha}{1+r}\right)}\right) = {}^{CF}/_{r+\alpha}$.

As you know, the current market value of the final cash flow of income of any configuration can be equivalent to the current market value of the capitalized cash flow in the form of an infinite annuity. Refer to the above analysis we can see that the rate of capitalization of the stream of expected returns from investments under these conditions is a risk-free interest rate plus a risk premium equal, in this case, to a probable increase in the uncertainty of future revenues, which increases with distance from the current time. We designated this value as "temporary risk", here it is the rate of decline in the expected income "α". Since the time factor is an indispensable element of financial analysis, temporary risk can be viewed as a form of financial risk. This is a complementary, but at the same time complicating moment for classifying risks.

Conclusion

All considered risks fully relate to the management of the quality process, as well as to other processes that can be identified as an independent object of management. All risks that correspond to the proposed classification are complex and can be estimated quantitatively from the positions offered by us. In some cases, preconditions are necessary to apply the proposed quantitative methods for assessing the risks associated with the process. Thus, in order to quantify the systemic "risk of making a suboptimal decision" about attracting additional financial resources for the quality process, it is necessary to ensure the optimality of the quality process itself, and therefore to have practically acceptable criteria for its optimality. "First, optimize the quality process, and then ensure that the optimality of the process management solutions is appropriate." Since this is a complex task, perhaps this explains the underdevelopment methodologically and in practice of the new types of risk of the quality process we have considered.

Acknowledgment

This research was supported/ partially supported by Peter the Great Saint-Petersburg Polytechnic University. We thank our colleagues from the Department of Finance, Institute of Industrial Economics and Management who provided insight and expertise that greatly assisted the research, although they may not agree with all of the conclusions of this paper. We thank Alexander E. Karlik for assistance with methodology and for comments that greatly improved the manuscript.

References

Biazzo, S., & Bernardi, G. (2003). Process management practices and quality systems standards: risks and opportunities of the new ISO 9001 certification. *Business Process Management Journal*, *9*(2), 149-169.

Hackman, J. R., & Wageman, R. (1995). Total quality management: Empirical, conceptual, and practical issues. *Administrative science quarterly*, 309-342.

Crosby, P. B. (1980). *Quality is free: The art of making quality certain*. Signet.

Flynn, B. B., Schroeder, R. G., & Sakakibara, S. (1995). The impact of quality management practices on performance and competitive advantage. *Decision sciences*, *26*(5), 659-691.

Stevenson, W. J., & Hojati, M. (2007). *Operations management* (Vol. 8). Boston: McGraw-Hill/Irwin.

Sokolitsyn, A. S., Ivanov, M. V., Sokolitsyna, N. A. (2016). Optimal financial means and profit distribution between public and private partners in PPP project realization. Proceedings of the 28th International Business Information Management Association Conference - Vision 2020: Innovation Management, Development Sustainability, and Competitive Economic Growth, p. 2122-212.

Nikolova, L. V., Kuporov, J. J., & Rodionov, D. G. (2015). Risk management of innovation projects in the context of globalization. International Journal of Economics and Financial Issues, 5 (3S), p. 68-72

Sweeney, J. C., Soutar, G. N., & Johnson, L. W. (1999). The role of perceived risk in the quality-value relationship: a study in a retail environment. *Journal of retailing*, *75*(1), 77-105.

Nikolova, L. V., Rodionov, D. G., & Afanasyeva, N. V. (2017). Impact of Globalization on Innovation project Risks Estimation. European Research Studies, 20(2), p. 396-410.

Stevenson, W. J., & Hojati, M. (2007). *Operations management* (Vol. 8). Boston: McGraw-Hill/Irwin.

Peculiarities of Quality Management Methodology for Innovation Projects of Industrial Enterprises

Alexander M. Kolesnikov, Department of Finance, Saint-Petersburg State University of Aerospace Instrumentation, Russian Federation, 9843039@mail.ru

Ekaterina D. Malevskaia-Malevich, Department of Finance, Institute of Industrial Economics and Management, Peter the Great St. Petersburg Polytechnic University, Russian Federation, malevskaia@spbstu.ru

Yulia A. Dubolazova, Department of Finance, Institute of Industrial Economics and Management, Peter the Great St. Petersburg Polytechnic University, Russian Federation, julia005@mail.ru

Abstract

In the scientific field, characterized in general as "research of innovative problems", a clarification of terminology and basic concepts pertaining to the studied problems is of great importance (perhaps more important than in other issues of the science of economic management). The article presents the author's definition of a number of key concepts of this scientific field, besides the peculiarities of the methodology of quality management which are applied specifically to the innovative activity of industrial enterprises are formulated.

The issues discussed in the article, in spite of the rich scientific background, are particularly relevant and still controversial. The authors justify the meaning of a "new / innovative product" not only as a "proper" product, but also as a process, a technology that, in turn, can be used both for the production of new products only and for the production of traditional "old products" with use of new methods / technologies, providing more economic use of resources.

The article presents a schematic diagram of an innovative mechanism that reflects the typology of managing the innovation process of an industrial enterprise as a single process of production and consumption of innovative products. Within the innovation system of the enterprise, quality management issues are considered separately, namely, its economic component as an innovation process. The article also shows how innovation processes are managed within the framework of the innovation system based on the example of quality management

Keywords: Innovative mechanism, innovation process, product, new / innovative product, proper, quality management.

Introduction

The concept of an "innovation system" combines such key components as the creation / production and consumption / use of innovative / new products. In our opinion, these are products that first appear in the relevant market (labor, factors of production, capital). The formation of an innovative system ensures the unity of the processes of creating and using new products within the framework of a single "innovation process". Based on this, new products can be:

- ✓ "actual" products,
- ✓ Processes, technologies that can be used to produce only new products, or also for the production of traditional "old products" using new production methods / technologies that ensure more cost-effective use of production factors in the production process (higher labor productivity, lower resource intensity of production).

Problem Statement and Research Objective

The company strives to maximize the useful result of its activities, while usually there are financial and budgetary constraints, so we can talk about optimizing activities under the specified conditions. (Asheim et al.,2003, Chesbrough, 2004, Hobday, 1998) When introducing system innovations - innovations such as management automation tools, switching to new products, technologies, etc., the object of research should be not only the innovation itself, as a tool that determines the main factors for the formation of the economic effect, but also the forms of interaction of systemic innovations with the organizational and production system, within which it is being implemented. (Freeman & Soete, 1997, Demidenko, Gorovoy & Malevskaya-Malevich, 2017)

Thus, in the actively developing risky external environment, the development of modern, effective management mechanisms is required, which primarily includes planning mechanisms in the broad sense, in particular, innovative mechanisms for the formation and economic justification of innovation programs. (Nikolova, Kuporov, & Rodionov, 2015, Rodionov, Rudskaia & Degtereva, 2017)

Key Results

In principle, the scheme of the innovative mechanism, reflecting the typology of management of the innovation process, as a single process of production and consumption of innovative products, is presented in Fig. 1

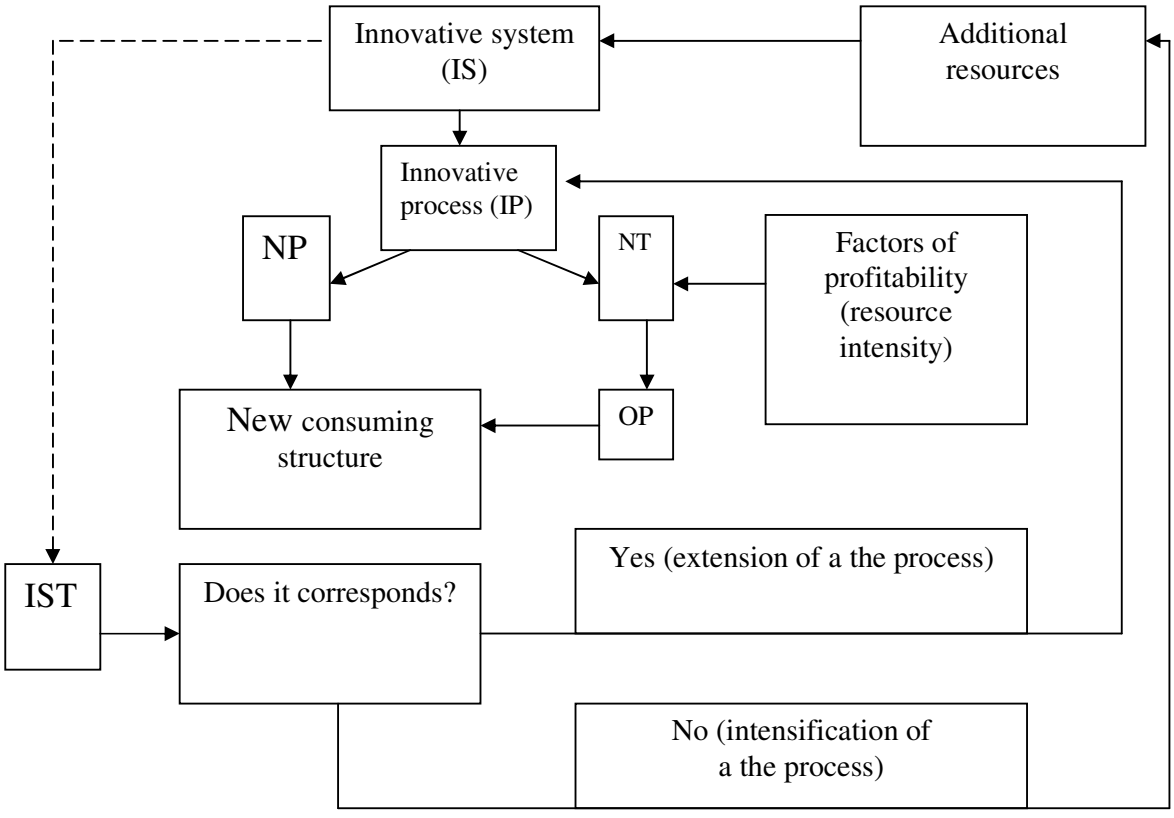


Fig. 1: Scheme of the innovative mechanism.

IS is an innovative system; IP is an innovative process; NP - "new" products; NT - new technologies (production technologies of products, in which the factors of economy (resource intensity) are

intensified); OP - "old" products produced using NT; NSC - a new structure of consumption; IST is an innovative standard.

An innovation system does not necessarily represent any organizational structure. It is a mechanism of economic management that generates new structure of consumption products, both "new" in their consumer properties, and "old", with the former consumer properties of economy or, in a broad sense, resource intensity. The new structure of consumption is "checked" in the innovative system for compliance with its innovative standard, which can be developed in the most innovative system, or is externally specified in relation to it (the diagram shows the dotted line). An essential element of the innovation system is an innovative process that includes "new" and "old" products and processes / technologies for their production. If the standard is complied with, the innovation process continues, if there is a discrepancy, its "intensification" is necessary, if necessary - by attracting additional resources.

We can talk about the cycle of the innovation process in the innovation system, it can be defined as a period from the beginning of the innovation process to the formation of the new structure of consumption. In this sense, the diagram (Fig. 1) depicts one cycle of the innovation process, which recurs during the innovative process.

As part of the mechanism of the innovation system, the innovative standard should ensure the timely promotion of both strategic and actual goals and objectives for managing the innovative process within the framework of the innovation system.

New production technologies in the framework of the innovation process can be used both for the production of new products and for traditional products, and when used by the consumer the utility, is higher due to improved performance indicators for their production (less resource intensity). The result of the innovation process is a new structure of consumption of products, which is either preserved if it meets the current consumption standard (old products may also be preserved if they become more economical in use due to improved production technologies) or changes in the direction of strengthening the influence of innovative factors to ensure compliance with the current, ever-changing consumption standard

The peculiarity of managing the innovation process, as the process of economic management, is the need for a certain resource base for the continuation or intensification of the innovation process. The existence and, if necessary, the replenishment of the resource base is an important function of the innovation system. The resource support of the innovation process should be considered separately, in particular, the question of whether resource provision should be considered as part of the Innovation process.

Quality management could be considered as one element of the Innovation process within the innovation system and its economic component. Quality, as it is known, is defined as a set of product properties that determine its consumer value when used. Using the example of quality management, it is possible to see how the IP is managed within the framework of the innovation system. As the properties of the product, you can consider the consumer characteristics of the product itself (purpose, speed, power, composition and accuracy of operations / works, etc.), as well as indicators that are more relevant to the process of product manufacturing (economy of use, resource intensity). At the same time, innovative functions in the quality management process are improving the quality of products and ensuring their quality.

The improvement of consumer characteristics of the product leads to the improvement the quality of products, and to ensure the quality of the product - the preservation of the consumer characteristics achieved in the production, as well as the cost reduction of products, reducing their resource-intensive use (production costs in terms of the methods used to evaluate the quality of the production process, metrology, reducing the level of rejects and technological losses, using economical and reliable quality control methods).
It can be seen that part of the quality management system related to products is not the task of economic management: improving the properties of products is an engineering task, often requiring

capital investment and a long time for implementation. Consequently, in a short period of time, in which IP is usually considered within the framework of an innovation system, improving the quality of products by improving their properties should not be considered at all in the production sphere, only in the sphere of consumption. You cannot improve the properties of the products produced, but you can improve the structure of their consumption. This is justified with regard to the quality of products, which is determined by the composition of consumer properties. (Figure 1)

Conclusion

When introducing innovation system - innovations such as management automation tools, switching to new products, technologies, etc., the object of research should be not only the innovation itself, as a tool that determines the main factors for the formation of the economic effect, but also the forms of where it is being implemented.

Thus, in an actively developing risky external environment, the development of modern, effective management mechanisms is required, which primarily includes planning mechanisms in the broad sense, in particular, the mechanisms for the formation and economic justification of innovation programs

Acknowledgment

This research was supported/ partially supported by Peter the Great Saint-Petersburg Polytechnic University. We thank our colleagues from the Department of Finance, Institute of Industrial Economics and Management who provided insight and expertise that greatly assisted the research, although they may not agree with all of the conclusions of this paper. We thank Alexander E. Karlik for assistance with methodology and for comments that greatly improved the manuscript.

References

Chesbrough, H. (2004). Managing open innovation. *Research-Technology Management*, *47*(1), 23-26.

Hobday, M. (1998). Product complexity, innovation and industrial organisation. *Research policy*, *26*(6), 689-710.

Chesbrough, H. W. (2006). The era of open innovation. *Managing innovation and change*, *127*(3), 34-41.

Freeman, C., & Soete, L. (1997). *The economics of industrial innovation*. Psychology Press.

Asheim, B. T., Isaksen, A., Nauwelaers, C., & Tödtling, F. (Eds.). (2003). *Regional Innovation Policy for Small+ Medium Enterprises*. Edward Elgar Publishing.

Demidenko, D. S., Gorovoy, A.A., & Malevskaya-Malevich, E. D. (2017). The new elements of risk classification. Proceedings of the 29th International Business Information Management Association Conference - Education Excellence and Innovation Management through Vision 2020: From Regional Development Sustainability to Global Economic Growth, p. 2217-2221

Rodionov, D. G., Rudskaia, I. A., Degtereva, V.A., (2017). Assessment of the effectiveness of regional innovation systems in Russia. Proceedings of the 29th International Business Information Management Association Conference - Education Excellence and Innovation Management through Vision 2020: From Regional Development Sustainability to Global Economic Growth, p. 3437-3450

Nikolova, L. V., Kuporov, J. J., & Rodionov, D. G. (2015). Risk management of innovation projects in the context of globalization. International Journal of Economics and Financial Issues, 5(3), p. 68-72.

Economic Effectiveness Criteria of Natural Monopolies

Alexander M. Kolesnikov, Department of Finance, Saint-Petersburg State University of Aerospace Instrumentation, Russian Federation, 9843039@mail.ru
Ekaterina D. Malevskaia-Malevich, Department of Finance, Institute of Industrial Economics and Management, Peter the Great St. Petersburg Polytechnic University, Russian Federation, malevskaia@spbstu.ru
Yulia A. Dubolazova, Department of Finance, Institute of Industrial Economics and Management, Peter the Great St. Petersburg Polytechnic University, Russian Federation, julia005@mail.ru

Abstract

As is known from economic theory, the market is a socio-economic institution that gives sellers and buyers the opportunity to come into contact for the exchange (mutually beneficial trade transactions). Taking into account the transactions difference in terms of the objects and conditions of implementation, different types of markets are allocated depending on the degree of competition (that is, the number of sellers, buyers and the number of exchanged products). The mechanism of free competition is not comprehensive in a market economy. There are industries in which one firm is a supplier of a product that does not have close substitutes or competitors on the market, thus such industry or enterprise are monopolies in the market place.

Keywords: Natural monopoly. Criteria of economic efficiency. Balance

Introduction

Unlike free competition, the monopolist sets not only the quantity of the products offered, but also the price, choosing a point on the curve of the sectoral demand. (Sharkey, 1982)

The market of a homogeneous goods is fully monopolized and there is only one seller and other sellers do not have permit to enter this market One of the reasons for the emergence and existence of a monopoly is the possibility of obtaining significant economies of production scale (saving on fixed production costs). The economy is the greater, the fewer suppliers (producers) are presented on the market. The presence of only one supplier on the market could be considered the ideal situation, who receives all the economies of production scale in the form of profits. (Baumol, 1977)

The market is the most monopolized under absolute or pure monopoly conditions. In practice, the so-called natural monopolies are closest to the pure monopoly market model. (Berg & Tschirhart, 1988) (Laffont & Tirole, 1994)

A natural monopoly exists when economies of production scale allow one enterprise to satisfy the entire market demand before the returns to production scale begin to decline. In addition, this type of monopoly is called natural because in this case the entry barriers are built on features of technology that reflect the natural laws of nature, and not on property rights or government licenses. Forced dispersal of production at several enterprises in this case is inexpedient, it would lead to an increase in costs.

Thus, a natural monopoly is a state of the market for services (goods, works), in which the creation of competitive conditions to meet the demand for a certain type of services is impossible or economically impractical due to technological production features and type of services it offers.

Features of the status of natural monopolies are manifested in various aspects: from the stage of creation to bankruptcy (insolvency).

For example, to recognize a person's legal status as a natural monopolist, the following requirements must be fulfilled: the existence of an objective economic situation in which a certain type of activity is characterized as natural monopoly; actual performance of such activity; legality (competence) of carrying out such activities. Legality can be confirmed by the constituent documents of the organization, the availability of necessary licenses, certificates, etc.

For example, the following features can characterize a natural monopoly:

1) most often, these are industries and infrastructures, which have a unique technology that requires significant initial investment;

2) there is a steady inelastic demand for the their products;

3) there is no competition in connection with economies of production scale and high conventional costs;

4) parties of natural monopoly produce a public (collective) nature products. The main purpose of their functioning is the implementation of any type of activity (mission) aimed at solving social and economic problems determined by the needs of society and the state.

5) A main feature of many parties of natural monopoly is a high share of equity in the overall structure of liabilities.

6) The activity of enterprises in the field of natural monopolies is regulated by the state with the help of antimonopoly legislation, and the tariff method takes the central place in this legislation system.

Based on the foregoing, we can conclude that the production of electricity, including production using alternative energy sources, has characteristic features of natural monopoly entities. Produced products are certainly a product of a collective nature, production technology is expensive, requiring significant initial investment, the demand for electricity is inelastic.

The majority of enterprises - subjects of natural monopolies - are in state ownership, subject to state regulation. Such organizations are forced to work in the interests of all participants in the sphere of natural monopolies (enterprises, consumers, the state themselves), therefore the main purpose of their functioning is the implementation of some kind of activity (mission) aimed at solving social and economic tasks determined by the needs of society and the state. The purpose of the enterprise's activity is reflected in its charter and approved by the authorized state body.

In addition to the obvious economic function, enterprises and electricity producers with the help of alternative sources solve the very urgent task of ecological efficiency

Problem Statement and Research Objective

For entities of natural monopoly, the task of a formation a sufficient amount of financial resources is closely linked to the tariff policy pursued at the enterprise, since the tariff value directly affects the profit received by the enterprise - the main source of its own financial resources. Formation of financial resources of enterprises - subjects of natural monopoly can be carried out at the expense of attraction of credits. The return of borrowed funds is carried out at the expense of net income and the funds of the depreciation fund. (Laffont & Tirole, 1986, Baumol, Bailey & Willig, 1977)

A feature of many subjects of natural monopoly is a high share of equity in the overall structure of liabilities.

Most natural monopoly entities have a number of features that determine the asset management policy: high capital intensity of production, the availability of obsolete equipment necessitates the renovation of fixed production assets, the search for financial resources for their renewal; growth of accounts receivable, etc., which also determine the specific structure of liabilities. (Sokolitsyn, Ivanov & Sokolitsyna, 2017, Rodionov, Rudskaia & Degtereva, 2017)

The main direction of investment policy, characteristic for natural monopoly entities are real investments. (Korol'kova, 2000, Borisova & Konoplyanova) They are characterized by a long

payback period, a high volume of capital investment, a long period of amortization of elements of fixed capital. Real investments can be carried out both at the expense of own funds (net income, depreciation charges), and at the expense of borrowed funds. The implementation of financial investments by entities of a natural monopoly and other participation in the activities of other commercial organizations is possible only upon agreement with the authorized body, at the expense of net income (actual profit). When assessing investments, it is necessary to take into account their social significance along with the financial effect.

Key Results

It is legally prohibited for the parties of a natural monopoly to invest free cash in securities, so the task of optimizing the money turnover is solved by effectively managing the company's cash flows during the circulation of its cash, ensuring the synchronization of volumes of receipt and spending of money for certain periods, maintaining the necessary liquidity of current assets. One of the results of such optimization is the minimization of the average balance of free monetary assets, which ensures a reduction in losses from their inefficient use and inflation.

The most favorable environment for the effective operation of any enterprise is the general economic equilibrium, which ensures the balance of all macroeconomic parameters: the volume of output produced by enterprises, final and intermediate (internal production) consumption, inter-production relations between enterprises, employee wages, products market prices

The most substantiated and successfully applied economic equilibrium model in the economic system is the balance-sheet "input-output" or the model of inter-branch balance of V. Leontiev (Novozhilov, 1972). Let consider a static, so-called "open" model of "input-output", which establishes equilibrium in the manufacturing sector. The products of "intermediate consumption" in this sector are the needs of technological processes, and the final demand is realized in the consumer sector. At the same time, it is possible that the same products refer to both final and intermediate consumption. It is assumed that the number of branches in the economic system corresponds to the number of products (one industry is one product). In the framework of this study, a model of production planning in the economic system is considered, ensuring a balanced and, under certain conditions, an optimal production plan and a model providing balanced estimates (hereinafter-the price) of an optimal balanced plan.

The balance of the production plan determines the quantity of each type of product that must be produced in a certain period to meet the production (intermediate) demand and the final (consumer) demand for products.

The parameters of the model are the coefficients of direct costs of resources for the production of products, due to the technologies used.

Mathematically, the problem can be represented in the following form (here and below - in the matrix form): $A \times X + C = X$, where A is a technological matrix with the elements of non-negative "technological" coefficients of "direct costs", indicating how many physical units of one product (one production sector) must be used to produce one unit of another product, X-vector- the column of the physical volume of output of products of each type in a certain period / planning period (Physical unit); C-vector- the column of final consumption of products in the planning period, (Physical unit).

It is also possible to isolate the column vector "$A \times X$", which is usually characterized as a vector of "material costs in the production sphere".

Matrix "A" provides information on the existing structure of intersectoral relations with the existing production technology and under these assumptions can be used for current or long-term planning. An additional condition for the application of the model is, in addition to the unchanged production technology, the linearity of the production cost model. The described model represents a direct task to make a balanced plan of manufacture in natural indicators.

The inverse / dual problem can be represented as follows: $P \times A + Y = P$, where P - vector- the row of product prices, (rubles / units); Y-vector of wage costs for production of a unit of production, rubles / unit.

These tasks are not optimized, because they do not have objective function and optimization criteria, and they contain strict equalities as constraints. From the relationship between the conditions of a direct and dual task (a balanced plan and its estimates), we can derive important equilibrium conditions in the economic system.

1. (***the balance condition***). All wages in the economic system must be spent in the consumer sector (final consumption).

The balance conditions are transformed to the following form:$X \times (I - A) = Y, P \times (I - A) = Y$, where I is the unit matrix, then the final consumption / demand in value form can be determined taking into account the given conditions:

$$P \times C = \frac{Y}{I - A} \times C = \frac{Y}{I - A} \times X \times (I - A) = Y \times X$$

From the above relations follows the condition of intersectorial equilibrium: to ensure a balance in the economic system, the value of the final consumption / demand should be equal to the amount of wages, which means that all wages must be "spent" in the consumer sector

Let us consider a conditional numerical example. Given

$X = \begin{pmatrix} 12 \\ 8 \end{pmatrix}$, $C = \begin{pmatrix} 4 \\ 5 \end{pmatrix}$, Y=(5 6), A= $\begin{pmatrix} \frac{1}{3} & \frac{1}{2} \\ \frac{1}{12} & \frac{1}{4} \end{pmatrix}$.

It is necessary to confirm the fairness of the conditions for ensuring a balance in the economic system.

Solution:

P*(1-A)=Y, $(P_1 P_2) * \begin{pmatrix} \frac{2}{3} & -\frac{1}{2} \\ -\frac{1}{12} & \frac{3}{4} \end{pmatrix}$ =(5 6)

$(\frac{2}{3} * P_1 - \frac{1}{12} * P_2 \quad -\frac{1}{2} * P_1 + \frac{3}{4} * P_2)$=(5 6)

$\frac{2}{3} * P_1 - \frac{1}{12} * P_2 = 5$

$\frac{1}{2} * P_1 + \frac{3}{4} * P_2 = 6$

$P = (P_1 P_2) = (\frac{102}{11} \frac{468}{33})$

P*C=Y*X $(\frac{102}{11} \frac{468}{33}) * \begin{pmatrix} 4 \\ 5 \end{pmatrix}$ =(5 6)* $\begin{pmatrix} 12 \\ 8 \end{pmatrix}$

107,91 ≈ 108. Condition fulfilled

If it is possible to avoid strict equality in the restrictions on the production and consumption of products, the task of determining the optimal interindustry balance and the corresponding optimal balanced prices becomes economically viable.

Optimization condition. The optimal balance in the economic system in planning is provided by determining the optimal balanced production plan (direct optimization problem) and the prices of the optimal production plan (dual task). Optimization of the production plan can be formulated as follows:

$$Y \times X \rightarrow min$$
$$X \times (I - A) \geq C$$

The economic meaning of the direct task of optimizing the production plan is to get an answer at what minimum level / standard of wages in the production sector of the economy "$Y \times X$" can be achieved the volume of production "X", allowing to provide the required level / standard of final consumption "C".

The economic meaning of the dual task of determining the prices of the optimal production plan is to get an answer at what maximum level of food prices, the required standard of final consumption in the economic system can be provided, while observing the available salary standards. The vector of the unknown variables of the dual problem "P" represents the prices of all the titles of products produced according to the optimal plan. The optimization of consumer prices can be formulated as follows:

$$C \times P \rightarrow max$$
$$P \times (I - A) \leq Y$$

Due to "linear" assumptions, the direct and dual optimization problems refer to linear programming problems and their solutions could be found using the appropriate methods

Conclusion

Profit maximization is achieved due to effective management of the company's assets, attraction of borrowed funds to the economic circulation, selection of the most effective areas of operational and financial activity. At the same time, in order to achieve the goals of economic development, the company should strive to maximize the net profit remaining at its disposal, which requires the implementation of an effective tax, amortization, and in the case of enterprises - natural monopolies and tariff policy. The volume of profit in the parties of natural monopoly is limited by the level of profitability, which is included in the calculated tariffs, as a mark-up to costs. Therefore, for enterprises -parties of natural monopoly - it is important to determine such an allowable level of profit that would allow them to function effectively and improve the quality of services provided.

The activity of enterprises belonging to the sphere of natural monopolies is regulated by the state with the help of antimonopoly legislation, the central place in which is given to tariff methods. In the world practice, the regulation of the activity of enterprises in the sphere of natural monopolies in the field of pricing takes place in accordance with models: based on regulation of the rate of profit, or regulation of tariffs.

Acknowledgment

This research was supported/ partially supported by Peter the Great Saint-Petersburg Polytechnic University. We thank our colleagues from the Department of Finance, Institute of Industrial Economics and Management who provided insight and expertise that greatly assisted the research, although they may not agree with all of the conclusions of this paper. We thank Alexander E. Karlik for assistance with methodology and for comments that greatly improved the manuscript.

References

Sharkey, W. W. (1982). The theory of natural monopoly.

Baumol, W. J. (1977). On the proper cost tests for natural monopoly in a multiproduct industry. *The American Economic Review*, 809-822.

Berg, S. V., & Tschirhart, J. (1988). *Natural monopoly regulation: principles and practice*. New York: Cambridge University Press.

Baumol, W. J., Bailey, E. E., & Willig, R. D. (1977). Weak invisible hand theorems on the sustainability of multiproduct natural monopoly. *The American Economic Review*, *67*(3), 350-365.

Laffont, J. J., & Tirole, J. (1986). Using cost observation to regulate firms. *Journal of political Economy*, *94*(3, Part 1), 614-641.

Laffont, J. J., & Tirole, J. (1994). Access pricing and competition. *European Economic Review*, *38*(9), 1673-1710.

Korol'kova, E. I. (2000). Estestvennaya monopoliya. Regulirovanie i konkurenciya. EHkonomicheskij zhurnal Vysshej shkoly ehkonomiki, 4(2).

Borisova, T. B., & Konoplyanova, G. A. Osobennosti finansovogo menedzhmenta na predpriyatiyah-subektah estestvennyh monopolij.

Novozhilov, V.V. (1972). Problemy izmereniya zatrat i rezul'tatov pri optimal'nom planirovanii. Nauka.

Rodionov, D. G., Rudskaia, I. A., Degtereva, V.A., (2017). Regional Foresight as a Technology for Development of The Regional Innovation System. Proceedings of the 29th International Business Information Management Association Conference - Education Excellence and Innovation Management through Vision 2020: From Regional Development Sustainability to Global Economic Growth, p. 2699-2706

Sokolitsyn, A. S., Ivanov, M.V., Sokolitsyna, N. A., (2017). Corporate Governance: Estimating Resource Providing Corporative Industrial Organization. Proceedings of the 29th International Business Information Management Association Conference - Education Excellence and Innovation Management through Vision 2020: From Regional Development Sustainability to Global Economic Growth, p. 191-200.

Exploring the Determinants of the Effectiveness of Fraud Prevention Mechanisms in Malaysia's Local Authorities: A Research Proposal

Safawi Abdul Rahman, Faculty of Information Management, Universiti Teknologi MARA, Shah Alam, Selangor, Malaysia. Email: safawi@salam.uitm.edu.my

Rohana Othman, Accounting Research Institute (ARI), Universiti Teknologi MARA, Shah Alam, Selangor, Malaysia. Email: rohana799@gmail.com

Intan Salwani Mohamad, Accounting Research Institute (ARI), Universiti Teknologi MARA, Shah Alam, Selangor, Malaysia. Email: intansalwani@gmail.com

Nooraslinda Abdul Aris, Accounting Research Institute (ARI), Universiti Teknologi MARA, Shah Alam, Selangor, Malaysia. Email: nooraslinda@salam.uitm.edu.my

Mohd Ridwan Seman @ Kamarulzaman, Universiti Teknologi MARA, Shah Alam, Selangor, Malaysia. Email: mridwan@salam.uitm.edu.my

Razif Rosli, Faculty of Accounting, Universiti Teknologi MARA, 40450 Shah Alam, Selangor, Malaysia. Email: razifrosli@yahoo.com

Abstract

Fraud is a global issue overwhelming all aspects of human economic and business activities as it poses potential threat of financial losses. Many detection and prevention mechanisms such as internal control systems, operational audits, codes of conduct and forensic accounting have been applied in organizations aiming at effectively mitigate internal fraud activities with questionable outcomes. Instead of putting much attentions studying the effectiveness of existing fraud prevention mechanisms in mitigating the fraud but less promising outcomes, this doctoral-level research proposal explores the determinants of the effectiveness of organizational fraud prevention programs. In doing so, the proposed study would base the exploration on the theory of planned behaviour (TPB). The central part of this study is to investigate the behavioral intentions as determinants following the variables of TPB. By this exploration, the potential determinants of the effectiveness of the prevention programs and how those determinants influence current practice related to the fraud prevention mechanisms could be learnt. This proposed study would be a quantitative study in which local authorities in Peninsula Malaysia will be solicited for data collection.

Keywords: Fraud, Fraud Prevention Mechanism, Malaysia's Local Authorities, Theory of Planned Behaviour (TPB), Determinants.

Introduction

Fraud is a global issue overwhelms all aspects of human economic activities and business-related matters. Conceptually, fraud includes all acts of misappropriation, unethical and unlawful conducts involving financial and assets are fraud in its essence. Fraud as unethical and unlawful conducts on financial and assets has a severe effect on organizations. A vast literature (Levi et al. 2007; Levi & Burrows 2008, Isa 2011; Kennedy & Xu 2012; Tuan Mat et al. 2013) espoused the effect of fraudulent on the massive organizational financial losses. The Association of Certified Fraud Examiners' (ACFE 2014) estimated that approximately 5 percent of a business' annual revenue is lost to fraud. The Kroll Global Fraud Report (2015) states that "the number of businesses suffering a financial loss as a result of fraud has also increased, from 64% in the previous survey period to 69% this year (pp. 7)". The LexisNexis (2016) reports that "there are indications of increasing fraud challenges for US retailers based on rising fraud costs and volume" (pp. 7). As a global problematic issue, fraudulent in all types (e.g. asset

misappropriation, corruption and fraudulent financial statements) lead to tremendous severe effects to both public and public organizations.

Aligned with global initiatives in mitigating the fraud, the fraud prevention mechanisms have also been widely used in Malaysia. The prevention mechanisms namely internal control systems and operational audits (Bierstaker, Brody & Pacini 2006), reference checks on employees (Bierstaker, Burnaby & Hass 2004; Bierstaker, Brody & Pacini 2006), whistle blowing system (Deloitte 2014), corporate security (Campbell 2011) and forensic accounting (Golden & Dyer 2006) are common mechanisms used by both local authorities and consulting firms (KPMG, Ernst & Young and others) in auditing the fraud cases.

However, generally, the application of prevention mechanisms was unsuccessful in mitigating the fraud. In a fraud survey, KPMG (2004) showed that 83 percent of respondents admitted as having experienced fraud in their organisations. The survey had also found that kickbacks, hit and kiting and false invoices were the three most common types of fraud faced by businesses in Malaysia. The high percentage of respondents' acknowledgement on the reality of fraud in their organizations indicates that the effectiveness of organizational fraud programs is low. In Malaysia context, despite the long run of fraud prevention programs over the years, the fraud cases continue to grow with no sign of deterioration.

The ineffectiveness of the current fraud prevention mechanisms in mitigating the fraud activities as indicated by the growing figures of fraud cases leads to an attempt of "understanding the conditions" (Ramos 2003) conducive for and maintain the fraud activities. While the triangle explains the factors, or causes of fraud occurrences, the conditions that associated with the effectiveness of preventive efforts remain questionable. This proposed study therefore takes the challenges in identifying the conditions that possibly influence the effectiveness of such mechanism as an academic effort.

Studying the effectiveness of detection and prevention mechanisms is endless and seems less fruitful in mitigating the fraud as the number of fraud cases increased yearly as Ernst & Young Global Limited (2016) acknowledged that *"while many businesses have made significant progress in tackling these issues, there remains a persistent level of unethical conduct"*. This acknowledgement indicated that detection and prevention mechanisms does not effective nor satisfactorily solved the fraud issue as it keeps increased over year. Earlier, Ramos (2003) suggested that the "investigations into the mechanisms of fraud prevention and detection must seek to understand the conditions that are generally present when fraud occurs. Therefore. instead of solely considering the effectiveness of prevention mechanisms, "understanding the conditions" in Ramos' suggestion may include exploration into the determinant of effectiveness of those mechanisms.

Getting triggered by this suggestion, the proposed study highlighted in this paper would explore the determinant of the effectiveness of fraud prevention initiative. In mechanizing the exploration, the proposed study looks at the potential of theory of planned behaviour (TPB) as determinant for measuring the effectiveness of organizational fraud prevention initiatives. This movement is due to the believe that fraud is caused by intention of fraudster as initially explained through the pressure, opportunity and rationalisation of Cressey's (1973) Fraud Triangle. Extending the intention trait, the proposed study would explore the factors determining the effectiveness of fraud prevention initiatives in Malaysian local authorities, and examine the relationship between the planned behaviour variables and the effectiveness of fraud prevention framework. The proposed study thus would explore the psychological process that *"put up a behavior that is stimulated by intention which is also influenced by some underlying beliefs"* (Ajzen, 1985; 1988; 1991). In this way, the internal behaviour such as ihsan, personal integrity, self-efficacy, idealism-ethical ideology, organizational commitment and intrinsic motivation are the determinants presumably influence the effectiveness of fraud prevention initiatives.

The rest of the paper is arranged to include the necessary components justifying the proposed doctoral-level of study. Next section justifies the issue, gap and objective of the proposed study. The following section briefly presents the related initial literature on the fraud issue followed by the potential determinants factors of the proposed study in Section 4. Section 5 presents the research model with its respective hypotheses. Section 6 follows to outline the potential method in mechanizing the study.

Section 7 discusses the significant and the potential outcome of the study while section 8 concludes the proposal.

Fraud Prevention Mechanisms

One of the practical way to minimize losses - mainly the financial - due to fraud is to prevent their occurrence. Identifying the fraud occurrence can be made through fraud risk assessments that attempt at recognizing the potential factors and threats that make organizations vulnerable to the fraud. The literature reports numerous organizational fraud detection and prevention mechanisms in detecting and preventing the fraud before or after its occurrences, respectively. Among the well-known fraud preventive mechanism are internal control systems, operational audits, code of conduct (Efiong 2013; Bierstaker, Brody & Pacini 2006), reference checks on employees (Bierstaker, Burnaby & Hass 2004; Bierstaker, Brody & Pacini 2006), whistle blowing system (OECD 2012; Deloitte 2014), corporate security (Campbell 2011) and forensic accounting (Ranallo 2006; Golden & Dyer 2006) are widely practiced as a continuous attempt in mitigating the fraud. The procedural methods and the success level in implementing these detection and prevention mechanisms globally and locally were widely reported and easily retrieved and therefore do not briefed out in this paper.

Despite the numerous mechanisms applied in detecting and preventing fraud, the number of fraud cases grow every year. Kummer, Singh & Best (2014) reveal that *"a review of several fraud surveys conducted by large accounting and consulting firms [including Association of Certified Fraud Examiners (ACFE), Binder Dijker Ottec (BDO), Ernst & Young (EY), Klynveld Peat Marwick Goerdeler (KPMG) and PricewaterhouseCoopers (PwC)] reveals that fraud is a growing crisis that is being faced by organizations*. This acknowledgement implies that the effectiveness of fraud detection and prevention mechanisms is an issue and questionable.

The Determinants of the Effectiveness of Fraud Prevention

There are many factors that can inhibit the control of desired behaviour including abilities, planning, skills, and knowledge. Ajzen and Madden (1986, p. 457) argued that there is a possibility to measure perceived behavioural control. The Theory of Planned Behaviour (Ajzen 1991) centralizes on the individual's intention to perform a given behavior. This theory posited that greater perceived control over behaviour may occur with more resources and opportunities available for individuals. TPB outlines three variables that effectively measure individual intention. Detailing out TPB, Ajzen (1991) stated that *"Intentions are assumed to capture the motivational factors that influence a behavior; they are indications of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behavior. As a general rule, the stronger the intention to engage in a behavior, the more likely should be its performance"*.

With respect to fraud issue where the fraudsters are generally involved internal employees, this proposed study assumes that the fraudster's intention is the motivational factor that lead to conduct of fraud. Therefore, this paper argues that in investigating the effectiveness of the prevention mechanisms, the employees' intention should be the focus as perceiving the planned (intention) behaviour of fraudster (employees) would enable the "safeguard" planning in mitigating the fraud. The following section discusses the proposed theoretical framework guiding the proposed study.

The Framework of Determinants for Fraud Prevention Effectiveness

As indicated earlier, the TPB outlines three variables (attitude toward the behavior, subjective norms and perceived behavioral control) as general guidelines for examining intentional behaviour in an individual leading to physical behavioural conducts. This proposed study devises the elements of intentional behaviours to include ihsan, personal integrity, self-efficacy, idealism-ethical ideology, organization commitment and intrinsic motivation.

Ihsan

Ihsan or kindness is the first element considered as inclined toward the behavioural intention. This element is under the attitude toward the behaviour variable. Ihsan can be defined as "*The actions that benefit others than those of the action without any obligation*" (Umar-ud-din, 1991, p. 241). In Islamic point of view, kindness is highly encouraged and the Prophet (P) was reported to have said that among the people of Paradise are the "*People who hold power and the fair and equitable; truthful and has been endowed with the power to do good deeds; and he who is merciful and kind to his brothers and to every Muslim who works and who does not lend his hand even had a large family to support" (Iyad Ibn himar, Sahih Muslim, hadith no. 6853).* The inclusion of this element as a determinant for measuring effectiveness of the fraud prevention is justified in the following paragraph.

The Ihsan is the core concept in Islamic ethics as it focuses on behaviour for the love of God. The idea of worship in Islam includes any constructive effort or work. This shows that a Muslim employee who is committed at any level of the organization should be doing his/her work for the love of God and with an awareness that God watches his/her behaviour all the times, even if his/her superordinate and mates do not know his/her doing.

The concept of Ihsan also includes excellence. Islam emphasises not only the productivity but also excellence in workplace. Al-Quran emphasised that remuneration shall be commensurated with the effort made (3: 136, 99: 7, 48: 19). This rule applies to immediate reward in this life and deferred reward in the hereafter. Performance appraisal and reward to an individual is not only judged by humans but also by God (Qur'an, 18: 30). Prophet Muhammad (P) taught: ''God has ordained excellence in everything…'' 5 and ''God loves, when one of you is doing something, that he [or she] does it in the most excellent manner'' (Al-Qaradawi, 1995).

Personal integrity

Personal integrity is the second element considered under the TPB's attitude toward the behaviour. Personal integrity has many conceptual definitions. It can be defined as individual "coherence" (Selznick 1992), "personal commitment to principles" (Becker 1998; Maccoby 1988; Mayer et al., 1995) and "honesty" (Yulk & Van Fleet, 1992), and/or "private modal codes" (Barnard, 1968, p. 263). In the field of ethics however, personal integrity relates to the principle of self-imposed ethics, values and moral autonomy (Solomon, 1993; DeGeorge, 1993; Kolb, 1988). For philosophical reasons, scholars (McFall, 1987; Williams, 1973; Taylor, 1985) had considerably advanced to increase their understanding of individual integrity by developing elaborate descriptions of this concept. The following reasons justify the personal integrity as a critical element regarding the subject of the study.

Calhoun (1995) describes personal integrity with three philosophies: (1) integrated-self (2) identity and (3) clean-hands. On integrated-self, integrity involves an integration of internal determinants of self's desires, evaluation, also commitment to the whole community. As for identity, integrity means loyalty to projects and principles that represent the core of one's identity. Integrity in the clean-hands view means maintaining transparency, morality, and honesty of one's actions.

The personal integrity can be explained in three picture following McFall (1987). The first picture is an integrated self-picture where the integrated self-picture of integrity outlines several conditions that require integrity. An individual will not just become a follower of the crowd, but he/she will stand for something and had his/her own reason to take that stance. A person of integrity is willing to suffer consequences for his beliefs, despite facing undesirable consequences. Therefore, there is an unconditional commitment towards something that determines what we think is important, which defines largely to private moral identity (second picture of personal integrity). In the third picture, personal integrity, clean-hands picture, integrity is a matter of support. Should the occasion arise, an individual will stand on main principles that determine what the individual could have done through the agency and within the limits which he/she will not go beyond (here lies embedded and professional integrity).

A person who has integrity will not do unethical things, even if he can gain good results from the unethical things (Calhoun, 1995). This view captures the "action" part of the identity of the picture portrayed, for which individuals would stand for something that is not just a matter of personal identification with a set of values or principles, but also a commitment to overcome a defect of values (which means action).

Organisational commitment

The organisational commitment is the last element considered under attitude toward the behaviour. Elizur & Koslowsky (2001, p.594) defined organisational commitment as the attachment of an individual, emotionally and functionally, to his/her place of work. Organisational commitment can also be referred to as the relative strength of individual's identification with involvement in a particular organisation (Mowday et al., 1979, p.226). O'Reilly and Chatman (1986, p.493) refers organisational commitment as the psychology attachment felt by a person for an organisation. It reflects the degree to which an individual internalises or adopts characteristics or perspectives of the organisation.

Allen and Meyer (1990; 1991) identified three general themes in attitudinal conceptualisations of organisational commitment: affective attachment, perceived costs, and obligation. The three components of commitment are regarded as a psychological trait where employees experience at various degrees. Each component of the commitment gain experience in various strengths (Stallworth, 2003). As for the first component, workers with higher affective commitment would stay in the organisation because they want to. Secondly, a worker with high continuance commitment would stay because they need to. Lastly, workers with high normative commitment would remain because they must. All components may depend on different backgrounds, for example personal characteristics, work characteristics, duration of work, and others.

Intrinsic motivation

The intrinsic motivation is the sole element belong to the variable of subjective norms of TPB. Intrinsic motivation can be described as conducting an activity for its inherent satisfaction, rather than for some separable consequence (Ryan & Deci, 2000, pp. 56). Generally, intrinsically motivated person does an action for the fun of it or to be involved with challenging activities. It is not driven by reward, external products or pressures. Referring to White (1959), the phenomenon of intrinsic motivation was first recognized within experimental studies of animal behaviour. White (1959) found that many organisms engage in exploratory, playful, and curiosity-driven behaviours without elements of reinforcement or reward. This spontaneous behaviour apparently bestows adaptive benefits on the organism, which do not look for any reason to play that role. The positive experience is subsequently related to exercise and expansion of moral capacity to a person.

In humans, intrinsic motivation is one of form from the forms of human desires or motivation. Humans in their healthiest states are active, inquisitive, curious, and playful creatures, displaying ubiquitous readiness to learn and explore. They do not require extraneous incentives to do things. This natural motivational tendency is very important, especially during the development stage of cognitive, social and physical abilities. By acting on self-interest, a person will grow their knowledge and skills on their own. The tendencies to have interest in something new, to assimilate actively and creatively make use of developed skills are not limited to childhood. This tendency is an important feature of human nature that affects performance, persistence, and prosperity throughout life (Ryan & LaGuardia, in press).

Self-efficacy

The self-efficacy and idealism-ethical ideology are two elements placed under perceived behavioural control. Self-efficacy refers as individuals' beliefs about their capability to mobilise cognitive resources and courses of actions needed to perform a specific task successfully within a given context (Bandura, 1982, 1997). Individuals with high self-efficacy beliefs that they can achieve their goals by three leading factors, which are to put more effort on it, pursue career strategies, as well as setting higher career goals.

By referring to King (2004), it is learnt that people's self-efficacy and their intention to exert control over career outcomes would enable them to exhibit career self-management behaviours. Moreover, those behaviours can also lead to the achievement of desired career goals and ultimately career success.

Stucliffe and Vogus (2003) stated that individuals create an overall sense of efficacy and competence which enables them to gain control and mastery over task-related behaviours. The results have shown positive correlation between career decision-making as they are being made with self-efficacy and personal characteristics, thus supporting the argument that individuals with self-efficacy gain greater control in the events of their lives and successfully master tasks decided for them and influencing their behaviour in career decision-making (Taylor & Popma, 1990; Abdalla, 1995). Noe and Wilk (1993) and Bell & Staw (1989) noted that the evidence obtained from their empirical study supported that the self-efficacy beliefs can influence career development and growth.

Bandura (1997) had conceptualised self-efficacy in three-layered dimension, which are level, strength, and generality. Level refers to an individual's feeling regarding their ability to perform a task based on the degree of difficulty of the behaviour or task. Strength refers to individual performance that can be achieved based on that individual performance. Weak self-efficacy expectations are easily modified by disconfirming experiences, while strong self-efficacy is robust and promotes persistence in the face of obstacles. Generality refers to self-efficacy concerning the range of situations, in which an individual considers him or herself to be efficacious (Lent & Hackett, 1987). The self-efficacy theory states that determination of self-efficacy is based on the strength of self-efficacy and the level of self-efficacy. That determination consists of several factors, such as how much effort will result to good results, how long the effort can be sustained in the face of obstacles, also whether behaviour will be initiated. Self-efficacy provides individuals with the ability to influence their one course of action and alter their environments (Bandura, 1997).

Idealism-ethical ideology

The idealism-ethical ideology is the last element considered for inclusion under TPB's perceived behavioural control variable. Forsyth (1980) stated that moral judgment consisted of two orthogonal dimensions, which are idealism and relativism. Individuals with high idealism, believe that "desirable consequences can, with the 'right' action, always can be obtained" (p. 176). Idealism can be described as the level of individual's concern and the individual show it for the welfare of others. The relativism can be described as the extent to which someone accepts or rejects universal moral rules.

When there are some who are more preferred to choose moral in absolutes when deciding on which action is the ''right'' one, there are also others who takes contextual information into account before making any conclusions. It means that people who are affected by contextual information are relativists. Relativists feel that the right decision depends on the complexity of situation and the people involved in it. Relativists also tend to be more dependent on circumstances and personal attitudes rather than ethical principles when judging the actions of others (Forsyth, 1992). On the other hand, low relativists tend to believe that the right thing is always the one that is in harmony with universal moral principles, norms, or law, depending on the context.

The Research Model

The six elements of intentional behaviours belong to the three TPB variables discussed in prior section are diagrammatically illustrated as the research framework in Fig. 1. These six elements are the variables for the proposed study. Following these variables, the study progresses to formulate the hypotheses necessary for testing and measurement as shown immediately after the model illustration.

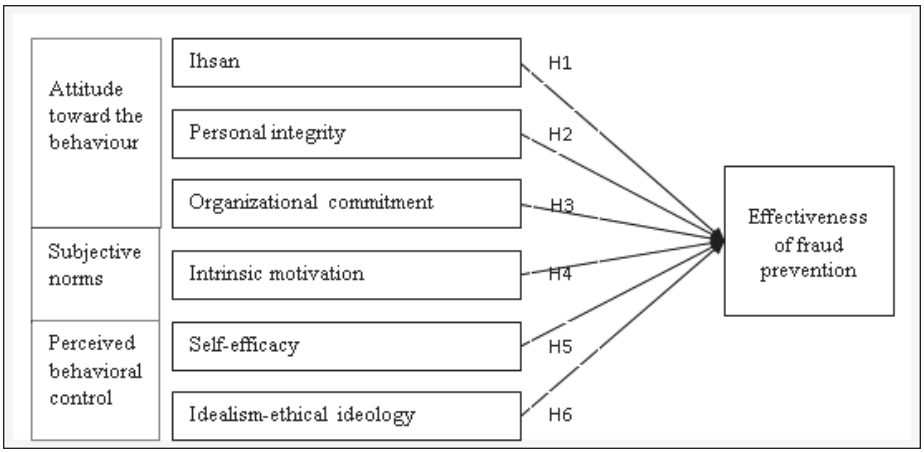


Fig 1: Conceptual Model for Exploring the Determinants of Fraud Prevention

The model depicted in Fig. 1 can be represented as;

$FP = ß_0 + ß_1 IH + ß_2 PI + ß_3 SE + ß_4 ID + + ß_5 OC + ß_6 IM$

Where:

FP : The Effectiveness of Fraud Prevention

IH : Ihsan

PI : Personal Integrity

SE : Self-efficacy

ID : Idealism-ethical ideology

OC : Organizational Commitment

IM : Intrinsic motivation

$ß_0, ß_1, ß_2, ß_3, ß_4, ß_5, ß_6$: Parameters

Based on the Figure 2, the potential hypotheses for testing are;

H1: Is there any significant relationship between ihsan and fraud prevention framework.

H2: Is there any significant relationship between personal integrity and fraud prevention framework.

H3: Is there any significant relationship between self-efficacy and fraud prevention framework.

H4: Is there any significant relationship between idealism-ethical ideology organizational commitment and fraud prevention framework.

H5: Is there any significant relationship between ideology organizational commitment and fraud prevention framework.

H6: Is there any significant relationship between intrinsic motivation and fraud prevention framework.

Research Methodology

This proposed study would adopt quantitative approach. The population of this study consists of 149 authorities in Peninsula Malaysia (Kuala Lumpur City Hall, 13 City Halls/Councils, 38 Municipal

Councils and 98 District Council). The questionnaires administered through mail will be used as the instruments for data collection. The data analysis would be using latest SPSS package but AMOS is another potential option for statistical examination. The statistical analysis techniques would be reliability and factor analyses, descriptive, correlation and regression among others.

Discussion: The Potential Outcome of the Study

The academic studies on the effectiveness of fraud detection and prevention are very common in the literature. The commercial and institutional reports on such issue are also easily retrieved. The study on the fraud issue looked at multiple dimensions of fraud such as the causes, the practices and the effectiveness of the mechanisms used in mitigating the fraud. With respect to the mechanism, different study produced different claims on the effectiveness of the mechanism adopted. Isa (2011) for example, claimed that "the literature on fraud consistently claims that an effective internal control system (ICS) is the primary means of preventing, detecting, and correcting fraud and errors". In contrast, Efiong, Inyang & Joshua (2016) posited that "forensic accounting techniques appears to be the most effective and are currently used in most developed countries of the world". Many other studies stated the claims that seem inconsistent with others in the subject of the effectiveness of fraud prevention mechanisms.

Deviating from this track – that does not effectively contribute to the decrement of the fraud cases – the proposed study seeks to explore the psychological aspects that triggers the occurrence of fraud. In other words, this study attempts at exploring the determinants or factors that associated with and leads to ineffectiveness of the fraud prevention mechanisms. By this, the proposed study explores the root instead of the shoot of the cause as embarking at the root is deemed to be more beneficial rather than justifying the outcome. Understanding the internal behavioral factors that possibly lead to fraud physical or behavioral commitment would help in devising and formulating a more comprehensive and effective prevention programs. While the existing fraud mechanisms concentrate more on "post" fraud conducts, the intentional determinants would help in tackling the "pre" fraud conduct that is internal to potential fraudster. The blend of both "pre" and "post" mechanisms complement each other in battling this universal organizational issue.

Conclusion

In Malaysia's context, this proposed research mainly aimed at driving the country's transition to a high value added and high-income economy with adequate preservation of financial sustainability. The National Key Result Area (NKRA) target to reduce crime and fight corruption and fraud in Malaysia is a key focus of the Government Transformation Program (GTP). Aligned with this aim, the issue of effectiveness of the fraud prevention mechanism should be properly addressed. It is expected that by knowing the cause of ineffectiveness of such programs, the appropriate solution may be formulated. This proposed study provides the basis for the formulation of the potential solutions that effectively addressed the fraud by first understanding the intentional behaviours of fraudster.

Acknowledgement

The proposed doctoral degree research described in this paper is supported and made possible by Malaysian Ministry of Higher Education's (MOHE) grants (600-RMI/FRGS 5/3(114/2015) under the administration of Institute of Research Management & Innovation (IRMI), Universiti Teknologi MARA (UiTM), Shah Alam, Selangor, Malaysia.

References

1. Abdalla, I. A. (1995). Arab business administration students: attributes and career decision making self-efficacy expectations. The International Journal of Career Management, Vol. 7 No. 6, pp. 27-35.

2. ACFE (2014). Association of Certified Fraud Examiners (2014) Report to the nations on occupational fraud and abuse. http://www.acfe.com/uploadedFiles/ACFE_Website/ Content/documents/2014RttN.pdf
3. Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckmann (Eds.), Action-control: From cognition to behavior (pp. 1 l-39). Heidelberg: Springer.
4. Ajzen, I. (1988). Attitudes, personality, and behavior. Chicago: Dorsey Press.
5. Ajzen, I. (1991) The theory of planned behavior. Organizational behavior and human decision processes, 50(2), pp179-211.
6. Ajzen, I., & Madden, T. J. (1986). Prediction of goal-directed behaviour: Attitudes, intentions, and perceived behavioural control. Journal of Experimental Social Psychology, 22(5), 453–474.
7. Allen, N. J. & Meyer, J. P. (1990). The measurement and antecedents of affective, continuance and normative commitment to the organization. Journal of Occupational Psychology, 63(1), 1-18.
8. Al-Qaradawi, Y. (1995). Dawr Al-Qiyam Wal-Akhlaaq Fi Al-Iqtisaad Al-Islaami (Maktabat Wahbah).
9. Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioural change. Psychological Review, 84 (2), 191-215.
10. Bandura, A. (1982). Self-efficacy mechanism in human agency. American Psychologist, 37, 122–147.
11. Barnard, C. I. (1968). The Functions of the Executive, Harvard University Press, Cambridge, MA, First edition in 1938.
12. Becker, T.E. (1998). Integrity in organizations: beyond honesty and conscientiousness, The Academy of Management Review. Vol. 23, No. 1 (Jan., 1998), pp. 154-16.
13. Bell, N. and Staw, B. (1989). People as sculptor versus sculpture: the role of personality and personal control in organisations. In Arthur, M., Hall, D.T. and Lawrence, B.S. (Eds), Handbook of Career Theory, Cambridge University Press, New York, NY, pp. 232-51.
14. Bierstaker, J. L., Brody, R. D., & Pacini, C. (2006). Accountants' perceptions regarding fraud detection and prevention methods.Managerial Auditing Journal, 21(5), 520-535.
15. Bierstaker, J. L., Burnaby, P. and Hass, S. (2004). Internal auditors' fraud prevention and detection methods. Internal Auditing, 19.3 (May/Jun), pp. 37–40.
16. Calhoun, C. (1995), "Standing for something", The Journal of Philosophy, Vol. 92 No. 5, pp. 235-60.
17. Campbell, G. K. (2011). Measures and Metrics in Corporate Security. Security Executive Council Publication Series. https://www.securityexecutivecouncil. com/content/measures_metrics_mini_200801.pdf
18. Cressey, D. R. (1973). Other People's Money. Montclair: Patterson Smith.
19. DeGeorge, R. T. (1993). Competing with Integrity in International Business, Oxford University Press, New York, NY.
20. Deloitte. (2014). Lead by Example: Making whistleblowing programs successful in corporate India A Deloitte Forensic India Survey Report. https://www2.deloitte.com/ content/dam/Deloitte/in/Documents/finance/in-fa-whistleblowing-survey-2014-noexp.pdf
21. Efiong, E. J. (2013). An Exploration of Forensic Accounting Education and Practice for Fraud Prevention and Detection in Nigeria. PhD Thesis, The Faculty Of Business And Law, De Montfort

University, Leicester. UK. https://www.dora.dmu.ac.uk/bitstream/ handle/ 2086/10118/Thesis.pdf?sequence=1

22. Efiong, E. J., Inyang, I. O., & Joshua, U. (2016). Effectiveness of the Mechanisms of Fraud Prevention and Detection in Nigeria. *Advances in Social Sciences Research Journal,* Vol.3(3). pp206-217.
23. Elizur, D. & Koslowsky, M. (2001). Values and organizational commitment, International Journal of Manpower, Vol. 22 No. 7, pp. 593-9.
24. Ernst & Young Global Limited. (2016) 14th Global Fraud Survey 2016: Corporate misconduct — individual consequences. http://www.ey.com/Publication/vwLUAssets/ EY-corporate-misconduct-individual-consequences/$FILE/EY-corporate-misconduct-individual-consequences.pdf
25. Forsyth, D. R. (1980). A Taxonomy of Ethical Ideologies, Journal of Personality and Social Psychology 39(1), 175–184.
26. Forsyth, D. R. (1992). Judging the Morality of Business Practices: The Influence of Personal Moral Philosophies, Journal of Business Ethics 11(5–6), 461–470.
27. Golden, T. W., & Dyer, M. T. 2006. The Art of the Interview. In A Guide to Forensic Accounting Investigation edited by Golden, Thomas W., Skalak, Steven L., and Mona M. Clayton, 349-364, Hoboken, NJ: John Wiley & Sons. Inc.
28. Isa, T. (2011). Impacts and Losses Caused by the Fraudulent and Manipulated Financial Information on Economic Decisions. Review of International Comparative Management Vol. 12(5). pp929-939
29. Kennedy, K. A. & Xu, L. E. (2012). An Analysis of Fraud: Causes, Prevention, and Notable Cases. Honors Theses. Paper 100. http://scholars.unh.edu/cgi/viewcontent. cgi?article=1099&context=honors
30. King, Z. (2004). Career self-management: its nature, causes and consequences, Journal of Vocational Behavior, Vol. 65 No. 1, pp. 112-33.
31. Kolb, D.A. (1988). Integrity, advanced professional development and learning, in Srivastva et al. (1988), pp. 68-88.
32. KPMG (2004). KPMG Forensic Fraud Survey 2003 [Brochure]. KPMG LLP.
33. Kroll Global Fraud Report (2015). Vulnerabilities on the Rise. Annual Edition 2015/16. http://anticorruzione.eu/wp-content/uploads/2015/09/Kroll_Global_Fraud_Report_ 2015low-copia.pdf
34. Kummer, T. F., Singh, K & Best, P. (2014). The Effect of Fraud on Risk Management in Not-For-Profit Organizations, Corporate Ownership & Control, Vol.12(1). Pp. 641-655.
35. Lent, R.W., & Hackett (1987). Career self-efficacy: Empirical statuus and future directions. Journal of Vocational Behaviour 30: 347-382.
36. Levi M & Burrows J 2008. Measuring the impact of fraud: a conceptual and empirical journey. British Journal of Criminology 48(3): 293–318
37. Levi, M., Burrows, J., Fleming, M., Hopkins, M., & Matthews, K. (2007). The Nature, Extent and Economic Impact of Fraud in the UK. London: Association of Chief Police Officers. http://www.acpo.police.uk/asp/policies/Data/Fraud%20 in%20the%20UK.pdf
38. LexisNexis Risk Solution (2016). Annual Report: True Cost of Fraud[SM] Study. http://images.solutions.lexisnexis.com/Web/LexisNexis/%7Bea78e9df-056e-46ed-b04c-e8bfbc526ffd%7D_2016_True_Cost_of_Fraud_Study_052516.pdf?elqTrackId=cc6d22e0b40d4a29a2931f28fb221092&elqaid=2567&elqat=2

39. Maccoby, M. (1988). Integrity: a fictional dialogue. In Srivastva et al. (Eds) (1988), Executive Integrity: The Search for High Human Values in Organizational Life, Jossey-Bass
40. Mayer, R. C., Davis, J. H. and Schoorman, F. D. (1995). An interactive model of organizational trust, Academy of Management Review, Vol. 20, pp. 709-34.
41. McFall, L. (1987). Integrity. Ethics, Vol. 98 No. 1, pp. 5-20.
42. Mowday, R., Steers, R., and Porter, L. (1979). The measurement of organizational commitment. Journal of Vocational Behavior, 14, 224-247.
43. Noe, R. and Wilk, S. (1993). Investigation of the factors that influence employees' participation in development activities, Journal of Applied Psychology, Vol. 78, pp. 291-302.
44. OECD, (2012). Whistleblower protection: encouraging reporting. http://www.oecd.org/cleangovbiz/toolkit/50042935.pdf
45. O'Reilly & Chatman 1986 OReilly, C. A. & Chatman, J. A. (1986). Organizational commitment and psychological attachment: The effects of compliance, identification and internalization on prosocial behavior. Journal of Applied psychology, 71, 492-499.
46. Ramos, M. (2003). Auditors' responsibility for fraud detection. Journal of Accountancy, 195(1), pp. 28-36.
47. Ranallo, L. F. (2006). Forensic Investigations and Financial Audits: Compare and Contrast. In (Ed.) Golden, Thomas W., Skalak, Steven L., and Mona M. Clayton) A Guide to Forensic Accounting Investigation, 109-117, Hoboken, NJ: John Wiley & Sons. Inc.
48. Ryan, R. M. and Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being, American Psychologist, Vol. 55 No. 1, pp. 68-78.
49. Ryan, R. M., & La Guardia, J. G. (n.d). (In press) What is being optimized over development?: A self-determination theory perspective on basic psychological needs across the life span. In S. Qualls & R. Abeles (Eds.), Dialogues on psychology and aging. Washington, DC: American Psychological Association.
50. Selznick, P. (1992). The Moral Commonwealth: Social Theory and the Promise of Community, University of California Press, Berkeley, CA.
51. Solomon, R.C. (1993). Ethics and Excellence: Cooperation and Integrity in Business, Oxford University Press, New York, NY.
52. Stallworth, H.L. (2003). Mentoring, organizational commitment and intentions to leave public accounting, Managerial Auditing Journal, Vol. 18 No. 5, pp. 405-18.
53. Stucliffe, K.M. and Vogus, T. J. (2003). Organizing for resilience, In Cameron, K.S., Dutton, J.E. and Quinn, R.E. (Eds.). Positive Organizational Scholarship, Berrett-Koehler Publishers, San Francisco, CA, pp. 94-110.
54. Taylor, G. (1985). Integrity, Pride, Shame and Guilt: Emotions of Self-assessment, Oxford, New York, NY.
55. Taylor, K.M. & Popma, J. (1990). An examination of the relationships among career decision making self-efficacy, career salience, locus of control, and vocational indecision, Journal of Vocational Behavior, Vol. 37, pp. 17-31.
56. Tuan Zainun Tuan Mat, Sharifah Nazatul Faiza Syed Mustapha Nazri, Fadzlina Mohd Fahmi, Aida Maria Ismail & Malcom Smith. (2013). Assessing the fraud prevention Mechanisms in Malaysian Government agencies. Malaysian Accounting Review, Vol.12 (2).

57. Umar-ud-din, M. (1991). The Ethical Philosophy of Al-Ghazzali (Sh. Muhammad Ashraf, Lahore, Pakistan).

58. White, R. (1959). Motivation reconsidered: The concept of competence. Psychological review, 66:297–333.

59. Williams, B. (1973), "Integrity", in Smart, J.J.C. and Williams, B. (Eds), Utilitarianism: For and Against, Cambridge University Press, Cambridge, MA.

60. Yukl, G. & Van Fleet D.D. (1992). Theory and Research on Leadership in Organizations. Handbook of Industrial and Organizational Psychology. Ed. Marvin D. Dunnette. Wiley InterScience.

Segmentation Analysis on Borrowing Usage Behaviour of Digital Library Services

[1]Mohd Razilan Abdul Kadir, [2]Irwan Kamaruddin Abd. Kadir,
[3]Ap-Azli Bunawan, [4]Mohd Zailan Endin, [5]Zairul Nizam Zainol

[1,2,3,4,5] Faculty of Information Management
Universiti Teknologi MARA
Puncak Perdana Campus
40150 Shah Alam
Selangor, Malaysia

mrazilan@salam.uitm.edu.my
irwan.kadir@gmail.com
ap-azli@salam.uitm.edu.my
zailan_endin@salam.uitm.edu.my
znzbbm@gmail.com

Abstract

Library has massively developed from traditional services to digital services in recent years. The demand from library patrons, institutions, colleges, and private organization needs and technology evolution, has changed the library setting either in budget allocation or in decision making approach. This study analyzes the borrowing transactions at private university's Digital Library users through application of bibliomining process. The objectives of this study are to identify decisions that can be predicted made from the bibliomining process and to discover the trends of popular subjects searched by library users. In answering the research questions, data from the university's Digital Library database was used to examine the process where unsupervised clustering method was employed for segmentation of subject searched into homogenous groups. Bibliomining process that are similar with data mining fields are tools used to visualize the results. Unsupervised learning method was applied where an optimal number of cluster generated is eight. The profiles fed to the model are related to bibliographic, circulation and patron attributes. Findings of the study indicates that borrowers profiles related to subjects of social science, history, finance and language composed the largest portion of the cluster with size of 51.7% . Library authority may use this finding to assist them in decision making, to craft library budget planning and as well to recommend to the top management for new topics/subjects/materials that could be offered.

Keywords: Segmentation, Data mining, Bibliomining, Digital Library

Introduction

Library has massively developed from traditional services to digital services in recent years. The demand from library patrons, institutions, colleges, and private organization needs and technology evolution, has changed the library setting either in budget allocation or in decision making approach. The fast growing development of information technology, communication technology and computer technology itself has changed the landscape of traditional libraries. Therefore, new digital libraries need to reinforce their capability of information processing and their resource organization. In view of that, data mining technology could help libraries through their library administrators to develop massive amounts of information in depth, extract the inherent link of the diverse information to promote and increase the capability of the library. Data mining technology and it is application techniques is the answer to deep dive and drill down structured or unstructured data. It has been applied in many industries which usually illustrate its positive aspect and advantages as well as its

potential for operationalization. As stressed by Zhang (2011), data mining could discover and extract hidden information from huge databases and it's a vast network information space in digital library. Since many decades ago, library, information services centres and knowledge centres in universities, colleges, schools and private organizations as well as government bodies and communities have had the capability to capture information about their library users, circulation history, resources or library collection and search patterns (Nicholson & Stanton, 2003).

This study discussed the role of data mining through bibliomining process and techniques in predictive decision-making for improvement of digital library services. The importance of predicting decision making in digital libraries will assist library administrators to make good evaluations and decisions in ensuring library services meet user needs. Against this background, a study was conducted with the following objectives: (i) to identify decisions that can be predicted made from the bibliomining process, and (ii) to discover the trends of popular subjects searched by library users.

In this paper, the case study is focused on Digital Library of private university in Malaysia. Every year the library needs to prepare their annual yearly budget. This budget encompasses all costs including purchasing new library resources and for library operations. Library administrators need to well plan, strategize and make decisions on allocating the budget amount with respect to its library needs. Most academic libraries act as none profit centres where it relies solely on the amount given and approved by the management of university.

The rest of this paper is structured as follows. Firstly this study presents the literature review in data mining and bibliomining, focusing on concepts, related theories, and model or framework used by researchers for studying data mining and bibliomining adoption. Secondly, it describes the research method, giving details on population and data collection. Thirdly, it presents the results based on data analysis. Fourthly, it elaborates on the research findings. Finally, it draws the conclusion of the study.

Literature Review

The use of data mining application techniques and methods has increased over the years in organization. With the use of this technique, the main advantages that the organization receive is organizations be able to know the hidden valued information in their data warehouse. A review of the previous literature has been made further to explore the determinant on how much this method has been successful to apply in organizations especially in this context of digital library. Booth and Brice (2004) claimed, studying the library's bibliographic data using bibliomining process is related with 'Evidence Based Research'.

Karno et al. (2013) mentioned that, it is an approach to information practice which promotes the collection, interpretation and integration of valid, important and applicable users – reported, librarian observed and research derived evidence. Their study involves the bibliomining process in order to assist the authority management of UTM library in decision-making. They adopted the 5 steps research framework introduced by Chen, Lin and Wu (2004), as exhibited in Fig. 1. Chan and Chen (2006) conducted a study on using data mining approaches to solve classification problem in a campus digital library.

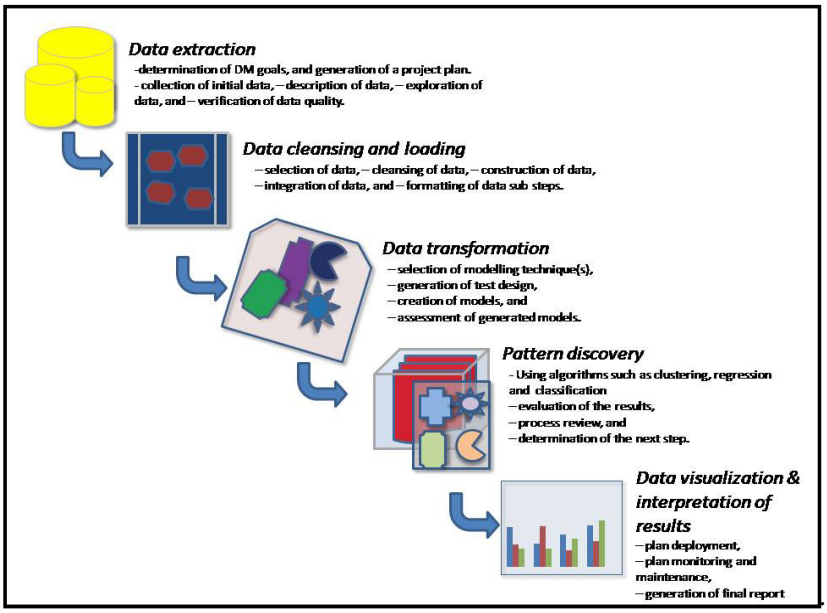


Fig. 1: Five Steps for research framework

Source: Karno et al. (2013) cited from Chen, Lin & Wu (2004)

The researchers examine the library catalogues that have become inefficient and inconvenient in assisting library users. They used data mining technology to elicit the knowledge from databases and established various kinds of data cubes. Chen and Chen (2007) employed data mining as a tool to explore the process. According to their findings, the flooding information often renders users unable to look for information they need. Therefore authors attempt to rectify the situation by proposing personalized smart user interface by developing personalized book recommender system through using existing historical record files in databases via data mining approaches.

Nicholson (2005) has developed a study on the basis for bibliomining framework for bringing together usage based data mining and bibliometrics. As mentioned by Karno et al. (2013) based on issues cited from Shieh (2009), the detailed behavioral data on existing customers from operational systems, enterprises hope to turn these myriad into some coherent profile of their customer in order to improve the quality of services.

Theoretical Framework

Fig. 2 shows user information records collected from the library source. The data carefully collected and picked in relating the prediction on how these variables could affect the digital library service through organization. Nicholson (2003) claimed that when a library authority wished to understand their user population better, they performed a frequency analyses to explore the demographic of their user base. Decision making tools one of the independent variables (IV) is an application methods that the library could apply as techniques to identify the behavior and interest of users. As suggested by Han and Kamber (2006) bibliomining process can apply five steps; data extraction, data cleaning, data transformation, pattern discovery and data visualization. Through the process it then would determine the result, finding or pattern produced which will be used as decision making tools level.

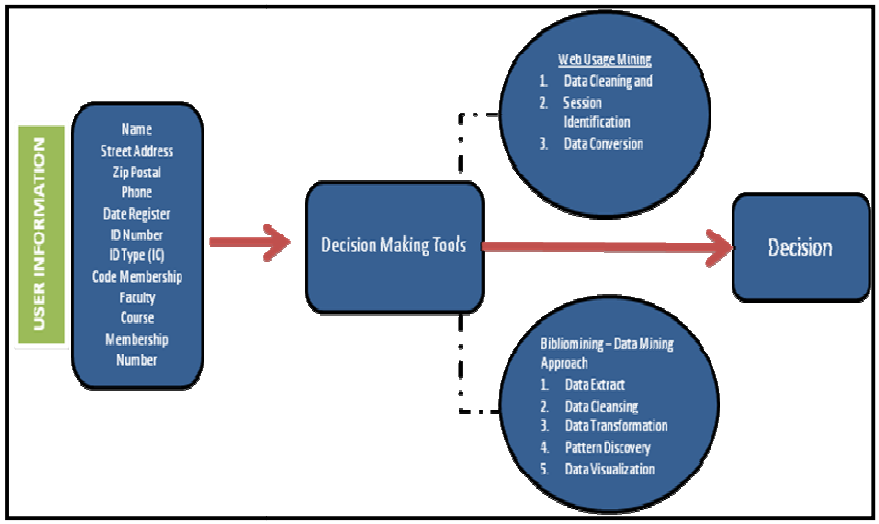


Fig. 2: Contextual Theoretical framework (extension)

Methodology

In this section, the methodology developed for the research is elucidated. This methodology provides instruments to answer the research questions and to fulfill the objectives of the research.

3.1 Data

The research used quantitative data from the library management system (LMS) KOHA, and qualitative approach (interview) to validate the research findings. This study is based on 11,517 borrowing transactions of the selected university's Digital Library from year 2008 – (April) 2015. The transactions were recorded and detected from the system. After the cleaning process, only 9,897 data were used and examined. In total, 9,129 registered users were detected in the system and the library was found to have about 5,493 titles.

The circulation data table was the main external data record that stores all circulation history process. User / patron data ID, gender, location and address were located in patron table and loaded in the circulation history when the borrowing process occurs. Data related to the book's details were kept in bibliographic table and it was designed for identifying volumes, series, format, dates, item number, call numbers and materials location. In Fig. 3, the relationships between table entities, as referred to Karno et al. (2013), are exhibited. However, for the purpose on this study, **three** main entities to feed the cluster model are used i.e. bibliographic (data on volumes, series, format, dates, item number, call numbers and materials location), circulation (external data record that stores all circulation history process) and patron (data related to user / patron, gender, location and address).

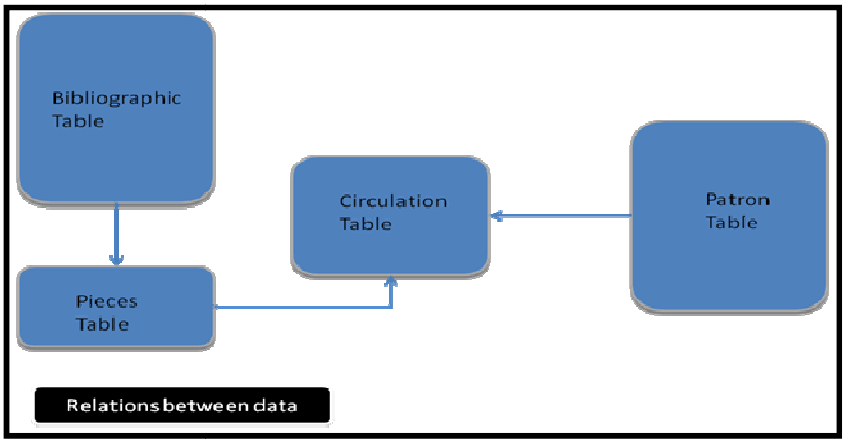


Fig. 3: Relation of entities

Source: Karno et al. (2013)

Framework of mining analysis

This study analyzes the bibliographic data as an example of circulation of data records in the university's Digital Library (as presented in Fig. 3). In extracting of the homogenous characteristics within groups, the typical five steps in the data mining process for library data applied are as follows:

- **Steps 1**: *Data Extraction* - the research method is to investigate numerous patron users based on the circulation of history of a 6 year period from 2008 to (April) 2015, via data mining approach.
- **Step 2**: *Data Cleansing* – process of cleaning readers' borrowing records by selecting the appropriate data from databases, performing data reduction, constructing multi-dimensional data tables and formatting them with accordance to analytical form and research needs.
- **Step 3**: *Data Transformation* - using Orange Data Mining tool, a free tool that available on-line. The tool is capable of analyzing big data mart of the library bibliographic records.
- **Step 4**: *Pattern Discovery* - performs appropriate data mining technique and unsupervised learning algorithms according to mining goals. Unsupervised learning deals with unlabeled data as opposed to supervised learning.
- **Step 5**: *Data Visualization* - performs various operations such as knowledge filtering from the output, analyzing the usefulness of extracted knowledge, and presenting the results to the users for feedback.

Tools

Data mining tools used for segmentation analysis is an open source machine learning and data visualization for novice and expert called *Orange*. *Orange* (Fig.4) is a component-based data mining software encompasses range of data visualization, exploration, preprocessing and modeling techniques. It can be used through an intuitive user interface or, for more advanced users, as a module for the Python programming language (Biolab, 2017).



Fig. 4: Official toolbar icon for *Orange* data mining tool

Below screenshots (Fig.5 and Fig.6) are taken from the main GUI of *Orange*.

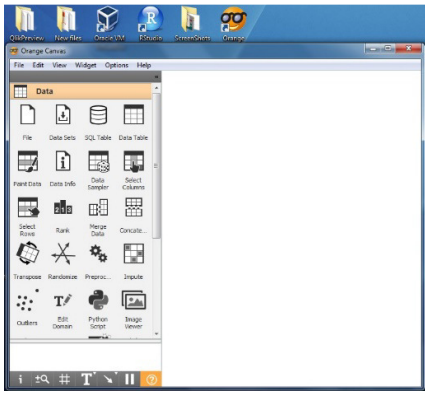


Fig. 5: *Orange* canvas

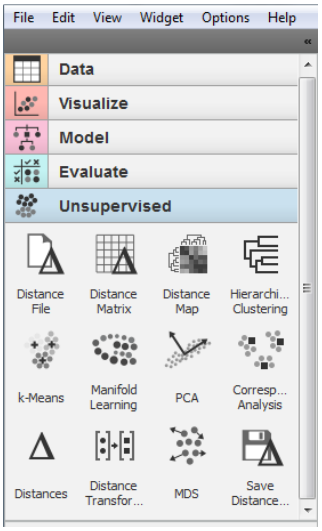


Fig. 6: Methods available in *Orange* for unsupervised clustering method

Findings

Findings with accordance to the research objectives stated are presented in this section. Table 1 shows the users' demographic profiles. Majority of them are Postgraduate students (71.29%) and followed by Undergraduate students (15.6%) whereas the minority were the External members (0.23%). Table 2 presents the frequency of transaction made by the library users in the analytical time window mentioned earlier. The highest transaction was made in a year 2012 with 29% followed by 2013 (26.9%) and 2014 (21.5%).

Table 1: Category of Users

Category of User	Frequency	Percent
AF (Academic Facilitator)	22	2.58
IM (External Member)	2	0.23
Undergraduates	133	15.6
Postgraduates	606	71.29
SPEED (Partner students)	5	0.58
Academic	44	5.17
Non Academic	38	4.47

Table 2: Total of borrowing transactions, by year

Year of Transaction	Frequency	Percent
2015	706	6.13
2014	2479	21.5
2013	3100	26.9
2012	3349	29
2011	263	2.28
2008 - 2010	1620	14.06

Segmentation results

The highest frequency of popular subjects and classification were determined by analyzing user / patron ID with the Call Number data. Through the data mining process and requirements, an unsupervised clustering method was applied and illustrate all borrowers can be clustered into 8 groups. There are different factors for each cluster and these are shown below:

i. **In Cluster 1**, borrowers are Academic Facilitators (AF). They are interested in Commerce (HF), Industries, land use and labor (HD), books on Theory and Practice of Education (LB) and Languages and Literatures (PL)

ii. **In Cluster 2**, borrowers are Individual Members (IM). They are interested books in Industries, land use and labor (HD) and Commerce (HF).

iii. **In Cluster 3**, borrowers are postgraduate's (PG) students (Master and PhD). They are most interested in Industries, land use and labor (HD), Theory and Practice of Education (LB), Commerce (HF), Social Sciences – General (H), Mathematics (QA), Statistics (HA), Finance (HG), English Language (PE), Sciences – General (Q) and History of Education (LA).

iv. **In Cluster 4**, borrowers are non – academic staff members (SN) of Asia e University. They are interested in Industries, land use and labor (HD), Commerce (HF), Theory and Practice of Education (LB) and Mathematics (QA).

v. **In Cluster 5**, borrowers are SPEED (SP06 & SP12) students (Executive Master & Executive Diploma programme). They are interested in Mathematics (QA) and Psychology (BF).

vi. **In Cluster 6**, borrowers are the Academic Staff (ST) of Asia e University. AeU academicians are more interested in Industries, land use and labor (HD), Commerce (HF), World History – Asia (DS), Mathematics (QA) and Social Sciences – General (H).

vii. **In Cluster 7**, borrowers are Librarians (SYS). AeU Librarian are more interested to borrow books in land use and labor (HD), Theory and Practice of Education (LB), Finance (HG) and Mathematics (QA).

viii. **In Cluster 8**, borrowers are Undergraduate students (Diploma and Degree). This category of students are more interested books in Commerce (HF), land use and labor (HD), Mathematics (QA), Theory and Practice of Education (LB), English Language (PE), Economic Theory and Demography (HB), Psychology (BF) and World History – Asia (DS).

Table 3: Cluster profiles

Cluster Group	Subject Interest	Number of borrowers	Percentage
Cluster 1	HF, HD, LB, PL	59	0.59%
Cluster 2	HD, HF	40	0.4%
Cluster 3	HD, LB, HF, H, QA, HA, HG, PE, Q, LA	5120	51.7%
Cluster 4	HD, HF, LB, QA	90	0.9%
Cluster 5	QA, BF	10	0.1%
Cluster 6	HD, HF, DS, QA, H	210	2.12%
Cluster 7	HD,LB,HG, QA	67	0.67%
Cluster 8	HF, HD,QA, LB, PE,HB,BF,DS	539	5.44%

The findings of clustering method are as exhibited in Table 3. An optimal number of segments generated using three main data entities is eight. Out of the total of eight clusters, Cluster 3 contributes the majority of segment size with 51.7% of borrowers followed by Cluster 8 with 5.44%. Other clusters with minimal size such as from cluster 1 (0.59%), cluster 2 (0.4%) and cluster 4 (0.9%) can be further studied with library experts in terms of combining them, if appropriate, into one or two segments by considering the suitability or other relevant factors. The main idea is to gain more suitable profile to personalize their needs that can be used to craft the future library planning.

Borrowing Trend

Postgraduate students borrowed significantly more than undergraduate students or any library borrowers group in the university's Digital Library population. In cluster 3, Master Degree and PhD or DBA level holders borrowed 7499 books on average or 75.9% compared with Undergraduates students from cluster 8 who studied in Degree and Diploma level holders, who borrowed 875 books only. The borrowing trend can be extended from the angle of usage of such digital library. Razilan, Diljit and Fatimah Almah (2013) pioneered the study in the context of electronic libraries, as well as digital libraries, where they examined the relationships between usage of students of higher institution and its impact using formative measurement model via partial least squares (PLS) model. Embarking on the relationships may reveal predictive elements of the behavior of borrowers using additional borrower's profiles.

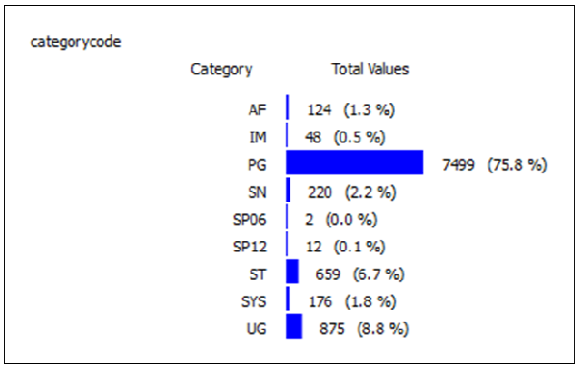


Fig. 7: Distribution of borrowings

Popular Subject and Classification

Land use and labor subjects from class number HD was described for the most popular subjects borrowed, that have the highest frequency with a huge margin. It is interesting to reveal that it is the most popular subject being used and read by the users which showed more than 2000 cumulative frequent usage. Secondly, *theory and practice of education* from LB classification showed that it was also among the top subjects borrowed. It contributes 1364 times or 13.8% of the total transaction. *Commerce* subject from HF class number also played a major role. It managed to attract library users to borrow from the collection. Chart as shown in Fig. 7 stated that on average, a total of 1,152 times books have been checked out within the modelling window selected for the study.

Discussion

This section includes a discussion of this study's contribution to research and practitioners, limitation of the study and agenda for further research.

Contributions to Research

This study contributes to research two main valuable insights. Firstly it provides researchers the visibility of what type of benefits can be received by libraries from data mining approaches. Secondly, it provides one framework to be used when examining library data bibliographic in order to assist Library authority in decision making and to craft strategic planning ahead to accommodate the current and future needs of the library users. Thirdly, the effectiveness of such plan can be assessed, as proposed by Razilan (2014), Noor'Aini, Saiful Farik and Razilan (2014), on any related systems once deployment of the digital library commenced in a period of time (to obtain enough data for modelling needs).

Contribution to Practice

Researchers may use the results of this study to assist them in decision making in library budget preparations. Moreover, the research provides researchers with a few options and guiding them where to focus in library expenses and what new services are suitable for the target group. Apart from that, it may add value to the performance of digital library perspective (Razilan 2014) i.e. by considering the profiles generated from the bibliographic, circulation (borrowing) and patron entities as used in the study.

Limitations of the Research

There are a few limitations in this study, which could hinder generalizing the results. Firstly, data mining needs special tools and applications to generate the desired objectives and results. Secondly, open source tools like Oranges as used in this study, provides high level functions of analytical data mining where beginners need a great deal of time for tools exploration. Finally, data preparation is very tedious and may consume more than one third of the research duration.

Further Research

This study provides a number of important themes for further research. It recommends the study can be extended on ezproxy login captured into digital library or electronic library. The digital library has become one of the major resources of knowledge acquisition where it is not limited to the academia but as well as to government and private sectors. Online database subscriptions (e-book, e-journal & etc.) may spark high costs. Having data mining to analytically explore the library borrowings data may lead to some important insights that can apply to reduce some costs. Moreover, injecting more attributes like demographic profiles of library users may add new insights of usage (Razilan, Diljit, Fatimah Almah, 2013; Razilan, Saiful Farik, Muhammad Khairulnizam and Wan Ab Kadir, 2015; Razilan, Safawi, Mohd Yusof, Fadhilnor & Zahari, 2014) indicated that ethnic and age play dominant role in the different of use of academic digital libraries of postgraduate students.

Conclusion

The segmentation of borrowing usage of one of private university's Digital Library is presented. Moreover, all of the research questions are answered accordingly, supported by statistical and visualization analysis. This study revealed that, effective library resource usage relies on borrowers' interest, programme offered at the university, subjects taken and the number of students. Results showed that subject on land, use and labor (HD) are the most popular subjects used and searched by library borrowers and the largest size of segment comprise of this subject. Thus, this may produce useful lead to library or library experts to craft their plan ahead in terms of subject allocation, budget, re-stock based on popular versus non-popular subjects and so forth. Based on the techniques applied, library administrators may regulate their library budgets accordingly based on the suggestions made by using the bibliomining process. This technique can be applied in any library as long as they have historical records on circulation transaction. It is a useful approach to justify estimation of certain monetary amount when preparing the library budget allocation. It may also set the priority on venturing money on hot or popular topics.

References

Bayley, L. (2009). Practicing what we preach: A case study on the application of evidence based practice to inform decision making for public services staffing in an academic health sciences library. *The New Review of Academic Librarianship*, 15(2), 235-252.

Biolab (2017). Orange3. Retrieved 10 October 2017 from https://github.com/biolab/orange3

Booth, A. and Brice,A., (2004). *Evidence-based Practice for Information Professionals: A Handbook*. London: Facet Publishing.

Booth, A. (2006). Counting what counts: performance measurement and evidence-based practice, *Performance Measurement and Metrics*, 7, 2, 63 – 74

Braaik, G., Mizzaro, S., and Tasso, C. (1996). Evaluating user interfaces to information retrieval systems: a case study on user support. *Proceeding SIGIR '96 Proceedings Of The 19Th Annual International ACM SIGIR Conference On Research And Development In Information Retrieval*, Pages 128-136. doi:10.1145/243199.243249

Burkhardt, J., MacDonald, M., and Rathemacher, A. (2010). *Teaching information literacy*. Chicago: American Library Association.

Chang, C.C and Chen, R.S. (2006). Using data mining technology to solve classification problems: a case study of campus digital library. *The Electronic Library*, 3, 307-321

Chang, C., and Chen, R. (2006). Using data mining technology to solve classification problems. *The Electronic Library*, *24*(3), 307-321. doi:10.1108/02640470610671178

Chakrabarti, S. (2009). *Data mining*. Burlington, MA: Elsevier/Morgan Kaufmann Publishers.

Chen, C., and Chen, A. (2007). Using data mining technology to provide a recommendation service in the digital library. *The Electronic Library*, *25*(6), 711-724. doi:10.1108/02640470710837137

Collis, J. and Hussey, R. (2009). Business research: A practical guide for undergraduate and postgraduate students (3rd ed.). New York: Palgrave Macmillan.

Eddy, M. (2013). The Shape of Knowledge: Children and the Visual Culture of Literacy and Numeracy. *Science In Context*, *26*(02), 215-245. doi:10.1017/s0269889713000045

Greaves, F. L. Jr (1974). The allocation formula as a form of book fund management in selected state-supported academic libraries. *Unpublished doctoral dissertation*, Florida State University.

Guenther, K. (2000). Applying data mining principles to library data collection. *Computers in Libraries*, 20, 4, 60-63.

Han, J. and Kamber, M. (2006*).* Data mining: concepts and techniques. 2nd ed. California: Elsevier pub.

Hernon, P. and McClure, C. R. (1990). Evaluation and library decision making. New Jersey: Ablex Pub. Co.

Hugh, D., Hickson, D., and Hinings, C. (1969). An Empirical Taxonomy of Structures of Work Organizations. *Administrative Science Quarterly*, *14*(1), 115. doi:10.2307/2391367

Joshila Grace, L., Maheswari, V., and Nagamalai, D. (2011). Analysis of Web Logs And Web User In Web Mining. *International Journal of Network Security & Its Applications*, *3*(1), 99-110. doi:10.5121/ijnsa.2011.3107

Kao, S.C., Chang H.C., Lin, C.H. (2003).Decision support for the academic library acquisition budget allocation via circulation database mining. *Information Processing and Management*, 39, 133–147.

Karno et al. (2013). Bibliomining in UTM digital library: Using data mining to discover user pattern behavior. Retrieved 13 July 2017 from http://ent.library.utm.my/custom/web/content/journal_260712.docx

Linoff G. S. and Berry, M. J. A (2011). Data mining techniques: for marketing, sales and customer relationship management. Indiana, Indianapolis: Wiley Publishing Inc.

Merriam-webster.com,. (2014). *Information - Definition and More from the Free Merriam-Webster Dictionary*. Retrieved 17 May 2017 from http://www.merriam-webster.com/dictionary/information

Mei, Z. (2011). Application of Data Mining Technology in Digital Library. *Journal Of Computers*, *6*(4), 761-768. doi:10.4304/jcp.6.4.761-768. Retrieved July 2017

fromhttp://ezproxy.aeu.edu.my/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=iih&AN=63897005&site=eds-live

Nicholson, S. (2003). The bibliomining process: data warehousing and data mining for library decision making. *Information Technology and Libraries,* 22, p. 4. Retrieved 19 December 2016, from http://www.bibliomining.com/nicholson/biblioprocess.htm

Nicholson, S. (2005). The basis for bibliomining: Frameworks for bringing together usage-based data mining and bibliometrics through data warehousing in digital library services. *Information Processing and Management,* 42, 785–804.

Noor'Aini, I, Saiful Farik M.Y. & Razilan A.K. (2014). An Empirical Study On Effectiveness of ERP System. *Australian Journal of Basic and Applied Sciences*, 8(23) Special 2014, 144-150

Prakash, K., Chand, P., and Gohel, U. (2004). Application of data mining in library and information services. 2nd Convention Planner 2004, Manipur University, Imphal, 4-5 November 2004. Retrieved from http://hdl.handle.net/1944/435

Razilan, A.K. (2014). *An assessment of the performance of digital libraries based on an information systems success model*. Ph.D Thesis, University Malaya.

Razilan A.K. and Diljit S. (2012). Examining the relationships of electronic library individual usage and impact using partial least squares: a formative measurement model. Malaysian Journal of Library & Information Science, August , 17(2), 1-15.

Razilan A.K., Safawi, A.R., Mohd Yusof M., Fadhilnor R. and Zahari M.A. (2014). Demographic Factors and Awareness of Academic Digital Libraries at Higher Learning Institutions, In Proceedings of the 24th International Business Information Management Association (IBIMA) Conference, Crafting Global Competitive Economies: 2020 Vision Strategic Plaaning & Smart Implementation by Khalid S. Soliman, November 6-7, Milan, Italy.

Razilan A.K., Saiful Farik M.Y., Muhammad Khairulnizam Z. & Wan Ab Kadir W.D. (2015). Analysing Socio-Demographic Differences in the Use of Academic Digital Libraries of Postgraduate Students in Malaysia*, Australian Journal of Basic and Applied Sciences*, 9(3), Special 2015, 45-49

Robert, S. (1998). Financial and cost management for librarians and information services. New Providence, NJ: Bowker.

Roiger, Richard J. and Geatz, Micheal W. (2003). Data mining: a tutorial-based primer. NewYork: Pearson Education. Inc.

Schachter, D. (2006). The importance of good decision making. *Information Outlook*, 10(4), 12-13.

Shieh, Jiann-Cherng. (2009). The integration system for librarians' bibliomining. *The Electronic Library,* 28,(5), 709-721.

Saunder, M., Lewis, P. and Thornhill, A. (2009). Research methods for business students (5th ed.). New York: Prentice Hall.

Tan, P., Steinbach, M., and Kumar, V. (2005). Introduction to data mining. Boston: Pearson Addison Wesley.

Vercellis, C. (2009). Business intelligence: data mining and optimization for decision making. West Sussex, U.K.: John Wiley & Sons Ltd.

Wu, C.H. (2003). Data mining applied to material acquisition budget allocation for libraries: design and development. *Expert Systems with Applications*, 5, 401–411.

Witten, I., and Frank, E. (2005). Data mining. Amsterdam: Morgan Kaufman.

Xie, H. I. (2008). *Users' evaluation of digital libraries (DLs): Their uses, their criteria, and their assessment. Information Processing and Management*, 44, 1346–1373.

Zobel, J., and Moffat, A. (2006). Inverted files for text search engines. *CSUR*, *38*(2), 6-es. doi:10.1145/1132956.1132959

The Relationship of the Social and Economic Progress: A Case of European Cohesion Regions

Tetiana Korovchenko Institute of Regional and Security Sciences, Faculty of Economics and Administration, University of Pardubice, Pardubice, Czech Republic; E-mail: tetiana.korovchenko@upce.cz

Ondřej Svoboda, Institute of Regional and Security Sciences, Faculty of Economics and Administration, University of Pardubice, Pardubice, Czech Republic; E-mail: ondrej.svoboda@upce.cz

Martin Ibl, Institute of System Engineering and Informatics, Faculty of Economics and Administration, University of Pardubice, Pardubice, Czech Republic; E-mail: martin.ibl@upce.cz

Abstract

With increased attention of society to issues of income inequality, we decided to explore how the Social Progress Index relates to the overall distribution of GDP and when the Social Progress Index ceased to follow this behaviour. This paper describes the Social Progress Index for a holistic assessment of both social and economic progresses. The work analyses the main trends influencing the wellbeing of society in Europe. At the same time provides analyses of the relationship between economic development (measured by region GDP per capita) and social development of society (measured by Social Progress Index). In frames of significant difference between GDP and SPI, we tried to find a deeper understanding of the relationship.

Keywords: Social progress, Income, Wellbeing, Social Progress Index (SPI)

Introduction

Economic growth in many countries has made it possible to improve the lives of hundreds of millions of people in many countries. But authors of SPI claim that (Social Progress Imperative, 2017): "*a model of development based solely on economic progress is incomplete*". Economic growth alone is not enough. A society is not succeeding when it fails to address basic human needs, equip citizens to improve their quality of life, protect the environment, and provide opportunity for its citizens. Inclusive growth requires achieving both economic and social progress.

The Social Progress Index aims to meet this urgent need through a robust and holistic measurement framework for social and environmental performance that can be used by leaders in government, business, and civil society to benchmark success and accelerate progress. The Social Progress Index is the first comprehensive framework for measuring social progress that is independent of GDP, but complementary to it. It was first implemented at the national level in 2014, and has been enhanced each year and expanded to regions, cities, and individual communities (Porter, 2015, Porter M., Stern S., Green M., 2016). The index is published by the non-profit organization The Social Progress Imperative, and is based on the writings of Amartya Sen, Douglass North, and Joseph Stiglitz (Pristine Journal, 2011).

The European Union Social Progress Index, which is measured across the 272 regions of the 28 European Union member states, is an aggregate index of 50 social and environmental indicators that capture three dimensions of social progress: Basic Human Needs, Foundations of Wellbeing, and

Opportunity. The Fig.1 shows the three dimensions each including four components and sub-components of every of them.

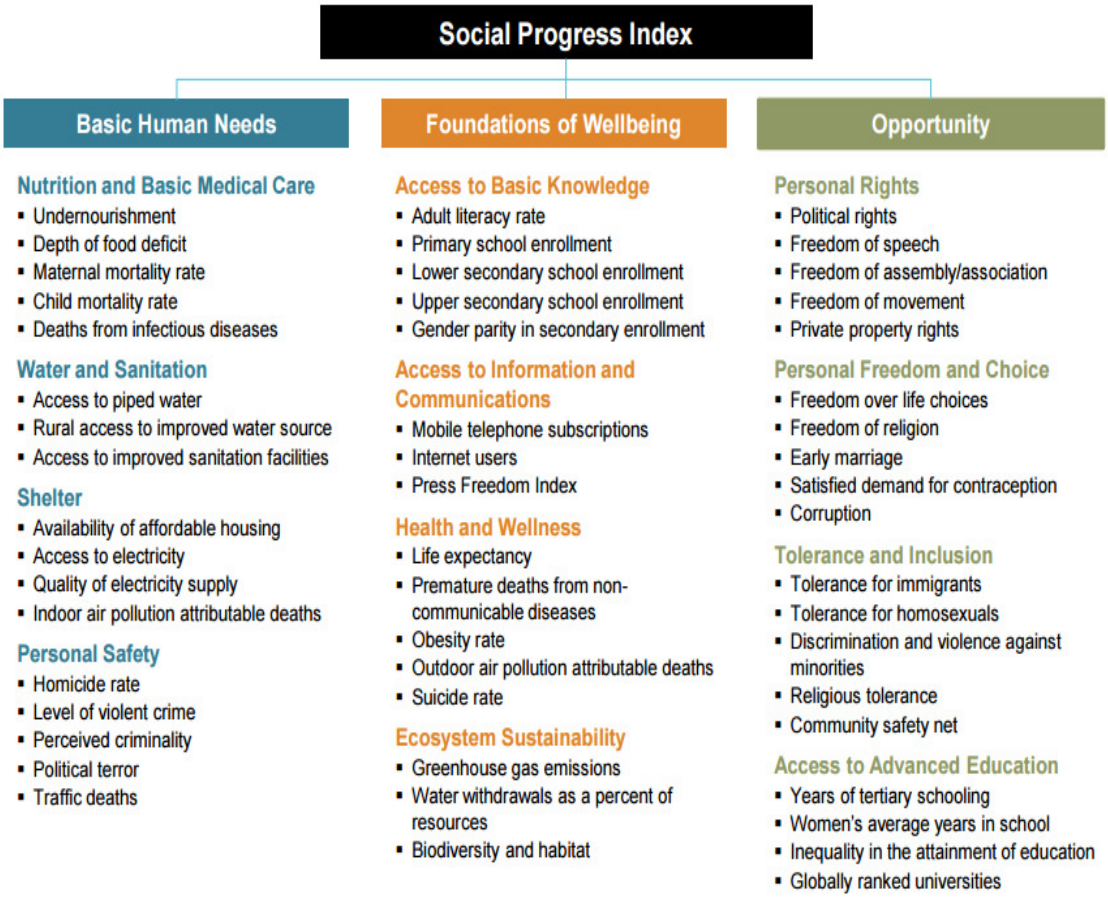


Fig. 1: The components of the Social Progress Index

Source: (Porter, 2015)

This regional version of SPI may help regions to identify similar regions. This is possible at any level of economic development and thus regions could learn about each other, solve and prioritise issues they want to address with their Cohesion Policy Programme. SPI is useful because it can serve as an indicator for the European Commission to evaluate whether the 2014-2020 programmes address the right issues. It is a composite index based on the aggregation of information from indicators derived from different sources (Annoni P., Dijkstra L., 2016).

One of the key differences with other wellbeing indexes is that the Social Progress includes social and environmental indicators and excludes GDP or any other income-based indicator. The main idea behind the index is to measure social progress directly, rather than utilize economic proxies.

The essence of this paper is analysis of SPI and GDP relationship to understand the relationship between economic and social development. The advantage of SPI is the possibility to separate the cause and consequences (this is perceived as a drawback, for example, in the Human Development Index used by the United Nations). The Social Progress Index has been designed to describe social and environmental aspects of regions, thus it is a complement of GDP. The authors of SPI designed this index to be (Annoni P., Dijkstra L., 2016): „*a robust, comprehensive and practical measure of inclusive growth*".

Several indexes already try to go beyond GDP, such as the Human Development Index and the Happiness Index (Bubbico B., Dijkstra L., 2011, Annoni P., Dijkstra L.,2016, European Commission, 2017), but none specifically tracks social and environmental outcomes. These outcomes include access to schools, healthcare, a clean environment, sanitation and nutrition.

While there might be (for someone) a clear correlation between the level of economic development and social progress, the relationship varies significantly. A country classification by income level often does not correspond to its level of social progress, especially in middle and lower income countries. All but one country in the high and very high-social progress tiers are also high-income countries, but not all high- or upper middle-income countries rank in the top half of social progress countries. For example, Russia, Saudi Arabia, and Venezuela are all relatively high-income countries but lower ranked on social progress (Ramos, Royuela, 2014).

Methods and Data

In this paper were used data regarding SPI (The Social Progress Imperative - Dataset, 2017) and GDP (Eurostat statistical data, 2016) for 2016 across the 272 regions of the 28 European Union member states. The data consists of NUTS 2 of 9 states of EU. As a method for our research was used correlation and regression analysis. The correlation analysis is aimed at determining the intensity of potential dependencies between random variables of the statistical set. The result of the analysis is determination of the degree of dependence, which is realized by calculating the values of the different types of correlation coefficients. The higher the value of the correlation coefficient, the higher the dependence (in the causal relationship) or the relationship (in association) between the variables X and Y.

Regression analysis is used to determine the statistical dependencies between dependant variable and one (or more) independent variables. The most common goal of regression analysis is to quantify the best estimates of unknown regression model parameters. A simple linear regression model is called a model where the graph of the regression function is a straight line and we can formally express it:

$$Yi = \alpha + \beta xi + \varepsilon i,$$

where εi are independent random variables for which $E\varepsilon i = 0$, $D\varepsilon i = \sigma 2$, $i = 1,2, \dots , n$.

εi is called a random folder in a linear model. A random component involves the effect of random influences or the effect of quantities not included in the model. We used the least squares method to estimate the regression parameters. The least squares method provides sufficient parameter estimates only when all assumptions about the data and regression model are met (Meloun, Militký, 2006).

In order to build a regression model, the proper variables have to be selected. The choice of variables focuses on those independent variables that explain a significant volume of variability depending on the variable (Hendl, 2004). This phase of research requires the breakdown of variables into dependent and independent variables. A meaningful use of regression analysis requires that the choice of dependent and independent variables is based on the hypothesis of the causal dependence. The causal dependence arises either from the previous implementation of the correlation analysis or is evident from the nature of the phenomena investigated.

In our research, GDP (economic progress) is a prerequisite for achieving high SPI (social progress). For this reason, the SPI index was chosen for the dependent variable and GDP was chosen as the explanatory variable. It must be stated that this view is a simplification of the actual relationship between social and economic progress, since social progress is likely to be linked to the economic progression.

As the results of the regression analysis are susceptible to the violation of OLS assumptions, normal distribution and other assumptions have been tested. Rejection of the existence of normal distribution

is often due to the existence of outliers. However, it can be partially removed by application of appropriate procedures (Meloun, Militký, 2006).

Results

How was mentioned before, economic development alone is not sufficient to explain social progress outcomes. That is why we try to find optimal way how to assess quality of life by comparison of two approaches - economic and social.

Fig. 2 shows that there is a subtle dependence between European Social Progress Index scores and GDP per capita.

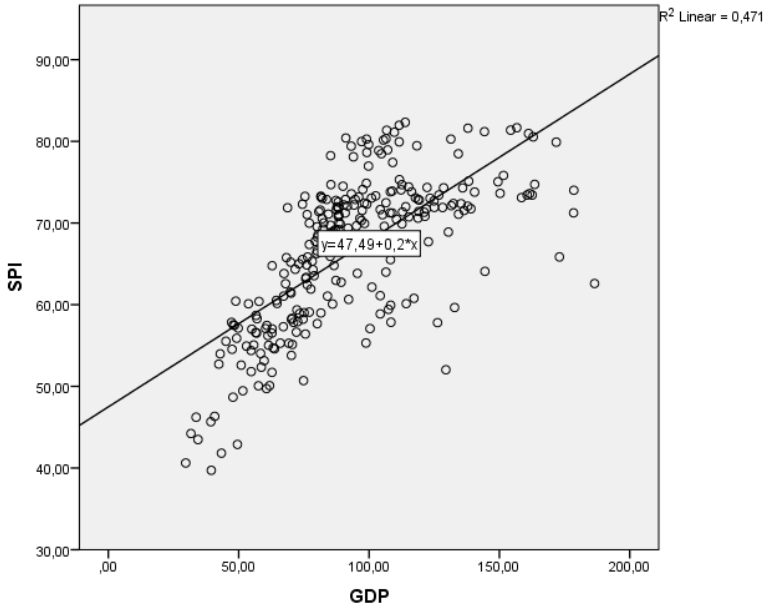


Fig. 1: Relation between the EU regional SPI and GDP per capita (2016)

Four values were classified as outliers and therefore were excluded from analyses, namely Inner London (now known Inner London – West and Inner London – East), Luxembourg, Brussels and Hamburg.

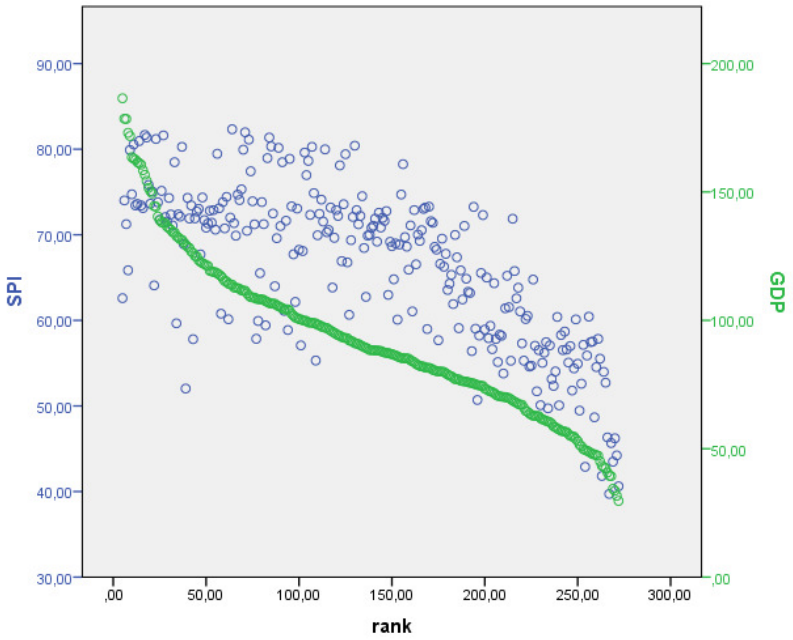


Fig. 2: Regional GDP per capita and Social Progress Index (sorted by decreasing sequence GDP)

The figure 3 indicates that there is a visible dependence between SPI and GDP mostly among regions on the lower end of GDP. This can be interpreted as a situation where a certain amount of GDP ceases to increase SPI. The figure 4 shows the distribution of cumulative correlation between GDP and SPI. It can be seen from the figure that there is a maximum point, i.e. the correlation between GDP and SPI takes the highest values for regions with GPD per capita lower than 98.22 in PPS (Purchasing Power Standard).

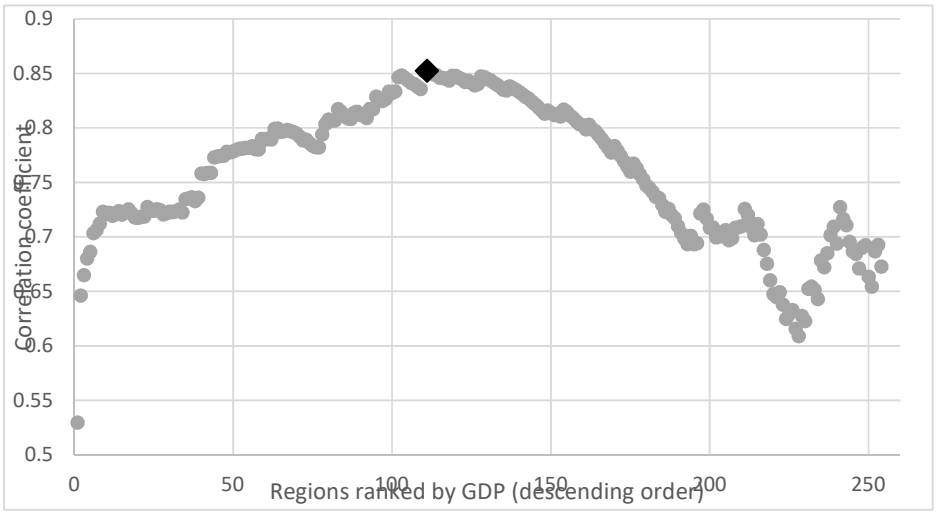


Fig. 3: Cumulative correlation coefficient between SPI and GDP (descending order)

Provided analyse show that economic growth translates into social improvement, but after some threshold this dependence ceased to exist. Fig. 5 represents the strong dependence between the SPI and the GDP lower than 98.22.

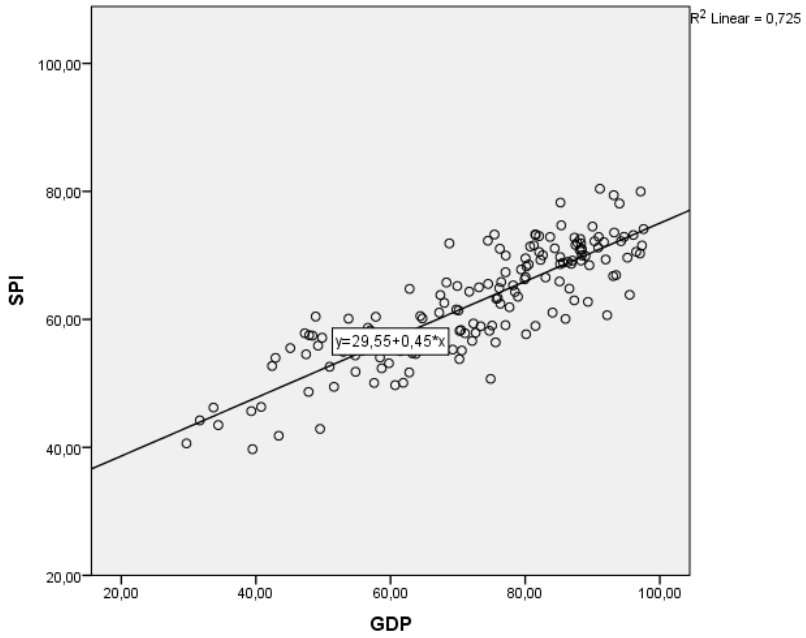


Fig. 4: Regression between SPI and GDP for reagion with GDP < 98.

Fig. 6 shows that the residuals does not show any significant signs of heteroscedasticity.

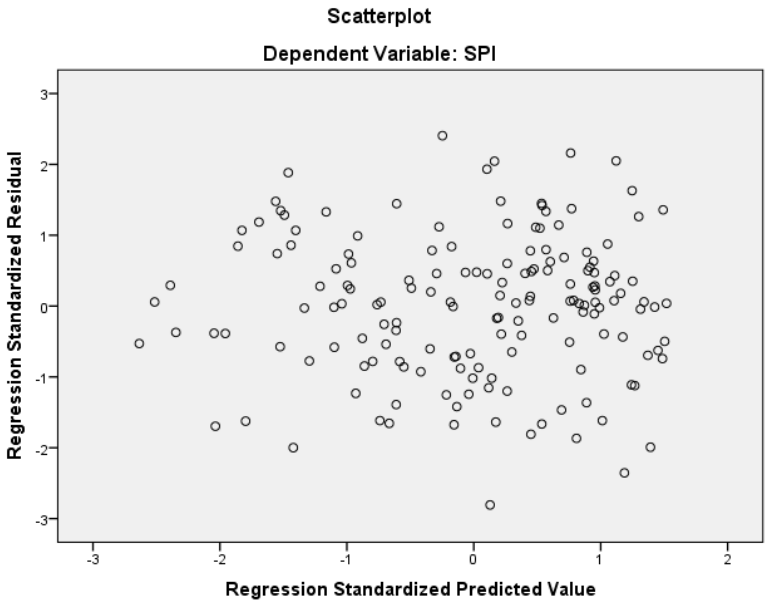


Fig.5: Residual analyses

Discussion and Conclusion

The results of the regression analysis have demonstrated the existence of a stochastic dependence between economic and social progress. This result leads to the conclusion that regional SPIs are growing with GDP growth. This relationship is not equivalent - when GDP grows by 1 PPS per

capita, SPI grows only by 0.45 units (which is apparent at least for regions with GDP below 98.22 PPS per capita).

The results of the regression analysis have clearly demonstrated the effect of the variability of the SPI index in the case of regions with a GDP per capita higher than 98.22 purchasing power standards. This limit was found by means of a correlation analysis, the results of which are shown in the curve in Figure 4. The concave course of the curve demonstrates the existence of a limit point in which the dependence between the variables studied increases. From this value (GDP = 98.22), the already found relationship fades. This can be explained by the hypothesis of the marginal declining benefit of economic progress in the direction of social progress, but it should be thoroughly examined in further research.

Limitations of our research stem mainly from the data base that was based solely on data for 2016 due to the recent creation of the SPI index. In the subsequent research, our focus will be on deeper exploration of this concave dependence and the context of income inequality. One possible explanation for the variability of the SPI index, even at very similar levels of GDP, can be explained by the existence of strong income inequality, which leads to the fact that even high GDP values do not lead to demonstrable social progress.

At the end it could be stated that thanks to rigorous and holistic measure of inclusiveness that is independent of GDP and other economic measures, the Social Progress Index provides a powerful tool for evaluating effectiveness of economic to social progress transformation. Thanks to that it can be used for leaders in government and broad society to benchmark performance, identify priorities for action, and to track the impact of interventions.

Acknowledgement

The paper was supported by the University of Pardubice, Faculty of Economics and Administration, Project SGS_2017_021.

References

Annoni P., Dijkstra L. (2016) The EU Regional SPI: *A Measure Of Social Progress in the EU Regions*, Methodological Paper, available at: http://ec.europa.eu/regional_policy/sources/information/maps/methodological_note_eu_spi_2016.pdf

Bubbico B., Dijkstra L. (2011) *The European regional Human Development and Human Poverty Indices,* Regional Focus, available at: http://ec.europa.eu/regional_policy/sources/docgener/focus/2011_02_hdev_hpov_indices.pdf

European Commission. (2017) The EU regional social progress index: Methodological note, available at: http://ec.europa.eu/regional_policy/sources/information/maps/methodological_note_eu_spi.pdf

Eurostat statistical data, (2016) *GDP at regional level,* available at: http://ec.europa.eu/eurostat/statistics-explained/index.php/GDP_at_regional_level

Hendl, J. (2004) *An overview of statistical data processing methods.* Prague: Portál. ISBN-10: 80-7178-820-1.

Meloun, M., Militký, J. (2006) *Compendium of statistical data processing.* Prague: Academia. ISBN-10: 80-200-1396-2.

Porter M. (2015) *Social Progress: The Next Development Agenda*, available at: http://live.worldbank.org/sites/default/files/mep_wb_final.pdf

Porter M., Stern S., Green M. (2016), The main report *Social Progress Index,* available at: http://www.socialprogressimperative.org/wp-content/uploads/2016/06/SPI-2016-Main-Report.pdf

Pristine Journal (2011) *What is Standard Deviation,* Retrieved 2011-10-29., available at: http://www.edupristine.com/blog/what-is-standard-deviation

Ramos R., Royuela V. (2014) *Income inequality in Europe. Analysis of recent trends at the regional level,* Regional Quantitative Analysis Research Group, available at: http://www.ub.edu/irea/working_papers/2014/201425.pdf

Social Progress Imperative. (2017) *Social Progress Imperative: Why Measure Social Progress?* available at: http://www.socialprogressimperative.org/why-measure-social-progress/

The Social Progress Imperative - Dataset (2017) available at: http://www.socialprogressimperative.org/custom-indexes/european-union/#data_table/countries/euregional/dim1,dim2,com5,dim3

Peculiarities in Convergence of Slovak Capital Stock to Western Countries

Karol Morvay, Department of Economic Policy, Faculty of National Economy, University of Economics in Bratislava, Slovakia; Institute of Economic Research, Slovak Academy of Sciences, Bratislava, Slovakia. karol.morvay@euba.sk

Martin Hudcovský, Department of Economic Policy, Faculty of National Economy, University of Economics in Bratislava, Slovakia; Institute of Economic Research, Slovak Academy of Sciences, Bratislava, Slovakia. martin.hudcovsky@euba.sk

Abstract

The Slovak economy is for a long time dealing with the problem of capital intensity. It is lagging behind other developed countries with significant improvement since 2014. However, the spread of undercapitalization is selective to industries which are present in the economy since the era of socialism. New established industries are not dealing with this issue. Despite the lag behind other developed countries, the situation is relatively favourable when compared with other CEE countries. The difference in the structure of the fixed assets between Slovakia and other developed countries lies in lack of intellectual assets on expense of machines and other non-intellectual assets.

Keywords: Undercapitalization, Capital Stock, Intellectual Assets,

JEL Classification: E22, E24, O34

Introduction and Motivation

Lagging in the capital intensity (i.e. undercapitalization) was perceived as a barrier to greater performance of the former transition economies of Central and Eastern Europe. The economic theory perceives changes in the capital to labor ratio as an explanatory factor for the economic growth and convergence of their level (see Solow growth theory). This paper examines how the Slovak economy overcame this undercapitalization problem. We assume that during the economy transformation, the level of capital intensity improved significantly, however, very differently within the sectors. It is also possible that there were significant differences within the group of former socialist economies of Central and Eastern Europe. We seek the answers to following questions:

To what extent the problem of the low capital to labor ratio has already been removed (alleviated)? Are there any sectors in which this process has progressed very significantly or on the other hand lagged?

Was the elimination of the undercapitalization associated with the formation of a similar fixed capital structure as we see in the most advanced economies? Has the convergence to the level of capital intensity of advanced economies been accompanied by imitation of their structure of fixed capital?

The Issue of Undercapitalization Overcoming in Literature

In the well-known simple production function is the amount of production defined by labor (L) and capital (K), therefore Q = f(K, L). The ratio K/L is used to express the capital intensity. Many remarkable papers focus on topic how changes in capital volume and capital intensity affected economic growth and the convergence of CEE countries. For example, Dombi (2013) proved with the use of growth accounting that the main driver of economic growth in CEE countries was the capital accumulation in the period after the year 1995, while the impact of the labor and multifactor

productivity was only marginal. That means the CEE countries followed the model of extensive and investment-oriented growth with a significant increase in K/L ratio. The results of so-called "development accounting" suggests that lower levels of GDP per hour worked in CEE countries (particularly compared to Germany) can be primarily attributed to their less capital intensity and secondary to their lower multifactor productivity (while the job quality is about the same as in Germany). The very low initial level of capital intensity, coupled with the higher level of investments rate (share of capital formation in GDP) than in developed economies had resulted in the significant potential for capital accumulation and thus, rapid economic growth.

Doyle, Kuijs and Jiang (2001) conducted an analysis for the period from 1991 to 1999 and stated that in the case of Slovakia, the benefit of fixed capital formation growth to GDP growth was the dominant driver (six times stronger than the contribution of multifactor productivity). However, the group of CEE countries achieved relatively heterogeneous results with the various contribution of capital in different countries. They also pointed out to difficulties in estimation of capital stock and capital intensity at the beginning of a transformation in these countries. A significant part of the capital had to be discarded as ineligible for further production. In Slovakia, the estimated capital intensity was relatively high even before the transformation process began (what was caused by the historically significant investments in the sectors of heavy machinery, arms production, and other capital intensive productions).

The importance of capital (more precisely its contribution to economic growth) varies greatly depending on the selected period of analysis: Borys, Polgár and Zlate (2008) in their analysis of the period 1997 – 2006 came to little different conclusions than papers mentioned above. They attributed in the CEE countries higher contribution to multifactor productivity and less contribution of capital changes. However, what these analyses have in common is the relatively high contribution of changes in capital and significantly lower (sometimes negative) contribution of changes in the labor force. Okáli (2008) revealed the contribution of production factors for different time periods. The contribution of changes in the capital is always dominant.

As well as in the already mentioned paper by Doyle, Kuijs and Jiang (2001), the paper by Němec and Prachár (2000) addresses the topic of the specific barrier for greater growth in the capital intensity – a slow depreciation of assets. Němec and Prachár (2000) elaborate the issue of blocked funds for capital renewal. Due to the increase in prices of capital goods (with the slow depreciation of capital), there was no room to cumulate sufficient amount of funds for replacement of worn-out capital. Consequently, other resources of funding must be used (loans and other "temporary solutions alleviating the pressure on resources").

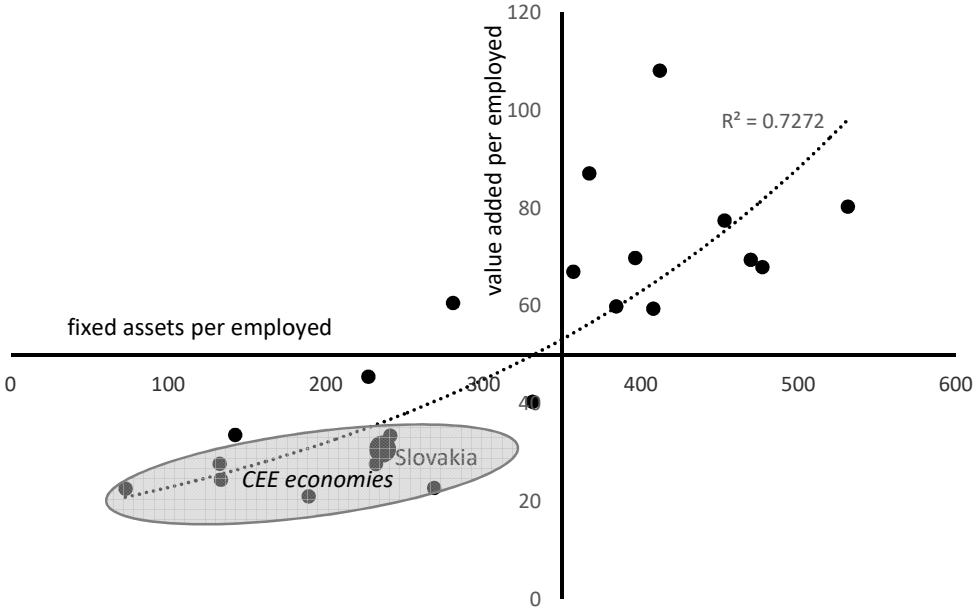
In summary, the increase in capital intensity in the Slovak Republic and CEE countries is in the literature considered to be a decisive factor in economic growth (although differently seen in various periods). The capital formation was mainly in the earlier stages of transformation complicated and distorted by slow depreciation (depreciation did not create a sufficient supply of capital reproduction).

The Problem of Low Capital Intensity Moderated. However, This Process Lagged Behind In Some Areas.

The literature demonstrates the importance of capital expansion and increase in capital intensity for the growth of the Slovak economy. Therefore, the undercapitalization explains the economy underperformance, yet gives the opportunity for higher economic growth and quicker catching-up. Here we focus on the assessment of the undercapitalization and changes in capital to labour ratio. In order to reflect the status of undercapitalization, we utilize the stock of fixed assets per employed, an approach based on national accounts methodology (Box 1). The volume of gross fixed assets is divided by the employment (based on ESA 2010 methodology). Thus, we obtain the ratio capable of international comparison. Its values describe what was the fixed assets (fixed capital) per worker.

the following

The higher levels of fixed assets per employed are linked with higher labor productivity (Figure 1). The CEE economies are concentrated in the lower-left quadrant of the figure where low levels of capital to labor ratio is combined with low labor productivity (labor productivity is expressed as value added per worker).

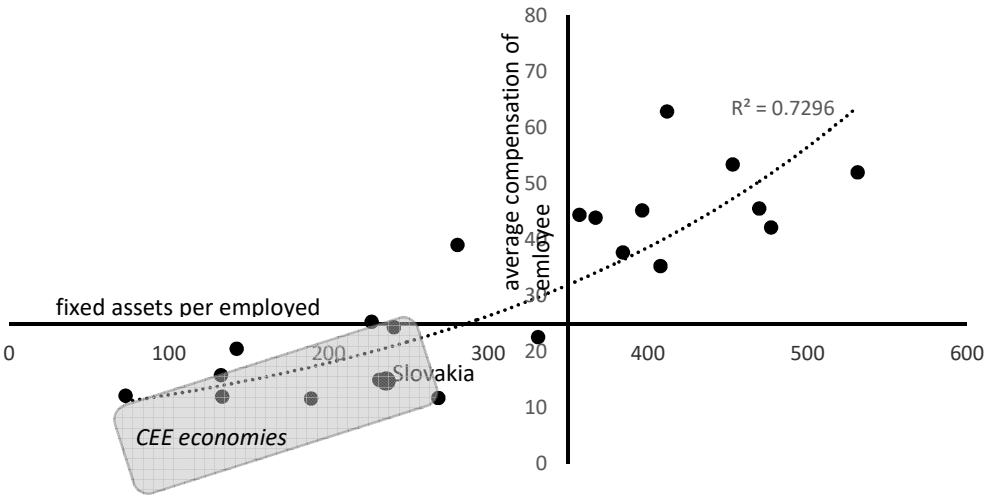


F i g u r e 1:Combinations of fixed assets per employed and value added per employed (thous. EUR, 2013)

Note: CEE- Central and Eastern Europe
Productivity calculated as value added divided by a volume of employed.
Source: Own calculations based on Eurostat- data.

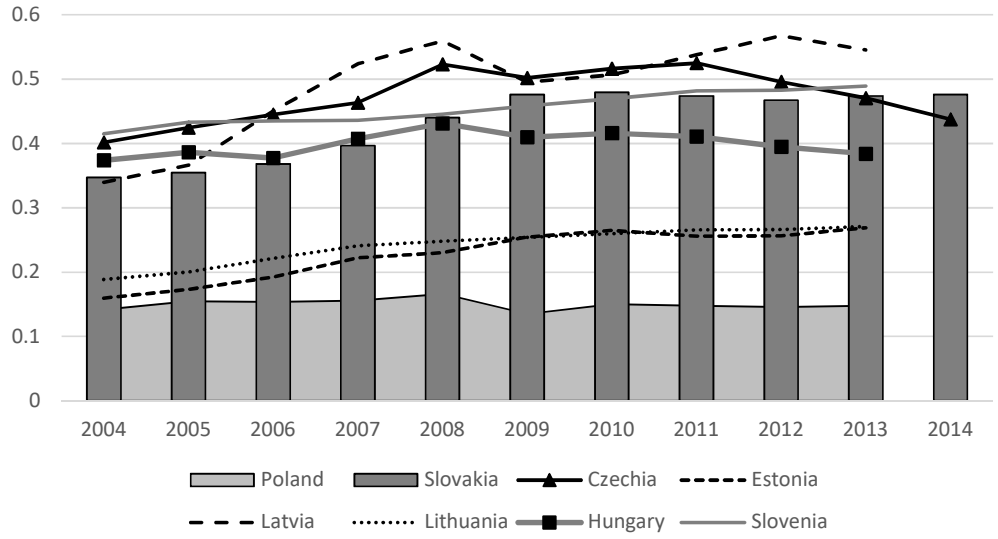
Approximately the same level of determination can be identified in the relationship between fixed assets per employed and compensation of employees level. We deal with the compensations of employees volume divided by the number of employees (by categories of national accounts). The

trend has an exponential character in both cases (Figure 1 and 2). When the fixed assets per employed reach level 350 thousand EUR, there is a significant increase in the labor productivity as well as in average employees' compensation. However, this is only a steady approach. Thus, it is not possible to gain the information on development in fixed assets per employed ratio and recognize if the phenomenon of undercapitalization is diminishing. The development trend is shown using ratios to the group of TOP3 countries. TOP3 group consists of three EU countries with the highest level of fixed assets per employed ratio. Thus, the figure 3 deals with the values of CEE countries in comparison to the three EU countries with the highest ratio of fixed assets per employed by the end of analyzed period.



F i g u r e 2: Combinations of fixed assets per employed and compensation of employees (thous. EUR, 2013)

Note: CEE- Central and Eastern Europe.
Average compensation calculated as compensation of employees (per year) divided by a volume of employees.
Source: Own calculations based on Eurostat- data.



F i g u r e 3: Relative level of fixed assets per employed ratio (TOP3 = 1)

Note:
TOP3- average level of three countries with the highest level of total fixed assets – labor ratio (these countries are Denmark, Austria, and Finland).
Source: Own calculations based on Eurostat- data.

Up to 2009, there was visible a significant catching-up process in the case of SR to the level of TOP3. However, since then, the relative level of Slovakia to TOP3 did not change dramatically. Moreover, the catching-up process in fixed assets per employed ratio was also hampered in some other CEE countries. This might be associated with the general fall in investments during the "troubled" period after the recession.

Now we focus on the relative level of fixed assets to employed ratio – by asset type and by sectors. We follow the typology of fixed assets according to the methodology of national accounts (see Box 1). We utilize from this typology the top three categories: total construction, machinery and equipment and intellectual property products – for the sake of simplicity we refer to them further as "intellectual assets". "Intellectual assets" consist of software, databases, research and development products etc.

In the gross perspective, we observe that the Slovak economy improved its relative fixed assets per employed ratio to TOP3 from 34.7 % in 2004 to 47.3 % in 2013 (Table 1). It implies a substantial convergence. However, this process took place mainly in period 2004 – 2009. Since 2009, the ratio is for SR rather stable at the same relative level with no significant change.

The undercapitalization does not apply to the sectors, which can be described as the newly emerging ones in the former transforming economy. Those are the IT sector, as well as the sector of financial and insurance activities. The level of fixed assets per employed is in these sectors in Slovakia almost at the same level as in TOP3 countries (in 2013). The much less favorable situation is in the "traditional" sectors such as agriculture, manufacturing, trade, transportation, accommodation or food services. The relative position of the Slovak Republic has been better than the average of CEE countries and V4 (V4 average is lowered by very low levels in Poland).

The disaggregation of fixed assets to individual types (see Box 1) has some remarks worthy of mention:

The relative level of machinery and equipment per employed ratio is higher than in other types of fixed assets.

The Slovak economy most significantly lags behind the level of TOP3 countries in the intellectual assets per employed ratio.

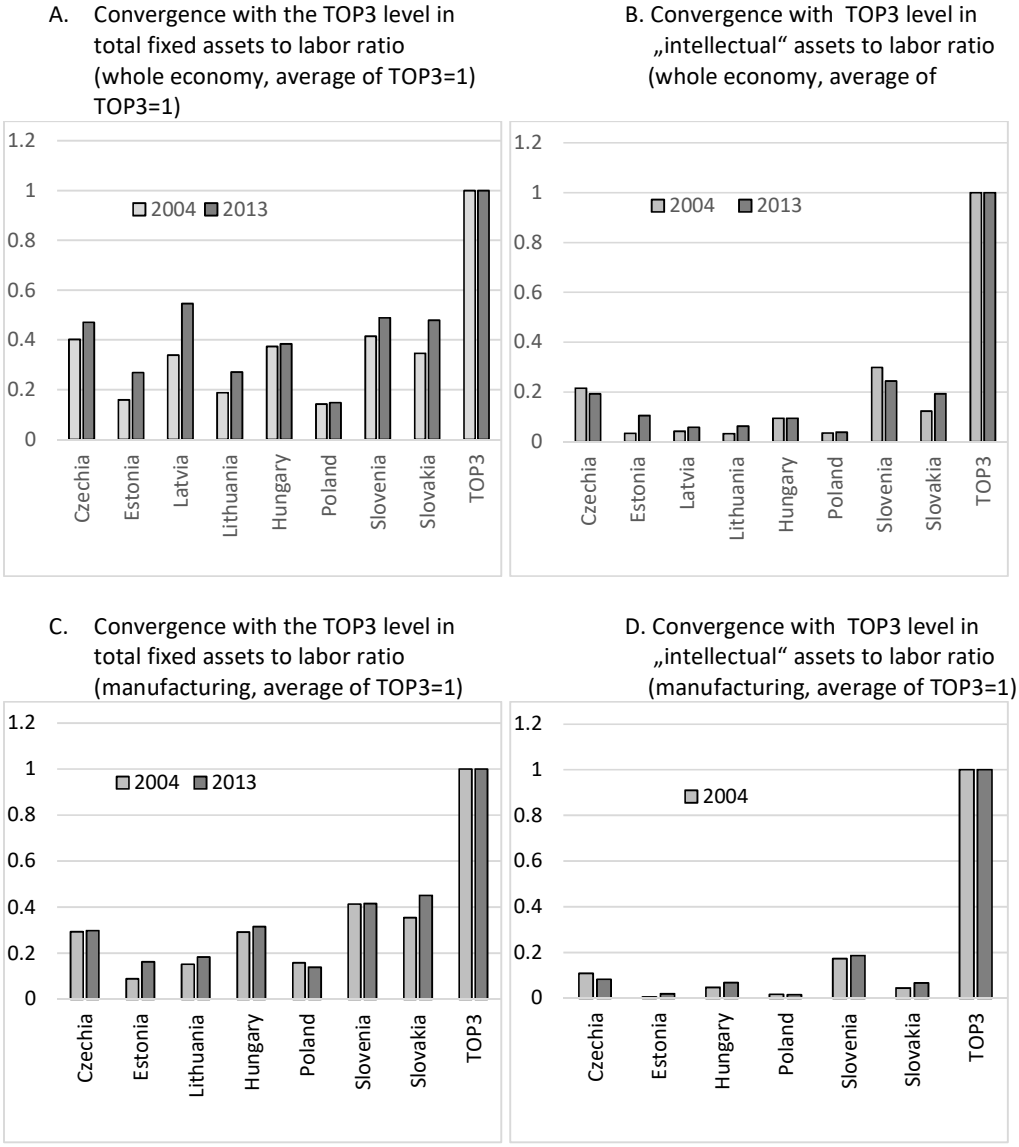
The extreme cases are the intellectual assets per employed ratios in manufacturing and sophisticated services (professional, scientific and technical activities). The Slovak position in these areas is particularly adverse.

T a b l e 1 : Relative level of fixed assets - labor ratio
(relative level of Slovak economy to selected country groups)

	SR to TOP3		SR to CEE		SR to V4	
Total fixed assets	**2004**	**2013**	**2004**	**2013**	**2004**	**2013**
Total economy	34,7	47,3	117,3	124,2	109,8	128,4
Agriculture	21,3	38,7	166,6	198,4	118,4	154,5
Manufacturing	35,9	51,2	161,8	182,4	129,2	149,2
Trade, transport, accomodation...	41,9	59,3	120,2	128,6	108,2	122,7
Information and communication	72,4	95,6	123,9	162,7	99,9	130,9
Financial and insurance activities	70,7	94,7	182,7	209,9	157,8	174,6
Professional, scientific and technical activities....	31,9	47,8	91,8	117,9	85,3	111,7
Public administration, education, healthcare....	53,5	77,1	123,8	143,4	87,8	111,4
Fixed assets- construction						
Total economy	32,8	43,5	107,7	113,8	104,7	122,2
Agriculture	19,7	34,5	181,5	208,4	123,0	153,0
Manufacturing	46,6	63,3	150,8	165,4	131,7	145,0
Trade, transport, accomodation...	73,1	95,1	121,1	131,8	110,1	124,1
Information and communication	74,5	71,9	93,8	106,1	87,2	97,4
Financial and insurance activities	60,0	83,4	150,3	160,3	142,4	152,5
Professional, scientific and technical activities....	83,6	143,8	108,8	164,5	100,6	150,1
Public administration, education, healthcare....	79,3	83,4	112,6	136,4	79,3	105,5
Fixed assets- machinery and equipment						
Total economy	43,7	73,5	141,8	154,3	116,7	140,4
Agriculture	22,9	42,4	141,8	167,2	111,2	150,2
Manufacturing	35,9	69,8	157,5	193,0	116,4	147,4
Trade, transport, accomodation...	44,9	75,1	106,1	110,8	93,3	110,7
Information and communication	81,3	147,7	152,4	213,4	105,7	149,4
Financial and insurance activities	87,7	112,0	206,7	286,9	161,0	200,8
Professional, scientific and technical activities....	14,4	18,1	67,1	71,9	69,0	68,6
Public administration, education, healthcare....	60,1	71,6	178,4	173,6	127,9	134,8
Fixed assets- intellectual property products						
Total economy	12,9	23,0	112,4	157,8	105,3	150,0
Agriculture	30,3	53,2	161,9	288,1	132,1	180,9
Manufacturing	5,2	7,5	88,9	126,6	81,1	118,8
Trade, transport, accomodation...	26,4	50,8	110,7	240,0	144,5	176,6
Information and communication	44,0	79,1	207,4	272,4	125,1	181,0
Financial and insurance activities	65,1	88,1	258,9	284,8	180,4	183,7
Professional, scientific and technical activities....	5,5	7,8	28,6	31,7	23,2	33,5
Public administration, education, healthcare....	18,1	30,5	196,2	246,6	189,7	204,1

Note:
TOP3- average level of three countries with the highest level of total fixed assets – labor ratio (these countries are Denmark, Austria, and Finland).
CEE- Central European economies (average). Data are available for Czech Republic, Estonia, Lithuania, Hungary, Poland, Slovenia, and Slovakia.
V4- Visegrad countries (Czech Republic, Slovakia, Poland, and Hungary).
Source: Own calculations based on Eurostat- data.

In the overall picture of the state of undercapitalization in Slovakia, the weakest element is the level of intellectual assets per employed. The overcoming of the lag in the intellectual assets per employed has been proved to be far less successful than the overall overcoming of the deficit in the total assets per labor. Particularly significant is the lagging in the manufacturing sector – however, the Slovak manufacturing is achieving the best results among the CEE countries with available data. (Figure 4C and 4D). Moreover, the fact that this problem emerged in manufacturing represents an additional problem: the manufacturing performance is considered to be crucial for the competitiveness of the economy.



F i g u r e 4: Catching-up with the most developed economies in assets to labor ratio

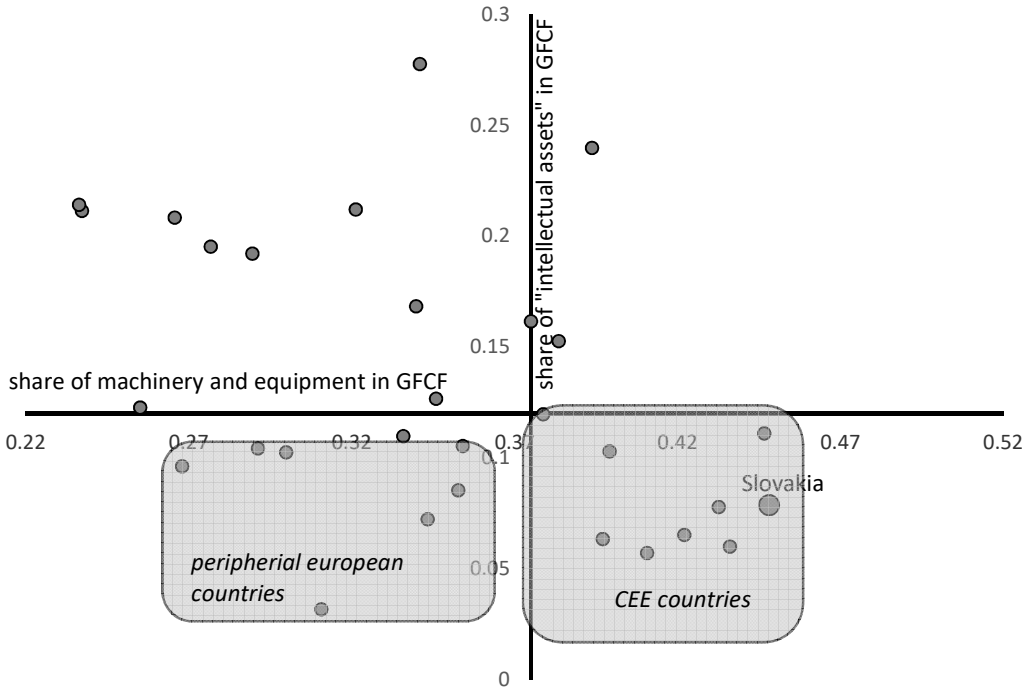
Note:
-TOP3 in figure 1A- an average of the group of three counties with the highest level of total fixed assets to labor ratio. In this case, the three countries are Denmark, Austria, and Finland.
-TOP3 in figure 1B- an average of the group of three counties with the highest level of „intellectual“ assets to labor ratio. In 2004 these countries were Denmark, France, and Finland. In 2013 Denmark, Ireland and Finland.

-TOP3 in figure 1C- - an average of the group of three counties with the highest level of total fixed assets to labor ratio in manufacturing. In 2004 these countries were Denmark, Austria, and Netherlands. In 2013 Denmark, Belgium and Finland.
-TOP3 in figure 1D- an average of the group of three counties with the highest level of „intellectual" assets to labor ratio in manufacturing. In 2004 and also in 2013 this group included Germany, France, and Finland.
Source: Own calculations based on Eurostat- data.

Particularities of Capital Formation Structure in the Slovak Economy

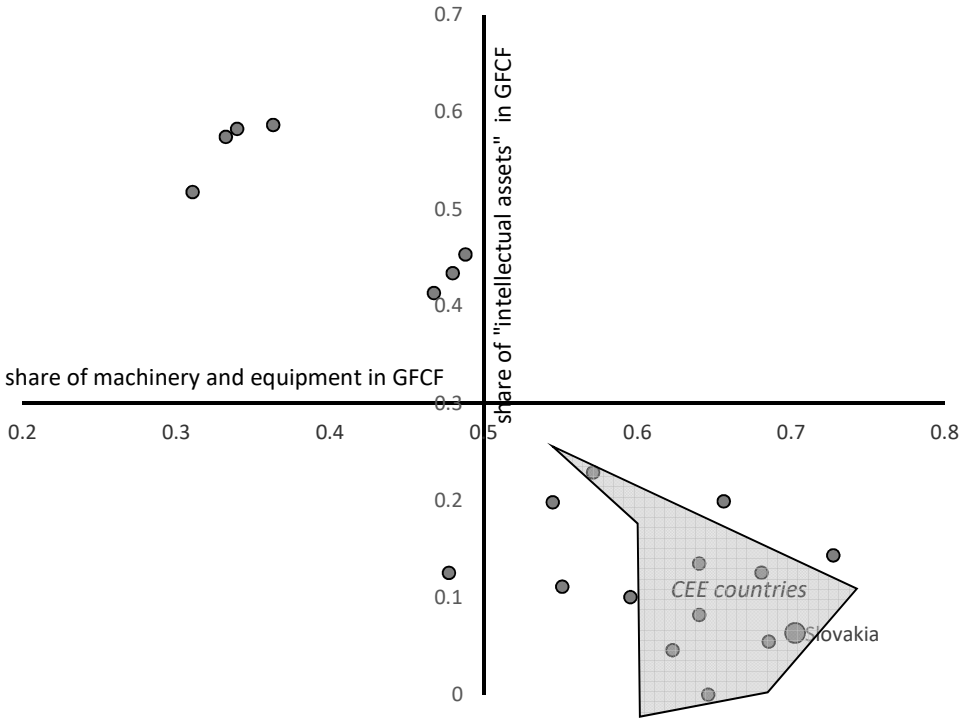
In the following, we deal with the category Gross Fixed Capital Formation (GFCF is a flow variable, while up to this point we analyzed the stock variable). The CEE countries are characteristic by their extremely high share of machinery and equipment in the GFCF and extremely low share of intellectual assets. In Figure 5 (combining the share of machinery and equipment with a share of intellectual assets), the group of CEE countries is located in the lower right quadrant. A notable case is also the group of "peripheral" EU countries (e.g. Greece, Portugal, Spain) where the low share of machinery and equipment in GFCF is combined with a low share of intellectual assets (therefore, the share of constructions is necessarily very high).

If we narrow down our focus just on the manufacturing sector (previously labeled as a specific case in the undercapitalization of the Slovak economy), we find a similar situation, however, with even more "extreme" values (further away from the values in the most developed economies – they are located in upper left quadrant of Figure 6).



F i g u r e 5: Shares of machinery and equipment and „intellectual assets" in gross fixed capital formation

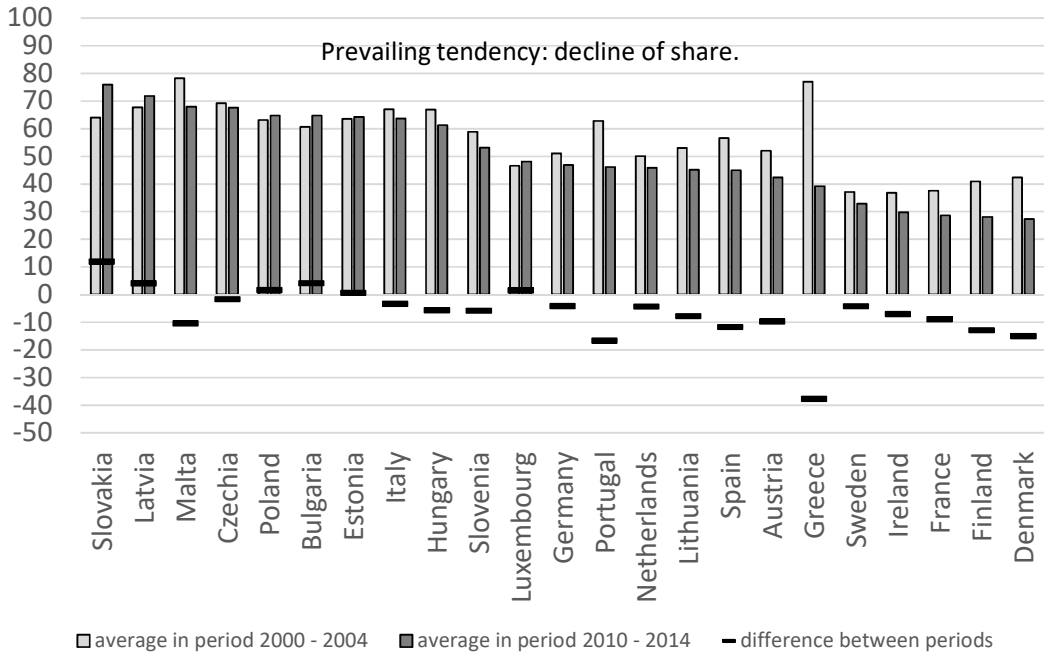
Note: GFCF- gross fixed capital formation
Calculated from indicators in current prices.
Source: Own calculations based on Eurostat- data.



F i g u r e 6:Shares of machinery and equipment and „intellectual assets“ in gross fixed capital formation- in manufacturing

Note: GFCF- gross fixed capital formation
Calculated from indicators in current prices.
Source: Own calculations based on Eurostat- data.

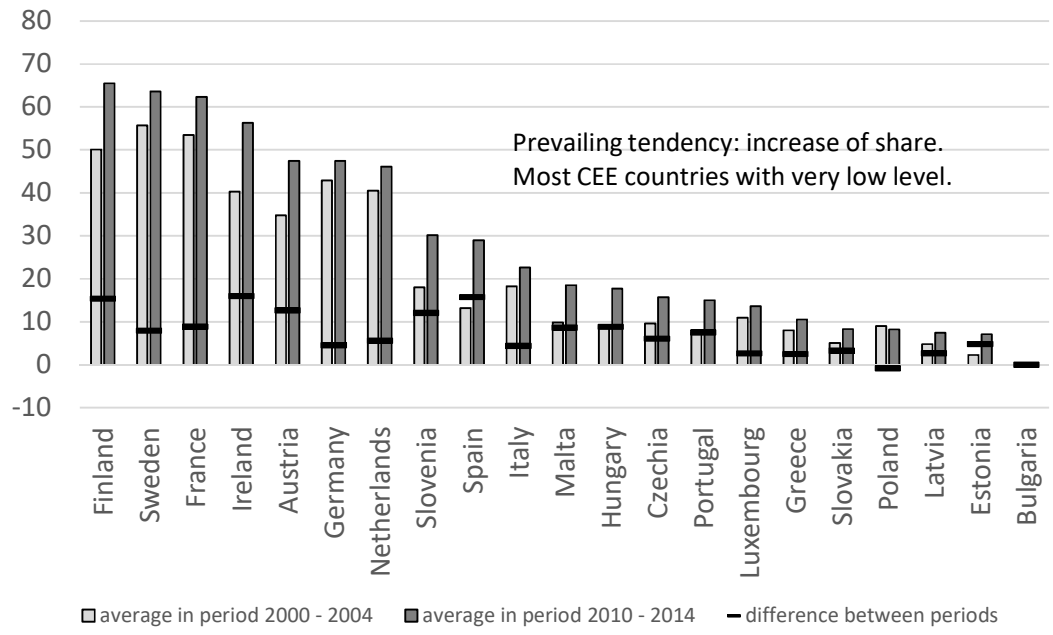
There is an extremely high proportion of machinery and equipment in GFCF in Slovakia. However, the international comparison suggests that there is an overall tendency of decline in the share of machinery and equipment (Figure 7). On the other hand, the share of intellectual assets has increased in majority of countries. The increase of this share was also recorded in the case of Slovakia and other CEE countries, but only with almost insignificant values. Therefore, it is clearly visible that the structural change is taking place in the advanced economies: the investments in machinery and equipment are substituted by investments to intellectual assets (this is in accordance with generally known facts about the investment process). More interesting is rather the fact how the CEE countries strongly deviate from these tendencies. The increase of fixed investments (in CEE) is mainly driven by machines and equipment with the only little contribution of intellectual assets. However, this could be at least partially explained by the fact that optimal conditions for convergence in intellectual assets can be created only after a certain level of machines and equipment is reached.



F i g u r e 7: Structural change of fixed investment in manufacturing: share of machinery and equipment on GFCF.

Note: percentage of total gross fixed capital formation, differences in percentage points
Source: Own calculations based on Eurostat- data.

Also, the investment structure was influenced by the typical fragmentation of production during which the less intellectual demanding activities of mass production developed in the CEE countries (see Garielová, 2008 or Morvay et al., 2015). It is the middle part of production chain, which is characterized by a lower rate of value-added; it has assembly nature or high intensity of physical capital in the form of machinery and equipment. This fragmentation contributed in a certain phase of former transition economies development to expansion of investments in machinery and equipment. The evolving nature of production is necessarily related to the nature of fixed investments.



F i g u r e 8:**Structural change of fixed investment in manufacturing: share of „intellectual capital“ on the gross fixed capital formation.**

Note: percentage of total gross fixed capital formation, differences in percentage points
Source: Own calculations based on Eurostat- data.

Conclusion

The undercapitalization of the Slovak economy has eased during the recent decades. However, it was a very uneven process: the massive increase in labor to capital ratio lasted till the period of 2009 recession, and then it froze. The undercapitalization used as the general characteristics of the economy in the previous period was deeply sectorally differentiated: It was absent in the sectors formed during the post-socialist period. The sectors such as information and communication or financial and insurance services were formed with similar capital intensity as they did in advanced economies. However, the undercapitalization was significantly present in sectors, which have been traditional present in the former socialist economy (agriculture, manufacturing, trade, transportation, accommodation, etc.).

Although the Slovak economy lagged in capital to labor ratio behind the most advanced economies, the position of Slovakia in the CEE countries has been relatively favorable. The total fixed assets per employed ratio increased in Slovakia substantially, however, the level of intellectual assets per employed remained at very low levels. The Slovak economy has particularly improved in one segment of capital intensity: in the machinery and equipment per employed ratio. It appears to be related to the nature of the production which is especially intensive for this component of fixed assets.

In the process of undercapitalization overcoming, the similar structure of fixed capital as may be observed in advanced countries has not been formed yet. The dynamics of machinery and equipment accumulation was particularly high, however, the accumulation of intellectual assets almost negligible.

The “weak spot” in the process of capital to labor ratio convergence is the development of intellectual assets per employed in manufacturing and sophisticated services (professional, scientific and technical activities). The position of the Slovak economy is particularly poor here.

*****

The paper is a part of research project APVV-0750-11, VEGA 2/0182/17 and VEGA 1/0810/15.

References

BORYS, M. M. – POLGÁR, É. K.—ZLATE, A. (2008): Real Convergence and the Determinants of Growth in EU Candidate and Potential Candidate Countries. A Panel Data Approach. Occasional Paper Series No. 86 / June 2008. European Central Bank. ISSN 1725-6534 (online). Dostupné na internete: https://www.ecb.europa.eu/pub/pdf/scpops/ecbocp86.pdf?7e66edb3d4f24f7d346218e122031c1b

DOMBI, Á. (2013): Economic Growth and Development in Cenral and Eastern Europe after the Transformation. Public Finance Quarterly 4/2013. Dostupné na internete: https://www.asz.hu/storage/files/files/public-finance-quarterly-articles/2013/a_dombia_2013_4.pdf?download=true

DOYLE, P. – KUIJS, L. – JIANG, G. (2001): Real Convergence to EU Income Levels: Central Europe from 1990 to the Long Term. IMF Working Paper WP/01/146. Intenational Monetary Fund . Dostupné na internete: https://www.imf.org/external/pubs/ft/wp/2001/wp01146.pdf

GABRIELOVÁ, H. (2008): Konkurencieschopnosť a globálny hodnotový reťazec. Workong Papers EÚ SAV, No. 10, Ekonomický ústav SAV, Bratislava.

MORVAY, K. a kol. (2015): Pohľady na štruktúrne problémy slovenskej ekonomiky III. Ekonomický ústav SAV, Bratislava. ISBN 978-80-7144-253-0 (print), 978-80-7144-254-7 (online).

OKÁLI, I. (2008): Investičná stránka hospodárskeho rastu na Slovensku. Ekonomický časopis. - Roč. 56 č.7 (2008), s.633-648.

NĚMEC, J. – PRACHÁR, I. (2000): Hlavné makroekonomické tendencie v Slovenskej republike po roku 1989 a ich vplyv na očakávaný vývoj. Ekonomický časopis. - Roč. 48 č.1 (2000), s.20-45.

Eurostat: Annual national accounts metadata. Dostupné na internete: http://ec.europa.eu/eurostat/cache/metadata/en/nama10_esms.htm

Spatial Manifestation of Inflation in Terms of the Territorial Heterogeneity of the Russian Economy

I.V. Danilova, South Ural State University, Chelyabinsk, Russia, danilovaiv@susu.ru

A.V. Karpushkina, South Ural State University, Chelyabinsk, Russia, angelvik28@mail.ru

A.V. Rezepin, South Ural State University, Chelyabinsk, Russia, avrezepin@susu.ac

S.V. Aliukov, South Ural State University, Chelyabinsk, Russia, alysergey@gmail.com

Abstract

The article is devoted to the analysis of factors of the inflationary process in Russia. It shows the influence of internal factors on the consumer price index, such as price expectations, the amount of money supply, per capita incomes of the population, as well as external factors: exchange rate, foreign trade openness. It is substantiated that in the conditions of heterogeneity of economic space, differentiation of territorial involvement in trade and economic relations in large federal states, there are differences in the price reaction of the regional economies. The depreciation of the ruble, as a macroeconomic factor, in regions with a high and low level of foreign trade dependence has spatial differences in price manifestations. The principles of coordination of actions of the federal center and regions in the implementation of the stabilization policy are formulated, allowing taking into account the external economic differences and the reaction of regions to changes in macroeconomic indicators.

Keywords: inflation; monetary policy; currency crisis; macroeconomic instability; territorial differentiation.

Introduction

The development of a theoretical model of inflation processes is the subject of many scientific papers. In the theory of inflation, the main problems are focused on the identification of factors and the driving forces of inflation in the country, which facilitates the choice of instruments and methods for conducting monetary policy to ensure price stability. Theoretical and practical questions of modeling and regulation of inflation processes are devoted to the works of R.J. Barro and D.B. Gordon (1983), C.A. Sims (1992), M. Woodford (1994), K. Aoki (2003), B.S. Bernanke (2005), J. Boivin, P. Eliasz and others. In publications J.B. Taylor (1999), J. Galí (2014) and R. Gupta (2017), attention is paid to the evaluation of factors and the mechanism for implementing anti-inflationary policies. The specific features of inflation processes in Russia, the impact of external economic factors and structural changes on the money sector of the economy are devoted to: A.O. Baranov (2015), E. Deryugina (2016), S. Tabata (2016), A.V. Ramazanov (2016), E.S. Alpatova (2016), etc. At the same time, insufficient attention has been paid to the problems of inflation and ensuring price stability in the conditions of spatially heterogeneous economic systems, the specifics of the factors determining the level of prices and the reaction of the regional economies to foreign economic factors and changing institutional conditions. In our opinion, the study of inflation processes in Russia requires the inclusion of both macroeconomic factors affecting the overall price level and the meso level factors associated with territorial socioeconomic characteristics, which together determine the variability of regional susceptibilities and differences in the level of price stability.

External and internal factors of inflation processes in Russia

Inflation is traditionally understood as a sustained, steady decline in the purchasing power of a monetary unit, manifested in the growth of the general price level. Influence of inflation is ambiguous: insignificant inflation promotes increase in economic activity, stimulates growth of GNP and promotes economic development. A high level of inflation has negative consequences for the standard of living of the population, the structure and magnitude of real incomes, and the activity of business processes. Because of this, inflation is an object of monitoring and one of the goals of economic policy with its significant manifestations.

The development of stabilization measures and the mechanism of active actions depends on an understanding of the factors that induce inflation. Depending on the key factors generating a rise in prices, there are: a) inflation, inspired by the monetary or real sector (a wide range of determinants, such as monetary, demand inflation, cost inflation); b) inflation, determined by internal, endogenous factors and external, exogenous for the country; c) inflation associated with objective events (for example, within the political cycle, economic shocks, etc.) or subjective, such as household expectations; d) system factors (macroeconomic nature) that determine the average, aggregated price level in the country and regional inflation, which is caused by meso level factors that generate a lot of price variations. Identification of the type of inflation is essential for the choice of stabilization policy instruments, as well as regional strategies for maintaining stability in the face of increasing external economic instability.

To assess the impact of inflation factors on the general price level in Russia, we will conduct a study of the statistical dependence of the consumer price index adjusted for seasonality (CPI) with the following internal and external indicators reflecting the effect of the relevant factors:

a) expected (previous) value of the consumer price index adjusted for seasonality;
b) growth rate of the money supply (M2 aggregate in the national definition), adjusted for seasonality;
c) growth rate of per capita income of the population, adjusted for seasonality;
d) growth rate of the weighted average US dollar rate adjusted for seasonality.

The alignment of the series of data was carried out using the Hodrick-Prescott filter, the statistical dependence was determined based on the correlation coefficients of the monthly statistics of the indicators for the period from January 2006 to January 2016 with a lag of 1 to 36 months, the source of which was data from the Statistical Bulletin of the Bank of Russia. The results of the analysis are shown in Figure 1.

According to the results of the analysis, a strong statistical dependence (the absolute value of the autocorrelation coefficient exceeds 0.7) between the consumer price index in the current period and the consumer price indices taken with a shift persists for 12 months, which indicates a high value of inflationary expectations and a significant inertia of changes in System of prices.

The change in the volume of money supply is accompanied by moderate changes in the consumer price index only after 12-18 months, which indicates the high extent of the transmission mechanism of monetary policy in Russia.

The change in the per capita income of the population is also accompanied by changes in consumer prices with a lag of at least 6 months, the closest relationship between these indicators is observed with a lag of 14 months, this indicates that Russian households form their consumer decisions on expenditures based on the possibilities of permanent or Long-term consumption, rather than from the level of current income.

The high statistical dependence between consumer prices and the weighted average US dollar rate for the first 6 months indicates that foreign economic shocks and changes in the value of imported goods are

instantly reflected in the dynamics of consumer prices. This is an objective factor of the external nature from which any developing country that has a monopoly in both exports and imports is poorly protected.

In our opinion, the weighty influence of the dollar rate can be explained by three effects:
1) change in the exchange rate has a direct effect on the value of the consumer basket, due to the high dependence on imports in the consumption of the population of Russia;
2) increase in prices for imported goods leads to a shift in the share of demand for consumption of domestic products, which in the absence of a corresponding increase in supply in the short term provokes an increase in the price level;
3) increase in the exchange rate forms expectations of price increases among consumers and producers, which stimulates the expansion of demand, the reduction of supply and increases the overall level of prices in the country.

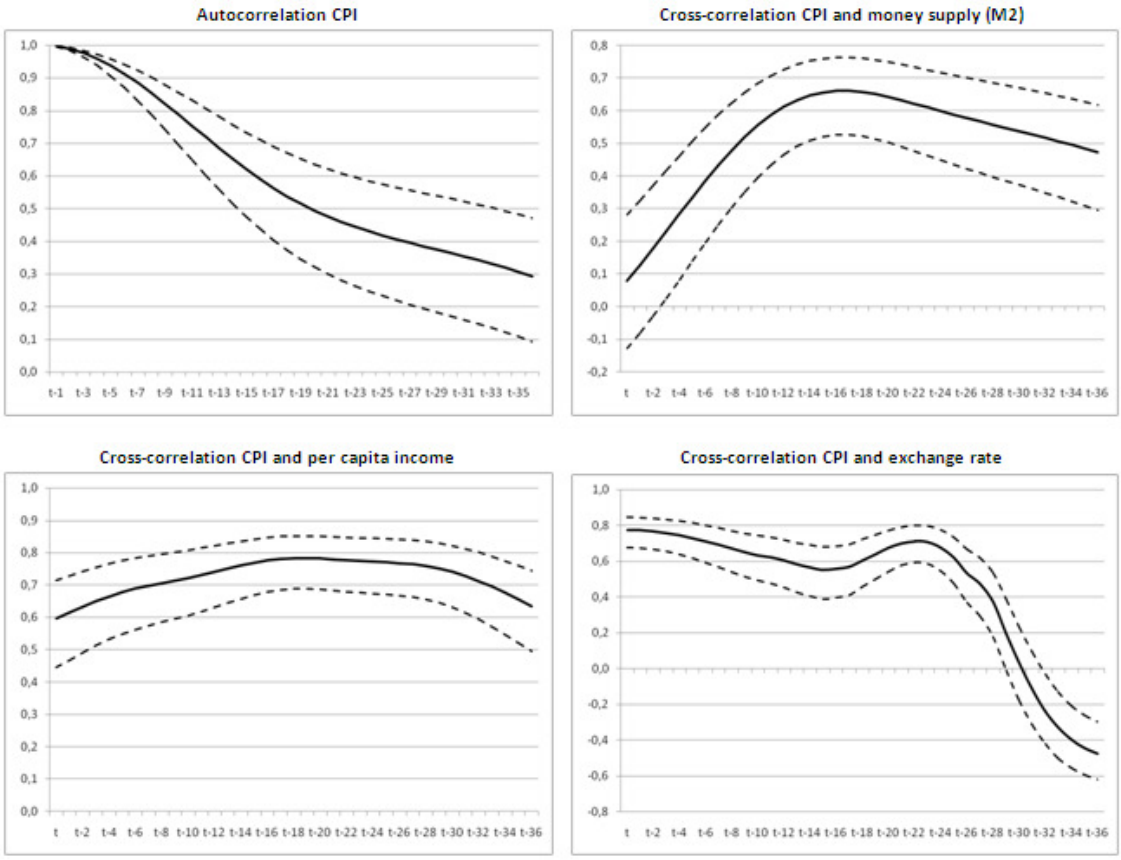


Fig. 1: Analysis of CPI and inflation factors interdependence.

Based on the information on time lags providing the closest relationship between the dynamics of consumer prices and the dynamics of the indices of the components of the inflationary process, a multiple regression model has been created that makes it possible to determine the contribution of individual factors to the formation of a common price level in each of the periods of inflationary processes in Russia under consideration. In our opinion, the inertial component of inflation should be excluded from the factorial distribution, since inflation expectations are formed under the influence of changes in per capita income, money supply and exchange rate dynamics and the preservation of this component is likely to

lead to a shift in the estimates of the significance of other factors. The results of the factor analysis are shown in Figure 2.

In each of the periods under review, the factors have different significance, so the reduction in the growth rates of consumer prices in 2009-2011 in many respects was determined by the decrease in the growth rates of the money supply (as confirmed by the relevant studies of Russian authors (Tabata, 2016; Akalin, 2015; Golovnin, 2016; Grigoryev, 2015), and the impact of the exchange rate turned out to be the maximum in the periods of the 2008 and 2014 crises. Currently, foreign economic factors and the dynamics of the currency rate have a significant impact on the state of the price system in. During the period 2015-2016 there was an unprecedented volatility of the US dollar rate in the Russian foreign exchange market, which generated differently directed impulses to change the general price level. The problem of achieving macroeconomic stability and exit from crisis processes is complicated by the fact that the economy of large federal states typically has high socio-economic differentiation in the regional context. This means that aggregated indicators like "average hospital temperature" do not give an idea of the actual processes, respectively, of the required changes, a combination of the center's tools and regions necessary to accelerate the yield to the price stability of the country as a whole. Individual regions show different reactions to changes in the parameters of the functioning of the national economy.

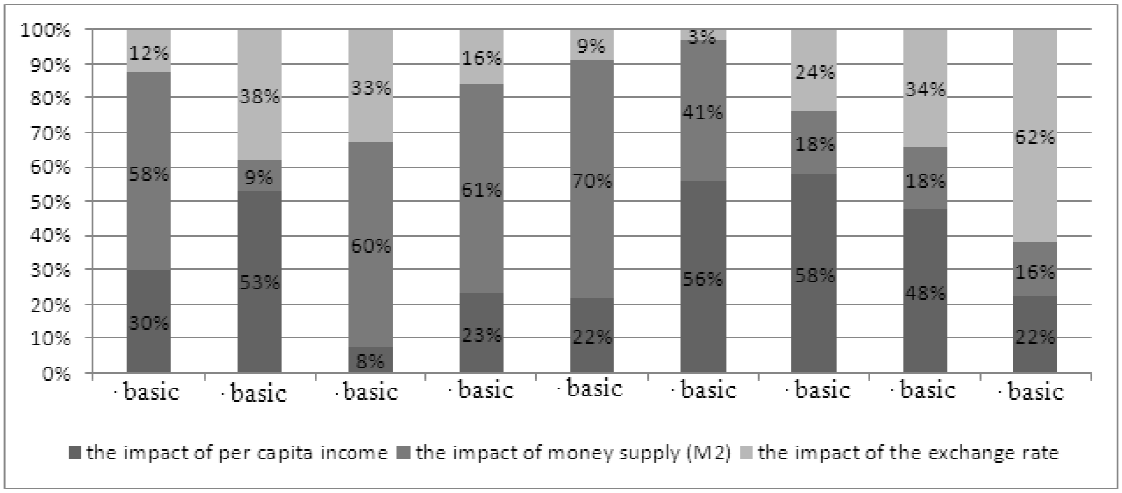


Fig. 2: Analysis of the impact of factors on inflation in Russia.

Regional factors of inflation processes in the Russian Federation

As it is known, the Russian Federation is a large and spatially heterogeneous economic system, so macroeconomic factors have a specific manifestation at the level of the territories. The authors formulated the hypothesis that the most important external factor for the dynamics of the level of consumer prices (it is revealed that it is the exchange rate determined by the system of external economic relations of the country) in different ways affects the price stability in the regions, which is largely determined by their foreign trade dependence.

To test this hypothesis, the subjects of the Russian Federation were typologized according to the level of external economic openness (dependence). To separate the sample into clusters, the Ward's method of clustering was used, the metric was the square of the Euclidean distance, the cluster analysis was based on the external economic indicators of 85 constituent entities of the Russian Federation for 2015. As parameters of the difference in the level of external economic dependence of regional economies, the following were determined: 1) foreign trade quota (the ratio of the arithmetic mean value of the value of

exports and imports to GRP in percent); 2) import quota (the ratio of the value of imports to the value of GRP in percent); 3) the share of imports from non-CIS countries in total imports in percentage terms.

Based on the results of the analysis, it is justified to identify four groups of RF subjects from the "low" (cluster 1 - the Altai Republic, Voronezh, Kursk, Omsk regions, etc.), "below average" (cluster 2 - Ivanovskaya, Kurgan, Tula, Chelyabinsk regions, etc. .), "Above the average" (cluster 3 - Krasnodar and Krasnoyarsk Territories, Novosibirsk, Sverdlovsk regions, etc.) and "high" (cluster 4 - Tyumen Region, Moscow, St. Petersburg, etc.) foreign economic openness (Dependence). The average values of clustering parameters and consumer price indices are presented in Table.

Table1: average values of indicators for clusters of subjects of the Russian Federation, divided by the level of external economic dependence

Cluster	Index	Foreign trade quota, %	Import quota, %	The share of imports from non-CIS countries in total imports, %	Consumer price index, %
Cluster1 (13 regions)	Average value	9,02	7,79	39,11	111,46
	Means quare deviation	7,65	8,98	15,58	1,87
Cluster2 (21 regions)	Average value	10,92	8,35	68,27	111,58
	Means quare deviation	9,56	7,18	8,52	2,03
Cluster3 (38 regions)	Average value	12,39	9,27	89,47	112,88
	Means quare deviation	61,35	8,47	6,51	1,84
Cluster4 (13 regions)	Average value	46,01	43,15	91,53	113,98
	Means quare deviation	8,25	26,28	8,57	1,98
RussianFederation (85 regions)	Average value	15,54	12,89	76,46	112,87[1]
	Means quare deviation	14,27	19,99	20,66	2,29

Analysis of consumer price indices for clusters showed that in 2015 the appreciation of the US dollar was affected in different ways in regional consumer price indices: the largest average consumer price index corresponds to cluster 4, which includes regions with "high" external economic openness (dependence); The smallest average value corresponds to cluster 1, which includes regions with a "low" openness (dependence). Thus, the external economic openness of territorial entities affects the projection of changes in the exchange rate on regional consumer prices. It is logical to expect differences in the reaction of regional economies to external economic shocks experienced by the Russian economy. This necessitates the development of conceptual approaches to the coordination of federal and regional stabilization policy measures with respect to the principles of regulation (Blanchard, 2001; Danilova, 2014).

Conclusion

The principles of the stabilization policy in federal states require a combination of regional regulation and the actions of the center, namely: 1) the principle of diagonal coordination of actions of federal and regional government structures, which implies the compatibility of actions of regulating bodies at different levels in the subject areas of stabilization, which allows adapting the center's measures to specific spatial conditions of their implementation; 2) the principle of effective market classification, the implementation of which supposes the addition of federal measures by the regional to reduce the negative

[1]Average value of the consumer price index for goods and services in the Russian Federation in 2015 - 112.9%.

consequences, which in the case of a price stabilization policy is manifested in the braking of the gross regional product; 3) the principle of combining the Strategy for Social and Economic Development of the Russian Federation with the Regional Development Strategies, taking into account the level of external economic openness and differences in susceptibility to shock impacts.

In our opinion, the application of these principles will allow to take into account the heterogeneity of the economic space of Russia and build a system for coordinating the interaction of the federal center and regions that ensures the effectiveness of the stabilization policy and non-inflationary and sustainable development of the economy of the regions and the Russian Federation as a whole.

Acknowledgment

The work was supported by Act 211 Government of the Russian Federation, contract № 02.A03.21.

References

Akalin, G.I., Prater, E.L. (2015). The global crisis of the late 2000s and currency substitution: A study of three Eastern European economies Russia, Turkey and Ukraine // Journal of Central Banking Theory and Practice, vol. 4, issue 2, pp. 5–22.

Alpatova, E.S., Khusainova, S.V. Economic crisis in russia: Structure,causes, manifestations of the overcoming // Journal of Economics and Economic Education Research, vol. 17, issue 2, pp. 185–191.

Aoki, K. (2003). On the optimal monetary policy response to noisy indicators // Journal of Monetary Economics, vol. 50, issue 3, pp. 501–523.

Baranov, A.O., Somova, I.A. (2015). Analysis of main factors of inflation dynamics in post-Soviet Russia. Studies on Russian Economic Development, vol. 26, issue 2, pp. 110–123.

Barro, R.J., Gordon, D.B. (1983). Rules, discretion and reputation in a model of monetary policy // Journal of Monetary Economics, vol. 12, issue 1, pp. 101–121.

Bernanke, B.S., Boivin, J., Eliasz, P. Measuring the effects of monetary policy: A factor-augmented vector autoregressive approach // Quarterly Journal of Economics, vol. 120, issue 1, pp. 387–422.

Blanchard, O., Shleifer, A. Federalism with and without political centralization: China versus Russia // IMF Staff Papers, vol. 48, issue SPEC. ISS., pp. 171–179.

Danilova, I.V., Rezepin, A.V. Coordination of federal and regional actions of stabilization policy for heterogeneous economic area // Economy of Region, issue 2, pp. 69–78.

Deryugina, E., Ponomarenko, A. (2016). Money-based underlying inflation measure for Russia: a structural dynamic factor model approach // Empirical Economics, pp. 1–17.

Galí, J. (2014). Monetary policy and rational asset price bubbles // American Economic Review, vol. 104, issue 3, pp. 721–752.

Golovnin, M.Y. (2016). Monetary policy in Russia during the crisis // Zhournal Novoi Ekonomicheskoi Associacii, vol. 1, issue 29, pp. 168–174.

Grigoryev, R.A., Kramin, M.V., Kramin, T.V., Timiryasova, A.V. Inequality of income distribution and economics growth in the regions of Russia in the post-crisis period // Economy of Region, issue 3, pp. 102–113.

Gupta, R. (2015). Forecasting inflation in an inflation targeting economy: structural versus nonstructural models // Applied Economics, vol. 49, issue 24, pp. 2316–2321.

Sims, C.A. (1992). Interpreting the macroeconomic time series facts. The effects of monetary policy // European Economic Review, vol. 36, issue 5, pp. 975–1000.

Tabata, S. (2016). Factors underlying inflation in Russia 2000–2015 // Eurasian Geography and Economics, pp. 1–18.

Taylor, J.B. (1999). The robustness and efficiency of monetary policy rules as guidelines for interest rate setting by the European central bank // Journal of Monetary Economics, vol. 43, issue 3, pp. 655–679.

Ramazanov, A.V. (2016). To the question about economic policy in Russia // Journal of Economics and Economic Education Research, vol. 17, issue 2, pp. 163–168.

Woodford, M. (1994). Monetary policy and price level determinacy in a cash-in-advance economy // Economic Theory, vol. 4, issue 3, pp. 345–380.

Planning of Electrical Installation Execution Project Using the Module Methodology of Large Project Management Based On Critical Chain Concept

Katarzyna Marek-Kolodziej, Opole University of Technology, Department of Project Management, Opole, Poland, k.marek-kolodziej@po.opole.pl
Iwona Lapunka, Opole University of Technology, Department of Project Management, Opole, Poland, i.lapunka@po.opole.pl
Dominika Jagoda-Sobalak, Opole University of Technology, Department of Management and Production Engineering, Poland, d.jagoda@po.opole.pl

Abstract

Efficient project-type order management is of an increasing importance in manufacturing and service enterprises work. It is a result of the fact that market competitive advantage depends of efficient order execution. Enterprises managers seek therefore new solutions in project type orders management. One of the methods may involve an application of methodological approach to projects management, in particular in the application of module methodology of large projects management based on critical chain concept. The methodology has been implemented in project planning and execution of electrical installation execution project in a water treatment station. Module type of methodology has facilitated selection of appropriate project planning modules. Selected elements from tactical and operational modules group have been applied, which brought significant advantages for the company. The project was successful and the project efficiency was higher than initially planned.

Keywords: projects management, large projects, module methodology, critical chain concept

Introduction

Efficient large projects planning and execution requires application of appropriate project management methodologies. Methodological approach to project management constitutes an ordered method of project planning, execution and inspection, characterized by certain formalization, discipline and structural activity. Such approach to projects management is based on: a specific project management methodology, gradually collected experience, and minimum intuition (Wirkus, 2014).

Projects management methodology can therefore be defined as a logical and coherent set of instructions for projects management measures taking method, which facilitate obtaining certain projects aims within a time and cost planned (Trocki, 2009). Projects management methods include: (1) basic project planning, execution and inspection principles, (2) methodology modes governed by ordered processes and procedures, (3) organization solutions, ordering principles of work, scope of duties and authorizations of persons involved in the project execution and (4) methods and techniques of project management support. The most popular methodologies of project management include: PRINCE2, TenStep. PMBOK is also applied in practice, being a guide for a Project Manager. It includes knowledge and the best commonly acknowledged solutions for project management, collected and published by the Project Management Institute (Strojny, Szmigiel, 2015, PMI, 2013, Rehacek 2016).

Project maturity is under extensive focus, which is also reflected in methodologies, as the higher the enterprise project maturity the higher is the importance of methods and methodologies of project management in project execution. Similarly as enterprises project maturity evolved, the project management methodologies developed as well (Łapuńka, Pisz 2014, Spałek 2014, 2016). We also currently speak about projects management methodologies maturity. The level of methodology

maturity is dependent upon the company's needs, and knowledge, experience and abilities of project team members.

There are more and more attempts in literature to find methodologies which facilitate flexible selection of elements for project planning and execution. The methodologies have been named component methodologies (Gasik, 2015). The component methodologies are constructed so that the Project Manager could select elements he needs (components), e.g. scope and time management procedure, and reject the rest of procedures. This type of methodologies shall provide the Project Manager a set of components, including a procedure, knowledge and other components, necessary for project planning and execution. A well-constructed component methodology must take into consideration all components of lower maturity level components, i.e. elements of methodologies focused on function, process and knowledge (Gasik, 2015).

The module methodology of large projects management described in the paper, based on critical chain concept is a kind of component methodology, which has been constructed for the needs of planning and execution of large production and service projects. The article presents a general structure and premises of individual methodology with a practical example of its application in industry. Module methodology has been applied in planning and execution of electrical installation execution project in a water treatment plant.

Guidelines for Large Projects Management Module Methodology Based On a Critical Chain Concept

Large projects management module methodology based on a critical chain concept has been constructed for the purpose of execution of complex, unique, strategic production and service projects. It facilitates selection of appropriate elements for planning and execution of large projects, therefore it can be assigned to component methodologies. It includes elements of methodology open to functions, as it is based on a critical chain concept. It presents a method of activity time estimating, using accumulated opposite of normal disintegration and allows calculating time buffers size, using fuzzy sets. The methodology includes also elements of process methodologies, as the individual modules include all project management processes. Additionally, the methodology has been developed on the basis of research conducted among manufacturing-service enterprises involved in large projects, which enhances it with values assigned to knowledge oriented methodologies. The project management process has moreover been extended by a working stage, which frequently occurs in large projects, as indicated by UNIDO methodology (Behrens, Hawranek, 1993). The methodology described can be applied both as complex support, using all modules, or may implement only selected modules of large projects management accordingly. This facilitates flexible selection of modules for planning and execution of a large project by the Project Manager (Marek-Kolodziej, Lapunka, Paszek, 2016). The method consists in total of 48 modules, divided into three groups: strategic, tactical and operational. Each of the modules has been marked by two letters and a number, which mean:

- the first letter describes a method of management in a project: S – strategic management, T-tactical management, O – operational management,
- the second letter determines a parameter of an iron project triangle: Z – scope of project, C – project time, K – project cost
- a number determines project execution stage: 1 – initiation stage, 2 – planning stage, 3 – execution stage, 4 – closing stage, 5 – exploitation stage.

The methodology described includes all project management stages. Pre-project, planning, execution, completion and exploitation stages have been included in it. The levels of project management have been extended by tactical level, which in large projects management occurs most frequently, when the project is executed separately, and tasks are performed by subcontractors at individual project stages. It moreover includes a process of inspection management at each of management stages. The method also suggests new solutions in large projects management, which refer to the processes of:

1. *Project team forming* – project team constitutes the most important body in projects planning and execution, as according to The Standish Group (2013), 13% of a project success depends on the competencies of project team members and following 15 % on the Project Manager. Module methodology focuses in particular on the roles performed by the members during team works. Research shows, that efficiency and effectiveness of a project team depends not only on knowledge, competencies, clearly determined relations, conformity of interests, but also on roles incorporated by the team members themselves (Chomicz, 2015; Gellert, Nowak, 2008; Kołodziejczyk-Olczak, 2013; Rutka, Wróbel, 2012; Scheurer, Ribeuro, 2009). Therefore, during team forming process and at the turn of forming and adjustment stages, it is advised to do the Belbin test, to check of team members represent adequate variability of roles, as only such a team is able to work efficiently (Belbin, 2010; Marek-Kołodziej, Łapuńka 2015).

2. *Estimated tasks duration times* - to estimate tasks duration times in the methodology described, the accumulated opposite of normal disintegration has been applied, with maintaining of 0,5 probability of timely execution of the project. This is the way of determining task aggressive times.

3. *Project programme* – project programme is established pursuant to the guidelines of critical chain method. The process includes: (1) determining relations between tasks, (2) determining of critical chain, (3) location of time buffers in programme, (4) determining of time buffers size, (5) introduction of time buffers into programme, (6) verification of critical chain location and (7) determining of time tolerances for individual stages of a project or sub-project. The methodology presented shows step by step how to build a project programme pursuant to the assumptions of critical chain concept. Method of time buffers location determining has also been presented (Goldratt, 2009; Marek-Kołodziej, Skomudek, 2015).

4. *Determining of time buffers size* – triangular fuzzy numbers have been applied for determining of time buffers (of a project and supporting one), (Marek-Kołodziej, Łapuńka, 2014). Buffers size calculated on the basis of triangular fuzzy numbers guarantees probability of 0,9 for project execution on time, which is not guaranteed by other calculation methods determined in literature (Marcini, Ruggeri, Caron, 2008; Patrick, 2014; Tenera, 2008).

5. *Project inspection and monitoring* – project inspection involves inspection and monitoring of the scope, programme and budget of a venture. Project programme inspection is performed according to time buffers use (project and supporting ones). Project Manager monitors at least once a week the progress of programme execution, dividing buffer into three zones: (1) green (monitoring), (2) yellow (planning), (3) red (performance). Project budget inspection takes place at least once in two weeks. Project budged inspection according to module methodology applies a method of EVM (Earned Value Method).

6. *Evaluation of project efficiency* – NPV (Net Project Value) or ROI (Return on Investment) shall be applied for project efficiency evaluation. The evaluation shall be conducted at the stage of the project finishing, when the company is the project contractor, but will not use the project product, or at the stage of project exploitation, when the enterprise is a contractor and recipient of the project product.

Apart from the new solutions listed above, the module large projects management methodology includes a description of processes which refer to risk, quality, communication and project interest parties management. Tools supporting selected processes have been elaborated additionally. Seven spreadsheets have been attached to the methodology, supporting planning and execution of large projects, according to module methodology, which are designed for: (1) project chart establishing, with specifying of the project risk, (2) NPV index size determining, (3) estimating the tasks time, (4) project budget establishing, (5) determining of time buffers size, (6) monitoring of buffers and (7) calculating the project value.

Large projects management module methodology based on critical chain concept is established so that the Project Managers and enterprise managers using it could choose proper modules for large project planning and execution. There are several options of modules selection, as presented in table 1.

Table 1: Possibility of application of large projects management module methodology based on the critical chain concept

No.	Project type	Name of modules/ group of modules
1.	A project as a whole is executed by one enterprise. At the same time the product of the project will be used by a given enterprise.	Application of all modules of the methodology.
2.	Project is executed as a whole by one enterprise, but its product will be used by another organization.	Application of all modules of the methodology except for part of modules which refer to the project use.
3.	Project is partly executed by a company and partly subcontracted.	Depending on the part ordered to the contractor: 1. If the enterprise supervises the project – a group of strategic modules is to be applied. 2. If the enterprise supervises and manages the project tactically, i.e. supervises and manages execution of project stages or subprojects, and the rest is subcontracted – groups of strategic and tactical modules are applied.
4.	Organization is a subcontractor and executes a group of works or specific tasks.	Application of operational modules group.
5.	Organization is a subcontractor and performs a specified stage of a project or sub project.	Application of tactical and operational modules.
6.	Organization has its own project management system and needs support in a specific part.	Any module may be applied separately, without implementing the whole methodology.

Source: own elaboration

The module methodology established can be applied as a whole, or selected modules can be implemented, e.g. if a project is executed partially be an enterprise and partly by its subcontractors, a group of strategic and tactic modules can be applied. Project Manager has a possibility to select proper tools for large projects management in the enterprise.

Characteristics of an Enterprise and a Project Under Execution

The enterprise described works in Opole District, and performs industry automatics projects since 1997. The company provides services in design and implementing of automation and industry systems of electrical installations for: technological installations, production halls and office buildings, machinery and machinery and processing devices, power supply objects, water treatment plants and environment protection installations.

The company executes automation systems using modern controllers of SIEMENS, GE Fanuc or other companies indicated by a client. The company also executes apparatuses and tools based on products of renowned manufacturers and suppliers. Additionally, the automation systems include execution of drive control, power supply distribution cabinets and in company workshops, and systems of objects pneumatics. The electrical installations are designed and executed by the company using modern technology and tools of the most renowned manufacturers.

The core of the company are several engineering and technical employees, with several years of experience in technological processes automation and control systems, with branch staff with licences for designing and execution of electrical installations.

The orders performed by the company constitute projects, because they must be completed within time set, at cost determined and give a product according to the customer's requirements. The orders are moreover unique and require individual approach in their planning and execution.

The company most frequently performs several orders simultaneously, which causes that persons responsible for the orders execution planning meet problems in duration time estimating, using the same resource in several orders at the same time. Planning of an order for electrical installation in a water treatment plant involved selecting of module methodology for large projects management, based on the critical chain concept. It results from the fact that the method uses an innovative approach for estimating the tasks duration times and use of resources in the project.

The project (order) for the electrical installation execution in the water treatment plant involved execution of ten main tasks: (1) internal power supply, control and measurement installations in the building, (2) assembly of power supply-control distribution station for the technological system, (3) assembly of power supply-control distribution station (RTOO), (4) internal power supply, control and measurement installations outside, (5)internal power supply, control and measurement installations in the filters building, (6) lighting system in ozone room, (7) assembly of power supply-control distribution station in ozone station, (8) internal installation of electrical power supply and control, (9) levelling installations.

Implementing of module methodology based on the concept of critical chain concept in practice

According to the client's programme the project was due to start no sooner than on 7.11.2016 and be completed no later than on 28.04.2017. The project value was about PLN 1 million, and expected return on the project is of 14,60%. The value has been determined by the company manager, at the assumption, that the project planned cost increases at most by 11 %.

The company performing the project has got a Quality Management System implemented, including a procedure named: "Services execution" adjusted to planning and execution of orders in a company. Modules of the methodology, indicated a need for implementing its following elements, included in the group of tactical management: (1) „T.Z.2", (2) „T.C.2", (3) „T.K.2", (4) „T.C.3", (5) „T.K.3", (6) „T.Z.4", (7) „T.C.4", (8) „T.K.4", (9) „T.K.5" – only for project efficiency, (10) „Tactical management of the project inspection". Only these modules have been selected as the project operational management (i.e. at the level of works manager) is performed pursuant to procedure named: "Services execution", which is included in the Quality Management System implemented in the company.

Project planning was commenced from project team appointment, pursuant to "T.Z.2" module. Structure of the project team has been presented in fig. 1, where project team members were selected, responsible for:

- project strategic planning and execution – company management,
- tactical planning and execution of the project – Project Manager, constructor, supplies specialist, financial specialist, and H&S specialist.
- operational planning and project execution – two working teams with foremen as managers, installations electricians and mechanics are team members.

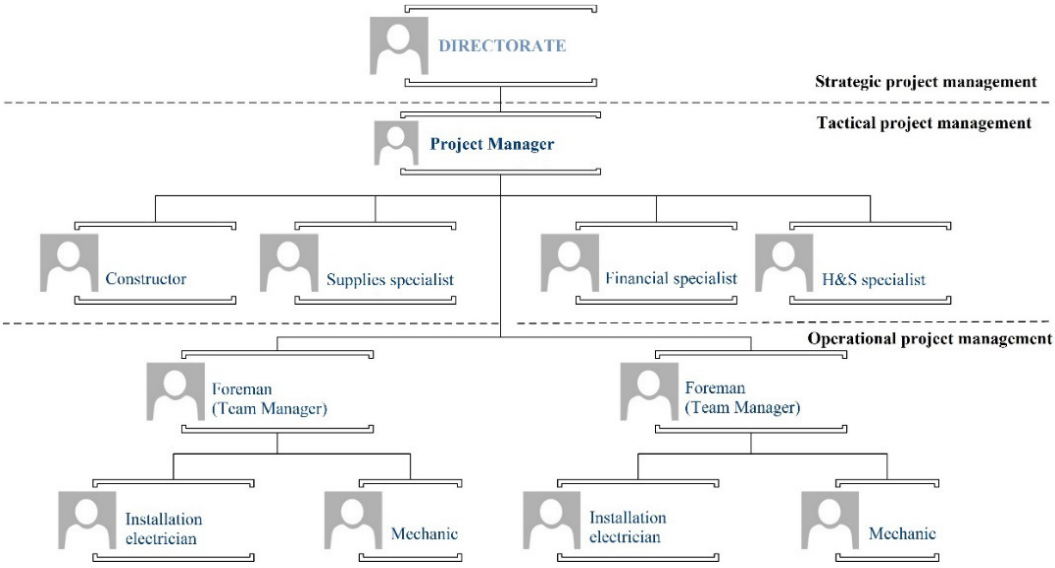


Fig. 1: Project team structure

Source: own elaboration

Pursuant to modules "T.C.2" and "T.K.2", duration times have then been estimated for the project stages, project programme was elaborated and cost of the stages determined. Spreadsheet used for the time duration was applied: "Tasks time duration estimating", including determining of aggressive execution times, pursuant to the critical chain concept. As the company is experienced and has got data collected from execution of similar projects, the following overlap has been applied for the times estimating: "According to statistical data". Times estimated in this way, had 0,5 of timely execution probability.

The project programme has been established in Microsoft Project, according to module "T.C.2". After all data and duration times have been introduced, the project critical chain was determined, and time buffers introduced. 8 time buffers were introduced in total, including 1 project buffer and 7 support buffers. Project buffer has been placed at the end of the critical chain, and support buffers at the ends of non-critical paths. The size of the time buffers introduced (project and support ones) was determined on the basis of fuzzy sets theory, according to module "T.C.2". Module methodology support spreadsheet was used for this purpose: "Buffers size determining". Project buffer size was calculated on its basis, including 46 days. Hence, the project had probability of 0,9 for timely execution. Table 2 presents sizes of the remaining time buffers.

Table 2: Size of the time buffers in the electrical installation execution project

Buffer type	Tasks path	Length of path [days]	Buffer size [days]
Project Buffer (PB)	1.1. – 1.3. – 1.5. – 1.6. – 2.2. – 2.4. – 2.5. – 3.1. – 3.3. – 3.4. – 4.1. – 4.2. – 5.2. – 5.4. – 5.5. – 6.1. – 6.5. – 6.6. – 7.1. – 7.2. – 8.2. – 8.3. – 9.1. – 9.2. – 9.4. – 10.1. – 10.2.	63	46
Feeding Buffer 1 (FB 1)	1.2. – 1.4.	4	1,5
Feeding Buffer 2 (FB 2)	2.1. – 2.3.	5	3
Feeding Buffer 3 (FB 3)	3.2.	2	0,5
Feeding Buffer 4 (FB 4)	5.1. – 5.2.	2	1

Feeding Buffer 5 (FB 5)	6.1. 6.2. 6.3.	3	1,5
Feeding Buffer 6 (FB 6)	8.1.	1	0,5
Feeding Buffer 7 (FB 7)	9.3.	1	0,5

Source: own elaboration

Project programme with buffers introduced and resources assigned, has been established in Microsoft Project. Installation electricians constituted key resources for the project execution, their number was limited depending on the working day. Programme established included also efficiency of installation electricians. The project aggressive programme has been presented in fig. 2. Critical chain has been marked in red in the programme, non-critical paths in blue, support buffers in green, and the project buffer in purple. Pursuant to programme established, the project should start on 7.11.2016, and be completed on 6 of April 2017. This means that the project should be completed by about 10 days earlier than previously planned. According to the initial programme the project was planned to commence on 7.11.2016 and be finished by 20.04.2017.

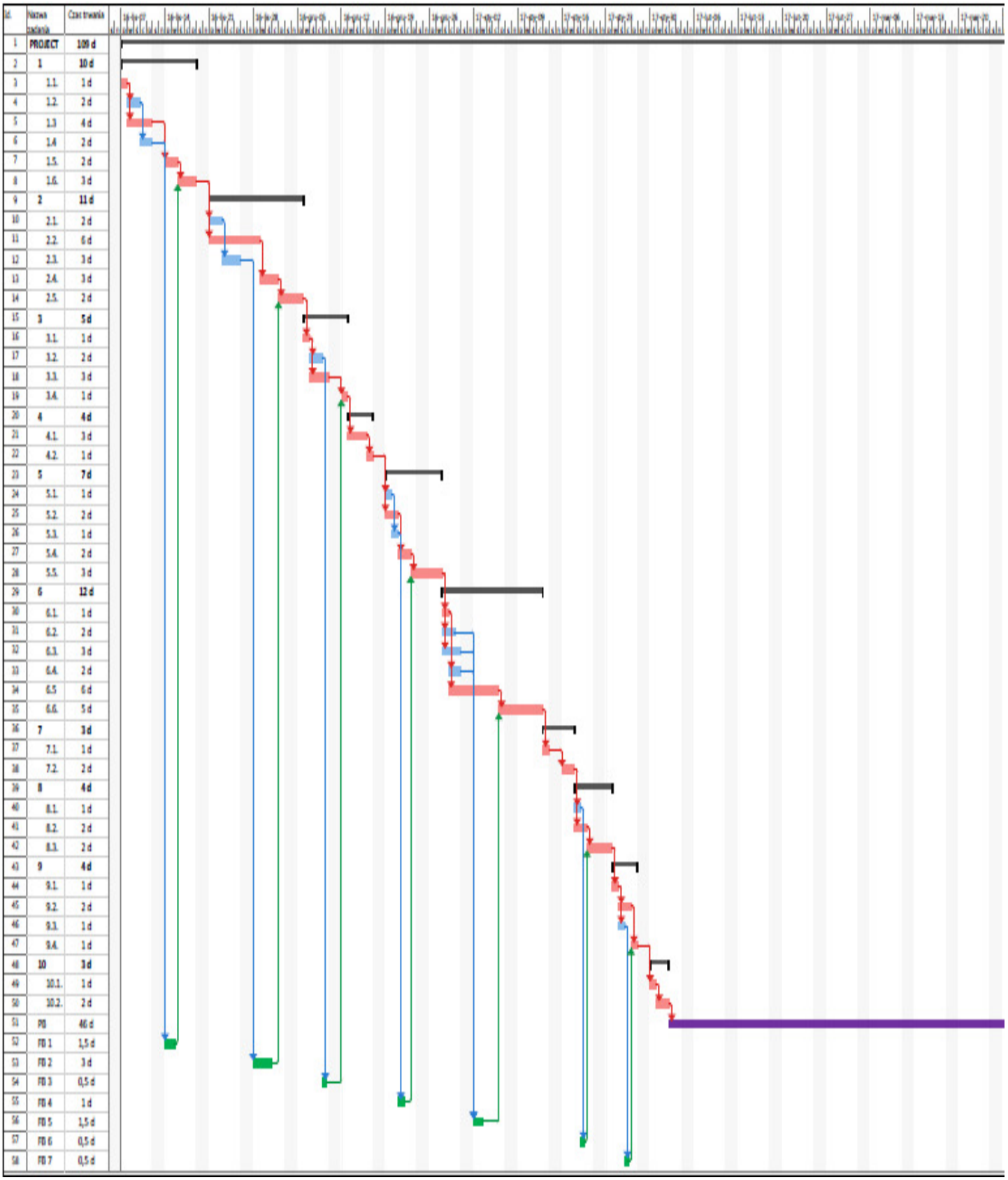

PROJECT 109 d
1 10 d
1.1. 1 d
1.2. 2 d
1.3 4 d
1.4 2 d
1.5. 2 d
1.6. 3 d
2 11 d
2.1. 2 d
2.2. 6 d
2.3. 3 d
2.4. 3 d
2.5. 2 d
3 5 d
3.1. 1 d
3.2. 2 d
3.3. 3 d
3.4. 1 d
4 4 d
4.1. 3 d
4.2. 1 d
5 7 d
5.1. 1 d
5.2. 2 d
5.3. 1 d
5.4. 2 d
5.5. 3 d
6 12 d
6.1. 1 d
6.2. 2 d
6.3. 3 d
6.4. 2 d
6.5 6 d
6.6. 5 d
7 3 d
7.1. 1 d
7.2. 2 d
8 4 d
8.1. 1 d
8.2. 2 d
8.3. 2 d
9 4 d
9.1. 1 d
9.2. 2 d
9.3. 1 d
9.4. 1 d
10 3 d
10.1. 1 d
10.2. 2 d
PB 46 d
PB 1 1,5 d
PB 2 3 d
PB 3 0,5 d
PB 4 1 d
PB 5 1,5 d
PB 6 0,5 d
PB 7 0,5 d

Fig. 2: Project programme established in Microsoft Project
Source: own elaboration

Project execution was performed pursuant to modules “T.Z.4", "T.C.4” and “T.K.4”. Project Manager supervised project scope execution, the programme itself and the project cost. Every two weeks, on the basis of daily reports from the team managers (foreman), and project inspection, he prepared reports on: (1) project scope execution, (2) budget stage execution and (3) programme timely execution Project inspection was performed pursuant to module: “Project inspection tactical management”. Project Manager monitored the programme by means of spreadsheet: “Time buffers monitoring”, checking the time buffers use. Project buffer was used in 67%, i.e. about 31 days. Electrical installation execution project in water treatment plant was completed on 16.03.2017, i.e. 40 days earlier than expected by the client.

Electrical installation execution in the water treatment plant was inspected according to time buffers use (project and support ones). Project buffer use during its execution has been presented in fig. 3. Although the project buffer use during project execution time appeared (see fig. 3, item A and B) twice in the red zone, it had no impact on the completion of the project in time. It was caused by a delay in materials and prefabricated item supply to the project execution site.

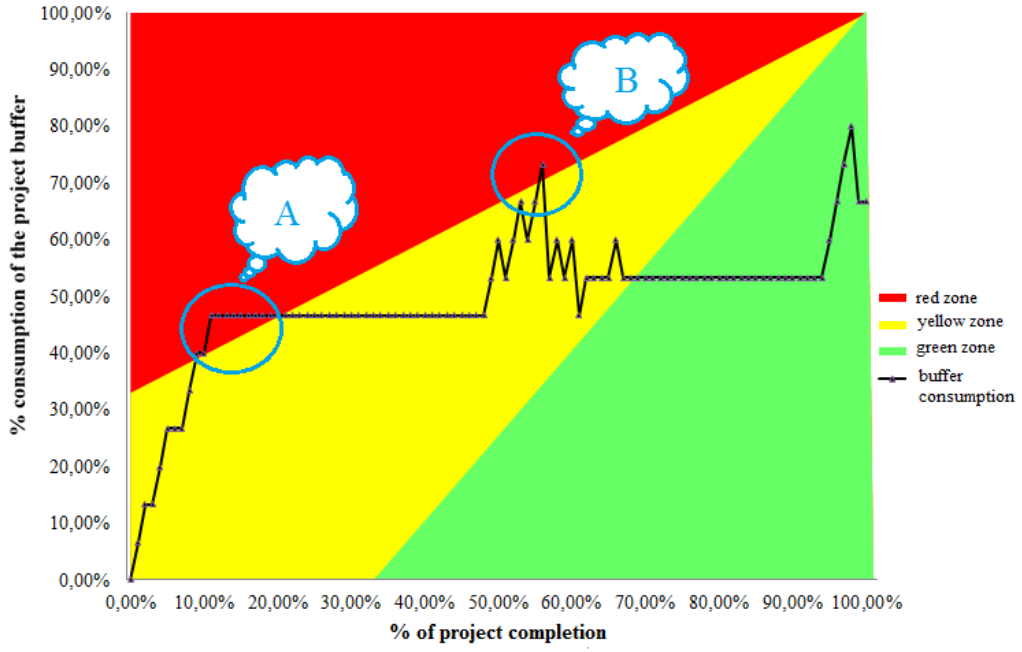


Fig. 3: Project buffer use in the electrical installation execution of a water treatment plant
Source: own elaboration

Except for programme inspection, an inspection of the project cost was performed, on the basis of the project value obtained. The cost of the project increased during its execution by PLN 28000, due to the tasks time extension in critical chain. The cost however has not exceeded the assumed budget tolerances.

Project execution was completed on 16.03.2017, and project completion process commenced. Project Manager prepared final report and project product handing over report. The project product with all documentation was handed over to the client.

After the project completion, a closing meeting was held, where all positive and negative project effects have been discussed. Efficiency and effectiveness of the project have been presented. The project efficiency has been analysed for the scope, programme and budget of the project execution,

by comparing the planned and actual values. Project effectiveness has been determined on the basis of Net Present Value and the Return on Investment, and compared with the values planned by the Project Manager.

The analysis indicates, that the electrical installation execution project in the water treatment plant was performed successfully, as the client received a project product 100% compliant with the client's requirements. The project has been moreover completed 15 days earlier than planned. Only the project cost was higher than planned (by 2%), but not higher than tolerances assumed. The cause of the project cost increase was the extension of several tasks in critical chain, which was caused by longer working time of the fitters.

Project effectiveness indicates, that module methodology brings higher financial profit for the company, as the project return increased by about 9,5%. NPV index was 25% higher than planned. To calculate the NPV, it was assumed that the annual return on assets involved in the projects execution is 22%.

Conclusions

The module methodology of large projects management based on the critical chain concept connects features of function, process and knowledge oriented methodology, i.e. it is a kind of component methodology. Large projects module management method based on critical chain concept, has been established so as to provide to the Project Managers, and company managers a possibility of selecting appropriate modules for planning and execution of a large project. It may be applied as a whole or involve implementing of selected modules only, i.e. when a project is partially performed by a company and partially by its subcontractors, a group of strategic and tactical modules is used. It provides possible selection of tools for large projects management in a company for a Project Manager.

Module methodology application in planning and execution of electrical installation execution project in water treatment plant caused increase of the project efficiency and effectiveness. Project execution time was by over 21% shorter than initially planned. Project efficiency increased at the same time, as the ROI index was higher by 9,5% than initially assumed.

References

Behrens W. and Hawranek P. M. (1993), Poradnik przygotowania przemysłowych studiów feasibility [Guide to preparing industrial feasibility studies]. UNIDO, Warszawa, (in Polish).

Belbin M. (2010) Team Roles at Work, 2nd ed., Butterworth Heinemann., USA.

Chomicz M. (2015) 'Ujęcie badawcze kompetencji kierowników projektów' [Research coverage of the competence of project managers], E-mentor, nr 2 (59), s. 42-55, (in Polish).

Gasik S., 'Dojrzałość metodyk zarządzania projektami' [The maturity of project management methodologies], [Online], Available: http://www.sybena.pl/dojrzaloscszp.htm [June 15, 2015], (in Polish).

Gellert M and Nowak C. (2008) Zespół [Team], GWP, Gdańsk, (in Polish).

Goldratt E. M. (1997) Critical Chain, Ashgate Publishing Group, USA.

Kołodziejczyk-Olczak I. (2013) Tworzenie i kompetencje zespołu projektowego [Creation and competence of the project team], *Przedsiębiorczość i Zarządzanie*, t. 14, z. 11, (in Polish).

Łapuńka I. and Pisz I. (2014) Koncepcja badań empirycznych czynników wzrostu dojrzałości projektowej przedsiębiorstw [The concept of empirical studies of the growth factors of enterprise design maturity], *Ekonomika i Organizacja Przedsiębiorstwa*, 7 (774), s. 3-18, (in Polish).

Mancini M., Ruggeri F. and Caron F. (2008) Comparing Project Buffer Sizing Methods with a Bayesian Model, Project Management Institute Research Conference.

Marek-Kołodziej, K. and Łapuńka, I. (2014) 'Zastosowanie teorii zbiorów rozmytych do szacowania wielkości buforów w harmonogramowaniu projektów metodą łańcucha krytycznego' [Application of fuzzy sets theory to estimate the buffer size in the scheduling of projects using the critical chain method], *Logistyka*, 6, CD 4, Logistyka - nauka, 12299-12304 (in Polish).

Marek-Kołodziej, K. and Łapuńka, I., (2015) 'Badanie efektywności zespołów projektowych według modelu Belbina na przykładzie dużych projektów budowlano-montażowych' [Efficiency research of project teams in accordance with the Belbin model on the example of large construction and assembly projects], *Przedsiębiorczość i Zarządzanie*, Stroińska E., Sułkowski Ł. (eds.), *Determinanty zarządzania projektami i procesami w organizacji*, Zeszyty Naukowe XVI, 5 (II), Łódź-Warszawa, 113-126 (in Polish).

Marek-Kolodziej K, Łapunka I. and Paszek A. (2016) Concept of Flexible Components Selection in project Management Methology, [in:] Soliman K.S. (ed.), Vision 2020: Innovation Management, Development Sustainability, and Competitive Economic Growth, 27th International Business Information Management Association Conference, Milan, Italy, 2016, pp. 623-634.

Marek-Kołodziej K. and Skomudek W. (2015) Lokalizacja buforów czasów według metody łańcucha krytycznego w harmonogramie projektu inwestycyjnego [Localization of time buffers according to the critical chain method in the investment project schedule], w: Wirkus M. (red.), Zarządzanie procesami i projektami, Politechnika Gdańska, Gdańsk, s. 65-71, (in Polish).

Patrick F. S. (2014) Critical Chain Scheduling and Buffer Management, Getting Out form between Parkinson's Rock and Murphy's Hard Place, Focused Performance, [Online], Available: www.focusedperformance.com [April 2014].

PMI (2013) A guide to the project management body of knowledge. 5th edition, Newtown Square, PA, USA.

Rehacek, P. (2016). Standards for Risk Management. In: Soliman, K. (eds.) Proceedings of the 28th International Business Information Management Association Conference on Vision 2020: Innovation Management, Development Sustainability, and Competitive Economic Growth. 9. -10. 11. 2016, Seville, Spain. pp. 3638-3657.

Rutka R. and Wróbel P. (2012) Organizacja zachowań zespołowych [Organization of team behawior], Polskie Wydawnictwo Ekonomiczne, Warszawa, (in Polish).

Scheurerr S. and Ribeiro M. (2009) Die neue Rolle des Projektmanagements – mit den richtigen Projektmanagement Assessment zu Weettbewerbsvorteilen [The new role of project management - with the right project management - Assessment to Weettbewerbsvorteile], Gruppendyn Organisationsberat, 40/2009, s. 279-301, (in German).

Spałek S. (2013) Dojrzałość przedsiębiorstwa w zarządzaniu projektami [Maturity of the enterprise in project management], Politechnika Śląska, Gliwice, (in Polish).

Spałek S. (2016) Doskonalenie zarządzania projektami w przedsiębiorstwie [Improving project management in an enterprise], Management Forum, vol. 4, no. 2, s.3-9, (in Polish).

Strojny J. and Szmigiel K. (2015) Analiza porównawcza podejść w zakresie zarządzania projektami [Comparative analysis of project management approaches], Modern Management Review, vol. 22 (3), s. 249-265, (in Polish).

The Standish Group (2013) The Chaos Manifesto: Think Big, Act Small.

Tenera A. B. (2008) Critical Chain Buffer Sizing, A Comparative Study, Project Management Institute Research Conference.

Trocki M., Grucza B. and Ogonek K. (2009) Zarządzanie projektami [Project management], PWE, Warszawa, (in Polish).

Wirkus M., Roszkowski H., Dostatni E. and Gierulski W. (2014) Zarządzanie projektem [Project management], Polskie Wydawnictwo Ekonomiczne, Warszawa, (in Polish).

Financial and Economic Aspects of IT Project Management

Alexander R. Bril, associate professor, Peter the Great St. Petersburg Polytechnic University, 29 Polytehnicheskaya st., St. Petersburg, 195251, Russia, e-mail: bar.bril@yandex.ru

Olga V. Kalinina, professor, Peter the Great St. Petersburg Polytechnic University, 29 Polytehnicheskaya st., St. Petersburg, 195251, Russia, e-mail: olgakalinina@bk.ru

Igor V. Ilin, professor, director of Graduate School of Business Technologies, Peter the Great St. Petersburg Polytechnic University, 29 Polytehnicheskaya st., St. Petersburg, 195251, Russia, e-mail: ivi2475@gmail.com

Abstract

The authors suggest a system of financial and economic calculations for efficient management of complex IT projects. It consists of the following calculations regularly and consistently performed at four project phases: commercial evaluation of projects and business planning; financial diagnostics of the companies which implement projects; business valuation at different project phases. The features of economic methods of project management are considered.

Keywords: economic methods, project management, commercial evaluation, company value, financial and economic calculations.

Introduction

Revolutionary development of information technologies has caused constant growth of investments into this sphere. The majority of developing companies make significant part of their capital investments in IT projects. Therefore, it is necessary to improve IT project management and to promote economic methods for enhancement of operating efficiency.

Project management means management of project implementation process. Project implementation, in its turn, means a package of measures to be taken to achieve project goals. Yield increase and company value maximization are the priority goals of IT projects implemented by trading companies. Economic results included in the original plan may be significantly altered during project implementation process depending on evolving circumstances and obtained interim results. Therefore, project implementation should be regarded as a continuous process which requires regular analysis of the current situation and trends. Such analysis may result in necessary adjustments.

Recent Research and Publications Analysis

A significant number of scientists have been published on the subject of project economic evaluation of IT project management (Adamenko et al, 2017; Focacci, 2017; Moran, 2016; Pelin Gurgun et al, 2017; Silkina, 2017).

A lot of works which study this problem are devoted to different economic and financial aspects of IT project evaluation (Ampatzoglou et al, 2015; Glukhov et al (2016); Laine et al, 2016; Matvienko, 2009; Marhasin, 2000; Nyuhin, 2010; San et al, 2017; Yuryev, 2008; Zalaeva, 2009; Zozulya et al, 2017; Ilin et al, 2016; Glukhov et al, 2015).

Projects are classified using various criteria, such as application area, subject field, scope, length, types of participants, complexity, impact of results on social sphere etc. (Akoff, 1985; Ivasenko et al, 2009; Golov et al, 2015).

Depending on the scope and structure projects are divided into mono-projects, multi-projects and mega-projects. Multi-projects are complex programmes and projects implemented within big companies. Such projects include both establishment of new companies and development of existing ones, as well as corporate management modernization.

This paper is dedicated to economic and financial calculations for IT multi-projects, i.e. projects aimed at establishment of new IT companies or branches of existing IT companies. The suggested calculation system provides for their effective development and creates conditions for operational management and decision-making at different phases. It should be noted that there are quite a lot of classifications of large-scale project phases (Bril et al, 2012; Ivasenko et al, 2009; Golov et al, 2015).

Problem Formulation

The authors use classification which divides a project into four phases:

- Pre-opening arrangements, initial financing and organizational development (start-up);
- Fast sales growth, significant investments in production, optional negative cash flow;
- Substantial economic results, return on investments, positive cash flow;
- Loss of income due to escalating competition, search for new ideas and development scenarios, optional negative cash flow.

Specific financial and economic calculations will ensure successful project implementation at each phase. Feasibility study comprising commercial evaluation of projects and business planning is applicable at the first stage. Regular assessment of a company's financial position and control over achievement of financial and economic goals set in its business plan is expected at the second stage. Control over a company's financial position and business valuation are performed at the third stage in order to prepare for the fourth stage. Another business valuation, development of new ideas and business planning are done at the fourth stage.

Calculation methods should be based on decision-making criteria at each phase in order to achieve successful project management and rational decision-making (Table 1).

Table 1: Project phases and financial and economic calculation methods

Multi-project phases	Financial and economic calculation methods	Decision-making criteria
1 Pre-opening arrangements, initial financing	Feasibility study and business planning	Net present value, profitability and operating leverage
2 Fast sales growth, optional negative cash flow	Regular assessment of a company's financial position and control over achievement of goals set in its business plan	Special system of financial indicators
3 Return on investments, positive cash flow	Control over a company's financial position and business valuation	System of financial indicators, company value
4 Escalating competition, search for new ideas and development scenarios	Another business valuation, development of new ideas and business planning	Company value, profitability and operating leverage

Initial decisions are made based on the project feasibility study and business planning. A business plan is a list of works and activities structured by sections which are required for project implementation. In this context a project is an investment plan aimed at achievement of intended benefits.

A business plan is prepared in order to provide rationale for project costs and, consequently, for its financing sources. The business plan is one of the principal documents to be submitted to investors and creditors. Business plans were originally prepared only for investment projects. That is why costs and resulting income should be calculated and justified for all works and activities included in the document. Based on these calculations investors and creditors make a decision on whether to finance the project or not. The financing decision is made based on such characteristics as payback period and simple rate of return, as well as such discounted indicators as net present value (NPV) and internal rate of return (IRR).

As multi-projects started to evolve, this calculation system turned out to be flawed due to the fact that above mentioned decision-making criteria were not applicable to describe business efficiency (Goremykin, 2013; Strekalova, 2013; Vilensky et al, 2015).

Financial position of a company and its development effectiveness are characterized by efficiency and solvency indicators. Among the most important indicators there are return on sales, return on assets and return on equity, as well as such solvency indicators as equity-to-asset ratio, financial leverage, current ratio, quick ratio and solvency ratio. In order to ensure efficient multi-project management, it is necessary to combine these indicators which are different for projects and businesses in one business planning system.

Problem Solution

Having performed multiple studies and calculations, the authors recommend the following two approaches to economic assessment of IT multi-projects:

- Two-step financial and economic calculations for investment projects;
- One-step calculations for operational projects.

The methodology suggested by the authors to evaluate investment projects using the first approach is based on the UNIDO method (Berens and Havranek, 1995) and provides for two-step calculation (Bril et al, 2012, 2015, 2016):

- Step 1: efficiency evaluation based on calculation of profitability and discounted indicators;
- Step 2: assessment of project implementation impact on the increase in profit, labour efficiency, profitability and operational risks.

In such a way business planning performed at the first phase of an IT multi-project is naturally incorporated in the general planning system of a company due to the fact that development project business plans and company business plans are elaborated according to accepted company strategies. While current (annual, quarterly) plans for trading and manufacturing activities are based on approved business plans. A company's planning system may be thus presented as follows (Figure 1).

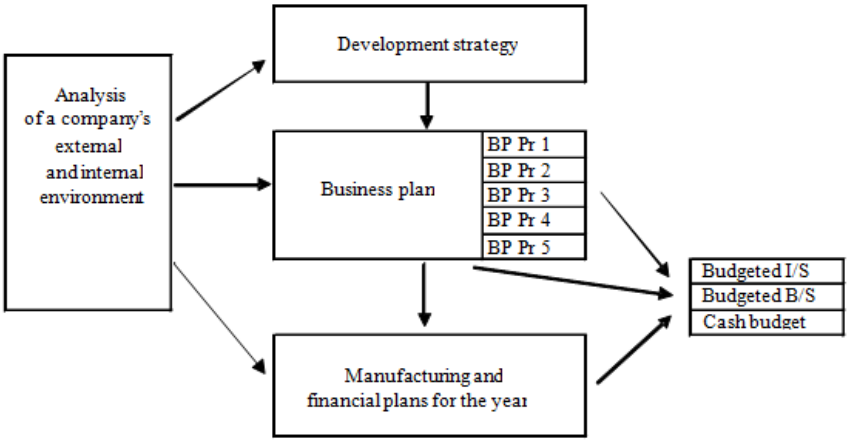


Fig 1: General planning system at an IT company

Business planning is a part of the general planning system of a company. It is based on a strategy development and used for current annual and quarterly planning. In order to evaluate specific projects such approach requires preparation of three documents which are usually disregarded when a usual project business plan is prepared. These documents include a budgeted income statement prepared using a standard income statement template, a budgeted balance sheet prepared using a standard balance sheet template and a cash budget prepared using a standard cash flow statement template which could be consolidated with respective statements.

These documents make it possible to evaluate how implementation of each project will affect financial position of the company under consideration, its profitability and solvency, as well as manufacturing and commercial risks. The main financial and economic indicators used to characterize budgeted results at both steps of multi-project evaluation are listed below.

Step 1. Efficiency evaluation based on calculation of profitability and discounted indicators.

	Indicators:
• Payback period	r
• Simple rate of return	i
• Net present value	NPV
• Internal rate of return	IRR

Step 2. Assessment of project implementation impact on the increase in profit, labour efficiency, profitability and operational risks.

	Indicators:
• Increase in sales profit	Inc
• Performance improvement (sales per one employee per month)	PI
• Return on sales	ROS
• Operating leverage	OL

It should be noted that the list of indicators for the second step may be significantly extended depending on the specific nature of each company which implements a multi-project. Additional indicators are selected using the financial diagnostics method developed by the authors within economic and financial calculations for IT multi-projects (Bril et al, 2012).

Calculation results based on a business plan of a big telecommunications company of the Siberian Federal Okrug are presented in Table 2. Only payback period is included in the table from resulting (criterial) indicators of the first step. Initial decisions are made based on the project feasibility study and business planning.

Table 2: Economic evaluation using the two-step calculation system

Project types	Special mobile Internet 1	Special mobile Internet 5
Number of users, thousand people	50	75
Number of employees, people	12	8
Investments, million rubles	157.0	120.0
Sales, million rubles / year	120.000	58.00
Current expenses (cost), million rubles / year, including :	69.0	36.0
Variable expenses	48.3	26.5
Fixed expenses	20.7	9.5
Payback period, years	3.08	3.75
Sales profit (budgeted increase for a company on the whole), million rubles / year	51.0	32.0
Performance improvement (number of sales per person per month), %%	11.3	5.1
Increase in return on sales, %%	5.6	3.2
Operating leverage for a company on the whole	2.79	3.20

As for the control over changes in financial positions of companies which implement multi-projects, a special financial diagnostics is performed at the second and third phases in order to ensure successful implementation of IT investment projects. It has been developed by the authors and described in Bril et al, 2012. Its purpose is to trace changes in sales profit, net profit, profitability and return on assets, as well as risk level and solvency at the second and third project phases.

Equipment upgrade, automation or start-up of new production projects in existing company can significantly affect the structure and the cost of capital, shares of fixed and variable expenses in total expenses and cash flows. Regular control over financial position of a company makes it possible to take timely reasonable measures for successful implementation of multi-projects.

Financial diagnostics is based on:

- Quarterly calculations;
- List of financial and economic indicators in line with those set in business planning methodology;
- Comparison of actual figures of the quarter with established standards, figures of the previous quarters and business plan figures;
- Decision-making methods (strategies) in case of significant variance between actual figures and figures for comparison.

Business valuation methodology to be used at the third and fourth phases of IT multi-projects is described below.

Company value maximization has been one of the most common goals of financial management and, therefore, business efficiency criteria for the last 20 – 25 years. It makes it possible for owners to make more sound decisions on company sale according to the early exit strategy or on multi-project investment at the third and fourth phases in order to compensate for losses from evolving competition and decrease in sales according to the leadership strategy. In view of this, the main purpose of regular business valuation during multi-project management is to identify a moment when the value starts to decrease, to understand the reasons for that and to make timely decisions on further project implementation.

The value of listed companies which have gone through IPO is determined on a daily basis, which forms a good statistics for decision-making. Valuation of small and medium enterprises may be performed by professional valuation experts. Usually this is an expensive single-use procedure. An easier alternative is required to reduce costs and provide regular results. The authors thus suggest a set of rather simple valuation methods based on financial diagnostics methodology which are easily incorporated in the overall system of financial and economic calculations for multi-projects.

Business valuation theory suggests three approaches achieve project goals, namely cost, income and comparison approaches. Quite a lot of methods are actually used within these approaches (Friedman and Ordway, 1997; Ilin et al, 2014). For IT multi-projects the authors suggest business valuation based on various development scenarios and financial diagnostics results at the second and third project phases.

In order to determine initial company value at the third phase of multi-project implementation, it is necessary to consider at least two development scenarios:

- The first scenario is *the lack of additional investments*. The project is implemented according to the goals set forth in the business plan.
- The second scenario is *fund-raising using the leadership strategy*. The rise in competition, commercial and financial risks, price reduction for company services are projected for the nearest period.

In both scenarios the company value as of the valuation date is determined using the cost approach after audit and financial diagnostics of the company. In order to have more information about the company value as of the valuation date it is also necessary to use such income approach methods as profit capitalization, 50% of sales and fivefold sales profit. Information about the company value may be also supplemented by the information about sales of similar enterprises. Actual value is determined based on obtained results. This figure is the base for further calculation of the company value in the planning period.

Valuation of a company which implements a multi-project on production of IT equipment elements and components is presented in Table 3.

Table 3: Initial business valuation at the third phase of multi-project implementation

Valuation method	Amount, million rubles
Cost approach	142
Profit capitalization	120
50% of sales	165
Fivefold sales profit	175
Approved actual value	145
Company value after investments into assets taking into account appreciation rate	190

When actual value of the company as of the valuation date is determined, it is necessary to set a planning period for calculation of changes in the company value. Its length depends on the type of project but cannot exceed three years.

In *the first development scenario* calculation of changes in the company value is made based on the above mentioned income approach methods, such as profit capitalization, 50% of sales and fivefold sales profit. Calculation is based on budgeted amounts of sales and profit for the planning period.

Net profit for the reporting period and statistics on average return on equity of the IT group of companies under consideration are used for profit capitalization method.

In *the second development scenario* it is necessary to obtain the company value as of the date of additional investments. It is important to take into account appreciation of the company due to

attraction of additional capital. Assets turnover (turnover during the year) and return on assets are used to obtain appreciation rate.

When the company value as of the date of additional investments is calculated, it is necessary to calculate the company value for the planning period. Several valuation methods may be applied here. The authors recommend using venture approach and future value method.

The venture approach is easier in terms of calculations but it requires construction of a cash flow diagram for determination of the future company value. Its implementation is possible with statistics of average profitability of the IT group of companies under consideration and its budgeted profitability rate. Then the company value as of the planning moment of time will be calculated as follows:

Value as of the planning moment of time = value as of the time of additional investments $\times (1+i)^n$
where:
i is the comparison rate accepted at the budgeted profit level taking into account average statistical data (10-12% per year);
n is the planning period in years.

The planning period may be set in months. In this case the comparison rate should be set on a monthly basis. The comparison rate determination is a key moment of the calculation which needs special justification.

The future value method provides for more detailed and difficult calculation. It is based on tables and diagrams of budgeted cash flows and takes into account provision of loans, revenues and payments of the enterprise under consideration during the planning period. Weighted average cost of capital (WACC) or actual return on assets (ROA) are used as a comparison rate here.
This calculation system makes it possible to obtain information base for specification and determination of actual and budgeted company value, adjustment of project implementation process and finding solutions for organizational, production and financial issues.

Conclusion

1. IT project management is a complex multiple-option process consisting of four main phases. Each phase requires adjustments based on economic analysis and calculations which include:
- Two-step commercial evaluation and business planning;
- Special financial diagnostics;
- Regular business valuation.

2. Financial diagnostics and business valuation at the second and third multi-project phases provide a wide base of financial and economic indicators used to approve and adjust operational plans for further multi-project implementation.

3. Rather simple calculation algorithms suggested by the authors and available software will make it possible to pay more attention to reliability of benchmark data for project development monitoring.

References

Adamenko, A.A., Zolotukhina, E.B., Ulanov, V.A. and Mamatelashvilli, O.V. (2017), 'Investment management activities of commercial enterprises,' *International Journal of Applied Business and Economic Research*, 15 (2), 11-21.

Akoff, R. (1985) Planning company future, Moscow, Russia.

Ampatzoglou, A., Cahzigeorggiou, A. and Avgeriou, P. (2015), 'The financial aspect of managing technical debt: A systematic literature review,' *Information and Software Technology*, 64, 52-73.

Berens, V. and Havranek, P.M. (1995) Guidelines for assessing the effectiveness of investments, Moscow, Russia.

Bril, A., Kalinina, O. and Valebnikova, O. (2016), 'Innovation venture financing projects in information technology,' *Lecture Notes in Computer Science*, 9870 LNCS, 766-775.
Bril, A.R. (2015) Business planning: objectives and situations, Saint-Petersburg, Russia.

Bril, A.R., Gorchakova, L.I. and Kalinina, O.V. (2012) Financial and economic calculations on innovation projects for enterprise development, Saint-Petersburg, Russia.

Focacci, A. (2017), 'Managing project investments irreversibility by accounting relations,' *International Journal of Project Management*, 35 (6), 955-963.

Friedman, D. and Ordway, N. (1997) Analysis and evaluation of income generating real estate, Moscow, Russia.

Glukhov V.V., Ilin I.V., Iliashenko O.Yu. Improving the Efficiency of Architectural Solutions Based on Cloud Services Integration. Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), Volume 9870. Springer (2016). Pp. 512-524.

Glukhov, V.V., Ilin, I.V. and Levina, A.I. (2015), 'Project management team structure for internet providing companies,' *Lecture Notes in Computer Science*, 9247, 543-553.

Golov, R.S., Baldin, K.V. and Perederiaev, I.I. (2015) Investment project, Moscow, Russia.
Goremykin, V.A. (2013) Business plan, methodology of development, Moscow, Russia.

Ilin, I.V., Kalinina, O.V., Iliashenko, O.Yu. and Levina, A.I. (2016), 'IT-Architecture Reengineering as a Prerequisite for Sustainable Development in Saint Petersburg Urban Underground,' *Procedia Engineering*, 15th International Scientific Conference "Underground Urbanization as a Prerequisite for Sustainable Development, ACUUS 2016", 1683-1692.

Ilin, I.V. Koposov, V.I. and Levina, A.I. (2014), 'Model of asset portfolio improvement in structured investment products,' *Life Science Journal*, 11, 11, 265-269.

Ivasenko, A.G., Nikonova, Y.I. and Karsavin, M.V. (2009) Project management, Rostov-na-Donu, Russia.

Laine, T., Korhonen, T. and Martinuo, M. (2016), 'Managing program impacts in new productdevelopment: An exploratory case study on overcoming uncertainties,' *Interntional Journal of Project Management*, 34 (4), 717-733.

Marhasin, A.B. (2000) Optimization and system design development of mobile communication systems, Novosibirsk, Russia.

Matvienko, D.N. (2009), 'Innovative methodology of reengineering legacy software systems,' *Omsk scientific bulletin*, 3 (83), 249-251.

Moran, A. (2016), 'The financial management of Agile projects,' *ITNOW*, 58 (3), 60-61
Nyuhin, A. (2010), 'Overview of methods of project economic evaluation in the field of information technology,' *Bulletin of Kamchatka state technical university*, 12, 56-59.

Pelin Gurgun, A., Polat, G., Gokberk Bayhan, H. and Damci, A., (2017), 'Financial anf economical risks impacting cost of leed certified projects,' Proceedings of ISEC 2017 – 9th International Structural Engineering and Constuction Conference: Resilient Structures and Sustainable Construction.

San, K.M., Riazi, S.R.M., Nawi, M.N.M. and Esa, M. (2017), 'The roles, challenges & improvement of project manager in project financial management in building development in Penang, Malaysia,' *International Journal of Supply Chain Management*, 6 (1), 238-245.

Silkina, G.Yu. (2017), 'Information and Communication Technologies in Ensuring of Innovative Development,' Proceedings of 29-th International Business Information Management Association Conference – Vision 2020: From Regional Development Sustainability to Global Economic Growth, Vienna, Austria, 1165-1177.

Strekalova, N.D. (2013) Business planning, Saint-Petersburg, Russia.

Vilensky, P.L., Livshits, V.N. and Smolyak, S.A. (2015) Assessment of efficiency of investment projects: Theory and practice, Moscow, Russia.

Yuryev, V.N. (2008), 'Teoretiko-organizacionnye aspekty informatizacii promyshlennogo predprijatija,' [Theoretical and organizational aspects of informatization of industrial enterprises], *Nauchno-tehnicheskie vedomosti SPbGPU. Jekonomicheskie nauki* [Scientific and technical sheets of the St.-Petersburg State Polytechnic university. Economic sciences], 2 (58), 86-94.

Zalyaeva, G.R. (2009), 'Development of information technologies: methods, management, standards,' *Bulletin of Kazan state university*, 12, 2, 43-48.

Zozulya, V.V., Sakhanov, V.V. and Romanchenko, O.V. (2017), 'Environmental economy development with financial mechanisms as a part of import substitution in timber processing industry,' *International Journal of Ecology and Development*, 32 (2), 23-32.

Social Supermarkets in the Czech Republic – an empirical study

Alexandr Asmalovskij, University of Economics, Prague, Czech Republic, alexandr.asmalovskij@vse.cz

Tomáš Sadílek, University of Economics, Prague, Czech Republic, tomas.sadilek@vse.cz

Abstract

The paper focuses on the so-called social supermarkets and their presence in the Czech Republic. The authors aim to give an overview of the status and form of social supermarkets on the Czech retail market. The analysis is based on data obtained from an empirical study conducted by the authors. The theoretical part consists of literature review on social enterprises in general and definition of social supermarkets. The criteria for selection of the research sample for observation were chosen based on the research conducted in Austria by researchers from University of Economics in Wien. The research sample consists of 40 retail stores belonging 5 retailers. The particular variables of the study are number of stores, store size, range of categories and products, discount rates, location, and number of employees in the selected stores in the Czech Republic.

Keywords: social supermarkets, social enterprise, retail, food waste, sustainability, Czech Republic

Introduction

Social enterprises (SEs) are a phenomenon in modern economy that emerged from lack of solutions to various social issues which are neither addressed by the private sector nor the public sector. Inspired by non-profit organisations, SEs focus on a particular social issue and build a business model brings a solution or helps resolve the issue, which is their main purpose. At the same time while benefiting the society, SEs try to make enough profit to ensure self-sustainability.

SEs fall within the so-called third sector. Literature also names it as social economy, the social sector, non-profit sector, voluntary sector, community sector, or civic sector (Dohnalová, 2006). A social enterprise is a socially oriented, implemented, innovative intent achieved through economic activity in the presence of real economic risks (Schumpeter, 1961). Entities like social enterprises operate under a wide range of legal forms and often represent the new or renewed expression of civil society against a background of economic crisis, the weakening of social bonds and difficulties of the welfare state (Borzaga and Defourny, 2004).

Food waste in relation to food surplus found mostly in developed countries is one of the issues addressed by the third sector and non-profit organisations. According to Abzug (1999), a large number of academic studies on non-profit organisations are related to topics like health, human service or education, while non-profit or social retailing was barely found in the academic sphere. But in the recent years, cross-sectoral cooperation has emerged in retailing (Gupta and Pirsch, 2008), including cooperation with non-profits and SEs. One of the initiatives of such cross-organisational partnership between retailers, manufacturers and government are the so-called social supermarkets (SSMs) (Holweg et al., 2010a).

Literature Review

In literature, various retail models with certain types of cross-organisational relationships related to food retailing and food waste can be found, for instance: Food Banks in countries all over the world including Czech Republic (Filipová et al., 2014; Robinson, 2016); Charity Shops in the United Kingdom (Broadbridge and Parsons, 2003; Horne, 2000); Super Discount Stores (Caroli and Gautie, 2008; Oh and

Kim, 2003); and Social Supermarkets (De Renobales et al., 2015; Holweg et al., 2010a, 2010b; Maric and Knezevic, 2014).

Due to orientation on Czech Republic and Austria, as a similar and comparable county, this paper focuses on two types of the aforementioned models – social supermarkets, and super discount stores. SSMs in Austria were first defined by Holweg et al. (2010a) based on their models in six European countries – France, Austria, Belgium, Switzerland, Luxembourg, and Romania:

"*Social supermarkets receive surplus food and consumer goods from partnership companies (e.g. manufacturers, retailers) for free and sell it at symbolic prices to a restricted group of people living in or at risk of poverty*".

Another definition is based on an SSM model in Croatia:

"*Social supermarkets are a social innovation that comprises social responsibility of associated individuals with the aim of showing social solidarity toward socially vulnerable persons or families, by collecting and distributing goods gathered from individual donors, large retail chains and/or other companies*". (Klindzic et al., 2016)

In the Czech Republic, the term "social economy" is usually poorly recognised within the general public. One of the reasons for this might be the absence of legislation concerning SEs defining their form or status. Despite this fact, academic research along with practice confirm that SEs are present in the Czech Republic (Dohnalová and Průša, 2011). Also, it is necessary to mention that the term "social" tends to arouse negative connotation in the context of Czech language, therefore this linguistic oddity as well as negative perception of people rather prevents the development of social entrepreneurship in the Czech Republic (Policar, 2010). This might be given not only by the language, but also the period of socialist political regime in the second half of 20th century.

Given the circumstances, the authors of this paper have decided to focus on research of social economy, retailing, and their relation in the Czech Republic by zooming in on the issues of citizens with low income and food waste, as well as the initiatives addressing them. Therefore, the aim of this observation was to map the current situation in social retailing and find out whether social supermarkets or other forms of social retailers are present on the Czech market, and analyse them using the variables presented in the research by Holweg and Lienbacher (2011) in order to make a comparative study. The outcomes will serve further research in order to select the best practices in retailing dealing with food waste and people living in or at risk of poverty.

Observation and Methodology

Due to lack of legislation defining SEs, it is currently not possible to determine the amount of SEs in the Czech economy, nor their specialisation in retailing (Asmalovskij and Sadílek, 2016a). Therefore the authors have chosen to conduct field research by looking for enterprises based on models similar to those defined in the literature review and carry out an empirical research.

In the first phase, the authors have done literature review to identify and choose the most appropriate criteria for the research sample in the context of Czech retail market. A set of variables has been chosen based on research by Holweg et al. (Holweg and Lienbacher, 2011) from University of Economics, Vienna with approval of the researchers. The aforementioned research has been selected due to its quality, geographical as well as demographical reasons, and retail market similarity as Czech Republic and Austria are well comparable neighbouring EU member countries.

Criteria for determining the observation sample have been set by the authors upon which a profile of a relevant entity was created as follows:
A retail company selling discounted food/non-food products with significant rate of discounts – 30% or higher discount rate compared to average retail market prices.

Applying the aforementioned profile, 5 retail companies with 40 stores (n = 40) were found on the Czech market using online sources and publicly available press. Further empirical field research in the form of observation was conducted. All of the selected stores were visited by the authors in August and September 2017 where variables derived from research by Holweg and Lienbacher (2011) were observed 7 of which are presented in the paper: assortment in food categories, non-food categories, discount rate, average spending per visit, store size, location within the country and district, number of employees.

Empirical Study Results

Overview

In total, 40 retail stores (n = 40) belonging to 5 retail companies were observed on the Czech retail market in Q3 2017, most of them located in smaller towns. With the exception of one company, which is run under a business licence of a physical entity, the form of the enterprises is Limited Liability Company (LLC). Two (2) of the retailers operate with central warehouses for their stores. As of their marketing activities and communication, all of the retailers are presented on their websites, some communicate via social networks, mainly Facebook, some distribute leaflets, and the largest retailer runs an e-shop with non-food goods. A more detailed overview is presented in profiles of the companies. All the information stated in the retailers' profiles was gathered from their websites.

- Levné potraviny s.r.o. (LLC) – the largest retailer, founded in 2007, owning 14 stores in 10 towns and cities including the capital city of Prague. The company runs a website (http://www.levnepotraviny.cz/) with an e-shop for non-food products, is a retailer and wholesaler, being an exclusive distributor of OKF brand products such as Aloe King. Its stores operate under a central warehouse. The discount rates reach up to 70% compared to average market prices. The company also communicates through social networks (Facebook, Twitter, Instagram) and distributes leaflets.

- DKS Morava s.r.o. (LLC) – the company was founded in 2008 and operates 10 stores in 7 towns. It runs a website with limited general information (http://www.dksmorava.cz/), and operates under a central warehouse. The discount rates reach up to 70% compared to average market prices.

- Nejlevnější potraviny Flaška (physical entity business licence) – runs 10 stores in 10 towns, communicates via website (http://www.nejlevnejsipotraviny.eu/), Facebook and leaflets. The discount rates reach up to 70% compared to average market prices.

- Václav Primus - ŘEZNICTVÍ, s.r.o. (LLC) – the company founded in 1999 runs 7 stores in 7 towns, communicates via website (http://www.potraviny-za-babku.cz/). The discount rates reach up to 70% compared to average market prices.

- Gridexel plus, s.r.o. (LLC) – the retailer founded in 2011 runs 2 stores, one largest, in the capital city of Prague. Its main activity is wholesale. The company communicates via website (http://vyplatise.cz) and Facebook. The discount rates reach up to 30% compared to average market prices.

Merchandise

The merchandise offered in the observed stores is similar to categories of products sold by conventional retailers on the Czech market. The categories are further divided into food and non-food goods. Nevertheless, the amounts and categories of products offered vary on the merchandise these retailers have been able to acquire from their suppliers – conventional retailers and manufacturers. All of the observed stores (100%) offer beverages, diary, tins and packets, and sweets, while none of them (0%) sell fresh fruit and vegetables. This might be given by difficulties of acquiring fresh produce from the suppliers but also demanding and complicated hygiene standards with which the retailers do not comply. On the other hand, frozen food is offered in 95% of the sample and often includes frozen vegetables, as well as frozen meat and poultry. Meat and poultry as a separate category are offered by 70% of the stores, while bread and bakery is present in 57% of the stores.

In general, less than a half of stores offer products in the non-food section. Only 40% of the stores offer products such as diapers and baby care, toilet paper, washing powders, cleaning products, and pet food. Body care and cosmetic products are offered by 22% of the stores and only 5% of the shops provide dental hygiene products. These products are mostly acquired by the retailers from manufacturers due to production changes, faults in labelling or returns by conventional retailers.

Prices

The discount rates in most of the observed stores (95%) reach the level of 50% up to 70% compared to average market prices in conventional retail stores. In only 2 stores (5%) the discount rates are at 30% level or lower. Discount rates are also dependent on the amount of goods retailers are offering and their expiration date or shelf life.

Average spending per shopper per visit on a regular basket of goods is up to 4 EUR in 57% of stores and more than 4 EUR in 43% of the stores in the sample.

Store layout

Average store size, meaning shopping area, in most stores varies from less than $50m^2$ up to $200m^2$ with an exception of the largest store in Prague counting more than $200m^2$. Most of the stores contain facilities such as storage and cooling storage and some of them even have freezer storage available in order to keep a larger amount of goods for longer period without the need for frequent restocking and order of goods.

Employees

In 93% of the stores, less than 5 staff members per store are employed. The maximum number of employees is up to 10 people. This is given by the small size of the stores and lower complexity of their management in comparison with conventional supermarkets and hypermarkets. Also, none of the stores recruit volunteers as it is often the case in social supermarkets or non-profit organisations. On their websites and on in-store displays, the companies present their job offers for positions of shop assistants and store managers for full-time and part-time employment contracts.

Location

An interesting factor is that locations of stores of the individual retailers do not overlap, with the exception of Prague where 7 stores of 2 retailers are located. Therefore, the retail chains do not represent direct competition to each other, at least from the geographical perspective which allows them to engage their position and gain return customers within their area of influence. As a matter of fact, in most cases these stores are not even located near conventional retail stores to avoid local competition. As for store

location within towns and cities, 60% of the stores are located in city centres allowing them to provide higher convenience and attract more shoppers.

Conclusion

Social enterprises as part of the so-called third sector address social issues and come up with innovative sustainable business models resolving various socio-economic issues to benefit the society. One of the major global issues such as food waste in relation to food surplus is also fertile ground for emergence of new innovative solutions where social enterprises play a role. So far, the academic sphere has rarely focused on social initiatives in retailing but in the recent years this trend has been changing. One of the initiatives addressing food waste and individuals in need is a concept of social supermarkets as defined by e.g. Holweg et al. (2010a).

Due to historical circumstances of socialist regime, without basis in legal environment and low level of public support, social entrepreneurship in the Czech Republic has to emerge from bottom-up and develop through prodigiously innovative approaches inspiring itself by initiatives from abroad. The main aim of this study was to analyse the up-to-date situation in social retailing and discover whether and in what form social retailers exist in the Czech Republic.

The outcomes of this empirical study show that a certain form of retail entities providing discounted food and non-food products to members of lower social class and thus helping reduce food waste and increase social status of citizens in need is present on the Czech retail market. It is represented by a specific type of small retail stores selling discounted food and other products nearing the end of expiration date or shelf life to all members of the public. As it has been proven by the authors in their previous research of identifying three factors that most affect consumers while shopping food, the most important factor for the vast majority of Czech consumers is price (Asmalovskij and Sadílek, 2016b). Therefore, even though such concept attracts mostly members of lower social class, the group of individuals shopping in these retail stores is rather large and not limited by any commercial, legal or other factor. Also, the observed retail chains are not non-profit or voluntary organisations. On the contrary they exist mostly in the form of for-profit entities such as limited liability companies. As for type of employment and labour, they provide common full-time and part-time employment to the wide public without narrowing down their interest to social minorities or groups of people in need like e.g. the long-term unemployed. Another factor is the way of acquiring goods from their suppliers – according to the information presented on retailers' websites, the selected stores do not receive goods for free like most concepts of social supermarkets, but they buy out products from conventional retailers and manufacturers which those would otherwise dispose of due to quality faults of the goods, labelling, or nearing expiration date. Therefore, these goods are bought by retailers for discounted prices and subsequently sold at significantly lower prices in comparison with the average market prices with discount rates reaching 70%.

Summarising the aforementioned information, the authors came to conclusion that these stores cannot be considered social supermarkets such as those in Austria or Croatia according to definitions of Holweg et al. (2010a) and Klindzic et al. (2016). Nevertheless, these stores can rather be considered the so-called super discount stores as described by Caroli (Caroli and Gautie, 2008) or Oh and Kim (Oh and Kim, 2003). One way or another, these super discount stores present on the Czech market, functioning on a different model than SSMs, play an important role in reducing food waste and aiding certain citizen groups to obtain goods of basic need.

In conclusion, it is possible to discuss the reasons of such development in the Czech Republic. The findings of this empirical study will serve as ground for further research in this field of the Czech retail market. The next step of the research will focus on comparison of such retail models in Austria and Czech Republic as well as other selected European countries. The outcomes will then be used in order to select

the best and most efficient practices in retailing dealing with food waste and people living in or at risk of poverty, which is meant to be the main contribution of the authors.

Acknowledgment

This research was supported by grant F2/50/2017 – Social and Sustainable Entrepreneurship in International Context, by Faculty of International Relations at University of Economics, Prague.

References

Abzug, R., 1999. Nonprofits in organizational sociology's research traditions: An empirical study. Nonprofit and Voluntary Sector Quarterly 28, 330–338.

Asmalovskij, A., Sadílek, T., 2016a. SOCIAL ENTREPRENEURSHIP IN THE CZECH REPUBLIC, in: 9th Annual Conference of the EuroMed Academy of Business. pp. 315–330.

Asmalovskij, A., Sadílek, T., 2016b. Food quality perception in the Czech Republic: trial study results. Ukrainian food journal 186–194.

Borzaga, C., Defourny, J., 2004. The Emergence of Social Enterprise. Psychology Press.

Broadbridge, A., Parsons, L., 2003. Still serving the community? The professionalisation of the UK charity retail sector. International Journal of Retail & Distribution Management 31, 418–427.

Caroli, E., Gautie, J., 2008. Low-Wage Work in France. Russell Sage Foundation.

De Renobales, M., San-Epifanio, L.E., Molina, F., 2015. Social supermarkets: a dignifying tool against food insecurity for people at socio-economic risk. Wageningen Academic Publishers, pp. 285–290. doi:10.3920/978-90-8686-820-9_35

Dohnalová, M., 2006. Sociální ekonomika v evropeizaci českého hospodářství. Národohospodářskỳ ústav Josefa Hlávky.

Dohnalová, M., Průša, L., 2011. Sociální ekonomika. Wolters Kluwer Česká republika.

Filipová, A., Mokrejšová, V., Zeman, J., 2014. Social Responsibility and Food Waste in the Czech Republic. E-Leader International Journal 9.

Gupta, S., Pirsch, J., 2008. The influence of a retailer's corporate social responsibility program on re-conceptualizing store image. Journal of retailing and consumer services 15, 516–526.

Holweg, C., Lienbacher, E., 2011. Social Marketing Innovation: New Thinking in Retailing. Journal of Nonprofit & Public Sector Marketing 23, 307–326. doi:10.1080/10495142.2011.623548

Holweg, C., Lienbacher, E., Schnedlitz, P., 2010a. Social supermarkets: Typology within the spectrum of social enterprises. ANZMAC. Doing More with Less. Christchurch, New Zealand.

Holweg, C., Lienbacher, E., Zinn, W., 2010b. Social Supermarkets-a New Challenge in Supply Chain Management and Sustainability. Supply Chain Forum: An International Journal 11, 50–58. doi:10.1080/16258312.2010.11517246

Horne, S., 2000. The charity shop: purpose and change. International Journal of Nonprofit and Voluntary Sector Marketing 5, 113–124.

Klindzic, M., Knezevic, B., Maric, I., 2016. STAKEHOLDER ANALYSIS OF SOCIAL SUPERMARKETS. Business Excellence 10, 151.

Maric, I., Knezevic, B., 2014. Social Supermarkets as a new Retail Format Inspired by Social Needs and Philanthropy–The Case of Croatia, at Kantarelis. D.(ed., 2014), Global Business and Economics Anthology 2014, Business and Economics Society International, Danvers: 278-286.

Oh, S.-Y., Kim, I., 2003. A Comparative analysis on the marketing mix strategies of foreign and domestic super discount stores. Korea Trade Research Association 28, 185–220.

Policar, L., 2010. Role, identita a inovace Sociálního podnikání v České republice v transnacionální perspektivě. Masarykova univerzita, Fakulta sociálních studií.

Robinson, H., 2016. Food Banks of the United Kingdom, how effective are they at providing services for people in need, and thus are they having a positive of negative effect on food insecurity in the UK. (masters). Queen Margaret University.

Schumpeter, J.A., 1961. The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle. Translated by Redvers Opie. Harvard University Press.

Business Model of Industrial Enterprise: Sustainability Assessment

Elena Viktorovna Melnikova, Ph.D. in Economics, Associate Professor, Reshetnev Siberian State University of Science and Technology, Krasnoyarsk, Russian Federation, melena6921@mail.ru

Yuliya Aleksandrovna Bezrukikh, Ph.D. in Economics, Associate Professor, Reshetnev Siberian State University of Science and Technology, Krasnoyarsk, Russian Federation

Abstract

The article deals with the problem of defining business model. The classification of various approaches to defining business model in terms of its sustainability management capability is given. The advantage of stakeholder approach is justified. The article also provides requirements of stability imposed on a business model in order to turn it into a management tool. Implied application of a business model is proved to be the key to sustainability management capacities of an organization. The matrix of possible implied applications of a sustainable business model has been developed. Various aspects of sustainability (including static, dynamic and structural sustainability) have been identified.

Keywords: business model, management system, sustainability of a business model, types of economic system, enterprise, stakeholders, strategy.

Foreword

Nowadays circumstances, which management is conducted in, are rapidly changing. Economic globalization, crisis phenomena, social and ecological problems demand reconsideration of management concepts. One of the directions management is now being developed in is strongly connected to various aspects of sustainable growth.

The problem of sustainable growth has recently become essential for the humanity itself. Solving it is the matter of saving our civilization, natural ecosystems, the stability of political and economic systems, preserving animal and plant species, preventing climate change etc. The problem of sustainable growth is the one of considerable interest to researchers in numerous scientific fields. Searching for models that ensure the sustainability of a system within predetermined time, space and other limits is aimed at reducing management expenses.

As far as the article is concerned, the advancement of the management system of an organization is regarded as choosing such a models that is more likely to ensure the organization's survival and development over the long period of time (Bezrukih, Medvedev, Ryabova, 2015, p. 123). It is essential for the goal of the research to look into conceptual basis of a business model and its significance for management system; identify the difference between a strategy and a business model; characterize the term "sustainability"; identify the approaches to estimating the sustainability of a business model.

The hypotheses of the research is that business model, not the economic entity serves as the object of strategic management. We believe it to be the case, for the sustainability of an organization itself will ultimately reduce it to stagnation and destruction, whereas sustainable business model guarantees its resistance to sinking within predetermined time and space limits.

Being an administrative and development management tool, business models are of interest, for the successful ones can be replicated and transferred into different fields of business (Bezrukih, Medvedev, Chuvayeva, 2015, p. 529). According to the view of some authors, "more than ninety per cent of all innovative business models are nothing but a combination of existing ideas and concepts borrowed from other spheres" (Gassmann, Frankenberger, Csik, 2014, c. 9). However, we are inclined to consider it impossible to adapt borrowed business models, integrate them into an existing

management system and, what is more, create a brand new business model without conducting an in-depth theoretical research on the matter.

Regarding the evaluation of successfulness of a business model, more emphasis is generally put on brand new business model, for "innovative business model tends to have more potential for becoming successful rather than innovative product or process" (Gassmann, Frankenberger, Csik, 2014, p. 17). Yet, how do we assess an existing business model? What criteria do we use? What is more, how can this tool be used so as to expand the development potential of traditional industries with buoyant demand? Searching for answers to these question ultimately leads to analyzing conceptual framework and especially how the terms "business model", "management system", "strategy" and the correspondence between them.

Modern organizations can no longer be considered in static. Management systems are constantly developing; so do its aims and strategies. Strategy is a long-term identified vector of development of an organization. That is to say, strategy is a vector of development that was chosen either freely, based on strategic targets and the vision of the responsible executives, or forcedly, based on competitive pressure, which is understood as influence of Porter's Five Forces, taking into account macroeconomic factors and stakeholders' interests (Medvedev, Bezrukih, 2015).

Business model is a business mechanism, which is less dynamic than a strategy, part of management system, and the base that the strategy is implemented on. According to one of the researches, "business model is a way that a company chooses to create value for its clients and to get profit from it" (Soolyatte, 2010, p 11). Other researchers (Morris, Schindehutte, Allen, 2005) put emphasis on the fact that business model is able to stimulate conceptualization of a company as an interdependent system of separate strategic choices and to search for interconnections between elements with the help of unique combinations. What is more, these strategic choices include both those that "made on purpose and on default" (Morris, Schindehutte, Allen, 2005, p. 733).

Unlike a strategy, business model is not necessarily unique; it is a miniature maquette of business that can be represented with different degree of formality and accuracy. Thus, there are process oriented models, sustainable management models, perfection models (Chugumbaev, 2016, p. 60), and their purpose varies accordingly. Coherence between management system, strategy and business model in terms of demand for sustainability can be defined the following way: any strategy, even the most risky one, the one that is able to unbalance the system should be counterbalanced by a business model so as to ensure organization's manageability.

On Methodology of Analysis of Business Model's Sustainability

According to basic classification of economic systems suggested by G. Kleyner, "the characteristics of a system should reflect particular qualities of its natural limits in space and time" (Kleiner, 2010, p. 9). Defining a manufacturing plant as a system of class S4 with clearly defined space limits while being unlimited in time, the author emphasizes that in absence of time limits those object systems tend to be economically passive (are willing to preserve a status quo in time), yet actively make use of space (Kleiner, 2010, p.11). We believe that business model reflects those particular elements of management system that remain stable over a long, not limited in advance period of time (until considerable environmental disturbance). Since "real economic systems generally tend to possess qualities of all four types S1, S2, S3, S4" (Kleiner, 2010, p. 13), the author admits that there are hybrid systems. Therefore, business model can be a maquette not only of an object system – of an organization – but of environmental, process, project systems, which can be corporate culture, manufacturing process, innovations.

It is the position of the designer of a business model that plays an important role. The founder world consider the organization a project, consultants and shareholders – an object, production managers – a process, top managers and specialist – an environmental system. That is why choosing the designer of a model is the key question in terms of ensuring its effectiveness as a tool. It is preferable to choose someone from the outside – business consultant or a consulting company – so as to design an

object business model, which is the basic type for manufacturing plant. If “an object is an object system, than subject should have characteristics of a project system” (Kleiner, 2010, p. 44). In actual practice, a process type system – manufacturing subsystem of an organization – generally becomes an object for design. In this case a specialist in the area or a department can be the designer.

Considering the sustainability of an organization, we think it is reasonable to consider “sustainability” as a “variable” product of an object system (Kleiner, 2010, p.20). Being at the same time dependent on perception, knowledge and time limits of the evaluation, sustainability makes us approach defining a subject and limits of a model more deliberately.

In our opinion, the understanding of a business model as the apprehended and conscious part of the control system serving as the instrument of achievement of goals of management is the most adequate regarding the research aims. Since the purpose is always limited “timed”, the substantial change in the next management cycle has to be followed by the change of a business model. The cause for additional interest towards the problem of sustainability of a business model is determined by the fact that the object system has to change smoothly, in dialectic opposition to flexibility and stability.

Thus, the appeal to classification of economic systems allows to draw a number of practical conclusions:

1) approaches to understanding of a business model differ both on a typology of the modelled systems and on the degree of involvement in development of various management subsystems;

2) the aspiration to stability is the "built-in" purpose of object systems;

3) the management system of an organization as an object is adequate to its goal if it supports the manufacturing of new products, reproduction of resources and conditions of activity;

4) smooth change of a business model is coordinated with the requirement of stability of an object system;

5) organization modeling as an object system demands involvement of an “outside onlooker”.

The problem of maintenance of raw materials base motivates the enterprises of the nature operating branches to consider an organization as environmental system, to introduce the concept of corporate social responsibility, etc. Lag from other competitors demands considering the organization in process aspect. Signals of the future essential change of the environment (macrofactors, structure of branch) have to initiate project management. Considering such organizations as systems of hybrid type increases the practical importance of development of business models and allows to expect direct recoil from their use in management.

Conceptual Approaches to Understanding a Business Model

The polysemy of understanding of the nature of a business model in Russian is most fully presented in the work of Strekalova (2009). Agreeing with the author regarding the six approaches to the interpretation of a concept of a business model, within this work, we considered it possible to point out two more approaches: the stakeholder approach and the information approach. The characteristics of approaches given below not only reflects the contents of each of them, but also represents the perception of the modelled system and the characteristics of its stability.

Economic approach represents a business model in terms of formation and use of profit, considering the organization in a process key. Assessment of stability is carried out in the form of the analysis of financial and/or economic stability, and its long-term aspect is implemented in the investment analysis. Market and macrofactors are not involved into the process of sustainability assessment.

Since this approach can easily be used as a tool, the majority of all assessment approaches correspond with it.

Operational approach is implemented in the form of the description of business processes. The coordinated among themselves, effective, not demanding further rationalization business processes form perception of a business model as stable in the current determined timescale (it is realized in Bezrukih, Medvedev, Alashkevich, Mohirev (2015)). This approach corresponds with the definition given by Harvard business school: "the business model is a set of the defining business solutions, and also concessions and compromises involved into generating profit" (Sahlman, Stevenson, Roberts, Bhide, 1999).

Strategic approach forms a business model in categories of market positioning with identification of interests of stakeholders, considering the organization as environmental and/or object system. The description of a business model does not give in to strict formalization, however there is time factor in the form of division briefly and long-term tendencies, interests. Sustainability of the model presented thus can be estimated in the expert way; significant elements of a business model act as units of assessment.

The integrating approach offered in Morris, Schindehutte, Allen (2005) and presented to Strekalova (2009, p. 98), defines a business model as the description of the mechanism of creation and maintenance of steady competitive advantage. Let's note that the requirement of sustainability is put in a concept of a business model, and in the description six components of model are allocated, each of which ideally can undergo sustainability monitoring. Morris, Schindehutte, Allen (2005, p. 730) distinguish from model components offer factors, market factors, internal opportunities, factors of competitive strategy, economic factors and factors of intentions. Authors represent the last component as follows "the integrated business model has to cover the businessman's time, scale and the size of ambitions" (Morris, Schindehutte, Allen, 2005, p. 730). The component is interpreted as investment model of firm and offered the list of variants: model of survival/existence (subsistence). income model, growth model, speculative model (Morris, Schindehutte, Allen, 2005, p. 730). As in model the owner's purposes are considered, system perception of the organization corresponds to both object type, and project type.

Structural approach considers business system elements in their interrelation and allows to estimate organizational and administrative sustainability of business if necessary. Prospects of this approach in line with this research are connected with the fact that such description of a business model allows to denote the replicated secret of sustainability of the enterprises of industry. The emphasis of attention on "design" of components (Mayo, Brown, 1999) allows to define perception of system as object, however also possible the environmental type of system. As in some works structural approach is treated in a broader sense is possible, the business model also includes network of interaction with stakeholders. In this work we allocate stakeholders approach as independent which along with communication aspect reflects also target aspect of interaction with stakeholders.

Imperfection of the structural approach (understood in narrow sense) is in the exception of consideration of interactions with the external environment. This restriction is overcome within the system approach, based on methodology of open systems.

Inclusion in investigation the external factors complicates a business model. At the same time dynamic sustainability is distinguished as a separate element of model, and continuous changes in the external environment predetermine adjustment and replacement of a business model. Sustainability is understood as ability "to keep the competitive advantage" (Afuah, Tucci, 2003, p. 70-71), the choice or a combination of three strategy is offered: "defend", "run away", "unite".

Other authors emphasize the cognitive importance of creation of a business model in commercialization of technologies and prove need of its change if "opportunities … technologies are not combined with the current business model of firm" (Chesbrough, Rosenbloom, 2002, p. 5). Thus, the steady business model is the model capable to the operated transformation after change of an external environment.

System approach combines environmental type and object type of the organization, allows to consider sustainability of the company in the environment. The matrix of system characteristics of a business model presented in (Strekalova, 2009, p. 101), allows to project system of indicators of assessment of a management system, including sustainability indicators, with emphasis on competitive sustainability. Indicators of competitiveness can be used to describe stability (Melnikova, 2010, p. 274), but do not exhaust its content.

Information approach considers a business model as set of information models of the company. It is offered (Melnikova, Hanagyan, 2012, p. 387) to allocate goal-setting model (includes a mission, the purposes, competitive advantages), organizational model (distribution of powers and responsibility), functional and technological model, resource model, process model and model of structure of data (the description of regulations of the company and objects of an external environment). The central place is allocated to a process model which reflects a chain of creation of value (Melnikova, Hanagyan, 2012, p. 387). Sustainability of a business model at high extent of formalization of its structure can be estimated by means of quality indicators of coherence of its separate components or indicators of stability of separate components of a business model. Can be projected of separate quantitative indicators, such as standard stock rate, a reserve of production capacities (Bezrukih, Medvedev, Alashkevich, Mohirev, 2015, p. 25). The central place is allocated to goal-setting model, estimated indicators are offered, allocation of three levels of management decisions (functional model) is proved (Aksenovskaya, Boos, Vaisman et al., 2010, p. 152).

Stakeholder approach to business simulation is directly connected with long-term sustainability of the company. The balance of interests of stakeholders, and subject of the analysis – features of interaction, efficiency and ways of communications with stakeholders can become a starting element of creation of a business model. The steady business model within stakeholder approach is such, in our opinion, way of business which minimizes contradictions of interests of stakeholders, and also the financial and non-financial purposes of the company. In case of the conflict the business model has to allow to make such choice which effectively would balance briefly and long-term goals of the company with interests of interested parties, minimized reputation risks and expanded the business horizons. Sustainability of a business model is provided thanks to creation of the divided value (M. Porter and M. Kreymer) that "increases competitiveness of the company, at the same time improving economic and social conditions of communities in which it conducts the activity" (Porter, Kramer, 2011, p. 66).

Generalizing told, we counted expedient to correlate approaches to definition of a business model and a typology of economic systems, having revealed the considered types of sustainability (Table 1).

Table 1: Comparative characteristic of approaches to determination of essence of a business model

Approach to definition of a business model	Type of the modelled economic system	The considered sustainability types
Economic	Process	Financial sustainability, economic sustainability
Operational	Process, design	Sustainability of technology, separate business processes, reliability of information systems, resource sustainability
Strategic	Environmental (external environment), object	Market sustainability; sustainability of interaction with stakeholders
Integrating	Object, design	Competitive stability
Structural	Environmental (internal environment), object	Organizational and administrative and communication sustainability

System	Environmental (in general), object	Sustainability of situation in the external environment, including competitive sustainability
Information	Object	Sustainability of each component of model as lack of a mismatch
Stakeholder	Environmental (in general)	Sustainable development

Conclusion, presented in the Table 1 can become a starting point of studying of sustainability of a business model. Depending on the revealed problem (or research objectives) the adequate approach to modeling is chosen. This allowes to bare relationships of cause and effect without excessive expenses and to carry out due administrative actions. Representation of approaches "from simple to difficult" to some extent explains attention of scientists and practicians to economic and operational models, a research of financial, economic, resource sustainability. However even more often there is a need for creation of more labor-intensive and difficult models, for a research of all aspects of sustainable development.

Despite limitation of use, prospects of stakeholder approach are connected, in our opinion, with the next moments:

1) approach assumes division into economic, social and ecological sustainability;

2) concordance with the concept of sustainable development (UN);

3) presence of adequate information of a research, including for carrying out the comparative analysis on the basis of reports of sustainable development;

4) management of sustainability is integrated into system of corporate social responsibility and a control system in general;

5) despite prevalence of not quantitative methods of the analysis, this approach allows to give a cost assessment of interaction with stakeholders.

The principle of assessment of benefits of stakeholders from interaction (Yefimova, 2013, p. 47) based on the analysys of added value distribution allows to gain primary impression about scale and structure of financial streams, about influence of the company on economic situation of stakeholders.

Non-financial reports as sources of information have considerable, in our opinion, advantage of comparability, are formed on the basis of the Guide to the reporting in the field of sustainable development of GRI, the Social charter of the Russian business, and also standards of interaction with interested parties of AA 1000SES and AA 1000AS. In our opinion, the choice of the standard of the reporting has to depend on branch of industry, problems of sustainability that are solved and extent of integration of management of sustainability into a business model of the company.

The review which showed the general growth of the companies forming reports of sustainable development, fix the termination of providing the report by the separate companies (Alenicheva et al., 2015, p. 92), included in a research. We see in this fact not only the strong-willed act of the management, but also signs of not inclusiveness of management of sustainability in a business model of the organizations, perhaps, decrease in efficiency of primary activity. The relation to the reporting of sustainable development as to the project, without inclusion in a business model – a striking example of pendular decisions.

Summing up the results, we will note that the business model as the instrument of management, irrespective of conceptual approach to its representation, has to meet the following requirements (Table 2):

1) possibility of the formalized description, including graphic;

2) existence of internal structure, orderliness of elements of model;

3) comparability with models of other organizations at least within branch, ideally – in intercountries and interindustry scale;

4) instrument of competitiveness , possibility of determination of advantages, obvious to managers, but unevident for competitors;

5) multifunctionality of model predetermining a possibility of its use in realization of each of functions of management (planning – organization – motivation – control - coordination);

6) measurability, presence of quantitative parameters of model that gives additional opportunities for comparison of models;

Table 2: Extent of realization of requirements to a business model

Approaches to definition of a business model	Requirements to a business model					
	Forma-lized	Structu-ring	Compa-rability	Instru-ment	Multi-functio-nality	Measura-bility
Economic	*	*	*		*	**
Operational	**	**	*		*	*
Strategic	*		*	**		*
Integrating	*	*	*	*		*
Structural	**	**			*	
System	*	*	*	*	*	*
Information	**	**	*	*	*	
Stakeholder	*	*	**	*	*	*

As shown in the table, only two approaches meet all requirements: system approach and stakeholder approach. The business models developed on their basis can be considered as instruments of effective management of the organization.

About Assessment of Sustainability of a Business Model

Logic of development of open social and economic systems such is: chaos and an order – two regularly replacing each other states. Chaos as stability loss inevitably leads to an order – its finding. It is impossible to resist development dialectics, however the steady business model in a bifurcation point (a decision-making point) will allow without additional managerial influences, in an operating mode to keep sustainability of system provided that deviations of conditions of the environment, or fluctuations, do not go beyond admissible significances. Successful numerous passing of such points of the choice allows to note that the company has an adequate business model, and the management managed to avoid notorious "manual control".

The organization cannot but be considered as the system having the following properties: openness, purposiveness, humanism. The organization as open system is more subject to influence of weak signals, and therefore in its model also has to be put sensitivity to weak signals for the purpose of the subsequent adaptation to essential indignations in the external environment . Weak signals by Ansoff's definition are "indistinct early indications of the forthcoming important events" (Ansoff, 1975).

Sustainability of the organization in the unstable external environment can be considered as attribute of system and as reaction to external instability (Melnikova, 2009, p. 195). Absolutely steady system has no attribute of adaptability, does not provide ability to development. The aspiration to sustainability can be realized at the level of perception of system, that is to say concerning a business model. The condition of insustainability of economic entity is inevitable, moreover, on the basis of the research of life cycle, it is possible to forecast not only an unsustainability position, but also its reasons, typical for this stage of life cycle. According to V. A. Lubkov, at different stages occur "an activation of various components of a business model" (Lubkov, 2013, p. 48). The applied research objective has to consist in search of the mechanism of creation of a steady business model and its regular updating.

According to I. Prigozhin, "during the initial period … instability is localized in a small part of system, then extends" (Prigozhin, 1991). The task which can be solved by means of a business model consists in timely recognition of a source of instability, decision-making for its elimination or inclusion in strategy. Diagnostics has to be performed by means of the indicators which are built in a business model and procedures of tracking of weak and strong signals as instability sources.

The choice in a point of bifurcation is more complex problem which is solved by means of subsystems of management of knowledge and innovations. Their allocation as a part of a business model and in the real organization allows to eliminate delay of process of accumulation of information and knowledge about fluctuations of the environment in comparison with real processes. This element of a business model is represented to us critical in preservation of long-term sustainability as only a learning organization is capable to distinguish systematically new opportunities in the revolting influences, to refuse the existing competitive advantages in favor of new, to redesign a business model, acting in the conditions of the lack of information. Thus the requirement of flexibility of a business model is implemented. Than the flexibility is higher, than the more simply and cheap to change this business model, than more changes go on the way of "thin tuning" – imperceptibly for competitors and ordinary employees.

So, the methodology of management of sustainable development of the company has to include assessment procedure of stability of a business model and its adjustment if necessary. The business model is steady if it allows with sufficient efficiency to react to changes of the environment, compensating negative consequences of these changes and keeping a condition of key parameters of model in the set range.

Depending on the used approach to the description of a business model, extent of its formalization, the available information base and type of the modelled economic system, significantly differ the directions and ways of assessment of its sustainability . In what measure each of approaches provides a capability of business model concerning management of long-term sustainability? In a descriptive key the answer to this question consists in assessment of compliance of the purposes, procedures and results of development of model within this or that concept to business model sustainability conditions. In a constructive key the decision is connected with differentiation of definitions "a steady business model" and "management of sustainability of the organization on the basis of a business model", and in the latter case is of importance the type of the reached sustainability of the organization.

The list of conditions with which the steady business model has to satisfy is created by logic of this research and includes:

1) Measurability, existence of quantitative indicators of sustainability;

2) Complexity, possibility of the accounting of all aspects of sustainability (economic, social, ecological);

3) Aiming at sustainable development, built-in need of the accounting of social and ecological aspects of sustainability;

4) Strategic, internal orientation on long-term development;

5) Comparability, including with the best practicians in branch and/or with the best practicians outside branch, in the country and the world;

6) Flexibility, ability to effectively change key parameters of a business model without decrease in volumes of activity;

7) Sensitivity in relation to "weak signals" of the external environment.

Assessment of degree of compliance to these requirements of various "models" of the organizations is given in Table 3.

Table 3: Compliance of approaches to sustainability conditions of a business model

Approaches to definition of a business model	Business model sustainability conditions							
	Measurability	Complexity	Aiming at sustainable development	Strategic	Comparability		Flexibility	Sensitivity
					in branch	in the country and the world		
Economic	+	–	–	–	±	±	–	-
Operational	–	–	–	–	+	–	±	-
Strategic	+	–	–	+	+	+	±	-
Integrating	+	+	±**	+	+	+	+	±
Structural	–	+	–	–	+	–	+	-
System	+	+	–	+	+	+	+	±
Information	+	+	-	-	+	-	±	-
Stakeholder	+	+	+	+	+	+	+	+

* in narrow sense
** compliance to the requirement only for the enterprises of those branches where the problem of negative outer effects in social and ecological spheres is particularly acute especially

Thus, it is possible to draw a conclusion about opportunities of the corresponding models in ensuring sustainability of the organization and to formulate a number of research problems: ensuring measurability and comparability of business models, formation of the built-in target orientation to sustainable development in the long-term period, coordination of the economic, social and ecological targets, at last, a problem of adaptability of model as instrument of management. Each of problems is cross-disciplinary and demands separate review.

On Target Reference Points of Sustainability Management

In works of a number of foreign researchers it is rather obviously possible to observe evolution of views from sustainability as the purposes (result) of a research of other problems prior to a research of management of sustainability. So, Peter Johansson (Johansson, 2007, p. 4) sets as the purpose to formulate the management model maintaining both sustainability of the organization, and global stability, realizing it by means of instruments of quality management. In later work, in a co-authorship, he considers the stakeholder theory of management of sustainability (Garvarea, Johansson, 2010), noting that organizational sustainability can be reached, meeting requirements of interested parties. The founder of the theory of stakeholders Edward Freeman, having offered

stakeholder's model of firm (Freeman, 1984), showed influence of management of interested parties on survival of the organization (Freeman, Harrison, Wicks, 2007). The idea of influence of stakeholders on sustainability, is developed in (Savage, Nix, Whitehead, Blair, 1991), including applied aspect.

Development of logic of the real research demands differentiation of the concepts "steady business model" and "management of sustainability of the organization on the basis of a business model", thereby we bring up a question of subjectivity and type of system again. Let's use classification of types of economic systems (Kleiner, 2010). The business model is the system of project type, replicated, limited in time and space. The organization, depending on the used approach can be considered as system of any of 4 types, or as system of hybrid type that extremely complicates its modeling.

The business model is created for the solution of a specific administrative problem, and if that is connected with sustainability, there is a natural question: about what sustainability there is a speech? The steady business model to some extent is "mirror" of the organization striving for sustainability. The model sustainability conditions given above are necessary for adequacy of this tool in order that "the mirror was not curve". For what sustainability the subject of management strives?

The fullest classification of types of sustainability of the enterprise is presented in (Grigoryan, 2015), however concerning a business model similar systematization is absent. The theoretical platform of the analysis of sustainability of system has, in our opinion, cross-disciplinary character and in the most general view assumes allocation of static and dynamic sustainability. Static sustainability assumes consideration of system as closed and reflects: a) a keeping of properties of system of rather certain ideal (sustainability of a state - SS1) and b) a keeping of the communications of system defining its uniqueness and viability (structural sustainability - SS2). Using the characteristic "by contradiction" (vice versa), we specify: statically unsustainability system has the current indicators of activity significantly better or worse planned (an unstable state) or uses other business model, there was its change control or not. Ability of a business model to adaptation will be coordinated with research objectives, and therefore the question of a measure of structural sustainability remains open.

The organizations as open systems, being in interaction with an environment, change the purposes, structure, communications, and therefore dynamically steady organization is the adaptive organization, viable in a long period. The dynamic sustainability (DS) of a business model reflects ability to keep integrity of the organization in the conditions of its constant evolution. The target reference points concerning sustainability realized within this or that approach to modeling taking into account type of the modelled system are presented in Table 4.

Table 4: Target reference points (intentions) concerning sustainability of a business model

Approaches to definition of a business model	**Type of the modelled economic system**			
	process	**project**	**object**	**environment**
Economic	SS1			
Operational	SS1, SS2	SS1		
Strategic		SS1, SS2	SS2	
Integrating		SS2, SS1	DS, SS2	
Information			SS2, DS, SS1	
Structural			SS2, DS	DS, SS1
System			SS2, DS	DS
Stakeholder				DS, SS2, SS1
SS1 - sustainability of a state (static sustainability), SS2 – structural sustainability, DS - dynamic sustainability				

Data of table reflect possibilities of this or that approach to modeling concerning achievement of the objectives of sustainability. The developer, based on its position relative to the object modelling and the objectives, can choose an adequate approach to creation of a business model, rather simple that the model was apprehended by performers, rather difficult, allowing to consider significant sources of fluctuations.

The sustainability type at which the control system is aimed introduces the accents in a business model. So, if "static approach to assessment of sustainability assumed accent on structural, technological and financial making models, then dynamic approach requires attention to a goal-setting, processes and functions" (Melnikova, Hanagyan, 2012).

Conclusions and suggestions

Theoretical and practical interest in a problem of ensuring sustainability presses for developments of the instruments of improvement of management integrating the economic, social and ecological targets of development of the organization. The problem is, of course, strategic, requiring study in statics and in dynamics.

The study used a systematic research methodology. Organization as primarily object-based, has a "built-in" commitment to sustainability, changes should have a smooth flow. The business model of the enterprise is understood as the accepted and recognized part of the control system, the prototype of the ideal. Finding a good business model allows the organization to maintain sustainability with minimal administrative intervention when fluctuations in the external environment within a certain range. It justifies the thesis that the pursuit of sustainability can be implemented at the level of the business model.

The appeal to a typology of economic systems allowed to systematize the content of eight approaches to understanding of a business model, to define their opportunities regarding management of sustainability. Requirements with which has to satisfy a business model as the instrument of management, and also business model sustainability conditions in relation to each of approaches are formulated.

Opportunities and mechanisms of management of sustainability at the level of a business model, are defined by target orientation of model. Seeking for maximizing profit in the short and medium term, the subject of management creates economic (financial) model of the company which is essentially unsuitable for the solution of problems of competitiveness, environmental problems. In the choice of the purpose and type of model it is impossible to rely only on strategic vision of the owner or head.

In work it is shown that achievement financial, technological, competitive, etc. sustainability as the purposes of development of the organization, so, and creation of a business model, is deprived of sense. In all-managerial context it is important to choose target orientation of business in temporary aspect, taking into account a phase of life cycle and a conditions of the environment. The target type of sustainability, eventually, depends on how the subject of management outlined environment borders. It is offered to consider static sustainability, structural sustainability and dynamic sustainability. Consideration of problems of sustainability in dynamics will influence not only contents and a way of calculation of indicators of sustainability, but also transforms requirements to structure of a business model, the importance of its elements, will change ability to adaptation, and also on a contour of feedback will affect features of a goal-setting and priority of development goals.

Along with a problem of formation of target orientation to sustainable development, further researches can be aimed at providing measurability, comparability and replicability of business models, coordination of the economic, social and ecological targets by the principle of "trinity", providing adaptation opportunities of a business model.

The practical importance of a research is connected with development of a matrix of target reference points of sustainability and systematization of approaches to creation of a business model.

Advantages of stakeholder approach are formulated. Further developments can be conducted in the direction of formation of indicators of sustainability of a business model.

Acknowledgements

The research has been completed with the support of RGNF (grant № 15-12-24003) and KGAU "Krasnoyarsk Regional Foundation of Science and Technology" (project "Developing a management system for enterprises of wood-processing industry in modern conditions").

References

Bezrukih, Ju. A., Medvedev, S. O., Ryabova, T.G. (2015) 'Sistema Upravleniya Lesopromyshlennym Predpriyatiem v Usloviyakh Ustoichivogo Razvitiya Ekonomiki na Sovremennom Etape: Metodicheskie Aspekty' [The System of Management of Timber Companies in Conditions of Sustainable Economic Growth at the Present Stage: Methodological Aspects], Science Prospects, 6 (69), 124-128.

Bezrukih, Ju. A., Medvedev, S. O., Chuvayeva, A. I. (2015) 'Sistema Upravleniya Lesopromyshlennym Predpriyatiem. Otsenka i Modelirovanie Biznes-Protsessov po Metodike BETEC' [Control System of the Timber Industry Enterprise. An Assessment and Modeling of Business Processes by BETEC Technique], Ekonomika i Predprinimatelstvo [Economics and Entrepreneurship], 5 Part. 2 (59-2), 529-534.

Gassmann, O., Frankenberger, K., Csik, M. (2014) The Business Model Navigator: 55 Models that Will Revolutionize Your Business, Pearson/Financial Times, London.

Medvedev, S. O., Bezrukih, Ju. A. (2015) 'Issledovanie Protsessov Deyatelnosti Lesopromyshlennykh Predpriyatii' [The Research into Operation Processes of Timber Industry Enterprises], Global scientific potential, 6(51), 89-92.

Soolyatte, A. Yu. (2010) 'Biznes Model – Klyuch k Razvitiyu Biznesa na Osnove Innovatsii' [Business Model – the Key to Iinnovations Based Bbusiness Development]. Menedzhment Innovatsii [Management of Innovations], 1(9), 6–15.

Morris, M., Schindehutte, M., Allen, J. (2005) 'The Entrepreneur`s Business Model: toward a Unified Perspective,' Journal of Business Research, 58 (6), 726–735.

Chugumbaev, R. R. (2016) 'Etalonnoe Upravlenie na Osnove Biznes-Modeli Sovershenstva' [Benchmark Management on the Basis of the Business Excellence Model], Uchet. Analiz. Audit [Accounting. Analysis. Audit], 1, 58-64.

Kleiner, G.B. (2010) Razvitie Teorii Ekonomicheskikh Sistem i ee Primenenie v Korporativnom i Strategicheskom Upravlenii [Evolution of the Theory of Economic Systems in Application to Corporate and Strategic Management], TsEMI RAN, Moscow.

Strekalova N.D. (2009) 'Kontseptsiya Biznes-Modeli: Metodologiya Sistemnogo Analiza' [Business Model Concept: the Methodology of System Analysis], Izvestiya Rossiiskogo Gosudarstvennogo Pedagogicheskogo Universiteta im. A.I.Gertsena [Journal of Hertzen Russian State Pedagogical University], 92, 95-105.

Sahlman, W. A., Stevenson H.H., Roberts M.J., Bhide A. (1999) The Entrepreneurial Venture (The Practice of Management Series), Harvard Business School Press.

Mayo M., Brown G. (1999) 'Building a Competitive Business Model,' Ivey Business Journal, 63 (3), 18–23.

Afuah A., Tucci C. (2003) Internet Business Models and Strategies, McGraw Hill, Boston.

Chesbrough H., Rosenbloom R. (2002) 'The Role of The Business Model in Capturing Value from Innovation: Evidence from Xerox Corporation's Technology Spin-Off Companies,' Industrial and Corporate Change, 11(3), 529–555.

Melnikova, E.V. (2010) 'Strategicheskii Kontrolling kak Faktor Povysheniya Ustoichivosti Organizatsii' [Strategic Control as a Factor of Increasing Sustainability of an Organization], Ekonomichni Nauky. Serii: «Oblik i Finansy» [Economic Sciences: "Accounting and Finances"], 7(25), 273-282.

Melnikova, E.V., Hanagyan, L. M. (2012) 'O Pokazatelyakh Ustoichivosti Biznes Modeli [On Indicators of a Sustainable Business Model]', Ekonomichni Nauky. Serii: Ekonomika ta Menedzhment [Economic Scienes: "Economics and Management"], 9-2 (33), 385-394.

Bezrukih, Yu. A., Medvedev, S. O., Alashkevich, Yu. D., Mohirev, A. P. (2015) Razrabotka Sistemy Upravleniya Lesopromyshlennym Predpriyatiem v Usloviyakh Ustoichivogo Razvitiya Ekonomiki: monografiya [The System of Management of Timber Companies in Conditions of Sustainable Economic Development: monograph], OOO RPB«Amalgama» [Amalgama].

Aksenovskaya, N. A., Boos, V. O., Vaisman, E. D. et al. (2010) 'Problemy Ekonomiki i Upravleniya Predpriyatiyami, Otraslyami, Kompleksami: monografiya, kniga 13' [Problems of Economy and Managing Enterprises, Industries, Complexes: monograph, vol.13], Sibprint, Novosibirsk.
Porter, M., Kramer, M. (2011) 'Creating Shared Value', Harvard Business Review, 1, 66.

Yefimova, O. V. (2013) 'Analiz Ustoichivogo Razvitiya Kompanii: Steikkholderskii Podkhod' [The Analysis of Sustainable Growth of an Enterprise: stakeholder approach], Ekonomicheskii Analiz: Teoriya I Praktika [Economic Analysis: Theory and Practice], 45 (348), 41-51.

Alenicheva, L.V. et al. (2015) Otvetstvennaya Delovaya Praktika v Zerkale Otchetnosti. Analiticheskii Obzor Korporativnykh Nefinansovykh Otchetov: 2012–2014 Gody Vypuska [Responsible Business Practice in a Reporting Mirror. Analytic Review on Corporate Nonfinancial Reports: 2012-2014 Years of Release], RSPP, Moscow.

Ansoff, I. (1975) 'Managing Strategic Surprise by Response to Weak Signals', California Management Review, 17(2), 21-33.

Melnikova, E.V. (2009) 'O Strategii Obespecheniya Ustoichivosti Firmy' [On the Strategy of Ensuring Sustainability of an Enterprise], Sovremennyi Rossiiskii Menedzhment: Sostoyanie, Problemy, Razvitie. Sbornik Statei 10 Mezhdunarodnoi Nauchno-Metodicheskoi Konferentsii ["Modern Russian Management: State, Problems, Development". Collection of Articles of the 10th International Science and Methodology Conference], Penza.

Lubkov, V. A. (2013) 'Obyekt i Etapy Strategicheskogo Analiza Organizatsii' [Subject and Stages of Organization Strategic Analysis], Rossiiskoe predprinimatelstvo [Russian Entrepreneurship], 8(230), 46-51.

Prigozhin, I. R. (1991) 'Filosofiya nestabilnosti' [Philosophy of Instability], Voprosy filosofii [The Questions of Philosophy], 6, 46–52.

Grigoryan, E. S. (2015) 'Klassifikatsiya Vidov Ustoichivosti Predpriyatiya' [Classification of the Types of Sustainability of an Enterprise], Kontsept [Concept], 3, 86-90.

Johansson, P. (2007) Quality Management and Sustainability - Exploring Stakeholder Orientation. Luleå University of Technology Department of Business Administration and Social Sciences Quality & Environmental Management, 1.

Garvarea, R., Johansson, P. (2010) 'Management for Sustainability – A stakeholder theory,' Total Quality Management & Business Excellence, 21(7), 737–744. DOI: 10.1080/14783363.2010.483095

Freeman, R. E. (1984) Strategic Management: A Stakeholder Approach. Harpercollins College Div, Boston.

Freeman R. E., Harrison J., Wicks A. C. (2007) Managing for Stakeholders: Survival, Reputation and Success. Yale University Press.

Savage, G. T., Nix, T. W., Whitehead, C. J., Blair, J. D. (1991) 'Strategies for Assessing and Managing Organizational Stakeholders,' Academy of Management Executive, 5(2), 61–75.

MAESTRO: Towards a Collaborative AAL Market Quality Assurance Platform for Monitoring Devices, Systems And Services

Karen Coan, Netwell, Dundalk Institute of Technology, Ireland, karen.coan@staffmail.dkit.ie Wassila Aggoune-Mtalaa, LIST, G.D Luxembourg, wassila.mtalaa@list.lu

Rodd Bond, Netwell, Dundalk Institute of Technology, Ireland, rodd.bond@staffmail.dkit.ie Djamel Khadraoui, LIST, G.D Luxembourg, djamel.khadraoui@list.lu

Abstract

This paper outlines the economic perspective for MAESTRO as both an Ambient Assisting Living (AAL) research and innovation project and as a viable quality assurance service platform. It examines the process of building an effective and sustainable business model and business plan for MAESTRO to address the current and future economic context. The MAESTRO project's objective is to develop an on-line platform that can create and showcase 'confidence, trust and reliability' in the emerging marketplace for monitored and self-monitored devices, systems and services that promote health and wellbeing for older people. With the pace and quantity of new products, services and technologies emerging within the AAL marketplace, it is difficult to source reliable and trustworthy product and service quality information that can underpin selection and procurement decision making. The MAESTRO platform is being developed to address this identified gap and market weakness, and it is being co-designed with solution providers, service commissioners and end users across the value chain, within a set of pilot projects in 4 European territories.

Keywords: Ambient Assisted Living (AAL), Service Platform, Self-monitored devices, Economic model

Introduction

Nowadays, there is a big quantity of new products, services and technologies emerging within the Ambient Assisted Living domain, see the works of Aggoune-Mtalaa et al., (2014) and Aggoune-Mtalaa and Aggoune (2014). However the clues and control references for adequate orientation of the consumer are lacking and the result is a media-supported image of a fantastic potential for follow-up of one's activities and even some vital parameters, but with often no verified nor legitimised and verified less certified criteria (there are exceptions of course), regarding such key dimensions as performance, reliability, user-friendliness, acceptability, potential for delivering medically ascertained data, privacy issues, etc, see the papers of Park et al. (2017) and Mainetti et al. (2016). This confusing and probably in many cases misleading landscape, is problematic for the elderly, often non fully digitally literate and not always in the capacity to know, understand and distinguish the key elements of the underlying promises associated with these technologies. There is therefore at the same time a claim to give access to truly helpful devices for well-being and health-related monitoring capabilities, but most of the time as an emerging market not accompanied by the kind of references and metrics which could establish the basis for an effective user-centered affordance of these new means, see the work of Norgall and Wichert (2013) and the one of Knegel and Auinger (2015).

The aim of MAESTRO project is therefore to deliver a reference framework for a commercially viable platform in the domain of monitored devices to promote health and wellbeing for older people. In the frame of the European Ambient Assisted Living (AAL) programme, MAESTRO project partners who are

either associations helping seniors and their caregivers, enterprises or research and academic institutions are joining their efforts to develop an ICT platform which will address the gaps in the market identified through the consortium research. The final look and feel, functionality and purpose of the MAESTRO platform will be informed by the user requirement interviews, focus groups and particularly by the pilots being conducted in Switzerland, Ireland, Luxembourg and Italy during the project. Based on the analysis of initial programmatic goal, constraint and requirement data, the consortium decided on two inter-dependent and sequential 'go-to-market' value propositions for the MAESTRO platform. It will form as two overarching services into two complimentary 'spaces', a developmental and formal assessment process into the 'professional space' and a curated informal marketplace for the 'consumer space'. This work is presented as follows: the next section is dedicated to strategic considerations. Then the framework dimension and value proposition are presented. The market landscape is described in the next section. The strategic options are then discussed followed by the consideration for preferred scenarios and the options that have to be analyzed to fine tune the go to market strategy. The paper ends with a summary of the scenario analysis conducted so far.

Strategic Considerations

The AAL market is a relatively new one, see the work of Maciaszek et al. (2017), and the MAESTRO platform will be an early development in this space. There are therefore many unknowns at this stage in the process but some of the key strategic questions need to be answered if the consortium wants to reach a successful commercialization of the platform.

Probably the starting question will be what do we see as our core target market - where are the best opportunities for MAESTRO? Is it focused on the smart homes segment, the AAL device market, eHealth? It may be better to develop a sense of a specific market segment where we feel there is a good chance for early success - with a view to moving into differing segments later in the enterprises life-cycle.

What is the value proposition? Is it to build trust and confidence for the consumer in choosing AAL products and services? Is it a developmental process or is it both? At this stage of the process we can see that MAESTRO could be an interdependent platform where a MAESTRO development process develops products for the MAESTRO marketplace registry. This hypothesis requires further detailed analysis. Understanding the value proposition is fundamental and needs careful consideration if MAESTRO has to be commercially successful.

Who are MAESTRO customers i.e. who will use MAESTRO services? Is it buyers of the devices and/or services? Or sellers of systems? Or companies developing services and products? Understanding the customer profile and their motivations is crucial but this question will obviously be shaped depending on the value proposition.

What are the key resources or assets? Is it a hosting platform, an online marketplace, a quality benchmarking site or a process which enables the exchange of intelligence and expertise? This will again depend on the agreed value proposition. This will also have a knock-on effect on how the enterprise will generate revenues; is it through membership fees, transaction fees, hosting or advertising revenue?

Above all, when conducting detailed marketing analysis for the strategic considerations noted above it is vital that the goal is to come up with a value proposition that has a clear point of differentiation or a Unique Selling Proposition (USP) which is easily communicated in order to support the successful launch of MAESTRO. The early stage of market development needs also to be taken into account and should shape a 5-year plan of how the platform could be launched, supported and developed in its early life-cycle.

Framework Dimensions and Value Proposition

There are three key variables when we look at framing the MAESTRO go to market scenarios. These are:

- Those who are selling monitored products or services - push companies.
- Those who are buying monitored products and services - pull organisations.
- Market maturity and readiness - where along the technology and market readiness spectrum does the product/service/system sit?

These variables can be further broken down to their component characteristics.

Those selling monitored products or services (push companies)

We can analyse the sellers of monitored systems and services according to the complexity of the system they are selling - at one end of the axis we have simple or standalone systems e.g. smartwatch and blood pressure monitor, moving on to more complex scenarios e.g smart homes through to fully integrated monitored systems at the opposite end of the axis, see Fig 1.
Each of these types of seller (Push Company) will have specific requirements in order to get to market which will help to define the MAESTRO value proposition from simple benchmarking or marketplace placement through to professional sales consultation and systems integration design.
In terms of market segmentation - sellers (push companies) will also broadly fit into differing market segments i.e. for simple systems it will more than likely be a mass market, consumer segment but for more complex, integrated solutions it will more than likely be a smaller pool of potential customers however these customers will be higher in value.

Those Buying Monitored Products or Services (Pull Organisations)

Similarly we can analyse those buyers of monitored systems and services against the type of buyer/level of expertise required in the buying function. On one end of the axis we have the end user i.e. older person, family member or caregiver buying the system. This moves up the axis to professionals buying or advising a series of systems for different end users e.g. brokers through to the procurement manager of an organisation (either public or private) e.g. the health service at the other end of the axis.
Each type of buyer (pull organisation) will have specific requirements which will again help to define the value proposition. In a simple product/system/service the value proposition could be a trusted presentation of options from a benchmarking portal all the way through to a co-design function to allow for tailored services/devices and support systems.
In terms of market sizing, we can again look at the differing market segmentation - buyers (pull organisations) will also broadly fit into differing market segments i.e. for simple systems it will more than likely be a mass market, consumer segment but for more complex, integrated solutions it will more than likely be a smaller pool of potential buyers who will be higher in value.

Market and Technology Readiness

One of the key variables in this framework in terms of defining where both the sellers and buyers are within the market, is the technology and market readiness of the products, services and systems.

Overlaying technology readiness in terms of whether the products and services are new and emerging or whether they have been launched and possibly nearing maturity will offer another lens to determine what go to market scenarios are best to launch with. For sellers (push companies), there is a massive difference in their potential needs between developing new products to selling mature products and services in this space. For buyers (pull organisations), there is also a difference in their requirements based on the technology/market readiness primarily in terms of the guidance needed in purchasing.
It will be critical when choosing a winning go to market scenario that we fully map these variables to give an overview of what combination(s) offers the biggest commercial opportunity.

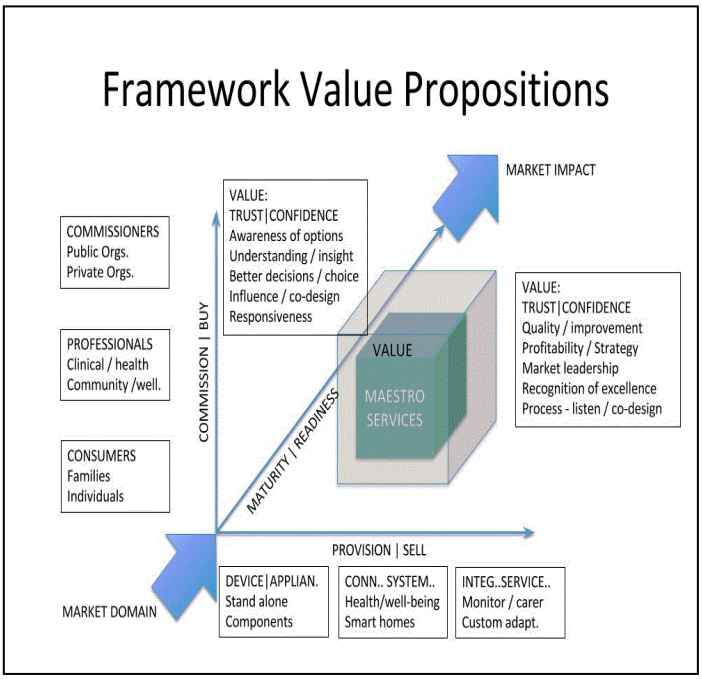


Fig. 1: Framework dimensions

Market landscape

Competitive Environment

There are many online sites offering information and comparisons on a range of smart monitored devices for instance just for fall detectors there is a wide selection of websites offering advice and guidance e.g. www.telecare.ie, www.assistireland.ie, www.medicalalertadvice.com, www.livingmadeeasy.org.uk. For cognitive support www.unforgettable.org and www.alzproducts.com are just two examples. For smart homes there is again many websites offering advice e.g www.pcmags.com, www.cnet.com, www.digitalhomes.ie, www.toptenreview/best home automation service 2017. There is also some consultancy styled websites for more complex systems e.g. www.medtronic.com and www.nhsbenchmarking.nhs.uk.

Even at this early stage, it is both a complex and confusing arena for caregivers and it is quite a competitive arena in which to launch a platform. A strong understanding of the target market, gaps in that market, value proposition and the USPs are all going to be critical when launching MAESTRO.

Gaps and Opportunities

Interviews with both push companies and pull organisations across Ireland, Switzerland, Luxembourg and Italy have all pointed several gaps and opportunities within this environment namely the need for guidance - both for push companies in developing their products and services and for pull organisations in procuring or advising the right solutions for the older people in their care. If we are to start to refine some of the possibilities that MAESTRO could provide commercially, investigating the gaps as perceived by end users will provide very valuable insight. The gaps identified by care providers (pull organisations) thus far are as follows:

- **Trust** - there's a lack of universally understood accreditation, standards or endorsements in websites offering monitored systems, products and services.
- **Online advice** i.e. benchmarking or marketplace with an initial assessment by a professional e.g. occupational therapist, which leads to a presentation of two/three options and their websites (This applies to professional 'pull' organisations as well as to end users).
- **Citizen's advice** element to the site - whereby you can have a tracker to only get options and you could receive financial assistance in procuring.
- **Links to global research** for pull organisations along with **links to feedback** from other users for families or end users in the area you are looking at e.g fall prevention.
-

Gaps identified by push companies looking at developing AAL products and services include:

- **Access to market research** reports initially e.g. specific Gartner styled reports to understand what the market potential is for their companies.
- **Networking** - access to other organisations who could help in the development cycle - particularly those in other jurisdictions.
- **Living Lab** - Access to end users for testing and evaluation
- **Advice on legal and ethical** issues particularly on data-sharing
- **Product monitoring and improvement**, or feedback during early post-launch phase.
- **A trusted route to market** - to give them a competitive edge.

Market structure and size

Global market size in dollars

The AAL market is a large and growing global market which is projected to be worth in the region of $60.14 billion by 2020 (this is split into $56.18 billion for smart homes and $3.96 billion for AAL products, systems and services). This represents a growth of 45% and 36% respectively in the five years from 2015, see Maclaszek (2016).

Though much of the growth in this area is anticipated to come from the US, particularly in the early adopter segment, Europe's ageing populations give rise to sizeable opportunities in this arena. Many technology companies who have developed products, services and applications in other arenas e.g. gaming

or fitness are looking at the possibilities offered by an emerging health and wellness enhancement market to support a global ageing population. There is massive potential to both target individuals and the national health systems, private healthcare and health insurance companies who are supporting them.

Stakeholder Analysis

We have already broken the AAL market from a MAESTRO perspective into both developers (push companies) and companies or individuals procuring AAL products and systems (pull organisations) who would find an information sharing site useful.

Using the detailed feedback from the field research carried out by the consortium we can start to look at some of the characteristics of the stakeholders in this market.

a) End users and caregiving 'pull' organisations:

Today, older end users have a tendency to be cautious in embracing technology, this however will change as the penetration of technology increases; it is worth noting that the penetration of smartphones is estimated to increase to 70% of the global population by 2020 as shown in Marketsandmarkets.com (2016).

Currently end users receive guidance from professionals in the area of wellness or health supports (particularly those with a technological aspect) or family who will also seek some assurance from a trusted source before choosing wellness or health supports. A simple benchmarking or marketplace site in this arena is not enough for them - they need guidance in making decisions.

Brokers or professional care-giving organisations see the value that technology offers in supporting older people, especially where there is a lack of government, community or family support - which is often the case. However, in our field research the overarching theme of risk came up. As a broker or professional caregiver they will not advise or recommend something they are not 100% sure of. Also, they need to know if the options are financially feasible i.e. the person can afford them.

Further detailed analysis of the care giving organisations and the end user profile will be required for the business case.

b) Developers or 'push' organisations

The analysis of stakeholders in the domain of developer or push company is complex and will depend on the type of product or service they are developing and the markets they wish to access. Some of the characteristics will be common to all developers however. These include the need to access a network of expertise and most importantly access to end users in testing their solutions. All developers wish to utilise a route to market which gives them a competitive advantage. Ultimately what developers need is the ability to plug a gap in the market with their solution, delivered in a manner which meets their target customers' needs. Our stakeholder analysis needs further development throughout the project in order to complete the business case.

Strategic options

The market framework described in the preceding section which overlays the key variables of product complexity against market and technology readiness, led us to come up with four market scenarios or strategic options for further investigation:

- A development process for new technology to support mass market products and services.
- An online curated/benchmarked marketplace for mass market product and services which will be purchased in a relatively simple transaction.
- A development process for new technology to support niche, high end and more complex products and services.
- An online consultative marketplace for niche high end and potentially more complex integrated systems, which require complex purchasing capability and sales support.

We have added a further layer to this model, shaped by the gaps in the market as identified by the detailed field research across the consortium. This layer addresses the expressed need for guidance and trust by both push companies and pull organisations.

The strategic options which we are now considering are built on those listed above and can be viewed as an interdependent, sequential platform which meets the needs of push companies both developing and selling the right, trusted products and services and pull organisations and end users who want to procure the right, trusted services and products.

This will be described further as MAESTRO development process which feeds the MAESTRO online registry.

Mass Market - Development process and curated marketplace registry

The characteristics of the mass market in this context are that it is driven by the consumer i.e. business to consumer sales [B2C] with a high volume of lower value units.

Mass Market early technology or early market scenario-emphasis on development (consultation, feedback forums, off the shelf research, advice on commercial partnerships, standards etc.) This scenario, as shown in Fig 2. focuses on push companies offering them access to a range of development and testing tools for mass market devices or services.

Mass Market mature technology or early market scenario-emphasis on availability (impartial curation/advice, benchmarking, branding). This scenario focuses on both the push companies and pull organisations, offering push companies a route to market and offering pull organisations or end users an impartial guide (curated comparative or benchmarking) platform where they can feedback user experiences.

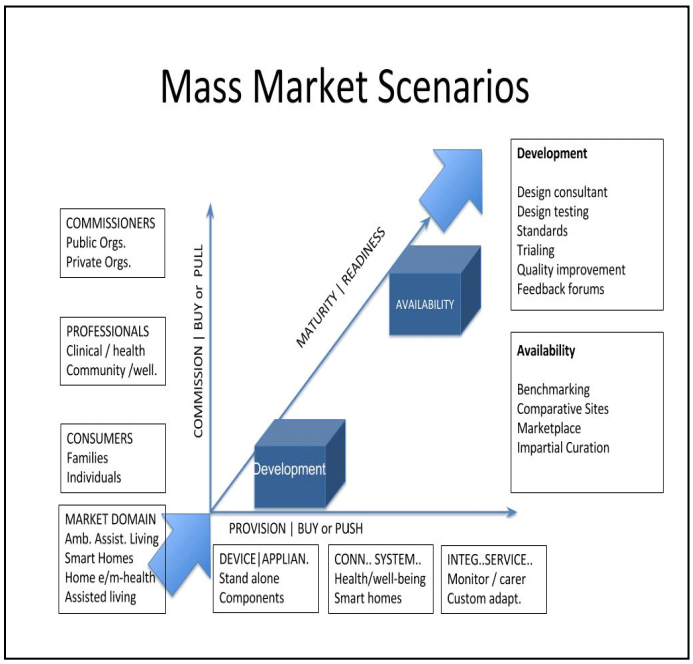


Fig. 2: Mass market scenarios

Niche market, Development process and consultative online sales channel

The niche market characteristics in this context are more business to business (B2B) in nature, developing and selling high value, complex solutions in lower volumes.

Niche high value, early technology or market scenario -emphasis on development (co-design, collaboration, consultation, integrated design and testing). This scenario, illustrated in Fig 3. focuses on push companies as they could use this platform to help develop their complex products and services by engaging expert pan European consultants to aid in design, interoperability, standards etc. Pull organisations may be interested in joining this type of forum to receive information/research analysis and to potentially participate in conferences, testing/trials**.**

Niche high value mature technology or market scenario - emphasis on market availability (complex consultative sales and procurement). This scenario focuses on both push companies and pull organisations as it facilitates a complex sales/purchasing transaction and could offer a range of consultative integration/training services to both**.**

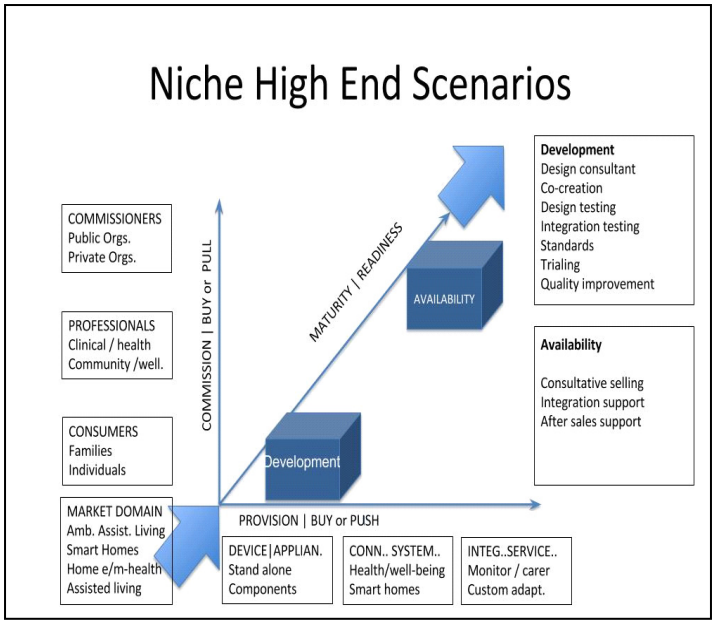


Fig. 3: Niche High End Scenarios

The MAESTRO Development and Formal Assessment Process (B2B)

The model highlighted above for both mass market and niche or high end developments can be further refined by inserting the need to build trust, confidence and reliability in both the mass market and niche product offerings which can be clearly demonstrated to consumers in the attached online registry.

This forum centres on the MAESTRO service delivery platform which is an eco-system for which push companies pay a membership to access. The platform will allow companies to access a network of companies which will help them to develop their products, systems and services to a recognised standard. These companies will encompass pull organisations, third party in various areas of expertise along with complementary companies. The platform will most importantly offer access to end users for testing and evaluation and refinement. The output will be a reliable, trusted product/service which has been tested with end users to deliver a truly useful and competitively superior offering to the customer.

The overview of the generic MAESTRO development and assessment process is set within the process model highlighted in Fig.4.

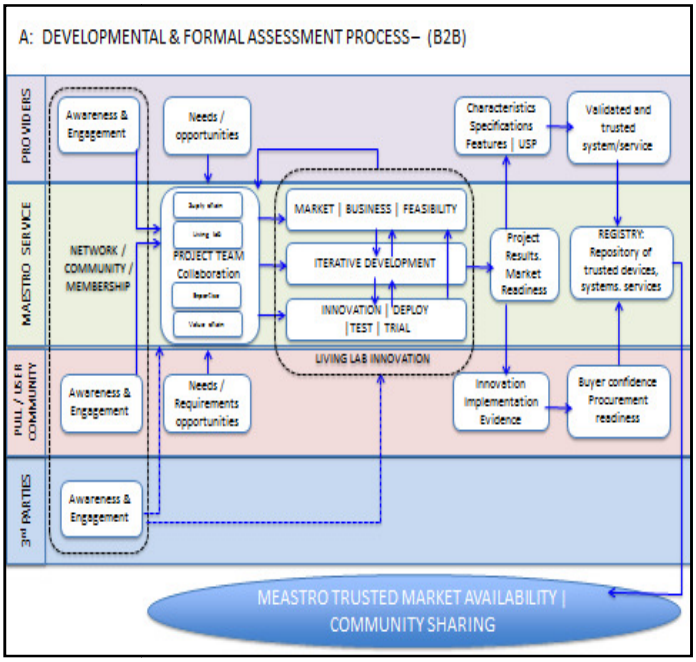


Fig. 4: Development and formal assessment process

The MAESTRO marketplace and informal assessment process (B2C)

The marketplace model as described earlier for both mass market and niche or high end products and services can also be refined based on the gaps or needs that our consortium research has outlined.

The MAESTRO marketplace centres on trust, confidence and guidance. This is achieved in the online registry's front end configuration. The insertion of both a search by condition which would prompt an online assessment questionnaire (which could be developed by healthcare professionals e.g physiotherapists) or a search by monitored system which would again prompt an online assessment questionnaire (again developed by a healthcare professional) was deemed to be very valuable and would install a sense of confidence.

Once completed, the prompt would be to either seek further assessment from a healthcare professional e.g. your doctor (if you fall into a risk category) or else you would be offered a selection of MAESTRO developed or tested products and services - this would satisfy the requirements for a trusted source of product/service.

Further online tools such as access to brokers ('broker' is an emerging role which act as a gateway to recommending and finding AAL technologies that meet a client's needs) in the area you have expressed an interest e.g. online dementia support forums, information on financial guidance to enable the person to access products and services along with an on-line feedback facility would all offer significant guidance, trust and therefore easily communicable USPs in the market.

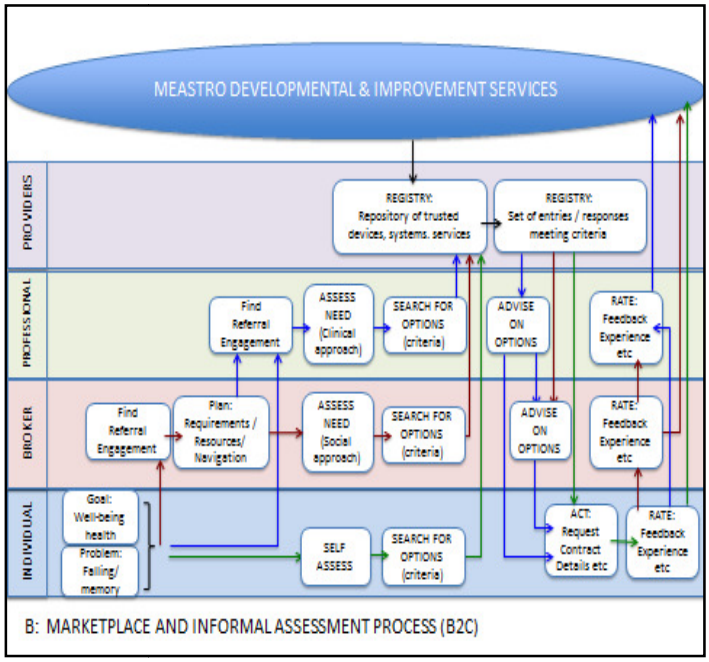


Fig. 5: Marketplace and informal assessment process

To fully evaluate this MAESTRO developmental and formal assessment process and associated marketplace and informal assessment process, we will separate them into their individual categories (mass market development, mass market maturity, high end development and high end maturity) and analyse each separately around opportunities, market entry strategy, development and potential revenue models to be further fully analysed.

Consideration for preferred scenarios

Consortium Readiness to Approach Market

One of the key considerations in deciding which scenario or scenarios is preferred is to see how these scenarios could be brought to market. Is the consortium in a position to launch either or both of the scenarios outlined in this work? Some of the detailed considerations can be investigated in the following sections.

Capacity

What resources are needed to support the launch and to maintain and grow the MAESTRO enterprise? The general organisational needs of the enterprise i.e. administrative staff, sales/marketing and commercial or accounting functions will need to be in place along with software developers and engineers.

The USP of the MAESTRO developmental and formal assessment process is access to a network of relevant, cutting edge companies and consultants and expertise in this field. This could, for the most part, be outsourced but would require a central function to maintain and grow this eco-system. The USP of the MAESTRO marketplace and informal assessment process would be the assessment tool, potentially access

to real healthcare or wellness professionals along with a database of services, products and special interest forums. These functions could again be outsourced but would require management within the MAESTRO enterprise. The capacity required to launch and support MAESTRO should be viewed in a 1-5 year plan as the model will need to be scalable.

Willingness to invest in enterprise

Are there any partners within the consortium who would be in a position to invest in the enterprise? Can the partners identify other commercial entities that may be willing to invest in the MAESTRO platform either as a Joint Venture or as a separate entity?

Market readiness

There is no doubt that the AAL market, particularly the smart homes segment represents huge growth opportunities for the companies developing products, systems and services in this space. This is a new market and as such exhibits all the characteristics of new market i.e. early adopter leads, niche player proliferation and confusion in the mass market. Some of the opportunities however lie in the fact this is an early market environment as developers see huge potential but need guidance, likewise, the companies procuring AAL devices need a lot of support in their decision making. Therefore, whilst the market is in its infancy, it represents the most potential for MAESTRO.

The suggested go to market scenario of a MAESTRO developmental process which feeds to a MAESTRO marketplace would fit with the general market development or readiness as the marketplace or registry, by its nature, would come later in the life-cycle of the enterprise.

Costs

A detailed analysis of potential costs associated with launching both or either go to market scenarios identified in this document will be provided in the business plan. Costs will broadly encompass internal organisational costs, third party expertise fees, advertising, and access to up to the minute medical or wellness assessment information along with on-going customer care costs.

Go to Market Strategy

In order to fine tune the go to market strategy, the MAESTRO consortium will need to address the critical considerations detailed in the table below. This can only be finalised following the feedback from the pilot phase of the project.

Considerations	Options
Commercialisation vehicle	Consortium Lead partner New Start-up Joint Venture Other

Considerations	Options
Business Model	What Development platform Benchmarking site Marketplace
	To whom: • Developers • Procurement officers • Consumers • Caregiving organisations
	Money Flows:
	Pricing Models: • Subscriptions • Transactional Fees • Hosting Fees • Advertising • Fellowship fees • Consultant fees
	Activities: • Core Activities • Outsourced activities
Go to market Strategy	Route to market • Direct • Joint Venture • Other
	Geography • Territories

Summary

Detailed field research has been undertaken by the consortium across Ireland, Switzerland, Luxembourg and Italy during months 1 - 18 of the project with both push companies and pull organisations. This research supports the project's overarching hypothesis, see Ouedrago et al. (2017); that there is a requirement for a collaborative ICT platform which would act as a central point for both the development of, and access to, AAL products and services to support wellness and wellbeing for older people.

This research has further refined the thinking on how this platform could look and what functions it could usefully and, most importantly, commercially provide in the AAL market.

Given the overwhelming need for guidance, trust, reliability and confidence in this area, we can see two value propositions emerging at this stage of the project:

- A central MAESTRO developmental assessment process which brings together developers, users/caregiving organisations along with third party expertise to develop services, systems and products with a level of accreditation or endorsement.
- These 'MAESTRO' developed or tested products and services could then populate a marketplace, which would have an element of online assessment and guidance for both end users and professional care giving organisations or brokers.

Further refinement of this scenario analysis will come from the additional detailed research currently being undertaken in the pilot phase of the project.

Conclusion

The global trend towards ageing populations, coupled with technological advancements in monitored wellness products all point to strong commercial opportunities in the Ambient Assisted Living market.

The go to market analysis conducted in this work gives some insight into the AAL market as it is today, one which is for the most part in its infancy, but one which promises much to the producers and procurers of technology to support older people.

Despite competition in this space, the gaps we have thus far identified i.e. the need for impartial guidance and trust, point to a potentially successful position for the MAESTRO platform which will need to be fully analyzed during the pilot phase of the project.

At this stage we believe, this position could be offering a sequential two staged value proposition of 1. An online development process, along the lines of a virtual living lab. In fact, the virtual living lab services could be our USP - the thing that plays to our unique strengths - access to a collaborative eco-system of research, networking and third party expertise to give guidance to developers. This would then feed 2. A MAESTRO marketplace of approved systems, services or products with online assessment, impartial advice, curated benchmarking and user feedback to give trust to caregivers and users.

We believe that both these 'market-spaces' and service concepts address clearly communicated gaps across the AAL value continuum, and can offer significant value to commissioning and supplying organisations and consumers within the AAL marketplace going forward.

There are many considerations which merit further investigation when deciding on our finalized preferred go to market scenario(s) - including how these services might look in the market, how will they be successfully brought to market, what pricing models could be attached to services, what are the projected revenue streams and the costs attached to the different models.

Further refinement of this scenario analysis will come from the additional detailed research currently being undertaken in the pilot phase of the project and will shape the business plan and ultimately the development of the MAESTRO platform.

Acknowledgment

This work was supported by the Luxembourg National Research Fund through the AAL Joint Programme with the reference INTER/AAL/14/9476692. This support is fully acknowledged.

References

Aggoune-Mtalaa, W., Nicolas, D., Djaghloul, Y., Khadraoui, D., Ayed, H., Sondergard S. and Smidtas, S. (2014), 'The MEDiATE Approach for the collaboration of heterogeneous Elderly Platforms: first Results,' Proceedings of The Third International Conference on Informatics Engineering and Information Science (ICIEIS2014), 239-246.

Aggoune-Mtalaa, W. and Aggoune, R. (2014), 'An Optimization Algorithm to Schedule Care for the Elderly at Home,' *International Journal of Information Science and Intelligent System*, 3(3), 41–50.

Knegel, L. and Auinger, K. (2015) 'AAL Service Development Loom From the Idea to a Marketable Business Model,' *Studies in Health Technology and Informatics*.

Maciaszek, L., Gryncewicz, W., and Kutera, R. (2017) 'Integrated service E-marketplace for indepenndent and assisted living – business and software engineering challenges,' *Lecture notes in Business Information Processing*.

Maclaszek, L.A. (2016) 'On service e-marketplaces for independent and assisted living,' Proceedings of the sixth International Symposium on Business Modelling and Software Design.

Mainetti, L., Patrono, L., Secco, A. and Sergi, I. (2016), 'An IoT aware AAL system for elderly people' International Multidisciplinary Conference on Computer and Energy Science, SpiTech.

Marketsandmarkets.com, (2016) 'Ambient Assisted Living and Smart Home Market by Product, Services, Assisted Living, Product (Safety & Security, Communication, Medical Assistive, Mobility, Telemonitoring, Compensatory Impairment) and Region - Global Trend & Forecast to 2020", Report code: SE 4009.

Ouedrago, M., Aggoune-Mtalaa, W. and Khadraoui, D. (2017) 'MAESTRO: Constructing a reference framework for self-monitoring devices dedicated to seniors', Proceeding of the IEEE International workshop on Intelligent Multimedia Applications and Design for Quality Living, Taichung, Taiwan.

Park, S.J., Subramaniyam, M., Kim, S.E., Jo C.M. and Seo, Y. (2017), 'Development of the elderly healthcare monitoring system with IoT' *Advances in intelligent Systems and Computing*.

Optimization of the Enterprise Value On The Basis of Value Added

Daniel S. Demidenko, Department of Finance, Institute of Industrial Economics and Management, Peter the Great St. Petersburg Polytechnic University, Russian Federation, demidenko11@rambler.ru

Alexander M. Malinin, Department of Regional Economics and Nature Management, The St. Petersburg State University of Economics, Russian Federation, Department of Regional Economics and Nature Management**,** Department of World Economics and Management, International Banking Institute, Saint-Petersburg, Russian Federation, alexmalinin46@mail.ru

Alexander N. Litvinenko, Department of economic security and management of socio-economic processes, Saint-Petersburg University of the Ministry of Internal Affairs of Russia, Lanfk@mail.ru.

Abstract

In this article, we investigate the relationship between the possibility of optimizing the company's market value with economic added value. It is shown that if we exclude from the production function of the enterprise the capital costs, in its classical sense, then only the added value will remain. At the same time, the result having scientific novelty is the proof that, under the assumptions made, the added value will have an extremum, thus one can find the maximum value of added value and optimize the market value of the company, which is the main objective of the enterprise according to the cost approach. The article presents the corresponding economic-mathematical model and a conditional numerical example

Keywords: Enterprise value. Economic value added. Production function.

Introduction

The innovation process is a vector of actual economic development for the Russian economy as a whole and every Russian enterprise. (Melnikov, Nadezhina, Rudskaya, 2016) An adequate criteria for the success of enterprise development is the known indicator of "added value" produced by an enterprise over a certain period of time that reflects the contribution of the enterprise and the production process to the creation of the product.

To assess the value of a product in economic research, the mathematical method of the "production function" is used, (Solow, 1957) which presents a model of the dependence of production results on the costs of production factors. The model in the form of the production function is usually based on reasonable assumptions about the interrelationships of the product parameters or the production process with the final result, established earlier, based on the provisions of economic theory, the results of scientific research, practical experience or logic and common sense.

The elasticity of substitution between capital and labor is a central parameter in economic theory, as it is shown by Pol Antras (Antras, 2004). The most common model is the Cobb-Douglas production function (Meeusen & van Den Broeck, 1977), which has the form $Y = L^{\alpha} \times C^{1-\alpha}$, $0 < \alpha < 1$, where L is labor for the production of a product in the quantity Y, C is the capital investment in the production process, α -is the output elasticity of Labor, 1-α – output elasticity of capital.
Creating a product in the amount of "Y" under the existing production process will require labor input of "L" and the creation of "value added" (McCaffrey et al., 2003) in amount $Y = \alpha\sqrt{L}$.
"Alpha" is a parameter of the connection between the units of quantity and the units of labor. A parabola of this type ($Y = \alpha\sqrt{L}$) corresponds to the neoclassical principle of "diminishing marginal

productivity of production costs," the most commonly used form of a growth model with a decreasing growth rate. The choice of the function form is based on the neoclassical idea of a diminishing marginal growth in the return on production costs-each subsequent unit of production costs has less effectiveness than the previous one. In the conditions of a perfect competitive market, the price of a product is a decreasing function of the quantity of the product, in the simplest case, a decreasing linear function of the quantity of product,

$P(Y) = P_0 \quad \beta \times Y = P_0 \quad \alpha \times \beta \times \sqrt{L}$, where P_0, β - are the constants.

After the necessary substitutions, we obtain an analytical expression for the added value:

$$Value\ added = P \times Y = \left(P_0 - \beta \times \sqrt{L}\right) \times \alpha \times \sqrt{L} = P_0 \times \alpha \times \sqrt{L} - \alpha \times \beta \times L$$

According to I.Fisher's (Fisher, 1930) principle, there exists an inverse relationship between the price of a product and its quantity in production with a fixed money supply, which by definition is curvilinear (hyperbola), it is replaced by a linear decreasing dependence. As a result of assumptions made, after the capital component has been removed from the production function, the only variable factor remains is - labor. We got production function as the dependence of the quantity of a product on labor. In order to turn this dependence into value, the quantity must be multiplied by the price. That shows that value added has an extremum and it can be determined, and it is clearly shown on a numerical example in the article.

Problem Statement and Research Objective

In the considered variant of the production function, its extreme / maximum value is at the edge of the range of possible value of production costs, the boundary of the range of possible values is determined only by the limit of production possibilities (production capacity). In fact, the growth of added value is accompanied by an increase in production risks (operational risks and financial risks), which sets a limit to the growth of value added. This economically known effect of the contradiction between "risk and return" can be clearly seen in the example of the definition of the "enterprise value" by the so-called "value-based method"(Young et al., 2000), when the market value is the current value of future earnings of the enterprise, while "revenues" are treated as net cash flows (the difference between incoming and outgoing cash flows for the review period). As "incoming" cash flows, income from the sale of products and services, as well as income from resale of the asset / enterprise at the end of the period, if the asset is resold to another owner. As "outgoing" cash flows, respectively, the costs of production in the review period, including investment costs.

The value added is created by labor (Rodionov, Nikolova et al., 2016) and, with no risk (constant in time) interest rate, the more labor will be expended. When using the Cobb-Douglas production function model as a value model, it already contains a division of cost factors (labor-creates added value, capital-does not create added value).

Key Results

Let us consider the proposed statement in details.

Let there be an asset / enterprise that brings a stable annual income from its activity in the amount of "Cash Flow" (CF) cu / period (henceforth, to exclude the influence of the income factor on the market value of the enterprise, we assume CF = 1). Let's also assume that the income stream is a regular cash flow with a discrete time scale, which means that the amount of the monetary amount of each period refers to the end of each period. Then, according to the principles of the "value approach", the market value of the enterprise as determined by the value-based method, is equal to the discounted interest rate "r" of the CF cash flow plus the terminal cash flow, that is, some residual value

The residual value V-this is the market value of the enterprise, since the enterprise is resold at this cost at the end of the hold period with the previous owner.

As is known from the theory of finance, the numerator of the formula is a finite ordinary income stream equal to "1", or a single "annuity", the sum of which is equal $\frac{1-(1+r)^{-n_1}}{i}$ and taking this into account, the market value of the enterprise, determined by the value-based method, (Ivashkovskaya, Kukina & Penkina, 2010), (Karlik, Kobelkov & Kolokoltseva, 2011) is equal to:

$$Value = \frac{1-(1+r)^{-n})}{(1-(1+r)^{-n}) \times r} = \frac{1}{r}$$

So we got the market value of the enterprise, determined by the value-based method, and it represents the current or reduced cost of an uninterrupted uniform annuity of the company's income, which confirms the fairness of the income approach. It could be added that in case the income stream of an enterprise before its resale does not represent a uniform annuity, the fairness of the conclusion is not lost, since any final annuity can always be equivalent to an infinite uninterrupted annuity.

Lets assume that "r" is risk -free rate (money price in a perfect financial market). In this case, the risks are not taken into account, or their magnitude can be taken into account indirectly in the form of corrective adjustments to the income in each period. It corresponds to the accepted rule - to take into account the risk by using a risk premium to a risk-free interest rate. The specific methods of the practical approach to risk taking are discussed below.

The market value formula of an enterprise can be specified taking into account the inevitable costs of an assessment of the market value that precede the resale of the property to the new owner. The need for the assessment always arises when using a value-based method for estimating market value, since there are no identical enterprises with the same income. The costs of assessing the market value of an enterprise can be significant and are usually determined as a percentage of market value. Let the share of expenses for an estimation makes "a" from value of market cost then the market cost of the enterprise defined by a value-based method, is equal:

$$Value = \frac{1-(1+r)^{-n})}{(1-(1-a)\times(1+r)^{-n})\times r} \quad (*)$$

$$Value(n) = \frac{(1+r_1)^{-1} + (1+r_1)^{-1}(1+r_2)^{-1} + \cdots + (1+r_1)^{-1}(1+r_2)^{-1}\ldots(1+r_n)^{-1}}{1-(1-a)(1+r_1)^{-1}(1+r_2)^{-1}\ldots(1+r_k)^{-1}}$$

Then shortly:

$$Value = \frac{\sum_{k=1}^{n}\prod_{k=1}^{n}(1+r_{kj})^{-1}}{1-(1-a)\prod_{k=1}^{n}(1+r_k)^{-1}}$$

Regarding interest rates that differ for each discrete period "n", it can reasonably be assumed that their value will increase as you move away from the current time at which the estimate is made. The reason is that at a constant value of a risk-free rate, the risk surcharge will grow as a consequence of the uncertain future. In the numerical example given below, an increasing number of risk surcharges is adopted experimentally. For practical purposes, no doubt, a more rigorous justification is required.

The obtained results of the numerical example are presented graphically. We consider "n" values from 1 to 21, substituting them in the formula to determine the market value of the enterprise, we obtain the market value values presented in the graph.

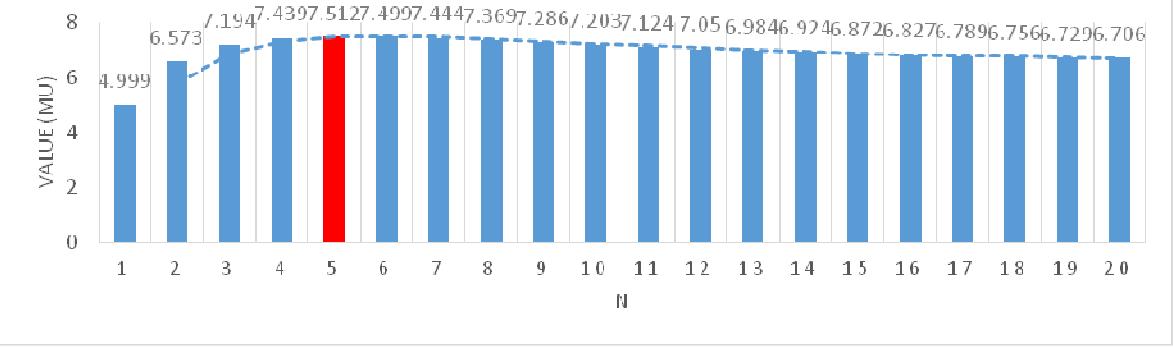


Fig. 1: Optimization of the enterprise value.

Obviously, for n = 6, the formula will reach a maximum, then it starts to decrease. The maximum of the function will correspond to the highest market value of the company / enterprise, which can be

considered optimal, there is no reason to keep the asset in the ownership when the market value of which falls.

For economic analysis, it is also interesting, at what ratio the combination of capital costs and value added (if we take into account that the type of production function that we have adopted reflects the amount of value added), we can expect the maximum value of the market value of the enterprise. Based on the results of the analysis, the owner can make a decision to run of enterprise until the market value of the enterprise starts to decline or sell it at a market value. For analysis a well known in economics "Tobin's coefficient" can also be used - the ratio of the market and accounting value of the enterprise.

Conclusion

The article shows that the optimization of value added can be achieved with the help of the proposed value model on the basis of risk taking by using the growth parameter of the interest rate in different periods.

Assuming an increase in the interest rate and a significant cost of valuation, the value added may have an optimum that can be determined by using a "modified parabola" in the model.

Acknowledgment

This research was supported/ partially supported by Peter the Great Saint-Petersburg Polytechnic University. We thank our colleagues from the Department of Finance, Institute of Industrial Economics and Management who provided insight and expertise that greatly assisted the research, although they may not agree with all of the conclusions of this paper. We thank Alexander E. Karlik for assistance with methodology and for comments that greatly improved the manuscript.

References

Antras, P. (2004). Is the US aggregate production function Cobb-Douglas? New estimates of the elasticity of substitution. *Contributions to Macroeconomics*, *4*(1), 1161.

Fisher, I. (1930). The theory of interest. *New York*, *43*.

Ivashkovskaya, IV, Kukina, EB, & Penkina, IV (2010). Economic added value. Concepts. Approaches. Instruments. Corporate finance, (2 (14)).

Ittner, C. D., & Larcker, D. F. (2001). Assessing empirical research in managerial accounting: a value-based management perspective. *Journal of accounting and economics*, *32*(1), 349-410.

Karlik, AE, Kobelkov, GV, & Kolokoltseva, EV (2011). Business valuation and investment attractiveness of the enterprise. Bulletin of Magnitogorsk State Technical University. GI Nosova, (2).
McCaffrey, D. F., Lockwood, J. R., Koretz, D. M., & Hamilton, L. S. (2003). *Evaluating Value-Added Models for Teacher Accountability. Monograph.* RAND Corporation. PO Box 2138, Santa Monica, CA 90407-2138.

Meeusen, W., & van Den Broeck, J. (1977). Efficiency estimation from Cobb-Douglas production functions with composed error. *International economic review*, 435-444.

Melnikov, A.V., Nadezhina, O.S., Rudskaya, I.A. (2016). Improvement of the mechanism ensuring innovative development of the oil sector in times of crisis. Proceedings of the 28th International Business Information Management Association Conference - Vision 2020: Innovation Management, Development Sustainability, and Competitive Economic Growth p. 2201-2209.

Rodionov, D., Nikolova, L., Velikova, M., Kalubi, R.D.M. (2016). Competitive strength of a concession integration model of labour market to education market interaction. Proceedings of the 28th International Business Information Management Association Conference - Vision 2020: Innovation Management, Development Sustainability, and Competitive Economic Growth, p. 689-699

Solow, R. M. (1957). Technical change and the aggregate production function. *The review of Economics and Statistics*, 312-320.

Young, S. D., O'byrne, S. F., Young, D. S., Young, S., & O'Byrne Stephen. (2000). *EVA and value-based management*. McGraw-Hill Professional Publishing.

Cluster´S Internationalisation Platform as a Springboard for Internationalisation of Firms in the Age of Digitalisation

Professor Aihie Osarenkhoe (PhD) & Dr. Daniella Fjellström (PhD), University of Gävle, Department of Business & Economic Studies, Gävle, SWEDEN

Abstract

This study aims to answer the following question: What platform does cluster organisation create to enable its internationalisation process in order for its partner´s organisations to effectively manage the challenges brought about by the cataclysmic changes in business logic in the age of globalisation and digitalisation? **Theoretical lens** draws on combination of the experiential learning-commitment interplay, which is the driving mechanism of Uppsala´s internationalisation process model with a similar experiential learning-commitment mechanism focusing on business network relationships. **Data collection** through in-depth interviews with Process Manager – R&D, Cluster Market Manager, Communication and Information, Cluster coordinator took place in the Swedish cluster Future Position X (FPX) - a leading cluster organisation in Europe within geographical information. **Findings** show that FPX was building international links with similar clusters in the Nordic, Baltic, and European countries. FPX later learned that for it to be in forefront of innovation, it needs to mix its own core competences with very complementing technology areas of the biggest hotspots in the world in Geo Spatial technologies. **Conclusion remarks and implications:** A sustainable internationalisation platform created by cluster is of utmost importance these days because digitalisation is fundamentally disrupting traditional industries, labour markets and the global economy, and transforming various facets of exchange. To companies, this means opportunities for new or changed business models, spanning from marketing and sales channels to logistics. **Originality:** This study contributes to the literature examining location can help firms to increase their competitiveness and thus supporting them in getting access to global value chains and new markets, by focusing solely on exogenous activities which serve to improve cooperation with global markets, that are critical to cluster dynamics.

Keywords: Cluster´s internationalisation, Internationalisation process, formal and informal networks, Future Position X (FPX), Digitalisation, Small and Medium-sized Enterprises

Introduction

In today's networked world (LeMahieu et al., 2017), turbulence, unpredictable uncertainty, and ambiguity are more the norm than the exception. So, a pertinent form of strategising is called for, one that differs from strategic approaches developed for less turbulent and more stable contexts, where organisations of various forms are less tightly connected to each other than is the case today (Awa et al, 2011). This study explores and explains a form of strategising that is fit for purpose in such conditions.

The basic premise of this study is that the fundamental mechanisms used to explain the internationalisation process of firms, cluster organisations, educational institutions and other types of organisations are at parity or equivalent. Hence, we consider theories and models used to explain internationalisation process of for profit and non-for-profit organisations to be at *pari passu* or on equal footing. While extant literature focuses on the concept of internationalisation of clusters from the perspective of the tasks they perform, and their links with international partners (Xu and McNaughton, 2006; Prashantham, 2008; Pla-Barber and Puig, 2009; Carneiro Zen *et al.* 2011; and Richardson *et al.* 2012; Carneiro Zen et al., 2016; and Ślepko, 2012), this study illuminates how a cluster´s internationalisation platform is used as a catalyst to leverage its entire innovation system to an international level. Thus, integrating the cluster with global innovation networks and international matchmaking and capitalization so as to get more links to investment capital for the companies in its platform. This will invariably increase the international links for startup companies and the regional innovation system.

The gap in literature is attributed to the fact that the impact of clusters on the internationalisation of cluster firms (Caputo *et al.* 2016) and the degree to which cluster activities improve collaboration and interaction between Firm-to-Firm, Firm-to-Research, Firm-to-Education, Firm-to-Capital and Firm-to-Policy, has received tremendous coverage in extant literature (Sölvell, 2009; Lindqvist et al 2013; Xu and McNaughton, 2006; Prashantham, 2008; Pla-Barber and Puig, 2009; Carneiro Zen et al. 2011; Richardson et al. 2013; Lamotte, 2014; Jankowska and Główka, 2016; Valdaliso et al , 2016). In other words, previous studies have mostly addressed internal gaps hindering effective mobility and collaboration inside clusters, to the detriment of external gaps vis-à-vis collaboration and interaction with global markets. This perspective has gained prominence because digitalisation combined with globalisation enables internationalisation by firms and clusters on a global scale (Caputo *et al,* 2016). To Swedish firms, this means opportunities for sales to customers worldwide. Conversely, to foreign companies this facilitates sales in Sweden. Both international and domestic competition toughens, as Sweden becomes part of a global market.

The following research question is used to guide the exploratory nature of this study:

RQ: What platform does cluster organisation create to enable its internationalisation process in order for its partner´s organisations (SMEs) to effectively manage the challenges brought about by the cataclysmic changes in business logic in the age of globalisation and digitalisation?

This study aims to shed light on exogenous gaps that are critical to cluster dynamics (Morgulis-Yakushev and Sölvell, 2017). Thus responding to recent calls (Jankowska and Główka, 2016; Valdaliso, Elola and Franco , 2016) for more research on gaps that are alien to the cluster, consisting of cross-cluster gap barring collaboration and interaction with firms in other clusters, and, most especially, the global market gap barring collaboration and interaction with global markets.

Theoretical Lens

Extant literature makes distinction between formal and informal networks (Forsgren, 2002, Hill, McGowan & Drummond, 1999). Forsgren (2002) described the formal network as a business network comprising a number of actors, linked with one another through different kinds of relationships. Johanson and Vahlne (2009) believed that also the current market is a network where actors are linked with one another, and in which a company must be active in order to establish itself on a new market. Furthermore, becoming established in a relevant network might result in an increase in knowledge, opportunities, and trust, resulting in an increased profit in the companies. Hill et al (1999) defined informal networks as social networks, incorporating relationships and alliances with people in society, outside the work place. Informal networks can furthermore create opportunities to develop SMEs, and might be viewed as an invisible asset. It is thus of great importance to be part of a large network, since that creates more opportunities as compared to small networks (Granovetter, 1973). Adrichivili, Cardozo, and Ray (2003) argued that informal networks might yield advantages for the company when identifying new markets.

Research concerning the significance of networks in connection with companies' internationalisation is abundant, though with divergent conclusions. Coviello and Munro (1997), Zain and Ng (2006), and Ojala (2009) argued that more research on the subject is required. Furthermore, formal as well as informal networks are of importance to the internationalisation process of organisations. Ojala (2008), Eberhard and Craig (2013), and Jeong (2016) claim that more research nonetheless is required in order to establish in what manner these network forms affect the internationalisation. Zhou, Wei-ping, and Xueming (2007) called for research around the linkage between the two network forms. In addition, there is a gap in the literature in terms of research on whether formal and informal networks unite during internationalisation.

Although understanding innovation in the context of the current changing industrial landscape in the age of digitalization has become cumbersome, and necessitates serious challenges to traditional internationalisation models (Luostarinen, 1994; Cavusgil, 1980; Bilkey and Tesar, 1977; Leonidou and

Katsikeas, 1996; Johanson and Vahlne, 1977, 1990, 2003) our theoretical lens draws on Uppsala internationalization model (Johanson and Wiedersheim-Paul, 1975). The central tenets of the model are how organizations learn and how their learning affects their investment behavior (Forsgren, 2002). Another important aspect of the Uppsala model is that it describes the internationalization of a firm as a gradual process. However, it is pertinent to mention that the number of people with extensive experience of international trade has also grown, meaning that firms can easily hire the competence they require rather than creating it themselves (Hollensen, 2007; Hill, 2003; Wild et al., 2007). Osarenkhoe (2009) propounded that "in an evolving international economy dominated by growing global integration, emerging fragmentation of traditional markets into global niches, and the birth of new competitive spaces thanks to technological developments, the steps and modes of foreign markets entry could experience significant deviations compared to the internationalization patterns of firms characterized by a series of incremental decisions, experiential learning and risk aversion, as envisaged in the traditional sequential models" (p. 287)

Internationalisation of firms has attracted great attention over the past decades (e.g. Johanson and Vahlne, 1977, 1990, 1992, 2003, 2009; Johanson and Mattsson, 1988; Dunning, 2000; Sun, 2009). However, this is not the case with small and medium-sized enterprises (SMEs). Hammond and Groose (2003) stress that international business activities should be seen as a continued development of firms´ competitive capabilities, which in turn enable them to compete successfully against rivals from and within different countries. As a growing number of SMEs have started operating on an international level (Coviello and McAuley, 1999; Chetty and Campbell-Hunt, 2003; Arte and Barron, 2016), it is important to understand how SMEs handle this challenge with their limited resources. Hence, Ngoma, Abaho, Nangoli and Kusemererwa (2017) investigated entrepreneurial orientation (innovativeness, proactiveness and risk taking) as a predictor of internationalisation of small- and medium-sized enterprises (SMEs), and established a significant relationship between the dimensions of entrepreneurial orientation and internationalisation of small- and medium-sized enterprises.

Both economic research and current business policy debate stress innovation as a key requirement to economic growth. Innovation is described today as an interactive process that rarely occurs within the confines of a single company or organisation (Inauen et al., 2012; Windrum et al., 2016; Sergeev, 2017; Bolaji Ilori et al, 2017). Rather, innovation is often a result of combining the resources of a multitude of actors in new constellations, where the goal is to generate value for everyone involved. Against this backdrop, digitalisation is fundamentally disrupting traditional industries, labour markets and the global economy (Koren, 2008). We are experiencing a digital revolution that transforms the world as we know it (Plesner and Raviola, 2016; Pinho and Pinheiro, 2015; Preston and Rogers, 2012; Quinn, Dibb, Simkin, Canhoto and Analogbei, 2016). Traditional business models and value chains are challenged as digitally performed activities allows for increased availability, shorter lead times, faster time-to-market and lower transaction costs. This translates into opportunities for lower overall costs, allowing smaller companies to compete with well-established companies and brands (Holmlund, Strandvik and Lähteenmäki, 2017). Simultaneously, customer expectations mount with increased transparency, and competition increases across sectors.

As mentioned above, networks can be divided into formal and informal networks, and Jeong (2016) maintains that earlier research agree in terms of how the two forms may be defined. Formal relationships are described as company activities between actors within a network, while informal relationships can be defined as personal relationships (Ojala, 2008). Zhou, Wei-ping, and Xueming (2007) moreover argued that actors' informal networks generate extended knowledge about foreign market opportunities, counseling, and experience-based learning along with trust and loyalty. By being active in formal networks, companies are able to utilize each other's resources and competences with the purpose of performing tasks. Companies may however act on their own initiative, which results in increased costs and higher risks for the companies. Informal as well as formal networks both proffer various advantages (Fernhaber & Li, 2013).

Methodology

This study aims to shed light on exogenous gaps that are critical to cluster dynamics. Consequently, we describe the platform created by cluster organisation to enable its internationalisation process in order for its partner´s internationalisation to effectively manage the challenges brought about by the cataclysmic changes in business logic in the age of globalisation and digitalisation. Data collection took place in Future Position X (FPX). FPX initiates and supports research and innovation projects as well as helps companies and organisations to reach new markets. Primary and secondary data sources were used in this study. Secondary data entailed a review of various evaluation reports. Primary data were collected through in-depth interviews with Process Manager - R&D, Cluster Market Manager, Communication and Information, Cluster coordinator, outward internationalized firms and inward internationalised firms at Future Position X.

A roundtable talk that took place in conjunction with the visit of international expert evaluators, sent by Vinnova (Sweden´s Innovation Agency), to evaluate the first three years of FPX´s Geo Life Region. A co-author of this paper was among senior researchers in Sweden invited to represent research and academic institutions with focus on the competitive edge of research and knowledge development – strategy and results". The other co-author was invited to participate in workshops with FPX and SMEs to discuss internationalisation. In other words, invited researchers represented the collaboration and interaction between Cluster-to-Research and Cluster-to-Education.

After the conclusion of the roundtable meeting with external evaluators of FPX, another roundtable talks with process leader of cluster initiatives, regional and local networks was conducted. The duration was two hours during two separate occasions. Answers our questions facilitated an understanding of how cluster´s formal and informal networks amalgamate during establishment on an international market. In other words, to shed light on exogenous gaps that are critical to cluster dynamics (Morgulis-Yakushev and Sölvell, 2017).

Transcripts were created from the tape recorders from various interview sessions. Questions were asked in an interactive group setting where participants were free to talk with other group members. The discussion was loosely structured, and free flow of viewpoints was encouraged on the main theme for discussion, which were solely based on the research questions. Having key themes and sub-questions in advance lies in giving the moderator or researcher a sense of order from which to draw questions from unplanned encounters (David and Sutton, 2004).

Data analysis

Data collected was analysed in three steps: data reduction, data display, and conclusion drawing (Miles and Huberman, 1994). Data reduction entails selecting and excluding/filtering data in order to focus, discard and organize the data in such a way that conclusions can be drawn and verified (ibid.). As for the tape- and video-recorded interviews, this analysis process began while transcribing the interviews. The aim of data display is to organize the data into a compressed assembly of information to elucidate appropriate conclusions and action. Accordingly, main themes, in our case the focus, objectives, activities and organisation of the clusters and networks, were extracted so as to provide succinct insight on the salient features of the cluster initiatives, regional and local networks in the region studied. Conclusion drawing and verification focuses on reflecting and understanding the data chosen for display. Although the process began at the initial stage, this step became more dominant during the later stages of the research. Despite the fact that the three steps are viewed as separate processes of analysis, it is important to note that the processes were going on simultaneously in this study.

Presentation and Discussion of Findings

The prevailing reason for FPX to consider an international scope was to keep its lead in technological development, identify upcoming market needs, properly reacting to transformation processes and to strengthen its own position on markets worldwide. From the beginning, FPX was building the

international links with similar clusters in the same technology area in Nordic, Baltic and European countries. Nevertheless, later learned that for FPX to be in forefront of innovation, it needs to mix its own core competences with very different technology areas. FPX built relationships with a number of the biggest hotspots in the world in Geo Spatial technologies. Thereafter, it started to build new relationships with complementing knowledge and hot spot centers, like the mobile and new media industry in Malmö, the digital media and gaming industry in China, the health industry in Beijing and Australia, the sports industry in Åre and Barcelona and Melbourne. This is enabling FPX to work with cross cluster international innovation and importantly supports the strategy of 'innovation within the gaps'.

Findings show that FPX has, since 2005 had an internationalization strategy and since 2012 a 'Born Global' vision for the spin-off companies coming out of its innovation system. FPX has a focus on the largest economy in the world, the Chinese market - a market with great potential and with a high psychic distance. Thus, FPX internationalisation strategy is in sharp contrast to the core assumption of Uppsala model (Johanson and Wiedersheim-Paul, 1975) that an entity starts its foreign operations in countries with low psychic distance. In other words, organisations favour countries countries that share similar environment with their home country. FPX has encouraged Gävle city to set up sister city relations with Zhuhai City in south China – the region in the world with the highest growth rate and that is also known as the factory floor of the world, Guang-dong.

FPX´s "global mindset, which is in line with entrepreneurial orientation (innovativeness, proactiveness and risk taking), is epitomised in the study by Ngoma, Abaho, Nangoli and Kusemererwa (2017), resulted in several new agreements with partners to ensure that they have the resources and expertise available for their activities and channels to investment capital and platforms for companies' international expansion. The prevailing reason for FPX to consider an international scope was to keep its lead in technological development, identify upcoming market needs, properly reacting to transformation processes and to strengthen its own position on markets worldwide. Fernhaber and Li (2013), who suggested that by being active in formal networks, companies are able to utilize each other's resources and competences with the purpose of performing tasks, support this strategic decision by FPX.

Our findings show that in the beginning, FPX had an internationalisation strategy which concurs with Johanson and Vahlne (1977 & 1990), who studied the internationalisation behavior of Swedish firms and found that they follow a sequential process. FPX was building the international links with similar clusters in the same technology area in Nordic, Baltic and European countries. Hence, it first entered country markets with low psychic distance. Combined with the experiential learning-commitment interplay as the driving mechanism from their previous internationalisation process with a similar experiential learning-commitment mechanism focusing on business network relationships (Johanson and Vahlne, 2003), FPX entered markets with high psychic distance.

Having learned that to be in forefront of innovation, FPX decided on mixing its own core competences with very different technology areas. Furthermore, its realisation that being active in networks will facilitate identification of opportunities that further govern its choice of entry modes and entry nodes (Albaum and Duerr, 2008; Koren, 2008; Sandberg et al., 2015; Galkina and Chetty, 2015; Jeong, 2016) when undergoing internationalisation. In compliance with Zhou, Wei-ping and Xueming (2007) who argued that actors' informal networks generate extended knowledge about foreign market opportunities, counseling, and experience-based learning along with trust and loyalty, FPX built relationships with a number of the biggest hotspots in the world in Geo Spatial technologies. Thereafter, it started to build new relationships with complementing knowledge and hot spot centers, like the mobile and new media industry in Malmö, the digital media and gaming industry in China, the health industry in Beijing and Australia, the sports industry in Åre and Barcelona and Melbourne. This is enabling FPX to work with cross cluster international innovation and importantly supports the strategy of innovation within the gaps.

Concluding Remarks and Implications

This study aims to facilitate understanding of how cluster´s formal and informal networks amalgamate during its international establishment. It is recognised in this study that clusters act as real "springboards" for firms, especially small and medium enterprises (SMEs) to help them in increasing their competitiveness and thus supporting them in getting access to global value chains and new markets (Meier and Zombori, 2011). Cluster participants can benefit from specialised business support services of cluster organisations stimulating and organising these actions. In particular, if firms have to increasingly integrate their activities into global value chains in order to become and remain competitive, being part of a cluster is supportive (Pavelkova, *et al.,* 2015). Clusters in the emerging industries face the needs for internationalisation. Consequently, transformation processes within value chains, brought about by digitalization, urge clusters to think global and internationalise accordingly.

Clusters' internationalisation is essential to their activity or even their very existence. The level of those activities then has a decisive influence on the competitiveness of clusters' firms, and it is a showcase of cluster organisation managers' ability to coordinate and administer those activities. The journey from initial idea to market-ready product or commercialisation of innovation, which is key to entrepreneurial success, is uneven, indirect and has many twists and turns. The path is plagued with many obstacles and possible entry and exit points. The participants in clusters are mainly SMEs, and they are often devoid of time, resources, knowledge, and international market experience and networks required to singlehandedly embark on the journey to go international. This is the rationale why cluster organisations can provide customised supporting measures and tools to the cluster participants on their paths towards internationalisation, as they usually have more resources at their disposal and are more experienced in internationalisation matters. A common understanding within clusters (e.g. FPX), a sophisticated internationalisation strategy and a consequent implementation of related actions are the prevailing key success factors for internationalisation of clusters. This requires specific cluster manager internationalisation skills for building long-term transnational and cross-sectoral cluster partnerships.

A sustainable internationalisation platform created by cluster is of utmost importance these days because digitalisation is fundamentally disrupting traditional industries, labour markets and the global economy (Einsiedler, 2013; Lee & Kao, 2014), and transforming various facets of exchange (Hagberg *et al* 2016). To companies, this means opportunities for new or changed business models, spanning from marketing and sales channels to logistics (Ivang *et al*, 2009). Traditional business models and value chains are challenged as digitally performed activities allows for increased availability, shorter lead times, faster time-to-market and lower transaction costs (Holmlund *et al*. 2017). This translates into opportunities for lower overall costs, allowing smaller companies to compete with well-established companies and brands. Against this background, collaborative development environments (Mendikoa *et al.,* 2008; Lin et al., 2012), such as FPX internationalisation platform, gain importance especially for small and medium enterprises (SME) with limited resources. This reinforces a need for clusters and firms to develop their management of interactive innovation processes.

Implications of this study are that internationalisation of clusters gains a new dimension and quality, if the future transnational collaboration and interaction is driven by a deep understanding of ongoing transformation processes in respective value chains – a process which is a sequel to digitalisation and globalization (Hagberg *et al*. 2016). It is obvious that such transformation processes or digitalisation process may have different dynamics in different regions (Holmlund *et al*. 2017). Therefore, clusters should focus their international and global partnerships on those regions with the highest dynamic. This is one important pre-condition to successfully conquer related markets or initiate cooperation with sustainable impacts. Furthermore, this study demonstrates that cluster companies can leverage on internationalisation operations performed by cluster organisations.

FPX global network serves to help the small and medium sized companies reach new markets and commence international business. FPX also inspire international companies to establish themselves in Gävle and further strengthen the GIS-environment in the region. The prominent ends attained by FPX internationalisation include increased access to knowledge, market, and key infrastructure. Internationalisation also helps FPX to get access to new business partnerships and collaborative

research. In addition, internationalisation enlarges its knowledge base by sourcing knowledge, technology and skills from other locations than their traditional environment. Transformation processes within value chains urge clusters to think global and internationalise accordingly.

This study offers insight into internationalisation of cluster in a Sweden context. It bridges the approaches to firm internationalisation with the theory of clusters. This is the first study to incorporate discussions on digitalisation in cluster internationalisation. This is particularly important because to succeed in the global marketplace, SMEs must put digitalisation in the center of their international strategy. Furthermore, by focusing solely on exogenous activities which serve to improve cooperation with global markets, that are critical to cluster dynamics, this study contributes to the literature examining location can help firms to increasing their competitiveness and thus supporting them in getting access to global value chains and new markets.

References

Albaum, G, & Duerr, E 2008, International Marketing And Export Management, n.p.: Harlow: *Financial Times Prentice Hall*, 2008

Ardichvili, A, Cardozo, R, & Ray, S. (2003), 'A theory of entrepreneurial opportunity identification and development', *Journal of Business Venturing*, 18, pp. 105-123

Arte, and Barron, A. (2016), Early Internationalisation of New and Small Indian Firms: An Exploratory Study, in Rob Van Tulder, Alain Verbeke , Jorge Carneiro , Maria Alejandra Gonzalez-Perez (ed.) The Challenge of Bric Multinationals (Progress in International Business Research, Volume 11) *Emerald Group Publishing Limited*, pp.525 – 558

Awa, H.O., Eze, S.C., Urieto, J.E., Inyang, B.J. (2011) "Upper echelon theory (UET): A major determinant of information technology (IT) adoption by SMEs in Nigeria", *Journal of Systems and Information Technology*, Vol. 13 Issue: 2, pp.144-162

Bilkey, W. & Tesar, G. (1977). The Export Behavior of Smaller-Size Wisconsin Manufacturing Firms, *Journal of International Business Studies*, 8 (1), pp. 93-98.

Bolaji Ilori, Lawal, and Simeon-Oke, (2017) "Innovations and innovation capability in palm kernel processing industry in southwestern Nigeria", *International Journal of Innovation Science*, Vol. 9 Issue: 1, pp.102-114

Carneiro Zen, A., Fensterseifer, J.E. and Prevost, F. (2011), "Internationalisation of clustered companies and the influence of resources: a case study on wine clusters in Brazil and France", *Latin American Business Review*, 12(2), pp. 123-141.

Caputo, A., Pellegrini, M.M., Dabic, M. and Dana, L.P. (2016) "Internationalisation of firms from Central and Eastern Europe: A systematic literature review", *European Business Review*, 28(6), pp.630 – 651.

Cavusgil, S.T. (1980). On the Internationalisation Process of Firms, *European Research*, (November), p. 273-281.

Cavusgil, S. T. 1994, 'Born Globals: A Quiet Revolution Among Australian Exporters', *Journal of International Marketing*, vol. 2, no. 3, p. 4.

Chetty, S, Ojala, A, & Leppäaho, T 2015, 'Effectuation and foreign market entry of entrepreneurial firms', *European Journal Of Marketing*, 49, 9, pp. 1436-1459

Chetty, S. and Campbell-Hunt, C. (2003), Paths to internationalization among small- to medium-sized firms, *European Journal of Marketing*, Vol. 37 Nos. 5/6, pp. 796-820.

Colovic, A. and Lamotte, O. (2014)," The role of formal industry clusters in the internationalisation of new ventures ", *European Business Review*, 26(5), pp. 449 – 470.

Coviello, E, N, & Munro, J., H. (1995). Growing the entrepreneurial firm: networking for international market development. *European Journal of Marketing*, Vol. 29 Iss: 7, pp. 49 – 61

Coviello, N. and McAuley, A. (1999), Internationalization and the smaller firm: a review of contemporary empirical research, *Management International Review*, Vol. 39, pp. 223-256.

Dunning, J.H. (2000), The eclectic paradigm as an envelop of economic and business theories of MNE activity, *International Business Review*, Vol. 9 Iss. 2, pp. 163-190.

Einsiedler, I. (2013) "Embedded Systeme für Industrie 4.0," *Product Management*, vol. 18, pp. 26–28.

Fernhaber, S, & Li, D 2013, 'International exposure through network relationships: Implications for new venture internationalization', *Journal Of Business Venturing*, 28, 2, pp. 316-334

Forsgren, M. (2002). "The Concept of Learning in the Uppsala Internationalisation Process Model: A Critical Review", *International Business Review*, 11 (2), pp. 257-277.

Francioni, B 2014, 'International market selection, mode decisions and psychic distance for SMEs', International Journal Of Strategic Change Management, 5, 2, pp. 93-106

Gankema, H.G., Snuif, H.R. and Zwart, P.S. (2000), "The internationalization process of small and medium-sized enterprises: an evaluation of stage theory", *Journal of Small Business Management*, Vol. 38 No. 4, pp. 15-27.

Galkina, T, & Chetty, S 2015, 'Effectuation and Networking of Internationalizing SMEs', *Management International Review* (MIR), 55, 5, pp. 647-676

Granovetter, MS 1973, 'The Strength of Weak Ties', *American Journal of Sociology*, 6, p. 1360

Hagberg, J., Sundstrom, M. and Egels-Zandén, N. (2016) "The digitalisation of retailing: an exploratory framework", *International Journal of Retail & Distribution Management*, 44(7), pp.694 – 712.

Hammond, C., and Groose, R. (2003), Rich man, poor man: Resources on Globalization, *Reference Service Review*, Vol. 31 No. 3, pp. 285-295.

Hill, J, McGowan, P, & Drummond, P 1999, 'The development and application of a qualitative approach to researching the marketing networks of small firm entrepreneurs', *Qualitative Market Research: An International Journal*, 2, 2, p. 71

Hill, C.W.L. (2003). "International Business: Competing in the Global Marketplace", Boston, MA: *McGraw-Hill*.

Hilmersson, M & Jansson, H, (2012), 'International Network Extension Processes to Institutionally Different Markets: Entry Nodes and Processes of Exporting SMEs', *International Business Review*, p. 682

Holmlund, M., Strandvik, T. and Lähteenmäki, I. (2017) "Digitalisation challenging institutional logics: Top executive sensemaking of service business change", *Journal of Service Theory and Practice*, 27(1), pp.219 - 236

Håkansson, H, & Ford, D 2002, 'How should companies interact in business networks?', *Journal Of Business Research*, 55, Marketing Theory in the Next Millennium, pp. 133-139

Inauen, M. and Schenker-Wicki, A. (2012) "Fostering radical innovations with open innovation", *European Journal of Innovation Management*, Vol. 15 Issue: 2, pp.212-231

Ivang, R., Rask, M. and Hinson, R. (2009) "B2b inter-organisational digitalisation strategies: Towards an interaction-based approach", *Direct Marketing: An International Journal*, 3(4), pp.244 - 261

Jankowska, B. and Główka, C. (2016),"Clusters on the road to internationalisation – evidence from a CEE economy ", *Competitiveness Review*, 26 (4), pp. 395 – 414.

Jeong, SW 2016, 'Types of foreign networks and internationalization performance of Korean SMEs', *Multinational Business Review* (Emerald Group Publishing Limited), 24, 1, pp. 47-61

Johanson, J. & J-E. Vahlne (1977). "The Internationalisation Process of the Firm - A Model of Knowledge Development and Increasing Foreign Market Commitments", *Journal of International Business Studies*, (8), pp. 23-32.

Johanson, J., and Vahlne, J-E. (1990). The mechanism of internationalisation, *International Business Review*, 7(4), pp.11-24.

Johanson, J., & Vahlne, E. J. (1992). Management of Foreign Market Entry. *Scandinavian International Business Review*, Vol. 1 No. 3 pp. 9-27

Johanson, J., & Vahlne, E. J. (2009). The Uppsala internationalization process model revisited: From liability of foreignness to liability of outsidership. *Journal of international business studies*, 40.9 (2009): 1411-1431.

Johanson, J., & Wiedersheim-Paul, F. (1975). The Internationalization of the Firm: Four Swedish Cases. *Journal of Management Studies*, 12(3), 305-322.

Johanson, J. and Mattsson, L.-G. (1988), Internationalization in industrial systems: a network Approach, in Hood, N. and Vahlne, J.-E. (Eds), Strategies in Global Competition, *Croom Helm*, London (pp. 287-314).

Johanson, J. & J-E. Vahlne (2003). Business Relationships, Learning and Commitment in Internationalisation Process, *Journal of Entrepreneurship*, 1 (2), pp. 83-101.

Johanson, J. and Wiedersheim-Paul, F. (1975), The internationalisation of the firm – Four Swedish cases, *Journal of Management Studies*, 3 (October), pp. 305-322.

Koren, M. (2008) "Challenges for science and society in the digital age: 2nd IFLA Presidential Meeting in Berlin", *New Library World*, Vol. 109 Issue: 7/8, pp.393-395

Köcker, M. and Müller, Z. (2011), European Clusters go International. Berlin: *Institute for Innovation and Technology*, 2011.

LeMahieu, P.G., Grunow, A., Baker, L., Nordstrum, L.E. & Gomez, L.M. (2017) "Networked improvement communities: The discipline of improvement science meets the power of networks", *Quality Assurance in Education*, Vol. 25 Issue: 1, pp.5-25

Lee, J., Kao, H. A., & Yang, S. (2014). Service innovation and smart analytics for industry 4.0 and big data environment. *Procedia CIRP*, 16, pp. 3-8.

Leonidou, S.C. & Katsikeas, C.S. (1996). The Export Development Process – An integrative review of empirical models, *Journal of International Business Studies*, 27(3), pp. 517-551.

Lin, H., S. Nagalingam, S., Kuik, S and Murata,T.(2012). "Design of a Global Decision Support System for a manufacturing SME: Towards participating in Collaborative Manufacturing," *International Journal of Production Economics*, 136(1), pp. 1–12.

Lindqvist, G., Ketels, C. and Sölvell, Ö. (2013), The Cluster Initiative Greenbook 2.0, Stockholm: *Ivory Tower Publishers*.

Madsen, T, & Servais, P 1997, 'The Internationalization of Born Globals: an Evolutionary Process?', *International Business Review*, 6, 6, p. 561

Mendikoa, I., Sorli, M., Barbero, J., Carrillo, A. and Gorostiza, A. (2008)."Collaborative product design and manufacturing with inventive approaches", *International Journal Production Research*, 46(9), pp. 2333–2344.

Miles, M.B. and Huberman, A.M. (1994), Qualitatively Data Analysis (2nd ed.). Thousand Oaks, CA: *Sage*.

Morgulis-Yakushev, S. and Sölvell, Ö. (2017) "Enhancing Dynamism in Clusters: A Model for Evaluating Cluster Organisations´ Bridge-Building Activities Across Cluster Gaps", Competitiveness Review: An International Business Journal, 27(2), pp. -

Musso, F, & Francioni, B 2012, 'How Do Smaller Firms Select Foreign Markets?',*International Journal Of Marketing Studies*, 6, pp. 44-53

Ngoma, M. Abaho, E., Sudi Nangoli, S. & Kusemererwa, C. (2017) "Internationalisation of SMEs: does entrepreneurial orientation matter?", *World Journal of Entrepreneurship, Management and Sustainable Development*, Vol. 13 Issue: 2, pp.96-11

Ojala, A. (2008). Entry in a psychically distant market: Finnish small and medium-sized software firms in Japan. *European Management Journal*, 26(2), 135- 144

Osarenkhoe, A. (2009), "An Integrated Framework for Understanding the Driving Forces behind Non-sequential Process of Internationalisation among Firms", *Business Process Management Journal*, 15(2), pp. 286-316.

Pavelkova, D., Pavel, B., Bialic-Davendra, M. and Knapkova, A. (2015), Internationalisation Activities of the Cluster *Internationalisation: Factors which influence them,* Transformation in Business & Economics, 14(3C), pp 316-332.

Pinho, J.C. and Pinheiro, M.L. (2015) "Social network analysis and the internationalisation of SMEs: Towards a different methodological approach", *European Business Review*, Vol. 27 Issue: 6, pp.554-572

Pla-Barber, J. and Puig, F. (2009), "Is the influence of the industrial district on international activities being eroded by globalisation? Evidence from a traditional manufacturing industry", *International Business Review*, 18(5), pp. 435-445.

Plesner, U. and Raviola, E. (2016) "Digital technologies and a changing profession: New management devices, practices and power relations in news work", *Journal of Organisational Change Management*, Vol. 29 Issue: 7, pp.1044-1065

Preston, P. and Rogers, J. (2012) "Crisis, digitalisation and the future of the Internet", info, Vol. 14 Issue: 6, pp.73-83

Prashantham, S. (2008), "Local networks and internationalisation", in Prashantham, S. (Ed.), The Internationalisation of Small Firms: A Strategic Entrepreneurship Perspective, New York, NY: *Routledge*, pp. 63-78.

Quinn, L., Dibb, S., Simkin, L., Canhoto, A. & Analogbei, M. (2016) "Troubled waters: the transformation of marketing in a digital world", *European Journal of Marketing*, Vol. 50 Issue: 12, pp.2103-2133.

Richardson, C., Yamin, M. and Sinkovics, R.R. (2012), "Policy-driven clusters, interfirm interactions and firm internationalisation: some insights from Malaysia's multimedia super corridor", *International Business Review*, 21(5), pp. 794-805.

Rodriguez, J 2007, 'The Internationalisation of the Small and Medium-sized Firm', *Prometheus*, 25, 3, pp. 305-317, Academic

Sandberg, J., Holmström, J., Napier, N., & Levén, P. (2015). Balancing diversity in innovation networks: Trading zones in university-industry R&D collaboration. European *Journal of Innovation Management*, 18(1), 44-69.

Sergeev, N. (2017) "High-priority directions of modernization of university education in innovational society", *International Journal of Educational Management*, Vol. 31 Issue: 1, pp.56-61

Ślepko, 2012 (Replace with: Jesús M. Valdaliso Aitziber Elola Susana Franco , (2016)," Do clusters follow the industry life cycle? Diversity of cluster evolution in old industrial regions ", *Competitiveness Review*, Vol. 26 Iss 1 pp. 66 -86

Sun, S.-L. (2009), Internationalization strategy of MNEs from emerging economies: the case of Huawei, *Multinational business review*, special issue on "Multinational & Emerging Markets".

Sölvell, Ö. (2009), Clusters – Balancing Evolutionary and Constructive Forces, Stockholm, Sweden: *Ivory Tower Publishers*.

Valdaliso, J.M., Elola, A. Franco, S.(2016), "Do clusters follow the industry life cycle?: Diversity of cluster evolution in old industrial regions", *Competitiveness Review*, 26(1), pp.66 – 86.

Williamson, O. (1979), "Transaction cost economics: the governance of contractual relations", *Journal of Law & Economics*, Vol. 22, pp. 233-62.

Windrum, P., Schartinger, D., Rubalcaba, L., Gallouj, F., Toivonen, M. (2016) "The co-creation of multi-agent social innovations: A bridge between service and social innovation research", *European Journal of Innovation Management*, Vol. 19 Issue: 2, pp.150-166

Xu, S. and McNaughton, R.B. (2006), "High technology cluster evolution – a network analysis of Canada's technology triangle", *International Journal of Entrepreneurship and Innovation Management*, 6 (6), pp. 591-608.

Zain, M. and Ng, S.I. (2006), "The impact of network relationships on SME internationalization process", *Thunderbird International Business Review*, Vol. 48 No. 2, pp. 183-205.

Zhou, Wei-ping, and Xueming (2007), Internationalization and the performance of born-global SMEs: the mediating role of social networks, *Journal of International Business Studies* (2007) 38, 673–690

Yields and Land Use for Wheat Production in Romanian Agriculture

Silvius Stanciu

„Dunarea de Jos" University of Galati, Romania, sstanciu@ugal.ro

Abstract

Wheat production represents an important factor in ensuring Romania's food security, independence and supremacy. During the interwar period, Romania was the main agricultural area producing cereals at a European level. Growing cereals, and especially wheat, is a very old practice on Romanian territory. Although wheat production suffered an important decrease after the change in the political regime from Romania, lately there has been a recovery in the sector, although the optimal use of Romania's natural potential hasn't been reached yet. The present paper proposes an assessment of the national wheat production, of the surfaces on which wheat is grown and of the average productivity per hectare by means of analysing the official data offered by the Romanian and local statistics. The conducted research showed that the record wheat yields obtained in the last few years by Romanian agriculture were not directly influenced by government investments in irrigation systems or by additional quantities of chemical fertilizers. Government and private measures to increase the invested capital or the irrigated areas, to modernize agricultural technologies or to improve wheat species may lead to an increase in the volume of wheat production and could place Romania among the most significant exporters in the world.

Keywords wheat, land, yields, Romania

Introduction

Wheat represents the most important crop in the world, covering the largest surface worldwide, estimated at over 220 million hectares. Wheat grains have a high carbohydrate and protein content. The foremost use of wheat is for human consumption, flour being the main ingredient in making bread and bakery products, the basic food for about 35-40% of the world's population. In industrial processing, wheat is used for the production of ethyl alcohol, of starch, of dextrin and of glucose, whereas in zootechnics, it is used as fodder for feeding animals. Virtually, nothing is wasted from the wheat yield. The bran, resulted after grinding the wheat, represents valuable fodder, rich in proteins, carbohydrates and mineral components, whereas straws are used in the pulp and paper industry or in feeding animals (Cristu, Cristu Scurtu and Stanciu, 2016). As far as agricultural technology is concerned, wheat growing is a good precursor for rapeseed and autumn fodder plants, because it improves the conditions for the administration of organic and mineral fertilizers.

During the interwar period, Romania was considered Europe's foremost wheat producer. Wheat growing has been practised since ancient times on the Romanian territory. The archaeological evidence from Cucuteni, Iași, shows that wheat was grown even from the Upper Neolithic and The Bronze Age. According to Troșan (2011), who quotes historical sources, the primitive species of wheat grown in our country were *T. monococcum* (such yields have been sporadically kept up to the present), *T. dicoccum, T. compactum* and, probably, *T. spelta*. Since the yields of *T. aestivum* were used even from the end of the third millennium BC, due to their technological advantages, this species of wheat may have been grown even from The Bronze Age on our territory, too. The Geto-Dacians used to practise a flourishing wheat trade with the Greek colonies from the shore of Pontus Euxinus and with the Thracians from the south of the Danube. The first information regarding the presence of bread in the north part of the Danube dates back to the 5th century BC at Xenofon, which reminds of unleavened bread. Also, in the 1st century AD, Pliny the Elder commented on the extraordinary taste of bread in this area. Wheat growing is also

mentioned by Darius, the king of the Persians, in his expedition against the Scythians (513 BC) from the Plains of Eastern Europe, Ukraine and the regions around the Caspian Sea. Wheat covered big surfaces, ranging from the Danube Plain towards the East and the South of Moldavia and the steppes of Ukraine, up to West in the Pannonian Plain. Mentions regarding wheat yields in the Danube Plain are also made by Alexander the Great in his expedition against Geto-Dacians (335 BC), whereas Teofrost (372 - 287 BC) speaks about a rich agriculture practised by the Geto-Dacians. Since 1850 and until WWII, local agriculture has continuously developed, largely due to wheat growing. During WWI, wheat growing declined a lot, in 1920, the surface on which wheat was grown reaching 2.03 million hectares. In 1925, the surfaces allotted to wheat growing were estimated at 2.3 million hectares, reaching 3.3 million ha. from 1926 to 1938. During the interwar period, the average productivity varied between 5.1 q/ha (1932) and 13.1 q/ha (1938) with an average of 9.4 q /ha. After WWII, wheat growing has continuously developed, due to an increase in the national technical equipment and material possibilities, to the introduction and expansion of improved wheat species and to the improvement in agricultural technologies (Răsfoiesc.com, 2017). The local lexical resources have kept numerous Latin-based terminology, which name the main operations performed when transforming wheat into bread, thus proving the continuity of a number of domestic operations on the territory of our country (Troșan, 2011).

Materials and Methods

The information regarding the farmland on which wheat is grown and regarding the yield obtained was taken from the National Institute of Statistics and Eurostat databases. The average productivity per hectare was calculated by comparing the yields to the cultivated lands. Other information, related to the characteristics of wheat species or the agricultural technologies employed in Romania were selected from the domain-specific literature. Some official information regarding the wheat yield was collected from the official media or from the press releases made by the Romanian officials. The data was statistically processed and graphically represented. The obtained results were interpreted and compared with data from the domain-specific literature for an adequate interpretation.

Wheat growing in Romania

Romania occupies an important position in European agriculture, being placed on the 6th position as far as the use of the farmland is concerned, with approximately 13.9 million ha in 2013, after France, Spain, Great Britain, Germany and Poland (PricewaterhouseCoopers Management Consultants SRL, 2017).

In Romania, the wheat-cultivated land represents almost 25% of the total arable land and 40% of the cereal-cultivated one (Dragomir, 2009). According to the data taken from the National Institute of Statistics (2017), the land allotted for wheat growing in Romania was between 1.46 million ha in 1992 and 2.54 million ha in 2001, with an annual average of 2.11 million ha from 1990 until 2016 (figure 1).

The main species of wheat in Romania is the common wheat (*Triticum aestivum ssp vulgare*). On smaller surfaces, which represent approximately 0.3% of the total land allotted to wheat, a variety of wheat with a higher grain hardness, the durum wheat, is grown (*Triticum durum* or *Triticum turgidum conv. Durum)*, which is intended for the manufacture of pasta.

As compared to France, Germany, Great Britain or Italy, the largest wheat producers in Europe, countries in which early (Apache, Autan) or semi-early (Renan, Reflection) varieties of wheat are grown, in Romania, the varieties used for high-performance agriculture are those semi-early or late, which can successfully cope with the more arid climate (BASF, 2017).

Although, lately, the durum wheat quantities harvested in Romania have recorded an upward trend, there is only one company specialised in the industrial processing of this wheat variety, the vast majority of the production being exported (Cristu, Cristu Scurtu and Stanciu, 2016).

At a European level, in 2016, Romania occupied the 5th place as far as the wheat-cultivated land is concerned, with 2.11 million ha, after France, Germany, Poland, Spain, the same place being held as far as the total wheat yield is concerned, after France, Germany, Great Britain and Poland, with 8.28 million tons (Agerpres, 2017).

In the international statistics, the first places are occupied by China, India, Russia and USA, countries that account together for more than half of the global wheat production (figure 1). The European Union, which is considered the biggest wheat producer, had a production level of 147.8 million metric tonnes in 2015 with a forecasted growth rate of 2% when comparing with previous year's performance. (Cristu, Cristu Scurtu and Stanciu, 2016).

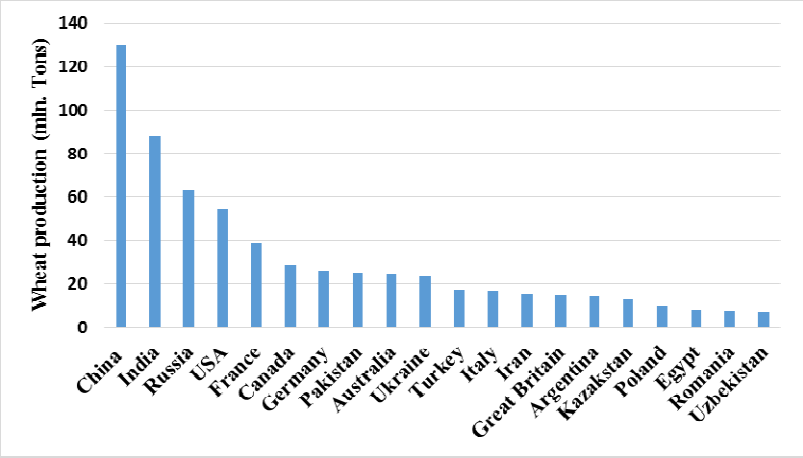


Figure 1:The worldwide wheat producers (2016)

Source: Author, using United States Department of Agriculture USDA data (2016),

The average productivity per has varied during the analysed period between a minimum of 1.429 tons/ha, recorded in 2012, and a maximum of 3.664 tons/ha in 2011, with an annual average of 2.77 tons/ha (figure 2). The general trend at a national level is to increase the average productivity per hectare, in the conditions in which farmland was reduced and agricultural technologies improved.

In May, experts estimated an average yield for 2017 of over 4 tons of wheat per ha, and significantly higher for farms with larger areas, given the climatic conditions of autumn-winter 2016 and the spring of 2017, respectively (Anghel, 2017).

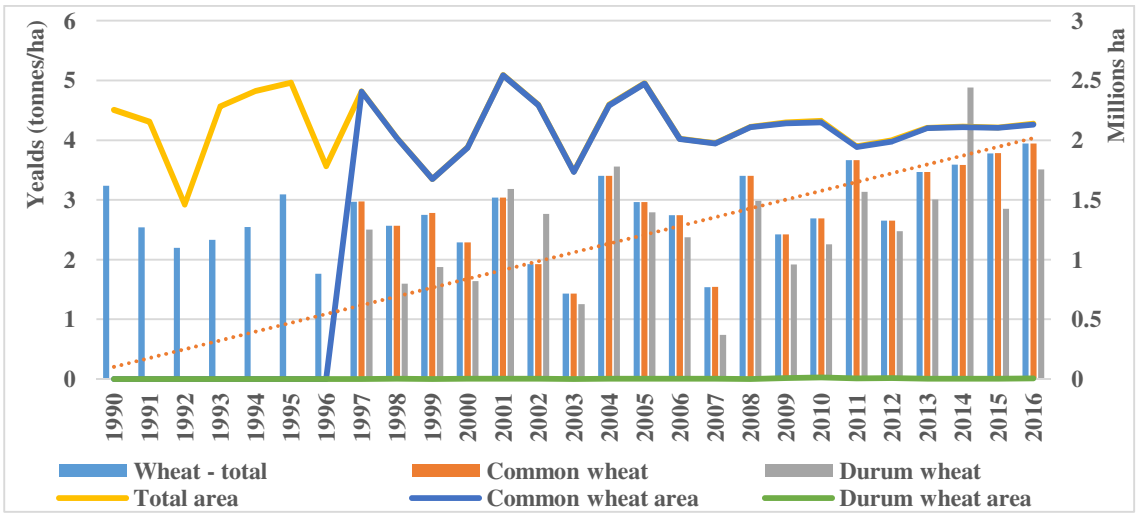


Figure 2: Wheat-cultivated land and average annual productivity in Romania
Source Author, by using NIS Data (2017)

The experts' forecast was confirmed by the Minister of Agriculture, who validated at the end of the harvesting campaign an average yield of de 4.836 kilograms per hectare, a record for Romania. According to the Eurostat data (2017), in 2016, Romania was on the 5th place in Europe regarding the average wheat productivity, surpassing countries such as Italy or Spain (figure 3).

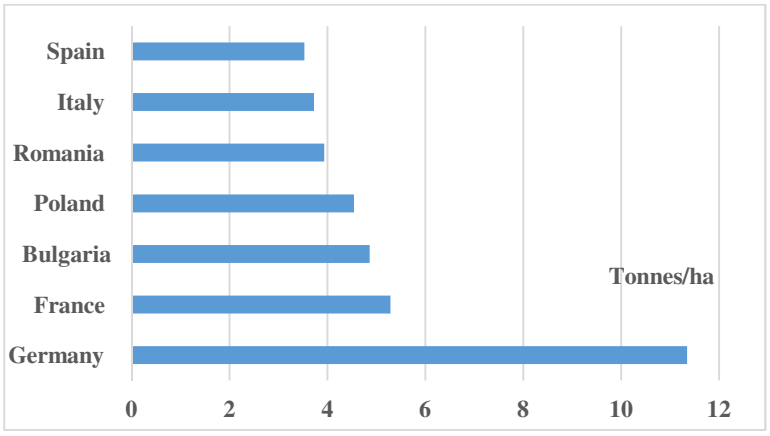


Figure 3: Average yield on wheat production by the main European producers (2017)
Source Author, by using EC Eurostat data (2017)

Romanian producers achieved in the recent years a growth of the average per ha production, more than 4 tons this year, and surpassing Ukraine, USA and India (figure 4). This agricultural productivity is a record of Romania for the last 10 years, with the highest average quantities obtained last year, respectively 3.84 tons per hectare, 2011-3.68 tonnes per hectare, in 2014 -3.58 tons per hectare, and finally, in 2008 - 3.40 tonnes per hectare (Ministry of Agriculture and Rural Development MARD, 2016).

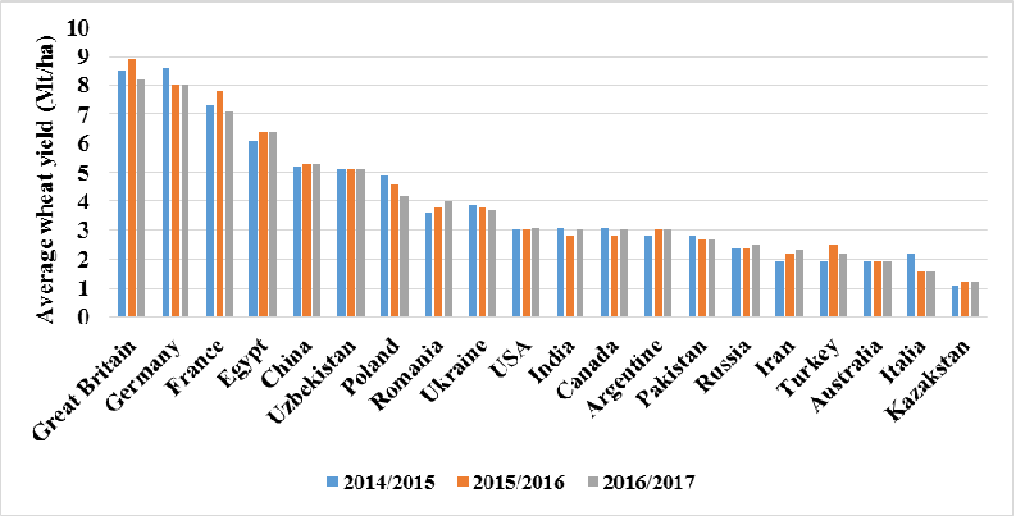


Figure 4: Woldwide average wheat productivity

Source Author, using Cristu, Cristu and Stanciu (2016)

The historic quantities of wheat obtained this year by Romania can be correlated with the national investments in the irrigation system, the Minister stating that other national irrigation systems are being implemented, and the cost of which exceeded 1 billion lei from the national budget and 431 million euro through the Rural Development National Programme 2014-2020 (Economica.net, 2017). The Minister's allegations are contradicted by official statistics, the NIS data (2017) showing that there weren't any substantial changes at a national level regarding the irrigation facilities. The evolution of the irrigated land at a national level is presented in figure 5.

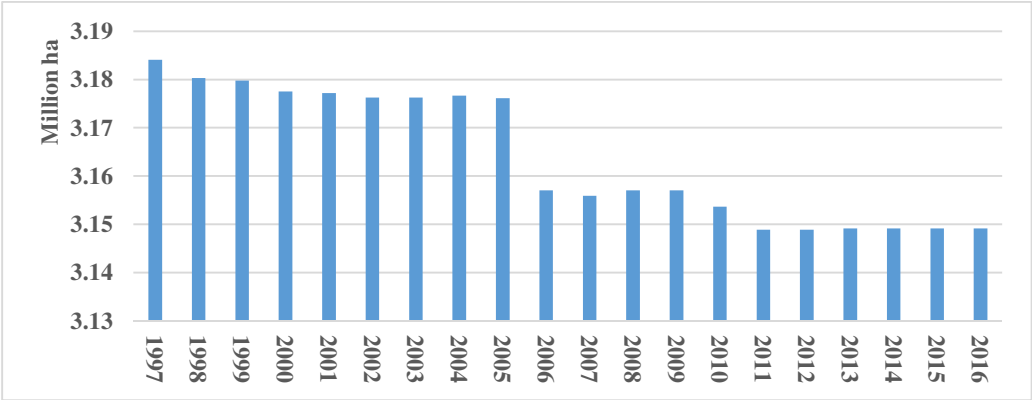


Figure 5: Irrigation facilities in Romania (ha)

Source NIS Data (2017)

According to the presented data, one cannot notice a significant evolution of the irrigated land at a national level from 2011 until 2016, which lately has remained at a relatively constant value of approximately 3.2 million ha.

There isn't any direct correlation between the quantities of fertilizers distributed in Romanian agriculture and the increase in wheat productivity, given the fact that there aren't any significant differences between the levels of fertilizers distributed on farmland in the last few years (figure 6).

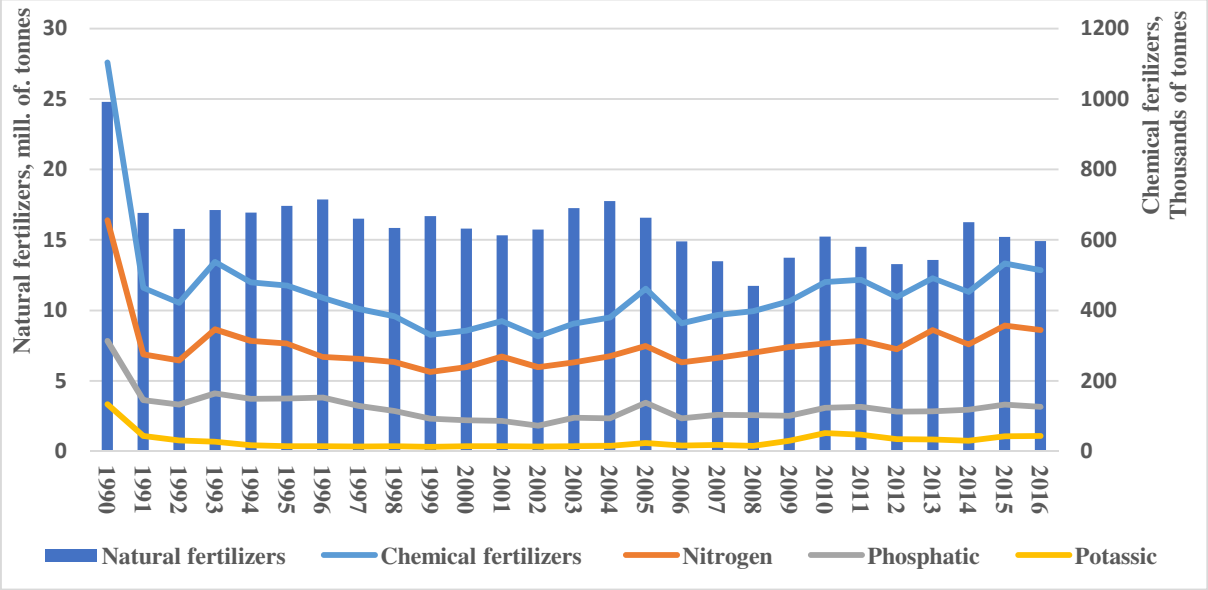


Figure 6: Chemical and natural fertilizers in Romanian agriculture (tonnes of active substance)
Source Authors, using NIS data (2017)

Since there weren't any significant evolutions in the development of irrigation facilities or in the usage of chemical fertilizers, it seems that the record yields obtained this year were mostly due to luck, represented by sufficient rainfall at the proper time, and not to irrigation or to fertilizers. An exhaustive analysis of the factors which led to an increase in wheat productivity must also take into account the climatic conditions, the agricultural machinery and the varieties of wheat used, the workforce, land merging etc.

Although it is characterised by a relatively low productivity as compared to other countries at an international level, Romania has constantly been, in the last few years, in the top 20 wheat-producing countries in the world, due to the large area of farmland dedicated to wheat growing, being a net exporter of cereals. In 2015, Romania occupied the 9th place as far as global wheat exporters are concerned (PricewaterhouseCoopers Management Consultants SRL PWC Report, 2017). In 2016, Romania was situated on the 2nd place in the European Union regarding wheat and barley exports. Last year, Romanian farmers exported over 840,000 tons of wheat in the first six weeks of the agriculture season, the exports reaching 1,589 million tons of what until the end of the year. Germany is on the 1st place in the ranking regarding European exporters, with 1,892 million tons of wheat exported at the beginning of the fiscal year 2016/17. Last year, the next positions in the European ranking are occupied by France, with 1,351 million tons and Poland with 971,000 tons of exported wheat (BASF, 2017).

According to the PWC Report, taking into account the large area of farmland and the reasonable usage rate as far as Romania is concerned (which is situated on the third place at a European level, after France and Spain), the yield is the main limiting factor of the national agriculture sector.

The volume of the annual production depends on the available farmland, on the usage rate of the available farmland and on the yield of the farmland. According to the PWC Report (2017), the theoretical yield of the farmland in Romania is of 7t/ha., a well-estimated value, given the fact that more EU

countries have had yields which exceeded 7t/ha in the last few years (France, Germany, Great Britain, Ireland), and the European average is estimated at 5.5 t/ha. If our country reached the average theoretical yield per hectare recorded at a European level, it would have an estimated wheat yield of 12 million tons annually, thus being ahead Germany and other European countries.

In order to increase Romania's real yield in the next few years, the main factors limiting the performance of the national agricultural sector should be addressed: the capitalization of farms, the improvement of the facilities used in agriculture, the training level of farmers and the average size of farms.

Nevertheless, the value of the annual production can be affected by the commodity prices and by other factors such as the fluctuations that may occur in the exchange rates.

Conclusions

Romania has the capacity to produce large quantities of wheat, ensuring the needs of the population and significant incomes for the farmers by exporting harvested quantities on the international market. The volume of the wheat yield in Romania could significantly increase if the national yield would reach the European average or at least the maximum theoretical yield of the farmland. In order to increase the average wheat yield in Romania, economic agents should apply concerted measures such as: the increase in the amount of capital invested and in the irrigated areas, the modernisation of the agriculture technologies, the improvement of the wheat varieties, correlated with government measures to increase the farmers' level of training and to alter the average size of farms. The increase in the wheat yield volume could place Romania among the most important exporters in the world, bringing important benefits to Romanian farmers and to national economy. The brief analysis of a number of potential factors which could have influenced the level of production in the last few years highlighted the fact that irrigation facilities and chemical and natural fertilizers have not influenced the high amounts of wheat obtained in Romania.

References

Agerpres, (2017), Romania, first in the EU in acreage and production of sunflower, [România, primul loc în UE la suprafața cultivată și producția de floarea soarelui], Agerpres (Mars 31, 2017), [online], (Retrieved September 12, 2017), https://www1.agerpres.ro/economie/2017/03/31/romania-primul-loc-in-ue-la-suprafata-cultivata-si-productia-de-floarea-soarelui-09-52-00.

Anghel, S., (2017). Experts estimate that in 2017 Romania will have a production of wheat identical to that of last year, [Specialiștii estimează că România va avea în 2017 o producție de grâu identică cu cea de anul trecut], AgroTV (May 9, 2017), [online], (Retrieved September 10, 2017), https://www.agro-tv.ro/specialistii-estimeaza-ca-romania-va-avea-2017-o-productie-de-grau-identica-cu-cea-de-anul-trecut.

BASF, (2017), Wheat Culture - When it sow wheat, technologies, treatments and fertilizers [Cultura grâului - Când semănăm grâul, tehnologii, tratamente și îngrășăminte], BASF Divizia Agro (April 24, 2017), [online], (Retrieved September 29, 2017), https://www.agro.basf.ro/agroportal/ro/ro/stiri/ stirile_agricole/ cultura-graului-cand-semanam-graul-tratamente-ingrasaminte-297088.html.

Cristu, C., Cristu Scurtu, M., Stanciu, S., (2016), An analysis of the evolution of Romania's cereals production and trade in the period of post-accession to the EU, Proceedings of The 28th International Business Information Management Association Conference: Innovation Management, Development Sustainability, and Competitive Economic Growth, Seville, Spain, (November10, 2016), Ed. Soliman, K.S, vol.I, pp.1501-1514.

Dragomir, L., (2009), Wheat, [Grâul]–*Triticum aestivum L*, Ferma (February 95, 2009), [online], (Retrieved September 15, 2017), https://www.revista-ferma.ro/articole/tehnologii-agricole/graul-triticum-aestivum-l.

Economica.net, (2017), Daea: At wheat we have an average production of 4,836 kilograms per hectare. Romania has not been met with such efficiency, [Daea: La grâu avem o producţie medie de 4.836 kilograme la hectar. România nu s-a mai întâlnit cu un asemenea randament], ECONOMICA (August 22, 2017), [online], (Retrieved September 19, 2017), http://www.economica.net/daea-la-grau-avem-o-productie-medie-de-4-836-kilograme-la-hectar-romania-nu-s-a-mai-intalnit-cu-un-asemenea-randament_142405.html.

European Commission - Eurostat, (2017), Wheat and spelt by area, production and humidity, [online], (Retrieved September 15, 2017), http://ec.europa.eu/eurostat/tgm/download.do?tab=table&plugin=1&language=en&pcode=tag00047.

Ministry of Agriculture and Rural Development MARD, (2016), Fields Crops. Wheat, [online], (Retrieved September 15, 2017), http://www.madr.ro/en/field-crops/cereals/wheat.html.

National Institute of Statitics NIS, (2017), Agriculture. Tempo Online, [online], [Retrieved August 24, 2017], http://statistici.insse.ro/shop.

PricewaterhouseCoopers Management Consultants SRL (PWC), (2017), Potential of the developmentfor the agricultural sector in Romania [Potenţialul dezvoltării sectorului agricol din România], [online], (Retrieved September 15, 2017), https://www.juridice.ro/wp-content/uploads/2017/03/Raport _PwC-agricultura.pdf

Răsfoiesc.com, (2017), The history of wheat culture, [Istoricul culturii grâului], [online], (Retrieved September 12, 2017), http://www.rasfoiesc.com/business/agricultura/ISTORICUL-CULTURII-GRAULUI 78.php.

Trosan, L., (2011), Wheat and bread in traditional culture. Mythico-symbolic dimensions [Grâul si pâinea în cultura tradiţională. Dimensiuni mitico- simbolice], PhD Thesis, [online], (Retrieved September 12, 2017), http://doctorat.ubbcluj.ro/sustinerea_publica/rezumate/2011/filologie/ trosan_laura_ro.pdf.

United States Department of Agriculture USDA, (2016), World Agricultural Supply and Demand Estimates (12.08.2016), [online], (Retrieved September 12, 2017), http://www.usda.gov/oce/commodity/wasde/ latest.pdf.

Patent Applications in Romania: Romanian Innovation in the European Context

Cezar Ionut Bichescu, Dunărea de Jos University of Galati, Galati, Romania,
cezar.bichescu@ugal.ro
Mariana Madalina Chivu, Dunărea de Jos University of Galati, Galati, Romania,
mariana.chivu@edu.gov.ro
Silvius Stanciu, Dunărea de Jos University of Galati, Galati, Romania,
sstanciu@ugal.ro

Abstract

Innovation can represent for the modern society the main way to achieve economic growth and to solve certain local and global issues related to the threat to population's health, food security or environmental concerns. European strategies in the field of Research, Development and Innovation aim at increasing the role and significance of patenting and at enhancing the protection and implementation of scientific breakthroughs. Although Europe has made progress in this area, the European office is still behind those from China, USA. Japan or the Republic of Korea. European countries, through Germany and France, are among the world's top holders of patents. Romania, although it has nationally recorded a number of progresses in the field of patent registration, registers low international shares. in particular, due to the prohibitive costs of patents registration. Romanian universities occupy modest positions in the field of patenting, registering an average of 1.4 patents / year. Supporting and encouraging national innovation and filing patent applications should be supported at governmental level, by reducing formalities, the duration of acquiring the patent and the patenting costs.

Keywords: innovation, patents, Europe, Romania

Introduction

Applied research and innovation represent a current priority for the European policy. According to Community guidelines, innovation must be a strong point for States Member in economic growth and for the creation of decent, quality and stable jobs, especially for young people, economic growth and socio-economic convergence, migration, security and the fight against populism. Research and innovation can improve the living conditions of EU citizens, representing key elements of the European Commission's policies, which seek to stimulate employment, economic growth and investments. Research and innovation can provide scientific knowledge and practical solutions for diminishing / avoiding certain short-term threats to the European area that may affect the health of the population (poliomyelitis epidemics, Zika, Ebola, etc.), food security and safety (lack of food , genetically modified production, etc.), social balance and humanitarian issues (refugee crisis, unequal distribution of incomes, etc.), or can respond on long-term to certain society challenges related to transport, climate changes or energy (European Parliament, 2017). The European Commission's recommendations to States Member aim to increase the funds allocated to research and development, being recommended to exceed the threshold of 3% of GDP until 2020 (1% of public funds, 2% of private investments), which is estimated to generate 3.7 mill. of jobs and would determine an annual EU GDP increase of around 800 billion euros. At the same time, the European Commission proposes a reduction of up to 80% in patenting costs at European level, with simultaneous recognition of patents in the 25 signatory states of the agreement, to boost the European patenting activity.

Materials

Information on patent applications filed at European level has been selected from the European Patent Office's statistical database. For the Romanian patenting, data were collected from the official statistics of the Romanian State Office for Inventions and Trademarks. The analysis period was 2006-2016, depending on data availability. For the European legislation in the field, there have been used the official releases of the European Parliament and the European Commission. National patenting legislation has been selected from the website of the State Office for Inventions and Trademarks and official publications of the Government of Romania. Where necessary, one related also to other sources, represented by scientific publications or official journals. Data have been systematized, statistically interpreted and graphically represented.

Patenting at European level

At European level, the body responsible for registering and validating patent applications is the European Patent Office (EPO), body of the European Patent Organization, an intergovernmental organization consisting in 38 countries (the Member States and 11 other European countries including Turkey).
Globally, over 80% of patents granted worldwide are granted by the European Patent Office (OEB), the Japanese Patent Office (JPO) and the United States Patents and Trademark Office (USPTO) (Rasvan, 2017).

In the statistics World Intellectual Property Organization WIPO, EPO has been the fifth in the year 2015, as number of patents registered (figure 1).

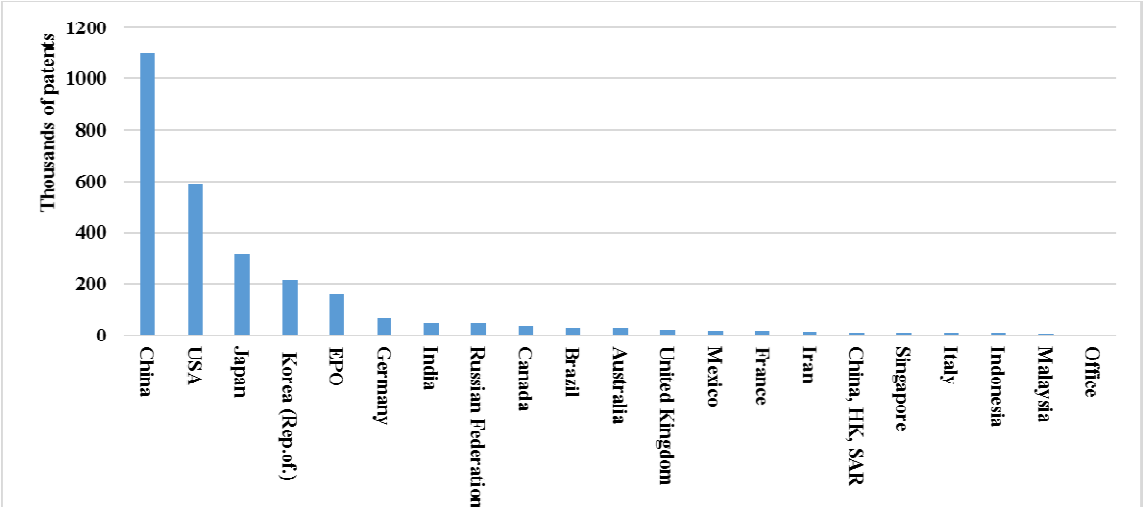


Figure 1: Patent - Applications for the top 20 offices (2015)
Source Authors, by using WIPO Data (2017)

It should be noted that in WIPO statistics, China, with an increase of 18.72% towards the previous year and with 1,101,864 patents registered in 2015, is the first state in the world to exceed the limit of 1 million patents registered. By comparison, USA and Japan, which are the second and third in Top 20 Patents WIPO registered, record cumulatively only 908,131 patents. Europe is represented by Germany, UK, France and Italy in the world top.

In Europe, the OEB examines the patent applications, being responsible for granting patents registered to the European Office if the necessary conditions are met. For the patent granted to be valid in a State Member, the inventor must apply for its national validation in each country where patent protection is sought. The process involves administrative and translation costs of up to € 32,000 when seeking for patents protection in EU-27, amount of which € 23,000 represent the translation fees. By comparison, obtaining a patent in USA costs an average of 1,850 euros. In order to preserve the validity of the patents, it is necessary to pay each year the extension fees in each country, and the patent transfer or a license agreement to use the patented invention must be registered in the same way (Romanian Permanent Representation attached to the European Union, 2017).

A statistic of patent applications registered depending on the residence state of the first author of the patent shows that 1,484,472 applications were registered to EPO during the period 2007-2016, from residents of 169 countries out of 177 registered in the European database. The dynamics of the applications registration during the analysed period is shown in Figure 2.

The largest share of registrations was recorded to EPO during 2015, when 160,004 applications were filed.

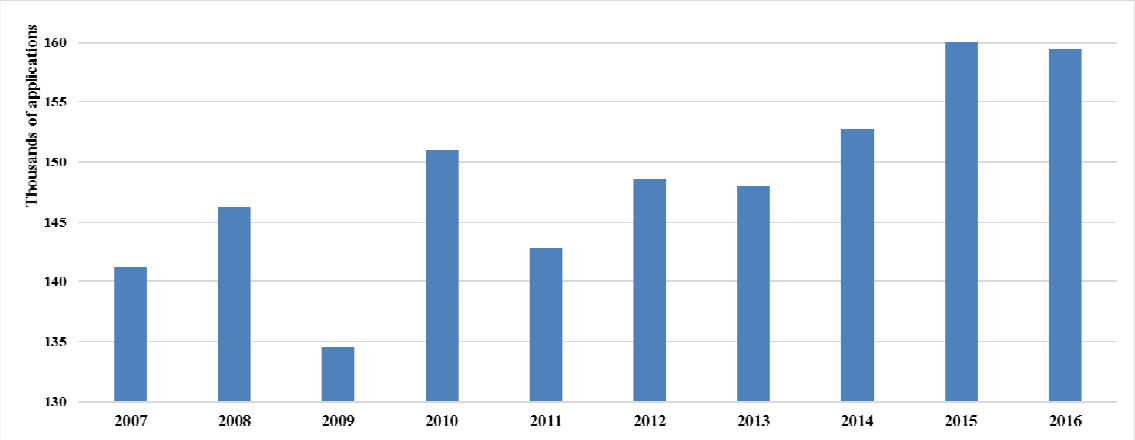


Figure 2: European patent applications 2007-2016
Source Author, by using EPO Data (2017)

Depending on the residence of the patent owner, in the top of the countries with the most applications to EPO during the analysed period, the USA ranks first, followed by Germany and Japan, covering over 50% of the total (Figure 3).

Benin, Bolivia, Botswana, Congo, Democratic Republic of Guadeloupe, Saint Helena, Vatican, and Zambia have no application registered during the analysed period.

With a total of 240 applications registered to EPO, Romania ranks 56 among the top of 177 countries from EPO base.

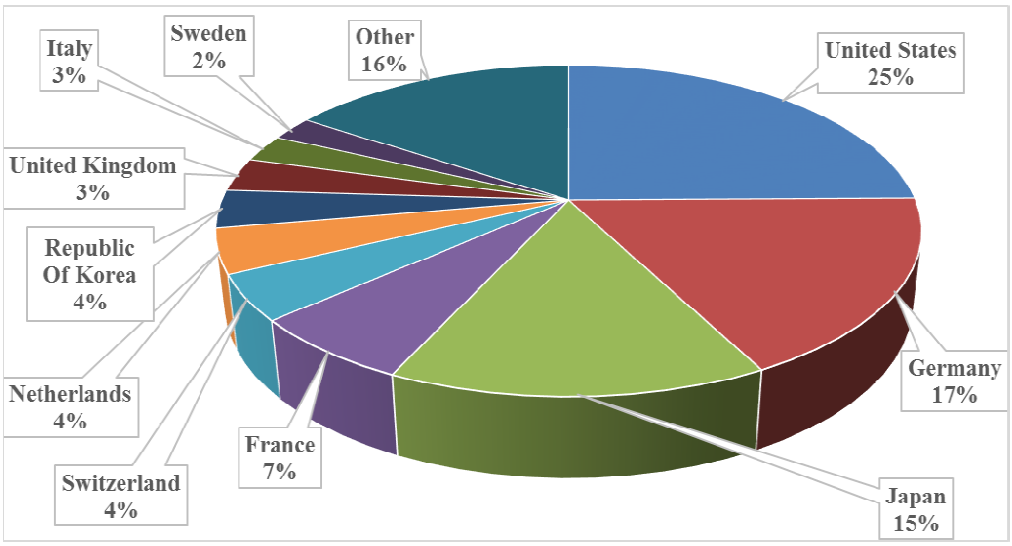


Figure 3: Top 10 European patent applications per country of residence of the first named applicant (2007-2016)

Source Author, by using EPO Data (2017)

Among the applicants residing in EPO member states, during 2016, 97,167 applications were submitted for patenting, increase with 370 units towards the previous year (Figure 4).

Germany is ranked first in the statistics of EPO members, a total of 31,815 applications being submitted last year, and representing more than a third of patent applications registered to EPO.

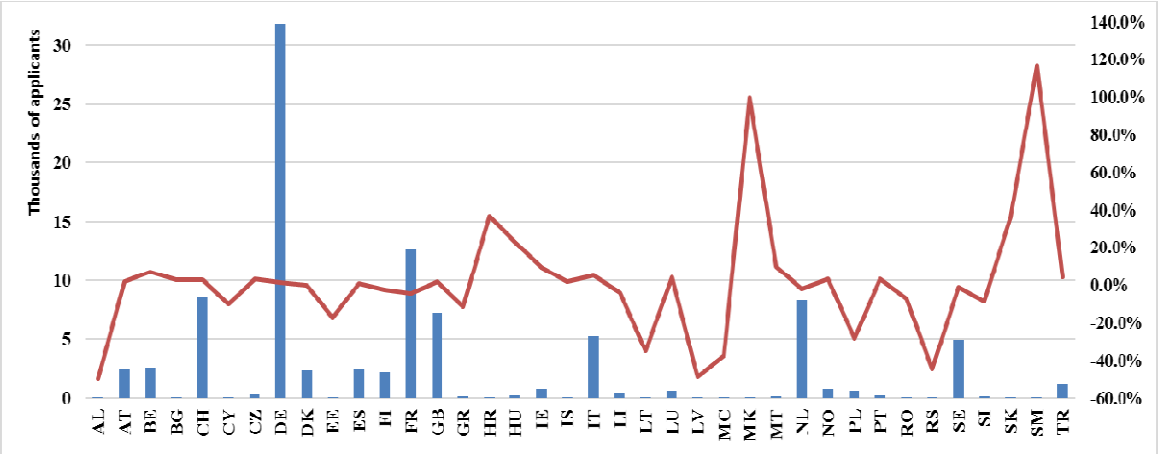


Figure 4: Patent applications registered by EPO state member during 2016 and evolution towards 2015

Source Author, by using EPO Data (2017)

France ranked second in the hierarchy last year, with 12,726 registered applications (still having a decrease of 4.3% compared to the previous year). Although it recorded at its turn a decrease with 2.1% in patent applications compared to the previous year, the Netherlands ranked third in the top from 2016, with 8,339 applications. Leading positions are completed by the Netherlands, the Czech Republic and

UK. Leading positions are also occupied by Germany, France, the Netherlands, Switzerland and Sweden, which are included in Top 10 Worldwide Patents.

Patenting in Romania

The sole authority on the Romanian territory with tasks in ensuring the protection of industrial property, in accordance with the national legislation in the field and with the provisions of the international conventions and treaties to which Romania is part, is the State Office for Inventions and Trademarks, OSIM.

OSIM operation is mainly based on the Government Resolution no. 573/1998 (Government of Romania, 1998), amended and completed by Government Resolution no. 63 from 23 February 2017 (Government of Romania, 2017). According to the legal provisions currently in force, OSIM is a specialized body of the central public administration with legal status, subordinated to the Ministry of Economy. The legislative provision issued by the Government of Romania this year passes OSIM from the Government subordination to that of the Ministry of Economy. OSIM prepares and submits to the Government of Romania the strategy for the development of industrial property protection in Romania and applies its policy in the field. OSIM is entitled to register and examine the applications from the industrial property field by releasing titles of protection conferring to the holders exclusive rights on the Romanian territory, as well as the depositary of the national registers of applications filed and national registers of protection titles granted for inventions, trademarks, geographical indications, drawings and industrial designs, topographies of integrated circuits, new plant varieties, being liable for the national collection and its correlation with international databases. If necessary, OSIM performs, upon request, specialized services in the field of industrial property, holds training programs in the field and performs any other tasks in the field of industrial property resulting from the legal provisions in force and from the international agreements. The unique protection title of inventions in Romania is the patent of invention, valid for 20 years, from the date of establishing the regular national depositary. Patenting is a formalized and laborious process that can reach Romania up to 30 months. The costs of patenting and validation of patents in Romania are quite high, although there is a tendency to reduce them, process also registered at European level. In this direction, the Government of Romania aims to reduce the formalities and costs of patenting, the new tax grid is presented in Annex 1 of the Law on Intellectual Property Taxes (Government of Romania, 2015).

The Official Industrial Property Bulletin of Romania (BOPI) is the publication of OSIM where inventions are made public and other industrial property categories patented. OSIM edits and publishes the series of invention patents, the Romanian Industrial Property Magazine and other publications intended to promote its object of activity. Romania is part of numerous multilateral agreements and treaties in the field of invention patents, the most important being presented in table 1.

Table 1: International agreements and treaties to which Romania is part

Nr. crt.	Treaty denomination	Romania ratification
1	Convention from Paris for the Protection of Industrial Property (1883), reviewed Brussels (December 1900), Washington (June 1911), Hague (November 6, 1925), London (June 2, 1934), Stockholm (July 14, 1967). * Amended on 2 October 1979	Decree no. 1177/ 28.12.1968 Official Bulletin B. Of. No. 1/06.01.1969
2.	Convention on the Establishment of the World Intellectual Property Organization (Stockholm, 1967)	Decree no.1175 from 28.12.1968 - B.Of. no.1/06.01.1969
3.	The Strasbourg Agreement on the International Classification of Invention Patents (1971), * Amended on 28 September 1979.	Law no. 3/1998 – Official Monitor M. Of. No. 10/14.01.1998
4.	Patent Cooperation Treaty, passed on Washington Diplomatic Conference (1970),	Decree no. 81 from 2 March 1979 - B. Of. No. 22/08.03.1979
5.	Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purposes of Patent Procedure (1977). * Amended on 26 September 1980	Law no. 75/1999 - M. Of. No. 210/13.05.1999
6.	The Convention Concerning the Issuance of the European Patent (Munich, 1973) and its Revision document (Munchen, 2000).	Law no 611/2002 - M. Of. No. 844/13.11.2002
7.	European Association Agreement between Romania, on the one hand, and the European Communities and their States Member (Bruxelles, 1993)	Law no. 20/1993 - M. Of. No.73/12.04.1993
8.	Marrakech Agreement on the Establishment of the World Trade Organization. Annex 1C - Agreement on trade-related aspects of intellectual property rights (Marrakech 1994)	Law no. 133/1994 - M. Of. No. 360/27.12.1994

Source: Author, using OSIM IP Law Database (2017a)

Patents registered in Romania

Evolution of validated patents in Romania during 2006-2016 is presented in Figure 5. According to OSIM data, a total of 30,717 patents were registered and approved in our country, during the analysed period, out of which 27,062 after joining the EU. As share, more than 80% of patent registrations to the national office come from recognitions of European patents based on the international agreements to which Romania is part.

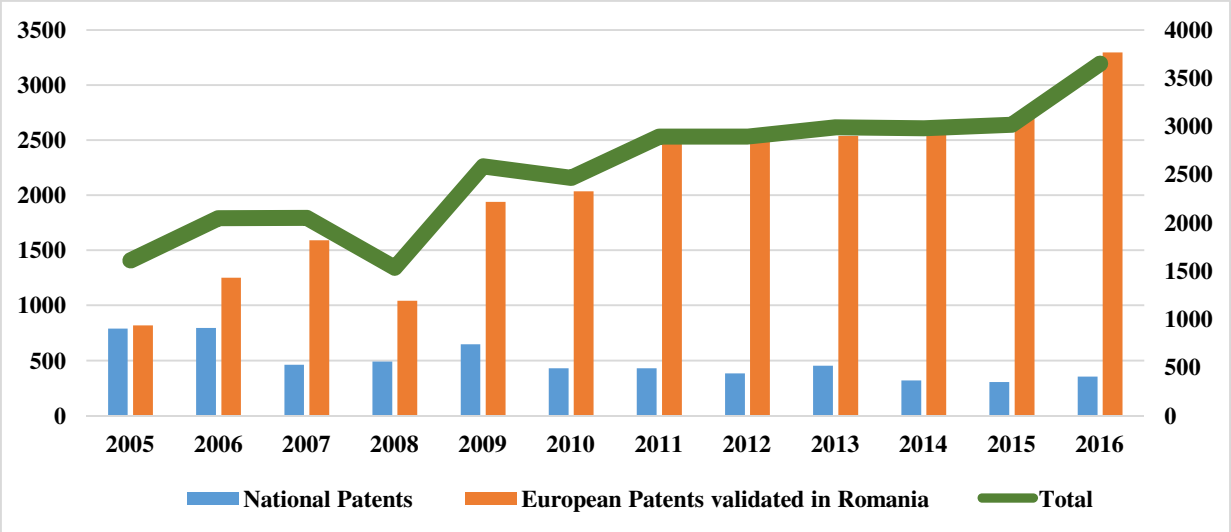


Figure 5: Patents registered in Romania (2005-2016)

Source Authors, by using OSIM data (2017b)

During the period 2005-2016, 13,331 patent applications were filed, out of which 12,672 belonged to the Romanian citizens, representing over 95% of the total. Residents abroad submitted only 659 patent applications to OSIM.
The main category of applicants for patenting research results consists in natural persons, which represent almost 50% of the total (Figure 6).

Although it has improved as share, the share of patents requested by universities accounted for just over 15% of the total number of applications registered during the analysed period, being close to the percentage recorded by private companies.

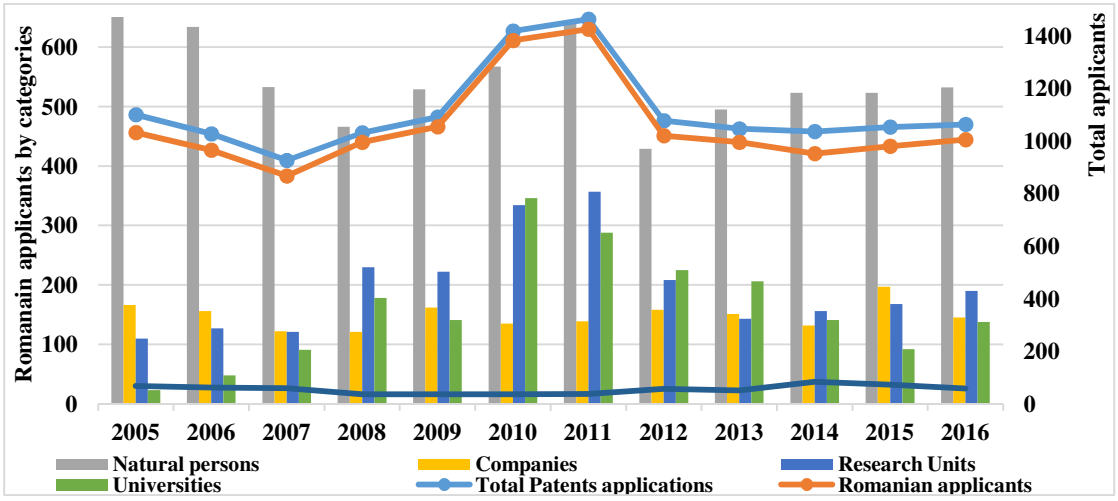


Figure 6: Patents applications submitted by Romanians

Source Authors, by using OSIM data (2017a)

The number of patent applications registered by universities has recorded a maximum in 2010, with 346 units, after which it recorded a significant decrease, reaching 92 units in 2015. Last year there was a slight increase of the applications, filed to OSIM with 138 units. Companies have registered between 150 and 200 validated patents, with a minimum of 122 units in 2007 and a maximum in 2015 with 197 patented applications. Specialized research units filed 2366 patent applications.

Patents Applications Registered and Validated By Universities

During the period 2005 - 2016 the evolution of patent applications registered by universities is presented in Figure 3. The data presented by OSIM are relatively differentiated according to the statistical department that presents them, there being small differences between the statistics from Figures 5 and 6.

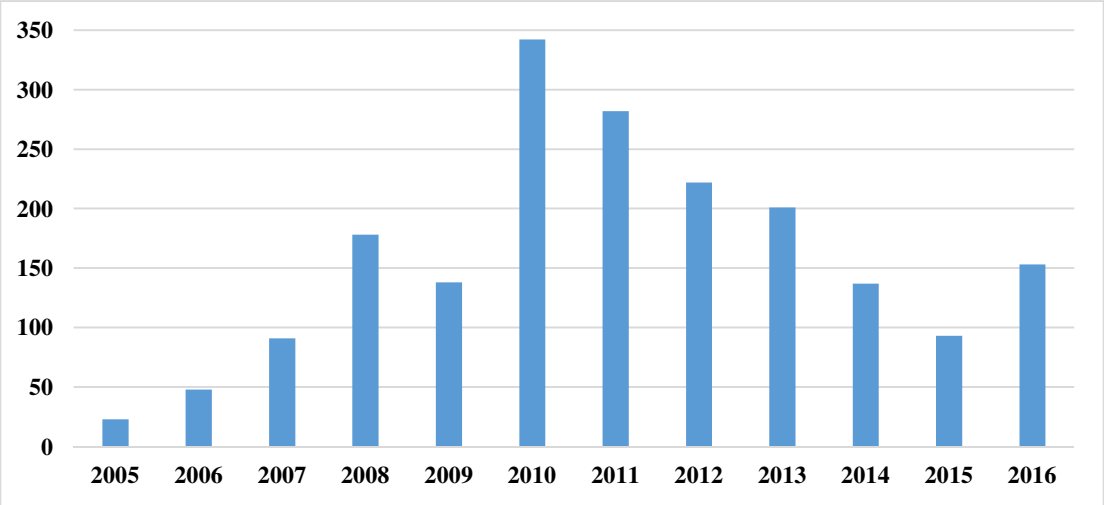


Figure 7: Invention patenting applications registered by Romanian universities
Source Authors, by using OSIM data (2017b)

The situation presented by OSIM regarding patent applications registered in 2007-2016 by the 37 universities from Romania with contributions in this field is presented in table 2.

Table 2: Invention patenting applications registered by universities to OSIM during the period 2007-2016/

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Pitești University	x	x	x	5	5	2	5	3	1	1	22
”Vasile Goldiș” University Arad	x	x	x	x	4	4	5	3	x	0	16
”Aurel Vlaicu” University Arad	2	0	x	1	1	1	1	0	0	0	6
Politehnica University of Bucharest	6	16	10	31	28	9	19	14	7	34	174
”Carol Davila” University Bucharest	x	3	2	9	5	3	4	1	1	3	31
Univ. of Agron. Sci. and Vet. Med. of Bucharest	x	2	x	2	6	4	1	x	4	5	24
University of Bucharest	2	1	x	3	3	3	4	x	1	6	23
Techn. Univ. of Civil Eng. of Bucharest	1	1	0	x	1	0	1	0	0	2	6
Military Technical Academy	0	0	0	0	0	0	0	0	1	2	3
Vasile Alecsandri University of Bacău	x	1	7	7	5	8	3	2	x	2	35

University of Oradea	x	2	1	5	2	3	x	1	1	0	15
”Transilvania” University of Braşov	x	29	13	22	31	23	37	19	7	10	191
Technical University of Cluj-Napoca	6	8	8	25	29	18	14	12	10	10	140
”Babes Bolyai” University Cluj Napoca	2	9	3	8	9	7	4	4	1	6	53
”Iuliu Haţieganu” Univ. of Cluj Napoca	x	1	x	4	1	2	3	3	4	3	21
Univ. of Agr. Sci. and Vet. Med. Cluj	2	1	1	1	1	5	x	2	2	4	19
”Sapientia” University	0	0	0	1	1	5	0	1	1	0	9
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
”Ovidius” University of Constanţa	x	x	x	6	5	1	1	x	1	0	14
”Valahia” University of Târgovişte	0	0	0	0	0	1	0	4	1	0	6
University of Craiova	1	x	3	9	1	2	1	1	2	3	23
Univ. of Med. and Pharmacy of Craiova	0	0	0	0	1	0	0	0	0	1	2
” Constantin Brâncuşi” Univ. of Tg. Jiu	0	0	0	0	2	0	0	3	2	1	8
”Dunărea de Jos” University of Galaţi	10	3	9	16	13	2	2	5	6	5	71
”Gh. Asachi” University of Iasi	14	21	19	32	26	21	11	7	12	15	178
”Alexandru Ioan Cuza” Univ. of Iaşi	1	5	1	4	3	2	6	2	1	3	28
”Ion Ionescu de la Brad” Univ. of Iaşi	0	0	0	0	1	5	0	0	1	1	8
”Grigore T. Popa” University of Iaşi	0	0	0	1	1	0	0	1	1	4	8
North University Centre Baia Mare	0	0	2	1	2	0	0	0	0	0	5
'Petru Maior" University of Târgu Mureş	x	3	x	2	1	35	12	2	2	0	57
Univ. of Med. and Pharm. of Tg. Mureş	0	0	0	1	0	0	0	0	0	0	1
”Petroleum Gas” University of Ploiesti	x	x	4	2	3	1	9	5	1	1	26
”Lucian Blaga” University of Sibiu	x	1	5	3	2	3	19	x	5	1	39
”Nicolae Balcescu" Land Forces Acad.	0	0	0	0	0	0	1	0	0	0	1
”Ştefan cel Mare” University of Suceava	36	68	46	130	88	46	35	42	5	19	515
Politehnica University of Timişoara	4	2	1	9	3	7	8	2	8	8	52
Banat Univ. of Agr. Sci. and Vet. Med.	4	1	1	3	3	0	0	1	2	4	19
”Victor Babeş” University of Timişoara	0	0	2	4	0	1	0	0	3	0	10

Source Data processed by authors from OSIM statistics (2017a).

A single patent was required by the Land Forces Academy "Nicolae Balcescu" and the University of Medicine and Pharmacy of Târgu Mureş, while the first positions are occupied by Ştefan cel Mare University of Suceava, Transilvania University of Braşov and Gh. Asachi University of Iasi, with 515, 191, respectively 178 registered applications (Figure 8)

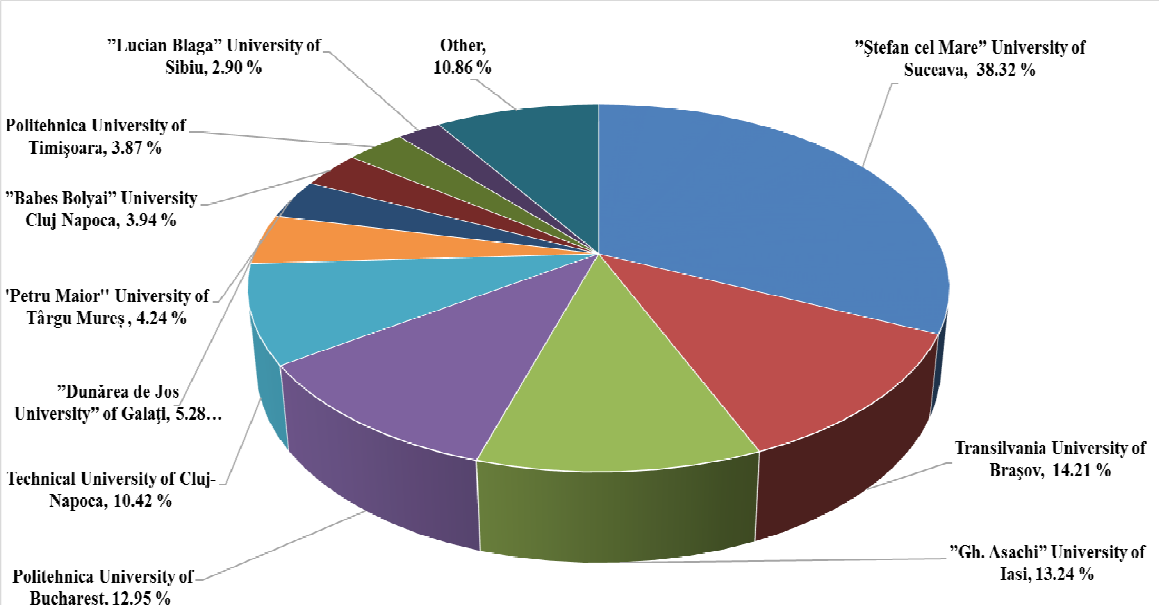


Figure 8: Patents application registered to OSIM, shares by university

Source Author, by using OSIM Data (2017a)

In fact, the first 10 universities, hierarchically ranked according to the number of registered patent applications, accounted for almost 90% of the total number of university patent registrations at national level. Engineering sciences, represented by technical universities, are the best represented in the statistics presented, the last positions being the military and medical fields.

Conclusion

Innovation and patenting of scientific research results is a priority at the European level, which has sought to maintain a leading position at international level and to reduce the gap towards the main competitors on the global patent market. Europe ranks the 5th among the patents registered to EPO, Germany being among the top 10 in the world. Romania holds modest positions at European and international level as number of patents registered, partly due to the high costs imposed by the registration and validation procedures. At national level, most patents are acquired by individuals, followed by research institutes, companies, and universities. The number of patents owned by individuals registered in the national database exceeds the cumulative value of patents validated for legal entities. The national legislation is correlated with the European rules, Romania being part of the main agreements and international treaties in the field of intellectual property.National economic growth can be sustained only by accelerating the national innovation process at national level and increasing the number of patents registered to OSIM and internationally recognized. The support for Romanian inventors should be carried out at national level through governmental measures to support RDI, both on public and on private level.

References

European Patent Office, (2017), Statistics. European patent applications 2007-2016 per country of residence of the applicant. [online], [Retrieved September 27, 2017], https://www.epo.org/about-us/annual-reports-statistics/statistics. html.

Government of Romania, (1998), Government Resolution no. 573 from 7 September 1998 regarding the organization and funcitoning of the State Office for Inventions and Trademarks, [online], [Retrieved September 10, 2017], http://legislatie.just.ro/Public/DetaliiDocumentAfis/15658.

Government of Romania, (2017), Government Resolution no. 63 from 23 February 2017 for amending and completing the Government Resolution no. 573/1998 regarding the organization and functioning of the State Office for Inventions and Trademarks, [online], [Retrieved September 10, 2017], http://legislatie.just.ro/Public/DetaliiDocument/186932.

State Office for Inventions and Trademark OSIM, (2017a), [online], [Retrieved September 25, 2017], http://www.osim.ro/legislatie/LegilatiaInDomeniulBreveteInventii.php#AcorduriSiConventii.

State Office for Inventions and Trademark OSIM, (2017b), Inventions patents 2006-2016, [online], [Retrieved September 25, 2017], http://www.osim.ro/despre_noi/capitolul_statistici.php.

European Parliament, (2017), Policy in the field of technological research and development, [online], [Retrieved September 18, 2017], http://www.europarl.europa.eu/atyourservice/ro/displayFtu.html?ftuId =FTU_5.9.6.html.

Parliament of Romania, (2015). Law for suspending the enforcement of the provisions of GO 41/1998 regarding fees in the field of intellectual property, Annex no. 1. Amount and deadlines regarding the payment of fees for the invention patent applications and invention patents [online], [Retrieved September 18, 2017], http://www.osim.ro/legislatie/Taxe-proprietate-industriala-inventii-Anexa-1.pdf.
Rasvan, R., (2017), Inventions protection in Europe, [online], [Retrieved September 27, 2017], https://rasvanremus.wordpress.com/2012/07/11/dreptul-proprietatii-intelectuale-procedura-de-brevetare-a-inventiilor-studenta-maria-rasvan-masterand-ioan-remus-rasvan,

Permanent Representation of Romania attached to the European Union, (2017), Europa. In order to boost research and innovation, the Commission proposed the unitary protection of patents, [online], [Retrieved September 27, 2017], https://ue.mae.ro/node/719#null.

World Intellectual Property Organization (2017), Record Year for International Patent Applications in 2016; Strong Demand Also for Trademark and Industrial Design Protection, Geneva (March 15, 2017), [online], [Retrieved September 29, 2017], http://www.wipo.int/pressroom/en/articles/2017/article_ 0002.html.

Study on the Production of Wheat Seeds in Braila County

Băcanu (Serban) Constanța, "Dunărea de Jos" University of Galaţi, Galati Romania, serbancing@yahoo.com
Dinca Cristina, "Dunărea de Jos" University of Galaţi, Galati Romania, dincacristina2007@yahoo.com
Ion Iuliana Manuela, "Dunărea de Jos" University of Galaţi, Galati Romania, iuliana.ion12@yahoo.com
Stanciu Silvius, "Dunărea de Jos" University of Galaţi, Galati Romania, sstanciu@ugal.ro

Abstract

Wheat (Tritucum aestivum) is of particular economic importance for Romania's agriculture grace to its national tradition, economic conditions of cultivation, high productivity and convenient preservation methods for long-term storage. The nutritional and technological processing potential allows multiple uses for wheat grains, both for direct human feeding and for industrial processing. The paper forwards a presentation of the multiplication plan for the surfaces sown with Romanian and imported wheat seeds lots and the certification thereof. The certification implies an extensive and rigorous series of technological sequences of the multiplication, conditioning, packaging, labelling and sealing process, procedures compliant e with the specific rules and technical norms meant to lead to the production of quality seeds. The research carried out aimed at assessing the potential of the Braila County, Romania, in the production of certified wheat seeds, in a national context, highlighting the conditions imposed by the Romanian legislation in the field. Braila County occupies the first positions on the national level in the production of certified seeds and sowing/planting material. The cultivated areas, the number of producers and the wheat varieties cultivated for seed have exhibited a positive evolution during the analysed period, on teh background of a growing demand due to a better use of the agricultural potential of the area and the interest of local farmers for this activity.

Keywords: grain, seed, quality indicators, Brăila farms

Introduction

Wheat is of particular economic importance for the Romanian economy, being a large-scale grown plant, appreciated by farmers due to economic and less demanding crop conditions, with high yield per hectare, high storage capacity, and multiple uses both the direct human food and for industrial processing.

The National Institute for Agricultural Research and Development (NIARD) Fundulea is the main research facility in Romanian agriculture, which, although in recent times is facing fierce competition from the multinational companies present in our country, occupies a preferential position in the top of the Romanian farmers' wheat-related choices (Dobre, 2016). National Institute for Agricultural Research and Development (NIARD)Fundulea is specialised in obtaining Romanian wheat varieties, productive and resistant to drought and diseases, adapted to local climatic and soil conditions. Every year, the Fundulea Institute sells about 3-4 thousand tons of basic seed for seed growers, who multiply them for sale on the market. Currently, according to National Institute for Agricultural Research and Development (NIARD) Fundulea researchers, over 65% of the total area cultivated with wheat in Romania is sown with varieties obtained by the Fundulea institute.

In order to obtain high quality seeds, with the permanent maintenance of the genetic structure and biological value at the initial level of the varieties of farming plants, it is necessary to scientifically substantiate the activity in the field of seeds, applying the theoretical knowledge from the field of genetics, improvement and seed production, respectively (Păcurar, Oprea, and Sălăgean, 2007). According to the quoted authors, the unaltered preservation of the original genetic heritage in the case

of wheat seeds is difficult, given the action of certain genetic factors: specific to genetic evolution (mutations, gene migration, natural selection, genetic drift), subjective (artificial selection in seed production) or technology (agricultural conditions, technologies, mechanical mixtures at harvest/conditioning, storage conditions, etc.) which may lead to deprecation of the biological value and the decrease of the initial production capacity of the varieties, namely the drop of the seeds vitality.

Material and Methods

The information on the technology for obtaining grain cereal seeds was selected from the National Institute for Agricultural Research and Development(NIARD) Fundulea documentation or from the technical publications. In some cases, media information from specialised journals for the agricultural sector has also been used. Data on areas cultivated with wheat for seed, authorised economic agents, yields obtained, cultivated varieties were selected from the databases of the National Seed Quality Inspection (INCS) and of the Braila Territorial Inspectorate for Seed and Sowing Material Quality (ITCSMS). The data collected were statistically processed and graphically plotted, the results being analysed and commented.

Technological Elements

The obtaining of seeds for the grain cereals varieties consists of three consecutive steps: obtaining the seed from the improver, producing the basic seed, producing the certified seed.

When sowing one used the basic seed or the pre-basic seed, organising seed-producing lots for obtaining "Certified Seed 1" (C1). This biological seed stock is used to sow about half of the areas destined to production for consumption. By using for sowing "certified seed 1" seed (C1), one organises seed-producing lots for the production of "Certified Seed 2" (C2) used for sowing about half of the production area destined to consumption. This seed, obtained in the first year by for sowing the seeds from the Basic biological category, is the „certified seed 1” (C1), and by sowing it one obtains the "certified seed 2" (C2). The seeds from the certified biological category (C1, C2) are produced in the development sector of the National Institute for Agricultural Research and Development (NIARD) Fundulea, in the agricultural research facilities and in the authorised private farms with activity in the seed-producing domain.

The technology of wheat seed production is based on the application of the well-known agricultural technology, taking into account some particularities related to the location of the crop; rotation of crops; pre-emergence plants; soil works; fertilisation; seeding; biological purification, combating weeds, diseases or pests; irrigation; harvesting, drying, conditioning and preserving seeds (Agriculture Journal, 2015). The wheat seed crops are to be sown on fertile fields, protected from insects and free of weeds. The best precursors are: soy beans, beans, corn; sun-flower is not accepted for multiplication in a soil plot that sown with wheat in the previous year due to impurification caused by samulaster. Te fertilisation of seed lots is very important fro completing the need of nutrients in the soil. The cultivation technology is done with high quality seeds and high performance machinery. The sowing period, the quantity of seed/ha, the depth and uniformity must be rigorously achieved and respected. The weed control is carried out with herbicides, the weeds are negatively influencing the quality of the seed, the twinning capacity, the frost resistance, the drought, the vegetative growth of the plants, the elements of the spike productivity, cause the occurrence and the intensification of the planting process and the fall of the plants (in the case of clinging weeds). Diseases and pests are eliminated by vegetation treatments whenever needed. The biological purification is a very important work in the seed lots and consists in the elimination of all non-typical plants in order to ensure the biological purity provided for in the certification rules. For the purpose of achieving a certain qualitative and quantitative production it is recommended to irrigate the seed crops. Seed harvesting takes place on parties of the same species, variety and biological category responsible for maintaining identity and varietal purity through measures to avoid any further contamination, by rigorously cleaning the harvesting equipment and the means of transport used, as

well as the elimination of the areas marginal or in the vicinity of irrigation channels (Ordinance 59/2011). After harvest, the seed is transported from the field to the processing stations accompanied by the Field Inspection Document with the decision „admitted" and the Transport Certificate. The processing operation is carried out by the economic agents authorised for processing which have a processing station and are monitored annually by the TIQSS in this respect. The processing operation is carried out with machines and advanced aggregates, grouped in plants that are commonly called seed conditioning plants (Bularda, 2011). Seed processing includes the sequences of seeding, pre-cleaning, cleaning, conditioning, loaning, packaging, closing, sealing and labelling, according to the Order of the Minister of Agriculture and Rural Development MARD (149/2010). After seed processing there comes their certification, lotisation and then sampling of the seed lots.

Certification of Seeds and Authorisation of Sowing Material Producers

The certification of the seed lots is registered by the economic operators who are seed owners who process their own seed or those who carry out the seed treatment on the basis of a service contract with an authorised economic agent and monitored annually in this respect on the basis of the document "Declaration of certification of seed lots". The declaration of certification is accompanied by the following documents: the document of field inspection" with the decision „admitted", the written consent of the variety keeper that it has the right of sale, the contract of "service provision in view of processing" and the "transport documents" completed with the quantity of seed harvested in the field. The determination of the variety purity is done with the metric frame in 5-20 control points, depending on the size of the wheat sown plot. At each point, all the components of the chain are determined, and the following determinations are made: the number of plants typical to the variety, the number of plants non-typical for the variety, the culture plants with difficultly separable seed, weeds with heavily separable seeds and plants attacked by quarantine pathogens. For a seed to be declared "admitted" in the field, it must meet the following conditions: the Prebase Seed G1, Prebase G2, Base must have a minimum purity of 99.9%, the Certified Seed C1 99.7%, and the Certified Seed C2 a minimum purity 99.0%. Once all the above conditions have been met, the seed shall be processed, divided by lots, packaged and stored properly. Then one must complete and sign the declaration of lots certification. The weight of a lot of wheat shall not exceed 30 tons plus 5%. The sampling of the lot shall be carried out in the presence of the seed owner or a delegate thereof, by the sampling operators certified and authorised by Territorial Inspectorates for Seed and Sowing Material (ITCSCMS). The sampler verifies the data entered in the Probing Report and verifies if the requirements are met for the lot to be sampled: lot size, uniformity, sealed packaging and official label of the same type, size and quantity except for the last fraction, accessibility of the lot and checking the storage space so as it does not affect the quality of the seed during the retention period. If the above mentioned conditions are met, the sampling of the lots shall be carried out, and, if the requirements are not complied with, the sampling operator shall refuse the sampling by mentioning the reason for rejecting the sampling.

The wheat seed lots can be made by one of the following methods: Nobble probe (used when seed is packed in bags) or baton probe (for bulk or large containers) according to SR 1633/2003. Each test sample is a separate sample. The extraction of the elementary samples is carried out from different places and depths of approximately equal weight. To obtain the composite sample, all these extracted samples will be mixed. The laboratory samples to be analysed are made from the composite sample. The samples for the determination of moisture indices are packed in plastic bags, taking into account the complete removal of the air from the package, and the other samples will be packed in bags paper. On all packages the lot identification data: species / variety, biological category, lot number, quantity/bag, treatment, if applicable, bag sealing date of the will be mentioned. The moisture sample is extracted after homogenisation from different depths and the rest of the samples, namely the analysis sample, the witness sample, the postcontrol sample and the duplicate samples are obtained by reducing the compound sample (using the divider) down to the nearest weight, but no smaller, as set out in the aforementioned Standard. In order to preserve and guarantee the identity of the samples, they are sealed with a self-adhesive tape inscribed National Seed Quality Inspection (INCS). All these tests are done to verify the quality indices for seed certification. The conditions to be met in the seed wheat laboratory to be certified and accepted for sowing the following year, as regards

germination, the purity of seed content of other plant species and humidity according to Minister of Agriculture and Rural Development MARD Ordinance 149/2010 are given in Table 1.

Table 1: Conditions imposed on wheat seed lots in the laboratory

No.	Seed biological category	Germination (%)	Purity Minimum (%)	Presence of other plant species (%)	Humidity Maximum (%)
1	Seed Prebase G1, Prebase G2, Base	85	99	4	14
2	Certified seed C1	85	98	10	14
3	Certified seed C2	85	98	10	14

Source Author, by using data provided by MARD Ordinance 149/2010

Production of Wheat Seed Lots in Brăila

According to **Mureşan** (2012), the production of wheat seed lots is a complex process, which takes place within an institutionalised framework. The creation of valuable biological forms and their maintenance in an institutionalized process of seed production is an activity with important social and economic implications, which must respond to the development of the national economy. At the level of the specialised institutions, it is envisaged to receive lots of qualitative seeds, under economical conditions and in sufficient quantity. Seeds intended for sowing must be able to reproduce as accurately as possible the cultivation pattern and the set of specific peculiarities thereof and to possess phytosanitary purity, strength and cultural value according to the standards in force.

The seeds sold to agricultural producers are the result of multi-institutional co-operation, the main role of the Ministry of Agriculture and Rural Development. Te National Seed Quality Inspection (INCS) is the nationally accredited certification body for seed lots. In the territory, INCS acts through the Territorial Inspectorates for Seed and Sowing Material (ITCSMS) and the Central Laboratory for Seed and Sowing Material Quality (LCCSMS).

The production of seed material is usually done in Romania on the basis of a contract between the seed company and the farmer. In line with the new global trend in seeds and seed production, large companies produce seed multiplication near where they sell them, thus avoiding additional shipping costs and possible shortcomings due to the lack of adaptation to local climate and soil conditions.

For the production of seed lots, it is possible to register, according to the legal provisions, any natural or legal person who proves that he has the necessary technical and material equipment and personnel with appropriate knowledge for the requested activity. The methodology of the Ministry of Agriculture, Forests and Rural Development (MADR) (2009) specifies the conditions imposed on agricultural producers involved in the production of seed material and the national and county bodies in charge of controlling this activity.

Braila County is the most important region in the sector of seed production on the national level. For the hybridization with sunflower and corn, the share of cultivated areas in the county exceeds 45% National Seed Quality Inspection (INCS Braila, 2012).

According to Territorial Inspectorates for Seed and Sowing Material (ITCSMS) Brăila (2017), the area of 18,479.31 ha of seed lots of cereal, corn, sunflower, mustard, lucerne and on small surfaces coriander (5 ha), potato (2 ha), flax (2ha) and planting material (1.71 ha) on 560 registered plots (according to Table 3), of which 18,227.71 ha were admitted, 196.6 ha being rejected. The wheat seed is cultivated on an area of 4,002.5 ha fully admitted according to Table 2. The area of 3,087.5 ha is sown with Romanian wheat and the rest with imported varieties.

In the year 2015 530 plots were registered with a total area of 13,402 ha of agricultural land intended for obtaining seeds, of which 13,248 ha were admitted and 129,9 ha were rejected. For the cultivation

of seed wheat, out of the 3,187 ha recorded, on the 152 plots 3133 ha were admitted, of which 2,275 Romanian varieties and the rest foreign varieties. In 2014, an area of 18,941 hectares was registered for multiplication, representing lots of cereal seed, oil plants and fodder plants. The multiplication of the area of wheat was smaller than in previous years of 3159 ha of the Romanian grain variety seedlings an area of 2,422 ha, the rest being sown with foreign wheat varieties as shown in Figure 1 on 137 plots, of which 3,139 ha were admitted, the remaining 20 ha being rejected from multiplication.

Table 2: Situation of seed-producing surfaces in Brăila County

No	Harvest year	Plan (ha)	Plots planned	Admitted (ha)	Admitted Plots	Rejected (ha)	Plots Rejected
1	2014-2015	3,159	137	3139	136	20	1
2	2015-2016	3,187	152	3133	149	54	3
3	2016-2017	4,002.5	206	4,002.5	206	-	-

Source Author, by using ITCSMS Braila data (2017)

In the case of wheat there is a great diversity, with some drought resistant and frost-resistant varieties, others being adaptable on soils with low fertility. The choice of wheat variety must be made taking into account these factors and the genetic potential of the variety, so that high yields are obtained at harvesting. The cultivation of some wheat varieties not adapted to the crops involves very high expenses with the culture technology and the production will be insufficiently capitalized. Choosing a sort of wheat to ensure the best match between the pedoclimatic resources of the area and the biological characteristics of the variety is an essential condition for obtaining a large and stable production.

Table 3: The situation of the surfaces sown with Romanian and imported varieties in Braila County

No.	Romanian varieties (ha)	Plots cultivated with Romanian varieties (ha)	Imported varieties (ha)	Plots cultivated with imported varieties (ha)	Multiplying farmers
1	2,422	99	737	38	57
2	2,275	106	912	46	74
3	3,087.5	138	915	68	114

Source Author, by using ITCSMS Braila data (2017)

Besides the high production capacity, the varieties must also have good resistance to the main risk factors and have a qualitative potential corresponding to the requirements. Procurement of quality seed of the varieties recommended for each crop area is an important decision for the production of the next yea.

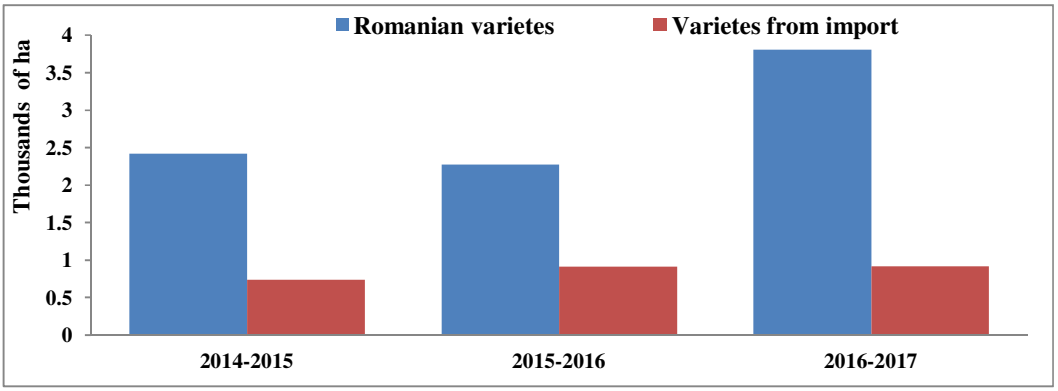


Figure 1: The situation of the surfaces of the Romanian and foreign wheat seed lots in Brăila county

Source Author, by using ITCSMS Braila data (2017)

Territorial Inspectorates for Seed and Sowing Material (ITCSMS) Braila has granted authorisations for the production, processing and/or sale of seeds or planting material to a number of 336 economic agents, with 386 working points. A total of 569 permits were issued, of which 49 new permits, and a number of 29 permits were withdrawn from the economic entities that did not fulfil the conditions for authorisation.

The main wheat varieties and the quantities certified for production in 2017 in Braila County, according to the National Seed Quality Inspection (INCS) Official Certification Database, are presented in Figure 2. In 2017, 34 wheat varieties were cultivated, 172,088 tons of wheat for seed. The common wheat varieties predominate, only 1.15% of the total, namely 2,256 kg, is originated from hard wheat varieties Atoudur and Pascadou. Almost 70% of the crop obtained is certified seed C1, and only 12% is of the basic/pre-basic seed category.

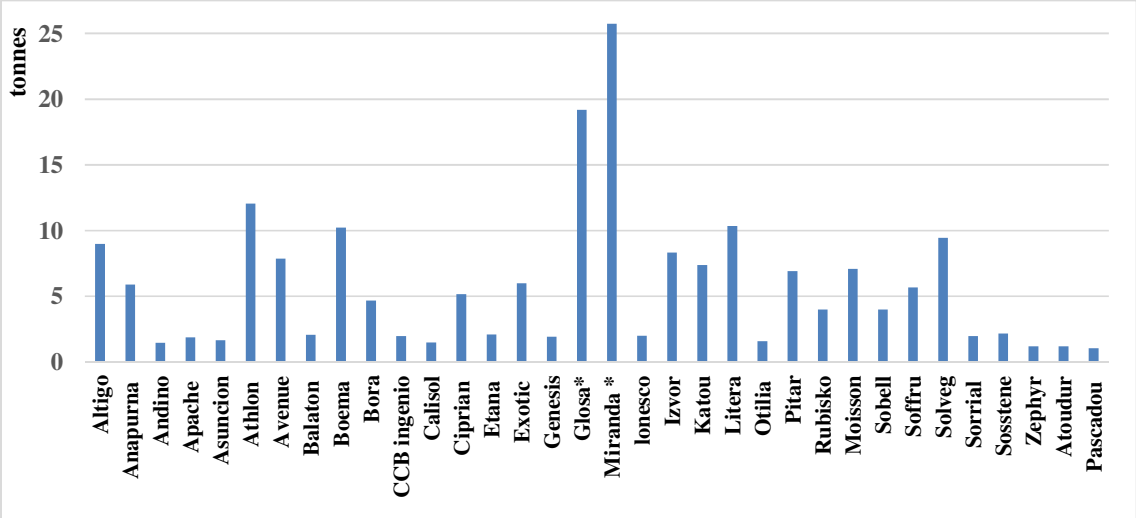


Figure 2: Certified wheat varieties cultivated for seed in Braila County

Source Author, by using INCS (2012)

More than one-third of total production in 2017 was made by the Miranda, Glosa, Athlon and Boema varieties. The Glosa variety was the most appreciated, in spite of the native wheat growth, produced at National Institute for Agricultural Research and Development (NIARD) Fundulea, being cultivated on about 35% of the total area allocated to wheat in our country (Sofron, 2016).

Pitar, with 6910 kg harvested in Brăila in 2017, is a relatively new variety, with high potential for Romanian agriculture.

Conclusions

The seed production activity involves specialists, much higher technology, technical endowment, varieties and hybrids adapted to the area, higher costs but also high incomes. The efficiency in seed production is the existence of technological links executed very rigorously and without which the realisation of lots is not possible.

A high-quality wheat seed must have good genetic and biological value, varietal and physical purity, superior germination index (mass of one thousand grains and hectolitreal mass), health and vigour. The seeds quality has always been determined to the same extent by the quality of the genetic material (seed), the soil types, the level of technologies applied, the provision of the technical materials (machinery, fertilizers, pesticides, irrigation) and the qualification of information, research and innovation of the multiplier. The process of certification of the lots destined to sowing on large areas is laborious and closely monitored by the local and national authorities.

Braila County is making progress in obtaining quality seeds and plating materials, improving its national position. Particular stress is laid on the production of seed wheat of the Romanian varieties, better adapted to the local climatic and soil conditions. Although the certification process is complex and licensed manufacturers are subject to a number of restrictive conditions, the domain is attractive for the local producers.

References

BASF, (2017), When We Sow Grain Culture, [Retrieved September 01, 2017], https // www.agro.basf.roagroportal / en / ro / news / news_agricole / wheat- wheat-ingrasaminte297088.htm treatments.

Bularda, M., Vişinescu, I., (2011), Applied scientific research in the field of seed production for the benefit of the great work, SCDA Braila,

Plant Selection Division and National Seed Quality Inspection, (2008), Guide to Identification and Sampling of Seed Lot, Collection of Territorial Inspectorate Institution for Seed and Propagating Material Quality, Braila.

Dobre, R., (2016), Romanian Wheat varieties that promise in 2016: Otilia, Pajura and Pitar. Will They Defeat Glosa ?, Agrointelligence (January 19, 2016), [online], [Retrieved September 23, 2017), http://agrointel.ro/47024/soiuri-romanesti-de-grau-care-promit- in-2016 otilia-tails-and-baker-will-succeed-it-to-overthrow-gloss.

National Seed Quality Inspection Inc, (2017), official certification basis, [online], [Retrieved September 26, 2017) http://date.incs.bvl.ro/agenti/Loturi10_detalii.aspx.

ITCSMS Braila (2016) Information on the production of certified seed for sowing the crop year 2015-2016 (Notification No. 714/2016), [online], [Retrieved September 26, 2017), https: //brailachirei.files.wordpress. com / 2016/04 / information-production-seminte.pdf

Ministry of Agriculture and Rural Development MARD, (2009), Methodology for registration of economic operators and licensing of production, processing and / or marketing of seeds and

propagating material of 21.12.2009, [online], [Retrieved September 20, 2017) https://lege5.ro/Gratuit/ geztaojwga / methodology-de-register the operators and economic-and-release-a-permit-to-production -processing-and-or-trade-seeds-and- material-planting-in-21,122,009.

Muresan, A., (2012), Research on economic optimization Desam winter wheat production counties in Transylvania, PhD Thesis, Veterinary Medicine Cluj Napoca, Romania, [online], [Retrieved September 22, 2017), http: // www.usamvcluj.ro/files/teze/2012/muresan.pdf.

Rules for assessing the germs (1973), Ministry of Agriculture Food and Water Collection Institution Inspectorate for Quality seeds and seedlings Braila

Ministry of Agriculture and Rural Development MARD, (2010), Order 149/2010 on the marketing of seed cereal Collection Institution Inspectorate for quality seeds and seedlings Braila

Ministry of Agriculture and Rural Development MARD, (2011), the order 59/2011 approving procedures for the specific requirements for production, certification and marketing of seed of cereals, oilseeds and wires and forage in Romania. Collection Institution Inspectorate for Quality seeds and seedlings Braila

Pacurar, I.Oprea, G., Salagean, D., (2007) Research on the production of cereal grains seminte, AN.NARDI Fundulea LXXV / 2007 (Volume Jubilee): 229-244.

Romanian Parliament (2014), Law no.266 / 2002 (Rerepublicată) on the production, processing, quality control and certification, marketing of seeds and seedlings, as well as testing and registration of plant varieties. Collection Institution Inspectorate for Quality seeds and seedlings Braila
Editorial Journal of Agriculture (2017), the wheat seed production technology, Journal of Agriculture (September 25, 2017), [online], [Retrieved September 25, 2017), http://www.agrari.ro/tehnologia-production-to-seed-to-grain-75647.

Sofron, L., (2016), wheat varieties, the creation of INCDA appreciated Fundulea Village World Magazine, 13 (2016 July 1-15), pp. 18-19

Romanian Standards Collection (SR) 2008-2013) Determination of the germination index, Institution collection organizations and the quality of seeds and seedlings Braila

Risk Management Methods in Construction Projects

Petr Řeháček, VŠB-Technical University of Ostrava, Faculty of Economics, Ostrava, Czech Republic, perehacek@gmail.com

Blanka Bazsova, VŠB-Technical University of Ostrava, Faculty of Economics, Ostrava, Czech Republic, blanka.bazsova@vsb.cz

Abstract

Construction objects life cycle is full of various risks. Risks come from many sources: temporary project team that is collected from different companies, construction site, etc. Moreover, the size and complexity of construction objects are increasing which adds to the risks. The object risks can be identified and evaluated by using the Pareto analysis, Saaty´s matrix or decision tree. We can assess an uncertain events or conditions which have a positive or negative effect on at least one construction project objective. The risks cause cost and time overruns in construction projects. The paper presents risk assessment methods which aims to identify, analyze and evaluate the risks associated with the construction projects.

Keywords: evaluation, management, methods, project, risk.

Introduction

The risk factor in construction business is very high. Construction objects are unique and built mostly only once. Risk management is a concept which is used in all industries, from IT related business, automobile or pharmaceutical industry, to the construction sector. Each industry has developed their own risk management standards, but the general ideas of the concept usually remain the same regardless of the sector. Decision-making is very important in the construction management, such as risk assessment results in construction projects, contractor and supplier selection, etc. Each project manager should have a basic knowledge about risks associated to a project and how to handle them. Risk management should be conducted on all projects. The degree, level of detail, sophistication of tools, and amount of time and resources applied to risk management should be in proportion to the characteristics of the project under management and the value that they can add to the outcome. Thus, a large project that provides value to an important customer would theoretically require more resources, time, and attention to risk management than would a smaller, short-term, internal project that can be conducted in the background with a flexible deadline.

The principles of risk management should be appropriately applied based on the specifics of a project and the organizational environment. Risk management provides benefits when it is implemented according to good practice principles and with organizational commitment to taking the decisions and performing actions in an open and unbiased manner.

Types of Risk

The risk management process in construction is extreme and important. Risk measure includes risk level determination of each objective and the risk analysis estimation by applying various approaches and technology. Risk control process evaluates performance of risk control. Risk identification is the first and main step of risk management process. It is describing the competitiveness conditions and the clarification of risk and uncertainty factors (Rutkauskas, 2008; Zayed et al., 2008), recognition of potential sources of risk and uncertainty event responsibilities. According to the Zavadskas et al. (2008) the project risks can be divided into three groups - external risks, project risks and internal risks. External risks are those risks that are beyond the control of the

project management team. Internal risks can be divided according to the party who might be the originator of risk events such as stakeholders, designer, contractor, etc. There are various classification ways of risk management methods. External risks (environmental criteria) includes political risk**,** economic risk, social risk and weather risk.

Political risks are changes in government laws of legislative system, regulations and policy and improper administration system, etc. (Li and Liao, 2007).

Economic risks. There is inconstancy of economy in the country, repayment situation in manufacture sphere, inflation and funding. Considering the current economic situation, this result can be reasonably expected (Tvaronavičienė and Grybaitė, 2007).

Social risks are the growing importance to any effort at risk allocation. It is an area in which political and social pressures from parties having little interest in a project but having a great impact on such a project greatly influence its outcome. The impact of the financial aid on social and economic development of the region is analyzed by Ginevičius and Podvezko (2009), risk communication in organizations is analyzed by Conchie and Burns (2008).

Weather risk. Except for extremely abnormal conditions, it is a risk for the contractor to assume, as its impact on construction methods can be assessed by the contractor.

Project risks methodology is described in PMI book and IPMA Competence Baseline Rehacek (2017b). The specific criteria such as recognizing of the value of Risk Management, individual commitment (responsibility), open and honest communication, organizational commitment, risk effort scaled to project and integration with Project Management are included in each risk management process (PMI, 2013). The relationship between project risks and IT brought many authors (Ropponen and Lyytinen 1997, 2000; Yetton et al. 2000; Kwak and Stoddard 2004; Na et al. 2004; Zwikael and Globerson 2006; Han et al. 2007; Jiang et al. 2009). Many studies pointed out the hard side of the impact the risk management on the project success. Monteiro de Carvalho and Rabechini Jr. Brought examined the impact of risk management on project performance. They pointed out the importance of soft skills. The main groups of criteria of the construction projects risks belong (see Fig. 1):

1. Time risk
2. Cost risk
3. Work quality
4. Construction risk
5. Technological risk

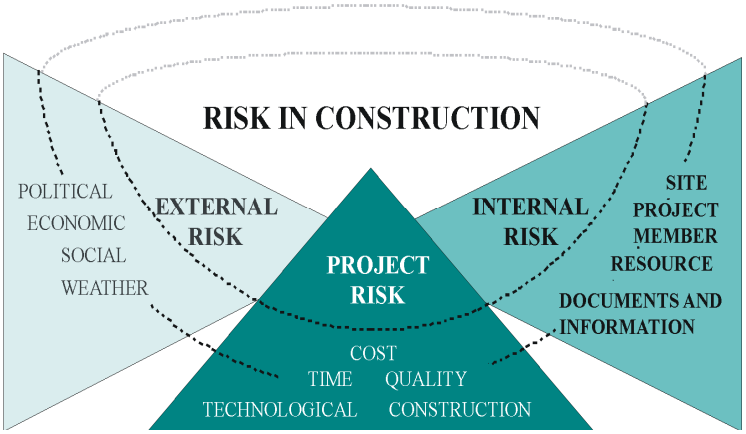


Fig. 1: The risk allocation structure in construction project (Zavadskas et al., 2008)

Time risk can be determined by appraisal of the delay at construction, technology and for all works. Cost risk. The cost of opportunity product grows due to neglecting of management (Zavadskas et al., 2008).
Work quality. Deflective work is considered a significant risk factor in this category because not only does it result in construction delays and additional cost to the contractor but it easily leads to disputes on the liability for the deflection.
Construction risk. The risks are involved in construction delay, changes in the work and construction technology.
Technological risk. Designing errors, lack of technologies, management errors, shortage of the qualified labour.

If we use Saaty´s matrix to assess the importance of these risks, we can achieve the results shown in Table 1. According to the expert ´s assessment we can calculate the weight of the particular type of risk. The highest weight has the time and cost risk (see Table 1).

Table 1: Types of risk evaluated by using Saaty´s matrix (own calculation)

Type of risk	Time risk	Cost risk	Work quality	Construction risk	Techno-logical risk	Geomean	Weight
Time risk	1	1	3	5	7	2.5365	0.386
Cost risk	1	1	3	3	5	2.1411	0.326
Work of quality	1/3	1/3	1	3	3	1.0000	0.152
Construction risk	1/5	1/3	1/3	1	3	0.5818	0.088
Technological risk	1/7	1/5	1/3	1/3	1	0.3165	0.048

Pareto analysis is based on the principle that 80-95% of the problems are caused by a small number of causes of 5-20%. These causes were formulated by Pareto and described them as a vital minority. For these reasons, it is necessary to focus, analyze them in depth and eliminate, respectively to minimize their impact. The other causes were later named by Juran to a useful majority. A graphical representation of Pareto´s claim, sometimes called the 80/20 rule, is Pareto diagram. From the Pareto diagram it is possible to determine vital causes, respectively factors that need to focus and focus on solving the problem. This diagram is composed of a bar graph and a Lorenz curve. The column graph is a cumulative number, Lorenz curve of relative frequency. To determine vital factors is a significant factor of the average factor (50%) that can be found on the Lorenz curve. Those factors above the average are a vital minority. (Bazsova, 2014)

Survey provided in 2016 with the managers of the SME showed the biggest frequency of the risk at the adverse weather. The results are displayed on the table 2 and figure 2 have shown that most companies rated the severity of the 5 most serious types of risk.

The most serious risks in a project-based organization include:

1. Risk of non-compliance with delivery date.
2. Risk of non-compliance with workflows.
3. Risk of unforeseen costs.
4. Risk of non-payment of invoices by customers.
5. The risk of adverse weather.

Table 2: The most serious types of risks from the survey

	Frequency	Cumulative share	Relative share
The risk of adverse weather	150	150	23,51%
Risk of non-compliance with delivery date	136	286	21,32%
Risk of non-payment of invoices by customers	131	417	20,53%
Risk of unforeseen costs	129	546	20,22%
Risk of non-compliance with workflows	92	638	14,42%

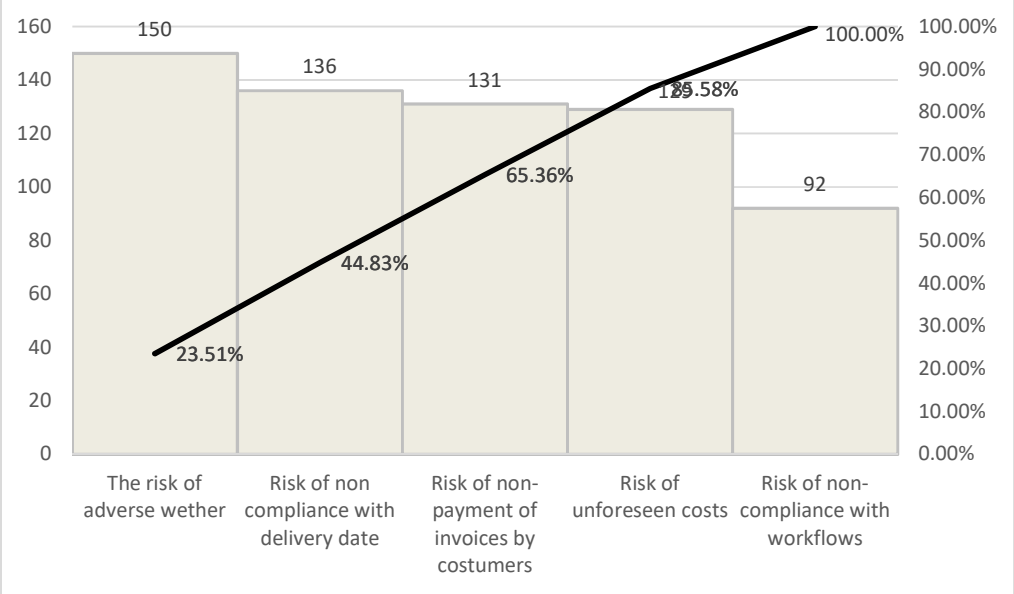


Fig. 2: Pareto diagram (own calculation)

Pareto diagram showed that the importance is at the first 3 types of risk the risk of adverse wether, the risk of non compliance with delivery date and the risk of non-payment of invoices by costumers. (see Fig. 2)

Internal (Intrinsic) Risks:

- Resource risk
- Project member risk
  - Stakeholders' risks
  - Designers risk.
  - Contractor risk.
  - Subcontractor risk
  - Suppliers risk.
  - Team risk.
- Construction site risk
- Documents and information risk

Resource risk. Materials and equipment involve considerable risks. The availability and productivity of the resources necessary to construct the project are risks which are proper for the contractor to assume (Fisk, 2003).

Project member risk. Team risk refers to issues associated with the project team members, which can increase the uncertainty of a project's outcome, such as team member turnover, staffing build up,

insufficient knowledge among team members, cooperation, motivation, and team communication issues.

Stakeholders' risks rightfully belong to the stakeholder alone and should be retained by stakeholders except to the extent that they are influenced by construction methods determined by the contractor, or created by suppliers controlled by the contractor. Stakeholders' influence on the external environment is analyzed by Mitkus and Sostak (2008).

Designers risk. The expansion of construction has placed great burdens upon the design professions. Maintaining performance standards in the face of this is quite difficult, and occasionally, design or specification deflections occur that create construction problems. Design failures or constructability errors are becoming more and apparent, and the architect should bear the true cost of such failures.

Contractor risk. The prime or general contractors are in the best position to assess the capacity of their subcontractors, and therefore it is they who should bear the risk of not assessing the risk properly.

Subcontractor risk is that is properly assumed by the contractor except where it arises from one of the other listed risks attributable to stakeholder or architect (Fisk, 2003).

Suppliers risk. Default from obligations of the supplier (Fisk, 2003).

Team risk. Team risk refers to issues associated with the project team members that can increase the uncertainty of a project's outcome, such as team member turnover, staffing build up, insufficient knowledge among team members, cooperation, motivation, and team communication issues. Working team must analyze the business activities of all alliance members and identify various risk factors in business activities and their characters (Gunstone, 2003; Li and Liao, 2007; Li et al., 2007).
Construction site risk. Accident exposures in workplace are inherent in the nature of the work and are best assessed by the contractors and their insurance and safety advisors (Fisk, 2003).

Documents and information risk. It assumes: contradiction in documents; pretermission; legal and communication. Changed order negotiation and delayed dispute resolution are significant risks during project construction. Communication is very important at all construction period and after finishing construction work.

Likewise, risk management has become a timely issue widely discussed across industries. There has been conducted by Rehacek (2017a) study in three countries which emphasizes importance of the project context considering the industry. However, with regard to the construction industry, risk management is not commonly used. More construction companies are starting to become aware of the risk management process, but are still not using models and techniques aimed for managing risks. This contradicts the fact that the industry is trying to be more cost and time efficient as well as have more control over projects. The construction industry operates in a very uncertain environment where conditions can change due to the complexity of each project (Sanvido et al., 1992). The aim of each organization is to be successful and risk management can facilitate it. However it should be underlined that risk management is not a tool which ensures success but rather a tool which helps to increase the probability of achieving success. Risk management is therefore a proactive rather than a reactive concept. These risk classifications for construction projects brought (Tsai and Yong, 2010. They point out naturel phenomenons like earthquake, fire, high gale, rainfall, economics phenomenon like materials costs, difficulty of financing, low market demand, exchange rate fluctuation, politics phenomenon like change of laws, bribery, corruption, etc.

This study brought results from the Czech republic construction companies. They have been addressed.

Table 3: Project risk structure

Natural Phenomenon	**Construction**	**Designer**
Earthquake	New technology implementation	Constructability
Fire	Too high quality standard	Vague drawing specifications
High gale	Faulty job field survey	Incomplete construction area
Rainfall	Inadequate construction planning	Incompetent supervision skills
	Inadequate procurement planning	Frequent design change
Economics/Finance		Lack of fair stance
Increased materials cost	**Job site**	
Exchange rate fluctuation	Incompetent planning	**Contractor**
Difficulty of financing	Incompetent management	Stringent contractual terms
Low market demand	Incompetent coordinator	Deficit contracting
Strong competitor		Short of manpower or experience
	Safety/Environment	Higher cost than bid taking
Politics/society	Environment damage/pollution	Short of capital/equipment
Change of laws	Accident-related loss	Local jobsite particularity
War/revolution/riot	Traffic or work hour restriction	Shortage in machine tools and workers mobilization due to clashes of several projects
Bribery/corruption	Third party's objection	
Language/cultural barrier		Low safety awareness
Lobby (legal/illegal)	**Client**	Erroneous allocation of human resource
Rigid bureaucracy	Feasibility study	Lack of trustworthy support by subcontractor
	Unreasonable demand	
Contract	Reference by subcontractors	Low working morale
Unequal contractual provisions	Relation with the third party	High personnel mobility
Dispute among entities	Late payment	
Unjust arbitrator	Reliance on architect /consultant	**Industrial characteristics**
Inadequate insurance coverage	Jobsite superintendent being incompetent	Monopolized bidding
Defect warranty	Financial problem/bankruptcy	Labour union
Misjudged cost estimation	Difficulty in choosing business dealer	

Risk Response Planning can be done by the following methods (Rajendhran and Sundar, 2011; Rehacek, 2016):

1. ***Risk Avoidance***: Risk can be warded off by removing the cause of the risk of executing the project in a different direction while still aiming to accomplish project objectives. Change project management plan to eliminate a threat, to isolate project objectives from the risk's impact, or to relax the project objective that is in jeopardy, such as extending schedule or reducing the scope.
2. ***Risk Transfer***: Transferring risk involves finding some other party who is willing to accept responsibility for its management, and who will bear the liability of the risk should it occur. Transferring a threat does not eliminate it; the threat still exists however it is owned and managed by another party. Transferring risk can be an effective way to deal with financial risk exposure. The aim is to ensure that the risk is owned and managed by the party best able to deal with it effectively.

3. ***Risk Mitigation / Reduction***: Risk mitigation reduces the probability and/or impact of an adverse risk event to an acceptable threshold. Taking early action to reduce the probability and/or impact of a risk is often more effective.
4. ***Risk Exploit***: This strategy seeks to eliminate the uncertainty associated with a particular upside risk by creating the opportunity definitely happens. Eliminate the uncertainty associated with a particular upside risk. An opportunity is defined as a risk event that if it occurs will have a positive effect on achievement of project objectives.
5. ***Risk Share***: Allocate risk ownership of an opportunity to another party who is best able to maximize its probability of occurrence and increase the potential benefits if it does happen. Transferring threats and sharing opportunities are similar in that a third party is used, those to whom the threats are transferred take on the liability and those to whom opportunities are allocated should also be allowed to share in the potential benefits.
6. ***Risk Enhance:*** This response aims to alter the "size" of the positive risk. The opportunity is enhanced by increasing its probability and/or impact, thereby maximizing the benefits gained from the project. Seeking to facilitate or strengthen the cause of the opportunity, and proactively targeting and reinforcing its trigger conditions.
7. ***Risk Acceptance:*** Ultimately it is not possible to eliminate all threats or take advantage of all opportunities – we can document them and at least provide awareness that these exist and have been identified, some term this „passive acceptance". This strategy is adopted when it is not possible or practical to respond to the risk by the other strategies, or a response is not justified by the grandness of the risk. When the project manager and the project team decide to accept a risk, they are agreeing to address the risk if and when it happens. This involves the use of a fallback (contingency) plan if a risk occurs. Contingencies can also be in the form of sometime kept in reserve to deal with unknown risks or in the form of costs to deal with unknown risks.
8. **Risk Control:** is the final step of the process (Rajendhran and Sundar, 2011; Rehacek, 2016). After we have implemented response actions, we must track and record their effectiveness and any changes to the project risk profile. Did the response actions have a positive or negative effect on achieving project objectives? Responses taken in risks should also be documented for future reference and project plans.

Risk Management Methods in Construction Projects

According to the Rajendhran and Sundar, 20011 and Rehacek, 2016 **the *Risk Identification*** can be done by the brainstorming, Delphi Technigue, Interview, Past experience, checklist and questionnaire. **Risk Assessment** can be done by the following methods (according to Rajendhran and Sundar, 2011; Rehacek, 2016): ***Qualitative Method:*** PI factor = Probability of Risk x Impact of Risk, ***Quantitative methods Sensitivity Analysis***: This is carried out to identify the uncertain and **Scenario Analysis.**

Decision Trees

The risk analysis is carried out by decision tree diagram. Decision trees are very helpful to both formulate the problem and evaluate options. In this analysis there are graphical models used to represents project and can clearly reflect the effects of each decision taken in the project. The decision tree in figure 3 displays evaluation of the project company which has three possibilities how to evolve under condition high, middle or low demand within four years. This company can even reduce its activities, or fuse with other company or to stay in the same condition as in previous years. Each edge has its utility in the decision tree. The edges together form branches. From the point of view of optimality, the optimal option for the decision maker is this, which delivers maximum usability. We can evaluate the usability The mentioned case study calculate the expected usability in the stochastic decision tree as:

$$\sum_{i,j=1}^{n} p_{ij} = 1 \qquad [1]$$

where: i - expresses i-th node, j – expresses j-th choice.

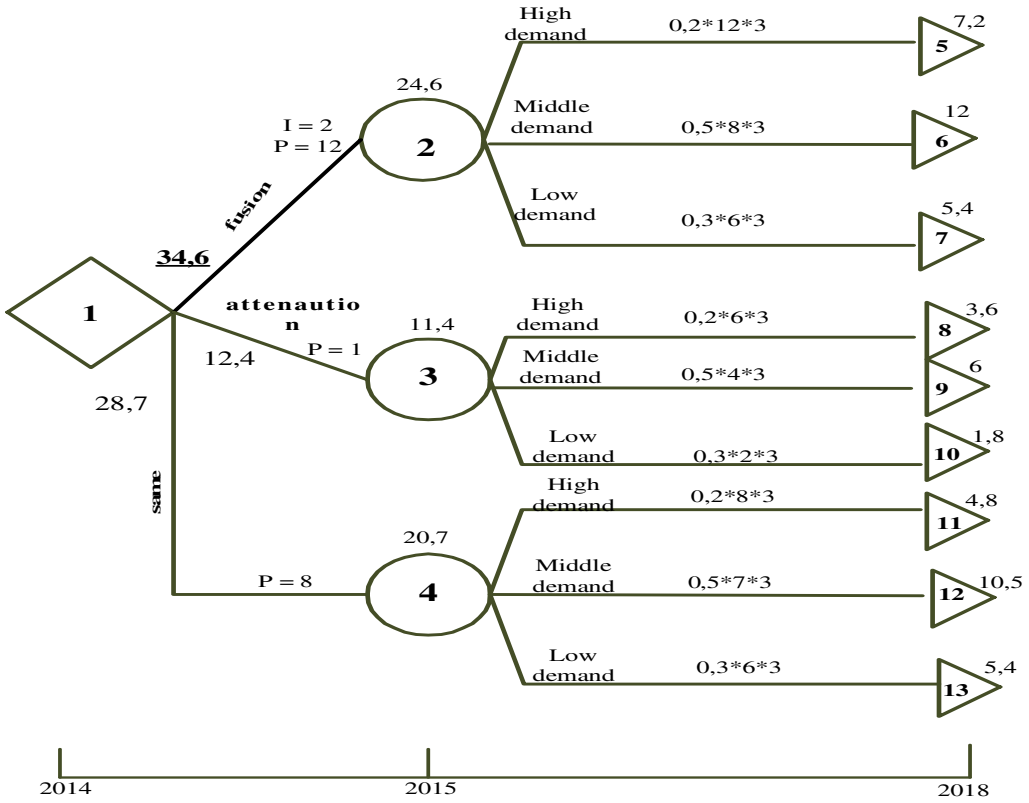


Fig. 3: Decision tree (own calculation)

Conclusions

Risks are being managed every day in the industry, but not in such a structured way as the literature describes. However information provided in those sources is rather messy. Some theories provided by risk management literature are not at all applicable to construction industry. As also other researchers confirmed, the knowledge of risk management is close to zero, even though the concept of risk management is becoming more popular in the construction sector.

Professionals in the construction industry are using techniques described in the literature concerning risk management, but are not aware of it. Risk management technique rarely used by the participants in construction projects. The participants used to handle the risks with an informal approach. This technique is not employed because of less knowledge and awareness among the construction industry. The risk management technique should be applied into any construction project at the initial stage of the project to get maximum benefit of the technique. Hence, there is thriving need to have a well-documented procedure which should be a one stop solution to all hazards that are likely to occur during project life cycle. There should be more wholesome approach towards risk management instead of the present sporadic approach towards the risks.

Acknowledgement

This paper was supported within Operational Programme for Competitiveness – Project No. CZ. 1.07/2.3.00/20.0296.

References

Bazsova, B. Analysis and Evaluation of Quality in University Education. In *24th International Business Information Management Association (IBIMA 2014)*: Milan, Italy 6-7 November 2014, IBIMA, 2014, pp. 738-745. ISBN 978-0-9860419-3-8.

Conchie, S. M.; Burns, C. (2008). Trust and risk communication in high-risk organizations: a test of principles from social risk research, Risk Analysis 28(1): 141–149. doi:10.1111/j.1539-6924.2008.01006.x

Fisk, E. R. (2003). Construction Project Administration. Seventh Edition. Prentice Hall Upper Saddle River, New Jersey Columbus, Ohio.

Ginevičius, R.; Podvezko, V. (2009). Evaluating the changes in economic and social development of Lithuanian counties by multiple criteria methods, Technological and Economic Development of Economy 15(3): 418–436. doi:10.3846/1392-8619.2009.15.418-436

Gunstone, S. (2003). Risk assessment and management of patients whom self-neglect: a 'grey area' for mental health workers, Journal of Psychiatric and Mental Health Nursing 10(3): 287–296. doi:10.1046/j.1365-2850.2003.00568.x

Li, G.-D.; Yamaguchi, D.; Nagai, M. (2007). A grey-based decision-making approach to the supplier selection problem, Mathematical and Computer Modelling 46(3–4): 573–581. doi:10.1016/j.mcm.2006.11.021

Li, Y.; Liao, X. (2007). Decision support for risk analysis on dynamic alliance, Decision Support Systems 42(4): 2043–2059. doi:10.1016/j.dss.2004.11.008

Mitkus, S.; Sostak, O. R. (2008). Modelling the process for defence of third party rights infringed while implementing construction investment projects, Technological and Economic Development of Economy 14(2): 208–223. doi:10.3846/1392-8619.2008.14.208-223

PMI. (2013). A Guide to the Project Management Body of Knowledge (PMBOK Guide). Fifth Edition. Project Management Institute Inc., USA.

Rajendhran, N.; Sundar, P. (2011). A Study of Risk Assessment and Management in Construction. PSG College of Technology, Coimbatore, India.

Rehacek, P. (2016). Project Management Standards. In: Soliman, K. (eds.) Proceedings of the 27th IBIMA Conference on Innovation Management and Education Excellence Vision 2020: from Regional Development Sustainability to Global Economic Growth. 4. – 5. 5. 2016, Milan, Italy. pp. 218-231. ISBN 978-0-9860419-6-9. WOS:000381172300028

Rehacek, P (2017a). Risk management standards for project management. International Journal of Advanced and Applied Sciences, 4(6): 1-13. doi:10.21833/ijaas.2017.06.001

Rehacek, P (2017b). Application and Usage of the Standards for Project Management and their Comparison. Journal of Engineering and Applied Sciences, 12: 994-1002. doi:10.3923/jeasci.2017.994.1002

Rutkauskas, A. V. (2008). On the sustainability of regional competitiveness development considering risk, Technological and Economic Development of Economy 14(1): 89–99. doi:10.3846/2029-0187.2008.14.89-99

Sanvido, V., Grobler, F., Parfitt, K., Guvenis, M., and Coyle, M. (1992). Critical Success Factors for Construction Projects. Journal of Construction Engineering and Management, Vol. 118, No. 1, pp. 94-111.

Tsai, T. C. ; Yang, M. L. (2010). Risk Assessment of Design-Bid-Build and Design-Build Building Projects, Journal of the Operations Research Society of Japan, 53(1), 20 – 39.

Tvaronavičienė, M.; Grybaitė, V. (2007). Impact of FDI on Lithuanian economy: insight into development of main economic activities, Journal of Business Economics and Management 8(4): 285–290.

Zavadskas, E. K.; Turskis, Z.; Tamošaitiene, J. (2008). Contractor selection of construction in a competitive environment, Journal of Business Economics and Management 9(3):181–187. doi:10.3846/1611-1699.2008.9.181-187

Zayed, T.; Amer, M.; Pan, J. (2008). Assessing risk and uncertainty inherent in Chinese highway projects using AHP, International Journal of Project Management 26(4): 408–419. doi:10.1016/j.ijproman.2007.05.012

Problematic Mobile Phone Use among Employees in Lebanon

Souha Fahed, Notre Dame University, Louaize, Lebanon, sabdelnour@ndu.edu.lb

Rita Kmeid, Bank of Beirut, Zouk Mosbeh, Lebanon, rkmeid@bankofbeirut.com

Abstract

The mobile phone usage by employees in the workplace might influence productivity positively or negatively. We aim in this study to assess whether Lebanese employees have a problematic use of mobile phones. Moreover, to understand whether there is any correlation between personality traits and the problematic use of mobile phones. Data was collected conveniently from 244 employees and 199 (81.5%) were considered for the study. Each participant filled the Problematic Use of Mobile Phones (PUMP) and the Big Five Model questionnaires. Results revealed that 86.93% of Lebanese employees have a problematic use of mobile phones. However, a regression analysis showed that the traits of personality of the Big Five Model could not explain much of the problematic use of mobile phones. This study adds to the knowledge of managers in Lebanese companies regarding their recruits.

Keywords: Mobile phone, problematic mobile phone use, personality traits, workplace.

Introduction

In today's business world, mobile technology offer flexibility, accessibility, and entertainment for their users. For many people, cellphones have become their endless companion.

Mobile Phone Technology at the workplace

Technology and smartphones has played an important role in people's personal lives as well as in corporations. In fact, it's predicted that by end 2017, the average number of cellphone users will rise to 4.77 billion worldwide.

Today's workforce is more mobile than ever. Due to internet's global reach, business people have the capacity to obtain old and current information from any source within seconds. Mobile technology provides employees the advantage of working on the go and it increases worker availability and flexibility without being bound to a physical location (Scheck, 2016). Hence, work is freed from geographical obstacles and individual performance is enabled during periods formerly spent at home or at remote sites. Thus, companies may benefit from individual connectivity to boost productivity even when workers are away (Powel, 2006).

Mobile phone use and personality traits

Although a mobile phone is useful and attractive as a mean of communication; there might exist the risk of addictive and problematic usage of this device.

Through the decades, researchers have developed theoretical frameworks on personality traits to understand better human behavior. As it was shown, personality is a unique constellation of attitudes and dispositions that governs individuals' consistent cognitive, affective and behavioral patterns (Costa and McCrae, 1995). These attitudes and traits of character enforce certain behaviors that might be aligned

with the person's affect or influenced by his social group. It is yet unclear whether mobile users' traits influence their mobile phone use.

The main body of the paper

Literature Review

The developments and evolutions of cellphones lead to a smarter devise called "smartphone" which provides more features and advanced utilities than a basic feature phone (Litchfield, 2010).

The importance of smart phones

Smartphones are so vital due to the internet connectivity for calls, text messaging and social networking sites. Moreover, business emails can be sent and received at any time of the day. Smartphones are so efficient due to the speed at which tasks can be done. From a business point of view, employees can be connected to their colleagues, partners, suppliers, customers at all time. Smartphones are so functional; people can store important data, files, pictures, and notes on the phone, and they can save time by achieving tasks such as online banking, transfer funds and make international calls.

Smartphones are essential due to the entertainment they provide where all people children, teenagers and adults can entertain themselves through updated games, applications, music movies and TV shows that can be downloaded and uploaded easily on the phone. In this respect, smartphones have revolutionized entertainment and transformed the world of portable gaming and movies. Smartphones are important because they can be used as GPS tracker having full GPS worldwide capacity. People considered that cell phones have brought positive change in their lives since it had made very easy to contact anyone, anywhere and anytime which gave them a feeling of assurance and safety (Andrew, 2014).

Mobile Phone Usage & Productivity at Work

Mobile technologies devices impact performance, culture and the structure of the company itself (Meeker et al, 2010). Some people believe that mobile phones improve communication, thus, will have positive impact on their work.

Others think that episodic cell phones use at work will distract them from their jobs, which negatively influence their productivity. These types of interruptions at work make employees lose their focus and consequently they would not meet their project deadline (Donya and Kumah, 2011). When employees receive a call or their cellphone rings, it will have a negative effect on their productivity, whether they answered it or not. During the few seconds spent on the decision to take or ignore that call, the flow of concentration is interrupted and it takes time to reestablish efficiency (Yihong, 2010). An external interruption refers to an event such as email, phone call, instant message or notification that alters work evolution. By contrast, an internal interruption identifies changes in work tasks that are self-initiated (Elwood, 2005). One study found that employees working in the manufacturing sector had a problematic mobile phone use which influenced negatively their productivity (Wahla and Awan, 2014).

In addition to distraction, side effects of mobile use could negatively influence efficiency at work. A study on Saudi Arabian participants, mentioned that 44.4% complained of headache, concentration deficiencies, memory loss, hearing loss, and exhaustion were related to their mobile phone use (Khan, 2008). Moreover, another study showed that 3-4% of mobile phone users suffered problems such as fatigue and dizziness, and more than 20% developed headaches (Al-Khlaiwi and Meo, 2004).

Mobile Phone Use and Demographics

The use of cell phones had been associated with harmful and disturbing behaviors. Examples include drivers who remain connected while behind the wheel which reduces their attention capacities leading to fatal accidents. Recently, the National Safety Council released statistics showing that 27% of car crashes were caused by mobile phone use (NSC, 2013). Brusque and Alauzet (2008) concluded that women are less likely to use cellphones while driving than women. In addition, other negative outcomes could result from the overuse of mobile phones such as financial problems, sleep disturbance and behavioral addiction.

The impact of cellphones may be influenced by the user characteristics such as age, gender, employment position. It may also vary due to the factors specific to certain countries. Lemish and Cohen (2005) found out that there may be different behaviors among men and women toward cellphones. Rakow and Navarro (1993) noted that the mobile phone usage is an extension of the public world when used by men and in contrary an extension of the private world when used by women. Researchers found that men are more annoyed by the use of cellphones in public places than women (Tuner, et al, 2000). Debaillon and Rockwell (2005) didn't find any significant difference in the use of mobile phones between young men and women at college and high schools (Debaillon, 2005). A recent study revealed that women spend more time on their smartphones and are more addicted to the device than men. While 52 percent of female used their mobile phones for at least 4 hours a day, only 29.4 percent of male respondents did the same. Male participants uses their mobile devices typically during breaks while women participants often sneak a peek to their phone to check instant messages and social networking such as Facebook and Instagram.

Initially men were more likely to utilize information and communication technologies (Ono and Zavodny, 2005). More recently, women started building interpersonal relationship through the internet usage which might have led to greater mobile phone dependency.

Age also has its impact over mobile phone usage. Younger individuals eighteen to thirty years old, care about their self-image and are willing to spend more for a mobile phone then their older counterparts (Venkatesan, 2015). Mature consumers on the other hand are less informed about technological developments, thus are more price-sensitive and care less about brand and design (Venkatesan, 2015). Although, the study in question included Indian participants, we might have an assumption that youngsters around the world might engage in higher spending on mobile devices. Another study recently showed individuals 35 to 45 years old constitute the fastest growing age segment for researching and engaging in online transactions (Challinor, 2012). Twice as many consumers aged 35 and older had made an online purchase through their cellphones since 2009.

Objectives of the study

Very few studies investigated the problematic use of mobile phone among people. Again, no studies correlated individuals' personality traits with the problematic use of mobile phones.

This study aims at answering the following research questions: (1) Do Lebanese workers have a problematic use of mobile phones? (2) Is there any correlation between employees' personality traits and the problematic use of mobile phones in Lebanon?

Methods

Sample

Participants in this study were randomly selected from different companies belonging to the banking, engineering and telecommunication fields. Out of the 244 distributed packages, we received 199 completed, achieving a response rate of 81.5%.

Each participant received two questionnaires and was allowed two weeks to respond. The two questionnaires included the Problematic Use of Mobile Phones (PUMP) and the Big Five Model (Big Five). Demographic variables included age, gender, seniority and work sector, and was collected using an additional section in the consent letter.

Tools

This is a non-experimental quantitative study that uses two reliable and validated tools for the assessment of its variables. The PUMP developed by Billieux and his colleagues (2008) and validated by Merlo, et al. (2013) for English speaking participants. The PUMP included thirty statements relevant to phone use habits, self-evaluated on a four-point scale. The Big Five assesses five significant dimensions that underlie most significant variation in human personality. The five factors are: (1) extraversion (2) agreeableness (3) conscientiousness (4) emotional stability and (5) openness to experience. The Big Five is a 50 item questionnaire reporting a self-description of respondents. Research has found a relationship between the above stated personality dimensions and job performance: Although conscientiousness is the trait most consistently tied to job performance, the others also influence some aspects of performance depending on the situation.

Findings

Concerning the first question on the problematic use of mobile phones, assessed using the PUMP questionnaire: The results revealed that 86.93% of respondents have a problematic use of mobile phones. Regarding personality traits: the descriptive analysis primarily shows that the majority of respondents (61.31%) are extroverted. As expected by the cultural traits of Lebanese people, this trait characterizes people who are sociable, talkative, assertive, and enthusiastic. They are usually more emotionally expressive and have better interpersonal skills.

The second variable, agreeableness relates to people who are cooperative, warm and trusting. These people are usually more compliant and conforming. The study revealed that about 59.8% of participants were agreeable.

Conscientiousness characterizes people who are responsible, organized, dependable and persistent. These workers show effort and discipline in the workplace. It was shown that 58.79% of subjects have that trait of personality.

Emotional stability is a state of mind which relates to people who are calm, self-confident, and secure. People with high negative scores are usually nervous, anxious, depressed and insecure. Almost 53% of Lebanese workers show signs of emotional instability. This of course might be in relation to the downturn in the economy, long work hours and stressful conditions that an emerging post-war country like Lebanon still suffers from. Finally, openness to new experience is a trait of personality that distinguishes creative, curious, and artistically sensitive individuals. These are employees with higher adaptation to change and enhanced leadership. About 57.8% self-reported traits of openness.

A regression analysis revealed that traits of personality of the Big Five Model could not explain much of the problematic use of mobile phones with the following R^2 values for extraversion (0.02), agreeableness (0.02), conscientiousness (0.09), emotional stability (0. 15), and openness to experience (0.26).

Conclusion

Study findings highlighted problematic use of mobile phones among a high percentage of Lebanese workers. The latter have major implications on organizational behavior research and the way management should deal with the abuse and misuse of mobile phones by their employees. Again, in setting the limits for their workers if they witness conditions where the mobile addiction exceeds its benefits. Moreover, this research attempted to explain whether certain individuals with specific personality traits exhibit higher problematic use of mobile phone. However, the assumption was rejected, and there was no significant relationship between Big Five personality traits and the problematic use of mobile phones.

References

Al Khlaiwi, T. and Meo, S.A. (2004) 'Association of mobile phone radiation with fatigue, headache, dizziness, tension and sleep disturbance in Saudi population,' *Saudi Medical Journal*, 25 (6), 732-736.

Andrew, L., Jacob EB., and Aryn C.K. (2014) 'The relationship between cell phone use, academic performance, anxiety, and Satisfaction with Life in college students,' *Computers in Human Behavior*, 31, 147–156.

Billieux, J., Van der Linden, and M., Rochat, L. (2008). The Role of Impulsivity in Actual and Problematic Use of Mobile Phone,' *Applied Cognitive Psychology*, 22, 1195-1210.

Brusque, C., and Alauzet A. (2008) 'Analysis of the individual factors affecting mobile phone use while driving in France: Socio-demographic characteristics, car and phone use in professional and private contexts,' *Accident Analysis & Prevention*, 40 (1), 35-44.

Costa, PT., and McCrae, RR. (1995) 'Domains and facets: Hierarchical personality assessment using the revised NEO Personality Inventory,' *Journal of Personality Assessment,* 64, 21-50.

Cohen, N. (2011) 'What Works: Grameen Telecom's Village Phones?,' *World Resources Institute, Digital Dividend.*

Challinor, M. (2012) 'Different age ranges use mobile in different ways,' [online]. International News Media Association, https://www.inma.org/blogs/main/post.cfm/different-age-ranges-use-mobile-in-different-ways.

Duncombe, R. and Heeks, R. (1999). Information and Communication Technologies and Small Enterprise. [online]. http://www.sed.manchester.ac.uk/idpm/publications/wp/di/di_wp07.pdf.

Doornik, J., and Hansen, H. (2008) 'An Omnibus test for univariate and multivariate normality,' *Oxford Bulletin of Economics and Statistics,* 70 (1), 927–939.

Ellwood, M. (2005) 'Time priorities for top managers,' International Association of Time Use Researchers (ATUR) Conference. Halifax.

Litchfield, S. (2010). Defining the smartphone. [online]. Retrieved from http://www.allaboutsymbian.com/features/item/Defining_the_Smartphone.php

Meeker M. (Apr 12, 2010). Mobile Internet Will Soon Overtake Fixed Internet. [online]. GIGACOM. https://gigaom.com/2010/04/12/mary-meeker-mobile-internet-will-soon-overtake-fixed-internet/.

Merlo, LJ., Stone, AM. And Bibbey A. (2013). Measuring Problematic Mobile Phone Use: Development and Preliminary Psychometric Properties of the PUMP Scale, Journal of Addiction, 2013, ID 912807.

Ono, H. and Zavodny, M. (2005), 'Gender differences in Information Technology Usage: A U.S.-Japan Comparison. *Sociological Perspective*, 1, 105-133.

Rakow, L. and Navarro, V. (1993), 'Remote Mothering and the Parallel Shift: Women meet the Cellullar Telephone', *Critical Studies in Mass Communication*, 20 (3), 144-157.

Donya, RK. and Kumah EA. (2011), 'Cellular Phone Usage and Productivity among Employees in A Ghanaian SME: An Assessment,' *International Journal of Computing and ICT Research,* 5 (1), 21- 34.

Venkatesan, G. (2015), 'A Study on Mobile Handset Buying Behavior of Different Age and Gender Groups in India,' *Intercontinental Journal of Marketing Research Review*, 3 (12).

Wahla, RS. And Awan, AG. (2014), 'Mobile Phone Usage and Employees Performance: a Perspective from Pakistan,' *International journal of academic research in accounting,* 5, 153-165.

Yihong Y., Raubal M. and Liu Y. (2010), 'Correlating Mobile Phone Usage and Travel Behavior –A case Study of Harbin, China,' Computers, Environment and Urban Systems, 36 (2), 118–130.

Promotion Techniques for A New Romanian Brand of Wine

Dospinescu Nicoleta, Alexandru Ioan Cuza University, Iaşi, Romania, dnicole@uaic.ro

Stoica Bianca Maria, Alexandru Ioan Cuza University, Iaşi, Romania, bianca.st94@gmail.com

Abstract

During the last 25 years, Romanian brands of wine have evolved very much based on consumer preferences, but at the same time they have revolutionized tastes and set new tendencies. Due to the stiff competition, many producers changed their vision and shifted towards the qualitative direction of the offer. The modern history of Romanian wine has been marked by brands such as: Grasa de Cotnari and Busuioaca de Bohotin, or Zestrea Murfatlar.
The goals of this article envisage emphasizing the promotion techniques for a new brand of wines from Romania, as well as their mechanism of functioning in the perception of connoisseurs. To make a good wine is very important part of the work, but after this is necessary to promote it according to the target audience. So an accurate communication to consumers and a smart use of the new technologies of digital marketing are in a state of evolutionary development, where new trends are likely to occur rapidly and wineries have to adapt.

Keywords: brand, marketing, promotion techniques, communication, loyalty, wine

Literature Review

The most valuable assets of a company are **brands.** According to (Aaker, 1995), a brand is a name and/or a distinctive symbol, used with the view of identifying products or services as belonging to a producer or a group of producers and differentiate between these goods or services and those of the competition.

Brands generate distinction, uniqueness in the mind of the consumer, recognition and loyalty, love mark. Which means, in economic terms, acquisition, profit margin for the organisation and market share as compared to other competitors. From (Aaker, 1995) perspective, the key to successfully achieve a ***new look*** is ***evolution***, not ***revolution***. A brand, within the development process, shapes up a personality which anchors in the mind of the target public and becomes decisive. It deserves to be kept in order to preserve categories which are already conquered, to attract new customers, to ensure loyalty, to keep the tradition, to constantly reveal the values of the product and of the organisation, to keep on telling the story. The studies (Kotler & Keller, 2015) show that, in fact, consumers by, consume and do business with an image.

(Steenkamp, 2014) speaks about the 4V model which links the directions of research regarding ***global brands***, providing a better understanding of these brands and of the way they create ***value*** for the organisation. This model is organized in four groups of elements which create value: valuable brands; source of value; delivery value, assessed results. The sources of value come from the uniqueness of the name which can awaken certain emotional or rational associations in the mind of the consumers, or from Unique Selling Proposition (USP) which decisively shapes up the product/service, or from its intrinsic characteristics.

According to (Aaker, 1995), the capital of a brand is a set of assets and liabilities linked to a brand, its name and symbol, which add to (or reduce) the value provided by a product or a service to a company and/or the buyers of a company. And this set of assets includes: loyalty to a brand, name recognition, perceived quality, brand association with other assets in the property of the brand: registered trademarks, relationship within the distribution channels. They *provide value to the buyer* increasing trust, information processing and user satisfaction. At the same time, they also *provide value to the company* by increasing the efficiency and the effectiveness of the marketing

programmes, loyalty to the brand, profit margins, brand extensions, commercial leverage and competitive advantage.

The personality of a brand is supported by ***communication to the public*** and the way ***it can differentiate on the market***, compared to other brands. Communication and publicity dominate brands, irrespective of their nature. A brand which promotes a valuable product will never be able to be efficient without an identity which transmits the same thing and vice-versa (Wheeler, 2013). Promotion has as goals increasing visibility, boosting the increase of demand on short term, securing customers' loyalty, changing the flux of demand, brand energizing and consolidating or attibuting new associations, involving the target public and connecting it with the product in a multi-dimensional experience. According to (Borkovsky, et al., 2017), if advertising is more effective at building brand equity, then the brand value would increase. There are many researches (Renton, et al., 2017), (Wang, et al., 2017), (Herstein, et al., 2017)in the food and beverage sector regarding the problem of the brand management and the future directions.

The research of (Lindstrom & Kotler, 2010) proves that 75% of our emotions are actually generated by what we smell, feel, see, taste and hear. Multi-sensorial branding is based on complete sensorial synergy, which produces a domino effect. In the same way opinions are stored in mind, when one sense is activated, it will lead to another, and then another, triggering a chain of memories and emotions. Sensorial branding helps us return to the basic senses, which remarcably influence our decisions and wishes. 5D branding may be considered an element of business which enhances the efficiency of the promotion campaigns of an organisation.

In order to increase the *visibility* of a brand, events play a very important role because they involve the target public, creating an experience, a personal relation with the brand. Some results (Fu, 2017) show that the brand strategy management based on the network is helpful to improve the turnover of the enterprise.

According to (Lee, et al., 2017), building brands with high levels of awareness and uniqueness is critical to ensuring brand strength and sustained competitiveness.

According to (Mustafi, et al., 2011), one can count on a brand interaction with the public online, as well as offline. The term of online refers to all the channels using the Internet so that the message is delivered to the public. Making websites more usable and improving the users' experience represents an important step when desiring to keep them from moving away. It's important to examinate the effects of the interactivity dimensions on users' content comprehension and their attitudes towards e-commerce websites (Dospinescu & Perca-Robu, 2017). This online promotion can be achieved by using:

- *Search Engine Marketing* where one can find Adwords, Bing Ads etc., which represent online means of publicity
- *Social Media Marketing* which includes all social media, such as Facebook, Twitter, Linkedin etc.
- *Display Media Marketing* which combines email marketing, mobile advertising and display advertising in another method of online promotion.

The advantages of online promotion consist of results measurable in real time, it is cheap and it allows fast interaction with the clients and their efficient targeting.
Offline channels by which promotion towards the target public can be achieved are represented by mass-media: press, radio, TV, OOH. The advantage provided by these channels is represented by increased credibility compared to New_Media, and placing the publicity message is close to the sale point.

Some studies (Krieger, et al., 2014), (Ramsak, 2014) analyzed the field of branding and brand management of wine production. In the case of wines, promotion (communication) is based on advertising, promotions, public relations (events, press releases, press conferences, seminars,

speeches), direct marketing and sale force (presentations addressing the theme of wine, business meetings, specialised contests, specialised tasting, catalogues with products from the respective range of products, e-mail). Starting from the organoleptic characteristics of the product, going through the story of the brand, reaching to the packaging, bottle design, label, colours, fonts, logo, logotype, symbols, USP up to endorsers and events, the promotion of grapevine products is absolutely interesting and provoking, taking in consideration the competition.
The research theme refers to the way in which promotion of new brands of wines is perceived by consumers and finding the techniques that have effect, adherence on them, in the online as well as in the offline environment. We will analize Hermeziu Winery, founded in 2014.

Research Theme and Research Methodology

In the process of finding promotion techniques for the brands of wines in the N-E of Romania, elaborating a detailed research, which is oriented towards the consumer, namely oenologists and professional tasters, who are aware of the Romanian wine market, is necessary. The goal of the research is to find out which promotion techniques function in this field, of wine, and which are the most efficient for ”Hermeziu Winery” with the of achieving the same success as that of other, well known and established wineries.

Research Methodology

For the present research, we have chosen to use ”Literature review” as first method, in order to find out the state of awareness in the field of promotion techniques and branding; then we applied a quantitative research – the questionnaire survey as an instrument of understanding the opinion of the target public as to the promotion techniques used by this winery and their efficacy; data interpreting was carried out with the help of SPSS programme.

Sampling: the researched sample consisted of 67 persons of different ages, out of which 59 were really acquainted to the brand and went through the entire quiz. These individuals are a part of the group ”oenology”, a public group where everyone interested in the field of wine can enlist. We could count on informed, relevant answers provided by specilized oenologists, as well as by sophisticated customers, committed to finding out about this field.

Research objectives and hypotheses

O1: Identifying the reasons for consuming a brand of wines and the importance of certain criteria in the decision of buying
O2: Appreciating the promotion techniques for the brand Hermeziu
O3: The impact of promotion on different media channels
The hypotheses of the research in this paper are the following:
H1: The age of the respondents is a criteria which influences the perception on the media channels
H2: The perception of the promotion techniques used by the brans Hermeziu differs according to the age group

Results And Discussions

The first question ”Do you consume the wines of Hermeziu winery?” is a filter-type question, which uses a dichotomic and nominal scale, with category variables. If the answer to this question was affirmative, the quiz continued with the following questions, and if it was negative, the quiz concluded with thanks for the time.

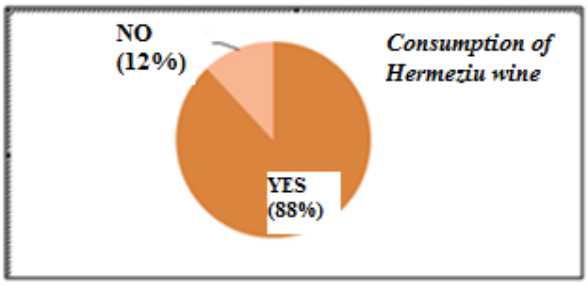


FIG 1- KNOWING THE BRAND

After centralizing the data, we find out that in a proportion of 88,1%, they know the Hermeziu brand, and 11,9% have not heard yet about this winery.

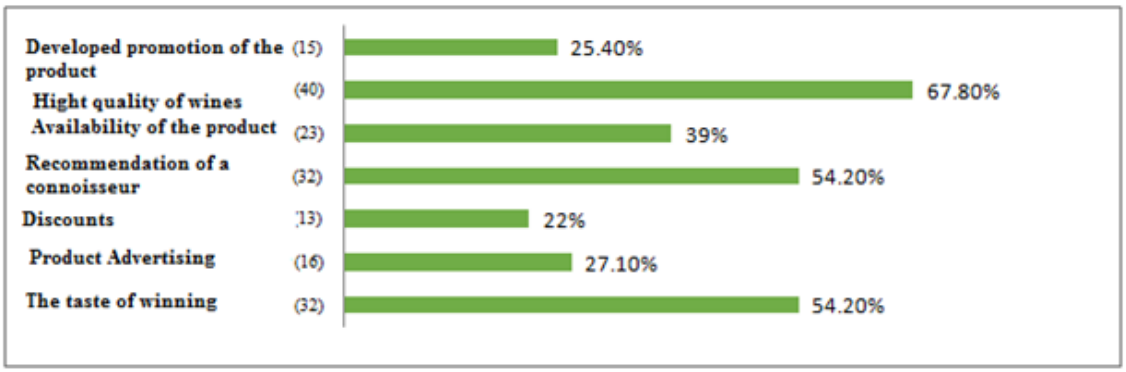


FIG 2 - THE REASONS FOR WINE CONSUMPTION

At the question: ”Which were the reasons for consuming wines from Hermeziu winery?”, we obtained important data which show that the main reason is: ”high quality of the wine”, on the second place is ”taste” and ”the recommendation of a connoisseur”; and on the third place is ”product availability”. We notice the fact that the organisation deserves to improve its promotion strategies, taking into consideration its place in the current ranking.

The third question: ”In your opinion, which characteristics you consider a premium wine brand should have, in order to be considered an ”Ideal” brand”? we obtained the following ranking:

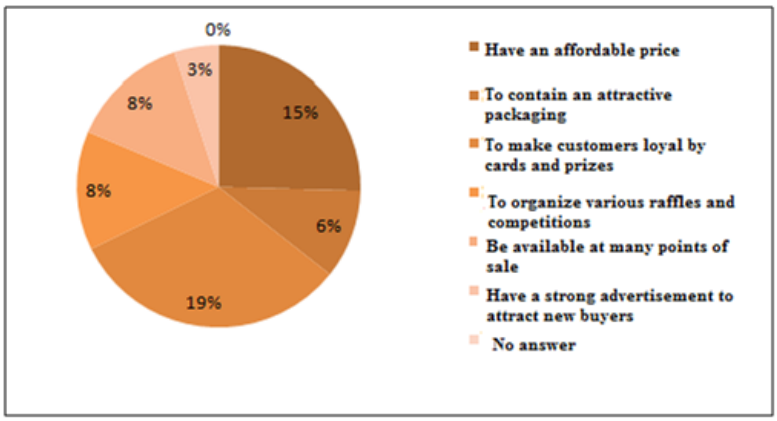


FIG 3 - IDEAL WINE

The goal of this question is intended to find out which are the promotion actions Hermeziu brand has to take in order to be considered a ”successful brand”. One can notice, from the *Fig. 3*, that the respondents of the quiz emphasise especially with securing loyalty by cards and prizes (19%), than an ”affordable price” (15%); organizing raffles and competitions, promotion (8%), but also, the avalilability of the product in many points of sale is appeciated .

These answers are very important for our research theme, that is why we are going to conduct a statystical analysis, relating this question to the answers of the question which indicates the age of the respondent. By this correlation we will find out whether there are any relations between the age of the respondent and some of the promotion techniques a premium wine brand can undertake.

With the help of SPSS (Statistical Package for the Social Sciences) statistical application, we developed a test *One-Way Anova*, by means of which we pointed out the relations that exist between the ***age of the respondent and some of the means of promotion of a brand.*** We will work witn the last column, where the „Sig” coefficient is to be found, in order to find out whether there are or there are not any differences between the two variables. „Sig” is the correlation *coefficient* which describes the intensity and the direction of the relation between the variables.
Hypotheses:

H_0 – age does not influence the characteristic ”affordable price”
H_1 – age influences the characteristic ”affordable price”
Sig = 0,763 > 0,05 => H_0 is accepted
=> H_1 is rejected
=> test is irrelevant

Table 1: ANOVA Test - The age of the respondent and the means of brand promotion

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
To have an affordable price	Between Groups	.126	2	.063	.272	.763
	Within Groups	13.207	57	.232		
	Total	13.333	59			
To contain attractive packaging	Between Groups	1.365	2	.682	2.943	.061
	Within Groups	13.218	57	.232		
	Total	14.583	59			
To make customers loyal to cards or prizes	Between Groups	.132	2	.066	.261	.771
	Within Groups	14.451	57	.254		
	Total	14.583	59			
To organize various raffles and competitions	Between Groups	.678	2	.339	1.363	.004
	Within Groups	14.172	57	.249		
	Total	14.850	59			
Be available at many points of sale	Between Groups	.866	2	.433	1.824	.001
	Within Groups	13.534	57	.237		
	Total	14.400	59			
Have a strong advertisement to attract new buyers	Between Groups	.097	2	.048	.193	.003
	Within Groups	14.303	57	.251		
	Total	14.400	59			
No answer	Between Groups	.071	2	.036	1.091	.343
	Within Groups	1.862	57	.033		
	Total	1.933	59			

Interpretation: As a result of the analysis carried out, there are no significant differences between a promotion strategy based on ”affordable prices” and the age of the respondent. There is no relation between the two, from a staystical point of view, this conclusion being guaranteed with a probability of 95%. The variables ”Having an attractive packaging”, ”securing customer loyalty by means of cards and prizes” and the variant ”no answer” have the value „Sig>0,05”, which means that there are no significant differences between the respective characteristics and the age of the respondent. For the variables ”organizing raffles/competitions”, ”product availability in various selling points” and ”strong advertising with the view of attracting new customers”, the value of the sig coefficient is calculated as follows:

Hypotheses:

H_0 – age does not influence the characteristic organizing raffles/product availability in selling points/strong advertising with the view of attracting new customers
H_1 – age influences the characteristic organizing raffles/product availability in selling points/strong advertising with the view of attracting new customers.
Sig = 0,04/0,001/0,003 < 0,05 => H_0 is rejected
=> H_1 is accepted
=> the test is irrelevant.

Interpretation: As a result of the analysis carried out, there are significant differences between the characteristics ”organizing raffles/product availability in selling points/strong advertising”, which means there is a correlation from a statistical point of view. For these variables, the test was rendered relevant. The result will determine a differentiation of the means of promotion of the products of Hermeziu winery according to age groups.

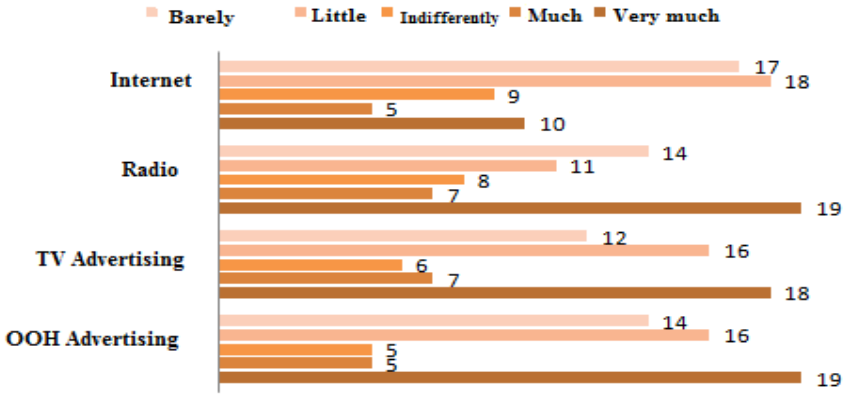


FIG. 4 - MEDIA CHANNELS

As for the media channels preferred by the respondents, we asked the question "To what extent does advertising on the following Media and New-Media channels (Internet, Radio, TV Commercial, OOH Commercial) influence you in selecting a blend of wine?" We used a 5 stages Likert scale, with possibilities of answering from 1 (very little) to 5 (very much). The results show that the main preferred channel is Internet, on the second place comes OOH commercial, on the third the TV commercial, than the one on the Radio.

With the help of SPSS application, we used the test *One-Way Anova.* By this test we will notice if there is any significant association or not, between the age of the respondent and the channels of promotion. This question answers to the goal regarding establishing the importance of promotion on different media channels according to age.

Hypotheses:

H_0 – there is no significant association between age groups and the TV commercial
H_1 – there is a significant association between age groups and the TV commercial
Sig = 0,007 < 0,05 => H_0 is rejected
=> H_1 is accepted
=> the test is relevant.

Interpretation: As a result of the analysis carried out, there is a significant association between the characteristic age of the respondent and TV commercial, which means there is a correlation, from a statistical point of view, this conclusion being guaranteed with a probability of 95%. For these variables, the test was rendered relevant, which means they are related to the theme of research.

Table 2: ANOVA Test - A significant association between the age of the respondent and media channels

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
TV Promo	Between Groups	2.458	3	.819	.496	.007
	Within Groups	92.525	56	1.652		
	Total	94.983	59			
Radio	Between Groups	5.586	3	1.862	.496	.007
	Within Groups	101.414	56	1.811		
	Total	107.000	59			
Internet	Between Groups	5.911	3	1.970	1.938	.004
	Within Groups	56.939	56	1.017		
	Total	62.850	59			
OOH	Between Groups	7.386	3	2.462	2.011	.003
	Within Groups	68.547	56	1.224		
	Total	75.933	59			

As we can notice, all the values of the „sig" coefficient are lower than the value „0.05", which means that from all the independent variables, that in "TV commercial", "Radio", "Internet" and "OOH" and the dependent variable "age" there is a significant association.

When asking the question: "How do you think the brand of wines Hermeziu should act in order to become better known on the market?" (with only one variant of answer), we obtained the following results:

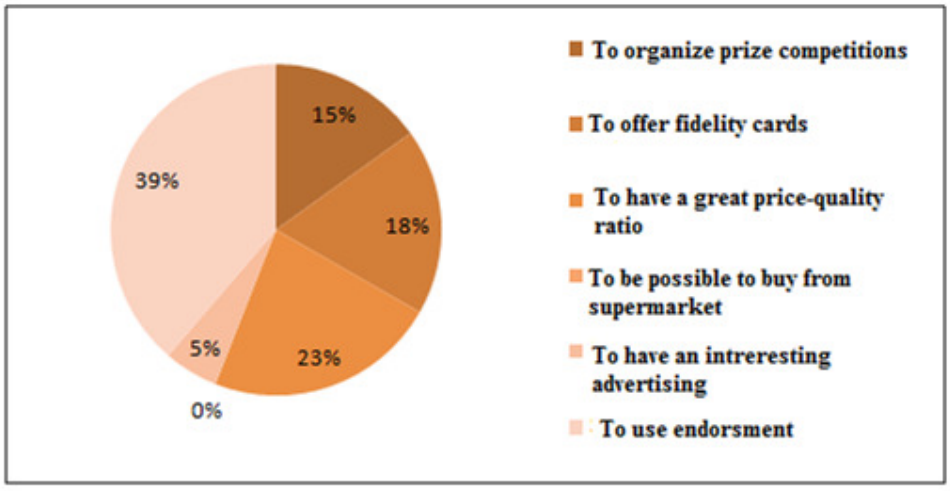


FIG 5 - THE BEST WAY OF ADVERTISING FOR THE BRAND

This question answers to the goal regarding the the respondents perception of promotion techniques. In order to analyze these answers, we will use the *One-Way Anova* test. By means of this test we will notice if there is a significant correlation or not, between the age of the respondent and the promotion methods Hermeziu brand of wines could use.

Hypotheses:

H_0 – there is no significant correlation between age groups and organizing raffles/ prize competitions
H_1 – there is significant correlation between age groups and organizing raffels/prize competitions
Sig = 0,003 < 0,05 => H_0 is rejected
=> H_1 is accepted

=> the test is relevant.

Interpretation: As a result of the analysis carried out, ***there is a significant correlation between the independent variable "age" of the respondent and organizing raffles and competitions.***

Table 3: ANOVA Test - The correlations between the age of the respondent and the promotion methods Hermeziu brand of wines

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
To organize prize competition	Between Groups	3.235	3	1.078	5.253	.003
	Within Groups	11.498	56	.205		
	Total	14.733	59			
To offer fidelity cards	Between Groups	.702	3	.234	.920	.003
	Within Groups	14.232	56	.254		
	Total	14.933	59			
To have a great price-quality ratio	Between Groups	.000	3	.000	.	.
	Within Groups	.000	56	.000		
	Total	.000	59			
To be possible to buy from supermarket	Between Groups	.551	3	.184	.962	.417
	Within Groups	10.699	56	.191		
	Total	11.250	59			
To have an interesting adevrtising	Between Groups	.000	3	.000	1.633	.
	Within Groups	.000	56	.000		
	Total	.000	59			
To use endorsemnt for brand advertising	Between Groups	.435	3	.145	1.029	.387
	Within Groups	7.898	56	.141		
	Total	8.333	59			

As we can see, the values of the "sig" coefficient for the variables ***"offer fidelity cards"***, ***"have a great price-quality ratio"***, ***"have an interesting advertising"*** are lower than the value of 0.05, which means that ***there is a significant correlation*** between these dependent variables and the independent variable "age".

For the variables ***"available in supermarkets"*** and ***"use endorsement for brand adevrtising"***, hypothesis H_0 will be accepted and hypothesis H_1 will be rejected, because the value of the coefficient "sig" is higher than 0.05, therefore for these dependent variables, the test will be irrelevant.

By means of the question "Would / Did you recommend Hermeziu winery to other people?", with the variants of answer "Yes" and "No", the level of appreciation of the winery, from the point of view of the respondents was intended. This question is accompanied by a photo which contains the logo of the brand. A number of 57 respondents, that is 97%

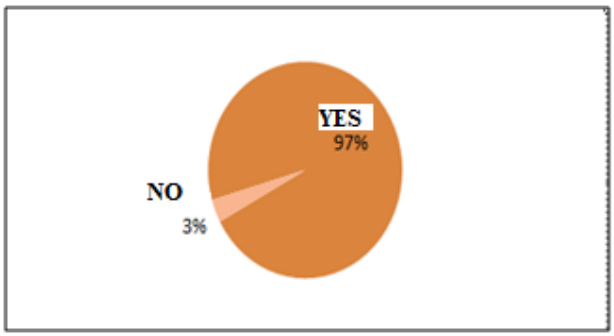


FIG 6 - BRAND RECOMMENDATION

Stated that they have or they would recommend the winery to other people, and 3%, that is 2 people would not do that.

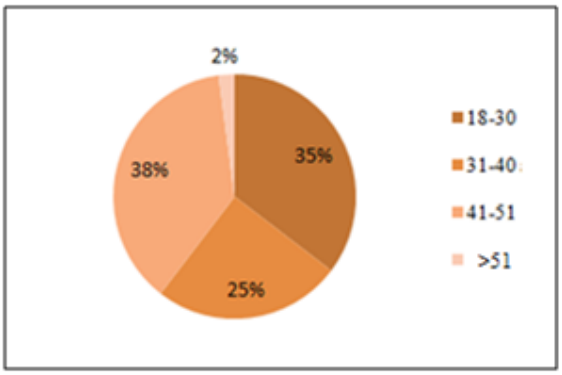


FIG. 7 - AGE OF RESPONDENTS (YEARS)

At the question regarding the age range where the respondents are situated, formulated with the purpose of dividing the questioned persons, we obtained the following results: 41-51 years old, representing 37.5%. another strong percentage is represented by 35.4%, meaning 18 people, with ages from 18 to 30 years old. The lowest percentage is represented by 2.1%, which is a sole respondent over 51 years old.

Conclusions

Taking into consideration the first goal of the research, that of ”identifying the reasons of consuming a brand of wines and the importance of certain criteria in the decision of buying” we have reached to the conclusion that for the consumers, the high quality of wine and the recommendation of a connoisseur are the main reasons why they prefer a specific kind of wine. As for the ”appreciation of the promotion techniques of the brand Hermeziu” we concluded that the respondents mostly appreciate ”promotion on the Internet” and the way the ”superior quality of the wine” is put into light.

The first objective envisaged was revealing the media/new-media channels appreciated by the public when it seeks an information / promotion about the brand Hermeziu. The results pointed out the fact that the public considered that the Internet and, OOH commercial are easier to access. With the help of the SPSS statistical programme, we designed an *Anova* table by which we emphasized whether the age range is influenced by the media channels and whether there is a correlation between these two variables. Following the analysis of the obtained results, we can state that the perception of the TV

and OOH commercials, and of the radio commercial differs depending on each age range. For this reason, adapting the content according to the target group would facilitate perception.

We have found out that the promotion techniques the consumers find adequate are represented by organizing competitions and raffles, creating loyalty cards, an individual commercial for the brand and that an advatageous ratio between quality and price is essential.

The present research has had positive results for the brand of wines Hermeziu. The winery delivered a message about the story of the wine they produce and a certain image that were perceived by the connoisseurs, as being on the whole to their benefit.

A marketing campaign that promotes the brand of wines Hermeziu would matter if the the media channels which are intended to be used for delivering the message and the age ranges of the target public would be taken into consideration. For example, they could use the Facebook social media platform more intensely, with the view of emphasizing the message they wish to deliver. The winery has to establish the target market so that it can take into account the age ranges that use the media channels. For the age range between 18-30 years old they could use the Internet and the outdoor advertising in order to promote their message, for the age range between 41-51 years old they could use radio and the OOH commercial, and for the age range between 41-51 years old they could use Radio and TV commercial. The outdoor advertising would be the most beneficial for Hermeziu winery, since it would be the mean of promotion by which all the age ranges would see the message proposed by the brand.

Promotion techniques adapted to the profile of the new brand and the age of the target public are essential for its correct perception, adherence of information, rasing curiosity, recognition, notoriety, uniqueness and its clear positioning in the mind of the consumer. The brand Hermeziu can exploit its tradition, as well as the novelty brought in a clever way, by appealing to a niche promotion.

References

Aaker, D., 1995. *Building Strong Brands.* s.l.:Free Press.

Borkovsky, R., Goldfarb, A., Haviv, A. M. & Moorthy, S., 2017. Measuring and Understanding Brand Value in a Dynamic Model of Brand Management. *Marketing Science,* 36(4), pp. 471-499.

Dospinescu, O. & Perca-Robu, A. E., 2017. The Analysis of E-Commerce Sites with Eye-Tracking Technologies. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience,* 8(3), pp. 85-100.

Fu, E., 2017. Research on the Brand Strategy and Management of Enterprises. *Agro Food Industry Hi-Tech,* 28(3), pp. 423-426.

Herstein, R., Drori, N., Berger, R. & Barney, B. R., 2017. Exploring the gap between policy and practice in private branding strategy management in an emerging market. *International Marketing Review,* 34(4), pp. 559-578.

Kotler, P. & Keller, K. L., 2015. *Marketing Management.* s.l.:Pearson.

Krieger, C., Hanf, J. H. & Belaya, V., 2014. Branding and brand management of wine production co-operatives: results of a business survey. *Berichte Uber Landwirtschaft,* 92(3).

Lee, W. J., O'Cass, A. & Sok, P., 2017. Unpacking brand management superiority Examining the interplay of brand management capability, brand orientation and formalisation. *European Journal of Marketing,* 51(1), pp. 177-199.

Lindstrom, M. & Kotler, P., 2010. *Brand Sense: Sensory Secrets Behind the Stuff We Buy.* s.l.:Free Press.

Mustafi, S., Jost, L. & Nguyen, T., 2011. *The Relationship Between Online and Offline Marketing.* [Interactiv]

Available at: http://docplayer.net/11387417-The-relationship-between-online-and-offline-marketing.html

Ramsak, M., 2014. Wine Queens: Individual and Cultural Brand Management Process. *Journal of Ethnography and Folklore,* Issue 1-2, pp. 46-63.

Renton, M., Daellenbach, U., Davenport, S. & Richard, J. E., 2017. Finding fit: An exploratory look at SME brand orientation and brand management in the New Zealand food and beverage sector. *Journal of Brand Management,* 24(2), pp. 289-209.
Steenkamp, J.-B., 2014. How global brands create firm value: the 4V model. *International Marketing Review,* 31(1), pp. 5-29.
Wang, C. L., He, J. & Barnes, B. R., 2017. Brand management and consumer experience in emerging markets: directions for future research. *International Marketing Review,* 34(4), pp. 458-462.
Wheeler, A., 2013. *Designing brand identity: an essential guide for the whole branding team.* New Jersey: John Wiley & Sons.

Implementation of "14 Quality Principles for Value Streams" In the Company from the Automotive Industry

Arkadiusz Kowalski, Wroclaw University of Science and Technology, Wrocław, Poland,
arkadiusz.kowalski@pwr.edu.pl (corresponding author)

Paulina Nowacka, Wroclaw University of Science and Technology, Wrocław, Poland,
205893@student.pwr.edu.pl

Piotr Szafer, WSB School of Banking, Poznań Poland,
piotr.szafer@wsb.poznan.pl

Robert Waszkowski, Military University of Technology, Warszawa, Poland,
robert.waszkowski@wat.edu.pl

Abstract

This article presents the implementation of "14 Quality Principles for Value Streams" in the company from the automotive industry. The Bosch Company has created a set of 14 principles and special criteria that it considered most important for its production system. Deploying them to all positions has become a superior goal for the entire organization. One of the important steps to take to achieve this goal is a thorough analysis of the prevailing conditions and careful planning of the action. Therefore, the first important step in the following work is to create an implementation plan. Then, based on a previously prepared evaluation sheet, a comparative analysis is made between the current state and the requirements contained in the 14 Company's Quality Principles.

Keywords: Automotive Industry, 14 Quality Principles, TQM, Project Management

Introduction

Economic changes in recent years have made the quality of products and services become a key criterion for the success of an enterprise (Gola (2014)). Equally important is the knowledge of the managerial staff on the potential for enhancing the results of work, which is the result of knowledge of the theoretical and practical basis for improving the company's business. Sustainable and continuous quality improvement can only be achieved by directing the organization's efforts to plan and prevent problems that occur at the source. This concept of quality management is called quality assurance, where greater emphasis is placed on advanced quality planning, training, product design, process and service improvement, process control and engaging and motivating people (Dale (2003)). Improving the quality also requires knowledge of customer expectations (Kłosowski and Gola (2016)). Is more than just collecting data from processes and from the customer.

How to more effectively manage the production company? There are many techniques and methods but not all are effective in practice. As it turns out since the early 1990s, the best results are achieved by Japanese entrepreneurs. Therefore, for many years, the eyes of all managers are headed in that direction. A good example is Toyota's phenomenon. This company is renowned for its high-quality products, cost-effective pricing, and innovative management approach. Its annual revenues are billions of dollars, so it is no wonder that it is considered one of the most profitable companies in Japan and North America. However, the main advantage of Toyota is its production model, the so-called "Lean Production", which is today widely regarded as another step in the evolution of the manufacturing process after the introduction of Ford's mass production system (Liker and Maier (2006); Bhamu and Singh Sangwan (2014); Jasiulewicz-Kaczmarek (2014); Chay et al. (2015); Liu, Wang and Peng (2015); Epler et al. (2017); Jasiulewicz-Kaczmarek and Saniuk (2018)).

High achievements in this area of Toyota have caused many companies to take an example and introduce their own system of quality improvement. Most of them are based on "Lean Production". This is exactly what happens at Bosch Company, which is analyzed in the following paper. The company has created a set of 14 principles and special criteria that it considered most important for its production system. Deploying them to all positions has become a superior goal for the entire organization.
This work presents the implementation of "14 Quality Principles for Value Streams". The deployment process is based on a single assembly area. 14 principles of quality is an important element of the functioning of this enterprise. On the basis of the experience gathered in other branches of the company, the effectiveness of the changes is very high. Significantly improve the quality of products and notice the decrease in complaints from customers in the long term.

One of the important steps to take to achieve this goal is a thorough analysis of the prevailing conditions and careful planning of the action (Anholon and Sano (2016)). Therefore, the first important step in the following work is to create an implementation plan. Then, based on a previously prepared evaluation sheet, a comparative analysis is made between the current state and the requirements contained in the 14 Company's Quality Principles. For such a complex project, an important element is also the creation of an appropriate team to make a fair assessment of the process. The whole course of the assessment with a corresponding comment to specific points is presented and described so that in the next step it is possible to draw appropriate conclusions and present them using the scoreboard. Following the evaluation, the changes to be made and the plan for their implementation is proposed. Then an example of process improvements is presented. All enhancements are based on the implementation of process-related principles. The final results are the impact of the improvements on the results of the assessment and the appropriate conclusions.

14 Quality Principles

"14 Quality Principles for the Value Stream" are the main rules in Robert Bosch company for the production system, implemented in every Bosch plant. It is very important to provide high-quality production in the automotive section. In this area of manufacturing, every single mistake or oversight could be dramatic in effect for the user (Świć and Gola (2013)). It is easy to imagine what can happen when breaks in our vehicles do not work properly. There is human life in consideration. That is why automotive companies should pay high attention to every detail which can cause any mistake.

Every rule in 14 Quality Principles is described very detailedly. It has to be clearly written and easy to understand for everyone. Most of the rules presented below have own equivalent in inside Bosch procedures. Some of them are already implemented but are not directly connected with 14 principles.

Principle 1: **Customer Complaints**. "Customer complaints are communicated within the production site and displayed at the station in question. Using problem-solving techniques, they are processed in a fast and systematic manner. The supply chain is promptly informed" (Fischer, Gemmer and Rach (2017)).

Principle 2: **Control limits applied**. "In the event of deviations in quality or if control limits are exceeded in the value stream (source, make, deliver), the employee needs to stop the process or escalate" (Fischer, Gemmer and Rach (2017)).

According to the instruction, three steps should be done after exceeding limit: Stop, Ask, Wait, when:
- 4 identical deviation are explored,
- 3 identical deviation are explored during 2 hours,
- 4 deviation for the same reference from one supplier are explored during 2 hours,
- 1 deviation is explored after one part go through all control point,
- 1 deviation is occurred caused by any problem.

Principle 3: **Instruction**. "Safety, health, production, and inspection instructions have complied with 5S standards are put in place and observed" (Fischer, Gemmer and Rach (2017)).

The instruction should be placed in space easy to access in latest document edition. The instruction should contain safety symbols and if appropriate, work instruction of manual works content right and left-hand movement description with illustrations. It concerns such instruction as TPM, health and safety, production and quality, 5S etc. The failure modes from the FMEA and special characteristics from the control plan are taken into account.

Principle 4: Process Parameters. "The target values/tolerances for all stated process parameters are observed" (Fischer, Gemmer and Rach (2017)).

Without any exception during the assembly activity of every single part, all parameters are controlled by detectors. Thanks for that it is easy to prevent dangerous situations. When the parameters are exceeded program stop the process.

Principle 5: Measuring & Test equipment. "Measuring and test equipment are defined, and monitoring intervals are observed" (Fischer, Gemmer and Rach (2017)).

Principle 6: Check the checker. "The check the checker principle is applied, and the checker's suitability is ensured" (Fischer, Gemmer and Rach (2017)).

"The suitability of processes used to prevent or detect errors (e.g. camera-monitored processes, sensor-based measurements, inspection processes) needs to be checked according to a predefined standard. Possible errors, such as loading the incorrect camera software/testing program or improper sensor calibration, need to be prevented by carrying out the inspection. These inspection processes, as well as maintenance and set-up processes, need to be evaluated using appropriate methods (e.g. FMEA)" (Fischer, Gemmer and Rach (2017)).

Principle 7: Total Productive Maintenance. "A maintenance standard is installed and observed at every station" (Fischer, Gemmer and Rach (2017)).

TPM instruction says about how to maintenance machines to prevent the unexpected damage and breaks and how to elongate machine lifetime. Document contain: who, what and how often should accomplish the defined activities. Instruction should be hang out in a place which is available for every worker of the workstation. Except for operator, TPM activities should be executed by Maintenance Department.

Principle 8: Tools. "Each tool has a defined service life; the current status must be recognizable. A quality evaluation must be carried out during removal or disassembly" (Fischer, Gemmer and Rach (2017)).

"The current service lives of all tools have been recorded. A warning system promptly displays when tools need to be serviced or replaced. Each tool needs to be inspected when removed or disassembled to check for damage/ wear and tear. In case of deviations, it is necessary to follow measures to ensure product quality is maintained. Restart is performed according to clearly defined rules (see Principle 9); the standard is regularly reviewed" (Fischer, Gemmer and Rach (2017)).

Principle 9: Regulated restart. "Restart after disruptions are clearly regulated for all machinery and equipment" (Fischer, Gemmer and Rach (2017)).

"Downtimes can alter process parameters, workflow sequences may change, and the consistency of material and supplies can change. All devices have been inspected according to a defined standard for quality risks in connection with disruptions (for example, an unplanned disruption to the welding process, the injection molding process stops unexpectedly, a product remains in thermal treatment for too long, the silicone bead is exposed to the air for too long). The standard also includes the analysis of critical wear parts (for example, drill bits or welding electrodes). Following longer disruptions

(e.g. station upgrade), it is necessary to newly release the process and carry out a process audit" (Fischer, Gemmer and Rach (2017)).

Principle 10: Labeling. "Products and containers are labeled according to the set standard" (Fischer, Gemmer and Rach (2017)).

Product must always have a clear status. All parts have the inimitable reference number. Additional identification is provided by colorful labeling system (white color – good part, yellow color – parts in testing, green color – tested, blue color – prototype, red color – scrap, white with red band – blocked). What are more "[…] red boxes must be secured against unintended access (e.g. by locking them, covering, spatial separation, covering during transport). Containers for rejects must be emptied in line with standards and the parts must be analyzed. Parts on the analysis station are spatially separated from the production flow and clearly identified. Only parts with the same status in the same container, no good parts in the red box. Products are protected against environmental influences (e.g. contamination) in line with regulations" (Fischer, Gemmer and Rach (2017)).

In the standard, the places intended for storage or direct delivery components to production, are labeled by the slate with the reference number and with photography of component. Visually presentation is more readable for workers. When the product has the wrong label or is placed in the incorrect box, the complaint should be submitted. All process is then analyzed and the risk of production danger is evaluated. Special reaction steps are implemented.

Principle 11: Rework / Scrap. "The handling of rejected parts and those to be reworked is clearly regulated" (Fischer, Gemmer and Rach (2017)).

All components are visually checked during the process. Thanks for that the negative one can be detected before causing any danger in the final product. Every defect which is noticed by the operator should be reported. If the problem is caused by nondependent reason from the production process, the preselection before delivery component on the production line is provided. During this selection, all defective parts are rejected and the scale of the problem is defined. Problem analysis help to assess on which level defects are created and prepare special activities to avoid this situation in future.

Principle 12: Dropped parts. "Any products that fall on the floor, into the machine or cannot be classified must be scrapped" (Fischer, Gemmer and Rach (2017)).

If during the process any part is dropped, regardless of its condition is scrapped in the special red container (the same as in the previous principle). Product after fell down can look untouched, but the internal structure and functionality might be broken. In that case, part qualifies as nonconformity and cannot be used in the process.

Principle 13: Correct Product. "Only the correct product may be provided for removal and assembly" (Fischer, Gemmer and Rach (2017)).

To producing the particular product, defined components are used. In some cases can happen that there is no visual differences between parts uses for various references. That is why during the changing process all delivering components must be controlled. Information about which component should be used in which references are placed in carts on the workstation.

Principle 14: Remaining Items. "The handling of remaining items/ quantities is clearly regulated" (Fischer, Gemmer and Rach (2017)).

The FIFO rule means that the parts with the oldest production date must be used first. It helps to avoid using wrong parts with exceed lifetime and maximum time of storage. The logistic department is responsible for changing components during the changeover and for delivering old components back to the supermarket.

Approach to Work Improvement and Tools Description

Continuous improvement of the organization is a prerequisite for its survival on market under conditions of increasing competition. The concept of improvement of work organization is understood as the implementation of improvement activities (organizational, technical, etc.), leading to the increased rationality of the functions carried out by the workplace, which should lead to increased economic. The issues related to the improvement of the functioning of the organization have been in the past and are currently the subject of numerous theoretical and practical considerations. The mainstream of interest in the improvement of economic organizations is focused on finding solutions to increase, broadly understood, economic effects of their functioning. The methods and tools for improving and evaluating processes of improvement are still of interest.

Nowadays, professionals seek to implement methods that will increase the efficiency of their work but will not be overly capital intensive. Often, efforts to streamline the workplace of production sites are complex and require appropriate analysis, involving production staff but above all a well-thought-out approach. In order to streamline the process with tangible benefits, it is necessary to analyze all the activities carried out in the implementation of the production process (Bartnicka (2016)).

The methodology is defined as a set of guidelines for how the procedure to be followed when performing a particular job or for achieving a specific goal (Marciniak (1989)). On the one hand, it deals with problems related to problem-solving, and on the other hand, describes their solution. The concept of methodology and its overall importance in carrying out various projects can be characterized as a way:

- a formal and detailed description of the activities carried out in the implementation process division into different stages and activities,
- covering all activities from the preparation stage to the phase exploitation of the implemented solution,
- planning activities on the basis of which implementation works are carried out,
- arranging and systematizing the implementation of the system,
- gathering principles that help guide the project (Trzaskalik (2005)).

The systematic problem-solving methodology is a multiple process that consists of activities:

- defining the purpose and modeling of the problem situation,
- analyzing running tasks,
- interpretation and interpretation of possible changes in the existing situation,
- determine the ability to target,
- planning strategies and resources,
- implementation of problem-solving in practice.

Improving work organization in an enterprise can be divided into three general phases, according to the life cycle of the project: preparation, design, implementation of change. The first phase focuses on creating the right climate for improving work. The venture must have strong support in management, otherwise, it will not produce the intended results. Activities in this phase involve the training of a working group and the provision of information to employees of production sites about their activities. Workers need to realize that their work and machine performance affect the position and competitiveness of the company they work in (Kosieradzka and Krupa (2009); Abolhassani, Layfield and Gopalakrishnan (2016)). Every employee should know what his role is throughout the system and how he or she can contribute to improving the business. The second and third phases, on the other hand, focus on designing activities and implementing methodologies for improving work organization by creating a team-based system and initiating profit-driven activities.

The application of the presented methodology allows, among others, to increase productivity, reduce product flow time, reduce waste, improve ergonomic conditions. In addition to measurable profits,

the benefits to the company include increased employee engagement, acquisition of new skills, and the release of creative potential. It includes the following steps:

- development of assumptions,
- gathering information about the workplace,
- analysis of collected data and defining major problems,
- defining corrective actions and their implementation,
- control of results and evaluation of results.

Other benefits of using the methodology include its versatility, ease of sharing knowledge, guaranteeing a thorough deepening of the problem without neglecting important aspects and maximizing effectiveness. Clarification of the organization of the work organization improves the dissemination of good practices for the whole organization and the use of elaborated solutions. The methodology is divided into following phases.

Phase I - Development of assumptions. Assumptions are information that needs to be taken into account when preparing work. They affect the direction of activities and define the expected end result. The assumptions should include elements such as:

- name and description of the area where work improvement activities will be carried out,
- objectives and expected benefits from planned improvements,
- justification of commencement of activities,
- restrictions,
- work schedule,
- defined resources.

Phase II – Data collection. The information that will be collected is intended to determine the initial situation area functioning. News must be objective and come from reliable sources. This may be in the form of descriptions, tables, diagrams, graphs, drawings. As an example can be procedures, requirements, instructions or dissemination of results and statements. It should take the time to observe, exchange information with and work within the area. The purpose of this stage is to draw conclusions about the work done, manufactured products, used machines, instructions, level of performance, etc. Knowledge of the position will help define the main problems. Occurring in the production process. In addition, this set of initial information will allow you to evaluate progress.

Phase III – Analyze the collected data and define the main problems. At this stage, data should be sort in the right order: the cause of the problem, the problem, and the effect of the problem. The analysis is based on a comparison of activities in the post with its optimized functioning. This applies to any behavior occurring in the area under investigation. It is possible to calculate what investments involve the implementation of improvements. It must be stated whether it is worth dealing with all the dysfunctions encountered, or whether only the most important ones, causing the longest downtime in production or generating the greatest losses.

Phase IV – Define corrective actions and implement them. The fourth stage is a time to reflect on the corrective measures to be taken to achieve the goals. Solution development will involve testing and simulation to select the most effective solution. There is a risk of encountering a large number of problems, technical difficulties, and employee resistance. It is important to cooperate with specialists and support the management. Once the corrective actions have been defined and their implementation is implemented, a comparison of the effects of the initial situation will be made..

The implementation of the solutions is aimed at reducing costs, improving quality, reducing the delivery time of products to the customer. Improvements should be designed so that they can be applied regularly and recognized as a new standard. Initially, pilot implementation can be carried out in only one separate area of the site and gradually expanded. Targeted personnel should be qualified and trained to use their working time effectively. Machinery and equipment are to be in good

condition, in adequate quantity to meet the needs. There should be no downtime or interruptions, unnecessary operations. Work methods are designed to guarantee safety and good organization.

Phase V - Control and evaluation of results. Once the corrective measures have been implemented to improve the job, a stabilization step is required. It means repetition of a defined working method, trained staff and achieving an optimal level of performance. Audits and the so-called. Manager's celebrations. Assuming that after the optimization has been carried out, monitoring of results will not be continued, then the level achieved will deteriorate. It is good practice to carry out a daily celebration by the manager to ensure continuity of production.

Audits are performed less frequently. During the audit, the use of working methods, quality procedures, functionality and efficiency of operations, productivity, the organization of work, order and cleanliness are verified. This ensures that the achieved performance level is maintained and shows where there are shortfalls that need improvement. The audit always ends with a feedback on the result. After the audit, actions are defined to return to a certain standard.

Rationality inaction leads to cost optimization, their reduction to a satisfactory level due to the economic performance of the organization and the level of quality of the products. The presented methodology for improving work organization at the production site allows for detailed analysis of problems and generating corrective actions, leading to systematize and create a structure of performing improvement actions to ensure the correct transformation of the enterprise. As a result, effective solutions are obtained and maximum efficiency is achieved. The risk of failing to meet the goals is reduced to a minimum (Bartnicka (2016)).

The concept of evaluation can be considered in various respects and meanings. In the most general sense, the judgment is a judgmental court, any statement expressing a positive or negative response to someone or something. Evaluations are psychologically and socially conditioned, they change historically according to changes in the systems of values they belong to. The objects of evaluation are called values in general, actions that determine them - evaluation or evaluation, and results - evaluations. Already the distinction between these concepts leads to the problem of expressing the difficult and complex - the objective existence of values and, consequently, the problem of objective assessment.

The use of multiple assessments in an enterprise depends on a number of factors, but the criteria for evaluating the idea and place of assessment in an enterprise are important. These criteria should be included:
- the purpose of the evaluation,
- the test methods used,
- the time to which the assessment relates,
- the detail of the study.

Depending on the destination, the rating can be divided into those for internal and external business purposes. Internal assessment is tailored to the decision-making needs of the management and other management levels in the enterprise. It allows you to assess economic events at different times, both ex-post and ex-ante, at different classification levels, using modern information processing techniques and research methods appropriate to this assessment. External evaluations are designed for the broadly understood corporate environment (shareholders, investors, shareholders, state institutions, banks). Taking into account the time to which the assessment is based, retrospective, current, and prospective evaluations can be distinguished. Prospective assessment includes the results of past actions.

Implementing Plan

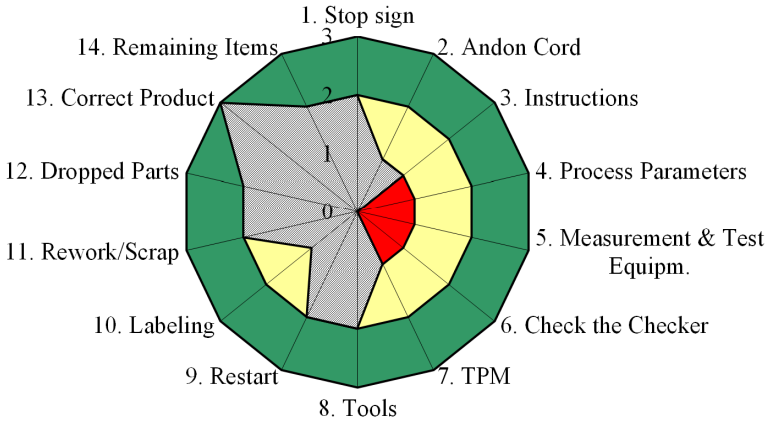
The automotive industry requires very good quality from its products. Great competition in the market and dangerous consequences do not allow the products to be weak. That is why every company in this sector strives to meet these requirements best. Production management tools that

ensure high quality should be familiar to everyone in such companies. That is why Bosch decided to gather all the most important of them and to create their own list of steps to improve their product. In such a way that for each employee the rules are clear and legible. So what is the purpose behind the implementation of 14 rules for production areas? The answer is simple, improving product quality and reducing mistakes. In that case, there is no doubt that these actions make sense.

Another thing is to understand the scope of implementation and the area where it is to be implemented. To properly implement the rules, you need to know the content carefully and then gather as much information as possible about the general requirements of the business and get to know the area where the rules are to be implemented.

As it knows, no project can be held without the right team. Therefore, one of the most important steps in preparing for the implementation of the 14 principles is the establishment of the right people. Once the team has been assembled, a very important part of the project can be addressed, which is the assessment of the area in terms of the presence of rules based on comparative analysis. This will allow to identify weaknesses of the process in relation to the requirements of the 14 principles and to create a plan for the implementation of each improvement. From that point on, it is only a step away from starting to implement the principles and observing the positive aspects of this action.

Thanks to the analysis it might be deducted, the points are the weakest and most need improvement. The graph below (Figure 1) show exactly what the evaluation results look like.



Legend red: $0 \leq$ rating < 1 yellow: $1 \leq$ rating < 2 green: $2 \leq$ rating ≤ 3

Fig. 1: Assessment results, based on the book by Fischer, Gemmer and Rach (2017)

To redefine expectations, it was necessary to re-examine the criteria and to determine how many of them could improve. After our analysis, it was found that not only critical results could be adjusted. As part of a continuous process of excellence and achieving the best results, even the good ones could show themselves better.

Results and conclusion

Manufacturing companies are facing a big challenge today. In addition to high-quality goods produced by the competition, they also have to meet the high requirements of customers. These factors, among other things, force companies to continually improve their processes and products. Most often, this is done with ready-made tools. For the entire Robert Bosch Corporation, the most important of these tools have been collected as "14 quality principles for the value stream".

The main goal of this work is to implement these principles into one of the areas in the Bosch production company. The area described here is one of the few that still does not meet the corporate

standards for implementing policies. To change this state of affairs, the following steps have been taken:
- creating a plan for the various activities that help to implement the rules properly, analyze the resources needed,
- familiarize with 14 quality principles, understand and analyze them, adapt existing procedures to content and criteria,
- familiarize with the functioning of the described area, the way of functioning and the management, the knowledge of employees and the work they do,
- team instituting on the basis of skills and qualifications,
- detailed analysis of the state of the current area within the scope of the introduced rules, comparative analysis of the current state with criteria included in the assessment list,
- draw conclusions from the assessment and propose improvements to the individual principles,
- creating an action plan, assigning responsibility to individuals, assessing time spent on tasks,
- brief discussion of the actions taken,
- presenting improved results through planned activities.

As a main indicator of evaluation is the assessment list, in which thanks for comparative analysis every principle were evaluated. The list is a pre-imposed evaluation tool that has its pros and cons. The advantage is that each area can be rated in the same way across the entire corporation. However, the negative side of the list is the fact that by its generality it is not well suited to the specifications of each area. This has led to the assessment of several issues that have been described and highlighted in the assessment. In the end, however, thanks to the evaluation, we managed to find weaknesses and plan actions to improve them. Many actions have been taken to raise the rating. Some of these were based on well-known methods in manufacturing environments such as TPM, Poka-Yoke and Andon Cord. On the other hand, others consisted of raising awareness of employees and bringing order in heavily unkempt aspects. The visual side of 14 principles and the adjustment of the area to these requirements have also played a large part.

In conclusion, in spite of encountering difficult situations, the ultimate goal of the job was achieved. The most part of „14 Quality Principles for the Value Stream" has been implemented in the assembly area. For rules that have not been implemented yet, there are already planned actions. This thesis can be an example for implementing rules in the following areas. The lessons learned after the whole process can be very informative for future activities. Among other things is to plan for a longer time to do the task or better prepare the staff to implement the change. However, the important conclusion is that some seemingly insignificant counterfeit activities can bring big benefits and will certainly save many people from hard work on catching up arrears.

References

Abolhassani, A., Layfield, K. and Gopalakrishnan, B. (2016) 'Lean and US manufacturing industry: popularity of practices and implementation barriers', *International Journal of Productivity and Performance Management*, 65(7), pp. 875–897. doi: 10.1108/IJPPM-10-2014-0157.

Anholon, R. and Sano, A. T. (2016) 'Analysis of critical processes in the implementation of lean manufacturing projects using project management guidelines', *The International Journal of Advanced Manufacturing Technology*, 84(9–12), pp. 2247–2256. doi: 10.1007/s00170-015-7865-9.

Bartnicka, C. (2016) 'Metodyka doskonalenia organizacji pracy na stanowiskach wytwórczych w przedsiębiorstwie produkcyjnym', in. *Konferencja Innowacje w Zarządzaniu i Inżynierii Produkcji*, Zakopane: Oficyna Wydawnicza Polskiego Towarzystwa Zarządzania Produkcją, pp. 356–546. Available at: http://ptzp.org.pl/files/konferencje/kzz/artyk_pdf_2016/T1/t1_0536.pdf (Accessed: 21 September 2017).

Bhamu, J. and Singh Sangwan, K. (2014) 'Lean Manufacturing: literature review and research issues', *International Journal of Operations & Production Management*, 34(7), pp. 876–940. doi: 10.1108/IJOPM-08-2012-0315.

Chay, T. *et al.* (2015) 'Towards lean transformation: the analysis of lean implementation frameworks', *Journal of Manufacturing Technology Management*, 26(7), pp. 1031–1052. doi: 10.1108/JMTM-10-2013-0143.

Dale, B. G. (2003) *Managing Quality*. Fourth Edition. New York City: John Wiley & Sons. Available at: https://books.google.com/books/about/Managing_Quality.html?hl=pl&id=06nSckwMjf8C (Accessed: 21 September 2017).

Epler, I. *et al.* (2017) 'Application of lean tools for improved effectiveness in maintenance of technical systems for special purposes', *Eksploatacja i Niezawodnosc – Maintenance and Reliability*, 19(4), pp. 615–623. doi: http://dx.doi.org/10.17531/ ein.2017.4.16.

Fischer, M., Gemmer, C. and Rach, E. (2017) *Value Stream Q-Basics. Best Practice Booklet.* Version 2.0. Stuttgart: Robert Bosch GmbH. Available at: http://purchasing.bosch.com/media/en/de/cp_documents/supplier_q_manual/q_basics/Q-Basics-Best-Practice_Bosch-Web.pdf (Accessed: 20 September 2017).

Gola, A. (2014) 'Economical Aspects of Manufacturing Systems Design', *Actual Problems of Economics*, (156(6)), pp. 205–212.

Jasiulewicz-Kaczmarek, M. (2014) 'Integrating Lean and Green Paradigms in Maintenance Management', *IFAC Proceedings Volumes*, 47(3), pp. 4471–4476. doi: 10.3182/20140824-6-ZA-1003.02213.

Jasiulewicz-Kaczmarek, M. and Saniuk, A. (2018) 'How to Make Maintenance Processes More Efficient Using Lean Tools?', in Goossens, R. H. M. (ed.) *Advances in Social & Occupational Ergonomics*. Cham: Springer International Publishing, pp. 9–20. doi: 10.1007/978-3-319-60828-0_2.

Kłosowski, G. and Gola, A. (2016) 'Risk-based estimation of manufacturing order costs with artificial intelligence', in. *Proceedings of the Federated Conference on Computer Science and Information Systems*, Szczecin, pp. 729–732. doi: 10.15439/2016F323.

Kosieradzka, A. and Krupa, A. (2009) 'Wdrażanie standaryzacji pracy w przedsiębiorstwach produkcyjnych', *Zarządzanie Przedsiębiorstwem / Polskie Towarzystwo Zarządzania Produkcją*, (nr 1), pp. 38–50.

Liker, J. K. and Maier, D. (2006) *The Toyota Way Fieldbook. A Practical Guide for Implementing Toyota's 4Ps*. New York: McGraw-Hill. Available at: https://books.google.com/books/about/The_Toyota_Way_Fieldbook.html?hl=pl&id=XZQHpV-8Uc8C (Accessed: 21 September 2017).

Liu, X., Wang, W. and Peng, R. (2015) 'An integrated production and delay-time based preventive maintenance planning model for a multi-product production system', *Eksploatacja i Niezawodnosc - Maintenance and Reliability*, 17(2), pp. 215–221. doi: 10.17531/ein.2015.2.7.

Marciniak, S. (1989) *Zespolona metoda oceny efektywności przedsięwzięć techniczno-organizacyjnych*. Warszawa: WPW.

Świć, A. and Gola, A. (2013) 'Economic analysis of casing parts production in a flexible manufacturing system', *Actual Problems of Economics*, (3), pp. 526–533.

Trzaskalik, T. (ed.) (2005) *Wybrane zagadnienia zarządzania projektami*. Katowice: AE (Informatyka w badaniach operacyjnych). Available at: https://www.ue.katowice.pl/jednostki/katedry/wiik/instytut-analizy-i-wspomagania-decyzji-zarzadczych/katedra-badan-operacyjnych/wydawnictwa-publikacje-katedry-i-pracownikow.html (Accessed: 21 September 2017).

Gestion RSE et Création De La Valeur Partagée

Cherqaoui Mohamed Jawad, Casablanca, Morocco, Cherqaouijawad@gmail.com

Boukhima Asmaa, Professor, Casablanca, Morocco, sntex@hotmail.fr

Abstract

Durant les dernières décennies, la responsabilité sociale des entreprises a fait part de plusieurs débats en lien avec le management des entreprises, le changement climatique, la pauvreté et le chômage, etc. Les entreprises sont considérées comme étant l'acteur pouvant apporter le plus de changement possible. Au lieu de les convaincre pour s'engager dans une démarche RSE, en parlant de performance financière, on doit s'interroger sur l'utilité de ce qu'elles font pour la société, c'est l'origine de l'idée de la Gestion RSE. Une idée qui renvoie à une organisation des efforts et actions des entreprises engagées en RSE. S'agissant de la mise en œuvre, on a besoin d'un organisme qui centralise ces efforts et actions pour les orienter, et donc pour répondre aux différents besoins et défis. Le concept de Gestion RSE ressemble à celui de la création de la valeur partagée, mais en fait il l'englobe. Peut-être que la vraie contribution au développement durable est celle qui concerne, tout d'abord, une limitation d'externalités négatives, et puis l'élaboration d'un projet, ou à en participer, en faveur de la société et l'environnement.

Keywords : Gestion RSE – valeur partagée – développement durable – RSE.

Introduction

Se soucier des problèmes environnementaux et sociaux nous emmène à parler de la conscience, rôle et engagement des Etats, et efforts des organisations non gouvernementales (ONG) par rapport au développement durable, mais aussi de l'engagement des entreprises qui sont souvent condamnées de l'état des choses, que ça soit au niveau social ou au niveau environnemental, et qui, en même temps, sont considérées comme étant l'acteur pouvant apporter le plus de changement possible. Donc, on s'aperçoit que la réflexion s'oriente vers le monde de l'économie.

Et c'est dans ce monde qu'on découvre la complexité des choses, une complexité que nous pouvons résumer en disant qu'il existe, en même temps et lieu, une recherche infinie de rentabilité et une dégradation continue de l'environnement et de la situation des sociétés.

Durant le 20ème siècle et début du 21ème, plusieurs événements ont marqué l'évolution de l'économie mondiale, notamment des crises qui ont provoqué le rejet d'une théorie ou pensée et l'adoption d'une autre. Le krach de 1929 montre les limites du modèle libérale, et on assiste durant les années trente à un passage vers le keynésianisme.

La méthode de relance économique proposée par Keynes, et qui s'est poursuivie aux Etats-Unis pendant la deuxième guerre mondiale, a permis à l'économie américaine et à celle de l'Europe de connaitre, après 1945, une période d'expansion, on parle des trente glorieuses.

Avec les idées apportées par Friedrich August Von Hayek et les chocs pétroliers de 1973 et de 1979, on découvre les insuffisances du keynésianisme et on passe au monétarisme tout en ouvrant la voie au néolibéralisme.

Avec un focus sur la rentabilité, favorisé par une liberté maximale pour les entreprises, il est fort probable que le néolibéralisme prend une part de tout débat se rapportant aux questions du changement

climatique et du bien-être à travers le monde. Il se définit comme un cadre institutionnel, politique et idéologique au sein duquel le capitalisme jouit de davantage de liberté de manœuvre[i].

De même, dans le cadre du capitalisme les entreprises sont perçues comme la cause majeure des problèmes sociaux, environnementaux et économiques. Il s'agit d'un constat établi par Michael .E. Porter et Mark R. Kramer, auteurs de l'article « Creating Shared Value[ii] » parue en 2011, un article sur lequel je vais me baser pour lancer l'idée de Gestion RSE en la comparant avec celle de la création de la valeur partagée. Il ne s'agit plus d'une critique, mais d'une simple comparaison ayant pour but de passer au crible des choses afin de donner une idée claire sur cette Gestion RSE.

Lorsqu'on parle de la RSE, du rôle des entreprises dans la contribution au développement durable, notre réflexion est souvent liée à la question suivante : qu'est-ce que ces entreprises vont gagner derrière cet engagement ? Et on essaie de répondre à cette question pour les convaincre de s'engager, mais peut être qu'en voyant les choses différemment qu'on va parvenir à mieux contribuer au développement durable, d'où l'intérêt de cet article. Le présent travail est subdivisé en deux parties, la première partie traite l'engagement RSE, tandis que la seconde concerne la création de la valeur partagée.

Engagement RSE et Gestion RSE

Débutant par une mise en évidence de la différence, en économie, entre croissance et développement. Ce dernier, indique un changement de structure de l'économie et de la société en général. On donne l'exemple d'un pays mono-exportateur qui, en produisant davantage de son seul bien exportable, ne devient pas, à cet effet, un pays développé (il croît, mais ne se développe pas)[iii].

Le développement fait allusion à des transformations qui concernent plusieurs volets, plus que l'économique, c'est à ce niveau qu'il se différencie de la croissance[iv]. On qualifie la croissance du quantitatif, alors que le développement est de nature qualitative et quantitative. A noter que le développement (qui produit des effets démographiques, sociaux-culturels et économiques) et la croissance sont interdépendants[v].

Si la croissance se différencie du développement, ce dernier à son tour se différencie du développement durable où on est dans une vision plus large, il s'agit de relever des défis dont la réflexion se place à l'échelle planétaire.

De plus, si la croissance n'entraine pas automatiquement la réduction des inégalités économiques et sociales, le développement ne permet pas de combler les inégalités mondiales et de garantir le progrès du bien-être. Partant de là, le développement durable se présente comme une solution quant aux limites du mode de croissance et de développement économique tout en prenant en compte ses différents effets sur le long terme.[vi]

Pour définir le développement durable on se réfère au rapport "Notre avenir à tous" de 1987 de la commission mondiale sur l'environnement et le développement, où on trouve qu'il s'agit d'un « développement qui répond aux besoins du présent sans compromettre la capacité des générations futures de répondre aux leurs. »[vii]

Lorsqu'on parle de l'application des entreprises du concept de développement durable, on parle de la responsabilité sociale des entreprises, il s'agit ici d'une réflexion correspondant à la troisième vague de conception de la RSE.

Selon Capron et Petit, on distingue entre trois vagues de conception de la RSE. Passant d'une conception « éthique » (1950-60) indiquant l'éthique personnelle du dirigeant d'entreprise, et dont le texte fondateur est celui de Bowen (1953), à une conception utilitariste (1960-70) où on abandonne l'exigence morale à l'égard de la société, et ce en faveur d'une exigence économique qui se traduit par le fait que le comportement social de l'entreprise doit servir sa performance économique. Puis à une conception de « soutenabilité » (années 90 et 2000) qui repose sur l'idée que l'entreprise doit prendre en considération

les préoccupations sociales et environnementales, elle ne peut donc être insensible aux pressions de la société civile et aux défis sociétaux de son temps.[viii]

En outre, le fait de s'interroger sur le lien entre engagement RSE et performance des entreprises, notamment financière, a fait couler beaucoup d'encre. Certainement il vient à l'esprit qu'il existe un impact positif d'un tel engagement sur la performance financière d'une entreprise, mais nous ne pouvons pas dire, d'une manière définitive, qu'il y a déjà un lien de causalité. Tout dépend des échantillons, du contexte, de l'horizon temporel de l'analyse réalisé.

On peut trouver une explication de cela si on se réfère à la synthèse de littérature sur la responsabilité sociale et performance financière des entreprises, élaboré par José Allouche et Patrice Laroche (2005). Le lien entre la responsabilité sociale des entreprises et leur performance renvoie à celui entre la performance sociale et la performance financière. Et c'est à ce point que la première difficulté apparaît, celle de l'évaluation de la performance sociale. Ajoutant à cela une pluralité de modèles théoriques (lien positif, lien négatif, synergie positive ou négative, absence de lien, un lien plus complexe). Ainsi, au niveau empirique, la contradiction caractérise les résultats des études réalisés, chose qui ne permet pas de prouver l'existence d'un tel lien.[ix]

De ce fait, il semble intéressant de voir les choses d'un angle différent, et ce en projetant la lumière sur les effets des actions RSE, des entreprises déjà engagées, sur la société et l'environnement. L'utilité de ces actions peut être considérée comme l'un des facteurs qui influence les résultats des études axées sur la relation entre un tel engagement et la performance.

Les entreprises se trompent quant aux leurs choix d'actions et d'efforts à mener vis-à-vis de la société et l'environnement en croyant que n'importe quel choix peut leur garantir un statut RSE, et n'importe quel choix peut suffire à leur assurer une certaine légitimité dans leurs rapports avec les parties prenantes.

Lorsqu'on ignore ce dont la société et l'environnement ont vraiment besoin, on ne peut pas s'attendre qu'il y aura un impact sur la performance, surtout positif. En terme de l'amélioration de la réputation, dont les conséquences concernent à la fois les clients et les salariés, l'utilité des actions RSE s'avère cruciale.

Si les actions/projets RSE, munis par une entreprise, sont inutiles ou n'ont pas une grande importance, notamment dans la région ou ville où cette entreprise exerce son activité, quel que soit leur nombre, ses actions vont échouer à gagner une bonne perception auprès des clients, donc on perd une opportunité à assurer la fidélisation qui, en diminuant les coûts d'acquisition de nouveaux clients, permet une efficacité commerciale à l'entreprise[x].

Et elles vont échouer à gagner une bonne perception auprès du personnel, et dans ce cas on perd aussi une opportunité, celle de gagner davantage de confiance des salariés envers l'organisation, à laquelle ils fournissent leur force de travail, il s'agit d'une manière d'augmenter la productivité. Ad hoc on propose la Gestion RSE.

La Gestion RSE signifie la gestion des actions, efforts ou/et projets des entreprises engagées. Cette gestion permet de répondre de la façon la plus appropriée aux besoins de la société et de l'environnement. Il s'agit en premier lieu de connaitre les différents besoins à satisfaire et problèmes à résoudre, puis de les mettre en ordre de priorité, ensuite de passer à l'action.

Si chaque entreprise suit ces étapes, que nous pouvons qualifier de travail individuel, ça sera une démarche convenable juste pour les entreprises qui ont les moyens permettant de faire ce type d'enquête dans les régions ou villes où elles opèrent. Donc, les petites et moyennes entreprises ne seront plus concernées par cette démarche et ne pourront plus en bénéficier.

Dans une situation pareille, on risque de faire un détour au point de départ où la RSE est considérée, dans le monde des affaires, comme un ensemble de coûts supplémentaires, et où la pérennité et la prospérité des entreprises sont liées à la recherche continue de la rentabilité.

De ce fait, on voie bien que la Gestion RSE est un travail de nature collectif et non pas individuel. La Gestion RSE indique l'existence d'un organisme ayant comme rôle l'organisation et l'orientation des efforts des entreprises engagées en RSE afin d'assurer la plus grande utilité possible.

Cet organisme doit élaborer, en collaboration avec les pouvoirs publics, un travail exploratoire afin d'identifier les différents problèmes et besoins. Puis, la mise en ordre par priorité des besoins et problèmes identifiés. Ensuite, la mise à disposition, des entreprises adhérentes à cet organisme, d'informations sur la prospection menée pour que chacune d'elles puisse décider de quelle manière elle va contribuer, soit en offrant des fonds soit en assurant la réalisation du projet ou d'une partie du projet, si ce dernier correspond à son activité. Ainsi, cet organisme doit veiller à l'accomplissement des projets dont la contribution des adhérents n'est que sous forme de fonds.

De plus, pour que cette contribution soit reconnue, l'organisme de Gestion RSE se charge de la publication périodique, mensuelle ou trimestrielle, des données sur le projet réalisé ainsi que sur les participants et leurs apports.

Le rôle joué par ledit organisme facilitera la tâche aux entreprises, l'adhésion de celles qui sont déjà engagées en RSE va certainement encourager d'autres pour adhérer et donc de s'engager. Il est à noter que la Gestion RSE ne concerne que les parties prenantes externes, tandis qu'en interne de l'entreprise le déroulement des choses diffère d'une unité à une autre.

En outre, l'adhésion d'une entreprise implique qu'elle apporte différentes données, notamment celles d'ordre financier, le but est de comparer sa situation avant et après l'engagement (on parle ici des entreprises qui ne sont pas engagées en RSE et qui veulent en devenir à travers ledit organisme).

La diversité des entreprises adhérées au niveau de la taille et du secteur, et qui comprend des entreprises offrant des produits ou des services ou bien les deux, industrielles ou commerciales, exportatrices ou non, connaissant une croissance ou une difficulté, ayant un investissement en cours ou non… va enrichir l'analyse autour de l'impact de la RSE avec une base de données qui s'élargie en continuité, et grâce à laquelle nous pouvons constituer, au fil du temps, les différentes échantillons qui peuvent exister.

En associant à cette abondance d'échantillons, l'utilisation de toutes les mesures qui existent en terme performance sociale et financière, on va parvenir à des résultats plus significatifs et plus pertinents à l'égard du lien entre engagement RSE et performance des entreprises.

Tout cela nous indique que la Gestion RSE garantit un équilibre entre la société, l'environnement et l'économie. Elle répond aux attentes de la société, qui comprennent celles de l'environnement, et aux attentes des entreprises, il s'agit principalement de gagner une certaine légitimité, d'améliorer la réputation et de motiver le personnel, donc une augmentation de la productivité.

Et en parlant de la réputation, la Gestion RSE va être d'une grande aide aux entreprises en ce qui concerne, d'abord la notoriété de la marque, puis l'image de marque. Il est à signaler que les avantages peuvent s'étendre pour concerner même les futurs clients et futurs salariés, notamment dans le cadre la marque de l'employeur « Employer Branding » et/ou de l'attractivité de l'employeur « Employer Attractiveness ». Concernant ce dernier point, on note comme exemple les travaux d'Aiman-Smith, Bauer & Cable (2001)[xi] et de Turban & Greening (1997)[xii].

Une meilleure réactivité est l'importante caractéristique de la Gestion RSE. Avec la démarche déjà soulevée on répond aux besoins de la société et de l'environnement d'une manière efficiente, surtout en terme de temps, et efficace, et de ce fait on se trouve dans une optique de performance de la RSE, des actions RSE, plutôt que juste se soucier de l'existence d'un lien entre un tel engagement et la performance des entreprises.

Gestion RSE et valeur partagée

L'idée de la valeur partagée existe déjà avec celle de l'entreprise sociale qui est une initiative entrepreneuriale dont la finalité sociale ou environnementale est supérieure ou égale à la finalité économique. L'argent généré par l'entreprise sociale, nécessaire pour la pérennisation et le développement, est totalement réinvestie dans l'entreprise. Autrement dit, les revenus générés sont générés pour défendre la finalité sociale ou environnementale.

La finalité économique, dans une entreprise sociale, n'est pas une fin en soi, mais un moyen au service de la finalité sociétale et environnementale, c'est ce qui différencie ce type d'entreprise des entreprises privées qui ont une politique de responsabilité sociale de l'entreprise. Ces entreprises ont bien évidement des actions au bénéfice de la société, mais elles optent pour ces actions une fois que l'actionnaire a été rémunéré, une fois que la finalité économique a été remplie, et aussi si elles ont le temps, l'envi et la possibilité.

L'idée de la valeur partagée de Porter concerne les autres entreprises, celles qui, selon lui, ont resté piégées dans une approche caduque de la création de valeur, elles continuent de voir la création de valeur de manière étroite, et ce afin de les réorienter vers, toujours selon Porter, un nouveau capitalisme : « *The concept of shared value can be defined as policies and operating practices that enhance the competitiveness of a company while simultaneously advancing the economic and social conditions in the communities in which it operates. Shared value creation focuses on identifying and expanding the connections between societal and economic progress.* »

S'agissant de la comparaison entre la Gestion RSE et la création de la valeur partagée. Le point commun entre les deux est que les entreprises doivent prendre l'initiative de rapprocher le Business et la société. Mais la manière de le faire diffère un peu.

Lorsqu'on parle de la Shared Value on parle de la création de valeur économique tout en créant une valeur pour la société en réponse à ses besoins et défis. Les entreprises doivent reconnecter leur succès avec le progrès social, autrement dit, elles doivent lier leur engagement, responsabilité et bienfaisance à leur activité afin de créer une valeur partagée, économique et sociale. Ce n'est plus en marge de l'activité principale, mais au centre, elle touche même la stratégie de l'entreprise.

Quant à la Gestion RSE, on est dans une vision d'organisation des choses. On organise les efforts des entreprises en matière d'RSE afin de répondre, avec performance, aux besoins et problèmes à la fois de la société et de l'environnement. Il s'agit d'un travail réalisé à l'aide d'un organisme qui gère ces efforts et projets. Cette gestion facilite l'engagement RSE pour les entreprises, à travers une simple contribution par ressources financières, et à travers l'autre type de contribution qui donne une chance à toutes les entreprises, surtout aux PME, de bénéficier de la valeur partagée. Alors, la Gestion RSE englobe la Shared Value.

Si la RSE est une activité périphérique et la création de la valeur partagée est au centre de l'activité principale de l'entreprise, donc cette valeur partagée n'est qu'un degré supérieur de la RSE. En suivant le même raisonnement la Gestion RSE est aussi un degré supérieur de la RSE, plus que celui de la valeur partagée.

En effet, la diversité des projets et efforts à réaliser, au cours des mois et des années, en faveur de la société et de l'environnement, fait que chaque entreprise, parfois, est dans la création de la valeur partagée, et parfois elle est dans un simple engagement RSE.

Selon Porter et Kramer « Businesses acting as businesses, not as charitable donors, are the most powerful force for addressing the pressing issues we face », ajoutant à cette citation ce que signifie la valeur partagée en tant création à la fois de valeur économique et sociale, de ce fait la création de ce type de valeur, dont Porter et Kramer parlent, semble être un investissement. Plutôt que de limiter ou dépasser le motif de la maximisation du profit, c'est précisément ce motif qui conduit le business model de la valeur partagée[xiii].

L'idée de la création de la valeur partagée fait signe que toute entreprise cherchant à créer cette valeur va ignorer les besoins, problèmes et défis de la société ne permettant pas de créer une valeur économique pour elle.

On est dans une vision opportuniste des choses, ce qui peut servir comme principale reproche de l'apport des deux auteurs. Au second rang, on a les exemples cités dans leur article, la plupart de ces exemples sont de grandes entreprises, certaines parmi elles ont atteints le niveau de globalisation, qui ont les moyens nécessaires pour créer cette valeur partagée soit en développant des clusters locaux, reconcevoir les produits et les marchés ou redéfinir la productivité dans la chaine de valeur.

Ainsi, on risque d'avoir un impact faible en terme de réputation, puisqu'on peut qualifier tout projet, effort ou action réalisé dans le cadre de la création de la valeur partagée comme étant un investissement, donc une exploitation plus qu'une contribution. La Gestion RSE, par diversité des projets, permet de faire de la philanthropie ou bienfaisance, ainsi que la création de la valeur partagée, et ce avec une grande utilité pour la société et l'environnement, donc un impact élevé en terme de réputation.

Notons que la création de la valeur partagée est plus importante dans le cadre de la Gestion RSE, parce que cette création correspond à ce que la société et l'environnement ont vraiment besoin. En effet, la valeur partagée est beaucoup plus forte dans le cas où elle répond aux besoins et défis de première priorité, et est réalisable avec moins de coûts possibles.

A la fin de leur article, Porter et Kramer annoncent que nous ne pouvons pas résoudre tous les problèmes sociétaux à travers la valeur partagée, une faiblesse face à laquelle la Gestion RSE se présente comme la solution la plus convenable.

Conclusion

D'après Porter et Kramer, les personnes dans le secteur public et privé ont souvent suivi des parcours pédagogiques et professionnels très différents. Par conséquent, peu de managers ont une compréhension, des problèmes sociaux et environnementaux, nécessaire pour aller au-delà des approches actuelles en matière de RSE. Ainsi, la plupart des écoles de commerce enseignent encore la vision étroite du capitalisme, leurs programmes d'études doivent s'élargir dans un certain nombre de domaines. En attendant un tel changement, donnons une chance à la Gestion RSE, avec laquelle on n'est plus dans une logique d'impact de l'engagement RSE sur la performance de l'entreprise, mais dans une logique d'impact de l'engagement RSE sur la société et l'environnement.

[i] Amin, S., Arrighi, G., Chesnais, F., Harvey, D., Itoh, M. and Katz, C. (2006), 'Qu'est-ce que le néolibéralisme?,' *Actuel Marx*, 2(40), 12-23.

[ii] Porter, ME. and Kramer, MR. (2011), 'Creating Shared Value. How to Reinvent capitalism – And unleasch a wave of innovation and Growth, ' *Harvard Business Review*, vol. 89.

[iii] Raffinot, M. (2015) Economie du développement : Cours, Dunod, Paris.

[iv] Beitone, A., Cazorla, A., Dollo, C. and Drai, AM. (2013) Dictionnaire de science économique Ed. 4, Armand Colin, Paris.

[v] Balland, S., Bocquillon, JF., Bouvier, AM., Mariage, M. and Testenoire, JP. (2011) Economie-Droit en fiches, Dunod, Paris.

[vi] Balland, S., Bocquillon, JF., Bouvier, AM., Mariage, M. and Testenoire, JP. (2011) Economie-Droit en fiches, Dunod, Paris.

[vii] Libaert, T. and Guérin, AJ. (2008) Le développement durable, Dunod, Paris.

[viii] Capron, M. and Petit, P. (2011), 'Responsabilité sociale des entreprises et diversité des capitalismes,' *Revue de la régulation,* n° 9.

[ix] Allouche, J. and Laroche, P. (2005), 'Responsabilité sociale et performance financière des entreprises : une synthèse de la littérature' Colloque "Responsabilité sociale des entreprises : réalité, mythe ou mystification ? ", Mar 2005, Nancy, France.

[x] Duprat, F., Hermel, L. and Louyat, G. (2009) Manager sa Marque, AFNOR.

[xi] Lynda Aiman-Smith, T. N. D. M., 2001. Are You Attracted? Do you Intend to Pursue? A Recruiting Policy-Capturing Study. *Journal of Business and Psychology,* 16(2), pp. 219-237.

[xii] Daniel B. Turban, D. W. G., 1997. Corporate Social Performance and Organizational Attractiveness to Prospective Employees. *The Academy of Management Journal,* 40(3), pp. 658-672.

[xiii] Hartman, LP. and Werhane, PH. (2013), 'Proposition: Shared Value as an Incomplete Mental Model,' *Business Ethics Journal Review*, 1(6), 36–43.

References

Allouche, J. and Laroche, P. (2005), 'Responsabilité sociale et performance financière des entreprises : une synthèse de la littérature' Colloque "Responsabilité sociale des entreprises : réalité, mythe ou mystification ? ", Mar 2005, Nancy, France.

Amin, S., Arrighi, G., Chesnais, F., Harvey, D., Itoh, M. and Katz, C. (2006), 'Qu'est-ce que le néolibéralisme?,' *Actuel Marx*, 2(40), 12-23.

Balland, S., Bocquillon, JF., Bouvier, AM., Mariage, M. and Testenoire, JP. (2011) Economie-Droit en fiches, Dunod, Paris.

Beitone, A., Cazorla, A., Dollo, C. and Drai, AM. (2013) Dictionnaire de science économique Ed. 4, Armand Colin, Paris.

Capron, M. and Petit, P. (2011), 'Responsabilité sociale des entreprises et diversité des capitalismes,' *Revue de la régulation,* n° 9.

Daniel B. Turban, D. W. G., 1997. Corporate Social Performance and Organizational Attractiveness to Prospective Employees. *The Academy of Management Journal,* 40(3), pp. 658-672.

Duprat, F., Hermel, L. and Louyat, G. (2009) Manager sa Marque, AFNOR.

Hartman, LP. and Werhane, PH. (2013), 'Proposition: Shared Value as an Incomplete Mental Model,' *Business Ethics Journal Review*, 1(6), 36–43.

Libaert, T. and Guérin, AJ. (2008) Le développement durable, Dunod, Paris.

Lynda Aiman-Smith, T. N. D. M., 2001. Are You Attracted? Do you Intend to Pursue? A Recruiting Policy-Capturing Study. *Journal of Business and Psychology,* 16(2), pp. 219-237.

Porter, ME. and Kramer, MR. (2011), 'Creating Shared Value. How to Reinvent capitalism – And unleasch a wave of innovation and Growth, ' *Harvard Business Review*, vol. 89.

Raffinot, M. (2015) Economie du développement : Cours, Dunod, Paris.

Management of Sustainable Development in Small and Medium-Sized Companies: Driver and Network Approach

Valery M. Anshin, Professor, Department of Business and Management, National Research University Higher School of Economics, Moscow, Russian Federation, email: val_an@mail.ru

Ekaterina Skripka, MSc student, Department of Business and Management, National Research University Higher School of Economics, Moscow, Russian Federation, email: ekskripka@mail.ru

Abstract

The article aims to highlight the network approach to sustainable development and its application to small and medium enterprises (SMEs). The network approach is illustrated with a case study of a medium-sized production company. Authors also focus on the SMEs characteristics and possible ways on how to implement sustainable development principles in SMEs strategic and operating activities.

Keywords: Sustainability driver based model, sustainable driver's network, sustainable development in SMEs

Introduction

Sustainable development (SD) concept firstly mentioned in 1987 in the World Commission on Environment and Development report was identified as a way of development allowing not only current but also future generations to "meet their own needs". Taking into account sustainability principles, management of organizations all over the world stepped into a new era of sustainable growth and development. In order to provide SD, organizations implement and follow social responsibility, eco-friendliness principles, as well as reorganize its operations. Today SD principles are widespread and well-known, yet very often sustainability is associated with big enterprises, transnational corporations rather than SMEs (Bos-Brouwers, 2010; Koe et al, 2015).

Sustainable Development Concept

There are three components of sustainable development: ecological, social and economic (Anshin, 2013; Günerergin et al, 2012). *Ecological sustainability* reflects an idea of saving the planet for future generations. *Social sustainability* implies the harmonization of business and society interests that, in turn, fosters long-term prosperity of the business and transfers this business to future generations. *Economic sustainability* reflects favorable economic conditions in the market, e.g. availability of resources, including financial resources that provides a steady increase in value of business; under economic sustainability we may also imply companies with well-developed competitive advantages, low operating costs etc.

Changes and improvements in each of these aspects are forced by specific drivers. A driver of sustainable development is a factor whose change leads to a change (improvement or deterioration) in the company's sustainability.

There are two sets of drivers representing sustainable development: general drivers and individual drivers. General drivers are labor relations, relations with the society, working conditions, terms of remuneration, the quality of products and services, customer loyalty, financing opportunities etc. Individual drivers are more associated with environmental sustainability, which is determined by technological specifics, company scale, territory, etc.

Drivers of sustainable development are interrelated. For instance, favorable working conditions result in employee turnover decrease, which, in turn, increases the level of satisfaction among employees. Satisfied workers produce work of a higher quality. Further, higher product quality leads to revenue growth, increased profits, and this, in turn, creates financial opportunities to improve working

conditions and environmental protection. Many companies use a driver based model to achieve strategic goals (Heskett et al, 1997; Heintman & Marson, 2005). Authors propose to transform this model into a sustainability driver based model (SDBM).

When implementing SDBM the following steps are required:

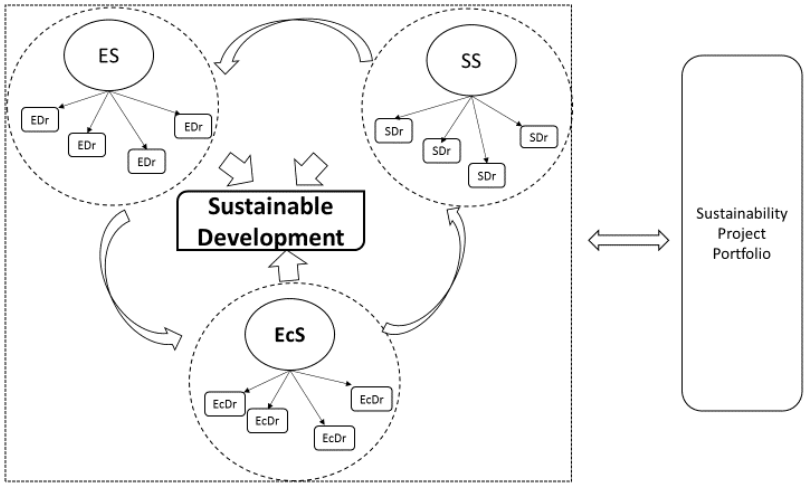
- Determination of main sustainability drivers;

- Determination of correlation between drivers via network analysis;

- Driver prioritization;

- Selection of the most important drivers and creation of a portfolio of sustainable development projects.

Proposition 1: management of successful sustainable development as an ongoing process that may be achieved through environmental, social and economic sustainability adherence, allocation of drivers, their correlation determination, and, finally, the formation of a portfolio of sustainable development projects.



Source: compiled by the author based on data available at open sources

Fig. 1. Management of Sustainable Development

ES – economic sustainability
ECS – ecological sustainability
SS – social sustainability
EDr – economic sustainability drivers
SDr – social sustainability drivers
EcDr – ecological sustainability drivers

Network approach in managing sustainable development

As it was mentioned above, drivers of sustainable development are interrelated; several drivers compose a *sustainable driver's network* (*SDN)*. Driver relations can be analyzed and visualized via special tools related to the theory of networks (Newman, 2010).

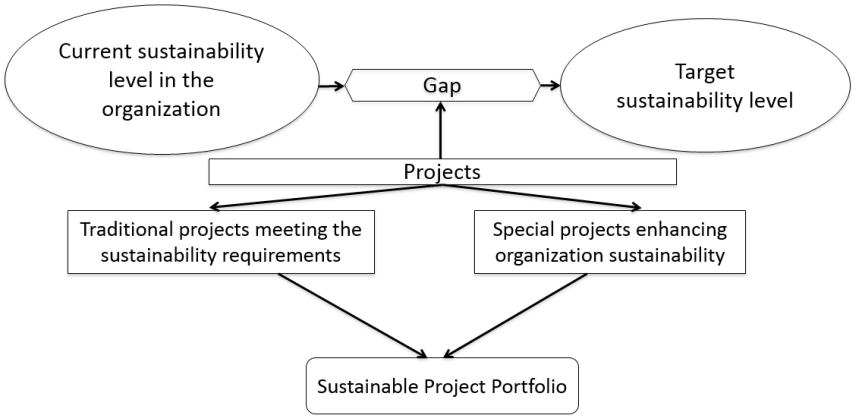
Sustainable driver's network (SDN) can be built through the following steps:

- Creation of structure design matrix (driver correlation matrix);
- Development of a graphical representation of a network;
- Drivers' validity/ significance determination;
- Drivers' prioritization based on its validity.

Structure design matrix is the first step of the network analysis (Fang et al, 2012). The matrix represents a square with drivers located in lines and columns. Matrix cells totaling "1" are located in the intersections of the interdependent drivers and called matrix nodes. The matrix is filled on the basis of expert evaluations. Thus, the matrix represents a network illustrating the interconnections of drivers. Network analysis allows identifying the most significant drivers of sustainable development. There are several tools of network analysis (Newman, 2010). In this article, the authors use the tool called a "degree of a node". A node degree is equal to the number of connections between a certain driver and the others. There are two main types of interconnections: "incoming degrees" showing influence other nodes have on a certain node and, vice versa, "outflowing degrees" demonstrating how this node influences other nodes.

Sustainable Project Portfolio

After driver correlation analysis, driver significance determination and driver prioritization, a portfolio of programs and projects is formed (Anshin, 2013). In this portfolio, the following two sub-portfolios can be identified: sub-portfolio of "traditional" projects, which aim is primarily to improve operating activities with a respect to sustainability principles and sub-portfolio of special projects, which are developed specially to foster sustainability in the organization. A project, in terms of which a new product should be developed in accordance with ecological requirements, is an example of a project of a traditional sub-portfolio. At the same time, the project of waste treatment facilities development relates to the second sub-portfolio. To enhance sustainability, it is crucial to execute projects of both sub-portfolios; however, these projects should be evaluated differently, with a respect to their special characteristics.



Source: compiled by the author based on data available at open sources

Fig. 2. Sustainable Project Portfolio Forming

Proposition 2: Sustainability may be achieved through management of portfolio containing both traditional projects meeting the sustainability requirements and special projects supporting and enhancing current organization' sustainability.

Sustainable development in small and medium-sized enterprises (SMEs)

SMEs are truly important part of the economy. Thus, in the countries with well developed economy such as EU and Norway, SMEs build up to 90% of GDP (Bell, 2015; Airaksinen et all, 2015). SMEs

provide workplaces, satisfy various needs of the population due to its flexibility, adaptability and better understanding of particular consumerist' needs. Returning to the research question, does SD exist in SMEs and in which forms? Indeed, sustainable development cannot exist in SMEs in the same from as it exists and prospers in large enterprises. The research conducted by the authors shows that small and medium-sized businesses have the following internal and external characteristics that influence management of sustainable development:

- Limited financial resources allocated to sustainable development;
- Limited opportunities to attract external financial resources;
- Insufficient managerial experience of business owners and top managers (not always, but quite often);

- In a number of cases, a low management culture, ignorance of the best practices for managing sustainable development;

- Intention to use the simplest and cheapest technological solutions not paying attention to working conditions and environmental impact;

- Low opportunities for fair pay and social guarantees;

- In some cases, violation of laws on pay and working conditions;

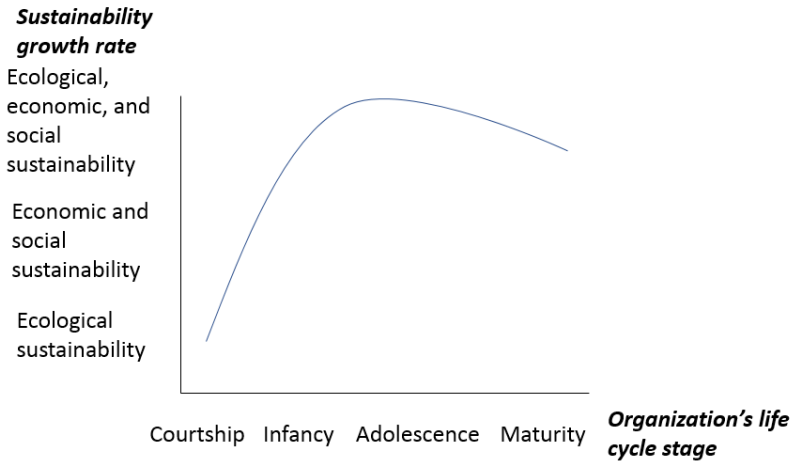
- SMEs are dependent on individual specialists, whose termination of employment may cause serious problems;

- The level of sustainability in SMEs depends on organization life cycle stage significantly.

According to Lazarus & Feldbaum (2011), business activity based on sustainable development principles will increase an attractiveness of SMEs for investors supporting Equator principles ("…the Equator principles is a risk management framework, adopted by financial institutions, for determining, assessing and managing environmental and social risk in projects…", The Equator Principles Association (2011)).

For SMEs, operating and strategic activities based on sustainability principles allow to solve the number of crucial problems. It is important to mention that sustainability priorities and efforts have to be related to organization's life cycle stage goals and objectives. For instance, in the early stages of the company's life cycle it is important to promote its own brand, attract more and more consumers producing eco-friendly products. Further, as we move to the next life cycle stage, economic stability becomes the priority; at the same time, during this stage it is important to improve working atmosphere, establish connections with local authorities. As the company achieves maturity, management of this organization has an opportunity to develop all aspects of sustainable development (fig. 3). Along with the mentioned transitions and sustainability principles development based on the company characteristics, there are also other means how sustainability may be integrated to business activities.

Taking into consideration the information given above, together with organization's life cycle there is business sustainability life cycle (BSLC). Each BSLC phase has to be managed using corresponding tools.



Source: compiled by the authors based on data available at open sources

Fig. 3. Business sustainability life cycle (BSLC)

Proposition 3: In small and medium-sized businesses, the structure, elements of sustainable development and the intensity of their application strongly depend on the stage of the company's life cycle and business sustainability life cycle.

Case study: Sustainable Development Network (SDN) for medium-sized FMCG company

An exemplified FMCG enterprise produces meat products and sells them through the distribution network. This company has a meat processing plant and a hog enterprise. The organization uses its own raw materials and buys some on the side. According to expert evaluations, the company enters the stage of maturity in its life cycle.

The company starts working on sustainable development and identifies key SD drivers (table 1).

Table 1: Key sustainability drivers in the exemplified company

Ecological drivers	Social drivers	Economic drivers
• Land, water, and air pollution reduction (A1) • Reduction of the degree of environmental pollution with meat processing waste (A2)	• Staff turnover decrease (A3) • Fair compensation (A4) • Favorable working conditions (A5) • Non-monetary motivation (A6) • High quality of work (A7)	• High product quality (A8) • Customer satisfaction and loyalty increase (A9) • Revenue (A10) • EBITDA (A11) • Internal financial resources (A12) • External financial resources (A13) • Assets (A14) • Value of the company (A15)

Source: compiled by the author based on data available at open sources

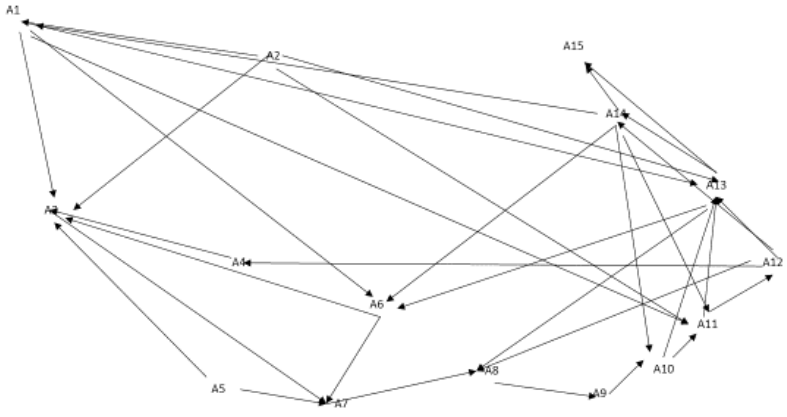
Driver relations are represented in table 2. Each driver has both "incoming" and "outflowing" degrees. Incoming degree characterizes the impact of other drivers on a particular one; outflowing degree illustrates how a certain driver influences others. From the table 2 it can be seen that driver A13 (external financial resources) has the largest incoming degree. This driver belongs to the group of economic stability; A13 it is influenced by other economic stability drivers and ecological drivers as well. At the same time, A13 influences other drivers, and it has the outflowing degree that is equals "3". In the second place, according to the incoming influence, there are drivers of social sustainability - employee turnover, further quality of work and EBITDA (economic stability driver).

Table 2: Driver correlation matrix

	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	Outflowing degree of a node
A1			1			1					1		1			4
A2			1								1		1			3
A3							1									1
A4			1				1									2
A5			1				1									2
A6			1				1									2
A7								1								1
A8									1							1
A9										1						1
A10											1		1			2
A11												1	1	1		3
A12				1				1					1	1		2
A13						1		1						1		3
A14	1					1				1	1		1		1	6
A15													1			1
Incoming degree of a node	1	0	5	1	0	3	4	3	1	2	4	1	7	3	1	

Source: compiled by the author based on data available at open sources

Based on outflowing influence, driver A14 (assets) takes the first place, and its position is absolutely justified: in order to activate other drivers it is obligatory to accumulate adequate capital expenditures and current assets. Driver A1 (land, water, and air pollution reduction) has a comparatively high outflowing degree, since this driver contributes to ecological sustainability increase and closely connected with social and economic sustainability drivers. Driver relations are illustrated in fig. 4.



Source: compiled by the author based on data available at open sources

Fig. 4. Driver interrelations in the exemplified company

Based on the characteristics described above, the portfolio containing the following sustainable projects may be developed:

1. Acquisition of biogas unit in the pig farm;
2. Acquisition of equipment for preliminary waste processing and outsourcing of the prepared wastes to specialized companies;
3. Implementation of key performance indicators (KPI) aimed at the growth of EBITDA;
4. Non-monetary motivation campaign launch.

Recommendations

Up to this point, network approach was exemplified by the certain company, yet there is a need in a broader understanding of application SDN in small and medium-sized enterprises. Ecological, economic, and social sustainability in SMEs may be achieved through the following means:

1. Development of a unique competitive advantage (it will provide conditions for economic sustainability);
2. Co-operation of SMEs and emergence of Self-regulated organizations (SRO) (such measures will also contribute to economic and social stability);
3. Project Management (a mechanism that covers all three aspects of sustainability: ecological, economic, and social).

It is important to remember that there is a tough competitions between SMEs existing in the market economy. Medium, small and especially micro enterprises are frequently forced to survive, to avoid bankruptcy, to attract consumers by any means and here, unfortunately, sustainability principles implying social responsibility, future generations care, and eco-friendliness will be always enormously violated.

The first recommendation is to develop a unique competitive advantage. Under this recommendation organizations are advised to develop and encourage information exchange, innovation, creativity, and intellectual capital (Todericiu & Stanit, 2015). Besides, niche strategies allow organizations to acquire a strong competitive advantage (unique products/services/techniques rather than cheap prices, good location, and other unstable advantages) that will, in turn, allow management to spent more time thinking over SD postulates and even implement them in days operations. It will provide organizations with confidence in the future.

The second recommendation is about creation of self-regulated organizations (SRO) and cooperation. Acting one by one, not as a united mechanism, SMEs can hardly defend its rights, present its interests etc. Here two goals can be achieved via SRO emergence. The first is a formal or informal deal or agreement, allowing each member to define itself, claim its specialization and to become a valuable unit in the whole mechanism. The second goal is lobbying of its interests in front of the government. It is worth mentioning that SMEs can cooperate not only with each other, but also with universities when developing and implementing sustainability-oriented innovation (SOI) (Jones et al, 2016).

The third recommendation may sound too general in the beginning, yet project management may become a truly important tool when implementing SD postulates in SMEs practice. Although project management is not a universal tool, yet such a complex, systematic mechanism contributes to efficiency and profitability increase, employees qualification increase, successful decision-making, acquisition of various certifications (accordance with norms and regulations). S. Marcelino-Sadaba et al (2015) in their research “Using project management as a way to sustainability. From a comprehensive review to a framework definition” suggest that project management correlates with sustainable development for the following reason. Project management is usually implemented in the organization in accordance with common standards such as PRINCE 2, PMBoK etc. Under these standards organizations work closely with stakeholders, introduce life cycle management that is nothing else than sustainability.

Outcomes

1. Management of successful sustainable development as an ongoing process that may be achieved through environmental, social and economic sustainability adherence, allocation of drivers, their correlation determination, and, finally, the formation of a portfolio of sustainable development projects;

2. Sustainability may be achieved through management of portfolio containing both traditional projects meeting the sustainability requirements and special projects supporting and enhancing current organization' sustainability;

3. In small and medium-sized businesses, the structure, elements of sustainable development and the intensity of their application strongly depend on the stage of the company's life cycle and business sustainability life cycle.

Conclusion

Society is interested in harmonization of SMEs activities, in modernization of SMEs from chaotic, constantly fighting with each other for short-term profits units to cohesive structure that may present its common interests and work under sustainable development postulates successfully. Driver-based sustainability models may become a useful tool for integrating sustainability principles to business processes. As for this study, it is currently in the process of examining small and medium-sized companies with a respect to exploration the practices of managing sustainable development and developing a driver and network approach in this area.

References:

Airaksinen, A., Luomaranta, H., Alajääskö, p., & Roodhuijzen, A. (September 2015). 'Statistics on small and medium-sized enterprises. Dependent and independent SMEs and large enterprises'. Eurostat. Statistics Explained, http://ec.europa.eu/eurostat/statistics-explained/index.php/Statistics_on_small_and_medium-sized_enterprises

Anshin V.M. (2013). 'Upravleniye proyektami s uchetom kontseptsii ustoychivogo razvitiya' [Project management based on sustainability concept], *Nauchnyye issledovaniya i razrabotki.* Rossiyskiy zhurnal upravleniya proyektami *[Scientific research and development.Russian journal of project management],* 2(2), 3-15. DOI: 10.12737/501

Anshin V.M. (2013). 'Strategicheskiye i organizatsionnyye aspekty upravleniya proyektnymi sistemami s uchetom kontseptsii ustoychivogo razvitiya' [Strategic and organizational aspects of project management in terms of sustainable development concept], *Nauchnyye issledovaniya i razrabotki. Rossiyskiy zhurnal upravleniya proyektami [Scientific research and development.Russian journal of project management]*, 2(3), 3-12. DOI: 10.12737/1239

Bell, S. (2015). 'Small and Medium Enterprises (SMEs) Finance'. The World Bank, http://www.worldbank.org/en/topic/financialsector/brief/smes-finance

Bos-Brouwers, H.E.J., (2010). 'Corporate sustainability and innovation in SMEs: evidence of themes and activities in practice'. *Bus. Strateg. Environ,* 19, 417–435. DOI: 10.1002/bse.652

Fang C,, Marle F., Zio E., Bocquet J-C. (2012). 'Network theory-based analysis of risk interactions in large engineering projects', *Reliability Engineering and System Safety*, 106, 1–10

Günerergin, M., Penbek, S., Zaptçıoğlu, D. (2012). 'Exploring the Problems and Advantages of Turkish SMEs for Sustainability', *Procedia - Social and Behavioral Sciences*, 58, 244 – 251, https://doi.org/10.1016/j.sbspro.2012.09.998

Heintman R.,Marson B. (2005). 'People, service and trust: is there a public sector service chain?' *International Review of Administrative Sciences*, 71:549.

Heskett J.L., Sasser E.W. Jr., Schlesinger L.A. (1997). 'The Service Profit Chain: how leading companies link profit and growth to loyalty, satisfaction, and value', New York: the Free Press.

Jones, J., Corral de Zubielqui, G., Doingwell. (2016). 'Doing well by doing good: A study of university-industry interactions, innovationess and firm performance in sustainability-oriented Australian SMEs', *Technological Forecasting & Social Change*. http://dx.doi.org/10.1016/j.techfore.2016.07.036

Klewitz, J., Hansen E.G. (2014). 'Sustainability-oriented innovation of SMEs: a systematic review', *Journal of Cleaner Production*, (65), 57-75. https://doi.org/10.1016/j.jclepro.2013.07.017

Koe, W., Omar, R., & Sa'ari. (2015). 'Factors Influencing Propensity to Sustainable Entrepreneurship of SMEs in Malaysia', *Procedia - Social and Behavioral Sciences*, 172, 570 – 577. https://doi.org/10.1016/j.sbspro.2015.01.404

Lazarus S., Feldbaum A. (2011). 'Equator Principles Strategic Review', Final Report, http://www.equatorprinciples.com/resources/execsummary_appendix_strategic_review_report.pdf

Marcelino-Sadaba, S., Felipe Gonzalez-Jaen, L., & Perez-Ezcurdia, A. (2015). 'Using project management as a way to sustainability. From a comprehensive review to a framework definition', *Journal of Cleaner Production*, (99), 1-16, http://proxylibrary.hse.ru:2174/S0959652615002371/1-s2.0-S0959652615002371-main.pdf?_tid=8b6247ba-91f9-11e7-a994-00000aab0f6b&acdnat=1504588843_92b875cccecd8a9e4df0fbabf9fdf58e

Newman M. (2010). 'Networks: An Introduction', Oxford University Press, 1,168-204

'Report of the World Commission on Environment and Development: Our Common Future'. (1987), https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf

The Equator Principles Association. (2011), http://www.equator-principles.com

Todericiu, R., Stăniţ, A. (2015). 'Intellectual Capital – The Key for Sustainable Competitive Advantage for the SME's Sector', *Procedia Economics and Finance*, (27), 676-681. https://doi.org/10.1016/S2212-5671(15)01048-5

Practical Framework for the Implementation of A Resource Sustainable Intellectual Property Rights Due Diligence in Mergers & Acquisitions

Adrian Bercovici[1*], Mihaela Maftei[2], Elisa Gotesman[3]
[1) 2) 3)] Bucharest University of Economic Studies, Romania
Email: patent@gmx.net Email: mihaela.maftei@ase.ro Email: elisagotes@gmail.com

Abstract

The correct analysis of patent data is crucial when implementing Intellectual property rights (IPR) management in any part of a business oriented entity. The analysis is standardly performed by specialists on the IPR field which can be divided into two groups: the patent attorneys and the in-house patent experts. But there are other possibilities to reach very good results and possibly save resources and time for example it can also be performed by technical specialists on the researched field and last but not least it can be performed by low level personal, for example students, which has been properly trained. The right amount of investment in the IPR analysis can decide over the level of risk reduction but can also dry out the available resources very fast. Key factors like who is performing the analysis and research can be decisive concerning the quality of the results, the security that it provides, but also the justification for the investment. The objective of this paper is to identify the right strategy of research, analysis and expert assessment to achieve the highest possible risk reduction for the least financial and work investment. The methodology used involves 6 different Due Diligence (DD) processes which were implemented in the course of 7 years in two different global corporations by the writers as well as a literature research of the best practices on the field. It is proposed to create a practical framework which guides and supports the path to a resource sustainable implementation of previous research results.

Keywords Risk management, mergers & acquisitions, Intellectual Property Rights, Due Diligence, sustainable strategy, time and resources investments

JEL Classification: A10, A11, D21, M12

Introduction

The thorough analysis of patent data is critical when projecting and implementing IPR management in a company. The analysis is usually performed by experts in IPR area like patent attorneys and in-house patent experts. In order to save resources and time and get the same quality of results, these analyzes could also be performed by technical specialists on the researched field and low level personal, for example students, which has been trained into looking for the right points and for the right parts in the material supplying the IPR specialists with a small summary implementing only the

relevant material for the analysis. The right amount of investment in the IPR analysis can decide over the level of risk reduction but can also dry out the available resources very fast. If too much resources are used the costs can skyrocket very fast and the added value of the additional risk reduction is very small and cannot be justified by the very expensive work invested into achieving it. Key factors like who is performing the analysis and research can be decisive concerning the quality of the results, the security that it provides, but also the justification for the investment. For example: patent attorneys which are the highest level IPR specialists are also the ones that could assume the highest level quality of risk analysis and can take a lot of responsibility for the opinions that they express as a result. The attorneys will normally have a very high quality insurance which will back up the responsibility that they are ready to assume. Unfortunately, most good patent attorneys know that the analysis reports that they are writing are only one point of view and at the end of their reports they will clearly cite that. Through this they retract the responsibility level to a minimum from their point of view. This way the responsibility they assume is more for the professional mistakes than possible misreading or misunderstanding of the analyzed material.

The objective of this paper is to identify the right strategy of research, analysis and expert assessment to achieve the highest possible risk reduction for the least financial and work investment.

Research Methodology

The methodology used involves 6 different Due Diligence (DD) processes which were implemented in the course of 7 years in 2 different global corporations by the writers as well as a literature research of the best practices on the field. It is proposed to create a practical framework which guides and supports the path to a resource sustainable implementation of previous research results**.** In previous research we developed a new strategy of implementing the intellectual property due diligence (IPR DD) into the merging and acquisitions (M&A) due diligence process. We researched and in parallel implemented the results, thus going through several steps of development until we reached a resources sustainable new strategy for IPR DD for M&A. We started with the basic questions that need to be answered by an IPR DD and continued into analyzing the different phases of the M&A DD which can be seen in figure no. 1.

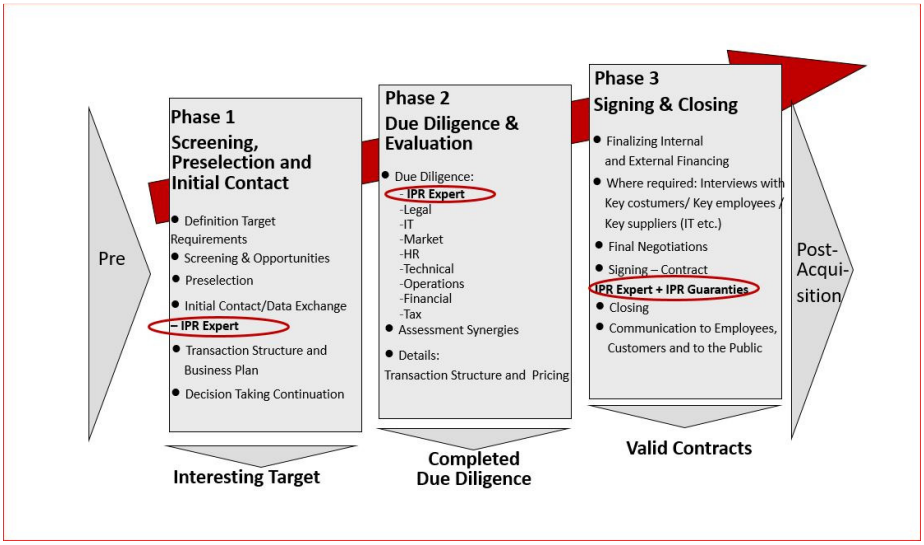


Figure 1 : M&A workflow the acquisition part and IPR expert positioning
Source: (Steven Appelbaum, 2000) and research conducted by the authors in 6 different DD cases.

Results and Discussions

To improve the efficiency of our IPR DD's we further divided the phases in 3 different stages. The first stage is defining the objectives of the phase in which the process is. The objectives are a mix between the needs of the management and the IPR management and have to be agreed together. For example, it is important to define clearly the time frame and the resources frame expected by the management and those which the IPR expert can achieve. In the second stage the IPR expert does investigation meaning he starts to research all the possible data and extracts all the information which relevant for the DD. The last is the analysis stage where the results of the investigation will be analyzed and assessed to produce a management summary with the results ad recommendations for the next phase. It is important to finish the investigation stage entirely before the analysis stage is started. In many cases the investigation case will already deliver conclusive results or the DD will be stopped before the analysis of all the results has to be started.

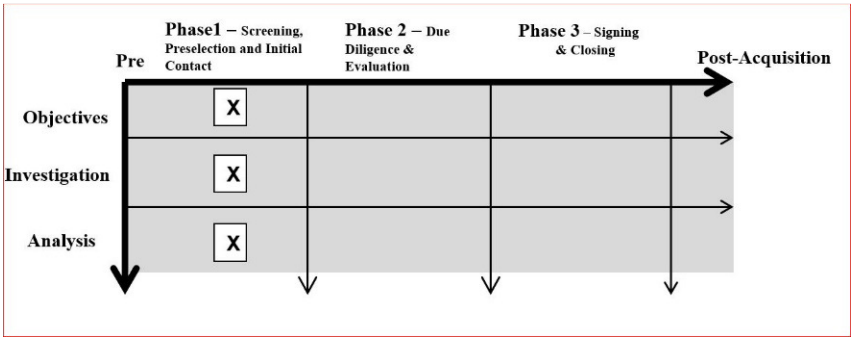


Figure 2: IPR due Diligence workflow

Source: (Bosch, 2006) and research conducted by the authors in 6 different DD cases.

This way we have reached a 3 dimensional IPR DD has the right phase and the right stage in the phase and the right questions in every stage. In this article we would like to continue developing this theory buy building the different stages and equipping them with the right questions thus giving the practical tools for implementing the 3 dimensional IPR DD

1. Phase 1 – Screening, pre-selection and initial contact

In most cases the IPR expert or most of the other experts are not directly involved in the choosing of a target company. This happens in the higher management circle and if existing together with the enterprise strategical development plan. Therefore, the actual work begins with Phase 1: screening, preselection and initial contact.

1.1 First stage - Definition and prioritization of the objectives

Some of the objectives of the management and the objective of the IPR manager may be totally different therefore it is important that the IPR manager will ask the management several questions that will define for him the business requirements and expectations and will prepare for the management in return a management summary of the target from the IP point of view in the same time repeating the business requirements of the management making sure that everyone understands these the same. We will use the word target for the company which is the subject of the DD. Though repeating experience in the research conducted by the authors in 6 different DD cases we reached the following format of questions and information that will define the objectives stage in phase 1 of the DD.

1.1.1 General information - In the first part of his research the IPR expert will gather some general information about the target with name, short company overview, management names and information about IP where their name appears, general technological concept and target approach.

1.1.2 Management Questions - These do not have to find an answer at this stage but have to be agreed upon. These define the main expectations of the management from the IPR DD results. (Cockburn, 2017)

- Are the processes of the target protected from the IPR point of view?
- Is an investment in the target accountable?

- What follow-up operations will be recommended from the IPR point of view, if a cooperation with the target will take place?

1.1.3 IPR Expert - questions that should be answered for a good prioritization and understanding and the business requirements. (Due diligence data room , 2017)

1. Is the intellectual property driving the contemplated deal or is it secondary?
   Example of an answer we received: "In phase one of this DD the intellectual property plays a central role in the decision taking of continuing the collaboration with the target"
2. Who are the companies interested in or are using this technology?
   Example of an answer we received: "The target is interested in further developing and implementing the targets products as described on their site. The problem is that at the moment the target cannot identify any concrete sellable products, therefore the focus is on the quality of the IPR that they possess."
3. Is the relevant industry litigious? Or are license programs routine?
   Example of an answer we researched: "A Google research does not reveal many patent suits or differences. Most international companies possess IPR on the field of the target but as it seems, because of the low rate of implementation they hold back with litigations."
4. Does the target company have a sophisticated or elementary IP protection policy?
   Example of an answer we researched: "The target company has an elementary IP protection policy trying to protect exactly the products that they have displayed on their page."
5. What type of transaction is being contemplated by the parties?
   Example: "Cooperation or Buy-In of the target"
6. What are the most important objectives of the transaction between the two parties?
   Example of an answer we received: "The target needs a strong financial partner to develop and deploy the products. The DD company (buyer) would like to implement the products in its platform and is looking for new business fields."
7. How do the intangible assets fit into each party's business objective?
   Example of an answer we researched and received: "The target wants to attract potential investors by protecting the IPR"," The buyer wants to invest in products with clear defined and protected USP's and wants to be sure that the target products are not infringing any third side IPR."
8. What is the timeframe that is set to phase 1 of the DD?
9. What are the resources that are allocated for this phase?

By answering the points above the expert and the management are now on the same level of understanding of the process and expectations. In short: the objectives are now clear.

1.2 Second stage - The substantive investigation

In this stage the IPR expert works mostly alone and needs to do a first real research of the target. Questions that need to be clearly answered are:

1.2.1 What are the products or services involved with this transaction?
The IPR Expert needs to identify all the products and services which could be protected by IP and have a good understanding of their functionality. This is information that can be achieved through collaboration with the technical team. The definitions can be used by both teams in their reports.

1.2.2 Does the existing IPR owned by the target cover those products?

Patent analysis of the targets patents using easy to reach information published by the patent offices (DEUTSCHES PATENT- UND MARKENAMT, 2016):

- Technical description of the protected invention as short as possible – this is needed for any future research and to make sure that the patent actually protects the products as claimed.
- An examination of the patent situation: Is it still existing? How strong is it according to the patent offices? Granted? First possible patents that may be infringed by the protected product can be easily identified here through the results of the official patent research and examination. (DPMAdirect, 2016)
- Example: Patent XAG - Protecting product 2

  "US – The US family member of this application EU was granted on

  The EPO did not grant it yet since is finds that the following (X) document:

  Patent probably not infringed by xxx - See page

  The European Patent application has good chances to be also granted in a constrained form. "

Results of the target IP analysis IPR expert opinion example:

"The company owns X patent families composed of EP and US applications protecting 3 out of the 7 products: Almost all applications are in examination phase. One patent application was granted in the US protecting the product number 2. The European patent office found prior art documents disclosing all of the applied inventions therefore it will be difficult to get them patented in the exiting form."

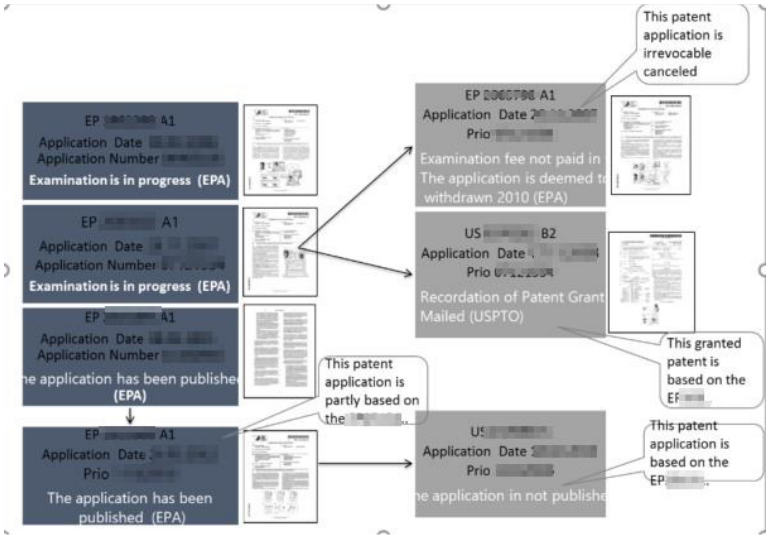


Figure 3: A visual display of the patent families of a target

Source: (Espacenet, 2017) and research conducted by the authors in 6 different DD cases.

1.2.3 Questions to the target company direct

1. Is the list of patents and patent applications as researched by us correct? In some cases the target owns further applications that have not been published yet or bought patents from other owners and that was not published yet.
2. What is the patent application strategy of the target company? It is important for the buyer to understand if such a strategy existed proving that the IP is taken serious by the target.
3. Are there any competitor patents that could be a threat to your core business? The target is committed to answer such a question to the best of knowledge. They are not allowed to hide information that they know about.
4. Who are your main competitors and how do their products work? This question is important to understand the targets sensitivity to competition as well as to get the information needed for a first level freedom to operate patent research.
5. Do you know of any other competitors which are using a similar technology as the one used by the target?
6. Have you ever had a Freedom-to-Operate patent research done? The results of such a patent research would substantially reduce the resources needed in the IPR DD especially in phase 2.
7. Is the granted patent of the company xxx a potential threat on a possible expansion of your business?
8. If through the first preliminary research any granted patents have been found which are a possible treat to a closing of a deal than these should be bespoken as soon as possible.
9. Do you have any license agreements with any external firms for example for using patented inventions or granting licenses on your patents, but also any other licenses? Licenses are normally not published but if existing are a crucial information as preparation to what further costs might come up after the deal is closed.
10. Do you have any new projects that would need patent protection? This is an important question for the post acquisition but especially because the ownership of the IP should clarified before signing.
11. List of owned Domains – Domains fall in the category of IP and therefore the IPR expert should have an inventory and make sure that the crucial domains are not under dispute from third side.
12. Do you own any trademarks and did you have any trademark disputes? As trademarks also fall in the IP category the IPR expert should have an inventory and if any complications exist he should use Trademark specialist to clarify.

    List of Trademarks online research

    - Deutsche Patent und Marken Amt
    - CTM-ONLINE Markenrecherche European/ Research Plus OHIM
    - Wipo Madrid – The International Trademark System
    - USPTO Trademark Electronic Search System
13. Who is the owner of the IP? A question that makes sure that the target does not conceal any information.
14. If the owner of the company is also inventor! Are the inventions 100% owned by target? Is the target entitled to sell the IP? In some cases, the legislation will automatically give a manager which is listed as investor on a patent application co-ownership of the patent. This needs to be clarified before a company is sold.

15. Who owns the copyright on literature, manuals, brochures etc.? These fall in the category of IP and therefore the IPR expert should have an inventory

1.2.4 The highest risk competitors and partners - should be researched for relevant patents already in this phase. These have the highest chance to own patents which could be a deal breaker for the buyer. The information and results can be gathered in a table defining the actual risk assessment for each of the patents.

Table 1: An overview of the highest risk competitors and partners patents

Company – Patent number	Status	About	Risk	Documents
The patent number is like a finger print and a clear identification for any patent that was ever applied anywhere in the world.	The status of a patent defines if the patent is in the application phase, granted, still active or dead checking this information is fast easy and can be done by any one	Short description of the invention patented	The risk level assessment - Low, middle, high and very high whereas very high would be in many cases a deal breaker from the point of view of the IPR expert	The patent document can be directly linked here for fast and easy reading

Source: research conducted by the authors in 6 different DD cases.

1.2.5 Further companies which are from the same field and also applied for patents. This is a preparation for an assessment of the needed time and resources in phase 2 of the due diligence.

Table 2: An overview companies which are from the same field

Company	Patents	Risk	Comments
Company names	Number of patent applications	Possible risk assessment	

Source: research conducted by the authors in 6 different DD cases.

1.3 Third stage - The analysis of the results – is the end of the phase 1 and brings together a management summary of the questions which decide if there is a deal breaker or not from the IP point of view.

1. Are the target processes protected from the IPR point of view? - In many cases the buyer is interested in the target only if through the deal he can reach possession of actual intellectual property for example patents. If this is not the case this could be a real deal breaker.

2. What further steps should be taken?

3. Is an investment in the target accountable? - Any concrete show stopper for an investment in target which cannot be solved by the pointed measures?

4. What follow-up operations will be recommended from the IPR point of view, if a cooperation with the target will take place?

5. Licenses
6. Ownership – is the IPR free transferable
7. Freedom to operate
8. What is the quality of the targets IPR?

These can be presented in form of a table with following form:

Table 3 : Management summary

Questions	Answers	Findings	Measures
1. Are the target processes protected from the IPR point of view?	In many cases the buyer is interested in the target only if through the deal he can reach possession of actual intellectual property for example patents. If this is not the case this could be a real deal breaker.	The risk level assessment low, middle, high and very high	Recommended measures to reduce the level of the risk in findings

Source: Research conducted by the authors in 6 different DD cases.

Conclusions

Through the repeated implementing and developing of the stages in the Phase 1 (Screening, pre-selection and initial contact of the M&A DD) we reached a point where we not only provide a check list for the IPR expert to follow. Check lists give very flat results which always look similar even dough DD's defer very much from each other, for example due to the different nature of the deal to be made for example buy or cooperation, or the different management strategies, expectations and requirements. The new framework for the implementation of a resource sustainable IPR due diligence in Mergers & Acquisitions is a full strategy that adjusts accordingly to any type of DD. This kind of implementation creates a situation in which the IPR expert does not only supply dry IP information but turns into a driving force of the whole DD team. The IPR expert is forced by the nature of the information that he needs to extrapolate from the IP material to understand the technology and strategy of the target. This information can be co-researched together with the strategy and technology teams thus saving resources for all and supplying a better inner look into the subject-matter. Thus in the practical implementation we were surprised to get more and more attention from colleagues in the strategy and in the technical team which found additional advantages in working with the IPR expert and implementing his results directly into their reports. In the next articles we will further develop the following subjects to round up the research and development of our theories in the field of IPR DD in M&A processes.

2. Phase 2 – Due Diligence and Evaluation

2.1 First Stage - Definition and prioritization of the objectives

The most important information for the IPR manager here is to exactly know the amount of resources that are at his disposal to obtain the needed results. Secondly, with the purpose of performing a resources sustainable IP DD the expert should agree with the management as early as possible upon the level of risk mitigation and risk assessment needed for each DD in separate.

2.2 Second stage - The substantive investigation

- Freedom to Operate Research (WIPO MAGAZINE, 2017) and Analysis – "begins by searching patent literature for issued or pending patents, and obtaining a legal opinion as to whether a product, process or service may be considered to infringe any patent(s) owned by others". Performing a resource sustainable FTO is a challenge on its own and will be analyzed in a separate article
- Licensing – analyzing that target is owner of all the licenses needed for selling the products that he is developing

2.3 Third stage - The analysis of the results

3. Phase 3 – Signing and Closing

3.1 First Stage - Definition and prioritization of the objectives
There is maybe no place where the management requirements and strategy should be more clearly communicated to the IPR manager like at this point. The IPR manager can supply researched data which will help to negotiate the final contracts in an advantageous form for the buyer.

3.2 Second stage - The substantive investigation
The main task for the IPR expert at this stage is to analyses the IP parts of the contracts and to negotiate the IP guarantees supplied by the target

3.3 Third stage - The analysis of the results

4. Post DD

- Secure the technological ledge of the acquired company versus other companies with the help of patent applications
- Developing and creating a patent portfolio for the acquired company as a protection against patent infringement suits
- Monitoring the competitors and the state of the art in the technological field of the company
- Freedom-to-Operate for new markets
- Generating further new revenues by selling of licenses for the owned IPR

References

Berens, W., Brauner, H., Strauch, J., & Knauer, T. (. (2013). *Due Diligence bei Unternehmensakquisitionen.* Stuttgart: Schäffer-Poeschel Verlag.

Bosch, M. C. (06 2006). *finnegan.com.* Von http://www.finnegan.com/resources/articles/articlesdetail.aspx?news=3af2e1b1-aa4f-47fa-bf5c-6429a5171f55 abgerufen

Cockburn, I. (12. 03 2017). *http://www.wipo.int.* Von http://www.wipo.int/sme/en/documents/ip_due_diligence_fulltext.html#P3_81 abgerufen

Deutsches Gesundheitsnetz. (19. 12 2016). *www.dgn.de*. Von https://www.dgn.de/produkte/fuer-den-rechtsgueltigen-elektronischen-datenverkehr-signaturkarten-zubehoer/ abgerufen

DEUTSCHES PATENT- UND MARKENAMT. (20. 12 2016). *www.dpma.de.* Abgerufen am 04. 04 2016 von https://www.dpma.de/docs/service/formulare/patent/p2795.pdf

DPMA ERVDPMAV. (16. 12 2016). Von www.dpma.de: https://www.dpma.de/docs/service/formulare/allgemein/a9519.pdf abgerufen

DPMA Formatierung. (16. 12 2016). *dpma.de*. Von https://www.dpma.de/service/e_dienstleistungen/dpmadirekt/allgemeineinformationen/unterstuetztetformate/index.html abgerufen

DPMAdirect. (16. 12 2016). *dpma.de*. Von https://www.dpma.de/service/e_dienstleistungen/dpmadirekt/ abgerufen

Due diligence data room . (13. 03 2017). *Digital Data Room* . Von http://www.duediligencedataroom.com/IP-Due-Diligence-Checklist.html abgerufen

Espacenet, E. P. (2017, September 12). *Espacenet Patent search*. Retrieved from https://worldwide.espacenet.com/

Heyd/Lutz-Ingold. (2005). *Immaterielle Vermögenswerte und Goodwill nach IFRS.* München: Verlag Franz Vahlen.

International Accounting Standards Board (IASB). (01. 01 2016). *http://www.ifrs.org/.* Von http://www.iasplus.com/de/standards/ias/ias38#link1 abgerufen

IPLYTICS. (12. 03 2017). Von http://www.iplytics.com abgerufen

Keukenschrijver, A., & Busse, R. e. (2013). *Busse Patentgesetz.* Berlin: Walter de Gruyter.

MacInnes, B. (19. 07 2011). *Adobe purchase of Echosign hit by patent lawsuit from rival RPost.* Von http://www.computerweekly.com/microscope/news/2240155799/Adobe-purchase-of-Echosign-hit-by-patent-lawsuit-from-rival-RPost abgerufen

MINISTERUL FINANTELOR PUBLICE. (2014, December 29). *http://www.monitoruljuridic.ro/.* Preluat de pe http://www.monitoruljuridic.ro/act/reglement-ri-contabile-din-29-decembrie-2014-privind-situa-iile-financiare-anuale-individuale-i-situa-iile-financiare-anuale-consolidate-emitent-ministerul-finan-elor-164321.html

Patentsight. (12. 03 2017). Von www.patentsight.com abgerufen

Popp, D. K. (13. 03 2017). *Intellectual Property due diligence.* Von http://mergerduediligence.com/ipduediligence.html#.WMY4c_mGNhF abgerufen

Steven Appelbaum, J. G. (2000). A*natomy of a merger: behavior of organizational factors and processes throughout the pre- during- post-stages (part 1).* MCB UP Limited 2000.

Storella, J. (07. 05 2012). *www.slideshare.net.* Von https://www.slideshare.net/jrstorella/successful-strategies-for-ip-due-diligence abgerufen

Telekom AG. (19. 12 2016). *telekom.de*. Von https://www.telekom.de/zuhause/de-mail?wt_mc=alias_9998_privatkunden/zuhause/de-mail abgerufen

T-Systems International GmbH. (19. 12 2016). *www.telesec.de*. Von https://www.telesec.de/de/signaturkarte/pks-auftrag abgerufen

WIPO MAGAZINE. (9. September 2017). *http://www.wipo.int.* Von http://www.wipo.int/wipo_magazine/en/2005/05/article_0006.html. abgerufen

Selected Possibilities of using Online Marketing and Online Advertising on the Slovak and Foreign Markets

Radovan Bačík, Prešov University, Faculty of Management, Prešov, Slovakia
radovan.bacik@unipo.sk

Jaroslava Gburová, Prešov University, Faculty of Management, Prešov, Slovakia
jarkagburova@gmail.com

Abstract

Nowadays, the use of online marketing and online advertising is an indispensable part of any company operating on the Slovak or international market. Online marketing and online advertising are among the most dominant tools for promotion in the field of tourism, as online marketing can not only influence but also change the buying behavior and consumer buying decisions. The aim of the contribution is the theoretical processing of tourism and internet marketing issues as well as the analysis of the use of selected types of advertising in Slovakia as well as in the foreign market.

Keywords: consumer, online marketing, tourism, purchasing habits, internet.

Introduction

Traveling has become a common part of the lifestyle of people, especially in developed countries. Larger participation in tourism is a result of the increase of leisure time. Tourism should not be hampered by the general right to tourism as a consequence of the right to rest and relaxation. The possibility of discovering and enjoying the resources of our planet should be accessible to everyone equally (Mitríková, 2014). People often regard tourism as activities resulting from services from other industries, such as accommodation, catering and transport services. If we want to talk about the tourism industry, it is likely to consist of tour operators (travel agent - tour operator, travel agent - retailer) and the start of modern tourism, based on a wide range of services, did not exist (Horner, Swarbrooke, 2003).

Literature Review

Novacká (1999) describes one of the first tourism definitions by one Austrian economist Hermann von Schullard in 1910 as a summary of activities (primarily of an economic nature) relating directly to the entry, stay and movement of foreigners outside or within the country, city or region. Jakubíková (2008) characterizes tourism as a large market that requires the satisfaction of different needs, thus attracting the attention of entrepreneurs, both private and public. It is a very progressive part of the economy. People choose to travel for two reasons, the first is duty (business, religion, visiting families, health reasons) and the other is pleasure (rest, sport, romance, fun, etc.).

Mariot (1983) divides the conditions for tourism into:

- **localization assumptions -** decisive factor is the geographical location of the site and its historical development. Using these assumptions, we can locate tourism activities in areas. Delivers natural (climate, water, relief, flora and fauna) and cultural and historical premises (museums, galleries, technical monuments, monuments of folk architecture ...).

- **selective assumptions -** represent the readiness of the country to participate in tourism (to receive or become a tourist). They can be divided into objective and subjective assumptions. Objective include political factors (peace settlement of the world without war conflicts), economic factors (the living standard of the population and the free time) and demographic factors (education, age structure). Subjective factors greatly affect travel, marketing and advertising experiences.
- **realization assumptions** - realization of the demands of the tourists in the resort with favorable localization assumptions. They are devoted to transport (quality of transport connections) and material and technical conditions (infrastructure: accommodation, catering, sports, recreational facilities ...).

Recently, internet and internet marketing in the field of tourism play a very important and indispensable role (Fedorko, Nastišin, Pollak, 2015). In the dynamic market environment, the internet plays an increasingly important role in marketing. According to Blažková (2005) Internet fulfills the role of new global infrastructure and has a new place in business processes. According to Dorčák and Pollák (2010) the use of Internet is wider:

- **Effective presentation of the company and its products.** Website added to customer loyalty program: The company provides a variety of services, on-site guides for the use of individual products or on-going technical support may be available on the web.
- **Information resources.** Internet offers space for searching for new information, searching for new suppliers and subscribers, as well as information about customers or competitors.
- **Better customer relationship management.** Internet enables intensive, easy and effective communication with customers as well as feedback. Accurate customer identification and behaviour gives businesses the ability to work better with an existing customer base, as well as the ability to reach better the future customers.
- **Efficient and new business channel.** E-commerce platforms and applications and other e-commerce offer the ability to quickly, cheaply and safely implement business transactions.
- **Managing internal business processes.** Better management of internal systems and processes and their computerization and subsequent integration will ultimately reduce costs. These include, in particular, costs such as telephone calls, printing and distribution costs and customer service costs. Savings are also due to a link to supply-chain chains.

Kita et al. (2010) among the most common e-commerce tools include:

- **www pages** - the home page of the company that provides customers with product offer information and company overview;
- **e-mail** – is a tool of customer interest, provides customers with specific information about the conditions of supply of goods, confirms product information, extends them;
- **online catalogs -** provide up-to-date information on prices, supply, inventory status and other services;
- **EDI** – Electronic Data Interchange, such as invoice, delivery note, customs documents, etc.
- **EFT** – i.e. EDI to transfer financial information - secures electronic payments - i.e. Payment orders, advice, statements from accounts.

With internet development, there is a shift in Internet trading. Companies invest in information technology and e-commerce to increase efficiency of operations and improve customer service. In order to say that everything is going through the Internet, the letter "e" (as electronic) is inserted before the common word. For example, the word e-business (electronic business), which we usually understand as a wider concept than e-commerce (electronic commerce), (Blažková, 2005; Mudrík, Fedorko, 2010).

Social networks are a relatively new type of web applications. Developers started at the beginning of the new millennium from their predecessors who served Internet users ahead of them. These predecessors were of a different nature, they were discussion servers, online photo galleries, weblogs, servers, data storage, and so on. Creators of these Internet services have long noticed that users are not only able to publish content but also want to communicate with other users. Gradually, services based on content, but on relations between their visitors (Bednář, 2011). Functions commonly offered by social networks for marketing purposes are a serious and important advertising channel that can accurately target marketing activities (Fedorko, Kakalejčík, 2015).

Results and Discussion

Destination organizations have difficulty measuring the site's visiting rates and the effectiveness of individual marketing channels. It is possible to measure the number of visitors on the website, viewing a promotional video on YouTube, downloading a digital brochure or mobile application, and tracking reservations made through partner websites, but using traditional ways of using, Motivation to fill out "visitor satisfaction questionnaires" is often the only way to identify where the visitor has come from and which marketing message has "forced" him to arrive at a destination (www.eturizmus.sk).

Picture 1 shows the Arrivalist data visualization - Red spots are the places where mobile users were exposed to a US Kansas destination organization's ad with the size of the tag reflecting their number. The blue spots feature Kansas sites that have seen the presence of devices previously hit by advertising out of the state.

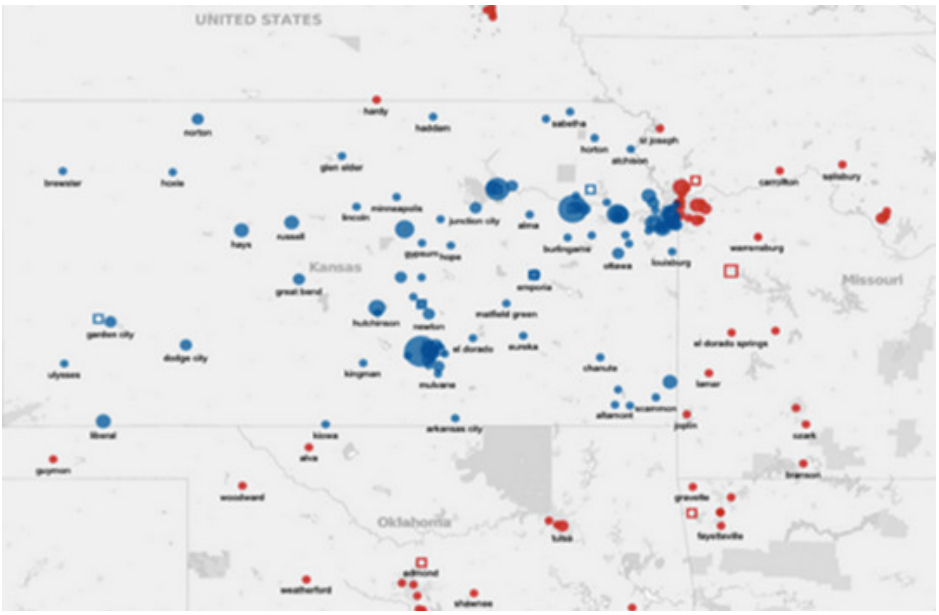


Fig. 1: Data visualization of Arrivalist

Source: http://www.eturizmus.sk

Discount portals appeared in Slovakia in 2010. Over the past 4 years, approximately 150 different discount portals have been created. Of course, not all of them could face the competitive pressure and thus ended their activity**.** Those that have managed to act now, act as a special marketing tool for companies and businesses they bring to customers. This does not mean, however, that profit increases with the growth of clients. This is confirmed by many of the top executives of specific devices. Many of them with this style of advertising and sales have bad experiences. Four-star hotels fill less solvent

customers, and this has an impact on the satisfaction of loyal clients. Expenditure also grows and, ultimately, the hotel has a decline in profits. Accommodations with such experience have terminated cooperation with discount portals and continue to acquire clients by other forms of promotion and sales promotion. Some companies, however, are grateful for their cooperation with discount portals. They perceive it as a way of advertising for the general public when they get to know as many people as possible. If the individual menu items and product are set correctly, a "faux pas" can be avoided with unsolicited clients.

Modern travelers are increasingly open to new things and cultures and require an authentic experience. The difference between "creative" tourists and cultural tourists is that they are not only aware of the first cultural heritage but also actively involved in its creation. They come into contact with the domestic population. An example might be the glass blowing in Biot, dancing the rumba in Barcelona, the baking croissants in Paris, weaving according to the majestic tradition or the creation of modern music in Ibiza. To support this new industry, Creative Tourism Network® was created in 2013. In particular, creative tourism brings the following benefits: sustainability, non-seasonality, better geographical distribution of the offer, not being tied to existing tourist attractions, increasing the confidence of the domestic population and improving local infrastructure and living standards.

Based on historical insights from marketing, we can see that marketers can use every technological innovation in their work. For the life of ordinary people, the advancement of technology is, for the most part, a forward and simplified life. Discovering the internet and creating a digital world has caused a radical change in the area of total communications. The sphere of marketing communication is immune to such massive changes. We can argue that technical news has not yet replaced existing forms of advertising, just completing them and adding new ones.

The agency ZenithOptimedia (2015) conducted the research in 65 countries around the world focusing on the use of individual media. In 2015 people spent 492 minutes a day using the media, an increase of 1.4% per day compared to 2014. The agency underlines that this increase is the result of an increased use of the Internet by 11.8%.

Long-term follow-up has shown that from 2010 to 2015 the time spent on the Internet has almost doubled (from 59.6 to 109.5 minutes per day) while the time spent with traditional media dropped from 402.2 to 375.8 minutes. The most serious aspect that was quite relevant to users was the development of mobile phones. Smartphones have brought new ways to use the media and have made the Internet open even to any activity. The trend of using mobile phones continues and we can say that it is growing more and more every day.

The GfK agency (2012) notes that even though the number of Internet users is steadily rising, it is still the mass media with the highest number of non-users (in 2012 it was up to 26% of the respondents). Evidence of the Internet growth is also the US research, which has come up with higher numbers. According to Nielsen's Q1 2016 Total Audience Report, smartphones and tablets have led to increased time spent with media. Adult US residents spent 20% more time using the media in 2016 than in 2015. The total number climbed to 10 hours and 39 minutes per day, and the internet has increased and all other media has declined. The television, the second popular one began to decline by 3 minutes per year (Lynch, 2016).

According to GfK (2012), the greatest potential for customers has the recommendation of friends, which was reported by up to 50% of the respondents. In the second place, TV got 47%, because for some people it's still an influential medium for buying. Next the printed media got 38% and the internet got 28%. At the end of the ladder, outdoor advertising got 11% and radio advertising 10%. Internet has always been a winner in the benchmarks, but it is weak in the aspect of credibility, especially since its underlying disadvantage is impersonal.

The American company, Peter J. Solomon Company (2014), made a research in July 2014 to distribute advertisements in various media. The result of the study is the Chart 1, which compares CPMs in major media. The chart shows the amount that an advertiser has to spend in order to reach 1000 views or otherwise impressed. Although this research has taken place in the US, we consider the resulting data to be relevant to us as well, because the price of advertising in individual media is comparable to the price ratio in Slovakia. However, it is important to note that this study does not include social networks, which, according to other authors, currently represent the cheapest option for paid promotion.

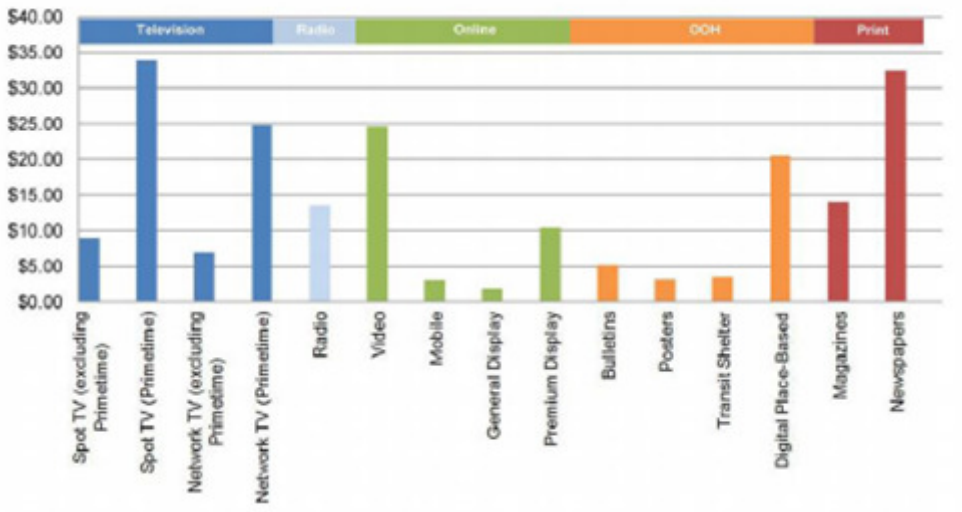


Chart 1: Major Media CPM Comparison

Source: Solomon Company, 2014

As we focus on the Slovak market, TNS Slovakia conducted research at the end of 2016 in Slovak companies and companies on their planned advertising budget for 2017. This study showed that we are also in the world trend. The Internet was the biggest increase, with companies focusing more on social networks this year. Mobile marketing also grows significantly, but not to such an extent as the above-mentioned social networks. On the contrary, in the press and television, marketers are planning to invest less in 2017.

Conclusion

Online marketing and internet advertising also have many respondents who are currently debating its merits. But every business subject needs it. The need for new forms of expression has become a major driving force not only in advertising but in all areas of human activity at the turn of the millennium. We are at a time when information technology is still affecting the economic life. It can be assumed that their role will grow in the future. Advertising is one of the most important communication tools for businesses that can influence consumer buying behavior. Recently, its impact on the successful management of the company is becoming more and more considerable. Certainly everything, as well as advertising, has many disadvantages, but they cannot be fully compared to the benefits it offers. The basis for success in creating online advertising and using online marketing is to know the company's analysis, its product, the market, and also to measure its communication effect to see if the ad has successfully passed the advertising message to the target customers.

Acknowledgement

This article is one of the partial outputs under the scientific research grant VEGA 1/0789/17 "*Research of e-commerce with relation to dominant marketing practices and important characteristics of consumer behavior while using mobile device platforms.*" VEGA 1/0806/16 *"Research on issues of consumer behaviour of a new generation of customers with emphasis on identifying preferences and usability of mobile platforms in the process of e-commerce of the subjects localized predominantly on the Central European Market."*

References

Bednář, V. (2011). Internetová publicistika. Grada. Praha.

Blažková, M. (2005). Jak využít internet v marketingu: krok za krokem k vyšší konkurenceschopnosti. Grada. Praha.

Dorčák, P., Pollák, F. (2010). Marketing & e-Business. EZO.sk. Prešov.

Fedorko, R., Kakalejčík, L. (2015). Search Engine Optimization and its Importance in the Purchase Process. Central European Conference on Finance and Economics (CEFE), ISBN: 978-80-553-2467-8, 30 September – 01 October, 2015, Herlany, Slovakia, 155-163.

Fedorko, R., Nastišin, Ľ., Pollák, F. (2015). On-line Reputation of the Selected Slovak Start-ups. Central European Conference on Finance and Economics (CEFE), ISBN: 978-80-553-2467-8, 30 September – 01 October, 2015, Herlany, Slovakia, 164-170.

GfK Slovakia s.r.o., (2012). Čo dokáže print? [Online], [Retrieved April 10, 2017], http://www.vydavatelia.sk/files/studie/GfK-sprava-vyber-konferencia-MM-1.pdf

Horner, S., Swarbrooke, J. (2003). Marketing, tourism, hospitality and leisure in Europe. International Thomson Business Press. London.

Jakubíková, D. (2008). Strategický marketing. Grada Publishing. Praha.

Kita, J. et al. (2010). Marketing. Iura Edition. Bratislava.

Lynch, J. (2016). U.S. Adults Consume an Entire Hour More of Media Per Day Than They Did Just Last Year. [online] Available at: http://www.adweek.com/tv-video/how-fx-used-russia-to-market-each-season-of-the-americans/

Mariot, P. (1983). Geografia cestovného ruchu. Veda. Bratislava.

Mitríková, J. (2014). Mimoeurópske turistické destinácie. Bookman. Prešov.

Mudrík, M., Fedorko, R. (2010). Business Via Google - New Possibilities and the Future. 3rd International Scientific Conference on Management - Knowledge and Management in Times of Crisis and Ensuing Development, ISBN: 978-80-555-0257-1, 21-22 October, 2010, Prešov, Slovakia, 448-455.

Novacká, Ľ. (1999). Služby a cestovný ruch. SPRINT. Bratislava.

Solomon, P. J. (2014). Major Media CPM Comparison. [online] Available at: http://porteradsblog.files.wordpress.com/2014/11/major-cpm-comparison.png

TNS Slovakia, (2015). Takmer 200 tisíc reklám v slovenských rádiách. [Online], [Retrieved April 03, 2017], http://www.tns-global-sk/informacie-pre-vas/tlacove-spravy/takmer-200-tisic-reklam-v-slovenskych-radiach

TNS Slovakia, (2016). Reklama na printovom trhu v minulom roku stagnovala [Online], [Retrieved February 06, 2017], http://www.tns-global-sk/informacie-pre-vas/tlacove-spravy/reklama-na-printovom-trhu-v-minulom-roku-stagnovala

TNS Slovakia, (2016). Reklama v televíziách v roku 2015. [Online], [Retrieved February 18, 2017], http://www.tns-global-sk/informacie-prevas/tlacove-spravy/reklama-v-televiziach-v-roku-2015

Zenithoptimedia, (2015), Internet use to drive 1.49% increase in media consuption in 2015. [Online], [Retrieved February 10, 2017], http://www.zenithmedia.com/internet-use-drive-1-4-increase-media-consuption-2015/

Analysis of the Use of Marketing and Promotion in a Non-Profit Area Operating on the Slovak Market

Jaroslava Gburová, Prešov University, Faculty of Management, Prešov, Slovakia
jarkagburova@gmail.com

Radovan Bačík, Prešov University, Faculty of Management, Prešov, Slovakia
radovan.bacik@unipo.sk

Abstract

As the company and the environment of potential customers have been changed over the years, forms of promotion have also changed to the same extent. Technical progress has brought mankind to a world where everything is bigger, more dramatic and more expensive, so marketing has acquired new forms of promotion to reach new customers. Nowadays, we can talk about the social significance of the mass media as well as about the mutual overlap of mass and network communication. The aim of the contribution is the theoretical processing as well as the analysis of the perception of selected types of promotion of non-profit organizations operating on the Slovak market from the point of view of the Slovak consumer.

Keywords: marketing, non-profit organization, promotion, consumer.

Introduction

Social development, responsibility, changing lifestyles, growing human awareness, globalization, increasing competition, a huge supply of new products with ever-less differentiation, and discerning consumers force businesses to find new ways to guarantee commercial success in the marketplace.

The non-profit sector and the organizations that make it up and do not make a profit, but they are still in a competitive environment, thus marketing communication is a key aspect for them in presenting to target groups. The non-profit sector in Slovakia is made up of organizations whose main goal is not the profit-making, but like any other organizations, they are trying to create their own target groups. Affecting these groups in an adequate way allows only optimally assembled marketing communication. This communication represents an effective and continuous action on the target groups, through a purposefully constructed communication mix (Štefko, Gburová and Matušíková, 2016).

Literature Review

Marketing tools and methods are constantly evolving as well as the marketing definitions are changing. It is typical for the 21st century economy that the role of marketing has not only been in the search of customers for products but has shifted to the search for products for customers. Information technologies enable businesses to monitor each customer and turn traditional mass marketing into multiple goals for individual marketing which has just one goal (Kotler et al., 2007). The main goal of non-profit organizations is to serve customers. Therefore, the customer must have a dominant position in a public sector organization, even in a non-profit organization, because he ultimately decides whether or not to accept the offered products. He also decides whether the products have such benefits for him. Marketing in non-profit organizations is understood as:

- how to carry out selected marketing activities in a certain sequence, most often they are public relations, advertising or market research,
- a strategy promoted by management,
- how to orientate the entire organization to the needs of the customer (Bartáková et al., 2007).

Introducing marketing in non-profit organizations is a long-term issue. It may take several years. In a non-profit organization, marketing activities of the organization must be perceived positively and actively by all the members, so that the organization effectively fulfills the purpose which is the reason for its existence (Vaštíková, 2008). Nowadays, which can be considered as a time when information technologies and the Internet are beginning to weaken the familiar forms of communication and advertising, marketers are more often confronted with the question of where their steps will be taken to produce an effective communication mix. Recently, effective communication campaigns must be more sophisticated than they were in the past. Among the new forms of communication mix we can mainly include various forms of direct marketing, sponsorship, event marketing, e-mail marketing and guerilla marketing (Štefko et al., 2012; Fedorko, Nastišin and Pollák, 2015).

In a reductive manner, we can say that e-business is just an electronic form of already existing activities (Fedorko, Kakalejčík, 2015). As at present, consumers have received product brochures in paper form, an electronic presentation is preferred in e-commerce, through websites, e-mail, and etc. Similarly, cash transactions begin to be executed electronically, e.g. paying by credit cards, using electronic checks, or direct payments from a bank account on the Internet (for example e-pay). In terms of definition, the business organization includes both profit-making and non-profit entities. Their processes include production, customer, internal, or business-oriented processes (Delina and Vajda, 2008; Mudrík and Fedorko, 2010).

Methods and Methodology

The object of the research was a non-profit organization (Dobrý anjel) operating in Slovakia. The survey sample consisted of 168 respondents. Respondents were citizens of Slovakia of different backgrounds, age groups, education and places of residence. In the field of information gathering, the questionnaire method of obtaining information was applied. The data collection was carried out during the year 2016. To achieve the aim of the research, the following hypotheses were set:

- We assume that there are statistically significant differences in the perception of promotion of a non-profit organization depending on the group of respondents.

- We assume that there are statistically significant differences in the non-profit organization's knowledge, depending on the education of the respondents.

Respondents (consumers) responded to a questionnaire's closed questions. Primary data obtained from questionnaire survey were later processed in a statistical program Statistica. In confirming or rejecting the established hypotheses the method of chi-square test was used.

Survey Results

The survey sample consisted of 168 randomly selected respondents living in Slovakia. Out of the 168 respondents who formed the survey, the largest number of respondents were 70 (42%) from the age of 18 to 29. The second largest group, with the number of 45 (27%) was represented by people from the age of 30 to 39. The third group is represented by 31 (19%) respondents from the age 40 to 49, and the fourth group is made up of 20 (12%) respondents, from the age of 50 to 59. The smallest number of respondents, 2 people (1%), were respondents from the age of 60 to 69. Of the total number of the respondents in the

survey sample, more than half were women, i.e. up to 105 (62.5%). Men in the research sample are represented by the number of 63 (37.5%).

Another important characteristic which was observed in the research sample was the highest level of education of the respondents. The educational level of the respondents was needed in order to find out whether the education had an impact on the knowledge of the non-profit organization Dobrý anjel (Good angel). The structure of respondents' level of education is shown in Table 1.

Table 1: Educational level of the respondents

	N	%	Valid %	Cumulative %
Secondary school without a school leaving examination	19	11,3	11,3	11,3
Secondary school with a school leaving examination	83	49,4	49,4	60,7
Bachelor degree	32	19,0	19,0	79,8
Higher education, second level of higher education	34	20,2	20,2	100,0
∑	168	100,0	100,0	

Source: own processing

Most of the respondents (83) have a secondary level of education with a school leaving examination which is 49.4% of the total. The second largest group is formed by respondents with university education, 34 respondents (20.2%) with a second level of higher education and 32 of the respondents (19%) with a bachelor degree. The lowest number of respondents, 19 people (11.3%) have completed secondary education without a school leaving examination.

As part of our research, we also focused on finding out which element in the non-profit advertising is most likely to appeal to respondents. From the options offered, respondents chose one option, and they also had the opportunity to express their own opinion. Individual options tracked the depth of the non-profit's ad group's knowledge and thus served to confirm or dispel differences about ad knowledge.

More than half of the respondents surveyed 88 (52.4%) said they are mostly interested about the non-profit organization's human story. 45 (26.8%) of the respondents rated the content as the most interesting aspect, 18 (10.7%) of the respondents considered a slogan interesting and 13 (7.7%) of the respondents considered the aspect of the contribution to be interesting. 4 (2.4%) of the respondents chose the option "own opinion", and they also chose the option "Others". In terms of new forms of promotion of a non-profit organization, 76 (45.2%) of the respondents would most likely appeal to mobile advertising in marketing communications. Based on the results in Table 2, we can estimate that 29 (17.3%) of the respondents would welcome a viral campaign, 23 (13.7%) of the respondents the internet kiosks, 18 (10.7%) of the respondents would chose the guerrilla marketing, 13 of the respondents (7.7%) E-mail marketing, 5 (3%) podcasting and 4 of the respondents (2.4%) s expressed the opinion that they would not receive any new form of promotion.

Table 2: New forms of promotion of the non-profit organization Dobrý anjel (Good Angel)

		N	%	Valid %	Cumulative %
	Viral campaign	29	17,3	17,3	17,3
	Guerilla marketing	18	10,7	10,7	28,0
	Podcasting	5	3,0	3,0	31,0
	Mobile advertising	76	45,2	45,2	76,2
	Internet kiosks	23	13,7	13,7	89,9
	e-mail marketing	13	7,7	7,7	97,6
	Others	4	2,4	2,4	100,0
	Total	168	100,0	100,0	

Source: own processing

The aim of the first hypothesis was to find out whether there are differences in the perception of promotion of a non-profit organization depending on the group of respondents. The results are reported in Table 3 and Table 4.

In accordance with the H1 hypothesis, gender differences in the perception of promotion were assumed. This hypothesis was verified by three questions. In all cases, a chi-square test of criterion independence was used, the outcome of which is a contingency table and an evaluation of the statistical significance of the relationship. The distribution of responses is shown in Table 3.

Table 3: Evaluation of Hypothesis 1a

			o12				
			Definitely	Probably	I do not know	Probably not	Total
Gender	Male	n	10	19	25	9	63
		%	15,9%	30,2%	39,7%	14,3%	100,0%
	Female	n	24	43	32	6	105
		%	22,9%	41,0%	30,5%	5,7%	100,0%
Total		n	34	62	57	15	168
		%	20,2%	36,9%	33,9%	8,9%	100,0%

Source: own processing

Table 4: Evaluation of Hypothesis 1b

Chi-square	df	p
6,416[a]	3	,093

Source: own processing

The promotion of a non-profit organization Dobrý anjel was considered to be definitely effective by 16% of men and 23% of women, probably effective by 30% of men and 41% of women. A more positive view, therefore, was seen in the case of women, but the gender difference was not evaluated as statistically significant ($\chi 2 = 6.416$; df = 3; p = 0.093). Hence the hypothesis H1 was not confirmed in this relation.
Secondly, within the H1, the differences in credibility of the promotion of the non-profit organization Dobrý anjel were observed. The distribution of responses in the case of men and women are presented in Table 5 and Table 6.

Table 5: Evaluation of Hypothesis 1c

			o13				
			Definitely	Probably	I do not know	Probably not	Total
Gender	Male	N	8	27	16	12	63
		%	12,7%	42,9%	25,4%	19,0%	100,0%
	Female	N	27	48	22	8	105
		%	25,7%	45,7%	21,0%	7,6%	100,0%
Total		N	35	75	38	20	168
		%	20,8%	44,6%	22,6%	11,9%	100,0%

Source: own processing

Table 6: Evaluation of Hypothesis 1d

Chi-square	df	p
7,938[a]	3	,047

Source: own processing

In this case, a more positive attitude was seen in the case of women, 26% of the total number of respondents, compared with the 13% of men, while the answers „Probably“ were rather similar (43% for men, 46% for women). Overall, however, gender differences were evaluated as statistically significant (x2 = 7.938; df = 3; p = 0.047), so we can infer that greater trust is generated in the case of women by the promotion of the non-profit organization Dobrý anjel (Good Angel).

In the third H1, we were looking at gender differences in answers to the question about marketing interests of the non-profit organization Dobrý anjel (Good Angel).

Table 7: Evaluation of Hypothesis 1e

			o15				
			Definitely	Probably	I do not know	Probably not	Total
Gender	Male	n	16	22	17	8	63
		%	25,4%	34,9%	27,0%	12,7%	100,0%
	Female	n	33	39	28	5	105
		%	31,4%	37,1%	26,7%	4,8%	100,0%
Total		n	49	61	45	13	168
		%	29,2%	36,3%	26,8%	7,7%	100,0%

Source: own processing

Table 8: Evaluation of Hypothesis 1f

Chi-square	df	p
3,751[a]	3	,290

Source: own processing

25% of men and 31% of women found it rather interesting. 25% of men and 37% of women were probably interested. Overall, the two groups had rather positive feelings about it, but there was no statistically significant difference between them ($\chi 2 = 3{,}751$; df = 3; p = 0,290). In the overall assessment of the second hypothesis a statistically significant gender difference was recorded only in one question, the H1 hypothesis is rejected.

The aim of the second research problem is to find out whether there are differences in the knowledge of a non-profit organization in relation to the highest completed education of the respondents.

Differences between groups in the case of education were surveyed by a chi-square test of independence of criteria in two questions. In one question, we tested the awareness of the non-profit organization Dobrý anjel. While respondents with the lowest level of education had the best chance of knowing, it was only 5% (1 respondent), in the other categories it was over 30%. In the case of the respondents with a bachelor degree is up to 53%. Overall, the relationship between the education and the knowledge of the organization was evaluated as statistically significant ($\chi 2 = 23{,}278$; df = 12; p = 0,025).

Table 9: Evaluation of Hypothesis 2a

			o5					
			Definitely	Probably	I do not know	Probably not	Definitely not	Total
Education	Secondary education without a school leaving examination	n	1	12	3	3	0	19
		%	5,3%	63,2%	15,8%	15,8%	0,0%	100,0%
	Secondary education with a school leaving examination	n	27	41	8	6	1	83
		%	32,5%	49,4%	9,6%	7,2%	1,2%	100,0%
	Bachelor degree	n	17	8	1	6	0	32
		%	53,1%	25,0%	3,1%	18,8%	0,0%	100,0%
	Second level of higher education	n	12	16	0	6	0	34
		%	35,3%	47,1%	0,0%	17,6%	0,0%	100,0%
Total		n	57	77	12	21	1	168
		%	33,9%	45,8%	7,1%	12,5%	,6%	100,0%

Source: own processing

Table 10: Evaluation of Hypothesis 2b

Chi-square	df	p
23,278[a]	12	,025

Source: own processing

The second question in the H2 was focused on the main aspects that respondents took on the advertising of the non-profit organization Dobrý anjel. The distribution of responses is shown in Table 11 and Table 12.

Table 11: Evaluation of Hypothesis 2c

			o8					
			Story of human destinies	Slogan	Ad content	Contribution options	Others	Total
Education	Secondary education without a school leaving examination	n	15	2	2	0	0	19
		%	78,9%	10,5%	10,5%	0,0%	0,0%	100,0%
	Secondary education with a school leaving examination	n	45	6	24	5	3	83
		%	54,2%	7,2%	28,9%	6,0%	3,6%	100,0%
	Bachelor degree	n	14	6	8	3	1	32
		%	43,8%	18,8%	25,0%	9,4%	3,1%	100,0%
	Second level of higher education	n	14	4	11	5	0	34
		%	41,2%	11,8%	32,4%	14,7%	0,0%	100,0%
Total		n	88	18	45	13	4	168
		%	52,4%	10,7%	26,8%	7,7%	2,4%	100,0%

Source: own processing

Table 12: Evaluation of Hypothesis 2d

Chi-square	df	p
15,132[a]	12	,234

Source: own processing

Respondents with the lowest level of education (79%) were attracted by the stories about humans, which was also the first place among other groups but with a smaller percentage. In the second place, in all groups, the content of advertising ranged from 10% of the respondents with the lowest level of education to 32% of respondents with higher education. However, the difference between the groups was not statistically significant ($\chi 2 = 15{,}132$; df = 12; p = 0.234). We reject this hypothesis, because only the first of the two observed relationships is statistically significant.

Conclusion

New marketing communication tools offer a wide variety of options to a nonprofit organization to reach target groups more efficiently and more moderately. Recently, a new form of marketing communication - viral marketing - has also emerged. Its use is recommended to non-profit organizations, especially in this context: Viral marketing is a tool that spreads advertising content via the Internet, namely by specific messages. The message is spread on the basis that it delivers a benefit to the broadcaster, for example in the form of humor or a shocking effect that inspires him to spread. Applying viral marketing would, in

particular, spread advertising videos with children, bringing individual hard-hitting human stories to personal computer screens. Powerful human stories and strenuous life fates make sense of the formation of a non-profit organization Dobrý anjel (Good Angel). Using viral marketing could also be a reason for the spread among the population.

By analyzing the use of selected marketing communication tools, we have found that a non-profit organization uses mainly printed, television, radio and Internet communication tools. In the view of the results of the questionnaire survey and its subsequent analysis, we can assert that the non-profit organization through its activities has created good conditions and rich scope for improving the used marketing communications tools and also for the use of new tools.

Acknowledgement

This article is one of the partial outputs under the scientific research grant VEGA 1/0789/17 "*Research of e-commerce with relation to dominant marketing practices and important characteristics of consumer behavior while using mobile device platforms.*" VEGA 1/0806/16 *"Research on issues of consumer behaviour of a new generation of customers with emphasis on identifying preferences and usability of mobile platforms in the process of e-commerce of the subjects localized predominantly on the Central European Market."*

References

Bartáková, G. et al. (2007). Základy marketingu. Grada Publishing. Praha.

Delina, R, Vajda, V. (2008). Teória a prax elektronického obchodovania. Grafotlač. Prešov.

Fedorko, R., Kakalejčík, L. (2015). Search Engine Optimization and its Importance in the Purchase Process. Central European Conference on Finance and Economics (CEFE), ISBN: 978-80-553-2467-8, 30 September – 01 October, 2015, Herlany, Slovakia, 155-163.

Fedorko, R., Nastišin, Ľ., Pollák, F. (2015). On-line Reputation of the Selected Slovak Start-ups. Central European Conference on Finance and Economics (CEFE), ISBN: 978-80-553-2467-8, 30 September – 01 October, 2015, Herlany, Slovakia, 164-170.

Mudrík, M., Fedorko, R. (2010). Business Via Google - New Possibilities and the Future. 3rd International Scientific Conference on Management - Knowledge and Management in Times of Crisis and Ensuing Development, ISBN: 978-80-555-0257-1, 21-22 October, 2010, Prešov, Slovakia, 448-455.

Štefko, R. et al. (2012). Základy marketingu. Bookman. Prešov.

Štefko, R., Gburová, J., Matušíková, D. (2016). Analysis of the use of marketing communication in the nonprofit sector in Slovak republic. Vision 2020: innovation management, development sustainability and competitive economic growth: proceedings of the 28th international business information management association conference, ISBN: 978-0-9860419-8-3, 9-10 November 2016, Seville, Spain, 2992-2998.

Vaštíková, M. (2008). Marketing služeb – efektivně a moderně. Grada Publishing. Praha.

Animal Welfare Organizations in Russia: Analysis of Structure, Typology of Volunteering Base and Functional Problems

Maria S. Gorbuleva, Tomsk State Pedagogical University, Tomsk, Russia, black_silver@bk.ru

Abstract

In the work the author attempts to analyze management of animal welfare organizations in Russia (in particular in Tomsk) on the basis of humanitarian assessment, as well as via verification of the impact of goals and symbolism of bioethics on the activities of volunteers. In the process of research, the most successful structure for implementing the statutory activities of organizations, various directions of volunteering activities, as well as internal and external problems of functioning of such organizations under the given conditions were identified. Conclusions about the consequences and possible stages of development also provide an opportunity for further research on this topic.

Keywords: animal welfare, volunteers, management, bioethics.

Introduction

In general, as of 2010, as its stated in Tetera (2007) article, All-Russian Scientific Research Institute of Hunting and Fur farming recognize the mass animal welfare movement in Russia do not exist precisely because of the disunity and ambiguity of actions and the small number of participants. Based on sociological surveys and field studies by Levchenko (2015), Gorbuleva (2012), Gorbuleva et al. (2016), Tarasenko et al. (2016a), the authors analyze some aspects of animal protection organization in Russia.

A significant part of data was obtained as a result of research of organizations located in Tomsk, where there is a favorable situation for development of animal welfare movements in comparison with larger cities, and there are a fairly large number of registered animal welfare organizations, shelters, charitable foundations, non-profit organizations, and volunteering initiatives which tend to be established as an organizations.

Protection of animals, the emergence of corresponding organizations and volunteer movements is actively occurring only during the last 5-10 years. This new phenomenon, originally spontaneous, develops thanks to the citizens' initiative, the opportunity to acquire positive experience and exploring the examples from countries with already established animal welfare protection infrastructure, fills the administrative and legal vacuum in this area on the part of the Government. Due to the growing activity of the volunteer movement, public awareness, media activity and a growing number of official organizations, only the last few years the authorities began to pay some attention to the problem of neglected animals, the control over their number, and the problems of humane treatment of them. Also the questions about the nature of the Russian animal protection movement become relevant, a well as dynamics of its development and possible forecast on its future. In this part of the research, the author will try to analyze the structure and functions of organizations, their internal and external problems, assess the possible social and anthropological consequences of emerging of the organized animal protection movement, as well as possible changes in the animal rights, based on the humanitarian assessment, described by Yudin (2006) and Tishenko (2008), Yudin and Lukov (2006).

Why it's important to change the attitude to animal rights? Because this is one of the goals of animal rights defenders. In addition to the daily protection of animals from cruel treatment, it is important to

prevent manifestations of cruelty - to achieve the adoption of relevant laws and change the current moral standards for "smaller brothers". This task is not only a legal, social, but also has moral, ethical, philosophical, and psychological context. Changes occur at the level of people's mentality, and this would take time and considerable effort. People who are used to treat animals as emotionless biorobots will hardly change their mind even in the long run. It's about the change of generations.

Methods of Research and Analysis of Results

Bioethics considers the issues relating to respect for life and individuality, as described by Melik-Gaykazyan and Mescheryakova (2015). In general, bioethics deals with the ethical issues and contradictions in medicine not only with respect to humans, but also all living beings. In Russia bioethics is a young science, but it caused the changes in the society which affect everyone in everyday life. Today, the process of restructuring and change has affected medicine, the attitude towards patients and the protection of patient rights. It can be said that the trials related to animal rights now taking place in Europe and the US are reminiscent of what is happening in Russia with respect to the rights of patients, as mentioned in works by Pervushina (2015), Melik-Gaykazyan at al. (2016), Mescheryakova at al. (2016), Tarasenko et al. (2016), Melik-Gaykazyan at al. (2017), Melik-Gaykazyan at al. (2017a), Evdokimov at al. (2016). Just as many political, economic, pedagogical and other projects require a comprehensive humanitarian assessment, movements of animal rights defenders (their activities: organizing animal shelters, training programs, volunteer communities, other activities to achieve their goals) also need ethical settlement and assessment because of complexity of the moral and anthropological problems that arise as a result of social progress in this sphere.

After all, in Europe and the United States, the process is underway, which was launched, perhaps more than a centuries ago, but received scientific confirmation only today, namely, the process of accepting (or rejecting) the possibility that animals possess consciousness and self-cognition. Since something new often provokes rejection of the majority, it requires some time to pass, both to confirm the current discoveries with new research, and for their adoption by the majority. After all, the acceptance of this fact will entail the reorganization of the moral foundations of the society and the legal system. Because if one agree with theses of the Cambridge Declaration of Consciousness, compiled by The Cambridge Declaration of Consciousness in Non-Human Animals and signed by Low at al. (2012), this will put one before a serious challenge about the animal rights in our society. It's like a bifurcation point. Among scientists there are supporters and opponents of the theory of presence of consciousness in animals. But the different studies (for example, Walker (2006), Reznikova (2007), Jones (2013) and many others) confirm that scientific progress inevitably leads us to the boundaries of this knowledge that already changes the attitude towards companion animals, animals used in food industry and agriculture, experimental animals, wild fauna, animals used in entertainment.

In Russia, over time, more and more well-structured animal welfare organizations emerge. This is provided by experience gained, availability of information through the media, the opportunity to monitor the development of other similar organizations, the opportunity to exchange knowledge not only with the Russian colleagues, but with overseas animal rights defenders as well. The official registration of animal rights protection organization adds duties and responsibilities, and at the same time opens up new opportunities for work. For example, reporting, the need for ongoing monitoring of legislation and its changes, opens up opportunities for obtaining support from the Government or funding from non-Governmental funds, grants, subsidies, etc. In addition, organizations that conduct transparent activities have more confidence, and, therefore, help from the partial citizens than the "individual animal rights defenders" or private take overs.

Most often, animal protection organizations are non-profit organizations, charitable foundations. This is in line with the primary activities and make reporting easy. In accordance with the stated charter, they can carry out both exclusively animal rights and propaganda activities, and have a take over point, a shelter, a veterinary office, and commerical projects, which profit should be spent on helping the animals.

An analysis of work of various organizations showed that an organization that has a clear internal structure and a system of interactions is more successful in achieving its goals. The core of organization is the director or other official who is its primary representative, has the right to sign and the seal. Also, most often, according to the charter, there is the council, the administration, that is, a group of persons responsible for internal activities, budget checks, reporting, etc.

One can talk about the different areas of work, but basically, an animal protection organization consists of the following units:

1. the administration: director, accountant, lawyer, coordinator / group responsible for grants and fundraising (all these "positions" can be filled by a single person or several people);

2. managing group / project coordinator: a person or several people implement the projects and actions aimed at promotion of the organization, administer the work of Internet resources, create and maintain the image and brand of the organization, produce printed and media products for promotion and propaganda (photo , video, printed matter etc.), work with the media and the public;

3. work with animals: the most important people to settle this type of work are the animal coordinator and animal curators. If there is a take over point in the organization, or the entire organization is a take over point or an animal shelter, the key figure is the take over manager. In some organizations or shelters, there are veterinary offices or a veterinary clinic where there is a full-time or part-time veterinarian.

4. work with volunteers - a recruiting of new staff, training, teaching the rules, coordination. Volunteers who help the organization, mainly work in the following areas: administrative and organizational work, transport assistance, take over at home, work with animals.

All these activities are very often interrelated. Of course, the named "positions" are not widely accepted terms for all organizations (in some of them, for example, there are such positions as "photo keeper" and "keeper of donations"), but in the process of research exactly this terminology has emerged. In addition, as already mentioned, one person can perform the different types of work. This is due to the capabilities of a particular volunteer and the level of development of the organization. But practice shows that the more people have clear boundaries of their activities and the more clear structure has an organization, the more chances for order, success and output. Sometimes the organizations which are small in terms of the number of members have greater success than a large ones, but having no idea of the internal structure and subordination, priorities and relationships in the work. Of course, the human factor, the lack of pay, and, at the same time, the demand for a significant contribution of time and effort, are destructive for charitable non-profit organizations, and sometimes one may be not able to correctly prioritize and cope with the loads, which, unfortunately, affects the image of not only a particular organization, but also all animal rights defenders.

In addition to internal problems, there are also external factors that can influence the growth and development of animal protection movement. Firstly, this is the lack of appropriate legislation. The difference between Russia and the more developed countries is that there is no animal protection law in Russia, except for Article 245 of the Criminal Code of the Russian Federation, which is ineffective in solving animal cruelty problems and this was mentioned not only by Zubchenko (2014). Under the current law, animals are considered the property and thus are not protected. In some cities and regions there are local laws or recommendations on keeping companion animals, but this does not work at all, and in the absence of legal regulation at the federal level is of little use. Even the work of ethical committees at the medical institutions and hospitals is questionable because it requires the appropriate legislation to address the issues of animal rights in experiments. If there is no animal protection at the legislative level, which provides, among other things, fines and penalties, then the work of animal rights defenders is ineffective. In fact, they deal with the consequences of a legal vacuum: cruelty and irresponsibility of

citizens towards animals. If you look at the statistics of effectiveness of the above-mentioned article 245 of the Criminal Code of the Russian Federation, it does not actually work: it is very difficult to prove the guilt, while the punishment is insignificant. It turns out that animal rights defenders are fighting not for animal rights, but rather for their welfare, which without a legal framework is also difficult.

Secondly, this is the lack of appropriate legislation. The animal rights defenders themselves are quite disconnected, as Levchenko (2015) points out, because of the human factor already mentioned. Also, the absence of unified regulatory framework significantly complicates the work. Some organizations rely on international treaties on animal rights (Universal Declaration on Animal Welfare (UDAW)), European Convention for the Protection of Pet Animals, European Convention for the Protection of Vertebrate Animals used for Experimental and other Scientific Purposes, The Cambridge Declaration on Consciousness. But this is an internal decision, more the ethic of work, which can help in internal work, but does not work at the administrative and legal level. And not all animal rights defenders use the abovementioned documents as the basis of their activities. Surveys of animal rights defenders show that a significant number of respondents are legislatively illiterate, and this, of course, affects the quality of the work, as stated in Gorbuleva at al. (2016). Thus, the internal work also becomes difficult, since in the absence of common norms and rules, there is a very high probability of negligence, or the other extreme - excessive fanatism in following the ideas of animal protection. The monitoring of such organizations is extremely problematic, because there are no clear standards and rules, which can lead to tragedies and a great resonance in society (for example BanoEco http://ria.ru/society/20160525/1439444096.html).

Thirdly, this is the lack of appropriate legislation. In the absence of a regulatory framework and legislative gaps, there is no possibility of influencing either the present generation or the future one. This is the serious anthropological problem of changing the mentality, perception of animals as an inanimate property, bio-robot or as a living creature, if not equal in rights to humans, then having an approximate rights. Very important here are the growing educational programs, which also appear due to the work of animal rights fighters and a vacuum on the part of the institution of power and legislation. A very important role in this process is played by the developing educational programs, which also appear as a result of the work of animal rights defenders and a vacuum on the part of power and legislation.

Conclusion

If one talk about the experience of animal protection abroad, in many countries the laws on the protection of animals were adopted long ago, taking into account the international treaties and recommendations. Often animal protection organizations work together with law enforcement agencies. So, in some police departments there are departments working on animal issues. They act independently or together with the Government organizations and shelters or the public charitable organizations, the private foundations and shelters. A single regulatory framework allows to coordinate the cooperation, or to strive for it. For example, in the United States there are no-kill shelters (often public, acting for donations, where animals are not euthanized, and therefore the number of places is limited) and open-admission shelters (most often the Government or State-run, staying in which is limited in time: either a new home or euthanasia upon the expiry of some period of time established by law or regulations, in order to free up the space for the newly arrived animals). In order to solve the problem of overpopulation of shelters with unlimited admission, there are the special funds, organizations and projects carrying out activities such as fairs or exhibitions to arrange a new families for the animals with "expiring time" through placing them in other shelters or take overs.

The foreign experience is a very valuable example for domestic animal rights defenders in the absence of legal support and relevant experience in Russia, as mentioned above. This makes it possible to focus on international animal related treaties and the experience of not only organizations protecting the rights and welfare of animals, but also biologists, ethologists, philosophers, bioethics which now not only simply consider the question of consciousness and its presence in various species of living beings. To some

extent, their consciousness is close to the human and how one would build relationships between "human" and "non-human" animals?

Scientists come to the conclusion that for different kinds of animals there must be the various tests and proofs about the presence of consciousness and self-cognition. Such an example can be a self-awareness study of dogs who were previously denied in self-awareness because they did not pass the mirror self-recognition (MSR) test (Cazzolla Gatti (2016)). For dogs, this test was modified into the sniff test of self-recognition (STSR) because dogs perceive the world in different way, the visual data is secondary for them. Dogs participating in the study passed the sniff test. Thus, for each animal species it is necessary to select individual options and an evaluation system.

Acknowledgment

The results were obtained in the frameworks of the RFBR (RHF) project №15-03-00598 “Bioethics: Creation of the New Symbolism”.

References

Cazzolla Gatti, R. (2016), 'Self-consciousness: beyond the looking-glass and what dogs found there,' *Ethology Ecology & Evolution*, 28(2), 232-240.

Evdokimov, K.V., Kuznetsov, V.G., Melik-Gaykazyan, I.V. and Melik-Gaykazyan, M.V. (2016), ‘“Semiotic Attractor”: A Model for the NBICS-Technologies Coherence Management,’ *Proceedings of the 27th International Business Information Management Association Conference (IBIMA),* ISBN: 978-0-9860419-6-9, 4-5 May 2016, Milan, Italy, 355-361.

Gorbuleva, M.S. (2012), 'Memory-turn and a bioethics content of a symbols of modern culture,' *Tomsk State University Bulletin. Philosophy. Sociology. Political science*, (4), 157-164.

Gorbuleva, M.S., Melik-Gaykazyan, I.V. and Melik-Gaykazyan, M.V. (2016), ‘Why Russian animal protectors are as they are and why do they act they do? *’ Sotsiologicheskie Issledovaniya,* 4, 157-158.

Jones, Robert C. (2013), '"Science, sentience, and animal welfare,' *Biology & Philosophy,* 28.1, 1-30.

Levchenko, N.V. (2015), 'Russian animal protectors who are they and how they act?, *' Sociological Studies*, 2(2), 151-155.

Low, P. (2012). 'The Cambridge Declaration on Consciousness. Francis Crick Memorial Conference on Consciousness in Human and non-Human Animals , *’ Churchill College, University of Cambridge*.

Melik-Gaykazyan, I.V., Gorbuleva, M. S., Vengerovsky, A.I., Melik-Gaykazyan, M.V. (2017), ‘Semiotic Diagnostics of Social Transformations, *’ Proceedings of The 29th International Business Information Management Association Conference* (IBIMA), ISBN: 978-0-9860419-7-6, 3-4 May 2017, Vienna, Austria, 435-439.

Melik-Gaykazyan, I.V., Melik-Gaykazyan, M.V., Mescheryakova, T.V. and Sokolova, N.S. (2016), 'The Model of Bioethics as" Semiotic Attractors" for Diagnosing Innovative Strategies of Training Specialists for NBICS-Technologies Niche,*′ In SHS Web of Conferences* (Vol. 28). EDP Sciences.

Melik-Gaykazyan, I. V., Tarasenko, V. F., Mescheryakova, T. V., Melik-Gaykazyan, M. V. (2017a), ‘Information Model for Management In the Area of Convergent Technologies, *’ Proceedings of The 29th International Business Information Management Association Conference* (IBIMA), ISBN: 978-0-9860419-7-6, 3-4 May 2017, Vienna, Austria, 429-434.

Melik-Gaykazyan, I.V. and Mescheryakova, T.V. (2015), 'Hippocratic Oath: Transformation of Semantics and Revival of Pragmatics,' *Schole,* 9, 1, 36-45

Mescheryakova, T.V., Melik-Gaykazyan, I.V. and Melik-Gaykazyan, M.V. (2016), 'Place of Bioethics in Knowledge Management in the Information Society,' *Proceedings of The 28th International Business Information Management Association Conference (IBIMA),* ISBN: 978-0-9860419-8-3, 9-10 November 2016, Seville, Spain, 2187-2186.

Pervushina, N. A. (2015), 'A BIOETHICAL ELEMENT OF THE VISUALIZATION,' *Tomsk State Pedagogical University Bulletin*, (5 (158)), 118-122.

Reznikova, Z.I. (2007), Animal intelligence: from individual to social cognition. Cambridge University Press.

Tarasenko, V.F., Melik-Gaykazyan, I.V. and Melik-Gaykazyan, M.V. (2016), 'The Global and the Local: the Model of Measuring Performance of International Business,' *Proceedings of The 28th International Business Information Management Association Conference (IBIMA)*, ISBN: 978-0-9860419-8-3, 9-10 November 2016, Seville, Spain, 2183-2186.

Tarasenko, V.F., Melik-Gaykazyan, I.V., Melik-Gaykazyan, M.V. and Gorbuleva, M.S. (2016a), '"Rabbit effect": the reasons of volunteer movements as the diagnostics of the role transformations of human resource management,' *Proceedings of The 28th International Business Information Management Association Conference (IBIMA),* ISBN: 978-0-9860419-8-3, 9-10 November 2016, Seville, Spain, 2179-2182.

Tetera V.A. (2007), 'Modern status of the fight against animal rights movement in Russia,' *Modern problems of nature management, hunting and fur farming. Materials of the International Scientific and Practical Conference*. Kirov, VNIIOZ.

Tishenko P.D. (2008), 'Philosophical grounds for humanitarian expertise,' *Knowledge. Understanding. Skill*, 3, 198-205.

Walker, R.L. (2006), 'Human and animal subjects of research: The moral significance of respect versus welfare, ' *Theoretical Medicine and Bioethics*, 27(4), 305-331.

Yudin B.G. (2006), 'Necessity and possibilities of humanitarian expertise,' *Knowledge. Understanding. Skill*, 4, 187-194.

Yudin, B.G. and Lukov, V.A. (2006), Gumanitarnaya ehkspertiza: K obosnovaniyu issle dovatel'skogo proekta. Moscow.

Zubchenko, N.I. (2014), 'On the issue of the relationship between the concepts of "animal welfare" and "protection of animals of ill-treatment" in international law,' *Actual problems of politics: Sb. Sciences Works / NU "OYA"; South Caucasus Center for Gender Studies*. Odesa, 2014. 52, 135-145.

Methodological Problems of NPS Index Application for Measuring Customer Relationship in B2B

Anastasii I. Klimin, Peter the Great Saint Petersburg Polytechnic University, Saint Petersburg, Russian Federation, klimin@kafedrapik.ru

Dmitrii V. Tikhonov, Peter the Great Saint Petersburg Polytechnic University, Saint Petersburg, Russian Federation, tikhonov@kafedrapik.ru

Aleksei V. Trykov, Peter the Great Saint Petersburg Polytechnic University, Saint Petersburg, Russian Federation, trykov@kafedrapik.ru

Abstract

The article deals with the theoretical problems of applying the NPS (Net Promoter Score) index when calculating customer loyalty in B2B market. In the article the concepts of loyalty and customer satisfaction were given. Based on the NPS research of B2B companies promoters and detractors were identified, as well as determine the level of loyalty and customer satisfaction in general.
Recommendations are given to improve the methodology for measuring loyalty and customer satisfaction on B2B markets. NPS normative values were proposed. The analysis of research results on NPS calculation for B2B is given, also methodological problems of its application for B2B markets are indicated in the article.

Keywords: Net Promoter Score, Customer loyalty, B2B marketing**.**

Introduction

Customer satisfaction is a measure that is determined by the ratio of the buyer's expectations to the actual quality of the purchased product or service. This is a feeling that the buyer has when he compares his preliminary expectations and perceived quality of the purchased product or service. (Kotler, Keller, Ancarani, Costabile, 2014)

In today's competitive market, customer satisfaction is an important indicator of efficiency and the main criterion of difference in the business strategies of competing companies. Consequently, the more customers satisfied, the stronger the customer ties with the company.

At present, questions about customer satisfaction and loyalty are very important due to the fact that companies are largely dependent on consumers, regardless of the type of activity or size of the business. It is consumers who are one of the most important factors for sustainable and successful business development. It is important to understand not only their current and future needs, but also try to exceed their expectations.

As practice shows, there is a correlation between the growth of the loyalty level and the increase in the company's profit (Yoo, Bai, 2013). Unsatisfied customers acquire fewer goods. Most often in their basket are goods whose yield is low.

The relevance of the topic is due to the fact that for successful operation, companies need to regularly monitor the level of satisfaction and loyalty. It is this measurement and choice of the evaluation system, as practice calls, which causes the greatest difficulties. Also worth noting is the fact that in Russia the issue of measuring customer satisfaction and loyalty is not given due attention, even though the

importance of the process of measuring these indicators is important for the functioning of a client-oriented business.

Measuring customer satisfaction is necessary for the following reasons:
1. Satisfied customers become loyal in the future. Loyalty is a belief that is formed due to the fact that the client is faced with a positive experience of interaction with the brand (Khan, 2013). Ensuring customer satisfaction is the process leading to loyalty in the future (Keiningham, Aksoy, Cooil, Andreassen, 2008).

2. Satisfaction is a key indicator of a company's success. Most often, the success of business is judged by time, volume and budget. Satisfaction is not taken into account when making important decisions. Nevertheless, in order for the company to be successful, it is necessary to interact with those for whom goods and services were originally created (Oliver, 2014). It is important to know, for example, whether your product meets their needs, or, is it necessary to add something.

3. The measurement of satisfaction will let you know whether the customer will buy from you again. For example, if a new customer remains satisfied with your product and service, then the likelihood that he will again acquire something will increase. Poor service will reduce the chances of their return.

4. Customers are more likely to leave because of poor quality of service than because of price considerations. The main reason for the loss of the campaign is not a change in the price of goods or services, but a poor customer service experience. For example, if a company pays attention to the needs of its customers and exceeds their expectations, it will be much easier to justify price increases in the future.

5. Acquisition of new customers will cost more than saving existing ones. Often practice shows that attracting new customers costs more than keeping those customers who already have it (Berry, 1995). That's why you need to use more resources to save existing customers, rather than trying to attract, but new customers.

6. Dissatisfied customers will necessarily tell about the negative experience of interaction with the company. This can be a strong blow to the reputation. It is important especially in the modern world, where information is spreading with enormous speed and large audience coverage (Banfield, 2015).

7. Growth of LTV (Lifetime Value) of a client. LTV is an indicator that shows the profit received from one client for all time of cooperation with him (Berger, Nasr, 1998). Accordingly, the longer the customer remains satisfied with your product or service, the longer it will stay with the company. This, in turn, will increase the chances of earning a profit for the time and money spent on acquiring the client. That is, maintaining customer satisfaction is important for achieving long-term success.

To solve such problems, B2C markets use the NPS index. It serves as an indicator of the loyalty of the company's consumers. According to the theory of this index, the most loyal consumer recommends the company, the goods or services which it uses, to others. The index is also used to assess readiness for re-purchases, mainly in commodity and consumer markets. The index was first presented in 2003 by Frederic Reicheld in Harvard Business Review.

The NPS measurement consists of the following steps (Reichheld, 2003):

1. Consumers are asked to answer the question "What is the probability that you will recommend the company (product/brand) to your friends (acquaintances/colleagues)?" On a scale from 0 to 10 points, where 0 corresponds to the answer "I will not recommend at all", And 10 -"I will definitely recommend ".

2. On the basis of the received values, all consumers are divided into three groups: 9-10 points - satisfied and active supporters-enthusiasts of the product (promoters), 7-8 points - satisfied, but neutral consumers (passive), 0-6 points - dissatisfied consumers (critics).

3. Calculation of the index. The index is a coefficient in the range from -100 to +100 (extreme points are reached if the share of promoters or critics is 100%), calculated by the formula:

$$NPS = \frac{P-D}{N} \times 100, \quad (1)$$

where N is the number of respondents, person; P - number of respondents who rated 9 or 10 (promoters), person; D - the number of respondents who rated from 0 to 6 (critics), person.

The number of companies using NPS is constantly growing for the following reasons.
If the consumer recommends the goods to others, it means that he is the most loyal. The article by F. Reicheld contains studies showing a close connection between the growth dynamics of the company and the share of promoters in the volume of consumers.

In marketing communications, the role of word-of-mouth advertising is growing, especially in connection with the development of the Internet (the emergence of social networks, blogs, etc.). The traditional model of communication AIDA (Attention, Interest, Desire, Action), many scientists and practitioners today supplement with the letter S (Share - send a link) or R (Recommend - recommend), some add S (Search - search), so modern communication models have the form AISDAS or AISDAR (Attention, Interest, Search, Desire, Action, Share or Recommend instead of Share), AIDAS (Attention, Interest, Desire, Action, Share) or even AISDA (Attention, Interest, Share, Desire, Action). In the last formula, we see that the desire to share interesting information appears with the consumer even before the purchase of the goods.

The theory of advertising by word of mouth says that people are more likely to spread negative information than positive. In addition, people remember the bad attitude towards themselves longer than good. Even if you serve the customer for a long time "at the highest score," you can lose it as a result of one negative impression. Therefore, the proportion of detractors is also important. According to the methodology for calculating the NPS index, one ill-wisher is equal to one promoter, but detractors are 0, 1, 2, 3, 4, 5, 6, and supporters are only 9 and 10 points. Thus, the proportion of "negative / positive" is 3.5 / 1. Especially you should pay attention to consumers who have put 0 and 1 point. These are embittered, offended consumers who will most actively criticize the company.

Technical implementation of the survey is simple; for research mainly used the Internet, SMS-messages and phone; most often only one basic question asked without specifying the reasons.

Literature Review and Research Methodology

Despite the simplicity of the NPS measurement technique, a number of questions arise when applying it.
1. In which markets and for what purposes can NPS be used?
2. What is the scale of scores - from 0 or from 1 to 10?
3. How to formulate the main question correctly?
4. What are the values of the "good" and "bad" index?
5. How does the share of passive consumers affect the outcome and how to use it?
6. How to analyze the answers of respondents who said: "I cannot evaluate" or "I do not know how to answer"?
7. Do you need to ask clarifying questions and ask them, should they be different for different categories of consumers?

The scope of application of NPS is expanding, extending to B2B markets (Zaki, Kandeil, Neely, McColl-Kennedy, 2016) which is also indicated by the provided research in this paper and staff loyalty studies (Bril, Kalinina, Ilin 2017), although the index was initially proposed for the B2C market.

The main question of NPS index sounds like: "How likely is it that you would recommend us to your friends?" In practical studies, you can find many different formulations:
- "With what percentage of probability from 0 to 10 would you recommend ...?";
- "What is the probability that you will recommend ...?";
- "On a scale from 1 (0) to 10, estimate how likely ...", etc.
Some formulations (for example, the first one) may be incomprehensible to the interviewee.

The sources do not represent the normative values of the "good" and "bad" values of the index, but there are data on the value of the best indices (Reichheld, 2006; Bălan, 2012). An example of the 10 companies-leaders in NPS in the US is shown in the Table 1 (Smith T. 2013). As an example of NPS of the automotive companies see Table 2 (“Предпочтения российских покупателей на автомобильном рынке”, 2014).

Table 1: Rating of companies-leaders in NPS in the US in 2013 in the markets of consumer goods

№	Company name	Industry	NPS, %
1.	USAA	Finance	83
2.	Amazon.com	Online sales	76
3.	USAA	Auto Insurance	74
4.	Trader Joe's	Foodstuffs	73
5.	Wegmans	Foodstuffs	73
6.	Costco	Department Stores	71
7.	Apple	Hardware	71
8.	USAA	Property Insurance	71
9.	Apple	Software	68
10.	HEB	Food products	68

Table 2: Rating of the automotive companies by NPS in Russia, 2014

№	Brand	NPS, %
1	Mercedes-Benz	70
2	Land Rover	68
3	BMW	62
4	KIA	62
5	Mazda	61
6	Subaru	60
7	Volvo	60
…	……..	…….
20	Great Wall	38
…	……	……..
31	Lada	5

There is no consensus on what a sufficient index value is. It depends on the market, the size of the company, the number of competitors and many other factors (Owen, Brooks, 2008).

The authors of the article suggest dividing the value of the index into four categories:
- less than 0 - "unsatisfactory";
- from 0 to 33% - "satisfactory";
- from 34% to 67% - "good";
- from 68% to 100% - "excellent."

"Unsatisfactory" values are associated with indicators of a negative index. The categories "satisfactory", "good" and "excellent" are the result of dividing the range from 0% to 100% into three approximately equal intervals.

Given the share of passive consumers (7 and 8 points) and those who found it difficult to answer, you can determine the direction of improvement in the company's activities. Neutral (passive) consumers are not involved in the calculation, however, in the extended version of the study they are asked what actions the company could increase their assessment to 9 or 10 points (Kinney, 2005). Thus, it becomes clear how to increase the proportion of the supporters of the brand. In Table 3 shows an example that clearly shows that for the same NPS (in this case it is equal to 20), companies A and B have different potential for growth due to passive consumers.

Table 3: The ratio of different categories of consumers for companies with the same NPS,%

Consumer category	Company A	Company B
Promoters	45	55
Neutral	28	2
Critics	25	35
No reply	2	8

Until now, the question of what the lower bound of the point scale is 0 or 1 point has not been clearly decided. Supporters of the scale from 1 to 10 believe that 0 cannot be considered a point, but initially F. Reicheld proposed a scale from 0 to 10. In addition, "zero" is of great psychological significance. The consumer, responding "Zero!" to the question: "What is the probability that you will recommend our company?", expresses its sharply negative attitude. His behavior deserves a separate analysis. Note also that the probability is measured from zero (Schneider, Berent, Thomas, Krosnick, 2008, June; Gloukhov V.V., Ilin I.V., Koposov V.I., Levina A.I., 2014).

As mentioned above, clarifying questions for different categories of consumers should be different. Passive consumers should be asked what could have raised their score to 9 or 10 points. Critics who have put 0 to 2 points should find out what they are so offended. Supporters (9 or 10 points) can be asked about what they would recommend to the company in terms of further development and victory over competitors, and how they see their future together with the company. Super loyal consumer is always interested in the victory of his company over the competitor.

Result

The main objective of the survey was to determine the level of loyalty and customer satisfaction in general, and also depending on the monthly costs of advertising campaigns. It was also necessary to find out what customer expectations are not met by the opportunities that already exist in the service.

Target respondents were independent B2B customers who systematically used the company services. Thus, the respondents were selected so that they simultaneously met the following criteria:

- independent clients (those who themselves are engaged in the conduct of advertising campaigns);
- customers who have replenished their balance and expenses at the time of the survey;

– customers who have committed more than three payments in the past 4 months.

In addition, customers were divided by the monthly budget, which they spend on advertising:

– less than 10 000 thousand rubles;
– from 10 000 to 30 000 thousand rubles;
– from 30 000 to 100 000 thousand rubles;
– more than 100 000 thousand rubles.

A similar division was made in order to understand whether there is a significant difference between the requirements and expectations of each of the selected segments. The total number of respondents was 262. The study was conducted with an online survey.

The level of loyalty was measured by the NPS index. Customers of the service answered a question that will allow them to know the level of their loyalty. The question was: "What is the probability that you will recommend the service to friends or acquaintances?" The answer to the question was a 10-point scale in which 0 is the smallest probability, and 10 is the largest. The answers, depending on the monthly budget, were divided as follows (Table 4):

Table 4: Share of promoters, neutral and critics of the company, depending on the customer monthly budget

Category	Less than 10 000, RUR	From 10 001 to 30 000, RUR	From 30 001 to 100 000, RUR	From 100 001, RUR
Promoters	81%	74%	65%	71%
Neutral	16%	22%	28%	26%
Critics	3%	4%	7%	3%

Thus, the NPS index was as follows, Fig. 1.

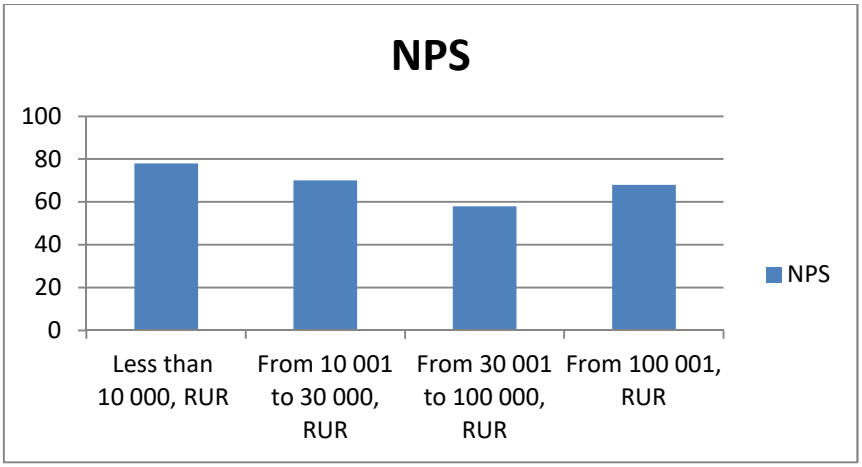


Fig. 1: NPS index depending on the monthly budget

Measuring the NPS index for all customers, the share of promoters, neutral and critics turned out the following, see Fig. 2.

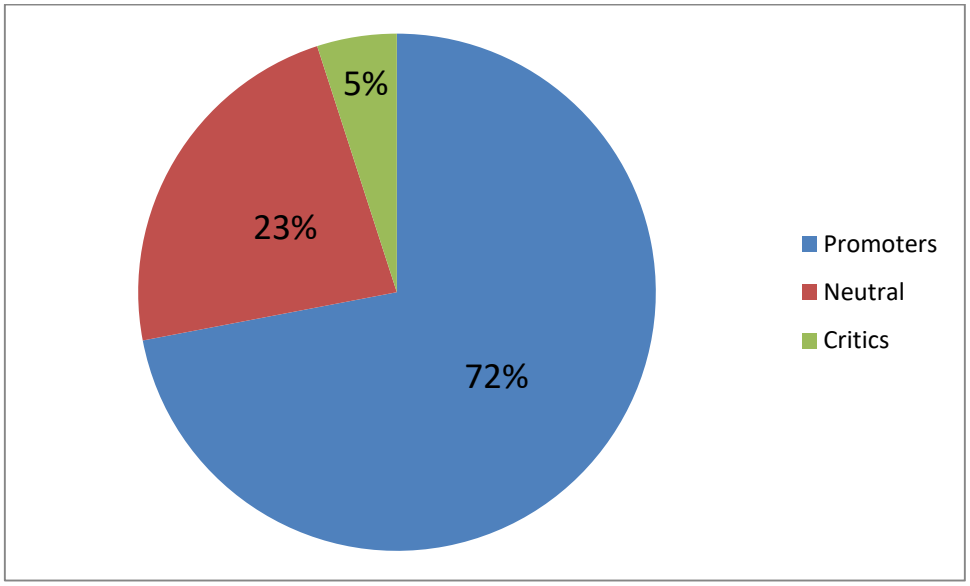


Fig. 2: Share of promoters, neutral and critics of the total

Thus, the level of NPS in the company as a whole is 67% (NPS = Promoters% - Critics% = 72% - 5% = 67%). 262 respondents mean that the maximum sampling error in this study is 6% (excluding the total number of clients). To calculate the maximum sampling error, the following formula was used (2):

$$\Delta = \sqrt{\frac{t^2 \times pq}{n}}, \quad (2)$$

where t is the normal distribution parameter (for the 95% probability the parameter t is equal to 1.96); pq is the maximum value of the share variance (equal to 0.25); n is the number of respondents.
The result is as follows:

$$\Delta = \sqrt{\frac{1.96^2 \times 0.25}{262}}$$

This indicator indicates that all results less than 6% are not significant, and the difference between responses less than 6% is also not significant.

Asking about the client's activity, it was possible to find out that the main part of users are specialists (47%) from small business (69%). Having received information about who our average client is, it will be possible to plan advertising strategies in a more qualitative way.

Customers with a monthly budget of 30 to 100 thousand rubles are the most dissatisfied segment (4.00 points), while the rest are approximately at the same level (from 4.29 to 4.30 points). Nevertheless, in general, the level of satisfaction among customers with different budgets is above average.

When analyzing the level of satisfaction of all customers, the following results were obtained. The highest scores were given to the Care Service and its speed (4.50 points) and the quality of the answers (4.52 points). Most of all the discontent was caused by training materials (4.00 points), as well as service

tools (4.01 points). The average level of satisfaction among all clients is 4.22 points, which is a good result.

The most loyal customers are those who spend on advertising less than 10 thousand rubles a month (78%). The lowest level of loyalty has customers with a monthly budget of 30 to 100 thousand rubles (58%). It is important to note that the level of loyalty among customers with different budgets in general is at a high level.

The level of NPS in the company is 67%. In order to understand whether this is a good result, for comparison, Figure 3 shows the range of the NPS index, depending on the industry.

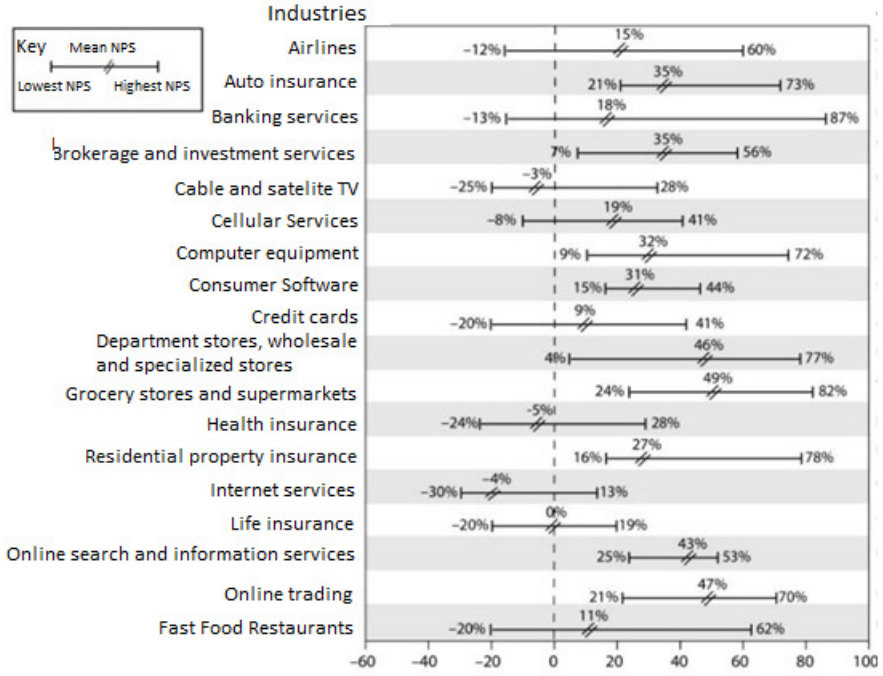


Fig. 3: NPS index range by industry (Reichheld, Markey, 2011).

The service of automation of contextual advertising can be attributed to the industry of Internet services. Figure 3 shows that in this industry, the NPS is generally not very high: the lowest is -30%, the average is -4%, and the highest is 13%. The figure of 67% for this industry is a very good result. This suggests that the researched company is one of the leaders in its market on loyalty.

Another NPS study commissioned by one of the companies in the B2B services sector was conducted for the first time for that company.
- Research method - telephone survey using the specialized computer assisted telephone interview (CATI) system.
- Respondents are divided into two categories by status.
- The total number of respondents - 2000 person.
- The total number of successful questionnaires is 687.
- The geography of the study is Russia.
The distribution of respondents by category is shown in Table. 5.

Table 5: Number of respondents to the questionnaire

Category	Respondents	Share, %
Category 1	483	70
Category 2	204	30
Total	687	100

In Table 6 it is shown the distribution of respondents by the number of points awarded when answering the question: "Estimate on a scale of 1 to 10, how likely is that you will recommend to other organizations to use our service?"

As you can see, more than 50% of respondents rated 10, which indicates a high degree of customer loyalty. Representatives of category 1 are more critical (11 respondents who put up 1 and 2 points, with 1 point put 10 people, whereas in category 2 no one put 1 and 2 points).

The final value of the NPS of 52.6% is a rather high index (according to our classification - the rating is "good"). Category 2 was more loyal (59%) than Category 1 (49.9%).

In the open source information was found about the relative value of the index value of competitors, which was 43%, i.e. the customer NPS indicator was 1.22 times higher.

Table 6: Distribution of respondents by the number of points

Rating	Category 1, %	Category 2, %	Total, %
1	2,9	0,0	2,1
2	0,3	0,0	0,2
3	1,2	0,7	1,0
4	1,2	0,7	1,0
5	6,7	4,9	6,2
6	2,3	3,5	2,7
7	6,1	4,2	5,5
8	14,3	16,7	15,0
9	12,2	15,3	13,1
10	52,2	53,5	52,6
No reply	0,6	0,7	0,6
Total	**100,0**	**100,0**	**100,0**

In Table 7 it is shown the calculation of NPS.

Table 7: Calculation of NPS

Customer portrait	Category 1, person.	Category 2, person.	Total, person.	Category 1, %	Category 2, %	Total, %
Promoters	309	141	450	64	69	66
Neutral	98	42	140	20	21	21
Critics	72	20	92	15	10	13
No reply*	4	1	5	0,6	0,7	0,6
Total	483	204	687	100	100	100
NPS, %	49,9	59,0	52,6	49,9	59,0	52,6

* Were counted as neutral for NPS calculation.

Consumers who put 7 and 8 points on the probability of recommendation (140 people), as well as those who found it difficult to answer (5 people) asked an open question: "What are your recommendations for the company in terms of improvement (quality of service), as a result of which your estimate may increase up to 9 or 10 points? "120 meaningful answers were received (high score).

The main indicator in analyzing the opinions of such respondents was that the recommendations on the price or quality of the product did not come to the forefront; mainly provided service characteristics that allow "bring" consumers to the state of loyal.

Conclusions and Discussions

Based on the results of the conducted studies on NPS for B2B companies it is concluded that NPS is suitable for B2B market, we recommend using our scale (satisfaction ranged in quartiles) because NPS for B2B would be unique for each market and it should be monitored in dynamics within the company. Comparing NPS index with competitors could make sense only within the framework of the same study
Due to the fact that the company will provide exactly the service that is really needed by clients, it can be assumed that customer satisfaction with respect to the service and the company as a whole will be increased through the provision of quality services. Satisfaction will be followed by increased loyalty, as the customer, satisfied with the service, will use it time after time, and in the future will start recommending to others.

Currently, the popularity of using NPS to evaluate customer relationships in a wide variety of markets (not just B2C, but also B2B) is growing, as well as for investigating employee loyalty.
There are unsolved methodological problems in determining NPS, which make it difficult to conduct standard studies and comparability of data from different studies.
Organizations using NPS should conduct regular monitoring studies of the indicator in order to determine the direction of improvement of their work.

In their research, competitors' brands should be taken into account, however, the data on the definition of NPS are of a closed nature, and therefore it is often impossible to compare one with competitors.

References

Bălan, C. (2012). NET PROMOTER SCORE: KEY METRIC OF CUSTOMER LOYALTY. Quality-Access to Success, 13.

Berger, P. D., & Nasr, N. I. (1998). Customer lifetime value: Marketing models and applications. Journal of interactive marketing, 12(1), 17-30.

Berry, L. L. (1995). Relationship marketing of services—growing interest, emerging perspectives. Journal of the Academy of marketing science, 23(4), 236-245.

Bril A., Kalinina O., and Ilin I. (2017). Economic Analysis of Projects in the Improvement of the HR Management System of Enterprises // Proceedings of the 29th International Business Information Management Association Conference – Sustainable Economic Growth, Education Excellence, and Innovation Management through Vision 2020. Pp. 2268-2278.

Gloukhov V.V., Ilin I.V., Koposov V.I., Levina A.I. Market risk neutral strategies: modeling and algorithmization. Asian Social Science. 2014. T. 10. № 24.C. 209-216

Keiningham, T. L., Aksoy, L., Cooil, B., & Andreassen, T. W. (2008). Linking customer loyalty to growth. MIT Sloan Management Review, 49(4), 51.

Khan, M. T. (2013). Customers loyalty: Concept & definition (a review). International Journal of Information, Business and Management, 5(3), 168.

Kinney, W. C. (2005). A simple and valuable approach for measuring customer satisfaction. Otolaryngology-Head and neck surgery, 133(2), 169-172.

Kotler, P., Keller, K. L., Ancarani, F., & Costabile, M. (2014). Marketing management 14/e. Pearson.

Oliver, R. L. (2014). Satisfaction: A behavioral perspective on the consumer. Routledge.

Owen, R., & Brooks, L. L. (2008). Answering the ultimate question: how Net Promoter can transform your business. John Wiley & Sons.

Reichheld, F. (2006). The microeconomics of customer relationships. MIT Sloan management review, 47(2), 73.

Reichheld, F. F. (2003). The one number you need to grow. Harvard business review, 81(12), 46-55.

Reichheld, F. F., & Markey, R. (2011). The Ultimate Question 2.0: How net promoter companies thrive in a customer-driven world. Harvard Business Press.

Banfield T. (2015). Why Customer Satisfaction is Important. Retrieved from https://www.surveymonkey.com/blog/2015/02/06/customer-satisfaction-important-focus

Schneider, D., Berent, M., Thomas, R., & Krosnick, J. (2008, June). Measuring customer satisfaction and loyalty: improving the 'Net-Promoter'Score. In Poster presented at the Annual Meeting of the American Association for Public Opinion Research, New Orleans, Louisiana.

Smith T. (2013). Top 10 U.S. Net Promoter Scores (NPS) for 2013. Retrieved from http://www.insightsfromanalytics.com/blog/bid/324678/Top-10-U-S-Net-Promoter-Scores-NPS-for-2013

Yoo, M., & Bai, B. (2013). Customer loyalty marketing research: A comparative approach between hospitality and business journals. International Journal of Hospitality Management, 33, 166-177.

Zaki, M., Kandeil, D., Neely, A., & McColl-Kennedy, J. R. (2016). The Fallacy of the Net Promoter Score: Customer Loyalty Predictive Model. Cambridge Service Alliance, University of Cambridge.

Preferences of Russian buyers in the automotive market (2014). Retrieved from https://www.autostat.ru/catalog/product/197/

The Impact of Social Media on Tourism: A Comparison between Germany and Romania

Sonia Budz, The Bucharest University of Economic Studies, Romania, sonia.budz@yahoo.com

Kejo D. Starosta, The Bucharest University of Economic Studies, Romania, k@ksfx.de

Bastian L. Kurth, The Bucharest University of Economic Studies, Romania, bastian.kurth@posteo.de

Abstract

In the last two decades, the emergence of Web 2.0 and social media have entirely changed the way in which tourists perceive tourism, starting with the way they plan their trips and to the way their complaints are handled in the aftermath. Instant access to any kind of information gives travelers the opportunity to discover, communicate, and collaborate, regardless of distance and time. Therefore, solid relationships have formed between tourists and providers via social media, which have enabled tourism to develop continuously from many points of view, especially in terms of demand and quality.

Today's electronic word-of-mouth (eWOM) is carried out through travel platforms, which are intermediaries for social collaboration and online recommendations. These are the most important sources of travel information as well (Tripadvisor / Tripbarometer 2016).

Being one of the most powerful states in Europe, Germany has recorded a considerable growth in terms of technology and tourism. The tourism industry has reached a noticeably mature level and the behavior of travelers is more consolidated. Technology has developed at a rapid pace in Romania as well, influencing all industries, especially tourism, which is an important ring of the economic chain, since it is interconnected to everything. This technological growth has caused Romanian tourism to become a billion-dollar business, resulting in respectively three-fold and two-fold increases in the expenditures and numbers of departures.

The aim of this paper is to discover the manifold paths of evolution in Romania and Germany, which lead to the question of how coherent and different the tourism environments are today and how the relationships between tourists and providers are affected. This research seeks to make a comparison between these two environments with respect to tourism and social media, in terms of quality and transparency, by identifying the potential differences and their evolution, as well as the opportunities for improvement. This comparison will be helpful for travelers, travel agencies, businesspersons active in the tourism field, and others directly affected by this industry, in order to enhance their views and businesses, and implement different strategies for improvement.

Keywords: Tourism, eWOM, social media, relationships

Introduction

Disruptions caused by social media have changed the way in which potential tourists behave and how the tourism industry needs to handle their customers in this new digitalized world. How customers communicate with each other and with the companies changed in an extraordinary way. Two decades ago, there was almost no possibility, except the classical word of mouth, for customers to communicate with one another. The classical word-of-mouth used by friends and family members is still very influential as shown by a study of PhocusWright (PhocusWrigth 2013). A major problem with the classical word of mouth is that a recommendation of friends is not available for every travelling destination, and even if there is some information available, the sample size is generally small by nature. These problems could be overcome with the help of social media, which can facilitate a direct customer-to-customer communication that cannot be mediated the by tourism companies and is thus is more reliable (Buttle 1998). The Tripadvisors Tripbarometer shows that most travelers (73% and 86%) use online sources in order to decide their destination and

accommodation (Tripadvisor / Tripbarometer 2016). Many (55% TripAdvisor / 45% other travel review sites / 39% content posted by travelers) used a direct customer-to-customer source, as information. This electronic-word-of-mouth is for most travelers the key source of information today (Pan et. Al 2007).

Despite the globally tourist fluctuations, known to this industry, Romania's touristic expenditures more than tripled between 1997 and 2015 ($699 m in 1997 - $2.33 b in 2015). In addition, the number of departures registered a two-fold increase (6.24 m in 1997 - 13.12 m in 2015). This resulted an extraordinary revolution regarding technology and tourism in general.

Meanwhile, Germany's tourist industry recorded a non-constant period, which consists in years of a robust growth (1995 - 1999), as well of stagnation. Since 1999, the number of departures grew slightly (78.1 m in 1999 - 83.7 m in 2015) while expenditures grew stronger in this period ($59 b in 1997 - $88.84 b in 2015).

While there is comprehensive literature on the relationship between social media and tourism, there is little research on how this relationship is established in different countries, and where the similarities and differences lie.

A comparison between Romania and Germany is of interest due to the very different development paths of the tourism industries in the past. While in Germany there was only a technological revolution in a mature market, Romanian mass tourism saw the light of day resulting the emergence of a young billion-dollar market in the period of observation. The different paths of evolution lead to the question of how similar the markets are today, how young and new solutions have evolved, and where travelers are stuck in their old behavior.

Theoretical Foundations

This study will focus on the analysis of the demand side of the tourism environment in Romania and Germany. While there are several definitions of "tourism demand", we will use the plain definition of Mathieson and Wall, which is "the total number of persons who travel or wish to travel, and use tourist facilities and services at places away from their places of work or residence" (Mathieson and Wall 1982). Further, this study will focus on the social media environment where this demand is expressed and the tourist industry, the counterpart of the demand, interacts with it.

Numerical Facts

In order to compare the similarities and differences between Romania and Germany, it is essential to compare the numerical facts of demands of each country. The facts chosen are elaborated based on different tourism demand-forecasting models. Even if this study will not focus on the demand forecasting, the demand forecasting models elaborated in the previous studies, specify which parameters are the most influential ones for the tourism demands. Reviewing recent research on tourism demands modelling and forecasting, Song and Li have said: "Although the explanatory variables included in the tourism demands models vary enormously with research objectives and researchers' backgrounds, the employment of certain indicators, as the measurement of tourism demands, variables in modelling and forecasting tourism demands, have been less controversial, as suggested in Song and Witt (2000)" (Song and Li 2010). Turner, Witt, Coshall and many others suggest using tourist arrivals as an explanatory variable for tourism demands (Turner and Witt 2001, Coshall 2005). The departures can be calculated on this raw data as well. Further studies suggest that the expenditures done in the countries of destination should be used as an explanatory variable (Li et. al. 2004and many others). Additionally, some authors suggest using expenditures for specific items, e.g. as lunch, dinner, sightseeing and shopping (Law and Au, 2000). Another common variable, which is helpful in determining the tourism demands, is the revenue of the tourism industry (Akal 2004). Witt et. al. suggest using tourism employment as an explanatory variable (Witt et. al. 2004). Smeral found tourism import and export to be of interest (Smeral 2004). For members of the European Union, Eurostat adds two further explanatory variables that might be of interest for this comparison, such as: share of population participating in tourism, and the balance of

payments for travel receipts and expenditures (Eurostat 2017). The World Tourism Organization (UNWTO) further defines the duration of a trip or visit, mode of transport, and type of accommodation as important for the demand perspective (UNWTO 2010). Apart from the tourism-specific variables, older demand models rely heavily on the total or per capita income (Stone 1954, and many others).

Social Media Use in the Tourism Environment

Similar to the comparison of the numerical facts, the comparison regarding social media environments will be based on the most influential and critical aspects of online services. The literature, which analyzes the key success factors of the social media environment of the tourism industry, stems from various disciplines: marketing, business administration and computer science. Minazzi provides a comprehensive overview of how social media is used in tourism and hospitality, which covers both, the supply side and the demand side (Minazzi 2015). Today, social media is one of the absolute key information factors for travelers around the world. Pan et. al. showed that user generated content, comprising customer reviews, recommendations, and blogs etc., is a key source of information rather than just additional (Pan et al. 2007). It is common to use online sources for travel planning and booking. In fact, 73% of travelers use online sources when deciding on their destinations, and 86%, use online sources when deciding on their accommodation (Tripadvisor / Tripbarometer 2016). Some authors further distinguish the usage of online sources based on the time they are used. In this paper, generally Engel's classification is used: before leaving (pre-trip), (during stay) during-trip and (after coming back) post-trip (Engel et. al. 1990). The during-trip phase is getting increasingly important, thanks to the development of mobile technologies (Buhalis and Law 2008). Especially, the abolition of roaming fees in the European Union will facilitate further during-trip applications, and bring all customers and travelers closer together during their trips. However, is not common to use online sources only for planning and booking. An increasing number of travelers also use social media channels in order to get authentic and reliable information on a customer-to-customer basis. More than 50% (55% TripAdvisor / 45% other travel review sites / 39% content posted by travelers) actively search for customer-to-customer advice (TripAdvisor / Tripbarometer 2016). Buttle insists that they have a good reason for doing so, because this is a customer-to-customer communication, which cannot be mediated by the tourism companies and it is thus more reliable (Buttle 1998). The possibility for every individual to post messages, make recommendations, and rate products, brands, companies, services, or even destinations, takes the power away from the tourism companies and gives it to the customers (Hennig-Thurau et al. 2004). This is probably one reason why eWOM is one of the most influential factors for travelers. Hennig-Thurau et al. define eWOM as "any positive or negative statement made by potential, actual, or former customers about a product or company, which is made available to a multitude of people and institutions via the Internet" (Hennig-Thurau et al. 2004). All customer statements in any kind of online source, for any item, will be included in our eWOM definition, including traveler portals, blogs, travel diaries, rating sites, etc. Besides the classical usage pattern of social media instruments, like recommendations, blogging, likes and online diaries, Nielsen found out that customers prefer social media to interact with companies, brands, or service providers (Nielsen 2012). Hence, customers try asking questions, and making compliments as well as complaints, directly in the public environment of social media. This new habit of the customers brings up new challenges and opportunities. Several studies agree that the impact of eWOM on customers' decisions cannot be emphasized enough (Schindler and Bickart 2005 and many more). Especially for intangible products and services, word of mouth plays a significant role (Murray and Schlacter 1990). Liu, Dellarocas and many others empirically demonstrated that the sentiment in the customer reviews does have a considerable impact on the financial performances of the analyzed companies (Liu 2006; Dellarocas 2003). While the importance of eWOM is unquestionable, there are still problems that need to be considered when analyzing the implementation and usage of eWOM on the various platforms available to German and Romanian travelers. Firstly, there are some homemade problems, namely the purchasing and under-reporting biases. Secondly, there are forces in the social media world that try to manipulate eWOM for different reasons and with different objectives. Hu introduces the purchasing bias, which describes that someone who bought a product or service already and has or had a biased positive opinion about it (Hu et al. 2009). Anderson describes that

only customers who are extremely satisfied or extremely dissatisfied post reviews and comments on Social Media (Anderson 1998). This is described as the underreporting-bias, because people who are neither extremely dissatisfied nor extremely satisfied are not motivated to post their experiences on social media (Hu et. al 2009). The manipulation of user-generated contents by fake reviews, is analyzed by numerous studies in the fields of computer science, media, business administration, among other fields. The credibility of online recommendations differs depending on the platform and many other aspects. Peer-networks (Facebook, LinkedIn and Xing) are very trustworthy, because the relationships are from friends and colleagues, who usually know each other in person. However, Cheung and Lee note that public review sites offer much more content and have deeper insights due to the vast number of users (Cheung and Lee 2012). Most online travel agencies (OTAs) offer their own review systems, where only customers with bookings can write reviews. In the OTAs' systems the reviews should thus be verified. Because of these specific issues with eWOM, the credibility of the portals providing social media instruments is the key factor for success. Several dimensions influence the trust-level and credibility of travel portals and review sites. Firstly, source credibility is a key factor to determine the transparency of online reviews. Minazzi defines source credibility as "…the extent to which a source of information is perceived to be believable, competent (characterized by a certain expertise), and trustworthy by information receivers." (Minazzi 2015). The number of reviews is another key factor for most readers to assess the popularity of an item (Duan et al. 2008; Chevalier and Mayzlin 2006). An accommodation or trip with fewer reviews should thus be ranked lower than counterparts with many reviews should. Further, the writer of a review has a major impact on credibility. If the writer provides additional personal information and could be identified in the offline world, the level of trust is much higher (Xie et al. 2011). Even more important than personal information is the possibility to trace other activities of that user. It has to be transparent how many and which other reviews the user wrote to check if there is a consistent picture of that user (Brown et al. 2007). The last important point for travelers to check the validity of a review is the review itself. The information derived from the review, is often just the sentiment itself, positive or negative. However, if the review is perceived as valid, strongly depends on the details of the message and how detailed the description is (Schindler and Bickart 2005). Not only has the credibility of reviews played an important role in the success of eWOM, but also the accessibility. According to different studies, not only the share of positive or negative reviews is important. Negative reviews play a much more significant role than positive ones. Even a very small number of trusted and credible negative reviews can have a considerable impact on the decision of the customers (Tanford and Montgomery 2014).

Analysis / Comparison

In line with the theoretical foundations, we chose the parameters for comparison as described below. The analyzed numerical facts will be described first, followed by an analysis of the compared topics of the social media environment.

To spot the similarities and differences, from a quantitative point of view, in the first phase we are going to analyze the numerical facts of the tourism industries in Germany and Romania. The German and Romanian arrivals in different destinations can either be used directly to review the most popular destinations for these countries' travelers, or be aggregated to get the total departures of the travelers. This study will use both values. The total and per capita expenditures from all destinations will be used to get an overview of what the tourists experience in their destinations. To include observations from the supply side, we consider the total revenue and number of employees of the tourism industry in the comparison. On a macroeconomic scale, tourism import and export, along with the balance of payments between receipts and expenditures, will be included. Further, we will follow the definition of the UNWTO and include the duration of a trip, the mode of transportation and the type of accommodation in our analysis. All this data needs to be related to the share of population participating in tourism and to the total and per capita income.

The analyzed numerical facts are summarized as follows:

- Most popular destinations
- Total number of departures
- Total expenditure / expenditure per capita
- Total revenue of the tourist industry
- Number of employees in the tourist industry
- Balance of payments in tourism (receipts - expenditures)
- Duration of a trip
- Share of population participating in tourism

To get an overview of the German and Romanian travelers' behavior, we will evaluate which online travel portals are used and how they differ from one another. We will also analyze if there are differences in the usage of those portals and how the travelers participate in the social media channels. First, the number of travelers that use online media need to be compared, in order to have a basis of comparison for the online behavior. Next, the five biggest (by revenue) online travel portals for Romanian and German tourists will be determined to complete this basis. We will analyze if there are overlaps in the portals, if there are country-specific portals, and how the revenues are distributed within and across the countries. We will also evaluate the social media or collaboration features for a customer-to-customer communication. Further, we will try to analyze the participation in the portals with spot checks on the number of reviews of tourist hotspots. As the literature review has shown, the single most important point of the social media environment on tourism is electronic word of mouth. Therefore, this point will also be analyzed in detail when examining the differences between the German and Romanian online environments for travelers. The first important property to check is if the number of reviews is transparently shown on the travel portals. The second question is if other activities of the reviewer can be traced on the website and the history of the reviewer's activities is clear. With this feature, the customer should also be able to determine how many reviews the reviewer created and to judge how trustworthy they are. Additionally, the availability of the reviewer's personal information will be checked. Besides the reviews themselves, the theoretical foundations have shown that there is a need to have all kinds of ratings accessible, because even a single negative rating might have a considerable impact on customers' decisions. Therefore, we will also compare the accessibility of reviews, as it is a crucial point in how travelers access information on travel portals. While the review and social media instruments of the online travel portals usually cover the pre-trip and post-trip phases of the travelers, Buhalis and Law say that the during-trip phase is getting increasingly important, thanks to the advancements in mobile technologies (Buhalis and Law 2008). We expect that this trend will not just continue but also accelerate with the abolition of roaming fees in the European Union. Therefore, we will also evaluate the current instruments for during-trip social media interaction.

Table 1 - Most Popular Destinations for German and Romanian tourists

No.	Germany	Romania
1	Germany (27.4%)	Romania (87%)
2	Spain (14.8%)	Italy (3.2%)
3	Italy (8.2%)	Spain (1.8%)
4	Turkey (5.6%)	Greece (1.7%)
5	Austria (4.6%)	Bulgaria (1.5%)
6	Greece (3.5%)	Germany (1.1%)
7	Croatia (3.2%)	Turkey (1.1%) (unreliable)
8	France (2.6%)	Hungary (0.5%)

Source for Germany: FUR Forschungsgemeinschaft Urlaub und Reisen e.V., Reiseanalyse 2017 (Data of 2016). Source for Romania: Eurostat http://ec.europa.eu/eurostat/statistics-explained/index.php?title=Tourism_statistics_-_top_destinations&oldid=192301

From the comparison above, the domestic tourism is at the top of the table, recording the biggest values. Most of the Romanian population prefer to visit their origin country. In Germany things are different due to the bigger income of Germans, which allows them to travel abroad easily. We can see that both, German and Romanian tourists prefer countries with a warm climate for holidays. Europe's popular tourist destinations Spain, Italy, Greece and Turkey are in the front-placings, additionally the neighboring countries are also found in the top ten.

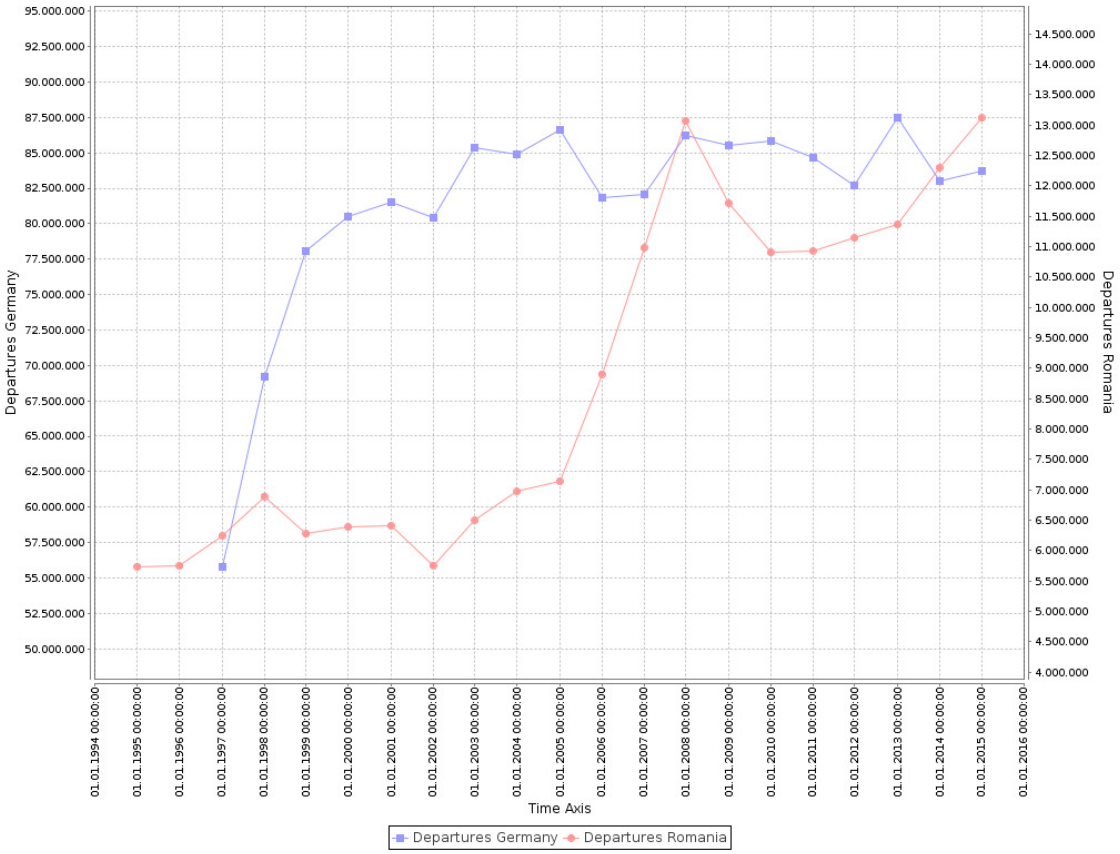


Figure 1 : Number of Departures

Source: World Tourism Organization, Yearbook of Tourism Statistics, Compendium of Tourism Statistics and data files (https://data.worldbank.org/indicator/ST.INT.DPRT?locations=DE-RO)

In the analyzed period, the number of departures is increasing with regard to both countries. In comparison with Germany, Romania's values are lower, due to the small salaries and number of population, determined as well by the large rural area. The business tourism put its mark on both countries.



Figure 2 : Total Expenditures

Source: World Tourism Organization, Yearbook of Tourism Statistics, Compendium of Tourism Statistics and data files (https://data.worldbank.org/indicator/ST.INT.XPND.CD?locations=DE-RO)

We can observe that in the second chart the situation is similar to the first. The only difference is the decreasing trend regarding Germany at the end of the analyzed period. This decrease could have been caused by the actual terrorism situation in Europe, Germans opting for neighboring countries or cheaper destinations.

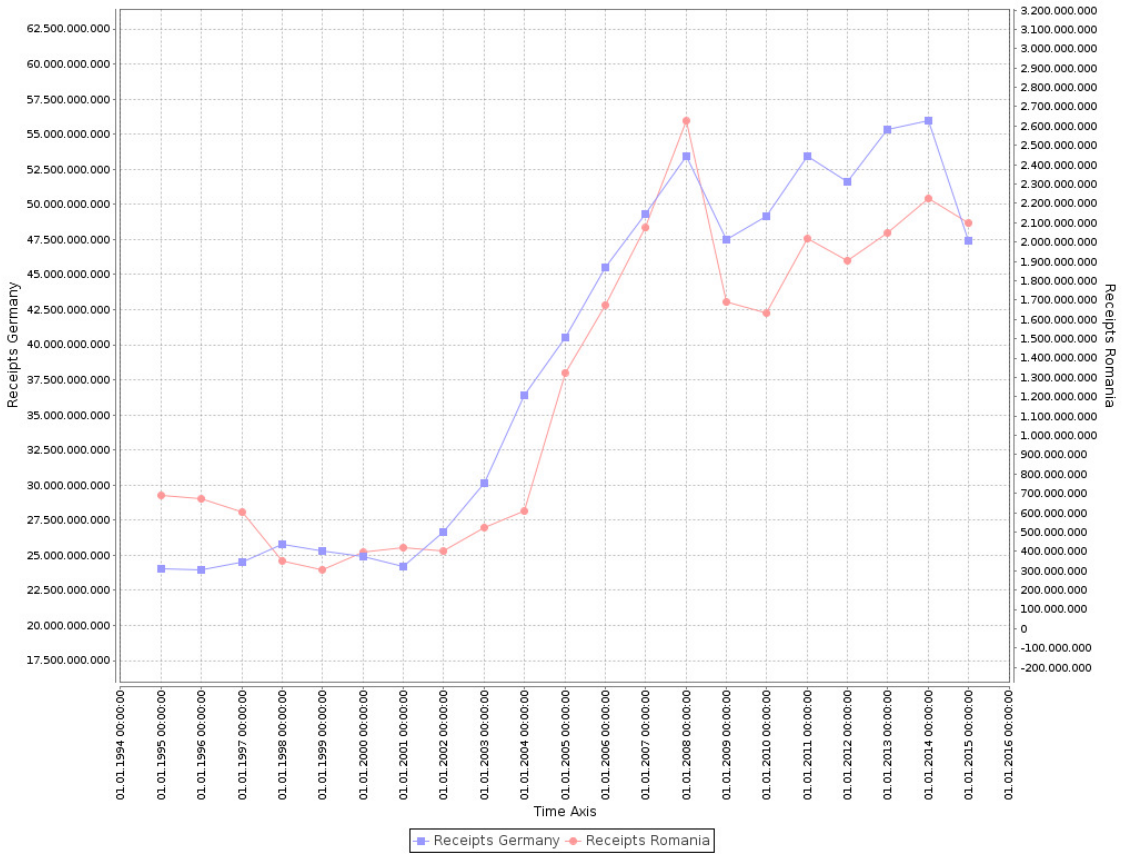


Figure 3 : Total Receipts

Source: World Tourism Organization, Yearbook of Tourism Statistics, Compendium of Tourism Statistics and data files (https://data.worldbank.org/indicator/ST.INT.RCPT.CD?locations=DE-RO)

In the chart above we can see a decrease regarding the German trend, probably due to the popularity of the Asian continent, tourists preferring the latter one. Romania's trend increased in the analyzed period, due to the beginning of awareness among foreign tourists and exploited potential.

Table 2 : Total Number of Employees in Tourism Industry

Country	Year	Number of Employees
Germany	2006	64,255
	2007	68,510
	2008	1,592,843
	2009	2,082,785
	2010	2,090,794
	2011	2,171,320
	2012	2,148,489
	2013	2,076,514
	2014	2,239,394
	2015	2,317,178

Country	Year	Number of Employees
Romania	2006	8,604
	2007	9,345
	2008	209,509
	2009	204,542
	2010	196,309
	2011	205,659
	2012	211,977
	2013	215,042
	2014	214,340
	2015	181,377

Source: Eurostat (http://ec.europa.eu/eurostat/product?code=sbs_na_1a_se_r2&language=en&mode=view) Calculation according to the definition of Eurostat: http://ec.europa.eu/eurostat/statistics-explained/index.php/Tourism_industries_-_employment

From the table above, the dissimilarity between the two countries is obvious. This difference is due to the bigger number of population in Germany, as well as the maturity of the tourism industry. The urban part predominates in the first country analyzed, which creates more demands for holidays and infrastructure. In both countries, the values are increasing and decreasing from year to year, which show the fluctuating trends of tourism.

Table 3 : Share of Population Participating in Tourism

	Year	Number of Tourists (1 Night and Over)	Population older than 15	Participation Rate
Germany	2012	54,801,532	69,554,894	78.79
	2013	54,860,590	69,840,843	78.55
	2014	53,295,033	70,125,031	76.00
	2015	53,820,334	70,510,814	76.33
Romania	**Year**	**Number of Tourists (1 Night and Over)**	**Population older than 15**	**Participation Rate**
	2012	3,874,801	16,911,747	22.91
	2013	4,230,146	16,880,465	25.06
	2014	4,201,139	16,852,702	24.93
	2015	4,357,576	16,789,563	25.95
	2016	3,961,003	16,695,321	23.72

Source: Eurostat (http://ec.europa.eu/eurostat/product?code=tour_dem_totot&language=en&mode=view, http://ec.europa.eu/eurostat/product?code=demo_gind&language=en&mode=view, http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=demo_pjanbroad&lang=en)

From the analysis above, Germany's values are bigger than Romania's, due to the number of population, urbanity and popularity among tourists. Although there is not more data available regarding the participation rate, our estimation is that the general trend in Romania is going upwards, which is underlined by the increasing number of departures and rising expenditures. In contrast, our expectation is that the participation rate in Germany is stagnating, due to the aging population and the already high level.

The analyzed social media aspects are summarized as follows:

- Share of travelers who booked online and in agencies
- Five biggest travel portals (by revenue)
- Overlaps in portals between Romania and Germany
- Highlighting of country-specific portals
- Distribution of revenues within and across countries
- Social media and collaboration features for customer-to-customer communication of the portals
- Spot checks of participation based on number of reviews on tourist hotspots
- How the credibility of the electronic word of mouth is ensured
    - Transparent number of reviews
    - Can a review be related to other activities of that user?
    - Personal information about the reviewer
    - Accessibility of reviews by rating
- Are portals offering during-trip mobile support?

To summarize, the most popular destinations among Romanian and German tourists are very similar. Europe's popular tourist destinations are Spain, Italy, Greece and Turkey, in the front-placings. Additionally the neighboring countries are found in top ten as well. An interesting fact is that Croatia seems to be far more popular in Germany than in Romania. Another interesting fact of the destinations statistics is that more German tourists travel abroad (72.6%) than Romanians (13%), due to the high poverty rate of the latter ones. While participation in tourism in Germany is more than two-thirds of the total population, it is only one-quarter in Romania (see Table 3). However, a look at the departures gives a slightly different view. There are only six times more departures in 2015 in Germany than in Romania, which is too low compared to the difference in population numbers in relation to the participation rate (see Figure 1 and Table 3). Therefore, it seems that the people who are able and willing to travel in Romania are travelling by far more often, even if the participation rate is much lower. Comparing the departures in 2015 (Germany: 83,737,000 vs. Romania 13,118,000) with the population that is participating in tourism, we can see that there are 1.55 departures per capita in Germany and 3.01 departures per capita in Romania, almost as double as in Romania compared to Germany (see Figure 1 and Table 3). An analysis of the expenditures' sheds a different light on the numbers again. The expenditures for tourism were almost 40 times higher in Germany than in Romania (Germany $88.84 b, Romania $2.33 b - 38.12 times – see Figure 2). While the tourism balance of payments is almost balanced for Romania (2015: expenditures 2.33 b, receipts 2.1 b), the Germans spend twice as much as they earn from tourism (2015: expenditures $88.84 b, receipts $47.39 b – see Figure 2 and Figure 3). The share of the biggest travel portals regarding all the tourism expenditures are as follows: Invia's revenues are more than 2.5% of the total tourism expenditures in Germany, Romania's Vola owning 1.23% of the Romanian expenditures.

Table 4 : Most Important Travel Portals in Germany (2014)

1.	Company	Invia (Former: Unister-Travel)
	Websites	ab-in-den-urlaub.de urlaubstours.de hotelreservierung.de fluege.de reisen.de
	Revenue	EUR 2B
	Social Media (review features)	The different websites use different business models; some of them are only intermediaries. When they act as seller (e.g. urlaubstours.de), they have their own review system.

	Credibility of User Generated Content	Transparent number of reviews: Yes, by age group and number of travelers (Single, Couples, Families) Can a review be related to other activities of that user? No, but the reviews are from verified customers only Personal information about the reviewer: Name, age group, date of trip Accessibility of reviews by rating: Yes, the listing can be sorted by rating
	Additional information	Trustworthiness additionally tested by Holidaytest.de
2.	Company	Expedia
	Websites	expedia.de
	Revenue	EUR 1.1B
	Social Media (review features)	Expedia powers its own review system, where only verified customers can leave their reviews. Additionally, the TripAdvisor rating and the number of TripAdvisor reviews are shown.
	Credibility of User Generated Content	Transparent number of reviews: Yes Can a review be related to other activities of that user? No, but the reviews are from verified customers only Personal information about the reviewer: No Accessibility of reviews by rating: Yes, the listing can be sorted by rating
	Additional Information	Each review can be rated as “helpful”
3.	Company	Holidaycheck
	Websites	holidaycheck.de
	Revenue	EUR 765M
	Social Media (review features)	Holidaycheck powers its own review system, where only verified customers can leave their reviews. The customers can review different aspects of each accommodation.
	Credibility of User Generated Content	Transparent number of reviews: Yes Can a review be related to other activities of that user? Yes, each user has a profile page where the activities are displayed Personal information about the reviewer: See above Accessibility of reviews by rating: Yes
	Additional information	Trustworthiness additionally tested by TÜV Süd
4.	Company	Schmetterling
	Websites	schmetterling.de
	Revenue	EUR 686M
	Social Media (review features)	No reviews, only ratings for different aspects of the accommodations are displayed
	Credibility of User Generated Content	Transparent number of reviews: Number of ratings is displayed Can a review be related to other activities of that user? No Personal information about the reviewer:

		No Accessibility of reviews by rating: No
5.	Company	eDreams
	Websites	edreams.de
	Revenue	EUR 659M
	Social Media (review features)	eDreams powers its own review system, where only verified customers can leave their reviews. The customers can review different aspects of each accommodation and even upload pictures.
	Credibility of User Generated Content	Transparent number of reviews: Yes Can a review be related to other activities of that user? Only the number of different reviews per user is displayed Personal information about the reviewer: Name, age, group Accessibility of reviews by rating: Exhaustive sort and filtering possibilities

Source: http://www.internetworld.de/bildergalerie/zehn-groessten-reiseportalbetreiber-in-deutschland-997711.html?seite=9

From the table above, we can observe that Germany has several tourism platforms due to the maturity of this industry and the population's openness regarding the online bookings.

Table 5 : Most Important Travel Portals in Romania

1.	Company	Vola
	Websites	vola.ro
	Revenue	$28.8M (2012)
	Social Media (review features)	Vola powers its own review system, where only verified customers can leave their reviews. The customers can review different aspects of each accommodation and even upload pictures.
	Credibility of User Generated Content	Transparent number of reviews: Yes Can a review be related to other activities of that user? No, but the reviews are from verified customers only Personal information about the reviewer: Full name, travelers group (Single, Couples, Families), date of review Accessibility of reviews by rating: No, the reviews are sorted descending by date
2.	Company	Direct booking
	Websites	directbooking.ro
	Revenue	-
	Social Media (review features)	Direct booking powers its own review system, where only verified customers can leave their reviews. The customers can review different aspects of each accommodation and even upload pictures Additionally, the portal provides a direct chat possibility, to contact an agency agent.
	Credibility of User Generated Content	Transparent number of reviews: Yes Can a review be related to other activities of that user? No, but the reviews are from verified customers only Personal information about the reviewer:

		Full name, travelers group (single, couples, families), date of review Accessibility of reviews by rating: No, the reviews are sorted descending by date
	Additional Information	Trustworthiness additionally tested by Trusted.ro
3.	Company	Eximtur
	Websites	eximtur.ro
	Revenue	-
	Social Media (review features)	None
	Credibility of User Generated Content	Transparent number of reviews: - Can a review be related to other activities of that user? - Personal information about the reviewer: - Accessibility of reviews by rating: -
	Additional Information	Trustworthiness additionally tested by Trusted.ro
4.	Company	Imperatortravel
	Websites	imperatortravel.ro
	Revenue	
	Social Media (review features)	
	Credibility of User Generated Content	Transparent number of reviews: Can a review be related to other activities of that user? Personal information about the reviewer: Accessibility of reviews by rating:
5.	Company	Zepelintour
	Websites	zepelintour.ro
	Revenue	-
	Social Media (review features)	None, but the rating of TripAdvisor is shown
	Credibility of User Generated Content	Transparent number of reviews: - Can a review be related to other activities of that user? - Personal information about the reviewer: - Accessibility of reviews by rating: -

Sources: https://seenews.com/news/romanias-volaro-again-tops-deloitte-technology-fast-50-ce-ranking-385435

The number of tourism portals in Romania is lower than Germany, due to the lack of infrastructure and openness to the online shopping system. Romanians prefer the classical way, choosing the agencies as travel intermediaries, instead of online platforms, the average age of the population, exceeding 40.

When comparing the online environment for travelers in Romania and Germany, the first thing that needs to be compared is the general usage of the internet when booking accommodations and means of transportation. The latest Eurostat statistics of 2014 show that just 7.1% of Romanian travelers, but 60% of German travelers booked their transportation and accommodation online (Eurostat 2016). Especially low are the numbers for domestic accommodations (5.6%) and means of transportation, other than air transportation (1.2% - Eurostat 2016). The comparison of popular online travel agencies in Germany and Romania, as listed in Table 4 and Table 5 respectively, shows that the champions in both countries rely heavily on the electronic word of mouth of their users and implement successful recommendation systems with lots of participants. While all online travel portals in Germany rely on user-generated content, the less popular ones in Romania provide only rudimentary or no social collaboration features.

Conclusions

The large number of departures compared to the low participation rate and the very low expenditures of Romanian tourists can be explained by the duration of the trips, the distance travelled, the price level in the destination country, and last but not least, the degree of the luxuriousness of the trip.

The low usage rate of online bookings in Romania seems to be driven by two factors, the availability and trustworthiness of online services on the one hand, and the behavior of customers on the other. Especially the online presence of domestic accommodation and domestic and international bus, train, and ship services could be strengthened. The stronger usage of online services for booking flights (23%) shows that people can and are willing to use online services if the services are available (which is the case for flights) (Eurostat 2016). This could make the booking processes in Romania more efficient and cost-effective. To make online services available today is extremely cost-efficient due to Airbnb services, for instance, which might be a solution for smaller hotels and guesthouses to expand their businesses without additional investments. In addition, direct customer contact through social networks will become more important in the future, being a good chance to improve online activities. Romanian portals with low numbers of reviews and ratings could try to display information in collaboration with the market leader TripAdvisor, as several German online travel agencies do. This could be a step forward in compensating the low numbers of tourists booking online and leaving reviews on the portals.

For both, German and Romanian markets, the local leaders' revenues are comparatively low, which might suggest that many people book via international platforms, where the revenues per country are not disclosed. This point would need further analysis in order to find empirical evidence.

The support for the during-trip phase of most platforms could not be evaluated properly. Even if some platforms offer maps and restaurant recommendations, there is always a lack of social interaction within these applications. In addition, it seems that people are more interested in information received from locals, due to the easier accessibility via mobile apps like Facebook, Jodel, Foursquare and others. The direct sharing of pictures and other experiences take place within social networks rather than travel platforms. Further research on the usage of mobile platforms, in the during-trip phase, would be required.

The Romanian and German markets reveal that online tourism portals and travelling agencies are not a winners-take-it-all markets. This fact make the online tourism services in Romania very interesting to observe. This country has a lot to catch-up in terms of tourism, and the numbers suggest that is on its way of doing so.

References

Akal (2004): Akal, M. (2004), *'Forecasting Turkey's tourism revenues by ARMAX model',* Tourism Management, Volume 25, Issue 5, Pages 565-580

Anderson (1998): Anderson, E. (1998), *'Customer Satisfaction and Word of Mouth'*, Journal of Service Research, Volume 1, Issue 1, Pages: 5-17

Buhalis and Law (2008): Buhali, D. and Law, R. (208), *'Progress in information technology and tourism management: 20 years on and 10 years after the Internet -The state of eTourism research'*, Tourism Management, Volume 29, Issue 4, Pages 609-623

Buttle (1998): Buttle, F. A. (1998), *'Word of mouth: understanding and managing referral marketing'*, Journal of Strategic Marketing, Volume 6, Issue 3

Brown et al. (2007): Brown, J., Broderick, A. J. and Lee N. (2007), '*Word of mouth communication within online communities: Conceptualizing the online social network'*, Journal of Interactive Marketing, Volume 21, Issue 3, Pages 2-20

Cheung and Lee (2012): Cheung, C. and Lee, M. (2012), '*What drives consumers to spread electronic word of mouth in online consumer-opinion platforms'*, Decision Support Systems, Volume 53, Issue 1, Pages 218-225

Chevalier and Mayzlin (2006): Chevalier, J. and Mayzlin, D. (2006), '*The Effect of Word of Mouth on Sales: Online Book Reviews*, Journal of Marketing Research, Volume 43, Issue 3, Pages 345-354.

Coshall (2005): Coshall, J. T. (2005), '*A Selection Strategy for Modelling UK Tourism Flows by Air to European Destinations'*, Tourism Economics, Volume 11, Issue 2, Pages 141-158

Duan et al. (2008): Duan, W., Gu, B. and Whinston, A. (2008), *'Do online reviews matter? - An Empirical Investigation of Panel Data'*, Decision Support Systems, Volume 45, Issue 4, Pages 1007-1016

Dellarocas (2003): Dellarocas, C. (2003), '*The Digitization of Word of Mouth: Promise and Challenges of Online Feedback Mechanisms',* Management Science, Volume 49, Issue 10, Pages 1407-1424

Engel et al. (1990): Engel, J., Blackwell, R. and Miniard, P. (1990), '*Consumer behavior'*, 10th Edition, Thomson/South-Western

Hennig-Thurau et al. (2004): Hennig-Thurau, T., Gwinner K., Walsh, G. and Gremler D. (2004), '*Electronic Word-of-mouth via consumer-opinion platforms: what motivates consumers to articulate themselves on the Internet?'*, Journal of Interactive Marketing, Volume 18, Issue 1, Pages 38-52

Hu et al. (2009): Hu, N., Pavlou, P. and Zhang, J. (2009), '*Overcoming the J-shaped Distribution of Product Reviews',* Communications of the ACM - A View of Parallel Computing, Volume 52, Issue 10, Pages 144-147

Law and Au (2000): Law, R. and Au, N. (2000), *'Relationship modeling in tourism shopping: a decision rules induction approach',* Tourism Management, Volume 21, Issue 3, Pages 241-249

Li et al. (2004): Li, G., Song, H. and Witt, S. F. (2004), *'Modeling Tourism Demand: A Dynamic Linear AIDS Approach'*, Journal of Travel Research, Volume 43, Issue 2, Pages 141-150

Liu (2006): Liu, Y. (2006), '*Word of Mouth for Movies: Its Dynamics and Impact on Box Office Revenue'*, Journal of Marketing, Volume 70, Issue 3, Pages 74-89.

Marthieson and Wall (1982): Mathieson, A. and Wall, G. (1982), '*Tourism: Economic, Physical, and Social Impacts'*

Minazzi (2015): Minazzi, R. (2015), '*Social Media Marketing in Tourism and Hospitality'*, Springer Press, Cham/Heidelberg/New York/Dordrecht/London, 9783319051819

Pan et al. (2007): Pan, B., MacLaurin, T. and Crotts, J. C. (2007), '*Travel blogs and the implications for destination marketing'*, Journal of Travel Research, Volume 46, Issue 1, Pages 35-45

Schindler and Bickart (2005): Schindler, R. and Bickart, B. (2005), '*Published Word of Mouth: Referable, Consumer-Generated Information on the Internet'*, Haugtvedt, C., Machleit, K. and Yalch, R.: Online Consumer Psychology: Understanding and Influencing Consumer Behavior in the Virtual World, Pages 35-61

Smeral, Egon (2004): Smeral, E. (2004), '*Long-term forecasts for international tourism'*, Tourism Economics, Volume 10, Issue 2, Pages 145-166

Song and Li (2008): Song, H. and Li, G. (2008), *'Tourism demand modelling and forecasting - A review of recent research'*, Journal of Tourism Management, Volume 29, Issue 2, Pages 203-220

Stone (1954): Stone, R. (1954), *'Linear Expenditure Systems and Demand Analysis: An Application to the pattern of British Demand'*, Economic Journal, Volume 64, Pages 511-527

Tanford and Montgomery (2014): Tanford, S. and Montgomery, R. (2014), *'The Effects of Social Influence and Cognitive Dissonance on Travel Purchase Decisions'*, Journal of Travel Research, Volume 54, Issue 5, Pages 596-610

Turner and Witt (2001): Turner, L. W. and Witt, S. F. (2001), '*Factors Influencing Demand for International Tourism: Tourism Demand Analysis Using Structural Equation Modelling, Revisited'*, Tourism Economics, Volume 7, Issue 1, Pages 21-38

UNWTO (2010): World Tourism Organization (2010), *International Recommendations for Toursim Statistics 2008*, 9789211615210

Witt et al. (2004): Witt, S. F., Song, H. and Wanhill, S. (2004), *'Forecasting tourism-generated employment: The case of Denmark'*, Tourism Economics, Volume 10, Issue 2, Pages 167-176

Xie et al (2011): Xie, H., Miao, L., Kuo P.-J. and Lee, B.-Y. (2011), *'Consumers' Responses to Ambivalent Online Hotel Reviews: the Role of Perceived Source Credibility and Pre-decisional Disposition'*, International Journal of Hospitality Management, Volume 30, Issue 1, Pages 178-183

Eurostat (2016): Eurostat (2016), *Statistics on ICT use in tourism*, <http://ec.europa.eu/eurostat/statistics-explained/index.php/Statistics_on_ICT_use_in_tourism>

Eurostat (2017): Eurostat (2017), *Tourism statistics*, viewed 11 June 2017, < http://ec.europa.eu/eurostat/statistics-explained/index.php/Tourism_statistics>

Nielsen (2012): Nielsen (2012), *State of the media: the social media report*, viewed 25 July 2017, <http://www.nielsen.com/us/en/reports/2012/state-of-the-media-the-social-media-report-2012.html>

PhocusWrigth (2013): PhocusWrigth (2013), *Optimizing the mobile travel experience*, viewed 11 August 2017, <http://www.phocuswright.com/free_reports/optimizing-the-mobile-travel-experience>

Tripadvisor/Tripbarometer (2016): TripAdvisor (2016), *TripBarometer - Traveler Trends & Motivations Global Findings*, viewed 11 August 2017, <https://www.tripadvisor.com/TripAdvisorInsights/TripBarometer-en-US>

UNWTO (2017): World Tourism Organization (2017), *Yearbook of Tourism Statistics, Compendium of Tourism Statistics and data files*: <http://data.worldbank.org/indicator/ST.INT.DPRT?locations=DE-RO>

Providing Security in Objects of Critical Infrastructure

Hana Malachová, Kamil Bednář
Department of Emergency Management
University of Defence
Brno, Czech Republic
hana.malachova@unob.cz, kamil.bednar@unob.cz

Abstract

This paper deals with the role and tasks of Active Reserve Units of Armed Forces of the Czech Republic in providing security protection to critical and defence infrastructure objects. The article defines legal framework of the issue and presents selected exercises of Active Reserve Units dealing with fulfilling tasks in the field of critical infrastructure protection in co-operation with other components of the Integrated Rescue System. Possibilities of providing security to the object are presented as well as sets of control questions for assessing physical protection of critical infrastructure object security provision in case of emergency or crisis situation of non-military character occurrence are designed using a checklist method. Causes of disruption to the national energy critical infrastructure element are shown on its example and based on the results of the checklist application; measures have been proposed to enhance physical protection of the object.

Keywords: Critical infrastructure, defence infrastructure, object, protection, Active Reserve Units of Armed Forces of the Czech Republic, object security

Introduction

Military and non-military threats to both internal and external security are increasingly overlapping and states are seeking effective measures to address these security challenges and what is more to eliminate them to the maximal extent. Providing critical infrastructure protection represents one of the key roles of Active Reserve Units when deploying them in case of declaration of the state of emergency. With the increasing number of non-military threats such as interruptions in strategic raw material supply, migration, financial crime, terrorism, cyber-attacks and deteriorating security situation in the states bordering with the member North Atlantic Treaty Organization (NATO) states and the European Union (EU), pressure is being put on Europe in the field of military capability and readiness of the individual states to withstand security threats (Ministry of Foreign Affairs, 2015).

Analysis of the current state

At present, EU states face many security threats. A lot of these threats are directed against infrastructure. The term infrastructure, in the most general concept, includes a plurality of interconnected elements that maintain the structure together. It is used in a number of areas, but the most prolific use it has in economics where it describes physical infrastructure such as buildings or roads.

Infrastructure has been defined in many ways, for example, those physical facilities that are sometimes called public works (Grigg, 1988). Public works have been defined by the American Public Works Association as follows: Public works are the physical structures and facilities that are developed or acquired by the public agencies to house governmental functions and provide water, power, waste disposal, transportation, and similar services to facilitate the achievement of common social and economic objective (Uddin, 2013). In the Czech environment, public infrastructure is defined by the Building Act (Act, 2006) as land, structures and facilities established or used for the public interest. Public infrastructure includes transport infrastructure (e.g. road communications, railways, waterways and airports), technical infrastructure (lines, construction and related technical equipment such as water mains, reservoirs, sewers, wastewater treatment plants, transformer stations, power lines and pipelines),

civic amenities (constructions, equipment and land used for example for education and training, culture, public administration and population protection) and public space (Act, 2006). Households, houses, blocks of flats, municipalities as well as the army, in the form of training and storage facilities, also have their own infrastructure.

Critical vs. Defence Infrastructure

The Czech Republic, as well as other EU countries, feels the urge to address critical infrastructure issues, and consequently its protection and defence. Critical infrastructure issue penetrates into the sphere of public life security in the sectors such as telecommunications, transport, energy supply, food and drinking water supply and functioning of state administration (Oulehlová, 2015). Critical infrastructure is defined in the Czech legal environment by the Law on Crisis Management as *an element of critical infrastructure or a system of critical infrastructure elements, disruption of which function would have a significant impact on the state security, the provision of basic living needs of the population, human health or the state economy* (Act, 2000). Basic principles of critical infrastructure protection which are subsidiarity, complementarity, confidentiality, proportionality, avoidance of duplication and stakeholder cooperation, including sharing best practices and increasing efficiency in cooperation (Bílek, 2010), are derived from the Green Paper on a European Programme for Critical Infrastructure Protection (EPCIP) (Commission of the European Communities, 2005). Government Regulation (Act, 2010) on Criteria for determining the critical infrastructure element defines cross-sectoral and sectoral criteria for identifying a critical infrastructure element. Cross-sectoral criteria include aspect of physical disability of persons, economic loss and restrictions in basic service provision to the population. By contrast, sectoral criteria specify technical and operational values and extent of impact of their function disruption. One sectoral criterion is the energy sector, including electricity, natural gas, oil and petroleum products as well as central heat supply.

Critical infrastructure objects are selected buildings and facilities of public infrastructure and other elements owned or operated by critical infrastructure bodies (Act, 2000). Crisis Management Act understands the crisis infrastructure protection as measures for reducing the risk of disruption to the critical infrastructure element function. In addition to the Integrated Rescue System (IRS) and the owners of the CI, Czech Academy of Sciences (CAS) has its share in fulfilling critical infrastructure protection tasks. Alternatively, infantry platoons of Active Reserve Units of regional military headquarters would also be used for fulfilling these tasks.

While providing defence of the Czech Republic territory, each infrastructure is unique and only the point of view of its use purpose allows its correct identification and classification as critical or defence infrastructure. The term defence infrastructure is not defined in any legal regulation; however, its definition is stated in the Plan of Operational Preparation of the Czech Republic Territory from 2015. Here the defence infrastructure is referred to as a set of objects, structures, land and equipment including necessary services, production and non-production systems essential for their operation, regardless of the form of the ownership and way of using which destruction, disturbance or limitation to their activities would, during peace, threat to the state or war condition, threaten the fulfilment of the tasks of the armed forces of the Czech Republic in the implementation of the Defence Strategy of the Czech Republic and operational plans, including mobilization measures, other components of the Security Strategy of the Czech Republic during the implementation of their partial defence strategies, the Allied armed forces in the implementation of their operational plans and protection of the population (Ministry of Defence, 2015).

The Directive on Evaluation, Selection and Protection of Defence Infrastructure Objects and Setting the Scope of the Processed Documentation defines the principles, criteria and procedures in the selection of a defence infrastructure object, specifies the scope, content, way of keeping the documentation and determines the principles of their guarding and protection. Objects of defence infrastructure for the purpose of providing defence of the state against external attack are:

(a) Objects important for state defence (OISD),

(b) Objects that may be attacked under the threat to the state or war condition, which are assessed by the regional authorities and the City of Prague City Hall, the so-called objects of possible attack (OPA).

The selection of defence infrastructure objects is based on documents related to the planning, management and organization of state defence as well as tasks that are fulfilled by the proposers, i.e. the ministries, other central administrative authorities, the Czech National Bank, intelligence services, regional offices, etc. in the field of providing defence of the state. Objects also include entities of production and non-production spheres operating facilities and buildings or providing services in defined areas of critical infrastructure.

The Defence Strategy of the Czech Republic (Act, 1999a) defines OISD as land and constructions located in military training areas and their corresponding objects, which are of political, military or economic significance for providing state defence, in particular for providing the basic functions of the state and securing the armed forces. OISD are also:

- land and constructions to which the property rights of the state and other property rights of the state are exercised by the ministry or a legal entity established or founded by it;
- land and constructions designed to protect the population;
- land, constructions and other objects of strategic importance determined by the government;
- land and constructions which may be of strategic importance under the threat to the state or war condition and are determined by the government (Act, 1999a).

As stated above, except for OISD, there are also OPA determined on the territory of the Czech Republic which, in terms of their function in providing state defence, is of no strategic importance, but they are crucial in the administrative districts of the regions and municipalities. They are crucial for:

- ensuring mobilization of the Czech Armed Forces on the regional territory,
- implementation of measures for providing defence on the regional territory,
- providing basic living needs for the population of the region,
- functioning of state administration and self-government on the regional territory.

In their assessment, regional authorities may request co-operation and cooperate with the territorially competent Regional Military Headquarters (RMH) and other territorial competent bodies, state administration and self-government bodies. Within the category of objects for maintaining the functions of the region in providing defence of the Czech Republic, fall among others, power plants and gas and electricity distribution systems. The RMH carries out exercises with soldiers of Active Reserve Units for protection of these objects exercising tasks to provide their protection. System of guarding and protection of the object in general terms results from the importance and value of the guarded object, from the possibilities of the allocated armed forces and means of the ACR and other components of the IRS and from the potential threat and risk level of its destruction (Janíček, 2010).

ACR and protection of both critical and defence infrastructure

Czech Armed Forces are also involved in the tasks of protecting critical and defence infrastructure, especially through members of Active Reserve Units. On the basis of a government decision, the units may be deployed for fulfilment of tasks in accordance with Act No. 219/1999 Coll., On the Armed Forces of the Czech Republic (Act, 1999b). As a priority, 14 territorial infantry platoons of Active Reserve Units of RMH are allocated in ACR for implementation of object security for which guarding of OISD objects can be considered one of the priority tasks. Units are trained and equipped for such activity and they create both personnel resources for the priority replenishment of selected units and equipment of the Czech Armed Forces. Their preparation and security is in charge of the RMH which, on the basis of the requirements of military units, call them up for the military exercise (Ministry of Defence, 2012).

An example of Active Reserve Units practicing the tasks of guarding objects was the co-ordination exercise Horizont 2012, in which members of Active Reserve Units of RMH Ostrava took place. The task for Active Reserve Units was to guard and defend the selected critical infrastructure object which

was power control room. The exercise took place in real conditions with a real threat scenario with participation of the members of the IRS components, the PCR and selected units of the ACR, namely the 72nd Mechanized Battalion at Přáslavice, Stará Boleslav Protective Platoon, the Chotyně Veterinary Base and the 23rd Helicopter Air Force Base at Přerov.

Another example was the Safeguard 2016 exercise which was also aimed at protecting and defending energy critical infrastructure objects, specifically the Kletná power control room. Soldiers of Active Reserve Units of RMH Ostrava participated in building the base, securing the external perimeter and security zone of the power control room critical infrastructure object. Active Reserve members practiced, among other things, conducting people and vehicle inspections and reactions to attacking the object (Police, 2017) which are important tasks for providing object protection.

The third exercise which tested preparedness of soldiers of Active Reserve Units to fulfil tasks in the operational deployment and to allocate forces and means for fulfilling tasks of the Police of the Czech Republic was Hradba 2016 exercise. Similarly during this exercise, activities in guarding the OISD were exercised as well as further activities in protection of the state border sections. Active Reserve Units were provided with co-operation by the professional units of the ACR. In general, it can be said that such exercises increase the readiness of units to perform tasks in the area of protection of the object in crisis situations (Army of the Czech Republic, 2012).

Providing security of the object

Protection means an activity that allows its permanent functionality, protection against penetration of strangers and protection against activities that would restrict its operation. Object protection is provided by technical, physical or combined security means. A detailed security description is provided below. Basic area of providing security is protection of objects and persons which is created by a system of technical, organizational and regime measures. Property security and protection is provided by:

- mechanical protection systems,
- electrical protection systems,
- physical security guard and regime measures.

Mechanical barrier systems are designed to directly secure the object by creating an appropriate barrier system, overtaking of which requires some time. If it is desirable to achieve higher security, classical protection has to be completed by electrical security systems that are able to detect unauthorized movement both inside and outside the object and pass the information to the guard of the object who subsequently intervenes.

Classical protection in the form of mechanical barrier systems has the task of creating a firm barrier and discouraging a potential intruder from the intention to commit a crime, preventing intruder from committing this crime or at least delaying its execution. Depending on which zone the mechanical barrier system or the electronic security system protects, the perimeter, sheath, space and object types of protection are distinguished. Examples of individual types of protection are shown in Table 1.

Table 1: Basic methods of providing object security protection

	Protection			
	Perimeter	**Sheath**	**Space**	**Object**
Mechanical protection systems	provides protection of the designated area and prevents unauthorized access to the third parties (fences, razor wire, entrance gate, gates, barriers)	prevents the intruder from entering a particular object (locks, doors, grilles, safety glass)	protection inside the building to prevent or delay movement of an intruder inside the building (interior doors, windows, locks)	measures to prevent the theft and unauthorized handling the protected assets (safes, safety cabinets)
Electrical protection systems	Detects disturbance to the outdoor area of an object (specially produced external technical equipment)	Announces the violation of the guarded object shell	Indicates a violation to spaces inside a guarded object	Detects the presence of the offender near a protected asset (safes equipped with a shock sensor)

Source: (Police, 2017), (Ivanka, 2010), (Lukas, 2011), (TZB-info, 2017)

By means of a suitable combination of mechanical barrier systems and electronic barrier systems, it is possible to create so-called multi-stage protection enabling to reach increased overall performance of safety elements. In addition to the above mentioned systems, organizational administrative procedures and measures have been applied with the aim to define the rules and permissions to persons, material and information when moving both inside and outside the protected object. These are directives for entering and leaving an object, asset handling, security system operation, key use regime, object security guard service, etc. The last object security system is physical guarding provided by persons who ensure the safety of protected assets by their presence in the building. The main purpose of physical guarding is to promote efficiency of other types of protection in order to detect and detain the intruder to the object. Physical security guard security is also carried out by members of the ACR.

Methods used

The following methods were used in the paper, namely the Iskihawa diagram for defining areas and causes related to security of critical infrastructure object, brainstorming method when searching for the ideas for determining the areas and causes of reducing security of the object, and a checklist for identifying potential threat, implementing the measures and checking them.

The Ishikawa diagram was designed to identify areas that could lead to a security reduction of a critical infrastructure object. This is a method for risk modelling developed by Professor Kaoru Ishikawa in 1960. Sometimes the method is called a fishbone diagram for its design. The basic idea of the diagram is the fact that each problem has its cause or a combination of different causes. It provides a systematic description of possible causes of a predefined problem and clearly and structurally identifies the most likely causes that may cause the problem (Your own way, 2017). The diagram is especially used for analysing and obtaining information about cause-effect relationships.

In addition to the information from scientific resources and exercises carried out (links), brainstorming method was used to compile the diagram. Brainstorming was performed in a group of four people who were suggesting areas and causes. At first, main areas (categories) leading to reducing the safety of the building were identified and subsequently possible causes were suggested for these areas. Brainstorming method is the idea search method. The principle of it is creative thinking of team members with the aim to create and clarify the list of ideas, problems and controversial issues. Subsequently, an evaluation of the ideas is made, in which each member expresses his or her own opinions on individual issues and develops them in detail. In the case of this research no idea was criticized or contradicted by other members and all ideas were recorded. In conclusion, ideas were recapitulated and scrutinised with the aim of their detailed clarification.

The Check List Analysis (CLA) was another method used. CLA is a simple technique that uses a list of items, steps or tasks to verify the accuracy or completeness of the procedure. CLA is often a basis of various sophisticated methods in the area of safety and risk. Analysis using the checklist is based on the practice and knowledge of the researched area. Checklist is created so that the manager, under the conditions of the ACR, the commander uses it to check the correctness and completeness of his or her actions or checked item status. The result can either be recorded as yes/no answers or more check options can be assigned to the checklist, e.g. almost meets the requirements, further check is needed, etc. CLA can be used as a preventive method as well as a method of retrospective investigation into the cause of a problem. It can verify the status of a device or the completeness of steps (ManagementMania, 2017). Checklists can be subdivided into sub-chapters according to risk sources (SBUSBS, 2017). Their structure can range from a simple list to a complex form that allows including different relative importance of the parameter (weight) within the set file. Checklists can arrange items by groups of homogeneous tasks, or items can be placed throughout the checklist in random order (Rick, 2017). The advantage of using the checklist for threat identification is its easy use for less experienced workers. The disadvantage of the checklist is the fact that it provokes tendency to mechanical approach without considering other possible alternatives and contexts. Checklists are also limited by authors‘ experience. It is therefore important that they are created by experts with experience, expertise and knowledge in the related fields (Ostrom, 2012).

Discussion

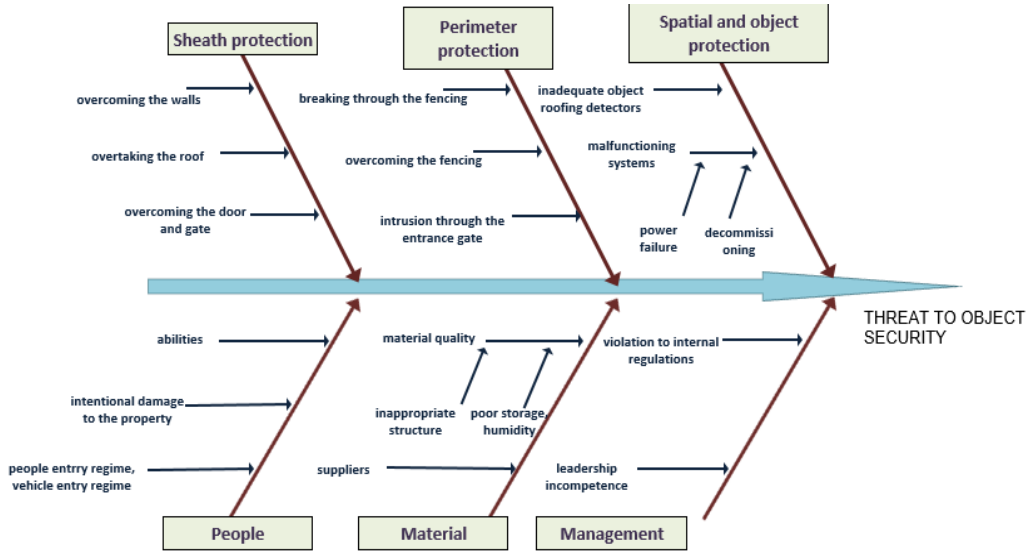
Application of the Ishikawa diagram while providing object security

Defining the consequence, i.e. the security of the object, was carried out clearly and briefly. Subsequently, the main areas of possible causes leading to the threat to the security were identified. Factors which were necessary to be taken into account comprised: material, management, people, facilities, and environment, in accordance with the basic ways of providing protection of the building, overcoming of the sheath, perimeter, spatial and object protection were determined as other areas.

The main areas that may lead to the threat to the safety of the critical infrastructure object are shown in Figure 1. Each area further breaks down into the main and secondary causes. These are the following areas and causes:

a) Sheath protection - overcoming the walls (poor technical condition, breaking through), overtaking the windows and grilles (breakage of door filling, damage to grilles), overtaking the roof (poor condition of the roofing), overcoming the door and gate (unlocking, force opening, smash in and inappropriate security lock),
b) Perimeter protection - breaking through the fencing (cutting through, breaking through), overcoming the fencing (crossing over due to the absence of concertina wire, going under it due to the absence of underground obstacles), intrusion through the entrance gate (absence of barrier, absence of security locks),
c) Spatial and object protection - inadequate object roofing detectors (low number, poor location, poor selection of detectors), malfunctioning systems (power failure, absence of generator, decommissioning, improper handling),
d) People - abilities (time of work, qualifications, male/female, physical condition, tiredness, skill), intentional damage to the property (cooperation with the intruder, theft of the property, sabotage), people entry regime, vehicle entry regime (insufficient entry check, employee negligence), identification elements (theft, loss, inappropriate manipulation),
e) Material - suppliers (inaccessibility of protective material, damage to packaging during handling), material quality (inappropriate structure, poor storage, humidity, dustiness, temperature),
f) Management – leadership incompetence (inadequate training, negligence, under-funding of preventive measures), violation to internal regulations (employee indifference, ingestion of alcoholic drinks in the workplace, granting unauthorized entry to a person into the building, deactivation of Alarm Security and Emergency Systems (ASES).

Figure 1 shows only the areas and the main causes. For clarity, only selected secondary causes in the



area of spatial and object protection and area of people are plotted.

Figure 1: Ishikawa diagram of causes leading to the threat to object security, author

Checklist design proposal for providing object security

By analyzing the causes, the team determined that the greatest effect on the result, i.e. the safety of the object, have three areas, namely the area people and overcoming the perimeter and sheath protection. Other areas should not be underestimated either; therefore the activities of the commander during object protection are also directed to these areas. It is imperative that all commanders have set up partial security aims and activities resulting from them. For this purpose, checklists structured into three parts, namely planning area, measures implementation area and review area were created.

When creating the questions of the checklist, it is necessary to stem from the risks that can threaten the object. The set of questions is open and it is appropriate to update it regularly and to supplement it by other questions, resulting from the views of experts. This provides more detailed elaboration of the questions and obtaining more specific answers.

Examples of questions for the first area, i.e. the planning area, cover questions 1-9 and focus on the implementation of preventive measures aiming at reducing the risk of object security violation. Subsequently, questions for the second implementation area were proposed, which was further subdivided into the area of resistance assessment, availability of materials needed for object protection and activities enhancing increase in resilience. This area is represented by examples of questions numbered 10-38. Questions focus on adopting necessary measures and supporting mechanisms for effective implementation. Measures should encourage participation and synergy of all soldiers and should also promote efficient communication to provide security of the facility. The aim is to minimize the risk. If possible, the risk should be eliminated. If this is not possible, it is desirable to be minimized by implementation of the activities and subsequent check-ups that form the third area, i.e. questions numbered 39-45. Proposed checklist questions are shown in Table 2.

Table 2: Checklist proposal

No.	1. Planning	YES	NO
1	Is the crisis preparedness plan available?		
2	Is an emergency plan of the object available?		
3	Is a fire plan of the object available?		
4	Is there a security check of people entering the building?		
5	Is the object perimeter monitored?		
6	Is the building equipped by an electronic security system?		
7	Are there any mechanical traps that trigger an alarm fitted?		
8	Is there a connection between different buildings?		
9	Are there slowing down retarders on the access roads?		
	2. Measures implementation	**YES**	**NO**
	a) Resistance of the object (guardhouse)		
10	Is the guardhouse (check point release) strong enough?		
11	Are places to build firing positions known?		
12	Is the guardhouse placed in a flame-proof area?		
13	Is the guardhouse well away from the fencing?		
14	Does the guardhouse have enough wall strength and adequate window size?		
15	Does the guardhouse have an emergency exit?		
	b) Material for providing security		
16	Are materials to increase resistance (sandbags, tires, barrels) available?		
17	Are nets as a protection against flying objects available?		
18	Are camouflage nets available to protect important sites?		
19	Is concertina wire available?		
20	Is material (sand, gravel, stones) for the construction of protective elements available?		
21	Are engineer tools available?		
22	Are emergency ammunition stockpiles available at firing sites?		
	c) Activities to enhance resistance		
23	Are there sandbags, tires, barrels distributed at firing sites?		
24	Are camouflage nets distributed at important sites?		
25	Are nets installed against thrown explosives and inflammables?		
26	Are emergency exits built?		
27	Are critical places of the object secured?		
28	Are there warning boards depicting the security perimeter distributed?		
29	Has any damage to the fencing been detected?		
30	Are the trees near the fencing, i.e. in the protected zone?		
31	Is it necessary to cut down trees and self-seeded trees located near the fencing?		
32	Is connection provided between the sites?		
33	Is concertina wire distributed in places where direct observation cannot be done?		
34	Are sandbags placed around the windows?		
35	Has the entrance been modified to ensure its protection?		
36	Have the firing sites been created?		
37	Has there been a shelter built inside the building to protect live power, ammunition and food?		

38	Has the emergency exit from the building been made?		
	3. Check-up		
39	Has the illumination been checked inside and outside the objects?		
40	Has the perimeter (fencing) been checked?		
41	Has the protection zone been checked?		
42	Has the connection between sites been checked?		
43	Has the emergency exits functioning been checked?		
44	Have the entrance barriers been checked?		
45	Has the check of the guardhouse resistance been carried out?		

Critical infrastructure component should evaluate security provision, primarily on the basis of legislative requirements. In the case of a critical infrastructure body, it is required to have a crisis preparedness plan of the critical infrastructure body elaborated which requirements and method of processing are stated in Government Regulation No. 462/2000 Coll. Crisis Preparedness Plan consists of basis, operational and auxiliary parts. It contains a description of potential threats and measures that should guarantee protection are set in it. The operational part of the plan provides an overview of the measures, the action plan, the internal security provision, regime measures, material and technical security arrangements, etc. Checklist proposal was designed as a tool for the commander when checking the implemented measures. Checklist monitors the measures, estimates the efficiency of the security system and deals with the constructions, raw materials, people, procedures and behaviour of individuals. The objective of monitoring is to find inadequate or insufficient measures and to identify the causes and consequences for security management. The critical infrastructure body should continuously review and improve the security management system, it should be built on the experience gained during exercises and subsequently it should apply corrective measures.

Conclusion

This paper deals with protection of the objects of critical, respectively defence infrastructure. The aim was to propose a procedure and measures to provide object security. Technical, physical and combined methods of securing the selected object and tasks of the ACR, in particular Active Reserve Units in protection of the selected objects were discussed.

In addition to the objects important for the defence of the state, the so-called objects threatened by the possible attack are also defined on the territory of the Czech Republic. These are objects that can be attacked under a state of emergency or state of war. Such objects include, for example, facilities providing services in areas of critical infrastructure such as power plants and electricity and gas distribution grids. The ACR is involved in the tasks of protecting the critical and defence infrastructure objects through members of Active Reserve Units. Active Reserve Units are predestined for implementation of security, for which they are materially equipped and their practical knowledge is practiced during military exercises.

Protection of the object is carried out not only by physical guard, but also by technical means and regime measures. The article describes basic ways of protecting the object security. Using the Ishikawa diagram, main areas of possible causes that can lead to the object security violation, namely the area of overcoming the perimeter and sheath protection and human factor have been defined. The measures proposal was therefore directed mainly towards the areas mentioned. However, even the area of management, material used and sheath and perimeter protection cannot be underestimated, so these areas were also taken into account when designing a checklist.

Checklist issues are based on the risks that may threaten the object. Proposed set of questions is open and can be supplemented according to the needs by further questions depending on the experience and knowledge of the commanders. In general, the degree of security is determined depending on the degree of risk of the protected object, value of the protected asset and capability of the intruders given by their knowledge, skills and technical equipment. It is important that a necessary number of soldiers carrying out activities leading to increase the object security were available if there is an increased risk

of disruption to such an object. To protect the facility, documentation is processed in compliance with the regulations which include measures to protect the site, persons and objects of protected interest from threats to facility safety. At the same time, it is necessary to assess the state of the site security by technical means, i.e. camera systems as well as electronic security systems.

Acknowledgment

Results presented in this article were obtained as a part of the solution of the project by Technology Agency of the Czech Republic with the topic Research and Development of Simulation Instruments for Interoperability Training of Crisis Management Participants and Subjects of Critical Infrastructure (research project No. TA04021582).

References

Act (1999a) Act No. 222/1999 Coll., of the Parliament of the Czech Republic on covering of defence of the Czech Republic. In *Collection of Law* (in Czech).

Act (1999b) Czech Republic (1999b) Act No. 219/1999 Coll., about Armed Forces of the Czech Republic. In *Collection of Law* (in Czech).

Act (2000). Act No. 240/2000 Coll., about crisis management. In *Collection of Law*. 2000 (in Czech).

Act (2006). Act No. 183/2006 Coll., Law on Spatial Planning and Building Regulations (Building Law). In *Collection of Law*, 2006 (in Czech).

Army of the Czech Republic (2012) Exercise of an Active Reserve of Regional Military Headquarter Ostrava finished the Struggle for Electric Power. [Online], [Retrieved August 08, 2017], http://www.acr.army.cz/vycvik-a-nasazeni/aktivni-zaloha/aktuality/cviceni-aktivni-zalohy-kvv-ostrava-vyvrcholilo-bojem-o-elektrorozvodnu-73849/ (in Czech).

Bílek, M. (2010) Critical Infrastructure Problems. ČEPS. [Online], [Retrieved September 09, 2017], http://ceses.cuni.cz/CESES-70-version1-KI.pdf (in Czech).

Commission of the European Communities (2005). Green Paper on a European Program for Critical Infrastructure Protection. KOM (2005) 576.

Act (2010). Government Regulation 432/2010, on Criteria for Determining Critical Infrastructure Element (in Czech).

Grigg, N. S. (1988). Infrastructure engineering and management, Wiley, New York. John Wiley & Sons Australia, Limited, New York, p. 380.

Ivanka, J. (2010), "Mechanical barrier systems" Tomas Bata University in Zlin, 151 s. ISBN: 978-80-7318-910-5 (in Czech).

Lukáš, L. (2011), "Security technologies, systems and management I", VeRBuM, 316 s. ISBN: 978-80-87500-05-7 (in Czech).

Management Mania (2017). Checklist analysis – CLA. [Online], [Retrieved July 15, 2017], https://managementmania.com/cs/analyza-kontrolni-seznam-cla-checklist-analysis

Ministry of Defence (2012) Concept of Active Reserve of the Armed Forces of the Czech Republic. Prague: Ministry of Defence (in Czech).

Ministry of Defence (2015) Plan of operational preparation of state territory of the Czech Republic (in

Czech).

Ministry of Foreign Affairs (2015). Security Strategy of the Czech Republic. Prague. ISBN 978-80-7441-005-5 (in Czech).

Ostrom, L.T (2012) Risk Assessment Tools, Technics and their Application, John Wiley and Sons Ltd. ISBN: 978-0-4708920-3-9.

Oulehlová, A.; Barta, J.; Malachová, H., Urbánek, J. (2015) Requirement engineering for emergency simulations. In: *IFIP Advances in Information and Communication Technology***.** Melbourne, Australia: Springer New York LLC, pp. 388-396. ISSN 1868-4238. ISBN 978-3-319-15993-5.

Police (2017). Active Reserve of the Army of the Czech Republic successfully defence the Electric Power [Online]. [Retrieved August 18, 2017], http://tydenikpolicie.cz/aktivni-zalohy-acr-uspesne-ubranily-elektrorozvodu/ (in Czech).

Janíček (2010). Protection of Defence Infrastructure, Uherské Hradiště (In Czech).

Rick, J. (2017). "Checklist method of performance evaluation". [Online], [Retrieved July 16, 2017], http://www.blackwellreference.com/public/tocnode?id=g9780631233176_chunk_g97814051169786_ss1-15

CBUSBS (2017). Risk Assessment. [Online], [Retrieved July 16, 2017], http://www.cbusbs.cz/docs/13_hodnocenrizik.pdf (in Czech).

TZB-Info (2017). Mechanical barrier systems. [Online], [Retrieved August 20, 2017], http://www.orsec.cz/cs/technika/produkty/mzs/ (in Czech).

Uddin, W.; Hudson; W. R.; Haas, R. (2013) Public Infrastructure Asset Management, 544 p, ISBN 978-0-07-182012-7.

Your own way (2017). Ishikawa diagram. [Online], [Retrieved August 08, 2017], http://www.vlastnicesta.cz/metody/ishikawa-diagram-1/

Can Different Professionals Talk and not Talk to Each Other at Once? Provisional Relations as Boundary Spanning Strategies between Management Academics and Practitioners

Paula Ungureanu, Department of Sciences and Methods for Engineering (DISMI), University of Modena and Reggio Emilia, Reggio Emilia, Italy, University of Modena and Reggio Emilia
paula.ungureanu@unimore.it

Fabiola Bertolotti, Department of Sciences and Methods for Engineering (DISMI), University of Modena and Reggio Emilia, Reggio Emilia, Italy, University of Modena and Reggio Emilia
fabiola.bertolotti@unimore.it

Abstract

This study contributes to a better understanding of how individuals belonging to different occupational communities negotiate pressures for stability and change during cross-boundary exchanges. We describe micro-dynamics of boundary work enacted by two communities of organizational scholars and management practitioners that come together and interact during a one-year executive master's program. By looking at how scholars and practitioners negotiated multiple pressures for stability and change (i.e., conformity with or deviance from the knowledge frames of their occupational communities of reference) we identify a set of resourceful strategies called *provisional relations* and discuss a series of implications for the literature on boundary spanning. Specifically, we propose a social interactionist perspective on change that addresses issues such as occupational interdependencies, mechanisms for coping with multiple simultaneous occupational exchanges, hybrid systems of expertise, and continuous transformation.

Keywords: occupational communities, executive education, provisional relations, interaction strategies, expertise, knowledge exchange, academics, practitioners.

Introduction

Since the late '80s, an increasing number of studies have investigated how members of different communities of practice manage to engage in significant exchanges despite intercommunity differences (Bechky, 2003a, 2003b, Carlile, 2002, 2004, Lave and Wenger, 1991, Brown & Duguid, 1991, Van Maanen & Barley, 1984). The basic assumption is that individuals make sense of events from within the context of their unique work cultures (Kunda, 2006, Martin, 1992, Van Maanen & Barley, 1984). In particular, not only do they acquire the value, norms, practices, artifacts and idioms of the occupational community to which they participate, but they also carry the community's imprinting in all the exchanges in which they take part (Bechky, 2003a, Brown & Duguid, 1991, Orr, 1990). This equals to saying that members of two institutionalized occupational communities that engage in social exchanges are likely to employ different sets of knowledge, make use of different repertoires of practices and routines to handle common tasks, putting in use different patterns of communication drawing on distinct cultural and symbolical tools. However, according to cross-boundary literature, differences do not constitute obstacles to exchanges *per se,* because they can become object of negotiation. Each community is organized around a core structure that is repository of unique, well-guarded characteristics and around a periphery where less exclusive characteristics can be translated to people outside the community, such as members of other communities, lay public or amateurs (Lave & Wenger, 1991, Van Maanen & Barley, 1984). The

more exchanges relate to core-expertise, the higher their costs (Barley & Kunda, 2001, Carlile, 2002, Dougherty, 1992). It results that negotiation is more likely to occur at the periphery, in partially overlapping boundaries arrays (Carlile, 2002, Bechky, 2003, Yanow, 2004), called also peripheral participation areas (Lave & Wenger, 1990), liminal spaces (Howard-Grenville et al., 2011, Bechky, 2006a), or trading zones (Kellogg et al., 2006). Boundary objects constitute one way to govern these exchanges. A boundary object is a work artifact which is both plastic enough to adapt to the local constraints of each group, and yet resilient enough to maintain a common identity across occupational groups (Star & Griesemer, 1989). CT scanners, 3D prints, CAD systems, machine drawings and prototypes constitute examples of boundary objects (Bechky 2003a, Bertolotti et al., 2004, Boland et al., 2007; Carlile 2002, Nicolini et al., 2012). Other studies point out to the importance of brokers that facilitate knowledge exchanges among experts, reinterpreting meanings in ways that are acceptable to all involved parties (Hargadon & Bechky 2006, Pawlowski & Robey 2004).

However, studies show that members of different occupational communities that are called to negotiate expertise issues within boundary settings may become caught between the need to remain coherent with their communities of practice and the need to change in order to successfully exchange knowledge with outsiders (Bechky, 2003a, Carlile 2002, 2004, Carton & Ungureanu, 2017, Howard-Grenville et al., 2011, Kellogg et al., 2006). Studies suggest that over time individuals make efforts to construct frames that allow them to deal with new requests coming from outsiders, yet without growing too distant from the knowledge repositories they have access to as insiders of a community of practice (Brown & Duguid, 2001). Yet, some contributions also show that constantly oscillating between reinforcing community-specific knowledge and adopting it to meet requirements coming from the outside may lead to significant changes at the institutional level, such as, for instance, how a knowledge community is perceived with respect to others and how it defines its occupational jurisdiction (see Barley, 1986, 1990, Carton & Ungureanu, 2017). However, in many cases boundaries between different professional, occupational or organizational communities are blurred, and hardly can they be identified as separated fields of culture and practice (see Kellogg et al., 2006, Orlikowski, 2000). For instance, members of a given community often hold, simultaneously, memberships in different communities of practice. At the same time, members of the same occupational communities may have different positions inside a community, according to the relations that they build with outsiders (Osterlund & Carlile, 2003). It is thus interesting to understand to which extent assumptions of intra-community homogeneity and inter-community heterogeneity hold in such situations, and how they are conceptualized by individuals that are tied together in heterogeneous loosely coupled networks and with what consequences on change-stability strategies (Bruns, 2013, Edmondson & Nembhard, 2009, Osterlund & Carlile, 2003). For instance, how are systems of expertise created and maintained in conditions of overlaps and interdependencies between different practice communities? How do individuals manage to cope with multiple exchange frameworks occurring simultaneously or at short intervals of time? For instance, Carton and Ungureanu (2017) discuss the emergent case of a new professional figure, the scholar-practitioner, showing that the struggles to carve out a distinct professional space in between traditional academia and traditional business practice is not only particularly challenging but ultimately shapes how these professionals see themselves, and what they are willing to do to defend who they are. As they operate on a continuum, with pressures for role segmentation (as determined by the institutional environment) at one end, and pressures for role integration (as driven by their own professional aspirations) at the other, they run across the two worlds with the help of segmentation strategies and integration strategies.

While some have argued that members of different communities of practice enjoy rather stable patterns of interaction such as roles, organizational functions or professional careers within reference communities (Barley, 1986, Bechky, 2003a, Bunderson & Sutcliffe, 2002, Sole & Edmondson 2002), others have shown that cross-boundary exchanges are often marked by volatility, high speed, uncertainty, and rapid change, leaving thus more space for pluralism (Kellogg et al., 2006, Majchrzak et al., 2012). For instance, Faraj and Xiao's (2006) study of coordination in emergency medical procedures shows how easy it can be for different experts to suspend occupational boundaries when required to do so. The authors examine

how anesthetists, operating practitioners and recovery nurses work together in a medical trauma center - a fast-paced setting where building shared understandings is too costly in terms of time and effort, showing the centrality of the ability to temporarily suspend disciplinary boundaries and improvise. Similarly, Ungureanu and Bertolotti (2016) suggest that suspending boundaries is a trial and error process, in which members of the two communities start off with the procedures they are most familiar with and if these do not work, they try out new procedures which require an increasing degree of empathy and creativity. It is thus important to understand how more or less stable conditions of exchange shape cross-boundary relations. Most studies have been concerned either with how occupational communities create a sense of belongingness that enables them to distinguish from other occupational communities or with how they manage to share knowledge across boundaries. As a consequence, the resourcefulness of work communities in defending occupational jurisdictions has been documented just as much as their ability to move, reshape and even tear apart pre-defined boundaries to accommodate interactions with other communities (see Bechky, 2003b, Boland & Tenkasi, 1995, Hansen, 1999, Okhuysen & Eisenhardt, 2002). However, the passage from costly knowledge exchanges to interaction outcomes such as appropriating terminologies, assimilating knowledge, configuring artifacts or aligning interests and intentions (Carlile, 2004) appears abrupt and underspecified. This way, we often do not get a sense of how the two aspects interplay to constitute boundary work. As a consequence, the potential conflicts or contradicting interests that may go side by side with knowledge sharing remain difficult to grasp (Osterlund & Carlile, 2005). Specifically, it is not clear what happens between members of different occupational communities once the interaction commences that enables them to go from the almost impossibility of understanding each other to the concreteness of doing things together. At the same time, it is unclear how occupational communities manage to maintain distinctiveness once they establish common backgrounds with other communities. Understanding how individuals draw on occupational membership, expertise and public acknowledgement to engage in cross-boundary exchanges can provide an integrative framework for these questions.

Three considerations can contribute to an integrative perspective. First, to see occupational membership and expertise as homogeneous within and heterogeneous in between allows for parsimonious explanations about success and failure in intercommunity exchanges but it also precludes a fine-grained understanding of how workers with multiple memberships and hybrid knowledge systems actually manage to either communicate despite differences or maintain distinctiveness despite a common background (Ungureanu & Bertolotti, 2016). Second, boundary work should thus include the intentions of individuals that engage in knowledge exchanges and the particularities of the exchange context itself. For instance, how do individuals make sense of the different systems of social knowledge and expertise they come across with? When are they likely to draw on their knowledge repertoires and when will they combine different systems of expertise in new ways in order to meet exchange requirements? Importantly, how do we conceptualize boundaries under such complex and multi-layered conditions?

Research Context and Methods

The paper brings examples from a study of two experienced communities of management academics and business practitioners that came together during a one-year executive program and interacted about how to manage technological innovation, each from an expert standpoint. We have chosen an extreme case to study the interaction mechanisms that regulate exchanges between two communities of practice that are said to be as homogeneous and connected within as they are heterogeneous and disconnected in between. For instance, it is widely acclaimed that there is a wide gap between organization science and business practice, since academics and practitioners belong to different worlds and operate with different bodies of expertise between which exchanges are often difficult, costly, even impossible to achieve. Particularly, the gap between theoretical and practical expertise is sought to encourage self-referentiality, hamper functional exchanges, and lead to a preoccupying incommunicability between academics and practitioners (Baldridge et al., 2004, Hambrick, 1994, Starkey & Madan, 2002). By studying a mundane

context in which academics and practitioners did actually have the chance to interrelate, we were able to take a fine-grained look at their interaction strategies. In particular, we were less worried about witnessing a successful or unsuccessful case of collaboration, than we were interested in studying academics and practitioners inter-subjectively, as they became aware and struggled to make sense of each other. Additionally, studying academics and practitioners when occasionally called to interact provided information also about those times or situations in which they were not called to do so. We thus focused on what the informants developed together in classroom but also on who they were outside the classroom, in their day-to-day worlds (Howard-Grenville et al., 2011, Weber & Dacin, 2011). Specifically, we tried to pay attention to the groups and communities they identified with, to how they attributed -or refused to attribute- specific types of knowledge systems to each membership and to how these were used in classroom interaction, as they tried to make sense of each other over time. By unfolding such micro-patterns of interaction we hope to advance the literature on how cross-boundary collaboration is initiated, maintained, negotiated, and transformed, but also to generate a better understanding of how we distinguish between the core expertise –or professional jurisdictions- of members of different communities of practice, in general, and between those of organization scholars and management practitioners, in particular. We collected our data through 225 hours of participant observation in the classroom and 70 in depth, face-to-face semi-structured interviews with academics and practitioners. In addition, we had full access to documents produced during the executive program. The material collected was coded following a grounded theory approach (Strauss & Corbin, 1998).

Findings

Instead of a single gap between two distinct communities of practice, the study points to the existence of manifold cross-community gaps and tangles that academics and practitioners draw upon each time they are called to interact. We show that when they are required to come together, members of separate and self-referential communities manage to speak to each other in mutually intelligible, socially acceptable ways. Even though they initially lack the common ground for sharing knowledge effectively and the common tools to avoid conflicts and misunderstandings, they are able to enact a series of sophisticated strategies, here called provisional relations, through which they build temporary and malleable bridges to their exchange partners. This study shows that this occurs because each exchange is latently supported by myriads of exchanges in which members take part in other contexts. Specifically, scholars and managers participate in multiple social relations and hold multiple memberships as part of their day-to-day lives. Classroom exchanges between academics and practitioners were not isolated dyads. Instead, each exchange was immersed in constellations of relations that implied the peripheral involvement of many other actors. During the program, business school staff, program coordinators, tutors, organizers, consultants, management gurus and public figures came in and out of the executive classroom. Although their level of inclusion varied -not all actors were involved all the time, nor was their involvement uniform throughout -they all occupied specific places in the local relational networks. All actors co-produced management labels and ideas, enacted their own practices, and had their own vision about managing technological innovation. Through their presence, each actor had an orientation towards the trajectories of the other actors, brokering between self, interaction partners and the other actors in the business school context. However, they were not necessarily those who brokered the exchanges between academics and practitioners. Instead, academics and practitioners had to manage themselves the multiple exchanges in the program (in situ), but in order to do so, they constantly drew on exchanges they were involved in outside the classroom (ex-situ). For instance, in support of classroom interaction, both academics and practitioners mentioned their experience as researchers and managers, as teachers and students, as bosses and subordinates, as colleagues, friends, parents, citizens, learners and doers. Research sites, company offices, laboratories, scholarly journals, peer reviewers, faculty, students, co-workers and bosses were time after time symbolically brought in as to mediate classroom discussions.

In other words, managers and scholars managed to interact by drawing malleably and creatively on ex-situ exchanges, according to purposes at hand. From this perspective, even exchanges that were liminal, isolated or occasional often interpenetrated other social exchanges, becoming relational constellations - relations which draw on broader systems of relations. Exchanges were generative and transformational precisely because actors combined in situ and ex-situ elements. Yet this creative process was neither linear nor straightforward because of the multiplicity of roles and heterogeneity of the implied commitments. When they first stepped into the classroom, for instance, academics and practitioners had little knowledge of each other. Although they were supposed to collaborate, there were no rules concerning how collaboration would occur. Both academics and practitioners had to come up with strategies for building a common ground for communication, and these were based on approximations, inferences and trials and errors. For instance, actors presented themselves in ways suitable to whomever they were talking to, and they made stereotypical inferences about who they were talking to in ways acceptable to themselves. As the interactions unfolded, however, both the self-definitions and the stereotypes were challenged and revised to incorporate new elements. Participants refused predetermined labels and invited each other to explore contextualized descriptions. Over time, the task of dealing with multiple invitations and resistances increased classroom involvement but also increased conflict and tension. Although commitments inside and outside the classroom were often different, actors were nevertheless able to sustain all of them in their interactions and without trade-offs, by enacting sophisticated interrelation strategies that we labeled provisional relations. In particular, in order to nurture in situ classroom interaction, academics and practitioners temporarily dis-involved themselves ex-situ. As they moved towards ex-situ situations again, they became re-involved and selectively incorporated in situ fragments (see figure 1). For instance, when faced with misunderstandings, conflicts, resistance and challenges, academics and practitioners avoided relational breakdowns by giving the impression they understood each other as if they were part of the same occupational community (i.e., promoting involvement from the inside). They did so by expanding their knowledge and practices into the meaning worlds of their interlocutors in myriads of temporary, partial and ephemeral ways. An evocative metaphor would be that of stepping into each other's shoes, but only halfway: while one foot tries on new pairs of shoes, the other one systematically returns to base, as in a dance that balances alternations. This metaphor is well exemplified in an academic's description of the dynamics characterizing his relationship with program participants. When actors wanted to take a discussion to a new level, they had to get involved in the reactions and invitations of those with whom they were conversing. This required empathic rephrasing –summarizing what the interlocutor had said using her standpoint- and perspective taking – trying to take on the discourse from where the other had left it. For instance, as they struggled to show each other their willingness to connect, academics and practitioners adopted imitation strategies: they made use of each other's distinctions and conceptual categories, took up similar voice tones and even used similar speech cadencies.

Due to the constant dance between involvements, dis-involvements and re-involvements exchanges in the classroom were dynamic, generative and transformational: academics and practitioners explored each other's worlds and together built a series of scenarios but without tying themselves irremediably to any of them. Interestingly, while playing with provisional self-extensions, actors almost managed to switch roles. Academics passed from theorizing to practicing, and practitioners engaged in broad theorizing activities under academic supervision. These findings were surprising because they indicated that theoretical and practical expertise were not characteristics that exclusively defined the jurisdictions of the two communities, but could be transformed and manipulated, appropriated or dis-involved according to the situation and purposes at hand. In other words, theories of practices were objects of exchange that were constituted as systems of provisional relations that drew on broader systems of relationships. For instance, sometimes academics and practitioners spoke to each other, other times they seemed to address an invisible listener such as a judge or an alter-ego. Even more frequently they seemed to address their own colleagues and co-workers who were not physically present, as if they were continuing conversations initiated elsewhere, in their own occupational realms. Despite some differences between temporarily switching perspectives and aligning them sequentially, all scripts implied trials and errors that enabled

actors to cast blame and take responsibilities, to act and react spontaneously, but without remaining in the same position long enough to solidify any particular relation.

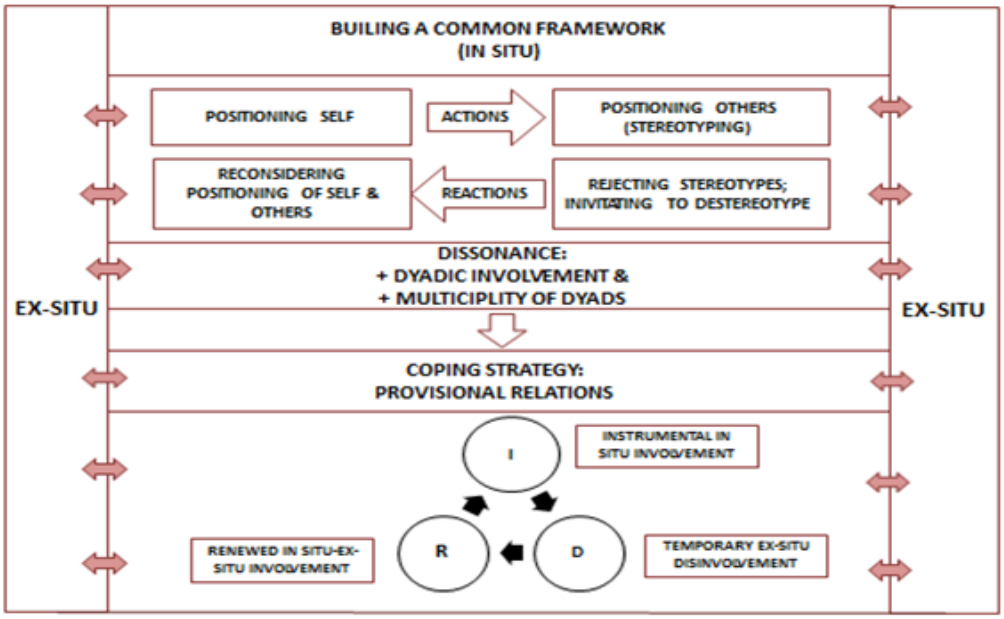


Fig.1: Mechanisms of multiple inter-community exchanges. Provisional relations

Implications and contributions to literature

The study problematizes the idea that different occupational communities have exclusive systems of expertise. By discussing the role that provisional exchanges and relational constellations play in the interaction of experts from different communities of practice, the study stresses the importance of seeing boundary work as relational rather than structural, expertise as socially entangled rather than community-specific, and exchanges as fluid, fast-paced, generative and constantly becoming instead of given. At the same time, social dynamics such as conflicts, dissonance and misunderstandings, or elements of complexity such as multiplicity and heterogeneity are treated symmetrically with respect to concepts which have received more attention in the cross-boundary literature, such as stability, homogeneity and knowledge sharing (Kellogg et al., 2006, Majchrzak et al., 2012). Generally, multiplicity, fragmentation and heterogeneity have been considered problematic for cross-community exchanges because they hinder knowledge flows, obstruct collaborations, slow down change and enhance local power mechanisms. However, this study points out that heterogeneous exchanges that become tied in relational constellations are 'windows for opportunity' (Tyre & Orlikowsky, 1994), through which transformation occurs. Thus different interests, knowledge and practices, are not necessarily what keeps different communities apart; they are 'inter-esse' (Latour, 1987), the junction points lying in between them. Just like the communities enacting them, exchanges have no beginning or end, and no definitive manifestation. Instead, they are always in the middle, between things, inter-being or 'inter-mezzo'. As such, conglomerates of management and managerial concepts, technologies, theories, rituals and practices are in a constant flux that traverses managerial and scholarly communities (Carton & Mouricou, 2017). However, a knowledge society is not simply a society of more experts and more technological gadgets and more specialist interpretations. It is a society permeated with interlocking knowledge cultures where one of the most challenging goals is to understand how interlocking processes occur (Knorr-Cetina, 1999). Our study describes the process by which actors plug and play when engaged in interoccupational exchanges (Faraj

& Xiao, 2006, Ungureanu & Bertolotti, 2006) that is, how they develop the ability to understand others' point of view, anticipate reactions, intuit preferences, and make assumptions about others' expectations and turn these into sources of personal advantage.

References

Baldridge, D.C., Floyd, S.W., & Markoczy, L. (2004). Are managers from mars and academicians from venus? Toward an understanding of the relationship between academic quality and practical relevance. *Strategic Management Journal*, 25(11), 1063-1074.

Barley, S.R. (1986). Technology as an occasion for structuring: Evidence from observations of ct scanners and the social order of radiology departments. *Administrative Science Quarterly*, 78-108.

Barley, S.R. (1990). The alignment of technology and structure through roles and networks. *Administrative Science Quarterly*, 61-103.

Barley, S.R., & Kunda, G. (1992). Design and devotion: Surges of rational and normative ideologies of control in managerial discourse. *Administrative Science Quarterly*, 363-399.

Bechky, B.A. (2003a). Sharing meaning across occupational communities: The transformation of understanding on a production floor. *Organization Science*, 14(3), 312-330.

Bechky, B.A. (2003b). Object lessons: Workplace artifacts as representations of occupational jurisdiction. *American Journal of Sociology*, 109(3), 720-752.

Bertolotti, F., Macrì, D. M., & Tagliaventi, M. R. (2004). Social and organisational implications of CAD usage: a grounded theory in a fashion company. *New Technology, Work and Employment*, 19(2), 110-127.

Boland Jr, R. J., Lyytinen, K., & Yoo, Y. (2007). Wakes of innovation in project networks: The case of digital 3-D representations in architecture, engineering, and construction. *Organization Science*, 18(4), 631-647.

Boland, R. J., & Tenkasi, R. V. (1995). Perspective making and perspective taking in communities of knowing. *Organization Science*, 6(4), 350-372.

Brown, J.S., & Duguid, P. (1991). Organizational learning and communities-of-practice: Toward a unified view of working, learning, and innovation. *Organization science*, 2(1), 40-57.

Bruns, H.C. (2013). Working alone together: Coordination in collaboration across domains of expertise. *Academy of Management Journal*, 56(1), 62-83.

Bunderson, J.S., & Sutcliffe, K.M. (2002). Comparing alternative conceptualizations of functional diversity in management teams: Process and performance effects. *Academy of Management Journal*, 45(5), 875-893.

Carlile, P.R. (2002). A pragmatic view of knowledge and boundaries: Boundary objects in new product development. *Organization Science*, 13(4), 442-455.

Carlile, P.R. (2004). Transferring, translating, and transforming: An integrative framework for managing knowledge across boundaries. *Organization Science*, 15(5), 555-568.

Carton, G., & Mouricou, P. (2017). Is management research relevant? A systematic analysis of the rigor-relevance debate in top-tier journals (1994–2013). *M@ n@ gement*, 20(2), 166.

Carton, G., & Ungureanu, P. (2017). Bridging the Research–Practice Divide: A Study of Scholar-Practitioners' Multiple Role Management Strategies and Knowledge Spillovers Across Roles. *Journal of Management Inquiry*, 1056492617696890.

Dougherty, D. (1992). A practice-centered model of organizational renewal through product innovation. *Strategic Management Journal*, 13(S1), 77-92.

Edmondson, A.C., & Nembhard, I.M. (2009). Product development and learning in project teams: The challenges are the benefits*. *Journal of Product Innovation Management*, 26(2), 123-138.

Faraj, S., & Xiao, Y. (2006). Coordination in fast-response organizations. *Management Science*, 52(8), 1155-1169.

Hambrick, D.C. (1994). What if the academy actually mattered? *Academy of Management Review*, 19(1), 11-16.

Hargadon, A., & Sutton, R. I. (1997). Technology brokering and innovation in a product development firm. *Administrative Science Quarterly*, 716-749.

Howard-Grenville, J., Golden-Biddle, K., Irwin, J., & Mao, J. (2011). Liminality as cultural process for cultural change. *Organization Science,* 22(2), 522-539.

Kellogg, K.C., Orlikowski, W.J., & Yates, J. (2006). Life in the trading zone: Structuring coordination across boundaries in postbureaucratic organizations. *Organization Science*, 17(1), 22-44.

Knorr-Cetina, K. (1999). *Epistemic cultures: How the sciences make knowledge*: Harvard University Press.

Latour, B. (1987). *Science in action: How to follow scientists and engineers through society*: Harvard University Press.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*: Cambridge university press.

Majchrzak, A., More, P.H.B., & Faraj, S. (2012). Transcending knowledge differences in cross-functional teams. *Organization Science*, 23(4), 951-970.

Martin, J. (1992). *Cultures in organizations: Three perspectives*: Oxford University Press.

Nicolini, D., Mengis, J., & Swan, J. (2012). Understanding the role of objects in cross-disciplinary collaboration. *Organization Science*, 23(3), 612-629.

Okhuysen, G. A., & Eisenhardt, K. M. (2002). Integrating knowledge in groups: How formal interventions enable flexibility. *Organization Science*, 13(4), 370-386.

Orlikowski, W.J. (2000). Using technology and constituting structures: A practice lens for studying technology in organizations. *Organization Science*, 11(4), 404-428.

Orr, J.E. (1996). *Talking about machines: An ethnography of a modern job:* Cornell University Press.

Østerlund, C., & Carlile, P. (2005). Relations in practice: Sorting through practice theories on knowledge sharing in complex organizations. *The Information Society*, 21(2), 91-107.

Pawlowski, S. D., & Robey, D. (2004). Bridging user organizations: Knowledge brokering and the work of information technology professionals. *MIS quarterly*, 28(4), 645-672.

Sole, D., & Edmondson, A. (2002). Situated knowledge and learning in dispersed teams. *British Journal of Management*, 13(S2), S17-S34.

Star, S. L., & Griesemer, J. R. (1989). Institutional ecology, translations' and boundary objects: Amateurs and professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39. *Social studies of science*, 19(3), 387-420.

Starkey, K., & Madan, P. (2002). Bridging the relevance gap: Aligning stakeholders in the future of management research. *British Journal of Management*, 12(s1), S3-S26.

Strauss, A., & Corbin, J. 1998. *Basics of qualitative research*: Thousand Oaks.

Tyre, M.J., & Orlikowski, W.J. (1994). Windows of opportunity: Temporal patterns of technological adaptation in organizations. *Organization Science*, 5(1), 98-118.

Ungureanu, P., & Bertolotti, F. (2016). Beyond boundaries. A relational study of knowledge exchanges between management scholars and business practitioners in executive classrooms. Paper presented at the 76th Annual Meeting of the Academy of Management, AOM 20162016, Pp. 1393-1398. DOI: 10.5465/AMBPP.2016.110.

Van Maanen, J., & Barley, S.R. (1984). Occupational communities: Culture and control in organizations. Research in Organizational Behavior. eds. B. Staw, L. Cummings, 6.

Weber, K., & Dacin, M.T. (2011). The cultural construction of organizational life: Introduction to the special issue. *Organization Science*, 22(2), 287.

Yanow, D. (2004). Translating local knowledge at organizational peripheries. *British Journal of Management*, 15(S1), S9-S25.

Romanian certified seed production. Evolution and characteristics in the international context

Dinca Cristina, "Dunărea de Jos" University of Galaţi, Galati Romania,
dincacristina2007@yahoo.com
Băcanu (Serban) Constanța, "Dunărea de Jos" University of Galaţi, Galati Romania,
serbancing@yahoo.com
Ion Iuliana Manuela, "Dunărea de Jos" University of Galaţi, Galati Romania,
iuliana.ion12@yahoo.com
Stanciu Silvius, "Dunărea de Jos" University of Galaţi, Galati Romania,
sstanciu@ugal.ro

Abstract
Advanced agricultural production currently depends on factors such as soil quality, agricultural works, the quantity of water available to plants during cultivation (either from natural rainfall or irrigation), farming treatments applied, yearly temperature regime and others. A particularly important element is the seed material used by farmers, which may be responsible for the quantity and quality of the agricultural production, for the food security of the region and, in some cases, for the safety and health of the population. The article carried out an assessment of the national production of certified seeds, analysing and interpreting the areas assigned for this activity and the production obtained at the county level during the period 2014-2017. The assessment of the concentration of the seed market in Romania, by calculating the GS Index, revealed high values of the indicator and a high degree of concentration of the market. The research has led to interesting results on the development of this segment of the agricultural product market, which can be useful to farmers and the national business environment.

Keywords: agriculture, certified seeds, concentration of the market, Gini Struck Index, Romania

Introduction

Obtaining certified seeds represents the basis for modern agriculture. The availability, access and use of quality seeds of adaptable crops are essential elements for increasing the agricultural productivity, ensuring the food security and improving the farmers' source of income (Bishaw, Niane and Gan, 2007). In many countries, seed production and trade are important elements in rural employment, generating important sources of income for farmers (Organization for Economic Cooperation and Development, OECD, 2012). Investments in competitive agriculture, increased productivity and high yields can be optimized by giving farmers access to high-quality seed for the agricultural crops. The quality of the seed material is one of the main factors that can affect the plant production potential. The quality of certified seeds used as a basis for the consumer production is given by the key attributes of the basic varieties (genetic quality, physical and physiological characteristics, health status), by the environmental conditions in which crops are developed, the agricultural production practices, or even by the storage conditions. Maintaining high seed quality is essential because the variety must meet the expectations of farmers and consumers. Seed growers should be aware of the technical requirements and regulations needed to develop a crop intended to obtain certified seeds and ensure that all operations are carried out strictly in accordance with specific and timely regulations. The limited choice of improved seed varieties, the lack of sufficient seed quantity, mechanization problems, and high seed production costs are some of the main constraints that hinder the development of an efficient and effective seed production industry (Bishaw, Niane, and Gan, 2007).

Materials and methods

The information on certified agricultural areas, the production of seeds and seedlings obtained and the number of producers authorised in Romania in the last 4 years were selected from the database of the

National Inspection for Seed Quality INCS, an authorised national institution in the field, subordinated to the Direction General for Control and Inspections of the Ministry of Agriculture and Rural Development - MARD. For local statistics in this domain, we have used the county databases of the Territorial Inspectorates for the Quality of Seed and Seedling (ITCSMS). The databases of the International Seed Testing Association (ISTA), the International Association for the Protection of New Varieties of Plants (UPOV), the International Seed Federation ISF have been used for illustrating the international transactions with seeds. The relevant national legislative provisions (normative acts, rules and technical regulations in force) have been consulted from the MARD database. For the international norms we used the Regulations of the Organisation for Economic Co-operation and Development OECD (especially the OECD Seed Schemes), the current regulations of the United Nations Food and Agriculture Organization (FAO), or the European rules available on the European Specialized Site Commission (Food Safety-Plants-Plant reproductive material). Where necessary, data from the literature or from the Romanian profile journals, with appropriate quoting, were selected and used. The data collected were analysed, statistically processed and plotted. In order to analyse the concentration of the seeds market at the national level, the Gini Struck method was applied, with the calculation of the Gini-Struck Index, GSI (formula 1), recommended by Săvoiu, Crăciuneanu and Ţaicu (2010).

$$GSI=\sqrt{\frac{n\sum gi^2-1}{n-1}} \quad (1),$$

where - n represents the number of terms of the series under study,
- gi represents the weight factor of i variety products/producer/certified area, related to the total registered products/producers/area.

Legislative regulations

At the level of the international commerce, the quality of the seed traded is regulated mainly through the OECD Seed Schemes, applicable to the certification of the seed lots (OECD, 2017)

FAO has a series of attributions on the quality of the seeds, assisting a number of countries in developing their national seed strategy and legislation by improving their technical expertise, strengthening their capacities and facilitating the process of formulating and negotiating agricultural policies (FAO, 2017). Thus, the harmonisation of the legislations of the Member States is currently one of the main concerns of the organization, FAO supporting some economic cooperation organizations in developing cooperation and in harmonising public or private regulations on seeds, which currently hinder the international trade. The International Treaty on Plant Genetic Resources for Food and Agriculture, entered into during the Thirty-First Session of the Conference of the Food and Agriculture Organization of the United Nations (November 3, 2001), aims at the conservation and sustainable use of all plant genetic resources for food and agriculture and the fair and equitable sharing of the benefits deriving from the use thereof, in line with the Convention on Biological Diversity for Sustainable Agriculture and Food Safety (FAO, 2001).

At the European level, a particular attention is paid to seed quality standards, the European Commission adopting specific marketing regulations, rules on the conservation of the genetic background and of the variety of plants. According to the review of EU legislation on the marketing of seed and propagating material (SPPM), 12 basic acts are applied in the field, most of them from the 1960s and 1970s. Taking into account the new requirements on food safety, traceability, new technologies and the increased importance of environmental issues or the EU enlargement, the European Commission has proposed modernising the European legislative system and adapting it to the new market-specific requirements (European Commission, 2008). The process included the public consultation (May 2011) and the elaboration of a regulation proposing the rescission and replacement of 12 directives that are no longer adapted to the current needs of the community (the European Parliament and the Council of Europe, 2013).

At the national level, the regulations on the functioning of the seed and propagating material market are elaborated by MADR, the vast majority being harmonised with the European legislation in the field. Since 1999 a series of norms have been elaborated that regulate the organization and functioning of the Inspectorate for Seeds and Seedlings (GD no.716/1999), the authorisation of the genetically modified

plants (MAPDR Order no 237/2006), the registration of the operators (MAPDR Order no.769/2009, MADR Order no.57/2011), the organization of the quality and phytosanitary control on the import and export of seeds and seedlings (MADR Order no.34/2011) or the designation of the authorised representatives for the application of the legislation on the production, processing, control and certification of quality, the marketing of seeds and seedlings, as well as the testing and registration of plant varieties. The complete list of the existing or repealed legislative regulations is presented on the site of the profile institution (National Inspection for Seed Quality, 2017a)

The International background on the seeds and seedlings market

Worldwide, there are a number of international organisations, conventions and treaties that regulate the seed and seedlings market, from access to seed material to the delivery of quality seed to growers. In conjunction, they provide an international framework for regulating the seed and certified seedlings market in order to monitor the interests of both producers and consumers. The most important organizations in the field are the OECD, the International Seed Testing Association (ISTA), the International Association for the Protection of New Varieties of Plants (UPOV), the International Seed Federation ISF, the United Nations Food and Agriculture Organization (FAO) and the European Commission.

OECD has set up the OECD Seed Schemes, updated on a regular basis, which are recognised and applied worldwide for the certification of seed traded on the international market. The objective of the OECD Schemes for Certification of Seed varieties is to encourage the constant use of high quality seed ascertained for the participating countries. The schemes authorise the use of labels and certificates for seeds produced and processed for international trade, complying with the agreed principles (OECD, 2017).

ISTA was established in 1924, becoming a global network of member laboratories in more than 70 countries/distinct economies worldwide. ISTA members work together to achieve " uniformity in global seed quality assessment". ISTA develops internationally recognised standards for seed sampling and testing, accredits laboratories, promotes research, provides international seed certification and training and disseminates knowledge in the field of seed science and technology. The International Certificates for seed tests, issued in accordance with the current ISTA standards, are only available for accredited ISTA laboratories. For non-ISTA members, the certificates can be purchased from the ISTA Secretariat, with restrictions on the number and price of certificates. The ISTA's activity facilitates seed marketing at the national and international level, thus contributing to improving global food security (ISTA, 2017). According to the latest report available on the organization's website, at the end of 2016, 58 organizations were affiliated as associate members (115% more than in the reference year 2008) and 222 laboratory members (nearly 20% more than in 2008). Du Pont Pioneer, Dow Agro Science, Monsanto SAS, Bayer and Hem Zadem are Industry Members (ISTA, 2017b).

UPOV is an intergovernmental organisation based in Geneva (Switzerland), created by the International Convention for the Protection of New Varieties of Plants. The Convention was adopted in Paris in 1961 and revised in 1972, 1978 and 1991. The mission of UPOV is to provide and promote an effective plant variety system in order to encourage the development of new plant varieties, for the benefit of the whole society. In 2016 there were 74 states/organizations affiliated to ISTA (UPOV, 2017). Applicants have at their disposal the Plant Variety Database, the Genie Database and the Plant Variety Protection Data and Statistics (PVP) databases containing the information provided by the competent authorities of 55 Union members and an intergovernmental organisation. In addition, on the organisation's website there is a collection of legislation in force in the field.

ISF, established in 1924, is a non-profit non-governmental organization representing the interests of over 1,000 international seed companies spread throughout the globe. The Seed Statistics database provides information on international seed transactions conducted internationally (ISF, 2017).

Worldwide, international conventions/treaties are applicable at the United Nations Food and Agriculture Organization (FAO), providing the international regulatory framework for seed trade issues, including phytosanitary measures, access to and sharing, as well as use of plant benefits of germplasm.

The European Union focuses on the traditional production, with an increasing interest in agro-food products of certified origin obtained in certain well-defined geographic areas (Stanciu, 2014). The EU regulates the marketing of the reproductive material of plants of the agricultural, plant, forest, fruit, ornamental and vine species, ensuring the compliance with the European criteria for health and quality. The Commission shall establish the rules in cooperation with the national experts of the respective permanent committees. The European legislation applies to important plant and vegetable species for the internal market, focusing on the registration of varieties and planting material, respectively on the certification or inspection of pre-commercial seed lots and propagating material (European Commission, 2017). Seeds from the third countries must meet the equivalence criteria and those states that guarantee that they meet these criteria can be listed as acceptable to export to the European market. Under certain conditions, strictly specified by European organisations, such as reduced seed germination in the domestic production, the European Member States may temporarily market seed lots which do not fully meet the Community criteria. The European database has two sections: Plant variety database, comprising 109 agricultural species, from potatoes to beans and beets, approved at the Community level and Vegetables, which includes 37 vegetable varieties, with many varieties of crop (European Commission, 2017).

The international market

The global exports of seeds reached a global quantity of 3,865,063 tonnes in 2015 and a value of over USD 10 billion (Table 1). Although the import volume exceeded exports by 2,288 tons, the value of the international transactions was positive, with a surplus of USD 352 million.

Table 1. International transactions with seeds (2014-2015)

Seed	2014				2015			
	Exports		Imports		Exports		Imports	
	Quantity (MTo)	Value (USD Mill.)	Quantity (MTo)	Value (USD Mill)	Quantity (MTo)	Value (USD Mill)	Quantity (MTo)	Value (USD Mill.)
Vegetable crops	117,854	3,791	135,869	3,650	15,747	3,630	133,395	3,521
Flower seed	6,084	308	7,341	291	5,181	281	5,702	261
Field crops	3,386,225	7,848	2,992,579	7,213	3,744,135	6,754	3,728,254	6,531
Total	**3,510,163**	**11,947**	**3,135,789**	**11,154**	**3,865,063**	**10,665**	**3,867,351**	**10,313**

Source: the authors, by using ISF Data (2017)

The most important transactions, covering over 96.87% of the total quantities exported in 2015, were recorded for the seeds of the field crops category. Compared to this, the vegetable crops cover only 2.99% of the exports, the difference being covered by the flower seeds.

Compared to 2014, in 2015 there was a decrease in global seed transactions on the international market, both in terms of quantity and value (Figure 1). Thus, 2015 brought a reduction in imports of 141 tons of seed, worth 793 million USD, along with a reduction in exports of 109 tons ($ 352 million), as compared to the previous year. Decreases were recorded in two of the three categories of seeds, the field crops being the only one with a positive evolution in the transactions on the international market.



Figure 1. Global transactions with seeds (2014-2015)
Source: the authors, by using ISF Data (2017)

The ISF statistics used in the presentation of the data include only seed exports worth more than $ 1 million, flower seeds include herbaceous and non-herbaceous plant seeds mainly grown for flowers, field crop seeds include pulse seeds, cereals, industrial crops and fodder crops, vegetable crop seeds include seeds from all vegetable crops and do not include potato and mushroom seeds.
According to the OECD (2012), the quality of the seeds can only be ensured by applying a combination of key technical procedures and regulatory measures (Figure 2).

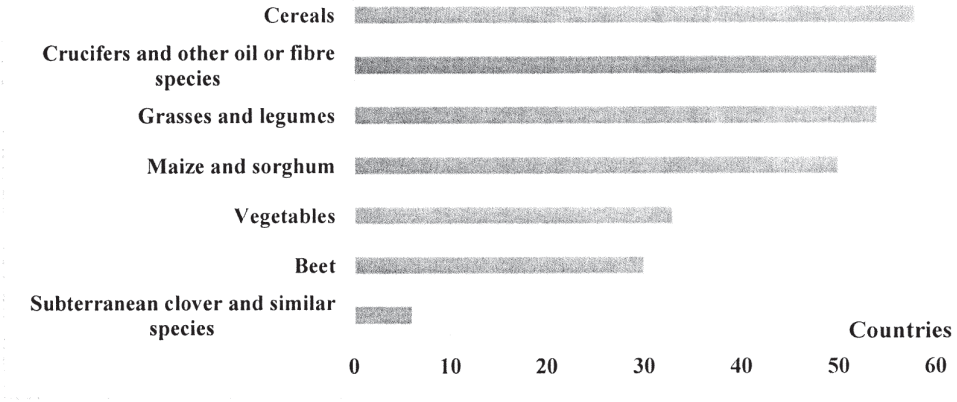


Figure 2. Countries participating in the OECD Seed Schemes (2016)
Source: the authors, using OECD Data (2016)

The quality assurance system which establishes administrative regulations and technical procedures has a supervisory role for the proper functioning and implementation of the program and for the application of regulatory measures to maintain the quality of the seeds produced. At the international level, according to OECD data, Grain Seed Schemes represent the quality assurance system to which most of the OECD member countries have adhered.

The national production of certified seeds
Romania's integration into the EU has also led to an increase in the interest of farmers in buying quality inputs and in a higher demand for certified seeds of qualitatively and qualitatively superior varieties.

Thus, in the last period, the Romanian cultivators have been convinced that the high quality seeds with biological and genetic value, as well as the varietal purity, the high health and germination indices, bring a significant contribution to the increase of the agricultural production. The certified seed preserves the full potential of the crop, has good sanitary quality and increases the agricultural productivity, through a superior germination power and a good adaptation to the cultural conditions in our country, also having an ecologically reduced environmental impact (Agrimedia, 2012).

Depending on the culture, farmers can earn 2-3 times more if they use seed lots than in case of conventional crops. If the farmer can decide each year to cultivate a particular species, depending on the weather conditions of the year in question, the seed company must plan seed production for a minimum of 4-5 years. According to Văduva (2016), in 2016 the largest areas for seed material were used for cereals. In 2007-2012, maize occupied an area of 10-25%, the rest being allocated to the cultivation of straw cereals. On average, using the seeds obtained from the production of a hectare of a batch of grain cereal seeds, 20 hectares of cereals for consumption can be sown. Compared to grain cereals, in the case of maize, the production obtained per hectare of maize hybrid batch can be used to cultivate much larger areas, reaching up to 170 hectares of commercial corn. In the analysed period, the multiplication of oil plant seeds was made on 5-10% of the total area of seed lots. Of these, the multiplication of sunflower was between 33 and 66% of the total oilseed area, and the rape multiplication plots occupied between 5 and 20% of the oleaginous plant multiplication area. For the other cultures, the areas on which multiplication lots were established were marginal (5 or less than 5% of the total).

The seed production in Romania is usually achieved on the basis of a contract between the seed company and the farmers, and the tendency of the international seed marketing companies to be marketed locally. The main counties where the seed is multiplied at the national level are Brăila, Iași and Călărași. The advantages of multiplication in these areas are the farmers' experience regarding seed multiplication technology, the possibility to provide secluded lots, equipping the farmers with specific machines (castration machines), the existence of a functional irrigation system or microclimates suitable for securing the production of seeds.

Since 2012, the Romanian Seed Industry Alliance (AISR), a private professional association, has aimed to promote and support the use of seed certified by farmers in order to increase agricultural production in Romania. AISR has as members 13 prestigious companies in the field of research, improvement, production and marketing of seeds with superior genetics, of which only two are Romanian (United Phosphorus Limited, India, the Porumbeni Institute of Phytosanitary Research, the National Institute of Agricultural Research and Development INCDA Fundulea, RAGT Semences, Procera Agrochemicals Romania, Bayer CropScience AG, Maïsadour Semences) (AISR, 2012). INCDA Fundulea has been an honorary member of the AISR since 2016, which, with the addition of the institute has reached 70% of the national market for certified seeds (*The Agriculture Gazette*, 2016). The National Institute for Agricultural Research and Development Fundulea is the most important agricultural research unit in Romania, with very good results obtained in agricultural research on cereals, technical and fodder plants and the possibility of their valorisation to Romanian farmers.

In Romania, 143 thousand hectares have been cultivated on average for obtaining certified seed in the last 4 years, the agricultural areas for this activity being between a minimum of 129 thousand hectares, registered in 2015, and a maximum of 151.4 thousand hectares in 2014.

The weight of the areas for the seed lots is almost 10% of the total agricultural area, i.e. about 15% of the arable land of the country.

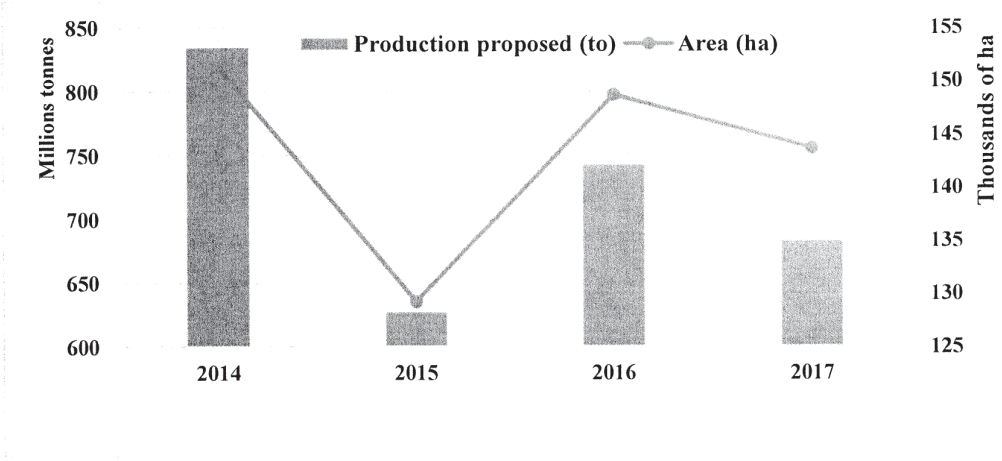


Figure 3. Evolution of certified seed areas and production in Romania
Source: Author, by using INCS data (2017)

Cultivated areas and yields vary from region to region. In 2017, Brăila County, with a weight of 12% of the total area cultivated at the national level and a production of over 94 thousand tons of seeds and seedlings occupies the first national position, followed, at a comfortable distance, by Călăraşi, with 14.8 thousand hectares, respectively Iasi, with 10.6 thousand hectares. On the last positions are the counties of Bistrita, Hunedoara, Caraş Severin, Sălaj and Sibiu, which have not reported certified seed production this year.

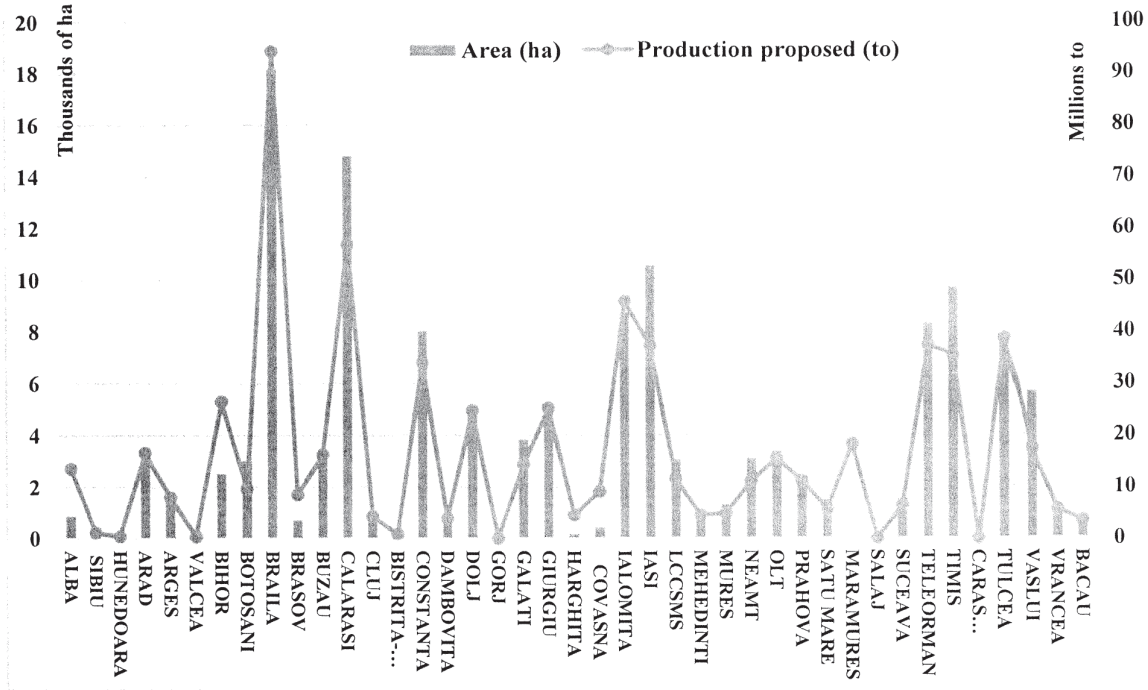


Figure 4. Areas and production of seeds certified in Romania (2017)

Source Author, by using INCS data (2017b)

According to the data presented in Figure 4, it can be noticed that out of the 41 regions analysed, only 6 counties exceeded the limit of 80,000 hectares cultivated to obtain seedlings. There are also significant differences in the average productivity for the hectare. Although the crop species are different, a summary of productivity shows a national average of 4.1 tons seed/hectare. The Alba, Vâlcea and Bihor counties have an average production per hectare of over 10 tons of seed, while most counties are in the range of 3-5 tonnes. For a proper analysis, the production should be differentiated by counties, by plant category, given the different productive characteristics.

Concentration of the seed market in Romania

The data on the cultivated areas and on the production of certified seeds in Romania provided by INCS (2017b) were statistically sorted and processed, with the calculation of the GSI index (Formula 1). The systematization of the data obtained is presented in table 2. The 41 counties of Romania, including Bucharest (n=41) were taken into consideration.

Table 2. GSI Values for the certified areas and for the authorised seed production

Year	**2014**	**2015**	**2016**	**2017**
$\sum g_i^2$ (Areas)	611.798	566.255	583.785	604.071
Valoare GSI	24.735	23.796	24.461	24.577
Market concentration	**High**	**High**	**High**	**High**
$\sum g_i^2$ (Producție)	548.341	525.535	575.216	561.887
Valoare GSI	23.416	22.925	23.983	23.704
Market concentration	**High**	**High**	**High**	**High**

Source: Author, own results obtained by processing INCS data (2017b)

The results obtained for GSI as a result of the research show relatively high values of this indicator and an average degree of concentration of the market. No significant differences were found between the values calculated over the four-year period or between the assessed values (areas or production). The national top of Romania's producing counties shows the existence of several regions with relatively high shares, respectively with quotas higher than 5%, and the national market of certified seeds has a high degree of concentration.

Conclusions

Achieving high production and quality requires the use of seeds with superior genetic characteristics, well-defined and at convenient prices. The research carried out by the authors performed an analysis of the national production of seeds and seedlings in Romania, an assessment of the international market, respectively. The authors have reviewed the main legislative regulations applicable at the international and national level, as well as the bodies with special attributions in the field. Romania, as a Member State of the European Union, has made progress in the harmonisation of national legislation with the Community legislation in the production and marketing of certified seeds. The analysis performed at the level of Romania's regions highlighted the existence of significant differences between the productions of seed lots at the level of the counties.

Applying the Gini Struck Method to analyse the concentration of the national seed and seedling market revealed high GSI index values and a high degree of concentration. Obtaining certified seeds is a cost-effective activity for farmers, although national procedures need to be respected in order to obtain the average level of productivity

The results of the study are useful for business and officials and can provide the basis for more extensive analysis of the seeds market in Romania.

Reference

Agromedia, (2012), Advantages of generalized use of certified seeds in modern Romanian agriculture, [Retrieved September 29, 2017], http://www.agrimedia.ro/articole/avantajele-utilizarii-generalizate-a-semintelor -Certificate-in-modern-Romanian agriculture.

Bishaw Z., Niane A.A., Gan Y. (2007) Quality Seed Production. In: Yadav S.S., McNeil D.L., Stevenson P.C. (eds) Lentil. Springer, Dordrecht.

European Commission, (2017), Plant reproductive material, [online], [Retrieved September 30, 2017], https://ec.europa.eu/food/plant/plant_propagation_material_en.

European Commission, (2017), Plant reproductive material, [online], [Retrieved September 30, 2017], https://ec.europa.eu/food/plant/plant_propagation_material_en.

European Commission, (2008). (Retrieved September 30, 2017), https://ec.europa.eu/food/sites/food/files/plant/ (S & PM), [online], [Retrieved September 30, 2017] docs / ppm_legis_review_s_pm_evaluation_finalreport.pdf.

Food and Agriculture Organization of the United Nations FAO (2001), The International Treaty on Plant Genetic Resources for Food and Agriculture, [Retrieved September 25, 2017], http://www.fao.org/plant-treaty / overview / en.

Food and Agriculture Organization of the United Nations FAO, (2017), AGP - Seed Rules and Regulatory Frameworks, [online], [Retrieved September 25, 2017), http://www.oecd.org/tad/code/oecd-seed-schemes.pdf.

The Agriculture Gazette, (2016), the Romanian Seed Industry Alliance (AISR) in support of Romanian farmers, [Retrieved September 25, 2017], https://www.gazetadeagricultura.info/plante/material-saditor/583 -seminte / 20 344-alliance-industry-seeds-of-romania-aisr-in-support-farmers-romani.html.

National Inspection for Seed Quality INCS, (2017a), Legislation, [online], [Retrieved September 30, 2017), http://www.incs.ro/incshome.htm

International Seed Federation ISF, (2017), Seed Statistics, [online], [Retrieved September 30, 2017), http: // 259970. vserv2152.swisslink.ch/wp-content/uploads/2017/06/Seed_Export_2015.pdf.

International Seed Testing Association ISTA, (2017a), Introduction to ISTA, [Retrieved September 29, 2017], https://www.seedtest.org/en/about-ista-_content---1--1011 .html.

International Seed Testing Association ISTA, (2017b), Activity Report of the International Seed Testing Association (ISTA) Committees 2016/OGM17-03 Activity Report of the ISTA Committees 2016 Final, [online], [Retrieved September 30, 2017), https://www.seedtest.org/en/home.html.

International Union for the Protection of New Varieties of Plants UPOV, (2017), International Convention for the Protection of New Varieties of Plants, [online], [Retrieved September 30, 2017), http://www.upov.int/export/sites/upov/members/en/pdf/pub423.pdf,

National Institute of Statistics, (2017), Agriculture. Tempo Online, online], [Retrieved August 24, 2017], http://statistici.insse.ro/shop.

Organisation for Economic Co-operation and Development OECD, (2016), List of countries participating in the OECD Seed Schemes, [online], [Retrieved September 27, 2017), http://www.oecd.org/tad/code/Updated%20IB%20260116%20-% 20List% 20of%20countries%20participating%20in%20the%20OECD%20Seed%20Schemes.pdf.

Organisation for Economic Co-operation and Development OECD, (2012), OECD Seed Schemes. A Synthesis of International Regulatory Aspects that Affect Seed Trade, [online], [Retrieved September 24, 2017), www.oecd.org/tad/seed.

Organisation for Economic Co-operation and Development OECD, (2017), OECD Seed Schemes 2017, OECD Schemes for the Varietal Certification or the Control of Seed Moving in International Trade, [online], [Retrieved September 25, 2017), http://www.fao.org/agriculture/crops/thematic-sitemap/theme/seeds-pgr/seed-sys/en.

Săvoiu, G, Crăciuneanu, V, Ţaicu, M., (2010), A new statistic method for analysing concentration or diversification of markets (in original in Romanian), The Romanian Journal of Statistics, No. 2/2019, [online], [Retrieved September 30, 2017), http://www.revistadestatistica.ro/ Articole/2010/A3ro_2-2010.pdf.

Stanciu, S., 2014, How Traditional is the European Union in the Agro-food Production? Annals of the University Dunărea de Jos of Galati: Fascicle: XVII, Medicine, 2015, Vol. 21(3), 18-24.
Stanciu, S., 2014, How Traditional is the European Union in the Agro-food Production? Annals of the University Dunărea de Jos of Galati: Fascicle: XVII, Medicine, 2015, Vol. 21(3), 18-24.
The European Parliament and the Council, (2013), Proposal for a Regulation of the European Parliament and of the Council on the production and making available on the market of plant propagating material [online], Retrieved September 25, 2017), http: // eur-lex.europa.eu/legal-content/EN/TXT/?uri= CELEX: 52013PC0262.
Vaduva, I., (2016), INCDA Fundulea, the largest national research and development institute in Romania, adheres to the Romanian Seed Industry Alliance, Farmer Magazine (May 16, 2016), [Retrieved September 23 , 2017), https://revistafermierului.ro/romania-agricola/cultura-mare/item/2147-incda-fundulea-cel-mai-mare-institut-national-de-cercetare-dezvoltare-agricola-din-romania-adera-la-alianta-industriei-semintelor-din-romania.html

Bratislava et le désert slovaque

Frédéric Delaneuville, PhD., Faculté de management de l'Université Comenius de Bratislava, Slovaquie,
frederic.delaneuville@fmuk.uniba.sk

Résumé

A l'ère de la globalisation, la concurrence entre les territoires ne se limite plus à des rivalités entre Etats-nations à la recherche de puissance pour affirmer leur souveraineté. Les continents, les régions ou les grandes villes européennes prennent part à une compétition pour le développement qui se joue à l'échelle de la planète. Les territoires et les structures démocratiques qui les administrent sont constamment confrontés à des nouvelles contraintes : changements climatiques, crise démographique, migrations de population, ou encore crises globales des finances publiques. Pour faire face à ces enjeux globaux, les collectivités territoriales européennes ont mis en place des stratégies et leurs modes de gouvernance ont parfois été modifiés. C'est le cas pour les grandes villes-capitales des pays du groupe de Višegrad qui ont connu un développement économique nettement supérieur à la moyenne des pays auxquels elles appartiennent. Aujourd'hui, la région de Bratislava est la 6ème région la plus riche d'Europe en termes de PIB par habitant. En revanche, le reste du pays peine à se développer. Les inégalités territoriales se sont creusées et la Slovaquie est devenue en quelques décennies un des pays où les différences de production de richesses entre les régions sont les plus importantes de l'Union européenne.

Mots clés : Bratislava, développement régional, gouvernance, décentralisation

Abstract

In the era of globalization, competition between territories is no longer limited to rivalries between nation-states in search of power to assert their sovereignty. Continents, regions or major cities in Europe are taking part in a development competition that is taking place on a global scale. The territories and the democratic structures that administer them are constantly confronted with new constraints: climate change, demographic crisis, population migrations, global public finance crises. To cope with these global challenges, European local authorities have put in place strategies and their modes of governance have sometimes been modified. This is the case for the major capital cities of the Višegrad Group countries, which have experienced economic development well above the average of the countries to which they belong. Today, the Bratislava region is the 6th richest region in Europe in terms of GDP per capita. On the other hand, the rest of the country is struggling to develop. Territorial inequalities have widened and in a few decades Slovakia has become one of the countries where differences in the production of wealth between regions are the largest in the European Union.

Keywords: Bratislava, regional development, governance, decentralization

Introduction

Le titre provocateur de cet article qui reprend celui d'un ouvrage de Jean-François Gravier « Paris et le désert français [1]» datant de 1947 ne vise bien évidemment aucun jugement de valeurs sur le niveau de développement des régions périphériques slovaques mais il vise à sensibiliser le lecteur sur le niveau inquiétant des inégalités territoriales en Slovaquie. D'ailleurs, cet ouvrage qui est devenu une référence était très critique vis-à-vis de la gestion jacobine des territoires en France. Cet article n'a pas la prétention de se comparer à l'œuvre de l'auteur français qui a inspiré de nombreuses politiques

décentralisatrices mais il vise à analyser les dynamiques qui ont conduit à l'accroissement progressif des inégalités territoriales slovaques. L'approche pluridisciplinaire visera à analyser les mécanismes qui ont permis l'essor rapide de la métropole-capitale de Bratislava et à identifier les facteurs historiques, économiques et politiques qui ont conduit à des écarts de développement si importants avec le reste du pays.

La compréhension du phénomène de métropolisation en Europe centrale ne peut faire l'économie d'une rétrospective historique. Bratislava constitue un exemple particulièrement intéressant. Après la scission de la Tchécoslovaquie en 1992, Bratislava a retrouvé son statut de capitale européenne. Cette ville à l'histoire très riche, également connue sous le nom de Presbourg ou de Pozsony, a traversé les empires et les régimes jusqu'à devenir le centre des efforts d'émancipation de la nation slovaque. La recontextualisation historique et politique du développement de Bratislava permet également de comprendre le fonctionnement de la gouvernance de la capitale de ce jeune État-nation qu'est la République slovaque. Inspiré des modèles dominants d'Europe de l'Ouest, la vague décentralisatrice qui a succédé au centralisme autoritaire a eu des conséquences sur la gouvernance politique de la ville de Bratislava. Ces réformes décentralisatrices, inspirés des pays d'Europe de l'Ouest, ont eu des résultats mitigés en matière de développement territorial.

I. Rétrospective Historique Du Développement De Bratislava

L'analyse du temps long permet de comprendre le processus progressif d'accumulation qui a permis à Bratislava de devenir cette importante région-métropole en Europe centrale.

La première référence écrite à Bratislava, alors connue sous le nom Brezalauspurc, se trouve dans les annales de Salzbourg, où y est décrite une bataille entre les troupes hongroises et bavaroises ayant eu lieu en l'an 907. Suite à leur victoire, les Hongrois occupèrent la partie orientale de la Grande Moravie, qui fut ensuite intégrée au royaume de Hongrie lors de sa création en l'an 1000. Bratislava a changé de nom à de multiples reprises durant son histoire mais fut toujours un centre économique et administratif important. De par sa position géographique aux frontières du royaume de Hongrie, elle fut sujette à de nombreuses attaques de forces ennemies. L'érection de fortifications autour de la ville au 12ème siècle renforcera son importance stratégique. Lors de la conquête de Budapest par l'Empire Ottoman, la noblesse hongroise se réfugie à Bratislava. Elle devient la capitale de la Hongrie en 1536. De 1563 à 1860, onze rois hongrois furent couronnés à Pozsony. Il s'en suivra un processus de magyarisation. Jusqu'en 1919, Pozsony, également connu sous le nom allemand de Presbourg mais aussi sous l'appellation slovaque de Presporok, est alors un lieu de coopération et de conflits entre les élites essentiellement germanophones et magyarophones.

Au lendemain de la Première guerre mondiale, la Tchécoslovaquie est créée et Bratislava devient de fait la capitale de la partie slovaque. Le conseil municipal adopte une délibération, le 27 mars 1919, qui donnera à Bratislava son nom actuel qui combine à la fois les mots slovaques « brat » qui signifie « frère » et « slàva » qui signifie « gloire ». Cette délibération fut entérinée par un décret le 4 octobre 1919 mais cette nouvelle appellation ne fut pas sans susciter de contestation de la part des pays voisins et les noms de Presbourg et de Pozsony continuèrent à être utilisés. La ville connaitra durant cette période un processus de « slovaquisation » (modification des noms des rues et monuments, création d'une université en vue de la formation des futures élites…). Le 14 mars 1939, le gouvernement slovaque choisit de devenir un État « indépendant » allié à Adolf Hitler plutôt que de tenter de faire face à l'invasion nazie. C'est la première fois qu'un État slovaque indépendant voit le jour. Il s'en suivra un soulèvement populaire contre les nazis, le bombardement de Bratislava par les troupes américaines et la libération par l'armée rouge le 4 avril 1945. Le 25 février 1948, les communistes assurent le contrôle du gouvernement tchécoslovaque et une nouvelle constitution est proclamée le 9 mai 1948. Cette constitution consacre Prague comme capitale de la Tchécoslovaquie et ne fait référence à Bratislava que comme le siège de l'Assemblée nationale. Dans les années 1960, Bratislava devient le centre de nombreux efforts

d'émancipation de la nation slovaque. En 1968, est signée au Château de Bratislava la Loi constitutionnelle sur la Fédération tchécoslovaque. Le 1er janvier 1969, la CSSR devient une Fédération formée d'une République socialiste tchèque et d'une République socialiste slovaque avec leurs propres Parlement et Gouvernement. L'administration est désormais représentée par des districts (okresy) et les communes (obce) ; Bratislava étant une unité jouissant d'un statut juridique particulier. La Constitution créant la Fédération tchécoslovaque lui reconnaît son statut de capitale de l'État fédéré slovaque. Ce fédéralisme fut maintenu durant la période dite de « normalisation » qui fera suite à la répression par les troupes soviétiques du « Printemps de Prague », durant lequel des responsables politiques slovaques tenteront d'instaurer un « socialisme à visage humain ». Mais ce fédéralisme n'a survécu que d'une manière formelle. « Maintenue dans les textes, la fédéralisation n'était que pure façade, les organes politiques communistes, dirigeant réellement le pays, ne fonctionnant plus selon une organisation fédérale ». « La fédéralisation de l'État était la seule réforme de 1968 qui ait survécu à l'invasion soviétique et à la « normalisation » qui suivit. Mais elle fut vidée de son contenu par la logique centraliste inhérente au système communiste ». Le régime soviétique, méfiant par rapport à toute idée d'auto-administration, n'a donc laissé à Bratislava que très peu de marge de manœuvre politique et toutes les décisions importantes étaient de fait prises à Prague.

Après la chute du Mur de Berlin et la partition de la Tchécoslovaquie, Bratislava a retrouvé son statut de capitale européenne. Si l'on fait abstraction de l'épisode de l'État fasciste durant la Seconde guerre mondiale, c'est la première fois que le peuple slovaque dispose de son propre État. La création récente de cet État-nation a entrainé la recherche de symboles fédérateurs. Avoir une capitale digne de ce nom avec des monuments historiques symbolisant la gloire passée ou la souffrance d'une nation désormais souveraine, contribue à la diffusion d'une mythologie unificatrice qui semble être un des points communs à beaucoup d'États-nations. Bratislava est le centre nerveux de la Slovaquie. Cette ville s'est dotée progressivement de symboles à la hauteur de son statut de capitale européenne comme le château récemment rénové qui domine la ville. Bratislava est une capitale européenne de taille moyenne de par sa population de 424 427 habitants mais elle représente 8 % de la population slovaque[2] mais en réalité il est difficile d'avoir des chiffres précis du fait que beaucoup de personnes résidant ou travaillant reste enregistré comme résidant dans leurs villes d'origines[3].

La globalisation exacerbe la concurrence entre les territoires. Les acteurs économiques préfèrent souvent les localisations métropolitaines car celles-ci offrent des avantages que les villes de taille inférieure ne sont pas en mesure de fournir. L'accès à des réseaux, à des services diversifiés, à une main d'œuvre abondante même dans des domaines spécialisés, permet aux entreprises à la recherche de flexibilité de faire évoluer leurs activités en fonction du contexte. Depuis la chute du mur de Berlin, des réseaux européens qui se sont constitués entre Bratislava et les grandes villes d'Europe ont favorisé son développement. Malgré les incohérences liées à l'insuffisance des mécanismes juridiques et politiques qui permettait au maire d'imposer aux différents arrondissements un développement plus harmonieux de la ville, la capitale slovaque reste très attractive même pour les familles pour lesquelles la localisation métropolitaine résidentielle à Bratislava est souvent liée à l'emploi .Bratislava présente beaucoup d'attrait : marché du travail large et diversifié favorisant la mobilité professionnelle, l'éducation des enfants, activités culturelles, l'emploi des femmes[4], etc… *« Si l'écart entre la rémunération des hommes et des femmes est également importante dans la capitale, le niveau plus élevé des salaires permet également aux femmes d'espérer une retraite plus important que dans le reste du pays*[5] *».* Ainsi beaucoup de slovaques font le choix de s'installer à Bratislava malgré les prix prohibitifs de l'immobilier dont l'inflation est amplifié par les spéculations et l'absence de réel plan de construction de logements qui seraient géré ou régulé par des organismes publics. Ainsi, l'inflation à Bratislava et l'insuffisance de la main d'œuvre a entrainé une augmentation des salaires (le salaire brut moyen dans la région du Bratislava s'élevait à 1377 euro en 2016[6]). Mais ce phénomène n'a pas pour autant entrainer mécaniquement une augmentation aussi significative du pouvoir d'achat du fait que la plus part des produits de consommation et des services sont plus onéreux dans la capitale que dans le reste du pays.

Pourtant, les écarts en termes sont tels qui poussent les jeunes à venir s'installer dans la capitale slovaque malgré la qualité de vie supérieure en province. Ainsi l'écart avec les autres grandes villes et régions slovaques s'est accru de manière très importante ces deux dernières décennies.

II. L'accroissement Constant Des Inégalités Entre Bratislava Et Le Reste Du Pays : La Conséquence De L'importation D'un Mode De Gouvernance Territoriale Inadapté ?

Dans le classement d'Eurostat des régions NUTS2 au regard du PIB par habitant réalisée en 2014, la région de Bratislava était classée en 6ème position avec un PIB par habitant qui représente 186 % de la moyenne de l'UE.

Tableau n° 2		
PIB régionaux par habitant par État membre de l'UE en 2014 en SPA[7]		
	Région	**UE28 = 100**
1	Inner London - West (UK)*	539
2	Luxembourg (LU)*	266
3	Bruxelles-Cap. / Brussel Hfdst. (BE)*	207
4	Hamburg (DE)	206
5	Inner London - East (UK)	204
6	Bratislavský kraj (SK)*	186
7	Oberbayern (DE)	179
8	Île de France (FR)	178
9	Praha (CZ)*	173
10	Stockholm (SE)*	172

En revanche, les trois autres régions slovaques de niveau NUTS 2 ont un PIB par habitant très largement inférieur à la moyenne de l'Union européenne (Slovaquie de l'Ouest 72%, Slovaquie centrale 61%, Slovaquie de l'Est 53%). Le PIB par habitant de la région de Bratislava est donc en moyenne 3,5 fois supérieure à celui de la région de la Slovaquie de l'Est (51 200 euros par habitant en standards de pouvoirs d'achat /14 600 euros/hab.)[8].

Tableau n° 2		
PIB des régions de l'Union européenne,2014, UE 28=100		
Pays	PIB par hab. en SPA	PIB par hab. en SPA
Slovaquie	21 100	77
Bratislavský kraj	51 200	186
Západné Slovensko	19 800	72
Stredné Slovensko	16 700	61
Východné Slovensko	14 600	53

La politique régionale vise à renforcer la convergence économique et sociale et, elle doit être un moteur pour l'emploi et la compétitivité[9]mais cet écart grandissant de production de richesses[10] met en évidence que cette politique européenne est insuffisamment efficace[11]. Le modèle décentralisée de gestion des territoires choisi n'a pas permis de maitriser les différences de développement économique entre les régions et qu'au contraire celles-ci se sont sensiblement accrues depuis les réformes régionalisatrices de 2001.

Les réformes visant à mettre en place la régionalisation après la chute du mur de Berlin avaient pour objectif de mettre en place une gouvernance territoriale moderne correspondant aux standards occidentaux[12]. En adoptant le modèle dominant qui faisait office de référence en matière de gestion des territoires, la Slovaquie démontrait qu'elle agissait de manière adéquate pour atteindre un objectif socialement valorisé. En l'espèce, la nécessité de l'adhésion à l'Union européenne bénéficiait d'un large consensus politique après la chute du mur et elle devint rapidement un des objectifs prioritaires quitte à faire d'énormes sacrifices. Il s´agissait également pour la Slovaquie d'attirer les investisseurs étrangers potentiels[13] qui étaient attirés par le faible cout de sa main d'œuvre qualifiée[14].

Pourtant l'importation de ces solutions nouvelles n'a pas exclu une adaptation, voire une déformation, des principes de ce modèle pour mieux les adapter aux réalités nationales. Au demeurant les réformateurs sont heurtés au phénomène d'inertie institutionnelle[15]. Les sociologues ont démontré que les membres d'une structure ne vont pas immédiatement s'investir dans un processus dont les effets attendus sont inconnus et ils vont préférer perpétuer les pratiques traditionnelles dont ils connaissent les rouages. La volonté de changement qui existait après la chute du mur a permis un remodelage complet des cadres constitutionnels mais dans la pratique les changements se sont inscrits dans la continuité de l'histoire politico-administrative de la Slovaquie.

Les principes de gestion décentralisée des territoires importés de l'Ouest ont été adaptés, voire même déformés, pour venir s'inscrire dans la continuité de l'histoire politico-administratives slovaque empreinte de centralisme. Il est possible de qualifier ce phénomène d'idiosyncrasie: « *Loin, en effet, de se conformer seulement à un modèle extérieur, celui de la mondialisation ou celui de l'Union européenne, chaque pays a pu faire valoir des traditions, des routines institutionnelles, et des groupes d'acteurs plus ou moins bien organisés. C'est à l'aune de leur force que le changement peut être compris, car c'est à partir de ces héritages institutionnels et des acteurs que les nouvelles règles du jeu ont été intégrées ou rejetées*[16] ». Il ne fut pas possible de faire table rase du passé. Les normes dominantes ont été intégrées mais elles ont été réinterprétées en fonction des contextes nationaux. Les nouveaux modèle slovaque de gestion des territoires fut le produit d'un « syncrétisme stratégique[17] ». Les divergences et les incompatibilités des principes de l'Ouest avec les réalités singulières de la Slovaquie, qui avaient été intériorisées, sont réapparues : « *Le ressort initial en est une situation de domination, le colonisateur prétextant de l'infériorité de l'autre et en provoquant l'intériorisation partielle et révoltée chez le colonisé. D'où, chez ce dernier la volonté de retrouver l'estime de soi en combinant deux systèmes de valeurs : l'un indigène, relu à la lumière de la situation nouvelle ; l'autre exogène, emprunté au dominateur. Le discours inédit, les pratiques nouvelles qui en naissent permettent de combattre sur deux fronts : l'édification d'une conscience de groupe et la lutte contre l'étranger*[18] ».

Durant la phase de préadhésion la Slovaquie s'est retrouvée en position de faiblesse vis-à-vis des pays de l'ouest et des institutions européennes. Du fait d'une opinion publique extrêmement favorable à l'adhésion, les élites politiques n'ont pas eu d'autres choix que d'adhérer formellement aux principes et standards occidentaux. Les incompatibilités ont été minimisées. Le désir de souveraineté de la Slovaquie dont l'histoire singulière est marquée par de longues périodes sous la domination de puissances étrangères a été intériorisé, voire dissimulé pour accélérer « le retour vers l'Europe », mais il est réapparu après l'adhésion.

Durant les premières années qui ont suivi la création de collectivités régionales dans les pays du groupe Višegrad, ces structures cohabiteront avec les structures étatiques dans un système dans lequel la répartition des compétences sera floue pendant plusieurs années : *« En Slovaquie la répartition des compétences entre les structures étatiques et les collectivités territoriales nouvellement crées furent peu claires pendant la période qui a précédé l'adhésion. Les limites étaient floues, mais il y avait un espoir que la situation se clarifie dans le futur*[19] *»*. Les bouleversements entrainés par la multiplication des réformes en vue de l'adhésion a créé une réelle instabilité.

Aujourd'hui malgré des compétences, les collectivités territoriales slovaques demeurent souvent très dépendantes de l'Etat central et elles sont incapables de mettre en place les politiques qui permettraient un développement endogène des territoires même si la culture de l'action s'y développe progressivement.

La notion de « path dependence » qui vient des sciences économiques permet d'expliquer certains mécanismes de résistance au changement. Certains économistes partent du constat que même si une solution optimale existe elle n'est pas forcément adoptée par les entreprises ou les institutions. Ainsi l'analyse du maintien du clavier de machine à écrire ou d'ordinateur QWERTY dans le monde anglo-saxon, malgré l'élaboration d'un clavier mieux adapté aux besoins, permet de comprendre certaines difficultés dans la mise en place des changements. Douglass C. North a utilisé cette théorie pour analyser le changement dans les institutions[20]. Il considère que ce phénomène de « dépendance au sentier » tient moins aux technologies elles-mêmes qu'au comportement des individus au sein des institutions. Ces analyses expliquent pourquoi les institutions sont stables et pourquoi elles résistent au changement. La théorie de la dépendance au sentier s'inscrit dans le prolongement du courant d'analyse appelé l'institutionnalisme historique. Ce paradigme théorique nous permet de comprendre pourquoi la diffusion des principes consacrant l'autonomie locale qui a constitué une véritable rupture institutionnelle n'a pas entraîné une révolution des pratiques en matière de gestion des territoires en Slovaquie. La théorie de la dépendance au chemin met en avant des éléments fondamentaux qui vont nous permettre de mieux comprendre ce phénomène de résistance institutionnelle au changement[21].

Les collectivités territoriales, notamment les régions, peinent à s'affirmer face aux autorités centrales slovaques. Il est possible d'expliquer ces difficultés par différents facteurs (besoin national d'affirmation de la souveraineté, tradition centralisatrice, faiblesse de la société civile et de la démocratie locale…) dont certains d'ailleurs ne sont pas spécifiques à la Slovaquie. Les contraintes liées à la nécessité d'un retour vers l'Europe ont accéléré les réformes décentralisatrices, mais elles ont également accru leur caractère formel. Il fallait intégrer les standards occidentaux dans la législation interne pour s'inscrire dans la modernité, ou plutôt dans la postmodernité, quitte à faire fi de la nécessaire consolidation de l'unité nationale. Pourtant dans ce jeune État unitaire est marqué par des traumatismes historiques, la Slovaquie avait besoin d'affirmer la souveraineté qu'elle venait de retrouver.

Avec la préparation de l'adhésion à l'Union européenne, ils durent rapidement préparer des délégations de compétences aux niveaux supra et infranational. Ainsi la volonté d'affirmation de la souveraineté fut intériorisée et les difficultés à conduire le changement dans un délai si court furent minimisées durant les négociations. Les choix en matière de gestion des territoires ont été réalisés sous la contrainte d'une décentralisation rapide, car le modèle centralisé de type soviétique semble contrevenir assez largement aux standards de l'Ouest. La dimension coercitive et brutale des réformes dans les années 90 peut permettre d'expliquer les stratégies de résistance au changement. Elle explique ce que l'on pourrait appeler les « contre-réformes » qui visent à un « retour de l'État » afin d'adapter les principes européens de la bonne gouvernance territoriale aux réalités complexes et singulières de la Slovaquie.

La mise en place d'un nouveau cadre institutionnel n'a pas permis de se débarrasser totalement des oripeaux culturels hérités du régime communiste. Dans les années 90, les élus locaux et les agents des collectivités territoriales nouvellement créées étaient dépourvus d'une véritable culture de l'action locale et ils se sont ainsi positionnés dans une position d'attente et d'infériorité par rapport au pouvoir central.

Les agents des collectivités territoriales était tous d'anciens fonctionnaires d'Etat et ils ont emporté avec eux leurs cultures administratives : *« Parfois, le personnel administratif n'a même pas dû déménager et le changement de l'enseigne apposé sur le bâtiment dans lequel ils travaillaient n'a pas pour autant fait immédiatement disparaître leurs habitudes de travail*[22] *».* Pourtant, la qualité de la formation des élites locales et le caractère méritocratique du recrutement sont des éléments indispensables à l'affirmation des collectivités territoriales.

En Slovaquie, l'aspect gestion des ressources humaines a probablement été négligé au profit d'une approche trop juridique de la transition. L'adoption de règles juridiques formelles en matière d'autonomie locale par les pays du groupe Višegrad n'a pas entraîné une modification immédiate des pratiques. La surreprésentation des juristes dans les instances européennes et leur rôle clé durant le processus d'adhésion est peut-être un facteur explicatif de cette négligence. Pourtant la gestion et la formation des ressources humaines sont des éléments clés dans tout processus de changement.

Au niveau des communes, le rapide transfert de compétences à des personnels peu formés a entraîné de nombreux dysfonctionnements. Par exemple, dans le contexte où la démocratie locale était encore balbutiante, la délégation de gestion des plans d'aménagement du territoire aux communes ne disposant pas de compétences en matière d'urbanisme a entraîné des incohérences dans les plans de développement urbain de certaines villes. Parfois, il a même mené à des abus. Le pouvoir de délivrer des permis de construire a pu permettre des enrichissements personnels au détriment de l'intérêt général comme l'illustre parfois le caractère anarchique de certaines constructions dans des zones surpeuplées, affectées par la pollution ou par des problèmes de stationnement. En l'absence d'une véritable démocratie locale, le pari du transfert de l'exercice de certaines compétences aux communes s'avérait risqué. Dans ces pays où le communisme a conduit les citoyens les plus téméraires à se résigner à accepter l'inacceptable, les citoyens ont perdu confiance dans l'action collective et ils favorisent des stratégies individuelles. Ainsi la création de collectivités territoriales en l'absence de démocratie locale a pu avoir des effets pervers. La perte de confiance dans la notion d'intérêt général qui fût pervertie par le régime et l'absence de la culture de la contestation collective ont laissé une marge de manœuvre importante pour les logiques individuelles et partisanes. Elles l'ont souvent emporté sur les intérêts locaux ou régionaux qui sont des notions encore balbutiantes.

Conclusion

Les disparités territoriales en Slovaquie sont parmi les plus importantes de l'Union européenne et l'actuelle politique régionale semble incapable d'endiguer ce phénomène. A la chute du mur de Berlin, les arguments européens en faveur d'un modèle décentralisé avaient facilement trouvé de nouveaux adeptes en Slovaquie car il y existait une volonté de rejet total des pratiques du régime communiste. Il ne semblait ne pas y avoir d'autre alternative que l'importation des modèles de l'Europe de l'Ouest perçue comme indispensable pour une adhésion rapide à l'Union européenne. Pourtant, le bilan de l'importation de ce modèle décentralisé semble mitigé. La rapidité de la mise en place des reformes territoriales a également accrue leur caractère purement formel. Certes d'un point de vue institutionnel et juridique, elles furent un succès. La reconnaissance des autonomies régionales et locales s'est matérialisée en par la mise en place d'institutions démocratiques chargées de représenter les intérêts locaux, par la reconnaissance explicite du principe de libre administration et par de nombreux transferts de compétences. Cette modification rapide du mode de gestion des territoires s'explique par la pression des institutions européennes, mais également par un phénomène de transfert de politique mais les mesures drastiques mises en place ne furent pas sans conséquences pour certaines populations notamment pour les personnes les moins mobiles vivant dans les régions éloignées de la capitale. Ainsi, il est possible de s'interroger sur la pertinence du choix politique de la décentralisation dans un pays où le communisme autoritaire avait détruit la culture politique de l'action locale et régionale. Les réformes mises en place n'ont pas entraîné une évolution immédiate de la culture administrative dans ce pays empreint de centralisme. Au demeurant, si les compétences des collectivités territoriales sont aujourd'hui

potentiellement très étendues, le manque de moyens dont elles disposent pour les exercer créé une dépendance de fait vis-à-vis de l'Etat. Un modèle « déconcentré » de gestion des territoires aurait pu être une solution plus appropriée à l'histoire politico-administrative de ce petit pays d'Europe centrale.

Le modèle actuel de gouvernance territoriale en Slovaquie semble inefficace d'un point de vue de la maitrise des inégalités territoriales. Le clivage qui oppose Bratislava aux zones périphériques s'est cristallisé après une longue de recomposition économique du territoire slovaque qui a créée à des zones de fragilité économique et sociale dans ce que l'on pourrait appeler « l'autre Slovaquie ». Avant la chute du mur de Berlin, il existait une logique d'intégration économique de la classe ouvrière qui vivait dans les zones industrielles. Aujourd'hui, la cartographie électorale montre les craintes des populations des territoires périphériques. Le vote extrémiste pour des partis comme celui de M. Marian Kotlebla « Naše Slovensko » est porté par l'anxiété des plus modestes qui vivent dans des territoires enclavés et qui ont peur des flux migratoires qui pourtant n'arriveront jamais dans leurs villes ou villages. Il est ainsi possible de mettre en corrélation l'accroissement des inégalités territoriales avec le retour en forces de la rhétorique populiste des partis nationalistes qui joue sur ces frustrations. Une partie grandissante de la population est ainsi sensible aux discours souverainistes visant à un retour d'Etat centralisé garant de la justice sociale.

Aujourd'hui, l'idéologie dominante est celle de la métropolisation et de la redynamisation des aires urbaines et il est difficile de revendiquer la promotion d'un autre modèle qui permettrait un développement économique spécifique pour les territoires ruraux. Celui-ci ne serait pas forcement incompatible avec la mise en place d'un mode de gouvernance spécifique pour la capitale slovaque. Les écarts de revenu sont d'une telle ampleur qu'ils engendrent inévitablement une certaine brutalité dans les rapports sociaux qui risque de s'accroitre avec la progression de ces clivages territoriaux. Ils permettent d'expliquer le ressentiment que peuvent avoir les citoyens des territoires enclavés vis-à-vis des résidents de la capitale. Des mécanismes de régulation, nationaux ou européens, permettant de financer des programmes favorisant le développement harmonieux des territoires en Slovaquie semblent indispensables car le modèle actuel de gouvernance territorial ne permet pas d'endiguer l'accroissement des inégalités qui risquent d'atteindre un niveau critique si des politiques volontaristes à la hauteur de l'ampleur de ce phénomène ne sont pas mises en œuvre.

[1] Gravier, J. F. (1947) Paris et le désert français, réédité en 1972 chez Flammarion, ISBN : B007EB19V2, p. 284.

[2] Statisticky urad SR, Stav trvale bývajúceho obyvateľstva k 30.6.(1.7.) 2016

[3] Peu de slovaques réalisent se changement de domiciliation qui de fait d'une législation inadapté qui la rend difficile pour les locataires qui ne sont pas propriétaires de leurs logements.

[4] Mitková, Ľ. (2016) Starnutie populácie Európy a rodový dôchodkový rozdiel. In: Európska ekonomická integrácia v kontexte aktuálneho vývoja a výziev pre členské štáty Európskej únie. Praha: Wolters Kluwer, pp. 68-80.

[5] Mitková, Ľ. (2016) Starnutie populácie Európy a rodový dôchodkový rozdiel. In: Európska ekonomická integrácia v kontexte aktuálneho vývoja a výziev pre členské štáty Európskej únie. Praha: Wolters Kluwer, pp. 68-80.

[6] Statisticky urad SR
http://statdat.statistics.sk/cognosext/cgi-bin/cognos.cgi?b_action=cognosViewer&ui.action=run&ui.object=storeID(%22iFE32FBCAEB0F4E00A94321FB61D9FC04%22)&ui.name=Hrub%c3%a1%20mzda%20a%20popisn%c3%a9%20%c5%a1tatistick%c3%a9%20charakteristiky%20%5bnp1103rr%5d&run.outputFormat=&run.prompt=true&cv.header=false&ui.backURL=%2fcognosext%2fcps4%2fportlets%2fcommon%2fclose.html&run.outputLocale=sk

[7] Le SPA (standard de pouvoir d'achat) est une monnaie artificielle qui prend en compte les écarts entres les niveaux de prix nationaux. Cette unité permet de comparer des indicateurs économiques en volume entre les pays. Les agrégats exprimés en SPA sont calculés en divisant les agrégats à prix courants et en monnaie nationale par les parités de pouvoir d'achat (PPA) respectives.

[8]Statistiques d'Eurostat, http://ec.europa.eu/eurostat/fr/web/products-press-releases/-/1-26022016-AP, [Consulté 19.09.2017]

[9] Nováčková, D. and Wefersová, J. (2016) 'Slovenská akadémia manažmentu', *Manažment podnikania a vecí verejných*, vol. 1/2016, XI. année, no. 31, ISSN 1337-0510

[10] Nováčková, D. (2012), Economic, social and territorial cohesion – co-part Strategy Europe 2020, Business Environment Horizons, p. 135

[11] Stachová, P. and Šuplata, M. (2013), 'Ekonomická dimenzia regionálnej politiky v podmienkach Slovenskej republiky', *Medzinárodné vzťahy 2013. Aktuálne otázky svetovej ekonomiky a politiky*. Bratislava: Ekonóm, p. 650-680 [CD-ROM], ISBN 978-80-225-3802-2

[12] Saxunová, D. and Nízka, H. (2011), 'Slovak businesses dealing with social services and inspiration for Slovakia from abroad', Proceedings of the 5th international conference of management and industrial engineering – "Change management in a dynamic environment", ISBN 978-973-748-658-5, 2011, Bucharest: NICULESCU, pp. 39-50.

[13] Lacová, Ž. (2016) 'Politique monétaire et investissements des entreprises en Slovaquie,' *Editions universitaires européennes*, Saarbrücken, p. 58.

[14] Milošovičová, P. and Stachová, P. (2016) 'Development of the global slovak-austrian relations - Globalization and its Socio-Economic Consequences 2016, pp. 1402. http://ke.uniza.sk/sites/default/files/content_files/part_ii_final_1.pdf

[15] Meny, Y. (1993), Les politiques du mimétisme institutionnel. La greffe et le rejet, L'Harmattan, Paris.

[16] Bafoil, F. (2006) Europe centrale et orientale. Mondialisation européanisation et changement social, Presses de Sciences Po, Paris, p.31

[17] Martin, D.-C. (1992) 'Le choix d'identité', *Revue française de science politique,* 42 (4), p. 585.

[18] Martin, D.-C. (1992) 'Le choix d'identité', *Revue française de science politique,* 42 (4), p. 585.

[19] Jacko, T. and Malikova, Ľ. (2013), 'Public Administration in Slovakia – One Step Forward, Two Steps Back?', MirkoVintar, Allan Rosenbaum, GyörgyJenei, Wolfgang Drechsler (eds.), *The Past, Present and the Future of Public Administration in Central and Eastern Europe*, NISPAcee Press.

[20] North, D. C. (1991) Institutions, Institutional Change and Economic Performance, Part of Political Economy of Institutions and Decisions, Washington University, St Louis.

[21] Bafoil, F. (2006) Europe centrale et orientale. Mondialisation européanisation et changement social, Presses de Sciences Po, Paris, p.45.

[22] Propos de Bielak Štefan, maire de Spišská Belá, entretien réalisé le 12.12.2010.

Références

Bafoil, F. (2006) Europe centrale et orientale. Mondialisation européanisation et changement social, Presses de Sciences Po, Paris, p. 31

Di Maggio, P. and Powell, W. (1983), 'The Iron-Cage Revisited : Institutional Isomorphism and Collective Rationality in Organizational Field', American Sociological Review n° 48, April, p. 147-160

Gravier, J. F. (1947) Paris et le desert français, réédité en 1972 chez Flammarion, ISBN : B007EB19V2, p. 284

Nováčková, D. (2012), Economic, social and territorial cohesion – co-part Strategy Europe 2020, Business Environment Horizons, p. 135

Jacko, T. and Malikova, Ľ. (2013), 'Public Administration in Slovakia – One Step Forward, Two Steps Back?', MirkoVintar, Allan Rosenbaum, GyörgyJenei, Wolfgang Drechsler (eds.), *The Past, Present and the Future of Public Administration in Central and Eastern Europe*, NISPAcee Press.

Lacová, Ž. (2016) 'Politique monétaire et investissements des entreprises en Slovaquie,' *Editions universitaires européennes*, Saarbrücken, p. 58.

Martin, D.-C. (1992) 'Le choix d'identité', *Revue française de science politique,* 42 (4), p. 585.

Meny, Y. (1993), Les politiques du mimétisme institutionnel. La greffe et le rejet, L'Harmattan, Paris.

Milošovičová, P. and Stachová, P. (2016) 'Development of the global slovak-austrian relations - Globalization and its Socio-Economic Consequences 2016, pp. 1402.

Mitkov Mitková, Ľ. (2016) Starnutie populácie Európy a rodový dôchodkový rozdiel. In: Európska ekonomická integrácia v kontexte aktuálneho vývoja a výziev pre členské štáty Európskej únie. Praha: Wolters Kluwer, pp. 68-80.d.).

Nováčková, D. and Wefersová, J. (2016) 'Slovenská akadémia manažmentu', *Manažment podnikania a vecí verejných*, vol. 1/2016, XI. année, no. 31, ISSN 1337-0510

North, D. C. (1991) Institutions, Institutional Change and Economic Performance, Part of Political Economy of Institutions and Decisions, Washington University, St Louis.

Saxunová, D. and Nízka, H. (2011), 'Slovak businesses dealing with social services and inspiration for Slovakia from abroad', Proceedings of the 5th international conference of management and industrial engineering – "Change management in a dynamic environment", ISBN 978-973-748-658-5, 2011, Bucharest: NICULESCU, pp. 39-50.

Stachová, P. and Šuplata, M. (2013), 'Ekonomická dimenzia regionálnej politiky v podmienkach Slovenskej republiky', *Medzinárodné vzťahy 2013. Aktuálne otázky svetovej ekonomiky a politiky*. Bratislava: Ekonóm, p. 650-680 [CD-ROM], ISBN 978-80-225-3802-2

Classification of the Russian Arctic zone territories according to the level of small business development

Elena V. Rytova, associate professor, Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russian Federation, E-mail: lery@list.ru

Svetlana S. Gutman, associate professor, Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russian Federation, e-mail: svelanka@mail.ru

Irina M. Zaychenko, associate professor, Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russian Federation, e-mail: imz.fem.spbpu@mail.ru

Abstract

This research was devoted to small business development in Arctic Zone of Russia. Structure of Russian Arctic territories was defined; statistical data were collected and analyzed in legislative borders of Arctic Zone territories. Arctic territories were classified by means of cluster analysis on small business development. Multidimensional classification revealed three clusters with different level of small business development. Marked clusters, which include arctic territories with similar level of small business, could be used for further factor analysis. Factor analysis helps to identify causes of differences in territorial small business development.

Keywords: Small business, cluster analysis, sustainable development, Arctic zone of Russia.

Introduction

The Russian Arctic is a unique region in terms of its economic-geographical location, resource wealth and natural conditions. The issues of social and economic development of the Russian Arctic zone is an extremely urgent task. However, according to the Decree of the President of the Russian Federation of May 2, 2014 (Decree of the President of the Russian Federation). The Arctic zone includes only some part of territory of regions having access to the Arctic Ocean. The definition of the boundaries of the Arctic zone in the Decree significantly complicates the analysis of socio-economic conditions and the creation of special measures for the development of this zone. Despite the high costs of doing business in the Arctic, the development of small businesses will contribute to the sustainable development of the region.

One of the components of the region's sustainable development strategy is the "Society and Market". Achieving the corresponding strategic goals is impossible without the development of small business. One of the most important functions in the implementation of the region's sustainable development strategy is the social function of small business: new jobs will help break the long-term downward trend in the population in the Russian North; local people can be provided with new competitive jobs; it is possible to use the initiative and creative potential of the population, especially the indigenous people; small business can become the basis of municipal budgets. In addition, it is possible to use an innovative small business initiative.

Literature Review

There are different forms of stimulating small business in the world practice (http://giac.ru/analytics/):
1. Tax relief, special tax regimes, preferential taxation of enterprises; (Japan) (Matsubara, Y. (2013), Japan's Policy on Small and Medium Enterprises (SMEs) and Micro Enterprises. Small and Medium Enterprise Agency, Ministry of Economy, Trade and Industry).

2. Grants by regional authorities, (in some countries up to 50%) for the opening of enterprises or the development of innovative products; (Sweden, Germany) (Tillmar, M. (2007), The German Mittelstand as a model for success. Federal Ministry for Economic Affairs and Energy).
3. Direct financing (subsidies, soft loans), targeted subsidies to support enterprises of priority industries or enterprises in depressed areas (also up to 50% of costs); (France, USA and other countries) (Nugent , N. (2017), Doh, S. and Kim, B. (2014), Haltiwanger, J., Jarmin, R.S., and Miranda, J. (2013)).
4. Deferment of payment, reduction or exemption of state duties for individual entrepreneurs and innovative small enterprises; (Austria, Germany, USA, Japan, etc.) (Naudé, W. (2013).
5. Creation of a special infrastruture for small businesses support; (Austria, Germany, USA, Japan, Austria, etc.) (Mc Namara A., Murro P. and O'Donohoe S. (2017), Ponomarenko, T.V. et al (2016).
6. Creation of venture funds for financing of innovative small enterprises; (England, Germany, France, Switzerland, the Netherlands) (Colombo, M.G et al (2016), Bertoni, F. et al (2015)).
7. Free of charge conducting office work, free services of lawyers; (Netherlands, Germany) (Brunswicker, S. and Vanhaverbeke, W. (2015).
8. State programs on insurance, risk reduction and reimbursement of risk losses; (Japan) (Japan's Policy on Small and Medium Enterprises (SMEs) and Micro Enterprises. Small and Medium Enterprise Agency, Ministry of Economy, Trade and Industry).
9. Legislative protection of intellectual property and copyrights; (All developed countries) (Henrekson, M. and Sanandaji, T. (2014).
10. Programs for the search for and attraction of foreign specialists for domestic innovative enterprises (Japan, USA, Australia) (Ates A. et al. (2013).
Recently, the approach to the development of regions based on clusters has become popular in Russia (Rudskaia, I.A et al (2017).
The analysis of the statistical data of Arctic Zone of the Russian Federation showed a low degree of providing of the majority of the Arctic territories by small enterprises, so it is necessary to make recommendations for the development of small business in future in this area.

Methodology

To make recommendations for the development of small business in the Arctic Zone of Russian Federation, it is necessary to classify Arctic territories according to the present level of development of small business. Classification was carried out on the basis of multidimensional statistical analysis (cluster analysis) [19]. The implementation of this method includes the following tasks (Dubnov, P.YU. (2004), Nasledov, A. (2013)):
1. Choice of clustering algorithm.
2. Selecting the clustering method.
3. Choosing a method for calculating the distance between objects.
4. Determination of the number of clusters.
The division of the territories of the Arctic Russia into groups depending on the level of development of small business was carried out according to the following system of indicators (classification characteristics) (Dzh, O. et al (1989)):
• Number of small enterprises in the territory, unit.
• Population of the territory, thousand people.
• Budget expenditures for supporting small enterprises, thousand rubles.
• Support costs for small business per capita, rubles.
The choice of the method of clustering depends on the structure of the examining clusters. The intergroup communication method was used in this investigation, because it minimizes the intracluster variance of objects that makes it possible to form the most homogeneous clusters. The clusters formation procedure has an iterative character and is repeated until the clusters characteristics obtained become in accord with the possibility of a logical interpretation of the grouping results.

Results

The "Hierarchical cluster analysis" was used to determine the optimal number of clusters and the results obtained in the "Coefficients" column of the "Agglomeration steps" table were analyzed. The resulting coefficients reflect the distance between two clusters, calculated on the basis of the selected distance

measure (Euclidean distance). The optimal number of clusters in our study was "3", equal to the difference in the number of observations (14) and the step number (11), after which the coefficient increases abruptly.
For visual analysis of the obtained distribution of regions, scatterplots were constructed, as well as histograms and dendrograms. The dendrogram shown in Fig. 1, reflects the distribution of the territories of the Arctic Zone of the Russian Federation in clusters, depending on the estimation of level of small business development (The official website of Rosstat).

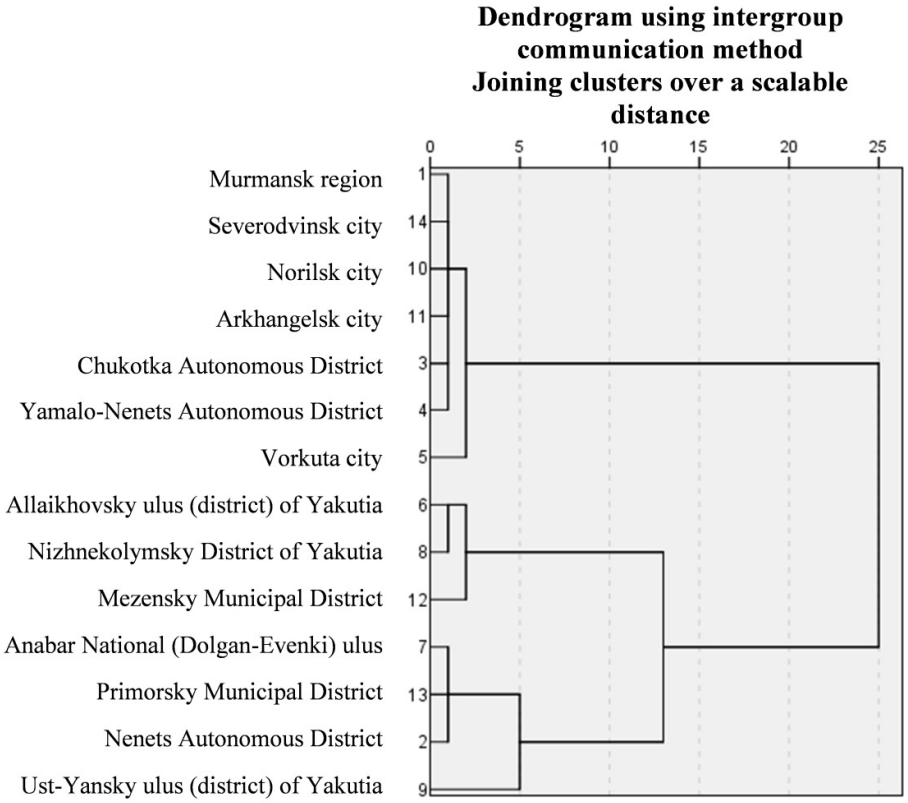


Fig. 1: Dendrogram

The multidimensional classification revealed 3 clusters with different levels of small business development (Table 1):

1 cluster. Murmansk Region, Chukotka Autonomous District, Yamalo-Nenets Autonomous District, Vorkuta City, Norilsk city, Arkhangelsk city and Severodvinsk city. This cluster - includes the most populated and economically and socially developed territories of the Arctic Zone of Russian Federation. The number of small enterprises in these territories is quite large for the northern territories.

2 cluster. Nenets Autonomous District, Anabar National (Dolgano-Evenki) Ulus (District) of Yakutia, Ust-Yansky Ulus (District) of Yakutia, Primorsky Municipal District of the Arkhangelsk Region. This cluster includes north territories of the Russian Federation with medium level of development of small business. These areas are significantly less populated. However, these territories are located in close proximity to the regional centers represented in the first cluster, which is affects positively their development in general and the small business development there.
3 cluster. Allaikhovsky ulus (district) of Yakutia, Nizhnekolymsky district, Mezensky municipal district - these territories are poorly populated, also are situated far from regional centers, have a low level of

budgetary provision. As a result they have the extremely poor level of development of small business, and quantity of small enterprises is much less than in average for north of Russia.

Table 1: Clusters

Surveillance	7 clusters	6 clusters	5 clusters	4 clusters	3 clusters	2 clusters
1: Murmansk region	1	1	1	1	1	1
2: Nenets Autonomous District	2	2	2	2	2	2
3: Chukotka Autonomous District	1	1	1	1	1	1
4: Yamalo-Nenets Autonomous District	1	1	1	1	1	1
5: Vorkuta city	3	3	1	1	1	1
6: Allaikhovsky ulus (district) of Yakutia	4	4	3	3	3	2
7: Anabar National (Dolgan-Evenki) ulus (district) of Yakutia	5	2	2	2	2	2
8: Nizhnekolymsky District of Yakutia	4	4	3	3	3	2
9: Ust-Yansky ulus (district) of Yakutia	6	5	4	4	2	2
10: Norilsk city	1	1	1	1	1	1
11: Arkhangelsk city	1	1	1	1	1	1
12: Mezensky Municipal District	7	6	5	3	3	2
13: Primorsky Municipal District of the Arkhangelsk Region	5	2	2	2	2	2
14: Severodvinsk city	1	1	1	1	1	1

Because of the lack of statistical information, three areas of the Arctic one of Russian Federation were excluded from the analysis: the Bulunsky Ulus (District) of Yakutia, the Taimyr Dolgano-Nenets Municipal District and the Turukhansk District of the Krasnoyarsk Krai. It can be assumed that the territories of the Bulunsky Ulus and the Taimyrsky District by their conditions are close to the third cluster, whereas for the Turukhansk District will probable fall into second cluster.

The proposed classification, i.e. the identified clusters, includes the territories of the Arctic Zone of Russia with a similar level of development of small business, and it gives opportunities for factor analysis of the reasons caused this differentiation of level of small business development in the identified clusters. The methodology of factor analysis of the level of development of small business clusters of the Arctic Zone of Russia provides for the identification of factors that have had a significant impact on the level of development of small business. Indicators, whose impact on the level of development of small business is most significant, will need to be taken into account first of all when developing and implementing a strategy for sustainable development of regions of the Russian Federation. Obviously, the influence of factors can be either positive or negative. Accordingly, it is necessary to split many factors into two groups: those that have a positive and negative impact on the level of development of small business in the Russian Federation.

Conclusion

As factors that affect the current level of small business development, we will consider the factors presented in Table 2 in the framework of the selected clusters.

Table 2: Factors of small business development in the Arctic Zone of Russian Federation

+	-
1. increasing the possibility of obtaining loans, reducing interest rates on loans; 1. simplifying the search for and attracting qualified personnel from other regions; 2. improvement of transport infrastructure; 3. availability of state support programs for small business; 4. presence of the richest natural resources and unique cultural environment.	2. high energy tariffs; 3. high rates for transportation; 4. decrease in purchasing power due to outflow of population and decline in living standards; 5. tax burden; 6. growth in rental rates; 7. lack of availability of office, retail, production space; 8. difficult access to new technologies.

Acknowledgment

The paper is elaborated in framework of scientific project №16-32-00040 supported by Russian Foundation for Basic Research

References

Ates A. et al. (2013), 'The development of SME managerial practice for effective performance management,' *Journal of Small Business and Enterprise Development*, 20(1), 28-54.
Bertoni, F., Colombo, M.G. and Quas, A. (2015), 'The patterns of venture capital investment in Europe,' *Small business economics*, 45 (3), 543-560.

Brunswicker, S. and Vanhaverbeke, W. (2015), 'Open innovation in small and medium-sized enterprises (SMEs): External knowledge sourcing strategies and internal organizational facilitators,' *Journal of Small Business Management*, 53 (4), 1241-1263.
Colombo, M.G., Cumming, D. J. and Vismara, S. (2016), Governmental venture capital for innovative young firms,' *The Journal of Technology Transfer*, 41(1), 10-24.

Doh, S. and Kim, B. (2014), ' Government support for SME innovations in the regional industries: The case of government financial support program in South Korea,' *Research Policy*. 43 (9), 1557-1569.
Dubnov, P.YU. (2004), 'Obrabotka statisticheskoj informacii s pomoshch'yu SPSS,' [Processing of statistical information using SPSS], M, OOO «Izdatel'stvo AST», Izdatel'stvo «NT Press», 221.

Dzh, O., Kim, CH.U., M'yuller, U.R. and et al (1989), 'Faktornyj, diskriminantnyj i klasternyj analiz,' [Factor, discriminant and cluster analysis]: Per. s angl. pod red. Enyukova, I.S., *M, Finansy i statistika*, 215.
Haltiwanger, J., Jarmin, R.S., and Miranda, J. (2013), 'Who creates jobs? Small versus large versus young,' *Review of Economics and Statistics*, 95(2), 347-361.

Henrekson, M. and Sanandaji, T. (2014), 'Small business activity does not measure entrepreneurship,' *Proceedings of the National Academy of Sciences*, 111(5), 1760-1765.
Japan's Policy on Small and Medium Enterprises (SMEs) and Micro Enterprises. Small and Medium Enterprise Agency, Ministry of Economy, Trade and Industry. [Online], [Retrieved August 21, 2017], Available: URL: http://www.chusho.meti.go.jp/sme_english/outline/04/20131007.pdf/

Malye predpriyatiya v sisteme klasterov. Global'nyj informacionno-analiticheskij centr. [Small enterprises in the cluster system] [Online], [Retrieved August 12, 2017], Available: URL: http://giac.ru/analytics/
Matsubara, Y. (2013) 'Taxation of Micro and Small Businesses in Japan: Recent Developments,' IMF-Japan High-Level Tax Conference. Tokyo, April.

Mc Namara A., Murro P. and O'Donohoe S. (2017), 'Countries lending infrastructure and capital structure determination: The case of European SMEs,' *Journal of Corporate Finance*, 43, 122-138.
Nasledov, A. (2013) 'IBM SPSS Statistics 20 i AMOS: professional'nyj statisticheskij analiz dannyh,' [IBM SPSS Statistics 20 and AMOS: professional statistical analysis of data], SPb, Piter, 413.

Naudé, W. (2013) 'Entrepreneurship and economic development: Theory, evidence and policy,' *Browser Download This Paper.*
Nugent , N. (2017) 'The government and politics of the European Union,' Springer.
Oficial'nyj sajt Rosstata [The official website of Rosstat] [Online], [Retrieved September 2, 2017], Available:
URL:http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/science_and_innovations/

Ponomarenko, T.V., Cherepovitsyn, A.E., Fedoseev, S.V. and Sidorov, D.E. (2016), 'Organizational-Economic Mechanism of Financing Strategic Investment Projects at the Regional Level in Regions with Poor Infrastructure,' *International Journal of Applied Engineering Research* ISSN 0973-4562 Volume 11, Number 16, 9007-9013.
Rudskaia, I.A, Rodionov, D.G and Degtereva, V.A. (2017), 'Assessment of the Effectiveness of Regional Innovation Systems in Russia,' Proceedings of 29-th International Business Information Management Association Conference – Vision 2020: From Regional Development Sustainability to Global Economic Growth, Vienna, Austria, 3437-3450.

The German Mittelstand as a model for success. Federal Ministry for Economic Affairs and Energy. [Online], [Retrieved July 29, 2017], Available: URL: https://www.bmwi.de/Redaktion/EN/Dossier/sme-policy.html/
Tillmar, M. (2007) 'Gendered small - business assistance: lessons from a Swedish project,' Journal of European Industrial Training, (31), 2, 84-99. http://dx.doi.org/10.1108/03090590710734327.

Ukaz Prezidenta Rossijskoj Federacii «O suhoputnyh territoriyah Arkticheskoj zony Rossijskoj Federacii» [Decree of the President of the Russian Federation 'On the land territories of the Arctic zone of the Russian Federation'] ot 02 maya 2014 g. № 296 [Online], [Retrieved September 02, 2017], Available: URL: http://base.consultant.ru/cons/cgi/online.cgi?req=doc;base=LAW;n=162553/.

Effectiveness of Public Spending on Tertiary Education: The Case of the Slovak Republic

Ľudomír Šlahor, Comenius University in Bratislava, Faculty of Management, Bratislava, Slovak Republic, ludomir.slahor@fm.uniba.sk

Mária Barteková, Comenius University in Bratislava, Faculty of Management, Bratislava, Slovak Republic, maria.bartekova@fm.uniba.sk

Janka Gasperová, Comenius University in Bratislava, Faculty of Management, Bratislava, Slovak Republic, gasperova.j@gmail.com

Abstract

Public tertiary education systems in the EU Member States are studied by comparing used resources with education and research outputs and outcomes. Efficiency in public tertiary education systems across EU countries and OECD countries is assessed with data analysis. Moreover, evidence is provided that public spending on tertiary education is more effective in what concerns labour productivity growth and employability when it is coupled with efficiency. The aim of this paper is to show the effectiveness of public spending on tertiary education in Slovakia. The paper contains only the partial results of our research. Delivering efficiency and value for money is an absolute operational priority. All stakeholders rightly expect efficient use of resources and in the current investment to maintain excellence mainly in tertiary education will often come through such efficiencies.

Keywords: effectiveness, public spending, tertiary education, Slovakia.

Introduction

In an economy in which public needs require public goods with high values, in the context in which the state's financial resources do not increase at a high rate, there appears a gap that mostly leads to insufficient resources necessary in performing all the economic activities and implicitly the education activities.

As a matter of fact, tertiary education is one of the driving forces of growth. In this paper we show that there is a link between labour and total factor productivity and spending in education. However, this link is only effective when spending is efficient. In other words, what really matters is that money and resources are spent in such a way that one gets outputs that in a broader layer are related to productivity and growth. Moreover, we present evidence of a link between tertiary education efficiency and employability. Unemployment rates among tertiary education graduates are lower than those among individuals that attained secondary level only, and this difference increases when public tertiary education is more efficient.

This paper examines the effectiveness of public spending on tertiary education in the Slovak Republic.

1 Slovakian Tertiary Education System

In the academic year 2015/2016, higher education in the Slovak Republic is provided by 20 public, 13 private and 3 state higher education institutions (HEI). State HEIs are founded and managed by the Ministry of Defence of the Slovak Republic, the Ministry of the Interior of the Slovak Republic and the Ministry of Health of the Slovak Republic, and funded as government-subsidised organisations. Their financing is in sole responsibility of these ministries. Public HEIs are largely financed through subsidies from the state budget provided by the Ministry of Education of the Slovak Republic based on a subsidy agreement. The state has no liability for obligations of public HEIs. Private HEIs are only entitled to a state budget subsidy to ensure the statutory entitlement of their students to social security (provision of social scholarships). Private HEIs may also apply for subsidies for study programmes, institutional

research or their development, but have no legal entitlement to them; from 2002 until the present, a subsidy for the provision of accredited study programmes was granted to private HEIs in one year only.

Figure 1 illustrates the number of academic staff in HE institutions relative to the total country population. This number varies between 7.1 (Austria) and 1.37 (Luxembourg). Romania has the second lowest figure available for an EU country. Notice that Austria and Denmark have a very high number of academics per 1000 inhabitants whereas the UK is below average (Eurostat, 2017$_a$).

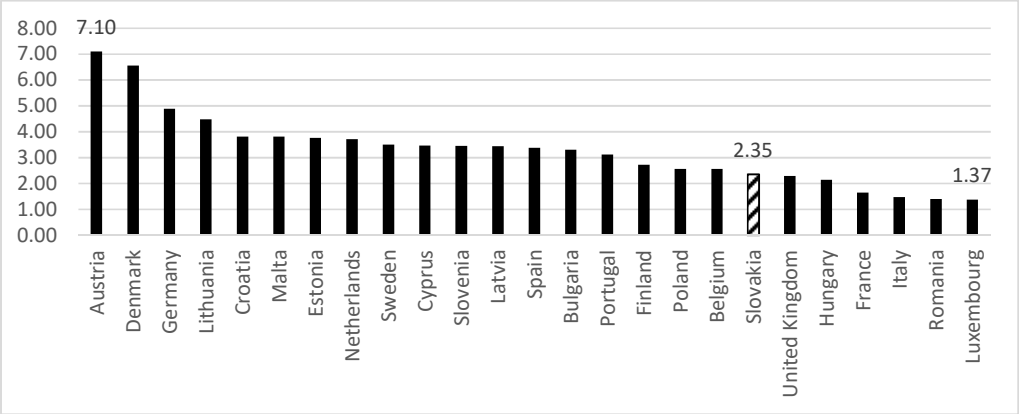


Figure 1: Number of Academic staff per 1000 inhabitants in 2015

Source: Eurostat

The average of the PISA indicator is 493. The highest scores are attained by Estonia, Finland, Slovenia, the UK, and the Netherlands. Austria have a slightly above average score and the lowest scores belong to Slovakia, Hungary and Italy (OECD, 2015). The PISA scores attained by Slovak students are decreasing.

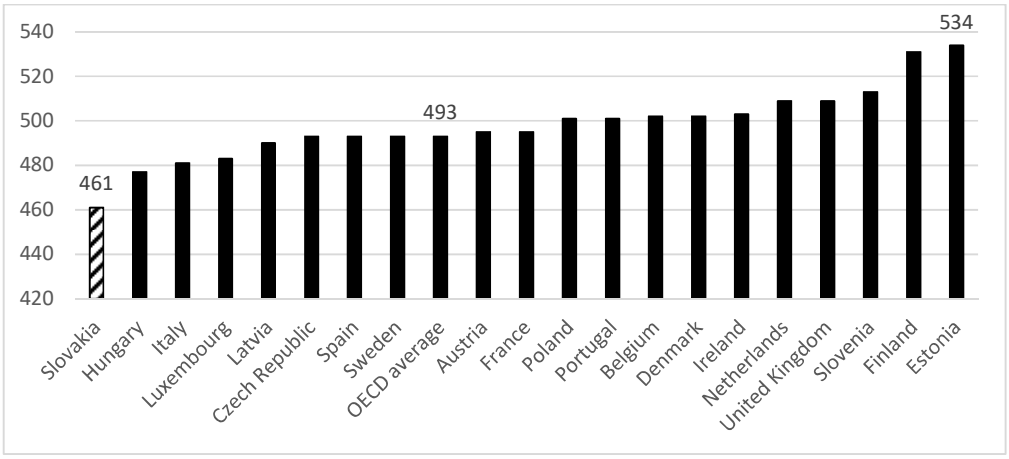


Figure 2: PISA indicator in 2015 – average of reading, science and mathematics scores

Source: OECD Database

This indicator presents a measure of expenditure on educational institutions relative to a nation's wealth. National wealth is estimated based on GDP, and expenditure on education includes spending by governments, enterprises, and individual students and their families. Investment in educational institutions as a percentage of GDP is one of the lowest across the EU: for tertiary education, the public

spending on educational institutions is only 0.97% of GDP, compared with an EU 28 average of 1.27%. This represents a decrease from the level in 2004 (1.09%) (Eurostat, 2017$_c$).

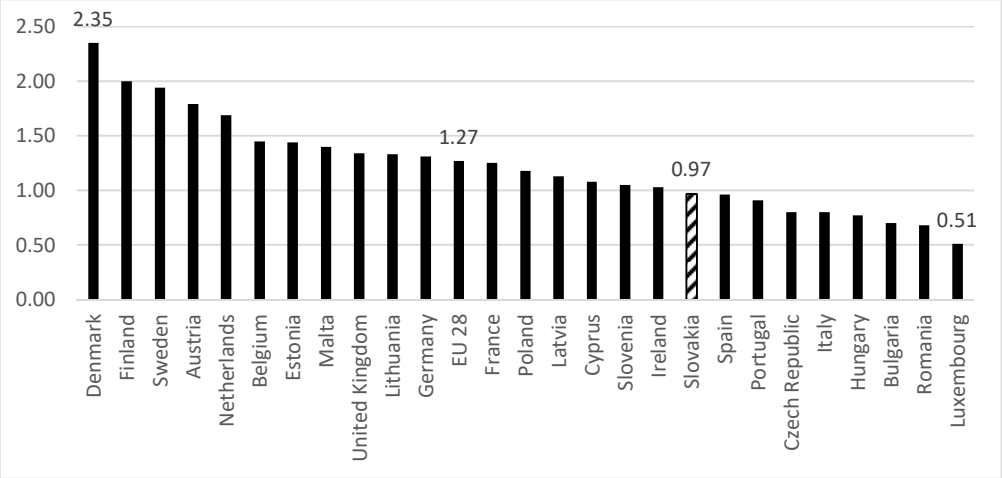


Figure 3: Public Expenditures on Tertiary Education as Percentage of GDP in 2014

Source: Eurostat

The rest of the paper is structured as follows. Section two presents the methodology used, section three provides results and discussion related to our research, while the last section concludes the paper.

2 Methodology

Our analysis consists of the following steps:

- To find appropriate data about the tertiary education in the Slovak Republic,
- To define indicators, on which the analyses will carried out,
- To evaluate results of our analyses.

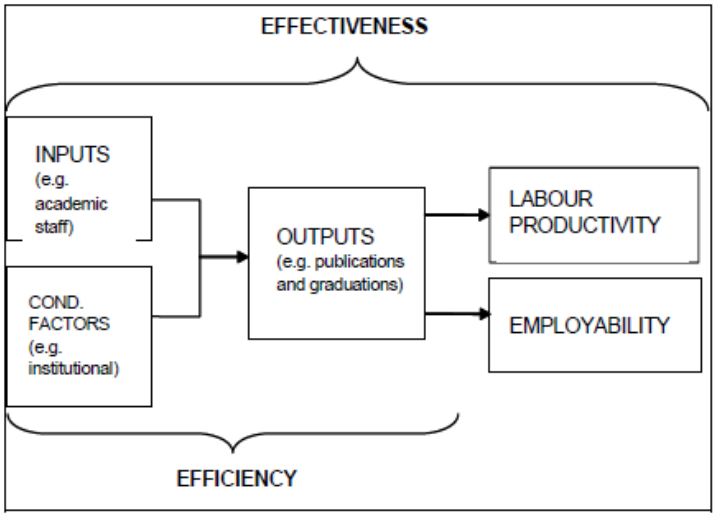


Figure 4 : The Model of Public Spending Effectiveness

Source: European Commission

While efficiency derives from a relationship between inputs and outputs, and refers essentially to the extent to which outputs are attained while minimising production costs, effectiveness refers to the connection between inputs, outputs and more general, second layer type objectives or outcomes. According to this preferred definition, while outputs from tertiary education are graduated students, outcomes to which these outputs in principle concur may be higher productivity, employability, innovation, or economic growth (European Commission, 2010).

We set just four main indicators for analysing effectiveness of public spending on the Slovakian tertiary education:

- Number of academic staff per 1000 inhabitants as the input indicator,
- Expenditure on tertiary education as percentage of GDP as the institutional condition,
- Public costs and benefits of education on attaining tertiary education as output indicator,
- Unemployment rates by educational attainment as the employability indicator.

Investing time and money in education is an investment in human capital. For adults, the labour market outcomes of higher educational attainment outweigh the initial cost of pursuing education. Better chances of employment and higher earnings are strong incentives for adults to invest in education and postpone labour market activities.

We used abbreviation "m" for missing data (e.g. break in time series) in the tables.

3 Results and Discussion

Educational institutions in EU countries spend an average of 1.7 times more per tertiary student than per primary student, but spending patterns vary widely, mainly because education policies vary more at the tertiary level.

In the Slovak Republic, expenditure per student increased between 2005 and 2013, by 69%. In the case of the Slovak Republic, this is partially explained by a steep decline (about 25%) in the number of students enrolled at primary, secondary and post-secondary non-tertiary level, the strongest decline in enrolment across EU countries. However, the lowest expenditures per student in 2013 belonged to Latvia, Lithuania, Poland, Hungary and the Slovak Republic (OECD, 2013).

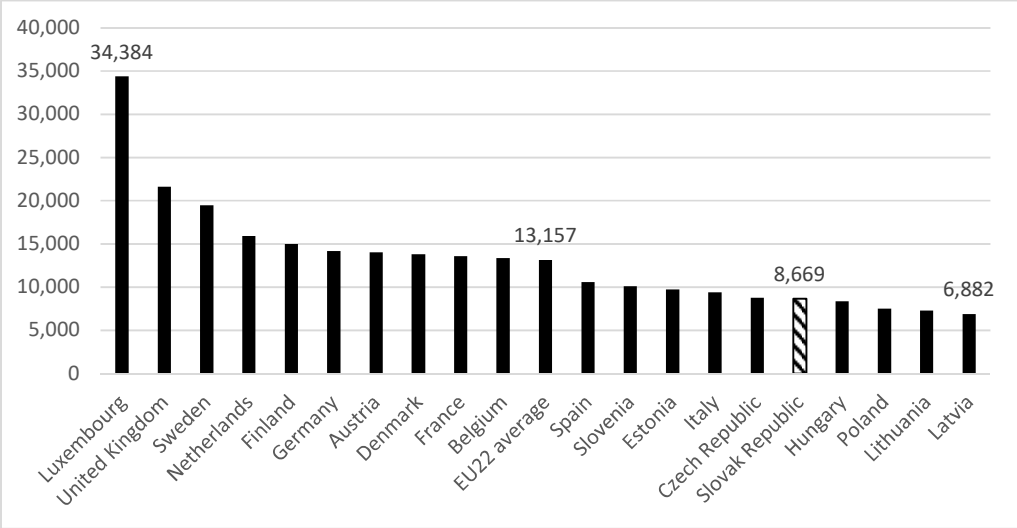


Figure 5 : Annual expenditure per student by educational institutions for all services by tertiary education in 2013

Source: OECD Database

Table 1 compares unemployment rates divided by attained education and age group in 2005 and 2015 (OECD, 2016$_b$). As one can see, the unemployment rate of young people (25 – 34 year old) was increasing between 2005 and 2015 (OECD, 2006). The same problem occurred in Denmark, Finland, France, as well as in other developed European countries.

Table 1: Trends in unemployment rates by educational attainment and age group in EU 22

	Upper secondary or post-secondary non-tertiary						Tertiary					
	Unemployment rates of						Unemployment rates of					
	25-64 year-olds		25-34 year-olds		55-64 year-olds		25-64 year-olds		25-34 year-olds		55-64 year-olds	
Country	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015	2005	2015
Austria	4,5	4,9	5,3	6,0	m	5,0	3,0	3,6	3,7	4,1	m	3,2
Belgium	6,9	7,5	9,4	10,6	4,1	6,1	3,7	4,1	4,9	5,7	m	4,0
Czech Republic	6,2	4,4	7,0	6,2	4,9	4,2	2,0	2,2	2,4	3,1	m	1,9
Denmark	4,0	4,7	4,3	5,7	5,7	4,4	3,7	4,8	5,0	7,6	3,6	3,3
Estonia	8,4	6,2	7,2	5,8	5,9	7,1	3,8	3,8	3,1	2,5	m	4,5
Finland	7,4	8,2	8,0	9,2	7,0	8,3	4,4	6,4	4,8	8,1	4,6	6,8
France	6,6	8,8	9,3	13,5	4,6	6,7	5,4	5,7	6,4	7,9	4,3	5,7
Germany	11,0	4,3	10,9	4,6	13,9	5,2	5,6	2,3	5,8	3,2	7,8	2,5
Greece	9,6	25,5	13,1	31,7	m	19,1	7,1	19,0	13,3	30,2	m	10,7
Hungary	6,0	5,7	7,3	7,2	4,0	5,7	2,3	2,2	3,1	3,4	m	1,7
Ireland	3,1	9,9	3,7	14,1	m	6,9	2,0	5,1	2,4	6,1	m	5,0
Italy	5,2	8,9	8,1	16,0	2,4	3,8	5,7	6,8	13,8	16,3	1,0	1,2
Latvia	9,0	10,7	9,4	9,4	10,1	10,9	4,1	4,5	4,0	6,0	4,3	3,9
Luxembourg	3,2	5,4	4,0	7,1	m	4,4	3,2	4,6	2,7	5,7	m	3,4
Netherlands	4,1	6,8	3,9	7,1	4,6	9,3	2,8	3,7	2,6	3,2	3,1	5,8
Poland	16,6	7,1	19,9	9,4	13,0	5,6	6,2	3,5	9,8	5,5	4,5	1,8
Portugal	6,7	11,4	8,3	12,5	m	11,5	5,4	8,2	9,2	13,0	m	3,6
Slovak Republic	12,7	9,9	13,8	11,8	11,6	9,4	4,4	5,6	5,3	7,6	7,7	4,8
Slovenia	5,7	9,4	6,7	13,3	6,3	9,0	3,0	5,7	5,1	10,5	m	4,7
Spain	m	19,2	m	23,3	m	15,1	m	12,4	m	17,5	m	8,4
Sweden	6,0	4,6	8,5	6,1	5,4	5,7	4,5	4,0	7,1	5,1	2,3	3,2
United Kingdom	3,1	3,6	4,1	5,1	2,4	3,0	2,1	2,7	2,4	3,4	2,8	2,8
OECD average	**6,3**	**7,3**	**7,5**	**9,2**	**5,8**	**6,4**	**3,8**	**4,9**	**5,3**	**6,9**	**3,6**	**3,8**
EU22 average	**6,9**	**8,5**	**8,2**	**10,7**	**6,6**	**7,6**	**4,0**	**5,5**	**5,6**	**8,0**	**m**	**4,2**

Source: OECD Database

Figure 6 displays employment rates among graduates in year 2016 (Eurostat, 2017$_b$). The employment rate of graduates reached in Slovakia is above the EU 28 average (Kajanová, 2015). On the other side, Poland, Hungary or Czech Republic had better results in this case.

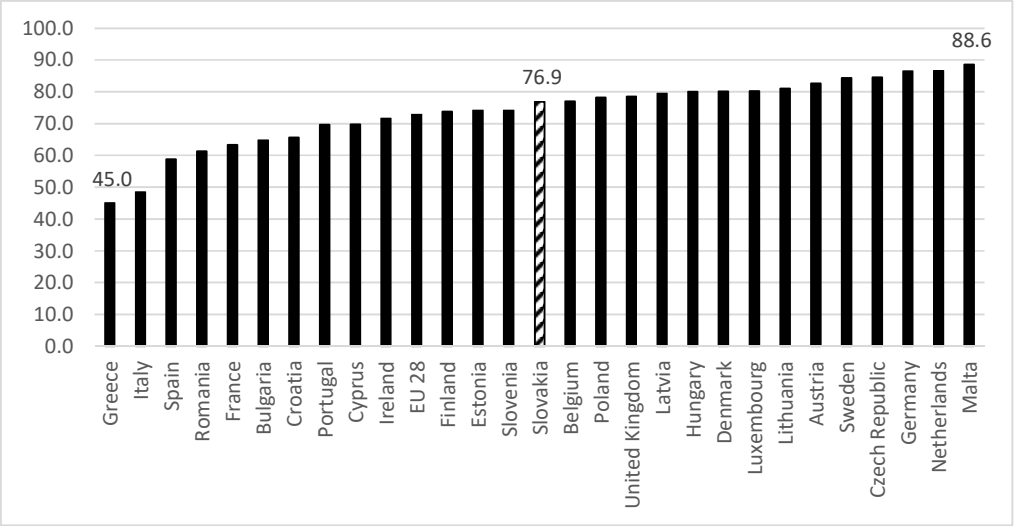


Figure 6 : Employment rates of graduates in 2016 (in %)

Source: Eurostat

While further education yields higher earnings over the career of an individual, private benefits from investing in education also depend on countries' tax and social benefits systems. Higher income taxes and social contributions, and lower social transfers related to higher earnings can act as disincentives to investing in further education by creating a wedge between the level of gross earnings needed to recover the cost of education and the final net earnings perceived by the individual. For instance, a man who chooses to invest in tertiary education will pay, on average, about 40% of his additional income associated with tertiary education in taxes and social contributions (OECD, 2014). In the Czech Republic, Estonia, Poland and the Slovak Republic, income taxes and social contributions amount to less than a third of the gross earning benefits, while in Denmark, Italy and Slovenia, they add up to about half of the gross earning benefits. As women tend to have lower earnings, they often fall into lower income tax brackets.

Total private costs, composed of direct costs and foregone earnings, generally rise with the level of education. The direct costs for a man or a women entering upper secondary or post-secondary non-tertiary education are, on average, about USD 2 500 across OECD countries, while they amount to about USD 10 500 for tertiary education (OECD, 2016$_a$).

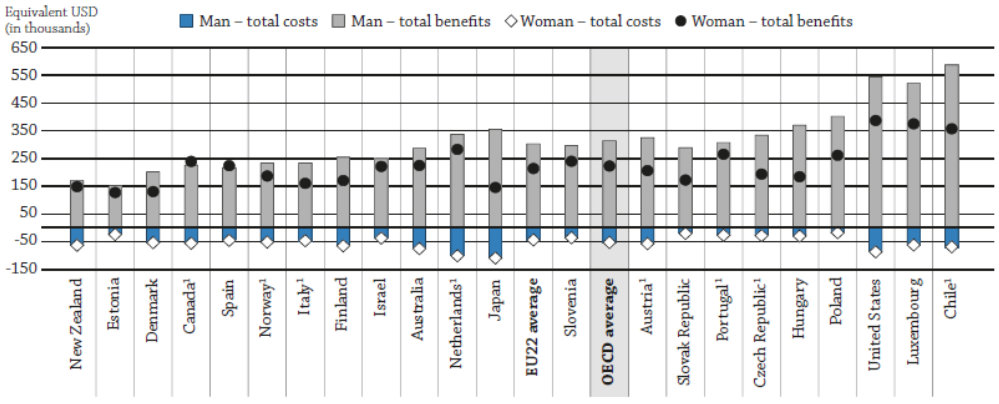


Figure 7 : Private costs and benefits of education on attaining tertiary education in 2012

Source: OECD Database

Public net financial returns are measured in a similar fashion to private net financial returns and are also based on the difference between costs and benefits associated with an individual attaining an additional level of education. Costs include direct public costs for supporting education and foregone tax revenue on earnings. Benefits are calculated using income tax, social contributions, social transfers and unemployment benefits. Total public benefits in the Slovak republic also differ between men and women, due to differences in labour market outcomes. This suggests that government have a role to play in easing the integration and participation of women in the labour market, in order to assure higher gains from the large investment of women in their education.

One can see public net financial returns were higher in the Slovak Republic than in Spain or Estonia. The highest public net financial returns were achieved by Luxembourg in 2012.

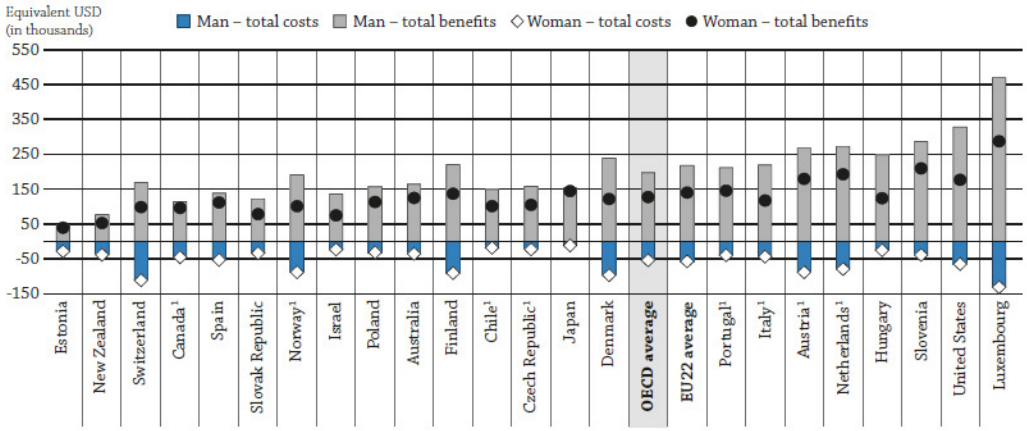


Figure 8 : Public costs and benefits of education on attaining tertiary education in 2012

Source: OECD Database

Comparison of Figures 7 and 8 shows that net financial returns on investment for governments are generally closely related to private returns. Countries where individuals benefit the most from pursuing tertiary education are also those where governments gain the largest returns. However, countries such as the Slovak Republic and Slovenia are exceptions. Although these two countries have similar net financial private returns (about USD 260 000 for a tertiary-educated man), the net financial public returns are more than USD 150 000 higher in Slovenia than in the Slovak Republic. This difference is mostly explained by larger income tax and social contribution effects in Slovenia (Rentková, 2017).

5 Conclusion

The main goal of this paper was to publish the partial results of the research linked with measurement of the public spending on the tertiary education in the Slovak Republic.

Main conclusion of our research is that the performance of the Slovakian tertiary education system is quite good. Indicators measuring the effectiveness depends also on the economic growth of the Slovak Republic. A measurement challenge is that the indicators available are crude, but that some issues are too big to be ignored while waiting for more refined indicators. There is a compelling need to evaluate the impact of tertiary education, and to assess the efficiency, and effectiveness of expenditure. It is also necessary to assess what employers seek from graduates from tertiary education, as well as the validity of available measures of teaching quality. Measuring the quality of tertiary education is as challenging as it is important.

More than a half of indicators showed that the public spending on the Slovakian tertiary education is efficient. The inadequate public spending on the tertiary education is causing the low number of academic staff in HE institutions relative to the total country population.

Effectiveness or the degree to which the objectives have been achieved is expressed in terms of benefits, respectively positive effects triggered in other domains of social-human life and which are difficult to quantify.

References

European Commission, (2010), 'Efficiency and effectiveness of public expenditure on tertiary education in the EU,' [Online], [Retrieved August 12, 2017], http://ec.europa.eu/economy_finance/publications/occasional_paper/2010/pdf/ocp70_en.pdf.

Eurostat, (2017a*), '*Classroom teachers and academic staff by education level, programme orientation, sex and age groups,' [Online], [Retrieved August 14, 2017], http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=educ_uoe_perp01&lang=en.

Eurostat, (2017b*), '*Employment and activity by sex and age - annual data,' [Online], [Retrieved August 14, 2017], http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=lfsi_emp_a&lang=en.

Eurostat, (2017c*), '*Public expenditure on education,' [Online], [Retrieved August 14, 2017], http://ec.europa.eu/eurostat/tgm/table.do?tab=table&plugin=1&language=en&pcode=tsdsc510.

Kajanová, J. (2015), 'Employment support in the context of regional development,' Hradecké ekonomické dny 2015: ekonomický rozvoj a management regionů, ISBN: 978-80-7435-546-2, 3-4 February 2015, Hradec Králové, Czech Republic, 377-384.

OECD, (2016a), 'Education at a Glance 2016: OECD Indicators,' [Online], [Retrieved August 13, 2017], http://download.ei-ie.org/Docs/WebDepot/EaG2016_EN.pdf.

OECD, (2016b), 'Trends in unemployment rates, by educational attainment and age group (2005 and 2015),' [Online], [Retrieved August 13, 2017], http://dx.doi.org/10.1787/888933396985.

OECD, (2015), 'Science performance (PISA),' [Online], [Retrieved August 15, 2017], https://data.oecd.org/pisa/science-performance-pisa.htm.

OECD, (2014), 'Education at a Glance 2014: OECD Indicators,' [Online], [Retrieved August 13, 2017], https://www.oecd.org/edu/Education-at-a-Glance-2014.pdf.

OECD, (2013), 'Annual expenditure per student by educational institutions for all services (2013),' [Online], [Retrieved August 14, 2017], http://dx.doi.org/10.1787/888933397529.

OECD, (2006), 'Education at a Glance 2006: Highlights,' [Online], [Retrieved August 13, 2017], https://www.oecd.org/education/skills-beyond-school/37376068.pdf.

Rentková, K. (2017), 'Analysis of regional development opportunities in Slovak republic,' Economic and social development (Book of proceedings), ISSN 1849-689X S. 66, 29-30 June 2017, Split, Croatia, 600-608.

Semiotic Approach to Pedagogical Bioethics

Nina A. Pervushina, Tomsk State Pedagogical University, Tomsk, Russia, pervushina_na@mail.ru

Abstract

The developing convergent technologies are actively entering in all the spheres of human life, and training does not stand aside, which makes knowledge management relevant. The interrelation between the cognitive and corporal impact of information actualizes the bioethical aspect of the problem by raising the question are the consequences of information perception predictable. In its turn, the symbolism of bioethics influences the relevant competences in education for a variety of professions. Bioethics protects a person's individuality in the field of medicine, but at the moment does not affect the field of pedagogy. Since one of the current trends is a significant predominance of visual representation of information over the verbal, it is relevant to consider the very visual perception of information. In the work, the author discovers the conceptual basis for conducting semiotic diagnostics of applicability limits of perceptual theories. As a result, the rationale for choosing models of the information-synergetic approach as such basis is justified.

Keywords: symbolism of bioethics, perception of visual information, knowledge management.

Introduction

Effective knowledge management is a necessary component of forming and development of the modern man. Since, according to modern studies, in the process of learning the brain changes physically (Macajova, 2013; Chernigovskaya, 2010; Zuk et al., 2014), and the training itself is ongoing and not always purposeful, it is important which information and which way one gets. This is the determining factor in knowledge management, when the creation, storage, distribution and application of the necessary knowledge is of particular importance. At the same time, the relationship between the cognitive and corporal impact of information actualizes the bioethical aspect of the problem.

Actively developing biomedical and other technologies, called the convergent ones and combining nano-, bio-, information-, cognitive technologies (Roco & Bainbridge, 2003), are aimed in their perspective at transforming the technological sphere of mankind into an organic part of the natural environment. These technologies affect a wide range of human life spheres and thus cause sociocultural transformations, so obvious and unprecedented that it is impossible not to notice them. Bioethics becomes a sociocultural reaction to the innovation of biomedical technologies (Mescheryakova & Melik-Gaykazyan, 2015; Melik-Gaykazyan et al., 2017). It is designed to regulate, prohibit or permit the implementation of such innovations, protecting the rights, dignity and autonomy of human, one's personality and individuality. With a broader view, under its "protection" is the individuality not only of human, but also of animals (Gorbuleva, Melik-Gaykazyan & Melik-Gaykazyan, 2016; Tarasenko et al., 2016). Such protection is based on the value of life, a merciful and humane attitude to all living things. Bioethics as a form of modern culture accentuates the right of individualy to be what one wants, and the duty of the society to provide individuality with this opportunity. The symbolism of bioethics spreads itself across all the spheres of knowledge, enters into life, forms new grounds for social altruism, protects the right to remain for each participant of communication process.

The problem is bioethics protects the individuality of human (Meshcheryakova, 2011; Mescheryakova & Melik-Gaykazyan, 2015) in the sphere of medicine, but at the moment does not affect the pedagogical sphere. Although the principles and rules developed by Tom L. Beauchamp and James Childress (non-maleficence, beneficence, justice, respect for patient's autonomy, and the rules of truthfulness,

confidentiality and informed consent), it makes sense to apply them to the sphere of education (Mescheryakova, Melik-Gaykazyan & Melik-Gaykazyan, 2016). So, for example, a student and / or one's legal representatives should have the right to obtain information about what impact will be rendered, what will be the final result of education, which "contra-indications" have the methods of training, i.e. the right to implementation of informed consent procedure. Thus, the specific characteristics of modern times make it necessary to apply bioethics in the sphere of pedagogy. Firstly, the visual presentation of information largely replaced the verbal one. Secondly, the life itself became a product of technology, i.e. it became an artifact. Thirdly, the pace of innovation discovers the frailty of intellectual traditions. Fourthly, the innovations of convergent and biomedical technologies create new risks. And, finally, the existence of individual in the environment of new risks requires a new degree of responsibility for the choice made by the individuality. In this case, individuality has to make a choice constantly - both corporeal and mental. Bioethics is at the intersection of some trends: it protects individuality from arbitrariness of biomedical manipulation, assess the new risks, keeps the moral positions of philosophical traditions for determining the permissible limits of interference of artificial to natural.

As technology creates more and more visual products, it becomes important how to channel this potential into the right direction. The visual representation of information has not only entertaining usage, but it can also be a powerful tool, which makes it important to find out the optimal ratio in the use of visual aids in relation with the characteristics of individual perception of visual information. In pedagogical science, the limits of applicability of approaches are usually not specified, which creates significant difficulties in establishing, for example, their axiological limits while modeling the learning process, combining methods, techniques and technologies developed in the framework of various theories of education (Mescheryakova, Melik-Gaykazyan & Melik-Gaykazyan, 2016; Melik-Gaykazyan et al., 2017). Being within these limits, it is possible to combine the methodical techniques proposed within various approaches so that they work not as an eclectic set, but as a thoroughly measured complex. It is the combination of different concepts that maximizes efficiency and ensures the comfort of training, since any methodical technique is effective only when it corresponds with specific goals and the particular perception of trainees.

In relation with the problem posed, a research question emerged, consisting in discovering the methodological grounds for conducting semiotic diagnostics of the limits of applicability of various approaches to the perception of visual information for knowledge management.

Methods of research and analysis of results

The information-synergetic approach, which is closely related to the systemic approach in the Russian tradition (Melik-Gaykazyan, 2010), is chosen as a research method and consists in modeling (Rogotneva, Melik-Haikazyan & Goncharenko, 2015; Melik-Gaykazyan et al., 2016). The information-synergetic approach has been tested in studies of relationships within self-organization of Hi-Tech system, transformation of education systems in the context of self-organization of convergent technologies (Mescheryakova et al., 2016) and the nonlinear dynamics of sociocultural systems (Gorbuleva, Melik-Gaykazyan & Melik-Gaykazyan, 2016; Tarasenko et al., 2016), which allowed to identify the emergence of symbolism of bioethics and its linking role in the transformation of scientific, educational and cultural systems (Melik-Gaykazyan, Gorbuleva et al., 2017). To solve the problem stated in the article, attractiveness of the approach lies in the fact that it opens the possibility to measure the range of impacts occurring in the process of teaching (Mescheryakova et al., 2016).

If one consider bioethics a sociocultural reaction to actively developing convergent technologies, it becomes obvious that its goals are embodied in its symbolism, which manifests itself, among other things, in visual images. In this regard, it is important to determine how the value of symbols is read. Or in other words, how these visual images are perceived. Therefore, the initial point of searching for solution will be addressing to interpretation of information perception as the stage of the information

process (Tarasenko, Melik-Gaykazyan & Melik-Gaykazyan, 2016; Melik-Gaykazyan, Tarasenko et al., 2017). The information approach is worth considering from the point of view of post-non-classical methodology (Tarasenko, Melik-Gaykazyan & Melik-Gaykazyan, 2016; Evdokimov et al., 2016; Melik-Gaykazyan, Tarasenko et al., 2017). The perspectives of researching perception in the framework of post-non-classical paradigm are associated primarily with rejection of traditional views, transition to a new vision of the world, based on the ideas of universal evolutionism, systemic, multivariate and poly fundamentalism.

It is possible to indicate the initial ideas underlying the post-non-classical vision of the world, according to Vyacheslav S. Stepin: the unity of the universe lies in the fact that the common laws act at all the levels of its organization; systemic vision as opposed to the mechanistic understanding of the world; the synthesis of determinism, multivariance and eventuality; rejection of the concept of reductionism (Stepin, 2003, 2015, 2016). These ideas are based on the following basic theses: the random and the regular are equal partners in the Universe; probabilistic self-organization of open nonequilibrium system, i.e. spontaneous transition to an ordered state, accompanied by redistribution of matter in time and space; approach to research of organism as an open system; the basic forms of cooperative behavior inherent to the living organisms have their analogues among inorganic systems (Stepin, 2003, 2015, 2016; Knyazeva & Kurdyumov, 2002). Proceeding from these theses it was established that the phenomena of self-organization include information processes, including the stages of generation and evolution of valuable information as an initial stage of this general process (Tarasenko, Melik-Gaykazyan & Melik-Gaykazyan, 2016; Evdokimov et al., 2016; Melik-Gaykazyan, Tarasenko et al., 2017).

In addition, within the post-non-classical paradigm, perception is understood as a dialogue, where a human is a full participant, determining its parameters. On the contrary, within the frameworks of the classical approach perception supposes contradistinction of subject and object, while the nonclassical approaches consider the complementary relations of the observer and the environment. As we see, in the post-nonclassical paradigm (Stepin, 2003, 2015, 2016; Lektorskii et al., 2016; Raitina, 2015; Trufanova & Gorokhov, 2014) a "human dimension" is introduced, supposing the inclusion of value-semantic factors. In this new space, new interactive cognitive strategies are formed, taking into account the multifaceted relationships between a man and the world.

This was especially evident in synergetics, where the new approaches to research of human and culture are being formed on the basis of natural science (nonlinear analysis, theory of deterministic chaos, theory of dissipative structures). The humanitarian orientation of synergetics, related to the ideas of irreversibility, the variety of possible development options that arise when the system passes through bifurcation points, the ideas of the organic relation between self-regulation and cooperative effects, allows us to talk about the emergence of "synergetics with a human face" (Knyazeva & Kurdyumov, 2002; Knyazeva, 2011, 2017).

The non-linearity of system has an ideological meaning. In the works of Yelena N. Knyazeva and Sergey P. Kurdyumov, the non-linearity in ideological meaning is manifested through: the idea of multivariance, alternative ways of evolution; ideas of choice from the given alternatives; ideas of evolution pace; ideas of evolution irreversibility (Knyazeva & Kurdyumov, 2002, p. 36). Describing the phenomenon of nonlinearity, researchers distinguish the following features: the principle of "small growth" or "amplification of fluctuations"; certain classes of open nonlinear systems demonstrate a "sensitivity threshold"; nonlinearity generates a "quantum effect" - discreteness of nonlinear systems' ways of evolution; unexpected changes in the direction of processes flow are possible (Knyazeva & Kurdyumov, 2002, p. 36).

The perceptual system is non-linear, since perception is determined not only by a combination of stimuli. Attempts by adherents of some psychological concepts to construct a theory of perception via "summing up" its elementary properties turned out to be insolvent, since the whole is not reduced to the sum of its parts. Sensory signals only "supply" the brain with the data, the choice of system leads to the birth of new

qualities, to restructuring of the structure. The perception of the same elements included in different contexts is variable, since, from the point of view of Lev Vygotsky, the psyche is "a sieve that filters the world" (Vygotsky, 1982, p. 347). A well-founded approach to perception as an open non-linear system is promising in the methodological plan, since it allows (Tarasenko, Melik-Gaykazyan & Melik-Gaykazyan, 2016; Evdokimov et al., 2016; Melik-Gaykazyan, Tarasenko et al., 2017) to discover the limits of applicability of various psychological concepts of perception from information-synergetic point of view and streamline them.

Perception of information as a non-equilibrium process allows to research the information-synergetic approach, since reception means the emergence of a certain orderliness in perceptual system (Mescheryakova, Melik-Gaykazyan & Melik-Gaykazyan, 2016). Information processes associated with reception of information, as revealed in the works of Irina V. Melik-Gaykazyan, are possible only in open and nonlinear systems. This understanding of perception is corresponding with psychological theory (Mescheryakova, Melik-Gaykazyan & Melik-Gaykazyan, 2016). The process of perception acts as a reception for selecting action algorithms in order to choose the method of further action. In this case, the selection of algorithms can occur both from memory and in real time (Mescheryakova, Melik-Gaykazyan & Melik-Gaykazyan, 2016). In other words, the reception process becomes the stage of information transmission in diachronic and synchronous mode.

The information-synergetic approach to research of perception is promising, because it is based on interrelation of the three theses: the phenomenon of information is the process irreversible in time; the beginning of this process is a random result of a spontaneous event; information processes are the mechanisms of self-organization of open complex systems. Each thesis is manifested in a specially developed conceptual model, and their combination is a method of solving problems in interdisciplinary studies of nonlinear dynamics of complex systems (Melik-Gaykazyan, Gorbuleva et al., 2017). It is these models (the conceptual and schematic types of which are exhaustively presented by Irina V. Melik-Gaykazyan in a number of articles (Tarasenko, Melik-Gaykazyan & Melik-Gaykazyan, 2016; Melik-Gaykazyan et al., 2017; Evdokimov et al., 2016; Mescheryakova, Melik-Gaykazyan & Melik-Gaykazyan, 2016)) that allow to conduct the semiotic diagnostics of limits of applicability of various approaches to perception of visual information.

The concept of perceptual system as open, complex and self-organizing, and therefore understanding of perception as a stage of information process that is irreversible in time and which is a random result of spontaneous event, makes it possible the diagnostics of limits of applicability of psychological theories of perception on the basis of models of information-synergetic approach. The usage of such diagnostics is relevant in pedagogy, since it allows to protect the autonomy of individual.

So, the conceptual basis for conducting semiotic diagnostics of limits of applicability of various approaches to perception of visual information will be the model of information process stages that represents the spectrum of impacts of these stages on human and anthropological perceptions of these impacts. The model allows to present the trajectories of impacts of normative, verbal, prognostic, critical, adaptive and compensatory functions. This becomes the key to ordering of psychological theories in the spectrum of their understanding of human perception essence, which is important in pedagogical bioethics and knowledge management.

Conclusion

To effectively use visual aids, it is necessary to rely on cultural traditions of perception and individual traits of trainee, since everyone has the right to autonomy. The relevance of application of bioethics principles in pedagogy determines modification of adaptive function of education to the reality that is constructed by convergent technologies. This reality initiates the new challenges and determines the

content of professional training of specialists in almost all spheres of activity. At the same time, the reality of the present and the near future is formed by semiotic means, among which the means of visual symbolism dominate. This dominance implies a new direction of adaptation - an adaptation to the preservation of one's own autonomy under the active impact of visual information. The ability to meter this impact in doses necessary for pedagogical purposes is based on solving the problem of measurement in humanitarian studies and the principles of bioethics that protect the autonomy of individual. The combination of different approaches and designation of limits of their applicability becomes a necessity, the very combination of different approaches makes sense, because each of them corresponds to one aspect. Understanding the scope of these aspects is fundamental, which is demonstrated in a clear form by the model of information-synergetic approach. The opportunity to categorize the theories of perception of visual information is relevant for the methodical regulation of their application in pedagogy and construction of "semiotic attractors" of education, the form of which is created by symbolism of visual information, and the meaning - by symbolism of bioethics.

Acknowledgment

The results were obtained in the frameworks of RHF project № 15-03-00598 - “Bioethics: Creation of the New Symbolism”.

References

Chernigovskaya, T. V. (2010), ‘The brain and language: Innate modules or a learning network?’ *Herald of the Russian Academy of Sciences*, *80*(3), 243-247. DOI: 10.1134/S1019331610030081.

Evdokimov, K.V., Kuznetsov, V.G., Melik-Gaykazyan, I.V. and Melik-Gaykazyan, M.V. (2016), ‘“Semiotic Attractor”: A Model for the NBICS-Technologies Coherence Management,’ Proceedings of the 27th International Business Information Management Association Conference (IBIMA), ISBN: 978-0-9860419-6-9, 4-5 May 2016, Milan, Italy, 355-361.

Gorbuleva, M.S., Melik-Gaykazyan, I.V. and Melik-Gaykazyan, M.V. (2016), ‘Why Russian animal protectors are as they are and why do they act they do? ’ *Sotsiologicheskie Issledovaniya,* 4, 157-158.

Knyazeva, E.N. and Kurdyumov, S.P. (2002), Foundations of Synergetics. Blow-up regimes, Self-organization, Tempoworlds. St. Petersburg: Aleteya.

Knyazeva, H. (2011), ‘The Cognitive Architecture of Embodied Mind,’ *International Journal of the Humanities*, *8*(11), 1-10.

Knyazeva, H. (2017), Complexity Studies: Interdisciplinarity in Action, Berechenbarkeit der Welt? Pietsch, W., Wernecke, J., Ott, M. (eds), Springer Fachmedien Wiesbaden.

Lektorskii, V. A., Arshinov, V. I., Kuznetsov, V. Y. and Pruzhinin, B. I. (2016), ‘Postnonclassical science and the sociocultural context,’ *Herald of the Russian Academy of Sciences*, *86*(4), 343-350.

Macajova, M. (2013), ‘Neuropedagogy and brain compatible learning-ideas for education in the 21st century,’ *Technologia Vzdelavania*, *21*(3), 1.

Melik-Gaykazyan, I. V. (2010), 'Conference in memory of E. G. Yudin,' *Voprosy filosofii,* 8, 175-177.
Melik-Gaykazyan, I. V., Gorbuleva, M. S., Vengerovsky, A. I., Melik-Gaykazyan, M. V. (2017), 'Semiotic Diagnostics of Social Transformations, ' Proceedings of The 29th International Business Information Management Association Conference (IBIMA), ISBN: 978-0-9860419-7-6, 3-4 May 2017, Vienna, Austria, 435-439.

Melik-Gaykazyan, I. V., Melik-Gaykazyan, M. V., Mescheryakova, T. V. and Sokolova, N. S. (2016), 'The Model of Bioethics as" Semiotic Attractors" for Diagnosing Innovative Strategies of Training Specialists for NBICS-Technologies Niche,' *SHS Web of Conferences* (Vol. 28). UNSP 01069. EDP Sciences. DOI: 10.1051/ shsconf/20162801069. UNSP 01069.

Melik-Gaykazyan, I. V., Tarasenko, V. F., Mescheryakova, T. V., Melik-Gaykazyan, M. V. (2017), 'Information Model for Management In the Area of Convergent Technologies, ' Proceedings of The 29th International Business Information Management Association Conference (IBIMA), ISBN: 978-0-9860419-7-6, 3-4 May 2017, Vienna, Austria, 429-434.

Melik-Gaykazyan, I.V. and Mescheryakova, T.V. (2015), 'Hippocratic Oath: Transformation of Semantics and Revival of Pragmatics,' *Schole*, 9, 1, 36-45

Mescheryakova, T. V. (2011), 'Bioethics at intersection of scientific and extra-scientific areas,' *Tomsk State Pedagogical University Bulletin*, *10*, 216-221.

Mescheryakova, T.V., Melik-Gaykazyan, I.V. and Melik-Gaykazyan, M.V. (2016), 'Place of Bioethics in Knowledge Management in the Information Society,' Proceedings of The 28th International Business Information Management Association Conference (IBIMA), ISBN: 978-0-9860419-8-3, 9-10 November 2016, Seville, Spain, 2187-2186.

Raitina, M. (2015), 'Transformation of subject-centered concepts of scientific creativity in conditions of communicative sociality,' *Procedia-Social and Behavioral Sciences*, *166*, 578-582.

Roco M. and Bainbridge W. (2003), Converging technologies for improving human performance: Nanotechnology, biotechnology, information technology and cognitive science. Dordrecht: Kluwer Academic Publishers, New York: Springer Press.

Rogotneva, E. N., Melik-Haikazyan, I. V. and Goncharenko, M. (2015), 'Bioethics: Negotiation of Fundamental Differences in Russian and US Curricula,' *Procedia-Social and Behavioral Sciences*, *215*, p. 26-31.

Stepin, V.S. (2003), Theoretical knowledge. Moskow: Progress-Tradition.

Stepin, V.S. (2015), 'Historical types of scientific rationality,' *Russian Studies in Philosophy*, *53*(2), 168-180.

Stepin, V.S. (2016), **'**Historical-Scientific Reconstruction: Pluralism and Cumulative Continuity in the Development of Scientific Knowledge,' *Voprosy Filosofii, 6, 5.*
Tarasenko, V.F., Melik-Gaykazyan, I.V. and Melik-Gaykazyan, M.V. (2016), 'The Global and the Local: the Model of Measuring Performance of International Business,' Proceedings of The 28th International Business Information Management Association Conference (IBIMA), ISBN: 978-0-9860419-8-3, 9-10 November 2016, Seville, Spain, 2183-2186.

Tarasenko, V.F., Melik-Gaykazyan, I.V., Melik-Gaykazyan, M.V. and Gorbuleva, M.S. (2016), '"Rabbit effect": the reasons of volunteer movements as the diagnostics of the role transformations of human resource management,' Proceedings of The 28th International Business Information Management Association Conference (IBIMA), ISBN: 978-0-9860419-8-3, 9-10 November 2016, Seville, Spain, 2179-2182.

Trufanova, E. O., and Gorokhov, V. G. (2014), 'Epistemology and the philosophy of science and technology in contemporary Russian philosophy: a survey of the literature from the late 1980s to the present,' *Studies in East European Thought*, *66*(3-4), 195-210.

Vygotsky, L.S. (1982), The historical meaning of the crisis in psychology: A Methodological Investigation. The Collected Works of Vygotsky. Vol. 1. Moscow, Pedagogika Publ.

Zuk, J., Benjamin, C., Kenyon, A. and Gaab, N. (2014), 'Behavioral and neural correlates of executive functioning in musicians and non-musicians,' *PloS one, 9(6)*, e99868. DOI: 10.1371/journal.pone.0099868.

The Role of Intellectual Capital in the Intrapreneurship Process and Its Effects on the Innovation Radicalness

José Carlos Curiel Franco
Universidad Complutense de Madrid
Campus de Somosaguas, 28223 Madrid, Spain
josecuri@ucm.es

Miriam Delgado Verde
Universidad Complutense de Madrid
Campus de Somosaguas, 28223 Madrid, Spain
miriamdv@ccee.ucm.es

Abstract

The purpose of this work is to highlight the major role that intellectual capital plays in the intrapreneurship, defined as an entrepreneurship process within an existing organization. The relationships between the intensity with which the opportunities are identified and exploited in the process, and the innovation radicalness resulted from it, are leveraged by the intellectual capital.

Keywords: Intrapreneurship; Entrepreneurship; Intellectual Capital; Innovation; Opportunity;

Introduction

Intrapreneurship is known as the entrepreneurship developed within an existing organization (Antoncic, 2007). This phenomenon is highly worthwhile for firms: it can be used as a strategy to maintain a high level of innovation in the dynamic environment of today (Ulhoi, 2005). In this competitive scenario, one of the best ways for reaching firm competitive advantage position comes directly from achieving higher levels of innovation radicalness (Marvel and Lumpkin, 2007).

For the last two decades, entrepreneurship has been widely studied and through many approaches. Nevertheless, there seems to be a consensus with a process-approach, derived from the seminal paper of Shane and Ventakaraman (2000). In fact, to tackle the entrepreneurship phenomenon from this process-approach offers the advantage that it can also be applied in an organization context. That is why, some authors claim that the intrapreneurship and the entrepreneurship are both the same process by which entrepreneurial opportunities are identified and exploited (Ulhoi, 2005). Even if opportunities are a fundamental requirement, they are not sufficient to explain the entrepreneurship process for the reason that someone has to identify and exploit them (Ramos-Rodríguez, et al 2010): in the individual entrepreneurship case, the human capital represents the knowledge and skills that entrepreneurs bring to the process they set out to perform (Dimov, 2010) while the social capital refers to the entrepreneur´s social network that help to ensure success. In a firm context, the human capital, the social capital, together with the organizational capital represent the intellectual capital that allows for the process to be completed.

In this sense, this work attempts to clarify the distinction between individual entrepreneurship and intrapreneurship in a practical way, considering the process-approach for the study and proposing a model including the key concepts underpinning entrepreneurship. To our knowledge little work has been carried out on the relationships between intrapreneurship, innovation and intellectual capital, all together. Wu et

al (2008) propose some relationships including moderator effects, but in this case, entrepreneurship, tackled from another perspective, is not defined as a process. This work fills some gaps in the intrapreneurship literature proposing a model where intellectual capital plays a major role leveraging the relationship between the intensity with which the opportunities are identify and exploited in the intrapreneurship process, and the innovation radicalness resulted from the process.

The work is structured as follows: first of all, we provide a review on the existing literature in order to lay the theoretical foundations of the study. Then we propose the model, based on a process-approach, and finally we formulate the hypothesis.

Literature Review

The Intrapreneurship Concept

Since it was first coined by Pinchot (1985), intrapreneurship had been referred to by many as "corporate entrepreneurship", "corporate venturing" or "internal corporate entrepreneurship" (Antoncic and Hisrich, 2001). Ulhoi (2005) defines intrapreneurship as the process within an organization; by which opportunities are identified and exploited, establishing that is the same process as in the individual entrepreneurship case. In this sense, a process is defined as a series of actions that transform inputs into outputs through use of resources (ISO 9001:2000).

The Entrepreneurial Opportunity

It corresponds to the input of our process-model. Scholars are focusing on it and this literature is growing very rapidly. In fact, opportunities have become for many researchers the core construct in the entrepreneurship framework (Uygur, forthcoming). Nevertheless, there is no consensus on the definition and some authors criticize the approach proposed for this construct (Dimov, 2010). Davidsson (2015) highlights the minority of works that offer a definition of opportunity and argues that the lack of construct clarity is the major reason why there is little progress on the study of entrepreneurship. "Opportunity" carries a connotation of favorability and, a priori, denoting success. In fact, we can only confirm that an opportunity is a truly opportunity once the product or service has been launched successfully into the market (Eckhardt and Shane, 2010). If we define opportunity as a set of circumstances that makes it possible to do something, the causes for failure in the entrepreneurship process are attributed solely to the entrepreneur (Dimov, 2010). Consequently, the term opportunity becomes tautological, proof of which Gaglio and Katz (2001) distinguish between opportunities and successful opportunities.

In its most elemental form, an opportunity is an underemployed or underutilized resource (Ardichvilli et al, 2003). The term "underutilized resource" does not necessarily imply success a priori. That is the reason why we propose to use the term "underutilized resource" instead of "opportunity". Although it is true that discoveries provide new opportunities, we suggest adding "undiscovered resource" to the term. In this way, "underutilized or undiscovered resource" depends on its own characteristics, on the entrepreneur and on the entrepreneurship process. Having verified at the end of the process some success, it could consequently be described as an opportunity.

Intrapreneurship and the Resource-Based Theory

To employ the term "under-employed or undiscovered resource" rather than opportunity offers the advantage to use the same unit of analysis as in the resource-based theory RBT: the resource. This helps us to frame the entrepreneurship on the RBT, together with the fact that the entrepreneurship process

could be developed within an organization, as seen it before. The RBT suggests that endogenous factors explain the sustainable competitive advantages of a firm. In this sense, Alvarez and Busenitz (2001) integrate the theory of entrepreneurship into the RBT arguing that not only both adopt precisely this same unit of analysis that is the resource, but they overlapping interests, such as knowledge, firm adaptation to environmental change, modes of organizing and the exploitation of opportunities.

The Identification of Opportunities

It corresponds to the first process step and is defined as the sub process comprising the action of entrepreneurial alertness (Shepherd and DeTienne, 2005), and the action of evaluation and decision-making (Davidsson, 2015). Kirzner (1979) defines entrepreneurial alertness as the ability to notice opportunities that have hitherto been overlooked (Gaglio and Katz 2001). In practice, this means scanning and searching for information and connecting previously-disparate information (Tang et al 2012). After that phase, an evaluation and decision-making action arises. At this stage the entrepreneur has to decide whether or not to continue with the process (Shepherd and DeTienne, 2005; Davidsson, 2015).

The Exploitation of Opportunities

It corresponds to the last process step and is defined as the sub process comprising the action of planning the business (Dimov, 2010) and the action of the gestation activities (Davidsson and Honig, 2003). Business planning deals with the information corresponding to the identify opportunity (Castrogiovanni, 1996). This involves the processes of analyzing information, evaluating required tasks, identifying risks and strategy, projecting financial developments, and also, documenting these things (DelMar and Shane, 2003). After planning, the process becomes more complex, redirecting or recombining resources in order to create and deliver value superior to that currently available (Ardichvilli et al, 2003). All the activities that might be undertaken in the process of trying to get a new venture up, is what we call gestation activities (Davidsson and Honig, 2003).

The Intellectual Capital

Opportunities do not explain by themselves the entrepreneurship phenomenon, for the reason that someone has to identify and exploit them (Ramos-Rodríguez, et al 2010). Several authors study "entrepreneurship" through the entrepreneur´s personality, knowledge or social networks (Shepherd and Grégoire, 2012). Those knowledge and skills that individuals bring to the process they set out to perform, is commonly known as human capital (Dimov, 2010). Originally developed to predict the influence of education on economic growth (Becker, 1964), the human capital is considered a vital factor to discover opportunities (Marvel et al. 2016). Individuals with more or higher quality human capital perceive profitable opportunities (Davidsson and Honing, 2003). However, human capital is neither the sole factor nor, often, the most important, because there are some external factors that also play a critical role, as social capital which represents all the resources resulted from social relationships of the entrepreneur, and provided by family, friends and colleagues (De Carolis and Saparito, 2006). Entrepreneurs with networks that are comprised of a large number of contacts are better able to identify opportunities and to acquire the resources to exploit them (De Carolis et al, 2009).

In the field of intrapreneurship, the human capital, the social capital and together with the organizational capital, represents what is called intellectual capital. The intellectual capital is defined as all the intangible resources related to knowledge which provides sustainable competitive advantage to the firm (Subramaniam and Youndt, 2005). In this context, human capital does not refer to an individual person, but to the knowledge and the skills of each employee as a whole. Social capital represents the firm´s knowledge gained from social exchanges, as customers and suppliers relationships, but also in networks

of their own employees. Organizational capital is defined as all the know-how, methods, processes, procedures, routines, task, activities, in short, all the intangible resources which leverage the organization's productivity. Organizational capital only makes sense in an intrapreneurship framework because the firm is already established.

In the proposed model of entrepreneurship process, the intellectual capital is identified as a resource by which identification and exploitation of opportunities are developed. Given the universality of the entrepreneurial opportunities, and given the fact that the process to identify and exploit them is the same; the intellectual capital should be the differentiating element between the individual entrepreneurship and the intrapreneurship.

Innovation

Traditionally, entrepreneurship has been associated with the creation of new ventures, but also with innovations. In the proposed model, the innovations are identified as an outcome of the process. From the literature review, there is no consensus definition of innovation, and several approaches have been proposed to study it, being the process approach and the result approach, the most relevant. This study opts for the result approach and innovation is defined as the introduction to the market of something new that can be a sustainable competitive advantage over time. Innovation literature typically distinguishes between radical innovations and incremental innovations. Radical innovations have very high economic and social impacts, increasing technological knowledge and providing new products or services. In contrast, incremental innovations are more common and the reward is smaller, leading to small incremental improvements in an existing product or service (Laursen and Salter, 2006).

The Model

This study proposes a model based on a process-approach and which integrates the key concepts underpinning entrepreneurship. The next figure represents a synoptic model summarizing the entrepreneurship process:

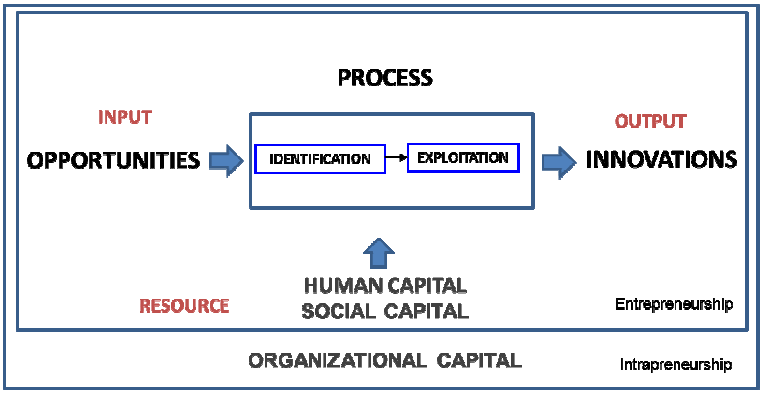


Fig.1: synoptic model

The Hypothesis

To our knowledge, little work has been carried out on the relationship between the identification and exploitation of opportunities, in terms of intensity, and the degree of novelty of innovations at the end of

an intrapreneurship process. Shepherd and DeTienne (2005) affirm that a positive relation exists between the number of opportunities identified and the degree of novelty of the entrepreneurship process. It is clear that the higher the number of opportunities identified, the greater the sample, consequently there is more variety to choose from (Ucbasaran et al. 2009). In the case of exploitation of opportunities, Stuetzer et al (2013) state that the higher number of gestation activities achieved the more chances of success in the entrepreneurship process. Samuelsson and Davidsson (2009) highlight that to obtain radical or incremental innovations depend on the number of gestation activities achieved. In this sense, Liao and Welsch (2003) note that radical innovations require more recombination of resources and large number of gestation activities because the process is more complex. Therefore, we propose the following hypotheses:

H1: The innovation radicalness is positive influenced by:

a. The intensity with which the opportunities are identified in the intrapreneurship process.

b. The intensity with which the opportunities are exploited in the intrapreneurship process.

Existing literature provides empirical evidence with respect to the relationship between intellectual capital and innovation. Marvel and Lumpkin (2007) suggest that radical innovations are the result of individuals with high experience and level of education, while Subramaniam and Youndt (2005) highlight that strong-tie with suppliers increase radical innovations. Tseng and Goo (2005) affirm that high levels of organizational capital in a firm, allow for faster knowledge transfer, having a positive impact on innovation.

Wu et al (2008) propose some relationships include moderator effects, but in this case, entrepreneurship has not a process approach and it is not defined has the identification and exploitation of opportunities. Therefore, we propose the following hypotheses:

H2: The relationship between the intensity with which the opportunities are identified in the intrapreneurship process and the innovation radicalness, is moderated by:

a. Human capital.

b. Social Capital.

c. Organizational Capital.

H3: The relationship between the intensity with which the opportunities are exploited in the intrapreneurship process and the innovation radicalness, is moderated by:

a. Human capital.

b. Social Capital.

c. Organizational Capital.

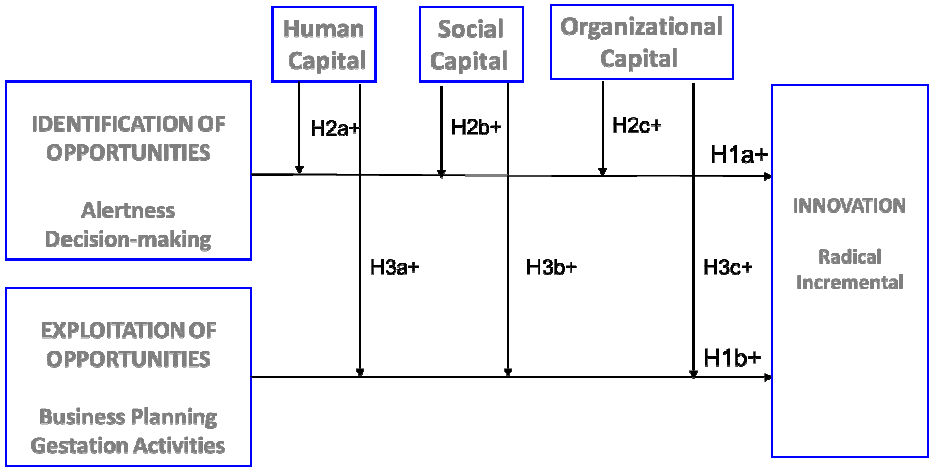


Fig.2: Theoretical model and hypotheses

Conclusions

Nowadays, the dynamic environment forces the firm to launch radical innovations. To achieve this goal, intrapreneurship can be a good strategy. This work highlights the important advantages to use a process-approach to explain it, and proposes a model including the key concepts underpinning intrapreneurship and their relations. Intellectual capital should be the differentiating element between the individual entrepreneurship and the intrapreneurship given the universality of opportunities, and given the fact that the process to identify and exploit them is the same in both cases. In the proposed model, intellectual capital facilitates the integration of an extensive literature focused on knowledge, capabilities, social relations, and other intangible resources, in the field of entrepreneurship. From our study, we expect that intellectual capital plays a major role moderating the relationship between the intensity with which the opportunities are identified and exploited in the intrapreneurship process, and the innovation radicalness resulted from the process. Empirical literature proposes many dimensions and items to measure the intellectual capital and the degree of novelty of an innovation, but it is not the case for the intensity with which the opportunities are identified and exploited in a firm context. This work suggests the dimensions of alertness and, evaluation and decision-making, for the identification of opportunities, and the dimensions of business planning and gestations activities for the exploitation of opportunities, always taking into account the context of the firm.

References

Alvarez, S. and Busenitz, L. (2001), 'The entrepreneurship of resource-base theory'. *Journal of Management* 27(6), 755-775.

Antoncic B. (2007), 'Intrapreneurship: a comparative structural equation modeling study', *Industrial Management & Data Systems* 107(3), 309-325.

Antoncic, B and Hisrich, R. (2001), 'Intrapreneurship: Construct refinement and cross-cultural validation,' *Journal of Business Venturing* 16 (5), 495-527.

Ardichvilli, A., Cardozo, R. and Ray, S. (2003), 'A theory of entrepreneurial opportunity identification and development', Journal *of Business Venturing* 18 (1), 105-123.

Becker, G. (1964), 'Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education.' Columbia University Press, New York.

Castrogiovanni, G. (1996), 'Pre-startup planning and the survival of new small businesses: Theoretical linkages', *Journal of Management* 22 (6), 801-822.

Davidsson, P. (2015), 'Entrepreneurial opportunities and the entrepreneurship nexus: A re-conceptualization', *Journal of Business Venturing* 30 (5), 674-695.

Davidsson, P. and Honig, B. (2003), 'The role of social and human capital among nascent entrepreneurs', *Journal of Business Venturing* 18(3), 301-331.

De Carolis, D.M., Litzky, B.E., Eddleston, K.A. (2009), 'Why Networks Enhance the Progress of New Venture Creation: The Influence of Social Capital and Cognition', *Entrepreneurship Theory and Practice* 33(2), 527–545.

De Carolis, D.M. and Saparito, P. (2006), 'Social capital, cognition, and entrepreneurial opportunities: A theoretical framework', *Entrepreneurship Theory and Practice* 30(1), 41-56.

Delmar, F. and Shane, S. (2003), 'Does business planning facilitate the development of new ventures?', *Strategic Management Journal* 24(12), 1165-1185.

Dimov, D. (2010), 'Nascent entrepreneurs and venture emergence: Opportunity confidence, human capital, and early planning', *Journal of Management Studies* 47 (6), 1123-1153.

Eckhardt, J. and Shane, S. (2010), 'The Individual-Opportunity Nexus' In: Acs Z.J., Audretsch D.B. (ed) Handbook of Entrepreneurship Research, International Handbook Series on Entrepreneurship, vol 1. Springer, Boston, MA.

Gaglio, C. and Katz, J. (2001), 'The psychological basis of opportunity identification: Entrepreneurial alertness', *Small Business Economics* 16 (2), 95-111.

Kirzner, I. M. (1979), Perception, Opportunity and Profit: Studies in the Theory of Entrepreneurship, University of Chicago Press, Chicago, IL.

Laursen, K. and Salter, A. (2006), 'Open for innovation: the role of openness in explaining innovation performance among U.K. manufacturing firms', *Strategic Management Journal* 27(2), 131-150.

Liao, J. and Welsch, H. (2003), 'Organizational Absorptive Capacity and Responsiveness: An Empirical Investigation of Growth-Oriented SMEs', *Entrepreneurship Theory and Practice* 28(1), 63-85.

Marvel, M. and Lumpkin, G. (2007), 'Technology Entrepreneurs' Human Capital and Its Effects on Innovation Radicalness', *Entrepreneurship Theory and Practice* 31(6), 807-828.

Marvel, M., Davis, J. and Sproul, C. (2016), 'Human Capital and Entrepreneurship Research: A Critical Review and Future Directions' *Entrepreneurship Theory and Practice* 40(3), 599-626.

Pinchot (1985) 'Intrapreneuring: why you don't have to leave the corporation to become an entrepreneur', Harper & Row, New York.

Ramos-Rodriguez, A., Medina-Garrido, J., Lorenzo-Gómez. J. and Ruiz-Navarro, J. (2010), 'What you know or who you know? The role of intellectual and social capital in opportunity recognition', International *Small Business Journal* 28(6), 566-582.

Samuelson, M. and Davidsson, P. (2009), 'Does venture opportunity variation matter? Investigating systematic process differences between innovative and imitative new ventures'. *Small Business Economics,* 33(2), 229-255.

Shane S. and Venkataraman, S. (2000), 'The Promise of Entrepreneurship as a Field of Research'. *Academy of Management Review*, 25 (81) 217-226.

Shepherd, D. and DeTienne, D. (2005), 'Prior knowledge, potential financial reward, and opportunity identification', *Entrepreneurship Theory and Practice,* 29(1) 91-112.

Shepherd, D. and Grégoire, D. (2012), 'Entrepreneurial Opportunities'. Edward. Elgar Publishing. United Kingdom.

Stuetzer, M., Obschonka, M. and Schmitt-Rodermund, E. (2013), 'Balanced skills among nascent entrepreneurs', *Small Business Economics,* 41(1), 93-114.

Subramaniam, M. and Youndt, M. (2005), 'The Influence of Intellectual Capital on the Types of Innovative Capabilities', *Academy of Management Journal* 48(3), 450-463.

Tang, J., Kacmar, M. and Busenitz, L. (2012) 'Entrepreneurial alertness in the pursuit of new opportunities', *Journal of Business Venturing* 27(1), 77-94.

Tseng,C. and Goo, Y. (2005), 'Intellectual capital and corporate value in an emerging economy: empirical study of Taiwanese manufacturers', *R&D Management*, 35 (2) 187-201.

Ucbasaran, D., Westhead, P. and Wright, M. (2009), 'The extent and nature of opportunity identification by experienced entrepreneurs', Journal *of Business Venturing* , 24(2) 99-115.

Ulhøi J. (2005), 'The social dimensions of entrepreneurship', *Technovation*, 25 (8) 939-946.

Uygur, U. (2017) 'An Analogy Explanation for the Evaluation of Entrepreneurial Opportunities', *Journal of Small Business Management*, forthcoming.

Wu W., Chang M. and Chen C. (2008), 'Promoting innovation through the accumulation of intellectual capital, social capital, and entrepreneurial orientation', *R&D Management*, 38 (3) 265-277.

Systèmes Décisionnels et Management:
Approche Sectorielle par les Modèles de Maturité

Ines Ben Tarbout, URISET, ISET Radès, Tunis, Tunisia, inesbentarbout@yahoo.fr

Adel Escheikh, , URISET, ISET Radès, Tunis, Tunisia, *adel.escheikh@yahoo.com*

Résumé

Les outils de Business Intelligence offrent aujourd'hui une chance aux Managers de bénéficier d'une aide à la décision en temps réel en transformant des flots de données éparses en informations utiles et pertinentes, élaborées sous forme de reportings et de tableaux de bord. Dans le monde turbulent des opérateurs de télécommunications, les systèmes de BI, qui trouvent un essor remarquable, conditionnent aujourd'hui la survie et le développement de ces entreprises. A ce titre, ce papier se propose d'examiner les composantes clés de ce projet aux plans humain, technologique et des processus à travers une application des modèles d'évaluation de maturité au niveau des opérateurs de télécommunications en Tunisie.

Introduction

L'évolution frénétique des outils et technologies de communication basée sur l'internet soumet les entreprises de télécommunications à l'obligation de renouveler sans cesse leurs offres et de mettre en place une veille technologique et commerciale à même de faire face à un contexte concurrentiel de plus en plus dur . Cette exigence s'accompagne d'une croissance exponentielle du volume des données auxquels accèdent ces entreprises du fait de la diffusion des objets connectés, des nouveaux usages d'internet qui s'ajoutent aux données issues du réseau (trafic, qualité de service), les données via les connexions sur les plateformes (portails, transactions web).

Pour rester au cœur de ces évolutions ces entreprises ont été amenés à constituer des entrepôts de données et à mettre en place des systèmes de Business intelligence (BI) de plus en plus sophistiqués. Un système qui s'appuie sur l'analyse de larges volumes de données passées et présentes pour comprendre les déterminants de l'activité et influencer la prise de décision dans l'entreprise. Une BI en temps réel qui contribue à la mesure quotidienne des indicateurs d'activité, à l'estimation des prévisions et l'actualisation des objectifs, autorisant les outils et les processus BI à occuper aujourd'hui une position centrale dans la gestion de ces entreprises.

C'est justement pour mesurer le niveau de développement de ces systèmes sur le plan technologique et organisationnel que se sont développés différents modèles de maturité construits à l'instar du CMM (Capability Maturity Model) et autres normes ou référentiels de bonnes pratiques des entreprises. Ces modèles permettent de rendre compte non seulement de la capacité technique de ces systèmes à stocker, traiter , analyser les données et à les transformer en informations pertinentes pour la prise de décision, mais , de plus en plus, de mesurer le niveau d'appropriation par les managers des informations fournies par le système décisionnel pour en faire un véritable levier de réussite au sein de l'entreprise. La dominance des aspects liés à la technologie informatique ne doivent pas en effet occulter l'importance fondamentale de l'évaluation de l'apport des systèmes BI au management de la performance via les outils d'aide à la décision et au pilotage que sont notamment les tableaux de bord.

Les considérations d'ordre technique relatives aux outils, à l'architecture du système et technologies choisis doivent être optimisés en vue de fournir une véritable assistance aux responsables métiers organisée dans le cadre d'une stratégie décisionnelle globale et cohérente avec les objectifs visés. C'est bel et bien cette dynamique que l'on essayera d'évaluer dans l'environnement turbulent des opérateurs de

télécommunications, les plus outillés sur le plan technique pour profiter des vertus liés à l'exploitation des entrepôts de données.
Aussi après avoir présenté une brève description des composantes de base d'un système de BI, ce papier mettra en lumières les évolutions récentes du concept de BI avant de faire le lien avec les besoins spécifiques des opérateurs de télécommunications dans ce sens. Nous présenterons par la suite le modèle de maturité de BI et de gestion de la performance qui nous servira d'étalon pour une évaluation critique de la stratégie des opérateurs de télécommunications opérant en Tunisie en matière de Business intelligence.

I Les Composantes D'un Système De Business Intelligence

Par opposition au système d'information produisant des données, ou système d'information transactionnel, la Business Intelligence s'appuie sur un système d'information spécifique, ou système d'information décisionnel (SID). D'un point de vue technique, Power(2007) soutient que le processus de BI vise à collecter les données brutes (extraites de différentes sources notamment d'un ERP ou d'un CRM, des données de marché, des données provenant de sources externes clients/fournisseurs..), à les transformer en informations et à les diffuser sous forme de tableaux de bord ou de reporting.

Un système BI doit remplir quatre fonctions fondamentales : la collecte, l'intégration, la diffusion et la présentation des données, selon wikipédia. À ces quatre fonctions s'ajoute une fonction d'administration, soit le contrôle du SID lui-même. Ainsi:

- La fonction collecte (parfois appelée datapumping) recouvre l'ensemble des tâches consistant à détecter, sélectionner, extraire et filtrer les données brutes issues des environnements pertinents compte tenu du périmètre couvert par le SID. Comme il est fréquent que les sources de données internes et/ou externes soient hétérogènes tant sur le plan technique que sur le plan sémantique , cette fonction est la plus délicate à mettre en place dans un système décisionnel complexe. Elle s'appuie notamment sur des outils d'ETL (extract-transform-load pour extraction-transformation-chargement).
- La fonction d'intégration consiste à agréger les données collectées dans un entrepôt de données. Celui-ci permet aux applications décisionnelles de masquer la diversité de l'origine des données et de bénéficier d'une source d'information commune, homogène, normalisée et fiable.
-
- La fonction de diffusion met les données à la disposition des utilisateurs, selon des schémas correspondant aux profils ou aux métiers de chacun. L'objectif à ce niveau sera de segmenter les données en contextes informationnels fortement cohérents, simples à utiliser et correspondant à une activité décisionnelle particulière. Chaque contexte peut correspondre à un datamart, correspondant souvent à un processus métier donné. Très souvent, un contexte de diffusion est multidimensionnel, c'est-à-dire modélisable sous la forme d'un cube; il peut alors être mis à disposition à l'aide d'un outil OLAP(On Line Analytical Process).. .
- La fonction de présentation régit les conditions d'accès de l'utilisateur aux informations. Elle assure la prise en charge des requêtes, la visualisation des résultats le plus souvent sous forme de Tableaux de bord.
- La fonction administration, enfin, permet le pilotage du processus de mise à jour des données, la documentation sur les données (métadonnées), la sécurité, les sauvegardes et la gestion des incidents.

II Evolutions du concept BI

Historiquement le concept de BI, traduit couramment par l'appellation Informatique décisionnelle, a été introduit par Howard Dresner, expert du groupe Gartner, en 1989 : la livraison de l'information factuelle pour aider les gestionnaires à améliorer leur prise de décision. Une définition avec une portée restreinte axée sur les possibilités de traitement des données à l'aide des technologies informatiques, qui a été par la suite affinée et élargie. Liautaud B, et Hammond désignent la BI aux moyens, outils et méthodes qui permettent de collecter, consolider, modéliser et restituer les données, matérielles ou immatérielles, d'une entreprise en vue d'offrir une aide à la décision et de permettre à un décideur d'avoir une vue d'ensemble de l'activité visée".

Citant plusieurs auteurs, Olzak (2013) distingue, historiquement, une évolution en trois temps de la BI. Dans un premier temps, jusqu'en 1990, la BI dite1.0, s'est étroitement liée aux systèmes d'information de gestion (Management Information System), aux systèmes d'aide à la décision (Executive Information systems) et des systèmes d'aide à la décision (DSS).
La Business Intelligence telle qu'on la connaît aujourd'hui, a évolué à partir de la recherche opérationnelle qui a commencé dans les années 1960, suivie par la supervision (Decision Support Systems) dans les années 1970, l'aide à la décision dans les années 1980 (entrepôts de données, OLAP et BI). Focalisée sur la production de tableaux de bord périodiques et de reportings statiques écrits par des programmeurs experts, la BI 1.0 était orientée sur la 'livraison au consommateur', selon l'expression de Olzak'(2013).

L'essor connu par la fouille des données (data mining) dans les années 1990 a permis d'envisager une nouvelle ère de la BI. Le datamining étant considéré comme une partie intelligente de l'informatique décisionnelle, il a favorisé la délivrance d'informations analytiques permettant une meilleures compréhension de faits complexes, un développement des techniques de prévision associés à des outils BI robustes. Parallèlement, de nouveaux champs d'intérêt sont apparues pour gérer des systèmes BI plus complexes: intégration de données, gouvernance de données, qualité de données, services Web, SaaS.. Ces systèmes devenus complexes et lourds ont empêché une plus grande diffusion des outils BI 2.0. On leur reprochait notamment leur caractère peu intuitif et peu collaboratif.

A partir de 2005, on remarque une nouvelle évolution des outils de BI amenés à conjuguer avec le développement des réseaux sociaux, des données mobiles et du cloud. Une évolution qui exige des outils qui non seulement permettent de mieux prendre en compte les données peu ou non structurées mais qui répond au souci des utilisateurs qui souhaitent davantage de réactivité aux données. Il s'agit désormais de centrer la BI sur l'utilisateur-décideur : grâce à un accès rapide et convivial, à une meilleure visualisation des données et à l'affichage rapide d'indicateurs de performance. La nouvelle B.I 3.0 , désormais popularisée, doit faciliter la prise de décision instantanée et l'alerte en pseudo temps réel, à tous les niveaux de l'entreprise.

Iii Les Besoins Et Spécificités De La Bi Des Operateurs De Télécommunications

L'industrie de télécommunications produit et stocke une quantité énorme de données (*Gary , 2005).)*. Ces données incluent des données de détail d'appel (Call Detail Records ou CDR), qui décrivent les appels qui traversent le réseau de télécommunications, des données de réseau, qui décrivent l'état du matériel et des composants logiciels dans le réseau et des données clients, qui décrivent les clients de télécommunications.

La collecte et l'intégration de ces données au sein d'un entrepôt de données consolidés constitue de ce fait une exigence fondamentale pour assurer leur exploitation en soutien du système transactionnel d'une part et pour fournir une base fiable d'aide à la décision dans un contexte concurrentiel très mouvant, d'autre part.

En effet, au fur et à mesure de la diversification des produits et service offerts de plus en plus personnalisés, les entreprises de télécommunications ont été amenées à développer des systèmes de facturation complexes. Les besoins de discrimination tarifaire en lien avec les différents segments de clientèle visés ou en relation avec le besoin d'optimiser l'exploitation du réseau ont généré des systèmes de facturation spécifiques et nombreux. La fiabilité de ces systèmes de facturation et leur cohérence avec les CDR transmis par les antennes relais et collectées par des services de Médiation, sont justement assurées par la collecte et la confrontation de l'ensemble de ces données dans le DW.

Cette mission de "Revenue Assurance' visant un contrôle systématique en soutien du système transactionnel, ou OLTP. Les outils BI permettent également de satisfaire à un autre objectif, la lutte contre la fraude. En effet, les techniques frauduleuses utilisant des générateurs d'appels (SIM Boxing) ou des liaison voIP illégales en trafic international (by pass) permettent aux fraudeurs de bénéficier d'une gratuité de service dommageable aux opérateurs qui sont obligés de coordonner leurs actions dans ce sens.

Les autres sources classiques d'alimentation de l'entrepôt sont constituées par les applications ERP ou CRM. Les outils BI classiques (reportings, tableaux de bord) permettent notamment le suivi des ventes sur stock (smartphones, tablettes, cartes SIM..), de contrôler la gestion des abonnés et d'élaborer les indicateurs de suivi des demandes de services des clients. Mieux, le développement de la fouille de données et les techniques de segmentation client autorisent un meilleur ciblage des besoins clients et permettent aux services marketing la construction d'une offre de plus en plus personnalisée permettant de limiter le taux d'attrition ('churn') des clients ou d'en capter de nouveaux. Le système BI se charge également du scoring des clients, autorisant ainsi les clients les plus importants à bénéficier d'une qualité de services spécifique (rapidité de traitement au call center, offres personnalisées, Value Added Services spécifiques)..

Dans un rôle plus classique, la BI peut accélérer le reporting financier au service du contrôle de gestion de l'entreprise. Elargi aux ressources humaines, les outils BI peuvent autoriser un meilleur alignement de la politique de gestion des compétences sur les objectifs stratégiques de l'entreprise. les indicateurs clés de performance

IV Les Modèles De Maturité Des Systèmes De BI

Dans la littérature, il existe plusieurs définitions de maturité mais il n'y a pas une définition générale pour expliquer ce qu'est la maturité d'une organisation ou d'un projet. D'après Andersen (2003), la maturité est la « qualité ou l'état de devenir mûr ». Pour Kerzner (2003), la maturité est « liée au développement des systèmes et des processus répétitifs qui représentent une haute probabilité de succès d'un projet » .

La mesure de la maturité permet, elle, de « montrer l'état atteint par rapport à l'état dans lequel le projet devrait être », selon Cooke-Davies(2003).

Le concept de modèles de niveau de maturité s'est maintenant étendu à toute une variété de disciplines. Dans les systèmes d'information, les modèles de niveau de maturité sont utilisés pour décrire les cycles de vie et évaluer les normes de qualité. Les modèles de niveau de maturité contribuent donc à créer de la transparence concernant l'état actuel du marché ou permettent, en terme de référencement, des comparaisons avec d'autres entreprises du secteur ou du marché. Les modèles de niveau de maturité sont également utilisés pour identifier les implications stratégiques pour les futures actions potentielles en fonction de leur positionnement actuel dans le modèle (Rapport Steria, 2013).

Un des modèles les plus reconnus est le Modèle Gartner de Maturité BI et de Gestion de performance. La plupart des modèles usités sont généralement centrés objet, ou centrés sur les processus voire centré sur la composante humaine. Le modèle Gartner a l'avantage d'être un modèle mixte reliant les hommes, les processus et la technologie.
Une revue de la littérature relative aux modèles de maturité nous permet de savoir qu'aucun modèle seul n'a atteint l'état d'une norme, pour que des certifications soient disponibles, comme ceci est, par exemple, le cas avec CMMI, comme le précisent Lahramann et al. (2012). Certes, comme la majeure partie des modèles fournis par des professionnels, sa documentation reste sommaire, ses soubassements théoriques sont jugés faibles ,note Rajterič (2010) *qui* reste assez critique à cet égard. En contrepartie l'expérience de ses auteurs et sa référence aux meilleures pratiques sectorielles demeure assez pertinente.

Comme suggéré dans le titre, Modèle Gartner de Maturité BI et de gestion de performance évalue aussi bien la maturité des outils et technologies BI que leur intégration au service de l'amélioration de la performance des processus métier. Le modèle décrit une feuille de route pour les organisations qui veulent situer le niveau de développement de leurs choix managériaux transposés aux pratiques BI. Il fournit un chemin pour le progrès par lequel ils peuvent profiter d'initiatives BI. Le modèle Gartner (version 2010), reconnaît cinq niveaux de maturité: inconscient, Opportuniste, Normalisé, entreprise (stratégique) et transformant (pénétrant).

L'évaluation inclut trois zones clés: les ressources humaines, les processus et la technologie.

Le premier niveau est souvent décrit comme "l'anarchie de l'information". Cela signifie que les données sont incomplètes, incorrectes, incompatibles et l'organisation n'a pas la métrique définie. Les utilisations d'outils de reporting sont limitées.

Le deuxième niveau de maturité BI signifie que l'organisation commence à investir dans la BI. Le processus engagé soutient la prise de décisions tactique et stratégique. Les sponsors du projet BI relèvent de la plus haute direction.

Au dernier niveau de maturité, la BI pénétre tous les processus métiers. La culture d'entreprise aidant, la BI fournit la flexibilité pour s'adapter aux changements rapides de l'environnement et à la demande de l'information. Les utilisateurs ont accès aux informations et aux analyses nécessaires pour créer de la valeur et améliorer la performance. L'utilisation de la BI est même disponible pour des clients, des fournisseurs et d'autres parties prenantes. Le déplacement d'un niveau de maturité à un autre exige des changements de toutes les caractéristiques qui composent ces étapes (Hagerty et Hostmann, 2010).

Les domaines principaux d'évaluation concernent les ressources humaines, les compétences, les processus et les technologies. Les sous-domaines incluent les éléments de BI traditionnel (requêtes ad hoc, les rapports, OLAP, l'intégration de données, l'entrepôt de données) de même que les applications analytiques ainsi que les applications de gestion de la performance . Le modèle aborde également la confiance des parties prenantes dans le système d'information décisionnel, l'adaptabilité au changement de l'environnement des affaires et l'intégration des utilisateurs externes au développement de la BI comme les fournisseurs, associés et clients. (Hagerty et Hostmann, 2010).

Tableau 1: Vue générale des niveaux de maturité du Modèle Gartner

Niveau	**Ressources Humaines**	**Processus**	**Métriques et technologie**
Inconscient	Les utilisateurs ne connaissent ni leur propre exigences en terme de données ni comment les utiliser	Les utilisateurs ne connaissent pas les processus métier. Les données sont de mauvaise qualité.	Manque de matériels et logiciels appropriés ; Les métriques ne sont pas définies ; l'utilisation du reporting est limitée.
Tactique	Les utilisateurs prennent les premières initiatives BI. Soutien fiable des cadres supérieurs.	Identification des processus métier de base.	Des « entrepôt de données » régionaux sont mis en place. Analyse des tendances et des données anciennes. Premiers outils interactifs de « reporting ». Les métriques sont souvent utilisées au niveau département seulement.
Facteurs de succès : support pour les cadres supérieurs, outils BI appropriés, qualité des données, métriques et processus métier définis.			
Normalisé	Les utilisateurs essayent d'optimiser l'efficacité des différents départements en utilisant la composante BI	Standardisation des processus métiers et élaboration des meilleures pratiques en BI	Des tableaux de bord de gestion sont utilisés; des « entrepôts de données » centralisées sont mis en place; ad hoc« reporting », Drill-down
Facteurs de succès : Le développement de la culture d'entreprise est basé sur des faits, exposant clairement la stratégie BI, mettant en œuvre le système d'apprentissage sur BI			
Entreprise (Stratégique)	Les utilisateurs ont de hautes capacités BI mais	Gestion de processus métiers basée sur des	Données de haute qualité ; ont une stratégie

	souvent non alignées avec leur rôles et responsabilités	faits	BI ; utilisant la prédiction et des outils de modélisation plus complexes ; fouille de données
Facteurs de succès : Soutien du DG, motivation des utilisateurs à collecter, analyser et utiliser l'information			
Transformant (pénétrant)	Les utilisateurs ont les moyens et le temps pour utiliser BI; formation qualifiante en BI ; les utilisateurs sont encouragés pour collecter, analyser et partager l'information; Enthousiasme du DG et large engagement de la direction	Largement supporté, esprit orienté processus Basé sur : les faits, l'apprentissage et le partage de Connaissance	Large architecture BI d'entreprise en grande partie implémentée; Rapports Personnalisés; BI et processus métier sont alignés et coopératifs
Facteurs de succès : soutien important de la part du PDG, bonne gouvernance des ressources humaines, les différents utilisateurs ont confiance en BI			

V Etude du cas des opérateurs de Télécommunications

1-Méthodologie de Conduite de l'étude

L'étude a touché l'ensemble des trois opérateurs de télécommunications. Des entretiens en profondeur ont été réalisés avec les premiers responsables des départements BI , des hauts cadres relevant de la direction Système d'Information (DSI) ou des services utilisateurs. Nous avons confectionné un guide d'entretien standard récapitulant les principales questions de recherche. La standardisation des instruments de recueil des données est nécessaire pour appuyer la validité, la généralisabilité et la maniabilité interne des résultats de l'étude multi-cas (Miles et Huberman 2000). Pour englober les différents points de vue, nous avons à chaque fois interviewé séparément des informaticiens et des opérationnels impliqués dans la prise de décision.

2-Présentation des Résultats

Avant de présenter les conclusions de l'étude, il y a lieu d'apporter certains éléments d'informations pertinents pour mieux comprendre l'environnement des départements BI au sein des opérateurs de télécommunications opérant en Tunisie.

- La création et par la suite le développement des départements BI au sein des DSI des nouveaux opérateurs de télécommunications s'est fait naturellement dès leur implantation sur le marché. Le transfert de technologie lié à leur appartenance à un groupe international spécialisé dans les télécommunications a largement facilité l'acquisition de savoir faire. L'opérateur historique, qui s'est lui aussi associé à des bailleurs de fonds étrangers, a créé ce département depuis 8 ans.

- Les moyens budgétaires alloués aux départements BI des trois opérateurs sont très disparates (variant de 0,3 à 2,5 M$), leur part dans le budget informatique de l'opérateur est néanmoins plus stable autour de 15%.

- Le marché des télécommunications qui connait une explosion du marché des smartphones vient de bénéficier du lancement de la 4G. L'opérateur dominant sur le marché du GSM, n'est pas présent sur le marché de la téléphonie fixe, largement dominé par l'opérateur historique. Le marché du GSM arrive à maturation avec un taux d'équipement qui dépasse 130%, il fait l'objet d'une forte concurrence tirant les prix vers le bas.

- L'instance nationale des télécommunications, instance de supervision légale du secteur, vient d'imposer le régimes de portabilité des numéros pour la téléphonie fixe et mobile. Ceci va encore libéraliser le marché et induire une plus grande volatilité des clients.

Ceci dit, le traitement des informations collectées nous a permis, au regard du modèle de Gartner, de positionner chacun des opérateurs de télécommunications sur trois niveaux différents, soit les trois niveaux 3, 4 et 5. Cette analyse peut être compartimentée sur les trois rubriques suivantes:

a/ Aspects Humains

Acquisition et développement des compétences: Il est important de signaler que le processus de mise en place des entrepôts de données et autres solutions de data-mining correspondante s'est fait différemment d'un opérateur à l'autre, intégrant de façon disparate, l'apport des consultants extérieurs. Il s'ensuit que l'acquisition de savoir faire et le développement des compétences se sont produits de façon différentes. Entre une équipe restreinte exigeant des compétences polyvalentes et un département, cinq fois plus étoffé, impliquant spécialisation des membres, les stratégies, la durée d'apprentissage et les besoins de formation sont très différents. Ces projets étant assez anciens, le personnel étant recruté auprès des meilleures écoles d'ingénieurs en informatique, il n'existe pas à priori de problèmes de compétences.

Compétences transversales et formation: La nature transversale de la BI nécessite de la part de l'équipe BI une parfaite connaissance des processus métier. Elle permet de ce fait à l'équipe BI de mieux cerner la demande de son client et donc de mieux utiliser le référentiel de données de l'entreprise. Ceci est particulièrement valable dans le cas de la conception des campagnes publicitaires ou la formulation d'une nouvelle offre commerciale ciblant une catégorie particulière de consommateurs. cela nous ramène sur le concept de segmentation basé sur des méthodes de classification hiérarchique connues par les statisticiens ou marketeurs. L'utilisation de ces techniques de data mining pour éviter le 'churn' des clients constitue un axe stratégique pour les opérateurs de télécommunications. Les opérateurs leaders sur le marché qui ont investi en formation ont vu leur investissement rentabilisé. I L'expertise cumulée à ce niveau a permis à certains opérateurs d'enregistrer des succès et de capitaliser de nouvelles compétences qu'il s'agit de préserver. Le faible turn-over des équipes BI constitue un signe de valorisation des ressources humaines par ces opérateurs.

b/ Aspects liés aux Processus

Processus d'amélioration continue: Les outils d'évaluation et de mesure du taux d'utilisation des solutions BI doit être prévu en accompagnement du projet BI. Il est curieux que le département BI qui communique aux processus métier l'évolution de leur indicateurs clés de performance, n'en dispose pas. Si l'on peut, à la limite comprendre cette faille pour les opérateurs classés au niveau de maturité 3, compte tenu du faible investissement effectué, on ne peut l'admettre pour les autres opérateurs.

Collaboration avec les processus Métier: Les projets BI sont en théorie des projets communs entre les DSI et les processus métier cibles. Le degré de collaboration entre les deux dépend de l'urgence et de l'importance des données fournies à la prise de décision. Si l'apport d'un datwarehouse dans la fiabilité du processus de facturation et des outils BI dans le recoupement des informations comptables enregistrées dans les ERP et applications ad-hoc sont fondamentaux pour garantir la qualité des états financiers et la rapidité de leur élaboration, ceci n'apporte pas forcément une grande marge de progression dans la prise de décision. Par contre, les divisions marketing, soumises à une concurrence acharnée, trouvent dans les outils BI, toute l'information dont ils ont besoin pour assurer l'alimentation de son système de veille. On comprend dès lors quels processus métiers sont plus motivés que les autres à mener des projets communs avec le département BI.

Appropriation par les utilisateurs: Le nombre de reportings standards livrés chaque jour varie suivant les opérateurs dans des proportions variant de 1 à 22,5. Le niveau d'exploitation de ces rapports est variable, il est estimé par certains opérateurs à 40%. l'appropriation des solutions BI passe par une stratégie de communication interne et une méthodologie forte de conduite de changement auxquelles les départements BI doivent être partie prenante.

c/ Aspects Technologiques

Infrastructure: Les opérateurs les plus matures ont atteint un volume tellement important atteignant 9000 reportings et tableaux de bord quotidiens. Un volume qui nécessite des investissements couteux qui limitent le choix des solutions de plateforme BI aux éditeurs les plus performants. Le choix des éditeurs et les conditions d'achat sont généralement négociés au niveau du groupe auquel appartient l'opérateur de télécommunications. Bien que coûteuse, cette option offre la garantie de la prestation efficace et efficiente des services nécessaires (en particulier ressources externes, licences, matériel) pour le développement et l'exploitation des applications de la BI.

Architecture des entrepôts de données: Les réseaux de télécommunication et commutateurs associés, systèmes de facturation et les services d'entretien produisent typiquement plus de 100M CDRs par jour. L'analyse complexe des données historiques combinées de ces sources oriente les activités de gestion de la relation client, l'assurance de revenu, la prévention de fraude et les programmes de reportings opérationnels. Le stockage et l'accès à toutes ces données est certes important mais techniquement coûteux. Le choix d'échantillonner et résumer les CDRs comporte des risques de changement dans les modèles d'appel ou dans les relations entre les données (Kumar,2012), il passe par une maitrise des techniques de l'intégration et la consolidation des données, que l'ensemble des opérateurs semble avoir atteint.

Qualité des données: La qualité des données est un sujet très sensible tout comme leur fiabilité , cohérence et leur consolidation. Ces risques augmentent chaque fois que l'on augmente le nombre de canaux sources et la variété d'informations peu ou non structurées. Les opérateurs de télécommunications ont choisi comme principe la mise en œuvre d'un environnement d'entreposage de données central, consolidé et évolutif qui est idéalement sur le concept d'entrepôt de données d'entreprise. Pour garantir la transparence des données, des tâches transversales (telles que la gestion de la qualité des données et des métadonnées et la gestion des données de base) sont professionnalisées .

OLAP et Tableaux de Bord : La personnalisation des reportings et tableaux de bord semble facilitée par l'émergence d'outils de visualisation interactifs, qui offrent aussi l'avantage de fonctionner In memory, ce qui permet de pallier au problème de volume de données(14). Cette technologie repose principalement sur le stockage des informations en mémoire vive, et prend en compte les avancées technologiques au niveau matériel et logiciel.

BI en pseudo temps réel: L'importance des enjeux financiers dans le secteur des télécommunications impose aux preneurs de décision un suivi régulier des paramètres et indicateurs de performance. A défaut de faire de la BI en temps réel, compte tenu du volume des données gérées, le reporting se fait de façon journalière. La fréquence avec laquelle les informations sont transmises aux utilisateurs a fait dire à un responsable du département BI, *" Aujourd'hui on ne fait pratiquement plus de distinction entre système d'information décisionnel et transactionnel"*.

Conclusion

L'utilisation des modèles de maturité pour évaluer les systèmes de BI au niveau des entreprises, n'est pas une fin en soi. Il s'agit en effet d'un outil diagnostic qui permet de saisir la qualité et la flexibilité de l'architecture de la solution d'entreposage des données adoptée et d'identifier les axes d'amélioration et de développement mais également de vérifier dans notre cas, la fluidité de la relation Equipe BI-Métiers à même de garantir une réelle mise à profit au service de la performance. Cet aspect lié à la qualité des sponsors de la BI, à une conscience collective des exigences d'un alignement de la BI sur les objectifs et stratégie de l'entreprise, met en valeur l'importance d'une culture d'entreprise favorable à ce type de projet pour qu'il soit réellement stratégique.

La complétude du projet BI au regard des modèles de maturité s'apprécie également par sa capacité à fournir un retour sur investissement favorable. Nous avons remarqué une certaine prise de conscience chez certains opérateurs de la nécessité d'encadrer les dépenses évoquant justement l'aspect de rentabilité. Même si la question est épineuse et que les aspects immatériels restent toujours difficiles à

quantifier, il y a toujours lieu de s'interroger sur la performance du projet BI à travers des indicateurs clés de performance adaptés.

Notons que le classement que nous avons opéré pouvait être différent si l'on avait adoptés d'autres modèles moins centrés sur l'aspect humain ou sur la culture d'entreprise. Par ailleurs les entreprises de télécommunications ayant atteint le stade ultime de maturité encourent le risque de noyer les utilisateurs dans un flot d'informations ingérable. Une BI en temps réel risque d'occasionner un couplage trop fort avec les systèmes d'information opérationnels avec des décisions de court terme qui sont alors privilégiées au détriment des décisions de long terme, comme confirmé par Marsal et Travaillé (2006).

Ce papier aura enfin servi à mieux comprendre les enjeux BI des opérateurs de télécommunications et mis en évidence le chemin qui reste à parcourir pour des opérateurs davantage freinés par l'aversion au changement organisationnel et culturel que par une technologie de plus en plus accessible et conviviale.

Références

Andersen E.S. et Jessen S.A. (2003), Project Maturity in organizations, International Journal of Project , Management. 21, pp. 457-461.

Business intelligence : Place de la BI et pilotage des projets décisionnels dans les grandes organisations françaises, Publication du CIGREF (En ligne) www.cigref.fr, consulté le 12/06/2017

Cooke-Davies T.(2003), The maturity of project management in different industries: An investigation into variations between project management project. International Journal of Project Management. Vol. 21, pp.471-478.

Dittmar C. Oßendoth ,V. et Schulze K.(2013), Business Intelligence : Les entreprises européennes sont-elles prêtes pour le Big Data ?. Rapport Steria 2013,En ligne, consulté le 12/06/2017. www.steria.com/fr,

Gary M. W (2005). Data Mining in the Telecommunications Industry. Data Mining and Knowledge Discovery Handbook, Part 12, 1189-1201.

Guide du Corpus des connaissances en management de projet (2004) Troisième édition (Guide PMBOK®) Project Management Institute, ISBN : 1-930699-70-0

Informatique décisionnelle, https://fr.wikipedia.org/wiki/Informatique_décisionnelle

Kerzner H.(2003), Advanced Project Management - Best Practices on Implementation, John Wiley & Sons, p. 847,.

Kumar P.(2012) - Impact of Business Intelligence Systems in Indian Telecom Industry,Business Intelligence Journal - July, 2012 Vol.5 No.2

Lahramann et al. (2012) Business Intelligence Maturity Models: An Overview, (En ligne), Consulté le 08/06/2017, www.cersi.it/itais2010/pdf/066.pdf),.

Liautaud B., et Hammond M (2002)., E-Business Intelligence. Turning Information into Knowledge into Profit, McGraw-Hill, New York, 2002.

Marsal C., Travaillé D.(2006), Les systèmes d'information de pilotage, les tableaux de bord Cahiers du FARGO n° 1060901 , Septembre 2006

Olzak C,(2013) Assessment of Business Intelligence Maturity in the Selected Organizations, Proceedings of the 2013 Federated Conference on Computer Science and Information Systems pp. 951–958

Power DJ (2007)., A brief history of Decision Support Systems, [En ligne], consulté le 15/06/2017 http://dssresources.com/history/dsshistory.html,.

Rajterič H.(2010): Overview of business intelligence maturity models, Management, Vol. 15, 1, pp. 47-67 I.

BPMN as a Quality Tool for the Efficient Functioning of the Company

Jan Nisler, Faculty of Informatics and Management, University of Hradec Kralove, Hradec Kralove, Czech Republic, jan.nisler@uhk.cz

Hana Tomaskova, Faculty of Informatics and Management, University of Hradec Kralove, Hradec Kralove, Czech Republic, hana.tomaskova@uhk.cz

Abstract

Today's companies are trying to make the most efficient operation possible. To optimize the company is necessary to know the complex firm functioning - ie corporate/business processes. Using the UML (Unified Modeling Language) or BPMN (Business Process Model and Notation) syntax, complex diagrams and methodologies are created to make the best use of these syntax. This article introduces this useful notation from its inception to the present and points to some problematic aspects of its use.

Keywords: BPMN, UML, History, methodology, syntax, workflow patterns

Introduction

The non-profit group BPMI was the founder of the BPMN(Barry, 2005; Rouse, 2005). Since the start of its existence in 2000, this group has sought to promote the business processes standardization as a means of supporting B2B development. The group was created by 16 e-business leaders such as Black Pearl, Blaze Software, Bowstreet, Entricom and others. In addition, the group grew to include more than 80 companies involved in the development of such an auxiliary concept. As sub-objectives, they set out: to promote and develop the use of BPM by creating standards for process design, deployment, implementation, maintenance, and optimization. BPMI wanted the whole process to be easier and more efficient for businesses in the global marketplace. At the time of the emergence of e-business, it reflected the unconventional ways in which business processes operate within the organization. There are several terms for the same item, each department uses a different process that should be uniform. The overall goal was to overcome these problems and create a standard to communicate, share data and applications more effectively. The concept itself contains three main components, namely the public interface and two private implementations. The public interface (two business partner interactions) is supported by protocols linked, such as BizTalk, ebXML, and RosettaNet. Other models are private, which are specific to each partner. The concept, however, was to build these private models into a common language that would define the same rules for each partner. This puts the first basics of BPML, which is a language based on XML syntax, so the language can be used to model enterprise data components. The associated language that held the questioner role was BPQL, and was the standard for management, and it was used to deploy and run defined business processes. These languages were open specifications, and anyone could download them from the official BPMI site. It was, however, necessary to present these languages in a single, graspable form that everyone would understand.

BPML

In order to understand what BPMN is and why this syntax is created, it is good to look at what this notation represents. According to the official BPMI 2002 source (BPMI.org, 2002) it is a methodology for modeling business processes and business data. Provides an abstract model of collaboration and transactional business processes. The ability of BPML is intended for mission-critical applications so that it supports synchronous and asynchronous distributed transactions. It offers a reliable security mechanism, it is used in integrated development environments, managing the home design and business

process models over the Internet (Wong & Gibbons, 2011). BPML also has an associated business query language to implement business processes (Dubray, 2002) (BPMI.org, 2004).

Another explanation from the article (Assaf & Intalio, 2002) can be: BPML usually defines the abstract model used to express the general procedure. Such a language can be used to define business processes, complex web services, and pluralism. The basic parts that make BPML are abstract BPML XML syntax constructs and BPML specifications that are Namespace, Features, Imports, Target namespace. BPML activities perform specific functions and are either simple or complex. Simple actions, such as call, compensation, etc, cannot be decomposed and it performs a single operation. Complex activities are all sequences, switches and so on. They consist of one or more activities and manage the performance of a certain activity through a set of activities.

First mentions and ideas of BPMN

The BPMI's notation for BPML's graphical representation was BPMN, and as is shown by the paper (BPMI.org, 2002) aims to: Provide a notation that is easy and understandable for all business users. From the business analyst who creates the initial process design to the technical developer responsible for implementing the technology that will perform these processes. So BPMN creates a bridge that overcomes the gap between process analysis and process implementation. Sometimes, however, there is a problem with the process timing (Wong & Gibbons, 2009) Another goal is that XML-based languages (BPEL4WS and BMPL (BPMI.org, 2002, 2004; Dubray, 2002)) can be formulated visually using one standard.

Furthermore, BPMN (BPMI.org, 2002) describes that the concept will be modeled in a business process diagram (BPD), where the individual elements (objects) will be linked and will be created using sequential, parallel or alternative paths. The BPMN concept must be clear and comprehensible to all users, but also complex enough to cover all possible processes that will be modeled today or in the future. As the authors (Mohelska & Tomaskova, 2010, Tomaskova, 2009) have said, understanding and modeling of business processes and knowledge are very important.

Workflow Patterns

In this document (Aalst, Barros, Hofstede, & Kiepuszewski, 2000), there are already formulations of the individual elements that are used in the BPMN syntax. At this stage of development, basic elements have been created, where for example interrupted and noninterrupted events have not yet been taken into account. This is understandable because the document is routed to BPMN 0.9 (BPMI.org, 2002) and some of the things that are widely used today are only in BPMN 2.0 (OMG.org, 2011). However, already in this version, the first version of the design templates, which was in the initial document of about 10 in the document (Biernacki, 2012), is now defined, but it can be assumed that the group wanted to use the syntax of Getting Started Standards and model it in the same or similar style. The group did not think of a completely new way of thinking but wanted to adopt rules and define how to model, create something new. Therefore, it has only created a graphical concept for modeling, maintenance, and business process innovation, for which the definition was established in the past years before BPMI was created. However, workflow patterns were defined in the 1990s as described by the Eindhoven University teacher, as documented in the "Advanced Workflow Patterns" (Aalst et al., 2000). Another 2002 paper from the same university entitled "Work patterns" (Aalst, Hofstede, Kiepuszewski, & Barros, 2003) is described in detail in 20 workflow patterns currently in use.

The Idea of BPMN

The primary language for this notation was BPEL4WS and BPML(Aalst et al., 2003; BPMI.org, 2004; Dubray, 2002), so BPMN will only apply to these languages. Aalst (Aalst et al., 2003) said that it is difficult to predict which mapping will be preferred by BPMN because the language specification is a volatile area. As another essential information that every "system architect" should realize is that the BPD is not designed to graphically pass on all the required information about running the business processes. Excessive detail in modeling leads to chaos, and its initial description lacks sense and is therefore unusable.

What versions we have (White, 2012) :

BPMN 1.x

- May 2004, version 1.0 was introduced
- In January 2008, following the merger with the OMG Group in 2006, version 1.1 (BPMI.org, 2002)outlined some errors that were in version 1.0 .
- Year later was released the version 1.2 (OMG.org, 2009), which was only a look at version 1.1, only minor bugs that were not created in the previous version and modified.

BPMN 2.X

- January 2011, version 2.0 was created (OMG.org, 2011), which changed the concept of previous versions. This version is also seen as a turning point when this concept was an increased interest in its diverse expressions of situations. The former leader of this concept was more of a diagram in the UML syntax. Although some authors think that the concept of UML with charting activities is better than BPMN. It is rather the opposite. Many ideas and articles have already been created on this subject that does not agree with this conclusion. A number of diploma theses have been developed on campus, which is just addressing the difference between the UML Activity Diagram and the BPMN. For example, you can read that these syntaxes are aligned, but some processes do not represent their complexity using UML.
- The latest version, which was so far presented to the public, was 2012 version 2.0.2 (OMG.org, 2014)

So, What Exactly Will BPMN Look Like?

BPMN will show the processes of each participant, each participant can view the scheme differently. This means participants have different angles of view on how these processes will behave. These processes may be for the participant by an internal process, that is, a process that is related to the participant), or these processes will be external, that is, when the participant will be present as a mere user. Therefore, each participant will have a different perspective on how to look at all processes with regard to internal and external processes. This is another aspect of the participant's view, but the diagram, model or process itself remains the same. Although the chart itself is very important to the viewer in order for the viewer to understand the process, BPMN will not currently support (version 0.9) (BPMI.org, 2002)to identify any mechanism that will determine what the view is. At present, BPMN is already different in terms of processes (OMG.org, 2011, 2014). BPMN is divided into several kinds of diagrams, each of them representing a different view of processes). The concept is open to modelers, but can also be utilized (and recommended) as a suitable help for vendors who can mold their processes into a visual page to better outline and characterize their processes to customers.

In the other parts of this paper, the individual elements are described as they were used. Interestingly, the descriptions contained in this document are still being used and have been changed only on a small or no scale. So even after the merger of the BPMI group with OMG, a similar terminology was used before.

At the beginning, the intention was also set out by the founders:

„BPMN will give businesses the ability to understand their internal and external business practices with graphical notation and will give organizations the ability to communicate with this syntax with others.“

And though many users were down with this concept, many were dissatisfied with the version, because some procedures could not be modeled and a more complex solution could not be rendered.

Several years since its inception (10 years), the BPMN syntax is already used as a standard without which it can not exist. In 2012, 45 firms that have still used BPMN version 1.X and 25 companies have fully switched to BPMN 2.0 (White, 2012). Although this information is based only on presentations, this author, S. White, has published many publications that are valuable and highly valued. As is the case in 2016, it is not yet known, but thanks to the openness of the syntax, several thousand end-users are already in line.

If we were to define whether their target had been fulfilled, we must say that BPMN has grown and other diagrams have been created that further deepen their importance for companies. Internal processes have become more controlled normative types, and external processes are modeled through newly created diagrams (2012) Collaboration, Conversation and Choreography (OMG.org, 2014). Unfortunately, at the moment, it also depends on the type of tool we model. We can not model using a tool that does not fully support the BPMN syntax, or which partially changes it for its use. Although this syntax is loose, the basic rules that follow will apply. However, we can say that BPMN has evolved into a concept that is also used to model organizational processes. Thus, the manager uses this notation more, and when a crisis situation occurs or when a culprit is sought for a possible failure, by modeling processes, for example in manufacturing, he knows what kind of person or activity could cause the problem.

In addition, the new elements that were added to the syntax in version 2.0, such as ad-hoc, which is described here as a badly named element, are described. In the document, we can also read that the BPMN notation itself has made many changes on the market. End-users have realized the potential of this syntax, as evidenced by the fact that only in 2012 was 70 independent tools (White, 2012) that supported this syntax to create the appropriate modeling environment for this concept. However, it demonstrates that the syntax will constantly evolve, like everything else. For modeling, and while version 2.0.2 (OMG.org, 2014) is already well equipped and provides a good user experience for the user, there are still many places where imagination needs to be used and a bit of abuse of notation rules to map the situation. So the syntax bends and is not used correctly. Although the notation is free and our imagination is necessary.

But what will they do next years for BPMN syntax? Today, we also have the ISO code for ISO / IEC 19510: 2013 (OMG.org, 2013), so we have to stick to certain rules to make it clear and clear. The notation will definitely evolve, but we too can be well-behaved and properly modeled by end users, we will need to constantly evolve, so we need to develop more sophisticated methodologies to model. This is very necessary in today's world. Every company modeling itself, but what we really need as a user is a methodology, unified and clear. Unfortunately, companies will never publish it because they are their know-how, and such knowledge is valued by gold. Here I see the possibility of universities and subsidy frames, when higher education institutions may be holders of these methodologies. In the past, it has proven to be a workflow pattern. Such a methodology would be highly valued and the founder will be recognized.

What Problems Can Occur When Defining BPMN Methodologies?

In a practical world, using the BPMN syntax to model business processes, the given syntax must be used according to the rules that are defined.

The question, however, is according to which methodologists should lead the modeler when there is no continuous methodology of using the given syntax. Although the BPMN syntax or other modeling tools are taught in schools, they do not teach the methodological part of this syntax. We have a free syntax that allows us to model complex diagrams and involve the given activities in status and type models, but we do not have a uniform modeling approach. The BPMN syntax gives defined elements for modeling, but it does not tell us how to proceed uniformly in process modeling. At this point, we do not have to worry about this problem, however, until we discuss this model with another company using BPMN. One company creates a model according to its own methodologies and the other according to its own. However, each company uses a different approach, and can not lean on the definition of a methodology. This creates disparate methodologies that only one company understands. There is a misunderstanding between companies. The definition of one methodology is not easy as the BPMN syntax is very extensive and provides modelers with over 100 modeling elements. When examining individual elements, some vague elements also come to light. It is thanks to these elements that different understandings of the modeling are made using syntax, and it is good to create a clear definition of these elements in order to avoid undesirable understanding. These aspects then lead to the unambiguous creation of methodologies that the modeling world would combine. When we talk about an exclusive gateway, there is still a question of the openness and closeness of this element. When we consider the side to which we are inclined is not such a difficult question. For example, see Figure 1 : Unification of **Activities**. When we have this example:

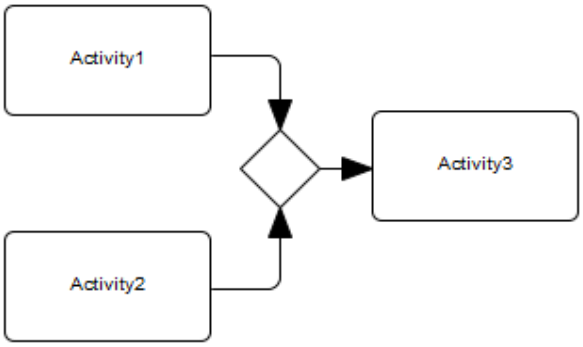


Figure 1 : Unification of Activities

1. Under the closed gateway condition. So when the flow passes, the element is closed, this example is clear. When one of the activities 1 and 2 is complete, the flow runs through the exclusive gateway to activity 3. The exclusive gateway is closed so that the flow from the second activity that is completed stops in the exclusive gateway.
2. In the second case, when we think that an exclusive gateway is open, this example is interpreted differently. When the first token goes to the gateway, it continues to activity3, because there is no condition in the gateway and the flow continues according to the flow direction. However, the second stream also passes through this gateway because the gateway is open. So, the flow that happens as a second goes into activity 3. We can compare it with the example where activity 1 goes flowing to Activity 3 and Activity 2 goes straight to Activity3 as in Figure 2- Direct unification of activities.

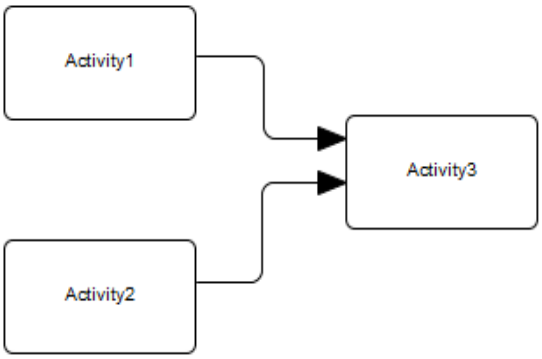


Figure 2: Direct unification of activities

Direct unification of activities

This example is one of many that can be addressed using an exclusive open or closed gateway. Solving this problem can be a problem. To avoid having to deal with this case, when the gateway is open or closed, it is better to use a different gateway that specializes in unification or distribution of a given stream. This element is a complex gateway, in which we can define how many flows must come to the gateway in order to unify the flow and move on. But to determine if this solution is correct, we must go through all cases of using the gateway exclusively and resolve the issue of openness and closeness of this element.

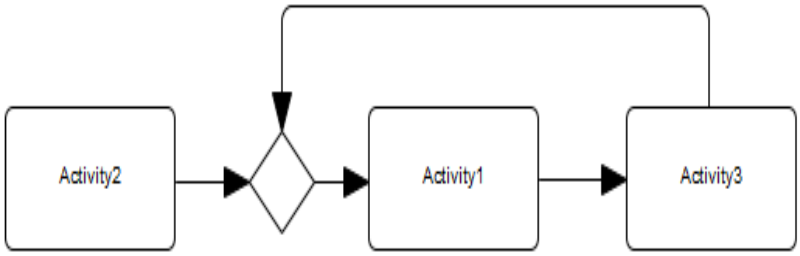


Figure 3: Repetition

Another example of the openness and closeness of the exclusive gateway is the repetition step.

> This is an example when the activity returns the flow back to a certain point in the process. The flow is linked to the exclusive gateway, which is solved here as open. In dismantling these two situations, namely Figure 1 : Unification of **Activities** and Figure 3: **Repetition**, we can see exactly the same situation. There are two flows at a given gateway at different times, and the flow passes through the gateway to the next element. This flow is in the same mixture. Therefore, there are the same rules as in the previous example, with no complex gateway here. So, from the first example, we get the solution that instead of the exclusive gateway you can use the complex diagram. However, in the second example, we must already take that complex diagram as unnecessary, since we are taking the exclusive gateway here. In this case, it is better to take the given exclusive gateway as open and we have everything well mapped. When analyzing the results, it is clear that a closed exclusive gateway is not needed, as it can be replaced by a complex gateway with the same result. This conclusion is based on these most common examples.

Conclusion

The BPMN syntax has been in the enterprise world for over 16 years, and for system development, system awareness is a relevant helper. But some aspects of this syntax have to be defined. It is necessary to define a unified methodology that would clearly determine how the object world is to be modeled. Unless problems are solved, methodologies will be developed that approximate the same subject matter, but each of them will solve the problem in its own way and will not take into account the wider framework of the methodology at all. It is not easy to define a uniform methodology because everyone understands this syntax in your own way, it is necessary to stop this uncontrolled syntax transformation. Although it is not possible to model all the elements in a single diagram, it is necessary for modelers to have subconscious definitions of the individual elements and situations that may occur. Unfortunately, all the syntax questions are not answered. Therefore, it is necessary to focus more on the issue of the global methodology.

Acknowledgment

The Financial support of the Specific Research Project “Autonomous Socio-Economics Systems” of FIM UHK is gratefully acknowledged.

References

Aalst, W. M. P. van der, Barros, A. P., Hofstede, A. H. M. ter, and Kiepuszewski, B. (2000). Advanced Workflow Patterns. In *Cooperative Information Systems* (pp. 18–29). Springer, Berlin, Heidelberg. https://doi.org/10.1007/10722620_2

Aalst, W. M. P. van der, Hofstede, A. H. M. ter, Kiepuszewski, B., & Barros, A. P. (2003). Workflow Patterns. *Distributed and Parallel Databases*, *14*(1), 5–51. https://doi.org/10.1023/A:1022883727209

Arevalo, C., Escalona, M. J., Ramos, I., & Domínguez-Muñoz, M. (2016). A metamodel to integrate business processes time perspective in BPMN 2.0. *Information and Software Technology*, *77*, 17–33. https://doi.org/10.1016/j.infsof.2016.05.004

Assaf, A., & Intalio. (2002, November 13). Business Process Modeling Language.

Barry, D. K. (2005). Business Process Modeling Initiative (BPMI.org). Retrieved August 28, 2017, from http://www.service-architecture.com/articles/web-services/business_process_modeling_initiative_bpmi.org.html

Biernacki, P. (2012). Work Flow Pattern BPMN 2.0. Retrieved August 28, 2017, from http://mgx.com.pl/WP/WorkFlowPaternsBPMN2d_Menu.htm

BPMI.org. (2002, November 13). Business Process Modeling Notation Working Draft (0.9). BPMI.org.

BPMI.org. (2004, May 3). Business Process Modeling Notation (BPMN) Version 1.0.

Dubray, J. J. (2002). A novel approach for modeling business process definitions. *BPMN Working Draft.*

Mohelska, H., & Tomaskova, H. (2010). The use of mobile application in the business environment in the Czech Republic. In Applied economics, business and development (AEBD): Proceedings of the world multiconference. Kantaoui, Sousse: World scientific and engineering academy and society.

OMG.org. (2009). BPMN 1.2. Retrieved August 31, 2017, from http://www.omg.org/spec/BPMN/1.2/

OMG.org. (2011, January). BPMN 2.0. Retrieved August 28, 2017, from http://www.omg.org/spec/BPMN/2.0/

OMG.org. (2013). ISO/IEC 19510:2013 - Information technology -- Object Management Group Business Process Model and Notation. Retrieved August 31, 2017, from https://www.iso.org/standard/62652.html

OMG.org. (2014, January 20). BPMN 2.0.2. Retrieved August 31, 2017, from http://www.omg.org/spec/BPMN/2.0.2/

OMG.org. (2017). OMG | Object Management Group. Retrieved August 31, 2017, from http://www.omg.org/

Rouse, M. (2005). What is Business Process Management Initiative (BPMI)? - Definition from WhatIs.com. Retrieved August 28, 2017, from http://searchcio.techtarget.com/definition/Business-Process-Management-Initiative-BPMI

Tomaskova, H. (2009). Marketing research of mobile technology used by firms like advantage. In Proceedings of the World Multiconference on Applied Economics, Business and Development (AEBD'09)

White, S. A. (2012). BPMN: Past, Present, and Future. IBM Corporation.

Wong, P. Y. H., & Gibbons, J. (2009). A Relative Timed Semantics for BPMN. *Electronic Notes in Theoretical Computer Science*, *229*(2), 59–75. https://doi.org/10.1016/j.entcs.2009.06.029

Wong, P. Y. H., & Gibbons, J. (2011). Formalisations and applications of BPMN. *Science of Computer Programming*, *76*(8), 633–650. https://doi.org/10.1016/j.scico.2009.09.010

Identifying Smart Cities Challenges: A Literature Review

Shamsaa Al Riyami, Information Technology Authority (ITA), Muscat, Oman,
shamsaalryami@gmail.com

Afra Al Mandhari, Information Technology Authority (ITA), Muscat, Oman,
almandharia92@gmail.com

Rasha Al Abdali, Information Technology Authority (ITA), Muscat, Oman,
rasha.alabdali@ita.gov.om

Zahran Al Salti, Sultan Qaboos University (SQU), Muscat, Oman
alsalti@squ.edu.om

Abstract

Technological development has been moving too fast and is becoming unpredictable day by day. The new era that human race has been experiencing with the powerful use of IT tools is yet to reform itself into something bigger than it used to be in the past. Internet of things enabled cities to get more connected to deliver the optimum value to their citizens by adopting "Smart Cities" concept. However, at the same time, it introduced several challenges that this paper has covered by studying a given set of literatures to produce a list of common challenges; which have been divided into two categories: technical and non-technical.

Keywords: IT, Smart cities, Challenges, Internet of things, Literature review

1. Introduction

Cities are the main poles of human and economic activity, more than 50% of the world's population today live in urban areas. An increase is expected because of population migration to these regions to make lives of citizens better. Urban areas need to manage their development, supporting economic competitiveness, while enhancing social cohesion, environmental sustainability and an increased quality of life of their citizens (*Monzon, 2015*). With the development of new technological innovations smart cities concept emerged as a means to achieve more efficient and sustainable cities. Smart cities consists of set of systems and solutions that are used to build, or rebuild, a more sustainable city by utilizing resources and available data in intelligent ways to make living for citizens better (*Ferraz, 2014*).

Smart city concept brings new challenges that are directly related to the concepts and structures of a city (*Ferraz, 2014*). These cities are developing themselves for attractive lifestyle like cultural and natural amenities, knowledge infrastructure like universities and businesses and technologies like sensors, mobile technologies and Internet of things (IoT) (*Bajracharya et al., 2014*). It is necessary to get a comprehensive overview of the Challenges that Smart Cities can face. There are multiple challenges that need to be studied before implementation a smart city." From technical infrastructure, that needs to be put in place, to adaption of system by citizens various technical and non-technical obstacles are to be dealt with" (*Bawanya and Shamsi, 2015*).

The purpose of this paper is to identify the key challenges in smart cities based on the review of literature on smart cities. The structure of this paper consists of four main sections: the definition of smart city, the methodology used to write the paper, a discussion about the technical and non-technical challenges, and at the end the conclusion with given recommendations are provided.

2. Research Question

Many of smart city research studies have determined several key challenges while implementing smart city as shown in table 1 (Findings section). These studies, however, discuss the key challenges from different perspective.

The aim of this study is to define the common challenges which may face cities while developing a smart city concept according to the given recent publications from year 2011 to 2017. The intended outcomes of this study are preliminary as it is a subset of bigger scope. Those results will be mapped to a specific geographical area (Sultanate of Oman) at later stage by conducting a field work and further analysis in order to predict challenges that could be faced by the upcoming national projects in this domain and provide proactive solutions and a list of recommendations.

3. Smart City Definition

There is no single definition for smart cities. As the concept is being known on the whole but used everywhere in the world with different names and in different circumstances, there are many conceptual variants generated by replacing the word smart with other alternative adjectives (*Nam and Tpardo, 2011*). In what follows, a few such definitions are given, originating from different papers.

According to Cassandras (2016), smart cities use information and communication technologies (ICT) to be more smart and active in the use of resources. This leads to saving costs and energy, improved service delivery and quality of life. Smart cities are able to take advantages from ICT implementation to growth efficiency in city's activities (*Arman et al., 2015*).

Furthermore a smart city is implements solutions by support of devices and interconnection of sensors, actuators, and mobile devices (*Novotny and Kadlec, 2014*). Moreover, it's the city that monitors and integrates of all of its critical infrastructures including roads, bridges, tunnels, rails, subways, airports, seaports, communications, water, and power (*Ermia et al., 2017*).

A smart city is all about connecting both of physical infrastructure, IT infrastructure, social infrastructure, and business infrastructure to leverage the collective intelligence of the city (*Chourabi et al., 2012*). However, Cocchia (2012) says "Smart city is the product of digital city combined with the Internet of Things".

On the other hand, Meijer (2015) defined smart city as a city which use smart computing devices to make the critical infrastructure and services of cities, which includes city administration, education, healthcare, public safety, real estate, transportation, and services more intelligent and efficient.

4. Research Design and Methodology

This study is a review of literatures on smart city. We decided to focus our study on papers that discuss the smart city challenges. Those papers are published in google scholar, Science Direct, Sparing, IEEE and Communications of the ACM journals and databases. The follow diagram illustrates the methodology used for literature review in this research. First, the main key words used for searching literatures are: smart city, challenges, and literature review. Second, the authors have collected research papers from multiple resources.

The authors considered all papers that were published for time period from 2011 to 2017. Forty nine research papers were collected and filtered. Out of those papers, twenty nine research papers were analyzed and used as references to obtain the required information. On this paper the authors summarized the definition of smart city based on information provided by eleven papers. Finally, the authors elicited challenges of smart city that were discussed in eighteen papers. The results were categorized into two

different categories: Technical and Non-Technical. Each category consisted of a number of sub-categories that have been studied further to generate the final conclusion.

5. Results

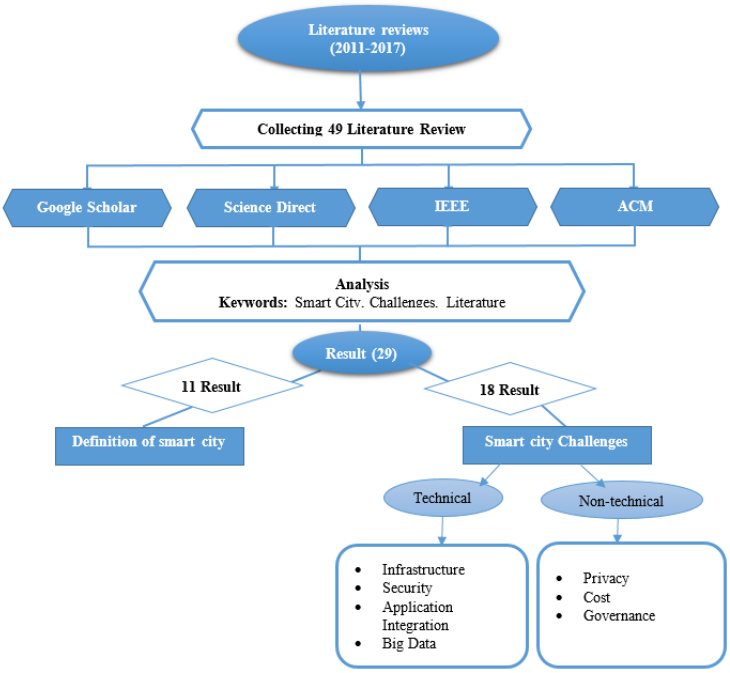


Figure 1: Methodology Structure

In this section, the eighteen selected papers are analyzed in order to define the key challenges for smart city implementation. These challenges classified into two sections: technical and non-technical challenges each sub-domain. In the following, each of these seven sub-domains are discussed.

5.1.Technical Challenges

Intuitively, smart city development is an attempt to integrate innovation in the city. Incorporating innovations in the city's infrastructure causes many challenges. In the following subsections, these technical challenges are identified.

5.1.1. IT Infrastructure

The smart city infrastructure is the introductory step for establishing the overall smart city framework and architecture. ICT infrastructure development in the physical space constitutes a huge barrier while applying smart city. Besides, reliable, scalable and high-speed network connectivity and infrastructure are the key fundamentals of integrating information systems in cities and this has to be ready before smart city is presented to citizens (*Bawany and Shamsi, 2015*).

Moreover, Raaijen (2017) noted that ICT infrastructure will connect a collective representation of interconnected smart devices which have to re-configure themselves through learning. Also, these smart devices depend on the vast of infrastructure in order to communicate with each other and the challenge is to create a flexible communication interface.

Table 1: Smart City Challenges

No.	Relevant Study	Technical Challenge				Non-Technical Challenge		
		IT infrastructure	Security	Applications Integration	Big data	Privacy	Cost	Governance
1	AlDairi & Tawalbeh (2017)		✓			✓		
2	Baig et al. (2017)		✓					
3	Mohammadi (2017)		✓		✓	✓		
4	Raaijen (2017)			✓				✓
5	Hashem et al. (2016)				✓	✓	✓	
6	Popescul & Diana (2016)		✓					
7	Zoonen (2016)		✓		✓	✓	✓	
8	Al Nuaimi (2015)				✓			
9	Bawany & Shamsi (2015)	✓	✓	✓	✓	✓		
10	Bolívar (2015)							✓
11	Edwards (2015)		✓			✓		
12	Monzon (2015)	✓	✓					
13	Bari et al. (2014)	✓	✓					
14	Bajracharya et al. (2014)		✓			✓	✓	✓
15	Elmaghraby & Losavio (2014)		✓			✓		
16	Ferraz & Guimarães (2014)		✓					
17	Elmaghraby (2013)		✓			✓		
18	Chourabi et al. (2012)							✓

4.1.2 Security

Recent, concerns over security have been an important part of the debate over the impact of smart cities and smart grids (*Elmaghraby, 2013*). Furthermore, various risks face the cyber-physical infrastructure used in smart city. However, these modern cyber-physical infrastructure systems are massively used and there is no sufficient insight for their vulnerabilities and threats. Generally, accidental threats on cyber-infrastructure for smart city cause serious consequences according to city's maturity and smartness (*AlDairi and Tawalbeh, 2017*). Bawany and Shamsi (2015) mentioned that threats from hackers, intruders, viruses, worms, Trojans etc. has the potential to disrupt and interrupt the services and bring down the whole system resulting in enormous losses. For example, transportation management systems face the most critical hacks and threats as they cause disasters, especially in air traffic systems or trains control systems. Furthermore, they cause huge traffic damage that may stay for hours by attacking control systems of traffic lights and their sequencing, road signs and speed limit signs (*AlDairi and Tawalbeh, 2017*).

Bawany and Shamsi (2015) insisted that an extended security approaches required to secure sensitive data at all levels of collecting, processing, storing and disseminating. It needs international collaboration, which includes experts from all over the world (*AlDairi and Tawalbeh, 2017*).

4.1.3 Applications Integration

The Smart cities vision is often focused on different domains and consider a heterogeneity services which require an action to address cross-thematic issues. According to Raaijen (2017), these different domains needs to be integrated together in one layer on top of the technology innovation that addresses heterogeneity systems. The challenge of this layer is the incorporation of different sensing techniques to monitor and address service specific challenges and this is referred to "service discretization".

On the other hand, application development and innovation needs to be fast which will lead citizens to get the maximum advantage of data that is being collected. Because if the development was limited to city management, citizens will be disappointed *(Bawany and Shamsi, 2015)*.

4.1.4. Big Data

Big data offer the potential for cities to gain valuable insights from a massive amount of data collected from various sources. In addition, data in smart city collected from various objects and devices. It requires new algorithms and visualization techniques, which affect smart city-focused activities in order to gain the insights of this data and to make decisions *(Hashem et al., 2016)*. In a research study by Al Nuaimi et al. (2015) it mentioned that, because of the massive data collected from smart city systems, it requires huge processing capability and this leads to the need of scalable and reliable software and hardware platforms.

Nowadays, data integration is one of the hardest challenges within organizations in the IT world. The smart city vision holds out the concept of integrating data from several organizations, different environments, and variety of intelligent devices. The volume, velocity, variety and variability of data makes data quality difficult to be ensured *(Hashem et al., 2016)*. Bawany and Shamsi, (2015) stated that data integration and analytics requires an efficient big data management system and it has to be reliable and scalable with no downtime.

4.2 Non-Technical Challenges

The coexistence of non-technical aspects besides technical aspects indicates the importance of balancing the two perspectives to successfully integrate smart city innovations. In the following, the challenges of these formal and informal aspects are identified.

4.2.1 Privacy

Privacy is a key policy and legislation challenge of the 21st century. A large part of smart city data comes from individuals and they may not prefer their data to be available in public *(Mohammadi and Al-Fuqaha, 2017)*. In addition, smart cities will allow authorities to track a person's location at all times by using video across the city, facial recognition, and other sensors. Although a person's activity may take place in public, this information can be extremely private *(Elmaghraby and Losavio, 2014)*. Bawany and Shamsi, (2015) argued that the privacy is not only about protecting data it also build citizens trust and confidence in order to use these systems. AlDairi and Tawalbeh (2017) defined that if cities want to ensure privacy while implementing smart city initiative they have to consider five privacy-related issues. These issues are protecting identities, protecting people areas that indicate to protect each one's space and properties, protecting locations, communication protection and transactions protection.

On the other hand, Zoonen (2016) states that there are three main factors influencing people's concerns about privacy. First is the type of data whether it is sensitive or not. Also, author defined that what it may be a privet information for one person it is not necessary to be private for others. Second factor is the purpose of collecting data, the usage and weigh the value that providing their data. Third, people's also concerns about who is dealing with their personal data. Zoonen (2016) says that "Eurobarometer data from 2011 indicate that across Europe people trust medical organizations and banks the most when it comes to their (most sensitive) data (Eurobarometer, 2011). On the lowest end of the spectrum, the Eurobarometer found telecom and internet companies, including social media and search engines; they are least trusted and sometimes even seen to threaten privacy".

4.2.2 Cost

Cost is one of the non-technical challenges for smart city adoption. Bawany and Shamsi (2015) stated that the requirement of IT consultancies, professional, number of devices, sensors, thousands of networking equipment and computing devices will create a considerable amount of expense. Also, these devices and equipment need to be integrated and embedded with each other this may be costly because of the lake on natural and human resources. Furthermore, this cost is not limited to one time only, the operational and maintenance cost for such a huge real time system will be much higher *(Hashem et al., 2016).*

4.2.3 Governance

Governance defines the formal aspects of initiatives which aim to achieve administrative modernization. Moreover, there are two main characteristic perspectives towards governance regarding smart cities. First, governance managing smart city development and its helps promoters to have a clear strategy which will help to receive in-depth insights into stakeholder's needs and values. Second, smart city initiatives shaping governance in order to understand which technologies shape governance, such as the availability of big data does and who benefits from the integration of new systems in terms of power and control *(Raaijen, 2017).*

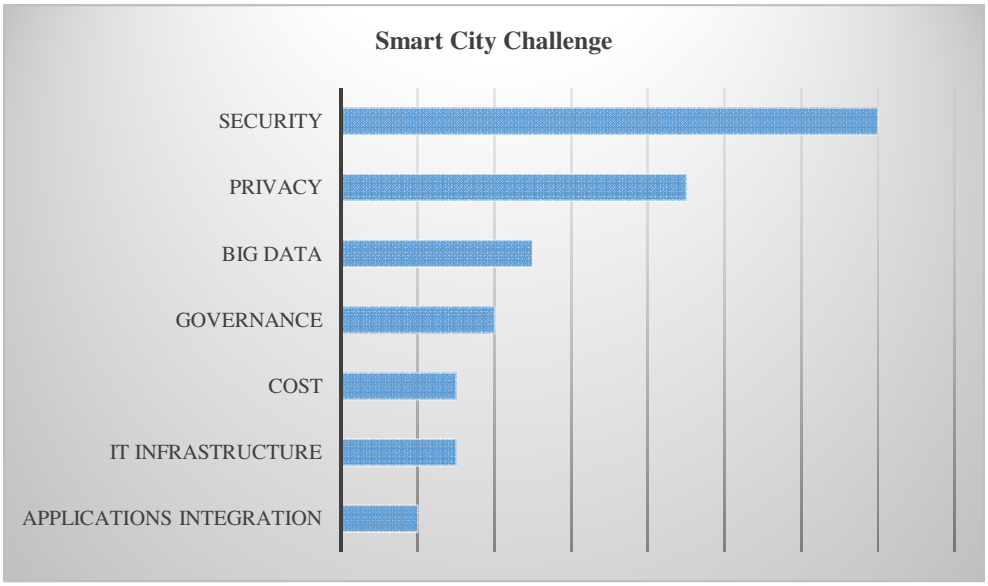
One of the major barriers to developing smart city application is the ownership of data and the regulations and arrangements to make it open. A case study done by Bajracharya et al. (2014) mentioned that due to the data ownership arrangements, developers in Costa Gold were unable to create smartphone apps which provide information such as weather warnings in real time. Nonetheless, many of the challenges faced by smart cities exceed the capacities and capabilities of their traditional institutions and their classical processes of governing. Therefore modern and innovative forms of governance are needed to meet these challenges (*Bolívar, 2015*).

6. Discussion

The analyzed literatures revealed a common pattern of challenges that have been facing smart cities implementation. From the given chart below, we can conclude that most of the authors agreed that Security and Privacy come at the top of the challenges list. This could be due to the emerging internet of things and smart grids concepts along with their associated complexity to control these both aspects: security and privacy *(Elmaghraby, 2013).*

Big data comes second as a challenge for smart cities. As interaction with many agencies at different sectors would be heavily active between government agencies and other industries, boundaries of data collection and sharing become very vague. The most challenging part here is that each organization might have its own privacy policies for protecting personal information and ensuring commitment to the various given policies for all is a fine line *(Al Nuaimi et al., 2015).*

Governance, IT Infrastructure, and Cost, come next in the challenges list at which these challenges will require adopting certain strategies and planning to ensure proper arrangements for developing smart cities concept in an effective manner. Surprisingly, Application Integration comes at the bottom of the list, assuming that technical challenges dissolve by time to support the overall implementations.



s

7. Limitations and Future Research

Since the concept of Smart cities is new, the number of published work related to challenges of this concepts is somehow limited. Also, as it is an emerging domain, it`s components are evolving everyday including technological and non-technological aspects. Various industries are getting involved and requirements of IT to accommodate their needs and provide the needed capacity has changed. That re-defines the challenges over a short period of time.

This paper have only covered the previous studies conducted to find out the challenges of Smart Cities. The next phase of this study will provide a further field analysis on a specifically given geographical scope. The results will be much richer to carry future studies that will enable practitioners and decision makers to put proactive plans that will overcome the Smart Cities challenges and enable the development of this area.

8. Conclusion

This paper starts with an argument on the definition of smart cities, and this new concept appears with new challenges. The main purpose of this paper was shedding light on smart city challenges, this paper has examined the challenges of smart cities through a collection of literatures review was published in different resources. Our studies smart cities challenges have revealed are many different challenges not just technical there is also some of non-technical challenges, we discussed seven category that could be face and each category consisted of a number of sub-categories that have been studied. Through this article we have provided a thorough insight about smart city technical and non-technical challenges.

9. References

Al Nuaimi, E., Al Neyadi1, H., Mohamed, N. and Al-Jaroodi, J. (2015). Applications of big data to smart cities. 15, pp.7-9.

AlDairi, A. and Tawalbeh, L. (2017). Cyber Security Attacks on Smart Cities and Associated Mobile Technologies. Procedia Computer Science, 109, pp.4-5.

Anthopoulos, L. G. (2015). Understanding the Smart City Domain: A Literature Review. Transforming City Governments for Successful Smart Cities, 11, pp.5-7.

Arman, A., Abbas, A. and Hurriyati, R. (2015). Analysis of Smart City Technology Initiatives for City Manager to Improve City Services and Quality of Life Based on ISO 37120. The ACM Digital Library, 6, pp.193-194.

Baig, Z. A, Szewczyk, P., Valli, C., Rabadia, P., Hannay, P., Chernyshev, M., Johnstone, M., Kerai, P., Ibrahim, A., Sansurooah, K., Syed, N. and Peacock, M. (2017). Future challenges for smart cities: Cyber-security and digital forensics. Digital Investigation, 11, pp.5-7.

Bajracharya, B., Cattell, D. and Khanjanasthiti, I. (2014). Challenges and Opportunities to Develop a Smart City: A Case Study of Gold Coast, Australia. 11, pp.5-10.

Bari, A., Jiang, J., Saad, W. and Jaekel, A. (2014). Challenges in the Smart Grid Applications: An Overview. International Journal of Distributed Sensor Networks, 10(2), pp.7-9.

Ben Letaifa, S. (2015). How to strategize smart cities: Revealing the SMART model. Journal of Business Research, 68(7), pp.1415-1416.

Bibri, S. and Krogstie, J. (2017). Smart sustainable cities of the future: An extensive interdisciplinary literature review. Sustainable Cities and Society, 31, pp.183-212.

Bolívar, M. (2017). Smart Cities: Big Cities, Complex Governance. Public Administration and Information Technology, 190(8).

Cassandras, C. (2016). Smart Cities as Cyber-Physical Social Systems. Engineering, 2(2), pp.157-158.

Chourabi, H., Nam, T., Walker, S., Gil-Garcia, J., Mellouli, S., Nahon, K., A. Pardo, T. and Jochen Scholl, H. (2012). Understanding Smart Cities: An Integrative Framework. 45th Hawaii International Conference on System Sciences, 9, pp.2-3.

Cocchia, A. (2014). Smart and Digital City: A Systematic Literature Review. Discover scientific knowledge at ResearchGate, 32, pp.19-20.

Edwards, L. (2016). Privacy, Security and Data Protection in Smart Cities: A Critical EU Law Perspective. SSRN Electronic Journal, 39, pp.10-17.

Elmaghraby, A. (2013). Security and privacy in the smart city. Ajman International Urban Planning Conference, 9, p.8.

Elmaghraby, A. and Losavio, M. (2014). Cyber security challenges in Smart Cities: Safety, security and privacy. Journal of Advanced Research, 5(4), pp.494-495.

Eremia, M., Toma, L. and Sanduleac, M. (2017). The Smart City Concept in the 21st Century. Procedia Engineering, 181, pp.12-19.

Ferraz, F. and Ferraz, C. (2014). Smart City Security Issues: Depicting information security issues in the role of a urban environment. 7th International Conference on Utility and Cloud Computing, 6, pp.2-3.

Hashema, I., Changb, V., Anuara, N., Adewolea, K., Yaqooba, I., Gania, A., Ahmeda, E. and Chiroma, H. (2016). The role of big data in smart city. International Journal of Information Management, 11, pp.5-6.

Meijer, A. and Bolívar, M. (2015). Governing the smart city: a review of the literature on smart urban governance. International Review of Administrative Sciences, 82(2), pp.396-397.

Mohammadi, M. and Al-Fuqaha, A. (2017). Enabling Cognitive Smart Cities Using Big Data and Machine Learning: Approaches and Challenges. IEEE Communications Magazine, 8, pp.6-7.

Monzon, A. (2015). Smart Cities Concept and Challenges: Bases for the Assessment of Smart City Projects. 4th International Conference on Smart Cities and Green ICT Systems, 11, pp.3-6.

Nam, T. and Pardo, T. (2011). Conceptualizing Smart City with Dimensions of Technology, People, and Institutions. The ACM Digital Library, 10, pp.284-285.

POPESCUL, D. and RADU, L. (2016). Data Security in Smart Cities: Challenges and Solutions. Informatica Economica, 20(1/2016), pp.34-35.

Raaijen, T. (2017). Depicting the Smarter Cities of the Future: A Systematic Literature Review & Field Study. 10, pp.2-6.

Radek Kuchta, R. (2014). Smart City Concept, Applications and Services. Journal of Telecommunications System & Management, 03(02), pp.1-2.

Van Zoonen, L. (2016). Privacy concerns in smart cities. Government Information Quarterly, 33(3), pp.472-480.

Zakaria, N. and A., J. (2015). Smart City Architecture: Vision and Challenges. International Journal of Advanced Computer Science and Applications, 6(11), pp.2-3.

Assessing the Impact of E-Service Quality on Customer Retention for E-Retailing in Malaysia

Dr. Abdullah Sarwar, Faculty of Management, Multimedia University, Cyberjaya, Selangor, Malaysia. Email: sunabdullah@gmail.com

Dr. Nurazlin Mohd. Fauzi, Faculty of Management, Multimedia University, Cyberjaya, Selangor, Malaysia. Email: nurazlin.fauzi@mmu.edu.my

Assoc. Prof. Dr. David Yong Gun Fie, Faculty of Management, Multimedia University, Cyberjaya, Malaysia. Email: gfyong@mmu.edu.my

Dr. Adedapo Oluwaseyi Ojo, Faculty of Management, Multimedia University, Cyberjaya, Malaysia. Email: ojo.adedapo@mmu.edu.my

Abstract

Customer satisfaction is one of the management's main priorities in today's business world as it leads to customer retention. To satisfy and retain the customers in the e-retailing, there is a need of offering quality services. Despite a good number of studies conducted on e-retailing in recent years, a very limited attention has paid towards e-services provided by the e-retailers in Malaysia. Keeping this in mind, this study aimed at identifying the determinants of e-service quality that may help to retain the Malaysian customers in e-retail business. This study has taken up the quantitative approach to achieve the research objectives. The survey approach helped to know the perception of the customers towards e-retailing. This study developed domains from the literature review to represent the key features of the research questions and to pose 26 the questions in a systematic manner. The study setting was in Klang Valley, Malaysia. The sample selected for this study is the customers who were willing to do e-retailing and the existing customers doing e-retailing of the products in Malaysia. Total 400 questionnaires were distributed among the respondents using random sampling technique. Structure equation modeling was employed for data analysis. This study was able to find three dimension representation of e-service quality which was found statistically significant. However, the variables were not enough to indicate the total gap of the research. Thus, this study suggests to analyze the dependent variable in future research with different other variables.

Keywords: Service quality, customer retention, E-retailing, Malaysia.

Introduction

The growth of e-commerce has created special interest among scholars to measure the e-service quality towards e-retailing (Chen, Shen, Lee & Yu, 2017; Sobihah, Mohamad, Ali & Ismail, 2015). Customer satisfaction is one of the management's main priorities in today's business world. Lee and Lin (2005) noted that customer satisfaction is a function of perceived service quality. Customer satisfaction also leads to customer retention which can be a positive move by the e-retailers and would be less costly than the customer replacement (Kim, Donald & Rao, 2009). However, to satisfy and retain the customers in the e-retailing, there is a need of offering quality services. The concept of customer satisfaction and customer retention are interrelated. Hence, it becomes essential for the e-business providers to offer better e-services to its customers that will ensure the growth of e-retailing. Kaur and Kiran (2015) found that the internet based interactive environment leads to greater level of adoption by the customers. Thus, it can be said that through providing superior e-services, customer satisfaction and customer loyalty can be enhanced. Therefore, this is very important for the commercial sector to make the e-customers to believe on the

product and the ease of use of the online service technology. Online retailers are more focusing on increasing the e-service improvement that makes e-retailing more efficient and effective for the customers.

Despite a good number of studies conducted on e-retailing in recent years (e.g. Akram & Sultan, 2014; Mekovec, Bubas & Vrcek, 2007; Ndubisi, Malhotra & Wah, 2009; Rossiter, 2007), a very limited attention has paid towards e-services provided by the e-retailers in Malaysia (Li et al., 2009). E-commerce in Malaysia is still in its early stage and is not very advanced as compared to that of the western countries (Sheng & Liu, 2010). Lack of security and reliability as well as the increasing numbers of fraud in e-retailing has limited the e-retailing industry to grow in Malaysia. Besides, little knowledge towards e-retailing among Malaysian consumers is also a reason for low adoption of e-retailing in Malaysian market (Chu, 2009). Hence, there is a need to understand e-retailer and consumer relationship to identify with of the decision making process of consumers. Keeping this in mind, this study aimed at identifying the determinants of e-service quality that may help to retain the Malaysian customers in e-retail business.

The factors that were considered in this study are information quality, website security, website reliability, e-service quality and customer retention. The main focus of this research was to seek the major factors that have high influence on the e-retailing in Malaysia. This makes the study more interesting as on e-service quality dimensions explaining e-retailing sector of Malaysia is still considered a new area for academic research.

Literature Review

The theoretical foundation of this study is based on Vroom (1964)'s "Expectancy Theory" that defines expectancy as a belief that is concerned to likelihood to follow the outcome. This is based on the idea of learning expectations of the peoples. For example, the customer believes, for a given response that is followed by the positive or negative event. Rosenberg (1986) was the first to introduce instrumentally the value model to investigate the attitude of the customers. The author further suggested that attitude is mostly influenced by beliefs of object like an action or policy for the attainment of a valued state. When an individual choose between various alternatives that have uncertainty in their outcomes, it says that behaviour is attacked not only by preference of the results, but also from the degree of belief on the results. Thus, expectancy theory is the best example to motivate the customers to do online purchasing (Lee & Lin, 2005).

Given the influence of shoppers' perceptions of quality on an online retailer's market share and profitability, the evaluation of performance quality is critical to both practitioners and researchers (Al-Hawari, 2014; Siadat, 2008). To assess it accurately, the attributes or dimensions perceived as the most important by the purchaser or recipient needs to be identified (Cronin & Taylor, 1992). In the context of online retailing, these include perceptions formed by interaction at the web site and throughout the entire purchasing experience, including web interactivity and delivery (Porter, 2001; Rolland, 2010). After the pioneer work done by Zeithaml et al (2002), quality of service in the electronic area has been explored in some depth through measures across different market sectors including e-retailing. To capture all dimensions of e-service, however, these conceptualizations must be expanded to be global level, and must take into account all aspects of the transaction including service delivery and customer support service.

Information Quality

Information quality means providing accurate information for the product or services in the website. The accurate information quality makes customers always accessible to the online service offered by online companies that can help customers to have a good image of online companies (Sobihah et al., 2015). Customers usually switch over to other companies due to lack of ease of use of online service by online companies. Consumers are helped to select products based on price rather on quality which suits best the

desire and needs of customers. Hence, higher transparency of product price and quality will increase profitability to the electronic retailers (Joia & Sanz, 2005). Posselt and Grestner (2005) indicated that the online tools such as accurate information on products, online navigation, product evaluation, and decision making towards buying products, deliveries, returns and customer support service have very high influence on the customer satisfaction and gains high positive attitude of the customers towards online shopping. Wang and Head (2001) showed that successful web based information is very critical for the e-retailing market to attract customers and deliver business function and strategy. Furthermore, this field still considered as a new field of study (Wang & Head, 2001).

E-service quality is a critical business factor for both customers and e-retailers. The main importance for e-service quality is the overall support by internet retailers and customers. If there is a gap between the retailers and customers then the business may suffers some issues. Many studies show the significance importance and effect of information reliability, understandability and awareness in terms of information quality. Amin (2016) quoted in his research that understandability includes ease of understanding and clearness of information. Since the main purpose of technical support in websites is to provide information and after-sales service, they do not emphasize online transactions. To date, few studies have explored factors that determine customers' service quality perceptions of technical support for websites. The present study, therefore, aims to fill this research gap (Chu, 2009). By identifying these e-service quality dimensions, online retailers will be able to assess their service performance (Yang, 2004). E-quality research is very complex and has produced non responsive results suggesting that more research on this area is required.

H1: Information quality of the website is having positive influence on the customer retention in e-retailing.

Website Security

Freedom from danger, risk or doubts during service process is considered as security. In terms of online purchase, most customers find this as barriers towards online shopping. Protection of personal data of customers, terms and conditions of payment and positive reputation has always been the basic idea on the research of service quality on internet. Studies by Zeithaml et al. (2002) on e-retailing context shown that e-service quality has seven dimensions including efficiency, fulfillment, reliability, and privacy and recovery of e-service quality including responsiveness, compensation and contact. Privacy and security is found to be the key factor to evaluate the online service. They are very closely related to each other. According to Al-Ajam and Md Nor (2015), there are things to be considered for the online service. First is the quality of information provided should be reliability, timely, customized, complete. There were various website security issues which stops the consumers to go for the e-retailing. Thus, security is very important to the online shopping for the customers.

Furthermore, due to lack of interaction between consumers and retailers, consumers prefer high importance to the technical aspects of online transactions as well as receiving products (Liu & Arnett, 2000). Therefore retail managers need to assess the sites including technical support of clarity, ease of use and adequate shipping options. Furthermore, measures to be taken for the website trafficking to ensure acceptable downloadable times. Besides, testing of the website needs to be done with different information system tools including testing of internet connection speeds, and system use. The interactive between customers and companies provides companies an opportunity to get information like purchase habits, needs, preferences which make the companies to provide personalized service to the customers. Personalized service can improve the customer satisfaction rather than switch over to other companies. Along with service and products, payment and delivery is also one of service process that needs to be meted by the companies on the demands of the customers.

H2: Website security of the website is having positive influence on the customer retention in e-retailing.

Reliability

Service reliability is the promises or assurance made by the providers during a service purchase. It grantees the promised services will be available during the mentioned period. Reliability in e-service quality deals with technical aspects. Parasuraman et al. (1988) explained reliability as the dimension of traditional service quality approach. Information quality must fulfils certain criteria like accuracy, timeliness, relevance and understandable by customers arising both the experience and product purchase (Al-alak, 2014; Amin, 2016;Chen et al., 2017; Kuo, 2003). The research on the reliability towards service quality has passed more than twenty years which says that it is one of the most important dimensions for all the services provided. Santos (2003) quoted that the ability to perform the promise accurately replying to the enquiries of the customers and online purchasing accuracy is the main job to explain reliability. It is very important for the providers to make sure that customers trust on the promises made by the organization towards the fulfilling of the works. Thus, exploring the contribution of e- service quality can change the customer's retention in e-retailing in Malaysia.

H3: Reliability of the website is having positive influence on the customer retention in e-retailing.

Methodology

This study has taken up the quantitative approach to achieve the research objectives. The use of quantitative is appropriate in this research because it explains a social phenomenon (Davis & Cosenza, 1993; Gray, 2004). Furthermore, Most of previous studies related to these research variables have been used quantitative approach. The survey approach helped to know the perception of the customers towards e-retailing. This study developed domains from the literature review to represent the key features of the research questions and to pose 26 the questions in a systematic manner. Pallant (2007) noted that a questionnaire should be as short as possible, constructed in clear and unambiguous language, and devoid of unwarranted assumptions on the part of the researcher. This study created questions to generate responses specific to the research problems and avoided leading questions to limit response bias. The study setting was in Klang Valley, Malaysia. The sample selected for this study is the customers who were willing to do e-retailing and the existing customers doing e-retailing of the products in Malaysia. Kothari (2004) and Sekaran and Bougie (2013) describes that for population more than 100,000, the sample size should be between 30 and 500. Accordingly, Total 400 questionnaires were distributed among the respondents using random sampling technique. Total 338 questionnaires were returned out of which 329 were found usable for further analysis. Finally, structure equation modelling was employed for data analysis.

Results and Discussion

This study was further extended by investigating on the customer's experience on e-retailing before. This investigation would seek to know the confidence level of the customers. Below are the demographic profiles of the respondents.

Table 1: Demographic profile of respondents

Gender			Age		
	Frequency	Percent		Frequency	Percent
Male	207	62.9	30 years and below	170	51.7
Female	122	37.1	31 - 40 years	132	40.1
Total	329	100	41 - 50 years	23	7
			51 years and above	4	1.2
Educational Background			Total	329	100
	Frequency	Percent			
Diploma	11	3.3			
Bachelor Degree	180	54.7			
Postgraduate	138	41.9			
Total	329	100	Monthly Income		
				Frequency	Percent
Daily Usage			RM 3,000 and below	33	10
	Frequency	Percent	RM 3,001 – RM 5,000	68	20.7
Less than 2 years	68	20.7	RM 5,001 – RM 10,000	77	23.4
2 - 6 years	199	60.5	RM 10,001 and above	115	35
Above 6 years	62	18.8	Does not apply	36	10.9
Total	329	100	Total	329	100

From the demographic results, it can be seen that out of total 329 respondents, 207 were male while the rest 122 were female. This also shows that male customers prefer e-shopping more that the female customers. In terms of age, the younger generation prefer e-shopping than the older generation as reflected in the table above. The next question asked to the respondents was regarding the internet access availability. Almost more than 80% of the respondents were having access to internet via hand phone or through internet connection or broadband. After the access of internet the next question that was asked to the respondents was regarding the internet usage in their daily activities. The response was quite positivistic as majority of the respondents use internet of more than 5 hours daily. This shows the importance of internet in their daily life. Rest of the category also explained in the above table.

Reliability Test

The reliability test was performed using the Cronbach's alpha test. It achieved an overall alpha value of .831. It seems very reliable as mentioned by Hair et al. (2010) who mentioned that a minimum alpha value of 0.70 is required to be reliable.

Structure Equation Modeling

Finally, SEM was conducted to find out the structural relationship among the variables of the study. The measurement model shows that it explained total 69.71% of the total variances. Furthermore, none of the five variables are highly correlated which proofs that all the five variables are independent to each other. The path relationships are shown in the figure 1 below.

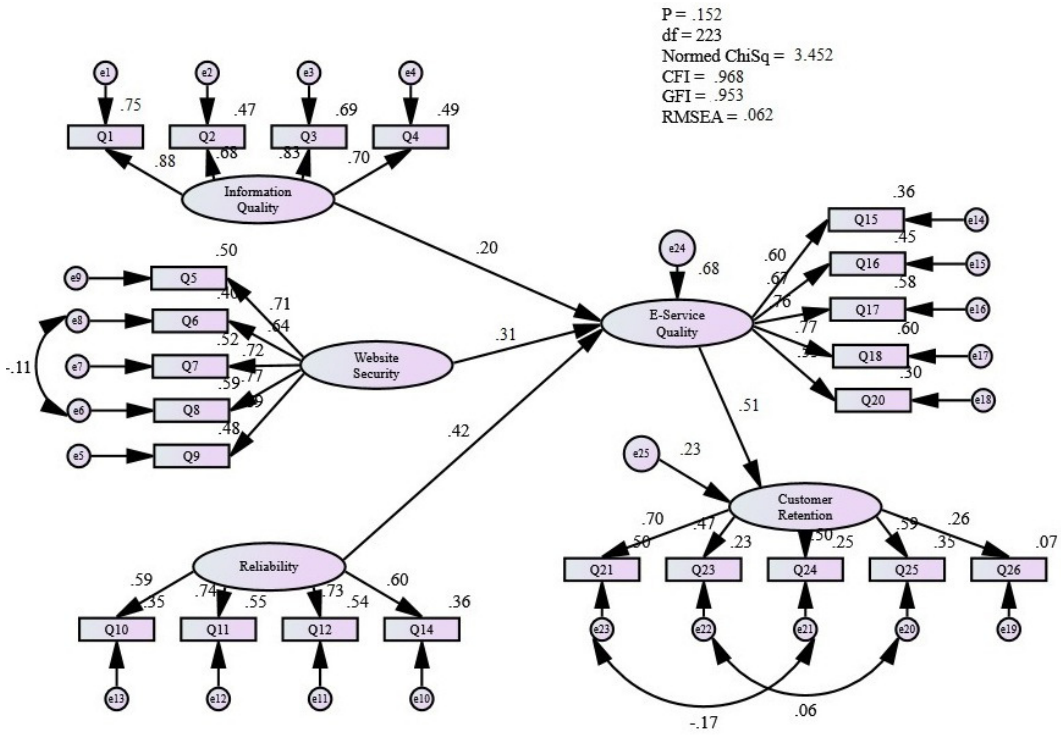


Fig. 1: Structural Model of the Study

Hypothesis Testing

From the coefficient analysis, it can be seen that the reliability and the website security plays significant role in enhancing retention of the customers to adopt e-retailing and make easy online transactions. From the findings, it seems that the information quality of the products and the transaction information are very important in order to increase the online purchase increase and marketing by the producers. In the above figure, we can see the significant level of all the three independent variables is having high path values and have statistical significance of less than 0.01. The figure also shows high correlation between information quality and e-retailing from all the other independent variables. Thus, it proofs that there is a strong relation exists between all the independent and dependent variables.

Table 2: Final Output

			Estimate	S.E.	C.R.	P
E-Service Quality	<---	Information Quality	.201	.092	2.184	.001
E-Service Quality	<---	Website Security	.314	.040	7.850	.001
E-Service Quality	<---	Reliability	.423	.091	4.644	.001
Customer Retention	<---	E-Service Quality	.512	.045	11.378	.001

For H1, there is a total influence of 20.1% of the independent variable information quality on the dependent variable customer retention on e-retailing in Malaysia. For H2, the analysis found that there was in total 31.4% of influence on the customer retention for e-retailing in Malaysia. For H3, in total there was 42.3% of influence of service reliability on the customer retention for e-retailing in Malaysia. By using the empirical model through SEM analysis, we have noticed that the service reliability on the retail product is the main factor to watch for an increase in the customer retention on e-retailing. These findings are also supported by the past studies (e.g. Aksoy, 2014; Al-Ajam & Md Nor, 2015; Al-alak, 2014; Amin, 2016; Chen et al., 2017; Kim et al., 2009; Kuo, 2003; Liu & Arnett, 2000; Park & Kim, 2003) who have noted that the quality of information availability needs to be speculated and demonstrated at every moment which will help the customer to make a decision on online purchasing.

From the analysis it was found that all the factors are having positive relationship with the customer intention of e-retailing. That means all the factors are playing there part for enhancing the retail business in Malaysia with an influence of having great impact on the minds of customers. From the analysis the main contribution was fulfilled by the Information quality factor and Service reliability factor. This shows a positive relation between Information qualities with the Customer retention on e-retailing in Malaysia. Findings also show that when there is an increase of one unit in the information quality, then there is an increase of around 20.1% in the customer retention on e-retailing in Malaysia.

Conclusion and Recommendation

In contrast to the previous studies it was found that the information quality was having less influence on the customer retention on e-retailing. Thus it is highly recommended to investigate in deep on this result accuracy. This study able to find three dimension representation of e-service quality. Chen et al. (2017) had quoted that customers prefers to multiple channel of transactions to execute most transactions over website. The variables were not enough to indicate the total gap of the research. Thus it is necessary to analyze the dependent variable in future research with different variables. However, no study is beyond limitation. There are various other factors affecting the customer retention on e-retailing in Malaysia which were not included in this research. Thus only 69.71% of the influence was explained by the variables and the rest of 20% were still remains to evaluate.

It was known from the current research that there are various other factors which affect the customer's retention in Malaysia, thus it is highly suggested to include these variables in the further research. It is also highly suggested to know the key areas that have high effect on customer retention on e-retailing have to look to increase the customer's importance on the retail products in Malaysia. There must be involvement of the other factors like user friendliness, Efficiency, Site organization and several others as a variable in the further research. Retail firms should look upon the improvement on the products and service quality to increase the value of the product in customer's retention.

References

Akram, M. A. J., & Sultan, P. (2014). Banking service quality in the Middle Eastern countries. *International Journal of Bank Marketing, 32*(7), 688-700.

Aksoy, L. (2014). Linking satisfaction to share of deposits: an application of the wallet allocation rule. *International Journal of Bank Marketing, 32*(1), 28-42.

Al-Ajam, A. S., & Md Nor, K. (2015). Challenges of adoption of internet banking service in Yemen. *International Journal of Bank Marketing, 33*(2), 178-194.

Al-alak, B.A. (2014). Impact of marketing activities on relationship quality in the Malaysian banking sector. *Journal of Retailing and Consumer Services, 21*(3), 347-356.

Al-Hawari, M.A.A. (2014). Does customer sociability matter? Differences in e-quality, e-satisfaction, and e-loyalty between introvert and extravert online banking users. *Journal of Services Marketing, 28*(7), 538-546.

Amin, M. (2016). Internet banking service quality and its implication on e-customer satisfaction and e-customer loyalty. *International Journal of Bank Marketing, 34*(3), 280-306.

Chen, Y. C., Shen, Y. C., Lee, C. T. Y., & Yu, F. K. (2017). Measuring quality variations in e-service. *Journal of Service Theory and Practice, 27*(2), 427-452.

Chu, P. Y. (2009). Determinants of the Service Quality of Technical Support Web Sites: An Empirical Study of IT Companies in Taiwan. *International Journal of Business and Information, 4*(1), 119-124.

Cronin, J. J., & Taylor, S. A. (1992). Measuring service quality: A re-examination and extension. *Journal of Marketing, 56*, 55-68.

Davis, D., & Cosenza, R. M. (1993). *Business Research for Decision Making* (3rd ed.). Belmont: Wadsworth Publishing.

Gray, D. E. (2004). *Doing Research in the Real World*. California, Thousand Oaks: SAGE Publications, Inc.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate Data Analysis: A Global Perspective* (7th Global edn.). Upper Saddle River: Pearson Prentice-Hall.

Joia, L. A., & Sanz, P. (2005). The hidden value of sporadic customers in e-retailing an empirical investigation. *Internet Research, 15*(1), 7-20.

Kaur, N., & Kiran, R. (2015). E-Banking Service Quality and Customer Loyalty: Changing Dynamics of Public, Private and Foreign Bank Consumers in India. *Global Business and Management Research: An International Journal, 7*(1), 74-92.

Kim, D. J., Donald, L. F., & Rao, R. H. (2009). Trust and Satisfaction, Two Stepping Stones for Success E-commerce Relationship: A Longitudinal Exploration. *Information System Research, 20*(2), 237-257.

Kothari, C. R. (2004). *Research Methodology: Methods and Techniques* (2nd edn.). New Delhi: New Age International Publishers.

Kuo, Y. F. (2003). A study on service quality of virtual community web sites. *Total Quality Management, 14*(4), 461-473.

Lee, G. G., & Lin, H. F. (2005). Customer perceptions of e-service quality in online shopping. *International Journal of Retail & Distribution Management, 33*(2), 161-176.

Li, P., Hongxiu, L., Yong, S. R. (2009). *Measurement of Eservice Quality: An Empirical Study on Online Travel Service*. Paper presented at the 17th European Conference on Information Systems, 8-10 June, Verona, Italy (1-13).

Liu, C., & Arnett, K. P. (2000). Exploring the factors associated with web site success in the context of electronic commerce. *Information and Management, 38*(1), 23-33.

Mekovec, R., Bubas, G., & Vrcek, N. (2007). A Method for Improvement of Objectivity of E-Service Quality Evaluation. *Journal of Information and Organizational Sciences, 31*(2), 15-27.

Ndubisi, N., Malhotra, N., & Wah, C. (2009). Relationship marketing, Customer satisfaction and loyalty: a Theoretical and Empirical Analysis from an Asian Perspective. *Journal of International Consumer marketing, 21*(1), 5-16.

Pallant, J. (2007). *SPSS Survival Manual: A Step by Step Guide to Data Analysis using SPSS for Windows* (3rd edn). Berkshire: Open University Press, McGraw-Hill.

Parasuraman, A., Zeithaml, V. A. and Berry, L. L. (1988). SERVQUAL: A multiple item scale for measuring customer perceptions of service quality. *Journal of Retailing, 64*(1), 12-40.

Park, C., & Kim, Y. (2003). Identifying Key Factors Affecting Consumer Purchase Behavior in an Online Shopping Context. *International Journal of Retail & Distribution Management, 31*(1), 16-29.

Porter, M. (2001). Strategy and the Internet. *Harvard Business Review, 79*(3), 62-79.

Posselt, T., & Gerstner, E. (2005). Pre-sale vs. post-sale e-satisfaction: Impact on repurchase intention and overall satisfaction. *Journal of Interactive Marketing, 19*(4), 35-47.

Rolland, S. (2010). A new measure of e-service quality in France. *International Journal of Retail & Distribution Management, 38*(7), 497-517.

Rosenberg, (1986). Self concept from middle childhood through adolescence. *Psychological perspectives on the self, 3*, 107-135.

Rossiter, J. R. (2007). Toward a Valid Measure of E-Retailing Service Quality. *Journal of Theoretical and Applied Electronic Commerce Research, 2*(3), 36-48.

Santos, J. (2003). E service quality, a model of virtual service quality dimensions management. *Service Quality, 13*(3), 233-246.

Sekaran, U., & Bougie, R. (2010). *Research methods for business: a skill-building approach* (6th eds.). Haddington: John Wiley & Sons.

Sheng, T., & Liu, C. (2010). An empirical study on the effect of e-service quality on online customer satisfaction and loyalty. Nankai Business Review International, 1(3), 273-283.

Siadat, S. H. (2008). *Measuring Service Quality Using Servqual Model: Case Study-Retailing in Iran*. Retrieved from www.eprints.utm.my/.../.pdf.

Sobihah, M., Mohamad, M., Ali, N. A. M., & Ismail, W. Z. W. (2015). E-Commerce Service Quality on Customer Satisfaction, Belief and Loyalty: A Proposal. *Mediterranean Journal of Social Sciences, 6*(2), 260-266.

Vroom, V. (1964). *Work and motivation*. New York: Wiley.

Wang, F., & Head, M. M. (2001). A model for Web-based information systems in e-retailing, Internet Research. *Electronic Networking Applications and Policy, 11*(4), 310-321.

Yang, Z. (2004). Online service quality dimensions and their relationships with satisfaction. *International Journal of Service Industry Management, 15*(3), 302-326.

Zeithaml, V. A., Parasuraman, A., & Malhotra, A. (2002). Service quality delivery through web sites: A critical review of extent knowledge. *Journal of the Academy of Marketing Science, 30*(4), 362-375.

L'impact Des Conditions Climatiques Et Bioclimatiques Sur L'efficience De La Culture De La Vigne Et La Production Des Raisins Dans La Région Des Collines Des Subcarpates De Vrancea, Roumanie

Elena Grigore, Université de Bucarest, Faculté de Géographie, Roumanie, ela_zigzag@hotmail.com;

Dana Maria (Oprea) Constantin, Université de Bucarest, Faculté de Géographie, Roumanie, danamartines@yahoo.com;

Elena Bogan, Université de Bucarest, Faculté de Géographie, Roumanie, elena.bogan@yahoo.com;

Tamara Simon, l'Institute National de Recherche-Developpement en Tourisme, Bucharest, Roumanie, tami_simon2003@yahoo.com;

Irina-Adriana Chiurciu, Université de Sciences Agronomiques et de Médecine Vétérinaire de Bucarest, Roumanie, irina.chiurciu@yahoo.ro;

Elena Soare, Université de Sciences Agronomiques et de Médecine Vétérinaire de Bucarest, Roumanie, soare.elenausamv@gmail.com;

Dan Vasile Ardelian, Administration Nationale des Pénitenciers - EOS, Roumanie, dan.ardelian@gmail.com.

Résumé

Le système relationnel développé par une culture agricole et les différentes expressions scientifiques qui visent l'impact des conditions naturelles, techniques et économiques sont utiles pour identifier les facteurs limitatifs quantitatifs et qualitatifs qui peuvent affecter ce genre de culture.

Cette étude analyse la manière dans laquelle certains facteurs climatiques (radiation solaire, température et humidité) influencent le développement de la vigne dans l'un des plus importants périmètres viticoles de la Roumanie – les Subcarpates de la région de Vrancea, et plus précisément les vignobles de Panciu, Odobeşti et Coteşti, où les surfaces cultivées avec des catégories de raisins de table couvrent 20% de la région et les surfaces avec des cépages pour le vin couvrent 80%.

Dans ce but, nous avons utilisé les données climatologiques provenant de quatre stations météorologiques de la région - Adjud, Tulnici, Odobeşti et Râmnicu Sărat, pour la période 1965–2015. L'analyse quantitative des importants paramètres et indices agro-climatiques (le coefficient des précipitations, l'indice hydro-thermique, le coefficient hydro-thermique Seleaninov etc.) relève que la valorisation de l'interférence des facteurs climatiques qui influencent la qualité et la quantité de la production peut constituer un important critère pour choisir l'emplacement des périmètres viticoles et les solutions techniques adéquates.

Mots-clés : température, précipitations, indices climatiques, vigne, Subcarpates de Vrancea.

Introduction

Les exigences climatiques et bioclimatiques participent activement à la croissance et au développement des cultures agricoles, influençant dans des proportions différentes les processus physiques, chimiques et

biologiques, la qualité et la productivité agricoles. Les facteurs climatiques deviennent pour les cultures les principaux facteurs restrictifs d'ordre qualitatif, qui, par leur variation annuelle, deviennent des facteurs décisifs pour leur réussite car le cycle biologique dépend des facteurs.

La vigne est une culture multi-annuelle avec des certaines particularités de croissance et fructification, adaptable aux conditions de l'environnement a attiré l'attention des agriculteurs dans les pays où les conditions climatiques correspondent aux besoins biologiques de la vigne, qui peut être cultivée sur cinq continents, étant une culture économique spécifique aux climats tempérés, sous-tropicaux et tropicaux, la majorité se trouvent entre les parallèles de 30° et 50°, dans le nord aussi que dans le sud (récemment on a trouvé ces cultures à une latitude de 10°, dans des pays comme le Brésil, la Colombie et le Pérou).

Le réchauffement global produit des fréquents dérèglements des écosystèmes agricoles (Cornelis van Leeuwen et Philippe Darriet, 2016). Les chercheurs Kenny et Harrison ont signalé depuis 1992 que ce réchauffement peut être bénéfique aux cultures de vigne dans le nord, et désavantageux pour les plantations dans le sud. La culture de vigne doit adapter ses cycles annuels de végétation, ce qui affecte la quantité et la qualité de la production de raisins. L'influence climatique a été étudiée maintes fois car le climat est celui qui conditionnent le déclanchement des phénophases et le métabolisme de la vigne qui, avec d'autres facteurs édaphiques (Duchêne et Schneider, 2005), influencent la croissance et la fructification de la culture, la quantité et la qualité des raisins, la densité et la durée de vie de la plantation, la résistance aux maladies, sécheresse, la gelée etc.

L'impact de la variabilité climatique sur la croissance et le développement des cultures agricoles se quantifie par le potentiel des paramètres météorologiques. La production agricole étant dépendante des conditions de l'environnement naturel, dont les facteurs climatiques jouent un rôle dominant (Gerós et al., 2015).

À partir de ces hypothèses, cette étude analyse la manière dont certains facteurs climatiques dans un périmètre sous une évidente influence des foehns en Roumanie – les Subcarpates de Vrancea. Ces caractéristiques influencent l'extension des vignes dans l'un des plus importants périmètres viticoles de la Roumanie, qui consiste des vignobles de Panciu, Odobeşti et Coteşti.

Région d'étude et données utilisées

Les Subcarpates de Vrancea sont situés dans l'est de la Roumanie, constituant une sous-unité des Subcarpates de Courbure entre les vallées de Trotuş et Slănic, dominés à l'ouest par les Carpates Orientales et à l'est, ils font la transition, tantôt lente et tantôt brusque, vers la Plaine du Siret (Ielenicz et al., 2003) (figure no.1).

Leur complexité structurale, l'alignement approximativement parallèle des dépressions et des collines avec les rangées des montagnes, la fréquence des foehns, le réseau hydrographique transversal (IG, 1992) créent des conditions favorables à la culture des vignes, qui a une ancienne tradition dans ce périmètre, des temps des Gètes et des Daces.

Pour aboutir aux objectifs et finaliser cette étude, nous nous somme basés sur l'existence et l'exploitation des données météorologiques et statistiques, des connexions de données qui ont assuré une analyse qualitative et quantitative.

L'analyse quantitative des principaux facteurs climatiques (température de l'air, les précipitations atmosphériques, le vent etc.) et l'évaluation de la relation entre le climat et la culture de la vigne est basée sur des observations et des déterminations météorologiques et le traitement des données enregistrées dans les stations météorologiques locales – Tulnici, Adjud, Odobeşti şi Râmnicu Sărat (figure no.1), entre 1965–2015, et des informations agro-météorologiques provenant de l'Administration Nationale de

Météorologie (ANM). Les quatre stations météorologiques sont représentatives pour le périmètre analysé par leur position géographique et la différence d'altitude (figure no.1).

La base de données climatiques a été enrichie avec les valeurs calculées des indices agro-climatiques, calcules possibles avec les données climatologiques des quatre stations météorologiques. Nous avons fait une analyse quantitative des indices agro-climatiques importants - l'indice de Mayr, le coefficient des précipitations, l'indice hydro-thermique, le coefficient hydro-thermique Seleaninov et l'indice bioclimatique de la vigne, qui met en évidence le degré de favorabilité climatique du périmètre analysé pour la culture des vignes (tableau no. 1).

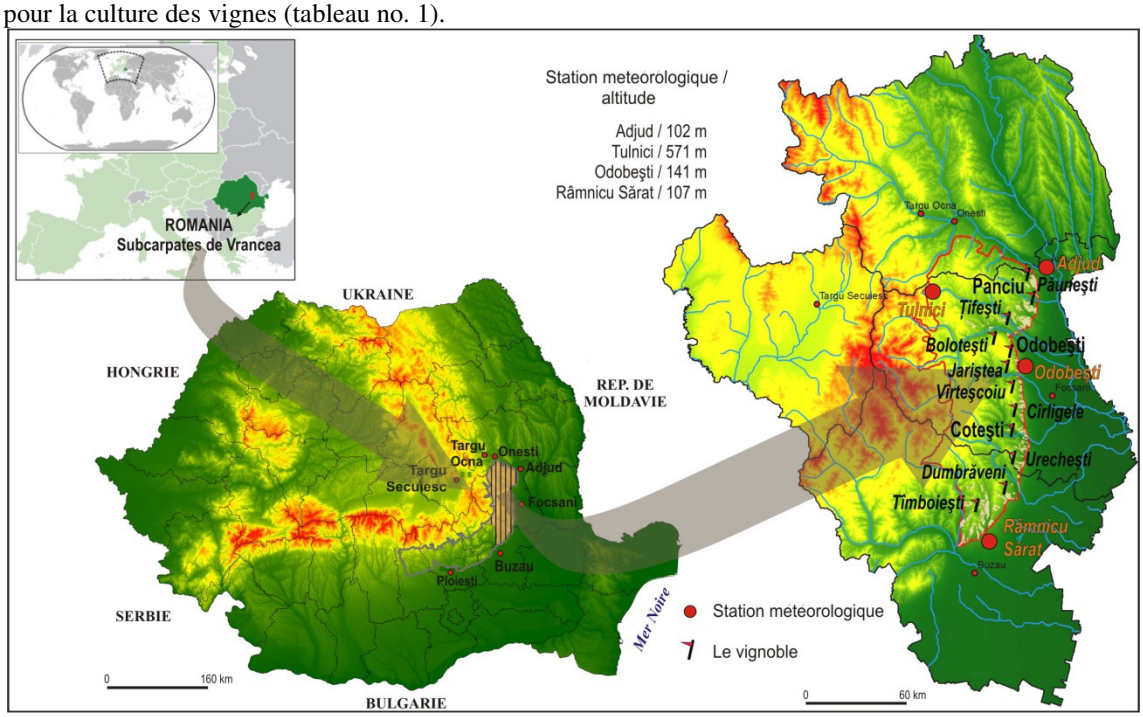


Figure 1 : Localisation géographique des Subcarpates de Vrancea en Roumanie et en Europe (à gauche) et emplacement des stations météorologiques dans les Subcarpates de Vrancea (à droite)
Source: les auteurs

Tableau: Indices agro-climatiques –caractéristiques

L'indice de Mayr	°C	est calculé comme moyenne des valeurs de température des mois de mai, juin, juillet et août
Le coefficient des précipitations	mm	Cp = P/Nzv; représente le rapport entre la quantité annuelle des précipitations et le nombre des jours de végétation
L'indice hydro-thermique	unités	Iht = (T·P/100)·k1·k2 (Teaci, 1980) ; est un indice qui résulté du produit entre la température moyenne annuelle de l'air et la quantité annuelle des précipitations, rapporté à 100, et multiplié par les coefficients de correction k1 et k2 pour les zones à fréquences différentes des mois de sècheresse, et pour les zones à température moyenne négative
Le coefficient hydro-thermique Seleaninov	mm/°C	CH = (∑mm/∑t°a)·10 où: CH – coefficient hydro-thermique Seleaninov; ∑mm – quantité annuelle des précipitations; ∑t°a – somme annuelle des températures actives; 10 – constante; est utilisé pour la caractérisation hydro-thermique
L'indice bioclimatique de la vigne	unités	Ibcv = (Ct·Ci)/(Cp·10) rapport entre le produit du coefficient thermique (Ct) et le coefficient d'insolation (Ci) et le produit obtenu par la multiplication de 10 fois du coefficient des précipitations (Cp) (Constantinescu et al., 1964)

L'interprétation statistique a été faite à base des informations fournies par l'Institut National de Statistique (INS) et des données fournies par la Direction pour Agriculture du département de Vrancea (surface cultivée, production réalisée pour chaque variété cultivée etc.).

Les méthodes utilisées dans l'analyse, l'interprétation et la représentation des données météorologiques sont les méthodes classiques, des analyses logiques, spatiales et comparatives, complétées par des méthodes modernes comme des opérations Corel Draw, Microsoft Office Excel, GIS. En plus, nous avons la recherche bibliographique et les observations dans le terrain.

Résultats Et Discussions

Le désir des producteurs d'avoir des récoltes de qualité qui correspondent à la direction de production dans des conditions d'efficience économique implique le respect des conditions de sécurité et amélioration des technologies de culture (protection, irrigation, travaux et opérations en vert, éliminations etc.) car les besoins des plantations différent d'un an à l'autre, et d'une phase de végétation à l'autre.

Dans la zone analysée, Subcarpates de Vrancea, sont l'un des plus importants périmètres viticoles de la Roumanie qui consistent des vignobles de Panciu, Odobeşti et Coteşti (une surface total de plus de 32.600 ha) (figure no.1). Par exemple, en 2015, de la surface totale de 224 100 ha cultivés avec des vignes en Roumanie (INS, 2016), 32610 ha appartenaient aux Subcarpates de Vrancea (DAJ Vrancea, 2016), ce qui représente 14,5 % de la surface totale. La Roumanie se situe ainsi sur la 10ème place dans le monde et la 5ème en Europe, étant une région viticole importante.

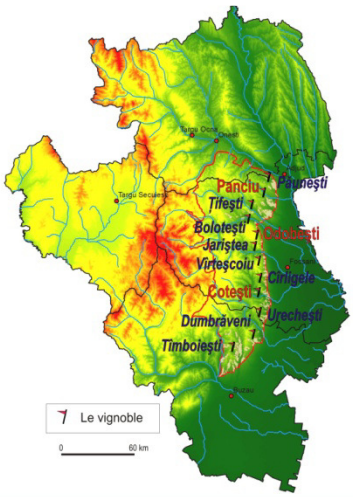
Le vignoble de Panciu (une surface de 9701 ha) est l'un des plus anciens de Roumanie, datent de la fin du 16ème siècle, un nom respecté parmi les producteurs de vins mousseux et inclut trois centres viticoles d'importance nationale: Panciu, Ţifeşti et Păuneşti.

Le vignoble d'Odobeşti (une surface de plus de 7792 ha) avec les centres: Odobeşti, Jariştea, Boloteşti se caractérise par une grande répartition de la marque *Galbena de Odobeşti*, qui trouve ici les conditions pédoclimatiques optimales, un symbole étant données ses caractéristiques organoleptiques spécifiques, est encadré, en fonction du périmètre de production, soit dans la catégorie de qualité supérieure, soit dans la catégorie des vins de consommation courante. Parmi les vins de cette zone viticole, la *Plăvaia* (marque autorisée) qui fait partie de cette catégorie depuis longtemps, est un vin de consommation courante.

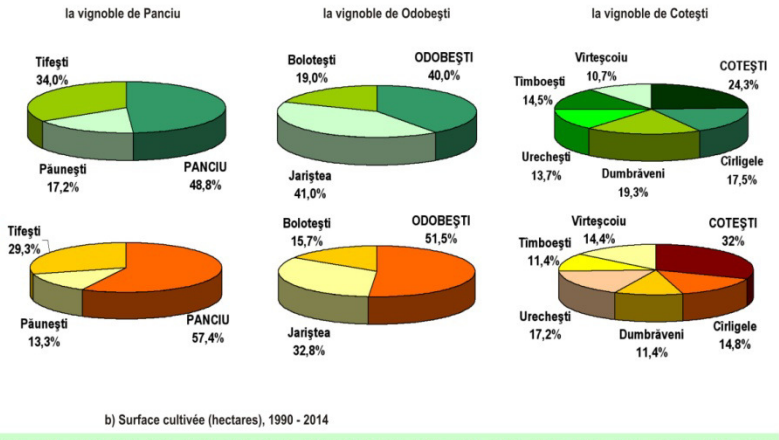
Le vignoble de Coteşti (une surface de plus de 15117 ha) ayant une histoire de 600 ans, formé par les centres de Coteşti, Vîrteşcoiu, Cîrligele, Urecheşti, Dumbrăveni et Tîmboieşti, se fait remarquer par une production à part des vins parfumés et équilibrés de la variété Fetească grâce aux conditions climatiques, et par un vin avec un bouquet à part, une arome de rose de confiture obtenue de la variété locale *Şarbă*. Les variétés cultivées dans la région sont conformes avec les variétés stipulées par la Loi de la vigne et du vin dans le système de l'organisation commune du marché de la vigne et du vin no 244/2002.

En ce qui concerne la surface cultivée, la centralisation statistique du Figure 2 indique une croissance de la surface cultivée avec la vigne à partir de l'an 2010. Croissance signifiante dans le cas des vignobles de Panciu et Coteşti, où la surface est devenue double, de 4874 ha à 9644 ha, et de 7867 ha à 15374 ha, tandis que dans le cas du vignoble de Odobeşti, la croissance a été d'environ 3800 ha. Cette croissance a été possible après une période où la surface cultivée a été en baisse. En Roumanie, la viticulture est un secteur de l'agriculture d'un niveau de productivité conforme aux normes de l'UE, car l'encadrement des zones viticoles dans les zones viticoles de l'UE a été possible à base des études faites par les institutions roumaines autorisées par l'état.

Les producteurs dans cette région analysée, pour assurer la sécurité de la production des vins d'origine contrôlée, respectent, d'abord, le régime d'autorisation concernant le respect des conditions de culture, des normes techniques de production et de commercialisation élaborées par l'Office National des Dénominations d'Origine des Vins (ONDOV) et l'Office National de la Vigne et du Vin (ONVV). Ils ont aussi choisi un système de Management de la Qualité et la Sécurité des Aliments conforme aux exigences du système d'assurance de la sécurité des produits alimentaires HACCP, élaboré à partir de la Directive du Conseil de la Communauté Européenne no 93/43/EEC/14.06.1993, Ordre du Ministère de la santé no 1956/1995, les standards SR EN ISO9001:2008, SR EN ISO 22000:2005, car ils veulent fournir aux consommateurs des produits surs et de qualité, et ils adoptent une politique appliquée adéquate, efficiente, efficace et d'améliorer la responsabilité conformément aux mesures établies.



a) Surface cultivée (%) et production de raisin (%), 1990 - 2014



b) Surface cultivée (hectares), 1990 - 2014

le vignoble de Panciu	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
PANCIU	2556	2556	2511	2511	2482	2482	2478	2467	2457	2457	2422	2452	2448	2444	2444	2403	2403	2403	2403	2403	4741	4741	4605	4705	4805
Păunești	852	907	907	885	1035	1035	1005	999	825	825	824	823	822	822	822	822	822	822	822	822	1644	1644	1644	1644	1632
Tifeşti	1862	1862	1820	1820	1692	1692	1690	1690	1690	1690	1662	1669	1656	1649	1649	1649	1649	1649	1649	1649	3259	3259	3288	3288	3264
total - hectares	**5270**	**5325**	**5238**	**5216**	**5209**	**5209**	**5173**	**5156**	**4972**	**4972**	**4908**	**4944**	**4926**	**4915**	**4915**	**4874**	**4874**	**4874**	**4874**	**4874**	**9644**	**9644**	**9537**	**9637**	**9701**

le vignoble de Odobeşti	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
ODOBEŞTI	1880	1880	1880	1888	1862	1862	1855	1856	1838	1830	1735	1705	1688	1675	1674	1669	1668	1668	1668	1668	3273	3273	2973	3073	3086
Jariştea	2061	2061	2037	2018	1858	1858	1765	1759	1794	1794	1718	1701	1696	1686	1686	1685	1685	1685	1685	1685	3308	3308	3260	3260	3299
Bolotești	908	1007	904	904	856	856	856	856	856	856	852	850	843	834	835	835	835	835	704	741	1405	1405	1467	1467	1407
total - hectares	**4849**	**4948**	**4821**	**4810**	**4576**	**4576**	**4476**	**4471**	**4488**	**4480**	**4305**	**4256**	**4227**	**4195**	**4195**	**4189**	**4188**	**4188**	**4057**	**4094**	**7986**	**7986**	**7700**	**7800**	**7792**

le vignoble de Coteşti	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
COTEŞTI	2243	2243	2245	2245	2258	2232	2231	2231	2174	2173	1997	2001	1993	1981	1981	1978	1975	1975	1975	1975	3907	3907	3947	4047	3638
Cirligele	1612	1612	1585	1531	1554	1544	1544	1544	1555	1557	1531	1488	1483	1473	1473	1465	1465	1464	1464	1464	2818	2710	2875	2875	2875
Virteşcoiu	1755	1755	1739	1721	1645	1645	1645	1644	1705	1705	1668	1649	1645	1640	1640	1640	1638	1638	1638	1638	3206	3206	3138	3138	3035
Urecheşti	1720	1720	1580	1580	1561	1561	1556	1554	1533	1535	1533	1529	1525	852	852	852	851	851	851	851	1686	1686	1700	1700	1674
Dumbrăveni	1242	1242	1219	1219	1226	1215	1215	1214	1231	1230	1221	1219	1217	1213	1211	1210	1253	1253	1253	1253	2445	2445	2486	2486	2436
Timboeşti	1090	1090	1016	1016	1227	1227	1227	1227	1042	1042	1039	1037	1035	1032	687	686	686	686	686	686	1312	1312	1371	1371	1459
total - hectares	**9662**	**9662**	**9384**	**9312**	**9471**	**9424**	**9418**	**9414**	**9240**	**9242**	**8989**	**8923**	**8898**	**8191**	**7844**	**7831**	**7868**	**7867**	**7867**	**7867**	**15374**	**15266**	**15517**	**15617**	**15117**

c) Production de raisin (tonnes), 2001 - 2014

le vignoble de Panciu	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
PANCIU	21524	28155	17031	35320	12453	32528	31149	25990	11185	30739	29991	11642	17534	12606
Păunești	2672	5396	619	5300	5400	9432	8250	7781	3999	6707	3213	2884	9325	3006
Tifeşti	10986	13540	2668	11820	8993	13459	10425	17938	4127	18031	15922	11624	14483	7181
total annuel - tonnes	**35182**	**47091**	**20318**	**52440**	**26846**	**55419**	**49824**	**51709**	**19311**	**55477**	**49126**	**26150**	**41342**	**22793**

le vignoble de Odobeşti	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
ODOBEŞTI	20852	19230	12551	22899	7301	34208	30725	20166	1591	14844	18936	9611	15943	6985
Jariştea	10855	12327	3774	10000	7807	12357	10546	15549	4119	13221	14311	12597	15575	7503
Bolotești	2876	2700	4055	5880	4284	7772	8469	4490	1372	6685	6555	6375	7169	2529
total annuel - tonnes	**34583**	**34257**	**20380**	**38779**	**19392**	**54337**	**49740**	**40205**	**7082**	**34750**	**39802**	**28583**	**38687**	**17017**

le vignoble de Coteşti	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
COTEŞTI	26114	27417	14605	31896	11973	30834	28215	18774	8875	18286	19352	13309	16372	8658
Cirligele	6223	8194	3738	6412	7484	9411	9176	15896	6062	14244	15181	10916	12654	6544
Dumbrăveni	6003	6916	4133	6016	5675	6932	9886	11008	5885	7453	9337	6945	7998	7708
Urecheşti	7583	10028	2753	5051	5796	17677	13660	18168	10987	17961	15330	11803	12827	3874
Timboeşti	4585	9215	6100	5680	5685	9227	5260	10420	5120	6340	9186	7233	11007	7167
Virteşcoiu	4126	3949	3170	7578	6641	7889	7559	15699	5332	15522	15972	9279	15773	6910
total annuel - tonnes	**54634**	**65719**	**34499**	**62633**	**43254**	**81970**	**73756**	**89965**	**42261**	**79806**	**84358**	**59485**	**76631**	**40861**

Figure 2 : Evolution des surfaces cultivées avec la vigne (ha) et dynamique de la production de raisins (tonnes) entre 1990-2014

Source: les auteurs et données traitées selon l'INS, 2016

Dans le domaine spécifique du vignoble des Subcarpates de Vrancea, qui consistent des vignobles de Panciu, Odobeşti et Coteşti, catégories des raisins de table détiennent 20%, et les cépages pour le vin

détiennent 80%. Les principales catégories cultivées ont aussi une grande valeur commerciale: *Chasselas Dore, Fetească Regală, Merlot, Băbească Neagră, Treminer, Pinot Gris, Galbena de Odobeşti, Fetesca Albă et Riesling Italian*. En ce qui concerne la production annuelle de raisins, on voit de variations signifiantes d'un an à l'autre dans tous les 12 vignobles identifiées dans la région étudiée. En général, les hausses et les baisses des productions annuelles varient entre 5.000 t et 30.000 t. Sauf le vignoble de Panciu où la production annuelle a une oscillation annuelle relativement réduite entre 2006–2008. Dans la période analysé, les productions ont varié entre 19.000 t et 55.500 t - Panciu, de 7.000 t à 50.000 t - Odobeşti et de 34.500 t à 90.000 t - Coteşti (figure no.2).

Maintes vins obtenus dans ces vignobles ont reçu des médailles aux compétitions nationales et internationales dans le domaine: le produit *Fetească regală* – an de récolte 1998, le vignoble de Panciu, médaille Maque d'Or au concours Salon international du vin „Casa Vinului"; produit *Şarba* – an de récolte 2002, le vignoble d'Odobeşti, médaille de bronze au Concours international OIV édition 2004; produits *Galbena de Odobeşti* et *Cabernet Sauvignon* – an de récolte 2000, le vignoble d'Odobeşti, médaille Marque d'Or au Salon Alcorom 2005 etc. (ONVPV, 2015). Le plus récent succès a été enregistré à la 14ème édition de International Wine Contest Bucharest IWCB – 2017, le plus grand concours des vins de l'Europe de l'Est, où les vins de cette région ont remporté trois médailles d'or (ONVPV, 2017).

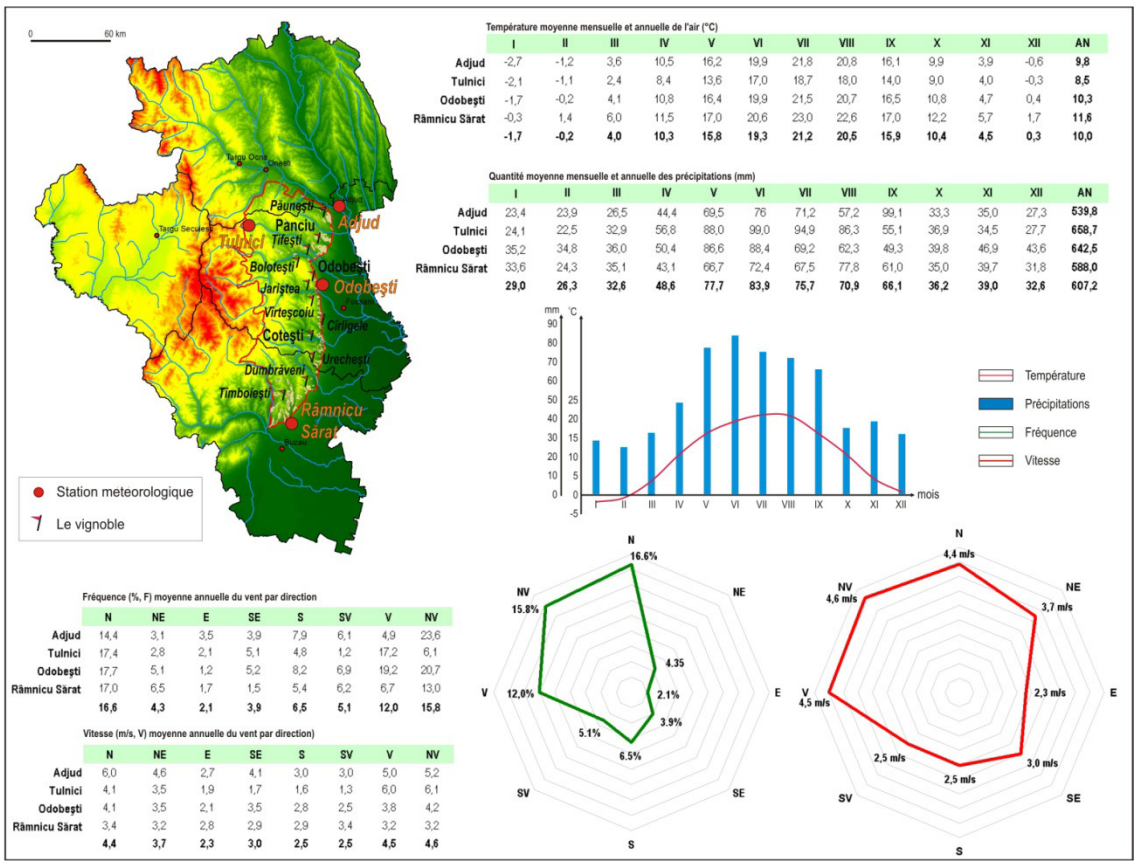
Du point de vue **climatique** les Subcarpates de Vrancea se caractérisent par une circulation atmosphérique générale dans laquelle prédominent les composantes occidentale et polaire. Le rôle orographique des Carpates Orientales se rajoute, ce qui détermine l'ascendance forcée des masses d'air humide, de l'ouest, sur les pentes des montagnes, pour favoriser la descendance sur les pentes orientales, abritées, vers les Subcarpates de Vrancea, à des caractéristiques nouvelles – des foehns. Les Subcarpates de Vrancea disposent d'un apport moyen annuel de radiation globale d'environ 120 – 122,5 kcal/cm^2 (IG, 1979) et la plus grande durée de l'ensoleillement de l'entière région des Subcarpates, de 2144,4 heures/an à Odobeşti (IG, 1992). Ces particularités des Subcarpates de Vrancea la fréquence des foehns et un grand nombre d'heures d'insolation ont une signification à part pour la culture des vignes, qui est une plante prétentieuse en ce qui concerne la lumière et la chaleur (Berbecel et al., 1970).

La température de l'air détermine et influence les processus vitaux de la plante, marquant le début ou la fin d'une phénophase, Sa sensibilité, pendant les premières phases de végétation, est plus grande à la température de l'air par rapport à l'humidité (Huglin et al., 1998). Les Subcarpates de Vrancea se caractérisent par une température moyenne multiannuelle de 8,5°C à Tulnici et 11,6°C à Râmnicu Sărat, pour la période 1965 – 2015 (figure no.3).

Dans le régime annuel de la température de l'air, la température minimale enregistrée aux quatre stations en janvier est -2,7°C à Adjud et -0,3°C à Râmnicu Sărat. De plus, dans les mois d'hiver, les inversions thermiques sont moins fréquentes dans le périmètre des Subcarpates de Vrancea. Les plus grandes valeurs moyennes mensuelles multiannuelles sont enregistrées au mois de juillet, 18,7°C à Tulnici et 23,0°C à Râmnicu Sărat. Entre avril – août, des forts réchauffements sont enregistrés à cause de la pénétration des masses d'air tropical du sud ou des vents catabatiques.

Pour le régime phénologique de la vigne, les moyennes des saisons et semestrielles sont aussi importantes, car elles varient entre: 17,9°C en été et -1,2°C en hiver, à la station de Tulnici; 20,7°C en été et -0,5°C en hiver, à la station d'Odobeşti; 20,8°C en été et -1,5°C en hiver, à la station de Adjud; 22,0°C en été et +0,9°C en hiver, à la station de Râmnicu Sărat. Pour les saisons de transition, les valeurs sont supérieures à 8,0°C dans les quatre stations, et gardent la différence de presque 2,0°C entre les deux stations Tulnici et Odobeşti. Les valeurs sont inférieures dans la station de Tulnici à cause de la différence d'altitude, de 430 de m et son emplacement en bas des montagnes de Vrancea. La moyenne du semestre chaud (01.04 – 30.09) qui correspond à la période de végétation de la vigne a un écart entre 15,0°C à Tulnici, 17,5°C à Adjud, 17,6°C à Odobeşti et 18,6°C à Râmnicu Sărat, tandis que la moyenne

thermique du semestre froid varie entre 2,0°C à Tulnici, 2,1°C à Adjud, 3,0°C à Odobeşti et 4,4°C à Râmnicu Sărat.



Température moyenne mensuelle et annuelle de l'air (°C)	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	AN
Adjud	-2,7	-1,2	3,6	10,5	16,2	19,9	21,8	20,8	16,1	9,9	3,9	-0,6	**9,8**
Tulnici	-2,1	-1,1	2,4	8,4	13,6	17,0	18,7	18,0	14,0	9,0	4,0	-0,3	**8,5**
Odobeşti	-1,7	-0,2	4,1	10,8	16,4	19,9	21,5	20,7	16,5	10,8	4,7	0,4	**10,3**
Râmnicu Sărat	-0,3	1,4	6,0	11,5	17,0	20,6	23,0	22,6	17,0	12,2	5,7	1,7	**11,6**
	-1,7	**-0,2**	**4,0**	**10,3**	**15,8**	**19,3**	**21,2**	**20,5**	**15,9**	**10,4**	**4,5**	**0,3**	**10,0**

Quantité moyenne mensuelle et annuelle des précipitations (mm)	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	AN
Adjud	23,4	23,9	26,5	44,4	69,5	76	71,2	57,2	99,1	33,3	35,0	27,3	**539,8**
Tulnici	24,1	22,5	32,9	56,8	88,0	99,0	94,9	86,3	55,1	36,9	34,5	27,7	**658,7**
Odobeşti	35,2	34,8	36,0	50,4	86,6	88,4	69,2	62,3	49,3	39,8	46,9	43,6	**642,5**
Râmnicu Sărat	33,6	24,3	35,1	43,1	66,7	72,4	67,5	77,8	61,0	35,0	39,7	31,8	**588,0**
	29,0	**26,3**	**32,6**	**48,6**	**77,7**	**83,9**	**75,7**	**70,9**	**66,1**	**36,2**	**39,0**	**32,6**	**607,2**

Fréquence (%, F) moyenne annuelle du vent par direction	N	NE	E	SE	S	SV	V	NV
Adjud	14,4	3,1	3,5	3,9	7,9	6,1	4,9	23,6
Tulnici	17,4	2,8	2,1	5,1	4,8	1,2	17,2	6,1
Odobeşti	17,7	5,1	1,2	5,2	8,2	6,9	19,2	20,7
Râmnicu Sărat	17,0	6,5	1,7	1,5	5,4	6,2	6,7	13,0
	16,6	**4,3**	**2,1**	**3,9**	**6,5**	**5,1**	**12,0**	**15,8**

Vitesse (m/s, V) moyenne annuelle du vent par direction)	N	NE	E	SE	S	SV	V	NV
Adjud	6,0	4,6	2,7	4,1	3,0	3,0	5,0	5,2
Tulnici	4,1	3,5	1,9	1,7	1,6	1,3	6,0	6,1
Odobeşti	4,1	3,5	2,1	3,5	2,8	2,5	3,8	4,2
Râmnicu Sărat	3,4	3,2	2,8	2,9	2,9	3,4	3,2	3,2
	4,4	**3,7**	**2,3**	**3,0**	**2,5**	**2,5**	**4,5**	**4,6**

Figure 3 : Distribution des principaux paramètres agro-climatiques, dans les Subcarpates de Vrancea, entre 1965 – 2015

Source: les auteurs et données traitées selon l'Administration Nationale de Météorologie

Les valeurs thermiques extrêmes sont le résultat de l'interaction entre les processus advectifs et les processus locaux générés par le bilan calorique de la surface subjacente, reflétés dans la viabilité des bourgeons et du bois. Par exemple, dans les Subcarpates de Vrancea les températures maximales absolues varient, pour la période 1960 – 2015, entre 18,6°C en janvier 1999 et 38,0°C en juillet 2000 à la station de Tulnici et entre 16,6°C en janvier 1971 et 38,3°C en juillet 1987 à la station d'Odobeşti. Les températures minimales absolues ont eu des valeurs entre -23,0°C en janvier 1963 et 6,4°C en juillet 1976 à la station de Tulnici, et entre -22,7°C en janvier 1963 et 6,4°C en juillet 1976 à la station d'Odobeşti.

Les précipitations atmosphériques en quantités moyennes annuelles de 400–700 mm/an, dont 250 mm sont concentrés dans la période de végétation, permettent des cultures de vigne sans irrigations. La vigne, par son fort et développé système radiculaire, et sa grande capacité d'absorption de l'eau et des sels du sol, est plus résistante à la sécheresse.

La quantité des précipitations multiannuelles augmente, dans les Subcarpates de Vrancea, de l'est vers l'ouest, de la 539,8 mm à Adjud, 588,0 mm à Râmnicu Sărat, 642,5 mm à Odobeşti à 658,7 mm à

Tulnici. Entre juillet – septembre, le seuil agro-climatique minimal des valeurs nécessaire à la phase de croissance et maturation des raisins de 50 mm (Azzi, 1956) est dépassé à la les quatre stations météorologiques, ayant une valeur plus basse de 0,7 mm en septembre à la station d'Odobeşti. Le manque de précipitations pendant cette période intensifie le processus de mûrissement, les grains des raisins restent sous-développés et par conséquent, la récolte se diminue. Dans la distribution saisonnière des quantités de précipitations, la saison la plus pluvieuse est l'été avec 280,2 mm enregistrés à Tulnici, c'est-à-dire 42,5% de la quantité annuelle et 219,9 mm à Odobeşti, c'est-à-dire 34,2% de la quantité annuelle de précipitations. Les plus basses valeurs saisonnières sont pendant l'hiver, entre 74,3 mm à Tulnici et 113,6 mm à Odobeşti. Dans les saisons de transition, les quantités de précipitations représentent entre 20% et 27% de la quantité annuelle. La quantité de précipitations dans la période de végétation (semestre chaud) varie entre 480,1 mm à Tulnici et 406,2 mm à Odobeşti, représentant plus de 60% de la quantité annuelle des précipitations (figure no.3).

L'humidité relative de l'air, par son distribution spatiale dans la région des Subcarpates de Vrancea, reflète les effets de barrage orographique des sommets des montagnes, ainsi que la moyenne multi-annuelle est située entre 85% à Adjud (82% à Tulnici) et 76% à Râmnicu Sărat (79% à Odobeşti). Pour que l'assimilation se déroule normalement, les demandes de la vigne par rapport à l'humidité relative de l'air se situent entre 50 – 80%, ce qui signifie que, de ce point de vue, la vigne répond aux conditions optimales de développement.

Le vent a une grande importance pendant la période de floraison, assurant le transport du pollen. Le vent sec à intensité modérée limite l'attaque de la manne, et lorsque le vent est fort, il rompt les pousses ou abat des soutiens. Par exemple, à Tulnici ce sont les vents de nord et de l'ouest qui prédominent, et à Odobeşti, le vent de nord-ouest. À Adjud et Râmnicu Sărat ce sont les vents de nord et de l'nord-ouest qui prédominent. Les plus grandes vitesses correspondent aux mêmes directions, nord-ouest - de 6,1 m/s à Tulnici et de 4,2 m/s à Odobeşti, nord - de 6,0 m/s à Adjud et de 3,4 m/s à Râmnicu Sărat. Les valeurs du calme atmosphérique reflet aussi l'influence des conditions locales, de 43,3% à Tulnici et de 15,8% à Odobeşti et assurent les conditions d'abri climatique relatif (figure no.3).

Le synergisme des facteurs climatiques est reflété par l'utilisation des **indices agro-climatiques**: l'indice Mayr, le coefficient des précipitations, l'indice hydro-thermique et le coefficient hydro-thermique Seleaninov, qui mettent en évidence le degré de favorabilité pour la culture de la vigne dans les Subcarpates de Vrancea (Ionac et al., 2015) (tableau no.2).

Tableau 2 : Valeur moyenne des indices agro-climatiques entre 1965-2015

Indices agro-climatiques	Stations météorologiques			
	Adjud	Tulnici	Odobeşti	Râmnicu Sărat
L'indice de Mayr	19,6°C	16,8°C	19,6°C	20,8°C
Le coefficient des précipitations	2,5 mm	2,9 mm	2,7 mm	2,4 mm
L'indice hydro-thermique	5,5 unités	5,6 unités	6,6 unités	6,8 unités
Le coefficient hydro-thermique Seleaninov	1,76 mm/°C	1,93 mm/°C	1,78 mm/°C	1,76 mm/°C

Source: les auteurs

L'indice de Mayr a des valeurs entre 16,8°C à Tulnici et 20,8°C Râmnicu Sărat. Cet indice exprime la valeur optimale thermique de la végétation pendant la période à une activité biologique maximale. Les valeurs baissent au long de la direction est – ouest, avec l'augmentation de l'altitude, mettant en valeur un léger refroidissement du climat au long de cette direction.

Après avoir calculé *le coefficient des précipitations*, nous avons obtenu les valeurs de 2,9 mm à Tulnici et 2,4 mm à Râmnicu Sărat. Ces valeurs indiquent un régime hydrique supérieur qui favorise les phases de formation des grains.

L'indice hydro-thermique a des valeurs entre 5,5 unités à Adjud et 6,8 unités à Râmnicu Sărat. L'indice donne des informations sur le degré d'approvisionnement avec l'eau des précipitations, et sur le complément d'eau par irrigations lorsque l'eau ne satisfait pas la demande optimale de la vigne. Selon les valeurs de cet indice, dans les Subcarpates de Vrancea, le nécessaire d'eau provenu des précipitations satisfait la demande optimale de la vigne.

Dans les Subcarpates de Vrancea *le coefficient hydro-thermique Seleaninov* a des valeurs entre 1,93 mm/ºC à Tulnici et 1,76 mm/ºC à Adjud et Râmnicu Sărat. Les valeurs entre 1 et 2 indiquent un régime à humidité suffisante pour la culture de la vigne et par conséquent, pour obtenir de vins supérieurs, à condition d'assurer les cépages adéquates des vignes (Oşlobeanu et al., 1980).

Pour le vignoble d'Odobesti il *l'indice bioclimatique de la vigne* a été calculé (Constantinescu et al., 1964). Cet indice permet d'établir le potentiel du vignoble pour une certaine ligne de production, dans le cas des nouvelles plantations viticoles. Par exemple, la valeur obtenue la station d'Odobeşti est de 7,72 unités, ce qui indique des années de production riches en ressources hydriques. Cet indice permet d'établir le potentiel du vignoble pour une certaine ligne de production, dans le cas des nouvelles plantations viticoles.

Toutes les valeurs climatiques analysées ci-dessus montrent en fait que la valorisation de l'interférence des facteurs climatiques, qui influencent la qualité et la quantité de la production peuvent constituer un critère important de choisir les emplacements des périmètres viticoles et l'utilisation des solutions techniques adéquates.

En printemps, les températures élevées et les précipitations sont les plus importantes car la vigne recommence la période de végétation, mais en même temps, la saison des maladies et des organismes nuisibles commence aussi, et l'été, par la période de floraison, donne des indices sur la qualité de la récolte. En été, la plantation a besoin d'un temps chaleureux et ensoleillé, aussi que sec, pour effectuer des tailles pour régler le processus de croissance et fructification, des tailles qui donnent des indices sur la dimension de la production et qui facilite la circulation de l'air à travers la vigne et permet l'exposition des raisins au soleil. L'arrivée de l'automne permet la maturation de la culture et le temps doit être optimal, avec des températures élevées et des précipitations réduites, pour commencer la cueillette des raisins et le contrôle de qualité du produit cueilli. L'hiver est une période de végétation latente pour la culture de vigne, bénéfice par ses périodes de gelée et neige, car ces périodes détruisent les organismes nuisibles et les maladies d'une manière naturelle, et les précipitations permettent la restauration des réserves de l'eau dans le sol. En hiver on peut aussi effectuer des travaux de régénération des branches pour améliorer la fertilité et la productivité de la variété visée.

Les trois vignobles analysés, même s'ils bénéficient des conditions climatiques adéquates au développement des variétés de haute qualité, maturation de la culture et amélioration de la concentration des sucres et des arômes des raisins (par exemple: climat tempéré-continental – Panciu et Odobeşti; climat de silvosteppe – Coteşti; influences scandinave-baltique et méditerrané-tropicale; diversité héliothermique, flux radiatif, durée de l'éclat du soleil et des précipitations adéquates etc.) sont affectés aussi par des phénomènes hydro-météoriques accidentels (températures en dessous de -30ºC, gelée, tempête de neige, invasion d'air tropical, pluie à torrent etc.) dans la région de Panciu, et les chercheurs de la Station de Recherche d'Odobeşti disent que, pendant les derniers 40 ans, un réchauffement climatique a eu lieu dans la région d'Odobeşti et Coteşti.

La plantation de vigne devient productive dans des conditions optimales et, comme il résulte de l'analyse de ces facteurs, cela arrive dans la région des collines, dans ce cas, des Subcarpates de Vrancea. Même dans cette situation, étant données les conditions climatiques, analysées en fonction des données météorologiques fournies par la station la plus proche de cette région, les résultats ne met pas en évidence

la vrai possibilité du terrain. Par conséquent, il faut prendre en considération les conditions climatiques aussi que les facteurs modificateurs de climat et le sens d'influence, c'est-à-dire l'altitude, l'exposition du relief, la végétation, les eaux, le sol etc.

Conclusions

Le but de cette étude est de motivation scientifique qui a certains avantages. Ce processus de motivation est utile dans l'élaboration des méthodes biotechnologiques spécifiques, des équipements pour le développement durable de la production et de la sécurité alimentaire, qui maintiennent les paramètres optimales pour les générations à venir. Toutes les actions sont conformes avec les objectifs établis par la Stratégie Europe 2020, parmi lesquels l'utilisation efficiente des ressources et la croissance intelligente, durable et favorable.

A présent, l'optimisation de l'écosystème viticole a comme but l'utilisation rationnelle des ressources écologiques et économiques, la conservation de l'habitat contre la pollution, la minimisation des coûts et de la force de travail ainsi que la maximisation de la production, de la qualité et du profit.

Dans un environnement économique où les résultats à effet économique sont quantifiables, avec une concurrence des dépenses, où les résultats se retrouvent sous forme de production réalisée et vendue, et dans les recettes et les pertes enregistrées, il faut tenir compte des facteurs limitatifs comme le type ou le système de plantation, les conditions agrobiologiques, les technologies, l'offre écologique, et le fait que nous ne pouvons pas contrôler l'évolution des facteurs climatiques et bioclimatiques et il n'est pas possible d'annuler entièrement leur effet sur les cultures de vignes.

La variation du rendement per hectare, chaque année, détermine des déséquilibres de la production totale de raisins. Les conditions climatiques par l'alternation d'un an à l'autre, l'intensité, la durée et l'expansion, le manque de systèmes d'irrigation se reflètent, en général, dans la production de raisins. Si nous avons des informations sur les facteurs climatiques et les besoins des variétés de vigne, on peut gérer de manière responsable la production, la protection et l'amélioration de la qualité. La production de raisins dans la région analysée a fluctué d'un an à l'autre, selon l'analyse présentée en dessus, à cause de l'avance du déroulement des phénophases végétatives et du changement du métabolisme de la vigne, et des situations hydro-météoriques imprévisibles, très fréquentes dernièrement en Roumanie aussi qu'en Europe. Toutes ces conditions aussi que d'autres facteurs ont contribué activement à la diminution quantitative et qualitative de la récolte dans certaines périodes, ce qui impose l'optimisation de la technologie de la production et d'assurer à temps les inputs nécessaires.

Le périmètre des Subcarpates de Vrancea est l'un des plus importantes périmètres viticoles de la Roumanie, avec les deux vignobles des 37 dans le pays, dont les types de vignes ont été approuvés pour être cultivés, par l'Ordre no 225 de 31 mars 2006, émis par le Ministère de l'Agriculture, des Forêts et du Développement Rural en Roumanie.

Contributions des auteurs

Tous les auteurs ont une contribution égale à la préparation de cet article scientifique.

Bibliographie

Administraţia Naţională de Meteorologie, 2008 : *Clima României*, Editura Academiei Române, 365 p.

Azzi G., 1956 : *Agricultural ecology*, Constable&Companz, Londra, 424 p.

Berbecel O. et al., 1970 : *Agrometeorologie*, Editura Ceres, Bucureşti, 293 p.

Constantinescu Ghe. et al., 1964 : Détermination de la valeur de l`indice bioclimatique de la vigne pour les principaux vignobles de R.P. Roumaine, *Revue Roumaine de Biologie*, Série de Botanigue, 9, nr. 1, 35 – 40.

Directiva Consiliului Comunităţii Europene nr. 93/43/EEC/14.06.1993, 2016 : www.miviga.ro

Direcţia Agricolă Judeţeană Vrancea, 2015 : www.dajvrancea.ro

Duchêne E., Schneider C., 2005: *Grapevine and climatic changes: a glance at the situation in Alsace*, Agron. Sustain. Dev., 25, 93–99.

Gerós H., Chaves M.M., Gil H.M., Delrot S., 2015 : *Grapevine in a changing environment : a molecular ecophysiological perspective*, Wilez-Blackwell, 400 p.

Huglin P., Schneider Ch., 1998 : *Biologie et écologie de la vigne*, Lavoisier Tec et Doc, Paris, 370 p.

Ielenicz M. et al., 2003 : *Subcarpaţii României*, Editura Universitară, Bucureşti, 263 p.

Ionac N., Grigore E., Constantin (Oprea) D.M., 2015 : Évaluation des phénomènes de dessèchement et de sécheresse dans la zone continentale du Plateau de la Dobroudja du Sud, *Actes du 28ème Colloque de l'Association Internationale de Climatologie*, 269 – 274.

Institutul de Geografie, 1992 : *Geografia României, vol IV*, Editura Academiei Române, Bucureşti, 545 p.

Institutul de Geografie, 1979 : *Atlas R.S. România,* Editura Academiei Române, Bucureşti.

Institutul Naţional de Statistică, 2016 : *Anuarul statistic al României*, Editura INS, Bucureşti.

Kenny G.J., Harrison P.A., 1992 : *The effects of climate variability and change on grape suitability in Europe*, Journal of Wine Research, 3, 163-183 p.

Legea viei si vinului, nr. 244/2002, Bucureşti, România.

Monitorul Oficial al României, Partea I, nr.225/2006, Zonarea soiurilor nobile de vita de vie roditoare admise în cultura în arealele viticole din România, Bucureşti.

Oficiul Naţional al Viei şi Produselor Vitivinicole, ONVPV, 2015 - 2017: www.onvpv.ro

Oficiul Naţional al Denumirilor de Origine pentru Vinuri (ONDOV), 2017: www.madr.ro

Oficiul Naţional al Viei şi Vinului (ONVV), 2017: www.madr.ro

Ordinului Ministerului Sănătăţii nr.1956/1995, Monitorul Oficial al României, Bucureşti.

Oşlobeanu M. et al., 1980: *Viticultură generală şi specială*, Editura Didactică şi Pedagogică, Bucureşti, 698 p.

Oşlobeanu M. et al., 1991: *Zonarea soiurilor de viţă de vie din România*, Editura Ceres, Bucureşti, 284 p.

van Leeuwen C., Darriet P., 2016, *The impact of climate change on viticulture and wine quality*, Journal of Wine Econ., http://dx.doi.org/10.1017/jwe.2015.21 (2016).

Strategy for Investing in the Modernization of Existing Coal Power Plants

Ryszard Bartnik, Opole University of Technology, Faculty of Production Engineering and Logistics, Department of Power Engineering Management, Opole, Poland, r.bartnik@po.opole.pl

Anna Hnydiuk-Stefan, Opole University of Technology, Faculty of Production Engineering and Logistics, Department of Power Engineering Management, Opole, Poland, a.hnydiuk-stefan@po.opole.pl

Abstract

The comparative study of the economic profitability of building new coal blocks on supercritical parameters without and with CCS technology, with economic cost-effectiveness of modernization of already existing, amortized blocks is analyzed. Modernization will allow them to continue operation for several decades.

Keywords: CCS, electricity, power plant, economy, CO2

1. Introduction

The catastrophic in consequences for the state and energy sector finance signed by the Polish government in December 2008, the climate and energy package, and its subsequent enlargement at the beginning of 2015, necessitates strategic decisions on which technologies to invest to minimize the effects of the package. Fundamental are the certainty, stability and continuity of electricity supplies and, what is extremely important, Poland's energy security.

From 2020 there will be no free allocation of CO2 emissions and energy companies will have to pay for every tone of carbon dioxide emitted, for a total of around 30 billion PLN a year. It is clear that the optimum technology is the one for which the specific cost of electricity production is the lowest. The answer to the question is whether to build new zero emissions coal power plants with CO2 capture, transport and storage facilities in deep geological formations, or to modernize existing blocks, taking into account the economic necessity of purchasing CO2 allowances? If modernization is better, than which technology to use?

Bartnik and Hnydiuk-Stefan (2016) presents an economic analysis of specific cost of electricity production in newly built power units in different production technologies. Work of Bartnik and Hnydiuk-Stefan (2016) presents the investment strategy methodology. This article compares the

economics of the profitability of building new coal units with supercritical steam parameters without CCS technology, and the economic cost-effectiveness of modernizing existing, amortized blocks to allow them to continue operation for several decades rather than to exclude them from work, which would be necessary because of climate and energy package.

It should be recalled that the Polish power industry is based entirely on amortized and gradually excluded from the operation of 24 power blocks of 120 MW, 63 of 200 MW blocks, 16 blocks of 360 MW and two 500 MW units. In addition, 3 newly built units with supercritical parameters with a total power of 1800 MW are exploited and another 4 with a combined capacity of 3800 MW are under construction.

Two modernisation variants of the depreciated block are subjected to economic analysis. One is the modernization of the block to the operation with higher thermal parameters of fresh steam, the second is its revitalization with the simultaneous superstructure of gas turbine and recovery boiler to gas-steam dual fuel, according to Bartnik (2013, 2017). In addition, the modernization of the newly built block with supercritical parameters to the CCS-based oxy-combustion block was analyzed by its cryogenic oxygen superstructure by Bartnik and Hnydiuk-Stefan (2016).

2. Methodology for calculating the specific cost of generating electricity in a modernized power unit

Fig. 1 presents the time diagram used to construct a mathematical model for analyzing the economic efficiency of block modernization.

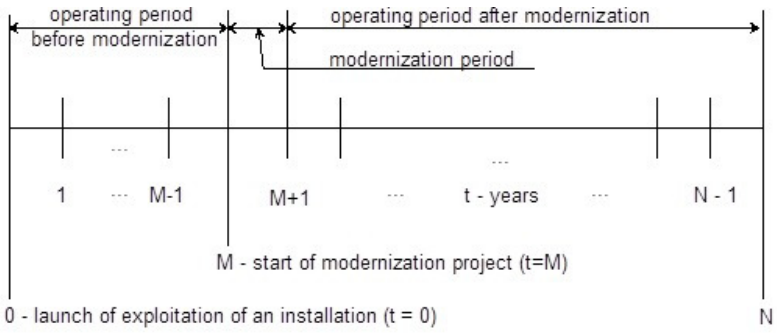


Fig. 1. Diagram of working time of modernized power plant

The average specific cost of electricity production $k_{el,av}$ in the modernized block can be estimated from the formula, according to Bartnik and Hnydiuk-Stefan (2016):

$$
\begin{aligned}
k_{el,av} = \Bigg\{ & \frac{N_{el} t_A}{\eta_{el}} (1 + x_{sw,m,was}) \frac{e_{fuel}^{t=0}}{a_{fuel} - r} \left[\mathrm{e}^{(a_{fuel} - r) t_1} - 1 \right] + \\
& + \frac{N_{el} t_A}{\eta_{el}} \frac{\rho_{CO_2} p_{CO_2}^{t=0}}{a_{CO_2} - r} \left[\mathrm{e}^{(a_{CO_2} - r) t_1} - 1 \right] + \frac{N_{el} t_A}{\eta_{el}} \frac{\rho_{CO} \; p_{CO}^{t=0}}{a_{CO} - r} \left[\mathrm{e}^{(a_{CO} - r) t_1} - 1 \right] + \\
& + \frac{N_{el} t_A}{\eta_{el}} \frac{\rho_{NO_X} p_{NO_X}^{t=0}}{a_{NO_X} - r} \left[\mathrm{e}^{(a_{NO_X} - r) t_1} - 1 \right] + \frac{N_{el} t_A}{\eta_{el}} \frac{\rho_{SO_2} p_{SO_2}^{t=0}}{a_{SO_2} - r} \left[\mathrm{e}^{(a_{SO_2} - r) t_1} - 1 \right] + \\
& + \frac{N_{el} t_A}{\eta_{el}} \frac{\rho_{dust} p_{dust}^{t=0}}{a_{dust} - r} \left[\mathrm{e}^{(a_{dust} - r) t_1} - 1 \right] + \frac{N_{el} t_A}{\eta_{el}} (1 - u) \frac{\rho_{CO_2} e_{CO_2}^{t=0}}{b_{CO_2} - r} \left[\mathrm{e}^{(b_{CO_2} - r) t_1} - 1 \right] + \\
& + J (1 + x_{sal,t,ins}) \frac{\delta_{serv}}{r} \left(1 - \mathrm{e}^{-r t_1} \right) + zJ \left[1 + \frac{1}{T} - \left(1 + \frac{1}{T} - \frac{t_1}{T} \right) \mathrm{e}^{-r t_1} \right] + \\
& + \frac{N_{el}^M t_A^M}{\eta_{el}^M} (1 + x_{sw,m,was}) \frac{e_{fuel}^{M,t=t_1}}{a_{fuel}^M - r} \left[\mathrm{e}^{(a_{fuel}^M - r) t_2} - \mathrm{e}^{(a_{fuel}^M - r) t_1} \right] + \\
& + \frac{N_{el}^M t_A^M}{\eta_{el}^{\mathrm{M}}} \frac{\rho_{CO_2} p_{CO_2}^{M,t=t_1}}{a_{CO_2}^M - r} \left[\mathrm{e}^{(a_{CO_2}^M - r) t_2} - \mathrm{e}^{(a_{CO_2}^M - r) t_1} \right] + \frac{N_{el}^M t_A^M}{\eta_{el}^{\mathrm{M}}} \frac{\rho_{CO} p_{CO}^{M,t=t_1}}{a_{CO}^M - r} \left[\mathrm{e}^{(a_{CO}^M - r) t_2} - \mathrm{e}^{(a_{CO}^M - r) t_1} \right] + \\
& + \frac{N_{el}^M t_A^M}{\eta_{el}^{\mathrm{M}}} \frac{\rho_{NO_X} p_{NO_X}^{M,t=t_1}}{a_{NO_X}^M - r} \left[\mathrm{e}^{(a_{NO_X}^M - r) t_2} - \mathrm{e}^{(a_{NO_X}^M - r) t_1} \right] + \frac{N_{el}^M t_A^M}{\eta_{el}^{\mathrm{M}}} \frac{\rho_{SO_2} p_{SO_2}^{M,t=t_1}}{a_{SO_2}^M - r} \left[\mathrm{e}^{(a_{SO_2}^M - r) t_2} - \mathrm{e}^{(a_{SO_2}^M - r) t_1} \right] + \\
& + \frac{N_{el}^M t_A^M}{\eta_{el}^{\mathrm{M}}} \frac{\rho_{dust} p_{dust}^{M,t=t_1}}{a_{dust}^M - r} \left[\mathrm{e}^{(a_{dust}^M - r) t_1} - \mathrm{e}^{(a_{dust}^M - r) t_1} \right] + \frac{N_{el}^M t_A^M}{\eta_{el}^{\mathrm{M}}} \left(1 - u^M \right) \frac{\rho_{CO_2} e_{CO_2}^{M,t=t_1}}{b_{CO_2}^M - r} \left[\mathrm{e}^{(b_{CO_2}^M - r) t_2} - \mathrm{e}^{(b_{CO_2}^M - r) t_1} \right] + \\
& + \frac{(J + J_M) \delta_{serv}^M}{r} \left(\mathrm{e}^{-r t_1} - \mathrm{e}^{-r t_2} \right) + zJ \left[\left(1 + \frac{1}{T} - \frac{t_1}{T} \right) \mathrm{e}^{-r t_1} - \left(1 + \frac{1}{T} - \frac{t_2}{T} \right) \mathrm{e}^{-r t_2} \right] + \\
& + J_M \left[\left(1 + \frac{1}{T - t_1} - \frac{t_1}{T - t_1} \right) \mathrm{e}^{-r t_1} - \left(1 + \frac{1}{T - t_1} - \frac{t_2}{T - t_1} \right) \mathrm{e}^{-r t_2} \right] +
\end{aligned}
$$

$$+\frac{N_{el}^{\mathrm{mod}}t_A^{\mathrm{mod}}}{\eta_{el}^{\mathrm{mod}}}(1+x_{sw,m,was})\frac{e_{fuel}^{\mathrm{mod},t=t_2}}{a_{fuel}^{\mathrm{mod}}-r}\left[\mathrm{e}^{\left(a_{fuel}^{\mathrm{mod}}-r\right)T}-\mathrm{e}^{\left(a_{fuel}^{\mathrm{mod}}-r\right)t_2}\right]+$$

$$+\frac{N_{el}^{\mathrm{mod}}t_A^{\mathrm{mod}}}{\eta_{el}^{\mathrm{mod}}}\frac{\rho_{CO_2}p_{CO_2}^{\mathrm{mod},t=t_2}}{a_{CO_2}^{\mathrm{mod}}-r}\left[\mathrm{e}^{\left(a_{CO_2}^{\mathrm{mod}}-r\right)T}-\mathrm{e}^{\left(a_{CO_2}^{\mathrm{mod}}-r\right)t_2}\right]+\frac{N_{el}^{\mathrm{mod}}t_A^{\mathrm{mod}}}{\eta_{el}^{\mathrm{mod}}}\frac{\rho_{CO}\ p_{CO}^{\mathrm{mod},t=t_2}}{a_{CO}^{\mathrm{mod}}-r}\left[\mathrm{e}^{\left(a_{CO}^{\mathrm{mod}}-r\right)T}-\mathrm{e}^{\left(a_{CO}^{\mathrm{mod}}-r\right)t_2}\right]$$

$$+\frac{N_{el}^{\mathrm{mod}}t_A^{\mathrm{mod}}}{\eta_{el}^{\mathrm{mod}}}\frac{\rho_{NO_X}p_{NO_X}^{\mathrm{mod},t=t_2}}{a_{NO_X}^{\mathrm{mod}}-r}\left[\mathrm{e}^{\left(a_{NO_X}^{\mathrm{mod}}-r\right)T}-\mathrm{e}^{\left(a_{NO_X}^{\mathrm{mod}}-r\right)t_2}\right]+\frac{N_{el}^{\mathrm{mod}}t_A^{\mathrm{mod}}}{\eta_{el}^{\mathrm{mod}}}\frac{\rho_{SO_2}p_{SO_2}^{\mathrm{mod},t=t_2}}{a_{SO_2}^{\mathrm{mod}}-r}\left[\mathrm{e}^{\left(a_{SO_2}^{\mathrm{mod}}-r\right)T}-\mathrm{e}^{\left(a_{SO_2}^{\mathrm{mod}}-r\right)t_2}\right]+$$

$$+\frac{N_{el}^{\mathrm{mod}}t_A^{\mathrm{mod}}}{\eta_{el}^{\mathrm{mod}}}\frac{\rho_{dust}p_{dust}^{\mathrm{mod},t=t_2}}{a_{dust}^{\mathrm{mod}}-r}\left[\mathrm{e}^{\left(a_{dust}^{\mathrm{mod}}-r\right)T}-\mathrm{e}^{\left(a_{dust}^{\mathrm{mod}}-r\right)t_2}\right]+\frac{N_{el}^{\mathrm{mod}}t_A^{\mathrm{mod}}}{\eta_{el}^{\mathrm{mod}}}\left(1-u^{\mathrm{mod}}\right)\frac{\rho_{CO_2}e_{CO_2}^{\mathrm{mod},t=t_2}}{b_{CO_2}^{\mathrm{mod}}-r}\left[\mathrm{e}^{\left(b_{CO_2}^{\mathrm{mod}}-r\right)T}-\mathrm{e}^{\left(b_{CO_2}^{\mathrm{mod}}-r\right)t_2}\right]+$$

$$+\frac{\left(J+J_M\right)(1+x_{sal,t,ins})\delta_{serv}^{\mathrm{mod}}}{r}\left(\mathrm{e}^{-rt_2}-\mathrm{e}^{-rT}\right)+zJ\left[\left(1+\frac{1}{T}-\frac{t_2}{T}\right)\mathrm{e}^{-rt_2}-\frac{1}{T}\mathrm{e}^{-rT}\right]+$$

$$+J_M\left[\left(1+\frac{1}{T-t_1}-\frac{t_2}{(T-t_1)}\right)\mathrm{e}^{-rt_2}-\left(1+\frac{1}{T-t_1}-\frac{T}{(T-t_1)}\right)\mathrm{e}^{-rT}\right]\Bigg\}\times$$

$$\times\frac{r}{N_{el}\left(1-\varepsilon_{el}\right)\left(1-\mathrm{e}^{-rt_1}\right)t_A+N_{el}^{M}\left(1-\varepsilon_{el}^{M}\right)\left(\mathrm{e}^{-rt_1}-\mathrm{e}^{-rt_2}\right)t_A^{M}+N_{el}^{\mathrm{mod}}\left(1-\varepsilon_{el}^{\mathrm{mod}}\right)\left(\mathrm{e}^{-rt_2}-\mathrm{e}^{-rT}\right)t_A^{\mathrm{mod}}} \tag{1}$$

where:

$a_{fuel}, a_{\mathrm{CO}_2}, a_{\mathrm{CO}}, a_{\mathrm{SO}_2}, a_{\mathrm{NO}_X}, a_{dust}, b_{\mathrm{CO}_2}$ – controls representing variable CO_2, fuel prices, etc. (exponential values, e.g. $e_{CO2}(t)=e_{CO2}^{t=0}\mathrm{e}^{a_{CO2}t}$)

b – duration of power block construction expressed in years,

$e_{pal}^{t=0}$, $e_{CO_2}^{t=0}$, $p_{CO_2}^{t=0}$ etc. – initial values of the prices of fuel, CO_2 emission allowances, tariffs on the use of the environment,

J – actual investment made in the construction of a power plant,

J_M – actual investment made in the modernization of a power plant,

N_{el} – gross electrical capacity of the power plant,

r – interest rate on investment capital (calculations assume r = 7%),

t_A – annual operating time of a power plant,

t_1 – the year of the block start modernization,

t_2 – year of block modernization completion,

T – expressed in years, calculating time of the block exploitation (calculations assume T = 20 years),

u – ratio of chemical energy of fuel to its total use, for which it is not necessary to purchase CO_2 emission allowances,

$x_{sw,m,was}$ – coefficient accounting for the cost of supplementing water, auxiliary materials, waste disposal, slag storage and waste (in practice, the value of $x_{sw,m,was}$ is equal to around 0.25),

$x_{sal,t,ins}$ – coefficient accounting for the cost of remuneration, taxes, insurance, etc. (in practice, the value of $x_{sal,t,ins}$ is equal to around 0.02).

z – discounting coefficient (coefficient of capital freezing) on the investment J at the instant of the completion of power plant construction,

$\square_{el}$ – internal electrical load of a power plant,

δ_{serv} – annual rate of fixed cost relative to the value of the investment (cost of maintenance and overhaul of equipment),

η_{el} – energy efficiency of a power plant,

ρ_{CO_2}, ρ_{CO}, ρ_{NO_x}, ρ_{SO_2}, ρ_{dust} – emission of CO_2, CO, NO_x, SO_2, and particulate matter per specific unit of chemical energy of the fuel.

In the case of modernization power plant to CCS oxyfuel combustion technology, the cost of emission of pollutants into the atmosphere resulting from the burning of coal and the purchase of CO2 emission allowances are not included in the cost of operating the modernized block, i.e. in the time interval from t_2 to T, in formula (1). Instead, there is the cost of transporting carbon dioxide to the place of storage. In the case of modernization of the block to the dual-fuel gas-steam unit, the power of the steam turbine must be taken into account along with the power of the gas turbine, and the annual operating costs of the used gas and the costs of the emissions generated by the combustion, according to Bartnik (2013, 2014).

3. Discussion and analysis of the example calculation results of the economic profitability of existing coal power blocks modernization

The economic profitability analysis is subject to modernization of the 120 MW depreciated block to the block for higher steam parameters and to the dual-fuel gas-steam system. In calculations it was assumed that, during the modernization (t_2 - t_1 = 2), regardless of the method, the block power is zero $N_{el}^{M} = 0$ (formula (1)). The block is therefore excluded for 2 years from operation.

The modernization of the newly built power block with a power of 460 MW with supercritical parameters to oxy-combustion CCS technology, based on research by Bartnik and Hnydiuk-Stefan (2016) has also been analyzed. It was assumed that $N_{el}^{M} = 460\text{MW}$, as the block operates in two years during cryogenic oxygen unit is built.

In all variants of modernization, the share of the chemical energy *u* in the fuel in its total annual consumption for which CO2 emission allowance is required is zero, *u = 0*, as there will be no free allocation since 2020. It has also been assumed that the zero values of exponents $a_{fuel}, a_{\text{gas}}, b_{\text{CO}_2}$ etc., correspond to the current prices of coal, gas, CO2 emissions, etc. For example, in the exponent $e_{fuel}(t) = e_{fuel}^{t=0} \text{e}^{a_{fuel} t}$ illustrating the coal price change, the present value is $e_{fuel}^{t=0} = 11.4\ \text{PLN/GJ} = 41\ \text{PLN/MWh}$. The results of calculating specific cost of electricity production in power blocks are presented in Figures 2-17 for several selected, from an unlimited number of possible scenarios of time changes in fuel prices and CO2 emissions. Figures 2-5 present the specific cost of electricity production in the newly built power block with the supercritical steam parameters in conventional technology, ie, in the combustion of coal in the air atmosphere and in CCS combustion technology in the atmosphere of technical oxygen and recycled in the appropriate proportion of carbon dioxide (so-called oxy-fuel process).

The results are presented, as already mentioned, multivariate, i.e. for different average coal prices over a period of time $\langle 0, T \rangle$ in accordance with the exponential equation above and for different average purchase prices of CO2 emissions in accordance with the exponent $e_{CO_2}(t) = e_{CO_2}^{t=0} \text{e}^{b_{CO_2} t}$. As is apparent from the results of calculations, the specific cost $k_{el,oxy}$ of electricity production of the power plant operating in CCS is at least two times higher than the cost of a conventional block. In order for this cost to be less than the cost in the power block without CCS, it will only be possible to meet the relation $k_{el,oxy} \le k_{el}$ if the average purchase price $e_{CO_2}^{av}$ of the emission allowances is higher than the 400 PLN/Mg_{CO2} (current price $e_{CO_2}^{t=0} \cong 29\ \text{PLN/Mg}_{\text{CO}_2}$) - Figure 4. It seems unlikely that this could ever happen. The cost $k_{el,oxy}$ would then be much higher than the cost of generating electricity in nuclear units, which is about 420 PLN/MWh, according to Bartnik and Hnydiuk-Stefan (2016). Therefore, the construction of blocks with CCS installations in this situation would be completely devoid of economic sense.

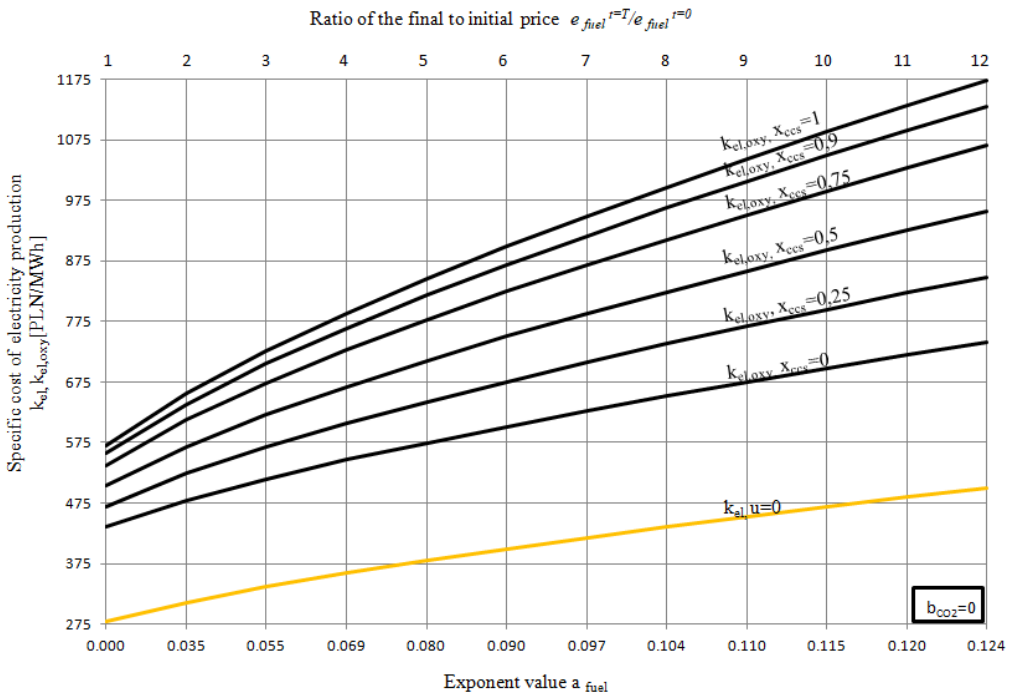


Fig. 2. The specific cost of electricity production in the 460 MW power block for supercritical parameters as a function of exponent value a_{fuel} and price ratio $e_{fuel}^{t=T}/e_{\text{fuel}}^{t=0}$, where: k_{el} - refers to coal power plant in air combustion; $k_{el,\ oxygen}$ - refers to the coal power plant with oxy-combustion; x_{ccs} - a factor that takes into account the cost of transporting carbon dioxide to its capture, injection and storage, according to Bartnik and Hnydiuk-Stefan (2016)

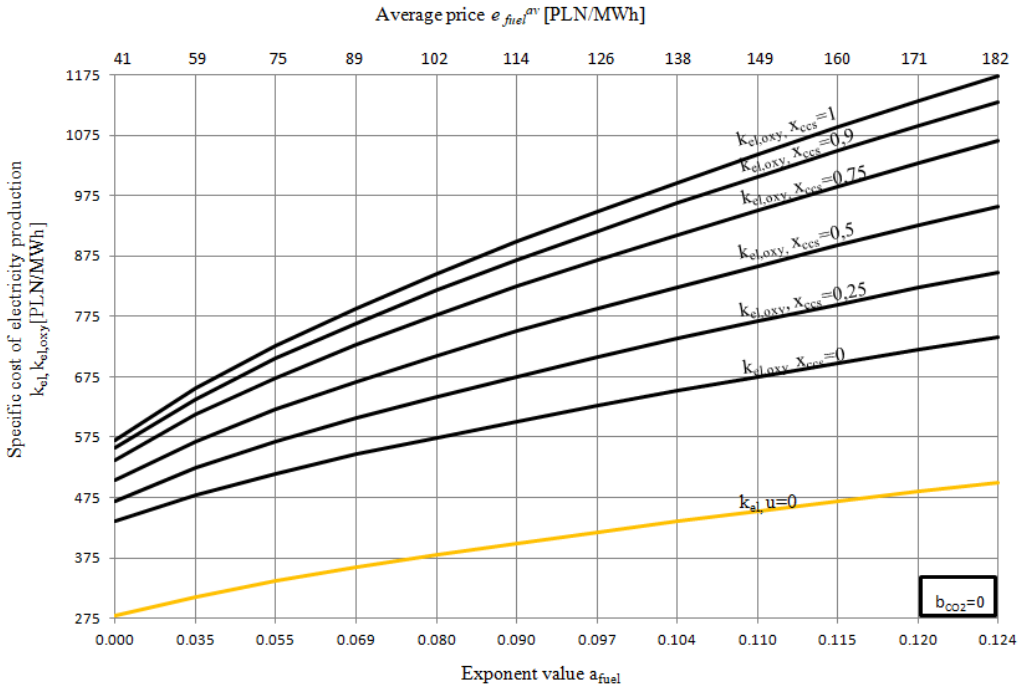


Fig. 3. The specific cost of electricity production in the 460 MW power block for supercritical parameters as a function of exponent value a_{fuel} and average fuel price e_{fuel}^{av}, where: k_{el} - refers to coal power plant in air combustion; $k_{el,\ oxygen}$ - refers to the coal power plant with oxy-combustion

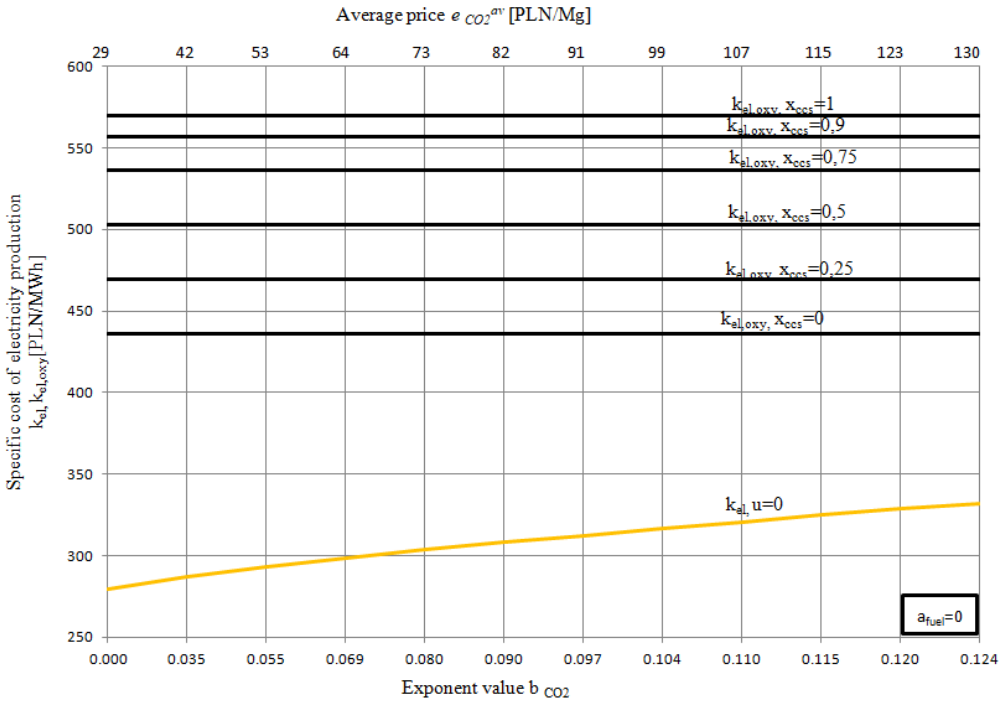


Fig. 4. The specific cost of electricity production in the 460 MW power block for supercritical parameters as a function of exponent value b_{CO2} and average CO2 tone purchase price $e_{CO_2}^{av}$, where: k_{el} - refers to coal power plant in air combustion; $k_{el,\ oxygen}$ - refers to the coal power plant with oxy-combustion

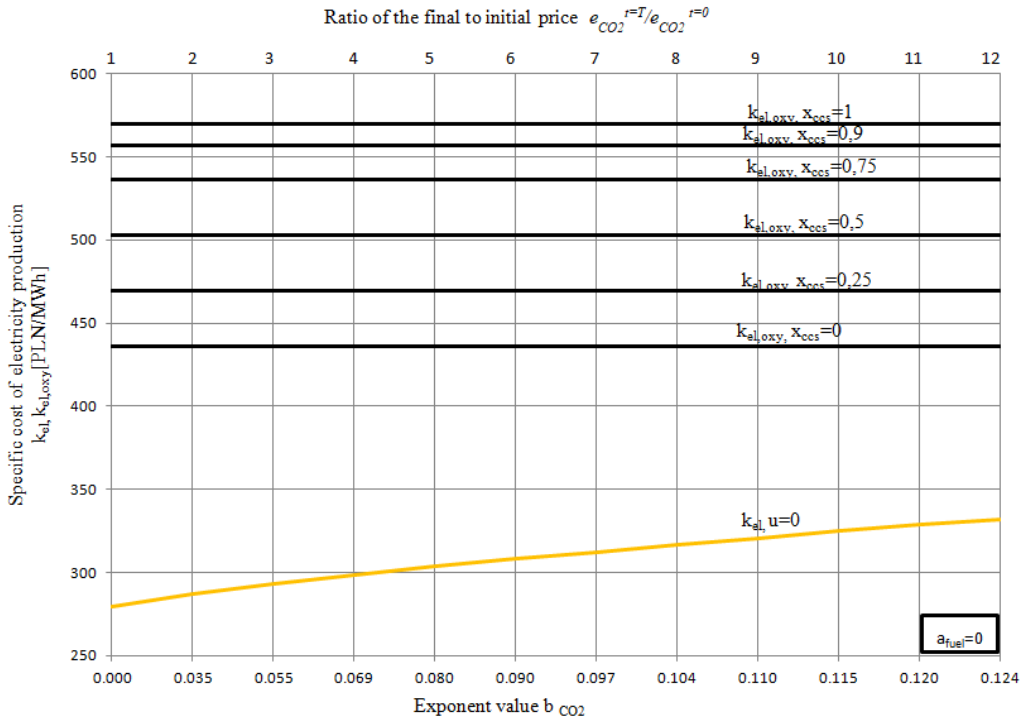


Fig. 5. The specific cost of electricity production in the 460 MW power block for supercritical parameters as a function of exponent value b_{CO2} and price ratio $e_{CO_2}^{t=T}/e_{CO_2}^{t=0}$, where: k_{el} - refers to coal power plant in air combustion; $k_{el,\,oxygen}$ - refers to the coal power plant with oxy-combustion

Figures 6-9 show the results of calculating the specific cost of generating electricity in a block for supercritical steam parameters modernized to CCS oxy-combustion technology. They are presented according to the year t_1 of the modernization start. Investment expenditures for modernization are assumed at J_M = 1.196 billion PLN (unit costs are i_M = 2.6 mln PLN /MW).

As the figures show, the t_1 year is longer, the smaller the specific cost of electricity production. This is obvious because the cost of a CCS block is at least two times higher than the cost without this technology, so the start year of modernization is far more distant, the specific cost in the modernized block is lower. It is therefore clearly say that the modernization of the block to the CCS oxy-combustion is completely unprofitable. It is better to purchase CO2 emissions allowances rather than modernize the power block and not emit CO2 into the atmosphere, despite the fact that the cost of CO2 emissions allowances is high. Its value at current specific (per unit of energy) coal price is 11.4 PLN/GJ and the price of CO2 emission equals 29 PLN is 25% of the cost of coal. This cost is therefore the third in terms of cost, after the purchase of coal and capital,

as part of the annual operating costs of the plan operation, and thus significantly increases the specific cost of electricity generation. Even more than a dozen times the price e_{CO_2} increase does not, however, make CCS technology more profitable - Fig. 4, 5, 8.

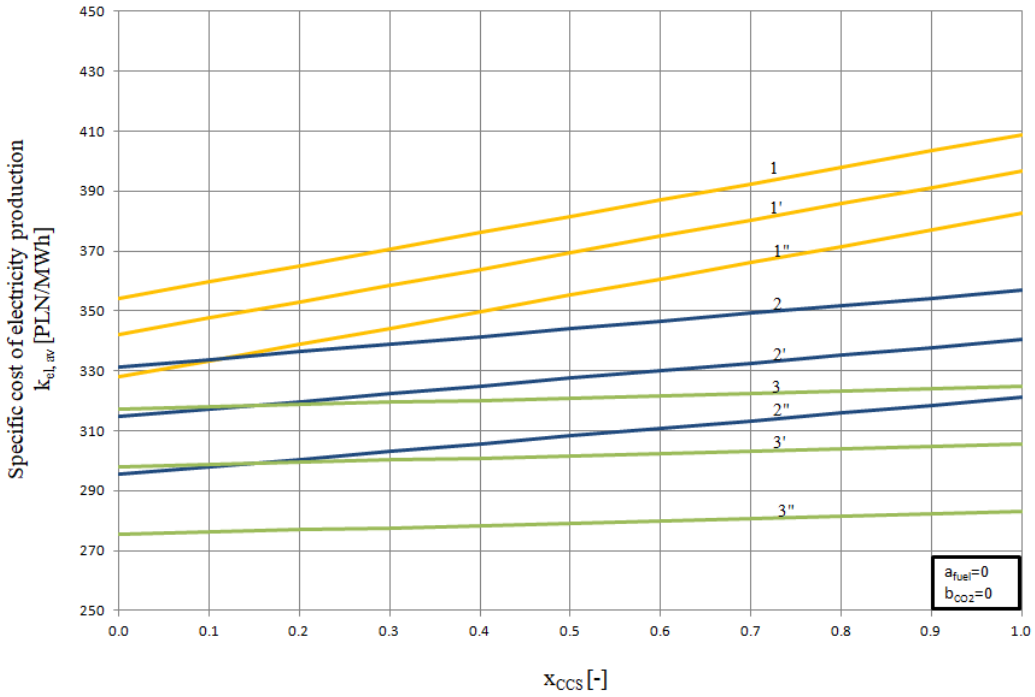


Fig. 6. Specific cost of electricity production in a 460 MW unit for supercritical steam parameters modernized to *CCS* combustion technology as a function of the x_{ccs} factor taking into account the cost of transporting carbon dioxide to the place of its capture, injection and storage, where: 1 – applies to t_1 = 5 years, e_{CO2} = 20 euro/Mg_{CO2}; 1' – applies to t_1 = 5 years, e_{CO2} = 14 euro/ Mg_{CO2}; 1" – applies to t_1 = 5 years, e_{CO2} = 7 euro/Mg_{CO2}; 2 – applies to t_1 = 10 years, e_{CO2} = 20 euro/Mg_{CO2}; 2' – applies to t_1 = 10 years, e_{CO2} = 14 euro/Mg_{CO2}; 2" – applies to t_1 = 10 years, e_{CO2} = 7 euro/$Mg_{CO2;}$ 3 – applies to t_1 = 15 years, e_{CO2} = 20 euro/$Mg_{CO2;}$ 3' – applies to t_1 = 15 years, e_{CO2} = 14 euro/$Mg_{CO2;}$ 3" – applies to t_1 = 15 years, e_{CO2} = 7 euro/Mg_{CO2}

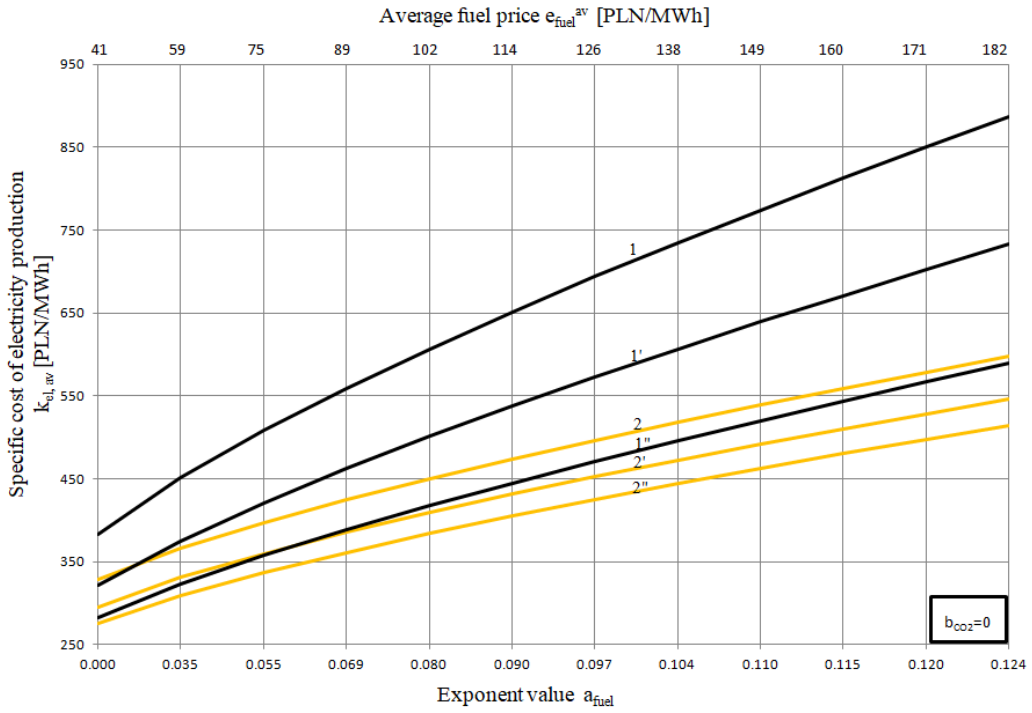


Fig. 7. The specific cost of electricity production in a 460 MW unit for supercritical steam parameters modernized to *CCS* combustion technology as a function of the average fuel price e_{fuel}^{av} and of exponent value a_{fuel}, where: 1 – applies to $t_1 = 5$ years, $x_{ccs} = 1$; 1' – applies to $t_1 = 10$ years, $x_{ccs} = 1$; 1" – applies to $t_1 = 15$ years, $x_{ccs} = 1$; 2 – applies to $t_1 = 5$ years, $x_{ccs} = 0$; 2' – applies to $t_1 = 10$ years, $x_{ccs} = 0$; 2" – applies to $t_1 = 15$ years, $x_{ccs} = 0$

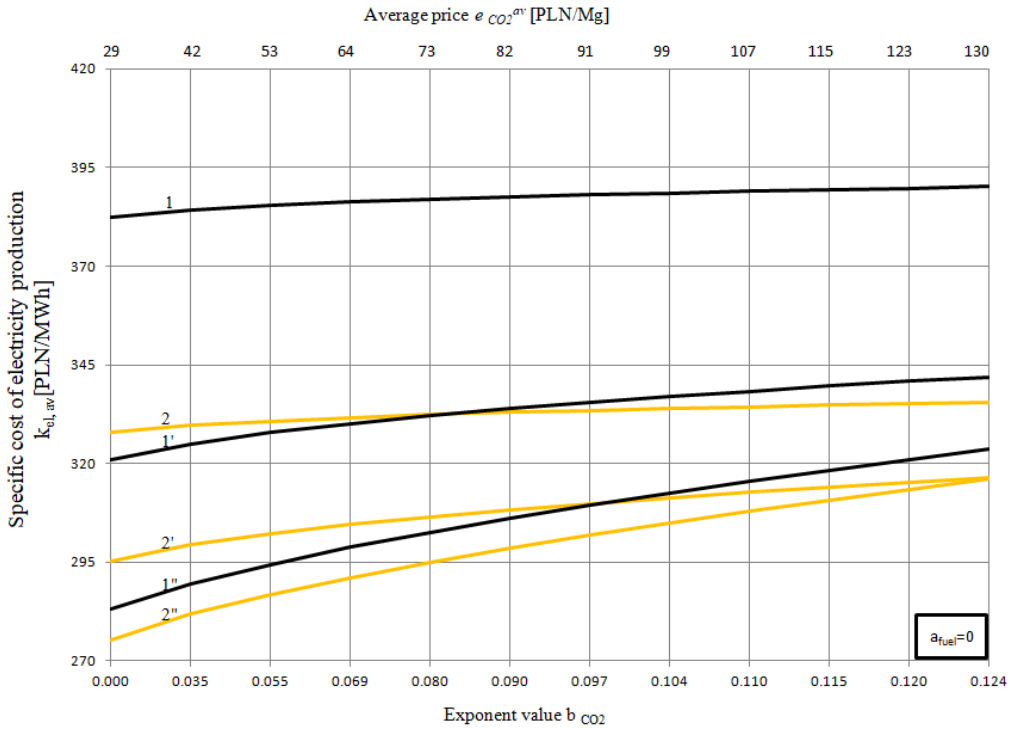


Fig. 8. The specific cost of electricity production in the 460 MW power block for supercritical parameters modernized to *CCS* combustion technology as a function of exponent value b_{CO2} and average CO2 emission price $e_{CO_2}^{av}$, where: 1 – applies to t_1 = 5 years, x_{ccs} = 1; 1' – applies to t_1 = 10 years, x_{ccs} = 1; 1" – applies to t_1 = 15 years, x_{ccs} = 1; 2 – applies to t_1 = 5 years, x_{ccs} = 0; 2' – applies to t_1 = 10 years, x_{ccs} = 0; 2" – applies to t_1 = 15 years, x_{ccs} = 0

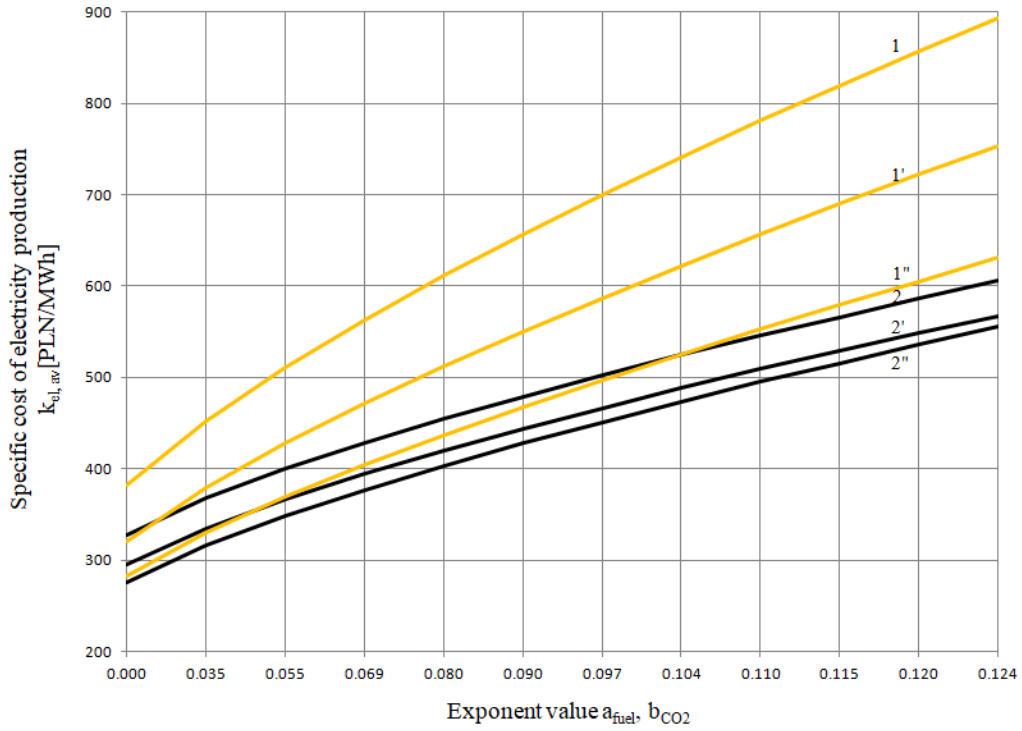


Fig. 9. The specific cost of electricity production in the 460 MW power block for supercritical parameters modernized to *CCS* combustion technology as a function of exponent values a_{fuel} and b_{CO2}, where: 1 – applies to $t_1 = 5$ years, $x_{ccs} = 1$; 1' – applies to $t_1 = 10$ years, $x_{ccs} = 1$; 1" – applies to $t_1 = 15$ years, $x_{ccs} = 1$; 2 – applies to $t_1 = 5$ years, $x_{ccs} = 0$; 2' – applies to $t_1 = 10$ years, $x_{ccs} = 0$; 2" – applies to $t_1 = 15$ years, $x_{ccs} = 0$

Figures 10-14 illustrate the specific cost of electricity production in a 120 MW depreciated power block modernized to a dual-fuel gas-steam unit. The power of the gas turbine assumed equal to $N_{el}^{TG} = 120\text{MW}$. Investment expenditures for modernization are assumed at J_M = 420 mln PLN (unit cost is i_M = 3.5 mln PLN/MW). The specific cost of electricity production in the modernized block is significantly lower than the cost in block for supercritical steam parameters, Fig. 2-5, despite the fact that it burns expensive natural gas alongside coal.

Moreover, for current coal and gas prices (i.e. when a_{fuel}=0 and a_{gas} = 0) it is relatively little higher than the specific cost for 120 MW block modernized to the block for higher parameters of fresh steam, which burns 3 times cheaper coal - figures 15 - 17.

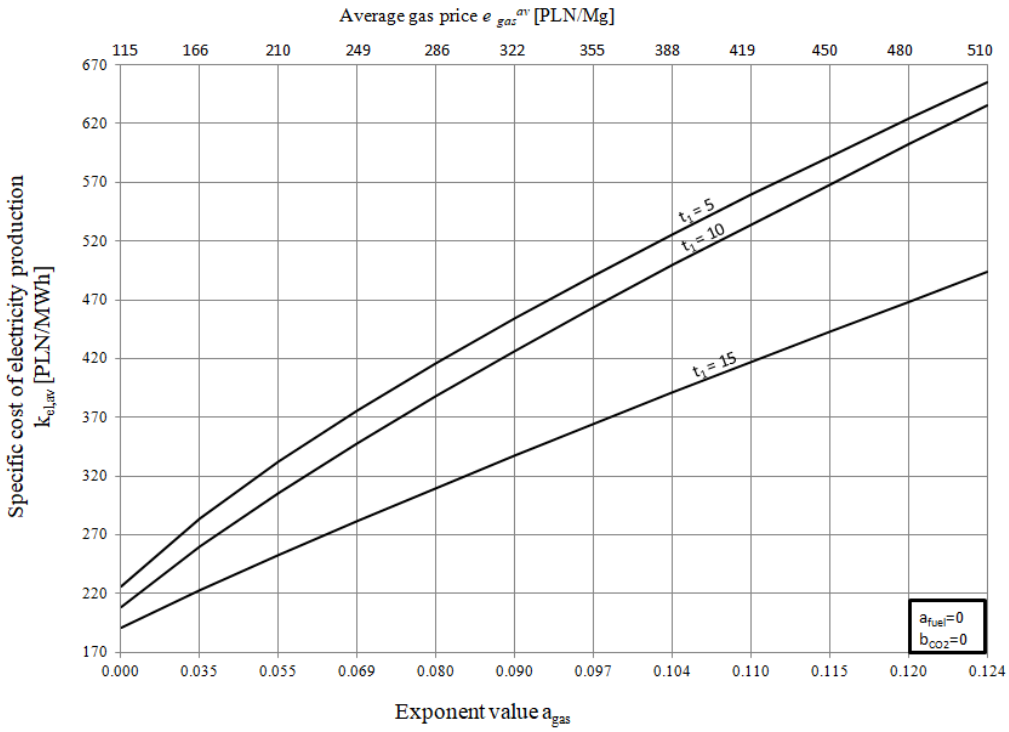


Fig. 10. The specific cost of electricity production in a 120 MW power plant modernized to a dual-fuel gas-steam system as a function of the exponent value a_{gas}.

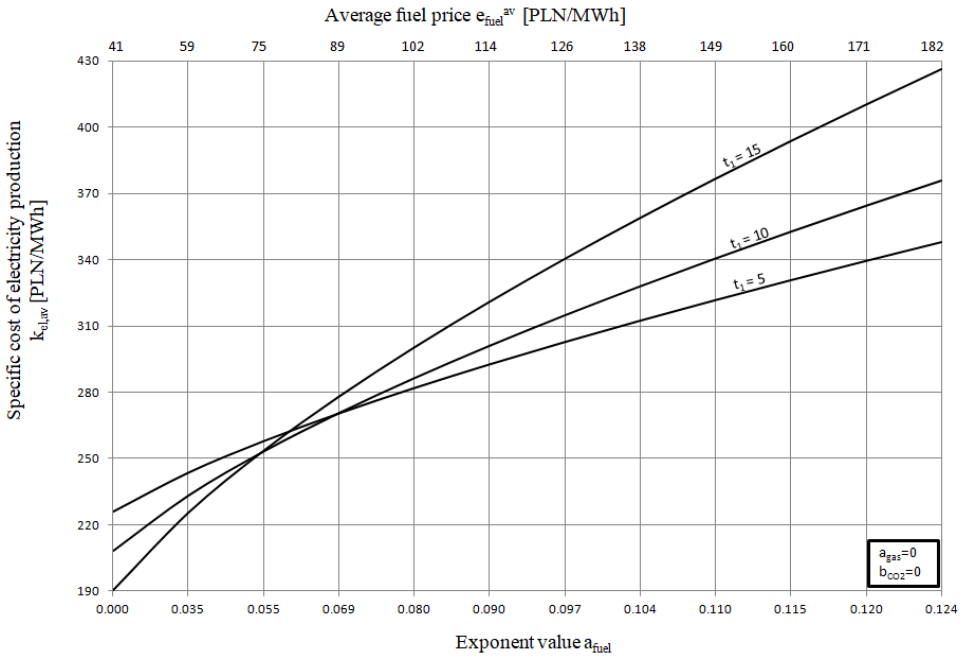


Fig 11. The specific cost of electricity production in a 120 MW power plant modernized to a dual-fuel gas-steam system as a function of the exponent value a_{fuel}.

As can be seen from the analysis of the curves in Figure 11, the lower ratio of the gas price to coal price, the quicker modernization of the block to the dual-fuel gas-steam system is more profitable.

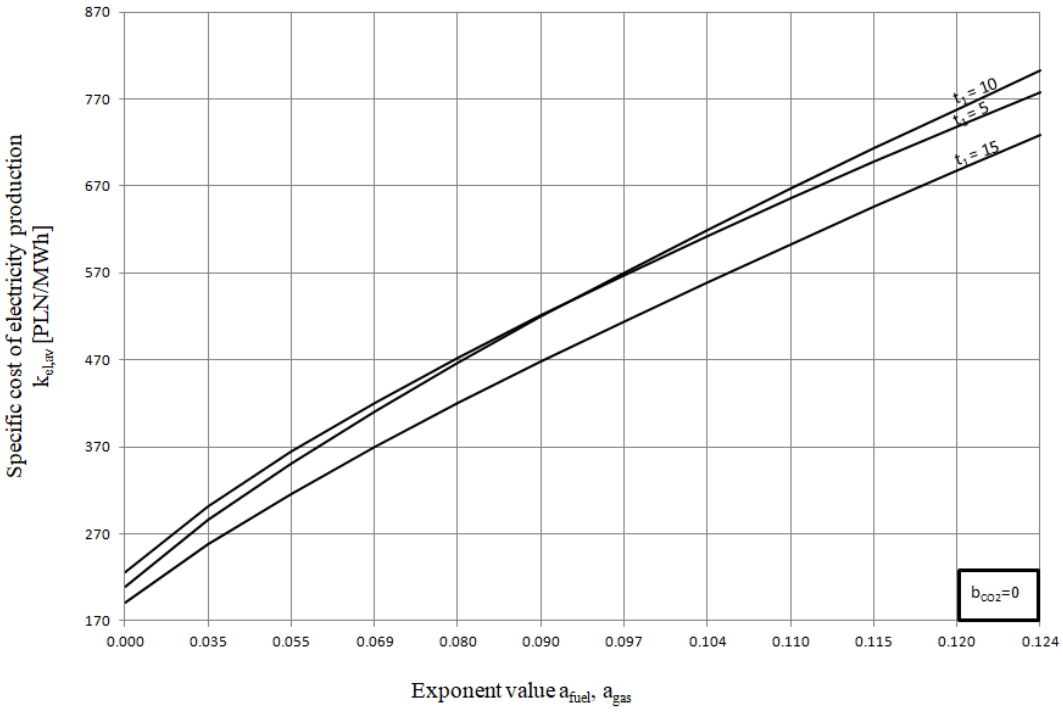


Fig. 12. The specific cost of electricity production in a 120 MW power plant modernized to a dual-fuel gas-steam system as a function of the exponent values a_{fuel} and a_{gas}

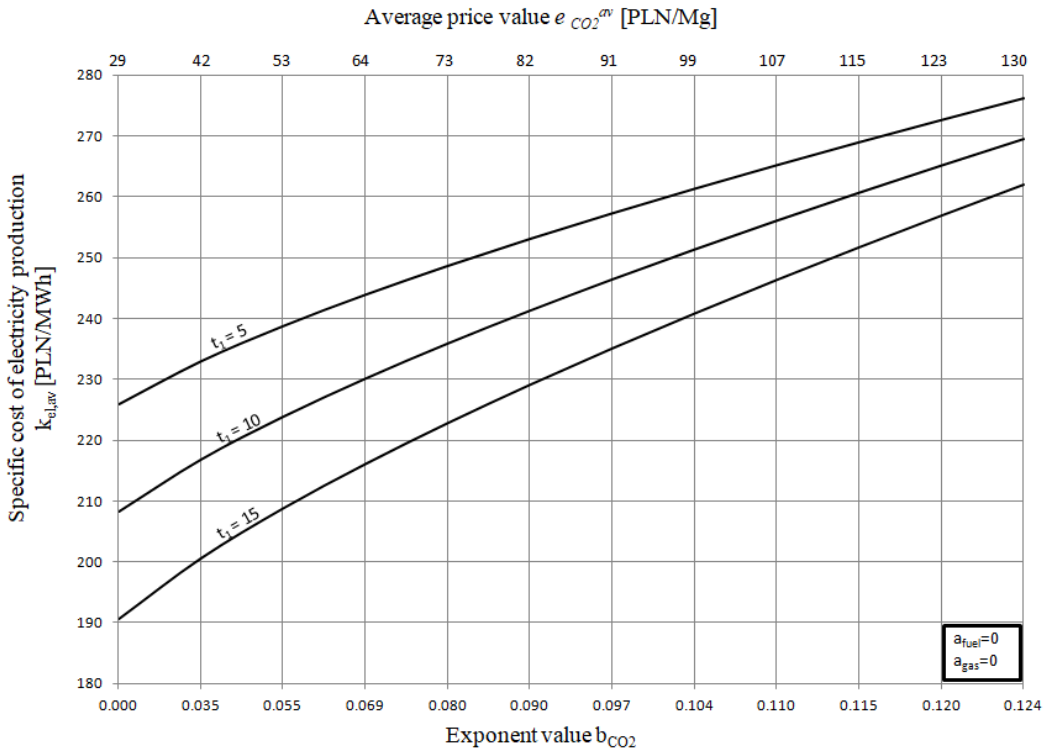


Fig. 13. The specific cost of electricity production in a 120 MW power plant modernized to a dual-fuel gas-steam system as a function of the exponent value b_{CO2}

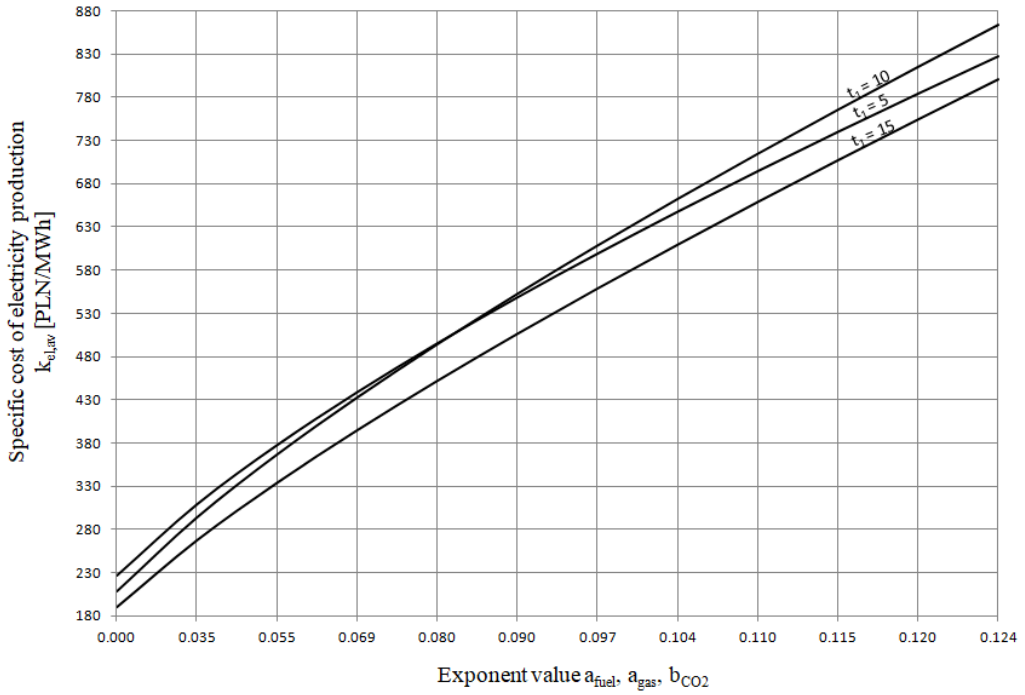


Fig. 14. The specific cost of electricity production in a 120 MW power plant modernized to a dual-fuel gas-steam system as a function of the exponent values a_{fuel}, a_{gas} and b_{CO2}

Figures 15-17 illustrates the specific cost of electricity production in a 120 MW amortized block, which has been upgraded to the block for higher thermal parameters of fresh steam. The block power after modernization is 130 MW. The calculations assume two values of investment for modernization: J_M = 240 mln PLN and J_M = 360 mln PLN (unit costs are i_M = 2 mln/MW and i_M = 3 mln/MW; for comparison, the unitary outlays for building "from the grass" power blocks for supercritical parameters are 6.5 million/MW). By analyzing the curves in the figures, it is possible to draw a misleading conclusion from the economic account that modernization is unprofitable, as the specific cost of electricity production in a modernized block is the smaller, the year of t_1, fig.1., the start of modernization is farer, when the modernization will occur as late as possible, and preferably at all.

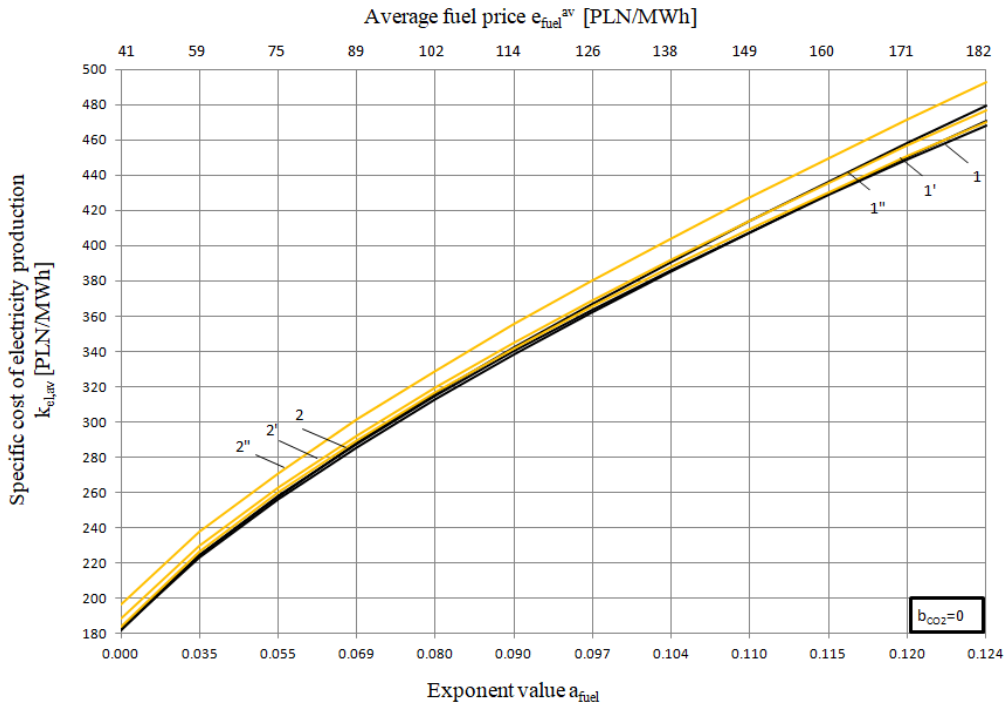


Fig. 15. The specific cost of electricity production in a 120 MW block modernized to block for higher thermal parameters of fresh steam as a function of exponent value $a_{fuel,}$ where: 1 – applies to t_1 = 15 years, i_M = 2 mln PLN/MW; 1' – applies to t_1 = 10 years, i_M = 2 mln PLN/MW; 1" – applies to t_1 = 5 years, i_M = 2 mln PLN/MW; 2 – applies to t_1 = 15 years, i_M = 3 mln PLN/MW; 2' – applies to t_1 = 10 years, i_M = 3 mln PLN/MW; 2" – applies to t_1 = 5 years, i_M = 3 mln PLN/MW

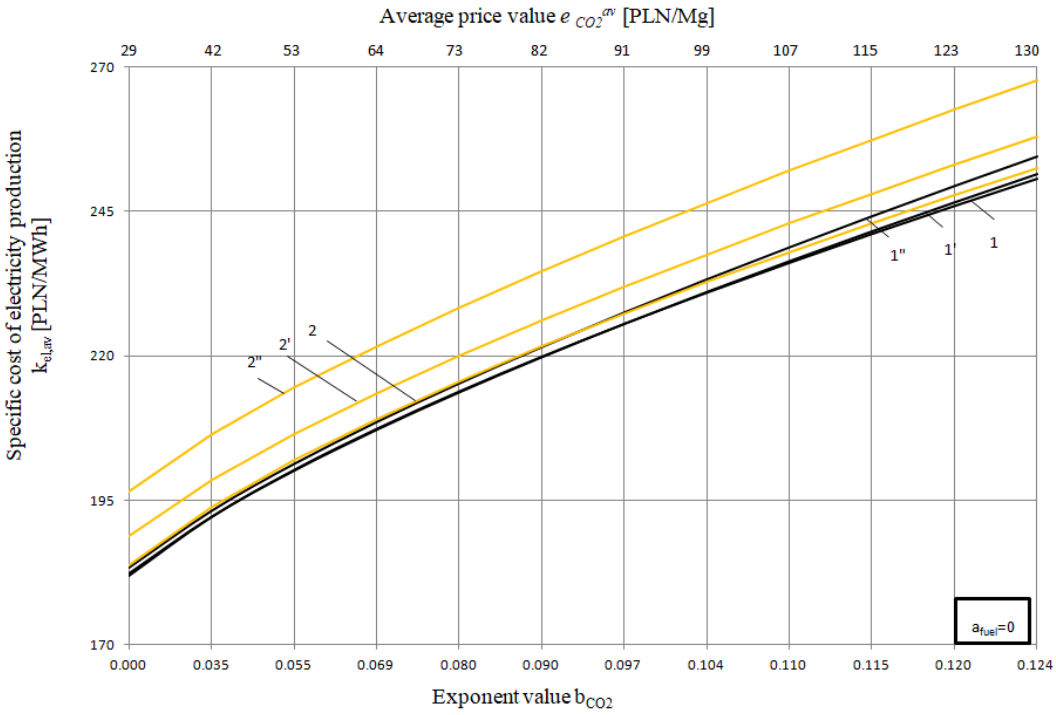


Fig. 16. The specific cost of electricity production in a 120 MW block modernized to block for higher thermal parameters of fresh steam as a function of exponent value b_{CO2}, where: 1 – applies to t_1 = 15 years, i_M = 2 mln PLN/MW; 1' – applies to t_1 = 10 years, i_M = 2 mln PLN/MW; 1" – applies to t_1 = 5 years, i_M = 2 mln PLN/MW; 2 – applies to t_1 = 15 years, i_M = 3 mln PLN/MW; 2' – applies to t_1 = 10 years, i_M = 3 mln PLN/MW; 2" – applies to t_1 = 5 years, i_M = 3 mln PLN/MW

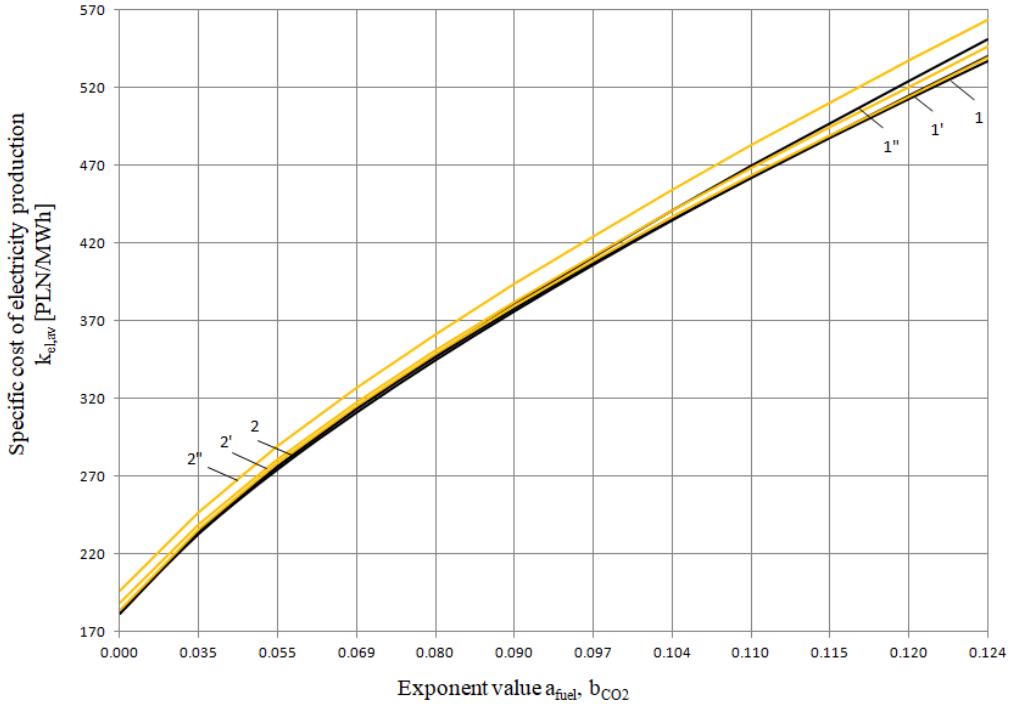


Fig. 17. The specific cost of electricity production in a 120 MW block modernized to block for higher thermal parameters of fresh steam as a function of exponent values a_{fuel} and b_{CO2}, where: 1 – applies to t_1 = 15 years, i_M = 2 mln PLN/MW; 1' – applies to t_1 = 10 years, i_M = 2 mln PLN/MW; 1" – applies to t_1 = 5 years, i_M = 2 mln PLN/MW; 2 – applies to t_1 = 15 years, i_M = 3 mln PLN/MW; 2' – applies to t_1 = 10 years, i_M = 3 mln PLN/MW; 2" – applies to t_1 = 5 years, i_M = 3 mln PLN/MW

The smallest specific cost is for t_1 = 15 years. This is because, in the modernized block, in its annual operating costs are again the cost of capital (installment depreciation of investment outlays J_M with its interest, according to Bartnik (2014)), the cost of which in the depreciated block is no longer apparent. Thus the annual cost of producing electricity in it is low, because its production is only the cost of exploitation. However, without upgrade the block, its further exploitation will be impossible, due to technical consumption it will need to be off from further operation. Hence the need to upgrade as quickly as possible. The specific cost of electricity production in the modernized block is significantly lower than the cost of the newly built block for supercritical parameters, even without oxy-combustion CCS technology - Fig. 3, 15. However, this cost is comparable to the cost in the modernized block for the dual-fuel gas-steam system – fig. 11, 15.

4. Summary

The results of the analyzes show unequivocally that modernization of already existing power plants rather than the construction of new coal power plants is the most important investment strategy in the country's electricity supply, while guaranteeing the country's energy security and, most importantly, stability, security and continuity of supply. Modernization expenditures, even when replacing boilers and steam turbines with new higher thermal parameters of fresh steam, are small compared to the costs of new supercritical coal blocks, where the entire power plant infrastructure needs to be built and which are already in retrofit. At most it will also need to be revitalized. The specific cost of generating electricity in such modernized blocks even at the time of purchase of the CO2 emission allowances is significantly lower than the costs of new coal blocks, and hence the rise in energy prices in the country will be small. When they are mixed with the costs of newly built nuclear power plants, they will continue to increase in small increments. An important opportunity for modernization of existing coal blocks is their superstructure with gas turbine despite expensive natural gas. The energy efficiency of these modernized blocks, what is very important, will increase significantly to around 50% and carbon dioxide emissions per MWh of produced electricity will decrease by half. At the same time, the specific cost of electricity production in them is also relatively low. For current prices of coal and gas is slightly higher than the cost from modernized coal power blocks for higher parameters of fresh steam. Moreover, and very importantly, according to Bartnik (2013, 2014) this superstructure doubles the electric power of the block.

In addition to the modernization of existing coal blocks, "clean", fully economically justified nuclear power stations should be built. It is necessary to significantly increase the power of the Polish National Power System, as the projected increase in electricity consumption in Poland is one of the highest in Europe.

References

Bartnik R., Hnydiuk-Stefan A. (2016): Economic analysis of specific cost of electricity production in various technologies of its production, *Energetyka*, nr 5, 2016 [in Polish]

Bartnik R., Bartnik B., Hnydiuk-Stefan A (2016): Optimum Investment Strategy in the Power Industry. Mathematical Models. *Springer*, New York

Bartnik R. (2015): The search for the optimal investment strategy in the energy sector. Methodology and results of sample calculations, *Energetyka*, nr 10, [in Polish]

Bartnik R., Bartnik B. (2014): Economic account in power industry, *Wydawnictwo WNT*, Warszawa [in Polish]

Bartnik R. (2013): The Modernization Potential of Gas Turbines in the Coal-Fired Power Industry. Thermal and Economic Effectiveness, *Springer*, London

Bartnik R. (2017): Gas-steam power stations and CHP plants. Energy and economic efficiency, *WNT*, Warszawa [in Polish]

The Research of Language Competency of Subjects of Bilingual Environment and Modern Educational Internet-Resources

Svetlana N. Fedorova, Doctor of Pedagogical Sciences, Professor, Mari State University, Yoshkar-Ola, Russia, svetfed65@rambler.ru

Irina N. Andreeva, Candidate of Pedagogical Sciences, Associate Professor, Mari State University, Yoshkar-Ola, Russia, andreeva_67@mail.ru

Ksenia Y. Vavilova, Candidate of Philological Sciences, Associate Professor, Mari State University, Yoshkar-Ola, Russia, vuk_2004@mail.ru

Elena V. Alekseeva, Candidate of Pedagogical Sciences, Mari State University, Yoshkar-Ola, Russia, elena_vitaliev@mail.ru

Elvira M. Vorontsova, Candidate of Pedagogical Sciences, Mari State University, Yoshkar-Ola, Russia, vem_77@mail.ru

Abstract

The article analyzes the research of language competence of subjects of bilingual environment and modern educational Internet resources. The authors of the paper give definition to the term "language competency" and define its structural components. The paper includes the results of diagnostics of language competency of students of Psychological and Pedagogical Department of Mari State University as subjects of bilingual environment. The research reveals typical mistakes made by bilingual people in the Russian language and the paper includes explanations of such speech disorders. The authors enumerate different opportunities of language virtual space in correcting speech disorders and increasing the level of language competency of subjects of bilingual space.
Keywords: language competence, bilingual environment, language virtual space, speech disorders.

Introduction

The term "competency" has appeared recently in the scientific literature, although the terms, connected with it, have existed in linguistics and pedagogics for a long time. Competency is a certain amount of knowledge and experience that are necessary for the effective activity in a certain subject area. Another term – competence – is connected with competency. Competence stands for a certain number of questions that a person is qualified in. It is a basic quality of a person that includes some closely-related qualities that are necessary for qualitative and productive activity (Burns, 1995). The research of language competency is mainly connected with competence that was analyzed by D.Himes, American sociolinguist stated that in order to establish communication it is not enough to know language signs and the rules of their usage, it is necessary to know "cultural and socially relevant situations" in which they might be used (Communicative competence as a component of key competencies, 2017). The notion "communicative competence" appeared in Russian scientific literature in the 1980s (M. N. Vatutnev, I. L. Bim, A. R. Artunov and others) and it was defined as the ability of a person to maintain communication. Speech is the main means of establishing contacts with people, expressing thoughts and emotions.

According to A.N. Shchukin, language competence is possessing the system of knowledge about the studied language at different levels: phonological, morphological, lexical and syntactical (Azimov and Shchukin, 2009). A person possesses language competence if he has understanding of the system of the language that he studies and he can use this system in practice.

In the research of the threshold level of the knowledge of the Russian language competence was defined as the ability of a student to construct grammatically correct forms and syntactical structures as well as speech syntagmas that are used and made up according to the rules of the Russian language and their use as if they were used by the native speakers in isolated position.

In Russian psychological, psycholinguistic and methodological researches language competence is analyzed as a combination of knowledge and abilities of a person. Scientists define two components: cognitive component (knowledge) and activity component (abilities and skills). Consequently, language competence can be analyzed as the knowledge of linguistic units, the rules of their formation and use as well as the ability to use them in the process of communication. Thus, it becomes possible to conclude that language competence is the knowledge of linguistic phenomena and the ability to use them in speech production and understand speech of other people; consequently, language competency is possessing of knowledge and experience that are necessary for communication and effective activity in the subject area.

It is possible to divide language competence into phonological, lexical, grammatical, orthographic competences. Let us analyze the mentioned competences as understanding of their essence is necessary in order to study the level of language competency of the subjects of the bilingual environment.

Phonological competence is the knowledge of the language system, stress, rhythm, intonation, melodic, the ways of phonetic speech production and the ability to use them in the intercourse (Azimov and Shchukin, 2009). For the Russian-language speakers the most important components of phonological competence are the abilities to stress the words correctly and to pronounce the sounds accurately.

Lexical competence is not only knowledge of lexis of the language, including words, word phrases, collocations, phrasal units, patterns of speech etiquette, but also the knowledge of proverbs and sayings and their use in speech.

Grammatical competence includes knowledge of grammatical elements of the language and the ability to use them in the process of speech. Grammatical competence includes the ability to understand and express certain meaning, make up phrases and sentences that are built according to the rules of the Russian language.

Orthographic competence is knowledge of spelling and punctuation norms, common conventions, symbols, etc.

Except for the competences mentioned above, linguists define competences in oral speech and competences in written speech, in the recent decade scientists analyze a new competence – competence of the Internet communication.

It is important to connect language and the ability to use different functional styles (business literature, scientific literature, etc) (Work Book, 2017).

Thus, we can see that language competence is part of a multilevel system that is connected with the speakers. People have certain language knowledge and experience, thus, language competences are necessary for effective communication in any subject area.

Purpose of the Study

The purpose of the study is the analysis of the level of language competence of future teachers, subjects of bilingual environment.

Research Methods

The main methods of the study are as follows: theoretical analysis of literature on the research subject, survey, observation, testing and analysis of the results.

Results of the Study

The study has included diagnostics of the level of language competence (phonological, lexical, grammatical and orthographical) of the students of Mari State University. 88 students (of the 1-4 courses of the pedagogical department) took part in the experiment. The level of language competence of future teachers was defined according to three diagnostic methods, including phonological, lexical, grammatical and orthographical competences: "A series of tests designed to define linguistics abilities" by I.N. Lukashenko, I.A. Zimney, "Methodology of diagnostics of verbal creativity" adapted version of method by S. Mednik, test on the norms of the Russian language elaborated by I.N. Andreeva (Andreeva, 2012).

The study of language competence of future teachers allows to reveal certain problems that exist in speech and measures to eliminate them.

The study showed the results of all diagnostic methods that are presented in Table 1.

Table 1: Results of Diagnostics of Language Competence of Subjects of Bilingual Environment according to Three Diagnostic Methods

Competences	A series of tests designed to define linguistics abilities	Methodology of diagnostics of verbal creativity	Test on the norms of the Russian language
Phonological	67%	-	58%
Lexical	63%	75%	26%,
Grammatical	54%	68%	39%
Orthographic	62%	-	78%

Diagnostic method "A series of tests designed to define linguistics abilities" by I.N. Lukashenko, I.A. Zimney allowed to figure out that 67 percent of respondents possess phonological competence, 63 percent of respondents have lexical competence, 62 percent of respondents have orthographical and only 54 percent of respondents posses grammatical competence.

"Methodology of diagnostics of verbal creativity" covers only lexical and grammatical competences. 75 percent of surveyed have coped with tasks on lexis successfully, 68 percent of surveyed have been successful in completing grammar tests.

Low percentage of grammatical competence of respondents, as it was revealed, might be explained by the difficulty of Russian grammatical rules that arise some predicaments. It is a fact that even Russian native speakers face such problems.

It is necessary to analyze the results of tests on the norms of the Russian language as these results were the worst among the three diagnostic models. The analysis has shown the following facts.

Students have made mistakes with the words *"kvartal", "logopedia", "zhaluzi"*. Students try to find out the meaning of the word *"kvartal"* by saying that different stress means different lexical meaning. In general, 88 people have made mistakes 145 mistakes in this task.

In the second task students have made 80 mistakes, mainly in words: *khodatajstvovat', shchavel'.*
The third task was easier as students have made only 68 mistakes, they mainly were in words: *svekla, novorozhdennyj.*

The forth task checked the norms of morphology, students have made 97 mistakes, the main problems were connected with the forms of the words: *brelkov-brelokov, shofyory-shofera, dzhins-dzhinsov.*

The lexical rules were checked in the fifth task in which students have made 115 mistakes as almost all collocations seemed difficult. When explaining the expressions, students commented that they heard such collocations in oral speech: *svobodnaya vakansii, narodnyj fol'klor* and they thought that it was a norm of the language.

Tasks number 6 and 7 were devoted to checking of morphological norms of numerals. Students have made 39 mistakes in task number 6, 89 mistakes in task number 7. Students decline cardinal numbers incorrectly as they have made a lot of mistakes in such tasks.

Task number 8 checked knowledge of grammatical norms, correct spelling of prepositions. Almost all students gave incorrect version of the use of the preposition: *"po priezdu"* instead of *"po priezde",* in general, they have made 113 mistakes.

Tasks 9, 10 and 11 were connected with the correct filling of business papers although task number 9 checked the knowledge of morphological norms of nouns that is knowledge of proper nouns (declining of surnames). There have been 116 incorrect answers in this task. Task number 10 was rather difficult as it required grammar knowledge where there have been 117 mistakes despite the fact that the similar task is used in papers for the General State Exam (correct use of dangling participle).
Task number 11 checked how to make up a written request, more than half of students (50 pupils of 88) could not find the mistakes in the test although they deal with requests regularly. Almost in all official papers signature is written to the right, date is written to the left and a line above the signature.

Task number 12 checked knowledge of punctuation in which students have made 138 mistakes and it shows that some basic knowledge was partially acquired at school.

Task number 13 was devoted to knowledge of orthography (spelling of suffixes of participles and adjectives), the result was rather bad (145 incorrect answers).

Having analyzed the results, we have concluded the following:
55 percent of students have problems with norms of orthoepy, 26 percent make lexical mistakes, 29 percent cannot cope with morphology of numerals, 49 percent – of nouns, 46 percent make mistakes in spelling of prepositions, 30 percent of students cannot deal with dangling participles.

The worst result was shown while completing the tasks in orthographic and punctuation norms (78 percent of students have made mistakes) and writing business documents (58 percent of students), 80 percent of students have made orthographic mistakes.

Representatives of the Mari nationality make a lot of mistakes. It is mainly connected with aural-oral skills and stylistic colouring of speech. A lot of Mari representatives make typical speech mistakes. Thus, speech of bilingual people does not contain some sounds as they are absent in their native speech *[v'] [v]* that is why they make some phonetic mistakes. Some Mari consonants, namely, *k, t, s, z, n, m, b* in isolated pronunciation coincide with Russian phonemes: *k, t, s, z, n, m, b.*

Let us analyze consonant phonemes of the Russian language pronunciation of which is different from the Mari language: *l, r, g, d, j, zh, sh, ch* and the words that cannot occur in the Mari words and with borrowings from the Russian language (sounds *f, ch, ts, sh*, orthographically *shch*). Specific sounds of the Mari language *[v, ng]*.
Consonant sounds of the Mari language *[r, j, zh, sh, g, l]* are pronounced differently than in the Russian language although they resemble Russian sounds.

Sound *[l]* in the Russian language is fricative and front. While pronouncing Russian sound *[l],* the tip of the tongue touches the upper teeth, the tongue fringe does not join, the air goes through the edge of the tongue, the sound is called lateral in linguistics. Mari sound *[l]* is milder than the Russian one. The difference between Russian *[l]* from the Mari sound is that while pronouncing Russian sound *[l],* the back side of the tongue takes an active part in speech production, rising up to the soft palate and in this part of the tongue there is tension. While producing Mari sound *[l],* the back side of the tongue does not rise or the soft palate rises a little.

Sound *[j]* is fricative, noisy sound and dorsal. While pronouncing Russian sound *[j]*, the tip of the tongue touches lower teeth, lateral borders are close to the lateral teeth, the lateral part of the dorsum rises to the hard palate and the air goes through the hole between the back of the tongue and the hard palate. This sound is called fricative. While pronouncing theMari sound *[j],* the dorsum, as it happens in Russian, the tongue comes closer to the hard palate. In the Mari language the sound *[j]* is pronounced with a bigger force at the beginning of the word than in the Russian language (it is produced with a greater affinity with the hard palate and with bigger force of exhalation. At the end of vowels of the first row sound *[j]* almost disappears. The Mari people tend to use this peculiarity of pronunciation of the sound *[j]* in the Russian language. For example, *desli* instead of *esli*.

Sound *[ts]* is a front, voiceless, plosive sound that exists in the Hilly accent of the Mari Language and in some accents of the Meadow accent of the Mari language.

Thus, instead of literary *"kochkash" (to eat)* these accents have *"kotskash", "tserkve" (church).* The sound *[ts]* appears in the Mari literary language in words borrowed from Russian. In old borrowings the sound *[ts]* was replaced with *[ch]* or *[s]* by the Mari people. For example: *chygan (tsygan), purys (perets).*

Sound *[kh]* is a noisy, voiceless, fricative, velar consonant. In Meadow-Eastern accents of the Mari language the sound *[kh]* has a relatively rare use (only in words borrowed from Russian). In the Hilly accent the sound *[kh]* occurs in originally Mari words (*khanga* – board, *khyyak* – sedge). Mari pupils sometimes replace the sound *[kh]* with their native sound *[k]*. This happens both in oral and written speech: *otdokni* (otdokhni).

In order to eliminate such cases and mistakes in speech, increase lingual competence of subjects in bilingual environment, we decided to try the use of language virtual space. We have already analyzed its meaning for modern teenagers in some papers before (Fedorova & Vorontsova, et al. 2016).

In our point of view, virtual space gives unlimited opportunities in the sphere of language training and practice of its use by different means: skype lessons, electronic textbooks, educational programs, computer didactic games, training systems, etc. Using these techniques pupils can train reading, writing, speaking, listening in this or that language, check their knowledge, etc.

Currently there is a wide variety of interactive programs, educational Internet resources that are aimed at teaching the most popular European languages: English, German and French. It becomes evident that it is necessary to use the opportunities of virtual space in teaching the languages of Russian peoples because Russia faces the problem of preservation the national languages.

Modern educational Internet resources are focused on the studies of national languages of Russian peoples. On-line school of national languages Ethnoschool http://ethnoschool.ru, founded by Eradil Tenghezov form Dagestan, was the first school of such kind. The project was aimed at preserving and

studying of native languages of different regions of Russia for those people who live outside the country and its regions.

Nowadays the school offers online courses of the Nogai, Tatar, Chechen, Avar, Dargin, Kumyk, Lak, Lezgin, Ingush, Kalmyck languages. Moreover, the course of Finno-Ugrian and Turkic languages of Russia is being elaborated. Education is based on the concept of interactive "pupil– teacher" in which the teacher inetrectcts with the pupil and train him with the help of presentations, by pronouncing sounds, talk with him in chat and answers pupil's questions (The first online school of Russian national languages, 2017).

Educational resource "Tatarschool.ru" http://tatarschool.ru draws a certain attention as it contains some multimedia applications to the textbooks of the Tatar language that were written on demand of the Ministry of Education and Science of the Republic of Tatarstan. Multimedia applications to the textbooks are the instruments of wide opportunities as the main advantage of such books is interaction.

Electronic applications to textbooks offer the possibility for distant learning as pupils can study independently, on their own and check their progress. If a person fails the task, multimedia application allows to complete the test once again and choose the individual pace of work. It is necessary to structure the presented material which is divided according to the year of studies (from 1-4 forms) and different parts: topics, dialogues, grammar, listening, dictionary, cartoons (Educational resource TATARSCHOOL.ru, 2017).

In 2016 2 mobile applications were created that supported learning of the Udmurt language "Udmurt-Russian-English Phrase Book" and manual for self-tuition "Kyldysin: Let's Learn the Udmurt Language ". The phrase-book is created to overcome difficulties in communication with the speakers of the Udmurt language. Having heard some phrases, the user will be able to mark it as the selected one and the system will find the necessary words with a certain combination. The second application "Kyldysin: Let's Learn the Udmurt Language" will serve to master the language skills in practice by reading, speaking, listening. 30 topics in different areas of grammar will deepen grammar, this part contains 50-100 words and phrases in the Udmurt language. The application as a real teacher will trace the progress and achievements of the user. For example, lesson 2 will not be available for opening without studying lesson 1. An interesting structure elaborated by the creator can encourage the user to achieve progress by getting score for completing tasks correctly. The results are put into the Table – Rating of Participants (Information Agency «Udm-Info», 2016).

A special attention deserves the Internet site «UROK95.RU» which contains a series of lesson in the Chechen language covering the whole syllabus of school subjects (Literature, History, Geography, Ethics, Local History, History) including the Chechen language (1-11 forms) that were placed in open access. Lessons consist of videos, papers, tests and training tasks. Students who study the Chechen language have access to the following parts: theory, library, set of words, training tasks (tests, exercises, word-builder, translator). The initiator, author and creator of the project is the Ministry of Education and Science of the Chechen Republic (Educational portal «UROK95», 2017).

The analysis of educational resources created in Russia and directed at the development of national languages of peoples has revealed that despite diversity of languages and cultures of Russian peoples, the quantity of qualitative educational content, including those that are placed on the Internet and available for many users, the number of people using such sites is relatively small. The most qualitative resources were created with the support of the Ministry of Education and Science of the national republics (Tatarstan, the Chechen Republic).

Conclusion

Language virtual space gives certain potential for shaping language competence of a person. Our research is directed at the developing the concept of language virtual space while arranging language

competence of the subjects of bilingual environment of the Russian and Mari languages, based on the structural-functional model of lingual virtual space. It is evident that there must be the system of diagnostic materials that reveal the level of language competence of a bilingual subject in case of Russian-Mari bilingual environment. It is necessary to create scientifically accurate useful methodical recommendations how to use language virtual space in shaping language competence of subjects of bilingual space. Another important step is the elaboration of electronic educational resources, Internet magazine, Web-site "Russian-Mari Language Virtual Space".

Acknowledgment

The reported study was funded by RFBR and Government of the Mari El region according to the research project № 17-16-12003

References

Azimov, E.G. & Shchukin A.N. (2009). New Dictionary of Methodical Terms and Concepts (Theory and Practice of Teaching Languages). Moscow: Ikar.

Andreeva, I.N. (2012). Russian Language and the Culture of Speech: Yoshkar-Ola: Mari State University.

Internet Resource. [Online] Available: mail.ru ipk.kuz-edu.ru (June 16, 2017).

Information Agency «Udm-Info» [Online] Available: https://udm-info.ru/news/politics/12-11-2016/mobilnye-prilozheniya-dlya-izucheniya-udmurtskogo-yazyka-stali-dostupny-Dlya-skachivaniya / (June 16, 2017).

Communicative Competence as a Component of Key Competencies lib.podelise.ru/docs/5/index -... copy (date of circula-tion: June 16, 2017).

Educational Portal «UROK95» [Online] Available: http://urok95.ru/ (June 16, 2017).

Educational Resource TATARSCHOOL.ru [Online] Available: http://tatarschool.ru/ (June 16, 2017).
Ozhegov, S. I. (1995). Thesaurus of the Russian Language: 80000 Words and Phraseological expressions Moscow.AZ. 928 p.

Work Book. Topic 1. Language Competence... [Online] Available: filling-form.ru›turizm/3180/index.html…(June 16, 2017).

The first Online School of Russian National Languages [Online] Available: http://ethnoschool.ru/ (June 17, 2017).

Svetlana N. Fedorova & Elvira M. Vorontsova, et al. 2016. Linguistic Virtual Space as a Means of Correction of Speech Deviations of the Subjects of the Bilingual Environment. The Social Sciences (Volume: 11 | Issue: 8 | Page.

Influence of Individual Psychological Characteristics of Senior High School Students over Professional Direction

Maria L. Blinova, Mari State University, Interregional Open Social Institute, Russia, airam8@mail.ru

Igor A. Zagaynov, Mari State University, Interregional Open Social Institute, Russia, zagainovigor@nm.ru

Anna D. Burlachenko, Interregional Open Social Institute, Russia, anya.burlachenko@mail.ru

Nadezhda I. Palagina, Mari State University, Interregional Open Social Institute, Russia, palaginanadiv@yandex.ru

Dmitriy A.Evdokimov, Interregional Open Social Institute, Russia, magnit.yola@gmail.com

Abstract

It is important to make a right choice of a future profession while studying at school. A senior high school student should know what professional activity to choose. The choice should depend on personal psychological characteristics of a student. They will help to self-fulfil in a chosen profession. Professional direction of a senior student is determinative while choosing profession. The article gives research data of educational and ascertaining experiments in personal and psychological characteristics influencing over professional direction on senior high school students. There are cases of professional direction changing while conducting the educational experiment when psychological and pedagogical activities were held according to personal psychological characteristics.

Keywords: professional direction, senior high school students, individual psychological characteristics, research, profession.

Introduction

Modern society needs professional mobile specialists. They should be ready to make their own decisions and complete important professional tasks in rapidly changing conditions. It should be taught since school age. Educational psychologists have an important role. They help solve problems of life journey decision, search of professional future, profession choice, and development of professional characteristics. Despite the investigation in the theory of this question, annually a lot of senior high school students have problems with professional direction.

In this regard great attention is given to special education modules and psychological support of senior students in forming their professional direction (Zagaynov & Blinova, 2017). Search and choice of profession, self-fulfillment – everything is influenced by individual psychological characteristics of a senior student. Based on the results of comprehensive schools practice we can see that development of professional direction of senior students receives little attention, it lacks interrelation of teaching educational subjects and educational work in the context of the outlined problem.

The Method

The problem of professional direction formation was studied before by different scientists. But there is little information about the influence of individual psychological characteristics over professional direction of senior high school students.

Methodological basis of our research was: principle of person's development at senior high school age (Alferov, 2008, and others); psychological conception of person's professional direction (Derevtsova, 2015, Ivannikova, 2013, and others); data about influence of personal characteristics over person's professional direction (Kovalevskaya, 2014, Koryagina, 2009, and others).
We used the following methods of research of individual psychological characteristics and professional direction: "I prefer" differential diagnostic form by E.A. Klimov; B.Bass technique of diagnostics of personal direction; "Big Five personality traits" technique by A.G. Gretsov.

The Research

The research was held among 45 senior students of a village school. The obtained results are useful for teachers, psychologists, school management.

Modern scientists consider professional direction of senior students as an integrated characteristics of motivation of professional activity determined by impulses in motivational sphere expressed by interests, relations, purposeful efforts. At senior high school age a system of stable life views and own place in the world is formed. Individual psychological characteristics have great influence over professional direction of senior students. For example, students who have inclination to professions of a "man-man" type are sociable and have a need in liability of emotions. In a "man-machine" type rigidity of behavior, vividness and independence appear. A "man-word picture" type shows liability of emotions and need in communication, ability to abstract away, impulsivity. A "man-sign system" type is marked by rigidity of behavior and affect persistence, vividness and independence. In a "man-nature" type sensitivity and a high emotional and feeling level are shown.

At the summative stage of the research we figured out that 38% of students of the experimental group and 32% of students of the control group were characterized as a "man-man" type of professional direction; 24% of the experimental group students and 26% of the control group students – as a "man-machine" type; 19% of the experimental group and 18% of the control group – as a "man-sign system" type. "Man-nature" and "man-word picture" types were less significant for the students. 33% of the experimental and 36% of the control groups showed their focus on themselves and communication, 38% and 32% respectively – on activity. 60 % of the experimental group and 62% of the control group are emotionally stable. 51% and 53% respectively are ready for new experience, 42% and 45% respectively are conscious to their future professional choice, 60% and 62% respectively are benevolent.

The research was conducted in the area of influence of individual psychological characteristics and interrelations of senior high school students over their professional direction. Therefore, we paid attention to rise of social status of senior students, development of benevolence, consciousness, emotional stability, activation of interrelation, motives to soaring to success. Hereby, we conducted the work on development of self-awareness (abilities and characteristics); environment and different professions.

The work on forming basic skills in self-awareness and self-esteem, self-development, effective interrelation with the environment, planning of professional advancement was conducted.
In forming professional direction and self-determination of students, development of individual psychological characteristics the important thing is existence of motivation, need in self-development and self-fulfillment.

We also defined extra personal psychological characteristics to characterize a successful person: energy, sense of purpose, emotional stability, consciousness, self-dependence, responsibility for actions, stability of life standards and values, openness to new actions.

According to the results of the control stage of the research we came to the conclusion that individual psychological characteristics of senior high school students influence over their professional direction: extraversion and vividness are specific for the "man-man" professional type and communication focus; consciousness and openness to new experience are specific for the "man-sign

system" and "man-machine" professional direction types and activity focus. If students are focused on themselves they show neuroticism and hostility.

As a result of the educational experiment a part of students changed their professional direction type. For example, in the experimental group there was a rise of number of students of the "man-man" (43%), "man-sign system" (24%) types; in the control group there was an inconspicuous rise of the "man-sign system" type of students. In the experimental group we observed the number of students focused on activity (up to 47%), communication (up to 43%), and the number of students focused on themselves decreased. In the control group the change of professional direction was inconspicuous. Students of the experimental group increased emotional stability (up to 79%), openness to new experience (65%), consciousness (65%) and benevolence (79%). In the control group the number of students with consciousness characteristics rose (49%).

Conclusion

The summary of the research: emotional stability, openness to new experience, consciousness and benevolence influence over the professional direction of senior high school students; development of individual psychological characteristics of senior students can correct properly their professional direction. Thereby, it can help make a right decision of future profession and develop professional skills according to individual psychological characteristics which will lead to professional self-fulfillment.

References

Alferov, A.D. (2008) 'Psychology of Students' Development', Rostov-on-Don, 384.

Derevtsova, A.B. (2015) 'Professional Direction of Senior High School Students of Different Gender', *Young scientist*, 3, 895-898.

Diagnostics of Professional Self-determination (2009), Compilor Y.S.Suntsova. Izhevsk, 112.

Ivannikova, L.V. (2013), 'Study of Professional Direction of Senior High School Students'

Koryagina, M.S. (2009), 'Personal Characteristics of Students of Different Faculties', *Psychology of the XXI century. International Interuniversity Research-to-practice Conference Proceedings,* Saint-Petersburg State University, 306-308.

Kovalevskaya, L.V. (2014), 'Career Orientation of Senior Students with Different Personal Characteristics'.

Raygorodsky, D.Y. (2007), Practical Psychognosis. Techniques and Tests. Samara. 672.

Zagaynov, I.A. & Blinova, M.L. (2017), Professional Direction of Students. *Society: Sociology, Psychology, Pedagogics*, 4, 54-56.

Neuropsychological Correction in Support of Preschool Children with Disabilities Living in the Multicultural Region

Elena Y. Borisova, Mari State University, Yoahkar-Ola, Russia, elenaborpsy@yandex.ru

Irina B. Kozina, Mari State University, Yoahkar-Ola, Russia, kozira@list.ru

Abstract

The main objective of the research presented in this article was the development and approbation of the technology of psychological and pedagogical support for pre-school children with disabilities being raised under the conditions of polylingual sociocultural environment. Implemented comparative analysis of dynamics of indicators of mental development of preschool children of different nosological categories living in polylingual and monolingual environment. Analysis of the results suggests that implementation of a neuropsychological approach to support for children with disabilities provides a positive change, characterizing both the regulative and praksis and gnostic processes, with a more pronounced positive effect is ensured with a sufficiently long correctional and developmental impact. It was revealed the effect of the specifics of the language environment on the effectiveness of correctional-developing work

Keywords*:* neuropsychological diagnostics, psychological and pedagogical support, polylingual and monolingually environment, children with disabilities

Introduction

Describing mental health of the child population the majority of researchers recognizes its progressive deterioration, notes the increasing number of children with deviations in mental development as well as indicators of CNS ill-being. For this reason, it is important to look for the methods and approaches that allow diagnosing difficulties in proper time and preventing development of maladjustment. Both in assessing relevant child development and in planning effective psychocorrective work increasing attention is being paid to neuropsychological approach that allows revealing weak cognitive mechanisms causing most of the difficulties that appear when getting training (Akhutina T.V., Pylaeva N.M. and Hotyleva T. Y., 2011; Akhutina T.V. and Pylaeva, N.M., 2008; Borisova E. Y.,2015; Borisova E. Y. and Kozina I.B., 2016).

Nowadays effectiveness of neuropsychological methods in work with children with disabilities is generally recognized; therefore, school neuropsychology is being promoted in modern teaching practice. However, most of the developed programmes focus on primary school age. Furthermore, issues of developmental characteristics and interaction of the brain systems and mechanisms during child languages acquisition are often overlooked areas in a research. As multiculturalism is characteristic of our country, the majority of pre-school children is being developed in polylingual environment. This fact defines importance of consideration of neuropsychological and psychological mechanisms and factors of higher mental functions development under the conditions of language diversity.

The main objective of the research is the development and approbation of the technology of psychological and pedagogical support for pre-school children with disabilities being raised under the conditions of polylingual sociocultural environment. This technology is based on neuropsychological approach. The assumption that the programme of correctional and developmental training, based on the results of the differentiated and system neuropsychological diagnosis, can be sufficiently effective appeared as the hypothesis of the research.

Materials and Methods

Comparative analysis of factors dynamics of pre-school children (the fifth year of life) mental development from different nosological categories, who are being raised in polylingual and monolingual environment, was made in terms of this research implemented and supported by RFBR (the project № 16-16-12004). Factors dynamics was monitored in the implementation of psychological and pedagogical support that includes neuropsychological diagnosis and correction. 70 pupils of secondary groups from pre-school institutions with general speech underdevelopment of the third level and with developmental delay took part in the experiment. The experimental group included 40 pre-school children and the control group included 30 pupils. Groups were formed on the basis of decisions made by psychological, medical and pedagogical commission as well as upon indicators of teachers (speech therapists) expert analysis.

Speech therapists, education psychologists and kindergarteners of groups took part in the implementation of the tested support programme.

Diagnostic programme of our research included individual samples of child-friendly battery of tests by A. R. Luria (T. V. Akhutina et al, 2012; J. M. Glozman et al, 2012). Complex correctional and developmental work based on the combination of kinetic and cognitive correction was being implemented individually and in groups on the forming stage during the academic year. Gaming methods including those ones that involve kinetic mediation of cognitive processes were predominantly represented in correctional and developmental programmes. Selection of game tasks, its number and complexity were personalized as they were determined by neuropsychological status of the child.

Results

To assess factors dynamics the intermediate diagnosis on individual tests (dynamic praxis, reciprocal coordination, tardive motor memory, correction task and compilation of the story according to the pictures) was made after the 1st stage of the support programme (two months of correctional work). Positive changes on the majority of the test items representing age-specific dynamics of regulatory functions formation were observed in both groups. Changes comparison of the studied characteristics in the control and experimental groups according to the Mann-Whitney U-test revealed more significant positive dynamics in the experimental group on such characteristics as programme realization ($p=0.036$), mistakes of multiple organization ($p=0.008$) in the test for tardive motor memory, effectiveness of the correction task implementation ($p=0.043$) and compilation of the story ($p=0.003$) (Borisova E. Y. and Kozina I.B., 2016).

The programme of the resulting diagnosis that accomplished the support programme was completely on a par in its composition with the primary one. Comparison of positive changes intensity in the control and experimental groups (Mann-Whitney U-test) revealed statistic significant differences for the following: programme assimilation ($p=0.019$) and the element order ($p=0.015$) in the test for dynamic praxis; programme execution in the test for reciprocal coordination ($p=0.023$); effectiveness of task execution in the test for postural pose praxis with the left hand ($p=0.033$) and interhemispheric reciprocal interaction in the same test ($p=0.001$); effectiveness of task execution on oral praxis ($p=0.00001$); quality of redrawing ($p=0.021$); effectiveness of realistic images identification in the test for visual gnosis ($p=0.003$); logical correspondence of the story ($p=0.030$) in the task on compilation of the story based on the series of meaningful pictures; understanding of logical and grammatical schemes ($p=0.011$). These characteristics do not attain statistical significance but they can be considered as a tendency to improve time of compilation ($p=0.065$) and the number of words in the story based on the series of meaningful pictures ($p=0.065$). Generally, it can be stated that the implementation of the neuropsychological approach in support of the children with disabilities provides positive changes characterizing regulatory, praxic and gnostical processes.

Discussion and Conclusions

Comparison of the results of primary and final diagnosis allows to claim that without the introduction of neuropsychological correction elements in support of the children with disabilities it is difficult to expect a significant dynamics of the regulatory functions formation. At the same time, data of intermediate diagnosis clearly illustrates the need for long-term rather than short-term exposure.

One of the research tasks was the results analysis from the perspective of the linguistic environment specific features influence on the effectiveness of the correctional and developmental work. For this purpose, two subgroups matched according to the nosological characteristics were formed within the selection: 1 - children raised in families and speaking the same language, 2 - raised in a polylingual environment (mainly bilingual).

The statistical analysis (Mann-Whitney U-test) based on the results of the intermediate diagnosis did not reveal significant differences in the changes of the studied characteristics in the monolingual and polylingual experimental groups, but there was a different sensibility to the correctional influence of pre-school children from bilingual and monolingual families. In particular, it turned out that the improvements in the performance of the acquired kinetic programme were more characteristic for bilingual pupils. At the same time, training influence in the group of monolingual pupils is more noticeable in terms of reducing the mistakes of multiple organization. According to other characteristics that specify voluntary regulation, changes observed under the influence of training in the group of monolingual and polylingual pupils did not differ significantly in the intermediate diagnosis.

Comparative analysis of the results of primary and final diagnosis allows to observe significant differences in the changes intensity in mono- and polylingual experimental groups according to the following sixteen characteristics: programme assimilation in the test for dynamic praxis ($p=0.038$), programme execution in the test for reciprocal coordination ($p=0.11$), effectiveness of execution ($p=0.11$) and the character of the left hand execution ($p=0.041$) in the test for the postural pose praxis, as well as the number of kinesthetic ($p=0.05$) and areal ($p=0.038$) mistakes in this task ; effectiveness of tasks execution on oral praxis ($p=0.026$); quality of redrawing ($p=0.006$); the effectiveness of superimposed images identification in the test for visual gnosis ($p=0.005$); the productivity of rhythmical structures evaluation in the test for the auditory-motor coordination ($p=0.001$); auditory and verbal memory ($p=0.006$); the number of specific situational explanations with the exception of excessive things ($p=0.021$); naming of objects and actions ($p=0.006$); phrases composition ($p=0.023$), the story compilation according to the picture ($p=0.016$); time of story compilation based on a series of meaningful pictures ($p=0.034$). In all the above characteristics with the exception of the time of story compilation based on a series of meaningful pictures the more significant positive changes occurred in the experimental group of monolingual pupils. This allows to conclude that realization of the neuropsychological approach in correctional work with children has a more intensive impact on pre-school children who are brought up in monolingual families.

In order to clarify the situation typical for pre-school children who are brought up in polylingual families we consider the results of both experimental and control groups. Significant differences in changes intensity between the control and experimental groups turned out to be more characteristic of polylingual pupils, since in these subgroups there were revealed statistically significant differences in the greater number of diagnosable characteristics (5 in the monolingual group and 15 in polylingual group). This fact allows to suggest that absence of special support which takes into account the neuropsychological status of the child affects more negatively on pre-school children who are brought up in polyilingual families.

According to the results analysis the following can be stated:
1. The implementation of neuropsychological approach in support of the children with disabilities provides positive changes that characterize regulatory, praxic and gnostical processes.

2. Absence of correctional work that takes into account the neuropsychological status of the child with disabilities does not allow to provide a significant dynamics of the regulatory functions formation.

3. The more significant positive effect is provided if the correctional and developmental work is implemented for a long time (at least 6 months); short-term programmes are not sufficiently effective.

4. Implementation of the neuropsychological approach in correctional work with children has a more intensive impact on pre-school children who are brought up in monolingual families. Absence of special support that takes into account the neuropsychological status of the child has a more negative impact on pre-school children who are brought up in polylingual families.

Generally, the results analysis of the research confirms the effectiveness of differentiated correctional and developmental influence that is based on the important child possibilities that are defined according to neuropsychological status. The revealed tendencies determine the necessity of realization of psychological and pedagogical support of pre-school children with disabilities with a glance to both the neuropsychological status of the child and the specifics of the polylingual social and cultural environment.

Acknowledgements

The reported study was funded by RFBR and Government of the Mari El region according to the research project № 16-16-12004 a(p)

References

Akhutina, T.V., Pylaeva, N.M. and Hotyleva. T. Y. (2011), Neuropsychological approach in inclusive education. Inclusive education: methodology, practice, technologies. Proceedings of the International Scientific and Practical Conference. Moscow: Publ.MGPPU.p. 71-73

Akhutina, T.V. and Pylaeva, N.M. (2008) Overcoming the difficulties of teaching: a neuropsychological approach. Saint Petersburg: Peter.

Borisova, E. Y. (2015). The possibilities of neuropsychological diagnostic of the risk of formation of developmental disabilities in the preschool age. *Messenger of Mari State University*. 2015, 5(20), p. 65-70

Borisova, E. Y. and Kozina, I.B. (2016) Neuropsychological approach to the correction of the deficiency of regulatory functions in children of preschool age with limited health abilities. *European Social Science Journal*, 11. p.311-317.

Glozman, J. M.(2012). Neuropsychological screening: a qualitative and quantitative assessment of the data, Moscow: Meaning

Akhutina, T.V., Inshakova, O.B. (2012). Neuropsychological diagnosis, examination of writing and reading of younger schoolboys. Moscow.

State Support of Small Forms of Economy in the APK of the Republic of Mariy El as the Condition of Improving their Investment Activity

Firdaus Z. Gumarova, State University, Yoshkar-Ola city, Russia, gumarovaf@mail.ru

Elena N. Potekhina, Mari State University, Yoshkar-Ola city, Russia, vilor@mail.ru

Marina V. Kazakovtseva, Mari State University, Yoshkar-Ola city, Russia, marina290576@mail.ru

Abstract

The directions of the state support of small forms of managing in agrarian and industrial complex of the Republic of Mari El. The problems for concessional lending to agribusiness, recommendations to improve the investment activity of small agribusiness. One of the priority directions of the State program for the development of agriculture and regulation of markets for agricultural products, raw materials and food for 2014-2020 is the stimulation of the development of small forms of management, including peasant (farm) farms, individual entrepreneurs engaged in the production, processing of agricultural products and its sale.

Keywords: State support, small forms of management (ICEM), the peasant (farmer) economy, private farming, preferential loans, investment activity of subjects of agribusiness.

Introduction

The current state policy of development and support of the agroindustrial complex is now determined taking into account the really established multifaceted nature of agricultural production. Over the years of market reforms in agriculture the conditions have been created for contribution of the formation in the country of exactly multi-structure by forms of ownership, the organization of labor, the size of production and other parameters of agricultural production.

The Main Body of the Paper

First of all, these are the terms of land supply, the independent choice of the type of activity, the conditions for the production and marketing of its products. However, the adaptation of small forms of management to market conditions is connected with difficulties and problems that are now the subject of attention for the authorities and society (Gumarova, F., 2014).

The state today really realizes the importance and significance of small forms of management in the countryside, because they are no less effective than large and medium-sized farms. The development of small forms of management is an essential condition for the maintenance and further development of agricultural and non-agricultural activities in rural areas. Small forms of management provide employment for the bulk of the population engaged in agriculture. (Gumarova, F., 2014).

Support of the small forms management development is caused not only by the need to solve the problem of providing the population with domestic products. Large agricultural enterprises usage in this case is more profitable.

However, the course for the development of only large-scale production is industrially high-cost, besides, it does not solve the problem of rural residents' employment and the preservation of rural life. Solving problems on sustainable development of rural areas, providing the population with domestic food,

demographic problems, maintaining the ecological balance in the biosphere, increasing the interest of farmers in agricultural activities is possible only with systematic state support for the development of small forms of management.

As of 01.01.2016, there were 2046 peasant (farm) households in the Republic of Mari El. In the structure of agricultural output, the share of the farming sector and personal subsidiary farms in 2015 accounted for 39.4%. These forms of management account for 95% of potato production, 87% of vegetables, 56% of milk, 48% of meat.

Since 2012, the Republic of Mari El has been implementing measures for farmers start-up support and the development of family livestock farms, which provide grants for the creation and development of peasant (farm) farms.

The state program "Development of agriculture and regulation of markets for agricultural products, raw materials and food in the Republic of Mari El for 2014-2020" provides for measures to stimulate the development of small forms of management in the agro-industrial complex.
These measures are presented in the subprogram "Support to small forms of management" in four main steps:

1. "Support for Beginner Farmers". Within the framework of the main event to support start-up farmers, grants are provided for the creation and development of peasant (farm) farms.

2. "Development of family livestock farms on the basis of peasant (farm) farms." Within the framework of the main event for the development of family livestock farms, grants are provided for the construction or modernization of a family cattle-breeding farm. This support is aimed at increasing the number of family livestock farms established in peasant (farm) farms, in which activities are organized on the personal labor participation of members of the economy.

3. "State support of small business loans". This step provides grants for compensation of a part of expenses for payment of percent on credits of banks and the loans received in agricultural consumer credit co-operative societies by country (farmer) economy, personal part-time farms

4. . "Peasant (Farming) farms land plots ownership registration". In this direction, about 50% of the total costs required for cadastral work are provided from the federal budget, the remaining funds are from the budgets of the constituent entities of the Russian Federation and municipalities.

Evaluation of small business support of the Republic of Mari El

In the Republic of Mari El in 2012-2015, grants for the creation and development of peasant (farm) holdings to 69 start-up farmers and 15 peasant (farm) farms for the development of family livestock farms have been granted under the subprogram "Support to small forms of management". To implement these measures, 164.8 million rubles of budgetary funds and 54.4 million rubles of own funds of peasant (farm) farms.

The ongoing state policy of supporting small forms of farming in the countryside has allowed to expand the opportunities for access of small agricultural enterprises to subsidized bank loans and loans to agricultural consumer cooperatives within the framework of the State Program.

In 2015 credit institutions issued 161 loans and a loan of 38.7 million rubles on the development of small forms of management. The main beneficiaries were citizens, leading personal subsidiary plots that received 79.9% of the total amount of credit resources, peasant (private) farms accounted for 20.1% of the total volume of loans issued (Table 1).

Table 1: 2015 year small forms managing credit indicators

	Credit institutions Total		**For credit institutions, as % of the total volume of credits (loans)**				
	Contracts qty	Mln Rub	MYFF of JSC "Rosselkhozbank"	Branch of Mari El PJSC "Sberbank"	Other Banks	Credit Cooperatives	Total
Credits received for the development of the IFC	161	38,7	83,33	16,5	0	0,17	100,0
Including:							
LPH	157	30,9	99,79	0	0	0,21	100,0
KFH	4	7,8	18,1	81,9	0	0	100,0

The Mari regional branch of JSC "Rosselkhozbank" remains the largest creditor of small forms of management, the share of which in the total volume of loans granted in 2015 was 83.33% (compared to 2014, decreased by 13.06%). The share of Sberbank of Russia in the total volume of loans increased from 3.6% in 2014 to 16.5% in 2015 (Gumarova, F., 2014).

As of January 1, 2016, the volume of subsidized loans attracted by small forms of management was 289.7 million rubles. In 2015, subsidies were paid in the amount of 11.641 million rubles, including 9.748 million rubles from the federal budget and 1,893 million rubles from the republican budget of the Republic of Mari El.

Most actively for providing state support in the form of reimbursing part of the interest rate on long-term, medium-term and short-term loans, citizens who own personal subsidiary plots (94.6%) apply.

Analysis small business lending

The structure of subsidized loans in 2015 is presented in Table 2 (Gumarova, F., 2014).

Table 2: Structure of loan funds by directions of use in 2015

Loan objectives	**% to total volume of credits (loans)**	
	LPH	**KFH**
1	2	3
1. Crop production	14,8	100,0
Including:		
Season works	0,4	3,1
Construction (reconstruction) of greenhouse complexes	0	71,7
Purchase of equipment	14,4	25,2

2. livestock	77,6	0
Including:		
Season works	8,4	0
Construction (reconstruction) of livestock complexes	22,0	0
1	2	3
Purchase of equipment	1,2	0
Farm animals purchase	46,0	0
3. Spare parts and materials for the repair of agricultural machinery	6,3	0
4. Other purposes	1,3	0
Total	**100,0**	**100,0**

The problem of inaccessibility of credit resources for investment purposes for the medium and long term remains a particularly significant problem for the small-scale sector.

Evaluation of Investment Attractiveness

Increase of investment activity in the agrarian sector of the economy will be facilitated by the introduction of a new mechanism of concessional lending at a rate of 5% per annum from 2017.
Decree of the Government of the Russian Federation No. 1528 of December 29, 2016 approved the Rules for Granting Subsidies from the Federal Budget to Russian Credit Institutions (10 Authorized Banks) for a refund in the amount of the Central Bank of Russia's key interest rate for the incomes received by them for loans granted to agricultural producers and individual entrepreneurs engaged in the production, Processing of agricultural products and its implementation.

21.3 billion rubles were provided for these purposes from the RF budget. In accordance with the new procedure for subsidizing the compensation of part of the interest rate on loans is planned to be provided directly to authorized credit organizations, which will significantly simplify the process of obtaining state support for farmers, eliminating the diversion of their own working capital to pay interest on loans.

The state now sees the role and functional purpose of the peasant farms and private farms not only in the production sector, but also a little bit wider: first of all, the preservation of rural settlement and the rural way of life, the social development of rural areas, the development of forms of local self-government and the strengthening of their active representatives of small agribusiness, for self-employment, upbringing of the younger generation and, in general, preserving the health of the nation, its culture, the natural environment (Gumarova, F., 2014).

State support measures are applied to all forms of agricultural activities, including peasant farms, citizens who carry out entrepreneurial activities in the countryside without forming a legal entity.

The principle of fairness is observed. However, only those entrepreneurs who provide established reporting, declare their income, have legal land and technical means of production, can use the appropriate state support - that is, the state is now pursuing a policy of supporting a civilized, market-oriented entrepreneur capable of competing in matters not only of production, but also effective distribution, in access to credit and leasing resources, information and consultation provision.

Today, and moreover in the long term, state support is available only to effectively functioning economic entities, which give a return in the form of additional production growth, paying taxes that can pay off on loans and leasing payments that have liquid assets and a positive balance sheet structure.

I must say that the share of the small sector in the subsidies received from the federal and republican budgets is insignificant. But in recent years, it has a dynamic of substantial growth. And they use various forms of state support precisely those entrepreneurs who are actively interested in all regulatory information, show business enterprise, who are really interested in strengthening their business, clearly sees their future prospects and is confident in the possibilities of developing their production.

A serious disadvantage and omission in the field of small-scale production is the lack of a coherent system of procurement and marketing of agricultural products produced in this sector, as well as the supply and maintenance of the private sector. It is the lack of an effective sales system based on high self-organization and cooperation that leads today to the lack of demand for this product, its noncompetitiveness in comparison with large suppliers.

In this regard, it is necessary to develop and support the creation of agricultural consumer cooperatives - marketing, supply, servicing, processing. As of early 2016, 37 agricultural consumer cooperatives were registered in the Republic of Mari El, including 18 credit, 3 processing and 16 supply and marketing cooperatives (Gumarova, F., 2014).

Preconditions for the Development of Small Business

Nowadays entering the auction individually, participation in competitions, form batches of certified products is almost impossible, and it is very expensive.

We need to unite in these issues, build a system of mutual relations based on cooperation and integration, taking into account the mutual interest and economic opportunities in the market.

Prerequisites for this are - there is still and still potential in the sector of private household plots and farm production, there is an economic incentive for the production of agricultural products - and it is determined primarily by the effective demand for food. Therefore, the small sector of agrarian entrepreneurship needs to intensify and coordinate work in terms of winning and retaining its positions in the market.

Within the framework of the State program in the development of small forms of management, the activity of rural entrepreneurs and residents remains very low. The reason for this, first of all, is the insufficient work at the municipal level of rural settlements with the population, its awareness and counseling.

Today, it is not enough just to convince the population, it is necessary to cover the positive experience of the work of farmers, personal farmsteads, and saturate the regional press with the necessary information that contributes to the increase of entrepreneurial activity of the population. The village will be able to survive and become rich only when each of its residents becomes an enterprising and diligent master.

The introduction of the food embargo against Russia caused a radical revision of the state program for the development of agriculture. The agrarian complex faces new tasks, including ensuring food security of the country in conditions of sanctions pressure.

Direct import restrictions cause, on the one hand, an increase in domestic food prices, and on the other hand, these same restrictions open large commodity niches for the domestic commodity producer. A sharp weakening of the ruble also increases the competitiveness of domestic goods, and given the improvement in the economic situation in the industry and the increase in the level of state support, agriculture has every chance to reach a higher level of production.

Summary

For Russia, the increase of competitiveness of agricultural products is essential, since today the main task is to provide the country with quality food of our own production and substitution of imported goods due to the pro-duction of competitive, best-selling products in the domestic market.

Among the important characteristics of the competitiveness of agricultural products, raw materials and food, you can highlight the presence of the optimal ratio of quality and cost indicators, achieving better results than competitors, and correlation with effective demand (Potehkina E. N. 2014)..

The product is competitive on the market if it has a set of attractive consumer, quality and value of properties, which in the conditions of a broad proposal provides customer satisfaction and commercial success to producers.

There is a direct dependence of production efficiency from the level of product competitiveness, as competitive products is more fully meet the needs and always finds its market, guarantee the financial stability of the company, as well as getting the profit.
For improvement of the competitiveness of agriculture in Russia will be contributed: Improvement of the secondary market of agricultural machinery; the use of resource-saving and environmentally friendly technologies; innovation in the sector; regulating the volume of exports of mineral and organic fertilizers; wage increases; the reform of credit policy.

Formation of a balanced system of management accounting will promote a competitive advantage to agricultural producers as part of their marketing activities through trading networks (Potehkina E. N. 2014).

At the same time, the understanding and attention of society and the state to the general problems associated with the technical backwardness of the industry, the disparity of prices, its high energy costs, high production risks are perceived by the Government of the Russian Federation as urgent, and therefore will certainly be resolved.

Acknowledgement

The reported study was funded by RFBR and Government of the Mari El region according to the research project № 17-12-12013

References

Law of the Republic of Mari El dated 03.12.2004 No. 54-Z "About state support of agriculture".

Decree of the Government of the Republic of Mari El of November 20, 2012 No. 428 "About the State Program for the Development of Agriculture and Regulation of Agricultural Products, Raw Materials and Food Markets in the Republic of Mari El for 2014-2020".

Gumarova, F., 2014. The development of small business as the basis for the stability of the region's economy / Actual issues of improving the technology of production and issues of improving the technology of production and processing of agricultural products: Mosolov readings: international scientific-practical conference materials. Issue. XVI / Mar. State. Un-t. - Yosh., 374-378.

Website of the territorial organ of the Federal State Statistics Service for the Republic of Mari El - http://www.maristat.gks.ru/

Potekhina, E., 2015. Management accounting as a tool for improving the competitiveness of enterprises. Mediterranean Journal of Social Sciences; p-ISSN: 2039-9340 / e-ISSN: 2039-2117, 425-430.

Assessment of finance and investment potential of companies

Taipova Elvira, South Ural State University (National Research University), Chelyabinsk, Russia, sss3101@yandex.ru
Zelenskaya Jeanne, South Ural State University (National Research University), Chelyabinsk, Russia, zhalenz@yandex.ru
Kolegova Irina, South Ural State University (National Research University), Chelyabinsk, Russia, kolegova-irena@yandex.ru

Abstract

The article considers the problem of Russian fixed funds depletion, primarily, the industrial companies' funds depletion caused by the absent or insufficient investments. The method to study the investment volume is based upon the statistical reports provided by Rosstat and the Bank of Russia. The purpose of the paper is to analyze the provisions on fixed capital investment at Russian companies within 2014-2016 both in general and structural terms, to identify the reasons for investment bust and the deformation of the investment activity financial&resource base. The companies' fixed funds require investments to provide their technology upgrade. It is necessary to develop a nationwide finance and investment strategy aimed at the investment activity boosting in Russian companies and resolving of financial issues. This is the only way to make the Russian economy develop and grow as well as to push its international competitiveness. The main source of funding the investments into fixed assets of the companies is depreciation deductions and a depreciation reserve developed by a company. However, the situation is the following: due to high fixed assets physical wear and funding absence, depreciation deductions are formed as a result of the re-evaluation of those fixed assets that are seriously worn-out. Indeed, it cannot provide for a real depreciation base. The article is finished by the summarizing of regression peculiarities of the investment financial support in Russia and the conclusion emphasizing the great importance of industrial investments.

Keywords: investments, reproduction rates, depreciation deductions, financial&resource base.

Introduction

Investments into fixed capital are the most important means ensuring the economic crisis overcoming and technical re-equipment of Russian companies. The intensification of investment activities in Russian companies as one of the key strategic directions for the national economic system stabilizing and development requires integrated financial support.

The current economic situation in Russia significantly complicates the financial support of investment activities intended at fixed assets renewal. The introduced international sanctions dramatically limited the access Russian companies and banks have to the international system of long-term borrowings and led to the decrease in foreign investment inflow. The mid- and long-term solution of these issues relates to the specific nature of market positions, the sectoral structure and financial support of the companies' investment activity. It is necessary to conduct the investment activity strategic planning with the account of the formed international and national economic conditions based upon the analysis and evaluation of diversified financial sources.

Despite the achievements in the investment theory development within foreign and national Economics of the XXth - beginning of the XXIst centuries, the methodical basis of this activity type does not sufficiently meet the contemporary and more complicated requirements laid down for the funding of the finance&investment strategy implementation by the companies. Under current economic conditions one shall pay special attention to the funding of Russian industrial companies' development strategy, boosting of their investment activity which will provide for a multiplicative effect and result in the economic growth in all the sectors of the Russian economy. However, the national literature does not pay sufficient attention to the study of investment activity financial support issues at large industrial companies as opposed to the study of investments to the financial and trade sectors. Under contemporary market competitive requirements and the implementation of measures within the public policy aimed at the Russian industry upgrade the aforementioned problem is even more relevant.

Results

The research of finance&investment strategy development issues occurring at Russian industrial companies is impossible without a preliminary consideration of their current investment activity and funding problems. The actual level of insufficient investments and fixed assets obsolescence at Russian industrial companies as well as the total costs necessary for their recovery are clear if we analyze fixed funds reproduction rates (Fig. 1) (Investments in Russia, 2015).

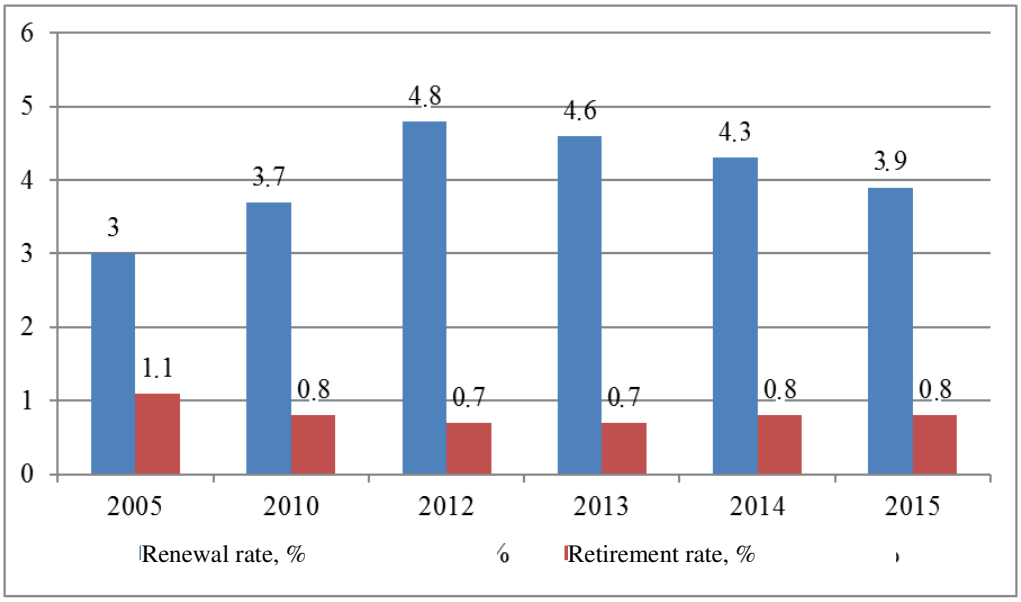


Fig. 1. Dynamics of fixed funds reproduction

Q2, 2016, was the 10th consecutive quarter of the fixed capital investment reduction (in comparable prices over a full range of organizations) in Russia. The reduction in 2014-2016 was preceded by a virtually zero investment dynamics in real terms during 2013. In 2014 the investment volume decreased by 1.5%, in 2015 - by 8.4% (returning to the value of 2008) while the annualized decrease in the 1st half of 2016 was 4.3%. The decrease rate is becoming slower, and in general, in 2016 the investment volume decreased by 2.7% while in 2017 the investments are anticipated to grow by 0.3%.

In the first half of 2016 the investment reduction rates in large and medium organizations slowed down even more compared to a full range of organizations with the annualized value of 1%. The investment reduction in 2014-2016 is different from the crisis occurred in 2008-2009 in such a way that during the previous crisis the investment bust was harsh and significant while the second period is characterized by a prolonged gradual decrease due to the opportunities that changed for the worse in terms of capital investments over a wide range of sectors and regions.

Let us consider a specific structuring of investments in 2005-2016: into dwellings, in buildings (except for residential ones) and erections, in machines, equipment and vehicles (Fig. 2).

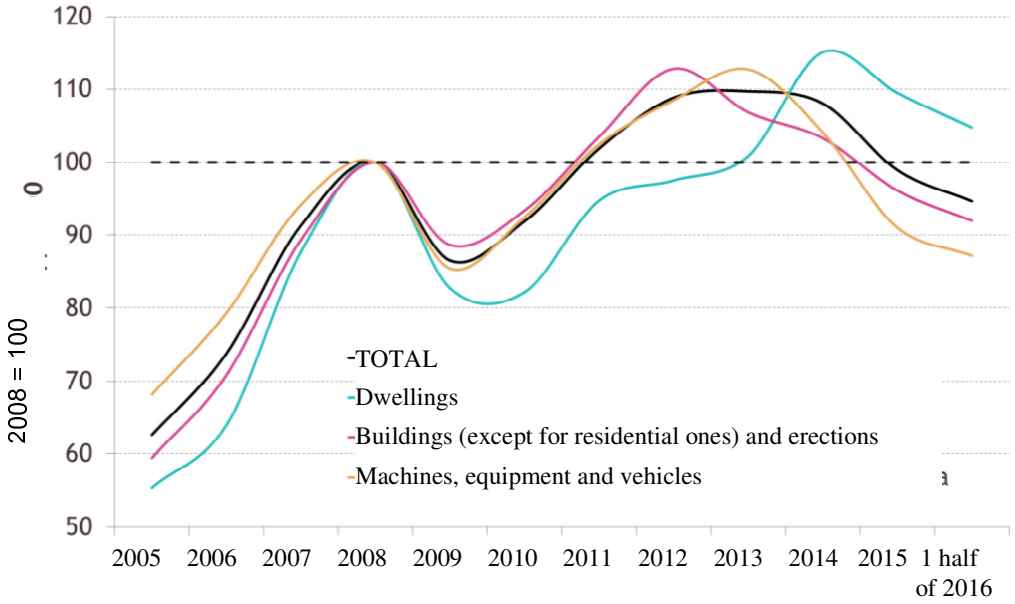


Fig. 2. Dynamics of investments on the fixed funds types in fixed prices, 2005 – Ist half of 2016 (Fixed Capital Investments …, 2016)

The investment volume reduction (large and medium organizations) was quite even among the key fund types for the last year which resulted in quite an insignificant change of the investment specific structuring in the 1st half of 2016 comparing to the 1st half of 2015: the investments in buildings (except for the residential ones) and erections made 47.9% of a total volume of capital investments (47.7% in the 1st half of 2015), in machines, equipment and vehicles - 34.4% (34.2%), in dwellings - 6.1% (5.6%). As more than a half of capital investments are intended for construction purposes, the investment reduction leads to stagnation at the construction market: by the end of the 1st half of 2016 the scope of construction works decreased by 5.7% in per year terms.

Reasons and consequences of negative dynamics

Besides equipment obsolescence, it also suffers from physical wear; these factors resulted in emergence of the Russian production structure characterized by its raw material orientation. One can observe a large-scale degradation of the production funds of Russian industrial companies, and the economy is now going through a structural crisis.

The Russian economy investment area suffered the greatest damage from the international crisis. Its consequences manifested not only in a significant decrease of the scope of works but also in a dramatical distortion of the investment activity's developed trends. The analysis conducted for the structure of investments made into fixed capital according to the funding sources revealed significant deformations of a finance&resource base of the investment activity. The share of proprietory funds in the structure of funding of the fixed capital investments increased up to 57% in the 1st half of 2016 due to a harsh decrease of the raised funds volume. As a rule, the access of organizations to the raised funds is limited during the investment slowdown period. Back in 2014, because of such limitation of the access to external funds (due to increased interest rates as well), the share of raised funds in the fixed capital investment funding structure at large and medium organizations dropped below the level of 50% (Table 1) for the first time since 1999. The data for the 1st half of 2016 demonstrate the situation did not significantly changed over the previous year: the proprietory funds share reached 56.5% being equal to 56.2% in the 1st half of 2015 (by the end of the year this value is usually lower) while in the 1st half of 2014 it was 52.5% (Table 1) (Kiryanov, Ye. O., 2017).

Table 1. Dynamics of investments into fixed capital (large and medium organizations) on financing sources as of the 1st half-year results, 2014-2016

	1st half-year, 2014		1st half-year, 2015		1st half-year, 2016		Change of fixed prices, 1st half-year, %		
	billion rubles	share, %	billion rubles	share, %	billion rubles	share, %	2015/ 2014	2016/ 2015	2016/ 2014
Investments into fixed capital, total	3579	100	3633	100	3921	100	-7.3	-1.0	-8.2
proprietory funds	1879	52.5	2043	56.2	2217	56.5	-0.8	-0.4	-1.2
raised funds:	1701	47.5	1590	43.8	1704	43.5	-14.5	-1.8	-16.0
bank loans	370	10.3	322	8.9	314	8.0	-19.9	-10.9	-28.6
including foreign bank loans	51	1.4	83	2.3	71	1.8	52.3	-22.1	18.7
debt funds of other organizations	244	6.8	197	5.4	302	7.7	-26.4	41.2	3.9
public funds:	445	12.4	465	12.8	482	12.3	-4.3	-4.9	-9.0
federal budget funds	213	6.0	249	6.9	260	6.6	6.6	-4.9	1.4
regional budget funds	199	5.5	183	5.0	192	4.9	-15.7	-3.0	-18.3
local budget funds	33	0.9	32	0.9	30	0.8	-7.3	-15.8	-22.0
extra-budgetary funds	7	0.2	8	0.2	9	0.2	-7.3	13.6	5.3
shared-equity construction funds of organizations and population	115	3.2	115	3.1	136	3.5	-10.2	10.8	-0.5
other raised funds*:	495	13.9	449	12.4	432	11	-17.3	-12.0	-27.3
overhead organizations	410	11.5	346	9.5			-23.4		
from corporate bond issuance	4	0.1	48	1.3			1105		
from stock issue	41	1.2	16	0.4			-69.1		

*Since 2016 Rosstat stopped publishing separate data for the category "other".

The capital spending nominal volume keeps growing but the investments made in the 1st half of 2016 lowered by 8.2% in comparable prices to the 1st half of 2014. This decrease is mainly due to the raised funds which have reduced by 16% for the last two years while the proprietory funds decreased only by

1.2 for the same period. The greatest part of such drop was made by "other raised funds" (-161 billion rubles in the prices of 2016, essentially, the overhead organizations' funds), bank loans (-126 billion rubles) and public funds (-47 billion rubles). At the same time, in 2016 the decrease rates slowed down while certain funding types started to recover, primarily, the debt funds of other organizations (apart from banks).

Investment activity funding sources

The market-driven economy conditions stipulate for the companies' proprietory funds to be the basis of the investment activity funding. In terms of the problem analysis it is logical to make the next step towards the specification of the self-funding opportunity for the companies' development bearing in mind their proprietory funds - depreciation deductions and profit (Daskovskiy, V. and Kiselev, V., 2014).

The developed trend for investment activity real funding does not correspond to the existing concept of the companies' development self-funding; their development opportunities keep reducing and are close to the end (Moskvin, V., 2015). That is why one can observe a continuing decrease of the proprietory funds share in the fixed capital total volume.

Government lending and borrowing in relation to the companies' development that lightens the budget burden by means of the reduction of grant funding for a number of investment programs and increasing the number of paid ones at moderate prices as well as by means of repayment of the credit resources contributing to the public budget is not organized in Russia. This means there is no opportunity to alleviate the investment funding for the budget and companies or to boost competition in the bank system to reduce the number of the speculative operations and interest rates of commercial banks.

Continuous deteriorating of the production means quality in the national economy leads to the reduction of the depreciation base. To limit the negative impact of this process as well as to control inflation, in 1992-1996 fixed assets were re-evaluated on the nationwide level (Daskovskiy, V. and Kiselev, V., 2013). Initiative never-ending re-evaluation of the companies' fixed assets has been conducted since the mentioned period until the present moment. The reported level of production means wear was 49.4% as of the beginning of 2015. These data demonstrate that, in compliance with the official numbers, more than a half of the depreciation base having physically worn out fixed assets is preserved by means of the accounting procedures. Today there is an abnormal situation in Russia's economy when fixed assets are renewed not by replacement with the new ones but by means of their cost re-evaluation which becomes higher after their upgrade (Daskovskiy, V. and Kiselev, V., 2014).

Most developed countries are characterized by the trend when the investment activity funding is performed by means of proprietary funds with a significant increase of a depreciation share. In Russia we can observe the opposite. Even at the favorable economic development stage the dependence on raised funds and profit demonstrates the growth trend while the significance of depreciation funds becomes lower.

Overview of the current state of the issue

The overview of Russian leading industrial companies' activities makes us draw a conclusion on the low level of their economic activities' efficiency. Thus, machine construction companies representing the key industrial sector are not capable of providing production means renewal and increasing the output products competitiveness. At the moment, Russian industrial companies are not ready to implement large-scale programs for technical re-equipment and production capacities reconstruction. Taking into account the profitability of the business activity implemented by Russian industrial companies, one can draw a conclusion on the depreciation base depletion (Chernenko, V. A. and al., 2015).

Low efficiency of modern Russian companies' functioning creates a vicious circle. The leaders of the economic sector are not capable of carrying on a large-scale investment activity due to the absence of any opportunity to use the depreciation reserves and profit. In its turn, the depreciation fund and profit cannot grow due to the absence of renewed fixed assets in the company; such renewal is impossible due to the absence of investments.

Unfortunately, by today the information on the specific large companies has not been issued anymore. However, with the account of the fact that in 2005 the profitability of sold goods and services was equal to 13.5%, decreasing to 9.3% by 2015, one can make a conclusion that there are no conditions to perform investment activities aimed at the renewal of the real production companies' fixed assets. Today the situation has seriously changed for the worse. Even the leading companies of the national economy are not capable of providing for production means renewal and financial state stability under contemporary conditions. Large business is focused on the infrastructure improvement, redistribution of the national and accretion of the foreign property. The article shows a severe deficit of investments which not only provide for the current needs but also cannot reach the level of 1990 which stipulates for the necessity to introduce a special responsibility and discipline while using the available opportunities for investment resource formation.

Let us consider investments from a structural point of view. The most efficient investments are direct ones as they are capable of direct embodiment into up-to-date technology and equipment. But their retardation comparing to other investment types is 3.4 times according to the statistical data.

A great part in the development of the national economy is given to foreign investments. However, they have their disadvantages which include their unpredictable nature as the volume, the time, the territory and the sector of such investments are unknown. Besides, in contrast to the national investments, the foreign ones can be exported in the form of depreciation deductions and net profit (Gerasimov, P. S., 2013).

Similar to the first decade of this century (except for 2006 and 2007), in 2015 the financial account of Russia's payment balance was closed with the exceedance of private capital export over its import. In relation to the private capital flow such exceedance was equal to 58 billion of dollars and, although it was lower than the record-breaking value of 153 billion dollars (for post-Soviet Russia) in 2014, it was not lower than in 2012-2014. Such exceedance of export over import has remained a characteristic one for all the forms of international capital flow both in and from Russia: direct investments, portfolio investments, derivative financial tools, other investments (Table 2) (Bulatov, A. S., 2016).

Table 2. Balance of payments of Russia, billion dollars

Indicator	2013	2014	2015
Net lending (+) / net borrowing(–) (Financial account balance including forex/gold reserves)	24.1	24.3	74.3
Direct investments	17.3	35.1	16.7
Net acquisition of financial assets	86.5	57.1	21.8
Net incurrence of liabilities	69.2	22.0	4.8
Portfolio investments	11.0	39.9	26.6
Net acquisition of financial assets	11.8	16.7	14.0
Net incurrence of liabilities	0.7	-23.2	-12.7
Derivative financial tools	0.3	5.3	7.4
Net acquisition of financial assets	-8.5	-16.6	-21.2
Net incurrence of liabilities	-8.8	-21.9	-28.7
Other investments	17.6	51.5	21.7
Net acquisition of financial assets	80.8	24.8	-15.1
Other capital participation	0.7	0.2	1.0
Foreign cash	-0.6	41.8	-19.7
Current accounts and deposits	17.1	-18.8	-2.8
Loans and borrowings	21.2	-20.2	-1.0
Insurance, pension and standard guarantees programs	0.6	1.5	0
Trade credits and advance payments	7.6	7.1	5.5
Arrears in goods delivery within intergovernmental agreements	1.1	-1.3	0.5
Questionable transactions	26.5	8.6	1.5
Other accounts receivable	6.5	5.8	-0.1
Net incurrence of liabilities	63.3	-26.7	-36.9
Other capital participation	0	0	0
National cash	1.8	-1.0	-0.9
Current accounts and deposits	16.2	-20.1	-32.6
Loans and borrowings	43.6	-8.9	-2.8
Insurance, pension and standard guarantees programs	0.2	0.7	0.2
Trade credits and advance payments	0.2	0.4	-0.6
Other accounts payable	1.3	2.2	-0.2
Special borrowing rights	0	0	0
Reserve assets	-22.1	-107.5	1.7

The reduction of direct investments' export and import started in 2014 and continued - in 2014 their flows were reduced to the minimum value since the middle of the last decade. Combined with the cheapening of the Russian companies' cost abroad due to the economic growth fluctuations in most world countries as well as the foreign companies' cheapening in Russia, it led to a further decrease in the volume of direct investments accumulated abroad by Russian residents (by 1.4 times for 2013-2015) as

well as in the volume of direct investments accumulated by non-residents of Russia (by 1.6 times for the specified period). Besides, one could observe the reduction of foreign derivative financial tools accumulated by Russian residents and even a greater reduction in Russian derivative financial tools accumulated by non-residents.

The situation is different in the area of portfolio investments. Since the middle of the last decade Russian investors continued to buy foreign bonds in a record-breaking scope which resulted in the growth of the accumulated portfolio investments from 54 billion dollars in 2013 up to 57 and 71 billion dollars in 2014 and 2015, correspondingly. At the same time, foreign investors disposed of Russian shares and bonds and, as a result, the volume of their accumulated Russian securities kept reducing - from 195 billion dollars in 2013 to 111 billion dollars in 2014 and 102 billion dollars in 2015 (International Investment Position …, 2016).

The flows of other investments were versatile in 2015. Thus, Russian residents kept reducing their foreign cash as well as their foreign currency savings at current accounts and deposits (especially in the 1st half of the year due to slowing of a harsh drop of the ruble value) while non-residents kept reducing their savings in rubles (due to ruble devaluation). The reduction of the non-residential accumulated volume of loans and borrowings that started in 2013 but stopped in 2014 continued despite the fact the trade credits and advance payments become available for them again. Considering the loans obtained from non-residents, similar to 2014, the volume of such loans kept reducing, and moreover, the accumulated volume of trade credits and advance payments received from non-residents started to reduce as well due to decrease in the volume of Russian services and goods import. The greatest reduction was observed for foreign currency liabilities of Russian banks (by 60 billion dollars).

We want to underline and draw your attention to the reduction in the volumes of the item "Questionable Transactions" which has been continuing for the 3rd year; this item includes the transactions that are characterized by fictitiousness features and relate to the trade of such services and goods, purchase/sale of such securities and allocation of such credits and transfers to the proprietory foreign accounts which have the purpose of trans-border funds movement. One can assume this is the result of the intensification of bank and customs supervision in our country as well as the campaign of a higher transparency of the offshore activity; such campaign is dynamically developing both in our country and abroad.

Harsh drop in the currency interventions implemented by the Central Bank in 2015 combined with the growth of the current transactions' account balance in the middle of the previous year stopped the reduction of the reserve assets (international reserves) while in the second half of the previous year such reserves slowly started to recover (up to 386 billion dollars by the year-end). As a result, the financial account balance was closed with the record-breaking exceedance of net lending over net borrowing registered after 2011 (by 74 billion dollars). Such increase of the financial account balance was observed in 2010-2011 when Russia's economy was recovering from the crisis of 2009. One can suggest that the growth of the financial account balance started in 2015 also demonstrates the recovery of the economic growth in Russia.

According to the preliminary estimates of the Bank of Russia, the proficit of the current transactions' account for the first four months of this year has been equal to 16.3 billion dollars against 37.3 billion dollars in the comparable period of the previous year. This is the result of a slower reduction of goods import with a high reduction of goods export. It is possible that slowed import rates also speak for the Russian economy recovery from the crisis. The trend of increasing the global oil prices for the considered period is also a piece of good news.

The financial account for January-April 2015 is characterized by similar trends: the volume of foreign assets accumulated by residents kept reducing very quickly while the volume of assets accumulated by non-residents in Russia (i.e., Russia's external liabilities) reduced slower. As a result, net capital export was equal to 12.8 billion dollars which is more than 3.5 times less comparing to the similar period of the previous year (Evaluation of Key Payment Balance …, 2016).

The growth of reserve assets which started in the second half of 2015 continued - from 368 billion dollars in the early 2016 they grew up to 396 billion dollars by May mostly because of monetary gold the reserves of which reached their record-breaking value of 1478 tons (Evaluation of Coming Changes …, 2016).

However, taking into account the physical facilities wear and the weakness of Russia's financial system, there are still no prerequisites for annual admission of 100 billion dollars of the foreign direct investments. We believe that such situation resulted from an obvious corruption component and a permanent crisis state of Russia's economy nullifying all other investment climate advantages existing in the country.

Today's foreign investments attracted to the mineral deposits extraction and initial processing cannot be satisfactory both in terms of their volumes and results, neither they can be considered as an important factor of the investment upgrade in Russia's economy.

At the contemporary stage one can observe the trend for the increase of direct investment volume in the Russian companies abroad. The general growth of direct investments is also impressive. The large-scale expansion plans of the foreign economies are developed by public companies. Alongside with the natural resources and intellectual capacities, financial resources are becoming a significant factor of Russia's presence in the global economy. The investments made into foreign companies decrease the level of production expenditures and provide for special conditions both in terms of export and products sale at the national market. Besides, the cost of borrowed financial resources is lowering while the offer price at IPO is increasing. Summing up the aforementioned, one can conclude that direct investments to abroad provide a synergistic effect for the development of a parent company which involves positive changes for the Russian economy in general.

However, one shall consider negative aspects as well. The investment outflow to abroad deprives Russia's taxation base of the opportunity to expand, but at the moment the taxation system is not able to support the public budget at the non-deficit level without any income from the sale of hydrocarbons at high prices at the international market. As the investments are intended for the purchase or manufacturing of the production means (including innovative ones) abroad, it leads to the loss of thousands of jobs in Russia. Investment resources and tax deductions thus develop foreign countries instead of solving Russia's internal problems. At the same time, in terms of the integration of transnational corporations, the production means takeover abroad is aligned with their strategy and promotes business efficiency enhancement at the global market.

Under these conditions Russia is characterized by industrial technology underdevelopment, losses and a humiliating role of the raw material supplier but not the supplier of ready products. This view leaves in serious doubt the assumption on the efficiency of investment export abroad. Thus, if one invest the financial resources exported abroad in the national agricultural sector, it will be possible to decrease the share of food import and increase the volume of tax deductions in the budget. Besides, it will improve a social an economic situation in villages.

Investing in national companies can result in a much wider range of possible advantages for the Russian population comparing to one from investing abroad. Thus, 28 key oil refining companies in Russia include six that were commissioned before 1940, six more were commissioned before 1950 while eight of them - before 1960. It turns out that 20 of 28 companies are 50-60 years old. As a result, oil refining capacities decreased to 83% of the 1994 level due to retirement because of a critical physical wear of assets. The loading of the remaining capacities is not full as well: low quality of products, insufficient refining depth, and high net cost. Additional loading of the oil refineries is provided by the refining depth deepening and making the oil product quality correspond to the export standards which requires 12 billion dollars that cannot be found in the internal turnover. Due to technical underdevelopment the income from oil products export is lower than one from crude oil sales.

From the economic point of view, the situation when the investments, in contrast to the foreign ones, are exported abroad under the conditions of a sever investment lack in the country is inadmissible. Furthermore, it is absolutely inappropriate that raw material companies forward large credit facilities abroad and not for the development of the national industrial production pledging natural subsoil resources they do not own for foreign loans' obtaining.

The investment mobilization for innovative production upgrade from the public savings is recognized as undesirable although the economy transition to a higher level requires to take this measure (Yegorov, A. Yu. and Selskov, A. V., 2015).

It is necessary to specify the situation of the economy innovative renewal with the account of all investments (Table 3). One shall take into consideration that starting from 2013 the fixed capital investments include the ones made into the intellectual property items: scientific, literature and artistic works; software and data bases for computers, inventions, utility models, industrial samples, selection achievements, costs for performed intangible development, costs for research, development and technological work, etc.

Table 3. Investment patterns and structure in Russian Economy (Russian Statistical Annual Report, 2016)

	2000		2008		2012		2015	
	billion rubles	%	billion rubles	%	billion rubles	%	billion rubles	%
Total volume of Russian and foreign organizations' investments	3162	100.0	40,693	100.0	89,945	100.0	141,818	100.0
Intellectual property items, R&D and other non-financial assets investments	18	0.6	89	0.2	173	0.2	148	0.1
Fixed capital investments	1165	36.8	8782	21.6	12,586	14.0	14,556	10.3
- dwellings investments	132	4.2	1194	2.9	1534	1.7	2189	1.5
- buildings' (except for residential ones) and erections' investments	502	15.9	3742	9.2	5560	6.2	6028	4.3

- machines, equipment and vehicles investments	427	13.5	3312	8.1	4732	5.3	5052	3.6
- other investments	104	3.3	534	1.3	761	0.8	1288	0.9
Financial investments	1245	39.4	26,402	64.9	67,725	75.3	127,114	89.6
Foreign investments, billion dollars	11		104		155		–	
Foreign investments billion rubles	308	9.7	2579	6.3	4803	5.3		
Russian organizations investments into foreign economies, billion dollars	15		114		150		–	
Russian organizations investments into foreign economies, billion rubles	426	13.5	2841	7.0	4658	5.2		

The investments made into machines, equipment and vehicles that were equal only to 8.1% in 2012 dropped down to a critical value of 5.3% while the funding of intellectual property, R&D alongside with other non-financial assets stopped at the level of 0.1-0.2%. The investment structure is intensively deteriorating: financial investments were 3 times higher than the investments in non-financial assets in 2008 while in 2012 they were 5.4 times higher. Their share in all investments over the considered period increased from 65 to 75.3%. The organization financial investments shall be understood as the investments of monetary funds or any other tangible assets into the securities of other legal bodies, interest-bearing bonds of public and local loans, authorized (joint-stock) capitals of other legal bodies incorporated in the territory of the country or abroad, etc. as well as the loans provided to other legal bodies. The excessive development of the considered direction is the result of the absence of control and management of the investment activity in Russia.

There is great discrepancy between the volumes into the active part of fixed assets and the retirement volumes of such fixed assets registered by Rosstat explained by the fact that 85% of these investments account not for non-recurrent but for the current cost the companies incur due to the repair of the equipment with its simultaneous upgrade. Only 15% of the investments made into the fixed assets active part participate in technical re-equipment. In 2008 the investments into equipment and vehicles were equal to 3312 billion rubles while the retirement of all fixed assets' types is registered in the volume of 429 billion rubles. Only 13% of the investments participated in the actual technical re-equipment.

In 2012 the investments made into equipment and vehicles in the amount of 4731 billion rubles resulted in the retirement of 0.6% of all fixed assets (702 billion rubles). Of course, this retirement included buildings and erections. However, even under the assumption that such retirement included only the active part of fixed assets, only 702 billion rubles were spent for its replacement. The remaining 4029 rubles (85%) accounted in the upgrade validated form as the investments are current assets the companies spent for the repair of the equipment with its simultaneous upgrade and not the lump ones. The division of the recorded investment into real capital spending and repair costs, 702 and 4029 billion rubles, correspondingly, demonstrates that only 15% of them participate in technical re-equipment.

In 2014 the investments made into the active part of fixed assets according to the statistical reporting show the tendency towards decrease and are equal to approximately 4856.3 billion rubles but only about 1540 billion rubles are forwarded for real technical re-equipment. They define the small part of retirement registered by the statistical numbers.

Summary of the issue

On the basis of the conducted research, one can identify the following peculiarities of the investment activity funding proving its regression:

1. The key purpose of the investment activity intended for fixed assets upgrade is the replacement of equipment with the highest wear level. Very often the replaced equipment is impossible to be operated due to its full physical wear.

2. The expansion of the market of the pre-owed fixed assets is under way with the increase of their purchase volumes by 2.89 times and their sales volumes by 3.61 times in the period of 2005-2014.

3. The equipment which does not change the production technology but increases the labour intensity of specialists and managers instead is being in a higher demand.

Conclusions

1. Today a great number of the industrial companies' fixed capital investments are the companies' investment costs for overhaul. Due to this peculiarity, the underdevelopment of physical facilities owned by Russian companies is conserved and aggravated as compared to the general global level.

2. The urgent issue of the Russian industry is deformation of the fixed capital investment funding structure and continuing inaccessibility of the "pre-market" volumes of the fixed capital funding (with an increased need in such funding) due to an incredible obsolescence of fixed assets over the last 20 years.

3. Due to the depreciation base depletion, the investment activity funding, including fixed assets renewal, is mostly provided with profit but not with depreciation deductions.

4. The bank system makes the minimum contribution to solve the problem of the innovative renewal of industrial companies. In general, the system of the institutional support of the economic material and technical facilities is not developed and built.

5. Industrial investments are the key factor ensuring the country's economic growth and development. The only way to protect the country from the global depression on the verge of which the global economy is to develop the national economy, fund the fixed capital investments and innovative development.

Acknowledgements

The work was supported by Act 211 Government of the Russian Federation, contract № 02.A03.21.0011, for which we are grateful to the Government of the Russian Federation.

References

Bulatov, A. S. (2016), "Russia in International Capital Flow in 2015 - beg. of 2016", *Analytical Report, MGIMO University; Laboratory of International Capital Flow,* 50.

Chernenko, V. A., Beregovoy, V. A. , Yuriev, S. V., Voronov, V. S. and al. (2015), "Relevant Problems of Corporate Finance", *Multi-author book.*

Daskovskiy, V. and Kiselev, V. (2013), "On Distortion of Measurements and Evaluations of Economy's State", *Investments in Russia,* 10.

Daskovskiy, V. and Kiselev, V. (2014), "Investments - Key Drive of Economic Growth and Development", *Investments in Russia,* 3, 5.

Daskovskiy, V. and Kiselev, V. (2014), "On Economic Growth and Development Management", *Investments in Russia,* 2.

Evaluation of Coming Changes of International Reserves and Other Liquidity in Foreign Currency of Monetary Control Bodies of the Russian Federation as of March 1, 2016, *Bank of Russia*. [Online], http://cbr.ru/statistics.

Evaluation of Key Payment Balance Aggregates of the Russian Federation in January-April 2016, *Bank of Russia*. [Online], http://cbr.ru/statistics.

Fixed Capital Investments and Their Funding Sources (2016), *Bulletin on Current Trends in Russian Economy*. [Online], [September, 2016], http://ac.gov.ru/files/publication.

Gerasimov, P. S. (2013), "Forecasting Investment Potential Parameters of Industrial Company at Innovative Activity Pursuit", *Transport Business of Russia,* 1, 19.

International Investment Position of the Russian Federation (2016), *Bank of Russia*. [Online], http://cbr.ru/statistics.

Investments in Russia (2015), *Stat. comp. Rosstat,* 190.

Kiryanov, Ye. O. (2017), "Building of Finance&Investment Strategy of Economic Entities (Exemplified by Russian Industrial Companies)", *Author's abstract by the Cand. of Economic Sciences,* 26.

Moskvin, V. (2015), "Influence of General Economic Decline on Savings Funding", *Investments in Russia,* 11, 23.

Russian Statistical Annual Report (2016), *Stat. comp. Rosstat,* 725.

Yegorov, A. Yu. and Selskov, A. V. (2015), "Management of Investment Potential of Industrial Corporation at Innovative Activity Pursuit", *Transport Business of Russia,* 3, 95.

Inter-Organisational Networks and Innovation Intermediation in the Digital Age

Gamidullaeva Leyla Ayvarovna, Penza State University, Penza, Russia, gamidullaeva@gmail.com

Chernetsov Michael Vladimirovich, Penza State Technological University, Penza, Russia, oksana_chernecov@mail.ru

Chistilina Elena Valeryevna, Financial University under the Government of the Russian Federation (Kursk branch), Kursk, Russia, shatoru@bks.ru

Abstract

Globalization of economics contributes to advancing innovation, developing inter-firm collaboration and network organizational structures, functional integration and technology transfer between firms, as well as with state, private laboratories, and universities. Consequently, there is a need for the search of partners, resources and ideas outside the company. In this connection, the concept of innovation intermediaries is gaining strength and recognition, which serve to establish or improve the relationship between all participants of the innovation system with complementary skill sets or interests. These intermediaries pursue the aim to support the generation and diffusion of innovation. Due to the active development of information and digital technologies in the international practice have gradually emerged new forms of innovation intermediaries, based on digital technologies. The article is also focused on the studying of network approach in the digital age and economic globalization. It reveals the causes of transition from the concept of national innovation system which dominated for years in economic theory and practice to the concept of regional innovation system with the use of innovation intermediary approach. The role of innovation intermediaries within regional innovation system is investigated in the paper.

Keywords: inter-organisational network, institutions, intermediaries, innovation system development, digitalization

Introduction

Russian policy makers are in the search of the optimal strategy of social-economic development. The escalation of geopolitical tension is aggravated by low functioning efficiency of the Russian economic system. It is believed that in a medium-term perspective, Russia is likely to curb recession and resume growth of GDP.

To reach this objective, along with effective political solutions there is a need for a new economic policy focused on consolidation of the economy, the development of which should follow, according to the majority of experts, the innovation path. The geopolitical crisis and the sanction policy towards Russia have revealed multiple implicit problems aggravated by the fall of oil prices as the main source of revenue, as well as by an extreme deployment of the import substitution and economic modernization

policy. It is worth noticing that the reverse side of the critical situation may become a powerful impulse of mobilization of implicit reserves for the development and implementation of existing capacities and capabilities of the Russian economic system. Consequently, the current situation should be considered as a real chance of fostering innovation and international economic integration of Russia. We must pay due attention to the fact that antimonopoly regulations and competition have played out. There are new challenges requiring a cardinally new methodological approach to the analysis and scientific understanding of principles and mechanisms of economic development (Vasin et al., 2017).

According to a number of researchers (Jill, 2002; O'Hagan, 2017), the world economy is becoming global, and globalization of economics is understood as the economy which functions as a whole in real time and space independently of the fact if it is concerned with capital, management, labour, technology, information or markets. In modern research literature on globalization the term "glocalization" is more and more often used. According to its dictionary meaning, the adjective "glocal" and the noun "glocalization" are formed by "merging the concepts of global and local".

In the early 1990s R. Robertson (1987), an English sociologist, defined this term as universalization of particularization and particularization of universalization. For Ritzer (2003), globalization is glocalization plus globalization. Globalization means imperatives of growth inducing "organizations and nations to expand globally and prevail over local". Regionalization of innovative activity is closely connected with the process of globalization. K. Ohmae (1993) states that in the world, where borders are gradually and increasingly disappearing, the region is becoming a "natural" economic area. Consequently, the efficiency of the national innovative system functioning, its competitiveness depends significantly on dynamization of innovative processes at the level of particular regions. The given fact is supported by the practice of foreign countries development where the current intensive economic growth is mostly provided by effective regional systems in innovative sphere.

In this context the scientific world as well as the world politics increasingly demand theories of regional development. Among them the following theories are worth mentioning: neoclassical development theory, agglomeration theory, M. Porter's competitive advantage theory, regional clusters theory, regional innovative growth model, technical and economic paradigm concept, etc. Currently, the interest of the scientific world in this issue causes the emergence of new theories and concepts of regional development.

Literature review

An important point is considering the changing essence and content of the concept "region" under the conditions of globalization. According to a number of researchers (Held et al., 2000) there is intensification of various relations on the global scale, and globalization means expanding, advancing and accelerating world-wide relations. Economic globalization is understood as a tendency to establish common investment environment and an integrity of national capital markets. Thus, it is a combination of processes of spatial merger of capital markets, goods, services and financial tools which are accelerated under the influence of competition at the innovation technologies level. Under globalization there is a growing importance of network as a form of representing complex systems. Recent research of innovative process emphasizes the importance of network in providing success for innovations, thus transforming the traditional model, which characterizes innovations as a linear sequence originating from fundamental research by means of product design, manufacturing and marketing. Currently innovations are viewed as

an interactive process which requires intensive movement of facts, ideas and data in the firm's internal and external environment.

Inter-organisational networks have been one of the fastest developing topics in management science over last two decades. Recently the concept of network has made a breakthrough in the theory of territorial economy after it began to be actively used in different forms and meanings in many disciplines. The concept of innovative network has a wide character. This definition encompasses innovative networks promoted by large European programmes which connect firms and other establishments from different countries, sectors into competitive innovative environment that is used by small and medium-sized business to implement innovative projects. If the purpose of cooperation is not connected with innovative activity, the mere fact of cooperation with other firms increases innovative opportunities. In its easy sense, network can mean a group of cooperating firms; the particular group can represent an innovative system, supply chain, cluster, or any other type of interfirm relations. Networks can connect only a couple of firms, or they can be quite wide, including the whole industry. They can focus on one type of activity, for example, education or a particular engineering problem, or on activity within the framework of the whole value chain. The duration of network can be limited by lifecycle of one product or current ones, or by that of all projects. Network can be supported by formal relations or it can be not.

In our opinion it is Tijssen's (1998) definition that reveals the most adequately the major features of network approach. In his view, a network is a developing system of mutual dependence based on resource interconnections where the system character of the latter is the result of interactions, processes, procedures and institutionalization. Creating, integrating, exchanging, transforming, incorporating and using resources within a wide range of formal and informal relations constitutes activity within the framework of such network.

It is evident that the nature of networks is quite diversified. Networks are so complex that theorists are not able to define an ideal network, although, as the experience shows, some functions can provide particular benefits. An ideal network is a network whose key actors are closely located; connections are long-term and stable, each connection is the key part of participants' business-strategy; there are close informal relations, the relations are running smoothly; all network members are equal, and the number of actors is big enough to provide a rich source of knowledge, and at the same time it is small enough to be manageable.

Networks are considered as a new way of organizing economic activity, which gives an opportunity to neutralize the disadvantages existing in deeply integrated firms as well as the disadvantages which appear under direct market contacts. Networks enhance the advantages of specialization (through easy access to external sources of knowledge) without provoking price rise (Powell, and Grodal, 2006; Vasin, and Gamidullaeva, 2015). Networking method of allocating resources gives an opportunity to conduct transactions through the network of individuals or institutions engaged in mutually beneficial and supportive activity, and not through odd exchanges and administrative orders.

Greater emphasis may be placed on a single activity, for example, education, or specific technical problem, or on the activity within the framework of value chain. The length of a network may be limited by the period of the life cycle of one project, by the current or by the duration of all projects. The network can be backed by formal relations.

According to H. Chesbrough (2003) in the framework of open innovation paradigm the flow of knowledge creates knowledge landscape which is an open access space with a great deal of databases of scientific ideas. The knowledge landscape emerges due to incoming (inflows) and outgoing (outflows) of knowledge. These ideas are accessible for the use and specialists may be employed by the other companies. Gloor's (2006) model of Collaborative Innovation Networks implies that innovations are increasingly becoming more interactive and economic growth involves various groups of society forming and unfolding a certain innovation ecosystem. Great contribution into mutual understanding of collaboration' importance have made I. Ansoff and A. Campbell (Ansoff, 2007; Campbell A., 1995).

They have shown that synergetic effects of innovation economy are the unique implicit resources, which may be found when company instead of the independent closed activity chooses cooperative activity in the field of using a common experience, use of common personnel and equipment. Businesses therefore join with other economic actors, diversify their activities and functions, create web sites, joint ventures, logistics systems, agro-industrial complexes, innovation clusters, strategic alliances, merge with and acquire other companies, search for synergy effects in various forms of firms' associations, in holding company models, consortiums, in the spatial distribution of productive forces.

The complicated and global changes in economic environment have caused serious challenges for firms related to the necessity to create value by working in alliances and networks. Authors (van Lente et al, 2003) highlight that intermediaries' significance is in maintenance of creation and coordination of networks of interdependent and different actors. These agents are called to coordinate firms within networks through contracts, agreements, etc. Innovation intermediaries use boundary spanning to identify and select previously unidentified solution-providers for the knowledge-seeker.

Authors J. Howells (2006), J. Steward and S. Hyysalo (2008), E. Almirall and J. Wareham (2011) highlight different approaches and significant propositions applied by innovation intermediaries propose a typology of innovation intermediaries. The authors investigate the emerging phenomena of ‘Living labs’ as entrepreneurial intermediary that presents a high level of involvement with users and engages the external stakeholders.

Results

Notoriously, innovative process can be considered within technological zone, industrial park, global value chain, region, cluster, community, etc. In this connection, it is necessary to answer the question what advantages exist in researching innovation processes at the regional level. As a result of thorough analysis conducted by the authors, the following advantages of research of innovation processes at the regional level were revealed.

1. As it has already been mentioned, first scientific works on innovative process concentrated on enterprise as a subject initiating it. Later, the accepted role of knowledge spillover contributed to changing the focus on the territorial aspect as the basis for innovative activity. It means, that there was a transition from enterprise to territory where the innovative process is taking place (new knowledge is produced and it is commercialized in innovation). According to M. Fischer (2001), territorial proximity between economic agents plays an important role for simplifying exchange of implicit knowledge, without which many radical innovations are impossible. Thus, an institutional context of innovative

process appears, which gives an opportunity to localize it and to do comparative analysis of different territories.

2. Within the framework of region there appears an opportunity to conduct complex innovative policy, as it is region that is able to identify strategic priorities on behalf of the state, establish relations with other regions, which, basically, gives it an authority of political jurisdiction.

3. Region openness allows them to be flexible and to easily adapt to fluctuations of global innovative network. M. Kahler (2017) states that globalization, which is understood in the narrow sense as "economic integration into international system", has caused problems connected with the necessity of taking decision-making into non-governmental sphere. Control changes its place. Governments either delegate more responsibilities for decision-making to supranational establishments or transfer authority of decision-making to subnational political entities. Such type of analysis points at the fact that as a result of globalization national economic sovereignty is becoming weaker while local economies, those which K. Ohmae (1993) calls "city states" are becoming the main actors in the global economy.

4. Changing forms of innovative process participants' communication, increasing role of horizontal connections, interactive communications also causes to single out the regional level of innovative process.

5. The regional level provides the presence of a variety of producers offering specialized services timely and flexibly in reply to requests, emergence of local labour force funds with concentration of specific skills and education forms, cultural and institutional infrastructure, which constantly appears inside and outside industrial clusters and which is very important for effective work of a single local social and economic system.

6. Region is a place of economic interaction and innovative activity. Region has specific and inherent to particular region resources to stimulate innovative opportunities and competitiveness of enterprises. Porter stated that strong competitive advantages in the global economy are often linked to the place. Earlier research of regional innovative systems confirm that innovative activity of enterprises is based on localized resources (specialized labour market, labour force, suppliers, intellectual resources, traditions of entrepreneurial activity, clients, sponsors, etc.).

7. Innovations are phenomena that belong to the system of social relations. In the regional context there is a set of rules, norms, and regulations of firms' behavior, which are derivatives from economic and social and cultural factors. A set of informal relations on the particular territory defines the image, a sense of belonging to the structure, which increases innovative potential of the territory by means of synergetic exchange, information and knowledge exchange.

Region has additional nonmaterial assets (internal dynamics of regional social, cultural, and political assets, informal knowledge spillover, etc.) which represent a specific form of capital that is derivative from social relations, norms and values within the framework of society. This capital helps to overcome difficulties on the market by supporting stable and mutually beneficial relations.

Consequently, the main factors influenced the formation of regional innovation system concept include:

1. increasing significance of regions as the basis for global economic competitiveness of companies;
2. focusing on significance of norms, procedures and conditions identifying the work of infrastructure providing regional economic competitiveness;
3. recognizing informal relations between firms along with formal organizations as mechanisms of maintaining trustworthy relationships between firms;
4. re-evaluating factors of geographical proximity or agglomeration for assisting exchange of implicit knowledge and other externalities;
5. recognizing the importance of ability to institutional and organizational learning for developing regional economy;
6. developing small innovative business and recognizing its role in building the economy of knowledge;
7. acquiring new interactive nature of innovative processes.

Proceeding with the research problem it seems to be important to understand the benefits from using innovation intermediaries within a region.

It must be noted, that innovation infrastructure that is commonly understood as a set of interrelated structures, which serve and provide the implementation of innovation activity, has a low level of interaction between participants in Russia. Hence, there needs to be a shift to the network organization of infrastructure that ensures high level of participants' cooperation. The process of developing objectives and problems, which need to be solved in the framework of such networks, should be the most transparent and interactive. It implies an open communication between representatives of the manufacturing industry, science, society, government ministries and departments. This would obviate and overcome market failures through the self-organization of science and business.

Generally, the use of innovative intermediaries in the region pursues the following major objectives: to promote their own ideas and projects; external expertise of ideas; exchange of experience and knowledge; search of partners, resources mobilization needed for implementing projects. Thus, the development of innovation intermediation in the region provides an opportunity for the companies to reduce the costs on the innovation development, to adjust sustainable innovation processes that are distributed in space, link them into a single chain of production, distribution, exchange and consumption of innovative product in the region.

A typology of intermediation should provide a great contribution into understanding of innovation intermediaries.

First type of intermediaries is "anchors". In this case, intermediaries collaborate with other actors, coordinate their activities and purposefully have a subjective interest regarding the innovation process. This type of intermediary links together networks and public organizations. They provide maintenance and establish social communication, identify trends and encourage supporters to new technologies. Their integrative potential provides communication, development and implementation of innovation opportunities of all stakeholders.

The second type of intermediaries so-called "bridges" links two disconnected parties and coordinate the information flow. These intermediaries provide consultancy services, manage customer's identity, access and broadcast a two-sided market, identify new opportunities and capabilities. Intermediaries - "bridges" provide the following services: development of engineering products/services, innovation project

evaluation, licensing transaction, help definition of the problem, evaluation of outcomes and market identification.

Third type is intermediaries "pumps" providing interaction and collaboration with other actors in order to create of new knowledge. They are oriented towards mediation, promotion collaborative research between various actors, providing commercializing mechanisms and facilitating knowledge transfer. These intermediaries speed up innovation process due to their intensive participation and coordination of innovation activities with universities and industry. The main advantages of these intermediaries are concerned with their ability to address opportunities for the region to generate and share new expertise, human capital and knowledge, to provide innovation actors with access platform for various types of knowledge, interdisciplinary collaboration, financial and human capital resources. These intermediaries provide the following services: advising, provision of resources, for example, knowledge and physical resources.

Last type of intermediaries is "door". They are often examined as market intermediary (Spulber, 2003). These intermediaries provide an augmented product for buyers, foster partnership and provide preferential access, and also provide liquidity. They exploit such coordinating mechanisms as web-enabled commerce, services, seller, buyer and independent alignment and financial support. These intermediaries can enhance organizational capabilities through changing portfolio strategy and network design, providing of new services enabled by ICT. Their functioning is based on information and communication technologies e.g. data warehousing and integration, sensor networks, collaborative filtering and time-and-place utility.

According to the opinion of many authors, the most significant functions that innovation intermediaries perform in the innovation systems, are the following:

1. Knowledge creation and dissemination.
2. The impact on the direction of the search (research and development).
3. Entrepreneurial experimentation.
4. The new markets creation.
5. Creating a legitimate entrepreneurial business environment.
6. Resources mobilization.
7. Development of positive externalities.

Innovation intermediaries operate between actors of the innovation system, create the necessary links, form and create opportunities for the development of relations and cooperation. That is, they establish and coordinate a relationship between the actors of the innovation system. Their main task, therefore, must be understood not as the generation and implementation of innovations, as well as the creation of opportunities and conditions for the development of innovation.

The emergence of new forms of innovation cooperation is the result of development of information technologies and digitalization processes. Increased use of the Internet has predetermined the emergence of virtual innovation intermediaries (for instance, virtual business incubators, operated in various subjects of the Russian Federation). These virtual innovation intermediaries have attracted increased attention because of its ability to cross geographic distances and scale the large amount of activity. The further development of this type of innovation intermediaries has continued with the occurrence of two-sided platforms operating on the technology markets.

A particular attention should be paid to the new form of innovation intermediary co-called Living Lab, which have spread through Sweden, Belgium, Finland and Spain since its inception in 2006. Living labs provide physical interactive platforms for interactions between users, organizations, research centers, and entrepreneurs for the development of new technologies. In collaboration with firms the early phase user-driven innovations are created. Living Labs provide regulation and offer a platform to the participation of users in the innovation process. They support groups of users, provide different services, contribute to the increasing of public involvement in the innovation processes. Their role is especially significant in interdisciplinary projects. Almirall and Wareham (2011) give the following definition to the Living Labs: "open innovation intermediaries that seek to mediate between users, research, public and private organisations, advance our concept of technology transfer by incorporating not only the user based experimentation, but also by engaging firms and public organisations in a process of learning and the creation of pre-commercial demand."

Currently, throughout the world there are more than a hundred Living Labs. This mediation service was created mainly as a public-private partnership for the realization of potential benefits to a region where user-driven innovations are integrated into the collaborative process of creating new services, products and infrastructure. They represent form of innovative cooperation, focused on the creation of a functional area where all stakeholders involved in a public-private partnership (e.g., universities, government agencies, institutions and society) can interact, with the aim of creating, prototyping and testing new technological products in real-time. This resulted in the emergence of a general platform to accelerate the innovation process and ensure the provision of medium- and long- term services for the development of new technologies that support innovation processes within various organizations (Vasin, et al., 2017).
Now we should consider more deeply Living Labs as one type of intermediary acting as system builders of a larger network of organizations. Living Labs were formed mainly as Public-Private Partnerships to enforce regional advantage, where innovation is integrated within the collaboration process of creation of new services, products and infrastructures.

Conclusion

Living Labs contribute to the generation of innovation through knowledge development, new markets formation, development of external economies, mobilization of resources (Lopez-Vega et al, 2016).
As a result of the analysis conducted Living Labs as innovation intermediaries perform the following main functions within the regional economy:

1. Facilitate the cooperation in the field of research. Living Labs act as connectors, seeking technological complementarity and generating links on this basis. At the same time, they contribute to cooperation through medium- and long-term studies of possible types of technologies with all stakeholders, including future users, who are brought in at the research and development stage.

2. Providing complementary services to stakeholders. As a rule, research and development centers are continually expanding their range of services through the inclusion of additional activities, such as rationale for a project, inspection, marketing analysis and so on. The feature of Living labs is that they offer complementary services, including not only the creation and development of technology, but also the provision an experimental platform with a large number of users who are involved in a joint invention process through the use of products' prototypes.

3. Linking science and the state. Living Labs contribute as intermediaries to the development of individual regions when initiated by universities and public authorities sharing a desire to collaborate over science-driven innovation. Although only few in number, these kinds of Living Labs aim to accelerate the development of new technologies in the region, promote certain directions of research, and create synergistic effects between regional actors (Vasin, et al., 2017). These Living Labs play a decisive role in the regional economy.

In conclusion, 'Living Labs' have a great impact on the knowledge development, new markets' formation, development of the external economy and resource mobilization. Hence, innovation intermediary approach has a great potential to make a significant contribution to the regional innovation development in Russia.

Acknowledgment

The research results were obtained while working on order of the Ministry of Education and Science of the Russian Federation.

References

Almirall, E., and Wareham, J., (2011), 'Living Labs: arbiters of mid- and ground-level innovation,' Technology Analysis & Strategic Management, 23(1), 87–102.

Ansoff, H.I., (2007) Strategic Management. [Online], [Retrieved July 13, 2017], http://dx.doi.org/10.1057/9780230590601.

Campbell, A., (1995), 'Vertical integration: Synergy or seduction?' Long Range Planning, 28(2), 126–128.

Chesbrough, H. (2003) Open Innovation: The new Imperative for Creating and Profiting from Technology. Boston, Massachussetts: Harvard Business School Press

Fischer, M.M., (2001), 'Innovation, knowledge creation and systems of innovation,' *The Annals of Regional Scienc*e, 35(2), 199–216.

Gill, S., (2002), 'Globalization, Market Civilization and Disciplinary Neoliberalism,' *The Globalization of Liberalism*, 123–151. [Online], [Retrieved May 12, 2017],http://dx.doi.org/10.1057/9780230519381_7.

Gloor, P. A. (2006), 'Collaborative Innovation through Swarm Creativity,' *Swarm Creativity*, 19–48. [Online], [Retrieved June 11, 2017], doi:10.1093/acprof:oso/9780195304121.003.0003

Held, D. et al., (2000), 'Global Transformations: Politics, Economics and Culture,' Politics at the Edge, 14–28. [Online], [Retrieved June 28, 2017], http://dx.doi.org/10.1057/9780333981689_2.

Howells, J., (2006), 'Intermediation and the role of intermediaries in innovation,' Research Policy, 35(5), 715–728.

Natkhov, T.V. and Polishchuk, L.I., 2017, 'Political economy of institutions and development: the importance of being inclusive,' *Zhournal Novoi Ekonomicheskoi Associacii*, 2 (34), 12–38

O'Hagan, J., (2017), 'The Role of Civilization in the Globalization of International Society,' *The Globalization of International Society*, 185–203. [Online], [Retrieved June 22, 2017], http://dx.doi.org/10.1093/acprof:oso/9780198793427.003.0010.

Ohmae, K., (1993), 'The Rise of the Region State,' *Foreign Affairs,* 72(2), 78.

Powell, W.W., and Grodal, S., (2006), 'Networks of Innovators,' Oxford Handbooks Online, [Online], [Retrieved June 17, 2017], http://dx.doi.org/10.1093/oxfordhb/9780199286805.003.0003.

Ritzer, G., (2003), 'The Globalization of Nothing,' *SAIS Review*, 23(2), 189–200.

Robertson, R., (1987), 'Globalization Theory and Civilization Analysis,' *Comparative Civilizations Review*, 17 (17). [Online], [Retrieved June 11, 2017], http://scholarsarchive.byu.edu/ccr/vol17/iss17/3

Spulber, D.F., (2003), 'The intermediation theory of the firm: integrating economic and management approaches to strategy,' *Managerial and Decision Economics*, 24(4), 253–266.

Steward, J., and Hyysalo, S., (2008), 'Intermediaries, users and social learning in technological innovation,' International Journal of Innovation Management, 12(03), 295–325.

Tijssen, R.J., (1998), 'Quantitative assessment of large heterogeneous R&D networks: the case of process engineering in the Netherlands,' *Research Policy*, 26(7-8), 791–809.

Van Lente, H., Hekkert, M., Smits, R., and van Waveren, B., (2003), 'Roles of Systemic Intermediaries in Transition Processes,' International Journal of Innovation Management, 07(03), 247–279.

Vasin, S.M. and Gamidullaeva, L.A., (2015), 'Development a Basic Model of the Innovation System,' *Review of European Studies*, 7(11). [Online], [Retrieved November 12, 2016], http://dx.doi.org/10.5539/res.v7n11p175.

Vasin, S.M., Gamidullaeva, L.A., Rostovskaya, T.K., (2017), 'The challenge of social innovation: approaches and key mechanisms of development,' European Research Studies Journal, 20(2), 25-45

Vertakova, Y., T. Tolstykh, E. Shkarupeta, I., Shishkin, K. Krivyakin, 'Assessment of the Impact of Higher Education Development on the Social and Economic Processes in the Region' Proceedings of the 29th International Business Information Management Association Conference (IBIMA), ISBN: 978-0-9821489-2-1, 3-4 May 2017, Vienna Austria, 2180-2191

Kahler, M., (2017), 'Networked Politics: Agency, Power, and Governance,' Networked Politics, 1–20. [Online], [Retrieved November 12, 2016], http://dx.doi.org/10.7591/9780801458880-003.

Lopez-Vega, H., Fredrik, T., Vanhaverbeke, W.T., (2016), 'Where and how to search? Search paths in open innovation,' Research Policy, 45, 125–136

Study and Assessment of the University's Integration Level into the National Innovation System: Case of Russia[1]

Silakova Liubov Vladimirovna, Department of Technological Entrepreneurship and Innovation Management, Saint Petersburg National Research University of Information Technologies, Mechanics and Optics (ITMO University), Saint Petersburg, Russia, silakovalv@niuitmo.ru

Laskina Liubov Yurievna, Department of Production Management and Technology Transfer, Saint Petersburg National Research University of Information Technologies, Mechanics and Optics (ITMO University), Saint Petersburg, Russia, risk05@mail.ru

Abstract

In the context of global upward trends in international innovation and high technology competition and the urge to increase the share of high-tech industries in the country's GDP, developing a national innovation system becomes a key problem to gain an insight into the directions and methods of modernizing the economy and integrating science, education and business. Russian universities are being transformed in terms of business processes to boost their integration into the national innovation system. The purpose of this study is to develop methodological tools for the management of such university transformations in order to increase their revenues through the enhancement of their innovation activity. The analysis of theoretical NIS studies revealed their structure, the specifics of the innovation process and the model of interaction of its main elements. With a system approach applied to the national innovation system, this study analyzes the impact of leading universities on the innovative development of regions and makes recommendations for their development. The suggested methodical approach to the comprehensive assessment of integration of a university into the innovation system is validated on a group of leading universities which participate in the federal Project 5-100. The results of this study will manage the transformation of the university to increase the level of its integration into the innovation system and boost the innovation activity and competitiveness of the country's economy.

Keywords: national innovation system, university, integration, innovative activity of the university, level of integration in national system

Introduction

In the background of global competition, formation of the knowledge economy and constant reduction of the share of government financing in the universities' budget, the country's competitiveness can only be maintained by transforming the activity and modifying the universities into integration centers for the generation and commercialization of new technology. In the knowledge economy, innovation-generating institutions come to the forefront (Etzkowitz, H., Leydensdorff, L., 1997). Therefore, the performance of the national innovation system (NIS) depends on the availability of favorable conditions and the ability of the institutions generating and commercializing new knowledge to produce and implement innovations (Lundvall, B., 1992). Universities are characterized by their integrity, the ability to represent both of these institutions and influence the innovation activity in the region and the country (Cowan R., Zinovyevac N., 2013). To this end, however, the activity of universities should be transformed into business so that the interaction between the university and the environment results in a "structural association" between the university and the region (Ropke, J., 1998).

By initiating innovative processes, universities are able to enhance the country's innovation activity to reflect the intensity of business innovation use by entities. The university's integration into the innovation

system indicates the effectiveness of its innovation activity. Different countries have different environment and mechanisms for implementing the innovation process at universities (Wessner, C.W. et al., 2012). This requires the development of adaptation tools to manage the innovation process at the university according to its specific characteristics.

Subject

The purpose of this study is to develop methodological tools for the assessment of integration of universities into the NIS based on the analysis of changes to the business processes of universities and provide directions for enhancing the innovation activity of the NIS. To this end, the following tasks were set: 1) to analyze the concept and composition of the NIS, demonstrate the model of interaction of its elements and establish the role of universities in the NIS; 2) to conduct a critical overview of the available methods for assessing the university's integration into the NIS, classify the university's innovation activities and develop a methodical approach to assessing the effectiveness of its innovation activities; 3) to validate the suggested approach on leading Russian higher education institutions and give recommendations to enhance the innovative activity of the universities; 4) to reveal the influence of the activity of universities on the innovative development of the country's regions.

Concept and structure of the national innovative system

The NIS is intended to ensure and maintain the generation and commercialization of new knowledge in the country. There are various approaches to the definition and structure of the NIS. The developers of the NIS concept defined the NIS as a network of public and private institutions the interaction of which determines the innovative performance of companies (Freeman, C., 1987, Nelson, R., 1993), located or established in the same country (Lundvall, B., 1992). A tighter definition of the NIS accentuates the institutional context which manages interactions and processes between organizations and individuals involved in the creation, distribution, adaptation and application of socially and economically important knowledge (Hall, A. et al, 2003). Others concentrated on the educational aspect of the NIS as creating, accumulating and transferring knowledge, skills and products (Metcalfe, J., 1994), determining the level and focus of technology education in the country (Patel, P., Pavitt, K., 1994). A broader concept of the NIS includes all important economic, political, social, organizational and other factors (Edquist, C., 1997), all scientific and technical resources (Archibugi, D., Alberto, C., 2005) that influence the development, diffusion and use of innovation.

With an institutional approach, we defined three groups of institutions within the NIS: institutions of new knowledge generation, institutions of new knowledge commercialization and a set of innovation infrastructure institutions. The latter group of institutions provides the interaction of the first two and includes the institution of innovation mediation, national development, registration and protection of intellectual property, civil society and financial institutions (see **Error! Reference source not found.**).

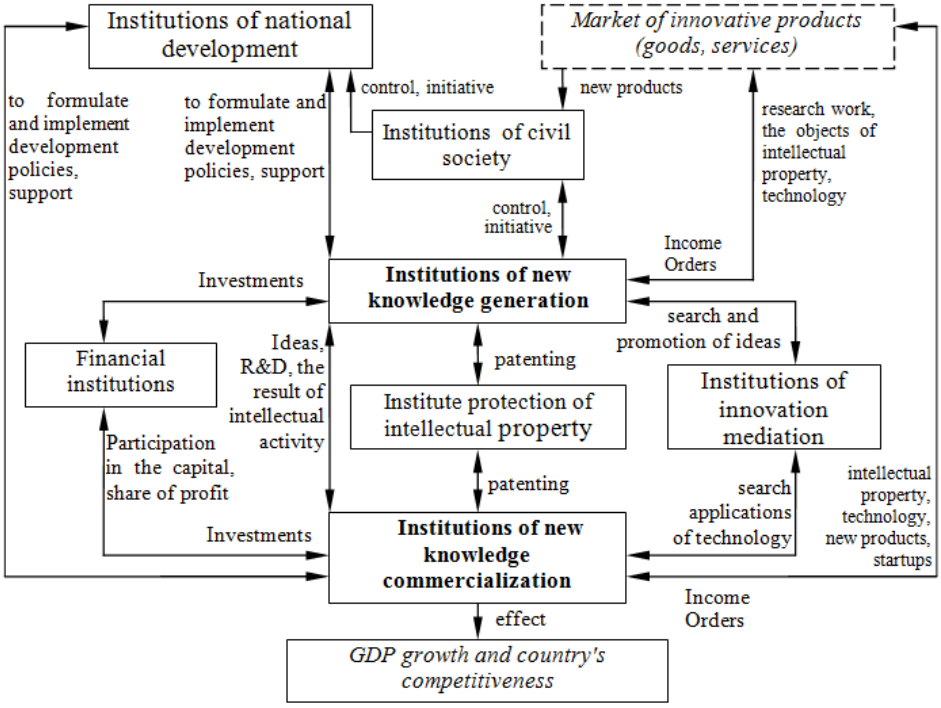


Fig .1: Model of interaction of NIS elements

Source: developed by authors

The key NIS elements are institutions of new knowledge generation and institutions of new knowledge commercialization, the interaction of which ultimately results in the growth of added value.

The main feature and advantage of the university is that it can act as a majority of the institutions: as a generation institution - through groups and teams of scientists, laboratories, university departments; as a commercialization institution - through the activity of small innovative enterprises (SIE), university research and innovation complexes; as institutions of innovation mediation - through the activity of technology transfer centers (TTC), business incubators, fundraising units, departments and centers using innovative educational programs; as a financial institution – by investing extra-budgetary funds in promising projects, through endowment funds; as a civil society institution - through associations, unions, communities.

The best practice of US universities such as Stanford, Massachusetts Institute of Technology, Georgia Tech, University of Texas-Austin shows their transformation into powerful engines of innovation, generating new promising companies and industries (Wessner, C.W., Wolff, A.Wm., 2012). This transformation was directly launched by a series of acts adopted in the 80-s of the XX century, authorizing institutions of knowledge generation to sell and license technology obtained as a result of government financing. These are the Bayh-Dole Act (1980), the Stevenson-Wydler Act (1980) and the Federal Technology Transfer Act (1985). By 2000, these measures have activated the innovative activities and increased the revenues of universities. The number of universities conducting technology transfer and technology licensing has increased 8 times (to 200), the number of university patents has increased 4-12 times according to different estimates, and revenues received from these licenses have increased 5.4 times (to $862 mln) (Mowery, D.C., Shane, S., 2002).

The Russian equivalents of these acts are Federal Law No. 217 (August 2, 2009) which ensured the establishment of small innovative enterprises in higher education institutions and Federal Law No. 273 on education in the Russian Federation (December 29, 2012), and a number of Government Decisions adopted In April 2010 to support and promote the development of innovation in higher education institutions.

These measures also proved to be effective – for the period 2000-2014 domestic research and development (R&D) expenditures increased 11 times, while the share of high education institutions (HEIs) in the total volume of domestic R&D expenditures increased from 3.62% to 9.16%. We observe the changing structure of funding sources of domestic R&D expenditures: the share of HEIs funds increased from 3.87% to 7.58%, the share of business funds - from 18% to 25.6%, and the share of public funds decreased from 64.9% to 61.6% (Federal state statistics service, 2017). The above illustrates the transformation of the existing NIS model.

Thus, in modern conditions, universities should develop mechanisms for the management of innovation processes to ensure the establishment of interaction between organizations included in the NIS. The development of such mechanisms should be carried out comprehensively and involve all innovation management and direction functions.

Methodology

Having analyzed the available methodology, we revealed that the suggested indicators are very diverse and data collection is difficult due to the lack of reports on specific groups of indicators.

There is currently no specific approach to evaluating the generally accepted set of indicators of the university's integration into the NIS. There are approaches to developing indicators and assessing the university's integration into the NIS, but the suggested sets of indicators reflect the innovative potential of the university rather than its innovation activity.

In order to evaluate the university's integration into the NIS, we assessed the effectiveness of integration with the indicators classified by the following fields: science, education, innovation (Kuznetsov A.V., 2012). Such an approach may reflect the integration of the university into the socio-economic system of the country rather than the NIS.

A system of indicators classified by the blocks: science, education, business (Volosevich K.E., 2011) is designed to evaluate the activity of the university as an integrated structure and rather evaluates the university environment, since the method is based on the analysis and evaluation of the university's innovative potential. However, the innovation potential is a broader concept, while the level of integration only reflects its implementation.

Even though other authors added a block of social indicators to education, science and business (Vorozhbit O.Y. et al., 2015), the suggested system of indicators still reflects the innovative potential. Moreover, the methodology is difficult to validate due to the complexity of obtaining and ambiguity of the optimal values of the indicators provided.

In order to determine a system of indicators to assess the university's integration into the NIS in terms of effectiveness of its innovation activity, we classified the HEI's business processes by three types according to the field: educational, research and entrepreneurial. Indicators of education field shows how demand University's education services. Research indicators shows how active University impact on economy growth through its publication and patents activity and its citations (Leonid Kogan, et. al., 2017,

p. 667). Entrepreneur indicators shows how much do University earn with its activity. Thus, commercial-potential indicators may act as indicators of the university's integration into the NIS. To calculate the indicator of the university's integration into the NIS, the following indicators were selected (**Error! Reference source not found.**).

Table 1: Indicators to calculate the HEI's integration into the NIS

Indicators of educational activities, K_1		**Indicators of research activity, K_2**		**Indicators of entrepreneurial activity, K_3**	
X_{11}	Number of foreign students, persons	X_{21}	Citation of publications databases (Web of Science), units	X_{31}	University's income from the use of the intellectual property, rub
X_{12}	Number of educational double degree programs, units	X_{22}	Citation of publications databases (Scopus), units	X_{32}	Number of patents received with external investments, units
X_{13}	Number of foreign scientists, working in high school more than 1 semester, persons	X_{23}	Citation of publications databases (Russian citation index), units	X_{33}	Number of active SIE in the University, units
X_{14}	Number of participants from other organizations, which trained refresher courses programs, persons	X_{24}	Amount of funds raised for R&D, rub.	X_{34}	University's income from the activities of the SIE, rub.
X_{15}	Presence of distance education courses on open platforms	X_{25}	Number of intellectual property objects (including patents), units	X_{35}	Number of new employment created in SIE, units
X_{16}	Number of students working in SIE and research laboratories, persons	X_{26}	Number of laboratories outside organizations on the basis of the HEI, units		
X_{17}	Number of contracts for consulting activities, units	X_{27}	Number of clusters which include a university, units		
X_{18}	Number of established programs of additional professional education, units	X_{28}	Number of grants received for R&D, units		
		X_{29}	Income from R&D (from contracts with business), rub.		

Source: developed by authors

According to the system approach, an element is effectively integrated into a system when the "output" processes of the integrated element become the "input" processes of other elements, while increasing the effectiveness of the entire system as a result of a synergetic effect. So, we believe that the university's integration into the NIS reflects its incorporation into the innovation processes within the NIS, that is, the intensity of interaction with other NIS elements. Therefore, we selected Xij indicators from the established innovative component of the HEI's activity according to their performance. In this case, the method can be used for both internal use by HEIs and ranking HEIs by their integration into the NIS.

The integrated indicator of integration of U university into the NIS is generally calculated as the sum of relative non-dimensional estimates of K_{iU} indicators (formula 1):

$$F_U = \sum_{I=1}^{I} K_{iU} \quad (1)$$

where: F_U – the level of integration of the university U into the NIS;

K_{iU} – the integrated relative indicator for each type of innovation activity;

i – the reference number of a group of indicators, i = 1,2,3…, n;

I – the amount of types of innovation activity;

U – the reference number of a university.

The integrated relative indicator for each type of innovation activity K_{iU} is calculated as the sum of standardized X_{ij} values given in a comparable form and weighted using the expert method (formula 2).

$$K_{iU} = \sum_{l=1}^{L} k_{ijU} \times p_{ij} \quad (2)$$

where: l = 1, 2, …, L – the amount of indicators for type 1 of innovation activity.

k_{ijU} – the relative value of indicator j for type 1 of innovation activity in U university;

p_{ij} – the weight of relative indicator j for type 1 of innovation activity as calculated with the expert method;

M – the amount of indicators in the system used.

In addition to the indicator of integration, it is reasonable to estimate the effectiveness of costs as the ratio of the growth in revenues from innovation activity to the growth in innovation-associated costs for the period. In view of the lagged effect of innovation activity, it is proposed to make a calculation for five years (formula 3).

$$E_{MU} = \frac{\sum_{\Omega=1}^{\Omega} \Delta T_{RI}}{\sum_{\Omega=1}^{\Omega} \Delta T_{CI}} \quad (3)$$

where: E_{MU} – the multiplier of innovation activity costs (by types: educational, research, entrepreneurial),

ΔT_{RI} – the amount of growth in revenues from innovation activity, mln rubles;

ΔT_{CI} – the amount of growth in innovation activity costs, mln rubles;

Ω = 1, 2, …, 5 – the study period.

By comparing the F_U and E_{MU} indicators, we can develop a matrix of effectiveness of the university's integration into the NIS and determine the direction of its development.

Data Description and Analysis

The suggested method was validated on a group of 21 leading Russian universities. The selection for validation was determined by competitive groups within the Federal Project "5-100" to increase the international competitiveness of leading Russian universities among the world's leading research and educational centers.

The major sources of primary and secondary information for the analysis of the universities were official university websites, strategic development program reports, and personal interviews and e-mail correspondence with university employees.

The aggregate base for the valuation of X_{ij} was the number of students and the number of scientific and pedagogical employees in HEIs. Further, we weighted k_{ijU} indicators with an expert assessment method after selecting experts from the university staff and conducting a survey (Silakova, L.V., Petropavlova, G.P., 2016). The total number of the experts interviewed was 11, including representatives of the educational, scientific, entrepreneurial and managerial activities of the university.

The estimation of the university's integration into the innovation activity involving a group of 21 HEIs participating in the project "5-100" is reflected in **Error! Reference source not found.**.

Table 2: Indicators to calculate the HEI's integration into the NIS Rating of a group of leading Russian universities by integration into the NIS

№	Universities participated in the federal program "5 into 100"	K_1	K_2	K_3	index value, F_U
1	National Research Nuclear University "MEPhI"	17,19	34,88	26,18	78,25
2	National research Tomsk State University (TSU)	16,28	16,11	21,98	54,37
3	Moscow Institute of Physics and Technology (MIPT)	18,59	14,65	12,84	46,08
4	Saint Petersburg National Research University of Information Technologies, Mechanics and Optics (ITMO University)	11,40	17,36	14,56	43,31
5	Novosibirsk State University (NSU)	14,49	13,05	15,18	42,72
6	Tomsk Polytechnic University (TPU)	14,27	15,98	11,72	41,97
7	Peter the Great Saint-Petersburg Polytechnic University (SPbPU)	10,72	8,77	19,57	39,06
8	National University of Science and Technology "MISiS"	8,93	12,82	14,09	35,84
9	South Ural State University (SUSU)	7,52	9,51	12,06	29,09
10	Lobachevsky State University of Nizhni Novgorod (UNN)	7,68	8,89	11,87	28,43
11	Samara National Research University (SSAU)	10,03	11,28	4,68	25,99
12	Higher School of Economics (NRU HSE)	12,19	7,72	3,82	23,72
13	Saint Petersburg Electrotechnical University "LETI"	8,54	9,10	5,29	22,93
14	University of Tyumen (UT)	6,09	5,83	8,29	20,21
15	Siberian Federal University (SFU)	5,51	9,91	4,10	19,52
16	Kazan Federal University (KFU)	8,64	7,05	3,73	19,41
17	Far Eastern Federal University (FEFU)	6,91	8,44	2,90	18,25
18	Russian University of friendship of peoples (RUDN University)	10,17	6,03	0,62	16,81
19	Ural Federal University (UrFU)	4,29	5,18	5,85	15,33

20	Immanuel Kant Baltic Federal University (IKBFU)	7,20	3,90	3,01	14,11
21	Sechenov First Moscow State Medical University (MSMU)	7,35	4,50	1,48	13,32

Source: developed by authors

The suggested methodological approach to the comprehensive assessment of the university's integration into the NIS implies the comparison of two indicators - the level of integration into the NIS and the multiplier of the university's costs. The state values of these indicators were calculated in accordance with **Error! Reference source not found.**.

Table 3: Qualitative scale for calculated indicators

Scale	Characterization
1. The level of integration University in NIS, F_U	
30-100	high relevance of the University activity; positive engagement with NIS elements
<30	relatively low relevance of the University activity; loose engagement with NIS elements
2. The multiplier cost, Ef	
>1	effective
<1	non effective

Source: developed by authors

However, as it was impractical to calculate the multiplier of innovation activity costs for all the universities analyzed (due to the lack of reports on the types of innovation activity in the universities), we used a multiplier of the university's total costs for the period 2014-2015 to validate the methodology (Monitoring of effectiveness of higher education Institutions, 2016), (Bikkulov, AS, et al., 2016), (Financial Support of Higher Educational Institutions subordinated to the Ministry of Education of Russia, 2016). As a result, we developed a state matrix of effectiveness of the innovation activity (see **Error! Reference source not found.**).

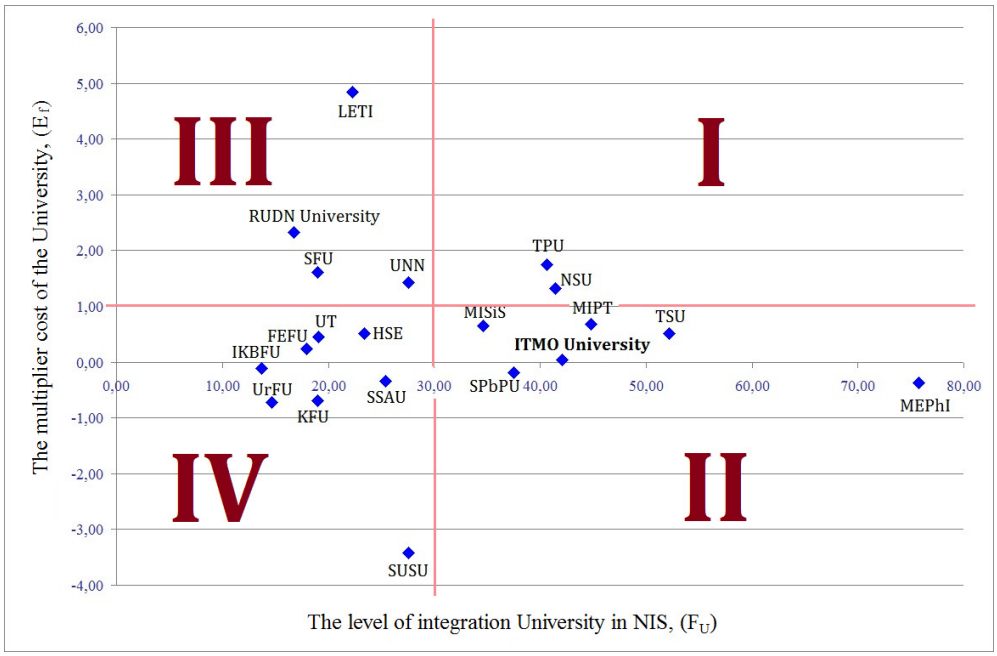


Fig. 2: State matrix of effectiveness of the universities integration processes in NIS

Source: developed by authors

As we can see, the universities most integrated into the NIS (MEPhI, SPbPU, ITMO, etc.) constitute group III of universities and can be characterized as universities that actively invest in innovation development while having insufficient economic returns on the use of results (growth in costs exceeds growth in revenues). A decrease in revenues with the growth in costs is typical of SPbPU (-0.19) and MEPhI (-0.38) and can affect the financial status of the university.

Low integration indicators of LETI and RUDN University (22.93 and 16.81 respectively) come along with high returns on costs (the multiplier is 4.84 and 2.32 respectively). These universities constitute group II, characterized by rational resource use, but also an increased risk of lower revenues in the future.

Grouping universities by level of integration will provide the development of specific measures to enhance each type of innovation activity. Thus, group 1 universities may need measures to enhance innovation. Group 2 universities need to reduce the risks of lower revenues in the future, for example, through the regular organization of exhibitions and competitions. Group 3 universities may need to intensify the process of generating new knowledge by creating a favorable creative environment at the university and encouraging employees. Group 4 universities require a range of measures to develop a creative environment, encourage employees to improve the process of generating new knowledge, and interact with the market, attract and establish long-term cooperation with customers.

Effect of Universities' Location on Integration into the NIS: Innovation Activity of Russian Regions

We assumed that the university's location in the region and its interaction with institutions integrated into the NIS will favorably influence the innovation activity of the whole region. The level of innovation

activity reflects the share of innovative and active institutions in the country. To establish the role of universities in the innovative development of regions, we undertook to discover a correlation between the location of entrepreneurial universities and the level of innovative activity in the regions. To this end, we analyzed the level of innovation activity of the regions for 2014 and determined 4 value ranges (**Error! Reference source not found.**.

Table 4: Qualitative and colour scale of Russia's regions innovation activity

Scale	Characterization	Color on the map
>15	relatively good	green
8-15	middling	orange
5-8	"poor"	pink
<5	inferior	red

Source: developed by authors

The following scale allowed us to create a map of innovation activity of Russian regions (see **Error! Reference source not found.**).

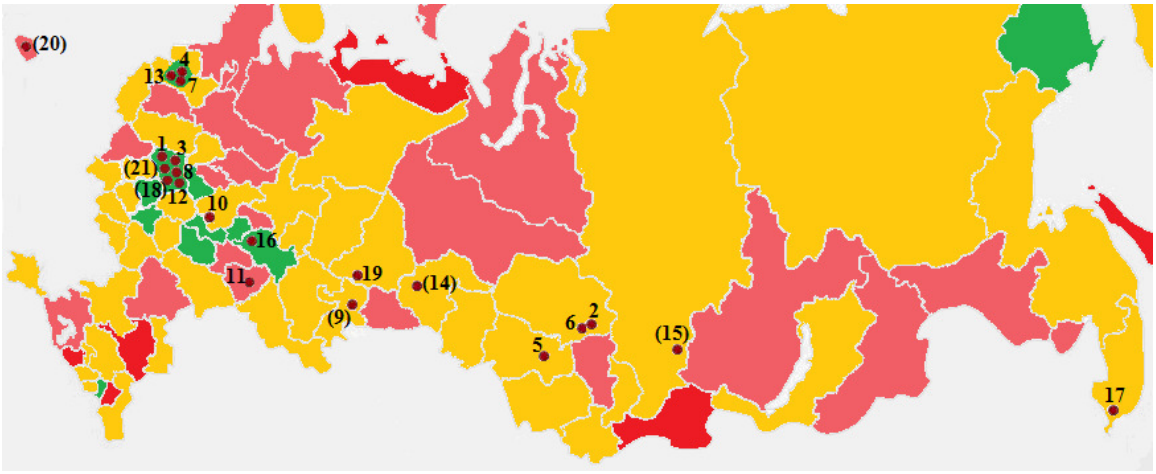


Fig. 3: Rating of entrepreneurial universities integrated into the NIS and their location on the map of innovation activity of Russian regions

Source: developed by authors

The universities put in a parenthesis did not participate in "5-100" in 2014. Their indication on the map had no effect on the general conclusion on the absence of leading universities in the regions with low innovation activity.

The overall picture of Russia's innovation activity according to the Federal State Statistics Service shows a wide scatter of integration level values across the regions, which even complicates and aggravates the problem of assessing "hidden champions" (Andreeva, E.L. et al., 2016). This is a promising area of further research.

Conclusion

Universities in Russia are undergoing a transformation of activities. The validation of the author's methodology shows that most universities of the country, even the leading ones, have insufficient returns on innovation activity. However, the process of transformation of universities' activities has already been launched, with active changes occurring to the structure of the NIS.

And so, a university in today's reality becomes an integrative center for the development of the NIS. The level of its integration into the NIS is determined by the intensity of interactions with its elements within the innovation activity. Therefore, monitoring the level of the university's integration into the NIS and assessing its contribution to the economy of the country will provide measures to enhance the innovation activity of the regions and increase the extra-budgetary revenues of the university.

The use of the methodological tools suggested will improve the change management process in Russian universities, while increasing their innovation activity and influencing the innovative development of the regions and the entire country.

References

Andreeva, E L., Simon, H., Karkh, D A. and Glukhikh, P L. (2016) 'Innovative entrepreneurship: a source of economic growth in the region,' *Economy of Region*, 12 (3), 899–910.

Archibugi, D. and Alberto, C. (2005) 'Measuring technological capabilities at the country level: a survey and a menu for choice,' *Research Policy,* 34(2), 175–194.

Bikkulov, A S., Bedareva, V V., Golovatova, E A., Mardanov, S A., Mihailova, E V., Fedenyova, A A. and Yanikina, N O. (2016), 'Monitoring of efficiency of innovative activity of Russian universities. *Analytics and research*. [Online], [Retrieved October 15, 2017], http://www.rvc.ru/upload/iblock/596/universities_monitor.pdf (rus)

Cancino, C A., Merigó, J M. and Coronado, F C. 'A bibliometric analysis of leading universities in innovation research, ' *Journal of Innovation & Knowledge*, Vol. 2, Issue 3, 2017, Pages 106-124. https://doi.org/10.1016/j.jik.2017.03.006

Cowan, R. and Zinovyevac, N. (2013) 'University effects on regional innovation,' *Research Policy*, 42, 788-800.

Edquist, C. (ed.). (1997) Systems of Innovation: Technologies, Institutions and Organizations, Pinter, Cassel, 432 p.

Etzkowitz, H. Leydensdorff, L. (1997) Introduction: Universities in the Global Knowledge economy, Universities and the global knowledge economy: A triple helix of university-inustry-government relations, London, 1–8.

Federal state statistics service of Russian Federation. [Online], [Retrieved October 15, 2017], http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/en/main (rus)

Financial support of higher educational institutions subordinated to the Ministry of education of Russia, Analytical component of the Ministry of education and science of Russia – AC KSUF. [Online], [Retrieved October 15, 2017], http://fin.edu.ru/web/minobr/vuzi (rus)

Freeman, C. (1987) Technology Policy and Economic Performance: Lessons from Japan, London: Frances Pinter, 36.

Hall, A., Sulaiman, R., Clark, N. and Yoganand, B. (2003) 'From measuring impact to learning institutional lessons: An innovation systems perspective on improving the management of international agricultural research,' *Agricultural Systems,* 78, 213–241.

Kuznetsov A V. (2012) Mechanisms of integration of university's science into national innovation system, PhD study, Voronezh, 233 p. (rus)

Lundvall, B. (1992) National systems of innovation. Towards a Theory of Innovation and Interactive Learning, London: Pinter Publishers.

Kogan, L., Papanikolaou D., Seru A. and Stoffman N. (2017) 'Technological innovation, resource allocation, and growth,' *The Quarterly Journal of Economics*, vol. 132, Issue 2, 665–712.

Kuznetsov A V. (2012) Mechanisms of integration of university's science into national innovation system, in PhD study, Voronezh, 233 p. (rus)

Lundvall B. (1992), National Systems of Innovation. Towards a Theory of Innovation and Interactive Learning, ed. London: Pinter Publishers.

Metcalfe J. (1994), 'The Economics of Evolution and the Economics of Technology Policy,' *Economic Journal*, vol. 104, 931-944.

Monitoring of effectiveness of higher education institutions. Chief of information and computational centre (CICC) of the Ministry of Education. [Online], [Retrieved October 15, 2017], http://indicators.miccedu.ru/monitoring (rus)

Lorek, L A., (2003), "Buyers catch on to online shopping,' *San Antonio Express-News*.

Mowery, D C. and Shane, S. (2002), 'Introduction to the special issue on university entrepreneurship and technology transfer,' *Manage Science*, 48 (1), v–ix.

Nelson, R. (1993), National Innovation Systems: A Comparative Analysis, New York: Oxford University Press.

Patel, P., Pavitt, K. (1994), 'The Nature and Economic Importance of National Innovation Systems', *STI Review, OECD*, Paris, 14, 9-32.

Ropke, J. (1998), The Entrepreneurial University: Innovation, academic knowledge creation and regional development in a globalized economy. Working Paper, Department of Economics, Philipps-Universitat, Marburg, Germany.

Silakova, L V. and Petropavlova, G P. (2016), 'The development of assessing method of the university into the national innovation system integration level,' *Economics and entrepreneurship,* 11(11), 85-91. (rus)

Volosevich, K E. (2011) A study and evaluation of integration in the innovation environment of a higher school, PhD study, Vladivostok, 151 p. (rus)

Vorozhbit, O Y., Krivolapov, V G. (2015), 'An algorithm and method of assessing the level of integration of University's science in national innovation system,' *Modern problems of science and education*, 1(1). (rus)

Wessner, C W. and Wolff, A Wm. (2012), Developing twenty-first century universities, Rising to the challenge: U.S. Innovation policy for the global economy, National Academy of Sciences, Printed in the USA, 102-113.

[1] We thank Nina Yanikina and Marianna Chistyakova for helping us in extracting information on data from group of Universities, participating in the government Program "5-100".

Employer Branding: The importance of retention

Susana Silva, School of Hospitality and Tourism, CEOS.PP, Polytechnic Institute of Porto, Vila do Conde, Portugal, susanasilva@esht.ipp.pt

Inês Calisto, Portugal, inesdiazcalisto@gmail.com

Abstract

Employer Branding is a new tool used in Human Resources Management which develops a corporate branding as well as creates an active relationship between the organization and the qualified candidates to recruit and retain. Nowadays, the organizations have to take special care in the retention of its employees. The retention of employees is a priority for the Human Resources Management, as it leads the businesses to achieve high levels of profitability and success. The main goal of this research is to understand how the organizations settled in Portugal retain their employees and what practices are used to do so. It is also important to realize if the organizations think that the retention of employees is indeed important, and if so, what is their vision on the subject and, if it is through the Employer Branding process that they can achieve higher rates of retention and satisfaction of their employees. For this study were analysed eleven companies in Portugal, from distinct business areas and different locations. The qualitative methodology was used and the main technique of data collection was the semi-structured interviews. Altogether, eleven interviews were held to the responsible for Human Resources of each organization, or one of the department's employees who were linked to people management. The final results of this investigation suggest that the process of Employer Branding begins to gain ground in human resource management and that the companies in Portugal are concerned with the retention of its employees, using different practices and sometimes, creative strategies to achieve it.

Keywords: Employer Branding; Retention; Human Resources Management; Employee retaining.

Introduction

Companies are increasingly faced with problems of attracting and retaining employees due to a shortage of key competencies in individuals. Employer Branding is a relatively new concept that can act as an important tool for organizations to position themselves in the labor market as a reliable and inviting employer, thus attracting and retaining employees.

In addition to the products and capital, there is no doubt that it is human resources that hold the leading role in a company. They are responsible for the creation of products and services capable of attracting customers and of making the organization in constant growth.

The importance of this practice is even more visible when analyzing the financial and business landscape where there is an increasing demand for specialized labor and with specific skills and knowledge. Thus, due to the changes that are taking place in the labor market, it has become essential and challenging to recruit employees with key competencies and retain those already existing in the company.

Employer Branding can be used both externally to attract potential employees, and internally to increase commitment and loyalty among current employees. Therefore, Employer Branding's primary objective is to differentiate companies in the labor market and truly support them in their approach to acquiring and retaining the most talented employees. Employer Branding, on one hand, develops the corporate brand as well as puts it on a level where it is seen as a reliable and attractive company in the market. On the other hand, it creates an active relationship between the organization and the qualified candidates to be recruited and retained (Sullivan, 2004).

A more thorough study of this new process in Human Resources is therefore relevant, which may be the key to ending many of the problems that affect organizations, for example when linked to retention practices. The objective is to perceive, in the perspective of the companies, how they implement the Employer Branding process and manage the retention of employees. It is important to collect data that is as close as possible to the reality of organizations in Portugal, and for such a qualitative approach is assumed as more adequate, since it allows a more in-depth understanding of the process under study.

Literature review

Employer Branding

Employer Branding addresses issues related to the potential of attracting and retaining employees. This process, in addition to creating a "brand image" for the employer, is also related to corporate policies, procedures and actions (Mandhanya & Maitri, 2010).

In the literature, there is an agreement that the gradual interest in Employer Branding arose with the changes that occurred in society, both economically and demographically (Moroko & Uncles, 2008). This has led companies to increasingly understand how important it is to attract and retain top talent, understanding the value of Employer Branding and the maxim of making a desirable organization work (Mosley, 2007).

Employer Branding aims to promote, internally and externally, the desirable aspects of working for a company, thus attracting and involving employees (Backhaus & Tikoo, 2004). Thus, this practice makes a company become the company in which everyone wants to work and everyone wants to be part, due to their organization, procedures, ways of working, and communication. (Backhaus & Tikoo, 2004).

One of the first definitions of Employer Branding was proposed by Ambler and Barrow (1996) describing this practice as being the employer's functional and economic benefits package, where it has as its main role to provide a coherent framework that simplifies management and focuses on management priorities such as: increasing productivity and improving the recruitment, retention and commitment of all employees.

Some authors (Minchington & Estis, 2009) focus on the view that Employer Branding is the sum of an organization's efforts to continue its existence and promote the image of an employer of choice or a place where it is desirable to work (Moroko & Uncles, 2008; Backhaus & Tikoo, 2004). Davies (2008) defines this practice as a long-term strategy, aimed at organizing the knowledge and perceptions of current and future collaborators, and of other stakeholders.

Many authors (Minchington & Estis, 2009; Backhaus & Tikoo, 2004; Sullivan, 2009) define the employer brand as the image that an organization has as a great place to work for the employees' and external market's vision of the organization, that is, as quoted by its competitors, where there is a clear view that it is a different and desirable company when compared with others.

The dissemination of this corporate image is, for the most part, demonstrated to the outside of the company through its own employees (Miles & Mangold, 2007).

Thus, according to Backhaus and Tikoo (2004), the Employer Branding process is divided into three phases. First, the company must develop a concept that is enveloped in the value it has to offer its employees and potential new employees - the image of being a great company to work with. The next step will be to externalize this image, so that there is attraction for the organization and, finally, the execution of what was developed in the previous phases, that is, to incorporate the organizational culture in the recruitment of new employees and in the retention of the existing ones.

In addition, Sullivan (2004) explains that the Employer Branding to be successful must have some components, being: a culture of sharing and constant improvement; have external recognition to the organization; make the organization a reference organization; there is a balance between productivity and good management practices; make employees aware of organizational culture and with high levels of proactivity and make a company highly recognized. Employer Branding consists of the associations that an employer / organization reproduces in current and potential employee's new collaborators, these associations being many times symbolic and that affect the corporate image of the company as a good or bad employer. (Backaus & Tikoo, 2004).

The literature and the studies surrounding the Employer Branding concept are not yet very extensive, but when this concept arose by the authors Ambler and Barrow (1996), they associated it with three distinct dimensions for its analysis. These dimensions are the functional, psychological and economic dimensions. According to the authors (Ambler & Barrow, 1996) the functional dimension refers to the existence of continuous training and development activities for all employees; the psychological dimension is linked to the employees' sense of belonging to the institution, the recognition and the organizational culture itself, and finally the economic dimension represented by rewards, awards and remunerations.

A new perspective on the analysis dimensions of Employer Branding emerges, where Berthon, Ewing and Hah (2005), based on the concept of employer attractiveness, present five dimensions of analysis of this human resources management practice. In this approach, much less deductive than the first, the authors (Berthon et al., 2005) describe the five dimensions of analysis as being five maximum values: social value, economic value, development value, application value, and interest value. Berthon et al. (2005) describe social value as one in which a worker is attracted to working in a given company because of his or her organizational culture, work environment and values. Economic value is described as the package of benefits that the company has to offer, such as above average earnings, career progression, compensation among others. In the dimension related to the development value, Berthon et al. (2005) describe how employees in a given company are able to develop their skills and the confidence and recognition they show in relation to their qualities as employees. In the value of the application, this dimension is described as the opportunity that the organization gives to the employee to apply all their knowledge in practice when it develops its functions and also to give opportunity that there is a sharing of knowledge among collaborators. Finally, the last value of interest is described as being closely linked to innovation and creativity, where the company allows and wishes employees to exploit these competencies, making companies with these ideals desired by employees who are looking for challenges and stimulating companies.

In general, we can compare both perspectives and match the dimensions of the Employer Branding analysis of Ambler and Barrow (1996) with those of Berthon et al. (2005), where in the functional dimension of the former the values of development and application are inserted, in the psychological dimension are the social and interest values and the economic dimension is compared to the economic value.

Recent research has shown that human capital is becoming an increasingly important asset and creates competitive advantages for firms (Barney, 1991; Mosley, 2007). Lievens and Highhouse (2003) argue that scarcity in the labor market increases the importance for companies to attract, recruit and retain appropriate employees.

Employer Branding can be used as an instrument to position the organization as a good employer. When creating an employer brand, organizations are using ways to communicate the characteristics of the workplace and in turn are also informing how the company differentiates itself as an employer of other organizations and therefore have a comparative advantage in comparison to other organizations.

Retention of employees is also one of the most important benefits that Employer Branding can bring. Obviously, if a company has a strong employer brand and is seen as an attractive and desirable employer by employees, they in turn find it unnecessary to look for other companies to work for. Thus, the task of the Employer Branding, in the context of retention, is to affect how employees feel towards the employer, creating feelings of belonging and pride for the employer increases the self-confidence of employees and their esteem for the company (Backhaus & Tikoo 2004).

Another of the benefits that can be acquired through Employer Branding is the ability of employees to have a high degree of performance. It is about reducing absenteeism and improving job performance (Barrow & Mosley, 2006; Ambler & Barrow, 1996). Employees who are proud of their jobs are likely to enjoy their jobs and therefore have fewer reasons to neglect their obligations. Pleasure for the work that is done helps improve performance and, for the most part, the individuals who enjoy their jobs, are good professionals.

An important role of Employer Branding is to differentiate an employer from all others by combining various particularities and attributes that will make it stand out from other employers (Keller, 2003).

However, for Employer Branding to work as a competitive advantage you need to follow a few criteria. Between the employer and the employee there is a psychological contract, and expectations regarding obligations for both parties are resolved during the recruitment process (Backhaus & Tikoo, 2004). The employer must offer and provide the employee with training so that there is a constant evolution, in exchange for a good performance by the employee. If this psychological contract is fulfilled it is more likely that there is a high degree of loyalty and involvement of the employee towards the company (Morocko & Uncles, 2008) and according to Backhaus and Tikoo (2004) loyalty and commitment bring increased productivity in company. Employment itself is a category that strongly affects the attractiveness perceived by employees and includes issues related to the work environment, the relationships existing between the different employees, the existing management style, the rewards, the type of work and the strength of work (Maxwell & Knox, 2009).

Therefore, the main objective of this study is to explore the use of Employer Branding by Portuguese companies. The specific objectives are: (1) to know the methods and tools used by the organizations in the retention of collaborators / talents; (2) to characterize the way organizations structure employee retention; (3) to understand the vision companies have about the process of Employer Branding and (4) identify the use of Employer Branding by companies in their employee retention processes.

This paper is organized as follows: in the next section are presented the methodology used to realize the study, namely the sample characterization and the description of process and data analysis. The following section presents the results obtained, and the paper ends with a section of discussion of results and main conclusions of the study.

Methodology

This study was conducted according to the interpretative research paradigm, based on the method Grounded Theory, using as technique of information gathering the semi-structured interview. To analyze all the interviews was used the technique of codification and data analysis recommended by the method Grounded Theory. According to Strauss and Corbin (1998), the Grounded Theory is a qualitative method of research that allows to carry out a vast analysis of the data and to know the relations between the collected information being essential that the participants know and understand in some detail the area of study. However, participants are not expected to understand all the concepts that are not part of their daily lives (Seale, 1999).

Participants

Considering that the study was intended to explore the implementation of Employer Branding by Portuguese Companies, it is clear that the sample in this study are companies that: 1) worked in Portugal; 2) medium-size or large companies; and 3) had a human resources managers. Therefore, the participants were a group of 11 companies in Portugal, from distinct business areas and different locations. All the interviews were conducted to the responsible for Human Resources of each organization, or one of the department's employees who were linked to people management. The participants have ages between 25 and 53, and most of them have undergraduate degrees. They worked in this function from eight months to 26 years.

Procedure and Data Analysis

In order to answer the objectives of the study, the procedure adopted followed several phases, and data collection and analysis occurred from March to August 2016.

In the first phase, all the companies received an e-mail with the objectives of the study trying to evaluate the availability to integrate the study and to conduct a semi-structure interview. The objective of this semi-structured interview was to interview the human resource manager, creating a more informal conversation, but focusing in the topic of the study. It should be noted that was also developed an informed consent document to all the study participants to sign.

Eleven interviews were conducted. Most of the interviews were conducted at company headquarters; however, some of the interviews had to be done via Skype, since some of the human resource consultants were far away. The interviews lasted approximately 40 to 50 minutes.

The third phase involved the treatment and analysis of the information collected. The interviews were transcribed in full verbatim, that is, word by word, being reviewed at the end, and everything that was transcribed corresponds to what each consultant answered in the interview. The analysis of data was realized using the coding and analysis procedures of Grounded Theory (Corbin & Strauss, 1990). Each interview was analyzed line by line to extract its meaning, coding it initially in open codes, and later organizing it in central themes, form where rise the axial and selective codes. This phase culminated with the formalization of the concepts that emerged from the information collected, and then confronted with the scientific literature of the area.

At the end of this process, were obtained a set of concepts and relationships between them, based on the information analyzed and confirmed by the literature, that explain employer branding has been used in the companies.

To ensure the validity of the analysis and the coding process, two researchers were consulted as auditors (independent researchers that discuss and validate the categories) throughout the entire data analysis process to assist the primary author by challenging ideas and assisting in the construction of the categories. The main results are presented in next section.

Results

Analyzed all the interviews emerged three central dimensions that organize all the data in order to explore the use of Employer branding by Portuguese companies, namely: (1) Retention; (2) Employer Branding; and (3) Attractiveness of employers.

The retention dimension is characterized by everything that organizations do and think about the permanence of employees. Retention is characterized as the efforts that companies make to keep their employees. The retention category emerged from the subcategories: problems in retention of employees, challenges in retention of employees, practices to retain employees, and changes in retention processes over the times.

The category problems in employee retention, is characterized as a particular issue or a particular subject that requires a solution. At the organizational level, it is a private matter that, once solved, becomes beneficial to the organization, that is, the term problem was analyzed as something that can be modified in the short term and in which there is knowledge about it and about your change. Thus, we speak of the problems felt by organizations regarding the retention of their employees. The main problems raised by the interviewees regarding the retention of their employees were the abrupt growth of the organization, problems related to leadership and to the organizational strategy itself. Other problems were raised during the retention dimension analysis. We speak for example of problems related to the age of employees; harassment by other competing companies; problems related to wage expectations; balance between professional and personal life; problems related to the adequacy of employees in relation to the organizational culture; lack of an evaluation system; high standards of competitiveness; lack of career progression and even the location of the company itself as mentioned in “we are in a very strong growth phase, and this causes a wear and tear on the team, because there is more work for everyone. The only way we have to compensate for this is by trying to reward and try to compensate people, even during their own time of work” (Company 5).

The subcategory retention challenges is characterized as something that must be overcome and where there is knowledge about the same but has not yet been thought and / or analyzed how to solve it.

Practices are another subcategory of the retention dimension, which are characterized by the efforts that companies use to retain their employees. In this way, organizations must have full knowledge of their employees so that they can implement practices that adapt to the reality they have. The practices most mentioned by the participants are the offer of food, fruit and drinks to employees; the commitment to active communication among all employees of the company, including managers; health and / or life insurance; medicine at work; activities, parties, physical activities and team buildings; premiums; career management and career advancement; flexibility of schedules; training and fostering teamwork. This can be illustrated by “we have many and I think we are a company known for it. We try our best to make our employees feel at home, there is always the idea of being the second house. We always have food available [...] The floor is all carpeted, people if they want to walk barefoot as they can at home, we have lots of sofas spread out here for people to have their moment of respite, to recover energy ... On our site there are some references and gives you the idea to get an idea, such as surf and yoga classes, the games room and the nap room. [...] We have a very open mind, when you walk around here you can not really understand who the managers are or not, although there is a hierarchy and everything [... [there is a great proximity between us. [...] We have the Occupational Medical Doctor who comes here. We have health

insurance for both workers and families. When an employee has a child we open an account with a value so that they can use it in any way they see fit" (Company 8).

The category changes made by the organizations in the retention processes over the is characterized by the explanation of everything that the companies did in the human resources management, more precisely in the retention of employees, everything they have implemented again, to adapt to reality and thus keep their employees. The changes most mentioned are the implementation of an evaluation system; conducting a satisfaction survey; competition analysis; improvement in the treatment given to employees; benefits package adapted to each employee and, to create changes whenever the need demands it. We can refer the example "in recent times, and having as main objective the monitoring of labor market practices, our organization has adapted and changed in the way of thinking about retaining the best employees. It is no longer enough to think only that to keep them we only need to pay the salary on time and on time. The market is increasingly competitive and if we want to retain and maintain those who contribute most to our success, we have to define strategies that require an ever higher investment" (Company 11).

The Employer Branding dimension is characterized as a structured process aligned with organizational values and business objectives, and where there is internal and external communication of the most important configurations about the identity of a company. The goal is to create a distinctive image with other companies and make them an employer of choice. Employer Branding makes a company become the company in which everyone wants to work and to be part, due to its organization, practices, forms of work, communication, etc. Each company has an image as an employer between current and potential new employees. To manage this image, it is necessary to create a positive impression of the company as an employer and convey the message that it is a great place to work.

The category Employer Branding emerged from the subcategories: process / knowledge, advantages, disadvantages, success in implementing Employer Branding practices, and failure to implement Employer Branding practices.

In an overview of the interview analysis, it was possible to perceive that most companies have a notion about the concept and maxim of this practice of human resources management, but that the idea is not really used in its fullness. That is, most interviewees know the practice and / or the concept of Employer Branding, but in the management of their teams and in the human resources management of the companies they represent, this practice is not known, and there is no full use of the benefits that this practice can bring to an institution.

The most pointed challenge is related to employee satisfaction and how challenging it is to maintain high levels of satisfaction. Other challenges inherent in retention have been identified, such as employee requirements; confidence in the company; the arduous task of balancing personal and professional life; career plan and benefits package; lack of approval of heads of department on certain matters; the lack of encouragement and encouragement to employees; individual treatment to some employees and challenges related to employee development. Another challenge mentioned, and which can not be generalized to most companies, is that other factors completely external to retention are the fact that they are not known in the foreign market, that is, people do not know a company what can lead to some discomfort and insecurity in our employees. the main idea of the interviewees about Employer Branding is related to corporate image and external recognition and prestige, but there is also the idea that is practical should be transversal to all areas and people of companies, as it is an excellent tool of communication and retention of employees and where you can see the pride of the employees for being part of the company and where they will be the brand ambassadors themselves. In this way the first subcategory, which concerns the process of Employer Branding, and the knowledge of this practice is identified. "It is the brand image of the company, that is, the way they come to me as an employer. What

I convey as an employer, as a company that can be attractive or not. Creating this image is very important. We here try to use this practice and create a strong corporate image of our company, we try to convey the reality of our company out, attract the best talent, we want the ideal people for each function." (Company 6).

In the subcategory advantages of the process of Employer Branding are analyzed all the benefits that this practice can bring to a company and its management of human resources, that is, all the benefits and positive aspects that can be achieved with the use of this process. The most mentioned advantages were the existence of recognition by the employees and the external recognition and also the existence of a very strong brand image associated to the company, which leads to another advantage that is the attractiveness that the company earns.

The subcategory of disadvantages is characterized by all the negative aspects that the sample pointed to the process, that is, the inconveniences and damages that can happen to an organization with the implementation of this practice. More than half of the respondents pointed out no disadvantage in the Employer Branding process, claiming that they saw no disadvantage in the method. However, some drawbacks have been identified such as the fact that it is a continuous and time-consuming process and where there may be a misinterpretation of the concept and practice. Disadvantages related to competition and competition from other companies in the industry were also identified as mentioned in "one of the main disadvantages is the unreasonable ambition. As it is obvious when something becomes very attractive, the greater the aggressiveness to conquer and to enjoy. In this way, when the conquest is not healthy you can fall into the error of forging the policies and good practices of the company. Another disadvantage may be the conformists, who when reached a level that they consider reasonable will not work for a continuous improvement, or even, a prosperous growth" (Company 11).

The success measurement subcategory refers to how companies get feedback from practices implemented with respect to Employer Branding, ie if a new tool is put in place, organizations need to realize if they are this should measure the success of the implemented practice. In order to measure success, satisfaction and opinion surveys and employee suggestions were identified as the predominant techniques of employee feedback on company management.

The subcategory measurement of failure is characterized by the analysis of the form and method that companies use to calculate the failure of practices implemented against Employer Branding, that is, if the tools they use bring a return to the organization. The respondents' feedback is similar to the subcategory presented previously, where the techniques used by the organizations are the surveys of satisfaction and opinion and the suggestions of the collaborators. This is how organizations analyze the failure to implement employee engagement practices.

The dimension attractiveness of companies, which is characterized as all factors linked to a company that make it pleasant and attract attention, that is all aspects that make a quality and desirable organization. In the attractiveness of companies, we consider the ability to attract, select, hire and retain people, maintaining good levels of employee satisfaction and excellent service standards. This dimension arose from the categorization of the subcategories: the opinion about what makes an employer attractive, the characteristics that a company must have to be considered the best company to work for, and finally the opinion about the employees' view of the company in that work.

In the subcategory employees 'opinion about the company, the interviewees' opinion on the company employees 'overall opinion was given, and in all the interviews the answer was the same, that is, all the interviewees stated that the employees' the company was quite positive and they consider the company where they worked, a good company as mentioned in "That's a good company to work with. Luckily we feel it, yes!" (Company 1)

The attractive employer subcategory is characterized by the personal opinion of the interviewees about what makes a company as an attractive employer, that is what captivates a company, whether in its management or even in relation to the services they provide and / or organizational culture.

In this subcategory was identified the good work environment and the career progression as the most relevant factors and those that really make an employer attractive. The permanence in the function was also one of the factors of reference, and there is a concern on the part of the employees with their own retention, because it is important to know that there is some security and duration in their functions. Other factors of relevance were the identification with the culture and values of the organization; the importance that companies give to employee satisfaction; the existence of constant feedback; the bet on the training of employees; the salary and benefits package; the autonomy and freedom given to employees as well as the diffusion of management based on active communication.

The last analyzed subcategory of the attractiveness dimension of employers is the characteristics of the best company to work for that is characterized as the attributes that companies must have to be considered as a great place to work and to be successful. Here we talk about the most important and essential characteristics that organizations must possess in order to have high standards of excellence. The most presented characteristics were the existence of a good work environment among all employees, including managers, autonomy and possibility of decision making and a compromise between the organization and the task performed. It was also presented as important characteristics the possibility of a balance between personal and professional life, issues related to business leadership, working conditions, the possibility of career progression, the exchange of feedback between employees and managers and the bet training of employees.

In the analysis of this subcategory is notable the variations between the opinions of the interviewees, once it was the analysis of the personal opinion of each one of the interviewees it is possible to identify a panoply of different characteristics, that is, it is a category where there can not be a great generalization since everyone has their idea about what makes a company the best company to be able to work, “I honestly do not know what the best features are, because it depends on company to company, and sector and depending on the employees themselves and all companies work differently ... Here, what are good characteristics, are exactly that flexibility that exists, this autonomy, that freedom of the employees can say what they feel, what they agree what they do not agree” (Company 3).

Discussion and Conclusions

The purpose of the present study was to understand the reasons for companies to use the Employer Branding process, and if they use it in human resources management, more precisely in the retention of their employees, realizing which practices they use to retain. Thus, this qualitative research focused on the panorama of eleven companies in Portugal and their contributions regarding the process of Employer Branding and retention of employees.

It is possible to conclude that, although Employer Branding (Mosley, 2007) is a relatively recent process in human resources management in Portugal, it is already beginning to gain ground and is based on the strategic plan of many companies. Organizations increasingly attach importance to the external recognition they have and to the company's image of society and its collaborators (Lloyd, 2002). Although there are some disadvantages associated with this process, most of them are only given advantages by human resource managers. When Employer Branding processes are implemented in human resources management, they are successful and guarantee a better performance and sense of belonging to employees.

It is also possible to conclude that employee retention is increasingly important for organizations, not only because of the extra expenses that the turnover entails but also, closely linked to the Employer Branding maxim, internal and external recognition is very important for the longevity and success of an organization. Collaborators are no longer seen as a number, but rather as the driving vehicle for a company's success at a structural, organizational and business level.

The management of resources (and managers) are increasingly present in their tasks the well-being of employees and, in turn, the idealization and organization of a retention plan that is appropriate and adapted to all employees. To do so, they use a range of tools and retention practices, ranging from a salary package and attractive benefits to raising awareness for an open and active communication policy among all.

Within the three large dimensions under analysis in this research, retention of employees, Employer Branding and attractiveness of employers, it was possible to perceive that companies are beginning to give more and more importance to employees, and human resources management is beginning to make progress with regard to concern with employees.

In general, it can be said that, although it is a complex process, retention (Chaminade, 2006) is a matter of importance to companies and that they are concerned with changing processes in their human resources management and performing some practices, in order to difficulties are reduced. The major problems with employee retention were the organization's abrupt growth, leadership problems, and organizational strategy itself (Singh & Rokade, 2014) and the great challenge with regard to retention is related to employee satisfaction and the difficulty of maintaining high levels of satisfaction among all employees (Hytter, 2007).

In order to maintain employees, organizations use a set of practices and procedures that work perfectly as strategies for retention. The practices described by the sample of this investigation regarding the retention of employees were immense. The most common are the supply of food and beverages to employees; the commitment to active communication among all employees of the company, including managers; health and / or life insurance; medicine at work; activities, parties, physical activities and team buildings; premiums; career management and career advancement; flexibility of schedules (Kaliprasad, 2006; Hytter, 2007).

Regarding the theme of Employer Branding, it was possible to perceive that most companies have notion about the concept and maximum of this process. Although the idea of being a fashionable process is obvious, the existence of the Employer Branding can be a strong weapon for the management of human resources. The central idea that exists about Employer Branding is related to corporate image and external recognition and prestige (Backaus & Tikoo, 2004), as well as an excellent communication tool (Hytter, 2007).

Limitations

The phenomenon of Employer Branding in the business world is relatively recent, hence the difficulty in obtaining more information and data in greater depth among the interviewees, which gave to realize the lack of knowledge about this process. Also, the retention issue has some limitations to this investigation, since it turns out to be a delicate topic, where none of the representatives of the companies that integrated this study had an interest in passing a negative image about the companies that represented them, always having neutral answers. This made the results turn out to be quite positive, that is, never mention was made of something less positive that was done in companies in terms of retention.

Social desirability is a problem that arises whenever one wants to investigate something using people's opinions and discourse, since there is a tendency for them to respond in a way that they consider to be the most acceptable in social terms. This is because the social subjects interviewed want to convey a positive image and give socially acceptable answers or that they consider to be correct. It should be noted that social desirability depends greatly on the situation, thematic and the issues that are presented. This happened despite the confidentiality and anonymity of all the information provided. When we do an investigation involving people and their opinions and assessments it is important not to forget the social side and the tendency to respond in accordance with what they think is right and in this case the fact that they talk about issues related to their jobs poses even more obstacles and fears.

Future research and implications

In this way, the present study raises some new questions. In future studies it is convenient to approach this topic through quantitative studies so that various perspectives can be analyzed, as well as different types of companies, that is, from small companies and companies more familiar to multinationals, so that there may be a larger spectrum of analysis.

It is also important, in future investigations, to replicate this type of approach to small businesses, in order to understand if there is a concern about retaining employees and creating a brand image around the organization, that is, understanding if small businesses also care with the external image they possess and if they think it is something that must be changed and adapted.

These are some of the rationales that may encourage the succession of new investigations in the future, since retention of employees will continue to be a very important issue in terms of human resources management and Employer Branding, even though it is a relatively new concept, is already beginning to gain ground, making its analysis essential.

These are also thematic that provide several contributions to the professional practice of human resources. Firstly, we begin to think about the work of a human resources professional who is not only concerned with bureaucratic matters, but rather the fundamental role that these professionals have in creating a strong employer brand in companies and in creating an image external force.

It is also important to realize that these professionals are endowed with skills that lead to high levels of employee retention and to high standards of profitability and profitability of organizations, thus becoming central for companies to have professionals of human resources with skill and knowledge on issues such as Employer Branding and Retention.

References

Seale, C. (1999). *Quality in qualitative research*. Qualitative Inquiry. University of London, Brunel University.

Strauss, A. & Corbin, J. (1998). *Basics of qualitative research: grounded theory*. London: Sage.

Ambler, T. & Barrow, S. (1996). The Employer Brand. Journal of Brand Management. 4(3), 185-206;

Backhaus, K. & Tikoo, S. (2004). Conceptualizing and researching employer branding. Career Development International, 9(5), 501-517.

Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. Journal of Management. 17(1), 99-120.

Berthon, P., Ewing M.J. & Hah L.L. (2005). Captivating Company: Dimensions of Attractiveness in Employer Branding, International Journal of Advertising, 24(2), 151-172.

Corbin, J. & Strauss, A. (1990). *Grounded Theory Research: Procedures, Canons and Evaluative Criteria*. Department of Social and Behavioral Sciences. University of California. San Francisco, U.S.A.

Chaminade, B. (2006). A retention checklist: How do you rate? HR Leader. Human Resources Magazine.

Davies G, (2008). Employer branding and its influence on managers, Journal of Marketing, 42 (5/6): 667-681.

Ewing, M.J.; Pitt, L.F.; de Bussy, N.M. & Berthon, P. (2002). Employment Branding in the Knowledge Economy. International Journal of Advertising, 21(1). 3-22;

Hytter, A. (2007). Retention strategies in France and Sweden. The Irish Journal of Management, 28(1), 59–79.

Kaliprasad, M. (2006). The human factor I: attracting, retaining, and motivating capable people. Cost Engineering, 48(6), 20–26.

Keller, K. L. (2003) Strategic brand Management, Building, Measuring and Managing Brand Equity. New Jersey: Pearson Education Inc., 3.

Lievens, F. & Highhouse, S. (2003). The relation of instrumental and symbolic attributes to a company's attractiveness as an employer. Personnel Psychology, 56;

Mandhanya, Y. & Maitri, S. (2010). Employer branding: A tool for talent management. Global Management Review, 4(2), 43-48

Maxwell, R. & Knox, S. (2009). Motivating employees to "live the brand": a comparative case study of employer brand attractiveness within the firm. Journal of marketing management, 25(9-10).

Miles, S.J. & Mangold, W.G. (2007). Growing the employee brand at ASI. Journal of Leadership & Organizational Studies, 14(1), 77-85.

Minchington, B. & Estis, R. (2009). 6 Steps to an employer brand strategy.

Moroko, L. & Uncles, M. (2008). Successful Employer Brands, Brand Management, 16(3).

Singh M. & Rokade V. (2014). Employer Branding: A Strategic Dimension for Employee Retention. Journal of Marketing and Consumer Research (5) ISSN 2422-8451;

Sullivan, J. (2009). Understanding Available Retention Strategies: Are You Prepared for Turnover Rates to Double? (Part I of 2 Part series).

Sustainability of Family Owned Business:

An Empirical Evidence from Family Owned Businesses

Babar Ansari, Institute of Business Management, Karachi, Pakistan, std_14370@iobm.edu.pk

Kanwal Gul, Institute of Business Management, Karachi, Pakistan, std_17826@iobm.edu.pk

Nawaz Ahmed Institute of Business Management, Karachi, Pakistan Nawaz.Ahmad@iobm.edu.pk

Syed Irfan Hyder, Institute of Business Management, Karachi, Pakistan, Irfan.hyder@iobm.edu.pk

Abstract

The purpose of the research is to figure out impact of Succession planning, Decision making authority and Successor influence on sustainability of Family Owned Businesses in Pakistan. This research will provide insights and recommendations to entrepreneurs and specifically family owned businessmen that how to make business sustainable for long term. Data will be collected from Family Owned Business Owners from Pakistan. Respondents will be selected on the basis of purposive sampling technique. Four big Cities of Pakistan (Lahore, Islamabad, Karachi, Hyderabad) has been chosen for sample population from which data will be collected. Respondent will be interviewed with semi structured survey questionnaire. Narrative analysis will be used to interpret results.

Keywords: Sustainability, Financial management, Succession planning, control of ownership, Successor Influence

Introduction

Background

Since the independence of Pakistan, in 1950s and 60s, there were 22 family oriented successful businesses in Pakistan (Deloitte, 2010) Out of them only few have managed to sustain. As the new generations -whether in shrinkage or in expansion-come in front and takes the front seat and conflicts nurtured. Family owned businesses in Pakistan are being handled by more than one family member, every member has its own vision, mission, way of leadership and management which in turn ultimately creates differences and led to bankruptcy of the family own company. Research shows that only 15% of the family owned businesses survive in Pakistan and 85% of them distributed or vanished till its third generation (Haq, 2010)

In 1987, people of the view that running family business is the toughest job on globe. As family businesses have to compete with multiple values, family norms, more competitive environment with more discussion on technology implementation with changing political situations (Kleiman & Peacock, 1996). Ten years before, family businesses don`t have to consider technological implications on success, participation of women in business, use of social media and the international market impact on domestic industry (Kleiman & Peacock, 1996). It was like to compete to the domestic industry and to cut off the interest rate at their maximum level (Carlock & Ward, 2001).

It was very much difficult for family businesses to stay in to the market. As market faced lots of changes. According to Fortune 500, since 1955, only seventy-seven family owned business succeed to compete the market, rest 80% failed to sustain, some sold their businesses, some got bankrupt (Perry, 2015). Reasons behind these drastic changes are technology development, more mature markets (domestic, international), more competitive strategies, more competition, customized suppliers and quick reaction to strategies from competitors present in the market. Mostly family businesses face more family conflicts on their management and share (Carlock & Ward, 2001). It is due to:

- *Unresolved personal conflicts*
- *Lack of trust*
- *Difficult family relationships*
- *Family Demands on business.* (Carlock & Ward, 2001)

For the success of the family business, there should be a separation between family problems and business is the key to success. For the achievement of this equilibrium, family businesses should devise a plan with policies under these five Cs:

- *Control*
- *Career*
- *Capital*
- *Conflict*
- *Culture* (Carlock & Ward, 2001)

The purpose of this research is to explain the perception of values in a philosophical standpoint, to analyze the business principles of world`s largest family owned businesses and non-family businesses and to highlight if there are certain specific values behind the success of the family owned businesses. Ceja, Agulles, & Tàpies (2010) concluded with three important results. 1st, on the basis of philosophical literature, authors have developed a description, categorization and chain of command of values. 2nd, authors found that values highlighted by top most successful organizations of the world, among them common among both family businesses and non-family businesses were ***(integrity, respect and customers).*** 3rd, at the end, authors succeed to find some important values behind the success of family owned businesses, that are "generosity, humility, communication, service, quality, excellence, creativity and entrepreneurship". (Ceja, Agulles, & Tàpies, 2010)

Family owned businesses are treated as the backbone of any economy because they contribute a lot in terms of wealth, jobs and also family owned businesses have very deep insights within their territory (Gideon A., 2015). Every business have both positive and negative aspects, so same is the case with family owned businesses throughout the world. Their negativities are their family conflict, incompetent next generation who ruins the business entity and their glitzy standard of living. Schwas (2013) research on family owned businesses throughout the world got succeed to achieve some cavernous insights which either help family businesses to sustain to many generations or they make them collapsed. Authors suggested two lessons that are:

- Each Successful family to more than two generations creates its own history composed of profits and losses but its success it based on immovable commitment and strong cultural ties.
- Every family business is like a tale composed of people, entrepreneurs and families. They left irremovable impact on the business that led family business to succeed over generations. (Schwas, 2013)

Schwas (2013) quoted "Family business is the people business" and that is the key point that most of the family businesses forget and lead to failure. Author has highlighted key points for the success of the family business:

- Family business owners enjoy freedom of business by having their own private entity and they apply self-possessed strategies with strong values for the business growth which make their family business to run over four generations.
- Family business owners incorporate strongly family roles within and out of family business but is succeed on condition that member have fine balance between their rights and duties. The business governance they have, provide clarity, leadership vision and trust within the members of the family (Schwas, 2013).

According to Family Firm Institute, most of the family business owners want to see their businesses to be transferred to next generations. Among them, 70% do not stay alive to next generation and 90% fail to stay alive till third generation. On these statistics Ward J. in the Perpetuating the Family Business 2004 states that the most grave concern in the family businesses are family issues than real business issues (Walsh, 2011).

The paper is based to ask for the help of the family entrepreneurs to evaluate and analyze the impacts of family ownership on businesses. For the highlighted purpose, authors have exemplified the business creation as it is buoyant by the policymakers and predicted the entrepreneurial activity done by family member round the globe. Authors have comprehended the data on entrepreneurship and analyzed the work done by scholars on impacts of families member in businesses. Authors have concluded that it is better is highlight the research aims for family businesses and giving them sample questions which can impact family dynamics and comfort (Jennings, Breitkreuz, & James, 2013)

Scope

The scope of the research is to boost the entrepreneurship culture in Pakistan, which will also help to increase sustainability of family owned businesses. Therefore, this research aims to know the factors involved in sustainability of family owned businesses in Pakistan over future generations. This research is based on Pakistani cities (La) what to do here

Objective

The general objective of the research is to find out factors involved in sustainability of family owned businesses in Pakistan. Whereas, precise objectives of the research are:

1. To figure out reasons which influence sustainability of family owned businesses?
2. To derive solutions from results to help strengthening sustainability of family owned businesses.

Problem Statement

To find out whether selected independent variables from literature have impact on sustainability of Family Owned Businesses.

Literature Review

Definitions

Sustainability

It is a Policy theoretical concept with beginning from the report-Brundland in 1987 (Kuhlman & Farrington, 2010). Sustainability is defined as to meet one own needs by not sacrificing future of future generations` needs. Sustainability is not only limited to just environmental needs, but it also is used for social as well as economic needs and development (Alberta, 2014).

Financial Sustainability (Definition)

Financial Sustainability is defined as the capability of an organization to take revenues reference to their demand to achieve sustainability in their production with a growing rate and to achieve financial targets. (León, 2001).

Financial Management

Walker and Brown in 2004 worked on Success factors influencing Small business entrepreneurs highlighted that whereas financial factors treated as the key factors to measure the business success, but finances may not only be the key gauge business triumph. Authors pointed out that entrepreneurs not only work to achieve financial goals, but they work to achieve targeted life style, personal accomplishment, pride and honor as well. Authors selected sample size of 290 small business owners based in Australia. Respondents in the research were questioned to rate importance to their lifestyle and financial goals in accordance with business achievement. Results concluded that bendy lifestyle, pride and target achievement were healthier signs than financial achievements. Concluding it, Walker and Brown summarized as it will be more beneficial to look for subjective measure than to gauge financial objective achievement (Wallace J. S., 2010).

Paper is about the impact on financial performance of businesses in Pakistan with reference to family possession. Authors have collected the secondary data from 2007 to 2011 and selected four family businesses in Pakistan. Two are from the manufacturing side and two are the financial firms listed in the Pakistan Stock Exchange. Authors have selected Financial Performance as the dependent variable whereas ROE and ROI are treated as the independent variable. To check their impact authors have used regression and correlation method. Authors concluded that financial performance has the positive relation with the ROE and ROI. Better management and governance increase the overall presentation of the company (Ahmad, Nadeem, Ahmad, & Hammad, 2014).

The Paper aims to explore the impact of strategic orientations` implications in the family owned business performance and their impact on their growth, sustainability and financial stability in Turkish family owned business. A simple regression following Descriptive Statistics of the sample have been used. Highlighting the factors, authors have applied factor analysis to verify the impact of the highlighted factors (Altindag, Zehir, & Acar, 2011).

Succession planning

Planning for succession of the business owned by family gathered importance in terms of research and literature (Sonfield & Lussier, 2002). Founders of the business have difficulties in “letting their business”

in other hands. Research suggest that family owned business see succession planning in more of a conceptual manner. The favor family-relationships and family bonding where as non-family business do succession planning in organized and task oriented way (Fiegener & Prince, 1994).

Several authors have identified factors for the success of the succession, growth and the stability of family owned businesses in multi generations. The survey of Australian family businessmen of 242 to know the reasons for the success of the business. Authors concluded the study with important factors ***Governance and Management***. The use of Pro Active tactics i.e. ***meetings, boards of directors, family councils, and codes*** of conduct played a major contribution in the success of the family business (Dana, Smyrnios, & Bi, 2015).

Authors say the succession planning and to regulate/systemize the management is the most important stage in the alteration of family business. The family members` impact is much worthy to impact the decisions regarding alteration of family business from one generation to the other (Walsh, 2011). To conclude authors stated that family business is not like giant organizations in which best strategic practices applied without any customization in it but for the family business a customization is required with a heavy family element in it. Author has highlighted the importance of communication in family members for succession planning. with the aim to set and achieve family business succession goal. For the better communication integration among family members and the ownership of family business among family members is a must (Walsh, 2011).Variable of the study taken from (Mahmoud, 2012). Variable is constructed on 5 items based on Likert scale.

Decision Making Authority

Authors have identified positive, negative, and neutral associations involvement in family business success. Authors investigated some challenges and identified that some are because of level of family member's involvement in the family business. Authors have quoted that family businesses are not like industrial organizations referred as binary organizations, whether family businesses are treated are heterogeneous composed of customized elements within every family business. Authors have selected sample of 6592 companies, and concluded that selective customizations within family business are related to outstanding financial output of the firm (Aguilera & Castro, 2014).

In family owned business, management is the main hurdle for the growth because it is much more different from a non-family owned business. Especially, when family members, relatives work together in a family business, they interfere business decisions with their emotions and the ultimate result is the failure of family owned business. Author also stated another type of problem in family business is "***to control day to day operations"*** and in other companies growth is the problem, this is due to other members of the family do not want to reinvest the profit back to the business (Centre, 2011).

Successor Influence (Ownership Transition)

For the stable family businesses, their key to success is to prepare their future leaders who lead their family business to next generation. For the established and winning family business, their tricks are mostly same at their three stages which are pre-entry, entry and succession. Whereas, in less winning family businesses expresses their difficultly in the succession stage. Another issue highlighted is the role adjustment during the phase of succession planning is missed between the father/1st owner and the successor. There is lack of documentation during the succession planning phase in all the three stages. Authors have observed the makeover from 1st generation to the other for the three stages. If the family industry is having low managerial function with small scale production and less use of technology, it will be in the same level till the second generation succeed to takeover and make some changes. The second generation have made known technological innovation with some expert managerial skills. Moving from

the second generation to third, they have shown world class managerial and operational skills, with sound knowledge of human resources, finance and marketing. Authors have identified the major challenge that family business face is to keep all the family members amalgamated without division in the business and to manage family members issues for the family business managerial roles (Afghan & Wiqar, 2007)

Methodology

Participants for this study will be selected on the basis of purposive sampling because authors need participants on the basis of certain characteristics. Four cities of Pakistan selected for the study because these four cities are considered as big cities of Pakistan and most of the family businesses are well developed in these cities. Cities are Lahore, Karachi, Islamabad and Hyderabad. No of participants is not restricted as this is an exploratory study and method of data collection is interviews so authors will conduct at least 30-35 interviews. Also authors will continue till a saturation point in data.

Limitations

Every research comes out with analysis of the data from different perspectives and angles, but it cannot be concluded here because criticism and suggestions are always welcomed in the research. This research is also limited in its scope as it is conducted in four cities of the country not over all Pakistan so generalizability of this research will not be broad. These cities have different environment and education level, demographics and living standards so other small cities or villages can have different factors which might impact on sustainability of family owned business.

References

Wallace, J. (2010). *Family-Owned Businesses: Determinants of Business Success and Profitability.* All Graduate Theses and dissertations .

Afghan, N., & Wiqar, T. (2007). Succession in Family Businesses of Pakistan: Kinship Culture and Islamic Inheritance Law. *Centre of Management and Economic Research, 7*(54), 33.

Aguilera, R. V., & Castro, R. G. (2014). Family Involvement in Business and Financial Performance. *Journal of Family Business Strategy*, 12.

Ahmad, N., Nadeem, M., Ahmad, R., & Hammad, N. (2014). Impact of Family Ownership on Firm`s Financial Performance. *Arabian Journal of Business and Management Review, 2*(8), 6.

Alberta, U. o. (2014). *University of Ablerta, Office of Sustainability.* Retrieved from mcgill: https://www.mcgill.ca/sustainability/files/sustainability/what-is-sustainability.pdf
Altindag, E., Zehir, C., & Acar, Z. A. (2011, June). Strategic Orientations and Their Effects on Firm Performance in Turkish Family Owned Firms. *Eurasian Business Review, 1*(1), 36.

Carlock, R. S., & Ward, J. L. (2001). Strategic Planning for Family Business. *Palgrave Macmillan*, 289.
Ceja, L., Agulles, R., & Tàpies, J. (2010). The Importance of Values in Family-Owned Firms. *Family Owned Business Chair*, 41.

Centre, W. E. (2011). Problems n Managing Family Owned Business. *Problems n Managing Family Owned Business*. Women`s Enterprise Centre.

Colli, A., & Rose, M. (2010). Family Business. In A. Colli, & M. Rose, *Forms of Business Organization* (p. 24).

Dana, L. E., Smyrnios, K. X., & Bi, R. (2015). Family business continuity: Key Factors and Practices. *Small Enterprise Association of Australia and New Zealand* (p. 20). Melbourne: Annual SEAANZ Conference 2015.

Englisch, P., Hall, C., & Astrachan, J. P. (2015). Staying Power: How do Family Business Create Lasting Success. *EY*, 24. Retrieved from http://www.ey.com/Publication/vwLUAssets/ey-staying-power-how-do-family-businesses-create-lasting-success/$FILE/ey-staying-power-how-do-family-businesses-create-lasting-success.pdf

Fudda, M. M., Ozim, & S.I. (2008). *The Corporate Governance Guide.* Karachi: Center of International Private Enterprise.

Glynn, N. (2012). Ownership and Management Transition in a Family Business. *Deloitte*, 3.

Haq, R. (2010). *Pakistan`s Growing Middle Class Responds to Challenge*. Retrieved from RiazHaq: http://www.riazhaq.com/2010/08/pakistans-middle-class-responds-to.html

Jennings, J. E., Breitkreuz, R. S., & James, A. E. (2013). When Family Members are also Owners: Is Entrepreneurship Good For Families? *Family Relations, 62*(3).

Kachaner, N., Stalk, G., Jr., & Bloch, A. (2012, November). What you can Learn from Family Business.
Kuhlman, T., & Farrington, J. (2010). What is Sustainability? *MDPI, Basel, Switzerland*, 13. doi:http://edepot.wur.nl/158493

León, P. (2001). Four Pillars of Financial Sustainability. *Resources for Success Series, 2*, 27. Retrieved from http://pdf.usaid.gov/pdf_docs/Pnadf342.pdf

N., K. (2013). Innovation in Small and Medium Sized Family Firms. *Springer Fachmedien Wiesbaden*, 11.

Quraishi, A., & Hussain, D. I. (2013, July). The Dilemma of Success and Failure of Family Business: Overcoming Failiure and Attaining Success. *International Journal of Academic Research in Economics and Management Sciences, 2*(4), 17.

Ramchandaran, K. (2006). Indian Family Business: Their Survival Beyond Three Generations. *Indian School of Business*, 22. Retrieved from http://www.encubeindia.com/downloads/indian_family_businesses.pdf

Schwas, J. (2013). Family Businesses: Success and Failure. *International Institute for Management Development*, 10. Retrieved from http://www.imd.org/uupload/IMD.WebSite/MicroSites/family-business/pdfs/Family%20Businesses%20%20Successes%20and%20Failures.pdf

Taylor, B. (2010, January). Enterprising Rural Families. *Enterprising Rural Families, 4(1)*. Retrieved from http://eRuralFamilies.org

Vani, R., Chandraiah, M., & Prakash, C. (2014). Family Business Management in Small and Medium Enterprises in Nellore District. *International Journal of scientific research and management (IJSRM), 2*(8), 18. Retrieved from http://www.ijsrm.in/v2-i8/17%20ijsrm.pdf

Wallace, J. S. (2010). Family Owned Businesses: Determinants of Business Success and Profitability. *All Graduate Theses and Dissertations*, 97. Retrieved from http://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=1590&context=etd

Walsh, G. (2011). Family Business Succession: Managing the all Important Family Component. *KPMG Enterprise*, 76.

Yasser, Q. R. (2011, February). Challenges in Corporate Governance: A Family Controlled Business Perspective. *International Journal of Innovation, Management and Technology, 2*(1), 4.

Zafar, F., & Usmani, Z. (2014). Impact of Corporate Governance in Solving Challenges Faced by Family Business Transitions. *Scholars Journal of Arts, Humanities and Social Sciences, 2*(1), 7.

Unethical Leader's Identity: A Simple Model and its Methodological Application

Mgr. Marian Stančík (Ph.D)

Institute of Management at Faculty of Management, Comenius University in Bratislava, Slovakia marian.stancik@fm.uniba.sk

Abstract

Since a leader can hide unethical actions and/or pretend ethical communication, an ethically positive self-image of an unethical leader can be intentionally achieved in the eyes of followers. This conference paper presents a simple model of unethical leader's identity (consisting of moral actions, communication and values) and its complementary potential for further research in the field of unethical (as well as ethical) leadership.

Keywords: Unethical leader's identity, ideology-based research approach, unethical leadership

Introduction

Many known authors, diverse empirical frameworks (see: Theoretical background) and popular conceptualizations (Padilla et al., 2007; Thoroughgood et al., 2012) are available, nevertheless (un-)ethical leadership stays a social phenomenon with a variety of conceptually different definitions.

But, how can anybody tell who is actually an unethical leader, if environmental factors like e.g. national culture (Ferencikova et al., 2016; Scholtens and Dam, 2007), individual factors like e.g. moral awareness (Rest, 1986) or individual development (Rest and Narvaez, 1991), as well as diverse situational factors e.g. information availability (Akerlof and Dickens, 1982) or salience of moral norms (Nye and Forsyth, 1984) and a whole spectrum of conflicts due to economic rationality play important roles besides? And, how to deal with observed paradoxes, when an ethical leader at work behaves unethically in private (Riggio et al., 2010)? Or, how to address a phenomenon when a direct leader is reported more cynically, but the one at the top of the hierarchy, personally unknown to the follower, is reported positively (Lord and Maher, 1991)?

The herein suggested theory bases on the Leader-Member-Exchange theory (Graen and Uhl-Bien, 1995) abbr. LMX which introduced the importance of a dyadic leader-follower relationship and the Implicit Leadership Theory (Rush et al., 1977) abbr. ILT which introduced the importance of follower's perception. But, opposite to recent trends in the field of (un-)ethical leadership, the suggested theory is derived from the author's working thesis *"consequences of an unethical leadership do not need to appear immediately"*.

To overcome the matter of time-dependent information processing, let us suggest moving object of research from its tangible area of a leader-follower dyad (any behavior, traits and characteristics) to its intangible but still descriptive and measurable area (cognition based on moral values and ideology) which is independent on the matter of leader's observable behavior and/or follower's perception. Hence, an alternative approach to study a well-known topic of (un-)ethical leadership attempts to uncover details which have not been considered so far.

Theoretical Background

To address the scientific chances and challenges of the research presented in this paper, let us first outline the situation using a selective analysis of four frameworks previously developed to measure ethical leadership (abbr. ELp).

The first analyzed tool to measure ELp is called Ethical Leadership Scale (Brown et al., 2005). Abbr. ELS bases on a social learning perspective. Brown et al. divert from a classical philosophical point of view "how leaders ought to behave" and propose a descriptive behavioral approach to measure ELp. According to social learning (or also cognitive) theory (Bandura, 1971), one's behavior can be acquired by observing and imitating others. Hence, Brown et al. build up a correspondent model to measure ELp through the follower's perception accordingly. The first comment that catches the reader's attention is when the authors discuss limits of this approach due to perceptual biases behind the self-other-agreement; one knows that leaders are almost certain to rate themselves favorably on the ethical dimension of leadership. Another comment that catches attention is the discussion on the levels of management; the extent of hierarchical distance from leader to follower plays an important role since the substance for a personal relationship disappears but the matter of an image-based relationship increases. Let us for now note that these two observations are important for further conceptualization because leader's formal power (thus hierarchical position in logical extent too) and his own perspective-taking (as a crucial precondition for an ethical leadership) correlate negatively (Galinsky et al., 2006; in Pink, 2012, p. 70)

The second analyzed tool to measure ELp is called Leadership Virtues Questionnaire (Riggio et al., 2010). Abbr. LVQ bases on four cardinal virtues (originally mentioned it texts written by Aristotle). Riggio et al. distinguish their work by pointing out the social learning approach limits of ELS. They mention the fact that leaders develop their own ethical leadership behavior by emulating admired, ethical leader role models; but, due to ethical relativism, leaders hence might get easily misguided. Let us here note that this is one of many reasons due to which unconscious leader's behavior plays an important role and thereby any methodology based on measuring tangible behavior must deal with the same troubles when interpreting results. Therefore, as a solution, authors propose to refocus the object of measurement at leader's traits and characteristics because characterological elements are independent of leader's behavior. Let us again mention two interesting limits that catch the reader's attention. Authors of LVQ discuss that the correlation with follower's moral identity, empowerment and organizational identification were better scrutinized longitudinally or experimentally than measured at the same time as the follower's perception of leader's virtues; ethical leadership impact is thus questionable since followers e.g. might not be morally capable of recognizing leader's virtues. While the second limit towards LVQ predictability roots in the fundamental emphasis of social psychology; one knows that the power of the situation overrides characterological factors. Again, let us for now note that these two observations are important for further conceptualization since the difference between intended and effectuated moral behavior is as old as humanity per se can remember and carries over.

The third analyzed tool to measure ELp is called Ethical Leadership at Work questionnaire (Kalshoven et al., 2011). Abbr. ELW bases on a multi-dimensional measurement whose authors critique ELS and LVQ as unidimensional tools that are too simple to measure the complex topic ELp. Therefore, Kalshoven et al. developed a complex set of dimensions to measure and evaluate leadership in terms of ethics and thus contribute to overcoming deficits of previous tools. No matter how complex and comprehensive this model is, let us note that it relies on measuring leader's behavior according to follower's perception and thus have empirical limits in common with many other behavioral frameworks. One comment that catch the reader's attention is the discussion about its predictability towards cultural environment; e.g. the importance of "power sharing" dimension might vary based on the well-known cultural "power distance" dimension. Hence, let us note that this reflection is important for further conceptualization; Since the interdependency of the ethical and the cultural systems is tricky for any social research application (e.g. Scholtens and Dam, 2007), its separation on the other side is a doctrine for an organizational anthropology in cross-cultural environment (Hofstede and Hofstede, 2006).

The forth analyzed tool to measure ELp is called an Improved Measure of Ethical Leadership (Yukl et al., 2013). Abbr. ELQ integrates Leader-Member-Exchange model (known as LMX) and puts work unit performance into focus. In comparison to previously analyzed approaches, the ELQ authors consider leader's individual moral balance of competing goals when influencing work unit performance; ethical leadership might have unethical consequences and, vice versa, e.g. unethical leadership towards individuals might have ethical consequences towards an organization etc. The reader's attention catches the discussion in terms of managerial effectiveness; being an ethical leader is not only commendable but also effective. Even though Yukl et al. count with the importance of leader-follower relationship, let us here note that they do not distinguish nor discuss the correlation of formal (positional at work) and informal (personal as friends) level of their dyad. Since formal and informal relationships coexist in practice all the time everywhere, let us note that this is a very important dimensionality especially in terms of chances for an unethical leader's behavior (e.g. corruption in public sector).

To sum up the analysis of four selected frameworks let us point out that neither applying the recommended 360-degree approach nor the self-other agreement correlation of any of these tools would in the future provide comprehensive answers to the questions introduced in this paper. No matter how many times mentioned in diverse studies, none of the known theoretical frameworks nor research approaches conceptualize the phenomenon of "ethically behaving leaders on workplace behave unethically in private life and/or vice versa" as an integrated as well as interdependent model. Hence, there is a chance for a new model and methodology that is to be presented in the following chapters.

Materials

According to Hunter, all reviewed materials related to unethical leadership have at least one similarity: complexity. And, as he also notes, at least one common need for further investigation: identity (Hunter, 2012). Let us therefore focus on identity closely and suppose that simplification is a strategy to deal with troubles of a current field of research.

The first instrument to build up a comprehensive model of an unethical leader's identity is a definitional analysis of unethical leadership. Known authors like to describe leadership with adjectives e.g. narcissistic, toxic, destructive, dark, dysfunctional, psychopathic, self-serving, despotic or even tyrannical. According to an extensive conceptualization of current theoretical trends by Lašaková and Remišová, "unethical leadership is a process of intentional or unintentional, passive or active, and recurrent influencing that harms others, being it individuals, organizations and/or society as a whole." Authors also define the following preconditions for an unethical leader: a) leader acts badly (lacks certain ethical virtues and engages in unethical acts), b) leader allows bad acts to happen, c) leader is ethically silent (does not voice the importance of ethics at a workplace), d) leader is absent (avoids contact with others or absents it at all), e) leader is self-centered, self-protective and self-serving, f) leader lacks respect to rules and g) leader is professionally incompetent (Lašáková et al., 2016; Lašáková and Remišová, 2015).

The second instrument to build up a measurable model of unethical leader's identity is an applicational analysis of ethical ideologies. According to the fundamental Theory of Ethical Positions (Forsyth, 1980) there are 4 ethical ideologies (or also called Ethical Position) derived from a 2x2 matrix. This concept is defined by dimensions of "ethical relativism" and "ethical idealism" (see: Table 1) and can be evaluated by using Ethics Position Questionnaire (abbr. EPQ).

Table 1: Adapted from the Taxonomy of Ethical Ideologies (Forsyth, 1980)

	Low Relativism	High Relativism
High Idealism	Absolutists: Principled idealists who believe people should act in ways that are consistent with moral rules, for doing so will in most cases yield the best outcomes for all concerned.	Situationalists: Idealistic conceptualists who favor securing the best possible consequences for all concerned even if doing so will violate traditional rules that define what is right and what is wrong.
Low Idealism	Exceptionalists: Principled pragmatists who endorse moral rules as guidance for actions, but admit that following rules will not necessarily generate the best consequences for all concerned.	Subjectivists: Pragmatic relativists who base their ethical choices on personal considerations, such as individualized values, moral emotions, or an idiosyncratic moral philosophy.

According to Forsyth, ethical relativism is interpreted as "while some personal moral codes emphasize the importance of universal ethical rules … others maintain a posture of relativism that skeptically rejects universal principles" (Forsyth, 1980). Based on this interpretation, let us suppose that *breaking, bending or respecting rules* in general refers to *one's own belief about the frequency of behaving in line with social norms as well as legal rules*. Further, the meaning of ethical idealism is interpreted by Forsyth as "while a fundamental concern for the welfare of others lies at the heart of some individuals' moral codes, others do not emphasize such humanitarian ideals; the former assume that we should avoid harming others, while the latter assume harm will sometimes be necessary to produce good" (Forsyth, 1980). Based on this interpretation, let us suppose that *caring less/more about others* in general refers to *one's own belief about the quality of behaving towards others or at the expense of others.*

Based on the argumentation above, let us further defined **unethical leader** (abbr. ULr) as *a leader who a) breaks/bends rules/norms more than a follower expects and/or b) cares about a follower less that a follower expects of him.* Regardless of this simplification, let us note that such a definition of ULr is in line with all preconditions of ULr by Lašaková and Remišová and, at the same time, in line with Forsyth's Theory of Ethical Positions; while the follower's expectation is thereby anchored to his own experience with ULp and thus grounded to the social learning theory (Bandura, 1971).

To conclude in other words, *an ULr is and/or behaves more subjectivistic than a follower expects of him*. And, since the meaning of "ethical" excludes "unethical" and vice versa, let us analogically suggest that *an ELr is and/or behaves more absolutistic that a follower expects of him*.

RESULTS

Based on two selected instruments and one definition, let us now suggest that the "Who is an unethical leader" question can be answered with the help of a simple model of an (un-)ethical leader's identity.

Firstly, to deal with diverse terminologies and frameworks used by behaviorists, let us suggest that *one's moral behavior can be understood in detail through his moral actions (abbr. a) and communication (abbr. c); while one's moral values (abbr. v) can be understood in detail through his Ethical Position.* Where the *moral decision making is understood as a process from an intended to an effectuated behavior*.

Secondly, based on the suggestions above, let us define an auxiliary model of one's identity flowingly: **one's identity** *consists of actions (abbr. -a), communications (abbr. -c) and own values (abbr. -v) in the way as they are perceived by one's self or by others*. And let us note, that such a definition is in line with basic ontological assumptions for social research.

Finally, let us induce and thereby define **(un-)ethical leader's identity** *as a set of (un-)ethical actions (abbr. -ra), (un-)ethical communication (abbr. -rc) and (un-)ethical values (abbr. -rv) a leader recognized of himself (or, also, consciously holds) as well as a follower so far perceived of his leader*. Thus defined, there are 6 independent parameters to consider.

So, how is a follower actually going to perceive a leader? In respect to the model of unethical leader's identity the following picture appears (see: Figure 1 and related discussion).

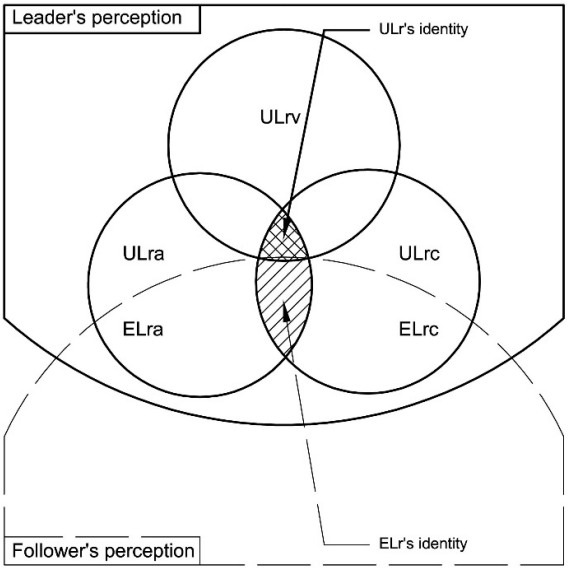


Figure 1: Ethical vs. unethical leader's identity (source: own production)

Discussion

Now, to test this model out, let us firstly remind that (1st premise) *the consequences of ULp do not exist until recognized by followers*, secondly that (2nd premise) *the leader's action can be hidden and/or communication pretended*, while thirdly (3rd premise) *the leader's value system is a moderator between his own actions and outside communication*.

Although a leader might behave unethically because he is unconscious of the consequences his behavior produces and/or is not aware of the follower's moral expectations, the first and second research premises imply that the *meaning of „is" relates to one's values, neither to actions nor communication.* Going back to the definitions of an (un-)ethical leader, one can assume that *if a follower perceives an ethical leader's behavior, it does not automatically mean that the same leader „is" ethical indeed.* And vice versa.

Supposing that a follower does not know a leader personally (see: Figure 1), the application of the first and second research premises explains why *the moral values a leader holds of him and the moral values a follower holds of his leader do not technically need/have to be the same values.* Going back to the definition of an unethical leader's identity, an *ULr might be able (intentionally) to achieve a positive (ethical) image of himself at the level of the follower's perception.* But the follower might never know.

Hence, the vagueness of antecedents and consequences related to unethical leadership might be rooted in (intentionally) shifted perceptions of a dyadic reality; *the leader's Ethical Position*

according to the follower's perception is not/does not have to be the same as an Ethical Position a leader holds in real.

No matter if such a shift in Ethical Positions is a product of legal rights and duties varying across the hierarchy, status of social groups or only individual interests. No matter if this vertical, in terms of social structures, shift in ethical ideologies is a personality antecedent for a successful rat racing or a consequence of national and/or organizational cultural dependencies. Let us for sake of this paper deduce (in relative terms) that *ULr holds a subjectivistic moral ideology, while ELr holds an absolutistic moral ideology* per se.

Although the measurability and result interpretation foresee its own limits, a further development of this model and related research methodology is open to integration with e.g. the theory of Cognitive Dissonance (Festinger, 1962) which could allow a more complex scientific and empirical application in the future. In terms of practical application, this simple (un-)ethical leader's identity model foresees a usefulness wherever any form of management and communication take place e.g. in the field of human resource management, political marketing strategies, cultural and organizational anthropology, negotiation and conflict-solving styles etc. Finally, this paper is a partial work towards understanding Slovak business culture and author's further research is therefore intended to achieve its unique conceptualization.

Besides that, once so openly defined for any other application, future research might take different directions. In terms of theoretical conceptualization, the new theoretical definitions of *a naive follower (the one who believes his leader is more ethical than he is in real)* and *a distrustful follower (the one who believes his leader is more unethical than he is in real)* need to be alternatively stipulated and, thereby, their coerced coexistence related to the model of (un-)ethical leader's identity is to be underlined. In terms of methodological development of an ideology-based approach of (un-)ethical leadership, the original EPQ must be adjusted to reflect the leader-follower dyad as technically as possible. In terms of philosophical groundwork, the bias for the result interpretation must be defined at front: Is one's state of mind (matter of subjective perception e.g. ethical consequences) an antecedent or a consequence of a state of reality (matter of objective fact e.g. cultural standard as a reference point)? And, since these two main ontologies are interdependent, how do they interfere with each other in practice?

Conclusion

The conference paper proposes a simple model of unethical leader's identity, in terms of moral actions, communication and vales, and its complementary potential for further research on ethical and unethical leadership.

The suggested theory and research approach propose to divert from researching follower's perception of leader's behavior in terms of ethics; it suggests researching follower's cognition based on own experience with leadership style over time which is independent on the matter of leader's observable behavior and/or follower's perception in the current situation and/or moment of time.

Discussing its methodological application, a variety of possible interpretations can be conducted. According to the definition of one's identity, an unethical leader has two "scientific faces" to be researched separately; one for himself and another for his followers. But, opposite to other methodologies, these two faces are clearly interconnected and, thus, a descriptive, causal, nomological, comprehensive, cross-culturally applicable, integrated and still measurable grounded theory to solve some empirical dilemmas e.g. self-other-agreement is herein offered for discussion.

Hence, an ideology-based approach to researching (un-)ethical leadership is proposed. Let us hope that the idea behind this conference paper helps the scientific community to understand observable (un-)ethical paradoxes at the individual level of leader-follower dyad and many irrational phenomena observed at the organizational, institutional or even public-government level too.

Acknowledgement

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

References

Akerlof, G.A., Dickens, W.T., 1982. The economic consequences of cognitive dissonance. The American economic review 72, 307–319.

Bandura, A., 1971. Social learning theory. General Learning Corporation 46.

Brown, M.E., Treviño, L.K., Harrison, D.A., 2005. Ethical leadership: A social learning perspective for construct development and testing. Organizational behavior and human decision processes 97, 117–134.

Ferencikova, S., Poór, J., Kollar, P., Legnerova, K., 2016. Evaluating the ethical position in eight Central and Eastern European countries. Journal of Eastern European and Central Asian Research 3, 1.

Festinger, L., 1962. Cognitive Dissonance. Scientific American 207, 93–106.
Forsyth, D.R., 1980. A taxonomy of ethical ideologies. Journal of Personality and Social psychology 39, 175.

Galinsky, A.D., Magee, J.C., Inesi, M.E., Gruenfeld, D.H., 2006. Power and Perspectives Not Taken. Psychological Science 17, 1068–1074.

Graen, G.B., Uhl-Bien, M., 1995. Relationship-based approach to leadership: Development of leader-member exchange (LMX) theory of leadership over 25 years: Applying a multi-level multi-domain perspective. The leadership quarterly 6, 219–247.

Hofstede, G., Hofstede, G.J., 2006. Kultury a organizace: Software lidské mysli (eng. Cultures and Organizations - Software of the Mind).

Hunter, S., 2012. (Un)Ethical Leadership and Identity: What Did We Learn and Where Do We Go from Here? Journal of Business Ethics 107.

Kalshoven, K., Den Hartog, D.N., De Hoogh, A.H., 2011. Ethical leadership at work questionnaire (ELW): Development and validation of a multidimensional measure. The Leadership Quarterly 22, 51–69.

Lašáková, A., Remišová, A., 2015. Unethical Leadership: Current Theoretical Trends and Conceptualization. Procedia Economics and Finance 34, 319–328.

Lašáková, A., Remišová, A., Kirchmayer, Z., 2016. Are Managers in Slovakia Ethical Leaders? Key Findings on the Level of Ethical Leadership in the Slovak Business Environment. Periodica Polytechnica Social and Management Sciences.

Lord, R.G., Maher, K.J., 1991. Leadership and Information Processing: Linking Perceptions and Performance.

Nye, J., Forsyth, D.R., 1984. The Impact of Ethical Ideology on Moral Behavior. Presented at the Annual Meeting of the Eastern Psychological Association, Baltimore, MD.

Padilla, A., Hogan, R., Kaiser, R.B., 2007. The toxic triangle: Destructive leaders, susceptible followers, and conducive environments. The Leadership Quarterly 18, 176–194.

Pink, D.H., 2012. To sell is human: The surprising truth about moving others. Penguin.
Rest, J., Narvaez, D., 1991. The college experience and moral development. Handbook of moral behavior and development 2, 229–245.

Rest, J.R., 1986. Moral development: Advances in research and theory. Praeger Frederick.

Riggio, R.E., Zhu, W., Reina, C., Maroosis, J.A., 2010. Virtue-based measurement of ethical leadership: The Leadership Virtues Questionnaire. Consulting Psychology Journal: Practice and Research 62, 235.

Rush, M.C., Thomas, J.C., Lord, R.G., 1977. Implicit leadership theory: A potential threat to the internal validity of leader behavior questionnaires. Organizational Behavior and Human Performance 20, 93–110.

Scholtens, B., Dam, L., 2007. Cultural Values and International Differences in Business Ethics. J Bus Ethics 75, 273–284.

Thoroughgood, C.N., Padilla, A., Hunter, S.T., Tate, B.W., 2012. The susceptible circle: A taxonomy of followers associated with destructive leadership. The Leadership Quarterly 23, 897–917.

Yukl, G., Mahsud, R., Hassan, S., Prussia, G.E., 2013. An improved measure of ethical leadership. Journal of leadership & organizational studies 20, 38–48.

Determinants of Organizational Commitment: A Study on Teaching Staff at a Public University in Vietnam

Pham Thi Bich Ngoc, Ha Noi, Vietnam, ngocpb@neu.edu.vn

Le Hieu Hoc, Hanoi, Vietnam, hoc.lehieu@hust.edu.vn

Abstract

In the recent years, research on organizational commitment has increased. However, few of them have empirically addressed the issue in educational context. Thus, the purpose of this paper is expected to fulfil such gap in the literature by examining the impact of organizational factors on teacher's commitment. A survey of 161 teaching staff from a public university in Hanoi was conducted in 2016. Multiple regression techniques were used to analyse the data. The research findings indicated that job characteristics, workplace friendship and financial rewards significantly associates with overall organizational commitment and affective commitment of teaching staff in the university. Despite of that, job characteristics have the strongest impact on continuance commitment, and financial rewards is the strongest predictor of the normative commitment.

Keywords: Organizational commitment, teaching staff

Introduction

The concept of organizational commitment (OC) has become a hot topic in the literature of industrial psychology and organizational behavior. In the recent years, interest in OC research had increased. The majority of OC studies has focused on industrial and organizational settings, but not in the educational context. Empirical evidence regarding OC and factors affecting OC of higher education teachers are still scarce in the international literature.

Moreover, an integrative model linking several factors like job characteristics, workplace friendship, financial rewards and OC seems limited. Some researchers focused only on the relationship between job characteristics and OC (Dunham et al., 1994; Faraji et al., 2015), while others concentrated on the relationship between financial rewards and OC (Anavari et al., 2011; Kee et al., 2016). Very few researches investigated the link between workplace friendship and OC. Additionally, previous studies have been conducted primarily in business sectors, and in foreign countries. Very few researches examine the joint impact of job characteristics, financial rewards and workplace friendship on OC of teaching staff at educational context in Vietnam.

Thus, the aim of this research is to contribute to the body of literature by examining the relationship between all three above mentioned factors on the overall OC and commitment dimensions of teaching staff at one public university in Vietnam.

Literature Review

1.1. Organizational Commitment

There have been various studies in the literature addressing the concept of OC. Commitment refers to attachment and loyalty. It is the relative strength of the individual's identification with, and involvement in, a particular organization. Mowday et al. (1982) defined OC as an attitude, which exists between the individual and the organization. It is considered as a relative strength of the individual's psychological identification and involvement with the organization. Organizational commitment is viewed as being more than a passive loyalty to an organisation; it involves an active relationship with the organisation such that the individuals are willing to give something of themselves in order to contribute to the organization's well-being. Meyer et al. (1993) defines OC is "a psychological state that (a) characterizes the employee's relationship with the organization, and (b) has implications for the decision to continue or discontinue membership in the organization". This is one of the most widely recognized approaches in OC literature. They suggested that OC was a multidimensional three-component model where (1) affective attachment to the organization is defined as affective commitment; (2) perceived cost associated with leaving the organization is defined as continuance commitment; and (3) an obligation to remain with the organization is defined as normative commitment.

1.2. Job characteristics and its relationship with organizational commitment

Job characteristics have received increasing attention in recent researches due to the fact that understanding job characteristics will help in designing job that may improve performance and OC of employee in an organization. Job characteristics theory of Hackman and Oldham (1975) was built upon the premise that specific core job characteristics must exist in work settings so as to create job outcomes of high job satisfaction, high job performance, and low turnover.

Several job characteristics including variety, autonomy, task identity, task significant and feedback have been proposed by Hackman and Oldham (1975). Skill variety refers to the degree to which a job includes a variety of different activities and involves the use of a number of different skills and talents. Task identity refers to the degree to which the job requires completion of a "whole" and identifiable piece of work. One that involves doing a job from beginning to end with a visible outcome. Task significance is the degree to which the job is important and involves a meaningful contribution to the organization or society. Autonomy refers to the degree to which the job gives the employee substantial freedom, independence, and discretion in scheduling the work and determining the carrying out procedures. Task feedback refers to the degree to which carrying out the work activities provides direct and clear information to the employee regarding how well the job has been done.

The congruence between the characteristics of the individual and of the organization itself is important for researchers to examine the relationship between job characteristics and OC, since such an organization-person fit may have an impact on job incumbents' attitudes and behaviors. It is argued that the greater the fit between the person and the organization and the job, the greater the commitment to the organization (Kristof-Brown et al., 2005). In addition, Dunham et al. (1994) identified job characteristics such as task autonomy, task significance, task identity, skill variety, and feedback as antecedents of affective commitment. In similar vein, Faraji et al. (2015) also found a direct and significant correlation between job feedback and OC. Sabella et al. (2016) also found that job characteristics were an important determinant of commitment among employees. A challenging work and high-quality supervision are necessary for OC. Thus, the paper proposed the following hypotheses:

Hypothesis 1: Job characteristics predict OC of teaching staff at a university

Hypothesis 1a: Job characteristics have significant relationship with affective commitment of teaching staff at a university

Hypothesis 1b: Job characteristics have significant relationship with continuance commitment of teaching staff at a university

Hypothesis 1c: Job characteristics have significant relationship with normative commitment of teaching staff at a university.

1.3. Workplace friendship and its relationship with organizational commitment

Berman et al. (2002) defined workplace friendship as "nonexclusive voluntary workplace relations that involve mutual trust, commitment, reciprocal liking and shared interests and values". The friendship is characterized by the levels of self-disclosure and trust, support and personal feedback and communication among individuals. Several studies highlighted the positive outcomes of the friendship at work. Workplace friendships can facilitate communication, support, trust, respect, cooperation, growth, energy and security that, in turn, influence work related attitudes and behaviors (Riordan and Griffeth, 1995). The study of Ellingwood (2001) revealed that having a good friendship at work is related to how committed an individual is to his/her organization; and 90 percent of dismissals are the result of poor attitudes, inappropriate behavior and difficulties with interpersonal relationship. This results highlights the importance of friendship relationships at work. Thus, the friendship at work seem to have significant effect on OC of employees (Richer et al., 2002). The following hypotheses are formed.

Hypothesis 2: Workplace friendship significantly associated with OC.

Hypothesis 2a: Workplace friendship significantly associated with affective commitment.

Hypothesis 2b: Workplace friendship significantly associated with continuance commitment.

Hypothesis 2c: Workplace friendship significantly associated with normative commitment.

1.4.Financial Rewards and its relationship with OC

Financial reward consists of basic pay, variable pay and benefits (Rose, 2014). Financial rewards play an important role in determining an employee's level of OC. Several researches have confirmed the relationship between financial reward and OC of employees in different settings. Anavari et al. (2011) found that compensation is an important component associated with employee behavior and attitude towards improving organizational achievement by increasing OC and motivation among the workers. Basic pay may influence the workers' behavior as well as attract, and increase the intention to stay and lead to the higher employee performance in the organization (Tella et al., 2007). Especially, pay satisfaction had a significant positive relationship with the OC (Ramay, 2011). Similarly, Munap et al. (2013) and Kee et al. (2016) indicated that salary was also a factor that influences the probability of the workers to join, leave or stay in the organization, as well as their OC. In addition to the basic pay, merit-based pay plays a vital role to bring job satisfaction, OC and job performance (Gorton, 1994). Umoh et al. (2014) also found that employee benefits have significant influence on continuance commitment.

Moreover, equity in salary and fringe benefits appear important to employee's job satisfaction. Greenberg (2010), argued that unfairly treated individuals tend to exhibit more negative attitudes and behaviors. Thus, perception of fairness of distribution may lead to positive emotional feelings and behaviors, and thus pay equity was considered as one of the main sources of commitment. According to Folger and Konovsky (1989), employees who perceive they are not being treated fairly due to unfair interpersonal treatment or unfair procedures, develop low job satisfaction and commitment and may seek alternative employment in pursuit of equity. The findings of previous studies imply that feelings of commitment are likely to occur when there is a belief that the rewards are equitable in comparison to others. Thus, it is hypothesized that:

Hypothesis 3: There is a significant positive relationship between fairness in financial rewards and OC.

Hypothesis 3a: There is a significant positive relationship between fairness in financial rewards and affective commitment.

Hypothesis 3b: There is a significant positive relationship between fairness in financial rewards and continuance commitment.

Hypothesis 3c: There is a significant positive relationship between fairness in financial rewards and normative commitment.

Based on the literature review and the above-given research hypotheses, the following conceptual model is proposed:

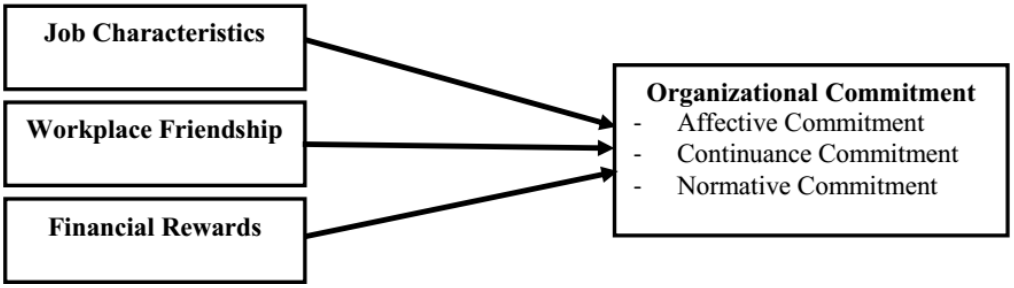


Figure 1: Conceptual Model

Methodology

This study applied the quantitative methodology to empirically clarify the relationship between different factors of teacher's OC and was concentrated on a public university in Vietnam. Several in-depth interviews with managers, lecturers and researchers in the public university were carried out in order to understand the current situation of job characteristics, workplace relationship, reward system and OC of teaching staff. Those qualitative research activities helped to prepare for the survey questionnaires.

3.1. Sample and Data Collection

Survey method has been used for the empirical analysis. Table 1 shows that the respondents in this study are those teaching at a public university in Hanoi. The total number of participants was 161 of which 65 were male (40.4 %), and 96 were female (59.6%). Nearly one third of the respondents had working experience of less than five years. Most of them had working experience more than 5 years. Regarding work positions, teaching staff constituted 63.4%, while 36.7% were head and deputy head of departments and faculties.

Table 1: Demographic Profile of Respondents

Demographic Variables	Frequency	Percentage
Gender		
Male	65	40.4
Female	96	59.6
Work seniority		
Less than 5 years	44	27.3
5 to <10 years	47	29.2
10 years – <20 years	35	21.7
More than 20 years	35	21.7
Work positions		
Teaching staff	102	63.4
Head and Vice Head of Department/Faculties	59	36.7
Educational Level		
Master degree	115	71.4
Doctoral degree	46	28.6

Measures

The questionnaire used self-developed and prior measurements corresponding to each variable in the literature and taking the context of the university into account. 5-point Likert scale (1: strongly disagree; 5: strongly agree) was employed for all questionnaire items. Multiple-item scales for all constructs in the conceptual model were either newly developed or grounded from previous researches to ensure the reliability and validity of the measurement.

Measurement of OC was grounded in the work of Meyer and Allen's (1991) where scales assessing normative, affective and continuance commitment are proposed. Affective commitment is based on an emotional attachment, and has as its basis a desire to be a part of the organization. The degree to which an individual feel as though he or she belongs to the group, and to which he or she is satisfied with the involvement in the organization is reflected in this component of commitment. The second component, continuance commitment, is based on an exchange between the individual and the organization. The strength of this commitment, therefore, is based on the degree to which the employee views the exchange as being in his or her favor. It results from an individual choosing to continue to work for an organization because the rewards and benefits to that individual outweigh the costs, or because the costs of not staying with the organization are greater than the benefits of leaving the organization. The third component of OC proposed by Meyer and Allen (1991) is normative commitment. This component is based on a belief that one has a responsibility to the organization, that one "ought" to be committed to an organization. This component of commitment reflects an individual's perceptions of what behaviors are considered acceptable in an organization.

In order to measure five job dimensions (skill variety, task significance, and task identity, task autonomy and task feedback), the adaptation of the job diagnosis survey (JDS) originally developed by Hackman and Oldham (1975) has been done. The scale of workplace friendship is adapted from the study of Morrison (2004).

Main Results

4.1 Reliability and validity of the proposed constructs

Reliability and validity tests are conducted for each of the constructs with multivariate measures. To measure the internal consistency of the multivariate scales, Cronbach's alpha was used. In this study,

the Cronbach's α of each constructs is greater than 0.7. According to Kline (1998), a set of items with a coefficient alpha greater than or equal to 0.7 is considered internally consistent.

Table 2. Internal consitency of the multivariate scales

Contructs	Number of Items	Mean	Standard Deviation	Cronbach's alpha
Job characteristics	5	4.16	0.48	0.65
Relationship with colleagues	5	4.03	0.47	0.80
Financial rewards	6	2.97	0.61	0.87
Affective commitment	4	3.88	0.69	0.85
Continuance commitment	4	3.47	0.74	0.82
Normative commitment	2	3.43	0.67	0.72
Organizational commitment		3.68	0.53	

In addition, an exploratory factor analysis was performed to ensure the reasonable constructs of the instrument. Using principal component analysis and varimax rotation, factors with eigenvalues greater than one and factor loadings greater than 0.6 were retained.

4.2 Correlation analysis

A Pearson correlation analysis was performed on the independent and dependent variables. Table 3 presents the correlation matrix addressing bi-variate relationships among the variables in the study. Most of the correlations were considered low (less than 0.4) and some were moderately correlated (between 0.4 and 0.7) and very few correlations were higher than 0.8. As expected, job characteristics, workplace friendship, financial rewards positively correlated with overall OC and its components.

Table 3: Correlations among variables

	JC	WF	FR	AC	CC	NC
Job Characteristics (JC)						
Workplace Friendship (WF)	.170*					
Financial Rewards	.244**	.381**				
Affective Commitment (AC)	.394**	.404**	.619**			
Continuance Commitment (CC)	.334**	.202*	.200*	.333**		
Normative Commitment (NC)	.218**	.276**	.403**	.662**	.361**	
Overall OC (OC)	.474**	.384**	.520**	.846**	.650**	.833**
*. Correlation is significant at the 0.05 level (2-tailed).						
**. Correlation is significant at the 0.01 level (2-tailed).						

4.3 Descriptive Statistics

Most of the respondents agreed that teaching and researching job is meaningful and gave them a lot of autonomy. In addition, those features of the job play crucial role in motivating the teaching staff at the university where knowledge is considered as critical asset.

Table 4: Mean Results of Job characteristics (n=161)

Scale Items	Mean	SD
- Skill variety	3.9	0.35
- Task significance	4.5	0.49
- Task autonomy	4.3	0.79
- Task feedback	4.3	0.84
- Task identity	3.8	0.43

Concerning the relationship with colleagues, most of the respondents agreed that they satisfied with it (Mean = 4.03, SD=0.67). There is a trust among teaching staff in the university. They have friendly relationship with colleagues and feel comfortable in communicating and sharing with peers. However, not many respondents agreed that they received support and helps from other colleagues.

Table 5: Mean Results of Workplace friendship (n=161)

Scale Items	Mean	SD
- Trust among colleagues	4.1	0.70
- Opportunity to develop close and strong friendships at workplace	4.2	0.70
- Communication among teaching staff is encouraged	3.9	0.57
- Opportunity to talk informally and socialize with colleagues outside the workplace	4.3	0.66
- Supports and helps from colleagues	3.6	0.71

Financial Rewards

Financial rewards are monetary compensation given to employees in return for their performance and contribution to the university. Financial rewards play an important role in determining teaching staff's level of OC. The survey results indicated that most of the respondents slightly dissatisfy with financial rewards provided by the university (Mean = 2.96, SD = 0.8). Most of the respondents agreed that income from university can not cover for all expenses in life (Mean = 2.8, SD=0.86), their performance was not rewarded in equitable manner (Mean = 2.8, SD=0.8).

Table 6: Mean Results of Financial rewards (n=161)

Scale Items	Mean	SD
- Income from university can cover for all expenses in life	2.8	0.86
- Salary reflects individual performance	3.2	0.77
- Teaching staff's performance were rewarded in equitable manner	2.8	0.86
- Having monetary incentives for individual having outstanding performance	2.8	0.87
- Benefits were provided to teaching staff in addition to the salary and	3.1	0.83
incentives	2.9	0.69
- Pay system of university motivate teaching staff		

Organizational Commitment

The mean scores for OC of teaching staff are not so high (Mean=3.9, SD=0.65). The affective commitment level of the university's teaching staff seems to far exceed the continuance and normative commitment (Table 7). Most of the respondents agreed that they feel emotional attachment to, identification with, and involvement in, the university. **Table 7. Mean Results of OC (n=161)**

Scale Items	Mean	SD
Affective Commitment		
- I would be very happy to spend the rest of my life with this organization	4.15	0.87
- I enjoy discussing my organization with people outside of it	3.87	0.87
- I really feel as if this organization's problems are my own	3.5	0.9
- This organization has a great deal of personal meaning for me	4.01	0.64
Continuance Commitment		
- It would be very hard for me to leave my organization right now, even if I wanted		
- Too much of my life would be disrupted if I decided I wanted to leave my organization now	3.4	1.01
- I feel that I have too few options to consider leaving this organization	3.64	0.85
- One of the major reasons that I continue to work for this organization is that leaving would require considerable personal sacrifice	3.2 3.5	0.98 0.8
Normative Commitment	3.3	0.75
- One of the major reasons that I continue to work here is that I believe that loyalty is important and therefore, feel a sense of moral obligation to remain.	3.4	0.83
- Things were better in the days when people stayed with one organization for most of their careers		
Overall organizational commitment	3.9	0.65

4.4 Hypotheses Testing

This section presents the statistical tests of the research model and for the research hypotheses examined in the study. The emphasis of the study is on assessing the statistical significance and relative influence of the independent variables on the three dimensions of OC.

Firstly, a test for the multicollinearity among independent variables is implemented to ensure not to violate the assumption of multiple regression statistics. To this end, the tolerance statistic was examined to identify any variables with a tolerance close to zero. The Variance Inflation Factor (VIF), which is the inverse of the tolerance value, was calculated. VIF of independent variables in all regression models ranged from 1.36 to 2.43. According to Chatterjee, Hadi and Price (2000), Hair et al. (1995), the value of VIF less than 10 is acceptable. Thus, the data is not subject to multicollinearity problems.

To analyze the first hypothesis, simple regression analyses were performed to establish the predictive power of job characteristics on OC. The statistical results indicated that the predictability of job characteristics was significant (Adj. R^2 = 0.22; 0.15; 0.106; 0.042.; $p<0.01$, respectively). Job characteristics contributes to 22% of the variance in overall OC and 15% of the variance in affective commitment; 10.6% in continuance commitment and 4.2% in normative commitment. The statistical result indicated support for the hypothesis 1, 1a, 1b and 1c.

To analyze the second hypothesis, simple regression analyses were performed to establish the predictive power of workplace friendship on OC. The statistical results indicated that the predictability of workplace friendship was significant (Adj. R^2 = 0.142; 0.158; 0.035; 0.07; $p<0.01$, respectively). Workplace friendship contributes to 14.2% of the variance in overall OC and 15.8% of the variance in affective commitment; 3.5% in continuance commitment and 7% in normative commitment. The statistical result indicated support for the hypothesis 2, 2a, 2b and 2c.

To analyze the third hypothesis, simple regression analyses were performed to establish the predictive power of financial rewards on OC. The statistical results indicated that the predictability of financial rewards was significant (Adj. R^2 = 0.266; 0.379; 0.034; 0.157; p<0.01, respectively). Financial rewards contribute to 26.6% of the variance in overall OC and 37.9% of the variance in affective commitment; 3.4% in continuance commitment and 15.7% in normative commitment. The statistical result indicated support for the hypothesis 3, 3a, 3b and 3c.

In order to test the joint impact of all proposed independent variables on affective commitment, continuance commitment, normative commitment, OC, and several multiple linear regression models were used. As observed, there is a significant improvement in the predictive power of this model in comparison with previous models with the explained percentages of total variance being 41.6% for the affective commitment, 12.3% for continuance commitment, 17.7% for normative commitment and 41.8% for overall commitment. Table 8 presented the results of multiple regression models.

Table 8: Multiple regression results for Organizational Commitment

Variables	Affective commitment	Continuance commitment	Normative commitment	Overall organizational commitment
	Beta	*Beta*	*Beta*	*Beta*
Job characteristics	0.245***	0.294***	0.117	0.354***
Workplace friendship	0.175**	0.121	0.133+	0.185**
Financial rewards	0.492***	0.082	0.324***	0.364***
Adjusted R2	0.461	0.123	0.177	0.418
F Statistics	46.685***	8.467***	12.462***	39.232***

Note: + p<0.1, * p<0.05, ** p<0.01, *** p<0.001

Discussion

It was found that all three factors have the significant relationship with OC. Among three independent variables, financial rewards have the strongest impact on overall OC, affective and normative commitment. In addition, job characteristics have a significant relationship with overall OC, affective and continuance commitments. Regarding the relationship between workplace friendship and three dimensions of OC and overall OC, workplace friendship has the biggest impact on affective commitment.

Consistent with previous studies (Kee et.al, 2016; Korir at al. 2016; Jensen, 2014; Ramay, 2011), this research found that financial reward is significantly associated with OC among teaching staff at the public university.

The results of the study confirmed the role of financial rewards in enhancing OC of teaching staff. It also provides deeper discussion of the impact of financial rewards on different aspects of OC. To enhance OC, it is needed to focus on building and ensuring an equitable financial reward system. The reward package for teaching staff should be closely associated with their performance and competence. As a result, a performance management system with clear and appropriate performance standards, performance criteria and appraisal methods then should be reexamined to ensure the accurate evaluation of faculty performance. In addition, salary reviews should be carried out in order to develop a reward system that is externally competitive, internally fair and consistent with the regulations of the government.

Moreover, the results of the study also recognize the importance of job characteristics in enhancing OC of the faculty. The study confirmed the importance of job characteristics in enhancing affective and continuance commitment. To enhance OC of teaching staff, it is needed to design the job that cover all five main dimensions. Skill variety can be improved by assigning different tasks for

teaching staff to do. Faculty members should be required to teach several subjects at different levels (undergraduate and post graduate). Providing opportunity for them to carry out consulting project and researches also help to increase their skill variety and then teaching staff's OC. Providing feedback on teacher's work also another issue which university manager need to take into account. Student feedback system and supervisor feedback should be facilitated and provided to teaching staff timely in constructive manner.

Workplace friendship also appears very important in enhancing teaching staff's OC. When teaching staff have opportunities to build and invest in interpersonal relationship with colleagues, their affective commitment and normative commitment are enhanced. They tend to stay in a university since they feel to be obligated to do so. The results imply that university managers (dean of schools, head of department) should create an opportunity for teaching staff to get to know each other, to communicate, to support each other. When the good interpersonal relationship is built, they tend to have higher commitment.

Conclusion

The study builds on and extents the findings of the previous researches on the determinants of OC of teaching staff with the data from a public university in Vietnam. It contributes useful information and creates a better understanding towards the job and organizational factors which will lead to OC of teaching staff in a public university. From this study, the university can identify the dominant factor that can lead to the strongest relationship between the financial rewards, job characteristics; workplace relationship and OC. This study also creates awareness on the importance of the building financial rewards system to minimize turnover of the teaching staff.

Although having certain contributions to the growing body of literature on OC, the study has several limitations. Since the data were collected from 161 individuals a public university, the findings may not be generalized at large, and/or in other settings. Additionally, there is a potential risk for common method bias due to the use of self-administered questionnaire with mainly perceptual measures.

The future study could attempt to extent the sample size, incorporate demographic and other factors to the existing model to create a more comprehensive model or conduct a comparative analysis on OC of teaching staff in public and private universities in Vietnam. On the other hand, future researchers can also focus deeply on the impact of different types of financial rewards on OC.

References

Allen, N. and J. Meyer (1990), "The measurement and antecedents of affirmative, continuance and normative commitment to the organization", *Journal of occupational Psychology*, 63 (1), 1-18

Allen, N. J. and Meyer, J. P. (1996), "Affective, Continuance, and Normative Commitment to the Organization: An Examination of Construct Validity", *Journal of Vocational Behavior*, 49 (3), 252-276.

Berman, E.M., West, J. P., Maurice, W., & Richter, N. (2002), "Workplace relations: Friendship patterns and consequences (According to managers)", *Public Administration Review*, 62 (2), 217-230.

Ellingwood, S. (2001), "The collective advantage", *Gallup Management Journal*, 1 (3), 35-40.

Faraji O., Ramazani A. A., Hedaiati P., Aliabadi A., Elhamirad S. and Valiee S. (2015), "Relationship between Job Characteristics and Organizational Commitment: A Descriptive Analytical Study", *Iranian Red Crescent Medical Journal*, 17(11), e19815.

Folger, R. & Konovsky, M.A. (1989). Effects of procedural and distributive justice on reactions to pay raise decisions. *Academy of Management Journal*, 32(1), 115-130.

Greenberg, J. (2010), "Organizational justice: The dynamics of fairness in the workplace". APA handbook of industrial and organizational psychology, Zedeck J. (ed.) Washington D.C., American Psychological Association.

Hackman, J.R. & Oldham, G.R. (1975), 'Development of the Job Diagnostic Survey', *Journal of Applied Psychology*, 60 (2), 159-170.

Idaszak J. R. and Drasgow, F. (1987), "A Revision of the Job Diagnostic Survey: Elimination of a Measurement Artifact", *Journal of Applied Psychology*, 72 (1), 69-74.

Kee, L. B., Ahmad, R. B. & Abdullah, S. M. (2016), "Relationship between Financial Compensation and Organizational Commitment among Malaysian Bank Workers", *Asian Business Research,* 1 (1), 75-85.

Korir, I., Kipkebut, D. (2016), "The Effect of Reward Management on Employees Commitment in the Universities in Nakuru County-Kenya", *Journal of Human Resource Management*, 4 (4), 37-48.

Lin, She-Cheng, and Lin, J. Shu-Jen (2011), "Impacts of coworkers' relationships on organizational commitment- and intervening effects of job satisfaction", *African Journal of Business Management*, 5(8), 3396-3409.

Lok, P. and Crawford, J. (2001) "Antecedents of organizational commitment and the Mediating Role of Job Satisfaction"*, Journal of Managerial Psychology*, 16 (8), 594-613.

Malhotra, N., Budhwar, P., & Prowse, P. (2007), "Linking rewards to commitment: an empirical investigation of four UK call centres", *International Journal of Human Resource Management*, 18 (12), 2095-2127,

Meyer, J. P., Allen, N. J. and Smith, C. A. (1993), "Commitment to Organizations and Occupations: Extension and Test of a Three-Component Conceptualization*", Journal of Applied Psychology*, 78 (4), 538-551.

Meyer, J. P., Stanley, D. J., Herscovitch, L. And Topolnytsky, L. (2002), "Affective, Continuance, and Normative Commitment to the Organization: A Meta-analysis of Antecedents, Correlates, and Consequences", *Journal of Vocational Behavior*, 61 (1), 20-52.

Morrison, R. (2004), "Informal Relationships in the Workplace: Associations with Job Satisfaction, OC and Turnover Intentions", *New Zealand Journal of Psychology*, 33 (3), 114-128.

Nwosu, H., Chiamaka, J., & Tochukwu, O. (2013), "Job Characteristics as Predictors of Organizational Commitment among Private Sector Workers in Anambra State, Nigeria", *International Journal of Asian Social Science*, 3 (2), 482-491.

Ramay, M. I. (2011), "Antecedents of OC of banking sector workers in Pakistan", *Serbian Journal of management*, 7(1), 89-102.

Richer, S. F., Blanchard, U., and Vallerand, R. J. (2002), "A motivational model of work turnover", *Journal* of *Applied Social Psychology*, 32 (10), 2089 – 2113.

Riordan, C. M., and Griffeth, R. W. (1995), "The opportunity for friendship in the workplace: An underexplored construct", *Journal of Business and Psychology*, 10 (2), 141 – 154.

Rose, M. (2014). Reward Management, Kogan Page Limited, USA.

Sabella, A. R., El-Far, M. T., Eid N. L. (2016), "The effects of organizational and job characteristics on employees' organizational commitment in arts-and-culture organizations", *International Journal of Organizational Analysis*, 24 (5), 1002-1024.

Sharma, R. (2016), "Enhancing OC through workplace relationships", *International Journal of Management*, 7 (3), 298–305.

Research of the Region Industrial Sphere in the Branch Section: Statistical Aspect

Tatyana A. Ignasheva, Mari State University, Yoshkar-Ola, Russian Federation, E-mail: samofeeva@mail.ru

Abstract

Important condition of increase in efficiency of social production is steady improvement of the industry branch structure reflecting the level of industrial development of the region, his economic independence, degree of technical equipment of production. The aggregate of key indicators of industrial production of the Mari El Republic defining the direction of the statistical analysis of the region industrial sphere in a branch section acts as a subject of the conducted research. The results of the analysis, best in the substantial plan, are received on the basis of application of modern economic-mathematical methods, in particular, methods of the multidimensional statistical analysis. Carrying out classification of industries by the level of profitability allowed allocating three classification groups. The most profitable industries of the Mari El Republic are the branches relating to the first cluster. Branches of the second cluster are intermediate. Branches of the third cluster treat the least profitable branches. The carried-out analysis of the available industrial potential shows on existence in the republic of the developed industrial complex, high technologies and conditions for expansion existing and opening of new productions. Results of a research can be useful to use in practical activities of economic development services of the region when developing strategy and forecasts of development, both separate industries, and an industrial complex in general.

Keywords: industries; classification; clusters; K-means method

Introduction

The Mari El Republic belongs to industrial and agrarian regions. Its industrial complex is represented by the organizations making industrial output, uniting the enterprises for mining, the enterprises of the processing productions, the enterprises for production and distribution of the electric power, gas and water. Ibragimova et al (2015) mentioned that the efficiency of the industrial sector development defines a condition of production capacity of the region, provides steady functioning of the main branches of economy. 27% of a gross regional product fall to the share of the industry, the enterprises of branch provide about 50% of tax revenues in budgets of all levels. The average number of employees of the industrial complex enterprises is 61,6 thousand people or 27,3% of the average number of employees of the republic organizations. Klunko (2012) mentioned that the leading branches are the mechanical engineering and metal working (20,8% of the total amount of industrial production), power industry (19,3%), the food industry (18,6%), the wood, pulp-and-paper and woodworking industry (14,5%), fuel industry (8,2%), medical, easy and the building materials industry (on 3 - 4%). In recent years the Mari El Republic was among the most dynamically developing regions of the Volga Federal District. In the region dynamic work on creating favorable conditions for the industry development, attraction of investments, increases in production competitiveness is conducted. In a research study by Beskaravaynykh (2015) it was concluded that the important value for programs development of progressive development of industrial branch complex has existence of the scientific base allowing to reveal the available weak points of branch structure and to offer an algorithm on prospect development.

Empirical Analysis

Due to the social and economic importance of the planned problem a research objective is carrying out classification of the region industries by profitability level. The base of a research was made by data on development of 15 industries of the Mari El Republic for 2015 year.

For carrying out the substantial analysis of the industry branch structure the cluster analysis allowing to pass from item-by-item to group representation of industries set is applied. Ignasheva (2015) mentioned that the task consists in association of industries in clusters on indicators of economic activity, using some measure of similarity or distance between objects and in creation of the corresponding hierarchical tree.

There are about 100 different algorithms of a clustering. In this research two methods of the cluster analysis are applied: the classification based on the description of classes by "kernels" (a clustering by K-means method) and hierarchical classification. Algorithms of hierarchical classification are applicable for classification of sets of rather small volume, but allow receiving in some cases fuller analysis of structure of the objects studied set.

As the main criteria of a clustering 6 indicators characterizing development of the region industries are selected:

x_1 - number of the operating organizations (on the end of the year), units;
x_2 - the volume of the shipped goods of own production, the performed works and the rendered services by own forces, million rubles;
x_3 - the index of production, as a percentage to previous year;
x_4 - the average annual number of the organizations employees, the people;
x_5 - balanced financial result (profit minus losses), million rubles;
x_6 - profitability of the sold goods, production (works, services), %.

When carrying out a research the following industries of the Mari El Republic were exposed to the analysis:

- the extracting productions;
- production of foodstuff, including drinks;
- textile and sewing production;
- production of skin, products from skin and production of footwear;
- processing of wood and production of products from a tree;
- pulp-and-paper production, publishing and printing activities;
- chemical production;
- production of rubber and plastic products;
- production of other nonmetallic mineral products;
- metallurgical production and production of finished metal products;
- production of cars and equipment;
- production of electric equipment, electronic and optical equipment;
- production of vehicles and equipment;
- production and distribution of the electric power, gas and water;
- other productions.

The results of classification, best in the substantial plan, are received with use of Ward's method and Euclidean distances. The method algorithm on the first step defines each of observations as a separate cluster, further on each step there is an association of two closest observations, then two closest groups of observations (clusters). Work of an algorithm comes to an end when all initial observations are united in one cluster. Process of such consecutive association is visually displayed on graphics in the form of a tree diagram (fig 1).

Results of classification demonstrate expediency of splitting industries into 3 clusters. The first cluster included branches of processing of wood and production of products from a tree, pulp-and-paper production, publishing and printing activities, metallurgical production and production of finished metal products, production of cars and the equipment.

The second cluster is formed by branches of the extracting productions, productions of skin, products of skin and production of footwear, textile and sewing production, chemical production, production

of rubber and plastic products, production of other nonmetallic mineral products, production of vehicles and the equipment, other productions.

The third cluster included branches of production of foodstuff, including drinks, productions of electric equipment, the electronic and optical equipment, production and distribution of the electric power, gas and water.

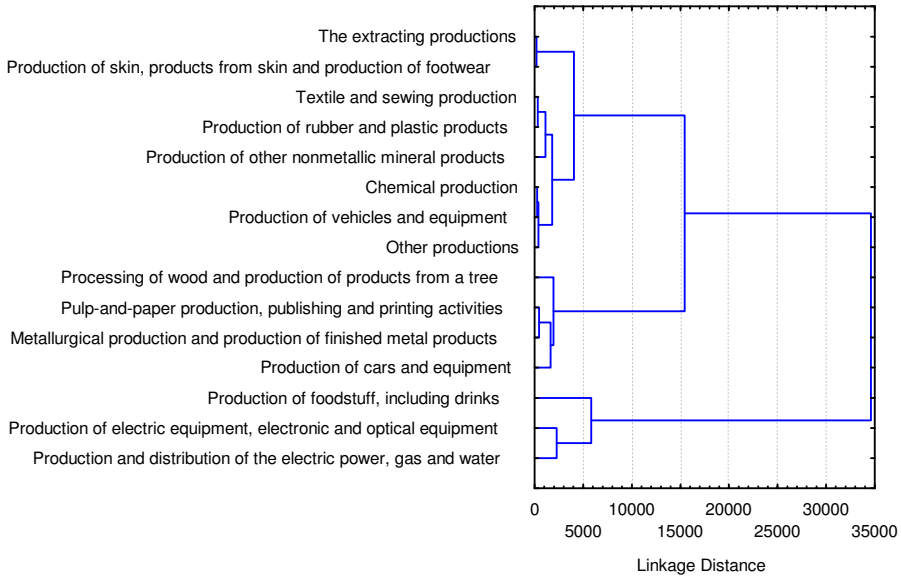


Fig. 1: Tree diagram of industries uniformity on operational indicators

Comparison of industries classification structure with the results received by K-means method is made for confirmation of the achieved results reliability. This method belongs to group of interactive methods. Process of classification begins with a task of some entry conditions, quantity of the formed clusters. Unlike hierarchical procedures the K-means method does not demand calculation and storage of a matrix of distances between objects. The algorithm of a method assumes use only of reference values of variables.

The K-means method made splitting the studied set of the region industrial branches into 3 classification groups. The analysis of the received results shows that the structure of the clusters created by a hierarchical method completely coincided with structure of the clusters received by K-means method except for their sequence that is explained by methodical features of algorithms. The first cluster included branches of production of foodstuff, including drinks, productions of electric equipment, the electronic and optical equipment, production and distribution of the electric power, gas and water. The second cluster consists of the branches forming the first classification group in hierarchical classification. The third cluster includes the extracting productions, textile and sewing production, production of skin, products from skin and production of footwear, chemical production, production of rubber and plastic products, production of other nonmetallic mineral products, production of vehicles and the equipment, other productions. Average values of the analyzed indicators for each cluster are presented in table 1.

Table 1: average values of classification indicators by K-means method

Indicators	Cluster 1	Cluster 2	Cluster 3
Number of the operating organizations (on the end of the year), units (x_1)	233	263	67
The volume of the shipped goods of own production, the performed works and the rendered services by own forces, million rubles (x_2)	8147,500	2895,525	985,050
The index of production, as a percentage to previous year (x_3)	96,83	97,35	91,35
The average annual number of the organizations employees, the people (x_4)	9067	4525	1210
Balanced financial result (profit minus losses), million rubles (x_5)	455,933	35,950	37,737
Profitability of the sold goods, production (works, services), % (x_6)	8,90	6,98	1,56

For more evident image average values of classification indicators are presented in figure 2.

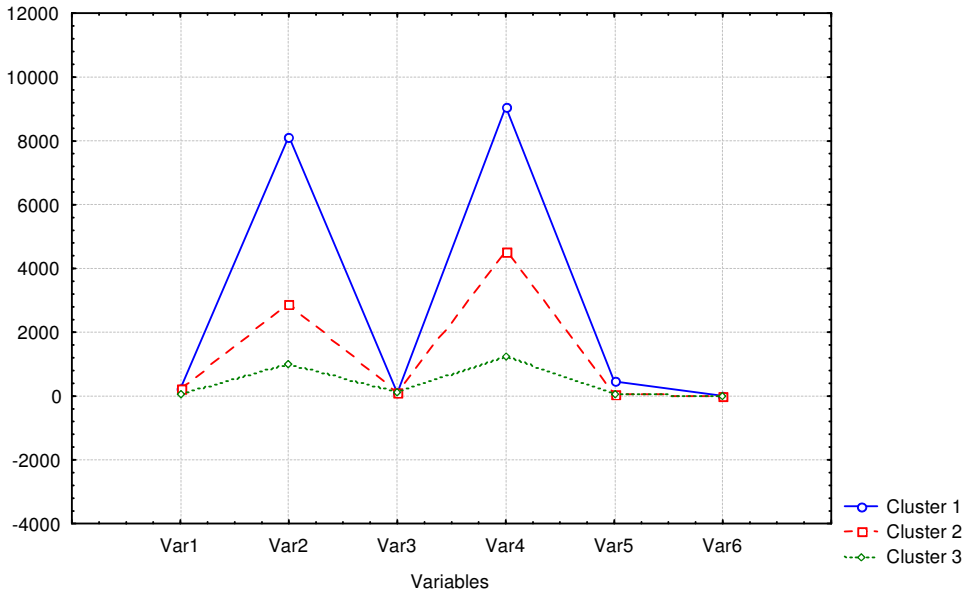


Fig. 2: Plot of means for each cluster

The analysis of means of classification indicators allows to draw a conclusion that the most profitable industries of the Mari El Republic are the branches relating to the first cluster: production of foodstuff, including drinks, production of electric equipment, electronic and optical equipment, production and distribution of the electric power, gas and water. They are characterized by the highest values on such important indicators as the volume of the shipped goods of own production, the performed works and the rendered services by own forces, balanced financial result, profitability of the sold goods, production (works, services). The received values of indicators can be explained with the fact that, for example, at the enterprises for production of foodstuff there is a continuous improvement of quality and expansion of the range of the made production, introduction of innovative technologies. Fedorova and Dovzhenko (2015) mentioned that the increase in production of electric equipment, electronic and optical equipment was reached due to reconstruction of the operating capacities, modernization and technical re-equipment of productions, introductions of resource-saving technologies and increase in production of production separate types.

The second cluster is intermediate. The branches forming it are in the lead on number of the operating organizations. Now the increase in domestic and external demand for production of a machine-building complex is observed, defining value have machine-tool constructing and tool production, mechanical engineering for the light and food industry and production of household appliances. Increase of production volume on processing of wood and production of products from a tree is reached due to reconstruction of the operating capacities, introduction of progressive technologies at the large and medium-sized woodworking enterprises. Cellulose and packing paper are a considerable part of an export turn of the region, increase in production is provided due to reconstruction and replacement of processing equipment at the enterprises of pulp and paper industry and development of new sales markets. At the enterprises for production of finished metal products modernization of productions, expansion of production spaces, mastering and output of new types of production is carried out.

Branches of the third cluster as the least developed in production sector of the region treat the least profitable branches.

Conclusion

The carried-out analysis of a social and economic situation in the region showed that in the republic are available the developed industrial complex, high technologies and the conditions for expansion existing and opening of new productions. The industrial enterprises are given the state support on subsidizing of a part of leasing payments and a part of percentage expenses on the loans attracted for implementation of the investment projects aimed at the development of production and creation of new jobs.

In the republic purposeful work on reconstruction and modernization of operating plants is carried out. More and more attention is paid to the knowledge-intensive productions. So, prime attention has to be paid to maintaining the reached level of production, strengthening of control over timely payment of the salary.

In a research study by Uzdenov (2014) it was concluded that in the solution of problems of ensuring sustainable development of economy the paramount role will belong to the innovative development capable to provide continuous updating of technical and technological base of production, development and release of new competitive production and entry into foreign markets of goods and services.

Acknowledgment

Research is carried out within the supported grant of the Russian humanitarian scientific fund No. 15-02-00567.

References

Beskaravaynykh, M V. (2015) ‘Topical Issues of Efficiency and Profitability Increase of Oil Industry Processing in Modern Conditions,’ *Business. Education. Right. Bulletin of the Volgograd Institute of Business*, 3 (32), 128-132.

Fedorova, EA and Dovzhenko, SE (2015), 'Development of Assessment Technique of Financial Stability of the Processing Industry Branch Organizations,' *Finance and Credit* 25 (649), 2-10.

Ibragimova, NU., Nigmatullina, RA. and Gabitova, ZR. (2015), 'Strategic Analysis of Textile and Clothing Industry of Russia and Prospect of Branch Development, ' *Economy and Business*, 11-1 (64-1), 388-395.

Ignasheva, T A. (2015) ‘Space Disproportion Analysis in the Housing of Territories,’ *Bulletin of Volga State University of Technology. Series: Economy and Management*, 4 (28), 15-29.

Klunko, N S. (2012) 'The Problem of the Introduction of the Cluster Model of Innovative Development of the Pharmaceutical Industry at the Regional Level,' *Problems of Economy (Kharkov)*, 1, 34-40.

Uzdenov, I Sh. (2014) 'Innovative Potential of an Industry: Essence and Major Factors,' *Urgent Directions of Scientific Research of the 21st Century: Theory and Practice*, V.2, 3-2 (8-2), 226-229.

Tasks of Academic Training in Conditions of Contemporary Challenges

Julia S. Obidina, Mari State University, Yoshkar-Ola, Russia, basiley@mail.ru

Tatiana V. Smyshlyaeva, Mari State University, Yoshkar-Ola, Russia, t.v.smyshlyaeva@gmail.com

Nadezhda V. Malkova, Mari State University, Yoshkar-Ola, Russia, nadin1125@mail.ru

Vladimir I. Aktanaev, Mari State University, Yoshkar-Ola, Russia, aktanaev@gmail.com

Abstract

The article deals with the basic aspects which influence the transformation of universities in contemporary educational and social-cultural paradigm. Social-cultural, legal, practice-oriented, educational aspects are distinguished as the main ones. Problems of continuity of local cultural policy, social-cultural adjustment mechanism of the youth and formation of a new cultural paradigm of education are included in the research discourse. The necessity of development of own Russian paradigm of university space in conditions of external and internal challenges is proved. It is concluded that the main task of university education is to form a unique ground for transfer and maintenance of cultural background, communication models of a cognizing subject.

Keywords: university, cultural policy, legal culture, patriotism, youth policy, educational strategies, global processes.

Introduction

In the era of permanent reforming of education more attention is given to transformation of higher school, to which truly monumental tasks are set today. The discussions about crisis of contemporary university continue not only among university professors but also in society as a whole. Contemporary education discourse leads to devaluation of background knowledge, loss of conceptual and systematic knowledge (Malakhova, 2002). This is especially evident in regions. Today a lot of regions of Russia face a serious problem related to a threat of social-economic, demographic and cultural degradation of the region, the cause of which can be closure (or reorganization) of a university which has a backbone nature. Higher education forms a level of cultural environment of the region. If general population is prevented from higher education, it may exacerbate stratification of the society because very few families will allow to train their children outside the region. It will be an additional factor in the outflow of the reproductive population to more advantaged regions of the country and, as a result, in increase of the age level of the population in the republic. In the long term the consequences of this process will be an economic decline of the region and domination of a simplified common cultural standard (Wyn, 2015).

Hypothesis

Functioning of university of classical type in a provincial town promotes to develop intellectual potential of the youth, its social and cultural activity. Continuity of regional social-cultural policy and formation of legal culture will allow ending further intellectual crisis of the Russian society.

Research Design and Methodology

The Mari State University was chosen as a model to confirm the hypothesis. The University has a serious impact on social-cultural environment of the region because the processes of socialization and education of the youth are taking place here. Particular attention is now given to educational policy,

which largely helps to form patriotism, tolerance and civic stand. The priorities of state youth policy for the period until 2025 are determined at the federal government level.

The formation of active civic stand of an individual, civic self-determination, perception of inner freedom and responsibility for own political and moral choice, respect for historical background of the country and activity of previous generations, desire to protect the country from external and internal destructive impacts, desire to work not only for satisfaction of own needs but also for the sake of the Fatherland, increase its authority among other countries of the world community – overall, the student of the university should have specific moral and psychological qualities: civic courage, boldness, honesty, decency, conviction, ability to defend own point of view (Chou et al, 2017).

Patriotic education is intimately connected with international one because Russia was and is a multinational country. Thereby, patriotism should have an international character based on necessary of different nationalities to live in the unique Russian State. In conditions of a multinational region education of culture of the international society is an important component of the system of personality formation in universities of humanistic type and the development of patriotic and national self-consciousness among the youth.

Legal culture is an integral part of general culture of the society which is intimately connected with civic-patriotic consciousness. Formation of legal culture among the youth is one of the priorities of the university and should be a scientifically based process to manage moral and legal formation of the personality of a student which is carried out to get a general image of a specialist, who is ready for fulfilling different social responsibilities and has high moral and civic qualities. Legal culture affects legal consciousness and influences the behavior of citizens in the society (Moreau, 2016). Principles of legal democratic society should become a basis to form legal consciousness of the youth and an evaluation criterion of own behavior and behavior of other people. Indicator and criterion of the level of formation of legal culture of a young specialist is a degree of consciousness of own rights and duties, conviction in necessity of their observance and realization on practice.

Sociological survey based on the social-cultural approach, which essence consists in an attempt to consider society as a unity of culture and sociality formed and transformed by human activity, has become a research tool of social-cultural policy conducted at the Mari State University. 2127 students, including 1475 girls and 652 boys, took part in the survey.

Results

Following the question “Whom do you feel in a greater extend?” 79,5% of the interviewed students said “citizen of the country” (Fig. 1). The differentiation of the answers by courses and gender of the respondents is insignificant.

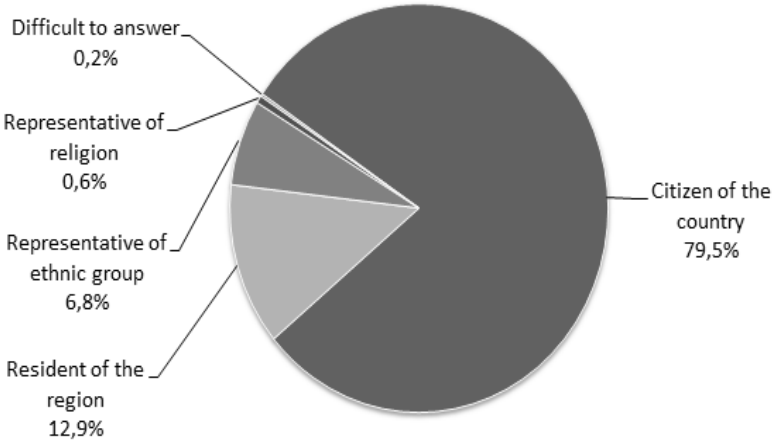


Fig. 1: Whom do you feel in a greater extend?

The obtained data allow to conclude that by self-identification students of the regional university is not only inclined to differentiate by national or religious grounds but, on the contrary, tends to emphasize their belonging to all-Russian society.

Thereby, the distribution of priority values of students shows their internal orientation to private welfare. Following the question "What is the most important for you in your life?" most of the students said "family" (86,1%). Less than 10% of the students chose such priorities as "welfare of the Motherland", "power and influence on people" (Fig. 2). The answers of the students are less differentiated by faculties, courses and gender of respondents.

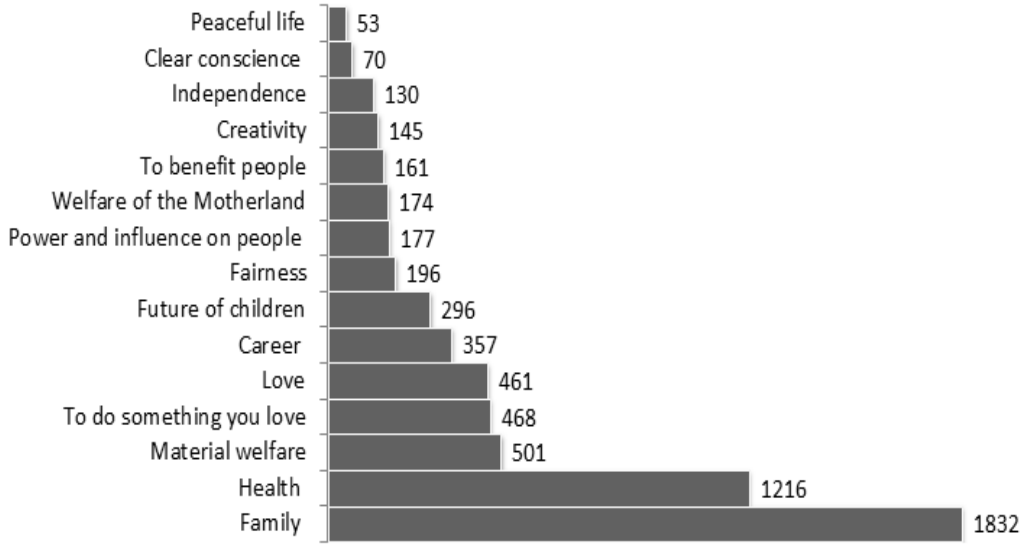


Fig. 2: What is the most important for you in your life?

Therefore, self-identification of the majority of the students of the regional university as citizens of the country does not determine an axiological choice of a student in favor of strictly civic values, a desire of a regional student is aimed at integration to all-Russian society on the basis of formed system of private values.

The analysis of the answers of the students to the question "When studying at a university, what do you do in addition to your learning activity (would like to do)?" showed that the vast majority of them is aimed at participation in extracurricular activities (Fig. 3).

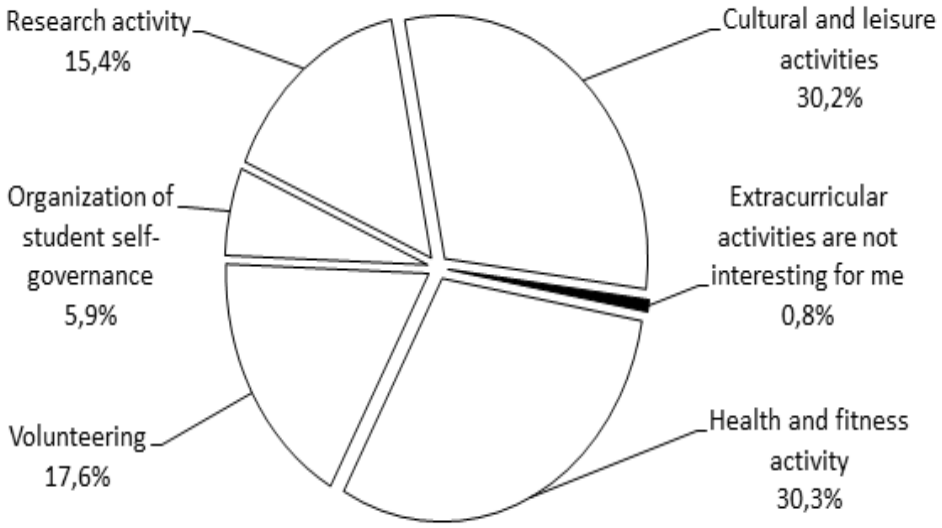


Fig. 3: When studying at a university, what do you do in addition to your learning activity (would like to do)?

One of the most popular directions of extracurricular activities in the Mari State University is volunteering. Promotion and popularization of values and voluntarism in the society is an effective mechanism of realization of social partnership and an important consolidating factor in conditions of the regional society. At the present time every third full-time student of the Mari State University participates regularly and systematically in volunteering (Smyshlyaeva, Obidina, 2016). The students of the Mari State University are actively involved in federal, regional and university volunteer activities through participation in both independent programs and programs of volunteer projects of different level. There are projects in the field of legal education and civic-patriotic initiatives among the most important directions of these projects.

Discussions

Obviously, undeveloped social-cultural mechanisms of adaptation of the youth to new conditions compound a problem of choosing value orientations and behavior (Beloshapka, 2015). The destruction of previous forms of adaptation of a person to ambient conditions, the growth of internal conflict is determined, according to Toffler, on the one hand, by spread between images, mental models of the reality and what it actually is (Toffler, 1970). Civic-patriotic education and formation of legal culture of the youth has an important meaning in the process of formation of value orientation.

However, education system in virtue of its conservatism cannot keep up with changeable social-cultural processes and create mechanisms of adaptation of the youth to the reality of the modern world. The system of student self-governance, under which social activity of a student of the regional university, can be a condition to create such a mechanism. Interests of young citizens are realized, to a large extent, in extracurricular activities and spread to a broad social space including volunteering and other socially useful initiatives.

In modern Russian science the view is expressed to form a new cultural paradigm of education that considers society and a person in their integrity, cultural and individual dimension instead of the

former one, in which education was aimed at transfer and acquisition of uniquely interpreted knowledge (Emikh, 2011). Personality passes the process of transformation and degeneration to a new personality through education. Personality becomes capable to transform the social reality (Agapov, 2014). Therefore, the more importance is being attached to the training of a specialist, who is capable of self- actualization in the process of social and labor activity, having such personal and professional qualities which ensure the solution of the tasks in all types of activity and the responsibility for their solution.

The importance of the university will increase due to establishment of close cooperation with the state authorities of the region, organizations, and companies – potential employers of the graduates of the university.

Net cooperation of science and practice allows to:

- attract additional extra-budgetary funds (Elsukova, 2015);
- introduce net forms of realization of educational programs;
- organize a probation of students in organizations of the region with subsequent employment of the graduates;
- effectively respond to real demands of the labour market and correct curricula;
- organize mass additional professional education of specialists in a particular field;
- provide continuity of professional and university education of the region.

Conclusions

Therefore, today an important task of university education is to form new mechanisms and a unique semantic field of transfer and preservation of cultural experience, models of communication of a cognizing subject. Under the influence of such processes new professional values are confirmed, social trends change, scientific and pedagogic practice adopts to the reality of our life. Not least this happens under the influence of self-preservation mechanism of the society which forms its new identity.

References

Agapov, O.D. (2014) Education on a sphere of anthropological experience. Scientific notes of the Kazan University. Edition: Humanities. №1. Vol.156. Pp.23-30.

Beloshapka, G.I. (2015) Theoretical approaches to the youth concept in the structure of the local society. Topical issues of social sciences: sociology, political science, philosophy, history. №46. Pp.28-34.

Chou, M, Gagnon, J.-P., Hartung C, Pruitt, L. J. (2017) Young People, Citizenship and Political Participation : Combating Civic Deficit? Rowman & Littlefield International. 162 p.

Elsukova, T.V. (2015) Lean accounting and throughput accounting: an integrated approach. Mediterranean Journal of Social Sciences. Vol.6. №3. Pp. 83-87.

Emikh, N.A. (2011) The foundations of philosophical-anthropological study of the cultural paradigm of education. The Buryat State University Bulletin. №6. Pp.49-53.

Malakhova, Y.N. (2002) On possibility of creation of university of classical type in modern society. The Tomsk State University Bulletin. №364. Pp.29-31.

Moreau, S. Discrimination Law and the Freedom to Live a Good Life. Law and Philosophy (2016). Vol. 35. Pp. 511-527.

Smyshlyaeva, T.V., Obidina, Y.S. (2016) Student self-government as a mechanism of construction of socio-cultural reality. Society of Russia: educational space, psychological structures and social values. №4-2. Pp.115-128.

Toffler, A. (1970) Future shock. M: AST, 2001. 558 p.

Wyn, J. (2015) Youth Policy and the Problematic Nexus Between Education and Employment. Interrogating Conceptions of "Vulnerable Youth" in Theory, Policy and Practice. Innovations and Controversies: Interrogating Educational Change. SensePublishers, Rotterdam. Pp. 49-61.

Basic principles of state youth policy in the Russian Federation until 2025 (approved by the Russian Governmental Decree of 29 November 2014№2403-r). https://rg.ru/2014/12/08/molodej-site-dok.html

The Role of Management Accounting Methodology in the Forecasting of Regional Economy Development

Yuliya B. Rzhavina, Mari State University, Russia, barievna1@rambler.ru

Mariya V. Sayranova, Mari State University, Russia, vladi986@rambler.ru

Abstract

Modern business conditions require development of existing approaches to the management process. Domestic economy growth towards innovation implies enhancement of its efficiency. There is an increasing necessity for management improvement on every level: micro- (organization, business), meso- (regions, branches of activities) and macro- (country economy). Conceptual framework of management accounting in Russia has its own peculiarities associated first of all with the history of its development, traditions of national accounting school and adjustment of global practices to management tasks. Modern management accounting principles are based both on traditional accounting elements and on particular tools of management accounting subsystems. Management accounting information can be important not only for a particular business entity internally, but also for timely long-ranged decision-making at a higher level of economy management. Thus consolidated theme-based managerial reports will extend the opportunities of analytical procedures of higher-level management bodies for the purpose of regional economy control. The fact that currently all the potential opportunities of management accounting tools at a regional level are not fully used generates the need for further researches within this topic.

Keywords: management accounting, business accounting, tools, forecasting, regional economy.

Introduction

Existing principles and peculiarities of market relations predetermine the development of business environment. In the economic system of every country containing features of market economy business entities are working in a competitive environment under natural scarcity, risks and uncertainty. Modern development of domestic economy towards innovation implies enhancement of its efficiency. Generated amendments of management methodology expect to elaborate new and to improve existing informational flow systems. Such conditions are leading to increase of necessity for management improvement on each level: micro- (organization, business), meso- (regions, branches of activities) and macro- (country economy).

The Method

Management system should ensure efficiency of business processes related to products (works, services) distribution to the ultimate consumer while management should receive full and exact information necessary for decision-making, analysis and control of current processes at different levels. Thus requirements for management information are increasing which is leading to a need to organize some tools contributing to the receipt of timely and full information reflecting the condition of internal and external environment (Rzhavina, Y.B., 2013).

The Research

A lot of foreign and national theorists and practitioners have been always interested in the origin and development of management accounting, its essence and role in the process of operation control. A great number of management accounting definitions can be found in various literature sources of recent years. The main point and the purpose of management accounting is widely described by the famous wording: “production of the information for management purposes” (Sokolov, 1996).

Accounting for the purpose of management, as confirmed by historical evidence, has been developed in line with book-keeping science and practice. For this reason economists of different countries acquire its own understanding and appliance of management accounting. Analysis of accounting evolution from its origin to this day allows for the conclusion that management accounting has appeared as a consequence of traditional accounting weak points (Rzhavina, 2015). Many elements of management accounting were not something new for the domestic economy. For a long time Russia has been stayed an agricultural country with a simple accounting based on the entries of debt and credit (unigraphic recording). By the end of XIX century in line with increase of industrial facilities and development of production accounting within various emerging accounting theories it can be talk of the first reference to management accounting. Russian experience highlights a successful development of industrial book-keeping which has been improved both in industrial activity and in building sector. Extensive use of budget estimates was a prototype of budgeting in its modern sense. Accounting development as a science required involvement of budget planning, forecasting, control and economic analysis to adjust accounting for management purposes (Sokolov & Sokolov, 2006). Modern principles of management accounting are based both on traditional accounting elements established by law (documentation and inventory, assessment and calculation, accounts and double entry, balance consolidation and reporting) and on particular methods of such management accounting subsystems as planning, analysis, control and monitoring (Rzhavina, 2013). Development of informational technologies provides management accounting with an opportunity to use the results of conducted researches on simulated models capable to find solutions for semi-structured tasks (Vahrushina, 2008).

Conceptual framework of management accounting in Russia has its own peculiarities associated first of all with the history of its development, traditions of national accounting school and adjustment of global practices to management tasks (fig. 1) (Rzhavina, 2013).

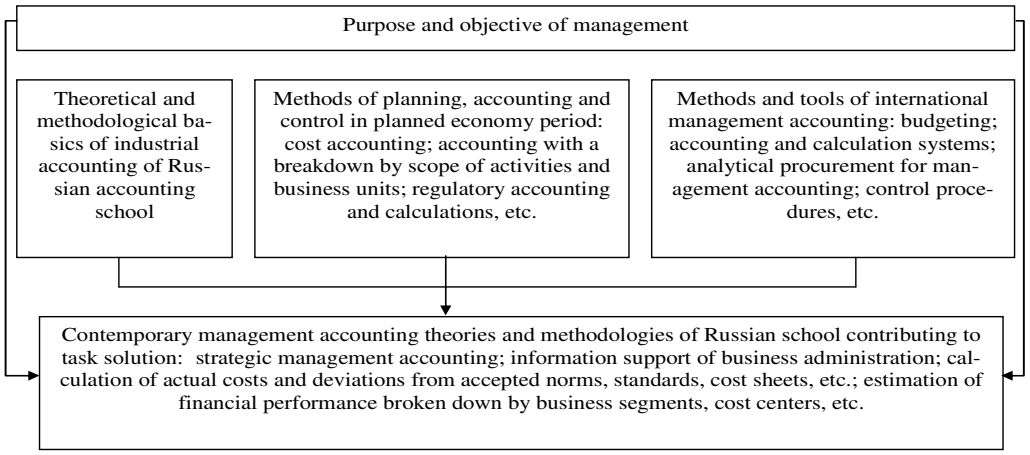


Fig. 1: Contemporary framework of management accounting in Russia

Obviously the development of efficient management accounting system depends not on the improvement of existing accounting tools but on identification of the principal informational needs of management on various levels and looking for appropriate and reasonable solution approaches. All methods of management accounting pursue the same goal – to provide with a real opportunity to select a reasonable management decision based on the comparison of alternatives generating a single organizational system which gives a possibility to find effective and intelligent solutions for retrospective, current and future predictive tasks.

Nowadays there is a great variety of management accounting organization and implementation forms used in domestic practice due to the lots of external functioning factors primarily political, economic and social as well as internal such as organizational and technological. Russian legislation does not cover management accounting. Every business entity considers necessity of implementation of

management accounting system, methods and managerial reporting standards individually (Rzhavina, 2013).

Management accounting information can be important not only for a particular business entity internally, but also for timely long-ranged decision-making at a higher level of economy management. Management accounting methods (devices and tools) used to consolidate management information can also be applicable at a regional level. As an example consolidated theme-based managerial reports of a public nature which do not contain any commercially sensitive information but extend the opportunities of analytical procedures of higher-level management bodies for the purpose of regional economy control. Similarly to accounting (financial) or statistical reporting which is provided to government agencies by every business entity based on regulatory requirements, managerial reports will be received by relevant departments in due time. Essential, supplementary and operational information which is obtained will generate an opportunity for executive authorities to use predictive and analytical tools of regional economic policy more efficiently. The content of managerial reporting, its purposive character, cycling and level of detail depend on its prospective users (Rzhavina, 2015). General scheme of managerial reporting levels of a region which are similar to managerial reporting levels of a business entity is as follows (fig. 2):



Fig. 2: Regional managerial reporting levels

Russia is a heterogeneous country with its specific spatial features, ethnic composition, natural and climate conditions causing the significant difference of economic opportunities and development level between regions. Socio-economic position of every region as a complicated system is influenced by both objective or external factors including macroeconomic conditions, geographic location, sectorial structure, natural resources and subjective or internal factors reflecting the quality of management tools (Nesterova & Osipova, 2014). Nowadays economic development is associated not so much with growth in volumes, but first of all with quality changes. The priority is given not to resource availability but to efficiency of its usage (Tsaregorodtsev & Sayranova, 2015).

All business entities of a region compose a sole object of regulation and development. Renovation of forecasting and planning techniques in all spheres of regional economic policy contributes to correspondence of goals and development objectives between region and particular business entities (Ataeva, 2015). In such case it is possible to apply management accounting techniques based on stated goals and objectives specific for every branch of a region. Therefore particular requirements for management accounting process will depend on specifics of workflows standard for each branch of a region. The point to be emphasized is that implementation of a system approach implying consistent organizational, informational and methodological support with a glance to peculiarities of every existing accounting system is of a great importance.

Conclusion

Currently management accounting tools are not fully implemented at the level of regions and branches due to the lack of theoretical, methodological and instructional researches in this area. Therefore it is necessary to elaborate methodology of accounting management as well as to improve procedural tools considering given specifics. Adjustment of management accounting techniques in terms of forecasting of regional economy evolution will provide with an opportunity to find the most efficient paths for development.

Acknowledgement

The research was supported by Russian Science Foundation project #16-18-10017 «Complex of programs for forecasting economic development region».

References

Ataeva, T.A. (2015), 'Forecasting and management of financial resources of region', *Theory and practice of social development*, 8, 83-85.

Vahrushina, M.A. (2008), 'Management accounting: manual for economics students', Moscow, 570.

Nesterova, N.N. & Osipova, I.V. (2014), 'Features of planning and forecasting of social and economic development of regions in conditions of global changes', *Modern problems of science and education*, 4.

Rzhavina, Y.B. (2017) 'Information issues in the management accounting system', Vestnik of Mari state University, 2 (10), 72-76.

Rzhavina, Y.B. (2015), 'Conceptual framework of management accounting in Russia', Vestnik of Mari state University, 3 (3), 84-88.

Rzhavina, Y.B. (2013), Monograph 'Methodology and organization of management accounting and internal control', Yoshkar-Ola, 156.

Sokolov, Ja.V. (1996), 'Accounting: from the sources to our days: textbook. Manual for high schools', Moscow, 638.

Sokolov, Ja.V. & Sokolov, V.Ja. (2006), 'The history of accounting: manual', Moscow, 288.

Tsaregorodtsev, Ye.I. & Sayranova, M.V. (2015) Monograph 'Economic potential of development of social and economic systems of the region', Yoshkar-Ola, 178.

Priorities and Risks of Innovatization in Managing the Economy of Russian Regions

Evgeny I. Tsaregorodtsev, Mari State University Russia, Yoshkar-Ola, evgts@marsu.ru

Michail P. Postaljuk, University of Management "TISBI" Kazan, Russia mp.44@mail.ru

Taras V. Postaljuk, University of Management "TISBI" Kazan P_taras@mail.ru

Abstract

The article deals with modern problems of social and economic development of Russia and its regions. The authors pay special attention to the innovative development of industry in Russian regions. They investigate factors, sources and technologies of sustainable growth of the regions, analyze the dynamics of indicators that characterize the place and role of the innovation component in these processes and justify the innovation of management of the economy of Russian regions as the dominant pattern of their development. In this regard, the main focus is on the creation of innovative industrial clusters in the regions, high-tech industries based on breakthrough technologies; the priorities and risks of forecasting the processes of innovation management of the economy of Russian regions are determined; the development of dynamic forecasts and simulation models for the development of sectorial clusters is carried out.

The research is supported by the grant of the Russian Science Foundation № 16-18-10017 "The complex of programs for forecasting the economic development of the region"

Keywords: forecasting, innovatization, risks, modeling.

Introduction

Objective. The aim of the study is to justify priorities and risks of forecasting the innovatization in managing the economy of Russian regions. In that context, the problem of regulating the system of managing the innovative development of enterprises in industrial complex of Russian regions and the rationalization of priorities and risks of these processes acquire special significance. Due to the insufficiency of their theoretical development and under the influence of external and internal disturbances, the regional structure of the industrial system can become unbalanced with pronounced social and economic contradictions. Therefore, this problem remains relevant, and upholds its theoretical and practical significance and prospective viability.

Methodology/Approach and Results

To achieve this goal, a holistic approach and a method of structural and logical decomposition to the study of priorities and risks of forecasting innovation in the management of the economy of Russian regions were used. It made it possible: to justify priorities, to identify the risks of forecasting innovation in managing the economy of Russian regions. The reliability of forecasted priorities and risks of sectorial clusters in the process of forming a model of indicative management of innovative development of enterprises of the industrial complex of Russian regions makes it possible to take proper managerial decisions to ensure their efficiency.

Originality/value

The originality of the research is in presenting the innovation of managing the economy of Russian regions based on justified assessment of priorities and risks as a process of accumulation, preservation, use and development of traditional capacities of innovative management of economic entities in the system of interaction between business, government and society. The article justifies

the need for the development of innovative industrial clusters as the basis for modernizing managerial processes in the regional economy of Russia. It is proved that the forecasting of risks of industrial clusters in the process of forming a model of indicative management of innovative development of enterprises of an industrial complex of Russian regions gives the possibility of taking proper managerial decisions to minimize them and targeted measures to support and stimulate innovative activities.

Theoretic Articulation of the Issue

All economic processes at any level of the economic system can be divided into traditional and innovative ones, which form traditional and innovative spheres of activity, having specific features at various stages of technical, technological, organizational, managerial, socio-economic and institutional development of a particular society. For example, traditional forms dominated in pre-industrial national spatial economic systems and primitive forms of innovative relations are only beginning to form. There prevailed material traditions with mild continuous improvement. Industrial society is characterized by the optimization and rigidity of the process of sustainable transformation of innovative and traditional relations. In this economic system, there is a predominance of orientations to innovative material forms and industrial technologies in its structure. The specific feature of the post-industrial period is a steady demand for intellectual innovations.

World theoretical and practical experience shows that one should take into account what forms, levels and ways of their interaction are preferable for it - routine, innovational or innovative in choosing the priorities in traditionalization and innovatization of the structures of sustainable development of a national economic system at all its levels apart from the criteria and levels of traditionality (basic, carrying fractals) and innovativeness (for different typologies in economic science: breakthrough, basic, improving, supplementing) material and immaterial, intangible benefits). We need to develop fractal properties and/or to create our own innovations, and/or to borrow them from other economic systems. At the same time, the circumstances of traditionalization and innovatization of specific spatial economic systems require clarification of the question of the alternative or complementarity of the main forms of innovation.

The orientation towards innovation, that is, the creation, accumulation, preservation, use and development of one's own breakthrough innovations, implies the partnership of business, government and society, which should support and ensure the development of the research and development sector, as well as the corresponding infrastructure (technology parks, innovative incubators, centers of prototyping and commercialization of technologies, etc.). The choice of the vector of innovative development, which is carried out with the help of technologies borrowed from other national economic systems, requires a different structural budgeting and strategy in this economic space. For example, the positive experience of Japan and South Korea shows that at the first stage of innovation of the structures of development of their national economic systems, the innovative form, that is, the borrowing of foreign technologies, dominated. Later an innovative form, which, at present, is the dominant and priority-oriented one, has balanced it out.

K. Peres revealed the negative consequences of the use of innovative forms of strategizing of the innovatization of spatial patterns of development of national economies in Latin America countries. In the 80-90-ies of the last century outdated technologies of the previous (the fourth) wave of technology were exported to these countries as on to the periphery, while the highly developed countries had already begun the distribution of the next, fifth, wave technology. As a result, with the help of outside funds, Latin American countries managed to create the infrastructure corresponding to the borrowed technologies that at that time was not able to give a full pay-off due to technologies of the fourth wave, which had already become potentially outdated. It all resulted in a debt crisis in this group of countries, Perez C. (2002) and Schumpeter J.A. (1982).

Specific features of Russian economy determine priorities for the innovatization of spatial structures for the development of economic systems at all levels, in all its sectors and spheres. On the one hand, the country has a scientific and productivity base (unlike Japan and South Korea in the middle of the last century) for an innovatization form of development based on its own breakthrough technologies.

On the other hand, there is a significant differentiation and disparity in the levels of innovatization in the spatial structures of the development of regional economic systems and their serious lag behind the level of foreign countries economic development. However, the strategic planning of an innovative form of development based on its own breakthrough technologies throughout Russia is too risky, and the orientation toward borrowed foreign technologies may not give the desired effect, fixing its peripheral position in the processes of innovatization at the mega-level .

It is extremely important to monitor the innovative potential in the field of creating or borrowing new technologies when choosing priorities for the innovatization of spatial structures of the development of the national economic system of Russia. The analysis showed that some regions of Russia could reproduce on their territory a development model based on the creation of breakthrough technologies, the other part of regions can specialize in borrowing already existing technologies. This will contribute to the diversification of the processes of innovatization in the spatial structures of the development of Russia's national economic system, which will reduce the risks in implementing various areas of its innovation policy.

World experience in supporting the innovatization of local structures of the development of national economic systems shows that it turns out to be the most effective at the meso level, on which individual regions and cluster entities are concentrated. The support and stimulation of the innovatization of the structures of their development, depending on their particular characteristics, is carried out both by alternative approaches and by complementary forms and methods that ensure the sustainability of innovatization of local structures for the development of national economic systems.

The problem of sustainability and its solution is based on maximization of the innovative potential of regional structures for the sustainable development of the national economic system. In the light of this, there is a need to define, regulate and maintain regional sustainability that corresponds to the initial assumptions and principles of innovation.

There are various approaches to definition of regional stability of development of an economic system: on the one hand, this category is disclosed as a guarantee for its purposeful movement; on the other hand, regional stability is characterized as the immutability of the trajectory of an economic system, as well as the form of proportionality of social reproduction.

We believe that the fundamental element of the regional stability of structures of national economic system development is their ability to generate innovation and innovative conditions, factors and prerequisites at all levels of the hierarchy of the economic system. We regard regional stability in this respect as a property of the regional economic system to create and maintain such fractal links between the structure-forming elements that support all the necessary parameters of its dynamic renewal at a given level with the purpose of its efficient functioning in a competitive environment.

With that, we note the unity of regional stability and the variability, equilibrium and non-equilibrium of regional structures of dynamic development of an economic system. In that context, the process of innovatization of the structures of regional sustainable development of economic systems is represented by a short-term stable initial criterion for the transition of the regional economy from uncertainty, disequilibrium and unbalance to a state of stable, balanced, conformal and coordinated dynamic development. That particular of all others predetermines the algorithm for the innovatization of regional structures for the sustainable development of economic systems

The Management of the Innovatization of the Industrial Complex of Russian Regions

The problem of regulating the system of management of the innovatization of the industrial complex of Russian regions is now acquiring special significance, since under the influence of external and internal disturbances the structure of the industrial system can become unbalanced with pronounced social and economic contradictions. An example of this is the world economic crisis of 2008, which became a kind of catalyst for the manifestation of negative phenomena in the social and economic life of most Russian regions. In particular, we are talking about a decrease in the level of business

activity, production volumes, profits, real incomes of the population, rising unemployment, increasing debt burden, decreasing liquidity, etc. The macroeconomic indicators presented in Table 1 indicate that the pace of socio-economic development has now sufficiently slowed down.

Table 1: Dynamics of macroeconomic indicators in the Russian Federation for years 2003-2016

The indicator	2003	2004	2005	2006	2007	2008	2009	2010	2015	2016
GDP growth rate, in % vs. to the prior year	107,3	107,2	106,4	108,2	108,5	105,2	92,2	104,3	104,3	103,4
Investment growth rate in % vs. to the prior year	112,5	113,7	110,8	116,7	122,7	109,9	84,3	106	108,3	106,6
Retail sales growth rate, in % vs. to the prior year	108,8	113,3	112,8	114,1	116,1	113,6	94,9	106,4	107	106,3
Profit margin in all the activities, in billion rubles	2 324	3 214	4 556	7 145	7 290	3 985	5 335	7 870	9 725	7 824
Real disposable household income of the population in % vs. to the prior year	115	110,4	112,4	113,5	112,1	102,4	103,1	105,1	101,2	105,8
The number of citizens with substandard income, in % to the total population	20,3	17,6	17,7	15,2	13,3	13,4	13	12,7	12,5	10,9
The unemployment level, in % to economically active population	8,6	8,3	7,7	7,3	6,3	6,5	8,7	7,3	6,5	5,5

Table 1 shows that almost all indicators characterizing the dynamics of development and the growth potential (investment) of Russia in recent years have a pronounced downward trend. In particular, the growth of industrial production following the results of 2016 significantly slowed down and amounted to only 3.4%. In these conditions, an important prerequisite for the development of industrial production is through intensive use of the resource base, the key factor in the development of which is innovatization.

Despite all the negative factors, the innovative scenario for the development of the economy of the Russian regions, developed by the Ministry of Economic Development of the Russian Federation, provides for an increase in the share of the innovation sector to 20% of GDP by 2030. Main problems of innovative industry development in Russian regions, where most of which still remain subsidized, are the following:

- a cut in prices at world commodity and raw materials stock exchanges, which will affect export comings, stability of the budget sector, the structure of domestic demand and inflation;

- the dependence of the balance of payments of Russia and the entire Russian financial system on capital flows and instability of global financial markets will increase;

- the cyclical development of the economy, which is reflected in the changes in the situation and other conditions of operation of industrial enterprises will contribute to crisis phenomena.

In general, only an innovative development scenario, in which the accelerated development of non-commodity sectors and the expansion of the national savings base are expected, in the end will manage to enhance the resistance of Russian regions' economy to possible destabilizing factors. In that context, regional authorities should focus on creating innovative industrial clusters; high-tech industries based on breakthrough technologies; scientific and innovation techno parks, engineering centers and technology transfer centers, design firms, testing laboratories, business incubators.

Their priority development should be based on the strategies of regions, designed for a long-term period. Cluster development programs should carry out a detailed strategic and cluster analysis of the regional economy and involve all stakeholders: government authorities, business, business associations, research and educational institutions, financial institutions.

Clustering As a Prime Organizational and Managerial Form of Innovatization in the Economy of Russian Regions

Clusters are to strengthen the innovative component of sustainable development of regional economies, because:

- regional innovation and industrial clusters are based on the established stable system of distribution of new technologies, knowledge, products, the so-called technological network, which has a joint scientific basis

- cluster enterprises have additional competitive advantages due to the possibility to carry out an internal specialization and standardization, to minimize the costs to introduce innovations;

- an important feature of innovative and industrial clusters is the presence of flexible business structures in their organization - small enterprises that gives the opportunity to form innovative points of economic growth in the region.

- regional industrial clusters are extremely important for the development of small business: they provide small firms with a high degree of specialization in servicing a particular business area, as this facilitates an access to the capital of an industrial enterprise, active exchange of ideas and transfer of knowledge from specialists to entrepreneurs take place;

- clusters provide the authorities with tools for an effective interaction with business, enable them to advance the adoption of organizational and economic decisions in the cluster;

- the staffing of enterprises improves, the infrastructure of research and development appears;

- clusters stimulate labor productivity and the promotion of innovations.

One of the results of successful state indicative management of innovative development of an industrial complex is the increase in the number of small innovative companies. With that, the innovation economy is intends to increase the level of investment attractiveness of a regional system and its image. Small innovative business is developing quite dynamically in the cluster model of spatial organization of region's economy. At present, the cluster approach in ensuring innovative development of industrial enterprises is actively used in many regions of the Russian Federation, namely in the Samara, Kaluga, Yaroslavl, the Tatarstan Republic and the Bashkortostan Republic, St. Petersburg, and others. In return, the intensity of innovation in industrial production determines the strategic positioning of regional industrial systems in general. The Primorsky Region, Magadan, Tomsk, Nizhny Novgorod Regions, the Chuvash Republic, the Sverdlovsk, Samara Regions, the

Republic of Tatarstan, the Orlov and Orenburg Regions occupied the first 10 positions in innovative activity from 2005 to 2016.

By the number of advanced production technologies created and used, it is possible to determine the direction of innovation activity in the regions, which also influences their innovative activity. One can see from Table 2, where the first 15 positions in these indicators are identified, that most organizations use ready-made technologies.

Table 2: Regions - leaders in the number of created and used technological innovations

The number of created technologies		**The number of used technologies (technologies, put into action)**	
Nizhny Novgorod Region	307	Nizhny Novgorod Region	109513
Moscow Region	272	Moscow Region	59099
Sverdlovsk Region	195	Sverdlovsk Region	50748
Samara Region	126	Tula Region	40561
Chelyabinsk Region	120	The Republic of Bashkortostan	29580
Novosibirsk Region	111	Samara Region	26848
Kaluga Region	90	Tyumen Region	25918
Tyumen Region	87	Saratov Region	24439
Voronezh Region	78	Perm Region	24218
Vladimir Region	45	Chelyabinsk Region	21220
Saratov Region	75	Kaluga Region	18763
Krasnoyarsk Region	68	The Udmurt Republic	17975
Belgorod Region	62	Omsk Region	16631
Perm Region	62	The Republic of Tatarstan	14697
Rostov Region	55	Vologda Region	13656

A peculiar feature of the Russian model of innovative development of enterprises in the regional industries is a sufficiently high scope of asymmetry. In particular, in terms of innovation activity, the scope of intra-regional asymmetry was 15.5 in 2016, compared to 25.5 in 2005. Thus, in 2005 the highest level of innovative activity was recorded in the Perm Region (33, 2%), and the lowest in the Amur Region (1.3%). In the year of crisis - 2008 - this ratio decreased to 11.2 (in the Magadan Region - 26.9%, in the Altai Republic - 2.4%). Gradually, in 2009 and 2010 the ratio decreased to 11.1: in 2009 in the Magadan region - 33.3%, in the Sakhalin Region - 3%, in 2010, respectively, 34.3% and 3.1%. In 2016, the scope of asymmetry declined, with the largest value also recorded in the Perm Region (23.2%), the smallest in the Altai Republic (1.5). Consequently, the level of territorial differences, despite the crisis, is gradually decreasing. The 2008-2009 crisis could explain that, when the regions needed to protect their economies by taking innovative decisions in business and industry. Transformation of economic conditions, increasing risks of financial and investment environment contributed to the fact that the positions of many regions have changed. Specifically, regions with a lower level of innovative activity advanced higher in rating (the Magadan Region in 2005 - 6.2%, in 2016 - 34.3%), or, quite the opposite, there is a tendency to decrease activity in some other regions (in 2005 in the Perm Region 33.2%, in the Sakhalin Region - 6.2%, in 2016 - 21.3% and 3.1%, respectively) Postaliuk M and all (2013)

We also note that the level of innovation activity in the industry of the regions should serve as a kind of barometer that correctly sorts out priorities in structural and technological policies, taking into account changes in research and development, the quality of researchers and R & D expenditures, the level of technology of production and labor productivity. Over time, the innovative component of the development of industrial will go up, as the introduction of innovations contributes to the competitive growth and adaptive effectiveness of its development Golichenko O. (2012).

Forecasting risks of innovatization in managing the economy of Russians regions

We note that in order to build a model for forecasting innovation in managing the enterprises in the industrial complex of regions, especially important is to have information about the projected risks in key industries Postaluk M.P. and Vafin A.M. (2015). At the same time, our research considers only internal risks of enterprises of regional industrial clusters, which largely simplifies their forecasting. External risks are rather difficult to forecast, and certain data on them for the future are contained in official government documents. As for the organizational, structural, technological, economic and social risks inherent in individual sector clusters, they are rather inertial, and there are no dramatic changes in the estimated parameters of the above-mentioned risks Glazyev S. and all (2002). This happens because the risks under consideration take place due to the state of the technical and technological level of the industrial potential of sectorial clusters in the regions, formed by their organizational structure, etc.

Forecasting the risks of sectorial clusters in the process of regional management is a difficult task, especially due to the insufficient degree of reliability of economic forecasts in the realities of the Russian economy is not high enough Lurie E.A. (2009).

The appearance of dynamic forecasts, and later on the elaboration of simulation models and territorial industrial meso models made it possible to study and present the trajectories of the development of industrial clusters. In dynamic models the interrelationship between the individual elements of an economic complex of the region and the conditions of their development over time experienced a more detailed examination, but the influence of technological links between the objects of specialization, servicing and auxiliary industries, consumption norms of many local resources and the scale of development of individual elements of the production infrastructure limited it Granberg A.G. (1985).

A cluster model of an economic complex of the region can be built only after the determination of its structure, trajectories of development of individual sectorial clusters and the system as a whole. The beginning of the use of alternative graphs, the development of linear-linguistic models, expert systems is the next stage in the development of forecasting models is the next step in the development of forecasting models Bodrunov S.D. (2013).

In order to forecast the risks of regional industry clusters, within the framework of this study, we have chosen a forecasting method based on autoregressive models of the integrated moving average (ARIMA time series). This method, unlike the regression analysis, for example, does not take into account causal factors, but it makes it possible to reveal tendencies, cycles and other systematic characteristics of statistical time series. It is a very accurate method of short-term (up to two years) forecasting, but with longer terms, its accuracy drops sharply.

ARIMA models rely mainly on the autocorrelation structure of the data. The ARIMA methodology does not provide for any clear model for predicting this time series. Only a general class of models is defined, which describe the time series and make it possible to somehow express the current value of a variable through its previous values. Then the algorithm, substituting the internal parameters, itself selects the most suitable forecasting model. There is a whole hierarchy of Box-Jenkins models. Logically, it looks as follows:

$$AR(p)+MA(q) \rightarrow ARMA(p,q) \rightarrow ARMA(p,q)(P,Q) \rightarrow ARIMA(p,q,r)(P,Q,R) \rightarrow$$

The Box-Jenkins forecasting methodology differs from the most of other methods, because it does not allow any particular structure of the data of the time series, for which the forecast is performed. It uses an iterative approach to the definition of an admissible model among the general class of models. Then the chosen model is compared with the historical data in order to check whether it describes the series accurately. The model is regarded as acceptable if the balances are generally small, distributed randomly, and do not contain useful information. If the given model is not satisfactory, the process is repeated, but already with the use of a new improved model. Such an

iterative procedure goes on until a satisfactory model is found. From that point on, the predetermined model can be used for forecasting purposes.

The risk forecast of regional industry clusters was carried out in the short-term perspective using the Box-Jenkins method. We chose this method not only due to high accuracy of the forecast, but also due to the accepted provision that the risks can be predicted for a longer term only with a high degree of conventionality.

Within the framework of this study, an attempt was made to forecast the risk profile of sectorial clusters of the Republic of Tatarstan, using the example of a petrochemical cluster. To do this, the «Matrixer» program was used, which is intended for data analysis and processing, econometric and statistical calculations. Using this program, it is possible to evaluate the following models (and test hypotheses about them): linear regression, nonlinear regression, binomial logit and probit, and many other models. Therewith, this program works with the following types of objects: matrices, variables (columns of matrices), scalars, rows and models.

According to the results obtained, the organizational, structural, technological, economic and social risks of the petrochemical cluster will decrease in the short-term perspective, but insignificantly (see figures: 1, 2, 3, 4).

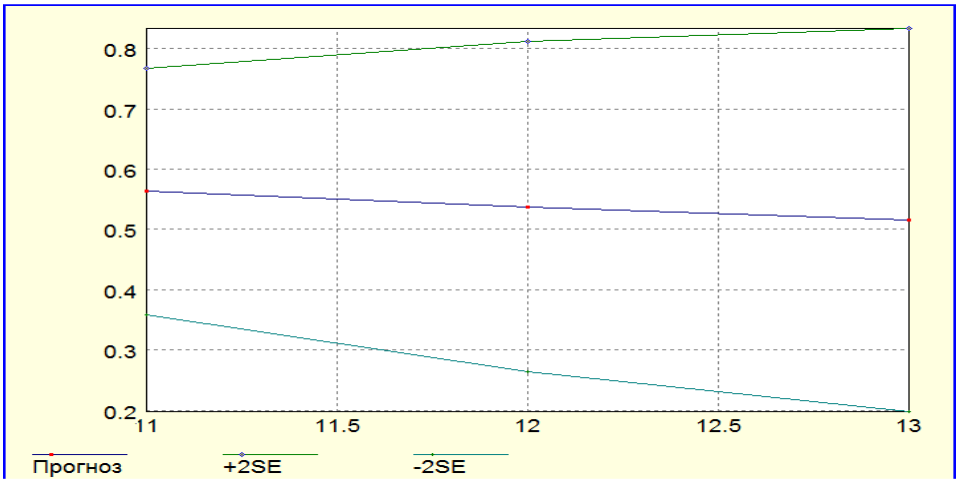


Fig. 1: The forecast of organizational market risks in a petrochemical cluster of the Republic of Tatarstan.

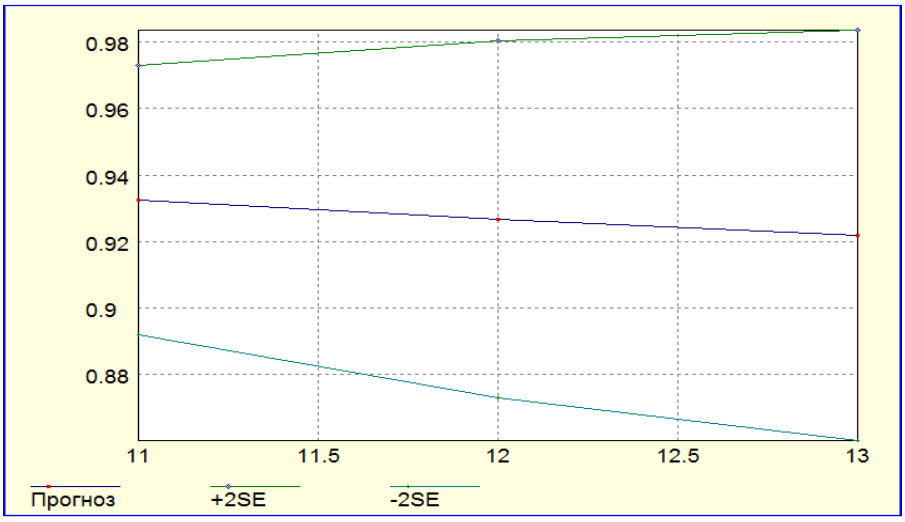


Fig. 2: The forecast of technological risks in a petrochemical cluster of the Republic of Tatarstan

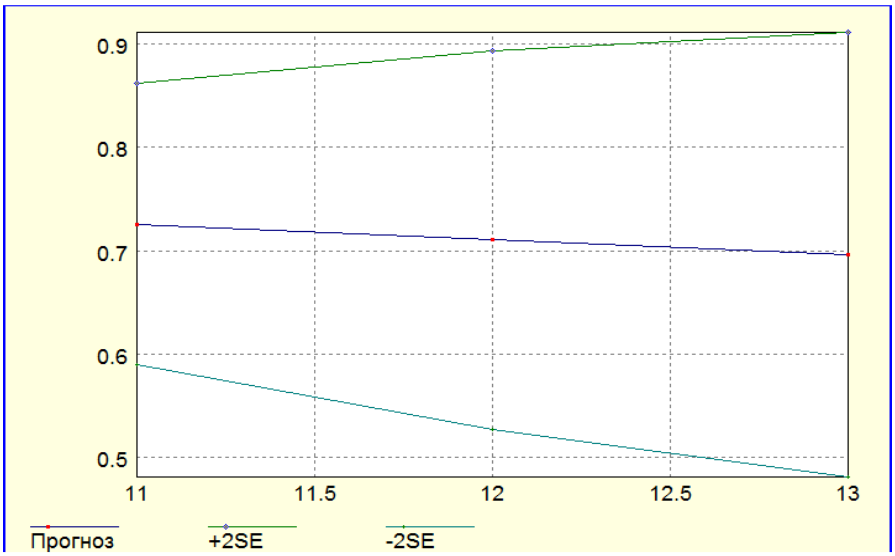


Fig. 3: The forecast of economic risks in a petrochemical cluster of the Republic of Tatarstan

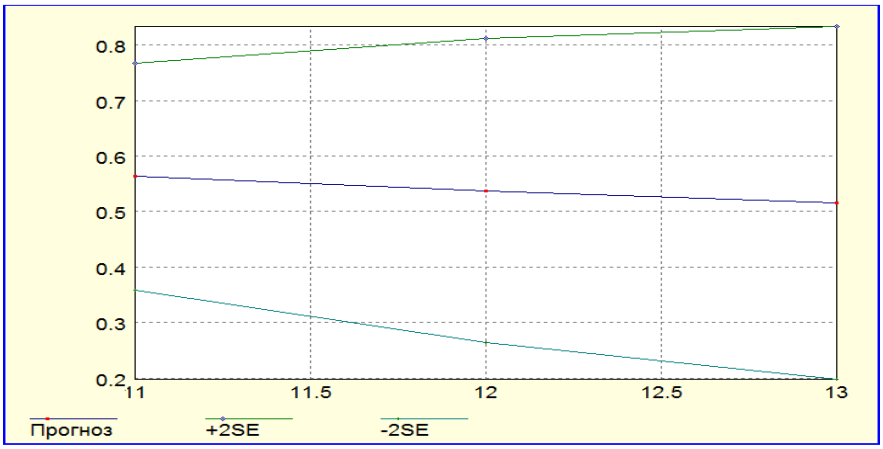


Fig. 4: The forecast of social risks in a petrochemical cluster of the Republic of Tatarstan

When constructing the forecast of the risks of the petrochemical cluster of the Republic of Tatarstan, one of the simplest models of Box-Jenkins was used (1.0.0) - an autoregressive function. The accuracy of the model characterizes the closest proximity of calculated observations to the actual one at the approximation period. We concluded that models with a smaller discrepancy between actual and calculated values reflect better the process under study. To characterize the degree of proximity, the following coefficients were used: the coefficient of determination (the closer to 1, the more accurate is the model); The average relative approximation error (the closer to 0, the more accurate is the model). For all the given parameters, the forecast values correspond to the requirements.

Minor risk reduction, in our opinion, is because this cluster is the most developed, has a good resource development potential, and concentrates sufficiently large investment flows. It is important that many priority projects of the petrochemical cluster of the Republic of Tatarstan have already been implemented, or are under implementation. However, the risk structure does not change. In this case, at the regional level, it is necessary to take measures aimed, first, at reducing technological risks, overcoming the technological and technical backwardness of petrochemical industries.

Conclusions

Forecasting the level of innovation activity in the industry of regions should serve as a kind of barometer that gives the possibility to sort out correctly priorities in structural and technological policies, taking into account changes in research and development, the quality of researchers and R & D expenditures, the level of technical equipment of production and labor productivity. The innovative component of the development of industrial enterprises in future should increase, as the introduction of innovations contributes to the recovery of competitiveness and adaptive effectiveness of its development.

Forecasting the risks of sectorial clusters in the process of forming a model of indicative management of innovative development of enterprises in the industrial complex of the regions, makes possible to take adequate management decisions to minimize the risks and target measures to support and stimulate innovation.

References

Bodrunov S. (2013) Formation of the strategy of reindustrialization of Russia Institute for New Industrial Development (INIR). St. Petersburg

Glazyev S., Lvov D. and Fetisov G. (2002) Evolution of technical and economic systems: the opportunities and boundaries of centralized regulation. Moscow.

Golichenko O. (2012) The model of development based on the diffusion of technologies *Questions of Economics* № 4 56-64

Granberg A. (1985) Dynamic models of the national economy. - Moscow

Lurie E. (2009) Territories of innovative development: the experience of the regions *Innovations.* v 2 31-44.

Perez C. (2002). Technological revolutions and financial capital: The dynamics of bubbles and golden ages. Edward Elgar Publishing.

Postaluk M. and Vafin A. (2015) Innovatization of industrial complex management in local economic systems of Russia. – Kazan

Postaliuk M., Postaliuk T. and Vagizova V. (2013) Implementation forms of institutional support for traditional and innovative development of national economic systems *Investment management and financial innovations*.. v. 10. № 4. 88-94

Schumpeter J. (1982) The theory of economic development: (The study of business profit, capital, credit, interest and cycle conjuncture) - Moscow.

Testing Different Particle Swarm Optimization Strategies

Pavel Raska, Department of Industrial Engineering - Faculty of Mechanical Engineering, University of West Bohemia, Pilsen, Czech Republic, praska@kpv.zcu.cz

Zdenek Ulrych, Department of Industrial Engineering - Faculty of Mechanical Engineering, University of West Bohemia, Pilsen, Czech Republic, ulrychz@kpv.zcu.cz

Abstract

The paper deals with testing different strategies - Inertia Weight Strategies, Constriction Factors and Interpersonal Learning – of a Particle Swarm Optimization implemented in a simulation optimizer. The strategies were tested on five different discrete event simulation models reflecting real optimization problems in industrial companies. We specified different objective functions of discrete event simulation models considering the simulated system. We tested different settings of the strategies to reduce bad settings. We replicated optimization experiments with concrete optimization method parameters settings to reduce the randomness of the behaviour of the optimization method strategies. We evaluated the success of finding the optimum by the different PSO strategies according to other optimization methods - Random Search, Downhill Simplex, Hill Climbing, Tabu Search, Local Search, Simulated Annealing, Evolution Strategy, Differential Evolution and Self Organizing Migrating Algorithm.

Keywords: Particle Swarm Optimization, discrete event simulation models, PSO strategies, heuristic optimization methods

Introduction

Simulation optimization is a commonly used problem-solving technique for finding the global/local optimum of the optimized objective function respecting the specified constraints. The equation reflects a process of finding a possible – feasible - solution (suitable settings of decision variables) using experimentation with a discrete event simulation model reflecting the modelled problems. (Volna, 2012), (Weise, 2009)

$$\breve{\mathbf{X}} = \operatorname{argmin}_{\mathbf{X}\in\tilde{X}} F(\mathbf{X}) = \{\breve{\mathbf{X}} \in \tilde{X}: F(\breve{\mathbf{X}}) \leq F(\mathbf{X}) \forall \mathbf{X} \in \tilde{X}\} \quad (1)$$

- $\breve{\mathbf{X}}$ denotes global minimum of the objective function;
- $F(\mathbf{X})$ denotes the objective function value of the candidate solution – the range includes real numbers. The objective function represents the aim of the simulation optimization;
- $\tilde{X}$ denotes the search space.

The objective function represents the quality of the found solution compared to the modelled problem. The objective function/s can reflect company activities i.e. production, logistics, sales, supply, the appropriate use of company resources - employees, machines, materials, etc. The objective function maximization can be converted to function minimization.

Simulated problems are often NP-hard problems, so we use the simulation optimizer using different (heuristic, metaheuristic, etc.) optimization methods to find the optimum of this function. The simulation optimizer automatically varies the input parameters of the discrete event simulation model to find the

suboptimal or the optimal feasible solution of the modelled problem. The simulation optimizer provides the suitable settings for the decision variables of a simulation model.

Particle Swarm Optimization – PSO

The PSO algorithm is a stochastic population-based optimization method proposed by Eberhart and Kennedy in 1995. (Eberhart & Kennedy, 1995)

PSO is a computational method, which optimizes a problem iteratively, trying to improve a candidate solution. PSO is a form of swarm intelligence simulating the behaviour of a biological social system i.e. a flock of birds or a school of fish. (Parrish & Hamner, 1997)

When a swarm looks for food, its individuals will spread in the environment and move around independently. Each individual has a degree of freedom or randomness in its movements, which enables it to find food accumulations. Therefore, eventually, one of them will find something digestible and, being social, announces this to its neighbours. These can then approach the source of food. (Weise, 2009)

Particle Swarm Optimization has been discussed, improved, and refined by many researchers such as (Bonyadi & Michalewicz, 2017), (Cai, et al., 2004) , (Sun, et al., 2012), (Venter & Sobieszczanski-Sobieski, 2003), (Zhan, et al., 2009)

Comparisons with other evolutionary approaches have been provided by Eberhart and Shi. (Eberhart & Shi, 1998)

We use a Box constraint – the search space is limited:

$$\tilde{X}_j = b_j - a_j, a_j \leq b_j \tag{2}$$

$$\tilde{X} = \prod_{j=1}^{n} \tilde{X}_j \tag{3}$$

- j denotes the index of the decision variable of the simulation model;
- $\tilde{X}_j$ denotes the length of the interval of the j-th decision variable;
- a_j denotes the lower bound of the interval of the j-th decision variable;
- b_j denotes the upper bound of the interval of the j-th decision variable;
- n denotes the dimension of the search space.

The swarm of particles (individuals) is generated in the search space. This initial generation of the set of particles usually uses random distribution. To distinguish these particles from each other, the generated particles are placed into a list. Each item can be accessed by its index in this list:

$$p_i = ParticleList[i] \forall i: i = \{0,1,2, \dots, m-1\} \tag{4}$$

- p_i denotes the i-th particle;
- $ParticleList$ denotes the list of particles;
- m denotes the length of the list.

Each particle represents the candidate solution - the individual - in the list of the generated candidate solutions – population – in the context of population-based algorithms. Each particle p has a position $p.X$. This position is the vector of point coordinates of each axes in the n-dimensional search space - the values of each decision variable of the simulation model in our case.

Some optimization algorithms need to access these values, so the element is transformed into a list of values of decision variables (vector of point coordinate in the search space). Decision variables – simulation model input parameters - represent the axes in the search space. These axes are indexed from zero to $n-1$:

$$p.X[j] = x_j \forall j: j = \{0,1,2,\dots,n-1\} \quad (5)$$

- $p.X[j]$ denotes the position of the particle in the n -dimensional search space;
- x_j denotes the point coordinate in the search space.

Particle swarm optimization uses a velocity vector to update the current position of each particle in the swarm.

The position of each particle is updated based on the social behaviour that a population of individuals, the swarm in the case of PSO, adapts to its environment by returning to promising regions that were previously discovered. The process is stochastic in nature and makes use of the memory of each particle as well as the knowledge gained by the swarm as a whole. (Venter & Sobieszczanski-Sobieski, 2003)

The velocity vector $p.V$of the particle p determines in which direction the search will continue. If this vector contains high values of velocity, the search for the optimum has an explorative character. Otherwise - low velocity, the search has an exploitive character.

The positions and velocities of all particles are randomly initialized in the initial phase of the PSO algorithm. The velocity of a particle is updated and then its position in each step. Therefore, each particle has a memory holding its best position $p.X_{best}$. In order to realize the social component, the particle furthermore knows a set of topological neighbours. This set could be defined to contain adjacent particles within a specific perimeter, i.e., all individuals that are no further away from the positon of the particle than a given distance according to a certain distance (Euclidian distance). (Weise, 2009)

For convenience, we assume that the optimization algorithms solve the minimization problem (function maximization can be converted to function minimization).

The following algorithm – see Fig. **1** - contains the following parameters:

- m denotes the number of generated particles;
- n denotes the dimension of the search space;
- $X[j].\mathrm{LowerBound}$ denotes the lower bound of the j-th decision variable;
- $X[j].\mathrm{UpperBound}$ denotes the upper bound of the j-th decision variable;
- $ParticleList$ denotes the list of particles; p denotes the current particle;
- g_{best} denotes the best found global particle from the list of particles (swarm);
- $\mathrm{Rnd}(x.y)$ denotes the function returning a single uniformly distributed random number in interval $[x, y)$;
- $p.X[j]$ denotes the position of the particle – point coordinate of the j-th decision variable;
- $p.X_{best}$ denotes the positon of the best found particle during its existence;
- $p.F_{best}$ denotes the objective function value of the best found particle during its existence (we use the objective function as the fitness function)
- $p.V[j]$ denotes the velocity of the particle of the j-th decision variable.

The algorithm contains functions:

- $\mathrm{CreateList}$ for creating an empty list for placing the particles into it;
- $*.Add$ function is a shortcut for inserting one item at the end of a list.

$particleList, gbest \leftarrow$
$GenerateParticles(m, n, X[j].\text{LowerBound}, X[j].\text{UpperBound}, g_{best})$

Generating the list of particles used in the PSO algorithms

```
1   begin
2     ParticleList ← CreateList(□);//create an empty list
3     for i ← 0 to m − 1 do begin
4         p ← CreateParticle(□); //creating a particle
5         for j ← 0 to n − 1 do begin
6             p.X[j] ← Rnd(X[j].LowerBound, X[j].UpperBound);
7             p.V[j] ← Rnd(−0.1,0.1);
8         end;
9         p.X_best ← p.X;
10        p.F_best ← F(p.X);
11        ParticleList.Add(p); //add current particle to the list of particles
12        if  F(p.X) < g_best.F then do begin //current particle is the best
13            g_best.X ← p.X;
14            g_best.F ← F(p.X);
15        end;
16    end;
17    result ← ParticleList, g_best;
18  end;
```

Fig. 1: Generate Particles Algorithm - Pseudocode

Inertia Weight Method

The Inertia Weight Method has been published by the authors Shi and Eberhart in several papers. (Shi & Eberhart, 1999), (Eberhart & Shi, 2000), (Eberhart & Shi, 2001)

The following equation describes the velocity of the particle where a new velocity for each particle (potential solution) is calculated. This velocity is based on its previous velocity, the particle's location at which the best objective function value so far has been achieved, and the population global (or local neighbourhood, in the neighbourhood version of the algorithm) location at which the best objective function value so far has been achieved.

$$p.V[j] \leftarrow w \cdot p.V[j] + c_1 \cdot rand(\quad) \cdot (p.X_{best}[j] - p.X[j]) + c_2 \cdot rand(\quad) \cdot (g_{best}.X[j] - p.X[j]) \tag{6}$$

- $p.V[j]$ denotes the velocity of the particle of the j-th decision variable;
- w denotes the weight – parameter reducing the velocity of the particle;
- c_1 denotes cognitive weight;
- c_2 denotes social weight;
- $rand(\quad)$ denotes the function returning a single uniformly distributed random number in interval $[0, 1)$;
- $p.X_{best}[j]$ denotes the positon of the j-th decision variable of the best found particle during its existence;
- $p.X[j]$ denotes the position of the particle – point coordinate of the j-th decision variable;
- $g_{best}.X[j]$ denotes the position of the best global particle from the list of particles– point coordinate of the j-th decision variable.

The following equation updates each particle's position in the solution hyperspace. Two random numbers are independently generated. The use of the inertia weight w, which typically decreases linearly from about 0.9 to 0.4 during a run, has provided improved performance in a number of applications. (Eberhart & Shi, 2000)

$$p.X[j] \leftarrow p.V[j] + p.X[j] \tag{7}$$

The Inertia Weight algorithm contains the other parameters:

- t_{max} denotes the maximum number of iterations;
- v_{max} denotes the maximum velocity of the particle;
- ReduceWeight denotes the parameter of reducing the weight – Boolean;
- $w_{default}$ denotes the default value of the weight;
- w_{reduce} denotes the constant reducing the weight;
- t denotes the number of current iteration;
- $ParticleList$ denotes the list of particles;
- p denotes the current particle;

Fig. 2 Fig. **2** demonstrates the principle of the Inertia Weight method. The algorithm parameters not described in the previous text have the same meaning as in the previous – see Fig. **1**.

$gbest \leftarrow$ InertiaWeight(m,n,X,t_{max},ReduceWeight, $w_{default}, c_1, c_2$)

Inertia Weight pseudocode

```
1   begin
2     g_best ← CreateParticle(□);
3     g_best.F ← Double.MaxValue();
4     for j ← 0 to n − 1 do begin
5       v_min[j] ← −1 * X[j].UpperBound;
6       v_max[j] ← X[j].UpperBound;
7     end;
8     w ← w_default;
9     ParticleList, g_best ←
      GenerateParticles(m, n, X[j].LowerBound, X[j].UpperBound, g_best);
10    t ← 0;
11    while t < t_max do begin
12      if ReduceWeight then do begin
13        w ← w_default − ((w_default − w_default * w_reduce) / t_max) * t;
14        if w < 0 then
15          w ← 0.01;
16      end;
17      for i ← 0 to m − 1 do begin
18        p ← ParticleList[i];
19        for j ← 0 to n − 1 do begin
20          p.V[j] ← w · p.V[j] + c1 · rand(□) · (p.X_best[j] − p.X[j]) + c2 ·
            rand(□) · (g_best.X[j] − p.X[j]);
21          if p.V[j] > v_max[j] then
22            p.V[j] ← v_max[j];
23          else
24            if p.V[j] < v_min[j] then
25              p.V[j] ← v_min[j];
26          p.X[j] ← p.V[j] + p.X[j];
27          if p.X[j] > X[j].UpperBound then
28            p.X[j] ← X[j].UpperBound;
29          else
30            if p.X[j] < X[j].LowerBound then
31              p.X[j] ← X[j].LowerBound;
32        end;
33        if F(p.X) < p.F_best then begin
```

```
34                  p.X_best ← p.X;
35                  p.F_best ← F(p.X);
36              end;
37              if F(p.X) < g_best.F then begin
38                  g_best.X ← p.X;
39                  g_best.F ← F(p.X);
40              end;
41          end;
42          t = t + 1;
43      end;
44      result ← g_best;
45  end;
```

Fig. 2: Inertia Weight Algorithm - Pseudocode

Constriction Factor (Clerc's constriction method)

Work done by Clerc (Clerc, 1999) indicates that use of a constriction factor may be necessary to insure convergence of the particle swarm algorithm. A detailed discussion of the constriction factor is beyond the scope of this paper, but a simplified method of incorporating it appears in the following equation:

$$p.V[j] \leftarrow K \cdot (p.V[j] + c_1 \cdot rand(\quad) \cdot (p.X_{best}[j] - p.X[j]) + c_2 \cdot rand(\quad) \cdot (g_{best}.X[j] - p.X[j])) \tag{8}$$

Where:

- K denotes the constant used for calculating the velocity that is affected by the cognitive and social weights. This parameter is reflected by other parameters:

$$K \leftarrow \frac{2}{\left|2-\varphi-\sqrt{\varphi^2-4\varphi}\right|}, \text{ where } \varphi \leftarrow c_1 + c_2; \tag{9}$$

- φ denotes the parameter used for calculating the constant multiplier K. (Eberhart & Shi, 2000)

Typically, when Clerc's constriction method is used, φ is set to 4.1 and the constant multiplier K is thus 0.729.

In initial experiments and applications, v_{max} was set to 100,000, since it was believed that v_{max} was not necessary when using Clerc's constriction approach. However, from subsequent experiments and applications (Eberhart & Shi, 2000) it was concluded that a better approach to use as a 'rule of thumb' is to limit v_{max} to $X[j].\text{UpperBound}$, the dynamic range of each variable on each dimension, while selecting w, c_1, c_2 according to previous equations. (Eberhart & Shi, 2001)

Fig. **3** demonstrates the principle of the Constriction Factor method. The algorithm parameters not described in the previous text have the same meaning as in the previous algorithms.

$gbest \leftarrow$ ConstrictionFactor(m,n,X,t_{max},ReduceWeight,$w_{default}$,c_1,c_2)

Constriction Factor algorithm - pseudocode

```
1   begin
2     g_best ← CreateParticle(□);
3     g_best.F ← Double.MaxValue();
4     for j ← 0 to n − 1 do begin
5       v_min[j] ← −1 ∗ X[j].UpperBound;
6       v_max[j] ← X[j].UpperBound;
7     end;
8     w ← w_default;
9     ParticleList, g_best ←
      GenerateParticles(m, n, X[j].LowerBound, X[j].UpperBound, g_best);
10    t ← 0;
11    φ ← c_1 + c_2;
12    K ← 2 / |2−φ−√(φ²−4φ)|;
13    while t < t_max do begin
14      if ReduceWeight then do begin
15        w ← w_default − ((w_default − w_default * w_reduce) / t_max) ∗ t;
16        if w < 0 then
17          w ← 0.01;
18      end;
19      for i ← 0 to m − 1 do
20        p ← ParticleList[i];
21        for j ← 0 to n − 1 do begin
22          p.V[j] ← K · (w ∗ p.V[j] + c_1 · rand(□) · (p.X_best[j] − p.X[j]) +
            c_2 · rand(□) · (g_best.X[j] − p.X[j]));
23          if p.V[j] > v_max [j] then
24            p.V[j] ← v_max [j] ;
25          else
26            if p.V[j] < −v_max [j] then
27              p.V[j] ← −v_max [j];
28          p.X[j] ← p.V[j] + p.X[j];
29          if p.X[j] > X[j].UpperBound then
30            p.X[j] ← X[j].UpperBound;
31          else do
32            if p.X[j] < X[j].LowerBound then
33              p.X[j] ← X[j].LowerBound;
34        end;
```

```
35            if F(p.X) < p.F_best then begin
36                p.X_best ← p.X;
37                p.F_best ← F(p.X);
38            end;
39            if F(p.X) < g_best.F then begin
40                g_best.X ← p.X;
41                g_best.F ← F(p.X);
42            end;
43        end;
44        t = t + 1;
45    end;
46    result ← g_best;
47  end;
```

Fig. 3: Constriction Factors Algorithm – Pseudocode

Interpersonal Learning PSO (ILPSO)

In the regular PSO, each particle in the swarm has two ways to learn information. Firstly, it learns from itself via its personal best position $p.X_{best}$, which can be considered as information exchanging in an internal environment. Secondly, it learns from the external environment by only using the best previous position $g_{best}.X$ in the entire swarm. However, it is obvious that some potential useful information is ignored because all the particles in the swarm learn from the same exemplar ($g_{best}.X$), which has been discussed in (Liang, et al., 2006). The interaction in regular PSO is "one-way", which means each particle in the swarm just assimilates the best information passively, and its personal best position $p.X_{best}$ will never propagate to other particles if the $p.X_{best}$is not the $g_{best}.X$.

Fig. **4** demonstrates the principle of mixing the indexes of particles to create the pairs used in the Interpersonal Learning PSO algorithm. This algorithm contains other parameters:

- $rndNumber$ denotes a random number – index of the particle, $rndNumber \in \mathbb{N}_0$;
- $rndIndex$ denotes the local variable representing the index of selected particle;
- $rndIndexesList$ denotes the list containing the randomly sorted indexes of particles.

The algorithm parameters not described in the previous text have the same meaning as in the previous algorithms.

$rndIndexesList \leftarrow MixIndexes(m)$

Function mixing the indexes of the particles in the list.

```
1   begin
2     rndIndexesList ← CreateList(⬚);
3     for k ← 0 to m − 1 do
4         rndIndexesList.Add(k);
5     l ← m;
6     while l > 1 do begin
7         l ← l − 1;
8         rndNumber ← Rnd(0, l + 1);
9         rndIndex ← rndIndexesList[rndNumber];
10        rndIndexesList[rndNumber] ← rndIndexesList[l];
11        rndIndexesList[l] ← rndIndex;
12    end;
13    result ← rndIndexesList;
14  end;
```

Fig. 4: Algorithm of Mixing the Particles Indexes – Pseudocode

ILPSO is a different technique from the basic PSO. The ILPSO algorithm randomly assigns two particles into a pair without repetition for all particles. The particles in the pair affect each other during the specified number of iterations – θ - line 23 in the ILPSO algorithm – see Fig. **5**. The learning centre is constituted through synthesizing their best personal positions – lines 38 and 39. Finally, both particles follow the learning centre to update their velocities and positions – line 52 in the ILPSO algorithm. (Ma, et al., 2015)

Fig. **5** demonstrates the principle of the Interpersonal Learning PSO algorithm. This algorithm contains the other parameters:

- θ denotes the reassigning gap – the number of iterations to reassign the pairs – the interpersonal learning process;
- w_1, w_2 denotes the weight of the first particle in the pair; weight of the second particle in the pair - ratio of particles distances to the learning centre;
- $rndIndexesList$ denotes the list containing the randomly sorted indexes of particles;
- $pairList$ denotes the list of the indexes of each particle in the pair;
- $pair[k]$ denotes the k-th particle in the pair $k \in \{0,1\}$;
- ρ_1 denotes the difference between the objective function values of the first particle in the pair and the objective function value of the best particle found by the whole swarm $g_{best}.F$

$gbest \leftarrow \text{ILPSO}(m,n,X,t_{max},\text{ReduceWeight},w_{default},\theta,c_1,c_2)$

Interpersonal Learning PSO algorithm -.pseudocode

```
1   begin
2     g_best ← CreateParticle(□);
3     g_best.F ← Double.MaxValue();
4     for j ← 0 to n − 1 do begin
5       v_min[j] ← −1 * X[j].UpperBound;
6       v_max[j] ← X[j].UpperBound;
7     end;
8     w ← w_default;
9     particleList, g_best ←
      GenerateParticles(m, n, X[j].LowerBound, X[j].UpperBound, g_best);
10    t ← 0;
11    rndIndexesList ← MixIndexes(M);
12    g ← 0;
13    while g < m do begin
14      pairList.Add( particleList[rndIndexesList[g]],
                      particleList[rndIndexesList[g + 1]] );
        //creating the pairs
15      g ← g + 2;
16    end;
17    while t < t_max do begin
18      if ReduceWeight then do begin
19        w ← w_default − ((w_default − w_default * w_reduce) / t_max) * t;
20        if w < 0 then do
21          w ← 0.01;
22      end;
23      if RunCount >= θ then begin
        //randomly pick up two particles to make pairs without repetition
24        rndIndexesList ← MixIndexes(m);
25        l ← 0;
26        pairList.Clear();
27        while l < m do begin
28          pairList.Add(rndIndexesList[l], rndIndexesList[l + 1]);
29          l ← l + 2;
30        end;
31        RunCount ← 0;
32      end
33      else
```

```
34          RunCount ← RunCount + 1;
35      end;
36      for i ← 0 to pairList.Length − 1 do begin
37          pair ← pairList[i];
38          ρ1 ← particleList[pair[0]].Fbest − g_best.F;
39          ρ2 ← particleList[pair[1]].Fbest − g_best.F;
40          if ρ1 + ρ2 = 0 then do begin
41              w1 ← 0.00001;
42              w2 ← 0.00001;
43          end
44          else begin
45              w1 ← ρ2/(ρ1+ρ2);
46              w2 ← ρ1/(ρ1+ρ2);
47          end;
48          end;
49          for k ← 0 to 1 do begin
50              p ← particleList[pair[k]];
51              for j ← 0 to n − 1 do begin
52                  p.V[j] = w · p.V[j] + c1 · rand(□)
                                · ((w1 · particleList[pair[0]].X_best[j] + w2
                                · particleList[pair[1]].X_best[j]) − p.X[j])
                                + c2 · rand(□) · (g_best.X[j] − p.X[j]));
53                  if p.V[j] > v_max [j]then
54                      p.V[j] ← v_max [j];
55                  else
56                      if p.V[j] < −v_max [j] then
57                          p.V[j] ← −v_max [j];
58                  p.X[j] ← p.V[j] + p.X[j];
59                  if p.X[j] > UpperBound then
60                      p.X[j] ← UpperBound ;
61                  else
62                      if p.X[j] < X[j].LowerBound then
63                          p.X[j] ← X[j].LowerBound;
64              end;
65              if F(p.X) < p.F_best then do begin
66                  p.F_best ← F(p.X);
67                  p.X_best ← p.X;
68              end;
69              if F(p.X) < g_best.F then do begin
70                  g_best.F ← F(p.X);
```

```
71                    g_best.X ← p.X;
72                end;
73            end;
74        end;
75        t ← t + 1;
76    end;
77    result ← g_best;
78  end;
```

Fig. 5: Interpersonal Learning PSO – Pseudocode

Other Tested Optimization Methods

We tested the Particle Swarm Optimization method against other optimization methods:

- Random Search (Majer, 2003)
- Downhill Simplex (Nelder & Mead, 1964), (Tvrdik, 2004), (Weise, 2009)
- Local Search (Majer, 2003)
- Hill Climbing (Weise, 2009)
- Tabu Search (Monticelli, et al., 2008)
- Simulated Annealing (Monticelli, et al., 2008), (Weise, 2009)
- Differential Evolution (Tvrdik, 2010), (Vincent & Ponnambalam, 2013)
- Evolution Strategy (Marik, et al., 2001), (Tvrdik, 2004), (Miranda, 2008)
- Soma (Zelinka, 2004)

A detailed description of the optimization methods which were implemented in the Simulation Optimizer can be found in (Raska & Ulrych, 2015).

Tested Discrete Event Simulation Models

We specified different objective functions according to the aim of the simulation. The quality of the candidate solution represents its objective function value. This value is calculated from the responses of the simulation model after a finished simulation run. We simulated all feasible candidate solutions of the discrete event simulation model to find the best candidate solution of the search space – the optimum.

Three discrete event simulation models were built in Arena simulation software. A detailed description of these simulation model can be found in (Raska & Ulrych, 2016).

- The manufacturing system and logistics model;
- The assembly line model;
- The penalty model.

Two other discrete event simulation models - the production and control stations model and the transport model - were built in Tecnomatix Plant Simulation software.

The Production and Control Stations Model

Two other discrete event simulation models were built in Tecnomatix Plant simulation software. The Production and Control Stations Model is focused on a production workshop – see Fig. **6**.

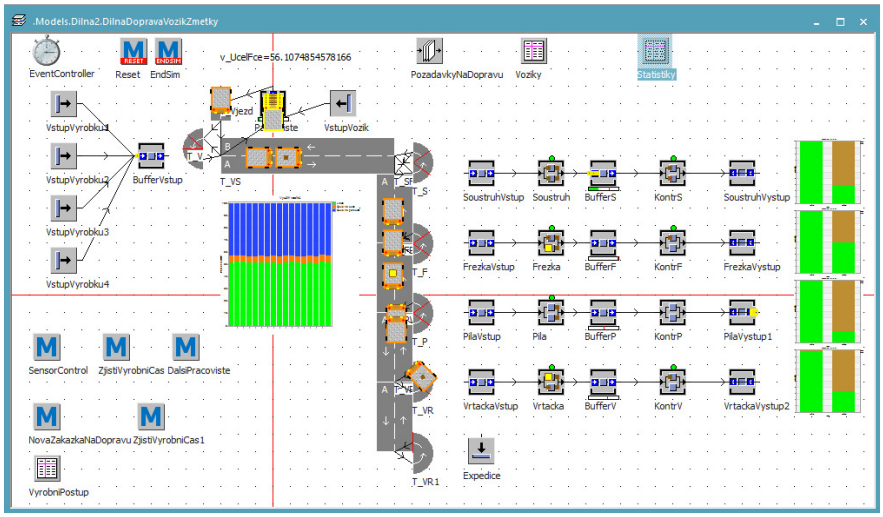


Fig. 6: Production And Control Stations Model – Tecnomatix Plant Discrete Event Simulation Model

The simulation model simulates six different workplaces. Four types of products are processed at the workshop. The time of the arrival of each product at the workshop is specified. The product passes through the workplaces respecting the technological processes. A forklift truck transports the products between workplaces.

The main goal is to determine the number of machines and controllers at individual workplaces according to the number of lift trucks, machines and controller utilization (maximizing production processes).

The objective function:

$$F(\mathbf{X}) = \frac{\text{NumberOfProcessedProducts}}{10} + \sum_{WN=1}^{4} (\text{MachineUtilization} + \text{ControllerUtilization}) \tag{10}$$

The Transport Model

The simulation model describes the transport from the warehouse to production lines by tractors. This model illustrates a situation where supply requirements are gradually collected. The tractor with trailers conveys the parts to production lines from the warehouse at regular intervals. The transports are performed according to the requirements of the production lines. Each tractor has defined places to serve and this list of places does not change during the simulation. All supply requirements arise stochastically. The aim of the simulation study is to find the correct sequence of served places at the production lines. The transport time is shorter than the processing time of the supplied parts at the production / assembly line. The places for unloading the parts are indexed and the tractor has to pass through these places in ascending order – see Fig. **7**.

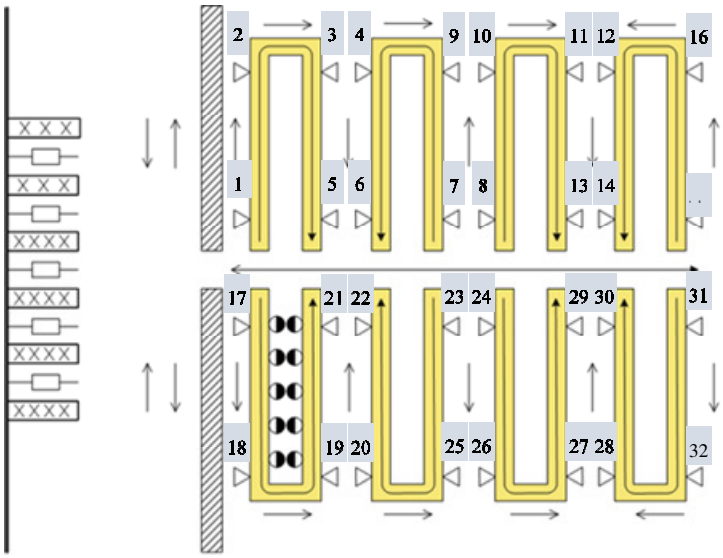


Fig. 7: Diagram of the Transportation Path

The simulation model has eight production lines. Each production line has four places for unloading. Four tractors convey the parts from the warehouse. Each tractor pulls a maximum of four trailers. A trailer can convey a maximum of six different boxes with components. Two hundred different parts are conveyed from the warehouse to the production lines. Each tractor can supply from zero to ten places for unloading. Each tractor exits the warehouse every fifteen minutes.

The objective function reflects the average utilization of tractors with trailers conveying the small and large parts, and the finished product. The objective function also reflects the overall average utilization of the production lines. The average utilization of production lines in the objective function is superior to the average utilization of all types of tractors using the coefficients. The objective function is minimized.

Definitions of the objective functions:

$$F_1(\mathbf{X}) = \sum_{i=1}^{4} DT_i \tag{11}$$

$$F_2(\mathbf{X}) = \frac{\sum_{i=1}^{32} TO_i}{100} \tag{12}$$

$$F_3(\mathbf{X}) = \left(\sum_{i=1}^{200} NT_i\right) * 10000 \tag{13}$$

$$F(\mathbf{X}) = F_1(\mathbf{X}) + F_2(\mathbf{X}) + F_3(\mathbf{X}) \tag{14}$$

Where DT_i denotes the distance travelled of the i-th tractor [m]; TO_i denotes the time over the maximum delivery time of the part at the i-th place for unloading at the production line [sec]; NT_i denotes the number of transport requests to the i-th part to a production line where the part does not have the assigned tractor for the transport [sec]; $F(\mathbf{X})$ denotes the objective function.

Optimization Experiments

We tested all possible solutions inside the defined Search space of the simulation model so we could create an external database containing the settings of the simulation model input parameters and its objective function value for each discrete event simulation model. The simulation optimizer downloads this knowledge database to local computer memory before it performs the simulation runs – increasing the speed of the simulation optimization experiment. The same termination criteria were satisfied for each optimization method. The first termination criterion is the maximum number of simulation runs that can be performed in the optimization for each model. We calculated this maximum number using the information entropy - Shannon Entropy. The number of all possible solutions in the search space is reduced using information entropy. (Borda, 2011)

The reduction coefficient:

$$\delta = \max\{0{,}1 - \beta \cdot log\tilde{X}\}, \delta \in [0{,}1] \tag{15}$$

- $\tilde{X}$ denotes the size of the search space – the number of all possible solutions in the search space;
- β denotes the coefficient of search space reduction.

The maximum number of simulation runs that it is possible to perform in each optimization experiment:

$$\tilde{X}_H = \left\lfloor 2^{\delta \cdot log_2 \tilde{X}} \right\rfloor \tag{16}$$

We could also specify the second termination criterion - the value to reach - because we could specify the global optimum of the objective function using the database of performed simulation experiments. If the optimization algorithm finds a possible solution whose objective function value is within the defined tolerated deviation from the objective function value of the global optimum, the optimization experiment is stopped.

We defined a step and lower and upper boundaries for the parameters of the PSO algorithms and other optimization methods. If the Random Search, Downhill Simplex, Hill Climbing, Tabu Search, Local Search, Simulated Annealing, Evolution Strategy, Differential Evolution or Self Organizing Migrating Algorithm have the same parameters as another optimization method, we set up both parameters with the same boundaries (same step, lower and upper boundaries).

Evaluating Criteria

The first criterion is the function whose output is the standardized scalar value $f_1 \in [0{,}1]$ of not finding the known VTR (value to reach). This value represents the failure of finding the global optimum by the optimization method in a particular series – value minimization. This criterion is expressed by pseudopascal code and shown in Fig. **8**. This criterion contains the parameters:

- X^* denotes the list of found optima in each optimization experiment in the series;
- $\mathbf{X}^*$ denotes the global optimum in the search space; ε denotes the tolerated deviation from the value of the objective function value of global optimum;
- $F(\mathbf{X})$ denotes the objective function value;
- n_{Succ} denotes the counter of successfully finding optimum;
- f_1 denotes the standardised scalar value.

```
1   begin
2     n_Succ ← 0;
3     for i ← 0 to Length(X*) − 1 do
4         if |F(X*[i]) − F(X*)| ≤ ε then
5             n_Succ ← n_Succ + 1 ;
      (*Optimum or acceptable candidate solution
      was found *)
6     result ← (Length(X*) − n_Succ) / Length(X*);
      (*standardization - % share of unsuccessful
      series*)
7   end;
```

Fig. 8: The First Criterion – Finding the Global Optimum or Suboptimum - Pseudopascal Algorithm

If the failure is 100[%] the first criterion equals 1, therefore we try to minimize this criterion. Average Method Success of Finding Optimum can be formulated as follows:

$$f_{1AVG} = \left(1 - \frac{\sum_{i=1}^{s} f_{1_i}}{s}\right) \cdot 100[\%] \tag{17}$$

- i denotes the index of one series;
- f_{1_i} denotes the value of the first criterion (Optimization method success – the best value is zero);
- s denotes the number of performed series.

The following chart – see Fig. **9** - shows the average optimization method success of finding the optimum (suboptimum if its objective function value is in the tolerated deviation from the objective function value of the global optimum).

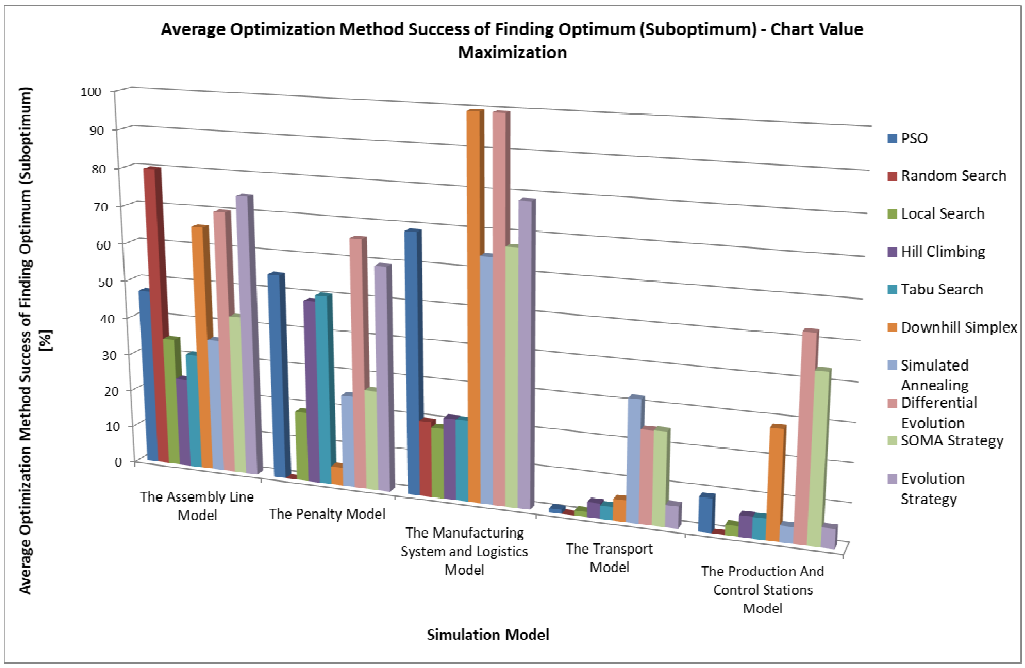


Fig. 9: Average Optimization Method Success of Finding Optimum (Suboptimum) of All Tested Optimization Methods

The following table shows the specifications of the tested discrete event simulation models. This table also contains the maximum number of performed optimization experiments using the Information entropy – reducing the search space.

Table 1: Specifications of the Discrete Event Simulation Models

Discrete Event Simulation Model	$F(\tilde{\mathbf{X}})$	$F(\hat{\mathbf{X}})$	n	$\hat{X}$	$\hat{X}_H$
The Assembly Line Model	7092	22032	2	238	124
The Penalty Model	100.7093	4,6426.34	2	251,001	8,747
The Manufacturing System and Logistics Model	-11.53367	22.64956	3	8,671	1,454
The Transport Model	44,502.25	4.26E+07	8	252,000,000	74,512
The Production And Control Stations Model	2.149858	57.29105	9	259,200,000	74,847

It is obvious that Random selection is not a very effective method for searching for the global optimum. The success of this method strongly depends on the number of simulation experiments. The high success of Random selection in the case of the assembly simulation model causes a small number of possible solutions in the search space of this simulation model. We can assume high average selection strategies success of finding the optimum (suboptimum) if the dimension of the search space of the discrete event simulation model is lower or the objective function surface is simple - The Manufacturing System and Logistics Model; The Assembly Line Model; The Penalty Model. If the objective function surface is hard

– multimodal, planar regions, etc. – the optimization failure rate of the PSO is high i.e. The Production and Control Stations Model.

We can see the high average optimization success of the Differential Evolution. The Downhill Simplex method is another effective method for searching for the global optimum. The PSO is not such an effective optimization method in the case of our tested discrete event simulation models. PSO performed a low number of optimization experiments. This method needs a higher number of experiments to move individual particles in the swarm to the global optimum.

The next figure – Fig. **10** – shows the success of finding the optimum of the tested PSO strategies. The chart contains the series where the best found setting is 100[%] – the global optimum in each optimization experiment was found. The specified tolerance between the best objective function value of the found solution candidate by the PSO and the objective function value of the global optimum in the optimization experiment equals $\varepsilon = 0.0001$. The Constriction Factors strategy is better than the other two tested strategies if the objective function surface is simple. The Interpersonal Learning PSO is more effective than the other tested strategies if the dimension of the search space of the discrete event simulation model is higher.

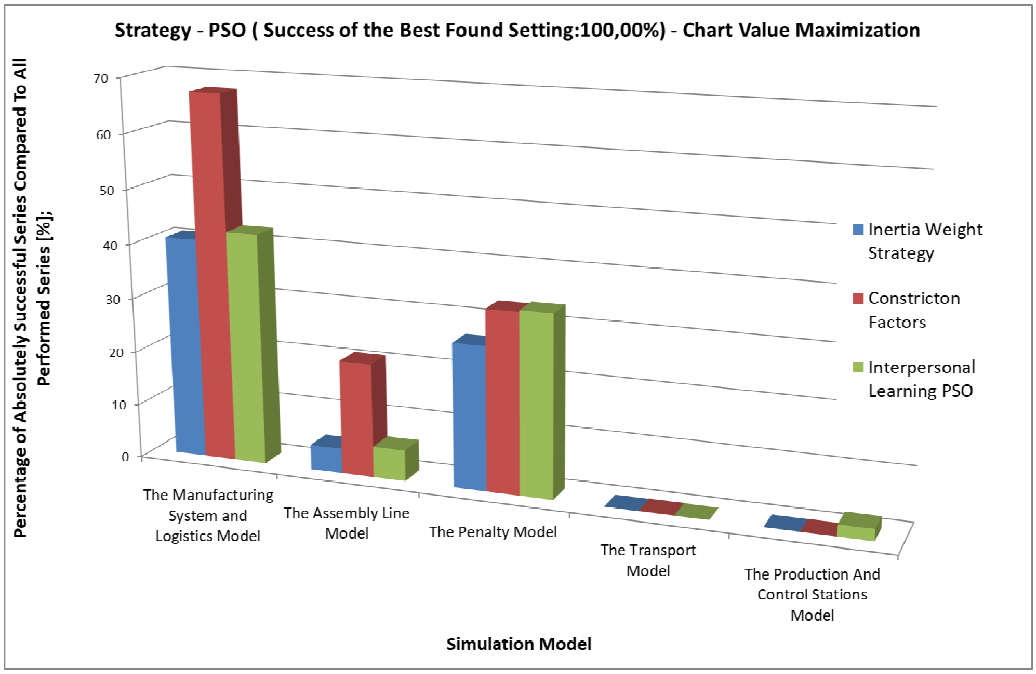


Fig. 10: Success of Finding Optimum of the Different PSO Strategies – the Series Where the Best Found Setting is 100[%]; ε = 0.0001

Conclusion

The goal of the research was to test different settings – series - of the PSO strategies on five discrete event simulation models. We evaluated the success of finding the optimum by different PSO strategies. We deduced that PSO is an effective strategy for the simulation models where the dimension of the search space is small and the objective function landscape is not multimodal. The PSO method was better than the other tested pseudo gradient methods. PSO was not more effective at searching for the global optimum than the other tested metaheuristic optimization methods.

A problem can occur if the objective function landscape is multimodal. The PSO needs a higher number of optimization experiments to converge to the global optimum than the other tested optimization methods.
We confirmed that the success of finding the optimum by the PSO strategies strongly depends on the objective function landscape. Problems occurred when searching for the optimum in the higher dimension of the search space of the discrete event simulation model - the production and control stations model and the transport model.

Acknowledgment

This paper was created with the subsidy of the project SGS-2015-065 'The development of parameters of a sustainable manufacturing system' carried out with the support of the Internal Grant Agency of University of West Bohemia.

References

Bonyadi, M. R. and Michalewicz, Z. (2017), 'Particle swarm optimization for single objective continuous space problems: a review', *Evolutionary Computation*, 25 (1), 1-54.

Borda, M. (2011) Fundamentals in Information Theory and Coding, Springer Berlin Heidelberg, Berlin.

Cai, T., Pan, F. and Chen, J. (2004), 'Adaptive particle swarm optimization algorithm' Proceedings of Fifth World Congress on Intelligent Control and Automation (WCICA 2004), ISBN: 0-7803-8273-0, 15–19 June 2004, Hangzhou, P.R. China, p. 2245–2247.

Clerc, M. (1999), 'The swarm and the queen: towards a deterministic and adaptive particle swarm optimization' Proceedings of the 1999 Congress on Evolutionary Computation (CEC99), ISBN: 0-7803-5536-9, 6-9 July 1999, Washington, USA, 1951-1957.

Eberhart, R. C. and Kennedy, J. (1995), 'A new optimizer using particle swarm theory' Proceedings of the Sixth International Symposium on Micro Machine and Human Science (MHS '95), ISBN: 0-7803-2676-8, 4-6 October 1995, Nagoya, Japan, 39-43.

Eberhart, R. C. and Shi, Y. (1998), 'Comparison between genetic algorithms and particle swarm optimization' Proceedings of the International Conference on Evolutionary Programming (EP 1998), ISBN 978-3-540-64891-8, 25-27 March 1998, San Diego, California, USA, 611-616.

Eberhart, R. and Shi, Y. (2000), 'Comparing inertia weights and constriction factors in particle swarm optimization' Proceedings of the 2000 Congress on Evolutionary Computation (CEC00), ISBN: 0-7803-6375-2, 16-19 July 2000, California, USA, 84-88.

Eberhart, R. and Shi, Y. (2001), 'Particle swarm optimization: developments, applications and resources' Proceedings of the IEEE Conference on Evolutionary Computation (ICEC), ISBN: 0-7803-6657-3, 27-30 May 2001, Seoul, South Korea, 81-86.

Kennedy, J. and Eberhart, R. C. (1995), 'Particle swarm optimization' Proceedings of International Conference on Neural Networks (ICNN'95), ISBN: 0-7803-2768-3, 27 November-1 December 1995, Perth, Australia, 1942–1948.

Liang, J. J., Qin, A. K. and Suganthan, P. N. (2006), 'Comprehensive learning particle swarm optimizer for global optimization of multimodal functions', *IEEE Transactions on Evolutionary Computation*, 10 (3), 281-295.

Majer, P. (2003), Modern Methods of Production Scheduling In Czech language: Moderní metody rozvrhování výroby, PhD. Thesis, University of Technology, Faculty of Information Technology, Brno

Ma, J., Zhang, J. and Xu, L. (2015), 'Interpersonal learning Particle Swarm Optimizer' 2015 IEEE Congress on Evolutionary Computation, ISBN: 978-1-4799-7492-4, 25-28 May 2015, Sendai, Japan, 148-155.

Marik, V., Stepankova, O. and Lazansky, J. (2001), Artificial Intelligence (3). Academia Praha, Prague.

Miranda, V. (2008), Modern heuristic optimization techniques, John Wiley & Sons, New Jersey

Monticelli, A. J., Romero, R. and Asada, E. N. (2008), Fundamentals of Simulated Annealing, Modern Heuristic Optimization Techniques, El-Hawary, M. E. (ed), IEE Press, New Jersey: John Wiley and Sons, 123-130.

Monticelli, A. J., Romero, R. and Asada, E. N. (2008), Fundamentals of Tabu Search. Modern Heuristic Optimization Techniques, El-Hawary, M. E. (ed), IEE Press, New Jersey: John Wiley and Son, 101-120.

Nelder , J. A. and Mead, R. (1964). 'A Simplex Method For Function Minimization', *The Computer Journal*, I (7), 308-313.

Parrish, J. K. and Hamner, W. M. (1997) Animal Groups in Three Dimensions: How Species Aggregate, Cambridge University Press, Cambridge.

Raska, P. and Ulrych, Z. (2015), 'Comparison of Optimization Methods Tested On Testing Functions and Discrete Event Simulation Models,' *International Journal of Simulation and Process Modelling*. [Online], [Retrieved March 31, 2015], http://www.inderscience.com/offer.php?id=71380

Raska, P. and Ulrych, Z. (2016), 'Testing the frequency of using the database records of discrete event simulation model input parameters during the simulation optimization' Proceedings of the 28th International Business Information Management Association (IBIMA), ISBN 978-0-9860419-8-3, 9-10 November 2016, Seville, Spain, 3104-3115.

Shi, Y. and Eberhart, R. C. (1999), 'Empirical study of particle swarm optimization' Proceedings of the 1999 Congress on Evolutionary Computation-CEC99, IEEE, 6-9 July 1999 Washington D.C., USA, 1945-1950.

Sun, J., Fang, W., Wu, X., Palade, V., Xu, W. (2012), 'Quantum-Behaved Particle Swarm Optimization: Analysis of Individual Particle Behavior and Parameter Selection,' *Evolutionary Computation*, 20(3), 349-393.

Tvrdik, J., (2004), 'Evolutionary algorithms - Textbooks (in Czech language Evoluční algoritmy - učební texty),' *Universitas Ostravensis.* [Online], [Retrieved February 6, 2012], http://prf.osu.cz/doktorske_studium/dokumenty/Evolutionary_Algorithms.pdf

Tvrdik, J., (2010), 'Stochastic Algorithms for Global Optimization (in Czech language Stochastické algoritmy pro globální optimalizaci),' *Universitas Ostravensis.* [Online], [Retrieved January 5, 2014], http://www1.osu.cz/~tvrdik/wp-content/uploads/STAGO_10.pdf

Venter, G. and Sobieszczanski-Sobieski, J. (2003), 'Particle swarm optimization'. *AIAA Journal*, 41(8), 1583–1589.

Vincent, L. W. and Ponnambalam, S. G. (2013), 'A Differential Evolution-Based Algorithm to Schedule Flexible Assembly Lines,'*IEEE TRANSACTIONS ON AUTOMATION SCIENCE AND ENGINEERING*, 10(4), 1161 - 1165.

Volna, E., (2012), Evolution algorithms and neural networks (in Czech language: Evoluční algoritmy a neuronové sítě),' *Universitas Ostravensis.* [Online], [Retrieved February 8, 2016], http://www1.osu.cz/~volna/Evolucni_algoritmy_a_neuronove_site.pdf

Weise, T. (2009), '*E-Book Global Optimization Algorithms - Theory and Application 2nd Edition,*' [Online], [Retrieved February 2, 2011], http://www.it-weise.de/projects/book.pdf

Zelinka, I. (2004), SOMA — Self-Organizing Migrating Algorithm, New Optimization Techniques in Engineering Studies in Fuzziness and Soft Computing,. Berlin: Springer Berlin Heidelberg, 167-217.

Zhan, Z.H., Zhang, J., Li, Y. and Chung, H. S.-H. (2009) 'Adaptive Particle Swarm Optimization,' *IEEE Transactions on Systems, Man, and Cybernetics, Part B (Cybernetics)*, 39(6), 1362-1381.

Social and Environmental Engineering done through Globalization

Victor Adrian Troacă, Bucharest University of Economic Studies, Bucharest, Romania, victoratroaca@yahoo.com

Alexandru Postolache, Bucharest University of Economic Studies, Bucharest, Romania, a.postol@gmail.com

Marcela Mitriță, Bucharest University of Economic Studies, Bucharest, Romania, mmitrita@yahoo.com

Constantin Constantinescu, Bucharest University of Economic Studies, Bucharest, Romania, constantienscu@yahoo.com

Raluca Georgescu, Bucharest University of Economic Studies, Bucharest, Romania, raluca.georgescu@infinitumgroup.com

Abstract

In the XXI-st century we still talk about the evolutionary concept of globalization. In the end, we should understand if it's a phenomenon that ignites research in technologies and evolves towards less developed areas of the world. Also, globalization could derail because of the environment, the social, economic and political spread could be seen as dangerous. These are some of the dilemmas that we have these days and we try to answer them in a clear and simple way during this paper.

Keywords: globalization, capital, growth, global commerce

Introduction

Starting from the premise of this quote, we realize that this process referred to in the last century as "globalization" has its origins from the beginning of civilization, when a man in his desire to know more had to migrate to countries that were rich or in full progress (Bran et al., 2012).

Globalization is a modern term mentioned the first time by Theodorov Levitt in his scientifically research "Globalization and Marketing" in 1980 and is used to describe changes in all companies as a result of events occurring in some part of the globe and the consequences that appeared. It is becoming more visible in societies around the globe, even in less developed countries that they need to handle these complex changes which are ceaseless, especially in countries fully in progress or already developed that seem to flourish in all areas under imminent globalization. (Bran et al., 2012)

People around the world are getting closer than ever, both physically and mentally. Goods and services appearing in a country will be promoted immediately in another one. International transfer and communication are more common and will soon become indispensable. To describe this moment, they use the term globalization. The widespread phenomenon affects economic affairs and exerts a broad influence on society. Growing developing countries is the main cause of globalization and brings them both as opportunities and disadvantages. Globalization is certainly a strong power and important change factor in terms of cultural, economic, political and social progress, inside not only in the USA, but also in the entire world. It can be considered a process by which countries get closer through increased contact, communication and trade in the idea to create a single global system, a New World Order.

Given that globalization is a complex set of processes that affect virtually all aspects of our lives everyday - art, culture, economy, politics, immigration, climate, and healthcare - studies on globalization reveal bluntly a multiplicity of perspectives in humanities, social science and the forms it takes globalization at a higher level, the forces that shape them, their historical origins and their impact on all aspects of life of individuals and communities.

Without doubting it, XVIII and XIX centuries where and still are the most dynamic periods in close connection with the development of historical facts, social contradictions and complexity of social movement, but as the dramatic consequences of processes and phenomena developed in spiritual, political and military context, and in economic and social values, which led to the spread of globalization. We can say that we are in "the century of extremes" in which mankind experienced the most spectacular evolutions, from nothing to almost everything, we managed both to "stop the clock in place" and to meet the highest level of economic and cultural development of civilizations in ages, actually situated the threshold very high today. But it is also the century in which hundreds of millions of people have been victims of wars, revolutions in various fields, and from different ideologies, whether religious, ethnic politics, etc.

Globalization is a concept often used to characterize the current state of the economy worldwide, but is understood by everyone because there is different perception of the events that happened in our lives. Some see it as a complex and complete uniformity, others, on the contrary, that of a diversification in the bad sense of proportion, based on respect for common principles that are imposed. Under this latter aspect, globalization is the almost natural consequence of the increasingly accelerated course imprinted on history, the first Industrial Revolution.

What distinguishes the contemporary phenomenon of globalization from the previous integration processes since its first appearance is: - scale (formerly being regional, current global); - the pace of change is slowly but surely beginning to grow, and now very fast for a period of 40-50 years to support a greater technological progress than before, with immediate and irreversible impact on the conditions of daily life.

With the advent of the Industrial Revolution, globalization has become more prominent, with the discovery of new territories and migratory flows. But the most interesting is the development synchronized with the technological progression by which manual work has been replaced by machines. In this process based on a mechanized worker, it is the most important actor in globalization, and globalization itself has the role of monitoring, control and power of the machine and quality control. The industrial revolution had the effect of increasing production, improving quality of life and human awareness that can hold more capital, more power, which made him sacrifice himself for a full life satisfaction (Bran et al., 2012).

It is only after the end of the Second World War that we can consider the extraordinary momentum of globalization; when the process has actually become a widespread phenomenon (or when the world has become aware of it), an alarming and extremely satisfying growth in rich countries. Now we can think of globalization as a union among nations which aims at reorganizing national borders and transposing them into a single market through which certain transfers can be made: a workforce based on "brain theft" or intellectual theft, then uniformly promotes unloading taxes for the less developed countries that cannot keep the pace. Members that are opulent are setting standard rules that impact not just the poor countries, but also the developed ones too. Lack of capital for environmental protection results in environmental decay, declining population, and high mortality for all beings (Bran et al., 2012).

The chaos we face today stems from the fact that from the development stage of the most important global economic plans, the economic and technological origins ignited mainly from the

United States, and represent that potential differences between all countries to create a so-called race in the pursuit of profit and power (Bran et al., 2012).

Immediately after this expansion of the phenomenon, the cruel reality shows us two clear asymmetric hypotheses: developed countries assimilate the most important benefits (economic efficiency, infrastructure, civilization, somewhat at higher ground), while poorly developed countries seem to regress from all points of view and remain indebted towards developed countries. On the one hand, there is a universally beneficial culture for everyone, and on the other the barricade created by the fact that culture of societies disappears and becomes a show that brings profit, but does not support evolution. Here we can conclude that this concept of globalization is only a façade after hiding the following reason: who owns capital has the profit, who do not hold debt with recovery in sight (Bran et al., 2012).

Objectives declared of globalization are concretized into one: building one governance system for the entire world and a world society with universal rules and thought in unison is utopic, but not impossible. But there is only one question. Who benefits from this transformation going from all national governments into a single world government? Rich countries can afford to go through transitions of this type, but poor countries should be indebted to move through transitions? This paradigm about the global society today that we discuss in this paper has further arguments and grounds based also on common sense.

The Club of Rome – Social Engineering from a Global Perspective

The purpose of this organization is to behave like a global stimulus, regardless of interests and political tendencies, ideological perspectives or existing business. The Club of Rome is composed of influential personalities with a special education in diverse and vast areas and that the main objective is to develop right thinking and healthy progress in regard of globalization and the struggle against globalization by this means should emphasized. This organization includes scientists, that could validate proclaims about the future, senior officials in the international environment business, presidents or former presidents of different states, people from business environments, etc. The Club is contributing to solving alarming global problems, like social, economic, policies, technological, environmental, psychological and even cultural ones; one of the most controversial enigmas that the world has to face, because change must be made at this level, but is also the most difficult to change the most difficult level.

Scientist Bertrand Schneider, Secretary General of the famous Club of Rome, says that the "global horizon" is actually an inclination transposing gradually in the world economy, in politics, in social life and in other areas on which the trend changed enormously its current route towards an information society biased on development.

In the idea that the computerization of this consuming society deepens itself with every aspect that we dissect closer, there are big questions about the way and the efficiency of the current governance at the level of each member state of this "masquerade" and last but not least about the capacity of the final decision makers. We could argue that globalization involves more than interdependency between nation states that nobody knows for sure if they really where biased towards freedom of movement in the direction of the economy, but is in reality an undermined economy, without small degrees of freedom

The following are also very relevant. First of them is the idea of geographically deployment, this phenomenon is not an all-encompassing phenomenon, because there are a lot of very poor and few developing countries who cannot participate in the "welfare" of the world because they cannot even help either. All parts of human existence are included in one, and man unfortunately take all steps that to expand rapidly without regard to long-term consequences.

In conclusion, summarizing all the above, globalization:

1. Is in general the product of dependent developed countries without national borders;
2. Highlights borderless information that speeds up the process of globalization;
3. Comprises the entire economy;
4. Represents universal culture;
5. It represents all kinds of human relationships.

Attitudes and Approaches Regarding Globalization

Globalization is a phenomenon as complex, heterogeneous, that has levels of development and different approaches in all respects, with chaotic changes and unfortunately irreversible processes, which obviously deepens with each event in part, through we cannot define it concretely. Actually, we cannot include a wealth of features in a single definition of just a few lines.

Approaches and attitudes about this process are indeed different and are sometimes located at opposite poles. Although if you look between the lines can be upheld, well-founded arguments that globalization is the antithesis even with itself are encountered, mainly because to the extent that it helps the already prosperous countries to hold the monopoly on global development, equally destabilizing alarmingly underdeveloped areas/economies and moving them to a continuous decline (Bodislav, 2015).

Joachim Wilmeyer states that participation in the creation performance, in fact, is itself entitled to performance, should offer equal opportunities for all, fair financing, equity among human generations in the country, especially to meet basic needs; only after they accept, we can conclude positively that only through globalization we have perfect environmental support in all respects. An interesting thing to note is that if hypothetically globalization would have been used and complied by all countries as a whole, then basic needs would be completed for all citizens of planet Earth.

From the other side of the observing position, UNESCO says that the way globalization pours exclusively negative effects on our social perspectives, relationships are not directly proportional to changes that evolve in market turbulence, but these are the effects of the flawed and even disastrous way in which governments of some countries make themselves felt present in the global mechanism. As shown above, the evolution of this phenomenon highlights that there are several actors from different fields (economy, culture, society, etc.) that attempt to balance the balance in favor of profit, also by disregarding the real interests of individuals (Bran et al, 2012).

In 1966 to better understand globalization, Marshal McLuhan introduced a thinking exercise that very efficiently summarizes planet Earth's human inhabitants: if the global population would be reduced to a single village with only 100 inhabitants and which would be called the global village, it would look something like 70% are illiterate persons, 15% would be have an average intellect and literacy level and other 15% would be developed intellectually and from literate perspective. It is easily to understand on whose side the power is and who dominates the entire "community" (Bran et al., 2014). There are two interesting observations, today 80% of the global population has poor conditions of life and welfare at optimal standards is found for 6% of the global population (Bran et al., 2012).

As we observe these favorable or less favorable attitudes towards the term globalization drive us towards the idea that single entity would be rather trimmed or could make a difference in this case if it represents the state. The state must assimilate the conditions "imposed" or offered under conditions of globalization

and filter them according to its traditions and specific (economic, cultural, social, etc.) and even according to long range interest.

Conclusions

For countries with poor economies the state loses much of its power because it has to concentrate towards development, but the social side brings it down; so, we could state that development is lagging in such countries, and they just have to be addicted to those that thrive. (Bran et al, 2012).

In response to these negative effects felt by most nations there is a set up mechanism and ignites an anti-globalization movement. A first approach on globalization is the internationalization of globalization. From this perspective, the term known as "global" is another term to describe relations between states, and "globalization" means an increase in interdependencies and international exchanges. In this sense, Paul Hirst and Grahame Thompson gave globalization the spin of being flowed mechanism for trade and capital investment among the world (Bran et al, 2012). Obviously, such a type of "globalization" can be identified in large flows between different countries and in terms of population, messages and ideas. Thus, globalization refers to the increasing interaction and interdependence between people from different countries. The second approach identifies globalization with modernization theory or westernization in the form of its role in the spec of being "Americanized". Following this idea, globalization is dynamic, evolving, so to speak having a faster rate than humanity's evolutionary trend. (Bran et al, 2012).

A third approach identifies globalization with universalization. When Reiser and Davies invented the word Globalization in 1940, had in mind "universalization" and heralded a fusion of all the cultures of the world and putting them in one conceptualized and universal culture. In this sense, global means all over the world, and globalization is the spread of different ideas, discoveries in science, but above all it represents universal culture among peoples from all over the world. In short, means "splintering" the nations, mixing and loss of national crops. (Bran, 2012).

The final approach to globalization is that it identifies the process similar with "deterritorialization". Starting from this premise we can say that one of the most well established goals involving a "geographical reconfiguration" is because territorial boundaries are no longer defined at a social space representative of a country, but there is a global space, uniform, featureless single, without taking into account the individual needs of individual recognition.

Globalization is about increasing links between states and societies that are currently taking part in the global system. It describes the process by which events, decisions and activities are carried in a part of the world that has significant consequences for individuals and communities located far from each other (Bran et al., 2012).

One last thing to say in this context, how this phenomenon draws both pro and contra opinions, but the only way we can evaluate the true face of globalization is the discussion of the areas in which it emerges and to draw conclusions in the most objective manner, especially when research is fragmented and offers a small piece of the puzzle.

References

Bodislav, D. A. (2015) 'The impact of privatization on regulated energy markets: a Great Britain's case study in industrial ecology', *Progress in Industrial Ecology,* vol. 9 (1), pp. 13-18.

Bran, F., Bodislav, D. A., Rădulescu, C. V., Ioan, I. (2014) 'Corporate governance intervention for a sustainable model', *Revista de Cercetare și Intervenție Socială,* no. 46, pp. 216-226.

Bran, F., Ioan, I. (2009) Globalizarea și Mediul, Universitara Publishing House, Bucharest, Romania.

Bran, F., Manea, G., Ioan, I., Rădulescu, C. V. (2012) Globalizarea. Manfestări și reacții, Economica Publishing, Bucharest, Romania.

A Global Perspective on Human Development and Climate Change

Marcela Mitriță, Bucharest University of Economic Studies, Bucharest, Romania, mmitrita@yahoo.com

Raluca Georgescu, Bucharest University of Economic Studies, Bucharest, Romania, raluca.georgescu@infinitumgroup.com

Alexandru Postolache, Bucharest University of Economic Studies, Bucharest, Romania, a.postol@gmail.com

Constantin Constantinescu, Bucharest University of Economic Studies, Bucharest, Romania, constantienscu@yahoo.com

Victor Adrian Troacă, Bucharest University of Economic Studies, Bucharest, Romania, victoratroaca@yahoo.com

Abstract

Globalization is a word that is synonym with commerce growth worldwide, which is in favor of increasing scaled production, consumption of goods and services in unseen quantities, beating all standards of the last century. This shaped human kind's activity and decreased the volume of hard labor. Although it is difficult to evaluate the impact of globalization on the environment, this paper tries to show some shades and nuances on the how the phenomenon influences today's life.

Keywords: globalization, deforestation, natural resources, greenhouse effect, CO2 emissions.

Introduction

Globalization is the process through which all people and communities experience economic, social, cultural evolution more frequent by having different experiences that are unified. By definition, the globalization process affects everyone in the whole world, regardless of their development level or on what side of the economic scale they are (Bran, Ioan, 2009).

Questions tied to globalization and its evolutionary environment have gained momentum due to tremendously growth observed in some parts of the world and in other parts regress constantly being registered, but globalization has meant also a change at the very important concept of how we each think of the environment. Many of us see today's environmental issues that are of international interest, not only of national interest, such as protection of rivers that are tributaries of the great Industrial Revolution and also end of the planetary ocean and not least the atmosphere that suffers because of pollution in each state, especially in those that are highly industrial and educating people on environmental protection is considered heritage and issues need to be financed to have their negative externalities reduced. This subject is a global threat because of the cross-border impact and because of the impossibility that only one or a few nations especially rich can solve this great dilemma through a proprietary manner (Bran, Ioan, 2009).

Climate change is one of the main environmental issues, perhaps the worst, because it is impossible to predict exactly how it will develop and what the consequences will be, especially if they are negative. Its causes, however, are known. Climate change comes largely from the greenhouse effect - ie excessive retention of solar energy in the atmosphere due to the accumulation of certain gases, especially CO2. The main sources of CO2 emissions are industrial production, transport and, more indirectly,

deforestation. These three human activities are independent of globalization as a process, but they evolved and accelerated during the 20th century, especially in recent decades.

Globalization – The Promoter of Mass Deforestation

Deforestation is an indirect cause, but perhaps the most serious and significant greenhouse effect, to which we add landslides and many other hazards seen on Earth today. A deforested area reduces the amount of CO2 the plants turn it into oxygen, this translates into an equivalent increase in the volume of CO2 in the atmosphere and thus add to the greenhouse effect. In total, the estimated emissions from deforestation is about 20% released in the atmosphere which has high levels of output. Between 1990 and 2005, the world lost 3% of its forests. Current, about 200 km2 of forest land - twice the size of Paris - disappears every day.

Following the path of environmental issues developed, there are many international non-governmental public and private organizations that are seeking solutions to environmental problems, such as the United Nations Environment Program, Greenpeace and World Watch Institute. A multitude of treaties have been concluded to harmonize government policy on environmental protection. Some environmentalists even proposed creating a "world environmental organization" to coordinate international policies.

In recent years, economic globalization has brought rapid and deep changes in countries around the world, more or less being sustainable through the filters of economic, social and environmental replenishment of resources. In general, there was a trend of decentralizing the government and reducing the role it plays in the daily life of its citizens. In countries that are in development, this change has major implications on forests and on the quality of life on the long run.

Whether it is due to a market economy (based on the consumer and consumption) or required by an economy that is centralized, the management or control of forest lands in usually as task of the public sector through its forest services. In order to stop illicit mass deforestation, public entities decided to privatize forests, by selling or renting them to private firms, NGOs, and so on, but this decision it seems to have been in vain if we look around at the thousands of hectares of forest species that disappear monthly (Bran, Ioan, 2009).

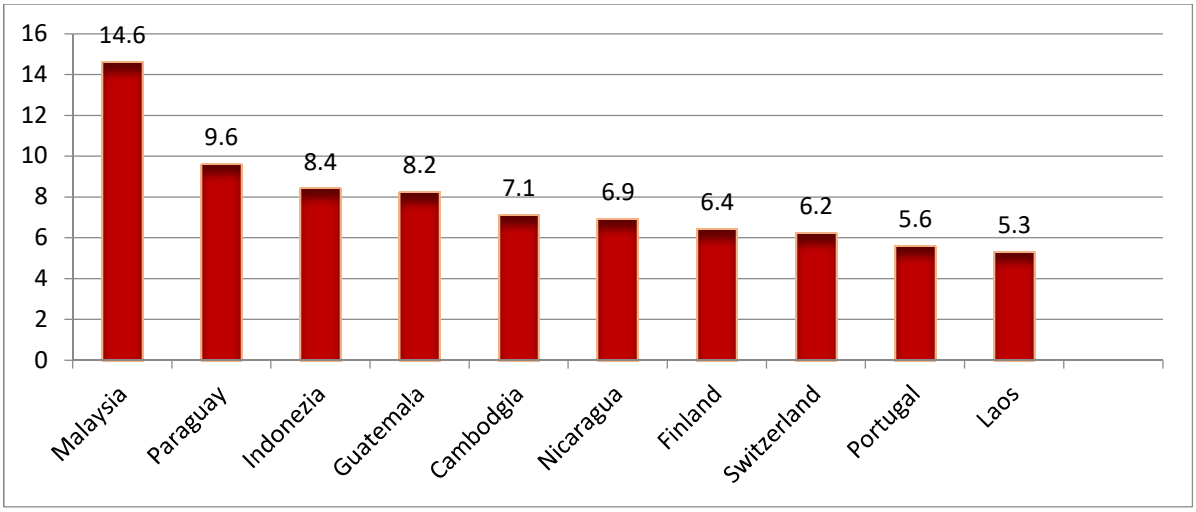


Fig. 1: Top countries with the largest illegal deforestation (% of the country's wooded area)

In this figure, we have the countries with the highest percentage of illegal deforestation in the world, in descending order.

The total loss of forest in Malaysia amounted to 14,4% of the country's forest area from 2000 to 2014. The loss square translates into 47.278 km (18.244 square mille), an area larger than Denmark.

As a critical promoter of globalization, the transport systems have multiplied emissions from road transport (mainly cars and trucks) which are, of course, very large, even more so within the national borders, but especially seen in the economically developing countries in particular. As you know, opening regional areas such as the total elimination of border controls between European countries part of the EU boosted extremely powerful road freight. Despite some recent alternatives to road transport, like lorries transported by train for part of the trip, transnational road transport is still a major source of CO2 emissions.

Globalization = Greenhouse Effect

The greenhouse effect increases the Earth's temperature by capturing the heat in the atmosphere. This keeps the Earth's temperature at a higher level than if the direct heat of the sun was the only source of light. When it reaches the Earth's surface, some of it is absorbed, ie that heats the soil, and then the rest bounces back into space in the form of heat. The greenhouse gases that are in the atmosphere absorb and then redirect some of this heat back to Earth.

The greenhouse effect is a major factor in support for our planet's warmth. In fact, without the greenhouse effect, the average global Earth's temperature would be much lower and life on Earth as we know it would not be possible.

The difference between the actual average temperate on Earth 14°C (57.2°F) and the effective expected solar radiation is -19°C (-2.2°F), and the average temperature that provides power and actual emissions is 33°C.

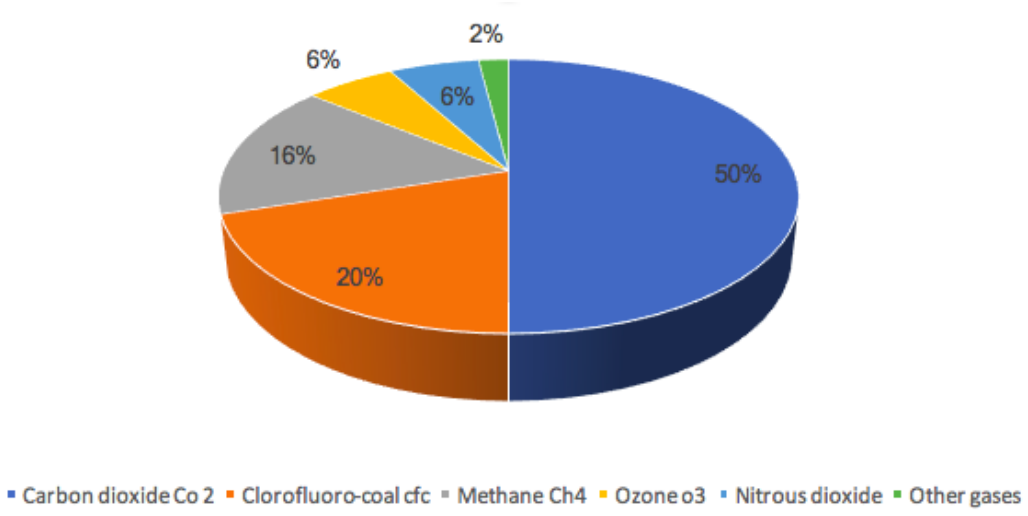


Fig. 2: Types of gas and their contribution in percentage points in 2016 air pollution

Globalization "Indirectly" Promotes CO2 Emissions Related To Industrial Activity

While the Industrial Revolution was a vector for accelerating globalization, buy empowering cross-border trade and transnational investments in turn, and stimulated industrial activity. This is often a major source of GHG (greenhouse gass) emissions, as in the case of electricity, which still largely involves burning coal, oil and its derivatives. Enhanced globalization has then accentuated the greenhouse effect and global warming. Global warming is one of the undesirable effects of globalization which apparently will become a major problem for humanity because it was deliberately not counted for.

For decades, developed countries - the world's pioneers of industrialization - have been the world's largest polluters, responsible for most of GHG emissions. Today, the United States is responsible for about 20% of global emissions and through the Trump administration it stopped being part of the Paris Climate Agreement.

According to statements of IEA - International Energy Agency, in 2016 the carbon dioxide emissions were at its maximum, and the fact is that it's in line with the development of countries across the globe. The prospects for 2017 show that in the first semester, China and the US have fallen as producers of GHG emissions, and in Europe stagnated. According to the agency, the largest decrease was in the US (-3%), ie 160 million tonnes of carbon dioxide (CO2) less than in the previous years, while the economy grew by 1.6%.

Across the EU, carbon dioxide emissions have stagnated in 2016 and in the first half of 2017. This happened in the conditions in which experts say demand for gas increased by 8% and the need for coal fell by 10% percent. Renewable energy has played a significant role, but one quite small. Researchers say the decline was driven by a sharp increase in shale gas supplies and renewable energy sources that replaced coal.

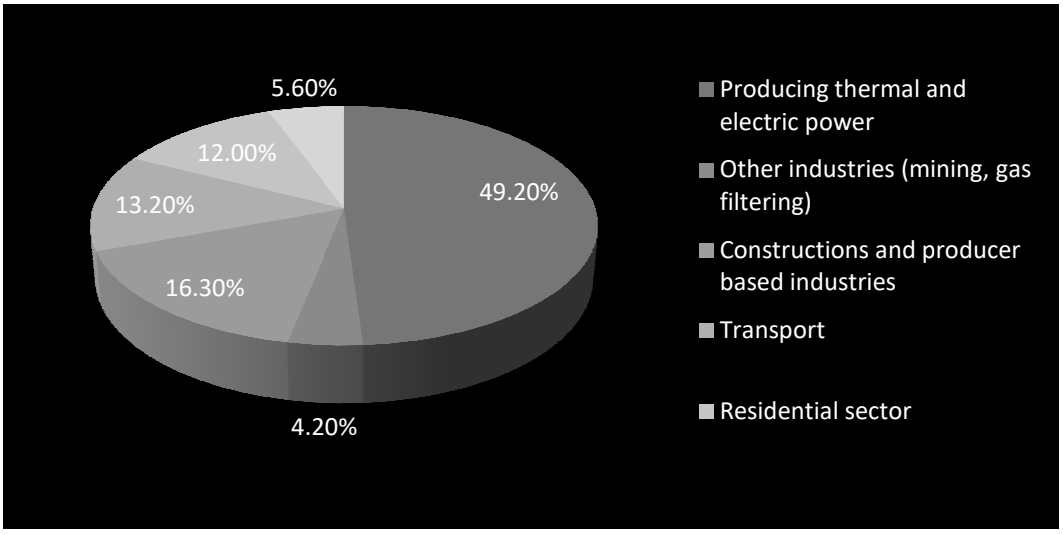


Fig. 3: Share of CO2 emissions by sector in EU

In China, carbon dioxide emissions fell by 1% in 2016 and the pace is kept also for 2017. In the same time the demand for coal decreased, although the economy grew by 6.7%. Experts say the contribution of renewable energy, nuclear energy and natural gas has contributed to this general decrease in emissions.

Globalization and the Behavior of Multinational Companies towards the Environment

There are four categories of multinational corporations:

1. Multinational corporation, decentralized with a strong headquarter;

2. Global corporation that is based on acquiring a cost advantage through centralized production or whenever available and cheaper;

3. International company that has an optimal fiscal headquarter and invests a lot in corporate R & D;

4. Transnational enterprise that combines the three previous approaches and merges into the modern corporation.

Industrial corporations are abundant in terms of technology innovation and capital investment targeted for increasing their production. In the context of globalization, privatization and market liberalization, they are considered to be one of the most important factors in shaping the future of the world. However, these factors have brought not only economic growth, but also a negative effect on the environment.

In an attempt to reduce costs, many multinational corporations have expanded their export activities through subsidiaries established in less polluting, already developed countries. Environmental pollution does not necessarily have to cross a country's borders as a substance, it can also cross the border by a decision taken in a state that leads to environmental consequences in another. Otherwise, the environmental degradation resulting from the subsidiary's activities can often be traced back to the parent company's regulatory orders. Importantly, because multinational corporations are large contributors to the world economy, they enjoy significant political power on the international stage. The predominant position of these corporate giants is not equally balanced with that of victims when they try to make multinational corporations responsible for environmental damage. Most often, the production cost is required to be countered by introducing environmentally unfriendly manufacturing processes and consumables used in production, which slowly but consistently have a consistent environmental footprint.

Ironically, all the elements of the environment still offer us the opportunity to go on clean streets and breathe clean air, in spite of the fact that polluting factors are rapidly multiplying. From multinational companies, to road traffic and people who deliberately deforest and pollute, we all have our part to blame for the environment's decay.

References

Bodislav, D. A. (2015) 'The impact of privatization on regulated energy markets: a Great Britain's case study in industrial ecology', *Progress in Industrial Ecology,* vol. 9 (1), pp. 13-18.

Bran, F., Bodislav, D. A., Rădulescu, C. V., Ioan, I. (2014) 'Corporate governance intervention for a sustainable model', *Revista de Cercetare și Intervenție Socială,* no. 46, pp. 216-226.

Bran, F., Ioan, I. (2009) Globalizarea și Mediul, Universitara Publishing House, Bucharest, Romania.

Bran, F., Manea, G., Ioan, I., Rădulescu, C. V. (2012) Globalizarea. Manfestări și reacții, Economica Publishing, Bucharest, Romania.

Employees' Training and Development System by Utilizing Competency Model and Wings Method

Katerina Kashi, VŠB – Technical University of Ostrava, Faculty of Economics, Ostrava, Czech Republic, email: katerina.kashi@vsb.cz.

Abstract

Currently, employees' training and development plays an integral part of human resources management; it is necessary for both, the company and its employees. Today, well-educated and trained employees present a significant value for any company. Competency models are more and more used for effective human resource management. Well-designed competency models can be used by the organizations within the human resource management for various activities. The author has used the MCDM methods; AHP helped to scale down the number of measures and helped to determine the most important competencies, which lead to the design of competency model. TOPSIS method has been used to evaluate employees' performance. From a MCDM application point of view the WINGS can be a powerful tool for managers in problems that deal with both importance and relationship among evaluated factors, attributes or alternatives. Using WINGS the managers can combine the weights (importance) derived from AHP or other MCDM method and also their subjective (expert) opinion about the cause and effect of these competencies. By improving those competencies, the overall training and development should improve the employee key competencies.

Keywords: Employees' training and development, competency models, key competencies, WINGS method.

Introduction

The activity of training and development does not represent only to manage some course or training, it is much more. Before the training, it is necessary to take certain steps, to consult proposal of training with employees and at the end of training cycle it is necessary to evaluate it. The process also includes the discussions with supervisors about the training necessity and justification for these training programs and also their financial demands. The most important part of training and development is the person who is being trained. Since, if our employees will be trained and developed towards something they do not really want or need, the training and development will not provide required results.

However, most of the companies exercise the training and development system where the training activities are based on the needs of employees, either based on needed development or according to their development objectives determined at their annual appraisal. According to Novák, Vokoun, Stellner and Vochozka (2016) also the private personnel agencies stress the need for better qualifications and skills.

Main aim of this paper is to identify the training and development needs and activities for middle managers in the automotive industry in the Moravian-Silesian region.

Literature Review

Learning is no longer the transfer of information but it is the creation of knowledge as it is visibly expressed by improvement in business results and innovations. At the beginning of 20th century human resource managers have expressed the opinion that one of the main challenges they have to confront involve issues related to training and development, Boyatzis (2008). Barett, O'Connell (2001) finds that employees are likely to place greater value on training programs that are highly respected by colleagues, supervisors and managers. Companies which are able to create an environment where training is valued and supported by employees will be able to achieve greater commitment outcomes. Training perceived by employees to be effective will likely have a positive impact on job satisfaction and motivation.

Forrest and Peterson (2006) said that training and development objectives are to develop competencies such as technical, human, conceptual and managerial for the furtherance of individual and company's growth. According to Vokoun (2015) the most hampering factors of innovation were among others lack of skilled personnel.

Competency and Competency Models

The introduction of competency based approaches within the corporate environment initiated around 1970 and their development has been rapid since then.
Mirabile (1997, pg. 74) defines competency as "a knowledge, skill, ability, or characteristic associated with high performance on a job, such as problem solving, analytical thinking, or leadership. Some definitions of competency include motives, beliefs and values".According to Berge and Verneil (2002) many organizations are now adopting competency-based models to meet the evolving goals and needs.
Vazirani, 2010 defines competency model as a descriptive tool that identifies the competencies needed to operate in a specific role within a job, occupation, organization or industry. According to Fogg, 1999 a competency model is a behavioral job description that must be defined by each occupational function and each job. Shippman, 2000 states that depending on the work and organizational environment, a group of 7 to 9 total competencies are usually required of a particular job and depicted in a competency model. According to Cooper, 2000 the competency model is a collection of competencies and standards of performance establishing qualifications for a specific job position.

Used Methods

The research presented in this paper is based on two methods, i.e. AHP and WINGS. These methods can be also used in comparison of regions, finance. (Zmeškal, Dluhošová, 2015 or Minarčíková, 2015). Analytic hierarchy process is a framework of logic and problem solving that spans from the spectrum from instant awareness to fully integrated consciousness by organizing perception, judgments and feelings into hierarchy of forces which influence decision results. The method is based on innate human ability to utilize information and experience to estimate relative magnitudes through paired comparison. The hierarchy represents a complex problem in a multilevel structure, where the first level is the goal followed by levels of factors, criteria and subcriteria. It can decompose a complex problem in search of cause-effect explanations in steps which form a linear chain. For detailed description of AHP, see Kashi, Friedrich (2013); Kashi, Franek (2014); Papalová (2015).

Wings Method

The WINGS method (Weighted Influence Non-linear Gauge System) has been published recently (Michnik, 2013) and it is not widely known yet. That's why it will be shortly described, all steps of WINGS procedure during the process of solution of the model (the full description of the method and its theoretical background can be found in (Michnik, 2013). The basic input in WINGS comprises two features of the studied system's components: internal strength of each component and influence that one component exerts on another one.

The following scale for the influence evaluations has been chosen: 0 no influence, 1 low influence, 2 medium influence, 3 high influence, 4 very high influence. Similarly, the evaluations for internal strength (importance) of system components span from no strength (0) to very high (4) with values computed from the initial AHP weights, that were acquired before. The strength (importance) dimension in WINGS can have different meanings, thus it is possible to use AHP estimated priorities converted into WINGS scale. The preferences of importance are a result of Saaty pairwise comparison instead of direct input made by decision makers suggested in the original WINGS procedure as of Michnik (2013). Following description of WINGS is composed of following steps.
All evaluations are inserted into a square matrix **D** called the direct strength-influence matrix. This matrix is a $n \times n$ type with components d_{ij}. Values that represent the strength (importance) of components are inserted on the main diagonal ie. d_{ii}= importance of the component i. Values

representing influences are inserted into the matrix so that $i \neq j$, d_{ij}= influence of the component *i* on the component *j*.
Matrix **D** is then calibrated according to the formula

$$\mathrm{C}=\frac{1}{s}\mathrm{D} \quad (1)$$

where calibrating factor *s* is defined as a sum of all elements of matrix **D,** ie.

$$s=\sum_{i=1}^{n}\sum_{j=1}^{n} d_{ij} \quad (2)$$

The calibration ensures the existence on total strength-influence matrix T defined in (3) if there exist at least two positive elements in the matrix D and both are not in the same row. Opposite situation can be excluded from the analysis, because it does not represent any system. As well as in the DEMATEL it will ensure that the results are stable according to homothetic transformation $d_{ij} \to d_{ij}^{'} = \alpha d_{ij},\ \alpha > 0,$ for $i, j = 1,...,n.$ In the next step the total strength-influence matrix T is calculated:

$$T = C + C^2 + C^3 + ... = \frac{C}{I - C} \quad (3)$$

The way of calibration ensures that the series in above equation converge, and consequently the total strength-influence matrix **T** exists in almost all cases besides some exotic ones that can be excluded from the consideration. Then, for each element in the system the row sum r_i and column sum c_j of the matrix **T** are calculated:

$$r_i = \sum_{j=1}^{n} t_{ij}, \quad c_j = \sum_{i=1}^{n} t_{ij}, \quad (4)$$

where t_{ij} are elements of the matrix **T**. The r_i and c_i represent the total impact and the total receptivity of component. Finally, for each element in the system $r_i + c_i$ and $r_i - c_i$ are calculated. $r_i + c_i$ shows the total engagement of the component in the system; $r_i - c_i$ indicates the net position (role) of the component in the system: its positive sign means the component belongs to the influencing (cause) group, negative sign means that the component belongs to the influenced (result) group. Therefore, we can create a graph XY ($r_i + c_i$ and $r_i - c_i$), that it is called engagement-position map, that together with a numerical output helps with the analysis and discussion.

Results

Based on the results from the research executed by the author in 2014, where employees of one manufacturing company located in the Czech Republic were asked about the satisfaction with the performance appraisal system and the choice of evaluated competencies, the following competencies were mentioned the most often: work with information, problem solving, leadership, change management, effective communication, active listening, negotiating, team cooperation, motivating others, relevant professional knowledge, business knowledge, strategic thinking, analytical thinking, proactivity, creativity, mental agility and emotional resilience. To be able to identify key competencies, one position (the top manager – who is a top manager in the company) was chosen for this illustration. To determine key competencies for top manager, the method AHP was used. Based on the consultation with the company's HR manager, director, and financial manager, these competencies were divided into

the four following groups (criteria): managerial, interpersonal, technical competencies and personal qualities.
Next these competencies were compared in pairs based on modified Saatys scale (1-9 i.e. A - I) and a scale was assigned to each competency group (criteria) and each competency (sub criteria). This evaluation was done by an oral interview, where a table has been printed and the author has interviewed and wrote the results into the table, where the assessors rated each competency based on his/her personal knowledge, experience, etc. The interview has been done with the HR manager, director (direct supervisor of top manager) and one top manager – financial manager. An average scale was calculated from all of the collected data for each competency. Then an evaluation was executed to find out which group of competencies (criteria) has the most value for given position. Next the specific competencies (sub criteria) were arranged in the order of importance.

Sample illustration of the decomposition of competencies for the utilization of AHP is shown in fig. 1.

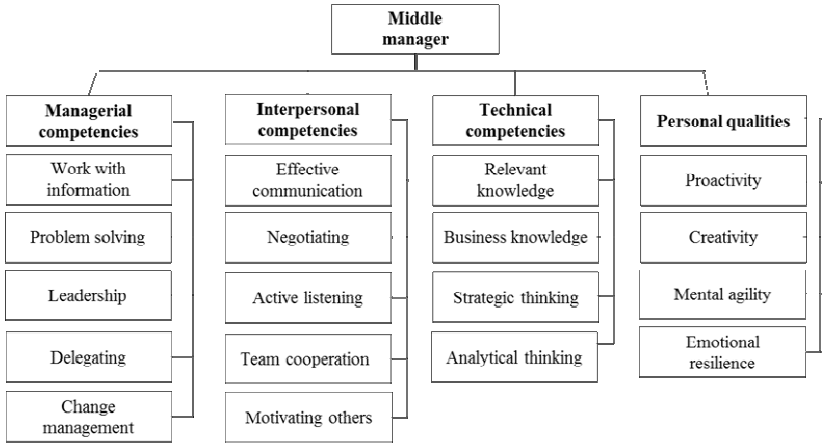


Fig. 1 : Proposal of the decomposition of competencies for the utilization of AHP

The above competencies were pair-wise compared by three experts based on a scale A-I, see Table 1. The author has purposely changed the scale from 1 – 9 to letter scale in order to eliminate rating score with the average number, i.e. 5.

Table 1: Paired comparison matrix for managerial competencies

Managerial	**Work with info**	**Problem solving**	**Leadership**	**Delegating**	**Change manag.**	**Local weight**
Work with info	1	1	7	7	3	0,369
Problem solving	1	1	7	7	5	0,408
Leadership	1/7	1/7	1	1	1/3	0,050
Delegating	1/7	1/7	1	1	1/3	0,050
Change manag.	1/3	1/5	3	3	1	0,123
RI	1,12	CI	0,02			
N	5	**CR=CI/RI**	**0,01**			
λmax 5.1312310						

Then the weights for individual group of competency were calculated based on the formulas. Global weights are shown in Table 2.

Table 2: Global weights for competencies for the position of middle manager

Ranking	Competency	Global weight	Ranking	Competency	Global weight
1	Professional knowledge	18,73%	10	Motivating others	2,77%
2	Analytic thinking	17,59%	11	Creativity	2,38%
3	Proactivity	14,06%	12	Strategic thinking	1,95%
4	Mental agility	9,22%	13	Problem solving	1,66%
5	Team cooperation	9,08%	14	Work with info	1,50%
6	Effective communication	5,94%	15	Negotiating	1,44%
7	Stress resilience	4,69%	16	Change management	0,50%
8	Business knowledge	4,26%	17	Leadership	0,20%
9	Active listening	3,83%	18	Delegating	0,20%

Utilization of WINGS method for the Determination of Necessary Training

The existing WINGS model of interrelationships and influences was used as a starting point and importance measure was added to the matrix as characterized by (1). Then the following sequence of (2) to (4) was used to determine the total strength-influence matrix **T.** Then values of $r_i + c_i$ and $r_i - c_i$ were calculated to draw the engagement-position maps for each of the levels of the model.

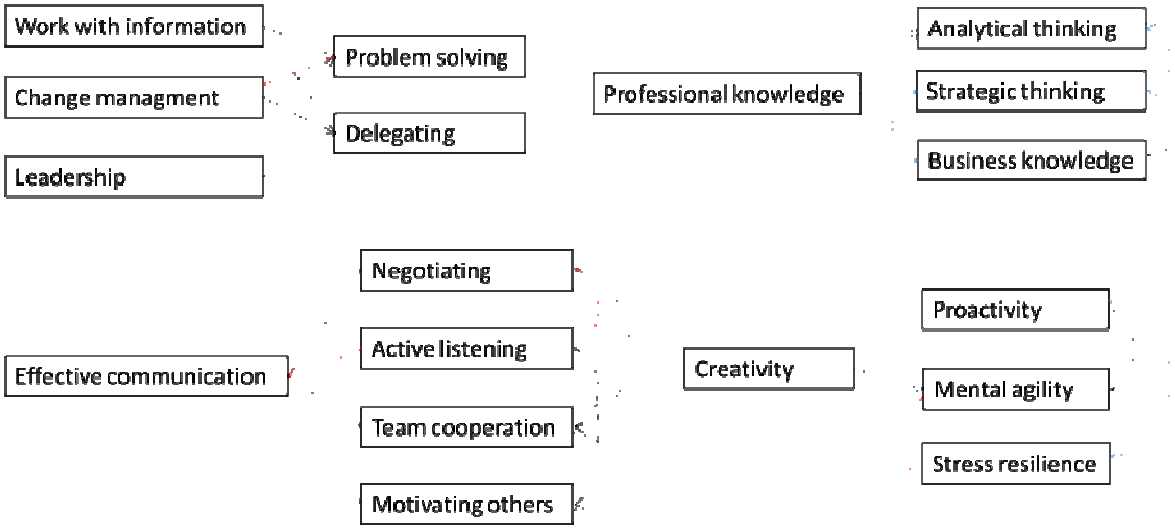


Fig. 2: Interrelation map for managerial competencies

It can be seen that the work with information, change management and leadership have high influence on competencies of problem solving and delegating, we can also see that the problem solving can have an effect of change management competencies as well; looking at the professional knowledge competence, we can identify complex relationship with analytical thinking, strategic thinking and business knowledge, which are interrelated and focusing on them can lead to a mutual improvement. It should be also noticed, that analytic thinking can impact the competency of business knowledge and strategic thinking. However, the effective communication was not identified, using the AHP, for the position of the middle manager as the most important, we can see that it has high influence on other important competencies, i.e. team cooperation, active listening, negotiating and motivating others. Furthermore, there are complex relationships among these competencies as well; this means that further improvement of these individual competencies will lead to the improvement of more than one competency. We can see that one of the identified key competencies, i.e. team cooperation plays an important role also within the interrelationship of the above mentioned competencies. Although, the

creativity was not identified as one of the key competencies, using expert's evaluation with WINGS it was found that it has an influence on more important competencies, such as proactivity, mental agility and stress resilience; it should also be mentioned that the proactivity has a profound influence on the mental agility and stress resilience.

This novel application of the multiple criteria decision making method WINGS is so far the only one focused on competency modeling and HR management. Using WINGS the managers can combine the weights (importance) derived from AHP or other MCDM method and also their subjective (expert) opinion about the cause and effect of these competencies. The results can be illustrated by the position-engagement map, which helps to identify the competencies that should be trained and developed the most, since they do have an impact on the most important competencies. By improving those competencies, the overall training and development should improve the employee key competencies.

Conclusion

Competency models designed by the utilization of AHP, TOPSIS and WINGS can help the human resource management in several areas, such as: planning training and development activities, employee appraisal, hiring new staff and compensation. The paper presented an example that revealed fundamental benefits of MCDM approach towards competency modelling. AHP method helped to scale down the number of measures and helped to determine the most important competencies, which can lead to the achievement of company's strategic goals. Because of the inherently inter-related nature of the attributes, the determination process of priorities can be quite complex.

This insight should help the company's management to concentrate on improving particular competencies that are most influential to the others. The technical competencies were found to be not affecting nor affected by other competencies. When comparing results from the expert evaluation using AHP and WINGS we have to look for an intersection. The most important competency according to prioritization using AHP is professional knowledge followed by analytic thinking. Application of WINGS revealed that these competencies are independent to other competencies and are interrelated only within technical competencies themselves. A training and development plan for middle managers can be developed from these results.

A combination of learning modalities seems particularly well suited for this purpose. Some competencies such as those in interpersonal competencies clusters benefit from face-to-face practice and, optimally, time spent observing other managers can help to improve these competencies.

The competencies are ordered based on importance, the HR department and the employees themselves will know on which competency they need to concentrate the most and also what knowledge/skills have to be improved by the employees the most. In our case the employees should mostly concentrate on improving professional knowledge, analytic thinking, proactivity, mental agility, team cooperation, effective communication and stress resilience, since these competencies are the most preferred by the company for the middle manager position.

The author sees limitation of the presented work in the number of respondents and selection of Moravian-Silesian region. Further research of the utilization of MCDM methods in competency modelling and in the human resources in general could be aimed at a larger number of respondents on different levels of management, the author plans to find out if there are differences in key competencies on various levels of management that is top management, middle and line management and if there are similarities on those positions if managers work in different fields. The study can also be broaden to other positions that can be generalized, i.e. teacher.

Acknowledgement

This paper is supported by the Student Grant Competition of the Faculty of Economics, VSB-Technical University of Ostrava, project registration number SP2017/125 and by the Education for

Competitiveness Operational Programme, project registration number CZ.1.07/2.3.00/20.0296. All support is greatly acknowledged and appreciated.

References

Barett, A. & O'Connell P.J. *Does the training generally work? The returns to in company training*. Industrial and Labor Relations Review, 2001, 54 (3): 647-662.

Berge, Z. and M.D. Verneil. The increasing scope of training and development competency. *Benchmarking: An International Journal.* Vol. 9, No. 1, 2002, pp. 43-61.

Boyatzis, R. E. *Competencies in the 21st Century.* Journal of Management Development. Vol. 27 No. 1 (2008), emerald Group Publishing, pp. 5-12.

Fogg, C. D. (1999). *Implementing your strategic plan How to turn "intent" into effective action for sustainable change*. New York: American Management Association, 2006. ISBN 978-1419645617.

Forrest, S. P. and T. O. Peterson, E. (2006). It's called andragogy. *Academy of Management Learning & Education, 5*, 113-122.

Kashi, K. & Friedrich V. Manager's Core Competencies: Applying the Analytic Hierarchy Process Method in Human Resources. In: *Proceedings of the 9th European Conference on Management Leadership and Governance*. Maria Th. Semmelrock-Picej a Ales Novak. 1. vyd. Reading: Academic Conferences and Publishing International Limited, 2013.(pp. 384-393).

Kashi, K., & Franek, J. (2014). MADM Methods: Applying Practical Decision Making in Business Processes. In *13th European Conference on Research Methodology for Business and Management Studies*, *City University London*, *16-17 June 2014* (pp. 416-424). Reading: ACPI.

Michnik, J. (2013) „Weighted Influence Non-linear Gauge System (WINGS) – An analysis method for the systems of interrelated components". European Journal of Operational Research. Vol. 228, No. 3, pp. 536-544.

Minarčíková, E. (2015). Evaluation of Regional Disparities in Visegrad Four based on Selected MCDM Methods. In *9th International Days of Statistics and Economics Conference Proceedings* (pp. 1128-1137). Prague: Melandrium.

Mirabile, R., J. Everything you wanted to know about competency modeling. *Training and Development Journal.* Vol. 51 No. 8, pp 73-78.

Novák, V., Vokoun, M., Stellner, F., & Vochozka, M. (2016). Institutional analysis of the contemporary regional labour market in the Czech republic.

Papalová, M.. Media Impact on Crisis Communication. In: International Scientific Conference on *Marketing Identity - Digital Life Location*. Smolenice: Digital Life, Pt II Book Series, 2015, p. 448-459 ISBN 978-80-8105-780-9.

Vazirani, N. Competencies and Competency Model – A Brief Overview of its Development and Application. *SIES Journal of Management.* Vol. 7 (1), 2010, pp. 121-131.

Vokoun, M. (2016). Innovation behaviour of firms in a small open economy: the case of the Czech manufacturing industry. *Empirica*, *43*(1), 111-139.

Zmeškal Z., & Dluhošová, D. (2015). Application of the advanced multi-attribute nonadditive methods in finance distribution. In *10th International Scientific Conference Financial management of Firms and Financial Institutions Ostrava*, (pp. 1439-1449). Ostrava: VŠB-TU Ostrava.

Econometric Models for the Production of Oil Deposits

Marius Bulearcă, Centre for Industry and Services' Economics, Romanian Academy, Bucharest, Romania, mariusbulearca@yahoo.com

Cornelia Neagu, Centre for Industry and Services' Economics, Romanian Academy, Bucharest, Romania, neagu_cornelia@yahoo.com

Cristian Sima, Centre for Industry and Services' Economics, Romanian Academy, Bucharest, Romania, sima60cristian@yahoo.com

Abstract

As stated in our previous works, this paper is part of a larger research aiming to build up econometric models applicable in oil industry that may be useful for managers working in oil industry. Hence, in this paper discuss about models that describe two-dimension motion in homogenous porous environment. In the first part, the article deals with flat radial motion, when is considered an oil well that crosses the entire thickness of the productive wall and the productive layer is horizontal. Then, the paper deals with motion generated by an oil well eccentrically located in a circular contour supply deposit, when the motion generated by an oil well under the conditions mentioned in the first part, the only difference that the oil well is placed eccentric. These models will be useful tools for decision makers to an optimal management of the extraction process in an oil drilling and extraction unit.

Keywords: oil deposits, decline oil production, two-dimension motion, homogenous porous environment

Introduction

Sustained development of production and the increase of its economic efficiency involves as a necessity the rational use and exploitation of material resources and energy [Kula, 1994; Pearce and Turner, 1990]. Therefore, increasing material and energy resource recovery is a major coordinate for economic growth and improvement in economic efficiency.

Despite the fact that oil extraction is achieved in a closed system, which should enable it to avoid or, at least, substantially reduce all forms of pollution, the exploration and exploitation of oil deposits continue to be among the most polluting industrial activities [Bulearcă and Popescu, 2014]. Oil, heavy oil, salt water and various chemicals contamination of land around drilling and extraction oil-wells is, with all its incidentally character, extremely harmful to soil, surface water and groundwater. In this respect, the severity of pollution will depend, of course, on the nature of the pollutant, its quantity and why this pollution occurs [Bulearcă *et al.*, 2016].

As this paper is part of a larger research aiming to build up econometric models applicable in oil industry that may be useful for managers working in oil industry, this article discusses about models that describe two-dimension motion in homogenous porous environment [Avram, 2005; Iordache and Avram, 1995]. Our focus should be placed on three different types of motion: flat radial motion; motion generated by an oil well eccentrically located in a circular contour supply deposit; and motion generated by an oil well in a deposit with linear supply contour (this type of motion, along with bi-dimensional motions in a homogeneous porous medium, will be presented in one of our future work).

Hence, by thorough analysis, we will demonstrate that certain methods used for the final recovery factor increase involve enhancing the natural energy of an oil deposit, as well as helping to improve oil well performance [as presented in our previous research - see Bulearcă *et al.*, 2017], like when applying under-balanced drilling that is instrumental in increasing oil wells productivity by reducing the oil well formation damage [Qamar, 2013; Rehm *et al.,* 2013]. In this respect, oil displacing (washing) by steam, which is a way of increasing the final recovery factor, leads to enhancing the total energy of the system. All these aspects and other related issues on this topic will be further discussed in the next paragraphs.

Flat Radial Motion

To estimate the crude oil production from oil deposits, analytical models have been developed corresponding to different geometric configurations [Costache, 2008; Cretu, 1987; Cretu and Ionescu, 2005]. On the other hand, some models consider oil as an incompressible fluid, and other (more complex) take account of its compressibility. Finally, the motions to be modeled shall be either stationary - independent of time -, or non-stationary.

The following incompressible liquid stationary motions are considered [Hawkins, 1956], characterized by the condition: $dp/dt = 0$, at any point in the motion range and at any time t. Fundamental equations solutions obtained for these motions can be used either to study qualitative certain aspects of non-stationary motions, or to study non-stationary motions through methods that assimilate them with a succession of stationary states.

It is considered an oil well that crosses the entire thickness of the productive wall, receiving fluid through its natural wall, and called *the perfect oil well from the hydrodynamic point of view.* If the productive layer is horizontal with a constant thickness h, and the oil well produces the constant pressure p_c, at a constant pressure p_s of a coaxial cylindrical zone with the outer border of radius r_c, (figure 1), then the radial motion is flat radial stationary, generally speaking.

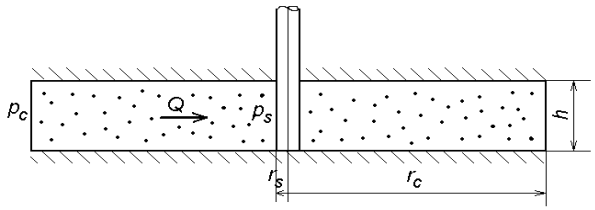


Fig. 1: Configuration of the flat radial motion of a fluid through a homogeneous porous environment

Notation used in figure 1 has the following meanings:

r_s – oil well radius;
r_c – supply radius contour (border);
$_{ps}$ – oil well dynamic pressure at a certain depth (measured from the average depth of perforated interval),
p_c - static pressure of productive layer, called the supply pressure on the perimeter.

Providing the stationary character of the motion generated by the oil well, the condition that the pressure p_c is constant is satisfied if through the outer border radius r_c, which must be permeable and it's named *supply border,* a quantity of fluid equal to that produced by the oil well enters into the drainage area of the oil well.

Given the axial symmetrical character of the motion, it is studied in cylindrical coordinates that, for flat motion, are reduced to polar coordinates *r,* q. Under these conditions, microscopic continuity equation associated with state equation of incompressible liquid is reduced to form:

$$\frac{1}{r}\frac{\mathrm{d}}{\mathrm{d}r}(r v_r)=0 \ , \tag{1}$$

where the radial velocity, which is the only component of the velocity filter, is given by Darcy's law:

$$v=v_r=-\frac{k}{\mu}\frac{\mathrm{d}p}{\mathrm{d}r} \ . \tag{2}$$

From relations (1) and (2) follows the differential motion equation:

$$\frac{\mathrm{d}}{\mathrm{d}r}\left(r\frac{\mathrm{d}p}{\mathrm{d}r}\right)=0 \ , \tag{3}$$

that is successively integrated until leading to the solution:

$$p = a \ln r + b, \tag{4}$$

which is the pressure variation law and is associated with boundary conditions (as shown in figure 1):

$$\begin{cases} \text{for } r = r_s \ , \ p = p_s \ , \\ \text{for } r = r_c \ , \ p = p_c \ . \end{cases} \tag{5}$$

By replacing the conditions (5) into (4) we obtain the equation for the two constants of integration:

$$a=\frac{p_c-p_s}{\ln\frac{r_c}{r_s}} \ , \ b=p_s-\frac{p_c-p_s}{\ln\frac{r_c}{r_s}}\ln r_s=p_c-\frac{p_c-p_s}{\ln\frac{r_c}{r_s}}\ln r_c$$

and pressure variation law (4) becomes:

$$p=p_s+\frac{p_c-p_s}{\ln\frac{r_c}{r_s}}\ln\frac{r}{r_s}=p_c-\frac{p_c-p_s}{\ln\frac{r_c}{r_s}}\ln\frac{r_c}{r} \ . \tag{6}$$

If the pressure derivative d*p*/d*r* is replaced in the Darcy equation, is established the filtration velocity equation:

$$v = -\frac{k}{\mu}\frac{p_c - p_s}{\ln\frac{r_c}{r_s}}\frac{1}{r}, \tag{7}$$

which introduced into the macroscopic continuity equation (8),

$$Q = A|v| \tag{8}$$

where the normal section at filtration velocity at any point has the form of a cylinder of any radius *r*, the area of this section being:

$$A = 2 \square r h, \tag{9}$$

leads to the equation of the incompressible fluid flow volume of the oil well:

$$Q = \frac{2\pi k h(p_c - p_s)}{\mu b_t \ln\frac{r_c}{r_s}}. \tag{10}$$

In the previous equation we have considered an oil well. For the oil flow to be expressed at the surface conditions (at the pressure in the storage tank that is practically equal to atmospheric pressure), in the denominator of equation (10) the oil volume factor b_t was introduced, being defined as the amount of oil at deposit conditions that corresponds to the oil unity volume under surface conditions. Given that, at the deposit pressure, the oil contains a significant amount of dissolved gases, which are separated in the liquid phase prior to its tank storage, volume factor of the oil has a value higher than the unity.

Figure 2 shows the variation graphics of filtration speed and pressure as related to the radius. It is noted that the maximum values of gradients pressure and velocity are recorded in the vicinity of the oil well, which highlights the importance of this area to the oil well production flow.

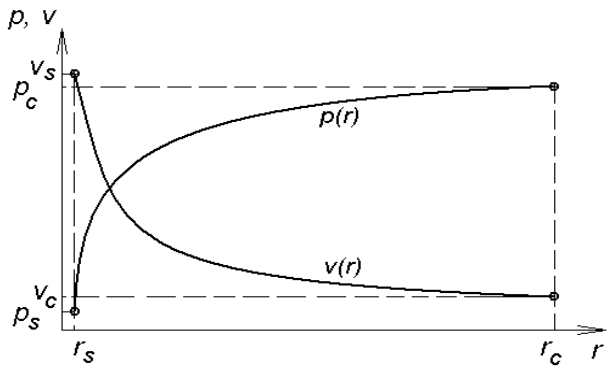


Fig. 2 Graphic of filtration speed and pressure as related to the radius, according to the stationary flat radial motion of a liquid

The ratio between the oil well flow and differential pressure of production is called *the oil well productivity index* and has the expression:

$$I_p = \frac{Q}{p_c - p_s} = \frac{2\pi k h}{\mu b_t \ln \frac{r_c}{r_s}}. \tag{11}$$

Specific productivity index is the ratio between I_p and the thickness h of the productive layer, i.e.:

$$I_{ps} = \frac{I_p}{h} = \frac{Q}{h(p_c - p_s)} = \frac{2\pi k}{\mu b_t \ln \frac{r_c}{r_s}}, \tag{12}$$

while the capacity:

$$C = k\,h \tag{13}$$

is called *the collector oil layer production capacity*. The parameters I_p and I_{ps} directly characterize the performance of the oil extraction well.

From equations (10) and (11) we see that productivity index is the slope $Q\ (p_c - p_s)$, and is called *the indicating diagram* (figure 3). In the area of validity for Darcy's equation upper limited by the critical point *C,* the indicating diagram is the straight line described by the equation (11), while in nonlinear filtering the indicating diagram is a curve with decreasing slope.

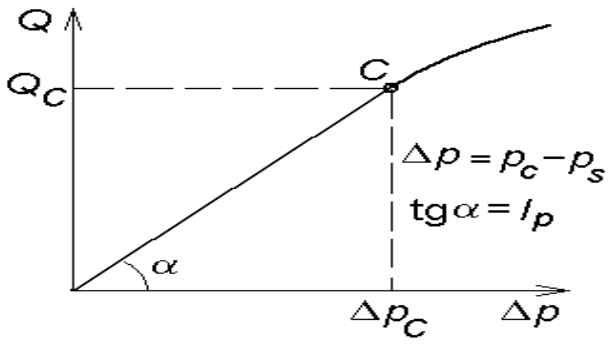


Fig. 3: Graphic of volume flow according to the differential pressure under flat radial motion Of a stationary liquid

One of the main purposes of oil extraction technology is to increase productivity index of each well to the maximum possible values from the economical point of view. This process is known as *stimulation of wells productivity* and can be done through various ways, which can be deduced from the analysis of how each factor in relation (11) should be amended to increase the productivity index.

Increasing the permeability *k* through hydraulic acidizing or cracking and thermal methods for viscosity lowering (as cyclic steam injection in the productive layer) are the main ways to boost productivity oil wells.

By stimulation oil recovery period is reduced as effect of increasing the extraction rate, but not necessarily obtaining an increase of the final recovery factor as well.

Methods to increase the final factor involve the enhancement of the natural energy of a deposit.

Thus, while displacement (washing) crude oil with steam, which is a way of increasing the ultimate recovery factor, leads to increase the total energy of the system, most of the heat supplied to the deposit in the cyclic steam injection (which is a method of stimulating oil wells productivity) is lost during production as a result of thermal conduction towards impermeable layers from the collector's roof and couch, and during heat transport to the surface at the same time with heated fluids produced by the oil well.

Motion Generated By an Oil Well Eccentrically Located In a Circular Contour Supply Deposit

Let's consider the motion generated by an oil well under the conditions mentioned in the previous paragraph, the only difference that the oil well is placed eccentric, at a distance *d* from the center of the circular contour supply of radius r_c.

To study this motion, the method of complex variable functions associated to flat potential motion can be used. In this regard it is noted that if the function is defined as:

$$\varphi = -\frac{k}{\mu} p \ , \tag{14}$$

then, velocity components presented according to Darcy's law as follows:

$$v_x = -\frac{k}{\mu}\frac{\partial p}{\partial x} \ , \ \ v_y = -\frac{k}{\mu}\frac{\partial p}{\partial y} \ , \tag{15}$$

take the form:

$$v_x = \frac{\partial \varphi}{\partial x} \ , \ \ v_y = \frac{\partial \varphi}{\partial y} \ , \tag{16}$$

showing that two-dimensional motion of single-phase incompressible fluids in porous homogeneous environment behaves like a potential move with speed potential *j*. Neglecting the oil well radius r_s related to radius r_c of the supply contour, the oil well can be assimilated to a linear distribution of negative sources.

The complex potential of the motion generated by the oil well in the plane *xOy* in figure 4 is given by:

$$f_1(z) = -\frac{Qb_t}{2\pi h}\ln(z+\delta)\ , \tag{17}$$

where $z = x + iy$, Qy *and* Qb_t are expressed as oil flow at oil deposit conditions (corresponding to flow Q at surface conditions), while complex number z_1 which defines the position of the oil well to the axis system is expressed as:

$$z_1 = x + \square + i\,y = z + \square$$

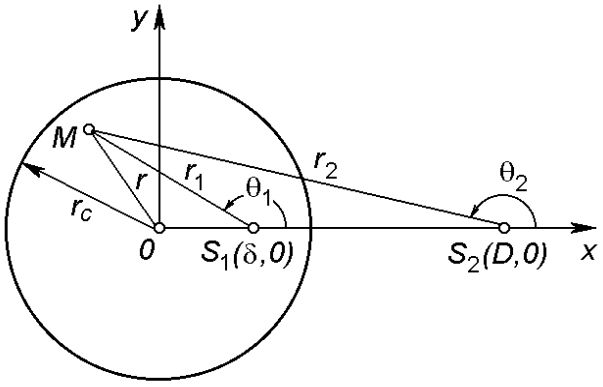


Fig. 4 : The two flat sources equivalent to the motion generated by an oil well eccentrically located

The oil well was considered as a negative flat source, S_1, because it absorbs fluid from the motion, while intensity (flow) flat source is the ratio between flow rate and length h of the linear source.

For the extension of the motion (which takes place, obviously, only within the circle of radius r_c) throughout the plane xOy, a positive source S_2 (considered as an injection well, with intensity (volume flow) + Q) is introduced, symmetric to the circle in point S_2, located from the field motion center at a distance:

$$D = r_c^2 / \delta\ . \tag{18}$$

Thus, the motion generated by the eccentric oil well of an oil deposit can be studied using the model of flat potential motion generated by two sources of opposite sign.

As a result, the complex potential of source S_2 is expressed as:

$$f_2(z) = \frac{Qb_t}{2\pi h}\ln(z+D)\ , \tag{19}$$

and the complex potential of the resulting motion is obtained by summing the complex potential of the two sources as follows:

$$f(z)=-\frac{Qb_t}{2\pi h}\ln(z+\delta)+\frac{Qb_t}{2\pi h}\ln(z+D)=\frac{Qb_t}{2\pi h}\ln\frac{z+D}{z+\delta}\ . \tag{20}$$

Writing that:

$$z_1=z+\delta=r_1e^{i\theta_1}\ ,\ z_2=z+D=r_2e^{i\theta_2}\ ,$$

equation (20) becomes:

$$f(z)=\frac{Q\,b_t}{2\,\pi\,h}\left[\ln\frac{r_2}{r_1}+i(\theta_2-\theta_1)\right]=\varphi+i\,\psi\ , \tag{21}$$

and the real part of the equation becomes:

$$\varphi=\frac{Qb_t}{2\pi h}\ln\frac{r_2}{r_1}+\varphi_0\ , \tag{22}$$

While introduced in (14), gives the pressure equation:

$$p=-\frac{Q\mu b_t}{2\pi k h}\ln\frac{r_2}{r_1}+C\ , \tag{23}$$

where r_1, r_2 are the bipolar coordinates defined in figure 4, and j_0 is the potential value at speed $r = r_s$.

To express the boundary conditions is assumed that the point M in figure 4 is successively owned by the oil well wall and supply contour.

If M belongs to the border of radius r_s, the first boundary condition takes the form:

$$\text{for } r_1=r_s \text{ and } r_2=D-\delta,\ \ p=p_s\ . \tag{24}$$

If M is on the outer border of the oil well area (figure 5), based on the relationship of symmetry to the circle (40) results that triangles OS_1M şi OS_2M are like.

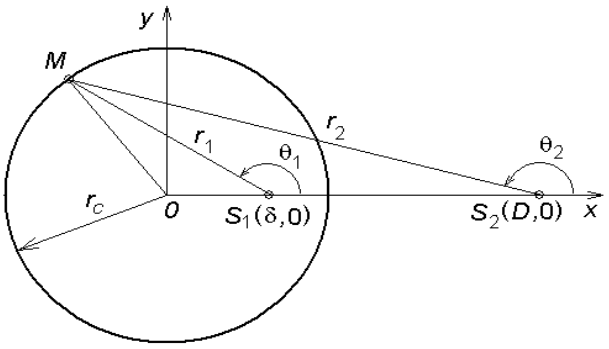


Fig. 5: Illustration of the condition that the point M belongs to the outer border of the eccentric oil well drainage area

We can write the equations expressing the two triangles' side proportionality:

$$\frac{r_c}{\delta}=\frac{D}{r_c}=\frac{r_2}{r_1}$$

and the second boundary condition as follows:

$$\text{la}\frac{r_2}{r_1}=\frac{r_c}{\delta},\ p=p_c\,. \tag{25}$$

Substituting the boundary conditions (24) and (25) in equation (23), the following system of equations is obtained:

$$\begin{cases} p_s=-\dfrac{Q\mu b_t}{2\pi k h}\ln\dfrac{r_c^2-\delta^2}{\delta r_s}+C\ , \\ p_c=-\dfrac{Q\mu b_t}{2\pi k h}\ln\dfrac{r_c}{\delta}+C\ , \end{cases} \tag{26}$$

For constant C and oil well flow rate Q, from equations (26) it then results:

$$C=p_c+\frac{p_c-p_s}{\ln\dfrac{r_c^2-\delta^2}{r_c r_s}}\ln\frac{r_c}{\delta}\ , \tag{27}$$

and

$$Q=\frac{2\pi k h\left(p_c-p_s\right)}{\mu b_t\ln\dfrac{r_c^2-\delta^2}{r_c r_s}}\ . \tag{28}$$

Introducing expressions (27) and (28) into (23), the pressure variation law in bipolar coordinates becomes:

$$p = p_c - \frac{p_c - p_s}{\ln\frac{r_c^2 - \delta^2}{r_c r_s}} \ln\frac{\delta}{r_c}\frac{r_2}{r_1}. \tag{29}$$

Returning to Cartesian coordinates, then multiplying by 2 the numerator and denominator from the right ratio of the equation (29) in order to eliminate radicals, we obtain the equation:

$$p = p_c - \frac{p_c - p_s}{2\ln\frac{r_c^2 - \delta^2}{r_c r_s}} \ln\frac{\delta^2\left[(x+D)^2 + y^2\right]}{r_c^2\left[(x+\delta)^2 + y^2\right]}, \tag{30}$$

expressing the pressure variation law in Cartesian coordinates. Based on this pressure we can now better estimate the production of crude oil from oil deposits; however, several analytical models corresponding to different geometric configurations helping to estimate this production will be presented in our future researches.

Conclusions

In conclusion, the present paper has aimed to build up more econometric models applicable in oil industry that may be useful for managers working in oil industry. Hence, this article dealt about models that describe two-dimension motion in homogenous porous environment. Our focus was placed on three different types of motion.

In the first part, flat radial motion was studied. It was considered an oil well that crosses the entire thickness of the productive wall, receiving fluid through its natural wall, and called the perfect oil-well from the hydrodynamic point of view. For a productive layer horizontal with a constant thickness and an oil well producing at a constant pressure, it was demonstrated that the radial motion is flat radial stationary, generally speaking, but this remains to be discussed in our future researches.

In the second part, the motion generated by an oil well eccentrically located in a circular contour supply deposit was analyzed. We considered the motion generated by an oil well under the conditions mentioned in the previous paragraph, with the only difference that the oil well is placed eccentric, at a certain distance from the centre of the circular contour supply. To study this motion, the method of complex variable functions associated to flat potential motion was used and then introduced in our analysis.

Hence, by thorough analysis, we have demonstrated that certain methods used for the final recovery factor increase involve enhancing the natural energy of an oil deposit as well as helping to improve oil well performance. In this respect, oil displacing (washing) by steam, which is a way of increasing the final recovery factor, leads to enhancing the total energy of the system. All these aspects and other related issues on this topic will be further discussed in the next paragraphs.

At the same time, in the paper we have analyzed that most of the heat supplied to the deposit in the cyclic steam injection process (which is a method for stimulating oil-wells productivity) is lost during the production process as a result of thermal conduction to impermeable layers of both roof and couch collector, as well as through the heat transport to the surface alongside the heated fluids produced by the oil well.

Starting from these findings and to extent the motion range from the upper semi-plane to the entire plane, a fictitious positive source of strength may be introduced, symmetric to the supply contour, and our future researches will take it into consideration. Hence, further analysis on this topic will follow in our next papers to come.

References

Avram, L. (2005), ‚Foraj marin', Oil and Gas University Publishing House, Ploieşti.

Bulearcă, M., Neagu, C., Ghiga, C., Sima, C. (2017), *"Econometric models to manage oil extraction process"*, Proceedings of the 29th International Business Information Management Association (IBIMA), 3-4 May 2017, Vienna, Austria, pp. 1529-1536.

Bulearcă, M., Neagu, C., Ghiga, C., Sima, C. (2016), *"Econometric models applicable in oil industry",* Proceedings of the 28th International Business Information Management Association (IBIMA), 9-10 Novembre 2016, Seville, Spain, pp. 2942-2951.

Bulearcă, M., Popescu, C. (2014), *"The Extractive Industry and its Impact upon the Environment",* Annals of the „Constantin Brâncuşi" University of Târgu Jiu, Economy Series, Issue 6, pp. 16-22.

Costache, G. (2008), 'Indrumar pentru forajul geologic si hidrogeologic', Technical Publishing House, Bucharest.

Cretu, I. (1987), 'Hidraulica zăcămintelor de hidrocarburi', vol. 1, Technical Publishing House, Bucharest.

Cretu, I., Ionescu, E. M. (2005), 'Hidraulica subterana', Oil and Gas University Publishing House, Ploiesti.

Hawkins, M. F. Jr. (1956), *"A Note on the Skin Effect",* Journal of Petroleum Technology Volume 8, Issue 12, pp. 65–66.

Iordache, G., Avram, L. (1995), **'**Foraje speciale şi foraj marin (II)*'*, Help-Ministries Romania Publishing House, Ploieşti.

Kula, E., (1994), 'Economies of Natural Resources, the Environment and Policies', Second Edition, Chapman and Hall, London.

Qamar, M. A. (2013), 'Introduction to Underbalanced Drilling', Lambert Academic Publishing, Saarbrücken.

Pearce, D. W., Turner, R. K. (1990), 'Economics of Natural Resources and the Environment', Harvester Wheat Sheaf, London.

Rehm, B., Haghshenas, A., Saman Paknejad, A., Al-Yami, A., Hughes, J. (Editors) (2013), 'Underbalanced Drilling: Limits and Extremes', 1st Edition, Gulf Publishing Company, Houston, Texas.

Levels of Business Process Modeling

Hana Tomaskova, Faculty of Informatics and Management, University of Hradec Kralove, Hradec Kralove, Czech Republic, hana.tomaskova@uhk.cz

Abstract

This article deals with introducing the BPMN notation and its use at different levels of modeling. BPMN is currently a highly desirable notation in a corporate environment that serves to understand the company, its structure and its subsequent re-engineering and modeling of business processes.

Keywords: BPMN, Object modeling, Levels of modeling, business process

Introduction

„The Business Process Modeling Notation (BPMN) is a graphical notation that depicts the steps in a business process. BPMN depicts the end to end flow of a business process. The notation has been specifically designed to coordinate the sequence of processes and the messages that flow between different process participants in a related set of activities.“(www.bpmn.org)

BPMN was created by an Object Management Group (OMG) as open and therefore free of charge. Looking at BPMN, at first glance, it allows very much similarity to flowcharts but instead offers much more sophisticated tools to describe and simulate behavior. This is an "event-triggered behavior," a description of the "something happened" mode (Silver, 2009). Another, very significant feature of BPMN is its "business-friendly" orientation. This orientation and processes modeling is very important for the company's business and knowledge (Mohelska & Tomaskova, 2010, Tomaskova, 2009).

Origin and history of BPM

Dumas (Dumas, 2013) derives the business processes management in the natural development of human life in connection with the division of labor. This situation culminated in the second industrial revolution when the individual employee's specialization reached such a level that it was necessary to create a group of experts to manage this work. They were responsible for meeting the goals, optimizing processes and ensuring the effective functioning of the company. One of the drawbacks of this solution was the extensive corporate structure. In the late eighties, the company learned about the Japanese companies management after the confrontation. These studies have found that it is more important to work with the whole process than with its individual tasks.

The previous paragraph is related to BPR - Business Process Redesign or Re-engineering. In spite of certain difficulties associated with poor access to BPR, where businesses attempted to over-radicalize or redesigned activities that were not key to business, it was proven that process-oriented companies were essential to increase efficiency and their customers satisfaction. (Dumas, 2013).

From the information technology development perspective, one of the most important facts was the development of specific systems to support BPM and BPR. These systems include ERP (Enterprise Resource Planning) and WfMSs (Workflow Management Systems). ERP systems are used to manage company data. WfMSs, on the other hand, serve to pass on the work to individual actors based on process models, thus allowing for easier changes implementation in company processes. Another of the features is to analyze business processes and to further develop them into more complex systems known as Business Process Management Systems (BPMSs). These are nowadays used to automate processes.

BPM life cycle

The BPM life cycle can be described as a continuous cyclical repetition of the following phases (Dumas, 2013)

1. Process Identification - Finding a problem, identifying process-related issues, determining process hierarchies, optionally measuring process performance
2. As-is modeling - a model of the current process is created
3. Process analysis - the relationship between the problems and the parts of the process in the as-is model, the determination of the priority to solve individual problems
4. To-be modeling - determines changes leading to problem-solving and their subsequent transformation into a model showing the new form of processes, optionally simulation and measurement of process performance and comparison with the as-is model
5. Implementation of the process - the changes defined in the previous phase are put into practice
6. Monitoring and Process Control - Process performance is measured and data is compared to data already acquired, to identify additional or unresolved errors

Process Identification

In terms of business process modeling, it is important to identify processes that will be modeled and then modified. In most businesses, the analysis of all business processes is not financially and time-consuming. It is often necessary to consider the priority of individual processes and first to focus on improving processes of strategic importance for business. Dumas (Dumas, 2013) emphasizes the need for knowledge of all processes in the company so that the criteria can be determined by the criteria that will be emphasized.

Designation phase

It is necessary to set a specific strategy for the processes selection and in a number of processes, it must be a reasonable compromise so that their change affects the processes improvement but at the same time it is possible to change them.

The next step in the determination phase is to determine the relationships between processes, whether from the hierarchical perspective of superiority and process subordination and from the viewpoint of the workflow of the work when determining the time sequence of the processes. However, realize that it is not the primary goal of strictly recording processes and relationships, but rather understanding all contexts and issues.

Validation phase

Dumas (Dumas, 2013) provides the following criteria, appropriate for verifying the importance degree and attention devoted to the process.

- Importance - relates to the strategic importance of each process and its relation to the strategic goals of society
- Dysfunction - Used to assess process status from the perspective of errors and problems, those with more obstacles deserve more attention
- Feasibility - Assessing obstacles to changing process, or motivation to make changes

Design of processor architecture

Process architecture is a model depicting the relationships between rules in society. It is about establishing a consumer-producer relationship. Process architecture also sets the level of detail capture. Dumas (2013) distinguishes between 3 levels.

- Landscape model - shows only the largest processes with a high degree of abstraction
- Abstract Process Models - shows individual business processes in a more detailed form, but still more abstractly
- Detailed Process Models - This is a description of processes at the level, inputs and outputs, flow, process participants, an example of this model is BPMN

BPMN levels

Bruce Silver in his book (Silver, 2009), divides modeling of business processes into three levels according to the way diagrams are used. These levels are subdivided according to the model purpose and, depending on the diagram detail.

Descriptive modeling is the simplest form of modeling to describe the functioning of an organization in terms of the continuity of activities and responsibilities and the roles of individual organizational units in these processes. In its essence, it is the closest to the classic modeling of flowcharts. For this purpose, only the basic set of BPMN notation elements is used. Here, however, a specific form must be retained so that, in case of an extension to the second or third level, the model can only be specified without major structural changes.

The second level is called an analytical model and its goal is to provide a complete and the complete processes description. The only exception is the removal of the technical details required for "running the model". For technical details, we mean, for example, the structure and type of data and their expression. However, the BPMN specification can not separate technical information from others, the second layer is defined by what is seen in the diagram. The second level of BPMN is focused on business processes and is designed for management and analytics, as it enables it to capture all the details that can then be passed on to the IT department in an easy-to-understand and simple form. Another suitable use of the second level of BPMN is the possibility of simple analysis of the alternative course of business processes.

The third level of BPMN diagrams is primarily focused on developers. It consists in adding all the technical details to the properties of the individual elements and subsequently generating the XML code. This use of BPMN is, however, a novelty from BPMN 2.0.

Conclusion

BPMN has been a very functional notation since introduction. This notation describes the business and its processes. The article presented a brief history of this notation and the basic of business processes modeling. Various levels of modeling and life cycle BPM have been described.

Acknowledgement

This study was supported by the research project The Czech Science Foundation (GACR) 2017 No. 15330/16/AGR Investment evaluation of medical device development run at the Faculty of Informatics and Management, University of Hradec Kralove, Czech Republic.

Reference

Bussiness Process Model and Notation. [Online] Object Model Group. [Citace: 7. 3 2015.] www.bpmn.org.

Silver, Bruce. 2009. *BPMN Method and Style.* Aptos : Cody-Cassidy Press, 2009. str. 213. ISBN 978-0-9823681-0-7.

Dumas, Marlon. 2013. *Fundamentals of Business Process Management.* 1st ed. New York : Springer, 2013. str. 399. ISBN 978-3-642-33142-8.

Mohelska, Hana, & Tomaskova, Hana. 2010. *The use of mobile application in the business environment in the Czech Republic*. In Applied economics, business and development (AEBD): Proceedings of the world multiconference. Kantaoui, Sousse: World scientific and engineering academy and society.

Tomášková, H. 2009. *Marketing research of mobile technology used by firms like advantage*. In Proceedings of the World Multiconference on Applied Economics, Business and Development (AEBD'09)

Aimprove E-Learning System by Enriching The Learner Knowledge Model

Amal Trifa, National School of Computer Sciences, Mannouba, Tunisia,
amal.tarifa@ensi-uma.tn

Aroua Hedhili Sbai, National School of Computer Sciences, Mannouba, Tunisia,
aroua.hedhili@ensi-uma.tn

Wided Lejouad Chaari, National School of Computer Sciences, Tunis, Tunisia,
wided.chaari@ensi-uma.tn

Abstract

E-Learning system acquired in the last decade an increasing number of students. In fact, it represents a flexible educational support for the student; it tunes automatically the studied resources according to the individual personality, needs and knowledge of the connected student; it offers a personalized service by analyzing collected data about the student. However, those students often cat off due to some mismatch with their concerns. In fact, e-Learning systems generally rely on the student's data observed on the e-Learning platform and neglect other sources of information. But, the more information we get, the more we are close to the student and his real expectations. Therefore, we propose, in this paper, the enrichment of the student model by observing his behavior on parallel opened URL(s) to deduce his acquired knowledge and to detect bridge events that require the system intervention for appropriate recommendation to stabilize the student behavior. The main treated issues focus on firstly, what is the useful information to observe in order to detect the real knowledge acquired by the student? Secondly, how this information is used to enrich the student's model?

Keywords: student modeling, data analysis, web personalization, e-Learning.

Introduction

In e-Learning platforms, individual personalization constitutes an essential service to attract the student. In fact, personalization of online platform services, in order to satisfy the implicit and explicit student needs or the student knowledge, has been a subject of many research studies. Eiriniaki and Vazirgiannis (2003) mentioned that web personalization is a process that contains a set of stages; first, the collection of the web data, second the modeling of these data, third the analysis of the collected data, and finally the personalized services are delivered. In this paper, we deal with the collection and the modeling of the web data, which concern the e-Learning platform, in order to detect the real student's gained knowledge as well as the troubles related to the student's learning behavior. The latter is used to provide an instantaneous recommendation to stabilize the student's learning attitude. In an e-Learning platform, the student-modeling phase includes several facets related to the complexity of the student's personality and how the external and internal effects of the learner's individual environment can affect his behavior on the studied course. One considered facet concerns the student's learning style, defined by Jonassen and Grabowski (1993) as the individual skills and preferences like learning materials that affect the learner perception and concentration. Yet, Popescu et al (2010) discussed in detail this subject and defined a tool handling different learning styles like the model of Felder and Silverman (1988). This model subdivides the

learner‘s style on various categories according to research work of Truong (2016), Ciloglugil and Inceoglu (2016), Rani et al (2015). However, it requires that student responds to a long survey in order to detect his style. This is considered as a major inconvenient. So, many works have tried to automate this detection, such case is depicted in the research work of Ahmad et al (2013) and Khribi et al (2013). Another important facet concerns the student’s knowledge is that it aims, on the one hand, to link the domain of the e-Learning application to the gained knowledge; on the other hand, it detects the gap that affects the evolution of the considered knowledge. This is a very important mean that allows an implicit assessment of the learner progression and determines the bridge events that simulate the demotivation of the student about some studied course or concepts. In the next section, we review this facet with details. Other works explored the facet of the student’s behavior and cognitive capability such us Polin and Martin (1992). They mainly analyzed the student’s cognition among his observed behavior and they characterized the student’s ability to learn, to keep attention of the course, etc. Bandura (2001) reported that the student cognition is often discussed in the field of psychology science. Besides, we note that studying the facet of student social interaction is omnipresent in the web personalization process, particularly with the e-Learning platform. It presents a crucial tool to deduce the existent relation between the e-Learning environment and the student’s social behavior as it is proved in the research work of Chu and Chen (2016). We consider that each quoted facet associated with student modeling issue, provides an overview of the observed student interests, needs, and wishes. The combination of them offers a complete mirror of the student and provides a better recommendation of possible resources and courses to the learner. Actually, the connected student to the learning platform leaves a trace of his personality, his interests, his intellectual level, and his social capability in each visited URL. Therefore, in order to be more accurate when modeling the student, we should take into consideration his external web navigation during his connection to the e-Learning platform. It’s like a large picture that can’t be detected from an only camera but it needs more cameras placed in distant places. Especially for student’s knowledge modeling, there are different external sources of information that can be cumulated and analyzed to determine the real level of acquired knowledge about defined concepts in the e-Learning platform. Hence, we propose to integrate the psychology facet and the knowledge facet in our analysis. Besides, we aim to detect the bridge event that simulates the student’s changing learning behavior. This then leads to the recommendation of the appropriate services.
The remainder of the paper is organized as follows: The second section presents the related works to the modeling of student knowledge and student behavior in the field of e-Learning system. The third section describes in detail the information provided by an e-Learning system about the student’s knowledge and the enrichment made by web scrapping on the student’s gained knowledge.

Our contribution is highlighted in the third section. It consists essentially on collecting the all student significant interactions; not only the past exams and tests but also the student interactions on forums. Furthermore, we deal with the emotional side in our analysis. The proposed approach is validated with a simulation of our algorithm to prove its efficiency to deduce the real knowledge gained by the student during its learning process.

Related Work

Since we deal with the student-modeling phase of the web personalization process, particularly modeling the student knowledge, we present, first, the developed models in order to model this knowledge. Then, we quote the proposed approaches that treat student behavior and events.

The Student Knowledge Models

In the context of e-Learning system, the most interesting fact to know is the knowledge of the student and his current as well as future interests about some concepts or knowledge. It is a challenging purpose because the studied subject “learner” can’t judge his knowledge about concepts as expert; moreover he

tends to hide his real knowledge or his misunderstood about something. Therefore, many studies had focused on such issue. In fact, there exist four principle classes; the overlay model, the perturbation model, the ontological model, and the machine learning model.

The overlay model was introduced by De Boeck and Wilson (2004). It consists on representing the student knowledge as a subset of the domain or expert knowledge. The gap of the student knowledge is detected through the difference between the expert's knowledge and the student's gained knowledge as explained by Bontcheva and Wilks(2005). Many tutoring systems have adopted this model such as GUIDON, which was introduced by Clancey (1983). The complexity of the overlay model depends on the granularity of the domain and its composed concepts representations. It supposes that the student knowledge is included in the expert knowledge; nevertheless, the student may have knowledge that experts didn't gain yet. Moreover, the student's behavior could vary from one student to another, as the reasoning process varies, so the logic of reasoning of an expert can't be the only path that leads to success. Besides, the overlay model ignores the cognition of the student and his needs according to his accumulated knowledge. Another developed approach manages the evolution of student's knowledge with a graph where the nodes correspond to the student's knowledge evolution rules and the edges represent the relationship showing the transition between connected nodes such as generalization. Thanks to the dynamic aspect of the graph, this approach offers an easy monitoring of the student's knowledge evolution, but the proposed graph has a static states.

The perturbation model as explained by Surjono and Maltby (2003), Baschera and Gross (2010) presents an amelioration of the overlay model since it considers the incorrect reasoning of the student to analyze the reasoning behind wrong answers and to understand the misconception of the student's behaving. A "bug" library supports such mission, is deduced from experimentations. However, new bugs and new misconceptions are not considered in this library.

Cheung et al (2010) explored the ontological model. The latter ensures the reuse of information organized in a semantic way as the knowledge of the domain. However, such model is closely related to the defined domain of the e-Learning application, also it ignores the cognition and the emotional states of the student.

Machine learning has been adopted as a model that dynamically observes the student and deduces if he is able to resolve certain problem, if the knowledge has been mastered, and if there is a lack in student understanding. The most known approaches that handle this model are the Latent Factor Model (LFM) based on Item Response theory introduced by Boeck and Wilson (2004) and the Bayesian Tracing Knowledge (BTK) introduced by Albert et al (1995). Indeed, the LFM deduces, from a group of student, the latent ability of each student to solve the problem and the latent difficulty of each problem. It doesn't treat the evolution of skills or student's knowledge through time. The BTK considers the evolution of knowledge in time but it doesn't make distinction between the student and the problem. To overcome those limits, Khajah et al (2014) suggested to combining the two models. The combination seems interesting as it insures the evolution of the individual knowledge in time taking into account the difference between student and problem. The limitation of this approach consists in collecting the student ability only from tests as well as neglecting the psychological effect on that model. Yet, there are other sources as questions and responses on forums that provide a certain level of mastered knowledge or a deficiency in certain knowledge. In addition, the passed tests don't often reveal the real level of knowledge gained by the student. In fact, there are many factors that affect the student's response especially on exams such as the track, the fear, and the lack of confidence. So, it is very interesting to be able to quantify the level of knowledge taking into account those factors. Besides, the observation windows used for tracking the student is very limited. We believe that the knowledge of the student is also built from external forums and external professional networks.

In this paper, we deal with computing the knowledge of the student accumulated from his internal and external web navigation. In fact, we believe that exploring the student's activity on the Web, such as

asking a question or answering a question, provide for the e-learning system a correct and clear vision about the actual knowledge gained by the student and the real incomprehension or blockage that the student suffers from. This improves the prediction of the student's intensions and preferences. So we can offer a stable and efficient learning process.

Mastered Concepts

Many research works have adopted the facet of student's mastered concept in the student's model in order to predict the student response facing a certain problem such as the Bayesian tracing knowledge or the Latent factor model. The latter takes into consideration the student's ability and the problem complexity. Indeed, for measuring the gained knowledge, it is important to consider all conditions that can influence the student response as emotions or problem difficulty. Besides, the connection that exists between concepts as well as the included set of Learning Objects in each concept constitutes a key factor that should be included to draw image of gained Learning Objects and so concepts and so determines his level of knowledge. In other words, it is essential to consider the concepts, concepts' domains, access hierarchies, exams and difficulties related to concepts, emotion of student, significance of response, and pertinence of questions. These factors contribute to enrich our Bayesian network model to provide the probability that Learning Objects/concepts are acquired by the student. So, we treat, in this section, the main information that should be analyzed to deduce the student's gained level of knowledge. This knowledge is detected according to different sources of information detection; knowledge obtained from an internal source, the e-Learning system in our case, called internal knowledge, and those obtained from external sources, the student web browsing, called external knowledge.

Internal Knowledge

In an e-Learning system, the domain of the application is represented as a set of concepts I, every course (F) includes a subset of concepts to handle. Besides, every concept is a set of Learning Objects and every Learning Object k_j is a set of term as:

$$C_i = \{k_j, j = 1..l\}, l \leq |k| \\ k_j = \{t_n, n = 1..f\} f \leq |t| \quad (1)$$

-Here C_i represents the *i* th concept in the course F and k_j represents the *j* th learning object on the concept C_i

A course F is represented as follows

$$F_j = \{C_h, h = 1..M\}, M \leq |C| \quad (2)$$

- With M number of concepts included in course F_j

The student can write a question on the forum of the e-Learning platform; every question is also related to a subset of terms that describe one or more concepts difficulties. So, a proposed question, x, at the moment, t, from the student, u, is represented as follows:

$$Q(t, x, u) = \{te_b, b = 1..B\}, B < |te| \quad (3)$$

Similarly, the response, x', produced at the moment, t', by the student, u, is presented as:

$$R(t', x', u) = \{te'_c, c = 1..C\}, C \leq |te'| \quad (4)$$

The student can also pass a test composed with large set of words related to a subset of Learning Objects included in concepts, generally, concepts related to each test and Learning Objects are indicated. So, the passed test, p, by the student, u, begins at time, t, and finishes at time, t', can be represented as follows:

$$test(t,t',u,p)=\{k_d, d=1..D\}, D<|k| \quad (5)$$

All concepts are organized in an oriented graph. The graph nodes represent the concepts and the edges represent the existence relation between those concepts. For instance, when the i th concept Ci is connected to the j th concept Cj, the edge is depicted from Ci to Cj, this means that before learning the concept Cj the student should imperatively gained the knowledge about the concept Ci. If there is a double connection between two concepts, the two concepts can be gathered because each concept can be related to the other. The following figure illustrates our example of the domain representation. Every set of concepts that has been surrounded represents a possible combination of those concepts in one course or one exam.

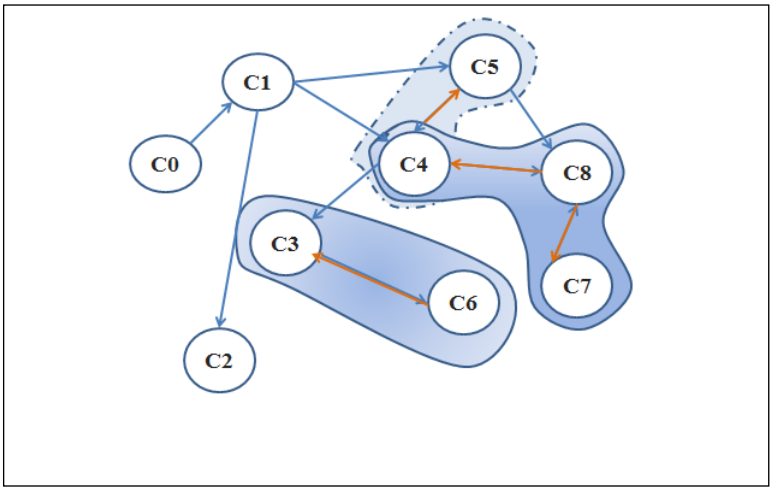


Fig.1: The relation between internal concepts

In order to be able to measure the degree of gained knowledge from each concept visited by the student, we deal with, firstly, the student's response and student's questions as well as the mark accumulated by the student during exams. We aim also to interpret the emotion of the student during exams to be able to judge the obtained mark since student emotion could influence the exam circumstances.

A. Deducing concepts and Learning Objects related to questions or responses

The first challenge is to be able to extract the concept and the Learning Object mentioned on each question and response. Computing the similarity between one asked question and one Learning Object is not an easy step; in fact, the same Learning object can be expressed with different sets of words such as "data visualization" and "how to plot m observation in two dimensional figure?". Applying a Jaccard coefficient leads to "0" similarities. So, we are facing a Natural Language Processing problem. The majority of researches that deal with such a problem employ one of the three following methods as knowledge based method, adopted by Radinsky et al (2011) as well as Gabrilovich, and Markovitch (2007) or corpus based method, adopted by Cilibrasi and Vitanyi (2007) or a combination of those

methods, introduced by Li et al (2003). In this paper, we deal with a corpus based method and more precisely with a supervised method. This is justified by the fact that we want to obtain an accurate classification of each asked question or given response related to the Learning Object existing in the e-Learning platform. In order to collect the needed corpus for the training data, we use Stack Overflow. This latter offers the possibility to obtain a large training data thanks to the stack exchange API. By querying the API, we obtain for each Learning Object between 1000 and 1500 questions, as well as Answers. Then, we consider the use of Recurrent Convolutional Neural Network RCNN, introduced by Lai et al (2015). After that, we compare its performance to the performance of Convolutional Neural Network CNN when applied to our data. CNN is introduced in the research work of Kim (2014). We conclude after experiments, as shown in Fig.2, that the RCNN outperforms the CNN. Therefore, we opt for the use of RCNN in order to obtain a more accurate classification task.

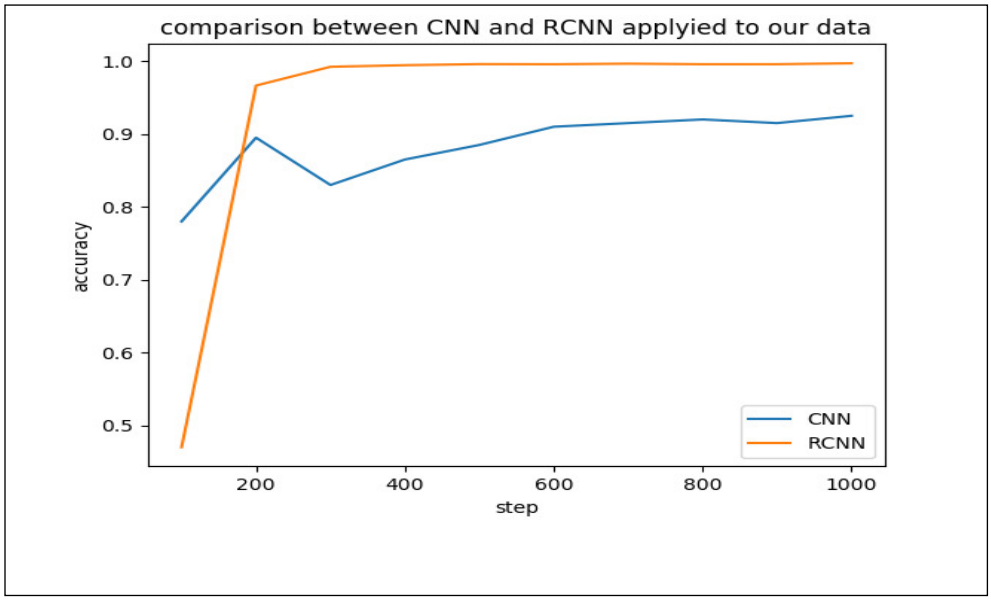


Fig.2: comparison between RNN and RCNN performance on our data

B. Question and test difficulties

It is very important to measure the concepts difficulties in tests, exams, or questions in order to be able to quantify the gained level of knowledge taking into account the student's response among the test's difficulty as well as the degree of student's question difficulty. This is useful to understand how the student has learned this concept (in depth or superficially). There are many definition of concept difficulty. The first definition, mentioned by Crocker and Algina (1986), considers that concept difficulty is the number of learner who answered the concept correctly divided by the total number of learner. This probability is generally given by teacher. The second definition, introduced by Kardan and Bahrani (2014), is based on the student's annotation (implicit feedback) when reading exams to determine the concept difficulty relying on term frequencies for every concept. We note that the first one proposes a general difficulty level and the second one proposes an individual difficulty level tracked from annotation. Therefore, we propose to combine the two definitions. We assume that measuring the difficulty of one concept figured in one test should take into account the general difficulty of this concept under all students as well as the individual probability that student has learnt this concept. The following equation resumes this computation:

$$concept\_diff(C_i) = \frac{P(nb\_rightAnswer(C_i))}{P(nb\_allAnswer(C_i))} \times (1 - P(gained\_ant(C_i))) \times \sum_{t \in C_i} d(t)$$
$$P(gained\_ant(C_i)) = \prod_{k \in nb(C)/C_k < C_i} P(gained(C_k)$$
$$d(t) = (1 - \tanh(f(t) + 1/3) \quad (6)$$

-nb_rightAnswer represents number of right answers realized by the student;

-nb_allAnswer represents the number of all existent answers delivered students whose accomplish the test. Where P(gained_ant(Ci)) is the probability of student's gained concepts that should be mastered before the concept Ci . d(t) is the difficulty rating of term t and f(t) is the frequency of tem t. The first fraction in the concept_diff(C_i) is experimentally deduced.

C. Measuring emotions behind exams and questions

In order to measure student's emotions when answering questions or exams, we suggest using the RCNN [22] for this classification problem. Indeed, emotions are classified into five defined classes as: <confused, confident, ignoring, stressed, nothing>. The entire student's annotation, before or when responding a question, is kept and labeled manually to be used as a training data. We note that emotion is a number accorded to each detected feeling when the student passes an exam, this number is deduced according to the probability of the emotion to influence the learner's marks such as confused= 0.5 , confident=1.5, ignoring=0, stressed=1.5, nothing=1.

D. Level of gained knowledge

In order to measure the pertinence of a question written by the concerned student on the concept, we compute the emotional feeling of the students who respond to question. This can be determined through RCNN as explained before, classifying responses on question as <interesting, not interesting, nothing>; we note that nb_interest represents number of persons that express a certain interest to the question or vote for the question $Q(C_i)$ and nb_notInterest is the number of persons that express a disinterest to the question or consulted the question without any reaction .

$$pertinenceQ(C_i) = \frac{nb\_interest - nb\_notInterest}{nb\_total} \quad (7)$$

Moreover, the pertinence of an answer is computed by dividing the number of time the response is viewed under the number of time the most viewed response is consulted. So, we summarize the form of the obtained and treated data to determine the level of gained knowledge as follows:

- Data related to exam: Concept, emotion, mark, difficulty, and time.
- Data related to question: Degree of evocation of concept, pertinence, and time. Generally, an asked question by the student reveals that he is confused about some concept, he misunderstands a thing related to a concept, or he ignores something related to a concept. In parallel, the pertinence of a question reveals that the student is learning in depth the concept and shows a certain level of concentration.
- Data related to response: Degree of evocation of concept, pertinence, and time. Generally, the response indicates an increase of level of knowledge when it is pertinent.

In order to build a full image of the learner gained knowledge about a certain concept after passing an exam or a test, we can compute the probability to gain a concept as explained in the Fig.3.The graph

(8)

illustrates the logic behind computing the gained knowledge in one concept. Precisely, it represents the structure of our Bayesian network given by the equation (8).

$$P(gained\_C) = P(gained\_k_{exam} \mid x,y,z,t) \cup P(gained\_k_{response} \mid p,t' < t)$$
$$-P(gained\_k_{exam} \mid x,y,z,t) \cap P(gained\_k_{reponse} \mid p,t' < t)$$
$$-P(unkoun\_k_{question} \notin k_{exam} \mid p',t'' < t)$$

With:

- k_{exam} represents the learning object figured in the exam, $k_{question}$ represents the learning object figured in the question, and $k_{response}$ represents the learning object figured in the response;

- x, y, z, and t are respectively emotion, difficulty, mark and time of passed exam; t' represents the time of posted response and t'' represents time of posted question.

- p and p' represent respectively pertinence of question and response.

- α, β, δ are the degree of evocation of the learning object k included in the concept among exam, question, and response.

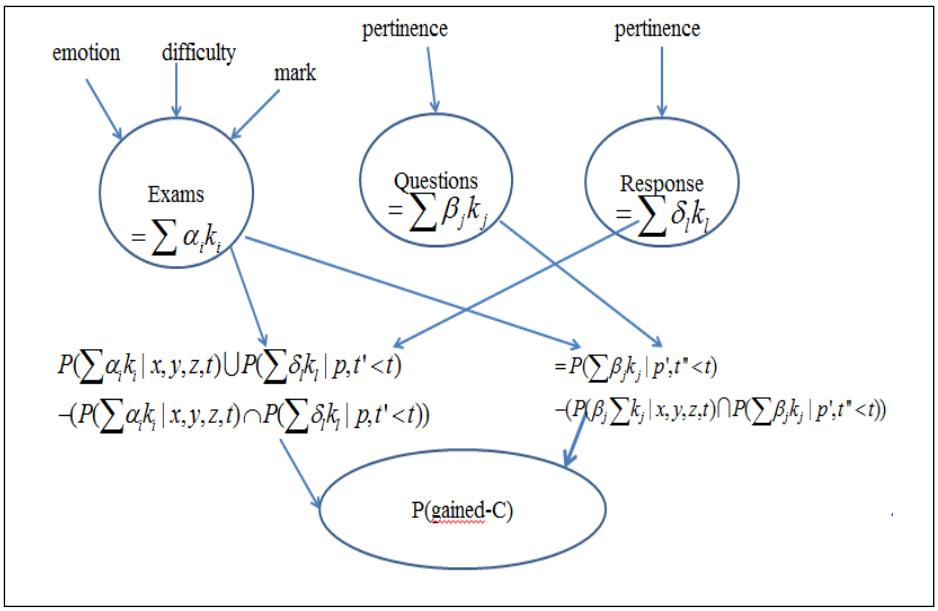


Fig.3: Level of gained knowledge in the concept C after passing an exam

We note that when combining the knowledge detected from m questions, the result is subdivided into m. So, we compute the mean of the computed knowledge from different student's actions and regarding to the same Learning Object.

External knowledge

Generally, the student opens several URL(s) in parallel to the e-Learning platform. He can consult in parallel his social networks to discuss with his friends the learned courses. He can use some known forums to ask about a misunderstood concept or to consult some responses about a certain question related to a certain concept. There are several forums like stack overflow, development.com, github, etc. Scraping student's behavior via these external URL(s) and especially forums could enhance the student's model. The scraping process should be automatically carried out according to a given filter. In our case, filter is a dataset of word corresponding to vocabulary related to the thematic of learning. However, this process presents some difficulties like performing data in short time or scraping data from a dynamic HTML structure. Indeed, the majority of web pages supports HTML format, which can be scrapped through the student's web browser to identify important URL(s) related to the learning topic. These URLs are used to capture student's concerns and interests about a particular subject. We notice that most websites have some Meta data stored in Meta tags of the HTML format; this meta data represents the description of the web page. Therefore, we extract the description of a webpage by parsing meta tags. Then, we compute the difference between the description of the concerned webpage and our defined filter. So, first, we extract information about opened URL(s) by means of the student's web browser. Then, we identify the following types of opened URLs:

- URLs that correspond to forums: Forum web pages are treated by using a method of text mining in order to understand the student's issues under the proposed questions and answers. For instance, in the case of Stack Overflow, the frameworks frequently used by student in computer science area could be detected.
- URLs of professional networks like LinkedIn. We analyze those URL(s) to extract the student's skills and to draw the graph of professional friends.

We explore those two types of URL(s) and we deal with data provided by web scraping according to a defined filter. We believe that the student's skills extracted from forums and professional networks can affect the student's model in the e-Learning context. It provides a better understanding of the gained student's knowledge and it indicates the encountered difficulties during the learning process. Moreover, the asked concepts in the extern platforms or forums can be related to other courses attended in another e-Learning platform, the recognition of these courses could be useful to recommend other courses for the student from our e-Learning platform. In our solution, we deal with Stack overflow. Through this forum, the student can ask a question, respond to a question and vote for a question or response, the vote can be negative. We propose to take advantage of the performed actions and determine if the contribution of the student is important. So, this can explain how the student is concentrated about one concept integrated in the question and it can inform us about the level of gained knowledge that concerns a certain Learning Object related to a certain concept. We are based on the combination between neo4j and Stack Overflow to implement our idea. Indeed, neo4j is capable to convert the Stack Overflow data in a huge graph that can be queried at any time to pursue the student's behavior on such forum. The information scraped from Stack Overflow is used to add the effective score for the learning object. We measure the score of each question and each response according to the tagged items in the corresponding question as follows:

$$ScoreQ_i = \frac{vote(Q_i) \times \sum_{j \in Q(i)} \alpha_j k_j}{totalviewed(Q_i)} \quad (9)$$

$$Score(R_{i,l}) = \frac{vote(R_{i,l}) \times \sum_{j \in R(k,i)} \beta_j k_j}{totalviewed(R_{i,l})}$$

Where:

-$ScoreQ_i$ corresponds to the score of the knowledge included in the question$i$. It describes how deeply the student is concerned about some concept.

-$ScoreR_{i,l}$ corresponds to the score of gained knowledge, detected in the response l related to the question$i$.

We are interested only on the Learning Objects or concepts included in the domain of the e-Learning platform, so that our problem is maintained as a classification problem. After that, we integrate the Learning Object and its computed score in our defined model in Fig.3. Indeed, the score represents the pertinence of the question or response related to this detected learning object. Following this logic, we accumulate an accurate image of the level of knowledge acquired by the concerned student.

A. Scenario and experiments

In this section, we present a simple simulation of our proposed approach in order to obtain more accurate information about the student's accumulated knowledge. We consider a student that learns from Dataquest. We choose the following parameters:

-Concept: Python foundation and programming concept,

-Learning Object: Exploration of Data Visualization, Learn how to explore data by creating and interpreting data graphics using matplotlib and pandas.

-Test on such concept: for each test the mark "x" is converted as 1 x>15, to 0.5 if 10<x<15, to 0 if x<10, the considered student obtains 1.

-Asked questions after tests: "data plotting in boxes with python: I have an array d[0:100] which is defined in boxes (or cells) whose center are stored in these two arrays x[0:100] y[0:100]and whose size is h[0:100]I wish I could plot an image showing boxes/cells colored according to the value of the array defined in each of them. It seems and histogram but it is not. Do you have any idea where to start?. The same query is asked on the e-Learning platform. It has 10 votes and 14 comments from different persons in the stack overflow platform and four interests and one disinterest in the e-Learning platform. Applying the previous cited algorism we obtain:

Table1: simple scenario explanation

	Internally	Externally
classification	Exploration of Data Visualization	Exploration of Data Visualization
pertinence	0,33333	0,714
Level of gained Knowledge(LO)	[(0,33333+0,714)/2]x1=0,5325→0,5	

We note that every score corresponding to the computed Knowledge "x" about a certain Learning Object is converted to 0 if x<0.4, to 0.5 if 0.4<=x<0.8, to 1 if x>=0.8.

Table2: A comparison between students' accumulated knowledge in the e-learning platform and those accumulated through our approach

	LO(1)		LO(2)		LO(3)		LO(4)		Agree
	B	A	B	A	B	A	B	A	
Student1	1	0.5	1	1	0.5	1	1	1	4A 2B
Student2	1	1	1	1	0.5	0	0.5	1	3A 3B
Student3	0.5	1	0.5	1	0.5	0	0.5	0	3A 1B

After exposing three students to the observation process of their external and internal navigation, we made a survey as each student is provided with two lists of its accumulated Knowledge. The first list (B) corresponds to the each student knowledge according to the passed tests. The second list (A) corresponds to the student knowledge regarding to our accumulated knowledge. This latter is related to the student's internal and external navigation. The result is shown on the table 2. In fact, we obtain for the first student four agrees about the A knowledge and two agrees about the B knowledge. We have for the second student agrees about three A and three B, and finally the third student agrees present three A and one B. We note that our process increases the performance of the learning process by tuning the knowledge level for each learning object according to all information kept from the learner learning process during his connection to the e-learning platform

Conclusion

This paper proposed a novel use of the student interaction on parallel open forums in order to better full fit the model of the student and more precisely construct a clear picture about the student gained knowledge. For that, we use Bayesian Network and we take into consideration emotion as well as question and response scraped in parallel opened URL(s). The fact of scraping from parallel URL(s) significant data is very challenging, yet we limit our focus on data correlated semantically to the domain of the e-Learning platform. This can be enlarged to encompass other learning objective but the process of identifying the Learning Objects in the scraped URL(s) should be automatically done.

References

Ahmad, N., Tasir, Z., Kasim, J., & Sahat, H. (2013). 'Automatic detection of learning styles in learning management systems by using literature-based method'. Proceeding of the conference Social and Behavioral Sciences, 103, 181-189.

Albert T. Corbett and John R. Anderson (1995). 'Knowledge tracing: Modelling the acquisition of procedural knowledge' . Proceeding of the conference User Modeling and User-Adapted Interaction, 4(4):253-278.

Bandura, A. (2001). 'Social cognitive theory of mass communication'. *Media psychology*, 3(3), 265-299. 3

Baschera, G. M., & Gross, M. (2010). 'Poisson-based inference for perturbation models in adaptive spelling training'. *International Journal of Artificial Intelligence in Education*, 20, 1–3.

Bontcheva, K., & Wilks, Y. (2005). 'Tailoring automatically generated hypertext'. *User Modeling and User-Adapted Interaction*, 15(1-2), 135-168.

Cheung, R., Wan, C., & Cheng, C. (2010). 'An ontology-based framework for personalized adaptive learning'. Proceedings of the 9th international conference on web-based learning (ICWL) (pp. 52– 61). Shanghai, China.

Chu, T. H., & Chen, Y. Y. (2016). 'With good we become good: Understanding e-Learning adoption by theory of planned behavior and group influences'. *Computers & Education*, *92*, 37-52.

Cilibrasi, R. L. and Vitanyi, P. M. B. (2007). 'The google similarity distance'. *IEEE Transaction.on Knowlege and Data Engineering.*, 19(3):370–383.

Ciloglugil, B., & Inceoglu, M. M. (2016, July). 'A Felder and Silverman Learning Styles Model Based Personalization Approach to Recommend Learning Objects'. Proceeding of the 16th International Conference on Computational Science and Its Applications (ICCSA) (pp. 386-397). Springer .

Clancey, W.J.: 'GUIDON', *Journal of computer-based instruction*, 10(1), pp, 8-14 (1983)

Conati, C., & Zhou, X. (2002). 'Modeling students' emotions from cognitive appraisal in educational games'. In Proceedings of the 6th international conference on intelligent tutoring systems (pp. 944–954). Biarritz, France and San Sebastian, Spain.

Crocker, L., & Algina, J. (1986). 'Introduction to classical and modern test theory'. New York: Holt, Rinehart and Winston.

Eirinaki M, Vazirgiannis M. 'Web mining for web personalization'. *ACM Transactions on Internet Technology (TOIT)* 2003; 3(1):1-27.

Felder, R. M., & Silverman, L. K. (1988). 'Learning and teaching styles'. *Engineering Education*, 78(7), 674–681.

Gabrilovich, E. and Markovitch, S. (2007). 'Computing semantic relatedness using wikipediabased explicit semantic analysis'. In Proceedings of the 20th international joint conference on Artifical intelligence, (IJCAI), pages 1606–1611, San Francisco, CA, USA. MorganKaufmann Publishers Inc.

Gers, F. A., Schmidhuber, J., & Cummins, F. (2000). 'Learning to forget: Continual prediction with LSTM'. *Neural computation*, *12*(10), 2451- 2471.

Jonassen, D. H., & Grabowski, B. L. (1993). Handbook of individual differences, learning and instruction'. Hillsdale, NJ: Lawrence Erlbaum Associates.

Kardan, A., & Bahrani, Y. (2014). 'Learner's knowledge modeling using annotation and Bayesian network'. In the 4th International Conference on Computer and Knowledge Engineering (ICCKE) (pp. 117-122). IEEE.

Khajah, M., Wing, R., Lindsey, R., & Mozer, M. (2014). 'Integrating latent-factor and knowledge-tracing models to predict individual differences in learning'. In Educational Data Mining 2014.

Khribi, M. K., Jemni, M., Nasraoui, O., & Graf, S. (2013). 'Toward a fully automatic learner modeling based on web usage mining with respect to educational preferences and learning styles'. Proceeding of 13th International Conference on Advanced Learning Technologies (ICALT) (pp. 403-407).

Lai, S., Xu, L., Liu, K., & Zhao, J. (2015). 'Recurrent Convolutional Neural Networks for Text Classification'. In the 29th proceeding of the conference on Artificial Intelligence (AAAI) (Vol. 333, pp. 2267-2273).

Li, Y., Bandar, Z., and Mclean, D. (2003). An approach for measuring semantic similarity using multiple information sources. *IEEE Transactions on Knowledge and Data Engineering*, 15(4):871–882.

P. De Boeck and M. Wilson. Explanatory Item Response Models: a Generalized Linear and Nonlinear Approach.Springer-Verlag, New York, NY, 2004.

Polich, J., & Martin, S. (1992). Cognitive capability and personality: A correlational study of university undergraduates. Personality and Individual Differences, 13(5), 533-543.

Popescu, E., Badica, C., & Moraret, L. (2010). 'Accommodating learning styles in an adaptive educational system'. *Informatica (Slovenia)*, *34*(4), 451-462.

Radinsky, K., Agichtein, E., Gabrilovich, E., and Markovitch, S. (2011). 'A word at a time:computing word relatedness using temporal semantic analysis'. In Proceedings of the 20th International Conference on World Wide Web, WWW '11, pages 337–346, New York, NY, USA. ACM.

Rani, M., Nayak, R., & Vyas, O. P. (2015). 'An ontology-based adaptive personalized e-Learningsystem, assisted by software agents on cloud storage'. *Knowledge-Based Systems*, *90*, 33-48.

Stansfield, J. C., Carr, B., & Goldstein, I. P. (1976). 'Wumpus advisor I: A first implementation of a program that tutors logical and probabilistic reasoning skills'. At Lab Memo 381, Massachusetts Institute of Technology, Cambridge, Massachusetts.

Surjono, H., & Maltby, J. (2003). 'Adaptive educational hypermedia based on multiple student characteristics. In Proceedings of the 2nd international conference on web based learning (ICWL) (pp. 442–449). Melbourne, Australia

Truong, H. M. (2016). 'Integrating learning styles and adaptive e- Learning system: Current developments, problems and opportunities'. *Computers in Human Behavior*, *55*, 1185-1193.

Weeds, J., Weir, D., and McCarthy, D. (2004). 'Characterizing measures of lexical distributional similarity'. In Proceedings of the 20th International Conference on Computational Linguistics, COLING '04, Stroudsburg, PA, USA. Association for Computational Linguistics.

Y. Kim, (2014). 'Convolutional neural networks for sentence classification'. In the Proceeding of the conference Empirical Methods on Natural Language Processing (EMNLP), Doha, Qatar, *arXiv preprint arXiv:1408.5882*.

Y.Li, D.McLean, Z. Bandar, J. O'Shea, and K. Crockett (2006). 'Sentence Similarity Based on Semantic Nets and Corpus Statistics'. in *IEEE Transaction on knowledge and data engineering*, vol. 18, nu. 8, august 2006

Box-ing Happiness

Feyza Aglargoz, Anadolu University, Eskisehir, Turkey, feyzak@anadolu.edu.tr

Feyyaz Kaya, Anadolu University, Eskisehir, Turkey, feyyazkaya@gmail.com

Abstract

This ongoing research aims to explore the consumer behavior and psychology behind the subscription box business models and the motivations of buying and sharing this experience in social media. The study tries to explore meanings of unboxing videos, not just merely observe. This exploratory research focuses on the subscription box business model which has become extremely popular among shoppers and are widely used by many companies. There are not enough overall statistics about subscription box industry but between 2013-2016, subscriptions have increased 3000% (Chang, 2016). The most popular subscription box companies are Birchbox, Ipsy, Mac & Mia, FabFitFun, The Year of Wellness, GlossyBox, BeautyArmy, Le Tote Box, Box of Style and Dollar Shave Club (Boyd, 2016). Content is generally created based on customer's preferences. There are so different subscription box models in a wide range of categories (women, men, beauty, food, moms, babies, kids, drinks, fitness, eco, crafts, pets, artisan etc.). However, the industry has become so saturated that new entries are starting monthly subscription boxes for more specific categories like niche boxes and luxury boxes (Ray, 2015).

Social media plays an important role in the diffusion of subscription box business models. Particularly, YouTube videos on subscription boxes are conspicuously increasing. So, in this study unboxing videos in YouTube will be used. Main research method of the study is interpretive video analysis (videography). Today, there is an explosive diffusion of privately produced videos using the Internet as a favorite medium of distribution. This has also opened new ways for the social sciences to produce and present data. The dissemination of video as a technology has now allowed many more social scientists to use it because it is not only relatively cheap, reliable, and available but due to its widespread private use, video has become less and less obtrusive. Knoblauch and Tuma (2011:416) consider videography to be a specific form of focused ethnography since the use of video has important consequences for the focusing process. Ethnography helps to determine exactly where, when and who is to be recorded on video. This exploratory research will contribute to a developing understanding of a new consumption phenomenon, subscription-based e-commerce. This research also contributes to consumer behavior by adopting ethnography on videos. Analyzing videos can bring valuable insights to consumer behavior study.

Keywords: Subscription box, unboxing, consumer behavior

References

Boyd, S. (2016). '9 Of The Best Subscription Boxes', https://www.forbes.com/sites/sboyd/2016/10/31/the-year-of-the-subscription-box/#5cd9fc76e778 (Accessed on 30.09.2017).

Chang, H. (2016). 'What's in the box? - A closer look at the subscription box retail trend', http://www.smu.edu.sg/podcast/whats-box-closer-look-subscription-box-retail-trend (Accessed on 29.05.2016).

Ray, T. (2015). '5 Predictions on the Future of Subscription E-commerce Models', http://yfsmagazine.com/2015/12/22/5-predictions-on-the-future-of-subscription-e-commerce-models/ (Accessed on 29.05.2016).

Knoblauch, H. and Tuma, R. (2011). Videography: An Interpretative Approach to Video-Recorded Micro-Social Interaction. In E. Margolis ve L. Pauwels. The Sage Handbook of Visual Research Methods, s. 414-430.

Innovation of the Economies of European Union Countries in 2009-2016

PhD. Anna Kowalska, Wroclaw University of Economics, Wroclaw, Poland
anna.kowalska@ue.wroc.pl

Abstract

The impact of innovation on the competitiveness of economies is one of the priorities of modern economic policy. Economists' views on the innovativeness of economies and the factors that influence the building or weakening of international position of each country have led to the creation of various rankings published by scientific institutes. These rankings not only determine the innovation of the individual countries, but also the factors that incite or discourage countries from doing innovative activities. The aim of this article is to present the results of a comparative analysis of changes in the innovativeness of the economies of the European Union over a period of 7 years. The analysis used the results of the Summary Innovation Index (SII) used in the European Innovation Scoreboard (EIS).

Keywords: innovation, economy, European Union, competitiveness

Introduction

The innovation of the economy is "the ability and motivation of entrepreneurs to conduct scientific research to improve and develop production, to seek new solutions, ideas and concepts" [Grodzka, Zygierewicz 2008]. The introduction of innovation can be carried out at different levels. Innovative actions by businesses, industries, regions or whole economies in the form of new products, technology improvements or increased efficiency will increase their competitiveness vis-à-vis other countries [Firlej, Kowalska, Piwowar 2017].

The impact of technological progress and innovation on economic growth has long been supported by economic theory [Solow 1957; Arrow 1962]. Economic empirical research also confirms this. They indicate that acceleration of economic growth is possible thanks to an increase in productivity dynamics [Khan, Luintel 2006; Leeuwen, Klomp 2006] and this provides investment in research and development as well as innovation [Cameron 1996; Bailey 2003]. At present, with limited labor and environmental resources and declining income from investment in physical and human capital, long-term economic growth can only be achieved by improving the efficiency of the use of these inputs.

The European Union to reduce the technological gap that separates the European Union from the United States and Japan has developed the Europe 2020 Strategy. This strategy was adopted by the European Commission in March 2010 and its priorities are to increase the innovation and thus competitiveness of the Community.

Purpose, Scope and Methodology of Research

The aim of the article is to evaluate the innovativeness of the economies of the European Union by means of synthetic indicators and to show the changes that took place in this regard in years 2009-2016. The analysis covered 28 countries belonging to the European Union.

The European Innovation Scoreboard (EIS) reports and the Summary Innovation Index (SII) have been used to analyze the innovations of individual economies in the European Union. The SII, in some reports

called European, was introduced by the European Commission and the University of Maastricht in 2001 as a unified system for examining the degree of innovation in European countries. This index was created to identify and analyze instruments impacting socio-economic cohesion policy when assessing the living standards of EU citizens [Tarnowska 2013]. The level of innovation was calculated using the international innovation research program – Community Innovation Survey, Eurostat and the OECD data.

Over the years, the methodology for measuring this index has changed. At present, the SII consists of 27 indicators, thematically divided into ten dimensions. Each dimension describes another area of the country's innovation. They were collected in four related groups:

1. framework conditions of the 3 most important areas known: human resources (new doctorate graduates, population completed tertiary education. lifelong learning), attractive research systems (international scientific co-publications, scientific publications among top 10% most cited, foreign doctorate students) and innovation-friendly environment (broadband penetration, opportunity-driven entrepreneurship);
2. investments, consisting of two areas: finance and suport (R&D expenditure in the public sector, venture capital investments) and firm investments (R&D expenditure in the business sector, non-R&D innovation expenditure, enterprises providing ICT training);
3. innovation activities, which included 3 areas: innovators (SMEs with product or process innovations, SMEs with marketing or organisational innovations, SMEs innovating in-house), linkages (innovative SMEs collaborating with others, public-private co-publications, private co-funding of public R&D expenditures) and intellectual assets (PCT patent applications, trademark applications, design applications);
4. impacts on specific projects in terms of innovation ie. employment impacts (employment in knowledge-intensive activities, employment fast-growing firms innovative sectors) and economic effects (medium & high tech product exports, knowledge-intensive services exports, sales of new-to-market and new-to-firm innovations), [more: EIS, Methodology Report, 2017]

The standared deviation ($S(x)$) was compared to the mean (arithmetic mean) as a measure of the variance between the states analysed [Olszańska 2012].

The results have been sorted in order to identify the European Union countries that stand out in terms of the largest and smallest levels of the phenomenon over the period under consideration. The number of groups separated in a given year depends on the variability of the phenomenon under investigation. For clarity, in some figures and in tables were used the country abbreviations as shown in table 1.

Tab. 1: Symbols of countries

Symbol	Country	Symbol	Country	Symbol	Country	Symbol	Country
BE	Belgium	EL	Greece	LT	Lithuania	PT	Portugal
BG	Bulgaria	FR	France	LU	Luxembourg	RO	Romania
CZ	Czech Republic	HR	Croatia	HU	Hungary	SI	Slovenia
DK	Denmark	IT	Italy	MT	Malta	SK	Slovakia
DE	Germany	CY	Cyprus	NL	Netherlands	FI	Finland
EE	Estonia	ES	Spain	AT	Austria	SE	Sweden
IE	Ireland	LV	Latvia	PL	Poland	UK	United Kingdom

Source: own study.

The scale of 0-1 was adopted for the SII index (where 1 stands for the highest achievable level of innovation). Depending on the distance separating the countries from the average innovation index of the

community countries, they were divided into four groups, depending on the % level of the innovation compared to the EU average:

1. "innovation leaders" (over 120%);
2. "following the leaders" (90-120%);
3. "moderate innovators" (50 - 90%);
4. "weak innovators" (below 50%).

Research Results

The value of the Summary Innovation Index for individual European Union countries varies (fig.1). Innovation leaders among the economies of the European Union are the Scandinavian countries, including Sweden, which has the highest value of SII. Countries such as Sweden, Denmark, Finland, but also the Netherlands, Great Britain, Germany, Austria, Luxemburg and Belgium in 2016 are also among the innovation leaders. These are countries which Summary Innovation Index accounted for more than 20% of the value of the average European Union index. When analysing innovation leaders, it can be seen that only the countries of the old European Union belong to this group.

In 2016 only three countries, ie. Ireland, France and Slovenia, were included in the group of so-called innovation supporters. The SII value for these countries was between 90 and 120% of the EU average. The most numerous group (as many as 14 countries in the European Union) found themselves in the so-called moderate innovators group. Among the countries the weakest in terms of innovation was (value below 50% of the EU average) Bulgaria and Romania.

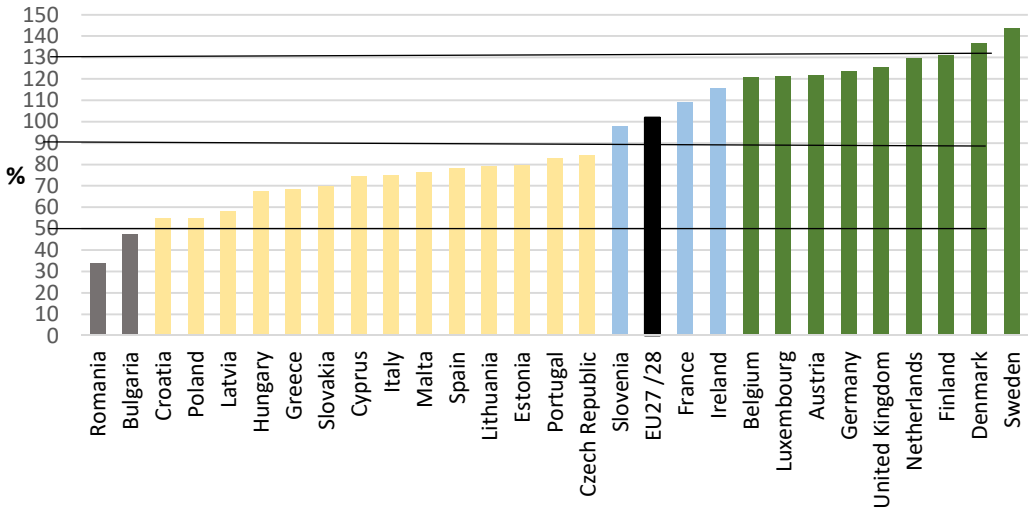


Fig. 1: Performance of EU Member States' innovation systems in 2016 [%]

Source: own study based on EIS

Analysis of the SII index in 2016 compared to 2009 showed significant changes in its values (fig.2). The states were divided into 4 groups because of the dynamics of change over seven years. Group 1 included countries whose SII increased in the analysed period, ie. Sweden, Denmark, Finland, United Kingdom, Netherlands, Austria and Belgium as well as so-called supporters of innovation: Ireland and France. The biggest increase in the index over the past 7 years has been observed in the UK. This allowed UK move

from so-called supporters of innovation to the leaders. This transition was also the case of Austria, the Netherlands and Belgium.

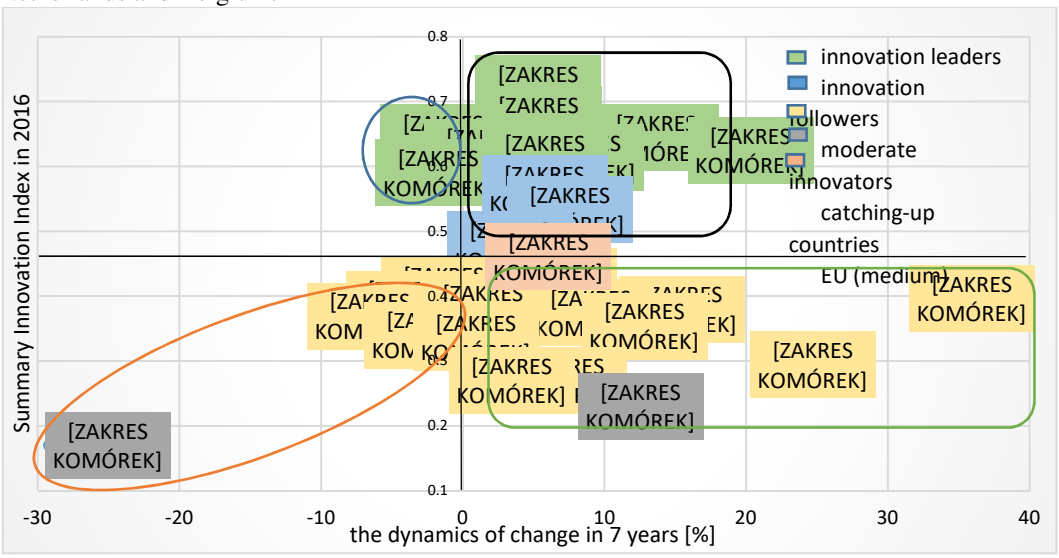


Fig. 2: SII index in 2016 and dynamics of change in 7 years [%] in EU countries

Source: own study based on EIS

In 2009 and 2016 only three countries, ie. Ireland, France and Slovenia, were included in the group of so-called innovation supporters. Another group of countries were those whose Summary Innovation Index declined but remained above the EU average. These countries included so-called innovation leaders ie. Finland, Germany and Luxembourg. The third group was composed of countries that, despite having the value of the index below the EU average, showed a rise in its value during the period considered. These countries are working to increase their competitiveness. These are the Czech Republic, Latvia, Malta, Lithuania, Slovakia, Croatia, Italy and Bulgaria, which, despite being in the group so-called weak innovators showed a positive change in the index over the period considered. In this group, a significant increase in innovation is evident in Latvia (almost 40%) and Lithuania (up by more than 20%). Such a significant increase in the innovation index allowed these countries to move to the so-called moderate innovators group. The fourth group is the countries whose Summary Innovation Index has declined within 7 years. Cyprus, Portugal, Estonia, Spain, Hungary, Greece and Romania belong to the so-called weak innovators. Cyprus (a drop of 10%) and Romania (a drop of almost 30%) showed that the value of the index, despite its low value, have decreased in the past seven years. Among the analysed countries were two, ie. Slovenia and Poland, whose index value did not change.

While analysing the SII of countries calculated previously, five groups of countries with similar levels of innovation were identified using the arithmetic mean and the standard deviation (table 2). Over the past three years, there is seen even greater disparity between countries in terms of innovation (from 2 to -3).

Throughout the period analysed, the highest index of innovation, falling within the range of two standard deviations from the mean, was recorded in Sweden and Denmark. In the second group of countries where the average index of innovation was above the EU average, but lower than in the group of leaders, were: Netherlands, United Kingdom, Germany, Austria, Luxembourg, Belgium, Ireland and France. This group joined Finland, which fell out of the so-called leaders group. In these countries, the SII was above the EU average by one standard deviation. Another group of countries in which the average index of innovation was less than one standard deviation throughout the analyzed period was Slovenia, the Czech Republic, Portugal, Estonia, Spain, Italy, Cyprus and Malta. The fourth group of countries in which the average index of innovation was in the analysed period two standard deviations below the EU average (-2) are

Latvia, Poland, Croatia and Bulgaria. The countries still included in this group were Slovakia, Greece, Hungary and Lithuania, which only in 2016 jumped to the supporters of innovation. In the last fifth group was Romania whose the SII in the last three years examined was three standard deviations below the EU average (-3).

Tab. 2: Diversification of innovation in EU countries according to SII in the years 2009÷2016

Country	2009	2010	2011	2012	2013	2014	2015	2016
Sweden	2	2	2	2	2	2	2	2
Denmark	2	2	2	2	2	2	2	2
Finland	2	2	2	2	2	1	1	1
Netherlands	1	1	1	1	1	1	1	1
United Kingdom	1	1	1	1	1	1	1	1
Germany	1	1	1	1	1	1	1	1
Luxembourg	1	1	1	1	1	1	1	1
Austria	1	1	1	1	1	1	1	1
Belgium	1	1	1	1	1	1	1	1
Ireland	1	1	1	1	1	1	1	1
France	1	1	1	1	1	1	1	1
Slovenia	-1	-1	-1	-1	-1	-1	-1	-1
Czech Republic	-1	-1	-1	-1	-1	-1	-1	-1
Portugal	-1	-1	-1	-1	-1	-1	-1	-1
Estonia	-1	-1	-1	-1	-1	-1	-1	-1
Spain	-1	-1	-1	-1	-1	-1	-1	-1
Italy	-1	-1	-1	-1	-1	-1	-1	-1
Cyprus	-1	-1	-1	-1	-1	-1	-1	-1
Malta	-2	-2	-2	-2	-1	-1	-1	-1
Lithuania	-2	-2	-2	-2	-2	-2	-2	-1
Slovakia	-2	-2	-2	-1	-1	-2	-1	-2
Greece	-1	-2	-2	-1	-1	-2	-2	-2
Hungary	-2	-1	-2	-2	-2	-2	-2	-2
Latvia	-2	-2	-2	-2	-2	-2	-2	-2
Poland	-2	-2	-2	-2	-2	-2	-2	-2
Croatia	-2	-2	-2	-2	-2	-2	-2	-2
Bulgaria	-2	-2	-2	-2	-2	-2	-2	-2
Romania	-2	-2	-2	-2	-2	-3	-3	-3

Source: own study based on EIS

The analysis of innovation data of economies conducted by 4 groups of dimensions showed not only large differences in innovation levels across countries but also significant changes over seven years (table 3).

The leader of innovation, as previously mention, was Sweden. Its Summary Innovation Index in the period considered was the highest among the surveyed counties and placed Sweden first in front of Denmark and Finland. The weakest quotations of the synthetic indicator showed Romania, Bulgaria and Poland.

Tab. 3: Innovativeness ranking by four thematic groups in 2016 as compared to 2009

Country	FRAMEWORK CONDITIONS			INVESTMENTS			INNOVATION ACTIVITIES			IMPACTS		
	2009	**2016**	**change**	**2009**	**2016**	**change**	**2009**	**2016**	**change**	**2009**	**2016**	**change**
SE	0.81	0.87	0.06	0.75	0.69	-0.06	0.68	0.62	-0.06	0.67	0.65	-0.02
DK	**0.81**	**0.91**	0.10	0.62	0.59	-0.03	0.69	0.61	-0.08	0.60	0.53	-0.07
FI	0.71	0.76	0.05	0.79	0.66	-0.13	0.73	0.65	-0.08	0.51	0.44	-0.07
NL	0.60	0.73	0.13	0.49	0.50	0.01	0.59	0.65	0.06	0.61	0.64	0.03
UK	0.64	0.65	0.01	0.54	0.49	-0.05	0.39	0.51	0.12	**0.69**	**0.84**	**0.15**
DE	0.35	0.46	0.11	0.55	0.65	0.10	**0.78**	**0.68**	-0.10	0.74	0.64	-0.10
AT	0.52	0.56	0.04	0.51	0.62	0.11	0.73	0.67	-0.06	0.68	0.72	0.04
LU	0.58	0.74	**0.16**	0.53	0.37	-0.16	0.66	0.57	-0.09	0.70	0.68	-0.02
BE	0.54	0.61	0.07	0.61	0.55	-0.06	0.64	0.67	0.03	0.47	0.46	-0.01
IE	0.52	0.57	0.05	0.57	0.40	-0.17	0.49	0.49	0.00	0.70	0.75	0.05
FR	0.56	0.58	0.02	0.50	0.48	-0.02	0.47	0.49	0.02	0.56	0.57	0.01
SI	0.62	0.53	-**0.09**	0.48	0.41	-0.07	0.52	0.47	-0.05	0.44	0.44	0.00
CZ	0.34	0.38	0.04	0.52	0.46	-0.06	0.38	0.34	-0.04	0.44	0.47	0.03
PT	0.42	0.52	0.10	0.46	0.42	-0.04	0.41	0.37	-0.04	0.36	0.33	-0.03
EE	0.37	0.45	0.08	0.44	0.51	0.07	0.53	0.30	**-0.23**	0.57	0.49	-0.08
LT	0.39	0.41	0.02	0.22	0.48	**0.26**	0.31	0.42	0.11	0.31	0.29	-0.02
ES	0.43	0.47	0.04	0.40	0.33	-0.07	0.37	0.29	-0.08	0.35	0.46	0.11
MT	0.23	0.36	0.13	0.24	0.21	-0.03	0.28	0.42	**0.14**	0.66	0.57	-0.09
IT	0.24	0.33	0.09	0.27	0.27	0.00	0.41	0.42	0.01	0.43	0.44	0.01
CY	0.33	0.38	0.05	0.43	0.23	**-0.20**	0.47	0.42	-0.05	0.50	0.47	-0.03
SK	0.32	0.30	-0.02	0.29	0.35	0.06	0.24	0.22	-0.02	0.62	0.64	0.02
EL	0.29	0.30	0.01	0.22	0.27	0.05	0.40	0.40	0.00	0.43	0.35	-0.08
HU	0.28	0.30	0.02	0.27	0.31	0.04	0.28	0.20	-0.08	0.41	0.48	0.07
LV	0.35	0.41	0.06	0.30	0.31	0.01	0.20	0.17	-0.03	0.27	0.38	0.11
HR	0.13	0.23	0.10	0.34	0.37	0.03	0.33	0.26	-0.07	0.46	0.33	**-0.13**
PL	0.24	0.27	0.03	0.23	0.32	0.09	0.26	0.18	-0.08	0.47	0.41	-0.06
BG	0.23	0.23	0.00	0.28	0.17	-0.11	0.18	0.21	0.03	0.30	0.31	0.01
RO	0.23	0.24	0.01	0.26	0.08	-0.18	0.20	0.09	-0.11	0.35	0.30	-0.05

Source: own study based on EIS

In spite of the high Swedish quotas for the SII, the deterioration in the value of indicators in particular group is evident. In the case of Sweden, the drop in the value of the indicators was achieved for three of the four group ie. investments and innovation activities (by 6% each) and impacts (by 2%). On the other hand, there was an increase in the rate for the framework conditions by 6%. The significant increase in the framework conditions was observed in Luxembourg (by 16%), Denmark, Malta and the Netherlands (by 13%). The fall in the value of the indicator in this group was noted by only two countries: Slovenia (by 9%) and Slovakia (2%). In the case of Bulgaria, however, its value has not changed. The biggest drop in the value of indicators after seven years was recorded in: Cyprus – in the group of investments (by 20%); Estonia – in case of innovation activities (by 23%) and in Croatia – an impacts (by 13%). On the other hand, the largest increase in the value of the indicator was noted in the group of investments in Latvia (by 26%), innovation activities in Malta (by 14%) and in an impacts in Great Britain (by 15%). Such a significant increase in the value of the index by the United Kingdom has given it first position in this area with an index of 0.84 points, thus diminishing Germany, Italy and Luxembourg. In the case of

two countries, ie. the Netherlands and Italy, the value of indicators has increased in all four groups. Very poor results were obtained by Romania. Over the past seven years, in three of the four groups, indicators have decreased, despite their earlier low values. A slight increase (by 1% to 0.24 points) was noted for the framework conditions.

The dimensions that influenced the value of SII obtained by individual countries were also analysed. Among the dimensions influencing the framework conditions of the countries that achieved the highest value of this indicator in 2016 was the innovation-friendly environment (fig. 5). Such countries were Denmark (1 point), Sweden (0.94 points) and Finland (0.87 points). The lowest values for innovation-friendly environment were recorded in Cyprus (0.23 points), Croatia (0.21 points) and Greece (0.15 points). In the case of Sweden and Finland, the value of this ratio increased respectively by 6% and 15% in 2009, while Denmark remained at the same level. In the case of Austria, the drop in value was the greatest (by 22%). It also decreased significantly in the case of Slovenia (by 16%) and Belgium (by 14%), and increased in case of Malta (by 22%), Poland (17%) and Lithuania (15%).

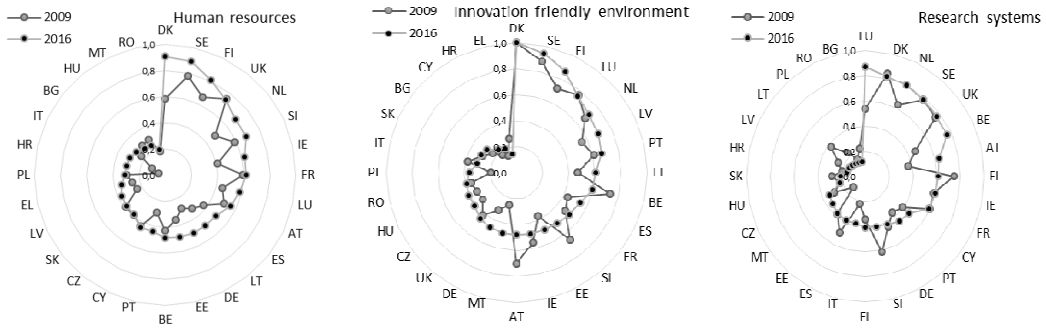


Fig. 5: Dimensions belonging to the framework conditions group in EU countries in 2009 and 2016

Source: own study based on EIS

Significant increase of indicators occurred in human resources dimension. In Belgium was the largest (by 33%). Second was Romania (by 26%). In turn, in the research systems dimension the highest value of the index in 2016 were recorded in Luxembourg. The 33% increase in the index allowed this country to take the first place in this group. Belgium (33%) and Malta (22%) also recorded significant gains. Latvia and Slovenia recorded the biggest drop, accordingly by 23% and 22%.

In the group of investments (fig. 6), the high values of the indicator for the finance and support dimensions recorded Estonia (70 points) right behind Finland (0.72 points). In 2016, the increase in this indicator compared to 2009 was the highest in Estonia (by 29%) and in Slovakia (by 34%). In this dimensions, as many as 18 countries recorded a drop in this indicator over the period considered. The largest was in sequence in Ireland (by 29%), Luxembourg (by 26%), Belgium and Bulgaria (by 22%) and Romania (by 20%).

In the case of the dimensions of firm investments, the highest indicators value were obtained in 2016: Germany (0.73 points, growth by 15%), Sweden (0.70, growth by 7%) and Austria (0.69 points, growth by 14%). The largest increase in the indicator in this dimensions was recorded by Latvia (by 24%). The weakest results in this dimensions took place in 2016: in Cyprus (0.20 points, compared to 2009 drop by 38%), in Lithuania (0.18 points, drop by 10 points), and in Romania (0.05 points, drop by 16%). Significant decrease in addition to Cyprus was recorded by Slovakia (by 22%).

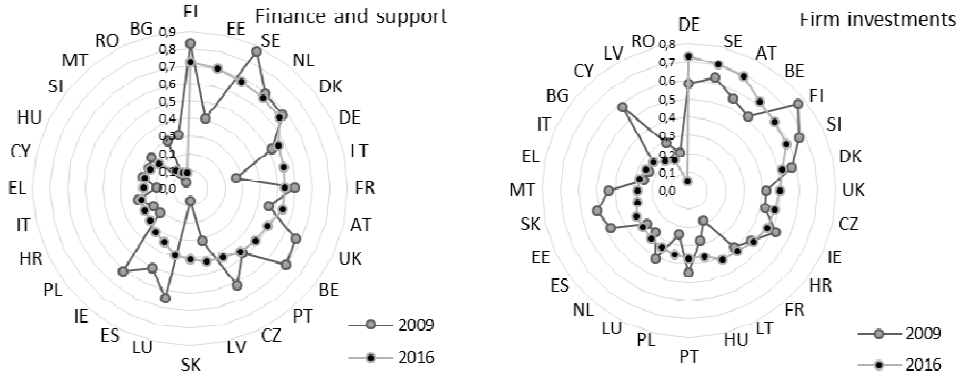


Fig. 6: Dimensions belonging to the group of investments in EU countries in 2009 and 2016
Source: own study based on EIS

Another group of the SII is innovation activities (fig. 7). One of the three dimensions in this group is innovation. In their case, over the past 7 years, the indexes have been declining in as many as 20 countries of the European Union. The biggest drop, as much as 65%, was recorded in Estonia, but also significant in: Denmark (by 24% and changed position in this dimensions from 1 to 3), Spain (by 22%) and Cyprus (by 20%). The Netherlands, Great Britain and Latvia recorded significant increases, accordingly by 18% and two times 16% .

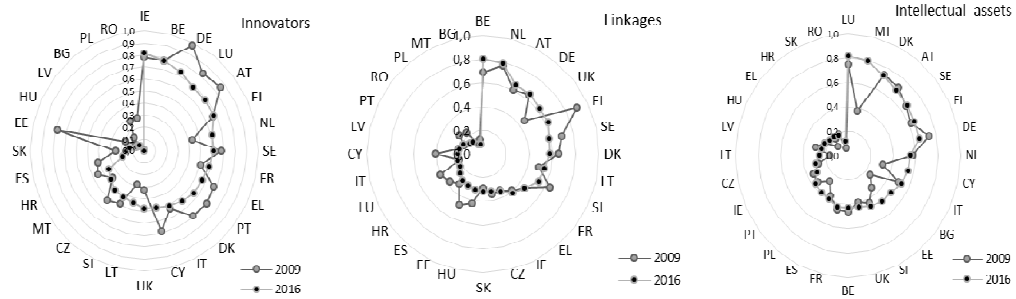


Fig.7: Dimensions belonging to the group of innovation activities in EU countries in 2009 and 2016
Source: own study based on EIS

In the linkages dimensions in 2016 compared to 2009 value of indicators also decreased in the majority of EU countries. The biggest decline was recorded in Finland, where the index fell by 28%. This caused Finland to fall from leader position to 6th place in the ranking. Significant drops of 19% were also recorded by Luxembourg and Cyprus. The biggest increase in the linkages index in 2016 can boast only the United Kingdom. The other countries, if they had an indicators increase in this dimensions, it oscillated within limits 1-5%.

The last dimensions in this group is the intellectual assets. For this factor, the highest rates in 2016 compared to 2009 were recorded in Malta, Luxembourg and Denmark. The highest increase was noticed in Malta (42%). Cyprus and Bulgaria also recorded significant growth in this dimensions (each 24%). The largest drop in the discussed dimension (at 9%) was obtained by Germany. The lowest value of the indicator in 2016 was achieved by Romania (despite the increase in the value of this index by 6% compared to 2009).
The last group affecting the SII is the impacts, which comprise two dimensions (fig. 8).

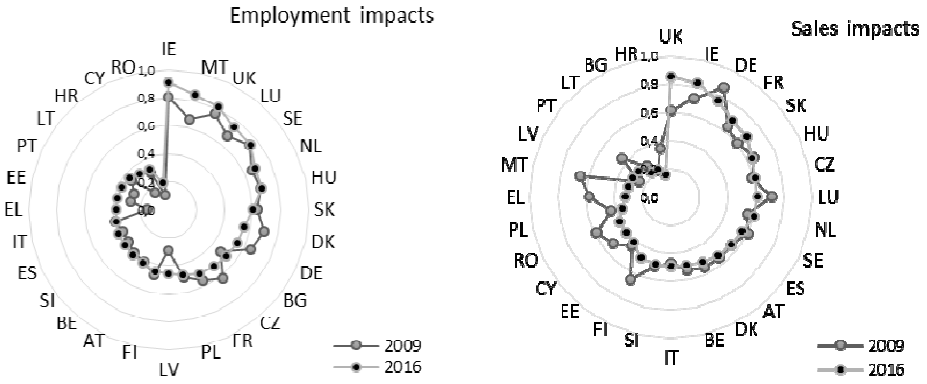


Fig. 8: Dimensions belonging to the group of impact in EU countries in 2009 and 2016
Source: own study based on EIS

In the employment dimensions, most EU countries recorded an increase in the value of this indicator. The leaders in this dimensions in 2016 were Ireland (0.91 points), Malta (0.84 points) and the United Kingdom (0.81 points). Romania has the lowest value (0.20 points), although there was a significant increase in the indicator in this dimension (9%). However, significantly higher values of the index were obtained by Greece (by 22%), Malta (by 18%), Lithuania and Croatia (by 17%). The value of this indicator in Denmark (14%), Germany and the Czech Republic (by 11%) declined the most. For the second dimensions of impacts, the highest values in 2016 were recorded by the United Kingdom (0.86 points) followed by Ireland (0.83 points). In the case of Great Britain, the highest increase in this indicator was observed (24%). This caused this country to move from the 8th to the 1th position. Most of the countries in this dimensions between 2009 and 2016 recorded a decline in these indicators. The biggest drops were in Malta (35%) and in Greece (25%). The lowest indicator in this dimensions was noticed in Croatia (0.20 points), which fell in the ranking from 25th to 28th place.

Conclusion

The article analyses changes in innovation of the economies of the European Union. On the basis of the comparison of indicators contained in the reports of the European Innovation Scoreboard (EIS) it can be stated that the countries of the community are very different in terms of innovation.
Summing up the results of the analyzes, it must be stated that the gap between the new and old EU Member States is large and in some cases still growing. In 2016, the position of the most developed countries has mostly strengthened further, while the countries of the new European Union, beside the significant increase in Lithuania, Latvia and Slovakia, have not significantly changed their position and in some cases even worsened.

At present, economic development largely depends on intangible factors related to knowledge. Skilful dissemination and application of knowledge ensures a better use of material resources available in a given country. Diffusion of innovation results in a competitive advantage, as demonstrated by indicators obtained by developed countries. Nevertheless, to make innovative solutions, you must have adequate financial resources. This is especially visible in the countries of the new European Union, ie Lithuania and Latvia. For these countries, the European Union's contribution to the improvement of both the synthetic index and the majority of indices in particular areas and categories has increased over the past 7 years.

Poor indexes in most countries of the new European Union as well as in countries experiencing the economic crisis, ie. Greece and Spain, indicate that they need to develop strategies for increasing the innovativeness of economies on the international stage. Certainly, the right strategy and the domination of their attributes by each country will allow for a longer period of time to reduce or even offset the distance between the two groups of countries.

References

Arrow, K.J. (1962). Economic Welfare and the Allocation of Resources for Invention, [w:] *The Rate and Direction of Inventive Activity: Economic and Social Factors*, (ad.) Nelson R.R. Princeton University, Princeton, pp. 609-626.

Bailey, *M. N.* (*2003*): The *Sources* of *Economic Growth* in *OECD Countries*: A Review Article, *International Productivity Monitor*, *7*

Cameron, G. (1996). *Innovation and economic growth.* CEPDP, 277. Centre for Economic Performance, London School of Economics and Political Science, London, UK.

European Innovation Scoreboard (EIS) 2009-2016 [20.09.2017] Available: http://ec.europa.eu/ DocsRoom/documents/ 24829

Firlej, K., Kowalska, A., Piwowar, A. (2017). 'Competitiveness and innovation of the Polish food industry', *Agricultural Economics* (AGRICECON), No. 63, pp. 1-8

Grodzka, D., Zygierewicz, A. (2008). *Innowacyjność polskiej gospodarki*. Infos - Biuro Analiz Sejmowych, nr 6(30).

Khan, M., Luintel K. (2006). *Sources of Knowledge and Productivity: How Robust is the Relationship?*, France: OECD Science, Technology and Industry Working Papers, 2006/06.

Leeuwen, van G., Klomp, L. (2006). On the contribution of innovation to multi-factor productivity growth, *Economics of Innovation and New Technology*, Vol. 15 (4-5), pp.367-390.

Olszańska, A. (2012). *Rynek żywca w Polsce (1955-2010) – zmiany strukturalne, koncentracja produkcji i wahania podaży*. Wrocław: Wydawnictwo Uniwersytet Ekonomiczny we Wrocławiu, pp. 160.

Solow, R.M. (1957). Technical Change and the Aggregate Production Function, *Review of Economics and Statistics*, Vol. 39, No. 3, pp. 312-320.

Tarnowska, A. (2013). Changes in the housing stock and their equipment in rural areas, The International Conference Hradec Economic Days 2013. Economic Development and Management of Regions. Peer-Reviewed Conference Proceedings, Part III, ISBN: 978-80-7435-251-5, 19-20 February, Hradec Králové, pp. 441-445.

European Innovation Scoreboard 2017. Methodology Report. [15.10.2017]. Available: http://ec. europa.eu/DocsRoom/documents/25101

Why Banks Adopt Mobile Banking?

Ceylan Onay, Boğaziçi University, Department of MIS, Istanbul, Turkey
ceylano@boun.edu.tr
Yasemin Ezgi Öztaş, Master student, Boğaziçi University, Department of MIS, Istanbul, Turkey
yaseminezgii@gmail.com

Abstract

Majority of literature on electronic banking has focused on internet banking adoption either by banks or by customers. Mobile banking differs from internet banking because it is available free of location and hence enables access to financial services anytime anywhere. However, why banks adopt mobile over and above internet banking has been neglected so far. This paper investigates the determinants of mobile banking adoption from banks' perspective. Using a sample of 14 retail banks from Turkey, we show that banks are more likely to adopt mobile banking to increase their deposits, profitability, market share and for better risk management of their loan portfolio.

Keywords Mobile banking, Banks, Financial Services, Technology, Turkey

Introduction

Financial institutions are profit-seeking enterprises that try to maximize revenues and reduce their cost of production simultaneously. However, competition in financial services is fiercer than ever due to information technologies that bring increased transparency, lower switching costs and higher disintermediation (Claessens , S., Dobos, G., Klingebiel, D., Laeven, L., 2013; Claessens, S., Glaessner, T., Klingebiel, D., 2001). We see disappearance of boundaries between banks and ICT companies, new start-ups that enable peer-to-peer lending, new payment infrastructures such as blockchain technology that challenge the value proposition banks deliver. Compared to banks these new financial services providers are much less regulated and far more flexible. These developments point out too much higher competition for not only retaining the existing customer base but also for protecting the margins. As margins decrease, banks profitability decrease. Banks are challenged to create new revenue sources such as service fees and commissions (Adizes, 2013). Hence, importance of creating value-added services that leverage information technology becomes even more important. (Wonglimpiyarat, 2014)

Mobile banking represents the next step of financial institutions towards providing new services to customers and seizing technological opportunities in terms of new business models (Riquelme & Rios, 2010). Mobile banking not only enables banks offering new and customized products and services but also enables customers to interact with their banks regardless of time or location, and to access details of their banking and financial transactions whenever and wherever necessary. Mobility is the most noteworthy difference of mobile from internet banking (Laukkanen, 2007; Suoranta, 2004). Furthermore, mobile banking enables access to financial services particularly for the unbanked segments in emerging economies bringing opportunities to expand banks customer base (Klein, 2011; Bose, 2016) . It naturally adds up that mobile-based financial services may increase a financial institution's asset growth, which is crucial in an increasingly competitive environment.

Research shows that customers have become less willing to visit traditional branches, less loyal, more receptive to new electronic channels and more sophisticated in demanding better service quality including

24 hour service availability (Coelho & Easingwood, 2003). Customers value compatibility, perceived usefulness, and attitude in their decision to adopt mobile banking (Shaikh & Karjaluoto, 2015). Customers perceive mobile banking as a competitive advantage (Koenig-Lewis, Hanmer-Lloyd, & Ward, 2010) and banks use mobile banking to build relationships with customers to retain and develop their customer base. (Veronika & Nikolay, 2015). Thakur (2014) shows that satisfaction from mobile banking in fact increases customer loyalty. Considering the fast penetration of smartphones in both developed and developing economies, mobile banking has become an important distribution channel for banks.

From a competition point of view banks who invest in IT increase productivity, decrease operating expenses, increase profitability and market share (Chang-Soo & Davidson, 2004). Transactions carried out via mobile are more cost-effective for both banks and consumers than branch-based transactions, involving less time and fewer people (Laukkanen & Lauronen, 2005). In this regard, mobile banking gives financial institutions an opportunity to lower their operating expenses, increase productivity and profitability. Previous research shows that banks increase profitability once they adopt internet banking. Hernando & Nieto, (2007); DeYoung, (2007); Ciciretti, Hasan, & Zazzara, (2009) and Onay and Ozsoz (2012) show that internet banking allows banks to focus on more labour intensive functions at branches. What does mobile banking add to this equation? Why and when banks adopt mobile is the question we address in this paper.

To our knowledge, this is the first study to explore the factors that affect financial institutions' decisions to adopt mobile banking particularly in an emerging economy. Penetration of mobile banking has been fast (Ratten, 2011) and new technology penetrates even faster in emerging economies due to leapfrog effect (Claessens, Glaessner, & Klingebiel, 2001). Literature reveals that many research on electronic banking has focused on Internet banking, whereas research focusing on mobile banking is relatively less and receives underrated attention (Suoranta & Mattila, 2004 ; Laukkanen & Pasanen, 2008; Puschel, Mazzon, & Hernandez, 2010).

In our paper, we follow a similar strategy to Furst, Lang, & Nolle, (2002); Singh, (2007); Dandapani, (2017), and Hernández-Murillo, (2010) who investigate internet banking adoption by banks and try to identify the factors that contribute to the adoption of mobile banking services by financial institutions in Turkey. Adoption of Mobile banking in Turkey began in the second half of the 2000's and penetrated thoroughly. Customers who have logged into mobile banking at least once in last three months has increased from 445k to 19million in the past 5 years. As of 2017 of the 33 retail banks in Turkey, more than half offer mobile banking according to the Banks Association of Turkey. The transition to mobile was a sequential process for all the banks in our sample as they first adopted internet banking channel, which was then followed by the adoption decision for mobile. In this regard, we are able to analyse what particularly drives mobile banking adoption for banks.

Information Technologies can be used by banks to support and enhance relationships with their customers through cross-selling of customized products and innovative services and by making the business process flexible and customer-driven. Information availability through apps/browsers and customer opinions may boost demand for niche products (Anderson, 2006). Furthermore, a bank's product mix can affect the adoption of technological innovations as information technology may help create more customized products/services (Hannan & McDowell, 1984; Dandapani, 2017). Banks can monitor customer payment behaviour, update campaigns and deliver relevant offerings via mobile. Accordingly, Information Technology not only enables customized offerings but also enables better risk management. While Dow Jr., (2007) discuss that banks would be less likely to invest in new technology when delinquent loans increase; Cadena & Schoar, (2011) show that SMS/application reminders have a comparable impact on the repayment behaviour of borrowers. Competition also challenges banks to innovate. Barbosa & Salazar, (2015) show that banks with more market share offer a more diverse set of products and services. Accordingly, we hypothesize that banks are more likely to adopt mobile banking in an attempt to increase deposits, profitability and market share and to manage loans and non-performing loans more efficiently.

Data and Research Methodology

Our dataset is collected from the year-end consolidated aggregate income statements and balance sheets compiled by the Banks Association of Turkey (2016) and adjusted for inflation using the Consumer Price Index (CPI) published by the World Bank (WDI, April 2016). The banks in our sample offered a similar package of Mobile banking products, services, and transactional capabilities at the time of adoption: 1) Information inquiries, 2) Account balance checking and maintenance, 3) Fund transfers, 4) Automatic Bill and Credit Card Payments, 5) Savings and investments transactions, 6) Retail and commercial banking transactions, and 7) Online trading. Our main dependent variable is mobile banking adoption dummy coded as one when the bank adopts a transactional mobile banking and zero otherwise. All unbounded explanatory variables are winsorized at the 1% level at both tails.

In our identification strategy, we first estimate OLS firm FE model and then replicate our main findings with probit and logit models with firm fixed effects for robustness. Using a sample of 14 retail banks over a period of 21 years from 1994 to 2015, we show that the level of deposits, loans, profitability and market share drives banks in adopting mobile over and above internet banking channel (Table 1).[1] We interpret our results according to column 11; the logistic regression estimation.

Findings and Discussion

We find that mobile banking services are more likely adopted when deposits to assets ratio decrease and when loans to assets ratio increase. This confirms our proposition that banks use mobile banking as a means of attracting new customers beyond the reach of its physical and internet branches as well as managing its assets more efficiently with more monitoring of customer behaviour data. We also show that banks are more likely to adopt mobile banking when profitability falls. This is contrary to findings of Furst, Lang, & Nolle, (2002); Singh, (2007); Dandapani, (2017), and Hernández-Murillo, (2010) who show that profitable banks adopt internet banking. We find that banks rely on mobile banking to increase profitability possibly via delivering more customized products/services and expanding their customer base via mobile. We also find a significant positive coefficient for market share indicating that banks are more likely to adopt mobile banking when their market share increases. This is also contrary to what has been documented for internet banking adoption Dandapani, Lawrence, & Rodriguez, (2016) and shows that mobile banking is also perceived as a way of increasing customer satisfaction and loyalty beyond increasing customer base. These results are robust to alternative estimations controlling for internet adoption by banks and crisis dummies.

Table 1 Regression Analysis - Estimations in columns 2-9 are OLS Firm Fixed Effects, while column 10 presents the results of Probit and column 11 presents the results of Logit estimation. Mobile dummy equals one when bank adopts transactional mobile banking and zero otherwise. Depositta is the ratio of total deposits to total assets. Loansta is the ratio of total loans to total assets. Nonperfta is the ratio of total non-performing loans to total loans. Roa is the return on assets. Market Share is the ratio of total asset of a bank to total assets of all banks within a given year. Internet dummy equals one when the bank adopts transactional internet banking and zero otherwise. Crisis dummy takes a value of one if there is a systemic banking crisis and zero otherwise. First row reports the estimated coefficients and second row gives the robust std. errors clustered at the firm level in italics. *** p<0.01, ** p<0.05, * p<0.1

OLS Firm Fixed effect panel regression ***probit estimation*** ***logit estimation***

VARIABLES	mobile dummy'	mobile dummy'	mobile dummy'	mobile dummy'	mobile dummy'	mobile dummy'	mobile dummy'	mobile dummy'	mobile dummy*	mobile dummy**
Wdepositta	**-3.318*** **							-0,856	**-12.42****	**-26.41****
	0,83							*0,656*	*4,978*	*10,82*
Wloansta		**1.689*** **						**1.592*** **	**24.01*** **	**55.42*** **
		0,223						*0,381*	*5,485*	*15,69*
Wnonperfta			**-2.657*** **					-0,532	-2,842	-21,07
			0,569					*0,985*	*25,94*	*27,48*
Wroa				**-7.205*** **				0,232	**-134.5*** **	**-296.8*** **
				2,318				*1,868*	*48,14*	*94,09*
Market Share					3,014			**2.348***	**50.44*** **	**149.6*** **
					2,552			*1,273*	*11,33*	*57,37*
Internetdummy						**0.413*** **		**-0.287****		7,691
						0,0553		*0,126*		*8,154*
Crisis							**-0.357*** **	0,0421		-13,96
							0,055	*0,128*		*6,789*
Constant	2.623***	-0.388***	0.509***	0.608***	0,137	0,0232	0.357***	0,366	-4,517	
	0,541	*0,112*	*0,0107*	*0,0479*	*0,151*	*0,0399*	*0,0055*	*0,517*	*3,657*	
Observations	196	196	196	196	260	280	280	179	160	177
R-squared	0,233	0,365	0,072	0,074	0,035	0,172	0,062	0,409		
Number of bankno	14	14	14	14	14	14	14	14	14	13

References

Adizes, I. K. (2013). Change and Its Repercussions for the Banking Industry. *Journal of Central Banking Theory and Practice , 3* (1), 5-8.

Anderson, C. (2006). The Long Tail: Why the Future of Business is Selling Less of More. *Canadian Journal of Communication Corporation , 33*, 127-139.

Barbosa, K. R., & Salazar, F. (2015). Assessing competition in the banking industry: A multi-product approach. *Journal of Banking & Finance , 50*, 340-362.

Bose, S. B. (2016). Dynamics of firm-level financial inclusion:Empirical evidence from an emerging economy. *Journal of Banking and Finance Law and Practice , 780*, 47-68.

Cadena, X., & Schoar, A. (2011). Remembering To Pay? Reminders Vs. Financial Incentives For Loan Payments. *Working Paper 17020* .

Chang-Soo, K., & Davidson, L. F. (2004). The effects of IT expenditures on banks' business performance: using abalanced scorecard approach. *Managerial Finance , 30*, 28-45.

Ciciretti, R., Hasan, I., & Zazzara, C. (2009). Do Internet Activities Add Value? Evidencefrom the Traditional Banks. *Journal of Financial Services Research , 35*, 81-98.

Claessens , Stijn; Dobos, Gergely; Klingebiel, Daniela; Laeven, Luc;. (2013). *The Growing Importance of Networks in Finance and its Effects on Competition.* In Innovations in Financial and Economic Networks.

Claessens, S., Glaessner, T., & Klingebiel, D. (2001). E-Finance inEmerging Markets:Is Leapfrogging Possible? *Financial Markets, Institutions & Instruments , 11*, 1-125.

Claessens, Stijn; Glaessner, Thomas; Klingebiel, Daniela;. (2001). *E-Finance inEmerging Markets:Is Leapfrogging Possible?* Financial Sector Discussion Paper No. 7.

Coelho, F., & Easingwood, C. (2003). Multiple channel structures in financial services: A framework. *Journal of Financial Services Marketing , 8*, 22-34.

Dandapani, K. (2017). Electronic finance – recent developments. *Managerial Finance , 43*, 614-626.

Dandapani, K., Lawrence, E., & Rodriguez, J. (n.d.). Determinants of Transactional Internet Banking. *Journal of Financial Services Research* , 1-25.

DeYoung, R. (2007). How the Internet affects output and performance at community banks. *J Bank Finance , 31* (4), 1033-1060.

Dow Jr., J. P. (2007). The adoption of web banking at credit unions. *The Quartly Review of Economics and Finance , 47*, 435-448.

Furst, K., Lang, W. W., & Nolle, D. E. (2002). Internet Banking. *Journal of Financial Services , 22*, 95-117.

Hannan, T., & McDowell, J. (1984). The Determinants of Technology Adoption: The Case of the Banking Firm. *RAND Journal of Economics , 15*, 328-335.

Hernández-Murillo, R. L. (2010). Strategic online banking adoption. *Journal of Banking and Finance* , 1650-1663.

Hernando, I., & Nieto, M. J. (2007). Is the Internet delivery channel changingbanks' performance? The case of Spanish banks. *Journal of Banking & Finance* , 1083-1099.

Klein, M. M. (2011). Mobile Banking and Financial Inclusion: The Regulatory Lessons. *Policy Research Working Paper , 5664*.

Koenig-Lewis, N., Hanmer-Lloyd, S. N., & Ward, P. (2010). Adoption of internet banking services in China: is it all about trust? *International Journal of Bank Marketing* , 7-26.

Laukkanen, T. (2007). Internet vs mobile banking:comparing customer value perceptions. *Business Process Management Journal , 13* (6), 788-797.

Laukkanen, T., & Pasanen, M. (2008). Mobile banking innovators and early adopters: How they differ from other online users? *Journal of Financial Services Marketing , 13*, 86-94.

Onay, C., & Ozsoz, E. (2012). The Impact of Internet-Banking on Brick and MortarBranches: The Case of Turkey. *Journal of Financial Services Research* .

Puschel, J., Mazzon, J. A., & Hernandez, J. C. (2010). Mobile banking: Proposition of an integrated adoption intention framework. *International Journal of Bank Marketing , 28*, 389-409.

Ratten, V. (2011). Social Cognitive Theory in Mobile Banking Innovations. *International Journal of E-Business Research , 7*, 39-51.

Riquelme, H. E., & Rios, R. E. (2010). The Moderating Effect of Gender in the Adoption of Mobile Banking. *The International Journal of Bank Marketing , 28* (5), 328-341.

Shaikh, A. A., & Karjaluoto, H. (2015). Mobile banking adoption: A literature review. *Telematics and Informatics* , 129-142.

Singh, P. (2007). Determinants of Internet banking adoption by banks in India. *Internet Research , 17*, 323-339.

Suoranta, M. M. (2004). Mobile banking and consumer behaviour: New insights into the diffusion pattern. *J Financ Serv Mark , 8*.

Suoranta, M., & Mattila, M. (2004). Mobile banking and consumer behavior: New insights into the diffusion pattern. *Journal of Financial Services Marketing , 8*, 354-366.

Thakur, R. (2014). What keeps mobile banking customers loyal? *International Journal of Bank Marketing , 32*, 628-646.

Veronika, B., & Nikolay, C. (2015). Mobile Banking Adoption in Russia: What Incentives Matter? *Basic Research Program Working Papers Series: Science, Technology, Innovation Economy Wp Brp 48/STI/2015* .

Wonglimpiyarat, J. (2014). Competition and challenges of mobile banking: Asystematic review of major bank models in the Thai banking industry. *Journal of High Technology Management Research , 25*, 123-131.

Notes:

[1] The banks in our sample represent 89% of all total assets in Turkey.

Significance of the Analytical Procedures in the Earnings Quality Assessment

Boris Tušek, PhD, University of Zagreb, Faculty of Economics & Business, Zagreb, Croatia, btusek@efzg.hr

Ana Ježovita, PhD, University of Zagreb, Faculty of Economics & Business, Zagreb, Croatia, ajezovita@efzg.hr

Ana Novak, PhD, University of Zagreb, Faculty of Economics & Business, Zagreb, Croatia, anovak@efzg.hr

Abstract

The paper includes a research on possibilities of earnings quality assessment and putting the results into the relationship with the most widely used traditional financial ratios as a return on assets, profit margin or total assets turnover ratio. The concept of the earnings quality measurement techniques represents relatively new, and an under-research field. The most significant researches are the one conducted by DeAngelo (1986), Jones (1991), Dechow and Dichev (2002) in which authors develop models for measuring discretionary and non-discretionary accruals that represent an earnings quality proxies. The purpose of those models is to detect levels of management choices that affect the financial result of the company. The conducted research gives results on modified Jones (1991) model by using the sample of large Croatian companies for a nine-year period. Next to determining the level of discretionary accruals, the paper includes correlation results between the accruals proxies and traditional financial indicators. The most significant part of the paper includes results about the differences between accruals level in the 'loss' and 'profit' companies. The obtained results show that there are more management choices (manipulations) in the 'loss' observations, and that 'profit' observations are more affected by business conditions (non-discretionary accruals).

Key words: earnings quality, discretionary accruals, non-discretionary accruals, cash flow

1. Introduction

Earnings quality, which is "the aggregate result of the application of various accounting treatments, estimates, and assumptions that are made by management", according existing literature, is one of several attributes of reported income that is widely considered to be desirable characteristics of a firm's reported earnings (Salerno, 2014, p. 255). The goals of decision-makers unquestionably determine the definition of earnings quality. According to Dechow, et al (2010, p. 344) "the quality of earnings is a function of the firm's fundamental performance". According to Dichev et al (2013), high-quality earnings are "sustainable and repeatable; specific characteristics include consistent reporting choices, backing by actual cash flows, and absence of one-time items and long-term estimates" (Dichev, et al, 2013, p. 1).

Most frequently used earnings quality proxies are earnings persistence, predictability, smoothness, timeliness, value relevance, loss avoidance, investor responsiveness magnitude of accruals, income-increasing accruals, absolute value of discretionary or abnormal accruals and the extent to which accruals map into past and future cash flows, volatility, conditional conservatism (Dechow, et al., 2010, p. 344, Dichev, et al, 2012, p. 1, Francis et al, 2004, p. 967, Perotti and Wagenhofer, 2014).

Francis et al (2004) characterize accrual quality, persistence, predictability and smoothness as accounting-based attributes because they are typically measured using accounting information only, while value relevance, timeliness, and conservatism characterize as market-based because proxies for these constructs are typically based on relations between market data and accounting data. In accordance with conducted research in which Francis et al. (2004) examined the relation between the

cost of equity capital and abovementioned attributes of earnings, the largest cost of equity effects is observed for the accounting-based attributes, in particular, accrual quality. (Francis et al, 2004, p. 967)

Perotti and Wagenhofer (2014) examine how commonly used earnings quality measures fulfill a key objective of financial reporting by predicting that firms with higher earnings quality will be less mispriced than other firms. According to their research, "accruals measures generate the largest spread in absolute excess returns, followed by smoothness and market-based measures. These results lend support to the widespread use of accruals measures as overall measures of earnings quality in literature" (Perotti and Wagenhofer, 2014, p. 545).

Many modes are developed with the objective to assess earnings quality. An early research stage resulted in less complex models that have been modified and improved over time. Recent researches focus on an assessment of non-discretionary and discretionary accruals as a proxy for assessing earnings quality by using information, not only from the balance sheet, but also from the cash flows statement. There is no clear consensus between researches which discretionary accruals model gives the best results.

2. Literature review

Accruals "modify the timing of reported earnings; therefore use of discretionary accruals enables the manager to transfer earnings between periods" (Healy, 1985, 89). Discretionary (abnormal or unexpected) accruals often serve as a proxy for earnings management, and are in focus of many developed expectations models (e.g. Healy model, 1985; DeAngelo model, 1986; Jones model, 1991; Modified Jones model, 1995; Dechow and Dichev model, 2005; Francis et al model, 2005).

According to Healy (1985), managers observe a cash flow from operations and non-discretionary accruals at the close of each year and select discretionary accounting procedures and accruals to maximize their expected benefit from bonuses (Healy, 1985, p. 89). Within the model, the discretionary accruals sum to zero over the managers' employment horizon with the firm (Healy, 1985, p. 89). "It is assumed that every firm having discretionary accruals other than zero applies profit management, every firm having discretionary accruals below zero operates in the direction of increasing profits and every firm having discretionary accruals above zero operates in the direction of decreasing profits" (Aren, 2003, cited in Yurt and Ergun, 2015, p. 41). In his research, Healy found that there is a close linkage between accruals and managers' income-reporting incentives under their bonus contracts (Healy, 1985, p. 106). "Holthausen, Larcker, and Sloan (1995) just like Healy found evidence, consistent with the hypothesis that managers manipulate earnings downwards when their bonuses are at their maximum" (Yurt and Ergun, 2015, p. 42).

DeAngelo's (1986) model uses prior period's total accruals as a measure of normal (non-discretionary) accruals and defines abnormal (discretionary) total accrual as the difference between current total accruals and normal total accruals (Jones, 1991, p. 207). Both Healy (1985) and DeAngelo (1986) models assume that the non-discretionary accruals are constant in the examined period (Yurt and Ergun, 2015, p. 43).

Jones (1991) model focuses on discretionary accruals as a measure of managers' earnings manipulations, but unlike previous models, he takes into account changes in non-discretionary accruals caused by changes in economic conditions (Jones, 1991, p. 223). According to results "managers decrease earnings through earnings management during import relief investigations" (Jones, 1991, p. 194).

Dechow et al (1995) modified the Jones model to eliminate the conjectured tendency to measure discretionary accruals with an error when discretion is exercised over revenues (Dechow, 1995, p. 199). In the Jones model, revenues are used to control the economic environment of a company, but

reported revenues to some extent may be affected by managers' attempts to decrease reported earnings (Jones, 1991, p. 211-212) because of which Dechow et al. in a modified version of the model implicitly assumes that all changes in credit sales in the event period result from earnings management (Dechow, 1995, p. 199). This improved version of the Jones model is named Modified Jones model and it is widely used by researchers.

Unlike previous models, which are focused on estimating abnormal accruals (Yurt and Ergun, 2015, p. 43), Dechow and Dichev (2002) put forward a new approach to measure accruals and earnings quality. They define accruals quality "as the extent to which working capital accruals map into operating cash flow realizations, where a poor match signifies low accrual quality" (Dechow and Dichev, 2002, p. 36). According to the new model, precise estimates imply a good match between current accruals and past, present, or future cash flow realizations (Dechow and Dichev, 2002, p. 53). Dechow and Dichev find that both earnings and accruals volatility are good proxies for measuring low accruals and earnings quality (Dechow and Dichev, 2002, p. 54).

Jones et al (2008) evaluate the ability of 10 measures derived from the extant discretionary accruals models to detect the existence of a fraudulent event that overstated earnings, the extent of fraudulent earnings, and voluntarily earnings restatements. They find that only the accrual estimation errors estimated from Dechow and Dichev 2002 and McNichols 2002 modification of Dechow and Dichev have predictive power for both fraud and non-fraudulent restatements of earnings. (Jones, Krishnan and Melendrez, 2008, p. 529)

To estimate abnormal accruals, Cheng et al (2012) evaluated the performance of the modified Jones model, modified Jones model with operating cash flows, and modified Jones model with return on assets. They recommend that researchers use the industry-specific modified Jones model with return on assets model to estimate abnormal accruals when investigating earnings management since the model remains the best one from the perspective of abnormal accrual mispricing (Cheng et al, 2012, p. 1).

Francis et al (2005) investigate the relation between the accruals quality and costs of debt and equity capital. In their study, accruals quality is used as a proxy for information risk, and accruals quality metric is based on Dechow and Dichev's (2002) model and following McNichols (2002) discussion of this model, they also include the change in revenues and property, plant and equipment as additional explanatory variables (Francis et al., 2005, 296). According to their research "lower-quality accruals are associated with higher costs of debt, smaller price multiples on earnings, and larger equity betas." (Francis et al, 2005, p. 323).

There are several studies that investigate the linkage between debt financing and earnings quality. Ghosh and Moon (2010), using accruals quality as a proxy for earnings quality, where earnings quality refers to the ability of earnings to predict future cash flows, determine non-monotonic relation between debt and earnings quality. In accordance with their study, the relationship is positive at low levels of debt and negative at high debt levels (Ghosh and Moon, 2010, p. 538). Similarly, Valipour and Moradbeygi (2011) find a positive and significant relationship between low levels of debt financing and earnings quality, and according to their study, "firms aggressively use accruals to manage earnings to avoid covenant violations and reduce the cost of financing" (Valipour and Moradbeygi, 2011, p. 155).

Šodan (2015) investigates whether the extent to which fair value disclosed in the financial statements is related to the earnings quality measures in the eastern European countries over 2002-2011. He formed an aggregate earnings quality measure that is based on the six most commonly used earnings quality proxies (persistence, predictability, smoothness, accruals quality, value relevance and conservatism). According to preliminary empirical findings, "both firms and banks with increased exposure to fair value accounting in financial reporting have lower level of aggregate earnings quality". (Šodan, 2015, p. 1769)

Salerno (2014) analysed the impact that quality of reported earnings has on the accuracy of financial analysts' earnings forecasts. He used two measurements of forecast accuracy. "For both measurements of accuracy the results show that higher earnings quality is associated with improved forecast accuracy." (Salerno, 2014, p. 255)

The accruals and earnings quality are a research field that has been covered by many papers during the last decade. In that period numerous approaches to measure accruals are developed. As Ohlson (2014) pointed out in his work, "while accruals can be misleading, on average accruals provide useful information as indicators of future cash flows and earnings that go beyond the information in current cash earnings". (Ohlson, 2014, p. 80.)

3. Research question, research design and methodology

The objective of this paper is to determine the level of abnormal accruals in Croatian large companies. Results will be used to assess the linkage between earnings quality proxies and traditional financial indicators and ratios in analysed companies. Accruals proxy can be used to compare management choices and potential manipulations in companies that operate with profit compared to companies that generate losses. Related to that, the research includes analysis of differences between results within the profitable and non-profitable observations. Considering the review of the objectives, it is possible to develop a research hypotheses:

H1: There exists a significant correlation between discretionary and non-discretionary accruals, and traditional financial indicators and ratios.

H2: It is possible to detect a significant difference in earnings quality between 'profit' and 'loss' companies.

As it was emphasized earlier in the paper, the Jones model is focused on total accruals as a measure of earnings management (Jones, 1991, p. 206). "Total accruals are calculated as the change in noncash working capital before income taxes payable less total depreciation expense. The change in noncash working capital before taxes is defined as the change in current assets other than cash and short-term investments less current liabilities other than current maturities of long-term liabilities and income taxes payable." (Jones, 1991, p. 207). The model used in the research represents the Jones model with certain modifications. Due to the lack of an available data the total accruals model does not include current maturities of long-term debt, and tax payable includes all tax liabilities, and not only income taxes. Next to that, deferred costs are included as a part of current assets, and deferred revenues as a part of current liabilities. All variables are scaled by total assets. Total accruals are calculated by using the following equation:

$$\frac{ACC_t}{TA_{t-1}} = \left(\frac{\Delta CA_t^{t-1}}{TA_{t-1}} + \frac{\Delta AVR_t^{t-1}}{TA_{t-1}} - \frac{\Delta Cash_t^{t-1}}{TA_{t-1}}\right) - \left(\frac{\Delta CL_t^{t-1}}{TA_{t-1}} + \frac{\Delta PVR_t^{t-1}}{TA_{t-1}} - \frac{\Delta TP_t^{t-1}}{TA_{t-1}}\right) - \frac{Dep_t}{TA_{t-1}}$$

where:

ACC_t = total accruals in year t for company i
TA_{t-1} = total assets in year t-1
ΔCA_t = change in current assets between year t and t-1
ΔAVR_t = change in deferred costs between year t and t-1
$\Delta Cash_t$ = change in cash between year t and t-1
ΔCL_t = change in current liabilities between year t and t-1
ΔPVR_t = change in deferred revenues between year t and t-1
ΔTP_t = change in tax payable between year t and t-1
Dep_t = depreciation and amortization costs in year t

The total accruals (ACC_t) represent a difference between changes in non-cash current assets and change in current liabilities other than the tax payables decreased for depreciation and amortization

costs. As previous researches highlight (DeAngelo, 1986; Jones, 1991; Dechow and Dichev, 2002) the total accruals include a change in a discretionary and non-discretionary accruals. The same authors affirm that the change in non-discretionary accruals is approximately zero, so the change in total accruals reflects the change in a discretionary accruals. The total accruals are determined as follows:

$$\frac{ACC_{it}}{TA_{it-1}} = \alpha_i \frac{1}{TA_{it-1}} + \beta_{1i} \frac{\Delta TR_{it}^{it-1}}{TA_{it-1}} + \beta_{2i} \frac{NonCA_{it}}{TA_{it-1}} + \varepsilon_{it}$$

where:

ACC_{it} = total accruals in year t for company i
TA_{it-1} = total assets in year t-1
ΔTR_{it} = change in total revenues between year t and t-1
$NonCA_{it}$ = non-current assets in year t
ε_{it} = error term in year t for firm i
i = 1,….,N = company index
t = 1,…,Ti = year index

The second model is used as a proxy in order to absorb the noise resulting from the change in a business condition where the non-current assets represent investments, and change in revenues scaled by total assets represents growth of business activities of the company. The prediction error (residual) in the model represents the level of discretionary accruals at the observation point.

In order to meet the research objective, we used traditional financial ratios that are considered as the most important in evaluating financial position and business performance. The financial position is evaluated by using an equity-to-assets ratio and a total assets turnover ratio. The business performance is evaluated by using a return on assets, return on equity and profit margin. The chosen financial ratios are computed in accordance with the formulas provided by Žager, K., Mamić Sačer, Sever Mališ, Ježovita & Žager L. (2017).

The conducted research includes an earnings quality analysis of Croatian large companies that prepared and disclosed their annual financial statements for 2016 (327 companies were classified as large). According to the Croatian Accounting Law, large companies are those that meet two of three criteria: total assets >150 million HRK, total income >300 million HRK, average employees' number >250 (Official Gazette, No 78/2015). Those criteria are harmonized with Directive 2013/34/EU of the European Parliament and of the Council of 26 June 2013 on the annual financial statements, consolidated financial statements and related reports of certain types of undertakings. Because the data on cash flows in Croatia are available only from 2008, the time framework covered by the research is a nine-year period. The next limitation included in the research is a companies' size. The analysis includes only companies that are classified as large within all observed years (2008-2016). That limitation reduced the number of observed companies from 327 to 208 companies (1664 observations).

4. Research results

Table 1 shows descriptive statistics of the total accruals, residuals (prediction error), and predicted values. According to Jones (1991) predictions based on the estimated regression coefficient from the used regression equation are considered as a non-discretionary accruals, and belonging residuals (prediction errors) are considered as a discretionary accruals (Jones, 1991, p. 217).

Table 1: Descriptive statistics

	Mean	Standard deviation	First quartile	Median	Third quartile
ACC	-.04	.15	-.10	-.04	.01
RES	.00000	.14990	-.05149	.00349	.05202
SRes	.00000	.99910	-.34317	.02325	.34670
PV	-.04355	.02939	-.05923	-.04441	-.03107
SPV	.00000	1.00000	-.53363	-.02926	.42460
ACC: Total accruals RES: Residuals SRes: Standardized Residual PV: Predicted Value SPV: Standardized Predicted Value					
Source: authors' calculation					

The total accruals in the regression model are dependent and change in total revenues and value of non-current assets, all scaled by total assets, are considered as independent variables. The results of the regression model (Table 2) show no auto-correlation problem (Durbin-Watson is 2.069) but an important limitation of the model is very low R^2 and adjusted R^2 by which every independent variable in the model explains only 3.7 % of the variations in the dependent variable. Nevertheless, the model is considered significant (p-value is 0.000).

Table 2: ANOVA table of multiple regression model

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.436	3	.479	21.271	.000[b]
	Residual	37.367	1660	.023		
	Total	38.804	1663			
a. Dependent Variable: Total accruals scaled by total assets						
b. Predictors: (Constant), Scaled non-current assets, Scaled change in total revenues, 1/TA(t-1)						
Source: authors' calculations						

The most important results of the model are residuals that represent discretionary accruals. Dechow and Dichev (2002) consider a standard deviation of the residuals a measurement of the earnings quality. The authors underline that lower standard deviation represents higher earnings quality. Jones (1991) highlighted that is necessary to calculate standardized residuals and standardized prediction values to obtain accruals proxies. The regression model, which is a result of this research, shows that non-discretionary accruals do not equal zero, and that the total accruals cannot be considered as only discretionary accruals. Next to that, we concluded that the discretionary accruals (residuals) have a higher standard deviation compared to the non-discretionary accruals (predicted values). Results show that changes in total accruals are mainly the outcome of a discretionary accruals.

In order to test the first research hypothesis, a correlation statistic is used. Pearson's correlation matrix (Table 3) shows the linkage between observed variables included in the earnings quality model and chosen financial indicators and ratios. Total accruals are statistically significant related to almost all variables. The correlation matrix shows significant but low strength between total accruals and non-discretionary accruals. On the other side, the total accruals are statistically significant and highly, almost perfectly, related to the standardized residuals.

As expected, cash flow changes are negatively related to the total accruals, i.e. if the total accruals increase the cash flow from operating activities decreases. Consequently, it can be concluded that a

higher accruals level leads to lower cash flows. Related to that, a net income and EBIT changes are positively related to the total accruals. Altogether, lead us to the conclusion that there exists a difference between accrual and cash basis in presenting financial information and results, and consequently accrual basis represent potential for management choices.

The total accruals are significantly linked to the business performance ratios as the economy and the profitability ratio. Higher accruals result in a higher total economy ratio, return on assets, return on equity and profit margin. Contrary to that, the financial position ratios, as an equity-to-assets ratio and total turnover ratio, are not statistically significant related to total accruals.

Table 3: Correlation matrix of observed variables

Corr/p-value	ACC	ΔNI	ΔEBIT	ΔCF	ΔiCF	RES	SRES	PV	SPV
ACC	1	.137** *.000*	.140** *.000*	-.217** *.000*	.292** *.000*	.981** *.000*	.981** *.000*	.192** *.000*	.192** *.000*
ΔNI	.137** *.000*	1	.994** *.000*	.073** *.003*	.816** *.000*	.025 *.307*	.025 *.307*	.582** *.000*	.582** *.000*
ΔEBIT	.140** *.000*	.994** *.000*	1	.065** *.008*	.833** *.000*	.026 *.293*	.026 *.293*	.594** *.000*	.594** *.000*
ΔCF	-.217** *.000*	.073** *.003*	.065** *.008*	1	-.025 *.299*	-.219** *.000*	-.219** *.000*	-.012 *.621*	-.012 *.621*
RES	.981** *.000*	.025 *.307*	.026 *.293*	-.219** *.000*	.181** *.000*	1	1.000** *.000*	.000 *1.000*	.000 *1.000*
SRES	.981** *.000*	.025 *.307*	.026 *.293*	-.219** *.000*	.181** *.000*	1.000** *.000*	1	.000 *1.000*	.000 *1.000*
PV	.192** *.000*	.582** *.000*	.594** *.000*	-.012 *.621*	.594** *.000*	.000 *1.000*	.000 *1.000*	1	1.000** *.000*
SPV	.192** *.000*	.582** *.000*	.594** *.000*	-.012 *.621*	.594** *.000*	.000 *1.000*	.000 *1.000*	1.000** *.000*	1
EUP	.123** *.000*	.148** *.000*	.136** *.000*	.089** *.000*	.096** *.000*	.102** *.000*	.102** *.000*	.119** *.000*	.119** *.000*
KVF	.035 *.149*	-.037 *.135*	-.043 *.079*	.025 *.307*	-.072** *.003*	.055* *.024*	.055* *.024*	-.098** *.000*	-.098** *.000*
ROA	.134** *.000*	.224** *.000*	.197** *.000*	.106** *.000*	.119** *.000*	.104** *.000*	.104** *.000*	.166** *.000*	.166** *.000*
ROE	.148** *.000*	.098** *.000*	.096** *.000*	.007 *.768*	.067** *.007*	.135** *.000*	.135** *.000*	.083** *.001*	.083** *.001*
MP	.144** *.000*	.134** *.000*	.129** *.000*	.072** *.003*	.129** *.000*	.135** *.000*	.135** *.000*	.060* *.014*	.060* *.014*
KOUI	.029 *.244*	.059* *.015*	.050* *.041*	.030 *.224*	.030 *.214*	-.043 *.079*	-.043 *.079*	.368** *.000*	.368** *.000*

ACC: total accruals scaled by total assets
ΔNI: change in net income
ΔEBIT: change in earnings before interests and taxes
ΔCF: change in cash flow from operating activity
RES: Unstandardized Residual
SRES: Standardized Residual
PV: Unstandardized Predicted Value
SPV: Standardized Predicted Value
EUP: total economy ratio
KVF: equity-to-assets ratio
ROA: return on assets
ROE: return on equity
MP: profit margin

Corr/p-value	ACC	ΔNI	ΔEBIT	ΔCF	ΔiCF	RES	SRES	PV	SPV
KOUI: total assets turnover ratio									
Source: authors' calculations									

Both accruals proxies, discretionary and non-discretionary, are related to the equity-to-assets ratio. The correlation is significant but low. Predicted values (non-discretionary accruals) are statistically significant related to changes in net income and EBIT. Respecting the obtained results of the conducted analysis, we accept the first research hypothesis that there exists a statistically significant correlation between discretionary and non-discretionary accruals, and traditional financial indicators and ratios.

The next research phase includes assessing earnings quality respecting the business performance measured by net income and traditional financial ratios. For the research purposes a dummy variable is included in the research. The dummy variable represents a category variable that divides observations into two groups, 'loss' companies (0), and 'profit' companies (1).

Table 4: Results of Mann-Whitney test for detecting changes in 'loss' and 'profit' companies for observed variables

	Net Income	Cash flow from operating activities	Return on Assets	Total accruals	Discretionary Accruals	Non-discretionary Accruals
Mann-Whitney U	.000	153326.000	29859.000	187756.000	203089.000	164400.000
Wilcoxon W	63903.000	214401.000	93762.000	251659.000	266992.000	228303.000
Z	-28.995	-8.779	-25.284	-5.660	-3.755	-8.563
Asymp. Sig. (2-tailed)	.000	.000	.000	.000	.000	.000
a. Grouping Variable: Category ('profit' companies = 1; 'loss' companies = 0)						
Source: authors' calculations						

Respecting the fact that the observed data is not normally distributed, the difference between the two categories is tested by using non-parametric Mann-Whitney test (Table 4). Obtained results show a significant difference respecting grouping variable, i.e. 'profit' vs. 'loss' companies (p-value is 0.000).

Table 5: Descriptive statistics for observed variables respecting category variable

	'loss' companies			'profit' companies		
	Mean	Standard Deviation	Median	Mean	Standard Deviation	Median
NI	-89,264,362	160,492,204	-29,008,989	68,135,865	190,154,693	17,678,015
CFt	62,237,317	336,253,626	9,688,515	107,169,557	337,965,897	41,089,280
ROA	-.04368	.11737	-.00861	.07894	.26508	.05206
ROE	-1.09309	8.43849	-.05697	.18712	1.75590	.06387
MP	-.06248	.20515	-.01379	.09830	.11654	.05754
ACC	-.06802	.19692	-.06513	-.03686	.13760	-.03386
SRES	-.10262	1.29489	-.07251	.02803	.90019	.04562

SPV	-.30879	.78454	-.31627	.08434	1.03556	.04080

NI: Net Income
CF: Cash flow from operating activities
ROA: Return on Assets
ROE: Return on Equity
MP: Profit Margin
ACC: Total Accruals
SRES: Standardized residuals (discretionary accruals)
SPV: Standardized predicted value (non-discretionary accruals)

Source: authors' calculations

As expected, the 'loss' companies have negative mean and median values of net income, and for the 'profit' companies observed indicators are positive (Table 5). It is interesting to notice that both categories have a positive cash flow from operating activities, but the value of the cash flow on average is significantly higher in 'profit' companies compared to 'loss' companies. The results of the chosen financial indicators confirm the existence of differences between observed categories. All observed financial ratios of 'loss' companies have the negative median, and for 'profit' companies median is positive. The negative median for return on assets and profit margin of the 'loss' companies tells us that at least 50 % of observation had higher reported loss than interest expenses.

The most important part of the research is to analyze the difference between earnings quality in 'loss' and 'profit' companies. "The standard deviation of a series of systematically large positive residuals may very well be low, indicating that there is little inference problem. Accruals quality therefore is consistent with the view that high-mean, low-variance firms have good (not poor) earnings quality." (Francis, Olsson and Schipper, 2008, p. 297) The results of Mann-Whitney test show the significant difference between two categories tested for total accruals, standardized residuals (discretionary accruals), and standardized predicted values (non-discretionary accruals). 'Loss' companies show a lower quality of the total and discretionary accruals. "Abnormal accruals as a measure of earnings quality is based on the view that accruals which are not well explained by accounting fundamentals (fixed assets and revenues) are an inverse measure of earnings quality. The abnormal accruals measure is typically estimated using some version of the Jones (1991) approach." (Francis, Olsson and Schipper, 2008, p. 298) Conflicting results are obtained for a non-discretionary part of total accruals where 'loss' companies result in higher quality than 'profit' companies. It can be concluded that 'profit' companies are more affected by business conditions than 'loss' companies. "Abnormal accruals are traditionally viewed as capturing management's financial reporting decisions (or discretion)." (Francis, Olsson and Schipper, 2008, p. 298) The higher standard deviation of discretionary accruals leads us to the conclusion that the financial result of 'loss' companies is more affected by management choices than in 'profit' companies. Taking into account obtained results of conducted analysis the second research hypothesis can be accepted, i.e. it is possible to detect a significant difference in earnings quality between 'profit' and 'loss' companies.

5. Conclusion

The paper includes research about the earnings quality of Croatian large companies for the period from 2008 to 2016. The purpose of earnings quality models is to detect levels of management choices that affect the financial result of the company. The research is conducted by using appropriate statistical tools as multiple regression model, correlation analysis, non-parametric tests. Limitation of the research is the lack of an available data due to the content and structure of the financial statementns, and much important than that, there is no availabe data on cash flows for periods before 2007. The conducted research gives results on modified Jones (1991) and Dechow and Dichev (2002) models. Obtained results show that there exists a significant correlation between accruals measurements and traditional financial indicators and ratios. The research resulted in finding a statistically significant difference in discretionary and non-discretionary accruals between 'loss' and

'profit' companies where 'loss' companies are more affected by management choices, and 'profit' companies are more affected by business conditions. Future researches could be directed to the analysis of specific accounting policies and estimates that affects financial position and business performance of companies.

Acknowledgment

The paper is a result of a project entitled "The Role and Significance of the Analytical Procedures in the Earnings Quality Evaluation" which is financed by the University of Zagreb as a short-term research support for 2017.

Literature:

Cheng, A., Liu, CZ., Thomas, W. (2012), 'Abnormal Accrual Estimates and Evidence of Mispricing', *Journal of Business Finance & Accounting*, 39 (1) & (2), 1–34.

DeAngelo, LE. (1986), 'Accounting Numbers as Market Valuation Substitutes: A Study of Management Buyouts of Public Stockholders', *The Accounting Review*, 61 (3), 400-420.

Dechow, PM., Sloan, RG., Sveeney, AP. (1995), 'Detecting Earnings Management', *The Accounting Review*, 70 (2), 193-225.

Dechow, P., Dichev, ID. (2002), 'The Quality of Accruals and Earnings: The Role of Accrual Estimation Errors', *The Accounting Review*, 77, Supplement: Quality of Earnings Conference, 35-59.

Dechow, P., Ge, W., Schrand, C. (2010), 'Understanding earnings quality: A review of the proxies, their determinants and their consequences', *Journal of Accounting and Economics,* 50 (2-3), 344–401.

Dichev, I., Graham, J., Harvey, CR., Rajgopal, S. (2013), 'Earnings quality: Evidence from the field' J*ournal of Accounting and Economics*, 56 (2–3), 1-33.

Francis, J., LaFond, R., Olsson, PM., Schipper, K. (2004), 'Costs of Equity and Earnings Attributes' *The Accounting Review*, 79 (4), 967-1010.

Francis, J., LaFond, R., Olsson, P., Schipper, K. (2005), 'The market pricing of accruals quality', *Journal of Accounting and Economics,* 39, 295–327.

Francis, J., Olsson, P., Schipper, K. (2008), 'Earnings Quality. Foundations and Trends® in Accounting', 1 (4), 259-340. http://dx.doi.org/10.1561/1400000004.

Ghosh, A., Moon, D. (2010), 'Corporate Debt Financing and Earnings Quality', *Journal of Business Finance & Accounting*, 37 (5) & (6), 538–559.

Healy, P. M. (1985), 'Effect of bonus schemes on accounting decisions', *Journal of Accounting and Economics*, 7, 85-107.

Jones, JJ. (1991), 'Earnings Management During Import Relief Investigations', *Journal of Accounting Research*, 29(2), 193-228.

Jones, K., Krishnan, G., Melendrez, KD. (2008), 'Do Models of Discretionary Accruals Detect Actual Cases of Fraudulent and Restated Earnings? An Empirical Analysis', *Contemporary Accounting Research*, 25 (2), 499-531.

Ohlson, JA. (2014), 'Accruals: An overview', *China Journal of Accounting Research,* 7, 65-80.

Perotti, P., Wagenhofer, A. (2014), 'Earnings Quality Measures and Excess Returns', *Journal of Business Finance & Accounting*, 41 (5) & (6), 545–571.

Perotti, P., Wagenhofer, A. (2014), 'Earnings Quality Measures and Excess Returns', *Journal of Business Finance & Accounting*, 41 (5-6), 545–571.

Salerno, D. (2014), 'The Role Of Earnings Quality In Financial Analyst Forecast Accuracy', *The Journal of Applied Business Research*, 30 (1), 255-275.

Šodan, S. (2015), 'The impact of fair value accounting on earnings quality in eastern European countries', *Procedia Economics and Finance*, 32, 1769-1786.

Valipour, H., Moradbeygi, M. (2011), 'Corporate Debt Financing and Earnings Quality', *Journal of Applied Finance & Banking*, 1 (3), 139-157.

Yurt, C., Ergun, U. (2015), 'Accounting Quality Models: A Comprehensive Literature Review', *International Journal of Economics, Commerce and Management*, 3 (5), 33-66.

Žager, K., Mamić Sačer, I., Sever Mališ, S., Ježovita, A., and Žager, L. (2017) Analiza financijskih izvještaja: načela, postupci, slučajevi (3rd amended ed.), Hrvatska zajednica računovođa i financijskih djelatnika, Zagreb

Comparative analysis of Business Process Management frameworks

Robert Waszkowski, Cybernetics Faculty, Military University of Technology, Poland, robert.waszkowski@wat.edu.pl

Arkadiusz Kowalski, Faculty of Mechanical Engineering, Wrocław University of Science and Technology, Poland, arkadiusz.kowalski@pwr.edu.pl

Abstract

Growing process maturity of Polish organizations, causes a growing demand for information technology to meet business expectations. The answer to these needs is Business Process Management. This article brings together the functionality of Business Process Management systems and the benefits of their implementation. Tools are compared according to certain criteria developed by the authors. Both open source and commercial tool are concerned.

Keywords: Busiess Process Management, tools, frameworks, comparison, open source, commercial

Introduction

In the era of growing process maturity of Polish organizations, there is also a growing demand for information technology to meet business expectations. IT tools should support business and keep up with its ongoing development as mentioned in Gawin et al (2013), Jasiulewicz-Kaczmarek et al (2016, 2018), Piotrowski (2007), Drejewicz (2012) and Baeyens (2017). Businesses are increasingly empowered to increase employee productivity and improve information management to increase competitiveness, reduce costs and adapt to dynamic market and legal situations.

The answer to these needs are the Business Process Management (BPM) systems. They allow you to map business processes as workflow diagrams, automate tasks and improve their execution parameters. The essence of process automation is the transfer of control from humans to IT systems.
.
Progressive globalization and the widespread development of the IT industry are contributing to the increasing availability of process management tools. The business software market is filled with modern and sophisticated solutions, so the choice of the right tool is becoming more and more difficult and raises a lot of questions and doubts among potential customers. Larger companies must organize tenders to collect comparable values for choosing the right system.

This article brings together the functionality of Business Process Management systems and the benefits of their implementation. Tools are compared according to certain criteria developed by the authors.

The BPM market in Poland has been growing at about the same pace as in other countries in Central and Eastern Europe, with initial systems being reminiscent of Document Management Systems (DMS) and projects focused on improving processes from the business logic point of view as described in Object Management Group (2017). Then, with the development of IT technology, the companies' vision of the BPM benefits focused on seeking financial and temporary savings as part of the optimization of their internal processes. In the public sector, however, the focus was on implementing ISO standards. Currently, the Polish market follows trends from Western Europe and the United States, where BPM implementation projects focus on operational risk management.

The market sectors in Poland, where BPM systems are the most popular are:

- banking,
- telecommunications,
- energy,
- public administration,
- insurance industry.

The above sectors are mainly composed of large companies employing over 200 employees and corporations with many complex business processes requiring automation. The most common areas in organizations that implement BPM tools are:

- customer service,
- administration,
- accounting.

These are areas where interactions with customers (internal and external) as well as work flow must be under strict control.

Analysis of process modeling capabilities

In order to compare their process modeling capabilities, each of the analyzed tools had been investigated to find a set of potential functional features that BPM tools can offer. The first analyzed feature is the ability to graphically model processes. The graphical environment in each tool can vary a lot from very modest to very sophisticated and eye-catching graphics. The next feature to check will be the presence of a process engine responsible for implementing and running the modeled processes. Some of the applications described offer not only the BPMN notation, which is currently standard in business process modeling, but also allow modeling using other notations like, for example, Unified Modeling Language (UML). If a framework offers its own notation, then this fact will also be noticed. In addition to the ability to draw a diagram, it will be shown whether these tools offer model validation. Flexible tools should offer the ability to export and import models created with other tools using MS Visio or XPDL. The data modeling context, which includes all the data required for a process, will also be analyzed. Process data like on-screen forms, documents, attachments, document repositories, or any external sources of information that may be required for execute the process at every possible stage will be considered. Another assessment criteria concerns the business rules, both defining and enforcing. A business rule is a rule that defines or constrains some aspect of business and always resolves to either true or false. Business rules are intended to assert business structure or to control or influence the behavior of the business. A useful option or extension of the BPMN diagram is the ability to simulate the process. Simulation is used to trace the process flow, find bottlenecks, and test the continuity of the process. More advanced tools also allow you to estimate the time and costs of processes, which may help you in forecasting your budget, but will not replace Business Intelligence. The last element analyzed is whether the framework is provided with ready-to-modify template processes.

According to Activiti (2017), Github Activity (2017), Bonita (2017), Github Bonitasoft (2017), Github: jBPM (2017), Documentation jBPM (2017), Camunda (2017), Github: Camunda (2017), Orchestra code (2017), Orchestra User Guide (2017), OW2 Orchestra (2017), Yaoqiang (2017), Code Yaoqiang (2017), Table 1 shows the results of the analysis of open source tools covering the above-described scope of features.

Tab. 1 Process modeling capabilities – open source tools

	Activiti BPM	**Bonita BPM**	**jBPM**	**Camunda BPM**	**Orchestra**	**Yaoqiang BPMN Editor**
Graphical modeling	YES	YES	YES	YES	YES	YES
Built-in process engine	YES	YES	YES	YES	YES	NO
Supported notations						
BPMN	YES	YES	YES	YES	YES	YES
BPEL	NO	NO	NO	NO	YES	NO
UML	NO	NO	NO	NO	NO	NO
Own	NO	NO	NO	NO	NO	NO
Model validation	YES	YES	YES	YES	YES	YES
Model import	YES	YES	YES	YES	YES	YES
Model export	YES	YES	YES	YES	YES	YES
Data modeling	YES	YES	YES	YES	NO	NO
Forms	YES	YES	YES	YES	NO	NO
Document repository	YES	YES	NO	YES	NO	NO
Business rules	NO	YES	YES	YES	NO	NO
Process simulation						
Process flow animation	NO	YES	YES	NO	NO	YES
Time/Cost estimation	NO	YES	YES	NO	NO	NO
Process templates	NO	YES	NO	NO	NO	YES
YES	9	13	11	10	7	7
NO	7	3	5	6	9	9

Based on the table above, all of the open source tools analyzed have a graphical interface that enables modeling using the BPMN notation, validation of modeled processes, as well as options for importing and exporting process models. The process engine that enables them to be implemented in enterprises is available in almost every application except the Yaoqiang BPMN Editor, which is used exclusively for modeling. Only Orchestra allows you to map the BPMN process to BPEL, while the rest of the analyzed applications only support BPMN.
Based on the above results, Bonita BPM not only provides an easy-to-read graphical and user-friendly interface, but it is also a fully-featured solution for complex process modeling.

According to Aurea BPM (2017), Bizagi (2017), IBM Blueworks (2017), iGrafx (2017), K2 blackpearl (2017), Oracle BPM (2017), Table 2 summarizes the results of the process modeling capability analysis for commercial tools and is subjected to the same evaluation criteria as the open source tools.

Tab. 2 Process modeling capabilities – commercial tools

	Aurea BPM	**Bizagi BPM Suite**	**IBM Blueworks Live**	**iGrafx FlowCharter**	**K2 blackpearl**	**Oracle BPM Suite**
Graphical modeling	YES	YES	YES	YES	YES	YES
Built-in process engine	YES	YES	YES	NO	YES	YES
Supported notations						
BPMN	YES	YES	YES	YES	YES	YES
BPEL	NO	NO	NO	YES	NO	YES
UML	NO	NO	NO	YES	NO	NO
Own	NO	NO	NO	NO	NO	NO
Model validation	YES	YES	YES	YES	YES	YES
Model import	YES	YES	YES	YES	YES	YES
Model export	YES	YES	YES	YES	YES	YES
Data modeling	YES	YES	YES	NO	YES	YES
Forms	YES	YES	YES	NO	YES	YES
Document repository	YES	NO	YES	YES	YES	YES
Business rules	YES	YES	YES	NO	YES	YES
Process simulation						
Process flow animation	YES	YES	YES	NO	NO	YES
Time/Cost estimation	YES	YES	NO	NO	NO	YES
Process templates	NO	NO	YES	YES	YES	YES
YES	12	11	12	9	11	14
NO	4	5	4	7	5	2

By analyzing the above table, it can be seen how small differences in their capabilities appear among commercial tools. All analyzed tools have a graphical environment for process modeling in BPMN notation, and also allow you to import and export modeled processes. Except for iGrafx FlowCharter, all standard tools are equipped with a model validator that can capture potential errors in the process. Similarly, screen forms support, the ability to model data and bind them to process elements, and the ability to model and execute business rules are present in all evaluated tools. The only tool out there that is suitable only for modeling is the iGrafx FlowCharter. It does not have a process engine, but includes the UML modeling feature and converts modeled processes into BPEL.
The differences in modeling capabilities between the analyzed commercial solutions are negligible. The tool with the best process modeling capabilities seems to be the Oracle BPM Suite, but the Aurea BPM competes with all the features but the ready-made diagram templates.

Analysis of end-user interface and business analyst interface

This section analyzes the interfaces available to end users of the application and to business analysts. Access options have been defined that reflect the various forms of work on the systems under consideration. The first will be web browser access for process modeling, task management, or process monitoring. The four most popular browsers are: Internet Explorer (Edge), Mozilla Firefox, Google Chrome and Opera. The next criterion is to check whether the system can work in the cloud and whether it has a mobile application or desktop application. It will show on which operating systems you can use the tool, and whether it is a cross-platform application that is independent of the operating system. The comparison will also take into account the language versions of the tool and whether the application has a

Polish version. The final element will be the interface for developers i.e. plugins for popular development environments, such as Eclipse or Microsoft Visual Studio.
According to Activiti (2017), Github Activity (2017), Bonita (2017), Github Bonitasoft (2017), Github: jBPM (2017), Documentation jBPM (2017), Camunda (2017), Github: Camunda (2017), Orchestra code (2017), Orchestra User Guide (2017), OW2 Orchestra (2017), Yaoqiang (2017), Code Yaoqiang (2017), Table 3 below shows the results of the analysis of open source tools that indicate the available user interfaces.

Tab. 3 Available user interfaces – open source tools

	Activiti BPM	**Bonita BPM**	**jBPM**	**Camunda BPM**	**Orchestra**	**Yaoqiang BPMN Editor**
Web browser interface:	YES	YES	YES	YES	YES	NO
Internet Explorer	YES	YES	YES	YES	YES	NO
Mozilla Firefox	YES	YES	YES	YES	YES	NO
Google Chrome	YES	YES	YES	YES	YES	NO
Opera	YES	YES	YES	YES	YES	NO
Cloud/SaaS	NO	NO	NO	NO	NO	NO
Desktop application	YES	YES	NO	YES	NO	YES
Operating systems						
Windows	YES	YES	YES	YES	YES	YES
Linux	YES	YES	YES	YES	YES	YES
Unix	YES	NO	YES	YES	YES	NO
Mac OS	YES	YES	YES	YES	YES	YES
Multi-platform application	YES	NO	YES	YES	YES	NO
Mobile application	NO	YES	NO	NO	NO	NO
Polish version	NO	NO	NO	NO	NO	NO
Plug-ins	YES	YES	YES	YES	YES	YES
YES	8	7	7	8	7	5
NO	3	4	4	3	4	6

By analyzing the above table, you can see that the poorest tool is the Yaoqiang BPMN Editor again - it's a desktop application, it does not require installation, and it is available in three versions for Windows, Linux and Mac. The remaining five tools offer access via all considered web browsers. None of the tools offer a Cloud or SaaS (Software as a Service) model, which may be understandable for community-driven solutions. The vast majority of solutions are cross-platform applications that have one version regardless of the operating system on which they are deployed. The distinctive tool is Bonita BPM, which is the only one with a dedicated mobile application.

Among the open source tools, the largest range of interfaces have Alfresco and Camunda BPM, but these are minor differences compared to the Bonita BPM, jBPM, and Orchestra, that took the second place.
According to Aurea BPM (2017), Bizagi (2017), IBM Blueworks (2017), iGrafx (2017), K2 blackpearl (2017), Oracle BPM (2017), Table 4 below summarizes the results of analysis of available user interfaces for commercial tools and is subjected to the same evaluation criteria as the open source tools.

Tab. 4 Available user interfaces – commercial tools

	Aurea BPM	**Bizagi BPM Suite**	**IBM Blueworks Live**	**iGrafx FlowCharter**	**K2 blackpearl**	**Oracle BPM Suite**
Web browser interface:	YES	YES	YES	NO	YES	YES
Internet Explorer	YES	YES	YES	NO	YES	YES
Mozilla Firefox	YES	YES	YES	NO	YES	YES
Google Chrome	YES	YES	YES	NO	YES	YES
Opera	YES	YES	YES	NO	YES	YES
Cloud/SaaS	YES	YES	YES	NO	YES	YES
Desktop application	NO	NO	NO	YES	YES	YES
Operating systems						
Windows	YES	YES	YES	YES	YES	YES
Linux	YES	YES	YES	NO	NO	YES
Unix	YES	YES	YES	NO	NO	YES
Mac OS	YES	NO	YES	NO	NO	YES
Multi-platform application	YES	NO	YES	NO	NO	YES
Mobile application	YES	YES	YES	NO	YES	YES
Polish version	YES	YES	NO	YES	NO	NO
Plug-ins	NO	NO	NO	NO	YES	YES
YES	9	7	8	3	6	10
NO	2	4	3	8	5	1

From the table above, most commercial tools offer web browser access and cloud computing, with the exception of the iGrafx solution, which only works with a desktop application running on Microsoft Windows. Also K2 Blackpearl and Oracle BPM Suite offer a desktop application. All applications support MS Windows operating system, while it is the only supported operating system for the K2 Blackpearl. The Linux and Unix OSs are supported by four tools: Aurea BPM, Bizagi BPM Suiute, IBM Blueworks Live and Oracle BPM Suite. Bizagi does not support Apple Mac OS and does not offer a cross-platform application-independent system.

Process monitoring capabilities analysis

One of the key elements of business process management is the ability to monitor them. It is called the Business Activity Monitoring (BAM). They continuously gather information about Key Performance Indicators (KPIs). This section outlines the capabilities of BAM tools delivered with the analyzed BPM systems.

A set of four predefined reports will be analyzed. Potentially reports should show process execution statistics (such as execution time or iteration amount), allow review of executed processes, provide detailed data about individual activities in the process, and provide a view of process participant statistics. It will be investigated whether the tools have the ability to define their own reports using the wizard. When creating your own reports, it will be helpful to define your own KPIs for the process. Next, it will be verified whether the tools enable working with data from external sources together with with process flow data. Next, you will be able to compare the capabilities of defining dashboards, drawing charts, and data operations (filtering, selection, and multi-layered data collapsing and expanding). It will be determined which tools have the ability to define system notifications when the indicator reaches a limit value. At the end, data import and export capabilities will be investigated.

According to Activiti (2017), Github Activity (2017), Bonita (2017), Github Bonitasoft (2017), Github: jBPM (2017), Documentation jBPM (2017), Camunda (2017), Github: Camunda (2017), Orchestra code (2017), Orchestra User Guide (2017), OW2 Orchestra (2017), Yaoqiang (2017), Code Yaoqiang (2017), Table 5 below summarizes the results of the analysis of business process monitoring capabilities for open source tools.

Tab. 5 Business process monitoring capabilities – open source tools

	Activiti BPM	**Bonita BPM**	**jBPM**	**Camunda BPM**	**Orchestra**	**Yaoqiang BPMN Editor**
BAM	NO	YES	YES	NO	NO	NO
Predefined reports:	NO	YES	YES	NO	NO	NO
Process execution statistics	NO	YES	YES	NO	NO	NO
Process review	NO	YES	YES	NO	NO	NO
Process activity statistics	NO	YES	YES	NO	NO	NO
Process participants statistics	NO	YES	YES	NO	NO	NO
Report wizard	NO	NO	YES	NO	NO	NO
KPI	NO	YES	YES	NO	NO	NO
External data	NO	YES	YES	NO	NO	NO
Management dashboards	NO	YES	YES	NO	NO	NO
Charts	NO	YES	YES	NO	NO	NO
Data manipulation:						
Filtering	NO	YES	YES	NO	NO	NO
Selecting	NO	YES	YES	NO	NO	NO
Multidimensional	NO	NO	YES	NO	NO	NO
Alert system	NO	NO	NO	NO	NO	NO
Data export	NO	YES	YES	NO	NO	NO
Printing to file	NO	YES	YES	NO	NO	NO
YES	0	14	16	0	0	0
NO	17	3	1	17	17	17

As you can see in the table above, BAM is not an open source domain for process management tools - only two of them offer this functionality. The jBPM, which offers a rich, built-in BAM module, is the best in the list. A set of predefined reports fulfills the criteria. It has a graphical report generator that allows you to create reports for business users. It supports process KPIs and allows you to create new indicators. The other solution, Bonita BPM, does not have a built-in report wizard, but is integrated with another open source tool that has such a wizard. Although because it is another project, it was not included in the list. The Bonita BPM reports do not have a multidimensional construction, which prevents aggregation and drilling up/down of data.

According to Aurea BPM (2017), Bizagi (2017), IBM Blueworks (2017), iGrafx (2017), K2 blackpearl (2017), Oracle BPM (2017), Table 6 summarizes the results of the analysis of the business process monitoring capabilities for commercial tools, and is subjected to the same evaluation criteria as the open source tools.

Tab. 6 Business process monitoring capabilities – commercial tools

	Aurea BPM	**Bizagi BPM Suite**	**IBM Blueworks Live**	**iGrafx FlowCharter**	**K2 blackpearl**	**Oracle BPM Suite**
BAM	YES	YES	NO	NO	YES	YES
Predefined reports:	YES	YES	YES	NO	YES	YES
Process execution statistics	YES	YES	YES	NO	YES	YES
Process review	YES	YES	YES	NO	YES	YES
Process activity statistics	YES	YES	YES	NO	YES	YES
Process participants statistics	YES	YES	YES	NO	YES	YES
Report wizard	YES	YES	NO	NO	YES	YES
KPI	YES	YES	NO	NO	NO	YES
External data	YES	NO	NO	NO	NO	YES
Management dashboards	YES	YES	NO	NO	YES	YES
Charts	YES	YES	YES	NO	YES	YES
Data manipulation:						
Filtering	YES	YES	YES	NO	YES	YES
Selecting	YES	YES	NO	NO	YES	YES
Multidimensional	YES	YES	NO	NO	YES	YES
Alert system	YES	YES	NO	NO	YES	YES
Data export	YES	YES	YES	NO	YES	YES
Printing to file	YES	YES	NO	NO	YES	YES
YES	17	16	8	0	15	17
NO	0	1	9	17	2	0

By analyzing this table, you can see that the IBM Blueworks Live and iGrafx FlowCharter tools do not provide common process monitoring modules. The IBM tool has a set of predefined statistics, which, using graphs with the ability to navigate through predefined filters, covers the scope of the report. Graph data can be exported to MS Excel. The other four tools, depending on the requirements of the enterprise, can meet the needs of process monitoring reports. Bizagi BPM Suite and K2 Blackpearl tools do not offer reports that include data imported from external systems. The other two systems, Aurea BPM and Oracle BPM, meet the complex scope of business process monitoring. It should be borne in mind that while Oracle fully supports BAM with its own resources, Aurea BPM is supported by an external analytical tool OEM (Original Equipment Manufacturer), which sells it under its own brand as a BAM module.

Analysis of integration possibilities

The tools that are used to implement the process management system should allow integration with existing infrastructure in the enterprise. Such integration enables full automation of business processes. In the first place, you will be able to integrate with the two popular tools: Sharepoint and Outlook and their ability to be used as client applications. Next, the capabilities of external access to process engines will be examined, as well as the capability of API or Web Service integration. Finally, you will be able to see which applications allow you to integrate processes with database objects.
According to Activiti (2017), Github Activity (2017), Bonita (2017), Github Bonitasoft (2017), Github: jBPM (2017), Documentation jBPM (2017), Camunda (2017), Github: Camunda (2017), Orchestra code (2017), Orchestra User Guide (2017), OW2 Orchestra (2017), Yaoqiang (2017), Code Yaoqiang (2017), Table 7 below summarizes the results of the analysis of the ability to integrate BPM tools with existing enterprise infrastructure for commercial tools.

Tab. 7 Integration capabilities – open source tools

	Activiti BPM	**Bonita BPM**	**jBPM**	**Camunda BPM**	**Orchestra**	**Yaoqiang BPMN Editor**
MS SharePoint	NO	YES	NO	NO	NO	NO
MS Outlook	NO	NO	NO	NO	NO	NO
API/Web Service – engine	YES	YES	YES	YES	YES	NO
API/Web Service – modeler	YES	YES	YES	YES	YES	YES
Database objects	YES	YES	YES	YES	YES	NO
YES	3	4	3	3	3	1
NO	2	1	2	2	2	4

By analyzing the results from Table 7, you can see a certain standard for open source software. All have APIs or Web Services to communicate with other software. This allows, for example, to run specific processes or remodel them using external software. The exception is, of course, Yaoqiang BPMN Editor which does not have its own engine nor external database access. None of the tools support integration with the popular MS Outlook e-mail program. Only Bonita BPM supports integration with the Sharepoint application platform.

According to Aurea BPM (2017), Bizagi (2017), IBM Blueworks (2017), iGrafx (2017), K2 blackpearl (2017), Oracle BPM (2017), Table 8 shows the results of the analysis of the integration capabilities of commercial tools, and they were subjected to the same criteria for evaluation as open source tools.

Tab. 8 Integration capabilities – commercial tools

	Aurea BPM	**Bizagi BPM Suite**	**IBM Blueworks Live**	**iGrafx FlowCharter**	**K2 blackpearl**	**Oracle BPM Suite**
MS SharePoint	NO	YES	NO	YES	YES	YES
MS Outlook	NO	NO	NO	YES	YES	YES
API/Web Service – engine	YES	YES	YES	NO	YES	YES
API/Web Service – modeler	YES	YES	YES	NO	YES	YES
Database objects	YES	YES	NO	NO	YES	YES
YES	3	4	2	2	5	5
NO	2	1	3	3	0	0

The data in Table 8 show that the analyzed commercial tools are mostly adapted to integrate with existing systems in enterprises. Four of them (Bizagi BPM Suite, iGrafx Flowcharter, K2 Blackpearl, Oracle BPM Suite) support integration with Sharepoint platform, three of which integrate with MS Outlook. Due to its purpose, iGrafx FlowCharter does not provide programming interfaces to communicate with external software. Systems K2 and Oracle in the above table meet the full scope of the tested integration possibilities.

Conclusions

By analyzing the statements in this article, you will notice that some of the tools are used exclusively to create process models and draw process diagrams. On the other hand, the rest can be a complete set of tools for implementing enterprise process management systems.
Table 9 summarizes the results of the previous four areas of analysis. The first column shows the tools tested, while the next four columns show all the criteria met, and then in the "Sum" column they are added together. A total of 49 properties were verified, as referred to in the last column showing the percentage of all the features for the tool. The tools are divided into commercial and open source.

Tab. 9 Analysis summary

		Process modeling capabilities	GUI	Process monitoring capabilities	Integration possibilities	SUM	% features fulfilled
open source	Activiti BPM	9	8	0	3	20	41%
	Bonita BPM	13	7	14	4	38	78%
	jBPM	11	7	16	3	37	76%
	Camunda BPM	10	8	0	3	21	43%
	Orchestra	7	7	0	3	17	35%
	Yaoqiang BPMN Editor	7	5	0	1	13	27%
commercial	Aurea BPM	12	9	17	3	41	84%
	Bizagi BPM Suite	11	7	16	4	38	78%
	IBM Blueworks Live	12	8	0	2	22	45%
	iGrafx FlowCharter	9	3	0	2	14	29%
	K2 blackpearl	11	6	15	5	37	76%
	Oracle BPM Suite	14	10	17	5	46	94%

The above analysis summary table clearly indicates that only two open source tools fulfill more than 75% of the analyzed features, Bonita BPM and jBPM deserve attention in this segment. Among the commercial tools, the most fulfilled features has the Oracle BPM Suite with the result of 94%. It should be noted that aside from the worldwide software giant, the Aurea BPM, which covers 84% of the measured range of functions, is exceptionally well presented. The other two commercial tools that fulfill more than 75% of the surveyed features are Bizagi BPM Suite and K2 blackpearl.

References

Activiti User Guide, http://activiti.org/userguide/index.html, retrieved 21 May 2017,

Aurea BPM, http://www.aurea-bpm.com/, retrieved 07 June 2017,

Bartłomiej Gawin, Bartosz Marcinkowski, 2013, *Symulacja procesów biznesowych. Standardy BPMS i BPMN w praktyce*, Gliwice, Helion

Bizagi, http://www.bizagi.com/, retrieved 07 June 2017,

Bonita BPM Documentation, http://documentation.bonitasoft.com, retrieved 22 May 2017,

Camunda User Guide, https://docs.camunda.org/manual/7.3/guides/user-guide, retrieved 30 May 2017,

Code Yaoqiang BPMN Editor, https://sourceforge.net/projects/bpmn/, retrieved 31 May 2017,

Documentation jBPM, http://www.jbpm.org/learn/documentation.html, retrieved 25 May 2017,

Fabrity Narzędzia dla projektantów, https://www.fabrity.pl/pl/oferta/zarzadzanie-procesami/narzedzia-dla-projektantow, retrieved 30 September 2017,

Github: Activiti, https://github.com/Activiti/Activiti, retrieved 21 May 2017,

Github: Bonitasoft, https://github.com/bonitasoft, retrieved 22 May 2017,

Github: Camunda BPM, https://github.com/camunda/, retrieved 30 May 2017,

Github: jBPM, https://github.com/droolsjbpm/jbpm, retrieved 30 May 2017,

Horus Workflow, http://horus.pl/produkty/workflow, retrieved 24 May 2017,

IBM Blueworks Live Admin User Manual, https://www.blueworkslive.com/download/ IBM Blueworks Live Admin User Manual.docx?postId=10000ae3e95c27e&fileItemId=10000ae3e95bb52, retrieved 07 June 2017,

IBM Blueworks Live, https://www.blueworkslive.com, retrieved 01 June 2017,

iGrafx FlowCharter, http://www.igrafx.com/products/process-modeling-analysis/ flowcharter, retrieved 15 July 2017,

Jasiulewicz-Kaczmarek M., Saniuk A., Nowicki T., 2016, The maintenance management in the macro-ergonomics context, [in.] Richard H.M. Goossens (eds.) Advances in Social & Occupational Ergonomics Proceedings of the AHFE2016 Conference on Social & Occupational Ergonomics, July 27-31, Walt Disney World®, Florida, USA Series: Advances in Intelligent Systems and Computing, Vol. 487 pp. 35-46 DOI: 10.1007/978-3-319-41688-5,

Jasiulewicz-Kaczmarek M., Waszkowski R., Piechowski M., Wyczółkowski R., 2018, Implementing BPMN in Maintenance Process Modeling, 38th International Conference on Information Systems Architecture and Technology, ISAT 2017; Szklarska Poreba; Poland; 17 September 2017 through 19 September 2017; Code 197389, Advances in Intelligent Systems and Computing Vol. 656, pp. 300-309

K2 blackpearl User Guide, http://help.k2.com/onlinehelp/k2blackpearl/UserGuide/4.6.11/webframe.html, retrieved 25 September 2017,

K2 blackpearl, http://www.k2.com/bpm-software, retrieved 25 September 2017,

Marek Piotrowski, 2007, *Notacja modelowania procesów biznesowych BPMN. Podstawy*, Legionowo, BTC

MGX partner iGrafx FlowCharter, http://www.mgx.com.pl/node/135, retrieved 16 July 2017,

OASIS, Web Services Business Process Execution Language Version 2.0. OASIS Standard (11 April 2007), http://docs.oasis-open.org/wsbpel/2.0/OS/wsbpel-v2.0-OS.html, retrieved 20 March 2017,

Object Management Group, Business Process Model and Notation (BPMN) version 2.0, http://www.omg.org/spec/BPMN/2.0/PDF/, retrieved 20 March 2017,

Oracle BPM - Business Process Management, http://www.oracle.com/us/technologies/bpm/overview/index.html, retrieved 11 August 2017.

Orchestra code, http://orchestra.ow2.org, retrieved 06 June 2017,

Orchestra User Guide, http://download.forge.ow2.org/orchestra/Orchestra-4.9.0-UserGuide.pdf, retrieved 06 June 2017,

OW2 Orchestra, http://forge.ow2.org/project/showfiles.php?group_id=266, retrieved 06 June 2017,

Szymon Drejewicz, 2012, *Zrozumieć BPM. Modelowanie procesów biznesowych*, Gliwice, Helion

Tom Baeyens, Joram Barrez, Introduction to Activiti BPM, http://www.slideshare.net/alfresco/introduction-to-activiti-bpm, retrieved 21 May 2017,

What's New Oracle BPM Suite 12c, Oracle white paper, http://www.oracle.com/technetwork/middleware/bpm/overview/bpm-12c-new-features-wp-2235510.pdf, retrieved 10 August 2017,

Yaoqiang BPMN Editor, http://www.yaoqiang.org/, retrieved 30 May 2017,

Ensuring Stability of the Territorial Subject of the Russian Federation in the Conditions of Unstable Economy

Marina V. Kazakovtseva, Mari State University, Yoshkar-Ola, Russia, marina290576@mail.ru

Firdaus Z. Gumarova, Mari State University, Yoshkar-Ola, Russia, gumarovaf@mail.ru

Elena Y. Yuricheva, Mari State University, Yoshkar-Ola, Russia, roman1135@yandex.ru

Abstract

Financial stability of territorial subjects of the Russian Federation in many respects depends on economic activity in the region. In the conditions of insufficient budget financing attraction of foreign investments by regions has to become one of sources of growth of enterprise activity.

Keywords: financial stability of the region, foreign investments, investment potential of the region.

Introduction

Balance and stability of the budgetary system on a long-term basis are the most important prerequisites of ensuring macroeconomic stability that promotes formation of basic conditions for economic growth, investment development and increase in competitiveness of the Russian financial and economic system.
Despite active work of federal organs of the power on improvement of the interbudgetary relations, it should be noted today that the operating system not fully solves a problem of financial stability of territorial subjects of the Russian Federation.

Investment Appeal of the Region as Base for Ensuring Financial Stability of the Budget of the Subject

The first six months of the current 2017 say that the income of budgets of regions of Russia continues to grow at rather high rates. Total amount tax and non-tax and the income for this period grew approximately more than by 20% in comparison with the corresponding period of last year. It demonstrates that the profitable base of subjects of Russia gradually began to grow. Deficiency of regional budgets made more than by 2,5 times smaller volume, than for the corresponding period of last year.

It testifies to efficiency of the events for optimization of expenses held by regions, mobilization of profitable sources.

At the same time it is necessary to recognize that own income for execution of the account powers assigned to regions only most economically developed regions have. Stability of modern budgetary system of regions in many respects has to be defined by efficiency of average or long-term strategy of regional policy of the Russian Federation.

Financial stability of the region is one of the key factors defining investment appeal of the region. At everything it is important to note it, as financial stability of regions directly depends on investment activity in the region, on its investment appeal both for Russian, and for foreign investors. Increase in budget revenues can be reached thanks to increase in a taxable basis due to placement on platforms of the region of new competitive productions (Ayupov, Kazakovtseva, 2014).

In the conditions of globalization use of foreign investments is the objective need caused by system of participation of national economy in the international labor division and a capital modulation in branch, free for business.

The important role of direct foreign investments as a factor of economic growth is confirmed with experience of the countries which showed high dynamism and realized essential structural transformations in the last decades: People's Republic of China, India, Brazil, South Korea, etc.

In Russia demand for investments, not important, foreign or Russian, is huge. The Russian regions took a big step over the past few years in the development plan for appeal of investment climate. The world community is deeply impressed that Russia in 5 years rose from the 120th place to the 41st place in the rating of Doing Business (Butenko, 2017). Respectively the international investors could not but pay to it attention.

Investment appeal of the region is defined as set of the factors influencing expediency, efficiency and level of risks of investment investments in the territory of this region. Let's consider distribution of the Russian regions according to the rating of investment appeal.

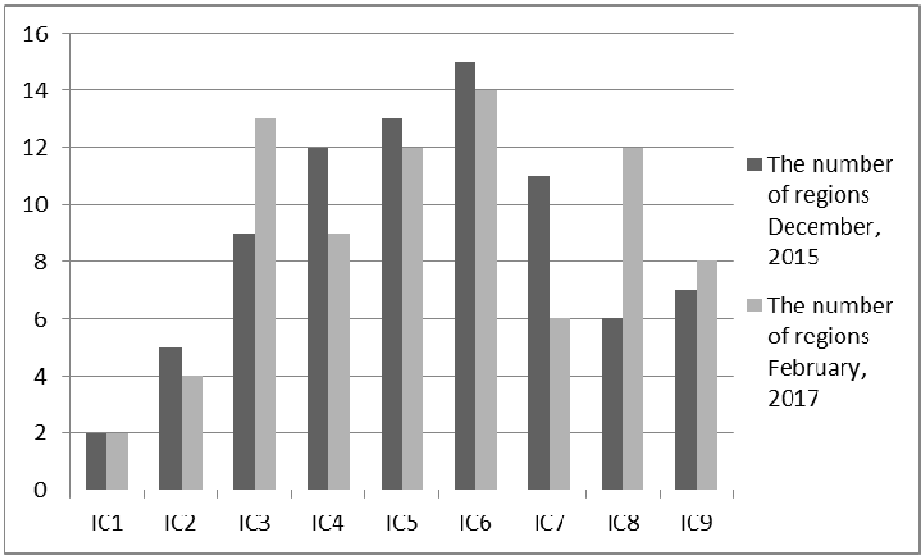


Fig. 1: Distribution of regions on groups of rating

If in 2015 19 regions worsened in a year the positions in rating, and 10 regions – improved, then in 2017 already 21 regions worsened the positions in rating, and improved only 6 regions. In 2017 the number of regions in group of leaders with "high" investment appeal – with 16 to 19 increased.

Results of rating of investment appeal of regions are confirmed by statistics of distribution of the direct foreign investments arriving in: 88% of receipts of direct foreign investments were the share of group of regions with "high" investment appeal while regions with "moderate" in total could attract only 2% of direct foreign investments.

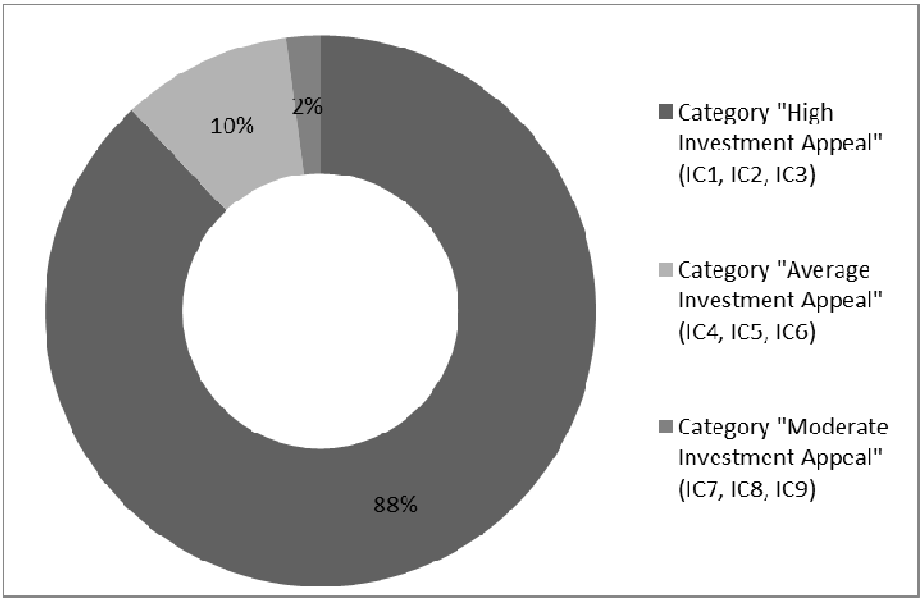


Fig. 2: Distribution of direct foreign investments

Investment appeal of the region consists of several factors, each of which can be estimated by means of selection of indicators for it. In the rating of National Rating Agency seven factors of regional investment appeal are considered:

1) Security of the region with natural resources and quality of the environment in the region.
2) Region manpower.
3) Regional infrastructure.
4) Domestic market of the region.
5) Production potential of regional economy.
6) Institutional environment and socio-political stability.
7) Financial stability of the regional budget and enterprises of the region.

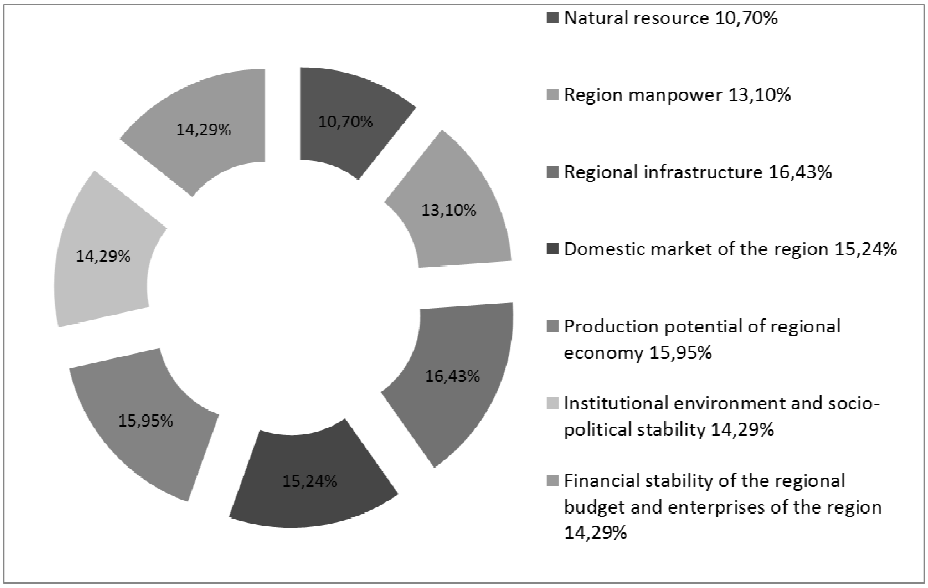


Fig. 3: Factors of investment appeal of regions

Financial stability of the region both its level of investment appeal the interconnected and complementary indicators: high level of financial stability of the region provides appeal of the region to investors and, on the other hand, the high level of investment activity in the region will provide financial stability of the regional budget due to growth of a taxable basis. The indicator of financial stability of the regional budget for an assessment of investment appeal is defined on the basis of indicators: amount of tax revenues, balance of the budget, level of a regional central government debt.

The rating of investment appeal of regions developed in Russia was already among the best world practices, other countries which thought of how to improve investment climate address his developers. Nevertheless in Russia this practice can be developed through models of regions, through road maps, advance to these target models. We consider what to the Russian regions is on what to work from the global point of view.

Actions for Attraction of the Russian and Foreign Investments into Regions of Russia

Now average profitability from investments becomes lower that leads to the fact that short-term financial investments already become less interesting. And world business the community is convinced that now, in Russia for three years it is senseless to invest.

Respectively it is necessary to pass to attraction of strategic investments when the investor comes seriously and for a long time. Various state support is especially necessary for such strategic investments.

Not to attract the strategic investor without existence of qualitative human resources, it is necessary that universities that people professionally grew were near and developed.

Now Russia loses the competition for the foreign capitals to Asian and Latin American developing states which markets are more attractive to investors (Byshok and Dorofeyeva, 2011).

At the beginning of 2014 in connection with a geopolitical situation around annexation of the Crimea, in the foreign exchange market in Russia large-scale investment crisis as a result of which the foreign capitals almost completely ceased to come to domestic economy began panic.

Following the results of 2014 the volume of direct investments in real sector of the Russian economy was reduced by 3,5 times. In 2015 the annual balance of direct foreign investments was reduced by 71% concerning the level of 2014. Do not want to invest the capitals in domestic economy not only foreign investors, but also the Russian oligarchs to whose share from 60 to 70% of total inflow of the foreign capital inflowing to Russia from offshore jurisdictions (almost all direct investments arriving from the Republic of Cyprus from the Bahamas fall and from the British Virgin Islands, have the Russian origin). Large-scale also decrease in attraction of the foreign credits and loans was same.

Despite aspiration of the federal center to alignment of quality of investment climate in regions of Russia, regions of Russia are still characterized by essential differentiation on the level of investment appeal. The non-uniform institutional environment and various administrative approaches lead to uneven distribution of investments between regions. The best regions continue to increase the investment appeal (so, base for economic development), and outsiders – "fail" stronger, the gap between the successful and lagging behind regions becomes even more (Devyatlovsky, 2012).

In 2016 the volume of direct foreign investments to regions considerably exceeded indicators of 2015, however the main volume of foreign investments (82%) falls to the share of 19 regions with high investment appeal.

At the same time on the following territorial subjects of the Russian Federation: Mordovia, Mari El, Ivanovo, Kostroma and Kirov regions in 2016 lowered rating estimates of investment appeal. In all

listed regions the macroeconomic situation remains adverse: investments fall or do not grow, infrastructure and institutional development lags behind the average Russian level, the income of regional budgets does not cover expenses, there is a growth of a debt load.

The volume of direct foreign investments to the Republic of Mari El in 2013 made 10 mln. dollars, in 2014 –6 mln. dollars, in 2016 – only 1,3 mln. dollars. In the next Chuvash Republic for the same period the volume of direct foreign investments made 163 mln. dollars in 2013 and 54 mln. dollars in 2014. On inflow of direct foreign investments per capita the Republic of Mari El shows in rating among territorial subjects of the Russian Federation one of the worst indicators.

Low level of foreign investments in these regions can be written off, of course, for the general macroeconomic instability in Russia, the imposed sanctions and low investment appeal of the country in general. However, experience of a number of regions (The Republic of Tatarstan, the Kaluga, Ulyanovsk, Belgorod regions) shows that to attract foreign investors quite really.

Activization of inflow of foreign investments into the Russian economy requires creation of favorable investment climate. Criterion of appeal of national economy to foreign investors is risk level of an entrepreneurial activity and profitability of investment projects.

Foreign investors, first of all, are interested in the economic capacity of the region, in capacious sales market of the made production, in high solvency of the population of the region. Respectively, the main indicator of investment appeal is the volume of a gross regional product, than above its level, especially the region is attractive to potential investors. On world statistics, the most attractive branches for attraction of foreign investments are the processing industry, trade, mining. The anti-Russian sanctions imposed in 2014 limit investment into financial sector and fuel branch that increases appeal of the alternative directions of investment, such as telecommunications, pharmaceutics, agricultural production and processing of agricultural products.

Possible forms of cooperation with foreign investors are various: crediting, leasing, creation of cooperation management enterprises or completely with the foreign capital, the conclusion of concession agreements, creation in the territory of the region of free economic zones.

Weak points of the Republic of Mari El are production, institutional, infrastructure spheres of action of economy. Outside the country very few people know about Mari El – the republic is poorly presented at the international economic forums, the mechanism of representations abroad does not work. The region is obliged to tell about the progress, advantages of a business environment, concrete achievements more. However participation in itself in the international forums does not give any guarantee of an indication of interest of foreign investors to the republic as the absolute information openness is important. Important not only how many investments now in the region, parallel improvement of the reached business climate is important. If not to improve business climate, investments will be even less.

Recently the tendency was outlined in Russia that investments flow from resource and export investments into investments into technologies, into services that means existence of the human capital.

Attraction, deduction, development of the human capital, in turn, requires qualitative and available health care, education, the comfortable urban environment.

If million-plus cities have more opportunities of attraction of investments into high technologies, telecommunications, then in the small cities and in the rural zone development of agricultural IT technologies is possible. The agricultural industry in Russia very well develops recently, not only grows, but also technologization. Attraction of foreign investments into agrarian sector (poultry farming, pig-breeding, processing of meat and a bird) is most urgent for the Republic of Mari El. More than 20% of internal regional product of the Republic of Mari El are occupied by agrarian sector. In recent years in Mari El in this branch steady growth rate of production and the largest

volume of investment investments is observed – the region takes leading places among regions of Russia on production of meat of the cattle and a bird per capita (Kazakovtseva, Gumarova, Tsaregorodtsev, 2015).

Today in the conditions of the imposed anti-Russian sanctions and reciprocal restriction of deliveries of agricultural production from Europe the Russian producers are forced to change constantly suppliers, to increase purchases in the countries of America. Such logistic shoulder increases both terms and cost, complicates quality control process. As a result, many European producers state intentions about localization of production in Russia. It, first of all, belongs to producers of seed material, incubatory egg. Localization of this production will allow to reduce product cost approximately for a third. In Russia this production will be demanded by both large-scale enterprises and small farmers. The Russian regions focused to a large extent on agricultural industry have an excellent possibility of involvement of the European investors on the platforms.

For attraction of investment projects in the region the body or the company (agencies on attraction of investments, corporation) which will be engaged in holding the foreign presentations of investment potential of the subject, participation in trade and economic missions, the international actions has to be created, to promote development of projects of public-private partnership, establishment of international cooperation, to participate in creation of necessary infrastructure and other actions for improvement of quality of investment climate in the subject (Kapustina, Lipkova L. and Falchenko, 2016).

In the Republic of Mari El since 2013 the Autonomous nonprofit organization "Agency of Investment Development of the Republic of Mari El" which tasks is implementation of above-mentioned actions works. The Investment portal of the Republic of Mari El is created. In 2015 on the basis of the Agency of investment development of the Republic of Mari El the Regional Integrated Center which purpose is ensuring granting the integrated package of services directed to business internationalization, and also increase in efficiency and competitiveness of business in the interregional and international markets is created. For formation of favorable investment climate the Investment strategy of the Republic of Mari El within which execution in 2016 by the Regional integrated center together with the Ministry of Economic Development of the Republic of Mari El held business missions of businessmen of the Republic of Mari El in Germany, the Netherlands, Finland, Sweden, Austria, Slovakia, Italy for the presentation of economic investment potential of the Republic of Mari El is accepted.

However the reached level of the saved-up investments, especially foreign, testifies to insufficiency of ongoing efforts.

One of actions for attracting investors to the region is creation of platforms for placement on them the industrial enterprises – industrial parks. In 2013 the Government of Mari El made the decision on creation of the industrial park, however because of insufficiency of budgetary funds realization of actions for creation of the industrial park is still not begun.

A special role is played also by subjective criteria of investment appeal of the region to which it is possible to refer: level of bureaucratic barriers, political stability, qualification of the population, respecting the rule of law and law and order, professionalism and sequence of regional administration.

Summary

All given actions for improvement of investment potential and attraction of the foreign capital have long-term strategic character. At the correct statement they are capable to help regions with the solution of structural and branch problems of economy with smaller state investment expenses and in much shorter terms. Improvement of investment potential of the region creates conditions for attraction of the foreign capital and, further, leads to a steady financial condition of the region (Kazakovtseva, 2012).

In the conditions of budgetary deficiency of the regional budget, fall of the real income of the population one of the main criteria of managerial effectiveness of the territorial subject of the Russian Federation will be ability to attract long-term Russian or foreign investors. It will allow to create new and qualitative jobs, will increase tax revenues, will provide growth of regional economy, financial stability of the region and will increase the general level of quality of life in the region.

Acknowledgement

The reported study was funded by RFBR and Government of the Mari El region according to the research project № 17-12-12014

References

Ayupov, A.A. and Kazakovtseva, M.V. (2014), 'Management of Financial Stability of the Non-Tax Income of Regional Budgets'. *Procedia -Social and Behavioral Sciences*. Volume 131. 15 May 2014. 187 –192.

Butenko V. (2017), 'Regions of the Russian Federation need advertizing of investments', *Messages – Economy,* [Online], [Retrieved May 12, 2017] http://www.vestifinance.ru/articles/78662

Byshok A. S. and Dorofeyeva A. V. (2011), 'Creation of favorable investment climate for the purpose of attraction of the foreign capital', Economy, management, finance, International Scientific Conference. June, Perm, 22-25.

Devyatlovsky D. N. (2012), 'Problem of attraction of foreign investments into economy of Russia', *Modern high technologies*. 7, 46-47.

Kapustina L. M., Lipkova L. and Falchenko O. D. (2016), 'Assessment of a contribution of direct foreign investments to economic development of Sverdlovsk region and Russia', *Economy of the Region*, 12/3, 741-754.

Kazakovtseva M. V. (2012), 'Methodological ensuring influence of factors on financial stability of budgets of territorial subjects of the Russian Federation',*Vector of science of the Tolyatti State University*. 3, 152-155.

Kazakovtseva M.V., Gumarova F.Z. and Tsaregorodtsev E.I. (2015), 'Forming of Competitive Advantages of Regional Agrarian and Industrial Complex as Mechanism of Ensuring Economic Safety', *Mediterranean Journal of Social Sciences*. 6/3, 213-220

Formation of the Practical Platform for Decision Making in Management Accounting at Investment Risks

Maria Stafievskaya, Mari State University, Russia, stafievskaya16@mail.ru

Rose A. Vanyukova, Mari State University, Russia

Ramziya K. Shakirova, Mari State University, Russia

Virinia E. Mamaeva, Mari State University, Russia

Albert E. Mamaev, Mari State University,Russia

Abstract

The article is devoted to the issues of making an administrative decision on the basis of accounting (financial) accounting data. A practical mechanism for evaluating the investment project from the position of management accounting is proposed. Documentary support of the risk management of the investment project for risk management has been developed. A methodology for estimating profit taking into account risk is proposed.

Keywords: risk, accounting, decision, project.

The research was carried out with the financial support of the RFFI and the Government of the Republic of Mari El oblast in the framework of the scientific project No. 16-12-12001 (a) "Development of accounting and analytical support for risk management and risk reflection in the accounting (financial) statements of commercial organizations of the Republic of Mari El in crisis management ".

Introduction

Currently, the activities of each organization are carried out under conditions of constant uncertainty. The consequence of market uncertainty is the occurrence of risks. Risk is, first of all, the probability of loss of resources, non-receipt of certain incomes and unforeseen expenses in the economic activity of the enterprise. Any enterprise risks, since it cannot rule out the occurrence of undesirable situations. But there is the possibility of reducing their occurrence and the occurrence of damage.

Hence, there is a desire to create such a mechanism that would promote the best way to take risks into account when implementing the goals set by the company. In this case, this mechanism is considered to be risk management or risk management. Risk management is a system for identifying, assessing and managing the risks faced by a business entity. The information of the accounting reporting facilitates the adoption of significant management decisions. According to the requirements of the legislation, events that have occurred and events that are likely to occur are recorded in the accounting. Since the purpose of accounting is to inform interested users, the analysis should be based on an assessment of the consequences of all possible significant risks.

Project Analysis

A well-organized system of internal information about the costs of an enterprise is an important and crucial condition for the effective management of the organization. The fact of adopting one decision is only an integral part of the effective decision-making process. Decisions should be effective. This means that the department of management accounting, risk management should be more widely involved in the decision-making process. This problem is raised in their research by such scientists as

Bethge (2000), Stafievskaya (2015), Tolstova (2009), Laikov (2009), Sokolov (2000), Khokhlov (2007).

The need for methodological developments in the convergence of management accounting and risk management is said in their research by scientists such as Sarycheva and Shvetsov (2015).

In the research, professor Mizikovsky (2004) says that each enterprise is subject to a number of risks that must be taken into account. For example, let's take the current commercial enterprise «Alfa», specializing in repair and construction works, whose plans are to launch an investment project - the production of construction materials for their own needs and for sale in order to obtain profit. To realize this goal, equipment for 800000 rubles is needed, the list of which is given in Table 1.

Table 1: necessary equipment for the opening of production of building materials at the Company "Alfa"

The equipment	Cost, thousand rubles.
Machine	600
Tool	100
Security system	100
Total:	800

To produce 1000 pieces of building materials, circulating assets amounting to 9220 thousand rubles are required (Table 2).

Table 2: requirements for working capital

Types of working capital.	Consumption	Price, rubles.	Cost, thousand rubles.
Raw materials and materials: - raw materials A, kg. - raw materials B, kg	 1000 220	 3 220	 3 0,220
Electricity, thousand kW/h	1	6	6
Total:	–	–	9,220

To start production at the «Alfa» plant, the cost of raw materials and materials will be realized in the amount of 3220 thousand rubles. The cost of electricity will be 6 thousand rubles.

For further calculation, you need to know the number and average monthly salary. The monthly wage bill is 36000 rubles (Table 3).

Table 3: number and average monthly salary at the enterprise "Alfa"

Position	Number of persons	Salaries, rubles	Amount, rubles
Worker for work on equipment	**2**	**18000**	**36000**

The cost of production was determined in the amount of 917250 rubles (Table 4).

Table 4: costs of construction materials production enterprise "Alfa"

Indicators	Cost, rubles
1. Raw materials	3220
2. Labor costs	36000
3. Payroll taxes	10800
4. Equipment purchase costs	800000
5. Total direct costs	850020
6. Expenses for maintenance and operation of equipment	25000
7. General production expenses	17000
8. General running costs	25500
9. Total indirect costs:	67500
TOTAL:	917520

For the implementation of the project, a decision was made to attract investment resources in the form of own funds for the amount of 950 thousand rubles, which covers the costs of production of construction materials.
The expected payback period characterizes the ratio of money flows and investments. Simple payback period is 3.5 months, i.e. 114 days. Discounted payback period, taking into account the real rate of comparison of 13% per annum, is 1 year and 11 months, i.e. 1 year and 357 days from the beginning of the project.

Define the risk-free discount rate by the formula:
r = (1 + n-1) * (1 + n-2) * (1 + n-3) -1
Where n1 is the real interest rate;
n2 - the rate of inflation;
n3 - is the probability of risk.

Define the variables:
n1 - 8.52% (for 2017);
n2 - 8.7%;
n3 - do not count.
r = (1 + 0.0885) * (1 + 0.087) - 1 = 1.0852 * 1.087-1 = 0.18

The next indicator of the effectiveness of the investment project is the net present value of the project (NPV). With a discount rate of 18% and a planning interval up to 2018

NPV = (950:1,18)+(950:1,36)+(950:1,54) = 805+699+617= 2121 thousand rubles.

Thus, this calculation of net present value indicates the profitability of the project (because NPV> 0). The internal rate of return on the project (IRR), i.e. the conditional income rate for the project without inflation is 39%. It is twice the discount rate, which is equal to 18%, which confirms the effectiveness of this investment project.

The breakeven point analyzes the lower limit of the profit of the investment project. In this case, it is equal (in 2017) (9900*5480) : (9900-3241) = 7849 thousand rubles. Therefore, it is necessary to render services 5280: (1500 -3341) = 450 services per year. The safety factor at the end of 2017 will be ((9900-7849): 9900)*100% = 20.72% consequently, the company "Alfa" will have a significant profit.

The profitability index (PI) was 1.57

PI = 150000:950000=1,57

The index of profitableness exceeds one.

Thus, on the one hand, we can say that the project under analysis for the enterprise is profitable. On the other hand, we must take into account the risks, since without taking them into account; the enterprise can expect a negative outcome.

We accept the profitability index of this project, since it is above unity. According to calculations, net income in 2017 will amount to 1256 thousand rubles and will reach in 2019 1,584 thousand rubles (Table 5).

Table 5: financial result of the project at the «Alfa» plant for 2017-2019

№	Indicators	2017 year	2018 year	2019 year
1.	Revenue from sales without value added tax, thousand rubles.	10000	11000	12000
2.	Cost of services, thousand rubles.	7500	8250	9000
3.	Gross profit from sales, thousand rubles.	2500	2750	3000
4.	Expenses related to core business, thousand rubles.	950	1000	1050
5.	Profit (loss) from sales, thousand rubles.	1550	1750	1950
6	Other income, thousand rubles.	100	110	120
7	Other expenses, thousand rubles.	80	85	90
8	Balance sheet profit, thousand rubles.	1570	1775	1980
9	Profit tax, thousand rubles.	314	355	396
10	Net profit, thousand rubles.	1256	1420	1584

In 2019 the company "Alfa" plans to increase the volume of services (Table 6).

Table 6: calculation of cash flow, thousand rubles

Indicators	The value of the indicator by years of project implementation		
	2017 year	2018 year	2019 year
1. Operating activities			
1.1. Revenue from sales without value added tax, thousand rubles.	10000	11000	12000
1.2. Expenses for rendering services	8450	9250	10050
1.3. Profit before tax	1570	1775	1980
1.4. Taxes and fees	314	355	396
1.5. Projected net profit	1256	1420	1584
2. Equity	950	–	–

Thus, a simple payback period is 3.5 months, the discounted payback period is 1 year and 11 months; The net present value of the project is 2,548 rubles; The internal rate of return of the project is 39%; Index of profitability - 1,20; Break-even point in monetary terms is equal to 3617 thousand rubles. Based on the calculated data, it is possible to give a positive assessment to the developed investment project.

Investing in this project, having the most favorable calculations, we should not forget that until the time of obtaining the required revenue from its implementation, there remains a risk that must be taken into account. For this purpose, in our opinion, it is necessary to open an off-balance sheet 040 "Risks". In the debit of the account, the actual risk is supposed to be reflected, in the credit of the account - income received to reduce the actual risk. The difference between the assessment of actual risk and income received is a "recognized" risk at the balance sheet date. The basis for the

maintenance of this account is the proposed primary document "The card of the off-balance sheet investment risk" (Fig. 1).

Type of risk *Investment risk*
Risk assessment:__*917520*_____ date:____*02.02.2017*_____
Accounting account _ Debit account 040, *Actual risk 917520*

Index	Date	Base	Amount, rubles
Proceeds from the project	*25.02.2017*	*Agreement No. 324 of February 23, 2017*	*122100*
…..			
Account credit 040:			*122100*

Recognized risk:*795420 руб. (917520-122100) date:__25.02.2017*_____
Recognized risk:_____ *date:*_____

Fig. 1 : The off-balance sheet of investment risk

The card is a cumulative register that allows you to obtain operational information about investment risks at the balance sheet date for risk managers. The card indicates the type of risk, the reason for the occurrence, the full assessment and the amount of recognized risk for the formation of the reserve. Practical significance is that the accountant takes timely and documented risk and creates a reserve to maintain the company's stable financial position. As a rule, risk is considered from two positions: probability of an event, or through its consequence, namely damage. If we estimate profit as an effect of the subject, then in the model of its calculation, we must take into account the risks, namely:

$$Pks = C\ Ke \sum_{i=1}^{i=n} - f\ x - F + Dr - Rr$$

Pks – profit of a commercial entity (net of tax) in conditions of uncertainty and risks.
C – Unit price
Ke – Number of units sold
f – Price per unit of the j - th factor of production
x - Total number of j-th factor of production used in the production process
n – Number of factors of production
F – Fixed payments
Dr – Incomes connected with the consequence of risk
Rr – Expenses related to the consequence of risk

Obtaining the result determines the following set of costs:

- Expenses for the reproduction of fixed and circulating funds;
- Marketing costs;
- Costs incurred by the subject within the framework of the implemented decision in a risk environment.
-

The proposed methodology differs from the typical one in that profit is determined taking into account the risk.

Since today the economic risk is not an object of accounting, but is analyzed in the system of risk management, then its investigation is possible if it is ensured:

- Description of economic risks associated with the activities of the commercial organization;
- It is possible to calculate the impact of economic risks on accounting objects;
- Reflection in the accounting (financial) reporting of information on economic risks and their consequences;

- Availability of analytical accounting tools for the purpose of assessing economic risks (correlation-regression method, variance analysis).
-

This aspect is possible on the basis of the development of methodological provisions that would ensure the interaction of the risk management system and accounting based on the exchange of information on risks, the development of precisely the analytical functions of accounting. Risk management in case of recognition of the presence of risks, must take decisions related to their minimization. In this case, the accounting system should reflect this information about the risks.

References

Bethge, J. (2000) Balansovedenie, M: Accounting.

Getman, V. (2012) International Financial Reporting Standards, Rev. and Sub, M .: INFRA-M.

Mizikovsky, E. (2004) International standards of financial reporting and accounting in Russia: a manual for schools, Moscow: Accounting.

Laikov, A.Y. (2009) 'Insurance risk management as an instrument of ownership,' Economy and management of the property, 19-25.

Sarycheva, T and Shvetsov, M., (2015), 'Statistical approaches to the evaluation of the demand and supply at the labour market based on panel data, ' Review of European Studies T. 7, 356-367.
Sokolov, Y. (2000) Fundamentals of Accounting Theory: Proc. for schools, M .: Finance and Statistics, Moscow

Stafievskaya, M., Nikolayeva, L., Kreneva, S., Shakirova, R., Semenova, O.A, Larionova, T., and Filyushin, N. (2015),' Accounting risks in the subjects of business systems, Review of European Studies, T. 7, 127-137.

Tolstova, A. (2009) 'Risk in business accounting,' Vestnik Samara State University of Economics, 9 (47), 94 - 97.

Khokhlov, N. (2007) Risk management: Proc. manual for schools, Moscow: UNITY-DANA.

Shevelev, A. (2007) Risks in accounting, 2007, : Textbook, Manual, M .: KNORUS.

Management of Preparation of Pedagogical Shots for Realization of Inclusive Education at Elementary School

Nadezhda N. Golovina, Mari State University, Yoshkar-Ola, Russian Federation
naduysha@inbox.ru

Svetlana V. Bakhtina, Mari state university, Yoshkar-Ola, Russian Federation
basvet56@mail.ru

Olga A. Petukhova, Mari State University, Yoshkar-Ola, Russian Federation
art-ga@mail.ru

LarisaVacilyevna Basova, Mari State University, Yoshkar-Ola, Russian Federation
lvbasova75@gmail.com

Abstract

The relevance of the stated topic is conditioned by the need to manage the quality of the training of primary school teachers implementing inclusive education technologies in general education organizations. The purpose of the article is to determine the model for managing the training of pedagogical personnel for the implementation of inclusive education in primary school. Research methods for this problem are analysis and synthesis, comparison and generalization of the results of other studies, questionnaires of employers-leaders of general education organizations, allowing systematically and comprehensively study the quality process of training pedagogical personnel of the primary education system for work in conditions of inclusion. The article presents the results of the assessment of the quality of the pedagogical staff in primary school for the implementation of inclusive education, and the model of training is described. The materials of the article are of practical value for specialists of professional educational organizations engaged in the training of personnel for inclusive education.

Keywords: management of training of pedagogical personnel, model of management of teachers` training, vocational training, inclusive education, primary school teacher, children with disabilities.

Introduction

Training of teachers is one of the priority areas of vocational education in Russia. The "National doctrine of education of the Russian Federation" (2000) affirms the leading role of the teacher in achieving the goals of education, pays great attention to the training of pedagogical personnel, to the involvement talented professionals in the education system. At the state level, priorities are set for managing the training of teachers in accordance with the demands and needs of society. The current request of the society at the moment is the introduction of inclusive education in the educational activities of general education organizations. The Law on education of the Russian Federation (2012, p. 27 article 2) focuses on the implementation of inclusive education, that can provide equal access to education for all students regardless of diversity, special educational needs and individual capabilities. It should be borne in mind that inclusive education is realized, first of all, in the interests of persons with disabilities who need to develop a special educational route, which is determined by specific educational needs. In this regard, the country needs highly qualified pedagogical staff capable of implementing inclusive education.

With the enactment of the Federal state educational standard of primary General education (2013), the issues of the realization of the right to education for students with disabilities became widely discussed. Since

2016, inclusive education has been introduced throughout the primary school. For children of this category, adapted basic educational programs for primary general education are being developed. In this regard, the tasks of training teachers for the implementation of inclusive education in primary school are put on the forefront. For primary school teachers who have rich teaching experience, courses of improvement of qualification on the implementation of inclusive education. Universities that have implemented training in the specialty 44.03.01 – pedagogical education –introduce disciplines that help the preparation of future educators for inclusion in the variable part of the federal state educational standard.

Materials and Methods

T. A. Vlasova, B. S. Gershunsky, N. I. Konyukhov, N. N. Malofeev, M. S. Pevzner, B. T. Puzanov, I. A. Sikorsky, and others devoted their researches to the study of professional training of teachers for work with children with disabilities in different historical periods. Methodological issues of teachers` training for work in conditions of inclusive education, measures to increase personal and professional readiness for work in conditions of inclusive education are presented by works of G.V. Novikova and Ts. Boyko (2015). N.V. Ryabova and O.I. Karpunina (2016) consider the problems of staffing of the education system, the solution of which the authors see in the retraining and upgrading of the pedagogical staff providing the educational process, the psychological and pedagogical support of subjects of education and the socio-cultural integration of persons with disabilities into modern society. The problem of competence-oriented improvement of professional skill of specialists in the field of designing an inclusive educational environment is discussed in the works of G.N. Podchalamova and TA. Zubareva (2012). Modern trends in the professional training of specialists in the inclusive sphere are attracted by T.V. Timokhina (2016), who describes options for training specialists to work with children with disabilities on the basis of primary, secondary and higher professional education in the areas of training: adaptive physical education, correctional pedagogy in primary education, junior nurse for caring for patients , special pre-school education, special defectology education, etc.

One way or another, the works of the above authors deal with the structuring and systematization of training for the implementation of inclusive education in general education organizations, but there is no talk of managing this process. In our opinion, it is necessary to raise the issues of managing the training of pedagogical personnel for the implementation of inclusive education. For our part, we propose a model for managing the training of pedagogical personnel for the implementation of inclusive education in primary schools.

Results

The preparation of pedagogical staff for the implementation of inclusive education in the primary school in the Republic of Mari El is carried out both by professional educational organizations, as well as by the institutions of advanced training and retraining of educators. If we pay attention to the programs they implement, then each structure makes its own contribution to the training of pedagogical personnel. State budget professional educational institution of the of the Mari El Republic "Orshanskiy Multidisciplinary College named by I.K. Glushkov" specialty 44.02.01 – Pre-school education – realizes the program"Organization of corrective-developing work with children with speech development deficiencies ". The Federal Budgetary Educational Institution of Higher Education "Mari State University" prepares specialists for the bachelor's system in the directions of 44.03.03. Special (defectological) education (Logopedics), 44.03.03 Special (defectological) education (Pre-school defectology), 44.03.01 Pedagogical education (Primary education), 04/04/01 Special (defectological education) (psychological and pedagogical support of persons with disabilities). The Mari Institute of Education is engaged in the development of skills in the field of inclusive education under the program "Content of Corrective and Developing Work with Primary School Students in the Conditions of Introducing the Federal State Educational Standard". Within the retraining courses for pedagogical staff, the Federal Budget Educational Institution of Higher Education "Mari State University" at the Department of primary and

general education realizes the program "Logopedic technologies in the professional activity of the teacher of educational organizations, implementing the Federal state educational standard of primary education"

In order to analyze and systematize the training of the teaching staff of the Mari El Republic in the field of inclusive education, we have compiled a table (Table 1)

Table 1: System of training teachers for inclusive education in the Republic of Mari El.

Educational organization	**Level of training**	**Realized direction of preparation**	**Educational programs**
State budget professional educational institution of the of the Mari El Republic "Orshanskiy Multidisciplinary College named by I.K. Glushkov"	Specialty of secondary vocational education	44.02.01Pre-primary education	Curriculum Program "Organization of corrective-developing work with children with speech development deficiencies "
Federal Budget Educational Institution of Higher Education "Mari State University"	Bachelor's program	44.03.03. Special (defectological) education	The curriculum program "Speech therapy"
		44.03.03. Special (defectological) education	Curriculum Programs "Preschool Defectology"
		44.03.01 Pedagogical Education (Primary Education)	Fundamentals of special pedagogy and psychology; Logopedic work in primary school; Federal state educational standard for children with disabilities in conditions of inclusive education; Methods of correction of developmental disabilities and social adaptation of younger schoolchildren
	Master's Courses	44.04.01 Special (defectological education)	Curriculum "Psychological and pedagogical support of persons with disabilities"
	Professional Retraining Courses	Logopedic support of training for persons with disabilities	Curriculum Programs "Logopedic Support for the Education of Persons with

			Disabilities"
	Teacher training courses	Training of primary school teachers in the field of inclusive education	The curriculum "Logopedic technologies in the professional work of the teacher of educational organizations implementing the Federal State Educational Standard of Basic General Education"
The Mari Institute of Education	Teacher training courses	Training of primary school teachers in the field of inclusive education	Curriculum Programs "The content of correctional and developing work with primary school students in the conditions of the introduction of the federal state educational standard"

To determine the optimal model for training teachers for the implementation of inclusive education and assessing the quality of training, a focus group survey was conducted. For this purpose the questionnaire was composed, which was based on the requirements of the teacher's professional standard (2009), reflecting the specifics of work in elementary school. . Below is the text of the questionnaire on assessing the level of the teacher's readiness for the implementation of inclusive education in primary school.

Questionnaires assessing the level of the teacher's readiness to implement inclusive education in primary school.

(Instruction: "Dear colleagues, evaluate the quality of the work of primary school teachers who have been trained in programs for the implementation of inclusive education." Each indicator is scored on a 100-point scale. Please note that 75-100 points is a high level of readiness to implement educational and educational activity, 60-74 points, sufficient level of training, 36-59 points - average level of training, 0-35 points - low ").

In the organization of pedagogical activity the teacher of primary classes:
1. takes into account the peculiarity of the social situation of the development of the first-grader in connection with the transition of the leading activity from the game one to the educational one, purposefully forms the social position of the pupil in children.

2. Provides the development of the ability to learn (universal learning activities), to the level necessary for training in the main school

3. Uses special approaches to teaching, in order to include in the educational process all students: with special needs in education; gifted pupils, pupils for whom the Russian language is not native; students with disabilities

4. he Is able to build educational work taking into account the cultural differences of children, gender and age and individual characteristics

5. he is ready to accept different children, regardless of their real educational possibilities, peculiarities in their behavior, mental and physical health. He is able to provide them with professional help.

6. he is able in the course of observation to identify different problems of children associated with the peculiarities of their development.

7. Ready for interaction with other specialists within the framework of the psychological-medical-pedagogical consultation.

8. Can read the documentation of specialists (psychologists, defectologists, speech therapists).
9. he is able to make together with other specialists a program for the individual development of the child.

10. He has special methods that allow him to carry out correctional and developing work.

11.he is able to monitor the dynamics of the child's development.

12. Is able to protect those who are not accepted in the children's collective.

13. he is able to develop and implement individual development programs (including: adapted basic general education programs, special educational development programs), taking into account the personal and age characteristics of students.

14. he owns psychological and pedagogical technologies (inclusive) necessary for working with various students: gifted children, socially vulnerable children who have fallen into difficult life situations, migrant children, orphans, children with special educational needs (autistic, with a deficit syndrome attention and hyperactivity), children with disabilities, children with behavioral deviations, children with addiction.

15. understands the mechanisms of the formation of violations existing in the child, uses special means and methods of correction in the pedagogical process.

The survey involved 98 heads of educational organizations and deputy heads on educational work of primary school. They evaluated the quality of training of specialists who received training in programs for the implementation of inclusive education, in compliance with the indicators of the professional standard. Then the average score was calculated, which corresponded to the following levels of training quality: 75-100 points - high level of readiness for inclusive education, 60-74 points sufficient level of preparation, 36-59 points - average level of preparation, 0-35 points - low.

In the course of analyzing the results of the questionnaire, we obtained the following data:
- The high level of preparation for the implementation of inclusive education (75-91 points) was shown by graduates of the Bachelor's Degree in the direction of 44.03.01 Pedagogical education (primary education) passed professional retraining courses "Logopedic support for the education of persons with disabilities".

- High indicators were noted among the graduates of the training area on March 44, 2003. special (defectological) education, but, as was noted by the respondents, they have difficulties in constructing the learning process, that is, they lack the knowledge of teaching methods in primary school.

- Sufficient level of preparation for the implementation of inclusive education (74-65 points) was noted among teachers who received education in the direction of 44.03.01 Pedagogical education (primary education), who received additional knowledge of inclusion in the course of studying the subjects of the variable part of the bachelor's educational program (the basis of special pedagogy and psychology, logopedic work in primary school, the federal state educational standard for children with disabilities in

the context of inclusive education; a method of correcting the developmental disability and social adaptation of younger schoolchildren).

- Sufficient level of preparation for the implementation of inclusive education (72-68 points) was noted among primary school teachers who have experience and passed courses of continuing education for primary school teachers in the field of inclusive education.

When assessing teachers who have experience in primary school but who have not received instruction in inclusive education, the average level of readiness was noted about 48-52 points, which is acceptable for the implementation of inclusive education. But, as a rule, these specialists have difficulties in compiling adapted educational programs and individual development routes for a child with disabilities.

Thus, the level of readiness of primary school teachers to implement programs of inclusive education varies in the parameters from 91 to 48 points, which indicates the imbalance of the training system. The solution to this problem may be the opening at the university a new direction of training 44.03.05 - pedagogical education with two profiles: primary education; psychology and pedagogy of inclusive education. The model of training primary school teachers for the implementation of inclusive education can be structured as follows: basic training is conducted in the direction of 44.03.05 - pedagogical education in two profiles: primary education; psychology and pedagogy of inclusive education, for beginners and graduate students who have not been educated in the field of inclusion, retraining courses "Logopedic support for the education of persons with disabilities" may be organized, for primary school teachers with educational experience may be organized training courses in the field of inclusive education.

Table 2: The model for managing the training of pedagogical personnel for the implementation of inclusive education in primary school

The level of training	**Specificity of training**
Higher pedagogical education (bachelor's degree)	44.03.05 teacher education in two profiles: elementary education; psychology and pedagogy of inclusive education.
Professional retraining for specialists with pedagogical education and pedagogical training areas 44.03.01	Courses "Speech therapy support education of persons with disabilities"
Refresher courses for teachers who have educational and work experience	Courses under the program "the Content of correctional-developing work with pupils of initial classes in the conditions of introduction of Federal state educational standard"

Conclusion

Thus, the system of teachers` training for the implementation of inclusive education goes through the stages of its formation. The most successful training of pedagogical staff in the field of inclusive education in the primary school should be based on the integration of basic training with two profiles, professional retraining and advanced training courses for teachers with extensive experience. The management of the training of pedagogical personnel is able to streamline the existing experience and

build an organic practical-oriented model for improving the quality of inclusive education of primary school teachers.

References

The National Doctrine of Education in the Russian Federation. Approved by the Decree of the Government of the Russian Federation of October 4, 2000. №751 / The Russian newspaper / 11.10.2000. https://rg.ru/2000/10/11/doktrina-dok.html

Novikova, GV, Boyko Ts.O. (2015) Methodological issues of teacher training for work in conditions of inclusive education // Bulletin of Moscow University. Ser.20, Pedagogical Education. - 2015. - №2. - From 48-55

Podchalamova, GN, Zubareva TG (2012) Competent-oriented training of specialists in the field of designing an inclusive educational environment // Education and training of children with developmental disabilities. - 2012. - №7. - C. 17-24

Ryabova, NV, Karpunina OI (2016) Training of teachers for inclusive education // Higher education in Russia. - 2016. - №10. - pp. 119-124

Order of the Ministry of Education and Science of Russia from December 31, 2015, No. 1576 "On Amendments to the Federal State Educational Standard of Primary General Education, approved by Order of the Ministry of Education and Science of the Russian Federation of October 6, 2009, No. 373," // Ministry of Education and science of the Russian Federation http: // минобрнауки.рф / документы / 8033

The professional standard of the teacher. 02/15/2013 - Professional standard_pedagogue_ (draft) .pdf // Ministry of Education and Science of the Russian Federation. http: // www минобрнауки.рф / documents / 3071

Timokhina, T.V. (2016) Modern Trends in the Professional Training of Specialists in the Inclusive Sphere // Innovations in Education. - 2016. - №2. - P. 100-110

Timokhina, T.B. (2016) Stages of development of vocational training of teachers of inclusive education // Innovations in Education. - 2016. - №5. - P. 122-130

Federal Law "On Education in the Russian Federation" of December 29, 2012 № 273-FZ (as of October 3, 2016) // Official Information Portal of the Unified State Exam http://www.ege.edu.ru/en / main / legal-documents / federal /? id_4 = 21634.

Adaptive System of Mathematical Training of Students: Structure and Comparative Analysis

Vera I. Toktarova, Mari State University, Yoshkar-Ola, Russian Federation, toktarova@yandex.ru

Abstract

This article considers the issues connected with pedagogical design of mathematical training of students of the higher educational institutions. It gives the definition of the adaptive system of mathematical training of students and considers different methodological approaches to the interpretation of adaptation as cross-disciplinary characteristics. Conceptual and functional structure of educational system is presented. There is a comparative analysis of mathematical training of students in traditional and adaptive educational systems.

Keywords: mathematical training, adaptive system, adaptation, educational process, university, students.

Introduction

Rapid development of multi-level education, widespread introduction of electronic and mobile educational programmes and standards implies the availability and provision of a wide range of alternatives, among which the students can make a choice based on their own abilities and competencies, as well as needs of the labour market.

Personal orientation of mathematical training of HEI students contributes to the rethinking of didactic techniques used in higher school, especially in conditions of functioning of HEI electronic information and educational environment (Fedorova and Toktarova, 2016). The content of modern mathematical education shall be directed to the development of student's professional and personal skills; educational technologies shall be based on the mechanisms of adaptation to students' individual characteristics; the learning strategy shall take into account student's internal motivation and the targets of training and shall be based on non-linear technology.

Legal framework of adaptation mechanisms was reflected in the Federal Act On Education in the Russian Federation (The Law, 2012) where one of the main features of state policy and legal regulation of relations in educational sphere is the freedom to choose education according to aptitudes and needs of a person, creation of conditions for self-fulfillment of every individual, and independent development of his or her abilities, including the right to choose the form of getting education, forms of education, institution providing educational activities, and direction of education. At the same time, Federal State Educational Standards should provide the variability of educational programmes content of the appropriate level of education, the possibility of developing educational programmes of different difficulty levels and directions taking into account educational needs and abilities of students.

Adaptation as a Cross-Disciplinary Characteristic

A productive study of adaptation phenomenon is possible only at the interdisciplinary level, which will allow to use efficiently the principles of a variety of approaches as a theoretical and methodological basis for the design of an adaptive system of mathematical training of students in higher educational institutions:

– *social and philosophical approach* is the adoption by a student of social goals and a system of values, recognition of the importance of studying mathematics, development of mathematical literacy and his or her culture, and building-up of an intelligent professional capable of self-organization and self-training, being ready and adapting to the constant changes in society and looking for solutions to the challenges in the new environment through the development of diverse forms of thinking;

– *medical and biological approach* where a student is considered to be a developing system capable of self-organization by means of inner resources and relationships with the external environment. In this case, the resources are physical and mental health, which can help to avoid the effects of fatigue and overloading in the process of studying mathematics and other subjects;

– *technical and cybernetic approach* is reflected in a combination of conditions ensuring a wide application in the educational process of information and communication technologies and electronic information and educational environment, including the means of building individual learning paths, interactive support of problems solution, and provision of personal statistics of learning progress which allows controlling and correcting the level of knowledge, skills, and abilities of a student at any stage of mathematical training;

– *psychological and pedagogical approach* reflects the dependence of adaptation processes on individual characteristics and abilities of a person, offers opportunities to increase the efficiency of students to study at the univerrsity, ensures continuity in the continuous system 'school-university', adapting of a student to new technologies, tools and methods of learning, facilitates the acquisition of skills of individual work, organization of mathematical activities in the electronic information and educational environment providing the functions of adapting to individual features and abilities of students.

Adaptation is an inherent characteristic of an individual, which has a direct impact on the degree of his or her inclusion in social relations and, as a consequence, in the educational process. When considering a student as a subject of study, the adaptation characteristics defined by different subject areas should be taken into account: the most important condition for the successful adaptation is the optimal combination of adaptive and adapting activities which vary depending on specific situations. Taking into account the fact that learning is a purposeful process of interaction between a teacher and students, it can be assumed that the key condition of successful adaptive learning is the mutual adapting activities of a teacher and adaptive activities of students.

The Structure of the Adaptive System of Education

The adaptive model of mathematical training of students is based on the idea of prioritizing the development of the student. In the process of its design, scientific knowledge is primarily considered as a means of personal development and then as an object of study. The purpose of mathematical training is to develop and correct aptitude for learning as a cognitive capability; subject-subject relationships; personal characteristics of the subject of study (Toktarova, 2017).

At the same time *the adaptive system of mathematical training of HEI students* is an open dynamic system which:
– includes a set of interrelated components – subjects of education;
– is oriented to meet the professional, personal, and social needs of students in mathematics, skill, abilities, and competencies;
– is characterized by adapting to the specific conditions of the learning process, depending on students' individual characteristics and necessary criteria for perfecting and improving the quality of education.

From the point of view of management theory, the adaptive system of training is characterized by adapting to the specific conditions of the learning process, depending on particular necessary criteria for perfecting and improving the quality of education. In respect to school education T.I. Shamova, P.I. Tretyakov, and N.P. Kapustin (2002) define the adaptive system of training as a 'flexible system of arranging learning sessions taking into account individual characteristics of students. In the system under consideration, the relationship between the teachers and the students is fundamental, at the same time, the feedback is a backbone factor (Figure 1).

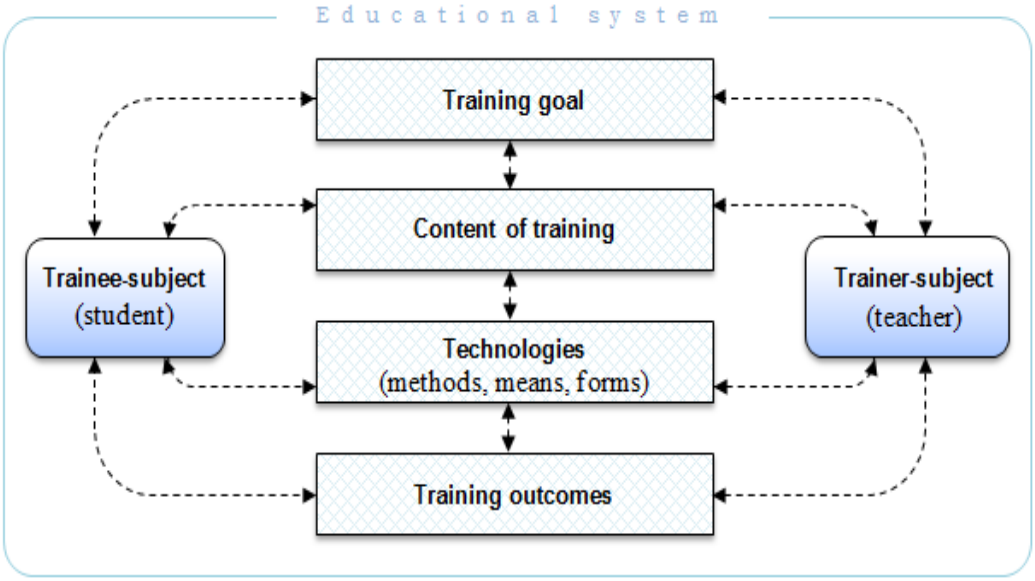


Figure 1: The structure of educational system.

When considering the functional components of a system, it is necessary to pay attention to the subsystem of technologies for training arrangement that play a special role in the process of providing adaptive learning. Each of the components of this subsystem has a high quality of adaptation depending on the intended objectives and training conditions.

Building of the mathematics teaching process for students in the adaptive system provides an opportunity to build mental activities of every student in accordance with their individual characteristics and preset requirements, which is achieved by clear definition of the purpose and stages of activity, methods and tools, content of education and educational technologies (Table 1).

Table 1: Comparative characteristic of mathematical training of students in different educational systems

Name of indicator	Traditional system of mathematical training of HEI students	Adaptive system of mathematical training of students
Purpose of training	Training of specialists with fundamental knowledge and competences in their profession / major	Training of specialists with fundamental knowledge and competences in their profession / major capable to develop and educate themselves
Orientation ('vector') of training	From the knowledge system to the object of training. Mathematical knowledge as an object of study.	From the subject of training to the content of knowledge and learning technologies. Mathematical knowledge as a tool for the development of a student's personality and as an object of study
Conditions of training	The educational process aims at creating similar conditions for all students	Students are subjects of the learning process, they determine an individual path in the process of training.
Principles of training	The learning process consists of interiorization of normative activities	Identification of personal learning style based on the diagnostics of a student's personal qualities
Taking into account the subjective experience of a student	The training process is primarily connected with an informational function independent of the subjective experience of the student	Diagnostics of the subjective experience and the prior foundation of knowledge determines the content of the student's mathematical training
Determination of the amount of knowledge	There is the same level of knowledge for all students and the relevant training material is selected	There is an adjusted amount of knowledge designed for each student based on his or her abilities, motives, opportunities, interests, etc.
Creation of a path for learning the training materials	The teacher consistently assignes the topics for the training material	The topics are consistent with the student's cognitive characteristics
Teacher's role (trainer)	There is a teacher's (trainer's) authoritarianism	Learning is seen as a process of development (self-development) of a student taking into account his or her abilities. The teacher acts as a tutor (assistant) most of all
The nature of an interaction of the participants in	A student as an object of study. Teacher's activities are aimed at regulating the student's activities	A student is an active subject of the learning process and is linked to the teacher by the joint activity

the learning process		
Orientation to training forms	Orientation to teamwork and frontal work	Orientation to individual work, independent exploration, and personal discoveries
Teaching methods	Reproductive teaching methods. The work is limited to 'coaching' of students to solve the tasks of one type, another type, etc.	Identification of student's learning style which serves as a basis for definition of the learning strategy, selection of appropriate teaching methods
Content of education	Invariant character of the content. The mathematics course predominantly provides for training and learning tasks; tasks for recognition and proof	Variability, flexibility of content within the standard. A student chooses the type of tasks to solve: training, learning, searching, problem-solving, creative; for recognition, construction, proof, research, conversion
Professional orientation of the mathematical content of education	Development of a system of mathematical knowledge for students to be used in further professional activities	Selection of mathematical tasks and study examples depending on the future career of the learner
Control	Strict system of supervision by the teacher	Application of various forms of control and self-monitoring, including continuous pedagogical monitoring

Thus, today, the strategic direction to improve the quality of the mathematical training of HEI students is defined by us as a conversion of the learning process into an adaptive system in which student's personality is at the centre of constant attention, is a backbone factor of training, is aimed at all-round development, and training activities are characterized by cognitive and developing skills.

Acknowledgement

This research was financially supported by the Ministry of Education and Science of the Russian Federation (Grant № 27.8640.2017/8.9).

References

Fedorova, S.N., Toktarova, V.I. (2016). Mathematical Background of Students at the Present Stage of Society Development: Importance, Model, Quality. *Proceedings of ADVED 2016 2nd International Conference on Advances in Education and Social Sciences*. Pp.489-492.

Shamova, T.I., Tretyakov, P.I., Kapustin, N.P. (2002). *Management of educational systems*. M: . 320 p.

The Law of the Russian Federation "On Education in the Russian Federation" No. 273-FZ. (2012, December 29) [Online] Available: http://www.consultant.ru (August 7, 2017).

Toktarova, V.I. (2017). Mathematical Competence Among HEI Students: Cluster Approach. *Proceedings of INTCESS 2017 4th International Conference on Education and Social Sciences*. Pp. 603-607.

The Value of Library Services Depending On Individual Determinants

Simona Pichová and Denisa Chlebounová
University of Pardubice, Faculty of Economics and Administration, Pardubice, Czech Republic
simona.pichova@upce.cz, denisa.chlebounova@upce.cz

Abstract

Importance of libraries is indispensable in the educational society, both with regard to the availability of public services and information for society as a whole, but also as a cultural and educational way. The value of libraries can be expressed through elicitation approaches of willingness to accept compensation and willingness to pay, which will be presented based on the obtained primary data from research in the Czech Republic. The data will be further compared to individual indicators of education with regard to the quality of human capital. The work will be a correlation and regression analysis of the data from which it will be possible to draw conclusions as to whether and to what extent the library services affect the level of education in society.

Keywords: libraries, WTP values, WTA values, contingent valuation

Introduction

Libraries are an important part of each developed country's culture. In the Czech Republic, even before, the law was in force, which made the creation of a separate municipality conditional upon the establishment of a library in that municipality. Public libraries running municipalities and cities currently have more than five thousand units in the Czech Republic and have more than 64 million library units with the library. The borrowed books were more than 60 million in 2015, which in the same year corresponds to 5.69 borrowings per inhabitant (according to date from Czech Statistical Office, 2016). Visitors go to libraries primarily for the purpose of lending books, but today the library functions as cultural, educational and community centers. Libraries also fulfill the principle of equality as a function of their ability to access and use their services regardless of gender, age, nationality, political or religious affiliation, and thus prevent social exclusion (Directive IFLA/UNESCO, 1994). Their services, thanks to a large number of libraries, are easily accessible to everyone, enabling the dissemination of information and fostering the growth of education in society.

Consumption of library services is made possible by the system of public services provided and is therefore covered by public budgets. The cost of providing them can be directly determined from the individual budgets of regions, towns and municipalities. However, their benefits to society are not directly measurable and difficult to express (Stejskal et al., 2013). One option is a contingent valuation method that works with elicitation approaches to willingness to pay (WTP) and willingness to accept (WTA) compensation. In the Czech Republic, under the guidance of the Municipal Library of Prague, research was carried out on these issues in cooperation with the University of Pardubice and the Matěj Bel University in Banská Bystrica. Thanks to this project, which was funded by the Ministry of Culture of the Czech Republic in 2013-2016, primary data is available which has enabled further research.

Theoretical Background and Previous Research

The most important part of the analyses is the determination of the benefit value that the contingent valuation method deals with. The principle of CV consists in assigning the relevant values to individual goods and services by the consumer, because the consumer himself can best define the perceived value of

a good or service. In the case of public services where there is no market price for a service, it is an expression of individual consumer preferences, for example through willingness to pay for public service consumption. The second option is to determine the amount of money consumers would be willing to accept as a deterioration in the quality of life if the service was not provided to them and would compensate for them. This method should help answer the question whether the service should be a public service, ie to be financed from public sources, and to what extent public resources should be represented to finance the cost of producing this service if the conditions of the Pareto Efficiency are to be met (Hanemann, 1991). For financial evaluation of non-market benefits resulting from the activities of public libraries, it is appropriate to use this method.

Determining the subjective value of consumed goods is possible only by questionnaire survey or controlled interview. Obtaining these data is technically very demanding because individual consumers have to understand the questions posed enough and must be able to express the value of their consumption in relation to, for example, their retirement, the value of their time or the comparison of the cost of other goods. In practice, approaches based on the consumer's willingness to pay have proved to be useful in determining the value of consumed goods (Knetsch, Sinden, 1984; Luzar, Cosse, 1998; Horowitz, McConnell, 2002). The WTP approach addresses the value of services according to individual preferences and determines the value the consumer is willing to spend on obtaining the service. Elicitation techniques for WTP issues have undergone significant developments, but there are still no unified practices that would be mainstreamed. Elicitation always depends on the individual's individual preference, on the various current factors, and on the question of the payment mechanism offered. So the survey maker can negatively or positively influence WTP results (Mitchell, Carson, 2013). The WTA approach expresses the value of the service on the basis of willingness to accept the denial of service consumption. It is the minimum amount of money the consumer is willing to accept for denial of a particular service or for what value he / she is willing to accept with a certain negative phenomenon (pollution, misuse).

The beginnings of the appraisal of public service valuation procedures have taken place on cultural (public) services and can be linked to a research conducted in the USA (North Carolina) between 1999 and 2002. The research concerned and evaluated the experiences of Blue Ridge Parkway visitors many views and scenic corners). Here, CVs have also been used, as researchers have used WTP's approaches to rewarding the benefits the park brings to its visitors. A pioneering study on the analysis of the benefits of public libraries was carried out in 1999 in St. Louis Public Library (USA). In 2004, further breakthrough studies were carried out in the field of library valuation in London in the United Kingdom and the United States, namely in Florida (Aabø, 2007). The first study, which brought a high-quality and scientifically widely accepted methodology, was a study of the economic benefits and returns of public investment in public libraries in the state of Florida (USA). Research has provided data to donors who have found effectiveness in returning public investment, total consumer perceptions, and the social benefits of libraries. Further studies on contingent valuation of library services are shown in Table 1. It is also possible to determine the ratio between the WTP and WTA values.

Table 1: The ratios between WTA and WTP elicitation approaches according to selected studies

Authors	Country	WTA	WTP	WTA:WTP
Holt, 1999	USA	136 mil. USD	15 mil. USD	9,0 : 1,0
Pung et al., 2004	Great Britain	273 GBP	116 GBP	4,9 : 1,0
Aabø, 2004	Norway	2000 NOK	400 NOK	5,0 : 1,0
Sociores, 2013	Czech Republic	1797,61 CZK	595,72 CZK	3,0 : 1,0

Source: own processing according to Holt (1999), Pung et al. (2004), Aabø (2004), Sociores (2013)

The values show that the value of accepting the compensation for the library service is several times higher than the willingness to pay for the service. At the same time, it is necessary to draw attention to the fact that the resulting WTP values are the result of more detailed inquiries, as the surveys are more focused on this value, while the WTA remains slightly omitted, and its values are, as a rule, devoted to just one question.

Data and Methods

The data was obtained through a questionnaire survey in 2012 for users of the Municipal Library of Prague. In the framework of the questionnaire survey, 11 397 Municipal Library of Prague readers were contacted, of which 2 227 were respondents (return of 20 %). However, the incomplete answers appeared from the results, which were removed for the accuracy of the analysis. The data analysis file after reviewing and editing included 1 429 records. The value of the benefits of library services through the WTP and WTA approaches will be further analyzed.

Subsequent data processing will be performed by statistical methods: correlation and regression analysis. The correlation analysis is used to determine the extent to which the individual properties interact. The Spearman's correlation coefficient will be performed in the article (Kubanová, 2008):

$$R_S = 1 - \frac{6}{\mathrm{n}\,.\,(n^2-1)} \sum_{i=1}^{n} (R_i - Q_i)^2$$

Regression analysis is used to describe the dependence of two or more numerical variables. It is a mathematical model that is expressed by a regression function. In the paper, a multiple linear regression model will be constructed in which the number of selected independent variables is expanded and the problem of how the values of the random variable Y depend on the independent variables xi, i = 1, 2,.. k. The multiple regression model has the form (Kubanová, 2008):

$Y_i = \beta_0 + \beta_1\ \beta_{i1} + \beta_2\ \beta_{i2} + \cdots + \beta_k\ \beta_{ik} + \varepsilon_i.$

Hypothesis and Data Analysis

The values that respondents attribute to library services in terms of (a) how much they are willing to pay (WTP) or (b) what amounts they are willing to accept for compensation if they are not able to use the service (WTA) are considerably subjective. The aim of the hypothesis is to demonstrate whether there is a correlation between the individual variables and WTP and WTA values. Thus, whether and to what extent variables have an effect on the value (a) of the willingness to pay and (b) the willingness to accept compensation for the library services for the consumer.

H1: The perceived value of the consumer of a library service depends on:

H1a: age of the consumer (age),

H1b: gender of the consumer (gender),

H1c: education of the consumer (education).

H1d: value of money saved by the library user (saved),

H1e: number of books borrowed per month (number of books),

H1f: net monthly household income (income),

H1g: frequency of library visits (frequency).

Within the established hypothesis, a correlation analysis (Spearman's correlation coefficient) was performed, the results of which are shown in Table 2. The correlation coefficient may take values within the interval <-1; 1>, with the value 0 indicating that the relationship between the variables is not, and the closer the resulting value is closer to the value 1, there is a greater dependence between the variables under consideration. The correlation coefficient was determined for confidence intervals of 99 %, 95 % and 90 %.

Table 2: Impact of selected variables on WTA and WTP

Determinants	**WTA**	**WTP**
Age	- 0,191***	- 0,002
Gender	- 0,005	0,035
Education	0,004	0,089***
Saved	0,040	0,080***
Number of books	0,027	0,119***
Income	0,099***	0,181***
Frequency	0,080***	0,091***

*Note: statistically significant values that are significant: *** at a confidence interval of 99 %; ** at a confidence interval of 95 %, * at a confidence interval of 90 %.*

Source: own processing

From the resulting correlation coefficients, it can be seen that WTP has a larger number of indicators than WTA. Statistically significant for the WTA value are the variable household income and library attendance frequency. Determining the WTP value affects both the amount of money saved and the number of books borrowed by respondents per month, as well as the household income and the frequency of library visits. Statistical dependence has been confirmed for some variables. The correlation coefficient is low and it can be assumed that these variables have little effect on WTA and WTP. The dependency of variables will be verified by regression analysis.

Regression models will be input to variables that have been flagged as statistically significant in the previous analysis, with WTA and WTP being tracked separately. For analysis, a multiple linear regression model will be used, which will be processed in Statistics, ver. 10. The resulting value of the determinant coefficient for the following statistically significant indicators is as follows:

- determination coefficient for WTA: 0,021156;

- determination coefficient for WTP: 0,0562322.

The results conclude that these variables, which are statistically significant, explain the model only from a small percentage. In the case of WTA, the model of the variables is influenced by only 2 %, and in the case of WTP access, the value is affected by statistically significant variables only from 5.6 %. There is a relationship that the more explanatory variables, the stronger the dependence of the variables, there is also the reason why the value of the coefficient of determination is higher for WTP (5 statistically significant indicators) than for the WTA (3 statistically significant indicators).

Conclusion

The correlation analysis showed statistically significant influence of variables on both WTA and WTP values. Further data exploration was done using a regression analysis, however, which found very little influence of these variables on WTA and WTP values. The variables examined do not significantly affect the value of WTA and WTP. The analysis also found that significant variables from the correlation analysis to the WTP value are based on positive values and hence there is a dependence: with the one variable growing, the other variable also increases. When income such as income, number of borrowed books, level of education, amount of money saved, and frequency of library visits increase, then the willingness of people to pay higher amounts for library services increases. The positive values of the correlation coefficient for the variable income and the frequency of the library visits are based on WTA values. If people have a higher income or are going to the library more often, then they would require a higher amount of compensation for not using the reader's card. At the same time, the variable age was found to be the only negative value of the correlation coefficient for WTA. If there are younger people, they require higher compensation for the library (the necessary literature for study, lower incomes during studies) may be justified. The analysis revealed that the variables examined, which originate from and affects the immediate surroundings of respondents, do not affect the expression of value for library services.

Discussion

The analysis has shown that individual variables that act on the immediate surroundings of the individual do not affect respondents in determining WTP and WTA value for library services. Due to the lack of dependency between variables, the WTP and WTA can only explain manipulative techniques in a questionnaire survey, which is, however, excluded by the Sociores Professional Proquest, as well as a verification pilot study. The analysis has shown that the surrounding influences do not affect the determination of the value of WTP and WTA, the effect of the subjective component of each individual

on particular values will be crucial. In order to find out, it is necessary to question the respondents in the form of questionnaire surveys. The research also brings new questions and suggestions that can be deal with in future research on the subject.

Acknowledgment

This work was supported by projects No. SGS_2017_017 of the Ministry of Education, Youth and Sports of CR with title “Supporting the development of smart cities and regions“ at the Faculty of Economics and Administration, University of Pardubice in 2017.

References

Aabø, S. (2004). ‘Valuing the benefits of public libraries,’ *Information Economics and Policy*, 17(2), 175 – 198.

Czech Statistical Office. (2016). "Statistical Yearbook of the Czech Republic 2016.' [Online], [Retrieved September 25, 2017], https://www.czso.cz/csu/czso/26-kultura-a-sport-psp3pgvcbk

Directive IFLA/UNESCO. (1994). "IFLA/UNESCO Public Library Manifesto 1994.' [Online], [Retrieved September 25, 2017], https://www.ifla.org/publications/iflaunesco-public-library-manifesto-1994

Hanemann, W. M. (1991). ‘Willingness to pay and willingness to accept: How much can they differ?’ *American Economic Review*, 81(3), 635 – 647.

Holt, G. E., Elliot, D. and Moore, A. (1999). 'Placing a Value on Public Library Services,' *Public Libraries*, 38, 98 - 108.

Horowitz, J. K. and Mcconnell, K. E. (2002). 'A review of WTA/WTP studies,' *Journal of Environmental Economics and Management*, 44(3), 426 - 447.

Knetsch, J. L. and Sinden, J. A. (1984). 'Willingness to pay and compensation demanded: Experimental evidence of an unexpected disparity in measures of value,' *The Quarterly Journal of Economics*, 99(3), 507 - 521.

Kubanová, J. (2008). Statistical methods for economic and technical practice, Bratislava, Statis.

Luzar, E. J. and Cosse, K. J. (1998). 'Willingness to pay or intention to pay: the attitude-behavior relationship in contingent valuation,' *The Journal of Socio-Economics*, 27(3), 427 - 444.

Mitchell, R. C. and Carson, R. T. (2013). Using surveys to value public goods: the contingent valuation method, London, Routledge.

Pung, C., Clarke, A. and Pattern, N. (2004). 'Measuring the economic impact of the British Library,' *New Review of Academic Librarianship*, 10(1), 79 - 102.

Sociores (2013). Primary research data.

Stejskal, J. et al. (2013). Measuring the value of public services: (by example of public libraries), Praha, Wolters Kluwer ČR, a. s.

Work Reform in Indonesia: An agenda for greater efficiency

Laurencia S. Krismadewi, University of Economics, Prague, Czech Republic,
krismadewi.laurencia@gmail.com

Abstract

Purpose: The aim of the present work is to study the effects of labour market, in a study of a concept of flexibility in referring to the firm's ability to institute some changes and read environmental changes socioeconomic through on-labour markets. The background of the study identifies some highlights, i.e. the determination of mobility of labour, migration, wage, improve the ability of labour, barriers to entry and exit, and flexible working. It is shown that labour market flexibility may not produce unidirectional effects on productivity and employment. **Design/methodology/approach:** We relied on a variety of methods to obtain understanding through the sources that we encountered from qualitative of practitioners in top management and quantitative data of 100 employees in Indonesia. The prevalent complementary data sources included organizational records and journals. **Findings:** This study generally found that the flexibility and outsourcing weighed the positive and significant effect on the labour market. We combine labour market flexibility and outsourcing when the labour market is set by prompting national governments to implement a variety of programs that would make labour markets flexible. **Originality/value:** The paper fulfils an identified utility to study critically discusses the implications of labour flexibility on the international management of human resources.

Keywords:flexibility,labour,outsourcing,efficiency.

Introduction

International competition more over the speed of technological change increase has been an increasing demand for greater labour flexibility (Vincente-Lorente & Suarez-Gonzalez 2007). The intense competition has been a reinforcing stimulus of non-standard forms of employment such as outsourcing, temporary, part-time or informal employment. Consequently, appearing the assumption that these labour market flexibilities giving alternative for the rising unemployment (Flau and Mittelstadt, 2010).

Indonesia boasts the largest economy in the Association of Southeast Asian Nations (ASEAN), and the 16th largest worldwide. As a growing country which is the most populous country inhabitants are second in the world, Indonesia provides a rich context for research with a great opportunity for researchers to experiment and to test theories, models, and ideas. Therefore, the strong point of Indonesia that explain about the foreign investments with increasing of the recent macroeconomic growth, the diverse natural resources, young, large and burgeoning population, political stability (relative), prudent fiscal management, strategic location in relation to the giant economies of China and India, low labour costs.

In the point of view of population growth about two million population of Indonesia available to work yearly, that becoming a very big challenge for the Government of Indonesia in stimulating the creation of new jobs in the various sectors. The unemployment reduction movement is a concept of flexible labour markets such as outsourcing and contract workers in Indonesia moreover outsourcing has become prevalent in all areas of industries. As job creation efforts, the Indonesian government to implement Unemployment Reduction Movement (GPP). The development program is to create employment opportunities more widely in the program such as the program of job training and productivity. The expectation of these programs is to improve

the competitiveness and competence of human resources. Highlight for selected economies in ASEAN in table 1 presents the form of multiple structural dimensions of Indonesia economy that it shows the competitiveness trends that underline the evolution of the overall the performance which can be compared to its peers.

Table 1: The Global Competitiveness Index (GCI) 2016 - 2017

No	Country	Overall Index		Sub-indexes		
		Rank (out of 138)	Value (1-7)	Basic requirements	Efficiency enhancers	Innovation and sophistication factors
1.	Singapore	2	5.72	6.37	5.73	5.25
2.	Malaysia	25	5.16	5.49	4.96	4.94
3.	Thailand	34	4.64	4.95	4.56	3.85
4.	Indonesia	41	4.52	4.78	4.38	4.16
5.	Philippines	57	4.36	4.61	4.24	3.76
6.	Brunei Darussalam	58	4.35	4.81	3.88	3.49
7.	Vietnam	60	4.31	4.49	4.15	3.47
8.	Cambodia	89	3.98	4.21	3.69	3.15
9.	Lao PDR	93	3.93	4.16	3.63	3.39

Source: World Economic Forum, 2017

Note: Myanmar is not included in the GCI 2016 -2017 Report

Indonesia (41st) drops four places as it is overtaken by a few countries. Despite many reforms to its business environment, its performance remains one of the contrasts: the country ranks 10th for market size, 30th in the macroeconomic environment pillar—in spite of the protracted commodity bust—and 31st for innovation. It performs well in terms of financial development (42nd, up seven). Nevertheless, Indonesia ranks a low 100th in the health and basic education pillar (down 20), and 108th in the labour market efficiency (World Economic Forum, 2017). The three most problematic factors in Indonesia linked to labour inadequately educated workforce, poor work ethic in the national labour force, and policy instability. These all present current data derive the indicators of the competitiveness trends in Indonesia economy along with the obstacles that will face in competitive market. Especially in a global market which is growing quickly as today, about countries need a flexible labour market to encourage the economy (Rajeev, 2009). However, to a greater extent flexible labour market need to ensure that the ongoing structural transformation process practises the creation of quality jobs. The greater labour flexibility will increase the ability of a nation to allocate its resources efficiently and improve purpose of the technology for the economic development of that nation. Therefore, to increase the labour market flexibility through innovation revamping that refers to employment issues such as staff wages, the ease of which companies can hire and fire employees, length of probation periods and power of unions. These flexible markets, which favour workers' rights can lead to lower unemployment and higher labour productivity. It will be important attention to Indonesia toward competitiveness challenges e.g. ASEAN Economic community has been open for the following 7 (seven) kinds of jobs are (1) Engineering Services, (2) Nursing Services, (3) Architecture, (4) Land Surveying, (5) Medical Practices, (6) Dental Practices, (7) Accountancy, (8) Tourism. These suggest faced serious challenges on labour markets in Indonesia that goods, services, including worker will flow from countries that have high efficiency and productivity into countries that have low efficiency and productivity. Unquestionably, what we intend to do in this paper subsist to analyse the functioning of the labour market flexibility. Accordingly, focus on labour market trends accordingly investigate how the flexibility of labour in Indonesia.

1. Literature Review

1.1. The concept of labour market flexibility

The reference of labour market flexibility namely the ability and willingness of labour to respond to changes in market conditions, including changes in the labour demand and the wage rate that connected with labour market regulations and institutions. Concerning how labour markets function adjust supply to demand in the central of supply-side of the macro-economy that acts as an essential aspect of labour market flexibility. The demand for labour adjusts constantly to changes in national income and the business cycle that will change as a result of large-scale and deep-seated changes to the structure of an economy that often brought about by changing technology or through globalisation. According to Eamets and Paas (2007), the extent of state institutions and trade unions in labour market regulation distinguish between the levels of labour flexibility in macro-level flexibility. The covers of institutional flexibility consist labour market regulations, labour policy, trade union activities and labour taxes. Meanwhile, in micro-level flexibility consist worker flows, job flows and working time flexibility (Messina, 2007). In essence, this refers to the firm's ability to institute some changes in its working patterns, including setting wages, hiring employees on contracts, firing them and changing the working hours (Conley 2008). A commonly held view is that labour market flexibility is an essential ingredient for progress for a long time as unequivocally good, helping address the wider problems of unemployment (Rowley 2013). Labour market flexibilities have created a knowledge-intensive economy where least of the workers obtain involved in knowledge-intensive work also benefit from high wages attached to those jobs (Schuler & Jackson 2005). Moreover, the types of labour market flexibility have as occupational flexibility is the ability of workers to move in different types of job, mostly related to available skills, reduces levels of structural unemployment; geographical flexibility is the ability of workers to receipts advantage of job availability in different areas, depending on quality of transport as well as housing market, reduces regional disparities, increases productive efficiency; wage flexibility is the ability of firms to adjust wages in response to changes in supply and demand, restricted by trade union power including another collective bargaining, commonly a key side to keeping unemployment down in extreme recession; contractual flexibility that happened in varied industries, workers inhabit now offered jobs in six or three months or constantly on month-to-month contracts, makes firms further willing to take on new workers – easily discarded if they don't work out. Related to issues of labour market flexibility, there are factors that affect labour market flexibility (Howell,2011:189):

- Remuneration

Wages that is a key element of labour market flexibility to adjust to bring about equilibrium between demand also supply, including relative wage flexibility which relates to the adjustment of wage rates between sectors of an economy, or between regions, however, real wage flexibility will adjust to economic shocks.The determination of wage levels national does not reflect local conditions including labour not conform to changes in the condition local who created inflexibility wages relatively. Including for incentives or the generous unemployment benefits may reduce labour market flexibility.

- Skills and training subsidies can improve labour mobility. Multi-skilled workers may be able to adjust their working patterns or workloads to suit changing demand conditions.
- Proportion amount of part-time or temporary work. The labour market is more flexible when there is a larger proportion of part-time work relative to full-time work or temporary contracts. For flexibility work hour that firm has the ability to offer a flexible working environment as well as flexible working patterns.
- Hiring or firing. The firms will have greater freedom to hire workers when demand increases, conversely when firing, the demand for labour decreases. The excessive legislation to limit the ability of firms to hire or fire will reduce flexibility.

- Information. The better information about job vacancies, or to opportunities for promotion make workers can respond more effectively to changes in the requirements of firms.
- Mobility namely the willingness also able to move from one job to another, geographical mobility, be that as it may, industrial mobility that moving between industries. In case of geographical mobility, the extent of migration allowing or encouraging labour to migrate between countries that will increase the degree of labour market flexibility in the recipient country.
- Entry or exit barriers. The entry barriers such as the requirement for excessive qualifications (racial, gender, disability or age discrimination), or due to trade union restrictive practices, further exit barriers such as lengthy contracts or notice periods of labour will become less flexible.

Atkinson's model identifies four main flexibilities sought by companies:

- The functional ability describes the firm's ability to match the skills of employees with tasks by dismantling the traditional rigidities between different occupational groups through outsourcing and offshoring of services (Kalleberg, 2003).
- External numerical flexibility involves adjustment of the labour force from the external market and through relaxed hiring and firing regulations including temporary employment (Leighton, 2003).
- Internal numerical flexibility involves adjustment of schedules or working hours and comprises mainly of part-time jobs (Wilton 2013).
- Financial/wage flexibility involves the wage differences with the aim of ensuring that the employment cost reflects the supply and demand of labour mainly of individual performance wages, assessment based pay and rate-for- the job systems (Wilton 2013).

In Atkinson's model describes how companies respond to the increased need for flexibility. The highly skilled workers are core group with firm-specific capabilities that contains a unique resource. The first peripheral group have possessed skills which are not firm-specific and hence the firm may rely on the external market to fill such posts namely functional and numerical flexibility (Wilton 2013). The second peripheral group consist of workers under atypical forms of employment that providing both the temporal and numerical flexibility.

1.2. Measure of labour market flexibility

The OECD's Employment Protection Legislation ("EPL")[16] index measure the labour market flexibility which is available from the OECD (Organisation for Economic Cooperation and Development) and G20 countries. The index measures the procedures involved in hiring workers on either fixed-term or temporary contracts and the procedures and costs involved in dismissing individuals and groups of workers. Based on statutory laws, collective bargaining agreements, case law, contributions from OECD member countries, and experts' advice for each country. There three main areas in 21 basic items: (1) Individual dismissal of workers with regular contracts (category EPR) measures three aspects of dismissal protection: (i) procedural inconveniences of the dismissal process faced by employers, such as notification and consultation requirements; (ii) length of notice periods and conditions of severance pay; and (iii) difficulty of dismissal, such as the circumstances under which a dismissal possible, and repercussions for the employer if an unfair dismissal is discovered; (2) Additional costs for collective dismissals (category EPC) measures the extra costs faced by employers when they dismiss several workers simultaneously, over and above the costs applicable for individual dismissals; (3) Regulation of temporary contracts (category EPT) measures regulations for fixed-term and temporary work contracts in terms of job type and duration, requirements for such workers to receive equal pay and working conditions of permanent employees, and regulations for the setup and operations of work agencies.

1.3. Implication of outsourcing on labour market flexibility

Labour market flexibility seems to have had tremendous impacts on the business world. Whereas these atypical forms of unemployment may not be new, the tactics and strategies employed in some countries are. However, there remains a dilemma with regard to creating a flexible workforce. Neoliberal economists hold to the view that labour market flexibility plays an important role in economic progress and is key to overcoming the turbulent effects of economic instability (Wilton 2013).

Changes in the labour market have led to the rise and growth in demand for flexible labour arrangements, such as part-time jobs, temporary contracts, labour hires and outsourcing among many others. Outsourcing has become a popular way to reduce company costs and gain other competitive advantages. In an ever-changing environment characterized by expanding intense globalization, nonstandard work arrangements and intense competition, outsourcing human resource functions not only seems logical but also a necessity (Kock, Wallo, Nilsson, & Hoglund, 2012) (Cooke, Shen, & Mcbride, 2005) state that outsourcing is often associated with specialized services, suppliers created extent economics, flexibility of organization, risk move and learning from external professionals. Governments are thus under pressure to minimize the regulation of business practices in response to the changing nature of the labour market. But at the same time, they must strike a balance between economic responsiveness and employee protection (Pagano, 2005). This can be seen with the long battle over the rights for workers working under atypical forms of employment such as temporary contracts, a key characteristic of the labour market flexibility.

Flexi-work as a factor of labour market flexibility arrangements is seen to further widen the wage gap, that impact of labour market flexibilities on income inequality. The studies by Blanchard & Landlier (2002) and Giesecke & Gross (2004)7 have argued that there is no upward mobility for atypical forms of employment; studies by Gregg & Wadsworth (2010) have found these labour market flexibilities as widening income inequality. Flexible working arrangements, such as outsourcing involve contracting out services by the management, which implies engaging 'labour without obligation' (Hall 2013). In return, workers implicated in outsourcing tend to feel a little obligation. There is a host of other issues of concern associated with non-standard employment such as low pay, lack of promotion, lack of employer pension schemes and even lack of sick pay provision (McGovern et al 2004). The study has been observed by Kalleberg et al. (2003) in the US, indicating the potentially harmful effects of labour market flexibility on the labour market.

2. Overview of Labour Market Trend in Indonesia

In ASEAN's performance in a global context, Indonesia, Singapore, Malaysia, and the Philippines have more services-based workforces, Malaysia has the region's largest share of the workforce in the industry, while Vietnam and Thailand have a more agriculture-heavy labour market. Nearly 40% of the overall workforce in ASEAN is occupied in agriculture, an equal number (41%) is engaged in the services sector while 19% are involved in the industry. Across the region economic and developmental indicators have improved steadily over the past decade that will presented in labour market condition ASEAN (see table 2).

Table 2: Labour market conditions in ASEAN

Country	Level finding skilled employees (7=easiest, 1=hardest)	Average monthly wage (US$)	Workers in vulnerable employment (%)	Incidence of child labour (%)
Cambodia	3.4	121	64	18.3
Indonesia	4.3	174	36	6.9
Lao PDR	3.1	119	83	10.1
Malaysia	5.3	609	22	-
Myanmar	2.4	-	89	-
Philippines	4.4	206	42	11.1
Singapore	4.8	3547	9	-
Thailand	3.8	357	56	8.3
Vietnam	3.4	181	63	6.9

Source: Asian Development Bank, 2016.

Note: "Workers in vulnerable employment" refers to the number of unpaid family workers and informal sector "own-account workers" as a share of total employment.

Over the years the Indonesia's labour market has continued to expand with the number of employed growing while unemployment rate has been steadily declining. However, the declining unemployment rate masks the overall employment situation in the country. More than 50 percent of the workers are still engaged in informal employment. Labour Market Outlook of Indonesia reveals that in 2016, the Indonesian labour force had reached 127.6 million with an overall total unemployment rate of 5.5 percent or equal to 7 million people who are without work. Owing to its rapid growth, the services sector became the key source of employment, creating 14.2 million jobs in the last decade. The industry sector, with its modest performance, contributed only 7.1 million new jobs, including 4.4 million jobs in manufacturing. The agriculture sector lost 900,000 jobs in the last decade. Most new jobs were generated in urban areas. The majority of jobs created use short-term contracting arrangements or are in the informal sector. Employment quality is a major issue, and compliance with existing labour regulations is very low. Youth unemployment, skills shortages, and skills mismatches are also persistent challenges. Gains in labour productivity have been slow, and a multifaceted approach for accelerating labour productivity is required to support growth in higher value-added activities**.**

2.1. Employment Trends

The economic challenges confronting Indonesia at present remain modest compared to those facing many emerging economies and other commodity-exporting countries. Indonesian financial markets also appear to be in good shape compared to many other countries. The labour market situation is more problematic. Since mid-2014 there has been much media attention and political discussion about job losses in the manufacturing sector. There have been closures of a few high profile multinational enterprises and warnings about mounting pressures in export markets.

The official labour market data compiled by the Indonesian statistical office (Badan Pusat Statistik, BPS) would suggest that aggregate labour demand weakened somewhat. Over the year to February 2016 the aggregate employment level declined by roughly 200,000. Employment contracted in agriculture and manufacturing year-on-year, with shifts between urban and rural labour markets helping to moderate job losses. Employment levels in the service sector remained static. The unemployment rate remains moderate at 5.5 %, partly because of a decline in labour force participation. Indonesia's labour markets have been characterised by a considerable degree

of turbulence and structural change. Labour markets are extremely flexible in Indonesia. Most of the poor are "unskilled" workers in rural areas. These workers are helped by a development strategy that favours rapidly expanding demand for labour and allows labour to reap the maximum rewards the market will bear. Public sector employment, however, is not a viable tool to increase the long-term standard of living of workers. Following Harrod's definition of the natural growth rate, potential labour productivity growth is potential growth less the growth rate of the labour force. Because labour market data in many developing economies in Asia are unreliable, working-age population, which is the population aged 15–64, is used as a proxy for the labour force. These data are filtered using appropriate statistical techniques to purge short-term variability, which is caused largely by transitory migration flows. The competitiveness trend of labour market efficiency ASEAN countries' economies that described in two indicators i.e. flexibility and effect use talent (see Figure 1 and 2).

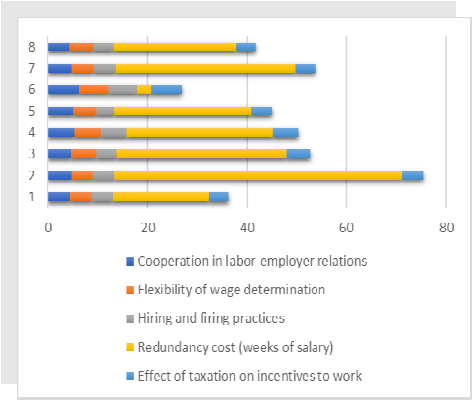


Fig. 1. Flexibility

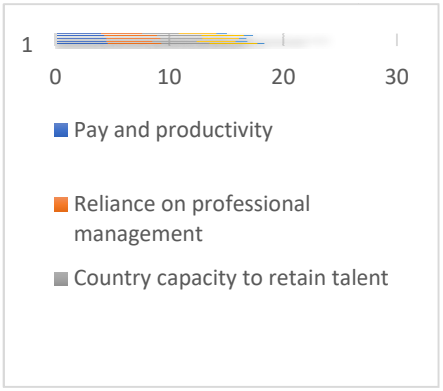


Fig. 2. Effect use talent

Source: WEF, 2017

Note:

1.	Cambodia	5. Philippines
2.	Indonesia	6. Singapore
3.	Lao PDR	7. Thailand
4.	Malaysia	8. Vietnam

The regular employees tend to have shorter periods of job tenure than other workers. Job tenure for own account workers, employers assisted by temporary and unpaid workers, employers of permanent workers, and regular employees. The regular employees tend to have shorter job tenure than do other workers. In addition, youth, women and those with lower levels of educational attainment also tend to have shorter job tenure in comparison to the average. This would suggest that these groups are more likely to work on short-term contracts than on permanent contracts, due to segmentation in the labour market. Each year a large number of jobs are created and destroyed, with workers being hired or separating from their employer. Incentives for short-term contract, the scale of the informal economy, changes to labour market regulations, and dismissal regulations tend to influence worker reallocation rates.

Indonesia ranked number five in the attractiveness of its outsourced business potential behind India, China, Malaysia and Brazil. In Indonesia, outsourcing has only been implemented on a small scale, but it provides significant opportunities to secure work from overseas. The key is therefore for responsible bodies such as the relevant ambassador and chamber of commerce officials to seek out work that can be carried out in Indonesia such as within data input, information technology and administrative processes. The demand that outsourced workers' rights should be protected is fair and justified. It is true that the perception of outsourcing by many Indonesians is negative as the government has not been forthcoming in

implementing outsourcing regulations. The number of job opportunities compared to the amount of labour available is also limited which is coupled with a lack of qualified workers so the bargaining position of workers is weak.

In Indonesia, merely one in three of workers captured in the sample completed secondary schooling or any post-secondary education. In contrast, the Philippines workforce exhibits higher educational attainment: nearly three in five are secondary school graduates or have post-secondary schooling. Moreover, across the five countries, only in the Philippines does high-skill employment as a manager, professional or technician exceed 20 percent. In Indonesia, the share is only around 9 to 10 percent, among the three countries with available information on the job experience, workers in Indonesia, on average, tend to have more experience working with the same employer (see Table 3).

Table 3: The global human capital report 2017

Description	0-14 age group	15-24 age group	25-54 age group	55-64 age group	65+ age group
Indonesia	27.7%	17.1%	42.5%	7.5%	5.2%
Capacity					
Literacy and numeracy	-	99.7	97.5	88.7	74.8
Primary education attainment rate	-	99.7	97.8	88.9	70.7
Secondary education attainment rate	-	78.3	61.1	30.6	20.5
Tertiary education attainment rate	-	-	11.1	6.0	3.3
Deployment					
Labour force participation rate	-	49.3	77.9	67.7	40.2
Employment gender gap	-	0.65	0.58	0.61	0.48
Unemployment rate	-	18.6	3.3	1.6	0.1
Underemployment rate	-	14.2	8.1	5.7	4.4
Development					
Primary education enrolment rate	92.9	-	-	-	-
Quality of primary schools[1]	4.3	-	-	-	-
Secondary education enrolment rate	80.0	-	-	-	-
Secondary enrolment gender gap	1.0	-	-	-	-
Vocational education enrolment rate	-	42.4	-	-	-
Tertiary education enrolment rate	-	31.1	-	-	-
Skill diversity of graduates[2]	-	0.19	-	-	-
Quality of education system[1]	-	4.4	-	-	-
Extent of staff training[1]	-	-	4.5	-	-
Know-how					
High-skilled employment share	-	-	9.9	-	-
Medium-skilled employment share	-	-	81.9	-	-

Economic complexity[3]	-	-	-0.03	-	-
Availability of skilled employees[1]	-	-	4.6	-	-
Philippines	32%	19.4%	37.6%	6.4%	4.7%
Capacity					
Literacy and numeracy	-	98.2	96.6	95.4	91.4
Primary education attainment rate	-	99.5	98.3	97.1	94.9
Secondary education attainment rate	-	85.0	75.9	56.8	41.5
Tertiary education attainment rate	-	-	29.3	20.9	16.5
Deployment					
Labour force participation rate	-	46.5	77.2	67.7	35.7
Employment gender gap	-	0.63	0.65	0.70	0.60
Unemployment rate	-	13.9	4.5	2.0	1.1
Underemployment rate	-	9.1	9.9	10.1	8.2
Development					
Primary education enrolment rate	96.8	-	-	-	-
Quality of primary schools[1]	3.9	-	-	-	-
Secondary education enrolment rate	64.6	-	-	-	-
Secondary enrolment gender gap	64.6	-	-	-	-
Vocational education enrolment rate	1.0	-	-	-	-
Tertiary education enrolment rate	-	35.8	-	-	-
Skill diversity of graduates[2]	-	-	-	-	-
Quality of education system[1]	-	4.3	-	-	-
Extent of staff training[1]	-	-	4.6	-	-
Know-how					
High-skilled employment share	-	-	24.1	-	-
Medium-skilled employment share	-	-	68.4	-	-
Economic complexity[3]	-	-	0.46	-	-
Availability of skilled employees[1]	-	-	4.5	-	-

Source: WEF,2017

Note:
Unless otherwise indicated by a superscripted note, "value" refers to percentage rates for the corresponding age group. The following exceptions apply: 1 / Survey response on a 1–7 scale (1 = worst score, 7 = best score) - 2 / Data on a normalized 0.090 - to 1.000-scale (0.090 = best score, 1.000 = worst score) - 3 / Data from –2.33 (worst score) to 2.21 (best score)

2.2. Earnings and governance trends

The Indonesian labour market is generally open and flexible, although there are significant restrictions on the use of contract workers. Recent significant increases in the minimum wage for many provinces have

made unskilled and semi-skilled labour costlier. In the bellwether Jakarta area, following a 44 percent increase in 2012, the minimum wage was raised again from IDR 3.1 million (USD $229.6) in 2015 to IDR 3.3 million (USD $244.4) at the end of 2016. Under the new wage setting policy adopted as part of the October economic stimulus package, annual minimum wage increases will be indexed directly to inflation and GDP growth. Previously, minimum wage adjustments were subject to negotiations between local governments, industry, and unions, and the changes varied widely from year to year and from region to region. With the new sector-based calculation, in Jakarta, the new minimum wage in the electronics sector was 30 percent higher or IDR 4.0 million (USD $296.3), while in West Java, the minimum wage in the automotive sector was set at IDR 4.1 million (USD $303.7). In 2015, Indonesia's monthly average minimum wage stood at US$123, higher than its competitors in manufacturing countries such as Vietnam ($118), Bangladesh ($68) and India ($77). The new minimum wage policy, which calculates annual wage hikes based on the inflation rate and economic growth, guarantees that workers' wages will increase every year.

Another challenge facing the labour market in Indonesia is workers' productivity, which has been cited by businesses as one of the key determinants when selecting a location to invest in. Vietnam, Indonesia's main competitor attributed 38 percent of its GDP growth between 1990 and 2013 to labour productivity growth. Indonesia's competitiveness becomes even more questionable when productivity stagnates and the discrepancy between wage and skill levels widens over time. In January 2014, Indonesia launched a national insurance plan. In October 2011, the Indonesian government passed a revised Social Security Law, which took effect in January 2014, in which all formal sector workers must participate. Subject to a wage ceiling, employers' must contribute an amount equal to 4 percent of workers' salaries to this plan. In July 2015, Indonesia established the Social Security Organizing Body of Employment (BPJS-Employment), a national agency to support workers in the event of work accident, death, retirement, or old age.

Indonesia's large domestic market, growth prospects, natural resource endowment and abundance of low-cost labour makes it a potentially attractive foreign direct investment (FDI) destination (Hornberger, 2011). FDI has a positive effect on economic growth and employment, because it decreases the shortage of capital accumulation and increases the productivity. One of the most important factors attracting FDI in recent trend is qualification of labour, besides low wages or better wage differentials between investors and host country. FDI inflows have picked up substantially over the past few years in Indonesia (see Table 4).

Tab.4: Flow of FDI in Indonesia

Economic Sector	2012	2013	2014	2015	2016	Trend
[A] Agriculture, forestry, and fishing	0.887	1.052	17.319	0.155	0.050	
[B] Mining and quarrying	14.379	19.357	44.636	407.322	39.592	
[C] Manufacturing	1,053.508	78.063	46.544	85.285	19.395	
[D] Electricity, gas, steam and air conditioning supply	0.176	1.543	0.234	1.385	0.452	
[E] Water supply; sewerage, waste management and remediation	0.001	0.039	0.065	0.009	0.248	
[F] Construction	0.822	0.264	-1.452	2.754	0.105	
[G] Wholesale and retail trade; repair of motor vehicles and motor cycles	-373.708	-30.927	-165.943	-23.972	-161.396	
[H] Transportation and storage	21.706	9.949	3.582	-1.004	23.504	
[I] Accommodation and food service	-0.937	-0.781	0.553	0.181	0.210	
[J] Information and communication	-5.158	1.484	3.357	-0.851	-0.344	
[K] Financial and Insurance	3,557.410	323.807	-87.196	-440.150	583.644	
[L] Real estate	6.268	1,783.188	4.859	3.377	4.455	
[M] Professional, scientific and technical	1.263	4.203	1.962	-0.556	-4.728	
[N] Administrative and support service	0.010	0.000	0.009	0.035	0.081	
[O] Public administration and defence; compulsory social security	0.000	0.000	0.000	0.000	0.000	
[P] Education	0.000	0.090	0.079	0.014	0.031	
[Q] Human health and social work	0.191	0.068	0.426	0.007	0.026	
[R] Arts, entertainment and recreation	0.254	0.038	-0.086	0.301	0.167	
[S] Other services.	105.725	122.970	-162.110	15.102	36.104	
[Z] Unspecified	-7.398	16.400	0.714	0.615	2.342	

Source: OECD, ASEANstat database, 2017

2.3. Employment quality trends

Unemployment decreased slightly to 5.5 percent in October 2016. Unemployment tends to be higher than the national average among young people. Indonesian labour is relatively low-cost by world standards, but lack of adequate skills training and complicated labour laws combine to make an Indonesia's competitiveness lag behind other Asian competitors. Investors frequently cite high severance payments to dismissed employees, restrictions on outsourcing and contract workers, and limitations on expatriate workers as significant obstacles to new investment in Indonesia. In October 2015, the Ministry of Labour issued a revised regulation No.35/2015 on the Procedures of Hiring Foreign Workers to lighten requirements for companies to bring foreign employees. The new regulation eliminates the provision that required companies to hire 10 local staff for every foreign worker hired and dropped the requirement of work permits for foreigners who participate in seminars, speeches, workshops, board meetings, and training. The new regulation still prohibits local companies from hiring foreign employees as commissioners. Employers also note that the skill base provided by the education system is lower than that of neighbouring countries, and successive Labour Ministers have listed improved vocational training as a top priority.

The projected, as well as Indonesia's working-age population will increase steadily until 2030. To take full advantage of this demographic dividend, further investment is needed in education and training that will help the economy make the transition to activities that add more value. Longer term, changes are required to improve the quality and relevance of education and training, and to address skill shortages and mismatches in the labour market. Table 5 highlights that in 2010 half the population lived in urban areas, and with the increasing pace of urbanization it is expected that an additional 85 million people will be living in urban areas by 2035. This shift will have profound implications for the labour market. In particular, rural labour force participation tends to be higher than urban labour force participation, and urban unemployment tends to be higher than rural unemployment. If these trends continue, there is a risk of lower labour force participation and higher unemployment in the years to come.

Table 5: Population projections for urban and rural areas, 2010-2035

Variable	2010	2015	2020	2025	2030	2035
Number of people (millions)						
Urban	118.8	136.2	153.7	170.9	187.9	203.6
Rural	119.7	119.3	117.4	113.9	108.5	102.1
Total	238.5	255.5	271.1	284.8	296.4	305.7
Percentage of the population (%)						
Urban	50%	53%	57%	60%	63%	67%
Rural	50%	47%	43%	40%	37%	33%

Source: BPS Indonesia population projection, 2010-2035, Jakarta

Demographic shifts will also influence the labour market. The workers that are entering the labour market today are better educated and have greater capacity for adopting new technology than the average worker of today. However, the share of younger groups (aged 15-29) in the working age population is projected to decline from 40% to 34% between 2010 and 2035, entailing an increase in the mature age population (Jones, 2013). As the labour force matures, the demographic gains from a younger and better educated workforce will dissipate.

2.4. Competitiveness and business climate

One of the keys to economic development through structural change is the promotion of a competitive, innovative and dynamic. The challenges facing Indonesia are illustrated by global

competitiveness rankings (Figure 3) i.e. labour market efficiency, primary education outcomes, technological readiness, and infrastructure.

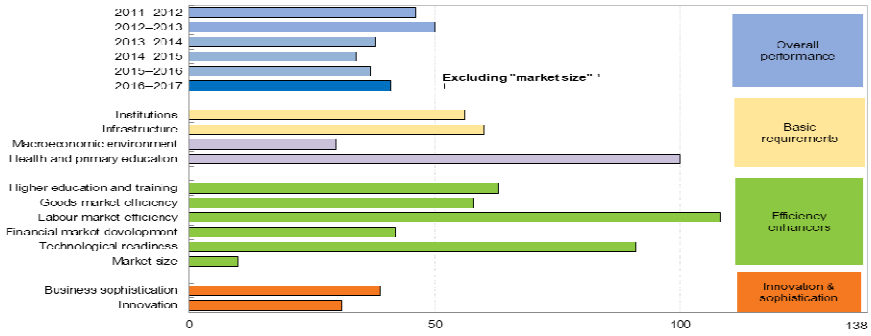


Fig.3. Indonesia's global competitiveness rankings, aggregate and subcomponents
Source: World Economic Forum, Global Competitiveness Report 2016-2017

3. Conceptual Framework, Methodology and Findings

3.1. Conceptual Framework

How do the perceptions about labour market flexibility can be influenced the economic growth in Indonesia? Two indicators in flexibility market, which are labour market, mechanism and innovation, are very important to make sure that the employees are allocated for the most effective utilization in a country's economy. A very simplified depiction of this conceptual framework is illustrated in Figure 4 below. Understanding how the functioning of the labour market flexibility in Indonesia.

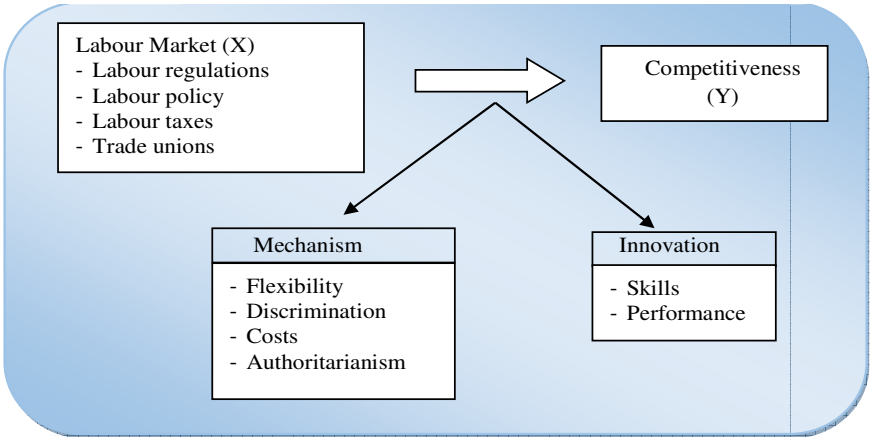


Fig. 4. Framework of report

The report pays particular attention to the function of the mechanism and innovative step that workers need to be equipped with to be employable and support firms' competitiveness and productivity.

3.2. Methodology and Findings

The evidence presented in this study is based on both quantitative and qualitative research methods. Qualitative and quantitative are an appropriate choice when seeking to gain a deeper understanding of an actual phenomenon from the involved participant's perspective (Yin, 2011). The samples of this study are workers in Indonesia through random sampling from the variety of industries. Data statement has been taken from the samples through questionnaires from the period January 2017 to

June 2017. Data analysis was performed using Statistical Packages of the Social Science (SPSS). Multiple regression analysis was utilized to determine the relationship between the independent variables and the dependent variable. It is based on variety of publicly collected data on labour market flexibility which are identified where appropriate in the text and table 6 and 7.

Table 6: Analysis of Multiple Linear Regressions

Independent Variable	Regression Coefficient	Beta	t-value	Sig
(Constant)	15.976		4.676	0.000
Flexibility	0.295	0.334	4.435	0.000
Innovation	0.251	0.314	4.297	0.000
R	0.447			
R Square	0.542			
F	31.82			
Sig F	0.000			

Source: Author calculations based on quantitative data.

Table 6 depicted that the number R obtained 0.447 and it explained the correlation between variables of flexibility and innovation affect on competitiveness is 0.447, that denoted a strong relationship. The value of R squared of 0.521 means contribution percentage of the flexibility and innovation affect on innovation amounted to 54.2%, whilst the remaining 45.8 % is influenced by other variables not included in this research model. The significant value of F with $\alpha = 5\%$ it can be concluded that flexibility and innovation simultaneously have a significant effect on competitiveness.

Tab. 7: Dimension correlation of labour market flexibility on innovation

Dimension	Indicators	Average of indicators	Average of dimensions	Average of variables
Mobility of labour	Willingness	4.33	4.39	4.12
	Ability	4.44		
Migration	Allowing	4.42	4.50	
	Encouraging	4.57		
Wage flexibility	Adjustment of wage rates	4.01	4.15	
	Real wage	4.28		
Rates of pay	Local	3.35	3.72	
	National	4.09		
Making work pay	Reward	4.64	4.58	
	Compensation	4.52		
Improve ability of labour	Skills	4.36	4.25	
	Training	4.13		
Barriers to entry and exit	Requirement	4.02	4.06	
	Agreement	4.10		
Ability to hire and fire	Freedom to hire	3.89	3.51	
	Freedom to fire	3.12		
Information	Vacancies	4.21	4.27	
	Promotion	4.32		
Flexible working	Environment	3.72	3.76	
	Patterns	3.80		
The amount of time	Part-time	4.13	3.12	
	Full-time	4.10		
Innovation relationship	Accumulation of skills	4.41	3.42	3.27
	Innovative performance	4.43		

Source: Author calculations based on quantitative data

Table 7 depicted that the average value of variable flexibility is 4.12, while the variable of innovation is 3.27. It indicates that flexible of labour market is good enough, while the innovation is still lacking. The average value of dimension of flexibility has lowest value is 3.12 by the amount time of time working. That indicates the labour market is more flexible when there is a larger proportion of part-time work relative to full-time work. Flexibility also improves when temporary contracts can be used. In dimension of flexibility that making work pay has the highest average is 4.58. For making work pay, if the reward gap between work and non-work is too small, there may be little incentive to work. Hence, excessively generous unemployment benefits may reduce labour market flexibility. The amount of tax paid from wages (the tax wedge) can also affect flexibility via its effect on incentives. In secondary data as a reference, a few econometric studies of the impact of minimum wages did not find a significant negative impact on minimum wages on overall employment. However, the upward adjustments of minimum wages were found to change the composition of employment. The rise in minimum wages adversely affected employment in smaller enterprises, but employment expanded in larger firms. The adverse employment impact was great for female, young and less educated workers, while the employment prospects of white-collar workers were enhanced by increases in minimum wages.

In the proposed qualitative, the use of unstructured in-depth interviews helped in gathering information during the data collection phase of the study. The unstructured interviews contained open-ended questions designed to provoke the disclosure of the relevant information necessary to answer the study's research questions. The qualitative analysis of the activities and implications of labour flexibility and talent utilization efficiency, including managers from various industries and department; and a review of a wide range of written material on the various intermediaries, including program documents, web-based descriptive material, and secondary descriptions of the organizations, and is presented in table 8 and 9.

Table 8: Primary and Sub-Themes Recorded from Practitioner Interviews

Primary themes	Sub-themes related to primary theme
reason to outsourced	The company focus on core activity that companies could do outsource for non-core work, e.g. production (packaging and helper), labour supply (office boy or catering).
Proportion	The proportion of females less than 30 percent that is distinguishing employees based on the type of work for outsourcing needs.
length of contract	The employment contract managed by the vendor that separated with the company. There are one-year contract and two-year contract.
recruitment	outsourced (contract) employee The contract is a company to company that every month company could request the vendors about how many employees that they need for a specific function or a certain position. The most important is the targets are achieved. For the labour supply employees like office boy, catering; the supervision is under the company, however, for the business outsourcing employees, the supervision is under the vendor. permanent employee The standard procedure in recruitment system, i.e. screening- interviews-medical check-up-offering post-salary-hire.

termination	outsourced (contract) employee the process is company to company if the contract end, the outsourced employee could change the vendors, therefore the employees are mostly same but need to move to new vendors permanent employee based on Law No. 13 of 2003 on the "Manpower Law" contains specific provisions on termination of employment the Employee can also give a voluntary written resignation to the Employer, for example, when the Employee wants to move to another company. The resignation process that is initiated by the Employee is not too complicated. The Employee will usually give a written resignation to the Employer 30 days prior to his/her resignation becoming effective. the entitlement of Employees who voluntarily (and properly) resign from employment to receive both service period recognition pays and compensation based on written or unwritten policies of the Manpower Department
incentives /bonus	outsourced (contract) employee the vendors decide to give the bonus to the outsourced employees, it is purely the profit of ndors that year permanent employee monthly incentive, mostly are received by sales people or merchandisers the company gives the bonus yearly; usually it is the combination between individual performance and business performance.
managing its employees	outsourced (contract) employee every month the company needs to adjust by order how to ensure the vendor will follow the company procedures and regulations, e.g. the audit and investigation of outsourced employees then company found that they were not paid based on the minimum wage permanent employee use work completion system in every area will input the data of the employees; how many days they worked, if they have an incentive or not, etc. Those would be the basis of the company copayment will have managed every month. the challenge is the generation that varies with the company; gen Y, gen X, and gen Z. the movement is very slow as high

	bureaucracy and quite centralized until the national office
demand of outsourced employees recruited into permanent employees	there is no demand – company avoided the same job for outsourced employees and permanent employees and have to divide work locations for outsourced employees and own employees
rules and information regarding the rights an obligation that obtain from the company	The company decided to choose company A, B, or C as the partner companies who provide the labour supply and made sure that they follow the Indonesian labour law on how they treat employees.
industrial relation	the outsourcing system regulations from the government is sometimes still in the "grey" area every 30 outsourced employees in one location, there must be one "coordinator" is owned by the company and they will report the working condition of outsourced employees to company that's responsible for these things and dealing with the company.
engagement	outsourced employee the outsourced employees as part of the company's engagement survey that focus more about productivity permanent employee the company has to make the right measurement and commitment to internal employees to make achievable standards

Source: Author's description based on qualitative data

Tab.10: Quantifying the 21 basis measures of employment protection strictness in Indonesia

A. Individual dismissals of workers with regular contracts

No	Items	Descriptions
1.	Notification procedures in the case of individual dismissal of a worker with a regular contract	The employer must negotiate with the worker or his/her trade union about an intended dismissal. If there is no agreement, the employer must receive permission to terminate the employment contract from the institution for the settlement of industrial relations disputes.
2.	Delay involved before notice can start	The employer and the worker or his/her trade union should attempt to resolve the dispute about termination within 30 days. If negotiations fail, one or both parties can file the dispute with the local manpower office, which will offer both parties the opportunity to settle the dispute through conciliation. If there is no agreement, the dispute is decided by the Industrial Relations Court, which should give a verdict within 50 days of the dispute being filed. If the first ruling is appealed to the Supreme Court, these delays are increased by another 60 days. Calculation (for EPL indicators): average of appealed and not appealed cases.
3.	Length of notice period at	There is no notice period as dismissal must be approved

	different tenure durations (a)	by the institution for the settlement of industrial relations disputes.
4.	Severance pay at different tenure durations (a)	Dismissed workers are entitled to severance pay equal to one month's wages for each completed year of service plus one additional month up to a maximum of nine months' pay and a reward-for-service payment equal to two months' pay for the first completed three years of service plus an additional one month's pay for each three completed years of service thereafter. In addition, the worker is entitled to compensation for housing, medical and hospitalization (which is deemed to be 15 percent of the severance pay and/or service pay to which the employee is entitled; cf. Art. 156(3) Manpower Act N. 13, 2003). However, this compensation is also paid in the case of resignation (and therefore it is not included in the calculation for EPL indicators - Art.162 Manpower Act N. 13, 2003) Calculation (for EPL indicators): 9 months: 1 month; 4 years: 5+2 months; 20 years: 9+7 months.
5.	Definition of unfair dismissal (b)	Fair: the worker has reached retirement age; grave wrongdoing by the workers (stealing, giving false information, drunkenness, indecency, gambling, violence, breaking the law, careless or intentional damage, leaking business secrets); violating provisions specified in the work agreement, the enterprise's rules and regulations or the enterprise's collective agreement (but dismissal can only take place in this case after giving three warnings each 6 months apart); in the event of a change in the status of the enterprise, merger, fusion or change in the ownership of the enterprise where workers are not willing to continue their employment; where the enterprise (or a division thereof) has to be closed down due to continual losses suffered for two continuous years (in this case ordinary severance pay is doubled) or force majeure; if the enterprise goes bankrupt; if the worker has been absent from work for at least five days without submitting a written reason to the employer and the employer has asked twice for a written reason. Unfair: absence from work due to illness, fulfilling obligations to the State, practicing religion, marriage, pregnancy or breastfeeding; union membership or carrying out union duties with the permission of the employer; reporting a crime by the employer; discrimination on the grounds of religion, political orientation, ethnicity, colour, race, sex, physical condition or marital status; disability due to an industrial illness or work accident.
6.	Length of trial period (c)	Maximum of three months. There is no trial period allowed for fixed-term contracts.
7.	Compensation following unfair dismissal (d)	The employer is obliged to pay all the wages and entitlements which the affected worker should have received.
8.	Reinstatement option for the	If the termination of employment takes place for reasons

	employee following unfair dismissal (b)	other than those allowed, it will be declared null and void and the employer shall be obliged to re-employ the affected worker.
9.	Maximum time period after dismissal up to which an unfair dismissal claim can be made (e)	Any worker whose employment is terminated without the decision of the institute for the settlement of industrial disputes and does not accept the termination can file a lawsuit to the institute for the settlement of industrial disputes within a one-year period after termination.

B. Temporary employment

No	Items	Descriptions
10.	Valid cases for use of standard fixed term contracts	A work agreement for a specified period of time can only be made for a certain job, which, because of the type and nature of the job, will finish in a specified period of time, that is: (a) Work to be performed and completed at one go or work which is temporary by nature; (b) Work whose completion is estimated at a period of time which is not too long and no longer than 3 years; (c) Seasonal work; or (d) Work that is related to a new product, a new [type of] activity or an additional product that is still in the experimental stage or tryout phase. A work agreement for a specified period of time cannot be made for jobs that are permanent by nature.
11.	Maximum number of successive standard FTCs (initial contract plus renewals and/or prolongations)	One extension possible.
12.	Maximum cumulated duration of successive standard FTCs	A work agreement for a specified period of time may be made for a period of no longer than two years and may only be extended once for another period that is not longer than 1 year.
13.	Types of work for which temporary work agency (TWA) employment is legal	In principle, temporary agency workers must not be used by employers to carry out their enterprises' main activities or activities that are directly related to production processes, except for auxiliary service activities or activities that are indirectly related to production processes. In practice, however, the limitation is so general that temporary agency workers are widely used in many different situations.
14.	Are there restrictions on the number of renewals and/or prolongations of TWA assignments? (f)	Temporary work agency workers are employed either on contracts of unlimited duration or fixed-term contracts. No limit for renewal of assignments.
15.	Maximum cumulated duration of TWA assignments (f)	Temporary work agency workers are employed either on contracts of unlimited duration or fixed-term contracts. No limit for assignments. But, in practice, long duration of subsequent fixed-term assignments increases the probability that contract workers successfully claim to become permanent employees of the user company.
16.	Does the set-up of a TWA require authorisation or reporting obligations?	Temporary work agencies shall take the form of a legal entity business with license from a government agency responsible for labour/ manpower affairs.
17.	Do regulations ensure equal	In principle yes but in practice this is rarely the case.

	treatment of regular workers and agency workers at the user firm?	Calculation (for EPL indicators): average of Yes and No.

C. Additional regulations for collective dismissals

No	Items	Descriptions
18.	Definition of collective dismissal (b)	There are no special regulations or additional costs for collective dismissals.
19.	Additional notification requirements in cases of collective dismissal (g)	There are no special regulations or additional costs for collective dismissals.
20.	Additional delays involved in cases of collective dismissal (h)	There are no special regulations or additional costs for collective dismissals.
21.	Other special costs to employers in case of collective dismissals (i)	There are no special regulations or additional costs for collective dismissals.

Source: OECD EPL Database

4. Conclusion

Labour market flexibility such as part-time jobs, temporary contract, outsourcing, labour hire and contracting out to have significant impacts on the labour market. Flexible labour arrangements, such as outsourcing, not simply a cost-cutting exercise, however, there is also an imperative need to strike a balance between economic responsiveness and employee protection (Autor, 2007). The device of strategies needs to take into consideration both the benefits of flexible arrangements and its implications on the labour market.

From the results of the study, there are three important points that are important and worthy of attention in labour market flexibility in Indonesia that is in need of innovation that is remuneration and conditions, information exchange, regulatory requirements for participation. A more flexible labour market needs to ensure that the ongoing structural transformation process does create quality jobs. The score from the Variable of Dependency on Professional Management Practice in Indonesia is also low, which means management in Indonesia has not professional yet. The scores for Indonesia's Capacity to retain or attract talented human resources are also low. Similarly, the female participation in the workforce is also still low. For current incentive systems in the labour market tend to discourage stable employment and career progression. There is the review from labour law provisions for short-term contracting, worker dismissal, severance payment and unemployment insurance in the light of the need to accelerate the skills formation and foster productivity gains. Over the long run, the role of government in the labour market is to formulate and enforce appropriate protective legislation, especially regarding worker safety, environmental protection, and prevention of abusive child labour practices and allow the labour union movement to develop in healthy and productive ways that allow labour to bargain on an equitable basis.

The studies of ILO having shown that there is a positive relationship between labour market policies and employment tenure that labour markets in Europe and Japan are quite stable, as indicated by the surprising resilience of long-term jobs, reflected in long average tenures and contributing to more productivity. Thus, the objective of the labour market policies and employment, should be to realize the right of every citizen to work or to (re-) integrate into the labour market, the right to a free choice of employment, as well as the right to decent conditions of work, and protection against unemployment and underemployment that will be the challenge for policymakers: To develop innovative policies that can better manage labour market changes from an economic and social point of view. The important point also

that labour market must have the flexibility to shift workers from one economic activity to other economic activity quickly and at low cost as well as to allow fluctuations in wages based on labour productivity without causing heavy social disruptions. Efficient labour market must also ensure strong and clear incentives for employees and promote meritocracy in workplaces. Together, these factors have positive effects on the employee's performance and the country's attractiveness to develop talents which are important elements in the growing labour market from time to time.

Acknowledgment

The study supported by IGA Grant 2017, University of Economics, Prague, Czech Republic.

References

Autor, D. H., Kerr, W. R. and Kugler, A. D. (2007). Does employment protection reduce productivity? Evidence from U.S. states. *The Economic Journal 117, F189–F217*.

Blanchard, O. and Landlier, A. (2002). The perverse effects of partial labour market reform: fixed duration contracts in France. *Economic Journal,* 112, pp.214-244.

Conley, H. (2008). *Work, employment and society: the nightmare of temporary work: a comment on Fevre.* London: Sage publications Ltd, vol 22.

Cooke, F. L., Shen, J., & Mcbride, A. (2005). Outsourcing HR as a competitive strategy? A literature Review and assessment of implications. *Human Resource Management, 44*(4), 413-432.

Eamets, R. and Paas, T. (2007). Labour Market Flexibility, Flexicurity, and Employment. Lessons of the Baltic States. Nova Science, New York, pp. 41-60.

Flau, F. and Mittelstadt, A. (2010). Labour market flexibility. OECD Economics and Statistics Department.
Giesecke, J., & Gross, M. (2004). External Labour Market Flexibility and Social Inequality. *Journal European Societies.* Volume 6, 2004 - Issue 3.

Gregg & Wadsworth, (2010). The UK labour market and the 2008-2009 recession. Centre for Economic Performance.

Hall. (2013). Outsourcing, contracting-out and labour hire: implications for human resource development in Australian organizations. [Online], [Retrieved May 31, 2017], http://www.voced.edu.au/content/ngv21101.
Howell, Chris. (2011). Regulating Labour: The State and Industrial Relations Reform in Postwar France. New Jersey: Princeton University Press.

Jones, G. (2013). The 2010 – 2035 Indonesian Population Projection Understanding the Causes, Consequences and Policy Options for Population and Development, United Nations Population Fund. Jakarta.

Kalleberg, A. L. (2003). Flexible firms and labour market segmentation: Effects of workplace restructuring on jobs and workers. *Work and Occupations*, 30(2): 154–75.

Kock, H., Wallo, A., Nilsson, B., & Hoglund, C. (2012). Outsourcing HR service: the role of human source intermediaries. *European Journal of Training Development, 36*(8), 772-790.

Leighton, P., (2003). Flexible labour markets, intermediation and the rise of the strategic individualist': challenges for law. Wales, UK.

Messina and Vallanti, (2007). Job flow dynamics and firing restrictions: Evidence from Europe. *Economic Journal 117, F279–F301.*

OCDE, (2013) b. Protecting Jobs, Enhancing Flexibility: A New Look at Employment Protection Legislation, *OECD Employment Outlook*, Chapter 2, OECD Publishing, Paris.

OECD. (2016). *OECD Economic Surveys Indonesia*. OECD Publishing, Paris.

Pagano, M. and Volpin, P. (2005) b. The political economy of corporate governance. *American Economic Review 95, 1005–1030.*

Rajeev, M. (2009). Globalisation and labour market flexibility: a study of contractual employment in India. *International Journal of Development Issues, 8(2), 168–183.doi:10.1108/14468950910997701*
Rowley, C. (2013). Issues in employee resourcing: is all labour flexibility good? London: Cass Business School.

Schuler, R.S. and Jackson, S.E. (2005). A quarter-century review of human resource management in the US: the growth in importance of the international perspective. *Management Review, vol. 16. (1).*
Simintzi, E., Vig, V. and Volpin, P. (2014). Labour protection and leverage. *Review of Financial Studies, forthcoming*.

Song, J., Drennan, J. C., & Andrews, L. M. (2012). Exploring regional differences in Chinese consumer acceptance of new mobile technology: A qualitative study. *Australasian Marketing Journal, 20(1), 80-88*.

Vicente-Lorente, J. D. and Suarez-Gonzalez, I. (2007). Ownership traits and downsizing behaviour: Evidence for the largest Spanish firms, 1990-1998. *Organization Studies, 28: 1613-1638.*

Wilton, N. (2013). An introduction to human resource management. Second edition. London: Sage publications

Yin, R. K. (2011). Qualitative research from start to finish. New York: Guilford.

Examining the Impact of Digital Media on Promoting Process in Small Businesses. Evidence from Romania

Cristina Petronela Simion, University Politehnica of Bucharest, Romania, cristinas_upb@yahoo.com

Gheorghe Militaru, University "Politehnica" of Bucharest, Romania, gheorghe.militaru@upb.ro

Mirona Popescu, University "Politehnica" of Bucharest, Romania, mirona.popescu15@gmail.com

Andrei Niculescu, University "Politehnica" of Bucharest, Romania, andrei@niculescu.com

Abstract

The boom of technology and the emergence of the Internet had led quite quickly to the existence of an online environment where people are spending more and more of their time. Smart devices allow them to access websites and social networks from anywhere at any time as long there's an internet connection. The purpose of this research was to explore the contribution of social media platforms to improve the marketing operations in small businesses. Thus, this study presents some of the results of a questionnaire-based research conducted in the first part of 2017, aiming to reveal the perspective of managers from small companies on adopting and utilizing e-marketing tools towards small businesses promoting process through sales and advertising activities. From the multitude of social media platforms, few are preferred by the companies to strengthen their online presence. Also, the article describes the latest Facebook features used to promote a product or a service on the market, especially for small companies. These findings aim to constitute as baseline for further investigation through research theories and practices for digital marketing development. Finally, limitations and future research directions are discussed.

Keywords: e-marketing, social media, online business, small businesses

Introduction

The appearance of Web 2.0 platform moved people from a position of passive users to active participants, and Web 2.0 enabled them to interact with other users and other businesses. Soon, social networks also appeared. *Myspace* opened this road, followed by *Facebook*. Malerba (2010) found that social networking sites such as *Facebook, Twitter, LinkedIn*, and *YouTube* represent a huge opportunity for services firms because these are more dynamic in exploiting opportunities using knowledge intensively. Hang (2014) observed that for many companies these social networks opened new doors and offered the opportunity to promote products and services in a new world. Web cookies became another informational source in the digital marketing industry, allowing data gathering on behaviour and browsing habits of internet users.

In 2015, the number of online searches over a mobile device exceeded the volume of desktop users, conforming to Google's current information cited by Today's. If people get the same access to information by using smart mobile devices instead of a home pc, then they tend to utilize more these portable devices that can be carried anywhere. In 2016 was estimated that 20% to 35% of all commercial orders were placed online using a smart mobile device. However, selling is just one side of the desired outcome, with the return of customers on same platform or website being just as important. In some cases, such as real estate or health care projects, it is very important to establish a contact with a customer through the contact form. Between 15 to 25% of contacts are made through a mobile device.

There are considerable gaps in our common understanding of the digital marketing and its role in small businesses development. The existing research has focused primarily on social media as e-marketing and advertising support for small businesses. This interaction has received relatively little research attention, creating a gap regarding this subject in specialized literature. The purpose of this study is to

systematically investigate how digital interactive media stimulates managers from small businesses to improve the bottom-line performance in real life, given the theoretical positive relation between the two into small businesses operations.

This article is proposing an analysis of online promotion platforms - especially *Facebook*, as being the most widespread social networking and describing the steps a small company should follow to promote its business in the online environment. This environment is used by most people because it is facile and easy to use anytime, anywhere by anyone who has a smart device with a valid Internet connection. More and more small companies adapted their websites by changing resolution and structure to be correctly displayed onto mobile device used by customers to access them. The questionnaire proposed in this paper has the role to establish the preferred channels adopted by small companies to reach their goals which mainly consists in the business prosperity on all levels.

The current paper will first provide a theoretical background and a brief discussion of the subject investigated in this study. Next, we present the research method employed in this study, followed by the analysis result and main findings. Finally, managerial implications, limitations, future directions and conclusions are discussed.

Theoretical background

In a world where more than 170 million people regularly use social networks, the success of a business consists in creating brand awareness in the online environment and promoting it through digital marketing by keeping up-to-date with developments in this domain. Nowadays, there are numerous researches in the field of digital marketing with the desire to find innovative ways to bring higher turnover and brand stability to the existing online market. This can be done by targeting consumers and meeting their requirements so that they do not just feel like a number but a real person.

The authors of this paper, Carvalhosa et al (2017) present a platform that enables them to analyse and optimize the information received from a municipality. They say that an organization can evolve by using tools for e-Government and techniques created especially for the digital marketing to satisfy the current customers and attract new ones. The process of adopting an optimum method is not an easy one and it presumes certain steps.

Semenov and his team of researchers (2017) outline how should the marketing activity of an enterprise be analysed in the context of digital marketing communications by using an algorithm. Its role is to increase the performance of an enterprise on all its levels from an economic point of view.

Stephen and Andrew (2016) study the consumer's behaviour in fields like social media. They defined five key points like the level of digital culture of a person, his / her reactions to digital advertising, how does this virtual environment affects a consumer, the transfer of information through word of mouth and the mobile environments. There are presented some directions that can be followed to improve customer's experience fold to their necessities and personality.

Signori et. al. (2016) reveal the outcomes of a study on the role of digital marketing for brand awareness in the online environment by creating a social impact with positive notes for the company's image. This study is realized by taking into consideration the activity of different actors, the construction of the ecosystem and the exchanges made between them. The innovative part is given by the new perspective of digital marketing that is different from the traditional one and it is concentrated on the social impact of present technologies.

In the case of online presence, it is important that the site has a well-optimized landing page, as stated by visitors who do not access it from the desktop.

In another article, Mooney (2016) presents an application that brings together the balance of business, the technology that should be adopted and the insight of user's needs. Their opinion must be taken in consideration always to satisfy their requirements and to ensure their loyalty.

The online environment has begun to be used to promote a business all over the world. This trend is due to the increase number of Internet users at a global scale and the advantages offered by this environment, which are mainly represented by the low costs and higher flexibility compared to other offline media means. At the same time, another advantage is the ease with which a company may reach its target audience using social media promotion channel.

An advertiser must consider three major aspects that can turn into benefits according to Nita (2010). First, the user's desired action is easy to accomplish, from accessing a form or viewing the contact data when navigating. Redundancy is not useful. Then, when it comes to online stores, the need for an account to place an order is not the most appropriate feature on mobile devices, because the waiting time and the steps that follow should be as short or as few as possible. Finally, the information needs to be well structured and easy to navigate on a small screen - like the most used by mobile devices. Images that occupy significant space are avoided, as is a video player that loads heavy content. To increase readability of a text, there can be used "Read more" buttons or choose a shorter one. The most important thing is the concise information.

According to a Google analysis, searches made on mobile by Internet users will exceed those made on the computer in 2017. It is an important moment for entrepreneurs who choose to make their online marketing strategy and determine for which device should prepare their website to make it more efficient at the target audience. The figure 1 will illustrate the percentage of the user's smart devices growing number.

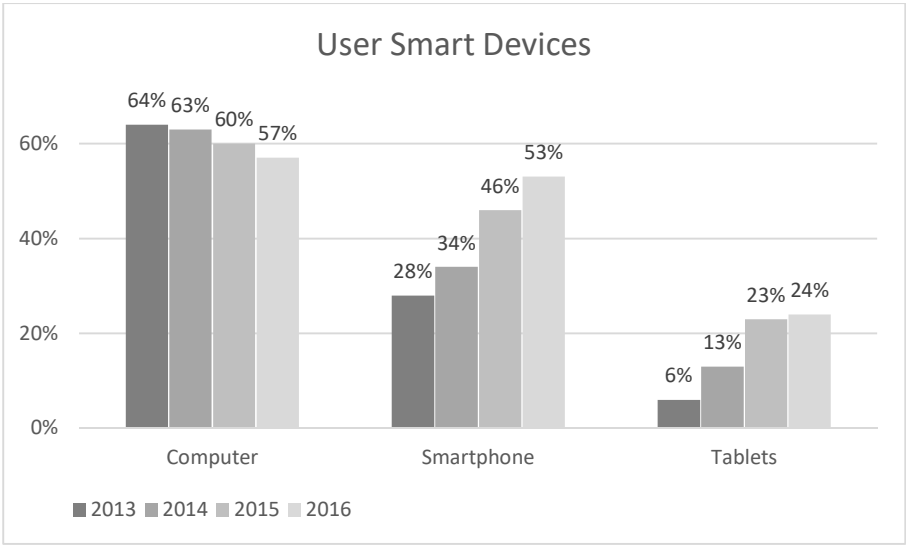


Fig.1 The increase usage of smart devices to access the Internet (source: adapted from L. Pârvu, newsletter, 13.10.2016, accessed 24 March 2017)

Facebook. This social network helps a company to interact with consumers by creating the opportunity to have a closer relationship with them. On Facebook, promotion campaigns can be run to engage consumers, and make a brand more and more valuable. Small markets can also be studied on Facebook. Consumers can be asked to indicate their sources of information for choosing the desired product. The promotion strategy can be adapted to their behaviour.

Twitter. This is another social network that helps to promote a business. Unlike Facebook, messages posted on Twitter must have other features. These should be as short as possible and may refer, among other things, to launching a new product, announcing the opening of a new store, announcing the winner of a competition organized by the company, announcement of winning a prize by the company at an advertising event, posting news related to the company's field of activity, posting links to direct fans to a clip in which a product or event organized by the company takes place, designing an exclusive campaign on this social network.

Blogs. Blogs are another important channel of promotion today. For example, a company operating on a certain market might be able to promote their products to blogs where products from the same area are being discussed. A company representative with a nickname may enter discussions with members of that community and try to direct their attention to the products of the company he represents. At the same time, those discussions remain posted on the blog and can be viewed by other people who are interested in buying that type of products. The major advantage of such discussions is that they show credibility to those who visualize them.

LinkedIn. Promoting on this network of professional profiles should not just be limited to creating employee profiles on LinkedIn, but also to enrol in professional groups related to the field in which the company operates. At the same time, employees must initiate and participate actively in the discussions that take place in those groups and try in a subtle way to promote the products or services offered by the company they represent.

Web directories and article directories. A method for better positioning your site in organic search results generated by Google's search engine is, among other things, enrolling in web directories and articles. Thus, a company's site will give credibility to Google's search engine, helping you in the long run to better rank in the organic results area.

Google AdWords. This program helps a company promote and sell the online store products they own. It is an effective way to get quick results by providing a competitive product offer, choosing relevant keywords for the company's products, and compiling persuasive ads that contain benefits and call-to-action messages. This will differentiate company's competitors and convince consumers to choose its products to the detriment of competitors. By using this program, a site may appear in the paid ad area on the right side of the Google search engine, on the first page of the results.

Regardless of size, the performance of an organization is directly related to the efficiency of its processes. Thus, the competitive advantage, as well as the strengthening of the market position, depends on the enterprise's effort regarding continuous improvement of business processes (Thakkar et al, 2008, Halley et al., 1997, Quayle, 2000). In this context, the use of digital technology generates major opportunities for SMEs facilitating product visibility and increasing attractiveness for new customers. Thus, according to the data collected by the National Institute of Statistics, SMEs in Romania often confront with problems in promotion process, due to lack of sufficient funds or lack of specialized personnel with specific knowledge of this domain.

Research methodology

To meet the research objectives, we developed a quantitative empirical study to investigate the impact of digital interactive media on the promoting process of small businesses. The methodology applied was a structured questionnaire and a procedure stratified sample with proportional allocation. The method used during the primary research is the survey and the tool – the questionnaire. We used a cross-sectional survey for data collection. A multi-item method was used to form the questionnaires.

Table 1: Composition of sample

Variable	Frequency	Percentage
Firm size (number of employees):		
Less than 9 employees	18	60
Between 9 and 20 employees	8	27
More than 20 employees	4	13
Firm age (number of years since foundation):		
Less than 3 years	16	53
Between 3 and 8 years	9	30
More than 8 years	5	17
Gender (respondents):		
Female	13	43
Male	17	57

The respondents of the pilot sample were 30 small companies from IT field. The authors intend to expand the research to other medium companies from all type of fields. The respondents were asked to indicate the extent to which they use the digital interactive media by social networking sites in promoting processes especially in small businesses. The respondents hold various job titles and have more than 2 years of experience with marketing activities. The response rate was 90 percent and resulted in 30 valid questionnaires (N=30). Among the valid respondents, 57 percent of the respondents were males and 43 percent of the respondents were women. Most of the small businesses have ranged from 1 to 15 years. The data were assessed for the extent of missing values. The missing values were completely at random and the means substitution method was used the replace them. The composition of the sample is presented in Table 1.

Analysis and results

As outlined in the present research, the top three social media channels that are preferred by small companies to be used for marketing promotion include Facebook - 79%, LinkedIn - 71% and Twitter - 60%. Detailed results are presented in Figure 2.

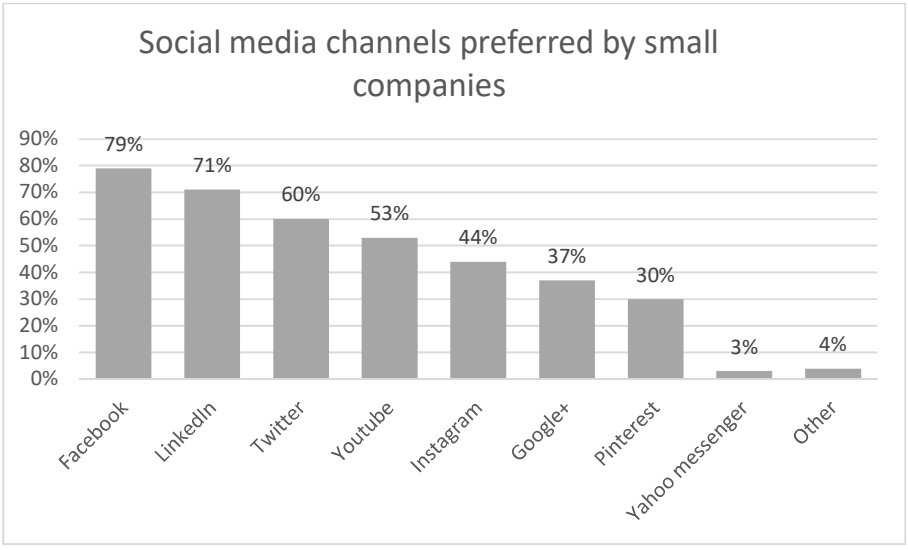


Fig. 2 Social media channels preferred by small business

The information disseminated by companies attribute in proportion of 82% to company's goods and services, 66% on general information about the company, and 58% about campaigns, promotions, direct or indirect sales. Job offers appear on social media to just 41% of companies

Whether of organic or paid usage, at some point a company will send users to their website and if it does not offer a great mobile experience, the company will lose them. In addition, images are slightly different on the mobile versus big screens of desktop computers, and a company should consider first the mobile users. Currently, there are two main ways to reach people on Facebook: *organic approach* - people simply see the posts on a page, and *promote* - pay for a particular post to be displayed to people. Although theoretically people can be reached and not pay (organic), this promotion method no longer works for 98% of business types. The 2% of businesses that can reach thousands or millions of people for free are those that have native viral content.

The key to effective Facebook use to promote business comes from customer understanding, how the platform works and testing the creative part. Facebook promotion can be displayed only to people who visited a certain site. Better yet, a company can show ads to people who have seen a certain page on the site. The outcomes of the questionnaire revealed that 83% of companies marketing departments concentrate their focus on building proper e-marketing campaigns and pages for their companies.

It is known that before a firm starts creating the campaign itself, it should define the target audience. Small businesses can use different tools to create the new audience, once the pixel is installed, can be done from Ad accounts and the All Tools section of the Audiences. Finding new customers can be done through the feature Lookalike Audience. More than 50% of companies queried by this research are using this option.

If a company has an e-commerce website for example, and it had collected hundreds or thousands of email addresses from customers so far, the department in charge of promoting the company can upload them to Facebook and Facebook will search for profiles associated with those email addresses. This way a greater number of people can be found, who resemble original customers in interests or behaviour. According to the present research a percentage of 64% of the questioned companies use this feature for the promoting process.

Similar to the way Lookalike Audience is created above, Facebook can be "asked" to find more people who resemble those who have seen specific pages on the company's site (service / goods page, for example). According to the study this is one of the best strategies deployed in the last year due to access to a large database. Facebook does a great job of identifying what they have in common with those who have bought from the company and thus can identify new potential customers.

Discussion and conclusions

Our exploratory study is a response to the demand for improvement in promoting process of small businesses and extends the stream of research to digital media. Small businesses must proactively develop their capabilities using IT to make their web presence more visible. Companies can use various systems to capture, store, analyse the data to extract value and generate market for their offerings. The findings confirm that digital media provide strong support for improving the business performance of small businesses.

One of the key insights provided by this study is how managers can use digital media in all stages of business process especially in promoting activities. Our findings indicate that some digital media contribute to faster time to market or faster to offering adoption on the market. Small businesses have been exploring the Internet for many years and, increasingly in last years, the social media for promotion. If, a few years ago, social networks, blogs, and microblogging services were jammed by marketing directors, largely because of the limited public and its lack of relevance for their business, the data now looks quite different.
Both the rank of the companies interested in advertising in this environment and the budgets spent on it has grown. The total amounts are no longer hundreds of millions of euros worldwide, as it was before

2008, but rather 4.26 billion euros this year, according to eMarketer Research Company, 70% above the level in 2010. Facebook is mainly responsible, however, for the impressive outlook and evolution of the market.

Digital mobility and connectivity are increasingly important in personal life, but also in business. Based on behaviours, we find that users carry over all mobile devices with them, check them frequently, and often use multiple mobile devices at the same time.

Digital media in business context for small companies is a key factor due to the increasing number of users who search a company on the internet and prefer to conduct their different actions and activities on the online environment by using a smart mobile device. Since business players are increasingly discovering the benefits for their own company through the use of digital marketing, this paper analyse the extent to which Romanian firms are moving in this direction and the proper tools for this target.

The main objective of the present paper consists in identifying the main channels preferred by small companies in Romania for online promotion. A future direction of this research is to extend beyond analysis of the current tools and gain actual insight of their perspective regarding the benefits of social media in performance improvement.

This study has several limitations, which can be addressed in future research. First, for each firm included in sample, a single respondent was the source of information. We suggest that the future research should use multiple sources of survey data. Second, our research is based on cross-sectional data. Furthermore, digital media tools adoption can be regarded as a dynamic process. Consequently, a longitudinal study may extend our research on mediating the effects of the relationship between digital media and promoting process. Thus, future research will be needed to investigate changes in patterns and factors. Digital media could have impact on the operating efficiency or quality provided by firms especially in service industry. We believe that this is a promising research area and our study offers an important first step in this direction.

Acknowledgement:

This work has been funded by University POLITEHNICA of Bucharest, through the "Excellence Research Grants" Program, UPB – GEX 2017. Identifier: UPB - GEX2017, Ctr. No. 94/25.09.2017 (IMkDiP_IMM).

References

Carvalhosa, P., Portela, F., Santos M.F., Abelha A. and Machado J. (2017). "Pervasiveness in Digital Marketing – A Global Overview". *Advances in Intelligent Systems and Computing*, vol 571, Springer, Cham.

Halley, A. and Guilhon, A. (1997). "Logistics behaviour of small enterprises: performance, strategy and definition", *International Journal of Physical Distribution and Logistics Management*, ISSN: 0960-003527, (8), 475-95.

Hang, H.L. (2014). "Performance effects of aligning service innovation and the strategic use of information technology", *Service Business* 8, 171-195.

Malerba, F (2010) Knowledge intensive entrepreneurship and innovation systems: Evidence from Europe. Abingdon: Routledge.

Mooney, M. and Slobodian, S. (2016). "Seeing the wood for the trees: Fixing large undefined problems in digital marketing", *Journal of Digital & Social Media Marketing*, 3(4), 294-303.

Quayle, M., (2000): "Supplier Development for UK Small and Medium-sized Enterprises". *Journal of Applied Management Studies*, ISSN 1360-0796, 9(1): 117-133.

Semenov, E. V., Budrina, I. K., Soldatov, A. G., Budrin, A. V., Soldatova and E. A. Eniushkina, E.A. (2017). "Factor analysis of the results of digital technology applications in the company's marketing activities", 2017 XX IEEE International Conference on Soft Computing and Measurements (SCM), 879-882, St. Petersburg, 2017

Signori, P. and Flint, D. J. (2016). "Digital marketing innovations and their role in service ecosystems, the exchange of value and social impact". Tiziana Russo-Spena and Cristina Mele, 259.

Stephen, A.T. (2016). "The role of digital and social media marketing in consumer behaviour". *Current Opinion in Psychology*, Vol.10, 17-21

Thakkar, J., Kanda, A., Deshmuckh, S., G., (2008). "Supply chain management in SMEs: development of constructs and propositions", published in *Asia Pacific Journal of Marketing and Logistics*, ISSN: 1355-5855, 20 (1), 97-131.

Kim, L., (2017), "5 Ridiculously Powerful Facebook Ad Targeting Strategies". [Online], The WordStream Blog. [Retrieved August 1, 2017], http://www.wordstream.com/blog/ws/2015/01/28/facebook-ad-targeting

National Institute of Statistics, Statistic Annual of Romania: The evolution of SMEs in Romania. [Online], [Retrieved August 10, 2017], http://www.insse.ro/cms/

Examining Students' Acceptance of Internet of Things Technology in Higher Education

Gheorghe Militaru, University Politehnica of Bucharest, Romania, gheorghe.militaru@upb.ro

Cristina Petronela Simion, University Politehnica of Bucharest, Romania, cristinas_upb@yahoo.com

Dana Deselnicu, University Politehnica of Bucharest, Romania, d_deselnicu@yahoo.com

Alexandra Ioanid, University Politehnica of Bucharest, Romania, alexandra.ioanid@upb.ro

Cristian Niculescu, University Politehnica of Bucharest, Romania, cristian@niculescu.ro

Abstract

The purpose of this study is to analyse students' acceptance of Internet of Thing (IoT) in higher education. Student performance is important in the evaluation the education quality in higher education institutions, but there is little research to explore the role of IoT services on teaching and learning processes. Previous research has demonstrated that IoT technology can promote online collaborative and interactive learning. This study is a cross sectional survey and it focuses on Romania. In spite of these findings, relatively little work has been conducted on whether IoT technology influence the higher education systems and students' academic performance. Thus, we explore students' attitudes towards the use of IoT tools in their learning or social activities, what kind of IoT tools the students prefer and if there is a significant difference in attitudes of students who are employed and who are not. We have used the regression analysis to investigate the acceptance of this technology in learning and teaching processes. Empirical data were collected through a survey of 86 students from University Politehnica of Bucharest, Romania. We used this analysis to test the proposed hypotheses. The findings reveal that student's perceptions about IoT services highlight the fact that there is a lack of regulation and privacy concerns. The analysis results indicate that IoT technology has significant positive effect on student performance. The students' acceptance of IoT technology in higher education depends on perceived usefulness and perceived ease of use. The results of this study support previous research and provide additional information about IoT services. The study is a cross sectional survey and it focuses on Romania. However, the results may be common to other countries and universities. These findings require further investigation in future research on theories, and practices for academic leadership development. Finally, limitations and future research directions are discussed.

Keywords: Internet of Thing, higher education, learning, teaching.

Introduction

The Internet of Things (IoT) or the Internet of Everything (IoE) brings together students, faculty members, data, teaching and learning processes, and smart, connected devices to create new dynamic capabilities and value by collaboration, interactivity, and cooperation. Education is one of many other areas of our lives that the IoT will transfer such as energy, transportation, homes, cities, and healthcare. Universities must become more flexible, agile in order to attract the best and brightest students in highly competitive education market. Kowatsch and Maass (2012) maintain that IoT offers many possibilities for research, teaching and learning and it plays a disruptive role in higher education. This technology can reduce the operating costs of universities and improve the ability to analyse big data regarding students' requirements. Thus, this technology is a catalyst that helps students develops the skills needed to successes in the education market.

Wessel and Christensen (2012) said that the internet is an infrastructure which provides the terminals for end users, while the IoT provides the interconnection of smart objects. Many students hadn't heard of the IoT and this situation may be a barrier to adoption of this technology in higher education institutions. According to Andersson and Matsson (2015) IoT adoption and usage has been analysed from the industry's point of view and it has obtained a lot of attention in healthcare, transportation, smart cities smart home and so on. However, except for the some studies, little is known about how students and faculty members accept this technology in higher education. Lack of awareness is a barrier to adoption for IoT devices. Education is an important factor to improve this situation.

This study purpose is twofold. First, we aim to analyse the influence of IoT usage in higher education. A students' performance is impacted by study, social habits, their passions, and effectiveness of teaching and learning processes. For example, professor can grade tests online and collect data on their students to better adapt the courses according to their capabilities and preferences. And, second, we study the antecedents which have an impact on student's acceptance and usage in higher education. And their possible mediating role in IoT services usage. Thus, this paper will provide new insights into the influence of each variable in the use of IoT services in higher education.

Next follows a literature review and hypotheses development. Then a section of this paper is dedicated to test our research model and hypotheses on data collected form respondents. Next, we present our research methodology, which is followed by our empirical analysis results. The paper concludes with a discussion of our findings, the theoretical and practical contribution of our study, and future research directions.

Theoretical background and hypotheses

This paper analyses the decision to adopt IoT services in higher education context. So, we must review research into adoption model and how smartphone, tablet and their collection of applications need to meet students' needs. Education can be improved significantly through access to better education materials and resources. Students' preferences and needs must be understood accurately. Teaching is not separate from learning because it will affect the way in which students learn. Teachers need to have a realistic understanding of student's capacity to learn to improve and accelerate the learning process because students vary in the level of abstraction that they can handle study time more effectively.

Universities have different devices such as vending machine, refrigerators, lab equipment, lighting systems, heating systems that can be connected to internet. Smart devices create opportunities for interaction, collaboration among students and professors and they can reduce operating cost by increasing energy efficiency by attaching smart sensors to monitor electricity use in university. Kuo, Walker, Schroder, and Belland (2014) said that limited interaction may affect students' satisfaction without the utilization of appropriate technologies in fully online learning settings. This approach is a fundamental change in the way teachers and students interact and how they meet new learning experiences.

The Technology Acceptance Model (TAM) is based on the Theory of Reasoned Action (TRA) and the Theory of Planned Behaviour (TPB). According of this model, attitudes may affect behaviour intention, which in turn has a high influence on the students' acceptance of IoT applications. Davis (1989) appreciates that perceived usefulness of IoT applications has positively influenced the behavioural intention to use. Davis, Bagozzi and Warshaw (1989) have developed the technology adoption, presented in Figure 1. The original TAM model developed by Davis defines perceived usefulness as the prospective student's subjective probability that using IoT applications will improve his or her academic performance in higher education. Davis (1993) thinks that perceived usefulness is a major determinant of use behaviour and intention. Trevino and Webster (1992) tested that users are willing to adopt new

technology is an antecedent to perceived ease of use. Also, perceived ease of use has been found to influence behavioural intention to use indirectly through perceived usefulness.

Davis defined the perceived usefulness as being the degree to an individual believes that using the system will help him/her attain gain in job performance. He also explained the degree of ease associated with the use of the system. Attitude toward using is the individual's positive or negative feeling about performing the target behaviour. Various studies have demonstrated how usefulness is directly related to attitude, as well as the intention of use.

The Internet of Thing refers to the possibility of smart objects to connect to the internet and to send and receive data. Smart sensors can easily be attached to every object to send its data wirelessly or via electric lines to a network hub. Bagheri and Naghighi (2015) thinks that this technologies offers different value propositions such as access to learning resources customise curricula, lower costs, personalised learning, enhanced safety and collaboration. Wessel and Christensen (2012) said that personalized learning process to enable students to determine the pace at which they learn. Student can view and lecture video presentations of their courses or other materials form wherever they are.

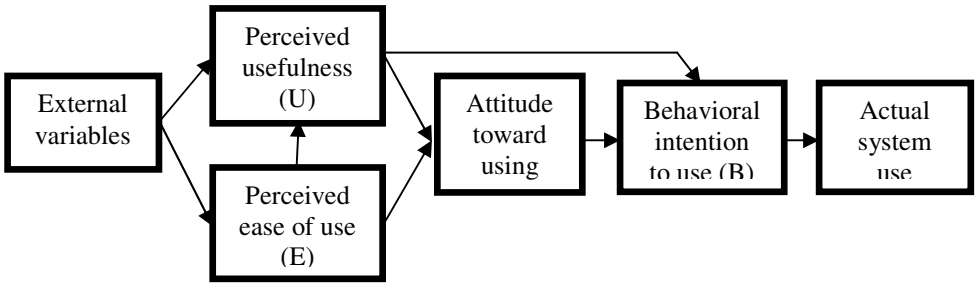


Fig.1. Technology acceptance model

The IoT hardware requires operating systems and communication protocols and the ability of smart connected objects to be identifiable, to communicate and to interact with each other or through a central control unit. Its architecture included different integration layers to combine and integrate information acquired from smart devices. A lot of students use laptops and mobile smart devices into their learning process. Advantage of mobile technology to meet students' needs by offering of tailored educational context. Wessel and Christensen (2012) said that predictive analytics can be used to attract most reputed and talented faculty members, eliminate errors through automated data acquisition or understand academic problems early and take corrective action. Our prediction is supported by previous research in which IoT based architectures can help students and explained how students become co-creators of knowledge, using the IoT services to capture more value of improved learning ecosystem. The technologies which universities use are increasingly cloud-based. These technologies make learning more engaging and relevant. As a result, we propose the following hypotheses:

Hypothesis 1*: Perceived usefulness will positively affect the intentions to use IoT applications in higher education*

Hypothesis 2*: Perceived ease of use will positively affect the intentions to use IoT applications in higher education*

Hypothesis 3*: Perceived ease of use will positively affect the perceived usefulness of IoT applications in higher education*

Hypothesis 4*: Students' attitude towards technology will positively affect the perceived usefulness of IoT applications in higher education*

Hypothesis 5*: Students' attitude towards technology will positively affect the perceived ease of use of IoT applications in higher education*

Hypothesis 6*: Perceived risk will positively affect the perceived usefulness of IoT applications in higher education*

Hypothesis 7*: Perceived risk will positively affect the perceived ease of use of IoT applications in higher education*

Hypothesis 8*: Perceived value will positively affect the perceived usefulness of IoT applications in higher education*

To reduce the variance caused by other factors, we controlled for the age and gender of respondents. Relationships among the constructs were empirically tested as follows. The conceptual framework is shown in Figure 2.

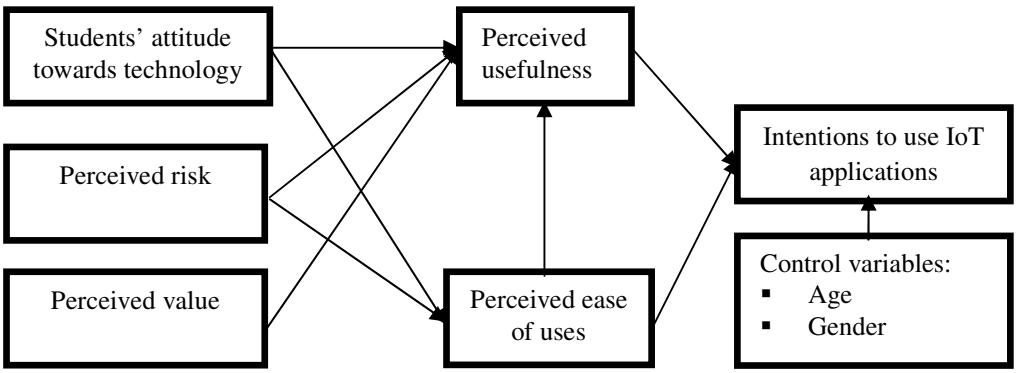


Fig.2. Proposed research model

Method

Research Design

In order to meet the research objectives and to test the proposed hypotheses, we developed a quantitative empirical study of the mediating effects of perceived ease of uses and perceived usefulness on the relationships between external variables and intention to use IoT applications. This study used cross-sectional survey data. The relationships proposed in the conceptual model were estimated through hierarchical regression analysis.

Data were collected from a sample of engineering students (86 students) were recruited from University Politehnica of Bucharest (UPB), during April 2017. This university is the largest and the oldest technical university in Romania. About 64 percent of the respondents were males and 36 percent of the respondents were fameless. The age of the respondents ranged from 22 to 25 (SD=1.86 years). The average age was

24.2 years. The response rate was 86 percent and resulted in 75 valid questionnaires (N=75). The data were assessed for the extent of missing values. The missing values were completely at random and the means substitution method was used the replace them. All of the items were also measured on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree).

Variable Measurement

When possible, construct measures were created based on previously validated survey instrument. In addition, individual measures were averaged to obtain a simple value for each construct. *Intention to use (IU)* (dependent variable) was developed by Venkatesh and Bala (2008) and adapted for this study and it was measured using 3 items: "I intend to use IoT services to improve my academic performance (IU1)"; "I think that IoT services would provide access to learning resources (IU2)"; "I would use the IoT services in the next few months (IU3)". *Perceived usefulness (PU)* developed by Pikkarainen et al. (2004) and adapted for this study and it was measured using 3 items: "I usually use smart devices into my learning process (PU1)"; "Using IoT technology could increase the efficiency of teaching process (PU2)"; "Using IoT technology could increase my collaboration with students and faculty members (PU3)". *Ease of use (EU)* was developed by Cabanillas et al. (2013) and adapted for this study and it was measured using 3 items: "Interaction with the IoT technology is clear and understandable (EU1)"; "I think it is easy to get IoT services in higher education institutions (EU2)"; "In general, the IoT services are easy to use (EU3)". *Perceived value (PV)* was measured using 2 items: "I like to use IoT services in teaching and learning processes because only in this way I can meet my needs and interests (PV1)"; "I believe that IoT services would be useful for accelerate the learning process (PV2)". *Perceived risk (PR)* was measured using 3 items adapted from (Benlian and Hess, 2011): "I believe the security of my data and applications are not guaranteed when using IoT services (PR1)", "The privacy in IoT services is not assured (PR2)", and "IoT services performance and reliability are not guaranteed (PR3)". *Students' attitude towards technology (STT)* was measured using 3 items: "I believe that technology enhances my learning experience (STT1)", "I look forward to that job that requires me to use IoT technology (STT2)" and "I believe that technology gives me the opportunity to acquire new knowledge and increase my satisfaction (STT3)".

Following previous studies, we controlled for respondent age and gender that were not of direct interest for testing our hypotheses but could be theoretically related to the intentions to use IoT applications and might provide reasonable alternative explanations for our findings. We expect that age has a greater impact on intentions to use IoT services because they have digital skills to use the IT tools. Student age was operationalized as the logarithm of the number of years in order to normalize the data. Gender, as dummy variable, was included to control for the specific impact on the intentions to use IoT applications in higher education. We coded male respondents as 0 and female as 1.

Analysis and results

We have tested all of the hypotheses together within a single model. All measurements of the constructs are based upon the respondent's perceptions. Because measures for the dependent and independent variables were taken from the same questionnaire, we performed Harman's one-factor test to see whether one factor accounted for the majority of variance in the data. Therefore, we entered all items used in the questionnaire into an unrotated exploratory factor analysis. The first factor accounted for 28.3 % of the variance. Since a single factor did not emerge and one-factor did not account for most of the variance, this suggested that common method bias was not a serious concern in our data set.

Table 1 presents the descriptive statistics, correlations for all variables used in this research and reliabilities among all variables. We can see that no bivariate correlation is greater than 0.8 and there is little threat of common methods in our data. The highest correlation coefficient is equal to 0.354. The correlation analysis shows that most coefficients are low (well under 0.4), which minimizes concern with multicollinearity issues in our analysis. Many indicators showed a significant positive correlation. Correlation greater than or equal to 0.248 are significant at $p<0.05$. Correlation greater than or equal to 0.312 are significantly at $p<0.01$.

Table 1: Descriptive statistics and reliabilities of the variables

Variables	M	SD	IU	PU	EU	PV	PR	STT	Gender
IU	5.83	1.27	(.809)						
PU	5.22	.87	.312**	(.906)					
EU	4.47	.54	.269*	.022	(.743)				
PV	6.78	.51	.003	.354**	.015	(.823)			
PR	4.87	.8	.260*	.318**	.262*	.031	(.895)		
STT	5.84	1.23	.248*	.321**	.175	.024	,151	(.783)	
Gender	.59	.49	.1	.065	.004	.123	.192	.048	-
Age	3.12	.09	.09	.224	.043	.061	.118	.181	.183

*Note: N=75; *p <0.05 correlation is significant at the 0.05 level (2-tailed); **p<0.01 correlation is significant at the 0.01 level (2-tailed)*

Data was analyzed with SPSS 20.0 software with maximum - likelihood estimation. Cronbach's alpha was used to determine the internal consistency of items in each scale. Statistical procedures were used to establish the reliability and validity of the measures with all items. We applied the Cronbach's alpha indicator to measure the scales' reliability. Reliability of the factors was measured using Cronbach's alpha for each construct and was found to be greater than the recommended minimum of 0.7 indicating high reliability (Hair et al. 1995). The Cronbach's alphas ranged between 0.906 (for perceived usefulness) and 0.743 (for perceived ease of use). Cronbach's alpha coefficients for internal consistency reliabilities appear in parentheses along the diagonal.

Hypothesis testing

The model was analysed using hierarchical linear regression with intentions to use IoT applications as the dependent variable. We have included in the model as control variables age in years and gender as male and female. The results are shown in Table 2. In Model 1 was included only control variables against intentions to use IoT applications, and no significance are shown. Model 2 examines perceived usefulness, perceived ease of uses, perceived value, perceived risk and students' attitude towards technology as the independent variables. The R Square is 0.411, that is, this model explaining 41.1% of the variance of dependent variable.

Table 2: Hierarchical multiple regression (dependent variable – IU)

Explanatory variables	**Model 1**		**Model 2**	
	β	t	β	t
Gender	.12	1.015	.094	.788
Age	-.116	-.985	-.103	-.846
Perceived usefulness (PU)	-		.56	3.244
Perceived ease of uses (EU)	-		.651	4.212
Perceived value (PV)	-		.089	.722
Perceived risk (PR)	-		.214	1.833
Students' attitude towards technology (STT)	-		-.97	3.236
R	.151		.411	
R Square	.023		.169	
Standard error of the estimate	1.27		1.22	
R Square Change	.023		.169	
F Change	.842		1.952	

The variables students' attitude towards technology and perceived ease of uses of IoT services has a key role in the explanation of intentions to use IoT applications in higher education. The most appropriate model that was found significant is 2. As predicted, we found that perceived usefulness of IoT services had a significant positive influence on the intentions to use IoT applications in higher education (β=0.56, $p<0.01$). The perceived ease of uses of IoT services had a significant effect on the intentions to use IoT applications in higher education (β=0.651, $p<0.01$). These results support Hypotheses 1 and 2. However, Hypothesis 3 was not supported because the coefficient for the interaction term was not significant and perceived value does not have a significant moderating effect. This result confirms that the IoT technology is not known in higher education institutions. Hypothesis 4 what it is refers to the influence of students' attitude towards technology on the perceived usefulness of IoT was supported (the correlation between these variables was .321, $p<0.01$). Hypothesis 5 was not supported because the correlation coefficient between these variables was not significant. Hypothesis 6 was not supported because the correlation coefficient (0.048) is not statistically significant. Hypothesis 7 was supported because the correlation coefficient is statistically significant (.262). Hypothesis 8 was supported because the correlation coefficient between these variables is statistically significant (.354).

Conclusion

The results of this study highlight the way in which the IoT services influence the intentions to use IoT applications and improve the students' performance. We found that the relationship between perceived value, perceived risk, and students' attitude towards technology on the intentions to use IoT services in higher education are mediating by effect of processes perceived usefulness and perceived ease of uses of IoT technology. The results highlight that perceived value and perceived usefulness was positively related to intentions to use IoT services in higher education.

The study presents a number of limitations, among which the perceptions of the students were surveyed and it would be helpful to examine the perceptions of the faculty members. Also, an interaction between students' perception and their cognitive learning strategy could influence the behavioural intention to use social media and digital computing devices in higher education institutions. In addition, the data in this study was collected by using a cross-sectional survey. A longitudinal design might be a good solution to

investigate the adoption and use of social media in higher education. Such future research should be based on more longitudinal methods to capture adoption's time dependency effect.

Finally, the sample size of this study was modest and the results need to be replicated and extended in both public and private universities with caution. As regards the sample, a larger sample would reduce the influence of random variation. Future research using larger samples should aim to examine the robustness of our findings, preferably by simultaneously testing them

Acknowledgement:

This work has been funded by University Politehnica of Bucharest, through the "Excellence Research Grants" Program, UPB – GEX 2017. Identifier: UPB- GEX2017, Ctr. No. 94/25.09.2017 (IMkDiP_IMM).

References

Andersson, P. and Mattsson, L. (2015). "Service innovations enabled by the internet of things". *IMP Journal*, 9(1), 85-106. DOI:10.1108/IMP-01-2015-0002

Bagheri, M. and Naghighi, M.S. (2015). "The effect of the Internet of Thing (IoT) on education business model", In: 12th International Conference on Signal-Image Technology & Internet-Based Systems (SITIS), IEEE Computer Society, 434-441

Benlian, A. and Hess, T. (2011). "Opportunities and risks of software-as-a-service: Findings from a survey of IT executives", Decision Support Systems, vol. 52, no.1: 232-246

Davis, F.D. (1993). "User acceptance of information technology: system characteristics, user perceptions, and behavioural impacts", *International Journal of Man-Machine Studies*, 38, 3, 475-487

Davis, F.D. (1989). "Perceived usefulness, perceived ease of use, and user acceptance of information technology". *Management and Information Systems*, 13, 3, 319-340

Davis, F.D., Bagozzi, R. and Warshaw, P. (1989). "User acceptance of computer technology: a comparison of two theoretical models". *Management Science*, 35, 982-1003

Hair, J.F., Anderson, R.E., Tatham, R.L., & William, C.B. (1995). *Multivariate data analysis with readings*. New Jersey, Prentice Hall, Inc.

Kowatsch, T. and Maass, W. (2012). "Critical privacy factors of internet of things services: an empirical investigation with domain experts". *MCIS* 2012, LNBIP 129, 200-211

Kuo, Y.C., Walker, A.E., Schroder, K.E.R. and Belland, B.R. (2014). "Interaction, Internet self-efficacy, and self-regulated learning as predictors of student satisfaction in online education courses". *The Internet and Higher Education*, 20, 35-50

Pikkarainen, T., Pikkarainen, K., Karjaluoto, H., & Pahnila, S. (2004). "Consumer acceptance of online banking: An extension of the technology acceptance model", *Internet Research*, 14(3), 224-235

Trevino, L.K. and Webster, J. (1992). "Flow in computer – mediated communication: electronic, electronic mail and voice evaluation". *Communication Resources*, 19(2), 539-573

Venkatesh, V. and Bala, H. (2008). "Technology acceptance model 3 and a research agenda on interventions". *Decision Sciences*, 39(2), 273-315

Vongsingthong, S. and Smanchat, S. (2014). "Internet of Things: A review of Applications and Technologies". *Suranaree Journal Of Science & Technology*, 21(4), 359-374

Wessel, M. and Christensen, C. (2012). "Surviving disruption". Harvard Business Review, December, 58-64

Data Collection for Smart Cities using Intelligent Sensors

Oldřich Horák, Institute of System Engineering and Informatics, Faculty of Economics and Administration, University of Pardubice, Czech Republic, oldrich.horak@upce.cz

Jan Linhart, Institute of System Engineering and Informatics, Faculty of Economics and Administration, University of Pardubice, Czech Republic, jan.linhart@student.upce.cz

Lukáš Petr, Department of Physics, Faculty of Science, University of Hradec Králové, Czech Republic, lukas.petr@uhk.cz

Abstract

This article describes the basic points of view on data collection in smart environments using intelligent sensors. The Smart Cities are used as the example environment for open the questions and tasks, some principles and techniques are described. In the conclusion, the next steps of future work in research on participating universities in this field are introduced.

Keywords: Smart Cities, IoT, intelligent sensors, smart systems

Introduction

Smart systems represent a new phenomenon of the current time. The one of the most developing area of this field is oriented on Smart Cities. The idea of smart or intelligent city brings many new questions and tasks for scientists, engineers, and designers. These questions should be answered and the tasks should be solved in very short time using the overall knowledge from many fields of physics, informatics or everyday life of people as the users and as the integral parts of such smart environment.

This article should open basic points of view on the smart environment, smart systems and intelligent sensors, and define the frame for the next research realized in cooperation of professionals of several participating departments of universities.

Smart Cities and Urban IoT

The definition of the "Smart City" term is not yet precisely specified, but there is a general notion of its meaning by Zanella et al (2014), Schaffers et al (2011), and Cuff et al (2008). It is a concept to make a better use of the public resources, increasing the quality of the services offered to the citizens, while reducing the operational costs of the public administrations. It specifies a new term “Urban IoT” that brings many benefits in the optimization and management of traditional public services, i.e. transport and parking, street lighting, surveillance and maintenance of public areas, etc. Different types of data, collected by a pervasive urban IoT, are available, that also stimulate the creation of new services upon those provided by the IoT.

Smart Structures

The "Smart Structures" are defined by the level of its sophistication as mentioned by Apurval et al (2017) based on first study by Rogers (1990). The relationship between these structures can be seen in the Fig. 1.

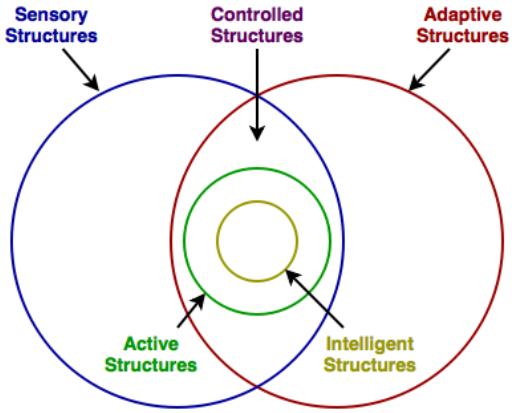


Fig. 1: Smart Structures relationship by Rogers (1990).

The brief descriptions of the levels with examples follow:

- **Sensory Structures** possess sensors that enable the determination or monitoring of system states or characteristics, i.e. temperature sensors.
- **Adaptive Structures** possess actuators that enable the alteration of system states or controlled manner, i.e. road signal switches.
- **Controlled Structures** result from the intersection of the sensory and the adaptive structures that possess both sensors and actuators integrated in the purpose of controlling the system states or characteristics, i.e. simple thermostatic controllers.
- **Active Structures** possess both sensors and actuators that are highly integrated into the structure and exhibit structural functionality in addition to control functionality, i.e. free parking places counters with front display showing the free places count.
- **Intelligent Structures** are basically active structures possessing highly integrated control logic and electronics that provides the cognitive element of distributed or hierarchic control architecture, i.e. intelligent city routing systems providing ability to find the route automatically.

Smart Materials

There are many of "Smart Materials" to be used as the base for sensor designs. The materials belong to one of two types, active or passive. While the passive material doesn't have an inherent capability to transduce energy, the active materials have an ability to modify their shape or some properties under the applied electric, thermal or magnetic fields, also they have an inherent capacity to transduce energy as described by Fairweather's thesis (1998). These materials, i.e., are used for sensor designs by Apurval et al (2017):

- **Optical fibers** – When the fibers are exposed to the influence of the strain, temperature, electrical and/or magnetic fields, pressure, and other conditions, the signal change (polarization, phase, intensity or frequency) can be measured.
- **Piezo-Electric materials** – When the material is in the influence of mechanical stress, it generates measurable electrical charge; when it is exposed to electrical field, its dimension changes can be measured.
- **Electro-Rheological (ER) fluids** – When the fluids are exposed to electrical field, its viscosity changes and can be measured.
- **Magnetostrictive materials** – When the material is in the influence of magnetic field, its dimension changes in relation to the process of internal magnetic domains structure modifications.

- **Shape Memory Alloys (SMAs)** – These alloys recover their normal shape under given condition, it means the deformations comes back to the original state.

Urban IoT

The Internet of Things technologies used to collect and provide data across the smart cities forms a new "Urban IoT" infrastructure. It should can integrate different technologies across the given communication lines to transfer data and commands. The typical design of that infrastructure by Zanella et al (2014) can be seen in the Fig. 2.

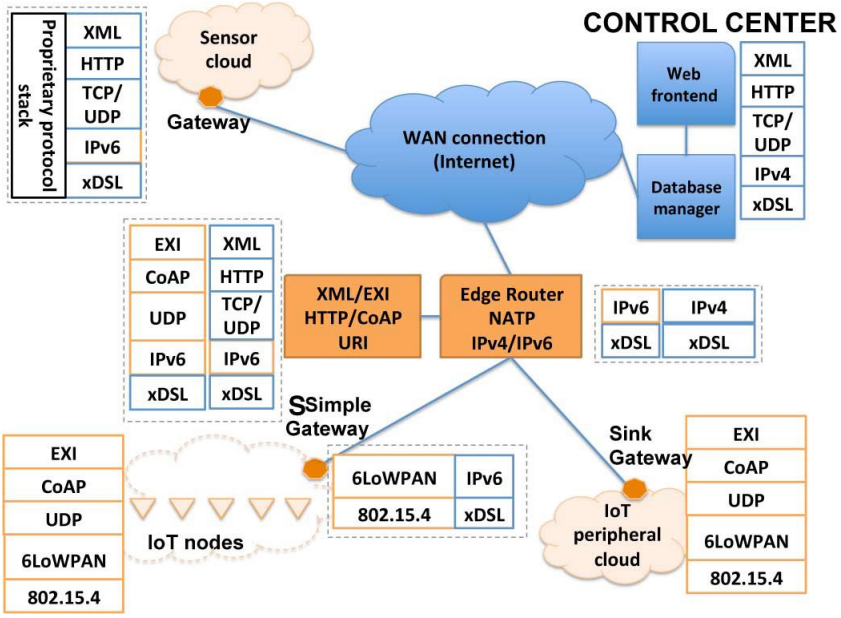


Fig. 2: Conceptual representation of an Urban IoT based on the web service approach by Zanella et al (2014).

The design of Urban IoT services requires to deploy a new protocol layers depending on the different sensor and communication technologies. The main effort is oriented on link layer of the simplified ISO/OSI model like four-layer TCP/IP stack. The higher layers of the network node stack correspond to the commonly used protocols and services, to be simply integrated in the given client's protocols and standards, typically web services.

Sensors and Communication

The technologies of data collection for Smart Cities opens wide field for using of intelligent sensors. In relation to Urban IoT design, there is important question how to collect the data and how to transfer the data from the sensor to the core of the system for evaluation and presentation to the citizens with minimal effort and minimal costs. It leads to using of simple and low consumption equipment forming the sensor itself, and the well-known and verified communication technologies and infrastructures to save the development costs.

Intelligent Sensors and Data Collection

Today, there are many different products on the market that provide the necessary service to be used as intelligent sensors. Typically, it consists of a microcontroller unit or simple microcontroller board with interfaces for analog sensing or digital communication with one or more sensors, and the sensors itself. This unit must communicate with the sensors as the first, and the other communication provides the data to the core of the system. The communication with the sensors depends on the sensor technology, in contrast with the communication with the system core that depends on the technology of the system elements interconnection.

Analog sensors need to be connected using A/D converter that typically comes as the part of used microcontroller unit. It is necessary to provide some procedures of measurements and function to convert the measured values to usable data. In this case, the intelligence of the sensors is given by the programming of the microcontroller unit.

Digital sensors contain their own basic intelligence providing the evaluation of the measured values into the form of digital data. In addition, they can be controlled by a microcontroller unit that can set an additional measurement parameters (scale, resolution, thresholds, etc.). When using the digital sensors, the designer doesn't need to know the details of the sensor physical technology well.

The data collection features depend on the requirements of the given system. The possible scenarios are these:

- **Periodical sensing** is used for the continuous collecting, when the system must provide short term or long-term progress description of the controlled feature.
- **Sensing on demand** provides the measurement depending on an event or an external request.

Connection in Smart Environment

In the smart environment, there is more types of connection that will be described separately. Today's trends and technologies brings a new look on the human interaction with the smart systems. This interaction can be described as a connection too, because it has very similar features to other connection types in the smart environment.

Connecting with People. This is the basic connection type that provides direct interaction with the system by administrators or common users in general. It is typically realized by Human Interface Devices (HIDs). The HIDs can have a form of common equipment or specialized application. Personal computers play main role used as HIDs, but their importance is diminishing. In opposite, the importance is higher with on the portable devices like tablets or smartphones. In the special environment of smart houses, there are smart human interfaces dedicated for this role, i.e. personal access system with biometric readers.

Connecting with Objects. The system should manage many elements, which are used as the execution objects. These objects also provide some information about their state as the feedback for the controlling system. The connection can have wired form, when the location of the object does not change, or can have wireless form, if the object changes its location often or the wired connection cannot be realized in relation to some limits.

Connecting Digital with Physical. A very special task is the realization of connection between physical sensor (typically measuring some non-electric physical quantity) and digital equipment that processes measured raw data and provides the connection to smart system, when playing the role of object (see previous paragraph). The bridging from physical to digital is typically the most demanding on designer efforts, although many converters are available on the market.

Conclusion and Future Work

The world of intelligent sensors is very diverse and miscellaneous, smart systems are developing very quickly now-a-days. The near future can bring these technologies in the everyday life of cities and their citizens.

The design of such systems needs to use cooperation of many technics and technologies with many intelligent structures and equipment. The next task for the designers and developers is to adapt used standards and customs, and specify new ones. This is the future work to hold the possible compatibility and flexibility of data collection, processing and evaluating in the smart environment.

Acknowledgment

This paper is supported by the Support of Development of Smart Cities and Regions project as the part of Student Grant Competition provided by University of Pardubice, Czech Republic.

References

Zanella, A., Bui, N., Castellani, A., Vangelista, L., and Zorzi, M. (2014) 'Internet of Things for Smart Cities,' *IEEE Internet of Things Journal*, 1 (1), 22–32

Schaffers, H., Komninos, N., Pallot, M., Trousse, B., Nilsson, M., and Oliveira, A. (2011) 'Smart cities and the future internet: Towards cooperation frameworks for open innovation,' *The Future Internet, Lect. Notes Comput. Sci.*, 6656, 431–446

Cuff, D., Hansen, M., and Kang, J. (2008) 'Urban sensing: Out of the woods,' *Commun. ACM*, 51 (3), 24–33

Apurva1, S., Tailor, S., and Rastogi, N. (2017) 'Smart Materials for Smart Cities and Sustainable Environment,' *Journal of Materials Science & Surface Engineering*, 5 (1), 520–523

Rogers, C. A. (1990) 'Intelligent Material, Systems and Structures,' *Proceedings of U.S. – Japan Workshop on Smart, Intelligent Materials and Systems*, 11–33

Fairweather, J. A. (1998) 'Designing with Active Materials: An Impedance Based Approach, Ph.D. Thesis, Rensselaer Polytechnic Institute, New York

Analysis of the Stability of Clustering Structures Based on the MCDM Methods

Roman Guliak, VŠB – TU Ostrava, Ostrava, Czech Republic; O. M. Beketov National University of Urban Economy in Kharkiv, Kharkiv, Ukraine. e-mail: roman.guliak@vsb.cz;

Abstract

The measurement of regional development and the clustering of regions are the problem of high importance, especially in the context of EU Regional policy. Properly defined a lagging cluster of regions is the main recipient of the Structural and Cohesion Funds. Traditional clustering methods fail to rank regions what makes these methods not applicable for the problem of recipients' determination. In the current measurement practice MCDM methods are considered to be a suitable ranking tool. Meanwhile MCDM methods are not meant to cluster the alternatives considering similarities between all alternatives within the cluster in terms of all criteria. The quasi-clustering can be done, which is based on the consideration of distances to the etalon established by MCDM methods. In this research the stability analysis has been suggested as a tool to validate the number of quasi-clusters, to identify the most stable structure and to define the most suitable MCDM method for the clustering. Two MCDM methods were chosen to measure the regional development, in particular VIKOR and Hellwig's. By the stability analysis the VIKOR method was defined as the most suitable for clustering. Clustering Stability analysis was applied for the 35 NUTS 2 regions from Visegrad group.

Keywords: regional development, MCDM, stability of clusters, Hellwig's, VIKOR

JEL Classification: C44, R15

Introduction

The measurement of regional development is the basic step for the realization of EU Regional policy with the subsequent distribution of Structural and Cohesion Funds. The last one requires the determination of lagging regions which is in current practice predominantly based on the GDP indicator. This indicator is not able to reflect properly the standards of living. Thus, it drives the search for the alternative ways of the lagging regions determination based on more essential indicators describing the regional development and well-being of the society.

In this paper we favor the application of Multi-Criteria Decision Making (further – MCDM) methods, but not traditional clustering ones. It is explained first of all because of the ranking power of the MCDM methods. Pure clusters, obtained by the traditional clustering methods, without knowing their aggregated level of development are of low interest in the context of EU Regional policy. Moreover in case of more than 5 criteria the interpretation of clusters is very challenging task. Due to this, the priority is given to the application of the MCDM methods able to conduct the multi-dimensional measurement of the regional level.

After the literature analysis we can sort out three groups of different approaches. The representatives from the first group (Snieška, Bruneckienė, 2009; Huggins, Thompson, 2010; Annoni, Dijsktra, 2013; Gábor, Ottaviano, 2015) prefer the simple linear way of criteria aggregation coming mostly from American school based on the multi-attribute value functions and multi-attribute utility theory (MAUT) (Keeney, Raiffa, 1976). The second group (Oliva, Miguel, 2005; Fernandez, Navarro, 2013, Guliak[b], 2017) is concentrated on the application of methods from outranking family. The most widely used methods are ELECTRE and PROMETHEE (Roy, 1968; Brans et al., 1984). Another principally different approach (Ramík, Hančlová, 2012; Charles, Zegarra, 2014; Guliak[a], 2017) originates from the Data Envelopment Analysis (DEA) – nonparametric method introduced by

Charnes, Cooper, and Rhodes (1978). The key concept of this approach is the technical efficiency being calculated following the input-output criteria division.

All listed MCDM methods are targeted on the ranking problem. However, there is another not less important clustering problem making a regional measurement complete. Having observed such a wide variety of MCDM methods applied, the question arises whether final utility values produced by the certain MCDM method are able to reflect in the best way the true clustering structure of the alternatives being evaluated. To the extent of our knowledge in the economic and management literature there is no research shedding the light on this question. Therefore the aim of this paper is to suggest the approach to the stability analysis of clustering structures produced by different MCDM. This analysis will provide the decision maker with the knowledge which MCDM method solves better the clustering task.

The remaining part of the paper is organized as follows. Section 2 describes the MCDM methods applied for the measurement of regional development. The following section presents the stability approach to the analysis of clustering structures. Section 4 presents the results of the application of MCDM methods. The last section gives the conclusions.

MCDM Methods Applied

Below we describe two selected MCDM methods, namely Hellwig's and VIKOR. Both of them are related to the distant based methods, with the same methodological basis steamed from Multi-Attribute Utility Value Theory (MAVT). Their utility functions measure the distance to the artificially created ideal point (etalon).

The mentioned methods are based on the distance function but differentiate in the dealing with the ideal point. The Hellwig's method measures the difference to the positive ideal point, while compromise VIKOR method pays attention to the mutual concession between a maximum utility of the majority and a minimum individual regret of the opponent. In other words, the VIKOR method considering just "closeness" to the positive ideal solution is influenced by the minimum of individual regret and suitable for the decision makers aimed at the maximum profit and risk avoidance. Meantime applying the Hellwig's method a decision-maker will prefer profit maximization following risk loving strategy.

Let us suppose that MCDM problem can be described by *m* alternatives $(A_1, A_2, ..., A_m)$ presenting the NUTS 2 regions and *n* criteria $(C_1, C_2, ..., C_n)$ characterizing the performance of the regions. Performance matrix $X = [x_{ij}]_{m \times n}$ shows all values assigned to the alternatives relating to an each criterion. The weights of criteria have been denoted by $W = [w_1, w_2, ..., w_n]$ under the condition of $\sum_{j=1}^{n} w_j = 1$.

The Helwig's method, named after Polish scholar, is aimed at the measurement of the degree of regional development and detecting homogenous groups (Harman, H.H., 1976; Hellwig, Z., 1968; Pluta W., 1977). The steps of introduced method are following.

Step 1: form an initial matrix of data and to normalize it:

$$Z_{ij} = (x_{ij} - \bar{x}_j) / S_j, \tag{1}$$

Step 2: determine an etalon E_o $(Z_{01} \ldots Z_{0n})$ in accord to the min-max criterion;

Step 3: calculate the distances from the etalon:

$$c_{io} = \left[\sum_{j=1}^{n} (z_{ij} - z_{oj})^2 \right]^{1/2}, \tag{2}$$

Step 4: calculate the upper limits C_o (critical distance) of the options using:

$$c_0 = \bar{c}_0 + 2S_0, \tag{3}$$

$$\bar{c}_0 = \frac{1}{m}\sum_{i=1}^{m} c_{i0}, \tag{4}$$

$$S_o = \left[\frac{1}{m}\sum_{i=1}^{m}(c_{io} - \bar{c}_o)^2\right]^{\frac{1}{2}}. \tag{5}$$

Step 5: to calculate the development score (d_i) of the options using:

$$d_i = 1 - \frac{c_{i0}}{c_0}. \tag{6}$$

where: x_{ij} – j^{th} attribute of the ith region, $i = 1,2, \ldots, m$ (number of regions);
$j = 1, 2, \ldots, n$ (number of attributes);
z_{oj} – normalized coordinate of the etalon;
Z_{ik} – normalized value of kth variable in the ith region;
S_o – standard deviation of the distances.

The VIKOR (VlseKriterijumska Optimizacija I Kompromisno Resenje) method is a compromise ranking method developed by Opricovic (1998). Its role is to find multi- criteria raking index based on particular measure of closeness to the ideal solution, providing a maximum group utility of the majority and a minimum of the individual regret of the opponent (Opricovic, Tzeng, 2004). The mathematical procedure of VIKOR has the four main steps.

Step 1: to determine the best (desired) f_j^*, and the worst (tolerable) f_j^- values of all criterion functions:

$$f_j^* = \left\{(\max_i \; f_{ij} \,\middle|\, j \in C^{benefit}), (\min_i \; f_{ij} \,\middle|\, j \in C^{cost})\right\} = \left\{f_j^* \,\middle|\, j = 1,2,...,n\right\} \tag{7}$$

$$f_j^- = \left\{(\min_i \; f_{ij} \,\middle|\, j \in C^{benefit}), (\max_i \; f_{ij} \,\middle|\, j \in C^{cost})\right\} = \left\{f_j^- \,\middle|\, j = 1,2,...,n\right\} \tag{8}$$

Step 2: to calculate the maximum utility of the majority (min S_i) and a minimum individual regret of the opponent (min R_i) from the L_p - metric:

$$L_{p,i} = \left\{\sum_{j=1}^{n}\left[w_j(f_j^* - f_{ij})/(f_j^* - f_j^-)\right]^p\right\}^{1/p}, \tag{9}$$

$$1 \le p \le \infty,\ i = 1,2,...,m,$$

$$S_i = \sum_{j=1}^{n} w_j(f_j^* - f_{ij})/(f_j^* - f_j^-), i = 1,2,...,m \tag{10}$$

$$R_i = \max_j[w_j(f_j^* - f_{ij})/(f_j^* - f_j^-)], i = 1,2,...,m. \tag{11}$$

Both S_i and R_i are measured from 0 to 1, when 0 means that it reached the best level.
Step 3: to compute the best and the worst values:

$$S^* = \min S_i,\ S^- = \max S_i, i = 1,2,...,m$$

$$R^* = \min R_i,\ R^- = \max R_i, i = 1,2,...,m.$$

Step 4: to determine the value Q_i representing the compromise solution, integrated by the maximum utility of the majority (S_i) and minimum individual regret of the opponent (R_i) as the base for an agreement established by mutual concessions:

$$Q_i = v\left[\frac{S_i - S^*}{S^- - S^*}\right] + (1-v)\left[\frac{R_i - R^*}{R^- - R^*}\right], i = 1,2,...,m. \tag{12}$$

where v is the balance parameter following the strategy of maximum group utility (if v >0.5) or the strategy supporting negative individual regret (v <0.5). In this research the equal importance is given to the both strategies and v =0.5.

All the presented methods deal with the external weights, which in the current research are calculated by objective Entropy method (Zanakis et al., 1998).

Approach to stability analysis of clustering structures

To start the discussion about clustering based on MCDM methods, one should mention that while MCDM methods construct an ideal point or etalon from the alternatives' attributes expressed in the best way, the clustering methods have nothing to do with that. On the contrary they pay maximum attention to the attributes of each alternative and measure the distance between alternatives to find the similarities for the cluster identification. MCDM methods in turn measure the distance to the purely etalon producing the corresponding vector of final scores. It means that MCDM do not pay explicitly (considering each attribute separately) attention to the neighbours with respect to the distance to them. The distance between neighbours is accounted indirectly by means of the distances to the etalon. Such way of similarities measurement can be called as quasi-clustering, what per se has the rights to exist and requires some additional analysis suggested below.

Let us define the main characteristics of the suggested stability analysis:
– firstly, it is based on the one input variable (utility value), presenting the distance to the etalon;
– secondly, the way how clusters are defined is the hierarchical agglomerative one, because all clusters consist of mergers of previously formed clusters and the clustering process begins with as many clusters as there are alternatives and ends with a single cluster;
– thirdly, to measure the similarities between alternatives we use the single linkage method or "neighbor joining" calculating the differences between utility values.
For example, an *i*-th alternative is declared to be closer (more similar) to *j*-th than to observation *k*-th if $D(i; j) < D(i;k)$. The linkage method has been chosen because relying on the vector of ranked utility values it will easy deal with non-elliptical shapes of clusters, will be sensitive to outliers and will produce elongated clusters (not spherical).

Therefore, considering the sets of alternatives $A = \{a_i | i = \overline{1,n}\}$, clusters $C = \{c_k | k = \overline{1,f}\}$, $f \le n$ and MCDM methods $M = \{m_p | p = \overline{1,l}\}$, the task for the clusterization is to find the optimal number of clusters $k_p^z \le n$ at the *z*-th step related to the *p*-th MCDM method. The algorithm of controlled merging process is the following:

1. Initialization. To start by assigning each item to each own cluster so as $k = n$.
2. Iteration. If $d(i + j, k) < d_z$ merge two clusters, which are the most similar until n=1.
3. Selection. To choose the most appropriate MCDM method (M*) for the clustering, defined at *z*-th step by the *p*-th MCDM method such as $m^* = \{ S_z^p \to \min \}$.

where d_z^* – is the minimal univariate discretion value or minimal similarity threshold at the *z*-th step measured as:

$$d_z = \frac{z}{n-1}; \tag{13}$$

S_z^p – in-Stability index related to *z* clusters and to the *p*-th method:

$$S_z^p = d_z^* \times \frac{k_z^p}{n} \text{ or} \tag{14}$$

$$S_z^p, \% = \frac{\max S_z^p - \min S_h^p}{\min S_h^p} \times 100\%. \tag{15}$$

k_z^p – is the number of clusters extracted at the the *z*-th step by the *p*-th MCDM method;

z, h – steps of clustering with corresponding minimal univariate discretion values d_z, d_h.

The described algorithm is based on the assumption that each region represents its own cluster if utility values are uniformly distributed. In this case there are no more or less similar alternatives merging into a cluster. As a result according to the algorithm we define the minimal in-stability index

representing the clustering structure with the strongest similarities within and the strongest dissimilarities between clusters. Such a structure is considered to be the most representative and points out at the p-th MCDM method as the most appropriate for the clustering.

Measurement of Regional Development within the Visegrad Group

The initial 9 essential indicators describing the economic, social and innovative aspects (table 1) are used for the measurement of performance of 35 NUTS 2 regions from Visegrad group. The entire indicators are benefit ones apart the UN, which is the cost one.

Table 1: Indicators describing the performance of regions from Visegrad group, 2013 year

#	Abbrev.	Indicators
1	*DI*	Disposable Income (net) of households by NUTS 2 regions, in purchasing power standard based on final consumption per inhabitant, PPS/inhab.
2	*ER*	Employment Rates by sex, age (from 15 to 64 years) and NUTS 2 regions, %.
3	*TE*	Tertiary Education (levels 5-8), %.
4	*UN*	Total Unemployment (%), %.
5	*PROD*	Regional productivity measured as the ratio between Gross Value Added at basic prices and the number of the persons employed, euro/pers.
6	*GFC*	Gross Fixed Capital formation by NUTS 2 regions, euro/per.
7	*TRD*	Total intramural R&D expenditure (GERD) by sectors of performance and NUTS 2 regions (Percentage of gross domestic product (GDP), %.
8	*JVR*	Job Vacancy Rate activities (except activities of households as employers and as own use producers; activities of extra-territorial organizations and bodies), %.
9	*BRD*	Total intramural R&D expenditure by business enterprise sector, %.

Source: Eurostat base available from: http://ec.europa.eu/eurostat

We have checked the suitability of the data sample by using the Kaiser-Meyer-Olkin indicator and Bartlett's test. The statistics from table 2 show that the selected indicators are suitable (KMO for all groups > 0.6; Sig. for all groups < 0.05) for the further aggregation by MCDM methods to obtain the level of regional development.

Table 2: KMO and Bartlett's Test

Indicator / Groups		
Kaiser-Meyer-Olkin Measure of sampl. adeq.		.692
Bartlett's Test of Sphericity	Approx. Chi-Square	290.163
	df	36
	Sig.	.000

Source: author

Utility values obtained by the MCDM methods (formulae 1-12) are presented in table 3 in the light of 4 countries and two MCDM methods.

Table 3: Utility values of the NUTS 2 regions

Region	Hellwig's	VIKOR	Region	Hellwig's	VIKOR
1. Czech Republic			3. Poland		
CZ01	0,4132	0,090	PL21	0,6636	0,525
CZ02	0,5452	0,614	PL22	0,6630	0,540
CZ03	0,6253	0,653	PL31	0,8519	0,825
CZ04	0,8189	0,844	PL32	0,6919	0,795
CZ05	0,6203	0,655	PL33	0,8990	0,957

CZ06	0,5422	0,508	PL34	0,8893	0,939
CZ07	0,6942	0,747	PL41	0,7277	0,585
CZ08	0,7072	0,748	PL42	0,8580	0,828
2. Hungary			PL43	0,8979	0,939
HU1	0,4017	0,113	PL51	0,7116	0,589
HU21	0,6883	0,783	PL52	0,9065	0,956
HU22	0,7492	0,799	PL61	0,8577	0,820
HU23	0,8148	0,898	PL62	0,8957	0,927
HU31	0,7961	0,927	PL63	0,7212	0,666
HU32	0,7038	0,823	4. Slovakia		
HU33	0,7303	0,834	SK01	0,5712	0,475
3. Poland			SK02	0,8091	0,774
PL11	0,7845	0,663	SK03	0,8314	0,836
PL12	0,4444	0,137	SK04	0,8446	0,844

Source: author

From table 3 we have derived the correlation between the GDP criterion and utility values generated by the MCDM methods. Based on the correlation from table 4 we can state that MCDM methods produce quite similar utility values as the correlation between them is 0.91. Besides, one should notice, that despite the fact of the methods similarity, VIKOR method correlates better with GDP criteria. Nevertheless, the difference between GDP and utility values is quite essential, as the correlation is less than 0.76.

Table 4: Utility values of the NUTS 2 regions

	GDP	*Hellwig's*	*VIKOR*
GDP	1		
Hellwig's	0,695	1	
VIKOR	0,763	0,911	1

Source: author

After the preliminary statistical analysis the stability algorithm is implemented to utility values according to the formulae 13-15. As a result all stability statistics describing the clustering process are gathered in table 5. According to the selection step from the algorithm the minimal instability index is being chosen. The minimum 0 % of instability is identified on several steps and within both methods. The most interesting however is that clustering structure which has the minimal instability with the largest number of clusters. Thus, we are inclined to choose the 3 clusters structure produced by the VIKOR method at the 2-nd step of stability analysis.

Table 5: Stability statistics

Criteria		Steps of stability analysis											
		1	2	3	4	5	6	7	8	9	10	11	12
Hellwig's method	n of clusters	20	14	9	5	-	-	-	-	-	-	-	-
	discretion value	0,03	0,06	0,09	0,12	-	-	-	-	-	-	-	-
	Instab., %	75	0	50	0	-	-	-	-	-	-	-	-
VIKOR method	n of clusters	7	3	2	2	2	2	2	2	2	2	2	1
	discretion value	0,03	0,06	0,09	0,12	0,15	0,176	0,206	0,235	0,265	0,294	0,324	0,353
	Instab.,%	17	0	0	33	67	100	133	167	200	233	267	100

Source: author

The transformation of clusters can be presented at the tree-like diagram (dendogram) recording the sequences of merges or splits at a certain step with the corresponding distance represented by the discretion value. In the dendogram (table 6), the rows are associated with the items and the columns are associated with levels (steps) of clustering, allowed by the controlled merging process.

Table 6: Dendogram based on the VIKOR method

Regions	Value score	Steps of analysis / # clusters											
		1/7	2/3	3/2	4/2	5/2	6/2	7/2	8/2	9/2	10/2	11/2	12/1
22	0,957												
28	0,956												
26	0,939												
23	0,939												
13	0,927												
30	0,927												
12	0,898												
4	0,844												
35	0,844												
34	0,836												
15	0,834												
25	0,828												
20	0,825												
14	0,823												
29	0,820												
11	0,799												
21	0,795												
10	0,783												
33	0,774												
8	0,748												
7	0,747												
31	0,666												
16	0,663												
5	0,655												
3	0,653												
2	0,614												
27	0,589												
24	0,585												
19	0,540												
18	0,525												
6	0,508												
32	0,475												
17	0,137												
9	0,113												
1	0,090												

Source: author

Having applied stability analysis to the utility values, we obtained the dendogram showing clustering structures at different steps. From the dendograms we can visually decide about the clusters' durability attributed to the method with long-lasting clusters. From table 6 we can observe that the most durable VIKOR based structure includes 2 clusters and lasts for 9 steps. Compare to all other

clustering structures originated from Hellwig's method, this is the most stable and has the in-stabilty index 0 %. This structure has the most similarities within and dissimilarities between clusters.

However, the priority can be given to another as well 0 % instable structure including 3 clusters. The final decision, in case when instability indices are equal, depends on the interpretability of the clusters and the problem specificities. Any way, one solid decision is made about VIKOR's appropriateness for the clustering problem. The VIKOR method is considered as the most suitable for the clustering due to its high clusters durability lasting 12 steps and the lowest instability index.

Conclusions

The MCDM methods were incorporated into the clustering problem and used as the distance measurement foundation. Measuring the distance to the etalon MCDM methods are able to provide just quasi-clustering, because the similarities between alternatives are not measured directly. Nevertheless quasi-clustering appears to be advantageous especially when all alternatives have to be ranked and there are many (more than 3) criteria essentially complicating the interpretation of clusters extracted by the traditional clustering methods.

To choose the most appropriate clustering structure and the MCDM method for this purpose is the important task especially in the context of EU Regional policy. The amount of Structural and Cohesion funds assigned to the lagging regions depends on the clustering and ranking results. Different MCDM methods would produce different distribution of utility values making the impact on the way how the alternatives are clustered. The algorithm for the stability analysis has been suggested to select the most appropriate MCDM method for the clustering problem.

The main idea of the suggested stability analysis is to control the merging process by the calibrating the uniform discretion value at each step. The uniform discretion value works as the benchmark for the similarity measurement. The minimal degree of clusters instability is a key indicator for the clusters validation and the method selection.

After all, according to the instability index we have selected VIKOR method as the most suitable for the clusters identification. Correspondingly the 3 clusters structure produced by this method is characterized by the highest similarities within cluster and highest dissimilarities between clusters.

Acknowledgements

This article has been funded by Student Grant Competition project SGS SP 2017/125 of Faculty of Economics, VŠB-Technical University of Ostrava.

References

1 Annoni P., Dijsktra L. (2013). *EU Regional competitiveness Index RCI 2013*, European Commission, Brussels.

2 Brans, J.P., Mareschal, B. and Vincke, Ph. (1984). Promethee: A new family of outranking methods in multicriteria analysis. In: J.P. Brans (ed.): *Operational Research*, 84, Elsevier Science Publishers B.V. (North-Holland), pp. 408–421.

3 Charles, V. and Zegarra, F. (2014). Measuring regional competitiveness through Data Envelopment Analysis: A Peruvian case. *Expert Systems with Applications*, 41, pp. 5371-5381.

4 Charnes A., Cooper, W. W. Rhodes, E. (1978). *Measuring the efficiency of decision making units*. European Journal of Operational Research, Vol. 2, No. 4, pp. 429–444. DOI: 10.1016/0377-2217(78)90138-8

5 Fernandez, E., Navarro, J., et al (2013). *Core: A decision support system for regional competitiveness analysis based on multi-criteria sorting*. Decision support systems 54 (3), pp. 1417-1426. DOI: 10.1016/j.dss.2012.12.009

6 Gábor B., and Ottaviano G. (2015). *Micro-founded measurement of regional competitiveness in Europe*. Mimeo, CERS-HAS

7 Guliak[a], R. (2017). *New Resonance Approach to Competitiveness Interventions in Lagging Regions: The case of Ukraine before the armed conflict.* Review of Economic Perspectives, Czech Republic, Issue 1, p. 25-56.
8 Guliak[b], R. (2017). *Two-factor outranking approach to MCDM methods for the lagging regions determination*. 12th International Conference on Strategic Management and its Support by Information Systems 2017, Czech Republic, Ostrava, May 25th - 26th, 2017.
9 Harman, H.H. (1976). *Modern factor analysis*. The University of Chicago Press, Chicago. 423 p.
10 Hellwig, Z. (1968). "*Usage of taxonomic methods for the typological divisions countries*", Stat Overview, Vol. 15, No. 4, pp. 307–327.
11 Hugins, R. and Thompson, P. (2010). *UK Competitiveness INDEX 2010*. Cardiff: Centre for International Competitiveness.
12 Keeney, R. L. and Raiffa, H. (1976). Decision with multiple objectives: Preferences and value tradeoffs. New York: John Wiley & Sons.
13 Oliva, M., Miguel , M. (2005). *Objective Competitiveness Ranking amongst EU Regions (Objective Method for Quantifying Regional Competitiveness – a case study applied to EU15 Regions)*. 45th Congress of the European Regional Science Association.
14 Opricovic, S. (1998). *Multi-Criteria Optimization of Civil Engineering Systems*. Faculty of Civil Engineering, Belgrade.
15 Opricovic, S., Tzeng, G.H. (2004). *Compromise solution by MCDM methods: a comparative analysis of VIKOR and TOPSIS*. European Journal of Operational Research, 156 (2), pp. 445–455.
16 Pluta W. (1977). *Multidimensional Comparative Analysis in economic research*. National Economic Publishing House, Warsaw.
17 Ramík, J., and Hančlová, J. (2012). *Multicriteria methods for evaluating competitiveness of regions in V4 countries*. Multiple Criteria Decision Making 12. Katowice: The Karol Adamiecki University of Economics.
18 Roy, B. (1968). Classement et choix en présence de points de vue multiples (la méthode ELECTRE). *Revue Française d'Informatique et de Recherche Opérationnelle,* 8, pp. 57–75.
19 Snieška, V. and Bruneckienė, J. (2009). *Measurement of Lithuanian Regions by Regional Competitiveness Index*. Engineering Economics, 1(61), p. 45-57.
20 Zanakis, S.H., Solomon, A., Wishart, N., Dublish, S. (1998). *Multi-attribute decision making: a simulation comparison of select methods*. European Journal of Operational Research 107, 507–529

Challenges for Industry 4.0 in Management Area

Piotr Wittbrodt, Opole University of Technology, Department of Management and Production Engineering, Poland, p.wittbrodt@po.opole.pl

Iwona Lapunka, Opole University of Technology, Department of Project Management, Opole, Poland, i.lapunka@po.opole.pl

Katarzyna Marek-Kolodziej, Opole University of Technology, Department of Project Management, Opole, Poland, k.marek-kolodziej@po.opole.pl

Abstract

In modern industry, we are slowly reaching the limit where performance, productivity, efficiency may be increased by better organization of systems and continuous improvement of production processes. Undoubtedly, the human factor, including the intellectual capital and reorganization of the management processes, make unused potential in this regard. The purpose of this article is to identify the changes taking place in the area of organizational management in response to the assumptions and defined development trends of Industry 4.0. The idea called Management 3.0 constitute the future of modern management. Creation of complex adaptive management systems will become a requirement for the efficient organization and efficient functioning of intelligent Industry 4.0 enterprises.

Keywords: Management 3.0, Industry 4.0, complexity, engineer of the future, soft skills.

Introduction

Issues shaping functional conditions of today's enterprises indicate the need of a permanent development of concepts and management theories in response to the ongoing of market transformation processes. Management is a tangible and distinctive instrument of action for every organization (Drucker, 2010). Among the most important management conditions for the 21st century are: (1) the globalization of economic activity, (2) dissemination of information technology, (3) formation of a post-industrial society, (4) increase in the importance of knowledge and skills, (5) conditions of continuous change, (6) increase of society aspirations (employees, customers, contractors), (7) economical state influence. Facing these economic changes, it is clear that far-reaching changes in business conduct and the management of various organizations are necessary. For more than a dozen years the source of success has been seen in the construction of a knowledge-based economy. It is assumed that in the circumstances of permanent uncertainty, only knowledge may constitute a competitive advantage and that the business's success lies in a unique way of acquiring, processing and creating knowledge. Continuous market changes, the emergence of new technologies, new products, new competitors require from modern companies to undertake new activities, forcing new ways of looking at the 21st century organization's effective management adapted to today's economic reality, new challenges and industrial conditions.

The pursuit of open innovation and continuous learning and technological improvement is related to the provision of appropriate infrastructure and adequate competence preparation. Thorough transformations in the emerging market' countries is also required in business models, especially in the resource management. In Poland, the main resources still comprise: work, capital and raw materials, but according to the fourth industrial revolution's concept these should be: data, knowledge and organization. In modern industry, we are slowly reaching the limit where performance, productivity, efficiency may increase by systems' better organization and continuous improvement of production processes. Undoubtedly, the human factor, including intellectual capital and reorganization of management processes, constitute an unused potential in this regard.

The purpose of this article is to identify changes taking place in the area of organization's management in response to the assumptions and defined development trends of Industry 4.0. The idea called Management 3.0 is going to become the future of modern management. Nonetheless, questions loom: what principles should be addressed facing the fourth industrial revolution, what transformations are expected by manufacturers in this area and, in long term, relating to trust-based management strategy; so called 'empowerment', is industrial engineer 4.0 already an average managerial level?

Fourth Industrial Revolution

From a manufacturer's perspective, contemporary market is a dynamic structure continually governed by the laws of demand and supply. Over the past few years, the conditions of running a business have changed significantly, particularly in areas where information technologies, rapid information exchange and new forms of interaction with customers are of increased importance. Production batches and shelf-life of products have shrunk considerably, and at the same time the diversity and complexity of products have increased. Customers have become more demanding, in many areas changing into prosumers, whereas manufacturers have been forced to accept new ground rules, as mass customization of products and services has become more profitable than mass production.

Production processes are one of the most important areas in the business activity in the world economy. According to analyses, companies capable of implementing innovative manufacturing techniques using existing infrastructure and traditional developed markets enjoy an additional competitive advantage. Such an approach is characteristic of the intensive phase of economic globalization, which will dominate the current (extensive) one over the next decade (Zawadzka, 2007). This stimulates attempts to create novel forms of production organization in accordance with evolutionary progress in automated manufacturing systems, reaching as far as self-regulating automated manufacturing cells and self-transforming automated manufacturing systems, as presented in (Afentakis, 1986; Banaszak, Muszyński, 1991).

Faced with the dynamically growing complexity of manufacturing systems, classic flexible manufacturing systems (FMS) are incapable of meeting the demands of modern civilization. This leads to decreasing human control over manufactured systems, which in the discussed area manifests as their low tolerance to disruptions. Increasing this tolerance, without resorting to engaging a human in each case, along with an increase in the system complexity control without losing its functionality, is the goal of solutions proposed within intelligent production systems (IPS) and digital manufacturing.

Another industrial revolution, termed Industry 4.0, is already underway (cf. Fig. 1). Its main objective is to increase global competitiveness by increasing the quality of products and decreasing manufacturing costs. Smart factory and smart services solutions will offer higher flexibility of actions and more effective allocation of resources, paving the way for agile manufacturing and scalable logistics solutions. Computer networks will be integrated with unified capabilities and real-time information exchange. The online control of processes requires building a suitable interface between the human, machines and technological devices, defined by their mutual interdependence. In the 21st century, the increasing complexity of systems becomes a concern requiring sophisticated solutions. According to analyses, the number of robots in Europe has doubled over the last decade, with the robots becoming more intelligent and flexible. According to Gartner Inc., the world's leading IT research and advisory company, until 2020 over 20 billion devices will be able to communicate with each other, which in the global economy will correspond to an added value of ca. 1.9 trillion USD (Gartner, 2017).

Evolutionary changes observed in the industry in the 21st century progress from electronic IT industrialization to next-generation (also known as intelligent) manufacturing systems (NGMS). The new generation of manufacturing, known as Industry 4.0, heads in the direction of designing manufacturing systems that integrate information processing with matter processing. This direction can be termed matter digitalization, and its assumptions are implemented in smart factories controlled by cyber-physical systems (CPS) in an environment known as the Internet of Things (IoT).

The term digital production refers to the integrated use of automatic systems, processes and tools by design and manufacturing companies to provide customers with products as soon as possible and with the minimum engagement of operators (Andrews, 2012).

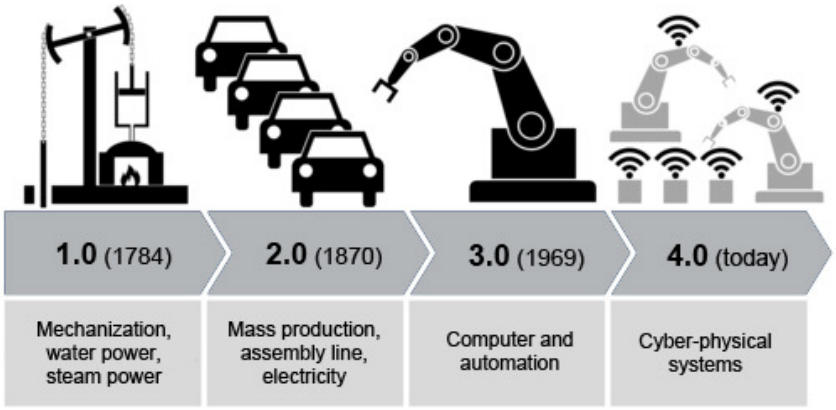


Fig. 1: Industry development stages

Digital modeling of matter processing allows to transform material goods, integrated based on information, within a computer-aided manufacturing organization system. In other words, material goods following digitalization increasingly become digital goods (Badurek, 2014). From the perspective of IT, this megatrend of civilization manifests as virtualization (Canetta, 2011). Nevertheless, the origin of Industry 4.0 is influenced by the cyclical development of economy and the occurrence of crises, where more risk has to be taken and new technological solutions need to be sought to sustain the increase in productivity of companies. This can no longer be achieved solely by the computerization of the industry using methods typical of the Industry 3.0 paradigm (i.e., electronic-IT industrialization) characteristic of the second half of the 20th century.

In the future, the gradual transformation of flexible manufacturing systems through the use of CPS into increasingly intelligent systems will allow to couple virtual and physical systems, culminating in a new level of integrated intelligence, characterized by the interaction and coordination of computing and physical processes in real time. According to Plattform Industrie 4.0 (2013) this will have a significant impact on creating values, business models, secondary (subordinate) services, and work organization, which in turn will force modern manufacturing companies to undertake actions with regard to: (1) horizontal integration by means of value networks, (2) comprehensive digital integration of engineering in the entire value chain, as well as (3) vertical integration and network integration of manufacturing systems.

Industry 4.0 poses both a chance and a threat for the industry. In reality, traditional business enterprises face new challenges that will change the existing rules of productivity and competition. Enterprises must proceed to remove the barriers between information and physical structures. Interdisciplinary thinking, both in technical and social areas, is key in the continuous process of learning and cooperation with a significant impact on individual professional roles. These transformations force entrepreneurs to reorganize their management processes accordingly, as well as to redefine the role of engineers by bestowing them with a managerial character.

Management 3.0 in Industry 4.0

The evolution of management theory can be described as a successive transformation of basic paradigms into respectively proposed concepts, beginning with hierarchy, through models, ending with its complexity (cf. Table 1). In today's market economy, the problem of system complexity precludes the use of Newton's linear solutions, which are characterized by trying to dismantle the problem first, analyze it then well and finally choose the 'best' solution, which often leads to local optimization, system's slowdown, and creation of rules which are often rejected by people. Such deterministic

approach to the industrial enterprise's management and human beings is only short-term and relatively limited, and has also particular significant limitations, as it effectively abolishes motivation, creativity, innovation and employee autonomy.

Systems thinking, self-organizing teams, creativity and people's and/or teams' innovation, delegation of authority and responsibility are the foundations of modern management.

Table 1: From Management 1.0 to 3.0

Management 1.0	Management 2.0	Management 3.0
Hierarchies	Models	Complexity
- issuing and controlling commands (command and control), - hierarchy, information flow and top-down management decisions, - the most popular way of managing, - still used today in the rigid organizational structures.	- response to Management 1.0 weaknesses, - implementation of processes and their improvements, - Business Process Reengineering, Total Quality Management, etc., - self-learning organization, - still top-down management (hierarchy), - inherits most problems from Management 1.0.	- an idea based on the complex adaptive systems theory, - an organization seen as a network of links between its participants, - self-organizing network, - assumes that all models (Management 2.0) may be useful but not always effective, - management focused on people and their relationships, not on processes and models, - empowerment of people, - indication of the boundaries in which the team is to move (alignment) instead of strict control, - shortening the feedback cycle time.

Source: elaboration based on (Pieprzyca, 2016)

The Management 3.0 approach is a proposal for a complete system where people can work more effectively with as few factors as possible, which would limit their performance and creativity, and at the same time, with clear established rules. It replaces traditional management concepts associated with hierarchical organizational structures, supplemented by emerging and disappearing concepts such as the Balanced Scorecard, TQM, etc. (Stawicki, Skowroński, 2013). The said Management 3.0 responds to the problem of maladjustment of the management system, particularly at the middle and high level of the organization for agility and self-organization practices. This concept is based on several assumptions described by Jurgen Appelo (2016) regarding to agile leadership. The author proposes a coherent, six-pillar system that would solve this problem (cf. Fig. 2). He presents it with a bit of a wink with the use of an amoeba-like creature called Martie, at the same time, distancing himself from rigid models, so often found in the management literature. His tentacles show the main pillars of Management 3.0 concept. There are no more important or less important tentacles, and their size, as in the case of pseudopods, varies according to needs and situations. Pure adaptive system.

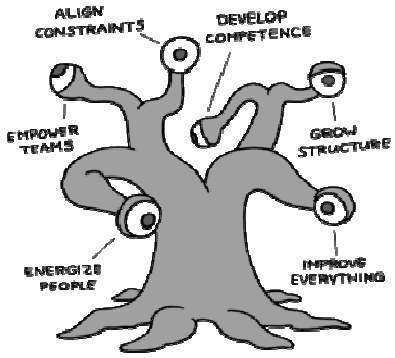


Fig. 2: Martie as the main assumptions of Management 3.0 according to J. Appelo
Source: (Appelo, 2016)

At the outset of the discussion, there is a paradigm that says that every organization is treated as a network of employees' connections and channels of communication, although its organizational structure continues to be formally hierarchical. Additionally, social complexity indicates that management refers to people and relationships between them, rather than corporate divisions and profits. So it can be said that Management 3.0 is not so much a concept of human management as the leadership of teams working in networked organizations, in which people and relations between them count most. This is the concept of taking care of people forming a complex adaptive system, rather than a mechanism composed of easily replaceable elements (Stawicki, Skowroński, 2013).

One of the basic assumptions of agile leadership pointed out by J. Appelo (2016) is a different approach, to the existing ones, to motivate people, hiding under the motto energize people, and oriented, in its essence, on internal motivation. Because people are the most important part of an organization, allowing them to be active, creative and motivated is the key task of the manager. In practice this means that the manager should understand the basic inner desires of people such as status, authority, curiosity, or relationships with others, try to recognize them in the members of his team and lead them accordingly. The agile management distances itself from the traditional methods referring to the legendary 'stick and carrot' and external motivational systems.

Empowering teams are another element of agile leadership, based on the assumption that teams can and can self-organize. The manager's task is to delegate decision-making powers to them and to create an ambience of confidence in their decisions and actions within established areas. This simplifies the decision-making path as well as facilitates the functioning of teams in a complex organizational community while encouraging team members' proactive attitudes. It is important that the manager himself also understands that delegating responsibility and decision-making power raises his or her status in the company rather than lowers it.

At the same time, the boundaries and directions of self-organizing teams should be defined. Align constraints are the third element of the model that answers the question of how to make the effects of the self-organizing system work according to assumed goals and intentions, without resorting to micro-management, temporary suspension of self-organization and other actions, withdrawing the company a few steps behind on the road to become an environment, which is truly supporting the creativity.

The fourth component of the Management 3.0 model is the employee's competence development with the introduction of the culture of the team's continuous competence improvement as well as processes at all levels of the organization. It is a trivial fact that self-organizing teams are not able to achieve their goals if team members have not got appropriate skills.

The last two components of the model are to create an adaptive and scalable organizational structure (grow structure) and continuous improvement (improve everything), understood as skillful management and change stimulation. In a complex environment, an ideal, balanced motivation system, competence development and self-organization does not exist. The main task of the manager is to behold, to draw conclusions, to correct, to change and to experiment. In today's world, the only thing that is certain is change, and a skilful implementation of it is becoming a standard competence for both managers and engineers. The agile manager understands and allows teams to experiment in a safe environment, stimulate development and effectively introduce required changes (Stawicki, Skowroński, 2013).

Industrial engineers 4.0 as knowledge workmen

The most important task for the 21st century companies is to increase the productivity of the most valuable asset in who is commonly identified as the knowledge worker (Drucker, 2010). In addition to the management level, in industrial enterprises, engineers, regarded as professionals, experts in their fields, play a key role in creating added value.

Karl E. Sveiby (1997) proposes to divide the organization's employees into four categories: (1) professionals, (2) managers, (3) supporting staff, and (4) leaders. He assumes that modern

organizations should mainly consist of professionals who generate enterprise's value, and leaders whose one of tasks is an appropriate professionals' management. Other groups of employees should support the work of professionals and leaders. Such an organization, aimed at generating added value through the use of knowledge, has a chance to succeed in today's difficult socio-economic conditions. (Beyer, 2012). Professionals are made up of specialists and experts. They are characterized by very high professional competence, intelligence and creativity. They are generally characterized by a high level of expertise, education, and experience that successfully translate into creation, dissemination and practical use of knowledge (Davenport, 2007). It is precisely this group that modern engineers must be epitomized with as they are increasingly attributed with their organizational skills and managerial competences.

There is no doubt that in the age of reproducibility, which is now assured by machine, which are currently replacing the human, the necessity to perform routine activities will decrease in favor of creative skills. An engineer should be able to process and analyze a large amount of data from multiple sources, evaluate the information validity, its credibility, and draw relevant conclusions. This will be helped by his ability to gain access to this information, including electronic media and Big Data tools (Stoch, Gracel, 2017).

The need for quick adaptation to changes in the modern world implies the need to rid the traditional concept of professional qualifications to the term 'competence'. The need for the research of new areas of competence, characterizes the engineers of the future. A growing demand for effective and efficient engineers with managerial qualifications is being beheld. At the same time, due to the enormous importance of the ability to communicate easily, solve conflicts or deal with non-standard situations, for proper modern organizations' functioning, there is a need for a new kind of competence, resulting not so much from the technical knowledge acquired during shaping of the technical education, but the ability to function in a team, the ability to build enterprises' intellectual capital. In order to implement new organizational or technological solutions, an adequate level of so-called absorption capacity is necessary – dependent mainly on knowledge, attitudes and employees' skills.

The Astor Academy representatives, using a personality profile (ThomasPPA), have created interesting profiles of the engineer's personality before the era of Industry 4.0, naming him a 3.0 engineer, and the engineer of the future (engineer 4.0). As a result of the analysis two diametrically different attitudes emerged. Engineer 3.0 is a logical, analytical and systematic person who follows the procedures. He has an innate need to perform his tasks properly and focuses on issues rather than people. He is able to work with people but in a team he knows. He does not like changes and new issues. He works calmly, prudent from the beginning to the end, and has the ability to bring things to an end. He is very attentive, polite, organized, predictable and methodical. Engineer 4.0 is an open and active person who loves diversity both in terms of human relations and tasks. He has the ability to impart the others with very technical, detailed information with enthusiasm and optimism, which arouses positive feelings among the audience, regarding the ideas that he shares. He attaches great importance to detail and strives for perfection. He ensures high quality of work and compliance with norms. He obeys rules and procedures (Stoch, Gracel, 2017).

Certainly, the features which distinguish these two profiles (two people) are: speed, openness to change and flexibility towards them. Engineer 4.0, besides invariably essential technical competences, must be aware of the importance of soft competences and the ability to integrate them skillfully. It is followed by greater interdisciplinarity and openness to the broadening horizons of knowledge in various disciplines. The productivity growth can be seen both: in the increase of automation and the computer system implementation as well as in the building of effective teams oriented on better goal achievement (Bittel, 1994). It seems that among the engineers, the ability of teamwork, independence in work organization and decision-making will be gaining importance. In Polish reality, appreciation of the importance of the co-workers' potential and their real empowerment is still a fundamental challenge for the 21st century management.

Conclusion

In-depth research is required in order to define the determinants of effective management of manufacturing companies according to the fourth industrial revolution assumptions and the progressive civilizational transformations, referred to as the 'third wave' embodying the information (technology) society. According to Alvin Toffler (Toffler, Toffler, 1995), the history of mankind is headed to the age of knowledge and information. At present, agricultural, industrial and the 'third' so-called post-industrial civilizations, overlap and the direction of the transition is being slowly developed. Increasingly, new technologies are being used, less energy-consuming, based on renewable energy resources – solar, water, and chemical. It is conducive to the reconstruction of the destroyed natural environment and to the establishment of the concept of sustainable development. High-tech industries like: computer, oceanic, cosmic, or biological, where human knowledge becomes a very important resource dominate high-developed economies. Simultaneously, new possibilities for interpersonal communication emerge – the flow of information is getting faster, bigger amount of and more diversified information is being transferred, which is essential for the development of these industries and promotes their dissemination. In such a complex economic reality, it is becoming increasingly important to make more and more decisions, thereby the scope of delegation of responsibilities must grow, heading towards the idea of empowerment, what directs changes in the attitudes of Industry 4.0 engineers. In this respect Management 3.0 assumptions seem to be justified. The question of management tools, such as: methods, techniques, tools, that enable successful implementation in an industrial environment remain an open one.

Industrial enterprises may certainly be presenting a new type of organization, but the production activities of these forward-looking companies are completely different from those of classical economics. It will no longer be a closed factory that uses only resources like work, capital, and raw materials, but new organizations which will create collaborative networks, effectively exploiting and multiplying resources such as data, knowledge, and organization. Contemporary industrial enterprises, heading in the direction of knowledge-based organizations should be characterized as follows (Mikuła, Pietruszka-Ortyl, Potocki, 2007): (1) appropriate structure of resources and investments in intangible resources, (2) knowledge management, (3) building relationships with the environment, (4) appropriate organizational structure, (5) appropriate organizational culture, (6) change of roles and working areas of employees. The development of intellectual capital in this type of industrial enterprise primarily involves investing in the development of its individual components, inter alia by: (1) investment in employees' education, (2) protection of intellectual property rights, (3) investment in new information and telecommunication technologies, (4) increase in R&D investment, (5) application of cooperation development programs.

Undoubtedly, the creation of complex adaptive management systems is a requirement for an efficient organization and productive operation of intelligent Industry 4.0 enterprises. The idea of Management 3.0, which is based on the principles of: energize people, empower teams, align constraints, develop competence, grow structure, improve everything is a forward-thinking concept, ridding from rigid models and hierarchies for a nimble management approach to complex production systems.

References

Afentakis, P. (1986), A model for layout design in FMS, [in:] Kusiak, A. (ed.), Flexible Manufacturing Systems: Methods and Studies, North Holland, Amsterdam, 127-139.

Andrews, C. (2017), Introduction to digital manufacturing, [Online], University of Strathclyde, Glasgow, UK, [Retrieved January 16, 2017], http://www.futuresme.eu.

Appelo, J. (2011), Management 3.0: Leading agile developers, developing agile leaders, Addison-Wesley, Boston, MA.

Badurek, J. (2014), 'Systemy ERP dla wytwórczości nowej generacji' [ERP systems for new generation production], *Przedsiębiorstwo we współczesnej gospodarce – teoria i praktyka*, 2, 79-90 (in Polish).

Banaszak, Z., Muszyński, W. (1991), Systemy elastycznej automatyzacji dyskretnych procesów produkcyjnych [Flexible automation systems for discrete manufacturing processes], Wydawnictwo Politechniki Wrocławskiej, Wrocław (in Polish).

Beyer, K. (2012), 'Współczesna organizacja – organizacja oparta na wiedzy' [Contemporary organization – organization based on knowledge], *Zeszyty Naukowe Uniwersytetu Szczecińskiego*, 736, Finanse, Rynki Finansowe, Ubezpieczenia, 55, 2012, 9-25 (in Polish).

Bittel, L.R. (1994), Krótki kurs zarządzania [Short course of management], Wydawnictwo Naukowe PWN, Warszawa (in Polish).

Canetta, L. (2011), Digital factory for human-oriented production systems, Springer, London.

Davenport, T.H. (2007), Zarządzanie pracownikami wiedzy [Management of knowledge workers], Oficyna a Wolters Kluwer Business, Kraków (in Polish).

Drucker, P.F. (2010), Zarządzanie XXI wieku – wyzwania [Management challenges for the 21st century], New Media, Warszawa (in Polish).

Gartner, Inc. (2013), Forecast: the Internet of Things, [Online], Worldwide, [Retrieved January 16, 2017], http://www.gartner.com.

Gonciarski, W. (1999), 'Wyzwania XXI wieku. Konsekwencje globalizacji oraz rozwoju mikroelektroniki i telekomunikacji' [Challenges of the 21st century. The consequences of globalization and the development of microelectronics and telecommunications], *Personel*, 1, 48-51 (in Polish).

Mikuła, B., Pietruszka-Ortyl, A., Potocki, A. (eds.) (2007), Podstawy zarządzania przedsiębiorstwami w gospodarce opartej na wiedzy [Fundamentals of enterprise management in a knowledge-based economy], Difin, Warszawa (in Polish).

Pieprzyca, W. (2016), Management 3.0, [Online], FIS-SST Sp. z o.o. ,Gliwice ,[Retrieved June 13, 2017], https://prezi.com/4rugkw9zuvv9/management-30.

Plattform Industrie 4.0 (2013), Recommendations for implementing the strategic initiative INDUSTRIE 4.0, Final report of the INDUSTRIE 4.0 Working Group, [Online], Frankfurt, [Retrieved January 12, 2017], http://www.plattform-i40.de.

Stawicki, J., Skowroński, D. (2013), 'Zwinne przywództwo, czyli Management 3.0' [Agile leadership namely Management 3.0], *Strefa PMI*, 3, 8-9 (in Polish).

Stoch, M., Gracel, J. (2017), 'Inżynierowie przemysłu 4.0: jak ich rozwijać?' [Engineers of Industry 4.0: how to develop them?], [Online], *Harvard Business Review Polska*, [Retrieved June 13, 2017], https://www.hbrp.pl (in Polish).

Sveiby, K.E. (1997), The new organizational wealth, Berrett-Koehle Publishers, San Francisco.

Toffler, A. and Toffler, H. (1995), Creating a new civilization: the politics of the third wave, Turner Publishing, Atlanta, GA.

Zawadzka, L. (2007), Współczesne problemy i kierunki rozwoju elastycznych systemów produkcyjnych [Contemporary problems and directions of flexible manufacturing systems development], Wydawnictwo Politechniki Gdańskiej, Gdańsk (in Polish).

Ways of Modern Agriculture In: Specifics and State Support[1]

Zhahov N.V., Candidate of Economic Sciences, associate professor of the department of finance and credit of FGBOOU WAUGH The southwest state university; e-mail: zakhov@mail.ru

Krivoshlykov V. S., Candidate of Economic Sciences, associate professor of management FGBOOU WAUGH Kursky state university; e-mail krivladimir@mail.ru

Shatokhin M. V., Doctor of Economics, professor of department of the international relations and public administration of FGBOOU WAUGH The southwest state university; shato-hinm@mail.ru

Abstract

In modern conditions the agroindustrial branch represents the multifactorial complex integrated social and economic system which comprises agrarian formations of various ways of agricultural production.
The purpose of the article is the consideration of tendencies of formation, author's emphasis, justification of contemporary ways of agricultural production management in the Russian Federation, identification of the key reasons of support of the main ones. At the present stage of agricultural production development in Russia it is possible to allocate the following ways of agricultural production management: corporate, individual, state, family, homeownership.
Pinpointed are the current shortcomings of priority state support of the corporate way and the current positive aspects of state support of the family way of agricultural production. Problems of justification of support by types of way in the Russian agrarian economy sector are obvious and demand more responsible approach of public authorities to creation of conditions for sustainable development of all forms of economic management and equal approach to economic support of both large agricultural organizations (corporate way) and small forms of agrarian business (family way) which farms are. At the moment support of the latter way is mostly declarative.

Keywords: agriculture, ways of agricultural production management, organizational and economic mechanism of management, state support.

JEL Classification Codes: O 13, F-14, Q 18, R 38

Statement of the Problem

Throughout the development of history, the agrarian economy sector was represented by its characteristic forms of management. In modern conditions, the agroindustrial sector represents a multifactorial, complex integrated social and economic system. It comprises agrarian formations in various organizational and legal forms of ownership, having a variety of needs for different resources. A key feature of agriculture reform in the Russian Federation after the collapse of the USSR has been the transition from collective farming units (collective farms and state farms) in the countryside to the formation of a mixed agrarian economy with comprehensive organizational and legal forms of agriculture (societies, partnerships, peasant (farmer) farming units, state unitary enterprises.

The urgency of the problem chosen for the study is predetermined by the task of analyzing the existing organizational ways of agriculture and choosing the most optimal one in the context of a reduction in state funding for this sector.

1 The publication was prepared within the framework of the scientific project No. 16-32-00030, supported by Russian Humanitarian Science Foundation

Analysis of Recent Research and Publications

The choice of the desirable type of farming, taking into account the interests of the entrepreneur and the state, was of interest to many scientists.

Vainshtein A.L., Lopatin I.D. in their work "Optimum sizes of the agricultural enterprise" [1], as well as Ritter K., Chayanov A. (Ritter, Tschajanoff, 1923) "Peasant economy course" [2] touched upon this topic, but could not give it proper attention.

Taking as a premise his own understanding of the specifics of peasant farms, A.V. Chayanov made a significant contribution to the interpretation of the processes of their differentiation and proposed a typology of farming ways in the early twentieth century, which includes six types of farming units: 1) capitalist, 2) semi-labor, 3) well-off family-labor, 4) poor family-labor, 5) semi-proletarian, 6) proletarian [3].

At the present stage, according to Dürr J. (Dürr, 2016), the role of agriculture in economic development, promoting small farmers against large-scale agriculture, have been and remain at the center of a long and controversial discussion [4].

At the same time, another researcher, K. Iliopoulos (Iliopoulos, 2013), discloses the issues of agricultural production management way from the point of view of the possibility of obtaining state support in the EU countries by non-traditional agricultural cooperatives [5].

Earlier we conducted a study [6,7,8,9], which indirectly touched upon the indicated topic and demonstrated that a unified economy, a mathematical model, which should be different for different ways of agricultural production, is an effective means of optimal planning of expanding the volume of effective production of agricultural products.

Despite the large amount of works in this field of research, typification and selection of the most promising way in the field of agricultural production remains of current interest.

Purpose of the Article

The purpose of the article is to review the trends in formation of, the author's emphasis of, the rationale for the current ways of agricultural production in the Russian Federation, and the identification of key reasons for supporting the main ones.

Main Results of the Study

The problem of choosing the optimal ratio of the size and type of agricultural production, is now very acute for Russia and is not fully assessed, either by the peasants themselves or by the country's leadership. However, as a matter of fact, the system of correlation of large-scale agricultural producers and small farms that is being formed in this period lays such foundations as food security, territorial organization, social equality, and the harmonious development of the country's territory as a whole.

The choice of this or that organizational and legal form is predetermined by the following factors:

- the aim of the agricultural business which is the basis for its management (the large-scale production, small-scale production, self-employment), that is, consumer or entrepreneurial approach with the selling of the surplus;
- the level of property responsibility of the founders, owners of the organizational and legal form;
- the legal criteria governing the management of enterprises of various organizational and legal forms (vertically integrated holding, horizontally integrated holding, society, peasant (farmer) farming unit);

- the fundamental approach to agricultural production management, based on family (small-scale production, self-employment with the involvement of relatives and possibly outsiders) or collective (large-scale) forms of labor organization.

At the present stage of agricultural production development in Russia it is possible to single out the following ways of managing agricultural production: corporate, individual, state, family, homeownership. We will dwell on each of them in more detail.

The corporate way is diversified large-scale agricultural agroindustrial holdings (investment companies) that have a branching network of subsidiaries that are not limited by the presence in one region, having a diverse specialization, at the head of which there is a parent company. The main goal, like in any large-scale business, is to maximize profit with reduced interest in the social development of the territories. This type of enterprise includes such enterprises as AIH Miratorg, OJSC Group Cherkizovo, OJSC Efco, etc.

The individual way is medium-sized farms, designed for commodity production of agricultural products that do not have a branching network (and are represented by local farms), limited by the presence in one or two districts of the region, having a narrow specialization.

The state way is a few farms of agroindustrial production preserved after the collapse of the USSR. This type includes such agricultural enterprises in agrarian educational institutions as training and experimental farms.

The family way is mostly represented by peasant farms, based on the involvement of family members, limited use of hired labor (only for seasonal work), the owner himself performs the main work, independently manages the production process, adopts and implements all decisions on production management. An important distinctive feature is the accommodation directly on the farm with the family. The predominant progressive thought of development is the well-being of the farming unit and of the territory as a stronghold of existence, the aim of large-scale commodity production is developed to a lesser degree than in other ways, while maintaining the development of agriculture in the given territory. This type includes a limited liability company, large farms, large personal subsidiary plots.

The homeownership way is represented by activities that mostly are not related to entrepreneurship, but are aimed at the production of agricultural products for one's own needs, with possible selling of surpluses, thus it is not a commodity production. In this way the availability of land resources is minimal, labor resources are represented by family members and in rare cases hired workers are employed. This type includes personal subsidiary plots, small farms.

Here we would like to note that profit is not the main task of economic activity of such agricultural production ways as the family way and the homeownership way. They are more focused on the development of the family.

However, with proper development of production activities, state support and the emerging synergetic effect, in the family way family-collective values will be combined with the goal of increasing production and reaching the level of large-scale production. That will ensure sustainable development of rural areas as an indispensable condition for preserving labor resources, population density and harmonious distribution of the country's population.

Table 1: The main indicators of agricultural development in the Russian Federation, in terms of

farm categories

Name of key figure	2000	2005	2010	2011	2012	2013	2014	2014 in % to 2000
Agricultural organizations								
Number of cattle, thousand heads	16509	11064	9256	9165	9060	8800	8523	52
Number of pigs, thousand heads	8518	7317	10815	11430	13679	14705	15588	1.8 times
Total area under crops, thousand hectares	74192	60472	56104	56643	55665	56096	55285	75
Peasant (farmer) farming units, including individual entrepreneurs								
Number of cattle, thousand heads	543	932	1476	1693	1931	2049	2145	3.9 times
Number of pigs, thousand heads	403	566	798	666	559	463	422	105
Total area under crops, thousand hectares	6501	11942	15601	16531	17155	18575	19727	3.3 times
Farming units of the population								
Number of cattle, thousand heads	10468	9629	9236	9253	8939	8715	8596	82
Number of pigs, thousand heads	6903	5929	5605	5162	4578	3913	3536	51
Total area under crops, thousand hectares	3977	3423	3482	3488	3505	3386	3513	88

Source: calculated by the authors on the basis of data from the Federal State Statistics Service of the Russian Federation

The identification of features in the production of agricultural products by farm category always causes genuine economic interest. Each farming unit category has its own characteristics and advantages in the production of agricultural products. For example, the farming units of the population have the smallest share in the production of grain and milk, but at the same time they have the highest yield and productivity for the five-year period. The major financial infusions into dairy farming through investment companies could not push it from stagnation, did not stop the fall in the number of cows [10]. And the farming sector, with minimal state support, has been showing steady growth of the livestock all these years: by 3.9 times in 15 years.

In 2014 peasant (farmer) farms in Russia, including individual entrepreneurs, produced agricultural products at current prices in the amount of 422.7 billion rubles. Compared to 2013, the volume of gross output (in comparable prices) increased by 11.2%, including in plant production by 12.3%, in livestock breeding by 7.5%. For comparison: in agricultural organizations, production in 2014 increased by 6.8%, and in farming units of population decreased by 3.2%.

The dynamics of the growth in the number of farms in the Russian Federation looked like this: 1991 - 49,013; 1995 - 280,112; 2000 - 261,100; 2014 - about 200 thousand, even less farms conducting agricultural activities. Russian farming is still developing in an unstable and not always cost-effective way. There is a clear tendency towards a decrease in the number of Russian peasant (farmer) farms, not only because of their enlargement.

In foreign countries this historically traditional form of farm management has evolved from a semi-natural farming unit to large and medium-sized commodity production [11]. The development of

family farming in Europe received significant state support after World War II. In the former Soviet republics farming units, like in Russia, have developed since 1990. In all countries there is a multi-structured multi-way agriculture, while state support for farms, in particular family farms, continues.

The State Program for the Development of Agriculture and Regulation of Agricultural Products, Raw Materials and Food Markets for 2013-2020 in the Russian Federation includes a special subprogram "Support of Small Forms of Management", the subprogramme's resources were provided in the following areas: support for beginning farmers; development of family livestock farms on the basis of peasant (farmer) farms; ownership registration of land plots by peasant (farmer) farms; state support for small business loans.

We can look at the example of a typical agrarian region of the Russian Federation - the Kursk region, and the promising indicators of the development of small forms of management on the land, which are laid down in the Subprogram "Development of agriculture, food and processing industries in the Kursk region for 2014-2020" [12]. The planned number of peasant farms created with the help of state support, envisioned in the program under consideration, is 53 units by 2015, which is almost 4 % from the number of peasant farms registered in 2014 (1339 units). The area of land plots that are registered into the ownership by peasant (farmer) farms, including individual entrepreneurs, for the program's period is 9.2 thousand hectares, which is only 3.6 % of the total land area provided for farmers at the end of 2014 (262.7 thousand hectares). It is obvious that the implementation of the program under consideration does not help to solve the problem connected with the development of small and medium-sized forms of management on the land.

The current target subprogram of agricultural development in the Kursk region for 2014-2020 does not provide for the distribution of resources according to the areas of their use, nor does it reflect the consideration of state support from the federal budget, which in turn creates difficulties associated with the use of indicative indicators of this program as a tool for program-target regulation of innovative development of regional agriculture in order to increase the level of food security.

The abovementioned example of one of the regional programs, on the whole, reveals the essence of the federal program which is mostly declarative: the indicators for the growth and improvement of agriculture efficiency, designed in the subprogram under consideration, have no economic feasibility, are not supported by any forecasting or analytical economic planning calculations; the text of the program, subprograms and appendices does not contain a justified agreement on the resource potential, distribution of agricultural products and production balances, schemes and descriptions of the location of agricultural production in the country.

The problems of support feasibility by ways of agricultural production in the agrarian economy sector are obvious and require a more responsible approach of government authorities to creating conditions for sustainable development of all forms of management and an equal approach to economic support of both large agricultural organizations (corporate way) and small forms of agrarian entrepreneurship (family way) which farms are.

With intensive development of the family way, the country receives additional volumes of quality food and, which is no less important, the stability of the social and economic development of rural areas increases. Today in the Russian Federation a trend is forming for the concentration of large-scale agricultural production in comfortable rural settlements, but there remain a large number of small villages and villages whose population is dying out, and there is no purpose of supporting such villages and the local population, as large investment companies (supported by the state) are not interested in this.

The policy of agricultural development of the Russian Federation in fact focuses on the implementation and support of investment projects (ranges from 17.5 billion US dollars to 350 billion US dollars), designed to attract significant private and public investment. In most Russian regions more than half of the subsidies fall on a single borrower. In the Chechen Republic all subsidies are allocated to one limited liability company, in the Primorsky Territory 99% of the subsidies fell on one Moscow agricultural holding [13]. And the direct consequence of this is an extremely low dynamics

of agricultural production growth, a chronic disadvantage of the village. The village continues to lose human capital at a rapid pace.

We will highlight the existing shortcomings of priority state support of the corporate way:

- the economic model of management in rural areas is destroyed, which leads to depopulation of the territtorry;
- the cost of large-scale investments is overestimated (corruptness), as a result there is a long payback period or sunk costs of projects and high debt load of the industry;
- the quality of the products is reduced (improper ration of animal feeding, use of antibiotics, veterinary drugs). As a result, often unsalutary products are produced;
- the ecological balance in rural areas is destroyed;
- the struggle between farmers and large businesses for the rental of shares of rural residents, as a consequence there is the growth of latifundia.

At the same time, we will note the existing positive aspects of state support of the family way of agricultural production:

- high quality of products produced among other things through organic farming;
- environmental safety of production itself and habitat;
- flexibility and low cost of investment;
- involving the local population in the business and ensuring its integration with existing businesses;
- preservation of the rural population of the working population of the country.

The family way of management today is not just agricultural business, it is a form of social organization of rural areas. The farmer should become a key figure of the rural economy in raising the level of the social life of the village. It is also important to have a real program for the development of peasant (farmer) farms.

Conclusions

Agroindustrial production has a tendency to move from simple to complex, from small to large. This is typical both for technology and the organization of production, the means of labor used, the size of the functioning enterprises, and for the systems of economic management.

In the current conditions of management in the agrarian sector, when the globalization of the economy inevitably leads to a process of increased intensification, industrialization, enlargement of production, on one hand, and increased competition and, consequently, the need for increased efficiency of production activity on the other hand, the state, as the regulator of agricultural development has a difficult task to choose the support of any given way. The choice of differentiating each of them predetermines the growth of agricultural production or the preservation and increase of the rural population itself employed in rural areas.

The simplest solution of the first task is to support the corporate way of farming, which to a greater extent has been implemented in the territory of the Russian Federation, with the formal declaration of the second task.

However, if the state seriously took care of increasing the volume of production of agricultural products by supporting the family way, then by rebuilding roads, power lines, assisting in construction, acquiring equipment, seeds, animals, etc., it would be possible indeed to introduce additional areas of agricultural land into the agrarian production and, on the basis of private ownership of land and new motivational factors for work, to bring a considerable share from the farming sector (family way) into the total volume of agricultural production of raw materials and foodstuffs in the country.

Multistructure in the Russian agrarian economy sector is impossible without the diversity of organizational and legal forms of management. Peasant farms are the main structure of small and medium-sized agricultural businesses and have the right to their positive development.

The activities of family farms are important for the preservation of rural settlements and rural areas. The catastrophic processes of extinction of villages can be stopped - first of all by creating economic conditions for profitable management in a considerable number of rural families, which would allow both to feed the family and to provide extended reproduction.

The task of the state today is to create economic conditions and remove barriers that impede the sustainable development of peasant farms as small agricultural business entities.

In most countries the family way develops in conditions of cooperation, which is not present in modern Russia. Not everything that exists now in this sector in foreign countries can be applied in Russia in a mirror manner, but much is not only possible but also necessary to introduce into the development of the family way in the agrarian sphere in the Russian Federation.

References

1. Weinstein A. L., Lopatin I. D. Optimum sizes of the agricultural enterprise: Сб. Research institute of agricultural economy. - M, 1921.

2. Ritter K. Tschajanoff A. Die Lehre von der bäuerlichen Wirtschaft. Berlin, 1923//Jahrbucher für Nationalökonomie und Statistik. - Jena, 1924. - B. 122. - H. 5. - S. 680 – 683

3. Chayanova A. V. Organization of country economy. – M.: Academic project; Yekaterinburg: Business book, 2015. – 363 pages.

4. Dürr, J. (2016), The political economy of agriculture for development today: "small versus large" scale debate revisited. Agricultural Economics, 47: 671–681. doi:10.1111/agec.12264

5. Iliopoulos, C. (2013), Public policy support for agricultural cooperatives: an organizational economics approach. Annals of public and cooperative economics, 84: 241–252. doi:10.1111/apce.12012

6. Zhakhov N. V., Krivoshlykov V. S., Shatokhin M. V. Planning of the optimum production of agricultural production in the region with use of multi-level approach//Economy and business. 2016. No. 6 (71). Page 929-934.

7. Zhahov N.V, Kryachkova L.I, Levchenko V.A., Petrachkova Y.L., Shatohin M.V. Efficiency of public administration at the regional level / Collective monograph ed. M.V. Shatohin – USA: Smashwords Edition, 2017. – 145 p.

8. Suslov, S.A. Effektivnost of use of production potential of agriculture (on materials of the Nizhny Novgorod Region) / S.A. Suslov//the Messenger Oryol GAU. 2012. – No. 1 (34). – Page 163-166.

9. Zhakhov N.V. Multistructure agriculture of the region: specifics and the state support//Young researchers of agro-industrial and forest complexes – to regions. Volume 1. Economic sciences: The collection of scientific works by results of work of the II international youth scientific and practical conference. – Vologda-dairy: FGBOOU WAUGH Vologda GMHA, 2017. - Page 60-64.

10. Bashmachnikova O. Inefficient agrarian policy//Agrarian review. - 2016. - No. 2. [Electronic resource] http://agroobzor.ru/econ/a-196.html

11. Voronin B. A., Voronina of Ya. V. Condition and tendencies of development of farms in foreign countries B. A., Voronin Ya. V. [Text] / Voronin.//Agrarian bulletin of the Urals.-2015.-№ 10 (140). - Page 65-70.

12. Administration of Kursk region. The resolution from 3/11/2013, 3119 pases, Kursk: "About the approval of the regional target program "Development of Branches of Agriculture, Food and Processing Industry in Kursk Region for 2013-2020" in an edition of resolutions of Administration of Kursk region from 4/4/2014 N 211 pases, from 7/23/2014 N 443 pases, from 2/24/2015 N 89 pases, from 8/12/2015 N 515 pases

13. Federal services of the state statistics of the Russian Federation [An electronic resource] http://www.gks.ru/

Unethical Leader's Identity: a Simple Model and its Methodological Application

Marian Stančík
Institute of Management at Faculty of Management, Comenius University in Bratislava
Odbojárov, Bratislava, Slovakia
marian.stancik@fm.uniba.sk

Abstract

Since a leader can hide unethical actions and/or pretend ethical communication, an ethically positive self-image of an unethical leader can be intentionally achieved in the eyes of followers. This conference paper presents a simple model of unethical leader's identity (consisting of moral actions, communication and values) and its complementary potential for further research in the field of unethical (as well as ethical) leadership.

Keywords: Unethical leader's identity, ideology-based research approach, unethical leadership

Introduction

Many known authors, diverse empirical frameworks (see: Theoretical background) and popular conceptualizations (Padilla et al., 2007; Thoroughgood et al., 2012) are available, nevertheless (un-)ethical leadership stays a social phenomenon with a variety of conceptually different definitions.

But, how can anybody tell who is actually an unethical leader, if environmental factors like e.g. national culture (Ferencikova et al., 2016; Scholtens and Dam, 2007), individual factors like e.g. moral awareness (Rest, 1986) or individual development (Rest and Narvaez, 1991), as well as diverse situational factors e.g. information availability (Akerlof and Dickens, 1982) or salience of moral norms (Nye and Forsyth, 1984) and a whole spectrum of conflicts due to economic rationality play important roles besides? And, how to deal with observed paradoxes, when an ethical leader at work behaves unethically in private (Riggio et al., 2010)? Or, how to address a phenomenon when a direct leader is reported more cynically, but the one at the top of the hierarchy, personally unknown to the follower, is reported positively (Lord and Maher, 1991)?

The herein suggested theory bases on the Leader-Member-Exchange theory (Graen and Uhl-Bien, 1995) abbr. LMX which introduced the importance of a dyadic leader-follower relationship and the Implicit Leadership Theory (Rush et al., 1977) abbr. ILT which introduced the importance of follower's perception. But, opposite to recent trends in the field of (un-)ethical leadership, the suggested theory is derived from the author's working thesis *"consequences of an unethical leadership do not need to appear immediately"*.

To overcome the matter of time-dependent information processing, let us suggest moving object of research from its tangible area of a leader-follower dyad (any behavior, traits and characteristics) to its intangible but still descriptive and measurable area (cognition based on moral values and ideology) which is independent on the matter of leader's observable behavior and/or follower's perception. Hence, an alternative approach to study a well-known topic of (un-)ethical leadership attempts to uncover details which have not been considered so far.

Theoretical Background

To address the scientific chances and challenges of the research presented in this paper, let us first outline the situation using a selective analysis of four frameworks previously developed to measure ethical leadership (abbr. ELp).

The first analyzed tool to measure ELp is called Ethical Leadership Scale (Brown et al., 2005). Abbr. ELS bases on a social learning perspective. Brown et al. divert from a classical philosophical point of view "how leaders ought to behave" and propose a descriptive behavioral approach to measure ELp. According to social learning (or also cognitive) theory (Bandura, 1971), one's behavior can be acquired by observing and imitating others. Hence, Brown et al. build up a correspondent model to measure ELp through the follower's perception accordingly. The first comment that catches the reader's attention is when the authors discuss limits of this approach due to perceptual biases behind the self-other-agreement; one knows that leaders are almost certain to rate themselves favorably on the ethical dimension of leadership. Another comment that catches attention is the discussion on the levels of management; the extent of hierarchical distance from leader to follower plays an important role since the substance for a personal relationship disappears but the matter of an image-based relationship increases. Let us for now note that these two observations are important for further conceptualization because leader's formal power (thus hierarchical position in logical extent too) and his own perspective-taking (as a crucial precondition for an ethical leadership) correlate negatively (Galinsky et al., 2006; in Pink, 2012, p. 70)

The second analyzed tool to measure ELp is called Leadership Virtues Questionnaire (Riggio et al., 2010). Abbr. LVQ bases on four cardinal virtues (originally mentioned it texts written by Aristotle). Riggio et al. distinguish their work by pointing out the social learning approach limits of ELS. They mention the fact that leaders develop their own ethical leadership behavior by emulating admired, ethical leader role models; but, due to ethical relativism, leaders hence might get easily misguided. Let us here note that this is one of many reasons due to which unconscious leader's behavior plays an important role and thereby any methodology based on measuring tangible behavior must deal with the same troubles when interpreting results. Therefore, as a solution, authors propose to refocus the object of measurement at leader's traits and characteristics because characterological elements are independent of leader's behavior. Let us again mention two interesting limits that catch the reader's attention. Authors of LVQ discuss that the correlation with follower's moral identity, empowerment and organizational identification were better scrutinized longitudinally or experimentally than measured at the same time as the follower's perception of leader's virtues; ethical leadership impact is thus questionable since followers e.g. might not be morally capable of recognizing leader's virtues. While the second limit towards LVQ predictability roots in the fundamental emphasis of social psychology; one knows that the power of the situation overrides characterological factors. Again, let us for now note that these two observations are important for further conceptualization since the difference between intended and effectuated moral behavior is as old as humanity per se can remember and carries over.

The third analyzed tool to measure ELp is called Ethical Leadership at Work questionnaire (Kalshoven et al., 2011). Abbr. ELW bases on a multi-dimensional measurement whose authors critique ELS and LVQ as unidimensional tools that are too simple to measure the complex topic ELp. Therefore, Kalshoven et al. developed a complex set of dimensions to measure and evaluate leadership in terms of ethics and thus contribute to overcoming deficits of previous tools. No matter how complex and comprehensive this model is, let us note that it relies on measuring leader's behavior according to follower's perception and thus have empirical limits in common with many other behavioral frameworks. One comment that catch the reader's attention is the discussion about its predictability towards cultural environment; e.g. the importance of "power sharing" dimension might vary based on the well-known cultural "power distance" dimension. Hence, let us note that this reflection is important for further conceptualization; Since the interdependency of the ethical and the cultural systems is tricky for any social research application (e.g. Scholtens and Dam, 2007), its separation on the other side is a doctrine for an organizational anthropology in cross-cultural environment (Hofstede and Hofstede, 2006).

The forth analyzed tool to measure ELp is called an Improved Measure of Ethical Leadership (Yukl et al., 2013). Abbr. ELQ integrates Leader-Member-Exchange model (known as LMX) and puts work unit performance into focus. In comparison to previously analyzed approaches, the ELQ authors consider leader's individual moral balance of competing goals when influencing work unit performance; ethical leadership might have unethical consequences and, vice versa, e.g. unethical leadership towards individuals might have ethical consequences towards an organization etc. The reader's attention catches the discussion in terms of managerial effectiveness; being an ethical leader is not only commendable but also effective. Even though Yukl et al. count with the importance of leader-follower relationship, let us here note that they do not distinguish nor discuss the correlation of formal (positional at work) and informal (personal as friends) level of their dyad. Since formal and informal relationships coexist in practice all the time everywhere, let us note that this is a very important dimensionality especially in terms of chances for an unethical leader's behavior (e.g. corruption in public sector).

To sum up the analysis of four selected frameworks let us point out that neither applying the recommended 360-degree approach nor the self-other agreement correlation of any of these tools would in the future provide comprehensive answers to the questions introduced in this paper. No matter how many times mentioned in diverse studies, none of the known theoretical frameworks nor research approaches conceptualize the phenomenon of "ethically behaving leaders on workplace behave unethically in private life and/or vice versa" as an integrated as well as interdependent model. Hence, there is a chance for a new model and methodology that is to be presented in the following chapters.

Materials

According to Hunter, all reviewed materials related to unethical leadership have at least one similarity: complexity. And, as he also notes, at least one common need for further investigation: identity (Hunter, 2012). Let us therefore focus on identity closely and suppose that simplification is a strategy to deal with troubles of a current field of research.

The first instrument to build up a comprehensive model of an unethical leader's identity is a definitional analysis of unethical leadership. Known authors like to describe leadership with adjectives e.g. narcissistic, toxic, destructive, dark, dysfunctional, psychopathic, self-serving, despotic or even tyrannical. According to an extensive conceptualization of current theoretical trends by Lašaková and Remišová, "unethical leadership is a process of intentional or unintentional, passive or active, and recurrent influencing that harms others, being it individuals, organizations and/or society as a whole." Authors also define the following preconditions for an unethical leader: a) leader acts badly (lacks certain ethical virtues and engages in unethical acts), b) leader allows bad acts to happen, c) leader is ethically silent (does not voice the importance of ethics at a workplace), d) leader is absent (avoids contact with others or absents it at all), e) leader is self-centered, self-protective and self-serving, f) leader lacks respect to rules and g) leader is professionally incompetent (Lašáková et al., 2016; Lašáková and Remišová, 2015).

The second instrument to build up a measurable model of unethical leader's identity is an applicational analysis of ethical ideologies. According to the fundamental Theory of Ethical Positions (Forsyth, 1980) there are 4 ethical ideologies (or also called Ethical Position) derived from a 2x2 matrix. This concept is defined by dimensions of "ethical relativism" and "ethical idealism" (see: Table 1) and can be evaluated by using Ethics Position Questionnaire (abbr. EPQ).

Table 1: Adapted from the Taxonomy of Ethical Ideologies (Forsyth, 1980)

	Low Relativism	**High Relativism**
High Idealism	Absolutists: Principled idealists who believe people should act in ways that are consistent with moral rules, for doing so will in most cases yield the best outcomes for all concerned.	Situationalists: Idealistic conceptualists who favor securing the best possible consequences for all concerned even if doing so will violate traditional rules that define what is right and what is wrong.
Low Idealism	Exceptionalists: Principled pragmatists who endorse moral rules as guidance for actions, but admit that following rules will not necessarily generate the best consequences for all concerned.	Subjectivists: Pragmatic relativists who base their ethical choices on personal considerations, such as individualized values, moral emotions, or an idiosyncratic moral philosophy.

According to Forsyth, ethical relativism is interpreted as "while some personal moral codes emphasize the importance of universal ethical rules … others maintain a posture of relativism that skeptically rejects universal principles" (Forsyth, 1980). Based on this interpretation, let us suppose that *breaking, bending or respecting rules* in general refers to *one's own belief about the frequency of behaving in line with social norms as well as legal rules*. Further, the meaning of ethical idealism is interpreted by Forsyth as "while a fundamental concern for the welfare of others lies at the heart of some individuals' moral codes, others do not emphasize such humanitarian ideals; the former assume that we should avoid harming others, while the latter assume harm will sometimes be necessary to produce good" (Forsyth, 1980). Based on this interpretation, let us suppose that *caring less/more about others* in general refers to *one's own belief about the quality of behaving towards others or at the expense of others.*

Based on the argumentation above, let us further defined **unethical leader** (abbr. ULr) as *a leader who a) breaks/bends rules/norms more than a follower expects and/or b) cares about a follower less that a follower expects of him.* Regardless of this simplification, let us note that such a definition of ULr is in line with all preconditions of ULr by Lašaková and Remišová and, at the same time, in line with Forsyth's Theory of Ethical Positions; while the follower's expectation is thereby anchored to his own experience with ULp and thus grounded to the social learning theory (Bandura, 1971).

To conclude in other words, *an ULr is and/or behaves more subjectivistic than a follower expects of him*. And, since the meaning of "ethical" excludes "unethical" and vice versa, let us analogically suggest that *an ELr is and/or behaves more absolutistic that a follower expects of him*.

Results

Based on two selected instruments and one definition, let us now suggest that the "Who is an unethical leader" question can be answered with the help of a simple model of an (un-)ethical leader's identity.

Firstly, to deal with diverse terminologies and frameworks used by behaviorists, let us suggest that *one's moral behavior can be understood in detail through his moral actions (abbr. a) and communication (abbr. c); while one's moral values (abbr. v) can be understood in detail through his Ethical Position.* Where the *moral decision making is understood as a process from an intended to an effectuated behavior.*

Secondly, based on the suggestions above, let us define an auxiliary model of one's identity flowingly: **one's identity** *consists of actions (abbr. -a), communications (abbr. -c) and own values (abbr. -v) in the way as they are perceived by one's self or by others*. And let us note, that such a definition is in line with basic ontological assumptions for social research.

Finally, let us induce and thereby define **(un-)ethical leader's identity** *as a set of (un-)ethical actions (abbr. -ra), (un-)ethical communication (abbr. -rc) and (un-)ethical values (abbr. -rv) a leader recognized of himself (or, also, consciously holds) as well as a follower so far perceived of his leader*. Thus defined, there are 6 independent parameters to consider.

So, how is a follower actually going to perceive a leader? In respect to the model of unethical leader's identity the following picture appears (see: Figure 1 and related discussion).

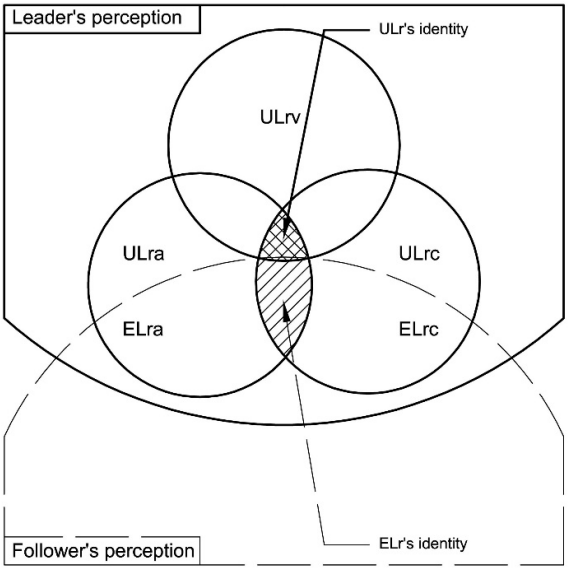


Figure 1: Ethical vs. unethical leader's identity (source: own production)

Discussion

Now, to test this model out, let us firstly remind that (1st premise) *the consequences of ULp do not exist until recognized by followers*, secondly that (2nd premise) *the leader's action can be hidden and/or communication pretended*, while thirdly (3rd premise) *the leader's value system is a moderator between his own actions and outside communication*.

Although a leader might behave unethically because he is unconscious of the consequences his behavior produces and/or is not aware of the follower's moral expectations, the first and second research premises imply that the *meaning of „is" relates to one's values, neither to actions nor communication.* Going back to the definitions of an (un-)ethical leader, one can assume that *if a follower perceives an ethical leader's behavior, it does not automatically mean that the same leader „is" ethical indeed.* And vice versa.

Supposing that a follower does not know a leader personally (see: Figure 1), the application of the first and second research premises explains why *the moral values a leader holds of him and the moral values a follower holds of his leader do not technically need/have to be the same values.* Going back to the definition of an unethical leader's identity, an *ULr might be able (intentionally) to achieve a positive (ethical) image of himself at the level of the follower's perception.* But the follower might never know.

Hence, the vagueness of antecedents and consequences related to unethical leadership might be rooted in (intentionally) shifted perceptions of a dyadic reality; *the leader's Ethical Position according to the follower's perception is not/does not have to be the same as an Ethical Position a leader holds in real.*

No matter if such a shift in Ethical Positions is a product of legal rights and duties varying across the hierarchy, status of social groups or only individual interests. No matter if this vertical, in terms of social structures, shift in ethical ideologies is a personality antecedent for a successful rat racing or a consequence of national and/or organizational cultural dependencies. Let us for sake of this paper deduce (in relative terms) that *ULr holds a subjectivistic moral ideology, while ELr holds an absolutistic moral ideology* per se.

Although the measurability and result interpretation foresee its own limits, a further development of this model and related research methodology is open to integration with e.g. the theory of Cognitive Dissonance (Festinger, 1962) which could allow a more complex scientific and empirical application in the future. In terms of practical application, this simple (un-)ethical leader's identity model foresees a usefulness wherever any form of management and communication take place e.g. in the field of human resource management, political marketing strategies, cultural and organizational anthropology, negotiation and conflict-solving styles etc. Finally, this paper is a partial work towards understanding Slovak business culture and author's further research is therefore intended to achieve its unique conceptualization.

Besides that, once so openly defined for any other application, future research might take different directions. In terms of theoretical conceptualization, the new theoretical definitions of *a naive follower (the one who believes his leader is more ethical than he is in real)* and *a distrustful follower (the one who believes his leader is more unethical than he is in real)* need to be alternatively stipulated and, thereby, their coerced coexistence related to the model of (un-)ethical leader's identity is to be underlined. In terms of methodological development of an ideology-based approach of (un-)ethical leadership, the original EPQ must be adjusted to reflect the leader-follower dyad as technically as possible. In terms of philosophical groundwork, the bias for the result interpretation must be defined at front: Is one's state of mind (matter of subjective perception e.g. ethical consequences) an antecedent or a consequence of a state of reality (matter of objective fact e.g. cultural standard as a reference point)? And, since these two main ontologies are interdependent, how do they interfere with each other in practice?

Conclusion

The conference paper proposes a simple model of unethical leader's identity, in terms of moral actions, communication and vales, and its complementary potential for further research on ethical and unethical leadership.

The suggested theory and research approach propose to divert from researching follower's perception of leader's behavior in terms of ethics; it suggests researching follower's cognition based on own experience with leadership style over time which is independent on the matter of leader's observable behavior and/or follower's perception in the current situation and/or moment of time.

Discussing its methodological application, a variety of possible interpretations can be conducted. According to the definition of one's identity, an unethical leader has two "scientific faces" to be researched separately; one for himself and another for his followers. But, opposite to other methodologies, these two faces are clearly interconnected and, thus, a descriptive, causal, nomological, comprehensive, cross-culturally applicable, integrated and still measurable grounded theory to solve some empirical dilemmas e.g. self-other-agreement is herein offered for discussion.
Hence, an ideology-based approach to researching (un-)ethical leadership is proposed. Let us hope that the idea behind this conference paper helps the scientific community to understand observable (un-)ethical paradoxes at the individual level of leader-follower dyad and many irrational phenomena observed at the organizational, institutional or even public-government level too.

References

Akerlof, G.A., Dickens, W.T., 1982. The economic consequences of cognitive dissonance. The American economic review 72, 307–319.

Bandura, A., 1971. Social learning theory. General Learning Corporation 46.

Brown, M.E., Treviño, L.K., Harrison, D.A., 2005. Ethical leadership: A social learning perspective for construct development and testing. Organizational behavior and human decision processes 97, 117–134.

Ferencikova, S., Poór, J., Kollar, P., Legnerova, K., 2016. Evaluating the ethical position in eight Central and Eastern European countries. Journal of Eastern European and Central Asian Research 3, 1.

Festinger, L., 1962. Cognitive Dissonance. Scientific American 207, 93–106.

Forsyth, D.R., 1980. A taxonomy of ethical ideologies. Journal of Personality and Social psychology 39, 175.

Galinsky, A.D., Magee, J.C., Inesi, M.E., Gruenfeld, D.H., 2006. Power and Perspectives Not Taken. Psychological Science 17, 1068–1074.

Graen, G.B., Uhl-Bien, M., 1995. Relationship-based approach to leadership: Development of leader-member exchange (LMX) theory of leadership over 25 years: Applying a multi-level multi-domain perspective. The leadership quarterly 6, 219–247.

Hofstede, G., Hofstede, G.J., 2006. Kultury a organizace: Software lidské mysli (eng. Cultures and Organizations - Software of the Mind).

Hunter, S., 2012. (Un)Ethical Leadership and Identity: What Did We Learn and Where Do We Go from Here? Journal of Business Ethics 107.

Kalshoven, K., Den Hartog, D.N., De Hoogh, A.H., 2011. Ethical leadership at work questionnaire (ELW): Development and validation of a multidimensional measure. The Leadership Quarterly 22, 51–69.

Lašáková, A., Remišová, A., 2015. Unethical Leadership: Current Theoretical Trends and Conceptualization. Procedia Economics and Finance 34, 319–328.

Lašáková, A., Remišová, A., Kirchmayer, Z., 2016. Are Managers in Slovakia Ethical Leaders? Key Findings on the Level of Ethical Leadership in the Slovak Business Environment. Periodica Polytechnica Social and Management Sciences.

Lord, R.G., Maher, K.J., 1991. Leadership and Information Processing: Linking Perceptions and Performance.

Nye, J., Forsyth, D.R., 1984. The Impact of Ethical Ideology on Moral Behavior. Presented at the Annual Meeting of the Eastern Psychological Association, Baltimore, MD.

Padilla, A., Hogan, R., Kaiser, R.B., 2007. The toxic triangle: Destructive leaders, susceptible followers, and conducive environments. The Leadership Quarterly 18, 176–194.

Pink, D.H., 2012. To sell is human: The surprising truth about moving others. Penguin.

Rest, J., Narvaez, D., 1991. The college experience and moral development. Handbook of moral behavior and development 2, 229–245.

Rest, J.R., 1986. Moral development: Advances in research and theory. Praeger Frederick.

Riggio, R.E., Zhu, W., Reina, C., Maroosis, J.A., 2010. Virtue-based measurement of ethical leadership: The Leadership Virtues Questionnaire. Consulting Psychology Journal: Practice and Research 62, 235.

Rush, M.C., Thomas, J.C., Lord, R.G., 1977. Implicit leadership theory: A potential threat to the internal validity of leader behavior questionnaires. Organizational Behavior and Human Performance 20, 93–110.

Scholtens, B., Dam, L., 2007. Cultural Values and International Differences in Business Ethics. J Bus Ethics 75, 273–284.

Thoroughgood, C.N., Padilla, A., Hunter, S.T., Tate, B.W., 2012. The susceptible circle: A taxonomy of followers associated with destructive leadership. The Leadership Quarterly 23, 897–917.

Yukl, G., Mahsud, R., Hassan, S., Prussia, G.E., 2013. An improved measure of ethical leadership. Journal of leadership & organizational studies 20, 38–48.

Well-Being or Well-Appearing? A Multi-case Analysis of Employees' Perceptions of Organizational Well-being Initiatives

Paula Ungureanu, Department of Sciences and Methods for Engineering (DISMI), University of Modena and Reggio Emilia, Reggio Emilia, Italy, University of Modena and Reggio Emilia
paula.ungureanu@unimore.it

Fabiola Bertolotti, Department of Sciences and Methods for Engineering (DISMI), University of Modena and Reggio Emilia, Reggio Emilia, Italy, University of Modena and Reggio Emilia
fabiola.bertolotti@unimore.it

Massimo Pilati, Marco Biagi Department of Economics, University of Modena and Reggio Emilia, Reggio Emilia, Italy, University of Modena and Reggio Emilia
massimo.pilati@unimore.it

Abstract

The aim of this study is to investigate the relationship between well-being initiatives and employees' perceptions of well-being initiatives in different organizational contexts. We conducted a cross-context analysis of well-being initiatives in three companies operating in different sectors. Findings highlight that organizational contexts (organizational culture, organizational structure and work processes) shape management's strategic intentions about the well-being initiatives offered (i.e., the criteria used to configure the well-being packages), and the intentions that employees attribute to management's decision to offer a given configuration of well-being packages. We contribute to the process-based research of HRM and to the well-being literature by theorizing on the interplay between employers' strategic intentions and employees' attributions of intentions.

Keywords: HR practices effectiveness; organizational well-being initiatives, employee perceptions, organizational context, process-based HRM

Introduction

Well-being is a popular notion in today's society, a virtue as much desired and promoted as contested and debated (Sointu, 2005). Among well-being topics, health and well-being in the workplace have become popular topics, achieving, in the last 50 years, growing impact in mainstream media, practitioner-oriented magazines and scholarly journals alike (Cooper and Cartwright, 1994; Danna and Griffin, 1999; Grant et al., 2007; Huppert and So, 2013; Smith et al., 1995; Sointu, 2005; Diener et al, 1999; Keyes, Schmotkin, and Ryff, 2002; Seligman, 2011). Leaders and managers are enhancing employee well-being in various ways, from professional development and employee recognition practices to healthcare benefits and free employee assistance initiatives, with the belief that these can provide a wide range of competitive advantages for the organization, such as higher employee performance on the job, higher capacity to attract and retain employees and higher recognition of the organization in its external environment (Danna and Griffin, 1999; Gant et al., 2007; Hartwell et al., 1996; Grawitch et al., 2006; Rynes et al., 2002; Sointu, 2005). While most competitive advantages deriving from well-being initiatives are associated to conditions that are internal to the organization (i.e., organizational performance and climate, employee commitment, retention, engagement, etc.), others have increasingly concerned organizational image with respect to external stakeholder such as customers, public press or potential employees. As a consequence, organizations that foster employee well-being are increasingly acknowledged by societal awards, such as Fortune magazine's annual list of the "Best Companies to Work For" and are recognized by current and prospective employees as desirable places to work.

However, well-being has been everything but a straightforward concept, both in research and in the societal sphere. It is widely acknowledged that conceptualisations and experiences of well-being are ambiguous or even contrasting, according to the different institutional settings in which they are produced (Sointu, 2005). Recent studies have identified considerable cultural ambivalence about how to implement work–life balance initiatives, and whom these must ultimately benefit. Questions are raised regarding the feasibility of benefiting different types of workers and organizations at the same time as well as about the possibility of reconciling competing interests between employees and employers. For instance, studies have highlighted the tensions in implementing initiatives that ultimately truly benefit both employers and employees, and have suggested the difficulties of reconciling multiple stakeholder agendas and identifying a common good nexus (Kossek et al., 2006; 2009). The ambiguous and contested nature of well-being is explained in part by the tendency of employers and employees to turn well-being into an increasingly broad, overarching concept which entails multiple dimensions, from health, spirituality, job satisfaction and up to work-life balance, such that, taken together, these can provide an indicator of the life satisfaction of "the whole person" (Warr, 1990; Jamison and O'Mara, 1991; Forgeard et al. 2011). Paradoxically, the wider the concept becomes, the more opportunities it offers for organizations and employees to draw on it differently, according to interests at hand (Kossek et al., 2009). However, relatively little research has explored how well-being initiatives -as proposed by highly different organizations and as experienced by multiple types of employees- are shaped by organizational settings.

In line with emerging research, we argue that to truly understand the underlying causes of well-being, as promoted by organizations and as perceived by employees, one must understand the context in which well-being initiatives are co-produced (Allen et al., 2013; Kossek et al., 2009; Ollier-Malaterre, 2009). From such standpoint, an increasing number of studies have suggested that organizational and institutional contexts impact the well-being initiatives that organizations decide to offer to their employees (Allen, 2001; Goodstein, 1994; Milliken et al., 1998; Ollier-Malaterre et al., 2013; Powell et al., 2009). Other studies have investigated employees' perceptions of well-being initiatives (Eby et al., 2005; Rhoades and Eisenberger, 2002; Shore and Shore, 1995; Thompson et al., 1999). As far as the first aspect is concerned, studies have identified a range of meso-level variables at the organizational level: organizational sector, setting and structure, demographic composition of organization, HR practices and initiatives, well-being culture, work groups and supervisor support (see Den Dulk et al., 2012; Goodstein, 1994) that impact the type of well-being initiatives being offered at the organizational level. Accordingly, organizations make both implicit and explicit choices regarding the adoption of certain practices and procedures as to reward and support certain employee behaviours. Organizational factors (i.e., structural and cultural) have been said to significantly shape the strategy that organizations adopt concerning well-being initiatives (see Allen, 2001; Ollier-Malaterre et al., 2013). Yet currently we have a limited understanding about this phenomenon and how it contributes to shape employees' perception of well-being initiatives.

As concerning employees' perceptions of well-being initiatives, various studies have highlighted that while a company might decide to make certain well-being initiatives available, not all employees may choose to take advantage of them, and not in all cases these will have a positive effect on employees' job satisfaction and affective commitment to the organization (Allen et al., 2013; Bardoel and DeCieri, 2006; Ollier-Malaterre, 2009; 2010; Thompson et al., 1999). In some cases, well-being initiatives may be administered in ways that limit employees' control over how, when and where they work. An insistent and universal promotion of employee initiatives outside the organization might upset employees if they perceive these are used by organizations to promote their own interests and image (Ollier-Malaterre, 2010). Employees may also discount available initiatives when implementation is not perceived in line with formally stated initiatives or when they are applied unequally or discretionally by managers and supervisors (Kelly and Kalev, 2006; Kossek et al., 2005; Lambert and Waxman, 2005; Shanock and Eisenberger, 2006). However, few studies have looked at both sides of the coin so far.

To understand the processes underlying these contrasts, Ollier-Malaterre (2010) calls for renewed attention to employees' awareness, need, use and judgment of organizational initiatives, and suggests that these aspects might develop in a relational space, at the interface between personal factors, organizational environment and institutional environment. From such perspective, how well-being

initiatives are proposed, on the one hand, and how they are perceived and used, on the other, are mutually-constitutive, and shaped by the culture and institutional frame in which the work environment is situated.

Research objectives

We suggest that adopting a relational perspective in which well-being initiative perceptions are a result of negotiated interactions with others (Ollier-Malaterre, 2010), can contribute to reducing this gap. To give an example, previous studies have overlooked whether employees' perception of organizational initiatives as genuine or legitimating, as enablers of their own needs or as constrainers, are related to their perception of the type of organization for which they work (see Allen et al., 2013; Friedman and Lobel, 2003; Grawitch et al., 2006; Kelly and Kalev, 2006). For instance, working in a large private company specialized in tangible goods production in which male employees are predominant might determine HR managers to offer different well-being initiatives than a public company specialized in intangible goods delivery in which women employers are the majority. The first may decide to invest more in development and health and safety initiatives, while the second might decide to give prevalence to work-life balance initiatives. In turn, how employees in the two companies will perceive the initiatives might depend on their understanding of the organization for which they work, and the sector in which it operates. Yet so far few studies have looked symmetrically at both employer and employee perspectives, considering the interests of one in relation to those of the other, and investigating the relation between availability, voluntary or involuntary use, and reports of perceived control among employees and employers (Thompson and Prottas, 2006).

We suggest that a perspective that takes into consideration the characteristics of the organizational setting, and the way they are perceived by employers and employees alike, may significantly contribute to advancing the argument (Kelly et al., 2011). Accordingly, organisations' well-being initiatives and their effect on employees must be considered within the context in which the organization operates (Kelly and Kalev, 2006). Organizational factors such as structure and culture represent further considerations that must be taken into account when trying to investigate employee's perception of the well-being practices they are exposed to.

Consequently, our research question is:

How do organizational characteristics influence organizations' employee well-being initiatives and the perceptions of the employees regarding availability and propensity to use?

Context and Methods

In our study we perform a qualitative cross-context analysis of well-being initiatives in three organizations active in different sectors – mechatronic industry, insurance services and knowledge intensive services – to investigate the relationship between organization contexts, well-being initiatives (in our study labeled as "well-being packages") and employee perceptions of well-being initiatives. Sait Industries is a leader in the design and creation of advanced mechatronic systems for power transmission in agricultural and industrial machines. Sait has more than 1500 employees, six production plants across two continents. Royal Insurance is a leading global insurance company with franchised offices in 60 countries which count about 80.000 employees. Franchises are highly standardized environments and heavily regulated by the parent company as far as locations, workspace layout, functional divisions inside the franchises, work hours and interaction with clients are concerned. Project Consulting is a consulting knowledge intensive firm specialized in the design of data warehouse management, business intelligence, big data analytics and performance management. It was founded in 2001 by a group of university researchers who made of IT research applied to business the strength of their company. Project Consulting is currently traversing a phase of intensive expansion; it employs 130 people, a number which has doubled over the last 5 years. Project Consulting has won several prestigious international awards.

Our data collection consisted in semi-structured interviews with top management, HR managers and employees in each organization, for a total of 70 fully-recorded, fully-transcribed interviews. •

We collected and analyzed our data following the grounded theory approach to build a grounded model (Corbin and Strauss, 2008; Strauss and Corbin, 1990). During the first phases of development of the grounded model, we open-coded for recurrent first order concepts, which we then grouped to create second order themes and finally, aggregate theoretical dimensions. As a final step of our coding, we identified relationships between second order themes and aggregate theoretical dimensions in order to build a grounded model that is represented in figure 1.

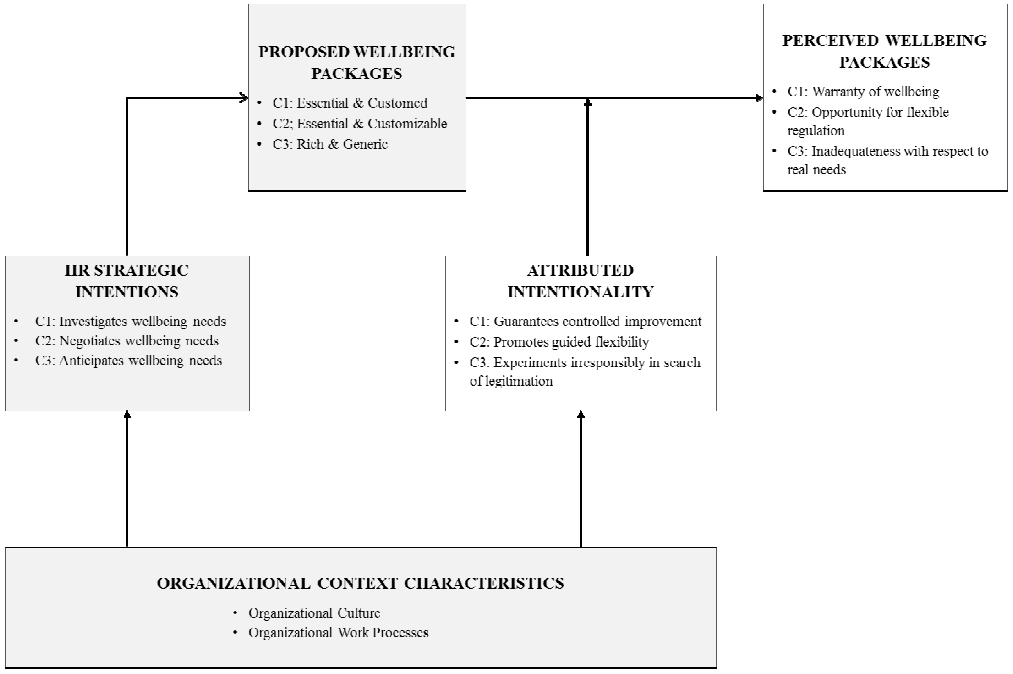


Fig.1. A grounded model of the interplay between well-being initiatives as offered by organizations and as perceived by employees. A cross-case study of three organizational settings (Case 1: Sait Industries (C1); Case 2: Royal Insurance (C2); Case 3: Project Consulting (C3).

Findings

Our findings show that organizational settings (organizational culture and work processes) significantly shape organizations' HR strategic intentionality- how HR managers gathered and used information about employees' well-being demands to craft their company's well-being initiative. We also find that employees interpret their organizations' well-being package by drawing on the broader understanding about the goals and intentions of the organizations for which they work.

In particular, the context characteristics in which the three organizations operated differed in terms of organizational culture, structure and processes. Accordingly, Sait's main goal was to strive for excellence by providing customers with innovative products and efficient services, and by using technological innovation to contribute to the balanced and sustainable growth of the planet. Strong know-how, high quality products, reliability, innovation and efficiency were mentioned by our informants and in documents among Sait's main values and distinctive features. A great attention to safety, health and hygiene were also frequently mentioned by our informants. In terms of organization

of work processes, Sait has a weak/functional matrix organization which combines coordination mechanisms based on rules and procedures with management by exceptions. For instance, functions that ensure operational efficiency and require more frequent or direct contact are located within the same open space. Cross-functional teams called "sites" are created to deal with complex projects inside the organization. A project manager supervises the team, assigning them macro-tasks while leaving micro-tasks for each team member to perform independently. Work processes both in offices and on the production floor are regulated by highly explicit rules and formalized procedures aligned with the total improvement perspective.

Royal Insurance's culture is deeply rooted in the customer-centric culture of the parent organization. As indicated by our informants, the parent company's customer-centric culture pushes the top management of the single franchises to organize and direct all work processes to reflect great attention to customer needs, including customer service hours and logistics or types of services being offered. To give an example, in line with the company slogan "Customer must feel at home", the franchise we studied had recently moved at the ground floor of a central building that offered better accessibility to customers with ambulation problems. We also found out that even the fragrance inside franchised offices was chosen by the parent company after a study of customers' preferences. As our informants explained, Royal aims at actively improving the quality of life of customers and employees alike. A "circular approach" to employee and customer satisfaction was frequently mentioned. Accordingly, Royal Insurance is committed to enhancing employees' happiness and attachment to the work environment because they expect this will also translate in greater customer satisfaction.

In terms of organization of work processes, Royal Insurance has a divisional (i.e., multi-focused) organizational structure based on the standardization and coordination of activities across franchised offices. Like Sait, it entails highly structured rules and procedures, and a clear hierarchical line in which general directives are communicated to managers using a top down logic. Once general directives are distributed, the members of each franchise, and then of each department within the franchise, decide autonomously how to achieve assigned objectives.

Project's culture is best described by dynamism. The company's rapid expansion is driven by the ambitious mission to design solutions for every individual, company and industry, by using cutting-edge technology, solid data analytics and expert teams ready to assist data-supported decisions. To do that, the company places high attention to its clients, aiming to anticipate their needs and exceed their expectations. The company slogan "Advancing knowledge for better decisions making" (internal document source) is used equally inside the company, with clients and in the interaction with external stakeholders. The distinctive features of the company culture are the drive to exceed expectations through a mix of "best decision competencies" -i.e., strong internal know-how, creativity, dynamism and innovation. In terms of organization of work processes, Project Consulting is a project-based company organized around temporary and highly fluid project teams. Employees are usually part of macro-teams from which they are continuously selected and assigned to smaller scope teams. Usually project teams are constituted by professionals at different career stages with different skills and expertise, to ensure complementarity and foster innovation processes. The company's work processes reflect the high speed and high flexibility that characterize the market of knowledge-intensive companies. Individuals' cooperative behaviors are an important ingredient of a team's success. The work environment is relatively unstructured, with few formal rules and procedures to follow, especially when consultants are on site. Individuals are given high levels of autonomy inside projects, based on their professional expertise.

In these three different organizational contexts, we found three types of strategic intentions: a strategy based on well-being needs investigation, in the case of Sait Industries, a strategy based on well-being needs negotiation, in the case of Royal Insurance, and a strategy based on anticipation of well-being needs, in the case of Project Consulting.

These HR strategic initiatives related to different "proposed well-being packages" as follows.

Sait's strategic intention to investigate well-being needs led to a package consisting of essential and customized well-being initiatives; Royal Insurance's strategic intention to negotiate well-being needs let to the setup of a well-being package with essential and customizable features, while the anticipatory strategy of Project Consulting led to the creation of a rich but generic offer of well-being benefits.

We also found that employees perceive well-being packages more or less positively (as warranty of well-being, in the case of Sait Industries, as opportunity for flexible regulation, in the case of Royal Insurance, or as inadequate with respect of real needs, in the case of Project Consulting), according to whether organizations investigated, negotiated or anticipated their well-being needs. Such relationship was influenced by the intentions that employees attributed to their organizations' well-being offer. In the case of Sait Industries, employees saw well-being packages as a way for HR to guarantee controlled improvement of the organization as a whole; In Royal Insurance, the well-being packages were seen as the way through which HR promoted guided flexibility of the work force. By contrast, in Project Consulting, employees interpreted the well-being packages as a corporate tool to experiment irresponsibly in search of internal and external legitimation. We also found that the intentionality that employees attributed to the well-being initiatives of their organizations was considerably shaped by their understanding of the organizational context.

We thus identify two significant factors that explain the degree of fit between well-being packages offered by organizations and employee perceptions:

1) HR strategic intentions - organizations' attributions about what employees might need in terms of well-being.

2) Employee's attributed intentionality - employees' attributions about the intentions with which organizations offer well-being initiatives.

We thus found that the well-being initiatives offered by the three organization were significantly influenced by the contexts in which they operated. Specifically, organizational contexts shaped management's strategic intentions regarding employees' well-being initiatives, on the one hand, and how employees made sense of such intentions (attributed intentions), on the other hand. In turn, attributed intentions shaped employees' perceptions of the well-being packages they were offered.

Discussion and Implications

We aim at contributing to theory and to managerial implications in several ways. First, with this study we propose a renewed attention to how employers and employees co-construct well-being initiatives in well-being context. We show that since cultural and structural features of organizations vary widely across industries, they can have profound implications for the interrelationships between well-being initiatives as proposed by employers and as received by employees. From such perspective, we bring to the fore the system of mutual attributions that surround well-being initiatives –i.e., organizations' and employee's intentionality attributions as far as well-being is concerned. We draw attention to the risks associated to anticipating well-being needs. Perceived initiatives discretion may make sense from the perspective of management, especially when accompanied by the intention to surprise employees by anticipating their needs, but it clearly contradicts employees' goal of increasing control over how, when and where they work and conduct their life in general. When organizations take a "Let's give it a try" approach, employees may resist their offers because they attribute such organizations hidden or auto-referential intentions, that are distant from their real wellbeing needs. Our findings are coherent with the studies showing that whenever employees feel constrained by adventurous HRM initiatives, they may not feel in control and, as a consequence, they may define the organization as unjust, untrustworthy or unreliable (Blair-Loy and Wharton, 2002; Hayman,2009; Kossek et al. 2006). It thus become important to understand whether well-being initiatives are perceived as "real" initiatives –i.e., authentic interest for employee's well-being or as façade initiatives –i.e., tools for "appearing" by obtaining legitimation inside and outside the organization (see also the discussion by Kelly and Kalev, 2006). From such standpoint, the role of management in facilitating the alignment between organizations' intentions and

attributed intentionality may constitute a further research direction to further understand the dynamics of alignment/misalignment (Ahuja et al., 2007; Bertolotti et al., 2004; Kossek et al., 2011; Thompson and Prottas, 2006;). Second, we contribute to the discussion on the role of well-being initiatives availability versus use, underlining the trade-offs between rich well-being packages which provide employees with multiple experiential opportunities and more customized packages which provide greater control (Allen et al., 2013; Chua and Iyengar, 2006; Iyengar and Lepper, 2000; Lapierre and Allen, 2012). Third, we draw attention to how the context in which organizations operate, their mission, goals and HR strategies might lead to unintended consequences as far as employee reception of well-being initiatives is concerned. We claim that the context characteristics in which the three organizations operated differed in terms of the following variables: organizational culture, organizational structure and organization of work processes. Different organizational characteristics contributed to shaping different HR strategic intentions, which were interpreted differently by employees that were seriously conditioned in their interpretation of well-being packages by the understanding they had of the organizational setting in which they were inserted.

The limited understanding about how people use elements from their environments to make sense about another's intention draws the case for a dynamic and contextualized analysis of people's understanding of their mutual roles. Yet, context has received only limited attention so far, and has been prevalently treated as contingency rather than as an active part of a shared intentionality process. The same problem is reflected in the HRM process-based literature which has given limited attention to the antecedents of the relationship between HR initiatives and employee perceptions (Bowen and Ostroff, 2004). By discussing employee oriented versus company oriented attributions, Nishii and colleagues (2008) and Chen and Wang (2014) make a step further but they do not delve into what determines employees to choose an attribution over another. From such standpoint, not only our perspective brings a more nuanced understanding of the well-being challenges people face in different work settings, but also initiates a discussion about the types of solutions that may be most appropriate for settings with different characteristics.

References

Ahuja, M. K., Chudoba, K. M., Kacmar, C. J., McKnight, D. H., and George, J. F. (2007). IT road warriors: Balancing work-family conflict, job autonomy, and work overload to mitigate turnover intentions. *Mis Quarterly*, 1-17.

Allen, T. D. 2001. Family-supportive work environments: The role of organizational perceptions. *Journal of Vocational Behavior*, 58(3): 414-435.

Allen, T. D., Johnson, R. C., Kiburz, K. M., and Shockley, K. M. 2013. Work–family conflict and flexible work arrangements: Deconstructing flexibility. *Personnel Psychology*, 66(2): 345-376.

Bardoel, E., and De Cieri, H. 2006. Developing a work/life strategy in a multinational enterprise (MNE).

Bertolotti, F., Macrì, D. M., and Tagliaventi, M. R. (2004). Social and organisational implications of CAD usage: a grounded theory in a fashion company. *New Technology, Work and Employment, 19*(2), 110-127.

Blair-Loy, M., and Wharton, A. S. 2002. Employees' use of work-family policies and the workplace social context. *Social Forces*, 80(3): 813-845.

Bowen, D. E., and Ostroff, C. (2004). Understanding HRM–firm performance linkages: The role of the "strength" of the HRM system. *Academy of Management Review, 29*(2), 203-221.

Chen, D., and Wang, Z. (2014). The effects of human resource attributions on employee outcomes during organizational change. *Social Behavior and Personality: an international journal, 42*(9), 1431-1443.

Chua, R. Y.-J., and Iyengar, S. S. 2006. Empowerment through choice? A critical analysis of the effects of choice in organizations. *Research in organizational behavior*, 27: 41-79.

Cooper, C. L., and Cartwright, S. 1994. Healthy mind; healthy organization—A proactive approach to occupational stress. *Human Relations*, 47(4): 455-471.

Corbin, J., and Strauss, A. (2008). *The basics of qualitative research* (3rd ed.) Los Angeles, CA: Sage

Danna, K., and Griffin, R. W. 1999. Health and well-being in the workplace: A review and synthesis of the literature. *Journal of Management*, 25(3): 357-384.

den Dulk, L., and de Ruijter, J. 2008. Managing work-life policies: disruption versus dependency arguments. Explaining managerial attitudes towards employee utilization of work-life policies. *The International Journal of Human Resource Management*, 19(7): 1222-1236.

Diener, E., Suh, M., Lucas, E., and Smith, H. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin*, *125*(2), 276–302.

Eby, L. T., Casper, W. J., Lockwood, A., Bordeaux, C., and Brinley, A. 2005. Work and family research in IO/OB: Content analysis and review of the literature (1980–2002). *Journal of Vocational Behavior*, 66(1): 124-197.

Eisenhardt, K. M. 1989. Building theories from case study research. *Academy of Management Review*, 14(4): 532-550.

Forgeard, M. J. C., Jayawickreme, E., Kern, M. and Seligman, M. E. P. (2011). Doing the right thing: Measuring wellbeing for public policy. *International Journal of Wellbeing*, *1*(1), 79–106.

Goodstein, J. D. 1994. Institutional pressures and strategic responsiveness: Employer involvement in work-family issues. *Academy of Management Journal*, 37(2): 350-382.

Grant, A. M., Christianson, M. K., and Price, R. H. 2007. Happiness, health, or relationships? Managerial practices and employee well-being tradeoffs. *The Academy of Management Perspectives*, 21(3): 51-63.

Grawitch, M. J., Gottschalk, M., and Munz, D. C. 2006. The path to a healthy workplace: A critical review linking healthy workplace practices, employee well-being, and organizational improvements. *Consulting Psychology Journal: Practice and Research*, 58(3): 129.

Hartwell, T. D., Steele, P., French, M. T., Potter, F. J., Rodman, N. F., and Zarkin, G. A. 1996. Aiding troubled employees: the prevalence, cost, and characteristics of employee assistance programs in the United States. *American Journal of Public Health*, 86(6): 804-808.

Hayman, J. R. 2009. Flexible work arrangements: exploring the linkages between perceived usability of flexible work schedules and work/life balance. *Community, Work and Family*, 12(3): 327-338.

Huppert, F. A., and So, T. T. 2013. Flourishing across Europe: Application of a new conceptual framework for defining well-being. *Social Indicators Research*, 110(3): 837-861.

Iyengar, S. S., and Lepper, M. R. 2000. When choice is demotivating: Can one desire too much of a good thing? *Journal of personality and social psychology*, 79(6): 995.

Jamison, D., and O'Mara, J. 1991. Managing workforce 2000: San Francisco: Jossey-Bass.

Kelly, E. L., and Kalev, A. 2006. Managing flexible work arrangements in US organizations: Formalized discretion or 'a right to ask'. *Socio-Economic Review*, 4(3): 379-416.

Kelly, E. L., Moen, P., and Tranby, E. 2011. Changing workplaces to reduce work-family conflict schedule control in a white-collar organization. *American Sociological Review*, 76(2): 265-290.

Keyes, C. L. M., Shmotkin, D., and Ryff, C. D. (2002). Optimizing well-being: The empirical encounter of two traditions. *Journal of Personality and Social Psychology*, *82*, 1007–1022.

Kossek, E. E., Lautsch, B. A., and Eaton, S. C. 2005. *Flexibility Enactment Theory: Implications of Flexibility Type, Control, and Boundary Management for Work-Family Effectiveness*: Lawrence Erlbaum Associates Publishers.

Kossek, E. E., Lautsch, B. A., and Eaton, S. C. 2006. Telecommuting, control, and boundary management: Correlates of policy use and practice, job control, and work–family effectiveness. *Journal of Vocational Behavior*, 68(2): 347-367.

Kossek, E. E., Lewis, S., and Hammer, L. B. 2009. Work–life initiatives and organizational change: Overcoming mixed messages to move from the margin to the mainstream. *Human Relations*.

Kossek, E. E., Pichler, S., Bodner, T., and Hammer, L. B. (2011). Workplace social support and work–family conflict: A meta-analysis clarifying the influence of general and work–family-specific supervisor and organizational support. Personnel psychology, 64(2), 289-313.

Lambert, S. J., and Waxman, E. 2005. *Organizational Stratification: Distributing Opportunities for Balancing Work and Personal Life*: Lawrence Erlbaum Associates Publishers.

Lapierre, L. M., and Allen, T. D. 2012. Control at work, control at home, and planning behavior implications for work–family conflict. *Journal of Management*, 38(5): 1500-1516.

Milliken, F. J., Martins, L. L., and Morgan, H. 1998. Explaining organizational responsiveness to work-family issues: The role of human resource executives as issue interpreters. *Academy of Management Journal*, 41(5): 580-592.

Ollier-Malaterre, A. 2009. Organizational work–life initiatives: context matters: France compared to the UK and the US. *Community, Work and Family*, 12(2): 159-178.

Ollier-Malaterre, A. 2010. Contributions of work—life and resilience initiatives to the individual/organization relationship. *Human Relations*, 63(1): 41-62.

Ollier-Malaterre, A., Valcour, M., Den Dulk, L., and Kossek, E. E. 2013. Theorizing national context to develop comparative work–life research: A review and research agenda. *European Management Journal*, 31(5): 433-447.

Nishii, L. H., Lepak, D. P., and Schneider, B. (2008). Employee attributions of the "why" of HR practices: Their effects on employee attitudes and behaviors, and customer satisfaction. *Personnel Psychology, 61*(3), 503-545.

Powell, G. N., Francesco, A. M., and Ling, Y. 2009. Toward culture-sensitive theories of the work–family interface. *Journal of Organizational Behavior*, 30(5): 597-616.

Rhoades, L., and Eisenberger, R. 2002. Perceived organizational support: a review of the literature. *Journal of Applied Psychology*, 87(4): 698.

Rynes, S. L., Colbert, A. E., and Brown, K. G. 2002. HR professionals' beliefs about effective human resource practices: Correspondence between research and practice. *Human Resource Management*, 41(2): 149-174.

Seligman, M. E. P. (2011). *Flourish – A new understanding of happiness and well-being – and how to achieve them.* London: Nicholas Brealey Publishing.

Shanock, L. R., and Eisenberger, R. 2006. When supervisors feel supported: relationships with subordinates' perceived supervisor support, perceived organizational support, and performance. *Journal of Applied psychology*, 91(3): 689.

Shore, L. M., and Shore, T. H. 1995. Perceived organizational support and organizational justice. *Organizational politics, justice, and support: Managing the social climate of the workplace*: 149-164.

Smith, K. K., Kaminstein, D. S., and Makadok, R. J. 1995. The health of the corporate body: Illness and organizational dynamics. *The Journal of Applied Behavioral Science*, 31(3): 328-351.

Sointu, E. 2005. The rise of an ideal: tracing changing discourses of wellbeing. *The Sociological Review*, 53(2): 255-274.

Strauss, A., and Corbin, J. M. 1990. *Basics of qualitative research: Grounded theory procedures and techniques*: Sage Publications, Inc.

Thompson, C. A., Jahn, E. W., Kopelman, R. E., and Prottas, D. J. 2004. Perceived organizational family support: A longitudinal and multilevel analysis. *Journal of Managerial Issues*: 545-565.

Thompson, C. A., and Prottas, D. J. 2006. Relationships among organizational family support, job autonomy, perceived control, and employee well-being. *Journal of Occupational Health Psychology*, 11(1): 100.

Warr, P. 1990. The measurement of well-being and other aspects of mental health. *Journal of Occupational Psychology*, 63(3): 193-210.

A Review of Bitcoin Literature

Ceylan Onay, Boğaziçi University, Istanbul, Turkey, ceylano@boun.edu.tr

Serhat Serhatlı, Hepsiburada.com, Istanbul, Turkey, serhat.serhatli@hepsiburada.com

Abstract

The purpose of this paper is to review the literature on Bitcoin and Blockchain technology in the past 6 years, during which it has become a global interest to both scholars and practitioners as an alternative to fiat currencies and payment systems. A content analysis is conducted to examine the development and evolution of bitcoin over time to reveal possible trends and changes. Reviewing 143 academic papers, we find that the most dominant research themes were economic and regulatory dimensions of Bitcoin.

Keywords: bitcoin, crypto currency, blockchain, digital economy

Introduction

Digital economy has taken a new turn with the emergence of bitcoin, which is a currency that is produced, stored and transferred digitally. When the first bitcoin transaction has taken place in 2009, little was known about what it was and how it would be used. Over years, Bitcoin has gained momentum rapidly. In a research survey conducted by PwC (2014), nearly half of the U.S. public was aware of Bitcoin and in an interview with Erik Schatzker of Bloomberg's "Street Smart," Bill Gates commented on Bitcoin as: "Bitcoin is better than currency in that you don't have to be physically in the same place and of course for large transactions currency can get pretty inconvenient."

Beyond being a technological innovation, Bitcoin has challenged how we define a currency. It is convertible to fiat currencies such as USD and Euros because it can fulfill three basic functions of money which are being a medium of exchange, a unit of account, and store of value. Yet, there is ongoing debate of viability of it as a currency as it is a decentralized system, where there is no central bank/authority behind it. In this regard, anyone with sufficient computational power could mine (produce) Bitcoin. Once easily mined at PCs, now it can be mined with excessive computing power due to the increase in the transaction volumes. In the Bitcoin network, each transaction has to be verified by six independent miners and this verification needs to be done all the way back to the first transaction in the Blockchain. Yet, this process means that it becomes more secure with each transaction.

Blockchain is essentially a public ledger technology on which cryptocurrencies such as Bitcoin is used. It challenges how we store and share information anonymously in many sectors ranging from health to financial services. It provides both transparency and security at the same time. Bitcoin works peer to peer for transferring money without any fees, challenging the value proposition of banks. PwC (2014) suggest that "Bitcoin becomes new payment system because it has no transaction fee and decentralized peer to peer payment system can be shielded from fluctuations caused by local government politics and their influence on central banks." In this regard, Bitcoin is becoming an open source monetary system solving the double spending problem and security issues via encryption.

In summary, Bitcoin is an electronic currency that's based on a collaboratively maintained ledger. People transfer money by sending messages to maintainers describing where and how much money should move. Maintainers make sure that the messages are from the true account owners by checking digital signatures. And finally, the maintainers reach consensus with each other through a math-based voting process. Six years ago, Bitcoin was just an innovation in information technology but now it is used to buy goods and services and has become an investment on its own. In this paper, content

analysis is conducted to examine what research fields were studied so far and how these topics changed over time.

Research Methodology

2.1 Content Analysis

There has been a remarkable increase in Bitcoin research over the past six years, and it continues to increase as it disrupts the financial services industry. Accordingly, the content of articles that are published in scholarly journals can give an idea about the change in research and themes about Bitcoin. This study provides a content analysis of research articles, which were published over six years, to understand the evolution of Bitcoin. According to Weber (1990) "Content analysis is a research method that uses a set of procedures to make valid inferences from text" and it is particularly used in social sciences to make trend analysis ((Nasir, 2005; Bayramusta and Nasir, 2016). The purpose of this study is; to set light on the progress of Bitcoin in academic research.

Figure 1 shows the content analysis process. The process starts with sample selection, where the articles are identified. In the second stage, the unit of analysis is chosen, which is followed by determination of the theme categories by coders in the third stage. In the fourth stage, from the category schemes judges select the final categories and a reliability analysis is made in the fifth stage to reveal the level of agreement between the judges. Last stage presents the analysis of collected data.

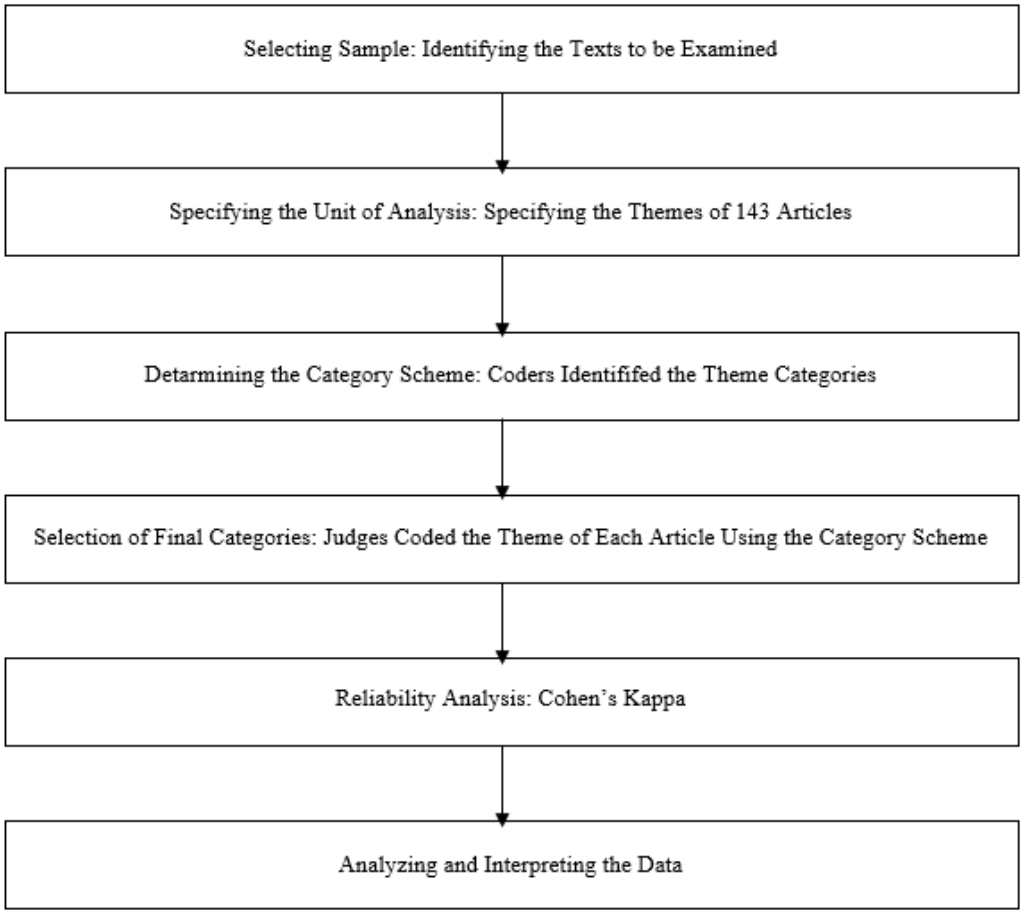


Fig. 1: Phases of content analysis.

2.2 Selecting Sample

The sample of the study consists of 143 academic articles published over the past six years from 2011 to 2016. The databases scanned through the library search facilities include ABI/INFORM complete, Ebsco, Emerald and Proquest, which include journals with different disciplines. The study sample consisted of articles from scholarly reviewed journals, which contain any of the "bitcoin", “Blockchain”, "crypto currencies", "crypto currency”, "digital currencies" or "digital currency" phrases in the title were included in the sample.

2.3 Specifying the unit of analysis

All articles from selected sample were consolidated in a table according to their database, title, author, year, journal and abstract. “Theme” of the articles is chosen as the unit of analysis to classify the papers and title and abstract of all 143 articles were reviewed by researchers to determine the main research topic of the articles.

2.4 Determining the category scheme

Two Ph.D. candidates, who have been studying both in the department of Management Information Systems and working at IT industry, were selected as coders to analyse list of themes and come up with categories. Initially they were trained by 10 randomly selected themes to ensure making classification process more reliable. As a result of training conflicts between coders were discussed and resolved. After training was completed, coders were asked to group 143 themes into small number of broader categories independently. Coders were free in determining categories and had no restriction in number of them while creating. Both coders generated seven categories each. Ultimately, a total of 16 categories were generated from 143 themes by 2 coders (Table 1)

Table 1 : Generated categories by coders.

Coder 1	Coder 2
• *Analysis of bitcoin transaction data and network*	• *Regulations & Legal Issues*
• *Application of Bitcoin on Various Context*	• *Privacy*
• *Evaluation of Bitcoin*	• *Technical Issues*
• *Evolution, Characteristics and Usage of Bitcoin*	• *Market Dynamics*
• *Examining Price of Bitcoin and Its Effects*	• *Financial Literacy*
• *Regulatory and Governmental Issues of Bitcoin*	• *Digital Economy*
• *Risks of Bitcoin* • *Security and Privacy Issues of Bitcoin* • *Tax-related issues in Bitcoin*	• *Security*

2.5 Selection of final categories

All the 16 categories which were collected from coders were evaluated by researchers and 6 mutually exclusive and exhaustive final categories are selected;

1. ″Economic dimension of Bitcoin" category: Analysing Bitcoin’s impact on (i) economic development, (ii) creation of alternative monetary, payment, and financial systems and (iii) its adoption by users
2. "Application of Bitcoin technology in a different sector" category: Usage/modification of bitcoin technology infrastructure, Blockchain, in different sectors such as health industry.
3. "Security dimension of Bitcoin" category: security, privacy, anonymity, cryptography, certification, protocols and validation issues of bitcoin technology.

4. "Price and risk dimension of Bitcoin" category: Evaluation of investing and trading bitcoin as a currency, valuation and risks of bitcoin such as speculation and price bubbles, crisis, inflation risk, usage of bitcoin in risk management
5. "Regulatory and legal dimension of Bitcoin" category: legal framework and compliance issues such as lack of regulation, fraud, criminal activity, taxes, money laundering and financial regulation.
6. "Technical dimension of Bitcoin" category: architectural design of Bitcoin in technical manner.

2.6 Reliability analysis

In order to measure reliability of categories, three judges with doctorate degrees in management information systems were assigned to make reliability assessment. They were asked to assign each of the 143 themes to final categories, which were selected in the last stage.

Even though, there are many ways to measure reliability, one way is to look pairwise percentage of agreement among judges in assigning same themes to the same categories (Table 2).

Table 2 : The percentage agreement of judges

Judges	Number of Matching (out of 143)	Percentage
A and B	*110*	*77 %*
A and C	*103*	*72 %*
B and C	*114*	*80 %*

However, Grayson and Rust (2001) mentioned that "simply using percentage agreement between judges is not so good because some agreement is sure to occur, if only by chance, and the fewer the number of categories, the more random agreement is likely to occur, thus making the relaibility appear better than really is" Therefore Cohen's K is also calculated for robustness according to the directions in the study by Grayson and Rust (2001).

$$K = \frac{p_a - p_c}{1 - p_c}$$

Where p_a is the proportion of agreed on judgments $\left(p_a = \frac{(n_{11} + n_{22} + \cdots + n_{77})}{n_{++}}\right)$; p_c is the proportion of agreements one would expect by chance $\left(p_c = \frac{(e_{11} + e_{22} + \cdots + e_{77})}{n_{++}}\right)$ and $\left(e_{ii} = (\frac{n_{i+}}{n_{++}})\ x\ (\frac{n_{+i}}{n_{++}})\ x\ n_{++}\right)$

We find Judge A and B are in agreement with 0.71 kappa score, judge A and C are in agreement with 0.66 kappa score and judge B and C are in agreement with 0.75 kappa score. According to Landis and Koch (1977), we find substantial agreement between our judges.

Research findings

The number of articles over six years is illustrated in Figure 2. At the beginning, only 2 articles were published respectively in years 2011 and 2012. Next year as bitcoin becomes more popular number of papers published climb up to 12 articles. There has been almost four-fold increase from 2013 to 2014 as the total number of articles reached to 40. After a slight short fall in 2015 with 34 articles, research on bitcoin accelerated dramatically with more interest on Blockchain technology and reached 55 papers in 2016.

3.1 Theme analysis

The result of the theme analysis is shown in Figure 3. The pie chart shows the percentage distribution of all 143 articles by themes. It is seen that, "Economic dimension of Bitcoin" (30%) and "Regulatory and legal dimension of Bitcoin" (22%) have been the dominant themes over six years. The third most studied theme is "Price and risk dimension of Bitcoin" (19%) followed by "Security and privacy dimension of Bitcoin" (16%) theme. Finally, "Application of Bitcoin technology in a

different sector" (9%) and "Technical dimension of Bitcoin" (4%) are the least attention-grabbing themes in the literature.

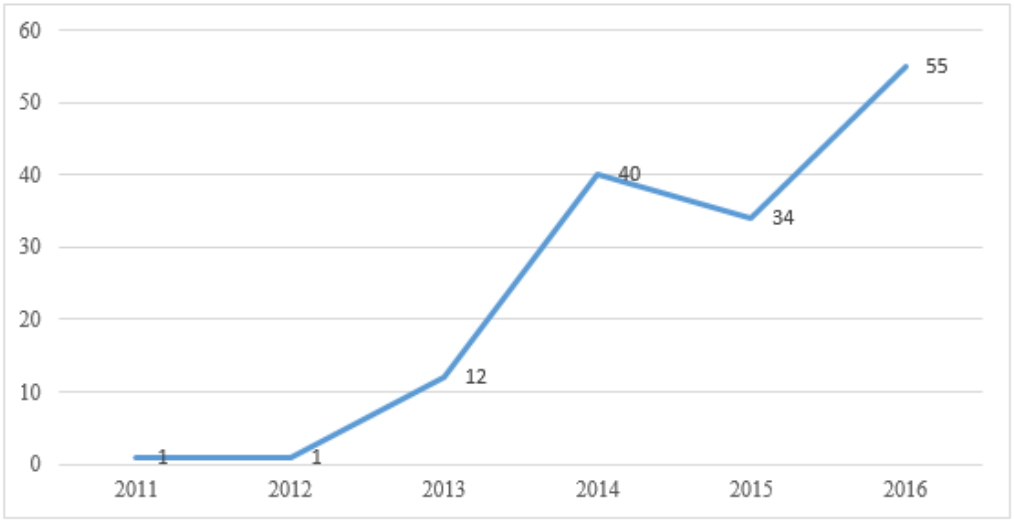


Fig. 2: The number of articles over six years

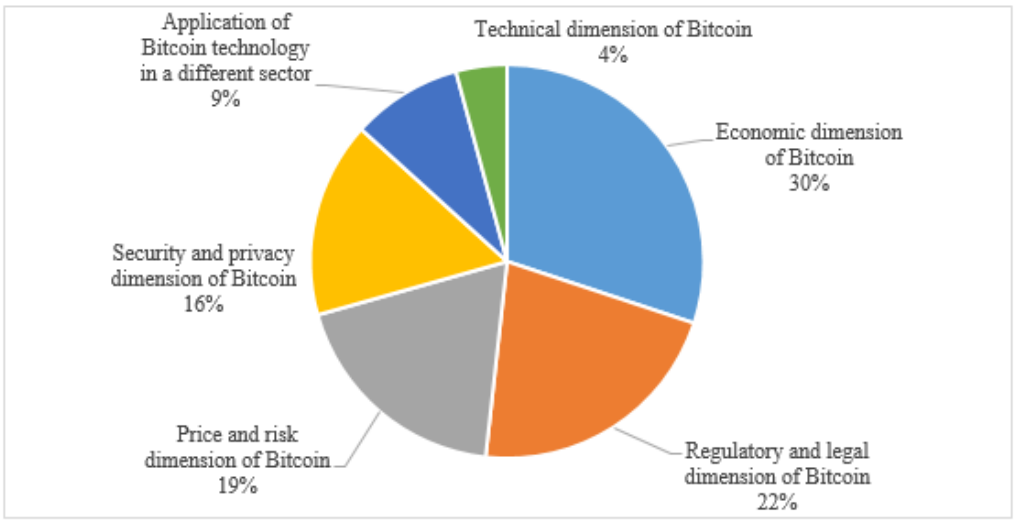


Fig. 3: Percentage distribution of articles by theme

References

Altman, D. G (1990) Practical statistics for medical research. CRC press.

Bayramusta, M. and Nasir,A. (2016), "A fad or future of IT?: A comprehensive literature review on the cloud computing research", *International Journal of Information Management* 36 (2016) 635–644.

Grayson, K. and Rust, R. (2001), "Interrater reliability", *Journal of Consumer Psychology*, Vol.

10 No. 1, pp. 71-73.

Landis, J. R. and Koch, G. G. (1977), "The measurement of observer agreement for categorical data", Biometrics, pp. 159-174.

Nasir, S. (2005), "The development, change, and transformation of Management Information Systems (MIS): a content analysis of articles published in business and marketing journals", *International Journal of Information Management*, 25(5), 442–457.

PwC (2014), "Digital Disruptor How Bitcoin is Driving Digital Innovation in Entertainment, Media and Communications", https://www.pwcaccelerator.com/pwcsaccelerator/docs/pwc-consumer-intelligence-series-bitcoins-entertainment-media-communications.pdf

Social Sustainable Supply Chain Practices and Impacts on Companies Performance: an Exploratory Study on Portuguese Manufacturing Industries

Luisa Alexandra Pinto, Prince Sultan University – College of Business Administration, Saudi Arabia - lpinto@psu.edu.sa / Polytechnic Institute of Viseu - School of Technology and Management of Lamego, Portugal - lpinto@estgl.ipv.pt

Abstract

As the role of businesses in contemporary society is changing, sustainable supply chain management has emerged as an important organisational approach to reducing environmental and social risks. Many companies' actions are under pressure from a number of stakeholders, among others customers, media, governments and investors to implement sustainable practices. So far, sustainable practices in the supply chain have focused largely on the environmental side of sustainability in comparison to the social side. Social standards in supply chains such as labour rights and worker safety are rather difficult to ensure because they are detached from the final product and hence demand monitoring for each step in the production process. This research aims at studying the internal and external social sustainable practices of eight Portuguese companies and the relationship with economic and social performance. First, the author identifies the different social practices based on the literature available It then builds on the data collected from interviews with eight Portuguese industrial companies that consisted of 22 semi-structured interviews with general managers, procurement and environmental/safety managers. Secondary data was collected from reports, websites and the companies' internal documentation. Sectors included glass, automotive, drink, wood-based panels, furniture and cork. The results indicate that the companies' performance is positively affected by the implementation of social practices into the supply chain, namely internal social practices. The paper is of use to supply chain managers, policymakers to understand the internal and external social practices used by the organisations and how they influence performance. Further, the findings could act as a key tool for managers seeking to implement socially sustainable supply chain management practices.

Keywords: social practices, supply chain, sustainability, performance.

Introduction

One of the problems of humanity is that, while man is capable of understanding the problems that he faces, he fails when it comes to planning effective solutions. This failing is due, in part, to an inability to understand that the whole is larger than its parts and that changing one of the elements always implies a change in the other elements of the system (Meadows et al., 1972). The 21stcentury is marked by a heightened urgency to respond to pressing global challenges. These include climate change, water and food insecurity, ecological degradation, and poverty, which are most pronounced in undeveloped countries but come together at the global level.

The concept of Sustainable Development (SD) has been defined in many ways, but the most frequently quoted definition is from *Our Common Future*, also known as the Brundtland Report (1987), where Sustainable Development is defined as "the development that meets the needs of the present without

compromising the ability of future generations to meet their own needs…". SD was introduced into the political agenda by the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992. The turning point for SD was in 2015, with the adoption of the Addis Ababa Action Agenda on Financing for Development, the 2030 Agenda and its associated Sustainable Development Goals, and the Paris climate conference (COP21) in December 2015, where 195 countries adopted the first-ever universal, legally binding global climate deal. The agreement sets out a global action plan to put the world on track to avoid dangerous climate change by limiting global warming to well below 2°C. SD represents a critical element that can only be achieved through a balance between the objectives of economic prosperity, ideals of environmental protection and guarantees of social equality, in accordance with the triple bottom line (TBL) perspective (Elkington, 1998). Furthermore, the focus on sustainable development must be in implementation.

Corporations are key actors for successfully implementing sustainability because of their impact on the environmental matrices of soil, water, and air as well as on the world's resources, their leading role in society (through moulding lifestyles), and their global reach. Sustainability in supply chains refers to traditional financial and operational performances and, simultaneously, to the social and environmental dimensions of business activities, as prominently conceptualised by the TBL approach (Gunasekaran et al., 2004; Dyllick & Hockerts, 2002).

The Sustainable Supply Chain Management (SSCM) agenda uses the term TBL to include all types of values, topics and processes that organisations should adopt. Besides economic objectives, this also covers environmental and social aspects, to minimise any possible damage that results from their activities, and helping create long-term economic, social and environmental value. The idea is to balance the needs of people, the planet and the company's profits to create long-term shareholder value (Elkington, 1998).Effective management of the supply chain is an essential strategy for success in global markets. The possibilities afforded by the concept of Supply Chain Management (SCM) are being explored and applied by companies to increase their growth, and helping develop agile supply chains that can bring products to market more quickly and cheaply (Gunasekaran et al., 2007).

Organisations are confronted on a daily basis with pressures from the media, non-governmental organisations (NGO), the surrounding communities and requirements imposed by environmental legislation. In addition, consumers demand more transparency and responsibility for the conditions under which their products are produced and distributed, and they demand more respect for the environment and human rights. This obliges companies to rethink the ways in which they do business, as they become more conscious of their responsibility to guarantee the long-term future ofmankind (Hay et al., 2005; Kleindorfer et al., 2005; Sarkis et al., 2011).

Sustainable companies have to ensure the production of their products without causing environmental damage while at the same time complying with social standards. Choosing to ignore this problem means they face a significant risk to their reputation and brand, having to justify their choice of suppliers to the media and confront NGO criticisms (Seuring, 2004; Lawrence, 2002). There are a number of NGOs that dedicate their work to highlighting inhumane working conditions, especially in less developed countries. Their work helps uncover strategies used by companies based in developed countries to profit from these unfair working conditions. To reduce costs, companies transfer a large part of their processes which add value to suppliers based in countries with lower cost bases. These companies put their image and reputation at risk due to the poor working conditions (Beske et al., 2008; Cheung et al., 2009; Reuter et

al., 2010). Consumer boycotts of specific products or services and the attention of the media illustrate this type of risk to a company's reputation (Locke, 2003; Teuscher et al., 2006).

SSCM covers numerous areas of environmental and social responsibility, such as the prevention of child labour and forced labour, the substitution of toxic substances in manufacturing processes, the excessive consumption of energy and material and the protection of biodiversity. To be able to manage all these areas, companies employ universally accepted guidelines or standards, such as international standards for certifying management systems covering quality, the environment, occupational health and safety, social or Global Reporting Initiative (GRI) directives (Beske et al., 2008;Bai & Sarkis, 2010; Gold et al., 2010; Koplin et al., 2007; Seuring & Müller, 2008; Wittstruck & Teuteberg, 2011).

The literature reviews available covering SSCM show the growing interest in thistheme, which is still dominated by the research into environmental practices in the supply chain, particularly the relationship between economic and environmental performance. Despite the growing number of papers, the latest literature reviews reveal that the research of social issues in sustainable supply chain management is still scarce and there is a call for more specific research in the field (Carter & Easton, 2011; Carter & Rogers, 2008; Hoejmose & Adrien-Kirby, 2012; Longoni et al., 2014: Pagell& Wu, 2009; Zorziniet al.,2015; Seuring, 2013; Tajbakhsh & Hassini, 2015).

In this research, theoretical contributions are three-fold. One will be to identify the internal and external social practices carried out by eight different companies representing different industries and their position and strategy to address social issues in the supply chain. Second, the level of the implemented practices in eight different manufacturing set-ups. Third, to analyse how the social practices influence the economic and social performance. Therefore, our primary objectives for this research are:

- To identify internal and external social sustainability practices on focal companies' supply chain.
- To analyse the level of social sustainability implementation on the eight manufacturing companies.
- To determine the similarities and differences in their approach to sustainability.
- To analyse how the social practices impact on the organisations' economic and social performance.

The structure of this article is organised as follows. After introducing the topic, the literature is reviewed to identify the socially sustainable practices implemented by different organisations. In section three, the methodology of the study is introduced. The findings and results of the empirical data analysis are presented in section four. Section five includes a summary of the findings, conclusions and future research directions.

Literature Review

A failure to correctly comply with social practices can have serious repercussions for a company's competitiveness and economic performance as well as its reputation and image in the marketplace (Schaltegger & Wagner, 2006).

Due to a failure to implement social practices in their activities, several companies have seen their public image deteriorate. These failures result in judicial proceedings and the loss of current and potential

customers, which represents large costs for the companies involved. Several examples include Nike, who lost hundreds of thousands of dollars in sales following accusations of having purchased from suppliers using child labour. The largest manufacturer of electronic components for computers in the world, producers of the iMac, iPod, iPad and the iPhone for Apple, Foxconn Technology Group, were accused of dozens of labour law violations in their factories in China, including excessive working hours, not paying salaries, and salaries that did not cover minimum living standards.In 2006, Walmart was accusedofa number of unions and community groups of obliging workers to work more hours than contracted, denying payment of overtime, rest periods and lunch breaks. In 2013, Nestle removed pasta meals from shelves in Italy and Spain and suspended deliveries of all processed products containing meat from German suppliers, because it was found that those pasta meals contained horsemeat. In the same year, in Bangladesh, the second largest textile exporter in the world, a building housing various factories collapsed causing the death of 1,229 workers and wounding more than 2,500 people. The image of numerous internationally recognised brand names was affected – including H&M, Benetton, and Mango. More recently, in 2016, factories in Turkey were found using Syrian refugee children working on clothes for Marks and Spencer and the online retailer Asos. Adult refugees were also found working illegally on Zara and Mango jeans. These examples show that all members of the supply chain (namely suppliers) need to incorporate and comply with social criteria and the focal companies are responsible for managing their supply chains.

The companies that are part of global supply chains face a high level of complexity; deal with a large number of suppliers, face constantly increasing customer expectations and different legal requirements for controlling social and environmental aspects. The pressures to effectively manage supplier relationships and the demand for ecologically correct and socially responsible products and services have increased worldwide. All these pressures from the different stakeholders present a significant challenge to company managers, encouraging them to integrate sustainable practices into their supply chains (Carter & Jennings, 2004; Geffen & Rothenberg, 2000; Porter & Kramer, 2006).

As stated in the introduction, a significant body of literature reviews SSCM from the TBL perspective. Gimenez et al. (2012) analysed the impact of environmental and social practices on the environmental, social and economic performance. Caniato et al. (2011) looked at a set of sustainable management practices in the supply chain and performance indicators to understand the relationships between these elements and their impact on the supply chain. Pullman et al. (2009) analysed the environmental and social practices in the supply chain and their impact on environmental performance, quality and costs in the food products sector. Yakovleva et al. (2009) studied economic, environmental and social performance in the supply chain for the food products industry. Using statistical data together with specialist opinions, they constructed a general sustainability index for the food products supply chain, using three sustainability dimensions (economic, environmental and social) to measure the sustainability of the supply chain. De Brito et al. (2008) analysed how companies in the textile sector supply chain can improve their economic, environmental and social performance by implementing a set of environmental and social practices.

Despite the growing number of papers, the latest literature reviews reveal that the research of social issues in supply chain is still scarce, and there is a call for more specific research in the field specially in the relationship between social practices and performance (Carter & Easton, 2011; Carter & Rogers, 2008; Hoejmose & Adrien-Kirby, 2012; Longoni et al., 2014; Pagell & Wu, 2009; Seuring, 2003; Tajbakhsh & Hassini, 2015; Zorzini et al., 2015).

Most of the studies on the social dimension of the TBL and the buying firms' performance (e.g., Akamp and Müller, 2013; Ciliberti et al., 2008; Das et al. 2008; de Brito et al., 2008; Hollos et al., 2012; Gallear et al. 2012; Gimenez et al. 2012; Klassen and Vereecke, 2012; Pagell and Gobeli, 2008; Pullman et al. 2009)have centred their attention on internal or external practices. The following studies have considered the impact of internal practices on different dimensions of the firm. Das et al. (2008) analysed how employee's safety affects operational outcomes, particularly product quality. Similarly, Pagell and Gobeli (2009) focused on the firm's operational performance and examined how it was impacted by managers' attitudes and experiences towards sustainability. De Brito et al. (2008) explored how firms in the fashion supply chain could improve their economic, environmental and social levels. Pullman et al. (2009) analysed the impact of environmental and social programs on the firm's environmental, quality and cost performances. Klassen and Vereeke (2012) developed a framework based on case studies in which they explored the role of external practices on achieving economic improvements. Stiller and Gold (2014) illustrate various SSCM practices in a focal company may use for enhancing social standards in international supply chains. Mani et al. (2015) found that the major social issues in the manufacturing supply chain in India are child labour, bonded labour, education, wages, housing, philanthropy and ethics. Another study by Awaysheh and Klassen (2010) identified four dimensions of supplier socially responsible practices: supplier human rights, supplier labour practices, supplier codes of conduct, and supplier social audits. They emphasise that an increasing number of tiers in a supply chain wouldincrease the use of supplier labour practices, codes of conduct, and social audits.

All these studies focus on either internal or external social practices. We found three papers that combined both internal and external social practices in their analysis, namely Ciliberti et al. (2008), Gallear et al.(2012) and Gimenez et al. (2012). Ciliberti et al. (2008), to achieve a socially responsible management of the supply chain, they classified the set of internal and external practices. Gallear et al. (2012) found that a firm's financial performance is affected by its internal awareness of sustainability issues, the monitoring of the firm's sustainability performance, and the sharing of best practices with suppliers. Finally, Gimenez et al. (2012) analysed the impact of internal and external programs on environmental, social and economic performances.

Although few recent reviews on the social dimension of SSCM and performance are currently available, further research in this field is needed, especially to cover the implementation of internal and external social practices and their relationship with economic and social performance. To this end, the next section seeks to identify the internal and external social practices implemented by companies in the supply chain, both upstream and downstream, the associated indicators used, and the impact of socially sustainable practices on the focal companies economic and social performance.

2.1. Social Practices

To ensure that the supply chain is socially responsible, companies need to adopt internal and external social practices into the supply chain, considering the internal and external environment of the organisation (Pullman et al. 2009, Tate et al. 2010; Gauthier, 2005).

Given the wide-ranging impacts of social questions, there are significant challenges and pressures that companies must confront to be able to systematically treat these issues. There are a series of social aspects to be considered that are related to questions that go beyond the more traditional areas of human rights and salaries. These include, among others, subjects related to health and safety in the workplace,

the contribution of the company to the community, the impact of gaining access to natural resources, health information and education, and other diverse socioeconomic questions.

The approaches that are more widely recognised are related to international human rights standards included in the Universal Declaration of Human Rights and the conventions of the International Labour Organisation. These include questions related to child labour, freedom of association, working hours, health and safety. Besides this, a growing number of NGOs started to develop directives covering commercial operations. Amnesty International laid down a set of principles covering the relationship between business and human rights. Social Accountability International implemented a standard for Social Responsibility (SA 8000) covering human and social questions in the workplace. The Fair Labour Association has a workplace code of conduct. The Ethical Trade Initiative drew-up an ethical work code, and the GRI created an international report on corporate social responsibility and sustainability, highlighting the importance of considering the workplace and human rights, as well as the socioeconomic development of the community in general and society. These approaches are concerned not only with the practices of one particular company but are also interested in the supply chain members for the whole product lifecycle. Thus, an improvement in the social dimension requires the development and maintenance of commercial practices which are just and fair for the workers and the communities in the supply chain. According to Wood (1991), the social issues in the supply chain should be spread across three stages of the supply chain: in-house operations, suppliers, customers, and the external stakeholders which includes society, and NGO's.

According to Elkington (2004), the questions relating to the internal environment of the organisation are linked to human resources practices. These may include the recognition, appreciation and encouragement of workforce skills with appropriate human resources policies; practices of equality, development and well-being; the creation and maintenance of an environment which is participative and open to worker development; fair pay; adequate working conditions; and training and adaptation programmes. In other words, a set of practices designed to bolster skills and competencies and consequently improve worker satisfaction (Daily & Huang 2001; Gauthier, 2005; Gimenez et al., 2012; Walker & Jones, 2012). The internal social practices refer to employment practices such as gender balance, discrimination, opportunities for career advancement, and occupational health and safety in the workplace.

The external environment of the organisation refers to the relationship with the local communities and society in general. The objective here is to guarantee thequality of life for the population and a good relationship with the different stakeholders. This relationship should be managed using democratic and ethical decision-making processes, showing responsibility for the products and services offered, considering the impact on both customers and the wider community who support the negative externalities created in the process (Pullman et al., 2009). External social practices go beyond the limits of the focal company, extending to the members of the supply chain (such as suppliers and customers), and to the relations with other stakeholders (such as local communities). In a bid to make supply chains more socially responsible, many companies are implementing codes of conduct for their suppliers as an integral part of evaluative and collaborative tools (Amaeshi et al., 2008; Andersen & Skjoett-Larsen, 2008; Mont & Leire, 2008). External social practices consider the relationship with stakeholders, as is the case with suppliers and customers, as well as local communities and NGOs.

Authors described the social sustainability in the supply chain in various forms. Krause (1999) described how socially responsible suppliers could be acquired and be enacted by socially responsible supplier development. Purchasing social responsibility (PSR) and its impact on supplier and buyer performance

was studied and proved that social practices have positive impacts on organisational performance (Carter and Jennings, 2000, 2002; Carter and Easton, 2011). Other studies explored what enables social sustainability in the supply chain, ethical supplier development and its impact on corporate social performance, and how social dimensions can be effectively used in supplier selection and evaluation (Lu et al., 2012; Mani et al., 2014).

A wide range of standards and codes of conduct exist for companies to contemplate. They contain recommendations regarding the implementation of environmental and social practices with associated indicators, including their respective metrics (e.g., GRI, Fair Labour Association Guides, Dow Jones Sustainability Index). This variety also reflects the fact that the social practices of sustainability are difficult to measure. Issues related to the downstream supply chain were explored more than issues related to suppliers and in-house operations of the manufacturing plants (Mani et al., 2015).Through this research, we attempt to identify various internal and external social practices in the supply chain and the impacts of the different social practices in economic and social performance.

Based on the literature, the social practices and social performance indicators used in this study are:

- Internal social practices
    - *Internal social management* (e.g. commitment by top management, interfunctional cooperation for social improvements, ethical codes and codes of conduct, SA 8000 certification).
    - *Employment practices* (e.g. gender balance and equality of opportunities, flexible working regimes, career progression opportunities, training and education, opportunities for career development, satisfaction, flexible working hours, rotation of workers).
    - *Health and safety practices* (e.g. number of workplace accidents, absenteeism, health and safety training, safety procedures).

- External social practices
    - *Social collaboration with customers* (e.g. customer health and safety, labelling of products and services, customer privacy, consumer education).
    - *Social collaboration with suppliers* (e.g. codes of conduct, health and security in the workplace, supplier evaluation).
    - *Collaboration with the community* (e.g. support for teaching institutions, support for community projects, grants and donations, partnerships).

2.2. Economic and Social Performance

A performance measurement system is defined as the ability that companies have to attract and retain clients in a market that is increasingly competitive (Neely, 1999). Measuring performance is fundamental for any organisation to manage its activities and operations, while at the same time being an important pre-requisite for an improvement process (Sink & Tuttle, 1989). According to Hervani et al. (2005), performance measurement allows, for example, the efficiency and effectiveness of an existing system to be determined or alternative systems compared. Lambert (2008) sees the lack of adequate measurements as potentially compromising customer satisfaction, having consequences for organisational performance and increasing the probability that opportunities for improving supply chain performance are wasted. Performance measurement is crucial to improving the management of the supply chain (Wong, 2009).

Neely et al. (1999) defend the idea that performance evaluation systems are a set of metrics that measure the effectiveness and efficiency of an organisation. The indicators, or performance measures, should be defined so as to monitor the effort that the organisations put into the different company activities designed to achieve sustainable development. Crucially, they should then be evaluated in comparison with the competition.

Measuring sustainable performance is much more complex than measuring the traditional economic performance for three reasons: (i) There is a need to add two additional dimensions to classic economic performance: social and environmental performance (Epstein & Roy, 2003); (ii) performance is not measured only in terms of customer expectations, but also in terms of the expectations of the different stakeholders in the organisation (Freeman, 2005); (iii) there is a need for transparency in the information exchanged between the different upstream members of the supply chain, even though these are normally outside the control of the focal company (Amaeshi et al., 2008).

The expectation is that implementing social practices will lead to an improvement in the associated indicators, namely those relating to the satisfaction and motivation of the workforce, improvements in the safety conditions in the workplace and number of workplace accidents. Previous research, while not being directly related to the study of internal and external social practices (Cagliano et al., 2010; Gimenez et al., 2012; Pullman et al., 2009), found that companies should recognise, value and involve human resources with practices and policies that promote equality, career progression and equal opportunities, leading to increased motivation and satisfaction among employees. Cagliano et al. (2010) concluded that training is a key factor for improving social and environmental performance, and the incentives are positively related to social performance. In other words, social practices, when they are not applied as part of a wider initiative, do not contribute to performance improvements. Gimenez et al. (2012) provide evidence that implementing social practices such as improvements in health and safety conditions, improve the social reputation. Pullman et al. (2009) found that the implementation of social practices in the food industry helps improve product quality. Drawing on the indicators found in the different studies cited in the literature review, the indicators used in this research are:

- Economic performance, which aims to quantify the impact of the implemented social practices on the focal firm, regarding sales, and Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA);
- Social performance, which aims to analyse the impact of social practices implementation in the focal firm, in terms of number of injuries, number of working hours lost due to illness, the accident frequency and severity index, absenteeism rate, overall staff turnover rate and training.

Methodology

This study adopted a qualitative approach, using a case study approach which was chosen as the most appropriate research method to describe and explore new phenomena applicable to sustainable practices in the private sector. Suggestions for the number of cases to use in multiple case study research vary, but Eisenhart (1989) suggests eight cases as the maximum that a person can mentally process. Yin (2009) and others are more circumspect in regards to hard numbers and suggest that data should be collected until theoretical saturation. In operations and supply chain management research there are numerous examples of multiple case study research using from three to 11 cases (Pagell, 2009; Walker, 2012).

The research sample is composed of eight companies. Those companies were chosen based ontheir location, production plants in Portugal, and company size as medium and large companies have more resources to implement environmental and social practices (González-Benito & González-Benito, 2006), the supply chain structure, the commitment to sustainability dimensions (economic, environmental and social), and having third party certification and/or recognition (e.g., OHSAS 18001, ISO 9001, ISO 14000, PEFC, GRI). The attitude of transparency that characterises their activities is described in their websites, social reports, newspaper articles, and business press.

Case studies have been developedby means of interviews conducted on the basis of a semi-structured protocol that was developedon the basis of the reviewed literature. The use of protocols is advocated to enhance the reliability of case studies (Eisenhart 1989; 19 Yin, 2009). Twenty-two (22) semi-structured face-to-face interviews were conducted with at least one senior manager in each organisation. Each interview lasted about 60-90 minutes and was conducted on site. For six companies, the respondents were the General Manager, Purchasing and the Environmental, Health and Safety Manager and in some cases other roles, the Human Resource Manager. All interviews were taped, recorded and transcribed, and participants reviewed a draft case study report. To encourage openness of response from interviewees, the company names were made anonymous.

To enhance the validity and reliability of the study, triangulation with secondary data sources was conducted (Yin, 2009). Secondary data was collected from reports and websites, including annual reports, sustainable reports, environmental, safety and social policies, code of conducts, newspaper articles and confidential internal procedures provided by the sampled companies.

Table 1 shows the main features of the selected companies.

Table 1: Characteristics of the Sample

Company	Industry	Annual Turnover	Number of employees	Number of interviews	Role of interviews
C1	Glass	95 ME	350	3	General Manager Environmental, Health & Safety Coordinator Purchasing Manager
C2	Cork	318 ME	927	4	General Manager Environmental, Health & Safety Coordinator Purchasing Manager Human Resources Manager
C3	Automotive components	84.4 ME	348	4	General Manager Integrated Systems Manager Purchasing Manager Public Relations Manager
C4	Wood-based panels	1.321 ME	177	3	General Manager Environmental, Health & Safety Manager Purchasing Manager
C5	Office and commercial furniture	8.62ME	122	1	Quality, Environmental, Health & Safety Manager
C6	Automotive	216ME	190	3	General Manager

	assemblage				Human Resources Manager Purchasing Manager
C7	Drink	498 ME	1500	1	Environmental,, Health & Safety Sustainable Manager
C8	Automotive textile	44 ME	182	3	General Manager Environmental, Health & Safety Manager Purchasing Manager

Analysis and Discussion of the Results

Social sustainability in the supply chain is how a corporation addresses external and internalsocial practices in the upstream and downstream supply chain. This section presents the similarities and differences between the eight companies with regard to their internal and external social sustainable initiatives across the supply chain, the performance indicators used, and the relationship between the social practices and economic, and social performance.

Internal Social Practices

The results are summarised to compare the extent internal social practices of the companiesare implemented, as detailed in Table 2.

Table 2: Level of implementation of internal social practices

Internal social practices	Companies							
	C1	C2	C3	C4	C5	C6	C7	C8
Internal social management								
Commitment by top management to social practices	I	I	I	I	I	I	I	I
Interfunctional cooperation for social improvements	I	I	I	I	I	I	I	I
Ethical codes and codes of conduct	I	I	L	I	L	I	I	L
Employment policies	I	I	I	I	L	I	I	L
Health and safety	I	I	I	I	I	I	I	I

I – Implementation of practices; L – Limited implementation of practices; N – No implementation of practices.

Table 2 shows that the top management's commitment to social practices is high in all the companies. They defined the vision, mission and strategy according to the different certified management systems and integrated management policy regarding quality environmental and social policies (e.g. ISO 9001, ISO 14001, ISO 22001, OSHAS18001, SA 8001) and third party certification depending on the activity sector (HACCP, FSC - Forest Stewardship Council) certification, and SYSTECODE (quality assurance system for the cork industry).

Companies C3, C5 and C8 do not publish a sustainability report according to GRI guidelines, while the others do. This signifies their commitment to the three dimensions of sustainable development (economic,

environmental and social).Company C3 does not publish a sustainability report but publishes an environmental and safety report. This company is looking to become SA 8000 certified and, the purpose is to publish sustainability reports in the near future. Companies C2 and C6 have specific plans for sustainability, reflecting the more direct commitment and involvement of top management to the issue of sustainability and social practices. Company C1 is the only one certified according to the social responsibility standards (SA 8000). All companies in the study define annual objectives covering interfunctional cooperation for social improvements. This ensures the involvement of those that are responsible for the different departments by using different management methodologies. Indicators, goals and action plans are set out to achieve established objectives. Indicators, goals and action plans are set out to achieve established objectives and are monitored on a daily and/or monthly basis, with either monthly or quarterly analysis. Social indicators are definedwith human resources, environment and safety department managers.

Regarding the ethical codes and codes of conduct, companies C1 and C4 have ethics codes and codes of conduct which are applicable to all employees. C1 is the only company that has a code of conduct applicable to all suppliers, while C4's code is applicable only to their tier one suppliers and service providers. The ethics code of C7 covers the relationships between the organisation and the main stakeholders in the organisation: customers, employees, suppliers, competitors and the community.

Companies C3 and C8 do not have an ethics code or code of conduct, but they subscribe to a set of values based on a number of ethical and honesty principles. Thisguides all employees and all those engaged in commercial relationships. Company C5 has a code of conduct for its workers described in the welcome guide that is given to all employees.

Employment policies in all companies are considered very important. Workers are considered the most important resource to achieve the main goals of the organisation. The involvement and active participation of the workers in the identification and resolution of problems related to environmental and social issues are reflected in the large number of activities and projects that target worker awareness in this area to help involve and motivate the workers. Some of the companies in this study show more evidence of worker involvement than others. Company C2 has specific projects and plans for retaining critical skills, helping to ensure the sustainability of the business. Company C8 involves its employees in a variety of activities such as Kaizen, Jishuken, and Quality Control Circles, and by encouraging the creation of working groups that cover different areas. All the companies except companies C4, C5 and C8 developed numerous internal activities that involve workers and community to stimulate the team spirit and solidarity, such as the collection of food products; books and waste oil; blood donation; commemoration of Environment Day, Safety Day, and International Women's Day, among others. Other companies invested in more general projects to encourage organisational culture and identity. This was the case with companies C2 and C6, where activities seek to stimulate interdepartmental knowledge. Two of the companies (C2 and C4) make particular use of Idea Management Systems. For all the companies in the group, these systems seek to identify innovative ideas and measures for improving management, procedures and processes. Furthermore, for all business units and employees, rewards are available for those who come up with the best ideas and suggestions.

Companies consider communication and transparency to be fundamental. A variety of different means of communication are being used to improve the relationship between workers and management. Examples include meetings, a company portal, or the publication of newsletters. C6 has an internal television

channel where employees are kept up to date with the different activities of the company in different areas.

All the sampled companies consider training a priority initiative. It helps encourage changes in attitudes and behaviour. To this end, all companies invest heavily in the training of their employees, including workplace environment and safety. All companies use education to improve the performance of their employees, giving them the opportunity and time to improve their qualifications. The companies undertake an evaluation of the satisfaction and performance of their employees. Some of the companies use performance related pay, which may be linked to individual or global goals.

Health and safety practices were found to have a high level of compliance, even though some of the companies did not have a certified health and safety management system. A variety of actions were implemented to avoid workplace accidents and work-related diseases.

4.2. External Social Practices

To identify the external social practices and analyse the companies' level of implementation, the data was collated and summarised, as shown in Table 3.

Table 3: Level of implementation of external social practices

External social practices	Companies							
	C1	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**
Social collaboration with the community	I	I	I	N	N	I	I	N
Social collaboration with suppliers	I	L	L	L	L	L	L	L
Social collaboration with customers	L	I	L	I	L	L	I	L

I – Implementation of practices; L – Limited implementation of practices; N – No implementation of practices.

Looking at external social practices, particularly *social collaboration with the community*, five of the eight companies were involved in social activities within the community. These activities seek to raise awareness among employees of the need to adopt social behaviours and extend to the implementation of activities for and with the community. Suchactivities include collecting food products and clothing; collecting school books; financial donations; voluntary activities in the local community; visits to educational establishments; and partnerships with non-profit organisations.

The relationship with the community is also implemented at a more academic level. Collaborative ventures are common with schools and universities, leading to study visits, placements and research work. Competitions are also used to encourage innovation in partnership with different associations. Companies collaborate with non-profit organisations on projects, which, as stated by the employees, consist of school visits that help develop an entrepreneurial spirit in children and young people. Companies C2, C3 and C6 carry out charity work with a diverse range of non-profit associations.

The company employees take part in colloquia and conferences to share best practice. In all companies, apart from C5 and C7, interaction occurs with associations linked to the area of social sustainability,

including WBCSD, BCSD Portugal, EPIS, GRACE, the Global Compact Network Portugal and the United Nations Global Compact.

C2 and C8 have non-profit foundations designed to promote solidarity and stimulate community initiatives of an ethical, religious, cultural and civil nature, besides the dimension of social and cultural support. They focus on support for children and needy young people in the company's home region, following their progress in school and creating opportunities for developing successful life projects. One of the foundations awards prizes to employees that complete any year of schooling/training in the educational system, also paying fees and textbooks to the orphans of employees and paying out bonuses for births and marriages.

Social collaboration with the suppliers is based on the interaction with the corporations and suppliers. Here the different elements join together in planning activities related to social questions to prevent and resolve social problems.

C1 was found to have a code of conduct applied to all suppliers, tier one and below, whileC4's code is applicable only to tier one suppliers. All companies have rigid regulations for service providers, requiring a series of documents of a social, safety and environmental nature, which is not the case for product suppliers. It should be stated that the majority of supplier companies have certified management systems in one or more of the following areas: quality, environment, health and safety in the workplace, and social responsibility. In turn, the first level supplier companies assure that their suppliers comply with the legislation and standards.

Social questions start with the selection of suppliers and the respective auditing. Most of the suppliers studied are from the European Union, where legislation is very demanding, and the social conduct rules must be upheld. These social conduct rules are based on fundamental human rights found in conventions and international treaties, namely the Universal Declaration of Human Rights from the United Nations and the International Labour Organisation. The companies have an image to preserve and as such do not wish to be associated with companies that use child labour, forced labour, or slavery. None of the companies studied jointly develop activities with their suppliers to meet social objectives.

Social collaboration with customers makes supply chains more socially responsible. Thisis based on democratic and ethical decision making, and taking responsibility for the impacts created by the company's products and services for both customers and the wider community (which are affected by negative externalities from other citizens consumption). Some of the areas of action noted by customers were the traceability of products, packaging integrity, product labelling, health and safety of customers, responsible marketing, education and customer privacy. The sampled companies guaranteed their customers quality products by defining requirements and technical specifications which are subject to rigorous quality control and legislative compliance within the company's sector of activity.

These measures ensure the health and safety of the customers and end-consumers by controlling raw materials, components and packaging.

Some of the companies are more forthright about their commitments in this area. This is the case of C7 which runs responsible marketing campaigns based on commitments with associations in the sector, amid other activities such as improvements in nutritional information, including recommended daily intake on the label of the products or bringing out new products with a low glycaemia level. Company C4 commits

itself to supplying its customers and end-consumers sufficient and reliable information regarding the nature, origin, proper use and disposal of products. Companies C2 and C3 measure their carbon footprint. In the case of C2, the company's activity is shown to benefit the planet in terms of greenhouse gas emissions by absorbing more CO_2 than it emits.

All the companies are united in their effort and dedication towards the question of sustainability. These companies do not consider sustainability to be just a legal obligation, but they believe that besides making profits, they have to work to achieve benefits for all interested parties, society and the surrounding environment.

4.3. Performance

The common performance indicators used by companies in this research to measure economic and social performance are:

- Economic indicators: sales and EBITDA (Earnings Before Interest, Taxes, Depreciation, and Amortization),
- Social indicators: number of accidents, number of working hours lost due to illness, accident frequency index, accident severity index, absenteeism rate, overall staff turnover rate, training hours per employee, age profile, breakdown by gender.

In relation to the social indicators, the number of accidents and the frequency index are monitored by all companies in the study. Six companies monitor the severity index, and five companies monitor the number of working days lost. Four companies monitor the incidence rate and the number of working hours lost due to illness.

Only three companies monitored the indicator covering workplace-related illnesses. As with the environmental indicators, C3 stands out by using a BSC for health and safety, with the indicators of accidents and workplace-related illness; working conditions; supply chain and stakeholders; and emergencies and continuous improvement. Only one company monitors workplace incidents by using the same analytical method for accidents.

Out of all the indicators used to measure external social practices, the customer satisfaction rate is one of the indicators used by all of the companies to measure collaboration with customers. Those companies that measure collaboration with the community use the number of activities carried out, and, more generically, the result obtained from those activities. As regards social collaboration with suppliers, the indicators used for measuring this practice are related to supplier evaluation.

To study the relationship between the implementation of social practices and the economic and social performance, a comparative analysis of the data for the eight companies was carried out. To collect evidence of this relationship, the different interviewees were questioned regarding the particular relationship that respondents felt existed between the implementation of social practices and performance.

While certain trade-offs are considered part of the relationship between implementing social practices and economic performance, three companies found that social practices generate a positive effect on economic performance, increasing motivation, satisfaction and pride among employees, with consequent effects on the product quality, productivity and profitability for the company. However, differing

opinions exist in two of the companies, referring to difficulties in establishing a positive relationship between internal social practices and performance.

According to the interviews given, the relationship between social practices and environmental performance (where this relationship was found to exist) is positive. For most companies, this is a relationship that is hard to verify, although the existence of environmental and social awareness by the employees does lead to a reduction in risk.

Generally speaking, all companies were found to be unanimous in their opinion that there is a positive relationship between implementing practices of health and safety and social performance. This positive relationship is enhanced by drops in absenteeism, the number of accidents and their severity, as well as costs associated with overtime – all factors which understandably have considerable economic impacts. It is without adoubt that a win-win relationship exists between internal social practices and social performance with effects on economic performance.

External social practices, namely those focused on the community, do not have a positive relationship with economic performance. However, the objective is not to achieve an increase in performance. These practices are related to the culture of the organisation, with a set of intrinsic principles and values which have repercussions on reputation and image in the marketplace. In other words, besides the internal impacts, the external impacts are reflected in recognition of companies by the wider community, such as with awards, partnerships being forged with NGOs and participation in different research projects with different stakeholders.

Conclusion and Future Research

The main goal of this research was to analyse social practices and their relationship with economic and social performance. To this end, a literature review was carried out to identify the internal and external social practices and the associated performance indicators. Using eight medium and large Portuguese companies, the most common practices used by the companies were identified, along with the economic and social key performance indicators. Furthermore, the relationship between social practices and performance was analysed.

The study found that the actions of companies cannot be dissociated from access to the resources that support their activities and the ways in which they organise their processes and implement social practices for continuous improvement of their businesses.

All companies employ the widespread use of social practices, namely internal practices. Applicationis based on certified management systems (reflecting internationally recognised standards) and interfunctional cooperation that are enshrined in annually defined objectives covering the different departmental managers using diverse management methodologies.

All, except C5 and C8, embrace external social practices, developing actions in the community designed to increase employee awareness of the importance of adopting sustainable behaviours. The companies guarantee to their customers a quality product by defining the technical requirements that are subject to rigorous quality control and the legislation in the sector. Some companies are more forthright about their behaviour in this area, using responsible marketing campaigns which vary depending on the size of the

company and the resources available. Nevertheless, the absence of joint decisions to reduce the environmental impact,with no joint plans implemented to anticipate and resolve environmental problems, leads us to conclude that the implementation of such practices is limited.

It is worth noting that the commitment to social practices varies according to the strategy and size of the company, the financial resources and the needs and demands of the customers. The observed diversity increases when considering training and awareness projects involving employees and the levels of social collaboration with the community, suppliers and customers.

Overall, drawing on the experience of the eight sampled companies, it can be concluded that implementing social practices has a positive impact on the social performance of the company. Differing opinions were foundin relation to the impact on economic performance. However, when a relationship was found to exist, most interviewees thought it positive. These results can help the professionals to understand how to implement social practices and identify the impact that each practice has on performance. It can also help companies to decide which social practices should be implemented, considering their relative social and economic impact.

As with any other study, there are some recognisable limitations which can hopefully be improved upon with future studies. In particular, while the sample includes companies from different sectors of the economy, it is based on a sample of eight case studies. This limits the possibilities for generalising the results to other contexts.

One of the paths for future work relates to the possibility of generalising the conclusions to other contexts. This can be done by replicating the research using other companies in other sectors or by applying the methodology to small and medium-sized companies from other sectors of the Portuguese economy. Another suggestion for carrying out future work would be the use of longitudinal case studies. This approach would help analyse the implementation and structural dimensions of social practices and economic and social performance over time. This technique benefits the analysis by providing a more comprehensive view of the phenomenon, especially as sustainable management of the supply chain is an emerging area, and the attitudes and behaviours can change significantly between the short and long-term.

Acknowledgment

The author thanks Polytechnic Institute of Viseu and CI&DETS of Portugal for funding this project. The authors wish to express their gratitude to the companies and individuals who agreed to participate in the study.

References

Amaeshi, K., Osuji, O. &Nnodim, P. (2008). Corporate Social Responsibility in Supply Chains of Global Brands: A Boundaryless Responsibility? Clarifications, Exceptions and Implications. *Journal of Business Ethics*, Vol. *81*, Nº1, 223–234.

Andersen, M. &Skjoett-Larsen, T. (2009). Corporate social responsibility in global supply chains.*Supply Chain Management: An International Journal,* Vol. *14*, Nº 2, 75-86.

Awaysheh, A.; Klassen, R.D.(2010). The impact of supply chain structure on the use of supplier socially responsible practices. *Inernational JournalOperations and Production Management. Vol.*30, 1246–1268.
Brito, M. P., Carbone, V. &Blanquart, C. M. (2008). Towards a sustainable fashion retail supply chain in Europe: Organisation and performance. *International Journal of Production Economics*, Vol. *114*, Nº2, 534-553.

Caniato, F., Caridi, M. &Moretto, A. (2011). Sustainability in the Italian meat supply chain - The adoption of supply chain practices to improve sustainability performance. *Proceedings of the 20th International Purchasing and Supply Education and Research Association Conference,* IPSERA, Maastricht, 1-10.

Carter, C.& Easton, P. (2011). Sustainable supply chain management: Evolution and future directions. *International Journal of Physical Distribution & Logistics Management*, Vol. *41*, Nº1, 46–62.

Carter, C.R. & Jennings, M.M. (2004). The Role of Purchasing in Corporate Social Responsibility: A Structural Equation Analysis. *Journal of Business Logistics*, Vol.*25*, Nº1, 145–186.

Christopher, M.(2004).*Logistics and Supply Chain Management: Strategies for reducing costs and improving service.* Second Edition, Financial Times/Pitman Publishing, London.

Cooper, M., Douglas M. &Pagh, J. (1997). Supply Chain Management: More Than a New Name for Logistics. *The International Journal of Logistics Management*, Vol. *8*, Nº 1, 1-14.

Daily, B. & S. Huang. (2001). Achieving Sustainability through Attention to Human Resource Factors in Environmental Management. *International Journal of Operations and Production Management*, Vol. *21*, Nº12, 1539-1552.

Eisenhart, K.M. (1989).*Building Theories from Case Study Research.* Academy of Management Review, Vol. 14, No. *4*, 532-550.

Elkington, J. (1998). *Cannibals with forks: The triple bottom line of the 21st century*. Stoney Creek: New Society Publishers.

Elkington, J. (2004). *Enter the triple bottom line. In A. Henriques and J. Richardson (Eds) The triple bottom line, does it all add up? Assessing the sustainability of business and CSR*, 1-16. London: Earthscan Publications Ltd.

Freeman, E. R. (2005). The Development of Stakeholder Theory: An Idiosyncratic Approach. The Process of Theory Development (Oxford University Press, Oxford), 417–435.

Gauthier, C. (2005). Measuring corporate social and environmental performance: the extended life-cycle assessment. *Journal of Business Ethics*, Vol.*59*, Nº 1, 199–206.

Geffen C.A. &Rothenberg, S. (2000). Suppliers and environmental innovation: The automotive paint process. *International Journal of Operations & Production Management*, Vol.*20*, Nº2, 166–186.

Gimenez, C., Sierra, V. & Rodon, J. (2012).Sustainable operations: their impact on the triple bottom line. *International Journal of Production Economics,* Vol.*140*, 149-159.

Gold, S., Seuring, S. & Beske, P. (2010). Sustainable Supply Chain Management and Inter-Organizational Resources: A Literature Review. *Corporate Social Responsibility and Environmental Management.*,Vol. *17*, Nº4, 230–245.

GRI (2006). Sustainability Reporting Guidelines Available in https://www.globalreporting.org/resourcelibrary/G3-Sustainability-Reporting-Guidelines.pdf

Handfield, R.& Nichols, E. (1999).*Introduction to Supply Chain Management*. Prentice Hall, Upper Saddle River.

Hay, R. L., Stavins R. N.&Vietor, R. H. K. (2005).*Environmental Protection and the Social Responsibility of Firms: Perspectives from Law, Economics and Business, Resources for the Future.*RFF Press, Washington DC.

Hervani, A., Helms, M., & Sarkis, J. (2005). Performance measurement for green supply chain management. *Benchmarking: an International Journal*, Vol. *12*, Nº4, 330–353.

Hoejmose, S. & Adrien-Kirby, A. (2012). Socially and environmentally responsible procurement: a literature review and future research agenda of a managerial issue in the 21st Century. *Journal of Purchasing and Supply Management*,Vol.*18*, Nº 18, 232-242.

Klassen, Robert D. (2009). Improving social performance in supply chains: exploring practices and pathways to innovation.*Researc hreport. VlerickLeuvemn Gent Management School*.

Kleindorfer, P. R., Singhal, K. &Van Wassenhove, L. N. (2005).Sustainable operations management. *Production and Operations Management*, Vol.*14*, Nº4,482-492.

Lage, N. (2001). *A reportagem: teoria e técnica de entrevista e pesquisa jornalística*. Rio de Janeiro: Record.

Lambert, D. M. (2008).*Supply chain management: processes, partnerships, performance*. 3ª ed. Sarasota: Supply Chain Management Institute.

Longoni A., Golini R., Cagliano R. (2014). The role of New Forms of Work Organization in developing sustainability strategies in operations, International Journal of Production Economics 147, 147-160.

Mani, V.; Agrawal, R.; Sharma, V.(2015). Supply Chain Social Sustainability: A Comparative Case Analysis in Indian Manufacturing Industries. Procedia Soc. Behav. Sci. 189, 234–251. 40.

Meadows, D.H., Meadows, D.L., Randers, J. &Behren, W. (1972).*The limits of growth*. MIT, Rome Club.

Neely, A. (1999). The performance measurement revolution: why now and what next? *International Journal of Operations and Production Management*, Vol. *19*, Nº2, 205-228.

Neely, A., Yaghi, B., &Youell, N. (2008). *Enterprise performance management: the global state of the art.* Cranfield: Oracle and Cranfield School of Management publication.

Pagell, M.& Wu, Z. (2009).Building a more complete theory of sustainable supply chain management using case studies of 10 exemplars. *Journal of Supply Chain Management*, Vol. *45*, No. 2, 37-46.

Porter, M. & Kramer, M. (2006). Strategy and society: the link between competitive advantage and corporate social responsibility. *Harvard Business Review*, 1-15.

Pullman, M., Maloni, M. & Carter, C. (2009). Food for thought: social versus environmental sustainability practices and performance outcomes, *Journal of Supply Chain Management*, Vol. *45*, No. 4, 38-54

Sarkis, J.&Lai, K. H. (2011).Evaluating green supply chain management among Chinese manufacturers from the ecological modernization perspective. *Transportation Research Part E*, vol. *47*, 808-821.

Seuring, S. (2004). Integrated Chain Management and Supply Chain Management: Comparative Analysis and Illustrative Cases. *Journal of Cleaner Production*, Vol. *12*, No. 8-10, 1059-1071.

Seuring, S. A review of modeling approaches for sustainable supply chain management. Decis. Support Syst.**2013**, 54, 1513–1520.

Seuring, S.&Müller, M. (2008a). Core Issues in sustainable supply chain management: A Delphi study. *Business Strategy and the Environment*. Vol.*17*, 455–466.

Simchi-Levi, D., Kaminsky, P. &Simchi-Levi, E. (2008).*Designing and managing the supply chain*. New York: McGraw-Hill. 3th ed.

Sink, D.&Tuttle, T. (1989). *Planning and measurement in your organization of the future*. Georgia: Industrial Engineering and Management Press.

Sloan, T.W. (2010). Measuring the Sustainability of Global Supply Chains: Current Practices and Future Directions.*Journal of Global Business Management*, Vol. *6*, Nº1, 92–107.

Tajbakhsh, A.; Hassini, E. Performance measurement of sustainable supply chains: A review andresearch questions. Int. J. Product. Perform. Manag.**2015**, 64, 744–783.

Tate, W.L., Ellram, L.M., Kirchoff, J.(2010).Corporate Social Responsibility Reports: A Thematic Analysis Related to Supply Chain Management. *Journal of Supply Chain Management*, Vol. *46*, Nº1, 19-44.

Teuscher, P., Grüninger, B. & Ferdinand, N. (2006). Risk management in sustainable supply chain management (SSCM): Lessons learnt from the case of GMO-free soybeans. *Corporate Social Responsibility and Environmental Management*,Vol.*13*, Nº1, 1–10.

Teuteberg, F. & Wittstruck, D.(2010).A Systematic Review of Sustainable Supply Chain Management Research.*Osnabrück, Germany, Wirtschaftsinformatik Proceedings, University of Osnabrueck*, 1001-1015.

Voss, C., Tsikriktsis, N. &Frohlich, M. (2002).Case research in operations management.*International Journal of Operations and Production Management*, Vol. *22*, Nº 2, 195–219.

Wittstruck, D. &Teuteberg, F. (2012).Understanding the Success Factors of Sustainable Supply Chain Management: Empirical Evidence from the Electrics and Electronics Industry. *Corporate Social Responsibility and Environmental Management*., Vol.*19*, Nº 3, 141–158.

Yakovleva, N., Sarkis, J. & Sloan, T. (2012),Sustainable benchmarking of supply chains: the case of the food industry, *International Journal of Production Research*, Vol. *50*, Nº5, 1297-1317.

Yin, R. (1984).*Case study research: Design and Methods.* London: Sage.

Yin, R. (2009).*Case Study Research: Design and Methods-Applied Social Research Methods,* 4th ed. Thousand Oaks, Sage Publications, California.

Zhu, Q., Sarkis, J. & Geng, Y. (2005).Green supply chain management in China: pressures, practices and performance. *International Journal of Operations and Production Management*, Vol.*25*, Nº5, 449–468

Zorzini, M.; Hendry, L.C.; Huq, F.A.; Stevenson M. (2015) Socially responsible sourcing: Reviewing the literatureand its use of theory. *International Journal of Operations and Production Management*, Vol. 35, Nº60.

Career Advancement Challenges of Single Women: An Examination of Indian Women Experiences

Dr. Jolly Sahni
Assistant Professor
Department of Management, College of Business Administration,
Prince Sultan University, Riyadh, 11586, Saudi, Arabia

Email- Jollyjasuja@gmail.com

Jsahni@psu.edu.sa

Abstract

The purpose of this study is to identify the nature of challenges single women experience in attempts to advancing in their professional careers in India. It examines the impact of 'Single Women Stigma' through their personal, professional and societal engagements on their career expectations and advancement. The present study adopted a qualitative descriptive approach because it aimed at investigating the experiences of single working women. Data was collected from in-depth interviews conducted with 21 Single Indian working women. This study draws from Bandura's (2001) social cognitive theory as the theoretical framework. The findings suggest that there are a number of social, organizational and personal attitudinal barriers which hinder the advancement of single women at workplace. Social and organizational stereotypes, gender discrimination, work-life balance issues, single means 'available' (assumptions men have about single women) and lack of opportunity for growth are amongst the most prominent challenges at workplace and in social context. The paper provides insight to the unheard voice of Indian Single Women; the challenges and barriers to their career advancement. The attempt has been made to address the gaps in the literature related to "Single working women" and their career advancement. The implications are discussed and the recommendations to address the needs of this category of employees are provided.

Keywords: Career advancement, Single women, Self-efficacy, Indian Cultural Society.

1. Introduction

The status of women has been subject to great changes over the past millennium. The role and participation of women in the workforce has attracted a great deal of research attention globally (Wertheimer, 1981; Morrison & Glinow, 1990; Matsui *et al.,*1995; Nelson & Burke, 2000; Hayes, 2004; Cheung & Halpern, 2010; Enid Kiaye & Singh,2013; Dezső *et al.,* 2016; Madsen *et al.,* 2017) and particularly in India (Sharma, 1990; Gupta *et al.,* 1998; Budhwar *et al.,* 2005; Singh & Hoge, 2010; Desai *et al.,* 2011; Sahni 2016). However, little work has been done on Single working woman which is a new Universal Sociological Phenomenon of this century. The traditional Indian society from its collectivist cultural perspective presents a common patriarchal social understanding. This positions the bread earner role with the male member of a family, be it father, husband or a son. The woman therefore within the context of this cultural understanding tended to have their identities and roles being constructed from these traditional assumptions (Dalton 1992).

However, as part of the shrinking world of globalization, the Indian society has over the years been experiencing social changes that continuously redefine roles and identities for both males and female members of the society. These changes have informed increasing roles for the female folks. Female members of the families are increasingly stepping out of the house to work, either to earn money to support self, family members or for the sake of maintaining self-respect and dignity that work provides. The increasing engagement of these women in the workforce also comes with its challenges, especially

with the single women of the group which may impede the realization of their career expectations and goals. To quantify the current contribution of the female working force to the Indian economy.

Previous research suggest limited studies on the challenges of single women (Lewis and Borders 1995) and therefore there is a need to further engage in understanding the challenges these category of employees face within different perspectives and experiences at work and careers (Dalton 1992, Kaslow 1992).

The purpose of this study is to identify the nature of challenges single women experience in attempts to advancing in their professional careers in India. It examines the impact of this 'Single Women Identity' through their personal, professional and societal engagements on their career expectations and advancement. This study draws from Bandura's (2001) social cognitive theory as the theoretical framework.

Therefore the present study examines the nature of the challenges through the three questions; what organizational factors impact on Indian single women career advancement? what societal factors impact on their career advancement? And what personal factors impact on their career advancement?

Through the adoption of in-depth interview technique and the general inductive, the study examines both personal and socio-structural issues that impact on career advancement of the study population. The 'single women identity' in the context of this study is inclusive of women who do not describe themselves as being in any formal relationship.

This section has introduced the research background. Section two discusses the review of literature followed by section three which is methodology adopted in the research. Section four highlights the findings of the study and section five are discussion and conclusion.

2. Literature Review

Women are becoming important part of labour force all over the world. They represent almost fifty percent of the population; however, their participation in the workforce is not equal to men in many countries (International Labor Organization, 2014). Especially in India, women participation is small but increasing gradually with passage of time. As more and more women understand their contribution in the economy they are coming forward despite of several challenges.

However, reaching higher positions in management has never been easy for women. Women in high management positions were nearly invisible from the 1970s till 1990s and still it is difficult to find a good number of women in higher positions (Helfat *et al.,* 2006; Laff, 2006). Because of the multiple challenges and barriers at work place female leadership is still disproportionately small in nearly all sectors (Paustian-Underdahl *et al.,* 2014; Srinivasan *et al.,* 2013). However, in modern India women have held high offices including that of the President, Prime Minister, Chief Minister, Union Minister, Governor and leadership positions in corporate world as well. Therefore there is no dearth of women role models in politics or the corporate world (for example, Indra Nooyi, CEO of Pepsico, Chanda Kochhar, the managing director and chief executive officer of ICICI Bank and Mazumdar-Shaw, one of the most famous and inspiring women entrepreneurs are just few to name). The academic research on single women working in India is a recent trend and this is an under researched area.

The misconception and debates whether women perform as well on jobs as men has been addressed by many past studies. The recent studies reveal that there is no male-female difference in learning, problem solving ability or analytical skills and both genders performs equally on leadership positions (Zell *et al.,* 2015; Paustian-Underdahl *et al.,* 2014). Moreover, studies have shown that women scored slightly higher than men on performance measures (Allendorfer *et al.,* 2012). However, studies reveal that women earn less money than men for the same work.

The challenges and opportunities for working women are relatively different than men which can be seen in many ways. They receive fewer challenging assignments and face manager's biasness in providing

development opportunities, which leads to lower moral in women who restrict their managerial aspirations (Hoobler *et al.,* 2014). Moreover, past studies suggest that the societal beliefs and expectations from women create a barrier in their career (Kulkarni, 2002; Budhwar *et al.,* 2005; Vasavada, 2012). Single working women face even more complex environment not only at work place but also in the society. According to Singh (2001), the two categories of Single are; those who are single due to 'circumstance' and the other who are single by 'choice'. The later is a growing phenomenon in India. While studies suggest that women who opt not to marry by choice are rather happier than the married women (Azmawati *et al.,* 2015).

There have been studies on female work role conflicts. Sidani & Hakim (2011) addressing the work family conflicts of white collar single women in a developing country (Arab) context reported low job satisfaction as these women were under paid and had lower upward mobility. Hess & Bourgeois (2010) in their research conducted three studies to access the stereo types regarding men's and women's emotional expressivity and self-perception of their emotional behavior. Studies also suggest a persistent and universal gap between men's and women's earnings (Damast, 2012; Lips, 2013). On the contrary, Gino *et al.,* (2015) found in their study based on number of research and over 4000 participants that women have a higher number of life goals but plays negative outcomes with high power positions therefore, perceives power as less desirable. However, studies on single working women have been limited (Houseknecht *et al.,* 1987; Misra, *et al.,* 2007; Sandberg, 2013).

Review of literature suggests that there have been many studies conducted on working women in India as well in other parts of the world. However, little attention has been paid to the new Universal Sociological Phenomenon of Single women and their challenges at work and in personal life. Therefore, the present paper would address this small but significantly growing portion of Indian workforce and will give insight to the career advancement challenges of single women and also try to close the gap.

Context of Study: India

India has a complex culture with its diverse religions and languages and different opinions and beliefs concerning role and treatment of women at work and in society (Littrell & Bertsch 2013). It is also the second most populous country in the world where 48.5% of the population is represented by women. Women have equal participation in higher education. However, the labour force participation rate for women is not equal to men. The status of women in Indian society has undergone many changes over past decades (Sharma and Mukherjee, 2012). Indian society is typically characterized with stereotyping the role women plays, women is seen as only as house wife and a mother who takes care of all household work (Haq, 2013). The prime responsibility of earning money has always been with the men. When women enters workforce she is expected to perform dual responsibilities and therefore face double challenges that she must both adhere to social expectations as a housewife and, also work as an effective employee (Naqvi, 2011). Moreover, the changing global work environment has impacted India as well, there is a demand of high commitment from employees (Sahni 2016).

In the context of economic liberalization, there has been an increase in employment opportunities for women, but women still face various challenges at workplace (Khandelwal, 2002). Past studies suggest that the societal beliefs and expectations from women create a barrier in their career (Kulkarni, 2002; Budhwar *et al.,* 2005; Vasavada, 2012). However, the trend is changing and India has witnessed a social change. Women employment has now been a widely accepted phenomenon in present Indian society. The perception of society towards working women; be it single or married largely depends on the background of people. For example educated people are having a change in their perception and attitude but some conservative section of the Indian society still do not consider it good for an unmarried girl to go out and work. There is need for change in the way society or people from different backgrounds treat women and the perception they have for working women. As stated by Rawat (2014), impact on social transformation will take place only when the concept of patriarchy is shaken and conditions supporting women empowerment.

3. Methodology

To understand and analyze the challenges in career advancement, the qualitative method was more appropriate for this study. Qualitative research permits researchers to "develop concepts, insights, and understanding from patterns in the data rather than collecting data to assess preconceived models, hypotheses, or theories" (Taylor & Bogdan, 1998, p. 7). A phenomenological qualitative approach has been employed in study with in-depth interviews conducted with Indian women who are single (who do not describe themselves as being in any formal relationship). The study examines the impact of this 'Single Women Identity' through their personal, professional and societal engagements on their career expectations and advancement. This study draws from Bandura's (2001) social cognitive theory as the theoretical framework.

To explore this social phenomenon, data was collected through telephonic interviews from a sample of 21 single women employed in different sectors like banks, universities, government offices and private companies. A convenience sampling was followed given the difficulty of reaching single women. The interviews were 60-70 minutes long and were conducted in English. The interviews were conducted between May 2017 and July 2017.The interview questions had open-ended questions which allowed the interviewees to express their feelings and discuss the challenges that hold them back. The researcher incorporated narrative inquiry techniques.

To maintain the confidentiality of participants, alphabets are used in reporting the findings. The interview transcripts were reviewed for any inaccuracies. Patterns were analyzed after collecting information from participants through open-ended questions. Using a thematic approach, themes related to career advancement challenges were identified after coding and recoding. Content analysis was performed to identify frequent and recurring themes.

A descriptive profile of participants is reflected in Table 1 below. Twenty one participants were chosen for the study. They were diverse in age groups and employment sectors. There was only one woman below the age of 30 years, the age of other participants ranged from 30 to 48. All the participants were employed in cross-sectors, with wide-ranging affiliations in education, banking, private companies and government agencies. The educational background of the participants was also diverse; four participants had earned a Doctoral degree, seven had Master's degree, eight had a Bachelor's degree while one participant was Diploma holder. Twelve participants were from the category of never-married; seven were separated or divorced while two were widow.

Table 1: Brief profile of participants

Name	Age	Status	Education level	Employment
A	38	Unmarried	Doctoral degree	Professor
B	32	Divorced	Bachelor's degree	School teacher
C	36	Unmarried	Bachelor's degree	Banker
D	35	Separated	Master's degree	Software engineer
E	42	Divorced	Master's degree	Private company
F	31	Unmarried	Bachelor's degree	Banker
G	29	Divorced	Master's degree	Software engineer
H	36	Unmarried	Master's degree	Software engineer
I	30	Unmarried	Diploma	Government
J	38	Unmarried	Bachelor's degree	Private company
K	31	Unmarried	Bachelor's degree	Software engineer
L	38	Divorced	Doctoral degree	Professor
M	41	Widow	Bachelor's degree	Banker
N	28	Unmarried	Master's degree	Private company
O	34	Unmarried	Bachelor's degree	School teacher

P	33	Separated	Bachelor's degree	Government
Q	39	Unmarried	Doctoral degree	Professor
R	45	Unmarried	Diploma (Technical)	Private company
S	39	Separated	Master's degree	Government
T	48	Widow	Doctoral degree	Professor
U	41	Unmarried	Master's degree	Banker

4. Findings

This qualitative study examined the experiences of twenty one working women who are not in any formal relationship therefore called 'single'. The findings of study suggest a varied number of issues and challenges as perceived by single women at work and in society at large. The main themes derived from the stories are; social stereotypes and prejudices, gender discrimination, work-life balance issues, single means 'available', lack of opportunity for growth and lack of mentoring. The findings of the study are presented in three parts: organizational factors, societal factors and personal factors, that impact on their career advancement.

The participants in this study provided valuable insights. Investigating the workplace challenges and barriers faced by single women in India, it was found that most of the participants had experienced discrimination at workplace. However, only five participants reported that their marital status does not affect their career advancement. But these women do face many barriers in workplace because they are women. The rich descriptions of the experiences of single women at work and in the social context are provided below.

Organizational Factors

Women are increasingly participating in the labor force in India. The concern here is not only their meager participation; however, they must be given equal opportunity to reach higher positions in the organization. One of the prominent theme which emerged from the interviews is 'gender inequality and discrimination' at workplace. Gender inequality connotes to unequal treatment or perceptions of individuals based on gender (Wood, 2009). This is directly related to lack of opportunity for growth and lack of mentoring for women in general, at workplace. The constraints present in the organization were obvious from the participant's responses. Gender inequality was observed in the response provided by the participants. For example:

(H) In my 10 years long career, I have never received equal increments as my male counterparts, no matter we are equally qualified, skilled and efficient. It is disappointing to note that every year my increment is less than other colleagues who are men. Although I tried to talk to my boss but my efforts go futile.

For single women, in particular, there are no family-friendly policies existing on ground, however, all organizations claim to have flexible work arrangements. It becomes a hindrance for single women who are taking care of the parents and whole family. Many issues were related to work-life balance, as stated by one of the participants:

(J) I am the one who is expected to stay back in the house whenever my parents fall sick, and unfortunately that is the time when my boss calls me to attend a meeting on urgent basis. Being a daughter, I can't leave my old parents on their own and I have to say 'no' to my work during this critical time. I wish my company had some kind of support may be elderly care etc. to help me focus on my work.

Another theme which was common among all the participants is single means you are "available''. This theme has its roots in the social stereotypes and prejudices but experienced in the workplace by most of the single women. The participants mentioned that the male colleagues start taking women who are not married as available for them to date. This is disturbing the single women both psychologically and making them insecure at work. Here is the quote form one of the interviewees which represents the feeling all single women:

(R) I have experienced this early in my career and I see the new girls facing the same in my as well as other companies. I am talking about the perception of men for unmarried women or single women, I don't know what makes them think that if we are not married there is something wrong in our character and we can hang out with them after office till late hours. I mean there's no harm in making friends but it's their scorching eyes which tell the truth-what they want from a female. This is disgusting and I've been handling such situations very carefully because sometimes it's your boss. You need to handle these conditions with great care.

Social factors

In the Indian society, it is difficult to lead a normal life if you choose to be 'single' or even if circumstances forced you to be 'single'. For women, the social pressure to get married and settle has always been there from ages. However, the traditional stereotypical views towards single career women are slowly changing and they are getting acceptance at least in the urban areas of India. The social and family commitment and responsibilities pose a great challenge to single women aspiring to progress and continue in their careers. The social restrictions limit women's advancement at work. For example, one of the participants described the type of constraints:

(T) Life has not been easy for anyone but for me it's a bit more difficult because I carry a tag of being single. The society in which we live does not accept the freedom of any women easily. When my husband died and I started working, my in-laws had an objection but my parents gave me full support to become independent. We have all types of people with all types of prejudices towards single women working in private sector.

There are single women who received a great support from their families and society at large. The following statement is representative:

(B) I am now Single by my choice. I really owe this freedom to my parents. They don't mind my staying with them after my divorce rather they welcomed me with open arms. Our culture used to be not so friendly for women who work for their financial freedom, but I have seen a lot of change in the thinking of people.

The change in the society can be attributed to the socioeconomic level of the given family and the level of education.

As many people have set prejudices in mind like women should take care of house and men are there to earn for them and feed them. One of the respondents said:

(D) In India the environment for working women and non-working women are totally different. Women who stay at home are not exposed so much to the outside world. When they see me going out and also taking tuitions at home where students of all ages come to my place…it's a cultural shock for them.

The finding suggests that being single and working in private sector raises questions in the society. However, the statements reveal that this social prejudice is changing by time. For working women the social prejudices still remain a barrier for career advancement for majority of single working women.

Personal Factors

One of the common themes was the single women's commitment to personal and family responsibilities over work. Women are said to be more emotional and responsible but this might become one of the constraints in their career advancement. Moreover, single women are challenged to cope with stress and sometimes it leads to distress. However, the advancement in technology has supported women in a big way. For example, the automated washing machines and dishwashers are great time savers. Furthermore, use of internet and access to work email has helped women employees who have flexible work arrangement in their organization.

From humane perspective, when one does not have proper emotional support and lacks the balance between personal life and professional life she tends to become weak. But having a good support network helps her in all ups and downs of life. For example, one of the participant's states:

(L) I am a single working mother and for me it's not easy to raise two children alone. However, I have my parent's support but I do not like asking for money from them for any good reason. I do overtime every single day to earn little extra for my school going children. There was a time when I thought of just ending all the problems by ending my life but then I saw my kids. I was under depression for two years and it affected my work to a great extent.

Despite of numerous barriers at work and challenges posed by society, the single women had shown a different level of self-reliance leading to self efficacy. They all were contended with the choices they made in their life. In the words of few participants:

(A)I don't want the world to be with me, I am concerned about only two or three people who are important to me. I am a kind of person who would like to adjust to any type of environment. I am basically an independent person. I am contended in my life.

(P) I cannot change the whole world but I can change myself. I feel hurt whenever I am in situation where people pass bad comments on my marital status I see these people as sick…they have some kind of disease so I am not bothered about their treatment. I just pray for them to get better. I don't react, ignore and I forgive them

(M) There are many problems in life, but one should never under-estimate herself. Women needs to be independent (Single or married) and not rely on anyone else.

These quotes suggest that Single women in India have been facing varied types of challenges in their personal as well professional lives. The organizational constraints and challenges are seen on day to day basis at their workplace (for example, discrimination, stereotype, lack of opportunity for growth) yet the self confidence and self efficacy of single working women is commendable.

The findings reveal the unheard stories of the single women, the constraints present at all levels explain that even in advanced setting people still live with the stereotypes in organization and in society; however, these stereotypes and prejudices takes ages to be broken. A single working woman is a category of employees which demand at least equal rights and opportunities.

5. Discussion And Conclusion

The findings from the sample of participants clearly emphasize the several types of challenges and barriers single women face in the workplace. These barriers serve as strong impediment in their career advancement. These barriers, specially the social factors are present not only in India but around the world (Berg-Cross *et al.,* 2004). The study answers three questions being: what organizational factors impact on Indian single women career advancement? what societal factors impact on their career advancement? and what personal factors impact on their career advancement?

Under organizational factors, the important themes which emerged are 'gender inequality and discrimination' at workplace, single means "available', lack of opportunity for growth and lack of mentoring for women in general. The social factors are equally important and they either undermine the career advancement of women or support them in their career. The main challenges as perceived by single women are; traditional stereotypes associated with single women, social and family commitment and responsibilities. There are other personal factors that add on to this list of challenges. Importantly, stress and distress, lack of emotional support and imbalance between personal life and professional life emerged as main themes under personal factors.

The women are now better educated, well trained and well equipped with self confidence. However, there was clear differentiation leading to discrimination based on the marital status at workplace. For single women the main concern is the quality of work they do and how does being single or married affect the output of their work. Moreover, the single women do not see 'singlehood' as a problem for anyone. In the present modern society, the identity of women should not be wrapped up in marriage. Some of the advantages of single hood as mentioned by the interviewees are; more time to work on yourself; freedom to travel on your choice; ability and freedom to take decision for my life etc.

Indian culture is a perfect example of a combination of both extremes; family pressurizes to get married and close family members becoming matchmakers in all your family occasions just to get you married. On the other hand, in India the family becomes the support system for single women (by choice or by circumstances), they welcome her with open arms. But when it comes to society or social settings, all single women become the talk of the town. However, this trend is changing gradually. People have started respecting single mothers and single working women as well. The contextual supports play key roles in the career advancement of single women.

The twenty first century single working women in India, despite of all odds enjoys the financial freedom, personal freedom and freedom from a unsuitable partner. Although all three factors; Organizational, Social and Personal factors impedes the upward mobility of single women in organizations, Organizational factors were the most common among single women which hinders their career advancement. However, a steady improvement is seen in thinking and perception the society at large has for single working women. The prejudices and stereotypes are still prevalent at many workplaces.

The study has provided a unique investigation of the social phenomenon of single working women and it has explored three different types of factors that prevent her from reaching higher positions in her career. The paper documents the story of unheard Indian Single working women. The constraints to their career advancement are present at all levels; personal, organizational and social. However, the self efficacy and commitment shown by these single women drives them at the workplace. These women have their coping efficacy that makes them stronger and prepare them for the coming challenges.

Moreover, the study has depicted the role of social cognitive systems in India and how salient stereotype limits the single women's growth in organizations. The findings have significant implications for practitioners, human resource departments, academic researchers and many other stakeholders. Few interventions are suggested; organizations should encourage the single professional women and shed the prejudices that men are superior to women (studies have shown there is no difference in the capabilities of men and women). By having more women friendly workplace policies considering contextual factors of Indian society, will help not only the single women employees but lead to organizational effectiveness through committed employees. Cultural and societal interventions are also needed to support them. Creating a positive image of single working women through media can be one of the interventions. The academic researchers might learn from the findings the unique workplace challenges that impede the career advancements of single working women in the contextual framework of India. The organizations can follow The United Nations Development Programme (UNDP) 'GENDER EQUITY SEAL", the new auditable standard and certification system to promote fair treatment of men and women in the workplace. Private sector can play an exemplary role by implementing the best practices nondiscrimination statements and written policies in wages, training and access to opportunities. In total the six critical areas addressed are; Gender-based pay gaps, women's roles in decision-making, work-life balance, women's access to jobs in more dynamic and traditionally male-dominated sectors of the economy, ending workplace sexual harassment and using non-sexist communication. Proper implementation could serve a promising future for all categories of employees.

6. Limitations And Future Research

The present study had some limitations. The limited amount of research available on single working women in India restricted the literature review. The sample size was small but adequate. It was difficult to reach out to the single women and moreover to get consent from women to participate in this study. In addition, the area of study was limited to metropolitan cities of India. Therefore, the future researchers can consider an empirical investigation including B or C class cities as well in the study. In addition, a comparative analysis of career advancement of single women in private and public sector can be one of the future research areas. The studies can consider bringing successful Role models (especially those working for key corporations) for advocacy. They can speak quote and publish for themselves as well thus increase the informal documentation around this important subject).

References

Allendorfer, J. B., Lindsell, C. J., Siegel, M., Banks, C. L., Vannest, J., Holland, S. K., & Szaflarski, J. P. (2012). Females and males are highly similar in language performance and cortical activation patterns during verb generation. *Cortex*, *48*(9), 1218-1233.

Arbor, A. (2008). *Analyzing open-ended questions by means of text analysis procedures* (1st ed., pp. 1-3). electionstudies.org.
Azmawati, A. A., Hashim, I. H. M., & Endut, N. (2015, January). " Don't Marry, Be Happy!"-How Single Women in Malaysia View Marriage. In *SHS Web of Conferences* (Vol. 18). EDP Sciences.
Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual review of psychology*, *52*(1), 1-26.
Berg-Cross, L., Scholz, A. M., Long, J., Grzeszcyk, E., & Roy, A. (2004). Single professional women: A global phenomenon challenges and opportunities. *Journal of International Women's Studies*, *5*(5), 34-59.
Budhwar, P.S., Saini, D.S. and Bhatnagar, J. (2005), "Women in management in the new economic environment: the case of India", *Asia Pacific Business Review*, Vol. 11 No. 2, pp. 179-193.
Cheung, F. M., & Halpern, D. F. (2010). Women at the top: powerful leaders define success as work+ family in a culture of gender. *American Psychologist*, *65*(3), 182.
Dalton, S. T. (1992). Lived experience of never-married women. *Issues in Mental Health Nursing*, *13*(2), 69-80.
Desai, M., Majumdar, B., Chakraborty, T., & Ghosh, K. (2011). The second shift: working women in India. *Gender in Management: An International Journal*, *26*(6), 432-450.
Dezső, C. L., Ross, D. G., & Uribe, J. (2016). Is there an implicit quota on women in top management? A large-sample statistical analysis. *Strategic Management Journal*, *37*(1), 98-115.
Enid Kiaye, R., & Maniraj Singh, A. (2013). The glass ceiling: a perspective of women working in Durban. *Gender in Management: An international journal*, *28*(1), 28-42.
Frederick Littrell, R., & Bertsch, A. (2013). Traditional and contemporary status of women in the patriarchal belt. *Equality, Diversity and Inclusion: An International Journal*, *32*(3), 310-324.
Gino, F., Wilmuth, C. A., & Brooks, A. W. (2015). Compared to men, women view professional advancement as equally attainable, but less desirable. *Proceedings of the National Academy of Sciences*, *112*(40), 12354-12359.
Gupta, A., Koshal, M., & Koshal, R. K. (1998). Women managers in India: Challenges and opportunities. *Equal Opportunities International*, *17*(8), 14-26.
Hayes, J., Allinson, C. W., & Armstrong, S. J. (2004). Intuition, women managers and gendered stereotypes. *Personnel review*, *33*(4), 403-417.
Haq, R. (2013), "Intersectionality of gender and other forms of identity: dilemmas and challenges facing women in India", *Gender in Management: An International Journal*, Vol. 28 No. 3, pp. 171-184.
Helfat, C. E., Harris, D., & Wolfson, P. J. (2006). The pipeline to the top: Women and men in the top executive ranks of US corporations. *The Academy of Management Perspectives*, *20*(4), 42-64.
Hess, U., & Bourgeois, P. (2010). You smile–I smile: Emotion expression in social interaction. *Biological psychology*, *84*(3), 514-520.
Hoobler, J. M., Lemmon, G., & Wayne, S. J. (2014). Women's managerial aspirations: An organizational development perspective. *Journal of Management*, *40*(3), 703-730.
Houseknecht, S. K., Vaughan, S., & Statham, A. (1987). The impact of singlehood on the career patterns of professional women. *Journal of Marriage and the Family*, 353-366.
International Labor Organization. (2014). Global Employment Trends 2014: Risk of a jobless recovery?
International Labour Organization, Global Employment Trends 2013: Recovering From a Second Jobs Dip (2013) p. 79.
Khandelwal, P. (2002), "Gender stereotypes at work: implications for organisations", *Indian Journal of Training and Development*, Vol. 32 No. 2, pp. 72-83.
Kulkarni, S.S. (2002), "Women and professional competency – a survey report", *Indian Journal of Training and Development and Change*, Vol. 32 No. 2, pp. 11-16.
Laff, M. (2006). The invisible wall. T+D. (61), 32-38.
Lewis, V. G., & Borders, L. D. (1995). Life satisfaction of single middle-aged professional women. *Journal of Counseling & Development*, *74*(1), 94-100.
Lips, H. M. (2013). The gender pay gap: Challenging the rationalizations. Perceived equity, discrimination, and the limits of human capital models. *Sex Roles*, *68*(3-4), 169-185
Madsen, S. R., Madsen, S. R., Scribner, R. T., & Scribner, R. T. (2017). A perspective on gender in management: The need for strategic cross-cultural scholarship on women in management and leadership. *Cross Cultural & Strategic Management*, *24*(2), 231-250.
Mathew, R. V., & Panchanatham, N. (2011). AN EXPLORATORY STUDY ON THE WORK-LIFE BALANCE OF WOMEN ENTREPRENEURS IN SOUTH INDIA. *Asian academy of management journal*, *16*(2).

Matsui, T., Ohsawa, T., & Onglatco, M. L. (1995). Work-family conflict and the stress-buffering effects of husband support and coping behavior among Japanese married working women. *Journal of Vocational Behavior*, *47*(2), 178-192.
Misra, J., Moller, S., & Budig, M. J. (2007). Work—family policies and poverty for partnered and single women in Europe and North America. *Gender & Society*, *21*(6), 804-827.
Ministry of Statistics & Programme Implementation, Statistical Year Book India 2015, "Table 2.1 Area and Population by States (Census 2011)" (2015).
Morrison, A. M., & Von Glinow, M. A. (1990). *Women and minorities in management* (Vol. 45, No. 2, p. 200). American Psychological Association.
Naqvi, F. (2011), "Perspectives of Indian women managers in the public sector", *Indian Journal of Gender Studies*, Vol. 18 No. 3, pp. 279-309.
Nelson, D. L., & Burke, R. J. (2000). Women executives: Health, stress, and success. *The Academy of Management Executive*, *14*(2), 107-121.
Paustian-Underdahl, S. C., Walker, L. S., & Woehr, D. J. (2014). Gender and perceptions of leadership effectiveness: A meta-analysis of contextual moderators. *Journal of applied psychology*, *99*(6), 1129.
Rawat, P. S. (2014). Patriarchal Beliefs, Women's Empowerment, and General Well-being. *Vikalpa*, *39*(2), 43-56.
Sahni, J. (2016). An assessment of employee perception regarding workplace Stress-causes and remedies: Evidence from Software Industry. *International Journal of Management, IT and Engineering*, *6*(7), 23-39.
Sahni, J. (2016). Assessing The Impact Of Quality Of Work Life Practices On Organizational Effectiveness. Proceedings of The WEI International Academic Conference, Page 113, ISSN 2167-3179
Sandberg, S. (2013). *Lean in: Women, work, and the will to lead*. Random House.
Sharma, U. (1990). Public employment and private relations: women and work in India. In *Women, Employment and the Family in the International Division of Labour* (pp. 229-246). Palgrave Macmillan UK.
Sharma, R.R. and Mukherjee, S. (2012), "Women in India: their odyssey towards equality", *Diversity Quotas, Diverse Perspectives: The Case of Gender*, Gower, Farnham.
Sidani, Y. M., & Al Hakin, Z. T. (2012). Work–family conflicts and job attitudes of single women: A developing country perspective. The International Journal of Human Resource Management, 23, 1376–1393.
Singh, S. (2001). Single in the City [Preface]. Delhi, India: Penguin.
Singh, S., & Hoge, G. (2010). Debating outcomes for "working" women: Illustrations from India. *Journal of Poverty*, *14*(2), 197-215.
Srinivasan, V., Murty, L. S., & Nakra, M. (2013). Career persistence of women software professionals in India. *Gender in Management: An International Journal*, *28*(4), 210-227
Taylor, S., & Bogdan, R. (1998). Introduction to qualitative research methods (3rd ed.). New York, NY: John Wiley & Sons.
Vasavada, T. (2012), "A cultural feminist perspective on leadership in nonprofit organisations: a case of women leaders in India", *Public Administration Quarterly*, Vol. 36 No. 4.
Wertheimer, B. M. (1981). We were there: The story of working women in America.
Wood, J. T. (2009). Gendered lives: Gender, communication, and culture.
Zell, E., Krizan, Z., & Teeter, S. R. (2015). Evaluating gender similarities and differences using metasynthesis. *American Psychologist*, *70*(1), 10.

Debates on Needs vs. Resources: The Limited Character of Natural Resources

Cornelia Neagu, Centre for Industry and Services' Economics, Romanian Academy, Bucharest, Romania, neagu_cornelia@yahoo.com

Marius Bulearcă, Centre for Industry and Services' Economics, Romanian Academy, Bucharest, Romania, mariusbulearca@yahoo.com

Cristian Sima, Centre for Industry and Services' Economics, Romanian Academy, Bucharest, Romania, sima60cristian@yahoo.com

Abstract

Most natural resources that are used in production are non-renewable. When they become depleted they are lost for future use. Does it follow that the limited availability of natural resources will at some time in the future constrain economic growth as many environmentalists believe? While classical economists have shared the belief in limits to growth, the distinctive feature of modern neoclassical economics is its optimism about the availability of natural resources. After demonstrating the major role natural resources play in all economies worldwide (in the first part), we revealed the national and international character of natural resources (in the second part), with special focus on the international trade with resources and goods that may alleviate temporary shortages in supplying with raw materials and energy resources of any economy. In the end, the paper dealt with the old controversy between unlimited needs (of economies and of population) and the limited resources (especially of non-renewable natural resources), as their availability is questioned more and more in the present days. Special focus was placed on natural resources scarcity as this is the most pregnant element showing the limitations natural resources must face today. To better understand this issue, an econometric model was given to demonstrate the strong link between the actual stock of natural resources, on one hand, and the increase in exploitable stock due to the geological and soil improvement activity, as well as the raw material and energy production, on the other hand. In the end, some arguments were given to strengthen the need for sustainable development and environmental protection as the sole way to deal with inter-generational allocation of natural resources, which is, in fact, the basis of sustainability.

Keywords: natural resources, availability, scarcity, resource substitution, sustainability.

Introduction

In order to move the entire world economic gear, on average of approximately 3 tons of active minerals per year per world inhabitant are taken from the Earth's crust. Depending on actual consumption, determined by the level of development, pollution is more than 3 tones in the case of an African, but more than 30 tones in the case of a North American.

Approximately 1.2 billion people consume annually four-fifths of the energy produced in the world, and more than 3 billion people use only one-fifth. The ecological balance is in danger not only because of the huge takeover of minerals, but also because of the emanations and discharges of pollutants.

Technology responds: new energies, new materials, new specific consumption, and new processing processes.

And these are just some of the problems of the world we live in. At their center – natural resources with their availability, needs, capitalization and use, subject of the next paragraphs.

The Role of Natural Resources In The Economy

Natural resources [1] occupy a central place in national wealth and of social reproduction as a whole; they constitute both the substance and material conditions, and the virtual driving force necessary for the development of the production of material goods (consumer goods and means of production), as well as the extension of the service system. All economic activities have as their starting point and, ultimately, they are based on the existence of natural resources.

Natural resources are used as sources of raw materials to make goods and also to provide energy [2]. Making goods and producing energy consumes large quantities of resources extracted from the Earth. These resources are removed from the ground by mining. Mining includes digging ore out of the Earth which is refined to produce metals. It also includes drilling for liquids under the Earth. Most people think immediately of oil and petroleum resources; natural gas is removed from the Earth, too.

Natural resources are difficult to define precisely, particularly in the context of international trade. Most people have an intuitive idea of what natural resources are, but “common sense” definitions cannot be relied upon since they eventually run into problems when dealing with ambiguous cases. For example, crude oil and wood are clearly natural resources, but it is less obvious how intermediate and final goods made from these products should be classified.

For the purposes of this paper we should agree with defining natural resources as “stocks of materials that exist in the natural environment that are both scarce and economically useful in production or consumption, either in their raw state or after a minimal amount of processing” (WTO, 2010a). Another way of expressing the idea that natural resources must be scarce and economically useful is that they must command a positive price in markets and can be used either as inputs in production or directly as a source of utility to consumers.

As noted earlier, natural resources falling under this definition typically share a number of key features, including exhaustibility, uneven distribution across countries, negative externalities consequences in other areas, dominance within national economies and price volatility. We now examine each of these features and illustrate them with some concrete examples.

Under these conditions, any act of social production can be regarded as an "entry-exit". The available for "entry" - and what, in the long run, is ordered to be introduced into the social production process - is, in general, resource. "Exit" is the result, which is obtained in the process, and from which a part is consumed definitively for the maintenance and perpetuation of the human factor - the driving force and the purpose of the productive act - and another part is preserved for its reintroduction into the circuit, becoming thus a resource for the development of social production.

In other words, resources are a dynamic, ever changing element. Their scope is not limited to natural resources only, which objectively have given determinations; even in their case, what is at one particular moment considered to be natural endowment, actually bears the imprint of the relative character of the assessment depending on the degree of knowledge and exploitation and valorization technologies at that time.

With regard to mineral resources that are nonrenewable, it is quite difficult to establish with certainty the number of years of exploitation of existing reserves until their complete depletion. If, however, the amount of mineral reserves grouped into safe, probable and possible categories is calculated, this is done by specialists not in order to show that over a number of years the resources of the globe will be

completely depleted or not. These quantities and their exploitation time horizons show the degree of knowledge of the reserves at a given time (allowed both by the size of the funds allocated for geological research and exploration, and by the practical interest that exists in this regard in allocating funds for those extractive industries to increase both current and immediate future production), as well as the technical and economic possibilities of their exploitation.

The extent of knowledge, as a result of geological research, improvement of exploitation and extraction technologies, increases the exploitable reserves of natural resources. Also, new mineral resources are drawn upon the economic circuit, thus enriching their range, while some of them can substitute the classic ones, especially those that have become too expensive.

Considering all this, it is more correct to appreciate that the evolution of the world economy, as a whole, as well as the national constituent economies, will be influenced not so much by the physical limits of resources under the conditions of a normal demographic evolution, but especially by the economies and technological advances (Thorvaldur *et.al.,* 1999). In this respect, the extraction costs of the various minerals become decisive, because of shifting to the use of mineral ores with a lower content and with a growing degree of impurities, at higher exploitation depths and in increasingly difficult conditions. Also a significant influence will have the evolution of research and the application of new technologies that make possible the substitution of classical resources with new ones, as well as saving resources by reducing specific consumption, by recycling them, etc. All these issues are reflected in the production costs and the level of economic efficiency of extracting the useful elements.

Finally, the human factor, the "consumer" of endowment with natural resources that are transformed with the help of economic resources [3], is the main resource of the production act. Without the human factor, this act itself would not exist. The creative work of man is the one that transforms natural endowment into resources; it is the only one that gives birth to the technical and economic resources and, in the process of labor, socially by itself, quantitatively and qualitatively creates and enriches social and economic resources.

Through the present study, the analysis aims at a limited objective: to make a global-world and national-particular “inventory” of natural resources - often referred to in the economic literature as production factors - without penetrating deep and deep neither in the dialectics of the production process itself, nor in the dynamics of the union of the three major categories of resources, nor in the gearing of the "entry-exit" correlations, although the approach permanently pursues the essential link between quantitative and qualitative endowment with resources (seen as "inputs") and economic performances (seen as "outputs").

As a result, numerous and widely important studies and works have drawn attention, especially over the last five decades, on global issues of natural resources (Meadows *et.al.,* 1972; Iancu, 1972; Ayres, 1978; Kula, 1994; Sneddon *et.al.,* 2006; etc.). By new, bold and interesting approaches, they have "shocked" and, precisely by such means, have achieved their purpose: the warnings launched have been received; global problems have penetrated into general consciousness, the dangers and threats stemming from their failure to resolve have been better understood and, as such, the requirement to solve these problems has been imposed.

Many approaches related to natural resources use have emanated from the industrialized world's perimeter, and few of them have projected global issues in light of the vision of this world. There have been trends, whether directly or indirectly, explicitly or implicitly, the problems of the industrialized world to be generalized and "globalized", whether or not the problems of the less developed world have been "forgotten" (van der Ploeg, F., 2011).

Insignificant activities have in fact been made in these approaches to address the global problems of mankind and less developed world, and even weaker have been the attempts to understand the serious and

pressing problems of this world, from catching and emphasizing their global-world impact and to enhance, if not the priority, at least the urgency of their settlement, through extensive international efforts (Warner, 2015).

National and International Character of Natural Resources

The resource problem is multidimensional, its determinations, coordinates and implications being natural, geographic, economic, technical, historical, social, political and ecological. It also proves to have a national and, at the same time, international character, as seen before.

The national character derives from the very objective reality of the national states, which makes the resources to exist, in fact, in geographic, historical and politically constituted-delimited spaces. Each such space has a certain endowment with natural, demographic, technical-economic and social-economic resources, and their allocation, the process of social production itself, takes place in this space, in specific coordinates.

In other words, at the social-national level, it takes place the exploitation of the natural resources stock, the reproduction of the human factor, the formation and distribution of the technical-economic resources, the creation and valorization of the social-economic ones. In each national economic-political-social complex there is, therefore, a specific combination of different categories of resources, which determines differences in their allocation, management, distribution and use in the content of social production itself (Alais, 1971).

Thus, from a global point of view, the situation is highly heterogeneous. The current heterogeneity derives not only from the inherent differences determined by, generically speaking, the "size" of the states and, therefore, the amount of available natural resources, but also from the discrepancies in the degree of the valorization and the efficiency of their use.

The international character of the resource problem is closely related to the heterogeneity mentioned, in both its aspects. The needs-resources report is not the same in the different national spaces, which makes the union, within each of them, of natural and economic resources with the demographic (the human factor), and thus the valorization of the resources as a whole (through the social production process), to be accomplished through relations with other national spaces (Ohlin, 1967). The different natural resources are objective unevenly distributed globally and the possibilities for reciprocal substitution are reduced; needs are, however, general, so there is no alternative to international exchanges with such resources (Bulearca, 1995).

At the same time, if their exploitation takes place in national spaces, the constraints of exploitation are global, because the environment is unique as only a certain takeover of resources may occur regardless of where this takeover takes place (due to the global, limited natural endowment) and only a certain deterioration under the influence of polluting effects may arise regardless of where such effects are generated. The very large and growing diversity of technical and economic resources gives a pronounced international character on the natural resources issue.

Under the circumstances of this diversity, it becomes technically impossible and economically ineffective that in every national space, the entire assortment of technologies and products that constitute links (and therefore resources) in the current production gear complex to be conceived and created; as it would not be possible in every national area to create and make available the full amount of financial resources claimed in such a case. Thus, a certain specialization - and consequently a wide international cooperation - in the sphere of technical and economic resources is objectively claimed. At the same time, consideration should be given to the need and usefulness of international exchanges of experience, in the field of resources, for organizing and managing the micro and macroeconomic processes.

Experience itself proves that the current asymmetry in the world in terms of levels of endowment with technical and economic resources (which causes serious discrepancies in the degree of capitalization of natural resources and human productive potential, as well as in the standard of living and civilization) is closely related to a certain kind of international relations. Organizing international relations is therefore an integral part of the resource issue. The process of allocating, capitalizing and distributing resources - which has, and will preserve, predominantly and decisively a national character - tends to, at the same time, take on an increasingly profound international character, in the context of increasing interdependencies between different national spaces.

Hence, worth noting that countries' differing natural resource endowments – and their uneven geographical distribution – play a critically important part in explaining international trade. Traditional trade theory emphasizes that differences in factor endowments prompt countries to specialize, and to export certain goods or services where they have a comparative advantage. This process allows for a more efficient allocation of resources, which in turn leads to an increase in global social welfare – the "gains from trade" (WTO, 2010b).

Studying the problems of primary resources and highlighting their relationship with the specialization of national economies and the structure of international economic exchanges made possible and necessary to develop ***the theory of endowment with factors***, synthesized in the so-called 'Heckscher-Ohlin theorem' [4]. Relative differences in countries' resource endowments are keys to the standard version of the Heckscher-Ohlin theory of international trade, according to which nations tend to specialize in industries and export products and services that require the use of relatively abundant and inexpensive production factors (natural resources). Conversely, nations tend to import goods and services that require large inputs of relatively scarce and expensive production factors (Heckscher, 1919; Ohlin, 1967). According to this theory, there is an organic link between the endowments with production factors (with primary factors, in particular) and the profile of the national economy.

Hence, endowments of immobile and scarce natural resources may form a source of comparative advantage that guides the pattern of international trade. Consistent with this theory, Leamer (1984) finds that the relative abundance of oil leads to net exports of crude oil and that coal and mineral abundance leads to net exports of raw materials. Trefler (1995) finds similar results with respect to trade in resource-intensive goods.

The Heckscher-Ohlin theory has been modified and extended by introducing other factors besides resource endowments, such as transportation costs, economies of scale and government policy, (WTO, 2010a) that also influence comparative advantage. For example, distance from world markets can be a decisive factor when the natural resource in question is bulky, such as natural gas, and when transportation costs are high. Complementary inputs, such as technology, capital and skilled labour, are also significant when a natural resource sector is characterized by difficult or technically complex extraction processes.

Variables such as education, infrastructure and institutions have also been observed to affect sectoral patterns of natural resources trade (Lederman and Xu, 2007). Only when these other determinants of comparative advantage are in place will a resource-abundant country tend to export resources to countries with a relative abundance in capital and skilled labour and import capital-intensive goods in return (Leamer, 1995). In short, natural resource endowments may represent a necessary but not sufficient condition for the production and export of resources or resource-intensive goods (Feenstra, 2004).

The existence of these two categories of resources - primary and qualitative - and especially the rapid increase in the role of non-material qualitative ones in "contemporary" national economies provided further clarifications and even changes in the old sense of the theory of endowment with factors, in the

following sense: as the development of national economies develops, their profile and structure is increasingly released from dependence on the endowment with natural primary production factors (Johnson, 1968; Vernon, 1970). The structure of the economy remains tightly linked to its own raw material and energy base, only as long as the national economy is at a low level of development.

Based on technical progress, with the expansion and upgrading of the economy's structure and, above all, of the industry's structure, the link with its own energy and raw materials base, in its traditional meaning, weakens (and this is good), in particular, due to three reasons (Sachs and Warner, 1995). Firstly, is the creation of new industrial branches and diversification of production incorporating an increasing volume of highly qualified work and research activities, proliferation of technical and scientific progress in the national economy, resulting in a reduction in the consumption of natural resources per unit of added value. Secondly, is the development of foreign trade relations, which creates availability of foreign currency means of payment for resource imports and the expansion of international cooperation relations on direct, production and technical-scientific investment in the field of energy resources and raw materials. Thirdly, is the widespread resource substitution of raw materials and energy resources with new synthetic and artificial resources, as well as the use of alternative resources (IMF, 2017).

Under these circumstances is required that the national fund of available resources to be known and put to good use by a rational trend in each country, according to its inalienable right to permanently and entirely dispose of national natural resources in the interest of developing its own economy (Tinbergen, 1977; Hartwick, 1977; Bravo-Ortega and de Gregorio, 2005). The current world trade system helps support substantial inequalities in the distribution of the use of natural resources. This raised (Ecobescu, 1981; Brown *et.al.,* 2015) and still raises important questions for global justice.

Therefore, ***the effectiveness*** (the fundamental economic criterion) and ***the equity*** (the fundamental social and ecological criterion), the two main objectives which must govern this process at national level and whose simultaneous implementation is of particular importance and complexity, must be both pursued internationally. In this respect, worth noting that the world economy today uses around 30% fewer resources to produce one Euro or Dollar of GDP than 30 years ago; however, overall resource use is still increasing, but resource efficiency has improved steadily globally. Anyhow, as we consume growing amounts of products and services, this upward trend is more than outweighed by the overall growth of our economies (Brekke and Howarth, 2002).

In order to create a more sustainable and equitable world, regions with high levels of per-capita resource use will need to sharply decrease their resource use in absolute terms. This reduction in resource use in richer regions will give poorer regions the chance to increase their resource use as they overcome poverty and increase their quality of life (Graham *et.al.,* 2017). This principle is already well established in the global debate on climate targets, and it needs to be extended to the area of resource use. Short-term actions can get rich countries on the right track. These include implementing policy measures that increase the prices of natural resources and reward resource-efficient behavior, exploiting resource efficiency within companies, increasing recycling and informing consumers about their options to reduce the use of natural resources (Wackernagel and Rees, 1996).

As a result, more fundamental questions about economics, development and resources need to be addressed in the medium term. Most significantly, how can new models of development to be created in industrialized countries that focus on well-being instead on increased production and consumption? This will require rethinking the role of economic growth and the links between resource use, quality of life and happiness. Therefore, whether economic growth can be sustained in a finite natural world is one of the earliest and most enduring questions in economic literature.

The limited character of natural resources, the need for their sustainable use

Anything that is dug out of the ground cannot be put back; that is why anything that is removed from the ground is considered limited and will ultimately run out. This means that when the supply of the resource runs out there will be no more. The Earth forms natural resources very, very slowly and it takes a very, very long time. The resources that are easiest to dig out are used up first. This includes the minerals in high concentrations and those that are near the surface. Once these are used up, it is necessary to look for more. These resources are harder to obtain and in lower concentration. This makes them more expensive to obtain, so goods cost more. And, as we stated before, eventually the resources will run out.

Natural resources, including materials, water, energy and fertile land, are the basis for our life on Earth. However, humanity's rapidly growing consumption of these resources is causing severe damage. Our climate is changing; fresh water reserves, fish stocks and forests are shrinking; fertile land is being destroyed and species are becoming extinct (Johnson, 2002). In order to continue to thrive on this planet, our lifestyles will need to become more sustainable, so that we are able to protect our natural resource base and the fragile eco-systems on our planet (Howarth, 2012).

Humans today extract and use around 50% more natural resources than only 30 years ago, at about 60 billion tones of raw materials a year. Increasing resource extraction doesn't just lead to environmental problems, but is often also linked to social problems such as human rights violations and poor working conditions. These negative environmental and social impacts are most strongly felt in African, Latin American and Asian countries with low environmental and social standards (Axelrod *et.al.,* 2011). People in rich countries consume up to 10 times more natural resources than those in the poorest countries. On average, an inhabitant of North America consumes around 90 kg of resources each day. In Europe, consumption is around 45 kg per day, while in Africa people consume only around 10 kg per day (SERI, 2009).

Even with unprecedented growth in human population and resource consumption, humans have been quite adept at finding solutions to the problem of scarce natural resources, particularly in response to signals of increased scarcity (Barnett and Morse, 1963; Barnett, 1979; Smith, 1979; Stiglitz, 1979). Because environmental resources are not generally traded on markets, however, scarcity signals for these resources may be inadequate, and appropriate policy responses are difficult to implement and manage. In the debate over the economic scarcity of natural resources, one significant change in recent years has been a greater focus on the ecosystem services and the resource amenities yielded by natural environments (Krautkraemer, 2005). The general conclusion at this point is that technological progress has ameliorated the scarcity of natural resource commodities; but resource amenities have become scarcer, and it is unlikely that technology alone can remedy that.

Starting from these evidences, although its influence on current research on the economics of sustainability is mainly historical (Neumayer, 2004), the legacy of *The Limits to Growth* study (Meadows *et.al.,* 1972) continues to have very considerable implications for environmental policy, in part because of the powerful appeal of the study's "apocalypse-or-renewal" rhetorical framing in the context of the contemporary sustainability movement (Meadows, 1992). In debates over climate change, for example, environmentalists (Victor, 2011) sometimes argue that, because the production and consumption of market goods and services is the proximate cause of greenhouse gas emissions, stabilizing climate will require some curtailment or even the reversal of economic growth.

In response, critics argue that, because economic growth is fundamental to the improvement of human welfare (Howarth, 2012), policies that negatively affect economic growth are unworkable and undesirable (Lomborg, 2001). This contextualization of the issue has led to policy gridlock grounded in an underlying ideological disagreement.

In traditional approaches, natural resources as well as the population appear to be exogenous variables of the economic and social system, which in the short run usually does not pose the real prospect of each resource. In reality, the evolution of primary, population and quality resources is in close interdependence with the evolution of the economic and social system (Stiglitz, 1974). Hence, in dynamic studies, and especially in long-term projections, the resource subsystem must be integrated into the economic system, and at the same time it is necessary to analyze both the evolution of the structure and the mutual influences of the change of the component elements of the system.

The economy and human society, as a whole, long-term development will depend on the availability of factors, represented, first of all, by the natural resources, comprised, in turn, in a very complicated network of relations with the demographic, technological, ecological and biological factors. For modeling these relationships, it is important to identify and define the conceptual apparatus with which we shall operate.

Therefore, worth noting that in most of the papers, a large part of the conceptual and methodological apparatus was closely related to solving the problems of optimal allocation of resources (Kantorovici, 1966), in which the limitation of the production factors appears to be relative in both the static and the dynamic vision. Indeed, resources appear to be deficient in their relationship to the growing need to meet more and more needs in production or consumption (Bulearca, 1993).

As noticed earlier, natural resources can be thought of as natural capital assets, distinct from physical and human capital in that they are not created by human activity (WTO, 2010a). Natural capital may be a potentially important input in a country's "production function", but is important to distinguish between natural resources as factors of production and natural resources as goods that can be traded internationally. For instance, minerals, oil, and various other materials can be extracted and enter into trade. However, other resources may form the economic basis for various sectors of the domestic economy, and therefore are only involved in trade in an indirect way (Josling *et. al.*, 2009). For example, climate and scenery can be exported through tourism. Similarly, agricultural land, which is the archetypal "fixed, immobile" natural resource, can be exported through agricultural commodities grown on that land. Hence, at a fundamental level, natural resources are often a reason for trade rather than tradable goods in their own right.

Hence, the general links between the economic results, on one hand, and the natural resources (interpreted as flows and stocks) and the other primary resources, on the other hand, can be more clearly identified using mathematical relationships and symbols. Thus, we may say that the labor force $L_0(t)$, the production resources $K_0(t)$ and the natural resources $R_0(t)$ are used as primary resources to achieve the final goods and services production $Y(t)$:

$$Y(t) = f\left[L_o(t), K_o(t), R_o(t), t\right].$$

The natural resources $R_0(t)$, represented by the flow of raw materials and primary energy that are used in the production process, are also obtained from the stock of material resources as a result of the mining, forestry and agricultural exploitation activity, and the use of the wealth of waters, etc., for which is required to allocate labor and fixed capital resources. Taking into account the so-called stock of natural resources existing in period t, noted as $S(t)$, as well as the $L_1(t)$ labor force and the fixed capital $K_1(t)$ available, the production of raw materials and energy $R_0(t)$ is given by the relationship:

$$R_o(t) = f\left[L_1(t), K_1(t), S(t), t\right].$$

The more the resource is extracted, the more difficult and more expensive it becomes to extract that resource from the nature. That is why stock *S* is a superior limit that can be reached in the given technological and economic conditions. But the stock has a dynamic character. It can be increased over time: in the case of non-renewable resources, through prospecting and geological research, by adding to the known and exploitable reserves category those new identified and studied resources; and, in the case of renewable resources, through natural processes (rain, wind, solar radiation) and by improving and protecting soil and forests, planting new forests, and researches to create the technologies needed to exploit the natural potential.

The increase in the stock of resources *G(t),* as a result of human activity, requires an appropriate volume of labor $L_2(t)$ and capital or fixed capital $K_2(t)$:

$$G(t) = f\left[L_2(t), K_2(t), S(t), t\right].$$

Taking into account the initial stock of resources (S_0), the increase in exploitable stock due to the geological and soil improvement activity *G(t)*, as well as the raw material and energy production *R(t)*, which leads to the stock resource shortage, the stock of resources at the end of the period *t* can be expressed by the relationship:

$$S(t) = S_0 + \int_0^t \left[G(\tau) - R(\tau) d\tau\right],$$

or in terms of a discrete time model:

$$S(t) = S(t-1) + G(t) - R(t).$$

This simplified model illustrates the linkages between variables and the way to allocate labor and fixed capital resources for the production of raw materials and primary energy, geological activity and improvements needed to increase the stock of resources that make possible to maintain the flow of raw materials and energy required to achieve the increase in final output of goods and services.

In order to stimulate the tendency to promote the consumption of renewable and/or renewable resources and to blur the consumption of non-renewable ones, E. Dolan (1969) proposed the use of a calculation and analysis tool for the evolution of resource expenditures, which he calls the gross national cost (GNC) and subdivides it into two categories: type I, the GNC fraction produced with renewable and recoverable resources; and type II, the GNC fraction produced with depleting and non-recoverable resources. From the point of view of economic management and conservation of natural resources, the issue is to maximize the type I fraction (produced with renewable and recoverable resources) and to minimize the type II fraction (obtained with depleting and non-recoverable resources).

In principle, economic and demographic growth leads to increased consumption of natural resources. Taking into account that natural resources are limited, as earlier demonstrated, it is necessary to know their volume in order to determine the duration of their use until full exhaustion, in the case of non-renewable resources, or their decrease per capita, beyond the level of subsistence, in the case of renewable resources. But these problems shall be thoroughly studied in some of our future works.

Conclusions and Recommendations

Natural resources are indispensable for the functioning of modern economies, and for achieving and maintaining high standards of living in all countries. They are primary inputs in the production of all manufactured goods (e.g. ores and other minerals). Also, they provide the energy needed to transport people and goods from place to place, to light our cities, and to heat our homes and places of work (fuels). They are also a potentially unending source of valuable materials and a habitat for wildlife and plant species (forests, oceans). Finally, in the case of water, they are necessary for sustaining all life on the planet. It is no exaggeration to say that the way the world manages its natural resources will go a long way towards determining the sustainability of the global economy.

Because of the limited character of natural resources, until recently, the economic analysis as a whole, and especially the one on optimization, has been dominated by the concept of resource scarcity (Krautkraemer, 2005). A large part of the conceptual and methodological apparatus was closely linked to solving problems regarding the allocation of resources at micro and macroeconomic level. In this context, the limit of the production factors appears to be relative in both static and dynamic view. Indeed, goods appear to be deficient in the ratio in which these goods are found in the production process, thus appears the need of combining them both quantitatively and qualitatively in the process of their use. They appear to be deficient because the necessary production factors are not available without limit during the production process.

The theory of optimal allocation of resources means a combination of production factors in such a way that, taking into account some restrictions given by the temporal deficiency of some resources, a maximum effect is achieved. Given a large number of technological factors and variants, their efficient use is being pursued, as well as the substitution of deficient resources with other non-fiscal ones. In this respect, conservation of natural resources is also another very important issue. The modern economies should always look for alternative sources of materials. This includes substitution of materials and recycling.

In general, as regarding processes in their dynamics, results that production factors are reproducing in increasing quantities. However, in the process of using the resources, their deficiency is maintained in a relative way (among resources), becoming virtually oscillating over time, precisely because of the intervention with different intensities of technical progress, direct action of man, economic mechanism, and so on. The scarcity of resources in relation to the needs of society is gradually diminishing, based on economic development and increasing the contribution of technical progress to economic growth (Neumayer, 2000).

The scarcity of resources should be highlighted in the economy with prices: the more these resources are deficient, the higher their prices are. Indeed, prices have to express, on one hand, the amount of living and materialized labor costs and, on the other hand, the current and prospective market situation (supply and demand), the status of natural resources, and so on. While trade in natural resources will almost certainly continue to grow in the future, improved international cooperation and domestic regulation should be able to contribute to efficiency gains, the elimination of the adverse consequences of extracting and using natural resources, and perhaps increased stability in the market prices of these goods (Araujo *et.al.,* 2013).

However, the above interpretations have become insufficient for a better understanding of the new issue in the real world. Therefore, it is necessary to address the resource problem in close connection with the evolution of the environment and its factors, with the new economic, social and technological processes of perspective, which take place not only on a national scale, but also on the world stage (Chasek *et.al.,* 2010). Anyhow, even if we look at things in general, the same traditional image is perpetuated, according to which the essential natural resources ensuring biological and economic life are free goods and that man lives in an unlimited space (De Man, 2016). Then, natural resources would be gifts of nature.

Developing industries and technologies, population growth, etc. have begun to increasingly use the environment, so that they have become an additional production factor, and pollution has become a more evolved element in the field of natural environment boundaries. It is necessary for man to change his behavior in relation to nature: from violence and foolishness, he has to be a protector and collaborator of the natural environment or, as Boulding says (1966), to find his place in a system ecologically cyclical that is capable of continuous reproduction of the material form. Anyhow, these issues will be largely addressed in our future work dealing with the estimative speculations and the *"Spaceship Earth"* concept introduced by Boulding a few decades ago [5].

Indicating the number of years of exploiting the reserves until their full depletion, when forecasting economic developments is made, and hence concluding that economic growth should be slowed down or stopped arises not only as an unjustified thing, naive in terms of economic reasoning. All of this, however, should not prompt us to a contemplative or passivity in terms of the impact that resources have on economic growth (van der Ploeg and Venables, 2011). On the contrary, they require the intensification of geological research, the rational management of resources, increased research and technological efforts for the transition to the exploitation of resources with lower content of useful substances and, in particular, the search for new efficient substitution resources or satisfying a larger range of needs.

At this time it is recognized the insufficient study of the relations and of the economic requirements for prevention or recovery of environmental factors, negative effects as well as the lack of a system of economical evaluations of natural resources sufficiently cohesive, comprehensive, efficient and theoretically substantiated, a system to be used for saving the limited natural resources and preserving the environmental factors (Laitos and Zellmer, 2015). Moreover, is the right time to evaluate mineral resources of the subsoil so that such assessments to be used as effective tools in the broad action of rationalizing the extraction and use in production of all natural resources, which is closely correlated with the requirements of economic growth in the future.

The evaluation of natural resources is of a not only theoretical importance, but also of practical importance, for the elimination of waste in the economic processes (production and consumption), for the rational exploitation thereof, and so on. The fact that, in general, the specific consumption of raw materials and energy resources is even higher (Darmstadter, 2002), that the recovery factor of many mineral resources is very small, that there is a great waste in the whole economic circuit precisely to those resources which in the future will become more and more scarce is because prices are set only on the basis of value - current work, and that the specific factors determining the current and prospective situation of these resources are not sufficiently taken into account.

All the above mentioned issues are useful elements in the realization of the economic policy in the field of resources. Carefully used, these elements can indeed help rationalize the consumption of natural resources and preserve environmental factors for a better common future. Moreover, sustainability cannot be developed and imposed on a community, small or large scale. Success depends on the participation and implementation by the community (Buffie *et.al.,* 2012). Community members must be the driving force for the sustainable quality of life for all members, now and for the future generations. Because sustainability is a dynamic concept rather than a static state, it requires decision makers to be flexible and willing to modify their approaches according to changes in the environment (including the diminishing of the actual stock of natural resources), human needs and desires, or technological advances. This means that actions that contribute to sustainability today, either in perception or in reality, may be deemed detrimental tomorrow if the context changes.

The intellectual and political debate about natural resources has seen public attitudes and expert opinion alternate between optimism and pessimism about whether precious natural resources will continue to be available for future generations (Perman *et.al.,* 2003). Growing concern for the environment, combined

with the steady rise in natural resource prices in recent years, has once again brought these issues to the forefront of public consciousness.

Endnotes

[1] There are two basic conditions for a substance or feature to be classified as ***a natural resource*****.** First, the resource must exist naturally in the environment; that is, not synthetically produced by human beings, such as in a laboratory or factory. Crude oil, timber, deer, and sailfish fit that requirement, whereas genetically engineered bacteria or computers do not. A naturally occurring commodity typically is classified as a natural resource when it is extracted or purified from its natural state rather than being created. Second, the resource must be able to be exploited by humans to directly satisfy a need or want. Copper, tuna, and air fulfill such a requirement (with air supplying a need, as a condition for life), whereas an infectious parasiteor mosquito does not (although the parasite or mosquito may provide an indirect benefit as part of nature, such as part of food chains).

Some authorities hold that for a substance or feature to be classified as a natural resource, it must offer potential or actual economic value, creating wealth. This was an original definition provided in the 6th edition of *Black's Law Dictionary* (1990): *"any material in its native state which when extracted has economic value"*. Others do not limit the term to those resources having economic product value, but also include supplying a non-economic value. Resources such as oil, coal, wood, water power, and arable land clearly can be seen as providing potential economic value. These are considered natural resources by all parties. The second, broader concept also includes such features as climate and trees planted in a park. While not considered to have any direct economic value, they do provide important non-economic values. A climate may be seen as part of one's enjoyment of nature and tourism, while trees in a park provide aesthetic values.

This distinction is reflected in the two divergent definitions of natural resource found in the 7th edition of *Black's Law Dictionary* (1999): (1) *"any material from nature having potential economic value or providing for the sustenance of life";* and (2) *"environmental features that serve a community's well-being or recreational interests, such as parks"* (Swarts, 2013).

[2] ***A natural resource industry*** is one in which the primary activity involves extraction and/or purification of the natural resource, instead of creation of the commodity. Examples of natural resource industries include crude oil extraction and processing, fishing, and forestry. Agriculture is not considered a natural resource industry (Swarts, 2013).

[3] Within resources, a growing weight and importance are those whose origin is directly the process of production and social activity itself; created by man, they increasingly condition their productive potential. They are of particular complexity and diversity, but their common specificity delimits them from the other two major categories of resources: natural, on one hand, and human, on the other. Therefore, the term they are called - ***economic resources*** - must be interpreted not in a narrow sense, but in its broad sense of maximum generality. Some of the economic resources represent work and accumulated experience - technical-economic resources, equipment, scientific knowledge, technologies, financial-investment means; others are the framework within which the productive-social activity is carried out, namely the existing economic and social organization, depending on the dynamics of the historical-social evolution and the accumulated experience - the social-economic resources related to the system of production relations and the organizational and management structures (Samuelson and Nordhouse, 2009).

[4] The Heckscher–Ohlin theorem is one of the four critical theorems of the Heckscher–Ohlin model. It states that a country will export goods that use its abundant factors intensively, and import goods that use its scarce factors intensively. In the two-factor case, it states: "A capital-abundant country will export the

capital-intensive good, while the labor-abundant country will export the labor-intensive good." The critical assumption of the Heckscher–Ohlin model is that the two countries are identical, except for the difference in resource endowments. This also implies that the aggregate preferences are the same. The relative abundance in capital will cause the capital-abundant country to produce the capital-intensive good cheaper than the labor-abundant country and vice versa.

Initially, when the countries are not trading: the price of the capital-intensive good in the capital-abundant country will be bid down relative to the price of the good in the other country, the price of the labor-intensive good in the labor-abundant country will be bid down relative to the price of the good in the other country. Once trade is allowed, profit-seeking firms will move their products to the markets that have (temporary) higher price. As a result: the capital-abundant country will export the capital-intensive good, the labor-abundant country will export the labor-intensive good.

The Leontief paradox, presented by Wassily Leontief in 1951 (Leontief, 1951), found that the U.S. (the most capital-abundant country in the world by any criterion) exported labor-intensive commodities and imported capital-intensive commodities, in apparent contradiction with the Heckscher–Ohlin theorem. However, if labor is separated into two distinct factors, skilled labor and unskilled labor, the Heckscher–Ohlin theorem is more accurate. The U.S. tends to export skilled-labor-intensive goods, and tends to import unskilled-labor-intensive goods (Miberg, 1996).

[5] Kenneth Boulding is widely regarded as one of the 'founding fathers' of ecological economics. In his classic paper written in 1966, Kenneth Boulding discusses a change in orientation that is required if mankind is to achieve a perpetually sustainable economy. Boulding concludes his paper by considering the extent to which the price mechanism, used in a way to put prices on external diseconomies, can deal with the transition to "*Spaceship Earth"*. He accepts the need for market-based incentive schemes to correct such diseconomies, but argues that these instruments can only deal with a small proportion of the matters which he raises.

References

1. Allais, M. [1971], 'Les Théories de l'équilibre générale et efficacité maximale. Impasses réels et nouvelles prospectives', in Revue d'économie politique.
2. Axelrod, R, VanDeveer, S. and Downie, D. (Eds.) [2011], 'The Global Environment: Institutions, Law, and Policy', 3rd Edition, Washington, D.C.: CQ Press.
3. Ayres, U. R. [1978], 'Resources, Environment and Economics', John Wiley and Sons, New York.
4. Barnett, H. [1979], *"Scarcity and Growth Revisited"*, in 'Scarcity and Growth Reconsidered', edited by V. K. Smith. Baltimore: Johns Hopkins University Press for Resources for the Future, pp. 163–217.
5. Barnett, H. and Morse, C. [1963], 'Scarcity and Growth: The Economics of Natural Resource Availability', Baltimore: Johns Hopkins University Press for Resources for the Future.
6. *Black's Law Dictionary* 6th ed. [1990], edited by Bryan A. Garner, West Publishing.
7. *Black's Law Dictionary* 7th ed. [1999], edited by Bryan A. Garner, West Group.
8. Boulding, K. [1966], *"The economics of coming Spaceship Earth"*, in 'Environmental Quality in a Growing Economy' (ed. H. Harret), Johns Hopkins Press, Baltimore, MD, pp. 3-14.
9. Brekke K. and Howarth, R. [2002], 'Status, Growth, and the Environment: Goods as Symbols in Applied Welfare Economics', Cheltenham, U.K.: Edward Elgar.
10. Bulearca, M. [1993], *"Energy Resources and Raw Materials - Restrictions in Macroeconomic Modeling",* in Economic Messenger no. 19 and 21, Bucharest.
11. Bulearca, M. [1995], *"Theory of Markets and Efficient Use of Natural Resources",* Economic Studies and Research no. 10-11, ERNE-IEI, CIDE, Bucharest.
12. Chasek, P., Downie, D. and Welsh Brown, J. [2010], 'Global Environmental Politics', 5th Edition, Boulder, CO: Westview Press.

13. Daly, H.E. [1979], *"Entropy, Growth, and the Political Economy of Scarcity',* in 'Scarcity and Growth Reconsidered', edited by V.K. Smith. Baltimore: Johns Hopkins University Press for Resources for the Future, pp. 67–94.
14. Darmstadter, J. [2002], 'A Global Energy Perspective. Sustainable Development Issue Backgrounder', Washington, DC: Resources for the Future.
15. De Man, P. [2016], 'Exclusive Use in an Inclusive Environment: The Meaning of the Non-Appropriation Principle for Space Resource Exploitation', Springer International Publishing Switzerland.
16. Dolan, E. [1969], The Economic Strategy for Environment Crisis, Holt, Reinhart and Winston, Inc., New York.
17. Ecobescu, N. [1981], 'Resources and the new international order', Political Publishing House, Bucharest.
18. Graham, S., Lukasiewicz, A., Dovers, S., Robin, L., McCay, J., Schilizzi, S. [2017], 'Natural Resources and Environmental Justice: Australian Perspectives', Csiro Publishing.
19. Heckscher, E. [1919], 'The Effect of Foreign Trade on the Distribution of Income', Ekemisk Tidskrift.
20. Howarth, R. [2012], *"Sustainability, well-being, and economic growth",* Minding Nature, Volume 5, Number 2, September.
21. Iancu, A. [1972], 'Economic Growth and Natural Resources', Political Publishing House, Bucharest.
22. Johnson, D.G. [2002], *"The Declining Importance of Natural Resources: Lessons From Agricultural Land"*, Resource and Energy Economics 24 (1–2).
23. Johnson, H. [1968], 'Comparative Cost and Commercial Policy. Theory for a Developing World Economy', Aloiqvist and Wicksell, Stockholm.
24. Kantorovici, I.V. [1966], 'Economic Calculation of Optimal Use of Resources', Scientific Publishing House, Bucharest.
25. Krautkraemer, J. [2005], *"Economics of Natural Resource Scarcity: The State of the Debate",* Resources for the Future, Washington, D.C., Discussion Paper 05–14, April.
26. Kula, E., [1994], 'Economies of Natural Resources', the Environment and Policies, Second Edition, Chapman and Hall, London.
27. Laitos, J. and Zellmer, S. [2015], 'Natural Resource Law', Hornbook Series, West Academic.
28. Lomborg, B. [2001], 'The Skeptical Environmentalist: Measuring the Real State of the World', New York: Cambridge University Press.
29. Meadows, D., Meadows, D. and Randers, J. [1992], 'Beyond the Limits: Global Collapse or a Sustainable Future', London: Earthscan.
30. Meadows, D., Meadows, D., Zahn, E. and Milling, P. [1972], 'The Limits to Growth', New York: Universe Books.
31. Neumayer, E. [2000], *"Scarce or abundant? the economics of natural resource availability"*, Journal of economic surveys, 14 (3), Blackwell Publishing.
32. Neumayer, E. [2004], 'Weak Versus Strong Sustainability: Exploring the Limits of Two Opposing Paradigms', Cheltenham: Edward Elgar.
33. Ohlin, B. [1967], 'Interregional and International Trade', Massachusetts, Harvard University Press.
34. Perman, R., Ma, Y., McGilvray, J. and Common, M. [2003], 'Natural Resource and Environmental Economics', Third Edition, Pearson Education Limited.
35. Samuelson, P.A. and Nordhaus, W.D. [2009], 'Economics', 19-th Edition, Mc Graw Hill Education, New York.
36. Sneddon, C., Howarth, R. and Norgaard, R. [2006], *"Sustainable Development in a Post-Brundtland World",* Ecological Economics 57.
37. Stiglitz, J.E. [1974], *"Growth with Exhaustible Resources: Efficient and Optimal Growth Paths",* in 'Review of Economic Studies', 41 (Symposium on the Economics of Exhaustible Resources), pp. 123–138.

38. Stiglitz, J.E. [1979], *"A Neoclassical Analysis of the Economics of Natural Resources"*, in 'Scarcity and Growth Reconsidered', edited by V.K. Smith, Baltimore, Johns Hopkins University Press for Resources for the Future, pp. 36–66.
39. Sustainable Europe Research Institute (SERI) [2009], *"Overconsumption? Our use of the world's natural resources"*, Austria and GLOBAL 2000, Friends of the Earth Europe, September.
40. Swarts, F. [2013], *"New World Encyclopedia",* New World Encyclopedia Creative Commons CC-by-sa 3.0, 4 July.
41. Tinbergen, J. [1977], 'Restructuring the international order (RIO)', Political Publishing House, Bucureşti.
42. Vernon, R., ş.a. [1970], 'The Technology Factor in International Trade', National Bureau of Economic Research, New York.
43. Victor, P.A. [2011], "Growth, De-growth, and Climate Change: A Scenario Analysis," Ecological Economics, in press, published online May 27.
44. Wackernagel, M. and Rees, W. [1996], 'Our Ecological Footprint: Reducing Human Impact on the Earth', Philadelphia, PA: New Society Publishers.
45. Araujo, J., Li, B., Poplawski-Ribeiro, M., Zanna, L-F., [2013], *"Current Account Norms in Natural Resource Rich and Capital Scarce Economies"*, International Monetary Fund Working Paper WP/13/80, March.
46. Bravo-Ortega, C., and de Gregorio, J. [2005], *"The Relative Richness of the Poor? Natural Resources, Human Capital, and Economic Growth",* World Bank Policy Research Working Paper 3484.
47. Brown, M. J., Grzybowski, J., Jensen, D., Kaye, J. L. [2015], *"Natural Resources and Conflict. A Guide for Mediation Practitioners",* The United Nations Department of Political Affairs and United Nations Environment Programme (UN DPA and UNEP), February, New York.
48. Buffie, E., Berg, A., Pattillo, C., Portillo, R. and Zanna, L. F. [2012], *"Public Investment, Growth, and Debt Sustainability: Putting Together the Pieces",* International Monetary Fund Working Paper 12/144, Washington.
49. Feenstra, R. C. [2004], *"The Heckscher–Ohlin Model". Advanced International Trade: Theory and Evidence*", Princeton: Princeton University Press, pp. 31–63.
50. Hartwick, J. M. [1977], *"Intergenerational Equity and the Investing of Rents from Exhaustible Resources"*, American Economic Review 66, pp. 972-74.
51. International Monetary Fund [2017], *"Macroeconomic management of Natural Resources",* Macro Research For Development: an IMF-DFID Collaboration, July 28, Washington.
52. Josling, T., Giovannucci, D., Kerr, W., O'Connor, B. and Young, M. T. [2009], *"Guide to Geographical Indications: Linking Products to their Origins",* International Trade Center, Geneva
53. Leamer, E. E. [1984], 'Sources of international comparative advantage', The MIT Press, Cambridge.
54. Leamer, E. E. [1995], "*The Heckscher–Ohlin Model in Theory and Practice",* Princeton Studies in International Finance no. **77**, Princeton, NJ: Princeton University Press.
55. Lederman, D. and Colin Xu, L. [2007], *"Comparative Advantage and Trade Intensity: Are Traditional Endowments Destiny?"*, in 'Natural Resource, Neither Curse nor Destiny', ed. Daniel Lederman and William F. Maloney, Stanford University Press.
56. Leontief, W. [1951], "*Input-Output Economics",* Scientific American Volume 185, No. 4, October, pp. 15-21.
57. Miberg, W. [1996], *"The rhetoric of policy relevance in international economics"*, Journal of Economic Methodology, 3 (2), pp. 237–259.
58. Sachs, J. D., and Warner, A. M. [1995], [revised 1997, 1999], *"Natural Resource Abundance and Economic Growth",* National Bureau of Economic Research Working Paper No. 5398, Cambridge, Massachusetts.
59. Thorvaldur, G., Herbertsson, T. T. and Zoega, G. [1999], *"A Mixed Blessing: Natural Resources and Economic Growth",* Macroeconomic Dynamics, 3(2), pp. 204-25.
60. Trefler, D. [1995], *"The Case of the Missing Trade and Other Mysteries"*, The American Economic Review, 85, pp. 1029-1046.

61. van der Ploeg, F., [2011], *"Natural Resources: Curse or Blessing?"* Journal of Economic Literature, American Economic Association, Vol. 49(2), pp. 366-420.
62. van der Ploeg, F. and Venables, A. J. [2011], *"Natural Resource Wealth: the Challenge of Managing a Windfall",* CEPR Discussion Papers No. 8694.
63. Warner, A. [2015], "*Natural Resource Booms in the Modern Era: Is the curse still alive?",* International Monetary Fund Working Paper WP/15/237, November, Washington.
64. World Trade Organization [2010a], *"World trade report 2010: Natural resources: Definitions, trade patterns and globalization",* available at https://www.wto.org/english/res_e/booksp_e/anrep_e/wtr10-2b_e.pdf.
65. World Trade Organization [2010b], *"World trade report 2010: Trade theory and natural resources",* available at https://www.wto.org/english/res_e/booksp_e/anrep_e/wtr10-2c_e.pdf.

The Evolution of Sport and Tourism Policies In Romania before and after 1989

Katalin Gál, Ph.D, assistant professor, Partium Christian University, Oradea, Romania,
katalin.gal@gmail.com

Tünde Gál, Ph.D student, The Bucharest University of Economic Studies, Bucharest, Romania,
tunde.gal@gmail.com

Abstract

The objective of this paper is to link tourism and sport policies, through the lens of the Romanian paradox: on the one hand increasing statistics referring to the economical embeddedness of sport and tourism, but poor measurable social and cultural impact of both phenomenon, on the other hand a global pressure trough international entities and European Union's long term strategies in policy making – all these have been encouraging to investigate the evolution of tourism and sport policy making in Romania before and after the year 1989, marking the fall of the communist regime. The study, based on a narrative approach, aims to present a short synthesis of the main tourism theory critiques an analysis of how tourism and sport tourism theories and policies are linked to each other in the Romanian context. Briefly reviewing the pre-1989 states in this paper, using a theoretical analytical approach, we undertake to examine also the post-1989 institutional and public policy structures responsible in formulating tourism strategies in Romania. At the intersection, we also keep track of when and in what context these strategies are targeting the sport as a part of tourism. The result of the analysis is a summary study aimed to capture the tourism-related public policy representations in Romania, all in a wider context.

Keywords: public policy, sport tourism, institutional frame, education, research based policy

Introduction

According to the World Travel and Tourism Council (WTTC) the total contribution of tourism to GDP in Romania was 5.2% in 2016, the total contribution to employment was 6.2% for the same year, and the visitor exports 2.8%, forecasted 9.1% for 2017 as stated in the WTTC's 2017 Economic Impact Report. These are just some emphasized statistics for highlighting the economical impact of the tourism sector. The main motivation of this study is to analyze the evolution of tourism and sport strategies and policies in Romania before and after 1989 in the context of the manifest signs and effects of the economical importance and the latent motivation of tourism. Following this logic we would like to answer the question: where is the Romanian decision- and policy making positioned in the global tourism-judgment, how the communist heritage effects the present decision-making, in what scale are EU-funding focused and used to fulfill the objectives and strategies.

The analysis applies a narrative logic and the structure of the study is based on a short overview of tourism theories – focused on critiques of the mainstream approaches, followed by a screening of what meant the public policy in tourism and sport in Romania before and after 1989: analyzing separately the early 90's, the early 2000's, the before and after EU-accession period, and finally the new faces of policy-making in Romania. The conclusion of this study is focusing on the formulation of the main critical aspects regarding tourism and sport policy-making in Romania, highlighting the importance of all manifest and latent factors of the tourism sector.

Short Overview of Tourism Theories Critique and the Theoretical Frame of the Analysis

The theoretical and analytical vision of the current study is embedded in the social scientific fact that the phenomenon around us in different societies/economies and cultures are multi-dimensional and cannot be treated/analyzed exhaustively with a single cause-effect model. According to this quasi-axiom, our

theoretical overview is based on Franklin and Crang (2001) tourism and travel theory critique, in which the authors highlight the dilemmas with existing tourism theories regarding the growing tourism-based research objects, the perception of tourism and the education and study of tourism. The authors also mention that the research objective of the tourism as science has grown and the researcher community connected to this extended area is relatively new. The consequence is that the academic society is faced with a quantitative expansion of scientific works and points of views, but these scientific achievements are dominated by case studies and policy-making documents. The second critique is closely linked to the first one presented and discusses about the problem of the fetishized tourism as a *thing*, *a product*, *a behavior* – which highlights the temptation of the scientific sphere to treat tourism as a particularly economic "thing" (Franklin and Crang, 2001). The authors highlight the importance of linking the social and cultural practices also to the scientific tourism perceptions. The third problematic issue in making tourism theory represents the way tourism is framed for study: the authors identified an obsession of taxonomies and classification, and also highlight a problematic way of analyzing the object of the tourism, the tourist as an over-rationalized economical actor. We can also complete this observation – in the context of Romania – that in the logic, how tourism is represented in the educational offer of the accredited higher education institutions is significantly economy-centered.

The authors' conclusion is that the tourism in not a specialist consumer product or mode of consumption, so the new approaches in modern tourism studies have to reflect the growing significance of the tourism as a cultural laboratory, where the individual tourist is functioning as a "piece" of a global cultural and economical interactional network (Franklin and Crang, 2001).

Based on the above lined up critiques, we have to link the tourism theory to the public policy responses, including not just tourism itself as a sector, but also aspects of sport-tourism. Weed (2008) in an article focusing on the examination of the UK's sport and tourism policy, explains the importance of cross-sectoral liaison between responsible policy entities (respectively sport and tourism public bodies and academic sphere research). The problem is that the well-working developed links between pubic bodies and/or research bodies are isolated and ad-hoc – focused more on priority events and related representations, not on a comprehensive, research-based policy making exercise. In this context Weed (2008) underlines the separate development of different "culture" in the two sectors. It is highlighted also that the "tradition" of public support is manifested in different ways in tourism and sport. While tourism appears in public representation as private sector, sport as public one, actually both having its own policy "department" with different level of the responsibility for policy development bodies.

The literature is relatively weak referring to the sport and tourism policy process, the theoretic goal being to understand the public policy responses to the sport-tourism link (Weed, 2008). Houlihen (1997) in his book about a comparative analysis about public policy making patterns in sport in five different countries highlights that comparison in the public policy analysis has to be done between policy sectors, between responses to a range of issues or between countries. In our analysis the 'between country' approach is unreasonable, but the analysis model of Houlihen on sport public policy and Hall and Jenkins's (1995) analysis model on tourism – integrated by Weed (2008) in his analysis on UK's sport and tourism policy gives us a useful theoretical frame to create those analytical aspects which will help us to follow up the Romanian situation.

The Analytical Frame of the Study

The logic of the analysis follows the outlined theoretical framework. Based on tourism theory critique and some aspects of Weeds' (2008) adopted model in UK's analysis, in case of Romania the presented periods will succeed the following topics: the structure of the policy communities for sport and tourism (the levels of organization, regional specificity, resources and funding, communication and influence); most important strategic policy documents (strategy initiatives, policy development; education and research (the scientific background of delivered experts and research documents, relationship between science and policy making).

The applied analytical vision and methodology is based on the tourism concept as a social, cultural and economic phenomenon, the approach is narrative historical: the study describes the main legislative

regulations and institutional background, presents the main strategically objectives of the policy documents, overlooks the change of position of the education and research during the communist period and after 1989.

Tourism and Sport Policy in Romania Before 1989

In order to analyze the period after 1989 in Romania, it is important to have an overview of the 'heritage' Romania faced after the regime change regarding institutions, political culture, policy making etc. in the context of tourism and sport. The 'story' begins with the nationalization of economic, commercial, and banks societies, road transportation decided on 11 June 1948 and carried out during the years 1949-1950, which determined the transition to state property of the existing touristic units. A part of these units maintained their original functions and once in state ownership, were assigned either to the PMR (Romanian Workers' Party) household or to the ministries and other central and local state administration institutions, or creative unions, being conducted and organized under the provisions of Decree no. 199 of 1949, like other economic units. There was thus a national network of state-owned and cooperative tourist units, consisting of hotels, restaurants, cottages, villas, rest homes, children's and student's camps, sanatoriums and balneo-therapeutic treatment accommodations. Under the strict control exercised over the entire Romanian society, it was set up a well working system of normative acts intended to provide the legal basis of the operation of touristic establishments. At the same time, recreational touristic initiatives were presented as great successes of the new regime, although in reality they were based on buildings, equipment and facilities confiscated from private owners. There were added, especially after 1955, a series of new tourist capacities built in the areas with high touristic potential, like the coastal and mountain areas and in the surroundings of mineral springs.

Until 1989 the institutional background designed to offer the management of tourism at the national level suffered several changes, and under the influence of state propaganda can be identified periods when the tourism and sport policy has been intersected. Initially the national coordination of establishment, organization and operation of the touristic units were provided by the General Confederation of Labor and by The Association of Physical Culture and Sport from RPR (Romanian People's Republic) through the Regional Tourism and Travel Services and Travel and Excursion Offices (that were constituted at the level of institutions and economic units). This inefficient bureaucratic structure has been changed several times. As a first step, the National Carpathian Tourism Office was set up as a state-owned economic enterprise, subordinated to the Ministry of Foreign Trade having in subordination all economic units with tourism profile in Romania. In 1959, in view of improving the functioning of the tourism activity, it was decided that National Carpathian Tourism Office extends its activity by taking over the whole material basis of tourism infrastructure and also the task of organizing domestic tourism activities. At the same time this Office was removed from the tutelage of the Ministry of Foreign Trade and transferred to the subordination of to the Union of Physical Culture and Sports. This was the first institutional interaction between tourism and sport, but in the practical activity, the tourist units have not benefited from this institutional arrangement, the Union of Physical Culture and Sports having other interests and goals, related to the promotion of sport not the organization of domestic or international tourism. In 1968, the establishment of the Youth Tourism Bureau was authorized as a specialized central body with legal personality, stimulating and facilitating tourism among all categories. Finally, in December 1970, was decided the founding of the Ministry of Tourism, with the task of implementing party and state policy in tourism industry in Romania by taking over and subordinating the National Tourism Office and each unit of its composition. So, after the nationalization an entire institutional and legislative background was built, in the field of tourism, with effect until 1989 on the establishment, organization and operation of units (Rădulescu and Stănculescu, 2012).

The education in tourism is another interesting and important critical aspect of the before 1989 situation in Romania. The whole nationalized and centralized educational system was assigned to the principles of the planned economy; the industrialization of the country and economic planning has redrawn the whole structure of the education – including higher education. The disastrous economic planning, focusing the human and material investments towards heavy industry, have had an impact on the Romanian higher education. The other dramatic change of the Ceausescu era consisted in the tendency to cut the university centers' autonomy, which had two important outputs: liquidation of some higher

education institutions and centralization of the remaining under the aegis of supervision of some university centrums.

The faulty five-year plan based economy caused substantial changes in the nomenclature of specializations, and together with legislative interventions, the Romanian higher education became rigid, with relatively small range of specializations – dominated by technical ones. The communist education policies – on higher and public education – the forced industrialization of the country, based on five year planned economy concept caused many discrepancies in the labour market, surpluses and deficits in some sectoral, professional, territorial areas, over-occupation and hidden unemployment of the labor force (Sora, 2011).

As the tourism sector operated under state propaganda, there was no specialized tertiary education, the secondary education system provided the domestic tourism with (more or less) skilled workforce, the higher education sector only after the change of regime started a professionalization process. The only positive aspect we have to highlight is the consolidated secondary education sector – but unfortunately it cannot be traced back to a conscious education policy, it is more related to increasing birth rate, the unmanageable economic plans, and was not effective, so the only thing that matters in this education sector is that it existed.

Regarding sport policies before 1989 the basic axiom is that the sport movement was inseparable from nation and state in Romania – as in the case of other states that had direct control over the society and the private life of the individual. Sport has been declared an important state policy in Romania, although it has also important health dimensions, the role of sport has been well appreciated by the politicians of the 20th century, its potential for transmitting national values and the propaganda message has transformed simple competitions into means of promoting political ideology and have absolutely nothing to do with tourism. As the Physical Education and Sport Law from 1967 provides: “Physical Education and Sport in the Socialist Republic of Romania are activities of national interest” – and transferred the operative authority to the National Council for Physical Education and Sport and for the unions of national institutions and state companies (Bărbulescu, 2010). This sport life organization model encompassed the whole life of the Romanian population, organizing amateur, professional and folk-sporting activities as well. The developed mechanisms for the practice of sport administered and funded by the state ceased after 1989, which greatly influenced the development of public policies since 1989 - its effects are reflected in the following subsection in detail.

Tourism and Sport Policy in Romania After 1989

The ten years after 1989 brought a general instability inside the political, economical, social and technological environment in Romania, spreading also in the tourism sector, causing a lack of coherent development strategy (Stănciulescu and Micu, 2009). This period also remarks the start of the privatization processes of numerous state companies, including the tourism industry as well. In 1998, the National Institute for Research and Development in Tourism was set up, and in the same year the Governmental Decision nr. 972/1998 was elaborated regarding the organization and functioning of the National Tourism Authority (NTA) as a specialized body of the central public administration, with legal personality, subordinated to the Government, which develops, applies, monitors and evaluates the Government's policy in the field of tourism. Despite all this, in the first two decades during the post-communist period, Romania has relied more on touristic "myths", rather than concrete measures; among the options of foreign visitors, the mountain, seaside and spa - Romania's touristic strengths - have registered a continuous decline after 1990 (Neacşu, Neguţ, and Vlăsceanu, 2014). Even though up to the year 2000 in all government programmes, tourism and agriculture have been considered high priority development areas, tourism faced with a lack of facilities and governmental subventions essential for promotion and maintenance (Stănciulescu and Micu, 2009).

The year 2001 marks a change, as Romania started to put into practice an aggressive promotion for its touristic products and this brought to an increased number of tourists. Romania launched its first promotional campaign at international level with the declared scope of improving its image abroad and attracting foreign tourists, entitled „Romania, simply surprising". As well it was present at numerous

trades and annual exhibitions promoting the country. As regards the sporting and educational strategies, the communist heritage was brought forward until the early 2000s without any significant strategic document for a change. During the years 2003-2006 the national programme "Construction of sport halls" had a positive effect not only on the local and regional level by providing proper sporting infrastructure for educational purposes and performance sport, but in recent years attracted multiple high level international competitions in various sports in the country, having a positive impact on tourism and the image of the country.

The European Commission (EC) and tourism stakeholders have recognized the important role that tourism plays in the development of European regions, against industrial and rural decline, or supporting urban regeneration, as well as the need to turn toward more sustainable and friendly practices and policies (EC, 2006). In this context, the year 2007 marks Romania's accession in the European Union (EU), dragging along the benefit of the membership: taking over EU strategies, good practices, the possibility of accessing structural funds. As the Romanian tourism sector has suffered from the absence of an overall policy to drive and direct the sector before entering the EU, in 2007 the Romanian National Tourism Master Plan for 2007-2026 was elaborated by international experts, covering the twenty year timeframe from 2007 to 2026, incorporating a six year action programme for 2007-2013. The plan was meant to be an umbrella policy including various plans and strategies to optimize the sector's contribution to the national economy. As regard to the intersection of sport and tourism policies, the master plan had a separate section targeting the development of the "activity tourism", such as winter sports, golf, hiking, equestrianism, hunting and fishing among the other important touristic areas, but as many other recommendations, were not fully exploited up to this moment. The document underlines also the weaknesses of the actual situation, as tourism, being one of the most competitive economic activities in the world, requires professionalism, commitment, organization and an effective human resource development strategy (MDRP, 2007). Hospitality service skills, both professional and behavioral, were adjudged as still under-developed, also the improvement of service attitude and mentality was pointed of urgent attention (MDRP, 2007). The level of competence in the hospitality and tourism industry was also rated as low, due to the lack of performance standards, the lack of adequate and up-to-date occupational standards, and the lack of adequate education and training standards. It was also highlighted that the NTA did not have a clear market development strategy based on full and deep understanding of market characteristics and trends (MDRP, 2007). As well, in a panorama of European tourism published by Eurostat (Eurostat, 2008) the situation of the Romanian tourism was summarized as follows: "Tourism in Romania is not yet well developed and depends heavily on domestic demand. International tourism flows in the country are still low, and mainly for business purposes."

Connecting sport and tourism, the development of mountain tourism could be considered both an opportunity and a priority for action-taking. The Romanian Carpathians are the largest massif on the continent inside the same border perimeter. The potential of these mountains is supported by the large variety of their natural features, like the 13 national parks and 13 national reserves, which cover around 7% of the country's surface and host wooden areas, natural lakes and pollution-free rivers. Despite the progress of the last few decades, the visibility of this tourism branch is still a work in progress. Even though the Carpathians host an extensive area of hundreds of kilometers of ski slopes brought up to European standards, the technical and material foundation is undergoing a process of modernization, together with the still underdeveloped transport infrastructure. Another key sector linking sport with tourism is ecotourism, and in 2009 the first National Strategy for the Development of Ecotourism in Romania was elaborated, which underlined the possibilities of utilization of ecotourism resources worldwide and in Romania, but drew attention that not only the programmes and information available are incomplete, but also the specific access infrastructure is lacking in the country.

As regard to the investment programmes in tourism, at the beginning of 2010, the Government decided upon a list of tourism investment projects and programmes, which facilitated the financing of tourism investment projects as well as the completion of the ongoing investment objectives. Unfortunately the funding has been interrupted after 2013, leaving important facilities undone in the handling of the local authorities. Due to the increase in the number of tourists and the amount spent per day, in 2015 the Government identified new investments in tourism, and decided to spend about 3 million EUR on

tourism promotion (INCDT, 2016), and some funds were also unblocked to finalize ongoing investments interrupted in 2013.

In 2016, experts within the National Authority for Tourism have developed "Vision for the Development and Marketing 2020", a programme document that defines the objectives and actions necessary to transform Romania into a competitive tourist destination, "adapted to the requirements of one of the most dynamic and markets in the world" (NTA, 2016). The strategy is the starting point for outlining some development areas based on quality, by implementing a quality certification system within tourist destinations and by improving the training and qualification of human resources. The overall objective is "to stimulate the interest of potential tourists to spend their holidays in tourist areas in the country, by increasing Romania's reputation as a quality tourist destination, by increasing the attractiveness of key forms of tourism and by developing sustainable tourism as an engine for local and national economic growth" (NTA, 2016), most of the objectives being almost identical with those, already mentioned ten years ago in the master plan for 2007-2026.

During an analysis of tourism policies over time it is important to mention that both before and after the EU accession, the tourism, as government objective, belonged to many different ministries, encumbering the formulation and implementation of objectives and strategies over time. Before EU accession tourism belonged to the Ministry of Transport, Construction and Tourism. In 2007, it was delegated to the Ministry for Small and Medium Enterprises, Trade, Tourism and Free Professions. Starting from December 2008, it had separate government body, the Ministry of Tourism, until 2009 December, when it was transferred to the Ministry of Regional Development and Tourism. Afterwards it was part of the Ministry of Economy, Commerce and Tourism until December 2015, then part of Ministry of Economy, Trade and Business Environment. From January 2017 has again its own governing body as the Ministry of Tourism.

Although Romania has a complex touristic potential - favoured by a diverse natural landscape and an old and authentic cultural component - supported by unique elements, at a European level we cannot overcome the "passive and subsistence tourism" phase offering mostly accommodation and potential attractions (Neacşu, Neguţ and Vlăsceanu, 2014). Still up to this date, according to the World Economic Forums' Travel and Competitiveness Report 2017, Romania is on the last place among the members of the EU. According to WTTC, Romania "is one of the world least intensive tourism countries, ranking 163 out of 185 countries in terms of contribution to GDP (WTTC, 2017)."

As regards the sport policies, the first National Sport Strategy was elaborated recently, for the years 2016-2032 highlighting that the interconnection between sport and tourism can be exploited both as a way of attracting people to practice sports (active tourism) but also as spectators, in both ways being a potential source of income for the sport industry. The number of mass-sport events have been soaring in the last decade, but this is mostly due to a global trend in developed countries and not as part of any strategy. Due to the destinational characteristics of Romania, the still low prices in the tourism sector compared to Western European countries, it has high potential in attracting sport tourists to the country from all over the world. Today sport and tourism are among the developed world's, most sought after leisure experiences (Brant and Adair, 2014). But establishing an appropriate tourist offer implies a significant effort on the part of the state, materialized in investments used in the consolidation of infrastructure elements. The state also assumes its role as protector of the tourism industry, through fiscal policy and credit policy for investors. Tourism worldwide is no longer just a complementary economic activity, but it has become a real "social phenomenon". Over a billion people travel for tourist purposes on Earth and they generate more than 1 000 billion dollars in revenue and these numbers show the current dimension of this phenomenon. Romania receives less than half of a percent of both, remaining tributary to a touristic system stuck in the past offering simple accommodation and potential beauties (Neacşu, Neguţ, and Vlăsceanu, 2014).

Conclusions

Tourism industry is one of the most dynamic sectors of the global economy, and for countries with significant touristic resources, like Romania, should be a key sector in the national economy through

appropriate strategies to exploit the existing resources. Tourism is also an important way of promoting the image of a country. But as it is apparent from above, the present tourism and sport public policy, and its incoherent intersections are highly influenced by the communistic heritage in Romania. The before 1989 built up models, the institutional and managerial structures has been affected for a long time the Romanian policy making mentality and exercise, the education development, strategies and the financial dimensions of the implementation.

The post-communistic era represents a rigid takeover of the previous systems' logic, only the serious and unsustainable discrepancies has been removed, in the context of the economical and social change tourism and sport did not represent a high priority. The educational system in that time represents disadvantages in the context of the specializations. The two post-communist decades are characterized by correlation and synchronization with world higher education and another type of communication and relationship between education and the economic and social environment. There was a need for a radical change in sense of decoupling from the communist regime. The changes in Romanian higher education are observable in the evolution of the number of specializations, the curriculum, the acquired skills and qualifications. In the case of tourism and sport specializations is particularly valid, because decade-old system-handicaps had to be corrected.

The modern policy making strategies and concrete intervention programs has been highly influenced by the European Union and other international forums' main strategies and objectives in the pre-accession and post-accession period. This fact somehow set a course for the Romanian policy-making, which process was very suggestible by the political interests at all time. The result is, that as the economical of the tourism and sport potential grew, the institutional and political importance also grew for this sectors. Tourism is essential to nations' competitiveness, and so tourism ranks high among European Union preoccupations, but it is a responsibility for each member state – including Romania – to design and to put in practice effective policies in this respect.

Bibliography

Bărbulescu, C. (coord.) (2010) Documente privind politica sanitară în România, Editura Mega, Cluj Napoca.

Brent, W. R. and Adair, D. (2014) Sport Tourism: An introduction and overview, Sport Tourism: Interrelationships, Impacts and Issues, Brent, W. R. and Adair, D. (ed), Channel View Publications, Clevedon.

European Commission (2006) 'A renewed EU Tourism Policy: Towards a stronger partnership for European Tourism'

Franklin, A. and Crang, M. (2001) 'The trouble with tourism and travel theory?', *Tourist Studies,* 1(1), 5–22.

Hall, C. M. and Jenkins, J. M. (1995) Tourism and public policy, Routledge, New York.

Harja, E. and Stângaciu, O. A. (2013) 'Tourism Activity of Member States and Romania's Place within the First Five Years after EU Accession', *Procedia Economics and FinanceI,* 6, 491-502.

Houlihen, B. (1997) Sport, policy and politics: a comparative analysis, Routledge, London.

Insitutul Național de Cercetare-Dezvoltare în Turism (2009) 'Strategia națională de dezvoltare a ecoturismului în România' Faza I și Faza II

Insitutul Național de Cercetare-Dezvoltare în Turism (2016) 'Analiză retrospectivă integrată a investițiilor în turism realizate în perioada 2007-2016'

Ministry of Youth and Sport (2016) 'National Strategy for Sport 2016-2032'

National Authority for Tourism (NTA) (2016) 'Vision for the Development and Marketing 2020'

Neacşu, M-C., Neguţ, S. and Vlăsceanu, G. (2014) 'The dynamic of foreign visitors in Romania since 1990. Current challenges of Romanian tourism.', *Amfiteatrul Economic*, XVI (8), 1340-1351.

Rădulescu, D.C. and Stănculescu, M.S. (2012) 'Oferta turistică din România 1948-2010', *Calitatea vieții* XXIII, 4, 299–326.

Tăchiciu, L. and Dinu, V. (2009) 'Tourism policy in Romania: a necessary change of direction', *Revista de turism,* 7, 26-34.

Sora, A. F. (2011) 'Evoluția calificărilor din învățământul universitar românesc 1968-2011', *Autoritatea Națională pentru Calificări*, [Online], [Retrieved September 22, 2017], http://www.invatamant-superior.ro/wp-content/uploads/2013/08/Raport_istoria_calificarilor.pdf

Stănciulescu, G. and Micu I. C. (2009) 'The development in dynamics and structure of the Romanian tourism in the context of the global crisis', *Revista de turism,* 7, 20-25.

Tăchiciu, L. and Dinu, V. (2009) 'Tourism policy in Romania: a necessary change of direction', *Revista de Turism,* 7, 26-34.

Weed, M. (2008), Why the two won't tango! Explaining the lack of integrated policies for sport and tourism in the UK, Sport and Tourism: a Reader, Weed, M. (ed.) Routledge, London.

World Economic Forum (2017) 'Travel and Tourism Competitiveness Report'

World Travel and Tourism Council (2017) 'Travel and Tourism Economic Impact Romania'

World Tourism Organization (2014) 'Romania National Tourism Master Plan 2007 - 2026'

Analysis of the Solvency of Airport Industry Companies Based on Cash Flow

Laskina Liubov Yurievna, Department of Financial Management and Audit, Saint Petersburg National Research University of Information Technologies, Mechanics and Optics (ITMO University), Saint Petersburg, Russia, risk05@mail.ru

Silakova Liubov Vladimirovna, Department of Financial Management and Audit, Saint Petersburg National Research University of Information Technologies, Mechanics and Optics (ITMO University), Saint Petersburg, Russia, silakovalv@niuitmo.ru

Smirnova Anastasiya Talibzhanovna, Department of Philosophy, History and Foreign languages, Federal State Budgetary Educational Institution of Higher Education "Norilsk State Industrial Institute", Nolilsk, Russia, smirnovaat@bk.ru

Abstract

This paper studies the possibility of using cash-flow-based ratios to improve the completeness and reliability of assessment of the company's solvency and financial stability. These indicators are more informative and reliable for internal users and potential investors and creditors. The two indicators: cash-flow liquidity ratio (CFLR) and cash interest coverage ratio (CICR) – are compared with the conventional ratios for the assessment of solvency - current liquidity ratio (CLR) and interest coverage ratio (ICR). This study explores the financial statements of 12 Russian companies engaged in the provision of airport services during the period between 2011 and 2014. Using the correlation analysis we compared the pairs of conventional liquidity ratios and cash-flow-based ratios. Current liquidity ratio and cash flow liquidity ratio proved to be loosely correlated. Strong correlation was revealed between interest coverage ratio and cash interest coverage ratio. The study showed that using cash interest coverage ratio provides a more accurate representation of the company's financial stability. This ratio can also be used to adjust the company's credit rating.

Keywords: solvency, cash flow, analysis, airport industry companies

Introduction

In the innovative economy environment, companies should decide if they are able to make prompt management decisions and ensure financial stability. Reaching the adequate level of solvency by the company results in the ability to promptly and fully meet its payment obligations. This is relevant both to the company and its partners and shareholders. And so, the quality of solvency management is one of the priorities. Both owners and managers and external users rely on the company's state analysis. An insufficient-solvency company may face a risk of losing both own resources and borrowings. This makes it unattractive for other business entities.

The concept of solvency is related to the concept of liquidity as the ability of an organization "...to convert its assets into cash and fulfill its current liabilities only in cash" (Sorokina E.M., 2012) or "…to have enough assets to cover its liabilities" (https://www.thebalance.com).

There is a wide range of solvency assessment methods used by various parties for specific purposes. It sometimes results in a conflict of interests between stakeholders, managers, and shareholders (Heejung

Yeo, 2016). Thus, clear reliable criteria for assessing solvency must be determined. Regardless of multiple approaches to assessing solvency, the most common practice in contemporary financial analysis is ratio analysis.

Literature Review

The solvency assessment methodology used in Russian practice is reflected in the works of V.V. Kovalev (Kovalev V.V., 2002), A.D. Sheremet and R.S. Sayfulina (Sheremet A.D. and Sayfulina R.S., 2006), N.P. Lyubushin and N.E. Babicheva (Lyubushin N.P. and Babicheva N.E., 2006). In world practice issues of solvency assessment using cash flow figures were considered by such researchers as Van Horne J.C. (Van Horne J.C. and Wachowicz J.M., 1992), L.A. Berntine (Bernstein, L.A. and Wild John J., 2000), Silviu C.V. Chiriac (Silviu C.V. Chiriac, 2015), Heejung Yeo (Yeo H., 2016), Keefe M. O'Connor (Keefe M. O'Connor and Yaghoubi M., 2016). In practice cash flow figures are used for different purposes. For example, the use of its figures in assessing of companies bankruptcy probability increases the significance of the results (Almamy J., et al., 2016, Fawzia N.S., et al., 2017). In addition, the cash flow sensitivities of financially healthy and weak firms are positively correlated with the severity of liquidity crises (Drobetz Wolfgang, et al., 2017). Other authors used cash flows to manage liquidity risk in certain business sectors (Oral C. and Akkaya G.C., 2015), as well as to maximize the future value of the firm (Gajek L. and Kucinski L., 2016).

The difference between the methods lies mainly in the composition of the indicators or approaches to evaluation. Mostly, relative ratios are used, with prioritizing liquidity ratios. However, we suppose that cash-flow-based ratios can be used as additional ratios to describe the company's solvency. Such ratio data are used by various analytical systems in the context of the solvency analysis. For example, the professional market and company analysis system "SPARK" which is widely used in Russia is one of the largest databases of financial and statistical information about companies in various industries, including the provision of interest coverage ratio (ICR) data.

ICR describes the ability of a company to fulfill its interest payment obligations. This ratio shows the probability of the company's default, which is extremely important for describing the level of solvency. The minimum value of the ratio is 1, which describes the company's ability to make interest payments at its own discretion and in full.

Note that interpreting the results with the ratio approach is an important stage in assessing the company's solvency and making financial management decisions. The higher the accuracy and reliability of the ratios used in the analysis, the more valid the conclusions about the company's financial state. Assessing these ratios is associated with a number of immediate problems concerning the limited efficacy of the assessment (Tsyrkunova T.A., 2011, Yeo H., 2016). Firstly, when comparing the estimated ratio values with the normative values, a greater emphasis is put on the value changes rather than the determination of the optimum ratio values. Secondly, there is insufficient accuracy and reliability of the initial information provision in the analysis of the company's financial state. The abstract character of the statement ratios is not able to provide information that will describe the level of its solvency and liquidity (Laskina L.Yu., Vlasova M.S., 2013). This primarily includes accounting earnings and profit. There is an increasingly low representation of data due to ratio manipulation by top managers in order to sugarcoat the real state of the company (Yeo H., 2016). In addition, asset valuation and accounting with the accrual method have some nuances.

The solution of the first issue lies in accounting, when evaluating "... the particular business environment of an economic entity" (Tsyrkunova T.A., 2011) and industry practices of ratio comparison and solvency analysis.

The second issue can be addressed by using cash-flow data in addition to the key ratios. Cash mediates all of the company's financial relations, while variable receipts and payments may result in a decrease in liquidity as a factor of solvency support.

"Cash Flow Statement" data are more difficult to manipulate due to the efficacy of the cash flow indicators. Therefore, cash flow data underlie a number of ratios to describe the company's financial state more fully and reliably (Cheremushkin S., 2007). For example, the "cash flow to debt ratio" is used as a predictor of financial insolvency, and to assess the credit standing of the company. "Capital expenditure ratio" shows the company's ability to finance future growth due to its operating activities. This ratio is used to assess the ability to pay debts and dividends. "Cash return on assets ratio" refers to the ability of the company's assets to generate cash. It is used to verify the conformity of accounting of return real cash flow.

The use of cash flow data in the calculation of cash ratios deals with the most liquid part of current assets - cash and cash equivalents. It also gives a representation of the company's future financial state. Thus, cash flows are advisable to use for liquidity assessment and adjustment of the conventional financial analysis ratios (Giacomino D.E., Mielke D.E., 1993, Kirkham R., 2012).

In terms of the short-term solvency analysis, some researchers suggest comparing such ratios as cash flow liquidity ratio (CFLR) and current liquidity ratio (CLR), as well as cash interest coverage ratio (CICR) and interest coverage ratio (ICR) (Table 1).

Table 1: The comparison of the liquidity of traditional and cash flow coefficients

Traditional ratios		**Cash flow ratios**	
Coefficient	Formula	Coefficient	Formula
Current liquidity ratio, CLR	$CLR = \frac{CA}{CL}$	Cash flow liquidity ratio, CFLR	$CFLR = \frac{CF}{CL}$
Interest coverage ratio, ICR	$CLR = \frac{EBIT}{TIP}$	Cash interest coverage ratio, CICR	$CLR = \frac{CF + TIP + T}{TIP}$

Where: CA – Current Assets; CL – Current Liabilities; CF – Net operating cash flow; EBIT – Earnings before interest and tax; TIP – Total interest Payable in the given period; T – Taxes.

Source: Giacomino D.E., Mielke D.E., 1993; Kirkham R., 2012

Notwithstanding the practice of estimating cash ratios, there are no data on the correlation degree between the above ratio pairs.

Research Method

To justify the possibility of using cash ratios, this paper studies the degree of correlation between cash ratios and conventional ratios in the solvency analysis. This article compares such cash ratios as CFLR and CICR. The object of the study is the data on Russian companies engaged in the provision of airport services.

Data Analysis

Airport industry is one of the key elements in the development of the world economy. The state and growth of such industries "considerably determine the competitiveness of the country's economy" (Orlova T.S., et al., 2013). There is the Federal Target Program "Russian Transport System Development (2010-2020)" which considers the transport system as "... a necessary condition for the implementation of the innovative model of economic growth ...", with "... the development of the land-based aviation infrastructure" being one of the priorities (Varaksa A.M., 2015, Decision of the Russia government No. 848, 2001).

This kind of attention to the Russian airport industry is due to the long period of reduction in the number of airports. According to the Federal Agency for Air Transport (FAAT), there are 297 airports in Russia (Federal air transport Agency, 2017). Experts (Stroganova V.I., 2010, Eremin V.L., et al., 2011) say that it's almost four times less than the 1990-s data (Fig. 1).

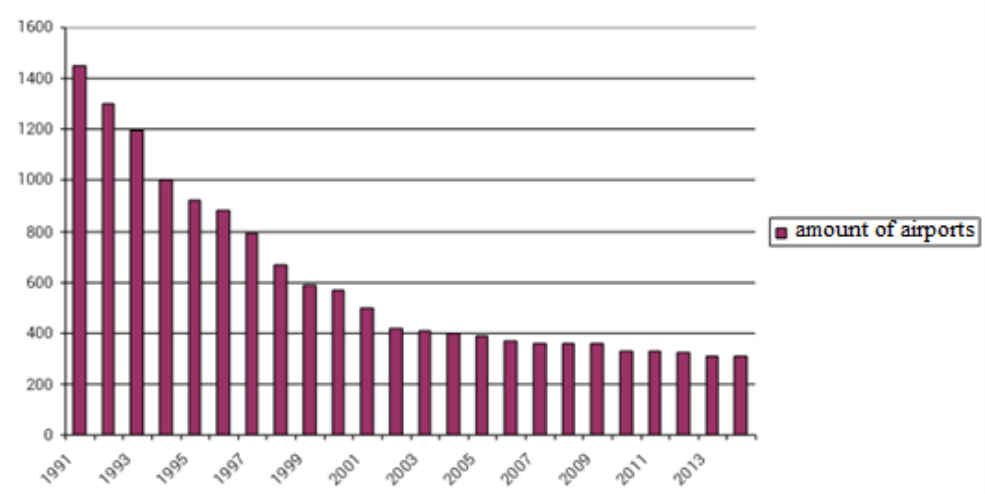


Fig. 1: the dynamics of airports amount in Russia

Source: Federal air transport Agency: https//www.m.favt.ru

Such behavior has particularly affected regions where transport support is less sufficient than in the western part of Russia. Such districts as the Siberian district and the Far Eastern district require extensive aviation infrastructure as the most appropriate mode of transportation in the country and abroad.

A reducing number of airports is accompanied by an increasing number of customer passengers, which results in depreciation of fixed assets. In 2011, this indicator ranged from 40% to 80% (Business Aviation Portal, 2017).

The situation as it has developed is holding back "... transit capacity building and realization, ... the development of the united economic area of the country" (Decision of the Russia government No. 848, 2001). To reverse the situation, heavy financial investments are required (Kramorenko M.I., Varaksa A.M., 2015). Thus, for the most part of airports, development investing means either heavy borrowing or searching for external investors. In both cases, airport companies need to maintain their solvency and stable financial position.

For this study, we selected 12 Russian airport companies located in five federal districts of Russia. Data for the analysis were taken for the period 2011-2014. The list of the companies is given in Table. 2.

Table 2: Sample composition

Airport	Airport
OJSC "Airport Anapa"	JSC "Airport Tolmachevo"
JSC "International Airport Irkutsk"	JSC "Airport Uliyanovsk"
JSC "Kazan" International Airport"	OJSC "International Airport Vladivostok"
PJSC "Khabarovsky Airport"	International Airport JSC "Vnukovo-Invest"
JSC "Omsk Airport"	PJSC "International Airport Volgograd"
OJSC "Airport Pobedilovo"	JSC "Yakutsky Airport"

Source: compiled by the authors

Table 3 calculates the ratio pairs: Current liquidity ratio (CLR) and Cash flow liquidity ratio (CFLR) according to the information provided by the companies in the financial statements for 2011-2014 (Corporate Information Distribution Center, 2017). In addition, Interest coverage ratio (ICR) and Cash interest coverage ratio (CICR) are compared.

Table 3: The comparison of the CLR and the CFLR in airports businesses

Company	2011		2012		2013		2014	
	CLR	CFLR	CLR	CFLR	CLR	CFLR	CLR	CFLR
OJSC "Airport Anapa"	21,88	5,91	1,78	-0,04	5,27	0,78	4,88	0,51
JSC "International Airport Irkutsk"					1,36	1,37	1,78	1,07
JSC "Kazan" International Airport"	0,72	-0,17	1,08	-0,05	0,79	0,06	1,88	-1,28
PJSC "Khabarovsky Airport"	1,19	0,72	1,78	0,49	2,57	0,36	2,23	0,05
JSC "Omsk Airport"	0,69	1,26	1,03	0,99	1,46	1,63	2,07	1,88
OJSC "Airport Pobedilovo"	0,70	-1,35	0,73	-2,38	0,20	-0,54	1,54	-3,30
JSC "Airport Tolmachevo"	1,43	1,12	1,10	0,85	1,62	1,46	3,86	2,85
JSC "Airport Uliyanovsk"	0,99	0,39	0,30	0,70	10,45	-1,04	0,70	0,21
OJSC "International Airport Vladivostok"	12,29	8,10	0,96	0,64	0,61	0,18	0,21	0,18
International Airport JSC "Vnukovo-Invest"	8,62	0,79	18,17	3,40	9,50	0,90	9,54	-0,13
PJSC "International Airport Volgograd"	1,52	0,17	2,17	1,48	3,17	1,96	4,06	2,43
JSC "Yakutsky Airport"	0,88	0,43	1,30	0,68	1,72	0,57	1,71	1,62

Source: Corporate Information Distribution Center, URL: http://www.e-disclosure.ru/

Only a few of the represented airport companies have transport-industry average (from 1.2) current liquidity ratios (Federal service for state statistics of Russia, 2017). This indicates the need of the companies to mobilize the available working capital to fulfill their short-term obligations. Moreover, problems with payments on short-term obligations are more likely to be faced by regional airports (particularly, airports of the Volga and Far Eastern Federal Districts).

Results

In contrast to the conventional Current liquidity ratio (CLR), Cash flow liquidity ratio (CFLR) is smaller for almost all of the companies. This suggests that in actual practice companies raise insufficient (or critically low) amounts of cash.

However, in most cases both of the analyzed ratios show synchronism in changing their values (Fig. 2).



Fig. 2: The dynamics of the CLR and the CFR of "Vnukovo airport"

On the other hand, we observe an alternative scenario: an increase in the value of one ratio is associated with the opposite change in the other (Fig. 3).

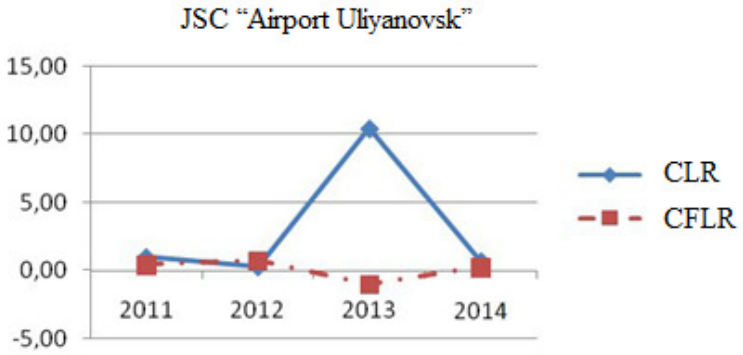


Fig. 3:The dynamics of the CLR and the CFR of "Ulyanovsk airport"

Once we found the "atypical" behavior of the ratios, we conducted a correlation analysis using Pearson's linear correlation coefficients and Spearman's rank correlation coefficients to interrelate the trends. Spearman's correlation between current liquidity ratio and cash flow ratio is 0.4097, indicating a positive but loose correlation between the two ratios.

The same procedure for calculating correlation coefficients was applied to the other pair of ratios: Interest coverage ratio (ICR) - Cash interest coverage ratio (CICR) (Table 4).

Table 4: The comparison of the ICR and the CICR in airport businesses

Company	2011		2012		2013		2014	
	ICR	CICR	ICR	CICR	ICR	CICR	ICR	CICR
OJSC "Airport Anapa"*			20,60	1,13	5,28	13,35	3,51	9,03
JSC "International Airport Irkutsk"*			9,58	2,39	8,55	9,89	13,01	12,83
JSC "Kazan" International Airport"	1,94	-2,60	11,05	0,20	13,82	6,03	25,49	-225,07
JSC "Khabarovsk Airport"	45,45	51,42	5,87	6,43	6,17	5,20	6,55	2,22
JSC "Omsk Airport"	7,42	17,95	28,63	39,02	48,36	74,01	1 875,41	2 145,95
OJSC "Airport Pobedilovo"	8,18	-7,37	-17,61	-13,85	-8,06	-7,99	12,20	-4,54
JSC "Airport Tolmachevo"	3,15	5,03	7,78	8,64	6,74	5,87	7,19	7,08
JSC "Airport Uliyanovsk"	16,35	97,35	359,59	3 267,59	1,23	-0,42	1,20	1,76
OJSC "International Airport Vladivostok"	6,73	7,05	11,97	12,43	0,73	6,27	-17,38	8,53
International Airport JSC "Vnukovo-Invest"	2,74	3,50	1,05	3,21	1,09	1,56	0,87	0,92
PJSC "International Airport Volgograd"*	16,65	7,33	43,65	76,71				
JSC "Yakutsk Airport"*	34,60	52,96	4 487	10 278				

*Note: a number of companies carried out their economic activities with no interest payments during these years, which made impossible the calculation of ratios.

Source: Authoring

Interest coverage ratio values for airport companies exceed the average of 4.25 for another infrastructure industry – transportation (Laskina L.Yu., 2012). According to CICR values, the following trend can be revealed: the smallest ratio values are attributed to small regional companies (OJSC "Airport Pobedilovo") or those with reduced operating profit (International Airport JSC "Vnukovo-Invest"). It is the companies that encountered the greatest interest payment difficulties.

The calculated CICR values exceed the conventional ICR values in most of the companies, with the same behavior during the investigated period (Figure 4).



Fig. 4: The dynamics of the ICR and the CICR of "Vnukovo airoport"

Note that atypical cases are observed with respect to the direction of changes in these values. For example, the investigated ratio values of OJSC "International Airport Vladivostok" in the last year of the analyzed period varied differently – from 0.73 to -17.38 for ICR and from 6.27 to 8.53 for CICR (Fig. 5).



Fig. 5: The dynamics of the ICR and the CICR of the airport "Vladivostok"

In order to obtain more reliable data on the intensity and behavior of correlation between interest coverage ratio and cash interest coverage ratio, a correlation analysis was conducted. According to the Chaddock scale, this pair of ratios under study is highly correlated. An additional analysis with calculating Spearman's rank correlation coefficient also shows high correlation between interest coverage ratio and cash interest coverage ratio. The rank correlation coefficient is 0,627.

Conclusion

Thus, the study showed that correlation between current liquidity ratio and cash flow liquidity ratio is loose. It would be more informative and reliable for both internal users and potential investors and creditors to use in the analysis the cash ratio from the other pair - interest coverage ratio and conventional interest coverage ratio. Due to the strong correlation, we can suggest a broader use of the cash interest coverage ratio in analyzing the financial state of companies.

Based on the results of calculations, it can be concluded that using cash interest coverage ratio in addition to interest coverage ratio in assessing a company's solvency may provide a broader and deeper understanding of the company's financial stability; moreover, it should be taken into account in determining the company's credit rating. Credit rating adjustment according to international standards will ensure more efficient assessment of investment attractiveness of companies.

References

Almamy, J., Aston, J. and Ngwa, L N. (2016) 'An evaluation of Altman's Z-score using cash flow ratio to predict corporate failure amid the recent financial crisis: Evidence from the UK,' *Journal of Corporate Finance*, 36, 278-285.

Bernstein, L A. and Wild John J. (2000) Analysis of financial statements 5th ed., New York, McGraw-Hill.

Business Aviation Portal. [Online], [Retrieved October 10, 2017], http://www.ato.ru/

Cheremushkin, S. (2007) 'Assessment of the financial condition of the company based on cash ratios,' *Financial management*, 5, 11–22.

Corporate Information Distribution Center [Online], [Retrieved October 10, 2017], http://www.e-disclosure.ru/

Drobetz,W., Haller, R., Meier, I. and Tarhan, V. (2017) 'The Impact of Liquidity Crises on Cash Flow Sensitivities,' *Quarterly Review of Economics and Finance* http://dx.doi.org/10.1016/j.qref.2017.03.004

Eremin, V L. and Kramarenko, A V. (2010) 'The concession mechanism as an effective means of modernization of airport infrastructure,' *Stage: economic theory, analysis, practice*, 4, 106-116 (in russ.)

Fawzia N S., Kamaluddina, A. and Sanusib, Z M. (2015) 'Monitoring Distressed Companies through Cash Flow Analysis,' Procedia Economics and Finance of the 7th International conference on financial criminology, April 2015,Wadham College, Oxford, United Kingdom, 28, 136–144.

Federal air transport Agency (Official website) [Online], [Retrieved October 10, 2017], http://www.favt.ru/

Federal Service for State statistics of Russia [Online], [Retrieved October 10, 2017], http://www.gks.ru/

Gajek, L. and Kucinski, L. (2017) Complete discounted cash flow valuation,' *Insurance: Mathematics and Economics*, 73, 1-19.

Giacomino, D E. and Mielke, D E. (1993) 'Cash flows: Another approach to ratio analysis,' *Journal of Accountancy*, March, 55–58.

Keefe, M O and Yaghoubi, M. (2016) 'The influence of cash flow volatility on capital structure and the use of debt of different maturities,' *Journal of Corporate Finance*, 38, 18-36.

Kirkham, R. (2012) 'Liquidity Analysis Using Cash Flow Ratios and Traditional Ratios: The Telecommunications Sector in Australia' *Journal of New Business Ideas & Trends*, 10 (1), 1-13.

Kovalev, V. (2002) Financial Analysis: Methods and Procedures, Finance and Statistics, Moscow, 559 p.

Laskina, L.Yu. (2012) 'Characteristics of the definition and assessment of financial leverage-domestic and foreign experience,' *Finance and Credit*, 38, 55-61. (in russ.)

Laskina, L Yu. and Vlasova, M S. (2013) 'Comparative estimate of enterprise liquidity using traditional ratios and cash flow ratios,' *Scientific journal NRU ITMO. Series "Economics and Environmental Management"*, 2, 7-13. (in russ.)

Ljubushin, N P. and Babichev, N E. (2006) 'Analysis of methods to assess the financial state of the Organization,' *Economic Analysis: Theory and practice*, 22, 2-7.

Murray, J. (2017) Learn What Solvency Is in a Business. [Online], [Retrieved October 10, 2017], https://www.thebalance.com/solvency-in-business-398474

Oral, C. and CenkAkkaya, G. (2015) 'Cash Flow at Risk: A Tool for Financial Planning,' *Procedia Economics and Finance*, 23, 262–266.

'On the federal target program for the development of the Russian transport system (2010-2020 years)' Decision of the Russia government No. 848, 2001 (in russ.)

Orlova, T S. and Yaroshevich, N Yu. (2013) 'Trends in the development of infrastructure sectors by the example of the global airport industry,' *Management*, 1 (41), 34-43. (in russ.)

Silviu, C V. Chiriac (2015) 'Considerations regarding the evolution of the liquidity and solvency indicators of the most important Romanian HORECA companies in the period 2010-2013,' *Procedia Economics and Finance*, 32, 833-840.

Sheremet, A., Saifulin, R. and Negashev, E. (2001) Financial analysis methodology, Ed. III, Moscow, Infra-M, 208 p.

Stroganova, V I. (2011) 'Directions of development of airport infrastructure,' *A young scientist*, 12, 188-190. (in russ.)

Tsyrkunova, T A. (2011) 'Application of the normal levels and analysis of trends in the formation of evaluation of financial ratios,' *Stage: Economic theory, analysis, practice*, 2, 61–68. (in russ.)

Van Horne, J C. and Wachowicz, J M. Fundamentals of Financial Management, 8th ed. Prentice Hall, Inc., 1992.

Varaksa, A M. (2015) 'An integrated approach to the study of the national economy,' *Scientific problems of transportation in Siberia and the Far East*, 1, 6-9. (in russ.)

Yeo, H. (2016) Solvency and Liquidity in Shipping Companies,' *The Asian Journal of Shipping and Logistics*, 32(4), 235-241.

Bait & Switch: Corporate Makeover or Destroyer

Benson Nwaorgu
Okan University, Turkey. benlykesu@gmail.com

Abstract

This paper examines the recent upcoming controversy surrounding advertising called "Bait and Switch". The topic has gained notoriety worldwide, in both international court systems and in media. Current research unveils various flavors of Bait and Switch tactics, thereby defining the phenomenon in general and legal context. The current research explains the defining criteria for the tactics to be considered as lawful and discusses the conditions where bait and switch tactic is considered a Turkey shootout instead of a fair sport. The article furthers by sharing the offer types excluding fallacious tactics. The article establishes the legality of this practice, exploring the lawful aspects Bait and Switch (BnS) distinguishing it from a fraud by elucidating its implementation in retail market, sales and departmental store market, and also its value in the sight of court of law. The article put a special focus on how BnS strategies are used by small and medium Enterprises (SME) to drive sales. I have given a detailed description of the model and its effect on the equilibrium. It also reviews the policies and guidelines of Federal Trade Commission (FTC) regarding Bait and Switch.
The later part of the paper discusses the research questionnaire conducted by offline survey. The subjects participating in the survey were people belonging to different income groups. Low income groups never shifted to substituted product owing to their financial limitations. High income group on contrary showed much more flexibility in shifting towards the substituted product.

Keywords: Bait and Switch, Deceptive; FTC; Advertising

Introduction

In general context, Bait and switch is type of advertising technique where a marketer advertises a very attractive price / term that is really a teaser rate which is just meant to attract customers. Once the prospective customer comes to the store to enquire about the advertisement, the product is either not available ("the bait") and in response the advertiser sells the customer a much more expensive product ("the switch"). However, BnS in Legal context is generally considered as a fraudulent or deceptive sales practice in which customer is attracted by advertisement of a low-priced item but then is encouraged to purchase a higher priced one. This term has become a part of scam as it is considered illegal and looked upon as dishonest way of selling goods. The bait and switch has gained most popularity in the mortgage sector, where the providers advertise unbelievably low rates for which vast range of applicants couldn't qualify and forcing the customers to settled at their rates

Two situations are given to explain how BnS occurs in real life example. In this case study peter wants to buy the refrigerator mentioned in advertisement. In situation one the seller baits peter by misrepresenting the product, by saying the refrigerator he is looking for has limited storage and is not suitable for consumers with large storage requirements. Seller pushes peter by diverting his attention from his desired product to the switch, the alternative refrigerator. He Baits peter by offering the product at nearly same price with better features and peter agrees the buy.
In the second situation seller, instead of comparing the refrigerator, says the running out of stock for that model and instead offer another refrigerator with for higher price for same features and carve peter's intention to buy the product which he agrees to buy later.

So, in this case study either the seller pitches the product with some major limitations and then offer the alternative product to buy, or the seller shows the out of stock for the product and pushes the seller to buy the desired product.

"Bait & Switch is also known as form of *Internet Trolling*, which attracts the internet users into watching certain things or entering certain websites with the use of misleading icons and links.

Its main aim is to promote purchases of substituted goods which are available at higher price and making customers satisfied with the available stocks as an alternative for the inconvenience caused due to unavailability of showcased products and reckoning on a seemingly partial recovery of sunk costs expended trying to obtain bait.

These types of scams are common in newspapers as well. The Bait and Switch is alluring for the customers who want to save money. Thus, they end up getting trapped and paying more amount of money as the company assures and convinces them that they are receiving a much better deal. Some customers don't realize that they are victims of bait and switch because this typically doesn't involve selling of phony or non-functional products. But these tactics are frequently used by retail stores & departmental stores which proves to be a blessing for sellers as it increases their sales and along with higher rating of products.

Distinguishing Bns Tactics from Non Bns Tactics

It is important to consider the tactics which are beyond of the circle of BnS, the same way its important to highlight the BnS tactics. It is also unethical t allegedly blame someone for a practice that does not come under BnS and this unnecessary blame game can counter back large legal implications on the consumers.
Pricing error is one concrete example of non BnS tactics and these are most commonly found especially in online searches. The advertiser will list the product A at $500 where its actual price is $5000. This is just a pricing error a consumer should also act rationale while choosing the offers as it is clear that the retail stores won't lose their hundreds and thousands of dollars for honoring this offer.

The other example is the ***availability of limited product stocks*****,** where an offer is proposed only for particular quantity of products or it might state that the offer is for first 10/15 customers only. Expiry of the offer brings the customers to pay the usual prices. This technique which is an exciting marketing stunt, of course, is not bait and Switch until and unless the advertiser mentions the details of the offer. It is like a loss leader, who brings people to the store in hope of large number of savings but end up with no product available in offer.

The advertisers use ***impressive and smooth wording*** to catch up the sight of customers which could sometimes convey wrong meaning or context about the offer to the consumers. There may be shift in perception in minds of consumer and the advertiser behind the idea of offer, but the offer cannot be considered as bait and Switch.

Legality of Bait and Switch

Fraudulent & deceptive forms of bait and switch are intrinsic concerns for law. This practice is crime & considered as fraudulent sales tactics and it is punishable offense under **Lanham Act**. In countries like United States, consumers can file a lawsuit against the advertiser for false marketing. Consumer laws hold this fraudulent business as liable for trademark infringement and the business might also be liable for damages. Consumer laws take this practice as fraudulent because the manufacturer advertises the products that are not meant for sale but the laws doesn't state that the consumer would get the same product they desire for.

As there are two sides of coin, some common advertising or marketing practices on other side of coin prove to be lawful by using traditional bait and switch. Lawful bait and switch occurs in abundance. Virtually every flavor of retail environment, in which consumers enters either physically or virtually, is designed to steer & route consumers to switch to buying more things or a more profitable item.

DELL, for example, has been sued over bait and switch charges by a California law firm for charging the computer giants with systematically deceiving their customers. Another example is of Luxury fashion company named Michael Kors which sued warehouse retailer Costco Wholesale Corp. in federal court over an alleged "bait and switch "advertisement. Kors accuse Costco of false advertising & unfair competition under Federal Lanham Act & New York Common Law.

Review of Federal Trade Commission (Ftc)

Federal Trade Commission defines Bait and switch as "an alluring but insincere offer to sell a product or service which the advertiser in truth does not intend or want to sell. Its purpose is to switch consumers from buying the advertised merchandise, to sell something else, usually at higher price or on basis more advantageous to the advertiser."

According to Federal Trade Commission (FTC), Bait and Switch is considered as fraudulent act as it meets the legal criteria of deception as stated in Section 5 of FTC Act. Thus, Federal Trade Commission prohibit the practice which is punishable on persuasion. While FTC has enforced the laws and deterred scams to a great degree, bait and Switch still remains a stubborn problem that could never disappear from the marketer's bags of tricks. Despite established laws over BnS, the tactic is found lawful in the sight of some marketers while most of the sales team avoid the use of this tactic which has been declared as unlawful by Federal Trade commission. Federal Statue and the State Regulation authority have also voted against this infamous doctrine.

Guidelines of FTC

FTC has issued guidelines to declare the criteria of Bait and switch explaining about what is "bait and switch" advertising and what isn't. where FTC emphasizes that "bait and switch" deals with a disingenuous advertisement. These guidelines are helpful in distinguishing the marketing strategy as bait and switch. According to FTC, if the seller has the ability to sell you the "bait" but talks you into buying something else. That's not "bait and switch." Similarly, If the seller runs out of the "bait" but the advertisement specifies limited quantities, that's also not "bait and switch."

However, If the seller does not intend to sell you the "bait," and disparages the bait or its warranty, credit terms, availability of service, repairs or parts then it's probably the "bait and switch":

similarly employs compensation methods that discourage or penalize sales people for selling the bait. Or Refusal to take orders for the bait refusal to make delivery of the bait within a reasonable time period is also considered as Bait and switch. If the seller shows you a broken or defective product that is also highlighted as BnS. Failure to meet anticipated demand for the bait without disclosing the bait's limited availability in the advertisement also comes under the definition of bait and switch.

Description of Model

Consider a good refrigerator that is for sale. If all the refrigerator's attributes were known, it would appeal to different individuals in different ways. For example, a single door is less likely to be valued highly by a family of four living in Antalya than it is valued by a single man who lives in Ankara. Similarly, a double-sided door refrigerator may have higher value to the family of four than to the single man. Let's

assume index of individuals by some vector of characteristics, x. In this case x might relate to family size and income.

Consider that there are two types of commodities: The first one that comes in two varieties, A and B. The second is a generic good that has price equal to one. Consumers are endowed with wealth W. Cars A and B cost P_A and P_B, respectively. If the consumer buys a type A refrigerator, then he has W - P_A left to spend on the generic good. If the consumer buys a type B, then he has W - P_B left to spend on the generic good. If the consumer buys neither A nor B, then he has W left to spend on the generic good. Thus, in the absence of search costs, utility is given by

$M(x, W - P_A)$ if A is consumed

$N(x, W - P_B)$ if B is consumed

R (X, W) if neither A nor B is consumed. (1)

Now suppose that the consumer must bear cost k to search for the commodity. Under these circumstances, utility is given by

$M(x, W - P_A - k)$ if A is consumed

$N(x, W - P_B - k)$ if B is consumed

R (x, W) if neither A nor B is consumed; no search occurs

R (x, W - k) if neither A nor B is consumed; search occurs. (1')

If a consumer searches and buys A, his utility is $M(x, W - P_A - k)$ and, analogously $N(x, W - P_B - k)$ if he buys B. If he chooses not to search, he avoids cost k and receives utility R (x, W). If he searches and then chooses not to buy, he receives utility R(x, W - k), because the search cost reduces his resources available for the generic good.

Let y be the proportion of firms that produce A and 1 - y the proportion that produce B. For simplicity, it is assumed that a potential customer gets a message from one and only one seller. The message identifies the location of the store and affirms that it has refrigerators to sell. It also declares the type of refrigerator that is for sale. After having received the message, the consumer can decide to "shop," that is, to inspect the good or to stay home. If he does not shop, then all his wealth is spent on the generic good. The consumer's type is un-known to the producer, primarily because the seller does not know the identity of the consumer that his advertisement reaches.

A firm that sells A can either advertise truthfully that it has A for sale at price P_A or advertise falsely that it has B for sale at price P_B. The second strategy is bait and switch. A bait-and-switch strategy is defined as advertising one good but offering another to the buyer after he has already borne the search costs and has come to inspect the product. The truth-telling situation requires a separating equilibrium in which A wants to advertise A and B wants to advertise B. A bait-and-switch equilibrium is defined as a pooling equilibrium in which both sellers advertise that they have B.

Defining a bait-and-switch equilibrium as a pooling equilibrium conforms to common usage of the term "bait and switch." In the bait-and-switch equilibrium, all sellers announce that they have the low-priced good for sale. The announcement merely identifies the location of the automobile showroom and lets the shopper know that there is some positive probability that the advertised good is actually for sale. Buyers

understand that some sellers engage in bait and switch. The shopper arrives at the showroom and learns the identity of the actual refrigerator for sale. If the car is in fact a B, he judges the advertisement to have been truthful. If the car is actually an A, he views the seller as having engaged in bait and switch; this seller has lied about the identity of the good. Even though buyers know that some sellers engage in deceptive advertising, the dishonest behavior by those sellers is exactly what is commonly called bait and switch.

To begin, let us provide conditions under which a separating equilibrium exists. In such equilibrium, sellers of A advertise A, sellers of B advertise B, and buyers shop for a car on the basis of it is announced characteristics. If firms tell the truth, then a consumer who sees an ad announcing that A is for sale at P_A will shop for and buy A if

$$M(x, W - P_A-k)>R(x, W) \quad (2)$$

Similarly, a consumer who sees an advertisement announcing that B is for sale at P_B will shop for and buy B if

$$N (x, W-P_B-k)>R (x, W). \quad (3)$$

When condition (2) holds, the consumer's utility is higher by buying the refrigerator at price P_A and bearing search costs k than by not shopping at all and saving search costs. When (3) holds, the consumer is better off by shopping and buying B than by not shopping at all and saving search costs.
For a separating equilibrium to exist, a seller of A must not want to move to a bait-and-switch strategy. That is, given that consumers expect truthful advertising, the seller of A must not want to advertise falsely that he has B for sale. Since we are interested in bait and switch, we now derive the condition under which a truthful advertising, separating equilibrium will not exist.
Suppose that a seller of A advertises B. Consumers, who initially assume truthful advertising, come to inspect the good if holds. When the customer arrives at A's showroom, he learns that the refrigerator is type A and not B. At that point, the consumer buys the refrigerator if

$$M(x,W-PA-k)>R(x,W-k) \quad (4)$$

After the consumer has borne search costs k, he can either decide to buy A at price PA and receive utility M(x, W - PA- k) or refuse to buy A and receive utility R (x, W - k). Since search costs have already been borne, the utility from not buying A is only R(x, W - k), not R(x, W). A sale of A by a seller who adopts a bait-and-switch strategy occurs only when both conditions (3) and (4) hold. Since the seller of A falsely advertises B, condition (3) must be met for a potential customer to shop. But since A is actually for sale, condition (4) must be met for a customer to buy. Define λ_B as the proportion of individuals with x such that conditions (3) and (4) hold. Then λ_B is the probability that a randomly drawn customer will buy A if a seller deviates to a bait-and-switch strategy, given that buyers expect truthful advertising. Similarly, define λ_T as the proportion of individuals with x such that condition (2) holds. Thus λ_T is the probability that a randomly drawn customer will buy A if seller A advertises truthfully, given truthful advertising by others. Finally, define λ_3 as the proportion of the population who satisfy condition (3), that is, the proportion who would shop for (and buy) B. Since some who will shop for B will not buy A once in the store, $\lambda_3 \geq \lambda_B$.

There are customers who will search for a car thinking that it is a B who would not have shopped at all had they known that only an A was available. Advertising B brings in these customers.

(' Conversely, a seller of B would not want to advertise falsely that he had an A. But A can always be redefined as B, and as will be shown below, if sellers of A want to bait and switch, sellers of B want to advertise truthfully. Therefore, the conditions for only one seller are relevant.)

Once there, some will buy because (4), the condition for buying after search has already been done, is weaker than (2), the condition for shopping and buying an A before search costs are sunk. But there is a cost to advertising B when only A is available. Some who would have bought A are not interested in B. There are likely to be individuals of type x such that (2) holds but (3) does not. Advertising B keeps those potential buyers away. This is the cost of bait and switch.

Normalize the rent per unit of A sold to be one. Then the expected rent to A from advertising truthfully is simply λ_T per potential customer. Analogously, the expected rent from bait and switch is XB per potential customer. A truthful advertising equilibrium exists when $\lambda_T > \lambda_B$ and when the analogous condition holds for sellers of B. Then sellers want to advertise truthfully, and buyers base their shopping decisions on the announced good. Conversely, if $\lambda_T < \lambda_B$, a seller of A will want to deviate from the truthful advertising equilibrium and will engage in a bait-and-switch strategy.

Research Methodology

Current research is focused on consumer behavior and explores the opportunities presented to consumer. Second part of research also focuses on finding the probability and conditions when they prefer to switch, and under what circumstances do they prefer to avoid the substituted products.

Subjects

To reach to the answer, an offline survey was conducted in which 150 people of different income groups were given a questionnaire form. This was followed by Face to face interview along with questionnaire filling.
The consumers of smartphone industry are our major subjects, located in Berlin. The consumers of smartphone industry are chosen because of frequent utilization of this advertising tactics in PC/smartphone industry by producing a product that is way below the market price and then bait with another product. Recent consumer reviews have also opened this dimension of BnS strategies by sales person on marts and huge stores.

Groups

People were divided in 3 income groups and each group was containing 50 people. The reviews of people were asked regarding the online shopping, types of frauds or problems they come across any many such questions.

Results and Discussion

Both high and middle income group were familiar to online shopping and the response rate was 100 % in comparison to 20% of Low income group people. 80% of the lower income group never shopped online. All the people among higher, middle, and lower income groups had come across attractive advertisement which had drawn their attention. On asking the availability of products 20% of higher income group nodded in a yes, however both middle income and lower income group never found the advertised product, and all the income group accepted being the victim to Bait and switch tactic.

Higher income group, did take up the substituted products offered as a switch all the time, and only 50% of middle income group took the switch (alternative product). However, lower income group never considered to buy the switch, owing to their financial limitation. Higher income groups continued purchasing from such vendors where 80% of the middle-income group and 100% of lower income group

had stopped purchasing from such vendors. This was the reason 100% of the lower income group in the study stopped buying online products considering it mostly risky, when 20% of the middle-income group had stopped buying, where this group found shopping online risky sometimes. This on contrary to High income group continue to buy online, where according to them was not risky as all. The responses stated were recorded and thus are analyzed and presented in chart.

After the interview, it was observed that once low income group people experience a fraud they do not tend to change their minds as they fear the loss of their money. The people of this income group never switched to the substitute as the substitute was always available at higher price and that moved out of their budgets. In contrast the change of the product does affect high income group. Due to more of income or savings available with them they mostly tend to change their minds and switch to the substitute product.

QUESTIONS	HIGH INCOME GROUPS	MIDDLE INCOME GROUP	LOW INCOME GROUPS
Have you done online shopping?	Yes	Yes	Only 20%
Do you come across some attractive offers while shopping?	Yes	Yes	Yes
Are the offered products always available?	20% of time	Never	Never
Have you ever been victim to Bait and Switch?	Yes	Yes	Yes
Do you always take up the substituted product given to you at higher prices??	Yes	Only 50% members tend to switch)	No (Seems to be out of budget)
Have you ever taken any legal action against such fraudulent practice??	No	No	No
After coming across such instance have you stopped buying from such vendors?	No	80% members have stopped	Yes
Have you stopped online shopping?	No	Yes-20%	Yes – 100%
Do you think online shopping is risky?	No	Sometimes	Mostly

Conclusion

Bait and Switch is mostly being used as fraudulent practice to deceive the consumers. This paper concentrated on understanding the proper meaning of the BnS concept and how the concept works to attain proper equilibrium in the economy. It also reflected, how the customers are affected and under what circumstance they always tend to substitute the product. This practice occurs only when there are potential customers for a good other than the one seller has available. In summary, bait and switch is more of economic destroyer owing to its misleading nature upon customer arrival. Use of this strategy to attract the consumers to increase their earnings is merely to mislead the customers to buy the desired product, which is an unethical practice, punishable under the FTC act.

Thus, it is advisable for the businesses to avoid pursuing such malpractices, and not to follow fraudulent techniques to improve businesses. It is highly recommended to make use of ethical advertising strategies, which can increase the sales by the use of search engine optimization (SEO), banner advertisements, social media marketing, Google AdSense, e-mail advertising etc.

References

1. Acquisti, Alessandro. 2003. Essays on privacy, anonymity, and tracking in computer-mediated economic transactions. Ph.D. thesis, University of California, Berkeley, Berkeley, CA.
2. Anand BN, Shachar R (2009) Targeted advertising as a signal. Quant. Marketing Economic. 7(3):237–266.
3. Audrey Laing • Jo Royle Bookselling Online: An Examination of Consumer Behaviour Patterns (2013) 29:110–127
4. Bagwell K, Ramey G (1993) Advertising as information: Matching products to buyers. J. Econom. Management Strategy 2(2):199–243
5. Chen, Yuxin, Chakravarthi Narasimhan, Z. John Zhang. 2001. Individual marketing with imperfect targetability. Marketing Sci. 20(1) 23–41.
6. Chen, Yuxin, Z. John Zhang. 2001. Competitive targeted pricing with strategic customers. Technical report, Leonard N. Stern School of Business, New York University, and Columbia Business School, New York.
7. Cramphorn MF. Gender effects in advertising. Int J Market Res. 2011;53(2):147–70.
8. David Adam Friedman, Explaining "Bait-and-Switch" Regulation, 4 Wm. & Mary Bus. L. Rev. 57 (2013), http://scholarship.law.wm.edu/wmblr/vol4/iss2/6
9. Denscombe M. Item non-response rates: a comparison of online and paper questionnaires. Int J Soc Res Methodol. 2009;12(4):281–91.
10. Diamond P (1971) A model of price adjustment. J. Econom. Theory 3(2):156–168.
11. Doherty NF, Ellis-Chadwick F. Internet retailing: the past, the present and the future. Int J Retail DistbManag. 2010;38(11/12):943–65
12. Eitan Gerstner, James D. Hess can Bait and switch Benefit customers? Marketingscience Vol 9, No spring 1999 114,124
13. Eitan Gerstner, James D. Hess; Yes! Bait and switch Really Benefit Customers Marketing science Vol 9, No spring 1998 283,289
14. Kirmani A, Rao AR (2000) No pain, no gain: A critical review of the literature on signaling unobservable product quality. J. Marketing 64(2):66–79.
15. Klemperer, Paul. 1989. Price wars caused by switching costs. Rev. Econom.Stud. 56(3) 405–420.
16. Montgomery, Alan L., Shibo Li, Kannan Srinivasan, John C. Liechty. 2004. Modeling online browsing and path analysis using clickstream data. Marketing Sci. 23(4) 579–595
17. Moorthy, K. S. 1993. Theoretical modeling in marketing. *J. Marketing*.57(April)92-106
18. Schartz, John. 2001. Giving the Web a memory cost its users privacy. New York Times (September 4). http://www.nytimes.com/ 2001/09/04/technology/04COOK.html.
19. Stole LA (2007) Price discrimination and competition. Armstrong M, Porter R, eds. Handbook of Industrial Organization, Vol. 3 (Elsevier, Amsterdam), 2221–2299.
20. Wernerfelt B (1990) Advertising content when brand choice is a signal. J. Bus. 63(1):91–98
21. William & Mary Business Law Review on explaining Bait ans switch regulation/ http://scholarship.law.wm.edu/cgi/viewcontent.cgi?article=1059&context=wmblr

Drivers and Specificity of Eco-Innovation in Poland – The Latest Research Results

Adam Ryszko, Silesian University of Technology, Gliwice, Poland, adam.ryszko@polsl.pl

Abstract

The paper presents theoretical considerations and results of empirical research on the drivers and specificity of eco-innovation activity in companies in Poland. The diversity of the drivers and the results of eco-innovation activity are pointed out. An analysis is performed of the latest eco-innovation statistics obtained from the Community Innovation Survey 2008 and 2014 carried out in Poland. In addition, the findings of own research are presented, focusing in particular on the relationships between the importance that the surveyed companies attach to selected eco-innovation drivers and the specific results of technological eco-innovation activity. The results of multiple regression analyses made it possible to identify pivotal drivers of both the product and the process eco-innovation speed, number and quality.

Keywords: eco-innovation, technological eco-innovation, eco-innovation drivers, eco-innovation specificity

Introduction

Sustainable development is embedded in the triple bottom line concept. It requires integration of environmental, economic and social performance, which is perceived as a crucial contemporary challenge that companies need to face in their business activity. Eco-innovation plays an essential role in achieving sustainable development and supports these goals, aiming to develop new solutions (i.e. products, services, processes, methods) in a way that benefits the environment. It might be considered as the process of development and adoption of environmentally friendly products, services or processes (from the processual point of view) and as the output (i.e. goal or result) of the eco-innovative process which can be achieved by companies.

According to the Eco-Innovation Scoreboard, Poland is among the countries catching up in eco-innovation. Still, its overall eco-innovation performance is one of the worst in the European Union (EIO Database, 2017). Eco-innovation activity is undertaken by companies in Poland extremely rarely (GUS, 2015). It is therefore essential that the specificity of eco-innovation activity and the drivers accelerating the uptake of eco-innovation are thoroughly investigated. Unfortunately, until now there has been a gap in such analyses with regard to companies in Poland.

For this reason, this paper presents a literature review and an empirical analysis performed in particular with a view to:

- presenting the specificity of eco-innovation activity in companies in Poland,
- identifying eco-innovation drivers in companies in Poland,
- investigating the relationships between the importance attached by companies in Poland to selected eco-innovation drivers and the specific results of eco-innovative activity.

Theoretical Framework

Defining eco-innovation is not a simple task although several attempts have been made in the literature (Carrillo-Hermosilla et al., 2010). According to Kemp and Pearson (2008), eco-innovation is the production, assimilation or exploitation of a product, production process, service, management or business method that is novel to the organization (developing or adopting it) and which results,

throughout its life cycle, in a reduction of environmental risk, pollution and other negative impacts of resources use (including energy use) compared to relevant alternatives. The European Commission defines eco-innovation as any form of innovation resulting in or aiming at significant and demonstrable progress towards the goal of sustainable development, through reducing impacts on the environment, enhancing resilience to environmental pressures, or achieving a more efficient and responsible use of natural resources (European Commission, 2011). The Eco-Innovation Observatory defines eco-innovation as the introduction of any new or significantly improved product (good or service), process, organizational change or marketing solution that reduces the use of natural resources(including materials, energy, water and land) and decreases the release of harmful substances across the whole life-cycle (EIO, 2012a). There is also definition of technological eco-innovations that is based on the general understanding of technological innovations as defined in the Oslo Manual (OECD, 2005) which distinguishes product and process innovations. Thus, technological eco-innovations, *i.e*., product and process eco-innovations, as specific kind of technological innovations consist of new or significantly improved products and processes to avoid or reduce environmental burden (Ziegler and Nogareda, 2009).

Despite differences in wording, all definitions of eco-innovation embrace the environmental component and reflect the two main consequences of eco-innovation: fewer adverse effects on the environment and more efficient use of resources. However, while eco-innovation can be realized in many forms (e.g., product, process, organizational and/or marketing methods), the effect of a diminishing environmental burden is not the primary reason for the deployment of eco-innovation (Hojnik and Ruzzier, 2016).

The studies on eco-innovation drivers commonly adopt general innovation theory (Rehfeld et al., 2007). This means considering technology push (supply side) and market pull (demands side) factors. The research studies in this area also comprise regulatory and institutional frameworks (De Marchi, 2012; Horbach, 2008; Rennings, 2000). In fact, Horbach (2008) enlarged the general innovation theory and proposed the term “environmental innovation theory”, encompassing demand side, supply side, institutional and political determinants of eco-innovation. Other studies (Horbach et al., 2012; Triguero et al., 2013) adopted this theoretical background in exploration of eco-innovation drivers. The research on eco-innovation drivers is also based on other theoretical backgrounds. It includes, most of all, institutional and neo-institutional theory (De Marchi, 2012; Li, 2014), resource-based theory (Chen, 2008; Yarahmadi & Higgins, 2012), and stakeholder theory (Oxborrow and Brindley, 2013; Weng, 2015).

The decision to create and diffuse eco-innovation is influenced by evolving set of factors. Horbach et al. (2012) indicate four groups of the main drivers of eco-innovation: the technology push (supply side), the market pull (demand side), the regulation/policy factors (institutional and political influences) and the firm-specific (internal) factors. Supply side consists of technological capabilities, path dependency and market characteristics. Demand side comprises expected market demand and social awareness of the need for cleaner production, environmental consciousness and preference for environmentally friendly products. Institutional and political influences relates to environmental policy (incentive based instruments or regulatory approaches) and to institutional structure (e.g. political opportunities of environmentally oriented groups, organization of information flow, existence of innovation networks) (Horbach, 2008). Firm specific factors are related to “green capabilities” that play an important role from the perspective of a resource-based view of a firm.

Furthermore, drivers of eco-innovation can be classified as internal or external factors (Del Río González, 2009; Del Río González et al., 2016; Horbach, 2008; Horbach et al., 2012). According to Del Río (2009), internal factors refer to the existence of internal preconditions and features of the company, which facilitate its involvement in environmental technological change. On the other side, external factors stem from the incentives and stimulus derived from a wide range of factors and actors that exert pressures to which company responds. Therefore, Bossle et al. (2016) point out internal factors (i.e. cost savings, adoption of certification, environmental capability, environmental managerial concern, human resources, environmental leadership and culture) that companies can manage in order to adopt eco-innovation and external factors (i.e. regulatory pressures, normative

pressures, market demands, changes in technology) over which companies have little or no control. With regard to internal capabilities which might facilitate an eco-innovative approach, top level management commitment, technological competency, financial and human resources are highly relevant. In addition, Chen et al. (2012) indicate the following internal origins of eco-innovations: environmental leadership, environmental culture and environmental capability.

Based on a thorough overview of emerging literature on eco-innovation drivers, Hojnik and Ruzzier (2016) make the following interesting observations:

- regulations and market pull factors constitute the most commonly and frequently reported determinants triggering eco-innovation,
- different factors trigger different eco-innovation types, i.e. product eco-innovations are driven most frequently by market pull factors and regulations, process eco-innovations are determined mainly by regulations and the Environmental Management System, and organizational eco-innovations are driven by regulations, technology push factors and market pull factors,
- regulations, market pull factors and the company size constitute important drivers of eco-innovation in both its generation stages (i.e. development/innovation stage and the adoption/diffusion stage), while collaboration with external partners seems to drive eco-innovation primarily in the development/innovation stage, and in turn coercive pressures, normative pressures and mimetic pressures spur eco-innovation in the adoption/diffusion stage. Nevertheless, most studies identify the technology push factors and technological and green capabilities of companies as facilitators of eco-innovation in the innovation/development stage, while in others they also work as facilitators of eco-innovation in the adoption/diffusion stage.

The further part of this paper presents results of the latest research on the specificity and drivers of eco-innovation in companies in Poland. The results are based on public statistics data and on the Author's own findings.

Eco-Innovation Activity and Drivers in Companies in Poland – Results from Public Innovation Surveys and Statistics

Two comprehensive analyses of eco-innovations in Poland have been performed so far. They focused on the response to the Community Innovation Survey 2008 (CIS 2008), covering the years 2006–2008, and the Community Innovation Survey 2014 (CIS 2014), covering the years 2012–2014. The scope of the two surveys differed slightly and different approaches were adopted to the aggregation of data and presentation of results. Although this makes it difficult to compare them directly and unequivocally, some essential conclusions can be drawn from them.

The CIS 2008 showed that in the years 2006-2008 eco-innovations had been introduced in 26.5% of industrial companies and in 16.1% of the service sector enterprises. Large companies (with 250+ employees) were the most innovative. Eco-innovations were introduced in 57.5% and 35% of them in industry and in the service sector, respectively, whereas in small businesses (10-49 employees) the percentage totalled only 21.7% and 14.6%.

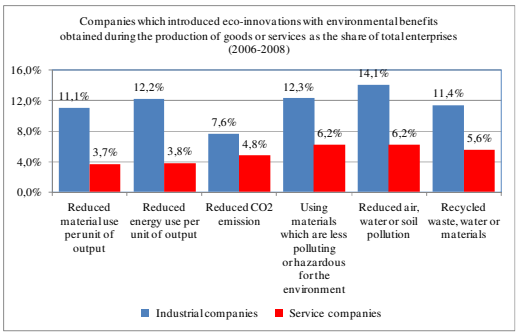
The analyses made a distinction between eco-innovations with environmental benefits obtained during the production of goods or services and those offering environmental benefits obtained during the consumption or use of a product or service by the end user. Eco-innovations with environmental benefits obtained during the production of goods or services were implemented by almost a quarter of the industrial companies and by 13.4% of the service sector enterprises. Eco-innovations with environmental benefits obtained during the consumption or use of a product or service by the end user were implemented by 17.8% of the industrial companies and by 11.4% of the service sector enterprises. The main advantages gained due to the implementation of eco-innovations during the production of goods or services were as follows: reduced air, water or soil pollution (14.1% of

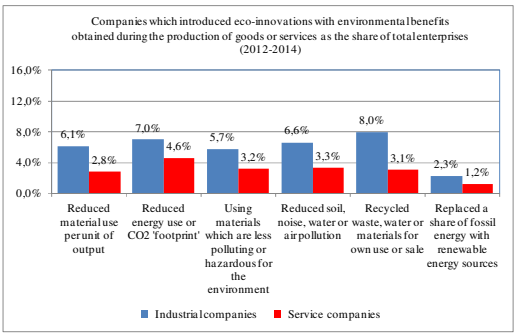
industrial companies and 6.2% of those from the service sector) and use of materials which are less polluting or hazardous for the environment (12.3% and 6.2%, respectively). The most common advantage in eco-innovations with environmental benefits obtained during the consumption or use of a product or service by the end user was reduced air, water or soil pollution (12.2% of the total of industrial companies and 7.2% in the service sector).

The CIS 2014 results indicate that the level of eco-innovations introduced in companies in Poland in the years 2012-2014 was significantly lower compared to the period of 2006-2008. In the years 2012-2014, process eco-innovations, product eco-innovations, organizational eco-innovations and marketing eco-innovations were implemented only in 4.1%, 3.9%, 1.6% and 0.7% of industrial companies, respectively. The service sector companies performed even worse: only 1.7% of them implemented product eco-innovations, 0.9% – process eco-innovations, 0.9% – organizational eco-innovations and 0.4% – marketing eco-innovations.

The main advantages gained due to the implementation of eco-innovations during the production of goods or services in industrial companies in the years 2012-2014 were as follows: recycled waste, water or materials for own use or sale (8.0%), reduced energy consumption or CO_2 footprint (7.0%) and reduced soil, noise, water or air pollution (6.6%). In the service sector, the respondents pointed to the following main advantages: reduced energy consumption or CO_2 footprint (4.6%), reduced soil, noise, water or air pollution (3.3%), and use of materials which are less polluting or hazardous for the environment (3.2%). Considering the company size, it can be observed that all types of environmental benefits were gained first and foremost by large entities operating in industry and in the service sector (companies with 250+ employees). The benefits obtained during the production of goods or services were definitely most often indicated by large industrial companies. They concern in particular: reduced energy consumption or CO_2 footprint (25.4%), recycled waste, water or materials for own use or sale (23.3%) and reduced soil, noise, water or air pollution (23.0%). With regard to eco-innovations with environmental benefits during the consumption or use of a product or service, the most frequent advantage, both in industrial and the service sector entities, was reduced energy consumption or CO_2 footprint (5.9% of industrial companies and 4.8% the service sector enterprises). The environmental benefit obtained during the use of a product or service which was indicated by the respondents the least often was facilitated recycling of a product after use (4.4% and 2.9% of companies from industry and from the service sector, respectively).

Detailed results concerning the benefits gained due to implementation of eco-innovations during the production of goods or services and during the consumption/use of a product or service in the years 2006-2008 and 2012-2014 in Poland are presented in Fig. 1.





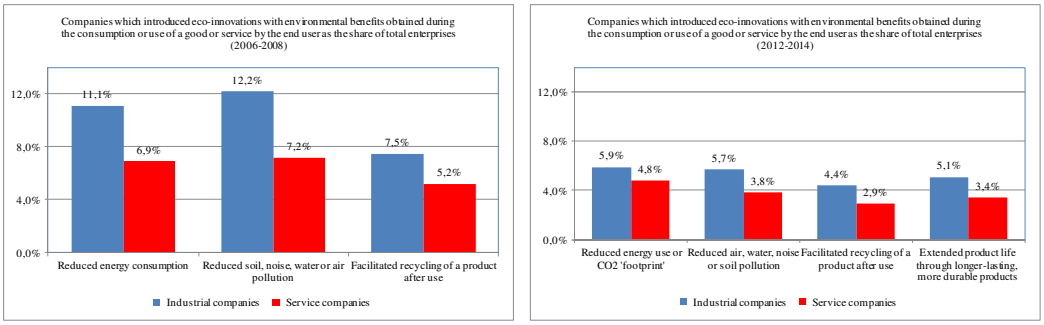


Fig. 1: Percentage of the total number of companies in Poland which introduced eco-innovations with environmental benefits obtained during the production of goods or services and during the consumption/use of a product or service by the end user in the years 2006-2008 and 2012-2014

Source: based on (GUS, 2010; GUS, 2015)

The survey results indicate that the factor with the strongest impact on a company's decision to introduce eco-innovations in the years 2012-2014 was the high cost of energy, water or materials, the importance of which was ranked "high" by 36.7% of industrial companies and 42.3% of enterprises from the service sector. Other factors of essential importance were also: improving the company reputation (rated "high" by 31.4% and 32% of industrial companies and the service sector enterprises, respectively) and existing environmental regulations (30.5% and 29.4%). The factor the importance of which the respondents rated as "high" the most seldom was government grants, subsidies or other financial incentives for introducing eco-innovations (9.9% and 9.1%, respectively). The relevant drivers prompting a company to introduce eco-innovations are presented in Fig. 2.

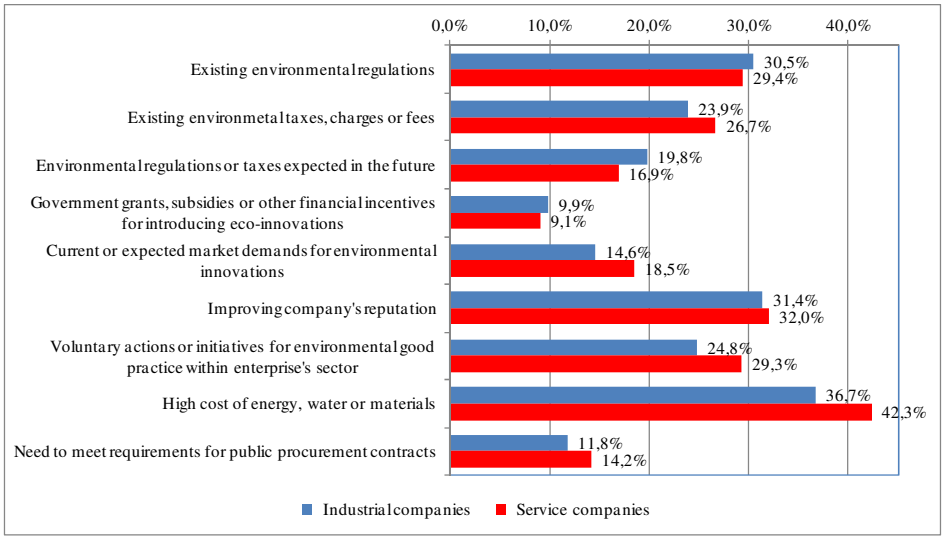


Fig. 2: Drivers of decisions prompting a company to introduce eco-innovations (importance rated as "high" as the share of companies which introduced eco-innovations) In the years 2012-2014

Source: based on (GUS, 2010; GUS, 2015)

Technological Eco-Innovation Specificity and Drivers in Companies in Poland – Own Research Results

In relation to the issues discussed in this paper, empirical research was carried out on selected aspects of eco-innovation activity in companies in Poland in the years 2011-2013. The research method drew

on the computer-assisted telephone interview (CATI) conducted by the largest Polish research agency – PBS Sp. z o.o. The interviews were conducted among representatives of companies: owners, management board members or other decision-makers in the organization. In order to enable analysis in the established groups of companies in each determined category, ratios by industry and the number of employees were used. After the categories and the size required to carry out the research had been defined, companies were drawn randomly from the nationwide business database with a stratification procedure along the dimensions of the company size and selected industrial and service sectors. The questions concerning the substance of this paper were answered by 292 representatives of various companies, including 47 large, 95 medium and 150 small businesses.

In particular, the research focused on technological eco-innovation. Respondents were asked to assess statements reflecting on the number of product and process eco-innovations, the technological eco-innovation speed (i.e. the company agility in terms of launching eco-innovative products and developing new environmentally friendly processes) and on the technological eco-innovation quality (i.e. novelty and eco-efficiency of eco-innovative products and processes) as compared to key competitors. The assessed statements included as follows:

- TEI-1 – Product eco-innovation speed (i.e. "we usually were the first on the market to introduce new eco-innovative products"),
- TEI-2 – Product eco-innovation number (i.e. "we have introduced more products that are eco-innovative"),
- TEI-3 – Product eco-innovation quality (i.e. "we have introduced products that are more eco-innovative"),
- TEI-4 – Process eco-innovation speed (i.e. "we usually were the first to introduce new, environment friendly methods of manufacturing, maintenance and logistics"),
- TEI-5 – Process eco-innovation number (i.e. "we have introduced more new or significantly improved processes bringing environmental benefits")
- TEI-6 – Process eco-innovation quality (i.e. "we have been improving environmental parameters of our processes more effectively").

The representatives of the companies were also asked to evaluate the importance of drivers that could accelerate the development and uptake of eco-innovation activity in their company. The analysed drivers included as follows:

- D-1 – Existing environmental regulations,
- D-2 – Expected future environmental regulations,
- D-3 – Securing or increasing existing market share,
- D-4 – New market entry,
- D-5 – Increasing market demand for green products,
- D-6 – Opportunity of cost-savings,
- D-7 – Access to existing subsidies and fiscal incentives for introducing eco-innovations,
- D-8 – Voluntary environmental agreements and codes of practice,
- D-9 – Opportunity for improving company image.

The Likert-type seven-point scales (1 – strongly disagree/much worse; 7 – strongly agree/much better) were used for all relevant statements related to the specific results of technological eco-innovation activity and eco-innovation drivers.

The results of the survey on the specific effects of technological eco-innovation activity, taking account of the differences in eco-innovation in individual companies depending on the business size are presented in Fig. 3.

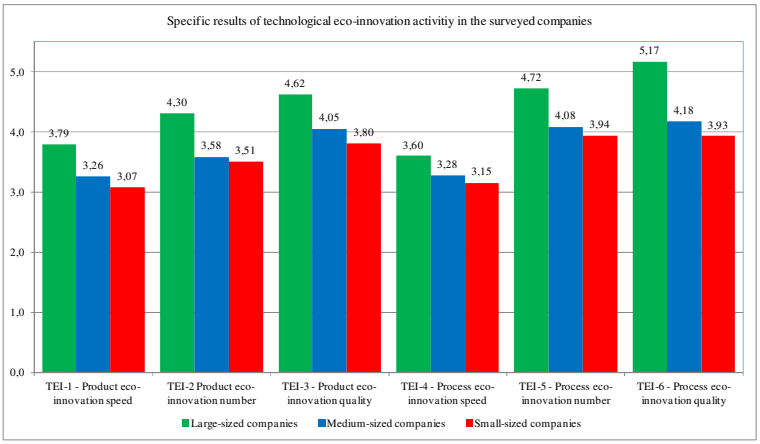


Fig. 3: Specific results of technological eco-innovation activity in the surveyed companies

The results of the analyses indicate that, irrespective of the entity size, the companies under consideration have the greatest problem with the speed of introducing either product- or process-related innovations. The number of introduced eco-innovations is rather unimpressive, too. When it comes to the effects of eco-innovation activity indicated during the surveys, the best performance can be observed in improving the process ecological parameters, i.e. the quality of the process eco-innovation. An analysis of the obtained results confirms that the advancement in eco-innovation activity depends significantly on the company size. The one-way ANOVA results prove that the company size has an essential impact on the differences in variables TEI-1 ($p<0.05$), TEI-2 ($p<0.05$), TEI-3 ($p<0.05$), TEI-5 ($p<0.05$), and TEI-6 ($p<0.001$). It should be added that large entities are characterized by definitely the highest level of eco-innovation. Considering the company size criterion, the greatest differences can be observed in relation to the process eco-innovation quality. In this area, small and medium businesses differ from large companies significantly.

Next, the analysis focused on eco-innovation drivers. The variables covered by the surveys, together with the results of the performed analyses taking account of the data obtained from companies depending on their size, are presented in Fig. 4.

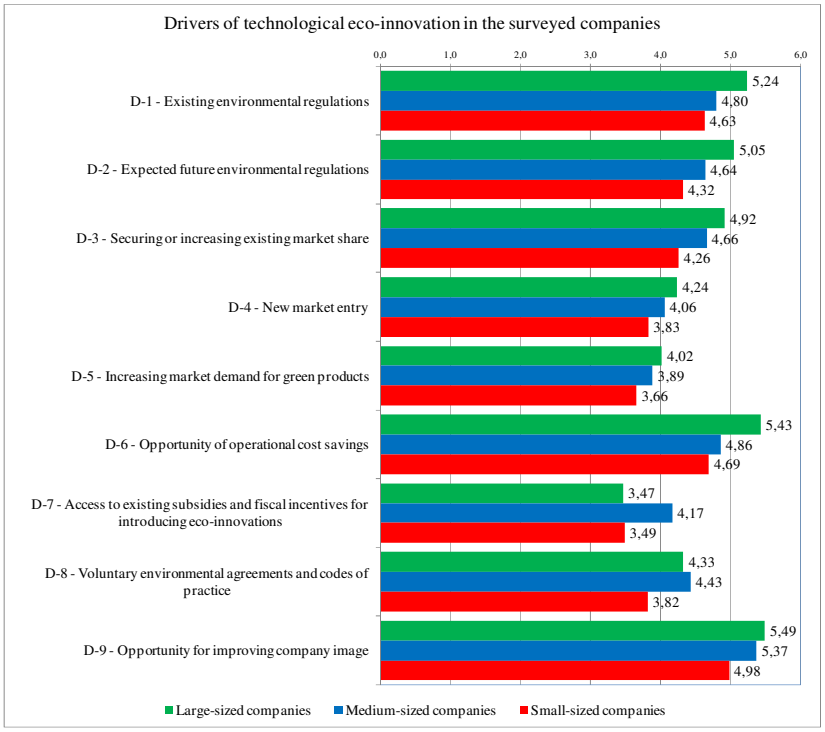


Fig. 4: Drivers of technological eco-innovation in the surveyed companies

The data presented in Fig. 4 indicate that the representatives of the surveyed companies generally agree as to the most important drivers prompting entities to take up eco-innovation activity. Regardless of the company size or the type of the business activity, the representatives believe that the most essential factors spurring eco-innovation implementation are the opportunity to improve the company reputation (D-9), the opportunity for operational cost savings (D-6) and the existing environmental regulations (D-1). This confirms the results of the research mentioned above concerning the importance attached to the company image, the potential reduction in costs or the need to comply with legal regulations. By far the least important factors are the following: access to existing subsidies and fiscal incentives for introducing eco-innovations (D-7), increasing market demand for green products (D-5) and new market entry (D-4), which may mean that most respondents fail to notice the market opportunities prompting companies to develop and implement eco-innovation.

In the next stage, the analyses focused on the relationship between the importance attached by company representatives to individual eco-innovation drivers and the specific results of technological eco-innovation activity in the surveyed companies. Multiple regression analyses were conducted where the eco-innovation drivers (D-1–D-9) were independent variables, whereas the specific results of technological eco-innovation activity (TEI-1–TEI-6) were the dependent ones. The results of the regression analyses are listed in Table 1.

Table 1: Results of multiple regression analyses

Independent variables	Dependent variables					
	TEI-1	TEI-2	TEI-3	TEI-4	TEI-5	TEI-6
Constant	0,618	1,268**	1,868***	1,008	2,074***	1,928***
D-1	0.112	0.018	0.036	-0.052	0.142*	0.066
D-2	0.021	0.075	0.030	0.057	-0.016	0.020
D-3	0.259***	0.138*	0.083	0.174*	0.029	0.054
D-4	-0.145	-0.104	-0.030	-0.008	-0.041	-0.027
D-5	0.114	0.205**	0.127	0.047	0.093	0.227***
D-6	0.048	0.076	0.126	0.163*	0.098	0.114*
D-7	-0.024	-0.006	0.036	-0.043	0.047	0.060
D-8	0.231**	0.097	0.143*	0.153	0.112	0.087
D-9	0.072	0.169*	0.082	0.104	0.120	0.058
R^2	0.254	0.266	0.191	0.199	0.190	0.256

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

The results obtained from the regression analyses prove that:

- existing environmental regulations (D-1) have significant effect on process eco-innovation number (TEI-5),
- securing or increasing existing market share (D-3) has significant effect on product eco-innovation speed (TEI-1), product eco-innovation number (TEI-2), and process eco-innovation speed (TEI-4),
- increased market demand for green products (D-5) has significant effect on product eco-innovation number (TEI-2), and process eco-innovation quality (TEI-6),
- possibility of reducing the operational cost (D-6) has significant effect on process eco-innovation speed (TEI-4) and process eco-innovation quality (TEI-6),
- voluntary agreements and environmental codes of practice (D-8) has significant effect on product eco-innovation speed (TEI-1) and product eco-innovation quality (TEI-3),
- improving company's reputation (D-9) has significant effect on product eco-innovation number (TEI-2).

Consequently, it follows that the introduction of product eco-innovations depends first and foremost on securing or increasing the existing market share and on voluntary environmental agreements and codes of practice. Implementation of this type of eco-innovation is also strongly affected by the increasing market demand for green products and the opportunity to improve the company image. Introduction of process eco-innovations depends primarily on the opportunity for cost savings, the increasing market demand for green products, securing or increasing the existing market share and the existing environmental regulations.

Discussion

The results of the presented analyses indicate clearly that regulatory, supply-side and market-pull factors have a diverse impact on the specific results of technological eco-innovation activity. Therefore, numerous and varied supporting measures are required to ensure effective eco-innovation stimulation due to the complexity of innovation drivers and understanding of the interaction between regulatory, demand and supply incentives. By doing so, demand for eco-innovative solutions is stimulated on the one hand and, on the other hand, eco-innovations will be more and more commonly embodied in business models of enterprises as a potential source of competitive advantage, thus generating the supply of such solutions. It should be emphasized that creating successful eco-innovation policy requires well-designed standards and regulations, including their appropriate stringency, flexibility and time frame. Supply measures should take into consideration equity support,

environmental research and development, pre-commercialisation, education and training for developing the human capital needed to deliver eco-innovative solutions, networking and partnerships target the development of eco-innovation and provision of essential infrastructure. Demand measures should include the shaping of environmental friendly attitudes and behaviours among customers, green public procurement, and technology transfer and know-how support (OECD, 2009).

The studies conducted in the EU member states indicate that the most widely used supply-side policy measures appear to be the support for research and development (R&D) and promotion of networking and collaborative R&D and innovation processes. Fiscal instruments, such as tax incentives for eco-innovative R&D, start-ups, and personnel, have not been reported as having a dedicated focus on eco-innovation support in any of the EU member states. The most widely used demand-pull instruments are: green public procurement, product and service certification and fiscal support for companies adopting environmental technologies. In addition, environmental regulations, national and EU targets, as well as the EU emission-trading schemes are very important in creating the framework conditions motivating companies to shift to greener practices, and in this way facilitate demand for eco-innovative technologies, products and services (EIO, 2012b).

The eco-innovation activity in Poland is supported by the following measures: (EIO, 2015; Baran et al., 2017):

- equity/business support – publicly co-funded ventures or guarantee funds,
- support for R&D in the public sector and industry – R&D funding and infrastructure, collaborative grants,
- education, training and mobility – tailored training courses, consulting for companies, entrepreneurs, a placement scheme for students, support for R&D workers recruitment,
- networks and partnerships – competence centres, clusters, science and technology parks, technology platforms and innovation networks, foresight and common vision building, market intelligence and other forms of information sharing,
- regulations and standards – regulations, targets, cap & trade schemes, performance standards, labelling, certification,
- public procurement – "green" public procurement of goods and services,
- technology transfer – advisory support for technology adopters, financial or fiscal support for technology adopters,
- support for private demand – tax reductions for products and services, demand subsidies, awareness raising and information provision.

However, as proved by the research results presented herein, the use of the instruments mentioned above is still insufficient, which is reflected by very poor performance of eco-innovation activity in Poland.

It should be noted that, irrespective of external incentives, engagement of companies in eco-innovation development and adoption depends to a great extent on the resources and capabilities available internally. These factors play a crucial role in facilitating the inclusion of eco-innovation into business models and creation of value which can enable companies to gain and maintain competitive advantage. Therefore, effective and efficient eco-innovation activity resulting in new or significantly improved products and processes may require comprehensive and reliable utilization of specific quantitative and qualitative tools applied both on the strategic and operational level (Baran, 2015; Brodny et al., 2016; Brodny et al., 2017; Janik, 2016; Loska and Paszkowski, 2018; Matusek, 2015; Szafraniec, 2015). In addition, eco-innovation activity involves the need to develop diverse innovative initiatives (Szmal, 2015) and suitable forms of internal and interorganizational cooperation (Brzóska et al., 2016).

Conclusions

The presented theoretical considerations and results of empirical research concerning the specificity and drivers of eco-innovation activity in companies in Poland point to a number of different motivations for and effects of taking up such measures.

The results of the CIS 2008 and the CIS 2014 indicate that the eco-innovation performance of companies in Poland in the years 2012-2014 was significantly worse compared to the period of 2006-2008. It should also be noted that the eco-innovation performance in the years 2006-2008 was already very low.

The own research findings prove that for the representatives of the surveyed companies in general the most important drivers that could accelerate the development and uptake of eco-innovation activity are the following: the opportunity to improve the corporate image, the opportunity for cost savings and the existing environmental regulations. However, considering the relationship between the importance that company representatives attach to individual eco-innovation drivers and the specific results of technological eco-innovation activity in the surveyed companies, the list of the most important spurs in this area is different. The results of the multiple regression analyses demonstrate that the product eco-innovation implementation depends first and foremost on securing or increasing the existing market share as well as on voluntary environmental agreements and codes of practice. The implementation of this type of eco-innovation is also strongly affected by the increasing market demand for green products and the opportunity to improve the company image. The process eco-innovation implementation depends primarily on the opportunity for cost savings, the increasing market demand for green products, securing or increasing the existing market share and the existing environmental regulations.

The results of the presented analyses demonstrate clearly that regulatory, supply-side and market-pull factors have a diverse impact on the specific results of technological eco-innovation activity. Therefore, numerous and varied supporting measures are required to ensure effective eco-innovation stimulation due to the complexity of eco-innovation drivers and understanding of the interaction between regulatory, demand and supply incentives. In Poland, eco-innovation activity is supported by diverse regulatory, market pull (demands side) and technology push (supply side) measures. However, as proved by the research results presented herein, the use of these instruments is still insufficient, which is reflected by very poor performance of eco-innovation activity in Poland.

Acknowledgment

The research presented in the article was supported by statutory work 13/030/BK_17/0027 carried out at the Silesian University of Technology

References

Baran, J. (2015), Proposal of Ecodesign Supporting Set, 15th International Multidisciplinary Scientific GeoConference SGEM2015. SGEM2015 Conference Proceedings, Vol. 3, Albena, Bulgaria 2015, 461–468.

Baran, J., Janik, A., Ryszko, A. and Szafraniec, M. (2017), Eco-innovation in the V4 countries – performance, drivers, barriers and progress towards circular economy, Proceedings of the 29th International Business Information Management Association Conference. Education Excellence and Innovation Management through Vision 2020: From Regional Development Sustainability to Global Economic Growth, Vienna, Austria, 3-4 May 2017. International Business Information Management Association (IBIMA), 3258–3275.

Brodny, J., Steculа, K. and Tutak M. (2016), Application of the TPM strategy to analyze the effectiveness of using a set of mining machines. 16th International Multidisciplinary Scientific GeoConference SGEM2016. SGEM2016 Conference Proceedings, Book 1, Vol. 2, 65–72.

Brodny, J., Tutak, M. and Michalak, M. (2017), A Data Warehouse as an Indispensable Tool to Determine the Effectiveness of the Use of the Longwall Shearer, Beyond Databases, Architectures and Structures. Towards Efficient Solutions for Data Analysis and Knowledge Representation, BDAS 2017, 453–465.

Brzóska, J., Knop, L. and Olko, S. (2016), Organizational forms of cooperation in clusters in the metal manufacturing sector, METAL 2016: 25th International Conference on Metallurgy and Materials, Conference Proceedings, Tanger, Ostrava 2016, 1701–1706.

Carrillo-Hermosilla, J., Del Río, P. and Könnölä, T. (2010), Diversity of eco-innovations: Reflections from selected case studies, *Journal of Cleaner Production*, 18, 1073–1083.

Chen, Y.-S., Chang, C.-H. and Wu, F.-S. (2012), Origins of green innovations: the differences between proactive and reactive green innovations, *Management Decision*, 50(3), 368–398.

Chen, Y-S. (2008), The driver of green innovation and green image—green core competence, *Journal of Business Ethics*, 81(3), 531–543.

De Marchi, V. (2012), Environmental innovation and R&D cooperation: empirical evidence from Spanish manufacturing firms, *Research Policy*, 41(3), 614–623.

Del Río, P. (2009), The Empirical analysis of the determinants for environmental technological change: a research agenda, *Ecological Economics*, 68(3), 861–878.

Del Río, P., Peñasco, C. and Romero-Jordán, R. (2016), What drives eco-innovators? A critical review of the empirical literature based on econometric methods, *Journal of Cleaner Production*, 112, 2158–2170

EIO (2012a), Methodological Report. Eco-Innovation Observatory, Funded by the European Commission, DG, Environment, Brussels, 8–9.

EIO (2012b), Closing the Eco-Innovation Gap: An economic opportunity for business, Eco-Innovation Observatory, Funded by the European Commission, DG Environment, Brussels, 49–54.

EIO (2015), Eco-innovation in Poland. EIO Country profile 2014-2015, Eco-Innovation Observatory, Brussels, 21–29.

EIO Database (2017), Available online: http://database.eco-innovation.eu (accessed on 24 September 2017).

European Commission (2011), Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Innovation for a sustainable Future – The Eco-innovation Action Plan (Eco-AP), COM(2011)899 final. Brussels, 2–3.

GUS (2010), Działalność innowacyjna przedsiębiorstw w latach 2006-2009, Informacje i Opracowania Statystyczne, Warszawa, 48–50.

GUS (2015), Działalność innowacyjna przedsiębiorstw w latach 2012-2014, Informacje i Opracowania Statystyczne, Warszawa, 123–127.

Hojnik, J. and Ruzzier, M. (2016), What drives eco-innovation? A review of an emerging literature, *Environmental Innovation and Societal Transitions*, 19, 31–41.

Horbach, J. (2008), Determinants of environmental innovation—new evidence from German panel data sources, *Research Policy*, 37(1), 163–173.

Horbach, J., Rammer, Ch. and Rennings, K. (2012), Determinants of eco-innovations by type of environmental impact—the role of regulatorypush/pull, technology push and market pull, *Ecological Economics*, 78, 112–122.

Janik, A. (2016), The Role of Environmental Life Cycle Costing in Sustainability Assessment of the Technologies, 16th International Multidisciplinary Scientific GeoConference SGEM2016. SGEM2016 Conference Proceedings, Book 5, Vol. 3, Albena, Bulgaria, 677–684.

Kemp, R. and Pearson, P. (2008). Final Report of the Project Measuring Eco-Innovation, Maastricht. http://www.oecd.org/env/consumption-innovation/43960830.pdf

Li, Y. (2014), Environmental innovation practices and performance: moderating effect of resource commitment, *Journal of Cleaner Production*, 66, 450–458.

Loska, A. and Paszkowski, W. (2018), SmartMaintenance – The Concept of Supporting the Exploitation Decision-Making Process in the Selected Technical Network System, Proceedings of the First International Conference on Intelligent Systems in Production Engineering and Maintenance ISPEM 2017, *Advances in Intelligent Systems and Computing*, 637, 64–73.

Matusek, M. (2015), Supplier selection process supporting sustainable development - using analytic hierarchy process to determine priority factors, CLC 2015: Carpathian Logistics Congress. Tanger, Ostrava, 2016, 404–411.

OECD (2005), The Measurement of Scientific and Technological Activities: Guidelines for collecting and interpreting innovation data, 3rd ed., Paris, 7–9.

OECD (2009), Sustainable Manufacturing and Eco-Innovation. Framework, Practices and Measurement. Synthesis Report, Paris, 28–32.

Oxborrow, L. and Brindley, C. (2013), Adoption of 'eco-advantage' by SMEs: emerging opportunities and constraints, *European Journal of Innovation Management*, 16(3), 355–375.

Rehfeld, K.M., Rennings, K. and Ziegler, A. (2007), Integrated product policy and environmental product innovations: An empirical analysis, *Ecological Economics*, 61, 91–100

Rennings, K. (2000), Redefining innovation—eco-innovation research and the contribution from ecological economics, *Ecological Economics*, 32(2), 319–332.

Szafraniec, M. (2015), Selected issues of supporting environmental decision-making processes in company, 15th International Multidisciplinary Scientific GeoConference SGEM2015, SGEM2015 Conference Proceedings, Vol. 3, Albena, Bulgaria 2015, 553–560.

Szmal, A. (2015), The role of innovative initiatives in innovative activities in the enterprise, 2nd International Multidisciplinary Scientific Conference on Social Sciences and Arts SGEM 2015, SGEM2015 Conference proceedings, Book 2, Vol. 3, Albena, Bulgaria, 915–922.

Triguero, A., Moreno-Mondéjar, L. and Davia, M.A. (2013), Drivers of different types of eco-innovation in European SMEs, *Ecological Economics*, 92, 25–33.

Weng, H.-H.R., Chen, J.-S. and Chen, P.-C. (2015), Effects of Green Innovation on Environmental and Corporate Performance: A Stakeholder Perspective, *Sustainability*, *7*, 4997–5026.

Yarahmadi, M. and Higgins, P.G. (2012), Motivations towards environmental innovation: A conceptual framework for multiparty cooperation, *European Journal of Innovation Management*, 15, 400–420.

Ziegler, A. and Nogareda, J.S. (2009), Environmental management systems and technological environmental innovations: Exploring the causal relationship, *Research Policy*, 38, 885–893.

Measuring International Students' Satisfaction in Malaysian Private Universities

Dr Abdullah Sarwar, Faculty of Management, Multimedia University, Cyberjaya, Malaysia. Email: sunabdullah@gmail.com

Dr S. M. Ferdous Azam, Graduate School of Management (GSM), Management & Science University, Kuala Lumpur, Malaysia. Email: drferdous@msu.edu.my

Dr Melissa Wendy Migin, Faculty of Management, Multimedia University, Cyberjaya, Malaysia, Email: melissa.migin@mmu.edu.my

Prof. Dr Murali Raman, Faculty of Management, Multimedia University, Cyberjaya, Malaysia, Email: murali.raman@mmu.edu.my

Vincent Oh Kim Seng, Faculty of Management, Multimedia University, Cyberjaya, Malaysia, Email: ksoh@mmu.edu.my

Abstract

The aim of this study is to investigate the international students' satisfaction in different universities in Malaysia. A total of 3 different private universities were selected for data collection. All the universities were located within the Cyberjaya area. Total 400 questionnaires were distributed and 327 were returned. Later, total 318 were found valid for further analysis. For data analysis, this study has used multiple regression. The result shows that most of the foreign students think that the teaching method used by the universities is appropriate. Besides, most of them are highly satisfied with their education and think that the learning method is appropriate. In addition, the respondents are agreed that the online resources are available while most of them think that the web-based communication as a popular way of communication adopted by the university. It contributes to current theories on how consumers resolve sequentially inconsistent information about a university's service quality. The study of behavioral aspects of students is of great importance for university policy makers and this knowledge can be applied to find out the students' needs and wants.

Keywords: Satisfaction, teaching method, tuition fees, web-based communication, Malaysia.

Introduction

Customer satisfaction is a key determinant and a variable in the attitudinal concept of consumer behaviour as it is purely experiential (Kuo et al., 2009; Aurier & N'Goala, 2010). Jones and Sasser (1995) viewed satisfaction as purely cognitive whereas Kim and Ok (2010) links to their expectancy disconfirmation model and categorizes it as emotional. Satisfaction needs to be categorized as an attitude and not as a behavior as per se as it gains traction in an experiential state rather than at a static manner (Mizik & Jacobson, 2007). Satisfaction cannot be seen as cognitive aspect as it is the outcome of most relationships and therefore it leads to future repurchase intentions which is deemed to be conative and not cognitive unless the role of satisfaction is changes not as an outcome but as a perception ((Cronin and Taylor, 1992; Parasuraman et al., 1985). A more acceptable view would be that of Heskett et al. (1997) who sees it a post purchase behaviour leading to judgment towards future purchase decision making. Therefore we can ascertain that satisfaction is a key outcome which must be achieved by uiversities in order to encourage future student enrollment. Huang (2009) also found the service quality like academic aspects and non-academic aspects determine the student satisfaction. Hence, service quality and

satisfaction is observed positively in their relationships (Kuo et al., 2009; Aurier and N'Goala, 2010; Kim and Ok, 2010).

As universities are also a part of the overall service industry, therefore, determining the factors that leads to customer satisfaction (international students) needs to be identified. In this case, it should specifically identify the factors towards international students' satisfaction on Malaysian private universities. Moreover, precedent literatures show that the limited empirical evidence appears to exist concerning the student satisfaction especially in Malaysia. So, there is a lack of research in this area whereby this is very important to measure what factors influence international students' satisfaction in any international university in Malaysia. The findings will help policy makers and top management in terms of better policy making.

Literature Review

Teaching Quality

There are ample arguments within the higher education communities on schooling methods or effectiveness of teaching (Braskamp & Ory; 1994; Theall & Franklin, 2016). Hoyt and Pallett (2015) defined operative teaching as "that which produces beneficial and purposeful student learning through the use of appropriate procedures" (p. 42). Most universities in the world accept a procedure by which apprentices deliver unidentified response at the end of each subject they finish. These evaluations of teacher efficiency have been a burning issue since they were first working in mid of 1920's (Chang, 2016) and they generate a vast challenge for almost every institution that uses them (Hoyt and Pallett, 2015). Throughout the study period learner valuation of trainers has changed considerably particularly in purpose and methodology areas. They have altered from being predominantly used to support students in the course choice, serving academic stuffs for increasing their teaching abilities and additional development, help officers with respect to personnel judgments (Ory, 2000).

Learning Method

Nowadays, student ratings of lecturer are vastly applied for the purpose of creating personnel verdicts and faculty improvement references (Scriven, 1995; Ory, 2016). For managers, the evidence provided from ratings aids them in reaching both cumulative and influential decisions dealing with possession of academic stuffs, appointment, contract and their promotion, picking faculty for excellent rewards and honors, and handover courses to the lecturers (Franklin, 2016; Kulik, 2016). Braskamp (2000) advised teachers to use the information constructively to develop and increase their instruction efficiency. Many investigators have concentrated on whether or not learners are appropriate judges of teaching usefulness. However, considering the thrive of qualifications and overall senses the students are both coherent and consistent sources of confirmation (Braskamp and Ory, 1994; Arreola, 1995; Pratt, 1997; Franklin, 2016; Kulik, 2016; Kim and Ok, 2010), Whereas inside the classroom, students are showing all kinds of educational proficiencies (such as, lectures, instructional materials and aids, readings, exams). They are significant effect in investigational users capable to determine the excellence, consequence, effectiveness, and lecturer collaboration with learners However, Ory (2016, p. 12) summed it up best stating: "unless they have not been to class, as consumers they have a legitimate voice.

Infrastructure

To help the student's progress so many types of internet articles are used. Various types of e- learning adopt combinations of different as online blogs, social media software and virtual classes. Computers and tablet devices concede both learners and instructors to use the web portals and other online applications, such as MS Word, XL, portable document files and photography files. Also mobile application devices use m-learning. Students and teachers can share their ideas and thinking by web portals (Chang, 2016).

Blog writing concedes learners and teachers sharing their thinking as well as commenting on each other's thinking. That makes bilateral studding environment. Using the term learn, instruction and education with technology means the using of technology in wide speeded area than the computer based or computer aided teaching of two decades before the 2000. Learning technology is also different than some purely web-based learning as online learning or teaching. E-learning is now very popular in the sense of mobile applications (Chang, 2016). E-learning also has various types of applications. It conceives a Virtual Learning Environment (VLE) in the higher educational fields. There all types of study outlines are managed by an invariable user interface (UI) in all over the institution. In general, virtual academic course means one kind of course where either complete or partial part is delivered through the internet (Kulik, 2016; Kim and Ok, 2010). Actually, virtual course is a course by that students no need to go to school for learning. It is not the way of direct teaching but in concept it is as the teaching in the class. Virtual schooling means the extent learning. By this way, study tutorials are exchanged by different ways such as data files, audio and video clips. Now-a-days, the rapid use of YouTube video tutorials has made the distance learning easier. By these technologies teachers and learners exchange their opinion each other.

Resource Availability

As the wealth of any university, the necessity of library is initially mentioned. Library is the main part of an institution and fundamental goal of the library is to add materials aids with lecturers, learners and researchers. It also creates proper knowledge sharing as training and practicing environment. This is very necessary in library maintaining that to spotlight on handling the well-wishers wealth. Perfection and quality of any academy can be measured by the library contents, Agaba (2005). According to Popoola (2008) the data contents and facilities in academic data systems is necessary for providing research fields among the research students and teachers. Iyoro (2004) affirms the information usability is one of the primary concerns of the data using. According to Halsey (2005) the users will be more attracted to use the library resources if they can get their necessary contents will less number of attempts. A lot of universities and online colleges already have opened online admission opportunity and online study for various fields of studies. They also provide certificate after completion of the study. For some of the courses students participate in physical classes in classroom but most of the classes are being provided by online. Also some programs are totally internet based. Several universities provide online student portals. There all sort of students' information uploaded on regularly basis. Likely, online registration, book borrows or purchase, students leadership activities and student counseling etc. These online contents also take sometimes students reports regarding accessibility to attract user interest.

Methodology

The target population of this study was the international students studying in various private universities in Malaysia. The measurement tool was adapted from Firdaus (2005)'s HEdPREF model. For data collection, a total of 7 different private universities were selected randomly. All the universities were located within the Klang Valley area. Total 400 questionnaires were randomly distributed among the foreign students. Total 327 questionnaires were returned out of which total 318 were found valid for further analysis. For data analysis, this study has used multiple regression.

Results and Discussion

Prior to multiple regression analysis, reliability test is conducted. According to Pallant (2005), the Cronbach's alpha value should be more than 0.60 to be considered as reliable. The result indicates that the measurement tool used in this study is highly reliable as the alpha value is 0.891. The Bartlett test helps to measure correlation among the variables. In order to be significant, the value should be less than .05 (Hair et al., 2010). The study shows that the value falls within the required threshold that is .000. The range of MSA index is from 0 to 1. However, the minimum acceptable range is above 0.50 (Zikmund,

2003). Table 1 below shows the KMO (MSA) is .682 which is more than .50 and therefore it is satisfactory; in fact, it is very good.

Table 1: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy (MSA)		.682
Bartlett's Test of Sphericity	Approx. Chi-Square	1283.891
	df	45
	Sig.	.000

Finally, this study performed the factor analysis to identify the measuring dimensions of the different factors used in this study. Total five factors were extracted based on the varimax rotation with eigenvalues greater than 1. It indicates that total 71.846% of the variance was explained by these extracted factors. As a result, it assumes that the information explained by these factors is independent to each other.

Multiple Regression Analysis

From Model Summary table (Table 2), we find R Square is 0.772, which indicates that 77.2% of the variance can be predicted from the independent variables. In addition, here the multiple correlation coefficient is 68 percent.

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Constant	.777[a]	.772	.768	.681

From Table 3, we only have to refer the significance value which indicates that the combination of these variables does not significantly ($p < .005$) predicts the dependent variable in this particular situation.

Table 3: Analysis of Variance (ANOVA)

Model	Unstandardized Coefficients	Standardized Coefficients		T	Sig.		Colinearity Statistics
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)[a]	1.151	.500		2.30	.23		
Teaching Quality	.419	.061	.419	5.256	.000	.588	1.701
Learning Method	.349	.047	.349	7.820	.000	.728	1.373
Infrastructure	.375	.089	.375	8.711	.001	.347	2.880
Resource Availability	.212	.077	.212	8.682	.001	.273	1.782

[a] Dependent variable: Student's Satisfaction

The result shows that teaching quality is the most important factor that influences the international student's satisfaction in Malaysian private universities with beta value of 0.419 that is also significant at 0.05 level. Besides, infrastructure was ranked as second most important factors with beta value of 0.375 that is also significant at 0.05 level. Moreover, learning method has a beta value of 0.349 where as resource availability has a beta value of 0.212. All the hypotheses are statically supported in this study.

Conclusion

In this world of globalize economy, all of the business institutions are in a competition with a good number of other business institutions all over the world, in their corresponding sectors. It is similar for those universities which are facing the competition not only with the local universities but also with the foreign universities. They are encouraging both the local and international students. That is how good service and satisfaction of the students does a vital job for the universities to stay in the front line of the race. From this specific kind of research it can be deduced that higher the service quality can provide higher student satisfaction.

It contributes to current theories on how consumers resolve sequentially inconsistent information about a university's service quality. Moreover, the idea of student satisfaction and such marketing was not really a separate management function but rather the whole matter as seen from the student's point of view. In other words, the marketing concept employed in this study defines a distinct university culture, a fundamental shared set of beliefs and values that put the students in the centre of the university's thinking about strategy and operations. Finally, this study is important because the study of behavioral aspects of students is of great importance for university policy makers and this knowledge is applied to find out the students' wants and needs.

References

Arreola, R. A. (1995). Developing a comprehensive faculty evaluation system. Bolton, MA: Anker Publishing.

Aurier, P. and N'Goala, G. (2010), "The differing and mediating roles of trust and relationship commitment in service relationship maintenance and development", Journal of the Academy of Marketing Science, Vol. 38 No. 3, pp. 303-325.

Braskamp, L. A. (2000). Toward a more holistic approach to assessing faculty as teachers. In K. E. Ryan (Ed.), *Evaluating teaching in higher education: A vision for the future. New directions for teaching and learning,* 83*,* 109-123. San Francisco, Ca: Jossey-Bass.

Braskamp, L. A., & Ory, J. C. (1994). *Assessing faculty work: Enhancing individual and instructional performance.* San Francisco, CA: Jossey-

Chang, T.S. (2016). *The effect of system administration on faculty attitudes toward student ratings.* Hualien, Taiwan: National Hualien Teachers College.

Cronin, J.J. and Taylor, S.A. (1992), "Measuring service quality: a re-examination and extension", Journal of Marketing, Vol. 56, July, pp. 55-68.
Firdaus, A. (2005). The development of HEdPERF: a new measuring instrument of service quality of higher education sector. Paper presented at the Third Annual Discourse Power Resistance Conference: *Global Issues Local Solutions*, 5-7.

Franklin, J. (2016). Interpreting the numbers: Using a narrative to help others read student evaluations of your teaching accurately. In K. G. Lewis (Ed.), Techniques and strategies for interpreting student evaluations. *New Directions for Teaching and Learning,* 87, 85-99. San Francisco, Ca: Jossey-Bass.

Hair, J.F. Black, W.C. B.J. Babin, Anderson, R.E. (2010), Multivariate Data Analysis; A Global Perspective, Pearson Education, Inc., Upper Saddle River, New Jersey.

Heskett, J.L., Sasser, W.E. Jr and Schlesinger, L.A. (1997), The Service-Profit Chain, Free Press, New York, NY.

Hoyt, M. P., & Pallett, W. H. (2015).). *Appraising teaching effectiveness: Beyond student ratings.* IDEA. Paper No. 36. Kansas State University, Center for Faculty Evaluation and Development. Retrieved June 1, 2002, from http://www.idea.ksu.edu/products/Papers.html

Huang, Q. (2009). The relationship between service quality and student satisfaction in higher education sector: A case study on the undergraduate sector of Xiamen University of China. *Thesis report submitted in partial fulfillment of the requirement for the degree of: Masters of Business Administration, Assumption University, Thailand*, 16-21, 30, 38-60.

Iyoro A. O. (2004). Serials availability, accessibility for use: perception of in training information professionals in a Nigerian University. *The Nigerian Library Link 11* (2): 66-72.

Jones, T.O. and Sasser, W.E. Jr (1995), "Why satisfied customers defect", Harvard Business Review, Vol. 73, November-December, pp. 88-99.

Kim, W. and Ok, C. (2010), "Customer orientation of service employees and rapport: influences on service-outcome variables in full-service restaurants", Journal of Hospitality & Tourism Research, Vol. 34 No. 1, pp. 34-55.

Kulik, J., A. (2016). Student ratings: Validity, Utility, and controversy. In M. Theall, P. C. Abrami, & L.A. Mets (Eds.), *The student ratings debate: Are they valid? how can we best use them? New directions for Institutional Research,* 109, 9-25. San Francisco, Ca: Jossey-Bass.

Kuo, Y.F, Wu, C.M. & Deng, W.J. (2009). The relationship among service quality, perceived value, cutomer satisfaction, and post-purchase intention in mobile value-added services. Department of Information Management. Institute of Economics and Management. National university of Laohsiung. Graduate School of Business Administration. Chung Hua University.

Mizik, N. and Jacobson, R. (2007), "Myopic marketing management: evidence of the phenomenon and its long-term performance consequences in the SEO context", Marketing Science, Vol. 26 No. 3, pp. 361-79.

Ory, J. C. (2016). Faculty thoughts and concerns about student ratings. In K. G. Lewis (Ed.), Techniques and strategies for interpreting student evaluations. *New Directions for Teaching and Learning,* no. 87. (pp.3-15). San Francisco, Ca: Jossey-Bass.

Pallant, J. (2007). *SPSS Survival Manual: A Step by Step Guide to Data Analysis using SPSS for Windows* (3rd ed.). Berkshire: Open University Press, McGraw-Hill.
Parasuraman, A., Zeithaml, V.A. and Berry, L.L. (1985), "A conceptual model of service quality and its implications for future research", Journal of Marketing, Vol. 49, Fall, pp. 41-50.

Popoola, S. O. (2008). The use of information sources and services and its effect on the research output of social scientists in Nigerian universities. *Library Philosophy and Practice.*

Pratt, D. (1997). Reconceptualizing the evaluation of teaching in higher education. *Higher Education,* 34, 23-44.

Scriven, M. (1995). Student ratings offer useful input to teacher evaluations. *Practical Assessment, Research and Evaluation,* 4(7), 1-5. Retrieved May 27, 2002 from http://ericae.net/pare/getvn.asp?v=4&n=7

Theall, M. and Franklin, J. (2016). *Looking for Bias in all the Wrong Places – A Search for Truth or a Witch Hunt in Student Ratings of Instruction?* In The Student Ratings Debate: Are they Valid? How Can We Best Use Them? Theall, P., Abrami, L. and Lisa Mets (Eds.) New Directions in Educational Research, no. 109. San Francisco: Jossey-Bass.

Zikmund, W.G. (2003). *Business Research Methods*, 5th ed. Mason OH: The Dryden Press.

Possibilities of Stakeholders in a Harmony Game to Increase Ethical Behavior shown on basis of Expanded Game Theory

Thomas Kronberger, Faculty of Management, Comenius University, Odbojárov 10, 820 05 Bratislava, Slovakia, e-mail: thomas@kronberger.info

Abstract

First, short insights into the non-computable stakeholder theory and the game theory for the harmony game have been provided. The game theory is computable but does not explicitly consider ethical aspects of decisions. The expanded game theory presented here for the harmony game derives benefits from both theories: it is computable and takes ethical aspects into consideration. At a glance, all consequences for active decision makers and passive stakeholders are evident. The expanded game theory has been applied to the two examples of "objective agreement" and "tax evasion". In both examples, three ways in which stakeholders can motivate the decision makers to behave more ethically have been demonstrated: The stakeholders can educate the decision makers, for they understand the possible consequences of unethical cooperation. The stakeholders can use their power to directly control the decision makers. The third way for the stakeholder is to vary the payoff for the decision makers. By adopting this framework in the decision-making process the stakeholders can foster ethical behaviour in the decision makers.

These methods show how to influence the decision makers, and can help the management to set up a structure in which the decision makers behave ethically and a certain profit is ensured for all parties.Some ideas for further research have also been mentioned.

The expanded game theory for the harmony game is a new framework that serves as a basis for holistic tools, fosters ethical leadership and altruism, and inhibits short-term economic rationality in the decision makers.

Keywords: game theory, harmony game, ethical decision-making (EDM), stakeholder theory

Introduction

There is a vast amount of existing literature pertaining to the stakeholder theory. In general, the stakeholders are first identified and then classified according to several parameters such as "power" and "risk" (Hügens, 2004) or "power", "legitimacy", and "urgency (Mitchell et al., 1997). Many academic papers have been written on the ways in which the stakeholders can be influenced (Mayers, 2005). However, Mayers, in his paper, does not regard the influence of the stakeholders. Also, Freeman et al write that the "stakeholder contributes to the value that is created for the others." (Freeman et al., 2016), but they don't mention how. These are only a few examples from the broad literature that exists on the stakeholder theory.

However, none of the available literature explains how stakeholders can use their power. Therefore, the present paper aims to close this gap in literature. The following three different ways in which the stakeholders can influence decision makers will be examined on a theoretical basis:

1. Educating the decision makers
2. Controlling the decision makers
3. Adapting the framework, so that the payoff for the involved parties changes.

These ways are explained further with the help of the harmony game, which is a special case of the game theory, since it is an apt example for highlighting the conflict between the decision makers on one side and the stakeholders on the other.

The ways to influence decision makers will be regarded with the help of two examples where unethical cooperation can occur easily. In both cases, the decision makers have a strong motivation to cooperate which each other at the expense of the stakeholder. Each way demonstrates one exemplary method by which the stakeholder can foster ethical behaviour.

Some of the positive effects of the decision makers' ethical behaviour in the example of "objective agreement" include survival of the company, motivation of the employees, and perhaps, even higher satisfaction of the suppliers and/or customers, if the objective agreements are designed according to the interests of the stakeholders.

The benefits of the stakeholder's influence on the decision-making process in the example of "tax evasion" will include: satisfaction of the population, more money for the tax authorities, which can be spent on investments, or a possible reduction in the tax rates.

Of course, for each way there exists other methods to navigate the decision makers towards an ethically-correct direction. The choice of method and its application depends on the concrete situation. The intention is to demonstrate to the stakeholders that they have several paths to choose from, if they wish to have an influence on the decision makers.

Stakeholder Theory

Stakeholders are "any group or individual who can affect or are affected by the achievement of the firm's objectives" (Freeman, 1984, p. 25). The ethical basis of the stakeholder theory is that the decision makers will consider all stakeholders in their decision making. This is vastly different from the traditional shareholder view, which considers only the owners' opinions as important.

The stakeholder concept was first applied in 1963 at an internal memorandum of the Stanford Research Institute (Freeman, 1984, p. 31). The stakeholder theory itself is much recent and was explained in 1994 by R. Edward Freeman, who is called "the father of the Stakeholder Theory" (Laplume et al., 2008). Ethical strategists such as Noland and Phillips claim that the "stakeholders must be integral to a firm's strategy, if it is to achieve real success" (Noland & Phillips, 2010); but I was unable to find a model that highlights the consequences of the firm's decisions on the stakeholders.

The stakeholder theory comprises of the following three aspects:

1. Descriptive/empirical aspect: It "is used to describe and […] explain specific corporate characteristics and behaviours" (Donaldson & Preston, 1995, p. 70).
2. Instrumental aspect: It is used to identify the (lack of) connections between stakeholder management and traditional management (Donaldson & Preston, 1995, p. 71).
3. Normative aspect: It is used for providing "moral or philosophical guidelines for the operation and management of corporations" (Donaldson & Preston, 1995, p. 71).

As we can see, the stakeholder theory explains whom to consider and why, but none of the aspects throws light on the manner in which this should be done and the concrete ways in which stakeholders can influence decision makers. In addition, there is another limitation in the stakeholder theory: it is not a model for forecasting of decisions.

Classical Game Theory

The game theory, designed by von Neumann and Morgenstern, is computable. In the game theory, success does not depend only on one's individual decisions but also on the actions of others. John von Neumann first mentioned the game theory in 1928 (von Neumann, 1928) and later worked it out with

Oskar Morgenstern in 1944. They assume that, "the consumer desires to obtain a maximum of utility or satisfaction and the entrepreneur, a maximum of profits" (von Neumann & Morgenstern, 1944, p. 8). From this starting point, von Neumann and Morgenstern created a model that enables the forecasting of the decision makers' behaviour.

There are many examples to explain the game theory. For the purpose of this paper, only a special kind of game has been considered: the "harmony game" (Licht, 1999). The harmony game is a simple game with only one equilibrium. Therefore, the analysis (for the stakeholders) is easier than in most other games. This is the reason why examples based on the harmony game have been chosen. Considerations with many case distinctions would go beyond the scope of this paper.

Both decision makers (A and B) have the two options, to cooperate (C) or to defect (D):

A	C	8 8	3 2
	D	2 3	1 1
		C	D
		B	

Fig. 1: Harmony Game

This can be simplified to the following schema (that I did not find in any literature on game theory): If both cooperate, they receive a high payoff, otherwise they receive only a little payoff.

Payoff for A and B:	High	Low
Decision	both C	Else

Fig. 2: Simplified Harmony Game

As we can see from this little example, the prediction pertaining to the two decision makers is easy. They will probably cooperate. If this cooperation is at the expense of the stakeholders, there is an existent "unethical cooperation".

The possibility of prediction is a big advantage for scientific and practical utility, but it goes hand-in-hand with the loss of ethical contemplation. In their book, von Neumann and Morgenstern (1944) avoid words like "ethic" and "responsibility". The effects of the decisions on the stakeholders are not revealed.

As explained above, the stakeholder theory and the classical game theory have some structural weaknesses. A fusion of both theories may help reduce these weaknesses.

Reasons for Expanding the Game Theory

Simply placing ethical parameters in the flat game theory is not the desired fusion, because there are too many aspects that must be regarded. All decision makers have individual ethical settings, different knowledges, and different methods of handling this information:

For considering the ethical settings, Forsyth developed the Ethics Position Questionnaire (EPQ) to measure individual differences in moral thinking (Forsyth, 1980). By utilising his questionnaire, it is possible to classify people based on two scales – how idealist and how relativist people are. He highlights that there are no pure phenotypes but gradually draws differences between the decision makers' ethical settings. The conclusion is that it is best not to mix up the personal payoff of a decision maker and the ethical benefits of an action in one domain of the classical game theory diagram. As every decision maker has different ethical settings, every game theory diagram would have to be elucidated in a different manner. It is easier to look at only the personal profit of a decision maker in the game theory and present the ethical aspects in a different manner.

The individual ethical setting is only one reason for formulating a new game theory. The other reason is that taking unethical decisions can be driven by many reasons that may be personal or external for the decision maker. People ignore the real scope of problems either intentionally, negligently, or unknowingly.

Intent: Aristotle wrote in his "Nicomachean Ethics" that our ethics depend on whether we take the good or the bad as an intent (Aristoteles, 1911). Some people have bad intentions and force a low payoff for themselves as long as they can reduce the payoff for others too. In a lab-in-the-field experiment, Poncela-Casanovas et al. (2015) labelled such decision makers as "envious" and identified about 30% of the decision makers in this group.

Negligence: The decision maker has enough information but does not assess them in the correct way. The examples of cognitive bias are as follows:

- "Warm-glow-giving" is an effect that is frequently employed in cause-related marketing by companies to benefit their own businesses and the interests of a non-profit organisation. Mimouni Chaabane and Parguel (2016) demonstrated that with high payoffs for the non-profit organisation, the warm glow becomes smaller and the scepticism increases.
- "Scope insensitivity" makes people ignore the actual extent of a problem. To illustrate, in a study (Hanemann, 1994), people were willing to pay an average of US$78 in order to save 20,000 birds. Moreover, to save 2,000 birds (stakeholders), the amount they were willing to pay was almost the same.
- The "overconfidence effect" can lead to high costs (for the stakeholders). Friedman and Friedman (2010) cite two examples – the oil spill of Deepwater Horizon and the financial meltdown of 2008 that started with the collapse of Lehman Brothers. In both cases, too many risks were taken and there were conflicts of interest.
- The contrast effect intensifies the perception of information that contrasts with other present information. For example, referees who must evaluate two gymnasts will judge the second according to the first one. The judgement varies if the referee perceives the gymnasts to be from the same team or from different countries (Damisch et al., 2006).

These effects show that decision makers do not consider all stakeholders and their payoffs at the right magnitude while deciding upon the course action. Certain effects change the perception, how the decision makers consider the stakeholders (mostly reduces it) and some even make the stakeholder even invisible.

Lack of information is another reason for ignoring the real scope. The question lies in whether the decision maker does not want to have a holistic point of view or whether he does not have access to the required information. The decision maker behaves unethically, intentionally or negligently, if he does not realise the consequences of his actions. If he does not have access to the necessary information for deciding, the game theory cannot be applied and it turns into a lottery game.

Expanded Game Theory for Harmony Game

As discussed, there are various theories explaining the link between ethical adjustment of decision makers and their concrete actions. All these gradual and different phenotypes have their own reality and their individual versions of ethical behaviour. The idea is to present the individual benefit and the benefit of the stakeholders on different levels. A generalised schema of the harmony game from Fig. 2 for the decision makers appears in this manner:

Payoff for decision makers:	$P(A)_{\text{all C}}$	$P(A)_{\text{not all C}}$
Decision	all C	else

Fig. 3: Generalised Harmony Game

As observed before, the stakeholders cannot be included in this board, as some decision makers refuse [e.g. envious decision makers (Poncela-Casasnovas et al., 2015)] the stakeholders' interest, and some consider the stakeholders to be lesser in stature than they are [e.g. partly idealist decision makers (Forsyth, 1980)]. This necessitates putting one or more levels with the stakeholders' payoff on top of the game theory:

Payoff for stakeholder n:	$P(S_n)_{\text{all C}}$	$P(S_n)_{\text{not all C}}$
	…	…
Payoff for stakeholder 1:	$P(S_1)_{\text{all C}}$	$P(S_1)_{\text{not all C}}$
Payoff for decision makers:	$P(A)_{\text{all C}}$	$P(A)_{\text{not all C}}$
Decision	all C	else

Fig. 4: Expanded Game theory for harmony game with n Stakeholders.

The stakeholders' payoff depends only on the behaviour of the decision makers. The stakeholders do not have any direct influence on their own payoffs.

In many cases (however, not always), the payoff of the stakeholders S_1 … S_n can be subsumed to one level:

$P(S_n)_{all\ C}$	$P(S_n)_{not\ all\ C}$
…	…
$P(S_1)_{all\ C}$	$P(S_1)_{not\ all\ C}$
$P(A)_{all\ C}$	$P(A)_{not\ all\ C}$
all C	Else

Fig. 5(a): Harmony Game with payoff of several stakeholders.

$P(S)_{all\ C}$	$P(S)_{not\ all\ C}$
$P(A)_{all\ C}$	$P(A)_{not\ all\ C}$
all C	else

Fig. 5(b): Subsuming the stakeholders To one level.

If there is only one (relevant) stakeholder S, or if the stakeholders can be subsumed to one level, it is possible to present the global payoff $P(\sum)$ on the top as follows:

$P(S)_{all\ C}$	$P(S)_{not\ all\ C}$
$P(A)_{all\ C}$	$P(A)_{not\ all\ C}$
all C	else

Fig. 6(a): Game theory with subsumation of the stakeholders' payoff.

$P(\sum)_{all\ C}$	$P(\sum)_{not\ all\ C}$
$P(S)_{all\ C}$	$P(S)_{not\ all\ C}$
$P(A)_{all\ C}$	$P(A)_{not\ all\ C}$
all C	else

Fig. 6(b): Adding a top level for showing global payoff.

Normally, the summation at the top ($P(\sum)_{all\ C}$ and $P(\sum)_{not\ all\ C}$) cannot be viewed as a game theory model of the harmony game, because the decision maker tends to consider only their individual payoffs ($P(A)_{all\ C}$ and $P(A)_{not\ all\ C}$).

Relevance of the Expanded Game Theory for Harmony Game

The harmony game is an interesting example to highlight how expanding the game theory helps in getting a holistic view and considering the stakeholders.

As the harmony game itself appears very simple, it is very easy for the decision makers to ignore the stakeholders. If you have to decide whether both you and your partner will get a small or big payoff, you will probably opt for the big payoff. This cooperation is easy but it is unethical, when it is at expense of the stakeholder(s).

The stakeholders are not active decision makers, but they can influence the decision makers to behave ethically. In general, to achieve this they can do the following:

1. Educating the decision makers
2. Controlling the decision makers
3. Adapting the framework, so that the payoff for the involved parties change

In the following sections of this paper, two examples of unethical behaviour will be provided and the aforementioned methods will be applied. The first example is about a company as the stakeholder and an employee and his head of department as decision makers. The second example regards the society as stakeholder and two businessmen as decision makers.

Objective Agreement

Even if an objective agreement is not completely fulfilled, both the head of the department in a company and his employee have strong interest in declaring the agreement as fulfilled. Through doing this, the employee will get his bonus. Subsequently, the head of department has a proof to submit to his boss that his team member was successful, and he will utilise this as argument for getting his bonus too. By such unethical cooperation of the head of department and the employee, the company (=stakeholder) will pay for work that has not been carried out. In order to prevent this, the company can employ the three mentioned ways:

1. Educating the decision makers: Unfortunately, we do not live in an ideal world where all employees and all team leaders have received an ethics education at home and in school such that they behave ethically and refrain from taking advantage of the company they work for. Therefore, the company can educate the members of the management and perhaps also the employees how to act and decide in an ethical manner. For this, the provided model can be applied.

   Supposing that the company has a total excess (before bonus) of 4. If it has to pay a bonus of 6, it will have a negative profit of –2. The expanded game theory appears in this form:

Excess	4	4
Profit for company	–2	4
Bonus for employee	6	0
Decision	Give bonus	Don't give Bonus

Fig. 7: Expanded game theory for decision makers and company as stakeholder

   A company that produces enough loss will fail. If the company can make at least the head of department or the employee understand this, and if one of them refuses the bonus to be received, the company will have a positive profit and can survive. As a result, the head of department and the employee can retain their jobs.

2. Controlling the decision makers: If the company controls the set-up and the fulfilment of the agreements, the decision makers cannot declare unfulfilled agreements as fulfilled. One possible method for controlling this process is applying the S.M.A.R.T.E.R. criteria (Piskurich, 2006) instead of the often used S.M.A.R.T. criteria (Doran, 1981). This means designing the objective agreements that they are not only **S**pecific, **M**easurable, **A**ssignable, **R**ealistic, **T**ime-related but **E**valuated consistently and **R**ecognized mastery, too.

   Consistent evaluation implies high expenses in terms of time for the head of department, because he has to regularly assess the employees' work based on his goals and check that he does not neglect his normal work. A masterful reorganisation of the goals and their achievement by higher management or a special supervisor is also expensive, because it is not enough in order to verify whether the agreements are corrupting or misleading. There must also be a step that controls whether the head of department and the employee interpret the agreements too soft or malleable.

   By these two extra steps, the influence of the stakeholder on the decision makers is ensured. They are strong but expensive aids to avoid issues like the company being cheated.

3. Adapting the framework: If the company fixes a limit for the bonus depending on the own excess, the company can guarantee a minimum of profit for itself. Supposing that at maximum, 50% of the excess will be utilised for bonus payments, the bonus for the employee will be the minimum of 6 and 2 (=50% of the excess).

Excess	4	4
Profit for company	2	4
Bonus for employee	Min (6, ½ of excess)	0
Decision	Give bonus	Don't give Bonus

Fig. 8: Expanded game theory with limited payoff for decision makers and guaranteed profit for company

The bonus for the employee is reduced. This generates the effect that he will be motivated to work on increasing the companies excess in the following year in order to increase his own profit.

Even when this simplification ignores taxes, social security contributions, and other effects with leverage, it highlights how these ways can guarantee a profit for the company, leading to its survival.

The company as a stakeholder can work on all three ways independently and by this, it has strong means for forcing the decision makers to behave ethically. In the following example, the stakeholder is an external party to the company, but the methods are the same.

Tax evasion

Tax evasion is a typical harmony game. In general, both decision makers can make a profit if they cooperate, but in this case, none have any disadvantages. If only one defects, the taxes need to be paid. The society is the stakeholder. Unpaid taxes create problems for necessary expenditures of the government (social aid, pensions, road maintenance, safety, and so on).

The society has the three mentioned ways to influence the decision makers:

1. Educating the decision makers: This training can be provided at business schools for example (Remisova et al., 2014). The expanded game theory can be utilised for the training process. It can be taught that a small profit for the decision makers can have expensive side effects for the stakeholders through examples. It is interesting to observe that the lowest corruption perception indices are present in the countries with the highest education (Dose, 2017) and that the high education correlates with a high happiness index of the population (AFP, 2017).

2. Controlling the decision makers: One of the many tools for controlling are forgery-safe cash registers ("sales recording modules") for example in restaurants and companies that deal with over the counter sales. If they are installed, they impede such unethical comportments (Ainsworth & Hengartner, 2009).

3. Adapting the Framework: As we have observed before, in the harmony game, both parties tend to cooperate. (Fig. 2). In the first example, the payoff for one decision maker was reduced if the

decision makers cooperate. In this example, the payoff for one decision maker is increased if one defects. As a result, the game does not remain a harmony game anymore.

The decision maker who receives an increased payoff in the form of a tax refund obtains the benefit if he defects. Such games do not remain classical harmony games. However, certain special cases can be presented in the game theory for harmony games.
The "fiscal note Sao Paulo" ("nota fiscal paulista") is such an example in Brazil (UOL, 2011). If a consumer asks a retailer to register his tax identification number on the bill, the retailer cannot further evade taxes. As retailers don't usually let their consumers participate in evading taxes, the consumer has the following options to choose from:

Excess for stakeholder	70% – lottery	0
Tax refund for consumer	30% + lottery	0
Decision	Pay tax	Evade tax

Fig. 9: Tax identification number on bill

The idea of a lottery is discussed even in the EU (Höhler, 2017).

If the retailer lets the consumer participate in evading taxes, the model of the expanded game theory for harmony games cannot represent the situation adequately.

Discussion

As we can observe in the two provided examples, the expanded game theory for harmony games can be applied for the purpose of representing the benefits of the decision makers and the stakeholders. It can indicate three ways to influence the decision makers.

Table 1: Tools and Applications

Tools	**Methods in example "Objective agreement"**	**Methods in example "Tax evasion"**	**Approach**
Education	Training in company	School, Business School education	Consider the stakeholder
Adapting Framework	Limit the Payoff	Lottery as a Bonus	Modify payoff of the decision maker
Control	Control the work and results	Control using technical resources	Direct influence on decision maker(s)

The link between the **tools** and **approaches** can serve a good starting point for further research. The possible questions pertaining to this are as follows:

- Are the indicated connections between the tool and approach always the same or are they tied to the specifics of individual cases?
- Does ethical education lead to altruistic comportment?
- Are there more ways of influencing the decision makers?
- How to regard/include CSR activities?
- What if two stakeholders have contrary interests?

Conclusion

The expanded game theory for harmony games is useful for presenting the ways stakeholders can influence the decision makers. Depending on the way and the situation, individual methods for achieving the desired ethical behaviour are required to be found.

In the second example, the situation where one businessman offers another the chance to engage in the making profit through tax evasion was presented. In this context, the expanded game theory for harmony games is too simple. A more complex model of the expanded game theory must be applied (Kronberger, 2017).

The expanded game theory for harmony game furnishes a model that presents the benefits for all involved parties, decision makers, and stakeholders in an intuitive way. The expanded game theory helps in motivating the decision makers to focus not only on their own payoffs, but also consider the stakeholders' outcome.

The expanded game theory is in line with Responsible Capitalism (Freeman et al., 2016) because it matches the concepts of "pro-social, language-using collaborators" and is in accordance with the cooperative stakeholder concept that is applied there. Thus, the expanded game theory for the harmony game is a new framework that serves as a basis for holistic tools, fosters ethical leadership and altruism, and inhibits the short-term thinking pertaining to economic rationality in the decision makers.

The expanded game theory offers a holistic view of the decision-making process because it does not consider only the decision makers. In fact, it visualizes the consequences of a decision for all involved parties, regardless of if they are active decision makers or inactive stakeholders.

References

AFP, 2017. *www.rp-online.de.* [Online] Available at: http://www.rp-online.de/leben/gesundheit/psychologie/world-happiness-report-2017-das-ist-das-gluecklichste-land-der-welt-aid-1.6701462 [Accessed 22 10 2017].

Ainsworth, R. T. & Hengartner, U., 2009. Quebec's Sales Recording Module (SRM): Fighting the Zapper, Phantomware, and Tax Fraud with Technology. *Canadian Tax Journal*, N.4 Vol.4, pp. 715-761.

Aristoteles, 1911. *Nikomachische Ethik.* s.l.:s.n.

Damisch, L., Mussweiler, T. & Plessner, H., 2006. Olympic Medals as Fruits of Comparison? Assimilation and Contrast in Sequential Performance Judgments. *Journal of Experimental Psychology: Applied*, pp. 166-178.

Donaldson, T. & Preston, L. E., 1995. The Stakeholder Theory of the Corporation: Concepts, Evidence, and Implications. *The Academy of Management Review*, 01, pp. 65-91.

Doran, G. T., 1981. There's a S.M.A.R.T. way to write management's goals and objectives. *Management Review. AMA FORUM*, 11, pp. 35-36.

Dose, D., 2017. *SHZ - Dänemark hat geringste Korruption, Somalia Schlusslicht.* [Online] Available at: https://www.shz.de/deutschland-welt/daenemark-hat-geringste-korruption-somalia-

schlusslicht-id15931706.html)%20(https:/www.quora.com/What-are-the-reasons-behind-countries-with-least-corruption)%20(http:/blog.transparency.org/2011/12/07/what-makes-new-zeal
[Accessed 24 09 2017].

Forsyth, D. R., 1980. A taxonomy of ethical ideologies. *Journal of Personality and Social Psychology*, 39, pp. 175-184.

Freeman, R. E., 1984. *Strategic Management. A Stakeholder Approach.* s.l.:Pitman.

Freeman, R. E., Parmar, B. L. & Martin, K. E., 2016. *Responsible Capitalism.* [Online] Available at: http://kirstenmartin.net/wp-content/uploads/2013/11/10-Freeman-Parmar-and-Martin-2.pdf
[Accessed 25 09 2017].

Friedman, H. H. & Friedman, L. W., 2010. Lessons from the twin megacrises: The financial meltown and the bp oil spill. *SSRN Working Paper SeriesNo. 1654596*.

Hanemann, W. M., 1994. Valuing the environment through contingent valuation. *The Journal of Economic Perspectives*, 4, pp. 19-43.

Höhler, G., 2017. *Handelsblatt - Griechische Lotterie gegen Steuerhinterziehung.* [Online] Available at: http://www.handelsblatt.com/politik/international/kartenzahlung-wird-belohnt-griechische-lotterie-gegen-steuerhinterziehung/20063734.html
[Accessed 24 09 2017].

Hügens, T., 2004. *Identifikation der relevanten Stakeholder für die Perspektiven der Relationship Management Balanced Scorecard,* Essen/Münster: Dieter Ahlert/Stephan Zelewski (Hrsg.).
Kronberger, T., 2017. *Unethical cooperation and its consequences for stakeholders: Insights from Game Theory.* Brno, in print.

Laplume, A., Sonpar, K. & Litz, R., 2008. Stakeholder Theory: Reviewing a Theory That Moves Us. *Journal of Management*, 1 December, pp. 1152-1189.

Licht, A. N., 1999. Games Commissions Play: 2x2 Games of International Securities Regulation. *Yale Journal of International Law*, pp. 61-128.

Mayers, J., 2005. *Stakeholder power analysis,* London: International Institute for Environment and Development.

Mimouni Chaabane, A. & Parguel, B., 2016. The double-edge effect of retailers' cause-related marketing - When scepticism cools the warm-glow effect. *International Journal of Retail & Distribution Management Vol. 44 Iss 6*, pp. 607-626.

Mitchell, R. K., Agle, B. R. & Wood, D. J., 1997. Toward a Theory of Stakeholder Identification. *Academy of Management Review*, H. 4, pp. 853-896.

Noland, J. & Phillips, R., 2010. Stakeholder Engagement, Discourse Ethics and Strategic Management. *International Journal of Management Reviews 12(1)*, January, pp. 39-49.

Piskurich, G. M., 2006. *Rapid Instructionional Design - Learning ID Fast and Right.* San Francisco: Pfeiffer.

Poncela-Casasnovas, J. et al., 2015. Humans display a reduced set of consistent behavioral phenotypes in dyadic games. *Science Advances Vol. 2, no. 8*, 5 Aug.

Remisova, A., Lasakova, A. & Buciova, Z., 2014. Ethical-Economic Dilemmas in Business Education. *Business, Management and Education*, 12(2), pp. 303-317.

Rousseau, J.-J., 1754. *Discours sur l'origine et les fondements de l'inégalité parmi les hommes.* s.l.:s.n.

UOL, 2011. *Entenda como funciona a Nota Fiscal Paulista.* [Online] Available at: https://economia.uol.com.br/noticias/redacao/2011/01/14/entenda-como-funciona-a-nota-fiscal-paulista.htm
[Accessed 24 09 2017].

von Neumann, J., 1928. Zur Theorie der Gesellschaftsspiele. *Mathematische Annalen*, Band 100, pp. 295-320.

von Neumann, J. & Morgenstern, O., 1944. *Theory of games and economic behavior.* 3rd ed. Princeton: Princeton University Press.

Characteristics of Audit Market in the Function of Audit Quality

Sanja Sever Mališ, University of Zagreb, Faculty of Economics and Business, Zagreb, Croatia, ssever@efzg.hr

Katarina Žager, University of Zagreb, Faculty of Economics and Business, Zagreb, Croatia, kzager@efzg.hr

Mateja Brozović, University of Zagreb, Faculty of Economics and Business, Zagreb, Croatia, mbrozovic@efzg.hr

Abstract

Audit market in most countries is characterized by a high concentration of audit firms. As a result, audit firms are now generally divided into two major groups: Big Four and non-Big Four audit firms. The main aim of this paper is to investigate if such strict division can be applied to the audit market in Croatia. In order to gain insight into the structure of the audit market in Croatia, an empirical research based on secondary data was conducted. Measures of descriptive statistics were calculated to identify audit firms that can be considered as statistical outliers according to their size. In order to determine the optimal number of audit firm groups, a hierarchical cluster analysis was applied. Measures of descriptive statistics show that the six largest audit firms can be considered as statistical outliers according to almost all observed size variables, while the remaining audit firms significantly lag behind. Although the individual market shares of Big Four audit firms are significant, there are also two additional audit firms that can compete with them based on the size criterion. This is confirmed with the cluster analysis. Therefore, although the audit market in Croatia is significantly concentrated, it is not dominated exclusively by the Big Four audit firms. Research results can serve as an input to regulators when considering possible measures for reducing market concentration. However, before taking any actions, an additional analysis regarding the effect of audit firm's size on audit quality should be conducted.

Keywords: audit quality, audit market, audit firm size, Big Four audit firms.

1Introduction

Audit market in most countries is characterized by a high concentration of the subjects on the supply side, despite the relatively high number of audit firms. At the international level, the audit market can be considered as an oligopoly since the 1980s, when the market was dominated by the eight largest audit firms, called the Big Eight (Ascher, 2008). The factors that most contributed to the creation of such a market structure include business combinations, economies of scale and high barriers to entry for small audit firms. Due to the additional business combinations that followed, as well as corporate scandals, the number of large audit firms has been halved. As a result of such developments, audit firms are now generally divided into two major groups: Big Four and non-Big Four audit firms. The main aim of this paper is to investigate if such strict division can be applied to the audit market in Croatia.

2. Oligopoly on audit market

Audit market, like any other market, can be viewed in the context of supply and demand of audit services. Market features, such as the number of participants on the supply and demand side, the homogeneity of products and services, freedom of entry and exit from the market, indicate the type of market structure. Audit markets are an example of imperfect competition, which due to certain factors has taken on the features of oligopoly in most countries (Ascher, 2008).

Measured by the amount of revenues or received total fees, the Big Four audit firms dominate the audit market for listed companies in most European Union countries with a market share exceeding 90% (European Commission, 2010). Oligopoly is a market structure where there are several market-dominated bidding parties and falls into the structures of imperfect competition (Samuelson and Nordhouse, 2005). If the size is measured by the total revenues earned, then the largest audit firm in the Big Four group is Deloitte which earned 36.8 billion USD in 2015 (Statista, 2017).

Observed at an international level, the audit market is considered an oligopoly since the 1980s, when the market was dominated by the eight largest audit firms called the Big Eight. The main characteristics of the oligopolies are the following: 1) large capital investments required, 2) control of necessary resources, 3) legal constraints and patents, 4) economies of scale, 5) top entrepreneurs, 6) mergers and acquisitions, and 7) barriers to entry (Kumar, 2017). The factors that have contributed the most to the increase in market concentration on the supply side of the audit market are business combinations, the economies of scale and strong boundaries to the entry of non-Big Four audit firms into the market of large and listed subjects of statutory audit.

Although the audit market has already been consolidated in the 1980s, the number of major international audit firms has additionally been halved - from the Big Eight to the Big Five, as a consequence of business mergers. After the Enron corporate scandal in 2001, the Arthur Andersen audit firm collapsed, further reducing the number of large audit firms and increasing market concentration on already highly concentrated market.

Numerous business combinations in the audit market were in the function of achieving the economy of scale. Namely, Big Four audit firms are able to allocate fixed business costs to a wider customer base. In the context of auditing, the auditor's effort measured by the number of working hours spent on one client can be considered as a variable cost. On the other hand, investing in audit technology is a fixed cost and involves acquiring knowledge and skills, investing in equipment and developing standardized audit programs (Sirois, Marmousez and Simunic, 2012). In this way, big audit firms are able to develop sufficient technical expertise and ability to conduct audits globally to meet the needs of complex international clients at lower costs in comparison to smaller audit firms (Government Accountability Office - GAO, 2008).

In addition to economies of scale and business internationalization, complexity of accounting standards and reputation are the main factors that pose potential barriers to the entry of smaller audit firms into the audit market. Oxera (2006) showed that less than 10% of FTSE 350 companies listed on the stock exchange considered the engagement of a non-Big Four audit firm. In addition, 82% of large and listed corporations in the United States (Fortune 1000) consider that their audit firm selection is limited to three or less audit firms (Government Accountability Office - GAO, 2008), which also demonstrated the importance of the auditor's reputation.

International Financial Reporting Standards are constantly changed according to the market needs. Since the Big Four audit firms have more staff to monitor regulatory requirements, big and listed companies are inclined more often to engage a Big Four audit firm. This is also confirmed by the ESCP Europe (*Ecole Supérieure de Commerce de Paris Europe*) research, which identified main barriers for smaller audit firms' entry into the listed companies' audit market. In particular, the main barriers are the lack of size or insufficient capacity in terms of number of auditors in mid-tier audit firms, limited geographical reach of mid-tier audit firms, a strong preference among large companies to choose Big Four audit firms because of their reputation, resistance among companies and the absence of incentives to change the audit firm (Le Vourc'h and Morand, 2011).

3. Domination of Big Four Audit Firms on Concentrated Audit Markets

Previous audit market concentration research has shown that the total market share of audit firms in the Big Four group differs considerably depending on the type of audit market being observed. The ESCP Europe (*Ecole Supérieure de Commerce de Paris Europe*) study, published in 2011, included all European Union Member States (27 at the time). Market shares at the level of the overall audit

market (calculated on the basis of total revenue of audit firms) led to the conclusion that the Member States could be grouped into four major groups. The first group includes countries such as Czech Republic, Poland and Slovenia, where the Big Four market share is less than 10%, with the smallest share (2%) registered in Slovenia. Countries in the second and third group are characterized by the Big Four market share between 10% and 20% (for example, Austria, Germany, Italy and Portugal) or 20% and 30% (for example, France, Finland and Belgium). The fourth group of countries marks the highest degree of concentration, given that the market share of Big Four audit firms is above 30%. The United Kingdom is located in that group with a concentration coefficient 4 equal to 40% (Le Vourc'h and Morand, 2011). The Big Four audit firms in the United Kingdom have a very large market share even in the entire audit market, due to the fact that they have the largest number of registered audit firms (together with Ireland: 7843). However, the same indicators are much higher at the level of listed companies. Namely, the average coefficient of concentration 4 for the European Union is 94% (Le Vourc'h and Morand, 2011). Since the average number of registered audit firms in the European Union is 985 per Member State, this means that the Big Four audit firms occupy 94% of the audit market for clients listed on national stock exchanges, while the rest (981 audit firms) account for only 6% of the market. At the national level, France has the lowest coefficient concentration 4 (81%), as a result of introducing mandatory join audits as an attempt to reduce audit market concentration.

The dominance of large audit firms is also characteristic of most developed western countries. In 2006, the four largest audit firms in the United States audited 98% of all public companies with revenues above 1 billion USD and 96% of public enterprises with revenues above 500 million USD (Government Accountability Office - GAO, 2008). Audit firms on American and European markets achieve 82% of the total revenue, which confirms the importance of these markets for audit firms (Big4.com, 2015). However, young audit markets in emerging economies, such as China and India, are less concentrated and more open. The share of Big Four in the market of listed companies in India is 41%, while the same indicator in China is 14%, where most of the clients are audited by the national audit firms (Huber, 2011). Consequently, it can be concluded that the market concentration depends on the category of audit clients as well as the development of audit market. The market shares of audit firms from the Big Four group are the highest for listed companies in developed western countries.

4. The Effect of Audit Firm Size on Audit Quality

Although large audit firms generally have a higher reputation and enjoy greater customer confidence, the question is whether they provide a better-quality service. In this context, the audit quality represents the auditor's ability to detect significant misrepresentations and to respond appropriately when expressing opinion (DeAngelo, 1981).

The audit quality primarily depends on the auditor's ability and independence. These are the two main factors that need to be taken into account when analyzing the impact of the audit firm size on the audit quality. Observed at the theoretical level, arguments can be found to support both views. In other words, there are reasons to support and deny the existence of a positive correlation between the size of the audit firm and the audit quality (figure 1.).

Compared to non-Big Four audit firms, Big Four audit firms have better financial and human resources, as well as more advanced information technology. They are therefore able to invest more in employee training and acquisition of other tools to ensure that their employees are skilled and capable of conducting audits in accordance with the highest quality standards (Sawan and Alsaqqa, 2013). In addition, a wider customer base increases negotiating power and reduces financial dependence on a particular client, meaning they should be more independent in expressing their opinions and less willing to tolerate management's attempts for earnings management.

According to DeAngelo's theory (1981), Big Four audit firms are operating with high reputation risk. High reputation risk results from the assumption that big audit firms have more to lose in case of

unprofessional behavior discovery. As auditors of public interest entities, they are also subject to greater oversight by the competent authorities, as well as under the surveillance of control mechanisms within the client itself (for example, activities of the audit committee). Hence, the greater ability to attract skilled employees and continuous investments in their education should contribute to the engaged audit team's ability to detect significant misrepresentations. On the other hand, greater independence as a result of reputation risk and stronger negotiating power should also result in expressing an appropriate audit opinion.

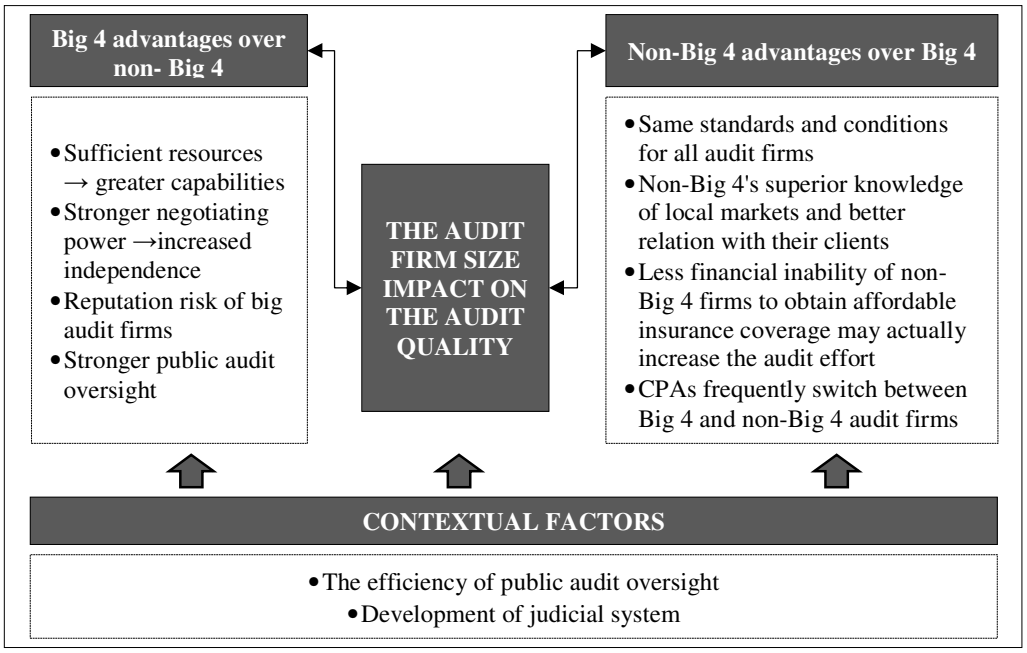


Figure 1: The impact of audit firm size on audit quality

Source: Systematization of authors based on previous research

However, there are also arguments as to why Big Four and non-Big Four audit firms could provide comparable audit quality. First, Big Four and non-Big Four audit firms are held to the same regulatory and professional standards, and thus both types of audit firms must adhere to a reasonable level of quality. Second, as non-Big Four auditors have superior knowledge of local markets and potentially better relations with their clients, these factors may enable non-Big Four audit firms to detect irregularities more efficiently. Of course, the converse argument could be made that closer relationships between non-Big Four audit firms and their clients could potentially lead to compromised independence; however, the net effect of these counteracting forces is unclear. Third, the inability of non-Big Four audit firms to obtain affordable insurance coverage may actually increase the audit effort of non-Big Four audit firms relative to Big Four firms because smaller audit firms cannot obtain a similar level of backing from insurance companies. Finally, CPAs frequently switch between Big Four and non-Big Four audit firms, and knowledge transfers can dilute the potential for one type of audit firm to become superior (Faroghi and Shahshahni, 2012).

In addition, contextual factors affecting the individual national audit market should also be taken into account. If the institutional framework at the national level does not encourage audit quality, the auditors will be less motivated to limit management's attempts to manage earnings, meaning that there will be no differences between Big Four and non-Big Four audit firms (Yasar, 2013). Key elements of an effective institutional framework in the context of promoting audit quality are an effective judicial system that guarantees the auditor's legal responsibility for expressed opinion and a developed system of public audit oversight. The public audit oversights system still significantly differs among the European Union Member States despite the attempts of international harmonization (for example by Audit Directives). Development of institutional framework should provide additional

incentives for better audit quality. However, an inadequate institutional framework, even assuming that big audit firms are generally able to perform better quality audits, clears the boundary between big and other audit firms, as none of them have appropriate incentives to improve audit quality above the required minimum level.

Many researchers investigated the relationship between the size of audit firm and the quality of auditing. In addition, this research has been carried out in different ways. Some researchers examined the attitude of different groups of respondents about the significance of the audit firm's size by conducting surveys. However, quantitative research was more numerous. The basic methodologies of these quantitative research lie on the application of multiple regression analysis where the audit quality is usually the dependent variable, while the size of the audit firm is an independent variable.

However, the definition of these variables differed considerably among the researchers. The size of the audit firm can be expresses as a discrete variable, which equals one if the audit firm belongs to the group of Big Four and zero in the opposite case. Prior to the world-wide corporate scandals and mergers of audit firms, there were the Big Eight or Big Six (Francis, Maydew and Sparks, 1999; Teoh and Wong, 1993; Krishnan and Schauer, 2000), followed by Big Four or the Big Three audit firms, depending on the country in which the research was conducted (Dehkordi and Makarem, 2011; Yasar, 2013). In addition, the size of an audit firm can be viewed as a continuous variable based on total assets, income or number of employees (Bae and Lee, 2013; Foroghi and Shahshani, 2012).

Since there is no agreement on how to measure the audit quality, there are variations in selecting the appropriate audit quality measure. The most commonly used measures are the level of discretionary accruals as a signal of earnings management (Yasar, 2013; Dehkordi and Makarem, 2011; Choi et al., 2010; Francis, Maydew and Sparks, 1999), as well as auditor's reporting on the going concern basis (Foroghi and Shahshahani, 2012). Considering that many other factors, apart from the size of the audit firm, may have an impact on audit quality, the empirically tested models include numerous control variables such as client's size, amount of cash flows from operations, selected financial ratios and others.

The results of the conducted research sometimes differ, which is certainly contributed by the different methodology of conducting the research, as well as the different institutional environment. Some research has shown that the size of the audit firm has a direct effect on the auditor's effectiveness and indirectly on the quality of auditing (Cheng, Chen and Chen, 2013). In addition, the degree of compliance with the required disclosures in accounting standards has shown to be higher when the financial statements are audited by a large audit firm (Krishnan and Schauer, 2001), and that such financial statements also enjoy greater investors' confidence (Teoh and Wong, 1993). According to the assumption of greater independence, Francis, Maydew and Sparks (1993) concluded that the audit firms that belong to the group of the largest audit firms are more capable of curbing the opportunistic and aggressive behavior of management when presenting financial results. A research conducted in Libya has shown that the respondents believe that: 1) the Big Four audit firms are more independent and more likely to issue qualified reports, 2) the Big Four audit firms can report the real financial situation of the clients more readily than other firms, and 3) that the Big Four audit firms perform more powerful, effective tests and are more credible than others (Sawan and Alsaqqa, 2012).

On the other hand, there are studies that did not reveal significant differences in the quality of audit performed by the audit firms from the Big Four group in comparison to other audit firms. One of these studies has been conducted in Turkey, where it was concluded that the affiliation of the Big Four audit firm is not related to the level of discretional accruals in the client's financial statements, which is justified by the fact that the audit environment in Turkey does not motivate enough audit firms to perform better quality audit (Yasar, 2013). Similar conclusions were reached from the research carried out in Iran, where it has been shown that the big audit firms are not more successful in reporting modified audit opinion due to the going concern issues (Foroghi and Shahshahani, 2012).

4. Cluster Analysis of Audit Firms in Croatia

Previous research has shown that the audit firms are usually divided into two major groups: Big Four and non-Big Four audit firms. The aim of this research is to test whether this hypothesis can be confirmed on the audit market in Croatia based on the cluster analysis. The size of the audit firm is described by the five variables based on the publicly available data. Three variables are related to the direct features of the audit firms (the number of employees, number of certified auditors and total revenues), while the remaining two variables reflect the market share of the audit firms and characteristics of their clients (number or clients and total income of clients). The best measure for the market share of the audit firms would be the total audit fee received but this information is not publicly available for all the companies, which is why the substitution measures were used. According to the Financial Agency data in 2014, there were 2.865 subjects of statutory audit in Croatia. However, the research population was reduced due to unavailability of data. In that sense, the subjects of the analysis are 182 audit firms which carried out statutory audit for 2553 clients.

The main features of the audit firms analyzed are shown in table 1. Mean values indicate that audit firms had seven employees on average, out of which approximately three certified auditors, with total revenues of 2.5 billion HRK. As for the clients' characteristics, the average number of clients was 14 and their total revenues in the year preceding the audit was 2.3 billion HRK. However, there is a noticeable dispersion on the level of all variables, especially the income of clients and the income of audit firms. Namely, the audit firm with the lowest income of its clients audited clients that generated only 2 million HRK in total income, while the maximum values of audit clients' revenues was 59 billion HRK. This fact results in a coefficient of variation of 356.2%. Due to the fact that the mean is not a representative, median is a better central tendency measure.

Table 1: Descriptive statistical measures for analyzed audit firms

	Number of clients in 2014	Clients' revenues in 2013	Number of employees	Number of certified auditors	Total revenues in 2014
Mean	14.03	2,343,909,188	7.14	2.81	2,591,573.75
Median	8	485,760,217	4	2	879,326
Mode	4	N/A	3	2	N/A
Standard deviation	23.04	8,349,003,744	15.87	2.78	9,279,474.06
Coefficient of variation	164.23%	356.20%	222.19%	99.06%	358.06%
Variation range	171	58,640,508,642	140	21	94,576,201
Min	1	1,924,045	0	0	33,037
Max	172	58,642,432,687	140	21	94,609,238
Count	182	182	182	182	182

Source: Calculated by the authors based on the data retrieved from: Financial agency (2017), Croatian Chamber of Commerce (2017) and Croatian Audit Chamber (2017)

In the next step, the outliers were identified. Outliers are observations that deviate from the mean for at least three standard deviations (Bahovec et al., 2016). The standardized values (z) that meet these requirements are shown in table 2. Out of the total 182 audit firms, six audit firms meet the criteria of outliers for at least three of the five variables.

Table 2: Audit firms that represent statistical outliers according to at least one variable

Tax number of audit firm	Number of clients in 2014	Clients' revenues in 2013	Number of employees	Number of certified auditors	Total revenues in 2014
58960122779	**3.56**	**6.74**	**5.22**	**3.30**	**3.57**
81744835353	**6.86**	**6.33**	**5.03**	**6.54**	1.65
76394522236	**5.51**	**6.05**	2.26	**5.46**	1.77
11686457780	**5.21**	**4.71**	**6.29**	**3.66**	**6.77**
20963249418	**5.16**	**3.94**	**8.37**	**5.46**	**9.92**
71665824084	1.17	**3.54**	1.19	**4.38**	**3.38**

Source: Calculated by the authors based on the data retrieved from: Financial agency (2017), Croatian Chamber of Commerce (2017) and Croatian Audit Chamber (2017)

None of the remaining 176 audit firms are distinguished by any observable characteristics, i.e. the deviation from the mean does not exceed two standard deviations. The six observed audit firms belong to the Big Four group (EY, PricewaterhouseCoopers, Deloitte and KPMG), together with the two other audit firms (BDO Croatia and Baker Tilly Discordia). In conclusion, the descriptive statistics show that the audit market in Croatia is not dominated exclusively by the Big Four audit firms, but it is a group of six audit firms. Other audit firms are significantly lagging behind in terms of size. If the descriptive statistics (table 3) are recalculated after eliminating outliers, the mean will be much more representative. By observing the remaining 176 audit companies, every audit firm an average has 10 clients, two certified auditors and total revenue of over one million HRK.

Table 3: Descriptive statistical measures for analyzed audit firms after eliminating outliers

	Number of clients in 2014	Clients' revenues in 2013	Number of employees	Number of certified auditors	Total revenues in 2014
Mean	10.43	858,475,626.90	4.59	2.35	1,164,679.49
Median	8	467,937,572	4	2	866,083
Mode	4	N/A	3	2	N/A
Standard deviation	9.77	1,101,071,501.07	3.32	1.16	1,123,595.82
Coefficient of variation	93.67%	128.26%	72.44%	49.18%	96.47%
Variation range	63	5,512,173,839	22	8	6,666,925
Min	1	1,924,045	0	0	33,037
Max	64	5,514,097,884	22	8	6,699,962
Count	176	176	176	176	176

Source: Calculated by the authors based on the data retrieved from: Financial agency (2017), Croatian Chamber of Commerce (2017) and Croatian Audit Chamber (2017)

In order to determine the optimal number of audit firms' groups, a hierarchical cluster analysis was performed. Cluster analysis or clustering is the task of grouping a set of objects in such a way that objects in the same group (called a cluster) are more similar (in some sense or another) to each other than to those in other groups (clusters). Hierarchical clustering is based on the core idea of objects being more related to nearby objects than to objects farther away. These algorithms connect *objects* to form *clusters* based on their distance. A cluster can be described largely by the maximum distance needed to connect parts in the cluster. At different distances different clusters will form, which can be represented using a dendrogram – a graph that explains where the common name *hierarchical clustering* comes from. In other words, these algorithms do not provide a single partitioning of the data set, but instead provides an extensive hierarchy of clusters that merge with each other at certain distances (Sarstedt and Mooi, 2014). Audit firms were classified according to the selected size

measures: the number of clients, clients' revenues, number of employees, number of certified auditors and total revenues. The process of merging audit firms into clusters is shown in figure 3.

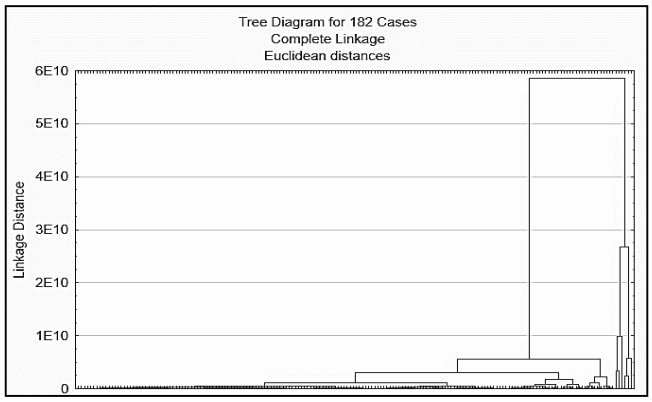


Figure 3: Dendogram of audit firms grouped by the size of the audit firm (*Statistica*)
Source: Calculated by the authors

A total of 181 steps was required for all audit firms to join into one cluster. The first 173 steps included only smaller audit firms, which was then followed with grouping the six largest audit firms together. It was necessary to determine the optimal number of clusters. Figure 4. shows how wide the distance between objects that were merged into clusters at each step was. It is evident that the first 179 steps were relatively small, followed by a noticeable jump. This means that the distance between the next two clusters was much larger. The conclusion is that the optimal number of clusters is three. The first cluster consist of two Big Four audit firms (EY and PricewaterhouseCoopers) and one audit firm that does not belong to that group but is considered as an outlier at the level of three size measures used (BDO Croatia). The same applies to the second cluster which includes Deloitte, KPMG and Baker Tilly Discordia. The last cluster is the largest and includes the remaining 176 observed audit firms.

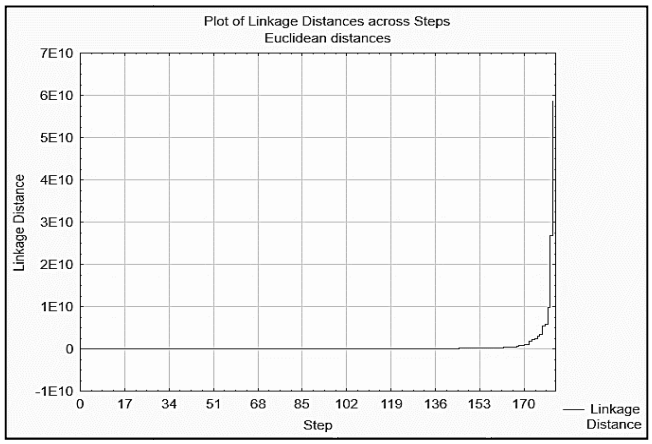


Figure 4: Euclidean distances – Plot of Linkage Distances across Steps (*Statistica*)
Source: Calculated by the authors

According to the measures of central tendency, it was expected that smaller auditing firms would be grouped into one cluster. However, there are significant differences between the six largest audit firms, which is why they are divided into two clusters. Cluster analysis of audit firms by the size gave the same results as the results of the descriptive statistics. Although the audit market in Croatia is highly concentrated, we cannot support the hypothesis that it is dominated only by the Big Four audit firms.

5. Conclusion

Audit markets are characterized by a high concentration and domination of Big Four audit firms, especially at the level of large and listed statutory audit subjects. Factors that contributed the most to this kind of market structure were mergers and acquisitions driven by the efforts to achieve the economies of scale and the consequent major barriers to entry for small and medium sized audit firms into the market. Although the audit market at the international level can be considered as an oligopoly since 1980s, the number of big audit firms has halved. As a consequence, it is commonly to group audit firms into two categories: Big Four and non-Big Four audit firms. High market concentration and size of the audit firms are especially important in the context of audit quality. The main question is whether big audit firms provide a better-quality audit service. There are theoretical arguments that support the positive relationship between audit firm size and audit quality, but it is also possible to find arguments that deny any difference. The empirical research was conducted in order to gain insight into the structure of the audit market in Croatia and to examine the importance of the audit firm size for audit quality. The hierarchical cluster analysis showed that the audit market in Croatia is dominated by six audit firms, which is why the hypothesis that only the Big Four audit firms are dominant was rejected. The domination of six audit firms, when compared to the domination of only four audit firms, should have a positive influence on the stability of the entire audit market.

Acknowledgements

This paper is the result of a project entitled "*Analysis of the Audit Market Factors in the Function of Financial Statements Audit Quality*", which was financed by the University of Zagreb as the short-term research support for the year 2017.

References

Ascher, B. (2008), 'The audit industry: world's weakest oligopoly?. The American Antitrust Institute Working Paper No. 08-03. *Social Science Research Network (SSRN)*. [Online], [Retrieved: September 15, 2017], https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1337105.

Bae, G. S. and Lee, J. E. (2013), 'Does audit firm size matter? The effect of audit firm size measured by audit firm revenues, number of offices, and professional headcounts on audit quality and audit'. *Social Science Research Network (SSRN)*. [Online], [Retrieved: September 15, 2017], https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2344052.

Bahovec, V. et al. (2012), Statistika, 2. izdanje [Statistics, Second Edition]. Element, Zagreb.

Big4.com (2015), 'The 2014 Big Four firm performance analysis - An analysis of the 2014 financial performance of the world's largest accounting firms'. [Online], [Retrieved: September 15, 2017], http://www.big4.com/wp-content/uploads/2015/01/The-2014-Big-Four-Firms-Performance-Analysis-Big4.com-Jan-2015.pdf.

Cheng, Y.-S., Chen, Y.-S. and Chen, Y.-C. (2013), 'Direct and mediating effects of auditor quality on auditor size and performance'. *International Business Research*, 6 (11), 134-148.

Choi, J.-H. et al. (2010), 'Audit office size, audit quality and audit pricing'. *Auditing: A Journal of Practice and Theory*, 29 (1), 73-98.

DeAngelo, L. E. (1981), 'Auditor size and audit quality'. *Journal of Accounting and Economics*, 3 (3), 183-199.

Dehkordi, H. F. and Makarem, N. (2011), 'The effect of size and type of auditor on audit quality'. *International Research Journal of Finance and Economics*, 80, 121-137.

European Commission (2010), 'Green paper - Audit policy: Lessons from the crisis', COM (2010) 561 final. [Online], [Retrieved: September 15, 2017], http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52010DC0561&from=EN.

Faroghi, D. and Shahshahani, A. M. (2012), 'Audit firm size and going-concern reporting accuracy'. *Interdisciplinary Journal of Contemporary Research in Business*, 3 (9), 1093-1098.

Financijska agencija – FINA [Financial Agency - FINA] (2017), Registar godišnjih financijskih izvještaja [Register of Annual Financial Statements]. [Online], [Retrieved: September 15, 2017], http://rgfi.fina.hr/JavnaObjava-web/jsp/prijavaKorisnika.jsp.

Francis, J. R., Maydew, E. L. and Sparks, H. C. (1999), 'The role of Big 6 auditors in the credible reporting of accruals'. *Auditing: A Journal of Practice & Theory*, 18 (2), 17-34.

Government Accountability Office - GAO (2008), 'Audits of public companies: Continued concentration in audit market for large public companies does not call for immediate action', Report to Congressional Addressees. [Online], [Retrieved: September 15, 2017], http://www.gao.gov/new.items/d08163.pdf.

Hrvatska gospodarska komora [Croatian Chamber of Commerce] (2017), Registar poslovnih subjekata – Biznet [Register of Business Entities - Biznet]. [Online], [Retrieved: September 15, 2017], http://www1.biznet.hr/HgkWeb/do/extlogon.

Hrvatska revizorska komora [Croatian Audit Chamber] (2017), Registar revizorskih društava [Register of Audit Firms]. [Online], [Retrieved: September 15, 2017], http://www.revizorska-komora.hr/index.php/registri/pretraga.html?http://registar. revizorska-komora.hr/.

Huber, N. (2011), 'The concentration battle'. *International Accounting Bulletin*, 6 (10). [Online], [Retrieved: September 15, 2017], http://www.blog-audit.com/wp-content/uploads/2012/03/e%CC%81tude-InternationalAccountingBulletin1.pdf.

Krishnan, J. and Schauer, P. C. (2000), 'The differentiation of quality among auditors: Evidence from the not-for-profit sector'. *Auditing: A Journal of Practice & Theory*, 19 (2), 9-25.

Kumar, M. (2017), 'Reasons for the existance of oligopoly (7 reasons)'. [Online], [Retrieved: September 15, 2017], http://www.economicsdiscussion.net/oligopoly/reasons-for-the-existence-of-oligopoly-7-reasons/7344.

Le Vourc'h, J. and Morand, P. (2011), 'Study on the effects of the implementation of the acquis on statutory audits of annual and consolidated accounts including the consequences on the audit market', Final report, *ESCP Europe*. [Online], [Retrieved: September 15, 2017], http://ec.europa.eu/internal_market/auditing/docs/other/executive-summary_en.pdf.

Oxera (2006), 'Competition and choice in the UK audit market (Prepared for Department of Trade and Industry and Financial Reporting Council)'. [Online], [Retrieved: September 15, 2017], http://www.oxera.com/getmedia/6f57bebe-ad07-4e01-953f-687f170319d2/Competition-and-choice-in-the-UK-audit-market%E2%80%94executive-summary_1.pdf.aspx.

Samuelson, P. A. and Nordhouse, W. D. (2005), Ekonomija, 18. izdanje [Economics, 18th Edition]. Mate, Zagreb.

Sarstedt, M. and Mooi, E. (2014), A concise guide to market research: The process, dana, and methods using IBM SPSS Statistics. Second Edition. Springer, Heidelberg.

Sawan, N. and Alsaqqa, I. (2013), 'Audit firm size and quality: Does audit firm size influence audit quality in the Libyan oil industry?'. *African Journal of Business Management*, 7 (3), 213-226.

Sirois, L.-P., Marmousez, S. and Simunic, D. (2012), 'Big 4 and non-Big 4 audit production costs: office level audit technology and the impact on audit fees'. *Comptabilites et innovation*, May 2012. [Online], [Retrieved: September 15, 2017], https://halshs.archives-ouvertes.fr/hal-00691147/document.

Statista (2017), 'Revenue of the Big Four accounting/audit firms worldwide in 2016 (in billion U.S. dollars)'. [Online], [Retrieved: September 15, 2017], https://www.statista.com/statistics/250479/big-four-accounting-firms-global-revenue/.

Teoh, S. H. and Wong, T. J. (1993), 'Perceived auditor quality and the earnings response coefficient'. *The Accounting Review*, 68 (2), 346-366.

Yasar, A. (2013), 'Big Four auditors' quality and earnings management: Evidence from Turskish Stock Market'. *International Journal of Business and Social Science*, 4 (17), 153-163.

An Overview of Human Resources in the Romanian RDI System

Cezar Ionut Bichescu, Dunărea de Jos University of Galati, Galati, Romania,
cezar.bichescu@ugal.ro
Mariana Madalina Chivu, Dunărea de Jos University of Galati, Galati, Romania,
mariana.chivu@edu.gov.ro
Silvius Stanciu, Dunărea de Jos University of Galati, Galati, Romania,
sstanciu@ugal.ro

Abstract

This paper proposes an analysis of the RDI sector in Romania from the perspective of the human resources employed in the system. Romania has an important recruitment base for human resource development in the national RDI, represented by more than 760 faculty graduates. Mean wages of the Romanian RDI system is close to the minimum, our country occupies the penultimate position at an European level.The lack of decent wages causes most young researchers to seek better working conditions or in another sector of the national economy or abroad.The RDI system became increasingly unattractive for young researchers since 2010, when the share of persons under 35 engaged in the system begins to plummet. Therefore, the present personnel structure is dominated by employees over 55 years, working in technical, administrative and other various fields of research. The business environment is the only sector characterized by the researchers of the RDI units below 50%. Romanian higher education, although filled with loads of research over the staff, excels at a national level in the field of scientific production. Reviving the national RDI system requires action from government officials and it involves salary increases and facilities for researchers, otherwise, a further decrease in qualified human resources and loss of sistem performance.

Keywords: RDI, HR, Romania

Introduction

Science is vital to the well-being of a nation, and the investment in basic science constitutes the condition for future economic prosperity. The favorable evolution of the national system of research-development-innovation, RDI can lead to an increase in the nation's welfare. Basically, the Commission states that the main challenge is that the European future of Romania must represent an increase in competitiveness (European Commission, 2013). National Strategy for Research, Development and Innovation (SNCDI) system, developed for the period 2014-2020, proposes national sector development through principal tool, the national plan for RDI (PNCDI3) 2014-2020, which is correlated with Regional Operational Plan for RDI (POS-CDI), 2014-2020. According to SNCDI 2014-2020, the chapter human resources system RDI, Romania recorded the ambiguous performance by comparison with Europe (the Romanian Government, 2014). Thus, the ratio of the number of new graduates in science and engineering and the total population of the relevant age exceeded the average for the past decade I 27. This was largely due to demographic trends and the dynamics of higher education, right up to the end of the last decade. The demographic trends are no longer as favorable as in the past, the forecasts for following years being reserved. The ratio of doctoral graduates in recent years and the population aged 25-34 years has recovered towards the European average. The ratio of the number of researchers employed in the private sector is far below the European average, the transfer of young doctors from the educational system innovative economic sectors being produced with difficulty (Stanciu, Sârbu, and Bucur, 2017). Romania is affected by the migration of researchers, with 15,000 specialists in the diaspora in the last period (World Bank, 2012). Human resource is the most important capital of the national RDI, being a decisive factor in the success or failure of its activity. The development of a company is determined and caused system performance education,

research and innovation, while ensuring the quality of the research activity results, i.e. equitable of potential users at services/products of this system. SNCDI specifies that a career in research should be appealing to both Romanian citizens and foreign ones, making it necessary to adopt the Charter and European Code of the researcher and to facilitate the employment conditions for foreign researchers in the Romanian research (Romanian Parliament, 2014).

Material and Methods

The informations regarding the human resources employed in establishments were selected for RDI from official statistics of the National Institute of Statistics NIS, the Ministry of Research and Innovation MCI, or the Reports of Worlds Banks WBO.The data was statistically processed and systematized. The results obtained were represented graphically and interpreted. For analysis, results were compared, where possible, with scinetific informations from literature to obtain credible conclusions.

The Research System Legislation

National SDI legislation system is represented by the legislative regulations covering the free access to information for public interest (Law 544/2001), the principles resulting from the case-law of the European Court of Human Rights (ECHR) in cases of default judgments handed down against a debtor's general public Law Research (National Strategy RDI 2014-2020, as amended), the Law on Education 1/2011, and other specific rules, the laws relating to The Ministry of Research and Innovation MCI (HG 13/2017 Organisation and operation of MCI, Regulation OM 2/2017 On the organisation and operation of MCI changed and completed, and other specific regulations), and the Executive Unit for Financing Higher Education, Research, Development and Innovation (UEFISCDI) related resource legislation (Government Ordinance no.62/1999 Approved with amendments by Law no.150/2000, as amended and supplemented. Regulation on organization and operation approved by the Minister of National Education and Research no. 5804/11.23.2016, Government Ordinance no.74/2010, Regulation on the organisation and operation of human resource 5804/2016, and other specific rules).

Romanian RDI Units

Romania has the potential of generating the staff for research, innovation and development, providing by 97 universities (56 of the public domain), with a total of 560 faculties. By 2016, 405,638 students were currently enrolled in undergraduate studies Level 6 ISCED (Bichescu, Chivu, and Stanciu, 2017). In the Level 7 ISCED were enrolled last year 106,794 graduates from the first level of higher education, national statistics indicating 19,154 students at the doctoral studies or postdoctoral (Level 8 ISCED), according to NIS (2017). It could be seen therefore that a recruitment database for educational units and national RDI system, which may be complemented by graduates of undergraduate degree programmes from other countries, Romanian or foreign citizens. The European strategy in the RDI proposed to create a national strategy of innovation, to provide necessary assistance to entrepreneurs to transform innovative ideas into products and services.

The national system of research and development is made up of all establishments and institutions governed by public law and private law with legal personality that have the object of research-development activity. MCI organises and leads national system of scientific research, technological development and innovation. According to the MCI (2017), Romanian RDI system comprises 263 public organizations, and about 600 enterprises with public or private property. 56 of the public organizations are public universities, 46 national institutes are research and development (43 being coordinated by MCI) and 65 are research institutions and centers of the Romanian Academy.

The National Network for Innovation and Technology Transfer (ReNITT) contains 50 specific organizations: technology transfer centers, centers for information technology, business and technology incubators and 4 science and technology parks.

The Business Research Performance Sector includes Business unities of the national economy that have their principal or secondary activity in research and development. The higher education performance sector includes all units from higher education and privacy, as well as medical clinics under direct supervision or administered in association with institutions in the higher education sector and conducting research and development activities.

Government sector includes all performance units (including ministries of budgetary appropriations intended for research and development), which provides public services the activities of research and development of the Central and local administration, as well as national institutes of research and development.

Private sector, non-profit performance comprises in unions, foundations, centers, associations, organizations, trade unions, political parties and political formations which carries out research and development activities, including family groups.

The evolution of the Romanian RDI units in 2011-2015 is shown in Figure 1. According to the information from NIS (2017), correlated with the data published by MCI (2017), the total units from the RDI Romania experienced a relatively steady trend in the period 2011-2017, reducing from 269 units in 2011 to 263 units in 2017. The private sector had an important decreased of RDI units, reduced by over 30 % in 2011-2015 (figure 1).

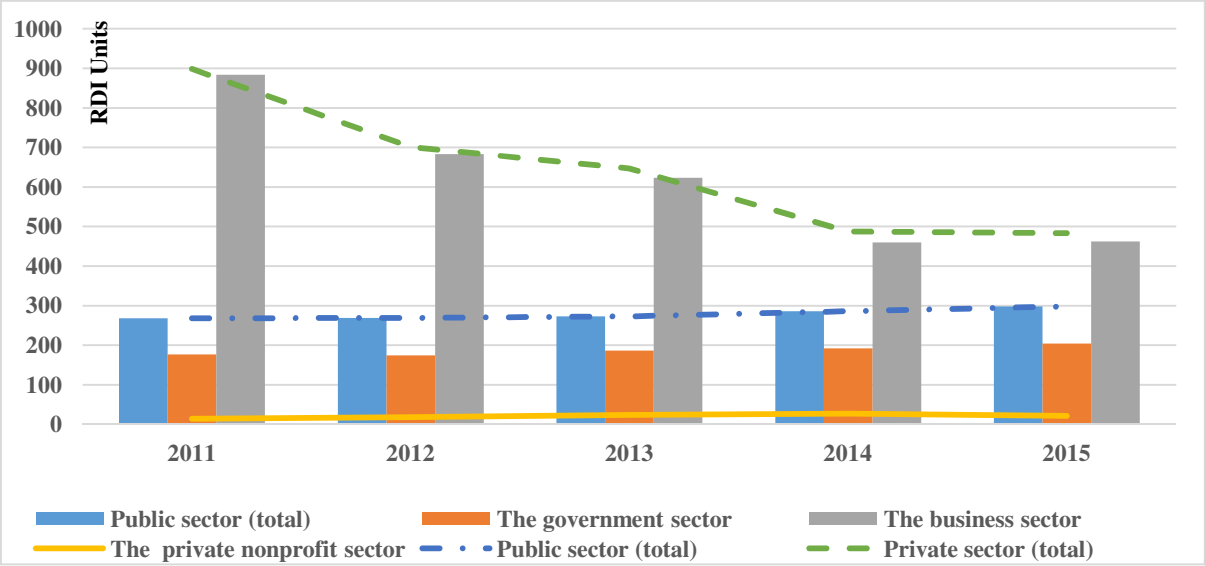


Figure 1: RDI from Romania's property types

Source Author, by using NIS Data (2017)

The most dramatic reduction has been observed for the business sector. During the period recorded in official statistics, the total number of RDI units from Romania down to 33% global reduction being caused by the decline in the number of specialized units in the private sector.

Although country-level, RDI system from Romania has a significant drop in 385 units, from 2011-2015 total number of employees experienced an overall increase of 5% (figure 2).

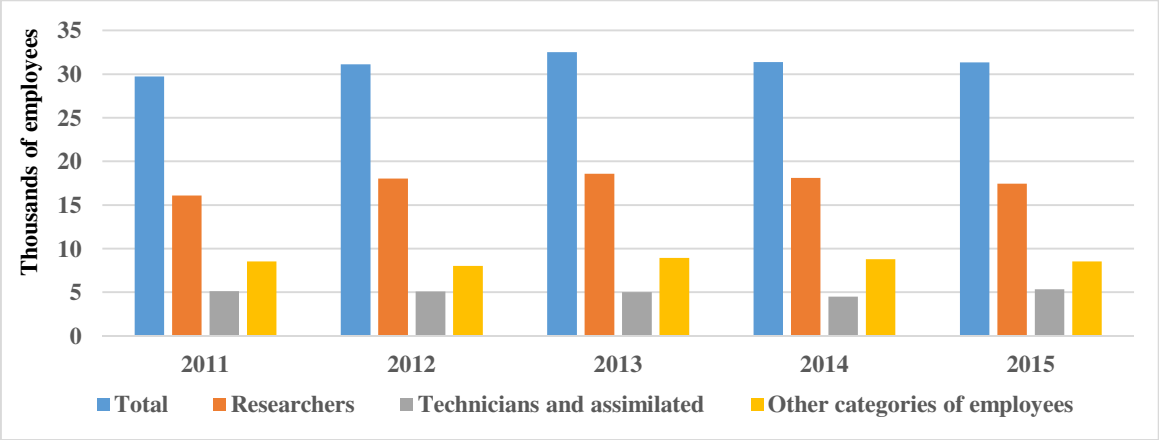


Figure 2: Employees in RD System by the occupation

Source Author, by using NIS Data (2017)

Researchers and technicians increased between 8.57% to 3.82%, and other categories of employees 0,82%. The evolution of Romanian RDI employees was backed by the State sector, in which universities and governmental institutions have engaged in personal research RDI system, while in the private sector there has been a reduction of personnel in the period assessed (figure 3).

The most consistent increase in staffing have been recorded in the governmental sector, where in 2015 were 13.16 % more researchers compared to 2011. In the Higher Education sector (1.45 %) and in Business (1.26%), the number of employees remained constant, increases being insignificant.

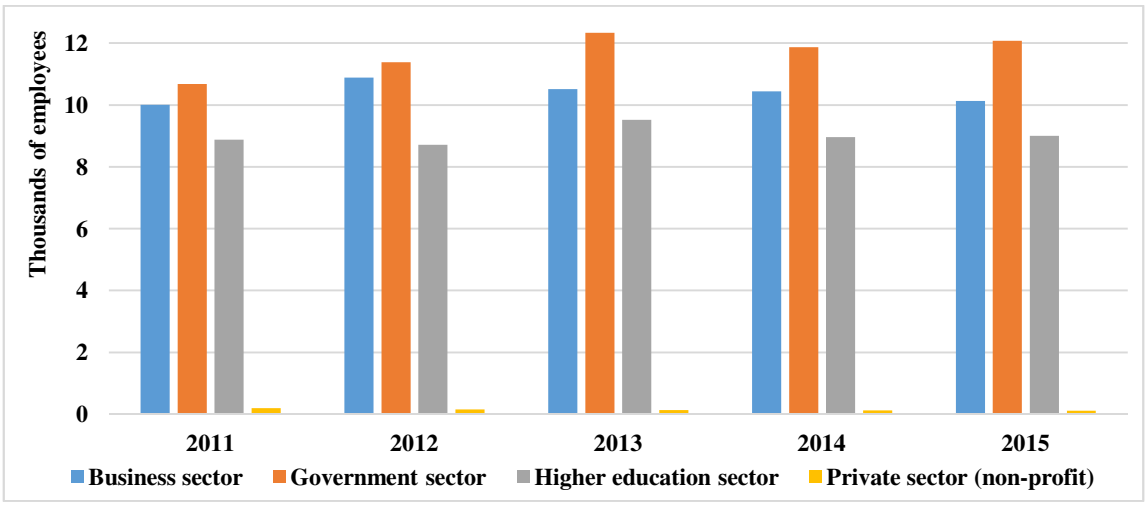


Figure 3: Evolution in the number of employees activity sector RDI

Source Author, by using NIS Data (2017)

The area in which there have been spectacular declines was the private non-profit sector, in which there were over 40% in loss on livestock. The explanation of this trend is mainly political and governmental in the economic sector business.

The massive reduction in the number of employees in the non-profit private sector can be explained by the fact that in the period 2014-2015 the access to European and Governmental funds was reduced, the financial year 2014-2020 being at the beginning and the financing of the R & D projects from the Community diminished (Figure 4).

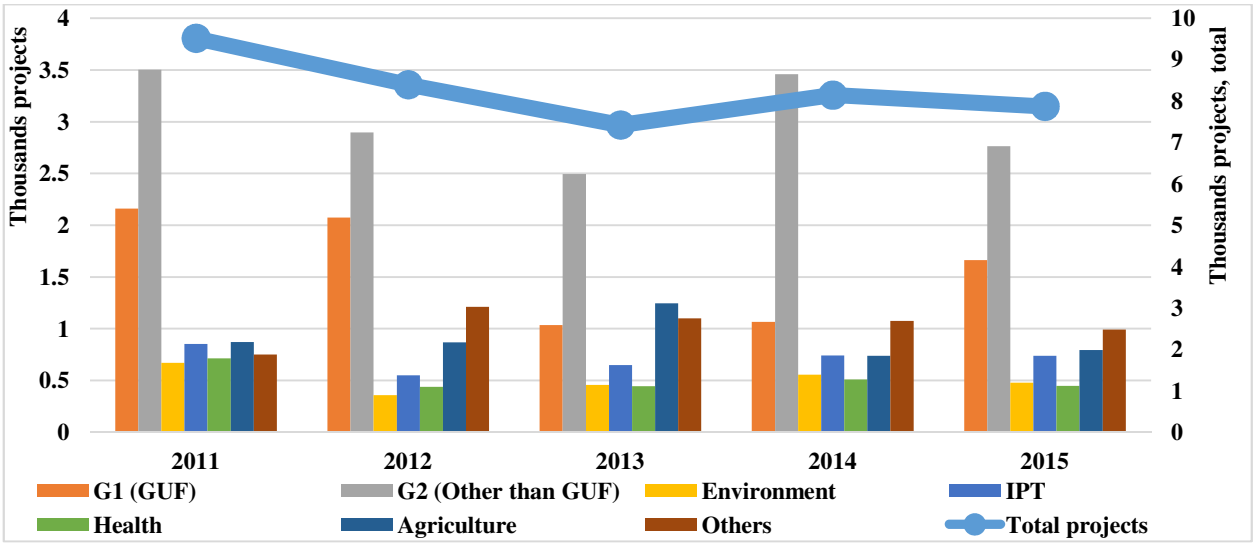
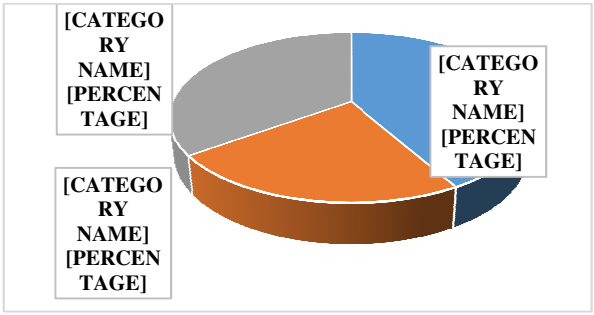


Figure 4: Projects for RD activity, according to NABS 2007

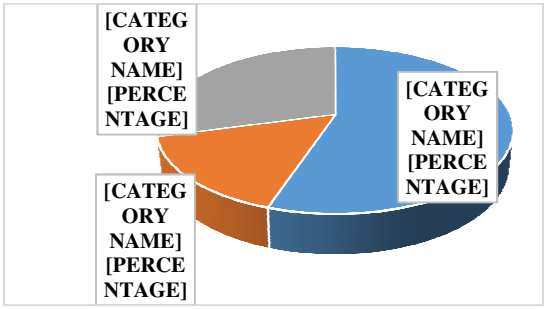
Source Author, using NIS Data (2017)

According to the data represented in Figure 4, it cuold be seen that during the period under review projects prevailed type G2 (General Advancement of Knowledge, financed from other sources than GUF), which accounted for over 30% of total funding. The second position in the top is occupied by fund G1 Type (General Advancement of Knowledge, financed from general university funds GUF). Projects for Agricultural and Industrial Production and Technology IPT are each about 10% of the total.

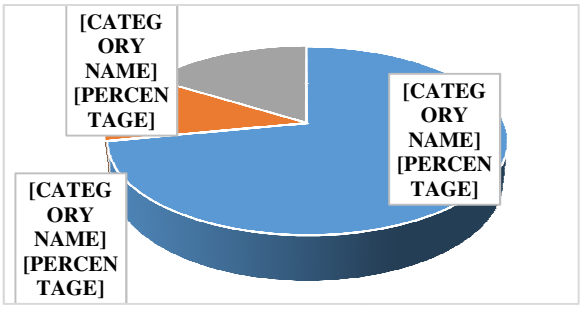
An interesting analysis is the evolution of the qualifications of the employees on the four areas of activity, as shown in Figure 5 (a, b, c, d). According to NIS (2017), excepts business, the share of researchers represents more than 50% of total employees.



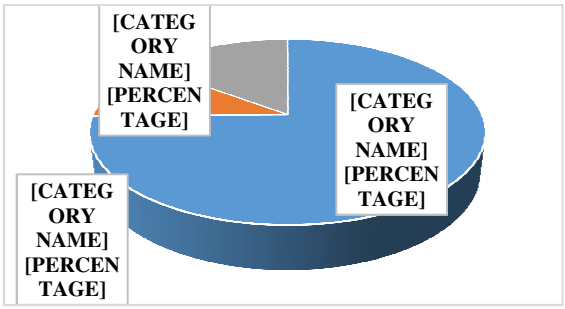
5a) Business sector



5b) Government sector



5c) Higher education sector



5d) Private sector (non-profit)

Figure 5: Distribution of RDI employees (2015) by categories and sectors: 5a) Business, 5b) Government, 5c) Higher education, 5d) Private - non-profit Source Author, by using NIS Data (2017)

A possible explanation for the weighting for the category "other categories of employees" could be the need for businesses sector to sell research results, although official data indicates a reduced capacity for marketing results the Romanian research and innovation and a very few multinational companies have brought with them to the country a substantial research component (Romanian Government, 2014). Private non-profit sectors and higher education are characterized by the highest share of researchers employed in total.

University education has proved its capability of developing scientific research through the high number of publications and notable performances, surpassing substantially the scientific productivity of both the institutes and the institutes of the National Academy research and development.

The share of employees in the Romanian RDI by the age categories is presented in Figure 6. A problem of the National RDI system is the lack of young researchers. According to NIS data (2017), the share of young people, under 35 years, does not exceed 30 % of the total employed in the system, being between 15.14 % in 2014 and 29.11% in 2009.

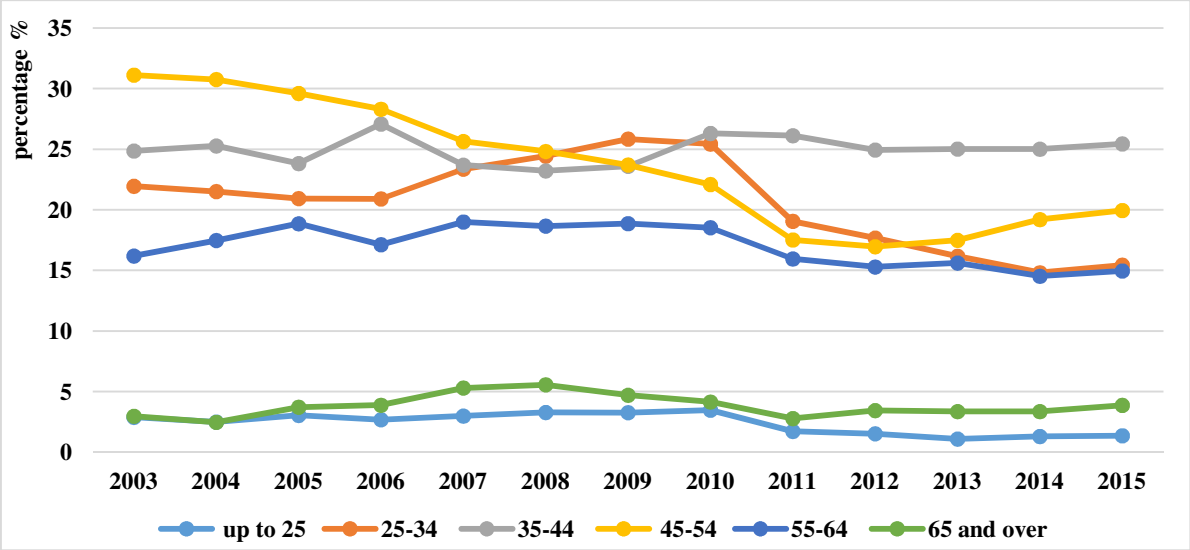


Figure 6: The share of employees on the Romanian's RDI, by age

Source Author, by using NIS data (2017)

Lack of attractiveness of the RD system for young researchers is becoming more evident starting in 2010, when begin to fall substantially of the number of people under 35 years of age. As a counterweight, young researchers under 25 years represent the least represented age group, being exceeded, including the pensioners/older than the limit for retirement and working in the system. The percentage of mature specialists, aged 35-45 years old, which must represent the majority of the employees does not exceed 25 % of the total human resource, except for 2006, when it was 27%. Unfortunately, the share of staff aged over 55 years is close to or even exceeds the Romanian young researchers the last years.

The cost of salaries for employees in the Romanian RDI fluctuated between € 92.62 million (2011) and € 159 million (2015), with a minimum of around € 77 million in 2013 (Figure 7).

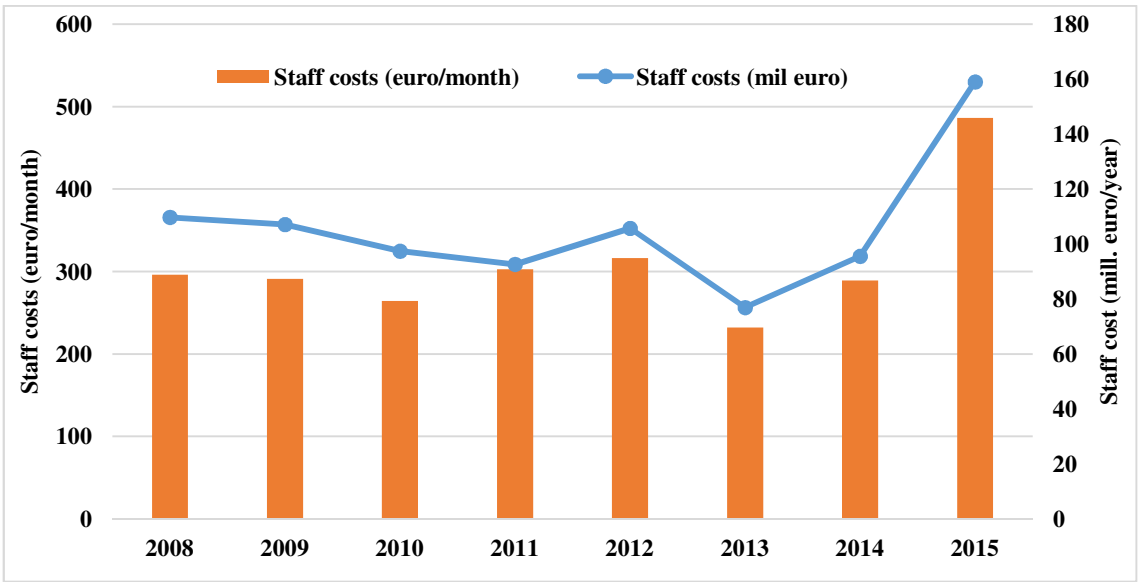


Figure 7: HR costs (annual – millions euro, respectively euro/employee monthly)

Source Author, by using NIS Data (2017)

Per employee, reporting total personnel costs by the total number of employees, it could be observe that an employee cost the Romanian RDI between 230 and 460 euro per month, which in terms of net revenue accounted for employees between 150 and 300 Euros/month.

At European level, Romania is situated just over Bulgaria at the salary of human resource (European Observatory of Working Life, 2017).

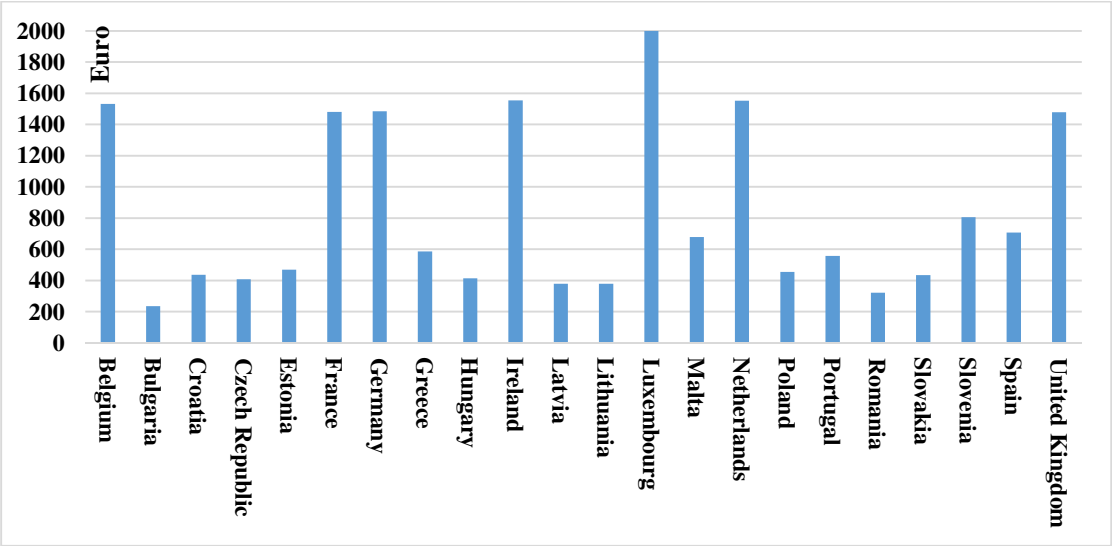


Figure 8: Minimum monthly wage level at European level (valid from 1 April 2017)

Source Author, using European Observatory of Working Life Data (2017)

Luxembourg ranks first position in top, with a minimum wage 2,000 euros/month, while in Ireland, Netherlands and Belgium is around 1,500 euros. Bulgaria (232 euro/month), Romania (321 euro/month) and Latvia-Lithuania (380 euro/month) occupy the last positions of the top. Under the conditions of wage discrimination, the researches from Babeș Bolyai notified the European Commission that the Romanian researchers partners in the Horizon 2020 programme have the level of the average wage of four times lower than that of Western European researchers, withdrawing from submitting/applying for funds (Ionel, 2016).

Following the Eastern Europe researchers' dissatisfaction, the European Commission announced on February 17th a change in the wage rules for Romanian researchers involved in the Horizon 2020 programme (HotNews.ro, 2017). The rule, by which researchers will be paid up to 4,300 euro/month, will help to reduce wage differentials between researchers involved in EU funded projects and eventually help East European countries to keep their most talented researchers home.

Conclusions

Most universities have limited connections with the economic companies and focused on burdening the research activities with didactic tasks. Consequently, full-time research posts are still unique in the academic environment, despite that its ability to disseminate scientific results had been demonstrated. The higher education system has a weak link with the private economic environment and a reversible opening of the university research environment to the private environment is needed. The share of employees over 55 is close to the share of young researchers in Rumanian RDI in 2011-2015. The wage of the domestic RDI staff is close to the minimum level, which does not encourage the performance and the engagement of prestigious researchers. For the Romanian RDI employees, passion for research could be an important factor, but when the level of incomes is too low, the temptation of other jobs in Romania or in other countries causes staff migration. We believe that in absence of concrete measures, like governmental support applied at a national level to sustain RDI, the sector will continue its descending course, with reducing the technical staff and experts.

Acknowledgments

This paper was supported by „Dunărea de Jos" University of Galați, România.

References

Bichescu, C.I., Chivu, M., Stanciu, S., (2017), Romanian Research, Development and Innovation System in the European Context, Proceedings of the 29th IBIMA Conference: Education Excellence and Innovation Management through Vision 2020: From Regional Development Sustainability to Global Economic Growth, Austria, Vienna (May 3-4, 2017), Ed. Soliman, K.S., pp. 3350-3357.

European Commission, (2013), Research and Innovation performance in EU Member States and Associated countries. Innovation Union progress at country level, Luxembourg: Publications Office of the European Union, p. 226.

European Observatory of Working Life, (2017), Statutory minimum wages in the EU 2017, [online], [Retrieved September 23, 2017], https://www.eurofound.europa.eu/observatories/eurwork/articles/statutory-minimum-wages-in-the-eu-2017.

Guvernul României, (2014), HG 929/2014. Strategia națională de cercetare, dezvoltare şi inovare (2014-2020), online], [Retrieved September 21, 2017], http://www.research.gov.ro/ro/articol/1021/legislatia-sistemului-de-cercetare.

HotNews.ro, (2017), Orizont 2020: Comisia Europeană anunță schimbarea regulilor de salarizare pentru cercetătorii români, HotNews.ro, (February 28, 2017), [online], [Retrieved September 23, 2017], http://www.parlamentor.ro/ youth-parlamentor/orizon-2020-comisia-europeana-anunta-schimbarea-regulilor-de-salarizare-pentru-cercetatorii-romani-6903.

Ionel, C., (2016), Cercetarea romaneasca, discriminata de Comisia Europeana. Cercetatorii romani au renuntat la un grant european de excelenta de 300.000 de euro, pentru ca sunt platiti cu 3-7 euro pe ora, in timp ce colegii din Occident primesc 20-30 euro, Hot.News.ro (November 22, 2016), [online], [Retrieved September 23, 2017], http:// www.hotnews.ro/stiri-esential-21429579-cercetarea-romaneasca-discriminata-comisia-europeana-cercetatorii-romani-renuntat-grant-excelenta-300-000-euro-pentru-sunt-platiti-3-7-euro-ora-timp-colegii-din-occident-primesc-20-30-euro.htm.

Ministerul Cercetării şi Inovării MCI, (2017), Sistemul naţional de cercetare, [online], [Retrieved September 21, 2017], http://www.research.gov.ro/ro/articol/4481/sistemul-national-de-cercetare.

National Institute of Statistics NIS, (2017), Tempo Online. Educație. [online], [Retrieved September 20, 2017], http://statistici.insse.ro/shop.

Stanciu, S., Sârbu, R., Bucur, R.C., (2017), An Analysis of the Romanian Market of Higher Education, in Proceedings of the BASIQ International Conference: New Trends in Sustainable Business and Consumption, 31 May -3 June 2017. Graz, Austria, ISSN 2457-483X, ISSN-L 2457-438X, Ed. Pamfilie,

R., Dinu, V., Tăchiciu, L., Pleșea, D., Vasiliu, C., ASE Publishing House, Bucharest, pp 624-632

World Bank, (2012), Functional Review of the Research, Development & Innovation Sector, p. 18.

Frameworks used in IT Governance

Ing. Matej Černý, PhD., University of Economics in Bratislava, Faculty of Business Management, Bratislava, Slovak Republic, matej.cerny@euba.sk

Ing. Mgr. Miloš Bodiš, PhD., University of Economics in Bratislava, Faculty of Business Management, Bratislava, Slovak Republic, milos.bodis@euba.sk

Ing. Anikó Töröková, PhD., University of Economics in Bratislava, Faculty of Business Management Bratislava, Slovak Republic, aniko.torokova@euba.sk

Abstract

The aim of this work is to find out, which frameworks are used in companies in the field of IT Governance. The first part of this work deals with definition of the term IT Governance and its difference to IT management and compiles the list of used IT Governance frameworks. The most used frameworks are COBIT, ISO and ITIL, but it is recommended that companies should use more than one framework, because every framework is strong in a different field. The second part is devoted to research on how companies in Slovakia use these frameworks with regard to their size defined by a number of employees and due to the origin of the company's owners.

Keywords: IT governance, IT management, framework

Introduction

Different definitions of IT Governance put emphasis on different areas of ISIT. In our research we will analyse usage of various methods and IT services. In a certain sense, the core of IT Governance is setting of rules for input data provided into individual areas of IT governance and rules of decisive rights in ISIT. Aim of this article is to uncover which frameworks are used in companies with focus on Slovakia in the area of IT Governance.

Literature Review

Status of the issue in the area of IT Governance in Slovakia and abroad

It may be not simple to fully understand the term of IT Governance, especially if its meaning is crossing through several areas of the organization. IT Governance can be called a way of approach towards the IT processes governance in an organization. These put information systems and information technologies (ISIT) into accordance with company's strategy. In a long-term horizon, IT Governance provides a correct direction of investments into ISIT of the organization, based on clearly defined processes of assessment of all IT development strategic requirements. IT Governance contains a body of rules, relationships and processes, which provide the organization's management with tools to make ISIT support the strategic goals of the company in a highest possible level (ManagementMania, 2016). A very simple definition comes from Craig Simons (2005), a researcher of the Forrester agency: IT Governance is a process, which is used for making decisions in the area of IT investments. It determines the way of making decisions, by whom they are made, who is responsible and how the results of decisions are measured and monitored. All of this creates parts of the IT Governance. Based on the definition, every organization has a certain form of IT Governance. The definitions provided earlier may be easily summarized: IT Governance is a framework, which makes the ISIT infrastructure able to support and enables the company's strategies and goals (Calder, 2007). Other definitions replace the word 'framework' with 'processes'. This is how IT Governance is defined also by the advisory company Gartner (2017).

However, it is necessary to see the difference between IT Management and IT Governance. IT Management covers specific daily decisions, which are made based on a systematic decisive process

by people, who were given the right to make decisions (Weill, Ross, 2004). To attain the correct goals of company's performance, IT Governance uses values of company governance for the correct usage and management of IT (Alkhaldi, et al., 2017).

IT Governance is not only a question of IT. In the broadest sense of the word, it is a part of the overall company governance but with specific focus on improving governance and control of information technologies for benefit of the parties involved. IT Governance covers culture, organization, policy and procedures, which provide governance and control of IT in five key areas: (NCC, 2005)

- **Alignment** – Provision of strategic direction of IT and alignment of IT and company goals in the area of services and projects.
- **Value Delivery** – Organization should be able to get the maximal benefit of IT and to assess returnability of the investments in IT.
- **Risk Management** – There are processes in the company to ensure that the risks are correctly managed. It contains evaluation of risk aspects in IT investments.
- **Resource Management** – Provision of directions on a high level during obtaining and using IT resources. Supervision of overall IT financing on an enterprise level. Examination of adequate ability and infrastructure of IT to support the current and expected business requirements.
- **Performance Measurement** – Verification of strategic compliance, which means reaching strategic goals in IT.

Primarily, it is the IT Director in the company who is responsible for IT Governance; however, the nature of ISIT has influence on work of all leading workers in the organization. Properly implemented principles of IT Governance increase the level of protection of investments into IT.
Implementation of good IT Governance in a company requires a framework, which is based on three main pillars: (Simons, 2005)

- **Organization Structure –** Who is making decisions? Which organization units, commissions, positions will be created, who will participate in the units and what will be the setting of responsibilities?
- **Process** – How are the investments decision in IT being made? What are decision-making processes for investments proposal, control, approval and preference of an investment?
- **Communication** – How will the results of these processes and decisions monitored, measured and communicated? What mechanisms will be used for announcements about IT investments decision for board of directors, executive management, company managers, IT managers, employees and shareholders?

In case of IT Governance implementation into a company, it is recommended to implement one of the frameworks, like:

ITIL – Information Technology Infrastructure Library. ITIL focuses on administration of IT services. Its goal is to ensure, that IT services are able to support the main processes of business. ITIL consists of five bodies of confirmed management procedures of strategy services, design, transition (e.g. Change Management), operation and continual service improvement (Lindros, 2017).

It is the most widely used methodology in ITSM. ITIL is a body of best practices concepts and methods, which are used for management of IT services delivery. Its primary motivation is improvement of planning, usage and quality of information technologies, either from the perspective of the customer or supplier. ITIL is an extensive manual for IT services administration. Its core is made of the following 5 publications: (Persse, 2010)

- Service Strategy (SS) – Basic direction and goals of the services,
- Service Design (SD) – Proposal of services,
- Service Transition (ST) – Transition of services into operation,
- Service Operation (SO) – Operation of services,
- Continual Service Improvement (CIS) – continual improvement of the service.

Methodology of ITIL is not the only framework used for IT services administration. Among the other widely used frameworks applied in the area of IT services administration is primarily COBIT (currently in version 5), MOF (currently in version 4.0) and the set of standards ISO/IEC 27002:2005. (Jurkscheit, 2014)

COBIT – Published by the organization ISACA, COBIT is a comprehensive framework of globally accepted methods, analytic tools and models. It is designed for governance of company's IT. Using the basis in the area of IT audit, the company ISACA increased the competence of COBIT to fully support IT governance. The newest version of COBIT 5 is widely used by organizations focusing on Risk Management and reducing their impact. (Lindros, 2017)

COBIT is a body of best practice for governance and administration of company's information technologies (IT Governance). It is designed for all kinds of companies (commercial companies, public companies or non-profit organization) of any size. It was by ISACA (International System Audit and Control Association) based on experience from 15 years of practice. Currently, its fifth version is in use, issued in 2012. (ISACA, 2012)

Methodology COBIT provides extensive framework of methods, which are supposed to help companies in attaining their strategic goals by means of effective usage of available resources and minimisation of IT risks. It helps to create optimal value consisting of IT service by establishment of balance among usage of resources, optimisation of risk level and creation of benefit. Its view is closer to top managers than IT managers. It uses holistic approach to IT management, connecting views of enterprise governance and IT services management.

Principles and terms used in COBIT 5

COBIT is based on five key principles:

- Proper understanding of the company's owner needs – companies exist to create value for their owners.
- Coverage of the business as a whole – IT assets need to be handled as any other assets of the company.
- Usage of a united, integrated framework – concord among the individual standards being used must exist.
- Support of holistic approach – effective and precise IT services governance requires holistic approach, using multiple mutually cooperating components.
- Governance Department and Management Department – company's governance should guide, monitor and evaluate the company's requirements and management should plan, prepare and monitor the activities subordinate to them.

In COBIT methodology, a process approach is used with seven categories of elements defined:

- Principles, rules and frameworks – tools for maintaining a required behaviour.
- Processes – organized sets of activities and practices producing an output, which supports the IT goal.
- Organization structures – key deciding entities.
- Culture, ethics and behaviour – characteristics of an individual or a society, often underestimated factor of success.
- Information – entity, necessary for function of the company, often a final product of the business.
- Services, infrastructure and applications – tools enabling the processing of information.
- People, abilities and competencies – entities capable of action and decision-making.

Processes COBIT 5

COBIT 5 divides 37 processes of IT services in a company into 2 basic domains – Governance and Management. Each of the groups contains a set of processes. The domain of Governance contains 5 processes and each of them applies principles of evaluation, direction and monitoring. The domain of

Management contains 4 subdomains in accordance with responsibilities of the management – plan, build, run and monitor (PBRM) – and provides end-to-end coverage of IT services. The individual subdomains are as following: (Knapp, 2010)

- Align, Plan and Organise (APO) – setting, planning and organization of activities; it contains 13 processes.
- Build, Acquire and Implement (BAI) – creation, acquisition and implementation of activities; it contains 10 processes.
- Deliver, Service and Support (DSS) – delivery, service and support of activities; it contains 6 processes.
- Monitor, Evaluate and Assess (MEA) – monitoring, evaluation and assessment of activities; it contains 3 processes.

Comparison with ITIL

The methodologies are mutually fully compatible, since the fundamental principles of IT delivery governance are either identical in a certain level or at least they are not in a contradiction. However, from the organization-process view they are interpreted in a different way. It is more suitable to use COBIT framework, if it is needed to define a strategic direction of IT in the company and interconnect it with the overall company's strategy. Methodology of COBIT is more focused on governance of company informatics, describing all the areas of the management, which should be covered to create value in an effective and precise way. However, the practices of the COBIT framework do not describe the design of the individual processes, functions and activities.

In comparison with COBIT, the methodology of ITIL is more adjusted for implementation of system of IT services delivery management, as it does not deal with the strategic interconnection between IT service and direction of the company in such a detail. It is focused on a detailed description for the purpose of the individual processes implementation.

CMMI – Integration method of the model Capability Maturity, which has been developed by the organization Software Engineering Institute, represents an approach of company's performance improvement. CMMI uses a scale from 1 to 5 to measure performance, quality and profitability of the organization. Levels of maturity in CMMI provide a strict reference and assessment method, which enables the organization to compare its capabilities with its competitors, industrial branch and in time. CMMI provides five levels of maturity, which demonstrate evident course towards improvement. (CMMI, 2017)

At reaching level 4 or 5 of the CMMI model, the organization shows deeper commitment to continue in capability improvement by means of statistic and other quantitative methods. Organizations of high maturity are constantly developing, adjusting and growing to satisfy the needs of parties and customers involved.

ISO/IEC 38500 and other supplementary ISO norms – ISO / IEC 38500: 2015 provides governing principles for the members of directing bodies in organizations (which may include owners, directors, partners, executive managers, etc.) about effective and acceptable usage of information technologies (IT). Also, it provides consultancy for those who deal with consulting, informing or helping the directing bodies. The following can be contained here: executive managers, members of groups monitoring resources inside the organization, external business persons or technical experts, e.g. law or accountancy experts, retail or industry associations or profession bodies, internal and external providers of services (including consultants) and auditors. ISO / IEC 38500: 2015 is related to governance of the current and future usage of IT by the organization, including processes of management and decisions dealing with the current and future usage of IT. These processes can be directed by IT experts in the organization, external suppliers of services or business units inside the organization. It defines IT governance as a subset or domain of the organization governance, or corporate governance in case of corporation. (ISO, 2015)

Frameworks comparison

The best example of how we can explain the comparison or interactions between frameworks is the analogy with building a house. By building a house we are beginning with foundation. With frameworks, it is ITIL with its IT service management, which creates the foundation of our house, COBIT is the walls and the roof is ISO 38500. If directing bodies in organization want to implement ISO 38500 without COBIT or ITIL, it won't work and also, on other hand, if the organization has implemented COBIT and ITIL and doesn't have ISO, coverage of all aspects of IT Governance is not complete. The Table 1 covers the IT Governance framework overview.

Table 1: IT Governance Frameworks Overview

	COBIT	**ITIL**	**ISO 38500**
FUNCTION	IT Process	Service Level Management	Guiding principles for TOP management
AREA	4 Process and 34 Domain	9 Process	6 principles
ISSUER	ISACA	OGC	International Organization for Standardization
CERTIFICATION POSSIBILITY	NO	Certification of personnel	At this time - NO

Research Design

In our research we focus on the area of IT Governance frameworks used by companies in formalised ISIT management and in harmonisation of the organization's aims with aims of IT department. Based on the analysis of the available theoretical literary sources from paid scientific databases, expert books and journals and from the internet, we have created a list of existing frameworks used by organizations in the area of IT Governance. Using the method of synthesis, we selected out these frameworks and created the final list.

Within the theoretical bases of the researched area of IT Governance, the conclusions and the list of the frameworks were consequently verified in practice by means of survey. The survey was focused on finding how do the organizations of various size working in Slovakia in various branches currently handle the area of the specific IT process.

In the statistical analysis, the first part of the analysis was dealing with research on the connections between two nominal variables and their frequency, using the methods of measurement of the association between two variables (Phi, Cramer's V. and Contingency Coefficient). In the second part consisting of the analysis of dependence, a statistic method of Chi-Square (Pearson) was used with statistical significance of 0.05.

The survey was performed by means of an electronic questionnaire aiming to gain sample of 200 answers. We obtained a random sample of business entities. The survey was performed among the business entities working in Slovakia. The studied sample was divided into categories based on size (number of employees), legal structure, geographic influence, structure of owners and branch. The basic statistic information about the respondents is stated in the Table 2.

Table 2: The basic statistical information about the respondents

Statistical Data		Legal Structure	Branch	Geographic Influence	Structure of Owners	Number of Employees	Turnover
N	Contained	236	236	236	236	236	236
Median		Inc.	Financial and Insurance Services	Europe	Entirely Slovak Owner	10 – 49 Employees	667,000. – 1.6 mil. €
Modus		Inc.	Financial and Insurance Services	Only Slovakia	Entirely Slovak Owner	10 – 49 Employees	over 1.6 mil. €

In Table 3, the number of employees in the analysed companies is covered. We used distribution as reported by the Statistical Office of the Slovak Republic.

Table 3: Number of employees

Number of employees	Count	Percent	Cumulative percent
1 – 9	59	25,0	25,0
10 – 49	62	26,3	51,3
50 – 99	25	10,6	61,9
100 – 249	33	14,0	75,8
250 and more	57	24,2	100,0
Total	236	100,0	

Research Results and Discussion

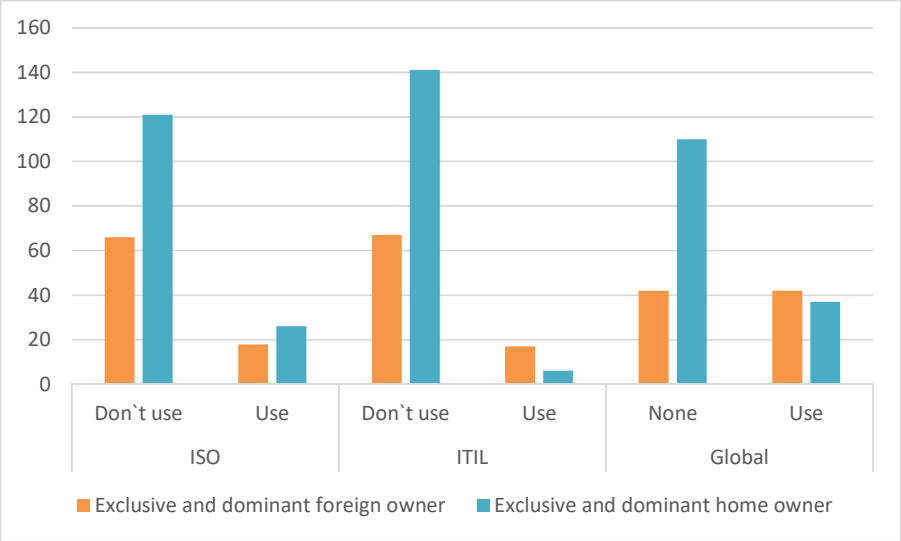
The survey was aimed to find out, which frameworks are used by companies in practice in governance of the specific IT process. The overview of frameworks can be found in the Table 4.

Table 4: Overview of the frameworks used

Methods	Answers
	Percent
ISO	17.7 %
CMM	3.2 %
ITIL	9.4 %
COBIT	1.2 %
Other	7.5 %
None	61 %
Total	100 %

The highest number of cases does not use any of the listed frameworks in creation and governance of the specific IT process. In companies which used one of the methods, the ISO method is used most frequently, followed by ITIL, then CMM models and COBIT.

For the purpose of more detailed analysis of the results an overview is provided, containing the first



three most frequent options from the Table 2, based on the origin of the organization's owners, that is either Slovak or foreign origin. We presume that the origin of the owners shall have impact on usage or non-usage of some of the approaches listed. We suppose that the companies with entirely or dominantly foreign owner shall be more inclined to usage of some of the approaches listed than companies with Slovak owner. The numbers are listed in the Graph 1.

For better understanding of the results, we calculated a ratio between the number of companies not using any of the listed frameworks and the number of companies, which do use some of them. In case

where the companies stated that they do not use any of the listed approaches, we calculated a ratio between the number of companies not using any of the approaches and number of companies using at least one of the listed approaches.

Fig 1: Numerousness based on the origin of the organization's owners

Answers, in which the respondents reported no usage of any of the approaches listed, divided our sample of research into group of companies using at least one of the approaches listed and group of companies using no approach. For the further analysis, it is necessary to find out if there is a mutual connection between using/not-using some of the approaches listed and origin of the organization's owners. Since we deal with research of relation between two nominal variables and their frequency is lower than 5 in some of the table fields, the methods of measure of association between two nominal variables were used. The results can be found in the Table 5.

Table 5: Mutual relationships

	Value	Approx. Sig. (p)
Phi	.319	.000
Cramer's V	.319	.000
Contingency Coefficient	.304	.000

The third column of the Table 3 contains Approx.Sig. (p), reaching values 0.000 < 0.05, thus it can be stated, that at the significance level of 0.05, there is a relationship between the variables. Based on the calculated values in the second column of the Table 5, it can be stated that the relationship intensity is medium. The method used in assessing the specific relationship is marked with a grey background in the Table 5.

One in four companies with entirely or dominantly Slovak owner uses a certain approach in procurement of application software. In the case of foreign owners, it is one in two companies using a certain approach. Lower usage of some of the listed approaches by companies with Slovak owners in comparison to companies with foreign owners can result in a higher risk of incorrectly created and governed specific IT process.

In the case of ISO norms, the difference in ratio between using/not-using is lower to disadvantage of Slovak companies. The lower difference can be assigned to the fact, that ISO norms are relatively widely spread and used in Slovakia. There is an opposite situation with ITIL standards, containing a considerable difference in ratios to disadvantage of companies with Slovak owners. The reason can be assigned to lower knowledge of these standards in Slovakia, mainly in the area of small and medium-size companies.

The relationship between the size of a company and the fact of using/not using some of the frameworks listed was also analysed in an expert way. We presume that the larger the company is, speaking about the number of employees, the higher will be the number using some of the frameworks listed, because the larger number of employees creates better conditions and capacity for usage of some of the frameworks listed. Size criterion was summarised into two categories: 1–99 employees and over 100 employees. The results are shown in the Graph 2.

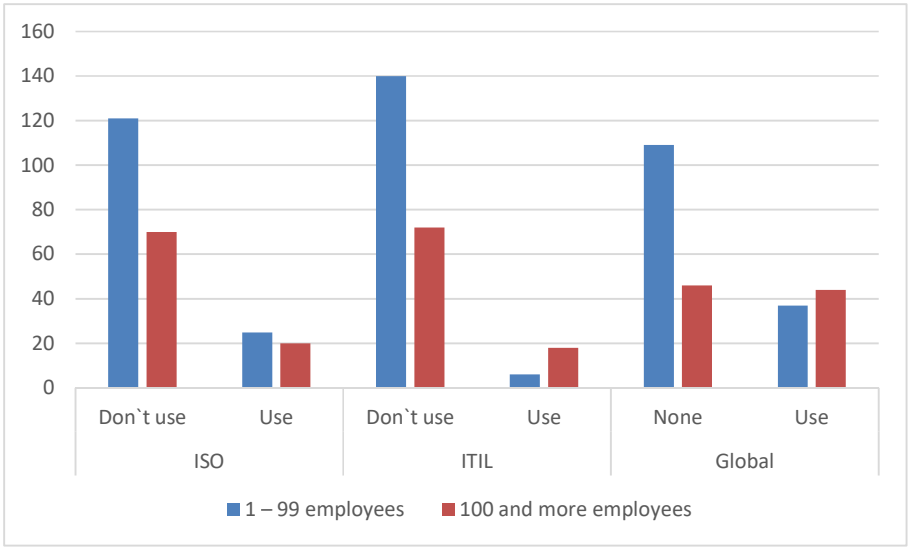


Fig 2: Frequency based on the size of the organization in regard to the number of employees

For analysis of relationship between number of employees and usage of some of the frameworks listed the statistic method Chi-Square was used, with statistical significance of 0.05. Based on the calculation of Chi-Square tests and by means of statistic software, results were uncovered and can be found in the Table 6.

Table 6: Chi-Square test

Chi-Square test	Value	df	Asymp. Sig. (p)
Pearson Chi-Square	28.271[a]	4	.000
a. No cell contains a value lower than 5. Minimal value is 8.58.			

The fourth column of the Table 6 contains Asmp.Sig. (2-sided) representing a minimal level of significance, based on which the mutual relationship can be either confirmed or denied. Since 0.000 < 0.05, it can be stated that in case of significance level of 0.05 there is a relationship between the variables. This relationship can be considered as strong.

Based on the results obtained it can be stated that in companies with more than 100 employees every second company is using some of the approaches listed. The situation is different in case of 99 or less employees. In this case, only one out of four companies uses some of the approaches listed. With the results uncovered, it can be stated that our presumption was confirmed.

Study limitations

In regards to the usage of ISO norms, it can be stated that their usage by companies in Slovakia is relatively high and the differences in ratios correspond with the previous findings. With ITIL standards, their usage by small and medium-size companies can be considered problematic, with only one in twenty-four organizations using this approach in procurement of application software. The lack of usage of these standards in small and medium-size companies may not be considered in a negative way, as these standards are more suitable for larger companies due to the increased complexity and demanding character of the standards.

The area of IT governance is related with the big companies and marginally also with medium size companies. The limitation of our research is that high amount of our data comes from small and medium size companies. We conducted the survey among the businesses only at a certain time. It would be desirable to verify findings with another survey or with a survey conducted in a different country.

Conclusion

IT Governance provides the company with many important functions as establishment and supervision over the organization's approach towards usage of information, digital services and related technologies. This contains, among the other things, the responsibility for digital services providing, the level of quality in services that meet the current and future business requirements, policies and methods for establishment of balance with compulsory law regulations and directives, strategic plans for ISIT, which enable the support of business strategy of the organization, transparent decision-making leading to rationale of investments with adequate balance among benefits, opportunities, costs and risks for the parties involved.

In the first part of the article, we attempted to summarise the basic grounds and definitions for the area of IT Governance and subsequently we created an overview of existing frameworks, which help companies in implementation of IT Governance and effective governance of their IT. Among the main frameworks there is COBIT, ITIL, ISO norms (mainly 38500) and others. Of course, organizations may use none of the frameworks listed, but in that case, they should follow the basic principles of IT Governance.

In the second part of the work, we focused to uncover the usage status of the selected frameworks used in IT Governance in Slovakia. Based on the research conducted among Slovak companies, the usage of these frameworks by the companies and impact of the company owner's origin and size of the company on the frameworks usage was analysed. Among the selected frameworks, ISO norms are the most widely used. Frameworks like ITIL, maturity models and COBIT are used in a lesser extent. It was uncovered that in companies with a Slovak owner there is a lower usage of some of the frameworks listed than in the companies with foreign owners. Speaking about the size of the company, usage of the frameworks is in direct proportion to the company's size and number of employees.

What is the most important for a company in the area of IT Governance is its effort to transfer the main business aim into the lower levels and harmonisation of their efforts to help in attaining the main aim.

Note

The article was prepared as a part of the project VEGA 1/0436/17 Conceptual frameworks of IT Governance and their influence on the competitiveness of companies in Slovakia (Original: VEGA 1/0436/17 Koncepčné rámce IT Governance a ich vplyv na konkurencieschopnosť podnikov v SR).

List of Abbreviations and Acronyms

IT – Information Technology
ISIT – Information Systems and Information Technology
ITSM – Information Technology Service Management
ICT – Information and Communication Technology
ITIL - Information Technology Infrastructure Library
COBIT - Control Objectives for Information and Related Technologies
CMMI - Capability Maturity Model Integration

References

ALKHALDI, M. – HAMMAMI, M. – UDDIN, A. (2017). Understanding value characteristics toward a robust IT governance application in private organizations using COBIT framework. *In International Journal of Engineering Business Management* [Online]. [2017.09.14.] Available on the Internet <http://journals.sagepub.com/doi/full/10.1177/1847979017703779>

BROHI, K. et al. (2011). Validating & Assessing IT objectives towards the development of an IT governance assessment framework (ITGaF). *In Journal of Information & Communication Technology* [Online]. no. 2. year 5. 40-51 p. [2017.09.14.] Available on the Internet <https://www.researchgate.net/publication/301636531_Validating_Assessing_IT_objectives_towards_the_development_of_an_IT_governance_assessment_framework_ITGaF>

CALDER, A. (2007). IT Governance - A Pocket Guide. IT Governance Publishing : England. 2007. 52 p.

CMMI Institute. (2017). What Is Capability Maturity Model Integration (CMMI)®?. [Online]. CMMI Institute: USA. [2017.09.14.] Available on the Internet: <http://cmmiinstitute.com/capability-maturity-model-integration>

Gartner. (2017). IT Governance (ITG). [Online]. Gartner: USA. [2017.09.14.] Available on the Internet: < http://www.gartner.com/it-glossary/it-governance>

International Organization for Standardization ISO. (2015). ISO/IEC 38500:2015. [Online]. International Organization for Standardization ISO: Swiss. [2017.09.14.] Available on the Internet: < https://www.iso.org/standard/62816.html >

ISACA. (2012). Cobit 5: A business framework for the governance and management of enterprise IT. Rolling Meadows. IL: ISACA.

JURKSCHEIT, J. (2014). An analysis of the success factors in implementing an ITIL-based IT change and release management application: based on the IBM change and configuration management database (CCMDB). Hamburg, Germany: Anchor Academic Publishing.

KNAPP, D. (2010). The ITSM process design guide: developing, reengineering, and improving IT service management. Ft. Lauderdale: FL: J. Ross Pub.

LINDROS, K. (2017). What is IT governance? A formal way to align IT & business strategy. [Online]. CXO MEDIA INC.: USA. [2017.09.14.] Available on the Internet: <https://www.cio.com/article/2438931/governance/governanceit-governance-definition-and-solutions.html>

ManagementMania. (2016). IT governance. [Online]. ManagementMania: USA. [2017.09.14.] Available on the Internet: < https://managementmania.com/sk/it-governance>

PERSSE, J. R. (2010). A basic approach to ITIL service operation: setting the foundation for ITIL v3. Atlanta: GA: Tree Of Press.

SIMONS, C. (2005). IT Governance Framework [Online]. Forrester: Cambridge. [2017.09.15.] Available on the Internet: <http://i.bnet.com/whitepapers/051103656300.pdf IT Governance Framework.pdf>

The National Computing Centre. (2005). IT Governance Developing a Successful Governance Strategy [Online]. The National Computing Centre: England. [2017.09.15.] 70 p. Available on the Internet: < https://www.isaca.org/Certification/CGEIT-Certified-in-the-Governance-of-Enterprise-IT/Prepare-for-the-Exam/Study-Materials/Documents/Developing-a-Successful-Governance-Strategy.pdf >

WEILL, P. – ROSS, JW. (2004). IT governance: how top performers manage IT decision rights for superior results. Boston: Harvard Business Press, 277 p.

WEILL, P. – ROSS, JW. (2004). Ten Principles of IT Governance. [Online]. International Harvard Business School: USA. [2017.09.14.] Available on the Internet: < http://hbswk.hbs.edu/archive/4241.html>

Determinants of Pro-Environmental Behavior at Work: State-Of-The-Art Review and Integrative Research Framework

Adam Ryszko, Silesian University of Technology, Gliwice, Poland, adam.ryszko@polsl.pl

Abstract

The paper presents a comprehensive review of theoretical frameworks and models used to explain pro-environmental behavior. In particular, conceptual approaches and determinants of specific patterns of pro-environmental behavior at work are identified and characterized. The presented approaches applied to explain pro-environmental behavior at work include, inter alia, the theory of planned behavior, the value-belief-norm theory, the social exchange theory, the cognitive theory of stress, and multilevel motivational model. It is indicated that pro-environmental behavior in organizational settings is the effect of different internal and external factors compared to green behavior observed in the private sphere. Therefore, based on the analysis results, an integrative research framework is proposed for holistic studies on determinants of pro-environmental behavior at work.

Keywords: pro-environmental behavior, pro-environmental behavior at work, employee green behavior

Introduction

Environmental sustainability depends strongly on human behavior patterns. Researchers distinguish different terms describing the same or similar types of pro-environmental behavior (PEB). However, all these studies focus on minimizing the negative environmental impact of human behavior. Kollmus and Agyeman (2002) claim that PEB is a kind of behavior that consciously seeks to minimize the negative impact of one's actions on the environment (Kollmuss and Agyeman, 2002). Ones and Dilchert (2012) define green behavior as scalable action and behavior that employees engage in that are linked with and contribute to or detract from environmental sustainability.

Stern (2000) points out that PEB in organizational settings is explained by different determinants compared to those which affect environmental behavior in the private sphere. In fact, many environmental researchers have attempted to identify the factors that influence PEB in household settings and different models have been developed for the purposes of the identification. The problem with the existing models is that they are applied to explain PEB in households, while research still fails to offer an exclusive explanation of PEB in the workplace. It is worth noting that employees spend about a third of their time at work. Consequently, it is expected that PEB in the workplace will contribute significantly to minimization of the negative impact of employees' actions on the environment.

This paper presents a comprehensive review performed in particular to:

- present theoretical frameworks and models used to explain pro-environmental behavior,
- identify and characterize conceptual approaches used to explain pro-environmental behavior at work,
- identify and discuss determinants of pro-environmental behavior at work,
- propose an integrative research framework for holistic studies on determinants of pro-environmental behavior at work.

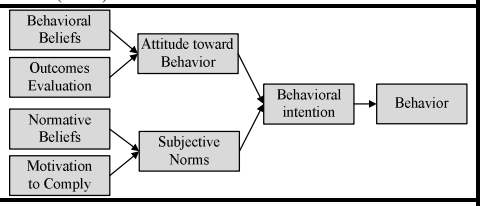
Selected Theoretical Frameworks Explaining Human Behavior In General

There are different basic conceptual frameworks and models explaining individual behavior that form the basis for further considerations related to PEB. In particular, they comprise as follows:

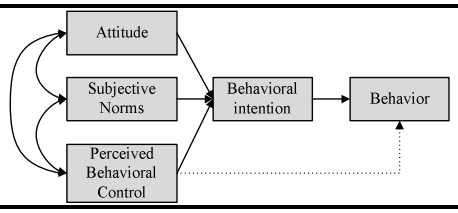
- Theory of Reasoned Action (TRA), drawn from social psychology, one of the most fundamental and influential theories of human behavior (Fishbein and Ajzen, 1975). TRA depicts a relationship that links beliefs, attitude, intentions, and behavior. Beliefs influence on one's overall attitude about an object. This in turn, guides the individual's intentions, which influence on behavior regarding the subject. Thus, according to TRA behavioral intention is determined by attitudes to behavior and subjective norms;
- Theory of Planned Behavior (TPB), extended TRA by adding the construct of perceived behavioral control. Therefore, perceived behavioral control is theorized to be an additional determinant of intention and behavior (Ajzen, 1991);
- Decomposed Theory of Planned Behavior (DTPB), to more reasonably explain and to predict human behavior on different conditions, Taylor and Todd (1995) decomposed the unidimensional belief constructs into multidimensional belief constructs. For example, the attitude is decomposed into the three constructs which include perceived usefulness, perceived ease of use, and compatibility (i.e. with values, experiences etc.);
- Multilevel Motivational Model (MM), general motivation theory as an explanation for specific behavior adapted for specific context in several studies. Vallerand (1997) presents an excellent review of the fundamental tenets of this theoretical base;
- Innovation Diffusion Theory (IDT), grounded in sociology has been used to study a variety of innovations (Rogers, 1983). Moore and Benbasat (1991) refined a set of constructs that could be used to study individual innovation acceptance;
- Norm Activation Model (NAM), developed in the context of altruistic behavior. The core of the NAM are personal norms which are actively experienced as feelings of moral obligation not as intentions. These personal norms are used in the NAM to predict individual behavior and they are determined by two factors: the awareness that performing (or not performing) the particular behavior has certain consequences, and the feeling of responsibility for performing the specific behavior (Schwartz, 1977);
- Value-Belief-Norm theory (VBN theory), provides a framework for investigating normative factors that promote environmental attitudes and behavior. The theory integrates value theory, the new environmental paradigm perspective and norm-activation theory. It suggests a chain of variables, from values and general environmental concern to specific beliefs about the negative consequences of certain actions and the individuals' ability and responsibility to avert these negative consequences, which in turn activates environmental personal norms for behavior (Stern et al., 1999).

Table 1 presents the core constructs and structure of selected models of the above mentioned conceptual frameworks.

Table 1: Core constructs and structure of selected models of individual behavior

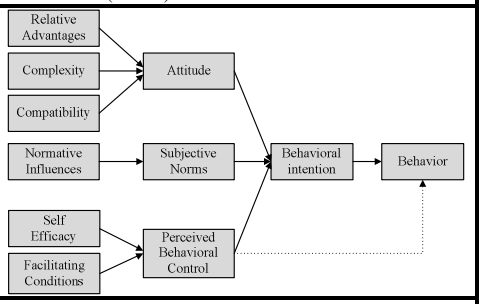
Core constructs	Structure of theoretical model
Theory of Reasoned Action (TRA)	
• Attitude towards behavior – an individual's positive or negative feelings about performing the target behavior • Subjective norm – the person's perception that most people who are important to him think he should or should not perform the behavior in question	
Theory of Planned Behavior (TPB)	

- Attitude Toward Behavior – adapted from TRA
- Subjective Norm – adapted from TRA
- Perceived Behavioral Control – the perceived ease or difficulty of performing the behavior, perceptions of internal and external constraints on behavior



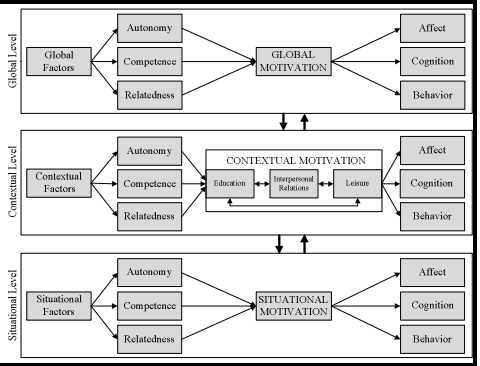
Decomposed Theory of Planned Behavior (DTPB)

- Attitude Toward Behavior – adapted from TRA
- Subjective Norm – adapted from TRA
- Perceived Behavioral Control – adapted from TPB
- Relative Advantage, Complexity, and Compatibility – adapted from IDT
- Normative Influences – influence of other people that leads one's to conform in order to be liked and accepted by them
- Facilitating Conditions – adapted from TRA
- Self-Efficacy – adapted from TRA



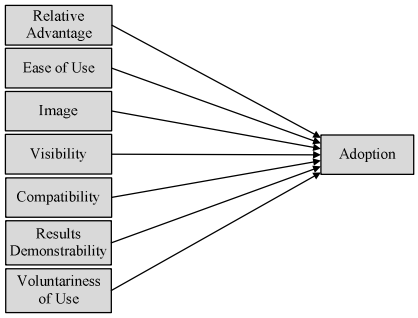
Multilevel Motivational Model (MM)

- Extrinsic Motivation – the perception that users will want to perform an activity because it is perceived to be instrumental in achieving valued outcomes that are distinct from the activity itself, such as improved job performance, pay or promotions
- Intrinsic Motivation – the perception that users will want to perform an activity for no apparent reinforcement other than the process of performing the activity per se



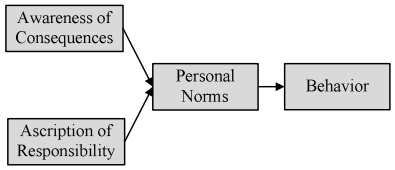
Innovation Diffusion Theory (IDT)

- Relative Advantage – the degree to which an innovation is perceived as being better than its precursor
- Ease of Use – the degree to which an innovation is perceived as being difficult to use
- Image – the degree to which use of an innovation is perceived to enhance one's image or status in one's social system
- Visibility – the degree to which one can see others using the system in the organization
- Compatibility – the degree to which an innovation is perceived as being consistent with the existing values, needs, and past experiences of potential adopters
- Results Demonstrability – the tangibility of the results of using the innovation, including their observability and communicability
- Voluntariness of Use – the degree to which use of the innovation is perceived as being voluntary, or of free will



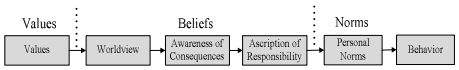
Norm Activation Model (NAM)

- Personal norms – a person's self-expectations for a specific behavior which originated from norms and values pertaining to the behavior
- Awareness of consequences represents the person's tendency to relate his own behavior to the welfare of others
- Ascription of responsibility refers to the person's personal feeling of whether he is responsible for the consequences of the behavior



Value-Belief-Norm theory (VBN theory)

- Personal norms – adapted from NAM
- Awareness of consequences – adapted from NA
- Ascription of responsibility – adapted from NAM
- Worldview – a view that human actions have substantial adverse effects on a fragile biosphere
- Values – general value orientations such as biospheric values, altruistic values, egoistic values or self-transcendence and self-enhancement values.



Based on: Ajzen (1991), Davis et al. (1992), Fishbein and Ajzen (1975), Moore and Benbasat (1991), Schwartz (1977), Stern (2000), Taylor and Todd (1995)

Determinants of Pro-Environmental Behavior in General

Steg and Vlek (2009) distinguish three lines of research that focus on individual motivations to engage in environmental behavior, respectively: perceived cost and benefits, moral and normative concerns, and affect.

A wide range of studies on environmental behavior started from the assumption that individuals make reasoned choices and choose alternatives with highest benefits against lowest costs (i.e. in terms of money, effort and/or social approval). With regard to this issue, TPB (Ajzen, 1991) has proven to be successful in explaining specific types of environmental behavior, e.g. the use of public transportation or travel mode choice (Bamberg and Schmidt, 2003; Heath and Gifford, 2002), household recycling (Kaiser and Gutscher, 2003; Mannetti et al., 2004), the pro-environmental purchasing (Harland et al., 1999), and general pro-environmental behavior (Kaiser et al., 1999; Oreg and Katz-Gerro, 2006).

Studies focused on the role of moral and normative concerns underlying environmental behavior from different theoretical perspectives. This includes the value-basis of environmental beliefs and behavior (De Groot and Steg, 2008). This research shows that the more strongly individuals follow values beyond their immediate own interests (i.e. self-transcendent, altruistic or biospheric values), the more likely they are to engage in PEB. Research focused on the role of environmental concern has mostly used the New Environmental Paradigm (Dunlap and Van Liere, 1978), but it should be noted that indicated relationship between environmental concern and acting more pro-environmentally was moderate (Poortinga et al., 2004).

Research on moral obligations to act pro-environmentally are generally based on the NAM (Schwartz, 1977) or the VBN theory (Stern et al., 1999). The NAM and VBN theory appeared to be successful in explaining low-cost environmental behavior and willingness to environmental behavior (Nordlund and Garvill, 2003; Stern et al., 1999). However, they have far less explanatory power in situations characterized by high behavioral costs or strong constraints on behavior and the TPB was more powerful in explaining environmental behavior in such cases (Bamberg & Schmidt, 2003). With regard to research on the influence of social norms on behavior, the theory of normative conduct has been validated in experimental studies concerning littering in public places (Cialdini et al., 1990).

Some studies have examined the role of affect in explaining environmental behavior. For example, Steg (2005) indicated that car use is most strongly related to symbolic and affective motives, while instrumental motives are less important.

It should be emphasized that the three above mentioned theoretical perspectives (i.e. perceived cost and benefits, moral and normative concerns, and affect) involve rather different antecedents of environmental behavior but are not mutually exclusive. This is because motivations are not homogeneous and are active differently at any given time.

Environmental behavior are not influenced exclusively on intra-personal factors such as attitudes, affect and personal norms alone. Indeed, many contextual factors may influence on individual

motivations and may facilitate or constrain environmental behavior. For example, the availability of recycling facilities, the quality of public transport, the quality and pricing of environmental friendly goods can strongly affect engagement in PEB. This means that contextual factors may operate in different ways They may directly affect behavior. The relationship between contextual factors and behavior may be also mediated by motivational factors. In addition, contextual factors may moderate the relationship between different motives and behavior, and the effects of contextual factors on behavior may depend on personal factors (Steg and Vlek, 2009).

It should be also noted that individuals do not always make reasoned choices. In many cases, behavior might be habitual and guided by automated cognitive processes. Habitual behavior may involve misperceptions and selective attention (i.e. people tend to focus on information that confirms their choices and neglect information that is not in line with their habitual behavior) (Steg and Vlek, 2009). Aarts and Dijksterhuis (2000) develop and apply in their research on environmental behavior a response-frequency measure of general habit strength, relying on the assumption that goals automatically activate mental representations of habitual choices.

Theoretical Frameworks Used To Explain Pro-Environmental Behavior at Work

According to Steg and Vlek (2009), the effectiveness of behavioral interventions generally increases when they are aimed at important antecedents of the relevant behavior and at removing barriers for change. This makes it possible to understand which factors promote or inhibit environmental behavior.

Factors affecting PEB in organizational settings have been studied from different theoretical perspectives. Application of these frameworks include the theory of planned behavior (TPB) (Blok et al., 2015; Cordano et al., 2010; Greaves et al., 2013; Nye and Hargreaves, 2010), the value-belief-norm theory (VBN theory) (Andersson et al., 2005; Scherbaum et al., 2008), the social exchange theory (Paillé and Boiral, 2013; Paillé and Mejía-Morelos, 2014), the cognitive theory of stress (Homburg and Stolberg, 2006), and multilevel motivational model (Kim et al., 2017).

Blok et al. (2015) confirm that the theory of planned behavior can explain PEB in the workplace. They show that there are clear differences between factors influencing PEB in households and in the workplace. Furthermore, factors like leadership support and exemplary PEB by leaders are at stake in case of PEB in the workplace, and have a significant positive impact on employee's intention to act pro-environmentally.

Greaves et al. (2013) use TPB to explore environmental behavioral intentions in a workplace setting (i.e. across three scenarios: switching off PCs every time employees left their desks for an hour or more; using video-conferencing for meetings that would otherwise require travel; and recycling as much waste as possible). TPB constructs were found to explain between 46% and 61% of the variance in employee intentions to engage in three environmental behaviors, and to mediate the effects of specific antecedent beliefs (i.e. related to attitude, subjective norms and perceived behavioral control) upon employee intentions to engage in these behaviors.

Nye and Hargreaves (2010) compare two interventions to improve PEB – at work (Environment Champions) and at home (EcoTeams). They show that the interventions open up different levels of opportunity for reviewing and renegotiating new environmentally friendly behavior against the reactions and expectations of the immediate peer group, existing workplace or domestic roles. The most important difference they found is that at work it appears difficult to break out of old roles and, alternatively, that new ones can be difficult to play in the office. Moreover, at work there is a need for hard facts and data to justify new actions.

Anderson et al. (2005) prove that when supervisors perceive commitment of their company to environmental sustainability, they are more likely to respond with PEB that is, in turn, directed toward the employees they supervise. Apparently, the supervisors in surveyed multinational corporations are attuned to the values of ecological sustainability promoted by top management, and they enact these values in their everyday interactions with subordinates. Nevertheless, they concluded that VBN theory cannot be generalized in work settings because perceived corporate commitment to sustainability was the only one of the variables from adapted VBN framework to predict supervisor sustainability support behavior. It turned out that supervisors' personal environmentalism, their trust in top management, and their affective commitment did not predict sustainability support behavior.

Scherbaum et al. (2008) examine the individual-level factors related to energy-conservation behavior at work among employees of a large state university. They found that environmental personal norms predicted energy-conservation behavior, as well as behavioral intentions. Environmental personal norms also mediated the relationship of environmental worldviews with energy-conservation behaviors and behavioral intentions.

Paillé and Boiral (2013) focus on organizational citizenship behavior for the environment (OCBE) which constitutes a construct to capture PEB in the work setting. They validate three-factor model of OCBE, including namely, eco-helping, eco-civic engagement, and eco-initiatives. It is indicated that when employees feel supported by their organization, they become more committed and satisfied and are willing to engage in OCBEs. In addition, perceived organizational support and job satisfaction had an indirect effect on OCBE.

Paillé and Mejía-Morelos (2014) prove that perceived organizational support has an indirect effect on PEB through employee commitment to the organization. In addition, organizational support moderates the effect of a perceived breach on employee job satisfaction. Their findings reveal that the employee perception of a discrepancy between what was previously promised and what was provided by the organization may be conceptualized as an obstacle to performing PEB.

Homburg and Stolberg (2006) develop a model that aims at explaining individual PEB: environmental stressors (e.g. pollution in domestic and work contexts), mediated via appraisal processes (demand appraisal, self-efficacy), activate problem-focused coping. This in turn leads to PEB in various behavioral domains (including workplace). They indicate that appraisal processes activate problem-focused coping, which in turn leads to PEB. It is worth noticing that Homburg and Stolberg distinguished direct or indirect PEB. Direct PEB refer to actions resulting in improving the environment (e.g., recycling), and indirect PEB refer to worker motivation about providing advice or encouragement to others individuals in the workplace to adopt direct PEB.

Kim et al. (2017), drawing on a multilevel motivational model in work groups and socially responsible behavior, develop and test a multilevel model of voluntary workplace green behavior that explicates why employees voluntarily engage in green behavior at work. They find out that conscientiousness and moral reflectiveness were associated with the voluntary workplace green behavior of group leaders and individual group members. Furthermore, a direct relationship existed between leader green behavior and the green behavior of individual subordinates as well as an indirect relationship mediated by green advocacy within work groups.

Ones and Dilchert (2012) present comprehensive taxonomies for understanding green behavior in organizational settings. They indicate that employees' actions may impact the environment through five main behaviors which include: conserving (i.e. reducing, use, reusing, repurposing and recycling), working sustainably (e.g. changing how work is done), avoiding harm (e.g. preventing pollution), influencing others (e.g. encouraging and supporting others), and taking initiative (e.g. initiating programs and policies). With regard to categorization proposed by Homburg and Stolberg, conserving, working sustainably and avoiding harm are direct PEB while influencing others and taking initiatives are indirect PEB. It must be stressed that research on indirect PEB in the workplace remains less developed we addressed indirect PEB.

Determinants of Pro-Environmental Behavior at Work

Kollmuss and Agyeman (2002) point out three groups of factors that may have some influence, positive or negative, on PEB in the workplace such as demographic factors, external factors (e.g. institutional, economic, social and cultural) and internal factors (e.g. motivation, pro-environmental knowledge, awareness, values, attitudes, emotion, locus of control, responsibilities and priorities).

Internal and external factors are seen from the viewpoint of the specific individuals and these factors might be managed in order to enhance PEB in the workplace. However, demographic factors will not involve differentiated management policies and therefore they are of lesser importance in terms of possible organizational interventions. Therefore, based on a comprehensive literature review, Blok et al. (2015) distinguish two groups of factors which could predict PEB in the workplace: internal factors and external factors.

Internal factors consist of social factors (i.e. social norms, personal norms), cognitive factors (i.e. environmental awareness, intention to act, perceived behavioral control), and affective factors (i.e. values, attitudes toward the environment).

Various research has shown a positive correlation between PEB and personal and social norms (e.g. Bamberg and Schmidt, 2003; Borgstede and Anders, 2002). In addition, personal norms can be viewed as an important general predisposition to act pro-environmentally. Nordlund and Garvill (2002) show that the personal norms could be seen as derived from self-transcendent and ecocentric values and activated by problem awareness. The personal norm mediates the effects from general values, environmental values, and problem awareness on PEB.

Cognitive factors comprise environmental awareness and perceived behavioral control. Environmental awareness relates to environmental knowledge and the recognition of environmental problems (Grob, 1995). Consequently, it is expected that the higher environmental awareness, the more PEB people will show, for example in terms of eco-friendly purchase and disposal decisions (Van Birgelen et al., 2009). With regard to perceived behavioral control, Kaiser and Gutscher (2003) confirm this construct to be significant direct predictor of ecological behavior.

Affective factors consist of general values, environmental values and attitudes toward the environment. Studies show that self-transcendent people show more PEB than people without such values (Dietz et al., 1998). Altruistic or self-transcendent values have a positive effect on personal norms to behave pro-environmentally and also have a positive direct effect on PEB (De Groot and Steg, 2008). In addition, self-transcendence and openness to change are strong predictors of PEB (Karp, 1996). On the contrary, values related to self-enhancement and conservatism are strong negative predictors of PEB. Pro-environmental values can serve as a predictor of PEB (Rioux, 2011), and according to Clark et al. (2003), such values might be necessary conditions to promote PEB. Attitudes toward the environment also appear to have a positive influence on PEB (Meinhold and Malkus, 2005).

However, Blok et al. (2015) indicate that personal norms, environmental awareness and self-transcendent values (altruism and environmental values) do not have a significant positive relation with PEB in the workplace. With regard to environmental values the results are inconsistent depending on specific pro-environmental activities. The difference between the impact of these factors on PEB in households and in the workplace may be explained by the fact that employees cannot act completely according to their own personal norms and values in the workplace. This means that they are primarily dependent on the norms, values, roles and routines of the company (Nye and Hargreaves, 2010). Nevertheless, Blok et al. (2015) prove clearly that environmental awareness and personal norms have a significant impact on the intention to act pro-environmentally and therefore, have an indirect positive impact on PEB in the workplace.

With regard to external factors, PEB can be performed only if the required conditions and infrastructure are available. This means that the less possibilities available to PEB, the less people are

likely to show it. The external factors at work comprise situational factors and leadership support. Fujii (2006) pointed out that perceived ease of implementation PEB has a significant positive effect on intention to PEB. The access to necessary infrastructure is an important situational factor with a positive impact on PEB (Klőckner and Oppedal, 2011).

The effectiveness of environmental activities depends on leadership (Ramus and Steger, 2000). Robertson and Barling (2012) indicate that leadership and PEB play crucial role in the greening of organizations. Leaders influence their employees in the workplace by sharing values, inspirational motivation, intellectual stimulation, and establishing a relationship with their employees. However, the influence of exemplary PEB by leaders and heads of departments must be distinguished from leadership support of employees to act pro-environmentally (Banerjee et al., 2003). Environmental leadership should be provided by a company's top management while the middle management is likely to have a critical impact on employees' attitudes and behavior. Blok et al. (2015) show clearly that exemplary behavior by leaders has a significant impact on the intention of employees to act pro-environmentally. Individuals may engage in numerous PEB to help their organization achieve environmental sustainability. Research has shown that employees are willing to engage in PEB when they perceive organizational support from their supervisors (Cantor et al., 2012; Ramus and Steger, 2000). Employees who are more satisfied with their job and committed to their organization are more likely to display PEB at work. While a lack of support is one of the major impediments to green behavior at work, supportive decisions by the employer are important facilitators for employees to engage in such behavior.

Norton et al. (2015) propose an interesting theory-based conceptual model based on person–environment interaction, job performance, and motivational theories to structure a multilevel review of the employee green behavior (EGB) literature. They differentiate between required EGB prescribed by the organization and voluntary EGB performed by employees that exceeds organizational expectations. In addition, they explored institutional-, organizational-, leader-, team-, and employee-level antecedents and outcomes of EGB and factors that mediate and moderate these relationships. Norton et al. (2015) also posit that EGB consists of behavior required by employer (e.g., participating in environmental management practices) and voluntary behavior beyond employee's core job tasks (e.g., citizenship behavior for the environment) depending on the motivational states that precede performance. The required behavior is supposed to be driven by controlled motivation (i.e. employee expects company's reward for EGB), whereas voluntary behavior is expected to be activated by autonomous motivation (i.e. personal satisfaction from doing EGB) (Deci and Ryan, 1987).

According to Norton et al. (2015), the factors influencing EGB include:

- at the institutional level – external pressures from regulatory (e.g. laws and regulations), normative (e.g. industrial standards, market demand) and cognitive-cultural (e.g. community expectations) sources;
- at the organizational level – attitudes (with subcategories for attitudes towards business, such as a business strategy, and attitudes towards the environment, such as the importance of environmental sustainability), activities (with subcategories for incentives, such as rewards, resources, such as facilities, and organizational-level behavior, such as complying with regulations) and norms;
- at the leader level – leader activities (supporting behavior, such as encouraging employees, giving feedback, such as environmental performance, and own EGB) and a leadership style (e.g. environmental transformational leadership);
- at the team level – group attitudes (e.g. perceived support from colleagues), behavior (e.g. goal setting) and norms (e.g. green group climate);
- at the employee level – attitudes towards the environment (e.g. environmental concern), behavior (e.g. perceived behavioural control, habits, private green behavior), norms (e.g. personal norms), motivation (e.g. intrinsic motivation), job factors (e.g. task control) and personality (e.g.

conscientiousness). In addition, the within-person categories refer to positive affect and behavioral intentions.

Integrative Research Framework for Studies on Determinants of Pro-Environmental Behavior at Work

Based on the analysis results presented in this paper, this section identifies areas that deserve further scientific attention and make up the future integrative research framework for holistic studies on determinants of PEB at work.

The presented theories and the analysis results provide an appropriate perspective to explain the importance of PEB and, in particular, of the identified determinants of PEB at work. However, the literature review indicates that this area still needs comprehensive research. Studies of this type require formulation of a unified model that integrates specific elements and factors across the approaches and models applied so far.

Therefore, the proposed framework developed to study determinants of PEB patterns at work should comprise:

- Internal factors, including:
  - affective factors (i.e. general values, environmental values, attitude toward the environment),
  - cognitive factors (i.e. environmental awareness, perceived behavioral control),
  - social factors (i.e. social norms, personal norms),
- Contextual factors, including:
  - institutional pressures (i.e. regulatory, normative, cultural),
  - perceived organizational support (i.e. attitudes, activities, norms),
  - leadership (i.e. leadership style, exemplary behaviors, support behaviors),
  - team (group) support (i.e. attitudes, behavior, norms),
  - situational factors (i.e. perceived ease of implementation PEB, necessary infrastructure),
- Motivations:
  - autonomous (i.e. personal satisfaction)
  - controlled (i.e. expectation of corporate reward) ,
- Behavioral intention,
- Pro-environmental behavior:
  - required by employer (e.g., participating in environmental management practices),
  - voluntary behavior beyond an employee's core job tasks (e.g., citizenship behavior for the environment).

The proposed constructs and relationships to be tested and validated are presented in Fig. 1.

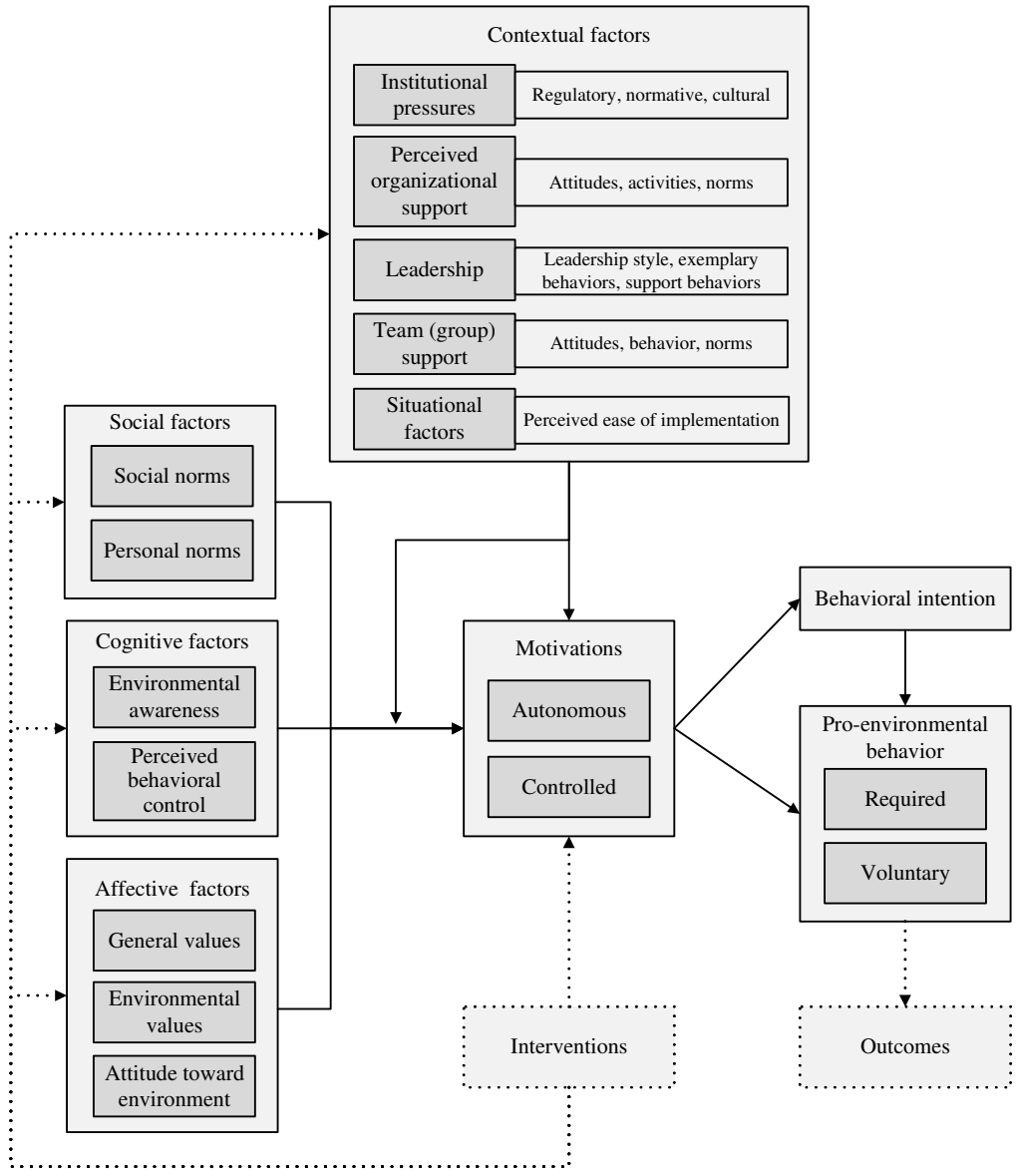


Fig. 1: Integrative research framework for holistic studies on determinants of PEB

It should be noted that the presented framework includes two additional elements: interventions (i.e. interventions that could best be applied to encourage PEB together with their effects) and outcomes (to examine the impact of PEB on the organization's or the employee's performance). These elements are not the subject of this paper, but it would be very interesting to analyze the possible relationships among all the issues presented in Fig. 1 in a holistic way. All the elements included in the proposed framework and all the postulated relationships (i.e. direct effects, indirect effects, mediation and moderation effects) should be analyzed simultaneously within integrated comprehensive research. The analysis could be based on cross-sectional data, but longitudinal studies carried out over multiple points of time, comprising different industries and various countries, would strongly support the obtained results.

Conclusion

Individuals can contribute significantly to achieving environmental sustainability by adopting various PEB patterns. Therefore, the challenge for researchers is to understand the determinants of green behavior so that PEB could be adequately facilitated.

The presented considerations aimed to identify and analyze the theoretical frameworks and models used to explain PEB. Due to the fact that PEB patterns in organizational settings are accounted for by different internal and external factors compared to those influencing green behavior in the private sphere in particular, conceptual approaches and determinants of PEB at work were identified and characterized.

Based on the analysis results, an integrative research framework for holistic studies on determinants of PEB at work is proposed. It comprises inclusion of internal factors (affective, cognitive and social), contextual factors (institutional pressures, perceived organizational support, leadership, team support, situational factors) and motivations (autonomous and controlled) which influence behavioral intention and pro-environmental behavior (required by the employer and voluntary behavior beyond the employee's core job tasks). The proposed framework also includes interventions and outcomes of PEB. It is suggested that all the elements and all the postulated relationships (i.e. direct effects, indirect effects, mediation and moderation effects) should be analyzed simultaneously within integrated comprehensive research. Such an analysis would make it possible to understand the interdependence of factors promoting or inhibiting PEB and, consequently, to implement adequate actions to achieve desired PEB patterns in organizational settings.

Acknowledgment

The research presented in the article was supported by statutory work 13/030/BK_17/0027 carried out at the Silesian University of Technology

References

Aarts, H. and Dijksterhuis, A.P. (2000), The automatic activation of goal-directed behaviour: the case of travel habit. *Journal of Environmental Psychology*, Vol. 20, 75–82.

Ajzen, I. (1991), The Theory of Planned Behavior, *Organizational Behavior and Human Decision Processes*, 50(2), 179–211.

Andersson, L., Shivarajan, S. and Blau, G. (2005), Enacting ecological sustainability in the MNC: A test of an adapted value-belief-norm framework. *Journal of Business Ethics*, Vol. 59, 295–305.

Bamberg, S. and Schmidt, S. (2003), Incentives, morality or habit? Predicting students' car use for university routes with the models of Ajzen, Schwartz and Triandis, *Environment and Behavior*, Vol. 35, 264–285.

Banerjee, S.B., Iyer, E.S. and Kashyap, R.K., 2003. Corporate environmentalism: antecedents and influence of industry type. *Journal of Marketing* ,Vol. 67, 106–122.

Blok, V., Wesselink, R., Studynka, O. and Kemp R. (2015), Encouraging sustainability in the workplace: a survey on the pro-environmental behaviour of university employees, *Journal of Cleaner Production*, Vol. 106, 55-67

Boiral, O. and Paillé, P. (2012). Organizational citizenship behavior for the environment: Measurement and validation. *Journal of Business Ethics*, 109(4), 431–445.

Borgstede, C.V. and Anders, B. (2002). Pro-environmental Behaviour: Situational Barriers and Concern for the Good at Stake. *Gőteborg Psychological Reports*, Vol. 32.

Cantor, D.E., Morrow, P.C. and Montabon, F. (2012), Engagement in environmental behaviors among supply chain management employees: An organizational support theoretical perspective. *Journal of Supply Chain Management*, Vol. 48, Issue 3, 33–51.

Cialdini, R.B., Reno, R.R., and Kallgren, C.A. (1990), A focus theory of normative conduct: recycling the concept of norms to reduce littering in public places. *Journal of Personality and Social Psychology*, Vol. 58, 1015–1026

Cordano, M., Marshall, R.S. and Silverman, M. (2010), How do small and medium enterprises go 'Green'? A study of environmental management programs in the U.S. wine industry. *Journal of Business Ethics*, Vol. 92, 463–478.

Davis, F.D. (1989), Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology, MIS Quarterly, 13, 319–3 39.

Davis, F.D., Bagozzi, R.P. and Warshaw, P.R. (1992), Extrinsic and Intrinsic Motivation to Use Computers in the Workplace, *Journal of Applied Social Psychology*, 22(14), 1111–1132.

De Groot, J. and Steg, L. (2008), Value orientations to explain beliefs related to environmental significant behavior: how to measure egoistic, altruistic, and biospheric value orientations. *Environment and Behavior*, Vol. 40, 330–354.

Deci, E.L. and Ryan, R.M. (1987), The support of autonomy and the control of behavior, *Journal of*

Dietz, T., Stern, P.C. and Guagnano, G.A. (1998), Social structural and social psychological bases of environmental concern, *Environment and Behavior*, Vol. 30, 450–471.

Dunlap, R.E. and Van Liere, K.D. (1978), The 'new environmental paradigm': a proposed measuring instrument and preliminary results. *Journal of Environmental Education*, Vol. 9, 10–19.

Fishbein, M. and Ajzen, I. (1975), Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research, Addison-Wesley, Reading, MA, 1975.

Fujii, S. (2006), Environmental concern, attitude toward frugality, and ease of behavior as determinants of pro-environmental behavior intentions, *Journal of Environmental Psychology,* 26(4), 262–268.

Greaves, M., Zibarras, L. and Stride, C. (2013), Using the theory of planned behavior to explore environmental behavioral intentions in the workplace. *Journal of Environmental Psychology*, Vol. 34, 109–120.

Grob, A. (1995), A structural model of environmental attitudes and behavior. *Journal of Environmental Psychology,* 15, 209–220.

Han, H., Hsu, L.-T.and Sheu, C. (2010), Application of the theory of planned behavior to green hotel choice: testing the effect of environmental friendly activities, *Tourism Management*, 31(3), 325–334.

Harland, P., Staats, H. and Wilke, H. (1999), Explaining proenvironmental behavior by personal norms and the theory of planned behavior. Journal of Applied Social Psychology, Vol. 29, 2505–2528.

Heath, Y. and Gifford, R. (2002), Extending the theory of planned behaviour: predicting the use of public transportation. Journal of Applied Social Psychology, Vol. 32, 2154–2185.

Homburg, A. and Stolberg, A. (2006), Explaining pro-environmental behavior with a cognitive theory of stress. *Journal of Environmental Psychology*, Vol. 26, 1–14.

Kaiser, F.G. and Gutscher, H. (2003), The proposition of a general version of the theory of planned behavior: predicting ecological behavior, *Journal of Applied Social Psychology*. Vol. 33, 586–603.

Kaiser, F.G., Wőlfing, S. and Fuhrer, U. (1999), Environmental Attitude and Ecological Behavior, Journal of Environmental Psychology, 19, 1–19.

Kaiser, F.G., and Gutscher, H. (2003), The proposition of a general version of the theory of planned behaviour (TPB): predicting ecological behaviour. *Journal of Applied Social Psychology*, Vol. 33, 586–603.

Kaiser, F.G., Wolfing, S. and Fuhrer, U. (1999), Environmental attitude and ecological behaviour. Journal of Environmental Psychology, Vol. 19, 1–19.

Karp, D.G. (1996), Values and their effect on pro-environmental behavior, *Environment and Behavior*, Vol. 28, 111–133.

Kim, A., Kim, Y., Han, K., Jackson, S.E. and Ployhart, R.E. (2017), Multilevel Influences on Voluntary Workplace Green Behavior: Individual Differences, Leader Behavior, and Coworker Advocacy, *Journal of Management*, Vol. 43, Issue 5, 1335–1358.

Kim, Y. and Choi, S.M. (2005), Antecedents of green purchase behavior: an examination of collectivism, environmental concern, and PCE. *Advances in Consumer Research*, 32, 592–599.

Klőckner, C.A. and Oppedal, I.O. (2011), General vs. domain specific recycling behavior – applying a multilevel comprehensive action determination model to recycling in Norwegian student homes. *Resources, Conservation and Recycling*, Vol. 55, 463–471.

Kollmuss, A. and Agyeman, J. (2002), Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research*, Vol. 8, 239–260.

Lo, S.H., Peters, G.J. and Kok, G. (2012), A review of determinants of and interventions for proenvironmental behaviors in organizations. Journal of Applied Social Psychology, 42(12), 2933–2967.

Mannetti, L., Pierro, A. and Livi, S. (2004), Recycling: planned and self-expressive behaviour. *Journal of Environmental Psychology*, Vol. 24, 227–236.

Meinhold, J.L. and Malkus, A.J. (2005), Adolescent environmental behaviors, *Environment and Behavior*, Vol. 37, 511–532.

Moore, G.C. and Benbasat, I. (1991), Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation, *Information Systems Research*, 2(3), 192–222.

Nordlund, A.M. and Garvill, J. (2002), Value structures behind proenvironmental behavior. *Environment and Behavior,* Vol. 34, 740–756.

Nordlund, A.M. and Garvill, J. (2003), Effects of values, problem awareness, and personal norm on willingness to reduce personal car use. *Journal of Environmental Psychology*, Vol. 23, 339–347.

Norton, T.A., Parker, S.L., Zacher, H. and Ashkanasy, N.M. (2015), Employee Green Behavior: A Theoretical Framework, Multilevel Review, and Future Research Agenda, *Organization & Environment*, Vol. 28, 103–125.

Nye, M. and Hargreaves, T. (2010), Exploring the social dynamics of proenvironmental behavior change. *Journal of Industrial Ecology*, Vol. 14, No. 1, 137–149.

Ones, D. and Dilchert, S. (2012), Employee green behaviors. In Jackson, S.E., Ones, D. and Dilchert, S. (Eds.), Managing human resource for environmental sustainability, Jossey-Bass, San Francisco, 85–116.

Oreg, S. and Katz-Gerro, T. (2006), Predicting proenvironmental behavior cross-nationally, *Environment and Behavior*, Vol. 38, 462–483.

Paillé, P and Mejía-Morelos, J.H. (2014), Antecedents of pro-environmental behaviours at work: The moderating influence of psychological contract breach, *Journal of Environmental Psychology*, Vol. 38, 124–131

Paillé, P. and Boiral, O. (2013), Pro-environmental behavior at work: Construct validity and determinants. Journal of Environmental Psychology, Vol. 36, 118–128.

Personality and Social Psychology, Vol. 53, 1024-1037.

Poortinga, W., Steg, L. and Vlek, C. (2004), Values, environmental concern and environmental behavior: a study into household energy use. *Environment and Behavior*, Vol. 36, 70–93.

Ramus, C. and Steger, U. (2000), The roles of supervisory support behaviors and environmental policy in employee eco-initiatives at leading-edge European companies. Academy of Management Journal, Vol. 43, Issue 4, 605–626.

Rioux, L. (2011), Promoting pro-environmental behaviour: collection of used batteries by secondary school pupils, *Environmental Education Research*, Vol. 17, 353–373.

Rogers, E.M. (1983), Diffusion of Innovations, Free Press, New York.

Scherbaum, C.A., Popovich, P.M., and Finlinson, S. (2008), Exploring individual-level factors related to employee energy-conservation behaviors at work. *Journal of Applied Social Psychology*, Vol. 38, 818–835.

Schwartz, S.H. (1977), Normative influence on altruism, *Advances in experimental social psychology*, Vol. 10, 221–279.

Steg, L. (2005), Car use: lust and must. Instrumental, symbolic and affective motives for car use. Transportation Research A, Vol. 39, 147–162.

Steg, L. and Vlek, Ch. (2009), Encouraging pro-environmental behaviour: An integrative review and research agenda, *Journal of Environmental Psychology*, Vol. 29,, 309–317.

Stern, P.C. (2000), Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues*, Vol. 56, Issue 3, 407–424.

Stern, P.C., Dietz, T., Abel, T., Guagnano, G.A. and Kalof, L. (1999), A value-belief-norm theory of support for social movements: the case of environmentalism. *Human Ecology Review*, Vol. 6, 81–97.

Taylor, S. and Todd, P. (1995), Decomposition and crossover effects in the theory of planned behavior: a study of consumer adoption intentions. *International Journal Research in Marketing*, 12(2), 137-155.

Vallerand, R.J. (1997), Toward a Hierarchical Model of Intrinsic and Extrinsic Motivation, *Advances in Experimental Social Psychology*, 29, 271–360.

Van Birgelen, M., Semeijn, J. and Keicher, M. (2009), Packaging and proenvironmental consumption behavior, *Environment and Behavior*, Vol. 41, 125–146.

Venkatesh, V. and Davis, F.D. (2000), A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies, *Management Science,* 46(2), 186–204.

Patent Applications in Romania
Romanian Innovation in the European Context

Cezar Ionut Bichescu, Dunărea de Jos University of Galati, Galati, Romania,
cezar.bichescu@ugal.ro

Mariana Madalina Chivu, Dunărea de Jos University of Galati, Galati, Romania,
mariana.chivu@edu.gov.ro

Silvius Stanciu, Dunărea de Jos University of Galati, Galati, Romania,
sstanciu@ugal.ro

Abstract

Innovation can represent for the modern society the main way to achieve economic growth and to solve certain local and global issues related to the threat to population's health, food security or environmental concerns. European strategies in the field of Research, Development and Innovation aim at increasing the role and significance of patenting and at enhancing the protection and implementation of scientific breakthroughs. Although Europe has made progress in this area, the European office is still behind those from China, USA. Japan or the Republic of Korea. European countries, through Germany and France, are among the world's top holders of patents. Romania, although it has nationally recorded a number of progresses in the field of patent registration, registers low international shares. in particular, due to the prohibitive costs of patents registration. Romanian universities occupy modest positions in the field of patenting, registering an average of 1.4 patents / year. Supporting and encouraging national innovation and filing patent applications should be supported at governmental level, by reducing formalities, the duration of acquiring the patent and the patenting costs.

Keywords: innovation, patents, Europe, Romania

Introduction

Applied research and innovation represent a current priority for the European policy. According to Community guidelines, innovation must be a strong point for States Member in economic growth and for the creation of decent, quality and stable jobs, especially for young people, economic growth and socio-economic convergence, migration, security and the fight against populism. Research and innovation can improve the living conditions of EU citizens, representing key elements of the European Commission's policies, which seek to stimulate employment, economic growth and investments. Research and innovation can provide scientific knowledge and practical solutions for diminishing / avoiding certain short-term threats to the European area that may affect the health of the population (poliomyelitis epidemics, Zika, Ebola, etc.), food security and safety (lack of food , genetically modified production, etc.), social balance and humanitarian issues (refugee crisis, unequal distribution of incomes, etc.), or can respond on long-term to certain society challenges related to transport, climate changes or energy (European Parliament, 2017). The European Commission's recommendations to States Member aim to increase the funds allocated to research and development, being recommended to exceed the threshold of 3% of GDP until 2020 (1% of public funds, 2% of private investments), which is estimated to generate 3.7 mill. of jobs and would determine an annual EU GDP increase of around 800 billion euros. At the same time, the European Commission proposes a reduction of up to 80% in patenting costs at European level, with simultaneous recognition of patents in the 25 signatory states of the agreement, to boost the European patenting activity.

Materials

Information on patent applications filed at European level has been selected from the European Patent Office's statistical database. For the Romanian patenting, data were collected from the official statistics of the Romanian State Office for Inventions and Trademarks. The analysis period was 2006-2016, depending on data availability. For the European legislation in the field, there have been used the official releases of the European Parliament and the European Commission. National patenting legislation has been selected from the website of the State Office for Inventions and Trademarks and official publications of the Government of Romania. Where necessary, one related also to other sources, represented by scientific publications or official journals. Data have been systematized, statistically interpreted and graphically represented.

Patenting at European level

At European level, the body responsible for registering and validating patent applications is the European Patent Office (EPO), body of the European Patent Organization, an intergovernmental organization consisting in 38 countries (the Member States and 11 other European countries including Turkey).
Globally, over 80% of patents granted worldwide are granted by the European Patent Office (OEB), the Japanese Patent Office (JPO) and the United States Patents and Trademark Office (USPTO) (Rasvan, 2017).

In the statistics World Intellectual Property Organization WIPO, EPO has been the fifth in the year 2015, as number of patents registered (figure 1).

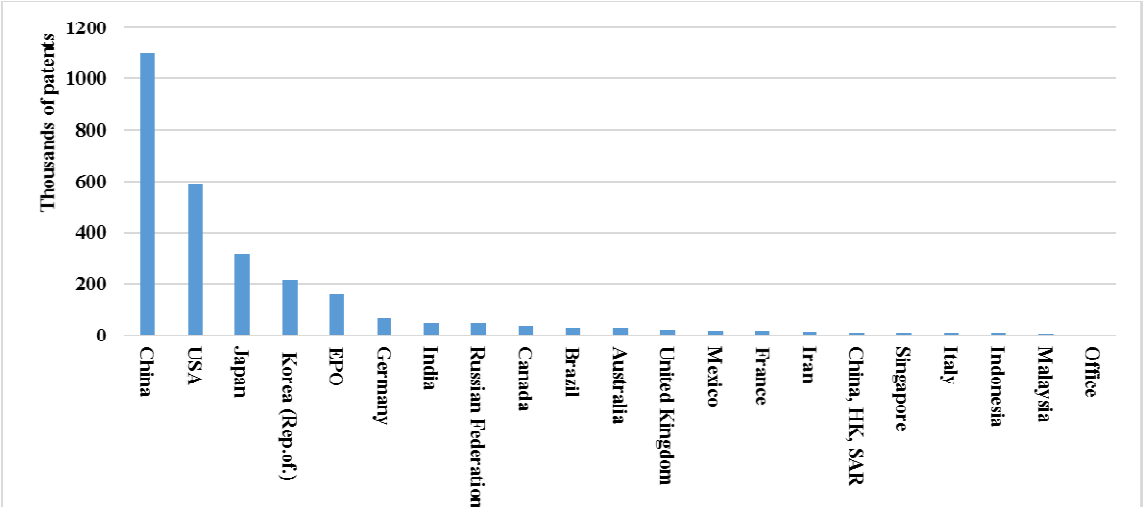


Figure 1: Patent - Applications for the top 20 offices (2015)

Source Authors, by using WIPO Data (2017)

It should be noted that in WIPO statistics, China, with an increase of 18.72% towards the previous year and with 1,101,864 patents registered in 2015, is the first state in the world to exceed the limit of 1 million patents registered. By comparison, USA and Japan, which are the second and third in Top 20 Patents WIPO registered, record cumulatively only 908,131 patents. Europe is represented by Germany, UK, France and Italy in the world top.

In Europe, the OEB examines the patent applications, being responsible for granting patents registered to the European Office if the necessary conditions are met. For the patent granted to be valid in a State Member, the inventor must apply for its national validation in each country where patent protection is sought. The process involves administrative and translation costs of up to € 32,000 when seeking for patents protection in EU-27, amount of which € 23,000 represent the translation fees. By comparison, obtaining a patent in USA costs an average of 1,850 euros. In order to preserve the validity of the patents, it is necessary to pay each year the extension fees in each country, and the patent transfer or a license agreement to use the patented invention must be registered in the same way (Romanian Permanent Representation attached to the European Union, 2017).

A statistic of patent applications registered depending on the residence state of the first author of the patent shows that 1,484,472 applications were registered to EPO during the period 2007-2016, from residents of 169 countries out of 177 registered in the European database. The dynamics of the applications registration during the analysed period is shown in Figure 2.

The largest share of registrations was recorded to EPO during 2015, when 160,004 applications were filed.

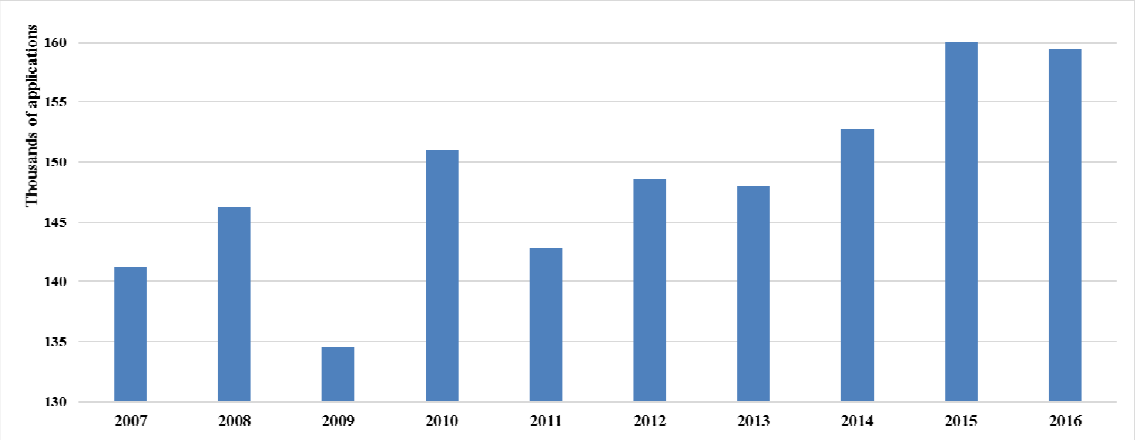


Figure 2: European patent applications 2007-2016

Source Author, by using EPO Data (2017)

Depending on the residence of the patent owner, in the top of the countries with the most applications to EPO during the analysed period, the USA ranks first, followed by Germany and Japan, covering over 50% of the total (Figure 3).

Benin, Bolivia, Botswana, Congo, Democratic Republic of Guadeloupe, Saint Helena, Vatican, and Zambia have no application registered during the analysed period.

With a total of 240 applications registered to EPO, Romania ranks 56 among the top of 177 countries from EPO base.

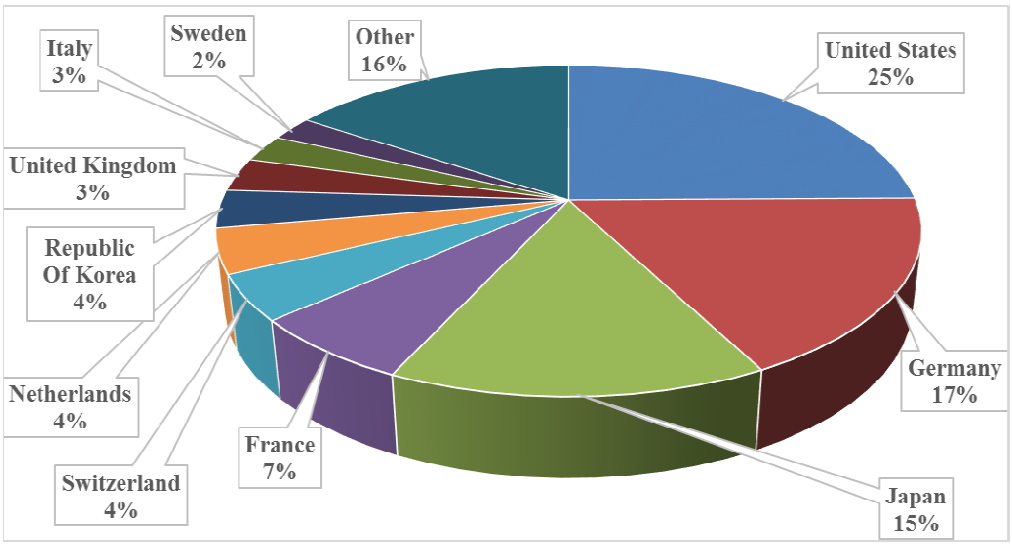


Figure 3: Top 10 European patent applications per country of residence of the first named applicant (2007-2016)

Source Author, by using EPO Data (2017)

Among the applicants residing in EPO member states, during 2016, 97,167 applications were submitted for patenting, increase with 370 units towards the previous year (Figure 4).

Germany is ranked first in the statistics of EPO members, a total of 31,815 applications being submitted last year, and representing more than a third of patent applications registered to EPO.

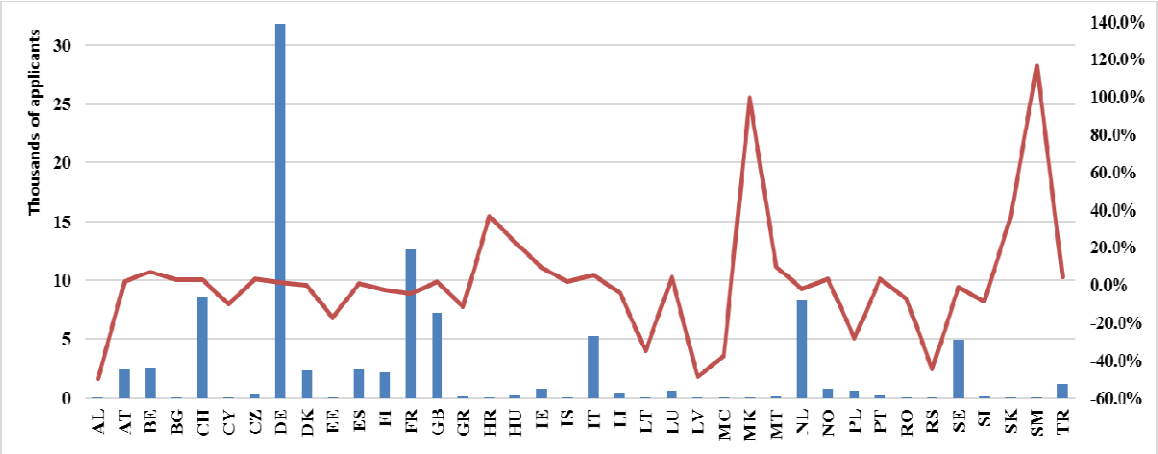


Figure 4: Patent applications registered by EPO state member during 2016 and Evolution towards 2015

Source Author, by using EPO Data (2017)

France ranked second in the hierarchy last year, with 12,726 registered applications (still having a decrease of 4.3% compared to the previous year). Although it recorded at its turn a decrease with 2.1% in patent applications compared to the previous year, the Netherlands ranked third in the top from 2016, with 8,339 applications. Leading positions are completed by the Netherlands, the Czech Republic and

UK. Leading positions are also occupied by Germany, France, the Netherlands, Switzerland and Sweden, which are included in Top 10 Worldwide Patents.

Patenting in Romania

The sole authority on the Romanian territory with tasks in ensuring the protection of industrial property, in accordance with the national legislation in the field and with the provisions of the international conventions and treaties to which Romania is part, is the State Office for Inventions and Trademarks, OSIM.

OSIM operation is mainly based on the Government Resolution no. 573/1998 (Government of Romania, 1998), amended and completed by Government Resolution no. 63 from 23 February 2017 (Government of Romania, 2017). According to the legal provisions currently in force, OSIM is a specialized body of the central public administration with legal status, subordinated to the Ministry of Economy. The legislative provision issued by the Government of Romania this year passes OSIM from the Government subordination to that of the Ministry of Economy. OSIM prepares and submits to the Government of Romania the strategy for the development of industrial property protection in Romania and applies its policy in the field. OSIM is entitled to register and examine the applications from the industrial property field by releasing titles of protection conferring to the holders exclusive rights on the Romanian territory, as well as the depositary of the national registers of applications filed and national registers of protection titles granted for inventions, trademarks, geographical indications, drawings and industrial designs, topographies of integrated circuits, new plant varieties, being liable for the national collection and its correlation with international databases. If necessary, OSIM performs, upon request, specialized services in the field of industrial property, holds training programs in the field and performs any other tasks in the field of industrial property resulting from the legal provisions in force and from the international agreements. The unique protection title of inventions in Romania is the patent of invention, valid for 20 years, from the date of establishing the regular national depositary. Patenting is a formalized and laborious process that can reach Romania up to 30 months. The costs of patenting and validation of patents in Romania are quite high, although there is a tendency to reduce them, process also registered at European level. In this direction, the Government of Romania aims to reduce the formalities and costs of patenting, the new tax grid is presented in Annex 1 of the Law on Intellectual Property Taxes (Government of Romania, 2015).

The Official Industrial Property Bulletin of Romania (BOPI) is the publication of OSIM where inventions are made public and other industrial property categories patented. OSIM edits and publishes the series of invention patents, the Romanian Industrial Property Magazine and other publications intended to promote its object of activity. Romania is part of numerous multilateral agreements and treaties in the field of invention patents, the most important being presented in table 1.

Table 1: International agreements and treaties to which Romania is part

Nr. crt.	Treaty denomination	Romania ratification
1	Convention from Paris for the Protection of Industrial Property (1883), reviewed Brussels (December 1900), Washington (June 1911), Hague (November 6, 1925), London (June 2, 1934), Stockholm (July 14, 1967). * Amended on 2 October 1979	Decree no. 1177/ 28.12.1968 Official Bulletin B. Of. No. 1/06.01.1969
2.	Convention on the Establishment of the World Intellectual Property Organization (Stockholm, 1967)	Decree no.1175 from 28.12.1968 - B.Of. no.1/06.01.1969
3.	The Strasbourg Agreement on the International Classification of Invention Patents (1971), * Amended on 28 September 1979.	Law no. 3/1998 – Official Monitor M. Of. No.

		10/14.01.1998
4.	Patent Cooperation Treaty, passed on Washington Diplomatic Conference (1970),	Decree no. 81 from 2 March 1979 - B. Of. No. 22/08.03.1979
5.	Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purposes of Patent Procedure (1977). * Amended on 26 September 1980	Law no. 75/1999 - M. Of. No. 210/13.05.1999
6.	The Convention Concerning the Issuance of the European Patent (Munich, 1973) and its Revision document (Munchen, 2000).	Law no 611/2002 - M. Of. No. 844/13.11.2002
7.	European Association Agreement between Romania, on the one hand, and the European Communities and their States Member (Bruxelles, 1993)	Law no. 20/1993 - M. Of. No.73/12.04.1993
8.	Marrakech Agreement on the Establishment of the World Trade Organization. Annex 1C - Agreement on trade-related aspects of intellectual property rights (Marrakech 1994)	Law no. 133/1994 - M. Of. No. 360/27.12.1994

Source: Author, using OSIM IP Law Database (2017a)

Patents Registered In Romania

Evolution of validated patents in Romania during 2006-2016 is presented in Figure 5. According to OSIM data, a total of 30,717 patents were registered and approved in our country, during the analysed period, out of which 27,062 after joining the EU. As share, more than 80% of patent registrations to the national office come from recognitions of European patents based on the international agreements to which Romania is part.

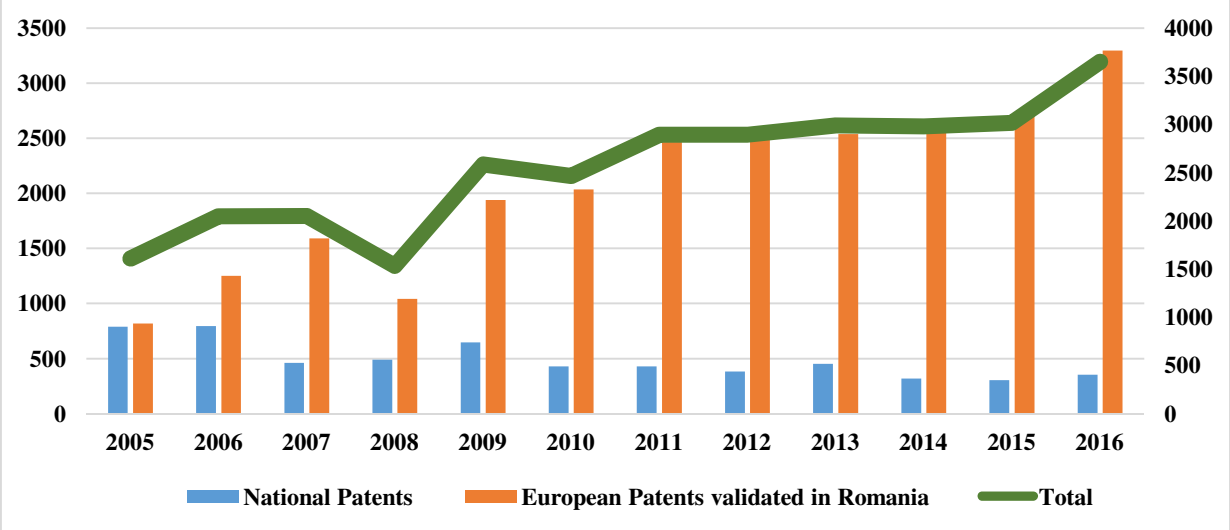


Figure 5: Patents registered in Romania (2005-2016)

Source Authors, by using OSIM data (2017b)

During the period 2005-2016, 13,331 patent applications were filed, out of which 12,672 belonged to the Romanian citizens, representing over 95% of the total. Residents abroad submitted only 659 patent applications to OSIM.

The main category of applicants for patenting research results consists in natural persons, which represent almost 50% of the total (Figure 6).

Although it has improved as share, the share of patents requested by universities accounted for just over 15% of the total number of applications registered during the analysed period, being close to the percentage recorded by private companies.

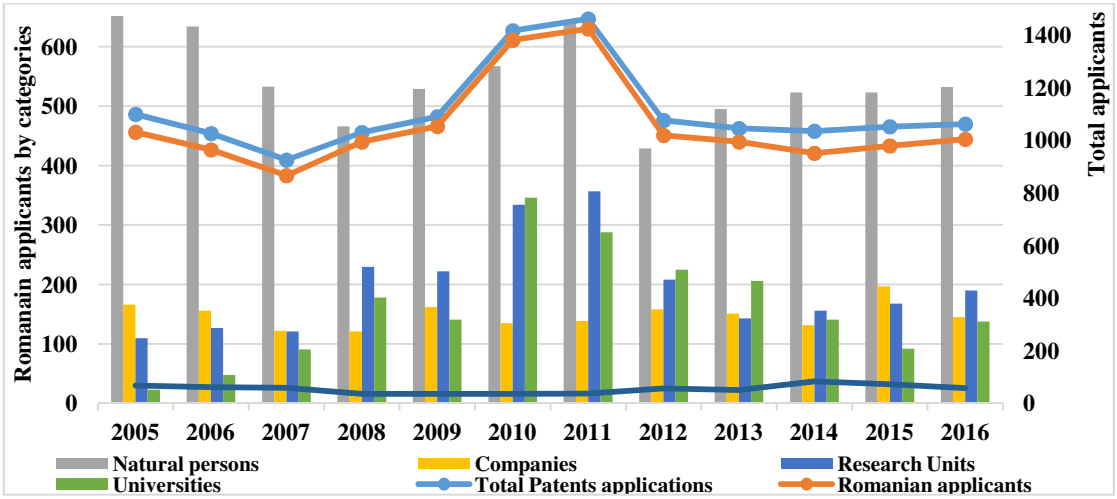


Figure 6: Patents applications submitted by Romanians

Source Authors, by using OSIM data (2017a)

The number of patent applications registered by universities has recorded a maximum in 2010, with 346 units, after which it recorded a significant decrease, reaching 92 units in 2015. Last year there was a slight increase of the applications, filed to OSIM with 138 units. Companies have registered between 150 and 200 validated patents, with a minimum of 122 units in 2007 and a maximum in 2015 with 197 patented applications. Specialized research units filed 2366 patent applications.

Patents applications registered and validated by universities

During the period 2005 - 2016 the evolution of patent applications registered by universities is presented in Figure 3. The data presented by OSIM are relatively differentiated according to the statistical department that presents them, there being small differences between the statistics from Figures 5 and 6.

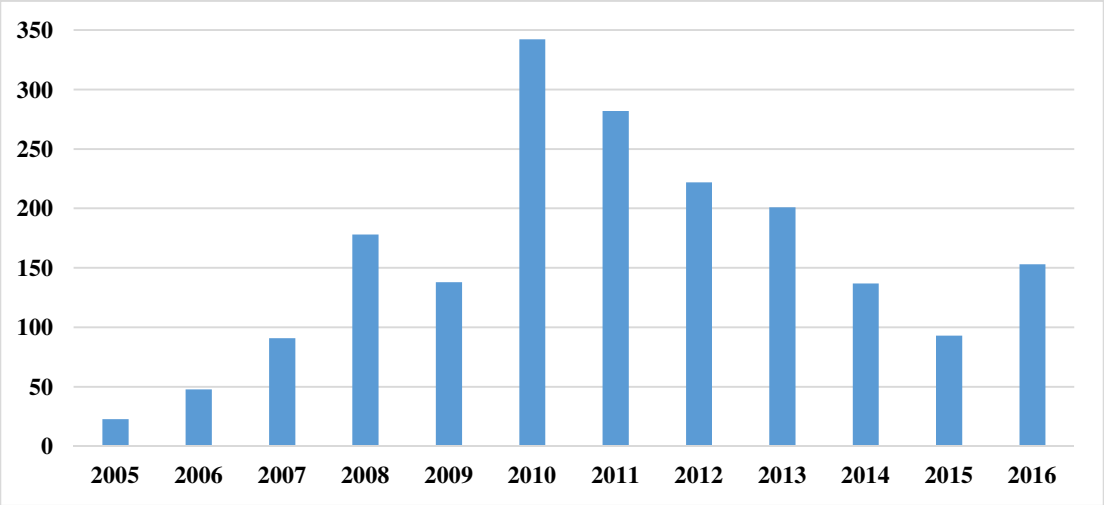


Figure 7: Invention patenting applications registered by Romanian universities

Source Authors, by using OSIM data (2017b)

The situation presented by OSIM regarding patent applications registered in 2007-2016 by the 37 universities from Romania with contributions in this field is presented in table 2.

Table 2: Invention patenting applications registered by universities to OSIM during the period 2007-2016/

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Pitești University	x	x	x	5	5	2	5	3	1	1	22
”Vasile Goldiș” University Arad	x	x	x	x	4	4	5	3	x	0	16
”Aurel Vlaicu” University Arad	2	0	x	1	1	1	1	0	0	0	6
Politehnica University of Bucharest	6	16	10	31	28	9	19	14	7	34	174
”Carol Davila” University Bucharest	x	3	2	9	5	3	4	1	1	3	31
Univ. of Agron. Sci. and Vet. Med. of Bucharest	x	2	x	2	6	4	1	x	4	5	24
University of Bucharest	2	1	x	3	3	3	4	x	1	6	23
Techn. Univ. of Civil Eng. of Bucharest	1	1	0	x	1	0	1	0	0	2	6
Military Technical Academy	0	0	0	0	0	0	0	0	1	2	3
Vasile Alecsandri University of Bacău	x	1	7	7	5	8	3	2	x	2	35
University of Oradea	x	2	1	5	2	3	x	1	1	0	15
”Transilvania” University of Brașov	x	29	13	22	31	23	37	19	7	10	191
Technical University of Cluj-Napoca	6	8	8	25	29	18	14	12	10	10	140
”Babes Bolyai” University Cluj Napoca	2	9	3	8	9	7	4	4	1	6	53
”Iuliu Haţieganu” Univ. of Cluj Napoca	x	1	x	4	1	2	3	3	4	3	21
Univ. of Agr. Sci. and Vet. Med. Cluj	2	1	1	1	1	5	x	2	2	4	19
”Sapientia” University	0	0	0	1	1	5	0	1	1	0	9
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
”Ovidius” University of Constanţa	x	x	x	6	5	1	1	x	1	0	14
”Valahia” University of Târgoviște	0	0	0	0	0	1	0	4	1	0	6

University of Craiova	1	x	3	9	1	2	1	1	2	3	23
Univ. of Med. and Pharmacy of Craiova	0	0	0	0	1	0	0	0	0	1	2
” Constantin Brâncuși” Univ. of Tg. Jiu	0	0	0	0	2	0	0	3	2	1	8
”Dunărea de Jos” University of Galați	10	3	9	16	13	2	2	5	6	5	71
”Gh. Asachi” University of Iasi	14	21	19	32	26	21	11	7	12	15	178
”Alexandru Ioan Cuza” Univ. of Iași	1	5	1	4	3	2	6	2	1	3	28
”Ion Ionescu de la Brad” Univ. of Iași	0	0	0	0	1	5	0	0	1	1	8
”Grigore T. Popa” University of Iași	0	0	0	1	1	0	0	1	1	4	8
North University Centre Baia Mare	0	0	2	1	2	0	0	0	0	0	5
'Petru Maior" University of Târgu Mureș	x	3	x	2	1	35	12	2	2	0	57
Univ. of Med. and Pharm. of Tg. Mureș	0	0	0	1	0	0	0	0	0	0	1
”Petroleum Gas” University of Ploiesti	x	x	4	2	3	1	9	5	1	1	26
”Lucian Blaga” University of Sibiu	x	1	5	3	2	3	19	x	5	1	39
”Nicolae Balcescu" Land Forces Acad.	0	0	0	0	0	0	1	0	0	0	1
”Ștefan cel Mare” University of Suceava	36	68	46	130	88	46	35	42	5	19	515
Politehnica University of Timișoara	4	2	1	9	3	7	8	2	8	8	52
Banat Univ. of Agr. Sci. and Vet. Med.	4	1	1	3	3	0	0	1	2	4	19
”Victor Babeș” University of Timișoara	0	0	2	4	0	1	0	0	3	0	10

Source Data processed by authors from OSIM statistics (2017a)

A single patent was required by the Land Forces Academy "Nicolae Balcescu" and the University of Medicine and Pharmacy of Târgu Mureș, while the first positions are occupied by Ștefan cel Mare University of Suceava, Transilvania University of Brașov and Gh. Asachi University of Iasi, with 515, 191, respectively 178 registered applications (Figure 8)

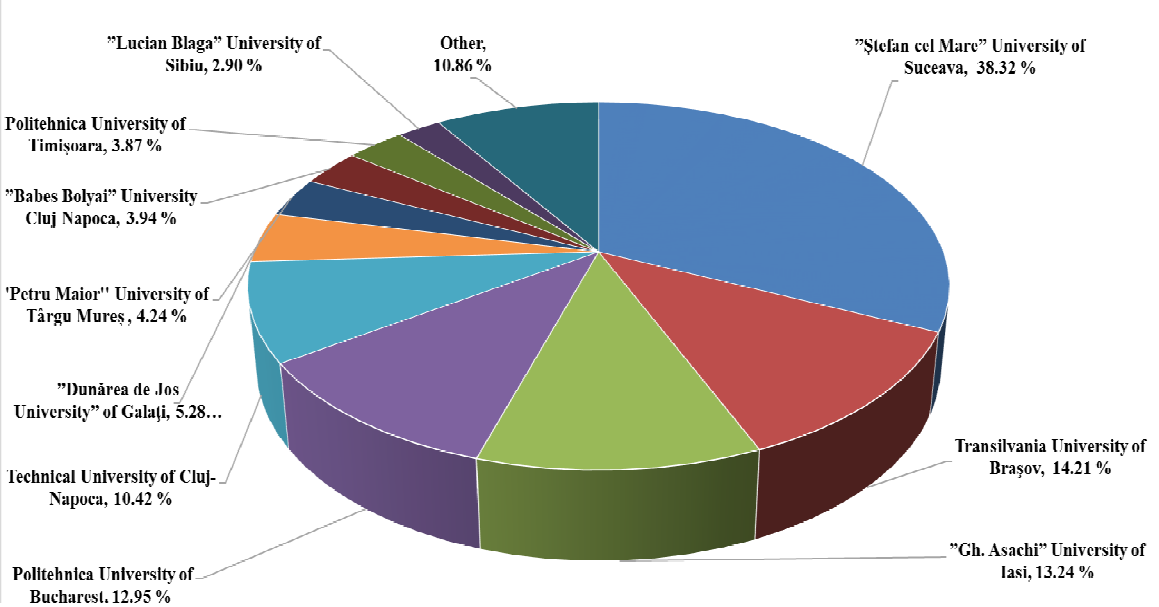


Figure 8: Patents application registered to OSIM, shares by university

Source Author, by using OSIM Data (2017a)

In fact, the first 10 universities, hierarchically ranked according to the number of registered patent applications, accounted for almost 90% of the total number of university patent registrations at national level. Engineering sciences, represented by technical universities, are the best represented in the statistics presented, the last positions being the military and medical fields.

Conclusion

Innovation and patenting of scientific research results is a priority at the European level, which has sought to maintain a leading position at international level and to reduce the gap towards the main competitors on the global patent market. Europe ranks the 5th among the patents registered to EPO, Germany being among the top 10 in the world. Romania holds modest positions at European and international level as number of patents registered, partly due to the high costs imposed by the registration and validation procedures. At national level, most patents are acquired by individuals, followed by research institutes, companies, and universities. The number of patents owned by individuals registered in the national database exceeds the cumulative value of patents validated for legal entities. The national legislation is correlated with the European rules, Romania being part of the main agreements and international treaties in the field of intellectual property.National economic growth can be sustained only by accelerating the national innovation process at national level and increasing the number of patents registered to OSIM and internationally recognized. The support for Romanian inventors should be carried out at national level through governmental measures to support RDI, both on public and on private level.

References

European Patent Office, (2017), Statistics. European patent applications 2007-2016 per country of residence of the applicant. [online], [Retrieved September 27, 2017], https://www.epo.org/about-us/annual-reports-statistics/statistics. html.

Government of Romania, (1998), Government Resolution no. 573 from 7 September 1998 regarding the organization and funcitoning of the State Office for Inventions and Trademarks, [online], [Retrieved September 10, 2017], http://legislatie.just.ro/Public/DetaliiDocumentAfis/15658.

Government of Romania, (2017), Government Resolution no. 63 from 23 February 2017 for amending and completing the Government Resolution no. 573/1998 regarding the organization and functioning of the State Office for Inventions and Trademarks, [online], [Retrieved September 10, 2017], http://legislatie.just.ro/Public/DetaliiDocument/186932.

State Office for Inventions and Trademark OSIM, (2017a), [online], [Retrieved September 25, 2017], http://www.osim.ro/legislatie/LegilatiaInDomeniulBreveteInventii.php#AcorduriSiConventii.

State Office for Inventions and Trademark OSIM, (2017b), Inventions patents 2006-2016, [online], [Retrieved September 25, 2017], http://www.osim.ro/despre_noi/capitolul_statistici.php.

European Parliament, (2017), Policy in the field of technological research and development, [online], [Retrieved September 18, 2017], http://www.europarl.europa.eu/atyourservice/ro/displayFtu.html?ftuId =FTU_5.9.6.html.

Parliament of Romania, (2015). Law for suspending the enforcement of the provisions of GO 41/1998 regarding fees in the field of intellectual property, Annex no. 1. Amount and deadlines regarding the payment of fees for the invention patent applications and invention patents [online], [Retrieved September 18, 2017], http://www.osim.ro/legislatie/Taxe-proprietate-industriala-inventii-Anexa-1.pdf.

Rasvan, R., (2017), Inventions protection in Europe, [online], [Retrieved September 27, 2017], https://rasvanremus.wordpress.com/2012/07/11/dreptul-proprietatii-intelectuale-procedura-de-brevetare-a-inventiilor-studenta-maria-rasvan-masterand-ioan-remus-rasvan,

Permanent Representation of Romania attached to the European Union, (2017), Europa. In order to boost research and innovation, the Commission proposed the unitary protection of patents, [online], [Retrieved September 27, 2017], https://ue.mae.ro/node/719#null.

World Intellectual Property Organization (2017), Record Year for International Patent Applications in 2016; Strong Demand Also for Trademark and Industrial Design Protection, Geneva (March 15, 2017), [online], [Retrieved September 29, 2017], http://www.wipo.int/pressroom/en/articles/2017/article_0002.html.

Improving Students' Self-directed Learning Outcomes on Mechanics Subject by Using E-Learning

Vina Serevina, State University of Jakarta, Jakarta, Indonesia, vina.serevina77@gmail.com, vserevina@unj.ac.id,

Abstract

This study aims to improve learners' self-learning outcomes on mechanics subject using E-Learning. The research method used was Miles and Huberman action research. Objects in this study were amounted to 31 students in the physics education program of State University of Jakarta. The research instruments used multiple choice questions and self-study learner questionnaire. The result of this research showed the effectiveness of E-learning on mechanics subject were obtained N-gain equal to score 0,818, so it was in very high category and there were increasing score of students' self-directed learning outcomes. In addition, the results of self-directed learning questionnaires were showed by aspect of the initiative with score 85%, own effort aspect with score 88% and aspect of responsibility with score 97%. The result of this study showed the improvement of students' self-directed learning outcomes on mechanics subject using E-learning.

Keywords: Improving Students' Self-directed learning outcomes, E-Learning.

Introduction

Technology development in globalization era is growing so fast. All sectors, including education, were demanded to be integrated with technology in order to produce competitive human resources (Kompas, 2012). Meanwhile, the development of information and communication technology in education has triggered a shift from face to face conventional learning to e-learning which can be accessed from any computers with no limitations. Along with the effects of globalization, education will be more open and two way, diverse, multi discipliner and related to competitive productivity (Kompas, 2014). Learning outcomes are the abilities of the students after they received a learning experience (Serevina, 2017).

In Antara News.com with topic Indonesia X and UNPAD release free online course explained that Indonesia X with State University of Padjadjaran (UNPAD) provide *Massive Open Online Courses* (MOOC) which gives free online course access for everyone in all over Indonesia. Free online course in indonesiax.co.id aims to democtratize education in Indonesia so that everyone, everywhere in Indonesia can be attended (Antara News, 2016).

Previous research by Maha Bali (Maha Bali, 2015) stated that cMOOCs gives opportunity to its participant to create a good collaboration which can help them to practice and develop skill in digital era.

cMOOCs can survive because of participant transformation to build connection between participants. Whereas, this research will focus on cMOOCs web based multimedia development and limited to basic mechanics subject.

Meanwhile, in research about *cMOOCS And Global Learning: An Authentic Alternative* (Carol Yeager, 2014) explained that cMOOCs can be used as media to explore and develop knowledge, skill, and individual behavior through provided contents and also can be used as place to build connection through discussion forum.

In a research study by Kristina (Kristina, 2014) concluded that students participation in cMOOCs based e-learning encouraged students to develop self-ability and improved their motivation. cMOOCs also demands students to be more active in activity and collaborating with other participants in order to achieve their goals.

Observation result also showed that Open University in Indonesia has provided several certified online course materials in moocs.ut.ac.id. Those materials are introduction to moodle 2.9, parenting, and marketing management. Basic mechanics has not been available in the following web. So the topic in this research choose mechanics subject.

The result of questionnaire through google form which was given to 64 respondents from universities in Indonesia was 57.1% stated that their lecturers have already used online instructional media while 52.45% have not yet. Those online instructional media were website which provide pdf file while video or animation were not provided in those website. Discussion forum and certificate of graduation have not provided in those website either. However there were exercise questions to evaluate students learning outcomes.

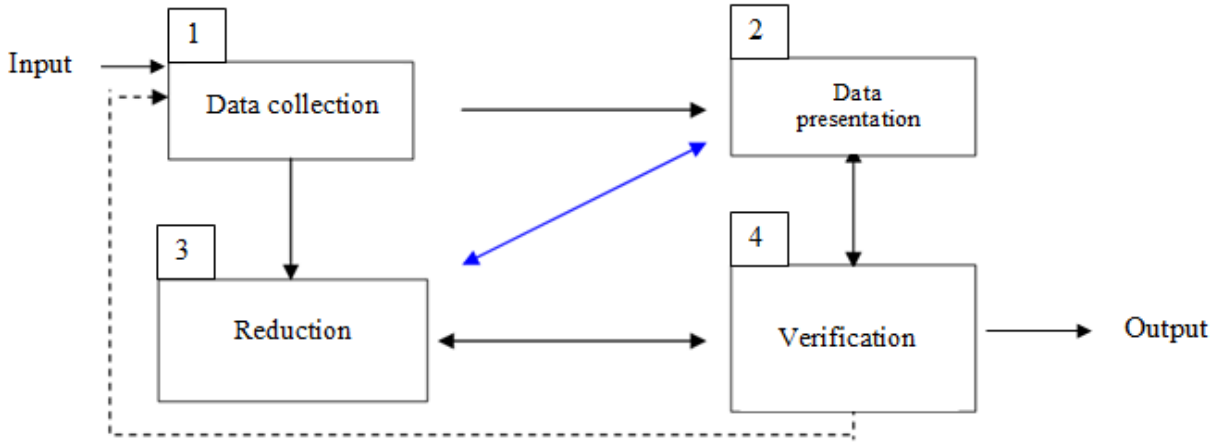
About 82,8% of respondents also stated that cMOOCs web has not already used as instructional media in their respective universities and 93.8% stated that the development of cMOOCs web based instructional media was necessary. Respondents were used to use gadget such as laptop or personal computer to access information with internet and 92.2% agreed that instructional media can encourage them to do a self-directed learning.

Based on argumentations above, this research about Improving Students' Self-directed Learning Outcomes on Mechanics Subject by Using E-Learning was done.

Research Method

Method used in this research was Miles and Huberman action research with steps as following (Miles & Huberman, 1994):

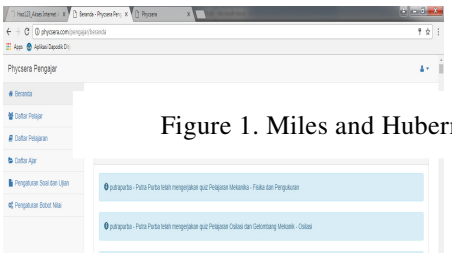
1) Data collection (secondary data, interview data, and event data)
2) Data presentation (pretest, mechanics subject learningusing e-learning E-learning and posttest)
3) Reduction / Exploration (collecting data based on research focus)
4) Verification / Member check: (analyzing focus to become more specific component)

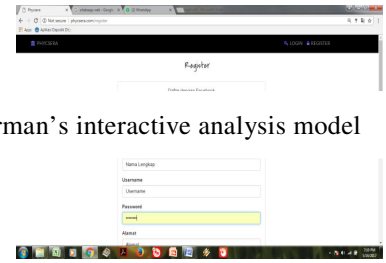


Instruments used in this research were mechanics multiple choice questions which is consists of oscillation, mechanical wave and thermodynamics and students' self-directed learning questionnaire. Questions were validated using point biserial formula and KR 20/21 to calculate its reliability (Widiyanto, 2014). Questions were used to find if there was an improvement of students' self-directed learning outcomes. Questionnaire was used to rate students' initiative, self-efforts, and responsibility.

Result and Discussion

1. Data collection was done by taking secondary data, interview data and event data as follows:





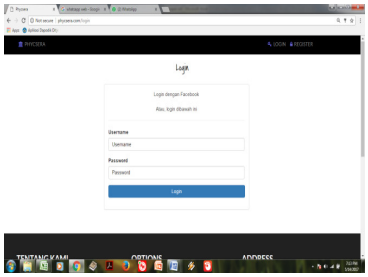
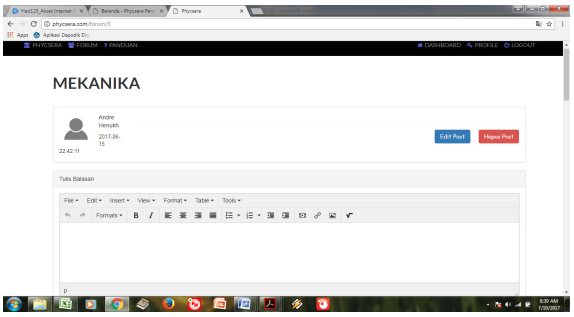


Figure 1. Miles and Huberman's interactive analysis model

Figure 2. Home of Web cMOOCs **Figure 3. a. Register** **b. Login**

2. Data presentation: Mechanics Subject



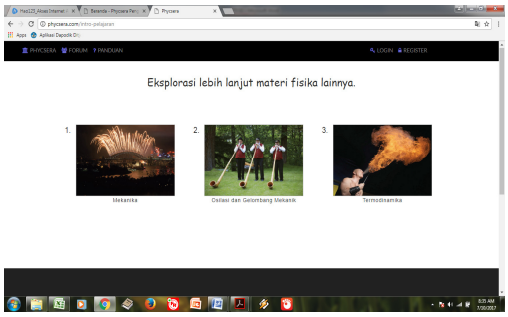


Figure 4a. Mechanics Subject Figure 4b. Mechanics Materials

3. Reduction of data was done by validating pretest and posttest questions.
   Validity and reliability test were done with results as follows:

a. Description of instruments' validity test.
   Validation of self-learning outcomes instrument was done by using point biserial formula at significance level of 5% for 31 respondents, obtained r table = 0.355. According to calculation, from 30 questions of mechanics subject only 20 questions considered valid; for oscillation and mechanical wave, from 20 questions, 14 questions were considered valid. Those valid questions were used as data collection instrument.
b. Description of instruments' reliability test.
   Reliability test used KR-20/21 formula. The result of reliability test were: 0.91 for mechanics questions, 0.91 for oscillation and mechanical wave questions, and 0.95for thermodynamics

questions. Those results were interpreted as a very high category. According to Widiyanto, instruments were considered to have a high reliability if its reliability coefficient is between 0.8-1.0 (Widiyanto, 2014). At significance level of 5% for 31 respondents, r table was obtained by 0.355 (Sugiyono, 2015).
According to calculation instruments used for data collection were valid and reliable.

4. Verification was done by analyzing pretest and posttest results.
Data verification was done in two ways, by data triangulation and N-gain test. N-gain is difference between posttest result and pretest result. N-gain indicated students' improvements after learning is done (Hake, 1999).

$$g = \frac{S_{post} - S_{pre}}{S_{max} - S_{pre}}$$

S_{post} is posttest score, S_{pre} is pretest score and S_{max} is maximum score of test. N-gain classifications are: (1) if $g \geq 0,7$, N-gain is in high category; (2) if $0,7 > g \geq 0,3$, N-gain is in good category; and (3) if $g < 0,3$ N-gain is in low category. According to calculation from 31 students who followed mechanics subject lecture, obtained N-gain = 0.818 and considered to be in high category.

Table 1: Test results

No	Test results		
	Pretest	Posttest	Max Score
1	45	88	100
2	40	90	100
3	30	93	100
4	45	85	100
5	30	88	100
6	30	86	100
7	40	83	100
8	25	88	100
9	45	88	100
10	35	93	100
11	40	92	100
12	25	93	100
13	30	86	100
14	25	92	100
15	45	85	100
16	45	87	100
17	20	96	100
18	30	86	100
19	40	84	100
20	35	90	100
21	55	88	100

No	Test results		
	Pretest	Posttest	Max Score
22	40	91	100
23	45	91	100
24	35	85	100
25	40	93	100
26	35	72	100
27	40	83	100
28	15	90	100
29	40	90	100
30	30	86	100
31	35	94	100
Total	1110	2739	3100
N-gain= 0.818			



Figure 5.a. Pre-Test (without E-Learning).





Figure b. & c. Post-Test (After with E-Learning)

Pretest and posttest result of students indicated that there was an improvement of students self-directed learning from E-learning usage.

Then, questionnaire was also used to find students initiative, self-efforts and responsibility. Questionnaire referred to Likert scale interval. Likert scale is used to measure behavior, opinion, and perception about social issue or phenomena (Riduwan, 2007). Obtained data then interpreted as follows:

Table 2: Likert scale (Sugiono, 2013)

Average Score	Interpretation
0%-20%	Very Bad
21%-40%	Bad
41%-60%	Enough
61%-80%	Good
81%-100%	Very Good

Questionnaire result is shown in figure 6.



Figure 6: Questionnaire result

According to graph above, initiative aspects reached score 85%, self-effort aspect 88% and responsibility 97%. The result of this three aspects were in very good category.

Djoko (Djoko Rahardjo, 2016) concluded that with maximum effort in searching of information will help student to reach their learning goal. Then, the result of aspects of initiative, self-effort and responsibility in this research equal to previous research.



Figure 7 : Students answer questionnaire

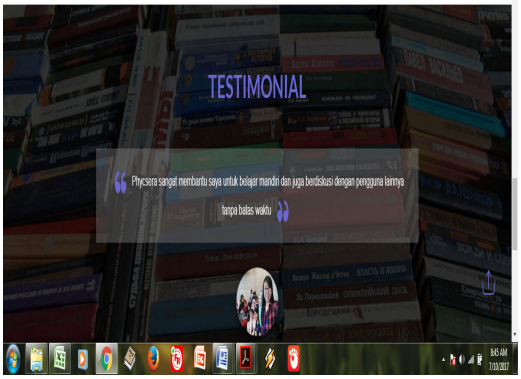


Figure 8 : Testimonial

Conclusion

According to assesment result of e-learning's effectivity, obtained N-gain= 0,818 (high category). This result indicated the improvement of students' self-directed learning outcomes. Questionnaire showed students' initiative score by 85%, self-effort by 85% and responsibility by 97%. So that, can be concluded that there was improvement of students' self-directed learning outcomes in mechanics subject using E-learning.

References

Antara News. (2016, May 3). IndonesiaX dan UNPAD luncurkan kursus online. Jakarta, DKI Jakarta, Indonesia.

Carol Yeager, B. H. (2014). cMOOCs and global learning: an authentic alternative. *Journal of Asynchronous Learning Networks*, 144-145.

Djoko Rahardjo, S. D. (2016). Internet Acces and Usage In Improving Students' Self-Directed Learning In Indonesian Open University. *Turkish Online Journal Of Distance Education*, 38-39.

Hake, R. (1999). *Analyzing change/gain scores.* USA: Woodland Hills.

Kompas. (2012, November 27). Kembangkan TIK di dunia pendidikan. Jakarta, DKI Jakarta, Indonsia.

Kompas. (2014, January 7). E learning, agar pembelajaran makin luas. Jakarta, DKI Jakarta, Indonesia.
Kristina, M. &. (2014). Participants' perceptions of learning and networking. *MERLOT Journal of Online Learning and Teaching*, 26.

Maha Bali, M. C. (2015). What makes a cMOOC community endure? Multiple participant perspectives from diverse cMOOCs. *Educational Media International*, 113.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: a sourcebook of new methods.* Beverly Hills CA: Sage Publications.

Serevina, V. (2017). Development of enterpreneurship based learning model to increase physics learning outcomes of students. *29th International Business Information Management Association* (pp. 122-129). Vienna: IBIMA.

Sugiono. (2013). *Metode Penelitian Pendidikan: Pendekatan kuantitatif, kualitatif dan R&D.* Bandung: Alfabeta.

Sugiyono. (2015). *Metode penelitian pendidikan.* Bandung: Alfabeta.

Widiyanto, M. A. (2014). *Statistika.* Jakarta: Kalam Hidup.

Combatting Tax Evasions

Darina Saxunova, Faculty of Management, Comenius University in Bratislava, Slovakia,
Darina.Saxunova@fm.uniba.sk

Rita Szarkova, Faculty of Management, Comenius University in Bratislava, Slovakia,
Rita.Szarkova@fm.uniba.sk

Abstract

Tax evasion is a threat to the society, the states and international organizations have been making an effort to combat negative phenomena associated with taxation, the tax evasion or tax fraud. Tax evasion represents a serious problem of each economy. It has a negative effect on the state budget and on the situation of public finances. The research object of a submitted paper is a tax evasion as a phenomenon that must be tackled and combatted. The primary goal of the paper is to focus on the connotation of the basic terms related to the tax evasions, to study in details their characteristics and definitions, highlighting the factors influencing remarkably occurrence of these phenomena. This scientific paper focuses on the tax evasion evolution, defining categories of the phenomena in this area sometimes resulting in tax fraud occurence. In addition, the strategies to detect potential tax evasion are highlighted to demonstrate governments' efforts worldwide, their being keen on stopping or minimasing negative consequences of tax frauds. No doubts about negative impacts of tax fraud and tax evasion to the national budgets. The countries and international organizations strive to combat the tax evasion or tax fraud, these issues are the main challenges of international tax agenda worlwide. Speculative businessmen could be found everywhere. Moreover, the partial, illustrative empirical research using the information from databases of big auditing commpanies is proving the relevance of tax issues that should be solved without no deferral.

Keywords: tax evasion, tax haven, tax fraud, controlled foreign companies legislation

Introduction

Individuals or entreprising entities have been levied taxes over centuries by a sovereign power. The resources were always necessary to fill in the state treasury, even deeply back to the era where they were not called taxes yet. There has always been a big dilemma on one side people would rather not pay taxes but on the other side they require high quality of public services ensured. People with common sense know everything costs something. Governments provide public services which companies in the market do not provide, because they are not economical for them, such as building roads, provide health care, legal system, security for the people, education for the people. To fund public expenditures requires a lot of capital and people would not be ready to contribute and pay for these services when they are needed so the states impose various fees and taxes. On the other hand, there always has been unwillingness to pay taxes or various fees. What is the reason why taxpayers are constantly looking for new ways to avoid taxation or at least to reduce the amount of tax liability? Tax evasion represents a serious problem of each economy. It has a negative effect on the state budget and on the situation of public finances. There is a big dilemma on one side people would rather not pay taxes but on the other side they require high quality of public services ensured. People with common sense know everything costs something. Why don't we want to avoid paying the taxes? The world is full of news that big corporation do not pay taxes but people who work hard every day, their tax is immediately reduced from their salary. Why this cannot be done also to big corporations, many ask. Nowadays, transparency where the money from the taxpayers go is the highest priority.

Objectives and Methodology

The objective of this scientific paper is a) to identify existing trends in the area of tax evasions and tax fraud in the theoretical focus and strategies and forms of tax evasion combatting. Comparison, analysis and synthesis, deduction as scientific methods were applied. No doubt when is business environment analysed or evaluated, tax system of the state should not be ignored, what strategies are implemented to protect state budget before the tax losses, in the practical level the analysis of selected countries – Slovakia, the Czech Republic, Hungary and Bulgaria were studied and analysed and empirical results are presented covering 2 recent years 2014 and 2016. The data of this economic crime started to be collected only recently therefore some data were obtained from the OECD database and from the research data of the auditing company PriceWatersCoopers, etc.

Literature Review

Tax evasion is a very old idea. The oldest evidences that confirm the existence of tax evasion are tax mutinies, first reported by ancient historians. The economic theory of a tax evasion is not as old as the phenomenon itself. According to Sandmo (2005), the beginning of the theoretical concept of tax evasion from the perspective of practitioners´ experience and theoreticians´ ideas can be dated to 1972. In this year, the first scientific paper about tax evasion was published, "Income Tax Evasion: A Theoretical Analysis" by Allingham and Sandmo.Tax evasion is defined by The European Commission as a phenomenon which "generally comprises illegal arrangements where tax liability is hidden or ignored, i.e. the taxpayer pays less tax than he/she is supposed to pay under the law by hiding income or information from the tax authorities". (EC – Taxation and Customs Union, 2017). Nowadays, a large number of domestic and foreign literature exists which deals with the topic of tax evasion and tax fraud. (Hayoz and Hug, 2007), (Gravelle, 2015), (Brown, 2011), (Tooma, 2008), (Murray, 2012). According to Webley et al. (2010) it is an old, but constantly developing issue. Beck, Lin and Ma (2014) are looking for the answer to the question: Why are companies constantly trying to avoid taxing? Other researchers are looking for new ways to reduce (Alm, 2012), (Piolatto, 2014) and measure tax evasion (Mo, 2013). There is an effort to compile different models for measuring, analysing tax evasion by applying various factors (Spicer, 1986), (Xiao, Liu and Lai, 2014), (Seidel a Thum, 2016). Thakur (2013) describes how to detect tax evasion by shares and how to catch fraudsters. Mawejje and Okunu (2016) examine the interaction between different indicators of the current business environment and tax evasion. Li and Ma (2015) focus on the relationship between the government and tax evasion.

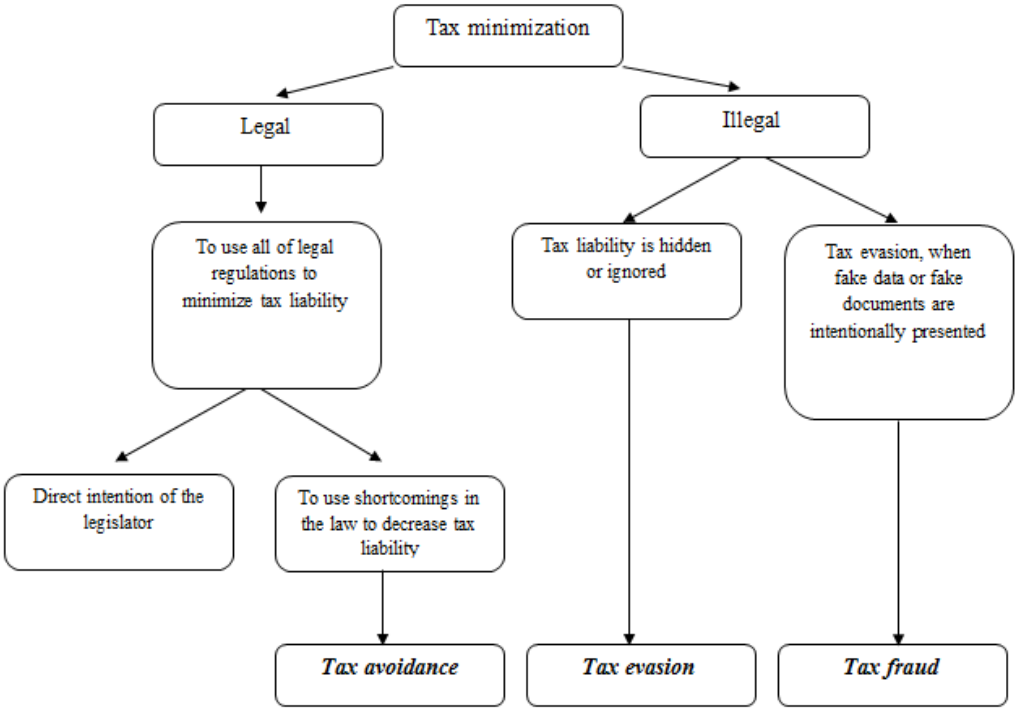
The term of ***tax evasion*** is often used by the general public or in academic environment, but to find its general definition is difficult. Faltová (2015) found out that the common element of all definition of tax evasion was the illegality. Aleš (2000) writes that tax evasion is a failure of tax liability. The concept of tax evasion (Boháč, 2015) can be understood as a situation in which the tax is not determined in accordance with the law. The result of mentioned situation is a difference between the amount of tax payable and the amount of tax paid. The amount of tax paid by the taxpayer is lower than the amount stated by the law. On the other hand, Lenártová (2000) defines tax evasion as a result of targeted, legal or illegal, economic behaviour of a taxpayer, which leads to the reduction or elimination of tax liability or to other economic benefit resulting from taxes.

In this context, foreign literature uses terms of "Tax evasion" and "Tax avoidance". Experts characterize "Tax evasion" as a type of tax fraud activities for which taxable entity can be sanctioned. The form of sanction depends on the extent of tax reduction, the amount of tax not paid and also whether or not the intention of tax elimination was demonstrated. Tax evasion can also occur on the basis of ordinary ignorance, lack of information or negligence. The constantly changing tax laws and regulations contribute to the disruption of legal certainty and to unintentional misconduct of the taxpayer.

Tax evasion and tax avoidance

The topic of tax evasion is a very actual problem of our society. People and organizations all over the world strive to find methods for detecting and reducing tax evasions. The crucial question frequently raised is what tax evasion means and what a variety of tax evasion cases may exist. Tax evasion is characterized as the result of the economic behaviour of taxpayers, considered as a leakage of tax liability. Tax avoidance is considered as a legal tax optimization, when a taxable entity applies all legal provisions to minimize the amount of his tax liability. It is actually a tax evasion while the taxable person uses all the legal options. The taxable entity can apply all statutory exceptions, exemptions, tax reliefs, discounts, depreciation, joint taxation of husband and wife, standard or percentage expenses of income and reserves directly and intentionally settled in the legislation. Legal tax optimization can include the usage of gaps in law and regulations. For example in the case of the division of a trading company into smaller business units it is possible to avoid of higher tax rate, if progressive taxation is applied. "Schwarz system" is another way to achieve legal tax benefits. Schwarz system means hiring workers based on their business license instead of employment contract. (Faltová, 2015)

Illustration 1: The types of tax minimization



Source: Own elaboration based on (Krestesová and Rezek, 2013)

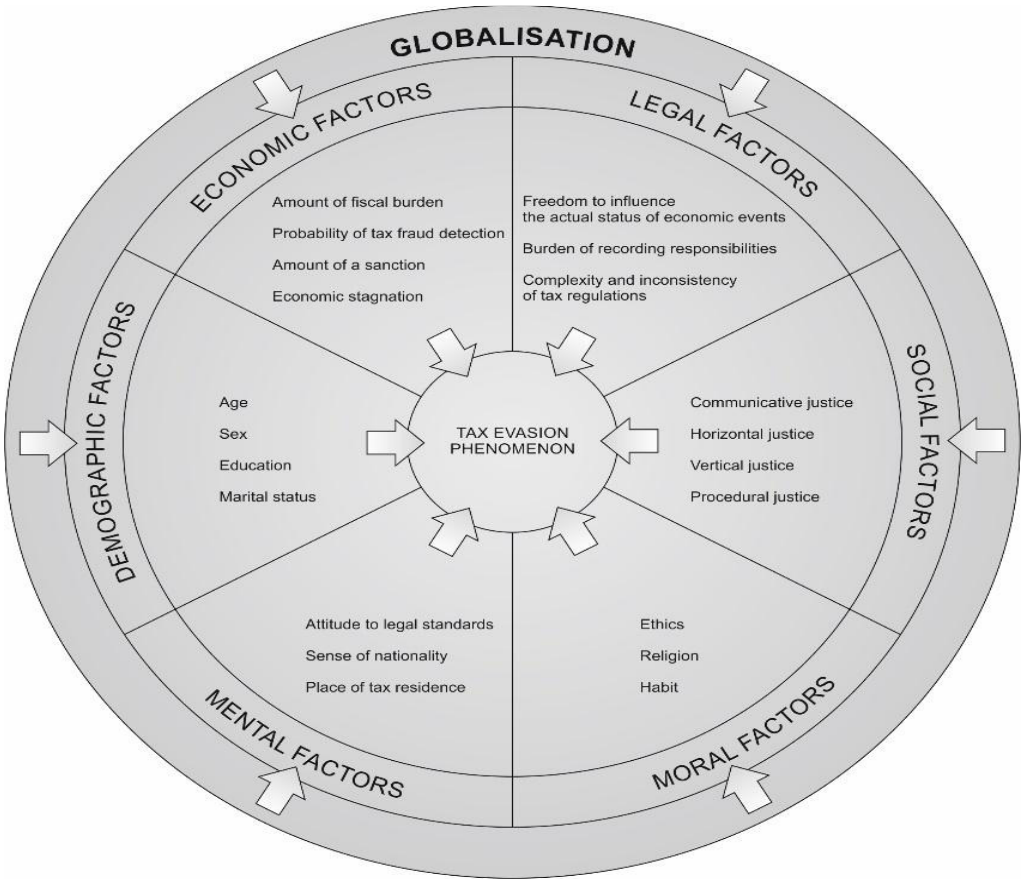
On behalf of the Ministry of Finance of the Czech Republic, Krestesová and Rezek (2013) drew up a scheme which helps to explain inconsistencies in the definitions of the terms in connection with tax evasion. The scheme showed and explained the terms used only in Slovak and Czech terminology and did not take into account the definitions presented by experts around the world. The new schema prepared by the authors of this paper shows different perspectives on the definition of tax minimization. The European Commission (EC – Taxation and Customs Union, 2017) clarified the concepts of the three most important phenomena that form the basis of our topic:

- ***Tax Fraud*** – "is a form of deliberate evasion of tax which is generally punishable under criminal law. The term includes situations in which deliberately false statements are submitted or fake documents are produced"
- ***Tax Evasion*** – "generally comprises illegal arrangements where tax liability is hidden or ignored, i.e. the taxpayer pays less tax than he/she is supposed to pay under the law by hiding income or information from the tax authorities"
- ***Tax Avoidance*** – "is defined as acting within the law, sometimes at the edge of legality, to minimise or eliminate tax that would otherwise be legally owed. It often involves exploiting the strict letter of the law, loopholes and mismatches to obtain a tax advantage that was not originally intended by the legislation".

Determinants of Tax Evasion

Tax evasion is affected by a number of different factors that have a strong impact on them due to globalization. Ciupek (2015) in her publication describes the causes of tax evasion from income tax, in six areas (see illustration 2):

Illustration 2: Determinants of Tax Evasion



Adapted from Ciupek (2015, 84)

- Economic factors – financial and economic situation of a taxable entity, general business conditions, the amount of tax burden, the probability of the detection of tax evasion, the amount of sanctions, business stagnation

- Legal factors – distrust in the state and in public institutions, freedom to influence the actual status of economic events, burdensome nature of recording responsibilities, complexity and inconsistency of tax regulations
- Social factors – exchange-related justice connected with tax payments and tax benefits, horizontal, vertical and procedural justice
- Demographic factors – age, gender, education, marital status
- Mental and moral factors – attitude to civil obligations, attitude to taxation

Lenártová (2000) in her scientific paper also examines the determinants of tax evasion, where she lists the following group of factors: economic, legal, socio-political, tax-technical, psychological, ethical and social factors.

Both researchers Ciupek (2015) and Lenartova (2000) identified as the reason of tax evasions financial and economic situation of the state, the amount of tax burden levied on the soleproprietors and corporations. After the financial crisis in 2008 a lot of countries in the European Union struggled to achieve any economic growth, governments in the CEE block wanted (belonging to the developing countries or in transition towards developed contries) to attract investors and FDI to support development and economic growth also by attractive tax rates. Simple generalisation offers the idea the idea of researching the countries that have a common, historical development bacground (Austrian –Hungarian monarchy) (Czech Republik, Slovakia and Hungary were the parts of the monarchy and we assumed a common mental and moral factors – attitude to civil obligations, attitude to taxation for these states would be similar and we have also selected the state with the lowest tax rates, and another criterium of the choice that rates should be aroung the average of the EU (around 20%, what is sufficiently low and the enterprising community should be assumed to pay taxes and tax fraud is assumed shold not be a threat for them. Which was not complitely n accordance with our assumption. Because Hungarians show the highest percentage of tax fraud and the tax rates are low.

Table 1: Tax rates after the financial crisis in a selected countries of the CEE

Tax rates (TR)	FO % PO %	FO % PO %	FO % PO%
	2010	2014	2015
BG Bulgaria	10,0 10,0	10,0 10,0	10,0 10,0
CZ Czech Rep.	15,0 19,0	22,0 19,0	22,0 19,0
HU Hungary	40,6 20,6	16,0 20,6	16,0 20,6
SK Slovakia	19,0 19,0	19,0* 22,0	19,0* 22,0
PL Poland	32,0 19,0	32,0 19,0	32,0 19,0
RO Romania	16,0 16,0	16,0 16,0	16,0 16,0
SI Slovenia	41,0 20,0	50,0 17,0	50,0 17,0
EU priemer	38,6 23,2	39,4 22,9	39,3 22,8

Soures: Adapted from the resource (Income tax rates, 2016)

Legend: Slovakia* for the soleproprietors (over 34000 EUR the TR is 25%.)

Tax Fraud in Slovakia, the Czech Republic, Hungary, Bulgaria and in the CEE

PricewaterhouseCoopers examined economic crime in the countries around the world. Table 1 shows that tax fraud in the analysed countries reaches higher results than in the global environment. The number of respondents in Slovakia who had registered tax fraud in their environments in 2016 (11%) was higher by 75% than in 2014 (4%). This number in the Czech Republic is much higher than in Slovakia. According to respondents, the appearance of tax fraud in the Czech Republic from 2014 to 2016 increased by 100%. While Slovakia and the Czech Republic record an increase in the number of tax fraud cases, Hungary and Bulgaria registered a decline. In 2014, the number of respondents in Hungary who registered tax fraud in their environment during the analysed period was 25%. In 2016 it was only 21%. A decrease has been also noticed in Bulgaria, where the amount declined from 10%

to 7%. In 2016, Slovakia (7%) and Bulgaria (7%) showed lower values of tax fraud appearance than the CEE average (11%), while the survey´s results in Hungary (21%) and the Czech Republic (14%) exceed the CEE average. This information started to be collected recently, the simple comparision of selected countries and the CEE is conducted with the future prospects for a deeper research.

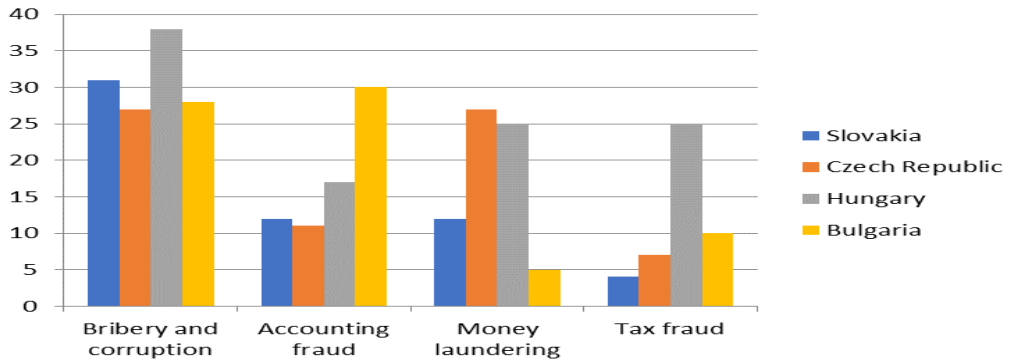
Table 2: Tax Fraud as Economic Crime: Slovakia, Czech Republic, Hungary, Bulgaria and the CEE.

In percentage [%]	Slovakia		Czech Rep.		Hungary		Bulgaria		CEE
	2014	2016	2014	2016	2014	2016	2014	2016	2016
Asset misappropriation	54	67	80	61	63	40	40	66	63
Procurement fraud	31	20	29	25	25	17	15	38	26
Bribery and corruption	31	23	27	21	38	38	28	48	34
Cybercrime	12	13	31	36	17	17	10	24	22
Accounting fraud	12	7	11	22	17	8	30	28	21
Human resources fraud	8	0	13	7	0	8	0	10	5
Money laundering	12	7	27	17	25	8	5	17	13
IP infringement/data theft	0	3	18	14	0	8	10	14	9
Mortgage fraud	19	10	24	11	17	0	5	17	8
Tax fraud	4	7	7	14	25	21	10	7	11
Insider trading	0	10	9	14	0	13	0	21	10
Competition law/antitrust law	8	0	7	7	13	4	25	14	7
Espionage	8	0	4	3	0	0	10	0	3
Other	0	10	0	11	0	13	25	0	8

Source: Own elaboration based on (PwC, 2014-2016)

Illustration 3 compares the appearance of tax fraud and related economic crimes in Slovakia, the Czech Republic, Hungary and Bulgaria in 2014. Bribery and corruption were in the first place. In all the analysed countries, more than 25% of respondents met this type of economic crime in their business environment during the analysed period.

Illustration 3: Economic Crime in 2014

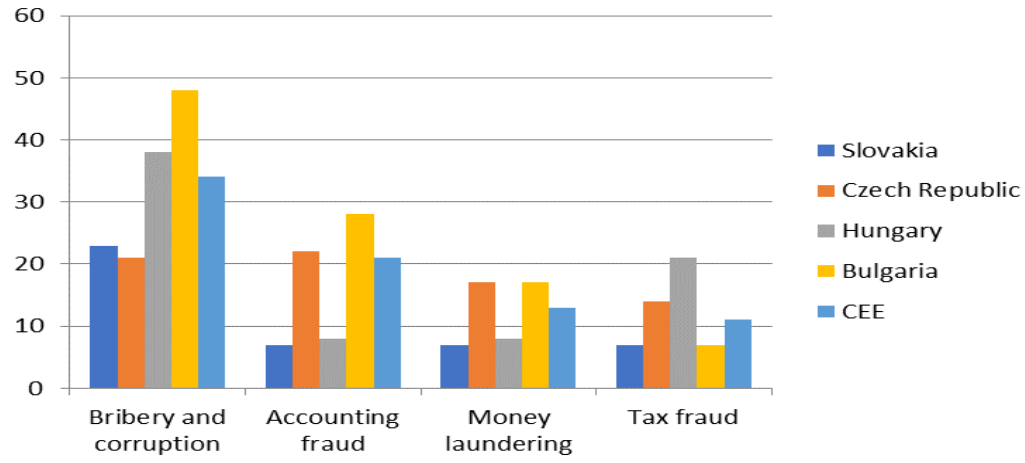


Source: Own elaboration based on (PwC, 2014b), (PwC, 2014c), (PwC, 2014d) and (PwC, 2014e)

Hungary reported much higher results as other countries - 38%. Slovakia and the Czech Republic showed the same level of accounting fraud occurence. This type of economic crime was the highest (30%) in Bulgaria. Money laundering was the most common in the Czech Republic and Hungary, while in tax fraud Hungary outran all the other analysed countries.

Illustration 4 compares the appearance of tax fraud and related economic crimes in Slovakia, the Czech Republic, Hungary and Bulgaria in 2016. Bribery and corruption were still in the first place. Slovakia and the Czech Republic had the lowest level of corruption, Hungary reported similar results as the CEE average. Bulgaria´s survey results transcend values in analysed countries. Slovakia and Hungary were on the same level in the occurrence of accounting fraud. This type of economic crime was the highest (30%) in Bulgaria, higher than the CEE average (21%). Money laundering was the most common in the Czech Republic and Bulgaria, while in tax fraud Hungary still outran all the other analysed countries.

Illustration 4: Economic Crime in 2016



Source: Own elaboration based on (PwC, 2016 a-e)

Bribery and corruption is very frequently defined as abuses of power by people in positions of authority. They're still going strong: it's estimated that more than US$1 trillion is paid each year in bribes globally, and that US$2.6 trillion is lost to corruption. That's 5% of global GDP – and the true figure is probably even higher. (PwC, 2016). Politicians in many countries with their political scandals related to the economic crime does not motivate businesses to behave ethically, but by this push away honest investors who look for stability and sustainability. If politicians cover the accounting or tax fraud because they may be involved as well, the public and ethical businesses have the only chance to start fight against these negative phenomena, and support and elect people who are moral and ethical and they really protect taxpayor's capital resources by accepting a suitable laws and legislation. The health business environment plays an important role for entrepreneurialship and combatting negative phenomena as economic crime, fraud, no possibility of law enforcement , etc. (Peracek, Noskova and Mucha, 2017). What steps have already been executed or strategically planned to combat e.g. tax evasions the following paragraph is dealing with.

Objectives and Strategies of Combatting Tax Evasion

Tax evasion limits countries in the implementation of their economic policy. It also represents a problem from the justice´s perspective. Countries, states, as well as the European Union, try to combat this phenomenon, analyse its range and to accept necessary actions to detect tax evasion and reduce the leakage. The biggest problem is that the evolution of tax evasion is faster than the actual regulation of legislation. The fight against tax evasion is undoubtedly a very actual, complex and sensitive issue at the same time. The goals of this fight are the efficient tax collection with unchanged tax rates, to discourage taxpayers from illegal actions and from using tax optimalization. The fight against tax evasion involves individual states, the European Union, as well as other international organizations. It can be successful only if all states and organizations join their forces and fight together against fraudsters. Actions to combat tax evasion are implemented at three levels: national level, EU level and international level. (Huba, Sábo and Štrkolec, 2016)

Table 2: Goals of the figth against tax evasion at national, EU and international level

Level	Goals
National level	Tax fraud elimination in indirect taxes Improve tax information exchange Eliminate the abuse of double taxation acts Fight against various forms of tax planning
EU level	Streamline information exchange between the EU and the member states Streamline income taxing from cross-border savings Cooperate in the field of taxation and in the fight against fraud Streighten the fight against not using double taxation in the area of hybrid structures Create a platform for taxation Improve administrative cooperation in the field of direct taxation Standardize information exchange
International level	Identify tax issues of the digital economy Neutralize the action of hybrid structures Strengthen the rules of controlled foreign companies Limit the tax base reduction through interest deduction and financial payments Streamline the fight against harmful tax practices with regard to transparency Eliminate the abuse of double taxation acts Create methodology for collecting and analyzing data on taxbase and profit shifting erosion Require taxpayers to publish their aggressive tax planning structures Explore the transfer pricing documentation Streamline mechanisms for conflict solution

Source: Own elaboration based on (Huba, Sábo and Štrkolec, 2016)

States, countries worldwide have recognized the need of the action adoption to combat tax evasion. These actions can be divided into two groups. The first group is created by the actions that have developed within the decision-making process of the general courts and they have the nature of criteria. These criteria are marked as tax doctrines. The second group is characterized as actions that have been adopted under an individual legislation. **General anti avoidance rule** (GAAR) has been introduced as a statutory action designed for the fight against tax evasion. It is defined as **a set of rules based on individual general principles existing in the national tax rules** and which are modeled to combat tax evasion. GAAR is a concept in the tax code which allows the tax authorities to deny taxpayers the right to recognize tax advantage. The goal of GAAR is also to penalize actions and transactions that may create a situation of illegal tax evasion. GAAR has been introduced as a statutory action designed for the fight against tax evasion. (Sábo, 2015). Generally, strategies to detect aggressive tax planning schemes can be divided into 5 main categories:

a) Disclosure and Reporting – taxpayers or third parties provide relevant information to the tax authorities. Initiatives proved to be useful for this strategy are special reporting obligation on losses, manadatory disclosure rules, ruling and co-operative compliance programs.
b) Investigations and audits – the tax administration itself seeks to detect relevant information by using its investigative powers.
c) Domestic and international cooperation – strategies that seek to build on information held either by government departments or that involve co-operation with the tax administration of another country.
d) Data analysis – strategies that seek to make the best use of internal tax administration information or external public data. The success of data analysis is dependant on the volume and quality of data available to the tax administration and how good they are at analysing, comparing, processing data and interpreting the information obtained to produce meaningful results.
e) Other detection strategies

Participating countries that have developed business models aimed at improving tax risk management and compliance by large business taxpayers through greater cooperation in Australia, Ireland, Italy, The Netherlands, New Zealand, Spain, Sweden, The United Kingdom and the USA. (OECD, 2016).

Novackova (2017) and her team studied tax havens and they state that tax havens are a big attraction for multinational companies to be utilised as international tax planning scheme, therefore they are in the focus of government tax policy initiatives. (Milosevicova, Novackova a Wefersova, 2017). Anti-haven legislation is introduced in many countries to protect their domestic tax base. There are some means how to control abusing tax haven for this purpose: such as a) pressure from supranational bodies for example the OECD, the EU threatens tax havens by imposing economic and trade sanctions on them; b) transfer pricing rules – they do not apply to arm's-length transactions, therefore no all forms of haven abuse are tackled, c) company residence rules- governments have been failing over years to define adequately entity's residence for tax purposes which caused that the tax haven abuse may be exercised, d) controlled foreign companies (CFC) legislation – the most effective method of eliminating deferral. The phrase controlled foreign company is used only in the meaning of a subsidiary resident in a country where it pays little or no tax. "Domestic shareholders of foreign companies must pay tax currently on their pro rata share of the income of the foreign company. Timing of the liability for domestic tax from the time of distribution of the foreign company's profits to its shareholders to the time at which it is derived by the foreign company is affected by CFC legislation. This legislation aims at bringing the timing forward." (Miller, Oats, 2016, p.567). How controlled foreign companies' CFC legislation is applied by the national government to a resident taxpayer the following scheme explains.

Table 3: CFC legislation

Resident shareholders' income	**Income generated by the subsidiary**	**Taxation is made ignoring**	**Usual tax rule is broken by the CFC country**
Will be taxed	Subsidiary is loca-ted in the tax haven	whether such income has been remitted to the shareholders' country of residence	Collection of independent entities instead of being treated as a multinational group of companies

Source: processed by authors

Miller and Oats (2016) state if the CFC legislation is applied to a resident taxpayer by a government, the tax is levied on the tax resident taxpayer as if the income had been earned by that tax payer.

25 years ago this American company, which owns 100% owned subsidiary in Anquilla, invented a patent for the mining industry. At that time the owners did not assume a real value of this intangible. The US company transferred the ownership title to Anquilla subsidiary for a minimal amout of USD. After years it has become a successful invention and it is licensed in the countries worldwide, earning company huge amount of royalties. The US is not able to tax the subsidiary on the royalty revenues not being resident in the USA and without any source of income in the USA. But government can impose the tax on the US company as if the US company received the royalties (which were received by the subsidiary). The company is taxed on all income generated by this subsidiary, albeit the US company has received any dividend, or interest from the Subsidiary in Anquilla. The application of CFC legislation prevents the US company to defer tax on the Anquila income until a dividend, interest is paid by Anquilla subsidiary. Because this deferral could be even indefinite. (meaning no payment ever to the USA from this Anquilla's income collected).

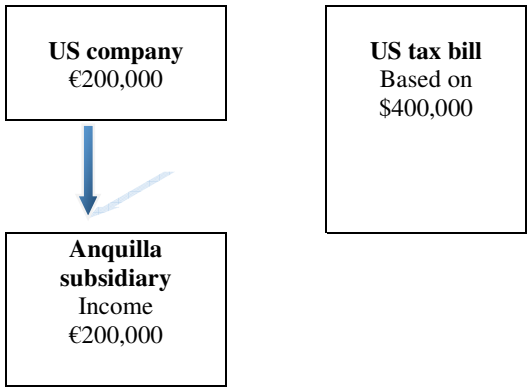


Figure 1: US company with 100% owned subsidiary in Cayman Islands

Source: Adapted by the authors based on the (Miller, Oats, 2016)

CFC legislation is usually focused on the resident shareholders' passive income of the foreign subsidiary (i.e. not on the trading earnings) with the purpose of taxing it. Passive income is derived from the financial investments and these are more likely to be transferred to the foreign subsidiary where they are taxed by the lower tax rate. It is a preferential treatment to transferring operations or business. The important arguments of advocates for relocating financial investments are two crucial points: price and complicated process of relocation, which is cheaper and less complicated compared to relocating factories and labour force.

Conclusion

While state authorities are trying to find a way to capture fraud and to adapt it to the legislation, tax entities already use new legal and illegal methods to avoid paying. Countries invest a lot of effort into interception tax evasion and tax fraud. Nevertheless, it is almost impossible to determine their size. PwC in its surveys has determined the size of the part what tax fraud presents in economic crimes. Analysis contains information about tax fraud as a part of economic crime from the global perspective, in Slovakia, Hungary, the Czech Republic and Bulgaria. According to the PwC survey, the highest tax fraud in the selected countries has been measured in Hungary. This area represents a large area of future research, an opportunity to look into the reasons of the phenomenon and how to fight against it.

Governmental and public concern over the tax practises of multinational gigants led to strenghtening the fight against the tax evasions and fraud. Especially NGOs are very active to push introduction of country by country financial reporting made by multinationals businesses (MNEs), especially disclosing earnings made and tax paid in each country where the MNEs do business. There are many aspects still not examined in this area of taxation, great opportunities for doing the research which, we all hope, will bring real successful results in the area of combatting the tax fcrimes.

References

Aleš, J. (2000) 'Daňový únik,' *Právo a podnikaní*, 22.

Alm, J. (2012), Designing alternative strategies to reduce tax evasion, Tax Evasion and the Shadow Economy, Pickhardt, M. and Prinz, A. (ed.) Edward Elgar Publishing, Inc., Massachusetts, USA.

Beck, T., Lin, C. and Ma, Y. (2014), 'Why Do Firms Evade Taxes? The Role of Information Sharing and Financial Sector Outreach,'. *The Journal of Finance* 69, 763-817.

Boháč, R. (2015), Teoretické otázky českého daňového práva z hlediska daňových úniků a podvodů, Daňové právo vs. daňové podvody a daňové úniky, Babčák, V., Románová. A. and Vojníková, I. (ed.) Vol. 1. Univerzita Pavla Jozefa Šafárika v Košiciach, Košice.

Brown, K. B. (2011), A Comparative Look at Regulation of Corporate Tax Avoidance: An Overview, A Comparative Look at Regulation of Corporate Tax Avoidance, Brown, K. B. (ed.) Springer, New York.

Ciupek, B. (2015). Premises of the phenomenon of income tax evasion, Daňové právo vs. daňové podvody a daňové úniky, Babčák, V., Románová. A. and Vojníková, I. (ed.) Vol. 1. Univerzita Pavla Jozefa Šafárika v Košiciach, Košice:

Faltová, Š. (2015), Daňový únik, Daňové právo vs. daňové podvody a daňové úniky, Babčák, V., Románová. A. and Vojníková, I. (ed.) Vol. 1. Univerzita Pavla Jozefa Šafárika v Košiciach, Košice.

Gravelle, J.. G. (2015), 'Tax Havens: International Tax Avoidance and Evasion,' [Online], [Retrieved January 1, 2017], https://fas.org/sgp/crs/misc/R40623.pdf

Hayoz, N. and Hug, S., (ed.). (2007) Tax evasion, Trust and state capacities, Peter Lang AG, Germany.

Huba, P., Sabo, J. and Štrkolec, M. (2016), Medzinárodné daňové úniky a metódy ich predchádzania, Univerzita Pavla Jozefa Šafárika v Košiciach, Košice.

Krestesová, M. and Rezek, V. (2013), 'Daňové nedoplatky a daňové úniky,' [Online], [Retrieved January 2, 2017], http://www.mfcr.cz/assets/cs/media/2013-10_Danove-nedoplatky-a-danove-uniky.pdf

Lenártová, G. (2000), 'Faktory vzniku daňových únikov'. *Ekonomické rozhľady*, 243.

Li, L. and Ma, G. (2015), 'Government Size and Tax Evasion: Evidence from China,' *Pacific Economic Review*, 20 (2), 346-364.

Mawejje, J. a Okumu, I. M. (2016), 'Tax Evasion and the Business Environment in Uganda,' *South African Journal of Economics* 84 (3), 440-460.

Miller, A. and Oats, L. (2016) Principles of International Taxation, 5th ed.Bloomsburry publishing, West Sussex, UK.

Milosovicova P., Novackova D., and Wefersova. J. (2017) Medzinarodne ekonomicke pravo. 1. vyd. - Praha : Wolters Kluwer, Czech Republic, S.282

Mo, P. L. L. (2003) Tax Avoidance and Anti-Avoidance Measures in Major Developing Economies, Praeger Publishers, USA.

Murray, R. (2012) Tax Avoidance, Sweet&Maxwell, London, UK.

Sabo, J. (2015), GAAR (všeobecné pravidlo predchádzania daňovým únikom) v právnom poriadku SR, Daňové právo vs. daňové podvody a daňové úniky, Babčák, V., Románová. A. and Vojníková, I. (ed.) Vol. 2. Univerzita Pavla Jozefa Šafárika v Košiciach, Košice.

Sandmo, A. (2005) 'The Theory of Tax Evasion: A Retrospective View,' *National Tax Journal,* 58 (4), 643-663.

Peráček, T., Nosková, M. and Mucha, B. (2017) Selected issues of Slovak business environment, Economic and social development-"Managerial issues in modern business" (Book of Proceedings) Varazdin : Varazdin development and entrepreneurship agency, S. 254-259.

Thakur, P. K. (2013) Tax Evasion Through Shares, Prashant Kumar Thakur at Smashwords, Kolkata.

Tooma, R. A. (2008) Legislating Against Tax Avoidance, IBFD, The Netherlands.

Webley, P., et al. (2010) Tax Evasion: An Experimental Approach, Cambridge University Press, New York, USA.

EC – Taxation and Customs Union. (2017) 'The fight against tax fraud and tax evasion - Time to get the missing part back'. [Online], [Retrieved January 9, 2017], https://ec.europa.eu/taxation_customs/fight-against-tax-fraud-tax-evasion/missing-part_en

Income Tax rate 1995 -2016. Trading Economies. online. 2016. [cit. 2016 -3-16].
Dostupný z > http://www.tradingeconomics.com/denmark/indicators

Disclosure Practice and Perspectives of Notes to Financial Statements in Croatian Tourism Companies

Ivana Mamić Sačer, University of Zagreb, Faculty of Economics and Business, Zagreb, Croatia, imamic@efzg.hr

Ivana Pavić, University of Zagreb, Faculty of Economics and Business, Zagreb, Croatia, ipavic@efzg.hr

Ana Rep, University of Zagreb, Faculty of Economics and Business, Zagreb, Croatia, arep@efzg.hr

Abstract

Companies all over the world present their financial information in the financial statements. Notes to the financial statements are one of the principal financial statements and represent a valuable source of information for investors and other interested groups. Disclosure requirements for financial statements prepared under the International Financial Reporting Standards are set by the International Accounting Standards Board. According to the International Accounting Standard 1 Presentation of financial statements, the entities should disclose financial information either in the primary financial statements or in the notes to financial statements. Often, the preparers are not aware that they should make decision which information is significant and should be presented in detail and in doing this they need to exercise judgments. The practice has shown that over the time the notes has become very extensive. As a result, the process of finding relevant information has become very challenging for many financial statements users. In order to solve that problem, the International Accounting Standard Board published in March 2017 a Discussion Paper Disclosure Initiative—Principles of Disclosure to call for a discussion on the problems of the disclosure. The paper deals with theoretical discussion on actual problems arising from the disclosure of the notes to financial statements and the analysis of the notes in Croatian tourism companies has been done in order to examine actual disclosure practice in the companies. Finally, the perspectives of the notes disclosures are presented in the paper.

Keywords: notes to the financial statements; financial reporting; disclosure requirements; principles of disclosure

1. Introduction

There are a number of users interested in different kinds of information about a certain company. Financial reporting can provide a broad set of accounting information which is inevitable in business decision making process. Accounting information is a significant source of financial data needed for statistical purposes and many macroeconomic analyses. Financial data are presented in the form of principal financial statements - balance sheet, the statement of comprehensive income, the statement of changes in equity and cash flow statement. Additionally, financial and non-financial data can be found in the form of the notes to financial statements. The aim of the notes is to clarify financial information presented in the primary financial statements and provide necessary information for understanding financial position and business performance of a company. In order to satisfy the disclosure requirements, set by International Financial Reporting Standards (IFRS), the notes to financial statements have become very extensive. Very common critics on the notes topic indicate that the notes are so repetitive and it is difficult for investors to find the most important information (EY, 2014). Further, a

broad spectra of information presented in the notes is often the reason why investors are not able to "see the woods through the multitude of information trees" (IASB, 2016).

However, a quantity is not always the warranty of a quality. The information overload risk has been a subject of many discussions of standard setters (Paredes, 2013). In that context, the IFRS's standard setter the International Accounting Standards Board (IASB) "has observed there are three main concerns about information disclosed in financial statements: not enough relevant information; irrelevant information or disclosure overload; and poor communication of disclosures" (IASB, 2017). As a result of the Board's effort and the financial statements users' concern on the quality of disclosure, in March 2017 the Discussion Paper Disclosure Initiative—Principles of Disclosure (DP) has been published. The Initiative calls for a discussion on the problems of the disclosure.

The Board believes that the main problem of not appropriate disclosure is often behavioral and argues that entities sometimes apply disclosure requirements mechanically, using the IFRS requirements as a checklist for disclosures (IASB 2017). The preparers are not often aware that they should judge what information is relevant to the users of financial statements.

Considering that the financial statements disclosure is hot topic worldwide, the goals of the paper are to determine the principal theoretical requirements for the notes to financial statements set by the IFRS and to investigate the current state of notes disclosure for the companies in Croatian tourism sector. Finally, the paper covers the activities for the improvement of the notes to financial statements' quality with regard to possible changes.

The research methodology includes secondary research with the analysis of present IFRS requirements and active projects regarding disclosure in the notes. Other than that, the primary research of the current state on the notes to financial statements of the companies in tourism sector in the Republic of Croatia was made.

2. Theoretical Requirements for Notes to Financial Statements Set By International Financial Reporting Standards

International Accounting Standard 1 Presentation of Financial Statements prescribes the goal and basic content of the notes to financial statements. The most important issues about the notes required by IAS 1 are as follows:

- Notes should contain information which is addition to the information disclosed in the balance sheet, income statement, the statement of changes in equity and cash-flow statement but also the information that do not fulfill the requirements to be recognized in those statements;
- Management should explicitly state that financial statements are prepared under the IFRS;
- The content of the notes depends on the disclosures requirements from other standards and interpretations;
- There is information that can be presented either on the face of the main financial statements (balance sheet and others) or in the notes (for instance subclassifications of the line items presented);
- Information about the basis of preparation of the financial statements and the accounting policies used forms a part of the notes;
- Any additional information important for understanding other basic financial statements and not disclosed in other financial statements should be also disclosed in the notes;
- To be understandable and user friendly, the notes should be presented in a systematic manner, i.e cross-referenced to other financial statements;
- The following order of the notes are common:
  - a statement of compliance with IFRSs

  - a summary of significant accounting policies applied
  - supporting information for items presented on the face of other financial statements
  - other disclosures;
- "Information about the key assumptions concerning the future and other key sources of estimation uncertainty at the balance sheet date, that have a significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year" shall be a part of the notes;
- "The domicile and legal form of the entity, its country of incorporation and the address of its registered office (or principal place of business, if different from the registered office); a description of the nature of the entity's operations and its principal activities; and the name of the parent and the ultimate parent of the group" shall be disclosed in the notes provided not disclosed elsewhere;
- Along with its significant accounting policies or other notes, the judgments, apart from those involving estimations, that management has made in the process of applying the entity's accounting policies and that have the most significant effect on the amounts recognized in the financial statements shall be published in the notes;
- The notes also contain narrative descriptions;
- As in other financial statements, a line item that is not individually material is aggregated with other items in the notes and an item that is not sufficiently material to warrant separate presentation in those statements may warrant separate presentation in the notes (IAS 1).

Materiality concept is crucial for the notes. It is well known that material information is information which omitting or misstating could influence decisions that primary users make on the basis of financial information. Also, materiality is "an entity-specific aspect of relevance based on the nature and magnitude, or both, of the items to which the information relates in the context of an individual entity's financial report" (IASB, 2015). So, the content of the notes depends on management judgment "whether information could reasonably be expected to influence decisions that the users make on the basis of those financial statements" (IASB, 2015).

Additionally, the content of the notes depends on the application of separate IFRS, IAS and interpretations due to the fact that all of them prescribe the list of important information which should be disclosed in the notes.

3. Empirical Research of International Accounting Standard 1 Requirements' Application in Croatian Tourism Sector

Principal financial statements are primarily intended for external financial statements' users, so the requirements for their presentation are prescribed. In order to facilitate the understanding of financial statements to the users and to make comparisons between the financial statements of different entities, International Accounting Standard 1 Presentation of Financial Statements prescribes the basis for presentation of financial statements.

In order to obtain a more detailed insight into the compliance of financial statements with International Accounting Standard 1, a research of financial statements for financial year 2016 has been conducted for the selected companies from Croatian tourism sector. According to the data of Croatian Chamber of Economy, revenues from tourism in 2016 were count for 18.01 % of Croatian GDP. Since tourism has a major impact on the entire Croatian economy, all companies in hotel sector which issue shares on public market have been taken in the research sample. They account for 21.5 % of all entities whose shares are quoted on the Zagreb Stock Exchange. The research sample consists of 31 annual financial statements. Table 1 shows the selected entities taken in the research sample. The source of data was the Financial Agency, the Croatian agency to whom entities should deliver their annual financial statements. The main research objective was to determine whether the entities present their financial statements in accordance with IAS 1. Further, the research questions are set as follows: are the requirements from the International

Accounting Standards too demanding for the investigated companies and is there a reason for changing the standards in a way to simplify the requirements so the entities could be more productive and the financial statements more useful for decision making process.

Table 1: The entities from Croatian tourism (hotel) sector whose shares are quoted on Zagreb Stock Exchange

Mark	Entity's full name
A	Apartmani Medena d.d.
B	Arena Hospitality Group d.d.
C	Dubrovačko primorje d.d.
D	Hoteli Brela d.d.
E	Hoteli Baška voda d.d.
F	Hoteli Haludovo Malinska d.d.
G	Imperial hoteljerstvo, ugostiteljstvo i turizam d.d.
H	Hoteli Jadran d.d.
I	Hoteli Makarska d.d.
J	Hotel Medena d.d.
K	Hoteli Maestral d.d.
L	Medora hoteli i ljetovališta d.d.
M	Hoteli Tučepi d.d.
N	HTP Korčula d.d.
O	HTP Orebić d.d.
P	HUP - Zagreb d.d.
Q	Hoteli Zlatni rat d.d.
R	Hoteli Živogošće d.d.
S	Ilirija d.d.
T	Jelsa d.d.
U	Liburnia Riviera Hoteli d.d.
V	FTB turizam d.d.
W	Maistra d.d.
X	Plava laguna d.d.
Y	Palace hotel Zagreb d.d.
Z	Valamar riviera d.d.
AB	Solaris d.d.
BC	Sunce koncern d.d.
CD	Turisthotel d.d.

Source: Zagreb Stock Exchange, created by the authors

There are a lot of presentation requirements for the notes to financial statements. However, for the purpose of this study certain requirements from IAS 1 have been tested. First, the order of the notes as it is prescribed under IAS 1 has been examined (IAS 1, 105):
(a) A statement of compliance with IFRSs;
(b) A summary of significant accounting policies applied;
(c) Supporting information for items presented on the face of the balance sheet, income statement, statement of changes in equity and cash-flow statement, in the order in which each statement and each line item is presented;
(d) Other disclosures, including:

(i) Contingent liabilities and unrecognized contractual commitments; and
(ii) Non-financial disclosures, e.g. the entity's financial risk management objectives and policies.

Table 2 shows how the observed companies in Croatian tourism sector meet the requests from the paragraph 105 of IAS 1.

Table 2: Presentation of the notes to financial statements

IAS 1, paragraph 105: An entity normally presents notes in the following order, to assist users to understand the financial statements and to compare them with financial statements of other entities:					
Entity	(a)	(b)	(c)	(d)	
				(i)	(ii)
A	+	+	+	-	+
B	+	+	+	-	+
C	+	+	+	the definition of contingent liabilities	+
D	+	+	+	the definition of contingent liabilities	+
E	+	+	There are not any numbers of the notes in the primary statements; the amounts from the notes regarding income statement's items do not comply with the income statement	-	In the annual report
F	+	+	Financial statements are published on website of Zagreb Stock Exchange	the loan for the reconstruction which has not started	+
G	+	+	+	the contingent liabilities related to the litigations and the management contract with the mother company	+
H	+	+	+	Litigations	+
I	+	+	+	Litigations	+
J	+	+	+	the definition of contingent liabilities	+
K	+	+	+	Off balance sheet records: the litigation, accrued war compensation HRK 108 millions	+
L	+	+	+	-	+
M	+	+	the notes are not cross-referenced properly with primary financial statements (the order of the notes differs from the numbers in primary financial statements)	The litigation which could lead to write-off of the lends and properties	+

IAS 1, paragraph 105: An entity normally presents notes in the following order, to assist users to understand the financial statements and to compare them with financial statements of other entities:					
Entity	(a)	(b)	(c)	(d)	
N	+	+	the notes are not cross-referenced properly with primary financial statements (the order of the notes differs from the numbers in primary financial statements)	The explanation of accruals for litigations, but there are no accruals in the balance sheet	+
O	+	+	the notes are not cross-referenced properly with primary financial statements (the order of the notes differs from the numbers in primary financial statements)	The litigation	+
P	+	+	+	The litigation	+
Q	+	+	+	Described in the polices and the note to the litigation	+
R	+	+	+	-	+
S	+	+	+	The litigations and the bank guarantee	+
T	+	+	+	The explanation that the company doesn't have contingent liabilities	+
U	+	+	+	The litigation, in detail	+
V	+	+	+	The litigation, contracted future Group's investment obligations	+
W	+	+	+	Conversion and privatization audit	+
X	+	+	+	Conversion and privatization audit, capital commitments under operating leases, the litigation	+
Y	+	+	+	The litigation	+
Z	+	+	+	The litigation, conversion and privatization audit, contracted investments commitments	+
AB	+	+	+	The litigation	+
BC	+	+	+	No litigations, only contracted car and property lease commitments	+
CD	+	+	+	Contract on issuing guarantees with the bank	-

Source: created by the authors

According to paragraph 16 of IAS 1, all the entities taken into research have an explicit and unreserved statement in the notes that their financial statements comply with IFRSs. Most of the entities present the notes following the suggested order. The notes of four entities are not cross-referenced properly with primary financial statements (the order of the notes differs from the numbers in primary financial

statements). Since all of the entities belong to the same sector, it was expected that all of them are faced with the same types of risks. There is only one out of 31 entities that do not disclose the risks in the notes. While explaining some item the observed companies often apply the same wording which is a result of quoting the requirements from the Standards. For instance, in this part of the notes, the definition of litigation was quoted from IAS 37.

Paragraph 77 requires that an entity disclose, either in the balance sheet or in the notes, further subclassifications of the line items presented, classified in a manner appropriate to the entity's operations. The detail provided in subclassifications depends on the requirements of IFRSs and on the size, nature and function of the amounts involved (IAS 1, 78). According to the principle of materiality, one of the basic accounting principles, the entity should disaggregate the financial statements positions into separate categories according to their materiality with regard to other positions and the overall business. So, if the contribution of some financial statement position is not significant with regard to overall business, the entity is not obliged to disaggregate it in detail. The entity can present aggregated information in the balance sheet and income statement and do the subclassification in the notes to the financial statements. The disclosures vary for each item, for example (IAS 1, 75):

(a) Items of property, plant and equipment are disaggregated into classes in accordance with IAS 16;
(b) Receivables are disaggregated into amounts receivable from trade customers, receivables from related parties, prepayments and other amounts;
(c) Inventories are disaggregated, in accordance with IAS 2 Inventories, into classifications such as merchandise, production supplies, materials, and work in progress and finished goods;
(d) Provisions are disaggregated into provisions for employee benefits and other items; and
(e) Contributed equity and reserves are disaggregated into various classes, such as paid-in capital, share premium and reserves.

Table 3 shows the results related to the disclosure of property, plant, equipment, receivables, inventories, provisions, equity capital and reserves which are presented in the balance sheet or in the notes, or both.

Table 3: Disclosure of property, plant, equipment, receivables, inventories, provisions, equity capital and reserves

IAS 1, 75 An entity shall disclose, either in the statement of financial position or in the notes, further subclassifications of the line items presented, classified in a manner appropriate to the entity's operations. The disclosures vary for each item, for example:					
Entity	(a)	(b)	(c)	(d)	(e)
A	notes	balance sheet and notes	notes	balance sheet and notes	balance sheet and notes
B	notes	balance sheet and notes	notes	notes	balance sheet and notes
C	notes	notes	notes	balance sheet and notes	balance sheet and notes
D	notes	notes	notes	notes	balance sheet and notes
E	balance sheet and notes	balance sheet and notes	balance sheet and notes	-	balance sheet and notes

IAS 1, 75 An entity shall disclose, either in the statement of financial position or in the notes, further subclassifications of the line items presented, classified in a manner appropriate to the entity's operations. The disclosures vary for each item, for example:					
Entity	(a)	(b)	(c)	(d)	(e)
F	notes	notes	balance sheet and notes	balance sheet and notes	balance sheet and notes
G	notes	notes	notes	notes	balance sheet and notes
H	notes	notes	notes	notes	balance sheet and notes
I	balance sheet and notes	balance sheet and notes	balance sheet and notes	balance sheet and notes	balance sheet and notes
J	notes	notes	notes	notes	balance sheet and notes
K	notes	notes	notes	notes	balance sheet and notes
L	notes	balance sheet and notes	notes	-	balance sheet and notes
M	notes	notes	balance sheet	notes	balance sheet and notes
N	notes	notes	balance sheet	-	balance sheet and notes
O	notes	notes	balance sheet	-	balance sheet and notes
P	balance sheet and notes	balance sheet and notes	balance sheet and notes	notes	balance sheet and notes
Q	notes	notes	notes	notes	balance sheet and notes
R	notes	notes	notes	-	balance sheet and notes
S	balance sheet and notes	balance sheet and notes	notes	-	balance sheet and notes
T	notes	notes	notes	-	balance sheet and notes

IAS 1, 75 An entity shall disclose, either in the statement of financial position or in the notes, further subclassifications of the line items presented, classified in a manner appropriate to the entity's operations. The disclosures vary for each item, for example:					
Entity	(a)	(b)	(c)	(d)	(e)
U	notes	balance sheet and notes	balance sheet	notes	balance sheet and notes
V		notes	-	notes	balance sheet and notes
W	notes	notes	notes	notes	balance sheet and notes
X	notes	notes	balance sheet and notes	-	balance sheet and notes
Y	notes	balance sheet and notes	notes	balance sheet and notes	balance sheet and notes
Z	notes	balance sheet and notes	notes	notes	balance sheet and notes
AB	notes	notes	balance sheet and notes	balance sheet and notes	balance sheet and notes
BC	balance sheet and notes	balance sheet and notes	-	-	balance sheet and notes
CD	notes	notes	notes	-	balance sheet and notes

Source: created by the authors

Most entities do the disaggregation of the items of property, plant and equipment into classes in accordance with IAS 16 in the notes, while in the balance sheet they present only the synthesized information. All of the entities present synthesized information on receivables in the balance sheet, but in the notes to the financial statements they disaggregate it into amounts receivable from trade customers, receivables from related parties, prepayments, receivables for taxes, receivables from employees and other receivables. As the restaurants are a part of the hotels, the entities must have inventories, which are disaggregated, in accordance with IAS 2 Inventories, into classifications such as merchandise (food and beverages), production supplies, materials, small inventory and other inventories. Applying the principle of materiality, most entities do the disaggregation in the notes, rather than in the balance sheet, since the amounts of inventories are not significant. According to the IASs, an entity should record the provisions for employee benefits and other items, but not all of the entities record provisions. The ones which do so, mostly disclose it in the notes.

According to the paragraph 86, when items of income or expense are material, an entity shall disclose their nature and amount separately either in the income statement or statement of other comprehensive income or in the notes to the financial statements. The circumstances that would give rise to the separate disclosure of items of income and expense include (IAS 1, 87):

(a) Write-downs of inventories to net realizable value or of property, plant and equipment to recoverable amount, as well as reversals of such write-downs;
(b) Restructurings of the activities of an entity and reversals of any provisions for the costs of restructuring;
(c) Disposals of items of property, plant and equipment;
(d) Disposals of investments;
(e) Discontinued operations;
(f) Litigation settlements; and
(g) Other reversals of provisions.

The research results show that the entities rarely record the write-downs of inventories to net realizable value or of property to recoverable amount. The same is with the restructuring of the activities of an entity, disposals of investments and discounted operations, although several entities are in the process of the pre-settlement. More than 50 % of the entities are involved in a litigation over the ownership and division of lends, but not all of them record the provisions for litigations. The entities disclose that information in the notes, along with other provisions and sometimes also in the paragraph where they present contingent liabilities. Although an entity shall present an analysis of expenses recognized in profit or loss using a classification based on either their nature or their function within the entity, whichever provides information that is reliable and more relevant (IAS 1, 88), all the entities present the analysis of expenses using a classification based on their nature. Most of the entities have accumulated losses from previous periods in the balance sheet, so only two entities have distributed dividends to owners during the period of the FY 2016 based on the retained earnings from previous years and one entity which has the preference shares pays fixed dividend to their owners.

Based on the conducted research it can be concluded that IAS 1 consists of many disclosure requirements which the entity can disclose either in the primary financial statements or in the notes. The preparers are not often aware which information is relevant to the users of financial statements so they disclose the same information in the notes even they already disclosed it in other financial statement. Since the main purpose of the notes is to provide a more detailed insight into significant elements of other financial statements, the entities should put only the relevant information in it. There is no need to give the definition of the accounting elements and to list the items already presented in other statements, but to emphasize significant items, explain their importance for the entity as well as present the policies which are applied by an entity. Thus, a purpose of the notes is not to cite the definitions of accounting positions given in the IASs, but to present the significant and relevant elements of their business. According to the conducted research it seems like the entities often upgrade the notes prom previous years, only changing the values of the financial statements positions. In this way, the entities satisfy the requirements of the IASs, but the notes are too extensive. It is noted that the notes gain in the volume by the years, usually citing the definitions and the requirements from the standards.

4. Activities for the Improvement of the Notes to Financial Statements' Quality

Since the notes to financial statements have become voluminous and the source of many not so relevant information, while not enough relevant information from the users' perspective is omitted, the project of Disclosure Initiative—Principles of Disclosure has been initiated. The root standard which covers the principles for the notes' preparation and disclosure – IAS 1 has been recognized as the hot issue and the IASB suggests either "making amendments to the parts of IAS 1; or creating a new disclosure standard to replace the parts of IAS" (IASB, 2017).

Through the Initiative, the IASB suggests several levels for discussion and possible changes:
- Principles of effective communication
- Principles on the location of information (primary financial statements, notes, annual report)

- Principles to address specific disclosure concerns expressed by the users of financial statements (the use of performance measure, the disclosure of accounting policies)
- Principles to improve disclosure objectives and requirements.

Seven principles of effective communication between a subject and the users of financial statements include an entity-specific information reporting and the reporting without the duplication of information in different parts of the financial statements. One of the biggest problems of financial reporting communication is that the companies usually do copy paste of the requirements prescribed by IFRS Standards. According to the principles of effective communication, the information disclosed in the notes should be clear and simple, organized to highlight important matters, linked to related information, free from unnecessary duplication and comparable in an appropriate format (IASB, 2017).

Second group consists of the principles about the place where information should be disclosed. Disclosure Initiative considers balance sheet, the statement of comprehensive income, the statement of changes in equity and cash flow statement as primary financial statements. The notes are extracted as a separate statement because their role differs from the role of primary financial statements. While the goal of primary financial statements is to present the financial position, business performance and the cash flows of a company, the role of the notes is to further clarify the information that can improve the knowledge on abovementioned categories. There is a general opinion that the users of financial statements, especially investors, put more attention on primary financial statements rather than on the notes.

As financial statements are usually published within an annual report, the IASB discusses about the location of the IFRS and non-IFRS information. While it is common that the IFRS information is a part of financial statements, the IASB proposes that some "IFRS information" could be placed outside the financial statements part, i.e. it should be placed within an annual report. Further, "non-IFRS information" can be placed inside the financial statements too, provided certain conditions are met. Such information positioning would, according to the IASB opinion, achieve more understandable annual report whereas the financial statements remain understandable and the information faithfully represented, clearly identified and cross-referenced (IASB, 2017).

Further, general requirements for fair presentation of performance measures in the financial statements are aimed to be set through this project as well.

The discussion is also about the structure of income statement and the cash flow statement which should be prepared in a way which makes it possible to gain subtotals, additional line items about the performance, and that investors wouldn't have to put a special effort to find such information in the notes (IFRS, 2017).

The following the IASB's suggestion is about the principles of disclosures on accounting policies. The proposal distinguishes three categories of accounting policies depending on the policies' significance and necessity. For instance, first category includes the policies which are always necessary for the users because of the material significance of items, transactions or events (for instance the policy required by IFRS standards) and the level of significance decreases with the second and the third group.

Finally, the Discussion Paper calls for users' opinion on the possible methods for developing centralized disclosure objectives which will help the Board to set the general rules for judgments used in disclosure.

5. Conclusion

Investors and other users of financial statements use the notes to financial statements when make business decisions. However, practice has shown that the consideration should be given to the quality of the notes' disclosures. This is why, a large project of investigation of public opinion on the disclosure has been initiated. Although the project has been in a process and the final version of disclosure requirements depends on the respondents' opinion, it is sure that the notes' structure and information content will be changed. As one could expect less comprehensive notes' content as a result of the project, the reducing the volume of disclosures is not the main objective (Paredes, 2013). In order to examine the notes' disclosure state in the entities from Croatian tourism sector a research was done. Based on our research results it can be concluded that the annual financial statements of the observed entities comply with the disclosure requirements set in the IAS 1. Regardless of the presentation which is in accordance with the IAS 1, the entities disclose some items in two or more statements at the same time. This makes the notes voluminous, with unnecessary data already disclosed in primary financial statements. Certain part of the notes is occupied by definitions from the IFRS. Such disclosure has become a burden for effective communication between an entity and the financial statements users. The preparers are not often aware that they should judge which information should be disclosed in the notes and which should not. After finishing Disclosure Initiative, provided the EU accepts a new standard or the changes of present standard, Croatian companies from tourism sector, as well as other preparers are gone experience the new requirements in the notes preparation. Consequently, investors in such companies will enjoy the new content of the notes and business decisions would be possible to make based on the improved accounting information disclosure.

Acknowledgements

This paper is the result of a project called „The improvement of the notes to financial statements' preparation„ which was financed by the University of Zagreb as short-term research support for 2017.

References

Croatian Chamber of Economy (2017) 'Tourism in 2016,' [Online]. [Retrieved September 4, 2017], file:///C:/Users/Ana/AppData/Local/Microsoft/Windows/INetCache/IE/K7OLIMQH/aktualna-tema-turizam-u-20165899d9633ad81.pdf

EFRAG, EFFAS, BVFA-ABAF, IASB (2017) 'Joint User Outreach Event, IASB Discussion Paper Disclosure Initiative – Principles of Disclosure,' Summary Report, Brussels, July 3, 2017

EY (2014) 'Disclosure effectiveness - What companies can do now,' [Online]. [Retrieved September 15, 2017], http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwjo7s6Pms3WAhVqDJoKHd5GBTwQFggkMAA&url=http%3A%2F%2Fwww.ey.com%2FPublication%2FvwLUAssets%2FEY-disclosure-effectiveness-what-companies-can-do-now%2F%24FILE%2FEY-disclosure-effectiveness-what-companies-can-do-now.pdf&usg=AOvVaw3JFmqBB-q14TbVrmz4_pJx

Financial Agency, Register of the annual financial reports. [Online]. [Retrieved September 4, 2017], http://rgfi.fina.hr/JavnaObjava-web/jsp/prijavaKorisnika.jsp

IASB (2015) 'IFRS Practice Statement: Application of Materiality to Financial Statements, Exposure draft,' IFRS Foundation. [Online]. [Retrieved September 15, 2017], http://www.ifrs.org/-/media/project/disclosure-initative/disclosure-intiative-materiality-practice-statement/ed-practice-statement.pdf

IASB (2016) 'Better Communication,' [Online]. [Retrieved September 15, 2017], http://www.ifrs.org/-/media/feature/news/2016/june/hans-hoogervorst-zurich-conference-2016.pdf?la=en&hash=C109CB6566FD6D64D47A3F0941C6F1929FDD0A91

IASB (2017) 'Disclosure Initiative—Principles of Disclosure,' Discussion Paper DP/2017/1

IASB (2017) 'Investor Update, Spotlight—overview of the Discussion Paper Principles of Disclosure,' [Online]. [Retrieved September 15, 2017], http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwiBjdzsm83WAhUCAZoKHYNWDFMQFggkMAA&url=http%3A%2F%2Fwww.ifrs.org%2F-%2Fmedia%2Ffeature%2Fresources-for%2Finvestors%2Finvestor-updates%2Finvestor-update-jun-2017.pdf&usg=AOvVaw0cogMeYMNlcO7u-tVVVHcm

IASB (2017) 'Snapshot: Disclosure Initiative—Principles of Disclosure,' Discussion Paper. [Online]. [Retrieved September 15, 2017], http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwiDjP6UnM3WAhXJd5oKHUn1AcEQFggpMAA&url=http%3A%2F%2Fwww.ifrs.org%2F-%2Fmedia%2Fproject%2Fdisclosure-initative%2Fdisclosure-initiative-principles-of-disclosure%2Fdiscussion-paper%2Feducation-materials%2Fprinciples-of-disclosure-snapshot-2017.pdf%2F&usg=AOvVaw0bpSw3q4f17FyiTRv7IGaK

IFRS (2017) 'Discussion Paper and comment letters—Disclosure Initiative—Principles of Disclosure,' [Online]. [Retrieved September 15, 2017], http://www.ifrs.org/projects/work-plan/principles-of-disclosure/comment-letters-projects/dp-principles-of-disclosure/

IFRS (2017) 'IASB Chairman's speech: The times, they are a-changin',' [Online]. [Retrieved September 15, 2017], http://www.ifrs.org/news-and-events/2017/09/iasb-chairmans-speech-the-times-the-are-achangin/

IFRS (2017) 'IASB Investor Update,' June 2017

International accounting standards. [Online]. [Retrieved September 4, 2017], http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008R1126&from=EN; http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015R2406&from=EN

Paredes, T. A. (2013) 'Remarks at The SEC Speaks in 2013,' U.S. Securities and Exchange Commission, Washington, D.C. [Online]. [Retrieved September 15, 2017], https://www.sec.gov/news/speech/2013-spch022213taphtm

Zagreb Stock Exchange, Regulated marker, Issuers. [Online]. [Retrieved September 4, 2017], http://www.zse.hr/default.aspx?id=36769

The Influence of Changes in the Notes on Evaluation of Indebtedness and Other Performance Measures – The Analysis of Lease Financing

Ivana Pavić, Faculty of Economics and Business, Zagreb, Croatia, ipavic@efzg.hr

Nikolina Dečman, Faculty of Economics and Business, Zagreb, Croatia, ndecman@efzg.hr

Ivana Mamić Sačer, Faculty of Economics and Business, Zagreb, Croatia, imamic@efzg.hr

Abstract

Notes to financial statements, along with other annual financial statements, are an important source of information for financial statements users, especially for shareholders and creditors. Notes provide more detailed information about elements of financial statements. In this paper, special attention was given to the notes regarding operating leases. In 2016, the International Accounting Standards Board issued a new accounting standard on leases - IFRS 16. The Standard is effective for annual periods beginning on or after 1 January 2019 and changes the presentation of operating leases in the lessee's financial statements in relation to former accounting standard - IAS 17. The most significant change introduced by the new standard is the presentation of right-of-use assets and related long-term liabilities derived from operating leases in the balance sheet of the lessee. Additional disclosure requirements were also introduced in notes to financial statements. The IASB emphasizes in its publications that the changes in accounting treatment of operating leases will have the greatest impact on financial statements of companies in the airline, retail, tourism and transportation industry sector. The theoretical background of the changes in the Standard has been investigated in the paper. Other than that, the paper analyses the financial statements of several companies from the airline industry sector. Further, in order to assess the impact of new Standard's requirements on the financial position and business performance a model has been developed. Research results indicate that the presentation changes regarding operating lease will contribute to a better assessment of lessee's financial liabilities and its financial position. The changes will also affect ROA and EBITDA of the lessee.

Keywords: leases, notes, debt ratios, ROA, EBITDA

1. Introduction

In January 2016, the new International Financial Reporting Standard (IFRS 16 - Leases) was issued. IFRS 16 changes the accounting treatment of operating leases. This standard is effective for annual periods beginning on or after 1 January 2019, and it replaces IAS 17 – Leases, previous accounting standard that prescribes the accounting policies and disclosures applicable to leases, both for lessees and lessors. The new standard was issues as a result of formalized co-operation between the US Financial Accounting Standards Board (FASB) recognized by the Securities and Exchange Commission as the designated accounting standard setter for public companies and the International Accounting Standards Board (IASB) - not-for-profit, public interest organization established to develop a single set of globally accepted accounting standards- IFRSs. As the IASB emphasizes, US Securities and Exchange Commission (SEC) estimated that US public companies may have approximately US$1.25 trillion of off balance sheet leases (IFRS 16 – Leases, Effects Analysis International Financial Reporting Standard, 2016). Taking into consideration the critics of present disclosure requirements regarding lease liabilities, a project on accounting for leases was initiated by the IASB and the FASB. The current lease model has often been blamed for providing insufficient information on operating leases to the users of financial statements. Therefore, the most significant modification introduced by IFRS 16 refers to the application of unique accounting model for the lessees. New requirements seek from lessees to recognize assets and liabilities in the balance sheet for all long term leases (operating and finance) except for leases of low-value assets. The new standard

will have a significant impact on the financial statements of lessees, especially those who have a high share of operating leases in their portfolio. Four sectors with the highest value of off-balance sheet leases are; airline, retail, tourism and transport industry sectors. According to the IASB's assessment, this type of lease will account for 22.7% of total assets in the airline industry, 21.4% of total assets in retail industry, 20.7% of total assets in tourism industry and 11.7% of total assets in the transport industry (Mazars – auditor's firm, 2016).

Methodologically, this paper consists of three parts. The theoretical part of the paper involves the analysis of the most significant changes in financial reporting about leases i.e. we explored possible impact areas in the new Standard on leases - IFRS 16. The empirical research comprises two parts. First, the analysis of the notes to financial statements of the selected airline companies was conducted. Second, we made an influence analysis of the changes in accounting treatment of operating leases through a research model. The research model includes the assessment of airline companies' indebtedness, calculation of return on assets (ROA) ratio and the calculation of EBITDA before and after the new IFRS requirements' application.

2. Accounting treatment of operating leases according to IAS 17 and IFRS 16

2.1.The most significant changes in lessee's financial statements

Previous accounting model for leases designed under IAS 17 - Leases required from the lessee and the lessor to classify the lease as operating or financial lease. According to IFRS 16 "a lease is classified as *finance if it transfers substantially all the risk and rewards incidental to ownership of an underlying asset. A lease is classified as an operating lease if does not transfer substantially all the risks and rewards incidental to ownership of an underlying assets."* The accounting treatment of operating and finance leases under IAS 17 was significantly different. Such a model was often criticized for providing insufficient information on leases to the users of financial statements, particularly for operating leases. Specifically, the previous model did not require the recognition of assets and liabilities arising from operating leases in balance sheet of the lessee, which according to new model presented in IFRS 16, will be mandatory. According to IAS 17 Leases, operating lease in balance sheet of the lessee should be presented as a short-term liability and as a lease expense for the accounting period, no matter the lease is long-term or short-term. Therefore, long-term lease liabilities arising from leases were not visible in the balance sheet. From the financial statements users' point of view it was hard to estimate the real indebtedness of a company with significant share of assets under operating lease. With the adoption of the new Standard, the IASB decided to apply equal accounting treatment for all leases - operating and financial. Applying IFRS 16, in essence for all leases, a company is required to: (a) recognize lease assets and lease liabilities in the balance sheet, initially measured at the present value of unavoidable future lease payments; (b) recognize depreciation of lease assets and interest on lease liabilities in the income statement over the lease term; and (c) separate the total amount of cash paid into a principal portion (presented within financing activities) and interest (typically presented within either operating or financing activities) in the cash flow statement (IFRS 16 – Leases, Effects Analysis International Financial Reporting Standard, 2016). Under this approach, the lessee in operating lease shall recognize a right-of-use asset and a lease liability.

According to IFRS 16, assets in operating lease should be presented (1) separately from the other assets in the balance sheet of lessee or (2) together with a similar type of asset, with an explanation in the notes about the position of the right-of-use assets. Lease liabilities under IFRS 16 should be presented: (1) separately from other liabilities or (2) together with other liabilities, with an explanation which liability item includes lease liabilities. Liabilities should be presented as short-term or long-term. IFRS 16 does not require a lessee to recognize assets and liabilities for (a) short-term leases (ie. leases of 12 months or less) and (b) leases of low-value assets (for example, a lease of a personal computer). A lessee shall initially measure the right-of-use asset at cost. According to IFRS 16 a lessee shall subsequent measure the right-of-use asset applying a cost model unless it applies either fair value model or revaluation model (if the right-of-use assets meet the definition of investment property or property, plant and equipment). To apply a cost model, a lessee shall measure

the right of use assets at cost: (a) less any accumulated depreciation and any accumulated impairment loss. As can be seen in Table 1, lease accounting has changed substantially, but here is a small change for lessors. These changes in lease accounting will have a significant impact on the value of total assets and long-term liabilities of companies that have a significant portion of assets under operating lease.

Tab1e 1: Operating leases according to IAS 17 and IFRS 16 in lessee's balance sheet

Balance sheet items	IAS 17	IFRS 16
	Operating leases	Operating leases
Assets		+
Liabilities	-	+
Off balance sheet rights/obligations	Assets and Liabilities	-

Source: IFRS 16 – Leases, Effects Analysis International Financial Reporting Standard, available at: http://www.ifrs.org/-/media/project/leases/ifrs/published-documents/ifrs16-effects-analysis.pdf (20.09.2017.)

The most important change in the context of lease accounting under the IFRSs is the transition from off-balance sheet operating leases model to balance sheet operating lease model in lessee's accounting (Gulin, 2015). This change in operating lease will result in an increase in assets and liabilities in the balance sheet for companies that have high off-balance sheet operating leases. According to Gulin et al (2012) this change will result in a more transparent reporting about the companies' indebtedness which will be visible through the calculation of *solvency (leverage) ratios* such as *debt to asset ratio* (total liabilities/total assets) or *equity to assets ratio* (total liabilities/principal). The presentation of operating lease in the balance sheet will also result in some modifications in income statement since the operating lease assets will be depreciated on a straight-line basis, which will have an impact on the profitability ratios such as *ROA (return on assets)*.

For companies with material off balance sheet leases, IFRS 16 changes the nature of expenses related to those leases (Table 2). In IASB publication (IFRS 16 – Leases, Effects Analysis International Financial Reporting Standard, 2016) was noted that IFRS 16 replaces the straight-line operating lease expense for those leases applying IAS 17 with a depreciation charge for the lease asset (included within operating costs) and an interest expense on the lease liability (included within finance costs). The depreciation expense and the cost of interest for the right-of-use assets should be presented separately in profit and loss account as an operating and financial expense.

Table 2: Expenses of operating leases according to IAS 17 and IFRS 16 in lessee's profit and loss account

P%L items	Operating leases – IAS 17	Operating leases – IFRS 16
Revenue	x	x
Operating costs (excluding depreciation and amortization)	Single expense	-
EBITDA	Lower	Higher
Depreciation and amortization	-	Depreciation
Operating profit	-	Higher
Interest costs	-	Interest
Profit before tax	No change	No change

Source: IFRS 16 – Leases, Effects Analysis International Financial Reporting Standard, available at: http://www.ifrs.org/-/media/project/leases/ifrs/published-documents/ifrs16-effects-analysis.pdf (20.09.2017.)

In order to ensure consistency between balance sheet, profit and loss account and cash flow statement, IFRS 16 requires from a company to classify cash payments for: (1) the principal portion of lease liabilities within financing activities; and (2) the interest portion of lease liabilities in accordance with the requirements relating to other interest paid. The expenditures related to short-

term leases and low value leases should be shown within operating activities. As can be seen in Table 3, IFRS 16 should reduce companies' operating outflows with a corresponding increase in finance outflows in cash flow statement. Applying IAS 17, companies should classify the outflows related to operating lease in operating activities while applying new Standard – IFRS 16 such outflows should be classified as finance activities in cash flow statement.

Table 3: Cash inflows and cash outflows related to operating leases according to IAS 17 and IFRS 16 in lessee's cash flow statement

Cash flow items	Operating leases – IAS 17	Operating leases – IFRS 16
Interest portion of lease liabilities	Operating/financing activities	Operating/financing activities
Principal portion of lease liabilities	Operating activities	Financing activities

Source: Created by authors

2.2.The most significant changes in lessee's notes to financial statements

The notes to financial statements provide a more detailed explanation of the information presented in the other financial statements. Despite the notes represent very important source of information for evaluation financial position and business performance of a company, some authors point out that financial statement users are still paying more attention to the information presented in balance sheet and profit and loss account than in the notes (Pavić, Žager and Rep, 2017). The reason for that can be found in the insufficient quality of the notes to financial statements. Shortcomings in notes to financial statements were recognized in the past few years by relevant global accounting (FASB, IASB, ANC, ICAS, and ICAEW etc.) and non-accounting (EFRAG, ESMA etc.) organizations which conducted several projects in order to improve the quality of the notes to financial statements (Pavić, Žager and Rep, 2017). Although IAS 17 required the disclosure of information about short and long-term leases in the notes to financial statements, it was noticed that this kind of presenting a company's indebtedness was not sufficiently transparent. According to IFRS 16, numerical information on long-term operating lease liabilities and corresponding right-to-use assets will now be presented to the users through balance sheet. As IAS 17 seeks (International Accounting Standards Board, 2016), lessees in operating leases were required to disclose the following lease information in the notes to financial statements: (a) the total of future minimum lease payments under non-cancellable operating leases for each of the following periods: (i) not later than one year, (ii) later than one year and not later than five years, (iii) later than five years, (b) the total of future minimum sublease payments expected to be received under non-cancellable subleases at the balance sheet date; (c) lease and sublease payments recognized as an expense in the period, with separate amounts for minimum lease payments, contingent rents, and sublease payments; (d) a general description of the lessee's significant leasing arrangements including but not limited to the following; (i) the basis on which contingent rent payable is determined, (ii) the existence and terms of renewal or purchase options and escalation clauses; and (iii) restriction imposed by lease arrangements, such as those concerning dividends, additional debt and further leasing (Ernst&Young, 2012).

According to IFRS 16, the objective of disclosures in the notes of lessees is to, along with the information provided in balance sheet, profit and loss account and statement of cash flows; give a basis for the users of financial statements to assess the effect that leases have on the financial position, financial performance and cash flows of the lessee. IFRS 16 requires from lessee to disclose the following amounts for the reporting period in a tabular format, unless another format is more appropriate: (a) depreciation charge for right-of-use assets by class of underlying asset; (b) interest expense on lease liabilities; (c) the expense relating to short-term leases. This expense need not include the expense relating to leases with a lease term of one month or less; (d) the expense relating to leases of low value assets, (e) the expense relating to variable lease payments not included in the

measurement of lease liabilities; (f) income from subleasing right-of-use assets; (g) total cash outflow for leases, (h) additions to right-of-use, (i) gains or losses arising from sale and leaseback transactions; and (j) the carrying amount of right-of-use assets at the end of the reporting period by class of underlying assets (International Accounting Standards Board, 2016). Moreover, a lessee shall disclose additional qualitative and quantitative information about its leasing activities to meet disclosure objectives.

Unlike IAS 17, IFRS 16 does not include a list of prescriptive qualitative disclosures but rather sets out the objectives and requires from companies to determine information that would satisfy those objectives (IFRS 16 – Leases, Effects Analysis International Financial Reporting Standard, 2016). The reason is that IASB wants to improve lease reporting by focusing on information important for business decisions making. It can be concluded that, in relation to IAS 17, some information "migrate" from the notes to financial statements to balance sheet. Also, new disclosure requirements have been added to the Standard. It should be presented in a table to ensure better transparency of the notes. Such a request certainly contributes to a better overview of the notes that makes it easier for financial statements' users to find particular information. In addition, the presentation of long-term (non-current) lease liabilities in balance sheet contributes to a better understanding of the companies' financial position.

3. The Importance of Changes In The Notes About Leases On The Evaluation Of Indebtedness And Other Performance Measures – Case Of Airline Industry

3.1. Analysis of notes to financial statements on leases in airline industry

The airline industry is a leading industry in the world. It creates very high added value and thus contributes significantly to the economic development. „According to the IATA's (the International Air Transport Association) director general and CEO, currently, aviation provides 58 million jobs and contributes ~$2.4 trillion in GDP. This is expected to increase to 105 million jobs and $6 trillion in GDP in 2034" (Market Realist, 2014). On the other hand, it requires intensive, significant and continuous investments in new technologies and maintaining existing capacities. There are two ways of financing aircraft: the purchase or leasing. Direct purchase or bank financing is considered a traditional way of financing airline companies, but in recent years, there is a very intense trend of renting airplanes through operating leasing. Each of these modes of financing has its advantages and disadvantages (StartupBoeing , 2007). By buying an aircraft it is possible to realize maximum airline control of airplane configuration, airline acquires equity in fleet, some countries give tax benefits and similar. However, it seems that for some airlines (especially those small ones) such a way of financing is unavailable since they would not be able to obtain expensive assets and aircraft due to the lack of funds. On the other hand, this type of financing requires large investment and financing requirements. Also, there is a residual value risk - less fleet flexibility than operating lease. The operating lease of an aircraft may reduce the capital investment requirements and increase fleet plan flexibility.

Notes to financial statements are an important source of information for all users, and especially external. In order to find out how they look, how extensive and which information related to the leases they contain, the paper analyzed annual reports and the notes on lease of several airline companies (Air France, Turkish Airlines, British Airways, Lufthansa, Adria Ways and Croatia Airlines) – Table 4. The analyzed notes are prepared in accordance with the requirements of IAS 17. At the beginning, it should be noted that the scope of the notes to financial statements varies from company to company, but on average, they are written on more than 50 pages. Each analyzed airline defines what leases are and how the company records them in accounting evidence. This is done through the explanation of significant accounting policies in the notes. In almost all analyzed airlines, operating lease payments are recognized as an expense on a straight-line basis over the lease term, except where another systematic basis is more representative of the time pattern in which economic benefits from the leased asset are consumed. Contingent rentals arising under operating leases are recognized as an operating expense in the period in which they are incurred.

From Table 4 it can be seen that it was not possible to determine the exact number of aircraft that are under operating lease for all analyzed airline companies. Therefore, it is not possible to determine the exact effects of the application of the new IFRS 16 on the financial position of the observed airlines. In addition, it can be noted that aircraft lease cost significantly differ depending on the size of the airlines. Usually, smaller airlines largely rely on operating leases while larger companies have a much higher percentage of its own aircraft in the fleet. However, nowadays, all airlines, regardless of the size, turn increasingly to operating leases. "Over a third of the world's airline fleet is now rented and the proportion is likely to keep growing" (The Economist, 2012).

Table 4: Information on leased aircraft of the selected airlines in their annual reports

Airline	Country	Aircraft fleet	Number of aircraft in lease	Aircraft lease costs (on an annual base)	Other information
Air France – KLM Group (Consolidated financial statements 2016)	France	534 (total number of aircraft in operation)	-	1,073,000,000 €	The minimum future payments on operating leases for the period less than 1 year, between 1 – 5 years and over 5 year
British Airways (Annual Report 2016)	Great Britain	290 (total number of aircraft in operation)	-	159,000,000 £ (180,722,893 €) exchange rate 1 GBP = 1.13911 EUR	The minimum future payments on operating leases for the period less than 1 year, between 1 – 5 years and over 5 year
Turkish Airlines (Annual Report 2016)	Turkey	334 (total number of aircraft in operation)	-	244,000,000 $ (207,412,454 €) exchange rate 1 EUR = 1.1800 USD	The minimum future payments on operating leases for the period less than 1 year, between 1 – 5 years and over 5 year
Lufthansa Group (Annual Report 2016)	Germany	-	206	Costs under long-term operating leases with terms up to 2022 came to EUR 833,000,000 in the financial year 2016. Expenses for operating leases were mainly payable to affiliated companies; only EUR 13,000,000 related to an external lessor.	-
Croatia Airlines (Annual Report 2016)	Croatia	5 (owned aircraft excluding aircraft in lease)	7 (rental period between 2 and 10 years)	135,867,000 kn (18,145,475 €) exchange rate 1EUR = 7.487652 KN	The minimum future payments on operating leases for the period less than 1 year, between 1 – 5 years and over 5 year
Adria Airways (Annual Report 2013)	Slovenia	6 (owned aircraft excluding aircraft in lease)	5 (rental period between 3 and 11 years)	10,633,095 €	-

Source: Annual Reports of selected airlines (for more detail see Reference list)

One of the requirements of the IAS 17 is to present the total of future minimum future payments on operating leases for each of the following periods: (i) not later than one year, (ii) later than one year and not later than five years, (iii) later than five years. In accordance with the conducted analysis, almost all the observed airline companies met this request (except Adria Airways and Lufthansa Group) and published the information in the notes to financial statements. Finally, airlines are aware of the new Standard (IFRS 16) on leases. For example, British Airways Group is currently assessing the impact of the new Standard on their financial statements. "It is expected that both net debt and non-current assets will increase on implementation of this standard as obligations to make future payments under leases currently classified as operating leases are recognized on the balance sheet, along with the related 'right-of-use' asset" (British Airlines, 2016).

3.2. Implications of the new leasing standard on a company's financial position and performance – model design

It has already been stated that the changes of the new standard on leases (IFRS 16) influence the airlines that are relying on operating leases in financing their core business. The effects should be visible in two basic financial statements: balance sheet and profit and loss account. Since airlines nowadays often rent aircraft through operating leases it is not surprising that this industry is selected for a case study. Since the IFRS 16 is effective for periods beginning on or after 1 January 2019 it was not possible to analyze the impact of the new Standard on actual data. Therefore, the simulation of data was carried out for two airline companies that will serve as an illustrative example.

Table 5: Financial statements of two airline companies using IAS 17 and IFRS 16

Airline Company A (leases 1 aircraft)	**IAS 17**	**IFRS 16**	**Airline Company B (leases 10 aircraft)**	**IAS 17**	**IFRS 16**
BALANCE SHEET (in millions of EUR)					
Non-current assets	**80**	**96,2**	**Non-current assets**	**80**	**242**
- Property, plant and equipment	60	76,2	- Property, plant and equipment	60	222
- Other non-current assets	20	20	- Other non-current assets	20	20
Current assets	**20**	**20**	**Current assets**	**20**	**20**
TOTAL ASSET	**100**	**116,2**	**TOTAL ASSET**	**100**	**262**
Equity	**40**	**40**	**Equity**	**40**	**40**
Non-current liabilities	**12**	**28,2**	**Non-current liabilities**	**12**	**174**
- Lease liabilities	0	16,2	- Lease liabilities	0	162
- Other liabilities	12	12	- other liabilities	12	12
Current liabilities	**48**	**48**	**Current liabilities**	**48**	**48**
- Lease liabilities	1,8	1,8	- Lease liabilities	18	18
- Other liabilities	46,2	46,2	- Other liabilities	30	30
TOTAL EQUITY AND LIABILITIES	**100**	**116,2**	**TOTAL EQUITY AND LIABILITIES**	**100**	**262**
PROFIT AND LOSS ACCOUNT (in millions of EUR)					
Revenues	**90**	**90**	**Revenues**	**90**	**90**
Operating costs (excluding depreciation and amortization)	**84**	**82,2**	**Operating costs (excluding depreciation and amortization)**	**84**	**66**
- Lease cost	1,8	0	- Lease cost	18	0
- Other operating costs	82,2	82,2	- Other operating costs	66	66
EBITDA	**6**	**7,8**	**EBITDA**	**6**	**24**
Depreciation and amortization	3	4,4	Depreciation and amortization	3	17
Operating profit	**3**	**3,4**	**Operating profit**	**3**	**7**
Interest - expenditure	1	1,4	Interest - expenditure	1	5
Profit before tax	**2**	**2**	**Profit before tax**	**2**	**2**

Source: Created by authors

Model has ten assumptions: (1) both airlines lease aircraft for the purpose of carrying out the services of carriage of passengers, mail and goods. (2) Airline companies have the same number of aircraft in their ownership. However, the first airline (Company A) leases only one aircraft by using operating lease and the second one (Company B) with the same balance sheet is leasing 10 aircrafts under operating leasing. (3) The useful life of each aircraft is 25 years. (4) The linear depreciation method is applied. (5) Under the lease agreement, the annual rent of one aircraft is EUR 1,800,000, which is a total of EUR 18,000,000 for 10 aircraft. (6) Both of the companies leased each aircraft for a period of 10 years. (7) Present value of unavoidable future lease payments for the Airline Company A is EUR 18,000,000 and for the Airline Company B it is EUR 180,000,000. (8) Depreciation and amortization (when applying IFRS 16) for the Airline Company A is EUR 1,400,000 and for the Airline Company B it is EUR 14,000,000. (9) Interest - expenditure (when applying IFRS 16) for company A is EUR 400,000 and for Airline Company B it is EUR 4,000,000. (10) Revenues of both airline companies are EUR 90,000,000.

Table 5 shows the effects of the application of IFRS 17 for two airlines with different share of operating leases in their portfolio. As it can be seen in table 5, the model shows that lease agreement of one aircraft will increase the property, plant and equipment value (EUR 16,200,000 is net value of property, plant and equipment (18,000,000 – 1,800,000)) as well as the value of non-current lease liabilities (EUR 1,800,000 is presented as current lease liabilities (matured part of long-term liabilities for one year)) for EUR 16,200,000. For Airline Company B the increase in property, plant and equipment will be much higher because company leases 10 aircrafts (EUR 162,000,000).

On the other hand, different proportion of leased asset will affect only the structure of profit and loss account. Precisely, only the structure of the costs/expenses will be changed will change. Operating cost excluding amortization and depreciation will be lower for a yearly lease expense on annual basis (that is EUR 1,800,000 for Airline Company A and EUR 18,000,000 for Airline Company B). This means that EBITDA (earnings before interest, taxes, depreciation and amortization) will be much higher when applying IFRS 16 especially for Airline Company B. On the other hand, amortization and depreciation cost and interest - expenditure cost will be higher for the same amount. Therefore, the profit before taxes remained the same. Finally, it is possible to conclude that effects on balance sheet are significant for both airlines and especially for Airline Company B because of material off balance leases. However, the overall effect on profit or loss is not as significant as for balance sheet.

Table 6: The effects of different accounting standards (IAS 17 vs. IFRS 16) about leases on the selected financial ratios

Financial ratio	Formula	What it measures	Airline company A (leases 1 aircraft)		Airline company B (leases 10 aircraft)	
			IAS 17	IFRS 16	IAS 17	IFRS 16
Debt to total assets	liabilities/assets	Solvency (leverage)	0.6	0.66	0.6	0.85
Equity to total assets	equity/assets	Solvency (leverage)	0.4	0.34	0.4	0.15
Debt to equity	liabilities/equity	Solvency (leverage)	1.5	1.91	1.5	5,55
Asset turnover	revenue/assets	Activity	0.9	0.77	0.9	0.34
EBITDA – earnings before interest, taxes, depreciation and amortization	profit before tax + interest + tax + depreciation and amortization	Profitability	6.0	7.8	6.0	24
ROA	Profit before tax + Interest - expenditure/ assets	Profitability	3%	2,93%	3%	2,67%

Source: Created by authors

In order to evaluate impact effects of IFRS 16 application on the financial position, indebtedness and profitability of a company some of the most commonly used financial ratios were calculated (table 6). It can be seen that leverage ratios i.e. long term solvency is significantly affected. It is evident that debt indicators deteriorated. Both analyzed airline companies show increase in debt to equity ratio because of the increase of non-current liabilities for lease liabilities. For Airline Company B, the most significant change is seen in indebtedness indicator (debt to total assets ratio), where up to 85% of total assets are funded by debt. Total asset turnover decreased because lease assets were recognized as the part of total assets. Finally, we tested company's profitability. As previously stated, EBITDA is significantly higher and ROA is lower for Airline Company B because of the higher share of operating leases in its portfolio.

4. Conclusions

Leases play a very important role in modern business conditions and, as such, have a significant impact on the financial position and business performance of a company. Therefore, it is extremely important to supply users with transparent information on the company's business operations. This is particularly the case with operating leases. The previous model, formed in IAS 17, did not provide the users with complete picture of the lessee's indebtedness. The absence of information about leases on the balance sheet meant that investors and analysts could not asses the company's financial position and performance properly without making some adjustments. That is why the IASB made the revision of existing standards requirements and issued a completely new IFRS 16, which requires the recognition of assets and long-term liabilities for all leases except for leases of low-value assets.

Airlines industry will be significantly influenced by new Standard, especially those airlines that have a high share of operating leases in their portfolio. For the purpose of presenting IFRS 16 effects on balance sheet and profit and loss account a model design of two airlines with different portion of operating lease was developed. According to our research results it can be concluded that the changes in accounting treatment of operating leases result with; (1) higher indebtedness indicators, (2) lower asset profitability ratios (ROA), (3) higher EBITDA for airline companies with significant share of right-of-use assets. In order to see how companies reported on operating lease so far, we analyzed notes about operating lease of the selected airlines. According to the conducted analysis, it is evident that the information on leases can be found in the notes but in a non-transparent way. Therefore, the change of Standard will be of great benefit to all users when assessing the company's real debt. Some information "migrates" from notes to balance sheet; new disclosure requirements have been added to the standard and notes should be presented in a table.

Acknowledgments

This paper is the result of a project called „The improvement of the notes to financial statements„ which was financed by the University of Zagreb as short-term research support for 2017.

References

Adria Airways (2013). Annual Report. Available at: https://www.adria.si/assets/Letna-porocila/EN/adria-airways-annual-report-2013.pdf (20.09.2017.)

Air France (2016). Annual Report. Available at: http://www.airfranceklm.com/sites/default/files/communiques/consolidated_financial_statemetns_2016.12_english.pdf (20.09.2017.)

British Airlines (2016). Annual Report. Available at: http://www.iairgroup.com/phoenix.zhtml?c=240949&p=irol-reportsannual (20.09.2017.)

Croatia Airlines (2016). Annual Report. Available at: http://www.croatiaairlines.com/About-us/Financial-information/Financial-reports (20.09.2017.)

Group of Authors (2012). Business Planning, Control and Analysis. Zagreb, Croatian Association of Accountants and Financial Experts

Gulin, D. (2015). Expected changes to IFRSs in the accounting models of leasing and goodwill, Accounting and Finance, Croatian Association of Accountants and Financial Experts, 7/2015

Deloitte, Available at:
https://www2.deloitte.com/ie/en/pages/tax/articles/aircraft-leasing-new-leasing-standard.html
(20.09.2017.)

IAS 17 - International Accounting Standards Board. Available at:
http://www.ifrs.org/issued-standards/list-of-standards/ifrs-16-leases/(20.09.2017.)

IFRS 16 – Leases, Effects Analysis International Financial Reporting Standard. Available at:
http://www.ifrs.org/-/media/project/leases/ifrs/published-documents/ifrs16-effects-analysis.pdf
(20.09.2017.)

IFRS 16 - International Accounting Standards Board
International GAAP 2012, Volume 2, International Financial Reporting Group of Ernst &Young.

Lufthansa (2016). Annual Report. Available at:
https://investor-relations.lufthansagroup.com/en/finanzberichte/annual-report/2016.html
(20.09.2017.)

Market realist, Available at:
http://marketrealist.com/2014/11/global-airline-industry-contributes-economic-development/
(20.09.2017.)

MAZARS auditors' firm, Available at:
http://www.mazars.hr/Naslovna/Vijesti/Novosti/MSFI-16-Najmovi-kljucne-tocke-novog-standarda
(20.09.2017.)

Pavić, I, Žager, K., Rep, A. (2017). Significance of Notes to financial statements in Business Decision Making, Proceedings of the International Conference: Theory and Application in the Knowledge Economy, 28-42.

StartupBoeing, Available at:
http://www.boeing.com/resources/boeingdotcom/company/about_bca/pdf/Financing_Options.pdf
(20.09.2017.)

The Economist: Aircraft leasing: Buy or rent? Available at:
http://www.economist.com/node/21543195 (20.09.2017.)

Turkish Airlines (2016). Annual Report. Available at:
http://investor.turkishairlines.com/documents/ThyInvestorRelations/download/yillik_raporlar/2016_Annual_Report.pdf (20.09.2017.)

Attributes of Employee Engagement Best Practices: A Guideline of Widely Used Engagement Models

Kanwal Gul , Institute of Business Management, Karachi, Pakistan, std_17826@iobm.edu.pk

Dr. Ghazanfar Bozai , HoD HR & Management, Institute of Business Management, Karachi, Pakistan, ghazan.bozai@iobm.edu.opk

Abstract

Engagement leads to enhanced productivity and competitive edge but due to lack of proper employee engagement policies and practices, disengagement cost economies billions of rupees. The purpose of this study is to conduct a comprehensive literature survey of the major best practices used for employee engagement globally. It could be used as employee engagement best practices guide for business in developing countries where the concept of employee engagement is in its infancy stage. The paper provides background of employee engagement, identify attributes of engagement and analyze widely used engagement models. Analysis of engagement models with their respective concepts and constructs are summarized which would serve as a baseline for organizations to select the appropriate elements of models in the context of business domain and cultural norms.

Keywords: Attributes, Engagement, Employee Engagement, Performance

Introduction

The ability of an organization to create a sustainable competitive edge relies mainly on its prowess to have an engaged workforce (Porter, 1998). It is anticipated that employee engagement (EE) helps in developing positive attitude and motivated work relationship with in the organization. Because EE plays an important part in ensuring that employees will give their 100% even in tough times and in time when organization need them more than ever (Bates, 2004). According to Gallup's research the engagement levels are dismally low and only 33% of US workforce is engaged (Gallup, 2017). While engagement is considered as a predictor of organizational success because world's successful organizations are armed with 70% of the engaged workforce according to Gallup. Conversely, research is focused majorly on negative psychological aspects. Journal of Health and Occupational Psychology is dealing with negative psychology where only 5% of the research articles are based on positive psychology (Schaufeli & Bakker , 2004). There is little focus towards positive psychology and consequently EE has not enjoyed its due share of importance. Only in the last twenty years, the topic of EE has begun to catch attention of academicians, researchers and industry leadership.

Under positive psychology, employee engagement is a distinctive construct which gathers all positive job attributes under one umbrella like Job Satisfaction, Commitment, Organizational Citizenship and Willingness to help (Ramarajan & Sujatha, 2015). Studies had concluded that EE is significantly correlated with higher organizational performance, but it is also revealed that the picture is not so straightforward (Kahn, 1990). EE as a construct itself is a very unitary and typical thus, this study will summarize and elaborate different factors, drivers and features of EE, which will help organizations to identify needs of employees, to choose suitable engagement tools and identify the organization's gaps in achieving success. This research highlights (i) the organizational awareness about EE and (ii) various attributes of EE models.

Background

Employee engagement seems a new term but it has gathered importance couple of decades ago. Though the very first article on EE was published in 1990s but in the 70's and 80's employee satisfaction (Job Satisfaction) was used as an alternate expression for EE (Hallberg & Schaufeli, 2006). Kahn suggested that term employee satisfaction is more about employee-organization relationship (Kahn, 1990) where EE is about "employee itself". This concept was further substantiated by research that an employee if "engaged" will be satisfied but satisfied employee will not be necessarily engaged (Hallberg & Schaufeli, 2006). Paradigm of EE shifted, when "personnel" became "Human resource" (Perrin, Working Today: Understanding What Drives Employee Engagment , 2003). "Employee Commitment" which was used a substitute term for EE, again research concluded that employee commitment could be a predictor of EE but could not be used as a replacement (Durkin, 2007). Researchers suggests that EE could be understood as "Passion for work" (Truss, Soane, Edwards, & Wisdom, 2006) where commitment refers to "living and standing up to the vision of the organization"(S. Abraham, 2012; Davis, 2015; Durkin, 2007). EE concept matured when a paper "From People to Profits" published in 1990 and concluded that the freedom of "being oneself" at work place engages an employee more into work (Kahn, 1990).

"The harnessing of organizational members' selves to their work roles" is the first definition given by Kahn for the term EE. He determined that when an employee express himself cognitively, emotionally and physically during job performance, EE is said to have realized (Kahn, 1990). Recent era definitions of EE varies organization to organization. A survey report on EE in US analyzed that organizations fall into a trap of mistaking their employee engagement survey strategy (Aon Hewitt, 2012). Organizations ask common EE questions to measure their employees' engagement which obviously does not lead an organization towards improving performance (Adkins, 2016).

EE is a complex concept with different factors influencing engagement at different level. Consequently, EE also defined differently in different organizations. So it is important that the approach towards engaging employees, in organizational processes should be different (Thakur, 2014). EE's importance goes beyond a "happy worker" and organization's benefits. Hence, less than of 25% of the organizations believe that their employees are engaged (HBR, 2013). Another report by Harvard Business Review determined that after recessionary years, organizations were highly engaged in investing in growth and cost cutting strategies. This report further concluded that critical success factors considered by leaders for a successful business are customer services, effective communication and high level of employee engagement. Despite of having awareness about importance of EE in western countries, results of Gallup poll shows consistent low levels of EE. It shows that for the last fifteen years engaged employees' percentage in United Sates remained less than 33% while in 2014 to 2015 percentage of engaged employees increased from 31.5% to 32%(Adkins, 2015).

In modern time with cost cutting and organizational culture, engagement is the most important issue companies are facing. The story of oil market downturn is not very old when organizations were facing challenge of retaining workforce as well as keep them engaged with work when business crashes kept employees' moral down (Ross, 2011). Evidence suggests that US lost 350 billion dollars per year to the disengagement of employees at work (Ross, 2011). The study also revealed that engagement is highly co related to the high performance thus, highly engaged employee outperform 400% more than a moderately engaged coworker (Ross, 2011).

Employee Engagement Conceptualization

History of EE definitions suggest that EE as construct consistently misinterpreted (Shuck & Wollard, 2009). Khan (1990) suggested that "people act out momentary attachments and detachments in role performances" with the reference to internationalist theory given by Goffman (Goffman, 1961; Kahn,

1990). Kahn (1990) drew suggestions from different psychologists' research work and hypothesized that for engagement employee safety, meaningfulness and availability are important attributes (H. M. Abraham, 1970; Alderfe, 1972; Goffman, 1961; Kahn, 1990). Safety referred to the ability to express one-self without fear of negative influence on image, status and career, "return on performance" as meaningfulness and availability referred as emotional, psychological and physical resources are available or not (Kahn, 1990).

Until 2001 personal engagement and disengagement was focus of empirical research linked with employee burnout. It was posited that EE is antithesis to the employee burnout (Maslach, Schaufel, & Leiter, 2001). Schaufeli and Baker in 2002 suggested that being engaged is a psychological state. When an employee feel enthusiastic, energized, joyful at work he/she will definitely get involved and remain engaged with the work (Schaufeli & Bakker, 2004). In 2009, Slaski gave psychosocial model of EE which suggests that when people find psychologically positive and socially acceptable work environment, they tend to get engaged in work. The positive environment is important for EE (Slaski & Cowan, 2009).

Current Status of Employee Engagement

A question, an organization should ask and should be asked that what kind of tools and techniques it is using to measure its employee performance. In this global era where workforce is different and digital, companies are still relying on surveys, tools, correlation techniques and models which can only predict the retention rate of employees but cannot provide any insights on employee engagement (HBR, 2013). And suppose if they provide insights, then those insights do not help organizations to outperform. In US, there is $1 billion worth market of survey agencies, who provide surveys with statistical models which measures level of engagement considering variety of job engagement predictors e.g. leadership style in organization, job satisfaction, commitment, enjoyment, rotation of work and work life balance (HBR, 2013). Models are reliable and valid but actionable results are far from consideration level (Ray, Hayland , Dye , Kaplan, & Pressman, 2014). Issues of engagement have risen in the minds of business leaders on the basis of the findings of current research which is as follows:

A report by HBR Analytic Services identifies the most impactful EE drivers as follows:

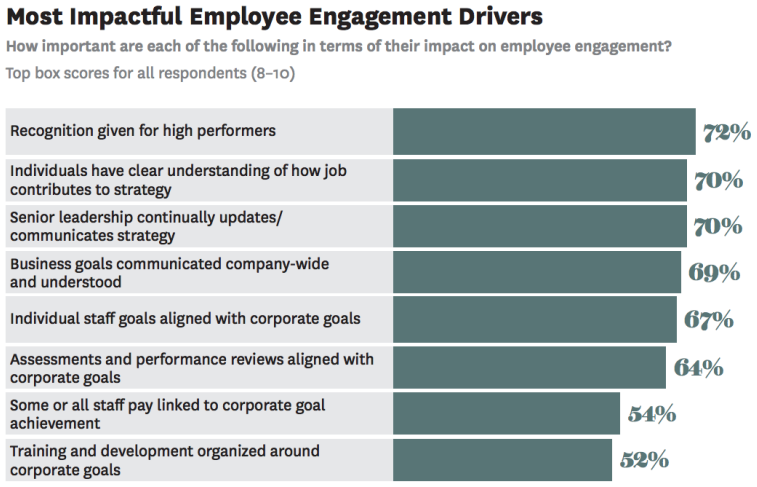


Figure 1.1: EE drivers

Source: (HBR, 2013)

- 54% employees recommend that Glassdoor (a company which ask their employees to rate and evaluate their employers) is a place to work (Brown, Melian, Solow, Chheng, & Parker, 2015)
- 50% of the employees would never recommend their peers to join their employer (Volini & Dussert, 2015)
- According to Victorian equal opportunity rights 80% of the work force want to be a part of an organization which is highly committed and compassionate about diversity (Deloitte, 2013)
- 72% of the employees seek recognitions as an important factor to get themselves engaged (HBR, 2013).

Literature Survey

Employee Engagement and Relationship Attributes

Before identifying construct based attributes of EE, individual factors are necessary to be defined and identified because engagement is more of a personal and decisional attitude rather than learned, altered or acquired (Lawrence, 2016). Relationship attributes or subjective attributes of EE are relationship of employee with

a. Co-workers and peers
b. Line managers
c. Organization itself
d. And outside the organization (stakeholder of the organization like suppliers and customers)

Researchers argue that employee and employer relationship should be a mutual-gain relationship to improve business productivity (Lawrence, 2016). Consequently, psychometric assessment is also used widely to analyze relationship and changing association between employer and employee (Khan, Yar, Khan, Nawaz, & Khan, 2013). 72% of the employees agreed that recognition given by employer having a positive impact of EE (HBR, 2013) (See Fig 1.1).

Employee Engagement and Demographics

To understand employee engagement concretely, an organization needs to understand changing demographics of human resource. According to research, changes in age composition of employee will have significant impact on business (Pitt-Catsouphes et al., 2011). Workforce demographics significantly affect satisfaction, commitment, engagement and productivity (Shah & Jalees, 2004).

Gallup (2015) reported that “different people should be managed differently”(Robison, 2015). This report revealed that college graduates are more disengaged than high school diploma workers. College graduates spend more time to earn their degree than keep themselves engaged in the work field. Generation X seems to be concerned about what their organization stands for, and so as baby boomers, who kept engaged at work where they feel their managers are doing extra efforts to show them that they are important part of the organization (Robison, 2015). The manager/leader should understand the thought process of an employee and do some extra efforts to recognize employees’ talent, experiences, skills, mind evolution and working style which needs to be managed and polished individually according to their age, race, gender, generation and psychometrics (Robison, 2015).

Methodology

For data analysis authors have selected qualitative method called Content Analysis. In mass media research this method is also called data collection method because of extraction of data through sources e.g. newspaper, contents, articles and etcetera (Mayring, 2014). In Content analysis, approach any kind of material like interviews, observations documents could be analyzed. For this study, Secondary Content Analysis approach is used in which data is collected from secondary texts, database, study material, scientific researches, white papers, annual and research reports. In qualitative content analysis, video materials can also be used to analyze and interpret (Mayring, 2014; Glaeser-Zikuda, Seidel, Rohlfs, & Groesc, 2005). Summarizing is the approach under content analysis by which secondary data on EE was collected, analyzed and explained.

Employee Engagement Models

Managers should stop only looking at what their organization is trying to achieve, which is success. Because success can be easily achieved by completing financial and operational goals but how organization achieve those goals is the part of organizational strategy (Gates, 2010). Strategy carried out by individuals working in that organizations thus their interest in the organization, willingness of work, sense of responsibility and pleasure will help managers to take organization on the path of sustainable success (PWC, 2017). Therefore, engagement of employee is an important aspect in which managers and leaders shall invest their time and resources. For this study three models have been chosen (1) Zinger Model, (2) Aon Hewitt's Model, and (3) X-Model of employee engagement. Rational for choosing these models is that these models are used globally and model's validity and reliability is checked constantly by the respective organizations (Aon Hewitt, 2015; Zinger, 2013).

1. Zinger Model

David Zinger, a Canadian ManagementC designed EE model to increase engagement in organizations. With 25 years of experience in management field, and the experience of extensive research he developed a workable model with 10 key aspects that managers must consider and follow to achieve organizational success (MSG Experts, 2017). Under this model, managers being accurate by not give too much work or burden to their employees which could result in disengagement fatigue and disinterest (David Zinger, 2012). Being accurate means managers are aware of organization's mission, goals and values. They are responsible to share knowledge about organization's strategies and let them (employees) know that an employee too have a role to play in the success of the organization (Vrouvas, 2016). When managers and subordinates work together to achieve an organizational goal, engagement level automatically rise (David Zinger, 2012) .

David provided a bold pyramid for EE which suggests that engagement could be achieved if an organization is equipped with practices according to the blocks of the model (David Zinger, 2012). Blocks of engagement are achieving goals, increasing performance, path progress, building relationships, recognition, master moments, strengthening, making meaning, enhancing wellbeing and enduring energy.

Model Summary

Zinger model lined EE with actionable and result oriented performance (Zinger, 2009). The pyramid starts from the top block of **achieving results** which is directed towards EE. Therefore the model starts with a key question that who wants to achieve what, in the organization (Zinger, 2013). In order to achieve results, an organization must **improve performance** by letting employees' know that how they are going to achieve and what organization is intended to accomplish in order to achieve organization's

ultimate goals (Schachter, 2012). **Crafting strategy** grabbed an essential place in the pyramid because according to Aon Hewitt's report biggest drop in EE is due to mangers not providing or failing to provide a clear perception of what organization wants to achieve (Aon Hewitt, 2012). Hence performance cannot be increased if jobs are not crafted properly (David Zinger, 2013). Job crafting is a practice of making cognitive and physical changes in the job in order to keep employees engaged (Berg, Dutton, & Wrzesniewski, 2008). Although job crafting makes tasks little bit difficult to achieve but in challenging jobs employees remain motivated to invest their efforts and time (Gorgievski & Hobfoll, 2008). Next block is **path progress**, progress principle 2012 determined that progress facilitation is most effective way to engage and motivate employees.

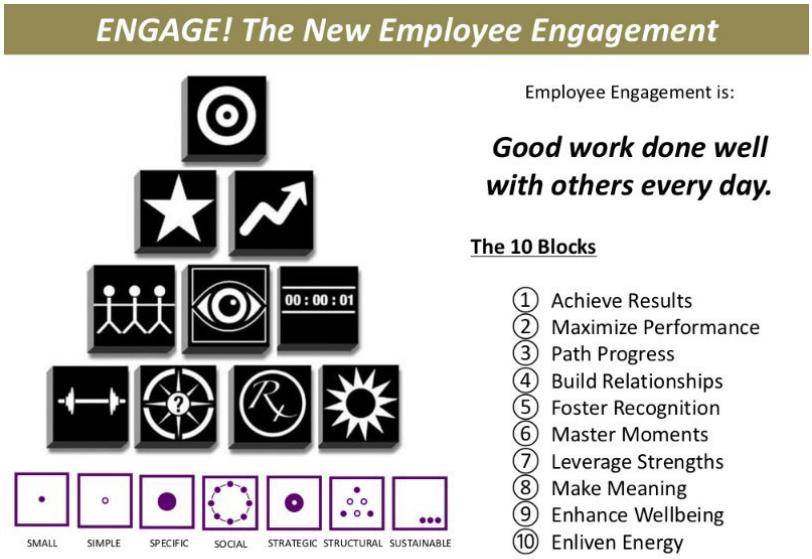


Fig: 1.2: Engagement Pyramid

Source: (Zinger, 2016)

The survey was conducted on 12000 daily diary entries of employees which summarized that even progress happen in small step or small chunks but it is important to make an employee realize that he/she at least succeed or achieved something or took another step towards its goal. This realization will create sense of motivation amongst employees and will keep them engage at work (Amabile & Kramer, 2012). When managers feel their responsibility to help, train and motivate an employee, a relationship of trust will automatically be build, which is the next block of the pyramid. **Building relationship** (Zinger, 2012) is foundation of EE. John M suggest that successful mangers are those who are able to develop and maintain networks and build relationships (John M, Gottman, & Joan, 2005). **Fostering recognition** is the block after relationship (Zinger, 2013) suggested by Zinger. In which he elaborated that (Re-cognition) which means managers needs to re-evaluate the meaning of the word recognition which is beyond roasters, donuts, minimum encouragements like saying "good job" kind of thing (Zinger, 2013). Today's work environment and workers are diverse. For this modern generation recognition could be using social media network at work, it can be an eat al fresco and also can be totally personal. According to Gallup survey it is suggested that EE and employee recognition are highly correlated variables, results were also endorsed by The Corporate Leadership Council and Towers Perrin (Perrin, 2003; Perrin, 2005; Council, 2004; Gallup, 2017). After recognition, model points towards **master moments** and **leverage strength.** Campbell (the parent organization of Campbell soup) introduces touch points to transform

disengagement onto engagement. They demonstrated that each point has ability to touch opportunity and establish high performance in someone's life. Touch points could be a get together between two people to get some task done so a manger needs to identify such touch points so that employees realize and memorize their master moments at work and try to **make meaning** out of it. Employees who are engaged can enhance their **wellbeing** as an engaged employee not only work for the organizational success but also for his/her own satisfaction. This will further induce **energy** and motivation in an employee.

2. *Aon Hewitt's EE Model*

Aon Hewitt a management consulting and human capital provider in at least more than 120 countries developed a model of measurement of employee engagement (Aon Hewitt, 2015). Engagement 2.0 a report by Hewitt suggest that organization's ability to take step to improve EE is going backward hence organizations are in dire need of engaging employees and retaining them (Aon Hewitt, 2015). Aon model of engagement gives insights of psychological state of an employee which leads an employee towards better performance (Aon Hewitt, 2017).

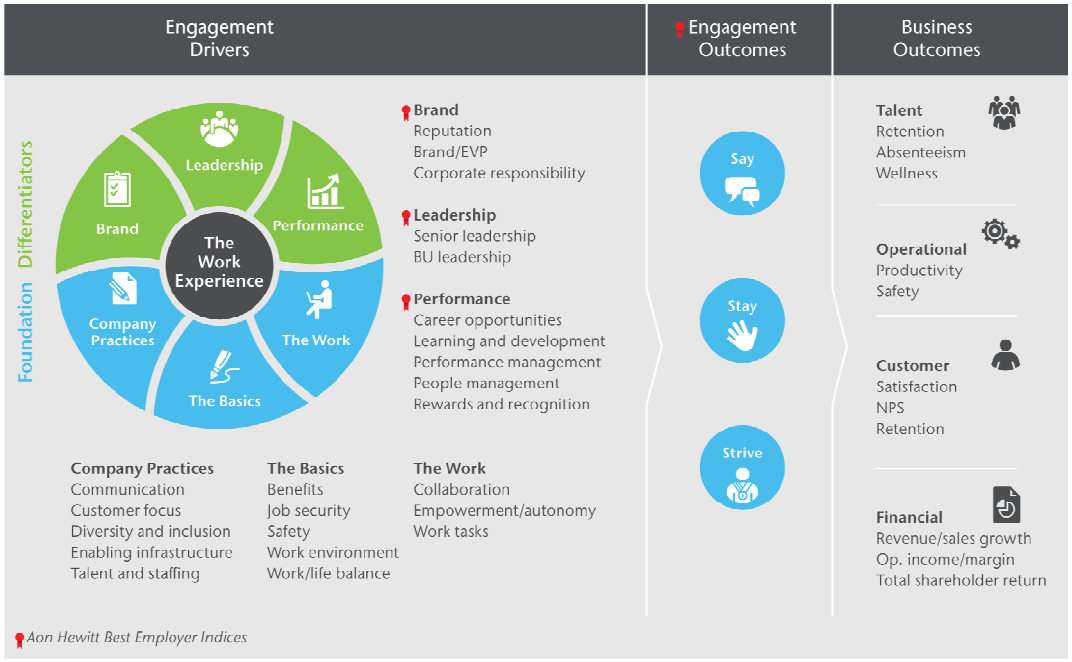


Fig: 1.3: Aon Hewitt's Model

Source: (Aon Hewitt, 2012)

Model Summary

If an organization focus on employee outcomes, it will help organization to keep its employees engaged. This model initially describes drivers of engagement which are **brand, leadership**, **performance, company practice, the basics and work** (Aon Hewitt, 2017)**.** Though drivers of engagement differ organization to organization, culture and country wise (Aon Hewitt, 2015), it is also suggested that drivers differ in terms of job segment. Hewitt model determined that engagement culture starts with the leader, his beliefs, experiences and displayed behavior effect psychological attitude of an employee (Aon

Hewitt, 2015). Aon Hewitt's model further describe the outcome of engagement which are **say, stay and strive** (Aon Hewitt, 2012)**.**

These outcome constructs are also known as observable facets. These outcomes suggest that when an employee is psychologically satisfied and get engaged in the work he/she **say** good words about the organization, **stay** affiliated with the organization for the longer period and **strive** for success of the organization and it self. After engagement outcomes, model determine business outcomes as well. **Retention** of talent, **productivity**, **satisfied customers** and **improved financials** are the business outcomes which are predictors of engagement in Aon Hewitt's model. Achieving these business outcomes is not as easy in today's global environment. Economic conditions continue to be a leading indicator for investments in talent and employee engagement.

3. X-Model of Employee Engagement

Managers as well organizations are eager to maximize the contribution of individual employee, individual employees are in need of purpose and satisfaction which is a return on their contribution (Cheryl, 2014). Increased contribution needs more engaged people is the one half of the engagement equation where other half of the equation is individual employees (BlessingsWhite, 2010). Individual employees have separate path or work definition and they work for their personal values, goals, career, promotion, compensation, satisfaction and success. Here individuals are managers, executives, employees and laborers who peruse their own individual definition of success (BlessingsWhite, 2013).

Model Summary

Organizations are pursuing their goals and achievements and so are employees. These two strategies intersect each other which is called "Job" (BlessingsWhite, 2013). The job intersection is all about what employees want to get from the job and what organization will give from the job. This model states that intersection of engagement is the **maximum contribution** to the organization and **maximum satisfaction** of an employee is point A "Apex" means the engaged one. People on the Apex are the maximum contributors and highly satisfied employees of the organization. But there are some other people on the intersection point as well. Some people might be highly satisfied with work (Like newly hired, highly paid or promoted) called **honeymooners** who are satisfied with the job but are not sure what their contribution is towards the organization. Right to opposite side, organizations have employees called **crash and burners.** whose contribution is really high but they are not aware of the benefits of the current job means rarely satisfied from the job but high in contribution. In simple words, they are not satisfied with what they do. Then the opposite of apex there are employees who are not satisfied nor contributing in the organization called the **disengaged**.

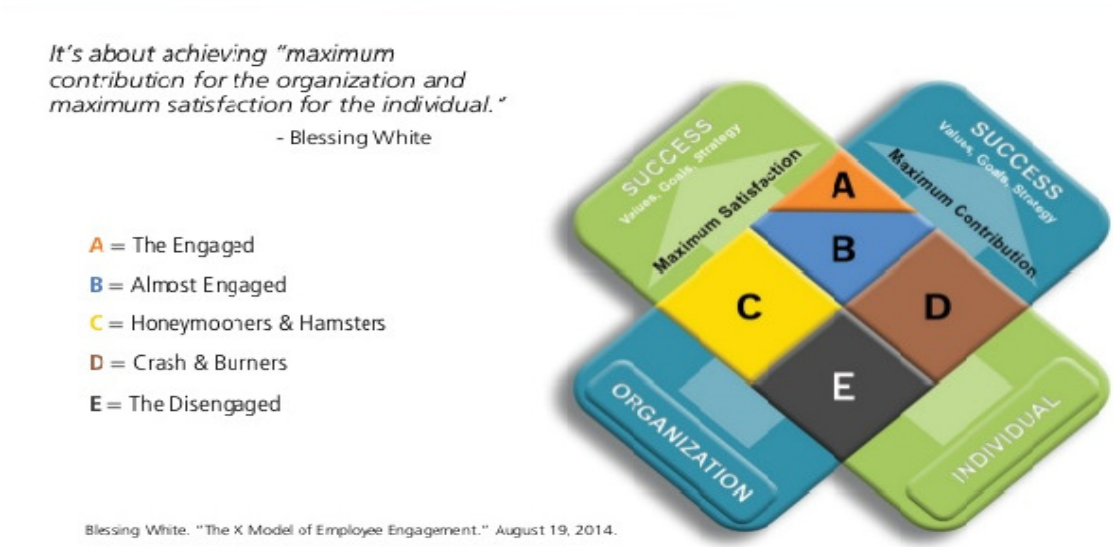


Fig: 1.4: X – Model of EE

Source: (BlessingsWhite, 2010)

Learning for Organizations

What could be done to improve employee engagement is a significant question in today's global environment. Where switching job is becoming a norm if an employee feel things are not going according to his/her interest (Purcell , Kinnie, Swart, & Rayton, 2008). To engage employees, organizations need to identify its drivers according to the culture of the organization, culture of the country, diverse workforce, nature of job and individual and organizational goals (Robinson, Hooker, & Hayday, 2007; Bates, 2004). In U.S. billions of dollars being spent on the employee engagement because they know it cost more than an organization to spend on a new hiring rather than retaining an old performing employee. There are many drivers, which do not need any expenditure of capital for identification but literature and models identified above in the paper. Now organizations need to identify that which of these drivers are important to target. Current literature survey identified drivers of engagement, which could be universal in nature. Like every organization need a leader who do not manage, employees but engage employees. So organizations need to identify leaders or create leaders in the organization. **Satisfaction** is the driver which is closely positively related to engagement (Abraham S. , 2012). IES study suggests that line managers have a very important role in fostering trust, recognition and relationship with employees (Robinson, Hayday, & Perryman, 2004).

Hence there is clear link between employees' personal experiences, personal life and sense of being involved at work and therefore engagement levels engagement are linked with their feelings of being valued and involved. One step beyond satisfaction, is engagement and it is linked with employee's commitment of long stay in the organization. So it makes sense that organizations should monitors employee's level of engagement and try to nurture this feeling. Integrating all EE drivers, a graphical depiction is presented in Fig. 1.5.

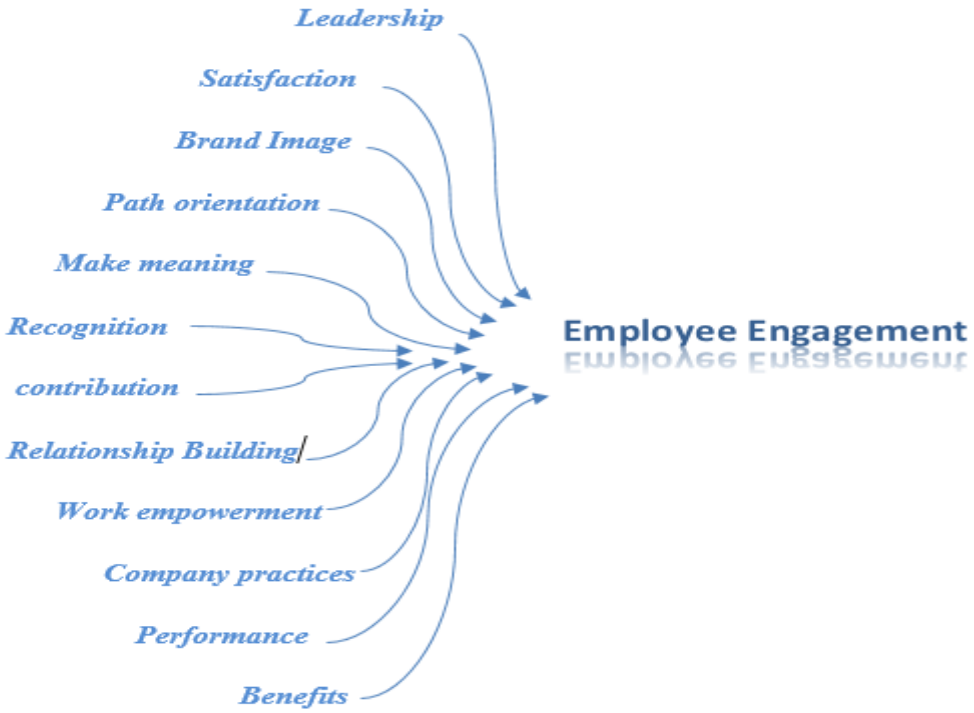


Fig:1.5: Drivers of EE

Source: Current Literature Survey

Discussion

Success is like a classical snakes and ladder game where achievements and accomplishments are ladders while setbacks are snakes. It is human psyche that snakes (setbacks) affect more strongly than achievements. So it is essential to build an attitude in which small loses could not eradicate small achievements. This attitude will be built when employee will realize importance of his/her work and existence in the organization. Employees often feel disconnected when they do not understand or informed about their progress at organization (Harter & Adkins, 2015). Research suggest that organizations, which have well established Performance Management System are more likely to engage their employees as compared to other organizations (Gallup, 2017). Performance management is not only telling employees what they need to do but managers often discuss about employees' responsibilities and personal development. These types of activities play major part in engaging employees at work because employees want their managers to help them in work as well as hold employees' accountable for their performance (Harter, Schmidt, Killham, & Asplund, 2011). Hence Zinger model is an ideal model for the organizations which are successful at performance management because the model suggests that from employee performance, recognition, employee strength and making meaning for employee everything should have proper check and balance and management system. This model offers ability to ability to structure and tackle each block at a time (Zinger, 2013). Model suggests that every block should be focused and analyzed at time. This model was originally designed for the managers to increase engagement of those employees who report them and then model was also used by managers to measure their performance level in the organization. Because an engaged employee can only engage others. Table 1 presents the summary and comparison of the three models discussed above.

Table: 1 Outcomes of EE

Model	***Key Drivers***	***Outcomes (Individual)***	***Outcomes (Organization)***	
Zinger Model	*Recognition* *Path orientation* *Relationship Building* *Leverage Strength* *Make meaning*	*Maximum performance* *Enhanced Wellbeing*	*Achieve results*	
Aon Hewitt's	*Brand* *Leadership* *Performance* *Company practices* *Benefits* *Work empowerment*	*Say* *Stay* *Strive*	*Talent* *Productivity* *Retention* *Revenues*	
X-Model	*Maximum Satisfaction* *Maximum contribution*	*Individual success*	*Organizational success*	

Hewitt's model suggests to engage employees is not about to making tools or technologies, or about HR survey and or managing engagement's score. Rather, It is about changing the culture (engagement culture) and leadership. Engagement culture align people, jobs and infrastructure where leadership demonstrate value of human capital and suggest strategies to make engagement happen.

Conclusion

What an organization could do to significantly engage their employees? This is the question organizations quest for (Purcell , Kinnie, Swart, & Rayton, 2008). It is not necessary for an organization that to engage an employee has to be expensive but positive energy and right timing is needed to engage an employee and off course benefits will outweigh these costs (Bates, 2004; Robinson, Hooker, & Hayday, 2007)

Engagement is all about feelings. Carl W. Buehner quoted that people will forget what you do, what you said but will never forget what you make them feel (Buehner, 1971). Engagement is an emotional connection of employees with their leader as described in Hewitt's model. Engagement is critically important for the bottom line. As in the U.S disengagement cost $350 billion a year and 445 billon in Australia (Ross, 2011). Despite thousands of studies on engagement, Gallup results shows that only 33% of the employees are engaged. That shows a threat with an opportunity that remaining 67% are waiting for a leader to engage them, they are waiting for the psychological benefits, they are waiting for say, stay and strive or waiting for to be treated as individuals (Aon Hewitt, 2017; Zinger, 2009; Vrouvas, 2016). If organizations want to stay competitive, it is imperative that following steps must be taken:

1) Who is sinking the ship

Mangers and leaders need to find the "sweet spots". Sweet spots are those employees who are highly engaged. Engaged employee is 30% more effective and productive so he/she needs to be identified and shall be given much attention to retain that employee. Then managers must identify 'Bad apples' too and target them as well. Mangers need to help them identify their area of interest and their motivation of

working with the organization. They must be given consultation regarding their reasons of disengagement and to be asked to adjust their attitude or should be given help out find a new place for work.

2) Leaders with Engagement Intelligence

Great leaders have emotional intelligence but quite a few are exceptional in driving real results. Leaders must possess EI2 called **engagement intelligence** (Wright, 2013). The leader High on EI, will be the key contributor in maintaining psychologically healthy work place (Nowack, 2008) Leaders with self-awareness, social awareness, self-management and social management are able to push employees to do better for him/her and for the organization as well as improve moral, attitude and results. They are the key motivators and mentors.

3) Recipe to engage People

Above models are repeatedly discussing the strategies of engagement of an employee which can be used as pills to get rid of the disease of disengagement. David Zinger's models points out building trust, give rewards and recognition to improve EE. Hewitt's model focuses on psychological wellbeing of an employee and X-model suggests that crash and burners needs to be attended first because they produce great results but not satisfied with what they want from work.

Future Research

With few exceptions (Kahn, 1990) there is a dire need of EE literature as well as quantitative results. In developing countries there are many agencies who conduct engagement surveys but in developing countries concept of engagement is not widely used. There is also need of studies on engagement in developing countries and also longitudinal studies on engagement globally. There is need of reliable and valid tools for measuring engagement in developing countries as engagement drivers could be different due to diverse culture and economy. This study can be further nourished if other engagement models could be analyzed and also a comparative analysis of the models could be done.

References

ABRAHAM, H.M. and Motivation, W., 1970. Personality (2nd edition).

Abraham, S. (2012). Development of employee engagement programme on the basis of employee satisfaction survey,. *Journal of Economic Development, Management, IT, Finance and Marketing, 4(1): 27-*.

Adkins, A., 2015. Only 35% of US managers are engaged in their jobs. *Gallup Business Journal*.

Adkins, A., 2016. Employee engagement in US stagnant in 2015. *Gallup. Published January*, *13*.

Alderfe, C. P. (1972). Human needs in organizational settings. New York: . *The Free Press of Giencoe.*

Amabile, T. M., & Kramer, S. J. (2012, Jan 2012). The Progress Principle: Using Small Wins to Ignite Joy, Engagement, and Creativity at Work. *McKinsey Quarterly,*. Retrieved 2017

Aon Hewitt. (2012). *"2012 Total Rewards Survey: Transforming Potential into Value." (2012).* Coursehero.

Hewitt, A., 2012. 2012 Trends in global employee Engagement. *Aon Hewitt Corp*, p.18.

Aon Hewitt. (2015). *Engagement 2.0 Focus on the Right People. Build the Excitement. Preserve the Passion.* Aon Hewitt. Retrieved from Aon empower Results: http://www.aon.com/default.jsp

Aon Hewitt. (2017). *Model of Employee Engagement.* Retrieved from Aon.com: http://www.aon.com/human-capital-consulting/thought-leadership/talent/aon-hewitt-model-of-employee-engagement.jsp

Bates, S. (2004). Getting engaged′, . *HR Magazine*, 49(2), 44–51.

Berg, J. M., Dutton, J. E., & Wrzesniewski, A. (2008). What is job crafting and why does it matter,. *J.A. Bruinsma (4300971)*. Retrieved 8 2017

BlessingsWhite. (2010, Nov). An Engagement Layer Cake. *When it comes to engagement, executives, managers and individual employees all own a piece of it.*

BlessingsWhite (2013). The 'X' model of employee engagement: Maximum Satisfaction meets Maximum Contribution [Recorded by a. b. whiteboardanimation.com].

Brown, D., Melian, V., Solow, M., Chheng, S., & Parker, K. (2015, February 27). *Culture and engagement The naked organization.* Retrieved from deloitte univercity press: https://dupress.deloitte.com/dup-us-en/focus/human-capital-trends/2015/employee-engagement-culture-human-capital-trends-2015.html

Buehner, C. W. (1971). *Richard Evans' Quote Book.*

Council, C. L. (2004). *Council, Corporate Leadership. "Driving performance and retention through employee engagement." Washington, DC: Corporate Executive Board 32.*

Davis, S. (2015). Dissed loyalty, http://www.workforce.com/articles/21344-dissed-loyalty (accessed:. *http://www.workforce.com/articles/21344-dissed-loyalty (accessed:.*

Deloitte. (2013). *Waiter, is that inclusion in my soup? A new recipe to improve business performance:Cooking up a storm.* Sydney launch: Victorian equal opportunity rights.

Durkin, D. (2007). How loyalty and employee engagement add up to corporate profits, . *Chief Learning Officer.*

Gallup. (2014). *Gallup Q12 Survey homepage, <https://q12.gallup.com/>*. Retrieved from gallup.com.

Gallup. (2017). *State of the American Workplace.* Copyright © 2017 Gallup, Inc. All rights reserved.

Gates, P. L. (2010). *Strategic Planning with Critical Success Factors and Future Scenarios: An Integrated Strategic Planning Framework.* Copyright 2010 Carnegie Mellon University.

Glaeser-Zikuda, M., Seidel, T., Rohlfs, C., & Groesc, A. (2005). Mixed Methods in der empirischen Bildungsforschung. *Muenster: Waxmann.*

Goffman, E. (1961). The presentation of self in everyday life. *New York: Anchor-Doubleday.*

Gorgievski, M. J., & Hobfoll, S. E. (2008). Work can burn us out or fire us up: Conservation of resources in burnout and engagement. . In I. J. (Ed.), *Handbook of stress and burnout in health care* (pp. 7-22)). New York: : Nova Science Pubslishers.

Hallberg, U. E., & Schaufeli, W. B. (2006). (2006), Same but different? Can work engagement be discriminated from job involvement and organizational commitment. *European Psychologist,.*

Harter, J., & Adkins, A. (2015). *What Great Managers Do to Engage Employees.* Havard Business Review .

Harter, J., Schmidt, F., Killham, E., & Asplund, J. (2011). *Q12® Meta-Analysis.* Q12® Meta-Analysis Gallup.

Harvard business review. (2013). *The Impact of Employee Engagement on Performance.* a report by harvard business review analytic services.

Infosurv Research. (2016, July 07). *The Demographics of Employee Engagement: The Insider Blog*. Retrieved Aug 5, 2017, from infosurv.com: http://www.infosurv.com/employee-engagement-demographics/

John M, K., Gottman, & Joan, D. (2005). *The Relationship Cure A 5 Step Guide to Strengthening Your Marriage, Family, and Friendships.* first published May 22nd 2001 Harmony.

Kahn. (1990). Psychological conditions of personal engagement and disengagement at work . *Academy of Management Journal by William.*

Khan, F., Yar, N. B., Khan, I., Nawaz, A., & Khan. (2013). Determining the Demographic impacts on the Organizational Commitment of Academicians in the HEIs of DCs like Pakistan. *European Journal of Sustainable Development (2013), 2, 4, 117-130* .

Lawrence, J. (2016, 8 6). *Factors that influence employee engagement - your complete list*. Retrieved from hrzone: https://www.hrzone.com/engage/employees/factors-that-influence-employee-engagement-your-complete-list

Mann , A., & Haters, J. (2016). The Worldwide Employee Engagement Crisis. *Business Journal*. Retrieved from http://news.gallup.com/businessjournal/188033/worldwide-employee-engagement-crisis.aspx

Maslach, C., Schaufel, W., & Leiter, M. (2001). JOB BURNOUT. *Annu. Rev. Psychol. 2001. 52:397–422*.

Mayring, P. (2014). Qualitative Content Analysis Theoretical Foundation, Basic Procedures and Software Solution. *Klagenfurt, Austria, 2014*.

MSG Experts. (2017, july 9). *Zinger Model of Employee Engagement*. Retrieved from MSG: http://www.managementstudyguide.com/employee-engagement-and-financial-performance.htm

Nowack, K. (n.d.). *Leadership, Emotional Intelligence and Employee Engagement: Creating a Psychologically Healthy Workplace.* Envisia Learning .

Perrin, T. (2003). *Working Today: Understanding What Drives Employee Engagment* . Towers Perrin HR Services.

Perrin, T. (2005). *Is Your Workforce Truly Engaged in Helping Your Organisation Succeed? Towers Perrin Rapid Engagement Diagnostic Survey.* Towers Perrin HR Services.

Pitt-Catsouphes, Marcei, Natalia, S., Rucha, B., Rene, & Chad, M. (2011). Effects of Country and Age on Work Engagment, Job Satisfaction nad organizational commitment Among employees in the united states. *Boston univercity Sloan Centeron Aging an Work.*

Porter, M. E. (1998). *Competitive Strategy: Techniques for Analyzing Industries and Competitors.* . Republished with a new introduction, 1998: New York: Free Press, 1980.

Purcell , J., Kinnie, N., Swart, J., & Rayton, B. (2008). People management and performance. . *Routledge*.

PWC. (2017, July 9). *Organizational DNA: The key to unlocking your company's potential*. Retrieved from strategy and: https://www.strategyand.pwc.com/global/home/what-we-think/multimedia/video/mm-v-organization_change_and_leadership

Ramarajan, P., & Sujatha. (2015). Employee Engagement on Organizational Citizenship Behaviour Results to Voluntarism. *Serials Publications*.

Ray, R., Hayland , P., Dye , D., Kaplan, J., & Pressman, A. (2014). The Engagement Institute: How organizations create and sustain highly engaging cultures,. *The Conference board. Inc.*

Reynolds , J. (2016). *THE DIFFERENCE BETWEEN EMPLOYEE ENGAGEMENT AND EMPLOYEE SATISFACTION*. Retrieved from tinypulse.com.

Robinson, D., Hayday, S., & Perryman, S. (2004). *The Drivers of rmployee engagmnet.* INSTITUTE FOR EMPLOYMENT STUDIES. Printed in Great Britain: INSTITUTE FOR EMPLOYMENT STUDIES Copyright © 2004 Institute for Employment Studies . Retrieved from http://www.employment-studies.co.uk

Robinson, D., Hooker, H., & Hayday, S. (2007). Engagement: The Continuing Story,. *Institute for Employment Studies*.

Robison, J. (2015, JAN 20). *Different Demographic Groups Must Be Managed Differently*. Retrieved August 5, 2017, from Gallup.com: http://www.gallup.com/businessjournal/181205/different-demographic-groups-managed-differently.aspx

Ross, C., 2011, January. Engagement–Does It Really Matter? In *ASSE Professional Development Conference and Exposition*. American Society of Safety Engineers.

SCHACHTER, H. (2012, Feb 26). *10 building blocks for employee engagement*. Retrieved Aug 2017, from the globe and mail.

Schaufeli , W., & Bakker , A. (2004). UTRECHT WORK ENGAGEMENT SCALE. *Occupational Health Psychology Unit*.

Shuck, M. B., & Wollard, K. (2009). A Historical Perspective of Employee Engagement: An Emerging Definition. *Proceedings of the Eighth Annual College of Education & GSN Research Conference*, (pp. 133-139). Miami: Florida International University.

Shah, S., & Jalees, T. (2004). An analysis of job satisfaction level of faculty members at the University of Sindh. *Journal of independent studies and research 2(1):167-192.*

Slaski, & Cowan. (2009). *The psycho-social model of engagement.* published by Thomas International as Thomas Engage © 2015.

Thakur, P. (2014). A Research Paper on the Effect of Employee Engagement on Job Satisfaction in IT Sector. *Journal of Business Management & Social Sciences Research (JBM&SSR).*

Truss, C., Soane, E., Edwards, C., & Wisdom, K. (2006). Truss, C., Soane, E., Edwards, C., Wisdom, K., Croll, A. and Burnett, J. (2006) Working Life:. *Employee Attitudes and Engagement*.

Volini, E., & Dussert, B. (2015). *The informed executive Improving organizational agility through workforce analytics.* Bersin by Deloitte proprietary research conducted with Glassdoor.

Vrouvas, M. (2016, 10 26). *Employee Models of Engagement*. Retrieved from smallbusiness.chron.com: http://smallbusiness.chron.com/employee-models-engagement-16604.html

Wright, K. (2013). Leadership - Engage your Team - Create a Culture of Engagement [Recorded by K. Wright].

Zinger, D. (2009, Oct 22). *Zinger Employee Engagement Model Version 1.3*. Retrieved Aug 2017, from Zinger Employee Engagement Speaker: http://www.davidzinger.com/zinger-employee-engagement-model-version-1-3-4547/

Zinger, D. (2012). *The Power of Employee Engagement.* David Zinger Associates. Retrieved Aug 1, 2017

Zinger, D. (2013, Oct 29). *Employee Engagement is not working even though it is about working*. Retrieved Aug 12, 2017, from davidzinger.com: http://www.davidzinger.com/employee-engagement-is-not-working-even-though-it-is-about-working-16883/

Zinger, D. (2016, May 5). *The New Employee Engagement: Find Your Inner Toddler*. Retrieved from Linkedin: https://www.linkedin.com/pulse/new-employee-engagement-find-your-inner-toddler-david-zinger/

Electronic Platforms and Transparency in Public Procurement

Isabel Ferreira, IPCA, Portugal, iferreira@ipca.pt

Pedro J. Camões, Universidade do Minho, Portugal, pedroc@eeg.uminho.pt

Sandra Cunha, IPCA, Portugal, scunha@ipca.pt

Luís A. Amaral, Universidade do Minho, Portugal, amaral@dsi.uminho.pt

Abstract

Public procurement represents the largest component of public expenditures and, for that reason, is one of the most sensitive areas of the risk of corruption. There are several governmental investments in this area to accomplish the principle of integrity and to achieve more transparency.

In Portugal, in the e-government context, the strategy was the adoption of electronic platforms for procurement, as the main reinforcement measure of transparency in public procurement. Through an exploratory literature review, based on OCDE recommendations and European Union official reports, this paper aims at contributing to the discussion on the use of information and communication technology, specifically electronic platforms, in Portuguese public procurement. While the gains are potentially significant, it should be noted that the implementation of the principle of integrity implies articulated measures of technological and political dimension as well as organizational culture.

Keywords: public purchase, electronic platforms, transparency, prevention of corruption.

1. Introduction

The literature commonly highlights the potential of information and communication technologies (ICT) in the design of new public governance models that promote transparency and accountability, which are considered critical requirements to an efficient resource management and to fight corruption. In this context, the specific sector of public procurement sector is critical, since it represents a large portion of public expenditures and is one of the most sensitive areas with respect to risk of corruption.

With a focus on enhancing transparency, several investments have been made by governments to implement e-procurement, representing one of the most relevant initiatives of digital government. Among other advantages, e-procurement can be an important tool to promote competition, to foster more transparent decision-making processes, to reduce corruption and bureaucracy, and to save time and money.

Among European countries, Portugal is considered a good example of e-procurement policies and practices and has focused on the complete dematerialization of pre-contractual procedures. The application of the Public Contracts Code (CPC) in 2009 entailed, among other measures, mandatory adoption of public procurement electronic platforms by contracting entities in support for pre-contractual procedures.

These instruments reinforce the promotion of transparency in public procurement, but can they be strengthened in another way to increase transparency? Based on an exploratory literature review on this subject, and focusing on a set of recommendations by the Organization for Economic Co-operation and Development (OECD) the European Union (EU) and the analysis of the instruments mentioned above, this article aims to discuss the contribution of electronic platforms in the increasing public procurement

transparency in Portugal. It adds the identification of limitations they present and, in this sense, the presentation of guidelines to promote their use.

In what follows, Section 2 addresses the importance of public procurement and the emphasis on transparency. Section 3 discusses how e-procurement is an instrument for promoting transparency and preventing corruption. The analysis of technological instruments adopted in Portugal, namely public procurement platforms, is presented in Section 4. Section 5 deals with threats to transparency. Finally, Section 6 presents discussion topics and further work to be made.

2. Public Procurement and the Focus on Transparency

Public procurement is an important part of the European Member States' national economies. It accounts for around one fifth of EU annul GDP (EU, 2014). In the OECD area, it represents about 12% of GDP and around 4.2 billion euros in 2013 (OECD, 2016).

For a number of reasons, particularly for the financial flows they create and for the close links between public and private sector, public procurement is a breeding ground for corrupt practices (Boehm, 2007; Lamsdorff & Nell, 2006; Rose-Ackerman, 2002; UE, 2014; OECD, 2016), as evidenced by several studies. According to a study on public procurement indicators, corruption practices lead to a 20 to 25% increase in spending on public procurements, and in some cases may reach 50% (EC, 2011). Taking into account the principles of integrity in OECD procurement, mismanagement ("governance deficit") of public procurement undermines competition and increases the prices of goods and services purchased by public entities, thus impacting public expenditure and income from taxpayers (UE, 2014). A study on detecting and reducing corruption in EU public markets concluded that, in 2010, the overall direct cost of corruption in public markets on only 5 sectors (road and rail, water and waste, public works, training, research and development) of 8 Member States (France, Italy, Hungary, Lithuania, the Netherlands, Poland, Romania and Spain) amounted to between 1.4 billion and 2.2 billion euros (EC, 2003). In addition, more than half of the cases of foreign briberies occur to obtain public procurement contracts (OECD, 2016) and several cases of illegal financing of political parties had favorable decisions in public procurement procedures as currency of exchange (OECD, 2009).

Public procurement presents a high risk of corruption and, in recent years, Member States have adopted reforms in the public procurement field, which have made it possible to strengthen transparency, competition, and prices (EU, 2004; OECD, 2009; Boehm, 2007; Lamsdorff & Nell, 2006).

Reforms to enhance transparency are essential, since public procurement accounts for a substantial proportion of taxpayers money and therefore requires efficient management and high levels of integrity in order to safeguard public interest (OECD, 2016; Armstrong, 2005). According to Armstrong (2005), accountability, understood as reporting information on the use of public resources to stakeholders of achieving the defined objectives, brings transparency improvement. Transparency, according to the same author, can be defined as the "(...) public access, with no restrictions, to on-time and reliable information about decisions and efficiency of public sector" (Armstrong, 2005: 1). However, transparency and accountability imply integrity and reliability, that is, honesty and trust. In brief, accountability, transparency and integrity are the essential pillars in safeguarding public interest.

In this context, OECD (2009) refers to ICT use as a fundamental instrument of reforms, especially in the area of public procurement. ICTs allow creation and strengthening of a culture of transparency, facilitating the monitoring of information as well as control of public procurement (OECD 2009; Bertot, Jaeger, Grimes, 2010). For example, "unique portals/platforms" can supplement traditional means of supporting transparency. The challenge is to ensure a degree of transparency that reinforces the anti-corruption fight, without undermining the efficiency and effectiveness of public procurement (OECD, 2009), while allowing citizens to monitor how public money is managed (Lourenço, 2013).

3. Electronic Public Procurement: A Tool for Transparency

According to the European Commission (2010), e-procurement generally means replacing pre-contractual, paper-based procedures with communication and processes based on information technologies and systems (TSI) (EC, 2004) and considers that it promotes the effectiveness of procedures and provides additional guarantees in terms of detecting and preventing corruption, since they enhance transparency, enable better application of standardized procedures and facilitate monitoring (EU, 2014).

A literature review by Ferreira and Amaral (2016) points out several benefits of ICT adoption associated with purchasing practices, highlighting: (i) the simple and efficient way of buying, allowing a reduction of transaction costs; (ii) identifying and negotiating with suppliers more efficiently; (iii) automation of workflows that can subsequently be extended to the entire supply chain and to the entire organization, enabling information sharing and integration; (iv) processing of orders, monitoring and control of acquisition activities; and (v) transformation of the way an organization conducts pre-contractual processes (Schoenherr & Tummala, 2007; European Commission, 2010).

Ronchi *et al.* (2010) focus on: (i) strategic benefits (related to comparative efficiency); (ii) transactional benefits (concerned with efficiency and effectiveness of transactional activities); and (iii) informational benefits (as well as decision support and timely communication). According to the authors, these benefits translate into financial and organizational gains, with impact on improving governance. To these advantages, Talero (2001) adds: (i) the increase of transparency in the relations between public organisms and the market (emphasis on the G2B components). Kassim and Hassin (2010) refer to (i) value creation, (ii) increased transparency, (iii) improved information flow, (iv) support for decision-making, (v) creation of open markets in order to all suppliers be able to compete, taking advantages from the aggregated power of governments to achieve dynamic prices of goods and services and improving the purchasing cycle efficiency, like (vi) the benefits in adopting e-procurement systems.

In sum, ICT has clearly the potential to play an important role by facilitating the access of suppliers/providers of goods/services to information more easily and in real time. ICT also facilitates monitoring of the public procurement process information, as well as its subsequent execution. This aspect is crucial for public procurement control by stakeholders, characterized by a multiple network of different actors, both internal and external: (i) in the context of governance and definition of public policies; (ii) in the context of public procurement activity - relationship between contracting entity and external entities in procurement processes; (iii) in the context of public procurement activity - internal actors of contract formation processes (Ferreira, 2016).

Understanding the context of the public procurement activity is also crucial in order to reach the concept of transparency, as presented by Heald (2006; 2012): process transparency and transparency of events; macro-level transparency and micro-level transparency; real-time transparency and transparency in retrospect (Lourenço, 2013). This discussion is imperative for the purpose of determining the overall government transparency strategy for public procurement in order to enhance accountability through the use of ICT (Lourenço, 2013), always in the defense of public interest.

4. The Portuguese Case in the Use of Electronic Platforms for Public Procurement

The gains of transparency attributed to the adoption of technologies in public procurement processes are recognized in the literature. However, it is also important to take into account the costs of adopting electronic public procurement platforms, as well as their maintenance costs, which probably vary according to the size and sophistication of the electronic platform (Ferreira & Amaral, 2016; European Commission, 2010). To these, it must be added the costs of licenses, internal and external resources, security systems, implementation and maintenance, integration solutions, process design, configurations and customization, training and communication (Ramanujam, 2012). In this context, the financial risk and risk in the development of technological solutions and legal issues, are determinant factors in electronic

public procurement projects (Oliveira & Amorim, 2001) and, consequently, the increase of transparency in procurement processes.

In addition, Ferreira and Amaral (2016) advert that the simple adoption of technological components does not mean necessarily that the organization automatically reap the benefits indicated. In this respect, the European Commission (2010) identifies a number of problems that may create obstacles in the adoption of e-procurement and hence transnational participation in e-procurement procedures (European Commission, 2010): (i) inertia and fear of contracting authorities and suppliers (reorganizing costs of internal systems; lack of knowledge regarding associated advantages; risks linked to the integration of procurement technologies with existing IT systems); (ii) lack of guidelines in electronic public procurement processes (suppliers are confronted with an electronic public procurement architecture composed of different platforms and devices); (iii) costly technical requirements, especially in authentication of tenderers.

However, Heald (2013) draws our attention to the existence of certain obstacles in open government initiatives that have implications for transparency gains. Legislative initiatives, public processes and the way information is made available, does not necessarily translate into improved transparency and, consequently, have implications in terms of accountability (Lourenço, 2013, Heald, 2016). To these it is also added models for technological development of artefacts, particularly in public procurement (Ferreira, 2016). In turn, Bertot *et al.* (2010) refer to usability, issues related to acceptance and implementation of technologies, education and culture, as potential barriers for transparency, enhanced by the adoption of technology.

In order to correct these problems and to promote transparency, smart, healthy and inclusive growth, the European Commission defines in its 2020 strategy the following vision for public bodies and services: creating public value through ICT, attributing to public procurement a crucial role in the definition of policies and concrete measures in this area. However, with regard to the effective use of public electronic procurement in most of the EU countries, the global adherence remains weak (Ferreira, 2016; European Commission, 2010). Portugal, according to this same report from the European Commission (2010), constitutes an exception in the legal sphere, for the complete dematerialization of contract formation processes, through CCP application, approved by Decree-Law no. 18/2008, of January 29th, with corrections introduced by subsequent legislation, thus transposing the guidelines of Directives 2004/17/CE and 2004/18/CE into the national plan, a key tool for implementation of the defined objectives associated with the National Public Procurement System (SNCP), mainly those related to electronic public procurement (Ferreira, 2016).

As a result, the translation of the European policy to national laws has been marked by the definition of a technological model that includes a set of measures and projects, among which e-platforms for public procurement in support for pre-contractual procedures, of mandatory use by the contracting entities and established in terms of development in the private model: the electronic public procurement platforms. These platforms, of mandatory use by contracting authorities in public procurement processes, according to BASE Gov, the Online Public Procurement Portal, consist of a technological infrastructure made by a set of applications, means and services necessary for the operation of the procedures national public procurement contracts to support the operation of the phases of the pre-contractual procedures legally envisaged for the realization of public expenditure. In this sense, these platforms must support the following functions: (i) receiving of proposals, applications and solutions; (ii) opening of proposals and applications, and providing information to competitors; (iii) evaluation of proposals, according to qualitative and quantitative criteria; (iv) characterization of the procedure and aggregation of its parts; (v) publication of the procedure, or delivery of invitations, making known its contents to all interested parties; (vi) making available the parts of the procedure for consultation; (vii) receiving of requests for clarification; (viii) delivery of answers, clarifications and rectification of parts of the procedure (CCP, 2008).

In September 2017, according to data available in BASE Gov, five electronic procurement platforms and their respective management entities were licensed in Portugal. A year ago, in July 2016, 10 platforms were licensed.

The introduction of public procurement platforms resulted in substantial gains, recognized in terms of pre-contractual procedures: (i) in transparency; (ii) in trust by competitors; (iii) in construction of organizational memory; (iv) in competition; (v) in the working methods of actors; (vi) in information management; and (v) in cost reduction (Ferreira, 2016). Concerning transparency, changes potentiated by the platform in phases where the jury intervenes, often accused of being the center of corrupt practices (EC, 2014). In this context, there is a strengthening of transparency in the process (Heald, 2006; Heald, 2012; Lourenço, 2013).

In short, e-platforms have contributed to improve transparency levels in the submission, analysis and evaluation phases of proposals, that is, in the phases where the jury intervenes. Thus, while in these phases the risk of corruption has decreased, in the remaining phases, especially those not supported by platforms, corruption risks have increased (EC, 2014; OECD, 2009). This may indicate that the focus on corruption has shifted from one phase to another, due to ICT introduction, which means in general terms that public procurement remains a very sensitive area in terms of preventing corruption. The question arises as to whether ICTs can contribute to enhancing transparency, and therefore to reduce the risk of corruption at all stages.

OECD (2009) stresses the importance and necessity of enhancing transparency at all stages of public procurement, in particular, at the phase of assessing needs, the phase of implementation of contracts and payments, phases not normally covered by regulation and not covered by platforms. This also occurs in the Portuguese case. Platforms support legal requirements, but fall short on OECD transversality (2009).

Considering the Integrated Management Model for Public Procurement oriented to Public Value presented by Ferreira (2016), in Portugal, e-platforms only support the contracting phase (from authorization of expenditures to adjudication and contract signature) and yet they do not present themselves as end-to-end solutions. This limitation of technological solutions, according to the same author, makes it difficult to manage public procurement processes at the organizational level.

In this context, despite good practices and considerable gains, other technological tools are needed to support a culture of integrity at all stages of public procurement, from the assessment of needs to the preparation of parts of the procedure and to the phase of implementation and payment (OECD, 2009; Ferreira, 2016), all based on a system for monitoring, managing and evaluating performances and impacts of public policies and public value based on the following modular components (Ferreira, 2016): (i) Management and evaluation of public policies oriented to public value: a) authorization of public policies; b) policy-making; c) integrated management of policies, programs and projects; (ii) Management and evaluation of public procurement: a) management and evaluation of the purchasing cycle (strategically manage planned purchases with public policies, manage prior authorization process for expenditure execution, manage processes of public procurement and evaluation); b) manage the execution of the contract, oriented to the execution of policies, programs and projects; c) manage suppliers and evaluate the execution of contracts; d) contract evaluation: evaluate social and financial outcomes (impact on public value).

Furthermore, it is stated that the model of development and implementation of technological solutions on the field of public procurement is presented as a limitation to the development of electronic solutions based on the above referenced view.

In Portugal, the model of development of electronic platforms of public procurement, as previously mentioned, is the private model. I.e., technological development tasks and risks are assumed by private entities, managing bodies of the platforms (Ferreira, 2016; Oliveira & Amorim, 2001).

In this sense, will this private model be an obstacle for the implementation of the integrity principle and enhancing transparency in the procurement process? Will the private entities be willing to take risks in

developing solutions that are not included in the legal plan, but considered key to foster an appropriate degree of transparency and integrity in all phases of the procurement cycle to ensure a fair and equitable treatment of potential competitors and contractors?

These issues need to be discussed and reflected, since these depend on new measures to strengthen transparency, fundamental to reduce risk of corruption (OCDE 2009, US, 2014).

5. Threats to Transparency

According to Ferreira, Cunha, Amaral and Camões (2014), with respect to Portugal, the high degree of implementation of e-procurement and the consequent gains in terms of transparency are not yet reflected in the perception of corruption indicators. Their data supports shows that the levels of perceived corruption remain high.

At the European level, Eurobarometer data on corruption (EU, 2014) revealed that more than 50% of companies report corruption in public procurement as a common practice. Results from this survey show that: (i) 32% of companies that submitted tenders in the context of public procurement claim that corruption prevented them from obtaining their tenders; (ii) bureaucracy (21%) and criteria that seem to have been designed to match certain competitors (16%) are identified as the main causes why companies do not compete for public procurement; (iii) more than 40% of companies report there are several illegal practices in public procurement.

In this alignment, the First Anti-Corruption Report of the European Union (2014), which devotes a chapter to the issue of corruption in public procurement, identifies as main problems: (i) specifications drafted with intention of favoring certain competitors; (ii) conflicts of interest at various levels and in various stages; (iii) disproportionate and unjustified award criteria; (iv) unjustified exclusion of competitors; (v) undue recourse to urgent procedures; (vi) insufficient analysis in case of abnormally low prices; (vii) excessive weight of the lowest price criterion (to the detriment of criteria regarding quality of goods/services and execution capacity); (viii) unjustified exemptions from publicizing procedures. This report also concludes that the main risks in terms of corruption are focused on the needs assessment, procurement planning and strategies, definition of evaluation criteria and selection of proposals and management of contract performance.

All these threats to the promotion of transparency and good governance add to the restricted vision of the procurement process underlying the design of e-platforms, fragile organizational culture and learning, disaggregation between legislation and platform functionality; the costs of access to platforms by suppliers (Ferreira, 2016; Ferreira & Amaral, 2016).

As can be seen from the problems and risks pointed out, the need to strengthen transparency is transversal to the whole process, including work practices and organizational behavior and requiring intervention beyond ICT. Therefore, it is concluded that reinforcement of transparency requires intervention at the ICT and decision-making level.

6. Discussion

Based on the Portuguese reality and the recommendations and reports of the OECD and EU, this article discusses the use of ICT as a means of strengthening and promoting transparency in public procurement. It seems consensual that the Portuguese case revealed gains in terms of transparency, at least in certain stages of the public procurement process, namely in submission, opening, analysis and evaluation phases of the proposals.

Since, as highlighted in several reports, platforms do not yet cover all the stages of the procurement process, several problems and risks remain though. Moreover, the risk areas still need to be addressed.

Public procurement has a technical dimension, where ICTs are very useful, but one must not forget the political dimension, the decision-making plan. Technology can help solve problems, but that does not

mean that problems are solved solely the use of technology. The fulfillment of the integrity principle and, thus, improvements of transparency on public procurement policies requires the coordination of technological, political and cultural measures.

Acknowledgment

A study conducted at Research Center in Political Science (UID/CPO/00758/2013) and at Research Center ALGORITMI, University of Minho, and supported by the FCT – Fundação para a Ciência e Tecnologia (Portuguese Foundation for Science and Technology) and the Portuguese Ministry of Education and Science through national funds, namely COMPETE: POCI-01-0145-FEDER-007043.

References

Armstrong, E., (2005), "Integrity, Transparency and Accountability in Public Administration: Recent Trends, Regional and International Developments and Emerging Issues", *United Nations*. [Retrieved September, 2017], https://www.researchgate.net/publication/265064749_Integrity_Transparency_and_Accountability_in_Public_Administration_Recent_Trends_Regional_and_International_Developments_and_Emerging_Issues.

Bertot, J.C., Jaeger, P.T. and Grimes, J.M., (2010), "Using ICTs to create a culture of transparency: E-government and social media as openness and anti-corruption tools for societies". *Government Information Quarterly*, 27 (3), 264-271. [Retrieved September, 2017], http://www.sciencedirect.com/science/article/pii/S0740624X10000201?via%3Dihub.

Boehm, F., (2007), "Anti-corruption Strategies as Safeguard for Public Sector Reforms". *Working Paper prepared for Anti Corruption Training*. [Retrieved April, 2016], http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.489.6602.

Código dos Contratos Públicos – Decreto - Lei n.º 18/2008, de 29 de janeiro. (2008). Diário da República, 1ª série (20). [Retrieved April, 2017], http://www.inci.pt/Portugues/Legislacao/Legislacao/DecLei200818.pdf

Comissão Europeia (CE), (2010), "Livro Verde relativo ao alargamento da utilização da contratação pública eletrónica na UE", *Comissão Europeia*. [Retrieved May, 2015], http://ec.europa.eu/internal_market/consultations/docs/2010/e-procurement/green-paper_pt.pdf.

Diretiva 2004/ 17/ CE do Parlamento e do Conselho, de 31 de Março. (2004). *Comissão Europeia*. [Retrieved May, 2015], http://eur-lex.europa.eu/legal-content/PT/TXT/?uri=celex%3A32004L0017.

Diretiva 2004/ 18/ CE do Parlamento e do Conselho, de 31 de Março. (2004). Comissão Europeia. [Retrieved May, 2015], http://eur-lex.europa.eu/legal-content/pt/TXT/?uri=CELEX%3A32004L0018.

European Commission (EC), (2014), "EU Anti-Corruption Report", *European Commission*. [Retrieved April, 2016], https://ec.europa.eu/home-affairs/sites/homeaffairs/files/e-library/documents/policies/organized-crime-and-human-trafficking/corruption/docs/acr_2014_en.pdf

European Commission (EC), (2013), "Identifying and Reducing Corruption in Public Procurement in the EU – Development of a methodology to estimate the direct costs of corruption and other elements for an EU-evaluation mechanism in the area of anti-corruption", *European Commission*. [Retrieved March, 2016], https://ec.europa.eu/anti-fraud/sites/antifraud/files/docs/body/identifying_reducing_corruption_in_public_procurement_en%20.pdf .

Lambsdorff, J. G. and Nell, M., (2007), "Fighting Corruption with Asymmetric Penalties and Liniency". [Retrieved March, 2016], https://ideas.repec.org/p/zbw/cegedp/59.html

Ferreira, I., (2016), "Modelo de Gestão Integrado dos Contratos Públicos orientados ao Valor Público", *Tese de Doutoramento apresentada à Escola de Engenharia da Universidade do Minho*. [Retrieved September, 2017], http://hdl.handle.net/1822/41510.

Ferreira, I. and Amaral, L.A, (2016), "Public e-Procurement: advantages, limitations and technological "pitfalls", Proceedings of the 9th International Conferences on Theory and Practice of Electronic Governance (ICEGOV2016), ISBN: 978-1-4503-3640-6, 1-3 March 2016, Montevideo, Uruguai. [Retrieved September, 2017], https://dl.acm.org/citation.cfm?id=2910019.2910089 .

Ferreira, I., Cunha, S., Amaral, L.A. and Camões, P., (2014), "ICT for Governance in Combating Corruption: the Case of Public e-Procurement in Portugal", Proceedings of the 8th International Conferences on Theory and Practice of Electronic Governance (ICEGOV2014), ISBN: 978-1-60558-611-3, 27-30 October, Guimarães, Portugal. [Retrieved September, 2017], https://dl.acm.org/citation.cfm?id=2691265.

Hardy, C. and Williams, S., (2006), "Public e-Procurement in Actions: Policies, Pratices and Technologies*", International Federation for Information Processing*. [Retrieved September, 2017], http://link.springer.com/chapter/10.1007/978-3-540-32257-3_27.

Heald, D. (2012) "Why is transparency about public expenditure so elusive*?"*, *International Review of Administrative Sciences,* 78, 1, 30-49. [Retrieved September, 2017], http://journals.sagepub.com/doi/10.1177/0020852311429931

Heald, D. (2006). "Varieties of Transparency*"*, in C.Hood and D. Heald (Eds), *Transparency: The Key to Better Governance?,* Proceedings of the British Academy, Oxoford University Press, 25-43. [Retrieved September, 2017], http://eprints.gla.ac.uk/113659/

Kussim, E. S. and Hussin, H., (2010), "Public e-Procurement: A Research Synthesis", Proceedings of the International Conference on e-Education, e-Business, e-Management and e-Learning *(IEEE Computer Society),* DOI: 10.1109/IC4E.2010.93*.,* 22-24 January, Sanya, China. [Retrieved September, 2017], http://ieeexplore.ieee.org/xpl/login.jsp?tp=&arnumber=5432367&url=http%3A%2F%2Fieeexplore.ieee.org%2Fxpls%2Fabs_all.jsp%3Farnumber%3D5432367.

Lourenço, R.P. (2013). "Transparência para accountability: uma estratégia e uma aplicação ao caso português", Atas da Conferência de Sistemas de Informação, ISBN: 978-989-8132-11-6, 4-5 outubro, Évora, Portugal. [Retrieved September, 2017], file:///Users/gisa/Downloads/eBook_CAPSI%202013%20(1).pdf.

OECD, (2016). Corruption in Public Procurement, OCDE, Paris.

OCDE, (2009) Principles for Integrity in Public Procurement, OCDE, Paris. [Retrieved September, 2017], http://www.oecd.org/gov/ethics/48994520.pdf.

Oliveira, L.M. and Amorim, P.P. (2001), "Public e-procurement", *International Financial Law Review*, 20 (3), 43–47.

Panayiotou, N., Gayialis, S. and Tatsiopoulos, I. (2004), "An e-procurement system for governmental purchasing", *International Journal of Production Economics*, 90, 79–102. [Retrieved September, 2017], https://www.researchgate.net/publication/223885731_An_e-Procurement_System_for_Governmental_Purchasing.

Ramanujam, P. G. (2012), "E-Government: Strategies for Successful e-procurement", I*nternational Journal of Engineering and Management Sciences*, 3(1), 53-59. [Retrieved September, 2017], http://www.scienceandnature.org/IJEMS-Vol3(1)-Jan2012/IJEMS_V3(1)8.pdf

Ronchi, S., Brun, A., Golini, R. and Fan, X. (2010), "What is the value of an IT e-procurement systems?", *Journal of Purchasing & Supply Management,* 16, 131-140. [Retrieved September, 2017],

https://www.researchgate.net/publication/230888505_What_is_the_value_of_an_IT_e-procurement_system.

Rose-Ackerman, S. (2002) Corrupção e Governo, Prefácio.

Schoenherr, T. and Tummala, V.M.R. (2007), "Electronic procurement: a structured literature review and directions for future research", *International Journal of Procurement Management,* 1 (1-2), 8-37. [Retrieved September, 2017], https://scholars.opb.msu.edu/en/publications/electronic-procurement-a-structured-literature-review-and-directi-2

Talero, E. (2001) Electronic Government Procurement: Concepts and Country Experiences, The World Bank.

How To Measure And Predict Degree Of Circularity Thinking in Construction Sector? – Modern Way to Build Competitive Advantage

Pedro Núñez-Cacho, University of Jaén, Jaén, Spain, pnunez@ujaen.es

Jarosław Górecki, UTP University of Science and Technology, Bydgoszcz, Poland, gorecki@utp.edu.pl

Valentín Molina, University of Granada, Granada, Spain, valentinugr@gmail.com

Francisco Antonio Corpas-Iglesias, University of Jaén, Jaén, Spain, facorpas@ujaen.es

Abstract

Nowadays, society demands new and more sustainable production models, seeking the long-term sustainability of the Earth and taking into account both, the scarcity of resources, and the reduction of waste generation. The construction sector is one of the largest waste generators (Esa, Halog and Rigamonti, 2017). The Circular economy (CE) could help this sector to diminish their environmental impact. One of the issues in order to develop the CE is the need for measuring the degree to which circular economy is implemented in construction projects. However, for the moment, there is no scale of measurement that can resolve this issue.

For this reason, this article has developed a scale of measurement of the degree of circularity for the construction sector. First, it was designed a scale-based literature review on the topic, and after that, the Monte Carlo simulation method was proposed to predict values. The scale is based on an analysis in five phases of construction projects: design, production of building materials, construction processes, maintenance and liquidation. Then, three levels of consideration are proposed in the model: organization, process, and workgroup. Results show that the scale can be useful for measuring the circularity thinking in the construction sector what, in turn enables to create more effective strategies by construction companies.

Keywords: Circular economy, building sector, scale measurement, organizational behavior.

Introduction

Building has been a sustainable sector since ancient times. Both materials and building techniques represented efficient construction, featuring ecologically designed buildings and eco-friendly materials with high reusability and recyclability. This model of construction was circular. However, the adoption of more resilient and durable building materials during the 20th century converted the sector into one of the most environmentally harmful, unsustainable and waste-generating industries in the world.

Fortunately, businesses worldwide have started to express increasing concern about environmental issues. In this context, the building sector, being one of the larger emitters of harmful gases, generators of waste, and consumers of resources (Esa, Halog and Rigamonti, 2017), plays a relevant role. The main causes of the building sector's environmental impact are found in the consumption of non-renewable resources and the generation of contaminant residues, both of which are increasing at an accelerating pace. The sector's primary effect is the accelerated destruction of the stock of natural capital (Wadel, Avellaneda and Cuchí, 2010; Lo Presti, 2013).

Modern materials, which are useful for construction and enable excellent building features, have the side effect of dramatically increasing the building sector's environmental impact. Furthermore, the

maintenance phase that follows a construction also has a significant environmental footprint. It is also necessary to focus on deconstruction, which is a key aspect for minimizing waste, so as to create more effective strategies (Esa, Halog and Rigamonti, 2017). Furthermore, the reuse of elements (e.g., parts of buildings) requires deep consideration of their quality, their usefulness in terms of dimensions (do they fit the new place?) and marketing issues (do people want to buy used materials?).

For these reasons, the circular economy (CE) can be presented as a business model of sustainability that is especially useful in the building sector, so it is necessary to create a specific framework for this business model, providing answers to questions about how to implement the CE in the building industry? However, there is a lack of circularity indicators that would allow us to measure the circularity thinking in the enterprises. Lewandowski's (2016) literature review on the CE reveals only eight references which were focused on evaluation models, some of which analyzed a scale of measurement of the CE. Besides, the indicators introduced by other works such as that of Lihong and Hui (2011) are generic, considering, e.g., emission levels or energy consumption. This scarcity of scales is acting as an obstacle to the development of the circular economy in construction companies. This research was aimed to create a measurement model of circularity thinking in the building sector based on a set of indicators, which would allow businesses to manage the degree of implementation of the CE, collecting information from the project life cycle.

Therefore, the main contribution of this paper is a CE measurement scale specifically designed for construction projects. It will be a useful method to evaluate the degree of implementation of CE, generating valuable information not only for the company (contractor), but also for other project stakeholders. This can be a step towards developing CE which is really useful in practice.

Theoretical Framework

Industrial Ecology theory as base of circular economy in building sector

Ecology is concerned as 'creation, use, and management of resources for the adaption, human development, and sustainability of environments' (Bubolz and Sontag, 1993), focusing on the interactions between humans (individuals, groups, and society) and the environment. The entire system comprises the cultural norms and beliefs that influence the other systems, which represent the framework for legislative changes. An ecological transition occurs whenever a person's position in the ecological environment is altered as the result of a change in role, setting or both (Bronfenbrenner, 1979; Bauer and Dolan, 2011).

This view is enriched and focused on the industry through industrial ecology theory, a new framework that is useful to describe sustainable building, which pays attention to designs, flows derived from the building process, energies used, and outputs generated (Boons *et al.*, 2017). The main assumptions of this theory are (Ehrenfeld, 1997) as follows. First, the Earth is configured as a closed ecological system in which the scale and design of development are inconsistent with long-term ecological survival. Second, human society and natural ecosystems have co-evolved; thus, nature has now an intrinsic value, and the ethical and moral underpinnings of economic actions overlook concerns for the world. Third, sustainability means independently maintaining stocks of human and natural capital. Fourth, policy strategy focuses on several issues, such as an economy based on functionality, moral and ethical transformation, technological realism, precautionary management of uncertainty, and the life cycle framework, all of which are useful for closing material loops in deconstruction (Kibert, 2007; Silvestre, De Brito and Pinheiro, 2014).

Tibbs (1993) articulated a framework for industrial ecology that was adapted to the building sector. Thus, industrial ecology is a strategic framework that can be used as a guide for the development of building practices. In the concept, the impacts of the design phase play a key role, guiding the flow of materials in and out of the environment (Hao *et al.*, 2017). It is crucial to consider buildings in their whole life cycle. According to Lenox and Ehrenfeld (1997), the first phase of design is a conscious, explicit activity to

establish new forms of technology, organizational or industrial structures, human competence, and rules. The design must be the starting point that allows the implementation of the CE in the building sector. Moreover, the current building misdirection is quite clear so the implementation of this new economic model based on circularity has to be done by generating a framework useful for practitioners. Thus, four paths are useful through which the CE can be applied to the building design process, based on the model of Tibbs (1993) and Ehrenfeld (1997). First path is to improve the current metabolic pathway of building processes and material used. The second one involves the need to implement the principles of CE in the industrial ecosystem. Third path dematerializes building output, keeping in mind the idea of the product as a service, Cradle to Cradle (McDonough *et al.*, 2003; Mulhall and Braungart, 2010; Van Dijk, Tenpierik and Van Den Dobbelsteen, 2014), and managing resources carefully. The last one systematizes the pattern of energy used (Braungart, McDonough and Bollinger, 2007).

The building sector in Europe and the Circular Economy

The building sector in Europe is strategic for the economies of the most European countries. In 2014, 1,545,460 million euros were invoiced, generating employment for 12,730,700 people[1].

Europe's building industry is highly fragmented and often local, possibly because of each country's legal restrictions. Because of the high inflow of physical goods and personal interaction, the employment ratio in the building industry has remained relatively stable in the various states of the European Union (EU). It usually ranges from 4.5% to 6.5% of total employment.

Currently, the amount of waste generated in the EU appears to have declined: approximately 2.5 billion tonnes of waste (or approximately 5 tonnes per capita) continue to be generated each year (according to: http://www.europarl.europa.eu/RegData/etudes/BRIE/2016/573899/EPRS_BRI(2016)573899_EN.pdf). Some EU members generate significant amounts of recyclable waste in the building sector (the Netherlands, Germany, France, Italy), whereas other countries' recycling share is lower. Figure 1 shows the total waste generation in European countries in 2014 according to Eurostat, Figure 2 shows waste generation decomposed by sector, and figure 3 the level of recycling.

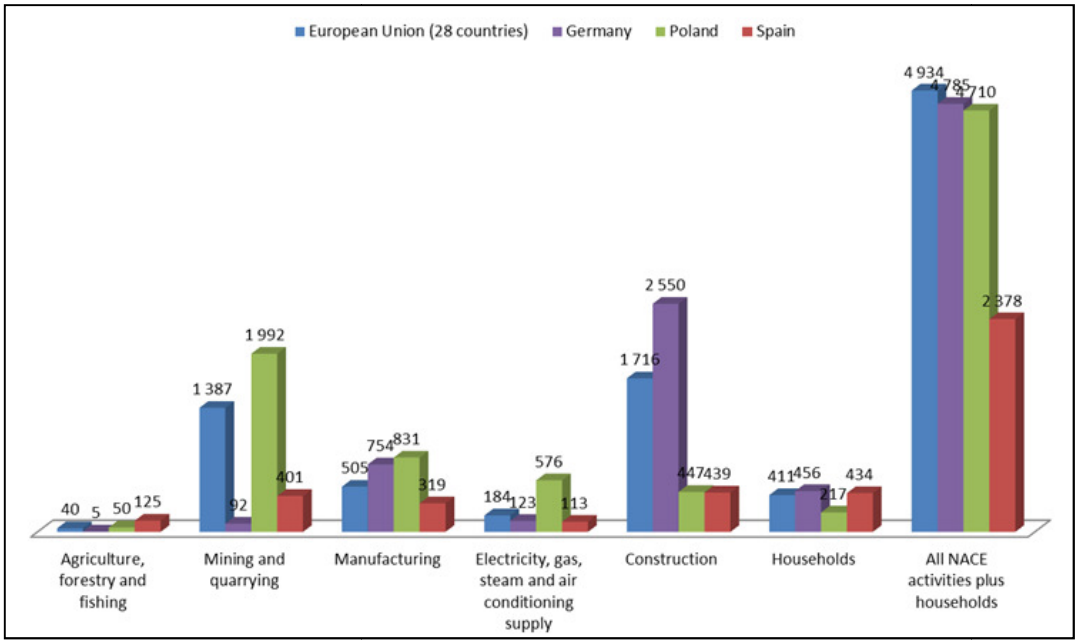


Fig. 1: Generation of total waste in Europe in kilograms per capita (2014)

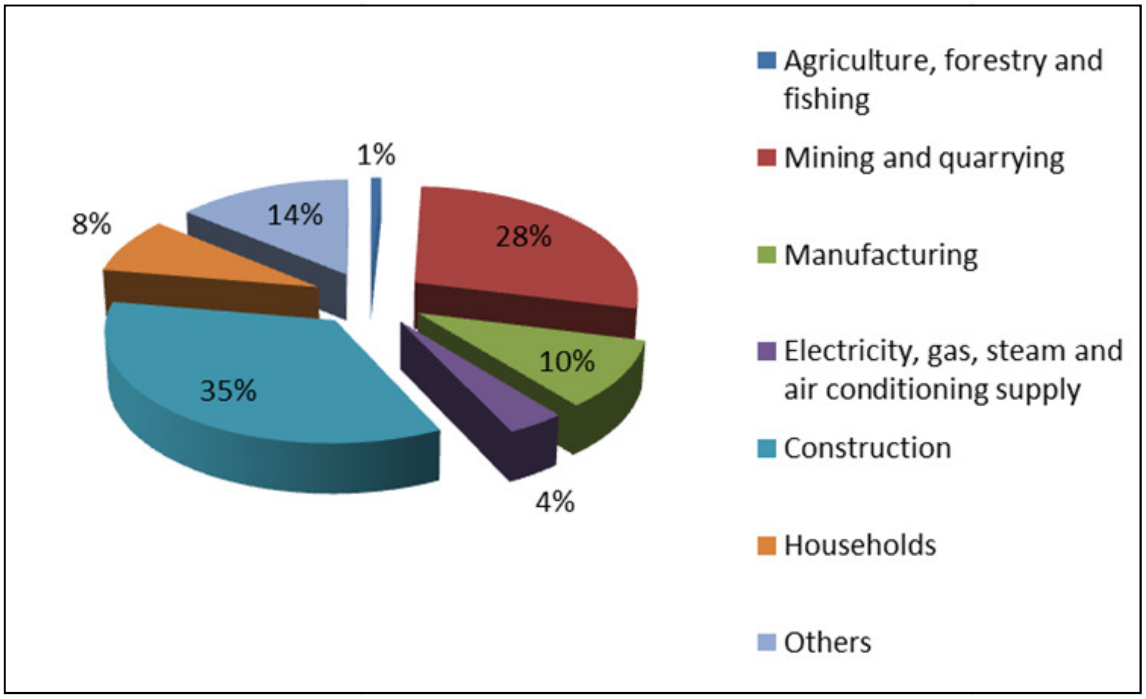


Fig. 2: Breakdown of total waste generated in European Union in 2014 by sector

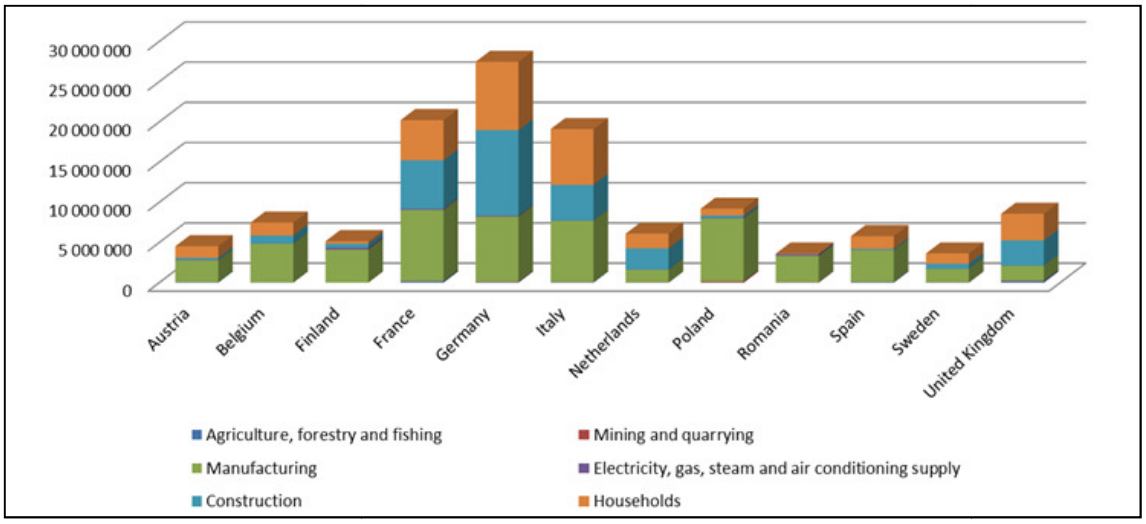


Fig. 3: Generation of recyclable waste by sector in Europe in 2014

Building sector is characterized by both its intensive energy and water consumption and its generation of negative externalities in the form of environmental pollution. The sector itself is aware that it must change its management model to become more sustainable and that it can comply with the new approach to the 'sustainable use of resources' set out in the European Building Products Regulations, which have been in force since 2013 and state that products' environmental declarations should be used when assessing the sustainable use of resources and the environmental impact of building works.

In addition, the EU is considering initiatives to the use of environmental variables as factors as a basis for establishing public procurement criteria. It is worth noting the EPD (Environmental Product Declaration) methodology, whose purpose is to provide quantitative information about a product or service's environmental impacts throughout its life cycle. In addition, the initiative regarding products' environmental footprint (PEF) attempts to raise awareness and value the environmental impact of the inputs that are incorporated into the production or building process. Thus, taking all of this into account, the sector must consider the transition and progressive incorporation of the new paradigm of the CE, approved by the European Commission, which determines, not only the efficient use of resources in environmental terms, but also the minimization of resources that are consumed, reincorporating them into a new productive or other type of process in which they are considered a productive factor. In this way, the building industry will contribute to a cyclical process in which product life will be as long as possible.

A Proposal for an Indicator of the Ce Based On an Analysis of the Building Life Cycle

Scale Inputs

In order to have the initial indicators of the scale, a systematic review of the literature has been carried out, whose purpose has been to obtain a complete view of the existing research on the subject. In this paper, it was presented the research that has been done so far, after having used explicit methods to narrow the search and to evaluate in a critical and justified way each of the related studies (Vázquez and López, 2011). The basic criterion is to show valid and applicable evidence for future research. The review should be methodological, transparent and reproducible with the aim of enhancing the knowledge base to make appropriate decisions (Tranfield, Denyer and Smart, 2003).

Review is a fundamental scientific activity and its logic is based on several premises. The first is that the large amount of existing information should be reduced to smaller, more manageable units to facilitate their understanding and management. In this way it will be possible to effectively use the previous scientific evidence, identifying key works and future lines of research. The second is that the review should show evidence of the process developed, it should be auditable and repeatable so that other researchers who follow the search and analysis guidelines can perform comparable work, avoiding search bias and analysis, and the third is that the review should summarize the evidence (Tranfield, Denyer and Smart, 2003; Rousseau, Manning and Denyer, 2008).

The research was based on the approaches of Vázquez and López (2011), and Nuñez-Cacho et al. (2012) defining the aspects to be investigated, developing subsequently the search in the bibliographic databases, i.a. ProQuest, limiting the results to a sample that includes the main journals in the study area. Specifically, based on the search terms: "Buiding", "Circular Economy", "Measurement Scale". A list of researched journals appears in the references section. Moreover, each authors analysed the content of each of the selected articles in order to identify the indicators that were to be introduced. It has to be underlined that in the research were involved professional experts responsible for construction projects. They were responsible i.a. with the authors for choosing the circularity indicators and for estimating parameters used in the simulation model. The selected indicator group was classified according to the Life Cycle Model. The selected indicators, and their desired value are shown in table 1, 2 and 3.

Table 1: Circular economy indicators in the construction sector: Organizational level

Level	Perspective	Indicators (Measures)	Desired value of the indicator (Target)	Justification
ORGANISATION	DE	'Designing for deconstruction' strategies - percentage	100%	Majority of experts pointed it out
	MM	"Better …" initiatives for sustainable production - percentage	80%	Majority of experts pointed it out
	CP	Complement of the Energy Use Intensity[2] index - percentage	90%	Majority of experts pointed it out
	MA	Building management strategies - percentage	80%	Majority of experts pointed it out
	EL	Decision accuracy of demolition time and transition to another loop - percentage	70%	Majority of experts pointed it out
DE – design phase, MM – manufacture of materials phase, CP – construction process phase, MA – maintenance phase, EL – end-of-life phase, CE – circular economy [2] - Complement of the Energy Use Intensity = 1-EC/GVA, where: EC – Energy Costs, GVA – Gross Value Added. Both EC and GVA are estimated for the whole organisation on the basis of particular projects				

Table 2: Circular economy indicators in the construction sector: Process level

Level	Perspective	Indicators (Measures)	Desired value of the indicator (Target)	Justification
PROCESSES	DE	Designs prepared in full BIM standard - percentage	100%	Majority of experts pointed it out
	MM	Continual improvement in CE (management control system) - percentage	90%	Majority of experts pointed it out
	CP	Construction site waste sorting - percentage	100%	Majority of experts pointed it out
	MA	Processes based on BMS - percentage	80%	Majority of experts pointed it out
	EL	Decision accuracy of demolition methods - percentage	90%	Majority of experts pointed it out
DE – design phase, MM – manufacture of materials phase, CP – construction process phase, MA – maintenance phase, EL – end-of-life phase, BIM – Building Information Modelling, CE – circular economy, BMS – Building management system				

Table 3: Circular economy indicators in the construction sector: Workgroup level

Level	Perspective	Indicators (Measures)	Desired value of the indicator (Target)	Justification
WORKGROUP	DE	'Close loop' instructions for designers - percentage	70%	Majority of experts pointed it out
	MM	More sustainable sources (reused components, recycled and controlled virgin feedstock) - percentage	100%	Majority of experts pointed it out
	CP	Waste collected for reuse and recycle - percentage	40%	Majority of experts pointed it out
	MA	CE / BMS instructions based on BIM - percentage	90%	Majority of experts pointed it out
	EL	Decision accuracy of demolition techniques - percentage	90%	Majority of experts pointed it out
DE – design phase, MM – manufacture of materials phase, CP – construction process phase, MA – maintenance phase, EL – end-of-life phase, BIM – Building Information Modelling, CE – circular economy, BMS – Building management system				

Method: Deterministic calculation

The environmental impacts of building are primarily evaluated on the basis of the life cycle assessment, which enables the examination of all stages in the product life cycle (Jiménez Rivero, Sathre and García Navarro, 2016; Shadram *et al.*, 2016; Nasir *et al.*, 2017). A theoretical framework for waste minimization using the concept of the CE in the life cycle of the projects has been proposed (Esa, Halog and Rigamonti, 2017), which observes the main principles of Industrial Ecology.

A sustainable life cycle consists of five phases: the sustainable design process; the sustainable production of sustainable materials and equipment; the sustainable building process; sustainable maintenance; and sustainable liquidation, meaning the conversion of outputs into the inputs of reuse, remanufacturing or recycling. These phases involve three different levels of study: organizational, meaning decisions related to planning and organizing in the company; processes, meaning decisions regarding the processes of the building; and workgroup, meaning decisions related to the worker level.

The model proposed in this paper can be useful for measuring the circularity thinking in a construction company. The following concept represents deterministic calculation of the Circular Economy Index (values: 0 - 100%) understood as a total performance of the company in terms of the CE.

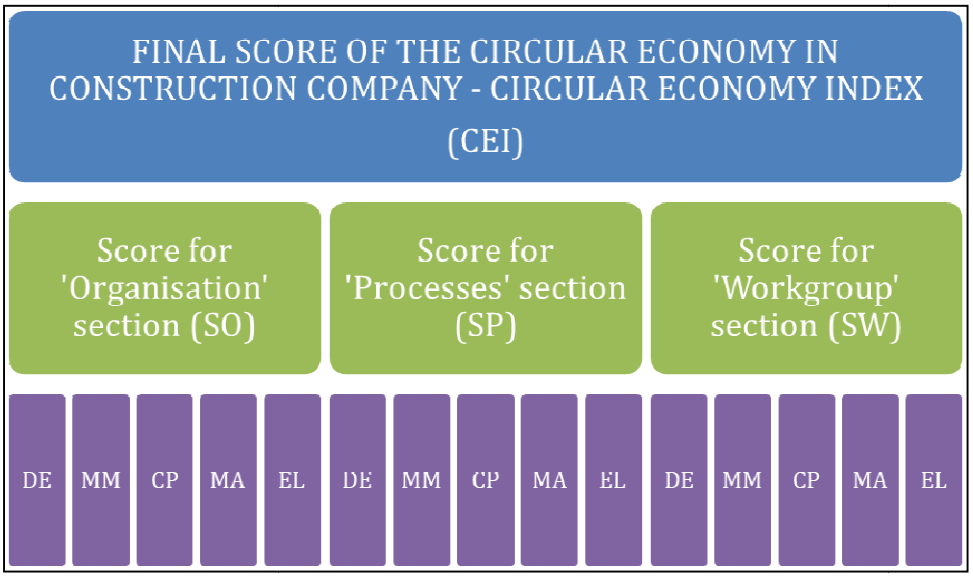


Fig. 4: Conceptual model of measuring circularity thinking in construction companies

The above figure shows a conceptual model of measuring company's circularity thinking, which is based on the formula described by the following equation:

$$CEI = \text{Arithmetic mean}(SO;SP;SW) = \text{Arithmetic mean}(\text{Weighted arithmetic mean}(SO\_DE;SO\_MM;SO\_CP;SO\_MA;SO\_EL);\text{Weighted arithmetic mean}(SP\_DE;SP\_MM;SP\_CP;SP\_MA;SP\_EL);\text{Weighted arithmetic mean}(SW\_DE;SW\_MM;SW\_CP;SW\_MA;SW\_EL)) \quad (1)$$

where:
CEI – Circular Economy Index
SO – Score for 'Organization' section
SP – Score for 'Processes' section
SW – Score for 'Workgroup' section

SO_DE – Score for 'Design' level in 'Organization' section
SO_MM – Score for 'Manufacture of materials' level in 'Organization' section
SO_CP – Score for 'Construction' level in 'Organization' section
SO_MA – Score for 'Maintenance' level in 'Organization' section
SO_EL – Score for 'End-of-life' level in 'Organization' section

SP_DE – Score for 'Design' level in 'Processes' section
SP_MM – Score for 'Manufacture of materials' level in 'Processes' section
SP_CP – Score for 'Construction' level in 'Processes' section
SP_MA – Score for 'Maintenance' level in 'Processes' section
SP_EL – Score for 'End-of-life' level in 'Processes' section

SW_DE – Score for 'Design' level in 'Workgroup' section
SW_MM – Score for 'Manufacture of materials' level in 'Workgroup' section
SW_CP – Score for 'Construction' level in 'Workgroup' section
SW_MA – Score for 'Maintenance' level in 'Workgroup' section
SW_EL – Score for 'End-of-life' level in 'Workgroup' section

Method: Probabilistic estimation

This section explains the Monte Carlo simulation method used to analyse the CE in the building sector. The simulation is a powerful technique to analyse and solve complex problems. It is a technique that imitates the operation of with a system of the real world that evolves over time. The simulation takes the shape of a set of suppositions about the operation of the system, expressing through mathematics the relationships between system components (Winston, 2008).

The Monte Carlo simulation is a technique that generates a random variable based on probability distributions. Because of its flexibility, most assumptions can be relaxed so that operating rules, including policies and components ageing processes, can be accounted for in the model (Zio, 2013). After defining a parametric model, saving the values begins the simulation process. Next, the iterative process is repeated thousands of times until the moment that each rank becomes a frequency distribution, allowing us to evaluate descriptive statistics such as variance, confidence, limits, and so on (Tate, 2012).

The output of the Monte Carlo simulation proposed in this paper is a probability distribution for the final result, showing a degree of the enterprise's involvement in the CE. Monte Carlo simulations have been used to research many aspects of not only enterprises and projects (Dutra, Ribeiro and de Carvalho, 2014; Mangla, Kumar and Barua, 2014; González Dan *et al.*, 2016) but also sustainability issues (Olaru, Şandru and Pirnea, 2014; Arnold and Yildiz, 2015; Pask *et al.*, 2017). However, its previous applications, for example, in the field of economics, do not concentrate on the CE, particularly the construction sector. Such a possibility is discovered in this paper.

The simulations run according to the following equation:

$$CES = \frac{\frac{\sum_{i=1}^{5} w_i \cdot x_i}{\sum_{i=1}^{5} w_i} + \frac{\sum_{j=1}^{5} w_j \cdot x_j}{\sum_{j=1}^{5} w_j} + \frac{\sum_{k=1}^{5} w_k \cdot x_k}{\sum_{k=1}^{5} w_k}}{n} \quad (2)$$

where:
CES – Circular Economy Scale
w_i – weights of particular indicators in 'Organization' section
x_i – set of probabilistic indicator values in 'Organization' section
w_j – weights of particular indicators in 'Processes' section
x_j – set of probabilistic indicator values in 'Processes' section
w_k – weights of particular indicators in 'Workgroup' section
x_k – set of probabilistic indicator values in 'Workgroup' section
n – number of sections (n=3)

The parameters x_i, x_j and x_k are input random variables that affect the probabilistic results of the construction enterprise maturity in terms of the CE. The probability distributions of the variables and their statistical properties may be input from a database or may be specified by experts. The probability distributions, which are established for each random variable, enable simulation of the corresponding random numbers. The Circular Economy Scale (CES) is generated in subsequent iterations by values of the input variables. After each iteration, the output is different because each time a new draw is performed, the CES values gained in the simulation, after a defined number of iterations, create a random variable f.

Multiple iterations allow to calculate the probability of the construction enterprise maturity in terms of the CE and thus the reliability of the deterministic estimation of this indicator. The simulations were conducted with an add-in called "@RISK" Risk Analysis Add-in for Microsoft Excel Version 7.5.1: Industrial Edition.

Results of the simulation

The indicators were grouped into three different levels - organizational level, processes and workgroup, looking for the best indicator selected by experts and authors from the literature review, of each phase of the life cycle. The key indicators at the organizational level with their desired values are shown in Table 1, at process level in Table 2, and at work-group level in table 3.

Table 4 shows calculation results of the Circular Economy Index (CEI). In the sample case, its value is 58,78%.

Table 4: CEI calculation results

YEAR:	2016	STAKEHOLDER:	Designer			Manufacturer			Contractor			Investor					
		NO. / PHASE:	DESIGN	target	w_i	MANUFACTURE OF MATERIALS	target	w_i	CONSTRUCTION PROCESS	target	w_i	MAINTENANCE	target	w_i	END-OF-LIFE / DEMOLITION	target	w_i
ORGANISATION	SCORE:	1	0,3	1	1												
	0,52	2				0,8	0,8	1									
	TARGET:	3							0,7	0,9	0,9						
	0,86	4										0,15	0,8	1			
	PERFORMANCE:	5													0,6	0,7	0,5
	60,67%		0,24	0,8		0,56	0,56		0,63	0,81		0,09	0,48		0,3	0,35	
PROCESSES	SCORE:	1	0,8	1	1												
	0,63	2				0,8	0,9	1									
	TARGET:	3							0,7	1	0,8						
	0,92	4										0,15	0,8	1			
	PERFORMANCE:	5													0,75	0,9	0,6
	68,85%		0,48	0,6		0,56	0,63		0,56	0,8		0,105	0,56		0,45	0,54	
WORKGROUP	SCORE:	1	0,3	0,7	0												
	0,61	2				0,8	1	1									
	TARGET:	3							0,7	0,4	1						
	0,76	4										0,15	0,9	1			
	PERFORMANCE:	5													0,75	0,9	0,4
	80,43%		0,09	0,21		0,76	0,95		0,665	0,38		0,075	0,45		0,3	0,36	
CLOSING LOOP 58,78%		<- FINAL SCORE OF THE CIRCULAR ECONOMY IN CONSTRUCTION COMPANY															

The deterministic calculation was followed by a probabilistic estimation of the Circular Economy Scale (Figure 5).

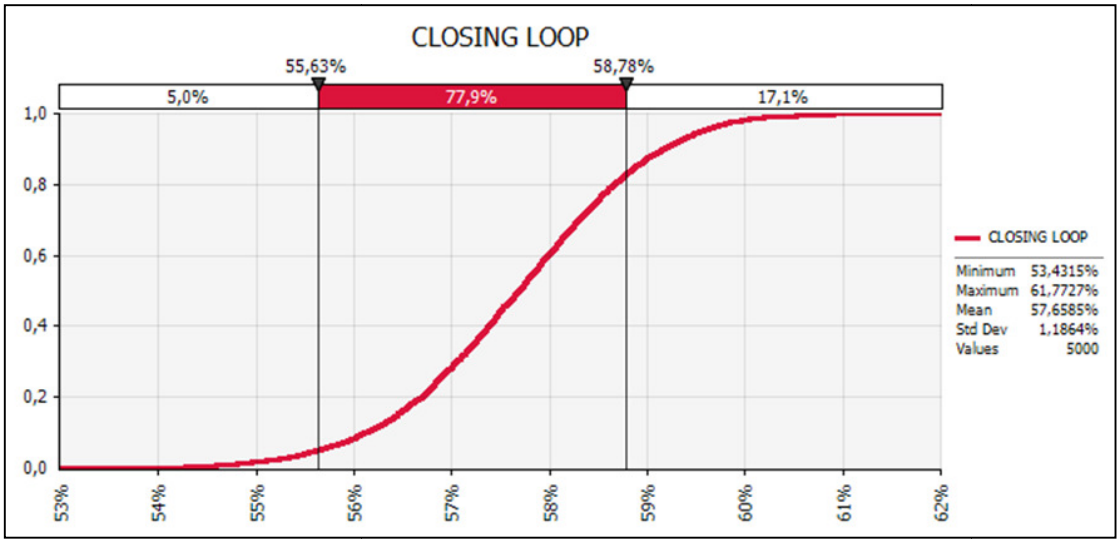


Fig. 5: Cumulative distribution of the CES after 5000 iterations

The simulations were conducted in "@RISK" during 5000 pre-set iterations. For the same case as for deterministic values, a level of 58,78% in Circular Economy Index can be reached only in 17,1% configurations what can be treated as a reliability of the deterministic estimation of the Circular Economy Index.

Discussion

The construction sector needs to undertake profound reforms to minimize its negative externalities, particularly in the areas of waste generation and resource management, which will ultimately result in a reduction in its environmental impact.

Therefore, the transition to another model of production such as the CE is not a question of social responsibility alone, but instead has become a strategic factor that guarantees the company's future continuity. In this scenario, the CE is shown as a model upon which the construction sector can rely to achieve its environmental impact reduction objectives.

A new paradigm guarantees the maximum use of resources and their biodegradability. The consideration of resources and technological nutrients leads us to consider the outputs of production processes as future inputs in other processes. The ideas of reducing, reusing and recycling are the basis of the new productive systems. Their application will translate into future sustainability. Moreover, public administrations, companies and institutions that seek sustainability have the right to ask companies to build their facilities in a manner that applies the CE in their processes. The problem is that there is no scale that allows us to measure the degree to which the CE is implemented.

To resolve this issue, a scale of desirable indicators of the company's circularity thinking was prepared. However, the application of life cycle theory to the building sector allows to establish 5 phases in which circularity thinking of the company is considered: the design phase, the manufacture of materials phase, the construction process phase, the maintenance phase, and the end-of-life phase. From practical point of view, it is easier to minimize the environmental impact in a systematic manner. In addition, it is useful to establish the level of the decisions, distinguishing between the organizational level, processes, and workgroup. Measuring the degree of the implementation of CE in each phase, the companies can be ranked, allowing businesses and administrations to evaluate the sustainability and create more effective strategies.

After the design of the scales, a Monte Carlo simulation method was used to evaluate the reliability of the CE measure. The results indicate that this scale will be useful to assess and evaluate each building project's environmental impact. The results show the relevance of each indicator and the desirable target, keeping in mind both each phase and each level.

First, the design phase indicators as design thinking on deconstruction strategies are a key indicator, with 100% being a desirable value (at the organizational level); in addition, the scale uses indicators related to design based on the full BIM (Building Information Modelling) standard (at the process level), 100% being the desirable value; indicators of 'Closed loop' instruction for designer (at the workgroup level) are also relevant; the desired value of this group would be 70% of fulfilment.

Second, in the phase of material manufacturing, the initiatives for sustainable production are a key indicator of the CE at the organizational level, and the desirable value is 80%. Moreover, continual improvement in the application of the CE at the process level is relevant, requiring a value of 90%. Focusing on the workgroup level, the indicator uses more sustainable sources, reuses components, recycles, and applies 3R (Reduce-Reuse-Recycle) ideas to the process; its target is 100%.

Third, in the phase of the construction process, focusing on the organizational level, it is desirable for the indicator energy use intensity to show a value of 90%, whereas at the process level, a percentage of

construction site waste generated must be established, with a value target for this item of 100% of fulfilment. However, at the workgroup level, we need to measure the level of waste and components recollected for reuse and recycling by applying 3R principles. The target for this indicator is 40%.

Fourth, in the phase of building maintenance, analysed at the organizational level, the management of building strategies is a key indicator with a value of 80%; processes based on BIM at the process level have an expected value of 80%, and instructions based on CE and BIM at the workgroup level have a desirable value of 90%.

Finally, the phase 'end of life' includes, at the organizational level, the indicator decision accuracy of demolition time and transition to another loop, with an expected value of 70%; the decision accuracy of demolition methods regarding the process level has an expected value of 90%, and the indicator of the decision accuracy of demolition techniques at the workgroup level has an expected value of 90%.

Conclusion

Based on the results, the paper contributes to developing the transition of the linear model to the circular model. Low scale values imply building companies working in the linear model, whereas high values of the final score for the CE show that companies make a commitment to implementing this model. Therefore, this paper's primary contribution lies in designing a scale of measurement of the degree of CE implementation, which will be useful for both government and businesses by facilitating the transition to the CE. Besides, a use of Monte Carlo simulations to rate construction enterprises in terms of their propensity to conduct activities based on the CE concept is an innovative solution. This may be treated as other of the paper's contributions.

Limitations and Future Research Line

This paper has the limitations derived from the use of a simulation method. It could be solved through a quantitative study using a Confirmatory Factor Analysis, which allows to establish the statistical properties of the scale. Another limitation originates in the horizontal nature of the research. The indicators are gathered at one point in time. It would be worthwhile analysing the circularity from an evolutionary perspective. Such an approach would use extended periods to isolate temporal phenomena that could distort the outcome. The limitations and the depth of the study have led to a series of future research proposals that are set out below. It is believed that it would be interesting to design a scale, not for a specific moment in time, but over a broader period of time and using longitudinal analysis to observe the evolution of the indicators.

References

Arnold, U. and Yildiz, Ö. (2015) 'Economic risk analysis of decentralized renewable energy infrastructures – A Monte Carlo Simulation approach', *Renewable Energy*, 77, pp. 227–239. doi: 10.1016/j.renene.2014.11.059.

Bauer, J. W. and Dolan, E. M. (2011) *Rural Families and Work : Context and Problems*. Edited by J. W. Bauer and E. M. Dolan. Springer-Verlag New York (International Series on Consumer Science). doi: 10.1007/978-1-4614-0382-1.

Boons, F., Chertow, M., Park, J., Spekkink, W. and Shi, H. (2017) 'Industrial Symbiosis Dynamics and the Problem of Equivalence: Proposal for a Comparative Framework', *Journal of Industrial Ecology*, 21(4), pp. 938–952. doi: 10.1111/jiec.12468.

Braungart, M., McDonough, W. and Bollinger, A. (2007) 'Cradle-to-cradle design: creating healthy emissions - a strategy for eco-effective product and system design', *Journal of Cleaner Production*, 15(13–14), pp. 1337–1348. doi: 10.1016/j.jclepro.2006.08.003.

Bronfenbrenner, U. (1979) *The ecology of human development: Experiments by design and nature*, *Harvard University Press*.

Bubolz, M. M. and Sontag, M. S. (1993) 'Human Ecology Theory', in *Sourcebook of Family Theories and Methods: A Contextual Approach*, pp. 419–448.

Van Dijk, S., Tenpierik, M. and Van Den Dobbelsteen, A. (2014) 'Continuing the building's cycles: A literature review and analysis of current systems theories in comparison with the theory of Cradle to Cradle', *Resources, Conservation and Recycling*, pp. 21–34. doi: 10.1016/j.resconrec.2013.10.007.

Dutra, C. C., Ribeiro, J. L. D. and de Carvalho, M. M. (2014) 'An economic–probabilistic model for project selection and prioritization', *International Journal of Project Management*, 32(6), pp. 1042–1055. doi: 10.1016/j.ijproman.2013.12.004.

Ehrenfeld, J. R. (1997) 'The Importance of LCAs—Warts and All - Ehrenfeld - 2008 - Journal of Industrial Ecology - Wiley Online Library', *Journal of Industrial Ecology*, 1(2), pp. 41–49. doi: 10.1162/jiec.1997.1.2.41.

Esa, M. R., Halog, A. and Rigamonti, L. (2017) 'Developing strategies for managing construction and demolition wastes in Malaysia based on the concept of circular economy', *Journal of Material Cycles and Waste Management*, 19(3), pp. 1144–1154. doi: 10.1007/s10163-016-0516-x.

González Dan, J. R., Guix, A., Martí, V., Arnaldos, J. and Darbra, R. M. (2016) 'Monte Carlo simulation as a tool to show the influence of the human factor into the quantitative risk assessment', *Process Safety and Environmental Protection*, 102, pp. 441–449. doi: 10.1016/j.psep.2016.04.024.

Hao, Q., Tian, J., Li, X. and Chen, L. (2017) 'Using a hybrid of green chemistry and industrial ecology to make chemical production greener', *Resources, Conservation and Recycling*, 122, pp. 106–113. doi: 10.1016/j.resconrec.2017.02.001.

Jiménez Rivero, A., Sathre, R. and García Navarro, J. (2016) 'Life cycle energy and material flow implications of gypsum plasterboard recycling in the European Union', *Resources, Conservation and Recycling*, 108, pp. 171–181. doi: 10.1016/j.resconrec.2016.01.014.

Kibert, C. J. (2007) 'The next generation of sustainable construction', *Building Research and Information*, pp. 595–601. doi: 10.1080/09613210701467040.

Lenox, M. and Ehrenfeld, J. (1997) 'Organizing for effective environmental design.', *Business Strategy & the Environment (John Wiley & Sons, Inc)*. John Wiley & Sons, Inc., 6(4), pp. 187–196.

Lewandowski, M. (2016) 'Designing the business models for circular economy-towards the conceptual framework', *Sustainability (Switzerland)*. doi: 10.3390/su8010043.

Lihong, W. and Hui, Z. (2011) 'Development of circular economy and optimization of industrial structure for Shandong Province', *Energy Procedia*, 5, pp. 1603–1610. doi: 10.1016/j.egypro.2011.03.273.

Mangla, S. K., Kumar, P. and Barua, M. K. (2014) 'Monte Carlo Simulation Based Approach to Manage Risks in Operational Networks in Green Supply Chain', *Procedia Engineering*, 97, pp. 2186–2194. doi: 10.1016/j.proeng.2014.12.462.

McDonough, W., Braungart, M., Anastas, P. T. and Zimmerman, J. B. (2003) 'Peer Reviewed: Applying the Principles of Green Engineering to Cradle-to-Cradle Design', *Environmental Science & Technology*, 37(23), p. 434A–441A. doi: 10.1021/es0326322.

Mulhall, D. and Braungart, M. (2010) 'Cradle to Cradle for the built environment', *Ekonomiaz No. 75*, (4), pp. 182–193. Available at: https://ideas.repec.org/a/ekz/ekonoz/2010415.html.

Nasir, M. H. A., Genovese, A., Acquaye, A. A., Koh, S. C. L. and Yamoah, F. (2017) 'Comparing linear and circular supply chains: A case study from the construction industry', *International Journal of Production Economics*, 183, pp. 443–457. doi: 10.1016/j.ijpe.2016.06.008.

Núñez-Cacho, P., Grande, F. A. and Pedrosa, C. (2012) 'The challenge of human resource management for the family business: state of the question', *El reto de la dirección de recursos humanos para las empresas familiares: estado de la cuestión*, 8(23), pp. 139–162.

Olaru, M., Şandru, M. and Pirnea, I. C. (2014) 'Monte Carlo Method Application for Environmental Risks Impact Assessment in Investment Projects', *Procedia - Social and Behavioral Sciences*, 109, pp. 940–943. doi: 10.1016/j.sbspro.2013.12.568.

Pask, F., Lake, P., Yang, A., Tokos, H. and Sadhukhan, J. (2017) 'Sustainability indicators for industrial ovens and assessment using Fuzzy set theory and Monte Carlo simulation', *Journal of Cleaner Production*, 140, pp. 1217–1225. doi: 10.1016/j.jclepro.2016.10.038.

Lo Presti, D. (2013) 'Recycled Tyre Rubber Modified Bitumens for road asphalt mixtures: A literature review', *Construction and Building Materials*, 49, pp. 863–881. doi: 10.1016/j.conbuildmat.2013.09.007.

Rousseau, D. M., Manning, J. and Denyer, D. (2008) 'Evidence in management and organizational science: Assembling the field's full wieght of scientific knowledge through synthesis', *The Academy of Management Annals*, 2(1), pp. 475–515.

Shadram, F., Johansson, T. D., Lu, W., Schade, J. and Olofsson, T. (2016) 'An integrated BIM-based framework for minimizing embodied energy during building design', *Energy and Buildings*, 128, pp. 592–604. doi: 10.1016/j.enbuild.2016.07.007.

Silvestre, J. D., De Brito, J. and Pinheiro, M. D. (2014) 'Environmental impacts and benefits of the end-of-life of building materials - Calculation rules, results and contribution to a "cradle to cradle" life cycle', *Journal of Cleaner Production*, 66, pp. 37–45. doi: 10.1016/j.jclepro.2013.10.028.

Tate, E. (2012) 'Social vulnerability indices: A comparative assessment using uncertainty and sensitivity analysis', *Natural Hazards*, 63(2), pp. 325–347. doi: 10.1007/s11069-012-0152-2.

Tibbs, H. (1993) *Industrial ecology: an environmental agenda for industry*. Global Business Network.

Tranfield, D., Denyer, D. and Smart, P. (2003) 'Towards a Methodology for Developing Evidence-Informed Management Knowledge by Means of Systematic Review', *British Journal of Management*, 14(3), pp. 207–222. doi: 10.1111/1467-8551.00375.

Vázquez, R. and López, E. (2011) 'Responsabilidad social corporativa: una revisión sistemática de la literatura', in *Comunicación a las II Jornadas pymes, empresa familiar e iniciativa emprendedora*. Universidad Pablo Olavide.

Wadel, G., Avellaneda, J. and Cuchí, A. (2010) 'La sostenibilidad en la arquitectura industrializada: cerrando el ciclo de los materiales', *Informes de la Construcción*, 62(517), pp. 37–51. doi: 10.3989/ic.09.067.

Winston, W. L. (2008) *Investigación de operaciones*. Grupo Editorial Iberoamericano. México.

Zio, E. (2013) *The Monte Carlo Simulation Method for System Reliability and Risk Analysis*. London: Springer (Springer Series in Reliability Engineering).

Development of Web Extended Massive Open Online Course (xMOOCs) on Thermodynamics Subject to Increase High Order Thinking Skill of Students

Vina Serevina, State University of Jakarta, Jakarta, Indonesia, vina.serevina77@gmail.com

Ruly Lasrina Octavia, State University of Jakarta, Jakarta, Indonesia, vserevina@unj.ac.id,

Abstract

This study aims to develop web-xMOOCs phydu.com as E-learning on thermodynamics subject and to increase higher order thinking skill of students. This research method used research and development by the ADDIE (Analyze-Design-Development-Implementation-Evaluation) model. The object of this study was amounted of 41 students in the physics education program of State University of Jakarta. The validation in this research used expert material validation sheet, E-learning expert validation sheet, learning validation sheet, multiple choice questions, and higher order thinking skill questionnaire. Expert material validation results show 85,00 % (very good). E-Learning expert validation results show 81,25 % (very good). Learning validation results show 82,00 % (very good). Based on the results of the investigation on the effectiveness of phydu.com web on thermodynamics subject, obtained N-gain equal to score of 0.6878 in good category. This shows the increased score of higher order thinking skill participants. Based on the above data, this study showed that the development of web extended Massive Open Online Course (xMOOCs) on thermodynamics subject can increase high order thinking Skill of Students.

Keywords: Development of Web xMOOCs, Higher Order Thinking Skill.

Introduction

Education is an essential aspect of life which is needed to build a personality, attitude and behavior. Education is not only change of behavior process but also a process to educate. There are some efforts done by government to improve education quality. The improvement of education quality will be achieved if all components of education put their efforts to do a change to become better. School has to provide facility to enhance students, teachers as facilitator, and perfects curriculum. Learning outcomes are the abilities of the students after they received a learning experience (Serevina, 2017).

Development of technology also require students' learning skills to support learning activity. Nowadays, development of information and communication technology has changed the way of learning. Education is changing at a rate that has never been happened before. To prepare students to be success in global condition, they need a new skills.

According to Republika, 23rd January 2016, technology has a role to improve education quality in Indonesia as means of learning for teachers and students. Interactive technology will be a catalyst for occurrence of change in the role teachers, from information to transformation and students activity from passive to be more active in order to access new knowledge (Republika, 2016).

Online based learning is currently developing especially *Massive open online course.* Many students follow this kind of online learning. According to National Geographic Indonesia in 20th February 2015, in one month, recorded that college students study online for 400.000 hours. Also, online university platform in England recorded that there were one million students registered for their lectures (**Kompas, 2015**).

Massive Open Online Courses provider company claimed that interest for online lectures has increased by 20% in three months by 2014. Online lectures can be followed by every college students all over the world.

Nowadays, there are many instructional media which used ICT. Besides, learning process also use website, blog, e-book and internet as instructional media. However, web instructional media has not included whole multifunction yet. In Indonesia, indonesiax.co.id is online learning media that can be accessed freely by user. State University of Semarang also has already used online learning through their University web (Semarang, 2015). In real life, students are more quickly to understand things if they are directly involved or demonstrate it by searching in internet and tends to remember for a long term. If students only read and memorize, they will remember for a short term.

In order to achieve skills that correspond the learning purpose, learning materials that encourage students to achieve learning purpose are needed. Those learning materials also should facilitate students in learning process. Technology development is very useful and helpful in learning and also has a positive effect in education.

This research did a preliminary study of students' curriculum and then, researcher gave a questionnaire for lecturers and students of Physics Education Department. According to the questionnaire results, from 51 respondents, 96.1% respondents have already attended online learning, 25,5% of online learning used discussion forum, 11.8% gave certificate as a proof of graduation, 10.9% used xMOOCs web. Observation results in PUSTEKKOM (Technology and Computer Center) shows that for undergraduate students, this kind of media has not been built yet.

According to Chaterins Adams, xMOOCs is a trans medial pedagogic lecture that proved to be adaptive in education. xMOOCs can be interpreted as online learning way that used internet or interactive learning that can be accessed with another students (Adams, 2014).

xMOOCs as e-learning can be assessed by measuring six aspects, as follows: 1)text, 2)picture, 3)graph, 4)animation, 5)sound, and 6)video. There are also seven aspects of e-learning as online lecture which are Curriculum, video, quiz, module, discussion forum, exercises, and certificate.

Learning material on thermodynamics subject includes Interpreting thermodynamics phenomenon, Analyzing zeroth law of thermodynamics, Analyzing pure substance properties, Applying state equation of thermodynamics systems, Analyzing work done by or to the system, Analyzing heat and first law of thermodynamics, Ideal Gases Real Gases, Analyzing second law of thermodynamics, Analyzing entropy, Analyzing thermodynamics potential, enthalpy, Helmholtz and Gibbs (Hadi, 2009).

Definition of Higher Order Thinking Skill by Haladyna and Bloom are as follow: analysis, evaluation and creation (King, 2013).

According to argumentation above, this research is conducted to develop web based e-learning that gives positive benefits for anyone who want to study independently, discussing with another user, and access the information more freely

Research Method

This research used *research and development* (R&D) method with ADDIE model. Steps of ADDIE model that is used are (Pribadi, 2014):

1) *Analysis*
   Analysis is the first step in ADDIE model. In this step program designer have to do a need analysis to collect information related to problems faced by students in undergraduate degree.
2) *Design*
   Design is the second step in ADDIE model where researcher designs the e-learning with xMOOCs characteristic so that students are expected to achieve goals and competence of following subject.
3) *Development*
   Development is the third step in ADDIE model. In this step, learning materials for e-learning are produced and developed.
4) *Implementation*
   Implementation is the fourth step in ADDIE. In this step, instructor implemented the e-learning in class according to teaching plan.

5) *Evaluation*
   Evaluation is the last step in ADDIE model. In this step, e-learning is evaluated in order to improve its efficiency and effectiveness. Based on this evaluation results any improvements are done to perfects the e-learning.

Research instruments that were used in this research are: learning material experts validation sheet, e-learning expert validation sheet, learning validation sheet, and multiple choice questions. Question instrument was validated using point-biserial formula and its reliability was computed by using KR-20/21 (Widiyanto, 2014).

Results and Discussion

Results

Product of this research is website phydu.com as thermodinamics e-learning. This website is open to the public and can be accessed anytime and anywhere. Main components of this website are:

1) Administrator. Administrator organizes students data, teachers data, hire teachers, and updates website.
2) Teachers. Teachers apply learning data, updates learning materials, and organizes test questions and score.
3) Students. Students attend online learning in phydu.com such as taking quizzes, final exam, discussion forum and information sharing with another user through social media. Student must register to login phydu.com.

Features in phydu.com are: 1)Register, 2)Login, 3)Home, 4)Learning Materials, 5)Discussion Forum and certificate, 6)Our Team, 7)Activity Log, 8)About Us, 9)Testimonials.

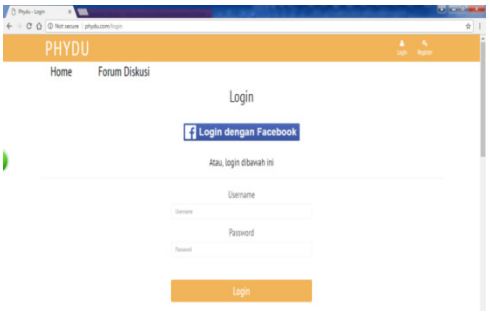


Figure 1. Login page

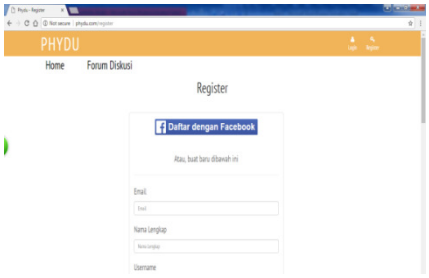


Figure 2. Register page

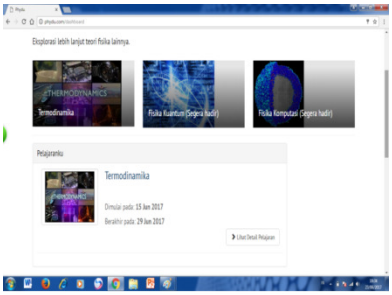


Figure 3. Learning Materials page

Table 1: Learning Material Expert's Validation Results

ASPECT	PERCENTAGE	INTERPRETATION
Interpreting thermodynamics phenomenon	85%	Very good
Analyzing zeroth law of thermodynamics	85%	Very good
Analyzing pure substance properties	90%	Very good
Applying state equation of thermodynamics systems	80%	Very good
Analyzing work done by or to the system	85%	Very good
Analyzing heat and first law of thermodynamics	90%	Very good
Ideal Gases Real Gases	90%	Very good
Analyzing second law of thermodynamics.	90%	Very good
Analyzing entrophy	100%	Very good
Analyzing thermodynamics potential, entalphy, Helmholtz and gibbs	100%	Very good
Average Percentage	**85%**	**Very good**

Validation by experts referred to Likert scale interval. Likert scale is used to measure behavior, opinion, and perception about social issue or phenomena (Riduwan, 2007). Obtained data then interpreted as follows:

Table 2: Likert scale (Sugiono, 2013)

Average Score	Interpretation
0%-20%	Very Bad
21%-40%	Bad
41%-60%	Enough
61%-80%	Good
81%-100%	Very Good

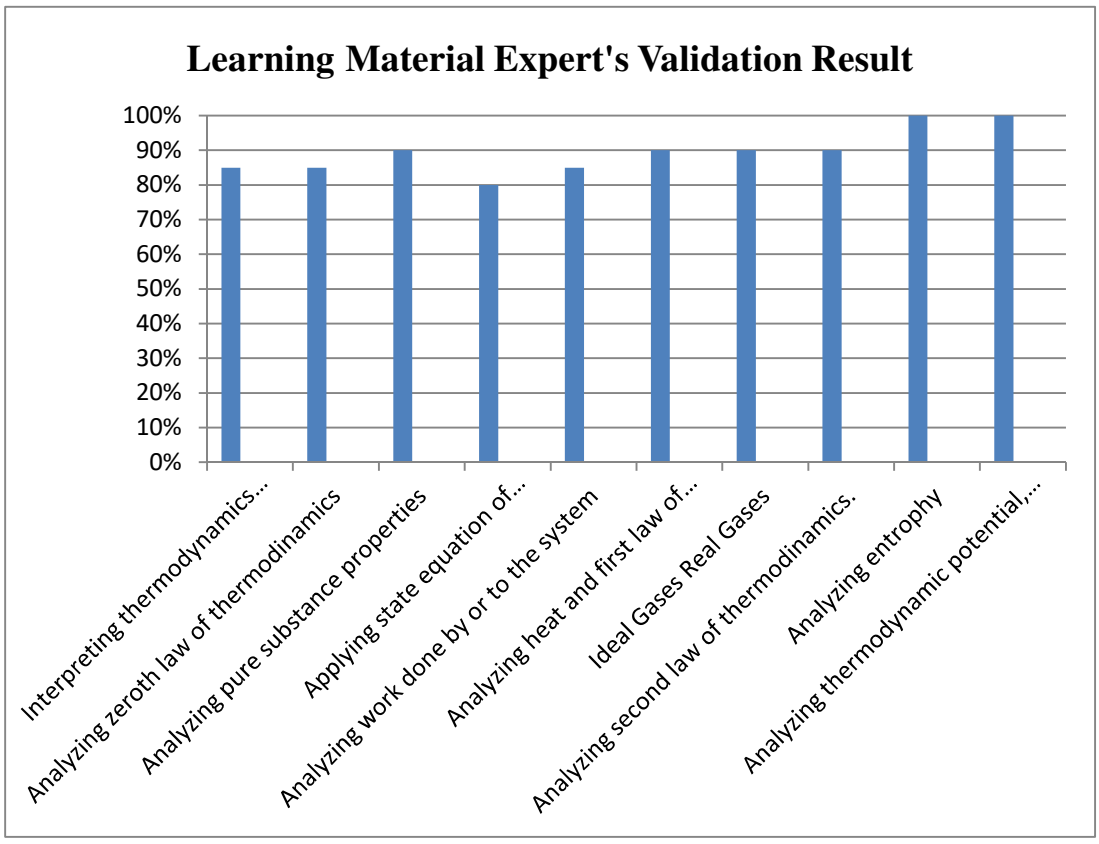


Figure 4: Learning Material Expert's Validation Results

Validation result by learning material expert by aspect Interpreting thermodynamics phenomenon 85%, Analyzing zeroth law of thermodynamics 85%, Analyzing pure substance properties 90%, Applying state equation of thermodynamics systems 80%, Analyzing work done by or to the system 85%, Analyzing heat and first law of thermodynamics 90%, Ideal Gases Real Gases 90%, Analyzing

second law of thermodynamics 90%, Analyzing entropy 100%, Analyzing thermodynamics potential, enthalpy, Helmholtz and Gibbs 100%.

This shows that web based instructional media achieve a very good result. Learning material expert's validation result obtained average score 85%. Based on this result, the developed e-learning is considered worthy of use for thermodynamics. E-learning expert's validation result was shown on table 2.

Table 2: E-learning Expert's Validation Result

ASPECT	Category	Expert		Total Score	Percentage	Average Score
		1	2			
Text	1	5	4	65	81.25%	81.25%
	2	5	3			
	3	5	4			
	4	5	3			
	5	4	4			
	6	4	4			
	7	4	4			
	8	4	3			
Picture	9	4	4	47	78.33%	
	10	4	4			
	11	4	4			
	12	4	3			
	13	4	4			
	14	4	4			
Graph	15	4	4	24	80.00%	
	16	4	4			
	17	4	4			
Animation	18	4	3	37	74.00%	
	19	3	4			
	20	3	4			
	21	4	4			
	22	4	4			
Sound	23	4	4	32	80.00%	
	24	4	4			
	25	4	4			
	26	4	4			

ASPECT	Category	Expert		Total Score	Percentage	Average Score
		1	2			
Video	27	4	4	32	80.00%	
	28	4	4			
	29	4	4			
	30	4	4			

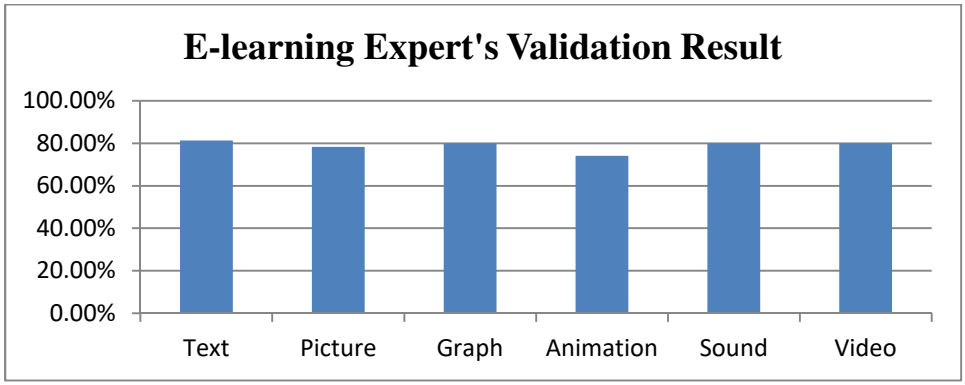


Figure 5: E-learning Expert's Validation Result

The result of e-learning expert's validation consists of six aspects: text (81,25%), picture (78,33%), graph (80%), animation (74%), sound (80%), and video (80%). Average validation result obtained is 81,25%. From this result can be concluded that the developed e-learning can be used in thermodynamics learning.

By referring to Likert scale, the result of learning expert's validation at table 3

Table 3: Learning Expert's Validation Result

ASPECT	PERCENTAGE	INTERPRETATION
Curriculum	82%	Very good
Video	77%	Good
Quiz	82%	Very good
Module	80%	Good
Discussion Forum	85%	Very good
Execises	90%	Very good
Certificate	85%	Very good
Average	**82%**	**Very good**

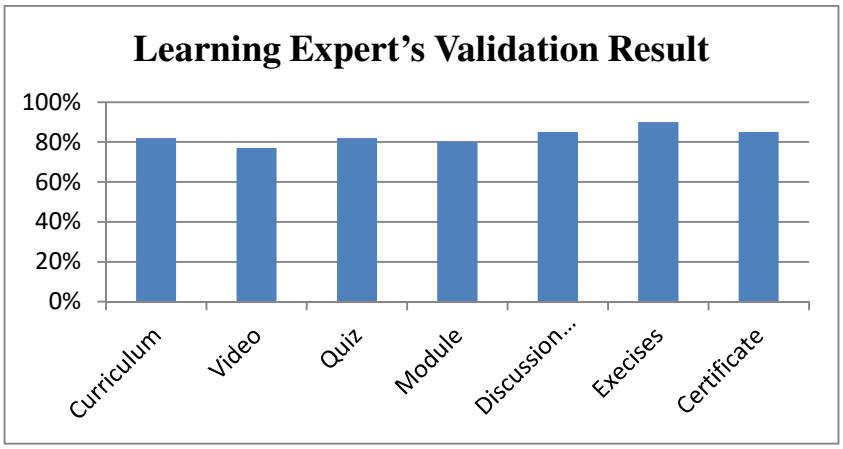


Figure 6: Learning Expert's Validation Result

Learning validation consists of seven aspects which are Curriculum (82%), video (77%), quiz (82%), module (80%), discussion forum (85%), exercises (90%), certificate (85%). Average validation result obtained is 82%.

From this result can be concluded that development of web extended massive open online course (xmoocs) on the thermodynamics subject has a very good result and can be implemented in thermodynamics learning.

The next step is validity and reliability test of question instruments. The result of validity and reliability test were:

1. Description of validity test data
   By using point-biserial at significance level of 5% for 41 respondents, obtained r table is 0,308 (Widiyanto, 2014). According to the calculation, from 50 questions of thermodynamics, 35 questions are valid and used as data collection instrument.
2. Description of reliability test data
   Reliability test was done using KR-20/21 formula. The result of reliability test is 0.83 which is a very reliable category. According to Widiyanto (Widiyanto, 2014) an instrument has very high reliability if reliability coefficient is between 0.8 to 1.0.

After validity and reliability test of question instruments, then do pre-test and post-test to 41 students. From the result of pretest and posttest, N-gain was obtained by 0.6878. According to Hake (Hake, 1999) N-gain was in good category ($0.3 \geq g \geq 0,7$). N-gain is normalization that obtained from pretest and posttest result (Hake, 1999). N-gain calculation is used to find the improvement using web based media before and after usage. Questionnaire was used to calculate students' higher order thinking skill improvement and its aspects using likert scale. Likert scale is used to measure behavior, opinion, and perception about social issue or phenomena (Riduwan, 2007).

Documentation



Figure 7. Pre-test



Figure 8. Post-test

The result of development of web extended massive open online course (xMOOCs) on the thermodynamics subject showed that student's high order thinking skill can be increased. This research was supported by several factors as follow:

1. Cooperation and tolerance of physics education department coordinator, faculty of math and science, State University of Jakarta.
2. Students' active participation during research.
3. Students' cooperation to attend online learning in phydu.com.
4. Students' maximum efforts during online learning.

According to previous research, maximum effort in order to search for information will help students to achieve their learning goals.

Conclusion

Expert material validation results showed 85,00 % (very good). E-Learning expert validation results showed 81,25 % (very good). Learning validation results showed 82,00 % (very good). This web extended massive open online course (xMOOCs) as E-Learning can increase students' Higher Order Thinking Skill (HOTS), proved by N-gain result = 0.6878 in good category. So, development of web extended massive open online course (xMOOCs) on the thermodynamics subject can increase high order thinking skill of students.

References

Adams, C. (2014). Distance Education. *Catherine Adams*, vol 35, No.2 , 202-216.

Hadi, D. (2009). *Termodinamika.* Jakarta: Departemen Pendidikan Dan Kebudayaan Direktorat Jendral Pendidikan Tinggi.

Hake, R. (1999). *Analyzing Change/Gain Scores.* USA: Woodland Hills.

King, L. G. (2013). Higher Order Thinking Skill: Definition, Teaching Strategies, & Assessment. Educational Service Program, (Online). *Higher Order Thinking Skill: Definition, Teaching Strategies, & Assessment. Educational Service Program, (Online)*, 19-21.

Kompas. (2015). *National Geographic Indonesia.* Jakarta: 20 Februari 2015.

Pribadi, B. A. (2014). *Desain dan Pengembangan Program Pelatihan Berbasis Kompetensi.* Jakarta: Prenada Media Grup.

Republika. (2016). *Senin 23 Januari 2016, Tekhnologi.* Jakarta: Republika.

Riduwan. (2007). *Pengantar Statistika.* Bandung: Alfabeta.

Semarang, U. N. (2015). *Kuliah Online.* Semarang: Universitas Negeri Semarang.

Serevina, V. (2017). Development of Enterpreneurship based Learning Model to Increase Physics Learning Outcomes of Students. *29th International Business Information Management Association* (pp. 122-129). Vienna: IBIMA.

Sugiono. (2013). *Metode Penelitian Pendidikan: Pendekatan kuantitatif, kualitatif dan R&D.* Bandung: Alfabeta.

Widiyanto, M. A. (2014). *Statistika.* Jakarta: Kalam Hidup.

Comparison of the Concepts of "Flow" And "Flow Process" In Logistics

Georgiy Greyz, South Ural State University, Chelyabinsk, Russia, ggreyz09@mail.ru

Yuliya Kuzmenko, South Ural State University, Chelyabinsk, Russia, julia.kyzmenko@gmail.com

Irina Okolnishnikova, South Ural State University, Chelyabinsk, Russia, okolnishnikovaii@susu.ru

Irina Saveleva, South Ural State University, Chelyabinsk, Russian Federation, mim@susu.ru

Abstract

The article presents a spectrum of views on the definition of the main object of logistics. The features of the main variants of definitions of "flow", "logistic flow", and "flow process" are presented and analyzed. A comparative analysis of these concepts is performed as an object of logistics. The problem of identity or difference of the concepts of "flow" and "flow process" is considered and the authors' variant of its solution with definition of the parity of these concepts in logistic sphere and the choice of object of logistics is offered. The definition of the flow process applied to the industrial sphere is given.

Keywords: logistics; theory of logistics; flow; flow process; flow process of an industrial enterprise.

Introduction

When determining the main object of logistics in a professional environment, currently, there is no unity of opinions, as an object, both (logistic) flow and (logistic) process are considered. At the same time, some scientists share these concepts, and some view them as synonyms. The purpose of this publication is to analyze the relationship between the concepts of flow and flow process in the context of the object of logistics.

Logistic flow as an object of logistics

As the analysis of scientific literature shows, in most cases the main object of studying logistics are flows (material or economic), rather than processes (Sergeev, 2005; Novikov, and Uvarov, 2000; Rodnikov, 1995; Semenenko, 2001, etc.). Butrin (2005) rightly noted that, despite the rather rapid development of the theory of logistics, the flow as a logistic category remains insufficiently studied.

Consider the spectrum of known views about this concept. In determining the most general properties of the flow, without "linking" it to the logistic system of an industrial enterprise, there are no special discrepancies. So scientists at the St. Petersburg School of Logistics believe that "a flow is a collection of objects perceived as a single entity and existing as a process over a certain time interval, and measured in absolute units over a certain period" (Novikov, and Uvarov, 2000; Parfenov, 2001). It should be noted that the described version of the definition of flow is the most common and generally accepted. The authors agree with this, the most general definition of this concept insofar as a flow is a collection of moving objects, perceived as a single whole.

The discrepancy in the views of various researchers manifests itself in the process of the appearance of variants of concretization of this concept. Thus, in work by Forrester (1971) flow is identified with a network and, at the same time, several types of networks are considered, combined with information:

orders, materials, money, labor and equipment. In book by Plotkin (1996), the category of "economic flow" is introduced into the scientific revolution. We should agree with the opinion of Stepanov (2007) in that part of the treatment of the economic flow, where all (and not only local) types of resources are indicated in their interrelationship. However, if we consider flows in relation to the enterprise, this definition of the nature of the economic flow is rather vague.

A certain concretization is present in the definition of economic flows as interrelated and interdependent processes of movement of the company's own, borrowed and attracted resources to achieve the company-wide goals (Kostoglodov, D.D., Savvidi, I.I., and Stakhanov, V.N.,2000).

Note that there is a rather large number of definitions not of the flow in general, but of specific flows with their constituent objects of a certain nature, first of all, of material flows. In the opinion of the authors, the most general concept of the flow was introduced by V. Popov and I. Krainyuchenko in the form of the generalized term of "MEI-flow". These specialists consider the flow as a composition of matter (M), energy (E), and information (I) (Popov, and Krainyuchenko, 2002). Indeed, any production process is a transformation of MEI-flows. At the input to this process we have some MEI parameters, and at the output - others. The production process consists in bringing energy and information flows to the objects of labor. As a result, the subject of labor is transformed into a product of labor - the flow of finished products. The following definition of flow is given in work by Sidorov, 2001: "Flow is a purposeful and ordered movement of matter, its elements (matter, energy, information)".

Logistic process as an object of logistics

Thus, despite some differences in the definition of flow, most logisticians hold the view that it is the flow that is the main object of logistics. In contrast to this point of view, in works by Katochkov (2005), and Katochkov, V.M., Greyz, G.M., and Okolnishnikova, I.Yu. (2013), as an object of logistics, economic flow processes are indicated. In accordance with the approach described in work by Katochkov, V.M., Greyz, G.M., and Okolnishnikova, I.Yu. (2013), the main feature of the flow is the motion of homogeneous objects, and for the flow process the main is the change in the qualitative state of the flow. As a consequence, flow processes reflect not only quantitative, but mainly qualitative changes - the transformation of flows within one form of existence, as well as the flow from one form to another.

Before considering the existing variants of the concept of the flow process, consider some of the definitions of the term "process" in general.

The Great Explanatory Dictionary of the Russian language (Kuznetsov, 2000) gives the following definition of the term "process" (from the Latin "processus" - advancement): 1) Consecutive change of phenomena, states in the development of something. 2) A set of sequential actions to achieve a result (e.g., a production process). 3) The order of consideration of cases in court, legal proceedings; a court case. In some works, the definition of the Great Explanatory Dictionary is practically repeated (Kuznetsov, 2000): the process is understood as the successive change of states, the change in the phenomenon, the stages of development when any result is achieved.

Very useful for understanding this concept is, according to the authors, consideration of definitions of the concept of "business process". A business process is a collection of various activities within which one or more types of resources are "used at the entrance," and as a result of this activity, a product representing value for the consumer is created at the "output" (Repin, and Eliferov, 2004). A term close to the content is interpreted in modern sources as a set of sequentially executed operations that together form a single process of converting raw materials into the desired product. Useful in considering approaches to the interpretation of the term "process" is the definition used by the German company SAP (System Analysis and Program Development), which sells software for the ERP logistics system. According to this interpretation, the process is a sequence, complete in terms of content, temporal and logical sequence,

necessary for processing an economically significant object. The business process is a special process that serves the implementation of the main objectives of the enterprise and describes the central scope of its activities. In the standard ISO 9001: 2015 on the quality management system is given a more concise definition: process is a set of interrelated and interacting activities that converts inputs to outputs.

Thus, in the authors' opinion, the process common to the definitions of the concept considered above, primarily to the processes within the enterprise, is the presence of purposeful transformative activities (works), as a result of which the initial resources (at the input of the process) are transformed into the planned product (at the output process), which has value for the consumer.

Correlation of the Concepts of Logistic Flow and Logistic Process

The relationship between the concepts of "process" and "flow" in the work of A.I. Semenenko and V.I. Sergeev on the theory of logistics (2001) is given through the prism of concepts the object of logistics and the subject of logistics. In the opinion of these scientists, the object of studying the theory of logistics are the material and the corresponding financial, information or their combinations of the flow processes of economic and other activities in reproduction and circulation, organized into flows. In this case, the flow is defined as a directed movement of the aggregate of something conditionally homogeneous (e.g., any processes, products, information, finances, materials, resources, etc.).

The authors agree with the representation of the process in work by Semenenko (2001) as a regular sequential change in the phenomenon, its transition to another phenomenon (transformation, development) to achieve any result. Also, there is no objection to the representation of processes by the property of matter, space and time, a property characteristic of both inanimate and living nature (including society).

According to many experts, flow processes differ from non-flow processes in that they can take a flow form (independently or under an external organizing influence). In accordance with the concept developed in work by Semenenko (2001), processes are an objective reality, and flows, as the movement of one environment into another, in particular flows in the economy, are abstract models, since in reality there is no economic environment in which information, financial and similar environments move. As proof of this provision, six content conditions for the existence of flows are given, the main of which is the presence of a structured (ongoing, continuous, or conditionally accepted for such) medium. Assuming that the economic environment can at best be considered to be poorly structured, research scientists (Semenenko, 2001) come to a rather controversial conclusion, according to the authors, that flows do not exist explicitly, and economic reality is different processes.

Moreover, in work by Semenenko (2001), on the basis of the fact that flows in economy are recognized as abstract constructions (models) necessary for their study and optimization, a paradoxical conclusion is drawn that simulation and organization of flows are the tasks of the corresponding professionals: suppliers, transport workers , forwarders, warehouse workers, etc. According to A.I. Semenenko and V.I. Sergeev, flows in a market economy cannot be managed, as one cannot manage, for example, atmospheric flows. It is only possible to optimize the use of flows by optimizing the processes in them in the name of the final target results. As follows from this, the object of logistics are flow processes of a different nature, and the subject of studying, researching and researching the theory of logistics is the optimization of material and corresponding financial and information flows.

The authors of this article are in agreement with the conclusions of A.I. Semenenko and V.I. Sergeev (2001) in the part that the task of logistics is to optimize the flow processes, rather than the flows themselves. However, the representation of the flows themselves as abstract models with the simultaneous assertion that their modeling and organization can be performed not by logisticians but by suppliers, transport workers and warehouse workers looks, in our opinion, somewhat artificial.

In a number of works on logistics, the concepts of flow processes and flows are not opposed, but implicitly used as synonyms. Thus, in book by Golikov (2000) optimization of flow process control is defined as the achievement of the maximum level of interaction of flow processes during the motion of these flows. Synonymous with this concept, in our opinion, is the following definition of the flow: "... economic flow should be considered as a sequence of interrelated events occurring in a single economic process" (Ivakin, 1997). In accordance with the rules of formal logic, this statement is identical to the following variant of the concept: economic flow is equal to the sequence of interrelated events and is equal to the economic process, i.e. we can assume that economic flow is equal to economic process. Identification of these concepts, in the opinion of the authors, is also present in work by Butrin (2005), etc. Also, some similarity of these concepts is present in the above definition of the flow from (Novikov, and Uvarov, 2000; Parfenov, 2001).

In the study of A.V. Parfenov (2001), the relationship between the concepts of flow and the flow process is represented as follows: "... the flow process as an object of management in logistics should be understood as a set of purposeful, sequential, one-parameter transformations of a system of structurally interrelated elements carried out for a specified purpose within a specified period of time." It is clarified that the category of "flow process" reflects a consistent change of states (stages of development) of a certain flow, and one-parameter transformations of flow elements are achieved by performing basic and/or additional logistic operations. In work by Parfenov (2001) it is rightly asserted that the more complex the flow processes, the more effective methods of managing them are required. At the same time, the complexity of the flow processes is determined by the scale of enterprises.

In one of the previous collective works of the scientists of the St. Petersburg State Economic University, the opinion is expressed that "... the object of study in logistics is the controlled flow and the fluxing process that generates it ..." (Shcherbakov, 2015). Thus, both the flow and the flow process are considered as objects of logistics without opposition. In the same work, apart from the traditional definition, the most general definition of the flow is given as an entity that manifests itself over a period of time and is measured in motion. Logistic flow is defined as an integrated flow, which is a directed movement of the aggregate of material, financial, information and other types of resources. The logistic process is defined as the sequence of operations, organized on the principles and methods of logistics, aimed at achieving the goals of the economic system.

The authors, in comparing the concepts of flow and the flow process, occupy some middle position between the complete identification of these terms and their qualitative separation.

In a number of special sources (Katochkov, 2005, etc.), along with the general definition of the flow process in general, there are references to the flow process in logistics, and various approaches to determining its essence are considered. Taking into account the analysis carried out by the authors of the concept of the process and for the chosen field of research, with regard to logistics in the industrial sphere, it is expedient to formulate the following definition of the flow process. The flow process of an industrial enterprise is a set of various interrelated activities (operations) that transforms the initial resources in the form of material, financial and information flows into a planned product also in stream form, and performed within the micro- or mesological system of the enterprise.

Commenting on this definition, we note that if in general the activity is understood as "a specific human form of relation to the surrounding world, the content of which constitutes its expedient change in the interests of people; condition for the existence of society" (The Great Encyclopedic Dictionary, 1998), then the addition of the definition of "operations" in the definition of clarification allows to reflect the specifics of the activity of an industrial enterprise.

Note that the proposed definition does not contradict the definition given by Katochkov (2005). Thus, the part of the definition: "the aggregate of various interrelated types of activities (transactions) that transforms the initial resources in the form of material, financial and information flows ..." can also be understood, including the transformation of interacting flows with the interchange of flows from one form to another, as this is presented in the study by Katochkov (2005). In our opinion, the proposed definition is not universal, but it reflects the most significant features that distinguish the flow process of an industrial enterprise from a multitude of other processes and phenomena.

Considering the specifics of logistic flow processes, it is necessary, in our opinion, to refer to the opinion of A.V. Parfenov (2001), which points out that any flow processes associated with various economic flows, which, in turn, are objects of logistic management methods, can be referred to logistic ones. Such flow processes, expediently, by analogy with logistic flows (material, financial, information, etc.), are called logistic flow processes. Professor A.V. Parfenov proposes to call such processes simply logistic processes, rightly referring to the fact that logistics a priori involves a flow approach. Such naming of these flow processes makes it possible to distinguish the features of their organization and regulation as objects of the logistics management system. The authors support the point of view of A.V. Parfenov, who considers the term logistic process as a synonym for the term of logistic flow process. Given the synonymity of these terms, it is possible to use both the term "logistic process" and "logistic flow process".

Conclusions

Thus, consideration of the problem of identity or differences in the concepts of "flow" and "flow process" allows to draw the following conclusions: these concepts are not synonymous, although they are similar in their logistics content. The flow fulfills the role of the initial "material" for the process, being an object of labor, which transforms the process, as a certain activity. From the position of the authors, the term "management of logistic flows" is not entirely accurate. The term "management of logistic flow processes" more accurately reflects the real situation, because actually they control not the flows themselves, but the activity of changing the logistic flows.

References

Butrin, A.G. (2005) Investigation and optimization of flow processes in an industrial enterprise, Monograph, Publishing House of SUSU, Chelyabinsk.

Forrester, J. (1971) Fundamentals of Enterprise Cybernetics, Progress, Moscow.

Golikov, E.A. (2000) Marketing and Logistics, manual, Publishers House "Dashkov and Co.", Moscow.

Ivakin, E.K. (1997) Logistics of capital construction in the region, RSSU, Rostov-on-Don.

Katochkov, V.M. (2005) Methodological issues of interaction of flow processes of commercial activity of industrial enterprises, Monograph, Publishing House of SUSU, Chelyabinsk.

Katochkov, V.M., Greyz, G.M., and Okolnishnikova, I.Yu. (2013) Methodological approaches to formation of a system for managing commercial activities of industrial enterprises on the basis of logistics, Monograph, Publishing House of SUSU, Chelyabinsk.

Kostoglodov, D.D., Savvidi, I.I., and Stakhanov, V.N. (2000) Marketing and logistics of the company, Publishing house "PRIOR", Moscow.

Kuznetsov, S.A. (2000) The Great Dictionary of the Russian Language, The Russian Academy of Sciences; Institute of Linguistic Research, Norint, St. Petersburg.

Novikov, O.A., and Uvarov, S.A. (2000) Logistics, manual, Business press, St. Petersburg.

Parfenov, A.V. (2001) Methodology for the development of logistics inter-system entities in a reformed economy, dissertation, Publishing house of SPbSUEF, St. Petersburg.

Plotkin, B.K. (1996) Introduction to commerce and commercial logistics, manual, SPbSUEF, St. Petersburg.

Popov, V., and Krainyuchenko, I.O. (2002) 'World outlook aspects of logistics,' *Logistics*, 3, 6-6.

Repin, V.V., and Eliferov, E.G. (2004) Process approach to management. Modeling of business processes, Standards and quality, Moscow.

Rodnikov, A.N. (1995) Logistics. Terminological dictionary, Economics, Moscow.

Semenenko, A.I. (2001) Logistics. Fundamentals of the theory: textbook for universities, Union, St. Petersburg.

Sergeev, V.I. (2005) Corporate logistics. 300 answers to questions from professionals, Sergeev, V.I. (ed.), INFRA-M, Moscow.

Shcherbakov, V.V. (2015) Logistics and Supply Chain Management, textbook for academic baccalaureate, Shcherbakov, V.V. (ed.), Yurayt Publishing House, Moscow.

Sidorov, I.I. (2001) Logistic concept of the enterprise, DNTP of the "Knowledge" Society, IVESEP, St. Petersburg.

Stepanov, V.I. (2007) Logistics, manual, Prospekt Publishing House, Moscow.

The Great Encyclopedic Dictionary (1998) 2nd ed., The Great Russian Encyclopedia, Moscow.

Can Employers and Educational Institutions Learn More about Their Candidates Through Analyzing Their Heroes?

Helena Šajgalíková
University of Economics in Bratislava, Faculty of Applied Languages, Slovakia
helena.sajgalikova@euba.sk

Lukáš Copuš
Comenius University in Bratislava, Faculty of Management, Slovakia
lukas@copus.sk

I find it difficult to make familiar strange for the power of the familiar is overwhelming Wisniewski , 2000

Abstract

Nowadays, with the lack of qualified workforce in almost all sectors, understanding the attitudes of students and employees towards their duties and career paths becomes more and more important. The paper deals with the findings of the first-order survey of heroes taken for behavioural models by the groups of 4th grade and 8th grade pupils of three different primary schools in Slovakia. Even though the samples are small, the differences identified in hero categories can be significant for understanding the tendencies and the further research. Our findings show that the most admired categories of heroes are family members as well as friends (especially in Roma community). Generally, these categories are common, but they cause several problems in above mentioned community. The reason is that the heroes they admire are often unemployed and uneducated and do not provide enough stimuli for pupils to progress, especially in future professional life.

Keywords: hero, behavioural model, function of the model, disadvantaged social group, Roma community

Introduction

Over time human beings develop not only physically, but also psychically and socially. Developmental psychology as an umbrelling field (integrating findings of a number of disciplines) focuses on identifying the developmental processes and their outcomes. It looks at the development of humans in micro sense, as they develop from babies to mature adults, but also in macro sense as the culture constituted by the humans in question evolves during the years.

The theories of developmental psychology moved from the "stage theory" suggesting that all humans develop through similar paths (represented primarily by Jean Piaget) to the social contextualization theory, i.e. adults' interference in development during critical stages known as "zones of proximal development", of Lev Vygotski, and many views inbetween.

It is important to take into account the fact (identified in many research findings) that social and emotional competencies acquired within the early development of human beings are linked to later academic achievement, whereas social and emotional problems or challenges are linked to academic difficulties as well as success or failure in working life (Blair and Diamond, 2008; Konold and Pianta, 2005; National Research Council and Institute of Medicine, 2002; Raver, 2002; Romano, Babchiskin, Pagani and Kohen, 2010). Indeed, skills within the social and emotional domains are believed to lay a

critical foundation for later life success across a wide variety of outcomes (e.g. Jones, Greenberg and Crowley, 2015, Moffitt et al., 2011).

Collectively, the research suggests that there are specific social and emotional competencies that parents, caregivers, educators, and policy makers should be promoting in early childhood for the sake of long-term individual and social well-being.

In the early stages, the process of an individual's socialization is executed via exemplification (the forms of the cultural context in which the individual lives and grows), i.e. the impact of an example as a means or method of inter-human influencing which can significantly change or produce relations and performance of the human (Grac, 1990). Jim Taylor coins the term hero for the example serving as a model (Taylor, 2010).

The examples can be categorized by their functions primarily into four following categories (Vrabec, 2013):

1. **instructional function of the model:** the percipient tries to act as the hero acts because he/she perceives his/her own behaviour as not as good as the hero's
2. **warning function of the model:** the percipient assesses the behaviour of the hero as bad one and he/she refuses to behave in the hero's way
3. **repulsive function of the model:** the percipient perceives the hero's behaviour as well as that of his/her own as bad and wants to change it (motivational impulse for change)
4. **assurance function of the model:** the percipient perceives his/her behaviour equally positive as the hero's one

From the point of view of the individual's future social role the instructional function of the hero/s is vital. Numerous surveys looked at the heroes and their impact on the percipients (e.g. Albert Bandura in Bobo Doll Experiments, 1961, 1963; Australian Childhood Foundation, 2006).

Thus, to identify the heroes admired by children now and here can give the picture of their current and future orientation. Therefore in our survey we looked at the heroes admired by pupils of three different primary schools. Firstly we identified the heroes of 4th grade pupils (approx. 9-year-old pupils) and those of the 8th grade (approx. 13-year-old pupils). Secondly we compared the heroes of different groups of pupils attending state and faith primary schools and a state school attended by socially disadvantaged pupils primarily from Roma population. We focused on the change or stability in the hero repertoire in 4 years span, compared the hero ranking among three different groups of pupils and, finally, compared the results with the data on the trends in the pupils' future career, i.e. the further studies of the pupils in question at secondary schools and the types of secondary schools they selected.

Research and Methodology

The survey aims to identify the heroes as behavioural models for pupils and possible shift in their structure within 4-year period. The categories of heroes include: a family member/relative, friend, teacher, sportsman/woman, singer, movie character, animated character, fairy-tale character, fiction character, sci-fi character, actor/actress, religious character, publicly known person, animal, and others.

The sample included 127 pupils from 3 primary schools differing in the following characteristics:

1. primary school in Kezmarok, faith school (42 respondents)
2. primary school in Spisska Teplica, state country school (34 respondents)
3. primary school in Hranovnica, state school with 100% pupils coming from socially disadvantaged background – Roma community (51 respondents)

The sample includes the pupils from all classes of the particular grade who were present at lessons when the survey took place.

The respondents of the 4th and 8th grades at primary schools represent an age group with the more or less clear image what they want to achieve to become the peers of their heroes. Even though they follow the wishes of their parents because they are not autonomous in their decisions, their image of the success (materialized in their hero) allows them for either getting fully involved in the steps leading to the objective (e.g. attending a particular school, course, or other career building activities), complying with their parents' decisions (passive resistance), or fighting their parents' decisions (active resistance). All these attitudes have vital consequences for the pupils' future performance. The behavioural patterns have a strong motivational potential. Therefore, we assume, to know who and what attract the pupils' imagination in terms of their hero/s is important to identify even in this early developmental stage. The problem area stays with the pupils who claim that they have no hero to admire and follow.

A questionnaire was used for the first-order survey. In addition to demographic questions related to age, gender, type of primary school, it included two questions:

1. **Write down who you take for a hero in your life, i.e. for the person you admire and you want to be like him/her. If there is nobody in your life, please, put it down as well.**

   (This question was open and the respondents introduced their responses in the way they wanted, i.e., as a single word or a phrase or described their responses in full sentences.)

2. **Choose the category your hero/model introduced in the question above belongs to.**

   (This question was closed with the possibility to choose just one option out of the range provided.)

The questionnaire was available electronically (Google Forms) and the pupils filled it in in their computer laboratories. During the process either the author or a teacher was present. The teachers were instructed how to work with the questionnaire and were ready to answer potential respondents' questions. The respondents could ask questions while filling the questionnaire in. The closed question was included to make the answers more objective and helped process the results. The acquired data were processed by MS Excel.

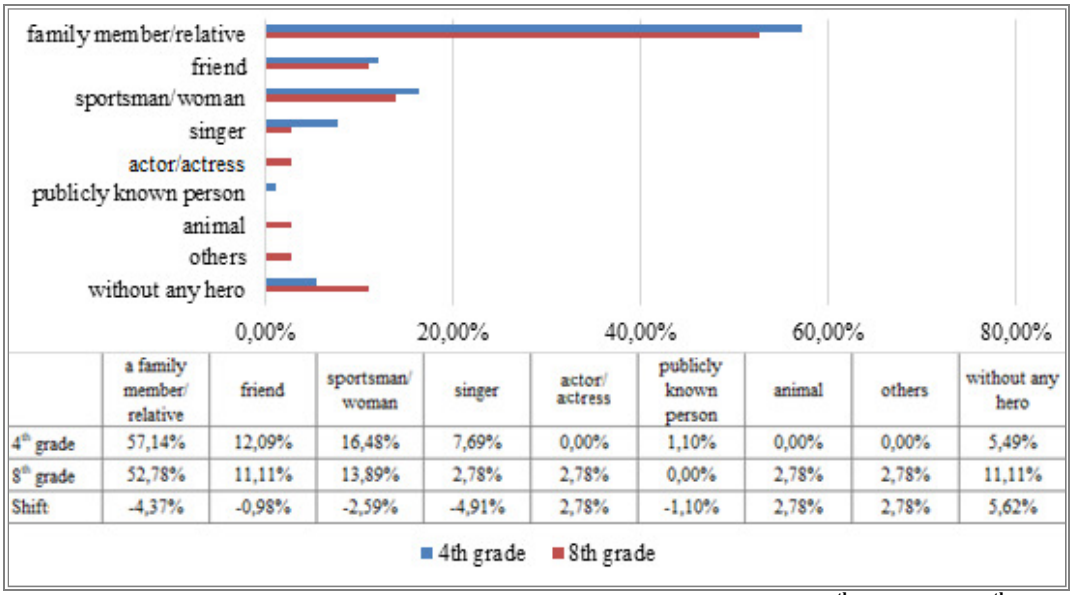
We assumed that the environment of the individual schools would show high level of homogeneity. Based on quantitative analysis we identified the heroes the respondents from individual schools introduced and identified the shifts between the 4th grade pupils and the 8th grade pupils' views. Based on the qualitative analysis we interpreted the results by individual schools and compared them with the success of the pupils in admission to the secondary schools if they decided so. The data on the latter was gained from the documents provided by individual schools.

Analysis and Discussion

As comes from Figure 1, family members account for the highest representation in the 4th grade group (57.14%). Other categories of heroes are represented markedly less and they come in the following order – sportsmen/women (16.48%) and friends (12.09%). The respondents of this group include also singers (7.69%) and other publicly known persons (1.10%) as well. No hero was stated by 5.49% of respondents in this group.

Similar results are achieved for 8th grade group. Family members account for 52.78%, however, the figure decreased by 4.37%. Sportsmen/women (13.89%), friends (11.11%), and singers (2.78%) follow. The

respondents of this group introduce also actors/actresses (2.78%), animals (2.78%) as well as others, i.e. not categorized (2.78%). No hero is introduced by 11.11% of respondents that accounts for 5.62% increase.

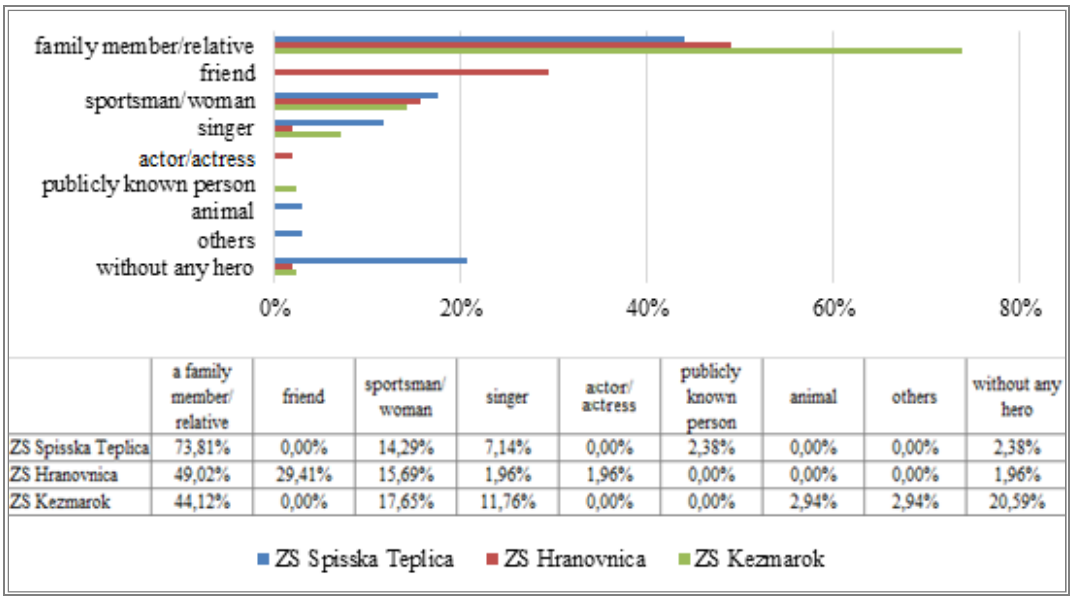


	a family member/ relative	friend	sportsman/ woman	singer	actor/ actress	publicly known person	animal	others	without any hero
4th grade	57,14%	12,09%	16,48%	7,69%	0,00%	1,10%	0,00%	0,00%	5,49%
8th grade	52,78%	11,11%	13,89%	2,78%	2,78%	0,00%	2,78%	2,78%	11,11%
Shift	-4,37%	-0,98%	-2,59%	-4,91%	2,78%	-1,10%	2,78%	2,78%	5,62%

Figure 1: Overview of the hero representation by the surveyed groups of 4th grade and 8th grade pupils

Figure 2 presents the total representation of heroes by individual schools. In comparison, the outstanding figures appear in three categories of heroes. Kezmarok (faith school) and Spisska Teplica (country school) primary schools do not account for the representation of friends at all, on the other hand, Hranovnica primary school (primary school with Roma pupils) achieves the representation of friends as heroes at 29.41%. Another category – family member – accounts for similar representation in Hranovnica primary school (Roma pupils) and Spisska Teplica (state country school) reaching 49.02% and 44.12% respectively, however, in Kezmarok primary school (faith school) it rises to 73.81%. Spisska Teplica (state country school) primary school manifests no hero in 20.59% which achieves an extreme figure when compared to other respondent schools (while Kezmarok faith school and Hranovnica state primary school with Roma pupils reach 2.38% and 1.96% respectively).

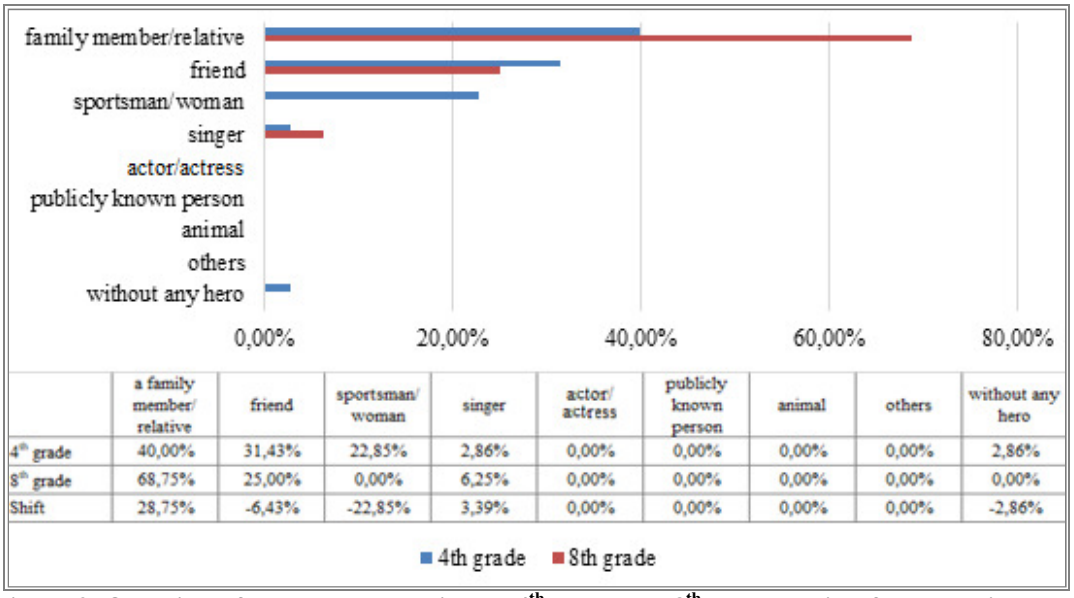
In other categories of heroes, the differences do not display such outstanding differences.



	a family member/ relative	friend	sportsman/ woman	singer	actor/ actress	publicly known person	animal	others	without any hero
ZS Spisska Teplica	73,81%	0,00%	14,29%	7,14%	0,00%	2,38%	0,00%	0,00%	2,38%
ZS Hranovnica	49,02%	29,41%	15,69%	1,96%	1,96%	0,00%	0,00%	0,00%	1,96%
ZS Kezmarok	44,12%	0,00%	17,65%	11,76%	0,00%	0,00%	2,94%	2,94%	20,59%

Figure 2 : Overview of hero representation by the surveyed primary schools

For the illustration we have chosen the responses of the Hranovnica state primary school respondents (Figure 3) because they are those who enter the labour market first (see Figure 4). When comparing 4th grade and 8th grade respondents' views, the most evident shift relates to sportsmen/women category where the percentage plummets by 22.85%, the friend category lowers by 6.43%, however, family member category rises by 28.75%.



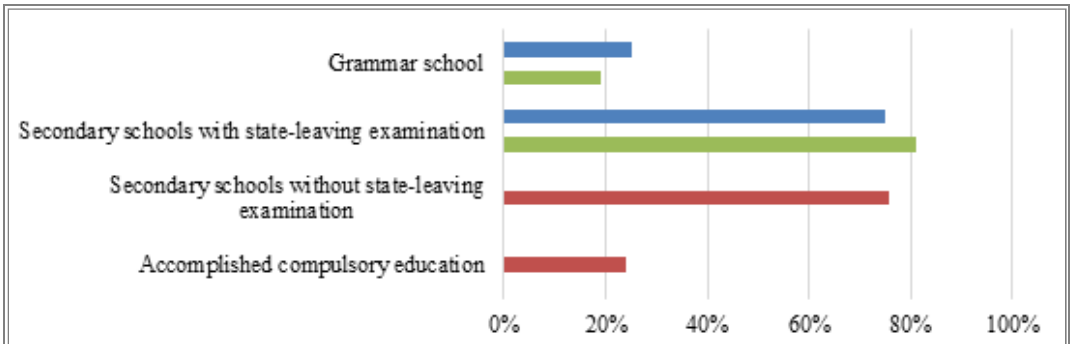
	a family member/ relative	friend	sportsman/ woman	singer	actor/ actress	publicly known person	animal	others	without any hero
4th grade	40,00%	31,43%	22,85%	2,86%	0,00%	0,00%	0,00%	0,00%	2,86%
8th grade	68,75%	25,00%	0,00%	6,25%	0,00%	0,00%	0,00%	0,00%	0,00%
Shift	28,75%	-6,43%	-22,85%	3,39%	0,00%	0,00%	0,00%	0,00%	-2,86%

Figure 3: Overview of hero representation by 4th grade and 8th grade pupils of Hranovnica state primary school

The lowest level of admission to secondary schools (Figure 4) is reached by the pupils coming from Hranovnica state primary school (with Roma pupils). They mostly continue studying at a secondary school (apprentice and vocational schools) accomplished without school leaving examination[1] (75.86%)

and, even worse, 24.14% do not continue in studies at all and accomplish just the compulsory education. The characteristic feature of this group is the hero – behavioural model – a friend or a family member. This means that *status quo* is their career prospect, even staying at the level of the same or similar age group. The heroes they admire (friends, family members often unemployed and uneducated) representing the background they come from does not provide enough stimuli for further progress. The results show the importance of providing these pupils systematically with other behavioural models.

Other two primary schools (Kezmarok and Spisska Teplica) achieve similar success in the admission; the pupils usually continue studying at vocational secondary schools accomplished with school leaving examination or grammar schools. In these cases, the heroes include mostly family members (successful in professional careers and educated), sportsmen/women, and singers. It shows that their ambitions lead them towards progress, success, and recognition as substance of exercising effort and hard work.



	Grammar school	Secondary schools with state-leaving examination	Secondary schools without state-leaving examination	Accomplished compulsory education
ZS Spisska Teplica	25,00%	75,00%	0,00%	0,00%
ZS Hranovnica	0,00%	0,00%	75,86%	24,14%
ZS Kezmarok	19,05%	80,95%	0,00%	0,00%

Figure 4: Overview of the pupils' future career paths by the surveyed primary schools

As comes from the above analysis, the behavioural models indicate the tendency of the respondents to follow their heroes. Even though the sample is small, the shift in hero categories in Kezmarok and Spisska Teplicka documents crossing the familiar context of the family and taking into account the models represented primarily by mass media and social media (sportsmen/women, singers), i.e. looking for new models even though to follow them would be demanding.

On the other hand, Hranovnica state primary school with the disadvantaged group of Roma pupils shows the tendency towards encapsulation in the familiar community. Even though the percentage of friend category decreases, the family member category rises by 28.75%. Functioning in the familiar context does not require extra effort and offers safe and comfortable feeling of familiarity.

Conclusion

The first-order survey of heroes at the level of 4th grade and 8th grade pupils shows that analysing the behavioural models can contribute to understanding the attitudes of people towards academic and work-related achievements. The employers, primarily those who employ unskilled or low-qualified workforce, should be aware of the fact that the behavioural model of the employee can crucially influence his/her attitude towards work-related tasks. This overview is important for secondary schools as well. The

students' success or failure (drop out) can be based on admiring achievement-supportive or achievement-unsupportive model, and not exclusively on the qualities of the student in question.

Of course, the combination of conditions leading to the success or failure in one's work career is complex, but the methodology using heroes as indicators of one's preferences is helpful. The pupils coming from low-stimulating background tend to imitate their family members leading towards having large family, friends, and stay happy with what is available at hand.

The survey provides evidence that pupils do not read books (global trend) because the categories of literary characters are missing in their responses.

The high percentage of responses without any hero is appalling and needs deeper analysis. This group consists of the youth easily influenced by *ad hoc* behavioural models, even negative ones.
Further research is needed not only in survey of higher age groups' heroes to see how categories change, but also in deepening to identify values with motivational as well as disvalues with de-motivational potential in the groups' career paths. This should be linked to the respondents' images of the successful careers they want to follow in the future.

[1] The state-leaving examination allows for further studies at universities, similar to *Matura* in Germany or *baccalauréat* in France.

Acknowledgment

The paper was prepared with the support of the project VEGA no. 1/0393/16.

References

Australian Childhood Foundation (2006). 'Every child needs a hero – A report tracking Australian children's concerns and attitudes about childhood. ' [Online], [Retrieved February 21, 2015], http://www.childhood.org.au/~/media/Files/Research/Every%20child%20needs%20a%20hero.ashx

Bandura, A. (1977). Social Learning Theory, Prentice-Hall, Englewood Cliffs, New Jersey.

Blair, C. and Diamond, A. (2008). 'Biological processes in prevention and intervention: The promotion of self-regulation as a means of preventing school failure.' *Development and Psychopathology*, 20, 899-911.

Community programs to promote youth development (2002). National Research Council and Institute of Medicine, National Academy Press, Washington.

Grác, J. (1990). Exemplifikácia: Vzory a modely v živote človeka, Obzor, Bratislava.

Jones, D.E., Greenberg, M. and Crowley, M. (2015). 'Early social-emotional functioning and public health: The relationship between kindergarten social competence and future wellness.' *American Journal of Public Health,* 105(11), 2283-2290.

Konold, T. R., and Pianta, R. C. (2005). 'Empirically-derived, person-oriented patterns of school readiness in typically-developing children: Description and prediction to first grade achievement.' *Applied Developmental Science*, 9(4), 174-187. http://dx.doi.org/10.1207/s1532480xads0904 1

Moffitt, T.E. et al. (2010). 'A gradient of childhood self-control predicts health, wealth, and public safety.' Proceedings of the National Academy of Sciences of the United States of America, Chicago

University Press, Chicago.

Piaget, J. (1936). Origins of intelligence in the child, Routledge & Kegan, London.

Raver C. C. (2002). 'Emotions matter: Making the case for the role of young children's emotional development for early school readiness.' Social Policy Report, 16. 3-6.

Romano, E., Babchiskin, L., Pagani, L. S., and Kohen, D. (2010). 'School readiness and later achievement: Replication and extension using a nationwide Canadian survey.' *Developmental Psychology*, 46, 995-1007. http://dx.doi.org/10.1037/ a0018880.

Suleimanová, J. H., Poláková, M. and Wojčák, E. (2013). 'University graduates´ competences of selected faculties in comparison to employers´ needs.' *Management: science and education*, 2(2), 41-44.

Taylor, J. (2010). 'Parenting/Popular Culture: Where Have All Our Heroes Gone?' [Online], [Retrieved January 19, 2017], http://www.psychologytoday.com/blog/the-power-prime/201007/parentingpopular-culture-where-have-all-our-heroes-gone

Vrabec, N. and Petranová, D. (2013). Nové vzory mládeže v kontexte mediálnej komunikácie, Vydavateľstvo Michala Vaška, Prešov.

Vygotski, L.S. (1929). 'The Problem of the cultural development of the child.' *The Pedagogical Seminary and Journal of Generic Psychology*. 36(3). 415-434.

Wisniewski, R. (2000). 'The Averted Gaze.' *Anthropology and Education Quarterly*, 31(1). 5-23.

Theoretical Model Application: Advantages vs. Disadvantages

Ap-Azli Bunawan, Mohd Razilan Abdul Kadir, Mohd Zailan Endin, Jannatul Iza Ahmad Kamal, Ezza Rafedziawati Kamal Rafedzi, Mohd Yusof Mustaffar, Nurhidayah Hashim.

Faculty of Information Management, Universiti Teknologi MARA, 40150, Shah Alam, Selangor. Malaysia.

E-mail: ap-azli@salam.uitm.edu.my, mrazilan@salam.uitm.edu.my, zailan_endin@uitm.edu.my, jannatul406@puncakalam.uitm.edu.my, ezza464@salam.uitm.edu.my, yusof769@salam.uitm.edu.my, nurhi066@salam.uitm.edu.my.

Abstract

This paper is formulated to demolish the confusion among researchers in terms of applying the theoretical model in research. As to demolish, this paper introduced issues that faced by researchers. These includes analysing the advantages and disadvantages of theoretical model application. Through the analysis, an extensive explanation of the model has been divided into two (2) categories. These include explaining on the advantages and disadvantages of theoretical model. By applying a scoping review technique as a methodology applied in this paper, the entire aspects of theoretical model are adequately analysed. This is then has led to the formulation of figure as to present the overall result of analysis. As presented, the advantages and disadvantages of theoretical model are firmly justified. Through these justifications, the several elements in each of categories which define in the literature are listed and explained. At last, this paper has concludes that, the entire explanation which resulted from the analysis is expected to resolve the confusion among the researchers.

Keyword: Theoretical Model, Application, Advantages, Disadvantages, Confusion.

Introduction

Nowadays, the development of model in research has become the main concern of the researchers. Part of the model concerned is on applying the theoretical model in research. As stated by Nilson et al. (2017), the theoretical model is an important tool to qualify and optimize the evaluative research process. However, Lenhardt and Schiffmann (2016) stated that theoretical model is not directly applicable to real world problems. This followed study conducted by Liu et al. (2017) which have not applied the multiphase theoretical model in their research because of the lagging in finalising the related theories. Therefore, this is where the details on advantages and disadvantages of applying theoretical model in research need to be clearly justified.

Literature Review

As to justify, there are two (2) subsection are designed for extensively described the advantages and disadvantages of theoretical model application. This designed is to ensure the exploration towards the entire literature that related to theoretical model application has been adequately conducted.

Advantages of Theoretical Model

Based on the literature, the theoretical model application has generates a number of valuable aspect while conducting a research. The research conduct by Chiariotti et al. (2015) have shown that a development of theoretical model in their research is not developed for a specific system but it can be applied to any real system that satisfies its assumptions. As it being satisfied, Ràfols and Molas-Gallart (2016) stated that, a theoretical model is needed for linking the research mission to be captured with the specific data to be measured. This followed by Burgio et al. (2017) which have specified that, a good theoretical model is required to interpret the observation and use it to place

constraints on fundamental theory. Through these literature reviews, it is proven that the application of theoretical model in research have facilitate researchers in fulfilling part of the research work.

Disadvantages of Theoretical Model

In this section, there are several arguments from the scholars are presented. These includes presenting the weaknesses of applying the theoretical model in research. Based on Tu and Yuan (2014), theoretical model is developed through literature review and has never been tested. This followed by Afsa and Givord (2014) which stated that, the theoretical model must be tested on a case-by-case basis. On top of that, Gonca et al. (2015) stressed that the verification of theoretical model need to be conducted using the experimental result. In fact, the research conduct by Ni et al. (2015) shows the theoretical model is not precise enough to present their entire data findings. Overall, the literatures have shown that, the application of theoretical model is only applicable for assuming the earlier stage of research findings.

Methodology

As for the methodology, this paper adopted a scoping review technique. According to Veronica Gutchell (2014), *a scoping review is an approach to summarizing the literature that assesses the relevancy and contribution of a published work, and not solely the methodological approach for inclusion criteria*. Then, Snyder et al. (2016) have stated that, *a scoping reviews are a form of a literature review that seeks to identify and map out the existing body of work, the research gaps that exist, and the opportunities for knowledge mobilization and communication efforts*. In fact, *the goal of the scoping review is to access and review published research that focuses on identifying competencies related to the innovation* (Metz, 2016). Through these justification, this is where this paper has adopted this review technique in searching the literatures.

Result

Through the entire analysis, this section is designed to present the entire result. These includes explaining each of the result into two (2) categories. As for the details, the overall result of analysis is visualised in the figure below.

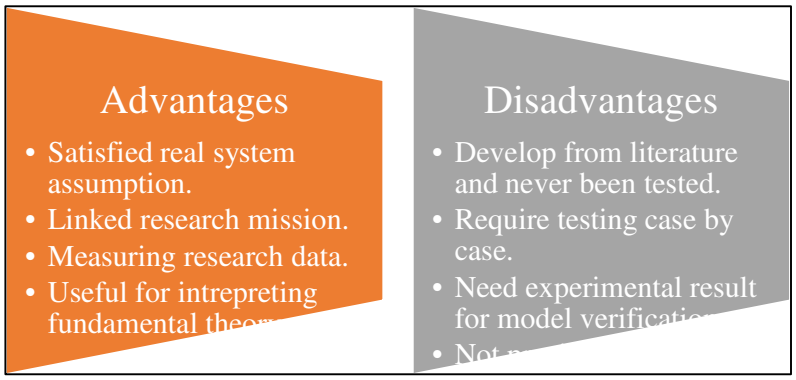


Figure 1.1: Advantages and disadvantages of Theoretical Model

Figure 1.1 above has visualised the advantages and disadvantages of theoretical model. As visualised, there four (4) advantages and disadvantages of theoretical model presented. The advantages includes satisfied real system assumption, linked research mission, measuring research data and useful for interpreting fundamental theory gathered from the literature. However, the disadvantages of theoretical model are includes develop from literature and never been tested, require testing case by case, need experimental result for model verification and lastly it is not precise enough to present entire data findings. Through these explanations, the comparative analysis regarding the application of theoretical model is adequately presented.

Conclusion

As a conclusion, demolish the confusion regarding the application of theoretical model in research among the researcher has become the main aim of this paper. Triggered by several argument from the scholars, it has led to the conflict of preferences either the theoretical model is requires or not while conducting research. By presenting advantages and disadvantages of applying the theoretical model, it is expected that the confusion and conflict of preference can be delineated precisely. Hence, this is also would act as a guidelines for the researchers in terms of developing a successive research model.

References

1. Afsa, C., & Givord, P. (2014). The impact of working conditions on sickness absence: a theoretical model and an empirical application to work schedules. *Empirical Economics*, *46*(1), 285-305.

2. Burgio, F., Drago, A., Jones, I., Metzeger, B., & Pizzochero, P. (2015). The structure and signals of neutron stars, from birth to death. *Il Colle di Galileo*, *4*(2), 29-34.

3. Chiariotti, F., Pilon, G., & Badia, L. (2015, December). A Game Theoretical Framework for Token-Based Adaptive Video Streaming. In *Global Communications Conference (GLOBECOM), 2015 IEEE* (pp. 1-6). IEEE.

4. Gonca, G., Sahin, B., Parlak, A., Ust, Y., Ayhan, V., Cesur, İ., & Boru, B. (2015). Theoretical and experimental investigation of the Miller cycle diesel engine in terms of performance and emission parameters. *Applied Energy*, *138*, 11-20.

5. Lenhardt, J., & Schiffmann, W. (2016, November). Energy Efficient Processing of Fine-Grained Loads in Heterogeneous Server Farms. In *Computing and Networking (CANDAR), 2016 Fourth International Symposium on* (pp. 105-111). IEEE.

6. Liu, K., Lu, L., Wang, F., & Liang, W. (2017). Theoretical and experimental study on multi-phase model of thermal conductivity for fiber reinforced concrete. *Construction and Building Materials*, *148*, 465-475.

7. Metz, A. (2016). Practice profiles: A process for capturing evidence and operationalizing innovations. *National Implementation Research Network White Paper*.

8. Ni, Y., Lin, H., & Li, Y. (2015). Stability design of maglev actuator in active vibration control.

9. Nilson, L. G., Dolny, L. L., Natal, S., Lacerda, J. T., & Calvo, M. C. M. (2017). Telehealth Centers: A Proposal of a Theoretical Model for Evaluation. *Telemedicine journal and e-health: the official journal of the American Telemedicine Association*.

10. Ràfols, I., & Molas-Gallart, J. (2016). A call for inclusive indicators that explore research activities in "peripheral" topics and developing countries. *Impact of Social Sciences Blog*.

11. Snyder, J., Cheff, R., & Roche, B. (2016). Perceptions of the Social Determinants of Health Across Canada.

12. Tu, Z., & Yuan, Y. (2014). Critical success factors analysis on effective information security management: A literature review.

13. Veronica Gutchell, D. N. P. (2014). An Evidence-based Path to Removing APRN Practice Barriers.

The Hybrid Model of Multivariate Index Analysis of Current Assets

Tsatsulin Alexander Nickolaevich

North-West Institute of Management — branch of the Russian Presidential Academy of National Economy and Public Administration (Saint-Petersburg, Russian Federation), Professor of the Chair of Financial Management, Doctor of Sciences (Economy), Professor, Honorary Worker of Higher Education of the Russian Federation, Full member of National Academy of Tourism of Russia, Full member of the European Academy of Natural Sciences (Hannover, Germany), vash_64@mail.ru

Evreinov Oleg Borisovich

Baltic Academy of Tourism and Entrepreneurship (St. Petersburg Russian Federation), Vice Rector for Academic Affairs and Innovations, candidate of economic sciences, associate professor, ob@batp.ru

Abstract

This article discusses the principles and methods of constructing hybrid model multivariate index analysis treatment of tangible assets on the example of retail trade enterprises. Analysis of the time and speed of the current assets held in respect of the current inventory storage for uniform positions of the group range shoe department of the economic entity. Separately were built time model and the turnover rate. And the final stage, the crossing using the index procedure was constructed by *vlt*-model, which comprises five separate signs factors. For each of rounds signs factors hides its standard statistical measure, which is traditionally carried out by an economic analysis based on defined goals and objectives, both in enterprises and for special applied research. These indicators serve as indicators of the financial condition of any economic subject, are comparative characteristics in assessing the competitiveness of the subject in the commodity markets and can be used to assess the market value of the business. The resulting model is verified, it held on reliable calculations. The model opens up new horizons of financial and economic analysis of movement of material assets of the enterprise, and allows you to put together a comprehensive study the parameters of speed and time of commodity circulation. The latter is complicated, and it is sometimes even impossible, in multivariate econometric models in connection with the phenomenon of multicollinearity of signs factors. This circumstance makes it promising for the first time built a similar hybrid model for solving the problems of short-term forecasting, and for the purpose of operational planning of material circulating assets.

Keywords: Simple index, analytical index, index crossing, mixed-index analysis, hybrid model of factor analysis, primary and secondary feature, working capital, current assets, index model

Rumors of slowness crocodiles are spread by the crocodiles themselves.
(From the observations of a nature lover)

Introduction

Research in the field of industrial production, as well as in wholesale and retail trade links issues of turnover of tangible assets is a separate and important area of analysis of the financial condition of any economic subject. The effectiveness of such asset management is reflected immediately in terms of solvency and stability of the enterprise. There is considerable domestic and foreign bibliography dedicated to the study of time and the speed of certain types of tangible assets. This article is related to the construction of a fundamentally new hybrid *vlt*-model multivariate analysis on the example of the dynamics of asset inventory of a particular trader.

Among the most important economic characteristics and generalizing Stick efficiency of movement in the market space and the commodity circulation mass in the form of raw materials and fuel finished product inventories and etc. within the production cycles are indicators – *The time of the work-*

ing capital and *the velocity of the working capital*. These indicators generally serve a special economic concept as turnover of goods.

The economic analysis of these characteristics is particularly important in setting conditions of the market mechanism of management of industrial enterprises of the real sector, sales, trading and purchasing of specialized applications and systems, improvement of commercial calculation and the increasing importance of financial leverage in the market of diverse relationship partners [1; 2].

Formulation of the problem

Analysis of the time and the velocity of inventory included in the scheme of analysis of working capital, but it should be carried out taking into account the results directly analyzing the volume and structure of sales production and trade. Let us consider the measure currents security indicator turnover of inventory, i.e. during the treatment of a fixed mass of commodities, in order to build a multifactor index model analysis of treatment of tangible assets of the economic entity [3-5].

Analysis of the inventory of the current storage for example, by the trade organization, can be illustrated by the example shown in the table 1 (columns 7-8). After analyzing the current inventory storage overall economic entity by techniques is analyzed by comparing individual headings range. Research Methodology, used here by the author, based on the technique of index analysis with the assistance of the First and Second Index systems, the development of which directly involved the works of authors [6-8].

The range of instruments used in the study includes the construction of simple and multivariate analytical indexes, with the release of a result on the construction of the five-factor model, a hybrid of retail turnover. Author's model contains the analysis of the time factors, material assets turnover rate, size, inventory and analysis of two structural components with respect to the value of one-day sales and stock SKUs current storage company.

Analysis of the Speed treatment of inventory (v-model). Analysis of the current inventory storage, one of whose tasks is to identify deviations of the actual stock on a specific date from the commodity standard of this period can't be complete without examining the rate of turnover of tangible assets, which has independent significance.

It is recalled that already considered above the indicator for the asset or the time-reversal of inventory – is the term or period of time during which marketed the average inventory. The faster committed commercialized products, the less working capital in the form of tangible assets required for uninterrupted treatment process in trading systems, and the lower, hence, distribution costs are developing in trade and value chains.

Acceleration asset turnover, in turn, leads to a reduction the duration of the process of handling the material benefits in the form of a complete production and supply cycle, and, accordingly, to increase profitability, strengthen the financial condition of the company and etc. On an indicator of security turnover inventory is closely related indicator of the *speed of circulation of commodities*, or the turnover of tangible assets having independent analytical value.

The rate of circulation of commodities, or *inventory turnover*, or even *the turnover speed* characterizes the number of revolutions of the mass of commodities, taken in the amount of the average commodity stock, which is calculated every time specifically for the analyzed period. The practical content of this characteristic can be interpreted as follows with the options a comment: how many times renewed commodity stock during the analyzed period, or a sales occurs during the reporting period in the amount of the average commodity stock.

Table 1 – Calculation of deviations from the norm of inventory storage current *j*-th type retailer Limited Liability Company "Trading House" for the III quarter of 2015*

Order №	At the beginning of the month reporting year	Credited (planned) turnover for the quarter, ths. rubles		The actual inventory of the current storage		Deviation from the norm		The actual turnover per month, ths. rubles
		total	day turnover ИП$_3$/n_{pl}**	cost of, ths. Rub.	turnover in days	cost of, ths. Rub.	turnover in days	
$i=\overline{1,k}$	i	$W_{pl}^{(ij)}$	$W(1)_{pl}^{(ij)}$	$З_1^{(ij)}$	$v_1^{(ij)}=\overline{З_1^{(ij)}}/W(1)_{pl}^{(ij)}$	$\Delta З_{1/n_0}^{(ij)}$	$\Delta t^{(ij)}_{1/n_0}$	$W(1)_1^{(ij)}$
1	2	3	4	5	6	7	8	9
1	01.07.2015	×	×	15 600	78.00	600.00	3.00	5 850.00
2	01.08.2015	×	×	12 000	60.00	-3 000.00	-15.00	5 200.00
3	01.09.2015	×	×	9 600	48.00	-5 400.00	-27.00	6 900.00
4	The specification for the III quarter	18 000	200.00	15 000	75.00	×	×	17 950.00
5	01.10.2015	18 900	210.00	15 900	–	–	–	–

* *Data source*: the official state reporting data operational and technical and managerial accounting;
** *Note*: n_{pl} = 90 days.

In analyzing the dynamics of the rate of circulation of commodities and commodity-supply treatment time is traditionally used index method is simple, it is a clear, reliable and generally efficient comparison tool in conducting analytical calculations factor in the following areas: analysis of growth in turnover through faster turnover of goods; calculation of volume released (mobilized) or overly involved (immobilized) current assets as a result of the rate of change and the time the time of turnover of goods [9].

In order to illustrate these aspects of the example analysis of said range of footwear companies, which is listed in Table 2, should be to build the index dynamics of the average rate of turnover for the three *k*-th commodity items $(k=\overline{1,s})$, that are reflected in the table for the reporting and the base period. This measure of the average speed will be the index of variable composition – characteristic of a productive attribute the so-called First index system (I *IS*):

Table 2

The analysis of turnaround time of (*t*-model) and of turnover speed (*v*-model) material current assets in trade for the shoe department of Limited Liability Company "Trading House" for the III quarter of 2014-2015

Order №	Name of product group footwear	Quarterly volume of turnover by period, ths. rubles		Individual quarterly turnover index	Average inventory on current storage periods, ths. rubles		Individual index of inventories	Structure of average inventory for the period, %		The speed of turnover by period, time	
		basic	reported		basic	reported		basic	reported	basic	reported
$k=\overline{1,s}$	k	$W^{(k)}{}_0$	$W^{(k)}{}_1$	$i^{(k)}_{W_{1/0}}=\frac{W_1^{(k)}}{W_0^{(k)}}$	$З^{(k)}{}_0$	$З^{(k)}{}_1$	$i^{(k)}_{З_{1/0}}=\frac{З_1^{(k)}}{З_0^{(k)}}$	$d^{(k)}_{з_0}=\frac{З_0^{(k)}}{\sum_{k=1}^{s}З_0^{(k)}}$	$d^{(k)}_{з_1}=\frac{З_1^{(k)}}{\sum_{k=1}^{s}З_1^{(k)}}$	$v^{(k)}{}_0$	$v^{(k)}{}_1$
1	2	3	4	5	6	7	8	9	10	11	12
1	Leather	24 260.00	29 820.00	1.2214	6 990.00	6 130.00	0.8770	27.67	23.03	3.47	4.86
2	Combined	21 350.00	30 640.00	1.4346	10 100.00	12 340.00	1.2218	39.99	46.36	2.11	2.48
3	Sports	12 080.00	12 110.00	1.0150	8 170.00	8 150.00	0.9976	32.34	30.61	1.48	1.49
–	Totally:	57 690.00	72 570.00	1.2579	25 260.00	26 620.00	1.0538	100.00	100.00	2.284	2.726

$$\Im_{\bar{v}(\bar{З},v)\,1/0} = \bar{З}_1\,\overline{v_1^{(k)}} : \bar{З}_0\,\overline{v_0^{(k)}} = \frac{\sum_{k=1}^{s} v_1^{(k)}\bar{З}_1^{(k)}}{\sum_{k=1}^{s}\bar{З}_1^{(k)}} : \frac{\sum_{k=1}^{s} v_0^{(k)}\bar{З}_0^{(k)}}{\sum_{k=1}^{s}\bar{З}_0^{(k)}},$$

$v^{(k)}{}_0 => v^{(k)}{}_1$
$З^{(k)}{}_0 => З^{(k)}{}_1$

where $\bar{З}_1\,\overline{v_1^{(k)}}$ – the average speed of the mass of commodities turnover in the reporting period specified in the Table. 2 commodity groups shoe range.

Thus, the relative *growth rate of turnover* in the reporting period compared with baseline was 19.35%. This increase occurred both through the growth of the actual speed rate (circulation of commodities) on all commodity positions range (see: Individual indices rate of commodity circulation in column 13 of table 2), and due to changes in inventory structure for the same commodity items, that is, i.e. on the analyzed groups of shoes – leather, combined and sports (respectively, columns 9 and 10 of table 2).

In other words, the very average increment rate in the dynamics has taken place due to the simultaneous and combined effects of these two factors taken into account traits that should be resolved by the analyst on the individual components. Consequently, this increment should be laid out on the factors noted specifically that will take into account their impact on the isolated change in the average characteristics of the velocity under the First *IS*. The index schema of factor analysis in this case can be in constructed by the expansion of variable composition of the index. But for the purposes of further analysis, the simple index of variable composition present in its *modified form* entry through the structural component – the proportion of margin in the range of graphs 9 and 10 table 2.

Continuation of Table 2

Individual index of commodity circulation speed	The volume of trade turnover for the one-day period, ths. rubles		Individual commodity mass index of a one-day turnover	The structure of the one-day turnover by period, %		Treatment in time periods, days		Individual index time reversal commodity weight
	basic	reported		basic	reported	basic	reported	
$i^{(k)}_{v_{1/0}} = \frac{v_1^{(k)}}{v_0^{(k)}}$	$W(1)_0^{(k)}$	$W(1)_1^{(k)}$	$i^{(k)}_{W(1)_{1/0}} = \frac{W(1)_1^{(k)}}{W(1)_0^{(k)}}$	$d^{(k)}_{W(1)_0} = \frac{W(1)_0^{(k)}}{\sum_{k=1}^{s} W(1)_0^{(k)}}$	$d^{(k)}_{W(1)_1} = \frac{W(1)_1^{(k)}}{\sum_{k=1}^{s} W(1)_1^{(k)}}$	$t_0^{(k)}$	$t_1^{(k)}$	$i^{(k)}_{t_{1/0}} = \frac{t_1^{(k)}}{t_0^{(k)}}$
13	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**
1.4006	271.00	331.00	1.2214	42.28	41.07	25.79	18.52	0.7181
1.1754	237.00	340.00	1.4346	36.97	42.18	42.62	36.29	0.8515
1.0068	133.00	135.00	1.0150	20.75	16.75	61.43	60.37	0.9827
1.1935	641.00	806.00	1.2574	100.00	100.00	39.407	33.027	0.8381

$$\Im_{\bar{v}(d\bar{\Im},v)1/0} = \frac{\sum_{k=1}^{s} d^{(k)}_{\bar{\Im}1} v_1^{(k)}}{\sum_{k=1}^{s} d^{(k)}_{\bar{\Im}0} v_0^{(k)}}.$$

$d_{\bar{\Im}_0} \Rightarrow d_{\bar{\Im}_1}$

$v_0 \Rightarrow v_1$

The aggregate index, all the values of the factors taken into account ($d_{\Im}$ и v) change their value during the transition from reporting period to the base period. For this reason, it should be recalled, the index is called the index of variable composition resultant variable. In order not to clutter the calculation formulas in the following text, the expression "hell" over the symbol of the sign as a characteristic of a statistical averaging of inventory on the corresponding headings of the analyzed sign-factor $\overline{\Im_0^{(k)}}, \overline{\Im_1^{(k)}}$ will have to be omitted.

To assess the impact of the turnover rate of individual headings to change the average velocity for the entire range of goods should be built within the I *IS* have analytical index of constant composition. Actually, the analytical index is constructed according to the rules of construction of factor analytic index with weights appropriate period taking into account the statistical nature of the indexed attribute [10]. In the case of constructing the index of constant composition – on the balance of the reporting quarter of 2015 in relation to the secondary feature – the velocity of the mass of commodities (*v*)

Calculations show that the decrease in the average turnover rate of 2.36%, reflecting the structure of index changes, there by reducing the proportion of the fastest on the winding assets against the share of growth relatively "slow" the winding assets (compare the reduction in the share of leather shoes and footwear increased percentage combined in rows 1 and 2 in column 9). This brings to mind a quote from Carroll, quoted in an epigraph to the article, where there categories *Comparability*, *Relativity* are treating terminologically extremely informative and very modern.

Built system indices can also be determined in accordance with the above trend analysis of the absolute amount of growth in turnover due to the acceleration of the turnover of individual products. This

value is defined as the difference form the index of constant composition formula, presented in a familiar, for analytical indexes, aggregate form. The presented scheme of construction of I and II *IS*, followed by analytical calculations and comments reveal certain possibilities of deepening and detailed economic analysis of the characteristics of the retail turnover of the company investigated. Opening possibilities allow further discussion during case study material to build more complex multivariate index structure in the form of analytical models involving, in addition to the characteristics of the turnover rate of current tangible assets (v), and the characteristic time of their treatment (t).

For the construction of the aforesaid models were used index methods of analyzing the dynamics of inventory homogeneous range with the assistance of the First (I *IS*) and the Second index system (II *IS*). And if I *IS* allows factor analysis with elements of degradation of resultant variable with respect to changes in the structure and composition of the assets, the II *IS* directs the analyst on the study of direct communication characteristics of statistical factors and their components.

Thus, in the course of transformation was obtained 3-factor model of the volume index of turnover, depending on changes in the average of inventory, changing its structure and changes in the average speed (rate) of its commodity circulation. This model can be called *three-factor model* analysis of trade, depending on the state and dynamics of commodity stocks. In terms of content model must be "streamlined" as indicated in the scheme of logical and quantitative link located directly below the expression.

$$\underset{1,2579}{\mathfrak{I}_{W(v,3)\frac{1}{0}}} = \underset{1,2224}{\mathfrak{I}_{\bar{v}(v)\frac{1}{0}}} \times \underset{0,9764}{\mathfrak{I}_{\bar{v}(d_3)\frac{1}{0}}} \times \underset{1,0538}{\mathfrak{I}_{3\frac{1}{0}}},$$

$\mathfrak{I}_{\bar{v}(v^{(k)},3^{(k)})\frac{1}{0}} = 1,1935$

$\mathfrak{I}_{W(v,3)\frac{1}{0}} = 1,2579$

Analysis of the treatment time (t-model) of tangible assets in the form of stock. Similarly, the above analysis the turnover rate can be analyzed during the treatment of inventory on the scheme I *IS* suitable for a homogeneous mix. However, here the pair Rounds and independent of each other factors ($t^{(k)}$, $W(1)^{(k)}$) of the multiplier determines the average size of the current storage stock ($3^{(k)}$). Needless to say, the influence factor calculations similar to the calculations for the analysis of asset turnover rate.

The index indicates a decline in the average time of treatment of inventory by improving the day-sales structure: in particular, significantly decreased the proportion of third heading (from 20.65% to 16.75% – see graphs 16 and 17 in Table 2), in which observed the most significant treatment time (see graph 19 in the same table 2). Upon completion of the analysis of current assets can be cut to obtain another interesting derivative of the dependence of the analyzed indicators. To do this, repeat all the necessary transformations with algebraic expressions, used as the component of I *IS*. Namely, with the index of variable composition, the average time reversal of inventory depending on changes in the actual turnaround time and one-day volume of turnover.

But the resulting ratio is definitely not the ultimate goal of the done reforms and is only an intermediate structure for the purpose of a more detailed study of the state and dynamics of current assets with the involvement of other optional examined similar analysis systems. It is also permissible already used technique *index cross connection*, which allows due to differences in the analyzed attributes index systems to implement a kind of factorial addition. So, on the one hand, according to the expression, of variable composition index $\mathfrak{I}_{\bar{t}(t,W(1))\frac{1}{0}}$ is equal to the product of two factor indices treatment time and one-day turnover

$$\mathfrak{I}_{\bar{t}(t,W(1))\frac{1}{0}} = \mathfrak{I}_{\bar{t}(t)\frac{1}{0}} \times \mathfrak{I}_{\bar{t}(W(1))\frac{1}{0}}.$$

On the other hand, the same index $\Im_{\bar{t}(t,W(1))1/0}$ in accordance with equation coincides with the expression

$$\Im_{\bar{t}(t,W(1))1/0} = \Im_{\bar{3}(t,W(1))1/0} \quad : \quad \Im_{W(1)1/0}.$$

Considering the last two entries in the expressions as a system of two equations with the same left-hand sides, we solve the system of equations for the index $\Im_{\bar{t}(t,W(1))1/0}$, taken as an unknown variable.

Then place all the existing (pre-built) codes on the right side of the multiplier factor in a strictly meaningful sequence to link the goals of these indices in the system.

In this way the updated causal mechanism of statistical relationships and productive factor, in this case, the primary feature of this time stands for average commodity index storage inventories current reporting period compared to the base period.

$$\Im_{\bar{3}(t,d_{W(1)},W(1))1/0} = \Im_{\bar{t}(t)1/0} \times \Im_{\bar{t}(d_{W(1)})1/0} \times \Im_{W(1)1/0},$$

1,0538 0,8499 0,9861 1,2574

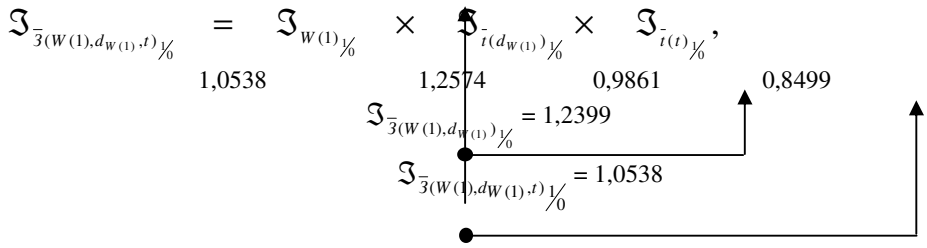
$\Im_{\bar{t}(t,W(1))1/0} = 0,8381$

$\Im_{\bar{3}(t,d_{W(1)},W(1))1/0} = 1,0538$

As a result of conversions received three-factor index model of average inventory-dependent changes in the mean time reversal of inventory ($\bar{t}$), a one-day change in the structure of trade turnover ($d_{W(1)}$) and the dynamics of one-day sales ($W(1)$).

This pattern of expression can be called *three-factor t-model* analysis of average inventory, depending on changes in the average time of treatment of assets, changes in one-day sales structure and dynamics of the one-day turnover. In terms of content and organizational terms aforesaid medium model of inventory of current storage must also be "ordered" or "linked" in a way that has already been used up, and as it is shown in the diagram, located directly under the multiplier from the expression. Such an ordering mechanism for causality of the phenomenon allows expert- analysts ably to perform, in addition to analysis of the influence of factors taken into account in the relative form, as an analysis of the impact of all the factors taken into account signs on the average size of inventory storage and the current in absolute terms, that is extremely important in the operational work of the specialists of the enterprise.

The data from this example table 2 permit to conduct such analysis of the impact of factors taken into account in absolute terms by the example of the same shoe product groups. For this it is necessary to arrange signs factors in the circuit of expression, starting with *a primary feature*, which is one-day trade $W(1)$, and further, in order of the content of their linkage in the index multiplier middle of inventory ($\bar{3}$). Then skip to the absolute account level of symptoms-factors, taking already as calculated indices and make a difference by calculating the index of the form, using the method of *chain substitutions*.



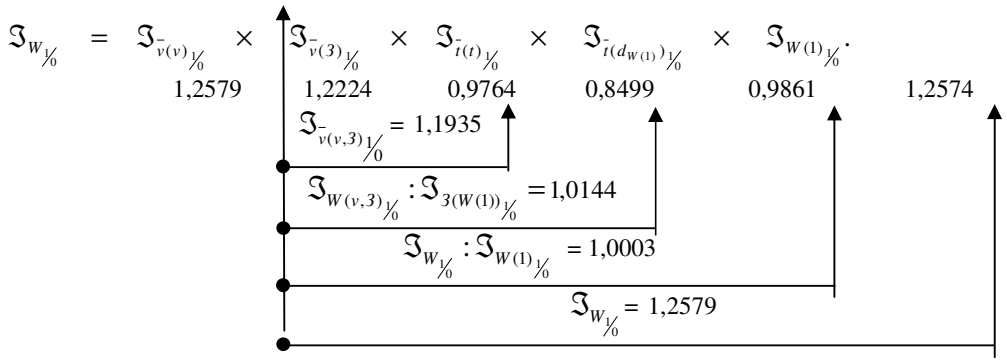
Because calculations on the scheme in the expression that due to a change in the structure of one-day sales (-1.39%), the mean of inventory increased by 23.99%. But due to the reduction of the time reversal of this reserve at 15.01% increase in the average stock of goods necessary for the reporting period was limited to only the size of a 5.38% compared to baseline.

Control countable check the balance of the partial effects (increments) factors on the change in the size of inventory in the reporting period compared to the base period gives a total of the amount of the total increment of the expression with the proviso of possible acceptable rounding error. All private, increment factors may be, if necessary, for the purpose of clarity, are summarized in a single standard analytical table of the table 3 type.

The Results of Research

In this article the author presents the conceptual hybrid *v*|*t*-model multivariate analysis (velocity-time), allowing much more detailed and much more fully explore the phenomenon of turnover of tangible assets of the economic entity.

Using the index schema of the expressions we can without difficulty obtain analytical relations that will link the complex into a single index variable composition scheme, both the index and three simple index of turnover dynamics, dynamics of average commodity stocks and the dynamics of one-day sales. The effectiveness of a sign, given the linear relationship (direct statistical relationship characteristics) of all indices in the form of a multiplier, will the index of retail trade turnover dynamics as dependent Rounds held in the analysis of the relative signs of factors, according to the regulations following *the five-factor model*



If *quantitative linkage* of all indices in direct communication performance does not cause technical difficulties, the meaningful economic docked each step with scoring indication (change of retail trade turnover) is not always obvious. Here, the expert-analyst should show patience in building a causal

chain of interrelated signs, to find the necessary parts of the circuit with fixed them actual performance. And finally, it is necessary to carry out a detailed interpretation of the results consistently. This is extremely important and is associated primarily with the fact that the plug-in hybrid model factors are manageable, they can predict and plan in orientation mode, the final economic results.

Bearing in mind the analysis of the absolute influence of the factors taken into account on a productive feature (in this case – the amount of retail goods turnover), the starting index of the chain in the formula of the expression should be the primary composite index only for its statistical nature trait-factor on the right side of the multiplier. He is a simple index of the dynamics of one-day sales – $\Im_{W(1)_{1/0}}$.

The next element of the chain linking "begs" to be an index that contains, at least in the numerator or the denominator of the aggregate characteristic of one-day sales volumes throughout the shoe assortment. That index is the index of one-day sales structure – $\Im_{\bar{t}(d_{W(1)})_{1/0}}$. Therefore, carefully calibrated and meaningful economic aspect of the method of chain substitutions, you can build the required analytical chain indices strictly specified sequence recorded chart below from the expression.

$$\underset{1,2579}{\Im_{W(W(1),\bar{t}(d_{w(1)}),t(t),\bar{v}(d_{\bar{3}}),\bar{v}(v))_{1/0}}} = \Im_{W(1)_{1/0}} \times \underset{1,2574}{\Im_{\bar{t}(d_{W(1)})_{1/0}}} \times \underset{0,9861}{\Im_{\bar{t}(t)_{1/0}}} \times \underset{0,8499}{\Im_{\bar{v}(d_{\bar{3}})_{1/0}}} \times \underset{0,9764}{\Im_{\bar{v}(v)_{1/0}}} \cdot \underset{1,2224}{}$$

$$\Im_{\bar{3}(d_{W(1)})_{1/0}} = 1,2399$$

$$\Im_{\bar{3}_{1/0}} = 1,0538$$

$$\Im_{W(d_{\bar{3}})_{1/0}} = 1,0289$$

$$\Im_{W(W(1),\bar{t}(d_{W(1)}),t(t),\bar{v}(d_{\bar{3}}),\bar{v}(v))_{1/0}} = 1,2579$$

As a control test is necessary to carry out an algebraic coherent meaningful linkage of each of the index built into the hybrid *v*|*t*-model (velocity-time) of turnover of tangible assets represented by the formula of the expression one by one, moving phases of this scheme in the direction *of the left – right*. We carry out a second factor linking the analytical index of the expression in the scheme of the index multiplier model. The second account is the index of the influence of the structure on the daily sales average time of treatment of the current inventory storage – $\Im_{\bar{t}(d_{W(1)})_{1/0}}$. The product of the first pair of indices gives the following interesting and understandable analytical dependence

$$\Im_{W(1)_{1/0}} \times \Im_{\bar{t}(d_{W(1)})_{1/0}} = \frac{\sum_{k=1}^{s} W(1)_1^{(k)}}{\sum_{k=1}^{s} W(1)_0^{(k)}} \times \left[\frac{\sum_{k=1}^{s} t_0^{(k)} W(1)_1^{(k)}}{\sum_{k=1}^{s} W(1)_1^{(k)}} : \frac{\sum_{k=1}^{s} t_0^{(k)} W(1)_0^{(k)}}{\sum_{k=1}^{s} W(1)_0^{(k)}} \right] =$$

$W(1)_0 \Rightarrow W(1)_1$

$d_{W(1)_0} \Rightarrow d_{W(1)_1}$, $t_0 = const$

$$= \frac{\sum_{k=1}^{s} t_0^{(k)} W(1)_1^{(k)}}{\sum_{k=1}^{s} t_0^{(k)} W(1)_0^{(k)}} = \Im_{\bar{3}(d_{W(1)})_{1/0}}.$$

$d_{W(1)_0} \Rightarrow d_{W(1)_1}$, $t_0 = const$

As a result, changes in the expression obtained an analytical index of commodity stock, depending on changes in the structure of one-day sales $\Im_{\bar{3}(d_{W(1)})_{1/0}}$. The next (third in a row) factorial analytical index in the formula of the expression, which is to be linked to the multiplier circuit is the index of

constant composition, the average time of inventory turnover – $\Im_{\bar{t}(t)1/0}$ of course, affects the size of the average stocks of this storage. We show below the necessary conversion

$$\Im_{\bar{3}(d_{W(1)})1/0} \times \Im_{\bar{t}(t)1/0} = \frac{\sum_{k=1}^{s} t_0^{(k)} W(1)_1^{(k)}}{\sum_{k=1}^{s} t_0^{(k)} W(1)_0^{(k)}} \times \frac{\sum_{k=1}^{s} t_1^{(k)} W(1)_1^{(k)}}{\sum_{k=1}^{s} t_0^{(k)} W(1)_1^{(k)}} = \frac{\sum_{k=1}^{s} t_1^{(k)} W(1)_1^{(k)}}{\sum_{k=1}^{s} t_0^{(k)} W(1)_0^{(k)}} =$$

$$= \Im_{\bar{3}(d_{W(1)},t)1/0} = \Im_{\bar{3}1/0}.$$

Next, for each factor to implement the scheme linking multiplier the fourth at the row components – index changes in the average turnover rate of tangible assets due to a structural shift in the composition of inventories. Here the result of the previous link of the index $\Im_{\bar{3}1/0}$, i.e. a simple index of the expression should be multiplied by an analytical index $\Im_{\bar{v}(d3)1/0}$. Should whenever approached carefully, guided by the rules of construction of the index scheme, the economic content of the technical and economic indicators and thoroughly carrying out the necessary changes in the aggregate parts conjugate of factor analytic index to the circular linking procedure codes into the system.

Noteworthy is the fact of "as if" automatic clarify the location of primary and secondary symptoms-factors $(W(1)^{(k)}, d_W^{(k)}, t^{(k)}, d_3^{(k)}, v^{(k)})$ in the corresponding intermediate chain links of the hybrid *v*|*t*-model up to the resultant variable factor - *W* from the expression. However, this seemingly natural ease laid analyst in advance in the preliminary selection of the factors taken into account and building up in the meaningful chain of interrelated indicators.

Conclusions

In the end, a case study based hybrid index model analysis of cost volume of the quarterly turnover, depending on the value of inventory and the current storage volume of daily sales. It is enough for the reader a clear economic sense of the final result of the conversion from the expressions, and allows managers to logistics and distribution business processes of production and trade, wholesale and retail trade and retailers to establish reasonable standards of current inventory storage. This approach can also be timely to make these regulations required course corrections as taking into account the intensity of daily sales, and taking into account an accurate assessment of the seasonality factor purchases-sales. Thus, even when taken separately and piecemeal, but a row, analytical indexes pair give in linking cost-clear and transparent results in the assumption that the factorial scheme in a straight multiplier characteristics of the statistical relationship is sufficiently pre-calibrated.

Semantic analysis of the scheme by individual expressions and, can be interesting to be interpreted as analytical indices built by a group of assessors "dual structural shift", which occurred in the first place, as a part of inventory, providing trade reporting period, due to changes in the structure of sales of daily trading enterprise of shoes. And this turned out to be an adverse structural shift was the cause of a different shift has happened as a result in the range of sales for the period under review. This is the second circumstance, as a result, led to a slight, barely noticeable, but the growth of retail trade turnover in the reporting period compared with the base only by 1.44% (compare with the previous indicator of growth +19.36% expression of formula) in the calculations of the analytical chain.

In fact, the first structural shift in the assessment of significant symptoms are caused by (as the cause) of the second structural shift of another, no less significant feature for quite appropriate analogy with the movement of geologic plates or reservoirs under tectonic phenomena of nature. The proposed model allows the author simultaneously and jointly explore and speed, and time of turnover of tangible assets with respect to typical primary reporting indicators and standard indicators of economic activity of the economic entity.

The hybrid model provides a reliable assessment of the effects of each factor on a productive sign and, accordingly, the carrying circular linking increments of each factor, not only in relative form, but also in absolute terms, i.e. at cost, using the method of the first differences as a special case of the method of chain substitutions with respect and dynamics, and targets, and the level of the plan. Table. 3 shows the influence of the absolute size of each of the five signs of factors on the amount of the quarterly retail turnover, as well as the values of these increments in comparison with both the overall increase (column 6), and in comparison with the base level of a productive attribute (column 7).

Table 3

Summary description of the analysis of the dynamics of material circulating assets of retailer Limited Liability Company "Trading House"

Order №	Factor name, which has been taken into account	Unit measurement	Contingent designations	Impact in absolute terms, Rub.	Relative deviation, % to	
					the total change	the level of the base period
$k=\overline{1,K}$	x_k	module	$\Delta W(x_k)_{1/0}$	$\Delta W(x_m)_{1/0} = x_{11}.x_{21}...\Delta x_{m1/0}...x_{k0}$	$\frac{\Delta\sum_{j=1}^{m} W(x_k^{(J)})_{1/0}}{\Delta\sum_{j=1}^{m} W(x_1,x_2,x_3,x_4,x_5)_{1/0}}$	$\frac{\Delta\sum_{j=1}^{m} W(x_k^{(J)})_{1/0}}{\sum_{j=1}^{m} W_0^{(J)}}$
1	2	3	4	5	6	7
1	The volume of one-day sales	rub. per day	$\Delta W(W(\mathrm{l}))_{1/0}$	15 043 700.13	101.10	26.08
2	The structure daily sales average time of treatment of the current inventory storage	days	$\Delta W(\bar{t}(d_{W(\mathrm{l})}))_{1/0}$	-3 008 815.39	-20.22	-5.22
3	The average stock turnover time	days	$\Delta W(\bar{t}(t))_{1/0}$	-6 073 615.21	-40.82	-10.53
4	Change in the average rate of inventory turnover due to a structural shift	speed for the period	$\Delta W(\bar{v}(d_{\bar{3}}))_{1/0}$	-4 374 671.48	-29.39	-7.58
5	The average velocity of circulation of inventory	speed for the period	$\Delta W(\bar{v}(v))_{1/0}$	13 293 401.95	89.33	23.04
–	In total:	rubles	$\Delta W(x_1,x_2,x_3,x_4,x_5)_{1/0}$	14 880 000.00	100.00	25.79

Of course, the above scheme is proposed based on a factor analysis of the hybrid model of the index is not the only possible one. There are other, no less interesting patterns of economic analysis of the state and dynamics of current tangible assets with a different set of factors that characterize the level of inventory at different angles and in different aspects, and with not necessarily the index method, and correlation and regression methods analysis, and other analytical methods, complexity; at the expense of more serious mathematical apparatus, for example, with the use of matrix methods of research [12], and so forth.

The Direction of Future Research

However, due to set out in a two-part article considerations, it seems very promising is the use of hybrid aggregated *v*|*t*-model systems integrated analysis of financial and economic state of the business entity as well as, say, a ratio analysis and multivariate models predicting the subject of bankruptcy. Of particular interest are the undoubted opportunities offered by the author of the model to be useful in order to adjust the state of the accounting (financial) statements of the enterprise in making its management informed management decisions in the organization, in assessing the market value of the business, as well as in the provision of engineering and operational long-term planning.

References

1. **Tsatsulin A. N.** The Peculiarities of demand in the new forms of trade [Osobennosti formirovania sprosa v ramkah noviyh form torgovli. Materialiy respublikanskogo sovetzhania-seminara «Sovershenstvovanie rabotiy po izucheniyu sprosa v noviyh usloviyah hoziystvovania», Cheliaybinsk. – M.: Izd-vo VNIIKS MT RSFSR, 1988. – PP. 50-53. (rus)

2. **Tsatsulin A. N., Babkin A. V.** Analysis of the Structural Components and Measurement of the Effects of Cost Inflation in the Industry with the Help of the Index Method [Текст]. Proceedings of the 28th International Business Information Management Association Conference 9-10 November 2016 Seville, Spain. ISBN: 978-0-9860419-8-3. Vision 2020: Innovation Management, Development

Sustainability, and Competitive Economic Growth // Editor Khalid S. Soliman, International Business Information Management Association (IBIMA). – pp. 1559-1573.

3. **Baklanov G. I.** *Some questions of an index method* [Nekotorye voprosy indeksnogo metoda]. M. : Statistics [Statistika], 1972. – 346 p. (rus)

4. **Tsatsulin A. N.** *Management of expenses at the enterprise* [Upravlenie zatratami na predpriyatii]. Educational and methodical complex. Direction of education: 08.02.00.62 "Management". Qualification (degree) of the graduate bachelor / Baltic academy of tourism and business [Baltiiskaya akademiya turizma i predprinimatel'stva]. – St. Petersburg, 2014. – 112 p. (rus)

5. **Ploshko B. G.** *Grouping and systems of statistics. Indexes* [Gruppirovka i sistemy statisticheskikh pokazatelei. Indeksy]. M.: Statistics [Statistika], 1971. – 177 p. (rus)

6. **Alan R.** *Economic indexes* [Ekonomicheskie indeksy]. Translation from English. M. : Statistics [Statistika], 1980. 324 p. (rus)

7. **Kazinets L. S.** *Growth rates and structural shifts in economy (indicators of planning and statistics)* [Tempy rosta i strukturnye sdvigi v ekonomike (pokazateli planirovaniya i statistiki)]. – M. : Economy [Ekonomika], 1981. – 184 p. (rus)

8. **Adamov V.E.** *Factor index analysis (Methods and problems)*. Moscow, Statistics [Statistika], 2012. – 200 p. (rus)

9. **Tsatsulin A. N.** On the construction of index models for the analysis of material current assets in trade [Text]. - International scientific and theoretical journal "Bulletin of the Belgorod University of Cooperation, Economics and Law", Series "Economic Sciences", No. 3 (59), 2016. – pp. 113-128.

10. **Tsatsulin A. N.** *The analysis of a condition of commodity stocks by means of index schemes* [Analiz sostoyaniya tovarnykh zapasov s pomoshch'yu indeksnykh skhem] / In the collection: "Improvement of wholesale trade in consumer goods" [Sovershenstvovanie optovoi torgovli tovarami narodnogo potrebleniya] // Materials of a scientific and technical conference [Materialy nauchno-tekhnicheskoi konferentsii]. Under edition of N. P. Goncharov. SPb. : Knowledge [Znanie], 1989. – p. 52–59. (rus)

11. **Tsatsulin A. N.** *Economic analysis* [Ekonomicheskii analiz]. The textbook for higher education institutions. – SPb.: NWIM of RANEPA publishing house [Izd-vo SZIU RANKhiGS], 2012. – 924 p. (rus)

12. **Maksimenko E. I.** Matematicheskie metody kontrollinga. gosudarstvo i biznes: sovre-mennye problem ekonomiki. Materialy VIII mezhdunarodnoj nauchno-prakticheskoj konferencii. T. 4. – SPb.: sziu, 2016. – p. 65-70. (rus)

13. **Mackeviius, J.** Benendrojo pardavimo elningumo kompleksinès analizès metodika / J. Mackeviius, O. Molien, D. Popkait // Economika. – 2008. – Vol. 25, № 8 – P. 74-90.
14. **David, R. A.** Statistics for business and economics / R.A. David, J.S. Dennis, A.W. Thomas. – Mason, USA : Thomson Higher Education / Thomson South-Western, 2006. – 1010 p.

Список Литературы

1. **Цацулин А. Н.** Особенности формирования спроса в рамках новых форм торговли [Текст]. Материалы республиканского совещания-семинара «Совершенствование работы по изучению спроса в новых условиях хозяйствования», г. Челябинск. – М.: Изд-во ВНИИКС МТ РСФСР, 1988. – СС. 50-53.

2. **Tsatsulin A. N., Babkin A. V.** Analysis of the Structural Components and Measurement of the Effects of Cost Inflation in the Industry with the Help of the Index Method [Текст]. Proceedings of the 28th International Business Information Management Association Conference 9-10 November 2016 Seville, Spain. ISBN: 978-0-9860419-8-3. Vision 2020: Innovation Management, Development Sustainability, and Competitive Economic Growth // Editor Khalid S. Soliman, International Business Information Management Association (IBIMA). – pp. 1559-1573.

3. **Бакланов Г. И.** Некоторые вопросы индексного метода [Текст]. – М.: Статистика, 1972. – 346 с.

4. **Цацулин А. Н.** Управление затратами на предприятии [Текст]. Учебно-методи-ческий комплекс. Направление подготовки: 08.02.00.62 «Менеджмент». Квалификация (степень) выпускника бакалавр / Балтийская академия туризма и предпринимательства. – Санкт-Петербург, 2014. – 112 с.

5. **Плошко Б. Г.** Группировка и системы статистических показателей. Индексы [Текст]. – М.: Изд-во «Статистика», 1971. – 177 с.

6. **Алан Р.** Экономические индексы [Текст]. Пер. с англ. – М.: Изд-во «Статистика», 1980. – 324 с.

7. **Казинец Л. С.** Темпы роста и структурные сдвиги в экономике (показатели планирования и статистики) [Текст]. – М.: Экономика, 1981. – 184 с.

8. Адамов В. Е. Факторный индексный анализ (Методика и проблемы) / под ред. В.Е. Адамова. – М.: Статистика, 2012- 200 с.

9. **Цацулин А. Н.** О построении индексных моделей анализа материальных оборотных активов в торговле [Текст]. – Международный научно-теоретический журнал «Вестник Белгородского университета кооперации, экономики и права», Серия «Экономические науки», № 3 (59), 2016. – СС. 113-128.

10. **Цацулин А. Н.** Анализ состояния товарных запасов с помощью индексных схем [Текст] / В сборнике: «Совершенствование оптовой торговли товарами народного потребления» // Материалы научно-технической конференции. Под редакцией к. э. н. П. Г. Гончарова. – СПб.: «Знание», 1989. – СС. 52-59.

11. **Цацулин А. Н.** Экономический анализ [Текст]. Учебник для вузов. – СПб.: Изд-во СЗИУ РАНХиГС при Президенте РФ, 2012. – 924 с.

12. **Максименко Е. И.** Математические методы контроллинга [Текст]. Государство и бизнес: современные проблемы экономики. Материалы VIII международной научно-практической конференции. Т. 4. – СПб. : СЗИУ, 2016. – СС. 65-70.

13. **Mackeviius, J.** Benendrojo pardavimo elningumo kompleksinès analizès metodika / J. Mackeviius, O. Molien, D. Popkait // Economika. – 2008. – Vol. 25, № 8 – P. 74-90.

14. **David, R. A.** Statistics for business and economics / R.A. David, J.S. Dennis, A.W. Thomas. – Mason, USA: Thomson Higher Education / Thomson South-Western, 2006. – 1010 p.

Study On the Relationship Types of Non-Governmental Organizations with the Government

Elisa Gotesman (Bercovici) [1] University of Economic Studies, Bucharest, Romania
elisagotes@gmail.com

Prof. univ. dr. Rodica Pamfilie[2] University of Economic Studies, Bucharest, Romania
rodica.pamfilie@com.ase.ro

Assist. Univ. dr. Ioana Ceauşu[3], University of Economic Studies, Bucharest, Romania
ioana.ceausu@fabiz.ase.ro

Adrian Bercovici[4], University of Economic Studies, Bucharest, Romania patent@gmx.net

Abstract

In this paper we discuss the growing phenomenon of collaboration between governments and other sectors, Non- Profit Organizations (NPOs) in particular. We aim to define global types of collaboration, find which macro environmental factors influence them and what the role of local authorities is. The types of collaborations between NPOs and government in Israel will be examined and six types of formal collaboration will be defined. The subjects interviewed are non-profit organizations and consulting firms' Chief Executive Officers (CEOs). A case study of *informal collaboration* between an NPO and the government in Israel between the years 2016-2017 will be presented. In order to understand the reason of collaboration, its benefits and limits, we interviewed 5 NPO staff members and 3 senior representatives of the Ministry of Education who took part in the collaboration. We found that formal collaboration between NPOs and the government is based on: specific regulation or existing regulation, collaboration through a third party or as a joint venture, collaboration with exemption of tender or by tender. Each type has different advantages or disadvantages which NPOs managers should take in to consideration. The government in Israel is taking steps to rationalize the management of the formal connection. In the informal collaboration we found that both the NPO and the government are looking to gain knowledge. Though, the gap of different work rate of each party can be a problem in maintaining this collaboration.

Keywords: NPOs, collaboration with government, growth strategies

JEL Classification: A10; E6; H5;H7; H11

Introduction

As part of the global trend of privatization and decentralization of public services, we witness more governments around the world increasing collaboration with businesses and organizations from the nonprofit sectors. This phenomenon helps promote global and local economy in developing and developed countries (Gebba, et al., 2013).

Privatization can be defined as the form of transferring the ownership from the government to private organizations (NPOs or business) or transferring public tasks through some types of collaboration (Solecka, K. 2013). In addition, we can witness models of organizations which are state-owned enterprises (SOEs) or partly owned by the government (Powell, et al., 2014)

Due to this process, NPOs are playing a significant role in the life of people, from birth to old age in various aspects. These nonprofit organizations have become a significant provider of many services for the citizens. Some of the services used to be provided by the government and some were new creations, meant to bridge the gap between public needs and the lack of government response to

these. Although each country is influenced by local aspects of regulation, model of civil society, diversity of population, culture and leading values, there are some similarities in the case of NPOs collaboration with governments. Each side can profit by coping with its own weaknesses and taking advantage of opportunities for the benefit of the civil society.

On the one hand, economic models show that in some cases, NPOs can be more efficient and deliver services more effectively, be more flexible to public needs than the government. NPOs play an important role in advocacy, and represent marginalized groups. However, they can have difficulty with structure, definition of goals, fund raising, and dependence on the requirements of stakeholders. On the other hand, governments can be in some cases more reliable, have broad strategic visions, an appropriate broad infrastructure, be legally mandated and financially more resourced than NPOs, though political interests interfere sometimes. However, they can be cumbersome regulatory and be influenced by political interests (Brinkerhoff, et al., 2002) cited in Teegen, at al., (2004).

Theoretical Background

Types of relationships between NPOs and government

Scientific articles analyze the relationship between NPOs and the government from different points of view in terms such as duration of time, degree of formalism, the degree of change required from each partner, the degree of risk they take. As the collaboration grows deeper, a better understanding of the relationships, its risks and opportunities becomes more significant for managers of NPOs as part of their growth strategies and for governments in order to become more efficient. In this article, we analyze several possibilities of collaboration between the parties and pinpoint the advantages and disadvantages involved in the process. We will refer to some points of view, both formal and informal in order to explain types of collaboration. These include specific settings regarding the effective competition, cost consideration, the way of the form of winning, tenders among them (Gazley, B. 2008). We will elaborate on the types of tenders between the government and NPO's in Israel.

Cooperation and collaboration

The degree of cooperation between the government and businesses and NPOs can affect the size of the collaboration, the amount of time it will last, the degree of formality of the relations between the managers of the collaborators and the amount of budget investment required of each partner for the collaboration to succeed. Because each partner invests considerable resources in the development and accomplishment of the collaboration, it is important to try and define the type of partnership. Table no. 1 shows the general settings for possible collaboration types.

Table 1: Types of potential collaboration between NPOs and the government

Type of collaboration	Explanation	Goals
Cooperation means short term, informal, voluntary relations between people and organizations (Houge 1994; Ciger 2001).	The two participants in the cooperation share information and location but are independent and look for establishing relationships with others to achieve individual development. Partners have low trust, and infrequent communication.	Short term, informal, achieve individual development

Coordination refers to partners that comprise strategies and responsibilities that entail information sharing, mutual planning and decision-making, mutual policy, projects and funding initiatives (Lawson 2002).	As Ovretveit (1993: 40) and others (Litterer 1973; Dunshire 1978) suggest the exercise of coordination intends to bring together interdependent parts in order to give birth to a whole. Though independent, organizations join forces in order to get to an agreed outcome. Since coordination means more than information and resource sharing, joint planning and operation, it calls for a higher level of commitment. In this way organizations lose autonomy and increase shared risk.	Medium term, more formall, joint planing to get an agreed outcome
Collaboration means a stable and long-term denser relationship (Gray 1989; Ciger 2001).	The collaboration parties are independent entities. Still, they have to share resources, data, clients, geographic issues. The parties will make major changes in their operational mode, face risks, and achieve strategic synergies leading to original solutions. Mutual tasks will be accomplished but the focus will be on the processes and institutional arrangement used to achieve them (Keast et al. 2007a, b; Mandell 1994, 2001).	Stable and long-term, major changes to achieve strategic synergies

Source: Authors' own contribution

Influence of macro environmental factors on the collaboration

Government, business or social sectors can be affected by their macro environment. These effects can be specific to any industry in a particular country or global in a number of countries.
Environmental factors taken into account are: economy, demographics, technologies, wars, which are specific to a region/country. For example, in Israel, following a steep increase in the prices of real estate in the last decade, the government enacted new laws that allow businesses to receive significant benefits for the expansion of residential construction for young couples in the geographic periphery outside the central cities at discounted prices. This move demanded the response of new services which were provided by the collaboration of the government with business and NPOs such as educational frameworks, employment, leisure activities and so on. In many countries in the world, we can see research on the macro-environmental effects on the relationship between government and non-profit organizations. Those researchers attempt to explain why and when collaboration between NPOs and government grows with the purpose to solve complex region problems by sharing their expertise, knowledge, resources to produce public value together. This point of view can be found in developing and developed countries such as Russia, (Cook, L. J. 2015), Netherlands, (Brandsen, et al., 2015), Israel, (Schmid, et al., 2016), Egypt, (Gebba, et al., 2013), Australia, (Keast, et al., 2014).

Collaboration of government with NPOs through local authorities

As part of the decentralization process, central government delegates responsibility and resources to local authorities to reinforce local communities for reflecting their local needs. Bar-nir, et al., (2011) state that they are provided by strong, new relationships with NPOs. In Israel, for example, in view of the sharp increase in the number of road accidents at the national level, the government decided to invest resources in delivering training courses for young and old drivers throughout the country. Since the populations of young people and adults in Israel differ from city to city, the government put the responsibility for implementing the program on the local authority, which accepted the budget and guidelines for the program's goals. Each local authority could have carried out the program in a manner that best suited the target populations in the city, together with the businesses or NPO's partners it chose.

As Archambault et al., (2002) cited in Bar-Nir, et al., (2011) noted, the bonds between NPOs and local authorities were formed because the latter saw NPOs as equal partners in their contribution to the benefit of civil society, such as the government. The main advantage of this type of collaboration lies in the good understanding by both sides of the target audience, the local needs and the local culture in order to succeed in the assimilation of the projects. At the same time, the budget for joint projects can be more limited for a local program in relation to direct national collaboration between the government and the NPO.

Informal relations between NPO's and government

Another view of relationship that is less analyzed tries to understand the informal collaboration between NPOs and government outside the contract formal arena. Researches like Gazley, B., (2008) show that government representatives engage in collaboration with NPOs for professional learning. This collaboration is based mostly on trust. This collaboration emerges from mutual goals trying to solve a civil problem. In this way, the joint work process can be created quickly and be very effective for the benefit of the public. Nevertheless, it is risky from the NPOs' point of view as they cannot resave financial support from the government. In this article we will present a case study of an informal collaboration between an NPO and the government in Israel.

Study

Israeli view on NPOs collaboration with the Government

In the preceding two decades, the nonprofit sector has grown significantly in both economic terms and the number of organizations (GuideStar Israel 2014[1]). The total job employment only in the NPOs sector is 13.6% (448,000) from the total employment in Israel. NPOs provide services for education, culture, religion, health, welfare. Incomes of Israeli NPOs are divided as - 50% from the public, 35% self-generated income and 15% philanthropy. Since 1980, 1,600 new NPOs have been registered. Between 1980 and 2013, over 52,000 NPOs have been registered in total. 36,000 NPOs were active in 2015 (Almog-Bar, M., 2016). The major change took place in 2008 when the government approved a decision which acknowledged the contribution of the civil society - NPOs - to the Israeli society. As a result, the government took decisions intended to build partnerships with NPOs. This strengthens the collaboration, at the same time maintaining the partners' independence. (Prime Minister's Office 2008, 18). Since 2008, round-tables have been serving as a vehicle meant to create a dialogue between the government, the business sector, NPOs and the corporate-philanthropic sector. This mutual acquaintance and contact with each other has led to a better collaboration between sectors, supplying an efficient mechanism which promotes joint activities. In this article we will focus on NPOs-government collaboration in Israel. While the NPOs offer the flexibility, creativity and basis for innovation that the government lacks, the government sector provides the resources, technologies and license needed to diffuse innovative approaches and to make them sustainable (Salamon et al., 2015). According to the Bureau of Statistics, the government's social purchasing budget in 2014 in Israel was- 2.1 milliard EUR which constitutes 40% of the total government procurement of that year.

Methodology

We will investigate the collaboration between the Israeli government and NPOs both in its formal (according to the definitions of the law on Government Decision 1950[2]) and informal system. First, in the following tables we will present and define 6 ways of *formal collaboration* between the government and NPOs, the advantages and disadvantages of each method. The definition of the form of collaboration was taken from the website of the Ministry of Finance in Israel[3]. In order to define

the advantages and disadvantages of each method, we interviewed 3 CEO's of leading consulting firms on this specific issue in Israel, 5 CEO's of NPOs that have cooperated with the government for more than two years and the Director of Cooperation in the Israeli Ministry of Finance. Second, we will discuss a case study on *informal collaboration* between an NPO and the Government in Israel.

Formal ways of collaboration with the government in Israel

Table no.2 defines and presents the advantages and disadvantages of 4 ways of formal collaboration between NPOs and the Government in Israel. They will be followed by the presentation of two more methods.

Table 2: Advantages and disadvantages of different ways of collaboration between NPOs and the government in Israel

Form of Collaboration	Advantages	Disadvantages
1. Specific Regulation - a designated regulation given according to a government decision to allocate funds to specific issues for a limited time until the issue is solved, e.g. The development of agriculture in a particular geographical area. The government creates a specific regulation by accurately defining the objectives it wants to achieve, the best possible partner will receive a budget, for a specific period of time	✓ Suitable NPOs can receive significant budgets for several years from one or several government departments. ✓ NPO's manager can assess the chances to get funding according to the amount of collaborations in the previous year (from public information).	☒ NPO's relatively small chance for matching the specific regulation conditions. ☒ The budget approved for the specific regulation will be divided among all organizations that applied and found suitable. ☒ The process is relatively long and can take up to a year for approval. ☒ It can be a relatively expensive process for an organization to submit the request itself.
2. Existing regulation - An existing regulation was created to provide a long-term solution to a civil issue which the state considers similar to the Specific Regulation just not temporarily. The government is not required to update the regulation, but it can increase the budget it invests in. For example, the government wants to provide a permanent solution for those who need immediate emotional help by having a telephone conversation with a professional 24 hours a day in order to prevent suicide. In Israel, the NPO called ERAN- (Emotional First Aid by	✓ Suitable NPOs can receive significant budgets for several years from one or several government departments. ✓ NPO's manager can assess the chances to get funding according to the amount of collaborations in the previous year (from public information).	☒ NPO's relatively small chance for matching the specific regulation conditions. ☒ The budget approved for the specific regulation will be divided among all organizations that applied and found suitable. ☒ The process is relatively long and can take up to a year for approval. ☒ It can be a relatively expensive process for an organization to submit the request itself.

Telephone & Internet) provides this service along with significant government support.		
3. Collaboration through a third party – collaboration with the government through a third partner who is already in direct partnership with the state. This requires an adjustment on the part of the organization in order to provide synergy to a third-party partner and not to be a direct competitor to it.	✓ NPOs could quickly get into the partnership with a third partner that already knows the whole process, and is used to the conditions of collaboration with the government. ✓ NPOs learn how to work with the government through a third party. ✓ NPOs share risks with a third-party.	☒ It may be difficult for NPO to locate a suitable third-party partner. ☒ NPOs are limited by the other third-party partner needs. ☒ The budget from the government has to be split between the two partners**.**
4. Collaboration as a joint venture - enables a government ministry to create high-level collaboration with an organization partner without the need to respond to a tender. The government usually initiates joint ventures with NPOs/Business in fields in which it already operates, and it already has insights on how to lead the field. The partnership is created in order to acquire new tools / knowledge from the NPO and to integrate them for several years on a regular basis in the governmental system. In such a joint venture, the degree of involvement of the government ministry is relatively high and the financial terms of the partnership require the government to invest money in it up to 49% and the NPO 51% of it. A joint venture can last for 3-5 years.	✓ NPOs get the opportunity to realize their long-term professional and financial vision with the largest partner. ✓ NPOs can acquire significant and broad information about target audience. ✓ This method is relatively achievable for both sides. ✓ Allows NPOs for multi-year collaboration with the government.	☒ Requires a high financial capability on the part of the NPOs for several years (51% each year). ☒ Requires the government to produce quantitative targets for the success of the plan that will justify its long-term investment, and the NPO to meet them.

Source: Authors' own contribution

Two additional ways of formal collaboration between NPO's and Government in Israel are presented below.

5. Collaboration with exemption from tender

This is a duty imposed on government in the Mandatory Tenders Law of 1992, and the Minister of Finance is charged with its implementation. Tender exemptions are intended to provide contractual arrangements while maintaining equality, fairness and integrity between government and

organizations. They are suitable only for organizations that can prove some uniqueness in their field, without other competitors. They are presented in Table no.3.

Table3: Collaboration via exemption from tender between government and organizations by specific committees in Israel

Type of committee	The budget amount that the committee can approve as an exemption from tender
In 2017 every ministry in Israel has an office tender committee and its members are the director general of the ministry (who serves as chairman of the committee), the accountant and the legal advisor, or their representatives, and two other employees from the ministry;	36,000 EUR
Since 2009, an office exemption committee has been operating in every ministry, including the director general of the ministry, the accountant and the legal advisor of the ministry;	from 36,000 EUR to 952,000 EUR
Central Examinations Committee, which is authorized to approve contracts with an exemption from a tender of all government ministries, whose members are the Accountant General and the Legal Advisor of the Ministry of Finance or their representatives and an additional member.	above 952,000 EUR

Source: Authors' own contribution

The data on the activity from the government's tender with other sectors is difficult to collect accurately

Because of the different reporting format of each government department to the Ministry of Finance

Illustrative data is presented to the public. As an example, table 4 presents the database of 17 government offices exemption tenders, from 2015 found on the government procurement administration website[4].

Table 4: Data from 17 government offices exemption tenders from 2015

Number of government offices which passed the information	Number of exemption tenders	Government data for 2015
17 government offices	16,521	43% of total engagements of the government this year.
The total value of the order in all the contracts of the government in 2015 were approximately 4.5 milliard EUR, and about 25% of the amount paid for the collaboration as exemption from tender.		

Source: The Knesset Research and Information Center [3]

To sum up, we can say that the advantages of collaboration between government and NPOs with exemption from tender can be time saving for NPOs and quickly approved, can be multi-year and have the option of extension and expansion for financing NPOs. Collaboration enables large budget collaboration between the NPO and the government. The disadvantages of this method of this collaboration can be the difficulty of the NPOs to prove their exclusivity. Furthermore, competitors can try to copy the NPO's uniqueness and file a petition against the exemption tender and, by doing so, stop it.

6. Collaboration by tender

There are a number of definitions and types of tenders according to law between NPO's and government. Detailed in Table no.5 are three main and most common tenders in Israel:

Table 5: Leading tenders in Israel

Type of tender	Explanation	Advantages	Disadvantages
Ordinary public tender	A tender where a request for proposals is made in a notice published to the public. Any organization can apply. Winning the tender with the government is examined according to specific scored criteria.	✓ Multi-year and has the option of extension and expansion. ✓ Enables NPO's large budget activity.	☒ May take a long time until the answer for NPO's is published. ☒ May be totally ceased from reasons of the government. ☒ NPO's standing in front the risk of investing resources without winning the tender at all.
Limited Public Tender	Tender in which negotiations are conducted with tender bidders.	✓ The NPO has the ability to influence the outcome. ✓ Multi-year and has the option of extension and expansion. ✓ Enables NPOs large budget activity.	☒ May take a long time until the answer for NPO's is published. ☒ May be totally ceased from reasons of the government. ☒ NPOs risk investing resources without winning the tender at all.
Closed tender	A tender where requests for proposals are addressed only to certain suppliers;	✓ There is a higher chance of winning the tender. ✓ Multi-year and has the option of extension and expansion. ✓ Enables NPO's large budget activity.	☒ May take a long time until the answer for NPO's is published. ☒ May be totally ceased from reasons of the government. ☒ NPOs risk investing resources without winning the tender at all.

Source: Authors' own contribution

In this first section, we presented six methods of cooperation between the government and the state, emphasizing the advantages and disadvantages of each method from the NPO's point of view. The Minister's Office in Israel presented at the annual conference on effectiveness in Israel[5], (May 2017) what they considered to be *problems* in the formal collaboration with NPO's from the government's formal point of view, and how *they are planning to deal with those problems* in the next few years in Israel. Table no.6 presents the problems and solution proposed by the government.

Table 6: Problems with formal collaboration and solutions proposed by the government

Problems	Solutions
☒ Problems in managing tenders-pursuit of renewal of engagements. ☒ Insufficient competition; from other organizations approaching proposals for cooperation with the government.	✓ Government responsibility for service – more quality and available service over time. ✓ Government infrastructure – more planning ability, standards and supervision. ✓ Objectives and measures - more determining

☒ Control is deficient - little enforcement of sanctions, tenders with inputs, and no results, limited ability to compare service operators. ☒ Bureaucracy cumbersome –it can take a long time from the moment of writing the tender until the winner is announced.	and translating them to improve the quality of service. ✓ Reducing dependence on individual suppliers. ✓ Provide to the public a three-year plan to upgrade the tender process, strengthen control, and reduce the burden on the process of the collaboration.

Source: MIDOT organization- cite of the annual conference, may 2017[5]

After analyzing possibilities for formal cooperation between the government and non-profit organizations, we also examined an informal relationship between the parties, and the following is a case study in Israel.

Case study of an informal collaboration between NPO and the government in Israel

An informal collaboration between an NPO and the government between the years 2016-2017 in Israel will be discussed. The NPO is a medium-sized one in the education sector. In 2017 the NPO 45 trainers (some of them outsourced) provided services to 7,500 beneficiaries spreading over more than 80 local authorities in Israel. Following the vision of the Minister of Education in Israel to promote the field of science, and especially the achievements of teachers and students in mathematics, the NPO developed a new professional program. It was meant to strengthen the resilience and personal motivation of teachers and students in high level mathematics. In 2016-2017 the program was offered as a pilot to high level mathematics teachers from all over the country. Registration for the program was on a voluntary basis and not compulsory by the Ministry of Education. In an independent initiative, taken by the NPO representatives, they appealed to the professional directors at the Ministry of Education and asked to inform them about the program and to think together how they can collaborate. This request was met positively by the representatives of the government ministry. As a result, professional discussions developed between the parties in the timeframe of 2016-2017.

The collaboration was defined from the beginning as informal, and was meant to deliver professional knowledge only. No agreement was signed by the two sides.

In this case study we interviewed five NPO staff members who ran the program, and three senior representatives of the Ministry of Education who managed the collaboration with the organization. In the interviews we asked three open ended questions:

- What were your goals in this collaboration?
- What were the benefits / gains from this collaboration?
- What were the difficulties / drawbacks of this collaboration?

From their answers we can see that the informal collaboration is important to the NPO. They needed this information for a deeper understanding of how to further collaborate formally with the government and to expand their knowledge. From the government point of view the importance of this informal collaboration was to gain professional knowledge. Nevertheless, there were difficulties in bridging the differences of methodology and the different pace of work of each side.
Table no.7 presents a summary of the responses of the interviewed people.

Table 7: NPO and government representatives' answers to the interview

Questions	NPO answers (n=5)	Government answers (n=3)
What were your goals in this collaboration?	1. To study/understand the objectives of the Ministry of Education for such a program for a future wider collaboration. 2. To learn how to reach the target audience of the program nationwide. 3. To add relevant professional information to the facilitators of the program.	To support the program so that it can prove the feasibility of its pilot cycles in order to possibly become a permanent program in the Ministry of Education in the future.
What were the benefits / gains from this collaboration?	1. The organization acquired significant professional knowledge for the success of the program in connection with her target audience. 2. The organization acquired knowledge of how to work in the future with a government ministry (also by ways like joint venture or tender) and how to measure the success of the program.	The government has been exposed to an innovative new method of motivating teachers and preventing them from dropping out of the educational system, without taking financial risks.
What were the difficulties / drawbacks of this collaboration?	The gap in professional methodology and the difficulty in engaging government officers.	1. A relatively fast rate of work for a government ministry. 2. Difficulty in creating professional trust for a new organization relative to the ministry office knowledge.

Source: Authors' own contribution

Conclusions

In view of the process of global privatization, we are witnessing the phenomenon of expanding collaboration between governments and other sectors especially with NPOs. These collaborations can be either formal or informal and are influenced by diverse environmental and local processes. In Israel, too, this process has become significant in the last decade and it places greater importance on the services that the government provides to its citizens. In this article we presented six formal types of NPOs which can collaborate with the government in Israel. NPOs that choose collaboration with the government as part of their growth strategy, may encounter difficulties with regulation, investment of resources, and sometimes uncertainty about the success of the process. Nevertheless they can benefit from a vast resource of knowledge, funds, easier access to target audience and achievement of goals at the national level. In addition, we presented a case study of informal contact between an NGO and the Israeli government. In the informal collaboration we found that both the NPO and the government are looking forward to gaining knowledge. Though, the gap of different work rate of each party can be a problem in maintaining this collaboration. These types of collaboration should be further investigated.

Bibliography

[1]GuideStar Israel http://www.guidestar.org.il/GS_Index?lang=en_US
[2]Israel Prime minister office http://www.pmo.gov.il/policyplanning/hevra/Pages/socialservices.aspx
[3]Ministry of Finance in Israel http://www.financeisrael.mof.gov.il/FinanceIsrael/Pages/En/Home.aspx
[4]The Knesset Research and Information Center https://www.knesset.gov.il/mmm/data/pdf/m03852.pdf
[5]MIDOT organization- cite of the annual conference, may 2017 , http://www.midot.org.il/%D7%94%D7%9B%D7%A0%D7%A1-%D7%94%D7%A9%D7%A0%D7%AA%D7%99-

%D7%9C%D7%90%D7%A4%D7%A7%D7%98%D7%99%D7%91%D7%99%D7%95%D7%AA-%D7%91%D7%9E%D7%92%D7%96%D7%A8-%D7%94%D7%A9%D7%9C%D7%99%D7%A9%D7%99-2017

1. Almog-Bar, M., 2016. Policy Initiatives towards the Nonprofit Sector: Insights from the Israeli Case. *Nonprofit Policy Forum,* **7**(2), pp. 237-256.
2. Almog-Bar, M., & Young, D. R. (2016). Special issue of nonprofit policy forum on "Policy towards nonprofits in international perspective: Current trends and their implications for theory and practice". *Nonprofit Policy Forum, 7*(2), 85-93.
3. Brandsen, T., & Pape, U. (2015). The Netherlands: The paradox of government-nonprofit partnerships. *Voluntas, 26*(6), 2267-2282.
4. Bar-Nir, D., & Gal, J. (2011). Who has the power? The role of NPOs in local authorities. *Voluntas, 22*(1), 1-25.
5. Brinkerhoff, J. M., & Brinkerhoff, D. W. (2002). Government-nonprofit relations in comparative perspective: Evolution, themes and new directions. *Public Administration & Development, 22*(1), 3
6. Ciger, B. (2001). Multi-organizational, multi-sector and multi-community organizations: Setting the research agenda. In M. P. Mandell (Ed.), Getting results through collaboration: Networks and network structures for public policy and management (pp. 71–85).
7. Cook, L. J. (2015). New winds of social policy in the east. *Voluntas, 26*(6), 2330-2350.
8. Dunshire, A. (1978). Implementation in a bureaucracy. Oxford: *Martin Robertson*
9. Gebba, T. R., & Ahmed, I. E. (2013). The performance of privatized financial institutions in Egypt: The case of Alexandria bank. *Journal of Applied Finance and Banking, 3*(4), 245-269.
10. Gazley, B. (2008). Beyond the contract: The scope and nature of informal government-nonprofit partnerships. *Public Administration Review, 68*(1), 141-154.
11. Gray, B. (1989). Collaboration: Finding common ground for multi-party problems. *San Francisco: Jossey-Bass*
12. Houge, T. (1994). Community based collaboration: Community wellness multiplied. Oregon State University: *Center for Community Leadership*
13. Keast, R., & Mandell, M. (2014). The collaborative push: Moving beyond rhetoric and gaining evidence. *Journal of Management & Governance, 18*(1), 9-28
14. Lawson, H. (2002). Improving conceptual clarity, accuracy and precision and facilitating more coherent institutional designs. In M. Brabeck & M. Walsh (Eds.), The contribution of inter professional collaboration and comprehensive services to teaching and learning. *The National Society for the Study of Education Year-Book*, University of Chicago Press
15. Litterer, J. (1973). The analysis of organizations (2nd ed.). New York*: Wiley*
16. Ovretveit, L. (1993). Coordinating community care. *Buckingham: Open University Press*
17. Powell, M., & Miller, R. (2014). Framing privatization in the English national health service. *Journal of Social Policy, 43*, 575-594.
18. Salamon, L. M. (1995). Partners in public service: Government–nonprofit relations in the modern welfare state. Baltimore: Johns Hopkins University Press
19. Salamon, L. M., & Toepler, S. (2015). Government-nonprofit cooperation: Anomaly or necessity? *Voluntas, 26*(6), 2155-2177
20. Schmid, H., & Shaul, B. N. (2016). Government and philanthropy in Israel. *Society, 53*(3), 307-314. doi:http://dx.doi.org/10.1007/s12115-016-0018-4
21. Solecka, K. (2013). The privatization of public tasks and ownership transformation in Poland - the outline of the issue. *Juridical Tribune Journal = Tribuna Juridica, 3*(2), 152-167.
22. Teegen, H., Doh, J.P. and Vachani, S., 2004. The importance of nongovernmental organizations (NGOs) in global governance and value creation: an international business research agenda. *Journal of International Business Studies,* **35**(6), pp. 463-483.

Securing Smart Cities with Monitors

Orhio Mark Creado, Monash University, Caulfield East, Victoria, Australia,
mark.creado@monash.edu

Phu Dung Le, Monash University, Caulfield East, Victoria, Australia,
phu.dung.le@monash.edu

Abstract

Advances in technology, population increase, climate change, international business and sustainability, now mandate the need for smart cities to accommodate increasing demands. However, current implementations of smart cities lack the security architecture to interlace all the essential components such as effective development, monitoring, and administration. Currently, many computer-based systems pose a high security risk due to the lack of a secure architecture which integrates these various components, opening the possibility for lapses in communication which can be exploited by cyber-attacks, and can prove to be extremely costly from a disaster recovery perspective. With no concrete definitions available to define a smart city, it is paramount to define a highly secure operating architecture for computer-based system which can be integrated within smart city implementations capable of supporting essential components such as energy distribution, health support, transport management, etc. A system built with such an essential security architecture can be more effective in preventing attacks and thereby increasing the system's availability and reliability through secure operations. This paper proposes a conceptual architecture of monitors which can be applied to modern day smart cities to secure lower level operations. This novel application of the monitor concept would allow any implementation to be more practical and realizable for many computer-based systems currently being used in smart cities.

Keywords: Smart city security, Security architecture, Computing system security

Introduction

Advanced and mega cities cannot function well without automation. More importantly, smart cities cannot be built without automation engines which are used to deal with population increase, climate change control, international business, and sustainability. For example, in a smart city, transport systems should be able to cope with increase in population and business demand, energy reliability must be considered as part of the city's security, telecommunications are critical to businesses and everyday functions of the whole city. These aspects cannot be treated as independent operations, but instead as subsets of a larger, more complex system.

However, the exact definition of a smart city is open to debate and varies based on perspective. This raises more questions when looking at how big problems should be tackled in the information and energy-hunger age for smart cities. Advanced infrastructure is no doubt the first requirement (Hall et al. 2000). Then, is the need to assess how secure and reliable such infrastructure can be. Economically and socially, there are always budget constraints and risks. Let's take an example of building a smart city where more people can live, work, and feel safe, and its government and businesses should be able to deal with its duties and benefits well. To achieve the objectives of such a smart city, many computer-based systems should be constructed in a way which allows them to work reliably, and protection against attacks on those systems should be a high priority. Such a system would mandate that security and reliability are essential to the computer-based systems managing the smart city. However, guaranteeing these aspects is purely dependent on the efficiency of the automation engines in use. Automation engines are associated with a computer system and therefore the reliability and security of automation engines

need be considered. Most approaches which exist to address this aspect treat security and reliability as independent objectives of the system, and focus explicitly on improving one and then perhaps improving the other. However, both approaches have advantages and disadvantages and they are either limited by low level management or open more security risks at the high level of operations. An alternative perspective is to aim for a deep secure core within an automation engine, and through secure operations of smaller independent subcomponents, ensure reliability of the larger system.

The rest of our paper is structured as follows. Section 2, studies some of the available literature to understand the current situation of security and reliability within computer-based systems used in smart cities. Section 3, describes our work at a high level in a more formal way to improve the security for automation engines used in smart cities and implicitly improve their reliability. Section 4, provides a theoretical evaluation of the automation engine in terms of operations and security. Lastly, section 5 concludes our work and provides directions applicable for future research.

Background

The literature review for our paper adopts a two-pronged approach, wherein the first subsection will address smart cities in general, and will aim to illustrate the concept of security and its application within these smart cities. The second subsection will address our proposed concept of monitors and their direct applicability towards achieving security within Computing Systems (CS). The last subsection will address our motivation behind this research undertaking.

Reviewing Smart Cities

Security and privacy are key essentials when considering any smart city (Martinez-Balleste et al. 2013)? However, when considering a system of the size and scale of a smart city, these issues also grow larger in size as they are fully dependent on the underlying implementation and execution behind the plan for such a city (Elmaghraby and Losavio 2014).

However, one of the key challenges which remains is the loose association and the use of the terminology “smart-city”. The lack of academic and scientific publications shows very little insight into the development of these cities as their development and implementation are open to debate, even less is evident from the perspective of securing the massive infrastructure which is essentially the key to a successful implementation (Chourabi et al. 2012).

Monitors to enhance Security

The use of monitors to ensure computer system security is by no means a novel concept. In fact, the concept of a monitor has been around longer than the notion of a personal computer and has been documented in the literature as far back in the work by Hansen (1970). The goal of the monitors, initially, were designed as mechanisms to structure the operating system (Hoare 1974), wherein monitors could be defined with administrative data and could be hierarchically nested to allow for inter-monitor calls. One of the challenges with this approach was the result of a deadlock scenario due to monitors at the same level within the hierarchy (Howard 1976). Future research by Lister and Sayer (1977), and Lister (1977) proved the viability behind this concept through structured implementations wherein realizable security was achievable within the CS.

Modern implementations of the monitor concept have been distilled into various sub implementations, some of these include the reference monitor within modern operating systems which enforce access control lists and capability based systems (United States Department of Defence 1985, Murdoch et al. 2012), trusted computing through the Trusted Platform Module (TPM) and its variants (Nibaldi 1979, Pfitzmann et al. 2001, DiRossi 2007), microkernels (Tanenbaum et al. 2006, Liedtke 1995, Klein et al.

2010), and other hybrid approaches which combine one or more of the above concepts, such as a Virtual Machine Microkernel model by Karger et al. (1991), a TPM based implementation of the Bell-LaPadula formal model by Nie et al. (2006), a TPM Microkernel model by Setapa et al. (2010), a TPM model to enforce hardware security by Hendricks and van Doorn (2004), a capability based system model by Gong (1989), and a capability based system called CHERI (Neumann and Watson 2010) operating via means of two independent kernels - a separation kernel linking the hardware with the OS kernel Capsicum (Watson et al. 2012).

The above is by no means an exhaustive list of possible implementations and applications, but these do illustrate the relevant key concepts and some example variants which are directly applicable to our proposed work.

Motivation

The main motivation behind our work stems from the lack of a concrete definition of the term 'Smart City'. To the best of our knowledge, not much available literature aims to define a security based smart city which can emphasize reliability and security as core functionality. Furthermore, with the move towards smart devices and electronic communication, our perspective is that automation within our everyday lives is no longer just a myth, but a reality. With such information being transacted on a global scale by automated machines, security and privacy will soon become requirements which cannot be compromised within any automated system. With this concept in mind, our proposed work aims to define security as a fundamental inclusion within the architecture
of a more complex system which is made up of several components that work together to fulfill a higher objective. The main contributions our paper aims to make are as follows:

- Propose a novel architecture, which has not been addressed before in the literature, which is capable of incorporating security as a key fundamental component within the architecture of a CS which can facilitate achieving security by design.

- Propose a model wherein this architecture can be directly applied to the concept of a smart city, both within existing implementations and new variants to provide a higher level of security, a higher level of reliability, and a greater reduction in cost in terms of secure operations and disaster recovery.

Proposed Theory

Smart cities are essentially large, complex, and distributed CS which mandate a single communication channel to operate as a singular unitary system. It is possible to break down such a large complex system into its various underlying components as shown in Fig 1.

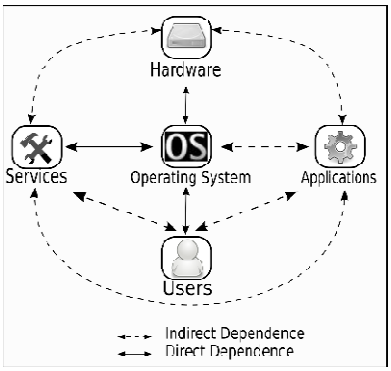


Fig 1: Smart City Components and their Interdependence

The five main components which comprise any functional complex system include the Hardware, Operating System (OS), Services, Applications, and Users. However, breaking down each individual component within this complex system can also be done into the same five components. This facilitates for a recursive breakdown of any complex system into a subset of these five key elements.

With this proposed view of our complex smart city, we can stipulate that the defined components are essential for macro level functionality, and due to their direct or indirect interdependence, vulnerabilities which affect any single subcomponent can propagate throughout the smart city. This renders a strong need to compartmentalize the subcomponents, which we address in the next subsection.

Compartmentalizing Smaller Independent Systems

Component operations can only be compartmentalized and isolated, if and only if:

- Operations can be unambiguously identified.
- Operations conform to specific rules which govern their execution within the system.

This logic allows us to further disintegrate independent components purely based on their underlying mode of operation. The commonality which we identify between the various functional components within a smart city system is that all components must execute digitally compiled code to provide the required functionality and to fulfill their stated operational objectives. With this notion, we define the following terminology:

Definition 1. *Block(s) of Code (BoC) - Is a self-contained set of low level instructions which can be interpreted and executed, one at a time, at the processor level within a CS. Within the proposed work, each instruction contained within a BoC is defined as per an instruction set architecture. Collectively as a unit, a BoC can accept inputs, produce outputs, and has an associated manifest which stores an integrity signature, indication of ownership, a set of trust levels, a set of resources which need to be accessed along with associated permissions for it to complete its execution, and a set of states which define the valid range of possible states for each instruction executed.*

The requirement and importance of this definition is paramount as no previous or current literature has proposed a segmentation of executed instructions in this manner. Some previous approaches towards partially addressing executed instructions includes the use of ordinary procedures, functions or methods which can form self-contained set of instructions provided all embedded function calls have their code unrolled. Some examples include programming languages such as Eiffel, which allows logical annotations of inputs and outputs past on pre and post conditions; and Rust, which attaches ownership labels to data belonging to procedures. While many of these aspects allow for signed operations at the

application level, these requirements for enforcing security are not applied to the BoC assigned to a component within the system.

The isolation of component operations aims to achieve security within the system as follows:

1. Reduce each component to its underlying BoC thereby alleviate any complexities based on definition, implementation, or execution.

2. Defining security within a CS in terms of independently enforceable characteristics.

3. Underpinning each of the defined characteristic with one or more underlying properties which can validate different aspects of security.

4. Defining a framework of monitors to enforce the above aspect.

Security as a set of Characteristics

The proposed work envisions security as an amalgamation of five independently satisfiable characteristics designed to be evaluated either prior or post execution of the BoC, or post the execution of an instruction within the BoC being executed. The requirement is for each underlying BoC to enforce these characteristics via means of logically sound properties. The degree of satisfaction of each property allows for a determination of the overall level of security of the CS. The included characteristics are as follows:

1. Is Invulnerable (Inv)
   The proposed work classifies errors to arise during execution because of invalid inputs or outputs which are not validated within a BoC prior to being processed. Hence, this characteristic can be achieved through strict validation of inputs and outputs to reduce the number of errors through the use of secure programming languages, secure coding practices, and rigorous testing.

2. Has Integrity (Int)
   Integrity, in this context, defines the requirement for authenticity, as well as an accountable owner, and can be achieved by having accountability standards via publicly verifiable metrics, such as a digital signature.

3. Is Verified (Ver)
   Verification can be achieved through rigorous state management to prevent unauthorized changes in the state of operation for each BoC executing within the system. While similar to the Is Invulnerable characteristic, the Is Verified characteristic mandates that any instruction can only exist in a finite set of possible states while being executed.

4. Is Trustworthy (Tw)
   The proposed work advocates that trustworthiness can be achieved by maintaining summarized operating history, and user-defined weighted variables which serve as inputs to a deterministic algorithm to obtain a calculable metric.

5. Is Secure (Sec)
   As the proposed work envisions security for any BoC as an amalgamation of the above characteristics, this can be represented as:

$$Sec(BoC) = Inv(BoC), Int(BoC), Ver(BoC), Tw(BoC)$$

Structuring Monitors to Compartmentalized Components

This section discusses the use of the structuring notion of Monitors and their underlying attributes to enforce security as a set of characteristics to achieve the compartmentalized isolation of components for secure execution of a BoC. Table 1 defines some of the notations which will be used through the rest of this section.

Table 1: List of Notations

Notations	Definition	Notations	Definition
A	Monitor Operational Access Level	A*	Monitor Functional Access Level
BoC	Block(s) of Operating Code	C	Monitor Class
E	Monitor Permissions	EM	Error Monitor
F	Monitor Functions	H	Monitor Hierarchy
IM	Integrity Monitor	Inv	Invulnerable
Int	Integrity	M	Monitor
O	Monitor Mode	Ψ	Computing System
R	Monitor Rules	S	Monitor Scope
S*	Monitor Functional Trust Level	Sec	Secure
SM	Security Monitor	T	Monitor Operational Trust Level
TM	Trustworthy Monitor	Tw	Trustworthy
Ver	Verified	VM	Verification Monitor

Defining Monitors

Definition 2. *Monitor: Is a self-contained, independently operating, programmed unit with a strictly defined operation boundary specified by a set of attributes which govern its underlying behaviour.*

Each monitor can be represented as a set of the following attributes.

Operational Attributes: Define monitor operations to enforce a specific security characteristic for each BoC, represented as follows:

$$M_{Operational} = C, O, A, T, S$$

where:

– Class (C)
Defines the level of operation and the degree of information sharing allowed. Includes:

- System-Only Class (C_O) - Allows operation over the entire system, but only monitors system level code and restricts information sharing to other C_O monitors only.
- System-Wide Class (C_W) - Allows operation over the entire system and sharing of information with other secure monitors.
- Local Class (C_L) - Allows local operations only with restricted access to system user space.

– Mode (O)
Defines the operational mode of the monitor to procure and store information to facilitate decision making. Includes:

- Analysis Mode (O_A) - An active observe-react-respond mode allowing for the use of historical data to perform run time statistical analysis and make decisions accordingly.

- Tracking Mode (O_T) - A passive observe-track-record mode only allowing the acquisition and storing of information to facilitate statistical analysis for later executions.
- Hybrid Mode (O_H) - Defined for high level system BoC only. Facilitates run time switching between O_A and O_T modes.

- User Mode (O_U) - Defined for use only in user space under any of the above modes, but only allows sharing of information to a system level monitor but not vice versa.

– Access Level (A)
Is closely related to the associated functional trust level of the BoC, and defines the level of resource access permitted. Includes:

- System Access (A_S) - Highest level of access, specifically for trusted system-only operations isolated from user intervention.

- Normal Access (A_N) - Default access level, for non-critical system or user operations.

- Restricted Access (A_R) - A restricted level of access for BoC without integrity signatures, or an untrustable trust level.

– Trust Level (T)
Associates the BoC's FT level to the monitor. Includes:

- Critical Trust (T_C)

- Verifiable Trust (T_V)

- Denied Trust (T_D)

– Scope (S)
Defines the operational visibility to other monitors or components. Includes:

- Global Scope (S_G) - Allows visibility across the entire system and facilitates information sharing with all other monitors in appropriate classes.

- Local Scope (S_L) - Allows visibility only within that component's operations. Information sharing is allowed with other monitors defined at the same level or via an S_G monitor.

Functional Attributes: Define monitor functions and behaviour while monitoring the execution of a BoC, represented as follows:

$$M_{Functional} = \{H, \{S*, A*, F, E, R\}\}$$

where:

– Hierarchy (H)
In conjunction with the monitor's class attribute, the hierarchy attribute defines the priority in the decision-making process. Includes:

- System-Only Global (H_{OG}) - Allows analysis and decision making across the entire system, and is reserved for system monitors.
- System-Wide Global (H_{WG}) - Allows analysis and decision making across the entire system, but does not allow intervening in any system level process.
- System-Wide Local (H_{WL}) - Allows analysis and decision making locally only. Monitors can only affect the operations of other H_{WL} monitors through the intervention of an H_{WG} monitor.

- Local Local (H_{LL}) - Allows analysis and decision making locally only, and cannot influence the operations of any other monitor.

– Functional Metrics
Define the available functions which outline monitor behaviour during the monitoring of a BoC. Includes:

- Trust Level (S*)
Associates the BoC's TT level to the monitor's functional attributes to facilitate the evaluation of future executions. Includes:

  * Transitional Trust (T_T)

  * Untrustable Trust (T_U)

- Access Level (A*)
Defines the access rights to assigned resources and is partially dependent on the resources required to facilitate BoC operations.

- Functions (F)
Outlines the set of instructions to be performed to enforce the underlying security characteristic while monitoring a specific BoC, and is restricted by the mode operational attribute defined for the monitor.

- Permissions (E)
Defines the rights to perform a specific action(s) within its set of functions.

- Rules (R)
Defines the specific set of conditions to be met to determine the degree of satisfaction by a BoC in enforcing the underlying security characteristic being monitored.

Monitor Operations: This section defines the basic monitor operations to be performed to enforce each security characteristic. Figure 2 illustrates the interdependence between each monitor assigned to a BoC.

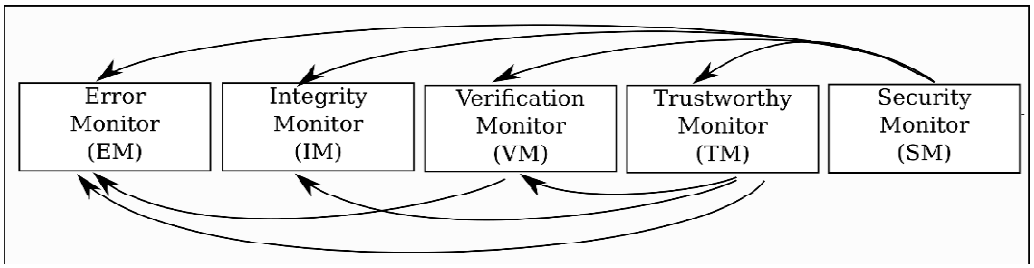


Fig 2: Monitor Interdependency

Each monitor assigned to a BoC is defined to operate independently of each other to determine the degree of satisfaction of its assigned security characteristic, via the fulfillment of each of the underlying properties. However, each monitor can accept as input the output of another monitor to facilitate part of that process. The SM acts as the fulcrum of execution, instantiates all other monitors, and ascertains the security level of the BoC as a combined result of all the other monitors. The SM serves two primary functions within the proposed framework:

1. Ensures each of its associated monitors are enforcing the required underlying security characteristic for the monitored BoC.

2. Negotiates with the SM belonging to other BoC to ascertain its security level prior to allowing communication between them during execution.

The following lists the basic operations for each defined monitor.

Error Monitor (EM): The EM is responsible for monitoring an executing BoC to ensure that no errors are encountered, specifically for handling all inputs and outputs. This can be achieved based on the definition of a BoC, wherein the previous, current, and the next probable instruction can be known. As a given BoC is a complete set of instructions to enable a specific functionality, an error state can be identified when the execution of the BoC does not execute the identified next instruction but defaults to another instruction within the same BoC. Thereby indicating a handled error during execution. The output status of the EM can be accessed by the TM to determine the level of trust to be associated with the executing BoC for future executions.

Integrity Monitor (IM): The IM is responsible for two functions – validating and verifying the authenticity and ownership signature for a BoC, and associating an authenticity and ownership signature for any BoC generated by the system as an output of an execution. The choice of enforcement mechanism to ensure integrity, at this stage, is independent of the monitor operations. But the basic requirement entails the provision of a valid metric, such as a signature, to identify ownership and authenticity, which can then be validated to ensure correct ownership.

Verification Monitor (VM): The VM is responsible for monitoring the instructions being executed within a BoC to ensure no unauthorized changes in the state of operation are encountered. While similar in operation to the EM, the V M only triggers when the next instruction being executed resulting from an error is outside of the set of instructions included within the BoC being executed, indicating that the error state resulted from an unhandled exception.

Trustworthy Monitor (TM): The TM is responsible for two functions – validating existing trust levels, and calculating new trust levels for generated outputs or for the BoC post execution. The TM can directly obtain the output states of the EM, the IM, and the VM to facilitate its operations within the system. The choice of the trust algorithm and the underlying metric weighting is out of scope of this paper at this time.

Security Monitor (SM): The SM is responsible for facilitating inter-monitor communication between monitors assigned to various component BoC within the system, and has three independent phases of operation, which involve:

1. Instance creation for each monitor and associating them with the underlying BoC prior to execution. Instantiates the monitors for each security characteristic and determines the enforcement attributes for each.

2. Monitors the enforcement of each security characteristic during execution. Requests inputs from the other monitors for each of the other security characteristics to ascertain the degree of

satisfaction, by the BoC being executed, for each of the underlying security properties for each characteristic.

3. Updating errors, trust levels, and other metrics post execution to facilitate secure future operations. Post execution, the trust levels associated with the executed BoC need to be updated to assist in determining the probability of successful future executions.

Monitor Component Integration: To facilitate for complex system designs comprising of diversified components, the architecture proposes a monitor engine which serves as the first point of contact for all components that are required to execute code within the system. The monitor engine facilitates for the creation and assignment of monitors to each component. This allows for distributed control and process execution, reinforcing compartmentalized isolation, ensuring that any compromise within one specific component does not indirectly affect the operation of another. Fig. 3 illustrates a high-level representation of the monitor engine in respect to the other components within the CS.

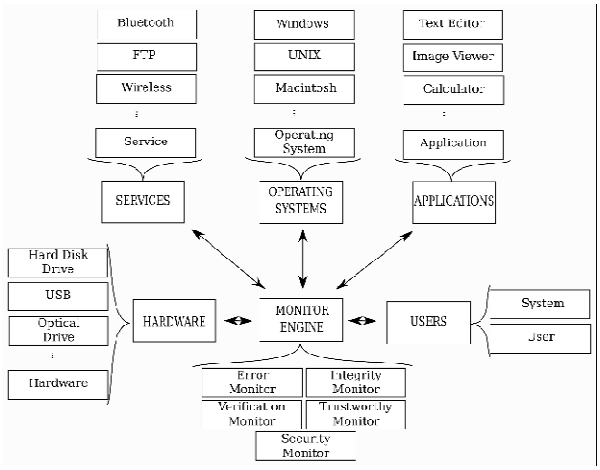


Fig 3: Monitor Engine and Component Integration

Monitor Engine Operations: The monitor engine views every component independently, and performs a list of operational procedures for each request made by a component needing to execute a BoC on the system. The operations of a CS are segmented into three distinct phases - start-up, running, and shutdown. While the basic operation procedures for the monitor engine are similar for all component levels, the sequence is reversed for the shutdown phase. These operational procedures include:

1. Validate the calling component for the existence of a programmable interface which would allow for the possibility to execute instructions.

2. Validate the integrity of the calling component.

3. Create a set of independent monitors with defined attributes to enforce each security characteristic.

4. Assign the defined monitors to be responsible for all communication to and from that calling component only.

5. Establish any monitor-component communication guidelines to facilitate both inter component and system-wide interactions.

The proposed monitor engine concept aims to alleviate the single point of failure within a CS. As traditionally the OS is responsible for functionality, security, communication, etc., secure verified code within the OS is not practically realizable. The monitor engine is defined as the primary facilitator within the CS, and as its operations only involve facilitating the interaction between components, the possibility for defining the monitor engine as a secure verified code operating within a larger system to facilitate security by design can be more practically realizable.

Achieve System Security: This section illustrates the inner workings of compartmentally isolated instruction execution by specifically addressing each component layer and the associated monitor attributes to facilitate the basic operational procedures outlined above, as follows:

- Secure Hardware - Fig. 4 illustrates the monitor attributes to enforce the basic operational procedures between the hardware component layer and the monitor engine.

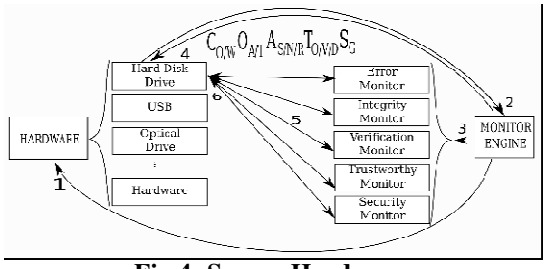


Fig 4: Secure Hardware

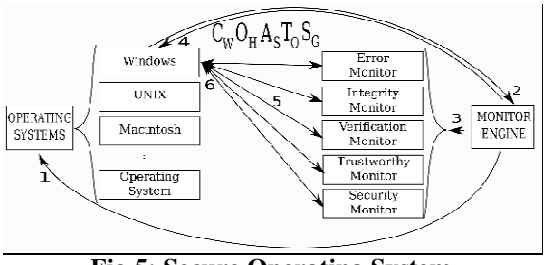


Fig 5: Secure Operating System

- Secure Operating System - Fig. 5 illustrates the monitor attributes to enforce the basic operational procedures between the OS component layer and the monitor engine.

- Secure Services - Fig. 6 illustrates the monitor attributes to enforce the basic operational procedures between the services component layer and the monitor engine.

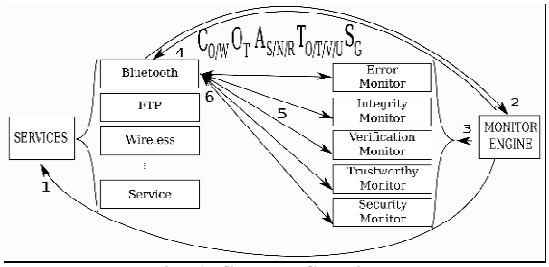


Fig 6: Secure Services

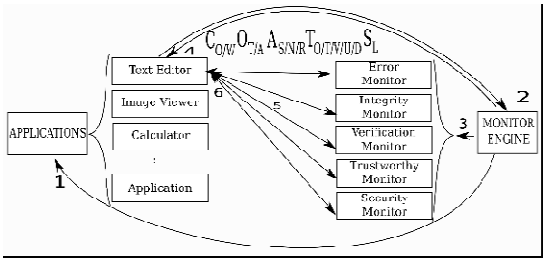


Fig 7: Secure Applications

- Secure Applications - Fig. 7 illustrates the monitor attributes to enforce the basic operational procedures between the applications component layer and the monitor engine.

- Secure Users - Fig. 8 illustrates the monitor attributes to enforce the basic operational procedures between the users' component layer and the monitor engine. To alleviate ambiguity in securing users, two broad classes of users have been defined: the system user and the regular user, each operating with its own set of independent monitors. Furthermore, as users initiate, run, and terminate functionality, only the specific subset of Integrity Monitor, Trustworthy Monitor, and Security Monitor are applicable to the users' component layer.

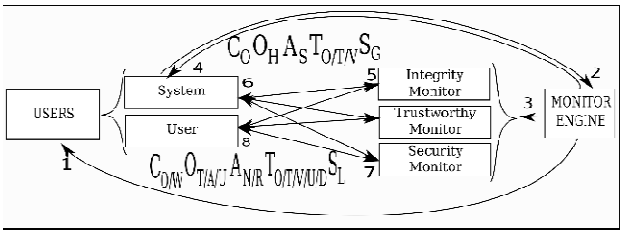


Fig 8: Secure Users

Structuring Using Monitors: Fig. 9 illustrates the allocation and assignment of monitors once instantiated to each BoC. The theory behind prior implementations suffered from nested hierarchical communication between monitors. The proposed architecture addresses this problem via the defined attributes assigned to each monitor. As the enforcement of the defined security characteristics by each monitor is independent of any hierarchy, the monitor operations, to ensure compliance and satisfaction for each characteristic, are thereby independent of any other operation. A scalable hierarchy between monitors based on operational attributes further streamlines monitor operations within the system to avoid deadlocks, which were another issue encountered in past implementations. Fig. 10 illustrates the proposed hierarchy within the architecture.

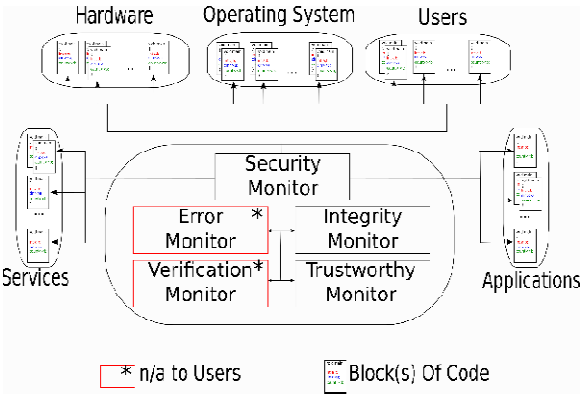


Fig 9: Monitor Component Allocation

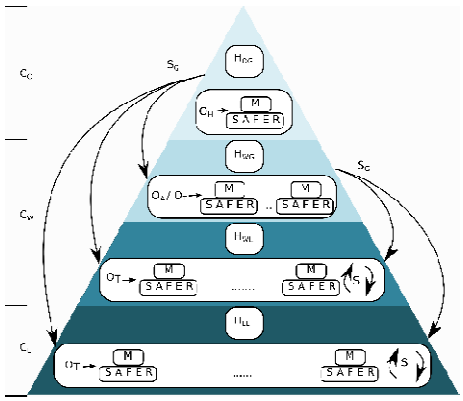


Fig 10: Monitor Hierarchy

Achieving Overall System Security

Definition 3. *Security: Is the amalgamation of a set of independent characteristics - Is Invulnerable, Has Integrity, Is Verified, and Is Trustworthy, such that it can be associated with the BoC's of each individual component within the CS.*

We can formally represent the overall level of security for any CS Ψ, as the associated level of security for each of its m BoC being executed independently, as follows:

$$Sec\ (\Psi)\ =\ \{Sec\ (BoC_1)\ ,Sec\ (BoC_2)\ ,\ldots,Sec\ (BoC_m)\}$$

Applying the proposed framework of monitors to enforce security, the formal definition of security for any specific BoC_x can be defined as follows:

$$Sec\ (BoC_x)\ =\ SM\ (BoC_x)\ =\ \{EM\ (BoC_x)\ \cup\ IM\ (BoC_x)\ \cup\ V\ M\ (BoC_x)\ \cup\ T\ M\ (BoC_x)\}$$

Applying the proposed definition of security, the overall level of security for the entire CS Ψ executing m BoC can be defined as the summation of the degree of satisfaction for each of the defined security characteristics by each BoC being executed within the CS, as follows:

$$Sec\ (\Psi) = \bigcup_{i=0}^{m} \{SM(BoC_i)\}$$

$$Sec\ (\Psi) = \bigcup_{i=0}^{m} \{EM(BoC_i) \cup IM(BoC_i) \cup VM(BoC_i) \cup TM(BoC_i)\}$$

Evaluation and Discussion

The adopted evaluation model adopts a theoretical bias in terms of proposing a formal example implementation of the proposed framework followed by an analysis of the architecture in terms of the level of security attained vs. the trade-off in performance.

An Illustrative Example

The proposed architecture achieves a higher degree of overall system security through the following:

- Compartmentalized isolation of instruction execution for all components.
- Structured monitoring of each BoC independent of any other.
- Enforcing independent criteria capable of deterministically ascertaining the degree of security for any executing BoC.

The defined illustrative example makes the following assumptions:

- A CS which executes the following simplistic BoC:
  - BoC 1 - An application executed in user space without system privileges.
  - BoC 2 - A service dependent application accessible across the system requiring some system level access.
  - BoC 3 - A service accessible from system start-up to system shutdown requiring system privileges.
- The underlying functional attributes are assumed to be dependent on the intended purpose of each BoC, and have not been defined at this stage as they are implementation specific aspects which need to be defined as high-level code which then can be represented as a BoC.

For each calling BoC, the monitor engine assigns a set of monitors with defined attributes as follows:

- BoC 1 = $\{C_L, O_T, A_N, T_V, S_L\}$ $\{H_{LL}, (S^*, A^*, F, E, R)\}$
  Operates with a local class, a tracking mode of operation, normal access, verifiable trust, and a local scope.
- BoC 2 = $\{C_W, O_T, A_N, T_V, S_L\}$ $\{H_{WL}, (S^*, A^*, F, E, R)\}$
  Operates with a system-wide class, a tracking mode of operation, normal access, verifiable trust, and a local scope.

– BoC 3 = {C_W, O_A, A_S, T_C, S_G} {H_{WG}, (S*, A*, F, E, R)}
Operates with a system-wide class, an analysis mode of operation, system access, critical trust, and a global scope.

– System = {C_O, O_H, A_S, T_C, S_G} {H_{OG}, (S*, A*, F, E, R)}
Operates with a system-only class, a hybrid mode of operation, system access, critical trust, and a global scope.

Fig. 11 illustrates a relevant subset of the main operations during the execution of each of the assumed BoC and depicts the communication flow, and enforcement of security via the framework of monitors.

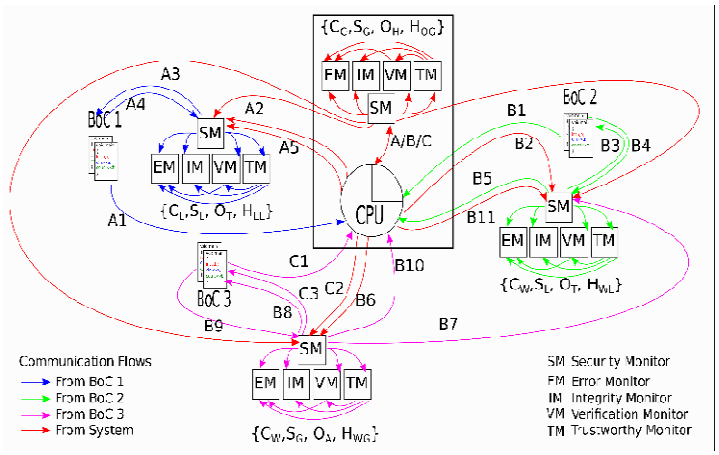


Fig. 11: Illustrative BoC Execution and Monitor Communication

The interactions of BoC 1 with the rest of the CS are isolated and are only possible via the system monitors.

BoC 2 is dependent on the service provided by BoC 3, and its local scope requires the system monitors to relay information between its SM and the SM of BoC 3 to obtain the provision of the service.

BoC 3, operating with a global scope, can communicate via its SM to the SM of any other monitor which operates on the same or lower hierarchical level within the system.

Lastly, the system's monitors have the highest defined attributes, allowing the system to relay between various SM of different BoC, collect execution information from other monitors, perform run time tracking and analysis of executions, and intervene into hierarchical operations to resolve conflicts or ensure enforcement of security characteristics by independent monitors.

The defined approach facilitates for the independent execution, monitoring, reporting, and enforcement of security characteristics for each BoC. The SM is responsible for ensuring communication and data flow only to and from other secure monitors, with the system's monitors responsible for the overall security of the system. Thereby preventing any insecure component from communicating with a secure component or inadvertently propagating errors or vulnerabilities to the rest of the system.

Defining a Probability Space

System security is always a direct result of the presence of a vulnerability which can then be exploited resulting in system compromise. Let us assume a probability space $\Omega \rightarrow \{0, 1\}$ for all $f \in F$ where f is an event with a probability outcome of some al$0 \leq a \leq 1$.

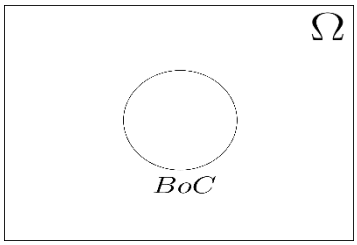


Fig 12: Default BoC

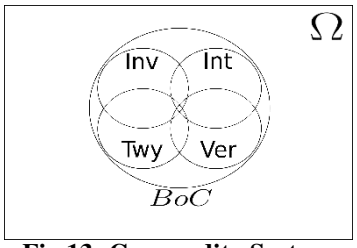


Fig 13: Commodity System

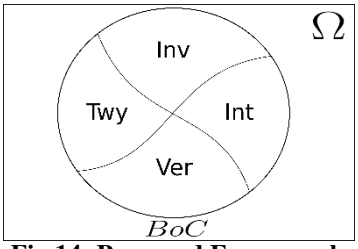


Fig 14: Proposed Framework BoC

As a BoC is defined as the smallest foundational unit of operation, any enforcement of each of the defined security characteristics must be enforced through the inclusion of operating code. A basic functional BoC, not enforcing any security enforcing code. would require a default number of instructions to provide this basic functionality. We can represent this default BoC as a set of n instructions as shown in Fig. 12.

If we consider a regular commodity system which enforces security through instructions specified in code, this is often done without any explicit segmentation or segregation of code. Some of the defined security characteristics might also be applicable to a commodity system although their enforcement might be left as optional add-ons at the user's discretion. Considering this type of code definition, we can represent this commodity BoC as a set of n + X instructions where X represents the total number of additional instructions to enforce security which is directly dependent on the number of security characteristics accounted for, as shown in Fig. 13

The proposed framework however, explicitly mandates the requirement for additional code within a BoC to ensure enforcement of the security characteristics, additionally the definition and operation of monitors allows the system to enforce overall system security as a culmination of the enforced characteristics. This allows us to represent any BoC to include the default instructions but also account for additional instructions which can enforce security. This renders the defined characteristics as a partition set within any BoC, thereby allowing each partition to be disjoint of the others. Considering this type of code definition, we can represent this a BoC within the proposed framework as a set of n + Y instructions where Y represents the total number of additional instructions to enforce each of the security characteristics within a BoC, as shown in Fig. 14.

Security Evaluation

Using the defined probability space, we apply a probabilistic model to compare the proposed framework vs. a regular commodity system in terms of the security offered by each system. We summarize our analysis in Table 2.

Based on this probabilistic calculation, considering all factors equal for simplicity, we can define the most ideal representation of the aforementioned probabilities for both systems considered as shown in Fig. 15. We note a strong indicative difference between the p(system security) for the considered systems, with the exception of all criteria being equal to zero implying no security or all criteria being equal to one

implying perfect security, neither of which are practically realizable. Furthermore, the indicative results obtained have considered commodity systems to equally enforce each of the defined security characteristics which isn't always the case thereby resulting with the associated probability being far lower than the ideal in most cases of commodity system operations.

Table 2: Security Evaluation

p(f)	Commodity System	Proposed Framework
For any CS executing m BoC, applying the five security characteristics in conjunction with the defined probability space and the rules for probability distribution for each BoC we can establish the overall p (system security) as the culmination of the enforcement of each of the defined security characteristics as follows:		
$p\ (Sec\ (\Psi\ )) =$	$\sum_{i=0}^{m} \begin{Bmatrix} Inv(V_i) \cap Int(V_i) \cap \\ Ver(V_i) \cap Twy(V_i) \cap \\ Sec(V_i) \end{Bmatrix} \mid i \in N$	$\sum_{i=0}^{m} \begin{Bmatrix} Inv(V_i) \cup Int(V_i) \cup \\ Ver(V_i) \cup Twy(V_i) \cup \\ Sec(V_i) \end{Bmatrix} \mid i \in N$
$p\ (Sec\ (\Psi\ )) =$	$\sum_{i=0}^{m} \begin{Bmatrix} p(Inv(V_i)) \cap p(Int(V_i)) \cap \\ p(Ver(V_i)) \cap p(Twy(V_i)) \cap \\ p(Sec(V_i)) \end{Bmatrix} \mid i \in N$	$\sum_{i=0}^{m} \begin{Bmatrix} p(Inv(V_i)) \cup p(Int(V_i)) \cup \\ p(Ver(V_i)) \cup p(Twy(V_i)) \cup \\ p(Sec(V_i)) \end{Bmatrix} \mid i \in N$
$p\ (Sec\ (\Psi\ )) =$	$\sum_{i=0}^{m} \{\alpha_i * \beta_i * \gamma_i * \delta_i * \mu_i\} \mid i \in N$	$\sum_{i=0}^{m} \{(\alpha_i + \beta_i + \gamma_i + \delta_i + \mu_i) / 5\} \mid i \in N$

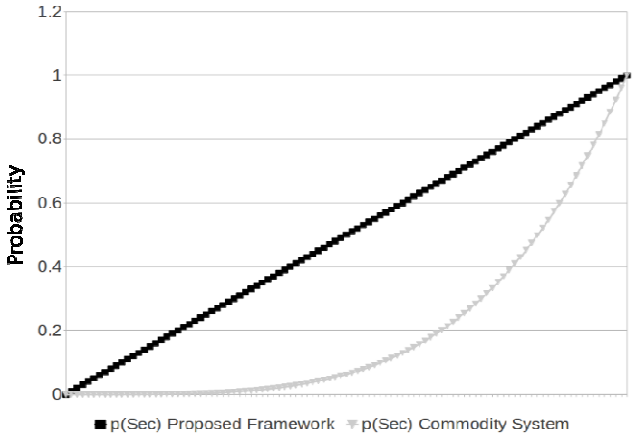


Fig 15: Comparative Analysis of p(Security)

Performance Evaluation

Performance evaluation within modern day commodity systems can often be measured in total number of instructions executed. Considering the proposed monitors to structure CS operations, we compare the proposed framework vs. a regular commodity system in terms of the total instructions executed. The assumption we make for our analysis is that all commodity systems incorporate each of the security characteristics to some degree. We summarize our analysis in Table 3.

Table 3: Performance Evaluation

Security Characteristic	Commodity System	Proposed Framework
The default Number of Instructions (O) for any functional BoC can be defined as:		
$O\ (default)$	$n \mid n \in N$	$n \mid n \in N$
The total number of instructions to enforce the Inv characteristic can be defined as:		
$O\ (Inv)$	$v \mid v \in N$	$a \mid a \in N, a > v$
The total number of instructions to enforce the Int characteristic can be defined as:		
$O\ (Int)$	$w \mid w \in N$	$b \mid b \in N, b > w$
The total number of instructions to enforce the Ver characteristic can be defined as:		
$O\ (Ver)$	$x \mid x \in N$	$c \mid c \in N, c > x$
The total number of instructions to enforce the Twy characteristic can be defined as:		
$O\ (Twy)$	$y \mid y \in N$	$d \mid d \in N, d > y$
The total number of instructions to enforce the Sec characteristic can be defined as:		
$O\ (Sec)$	$z \mid z \in N$	$e \mid e \in N, e > z$
The total number of instructions to enforce all Monitors (Mon) can be defined as:		
$O\ (Mon)$	0	$f \mid f \in N$
The total number of operations for securing the CS executing m BoC can be represented as follows:		
$O\ (\Psi) =$	$\sum_{i=0}^{m} \left\{ \begin{matrix} O(default) + O(Inv_i) + \\ O(Int_i) + O(Ver_i) + \\ O(Twy_i) + O(Sec_i) \end{matrix} \right\} \mid i \in N$	$\sum_{i=0}^{m} \left\{ \begin{matrix} O(default) + O(Inv_i) + \\ O(Int_i) + O(Ver_i) + \\ O(Twy_i) + O(Sec_i) + \\ O(Mon_i) \end{matrix} \right\} \mid i \in N$
$O\ (\Psi) =$	$\sum_{i=0}^{m} \{n_i + v_i + w_i + x_i + y_i + z_i\} \mid i \in N$	$\sum_{i=0}^{m} \{n_i + a_i + b_i + c_i + d_i + e_i + f_i\} \mid i \in N$

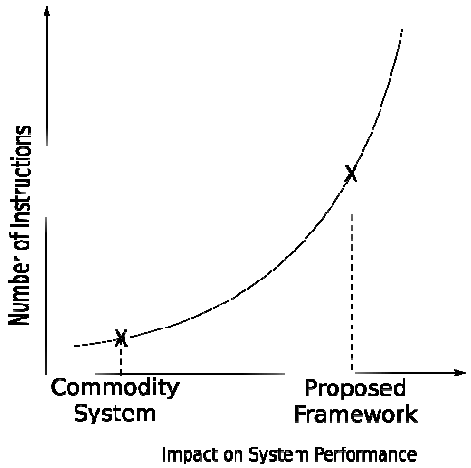


Fig. 16: Comparative Analysis of Operational Overhead

Based on this probabilistic calculation, considering all factors equal for simplicity, we can define a hypothetical representation of the aforementioned performance in terms of operational overhead for both systems considered as shown in Fig. 16. We note that there exists a strong potential for operational overhead with the proposed framework. However, at this stage in the conceptual development, these results are only indicative as implementation level empirical data doesn't exist. Furthermore, the

assumption made in the depiction of the graph is that the instruction execution process outlined in Fig. 16 is carried out irrespective of the BoC being executed. In real world situations, this is far from ideal. Keeping this in mind, we proceed to discuss some of the advantages
and shortcomings of the proposed framework in the next section.

Summary

We address some potential concerns which may be construed as gaps by an avid reader include:

Theory: Envisioning a practically relatable model is always a challenge in theoretical computer science. Presenting a conceptual framework, we have stepped away from any suggested implementations with the aim of outlining an area wherein CS security can be enhanced through architectural enhancements.

Evaluation: The presented evaluation, although not to scale graphically, has aimed at presenting a benchmark based on low level operations within a system. The probabilistic approach models extremes in a plausible operating scenario. External factors are exempted from consideration at this time but will always remain a factor for operational overhead.

Challenges: The proposed framework relies on standardization of characteristic definitions to enforce security, this will always be an on-going challenge as universal applicability is not always possible. With this in mind, the proposed framework considers characteristics which allows for generic applicability of CS operations at lower levels thereby facilitating seamless integration of operating code irrespective of complexity, and/or desired functionality.

Limitations: The defined security characteristics may be subject to biased scrutiny, but the selection of which ensure minor relatability to modern day systems to attain a realizable model. By adhering to existing accepted standards, the proposed work defines a framework which structures these ad-hoc metrics so as to be able to deterministically evaluate subjective criteria within CS.

Conclusion

Current computer-based systems are either designed to achieve functionality and performance goals or have low level of security. Their security is an add-on or dependent on the OS, database, services and libraries in use. This leads to higher potential of much lower reliability and higher possible disaster when under attack. Since smart cities have many automation engines which determine the liveability and efficiency of many people and organisations, a new approach to support security and reliability of such automation engines is highly desired. In this paper we have proposed a new approach to allow the construction of computer-based systems with higher security and reliability. This is now a crucial inclusion when constructing computer-based systems for smart cities for our modern-day world.

The security is associated with the concept of monitors which allow the flexibility and system-specific structure. This makes the proposed work more adaptable to many important systems. From the design concepts with flexibility, our approach not only can benefit general purposed computer-based systems, but also specific systems, at least at the level of design, and at some higher levels of specific implementations.

Our future directions and goals for our research includes possible attempts to simulate our work to demonstrate some real applications of our theory to demonstrate its usefulness when applied in a computer-based system to support either automation engines or smart city control systems.

Bibliography

Robert E Hall, B Bowerman, J Braverman, J Taylor, H Todosow, and U Von Wimmersperg. The vision of a smart city. Technical report, Brookhaven National Lab., Upton, NY (US), 2000.

A. Martinez-Balleste, P. A. Perez-martinez, and A. Solanas. The pursuit of citizens' privacy: a privacyaware smart city is possible. *IEEE Communications Magazine*, 51(6):136–141, June 2013

Adel S. Elmaghraby and Michael M. Losavio. Cyber security challenges in smart cities: Safety, security and privacy. Journal of Advanced Research, 5(4):491 – 497, 2014. ISSN 2090-1232. doi: http://dx.doi.org/10.1016/j.jare.2014.02.006. URL http://www.sciencedirect.com/science/article/pii/S2090123214000290. Cyber Security.

H. Chourabi, T. Nam, S. Walker, J. R. Gil-Garcia, S. Mellouli, K. Nahon, T. A. Pardo, and H. J. Scholl. Understanding smart cities: An integrative framework. In 2012 45th Hawaii International Conference on System Sciences, pages 2289–2297, Jan 2012. doi: 10.1109/HICSS.2012.615.

Per Brinch Hansen. The nucleus of a multiprogramming system. Communications of the ACM, 13(4):238–241, 1970. doi: http://dx.doi.org/10.1145/362258.362278.

C. A. R. Hoare. Monitors: An operating system structuring concept. Communications of the ACM, 17(10):549–557, 1974. doi: http://dx.doi.org/10.1145/355620.361161.

John H. Howard. Proving monitors. Communications of the ACM, 19(5):273–279, 1976. doi: http://dx.doi.org/10.1145/360051.360079.

A. M. Lister and P. J. Sayer. Hierarchical monitors. Software: Practice and Experience, 7(5):613–623, 1977. doi: http://dx.doi.org/10.1002/spe.4380070506.

Andrew Lister. The problem of nested monitor calls. ACM SIGOPS Operating Systems Review, 11(3):5–7, July 1977. doi: http://dx.doi.org/10.1145/850644.850645.

United States Department of Defence. Trusted computer system evaluation criteria, 1985. URL http://csrc.nist.gov/publications/history/dod85.pdf. Accessed 2015 July 15.

Steven Murdoch, Mike Bond, and Ross J. Anderson. How certification systems fail: Lessons from the ware report. IEEE Security and Privacy, 10(6):40–44, November 2012. doi: http://dx.doi.org/10.1109/MSP.2012.89.

G. H. Nibaldi. Specification of a trusted computing base (tcb). Technical Report ADA108831, MITRE Corporation, Bedford, Massachusetts, USA, November 1979. URL http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA108831. Accessed 2015 July 15.

Birgit Pfitzmann, James Riordan, Christian Stüble, Michael Waidner, and Arnd Weber. The perseus system architecture. In Proceedings Verlässliche IT-Systeme (Dependable IT Systems), number RZ 3335 (No 93381), pages 1–17, 2001. URL http://semper.schunter.org/sirene/publ/PRSW_01PERSEUS_IBMRep.pdf. Accessed 2015 July 15.

M.D. DiRossi. Towards a high assurance secure computing platform. In Proceedings of the 10th IEEE High Assurance Systems Engineering Symposium,, HASE'07, pages 381–382, 2007. doi: http://dx.doi.org/10.1109/HASE.2007.25.

A.S. Tanenbaum, J.N. Herder, and H. Bos. Can we make operating systems reliable and secure? Computer, 39(5):44–51, 2006. doi: http://dx.doi.org/10.1109/MC.2006.156.

Jochen Liedtke. Onμ-kernel construction. In Proceedings of the 15th ACM Symposium on Operating System Principles, SOSP'95, pages 237–250. ACM, December 1995. doi: http://dx.doi.org/10.1145/224056.224075.

Gerwin Klein, June Andronick, Kevin Elphinstone, Gernot Heiser, David Cock, Philip Derrin, Dhammika Elkaduwe, Kai Engelhardt, Rafal Kolanski, Michael Norrish, Thomas Sewell, Harvey Tuch, and Simon Winwood. sel4: Formal verification of an operating-system kernel. Communications of the ACM, 53(6):107–115, 2010. doi: http://dx.doi.org/10.1145/1743546.1743574.

P.A. Karger, M.E. Zurko, D.W. Bonin, A.H. Mason, and C.E. Kahn. A retrospective on the vax vmm security kernel. IEEE Transactions on Software Engineering, 17(11):1147–1165, 1991. doi: http://dx.doi.org/10.1109/32.106971.

Xiao-Wei Nie, Deng-Guo Feng, Jian-Jun Che, and Xin-Pu Wang. Design and implementation of security operating system based on trusted computing. In 2006 International Conference on Machine Learning and Cybernetics, pages 2776–2781, 2006. doi: http://dx.doi.org/10.1109/ICMLC.2006.258997.

S. Setapa, M.A.M. Isa, N. Abdullah, and J.-L.A. Manan. Trusted computing based microkernel. In Proceedings of the 2010 International Conference on Computer Applications and Industrial Electronics, ICCAIE'10, pages 1–4, 2010. doi: http://dx.doi.org/10.1109/ICCAIE.2010.5771164.

James Hendricks and Leendert van Doorn. Secure bootstrap is not enough: Shoring up the trusted computing base. In Proceedings of the 11th Workshop on ACM SIGOPS European Workshop, EW 11. ACM, 2004. doi: http://dx.doi.org/10.1145/1133572.1133600.

L. Gong. A secure identity-based capability system. In Proceedings of the 1989 IEEE Symposium on Security and Privacy, pages 56–63, 1989. doi: http://dx.doi.org/10.1109/SECPRI.1989.36277.

Peter G. Neumann and Robert N. M. Watson. Capabilities revisited: A holistic approach to bottom-to-top assurance of trustworthy systems. In Proceedings of the 4th Annual Layered Assurance Workshop, LAW'10, 2010. URL http://www.csl.sri.com/users/neumann/law10.pdf. Accessed 2015 July 15.

Robert N. M. Watson, Jonathan Anderson, Ben Laurie, and Kris Kennaway. A taste of capsicum: Practical capabilities for unix. Communications of the ACM, 55(3):97–104, March 2012. doi: http://dx.doi.org/10.1145/2093548.2093572.

Voluntary Simplicity in Consumer Behaviour – Necessity, Challenge or Utopia

Katarína Gubíniová, PhD., Faculty of Management Comenius University in Bratislava, Odbojárov 10, 820 05 Bratislava 25, Slovak Republic, katarina.gubiniova@fm.uniba.sk

Silvia Treľová, PhD., Faculty of Management Comenius University in Bratislava, Odbojárov 10, 820 05 Bratislava 25, Slovak Republic, silvia.trelova@fm.uniba.sk

Mgr. Ing. Juliana Mruškovičová, University of Economics in Bratislava, Faculty of Commerce, Dolnozemská cesta 1, 852 35 Bratislava, Slovak Republic, jmrusko@gmail. com

Abstract

Our society is burdened by an unbearable weight of consumerism, which promises to overcome all personal and social problems by boosting consumption. Reasonable needs, which are associated with so called voluntarily simple lifestyle, have been more and more frequently discussed in relation to the increasing material needs. The article deals with the issue of (un)sustainable consumption and so called voluntary simplicity as a way of life. Voluntary simplicity is a phenomenon that triggers contradictory reactions. Its main objectives include the least possible waste of energy, efforts to live more environmentally friendly, and to avoid consumerism. As long as a person decides to live in more simplicity, they have to make some important steps in their daily consumer behaviour, which are dealt with by our article.

Keywords: Consumer behavior. Consumption. Unsustainable consumption. Sustainable consumption. Reasonable needs. Voluntary simplicity.

Introduction

Modern society is more and more confronted with systematic, deliberate and increasingly sophisticated ways of environmental degradation, on which human existence is almost entirely dependent. This degradation is partly due to environmentally unfriendly production technologies, supported by the developing profit-oriented lifestyle, purchasing and accumulation of things, which degrade environment to goods that can be carelessly used to satisfy supposedly ever-growing human needs.

This article deals with the issue of life in voluntary simplicity, as our attention is focused on an alternative to the lifestyle prevailing in society, i.e. the style of majority. Such a way of life is lived with an intention and on the basis of a voluntary choice, particularly a value-based choice, and enables a sufficiently dignified, joyful and satisfying life in the ecological distress.

Significance of Reasonable Needs from the Perspective of Modern Marketing Revaluation and Voluntary Simplicity

Everybody has their own needs, whether material and/or psychological, and products (goods and services) and their consumption are intended to satisfy such individual needs.

The problem of modern society, especially the developed or rapidly developing economies, is a constant and unstoppable growth in their needs. They do not only include the needs in the strict sense, i.e. those introduced by A. M. Maslow (2000, p. 158) but also the needs generated by a whole series of pressures. From social through historical to economic ones, most frequently created and supported by the marketing communication tools (e.g. advertising). Modern economic systems are built on the concept of people having to buy and spend as much as possible, otherwise the whole system ends up in a crisis. People buy things that they actually do not need but that bring them at least a short-term happiness, that can make them relaxed or think about pleasant things. We believe those are false needs, sometimes called pseudo needs that are unnatural, artificial, the needs of markets or producers, not leading to natural human growth and development.

However, we have to point to the fact that more and more people believe that unlimited satisfaction of needs does not lead to lasting happiness not only because most of thus satisfied needs only result in momentary delight, but also because the advancement, whose benefits people used to rely on so much, rather leads to ecological threats, and economic growth is further dividing the world into the rich and the extremely poor. (Fromm, 1992).

So called *reasonable needs* have been more and more frequently discussed in relation to the increased material needs. Strict definition of reasonable needs and reasonable consumption is difficult, even impossible. The perception of what people actually need and what their reasonable needs are is not only highly subjective but is significantly affected by a great number of different aspects. E. Fromm (1992) is aware of the fact that people cannot be directed to buy or not to buy something, but he is persuaded that the state could define standards of what is healthy and what is so called pathological consumption. In spite of the fact that it is very problematic to identify where the reasonable needs end and the artificial needs start, we assume that a few general attributes, which can help define reasonable needs, can be recognised. Such needs are most frequently associated with so called voluntarily simple / voluntarily moderate, or ecologically friendly, environmentally friendly, sustainable, or simple lifestyle. Even though some authors, such as Librová, H. (2003), Shrader-Frechett K. (1992), insist on the exact differentiation and definition of individual terms, common major characteristics can be identified in the views of all of them. They especially include a value-based orientation on the rejection of consumerism and intended or mediated environmental friendliness. The emphasis on spiritual values or ethical principles are also included. All these lifestyles, with all their greater or smaller differences, can be referred to by a very popular adjective nowadays - alternative.

Foreign literature has adopted term *voluntary simplicity* (Alexander – Ussher, 2012). Simplicity is based on the awareness of the fact that only a little is necessary to live a happy life.

A question arises in this relation: Why do some people living in the richest countries in the world live in moderation and simplicity compared to others despite the fact that with their income, they could afford to live luxurious lives full of shopping and spending? Several reasons can be identified. On the one hand, they can include purely religious, spiritual or ecological reasons, or their combinations.

On the other hand, paradoxically, E. Fromm (1992) understands the efforts to give up pleasures and to live austere lives as resulting from a great desire to own property and lead a consumer lifestyle. Such people suppress their desires however the issues of property are embedded in their mind.

Consumerism In Comparison To Voluntary Simplicity Activities

Consumerism is a lifestyle that some sociologists view as problematic from the perspective of their own environment as well as from the perspective of human culture. It is a way of life in which permanent

increase of material consumption is especially important. If people have more material possessions they will be better, their lives will be more beautiful, and identical to the life presented by the "mass" marketing communication tools (e.g. advertising of consumer goods). The world is becoming a reservoir of resources, and people are becoming so called *one-dimensional consumers*.

An implicit triple assumption appears in the background: the goal of life is to have more and more, and the only role of the state is to enable it, as consumption increase overcomes all the problems people cannot solve themselves. Everything else has to wait. The essential need is to produce - more and faster. (Kohák, 2010). Dynamism is significant to consumerism nowadays.

Consumerism is not a phenomenon observable for only last decades. The first indications of such tendencies are sometimes associated with a renowned trend predictor, founder of the techniques and tools of communication between institutions and companies and the public E. L. Bernays (the 1920s and 1930s), who shifted the paradigm in the approaches to shopping from the customer´s position "*I need to buy*" to "*I want to buy*".

However, the major wave of consumerism appeared not sooner than in the 1950s, after the Second World War, especially in the United States of America (war-torn Europe was less affected), and was accompanied by the post-war development of commercial transport and the idea to import resources and goods from distant areas as an alternative to local production. A decade later, in response, especially young generation rejected consumerism, and the schools of thought emerging in the turbulent 1960s significantly influenced also others.

The beginning of the 1980s, affected by neo-liberal capitalism (represented by M. Thatcher and R. Reagan) is considered to be the second wave, followed by globalisation since the second half of the 1990s. To a certain extent, this phenomenon has facilitated consumption habits of the people supporting this way of life in the global perspective, and has "standardised" the level of commercial services, especially in the first-world countries.

The approach best describing consumerism is that it would love to absorb the entire world. E. Fromm compares the consumer to an "infant forever eager to get a bottle with milk". Earlier, poets and philosophers were dealing with the question of whether a man works in order to live, or lives in order to work. The question of whether a man has to consume in order to live, or whether they live in order to be able to consume is dealt with nowadays. However, that means that we are still able and feel the need to differentiate between life and consumption.

A "counterweight" to consumerism is a lifestyle that can be named voluntary simplicity. Some authors prefer the term thoughtful choice for such lifestyle. To simplify it, we could say that a voluntarily simple person does not spontaneously buy every "trifle" that others have, or that a television commercial "tells" them to buy. Voluntarily simple people endeavour to buy only necessities and are interested in the origin of goods (environmental impacts in their manufacturing processes, during use, after end-of-life, during their transport and logistics) and/or how such goods destroy human dignity of the employees making them. From the point of view of the consumer typology, it can be said that the representative of voluntary simplicity is an eco-friendly consumer or alternatively a responsible consumer.

Voluntary simplicity is not only manifested in buying but also in travelling, housing, holiday, or choice of career. People living this lifestyle hold spiritual or intellectual values rather than consumption values. Majority of them does not believe that they lack something due to their choice of life; the exact opposite is claimed. (Librová, 2003).

Steps in transition to consumption exhibiting characteristics of voluntary simplicity

As long as a person decides to live in more simplicity, they have to make some important steps in their daily consumer behaviour.

The right approach and attitude to life are especially important. When people understand that real wealth is not in owning the latest products, they realise that they are much richer at that moment. As Alexander and Ussher opine, humility and efforts to only impress ourselves are also of importance. Liberating the mind from the modern consumer culture requires much effort. (Alexander – Ussher, 2012).

The approach to finance is of equal importance. People show their preferences through money. What they spend (their) money on reflects their choice of what will exist in the world. The purchase of a product sends a message to the market, acknowledges its existence, ecological impacts, manufacturing processes, etc. Money has power, which is accompanied by responsibility. If people invest their money elsewhere this world can be changed. It is essential to be thoughtful and consider where to invest our "vote", to support businesses deserving our support, e.g. fair-trade businesses. Fair-trade is a business ensuring workers from developing countries a fair remuneration for their work. In the fair-trade system, farmers (growers) and craftsmen receive the feed-in-tariffs corresponding to production costs and ensuring them dignified lives. As Ambler states, fair-trade also offers consumers an opportunity to simply and efficiently support a sustainable economic model, to vote for a different method of trade and production, and last but not least, to acquire high quality products for corresponding prices. Organisations that actively commit to support producers, increase the awareness of this concept, and to arrange campaigns aimed at changing the rules and practices of conventional international trade are an inseparable part of fair-trade. (Ambler, 2003).

Another important step is to consider how much time one will spend working. The more one consumes, the more time they have to spend working in order to be able to afford the consuming lifestyle. Once they find a way how to considerably reduce the overall expenses of their households, they realise that they do not have to work overtime. It results in significantly more free time for other interests and their families. It is thus a method of reducing material wealth and increasing the quality of life. Home offices or teleworking can also save the commuting expenses and costs of clothing. According to Treľová, it is an effective method of working, which is more and more favoured by both employees and employers. (Treľová, 2016).

Food is among the key human needs which one can consume with more modesty. Nowadays, majority of food products originates in corporations, which prefer their profit to nutritional values. Food products can be produced on one´s own however it is not possible for everybody. If it is impossible to produce own food products, or if such production is too small, the necessary food products should be bought from local farmers, thus supporting local production and avoiding supermarkets and hypermarkets as much as possible. Certain food categories can be reduced, and seasonal foods and pick-your-own farms should be preferred.

Clothing is almost exclusively a matter of fashion nowadays, as well as it determines a social status of the person wearing it. Wearing simple, modest and functional clothing can be an external manifestation of simplicity and an expression of disapproval of the consumer culture. (Pajtinková Bartáková – Gubíniová, 2012). It is not necessary to spend much financial resources on clothing, and many people living in voluntary simplicity are able to mend their clothes, or very often sew them themselves. Great amounts of clothes are delivered to second-hands every day.

Life in voluntary simplicity first of all includes a revaluation of the mode of transport. It is essential to find an escape from the contemporary car culture. The greatest challenge of car transport is short distances, while most of such places do not require a car transfer. It is suitable in such cases to walk or use a bicycle as much as possible. Bicycles can be equipped with further improving accessories such as seats for children, offering their transport to school, and the "adventure" as a bonus. Other benefits include the fact that we do something for our health at the same time. An alternative in the case of unfavourable weather is public transport. Car sharing is also among very effective methods.

Reducing the costs of housing and energy is an important step in the transition to voluntary simplicity. Housing typically represents the highest cost in our lives, which is why where and how we will live needs to be thoroughly considered. Low-cost housing helps save even years of hard work. Housing in passive houses is very effective, as they are designed based on the principle of utilising passive heat gains in the building. Living close to the place of work contributes to establishing the life in voluntary simplicity. The latest researches ((Pajtinková Bartáková – Gubíniová, 2012) show that commuting to work is among the most unpleasant aspects of modern life and everything should be done to prevent it.

Energy consumption needs to be radically reduced, as carbon dioxide concentrations are continuously increasing. Fossil fuel combustion is the fundamental process causing this increase. (Nátr, 2015). Alternative energy resources, such as solar panels for water heating, are becoming greatly supported. Even small steps are therefore important in this aspect, such as the use of energy-efficient appliances.

One of the most worrying aspects of consumerism is excessive waste production. Voluntary simplicity includes essential steps (Beniak - Križan - Matúš - Svátek, 2015) that help prevent waste production. For instance, drinking tap water is preferred to buying water in plastic bottles (of course, if the situation allows it). Do not buy new shoes before the "old ones" stop fulfilling their function. Prevent unnecessary flights, use textile shopping bags, etc.

Living in simplicity does not mean that we necessarily have to give up all these things, but it means that we should reduce them as much as possible, and buy thoughtfully. Such life requires a certain level of creativity, so it is rather an aspiration that should be further developed.

Since there is an interest in the sustainability and the ethical dimensions of products and services already with customers themselves, retailers should take several activities. As an integral part of their promotion and sales, they should increasingly focus on offering healthier food, emphasizing the environmental and social aspects of cooperating with suppliers, producing less waste, more recycling, promoting employee volunteering.

Conclusion

Consumerism defined as buying of products and services or material consumption exceeding the fundamental needs is as old as the first civilisations. After consumerism entered the awareness of people, a different way of life in the form of voluntary simplicity was established.

Voluntary simplicity is an issue that triggers contradictory reactions among both the public and academics. Its main objectives include the least possible waste of energy, efforts to live more environmentally friendly, and to avoid consumerism. It is a way leading not back into the past and behavioural patterns typical of the past; on the contrary, it is a way leading ahead. Such life requires a certain level of creativity, so it is rather an aspiration that should be further developed.

In conclusion, it is necessary to state that people who decide to take this demanding way to fulfil their dreams frequently experience misunderstanding or even contempt, even though the situation requires exactly opposite reactions.

References

Alexander, S. – Ussher, S. (2012), 'The Voluntary Simplicity Movement: A Multi-National Survey Analysis in Theoretical Context'. *Journal of Consumer Culture*, 2012, Vol. 12, Iss. 1.

Ambler, T. (2003), Marketing and the Bottom Line. 2nd Edition. London : Prentice Hall, 2003.

Beniak, J. - Križan, P. - Matúš, M. - Svátek, M. (2015), Modern and ecological materials for fused deposition modeling of rapid prototyping technology. In ERIN 2015 : proceedings of abstracts of the 9th international conference for young researchers and PhD students. Monínec, ČR, 4.-6.5. Praha : CTU publishing house, 2015, S. 24. ISBN 978-80-01-05736-0.

Fromm, E. (1992), Mít nebo být? Praha : Naše vojsko, 1992.

Kohák, E. (2010), Zelená svatozář: kapitoly z ekologické etiky. Druhé, přepracované vydání. Praha : Sociologické nakladatelství, 2010.

Librová, H. (2003), Vlažní a váhaví: kapitoly o ekologickém luxusu. Brno : Doplněk, 2003.

Martíšková, P. – Švec, R. (2017), 'E-shops and Customer Feedback: Experience by Czech B2C Customers'. *Littera Scripta*, Vol. 10, No. 1, 2017.

Maslow, A. H. (2000), Ku psychológii bytia. Modra : Persona, 2000.

Nagyová, Ľ. – Košičiarová, I. – Holienčinová, M.(2016), Sustainable Consumption of Food: A Case Study of Slovak Consumers. In: Proceedings of the 2016 International Conference Economic Science for Rural Development, No. 43, 2016.

Nátr, L. (2015), Rozvoj trvale neudržitelný. Praha : Karolinum, 2015.

Pajtinková Bartáková, G. – Gubíniová, K. (2012), Udržateľný marketingový manažment. Trenčín : Inštitút aplikovaného manažmentu, 2012.

Shrader-Frechette, K. (1992), 'Dobrovolná střídmost. Omezování spotřeby s cílem umožnit osobní rozvoj'. *Časopis Veronika*, 1992, č. 4.

Treľová, S. (2016), Flexibilné zamestnávanie. In: Digital Science Magazine, Vol. 5, issue 1., unpaged [15 p.] [online] Available: http://digitalmag.sk/flexibilne-zamestnavanie/?print=print

Current Problems of Unemployment in Slovakia

Peter Bajzík, Comenius University in Bratislava, Bratislava, Slovakia,
peter.bajzik@fm.uniba.sk

Abstract

The article focuses on the current problems related to the unemployment in the Slovak Republic. Based on a blended descriptive-analytical approach to data on unemployment, the article critically reflects the employment policy of both the European Union and Slovakia and points at certain problems that arose together with fundamental changes in several sectors of the economy, namely the mismatch between peoples' skills and vacancies offered and pertaining regional disparities in Slovakia. In its first part, the article deals with brief delineation of the phenomenon of unemployment and its types. Consecutively, the next section focuses on the economic and social consequences of unemployment in Slovakia. Furthermore, the article offers an overview and analysis of unemployment in Slovakia based on selected demographic factors.

Keywords: employment, unemployment, labour market, regional disparities, Slovakia

Introduction

The process of economic transformation in Slovakia was accompanied by an increase in unemployment. At present, the policy of eliminating unemployment is one of the priorities of the Slovak government and the European Union under the Europe 2020 strategy (European Commission, 2010). Unemployment in Slovakia averaged 13.02% from 1994 until 2017, reaching an all-time high of 19.79% in January 2001 and the lowest 6.5% in august 2017. The priorities of the Slovak Republic's strategic investments are to fund the system for creation of new jobs, mainly for the long-term unemployed and disadvantaged groups. In this context, it must be taken into consideration, that the importance of work in human life is undeniable. Work, by its nature, stimulates the development of people and the advancement of the society as a whole, and above all, work assists people to fulfil their needs. Unemployment often leads to poverty, which also negatively influences the regional development. Slovakia is one of the countries with the largest regional disparities of the GDP per capita. This is directly related to the varying levels of unemployment in the regions, higher level of poverty and increased crime in the regions concerned, which has a negative impact on the progress of regions in question. One of the causes of regional differences is the lack of job opportunities in the region and low sectoral diversification of the economy. Other factors of unemployment include low level of education, lack of flexibility, incapability to work, lack of job opportunities, and insufficient information about job vacancies. This paper focuses on the current problems related to employment policy in Slovakia. The labour market policy is a part of economic policy and it represents an instrument for solving a wide range of socio-economic problems. Eurostat defines unemployed persons as people aged 15 to 75, who are without work, are available to start working within the next two weeks and have actively sought employment during the last four weeks period. The unemployment rate is the number of people unemployed as a percentage of the labour force. There are different types of unemployment, the most common include frictional unemployment, structural unemployment, real wage unemployment, mismatched unemployment, cyclical unemployment (Investopedia, 2017). In this context it should be noted that a certain amount of unemployment is natural. Full employment does not mean that no one is without a job. To effectively combat with unemployment, governments throughout the EU now aim to increase the number of jobs rather that cut the unemployment numbers (De Castella & McClatchey, 2011).

The Aims and Methodology

The objective of the paper is to present the current state of unemployment in Slovakia. The paper analyses selected aspects of unemployment in the economy based on the data derived from Eurostat,

Statistical Office of Slovakia, and several other sources. Using a blended descriptive-analytical approach, the unemployment policy from the point of view of both theory and practice is analysed. One way to address this social problem is to ensure synergy between education and the requirements of economic practice, as there are currently many vacancies in Slovakia. It is undisputable that awareness of new jobs should be increased and services provided by authorized bodies should be closer to the citizen.

Delineation of Unemployment and its Types

Unemployment is one of important macroeconomic problems of the market economy. As a global phenomenon it leads to serious economic as well as social consequences. For almost every person, the job loss has traumatic consequences and is associated with uncertainty, loss of regular income, drop in living standards, etc. From a person's point of view, loss of employment can cause a sense of failure, uncertainty, and embarrassment.

The unemployment rate is the basic criterion for assessing the success or failure of employment policy. The unemployment rate is one of the measures of labour market performance in developed market economies.

The Europe 2020 strategy for sustainable and inclusive growth includes the commitment to raise the average EU employment rates to 75% (within the age cohort of 20-65 years old) by 2020 (European Commission, 2010).

According to the definition of the International Labour Organization (ILO), unemployed people are without work, but seeking work and available for work. The unemployment rate is still high in the European Union (EU), namely 8.2% by 31st December 2016 (European Commission. 2017) compared with other developed countries. Many of the unemployed would like to work, and are actively looking for a new job or are available to work. (ILO, 1982). The European Commission has adopted similar definition as ILO. The main aspects are that they someone aged 15 to 74 (in Italy, Spain, the United Kingdom, Iceland, Norway: 16 to 74 years), without work during the reference week, available to start work within the next two weeks (or has already found a job to start within the next three months), actively having sought employment at some time during the last four weeks (European Commission, 1999).

The employment rate covers all people, including the inactive population (students, children, the retired, etc.). It represents the total number of people in employment as a percentage of the overall population of a given age. It is worth noting that the Europe 2020 strategy has been framed in terms of the employment rate, not the unemployed rate.

The unemployment and joblessness represent both a social and economic stress, including risk of poverty, homelessness, physical and mental illnesses, or suicides (Bell and Blanchflower, 2009). It is also one of the main sources of reduced social, material and psychological well-being.

Economic and Social Consequences of Unemployment in Slovakia

The long-term unemployment rate in Slovakia is one of the highest amongst the EU member states. Almost two thirds of unemployed people are unemployed for more than 12 months. It is known that many people who found jobs have been unemployed for longer than a year. This can be caused by the long time that takes for people to find a job and get employed.

The main economic consequence of unemployment is the issue of the labour force potential, as well as the skills, knowledge and capabilities of individuals that do not produce an economic effect. This results in decrease of the gross domestic product as well as the economic loss through measures of unemployment elimination and its consequences. In addition to the unemployment support itself, it is the contribution to funds (health, social), employees of labour offices, and so on.

In Slovakia, foreign investment is one of the main sources of employment. Foreign organizations belong to the largest employers in Slovakia. Unemployment also has negative consequences from a social point of view. It is true that the longer people are unemployed, the more negative emotions are present, such as the loss of motivation and the ability to work, the feeling of failure, etc. The impact

on mental and physical health is another significant aspect. Loss of income resulting from unemployment leads to growing inequality in redistributing income. (Weffers, 2017) With several programs through the Structural Funds, the EU helps to eliminate unemployment. For the programming period 2014-2020, Slovakia has allocated approximately 14 billion EUR for cohesion policy. Labour mobility within the EU is one of the ways with the help of which workers are guaranteed the opportunity to improve their living and working condition. (Novackova, 2014) Labour mobility itself helps economic migration and enables citizens from Member States to find a job.

Unemployment can be characterized also as a social phenomenon of involuntary and long-lasting interruption of work because of the impossibility of finding a job. The causes for unemployment may vary, but unemployment is closely linked to the qualifications of the unemployed. According to the information published by the Ministry of Finance of the Slovak Republic in 2016, 54 thousand of new job positions were formed, and the unemployment rate has dropped to the lowest level since the end of 2008. In the fourth quarter of 2016, it reached the level of 9% and 54 thousand job positions were formed in 2016, the second most successful year in the history of the Slovak Republic. (Ministry of Finance of the Slovak Republic, **2017).**

An Overview of Unemployment by Selected Demographic Factors and Regions

Table 1 shows the differences in unemployment and vacancies by regions in Slovakia.

Table 1: Unemployment and vacancies by Slovak regions in August 2017 (ISTP, 2017); Ústredie práce, rodiny a sociálnych vecí. (2017)

Region	Number of job seekers	Unemployment rate calculated from the total number of job seekers	Unemployment rate	Economically active population	Number of vacant work places
Bratislava	12,783	3.94%	3.64%	350,998	21,709
Trnava	9,024	3.74%	3.05%	296,274	18,270
Nitra	16,463	4.66%	3.88%	348,020	11,559
Trenčín	11,768	5.76%	4.73%	303,588	9,570
Žilina	17,414	5,90%	5.07%	343,513	8,103
Banská Bystrica	30,306	11.21%	9.43%	321,332	8,585
Prešov	42,325	12.29%	10.53%	401,819	7,438
Košice	38,170	12.53%	10.59%	360,294	5,605
Slovakia	178,253	7.70%	6.54%	2,725,838	94,364

Two regions with the lowest unemployment (Bratislava, Trnava region) have more vacant job positions available than there are job seekers (12,783 vs. 21,709; 9,024 vs. 18,270). In three regions (Banska Bystrica, Presov, and Kosice) there are for several times more job seekers than there are vacant positions (42,325 vs. 7,438; 38,170 vs. 5,605). Presov, the region with the highest number of economically active population, has most job seekers, the second highest unemployment and second lowest number of vacant positions (401,819 job seekers; 11.21% and 9.43% respectively; 7,438 vacant positions). Furthermore, there are about twice as much job seekers than vacant positions in Slovakia (178,253 job seekers and 94,364 vacant positions).

Slovakia's real GDP growth rate of more than 3% as of June 2017 (Trading Economics, 2017), increasing employment rates and decreasing unemployment have not translated into resolving one of the most frustrating problems – long term unemployment.

The employment rate in Slovakia had been steadily increasing from 2001 until the depression in 2008. In 2009 and 2010 it somewhat declined, and it has been recovering since, for example, the employment rate in 2015 reached 62.7% according to Eurostat (European Commission, 2015).

The unemployment rate decreased from almost 20% in 2001 to pre-crisis 9.6% in 2008, afterwards it soared to almost 14% in 2013. However, a declining trend started in 2013 which resulted in today's 6.7% of statistic unemployment or 7.91% according to job seekers as of July 2017. There are also significant regional differences between western and eastern part of the country. In five counties, the unemployment rate is below or just slightly above 5%. Bratislava and Trnava regions have the lowest unemployment rates in the country (3.7% and 3.12%, respectively). On the other hand, unemployment in other three counties is oscillating around 10% This is the case of Bansks Bystrica, Presov and Kosice regions (9.43%, 10.53% and 10.59% respectively).

Age

The unemployment of youth is a persistent problem in the Slovak labour market. In 2008, it reached its historic low at 19.3%, yet during the crisis it rose up to 33.9% in 2013. Since then, it is continuously declining. Yet, amongst the Visegrad countries, Slovakia has the highest rate of young people between 15 to 34 years, that are neither employed nor in education or training (NEET).

Ethnicity and Nationality

The Roma population is one of the most disadvantaged groups in the Slovak labour market. There are no net data on the population, though unofficial estimates talk about 450,000 people (approx. 8% of population). Though the unemployment and employment rates in Slovakia shift, the rates for Roma population are quite stable.

Foreign workers represent about 1% of the entire workforce in Slovakia. Majority of foreign workers are from the EU/EEA states, namely Romania, Czech Republic, and Hungary. According to the Slovak government's official employment strategy, the gaps in labour market should be filled primarily by domestic workforce, and only if there are no suitable candidates, they should be occupied by foreign workers. This policy ignores the need to cope with skill and labour shortage and its practical monitoring and control remain questionable.

To conclude, it is estimated, that in Slovakia about 12% of active workforce work without any type of work contract, which means they are engaging in undeclared labour (European Commission, 2016). The most common form of undeclared work in Slovakia and in the EU member states are home repairs and products purchases. In the case of product purchases, car parts are the leading product (European Commission, 2014).

While the risk of poverty in Slovakia declined in the last two decades, it has not diminished completely. It is estimated, that in 2016 the amount of population at risk of poverty was around 12.7%, representing approx. 670,000 persons. It is not surprising, that the unemployed are in the highest risk of poverty (around 48% in 2016). But the economically active population is not save from poverty as well. The number of working people at the risk of poverty is still very high. Some estimates state that it accounts for about 10%. Another group of people are those who earn minimal or slightly above minimal wage.

Conclusion

Perhaps the most unfortunate consequence of unemployment is that an individual or group of people, who have certain mental and physical abilities to perform certain types of work, do not perform and do not use their skills to work. Slovakia's unemployment reduction policy has produced positive results, but current information from Ministry of Labour, Social Affairs and Family of the Slovak republic points at the fact that there are many vacancies in Slovakia. This leads to the issue of why the unemployed are not interested in finding a job out of the current vacancies. Effective co-ordination and partnerships in different areas (e.g., employment, job creation, employment services, education, youth, social affairs, and support through the European Social Fund) can contribute to the systemic solution of the respective problems. To eliminate unemployment, the Labour Code, which

has introduced the institute of flexi-work (Business Dictionary, 2017), also contributes to the reduction of the negative effects of sectoral changes in the economy. This type of measure helps create new jobs and at the same time is a tool for harmonizing family and work life.

References

Bajzíková, L., Šajgalíková, H., Wojčák, E. and Poláková, M. (2010), Employee growth in Slovak knowledge - intensive businesses. *Journal of Human Resource Management*. Roc.13, N. 1-2

Bell, D. N. F. and Blanchflower, D. G. (2009), *What Should Be Done About Rising Unemployment in the UK?* Institute for the Study of Labour

Business Dictionary. (2017), *Definition of Flexiwork*. [Online], [Retrieved September 29, 2017], http://www.businessdictionary.com/definition/flexible-work.html

De Castella, T. and McClatchey, C. (2011), Whatever happened to full unemployment? *BBC News Magazine*. [Online], [Retrieved September 22, 2017], http://www.bbc.com/news/magazine-15276765
Delaneuville, F. (2017). L´impact des préceptes du New Public Management sur l´évolution de la gouvernace territoriale en Europe. Analyse Critique du processus de régionalisation en Slovaquie. IBIMA

European Commission (1999). *Eurostat*. [Online], [Retrieved September 19, 2017], http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Unemployment
European Commission (2015). *Eurostat*. [Online], [Retrieved September 19, 2017], http://ec.europa.eu/eurostat/web/lucas/data/primary-data/2015

European Commission. (2010). *Europe 2020*. [Online], [Retrieved September 19, 2017], http://ec.europa.eu/eu2020/pdf/COMPLET%20EN%20BARROSO%20%20%20007%20-%20Europe%202020%20-%20EN%20version.pdf

European Commission. (2014). *Special Eurobarometer 402*. [Online], [Retrieved September 19, 2017], http://ec.europa.eu/commfrontoffice/publicopinion/archives/ebs/ebs_402_en.pdf

European Commission. (2016). *European Semester Thematic Factsheet>Undeclared Work.* [Online], [Retrieved September 19, 2017], https://ec.europa.eu/info/sites/info/files/european-semester_thematic-factsheet_undeclared-work_en.pdf

European Commission. (2017). *Newsrelease Euroindicator.* [Online], [Retrieved September 21, 2017], http://ec.europa.eu/eurostat/documents/2995521/7844069/3-31012017-CP-EN.pdf/f7a98d76-13bc-4586-9e25-9e206e9b6f02

ILO. (1982). *Resolution concerning statistics of the economically active population, employment, unemploymentt and underemployment*. [Online], [Retrieved September 27, 2017],

http://www.ilo.org/global/statistics-and-databases/standards-and-guidelines/resolutions-adopted-by-international-conferences-of-labour-statisticians/WCMS_087481/lang--en/index.htm
Investopedia. (2017). *Types of Unemployment.* [Online], [Retrieved August 19, 2017],

http://www.investopedia.com/exam-guide/cfa-level-1/macroeconomics/unemployment.asp
ISTP. (2017). *Vacant work places in Slovakia.* [Online], [Retrieved September 9, 2017], https://www.istp.sk/volne-pracovne-miesta

Kirchmayer, Z. and Fratričová, J. (2017). On the Verge of Generation Z: Career Expectations of Current University Students. In: Education excellence and innovation management through Vision 2020 : From regional development sustainibility and competitive economic growth (IBIMA), ISBN: 978-0-9821489-2-1

Labour Code. Act No. 311/2001 Call.

Ministry of Finance of the Slovak republic. **(2017).** *National Reform Programme of the Slovak Republic.* [Online], [Retrieved September 19, 2017], http://www.finance.gov.sk/en/Default.aspx?CatID=450

Novackova, D. (2014). *Voľný pohyb osôb.* Vnútorné politiky a činnosti Európskej únie. Aleš Čeněk, Plzeň

Slovakia GDP Annual Growth rate. (2017). *Trading Economics.* [Online], [Retrieved September 29, 2017], https://tradingeconomics.com/slovakia/gdp-growth-annual

Treľová, S. (2014). Pomoc v hmotnej núdzi rodinám s deťmi. Bratislava. Univerzita Komenského v Bratislave

Ústredie práce, rodiny a sociálnych vecí. (2017). *Mesačné štatistiky August*. [Online], [Retrieved September 28, 2017], http://www.upsvar.sk/statistiky/nezamestnanost-mesacne-statistiky.html?page_id=1254; (2017)

Wefersová, J. (2017), Projekt Európa. *Udrzitelný rozvoj VIII – Evropa v reformním čase*. České Budejovice

Wojcak, E. (2013). *Flexibilne formy organizacie prace*. 2013. Bratislava: Ofprint.

The Financial Sector and Economic Development

Katarína Rentková, Comenius University in Bratislava, Faculty of Management, Odbojárov Slovakia.
E-mail: katarina.rentkova@fm.uniba.sk

Darko Panevski, Comenius University in Bratislava, Faculty of Management, Odbojárov Slovakia.
E-mail: darko.panevski@fm.uniba.sk

Abstract

Economic growth is one of the ultimate goals of any economic system. The relationship between the development of the financial system and economic growth is a subject of longtime debates. Although it seems that it has reached indicative consensus, economists still have different thoughts on the importance of financial system for the economic growth of one country. The primary purpose of banks is to mobilize otherwise idle resources for use in productive investment. A wide array of theoretical models has appeared in the growth and development literature in the past decade to formalize the link between financial-system functioning and the growth of the real economy. In comparison to the traditional growth models in which output was seen as a function of capital, labor, and disembodied technological progress, the current models provide a richer framework for interpreting the potential impact of financial systems. The main issue of this paper is to analyze the relation between development of the financial system and economic growth by using the secondary analysis of literature and historical descriptive analysis for empirical research. The purpose of research is to put the Macedonian banking system and its economic growth in comparative and historical perspective with the banking systems of Central and Southeastern Europe countries.

Keywords: Banking sector, Development, Economic growth, Financial system.

Introduction

The relationship between the development of the financial system and economic growth is a subject of longtime debates. Although it seems that it has reached indicative consensus, economists still have different thoughts on the importance of financial system for the economic growth of one country.

Economic growth is one of the ultimate goals of any economic system. The need to stimulate and manage economic growth is from a big importance in advanced, emerging, and developing countries. Despite the burgeoning research on finance and growth, the importance of financial-system structure has yet to be determined. Much of the debate over banking reform in the United States hinges on the assumption that certain types of financial systems allocate an economy's resources more efficiently than others.

Research objective

The primary purpose of banks is to mobilize otherwise idle resources for use in productive investment. A wide array of theoretical models has appeared in the growth and development literature in the past decade to formalize the link between financial-system functioning and the growth of the real economy. In comparison to the traditional growth models in which output was seen as a function of capital, labor, and disembodied technological progress, the current models provide a richer framework for interpreting the potential impact of financial systems. For their motivation, nearly all appeal to the observed correlations between financial-system development and industrial growth uncovered by economic historians and development economists during the 1960s and '70s.

In global framework the relationship between the banking, and wider - the financial system and economic growth is a subject of many research studies. The literature suggests that when the financial system is bad, so is the rest of the economy. For example, when bank balance sheets are heavily burdened with nonperforming loans banks may not be able to provide new loans to companies, even to those that have good investment opportunities. Lack of finance, of course, reduces investment and economic activity and, ultimately, economic growth. In the extreme, a credit crunch impacts adversely even on trade finance and can grind all economic activity to a halt.

More broadly, it is now widely accepted that a fragile financial system can impair long run growth. Recent research, for example, shows that the combination of lax prudential regulation and supervision with inadequate corporate governance practices in banks can have disastrous consequences for the rest of the economy.

Methods and methodology

The research is processed by using a wide scale of the scientific methods and procedures. The specific range of methods was based on the research needs of the individual parts. The intention is to follow the logical continuity of the articles' parts, the correctness and the adequacy of information and data. First part is focused on the different definitions. This section is prepared by using the analytical methods – the analysis, the casual analysis, the synthesis. We analyzed scientific publications and scientific articles, papers by various authors (e.g. Burton, M., Brown, B. (2009, Delong J. Bradford (2001), Levine, R. (2005), Thierry, B. (2012), Thompson, D. (2011)). Pawera, R. (2007), Janać, J. – Mariak, V. (2013), Šlahor, Ľ. – Majerčáková, D. – Barteková, M. (2016), Komorník, J. – Majerčáková, D. – Husovská, M. (2011), Komorník, J. – Janać, J. (2011), Gejdoš, P. (2013) and (2015)). The first part is based on preparation and explanation of key terms. (Mitková, L. 2010) Methodology contains of identification of research assumptions, as well as methods and sources used in the paper. Results part consists of the main findings and is prepared by using a comparative and historical descriptive analysis.

Theoretical Background

Empirical evidence generally suggest a positive relationship between financial development and economic growth. Some studies even, found that good financial development could predicts future economic growth rates. Panel studies, studies of individual countries, as well as analysis of the level of industries and firms, have documented periods in which financial development had a crucial impact on the speed and the course of economic development. (Thompson, D., 2011) However, a study of this type, according to our best knowledge, is not made specifically for country that is coming from Southeastern Europe. That will be our main motivator which will drive us to compute this research in best possible way and found a satisfying outcome with computing various test and based on underlying real data.

Role of the banking system in the economy

A banking system is a sum or a structural network of institutions that provide a diversity of financial services within one economy. These institutions are responsible for operating a payment system, providing loans, taking deposits and helping with investments. The main role of the banking system is to provide entities with surplus funds to invest and transfer them into entities that lack the financial resources (entities with plans for new projects), and ultimately making profit. (Burton, M., Brown, B., 2009) In other words financial systems, i.e. financial intermediaries and financial markets, channel funds from those who have savings to those who have more productive uses for them. They perform two main types of financial service that reduce the costs of moving funds between borrowers and lenders, leading to a more efficient allocation of resources and faster economic growth. These are the provision of liquidity and the transformation of the risk characteristics of assets. By performing these roles, the banking system

supports the economic activity and creates the basis for large investment ventures and technological innovations.

As stated in the introductory part, the banking system exists to allow overcoming of the difficulties that arise in the operation of enterprises and to provide financing of the long-term investment projects or maintenance of the current (short-term) liquidity.

In order for a one company to finance in investment projects that are basis for its growth, it should have the available funds. This reserve of financial resources can be funds from past profits of the company, investments from the owners and funds provided through an issue of new equity securities. But if the funds cannot be created in such ways (so-called equity capital), then they need to be borrowed from external sources (i.e. debt capital). The population of one economy can invest their surplus funds to theses deficient enterprises. Here the financial system is appearing as a balancing agent between deficit and surplus entities with aim to enable the channeling of these funds to be at minimal cost and with minimal risk.

If the channeling of funds from surplus to deficit agents are going straight, without the existence of financial institutions, there will be two types of costs: informational and transaction costs. Savers (surplus agents) will generate informational cost in order to learn about the operations of the company (deficient agent) or to assess the productivity of the project (its ability to repay borrowed funds). J. Bradford DeLong (2001) in informational costs includes the costs generated for depositors to feel safe, measures to increase operational safety of the deposit. Transaction costs, however, are measured by the required time and resources for the implementation of a transaction. If such costs did not exist, also the necessity for financial system would not exist. Since they are present in the complex reality, the role of financial institutions consists in minimization and overcoming of these costs for effective allocation of the resources and indirect support of the economic growth.

Place and role of the banking system for economic growth of the economy

According to the above discussion, the role the banking system is to identify the needs for financial services, with reducing of transaction and information costs, creation of needed products and their sale at affordable prices. In this way the banking system is developing, and while responding to the needs of the economy, it could contribute to overall economic development. The development of the banking system is closely linked to the competition between banks in the economy, because motivated by increased competition, banks can offer more products and services. At the same time, the growing international movement of capital contributes for increasing the participation of banks in international financial markets, consolidation of banks from different geographical areas and emergence of regional banking groups. These development trends of the banking system contributes to reduction of prices of bank products, that, in turn, stimulates investments in new projects and technological advances, which in final stage stimulates economic growth. By providing its basic functions the banking system influence its own growth. At the same time, performing these basic functions defines channels that support the overall growth of the economy. These functions are:

1. Generating information for potential investment opportunities and allocation of capital;
2. Mobilization of savings;
3. Monitoring and control of enterprises-borrowers;
4. Risk Management;
5. Specialization and concentration of banking activities.

Below we will explicate in details how the performance of each of these functions can affect the economic growth of one country.

Generating information for potential investment opportunities and allocation of capital

Before deciding on approving of a loan, the bank always make a detailed analysis of the enterprise performance or the borrower. This analysis creates information and transaction costs accumulated for determining the solvency of the company, all the future plans for investment and risk assets that might not be recovered if the investment projects fail. If the banking system does not exist, then these big costs for finding the right information and assessment of enterprises will keep individual savers from proper allocation of their capital, which would ultimately prevent the companies to continue their investment plans. By reducing these costs, the banking system improve the allocation of capital and channels it to the places of his most productive use. In this way, investment projects can be realized and they represent the basis for economic growth. In addition, with the advantages from the increased scope of information available and due to the diversity of its loan portfolio, the bank reduces the credit risk, i.e. the risk that a given asset might not be recovered.

Lower credit risk reduces the cost of investment - the interest rate, which makes capital cheaper and more accessible. Consequently, on an aggregate level, by managing the information on borrowers, financial intermediaries contribute for realizing greater investments, reduction of interest rates and thus stimulate greater economic activity. All this support and boost economic growth of one economy.

Mobilization of savings

Closely related to the previous function is mobilizing of resources or collection of funds from a number of individual savers. The savings deposits are financial instruments with a small denomination, which provides also depositors with lower income opportunity for savings. According to Levine (2005), as well as in the process of allocation of capital, the process of mobilization of savings also includes overcoming of the transaction costs related to collecting the savings of many different subjects and overcoming the information costs related to the confidence of depositors in the financial institution, and sense of control over their savings. In other words, to reduce these costs, the bank uses economies of scale, where one information that it possesses can be exploited for multiple clients.

A typical example of this is the so-called delegated supervision, when the bank control the investments of companies funded by her and share this information with the individual savers (potential investors). If each depositor is left to analyze the company again on its own, huge costs will be accumulated making the overall process more expensive and less efficient. Thus, by exploiting economies of scale, banking systems increase efficiency in the mobilization of savings from individuals, and allow faster allocation of funds, supporting investment projects and technological innovation, and positively influencing the economic growth of one economy.

Monitoring and control of enterprises-borrowers

Third channel through which the banking system can influence the economic growth is with control by the bank over the way of utilizing debt capital within the companies-borrowers. According to previous discussion, the banks mobilize savings of many individuals and lend to businesses. Banks on behalf of depositors, oversee the use of funds by businesses. If savers individually performed this, monitoring costs will be high, which will make the price of capital (interest rate) increase. Therefore, monitoring and control on users of funds by the bank lender, will influence on rational and productive utilizing of capital, which will increase the value of the company and consequently will contribute to overall economic growth.

Some studies state that the role of banks as controllers of the use of funds by companies have positively effect on creating long-established relationship between enterprises and the bank, which offers the possibility of gaining mutual trust and opportunity for financing new long-term capital projects and innovative technologies. And by directing capital into long-term projects to support economic growth.

In the short term, however, when the bank has already established effective monitoring of the enterprise and it knows the operation and performance of the same, the procedure for financing the activities of the company are shortened. The short term financing allows the company to reduced cash holding to a minimum. The excess of free money can be invested in financing of its own activities and increase the productivity of operations. Consequently, monitoring the activities of the company reflects positively on productivity, the accumulation of capital and the growth of the company. Thus lead us to conclusion that monitoring of the companies by the bank supports the overall growth of the economy.

Risk Management

Banks can also reduce information and transaction costs by proper management of financial risks. Bank holds various debt instruments in the form of deposits with different maturities and regular interest. On one side there are savers that most often want to deposit the funds on shorter periods, but are reluctant to risk. On the other side appear borrowers who have riskier and longer-term projects. Bank as an intermediary is collecting mass of savings with shorter deadlines, perform maturity transformation and place funds on longer deadlines, but in different economic agents thus credit risk is diversified. Individual savers cannot diversify their funds and reduce credit risk, so if banks were not existing, investments in risky highly profitable projects will lag behind. At the same time, by offering savings accounts with short maturity, the bank satisfy the liquidity needs of its savers.

Banks also play a huge role in the management of liquidity risk enterprises. During the production process, companies are in need of additional funds, mostly to support production activities and the maintenance of current liquidity. Here the banks offer a variety of short and medium-term credits (revolving loans, loans for the purchase of raw materials, financing of inventory, financing on construction in progress, short-term loans to finance foreclosure and etc.). (Thierry, B., 2012) By maintaining the current liquidity, companies have continuous workflow and production, which have positive impact on overall economic performance and maintaining the liquidity of the entire system and in final stage supports economic growth. Moreover, according to the aspects discussed in previous sections, the long-term liquidity will enable financing long-term projects, which influence the development of the enterprise and hence the overall economic growth.

Specialization and concentration of banking activities

The Banking system may be the basis for the growth by specialization and concentration of its activities. Banking systems which contribute for reduction of transaction and information costs are influenced by the specialization of banks in their operation. Therefore with utilizing economies of scale, increased operational efficiency and increased set of financial services at lower prices, technological innovation, etc., they are influencing the economic growth of one economy.
As a conclusion, banks can influence economic growth through achieving its five functions, which are down to two conceptual directions:

- Increased saving is the basis for enhanced and efficient allocation (lending) in yielding projects, which is the basis for economic growth;
- Monitoring and control of enterprises, risk diversification of the loan portfolio and increased efficiency in banks' operations reduce the cost of financing (interest rate), allowing more projects to become profitable, which is the basis for economic growth.

Modern concepts for the link between economic growth and banking sector

Stable and well developed financial system is a key factor for an efficient functioning of any market economy. The banking institutions have the central place within the financial system in one country. The reason for this may be the fact, that banks are continuously expanding the scope of activities they perform, and this activities were operated only by non-banking institutions, in the past. But despite this, the primacy within each financial system belongs to the banks. (Scott, S. 2014) Stability and liquidity of banks are essential for maintaining the stability of the financial sector in each national economy.

Many authors are sceptic for the positive link between the development of the banking system and economic growth. They indicate that higher development of the banking system result with stronger competition between banks, which according to them, in many cases could have negative influence on the economic growth of one country.

Measures for the development of the banking system

Similar to the determinants of economic growth, the literature is not unanimous in terms of indicators by which we should measure the development of the banking system. However, when banking system is placed in the context of economic growth, then there is greater consensus on the measurement of its development. Thus World Bank divide the indicators in two groups: traditional and modern; While the traditional measures for development of the banking system can be brought in direct relation to economic growth. Therefore, the main measures for the development of the banking system are drawn from traditional indicators. It is considered that some of the shortcomings of traditional indicators can be exceeded by using new, modern indicators. However, as we shall see below, they are more related to the availability of banking services to households and not directly related to economic growth. They are: density of the network of subsidiaries, branches and ATMs; average size of credits and deposits per capita in relation to GDP; number of loans and deposits per capita; percentage of the population that has a credit or deposit account in the bank; and percentage of firms that finance their investment activities through loans. Having in mind that cannot be brought in direct relationship with economic growth, and also the fact that a significant proportion of information for them are inaccessible for Macedonia, we decided that we are not going to use them in our analysis.

Consequently, we use the following indicators of development of the banking system:

Indicators of banking development: loans to private sector / GDP; liquid liabilities (short-term deposits from private agents) / GDP; total assets / GDP; net interest margin; and operating expenses / total asset

Base on this indicators we are going to test and prove the link between economic growth and development of the banking system.

Central, Southeastern Europe and Macedonia: Comparative and historical descriptive analysis

The purpose of this chapter is to put the Macedonian banking system and its economic growth in comparative and historical perspective with the banking systems of Central and Southeastern Europe countries. First, we present a comparative analysis between the countries from CEE and SEE, and then we observe the Macedonian banking system in historical perspective and examine the current situation today.

Comparative analysis

For the purposes of this comparative analysis, firstly we needed to define the exact number of countries that will be included in this comparison. In order not to analyze this phenomena only in a partial sample, we defined a wider set of countries belonging to the two geographic areas: Central Eastern Europe (CEE: Slovakia, Poland, Czech Republic, Hungary, Estonia, Lithuania, Latvia and Slovenia) and South Eastern Europe (SEE: Macedonia, Croatia, Serbia, Bosnia and Herzegovina, Albania, Kosovo, Romania and Bulgaria). For comparison purposes we took the aggregate or average data for the Eurozone 15. This classification corresponds to the fact that CEE countries are characterized by considerably higher GDP per capita and greater development of the banking system in terms of SEE countries; while the average GDP per capita of Eurozone 15 is the highest and have the most developed banking system in terms of all countries in the comparison group.

Macedonia belongs to the group of SEE countries, and the road to integration into the Eurozone should pass the stage of development that currently have the CEE countries. Sources of data for this analysis are: the IMF, the ECB, Eurostat and the Internet pages of individual central banks of the selected countries.

Development of the banking systems in CEE and SEE countries

In recent years, the banking systems of CEE and SEE have been marked by two structural changes: 1. Strengthening of the dominant share of foreign shareholders and international banking groups in domestic banks, leaving only a fraction of state-owned banks that can be privatized; and 2. Introduction of international financial reporting standards, the principles of Basel 2 agreement and more effective regulation and supervision of the banking industry. The group of CEE countries is farther ahead than SEE countries on both trends. These reforms were aimed for supporting the development of the banking system and securing its efficiency and stability on the path of integration of these countries in the financial system of the Eurozone. In this comparative analysis, we will observe the development of the banking systems through the following coefficients: total loans / total deposits; annual growth of private loans; and annual growth of short-term deposits. The movements of these indicators for CEE and SEE are shown in Figure 1 – Figure 3.

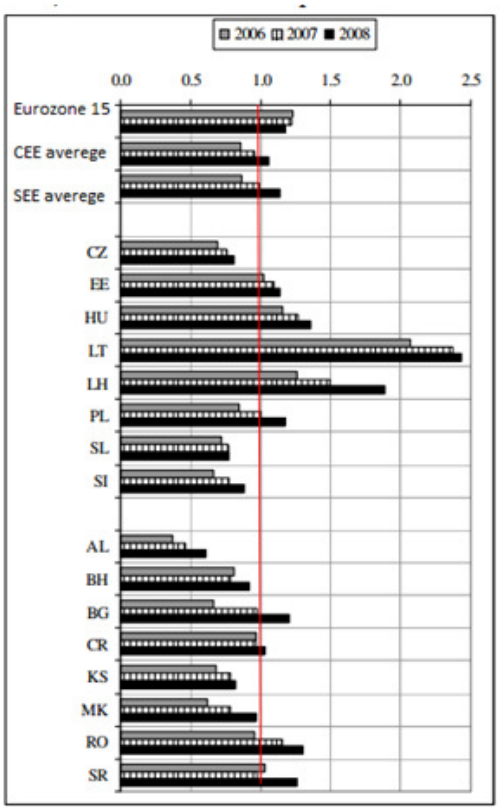


Fig. 1: Indicators for the development of the banking systems of CEE and SEE countries – Total loans / Total deposits

The coefficient total loans / total deposits (Figure 1) measures the channeling of deposits in private loans, or what proportion of domestic savings is channeled into loans and furthermore in investment and consumption. The average value for the CEE and SEE countries rises in the period of 2006-2008, so in 2008 exceeds the value of 1.00 and amount to 1.06 and 1.14, respectively. These developments are rough indicator of convergence of the financial systems of these two groups of countries towards the financial system of the Eurozone which, on average remained at a similar level of development in the last three years (around 1.2). However, it seems that it the group of Central and Eastern Europe there is a greater diversity of the value of the indicator, unlike the SEE countries within which only Albania significantly lags behind with (0.6). In the observed three years, Macedonia has achieved a greater growth of this indicator in comparison with the other countries from the SEE group (annual growth of 20% in 2007 and 2008), and reaches a ratio of close to 1.00, but still lags behind Romania (1.3), Serbia (1.3) and Bulgaria (1.2). According to the movement of this factor, Macedonia is approaching to the average of the CEE countries, although still lags behind most of these countries.

In 2008, private loans experience a significant decline (Figure 2), as a result of the tight credit policy and lower investment (due to reduced economic activity) as well as measures set by the central banks of these countries. In the last three years, the SEE countries have the higher growth rate of private loans compared to CEE countries and the Eurozone 15, which mainly reflects the lower initial development of the banking systems of these countries, as well as the larger development needs of their economies, in general.

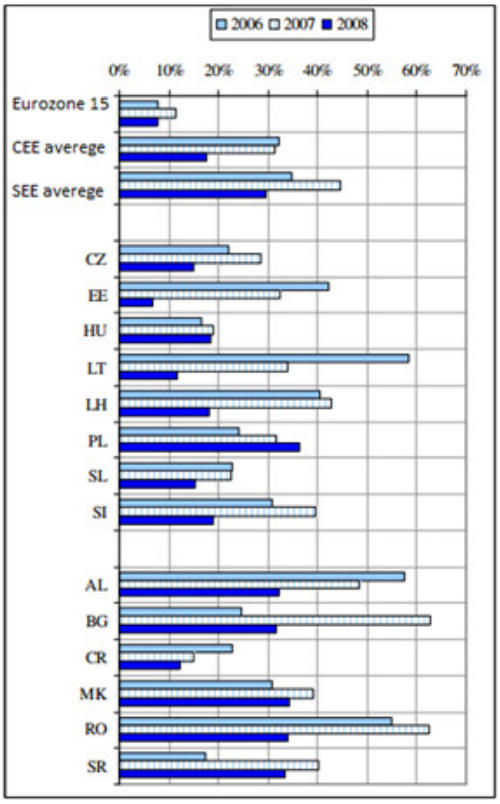


Fig. 2: Indicators for the development of the banking systems of CEE and SEE countries – Annual growth of private loans

Furthermore in 2008, the growth rate of the short-term deposits (Figure 3) was marked with drastic slowdown; in SEE countries amounted to only 0.8% and in CEE entered the negative zone with score of -5.8%.

The efficiency of the banking system is measured by the size of the operating costs in terms of total revenues. We associate this factor with profitability of the banking system, which is measured by the ratio for return on assets (ROA). Through diagram of circles (in Figure 4) we observe the potential connection between these two indicators. The size of the circles represent the relative size of operating costs of the banking system.

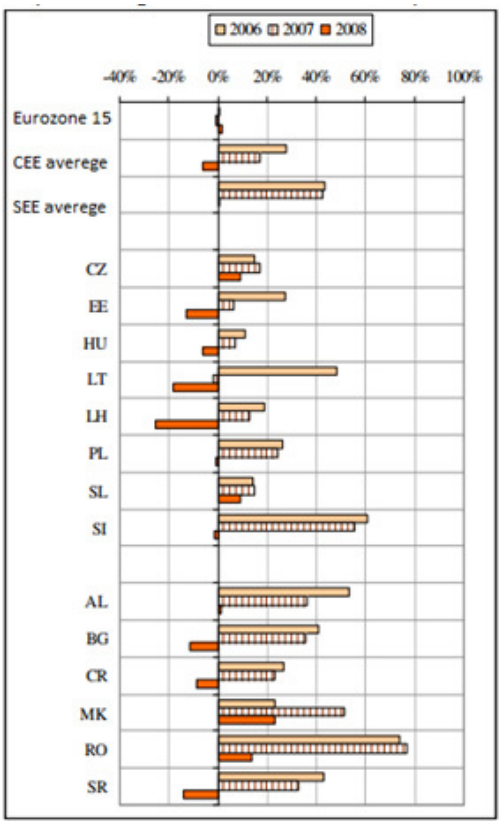


Fig. 3: Indicators for the development of the banking systems of CEE and SEE countries – Annual growth of short-term deposits

Looking at Figure 4 we can notice that the larger circles are placed at the bottom of the diagram, which indicates the possible negative relationship between operating costs and profitability of the banking system. This tendency is particularly expressed for the Eurozone, where in 2007 and 2008 the operating costs have increased by 105.1% and 99.8%, respectively, compared to 2005 and 2006, and reduce ROA to 0.2% in 2008. In the CEE countries, by 2007, the decline in costs was accompanied by increased profitability. Yet this connection is not so obvious in 2008, when despite of unchanged operation costs it comes to decline by (27.4%) of the ROA. The latter, probably due to the more obvious effects on the profitability of the global financial crisis. This is probably due to negative effects that the global financial crisis have on the banking system and economies of Europe countries. In the SEE countries, the link between the performance of the banking system and its profitability appear negative, although there is no significant reduction in profitability and an increase in operating costs, as was the case with the Eurozone. From 2007 to 2008, operating costs in SEE countries increase from 41.5% to 48.0% and ROA was reduced from 1.7% to 1.6%.

In Macedonia, from 2005 to 2007 there was a trend of decline in operating costs (From 75.2% to 58.4% of total revenue) while increasing profitability (from 1.2% to 1.8%). These trends reflect the increasing efficiency of the Macedonian banks in this period. But in 2008, operating costs in Macedonia (62.2% of total revenues) follow the same trend as in the SEE countries, and are accompanied by a decline in ROA of 1.8% to 1.4%.

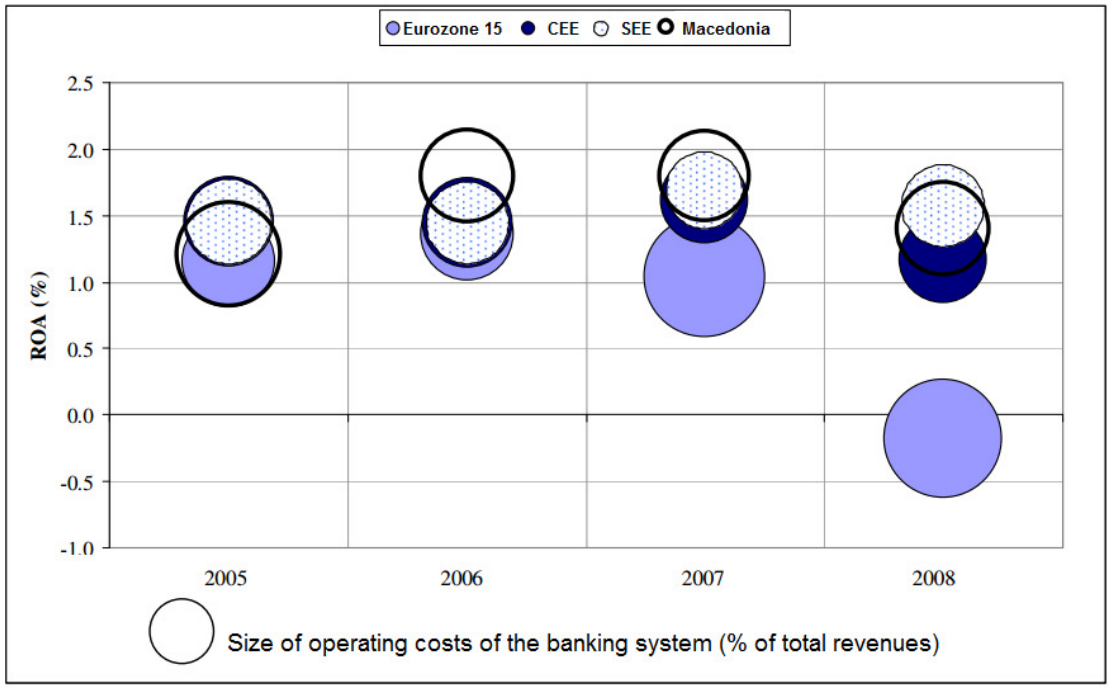


Fig. 4: Indicators for efficiency of banking systems in the Eurozone, CEE, SEE and Macedonia

Link between the banking system and economic growth in CEE and SEE countries

On the road to European integration, the countries of CEE and SEE need to go through the process of reforms, which implies convergence of their national income and living standards to the same in EU. Figure 5 represent the GDP per capita, expressed in international dollars for CEE and SEE countries and the average for the Eurozone. It can be observed that the average of CEE countries ($ 21,271) is higher than the average of SEE countries ($ 11,126), which implies that the first group is far ahead in the actual process of EU integration, compared with the second group. In the CEE group, countries that particularly stand out are Slovenia, Czech Republic and Slovakia. Higher economic growth of this group of countries is linked to their higher starting point, and their early membership in the EU (the process of real convergence). On the other hand, the SEE countries are significantly lagging behind, with an average GDP per capita, which amount almost half of the average of CEE. Also, the countries of this region are more heterogeneous than the countries from CEE region, only Romania, Bulgaria and Croatia are EU members, and Macedonia, Serbia and Bosnia and Herzegovina signed the Stabilization and Association Process with EU and Albania and Kosovo are still facing certain political problems.

However, for the process of real convergence in context of the banking system, these countries have made significant restructuring and privatization of the sector, and implied numerous reforms which turn out to be quite beneficial for them and for their economies. The observations from this statistical data just confirm our expectations that for positive potential relationship between development of the banking system and economic growth of one country.

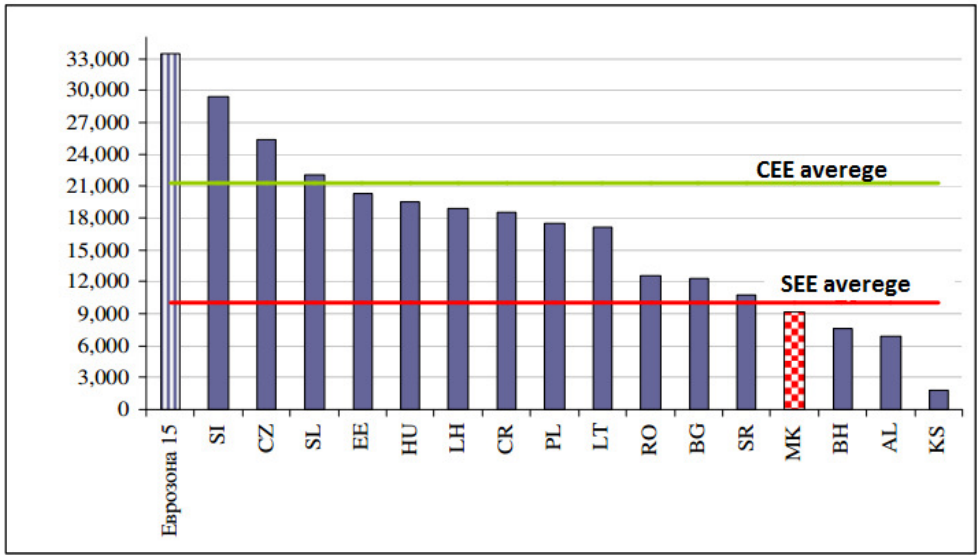


Fig. 5: GDP per capita CEE and SEE countries

Conclusion

The objective of this paper was to investigate the potential link between development of the banking system and the economic growth of one country. Special attention was drawn to Macedonia, in a comparative analysis between the countries from CEE and SEE region. From the research of the theoretical literature we can conclude that the banking system can influence the economic growth by performing its basic functions: First of all by generating information for potential investments and allocation of capital, the banking system contributes for improving the information available about current status of companies in the economy, as well as their future plans and decisions. This information decreases the risk factor and reduces the cost of borrowing and the interest rates of loans offered by banks, and thus stimulates economic growth. Secondly through mobilization of savings, which includes overcoming of transaction costs related to collection of savings from different entities and information costs for increasing the confidence of depositors in the financial institution, the banking system can support high-volume projects and technological innovation in the economy and thus stimulate growth. Finally via specialization and concentration, the banking system can exploit economies of scale and introduce a wider range of products that can reduce the cost and the risk of borrowing which in the end will support the economic growth of one country.

In conclusion, the comparative analysis showed us that: 1) The development of Macedonian banking system is mostly average compared with the level of development of banking systems of SEE countries, but significantly lags behind averages of CEE countries; 2) We concluded that there is a potential positive relationship between the level of banking depth and economic growth and potential positive relationship between profitability and efficiency of the banking system and economic growth in one country. These observations are in direction of our initial expectations that the higher development of the banking system could imply higher economic growth.

Although the survey of this paper did not face significant constraints still we have to highlight those related to the lack of appropriate variables or lack of variability in the series of certain variables at the moment. One example is the analysis of the capital market, which although desirable, could not have been exercised mainly because his participation in the financial system of Macedonia is still small in

relation to the share of the banking system; Another constrain was that movements of Macedonian Stock Exchange seems to be still driven by speculations, and as a result of that these series were not included in this survey.

One direction for expansion of the topic treated in this paper is examining the relationship between development of the banking system and economic growth in times of economic crisis. Another direction for extension of this topic is examining the impact of financial stability and the concept of risk management on economic growth. From this perspective, the financial stability will cover the behaviour of the two key agents: households and corporate sector, on one hand, and the behaviour of financial institutions through the acquisition and management of risks, on the other hand, and their impact on the economic activity in one country.

These two alternative streams for expansion of the topic suggest that although in terms of the relationship between banking development and economic growth there is a tentative consensus, directions in which it can be explored are numerous and dynamic.

References

Burton, M, Brown, B. (2009). Financial System of the Economy: Principles of Money and Banking. Routledge.

DeLong J. B. (2001). Macroeconomics. McGraw Hill

Gejdoš, P. (2013). Total Quality Management. TU Zvolen, Zvolen.

Gejdoš, P. (2015). 'Contiuous quality improvement by statistical process control'. Proceedings of international conference Business economics and management 2015, ISSN 2212-5671, 565-572.

IMF. (2010). International Financial Statistics: Central, Eastern, and South-eastern Europe.

IMF. (2016). World Economic Outlook. 2016, Washington, DC: International Monetary Fund, Publication Services.

Janać, J. and Mariak, V. (2013), 'Budúcnosť systému starobného dôchodkového zabezpečenia v Slovenskej republike' Proceedings of Horizonty podnikateľského prostredia II. zo 08.11.2013. Bratislava: Fakulta managementu UK, Katedra ekonómie a financií.

Kajanová, J. (2015). 'Performance Analysis in SMEs through the Usage of Accounting Information Systems,' Proceedings of 9th International Conference on Applied Business Research (ICABR), ISBN: 978-80-7509-223-6, 06-10 October 2014, Talca, Chile, 372-380.

Komorník, J. and Janać, J. (2011). 'Family Finance.' Proceedings of 12th International Conference of the Society for Global Business & Economic Development in Singapore, ISBN 978-0-9837898-2-6. 21.-23. july 2011. 1298-1303.

Komorník, J. and Majerčáková, D. and Husovská, M. (2011). Finančný manažment. Kartprint, Bratislava.

Levine, R. (2005). Financial Structure and Economic Growth: A Cross-Country Comparison of Banks, Markets, and Development. MIT Press.

Mitková, L. (2010) 'Využitie kvantitatívnych metód výskumu v manažmente. In: Súčasné trendy a smery v manažmente organizácií'. Proceedings of Vedecká konferencia doktorandov FMUK v Bratislave (p. 128-136). Univerzita Komenského v Bratislave, Fakulta managementu: Kartprint.
Olvecká, V. (2013) 'The entrepreneurial environmnent in Slovakia'. Vilnius: Mykolas Romeris University, 2013.

Pawera, R. (2007) 'The factors of the labour market in the Slovak Republic' In: Increasing competitiveness or regional, national and international markets development. New challenges [CD-ROM]. Ostrava: VŠB TU.

Rentková, K. and Janać, J. (2016). 'Specific Practices in Risk Management of Biogas Production,' Proceedings of the 28th International Business Information Management Association Conference (IBIMA), ISBN: ISBN: 978-0-9860419-8-3, Seville, Spain, 1694-1702.

Roštárová, M. and Janác, J. (2014). 'Analýza podnikateľského prostredia v Srbsku'. Proceedings of Horizonty podnikateľského prostredia, Bratislava: Univerzita Komenského v Bratislave.

Scott, S. (2014). Bank Management. Thomson/South-Western, Cengage Learning.

Šlahor, Ľ. (2015). 'VAT evasion: Recent evidence from Slovakia,' Proceedings of the 26th International Business Information Management Association Conference, ISBN: 978-0-9860419-5-2, 11-12 November 2015, Madrid, Spain, 1555-1560.

Šlahor, Ľ. – Majerčáková, D. – Barteková, M. (2016), 'Implications of low/negative interest rates for banks´asset and liability management – an example', Proceedings of the 13th International scientific conference, Brno: Masaryk University, 721-727.

Thierry, B. (2012). From Crisis to Recovery: Old and New Challenges in Emerging Europe. UK: Palgrave Macmillan.

Thompson, D. (2011). The Banking Effect: Acquiring Wealth through Your Own Private Banking System. Create space.

Analysis of the Evolution and Influence of Final Energy Consumption on Gdp in Eu Countries

Georgeta Soava, University of Craiova, Romania, georgetasoava@yahoo.ro

Anca Mehedintu, University of Craiova, Romania, ancamehedintu@yahoo.com

Abstract

Starting from the decisions of the European Union (EU) to reduce energy consumption by 20% by 2020 the overall objective of this paper is to analyze the impact energy consumption on the development of the EU countries, thus implicitly the gross domestic product (GDP) of these countries. To this aim, the study realized in the paper was carried out in two directions: firstly, we analyze the evolution of GDP in the EU countries, and secondly, we analyze the influence of final energy consumption (FEC) on GDP of each EU country. For this we collect the information provided by Eurostat for the period 2006-2016 for the 28 EU states members on the evolution of macroeconomic indicators: GDP and FEC (nominal and on capita). We analyze these series of data using the EViews 9 econometric software package. The Dickey-Fuller and Philips-Perron unit roots tests and the Granger causality standard test were applied to examine the relationship between GDP and FEC at both nominal and per capita. The results of the analysis did not indicate a cointegration relationship between the studied variables, but this can be considered as a positive element, because the reduction of the final energy consumption can lead to the reduction of the gas emissions, which can have a beneficial effect on the economic development and implicitly of living standards. However, in developing countries there is still the possibility of increasing FEC leading to GDP growth, and positive shocks in GDP per capita cause positive shocks in the FEC.

Keywords: final energy consumption, economic growth, panel countries, Granger causality

Introduction

Europe's developed countries have a developed economy and a higher standard of living than most of the world's states. Emerging economies are dependent on the economies of developed countries, economic growth in Western European countries can lead to an increase in emerging economies, but their recession has a strong negative impact on developing nations. A major difference between rich and emerging states is per capita income, which determines their consumption, so developed economies tend to consume more energy than the poor.

Gross domestic product (GDP) is the most commonly used macroeconomic indicator for the global assessment of an economy. Nominal GDP is commonly used to determine the economic performance of a country or region and to make international comparisons. For statistical comparisons, each country's data should be converted into a common currency, respectively nominal parity and purchasing power (PPP).

Another widely used indicator derived from this is GDP per capita that is used to eliminate the influence of the absolute size of the population, allowing for easier comparison of living standards between different countries. GDP per capita in PPP is a general economic indicator of living standards that allows comparison of the dynamics of economic development both over time and between economies of different sizes, regardless of price levels.

At present, energy is one of the main factors influencing economic systems, and can have a leverage effect on economic growth. Final energy consumption (FEC) includes the energy consumption of all users, except for the energy sector itself. The European Union (EU) has committed itself to reducing its final energy consumption by 20% by 2020.

Starting from the European Commission's decisions on the need to reduce FEC, the overall objective of this paper is to analyze the evolution and the impact the GDP on FEC of each EU country. EU countries governments are more and more interested in studying relationship from GDP and FEC because of the international goal of curbing the increase in global temperature to a maximum of 2°C in the context of global warming. To this aim, the study was carried out in two directions: firstly, we analyze the evolution of FEC and GDP in EU countries, and secondly, we analyze the impact the GDP in FEC.

The paper is organized as follows: Section 1 discusses a brief review of literature on empirical studies concerning FEC and GDP, Section 2 describes the empirical models, estimation methodology and the data source, Section 3 presents empirical investigation and results and the last section concludes the study.

Literature Review

Energy arguably plays a vital role in the economic growth and livelihood, both in terms of demand side (energy is needed by the consumer to maximize its utility), and supply side (energy is a key factor in production, together with capital, labor and materials). This means that there should be causality between final energy consumption to national income or gross domestic product as well as vice versa. Naturally, the following questions arise: “Is energy consumption a stimulus to economic growth?” or “Is economic growth a stimulus for energy consumption?”

Many economists and researchers have studied the relationship between energy consumption and GDP from different perspectives and using diverse methodologies. Their methods have ranged from descriptive time series analysis to cointegration applications with panel data.

A multitude of authors have studied the relationship between GDP and energy consumption by providing a wide range of results in terms of causality, statistically highlighting either a one-way causality, a bidirectional causality or none. Such analysis were performed in (Anwar et al. 2017) on a panel of 29 OIC countries, data period 1990–2014; in (Alper, Oguz 2016) on a panel of 8 east-central European countries, data period 1990–2009; in (Sadorsky 2009) on a panel of 18 emerging countries, data period 1990–2003; in (Bhattacharya et al. 2016) on a panel of top 38 countries, data period 1990–2003; in (Inglesi-Lotz 2016) on a panel of OEDC countries, data period 1990–2010; in (Bozkurt, Destek 2015) on a panel of OEDC countries, data period 1980–2012; in (Tugcu et al. 2012) on a panel G-7 countries, in (Okyay et al. 2014) on a panel of developed countries in Europe, data period 1990–2011; in (Chontanawat et al. 2008) on a panel of 100 countries, data period 1960–2000 or 1971–2000.

In the final consumption, the evolution of final energy consumption is of particular importance, as energy contributes to the stimulating of growth and economic development, and there is a dynamic causality between energy in general and economic growth (Wada 2017).

Lee (2005) investigated the causal relationship between FEC and GDP for 18 developing countries in 1975-2001, and the results showed a unidirectional GDP causality in FEC (increased FEC led to growth GDP).

Narayan et al. (2010) examine the impacts of energy consumption on GDP in for 93 countries during the time period from 1980-2006.

Aslan (2013) studied the relationship between energy consumption and economic growth for 22 OECD countries, highlighting the strong correlation in most cases.

Similar studies for the case of individual countries and for different periods of time can be found for Algeria (Amri 2017), for Saudi Arabia (Wada 2017), for China (Lin, Moubarak 2014), for Turkey

(Ocal, Aslan 2013), for Brazil (Pao, Fu 2013), for U.S. (Stern 2000; Yildirim et al. 2012), for Lithuania (Bobinaite et. al 2011).

Research Methodology

Starting from the above-mentioned elements, in this paper we analyze the evolution of GDP and FEC (nominal values and per capita), in EU countries and relationship between FEC and GDP. The survey is based on indicators taken from the Eurostat and World Bank database for the period 2006 - 2016 for the 28 EU member states.

We will use panel series (cross-section and time series that contain information on the value of the indicators analyzed: GDP, GDP/capita, FEC and FEC/capita between 2006-2016) for the 28 EU Member States.

Models analysis on these data, based on classic regression, show that important properties of time series data can be more restrictive than similar properties for cross-section data.
In the first part of the study we will make a statistical analysis of the indicators evolution and the second part of the study aims to analyse the impact of final energy consumption on economic growth, where we will use a linear regression model:

$$LGDP_{it} = \alpha_i + \beta_i LFEC_{it} + u_{it}, \quad (1)$$

$$LGDP\_CP_{it} = \alpha_i + \beta_i LFEC\_CP_{it} + u_{it} \quad (2)$$

where $i = 1, \dots, N$, is the index of a country in the panel, $t = 1, \dots, T$, refers to the time period, while $LGDP_{it}$, $LGDP\_CP_{it}$, $LFEC_{it}$ and $LFEC_CP_{it}$represent natural logarithms of real GDP and GDP/capita, and FEC and FEC/capita for the country i at the time t, respectively. The terms α_i, β_i are unknown parameters to be estimated, whileu_{it}, are the error terms (assumed to be independent and identically distributed with a zero mean and a constant variance, for each i).

Variables in natural logarithms can be interpreted in growth rate after taking the first difference into account.

The above theoretical models will be estimated using panel data techniques, with the aid of EViews 9 software product.

The analysis of the regression model is performed in four steps. Firstly, two different unit root tests are used to investigate whether the variables are stationary or not and the order of integration of the variables. We used Augmented Dickey-Fuller (ADF) (Dickey, Fuller 1981) and the Phillips-Perron (PP) (Phillips, Perron 1988) test to this purpose. Secondly, when all of the series are found to be integrated of the same order, we test the co-integration relationship between the variables in Eq. (1) and Eq. (2) using the Johansen maximum likelihood method (Johansen, Juselius 1990) and Pedroni cointegration test (Pedroni 2004). The existence of cointegration indicates that there are long-run equilibrium relationships among the variables, and thereby, Granger causality exists among them in at least one direction (Engle, Granger 1987).

Next, the parameter estimates for the regression equations (1) and (2) are evaluated using the fully modified least square (FMOLS) regression method (Phillips, Hansen 1990). This cointegration equation can work with variables that are stationary at different levels. An analysis of the estimations error using the Jarque and Bera test (Jarque, Bera 1980) for normality is also performed. Finally, the Granger causality test (Granger 1969) is used to find unidirectional or bidirectional causalities between the GDP and FEC.

Empirical Findings and Results

Statistical analysis of data

To empirical analysis is based on series of FEC and GDP (nominal and per capita) data on a panel of 28 countries of UE during the 2006-2016 period.

From Eurostat's data on nominal GDP in trillion euro for the analyzed period, it is observed that at the level of the EU states, the GDP has grown with a relatively constant year-on-year rate for the EU founding states, and the new entrants in EU marked a sustained and robust growth of over 70% in 2016 over 2006 (Malta 83.67%, Slovakia 77.82%, Bulgaria 74.05% and Romania 72.30%). The only country whose GDP declined steadily by 2015 was Greece, but there is a slight increase in 2016 (0.11%) compared 2015. The increase was due to the governments' commitments of these countries to realize a stable monetary policies, of trade policies (export-oriented), low rates of fixed tax and the use relatively cheap labor.

To assess living standards, we analyzed GDP per capita of EU countries and found a major difference between countries. Thus, Luxembourg has the highest GDP per capita (largely due to cross-border workers in Belgium, France and Germany), followed by Ireland, Denmark, Sweden, the Netherlands and Austria (with a GDP of more than 40000 euro per capita). In the other side of the list are Romania (~ 8000 euro/capita) and Bulgaria (~ 6000 euro/capita) who occupy the last places, followed by Croatia, Hungary and Poland with a GDP/capita of less than 12000 euro/ capita, then Latvia, Lithuania and Slovakia with up to 15000 euro/capita.

After analyzing the FEC at nominal values, expressed in thousands of tonnes of oil equivalent TOE, using Eurostat data, we found as energy consumption it remained relatively unchanged between 2006 and 2008, then FEC decreased by 5.8% in 2009 due to predominantly economic and financial global crisis. FEC level in the EU-28 in 2015 is lower than in 2006 in all countries except Malta and Poland. FEC per capita for countries studied also shows a year-on-year decline. Finland has the highest average per capita consumption (around 16,000 kwh), followed by Sweden (around 14,000 kWh) and Luxembourg (around 12,000 kwh). The largest increase in FEC/capita was registered by Malta 46.46%, followed by Poland 23.68%, Czech Republic 16.12% and Estonia 13.44%. FEC/capita had the largest decline in Greece (25.33%), Ireland (24.19%) and Hungary (22.23%).

In table 1 we presents descriptive statistics of the GDP and FEC (nominal and per capita) series for each country. The GDP and FEC series data follow a normal distribution for all countries. Germany has a GDP that is higher than the regional average at 2716.87 billion euro with a standard deviation of 330,925.9. In contrast, Malta has an average GDP in market prices 7.2 billion euro. This is the lowest figure amongst all the countries, with a standard deviation of 1.464513. The largest average of GDP per capita is held by Luxembourg with 79792 euro/capita, with over 200% compared to the European average, and the lowest value is recorded by Bulgaria with 5389 euro/capita. Distribution shows positive asymmetry at all states, which means that during the analysed period, GDP had a trend of growth, and kurtosis has a value less than 3 in all countries, i.e. the distribution is flatter than the normal curve (platykurtic), except for Croatia, Czech Republic, Ireland Slovenia and Slovakia which has a sharper distribution than the normal curve (leptokurtic).

Table 1: Descriptive statistics: GDP at market prices (billion euro), GDP per capita (euro), FEC (TOE) and FEC per capita (kwh)

Coun-try	Mean				Kurtosis				Jarque-Bera			
	GDP	GDP /cp	FEC	FEC /cp	GDP	GDP /cp	FEC	FEC /cp	GDP	GDP /cp	FEC	FEC /cp
AT	308.15	36364	27419.86	7985.88	1.892	1.883	2.195	1.464	0.570	0.658	0.602	0.993
BE	375.52	38489	35794.7	8270.16	1.876	1.924	2.014	2.683	0.583	0.808	0.473	0.419
BG	39.37	5389	9406.66	4180.98	2.938	2.755	1.902	1.597	0.991	0.624	0.944	0.843
HR	44.28	10375	6934.99	3858.78	4.029	4.022	1.819	3.102	0.531	0.799	0.914	0.387
CY	18.30	21446	1819.44	4218.42	2.349	2.363	1.557	3.280	0.387	0.334	1.317	1.878
CZ	155.61	14775	25072.28	5665.45	3.410	3.514	1.831	3.887	1.939	2.299	0.699	2.886
DK	250.05	44567	14775.95	6290.57	1.843	1.778	1.556	1.469	0.666	0.689	0.915	0.977
EE	17.23	12996	2887.66	5819.07	1.726	1.707	2.645	1.583	0.744	0.770	1.385	0.889
DE	2716.87	33640	25230.89	15922.76	1.927	1.778	1.651	2.358	0.762	0.749	0.781	1.012
IE	196.17	42603	150335.4	7150.85	3.287	3.271	1.768	1.678	3.486	3.359	0.746	0.728
EL	205.87	18643	213622.8	6800.75	1.364	1.376	1.929	2.248	1.237	1.242	0.684	0.562
ES	1066.11	22861	18768.13	6156.9	2.037	2.053	1.493	1.419	0.469	0.449	0.961	1.044
FR	2050.99	31161	16966.88	4209.42	1.999	2.168	1.955	1.703	0.471	0.496	0.543	1.279
IT	1614.78	26794	11786.68	6225.27	2.878	2.604	1.532	1.455	0.229	0.259	1.198	1.106
LV	21.72	10701	125220.6	5331.46	1.751	1.755	1.678	1.595	1.131	0.881	0.728	1.021
LT	32.09	10879	4028.5	3115.08	1.907	1.924	2.079	2.552	0.627	0.532	0.517	0.115
LU	43.33	79792	4901.54	2896.66	1.802	1.782	2.742	3.105	0.796	0.725	0.717	0.551
HU	101.93	10270	4209.42	12777.19	2.193	2.327	1.498	2.388	0.299	0.244	0.996	0.736
MT	7.20	17040	485.52	4492.13	2.187	2.129	2.244	1.835	1.013	0.869	0.739	0.690
NL	642.26	38234	51791.91	6829.3	2.732	3.075	2.502	2.183	0.071	0.511	0.658	0.342
PL	369.41	9612	62931.08	3501.51	2.278	2.286	2.414	2.799	0.872	0.885	1.245	2.403
PT	175.31	16713	17337.72	4884.57	2.280	2.833	1.292	1.518	0.242	0.194	1.244	0.966
RO	136.76	6833	22981.38	2365.52	2.742	2.632	1.884	2.650	0.083	0.067	1.223	0.634

SI	36.51	17763	10801.03	5405.18	4.028	4.060	1.620	1.948	1.794	1.935	0.795	0.777
SK	68.41	12648	4896.53	7097.18	3.214	3.297	2.850	2.267	1.682	1.863	0.138	1.272
FI	195.47	36033	87536.58	5937.42	2.124	2.269	1.691	1.705	0.494	0.643	0.838	0.701
SE	393.50	41097	32376.62	14563	1.672	1.732	2.130	1.836	0.899	1.046	0.660	0.565
UK	2097.62	32773	139395.9	5551.82	2.413	2.409	1.570	1.500	0.321	0.223	0.962	0.972

In terms of FEC, all EU countries have a normal distribution, the average of consumption in nominal values is highest in Germany (213622.8 TOE) and the smallest in Malta (485.52 TOE). At FEC/capita, the highest average holds Finland (15922.76 kwh) well above the EU average (6344.48 kwh) and Lithuania has the lowest value (2896.66 kwh). The distribution shows a slight positive asymmetry in all states, being a platykurtic distribution.

Testing causality between GDP and FEC (nominal and per capita)

a. Results of unit roots tests

The time series properties of the variables in Eq. (1) are evaluated through two different unit root tests, namely ADF and PP. We find that for most of the countries the four time series are stationary in their first difference, at least at 10% level (table 2).

Table 2: Results of the unit roots tests, 2006-2016 Variables LGDP and LFEC

Country	Variable	ADP		PP	
		Level	First difference	Level	First difference
AT	LGDP	-0.782476	-6.537774***	-1.041024	-5.105433***
	LFEC	-3.377452**	-5.095205***	-8.087674***	-17.48357***
BE	LGDP	-0.943192	-5.187622***	-1.534649	-7.523331***
	LFEC	-5.063709***	-6.299604***	-5.094983***	-19.21380***
BG	LGDP	-3.883156**	-6.073287***	-4.194598**	-5.463665***
	LFEC	-2.052065	-2.148837	-2.927159*	-1.955595
CZ	LGDP	-2.901614*	-5.479648***	-3.814531**	-4.311457**
	LFEC	-1.199721	-3.908956**	-1.671083	-7.979245***
CY	LGDP	-2.099887	-2.130873	-2.465290	-2.203257
	LFEC	-1.572488	-2.430063	-0.384811	-1.466299
DE	LGDP	0.046616	-3.194777	1.139712	-3.279329*
	LFEC	-7.524313***	-3.378542**	-12.79800***	-22.86541***
DK	LGDP	0.198862	0.198862	-0.065145	-7.951829***
	LFEC	-0.935587	-4.213374**	-0.766889	-7.737500***
EE	LGDP	-1.145367	-4.348738**	-1.099474	-3.040596*
	LFEC	-1.959945	-4.302188**	-1.983766	-6.048018***
EL	LGDP	-3.900194**	-2.764909	-0.328767	-1.971013
	LFEC	-0.739296	-1.844735	-0.749710	-1.482327
ES	LGDP	-2.366924	-2.416260	-2.297901	-2.416260
	LFEC	-0.696943	-3.688097**	-0.440742	-4.302894**
FI	LGDP	-1.529107	-6.108924***	-1.529116	-6.265897***
	LFEC	-2.294248	-4.835163***	-2.224600	-8.981686***

Country	Variable	ADP		PP	
		Level	First difference	Level	First difference
FR	LGDP	-1.132772	-6.540463***	-1.443674	-7.216396***
	LFEC	-0.473896	-4.845134***	-1.881883	-14.18414***
HR	LGDP	-3.273686**	-5.671711***	-3.372329**	-3.042107*
	LFEC	-0.777835	-3.042994*	-0.713193	-3.038771*
HU	LGDP	-2.070073	-4.533442**	-2.070073	-4.865863***
	LFEC	-3.462486**	-3.450343**	-5.094644***	-5.139554***
IE	LGDP	0.092982	-2.131622	0.092982	-2.131622
	LFEC	-1.260464	-2.770031	-1.260464	-2.769396
IT	LGDP	-2.446080	-5.978451***	-2.430709	-5.119254***
	LFEC	-0.089372	-6.097208***	-0.680563	-12.49433***
LT	LGDP	-1.694639	-5.025642***	-1.695200	-5.314733***
	LFEC	-2.137700	-3.712111**	-2.022539	-3.862661**
LU	LGDP	-0.403698	-4.985761***	-0.174125	-4.511326**
	LFEC	-1.395772	-4.645904***	-1.230651	-8.507913***
LV	LGDP	-1.820868	-5.245159***	-2.293691	-3.181203*
	LFEC	-1.051886	-5.055880***	-0.607333	-12.63449***
MT	LGDP	1.217900	-2.353172	1.939346	-2.349806
	LFEC	-2.871181*	-5.725219***	-1.566041	-5.725219***
NL	LGDP	-1.468108	-6.241763***	-1.468329	-5.836418***
	LFEC	0.655946	-5.490337***	-1.169822	-5.490337***
PL	LGDP	-2.226640	-9.562192***	-2.519766	-7.072120***
	LFEC	-2.002787	-3.478844**	-2.002787	-3.478844**
PT	LGDP	-1.673547	-2.456377	-1.806445	-2.457832
	LFEC	-0.619324	-1.872995	-0.667799	-1.854639
RO	LGDP	-2.124408	-6.174904***	-2.124408	-5.622597***
	LFEC	-1.673142	-4.257949**	-4.420595***	-7.393309***
SI	LGDP	-3.056237*	-4.825202***	-3.056237**	-4.198239**
	LFEC	-1.763265	-4.908533***	-1.713642	-5.334154***
SK	LGDP	-4.723174***	-17.25028***	-4.760417***	-7.185020***
	LFEC	0.036118	-4.430044**	-1.465456	-10.64662***
SE	LGDP	-0.810123	-3.087035*	-0.445744	-3.881390**
	LFEC	-2.366874	-4.390374**	-2.336553	-8.889113***
UK	LGDP	-0.997072	-2.352487	-0.997072	-2.384131
	LFEC	-0.856215	-3.658596**	-1.352385	-12.63780***

*Note: * Denotes significance at 10% level, ** denotes significance at 5% level, *** denotes significance at 1% level (figure 1).*

Augmented Dickey-Fuller/Philips-Perron test statistic
LEVEL

Test critical values:	1% level	-4.297073
	5% level	-3.212696
	10% level	-2.747676

Augmented Dickey-Fuller/ Philips-Perron test statistic
First difference

Test critical values:	1% level	-4.582648
	5% level	-3.320969
	10% level	-2.801384

Figure 1: The critical values for ADF and PP tests

We proceed analogously, to make the tests for Eq. (2). According to the results, for some countries, namely, Cyprus and Portugal, the null hypothesis of the existence of a unit root cannot be rejected at level and first difference both to FEC, FEC/capita and GDP, GDP/capita. The null hypothesis of the existence of a unit root cannot be rejected at level and first difference for GDP series at Ireland, Estonia and United Kingdom.

In the next step we test whether the variables in Eq. (1) and Eq.(2) are cointegrated. The results for the Johansen test for each cross-section we performed are indicating the existence of a cointegrated relation between GDP and FEC at the 5% significance level.

b. Estimation of regression parameters in Eq. (1) and Eq. (2)

The parameter estimates for Eq. (1) are reported in Table 3.

Table 3: Estimated coefficients of Eq. (1), 2006–2016

Country	$\hat{\alpha}_i$		$\hat{\beta}_i$	
	Coefficient	Prob.	Coefficient	Prob.
AT	13.79951	0.3613	-0.791198	0.5925
BE	14.90235	0.1603	-0.857302	0.3964
BG	17.18923	0.0000	-1.480992	0.0007
HR	1.829629	0.6940	0.221321	0.6738
CY	1.137865	0.6880	0.235805	0.5325
CZ	21.71597	0.0050	-1.647231	0.0305
DK	14.69151	0.0057	-0.956573	0.0826
EE	8.310435	0.1812	-0.689533	0.3762
FI	14.14722	0.0805	-0.876458	0.2715
FR	19.45305	0.0277	-0.993025	0.1789
DE	17.69503	0.2090	-0.799072	0.4857
EL	-2.873475	0.1795	0.834897	0.0002
HU	7.732711	0.3760	-0.320392	0.7207
IE	5.268749	0.0830	-0.003640	0.9910
IT	8.971393	0.1093	-0.135324	0.7762
LV	10.92874	0.0539	-0.948544	0.1640
LT	1.964221	0.7960	0.173554	0.8461
LU	28.16019	0.0000	-2.927210	0.0003
MT	-5.117195	0.0003	1.139711	0.0000
NL	13.66558	0.0507	-0.664276	0.3010
PL	-15.58390	0.2097	1.943285	0.0844
PT	4.553296	0.2474	0.062242	0.8772
RO	20.30712	0.0006	-1.535796	0.0084
SK	23.25001	0.0000	-2.051924	0.0004
SI	4.789981	0.4704	-0.141579	0.8561
ES	5.513929	0.2187	0.127706	0.7455
SE	22.89424	0.0379	-1.631610	0.1237
UK	12.22964	0.0596	-0.388433	0.4771

Note: Figures in parenthesis indicate the p-values of the t-statistic.

The results of the test in Table 3 show that the coefficients determined for linear regression in eq1 are not significant in most countries, therefore this regression model is not relevant to the impact of final energy consumption on GDP. Analogously we found the same thing for eq. (2).

Estimation of regression parameters in Eq. (1) show that the coefficients determined for this linear regression are significant on the 5% level for Bulgaria, Czech Republic, Denmark, Luxemburg, Malta, Romania and Slovakia. So, for these countries this regression model is relevant for the impact of final energy consumption on real GDP. In eq. (2) the coefficients determined for this linear regression are significant on the 5% level for Austria, Denmark and

Luxembourg, and for these countries this regression model is relevant for the impact of final energy consumption per capita on GDP per capita.
The model properties were evaluated using the Jarque and Bera test for normality of the errors. Analyzing the values of the estimated regression coefficients $\hat{\beta}_i$ corresponding to the variable $LFEC_i$ and $LFEC\_CP_i$ we note that:

- all coefficients $\hat{\beta}_i$ are negative, indicating a unfavorable impact of final energy consumation on economic growth;
- these coefficients are smaller than 1, indicating that the impact of final energy consumption on economic growth is not very significant.

c. Granger causality test

In table 4 below the results of the Granger causality test between variables LGDP and LFEC are presented.

Table4: Granger causality test between variables LGDP and LFEC

Country	Null hypothesis 1			Null hypothesis 2		
	L_FEC does not Granger-cause L_GDP			L_GDP does not Granger-cause L_FEC		
	F-Statistic	Prob.	Conclusion	F-Statis,	Prob.	Conclusion
AT	0.5013	0.6489	Accept	2.3783	0.2405	Accept
BE	0.0624	0.9407	Accept	14.032	0.0300*	Reject
BG	1.9697	0.2842	Accept	0.8692	0.5038	Accept
HR	3.5649	0.1612	Accept	0.4340	0.6830	Accept
CY	3.8611	0.1480	Accept	2.6782	0.2151	Accept
CZ	1.7968	0.3069	Accept	0.9904	0.4675	Accept
DK	1.1042	0.4372	Accept	9.9255	0.0476*	Reject
EE	36.179	0.0079*	Reject	0.9825	0.4697	Accept
FI	3.1854	0.1811	Accept	5.9613	0.0901*	Reject
FR	0.6655	0.5765	Accept	1.7881	0.3081	Accept
DE	0.1894	0.8367	Accept	0.2620	0.7855	Accept
EL	1.5358	0.3473	Accept	6.5760	0.0800*	Reject
HU	4.9120	0.1131	Accept	0.5961	0.6054	Accept
IE	1.7178	0.3183	Accept	1.9199	0.2905	Accept
IT	24.056	0.0142*	Reject	1.1970	0.4148	Accept
LV	4.3719	0.1291	Accept	0.1040	0.9043	Accept
LT	2.4634	0.2328	Accept	0.1528	0.8646	Accept
LU	1.9888	0.2819	Accept	4.3697	0.1292	Accept
MT	5.2271	0.1053	Accept	26.918	0.0121*	Reject
NL	1.9532	0.2863	Accept	3.8176	0.1498	Accept
PL	0.0227	0.9777	Accept	5.7313	0.0945*	Reject
PT	1.4745	0.3581	Accept	0.2438	0.7978	Accept
RO	4.1028	0.1385	Accept	6.5248	0.0808*	Reject
SK	1.6354	0.3309	Accept	8.9648	0.0543*	Reject
SI	11.559	0.0389*	Reject	1.7008	0.3208	Accept
ES	0.0488	0.9531	Accept	0.0520	0.9502	Accept
SE	1.1642	0.4225	Accept	3.9216	0.1455	Accept
UK	6.6987	0.0783*	Reject	0.2189	0.8152	Accept

Note: * Denotes that the null hypothesis is accepted at 0.10 level.

The conclusions emphasized within this table have the following significance:

- "Accept" - means that the null hypothesis is accepted, that is the left variable does not Granger-cause the right corresponding variable;
- "Reject" - means that the null hypothesis is rejected, that is the left variable does Granger-cause the right variable.

Both the results of the standard Granger LGDP and LFEC, and LGDP/capita and LFEC/capita causality tests show that there is no causal relationship between FEC and GDP (nominal and per capita) for the period 2006-2016. An analysis over a longer period 1995-2016 shows that there is bidirectional Granger causality FEC↔ GDP for 12 countries in the panel, namely Czech Republic, Ireland, Greece, Croatia, Cyprus, Lithuania, Luxembourg, Netherlands, Austria, Poland, Slovakia, Finland;

- unidirectional Granger causality FEC → GDP for 11 countries, namely Belgium, Denmark, Estonia, Spain, France, Italy, Hungary, Portugal, Romania, Slovenia, Sweden;
- unidirectional Granger causality GDP → FEC for 4 countries, namely Bulgaria, Denmark, Latvia, United Kingdom;
- no Granger causality for Malta.

Conclusion

This paper aimed to extend the research on the causal relationship between economic growth and final energy consumption using a panel of data for 28 countries of European Union over a period from 2006 to 2016.

Motivated by EU Directive of decrease of final energy consumption by 2020, we did statistical analysis of final energy consumption within the data panel.

The empirical results showed a positive impact, although statistical small, of energy consumption on economic growth. Also, causalities were not found between GDP and FEC macroeconomics indicators. For emerging countries there is a large gap between nominal GDP and PPP, but at the level of advanced countries the difference is much lower.

By means of linear regression, a decreasing trend was found for the between final energy consumption to all EU countries but less for emerging countries. However, in developing countries we still have the potential to increase final energy consumption that may (be) leads to GDP growth, and positive shocks in GDP/capita that cause positive shocks in final energy consumption. The causal link is greater for developing countries then any restraint on energy consumption will have a bigger effect on these countries compared to the more affluent industrialized countries. In this case it could be argued that any reduction in energy consumption should predominantly be undertaken by the developed world so as not to inhibit the development of the less developed nations.

The lack of causal relationship between GDP and FEC for the past 11 years can be considered as a positive element, because in the context of global warming debates, lower energy consumption involves reducing greenhouse gas emissions, but does not mean a drop of living standards, but on the contrary by using low energy-consuming modern technologies, economic growth and, implicitly, raising the standard of living can be recorded.

References

Alper, A. and Oguz, O. (2016), 'The role of renewable energy consumption in economic growth: Evidence from asymmetric causality', *Renewable and Sustainable Energy Reviews* 60: 953-959.

Amri, F. (2017), 'The relationship amongst energy consumption (renewable and non-renewable), and GDP in Algeria', *Renewable & Sustainable Energy Reviews* 76: 62-71. https://doi.org/10.1016/j.rser.2017.03.029

Anwar, A., Arshed, N. and Nabeela Kousar, N. (2017), 'Renewable Energy Consumption and Economic Growth in Member of OIC Countries', *European Online Journal of Natural and Social Sciences* 6(1): 111-129.

Aslan, A. (2013), 'Energy Consumption and GDP: The Strong Relationship in OECD Countries', *Journal Energy Sources, Part B: Economics, Planning, and Policy* 8(4): 339-345. http://dx.doi.org/10.1080/15567240903502586

Bhattacharya, M., Paramati, S., Ozturk, I. and Bhattacharya, S. (2016), The effect of renewable energy consumption on economic growth: Evidence from top 38 countries, *Applied Energy* 162: 733-741.

Bobinaite, V., Juozapaviciene, A. and Konstantinaviciute, I. (2011), 'Assessment of causality relationship between renewable energy consumption and economic growth in Lithuania', *Engineering Economics* 22(5): 510-518.

Bozkurt, C. and Destek, M. (2015), 'Renewable energy and sustainable development nexus in selected OECD countries', *International Journal of Energy Economics and Policy* 5(2): 507-514.

Chontanawat, J., Hunt, L. and Pierse, R. (2008), 'Does energy consumption cause economic growth? Evidence from a systematic study of over 100 countries', *Journal of Policy Modeling* 30: 209-220.

Dickey, D.A. and Fuller, W.A. (1981), 'Likelihood ratio statistics for autoregressive time series with a unit root', *Econometrica* 49: 1057–1072.

Engle, G. and Granger, C. (1987), 'Co-Integration and error correction: Representation, estimation, and testing', *Econometrica* 55(2): 251-276.

Granger, C. (1969), 'Investigating causal relations by econometric models and cross-spectral methods', *Econometrica* 37: 424-438.

Inglesi-Lotz, R. (2016), 'The impact of renewable energy consumption to economic growth: A panel data application', *Energy Economics* 53: 58-63.

Jarque, C.M. and Bera, A.K. (1980), 'Efficient tests for normality, homoskedasticity and serial independence of regression residuals', *Economics Letters* 6: 255-259.

Johansen, S. and Juselius, K. (1990), 'Maximum likelihood estimation and inferences on co-integration with approach', *Oxford Bulletin of Economics and Statistics* 52: 169–209.

Lee, C. (2005), 'Energy consumption and GDP in developing countries: A cointegrated panel analysis', *Energy Economics* 27: 415-27.

Lin, B. and Moubarak, M. (2014), 'Renewable energy consumption-Economic growth nexus for China', *Renewable and Sustainable Energy Reviews* 40: 111-117.

Narayan, P.K. and Popp, S. (2010), 'A new unit root test with two structural breaks in level and slope at unknown time', *Journal of Applied Statistics* 37(9): 1425-1438.

Ocal, O. and Aslan, A. (2013), 'Renewable energy consumption-economic growth nexus in Turkey', *Renewable and Sustainable Energy Reviews* 28: 494-499.

Okyay, U., Ebru, A. and Fatih, Y. (2014), 'Energy consumption and economic growth nexus: Evidence from developed countries in Europe', *International Journal of Energy Economics and Policy* 4(3): 411-419.

Pao, H.T and Fu, H.C. (2013), 'Renewable energy, non-renewable energy and economic growth in Brazil', *Renewable and Sustainable Energy Reviews* 25: 381–392.

Pedroni, P. (2004), 'Panel cointegration: asymptotic and finite sample properties of pooled time series tests with an application to the PPP hypothesis: new results', *Econ. Theory* 20: 597–627.

Phillips, P.C.B. and Hansen, B. (1990), 'Statistical inference in instrumental variables regression with I (1) processes', *Review of Economics Studies* 57: 99–125.

Phillips, P.C.B. and Perron, P. (1988), 'Testing for a unit root in time series regression', *Biometrika* 75: 335–346.

Sadorsky, P. (2009), 'Renewable energy consumption and income in emerging economies', *Energy Policy* 37(10): 4021–4028.

Stern, D. (2000), 'A multivariate cointegration analysis of the role of energy in the US economy', *Energy Economics* 22: 267-283.

Tugcu, C.T., Ozlturk, I. and Aslain, A. (2012), 'Renewable and non-renewable energy consumption and economic growth revisited: evidence from G7 countries', *Energy Econ* 34: 1942–1950.

Wada, I. (2017), 'Energy production and economic growth in Saudi Arabia: Dynamic causality', *Energy Sources, Part B: Economics, Planning and Policy* 12 (6):584-590. http://dx.doi.org/10.1080/15567249.2016.1248872

Yildirim, E., Sarac and S. and Aslan, A. (2012), 'Energy consumption and economic growth in the USA: Evidence from renewable energy', *Renewable and Sustainable Energy Review* 16(9): 6770-6774.

Balacing Between Comprehensibilty and Accuracy for Credit Risk Assessment Using GP

Ines Gasmi[1], Salima Smiti[2], Makram Soui[2], Khaled Ghedira[3]

[1]University of Manouba, Manouba, Tunisia
e-mail: gasmioines@gmail.com

[2]University of Gabes, Gabes, Tunisia
e-mail: salima.smiti92@gmail.com.
e-mail: souii_makram@yahoo.fr.

[3]University of Tunis, Tunis, Tunisia
e_mail: khaled.ghedira@isg.rnu.tn

Abstract

Credit risk is considered as one of the important issues for financial institutions. It provokes great losses for banks. To this objective, numerous methods for credit risk evaluation have been proposed. Many evaluation methods are black box models that cannot adequately reveal information hidden in the data. However, several works have focused on building transparent rules-based models. For credit risk assessment, generated rules must be not only highly accurate, but also highly interpretable. In this paper, we aim to build both, an accurate and transparent credit risk evaluation model which proposes a set of classification rules. In fact, we consider the credit risk evaluation as an optimization problem which uses a genetic programming (GP) algorithm, where the goal is to maximize the accuracy of generated rules. We evaluate our proposed approach on the base of German and Australian credit datasets. We compared our finding with some existing works; the result shows that the proposed GP outperforms the other models.

Keywords: Credit risk assessment, rule generation, genetic programming, feature selection.

1. Introduction

Nowadays, risk management is the most important issue in the financial institution. High-quality risk management allows banks to build a robust decision-making system and to reduce losses. In fact, banks are exposed to various types of risk such as credit risk, liquidity risk, market risk, interest rate risk, etc. (Rose, 2002). According to Basel Committee on Banking Supervision Basel II (Basilea, 2006), banking risk is measured considering three types of risks: credit risk, market risk and operational risk.

Therefore, the credit risk has become an important and widely studied topic in banking field (Angelini et al., 2008; Nazari and Alidadi, 2013; Wang, 2013). It presents the largest risk facing banks. According to (Buehler et al., 2008), credit risk represents 60% of the overall risk that banks face. Hence, many researchers have focused on defining and developing a credit risk measurement and management systems. In this way, the credit risk evaluation has gained increasing attention and has been very considerable (Akkoç, 2012; Danenas et al., 2011; Finlay, 2011). However, most of the existing works about credit evaluation relies on applicants' classification (Hens and Tiwari, 2012; Lee et al., 2006;

Oreski and Oreski, 2014a). In fact, it is the task to classify applicants into two classes: "good applicant" or "bad applicant". In this context, credit scoring is considered as the most popular model used for credit risk management (Marzal and Jiménez, 2012).

Recent research has focused on increasing the accuracy of credit risk evaluation model. To fulfill this aim, many classification techniques are used for building accurate models that can be grouped into three categories, i.e. statistical techniques, artificial intelligence techniques and hybrid techniques. While the most statistical techniques used for the credit risk assessment are the discriminant analysis and logistic regression (Malhotra and Malhotra, 2003), many others artificial intelligence techniques such as support vector machine (SVM), neural network (NN), genetic algorithm (GA), and decision tree (DT) have been widely used in credit risk evaluation (Bellotti and Crook, 2009; Hens and Tiwari, 2012; Yang, 2007). In recent years, an important number of effective hybrid techniques have been also proposed (Oreski and Oreski, 2014a; Šušteršič et al., 2009). However, there is no consensus about the most optimal technique which can be used in building credit evaluation models. In spite, numerous methods of evaluating credit risk have been successfully applied to the classification of applicants; most current assessment methods are black box models. Although the black box patterns expression can provide an accurate knowledge of data but they are effectively incomprehensible. In contrast to transparent box expression whose provides understandable and easy interpretable patterns.

For this aim, credit risk assessment has been conducted using several proposed rules-based techniques (Hayashi, 2016; Martens et al., 2010) called also induction-based techniques (Huang et al., 2006). The reason why rules-based techniques remain popular is that they are able to extract practical knowledge from a given datasets and transform it into usable and understandable information. A useful credit risk assessment model is a model that can achieve a good balance between accuracy and comprehensibility (Bock, 2017; Hayashi, 2016). Therefore, using rules allows financial institutions and experts to generate transparent decision model which is capable of classifying and evaluating easily new applicants.

Credit risk evaluation is mainly based on various historical data such as the amount and duration of credit, customer credit history, the purpose of the loan, etc. which is associated with real-world datasets. But, there is no consensus about data or indicators that should be used to classify customers. For credit risk evaluation, it is important to use all existing data in the real-world datasets to enhance accuracy. Therefore, refining these data is considered as a crucial phase which allows eliminating irrelevant data in training dataset, and, it is required to select the most significant data to increase the accuracy of proposed evaluation model. In this context, many research studied consider feature selection processes as optimization problem. For instance, (Oreski and Oreski, 2014b) highlighted the importance of feature selection to build an accurate and scalable credit risk evaluation model. In fact, feature selection aims to select the most relevant attributes for determining the default risk. It allows reducing the search space and increasing the accuracy of generated rules. Thus, (Oreski and Oreski, 2014b) reported that feature selection is the important key to create sophisticated credit risk detection method. To this end, they proposed the hybrid feature selection heuristic (HGA-NN) to address this issue.

In this context, the goal of our proposal is to generate classification rules based on genetic programming algorithm to evaluate automatically the customers' banks. The GP has been widely used for classification problems (Z-Flores et al., 2015). In addition, it's considered one of the most recent techniques that have been applied in the field of credit risk assessment. Unlike the traditional statistical methods such as the logistic regression and the discriminant analysis which need the assumptions of the dataset and the attributes, the GP is a non-parametric tool and can adaptable for different datasets. In fact, we consider the rule generation process as an optimization problem where the goal is to maximize the accuracy of the proposed model. Thus, we will focus on this work to increase the accuracy of classification rules generated from the GP. In fact, we suggested that well accuracy is obtained by generating a set of rules that combining the most relevant and important user's characteristics for making decision.

The remainder of this paper is organized as follows: Section II will review some related work on GP technique applied to the credit risk assessment problem. Section III will represent the research methodology. Section IV will highlight the experimental setup. Section V will report the results of the empirical analysis. Finally, section VI will draw the conclusion and future directions of research.

2. Related work

Recently, several researchers have applied genetic programming (GP) or genetic algorithm (GA) models for credit risk assessment, because of its high capabilities in solving different complex problem. Furthermore, the GP and the GA algorithms have been the most widely used in the field of credit scoring (Marqués et al., 2013).

Therefore, one of the widely used methods to evaluate customer credit is the function-based approach. In this way, (Ong et al., 2005) presented the GP in the analysis of credit scoring models. The experimental results showed that GP algorithm achieved the highest accuracy compared with neural networks, decisions trees, rough sets and logistic regression. (Cai et al., 2009) applied also the genetic algorithm to solve credit scoring problems. The experiments over the German dataset prove the effectiveness of the new model. Moreover, (Abdou, 2009) investigated the ability of GP in the analysis of credit scoring models in Egyptian public sector banks. The experimental results showed that GP algorithm achieved the highest accuracy rate and the lowest misclassification cost compared with probit analysis and weight of evidence models. All these studies used the GA and the GP to find a discriminate equation which takes into account the values of both good and bad customers in the training set. However, the main problem of these methods is commonly described as opaque structure because they generate complex mathematical internal works which are hard for human interpretation. To this end, the induction-based approach has become a popular technique for evaluating credit risk because the result is easily interpretable, visualized and facilitate the construction of risk detection models.

In this way, (Huang et al., 2006) proposed two-stage genetic programming (2SGP) for building credit scoring model based on IF-THEN rules. They reported that this type of model able to provide intelligent decision-making systems easily understandable by users. In This study they suggested the use of GP due to its ability for extracting automatically and heuristically IF-THEN rules based on specific fitness function that validate simultaneously the referred objective. In addition GP can perform well with small or big data and it is able to manipulate any type of data. The accuracy of the model was compared with GP, MLP, Classification and regression tree (CART), C4.5 algorithm, rough sets and LR using the two datasets: German and Australian datasets. They reported that 2SGP can obtain better classification accuracy compared with the other models. Furthermore, (Zhang et al., 2008) developed a hybrid credit scoring model based on GP and SVM. In the first stage, GP is employed to derive the IF-THEN rules. Then, the remaining dataset which does not satisfy any rules or satisfy more than one rule is used to train SVM and build the discriminant function. The result showed that this method provides superior accuracy compared to other models (support vector machine, genetic programming, Decision tree classifiers, Logistic regression and Back-propagation Neural network). In addition, (Tran et al., 2016) build a robust credit model in which they combine the deep learning and the genetic programming algorithm. In this paper, the GP is employed to generate the IF-THEN rules. All research works mentioned above proposed a hybrid model based on genetic programming which used to drive the IF-THEN rules. Still, the hybrid techniques are difficult to formulate and implement than simple methods because more than one classifier are used. Also, the extraction of rules from black box model can minimize the accuracy. To this end, our contribution aims to generate automatically a comprehensible classification rules for credit risk evaluation based only on GP that allows the coverage of the most of the creditor's characteristics. We suggested generating simultaneously the accurate and comprehensible rules that combine only the most relevant data for credit risk assessment.

3. Credit Risk Evaluation Approach

In this research, credit risk will be evaluated as an evolutionary problem with two real-world datasets. In fact, we propose a search-based approach using genetic programming algorithm to generate automatically classification rules. Our approach consists of using knowledge from previously manually collected examples. We use the GP to generate classification rules. In fact, GP allows us to generate randomly, from a given dataset, a combination of customer's characteristics for each class type. The final goal of our approach thus is to generate the best classification rules among all possible rules that maximize the accuracy. Maximizing the accuracy achieved by generating rules that combines the most relevant attributes for determining the default risk. The rule generation process so aims to find a good combination of the characteristics which have the high weight.

As showed in Fig 1, rule generation process takes as inputs datasets of credits and generates as output a set of classification rules. During the rule generation process, our approach combines randomly the characteristics of customer within logical expressions (intersection AND) to create rules. A fitness function calculates the weight of each rule using the instances from datasets.

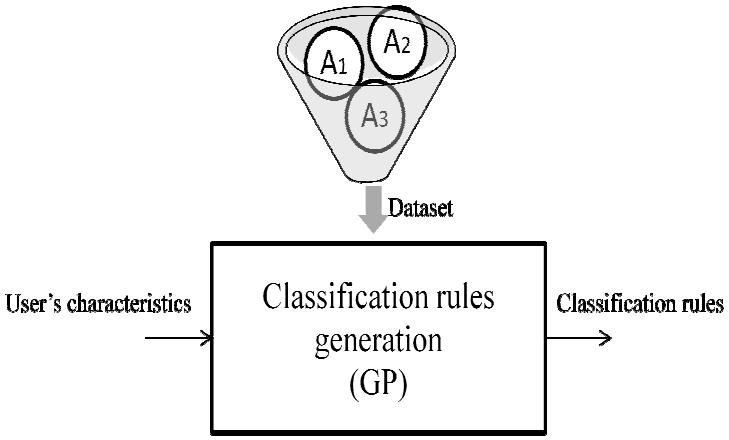


Fig. 1: The proposed approach overview.

The pseudo code for the algorithm is given in Fig 2. The algorithm takes as input set of customer's characteristics and datasets of credits. Lines 1–3 construct an initial GP population which is a set of the individual that define possible classification rules. Lines 4–13 encode the main GP loop, which searches for the best classification rule. During each iteration, the quality of each individual is evaluated, and the solution having the best fitness (line 9) is saved. Then, a new population of solutions is generated using the crossover operator (line 10) to the selected solutions; each pair of parent solutions produces two new solutions. We include the parent and child variants in the population and then apply the mutation operator to each variant; this will provide the population for the next generation. Steps 4 to 12 are performed repeatedly until maximum iteration is fulfilled. The output of the algorithm is the set of best extracted classification rules.

: Set of characteristics of customers
Input: Data sets.
Output: Classification rules.
initial_population (P, Max_size)
2: P:=set_of (I)
=classification_rule (R, class type)
4: repeat
5: for all Rϵ P do
:nerated rule: =execute_rules(R, I)
(I):= compare (generated rule, examples)
8: end for
best_solution:= best_fitness(I);
P:=generate_new_population(P)
11: it:=it+1;
12: until it=max_it
13: return best solution

Fig. 2: High-level pseudo-code for GP adaptation to our problem

Classification rules generation

- *Creation of Initial population:*

We aim to assess credit risk based on historical data. To this end, we propose to generate classification rules which will be used to predict risks. In our work, an individual is a set of IF – THEN rules. The IF clause (premise) corresponds to the condition that combining user's characteristic. THEN clause corresponds to the type of detected class. This kind of rules representation has the advantage of being intuitively comprehensible for the user. A classification rule has the following structure:

IF "Combination of customer's characteristic" THEN "Class of customer"

This step takes as input customer's characteristics (checking account, purpose, guarantor, saving account, etc.), and class type (good or bad) and generates, as output, a random initial population from a possible combination of customer's characteristics. Our solution is modeled as a tree representation, when, the terminals (leafs nodes of a tree) correspond to different customer's characteristics with their threshold values. Fig. 3 represents an example of individual (solution) represented as a tree. This representation corresponds to an OR composition of three sub-trees, each sub-tree represents a rule:

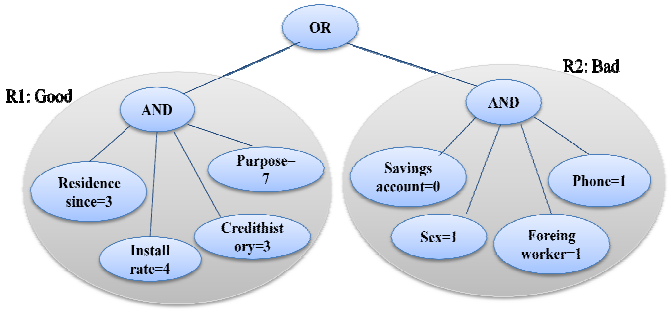


Fig.3: A tree representation of an individual

- *Genetic operator*

To better explore the search space, we use this three genetic operator: crossover, mutation, and selection:

Crossover: this operator aims of generating offspring. To this end, the proposed algorithm starts by selecting randomly two parents. These parents will be split into two sub-tree. After that, they are combined to generate two new individuals (offspring). Each child combines information coming from both parents. An example of crossover process is shown in Fig 4.

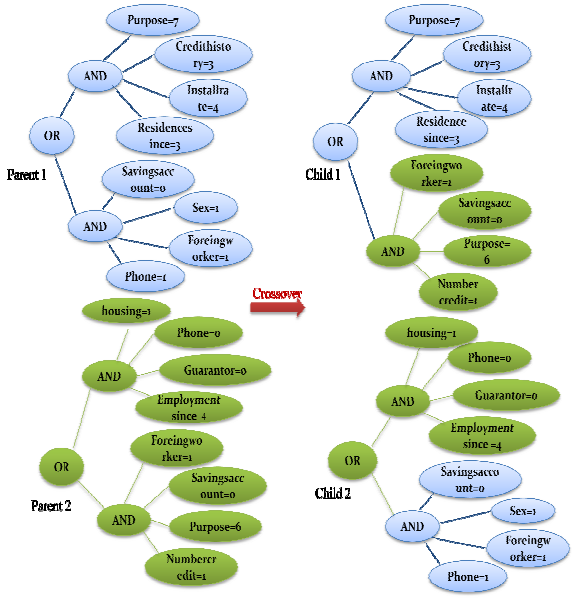


Fig. 4: Crossover operator

Mutation: Normally, after crossover has occurred, each child produced by the crossover undergoes mutation with a low probability. This phase consists of changing randomly one or more rules in the solution. The modification of rule aims to change randomly the value of customer characteristic. Fig. 5 shows a new solution derived from the one of Fig. 4.

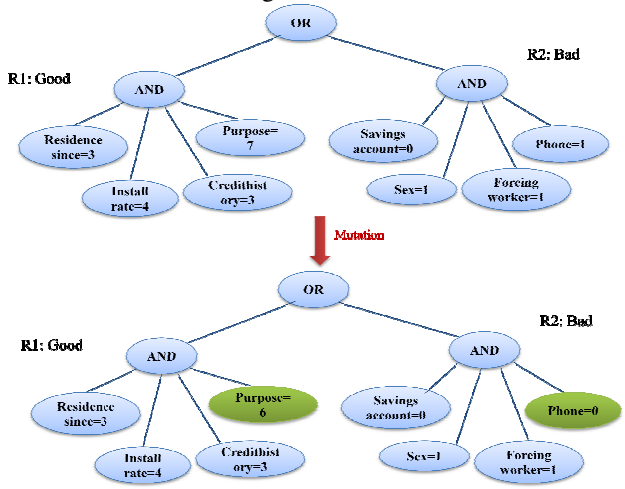


Fig. 5: **Mutation operator**

Selection: In this phase, the set of solution that will participate in the crossover and mutation operators are selected. Two parents (individuals) are selected from the initial population. Thus, proposed algorithm use binary tournament selection to guide the selection process. In fact, this step aims to select the best individuals to be reproduced in the child population.

- *Evaluation of individuals of the initial population:*

In this step, we evaluate the generated solutions of the initial population (Pt) in order to estimate and discover the interesting classification rules. In fact, generated individual should be validating with a fitness function that quantifies the quality of generated rules. So, it is crucial to use an efficient and performant fitness function in order to reduce computational complexity and maximize the accuracy. This evaluation is based on the calculation of the fitness function Weight given in equation (1) which will evaluate the weight of classification rules. It aims to generate a set of best rules that can be used in the decision process to classify new customer. The idea is to improve the accuracy of classification rules by maximizing the weight. Weight function aims to select validate rules that combining characteristics with high weight of evidence (WOE) (using the information values).

$$Weight = \frac{\sum WOE\ of characteritics}{number of characteristics\ of\ rules} \qquad (1)$$

We suggested integrating the feature selection in the rules generation process. In fact, the problem of credit risk evaluation has high dimensionality due to the high number of input features and the high number of examples. However, the irrelevant and redundant features in the training set can produce less accurate results. Therefore, using the appropriate set of features is an important issue. According to (Fayyad et al., 1996), the selection of relevant features is defined as a preprocessing step of knowledge discovery. It is applied to enhance the performance of generated evaluation model. It is an important step to find out the best subset of attributes and to improve the prediction accuracy of the genetic programming classifier. Moreover, it aims to remove redundant and irrelevant features and reduce the amount of data needed for learning. This reduction facilitates the understanding of the data and increases the interpretability of the models (Oreski and Oreski, 2014b).

In this study, the selected feature was performed by the weight of evidence method (WOE). According to (Weed, 2005), the WOE is a quantitative method used in the context of risk assessment. It provides weight to each attribute and also determines variable importance ranking and gains data (Abdou, 2009). It is a standard pre-processing technique applied to credit risk assessment problem (Finlay, 2011). The weight of evidence is then defined as the logarithm of the fraction of the proportion of 'goods' in the attribute among the proportion of 'bads' in the attribute. Each attributes can has positive or negative weight. High negative weight, therefore, correspond to high risk while high positives weight correspond to low risk. The WOE of an attribute is expressed in the following equation (2):

$$\mathrm{WOE} = \ln\left(\frac{g_i/G}{b_i/B}\right) \qquad (2)$$

Where: G and B represent the total number of good and bad observation, respectively, gi and bi are the number of goods and bads within the attribute i. The use of WOE as a technique for ranking the importance of variables allows us to find those variables that are more significant in determining the risk of default, which is helpful to eliminate the ineffective applicant's variables. In our work, the generation of classification rules is based on the weight of features. In addition, the variable with greater value means that is able to predict the most accurate results.

4. Experimental Setup

Description of the experimental datasets

The performance of the proposed GP classifier is evaluated using two published credit datasets: German and Australian credit datasets. These two credit datasets used in this work were obtained from the university of California, Irvine (UCI) Machine Learning Repository (see www.ics.uci.edu/mlearn/ MLRepository.html). A summary of the main characteristics of these two datasets has been presented in the following table.

Table 1: characteristics of two real datasets

Name	Instance	Predictive Attributes	Good credit	Bad Credit	No of classes
German credit	1000	20	700	300	2
Australian credit	690	14	303	387	2

German and Australian datasets are randomly partitioned into two parts, training set and testing set. In this study, 70% of the data are used for training and the remaining 30% are exclusively used to evaluate the performance of the model.

Evaluation criteria

Different evaluation criteria are used to verify the effectiveness and the feasibility of the proposed technique for credit risk assessment include, accuracy, error rate, Gini coefficient, kolmogorov-Smirnov statistic, mean squared error, area under the ROC curve (AUC) and type I and type II errors. Among all these standard evaluation criteria, AUC, accuracy, type I and type II errors are the most commonly used measures to evaluate classification performance [13]. The definition of these metrics can be explained with respect to a 2×2 confusion matrix as that given in the following table:

Table 2: A confusion matrix

	Predicted class (%)	
Actual class (%)	Good credit	Bad credit
Good credit	TP	FN (Type II error)
Bad credit	FP (Type I error)	TN

Most credit risk assessment studies employ the accuracy as the criterion for performance evaluation. It indicates the proportion of correctly classified instances (both good and bad applicants) on a particular dataset. The accuracy can be defined by equation (3):

$$\text{accuracy} = \frac{\text{TP} + \text{TN}}{\text{TP} + \text{FP} + \text{FN} + \text{TN}} \qquad (3)$$

5. Empirical Analysis

Our study addresses two main experiments, which are defined below. In this section, we explain how we designed these two experiments. The goal of the study is to evaluate the performance of our proposed method in terms of its AUC, accuracy, and error rate for generating classification rules.

Experiment 1: GP performance

To emphasize on the necessity of using an evolutionary technique, we empirically experiment the performance of GP when randomly generating a classification rules. During the rules generation process, we combined customer's characteristics randomly within logical expressions (intersection AND) to create rules. Where, the number n of possible combinations is very large. This process consists of finding a good combination between "c" customer's characteristics. In addition, each customer's characteristics can take different attributes; thus a huge number of rules can be generated. Moreover, each class can be defined using several symptoms. There is no definition or consensus about how to classify the customer as bad or good. Consequently, to ensure the scalability of our solution, we considered the rule generation process as a combinatorial optimization problem.

First, we need to set out GP parameter because it influences significantly the performance of a search algorithms on a given search problem. It is usually difficult to preemptively set the best tuning setting. To this end, we use the trial and error method in order to obtain a good parameter configuration. Table 3 shows the important setting parameters.

Table 3: the parameter setting of GP

Parameter	Value
Population size	100
Number of generation	100
Fitness function	Equation (2)
Selection	Tournament selection
Crossover rate	0.9
Mutation rate	1

To study the impact of using weight of each characteristic attribute, we run the process of generating rules using only a simple function (Quality) which aims to validate the generated individual by comparison to the expected ones in the dataset, and then we measure average coverage score of the execution of the generated rules on our system. Then, we run the process of generating rules using Weight function and we report the evolution of their relative coverage scores over the two datasets in the Fig 5.

The results of Fig.6 demonstrates that using Weight function increase the median fitness function of the last generation of the algorithm. Thus, the use of Weight function helps the algorithm in better exploring the search space and generates near-optimal solutions. Weight function aims to capture the relevant attributes that enhance accuracy and so achieve better coverage.

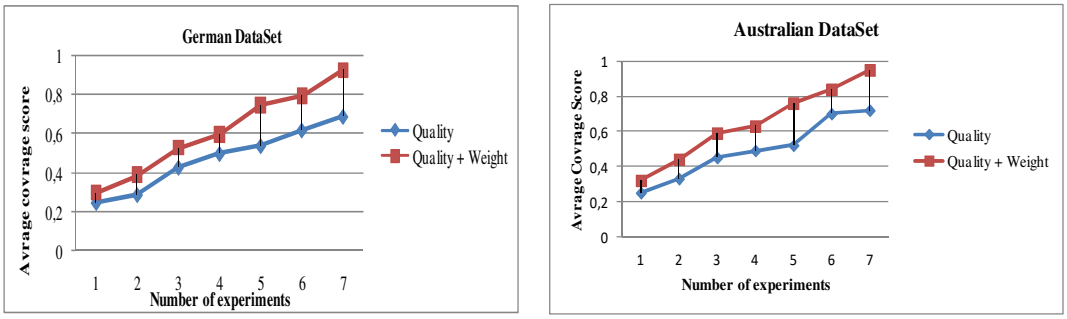


Fig. 6: Average Coverage Score of Quality and Weight.

Hypothesis: given a specific rules set generation, the accuracy of these rules set is strongly correlated with their weight.

We performed the Pearson correlation test and the t-test for accuracy and weight, at a significance level of 0.01, based on the last generation of 31 independent run and the testing set of German and Australian credit dataset in order to test the aforementioned hypothesis. Table 4 shows the results of the Pearson correlation test (R) and t-test for the values of accuracy and weight. The result shows that there is a strong correlation between accuracy and weight (0.942). Thus, we can confirm that our fitness function is effectives to validate the generated rules. So, our suggested model is able to generate accurate and interesting rules which help financial institutions for making decision. To this end, we can accept our hypothesis. According to the finding results, we can conclude that using weight as fitness function allows generating comprehensible rules and enhancing the accuracy of this proposed model. Therefore, our findings confirm the effectiveness of our credit risk assessment models.

Table 4: The Pearson correlation test and t-test between accuracy and weight

	Weight		
	R	**p-val.**	**t-test**
Accuracy	0.942	0. 328	-0.8997

Experiment 2: Comparative study

At the present, several data mining techniques such as support vector machine, genetic programming, genetic algorithm and neural network have been successfully applied to credit risk assessment, and they usually have good prediction accuracy. Therefore, to estimate the efficiency and the performance of the proposed GP algorithm, we compare its accuracy and its error rate with the accuracy and the error rate of the existing techniques in the literature.

Table 5: The comparison of the accuracy of different models for the two credit datasets

Algorithm	German credit (%)	Australian credit (%)
GP	93	95.6
SVM+GA (Hens and Tiwari, 2012)	77.92	84.05
GP+SVM (Zhang et al., n.d.)	79.88	89.45
HGA+NN (Oreski and Oreski, 2014b)	78.10	73.4
GP (Huang et al., n.d.)	75.5	85.5
2SGP (Huang et al., 2006)	83.1	78

Table 5 compares the accuracy results of our proposed GP with other existing techniques on the German and Australian datasets.

As can be seen, the GP has the highest accuracy value 93% for the German credit, followed by 2SGP with 83.1% and GP+SVM with 79.88%. Also, GP outperforms all the other techniques with accuracy 95.6% for the Australian credit dataset. Therefore, we conclude that the GP extraction rule outperform all other techniques for the two datasets in terms of accuracy rate. As a result, we can conclude that the proposed GP technique is a feasible solution to improve the accuracy and comprihensibilty of credit risk evaluation

6. Conclusion and Future Works

In this paper, we propose to generate classification rules based on GP to tackle customer credit risk assessment. We aim to propose a comprehensible evaluation model based on IF-THEN rules and to maximize the performance of the generated classification rules. The performance of our proposal is evaluated using the Germany and Australian credit datasets and compared with various techniques that exist in the literature. According to experimental results, our proposed model outperforms existing methods and the rule sets generated from the GP provides the best accuracy rate. Several directions for further research have emerged from this study:(i) to apply a multi-objective where many others objectives should be satisfied (ii) to use different credit datasets with different sizes and attributes for extra validation.

References

Abdou, H.A. (2009). “Genetic programming for credit scoring: The case of Egyptian public sector banks”, available at:https://doi.org/10.1016/j.eswa.2009.01.076.

Akkoç, S. (2012), “An empirical comparison of conventional techniques, neural networks and the three stage hybrid Adaptive Neuro Fuzzy Inference System (ANFIS) model for credit”, *European Journal of Operational Research*, available at: http://www.sciencedirect.com/science/article/pii/S0377221712002858 (accessed 29 March 2017).

Angelini, E., Tollo, G. di and Roli, A. (2008), “A neural network approach for credit risk evaluation”, *The Quarterly Review of Economics and*, available at: http://www.sciencedirect.com/science/article/pii/S1062976907000762 (accessed 29 March 2017).

Basilea, C. de. (2006), “Basel II: International convergence of capital measurement and capital standards: A revised framework–comprehensive version”.

Bellotti, T. and Crook, J. (2009), "Support vector machines for credit scoring and discovery of significant features", *Expert Systems with Applications*, available at: http://www.sciencedirect.com/science/article/pii/S0957417408000857 (accessed 31 March 2017).

Bock, K. De. (2017), "The Better of Two Worlds: Balancing Model Strength and Comprehensibility in Business Failure Prediction Using Spline-Rule Ensembles", *Expert Systems with Applications*, available at: http://www.sciencedirect.com/science/article/pii/S0957417417305122 (accessed 29 August 2017).

Buehler, K., Freeman, A. and Hulme, R. (2008), "The tools-The new arsenal of risk management", *Harvard*.

Cai, W., Lin, X., Huang, X. and Zhong, H. (2009), "A Genetic Algorithm Model for Personal Credit Scoring", *2009 International Conference on Computational Intelligence and Software Engineering*, IEEE, pp. 1–4.

Danenas, P., Garsva, G. and Gudas, S. (2011), "Credit risk evaluation model development using support vector based classifiers", *Procedia Computer Science*, available at: http://www.sciencedirect.com/science/article/pii/S1877050911002420 (accessed 29 March 2017).

Fayyad, U., Piatetsky-Shapiro, G. and Smyth, P. (1996), "From data mining to knowledge discovery in databases", *AI Magazine*, available at: https://vvvvw.aaai.org/ojs/index.php/aimagazine/article/view/1230 (accessed 5 April 2017).

Finlay, S. (2011), "Multiple classifier architectures and their application to credit risk assessment", *European Journal of Operational Research*, available at: http://www.sciencedirect.com/science/article/pii/S0377221710006272 (accessed 29 March 2017).

Hayashi, Y. (2016), "Application of a rule extraction algorithm family based on the Re-RX algorithm to financial credit risk assessment from a Pareto optimal perspective", *Operations Research Perspectives*, available at: http://www.sciencedirect.com/science/article/pii/S2214716016300197 (accessed 22 March 2017).

Hens, A. and Tiwari, M. (2012), "Computational time reduction for credit scoring: An integrated approach based on support vector machine and stratified sampling method", *Expert Systems with Applications*, available at: http://www.sciencedirect.com/science/article/pii/S0957417411017283 (accessed 31 March 2017).

Huang, C.-L., Chen, M.-C. and Wang, C.-J. (2007). "Credit scoring with a data mining approach based on support vector machines", available at:https://doi.org/10.1016/j.eswa.2006.07.007.

Huang, J.-J., Tzeng, G.-H. and Ong, C.-S. (2006), "Two-stage genetic programming (2SGP) for the credit scoring model", *Applied Mathematics and Computation*, Vol. 174, pp. 1039–1053.

Lee, T., Chiu, C., Chou, Y. and Lu, C. (2006), "Mining the customer credit using classification and regression tree and multivariate adaptive regression splines", *Computational Statistics & Data*, available at: http://www.sciencedirect.com/science/article/pii/S016794730400355X (accessed 31 March 2017).

Malhotra, R. and Malhotra, D. (2003), "Evaluating consumer loans using neural networks", *Omega*, available at: http://www.sciencedirect.com/science/article/pii/S0305048303000161 (accessed 31 March 2017).

Marqués, A.I., García, V. and Sánchez, J.S. (2013), "A literature review on the application of evolutionary computing to credit scoring", *Journal of the Operational Research Society*, Palgrave Macmillan UK, Vol. 64 No. 9, pp. 1384–1399.

Martens, D., Gestel, T. Van and Backer, M. De. (2010), "Credit rating prediction using ant colony optimization", *Journal of the*, available at: http://link.springer.com/article/10.1057/jors.2008.164 (accessed 31 March 2017).

Marzal, A.M. and Jiménez, V.G. (2012), "Two-level classifier ensembles for credit risk assessment", available at: http://repositori.uji.es/xmlui/handle/10234/70101 (accessed 29 March 2017).

Nazari, M. and Alidadi, M. (2013), "Measuring credit risk of bank customers using artificial neural network", *Journal of Management Research*, available at: http://search.proquest.com/openview/84d8301714db2880be04919647feedf9/1?pq-origsite=gscholar&cbl=366237 (accessed 29 March 2017).

Ong, C.-S., Huang, J.-J. and Tzeng, G.-H. (2005). "Building credit scoring models using genetic programming", available at:https://doi.org/10.1016/j.eswa.2005.01.003.

Oreski, G. and Oreski, S. (2014a), "An experimental comparison of classification algorithm performances for highly imbalanced datasets", *Central European Conference on*, available at: http://search.proquest.com/openview/d6087985191c5bab6bcba81c708a07bd/1?pq-origsite=gscholar&cbl=1986354 (accessed 31 March 2017).

Oreski, S. and Oreski, G. (2014b), "Genetic algorithm-based heuristic for feature selection in credit risk assessment", *Expert Systems with Applications*, available at: http://www.sciencedirect.com/science/article/pii/S0957417413007239 (accessed 2 April 2017).

Rose, P. (2002), "Commercial bank management".

Šušteršič, M., Mramor, D. and Zupan, J. (2009), "Consumer credit scoring models with limited data", *Expert Systems with Applications*, available at: http://www.sciencedirect.com/science/article/pii/S0957417408002996 (accessed 31 March 2017).

Tran, K., Duong, T. and Ho, Q. (2016), "Credit scoring model: A combination of genetic programming and deep learning", *2016 Future Technologies Conference (FTC)*, IEEE, pp. 145–149.

Wang, Y. (2013), "Credit Risk Management in Rural Commercial Banks in China", available at: https://core.ac.uk/download/pdf/29594318.pdf (accessed 29 March 2017).

Weed, D. (2005), "Weight of evidence: a review of concept and methods", *Risk Analysis*, available at: http://onlinelibrary.wiley.com/doi/10.1111/j.1539-6924.2005.00699.x/full (accessed 20 April 2017).

Yang, Y. (2007), "Adaptive credit scoring with kernel learning methods", *European Journal of Operational Research*, available at: http://www.sciencedirect.com/science/article/pii/S037722170601191X (accessed 22 March 2017).

Z-Flores, E., Trujillo, L., Schütze, O. and Legrand, P. (2015), "A Local Search Approach to Genetic Programming for Binary Classification", *Proceedings of the 2015 on Genetic and Evolutionary Computation Conference - GECCO '15*, ACM Press, New York, New York, USA, pp. 1151–1158.

Zhang, D., Hifi, M., Chen, Q. and Ye, W. (2008). "A Hybrid Credit Scoring Model Based on Genetic Programming and Support Vector Machines", available at:https://doi.org/10.1109/ICNC.2008.205.

Analysis of International Trade between Latin America and Germany using gravity models

Lourdes Gabriela Daza Aramayo

Center for Latin American Studies, Department of International Business of the Faculty of International Relations of the University of Economics, Prague, Czech Republic. E-mail: lourdes.aramayo@vse.cz

Marek Vokoun

Department of Management of the Institute of Technology and Business in České Budějovice, Czech Republic. E-mail: Marek.vokoun@mail.vstecb.cz

Abstract

The trade theory seeks to identify the variables determining international exchange between countries. In recent years, variables not traditionally considered in traditional models, such as geographic location, the cost of transport, and cultural and institutional factors have emerged as important explanatory variables, and therefore need to be incorporated in the analysis. In order to make new contributions, this paper contains an extended business gravity model with panel data and random effects that combine institutional, economic and cultural changes as one of the determinants of bilateral flows between the country of origin (Germany) and its trade partners (Latin-American region) during the period 1995-2011, through the use of different aggregate indicators, incorporated as explanatory variables in different design specifications. The main objective of this research is to analyze the determinants of trade between Germany and Latin America with an extended/modified model of trade where the economic characteristics of countries are combined with the institutional and policy factors of trade, such as trade agreements. The strong determinants of international trade between Germany and Latin America are free trade agreements, property rights index and corruption index.

Keywords: Gravity model, International Trade, Institutions, Free Trade Agreements, Economic and Political factors.

Introduction

This study analyses how economic and institutional factors influenced Latin American trade with Germany and vice versa. The estimated behavioral parameters and break-even points of robustness will be used for the analysis of policies and institutional factors of trade (exports and imports). Five econometric approaches are used to estimate the gravity equation. Total of 17 Latin American countries[1] were selected as a sample for a more detailed analysis of trade flows between this region and Germany. The quality of institutions is an important element in the smooth functioning of a market. On this basis, we can explore this research topic: If the institutions are more developed and business oriented the firms' transaction costs will be lower which makes the efficiency of international trade as a whole greater.

De Groot et al. (2003) highlights the positive correlation between trade and institutional quality, and with the help of a gravity model, the author shows how the similarities between countries tend to increase bilateral trade between them. Other authors associate the institutional factors with the country risk rating, which could affects the investments in the countries Popa, S., (2012). About the institutions and how state's sovereign rights (as traditionally understood) could represents a

[1] Argentina, Bolivia, Chile, Costa Rica, Brazil, Colombia, Guatemala, Honduras, Ecuador, México, Nicaragua, Panama, Paraguay, Peru, Salvador, Uruguay, Venezuela.

significant barriers wrote Padmanabhan (2012) and the impact of International Agreements can have on foreign direct investment (FDI) flows.

This paper will analyze the development of trade during the period 1995-2011 of Germany. It designs five gravity models with variables dealing with economic environment, institutional infrastructure, Free Trade Agreements, and political factors. The main objective of this research is to analyze the determinants of trade between Germany and Latin America. Also, the objective of this research will be the contribution of new insights into the trade flow mechanisms of these countries based on an econometric model and its comparison. The first section of this work reviews the literature, which illustrates the links between institutional factors and trade concerns. The second section describes the characteristics of the gravity model, the methodology and data sources used. The third section summarizes the methodological specifications of the research, and the last section contains the results of this research.

Theoretical Background

Jan Tinbergen, the first Nobel laureate in economics, was one of the pioneers in the application of mathematical tools in economics. He was the first economist to use the concepts based on the law of universal gravitation, developed by Newton in the field of physics. He applies it to economy, specifically for the determinants of trade flows between the countries, in his 1962 work *Shaping the World Economy*. In this work (1962), he states that the trade volume increases between two countries (or regions) with the size of their economies and decreases with the distance that separates them. The gravity model is used to estimate the structure of international trade. The basic model consists of factors related to geography and spatiality. It was subsequently expanded and used to test hypotheses about economic theories of international trade. We will use the gravity model as an empirical way to analyze the determinants of trade flows between different geographical entities.

The empirical strength of this model is well known for its ability to identify extreme cases of artificial trade barriers, as well as the role of distance and the effects of the customs unions and commercial agreement between different geographical regions. Norman Aitken (1973) used the gravity model to analyze the impact of different trade policies between different geographical entities. This econometric model has been applied to different areas such as the analysis of foreign direct investment, tourism and migration, among others. Aitken (1973), along with several others; Bergstrand (1985) and Thursby & Thursby (1987), was part of a series of economists who were all commissioned to show that European trade blocs had increased their trade during the 1960s and 70s.

Helpman and Krugman, P. (1985) also completed the gravity model using explanations based on the Heckscher - Ohlin Model and their new international trade theory. With the theory of Geography and International Trade, Paul Krugman (1991) affirmed that the dominant factor used to explain a concentration of trade is geographic proximity between trading partners. The distance can represent the geographic proximity when inserted as a significant parameter in the gravity equation (Anderson 1979, Anderson 2003, Anderson and Wincoop 2011).

Subsequent work by Frankl & Weiss (1993), Frankel et al. (2005) and Frankel (1997) found evidence of trade creation between trading blocs in Asia and North America from 1970-1992, while the Soloaga & Winters study (2001) found significant evidence of trade creation in Latin America during the nineties. The work of Rose (2000), Feenstra et al. (2001), and Frankel and Rose (2002) found, too, that the agreements are, in general, trade makers. Rose (2002) explains the effects of multilateral trade agreements, added variables such as culture, common language, geography and history; in conclusion, it is possible to say that the World Trade Organization (WTO) and the Agreement General Agreement on Tariffs and Trade (GATT).

Current research in Latin America is oriented at dynamic gravity models and different approaches to measuring the distance variable. Lewer and Saenz, M. (2004) analyze the equity release EFET on trade flow through a gravity model extended to 20 countries in Latin America. Acosta et al. (2006) show the relevance of the preferential trade agreement in the Andean Community of Nations, as well as the importance of geography and infrastructure as key elements in the development of trade

between these countries. Martínez-Zarzoso and Nowak-Lehmann (2003) analyzed MERCOSUR sectoral exports to the EU: the role of economic and geographical distance by gravity model, while Martínez-Zarzoso (2003) applied the gravity trade model to assess Mercosur - European Union trade and the trade potential following agreements recently reached between the trade blocks. The model tested a sample of 19 countries. Carrillo and Li (2002) discussed the importance of preferential trade agreements in Latin American trade, referencing the Andean Community and the Southern Common Market (Mercosur). The study of international trade in Latin America through the use of the gravity model has proven to be an efficient tool for analyzing regional trade. However, a lack of continuity can be observed.

Traditional gravity models analyze the trade rigidity by incorporating the distance into the equation. Clearly transport costs are related to distance, but this dependence might not be linear. Babeckii, Kukhartchuk and Raiser (2003) added also the factor of being land-locked, and other border related variables. The next step draws from our own recent experience in modeling the attraction of FDI flows by 32 European countries (Benacek et al., 2012) where we found that, except for fundamental economics and macroeconomic policy variables, there are also important political risks that influence the capacity to invest and trade.

Globalization tendencies (free trade agreements, global value chains, communication and networking, etc.) are important factors of international trade but there are many more variables of interest. For example, Druláková and Zemanová (2016) introduced Un Global Compact corporate sustainability initiative variable to account for differences between countries. Other interesting factor is the level of the integration into German distribution channels (Taušer, Arltová and Žamberský, 2015) or the level of fiscal activism in times of economic crisis (Macháček, 2013). Globalization factors are hard to measure. Thus, on the right side of the gravity model equation variables of interest are incorporated: tariff/non-tariff preferences, indicators of institutional quality (government effectiveness, the rule of law and corruption level). Indicators were taken from the database created by Daniel Kaufmann et al. (2006). Government Effectiveness (GE) refers primarily to the quality of bureaucracy, professionalism of staff and the credibility of the commitment to policies, including trade. It is; therefore, a measure of the quality of government functions. The rule of law (RL) indicator approximates the level of public confidence in the law. It reflects the quality of the legal system and the enforcement of contracts. It encompasses indicators of the incidence of crime, the effectiveness of the judiciary and the ability to enforce contracts. The Corruption Control (CC) indicator reflects the level at which public authorities are used for private gain.

Methodology and Data

According to the standard gravity model of trade, exports X_{ijt} from country i to county j in year t are a function of domestic GDP Y_{it}, partner's GDP Y_{jt} and the impediments to trade represented by distance between countries D_{ijt}:

$$\mathbf{X_{ijt} = a * Y_{it}^{b} * Y_{jt}^{c} * D_{ijt}^{d} * \varepsilon_{ijt}} \qquad \mathbf{(1)}$$

where exponents of these variables are the behavioral parameters to be estimated, ε is the error term and i, j = {1, 2, 3, ... , m} are countries and t = {1995, 1996, ... , n} represents the years.
Two vectors with institutional variables are denoted N and R. The former represents various dummies with integration/treaty arrangements and the latter dummies for variables of risk, cultural or psychic factors of trade:

$$\mathbf{X_{ijt} = a * Y_{it}^{b} * Y_{jt}^{c} * D_{ijt}^{d} * N_{ijt}^{n} * R_{ijt}^{r} * \varepsilon_{ijt}} \quad \mathbf{(2)}$$

Our analysis will be derived from the econometric estimation of trade flows (e.g. exports) between countries i and j (i≠j). The estimation procedures will draw from our past experiences with this kind of modeling by means of panel data (see Benacek et al. 2005 and Benacek et al. 2006). The usage of estimation techniques depends on the characteristics of data. We will utilize the one-way panel estimation. The default method will be Ordinary Least Square (OLS) and Poisson estimation (PO). The other methods we will use are derived from them: Poisson Pseudo-Maximum Likelihood, LSDV – Least Square Dummy Variable and panel estimation method "Mundlak" (Mundlak, 1978). We will control for time characteristics by time dummies or by the inclusion of linear trend. The individual fixed effects will not be controlled for, at least not directly. This is because of the nature of the gravity

model and its exact sciences heritage. We are aware of the drawbacks and insufficiency of the model and its cross-sectional setting (see Milner and Greenaway, 2002).

The LSDV framework along with Poisson estimation (PO) is commonly used in standard gravity models of trade. Panel estimation is possible and we are utilizing only the "Mundlak" estimation which allows relaxing the assumption in the random-effects estimator that the observed variables are uncorrelated with the unobserved variables. Standard fixed effects estimation (not reported) removed a lot of variation and it changed the nature of analysis to within estimation without the distance variable. Standard random effects model (not reported) failed to provide consistent estimation and didn't pass the Hausman test. The linear dynamic panel-data method, the generalized method of moments (GMM) estimation is another way to get the results for our gravity model; however, this estimation requires well selected instrumental variables, which might be problematic to vindicate, with the risk of underestimating of standard errors. Our (not reported) consistent estimates only suggested significance of lagged variables (dependent and GDP) in the robust two way estimation.
These findings have brought us back to the selected methods (LSDV, PO, Mundlak) which describe rather a general tendency in trade relations. We are aware that for one region or a country the time series analysis (for example: vector error correction model, vector autoregressive model) will be the proper estimation technique to obtain clear-cut results. The standard errors will be reported as a cluster robust, i.e. adjusted according to the group variable which is the country identifier. The policy analysis will rely on the estimation of exports to various territories using the parameters describing behavioral characteristics of real trade, meanwhile the policy/institutional variables will simulate their presence or absence of given instruments. The data are collected from Eurostat, European Commission, the World Bank, IMF, CEPII, Geobytes, Heritage Foundation, WTO, UNCTAD & our own estimation.

Instead of basing the gravity model econometrics on data for a single year of observation, we will concentrate on the panel data of bilateral trade by countries for 16 years, from 1995-2011, with more than 20 explanatory variables, which will require processing thousands observations for each country. We are using five models which we selected after sensitivity analysis.

M (1): Basic regressions (OLS) with "cluster robust" standard errors, i.e. we have controlled for the time trend and adjusted our measurement error according to country specifics.

M (2): Time specific dummy regression (LSDV)[2] with "cluster robust" standard errors, i.e. we have controlled for time effects (one way panel) and we have adjusted our measurement error according to country specifics.
M (3): Poisson (PO) time specific regression with "cluster robust" standard errors, i.e. we have controlled for time fixed effects (one-way panel, GDP Germany dropped out) and we have adjusted our measurement error according to country specifics.

M (4): Poisson Pseudo-Maximum Likelihood (PPML) time specific regression with "semi robust" standard errors (Santos Silva and Tenreyro 2006, Santos Silva and Tenreyro, 2010).

M (5): "Mundlak" random effects (MRE) estimation with group-means of independent variables added to the model (group variables are not reported).

Results

We can observe that German exports to Latin America and Caribbean (sample of 29 countries) depends on the distance, the size of the economy (GDP) of the trading partner, some institutional factors, like Government Spending, Financial Freedom (from the Heritage Foundation) and three indicators from the World Bank: Control of Corruption, Political Stability, and Voice and Accountability, which we can observe in the results shown in Table 3. The distance in the exports to Latin America and the Caribbean has a negative effect which ranges from -1.19 % to -1.34 %. On

[2] LSDV estimator (Least Square Dummy Variable)

average, if a Latin American country has 1 % higher real GDP then the German exports to this region will be from 0.98 % to 1.099 % higher (ceteris paribus). Exports could be higher between 17.8 % and 42.4 % in the countries where an FTA exists, which is the case of Mexico, Chile and Caribbean countries. Between institutional factors, it seems that with an increase of 10 % in the Political Stability, exports could increase up to 3.18 % while the same increase in Government Effectiveness could increase German exports to Latin America between 1.2 to 2.75 %.

Table 1: Gravity models of trade between Germany and Latin America

Exports	(M1)	(M2)	(M3)	(M4)	(M5)
	OLS (LN)	**LSDV(LN)**	**PO**	**PPML**	**MRE (LN)**
Distance (LN)	-1.159	-1.131	-0.080	0.148	-1.159***
	(0.69)	(0.68)	(1.10)	(0.39)	(0.29)
Real GDP (LN)	0.965***	0.962***	0.992***	0.999***	0.965***
Partner	(0.05)	(0.05)	(0.05)	(0.03)	(0.02)
Free trade agreement	0.418*	0.421*	0.392***	0.458***	0.418**
	(0.24)	(0.24)	(0.13)	(0.11)	(0.17)
Tariffs	-0.015**	-0.015**	-0.015**	-0.597*[(i)]	-0.015***
	(0.01)	(0.01)	(0.01)	(0.31)	(0.00)
Corruption	0.005**	0.004	0.006*	0.144**[(i)]	0.005**
	(0.00)	(0.00)	(0.00)	(0.07)	(0.00)
Linear trend	-0.052***	Year dummies	Year dummies	-0.032*	-0.052**
	(0.02)			(0.02)	(0.02)
Constant	89.363***	4.537	-3.817	44.507	89.363**
	(30.31)	(6.40)	(10.12)	(29.90)	(36.03)
Imports	(6)	(7)	(8)	(9)	(10)
	OLS (LN)	LSDV(LN)	PO	PPML	MRE (LN)
Distance (LN)	-1.307	-1.372	1.077	1.215***	-1.307***
	(0.90)	(0.89)	(0.94)	(0.45)	(0.51)
Real GDP (LN)	0.662***	0.663***	0.890***	0.885***	0.662***
Partner	(0.09)	(0.10)	(0.06)	(0.03)	(0.04)
Free trade agreement	0.921**	0.888**	0.002	0.207	0.921***
	(0.39)	(0.38)	(0.19)	(0.15)	(0.29)
Tariffs	-0.028*	-0.027	0.000	0.485	-0.028***
	(0.02)	(0.02)	(0.01)	(0.46)	(0.01)
Property rights	0.013*	0.013	0.012**	0.222**	0.013***
	(0.01)	(0.01)	(0.01)	(0.11)	(0.00)
Linear trend	-0.022	Year dummies	Year	-0.043*	-0.022
	(0.05)			(0.02)	(0.04)
Constant	32.835	15.300	-14.945*	22.929	32.835
	(89.12)	(9.04)	(9.03)	(38.86)	(62.08)

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, Observations = 289, [1)] inverse hyperbolic sine transformation of explanatory variables in PPML model, LN – logarithmic transformation, IHS – inverse hyperbolic sine transformation. Selected variables.

In the case of German imports from Latin American countries, we can observe a dependence on Germany's Real GDP, the Real GDP of the trading partner, Property Rights, Government Effectiveness, Political Stability and Rule of Law variables (Table 1). On average, the trade agreements are not significant in comparison to the case the exports. Even in the PPML model, the FTA variable is only significant with a 10 % alpha and suggests a 0.28 % increase in imports. We note that the distance is not significant to the imports from Latin America to Germany as it was in the case of exports. On average we observe that if a Latin America country increases its GDP in 1 %, the imports from Latin America will increase from 0.83 % to 0.91 % if the economic conditions do not

change. If we look at institutional factors we can see an import increase from 1.1 % to 2 % if the Property Right variable increases in 10 %. Another significant variable is the Rule of Law, in which a 10 % increase could lead to 2.4 % to 4.32 %.increase in imports. The other analyzed variables were not statistically significant. In the PPML model where no country specifics are controlled for, a 10 % lower Fiscal and Monetary Freedom can lead to 5.55 % and 6.1 % higher exports, respectively. It seems that more goods will flow into countries with bad fiscal policies (wasteful public spending) and bad monetary setting (currency depreciation and inflation).

Conclusions

This paper applied a gravity model to analyze bilateral exports and imports between Germany and the countries of Latin America. The total sample was 29 countries, 17 years and about 30 variables of interest. The main objective of this research was to analyze the determinants of trade between Germany and Latin America. We looked at the behavior and determinants of trade in this European country in order to compare it with that of Latin America (29 countries including the Caribbean countries). We observed that for a bigger economy such as Germany, the distance does not affect imports from Latin America, while for a small economy; the distance can negatively affect these imports. We investigated the role of free trade agreements and they were not as significant as expected. However, the role that institutions play was much bigger than expected. The relation of institutions and trade is very important, with some of the stronger determinants being Political Stability, Government Effectiveness, and Rule of Law. Our results support the hypothesis of the importance of these variables, as most of them are statistically significant expected. This paper also contributed by incorporating 5 different gravity models. The beta coefficients differ substantially between models. This suggests limited comparability of results and also inefficiency of some models to provide unbiased results.

Acknowledgements

This paper was created as part of the research project IGA "Influence of growing middle class on selected development and developed regions", no. F2/47/2016. This paper is also the input of scientific work at the Department of Management at the Institute of Technology and Business in České Budějovice.

References

Acosta Rojas, G. E., Calfat, G. Flores (2006). Comercio e infraestructura en la Comunidad Andina. Revista de la Cepal. No. 90-2006.

Aitken, N. D. (1973). The Effect of the EEC and EFTA on European Trade: A Temporal Cross-Section Analysis. *American Economic Review*, 65(5), pp. 881-92.

Anderson, J. A. (1979). Theoretical Foundation for the Gravity Equation. *The American Economic Review*, 69(1), pp. 106-116.

Anderson, J. A. (2011). The Gravity Model. *Annual Review of Economics*, 3, pp. 133-160.

Anderson, J. E., Wincoop, E. V. (2003) Gravity And Gravitas: A Solution To The Border Puzzle. *American Economic Review*, 93(1), pp. 170-192.

Benacek, V., Lenihan, H., Andreosso-O'Callaghan, B., Michalíková, E, Kan, D. (2012). Political Risk, Institutions and Foreign Direct Investment: How Do They Relate in Various European Countries? *Working Papers IES 2012/24*, Charles University Prague, Faculty of Social Sciences, Institute of Economic Studies.

Benacek, V., Podpiera, J., Prokop, L. (2005). Determining Factors of Czech Foreign Trade: A Cross-Section Time Series Perspective. *Working Papers 2005/03*, Czech National Bank, Research Department.

Benacek, V., Prokop, L., Visek, J. (2006). *Determining factors of trade and specialisation in transitio : econometric testing of the Czech exports and imports*, 1993-2001. Praha: FSV UK.

Bergstrand, J. H. (1985). The Gravity Equation in International Trade: Some Microeconomic Foundations and Empirical Evidence. *The Review of Economics and Statistics*, MIT Press, vol. 67(3), pp. 474-81.

Carrillo, C., Li, C. A. (2002). Trade Blocks and the Gravity Model: Evidence from Latin American Countries. *Economics Discussion Papers 542*, University of Essex, Department of Economics.

De Groot, H. L. F., Linders, G. J., Rietveld, P. (2003). Why do OECD-Countries trade more? *Tinbergen Institute Discussion Papers* 03-092/3.

Feenstra, R. C., Markusen, J. R., Rose, A. K. (2001). Using the Gravity Equation to Differentiate among Alternative Theories of Trade. *The Canadian Journal of Economics*, 34(2), pp. 430-447.

Frankel, J. A. (1997). Sterilization of money inflows: Difficult (Calvo) or Easy (Reisen)? *Estudios de Economia*, University of Chile, Department of Economics, vol. 24(2), pp. 263-285.

Frankel, J., Rose, A. (2002). An Estimate Of The Effect Of Common Currencies On Trade And Income. *The Quarterly Journal of Economics, MIT Press*, 117(2), pp. 437-466.

Frankel, J., Stein, E., Wei, S. (1995). Trading blocs and the Americas: The natural, the unnatural, and the super-natural. *Journal of Development Economics*, 47(1), pp. 61-95.

Frankl, G. P., Weiss, N. F. (1993). An Experimental Comparison of the Effectiveness of Branch Testing and Data Flow Testing. *Software Engineering*, 19(8), pp. 774 - 787.

Helpman, E., Krugman, P. (1985). *Market Structure and Foreign Trade: Increasing Returns, Imperfect Competition, and the International Economy*. MIT Press. 271 pp.

Kaufmann, D., Kraay, A., Mastruzzi, M. (2006). Governance matters V: aggregate and individual governance indicators for 1996 - 2005. *Policy Research Working Paper Series 4012,* World Bank.

Krugman, P. R. (1991). *Geography and Trade*. MIT Press, 142 pp.

Lewer, J.J., Saenz, M. (2004). Efectos de la liberalizacion financiera sobre el comercio exterior: Modelo gravitacional de Latinoamerica, 1995-99. *Estudios Economicos de Desarrollo Internacional*, Euro-American Association of Economic Development, vol. 4(2).

Macháček, M. (2013). The Rebirth Of Fiscal Activism: Hype Or Hope? In Tvrdon, M and Majerova, I (Ed.), *Proceedings Of The 10th International Scientific Conference: Economic Policy In The European Union Member Countries: Selected Papers* (pp. 196–207).

Martínez-Zarzoso, I. 2003. *Gravity model: An application to trade between regional blocs.* Atlantic Economic Journal, International Atlantic Economic Society, 31(2), pp. 174-187.

Martínez-Zarzoso, I., Nowak-Lehmann, D. F. (2003) Augmented gravity model: An empirical application to Mercosur-European Union trade flows. *Journal of Applied Economics*, Vol. VI., pp. 291-316.

Milner, C., & Greenaway, D. (2002). *Regionalism and Gravity* (SSRN Scholarly Paper No. ID 412940). Rochester, NY: Social Science Research Network. Dostupné z http://papers.ssrn.com/abstract=412940

Mundlak, Y. (1978). *On the Pooling of Time Series and Cross-section Data*. Econometrica (46), pp. 69–85

Padmanabhan, A., 2012. Relationship between FDI inflows and Bilateral Investment Treaties / International Investment Treaties in developing economies: An Empirical Analysis. International Journal of Economic Sciences, I(1), pp.65–84.

Popa, S., (2012). The influence of the country risk rating on the foreign direct investment inflows in Romania. International Journal of Economic Sciences, I(2), pp.93–116.

Rose, A. K. (2000). Do currency unions increase trade? A "gravity" approach. *FRBSF Economic Letter*, Federal Reserve Bank of San Francisco, issue Feb 4.

Rose, A. K. (2002). Do We Really Know that the WTO Increases Trade? *NBER Working Papers* 9273.

Santos Silva, J. M. C, Tenreyro, S. (2006). The Log of Gravity. *The Review of Economics and Statistics*, 88(4), pp. 641-658.

Santos Silva, J. M. C, Tenreyro, S. (2010). *On the existence of the maximum likelihood estimates in Poisson regression*. Economics Letters (107), pp. 310-312.

Soloaga, I., Winters, A. L. (2001). Regionalism in the nineties: what effect on trade? *The North American Journal of Economics and Finance*, 12(1), pp. 1-29.

Taušer J, Artlová M, Zambersky, P. Czech Exports and German GDP: A Closer Look. Prague Economic Papers. Volume 24. Number 01/2015. pp.17-37.

Thursby, J. G., Thursby, M. C. (1987). Bilateral Trade Flows, the Linder Hypothesis, and Exchange Risk. *The Review of Economics and Statistics*, MIT Press, vol. 69(3), pp. 488-95.

Tinbergen, J. (1962). *Shaping World Economy Suggestions for an International Economic Policy.* The Twentieth Century Fund.

Zemanová, S and Drulakova R. (2016). Making Global Goals Local Business in V4 Countries: V4 Entrepreneurs and the UN Global Compact. GLOBALIZATION AND ITS SOCIO-ECONOMIC CONSEQUENCES, 16TH INTERNATIONAL SCIENTIFIC CONFERENCE PROCEEDINGS, PTS I-V pp. 2490-2497.

Electronic sources

- Eurostat: www.epp.eurostat.ec.europa.eu
- IMF: www.imf.org
- CEPII: www.cepii.fr
- World Bank: www.info.worldbank.org
- Heritage Foundation: www.heritage.org
- United Nations (Human Development Reports): www.hdr.undp.org
- Douglas Dow: www.mbs.edu
- World Trade Organization: www.wto.org/

Creating Organizational Culture under the Influence of Leadership and Training – A CA Approach

Agnieszka Kowalska-Styczeń, Tomasz Owczarek,

Faculty of Organization and Management, Silesian University of Technology, 41-800 Zabrze, Poland, e-mail: Agnieszka.Kowalska-Styczen@polsl.pl

Abstract

In order to study processes in organizations such as creating or changing organizational culture, more and more often computer simulations are used. In this study we examined how the density of ties between organization members and the size of non-formal groups affect the creation of organizational culture in context of two mechanisms: the influence of leaders and the organization activities (training). To analyse the dynamics of the transfer of attitudes that are consistent with the culture expected by an organization the cellular automata (CA) model was used. The model is based on local interactions between members of the organization, that take place in the nearest neighbourhood. These groups of close neighbours are represented by von Neumann's neighbourhood and Moore's neighbourhood of radius r = 1 and r = 2.

Keywords: cellular automata, agent-based modelling, network of contacts, organizational culture, organization

Introduction

The word 'culture' for organizations and managers refers to the climate and organizational practices that develop around people and values that are part of the organization's views and principles (Schein, 2004). Culture is a dynamic phenomenon created by our interactions with others and with leadership behaviours. As Amah (2012) points out, culture helps in the day-to-day operations of employees to meet specific goals, and allows organizations to react quickly to the organization's environment. Corporate culture is, therefore, an 'automatic pilot' that manages employees in a way that is consistent with organizational expectations (McShane and Von Glinow, 2006). It is a form of deep-seated social control that drives employee decisions and behaviours so that the organization achieves the success. Organizational culture is also referred to as shared values, shared assumptions, shared understandings and ways of thinking that are shared by members of the organization and passed on to the new members as right (Duncan, 1989).This means that we learn culture, and it is not inherited from generation to generation and thus can be changed.

Organizational culture is intrinsically linked to leadership, it begins with leaders who impose their own values and assumptions on a group (Schein, 2004). Foremost, it is a mediator of the relationship between transformational leadership and organizational innovation and performance (Prather and Turrell, 2002; Xenikou and Simosi, 2006). Transformational leadership does not exhibit external motivation (based on exchange relations) but internal motivation. In this concept, the transformational leader is a charismatic visionary, who sets ambitious goals; he is a model for his followers; he inspires them to act (Burns, 1978). In view of the above, in this work, leader is a charismatic leader with a strong influence (not having a formal leadership role) interacting with other members of the organization through a network of informal contacts.

We are interested in the process of creating culture under the influence of leaders and organization activities (employee training, etc.). Our goal is to gain insights into the global behaviour of the analysed system based on local interactions within groups of employees. Organizational culture is created through exchanges of information between members of the organization. The organization is therefore perceived as a social system.

The methodological approach that is increasingly used by the organizational researchers is agent-based simulation (Dolley, 2002). In the context of social systems, this is an agent-based social simulation, which implements a paradigm of studying system dynamics based on local interactions of their elemental components (Gotts et al., 2003). This approach applies when the system is described by units that respond to each other and to the environment (agents follow the rules, interact and learn). A special type of agent models are cellular automata (CA). CA is a mathematical object consisting of a network of cells in D-dimensional space, a finite set of states of a single cell and a rule, which determines the state of the cell at time $t + 1$ depending on the state at time t of the cell and cells that surround it. Surrounding cells are called the neighbourhood of the i-th cell. To simulate the process of creating culture, we use the CA model.

The agent-based modelling and cellular automata approach for the study of knowledge transfer was used for example by Morone and Taylor (2004), Xuan et al. (2011), Hirshman et al. (2011), Giacchi et al. (2016).The organization members are modelled as CA space (network of cells), and each employee is a cell (agent). Each agent is under the influence of other agents (its neighbours) and influences others at the same time. In the proposed model, each person has a "culture" as understood by Axelrod (1997), that is a set of individual characteristics that are subject to social influence. It is a vector consisting of n elements - cultural features (cultural dimensions such as religion, language, way of dressing, political views). Our simulation experiments were conducted to answer this question: how the density of ties between organization members and the size of non-formal groups affect employees' adoption of the organizational culture under two mechanisms: the influence of leaders and training. The members of the organization adjust to the organizational culture by exchanging their knowledge on the subject with other employees. In addition to the influence of leaders, we propose a mechanism of training, as modifying members' knowledge through training is very important for the knowledge transfer (Argote and Fahrenkopf, 2016).

Model

In these studies, a two-dimensional cellular automata (CA) with periodic boundary conditions is used. The organization is presented as a square network of L x L agents. Initially agents are distributed randomly on the lattice, i.e. with probability $p \in [0, 1]$ a cell is occupied and with probability $1 - p$ it is empty. The total number of agents will be donated by M, $M = pL^2$. The behaviour of the agents (members of the organization) depends on their nearest neighbourhood and it is described by appropriate rules. Employee groups are represented by von Neumann's neighbourhood (4 and 12 elements neighbourhood) and Moore's neighbourhood (8 and 24 elements neighbourhood)- see fig. 1and 2.

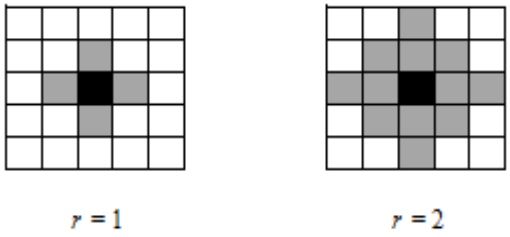


Fig. 1: Von Neumann's neighbourhood for r = 1and r = 2 (neighbours are grey cells)

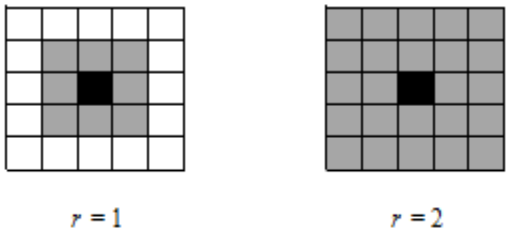


Fig. 2: Moore's neighbourhood for r = 1and r = 2 (neighbours are grey cells)

In the proposed model, the culture of each agent is described by a vector consisting of *n* elements - cultural dimensions (such as religion, language, way of dressing, political views), each of which is expressed by 0 or 1 (which can mean 'yes' or 'no ' for a particular cultural dimension). The culture of each person is expressed in *n*-element sequence 0 and 1.

The basic rules for agents are as follows:

- At the beginning of the simulation, every agent in the network has a 'culture' assigned randomly i.e. a vector of *n* - features consisting of 0 and 1.
- In each simulation step, the agent checks each attribute of its neighbours' vector and changes its value to the dominant in the neighbourhood. If it has the same value as the dominant one - nothing changes (we call this rule of assimilation).

The rule of assimilation is illustrated in figure 3. In this example we assume $n = 3$ (agents' culture consists of 3 features) and von Neumann's neighbourhood with $r = 1$. At the beginning of the iteration the vector of culture of the agent in the middle is 101. But it is changed at the of the iteration to 110, because the dominant value in its neighbourhood for the second feature is 1, and the most common value of the third feature is 0.

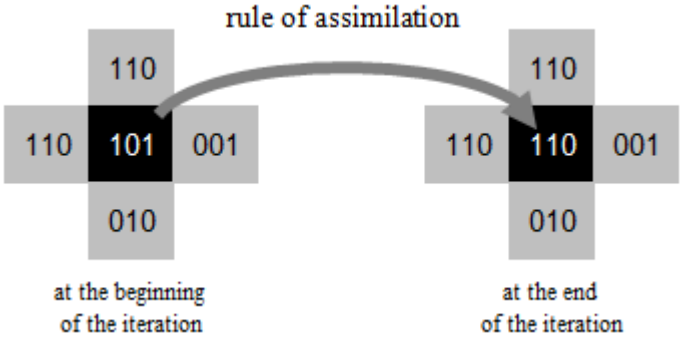


Fig. 3: Example of the rule of assimilation at work

Agents (members of the organization) can be influenced by leaders, who are assumed to promote the culture preferred by the organization. In this context, a leader has strong influence, affecting the other members of the organization mainly through a network of informal contacts.

Leaders rules are as follows:

- Leaders have a culture preferred by the organization (in the presented model, it is a vector consisting of only 1).
- At the beginning of the simulation, *l*% of all agents are randomly selected as leaders.
- Leaders do not change their culture, all other agents act according to assimilation rule.

Organization members may also acquire the elements of organizational culture during training and courses organized by the organization. Training may involve different aspects of an organizational culture, that is, the adoption of culture may involve different elements, depending on the subject matter of the training. We model this aspect of organization by introducing external field *t,* which represents the rate of employees that are send for training.

The influence field *t* works as follows:

- At each simulation step, one attribute in the culture vector is randomly selected, and then *t%* randomly chosen agents change their value of this attribute to 1.

Experiments

The conducted experiments were designed to investigate the impact of the leaders and the organization activities (training) on adopting a culture consistent with the organization's policy. Our goal was to examine how the density of ties between organization members and the size of non-formal groups affect the creation of organizational culture. For this reason the following parameters were chosen as independent variables:

- *p* – population density,
- *r* – neighbourhood size ,
- *n* – number of cultural attributes
- *l* – fraction of the leaders,
- *t* – the intensity level of training.

To model different density of ties between employees and diversify the size of non-formal groups we assumed three levels of the population density: $p = \{0.5, 0.75, 1.0\}$ and four levels of neighbourhood size: von Neumann's neighbourhood of radius r = 1 (4-elements neighbourhood), von Neumann's neighbourhood of radius r = 2 (12-elements neighbourhood), Moore's neighbourhood of radius r = 1 (8-elements neighbourhood), and Moore's neighbourhood of radius r = 2 (24-elements neighbourhood).

The population density *p* represents the density of ties between employees – greater value of *p* causes more interactions (because more cells are occupied by other agents), so the network of contacts is denser. On the other hand, by testing different neighbourhoods we wanted to check how the size of the non-formal groups (represented by the neighbourhood) influences the dynamics of organizational culture diffusion.

The size of the vector describing a culture was held constant with five elements (n = 5). The leaders fraction level *l* was changed from 1% to 50% with a step of 1% and the intensity level of training *t* ranged between 0% and 25% with a step of 1%.

As the dependent variable describing organization members behaviour we used the fraction of agents with the desired organizational culture (the "desired culture" could be any fixed combination of zeros and ones, we chose a sequence consisting only of ones). In this work we treat it as a measure of effectiveness of two mechanisms: leaders (*l*) and training (*t*). This measure was adopted after Daft (1998) who defines effectiveness as 'the degree to which goals are attained'.

The simulation stopped after the first iteration when no change in any agent's culture occurred. Each of the simulation experiment variant was performed 1000 times and the results were averaged.

Simulation Results

Initially, the impact of the leaders on the organization members culture was analysed. Population densities p = 0.5, p = 0,75 and p = 1.0 were tested to see what is the influence of the leaders' presence on the diffusion of appropriate culture between employees in the network with sparser and denser ties of contacts. Simulations were carried out for the network size L = 50 and four types of neighbourhoods (see Fig. 1 and 2). These neighbourhoods represent informal groups in an organization that consist of a different number of members. Leaders represent the views consistent with company policy, that is they try to convince others to the culture preferred in the organization. Figure 4 shows the percentage of the organization members, who have accepted the culture of the organization at the end of simulation runs, depending on the percentage of leaders, different population density and different neighbourhoods.

As can be seen in Figure 4, the leaders impact is more effective in larger network densities (p = 0.75, p = 1.0). In this case smaller value of *l* has a bigger impact on accepting culture proposed by a leader (which is consistent with the organization's culture) than for p = 0.5. This dependency is visible for all types of neighbourhoods. The leaders effectiveness depends also on the size of neighbourhood. The larger number of the employees group (r = 2), the greater effectiveness of leaders - this means larger number of employees who have adopted required organizational culture. Thus, with a high number of interactions, smaller number of leaders is required so that the acceptance level of the desired culture increases significantly.

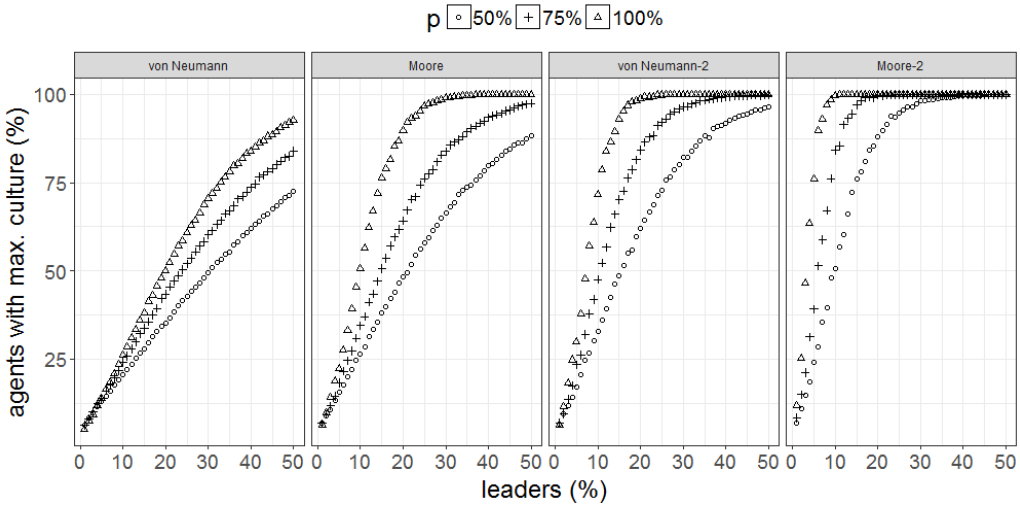


Fig. 4: Fraction of employees depending on the percentage of leaders, population density (p) and neighbourhood

The second experiment was performed to examine how the training (courses) organized by the organization impacted the adoption of organizational culture. Similarly, population densities p = 0.5, p = 0,75 and p = 1.0 were tested and simulations were carried out for the network size L = 50 for four types of neighbourhood. Figure 5 shows the percentage of the organization members, who have accepted the culture of the organization, depending on the intensity of organization's training.

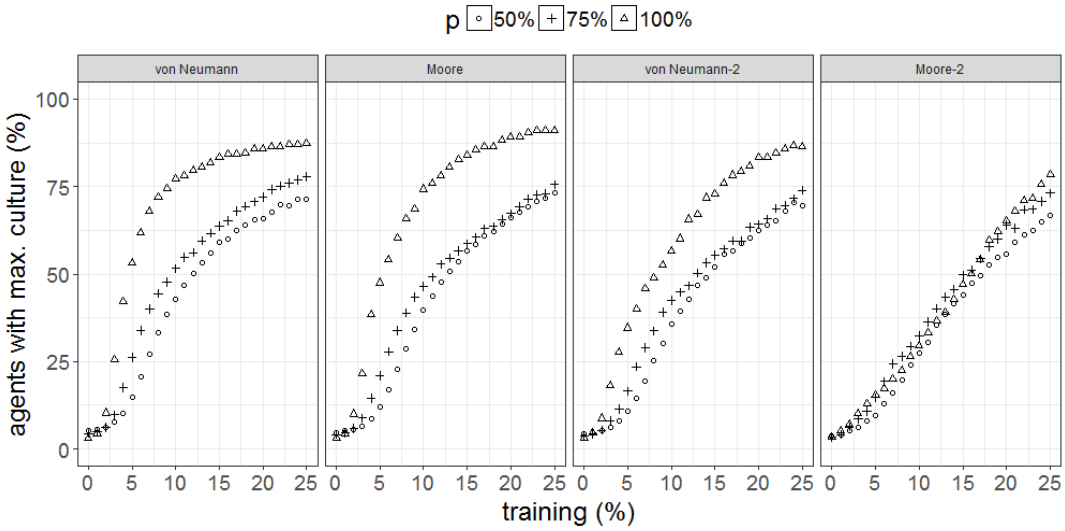


Fig. 5: Fraction of employees depending on the intensity level of training, population density (p) and neighbourhood

Generally, greater *t* (training) causes bigger percentage of people who have accepted the culture of the organization. The larger network density (p = 0,75 and p = 1.0) causes, that the training is more effective. This is not so clear in the case of the largest neighbourhood. In contrast to the previous tested case (with leaders), here it is the smaller neighbourhood size (r = 1) that is conducive to the acceptance of the organization culture. Furthermore, as can be seen on the two most left panels of fig. 5, when t exceeds 5% the effectiveness of training grows slower. Of course, in addition to the 'training' mechanism, all agents are also influenced by the assimilation rule described earlier. This rule causes that denser contact networks (larger p) contribute to the spread of the desired culture, but with the increase in the size of groups (larger r), the effect is getting weaker.

Summary and conclusions

The proposed model has been designed to investigate the impact of the leaders and training on the employees culture. Apart from the leaders and the training, all of the agents in the network were also influenced by those members of the organizations which were close (in the "social" sense) to them. In our model it is represented by the assimilation rule, which reflects informal interactions. It is consistent with numerous studies which show the relationship between social interaction (i.e. informal contacts) and the rate of knowledge transfer and organization efficiency (e.g. Ingram and Roberts, 2000; Reagans and Zuckerman, 2001; Reagans and McEvily, 2003; Chen and Huang, 2007). The transfer of knowledge (which relates to diffusion of organizational culture) takes place mainly through informal contacts between the organization members. These contacts were modelled by different neighbourhood sizes and population density. Our goal was to answer the question: how the density of ties between organization members and the size of non-formal groups affect employees' adoption of the organizational culture under two mechanisms: the influence of leaders and training. To answer this question, we performed two simulation experiments.

Our results show that the density of the network as well as the size of the neighbourhood affect the effectiveness of the leadership and training mechanism. Bigger groups and denser network strengthen the influence of the leaders. With a high number of interactions even a small number of leaders is enough to make the level of acceptance of the desired culture very high. In case of training effect, the results are a

little different. Denser network of contacts contributes to the spread of the desired culture, but with the growth of groups this effect is getting weaker.

As Alipour et al. (2011) emphasize “the organization can facilitate knowledge sharing and offer incentives for dialogues and team work”. To facilitate the transfer of knowledge in the organization, the manager should design a structure in which members of the organization can easily exchange information and experience. Based on the results we can formulate two practical hints in this regard in the context of adopting organizational culture. Leaders should often meet with their employees and encourage them to interact with each other to ensure that organization's views and practices are stated clearly and understood correctly. On the other hand, training should be carried out in a targeted manner, as its positive effect can be limited by local "islands" of a different organizational culture inside the groups of closely collaborating workers. This is in line with Albrecht et al. (2015) who argue that “systematic focus on training needs, training delivery, training transfer and training effectiveness should be an integral focus of effective performance management and development processes”.

Agent-based simulations are used in situations where precise analytical descriptions of the observed phenomenon are inaccessible or direct experiments are impossible. This is the case in complex social systems where many relationships, interactions between individuals, can be identified, but it is not possible to perform an experiment that will examine the effect of their interaction over time. Although the results shown in this study are rather general and largely qualitative, they can be interesting for decision-makers in organizations, as shown above. The applied simulation approach should be considered as complementary to traditional empirical research.

The model presented in this work can be easily extended and other factors describing the process of adoption of organizational culture could be taken into account. One of them could be e.g. homophily because research show that it affects the frequency of the interaction between agents (Hirshman at al., 2011). Additionally, it would be interesting to include some diversity between leaders, e.g. to consider the differences between transformational and transactional leadership (Odumeru and Ogbonna, 2013).

Acknowledgement

The work was supported by funds from the National Science Centre (NCN) through grant no. UMO-2014/15/B/HS4/04433.

References

Alipour, F., Idris, K. and Karimi, R. (2011), ‘Knowledge creation and transfer: role of learning organization’, *International Journal of Business Administration*, 2(3).

Albrecht, S. L., Bakker, A. B., Gruman, J. A., Macey, W. H., and Saks, A. M. (2015), ‘Employee engagement, human resource management practices and competitive advantage: An integrated approach’, *Journal of Organizational Effectiveness: People and Performance*, 2(1), 7-35.

Amah E. (2012), ‘Corporate Culture and Organizational Effectiveness: A Study of the Nigerian Banking Industry’, *European Journal of Business and Management*, 4(8), 212-229.

Argote, L. and Fahrenkopf, E. (2016), ‘Knowledge transfer in organizations: The roles of members, tasks, tools, and networks’, *Organizational Behavior and Human Decision Processes*, 136, 146–159.

Axelrod R. (1997), ‘The dissemination of culture: A model with local convergence and global polarization’, *Journal of Conflict Resolution*, 41, 203-226.

Burns J.M. (1978), Leadership, Harper and Row, New York.

Chen Ch., Huang J. (2007), 'How organizational climate and structure affect knowledge management—The social interaction perspective', *International Journal of Information Management*, 27(2), 104–118.

Daft, R. L. (1998), Organization Theory and Design, OH: South-Western College Publishing, Cincinnati.

Dooley K. (2002), 'Simulation Research Methods', Companion to Organizations, Baum J. (ed). Blackwell, London, 829-848.

Duncan W. J. (1989), 'Organization Culture: "Getting a fix" on an Elusive Concept', *Academy of Management Executive*, 3(3), 229 – 36.

Giacchi, E., La Corte, A. and Di Pietro, E. (2016). 'A dynamic and context-aware model of knowledge transfer and learning using a decision making perspective. Proceedings of the 1st International Conference on Complex Information Systems, 66–73.

Gotts N. M., Polhill J. G., and Law A. N. R. (2003), 'Agent-Based Simulation in the Study of Social Dilemmas', *Artificial Intelligence Review*, 19(1), 3–92.

Hirshman, B. R., Charles, J. S. and M., C. K. (2011), 'Leaving us in tiers: can homophily be used to generate tiering effects?', *Computational and Mathematical Organization Theory*, 17(4), 318–343.

Ingram P. and Roberts P. (2000), 'Friendships among competitors in the Sydney hotel industry', *American Journal of Sociology*, 106(2), 387-423.

McShane S .L. and Von Glinow M. A. (2006), Organizational Behaviour. Emerging Realities for the Workplace Revolution. 4th Ed. McGraw Hill Companies Inc.

Morone, P. and Taylor, R. (2004). 'Knowledge difusion dynamics and network properties of face-to-face interactions', *Journal of Evolutionary Economics*, 14(3), 327–351.

Odumeru, J. A., and Ogbonna, I. G. (2013), 'Transformational vs. transactional leadership theories: Evidence in literature', *International Review of Management and Business Research*, 2(2), 355-361.

Prather, C. W., and Turrell, M. C. (2002), 'Involve everyone in the innovation process', *Research Technology Management*, 45, 13-16.

Reagans R, and McEvily B. (2003), 'Network structure and knowledge transfer: The effects of cohesion and range', *Administrative Science Quarterly*, 48, 240–267.

Reagans R., and Zuckerman E. (2001), 'Networks, diversity and performance: The social capital of R&D units', *Organization Science*, 12, 502-517.

Schein E. H. (2004), Organizational Culture and Leadership. Third Edition, Jossey-Bass.

Xenikou, A., and Simosi, M. (2006), 'Organizational culture and transformational leadership as predictors of business unit performance', *Journal of Managerial Psychology*, 21(6), 566-579.

Xuan, Z., Xia, H. & Du, Y. (2011), 'Adjustment of knowledge-connection structure affects the performance of knowledge transfer', *Expert Systems with Applications*, 38(12), 14935–14944.

Teaching Aids, Their Creation and Use in Vocational Training

Daniel Kučerka, Institute of Technology and Business České Budějovice, Faculty of Corporate Strategy, České Budějovice, Czech Republic, email:kucerka@mail.vstecb.cz

Roman Hrmo, DTI University Dubnica nad Váhom Slovakia, email: hrmo@dti.sk

Mária Vargová, Institute of Technology and Business České Budějovice, Faculty of Corporate Strategy, České Budějovice, Czech Republic, email:vargovam2@mail.vstecb.cz

Monika Kučerková, Institute of Technology and Business České Budějovice, Faculty of Corporate Strategy, České Budějovice, Czech Republic, email:4monika4@gmail.com

Abstract

The contribution is dedicated to didactics, teaching technique, learning tools and their functions and teaching methods in vocational training of a metal worker. In the theoretical part we want to point out on the vocational training as an important aspect of the students´ training for his future profession. Teaching aids are a very important part of teaching. The advantage of a teacher of practical lessons compared with a teacher of vocational subjects in theoretical teaching is that he works more hours with real didactic machines. In the experimental part we evaluated teachers' access and the availability of teaching resources. We evaluated it by a questionnaire.The results show that teachers have sufficient access to teaching means, and that they use them in practical teaching for clearer explanation of curriculum.

Keywords: didactics, teaching techniques, teaching aids, teaching methods, vocational subject

1. Introduction

The contribution is focused on the creation of teaching aids for the teaching of machinists. Teaching aids and teaching techniques are in vocational training very important part of teaching and they mean the increase of clarity of teaching substances. Use of aids in teaching is a necessity today, teaching is becoming more diverse, more understandable for students and it is easier for teachers to interpret the substance. Currently there are major changes in the Czech vocational education, the structure of secondary vocational schools has changed. It is mainly about merging several schools in new units, as well as they did it at the Secondary School of Crafts and services in Strakonice, which merged on 1.1.2012 with the College and the Secondary Technical School in Strakonice. These changes bring positives in the form of adaptation to the current demand for schools, apprenticeship programmes, modernization of classrooms and teaching aids and teaching improvement. To make these changes it is necessary that the teachers would be involved in this process, because they have a pivotal role in the learning process and many demands are placed on them because they have to use all the latest findings of modern technology in their lessons of theoretical and practical training (Ližbetinová and Farkašová, 2016). The best is a combination of traditional elements of education with innovative forms of teaching so that the educational process has brought satisfaction for both educators and pupils (Kampf et al., 2017; Lorincová et al., 2016).

2. Material and Methods

The word didactics comes from the Greek word didaskein - or learn to teach and learn. Exact name of didactics is "general didactics" - but normally even in the professional expression is used the abbreviated name "didactics" (Průcha, 2009). Didactics is according to Průcha, Veteška (2014) the basic discipline of pedagogy. It is its important component because the teacher has educational influence especially in teaching where youth is the immediate subject of a planned and purposeful action (Drahovrzal et al., 1997). Čadílek (2005) indicates didactics as a theory of education. Drahovrzal et al.

(1997) also says that education is focused on exploring all forms of deliberate (international) effect on personality development, didactics of vocational subjects is focused on the peculiarities of this work in the education - learning process (Hitka et al., 2016; Hitka et al., 2015). Didactics is the theory about intentional (deliberate purpose-planned) educational processes: it designs the models of learning and teaching, models of contents and goals of educational processes, methods and forms of teaching, a method of detecting and evaluating the results of educational processes. As the educational processes are carried out in a very large and variable number of educational environment, didactic theory is very differentiated: there is a school didactics within which there are the didactics of individual types of schools, individual educational fields and subjects (for example didactics of history in elementary schools, didactics of anatomy in the education of medical students, etc.).

Means of vocational training

Securing of adequate conditions and means for achieving the objectives and fulfilling the objectives of vocational training in accordance with the teaching principles and rules is didactically, technically and economically long and difficult process. However, it is absolutely necessary to meet the desired objective. Generally as the means we consider those realities (objects and phenomena), which serve and help to achieve the objectives. Similarly in the pedagogy term educational resources in a broad sense include everything that is conducive to meet the educational goals (Čadílek, 2005).

The didactic under the term means we understand everything what teachers and students can use to achieve learning objectives. Such means can be a method of teaching, teaching form, teaching principles, reaching a stopover is a means of achieving final goals, but the means also include the school board, textbooks, teaching facilities, computer equipment, etc. (Kalhous, Obst et al., 2002).
Teaching resources in practical training can be divided into material and immaterial:

immaterial resources - organization and methods used in teaching of practical training

- training organization - the allocation of classroom in learning periods, teaching practices, coordination of practical training and theoretical training, organizational forms (place of teaching, teaching methods, teaching day)
- teaching methods in practical training - working with technical and accountancy documentation, training, simulation methods, problem methods, staging methods, excursions (Čadílek, 2005).
- material resources - equipment and items that are necessary for practical training, and those that assist by their didactic function to acquire the curriculum effectively.
- the means of production (machinery, tools, gauges), educational resources (teaching materials, teaching techniques).
- the fiction of didactic material resources stems from the fact that man gains 80% of information visually, 12% by hearing information, 5% of the information by touching and 3% by other senses (Kalhous, Obst et al., 2002).

Teaching methods in teaching vocational subjects

Authors of professional literature agree that the main objective of teaching method is the effective management of pupils by their teachers in order to meet the educational goals. Accivities of pupils and teachers should always be coordinated and should be closely linked.

According to Maňák and Švec (2003) a teaching method is understood on the base of the interaction of a teacher and pupils, it acts as a structured system of teaching activities of teachers and learning activities of pupils aimed to achieve the educational objectives. As a teaching method can be considered such system of teaching activities of a teacher and learning activities of a pupil which leads to the fulfillment of the educational objectives set by a teacher and received by a pupil (Kalhous, 2002).

Drahovzal et al. (1997), states that vocational subjects are characterized by a rich variety of traits, which connect them through technical and technological base with related groups of learning subjects and disciplines. According to this fact the centre of teaching leads to laboratory and practical methods

where the professional skills and habits of future technician are formed the most intensively. The essence of teaching methods is such management of active cooperation of students with a teacher, which leads to efficient mastering the curriculum ensuring fulfillment of educational goals. Material teaching means are used for successful implementation of teaching methods. Methodological mastering of their proper use in teaching is get by the creation of the necessary professional skills of teachers. Teaching methods are characterized by their close connection to the internal conditions of teaching (especially in the professional view), while organizationbal forms are part of the external conditions (Mura and Orlikova, 2016).

- Průcha (2009) as a teaching methods also considers the lecture, discussion, dramatization, written work with text.
- visual methods (demonstration) – they allow on the baiss of the direct watching the demonstrated object or phenomena to recognize immediately its the most important features. We include here observation and demonstration in the classroom. Průcha (2009) states also the watching the paintings, models, experiments, film or computer projections.
- methods of work - work can be a source of valuable knowledge, but it also can create its own educational content. According to its character we distinguish the laboratory methods, craft works. According to Průcha (2009), among these methods we also include creative activities, manual work in the workshops.
- activation methods – require the increased share of activity of each pupil on the process of teaching and learning. Activation of pupils is reflected in the teaching methods as a problem teaching, discussion and staging methods, program teaching and learning methods of individual work with the textbook, literature and trainer training.
- methods of screening and assessment of pupils - have considerable educational importance by their controlling function (as a feedback to pupils and teachers) and their motivational functions (encouraging to the next learning eventually early correction and initiative to remedy).

Methods of control of the study results are divided into oral tests, written tests and achievement tests (Drahovrzal et al., 1997).

Didactic Technology

According to Průcha, Veteška (2014) the educational technique is the general term indicating information and communication technology equipment, which are used in learning and teaching. As a result, the overall development of technology the type and method of use of these means has changed. While in the 60-ies of the last century were typical for example didactic projector, overhead projector, educational film etc, currently these means are much more developed represented mainly by audiovisual equipment, such as computers and educational software, videotechnical equipment, CD player, interactive whiteboard , a language lab and others. Prucha et al. (2001) distinguishes traditional didactic technique (slide projector, overhead projector, film projector, etc.) and modern (computer for educational programs, language lab, multimedia tutorial system, etc.), new technologies in education, technology education. The placement of educational technology in teaching significantly changes the style of work of the teacher.

Function of educational technology

Function of educational technology consists of the mediation of education - learning content. Its upbringing - educational outreach must be always assessed in the unity with the appropriate contents and forms of media programs that animate their work and develop it in the classroom. By incorporating the educational technology into teaching of vocational subjects varies significantly overall style of the teacher's work as a leading factor. In the process of teaching management there occurs a tendency to implement so called automated system of education, which includes:

a) learning management program, ie. the estimated algorithm of pupils´education, structure of presumed methods of teaching and learning, teacher´s optimal variant of the process for achieving educational objectives,

b) material didactic aids (teaching aids, teaching techniques, architectural design of micro - and macrospace)

c) diagnostic technique for evaluating the results and control of educational processes,

d) own learning activities of students and their teacher in the intent of program management (Drahovrzal et al., 1997).

Nowadays, the term didactic technology is replaced by terms such as instructional media, instructional technology (Průcha, 2009). These are visual, audio and audio-visual means, such as eg. overhead projector, educational film, educational television, a language lab, teaching simulator, computer tutorials, internet.

Overview of didactic techniques used in secondary schools:

1) Means of visual techniques

a) for not screened aids (means DT aid carrier of information), blackboard teaching drawing, magnetic board, paper materials, articles on ferrite, flannel boards, utilities taped flannel or velcro, plexit blackboard, teaching drawing, flipchart teaching drawing, rack or hook on the whiteboard, wall or blackboard painting, map)

b) for static projection (DT aid means (medium), epiprojector aid opaque backing, stereopticon slides)

c) for dynamic projection (DT aid means (medium), film projector, a silent film, film loop

2) Means of auditory technique (DT aid means (medium), gramophone records, reel tape, tape, cassette recorder, cassette tape, player CV CD (compact disc), radio, radio broadcast)

3) Production of audiovisual equipment (DT aid means (medium), film projector sound film, television broadcasts, videotape, DVD player, DVD, multimedia computers, CD - Rom with multimedia programs, data projectors, data in computers or other sources

4) Other electronic educational resources (visualiser (document camera), Interactive whiteboards, voting system, interactive touch panel, DVD player, copying whiteboards, mobile interactive system, overhead projector, device onto a transparent pad or a large-format slide

Teaching aid and its functions

It is also necessary to distinguish what a didactic technique is and what a teaching aid is. There is often the confusion between these two concepts. Čadílek, Loveček (2005) state that for example the blackboard, tape recorder, overhead projector, projection device , etc. are also a didactic technology. Teaching aids are for example the image on the screen, drawing on the blackboard, film, etc. Teaching aid is actually the carrier of didactic information which are used directly in the educational process and to illustrate teaching event or activity. Teaching aids are part of the teaching process, because they directly relate to the subject matter. Drahovzal et al. (1997) state that aids by their function are used as:

a) means of motivation and stimulation, ie. the means inducing the inner relationship of pupil towads learning, problem solving and problem situations promoting creative search, discovery and action,

b) sources of information that help the student to approach the curriculum (content and interpretive information) so that the process the acquisition of knowledge would be as much as possible facilitated. Teaching aids should lead the student as means of verbal and non-verbal communication to understand the nature of phenomena in various ways,

c) the means of systematization of knowledge inducing the connection with new concepts and knowledge acquired in advance. Teaching aids should help the student to organize the curriculum not only into logical structures, but to facilitace him from the way of knowledge from specific to the general,

d) means for controlling the working methods simultaneously with the discovery of new phenomena,

e) means of connection the school with practice,

f) the means to implement a differentiated approach to the pupil to develop better his psychological and physical abilities.

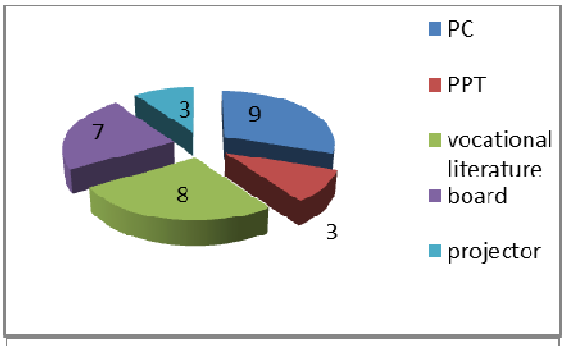
Didactic technology and teaching aids can act as an educational, communication and media means, which the teacher uses for his influence on students in the educational process.

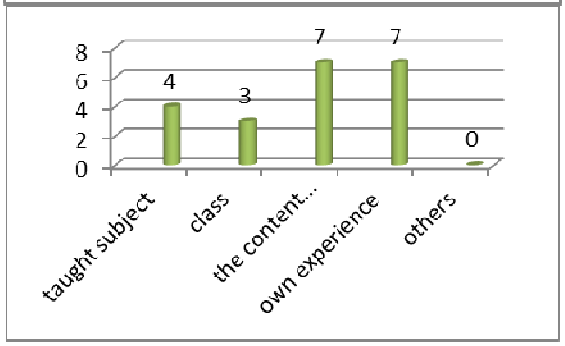
3. Results and Discussion

The research was conducted in January 2016. We chose the method of quantitative research using a non-standardized questionnaire. The questionnaire was divided among individual respondents – teachers of practical training of the Secondary School of Crafts and Services Strakonice. The questionnaire was created as a form that respondents filled in.

The research was conducted within the framework of practical training by teachers of practical training. In the workshops where practical training of SOŠŘaS Strakonice takes place are educated 36 pupils of the apprentice field of machinists. The questionnaire survey was realized by 11 teachers of the practical training, including the Deputy Director for practical training.

Evaluation of questionnaire
For setting the hypotheses there was created the questionnaire with eight questions. Type of questions was always chosen as closed. In some cases it was possible to select multiple answers. Questionnaires were distributed to the teachers of practical training of the apprentice field of machinists. A total of 11 questionnaires were filled in by teachers.
Question No. 1 - What equipment do you use for the practical teaching of your vocational subject?
a) PC
b) presentation
c) technical literature - textbooks
d) the board
e) projector
Question No. 2 - How do you decide which teaching aid will you select?
a) taught subject
b) class
c) the content and topic of the curriculum
d) own experience
e) others (mention): .....





Graph 1 Used aids **Graph 2 Decision for aid choice**

The question 1 was answered by all respondents. There could be marked more than one answer that´s why we have a total of 30 responses. The aim was to find out what aids are mostly used by teachers during practical training. A total of 9 respondents (30%) responded that they use PC and other the most used aid is the literature (27%), which corresponds to eight answers. Furthermore, seven of the respondents (23%) said the board and the three responses (10%) involved a presentation and data projector.

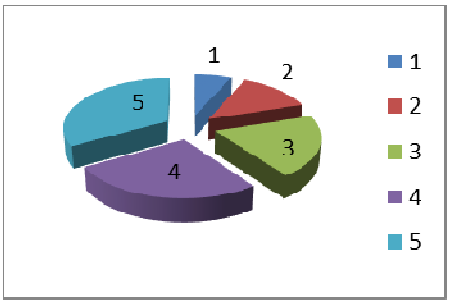
Question No. 2 again allowed multiple responses and a total of 21 responses were identified. The question was tasked to determine whether the teachers emphasize the pupils' actual needs and pay good attention to the selection of teaching aids. The same number of teachers (33%) responded that they decide according to the content and curriculum topic and according to their own experience, which is also related to the length of their experience and knowledge and experience as the practical training is taught by many teachers with their experience of more than 15 years. Four respondents (19%) responded that they decide according to the subject taught and a further 3 respondents (14%) according to a class.

Question No. 3 - Are you happy with your school facilities for teaching technical subjects?

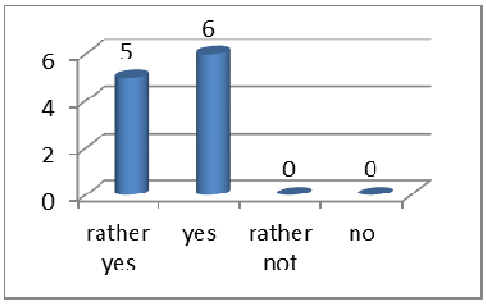
a) rather yes
b) yes
c) rather not
d) no

Question No. 4 - Evaluate how your school is equipped with the teaching equipment on a scale 1 to 5 as at school.

a) 1
b) 2
c) 3
d) 4
e) 5



Graph 3 Satisfaction with the aid equipment of your school

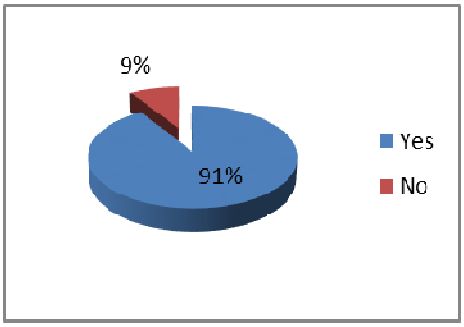


Graph 4 Evaluation of school by aids

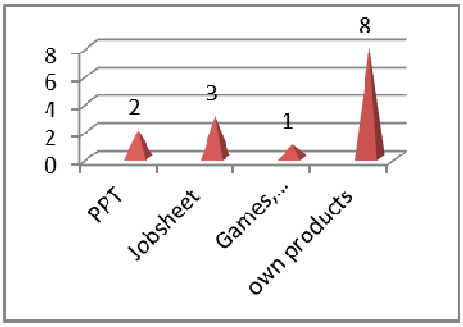
The question 3 shows that teachers generally perceive the didactic technique available to the practical training as adequate and well equipped (graph 3). As many as 55% said they are satisfied with school equipment for teaching technical subjects and rather yes responded 5 respondents representing 45% of overall respondents. Nobody responded negatively.

Question No. 4 the respondents assessed mostly positively too (graph 4). Most (73%) judged the equipment by education technique with mark 2. One respondent even assessed by the mark of 1 and the last two respondents would rate by the mark of 3. This and the previous question No. 3 refer to the hypothesis No. 2. Both questions confirm the hypothesis , because teachers are satisfied with school equipment for teaching technical subjects.

Question No. 5 – Do you create for your subject your own teaching materials and aids?
a) yes
b) no
Question no. 6 - If yes, what? (Answer only if you answered yes for question No. 5)
a) Power Point presentation
b) worksheets
c) games, competitions
d) own products



Graph 5 Creation of own aids



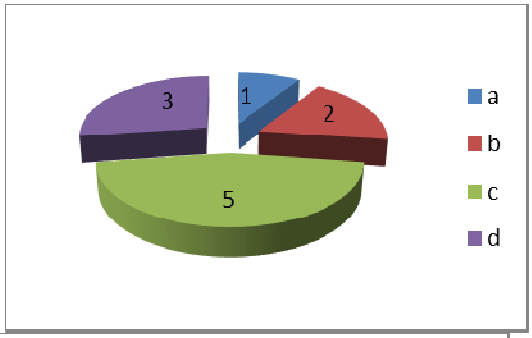
Graph 6 Types of aids

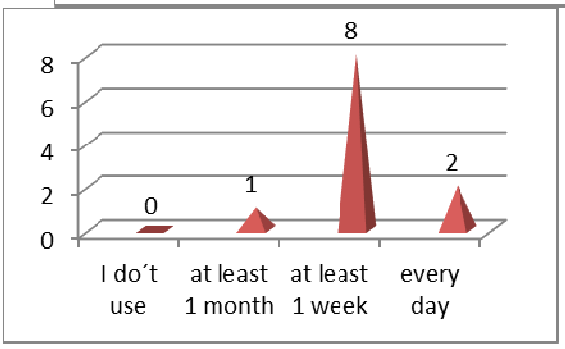
91% of respondents said that for their subject they create their own materials and teaching aids. Only one respondent replied that he does not create aids for teaching vocational subjects.

The aim of question No. 6 was to determine what teaching aids are used in teaching vocational classes. There could be marked again more answers. Respondents in 58% of the responses marked own products, further 21% use worksheets. Only two respondents (14%) described the use of PowerPoint presentations and one respondent (7%) uses games and competitions. From these responses it is clear that teachers are accustomed to the traditional demonstrations using their own products, which are produced by the pupils themselves.

Question No. 7 - What is your relationship to the use of educational technology?

a) I do not like using a teaching technique
b) only certain types of educational technology, because I cannot deal with all the technology perfectly
c) I use the available didactic technique, but I would welcome greater amount compliant with modern standards of practical training
d) I often use didactic technique and I'm happy with it
Question No. 8 - How often do you use didactic technique?
a) I do not use it at all
b) at least 1x per month
c) at least 1 x per week
d) every day





Graph 7 Relation todidaktictic technice **Graph 8 Interval of use of aids**

By the question No. 7 we investigated how respondents are related to the use of educational technology. Only one respondent replied that he does not like using it, the other two only use certain kinds of techniques because they cannot handle them perfectly. Satisfaction with didactic technology is 27%, and most respondents (45%) use available didactic technique, but consider it as too outdated and obsolete.

The aim of question No. 8 was to determine the interval of using didactic technique by respondents. Most up (73%) respondents use it at least 1 time a week and even two of the respondents (18%) use it every day. One respondent (9%) responded that he uses it at least 1 x per month and no one was found who would not use the didactic technique.

4. Conclusion

The aim of this paper was to investigate by using a questionnaire the teaching aids for practical training. Practical training is specific in that these are the entire 6-8 hour sessions. Pupils are opposed to theoretical subjects able to test their practical work on machine tools and acquire the basic habits and

skills. Questionnaires were completed by teachers of practical training. The survey was focused on teachers' satisfaction with available teaching aids and didactic technology, which is used in practical training.

The survey showed that teachers are satisfied that the didactic technique is often used. At the same time it became clear that they would welcome more modern classrooms equipped with teaching equipment and teaching aids. The most used are boards, textbooks, training simulators for CNC programming or computers in teaching programming of CNC machines. As a solution to the current situation and conditions that are currently in training workshops on SOŠŘaS in Strakonice and based on the outcomes of the survey results we suggest to increase the use of data projectors and interactive whiteboards, because those I consider to be modern teaching techniques. By using a data projector or interactive whiteboard in conjunction with a PC, it is possible to prepare the appropriate audio-visual aids and better explain the problem to pupils. To use the projector more effectively, it is necessary to start to use power point presentations and videos more. Teachers have more time for other activities, such as demonstrations on CNC machines, and other machine tools, and while doing these activities they will meet the educational goals.

As the survey shows that there is a need to modernize the existing equipment, we suggest to buy the interactive whiteboard with the touch display for the practical training. It also results that the teachers are active to engage in projects which promote the curriculum innovation and the creation of teaching materials. They use the created teaching materials in their teaching, because in most cases they have the activation component which leads pupils to participate in the teaching process.

References

1. Čadílek, M. (2005), ´Didaktika praktického vyučování˝ I. CERM, Brno.

2. Depešová, J., Noga H. and Vargová, M. (2011), ´Edukacja ogólntechniczna w szkolach podstawowych na Slovacji i w Polsce,´ *Konspekt*. 41 (4), 65-74.

3. Drahovzal, J., Kohoutek, R. and Kilián, O. (1997), ´Didaktika odborných předmětů,´ Paido, Brno.

4. Hitka, M., Ližbetinová, L., Caha, Z. and Xu, Y. (2016), ´Facility mangement – instrument for the management of support processes for HRM outsourcing,´ *Komunikácie,* 2, 37-43.

5. Hitka, M., Závadská, Z., Jelačic, D. and Balážová, Ž. (2015), ´Qualitative indicators of employee satisfaction and their development in a particular period of time,´ *Drvna industria*, 66 (3), 235-239.

6. Kampf, R., Lorincová, S., Hitka, M. and Stopka, O. (2017), ´Generational Differences in the Perception of Corporate Culture in European Transport Enterprises,´ *Sustainability* 9 (9), 1561

7. Kučerková,M. and Kučerka,D. (2013), ´Didactics, teaching technology and their using at the lessons of english language in Slovak Republic,´ Language and the environment: conference proceedings. 295-303, ISBN 978-83-61401-88-9, ISSN 2084-2961, Gliwice: Gliwicka Wyźsza Szkoła Przedsiębiorczości, Uniwersytet Śląski,

8. Ližbetinová, L. and Farkašová, V. (2016), ´Librarians competencies in the global environment,´ 16th International Scientific Conference on Globalization and its Socio-Economic Consequences, 1204-1211, ISBN:978-80-8154-191-9, October 05-06, 2016, Rajecke Teplice, Slovakia

9. Lorincová, S., Hitka, M. and Balážová, Ž. (2016), ´Corporate culture in Slovak enterprises as a factor of HRM quality - case study,´ *International journal for quality research*, 10 (4), 719-732.

10. Maňák, J. and Švec, V. (2003), ´Výukové metody,´ Paido, Brno.

11. Mura, L., and Orlikova, M. (2016), ´ Social entrepreneurship and social enterprises: the case of Slovakia,´ 4th International Conference on Innovation Management, Entrepreneurship and Corporate Sustainability (IMECS), ISBN 978-80-245-2153-4, 495-505, May 26-27, 2016 Prague, Czech Republic

12. Průcha, J. (2009), ´Přehled pedagogiky: úvod do studia oboru,´ Portál, Praha.

13. Průcha, J. and Veteška, J. (2014), ´Andragogický slovník,´ Grada, Praha.

14. Skalková, J. (2007), ´Obecná didaktika,´ Grada, Praha.

15. Učební obory: Obráběč kovů. VOŠ & SOŠ &SOŠŘaS [Online], [Retrieved December 22, 2016], [online]. [cit. 2016-02-17]. z:http://www.ssst.cz/uploads/dokumenty/pdf/ucebniobory/obrabec_kovu.pdf

What Drive Bank Performance Overtime? A Dynamic Panel Analysis on Islamic Vs Conventional Banks

Cedrix Ngandop Djeutcheu[a], Luc Matabaro Borauzima[b]

[a] Finance Department, University of Mons, Mons, Belgium,
cedrix.djeutcheungandop@student.umons.ac.be

[b] Finance and Law Department, University of Liège, HEC-Management School, Liège, Belgium,
blmatabaro@doct.ulg.ac.be

Abstract

This paper investigates the drivers of bank performance overtime, between Islamic and Conventional banks by using a dynamic panel approach. The study period covers ten consecutive years (2006-2015), we use ROAA (Return on average Asset), ROAE (return on average Equity), and NIM (Net Interest Margin), Sharpe ratio, Jensen and Treynor indices as measures of performance. We applied panel regression by using the technique of fixed effect estimation instead of random effect, and then to address the issue of endogeneity and omitted values we applied two step system of GMM (Generalized Method of moment). Results suggest that bank performance is mainly driven by non-performing loan provision (NPLP), cost to income ratio as measure of bank efficiency, and size, net loan to total asset with NPLP and cost to income ratio being significant when using different performance measures. Within a dynamic panel framework NPLP has a negative impact on CBs performance whereas it affects positively IBs performance. This is consistent with Beck et al. (2013) who suggest that IBs have higher asset quality than conventional banks. This study also contradicts the idea that IBs are less cost-efficient than CBs because the cost to income ratio as a measure of efficiency is more significant for IBs than CBs.

Keywords: corporate governance, Islamic banks, performance, stock market risk adjusted measures.

JEL classification: G30, G01.

Introduction

During the last recent years, the speed at which Islamic banking has been growing and its resilience to the 2007 financial crisis(see for instance Beck, Demirgüç-kunt, & Merrouche, 2013; Olson & Zoubi, 2016) provide evidence of its ability to compete with or outperform well-established conventional banks (CBs).Martin & Hesse (2010) and Olson & Zoubi (2016), document that more than 300 IBs are operating throughout 51 countries in the financial industry and hold almost $ 1.5 million dollars of assets. Similarly, Ernst & Young (2016) argue that over the period of 2009-2013, Islamic banking assets value growth reached 17%.The creation of Islamic stock market indices in the world's largest stock exchanges such as the MSCI Global Islamic Indices (2007), FTSE Global Islamic Indices and S&P Sharia Indices (2006), Dow Jones Islamic Market Indices (1999), or the Russell-Ideal Ratings Islamic Indices (2013) is important to sustain the idea of IBs growth.

As Compared to conventional banks, Islamic banks rely on a sharia-compliant finance that prevents them the right of charging interest, does not allow for illicit investments and speculation as well as strengthening the risk sharing principle both on assets and liabilities. For Gueranger (2009) Islamic finance is an ethical finance whose priority objective is not only the frantic search of profit.

Following the aforementioned literature, our study's objective is to assess what determines the performance of IBs compared to conventional banks. We seek to contribute to the literature in two ways. (I) First, we follow the existing literature on the performance in the banking industry in general. Most generally, bank performance is measured by accounting ratios such return on equity, return on asset and net interest margin (see for instance Athanasoglou, Brissimis, & Delis,(2008); Dietrich&Wanzenried,(2011);García-herrero,Gavilá,& Santabárbara,(2009); Pathan&Faff,(2013). In most recent studies, some use measures of stock performance such as Tobin's Q (Mollah & Zaman, 2015), Sharpe ratio (Gropper, Jahera, & Chul, 2015) and stock return. Our innovation relies on the fact that we use both Jensen ratio and Treynor ratio (both as stock performance measures) that have not been used as proxy of bank performance to the best of our knowledge. We will provide an answer to how well systematic risk is able to predict bank performance by distinguishing between IBs and CBs. (II) we use mainly African conventional banks because African banking industry is still the least developed in the world. By doing so, we complement the existing literature by documenting the gap between conventional banks evolving in least developed country (which are supposed to have low margin) to IBs.

The remainder of this paper is organized as follow as. (1) We document the existing literature on conventional bank and Islamic performance. (2) In the following section we present the data and the methodology that are used to study performance. (3) Section 3 presents our results from different empirical applications and section 4 concludes.

Literature Review

Performance is among the most discussed issues within the banking industry in an empirical perspective. Some researchers used to investigate bank performance in terms of ownership structure (knyaeva et al 2013) by comparing private to public bank, foreign to host banks. Other studies focus on the factors driving performance without relying on bank-type analysis (see Poin Hoin et al 2016; Rashid & Jabeen 2016; Jawadi 2016).For instance Figueira, Nellis and Parker (2006) have studied the ownership structure and performance of African banks. They found that, when private shareholders introduce foreign shareholders into the ownership structure of African banks, this tends to have a positive effect on the performance of the latter. These studies have documented for some cases significant link between governance mechanisms and banks performance (mollah & Zaman 2015) or relevant information about comparative performance between IBs and CBs (Johnes et al 2013).

Prior to the tremendous growth of Islamic banks, an important body of literature have emerged to most importantly address to which extend Islamic banks are different from conventional banks. To address this issue, Bourkhis & Sami (2013) investigate the difference between IBs and BCs resilience to the 2007-2008 financial crisis and find no difference with regard to their soundness because IBs tend to diverge from their business model. Beck et al. (2013) addresses business model and efficiency issues by comparing Islamic to conventional bank. They found that IBs are better capitalized, have higher ratio of intermediation, high asset quality although they are less cost-efficient. They also suggest that IBs were less affected by the 2007-2008 financial crisis because of the high asset quality their carry.

In the same spirit, Olson&Zoubi(2016) investigates the convergence of IBs and CBs performance. They argue that CBs converge faster than IBs especially after the financial crisis.

Methodology

This study focuses on publicly traded African conventional and worldwide Islamic banks. We choose publicly traded banks since our study employs equity performance measures as proxies of performance in the banking industry. Our sample is split into 48 IBs and 61 CBs on the period of 2006-2015. To conduct this study, our data are retrieved from different sources: (I) Bank level data are retrieved from Bankscope database which was provided by Bureau Van Dijk Belgium until December 2015 (II), stock market data (here stock prices and market capitalization) stem from

DataStream and (III), Macroeconomic data to account for country heterogeneity in terms of economic performance and financial depth are obtained from the World development indicator part of the world Bank website. (iv) Risk-free rates were mostly downloaded from Central Bank websites and it is represented by a 91 days' maturity treasury bills and some countries we proxy the risk-rate by a one-month US treasury bill retrieved from Kenneth Fama-French data library[1]. We compute stock return using arithmetic approach[2], Treynor and Jensen performance measures are driven from a CAPM[3] model using different stock indices as market proxy as retrieved from DataStream. Overall, our correlation matrix as reported in Table 4.1 suggest that our variables as mostly significantly correlated although their value are not high to suspect a potential multicolinearity. Descriptive statistics are reported in the annex and show that Islamic banks have higher asset quality than conventional.

In order to investigate factors driving bank performance, we follow Athanasoglou, Brissimis, & Delis(2008); Dietrich & Wanzenried (2011); García-herrero, Gavilá, & Santabárbara, (2009) and Pathan & Faff (2013) from whom we choose to set up the following specification:

$$PFO_{it} = \beta_0 + \gamma_{it} PFO_{it-1} + \sum_{i=1}^{k} \beta_i X_{it} + \sum_{i=1}^{k} \delta_i F_{it} + \mu_i + \varepsilon_{it} \quad (1)$$

Where PFO_{it} stands for the performance of the bank i at time t (here the year), βi and δi are the parameters we intend to estimate, Xit represent bank specific and Fit denote macroeconomic variables and other control variables, e_t the error term, μ_i represent fixed-effects among different banks. $PFOi_{t-1}$represents the lagged value of the performance measured due to the persistence of bank performance with respect to regional and macroeconomic factors as suggested by Berger, Bonime, Covitz& Hancock (2000).To estimate our parameters, we use a dynamic panel approach suggested by Arellano, M.; Bond, (1991).

Table 0-1Variables presentation and expected signs

Variables	Description	source
Depend variables: bank performance		
ROA	Net income over the average assets in %	Bankscope
ROE	Net income over the average equity in %	Bankscope
Net interest margin	Net interest margin as overs total revenue or total assets	Bankscope
Sharpe ratio	Average excess return over standard deviation the portfolio risk	Author calculation using DataStream data
Treynor ratio	Excess return over the beta market (systematic risk)	Author calculation using DataStream data
Jensen ratio	Difference between the return and the expected return	Author calculation using DataStream data
Independent variable		

[1] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

[2] $R_t \frac{P_t - P_{t-1}}{P_{t-1}}$

[3] Capital Asset Pricing Model: $E(R_i) = R_f + \beta_i\big(E(R_i) - R_f\big)$

Bank specific variables		
Capital ratio	Equity to total assets value	Bankscope
Loan to deposit ratio	Loan value divided as percentage of deposit	Bankscope
Overheads to total assets	Operating expenses over total assets	Bankscope
Nonperforming loan provision	Loss provision over total assets	Bankscope
Bank size	Log of total assets	Bankscope
Cost to income ratio	Ratio of total expenses to total revenue	Bankscope
Bank Age	Number of years the bank was established until 2015	Bankscope
Bank Category	Either Islamic Bank or commercial African bank	
Macroeconomic variables		
GDP growth	Yearly GDP growth rate in %	World development indicators
Inflation rate	Yearly consumer price index variable in percentage %	World development indicators
Boone indicator	Competition measure derived from Boone-type model	Global financial development

Table 0-2: Correlation Matrix of different variables

	ROAA	Sharpe r~o	treynor~o	jensenr~o	log_SIZE	OHTA	NPLPTA	EQTA	OFBSTA	CIR	NETLOAN~N	INFLATION	GROWTHR~E	boonein~r
ROAA	1													
sharpera~o	0.0455	1												
treynorr~o	0.031	-0.144***	1											
jensenra~o	0.0747	0.216***	-0.0392	1										
log_SIZE	-0.105**	0.0101	-0.0235	0.00989	1									
OHTA	0.121***	-0.0777	0.108*	0.109*	-0.238***	1								
NPLPTA	0.0702*	-0.145***	0.213***	-0.0617	-0.267***	0.791***	1							
EQTA	-0.255***	-0.0615	-0.0034	-0.0182	-0.131***	0.0586	0.145***	1						
OFBSTA	0.254***	0.029	0.0151	0.160***	-0.192***	0.396***	0.352***	-0.0798*	1					
CIR	-0.331***	-0.073	-0.0116	0.016	-0.149***	-0.0748*	-0.0793*	0.275***	-0.198***	1				
NETLOAND~N	0.0644	0.00133	-0.0667	0.0148	0.286***	-0.133***	-0.123***	0.035	0.0393	-0.207***	1			
INFLATION	0.131***	-0.0756	0.112*	0.013	-0.142***	0.0274	0.119***	-0.0304	0.114**	-0.0866*	-0.125***	1		
GROWTHRATE	0.179***	-0.0171	-0.00283	-0.00922	-0.124***	0.00797	-0.0336	0.0273	0.0338	-0.102**	-0.0534	-0.0537	1	
booneind~r	-0.158***	-0.148***	0.0122	-0.0352	0.188***	0.06	0.0407	0.0582	-0.216***	0.0455	0.00969	-0.183***	0.021	1

This table reports pair-wise correlation levels among our main variables. Significantly different to zero correlations at 0. 1%, 1% and 5% are marked ***, **,* respectively. The sample include both conventional banks and Islamic banks from 2006 to 2015 for a total sample of 109 banks split in 61 conventional banks and 48 Islamic banks. For notation, see Table 3.1 above.

Empirical Results

Fixed effects estimation are presented in Tab 4.2 and Tab 4.3 which respectively account for only bank-specific variables and macroeconomic variables. The R-squared of our models are different when we split our sample into IBs and CBs compared to when we use the full sample. Indeed, the first estimation report much higher R-squared than the second which can be explained by the heterogeneity between the two types of bank. In general our models fit with fixed effect according to the Hausman test. Globally we found that, when we only control for bank-specifics variables, size, Cost-to-income ratio, NPLP and Overheads to total assets are the main determinants of bank performance.

Our findings are consistent with the existing literature on the size impact on bank performance. When we measure performance by ROAA, ROAE and Sharpe ratio, we find a negative effect of size. These results are consistent with the findings of (Beck et al., 2013; Dietrich & Wanzenried, 2011; Mollah & Zaman, 2015; Olson & Zoubi, 2016).As our study encompasses also the crisis period, it is possible that bigger banks had large amounts of non-performing loan provision, which might affect negatively their performance. For Islamic banks especially where loans issued through the so-called Mudarabah have to be provisioned with a special account (IADS), which would affect IBs performance with a long term mechanism and most importantly have larger size.
However, some studies such as Gropper et al., 2015; Pathan & Faff, (2013) among others have found positive link between size and bank performance. Because bigger banks have higher diversification possibilities, they might enjoy economies of scale and hence high performance.

As a measure of credit quality, non-performing loan provision is highly significant in this study for all our performance measures. Using all these performance measures, this variable shows a negative significant impact on bank performance either for conventional banks or Islamic banks as well as for the full sample. This results entails the fact that the higher the loss provision, the lower the credit quality of the bank and hence the lower the performance. Empirical studies (see for instance Beck et al., 2013; Gropper et al., 2015) provide supporting evidence that high loss provision is detrimental to bank performance because the amount of provision allocated decreases the bank net income. Although significant, loan provision are not as important as for conventional bank(Beck et al., 2013), Islamic banks' performance is also negatively affected by high loan loss provision because some products have to be covered by amount of provision.
In table 4.3 we control for macroeconomic variables. Boone indicator as a measure of bank competition has a negative and significant impact on bank performance. Indeed, the structure-Conduct-Performance hypothesis suggests that a highly concentrated market indicates a low degree of competition and hence high profitability for banks. Our results support the competitive nature of the banking industry since the financial liberalization. Some studies however, use HHI concentration measure to assess the impact of bank market structure on the performance. Mirzaei, Moore, & Liu, (2013) demonstrate that market structure has a positive impact on banking both in developed and emerging economies. Moreover, we have mentioned so far that Islamic banking is growing at high pace. This result suggests that Islamic banking profits could be highly affected by the market structure despite the existence of unique regulation.

Table0-1 : Fixed effects regressions for bank performance: Full sample

	(1)	(2)	(3)	(4)	(5)	(6)
	ROAA	ROAE	NIM	Sharpe ratio	Treynor ratio	Jensen ratio
VARIABLES						
log_SIZE	-0.40845***	-0.16318	0.05454	-0.77688***	0.05548	0.00155
	(0.15650)	(1.84930)	(0.18713)	(0.20320)	(0.06721)	(0.00318)
OHTA	-0.06841	-0.00428	0.30164*	-19.54174	10.32968**	0.26350
	(0.14900)	(1.71297)	(0.17816)	(13.03623)	(4.19162)	(0.19854)
NPLPTA	-0.01626	-0.39535	1.46279***	-28.95293***	12.44620***	-0.12835
	(0.17323)	(1.99159)	(0.20714)	(7.49239)	(2.49724)	(0.11829)
EQTA	-0.00050	0.03609	0.00344	-0.00974	0.00069	0.00004
	(0.00209)	(0.02406)	(0.00250)	(0.01318)	(0.00531)	(0.00025)
OFBSTA	0.88532	7.10008	-3.62704*	-1.31224	0.41721	0.01750
	(1.66980)	(19.23545)	(1.99664)	(2.31064)	(0.79911)	(0.03785)
CIR	-0.01527***	-0.13198***	-0.01412***	-0.01069	-0.00157	-0.00016
	(0.00151)	(0.01738)	(0.00181)	(0.00650)	(0.00223)	(0.00011)
NETLOANDEPOSSTFUN	-0.00822*	-0.11615**	0.01057*	-0.01077*	-0.00061	-0.00013
	(0.00454)	(0.05302)	(0.00543)	(0.00597)	(0.00206)	(0.00010)
Constant	6.77249***	29.62658*	6.49378***	9.44261***	-0.96790	-0.01114
	(1.42409)	(16.77456)	(1.70284)	(2.17369)	(0.74081)	(0.03509)
Observations	798	787	798	589	523	523
R-squared	0.14393	0.08392	0.18637	0.06932	0.07336	0.01303
Number of bank	109	109	109	83	68	68
Time FE	YES	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES

This table reports result from a fixed effects estimation which is adopted from a Housman test. The study is applied to both conventional and Islamic banks to determine what drive bank performance in the two banking industries we control only for bank specific characteristics. Our full sample includes the period of 2006-2015 with 61 conventional banks and 48 Islamic bank. Dependent variables a respectively return on average Assets (ROAA), return on average equity (ROAE), Net interest margin, Sharpe ratio, Treynor ratio and Jensen ratio. Statistically significant coefficients at the 1%, 5ù and 10% level have ***, **, * symbols respectively.

With respect to the GDP growth, our study suggests both positive and negative link with bank performance. Mirzaei et al.(2013)document that GDP growth influences bank performance through raising demand for loans. Bashir (2003) who evaluated the determinants of profitability in Middle East Islamic Banks, found a strong positive impact of GDP growth on profitability because of competition environment and innovative products channels. Goddard, John, Phi, & Wilson (2004)also estimated the profitability of 583 European Union domestic banks where cross sectional regression showed a significant positive effect of GDP on profits. Ghazali (2008) considered a six years data of 60 Islamic banks operating in 18 countries. Results ascertain that GDP and inflation positively influence the revenue of banks. On the other hand, negative links have also been reported by Naceur (2003) who found an insignificant link between Tunisian bank profitability and the annual growth rate and inflation.

Table 0-2 : Fixed Effects Macroeconomic control variables

		(2)	(3)	(4)	(5)	(6)
	Model7	Model8	Model9	Model10	Model11	Model12
VARIABLES	ROAA	ROAE	NIM	Sharpe ratio	treynor ratio	Jensen ratio
log_SIZE	-0.10906	1.47101	0.47996**	-0.85208***	-0.00004	0.00424
	(0.20567)	(2.45310)	(0.24052)	(0.25924)	(0.04216)	(0.00430)
OHTA	-0.29206	0.38918	-0.47189*	-15.51244	-1.60953	0.36188
	(0.23138)	(2.67488)	(0.27058)	(14.54841)	(2.31525)	(0.23610)
NPLPTA	0.33741	-0.84899	2.64728***	-8.87117	0.77584	-0.03244
	(0.29642)	(3.42677)	(0.34665)	(9.29355)	(1.49676)	(0.15263)
EQTA	-0.00055	0.02324	0.00498	-0.01364	-0.00008	0.00007
	(0.00260)	(0.03008)	(0.00304)	(0.01704)	(0.00402)	(0.00041)
OFBSTA	2.28039	5.08655	-6.42455***	1.07491	0.65618	0.02586
	(2.11322)	(24.49993)	(2.47131)	(2.77084)	(0.45488)	(0.04639)
CIR	-0.01780***	-0.14708***	-0.01894***	-0.00723	0.00111	-0.00013
	(0.00181)	(0.02087)	(0.00211)	(0.00714)	(0.00119)	(0.00012)
NETLOANDEPOSSTFUN	-0.01281**	-0.16267**	0.00286	-0.01441**	-0.00081	-0.00015
	(0.00547)	(0.06453)	(0.00640)	(0.00672)	(0.00113)	(0.00011)
Boone indicator	-3.96684***	-67.74187***	-0.37129	-3.74039***	-0.03717	-0.01190
	(0.91943)	(10.63103)	(1.07523)	(0.97631)	(0.15486)	(0.01579)
GROWTHRATE	0.06130***	0.27543	-0.01415	-0.01146	0.00407	-0.00026
	(0.02039)	(0.23784)	(0.02385)	(0.02138)	(0.00341)	(0.00035)
INFLATION	0.01407	0.14281	0.03779*	-0.06220***	0.00315	0.00019
	(0.01662)	(0.19530)	(0.01943)	(0.01801)	(0.00300)	(0.00031)
Constant	3.61641*	14.23935	5.45403**	9.15325***	-0.28947	-0.04306
	(1.89624)	(22.54415)	(2.21756)	(2.69419)	(0.45250)	(0.04614)
Observations	610	599	610	473	437	437
R-squared	0.22636	0.17342	0.28780	0.10388	0.01779	0.01813
Number of bank	93	93	93	77	66	66
Bank FE	YES	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES

This table reports result from a fixed effects estimation which is adopted from a Housman test. The study is applied to both conventional and Islamic banks to determine what drive bank performance in the two banking industries we control both for bank-specific and macroeconomics variables. Our full sample include the period of 2006-2015 with 61 conventional banks and 48 Islamic bank. Dependent variables a respectively return on average Assets (ROAA), return on average equity (ROAE), Net interest margin, Sharpe ratio, Treynor ratio and Jensen ratio.. Statistically significant coefficients at the 1%, 5ù and 10% level have ***, **,* symbols respectively.

In a short term perspective, inflation is an important factor to growth rebound. However, this link appears to be positive when the performance is measured by Sharpe ratio. The explanation behind this may be drawn from speculative and anticipative investors' behaviour on the financial market. The positive link between inflation and performance is documented by Albertazzi & Gambacorta (2009 ; 2010).

To address the issue of endogeneity and omitted variables bias, we follow(Dietrich & Wanzenried, 2011; Liang et al., 2013; Pelster, 2017) and use the Arellano & Bover (1995) and Blundell & Bond (1998)two-step system GMM that uses lagged values of dependent variable in level and difference as well as lagged values of explanatory variables in level.

Table 0-3: System GMM estimation of bank performance

Performance measures	(1)	(1)	(1)	(1)	(1)	GMM6
VARIABLES	ROAA	ROAE	NIM	Sharpe ratio	treynor ratio	Jensen ratio
Lagged value of Dependent variables	0.72682***	0.37403***	0.96273***	0.05304	0.14868*	0.10717*
	(0.12499)	(0.08584)	(0.14763)	(0.08231)	(0.06524)	(0.05269)
log_SIZE	0.20209*	0.02981	-0.09522	-0.02013	-0.02222	0.00074
	(0.09942)	(0.55092)	(0.08869)	(0.08235)	(0.02684)	(0.00056)
OHTA	-0.08258	-1.17381*	0.03960	-6.44100	4.10182	0.06059
	(0.05644)	(0.52961)	(0.14355)	(9.43180)	(4.97493)	(0.07630)
NPLPTA	0.33288*	1.64035***	2.18627***	-29.42034*	17.29460	-0.11968
	(0.14028)	(0.56829)	(0.66532)	(11.51991)	(13.36598)	(0.14918)
EQTA	0.01138***	0.02005*	-0.00183	-0.00954*	-0.00094	0.00001
	(0.00405)	(0.01052)	(0.00239)	(0.00535)	(0.00111)	(0.00006)
OFBSTA	1.62549	19.07552	-12.02938***	0.58162	-0.22980	0.01477
	(1.42895)	(13.63010)	(3.98560)	(3.29692)	(0.70667)	(0.01901)
CIR	0.00926*	-0.04258***	-0.00168	0.00612	0.00037	-0.00006
	(0.00476)	(0.01504)	(0.00290)	(0.00863)	(0.00317)	(0.00009)
NETLOANDEPOSSTFUN	-0.01279*	-0.12515***	0.01292	-0.00733	-0.00036	0.00001
	(0.00661)	(0.04752)	(0.00881)	(0.00553)	(0.00140)	(0.00004)
dummy==Islamic	-0.42963	1.34347	-4.84610***	-0.05606	0.04450	-0.00841
	(0.53646)	(5.48351)	(1.82303)	(1.35784)	(0.26884)	(0.00811)
Constant	0.00000	0.00000	7.09393*	0.00000	0.00000	0.00000
	(0.00000)	(0.00000)	(3.03442)	(0.00000)	(0.00000)	(0.00000)
						462
Observations	705	694	706	522	462	67
Number of bank	107	107	107	80	67	YES
Hansen test	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)	(1.000)
Arellano-Bond AR(1) test (p-value)	(0.001)	(0.01)	(0.0167)	(0.001)	(0.007)	(0.003)
Arellano-Bond AR(2) test (p-value)	(0.0453)	(0.771)	(0.307)	(0.259)	(0.232)	(0.857)

This table reports result obtained from a system GMM approach of the determinants of bank performance both conventional and Islamic banks. Depend variables a respectively return on average Assets (ROAA), return on average equity (ROAE), Net interest margin, Sharpe ratio, Treynor ratio and Jensen ratio. We follow Arellano & Bover (1995) to estimate our coefficients given the endogenous nature of bank performance determinants. Statistically significant coefficients at the 1%, 5ù and 10% level have ***, **,* symbols respectively. Standard errors are reported between brackets. Over-identification test is constructed from Hansen and Arellano Bond test of autocorrelation is represented by autoregressive process respectively AR(1) and AR(2)

Results reported in Table 4.4 suggest that, our model fit the system GMM estimator. In fact, Hansen-J statistics of over-identifying restrictions and Arellano-Bond second order autocorrelation tests are not statistically significant. The first-order auto-correlation on the other hand appears to be statistically significant which is true by construction. All in all, after we have controlled for heterogeneity, dynamic endogeneity and simultaneity, non-performing loan loss provision, equity to total asset, cost-to-income ratio appear to have a significant impact on both conventional banks and Islamic banks performance.

This study also confirms the persistence nature of bank performance during our study period. Except, Sharpe ratio, all the first-order lagged values of our performance measures are statistically significant. These results are consistent with those of Dietrich & Wanzenried, (2011); Guidara, Lai, Soumaré, & Tchana, (2013); Liang et al., (2013); Pelster, (2017).

We have to stress that the use of stock performance measures as proxies of bank performance, especially the Treynor ratio and Jensen did provide evidence that risk-adjusted performance can provide management style for bankers.

4 Conclusion

The main objective of this study was to determine what drives the performance of Islamic vs conventional banks using both classical measures (ROAA, ROAE, and NIM) as well as stock market risk-adjusted measures. A sample comprising respectively 48 Islamic and 61 conventional publicly traded banks during the period stretching 2006 to 2015 is employed in our analysis. To test how Islamic banks' performance differs from conventional banks', we employ a two-step system GMM estimator which allows controlling for endogeneity and unobserved variables bias.

Our findings reveal that bank performance is mainly driven by non-performing loan provision, cost to income ratio, and size, net loan to total asset. Within a dynamic panel framework NPLP has a negative impact on BCs performance whereas it affects positively IBs performance. This is consistent with Beck et al. (2013) who suggest that IBs have higher asset quality than conventional banks. This study also contradicts the idea that IBs are less cost-efficient than CBs because the cost to income ratio as a measure of efficiency is more significant for IBs than CBs.

Controlling for macroeconomic variables within a fixed effect approach, this study is consistent with the Structure-Conduct performance hypothesis that suggests a positive link between market concentration and bank performance. Measured by Boone indicator, competition as the opposite of market concentration affects negatively both IBs and CBs.

This study also confirms the persistence nature of bank performance during our study period. Except, Sharpe ratio, all the first-order lagged values of our performance measures are statistically significant.

Our study has provided evidence that bank performance could be measured both by JENSEN and Treynor ratios.
The conclusion from this study is related to our sample and would have been different in some other specific cases. For instance, a longer study period or/and a larger sample could have led to different conclusion as the sample size and heterogeneity would impact the consistency of our results. Moreover, accounting for regulatory differences, constructing a single index for each category of banks would affect our results.

5 References

Albertazzi, U., & Gambacorta, L. (2009). Bank profitability and the business cycle. *Journal of Financial Stability*, *5*, 393–409.

Albertazzi, U., & Gambacorta, L. (2010). Bank profitability and taxation. *Journal of Banking and Finance*, *34*(11), 2801–2810.

Arellano, M.; Bond, S. (1991). Some Tests of Specification for Panel Carlo Application to Data : Evidence and an Employment Equations. *Review of Economic Studies*, *58*(2), 277–297.

Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics*, *68*(August 1990), 29–51.

Athanasoglou, P. P., Brissimis, S. N., & Delis, M. D. (2008). Bank-Specific, Industry- Specific and Macroeconomic Determinants of Bank Profitability. *Journal of International Financial Markets, Institutions and Money, 18*(2), 121–136.

Beck, T., Cull, R., & Jerome, A. (2005). Bank privatization and performance : Empirical evidence from Nigeria q. *Journal of Banking and Finance*, *29*, 2355–2379.

Beck, T., Demirgüç-kunt, A., & Merrouche, O. (2013). Islamic vs . conventional banking : Business model , efficiency and stability. *Journal of Banking and Finance*, *37*(2), 433–447.

Berger, A. N. (1995). The Relationship between Capital and Earnings in Banking pp . *Journal of Money, Credit and Banking*, *27*(2), 432–456.

Berger, A. N., Bonime, S. D., Covitz, D. M., & Hancock, D. (2000). Why are bank profits are so persistent ? The roles of product market competition , informational opacity , and regional / macroeconomic shocks q. *Journal of Banking & Finance*, *24*, 1203–1235.

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, *87*(115–143).

Bonin, J. P., & Wachtel, P. (2005). Bank performance , efficiency and ownership in transition countries, *29*, 31–53.

Boubakri, N., Cosset, J., & Fischer, K. (205AD). Privatization and bank performance in developing countries. *Journal of Banking and Finance*, *29*(2005), 2015–2041.

Bourkhis, K., & Sami, M. (2013). Review of Financial Economics Islamic and conventional banks â€™ soundness during the 2007 – 2008 financial crisis . *Review of Financial Economics*, *22*(2), 68–77.

Bremus, F. M. (2015). Cross-border banking , bank market structures and market power : Theory and cross-country evidence. *Journal Of Banking Finance*, *50*, 242–259.

Claessens, S. (2001). How does foreign entry a ect domestic banking markets ? q, *25*.

Demirguc-Kunt, A., Huizinga, H. (1999). Determinants of Commercial Bank Interest Margins and Profitability : Some International Evidence. *World Bank Economic Review*, *13*(2), 379–408.

Demirguc-Kunt, A., Huizinga, H. (2000). Financial Sructure and Bnak profitability. *World Bank Economic Review*.

Dietrich, A., & Wanzenried, G. (2011). Determinants of bank profitability before and during the crisis: Evidence from Switzerland. *Journal of International Financial Markets, Institutions and Money*, *21*(3), 307–327.

Gambin, L. (2004). Gender Differences in the Effect of Health on Wages in Britain.

García-herrero, A., Gavilá, S., & Santabárbara, D. (2009). What explains the low profitability of Chinese banks ? *Journal of Banking and Finance*, *33*(11), 2080–2092.

García-meca, E., García-sánchez, I., & Martínez-ferrero, J. (2015). Board diversity and its effects on bank performance : An international analysis. *Journal of Banking and Finance*, *53*, 202–214.

Goddard, John, Phi, l M., & Wilson, J. O. . (2004). Dynamics of Growth and Profitability in Banking. *Journal of Money, Credit and Banking*, *36*(6), 1069–1090.

Gropper, D. M., Jahera, J. S., & Chul, J. (2015). Political power , economic freedom and Congress : Effects on bank performance q. *Journal of Banking and Finance*, *60*, 76–92.

Guidara, A., Lai, V. S., Soumaré, I., & Tchana, F. (2013). Banks ' capital buffer , risk and performance in the Canadian banking system : Impact of business cycles and regulatory changes. *Journal of Banking and Finance*, *37*(9), 3373–3387.

Jensen, M. C. (1968). The performance of mutual funds in the period 1945-1964. *The Journal of Finance*, *23*, 389–416.

Liang, Q., Xu, P., & Jiraporn, P. (2013). Board characteristics and Chinese bank performance. *Journal of Banking and Finance*, *37*(8), 2953–2968.
Martin, Č., & Hesse, H. (2010). Islamic Banks and Financial Stability : An Empirical Analysis, 95–113.

Mirzaei, A., Moore, T., & Liu, G. (2013). Does market structure matter on banks ' profitability and stability ? Emerging vs . advanced economies. *Journal of Banking and Finance*, *37*(8), 2920–2937.

Mollah, S., & Zaman, M. (2015). Shari ' ah supervision , corporate governance and performance : Conventional vs . Islamic banks. *Journal of Banking Finance*, *58*, 418–435.

Olson, D., & Zoubi, T. (2016). Convergence in bank performance for commercial and Islamic banks during and after the Global Financial Crisis. *Quarterly Review of Economics and Finance*. http://doi.org/10.1016/j.qref.2016.06.013

Pathan, S., & Faff, R. (2013). Does board structure in banks really affect their performance ? *Journal of Banking and Finance*, *37*(5), 1573–1589.

Pelster, M. (2017). Financial penalties and bank performance. *Journal of Banking and Finance*.
Sharpe, W. F. (1964). A Theory of Market Equilibrium under Conditions of Risk. *The Journal of Finance*, *19*(3), 425–442.

Comparing the Brand Personality of Nike in Slovakia and Czech Republic

Lucia Vilčeková, Faculty of Management, Comenius University in Bratislava, Odbojárov 10, 82005 Bratislava, Slovakia, lucia.vilcekova@fm.uniba.sk

Abstract

The concept of brand personality originated in human psychology. Because of the differences in personalities within cultures, there has been a need to examine the brand personality construct from an international perspective. The purpose of this study is to evaluate the personality of the brand Nike and to examine the differences between Slovak and Czech consumer perception. An online survey with a sample of 500 Slovak and Czech consumers was carried out with the main goal to describe Nike as a person, characterize the friends of the brand and suggest hobbies of the brand. In general, Slovaks see the brand as an active man, a winner and a sportsman. His hobbies are all kinds of sports, and fashion and he is very health-conscious. His friends are also very active, attractive and young. Slight differences were found when comparing the Slovak and Czech perception. The cultural differences result in differences of perception and attitude regarding brands. Therefore, it is beneficial to examine the global brands in national contexts.

Keywords: Nike, brand personality, Slovak consumers, Czech consumers.

Introduction

Brand personality is defined as "the set of human characteristics associated with a brand"(Aaker, 1997). To describe a brand any human feature can be used. The associations might be linked to certain demographic features (such as age, or gender), beliefs, hobbies, and personality traits (Rojas-Méndez, Erenchun-Podlech and Silva-Olave, 2004). This concept works because consumers often describe the brands with help of human personality traits.

By assuming the brand as a person, it can create a self-expressive benefit that becomes a vehicle for the customer to express his or her own personality (Aaker, 1997). Kotler and Keller (2016) confirmed customer usually choose the brands which match their self-image or sometimes consumers choose a brand based on their ideal self-image or social self-image.

Literature Review

Since brands, like persons, are usually described with adjectives, the psychological approach seems to be a good method for identifying the main characteristics of brands' personalities in the perception of consumers, and to select the best adjectives for conveying certain characteristics (Caprara, Barbaranelli and Guido, 2001). Consumers can easily view a brand as having a friendly or exciting personality or as a person with whom they may choose to have a relationship (Blackston, 2000).

In the field of marketing and consumer behavior understanding and measuring brand personality is very important because brand personality can be used as one of the means of communication to increase consumer preferences. It can differentiate the brand within a product category, (Aaker, 1997; Biel, 1992).

Consumers can make attributions about the brand's personality, "inner character", goals and values. In some marketing strategies, the brand is actually made to be "alive" and action-oriented (Aaker, Fournier,

1995). Fournier adds brand personality has an impact on various key variables, such as attitude, preference, usage imagery, and emotion (Fournier, 1998).

According to Khani et al, (2013) brand personality comes from three main sources:

- the relationship that customers have with the brand;
- the image which is a company trying to present;
- the unique features of product.

Aaker (1997) used methods similar to human psychology to identify five brand personality dimensions: sincerity, excitement, competence, sophistication and ruggedness. Further researches suggested different traits, e.g. Levy and Rook (1999) divided brand personality into five dimensions, which are excitement, competence, peacefulness, sincerity, and sophistication. In the Japanese context there was no Ruggedness dimension as in the American study, and another dimension – Peacefulness, was identified as a very strong trait. In Spain, in addition to the Sincerity, Excitement and Sophistication dimensions (that also existed in the USA and Japan), Peacefulness (found in Japan but not in the USA) and Passion (not found in the other two countries) were identified. In Brazil, the dimensions of brand personality were Credibility, Joy, Audacity, Sophistication and Sensitivity (Muniz, Marchetti, 2012).

Because of the differences in personalities within cultures, there has been a need to examine the brand personality construct from an international perspective.

Material and Methods

The goal of the research was to examine the personality of the Brand Nivea in Slovak and Czech consumers. The participants were evenly distributed 500 Slovak and Czech subjects. Average age was 26 years with standard deviation of 5.17. They were chosen on principles of convenience sampling and the participants have been selected from available population.

Respondents were presented a questionnaire. First, they were asked if they know the brand and only those reported knowing it were considered for the study. Then they were asked to imagine Nike was a person. “What kind of person it would be?”, “Who would be Nike friends with?”, “What kind of hobby it would have?”, “Would it be male or a female?” – These were the questions to describe the brand personality.

To visualize the results from the open-ended questions, word cloud Tagxedo was used.

Research results

The personality of Nike is very much related to the product that the company sells (active and athletic) as well as the characteristic of athletes (competitive) and of a heroic person (determined and focused). According to Mark & Pearson, Nike is perceived as a hero, the one who triumphs, gets through challenges and, in doing so, is an inspiration to all of us, it is a warrior and a leader. Nike’s personality is athletic. The company is positioned as providing the best athletic gear to all athletes no matter what sport. They have successful products in every major sport around the world. The brand created a personality of being a cool, successful and athletic.

According to Slovak consumers, concerning the demographics of Nike’s personality, 70 percent of Slovaks see it as a man and for 30 percent it is a woman. The average age is 33 years, ranging from 16 to 80 with a standard deviation of 11.

As a person, Nike is seen as (see Fig. 1) an athlete who is strong, fit, energetic and determined. Other qualities of the brand are kindness, openness, and confidence. It is also described as winner, friendly, adventurous, competitive, dynamic and clever. Furthermore, this brand is perceived as well as fast, stylish, tireless, flexible, modern, sporty and brave. The strongest associations are connected with sports, activity and energy, but also with fashion and style. All of the traits were positive, Slovak consumers do not associate Nike with any negative feature.



Fig. 1: Personality of Nike according to Slovak consumers

To a question "What kind of people would Nike hang out if it was a person", most of Slovaks answered it would be sportsmen and athletes. Young, active and attractive people would be friends of the brand. Funny, energetic, outgoing, extroverted, successful, easy-going, fit and smart. These are the qualities of potential friends of Nike. They copy the personality of the brand as an active, outgoing athlete who is enjoying life.

To get a complex view of the brand, Slovak respondents were asked to describe what kind of hobbies the brand Nike would have if it were a person. The most frequent answer was doing sports and healthy lifestyle. Nike is connected to a lot of sporting activities like hockey, climbing, running, yoga, fitness, tennis, basketball, and indoor sports, cross fit, hiking and athletics. Other hobbies would be traveling, fashion, hanging out with friends, going to parties, long walks in the nature and relaxing. We can conclude, Nike is a very active brand and also a brand that is modern, trendy and fashionable.

Czech consumers see Nike as a man in his 30ties. They describe the brand (see Fig. 2) as determined, athletic, active, energetic and strong. Other features of the brand are kindness, ambition, independence and friendliness. The man Nike is also very social, competitive, driven and smart. For some Czechs it depicts a hardworking, fashionable and proud man. He can also be described as a restless, brave leader. Almost all of the features connected to the brand were positive. The only two negative attributes were selfishness and arrogance, but they were only mentioned by less than 3 percent of the respondents.


athletic
AMBITIOUS
DETERMINED
ACTIVE
SOCIAL
KIND
PROUD
energetic
CHEERFUL
creative
strong
smart
COMPETITIVE
SPORTY
ORIENTED
DRIVEN
Self
FASHION
FLEXIBLE
STUBBORN
hardworking
adventurous
fast
nice
TEAM
ENTERTAINER
FIT
HEALTHY
caring
TIRELESS
PLAYER
people
family
AGILE
COOL
FRIENDLY
independent
taking
joyful
restless
BRIGHT
leader
HEALTH
HELPFUL
SOUL
ARROGANT
crazy
FRESH
initiative
PURPOSEFUL
ATHLETIC
LIFESTYLE
FIGHTER
relaxed
SUCCESSFUL
ENTHUSIASTIC
POSITIVE
PATIENT
CALM
RICH
HONEST
CURIOUS
BRAVE
TALL
sense
Spirit
SELFISH
OPEN
STRAIGHTFORWARD
determined
CREATIVE
EXTROVERTED
CONFIDENT
BEAUTIFUL
GOING
BUSINESSMAN
ATTRACTIVE
PERFECT
ACTIVE
free
charming
ENERGETIC
PERSONALITY
CONFIDENT
ENERGETIC
SMART
COOL
ATHLETIC
BEAUTIFUL
AGILE
FUNNY
easy
DYNAMIC
SEXY
KIND
SPORTY
competitive
driven
introverted
HAPPY
JOYFUL
STRONG
ORIENTED
SOCIAL
LEADER
HEALTH
HELPFUL
ATTRACTIVE
ASSERTIVE
PERSONALITY
RICH
ENERGETIC
SMART
BEAUTIFUL
AGILE
BUSINESSMAN
GOING
PURPOSEFUL
ATHLETIC
FLEXIBLE
FRESH
STUBBORN
DYNAMIC
easy
FUNNY
BRIGHT
leader
HEALTH
SOUL
ARROGANT
crazy

Slovak consumers see Nike as a young, active man who is interested in sports, fashion and is living a healthy lifestyle. He is smart, outgoing and a natural winner. He would spend his time with young, attractive people who love sports. Czech consumers see Nike as determined, active and kind. It is a man in his thirties and likes to who practice various kinds of sports.

Nike is unique in the fact that the company has a broad target market. They target athletes, both professionals and non-professional. However, they don't focus on a specific age range. Nike has appeal to athletes from adolescence, to adulthood, to parenthood. Anyone who strives to be an athlete can be seen wearing Nike. This identity is reflected in the personality of the brand.

The overall personality of the brand is very similar in both Czech and Slovak consumers. According to both, Nike is positive, young, active and dynamic. It is in accordance with the overall image of the brand communicated worldwide no major differences in brand image and brand perception were found.

It is important to realize if the concept of human personality is applied to marketing, the principles of different cultures and different perception apply to humans as well as to brands. The cultural differences result in differences of perception and attitude regarding brands. Therefore it is beneficial to examine the global brands in national contexts.

Both researchers and practitioners have given considerable attention to brand personality because it is clear that perceptions associated with a brand go beyond functional attributes and benefits of a product. Brand personality can diverse the brand from other brands since brand has its own individual character. Having a favorable and unique brand personality, which creates positive brand equity, is important because it is a basis for competitive advantage and can even generate revenue for a company.

References

Aaker, J. (1997) 'Dimension of brand personality,' *Journal of Marketing Research*, 34 (3), 347–356.

Aaker, J.and Fournier, S. (1995) 'A brand as a character, a partner and a person: three perspectives on the question of brand personality,' *Advances in Consumer Research,* 22 (4), 392-401.

Biel, A.L. (1992) 'How brand image drives brand equity,' *Journal of Advertising Research*, 32 (6), 6–12.

Blackston, M. (2000), 'Observations: Building brand equity by managing the brand's relationships,' *Journal of Advertising Research*, 40 (6), 101-112.

Caprara, G. V., Barbaranelli, C. and Guido, G. (2001) 'Brand personality: How to make the metaphor fit?,' *Journal of economic psychology*, 22 (3), 377-395.

Eliasson, N. and Alftén, J. (2016) "Would you buy it?" What triggers ethical consumption, based on personality archetypes, [Online]. [10 Spet. 2017]. Available: http://www.diva-portal.org/smash/get/diva2:931738/FULLTEXT01.pdf

Foret, M. and Procházka, P. (2007) 'Buying behaviour of households in the Czech Republic,' *Agricultural Economics–Czech*, 53 (7), 318-324.

Fournier, S. (1998) 'Consumers and their brands: Developing relationship theory in consumer research, 'The *Journal of Consumer Research*, 4 (4), 344-349.

Haddad, L., Hamza, K. and Xara-Brasil, D. (2015) 'Archetypes and brand image: an international comparison, 'Australian *Journal of Basic and Applied Sciences*, 9 (34), 27-34.

Khani, S. et al. (2013 'The Relationship of Appliance Consumer Personality Trait, Brand Personality, Brand Loyalty and Brand Equity in the Mobile Phone Industry,' *International Journal of Fundamental Psychology & Social Sciences*, 3 (4), 63-71.

Kotler, P. and Keller, K. L. (2016) Marketing Management, 15th Edition, Pearson India, Uttar Pradesh.

Levy, S. and Rook, W. (1999) Brands, Consumers, Symbols and Research, Sidney, Sage Publications.

Lizbetinova, L., Weberova, D. and Starchon, P. (2016) 'The Importance and Influence of Country-of-Origin on Consumer Brand Perception,' Proceedings of Vision 2020: innovation management, development sustainability, and competitive economic growth, 1710-1722.

Majerčáková, D. and Kočišová, L. (2016) 'Impact investing - opportunity for creative investment,' Proceedings of 16th International Scientific Conference on Economic and Social Development - The Legal Challenges of Modern World Location: Split, Croatia, Sep. 01-02 2016 , 452-458.

Mengxia, Z. (2007) 'Impact of brand personality on PALI: a comparative research between two different brands,' *International Management Review*, 3 (3), 35-42.

Muniz, K. M. and Marchetti, R. Z. (2012) 'Brand personality dimensions in the Brazilian context,' *Brazilian Administration Review*, 9 (2), 180-187.

Olšavský, F. (2016) Ethnocentrism of Slovak and Czech consumers - Generation Approach, Proceedings of the Vision 2020 conference on Innovation Management, Development, Sustainability and Competitive Economic growth, Bratislava, Slovakia, 3458-3466.

Rojas-Méndez, J. I., Erenchun-Podlech, I., and Silva-Olave, E. (2004) 'The Ford Brand Personality in Chile,' *Corporate Reputation Review*, 7 (3), 232-251.

Sulikova, R. and Strazovska, L. (2016) Women in Management. Proceedings of the 16th International Scientific Conference on Globalization and its Socio-Economic Consequences. Steyer, Austria, 2167-2173.

Thangaraj, J. (2004) 'Fascinating fonts; is the power of typography a marketing myth, 'Style *DeKalb IL*, 2 (1), 35-42.

Vilčeková, L. (2014) 'Slovak Consumers' Attitudes toward Foreign versus Domestic Brands. 'Journal *of Marketing Management*, 2 (1), 33-42.

Wanninayake, W. M. C. B. (2014) 'Consumer decision-making styles and local brand biasness: Exploration in the Czech Republic,' *Journal of Competitiveness*, 6(1), 36-41.

Stylized Facts About The Mortgage Market In The Czech Republic: A Cross-Correlation Approach

Ing. Mgr. Vlastimil Reichel, Masaryk University, Brno, Czech Republic, reichel.v@mail.muni.cz

Bc. Jana Gajdošová, Masaryk University, Brno, Czech Republic, 418267@mail.muni.cz

Abstract

This paper investigates a relationship between central bank interest rate (PRIBOR3M) and housing (mortgage) cycles in the Czech economy. The aim is to determine whether central bank's interest rate is leading indicator for monitoring housing cycles. To assess the crucial role of interest rate in the set of mortgage interest rates is used methodology of leading indicator applied by OECD. Moreover, the cross-correlation approach identifies the relationship between quarterly interest rate and the following individual variables: house price index, average mortgage interest rate, average fixed 1, 3 and 5 year mortgage interest rates, number of new mortgages, volume of new mortgages, average mortgage amount and mortgage installment. The data set covers a period between 2006:Q1 and 2016:Q3. The results of the paper will be used for later research and modelling of the housing sector in the Czech economy.

Keywords: house prices, business cycles, cross-correlation approach

Introduction

As housing sector still plays a significant role in the functioning of the Czech economy. For this reason, it is in the interest of the monetary authority to control and supervise the sector as an important part of the economy (Brůha and Polansky, 2014). One of the tools to influence the mortgage market is the interbank interest rate. This process begins with the operations on the open market by setting the interbank interest rates. From there, the transfer can take place through many channels, which is described by Mischkin (2007) or Michelva and Sebastian (2010).

We will focus on the relationship between the interbank interest rate and the variables describing the real estate market. The relationship is depicted on Figure 1. The solid lines show connections to be verified, the dashed lines display these, which are not subject of our examination. The plus sign means that pro-cyclic behavior of the time series is expected, the sign minus means that counter-cyclical behaviour of the time series is expected. If we assume that mortgage banks set their mortgage rate according to the central bank's rates then the behavior of mortgage interest rates should be pro-cyclical and delayed. Following the delay in response to mortgage interest rates, the average mortgage amount and mortgage installment should also be delayed. Because they both depend negatively on the mortgage rate, we assume the counter-cyclical relationship of the variables. Therefore, we expect the relationship between the interbank interest rate and the average mortgage amount and the mortgage installment to be delayed and counter-cyclical. The relationship between mortgage interest rates and the number of new mortgages or volume of new mortgages can be considered negative. The rise in mortgage interest rates affects the economic agents who borrow less and decrease the number and volume of new mortgages. This has an impact on the demand for real estate, which decreases and reduces the price of real estate (Iacoviello, 2000 or Hloušek, 2016).

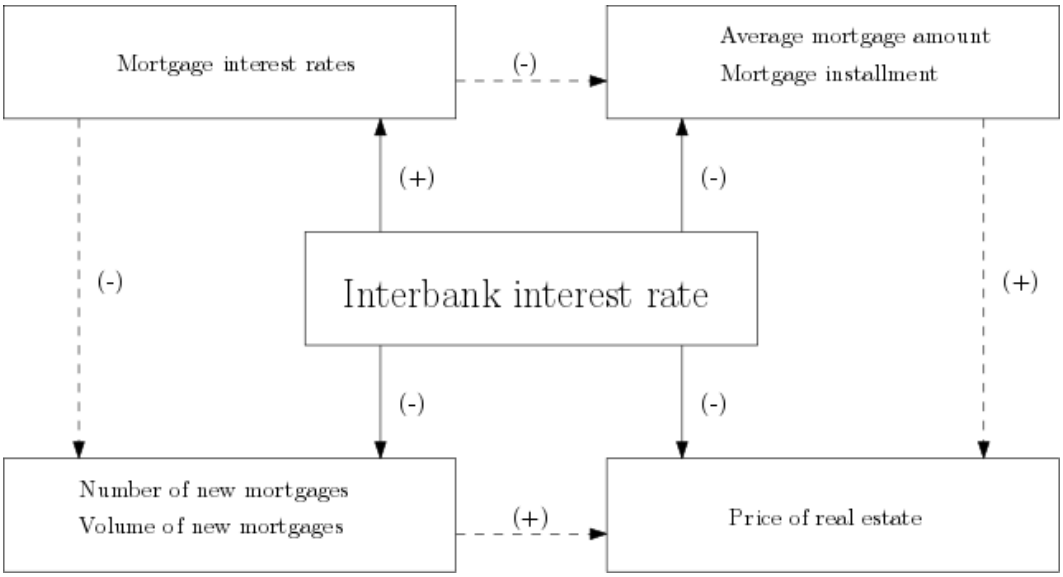


Figure 1: Relationships description

Methodology

The research briefly follows the OECD (2004) methodology of composite leading indicator (CLI) for monitoring and predicting business cycles. The methodology is composed of three steps (i) collection and preparation of data set, (ii) the peak analyses and (iii) a cross-correlation calculating. The same algorithm was used in the work Reichel (2016).

Data

The following variables were used in the research of monetary influence on the housing sector: house price HP, interbank interest rate PR_{3m}, average mortgage interest rate R_m, average fixed 1 year mortgage interest rate R_{1m}, average fixed 3 year mortgage interest rate R_{3m}, average fixed 5 year mortgage interest rate R_{5m}, number of new mortgages NN, volume of new mortgages VN, average mortgage amount (mil) AM, mortgage installment (1 million CZK for 20 years) Mi.

The data set was obtained from the Czech Statistical Office, the Czech National Bank and financial hypoindex databases (FH) and cover period 2006:Q1 – 2016:Q3. Time series with a monthly period were transformed into series with a quarterly period. The seasonally adjusted quarterly time series were all in logarithms, except for mortgage interest rates and interbank interest rate. Hodrick Prescott filter was used (with lambda=1600, see Hodrick and Prescott, 1981) to obtain the cyclical component of the variables. More detailed description is quoted in Table 1.

Table 1: Time series description

Time series		Data source	Frequency
Interbank interest rate PRIBOR3M	PR_{3m}	CNB	quarterly
average mortgage interest rate	R_m	FH, CNB	quarterly
average fixed 1 year mortgage interest rate	R_{1m}	FH, CNB	quarterly
average fixed 3 year mortgage interest rate	R_{3m}	FH, CNB	quarterly
average fixed 5 year mortgage interest rate	R_{5m}	FH, CNB	quarterly
number of new mortgages	NN	FH	monthly
volume of new mortgages (mil)	VN	FH	monthly
average mortgage amount (mil)	AM	FH	monthly
mortgage installment (1 million CZK for 20 years)	Mi	FH	monthly
Offering price of flats	HP	CZSO	quarterly

Source: Czech National Bank (CNB), Czech statistical office (CZSO), Fincentrum Hypoindex (FH)

The peak analysis

Peak analysis is based on identifying the location of the global maximum and global minimum values in each time series and their comparison with a selected variable. Following section presents (i) global maximum of the time series and delay between global maximum of central bank interest rate and others variables, (ii) first global minimum of time series after this maximum and delay between global minimum of central bank interest rate and other variables and (iii) length of time period between maximum and minimum.

The Cross-Correlation Approach

The cross-correlation approach is a method of estimating the degree to which two series are correlated. The theory and algorithm were adopted from Paul Bourke (1996). We consider two series x_i and y_i where $i = 0,1,2 \ldots N-1$. In our case x_i is the vector of all variables mentioned above and y_i is interbank interest rate (PRIBOR 3M). The cross correlation $r(d)$ at delay d is defined as

$$r(d) = \frac{\sum_i [(x_i - \bar{x}) * (y_{i-d} - \bar{y})]}{\sqrt{\sum_i (x_i - \bar{x})^2} * \sqrt{\sum_i (y_{i-d} - \bar{y})^2}},$$

where $\bar{x}$ and $\bar{y}$ are the means of the corresponding series. If the above is computed for all delays $d = 0,1,2, \ldots N-1$ then it results in a cross correlation series of twice the length of the original series. The range of delays d and thus the length of the cross correlation series can be less than N, for example the aim may be to test correlation at short delays only. The denominator in the expression above serves to normalise the correlation coefficients such that $-1 \leq r(d) \leq 1$, where the bounds indicate maximum correlation and 0 indicates no correlation. A high negative correlation indicates a high correlation but of the inverse of one of the series.

Results

Table 1 presents leading and lagging variables. For maximal peak of PR_{3m} are lagging variables $R_m(6)$, $R_{1m}(5)$, $R_{3m}(5)$, $R_{5m}(6)$, $Mi(3)$ and $HP(1)$. Delays in individual fixed mortgage rates were expected. Individual mortgage banks respond to a change of the central bank with a delay. They are often unwilling

or unable to respond immediately because of additional costs, for example. The delay of the average monthly repayment is related to the mortgage rate fixation - the fastest growing average mortgage payments are for the one-year fixations, then for the three-year fixations and the slowest for the five-year fixations. This claim is also linked to the varied volatility of individual interest rates. The last column in the table shows the highest volatility in short-term interest rate fixations, while the lowest volatility has interest rates with a longer interest rate fixation. The volatility of the average mortgage rate is slightly higher than the three-year fixation rate volatility.

For maximal peak of PR_{3m} are leading variables NN (-4), VN (-4) and AM (-1). According to economic theory, the result is unexpected, but the findings due to the culminating boom are justifiable. The number of new mortgage loans is generally strongly correlated (Reichel and Gajdošová, 2017) with the volume of these loans (in currency). For this reason, we assume that both of these variables respond to the rise in interest rate equally. With the initial rise in the interest rate, mortgage interest rates increase and the total volume of these new mortgages drops. As a result, if the mortgage interest rates rise household's volume of new mortgage loans should decrease before the interest rates reach the maximum. Because of this, NN and VN may be the leading variables around the maximum. We see that the standard deviations for these two variables are the highest. Therefore, we can assert that the variables are the most volatile and the economic agents are very sensitive when drawing on these loans. Exceeding the average amount of the mortgage loan can also be considered as a consequence of the decline in interest in new mortgages due to increased interest rates and the economic downturn.

Table 2: Time series - peak analysis

Var.	Max	L_{max}	Min	$L_{\min}$	$\Delta_{Max-Min}$	STD
PR_{3m}	08:Q2	-	10:Q2	-	8	0,55
R_m	09:Q4	6	13:Q1	11	13	0,39
R_{1m}	09:Q3	5	13:Q1	11	14	0,45
R_{3m}	09:Q3	5	13:Q1	11	14	0,38
R_{5m}	09:Q4	6	12:Q4	10	12	0,37
NN	07:Q2	-4	10:Q1	-1	10	21,92
VN	07:Q2	-4	10:Q1	-1	10	20,50
AM	07:Q4	-2	15:Q4	18	32	6,78
Mi	09:Q1	3	13:Q1	11	16	3,09
HP	08:Q3	1	13:Q2	12	19	6,29

Source: Authors` calculations

For minimal peak of PR_{3m}, only one variable behaves differently than the maximum (AM is now the lagging variable). Other variables remain the leading or lagging variable. Furthermore, based on the results, it can be argued that the delay in reaching the minimum of individual variables compared to the minimum interbank interest rate $L_{\min}$ is much higher than in the case of the maximal interbank interest rate $L_{\max}$. Note that the highest delays $L_{\min}$ reach the variables R_m, R_{1m}, R_{3m}, R_{5m}, Mi and AM that are determined mainly by mortgage banks. This fact can be described as a kind of asymmetric behavior of mortgage banks. The results show that mortgage banks react more quickly to tightening monetary policy than to relaxing (as shown Guerrieri and Iacoviello, 2015 or Hloušek, 2012). On the other side, the lowest reactions between global minimums (due to interbank interest rate) have variables NN and VN, which are determined by the behavior of economic agents (households, firms), that are more sensitive to changes in interbank interest rate.

The cross-correlation values of central bank interest rate (PRIBOR3M) with the gaps of the examined time series are denoted in Table 2. Statistically significant values are shown in bold and the highest correlation values are underlined.

Even in this simple view of the data, there is evidence that the link between monetary interest rate and the mortgage interest rates has procyclical behavior over time. Moreover, all of the highest cross-correlations display shows mortgage interest rates as lagged variables and the lag of each series is different. This can be explained by the fact that mortgage banks consider (with longer fixation of interest rates) the future development of the interbank rate. For comparison, the average interest rate is delayed (the maximum value of the correlation is 0,62) as well as the mortgage interest rate which is fixed for five years. This may indicate that the clients of mortgage banks prefer longer and less risky fixation of mortgage interest rate. However, it should be noted that differences in the amount of correlation for each delay $0 \leq t \leq 5$ were negligible and statistically insignificant.

Table 3: Cross-correlation between interbank interest rate and the other variable

Variable	t-5	t-4	t-3	t-2	t-1	t	t+1	t+2	t+3	t+4	t+5
R_m	**-0,52**	**-0,37**	-0,18	0,00	0,25	**0,47**	**0,59**	**0,60**	**0,61**	**0,62**	**0,56**
R_{1m}	**-0,59**	**-0,45**	-0,25	-0,04	0,23	**0,48**	**0,62**	**0,66**	**0,65**	**0,60**	**0,49**
R_{3m}	**-0,55**	**-0,41**	-0,22	-0,02	0,24	**0,47**	**0,61**	**0,63**	**0,64**	**0,62**	**0,56**
R_{5m}	**-0,43**	-0,31	-0,15	-0,02	0,18	**0,35**	**0,43**	**0,45**	**0,53**	**0,56**	**0,53**
NN	0,30	**0,46**	**0,41**	**0,45**	**0,36**	0,22	-0,02	-0,13	-0,30	**-0,41**	**-0,51**
VN	0,25	**0,48**	**0,50**	**0,60**	**0,55**	**0,42**	0,13	-0,02	-0,24	**-0,40**	**-0,54**
AM	0,00	0,18	0,28	**0,35**	**0,40**	**0,41**	**0,32**	0,19	0,04	-0,10	-0,21
Mi	**-0,59**	**-0,44**	-0,26	-0,07	0,19	**0,44**	**0,59**	**0,63**	**0,65**	**0,64**	**0,59**
HP	**-0,46**	-0,29	-0,08	0,17	0,46	**0,71**	**0,80**	**0,78**	**0,70**	**0,54**	**0,34**

Source: Authors` calculations

The variables NN and VN are expected to be countercyclical and delayed with the interbank interest rate. Furthermore, we expect that the delay will be higher than delay between monetary interest rate and mortgage interest rates. This fact has been fully confirmed only in case variable NN where the highest value of the correlation was -0.51 with the delay of 5 years. Since we were not fully satisfied with the result, we decided to investigate the longest possible delay until time t+10. Unfortunately, it failed to prove that the longer the lag time, the higher are some of the negative correlations. From the variable AM we expected counter-cyclical and delayed behavior. For horizon $-5 \leq t \leq 5$, the highest correlation coefficient (0,41) was positive and no delay was established. For horizon$-10 \leq t \leq 10$, the lowest negative value of the correlation coefficient was -0.28 at time t+6. Therefore, at a longer horizon, it cannot be clearly stated that there would be a statistically significant delay, although some indications are captured in the data.

Looking at the value of cross correlation coefficients between interbank interest rate and real estate price, we can see a pro-cyclical relationship (correlation coefficients is positive 0,80). The similar results are denoted in Tsatsaronis and Zhu (2004). One would expect that higher interbank interest rate will also increase mortgage interest rates and simultaneously reduce demand for loans, which in turn will decrease demand for real estate and property prices should fall. This mechanism is not captured by the cross-correlation coefficient in the data. The result may indicate the inefficiency of the policy due to the longer time adjustment of economic agents.

Conclusion

The aim of this work was to briefly introduce how housing sector in Czech is related to the interbank interest rates of Central Bank. In the first part of the paper, we described general expectations of the relationship between the real estate market and interbank interest rates. Subsequently, the peak analysis was described. We found that the real estate market reacts faster with the growth of the interbank interest rate than with the decline. The last part of the paper focused on identifying the cyclicity of time series and finding the delays between them using correlation coefficients. The results coincided with expectations in: all pro-cyclical and delayed mortgage interest rates and variable number of new mortgages, which was counter-cyclical and delayed. For other variables, relationship expectations were not supported by the results.

Acknowledgment

This paper was created as a part of the specific research project no. MUNI/A/0943/2016 at Masaryk University.

References

Bourke, P. (1996), Cross Correlation. [Online]. [Retrieved September 28, 2017], http://paulbourke.net/miscellaneous/correlate/

Brůha, J., and Polanský, J. (2014), 'The housing sector over business cycles: Empirical analysis and DSGE modelling.' Working paper*, Czech National Bank*, Research Department

Guerrieri, L., and Iacoviello, M. (2015), 'Collateral constraints and macroeconomic asymmetries,' *Journal of Monetary Economics,* 90, 28–49.

Hloušek, M. (2016), 'An Estimated DSGE Model with a Housing Sector for the Czech Economy.' *Statistics and Economy Journal*, Prague: Czech Statistical Office

Hloušek, M. (2012), 'DSGE model with collateral constraint: estimation on Czech data.' *Proceedings of 30th International Conference Mathematical Methods in Economics* (Ramík, J. and Stavárek, D.), ISBN: 978-80-7248-779-0, 11-13 September 2012, Karviná: Silesian University: School of Business Administration, 296-302.

Hodrick, R. and Prescott, E. (1981), 'Post-war U.S. business cycles: an empirical investigation.'*Discussion Papers 451*, *Journal of Money, Credit and Banking, Vol. 29, No. 1* Northwestern University, Center for Mathematical Studies in Economics and Management Science.

Iacoviello, M. (2000), 'House price and the business cycle in Europe: a VAR analysis.' *Boston College Working Paper* 540

Milcheva, S. and Sebastian, S. (2010), 'Housing Channels Of Monetary Policy Transmission In European Industrial And Transition Countries.' *ERES eres2010_159*, European Real Estate Society (ERES), Milan, Italy, 2010.

Mischkin, F. (2007), 'Housing and the monetary transmission mechanism' *Proceedings - Economic Policy Symposium*, Jackson Hole, Federal Reserve Bank of Kansas City, 359-413.

OECD (2004), The OECD–JRC Handbook on Practices for Developing Composite Indicators. *OECD Committee on Statistics*, Paris

Reichel, V. (2016), 'House price and business cycle in Czech economy: A crosscorrelation approach.' *Quantitative Methods in Economics; Multiple Criteria Decision Making XVIII*, ISBN: 978-80-972328-0-1, University of Economics, Bratislava, 327-331.

Reichel, V. and Gajdošová, J. (2017), 'Historical development and current problems of Czech housing sector.' *Hradecké ekonomické dny 2017*, ISBN: 978-80-7435-664-3, Hradec Králové: Univerzita Hradec Králové, 730-736.

Tsatsaronis, K. and Zhu, H. (2004), 'What drives housing price dynamics: cross-country evidence.' *BIS Quarterly Review*, Bank for International Settlements.

Structural Analysis of Factors Affecting the Effectiveness of Complex Technical Systems

Katarzyna Szwedzka, Faculty of Engineering Management, Poznan University of Technology, Poznań, Poland, katarzyna.szwedzka@gmail.com

Piotr Szafer, Faculty of Finance and Banking WSB School of Banking, Poznań, Poland, piotr.szafer@wsb.poznan.pl

Ryszard Wyczółkowski, Faculty of Organization and Management, Silesian University of Technology, Zabrze, Poland, ryszard.wyczolkowski@polsl.pl

Abstract

The article describes factors affecting effectiveness of complex technical systems, their relations and dependencies. Currently used complex technical systems performing operations that in past were done in separate, standalone machines are very sensitive for any disturbances as they are representing serial structure work centers. Fault of one chain of it causes downtime of all system. Each unit that system consist of has a different specifics and it's sensitiveness is in different area. Analysis of system environment requires detail researches in area of relations between factors that have direct influence on each unit and finding the way they influence indirectly on the rest of system elements. The article shows structural analysis carried out using MICMAC tools, that allow creating map of dependencies, build the model and find the key areas influencing system the most. The analysis of subject shows that OEE relevant to find root causes of standalone machine problems is not enough for finding reasons for complex technical systems downtime reasons.

Keywords: effectiveness, complex technical systems, OEE

Introduction

The changes that took place in the 21st century in the sphere of industrial production as a result of the continuous technological race led to significant reduction of production cycles by increasing the efficiency of the machinery parks (Juszczyński and Kowalski, 2013; Saniuk et al., 2015). As a result of the interaction of various external and internal factors in the operating complex technical systems, various cases are occurring causing processes to lose their usefulness. The problem of systems with a serial structure availability that was described in this article (due to the structure of the work center) should be interpreted in the category of faultless operation. The combination of machines and devices in this way expresses an object where its state of functioning occurs only when all its components are in a state of functioning. The object is down if one of its elements is broken (Niziński, 2002; Macha and Niesłony, 2010). This means that the elements of the system that interact with each other when performing certain functions at a given decomposition level are indivisible (Chybowski, 2014).

The aim of the paper is to present the possibilities offered by problem modeling by means of structural analysis to solve problems related to the effectiveness of complex technical systems. As a result of the analysis, a key factor was chosen for the downtime of the work center.

Structural Analysis Background

The advantage of structural analysis is the ability to identify compounds that combine features whose mutual influences are not obvious and may remain unrecognized by experts in the field (Loska, 2016). The use of structural analysis in the research problem enables the organization and analysis of collections involving a large number of variables (factors) that have mutual influence. The visualization of the relationship between the observed factors makes it possible to understand the problematic situation and to estimate whether the influence of factor A on factor B is significant or not (Nazarko et.al, 2017). From the network of links thus established, a comprehensive picture of the situation emerges, which takes into account the chains of interactions between elements and loops – causal links. Linked factors create loops, reinforce or counterbalance the problem (Piekarczyk and Zimniewicz, 2010). Using the methodology of structural analysis, one should interpret the force of interactions between the features by (Loska, 2016; Zimniewicz 1999):

- constructing of matrix of influences and direct and indirect dependencies between particular characteristics,

- transforming the matrix of influences and dependencies into a graph whose vertices correspond to the particular features,

- determining the interactions of external environment characteristics based on the number of paths and loops entering each node and exiting from each graph node, respectively,
- developing a map of interactions between the characteristics of the external environment.

The result of such analysis is a graphical image of clusters, described in the form of sets of factors (Fig.1).

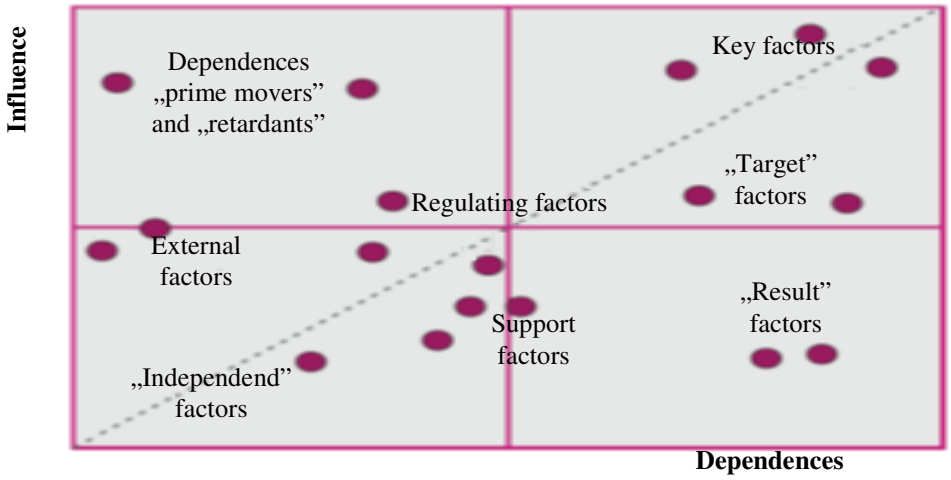


Fig. 1: Example analysis of technical system features (Nazarko, Wnorowski and Kononiuk, 2011)

The analysis includes the following group of factors (Nazarko, Wnorowski and Kononiuk, 2011; Loska, 2016):

- key factors: combining high impact force with high degree of dependence,

- factors "targets" that most often change by influence of other factors that affect the others, representing the objectives of the system,
- "results" factors, characterized by low impact and high complexity from other factors, are therefore susceptible to changes of determinants and key factors,
- decisive factors, which have a very strong influence on the tested system, i.e. driving and braking but also difficult to control,
- regulatory and ancillary factors that, although having a small impact on the analyzed system, can help to achieve the strategic objectives,
- autonomous factors, which have the least effect on changes occurring in the system,
- external factors that have an average impact on the system and at the same time have little impact on it.

The structural analysis matrix can be transposed using the MICMAC computer program. The basis of the software is the Boolle's algebraic logic principle, developed by Godet and experts from the French Computer Innovation Institute 3IE. The purpose of the application is to support scenario modeling based on La Prospective technology (Czaplicka-Kolarz, 2007). The application used at the initial stage of the analysis leads to the determination of the relationships between the variables indicated, in order to indicate the key factors. Taking into account the direct and indirect effects, the risk of not noticing the problem by the expert group is reduced. The expert group in the course of modeling decides on the interrelationships and relations between the elements of the system on the basis of brainstorming. Such a program is especially useful in the analysis of complex technical systems, which are made up of many driving forces, allowing the system to be represented in a simplified form, indicating the key factors of the examined problem situation.

Research object characteristics

The research object is a technical system built from an automatic feeder, a double end tenoner, a turning device, a second double end tenoner, an automatic conveyor, two drilling units, a turning device, a conveyor and an automatic stacker. The task of a complex technical system (Figure 2) is to obtain from the processed solid wood or wood based material element, the desired shape, size, accuracy and roughness of the edges, as well as drilled circular and blind holes, shape and diameter depending on the type of drill bit used. Depending on the production needs and the type of product produced, working centers are supplemented with additional processing units necessary for the process. Each complex technical system in this case in actual production is operated at a speed of 0.5 to 1.3 m/s, including a throughput of the drilling machine which is 1.4 to 1.6 m/s.

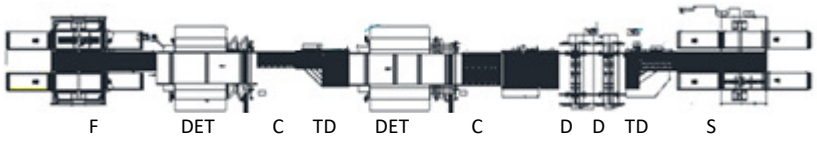


Fig. 2: An example of a numerical controlled working center used in large furniture manufacturing companies - as a system of serial structure, own elaboration (F-feeder, DET-double end tenoner, TD-turning device, C-conveyor, D-drilling machine, S -stacker)

Manufacturing companies to evaluate the machines and equipment use efficiency are based on the OEE Performance Indicators (Jasiulewicz-Kaczmarek and Bartkowiak, 2016). The OEE model is a key performance identifier used in the Total Productive Maintenance (TPM) strategy. Total Machine and Equipment Efficiency is used to estimate the efficiency of machine utilization during the planning phase and to verify that their implementation results. OEE compares the maximum theoretical capacity with actual production and indicates the development potential, defining the product of the three sub-indices

(Hamrol 2015; Jasiulewicz-Kaczmarek and Drożyner, 2011). Readiness, availability, and quality are expressed in the form of a product:

OEE = AVAILABILITY × PERFORMANCE × QUALITY (1)

where:

AVAILABILITY – technical readiness indicator,

PERFORMANCE – performance indicator,

QUALITY – Quality indicator defining the percentage of errors in the total number of items/products or work cycles.

Based on the performance index for four complex technical systems operated in a comparable manner (Table 1), it was noted that the overall machine evaluation model does not indicate the most critical system components. This problem is already recognized in the literature (Hedman, Subramaniyan and Almström, 2016; Zammori, Braglia and Frosolini, 2011). The table indicates that the quality index of the items produced is high, and the final performance indicator is low.

Tab.1: Example of evaluation of the OEE indicator for complex technical systems in selected companies (own elaboration based on enterprise data)

CTS **Indicator**	**„A" CTS**	**„B" CTS**	**„C" CTS**	**„D" CTS**
Availability	60%	58%	58%	61%
Performance	65%	60%	59%	66%
Quality	99,56%	99,61%	99,62%	99,86%
OEE	**38,98%**	**34,25%**	**34,17%**	**40,71%**

Low operating efficiency of complex technical systems obliged companies producing products for the same customer (benchmark analysis of Table 1), appointing their join experts group supervising the production processes in all their factories. Experts have analysed the downtime of complex technical systems and selected factors that affect the effectiveness of the operation. Factors selected by the expert group were focused on: technical, preventive, management and information areas.

Technical factors (T) were violent, unforeseen damage to system or destruction of its components, resulting in interruption of operation or loss of performance. Preventive factors (P) were related to preventive strategies and involved planning and implementing various types of activities to avoid failure and undesirable downtime. Management factors (Z) concerned the non-use of the normal production capacity of complex technical systems and the lack of a system of procedures, instructions and mechanisms to achieve the objectives set by the company. On the other hand, the information factors (I) concerned the stopping of the machining centre without affecting the other factors, which means that there was no technical failure. The results of the expert workshop on identification and organization of features are presented in Table 2.

Tab. 2: List of major factors affecting downtime of complex technical systems (from company documents)

Factor group	Symbol	Factors name
Technical	T1	unforeseen events (failure)
	T2	repair time
	T3	interruptions in delivery of production media
	T4	lifetime of moving parts of machines

	T5	setup conversion
Preventive	P1	Machine diagnostics (CTS monitoring)
	P2	schedule of diagnostic actions
	P3	undertaken improvement actions during work
	P4	unidentified cause of downtime
Managing	Z1	operational intensity (production plan)
	Z2	no raw materials or components
	Z3	deviation from quality requirements
	Z4	knowledge and competence of employees
	Z5	knowledge and competence of superiors
	Z6	stability of employment
	Z7	waiting for repair
	Z8	standardization of the production process
	Z9	standardization of spare parts supervision
Informative	I1	information exchange / communication

An expert group based on 19 factors identified the following research task: *What are the direct factors that affect the downtime of complex technical systems with a serial structure?*

Results of structural analysis carried out using MICMAC tools - Direct Impact Matrix

Internal group of experts initially carried out an assessment of the impact of characteristic a on characteristic b, based on the following scale: "0" - without influence, "1" - slight impact, "2" - moderate impact, "3" - significant influence (Zimniewicz, 2015). Such prepared forms allowed one to form a dominant matrix of direct influence and the degree to which individual factors influencing the downtime of complex systems were affected. The matrix of the values of direct influence and dependence of the interrelated features of the analyzed causes of downtime of complex technical systems is shown in Table 3.

Tab. 3: Direct Impact Matrix (own elaboration on the basis of company documents)

	1: T1	2: T2	3: T3	4: T4	5: T5	6: P1	7: P2	8: P3	9: P4	10: Z1	11: Z2	12: Z3	13: Z4	14: Z5	15: Z6	16: Z7	17: Z8	18: Z9	19: I1
1 : T1	0	0	0	2	0	0	0	0	0	3	0	0	0	0	0	2	0	3	2
2 : T2	0	0	0	1	0	3	3	1	2	1	0	0	2	0	0	1	2	1	2
3 : T3	0	0	0	1	0	0	0	0	0	1	2	1	1	0	0	0	0	0	0
4 : T4	3	0	0	0	0	3	2	1	2	3	0	0	2	1	0	0	3	3	2
5 : T5	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	3	3	1
6 : P1	0	2	0	0	0	0	2	0	0	3	0	0	2	0	0	0	3	3	2
7 : P2	0	0	0	2	0	2	0	0	0	1	0	0	1	2	0	0	1	1	2
8 : P3	0	1	0	2	0	1	0	0	0	1	0	2	2	0	0	0	0	0	2
9 : P4	3	3	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
10 : Z1	3	2	0	3	0	1	0	1	1	0	0	1	0	2	0	0	0	0	0
11 : Z2	0	0	0	0	1	0	0	0	0	0	0	2	0	2	0	0	0	0	0
12 : Z3	0	0	0	2	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0
13 : Z4	0	2	0	1	0	2	0	3	0	0	0	1	0	3	2	0	1	0	2
14 : Z5	0	0	0	0	0	2	0	0	0	3	1	1	1	0	1	0	1	1	2
15 : Z6	0	0	0	0	0	1	0	0	0	0	1	0	2	0	0	0	0	0	3
16 : Z7	0	2	0	0	0	1	0	1	0	0	0	0	1	0	0	0	1	0	1
17 : Z8	0	3	0	2	1	1	0	0	0	1	0	0	1	0	0	0	0	3	1
18 : Z9	1	1	0	3	0	1	0	1	1	1	0	0	0	0	0	1	0	0	0
19 : I1	0	1	0	2	0	3	0	1	0	3	0	0	0	3	1	0	2	2	0

©LIPSOR-EPITA-MICMAC

The property characteristics of the direct influence matrix is shown in Table 4.

Tab. 4: MDI characteristics

INDICATOR	VALUE
Matrix size	19
Number of iterations	5
Number of zeros	231
Number of ones	58
Number of twos	44
Number of threes	28
Number of P	0
Total	130
Fill rate	36.01108%

When analysing filled matrix fields, there were 231 cases in which there was no relationship between variables and 58 cases had a poor relationship. Moderate impact occurred in 44 situations and strong correlation was observed in 28 cases. Identified by experts dependencies accounted for 36% of the matrix area.

Results of structural analysis carried out using MICMAC tools - Direct Impact Forces Analysis

The combined effect of the 19 factors affecting the downtime of complex technical systems indicates that the direct effect on other factors is due to the technical viability of the moving parts of the machine (T4); the technical factor described as repair time (T2), the machine diagnostics (P1) as well as two management factors, focusing on the intensity of complex technical systems (Z1) employed and the skills and preparation of employees for machining centers (Z4) as well as the information factor expressing the direct exchange of information between changes (I1). Direct effects, however, do not exert a factor in the supply of production media (T3), which can be interpreted as a factor independent of the production capabilities of complex technical systems. High dependence on other factors is due to technical factors indicating the system component's repair time (T2) and the lifespan of the moving parts (T4). System diagnostics (P1) are assigned to preventive factors. Management factors that determine the intensity of complex system operation (Z1), employee knowledge and competence (Z4), and standardization of process and spare parts (Z8 and Z9) also show strong dependencies. Factors that exchange information (I1) may indicate a lack of communication between departments and changes. The impact force is shown in Table 5.

Tab. 5: Total direct impact force between structural analysis factors (based on MICMAC software)

N°	VARIABLE	STRENGTH OF INFLUENCE	STRENGTH OF DEPENDENCE
1	T1	12	10
2	T2	19	17
3	T3	6	0
4	T4	25	21
5	T5	10	2
6	P1	17	21
7	P2	12	7
8	P3	11	11
9	P4	10	6
10	Z1	14	21
11	Z2	5	5
12	Z3	4	8
13	Z4	17	19
14	Z5	13	13
15	Z6	7	4
16	Z7	7	4
17	Z8	13	17
18	Z9	10	20
19	I1	18	24
	Totals	230	230

Based on a structured analysis, a key factor has been identified that exerts a strong influence on other factors and is strongly influenced by other factors. An analysis based on the developed evaluation form prepared by the expert group has allowed the emergence of a key factor which, as a result of connections and influences, determines the downtime of complex technical systems (Figure 3).

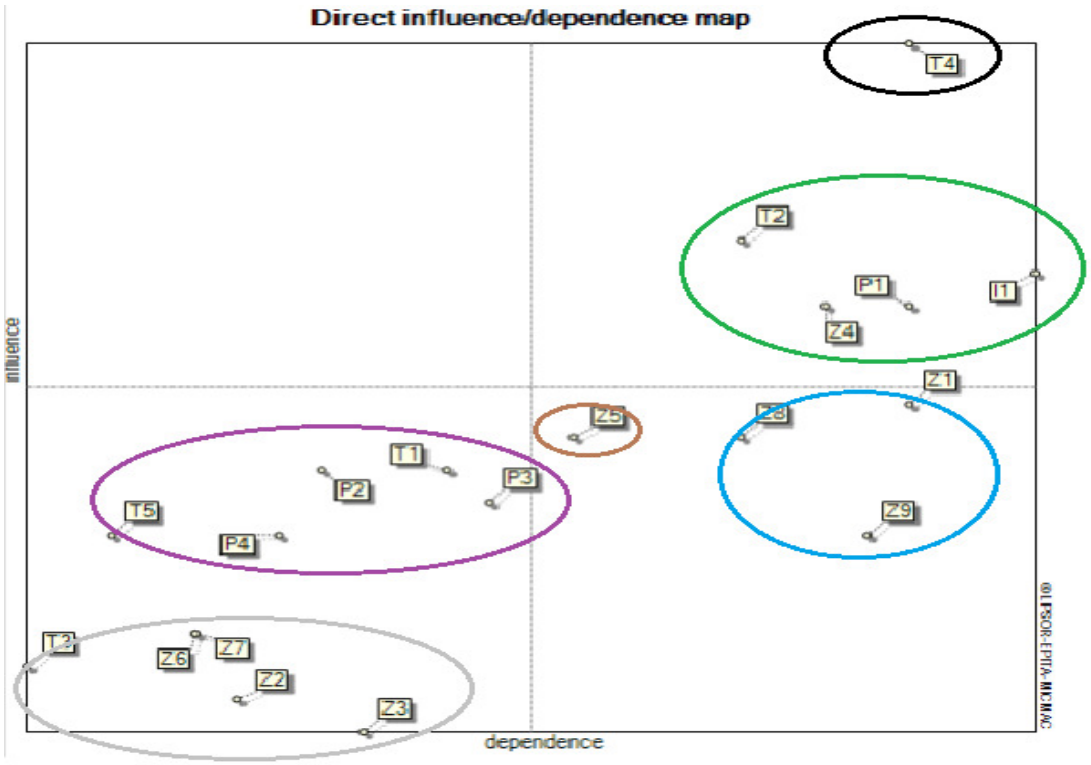


Fig. 3: Structural analysis factors on the basis of direct effects (color: black: key factor, green: target factor, blue: results: brown: adjusting: purple: external: grey: autonomous (elaboration based on Arcade, Godet, Meunier and Roubelat, 1994)

The distribution of factors allowed to isolate 6 groups of them. In the area of key factors a technical factor expressing the viability of the moving parts of a complex technical system can be found. Factors such as repair time (T2), machine diagnostics (P1), knowledge and skills of employees (Z4), and communication (I1) were identified in the group of "target" factors. The results of the system analysis include factors: (Z1) intensity, (Z8) standardization and (Z9) standardization. The group of autonomous factors includes: interruptions in delivery of production media (T3), lack of raw materials and components (Z2), deviations from quality requirements (Z3), stability of employment (Z6) and waiting for repair (Z7). Ancillary factors are expressed by five factors: breakdowns (T1), setup conversion (T5), schedule of diagnostic actions (P2), undertaken improvement actions during work (P3) and unidentified downtime (P4). On the other hand, one regulatory factor was identified. It was the knowledge and competences of superiors (T5).

Results of structural analysis carried out using MICMAC tools - Conclusion

An important problem affecting the efficiency of the machining center is the lifespan of the moving parts. The structural analysis showed that the factor influencing such a condition is the level of production plan load. It can be assumed that the objects are overexploited and in the event of a failure, the implementation of the production plan runs on another available machining center. The autonomous factor expressing the expectation of repair clearly indicates this probability. It follows that the knowledge and experience of operators and technical services is not transferred at the level of change and between shifts. As a result, technologists are unwittingly introducing bloated production schedules, and the planner as a result of lack

of information does not take into account the cycle time of the process related to unscheduled failures or technical problems with complex technical system.

Summary

A systematic analysis to identify the key factors affecting the total efficiency of OEE equipment, confirms the high utility of the chosen method. As a result of its use, a key factor influencing machining center downtime has been identified. It should be noted that the performed analysis is closely related to the selection of experts involved in the study, what leads to proper interpretation of the system condition. Implementation of the methodology in company does not guarantee immediate success in solving manufacturing problems. Structural analysis requires exercise, expert experience and consistency in bringing the project to completion. If you follow the assumptions, each participant can gain new knowledge into the needs and performance of the business and identified further problems that can be stepwise eliminated. This paper identifies one key factor that strongly influences other factors. The designated area requires many improvements and consequences in the implementation of the project to the end. Pointing out additional areas can only discourage experts so that the project will not be completed and the current situation will not improve.

References

Arcade, J., Godet, M., Meunier, F. and Roubelat, F. (1994), 'Structural analysis with the MICMAC method & Actors‘ strategy with Mactor method', *AC/UNU Millennium Project Futures Research Methodology*, Paris.

Chybowski, L. (2014), 'Ważność elementów o strukturze złożonych systemów technicznych, Studia i Rozprawy', *Wydawnictwo Naukowe Instytutu Technologii Eksploatacji –PIB*, Radom.

Czaplicka-Kolarz, K. (2007),'Scenariusze rozwoju technologicznego kompleksu paliwowo-energetycznego dla zapewnienia bezpieczeństwa energetycznego kraju', *Główny Instytut Górnictwa*, Katowice.

Hamrol, A. (2015) 'Strategie i praktyki sprawnego działania LEAN, SIX SIGMA i inne', *PWN*, Warszawa.

Hedman, R., Subramaniyan, M. and Almström, P. (2016), ‘Analysis of critical factors for automatic measurement of OEE ', Procedia *CIRP,* Vol. 57, pp. 128 – 133.

Jasiulewicz-Kaczmarek, M. and Drożyner, P. (2011),‘Maintenance Management Initiatives towards Achieving Sustainable Development,’ P. Golinska et al. (ed) Information Technologies in Environmental Engineering Environmental Science and Engineering, Springer - Verlag Berlin Heidelberg, pp. 707-721.

Jasiulewicz-Kaczmarek, M. and Bartkowiak, T. (2016), ‘Improving the performance of a filling line based on simulation,’ Cohal, V; Lobont, L; Topala, P; et al. (ed), MODTECH International Conference - Modern Technologies In Industrial Engineering IV, PTS 1-7, Iasi, ROMANIA

Date: JUN 15-18, 2016, Book Series: IOP Conference Series-Materials Science and Engineering Volume: 145 Article Number: UNSP 042024, doi:10.1088/1757-899X/145/4/042024.

Juszczyński, M. and Kowalski, A. (2013),'Achieving desired cycle times by modelling production systems', in Computer Information Systems and Industrial Management. *Springer*, pp. 476–486. DOI: 10.1007/978-3-642-40925-7_44.

Loska, A. (2016), 'Metodyka modelowania eksploatacyjnego procesu decyzyjnego z wykorzystaniem metod scenariuszowych', *Wydawnictwo Politechniki Śląskiej*, Gliwice.

Macha, E. and Niesłony A. (2010), 'Niezawodność systemów mechatronicznych', *Politechnika Opolska, Opole.*

Nazarko, J., Ejdys, J., Halicka, K., Nazarko, Ł., Kononiuk, A. and Olszewska, A. (2017), 'Structural Analysis as an Instrument for Identification of Critical Drivers of Technology Development,' *Procedia Engineering* 182, 474 – 481.

Nazarko J., Wnorowski H., Kononiuk A. (2011),'Analiza strukturalna czynników rozwoju nanotechnologii w województwie podlaskim', *Foresight*, Białystok.

Niziński, S. (2002), 'Eksploatacja obiektów technicznych', *Biblioteka Problemów Eksploatacji*, Warszawa –Sulejówek –Olsztyn –Radom.

Piekarczyk, A. and Zimniewicz, K. (2010), 'Myślenie sieciowe w teorii i praktyce', *PWE*, Warszawa.

Saniuk, A., Jasiulewicz-Kaczmarek, M., Samolejova, A., Saniuk, S. and Lenort R. (2015), 'Environmental favourable foundries through maintenance activities,' *METALURGIJA* 54(4), 725-728

Zammori,F., Braglia,M. and Frosolini, M. (2011), 'Stochastic overall equipment effectiveness', *International Journal of Production Research* Vol. 49, No. 21, (1) 6469–6490.

Zimniewicz,K. (1999), 'Współczesne koncepcje i metody zarządzania', *Polskie Wydawnictwo Ekonomiczne,* Warszawa.

Relationship between Corporate Default Risk and Macroeconomic Indicators in Czech Republic

Mgr. Tomáš Jeřábek, MBA, Department of economy and management, College of Business and Hotel Management, Brno, Czech Republic, jerabek@hotskolabrno.cz

prof. PhDr. Vladimír Šefčík, CSc., Department of economy and management, College of Business and Hotel Management, Brno, Czech Republic, sefcik@hotskolabrno.cz

Ing. Zdeněk Málek, Ph.D., Department of Gastronomy, College of Business and Hotel Management, Brno, Czech Republic, malek@hotskolabrno.cz

Abstract

Probability of default is a key parameter for estimating the credit losses. In the last decade, growing importance of this parameter, it serves as an important input factor for determining capital requirements for banks that use internal models to estimate the rating - IRB approach. Important significance has especially aggregate probability of default, which besides being a parameter of the credit risk, they are also the most important factor stress tests in the Czech Republic. This paper analyses the impact of macroeconomic variables in the modelling of corporate default, in terms of both short-run and long-run causal relationship.

Keywords: corporate default, macroeconomic model, contegration,

Introduction

The probability of default is a key parameter for estimating the credit losses. In the last decade, growing importance of this parameter, it serves as an important input factor for determining capital requirements for banks that use internal models to estimate the rating - IRB approach. Important significance has especially aggregate probability of default, which besides being a parameter of the credit risk, they are also the most important factor stress tests in the Czech Republic. Therefore, the knowledge of the credit risk predictions crucial information for all types of financial institutions, as regulators of the banking market - primarily under the capital requirements under Basel II and Basel III, which ensures the active participation of banks in the measurement of the probability of default.

Chan-Lau (2006) distinguished four approaches in the default probability modelling – particularly considering based macroeconomic models as well as models that work on the basis of accounting data models based on the rating and finally hybrid models. Macroeconomic-based (MB) models are motivated observed assumptions that the default rate for different entities increase during the recession. This observation led to the implementation of econometric models, whose aim is to explain the default indicators, such as default probability and default rate, using macroeconomic indicators. As noted above, estimating the probability of default is currently of considerable interest, both from the technical and academic community. Chan-Lau (2006) also cite several advantages MB models, which can be significant opportunity to apply this sort of models for making stress test scenarios as well as a strong point of these considers the easy availability of the necessary macroeconomic data. On the other hand, for example Simons and Rolwese (2009) mentioned two essential drawbacks, the first of which is based on the need to work with data covering a longer time range for more than one economic cycle. As a second

disadvantage of the authors mention the possible inaccuracy of these models from the instability of the model parameters over time, as pointed out by Lucas (1976) in his critique.

Simons and Rolwese (2009) divided of MB models into exogenous and endogenous, while the difference between them lies in the different conception macro-variables in the model. The first group of models considers these variables as exogenous, which is not always in line with reality - namely due to the anticipated exogenous would be a relationship between default and individual variables over time invariant. In this paper, we discuss the second group of models which are based on the vector autoregression (VAR) approach used for multivariate time series modelling, see Enders (2010). In order to model the probability of default through a VAR model see for example Alessandri et al (2009) or Hamerle et al (2011).

This paper analyses the impact of macroeconomic variables in the modelling of corporate default, in terms of both short-run and long-run causal relationship. As the macroeconomic data are used nine different variables, the default rate is considered in a non-linear expression suggested by Wilson (1997). The text aims to reveal that the macroeconomic variables tend to long-term and short-term causal influence the default probability.

Methodology

It is necessary to assemble the model so that it will be able to link specific macroeconomic variables with the degree of credit risk. These models are based on the relationship between measures of loan quality and macroeconomic indicators. For example Blaschke et al (2001) work with the share of non-performing loans, which are trying to explain through nominal interest rate, inflation and GDP growth. These models are based on the assumption of sensitivity to changes in credit quality in the economic cycle. For building a model, it is important to use a set of macroeconomic and financial variables for which it can expect any significant impact on credit risk. Variables such as economic growth, unemployment, interest rates, the value of the share capital and corporate bond spreads certainly, whether positively or negatively, affect the credit risk. By selecting the appropriate model variables examined further Drehmann (2009) and Simons and Rolwes (2009).

Marcucci and Quagliariello (2008) applied the VAR approach to corporate credit risk modeling and the four macroeconomic variables, namely GDP, inflation, interest rate and exchange rate. A similar approach, but now applications vector error correction (VEC) model used Asberg and Shahnarazian (2008). Furthermore Alessandri et al (2009) and Hamerle et al (2011) applied VAR model to predict the default rate. As pointed out Foglia (2009), problem of VAR approach lies in its linearity. The problem is that the linear approximation default rate is credible only if small macroeconomic shocks. Van den Ende et al (2006) say that a non-linear approximation of the dependent variable expands its range into negative territory, thus it takes possible non-linear relationship between the rate of default and macroeconomic variables into account which are typical for the period of major macroeconomic fluctuations. In order to non-linearization VAR model can be used the Wilson approach published by Wilson (1997), consisting of the application logit transformation on the probability of default for a share of non-performing corporate loans repaid.

Given that default probability is usually publicly unavailable (Foglia, 2009), we use the default rate as an approximation of default probability. For default rate holds

$$PD_t = \frac{1}{1+\exp(-y_t)} \qquad (1)$$

where PD_t is default rate determined as a proportion of non performing corporate loans and total corporate loans. Variable y_t is the macroeconomic index where

$$y_t = \beta_0 + \beta_1 x_{1,t} + \beta_2 x_{2,t} + \cdots + \beta_n x_{n,t} + u_t \qquad (2)$$

where $\beta_1, \ldots, \beta_n$ are model parameters are determined to estimate, $u_t \sim N(0, \sigma_u)$, further $x_{1,t}, \ldots, x_{n,t}$ indicate the macroeconomic variables that can be modelled by autoregression process of order q, thus for $i = 1, \ldots, n$

$$x_{i,t} = \rho_{i,0} + \sum_{j=1}^{q} \rho_{i,j} x_{i,t-j} + v_{i,t} \qquad (3)$$

kde ρ are unknown parameters and $v_t \sim N(0, \sigma_v)$. At this point it should be noted that equation (1) is Wilson's original proposal in shape with a positive value y_t. With the shape of a macroeconomic index referred to herein also worked example Assouan (2012) and Youssef (2014). The goal of this treatment is more interpretive: lower the value of macroeconomic index implies lower the value of probability of default.

In order to estimate the model specified above are applied to vector error correction (VEC) model; see Enders (2010).

Data

The data have the character of monthly time series covering the period from 2003:01 to 2013: 06. The following figure shows the graph of the probability of default defined proportion of non-performing and performing loans, as defined above, and further development of the macroeconomic index y_t obtained from (1).

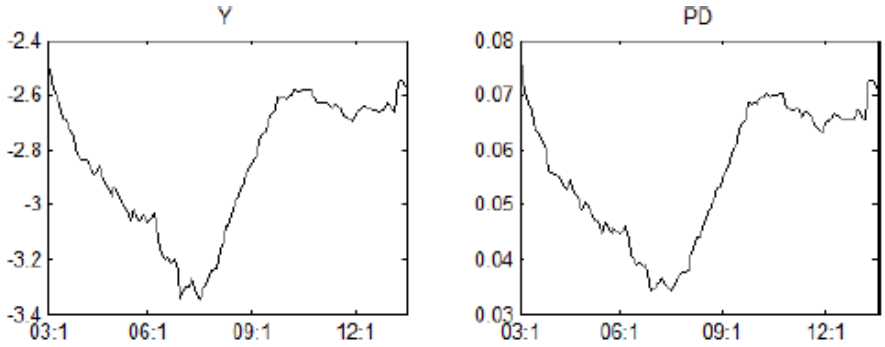


Figure 1: Macroeconomic index (left) and default rate

Selection of macroeconomic variables was carried out according to Jakubik (2007) and Simons Rolwese (2009). The source of data is the database ARAD Czech National Bank. These variables are:

- Gross domestic product - GDP equals aggregate demand, which represents the volume of corporate sales. Lower GDP growth means lower sales volume growth which is harder to generate profits for companies. For this reason, lower GDP increases the likelihood that the company will be unable to meet its obligations.

- Inflation - we expect the positive impact of inflation on the default of companies, i.e. higher inflation causes an increase in the probability of default. The reason is that higher inflation in the short-run leads to improve the financial situation of borrowers and it stimulate people to take on extra risk to invest, therefore, it develops a relationship with default probability in this way.

- The real interest rate - companies often finances their activities through other sources. The funding costs of firms are therefore positively related to interest rates. Thus, we suppose positive relation among interest rate and default probability.

- The real effective exchange rate - depreciation or devaluation of the exchange rate of the currency does not have a clear impact on company default. It is a fact that for companies in the domestic economy, engaged in import, growth of the exchange rate has a positive effect in terms of compromising their production. It is opposite for export companies

- Indebtedness of the corporate sector - the degree of vulnerability of the corporate sector depends on the extent of its debt. This indebtedness expresses the ratio of the total corporate debt due to real GDP and we suppose positive long-run and short-run relationship to the probability of default.

- Europe Brent Spot Price FOB - the crude oil price is of course reflected in increased fuel whose price enters to the company's production. Thus, with the increase in oil prices can be expected increase the probability of default.

- Unemployment - we expect positive long-run and short-run relationship to the probability of default.

- The monetary aggregate M2 - we expect a positive relationship between the money supply and the default of probability.

- Index PX - According to Merton option theory, the probability of default is negatively related to stock market returns. Thus, we assume that the decline in the index PX will cause an increase of the probability of default.

All macroeconomic variables have been obtained already seasonally adjusted, and were subjected to logarithmic transformation. The modified data are shown in Figure 2.

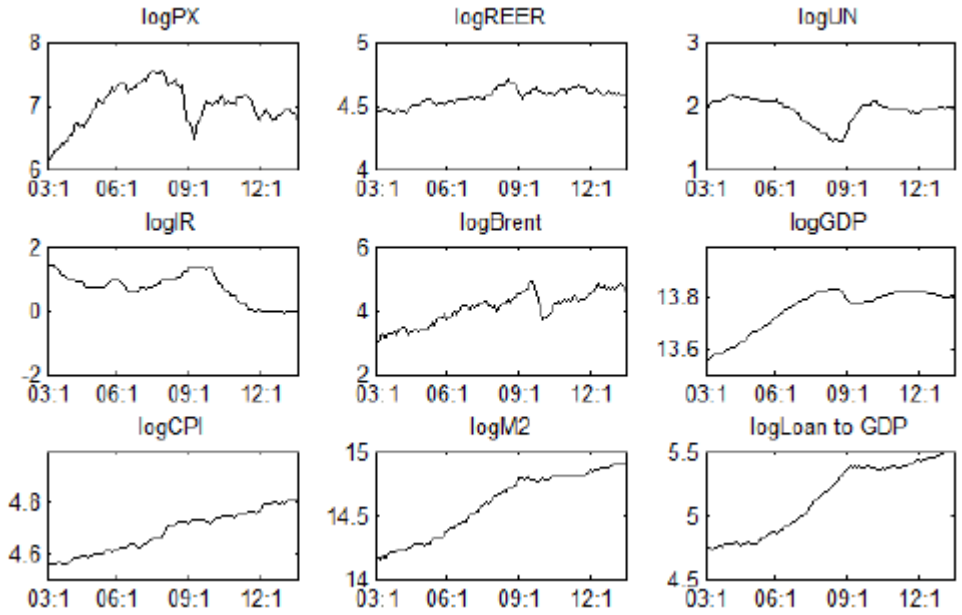


Figure 2: The modified data

The above graphs show that the monitored time series are non-stationary. We have verified this assumption by Augmented Dickey-Fuller (ADF) test. The test was administered with a constant. Based on these results we can say that all the time series are non-stationary at 5% level of significance. If data are non-stationary, it is necessary to consider the possible existence of cointegration relationships between variables. Additionally, lag order for VAR model is determined. For example Ivanzov and Kilian (2005) propose three criteria for lag order selection, namely the Bayes Information Criterion (BIC), Hannan-Quinn information criterion (HQC), Akaike information criterion (AIC). Results in Table 1 show that optimal lag length is 2 month. Since the Akaike Criterion may be unstable in some cases, we accept the results of the BIC and HQN criteria.

Table 1: Lag length selection

Lag	AIC	BIC	HQN
1	-55.332140	-52.720977*	-54.272157*
2	-56.256241	-51.271293	-54.232637
3	-56.708294	-49.349562	-53.721069
4	-56.212136	-46.479619	-52.261290
5	-56.195487	-44.089185	-51.281020
6	-56.634135	-42.154049	-50.756047
7	-57.949742	-41.095871	-51.108034
8	-60.347700	-41.120044	-52.542370
9	-62.991792*	-41.390352	-54.222842

To determine whether between different variables exist long-run relationships, we use Johansen cointegration test which is based on the eigenvalues of stochastic matrices; see Enders (2010). Lüutkepohl (2001) classifies Johansen test according to the length of the time series. Specifically, for a longer time series prefers l-max test versus trace test, which is recommended more for shorter series. In our case, mainly because a sufficient number of observations, we prefer results l-max test that are listed in the following table.

Table 2: Test for the number of cointegrating vectors

Rank	Eigenvalue	l-max test	p-value
0	0.54178	95.991	[0.0000]
1	0.47568	79.415	[0.0000]
2	0.35531	53.995	[0.0289]
3	0.34684	52.390	[0.0067]
4	0.28054	40.498	[0.0407]
5	0.19656	26.919	[0.2769]
6	0.17511	23.678	[0.1488]
7	0.15595	20.854	[0.0532]
8	0.069047	8.8002	[0.3103]
9	0.020294	2.5219	[0.1123]

Thus, the results in Table 2 show that there are five cointegrating relations at 5% level of significance. Now we can estimate VEC model for corporate default rate.

Results

For the cointegration analysis, max eigenvalue statistic recommended five cointegrating vectors were used in order to establish the long-run relationship. Recall that when we estimated the VAR model with our variables in log form, the AIC selects model with 9 lags, while the BIC and HQN select a VAR model with 2 lags. We estimated the VAR model recommended by BIC and HQN criterions, thus VAR(2) model.

Table 3 shows coefficients estimated for the cointegrating vectors. The first vector (CointEq1) is normalized on corporate macroeconomic index, the second vector is normalized on log M2, and so on, the last vector is normalized on log CPI. Further, we will deal with only the first vector expressing long-run relationship between the macroeconomic index (and thus default rate) and the macroeconomic variables.

VECM estimate of the first normalized equation is

$$Y = 5{,}2131 \cdot logUN + 0{,}3392 \cdot logIR - 1{,}4237 \cdot logBrent + 6{,}7127 \cdot logGDP + +0{,}6438 \cdot +logloan\_GDP + EC1$$

As regards the long-run relationship, corporate macroeconomic index shows significant positive relation with unemployment (UN) in long-run, thus unemployment increase makes worse the corporate default rate – it means positive extensive effect on corporate NPLs. We get the same result for interest rate. Both results (for UN and IR) are in agreement with the assumptions. The normalized equation also shows that there is significant negative relationship between corporate macroeconomic index and price of Brent oil (Brent). This implies that along with the increase in price of Brent oil, there is a negative reduction effect on NPLs –the default rate will decrease. There is positive long-run relationship between default rate and GDP. The positive relationship between default rate and indebtedness in corporate sector (loan_GDP) is insignificant in the long run.

We can see that an increase in the GDP causes an increase in the default rate in the long run. This result seems as a contradiction to the determined assumptions. On the other hand, when looking at GDP graph shown in figure 2 is an obvious steady GDP growth during the entire period, except for a break between crisis years 2008 and 2009. It is also evident steady rise in the default rate from the beginning of the crisis. Thus, due to structural changes in the economy, there is a long-run positive relationship between the GDP and the probability of default. Also, the emergence of new companies without a strong capital in economic growth periods plays a role here. These firms later go bankrupt in the growing economy. Additionally, the normalized equation gives us yet another unexpected result - the negative long-run relationship between the Brent oil prices and the default rate. Thus, an increase in Brent oil prices in the long-run causes a decrease in the default rate. For this variable we assumed a positive long-run relationship. However, this is the understandable result given by the long-run positive impact the GDP to the default rate. Namely, higher the Brent oil price is usually associated with lower the long-run economic performance and therefore it causes a decrease in the corporate default probability

Table 3: VEC model results

Cointegrating Eq	CointEq1	CointEq2	CointEq3	CointEq4	CointEq5
Y(-1)	1.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
log_M2(-1)	0.0000 (0.0000)	1.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
log_PX(-1)	0.0000 (0.0000)	0.0000 (0.0000)	1.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
log_REER(-1)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	1.0000 (0.0000)	0.0000 (0.0000)
log_CPI(-1)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	1.0000 (0.0000)
log_UN(-1)	-5.2131 (0.7112)	0.2341 (0.0444)	-3.6878 (0.4138)	-1.6635 (0.2417)	-1.2427 (0.1619)
log_IR(-1)	-0.3392 (0.1961)	0.0255 (0.0123)	-0.2448 (0.1141)	-0.0893 (0.0667)	-0.0345 (0.0447)
log_Brent(-1)	1.4237 (0.3297)	-0.1081 (0.0206)	0.8006 (0.1919)	0.4557 (0.1121)	0.2372 (0.0751)

log_GDP(-1)	-6.7127 (2.3925)	0.0189 (0.1495)	-11.4070 (1.3922)	-4.3132 (0.8131)	-2.2607 (0.5449)
log_loan_GDP(-1)	-0.6438 (0.7587)	-0.7246 (0.0474)	1.4794 (0.4415)	0.5394 (0.2579)	0.1242 (0.1728)

The following Table 4 shows part of the results of the VEC model, specifically captures short causality. If we focus on the first parameter EC1, therefore, error correction term related to the dependent variable PD_all, we can see that there is a negative and statistically significant. These two properties are very important for the information capability of the model, see Enders (2010). Specifically, value EC1 (-0.196) imply short-term adjustments of this series by 19.6% in a month. In other words, it took approximately 5 months (1/0.196) to eliminate the disequilibrium. Regarding the signs of the regression coefficients of the VEC model, we find that the macroeconomic index (and hence the default rate) positively related to the CPI inflation lagged two months at 1% significance level, thus growth of inflation is followed by growth of default rate after two months. Further, depend variable is positively related lagged one month to unemployment at 1% level of significance as well as to interest rate at 5% level of significance. Also between default rate and Brent oil is a positive relationship lagged two months at 10% level of significance. Finally, we can see that default rate is negatively related to GDP lagged two months at 10% level of significance.

Table 4: VEC model results

	coefficient	std. error	t-ratio	p-value
const	10.37	2.8937	3.584	0.0005***
d_Y_2	-0.263	0.0871	-3.015	0.0033***
d_log_CPI_2	1.839	0.4338	4.238	0.0000***
d_log_UN_1	0.275	0.1001	2.754	0.0072***
d_log_IR_1	0.099	0.0441	2.248	0.0269**
d_log_Brent_2	0.048	0.0254	1.884	0.0656*
d_log_GDP_2	-3.864	2.1549	1.793	0.0761*
EC_1	-0.196	0.0361	-5.44	0.0000***

Note: *, **, *** indicate Significance at 10%, 5% and 1% levels respectively.

Further, we interested in diagnostic tests of VEC model, such as testing for the absence of autocorrelation, heteroskedasticity and non-normality in the error process. At the first, we test normality of residuals. We use Doornik – Hansen test, which reject the null hypothesis of multivariate normality of VEC model residuals at high significance level. According to Juselius (2006) the residuals in the VAR or VEC model need not normally distributed if this is caused by excess kurtosis and Johansen (1995) states that the normality assumption is not so serious for the conclusion. Furthermore, for the autocorrelation testing we select Ljung – Box test. The test does not reject the null hypothesis of no autocorrelation at 5% level of significance. Finally, we test for heteroskedasticity by ARCH-LM test. Again, we do not reject the null hypothesis of no cross term (no heteroskedasticity) at the 5% level of significance. Overall results of the testing of all three conditions are shown in Table 5.

Table 5: Summary of diagnostic tests

	Autocorrelation	Heteroskedasticity	Normality
H0	H0:no serial correlation at lag order	H0: no cross terms	H0: reziduals are multivariate normal
Test	Ljung – Box	ARCH – LM	Doornik – Hansen
p-value	0.166	0.916	0.000

For the backtesting purposes, we define the training sample consisting of 1000 observations. The sample is used to estimate the Value at Risk model parameters.Then we use a rolling window approach. The estimation training sample is rolled over the entire data period. We keep the training sample length constant, starting at the beginning of the data set. The test sample begins at the end of the training sample. The result of this procedure are the VaR estimates series covering the sample from 1,001th to 2,750th. In this way, we get a total of 1,750 one-day VaR estimates. Figure 1, 2 and 3 show the real portfolio returns (data) in the test period and VaR estimates for the different methods used and the different confidence levels. Except for the methods presented above, the traditional Variance-Covariance method is used for a better comparison.

Conclusion

The aim of the article was through econometric approach to assess the impact of selected macroeconomic variables on the corporate default probability. It was used vector error correction model that can capture both short-run and long-run relationships between variables. The corporate default probability was represented by default rate expressing the share of non-performing corporate loans to total amount of corporate loans. As macroeconomic variables were used Czech GDP, inflation, real interest rate, real Effective Exchange Rate, indebtedness of the corporate sector, Brent oil price, unemployment, monetary aggregate M2 and PX index. In the research, we examined several options link among variables. The resultant model was the most stable of all and corresponded to of our requirements.

The model detected that in the short-run, the default rate is positively related to the CPI inflation lagged two months. Thus, the inflation growth is followed by growth of default rate after two months. This result is in line with our assumption because inflation growth will stimulate people to take on extra risk to invest, therefore, it leads to higher default probability. Further, the corporate default probability is positively related lagged one month to the unemployment in one side and to interest rate in other side as well as to Brent oil price. These results were expected too. Finally, there was negative relationship between the corporate default probability and the GDP.

In the long-run, the corporate default probability is positively related to the unemployment and to the interest rate. Both results are in agreement with our assumptions. We found that there is a contradiction to our suppositions for the GDP and the Brent oil price in the long-run. The model revealed that when the economy growths, the corporate default probability growth in the long-run. Thus, in the short-run, when economy growths, the corporate default probability falls. But, in the long-run, the economy growths is followed by increase in the corporate default probability. This is caused by the structural changes in economy in one side and the emergence of new companies without a strong capital in economic growth periods in other side. These firms later go bankrupt in the growing economy and thus, corporate default probability growths. Additionally, an increase in Brent oil prices in the long-run causes an decrease in the default rate. We assumed a positive long-run relationship for this variable. However, this is the understandable result given by the long-run positive impact the GDP to the default rate. Namely, higher

the Brent oil price is usually associated with lower the long-run economic performance and therefore it causes a decrease in the corporate default probability.

Acknowledgment

This research was supported by Grant agency of College of Business and Hotel Management (Project: *Modern approaches to measuring and managing of financial risks*)

References

ALESSANDRI, P., GAI, P., KAPADIA, S., MORA, N., PUHR, C. Towards a Framework for Quantifying Systemic Stability. *International Journal of Central Banking.* 2009, vol. 5, no. 3, pp. 47-81.

ASBERG, P., SHAHNAZARIAN, H. Macroeconomic Impact on Expected Default Frequency. *Sveriges Riksbank Working Paper.* 2008, no. 219.

ASSOUAN, S. Stress testing a retail loan portfolio: an error correction model approach. *Journal of Risk Model Validation.* 2012, vol. 6, no.1, pp. 3–25.

CHAN-LAU, J. A. Fundamentals-Based Estimation of Default Probabilities: A Survey. *IMF Working Paper*. 2006, no. 06/149.

DREHMANN, M. Macroeconomic stress testing banks: A survey of methodologies. In: M Quagliariello (ed), *Stress testing the banking system: Methodologies and applications*, Cambridge University Press, 2009. ISBN: 9780521767309.

ENDERS, W. *Applied econometric time series*. Hoboken: Wiley, 2010. ISBN : 978-0-470-57425-6.

ENGLE, R. F., Granger, C. W. J. Co-integration and Error Correction: Representation, Estimation and Testing. *Econometrica*. 1987, no. 55, pp. 251–276.

FOGLIA, A. Stress Testing Credit Risk: A Survey of Authorities Approaches. *International Journal of Central Banking*. 2009, no. 5, pp. 9-45.

HAMERLE, A., DARTSCH, A., JOBST, R., KILIAN, P. Integrating macroeconomic risk factors into credit portfolio models. *The Journal of Risk Model Validation*. 2009, vol. 5, no. 2, p. 3-24.

BROOKS, C. *Introductory econometrics for finance*. Cambridge: Cambridge University Press, 2008. ISBN: 9781107661455.

JAKUBIK, P.: Macroeconomic Environment and Credit Risk. *Czech Journal of Economics and Finance*. 2007, vol. 57, no. 1-2, pp. 60-78.

JOHANSEN, S. *Likelihood-based Inference in Cointegrated Vector Autogressive Models*. Oxford: Oxford University Press, 1995. ISBN: 9780198774501.

JUSELIUS, K. *The cointegrated VAR model-Methodology and Applications*. Oxford: Oxford University Press, 2006. ISBN: 9780191622960.

LUCAS, R. E. Econometry policy evaluation: a critique. In: Brunner, K., Meltzer, A. H. (Eds.), *The Phillips Curve and Labor Markets, Supplementary Series to the Journal of Monetary Economics*. 1976, pp. 19-46.

LÜUTKEPOHL, H. Maximum eigenvalue versus trace tests for the cointegrating rank of a VAR process. *The Econometrics Journal*. 2001, vol. 4 no. 2, pp. 287–310.

MARCUCCI, J., Quagliariello, M. Is Bank Portfolio Riskiness Procyclical? Evidence from Italy using a Vector Autoregression. *Journal of International Financial Markets, Institutions and Money*. 2008, vol. 18, no. 1, pp. 46–63.

SIMONS, D., ROLWES, F. Macroeconomic Default Modeling and Stress Testing. *International Journal of Central Banking*. 2009, vol. 5, no. 3, pp. 177-204.

VAN, D, E., HOEBERICHTS, J. W., M., TABBAE, M. Modelling Scenario Analysis and Macro Stress-Testing. *De Nederlandsche Bank Working Paper*. 2006, no. 119.

WILSON, T.C. Portfolio Credit Risk (II). *Risk*. 1997, vol. 10, no. 10, p. 56-61.

YOUSSEF, A. B. The Link between Default Risk and Macroeconomy in Tunisia: Cointegration Approach. *International Journal of Economics and Finance*. 2014, vol. 4 no. 6, pp. 257-275.

Financial Perspectives of Big Data

Sigova Maria V., Doctor of Sciences in Economics, Professor, Rector of the Autonomous Non-profit Organization of Higher Education «International Banking Institute» (ANO HE IBI), Saint-Petersburg, Russia, E-mail: sigovamv@ibispb.ru

Vasiliev Sergey A., Doctor of Sciences in Economics, Professor, Adviser of rector of the Autonomous Non-profit Organization of Higher Education «International Banking Institute» (ANO HE IBI), Saint-Petersburg, Russia, E-mail: ibispb@ibispb.ru

Klyuchnikov Igor K., Scientific Consultant of the International Banking Institute (IBI), Doctor Sciences in Economics, Professor, ANO HE IBI, Saint-Petersburg, Russia, E-mail: igorkl@list.ru

Zatevakhina Anna V., PhD in Economics, Associate Professor, Department of Enterprises and Industry Economics and Finance, ANO HE IBI, Saint-Petersburg, Russia, E-mail: zatevakhina@ibispb.ru

Abstract

The article analyzes the macro- and micro-financial perspectives of big data and their impact on the development of the methodology and some of the foundations of a financial outlook.
The financial perspective depends on the development and involvement of big data in the industry and the construction on this basis of non-standard models. The article shows the transfer of finance to large data and the process of forming a new financial cycle, which is derived from new technologies related to the development of large data and the participation of the latter in the decision-making process. A conceptual framework has been developed for transitioning the modeling of the industry to large data. The article concludes that the use of large data in finance is able both to improve the stability of the system and to increase the uncertainty of its functioning.

Keywords: Big data, finance, financial stability, financial uncertainty, market rationality and irrationality

Introduction

There is one important theoretical and practical division in the economic field in general and financial in particular, it is based on macro and micro approaches to the study and application of finance. Although, they are often viewed as competing perspectives: if a macro looks at large pictures of the financial market and explains them in general, and for this, develops general economic and forecasting models for the money, credit and finance evolvement, then, while using micro-focusing, it concentrates on individual financial processes and phenomena, on individual (including corporate) monetary behavior and experience, on economic life and everyday monetary life. Nevertheless, the two prospects complement one another and depend on each other. Their further interaction and development are largely determined by attracting big data technologies into finance and an information explosion in the financial industry.

It is highly probable that many macro-financial studies mostly ignore the problem of big data and rarely use numerous microeconomic indicators to test their models. In any case, they are more often divorced from reality in order to be useful for practical application and rather represent ideal past pictures extrapolated with a certain adjustment for the future. A promising vision of them is based on attempts to incorporate past experience to understand the future. In the conceptual plan, various cyclic constructions and statistical techniques based on long time series attract to this end. True, there are notable attempts to break the reception when the past tendencies are invested in the future and rely on the accumulated experience to solve current and future problems, which they try to apply even to unpredictable innovations and events. So, a couple of years ago, we proposed special

methods for analyzing exchange prices. They are based not on the usual repeatability of events, which is typical, in particular, for the Elliott wave theory and many other traditional price structures (calculated for a certain rhythm) [Klioutchnikov, 2017], but for special models based on big data that can influence the deformation of the cycle. In this respect, the growing number of economic and social indicators and macrofinance processes allows us to exceed the usual model designs in terms of their forecast characteristics. [IFC, 2017; Vlasova, 2015]

The growth in the volume of financial information is quite obvious and can be accounted for. The transition to big data allows a new assessment of the correlation of macro- and microfinance analytical techniques. In practice, this process is largely related to the transition of analysis of many financial events in the "chaos-order" coordinate system. With this approach, the task is reduced to finding conditions for a cyclic transition from chaos to order and back to chaos and to find out how, with the help of big data, the analysis and understanding of such transitions is expanding. Due to the revolutionary changes in finance, the main trend is the growth of random events, which are not always embedded in the usual framework of market behavior and have a shock effect on the entire system. The presence of such "random events" requires new approaches to working with financial data.

The article analyzes the macro- and micro-financial perspectives of big data and their impact on the development of the methodology and some of the foundations of the financial worldview.

Traditional and New In Data Analysis In Finance

At the present time, there is a kind of competition between the traditional view of macro and micro processes, for studying which an established set of data and methods is used, and a new one based on big data that led to the development of new directions and methods of analysis taking into account new directions, classificatory approaches [Sigova, 2016] and methods of analyzes.

The main areas of work with big data in forecast macrofinance research:

1. In finance, regression analysis became an important method of working with big data, which was quite naturally taken from the context of working with conventional data. It is based on statistical research methods with independent variables *X1, X2, ..., Xp*, which determine their influence on the variable *Y*. An example of such work is the modeling of the impact of changes in the money supply, interest rate, inflation, employment rate on the growth of the gross product (*Y*). However, this approach had limitations, because it reflected only the mathematical dependence of the variables, but not their causal relationship. Partially leveled the errors of various corrections. To this end, the following techniques were widely used: simple correlations (establishing relationships between different quantities) and autocorrelation (taking into account temporal motions of events); linear dependencies both within the framework of multicollinear regressive modeling (rather strong correlation dependencies between variables, but with a weak level of cause identification and high uncertainty level of forecasts), and simple regression modeling (for example, for forecasting time series – changes in exchange prices over time); cross-validation of models (estimation of the behavior of models with different initial data). The combination of this method with others allows you to level out its shortcomings when moving to big data and to estimate the outlook for events quite clearly.

2. When analyzing big data, *neural network* principles are widely used. They have a number of advantages in comparison with other methods, among which is the opportunity to assess the overall information-network attitude of the financial market. First of all, using these principles makes it possible to compress and optimize the data for subsequent analysis, that is, to bring them into a framework that allows you to work with conventional data. The method is based on the principle of limited resource base, on the basis of which, on the one hand, it is eliminated, and on the other hand, excessive information is being compressed at the entrance to the system. The process of information compression can be multi-stage – at each stage different filters and concentrators are used, which gradually compress the information to an acceptable level for calculations and modeling. The main disadvantage of this method is the possibility of propagation and multiplication of errors - a primary

error can lead to significant deviations in the course of information compression. There are various error compensators designed to restore the lost signal during its compression. Usually errors are detected and the recovery occurs during the examination, which is carried out after compression (directly at the modeling stage), which significantly improves the reliability of simulation results.

3. In the study of big data, more and more often resort to various methods of modeling. So, *situational modeling* allows to build models that describe the behavior of the financial market, mirror it in the models taking into account the impact of certain endogenous (for example, financial innovations) and / or exogenous (economic policy) impacts on it. Situational modeling has received wide recognition not only in the macroeconomic analysis of financial processes, but also in microeconomic modeling (for example, in the analysis of the impact of the new interface on the client base of the bank). At its core, the situational model is a logical-mathematical description of situations on the market, the identification, formalization and recording of cause-effect relationships. There is a wide range of situational models - from descriptive logistical financial flows to chains of interconnected banking services and products. For situational modeling, various packages of applied mathematical programs are used (for example, AnyLogic, MatLab FEM Physics Simulation Toolbox, Nogrid points, SimScale, Sxulab, Maxima, Scicos, etc.).

4. *Trinitarian models* are used to solve fairly complex problems-for example, in determining the relationship and at the same time the autonomy ("self-development") of inflation, the exchange rate and the interest rate. In finance, these models came from the social sphere (for example, analysis of the change in organizational structures under the influence of human activity). The peculiarity of models is the possibility of analyzing the self-development of the market (self-management, self-reproduction) and the influence of external factors (control action) on it. It is believed that these models allow us to analyze the process of optimizing the interaction of endogenous and exogenous factors on the market. These models made it possible to move from direct analysis to more complex indirect impacts: a binary-linear type – $A \rightarrow B$, which establishes links between individual events A (for example, a change in the base rate) and B (inflow or outflow of capital to the country); more complex interaction – $A \rightarrow B \rightarrow C$ (where C – level of economic activity). In the latter case, indicator B is transitory to achieve the main – economic growth.

5. *Associative modeling* has introduced a wide range of behavioral finance. In analyzing financial processes, we also use techniques of associative memory built on neural networks. An example is the financial crisis of 2008, which immediately led to the association with the Great Depression of 1929-1933 and led to a series of comparisons, which increased interest in comparative modeling [Klioutchnikov, 2011].

The list of approaches to big data is far from complete, but it also gives an idea of the variety and possible variations in the choice and differences in the results of the analysis. At the same time, the competitive advantages of each new and old in data analysis techniques are not sufficiently evident.
So, there is a distinctive competition between the different methods of analysis, which reflects the differences between traditional views on macro and micro processes and new ones. At the heart of the former is a well-established set of data and techniques, the second - new technologies, which were caused by the transition to work with big data. Not always new principles and techniques win. But this is typical during the transition period, in which not only the assimilation of the new and, due to this, the expansion of the technological and methodological base occurs, but also the rejection of untenable approaches, the screening of excessively cluttered analysis and the selection of more targeted designs. The inclusion of new techniques and technologies in macro- and micro-financial observations is able to change our perceptions to many economic processes and rebuild financial science. The fact is that the results of the selected analysis methods largely depend on the overall assessment mood and the conceptual orientation of the finance.

The transition to a comparison of the two views (traditional and new) is fundamentally connected with the dispute between economists about the state of the modern financial market, the ratio of uncertainty and certainty on it. So, recently the financial market is usually defined as efficient and

rational and, accordingly, balanced. The attitude towards it as inefficient and irrational became quite innovative, which makes it possible to characterize its basic state as unstable. The initiators of this approach to the market are supporters of the Minsky's hypothesis, as well as partly behavioral finance and the Austrian economic school. As a result, there was another confrontation between the mainstream and various lateral trends in financial science.

Macro-Financial Perspectives of Statistical Thinking in the Transition To Big Data

Macroeconomic prospects of finance are largely related to changes that occur in the statistical worldview and representation of the main processes in the form of time series. In general, modern society has switched to statistical thinking - the assessment of what is happening is largely done on the basis of comparisons of cost indicators. An important condition for the transition was the involvement in the theory and practice of probability theory. However, it was applied to statistics as far back as the seventeenth century and on this basis achieved important practical results – went to insurance, and in the nineteenth century – arbitrage exchange transactions and complex financial products. New in the use of probability theory was the assessment of the financial market from the position of uncertainty and irrationality, which increasingly began to choose as its basic state, rather than a special one, as was customary in the theory of an effective market. In this regard, probability theory has allowed departing from the dominance of views on the stability of the financial market and its natural balance. The main drivers of instability were chosen financial innovations, which in many ways began to determine the face of the fourth industrial revolution. Shifting the bank of revolutionary changes in finance is not accidental. In this area, there is a combination of information technologies, which largely determine the face and profile of the fourth industrial revolution, with the main financial processes in a single whole - "financial production". On this basis, the formation of an information and financial order is taking place, which becomes an important distinctive feature of the present stage of the development of society. This order occupies a special place in the system of economic and social co-ordinates of chaos-order.

The evolution of modern statistics is inextricably linked with the solution of state problems, primarily related to the recording and measurement of achievements. The culmination of development statistics was the applied econometrics of the twentieth century. [Desrosières, 2002], Important arguments require evidence, and quantitative data requires statistical evaluation. In some cases, deep and subtle statistical ideas, such as the paradox of aggregation and regression, are required; in others it is necessary to describe "Middle Man" as a market participant – consumer, investor, borrower, lender, taxpayer, recipient of social payments, etc. [Stephen, 2002] The main new processes are somehow connected with the "big data" phenomenon.

Thirty years ago, the events leading to the financial crisis and the factors underlying it were predicted in the 1986 Oxford Economic Policy Review of the 1986 Financial Innovation Assessment. The same ideas, on the basis of which the forecast was made, pointed to significant shortcomings in the response to the financial crisis, both on the part of the state and the market, and the inability to determine the requirements for regulatory strengthening, as well as its limits. In particular, there was a need for institutional reforms, which have not received sufficient attention since. [Mayer, 2015] However, at that time questions related to accounting and analysis, all the growing information in finance, had escaped from analysis. These questions were actualized only with the transition to the era of big data. Previously, the issue of collecting, accounting and using information in finance was decided as if by itself, being an integral element of finance, it did not need special allocation. The relevant data was inextricably linked to finance and were its natural state and were used in the "production" process (lending, investing, settlements, etc.). But the information explosion of recent years and the sharply increased amount of data that came into the financial system, and was generated by the latter, changed the approach to them - not only gave it peculiar shades, but also demanded unusual solutions. Starting the transformation of financial practice, he also touched on financial statistics and financial theory.

Increasingly, scientists and practitioners are asking a very important question - how much society is ready for the era of big data. [Brown, 2011] The answer to it is specific in each field of activity. He has special value in finance. The fact is that all the finance cannot only be represented in the form of data (different cost indicators and assets), but the financial process itself is the accumulation, transformation and use of data. Moreover, to organize the movement of value data, which is directly finance, it is often necessary to process huge amounts of various non-value data, most of which can not be structured by generally accepted methods. And the ratio of data directly financial and non-financial, is changing in favor of the latter - the non-financial data necessary for the organization of the financial movement is growing at an accelerated exponential scale.

Finance for professionals, for the economy and the state, as well as for the population, has significant differences and unequal significance - in each sphere a special set of data, principles and regulations is used, but there are common denominators. The latter are related to the valuation of the movement of liquid assets (financial assets that are at the disposal of different groups and somehow redistributed among them). In the most general plan, this movement reflects, firstly, the transfer of value from one agent to another, secondly, the growing debt of the population, economy and government, thirdly, the growth of savings and the relative overaccumulation of capital. Big data made significant adjustments at almost all levels of financial assets turnover. First of all, the indicators of financial turnover have significantly increased. Equally important, quantitative changes have had an impact on the quality of financial assets. So, there was not just a quantitative increase in financial assets, the more significant was that the finances from serving the real production industry have become a self-developing and self-sufficient sphere of activity. This process was called the financing of the economy [Klioutchnikov, 2013], and its result was quantitatively expressed in the general growth of debt.
The growth of debt does not reflect only the process of borrowing, but is connected with the restructuring of the existing financial system and the entire economy, a change in the links between finance and the material world. Structural shifts in the economy led, in particular, to the growth of debt dependence and the associated over-crediting and overheating of the economy. [Mason, 2017] Big data contributes to the acceleration of these processes. They significantly strengthen the information and financial component of the development of society. The problem between the standard approach to solving the problem of financial data and the new one based on big data in finance, in particular relates to solving the debt problem and determining its place in the modern economic system. Ultimately, the decision grows into a new financial order in the "chaos-order" system, within which liquid financial assets move.

Scale Effect: From the Transition to Large Data

Macroeconomics focuses, of course, on the problems of economic and financial stability and how to organize sustainable growth. In this sphere since the 1990s a new direction of research has appeared. It is associated with the development of the following concepts: "new growth", "new trade", "new economic geography". Modern approaches to understanding economic development and the territorial organization of production and capital are largely determined by changes in the role and place of credit and investment in the organization of the economy (mainly in connection with the emergence of the effect of the financialization of the economy [Klioutchnikov, 2013]) and meet the requirements for accounting for big data in their development. First of all, a restructuring of the model range of the main economic processes was outlined. Traditional models built on complete equilibrium and aggregate behavior were found to be weakly acceptable to reflect real processes. They were built on complete balance and aggregate behavior, stemming from individual maximalism. In new approaches, attempts have been made to take into account the discontinuity and variability of the spatial structure, fragmentation and volatility of behavior (not always based on individual economic expediency), sharp fluctuations in business activity, change in development vectors (including those related to economic, political, social cycles) and other deviations from the usual lines. Accounting for deviation and non-standardization has become the norm for solving many economic problems. Financial research is particularly relevant to them. The usual deviation in the financial sphere is associated with the irrationality of the market and its players. [Klioutchnikov, 2017] In this case, it affects market uncertainty.

To study deviations attract related disciplines and various techniques. So, for this purpose, in some cases, apply network effects, in others – methods of comparative advantages and different correlations, in the third - different interpretations of the already familiar economies of scale, etc. As a result, the model range has expanded and the approach to modeling has changed, the number of expert assessments and various correlations has increased, which can influence the results of research. These processes are connected with the phenomenon of "big data", which in the current decade has largely determined the course and direction of macroeconomic transformations in both the general economic and financial spheres.

We give just one example of the operation of the scale effect, first for the general economic sphere, which in the last century became traditional. Rather, it concerns a return to the scale effect at the next stage of development, when we take into account, on the one hand, only the relations between the input and output quantities, and on the other hand, all calculations are based on "big data" and the results depend on the inclusion of a multitude of conditions, which were simply not taken into account before. First, consider the effect of the effect taking into account the big data applied to production, and then turn to its specificity in finance.

The term "return to scale" arose in the context of an analysis of the company's current production function. Through this term explains the behavior and conditions that ensure the growth of production (*production function*) in comparison with the corresponding increase in costs (factors of production – *cost function*) in the long run. Ultimately, all factors of production are variable and can be changed in the direction of increasing the size (scale of production) of returns (output conditions). In new conditions, economies of scale show the effect of growth at the output, reduced to unit costs, the return on scale is focused only on the ratio between input and output quantities.

Return to scale is a set of three interrelated and consistent laws*: the law of increasing returns* depending on the scale (the output results depend on long-term changes in the input), *the law of return to scale* (any additional investments in factors of production do not lead to an increase in output) and *the law of diminishing returns* (an increase in one of the factors of production does not ensure a corresponding increase in income). Three options: if the output growth is proportional to changes in the input, then the constant return on scale growth; if the yield increases less than the growth of input factors, then with the growth of scales, the return is reduced; If the output increases more than the growth of the input factors, then the return is increased in accordance with the scale. The production function of the firm can demonstrate different types of return to scale in different ranges. The innovativeness of the function lies in the possibility of a larger increment at the output than at the entrance to the force of new approaches to the organization of production. In the microeconomic mainstream, the return to the scale faced by the firm is completely determined by technological and organizational innovations and does not depend on economic or market conditions. Conclusions are quite unambiguous-a return to scale arises from a transition to a specific structure of the economy, which is mathematically quite understandable within the framework of the production function.

New circumstances and knowledge become a key condition for all macroeconomic changes and therefore need to be investigated. The common is the transition to the figure in the main production and economic processes, as well as the data revolution that led to the phenomenon of "big data", which had an impact primarily on the financial industry - money flow, lending, insurance. In particular, under the influence of new processes, the mechanism of economic growth has changed and the scale effect in the financial sphere has been revised.

For the financial sphere, an important feature of the return to scale effect is the possibility of a transition of finance to self-development, which has already been reflected in the process of the financialization of the economy. However, the quantitative consideration of this effect allows us to parameterize the "production" function of a financial institution, at the entrance of which there are financial data that are processed using the involved non-financial data (the "production" process) and in a modified form to consumers (the output of data outside the system is a kind of implementation) . That is, the usual system of entry and exit operates, but with respect to big data it means that for their

servicing at the input it is necessary to attract more and more diverse external information, which formally does not refer to financial, but is necessary for organizing financial "production".

Thus, the process of financial "production" can be represented in the form of a matrix with the main line in the form of financial data directly and secondary - the non-financial data necessary for "production" purposes. We invited to consider three main options for the operation of this function.
The first option: the law of increasing profitability, depending on the scale of the financial institution. This effect was dominant and in the previous decade undeniable – it was believed that financial giants consistently show the best indicators of development and income. And purely quantitative to that were confirmations – in past decades stock quotes and incomes of leading financial companies were higher than the industry average. The scale effect worked in direct proportion. In such conditions, it seemed that big data would allow this trend to continue. But everything has changed in the current decade – profitability has declined.

The second option: a return to scale means that any additional investment and capital growth of financial institutions does not lead to an increase in profitability. For finance, this option has at least two differences from other areas of entrepreneurship: the first is related to the implementation by banks of Basel 3 requirements for increasing the banks' own capital and changing attitudes to risks (that is, regulatory – exogenous factor); The second – financial startups demonstrates the best growth and profitability indicators than traditional institutions (market, but also exogenous factor, which as the startups are involved in the financial industry turns into endogenous, as already nouveaux riches operate inside the system).

The third option: diminishing returns is a possible gradual replacement of traditional financial institutions by financial startups from the market and introduction of enterprises from the sphere of information technologies and communications, as well as retail vendors. At the heart of this option are also technologies of big data that allow you to enter the financial sphere of the nouveaux riches. In this variant, an additional supernovational option is possible, which is based on block-based technologies and the development of settlement, credit and investment relations without third parties – financial intermediaries (in particular, a new type of credit and settlement interactions based on B2B, P2P, B2C, and also crowd-funding procedures and exchange traders crypto currency).

Everything depends on the solution of the following problems: the ratio of simplicity and complexity, conventional and big data, traditional financial institutions and financial nouveaux riches. It is appropriate to compare the transition from the simple to the more complex market - from the bazaar to the stock exchange, and within the financial market to the derivative market and then to the high-frequency exchange market with robot-trading. If we construct all the transition processes by means of logarithmic plotting, then a significant acceleration of the complications is given, which is reflected in the results – financial modeling. The transition to a new model range, determined by big data, means a universal law of innovation growth and is one of the options for its implementation. [West, (2017] There is a malfunction in the work of the usual model clip, but new models do not keep up with new technologies based on big data.

The entire history of the development of finance can be seen in the form of large, super-long financial cycles, which, in our opinion, it is advisable to define as civilizational. The foundation of modern finance was laid about 700 years ago (transition to the decimal system of accounting, double bookkeeping, the introduction of market shares, bills, the emergence of modern banks and exchanges). The basis of this foundation was the data, the volume of which constantly increased, but with the course of subsequent centuries, in principle, little changed. In the new century, the situation has changed radically. Big data influenced the fundamental principles of the financial business - not only spasmodically extended its information basis, but also blurred the boundaries of the industry, opened the gateways for the entry into it of other spheres of activity. Throughout the 700 years of the existence of traditional finance, the corresponding financial theories and models have evolved. The financial crisis of 2008 and the subsequent events associated, on the one hand, with the fragmentation of finance under the influence of Brexit and the attempts of non-market restrictions on global capital flow, and on the other hand, with the transition to big data and the digitization of financial

information that facilitated the universalization and globalization of financial flows, undermined faith in traditional financial models.

Standard finance offers two diametrically opposed approaches to the market: market optimization occurs independently-automatically (monetarism) or under state influence (Keynesians). Such views were the beginning of all assumptions and they conceptually predetermined the subsequent results. But they do not take into account human behavior. Attempts to take it into account are usually associated with behavioral finance, which is usually based on the theory of the prospects of D. Kahneman and A. Tverskikh (1979), which uses methods of cognitive psychology to explain the divergence between real and ideal (based on traditional theory) economic processes.

Big data have made significant adjustments and expanded the boundaries of the use of behavioral finance in the decision-making process. In a number of cases, they simultaneously disoriented the participants in the relationship, because under their influence the range of internal and external influences on the results, the full accounting of which is quite problematic, has considerably expanded. As a result, many decisions instead of more reasonable ones, which suggested introduction to analysis and modeling of big data, became increasingly more intuitive. As a result, the contradictions between the objective and subjective in the decision-making process increased. The input of big data into finance marked the radical uncertainty of the entire system, since it is not possible to calculate and include in the model all the information. Financial prospects began to be connected and innovations, accidents and uncertainties. All this required reorientation and caused a rethinking of the risk management in the organization and management of finances. As a result, macro- and microeconomic financial benchmarks were replaced, mainly due to the sharp expansion of the boundaries of financial responsibility and economic response, the main on financial leverage. Again, this transition is associated with big data and is determined by the laws of their development.

* * *

In the long term, the financial landscape and, above all, its stability and certainty, according to consulting firm Greenwich Associates, depends on the evolution of technology [Technology Helps Buy…, 2017] and the direction of market regulation. In the short term, the financial situation was influenced by various factors, for example, in 2016, the US presidential election and Brexit had a significant impact. Under this influence, there were quite a lot of price and volume outbursts and falls, and market uncertainty generally increased, and the investment climate was unstable. With the acceleration of the introduction of technologies and the reduction of the time for adaptation to them, many traditional financial companies are beginning to keep pace with the changing information landscape and meet the challenges of numerous financial strata and non-financial companies expanding their activities in the financial sector. Thus, according to some estimates, the banks of Scandinavian countries in terms of development of finteh and the use of big data in their activities outstrip the non-financial companies of the region. [Outside-in disruption… 2016] True, in many other countries the balance of power is not shifted in favor of traditional financial institutions that are forced to follow their competitors and "pull themselves up" to their level of development and use of information for the development of financial services.

In general, the financial perspective depends on the development and involvement of big data in the industry and the construction on their basis of non-standard models. There is also a rethinking of financial statistics and its place in the development of finance. The current financial cycle is largely determined by the technologies associated with the development of big data and the involvement of the latter in the decision-making process.

Literature

Desrosières, A (2002), The Politics of Large Numbers, [Online], [Retrieved August 23, 2017], http://www.hup.harvard.edu/catalog.php?isbn=9780674009691.

Brown B., Chui M., Manyika J. (2011), Are you ready for the era of "Big data"? *McKinsey Quarterly*, [Online], [Retrieved August 22, 2003], http://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/are-you-ready-for-the-era-of-big-data

IDC's Worldwide Storage for Big Data and Analitics Taxonomy, 2017. International Data Corporation. Framingham (MA, USA), May 2017. P.1 (19). // Electronic resource] URL: www.idc.com

Klioutchnikov I.K., Klyuchnikov O.I. (2017), Macroeconomics. Credit and Exchange Cycles, Yurayt, Moscow, 286 p.

Klioutchnikov I.K. (2013), Scenarios for the development of the monetary and financial economy, *Bulletin of St. Petersburg University*, Ser. 5. The economy, 4, 110-129

Klioutchnikov I.K., Molchanova O.A., Klyuchnikov O.I. (2011), Financial crises: theory, history and modernity, Publishing House SPbGuEf, St. Petersburg, 258 .

Mason, Josh (2017), How Not to Criticize Standard Economic Models, [Online], [Retrieved September 13, 2017], https://www.youtube.com/watch?v=6HiKk9o2C0Q

Mayer C. (2015), Big Bang: new beginning or beginning of the end?, *Oxford Review of Economic Policy*, 31, Issue 2, 186-198

Outside-in disruption and digitalization in Nordic finance services. MISYS Financial Software, 6 September 2016, Stockholm, Sweden, [Online], [Retrieved September 13, 2017], http://www.misys.com/fintech-insights/news-features/outside-in-disruption-and-digitalization-in-nordic-financial-services/

Sigova M.V., Kruglova I.A., Klyuchnikov I.K. (2016), Approaches to the classification and assessment of the prospects for financial security, *Banking law*, 6, 29-35.

Stephen M. (2002), Stigler Statistics on the Table, [Online], [Retrieved August 30, 2017], http://www.hup.harvard.edu/catalog.php?isbn=9780674009790.

Technology Helps Buy Side Prepare for Uncertainty, Greenwich Associates, February 28, 2017, [Online], [Retrieved September 13, 2017], https://www.greenwich.com/equities/technology-helps-buy-side-prepare-uncertainty

Vlasova, M.; Laskina, L.; Musalimov V., Musalimova L. (2015) The impact of taxation on the sustainability of machine – building enterprises: a case study // Proceedings of the 10th International Conference of DAAAM Baltic, Industrial Engineering, 12-13 May 2015, Tallinn, Estonia, ISBN 978-9949-23-804-0, ISSN 2346-612X (print), ISSN 2346- 6138 (online), indexed in Scopus and ISI Web of Science. Electronic resource] URL:http://innomet.ttu.ee/daaam15/Proceedings/Mechatronics&System%20Engineering/vlasova.pdf

West G.B. (2017), Scale: The Universal Laws of Growth, Innovation, Sustainability, and the Pace of Life in Organizations, Cities, Economics, and Companies. Penguin Press, 490p.

Employees' Retention: A Systematic Literature Review

Viviana Meirinhos, ISCAP, CEOS.PP, Polytechnic Institute of Porto, Porto, Portugal, vivianameirinhos@iscap.ipp.pt

Sara Abrunhosa, ISCAP, CEOS.PP, Polytechnic Institute of Porto, Porto, Portugal, sara.abrunhosa@gmail.com

Dora Martins, ISCAP, CEOS.PP, Polytechnic Institute of Porto, Porto, Portugal, doramartins@iscap.ipp.pt

Abstract

Framed on a wider project on Employees' retention, this project specifically aims to explore the state-of-art on of this field of study. This paper presents the preliminary results of the project as a call for international partnership for the follow up stages of the project. It is our intention to widen this research to other countries in the empirical study in order to acquire and generate more significant insights to employees' retention problematic. In this kick off phase we developed a systematic literature review between 2006 and 2015, which permitted (a) the characterization of scientific production of the last decade on the subject, (b) the identification of the main issues associated to employees' retention problematic, (c) the retention factors of employees on organizations, and (d) the more prevalent human resources management practices related to employees' retention.

Keywords: Retention; human resources management; systematic literature review; good practices

Introduction

Although the employees' retention literature has been growing along the last years (Steel, Griffeth & Hom, 2002), remains unaddressed the relationship between Human Resources Management (HRM) practices and employees' retention (Hausknecht, Rodda & Howard, 2009; Pinheiro, 2012; Bandura & Lyons, 2014).

This concern is increasingly present on the agenda of organizational retention researchers given the recent growing need of linking the retention framework to other factors such as unemployment, turnover, or labor productivity. The focus on employees' retention gathers importance both in what concerns the understanding why employees remain within the organization, and recognizing which factors underlie and are associated with human resources management (Griffeth, Hom & Gaertner, 2000).

As referred by literature (e.g. Sullivan & Mainiero, 2008; Holtbrügge, Friedmann & Puck, 2010; Kaye & Giulioni, 2016), the retention is a key factor of organizational' effectiveness, especially during recession periods, namely the difficulty in keeping the more talented employees. Furthermore, on the one hand recent researchers (e.g. Hausknecht, Rodda & Howard, 2009; Snow *et al.*, 2011; Mountford, 2013; Ramani *et al.*, 2013; Ali, Metz & Kulik, 2015) have shown the need of concentrating the retention analysis in different clusters, such as business activity sectors, functional positions, international assignments, work conditions as well as individual characteristics of employees. On the other hand, some authors (e.g. Rahman et al., 2010; Midtsundstad, 2011; Witter, Ha, Shengalia & Vujicic, 2011; Mohamed *et al.*, 2013; Hatcher, Onah, Kornik, Peacocke & Reid, 2014; Wang & Heyes, 2017) underline factors as job satisfaction, career advanced, self-development desire, retirement willingness, contract security, internal flexibility, reward system satisfaction.

In line with this perspective, some recent authors (e.g. Chan & Kuok, 2011; Clarke, 2013; Vaiman, Haslberger & Vance, 2015; Oliveira et al., 2017) show that human resource management practices

could explain the willingness to remain the organization and these authors also believe that retention management could be a critical factor for organizations around the world in the next years. According to Wright and McMahan (1992), organizations should promote different human resources management strategies for retaining their main employees during a long-time period. Finally, several studies suggest that retention management is the most important human resource process on organization return through the promotion of new capacities that promote the business competitiveness (Grant, 1996; Cegarra-Leiva, Sánchez-Vidal & Cegarra-Navarro, 2012; McCracken, Currie & Harrison, 2015), opportunities to create new services or products (Devi, 2009), supporting the attraction of the best applicants (Pathak, 2015), and on promoting organizations' recognition as a reference employer (Ezulike, 2012). Thus, all these factors could be a positive impact on organization image.

Methods

In order to accomplish our research goal of understanding the main factors underlying employees' retention, we developed a systematic review of literature between 2006 and 2015. This methodological option allowed us:

- To characterize the scientific production on the field of employees' retention;
- To develop a conceptual framework of employees' retention field;
- To identify the main dimensions on employees' retention addressed by scientific studies;
- To systemize all the employees' retention explanatory factors identified by scientific studies.

With this intent, we developed a sample, considering international and national (Portuguese) scientific literature. For the international sample we considered all scientific journals with formal scientific impact, which title included the combination of the terms "human*" and "resources*" in Boolean language (n^1=15). Our source was *SciVerse Scopus* and *Web of Science* databases (considering *SCImago Journal & Country Rank* and *Journal Citation Reports,* both 2015 version). Access to journals was accomplished by b'on (Online Knowledge Library) between March and May 2016 (table1).

Table 1: Human Resources' Scientific journals with impact factor within *SciVerse Scopus* and *Web of Science*

Databasis		Impact factor		Journal Title	Country
		WoS	SVS		
WoS	SVS	8	1	International Journal of Human Resource Management	UK
WoS	SVS	9	2	Journal of Human Resources	USA
WoS	SVS	6	3	Human Resource Management Review	UK
WoS	SVS	4	4	Human Resource Management	USA
WoS	SVS	7	5	Human Resources for Health	UK
WoS	SVS	5	6	Human Resource Management Journal	UK
-	SVS	-	7	Research in Personnel and Human Resources Management	USA
WoS	SVS	2	8	Human Resource Development Quarterly	USA

WoS	SVS	1	9	Asia Pacific Journal of Human Resources	Australia
WoS	SVS	3	10	Human Resource Development Review	USA
-	SVS	-	11	Advances in Developing Human Resources	USA
-	SVS	-	12	Journal of Human Resources in Hospitality and Tourism	UK
-	SVS	-	13	International Journal of Human Resources Development and Management	UK
-	SVS	-	14	Human Resource Management International Digest	UK
-	SVS	-	15	Research and Practice in Human Resource Management	Australia

For the national sample two different sources were considered: The Portuguese Open Access Scientific Repository (RCAAP) and the National General Directorate of Education and Science Statistics (DGEEC). Data was collected within these two databases in June 2016.

Documents were selected from all sources by the application of a conceptual filter: the term "retention*" was used as the keyword for collecting the documents that originated our final sample. For a more functional and specific selection, we considered both the lexical variation "retain*" and the portuguese similar "retenção*" and "reter", as well as cumulatively the "employee*" / "colaborador*" or "Staff*"/ "equipa*" or "worker*"/"trabalhador*" or "person*"/"pessoa*" or "human resource*"/ "recursos humanos" or "HR"/"RH" or "firm*"/"empresa*", in at least one of the search fields (title or keywords). Validation criteria included (1) written in English or in Portuguese; (2) access to the article; and (3) content explicit focused on human resources retention. The final sample consisted on 189 documents.

From each document was collected title, keywords, country of the first author, its institutional affiliation, number of annual citations, type of study, study sample, and main contributions. Categories for studies' methodological options and for the variables studied were initially created. From the basic categorical construction a hierarchical tree of categories and subcategories was on a second phase developed. Categorical system was validated by 3 scientific judges. This content analysis stage was held between February 2017 and May 2017 supported by NVivo software.

Results

General view of scientific production about human resources' retention

Results show a growing trend in terms of publication numbers by year. Between 2006 and 2015, the number of scientific publications about Human Resources' retention almost tripled. Results revealed an exponential increase on scientific citation on this subject, a rise around149 times more citations within the analyzed decade (Figure 1).

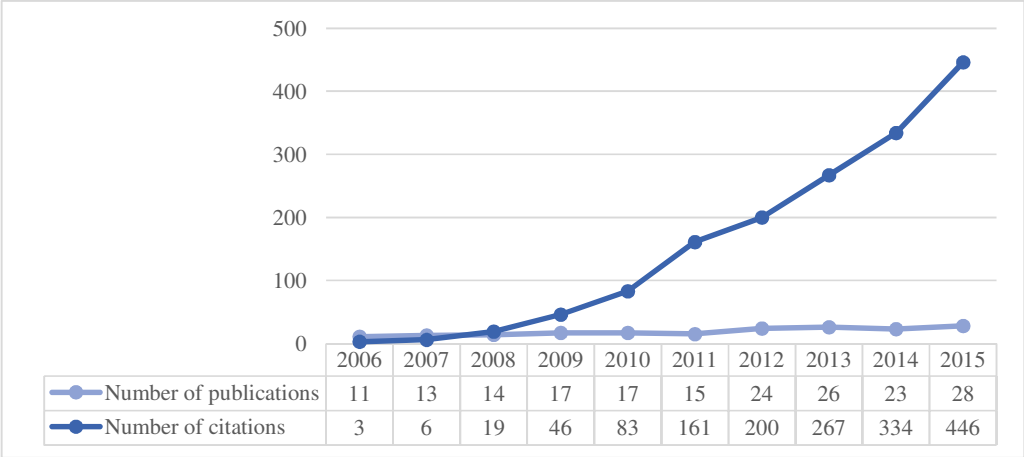


Figure 1: Number of scientific documents published per year and number of scientific documents citations

Geographically, most of scientific literature is developed by European authors (40.4%), followed by American (36.8%), Asia and Oceania (both with 9.6%) and at last Africa (3.8%).

Our results demonstrate that quantitative method is dominant in people's retention studies (table 2), being applied in 64% of the articles analyzed. In second place is the qualitative method with 30%, and at last the mixed method with only 6%.
In order to identify the documents relevance, we analyzed the number of quotes by article. The fifteen most quoted authors represent 61.3% of the total quotes. Hausknecht (2009) is the most quoted author.

Table 2 : Top-15 most quoted authors

Main Author	Publishing year	Country of main author	Institutional afiliation	Number of quotes
Hausknecht	2009	USA	Cornell University, ILR School	167
Henderson	2008	Australia	Australian Agency for International Development	113
Kraimer	2009	USA	University of Iowa	102
Manafa	2009	Ireland	Centre for Global Health, Trinity College, University of Dublin	77
Shacklock	2009	Australia	Griffith University	65
Sheehan	2006	Australia	Monash University	51
Shen	2009	USA	School of Management, Boston University	49
Rahman	2010	Bangladesh	International Centre for Diarrhoeal Disease Research	48
Sullivan	2008	USA	College of Business, Bowling Green State University	48
Devi	2009	India	KL University	48
Lam	2009	China	The Hong Kong Polytechnic University	46
Reiche	2007	Spain	IESE Business School, University of Navarra	43
Holtbrügge	2010	Germany	University of Erlangen-Nuremberg	40
Kaplan	2011	USA	Saint Louis University	32
Woodruffe	2006	UK	Human Assets Ltd	31

In what concerns the terms more mobilized for the articles (table 3), we identified the term "retention", followed by "employee", "health", "talent", "workers", "management" and "practices".

Table 3 : Main English terms used on the title of the scientific documents

Word	Frequency(x)	Percentage (f)	Cumulative percentage (Cf)	Family of words
retention	92	5,62%	5,62%	retention, retain, retaining, retains
employee	50	3,05%	8,67%	employee, employees
health	28	1,71%	10,38%	health
talent	26	1,59%	11,97%	talent, talents
workers	23	1,40%	13,37%	worker, workers
management	22	1,34%	14,71%	management, managers, managing
practices	20	1,22%	15,93%	practice, practices, practicing
resource	18	1,10%	17,03%	resource, resources
recruitment	18	1,10%	18,13%	recruit, recruiting, recruitment
development	13	0,79%	18,92%	developing, development, developments
human	13	0,79%	19,71%	human
rural	13	0,79%	20,50%	rural
study	13	0,79%	21,29%	study
job	12	0,73%	22,02%	job
work	12	0,73%	22,75%	work, working
staff	11	0,67%	23,42%	staff
factors	10	0,61%	24,03%	factor, factors
best	10	0,61%	24,64%	best
firm	10	0,61%	25,25%	firm, firms
effect	10	0,61%	25,86%	effect, effective, effectively, effects

Key-words, in its turn, present 423 different terms in English. Table 4 shows the most used key-words, with a cumulative frequency near 50%. "Retention" is the dominant term (x=140) followed by "employee" (x=81), "management" (x=66), "human" (x=44) and "resource" (x=63).

Table 4: Principal English terms used on the key-words of the scientific documents

Word	Frequency(x)	Percentage (f)	Cumulative percentage (Cf)	Family of words
retention	140	8,74%	8,74%	retention, retaining
employee	81	5,06%	13,80%	employee, employees
management	66	4,12%	17,92%	management, managers, managing
human	64	4,00%	21,92%	Human
resource	63	3,94%	25,86%	resource, resources
recruitment	40	2,50%	28,36%	recruitment
development	36	2,25%	30,61%	developing, development
turnover	31	1,94%	32,55%	Turnover
health	27	1,69%	34,24%	Health
organizational	27	1,69%	35,93%	organizational
talent	24	1,50%	37,43%	talent, talents
job	19	1,19%	38,62%	Job
satisfaction	18	1,12%	39,74%	satisfaction
performance	16	1,00%	40,74%	performance

workers	16	1,00%	41,74%	worker, workers
intentions	15	0,94%	42,68%	intent, intention, intentions
training	14	0,87%	43,55%	Training
practices	14	0,87%	44,42%	practice, practices
work	13	0,81%	45,23%	work, working
career	12	0,75%	45,98%	career, careers
age	11	0,69%	46,67%	age, aged, ageing, aging
rural	11	0,69%	47,36%	Rural
skills	10	0,62%	47,98%	skill, skilled, skills
attraction	10	0,62%	48,60%	Attraction
awards	10	0,62%	49,22%	Awards
culture	10	0,62%	49,84%	cultural, culture

Contribution of scientific production on retention of people

From our sample 8 different dimensions aroused in order to systematize the scientific production in the human resources' retention problematic: (1) employees retention (n=83); (2) by business area (n=45); (3) in human diversity scope (n=32); (4) by different organizational contexts (n=9); (5) in international mission's scope (n=9); (7) by organization size (n=7); and (8) by generation (n=5).

Table 5 shows that employee's retention factors are mainly organizational (N=63), individual (N=45), connected to the functions (N=24) and to context (N=8).

Table 5: Explaining factors of employee's retention

Organizational Factors (N=63)	**Individual Factors (N=45)**
Good relationship with hierarchical superior (n=25) Good relationship with work colleagues (n=9) Work conditions (n=7) Commitment with HRM (n=6) Positive external image (n=3) Operation market (n=3) Social responsibility (n=2) Hierarchical structure (n=2) Contractual stability (n=2) Administration (n=2) Favorable internal economic conjecture (n=1) Dimension (n=1)	Effective organizational commitment (n=17) Work satisfaction (n=11) Demographic factors (n=5) Individual interests (n=4) Personality (n=3) Professional efficiency (n=2) Financial independency (n=2) Professional life relevance (n=1)
RETENTION	
Factors related to function (N=24)	**Conjecture factors (N=8)**
Challenge (n=6) Possibility of applying skills (n=5) Work's meaning (n=5) Autonomy (n=3) Responsibility (n=2) Liking the functional content of the work (n=2) Technical knowledge of the used ITs (n=1)	Geographical location (n=5) Collective representation structures of the employees (n=1) Social context (n=1) Unfavorable economic conjecture of the country (n=1)

Organizational factors seem to be the most dominant group to influence retention (N=63), specially the good relationship with the hierarchical superior (n=25) and with work colleagues (n=9). Standing out are also the work conditions (n=7) and the commitment of the organization with the HRM (n=6). Reasons of permanency are also distributed among the individual factors of the employees (N=45), as

an example, the effective organizational commitment (n=17), the satisfaction at work (n=11), and the demographic factors (n=5). The factors connected to the functions (N=24) are based mainly on the challenge (n=6), on the possibility of an employee applying his skills (n=5) and on the meaning of the job (n=5). According to the results, the context factor (N=8) more determining in the retention of employees is the geographical location (n=5), on the country level, region and city.

Regarding HRM practices oriented to retain workers, a total of 59 practices can be identified. On table 6 we identify the 14 most referred practices, in which the extrinsic rewards, the opportunity of developing skills, and an attractive benefit portfolio assume first, second, and third places, respectively.

Table 6 : TOP-14 of the HRM practices promoted in global retention of the employees

TOP	HRM Practices
1	Extrinsic rewards (n=26)
2	Opportunities to develop skills (n=18)
3	Attractive benefit portfolio (n=17)
4	Policy of fair rewarding (n=15)
5	Diagnosis of the most suited retention practices (n=14)
6	Retention practices adjusted to the retention of talents (n=13)
7	Planning procedure and carrier preparation (n=13)
8	Efficient internal communication (n=12)
9	Balance between personal and professional life (n=12)
10	Carrier evolution opportunities (n=11)
11	Cultural cohesion development (n=11)
12	Good work environment (n=11)
13	Guiding the development towards the individual needs(n=10)
14	Evaluation of the agreement person-organization(n=8)

Label: n represents the number of scientific documents that identify the shown results

Within the main HRM practices identified to improve the retention rate are Compensation Management (e.g. extrinsic rewards), Professional Development (e.g. opportunities to develop skills), Retention Management (e.g. diagnosis of the most suited retention practices), Organizational Culture (e.g. efficient internal communication), and Recruitment and Selection (e.g. Evaluation of the agreement person-organization).

Conclusion

Results of this initial stage of the project allowed us to characterise the scientific literature on employees' retention, as well as identifying multiple explanatory factors for the retention, and the Human Resources practices converging to this goal. This preliminary analysis enabled a grounded starting point to develop solid instruments to collect data for the international comparative study, to which we invite international partners.

Endnotes

[1] **n** represents the sample number

References

Ali, M., Metz, I. and Kulik, CT. (2015), 'Retaining a Diverse Workforce: The impact of gender-focused human resource management,' *Human Resource Management Journal*, 25(4), 580-599

Bandura, RP. and Lyons, PR. (2014), 'The Art and Science of Job Satisfaction: Much of it Comes Down to Decent Management Practice,' *Human Resource Management International Digest*, 22(7), 32-35

Cegarra-Leiva, D., Sánchez-Vidal, ME. and Cegarra-Navarro, JG. (2012), 'Work Life Balance and The Retention of Managers in Spanish SMEs,' *The International Journal of Human Resource Management*, 23(1), 91-108

Chan, SH. and Kuok, OM. (2011), 'A Study of Human Resources Recruitment, Selection, and Retention Issues in The Hospitality and Tourism Industry in Macau,' *Journal of Human Resources in Hospitality & Tourism*, 10(4), 421-441

Clarke, E. (2007), 'Safety in Numbers (Retention),' *Human Resource Management International Digest*, 15(4), Doi.org/10.1108/hrmid.2007.04415dad.006

Ezulike, G. (2012), 'How to Hold on to Your Key Information-Technology Specialists: … And The True Cost of Replacing Them,' *Human Resource Management International Digest*, 20(4), 21-23

Grant, RM. (1996), 'Toward a Knowledge-Based Theory of The Firm. *Strategic management journal*, 17(S2), 109-122

Griffeth, RW., Hom, PW. and Gaertner, S. (2000), 'A Meta-Analysis of Antecedents And Correlates of Employee Turnover: Update, Moderator Tests, and Research Implications for The Next Millennium,' *Journal of management*, 26(3), 463-488

Hausknecht, JP., Rodda, J. and Howard, MJ. (2009), 'Targeted Employee Retention: Performance-Based and Job-Related Differences in Reported Reasons for Staying,' *Human Resource Management*, 48(2), 269-288

Hatcher, AM., Onah, M., Kornik, S., Peacocke, J. and Reid, S. (2014), 'Placement, Support, and Retention of Health Professionals: National, Cross-Sectional Findings from Medical and Dental Community Service Officers in South Africa,' *Human resources for health*, 12(1), 14

Kaye, B., and Giulioni, JW. (2012), Help Them Grow or Watch Them Go: Career Conversations Employees Want, Berrett-Koehler Publishers, San Francisco.

McCracken, M., Currie, D. and Harrison, J. (2016), 'Understanding Graduate Recruitment, Development and Retention for The Enhancement of Talent Management: Sharpening 'The Edge'of Graduate Talent,' *The International Journal of Human Resource Management*, *27*(22), 2727-2752

Midtsundstad, TI. (2011), 'Inclusive Workplaces and Older Employees: An Analysis of Companies' Investment in Retaining Senior Workers,' *The International Journal of Human Resource Management*, *22*(06), 1277-1293

Mohamed, AF., Singh, S., Irani, Z. and Darwish, TK. (2013), 'An Analysis of Recruitment, Training and Retention Practices in Domestic and Multinational Enterprises in The Country of Brunei Darussalam,' *The International Journal of Human Resource Management*, 24(10), 2054-2081

Mountford, H. (2013), 'I'll Take Care of You: The Use of Supportive Work Practice to Retain Older Workers,' *Asia Pacific Journal of Human Resources*, 51(3), 272-291

Oliveira, LB., Cavazotte, F. and Dunzer, RA. (2017), *'The Interactive Effects of Organizational and Leadership Career Management Support on Job Satisfaction and Turnover Intention,'* The International Journal of Human Resource Management, DOI:10.1080/09585192.2017.1298650

Pathak, AA. (2015), 'Zen Room Enhances The Workplace for Nobeltek's Women Employees: … And Helps The Company to Retain Valuable Female Talent,' *Human Resource Management International Digest*, 23(7), 15-17

Pinheiro, CAO. (2012), '*Gestão da idade nas organizações: importância das práticas de recursos humanos e influência das mesmas na retenção dos trabalhadores,'* (Master's thesis). ISCTE - Lisbon University Institute, Lisbon, Portugal.

Rahman, SM., Ali, NA., Jennings, L., Seraji, MHR., Mannan, I., Shah, R., Al-Mahmud, AB., Bari, S., Hossain, D., Das, MK., Baqui, AH., Arifeen, SE. and Winch, PJ. (2010), 'Factors Affecting Recruitment and Retention of Community Health Workers in a Newborn Care Intervention in Bangladesh, '*Human Resources for Health*, 8(1), 12

Ramani, S., Rao, KD., Ryan, M., Vujicic, M. and Berman, P. (2013), 'For More Than Love or Money: Attitudes of Student and In-Service Health Workers Towards Rural Service in India. *Human Resources for Health*, 11(1), 58

Snow, RC., Asabir, K., Mutumba, M., Koomson, E., Gyan, K., Dzodzomenyo, M., Kruk, M. and Kwansah, J. (2011), 'Key Factors Leading to Reduced Recruitment and Retention of Health Professionals in Remote Areas of Ghana: A Qualitative Study and Proposed Policy Solutions,' *Human Resources for Health*, *9*(1), 13

Steel, RP., Griffeth, RW. and Hom, PW. (2002), 'Practical Retention Policy for The Practical Manager. *The Academy of Management Executive*, 16(2), 149-162

Sullivan, SE. and Mainiero, L. (2008), 'Using The Kaleidoscope Career Model to Understand The Changing Patterns of Women's Careers: Designing HRD Programs That Attract and Retain Women,' *Advances in Developing Human Resources*, 10(1), 32-49

Vaiman, V., Haslberger, A. and Vance, CM. (2015), 'Recognizing The Important Role of Self-Initiated Expatriates in Effective Global Talent Management,' *Human Resource Management Review*, 25(3), 280-286

Wang, W. and Heyes, J. (2017), 'Flexibility, Labour Retention and Productivity in The EU,' *The International Journal of Human Resource Management*, DOI: 10.1080/09585192.2016.1277370, accessed in http://dx.doi.org/10.1080/09585192.2016.1277370

Witter, S., Ha, BTT., Shengalia, B. and Vujicic, M. (2011), 'Understanding The 'Four Directions of Travel': Qualitative Research into The Factors Affecting Recruitment and Retention of Doctors in Rural Vietnam,' *Human Resources for Health*, 9(1), 20

Wright, PM. and McMahan, GC. (1992), Theoretical Perspectives for Strategic Human Resource Management, *Journal of management*, 18(2), 295-320

Implication of Global Competition on Innovation Performance of Organizations

Maier Dorin, PhD ec. PhD eng., Technical University of Cluj - Napoca, Romania,
dorin.maier@gmail.com

Jörg Bothe, PhD Student, The Bucharest University of Economic Studies, Romania,
joerg.bothe@gmx.de

Wafeed Mansour, PhD Student, The Bucharest University of Economic Studies, Romania,
wafeed_t@yahoo.com

Maier Andreea, PhD, Technical University of Cluj-Napoca, Romania,
andreeaelenamaier@gmail.com

Abstract

The study presented in this paper evaluates the implications on the innovation management generated by fierce competition caused by economic globalization. In order to ensure the competiveness and success of the organization managers need to accept innovation as a key element for the organization. Although there is recognition of the importance of innovation for the organizations, the field of management it is still not enough studied or applied in practice. There are many managers that do not know the design tools or modern techniques to create or to manage the innovation process. The main purpose of this research is to identify the current challenges regarding innovation management and to provide useful solutions for managers in order to have a better use of the innovation process. Another purpose of the paper is to create new opportunity and find new research gaps in the field of innovation management that can be explored in the future studies. By identifying the resistance reasons for implementing innovation management and offering solutions to overcome this resistance, the results of the studies performed in this paper can be useful for any manager and can contribute to the increase of performance for organizations in today's highly demanding environment.

Keywords: Innovation, innovation management, economic globalization, innovation management resistance, business performance

1. Introduction

In the current era, characterized by economic globalization - which requires trade liberalization and lowering costs in communications - the developed countries must compete with countries that have a workforce poorly paid, although well-educated – innovation have an important place. And if we add also the progress of science and technology we can observe that innovative organizations benefit more from opportunities and competitive advantages (Maier et al, 2017).

A fierce competition, brief market niches, and frequent changes in product demand characterize the new economic environment, a globalized one. The organizations will have to face more and more frequently and unpredictable changes on the globalized market. In order to be competitive and to be able to capitalize any opportunity, the organizations will have to develop new ways of management, which has to adapt and to be able to predict, as quickly as possible, the apparition of various changes.

A key consideration for companies is their ability to adapt and innovate. The purpose of innovation is mostly to survive, to grow, to make a profit, but what matters for innovation is how it affects the chances of survival, profit and growth opportunities

The importance and the need for innovation result from its contribution to enhancing the productivity, competitiveness, economic performance and social objectives (Lendel et al. 2014). Few managers have a wider vision which includes innovation, allowing a better performance of the activities.

The growing importance of innovation in the current economic context can be observed in the increasing number of scientific paper (Maier et al, 2017). A search, done in early 2016, in the most important scientific database in the world, ISI Web of Knowledge, by the word "innovation", reveals that there are over 340 000 articles that deals with innovation. An interesting aspect in analyzing the total number of article published, about innovation, is that if we compare the total number of 167 888 articles published before 2010 (without articles published in 2010) with the number of articles published after 2010 (including articles published in 2010) which is 169 195 articles, we can observe that in the last five years the articles involving innovation have already surpassed the total amount of articles published before 2010 (Maier et al., 2016).

The innovation process is one of the most important factors behind the growth and prosperity of the global economy today but this is poorly understood. Over the last century, industry leaders have learned to master the production process to such an extent that today it is not a significant competitive advantage. The new challenge is to master the process of innovation – capitalizing change, creating new competitive advantages by offering better products by using better processes, providing better service or offering entirely new solutions.

2. Innovation Management – Short Literature Review

Although in the current economic context, innovation is one of the most used terms, many studies (Maier et al, 2017; Maier et al, 2014; Maier et al, 2013) reveal that it is still not well understood especially due to its complexity and the multitude of specific characteristics of each activity sector.

Most of the managers expect for a universal tool, technique or even a spell that once is applied it transform a less innovative organization in a high innovative one. But such a tool does not exist, not because nobody thought about it or nobody tried to developed one, but because with the current knowledge it is not possible to have one.

There are multiple attempts to develop several frameworks for managing innovation, but in most cases the final results is a general innovation identifier that can offer the manager a sense of the state of innovation in his organization and some direction to follow in order to become an innovator.

This unpredictable character of innovation led to a wealth of failed innovation projects over time. However the lack of innovative projects is not a solution, this was felled even by large companies that were once precursors and creators of all markets, but they have failed to remain competitive when major changes occurred, particularly the technological changes (Ribiere and Tuggle, 2010).

Organizations tend to developed themselves and to get used with what they do (basic skills) suck that they get stuck there, and when the environment changes (ex. Changing customer requirements, changing regulations) they are unable to adapt quickly and easily (De Jong et al., 2015).

Like any other managerial activity, the innovation process must be planned, organized, managed and controlled (Hamel, 2006). Fernez-Walch and Romon (2009) defined innovation management as "all the activities and options conducted by an organization to foster the emergence of innovation projects, to decide on their launch and to market the new products or to implement new processes in the organization, to increase competitiveness". Management innovation can also be defined as the invention and implementation of a management practice, process, structure, or technique that is new to the state of the art and is intended to further organizational goals (Birkinshaw et al., 2008).

Concerns about innovation management are also at the level of the European Union, where a proposal for Innovation Management System CEN / TS 16555-1: 2013 was developed in the CEN / TC 389 Technical Committee "Innovation Management". The success of the implementation of the innovation management system proposed by the CEN / TS 16555-1: 2013 is given by the organization's ability to respond to internal and external conditions influencing innovation capacity as well as factors influencing the innovation process at the organization level such as the level of involvement of the organization's leadership, innovation strategy, innovation-friendly factors, or

different innovation management techniques. These have an impact on the results of the innovation process, and therefore there is a need for the analysis and evaluation of these results that can lead to the development of improved methods and better planning of future innovation processes.

The process of managing innovation influence also the way managers set directions, make decisions, coordinate activities, and motivate people (Hamel, 2006). Another perspective assumes that new practices, processes, or structures are deliberately introduced by key individuals within organizations to improve the organization's performance (Vacaro et al., 2012). Innovation management is the introduction of a new structure, process, system, program, or practice in an organization or its units (Walker et al, 2015), it involves a gradual implementation requiring repeated decisions over a substantial period of time (Purcarea and Olaru, 2011). Innovation management are managerial activities which the organizations carry out innovation under a controlled process of irregular and complex structures in order to adapt to the changes in internal and external environment (Walker et al, 2015).

At the European level the OECD (2005) Oslo Manual and the Community Innovation Survey have provided a comprehensive list of innovation management grouped in three categories: (1) new business practices such supply-chain management, business re-engineering, knowledge management, lean production, and quality management; (2) new methods of organizing work responsibilities and decision making such as first use of a new system of employee responsibilities, teamwork, decentralization, integration or de-integration of departments, and education/training systems; and (3) new methods of organizing external relations with other organizations such as first use of alliances, partnerships, outsourcing, or subcontracting.

The companies are facing with real problems when dealing with innovation management. Number of factors participates in its provision, from theoretical concepts, through model solutions to practical applications. The biggest or the most significant problem can be seen in an absence of unified or complex and at the same time transparent management innovation processes model in company (Lendel et al, 2014).

Based on various results of the conducted research it can be said that many organizations manage intuitively theirs innovation processes and activities. Successful innovation management involves a strategic approach to both innovation and management issues, involves the use of effective implementation mechanisms and structures, requires the development of an organizational culture that supports innovation and involves the maintenance and development effective external links.

3. Challenges of the Innovation Management

The motivation to adopt a model of innovation management was studied in the literature and various explications were found. The theoretical approaches identified were related to rational, fashion, cultural and institutional characteristics of innovation management (Walker et al, 2015). The most widely used reasons for adopting an innovation management are the rational and institutional explanations. The rational approach is associated with immediate and direct operational economic performance gains, while the institutional perspective is associated with social and legitimization outcomes at the point of adoption rather than technical performance, which are therefore more uncertain and diffuse: performance benefits may arise, but not in a timely manner (Walker et al, 2015).

Significant improvements of the organizational performance were generated when innovation management was implemented and sustained. However many managers have experience difficulties, both internal and external ones, in diffusing innovation externally.

Implementing innovation management within an organization is not quite an easy thing to do. Innovation is characterized by novelty, always working on the limit of knowledge, thus trying to manage it involves new approaches that more often are met with resistance.

This phenomenon occurs even when the innovation identified for implementation is well known and has been recognized and awarded in other organizations. Surprising to some, resistance may occur even when organizations are essentially mandated to adopt and implement these innovations.

The main reason for this resistance is the communication problems that occur between various levels of entities within organizations. Usually these entities are formed by many employs with different agendas, requirements and objectives. A part of the personnel is not involved in the implementation of the innovation management, and thus they have little information regarding this process and this lack of information can lead to a state of uncertainty over the success of the innovation management.

Another reason identified in the literature refers to the situations when the majority of the personnel have the information regarding the innovation management and how it must be implemented, but this information are in conflict with the existing one. This conflict appear mostly because communities and organizations are in general very protective with the existing processes and procedures, they have created some competency for those processes and they refuse to try something new, usually because of the fear of unknown.

Other reason for resisting to the implementation of innovation management can be the lack of a proper measurement tool for the value of implementing it. It is quite hard to convince personnel to adopt new ways of resolving problems when they do not have a clear image of the value added by the new approach. In general is better to have some concrete results, some visible results or to be better communicated to the entire organization.

These are the most common reasons that lead to a resistance of implementation the innovation management, but of course are not the only reasons. The reasons can vary from case to case, from one sector of activity to another, and in general when dealing with innovation and how to manage it, is very hard to have a universal tool or a template that can be apply to any organization, because of the novelty character of innovation.

Innovation involves novelty thus it cannot be predicted and the task of managing it is very challenging for managers. When dealing with failures there can be a lot of causes with different character, this means that innovation management cannot be made intuitively, based on the evolution of situation. The innovation management is a complex process, having a lot of aspects, managers should identify the real innovation potential of the organization by taking measures to eliminate the weaknesses, to have persons prepared for different situation. All this if they are corrected applied can increase the probability of success the innovation management process in the organization.

Innovation management problems in organizations are caused also by the number of factors participates in its provision, from theoretical concepts, through model solutions to practical applications. The biggest or the most significant problem can be seen in an absence of unified or complex and at the same time transparent management innovation processes model (Lendel et al, 2015).

In order the innovation processes should be managed effectively it is necessary to report some results in fields which affect to the management of innovation processes. Every organization has a different level of management of innovation processes. Therefore, it is necessary to identify in the first step the current level of innovation process management in the company, then discover weaknesses and make recommendations for their improvement. It is necessary to build up an appropriate methodology for evaluating the innovation process management in the organization.

The communication is important role in this process. An essential foundation for the successful management of innovation processes in the company can be considered an effective system of information security innovation processes.

4. Solutions for a Better Innovation Management

For an organization to benefit from the advantages of the knowledge given by innovation management it is important to continuous improve and find innovative solutions that will guarantee them superior results. The business environment it is very disruptive and volatile, customers are too hesitant and willing to switch between providers when the purchase experience does not satisfy them, competitors eagerly leverage first-mover advantages and exploit their rivals' mistakes.

By analysing the information presented so far a series of aspects that can make the difference between a successful and an unsuccessful innovation management can be found.

The success of any organization regardless of its activity is influenced by its leader. In case of a successful innovation management it is very important that the leader is indefatigable. Leaders must understand that changing structures and processes in order to have a better diffusion of innovation is possible only if he is a part of it and if he is an example for the others employees. Therefore an indefatigable leader keeps the personnel in reaching the specific objectives and goals, all the time. A good innovation management can make the difference between a profitable organization and one that is trying to survive in the current global markets.

Another characteristic of a relentless manages is that he encourage transparency, especially when things are not going well. The indefatigable attitude give them the possibility to be more open to bad news from employees, this having the result of resolving the problems in timely manner and sometimes avoid the failure of the hole project.

A good leader is able to transmit the positive results of their actions to the team and thus the personnel is able to see the results of their efforts and continue to improve performance.

Besides indefatigable leaders a successful innovation management need the participation of the entire personnel. Thus the quality of the personnel is very important and in order to be successful continuous training and education of employees is a must for any organization. Understanding the innovation and thus observe the positive results can influence its acceptance. As part of training program managers should let the employees to experiment with innovation activities. These experiments have two dimensions for the employees, on the one side they can see the improvements and the benefits of innovation, and on the other side they can understand that some projects will fail regardless of the importance of the initial idea.

We have identified some key elements that influence the performance of innovation (Figure 1). One of the key element is *the management support* – not only the support from the point of view of approving the innovative way of thinking of employees but also about active support it, such as motivating employees, stimulating their spirit of innovation and to provide training and retraining programs;



Fig 1: Key elements that influence the performance of innovation

Another key element is creating an *environment* in which each employee can freely expose ideas and also an environment where the employee's ideas are being listened and seriously analyzed because you never know from where innovative ideas can come and bring success to the organization. The *employee reward* is influencing the innovation performance - creative, committed and talented

employees play an extremely important role especially for companies that rely on innovation to thrive and become more competitive. Because they play an important role for companies, employees should be rewarded accordingly, and here we are not just talking about a monetary reward but also an emotional one, such as public recognizing of the merits within the organization.

Developing *the communication networks* within the organization is another key element that influence the performance of innovation in an organization - the communication networks within any organization must be very effective, so if an employee has a new and innovative idea in terms of a product, service or process, it can be heard and appropriately exploited. Besides developing the communication network is also important to develop the *organizational culture* in order to allow the development of innovation and thus to be a culture that is willing to take the risk, embrace constructive failures to achieve extraordinary results. In the end a *smart allocation of the resources*, both human and financial, is very important when dealing with innovation, especially because of the unpredictability of the innovation process, there is no certainty that the innovation process will succeed so there is always a risk of losing resources.

From the employees point of view, some key elements that they can be aware of are to be creative, innovative, flexible and communicative; to trust in their abilities; to be brave to expose and support innovative ideas at work; to be prepared and eager to make responsible decisions at work.

As the innovation process continues, a good innovation management measure is to increase the training and education beyond the initial innovation familiarization. Managers, depending on the specificity of the organization, can use some training materials. In dealing with the continuous improvement and training of the personnel it is important that the training period to be a part of the organizational culture and therefore regardless of the future leader the innovation training will continue.

In the pursuit of a better innovation management in the current economic context every organization should develop strong relationships with external and supporting organization. This part of innovation is one of the most discusses subject in the innovation literature and it is called open innovation. If until three decades ago, almost every objective of an organization where approach from the economic efficiency point of view, nowadays the intense development of the human activities oblige companies to take into consideration other aspects related to their activity. There is a great interest for innovation both in the academic area and among practitioners. This interest is more pronounced in today's globalized economy and in this case new solution for a better understanding of innovation or for obtaining better results from innovation is needed.

The new approach describe a process in which the organization wants to acquire external collaborations ideas or new technologies to exploit their assets and establish alternate routes to market during the innovation cycle. Therefore, the boundaries between enterprise and the environment become less restrictive and allow two-way interactions, inwardly and outward.

In order to progress a good innovation management is necessary, but to manage innovation is difficult especially in large organizations with a high bureaucratic departments. This does not mean that a large organization cannot be innovative or cannot benefit from innovation management, for every organization it is important to make as much as possible at every level.

The process of diffusion an innovation management throughout the entire organization is not very easy, especially in complex structure organizations, in the same time this complex structure can be used as leverage for innovation management diffusion.

For an organization to maintain its advantages it must continue to develop, and not to consider that once it obtains a success with an innovation it is enough. There is this tendency once you have success to reduce the development part and to relay only on past successes. This is approach in the current economic context is quite dangerous, because the fierce competition makes other organization to develop also and there will always be some other organization which tends to fill your market place.

5. Conclusions and Discussions

The results of the research presented in this paper highlight that a key consideration for companies is their ability to adapt and innovate. The purpose of innovation is mostly to survive, to grow, to make a profit, but what matters for innovation is how it affects the chances of survival, profit and growth opportunities.

Another important idea from this study is the existence of a resistance to innovation management throughout the organization. Our results identify three main resistance reasons, a poor communication in the organization, the conflict between new information with the existing ones and the lack of proper measurement tools for innovation management results.

In order to counteract this resistance to innovation management a series of solutions were proposed. The most important one are referring to an indefatigable leader of the organization, a continuous process of training and development of the personnel and creating good relations with other external partners that can help to a better innovation management.

The implementation of an innovation management remains yet a difficult thing for many managers, but with this results from our studies they can have another tool for making the process of implementing innovation in theirs organization easily.

Beside the practical part of the results, which were the main purpose of the research, other aspect related to the process of managing innovation can be observe, like the part of the resistance to innovation management of the personnel within an organization, the necessity of an indefatigable leader and how can a leader maintain its state of relentless, various mechanisms of maintaining the entire personnel in a continuous deliberative training and development or how to have better relation to other organizations especially with the ones that are more innovative. These are some of the future research themes that are necessary to be more toughly evaluated and developed.

References

Birkinshaw, J., Hamel, G., & Mol, M. J., (2008), Management Innovation, *Academy of Management Review*, Vol. 33, No. 4, 825–845

Fernez-Walch, S. & Romon F. (2009). *Dictionnaire du management de l'innovation*, Vuibert, Paris

Hamel, G. (2006). The why, what, and how of management innovation, *Harvard Business Review*, 84, 72–84.

Lendel, V., Hittmára , S., Siantová, E., (2014), *Management of Innovation Processes in Company*, 2nd Global Conference On Business, Economics, Management and Tourism, Prague, Czech Republic
Maier, D. Irmer S., J. Astrid F. & Maier, A. (2017). *Development and Operationalization of a Model of Innovation Management System as Part of an Integrated Quality-Environment-Safety System*, Amfiteatru Economic, Volume: 19, No. 44/2017, pp 302-314.

Maier, D., Olaru, M., Maier, A., & Eidenmuller, T. (2016). Importance of Innovation in the Context of Changes Arising from Economic Globalization. *27th International Business Information Management Association Conference*, 04-05 May, Milan, Italy.

Maier, D., Olaru, M. and Maier, A. (2013). *Integrating concepts of innovation and creativity - a key to excellence in business.* In: s.n. The 8th European Conference on Innovation and Entrepreneurship. Brussels, Belgium, 19-20 September.

Maier, D., Olaru, M., Weber, G. and Maier, A. (2014). *Business Success by Understanding the Process of Innovation*. In: s.n., The 9th European Conference on innovation and Entrepreneurship – ECIE 2014, Belfast, UK, 18-19 September 2014.

Organisation for Economic Co-operation and Development (OECD), 2005. Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data Available at: http://www.uis.unesco.org/Library/Documents/OECDOsloManual05_en.pdf, Accessed 21 January 2017.

Purcărea, I. and Olaru, M., (2011), *Paving the Path for Innovation: the case of Romanian SMEs*. , The 6th European Conference on Innovation and Entrepreneurship - ECIE 2011. Aberdeen, UK, 15-16 September 2011.

Ribiere, V. and Tuggle, F., (2010), Fostering innovation with KM 2.0. The *journal of information and knowledge management systems*, 40 (1), pp. 90-101

Torugsa, N., O'Donohue, W., (2016), Progress in innovation and knowledge management research: From incremental to transformative innovation, *Journal of Business Research*, Volume 69, Issue 5, Pages 1610–1614

De Jong, M., Marston, N. & Roth E. (2015). *The eight essentials of innovation*, retrieved from http://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/the-eight-essentials-of-innovation, accessed on 20 May 2017

Walker, R., Chen, J., Aravind,. C, (2015) Management innovation and firm performance: An integration of research findings, *European Management Journal*, Volume 33, Issue 5, Pages 407–422
***, (2013), CEN/TS 16555-1 Innovation management – Part 1: Innovation management system

Are Phones Still Used as a Distribution Channel of Services in the Age of the Internet? An Empirical Study

Marcin Lipowski, Maria Curie Skłodowska University, Lublin, Poland, marcin.lipowski@gmail.com
Marek Angowski, University of Live Sciences, Lublin, Poland, marek.angowski@up.lublin.pl

Abstract

Changes taking place in the services market, including especially those connected with globalisation processes and ICT advancement, are increasingly forcing modern enterprises to search for new sales strategies for their services.

The aim of this article was to discuss the use of the phone distribution channel, as compared to the Internet channel, in the services market. Comparative analyses took into consideration the decision-making process and the costs arising from the use of various distribution channels of services, as perceived by consumers.

The research component was based on the results of a survey entitled *"Modelling distribution in the network economy,"* which was a quantitative survey implemented using the computer-assisted personal interview (CAPI) method on a national sample of 1103 respondents. The sample established through quota-random sampling and the survey was conducted in the second half of 2015.

The empirical component involved analysing the use of the phone channel by consumers in the service purchase process. The analysis covered such aspects as when and why this distribution channel was chosen by consumers at various purchase process stages, and whether there were any differences in terms of behaviour patterns among individual user groups, regarding this sales channel (e.g., differences by gender, age and income groups).

Keywords: consumer behaviour, multichanneling, phone channel, distribution channel of services

Introduction

The knowledge of customers' behaviours and preferences is a key determinant to the enterprises' market success. The identification of consumers' expectations regarding a given product and the recognition of factors determining their choice make it possible to improve the product, raise its parameters and provide the most desirable properties. Gathering such information enables identifying the product features which are most wanted by customers, which can form grounds for searching the efficient operating strategies in a competitive market. The modern customer-oriented marketing model forces sellers to acquire comprehensive knowledge of purchasers' behaviours, based on which they can send personalised messages directly addressed to specific recipients, taking into account the needs, interests and capabilities of individual target groups (Lipowski and Angowski 2016).

The development of the network economy and the related ICT advancement have significantly modified consumers' behaviours in the services market by providing a much wider access to offered services. Given the multichanneling strategy, which exploits the benefits flowing from the network economy and ICT advancement, contemporary consumers have enjoyed a greater choice of time, place and service purchase options (Li and Kannan 2014, Lipowski 2015).

For the last two decades, in connection with the rapid ICT development, an increasing number of suppliers have started using ICT solutions with the aim of diversifying distribution of their products and services. New technologies not only allow entrepreneurs to sell their products via the Internet, without the need to resort to specialised agents in numerous and often distant markets, but they have also created new opportunities of using indirect distribution channels by facilitating producer-seller communication. The ICT use in the distribution process has become more efficient with the development of mobile applications for portable devices. The still evolving mobile channel offers

certain features which make it more adapted to searching for information although the purchase process itself may still be less convenient (Lemon, Verhoef, 2016). The mobile channel enables suppliers to better adjust their discount offers to certain time, locations or purchaser groups. The majority of suppliers are currently not limited to selling their products in stationary stores but they are also using online stores, mailing systems, social media, phone services and mobile applications (Cortiñas et al. 2010, Lipowski 2014, Rangaswamy and Van Bruggen 2005, Verhoef et al. 2015). Both the online environment and the dynamically growing network economy make the difference between communication and distribution channels gradually vanish, as virtually any communication channel can now be effectively used to convey information and to make a direct product or service purchase (Dholakia et al. 2010, Melis et al. 2015). The omni-channel concept clearly shows that the purpose of integrating numerous distribution channels, mass communication and various customer contact points is to shape consumers' experience and to conduct large-scale sales through various channels (Verhoef et al. 2015).

The new communication channels have given rise to new and easily accessible seller-independent sources of information, reducing the information gap between the seller and the purchaser. Using the multichanneling strategy in their access to the offered products and services, contemporary consumers have come to enjoy almost unlimited opportunities of choosing the product purchase place and method. While facilitating the decision- and purchase-making processes at any time and place, multichanneling has also triggered modifications to the course of these processes. Consumers can now choose to include (or not to include) new sales channels in their purchase processes, replace the previously used solutions with new ones, offered by the supplier, or use many different solutions at the same time (Chiu et al. 2011, Lipowski 2015, Voorveld et al. 2016).

Enterprises offering their products through numerous sales channels seek to manage consumers in a multichannel environment, which implies using one or many sales channels or communication media in a consistent mode, coordinated within all channels and media. Every such channel can be used for various purposes, depending on the actual needs. The underlying benefits which consumers draw from multichanneling, resulting from the supplier's multichannel management, include increased consumer's comfort, improved experience in contacts with the supplier, and the possibility of freely choosing and switching between various channels at any time (Bondos and Lipowski 2016, Cambra-Fierro et al. 2016).

Problem Formulation and Methodology

The strategy of providing purchasers with access to a greater number of sales channels in the services market is becoming increasingly popular *modus operandi* in a competitive market. However, the launching of additional sales channels itself does not determine the market success, as the key issue is the ability to correctly identify purchasers' needs and expectations regarding the service purchase methods and the subsequent service use (Lipowski and Bondos 2016). Surveys have revealed that the intent to use a certain sales channel is influenced by the perceived exploitation costs (both monetary and non-monetary). Among the non-monetary costs, the authors mainly point to such aspects as effort, time, convenience, the sense of privacy or security (Yu et al. 2011). As regards monetary costs, the purchase price appears to be crucial for consumers. Thus, sellers intend to offer lower prices for products sold online, due to the lower level of services available through that channel and the generally lower costs of online sales (Vogel, Paul, 2015).

In this publication, an attempt was made to respond to the following research questions:

1. Why do consumers usually opt for phone channels in the service purchase process?
2. Are there any differences in using phone and online distribution channels of services among users?
3. Can we identify any differences in the shopping habits related to the choice of phone and online distribution channels among various purchaser groups by gender, age and income?
4. What are the different ways of perceiving the costs of using phone and online distribution channels by users?
5. What are the possible future applications of the phone channel?

The analyses presented in the publication are based on the results of the survey conducted as part of NCN grant No. UMO-2014/13/B/HS4/01612, entitled *"Modelling distribution in the network economy."* This quantitative survey implemented using the computer-assisted personal interview (CAPI) method covered a national sample of 1103 respondents. It was conducted in the second half of 2015. The sample was established through quota-random sampling, with the quota determined by respondents' age and gender, and the characteristics of respondent's place of residence. The number of interviews was determined separately for each voivodeship, pro rata to its share in the total Poland's population. The sample selection was conducted through random selection of starting points.

The survey included 1103 people, with women accounting for 51.3% and men for 48.7% of all respondents. As regards age, categories corresponding to the demographic groups used in sociological studies were used. The respondents surveyed represented generation Y (born between 1981 and 1996) – 32.2%, generation X (1965-1980) – 35.4% and the baby-boom generation (1946-1964) – 32.3%. Among respondents 34.7% declared the household income per capita up to PLN 1250 (1), 38.9% from PLN 1251 to PLN 2000 (2) and 26.4% above PLN 2000 (3).

Survey results

The principal objective of the analysis was to answer the question of whether phone channels could effectively compete in the services market with online channels which have enjoyed growing popularity in the age of the ICT revolution.

The authors' main focus was on how consumers use the currently available options of choosing the individual service access channels at various stages of the purchase process. The analysis took into account the behaviour patterns prevailing among purchasers in the service market at the individual stages of the purchase process and the perceived service use costs.

The most frequently distinguished stages of the purchase process include the pre-purchase (which mainly involves searching for information), purchase, post-purchase and resignation stages (Lipowski 2016).

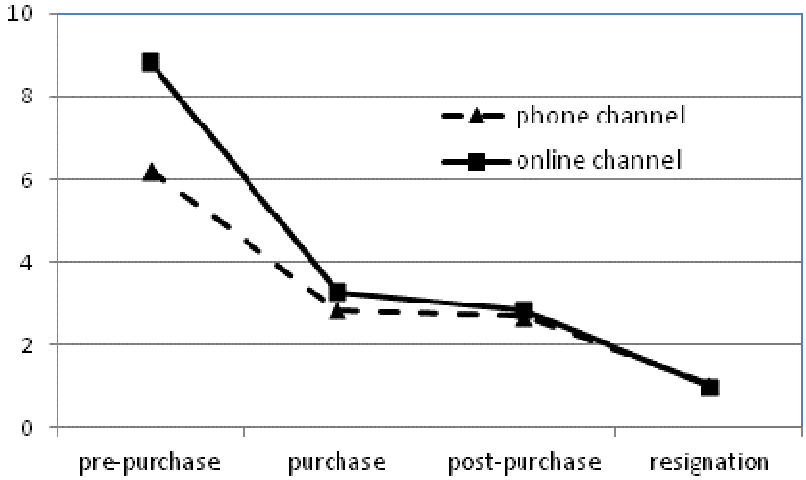


Fig. 1: The actual use of the distribution channels at the individual stages of the service purchase process
(the number of contacts per year)
Source: own work based on the survey results

By analysing the survey responses, a conclusion can be drawn that the online channel is generally a more frequent mode of communicating with service providers. The most significant differences in selecting the phone or online distribution channel are visible at the information search stage. Then,

they tend to decrease with each subsequent stage and at the resignation stage both channels are used to the same extent. The considerable difference in the frequency of using the Internet while searching for information may result from the specificity of web-based information resources which can be accessed both easily and quickly, and are considered virtually unlimited in both quantity and spatial terms.

The following stage of analysis involved verifying whether there are any differences in choosing the distribution channels of services by various consumer groups in the decision-making process, in the network economy-based services market. The analysis covered such categories as gender, age and income. Table 1 shows the actual use of distribution channels, as declared by women and men.

Table 1: The actual use of the distribution channels at various stages of the service purchase process (the number of contacts per year) by gender

	Phone channel		Online channel	
Channel/Gender	**Women**	**Men**	**Women**	**Men**
Pre-purchase	5.5575	6.8727	8.4602	9.2128
Purchase	2.2726	3.4219	2.7239	3.8736
Post-purchase	2.2628	3.1273	2.3779	3.3197
Resignation	1.0177	1.0827	0.9451	1.0743

Source: own work based on the survey results

An independent samples t-test has revealed statistically significant differences in the use of the two distribution channels by men and women (two-tailed significance) in terms of the following aspects:

- searching for information by phone (more frequent among men)
- making purchases by phone (more frequent among men)
- making online purchases (more frequent among men)
- post-purchase service by phone (more frequent among men)
- online post-purchase service (more frequent among men).

The actual use of phone and online channels by the surveyed respondents, taking into account their age and income, is shown in Tables 2 and 3.

Table 2: The actual use of the distribution channels at various stages of the service purchase process (the number of contacts per year) by generation X, Y, BB

	Phone channel			Online channel		
Channel/Generation	**Y**	**X**	**BB**	**Y**	**X**	**BB**
Pre-purchase	7.4171	7.3577	3.7185	12.7149	10.1615	3.4930
Purchase	3.0955	3.5846	1.7507	4.1110	4.1167	1.5518
Post-purchase	3.0674	3.3769	1.5462	3.7514	3.4474	1.2591
Resignation	1.1994	1.0231	0.9286	1.6096	0.8256	0.6078

Source: own work based on the survey results

Table 3: The actual use of the distribution channels at various stages of the service purchase process (the number of contacts per year) by income group 1,2,3

	Phone channel			Online channel		
Channel/Income	**1**	**2**	**3**	**1**	**2**	**3**
Pre-purchase	5.37	7.63	8.54	7.09	10.83	11.25
Purchase	2.58	3.25	4.28	2.65	3.96	4.45
Post-purchase	2.63	3.55	3.44	2.66	3.77	3.46
Resignation	0.69	1.43	1.53	0.93	1.10	1.21

Income: (1) up to PLN 1250, (2) from PLN 1251 to PLN 2000; (3) above PLN 2000

Source: own work based on the survey results

The following stage of the study was meant to assess consumers' perception of costs connected with using services through phone and online channels. The service use process entails the necessity to incur certain costs by service recipients, which becomes one of the most significant factors taken into consideration while choosing the distribution channel. Every purchase-related decision requires the consumer to estimate the actual service value by comparing the indispensable costs with the expected benefits. The costs may be perceived by customers in a number of ways, depending on the communication channel, and they may be of a multi-faceted nature (monetary or non-monetary). Consumers' perception covers such aspects as the service value, quality, time and energy consumption, incurred risks and many other factors (Carlson et al. 2015, Forsythe et al. 2006).

With a view to measuring the perceived costs connected with using services through specific distribution channels, a seven-point scale was developed, where 1 indicates that the perceived cost is low and 7 that it is high. The cost components under analysis were grouped in the following way (the presented costs classification (1-13) will be employed for Fig. 2 and Tables 4, 5, 6.):

1. the effort connected with getting to the service point/making a phone call/communicating by the Internet,
2. the response time,
3. the service activation time,
4. the duration of the problem-solving/complaint-processing in relation to service use,
5. the service price offered through a given channel,
6. the waiting period for being served through a given channel,
7. the effort made to change the contract terms and conditions through a given communication channel,
8. emotions connected with the need to contact the service provider's staff/with personal contact/ with voice contact/with the lack of any such contact,
9. emotions connected with the need to contact other consumers/with the lack of such contact,
10. fears connected with remaining anonymous while searching information about the service,
11. fears connected with other people's opinions on the purchase of services through a given channel,
12. safety concerns related to the service purchase transaction,
13. the likelihood of the need to make another contact on the same matter due to its not being dealt with through a given channel following the initial contact.

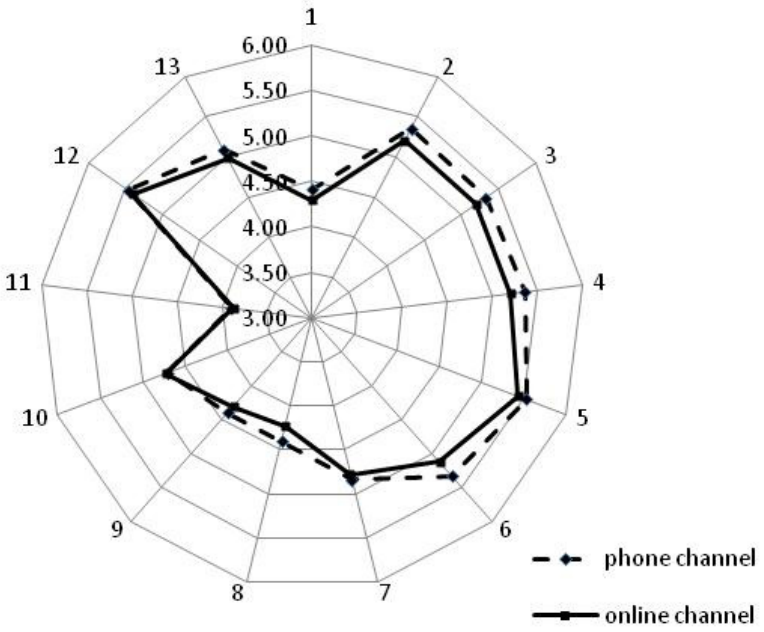


Fig. 2: The perception of costs connected with using services through specific distribution channels, based on a scale from 1 (the costs perceived as low) to 7 (the costs perceived as high). The individual cost types (from 1 to 13) are discussed earlier in the text.
Source: own work based on the survey results

Table 4: The perception of costs connected with using services through specific distribution channels by gender

Channel	Gender	Cost types												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Phone channel	Women	4.53	5.36	5.38	5.36	5.60	5.40	4.91	4.50	4.48	4.82	3.95	5.53	5.12
	Men	4.29	5.35	5.26	5.36	5.44	5.25	4.77	4.30	4.32	4.59	3.84	5.40	5.07
Online channel	Women	4.36	5.23	5.23	5.18	5.47	5.18	4.82	4.29	4.37	4.83	3.93	5.45	5.04
	Men	4.23	5.18	5.16	5.24	5.39	5.06	4.73	4.18	4.24	4.61	3.81	5.35	4.94

The assessment is based on a scale from 1 (the costs perceived as low) to 7 (the costs perceived as high). The individual cost types (from 1 to 13) are discussed earlier in the text.
Source: own work based on the survey results

Table 5: The perception of costs connected with using services through specific distribution channels by income group 1,2,3.

Channel	Income	Cost types												
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
Phone channel	1	3.85	5.24	5.15	5.16	5.51	5.19	4.45	3.80	3.85	4.68	3.56	5.51	4.83
	2	4.21	5.27	5.32	5.32	5.51	5.27	4.66	4.31	4.28	4.52	3.67	5.34	4.96
	3	5.19	5.77	5.68	5.73	5.82	5.76	5.45	5.06	5.15	4.86	4.27	5.77	5.65
Online channel	1	3.56	4.95	4.86	4.84	5.22	4.74	4.21	3.59	3.67	4.53	3.39	5.23	4.57
	2	4.35	5.41	5.39	5.36	5.62	5.29	4.85	4.35	4.41	4.79	3.91	5.49	5.06
	3	5.01	5.55	5.60	5.64	5.76	5.58	5.38	4.87	5.03	4.83	4.25	5.75	5.59

Income: (1) up to PLN 1250, (2) from PLN 1251 to PLN 2000; (3) above PLN 2000
The assessment is based on a scale from 1 (the costs perceived as low) to 7 (the costs perceived as high). The individual cost types (from 1 to 13) are discussed earlier in the text.
Source: own work based on the survey results

Conclusion

Based on analysing the literature on the subject matter and the survey results in question, the following conclusions can be drawn:

Both the phone and online channels are the most frequently used at the pre-purchase stage of the service purchase process. It is also at this stage when the most significant differences in the frequency of using those channels can be noted. At the information search stage, the online channel is used much more often than the phone channel. The market practices seem to reveal that phone services are more frequently sought for activities that are much more advanced than information provision. For instance, it has been recently observed that vehicle claim settlement services are increasingly often rendered by phone. At the subsequent stages of the service purchase process, the reference differences tend to diminish, and they are hardly noticeable at the resignation stage. This probably results from the need to establish personal (and often direct) contact with the supplier in an attempt to change the service provider and withdraw from the previously concluded contact.

By analysing the age-dependent behaviour patterns of the surveyed consumers, it can be noted that men are more willing to use remote distribution channels than women. These differences are statistically significant at all stages of the purchase process, except for resignations submitted by phone. Men tend to more frequently use the phone distribution channel, and these preferences seem to result from assessing price-unrelated costs. The most significant differences in the perception of costs connected with using the phone channel by women and men concern the following aspects: the effort connected with making a phone call, fears connected with remaining anonymous, and emotions connected with making a phone call. Those costs are assessed as being lower by men than by women.

The phone channel is more frequently used by representatives of the X and Y generations than by the so-called baby-boomers. At the information search stage, this distribution channel is used by the latter group of respondents nearly half as often as by representatives of the younger generations, with differences being evident at all stages of the purchase process. This is partly justified by the higher frequency of contacts with the service provider at all purchase process stages, preferred by the younger generations. Consumers seem to make a relatively frequent use of the phone channel because the online channel is not always sufficient for their needs. Perhaps it still fails to offer some of the purchase functions, which may result from legal or technological factors, or from limited skills of the contacting person.

A similar trend in using remote distribution channels by purchasers from various generation groups has also been revealed while analysing the respondent income groups. People with the highest income more willingly use the phone channel than other consumers at all stages of the purchase process. The wealthiest people recognise the relatively high costs of using phone channels for service

distribution but they, nevertheless, tend to use such channels more frequently than representatives of lower income groups. Younger and wealthier respondents, making a more active use of the service distribution channels, also report more drawbacks connected with remote distribution channels.

The development of multichanneling and access to ICT make the differences between various sales channels gradually vanish, as these channels are becoming multi-functional. For instance, the online channel can be used to talk to the consultant, and even see him/her. Also, while talking to the customer, the consultant can send files with service proposals, specifying the terms and conditions of the prospective contract. Considering the above, the telephone will undoubtedly perform diversified roles, starting with the traditional straightforward talk to the use of mobile applications. Nonetheless, the phone-call function is likely to remain significant for consumers in the service distribution channel, as it ensures the fastest and the easiest contact form. However, given the relatively high costs of this channel, both for the supplier and the customer, it will be dedicated to more advanced sales-related activities.

References

Bondos, I. and Lipowski, M. (2016) 'Effectiveness of PWYW – are there interchannel differences?' Proceedings of the Make Learn/TIIM Joint International Conference 2016, Timisoara, 181-188

Cambra-Fierro, J., Kamakura, W., Melero-Polo, I. and Sese F.J. (2016) 'Are multichannel customers really more valuable? An analysis of banking services' International *Journal of Research Marketing*, 33, 208-212

Carlson, J. O'Cass, A. and Ahrholdt, D. (2015) 'Assessing customers' perceived value of the online channel of multichannel retailers: A two country examination' *Journal of Retailing and Consumer Service*", 27, 90-102

Chiu, H.C., Hsieh, Y.C., Roan, J., Tseng, K.J. and Hsieh, J.K. (2011) 'The challenge for multichannel services: Cross-channel free-riding behavior' *Electronic Commerce Research and Applications*, 10, (2), 268-277

Cortiñas M. Chocarro R. and Villanueva M.,L., (2010) 'Understanding multi-channel banking customers' *Journal of Business Research*, 63 (113), 1215–1221

Dholakia, U.,M., Kahn, B.,E., Reeves, R., Rindfleisch, A., Stewart, D. and Taylor, E., (2010) 'Consumer Behavior in a Multichannel, Multimedia Retailing Environment' *Journal of Interactive Marketing*, 24 , 86–95

Forsythe, S., Liu, Ch., Shannon, D. and Gardner, L.Ch. (2006) 'Development of a scale to measure the perceived benefits and risks of online shopping' *Journal of Interactive Marketing*, 20, 55-75

Li, H.A. and Kannan P.K. (2014) 'Attributing Conversions in a Multichannel Online Marketing Environment: An Empirical Model and a Field Experiment' *Journal of Marketing Research*, 51, 40-56

Lemon, K.N. and Verhoef, P.C. (2016) 'Understanding Customer Experience Through the Customer' *Journey, Journal of Marketin*g, 80, 69-96.

Lipowski, M. (2016) Multukanałowość dystrybucji usług w gospodarce sieciowej, Wydawnictwo UMCS, Lublin

Lipowski M., (2014) 'Consequences multi-channel sales – customers and retailers perspective' *Вісник Національного Університету Львівська Політехніка. Логістика*, 811, 209-214

Lipowski, M. (2015) 'Konsument multikanałowy – przyczyny i implikacje zjawiska' *Studia i Prace Wydziału Nauk Ekonomicznych i Zarządzania*, 39 (2), 459-469

Lipowski, M. and Angowski, M. (2016) 'Gender and Consumer Behaviour in Distribution Channels of Services' *International Journal of Synergy and Research*, 5, 45-58

Lipowski, M. and Bondos, I. (2016) 'Postrzeganie kosztów w kanałach dystrybucji usług' *Handel Wewnętrzny*, 2 (361), 41-55

Melis, K. Campo, K. Breugelmans, E. and Lamey, L. (2015) 'The Impact of the Multi-channel Retail Mix on Online Store Choice: Does Online Experience Matter?' *Journal of Retailing*, 91 (2), 272-288

Rangaswamy, A. and Van Bruggen, G. H. (2005) 'Opportunities and challenges in multichannel marketing: An introduction to the special issue' *Journal of Interactive Marketing*, 19 (2), 5-11

Verhoef, P.C., Kannan, P.K. and Inman J.J. (2015) 'From Multi-Channel Retailing to Omni-Channel Retailing: Introduction to the Special Issue on Multi-Channel Retailing' *Journal of Retailing, Journal of Retailing*, 91 (2), 174-181

Vogel, J. and Paul, M. (2015) 'One firm, one product, two prices: Channel-based price differentiation and customer retention' *Journal of Retailing and Consumer Services*, 27, 126-139.

Voorveld, H., A.M., Smit, E.G., Neijens, P.,C. and Bronner, A.E.(Fred) (2016) 'Consumers' Cross-Channel Use in Online and Offline Purchases. An Analysis of Cross-Media And Cross-Channel Behaviors between Products' *Journal of Advertising Research*, 56 (4), 385-40

Yu, U-J., Niehm, L.S. and Russel D.W. (2011) 'Exploring Perceived Channel Price, Quality, and Value as Antecedents of Channel Choice and Usage in Multichannel Shopping' *Journal of Marketing Channels*, 18, 79-102.

Key Issues In Relation To Leading and Managing Educational Change: Professional Development in Secondary School

Ziyadin Sayabek, D.Sc. (Economics), Professor, al-Farabi Kazakh National University, sayabekz@gmail.com, Kazakhstan, Almaty

Maiya Arzayeva, candidate of economics, ass.prof., al-Farabi Kazakh National University, Arzaeva.Maiya@kaznu.kz, Kazakhstan, Almaty

Mediyeva Gulbazar, D.Sc. (Economics), Professor, Kazakh Leading Academy of Architecture and Civil Engineering, mediyeva_niark@inbox.ru, Kazakhstan, Almaty

Akmaral Mustafina, lecturer, al-Farabi Kazakh National University, Akmaral.Mustafina@kaznu.kz, Kazakhstan, Almaty

Tlemissov Ulan, Doctoral student International University of Kyrgyzstan, ulangov@mail.ru, Bichkek, Kyrgyzstan

Abstract

The higher education sector has significantly made its position in the global industry, competing with the institutions in the international market, which is reflective with the generation of workforce competent for the present national and international requirement. Hence, there is an emerged concept such as managerialism and performativity in Higher Education which is one of the concepts of managing and leading an academic staff. This paper focuses on possibilities and challenges facing lecturers working in the Higher Education sector when dealing with managerialism and performativity.

Introduction

Currently, the system of education is in the middle of unprecedented change, and the rate of change is expediting. The role of policymakers, school administrators, principals and educators will be different in the future than previous and current times in terms of beliefs, values and views at things. The rapid changing world is making present knowledge and methods of teaching out of date much faster (Ball, 2012). If current teaching is not out of date, it will be so in the expected future. In order to conform to this change, the constant professional development of teachers is necessary.

Professional development refers to the improvement of staff capabilities through training and education, and may be done in formal processes like workshops, university courses, or seminars and relatively informal ones such as collaborative learning in a team, peer observations, independent reading, and discussions with colleagues (Guskey, 2009). Professional development is often done in order to acquire new skills and knowledge that will help to improve employees' job performance (NSDC, 2009). When this is done continuously then it becomes continuous personal development (CPD). Different professions have different professional development programs for their members, and some may even make it a mandatory requirement to continue working. However, in most fields, professional development (PD) is a voluntarily area as is the case in education.

A number of studies have been conducted in this subject area, and they have found that PD increases the quality of teaching as well as the kind of leadership present in an institution. Furthermore, students tend to learn at the highest levels possible while teachers implement best practices (Bennett, 2005). While these benefits are quite welcome, there are some misunderstandings that revolve around professional development. First, it is possible that some educators are not fully aware of its functions and purpose. There are also instances when the expected benefits from PD are not experienced by educators thus leading to frustration. It is thus essential to analyse the challenges and benefits of professional development within a specific setting; that is, a secondary school, so as to clarify these misunderstandings and misgivings.

This essay will consider key issues such as what is educational change, models of educational change and their role in implementation new ideas, and what does it mean to lead and manage change. In particular focusing on benefits and challenges facing teachers working in the Secondary school sector when leading and managing professional development in secondary school.

Literature Review: What Is Educational Change?

Before discussing educational change, we should define what change actually is because researchers utilise a number of terms to explain, and to discuss, changes in systems of education. Official changes at any level (institutional, regional or national) which have obviously been planned and fully thought through are reported in the literature as innovations in education. Occasionally, a considerable number of changes at the national level, such as the structure or content of a national curriculum or the formats or methods of assessment, are given as major examples as reform in education (Wedell, 2009). The meanings given for 'educational change' are all similar, mostly that of alterations or modifications within an educational system. In this essay, I prefer to use the term 'change' to refer to amendments and alterations within the educational system, regardless of scale or level of planning.

Any educational change such as planning and implementing new ideas is not easy, and the process of educational change is particularly complex (Fullan, 2007). Knowing this, it is not clear why politicians would take such a risk, particularly given the political sensitivity of education. The one, quite astounding, reason for taking such a risk, as claimed by Hunter and Benson (1997), is that the system of education serves two societal issues: the first is that of the stability (perpetuation) of society, whilst the second is that of changing, improving and building upon society.

If the educational system is the site of the stability or any changes in society, then it is questionable as to why one might decide to change it and what they hope to achieve by such change; for instance, it might well be that educational changes are needed to support other, wider changes in society (Wedell, 2009). This gives rise to another question, which is one of why such wider changes are even necessary.

One of the most important reasons for change in a wider, or national, context is that of the economic and technological effects of globalisation (Thomson, 2010). These effects force politicians to realise the need to progress or develop policies which will improve or support their state's competitiveness within a fast-changing global market. Today's education system was formed in the industrial age; its main goal was, and is, to help students or citizens gain general information (Encyclopaedic knowledge) and the skills needed to be prosperous in a relatively ordinary career, such as the manufacturing or services industries of the previous century (Bishop, 2012). Currently, high technologies are taking many such functions, so contemporary employees need to be more productive, and be able to construct modern approaches to resolving issues in a combined yet uncertain world. Consequently, education systems are now proving to be insufficient in preparing students for life generally and the job market in particular in a novel age of knowledge, where knowledge can quickly become out of date (Mok, 2012). This is why an educational system needs to prepare students for life where knowledge is increasingly widened; this being the case, citizens should know how to perpetually update and use their knowledge in modern life. In this context, educational change might be regarded as a powerful tool in the maintenance of the nation in the face of other external changes going on worldwide.

The second important reason for change within an education system is that of standards and measurement. Since 1980 in western countries (Wedell, 2009), and 2000 in developing countries, has been emerged the understanding that outcomes of education should be more rigorously standardised and measured (Glewwe & Kremer, 2006). The initial impulse behind this concept was both political and ideological; in the last two decades of the 20th century, the governments of many countries have begun to spend a huge amount of money on their education systems; in this case, politicians also came to the decision that educational institutions and teachers should be made increasingly accountable to the government (Ball, 2012). Consequently, when governments began or initiated any educational change, the main emphasis was on creating systems to standardise and control the process and content of the education system, and to design easier ways to precisely measure the outcomes of education (for example, through students' performance via standardised exams). If an educational system has clear standards which that are accepted across all institutions, it might be hoped that in these schools there will

be an essential and systematic change that drives improvements in learning for all learners (Riley, Selden & Caldwell, 2004). However, Bennett (2005) claims that the UK spent a huge amount of money in improving standards and assessments within its educational system, but despite this the gap between achieving a high educational level between children from richer and poorer families has actually increased. In this regard, it is clear that good standards are no guarantee of successful learning.

Educational change is an alteration in an educational system that is made with the aim of improving quality of knowledge, skills, and the lives of citizens in an increasingly competitive world, or otherwise supporting other changes within society. Two possible reasons for initiating educational change have been suggested: first, preparing students for technological and economic challenges at the national or international level, and second to make the system of education more accountable to government via standards and measurement of performance.

Useful Model of Change

Today, there are so many models of change that are necessary for the successful implementation of a new idea in any sphere of life. However, not all of these are useful as regards educational change because this is dependent on the level and scale of change, culture, values, beliefs and economic condition of a given organisation or nation. This part of the essay will be considering three models of change (Lewin's model, Fullan's model and the Carnall cycle of change), any or all of which might be useful regarding educational change.

Lewin's model consists of a three-step change model: unfreeze, process of changing (movement) and refreeze (Lewin, 1952).

The first step is unfreezing, where the main idea is to unfreeze the present situation or status quo. Unfreezing is needed to surmount the resistance of individuals to change. There are three methods of unfreezing a current situation: in the first, the dynamic forces that guide behaviour away from the current condition or status quo should be enhanced or increased. Secondly, resistance that will disrupt the current equilibrium should be reduced. Thirdly, an amalgamation of the two approaches considered above should be used (Robbins, & Judge, 2013).

The second step in Lewin's model is movement in the process of change. At this level, it is necessary to transfer the planned system to a novel stage of equilibrium. There are also three activities that might help in this movement: assuring employees that the current status quo is not useful to them and persuading them to see the problem from a new viewpoint, acting together to find new appropriate material or information, and linking the opinions of the group to reputable, influential leaders, which also maintains change (Kritsonis, 2004).

The third step of Lewin's model is unfreezing. This step is introduced after the alteration has been completed in order to sustain of change. If this step is not implemented, it is possible that the change will be short-lived and employees will return to their former equilibrium. The aim of refreezing is to maintain the new change (equilibrium) via balancing both the restraining and driving forces through formal and informal policies (Burnes, 2004).

Lewin's model of change is highly rational and purpose-oriented (Cameron & Green, 2015). The model is good in the document since it makes rational sense, though when implementing a model that does not take account of people's experiences, feelings and beliefs, a negative aftermath can result.

Another model of change is Carnall's cycle of change. He adopted five stages to the coping cycle of change: stage 1 - denial, stage 2 - defence, stage 3 - discarding, stage 4 - adaptation and stage 5 - internalisation (Burnes, 2009).

Denial is when people claim that they need change and as to the effectiveness of the status quo. Defence is when people recognise that change is inevitable and they try to protect their territories and status quo. Discarding is when people leave old behaviour and begin to look forward; also at this stage, people may more optimistic and may start to think about how to solve problems. Adaptation is where people adapting to the new alteration and begin to see its effectiveness; however, at this stage, people can feel anger

towards the new situation, but it is not obligatorily protection to the change, it can be in attempting to make the new system operate (Cameron & Green, 2015). The final stage is internalisation, where all the changes become operational, and people feel, psychologically, that the changes are the norm.

Hargreaves, Lieberman, Fullan & Hopkins, (2013) claim that Carnall's cycle of change is inevitable; every organisation should pass these stages in order to come to grips with change. However, when people face new circumstance, their reactions can be different, even for individuals working at the same place. Some people can reach the denial stage more quickly than the internalisation stage, but some can stay at the stage of denial for a long time, or at the defence stage, as they may not accept the new ideas (Burnes, 2009). Hence, it is difficult to pass every stage; it means this model is also not ideal.

The third model considered in this essay is Fullan's model of change: initiation, implementation and continuation. Initiation is the process of beginning of a new idea and deciding on its implementation. Fullan (2007) claimed that the source and reason for initiating innovation can be different. There are several factors that can influence the initiation of change: 'New policy (federal, state, local), External Change agents, Advocacy from Central administration, teacher advocacy …' (Fullan, 2007, p.70).

The second phase is implementation, where the main idea is to put new ideas and programs into process or practice. This implementation phase is dependent on three main factors: external factors (such as government), local characteristics (district, teachers, principals) and the characteristics of the change (necessity, clarity). Fullan (2007) claimed that if any of the factors acted contrary to implementation, the process will be not successful. Hence, this means that it is difficult to find people or organisations that think in a similar manner and can support each other in the faster, changeable world due to varied beliefs and values. In other words, if more factors support implementation, the more likely this stage is to be successful.

The third phase is continuation, where the new idea is no longer innovation, and people now want to sustain the its development. This continuation also dependent on certain factors, however, such as funding, the idea corresponding with that of advancing technology, or people's changing values and beliefs.

In conclusion, there is no correct or incorrect model that can be used with regards to change management due to management itself not being a specific, or exact, science. Nevertheless, present and future research will never cease in its efforts to find an efficient model of change that may fill the current gaps in this sector. In addition, choosing the most 'correct' and appropriate model may be dependent on culture, the economic stability of a country or organisation, or people's values and beliefs.

What Does It Mean To Lead And Manage Change?

The necessity for change is present in every country and organisation in the marketable world. If an organisation does not change and innovate regarding market needs, or does not meet current challenges, then it will cease to operate or become increasingly non-competitive. Hence, if change is inevitable, then it should be led and managed in order to be more successful and less painless.

Benton (2005) states that management is a science that is composed of methods, estimations, predictions and statistics. On this basis, one can understand that the need to manage change is to plan for change (i.e., what needs to be changed), the choice of model of change, an estimate as to the current situation and the creation of the goals and aims of change. Hence, to manage change is a complex issue that managers or policy makers must consider in detail in order to successfully implement a new idea or innovation within any organisation. To implement such innovation successfully, managers decide as to its main goals, which might be to improve the performance and efficiency of teaching and learning in schools (Riley, 2008). Determining the main goal of change is an important aspect of change because managers should believe that their goals are achievable on the basis of statistical data and research. On the basis of this goal, managers will determine the model of change that will most successfully drive change to the required endpoint. However, choosing the most suitable model for the context where change is to introduced is complex because this depends on beliefs, people's values (though not necessarily), and favourable economic and cultural conditions within the country or organisation. After choosing the

model of change, it is necessary to support the change to achieve its successful implementation; if necessary, managers or leaders will correct the model of change or any process of change as circumstances dictate. This entire process can thus be summarised: define the goal/ aim of the change, choose the correct model of change, and support the change on the basis of statistics and research.

Finding the correct, or most suitable, meaning for leading change is necessary in order to define the meaning of leadership. However, there is no one exact meaning of leadership. Payne (2005) claims that there are about 650 definitions of leadership in the literature. However, one can find a number of important definitions that might be considered significant in developing the meaning of leadership. According to Stogdill (1950, as cited in Silva, 2015), leadership is defined as 'the process of influencing the activities of an organised group in its efforts toward goal setting and goal achievement'. This determination is possibly the central meaning of leadership that mentions the act of influencing people. In addition, Benton (2005) states that leadership is the art of influencing people in order to accomplish an aim through the use of power. Therefore, one can affirm that leadership is a process that involves the capacity to lead and motivate people towards reaching an aim. Based on these theories, one can assert that leadership is a process that includes the ability to influence and motivate individuals.

On the basis of the above-mentioned theories, one can understand that to lead change is the process of driving or leading change towards its successful implementation and continuation idea by influencing people. For the successful implementation of a new idea in the education system, leaders use power, or any other art of influence, to change the beliefs and values of employees (Fullan, 2007). Therefore, the beliefs and values of teachers are crucial concepts that can be directly linked with successful implementation.

In conclusion, if managing change is for the most part about the creation of goals and the purposes for change, and the subsequent choice of an appropriate model of change through the objective use of data, then leading change can be considered to be principally about influencing people's beliefs, values and motivation in order to achieve the goals of change. Both concepts are important for successful and sustainable change because they are intimately connected to each other.

Difficulties for Secondary school teachers experience in relations to Professional Development

One of the most obvious and common challenges surrounding professional development is its definition. When key stakeholders are not speaking the same language with regard to PD, then implementation and outcomes are unlikely to yield desired results in the faster changeable world. This means that procedures, practices and policies that are developed by education authorities, schools and educators themselves are likely to be divergent. In the United Kingdom, the standard term in most settings is CPD (continuous professional development). However, teachers themselves are not sure about which parameters fall in CPD and which ones do not (Guskey, 2009). Unless such ambiguity is overcome, it will be difficult to truly exploit the potential of PD in secondary schools.

In close relation to the above challenge is the role that the government plays in regulating CPD. Within the UK, the previous regime used to be highly prescriptive about the standards and process that schools must undergo when doing CPD. In fact, it was a requirement that maintained schools dedicate a minimum of 5 days annually towards this effort (Pont et. al., 2008). However, the new government is not as a rigid as the former one, yet head teachers had grown accustomed to getting direction from above. Specific details on national strategies are not forthcoming, and schools do not know how much money and time to dedicate towards CPD.

Institutional issues also come in the way of professional development for teachers. Many schools tend to treat CPD as their own initiative rather than that of the educator. For this reason, educators themselves lack personal goals that they might use in order to improve Dede et. al. (2009). Additionally, the top-down managerial approach makes it seem like it is something that will not benefit the educator. As a result, most secondary schools teachers lack commitment to CPD because it viewed as something done for their institutions (Hoyle & John, 1995). Head teachers are especially responsible for this attitude since they tend to control most of the decisions made about professional development.

The lack of support from local authorities and intense focus on academics is also a key challenge for several secondary school teachers. Ratcliffe (2013) reports that teachers are too worried about performance targets and exams for them to implement new teaching methods they may acquire from PD. Resistance to change is quite common especially when teachers lack confidence in their ability to implement what they have learned (Porter, 2000). They may not be certain that the skills they acquired will cause change, so they would rather focus on academics.

Most CPD efforts are external rather than internal, yet research has shown that external interventions are rarely effective. It is becoming increasingly common for schools to bring in experts or trainers from outside for CPD. These secondary schools often spend a lot of money on the so-called experts, yet minimal improvements are rarely achieved. The trainers often teach general principles that have little effect on particular schools, let alone specific educators. Additionally, this external focus is often for the short term, so its effects rarely last for a long time. Workshops and conferences are some of the regular interventions that come to mind when talking about CPD, yet these are never really beneficial to the participants involved. Biancarosa et. al. (2010) found that externally-focused interventions do not translate into tangible effects on pupil outcomes.

The lack of continuity has been found to be a key difficulty in leading change among educators (Guskey & Yoon, 2009). A vast number of institutions outsource professional trainers who do it superficially. They simply deliver their content and leave without instating mechanisms for evaluation. Furthermore, no action plan is ever put in place for the participating teachers to demonstrate how they will apply their acquired information (Fullan, 2007). These institutions have no way of knowing that the efforts they made had tangible returns through the assessment of students or observations from their peers.

Many schools also complain about the expenses incurred when setting up PD programs. A vast number of CPD programs are quite costly especially when they are externally done. Schools and school authorities must set aside sufficient finds for these interventions especially when they are done as events (Stes et. al., 2011). Schools have to find the money to pay for trainers' accommodation, venues and travel. Alternatively if it is a course that has to be paid by the sponsoring institution, then that becomes a challenge.

Continuous professional development requires a commitment of time and this is usually quite strenuous for the people involved (Ebert-May et. al., 2009). If the program is external and being done during school time, then the school has to find a replacement for the teacher who is training. This means more costs for the institution involved since the regular school program must continue even when professional development takes place.

Conclusion

Most of the analyses and researches demonstrate that professional development and CPD in teaching can be useful if done correctly in the middle of unprecedented change. When a program is more oriented towards peer collaboration and personal interactions, it yields results. Furthermore, when it is long term in nature and geared towards the process of learning rather than technical content it can improve teacher's expertise and confidence, student outcomes and classroom experiences. On the other hand, several professional development programs do not have these characteristics. Additionally, concerns about the budget and time implications, the intermittent nature of programs and minimal effect on student achievement are some of the challenges secondary teachers face when implementing professional development.

A number of obstacles have been identified in terms of CPD and its implementation in secondary schools. Some of those obstacles are related, so one solution can account for all of them. In order to tackle the challenge of poor understanding of the purpose of CPD, it is essential for all the key participants, including the local educational authorities, government, head teachers and teachers to define and specify activities involved in professional development. The top down approach is a barrier to CPD and can be overcome by using more participative decision making processes.

All schools should refrain from programs with an external focus as these not only consume money but they yield minimal results. Instead, they should first specify the needs in their schools before engaging any program. Furthermore, all participants of a professional development program should be required to create an action plan of how they will apply what they have learnt. Additionally, special effort should be taken to evaluate the outcomes of each program on teaching and student outcomes so that accountability may be instated.

Systematic planning is essential to making CPD effective in the secondary settings. Schools and local authorities should acquire sufficient knowledge of the features that will make professional development work. They should also create infrastructure that will assist in implementation of CD activities. Technical assistance, guidelines and funding from the state can go a long way in surmounting some of the obstacles identified in the earlier sections. CPD holds a lot of promise but its benefits can only be felt when stakeholders adopt a collaborative stance.

The issue of external trainers does not have to be completely abandoned because shortage of resources may prevent some schools from using the long term intensive CPD programs recommended above. In such cases, care should be taken to inform trainers of the needs in the schools. This implies knowing the skills that the workforce has and also determining the end goal for the evaluation process. Structural barriers are best overcome through assistance from the top.

References

Ball, S. (2012). *Politics and Policy Making in Education (RLE Edu D)* (1st ed.). Hoboken: Taylor & Francis.

Bennett, C. (2005, July26). Growing educational gap between rich and poor children. *The Times*, p.5

Benton, J. (2005). *The Air Force officer's guide* (34th ed.). Mechanicsburg, Pa.: Stackpole Books.

Biancarosa, G., Bryk, A. & Dexter, E. (2010). Assessing the Value-Added Effects of Literacy Collaborative Professional Development on Student Learning. *The Elementary School Journal, 111*(1), 67-69.

Bishop, P. (2012). The three horizons of educational change. *On The Horizon*, *20*(2), 137-144.

Boyle, B., While, D. & Boyle, T. (2004). A longitudinal study of teacher change: What makes professional development effective? *The Curriculum Journal, 15*(1), 45-70.

Burnes , B. (2004). Kurt Lewin and complexity theories: back to the future?. *Journal Of Change Management*, *4*(4), 309-325.

Burnes, B. (2009). *Managing change* (5th ed.). Harlow: FT Prentice Hall.

Cameron, E., & Green, M. (2015). *Making Sense of Change Management: A Complete Guide to the Models, Tools and Techniques of Organizational Change* (4th ed.). Philadelphia: Kogan Page.

Dede, C., Ketelhut, D. J., Whitehouse, P., Breit, L., & McCloskey, E. M. (2009). A research agenda for online teacher professional development. *Journal of Teacher Education, 60*, 8-19.

Denton, C. A., & Hasbrouck, J. (2009). A description of instructional coaching and its relationship to consultation. *Journal of Educational and Psychological Consultation, 19*(1), 150-175.

Ebert-May, D., Derting, T. L., Hodder, J., Momsen, J. L., Long, T. M., & Jardeleza, S. E. (2011). What We Say is Not What We Do: Effective Evaluation of Faculty Professional Development Programs. *BioScience, 61(*7), 550-558.

Evers, A. T., Kreijns, K., van der Heijden, B. I. J. M., & Gerrichhauzen, J. T. G. (2011). An organizational and task perspective model aimed at enhancing teachers' professional development and occupational expertise. *Human Resource Development Review, 10*, 151–179.

Fullan, M. (2007). *The NEW meaning of educational change* (4th ed.). New York: Teachers College Press.

Garet, M., Porter, A., Desimone, L. Birman, B., & Yoon, K. (2001). What makes professional development effective? Analysis of a national sample of teachers. *American Education Research Journal, 38*(4), 915-945.

Glewwe, P., & Kremer, M. (2006). Chapter 16 Schools, Teachers, and Education Outcomes in Developing Countries. *Handbook Of The Economics Of Education*, *2*, 945-1017.

Guskey, T. (2009). Closing the Knowledge Gap on Effective Professional Development. *Educational Horizons, 87*(4), 101-104.

Guskey, T. and Kwang, Y. (2009). What Works in Professional Development? *Phi Delta Kappan, 90*(7), 55.

Hargreaves, A., Lieberman, A., Fullan, M., & Hopkins, D. (2013). *International Handbook of Educational Change*. New York: Springer.

HMSO (2001). *Schools achieving success.* London: DfES.

Hoyle, E., & John, P. D. (1995). *Professional knowledge and professional practice.* London, England: Cassell.

Hunter, W., & Benson, G. (1997). Arrows in time: The misapplication of chaos theory education. *Journal Of Curriculum Studies*, *29*(1), 87-100.

Kennedy, E., & Shiel, G. (2010). Raising literacy levels with collaborative on-site professional development in an urban disadvantaged school. *The Reading Teacher, 63*(5), 372-383.

Kritsonis, A. (2004). Comparison of Change Theories. *International journal of scholarly academic intellectual diversity*, *8*(1), 1-7.

Mok, M. (2012). Educational Psychologyfor the Knowledge Age. *Educational Psychology*, *32*(1), 1-6.

National Staff Development Council (2009). *Professional learning in the learning profession: A status report on teacher development in the United States and Abroad.* Stanford, CA: NSDC & School Redesign Network.

Lewin, K. (1952). *Field theory in social science* (1st ed.). London: Tavistock Publications.

Payne, V. (2005). *Planning and managing change* (1st ed.). [New York]: American Management Association.

Peseta, T., Manathunga, C., & Jones, A. (2010). What kind of interdisciplinary space is academic development? In M. Davies., M. Devlin & M. Tight (Eds.), *Interdisciplinary Higher Education: Perspectives and Practicalities* (pp. 97-111): Emerald Publishing, UK.

Pont, B., Nusche, D., & Moorman, H. (2008). Improving school leadership, Volume 1: Policy and practice. Paris, France: OECD.

Porter, A. C., Garet, M. S., Desimone, L., Birman, B. F., Suk Yoon, K. (2000). *Does professional development change teaching practice? Results from a three-year study*. Washington, DC: U.S. Department of Education.

Ratcliffe, R. (2013, October 7). *Professional development in teaching: The challenges, solutions and status quo*. Retrieved from https://www.theguardian.com/teacher-network/teacher-blog/2013/oct/07/professional-development-teaching-learning

Richardson, V. & Placier, P. (2001). Teacher change. In V. Richardson (Ed.), Handbook of research on teaching (4th ed.) (pp. 905-947). Washington, DC: American Educational Research Association.

Riley, K., Selden, R., & Caldwell, B. (2004). Big Change Question Do Current Efforts To Initiate Top-Down Changes Fail To Support The Moral Purpose Of Education?. *Journal of Educational Change*, *5*(4), 417-427.

Riley, K. (2008). Can schools successfully meet their educational aims without the clear support of their local communities?. *Journal Of Educational Change*, *9*(3), 311-316.

Robbins, S., & Judge, T. (2013). *Organizational behavior* . Boston: Pearson.

Silva, A. (2016). What is Leadership? *Journal Of Business Studies Quarterly*, *8*(1), 1-6.

Stes, A., De Maeyer, S., Gijbels, D., & Van Petegem, P. (2011). Instructional development for teachers in higher education: effects on students' learning outcomes. *Teaching in Higher Education, 4*(15), 1-14.

Thomson, P. (2010). *Whole school change: a literature review* (2st ed.). London: Arts Council England.

Wedell, M. (2009). *Planning for educational change* (1st ed.). London: Continuum.

Transaction Costs, Institutions and Regional Innovation Development: the Case of Russia

Gamidullaeva Leyla Ayvarovna, Penza State University, Penza, Russia, gamidullaeva@gmail.com

Tolstykh Tatyana Olegovna, National University of Science and Technology, Moscow, Russia, tt400@mail.ru

Abstract

Working on the assumption that innovation should be an inherent part of the economic mechanisms of all businesses and shall encounter no obstacles, a principle issue here is the revealing of key internal incentives for innovation, the efficient management of which will ensure dissemination thereof and self-development of the regional innovation system. We argue that the principal incentive to innovate is value-added generated by economic agents in the processes of innovation, research, and technology transfer. Therewith, the management of innovation development should be embedded into the very managing system in such a manner, that the management mechanisms will accord with mechanisms and regularities of self-organisation and self-development. Innovation process participants should actively collaborate and develop the experience of joint projects on creation and commercialization of innovations. Thereby, a special focus should be on the development and implementation of an appropriate strategy that will ensure establishment of structures-attractors, which are to draw innovative paths of development and to determine principal areas of promotion of collaboration for innovation activity participants. These attractors may be represented by innovation institutions with the greatest potential in decreasing of transaction costs in innovation activities.

Keywords: transaction costs, institutions, value added, innovation system development

Introduction

Modern Russia is in the search of the optimal strategy of economic development of the country. Determined by world commodity price trends, the inertial prosperity does not ensure national security of the country. Russia's entering WTO and the events of Contemporary history have increased risks and ambiguity of development prospects manifold. The escalation of geopolitical tension, objectively determined by structural shifts accompanying the change of technological modes, is aggravated by low functioning efficiency of the Russian economic system. Besides competent political solutions there is a strong need for a new economic policy aimed at consolidation of the economy, the development of which should follow, according to the majority of experts, the innovation path. The geopolitical crisis and the sanction policy towards Russia have revealed multiple implicit problems aggravated by the fall of oil prices as the main source of revenue, as well as by an extreme deployment of the import substitution and economic modernization policy.

It is worth noticing that the reverse side of the acute problem may become a powerful impulse of mobilization of hidden reserves of development and implementation of potential capacities of the Russian economic system. Consequently, the current situation should be considered as a real chance of integration into the common international trend of innovative development.

The last year showed us that in order to solve the problem of innovation system management the existing approaches, tools and mechanisms, regardless of features of the modern crisis and the economic behavior of leading actors of the economic system, are insufficient. We have to admit that antimonopoly regulations and competition have played out. There are new challenges requiring a cardinally new

methodological approach to the analysis and scientific understanding of principles and mechanisms of innovation system management at macro-, meso- and microlevels. The number of objects of innovation infrastructure (business incubators, business accelerators, technological parks, innovation centers, centers for technology transfer and commercialization etc.) is expanding at a very rapid pace. Unfortunately, the same could not be said of their effectiveness. It is worthy of note that continues to be the problem with overcome the gap between the state research and development sector, the sector of research and development of universities and the private sector of the economy. The increase in the number of intermediaries in innovation sphere, whose functions are performed by objects of innovation infrastructure, does not solve the task to integrate the national innovation system of Russia. Unsystematic character of the creation of innovative infrastructure and its institutional weakness determines the weakness of the interaction between science and industry.

One of generally recognized indicators that assess the effectiveness of innovation, as it is known, is the innovative activity of the enterprises. It is obvious that in the economic sector of our country has developed a practice when the innovative activity of the enterprises has been extremely low (Table 1).

Table 1: Innovative activity of the enterprises (the proportion of organisations implementing technological, organisational and marketing innovations in the reporting year, in the total number of organisations surveyed)

Industries	The proportion of organisations implementing technological, organisational and marketing innovations in the reporting year, in the total number of organisations surveyed (percentage)				
	2012	2013	2014	2015	2016
Altogether	10,3	10,1	9,9	9,3	8,4
Extracting industries	8,2	7,6	7,5	6,9	7,4
Processing industries	13,4	13,3	13,6	13,3	13,3
Production and distribution of electrical energy, gas and water	5,6	5,3	5,1	4,9	4,8
Communications	13,3	14,2	12,2	13,3	12,2
Activity connected with the use of computer facilities and information technologies	13,3	14,2	12,2	13,3	12,2
Research and development	13,3	14,2	12,2	13,3	12,2
Providing other services	13,3	14,2	12,2	13,3	12,2

Compiled by the authors according to the data of Russian Federal State Statistics Service. URL: http://www.gks.ru/

Thereby, the innovative activity of the enterprises in Russia has been at a low level in recent years. Meanwhile, according to the level of this index, the Russian economy is noticeably inferior to not only leading developed countries (Germany – 70%; Canada – 65%; Belgium - 60%; Ireland, Denmark and Finland – 55–57%), but to the most of Central-Eastern European Countries, where the figure is in the range of 20–40%. According to international ratings of innovative activity and the competitiveness their level in the Russian Federation is extremely low (Table 2).

Table 2: International ratings of innovative activity and competitiveness of some countries by the method of INSEAD and GCI WEF *

Countries	Global Innovation Index INSEAD, 2015		The Global Competitiveness Index WEF 2015-2016	
	The total score	Rating	The total score	Rating
Switzerland	68,30	1	5,76	1
Sweden	62.40	3	5,43	10
UK	62.42	2	5,43	9
Netherlands	61.58	4	5,50	8
USA	60.10	5	5,61	3
Finland	59.97	6	5,45	4
Hong Kong	57.23	11	5,46	7
Singapore	59.36	7	5,68	2
Russia	***39.32***	***48***	***4,44***	***53***

Compiled by the authors.

It is necessary to identify the underlying reasons for these negative economic consequences, in order to use them in the management practices. The copying of forms, methods and innovation management models, had been successfully implemented in most of foreign countries and had a great impact through the contribution in innovation development, did not work in Russia. These attempts have been undertaken for a long time and, obviously, have not led to the expected results that is statistically confirmed.

In our opinion, the understanding that the introduction of an innovation system model, which has positively proven itself within other socioeconomic systems, will not lead to the desired results is a matter of principle, as the existing institutional environment is not ready to adapt the introduced principles and mechanisms of management. The existing theories, conceptions and approaches to establishment and development of an innovative system hardly assist in resolving the given problem and, therefore, in providing manageability of innovation processes and predictability of results of managerial decisions in the present field.

Adhering to the directive that innovations should immanently be a part of economic mechanisms of all business entities and should encounter no obstacle, a matter of principle here is the determination of key internal motives for production of innovations in an economic system, the efficient management of which will provide dissemination thereof and self-development of the whole innovation system.

Literature Review

The understanding of the importance of innovations in economic development correlates with a growing interest in the stated problem by the academic community. At the same time, the understanding of innovative phenomena and accumulation of empirical data in the given field are also growing. Innovation is more often considered as a process endowed with special features, the combination of which causes a necessity to develop an approach beyond the classical “mainstream”, i.e. beyond the paradigm that acknowledges the existence of a representative economic agent featuring full rationality.

The research problem of present study caused a necessity to examine a broad set of works analyzing the subject matter, directly or indirectly connected with the problem of innovation system development.

In recent years, the concept of innovation system is gaining strength and recognition. This theory describes evolving interrelations between economic actors, the change of innovation activity models and their relations with external environment

The innovation system is a concept, originally introduced in 1980s-1990s by R. Nelson (1993), B.-A. Lundvall (2002) and C. Freeman (1980). Freeman was the first who suggested the notion of "national innovation system", implying "a network of institutions in state and private sectors that initiate, import, modify and disseminate new technologies in cooperation" (Lundvall, 1980).

The concept of innovation system emphasizes a complex web of connections and interactions among various actors focused on establishment, dissemination and application of knowledge. The innovation system approach allows to analyze a critical category of "innovation activity" from a broader point of view focusing on the results of not just innovations themselves, but on the processes that lead to them and the diversity of actors involved in creation of innovations. The innovation system approach is based on the understanding and conceptualization of the fact that the innovative process is not linear; it involves various actors with their interests taking part in co-evolutionary processes. Recent research of innovative process emphasizes the importance of network in providing success for innovations, thus transforming the traditional model, which characterizes innovations as a linear sequence originating from fundamental research by means of product design, manufacturing and marketing. Currently innovations are viewed as an interactive process which requires intensive movement of knowledge, ideas and data in the firm's internal and external environment. Some empirical studies have found that firms' collaboration with external partners may provide their effectiveness and speed up innovation process (Chesbrough, 2003). According to the open innovation approach, actors need more knowledge flows for the accelerating the innovation process and broadening markets.

Recently the concept of network has made a breakthrough in the theory of innovation economy after it began to be actively used in different forms and meanings in many scientific fields. The concept of innovative network has a wide meaning. This definition encompasses innovative networks promoted by large European programmes which connect firms and other establishments from different countries, sectors into competitive innovative environment that is used by small and medium-sized business to implement innovative projects.

If the purpose of cooperation is not connected with innovative activity, the mere fact of cooperation with other firms increases innovative opportunities. In its easy sense, network can mean a group of cooperating firms; the particular group can represent an innovative system, supply chain, cluster, or any other type of interfirm relations.

Despite an exponentially growing interest of the scientific community in the problem of innovative development efficiency, there still remains an unresolved question – why does the implementation of an innovation system model that has successfully proved itself in actual management in a number of countries lead to negative results within a concrete socioeconomic system. Besides, there is a lack of a system of innovative development management and forecasting, which will promote elaboration of an efficient strategy of innovative development of a concrete country. In Russia the establishment of the innovation system has been in progress for a long time, some significant funding has been spent, however, negative results revealed themselves clearly last year, which turned out to be indicative in view of the developed external-economic and political situation.

Results

We have to admit that antimonopoly regulations and competition, which used to have an effect in the industrial economy, have played out. There are new challenges requiring cardinally new approaches to management. Russia, as well as other countries with similar macroeconomic systems, requires the state to

enter the economic and innovative processes as a generator of incentives to innovations, which, as it has been pointed out, can be provided neither by the market nor by the existing poorly developed institutional environment. Golichenko O.G. notes that "it is impossible to establish a modern national system within the economy, the institutions of which have been obsolescent for a long time" (Golichenko, 2011).

In economically developed countries, positive consequences of innovations occur when economic development is provided to market subjects, particularly, when company owners face the dilemma of profit distribution between profit reinvestment and profit dividends distribution. On the one hand, it causes short-term investment attractiveness; on the other hand, it provides the foundation for expanded reproduction of an economic system.

It is known that the companies' innovation activity is a commonly recognized indicator of innovation activity efficiency evaluation. We have to admit that within the pattern established by the Russian economic sphere the companies' innovation activity is insignificant (Table 3).

Table 3: Innovation activity of organisations (organisational, marketing innovations in the reporting years out of the total examined organisations), by types of economic activities

Industries	Innovation activity of organisations (share of organizations implementing technological, organizational, marketing innovations in accounting years out of the total examined organisations), by types of economic activities (percentage)				
	2012	2013	2014	2015	2016
Total	10,3	10,1	9,9	9,3	8,4
Mining operations	8,2	7,6	7,5	6,9	7,4
Manufacturing activity	13,4	13,3	13,6	13,3	13,3
Production and distribution of electric energy, gas and water	5,6	5,3	5,1	4,9	4,8
Communication	13,3	14,2	12,2	13,3	12,2
Activity associated with computer engineering and IT	9,4	9,6	8,8	8,0	6,3
Research and development	30,1	31,0	33,3	32,2	30,7
Rendering of other services	4,0	3,5	3,5	3,1	3,0

Complied by the authors on the basis of the Russian Federal State Statistics Service "Science and innovations"

Thus, the innovation activity of Russia in recent years has experienced no highs and lows. Meanwhile, the level of the indicator under study in the Russian economy is significantly lower than the ones in leading industrial countries (Germany – 70%; Canada – 65%; Belgium – 60%; Ireland, Denmark and Finland – 55–57%), as well as in the majority of countries of Central and Eastern Europe with the indicator being in the range 20–40%. Besides, Russia is dragging behind in exports of high-technology products. The share of Russia in this market is only a quarter of a percent (Gamidullaeva, 2015, 2016). It is necessary to

reveal the causes of such negative economic consequences, the identification of which will make it possible to establish a vector of management for politicians. Simple coping of forms, methods and models of innovation management, successfully implemented by foreign countries, taking place for a long time, doesn't lead to the desired results – it is obvious and proved statistically.

Manifesting itself in a growth of instability of existing companies' connections and relations and, as a result, in a growth of combined costs at intermediate stages of the innovative process, the innovations lead to a low innovation activity of economic agents. It is associated with high costs of the innovation activity being mostly not of transformational (dealing with reorganisation, changes of initial resources), but of transactional (predominantly caused by a necessity of collaborating and networking) nature. It happens because innovation products are being transferred in to the new B2B (business-to-business) system, however, the implementation thereof takes place in the B2C (business-to-customer) sector, which in turn makes it impossible to use directive methods of innovation system management.

The lack of mutual self-descriptiveness between economic agents leads to permanently high risks of running business in Russia, and, as a result, for instance, - inadequately high credits in banks. Correspondingly, without an access to long-term borrowed funds companies are forced to slow down their innovation activities. Such situation virtually demotivates implementation and realization of innovations. Monopolization has a similar effect leading to the innovation activity being useless at the present level of competition development for company owners and in most cases being implemented only provided for direct financing by the state. As a result, the discrepancy between the state's expenditures on innovation activity development and the level of innovation activity of domestic enterprises grows. We are to admit that according to the level of budgetary expenditures on research and development Russia is among the leaders outrunning USA, Israel, Japan and China. However, the share of organisations implementing technological innovations suffers a stable fall (Table 1). The Russian practice of establishing the innovation infrastructure - the destination of the lion's share of the budgetary resources – has been developed de facto guided by the logic of industrialization mainly based on replication of production and infrastructure projects.

In our opinion, it is essentially important to have a clear understanding of the fact that without the creation of motives to innovative development for economic agents the innovative process will remain an occasional phenomenon in the Russian economic system yielding to the competitiveness decrease and economic growth retardation.

It is impossible to disagree with the view of RAS academician L.I. Abalkin (2002), who formulated the main condition of scientific and technical advance: the scientific and technical advance and the associated standards of industrial and labor organisation will be in demand, if they are capable of attracting income that exceeds the labor remuneration economy existing at the moment of time. It logically implies that the general growth of employees' income being a significant part of companies' expenses is inevitable when companies are innovatively active. However, the economic reality testifies that company transformation into an innovatively active enterprise does not always lead to positive consequences for business in the form of its economic efficiency growth. All the above mentioned determines the following conclusion: company owners will be motivated to implement innovations provided the efficiency of such innovative projects exceeds the loss of profit from capital savings on qualification and quality of manpower resources (Gamidullaeva, 2016; Vasin and Gamidullaeva, 2015).

This, in turn, confirms the following thesis: without the establishment of stimulus for innovation development for market entities the innovation supply might not find its consumers in the required volume, and the innovation development will remain local. Thus, it is a matter of principle to determine the key internal incentive to reproduce innovations in the economic system. The incentive management will provide the diffusion and dissemination of innovations. We believe that the indicator of value added

(Gross Regional Product if consider at regional level) and its structure should be in the focus of the macroeconomic policy (Vasin and Gamidullaeva, 2015).

Recognizing the importance of the policy in the field of taxation, competition etc., low levels of remuneration and value-added established by labor determine the impossibility of mass dissemination of innovation activities within the concrete economic system. To make value added grow it is necessary to use the potential of companies themselves as well as institutional factors of development that appear to be more important and efficient under the economic conditions of Russia in comparison with other, in particular, with factors of demand for innovations. In order for individual companies to get involved in the innovative process of the system, the institutional support is required in the form of establishment of the corresponding institutions at the micro-level. This process can be influenced by the state only indirectly. The initiative must arise from company owners and managers, aspired to remain competitive in the innovation economy conditions. From our point of view, a positive effect of the development and improvement of institutions at meso- and macro-levels of the innovation system will be the institutionalization of the innovation activity at the micro-level of the economic system.

Conclusion

Considering value added as an object of optimization, we shall first address its structure. As a rule, it includes profit and remuneration intended for managers and wage workers who are the source of its formation at enterprises. Therefore, value added can be maximized through increasing profit and remuneration. An increase of profit from innovation activities, in turn, can be provided by a decrease of costs of transactions associated with innovations, and, accordingly, an increase of labor income – by means of increasing the value added share created by intellectual capital through its motivation to innovation activities.

It follows from the above that the main barriers in the internal field of innovations are high transaction costs associated with innovations as well as low companies' staff motivation to innovation activities. It is necessary to specify that under transaction costs minimization one should understand not a process of reduction thereof to zero, but optimization thereof within the norm, as they are objectively required for the economic system functioning. A stable innovative economic growth of the Russian economy may be ensured through achieving the optimal level of transaction costs as it is a requirement for innovative development in the framework of individual regions and the country as a whole.

Within the transactional approach the innovation activity of economic subjects is considered as the aggregate of transactions performed in order to gain a temporary advantage over competitors. We agree with the view of the majority of critics of neoinstitutionalism as well as institutionalism that the main problem of the said theory still remains indistinctness of terms and definitions. At the present moment there is no universally recognized definition of transaction costs. Nevertheless, the supporters of the said theories actively use them in their conclusions and recommendations for political administrations. As a result – the problem of evaluation, as it is difficult to evaluate something that has no unambiguous definition.

The researchers of this area are deeply convinced about the necessity of taking out the content of transaction costs from the production process exclusively into the field of exchange (costs are strictly divided by them into transformational and transactional). Admitting that such costs are first of all costs for interaction, we assert that they may occur at the pre-market stage as well, at the stage of production (being a part of transformation costs) and consumption. In this case they represent costs for interaction, for example, as a result of integration and cooperation, which are extremely important for innovative processes.

According to A. Shastitko (1997) growing transaction costs are compatible with "increasing efficiency and economic growth". A decrease of transaction costs at the meso-level will theoretically promote a rise of demand for transaction services, and, as a result, an increase of general transaction costs at the meso-level, determined by the economic system complexity due to intensified cooperation, division of labour etc.

According to the synergistic approach, an increase of economic complexity presupposes diversification of interaction types, taking place in cycles and being "a requirement for long-term economic development" (Saviotti, 2001). Herewith, the complexity of the system grows simultaneously with the complexity of coordinating the operation of its individual elements, and, as a result, transaction costs also grow.

Thus, we may conclude about the growth of transaction costs in the economic system being a reflection of complication of economic cooperation between business entities and economic agents. At the same time, it is assumed that institutions will decrease not the general transaction costs, but the unit costs, intended for individual transactions. Therefore, transaction costs are an objective indicator of economic system development. The logic of correlation between transaction costs and institutions is presented in Figure 1.

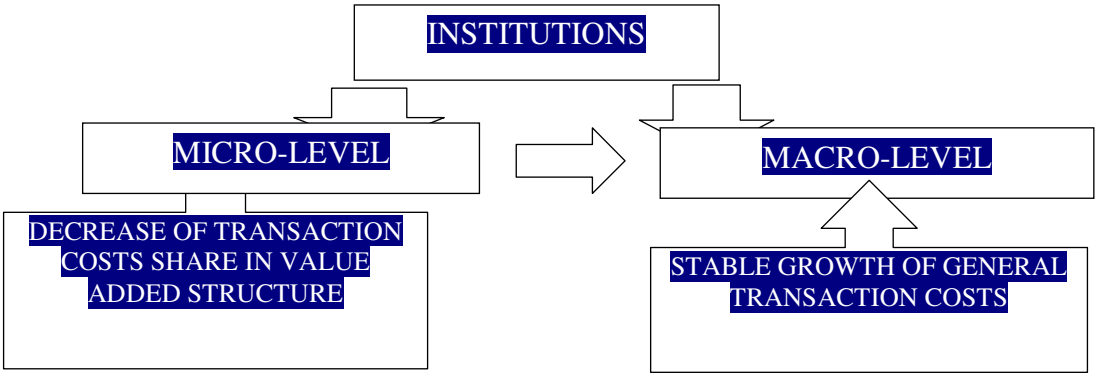


Fig. 1: Correlation of transaction costs and institutions at the micro- and macro-level of the innovation system

Discussion

It should be understood that innovative development relates to various aspects of the economy and the society. It can be studied only through integration of a number of methodological approaches to the research enabling to use the potential of obtained theoretical results and practical recommendations for innovation system management as much as possible.

Taking the following thesis as the initial one: the macro-level creates conditions for the micro-level in the innovation system, and the micro-level generates innovations required by the whole innovation system; there rises a necessity to combine a "macro approach" and a "micro approach". Within the macro approach, the economic agent is considered as a "hollow" component that reflexively reacts to changing environment. In the micro approach the economic agent acts as a complex multisubject and multilevel organism. A necessity of introducing the research micro-level into the analysis, particularly, the internal motives of companies as main actors of the innovation system, causes a necessity to use narrow scientific methodology – the neoinstitutional approach that, in turn, allows to institutionalize innovative development processes at the micro- and meso-level, - as a requirement for creation of basic incentives to generate innovations. Thus, the neoinstitutional approach will make it possible to include the research

micro-level into the theory of innovation systems and to reduce the research subject to consideration thereof through the prism of categories of neoinstitutionalism – institutions and transaction costs.

The use of the systemic approach will make it possible to correctly structure and interrelate the elements and factors of development, as well as to reveal "bottlenecks" in the innovation system development. The synergic approach will enable to take into account a dynamic aspect of the innovation system development, such categories as gain of complexity, ambiguity etc., which are integral features of innovation activities.

Thus, we believe that the most preferable path of the innovation system research is the use of a neoinstitutional system-synergistic methodological approach that represents a constructive instrument allowing to describe and to simulate regional innovative development management.

On the basis of the above-stated, we think that the conception of innovation activity management should implement integrated approaches: the neoinstitutional, systemic and synergistic ones, and be focused on creating mechanisms for elimination of internal environment barriers in the companies' innovation activity. Such barriers are represented in our opinion by high transaction costs associated with innovations and low company staff motivation to innovation activities. Therefore, the main element to be optimized in the course of the innovation policy is the volume and structure of value added (Gross Regional Product), established by companies.

We believe that the innovative development management should be embedded into the very managed system in such a manner, that the management mechanisms will agree with mechanisms and regularities of self-organisation and self-administration. Innovation process participants should collaborate without hindrance and develop the experience of joint projects on implementation of innovations. Therefore, the innovation system management should be focused on the development and implementation of the corresponding strategy that will ensure establishment of attracting structures, which are to draw innovative paths of development and to determine principal areas of development and promotion of collaboration for innovation activity participants. The latter may be represented by innovation institutions that possess the greatest potential in decreasing of transaction costs of the innovation activity and optimization of the volume and structure of value added, generated by economic agents.

The analysis carried out has helped to reveal the dual nature of innovations, manifesting itself in a growth of instability and ambiguity of existing companies' connections and relations and, as a result, in a growth of transaction costs at interim stages of the innovative process, which leads to a low innovation activity of economic agents in conditions of the Russian economy. It has been determined that it is the increase of the value added share in the structure of general income that should motivate business owners and wage workers to implement innovations. Therefore, it becomes a conceptual objective for the state to create a favorable institutional environment for development of such processes through establishing the mechanisms that reduce transaction costs of innovation activities. The stated objective should be implemented on the basis of integrated approaches (neoinstitutional, systemic and synergistic), all of which represent an efficient mechanism for regional innovation system management and forecasting of economic development. It is important to conclude that in order to efficiently manage innovation systems it is necessary to use their self-organisation and self-development capacities. At this point it becomes crucial to reveal attracting structures in conditions of the Russia's economic reality, which may be represented by certain institutions of the innovation field that possess the greatest potential in decreasing of transaction costs of economic agents and optimization of value added, generated by them. Such institutions should, supposedly, attract innovative paths of regional development.

Future research direction

We suggest the following *hypothesis for future research*: there exists a bilateral dependency between the level of transaction costs of innovation activity, value added (Gross Regional Product) and innovation activity of businesses, which has qualitatively- and quantitatively-defined boundaries of optimality. Beyond these boundaries, the economic system functioning efficiency decreases. A stable innovative economic growth of the Russian economy may be ensured through achieving the optimal level of transaction costs as it is a requirement for innovative development in the framework of individual regions and the whole country.

Acknowledgment

The research results were obtained while working on order of the Ministry of Education and Science of the Russian Federation.

References

Abalkin, L.I. (2002) The logic of Economic Growth. Moscow: Institute of Economics
Archibugi, D. and Pianta, M., (1992), 'Conclusions,' *The Technological Specialization of Advanced Countries*, 146–152. [Online], [Retrieved November 17, 2016], http://dx.doi.org/10.1007/978-94-015-7999-5_11.

Carlsson, B. et al. (2002), 'Innovation systems: analytical and methodological issues,' *Research Policy*, 31(2), 233–245.

Castellaci, F. et al. (2005), 'Advances and Challenges in Innovation Studies,' *Journal of Economic Issues*, 39(1), 91–121.

Chesbrough, H. (2003). The Logic of Open Innovation: Managing Intellectual Property. *California Management Review*, 45(3), 33–58. doi:10.2307/41166175

Cooke, P. & Morgan, K., (1998), 'The Associational Economy: Introduction,' *The Associational Economy*, 1–8. [Online], [Retrieved November 12, 2016], http://dx.doi.org/10.1093/acprof:oso/9780198290186.003.0001.

Cooke, P. (2001), 'Regional Innovation Systems, Clusters, and the Knowledge Economy,' *Industrial and Corporate Change*, 10(4), 945–974.

Coriat, B. & Weinstein, O. (2002), 'Organizations, firms and institutions in the generation of innovation,' *Research Policy*, 31(2), 273–290.

Edquist, C., (2006), 'Systems of Innovation: Perspectives and Challenges,' *Oxford Handbooks Online,* [Retrieved October 23, 2016], http://dx.doi.org/10.1093/oxfordhb/9780199286805.003.0007.

Feldman, M.P. and Audretsch, D.B. (1999), 'Innovation in cities,' *European Economic Review*, 43(2), 409–429.

Freeman, C., 1980, 'Government Policy,' *Technical Innovation and British Economic Performance*, pp. 310–325. [Online], [Retrieved November 12, 2016], http://dx.doi.org/10.1007/978-1-349-06381-9_18

Freeman, C., A Hard Landing for the "New Economy"? Information Technology and the United States National System of Innovation. Systems of Innovation and Development. [Online], [Retrieved November 12, 2016], http://dx.doi.org/10.4337/9781781009895.00013.

Gamidullaeva, L.A., (2016), 'Institutions in the Development of Innovation Systems,' *Journal of Economic Regulation,* 7(1), 93–103.

Gashenko, I.V. et al., 2016, 'Theoretical and Methodological Aspects of Innovation Development in Modern Economic Systems,' *Contemporary Economics*, 10(4), pp.363–372.

Golichenko, O.G. (2011) The main factors of development of the national innovation system. Moscow: Science.

Lundvall, B.-A., 2002. Innovation, Growth and Social Cohesion. [Online], [Retrieved November 12, 2016], http://dx.doi.org/10.4337/9781781008348.

Natkhov, T.V. and Polishchuk, L.I., 2017, 'Political economy of institutions and development: the importance of being inclusive,' *Zhournal Novoi Ekonomicheskoi Associacii*, 2 (34), 12–38

Nelson, R. (1993) National Innovation Systems: A Comparative Analysis, New York: Oxford University Press

Nill, J. and Kemp, R. (2009), 'Evolutionary approaches for sustainable innovation policies: From niche to paradigm?' *Research Policy,* 38(4), 668–680.

Samygin, D., Baryshnikov, N. & Shlapakova, N. (2015). Models of investment appeal of agribusiness in russian regions. J. Ponte, 73(2), 344–351.

Saviotti, P.P., (2001), 'Variety, growth and demand,' *Escaping Satiation*. [Online], [Retrieved November 12, 2016], http://dx.doi.org/10.1007/978-3-662-04528-2_8.

Schumpeter, J. (2006) Capitalism, Socialism and Democracy. [Online], [Retrieved November 12, 2016], http://dx.doi.org/10.4324/9780203202050.

Shastitko, A. (1997), 'Transaction costs (the content, evaluation and correlation with the problems of transformation),' Questions of the economy, 7, 36-45

Shinn, T. (2002), 'The Triple Helix and New Production of Knowledge,' *Social Studies of Science*, 32(4), 599–614.

Taylor, M.S., Grossman, G.M. and Helpman, E., (1993), 'Innovation and Growth in the Global Economy,' *Economica,* 60(239), 373.

The Business School for the World (INSEAD). [Online], [Retrieved October 12, 2016], http://www.globalinnovationindex.org

The Global Innovation Index by the Boston Consulting Group. [Online], [Retrieved November 15, 2016], http://www.bcg.com.

Vasin, S.M. and Gamidullaeva, L. A. (2015), 'Conceptual issues of innovation system management,' *Russian Journal of Management*, 3(4), 342–351.

Vasin, S.M. and Gamidullaeva, L.A., (2015), 'Development a Basic Model of the Innovation System,' *Review of European Studies*, 7(11). [Online], [Retrieved November 12, 2016], http://dx.doi.org/10.5539/res.v7n11p175.

Vasin, S.M. and Gamidullaeva, L.A., (2015), 'Increasing the Efficiency of State Institutional Aid to Small Innovative Enterprises,' *Review of European Studies*, 7(11). [Online], [Retrieved November 12, 2016], http://dx.doi.org/10.5539/res.v7n11p77.

Vasin, S.M., Gamidullaeva, L.A., Rostovskaya, T.K., (2017), 'The challenge of social innovation: approaches and key mechanisms of development,' European Research Studies Journal, 20(2), 25-45

Vertakova, Y., T. Tolstykh, E. Shkarupeta, I., Shishkin, K. Krivyakin, 'Assessment of the Impact of Higher Education Development on the Social and Economic Processes in the Region' Proceedings of the 29th International Business Information Management Association Conference (IBIMA), ISBN: 978-0-9821489-2-1, 3-4 May 2017, Vienna Austria, 2180-2191

World Economic Forum. The Global Competitiveness Report 2013-2014. [Online], [Retrieved October 12, 2016], http://www.weforum.org/issues/global-competitiveness.

The Impact of Critical Success Factors of Enterprise Resources Planning System on Organizational Performance in Islamic International Arab Bank

Maha Alkhaffaf
World Islamic Sciences and Education University
Amman- Jordan
E Mail: alkhaffaf@yahoo.com

Abstract

This study aimed at identifying the impact of critical success factors of enterprise resource planning system (ERP) on organizational performance. The study used an empirical study to achieve its objectives; the study sample consisted of 170 employees who were randomly amounted of ERP users in the Islamic International Arab Bank. The empirical data were analyzed and results of the study showed a high significant effect of ERP critical success factors (support of senior management, the efficiency of the IT department, ERP vender's support) on organizational performance. The study recommend that organizations must prepare its work system before applying the ERP system, by getting a good support from the senior management, and preparing the human resources in order to guarantee a good application of ERP system, the management also must has a clear strategies for judging its corporate performance.

Keywords: Critical success factors, Enterprise resource planning, Organizational performance.

Introduction

The last decades and even the beginning of twenty-first century have witnessed many changes, developments and enormous accelerating challenges that are complex in their interferences, which commercial banks face in general, and Jordanian bank in particular. These organizations have no choice but to be at the forefront of this competition. The use of IT services and the Internet has become of great importance, which increases the use of ERP solutions in Jordan and all around the world. These systems provide integration for all human being and technical factors, and also for all organizational and functional levels of the enterprise. It aims to enhance and improve the enterprise's competitiveness by improving the organization's ability to generate information accurately and provide it in a timely manner to all its beneficiaries in the enterprise (Kennerely, 2001). The importance of ERP system is to support top management, giving a complete refection of the project, objectives, and directions in carrying out the project. (Alkhaffaf,2016)

Jordanian firms usually procure these systems from companies that play a leading role for these systems to realize success as being changed and developed over time. The suppliers of these systems should be carefully selected for their important role in forming the final outcome of the system implementation process.(Ayyagari,2010). Despite the importance of ERP system to organizations, many applications in organizations have failed. Therefore, it is necessary to address the critical success factors that ensure that these systems are applied successfully. This study focuses on these factors for the successful implementation of ERP system of organizations in general, and the Islamic International Arab Bank in particular, and examines the impact of their application on institutional performance (Bhattacharya, 2016). The banking sector is one of the most profitable service sectors in Jordanian society, which relies on accuracy and timely provision of information. The ERP system helps the various departments of the organization such accounting, finance, human resources, production, implementation and distribution through coordination of activities and sharing information.

These systems will link different business units into one integrated system that contains a platform for information flow through the business organization. As a result, this title was chosen as applying the success factors of ERP system is important, to ensure the system is applied successfully, which in turn will affect the institutional performance. It is worth mentioning that many organizations failed to implement such system despite the large amounts of money paid to procure these systems. Hence, it is importance to realize that critical factors successfully for ERP systems. As many institutions failed to implement ERP system, the importance of this study is to suggest ways to facilitate the implementation of ERP system successfully in a leading banking sector, which plays an important role in Jordanian economy through applying critical success factors in it. It is necessary to properly understanding the critical success factors of ERP system, especially since investing in these systems costs large sums of money. The study aims at focusing on the role of success factors for properly applying ERP system, identifying the problems faced by the organizations in applying ERP system, and understanding the influence of top management's support in Islamic International Arab Bank on applying ERP systems successfully. This is in addition to the impact of IT department's efficiency on the success of ERP system at Islamic International Arab Bank. Finally, we have to understand the impact of supplier support and other factors on applying ERP systems successfully at Islamic International Arab Bank.

Literature Review

The study of (Alkhaffaf, 2016) discussed the case of "Jordanian Hashemite Fund for Human Development", It aimed at analyzing the impact of ERP system on achieving better organizational performance by analyzing the effectiveness of ERP system (information quality, system quality, user satisfaction). The study found that there was significant relationship between ERP and its impact on organizational performance. However; Zhang et al; (2004) discussed a framework of ERP system implementation success in China, ERP system was considered one of the most important options for obtaining a competitive advantage for manufacturers. Dezdar in (2012) studded Strategic and Tactical Factors for Successful ERP Projects aimed to identify strategic and tactical factors that are critical to the successful implementation of ERP systems. A significant relationship were found between (top management support, project management, education and training of users, communication and providers support) and the successful implementation of ERP system. Another relationship were found between business reengineering and the successful implementation of ERP. Maditions et al., (2012) had the same results of the study above. The study entitled "Factors Affecting ERP system implementation effectiveness". And it found that consultants support and knowledge transfer are critical factor affecting the effective implementation of ERP system, while top management support has no significant impact on the same. In addition, the users support had an indirect effect on effectiveness implementation of ERP system. In contrast, the study found that effective communication and conflict resolution had no impact on the effective implementation of ERP system. Furthermore; Huang (2011) explores the impact of the implementation of ERP on business strategy of the organization and organizational capacities that in turn enhance the organizational performance. Huang indicated that the implementation of ERP systems had a positive impact when applied, as the system employed a work strategy to help strengthen the organization's capacity to utilize from organizational capacity. It also helps to achieve a higher level of financial performance for the company. However; Ifinedo (2008) noticed the Impact of business vision, top management support and external experience on ERP success" aimed to identify the factors influencing ERP system such as top management support, business vision, and external experience on ERP success. The results confirmed the relative importance of experience quality of staff responsible for initiatives of the ERP systems. (Hong, 2002) provide a methodology of ERP Implementation System, the results showed a decrease in total productivity of organization before the implementation of system, and in return the inventory was increased after the implementation of ERP system. The productivity of staff was low as a result of outsourcing after the implementation of ERP system.

Research Methodology and Design

To reach the objectives of this study, the researcher used a descriptive approach method in order to reach a better description of the research problem, which will be described accurately. The researcher used a simple random sample to achieve the purposes of this study. However; the study population is consisted of all the staff members who use the Enterprise Resource Planning (ERP) system and working in 41 branch of Islamic International Arab Bank in Jordan, the study sample consisted of 170 staff members. The questionnaires distributed over 180 members and 170 questionnaires have been collected. The questionnaires consisted of three main paragraphs; paragraphs that reflect the demographic characteristics of the sample members, including education, career level, and experience, paragraphs that measure the independent variables of study and paragraphs that measure the dependent variables of study. SPSS was used to analyze the data collected.

Research Hypothesis

Hypothesis I: The impact of all the critical success factors of ERP system on organizational performance.

There is no statistically significant effect at level (α□0.05) of all of the critical success factors of ERP system (top management support, IT department efficiency, and support of ERP systems' vendors and providers) on organizational performance by its combined factors, learning, and institutional growth.

Ho1.1: There is no statistically significant effect at level (α□0.05) Top Management support organizational performance.

Ho1.2 There is no statistically significant effect at level (α□0.05) of efficiency of IT department on organizational performance

Ho1.3 There is no statistically significant effect at level (α□0.05) of support ERP vendors and service providers on organizational performance.

Hypothesis II: There is no statistically significant effect at level (α□0.05) of all critical success factors of ERP system on Organizational performance (efficiency of internal operations, learning, and institutional growth)

Ho2.1 There is no statistically significant effect at level (α□0.05) of critical success factors of ERP system on internal processes.

Ho2.2 There is no statistically significant effect at level (α□0.05) of critical success factors of ERP system on learning and institutional growth.

Data Analysis and Hypothesis Testing

Hypothesis Results

Hypothesis I : There is no statistically significant effect at level (α□0.05) of all of the critical success factors of ERP system (top management support, IT department efficiency, and support of ERP providers) on organizational performance.

To test this hypothesis, Multiple Regression was used to detect the impact of critical success factors of ERP system (top management support, IT department efficiency, support of ERP systems' providers) on organizational performance, as shown in table (1):

Table (1): Analysis Results of Multiple Regression to find out the effect of success factor of ERP on Organizational Performance (N=170)

Dependent Variable	T Value	"t"	Beta	R	R2	F	"f"	Hypothesis Result
Top Management Support	4.454	0.000	0.272	0.667	0.445	44.442	0.000	Rejected
IT Efficiency	1.158	0.248	0.075					
Vendors & support Providers' of ERP	7.759	0.000	0.501					

Dependent Variable: Organizational Performance

Table (1) shows that the value of (f) is (44.442) with statistical significance of (0.000). The value of (R) is (0.667), which represents the correlation coefficient of the total model. The value of (R2) is (0.445), which represents the effect percentage or interpretation of all independent variables on dependent ones. This indicates that there is an impact of critical success factors of ERP system (top management support, IT department efficiency, support of ERP systems' providers) on organizational performance. Based on, hypothesis I is rejected, while the alternative one is accepted.

Sub-hypothesis I: There is no statistically significant effect at (α□0.05) of top management's support on organizational performance. To test this hypothesis, Linear Regression analysis has been used to find out the impact of top management's support on institutional performance, as shown in table (2)

Table (2) illustrates that the value of (f) is (36.923) with statistical significance of (0.000). The value of (R) is (0.424), which represents the correlation coefficient of the total model. The value of (R2) is (0.180), which represents the effect percentage or interpretation of all independent variables on dependent ones. This indicates that there is a statistically significant effect at level (α□0.05) of top management's support on organizational performance. Based on, sub-hypothesis I is rejected, while the alternative one is accepted.

Table (2): Analysis Results of Linear Regression to find out the effect of Top Management Support on organizational Performance (N=170)

Independent Variable	T Value	"t"	Beta	R	R2	F	"f"	Hypothesis Result
Top Management Support	6.076	0.000	0.484	0.424	0.180	36.923	0.000	Rejected

Sub-hypothesis II: There is no statistically significant effect at (α□0.05) of IT efficiency on organizational performance.

To test this hypothesis, Linear Regression analysis was used to find out the impact of IT efficiency on institutional performance, as shown in Table (3).

Table (3): Analysis Results of Linear Regression to find out the effect of IT on Organizational Performance (N=170)

Independent Variable	T Value	"t"	Beta	R	R2	F	"f"	Hypothesis Result
IT Efficiency	5.004	0.000	0.610	0.360	0.130	25.042	0.000	Rejected

Table (3) indicates that the value of (f) is (25.042) with statistical significance of (0.000). The value of (R) is (0.360), which represents the correlation coefficient of the total model. The value of (R2) is (0.130), which represents the effect percentage or interpretation of all independent variables on dependent ones. This indicates that there is a statistically significant effect at level (α□0.05) of IT efficiency on organizational performance. Based on, sub-hypothesis II is rejected, while the alternative one is accepted.

Sub-hypothesis III: There is no statistically significant effect at (α□0.05) of vendors and support providers' of ERP on Organizational performance.

To test this hypothesis, Linear Regression analysis was used to find out the effect of IT providers' support of ERP on organizational performance.

Table (4): Analysis Results of Linear Regression to find out the effect Providers' Support of ERP on organizational Performance (N=170)

Independent Variable	T Value	"t"	Beta	R	R2	F	"f"	Hypothes is Result
Vendors and support Providers of ERP	9.834	0.000	1.107	0.604	0.365	96.711	0.000	Rejected

Table (4) indicates that the value of (f) is (96.711) with statistical significance of (0.000). The value of (R) is (0.604), which represents the correlation coefficient of the total model. The value of (R2) is (0.130), which represents the effect percentage or interpretation of all independent variables on dependent ones. This indicates that there is a statistically significant effect at level (α 0.05) of providers' support of ERP on Organizational performance. Based on, sub-hypothesis III is rejected, while the alternative one is accepted.

Hypothesis II: There is no statistically significant effect at level (α 0.05) of all critical success factors of ERP system on Organizational performance (efficiency of internal operations, learning, and institutional growth)

To test this hypothesis, Multiple Regression was used to detect the impact of all critical success factors of ERP system (efficiency of internal operations, learning, and institutional growth) on Organizational performance, as shown in table (5)

Table (5): Multiple Regressions was used to detect the impact of all critical success factors of ERP system (efficiency of internal operations, learning, and institutional growth) on Organizational performance

Dependent variable	T value	Seg	Beta	R	R2	F	sig	result
Internal efficiency	8.297	0.000	0.541	0.641	0.410	58.130	0.000	Rejected
Learning and institutional growth	2.844	0.005	0.186					

Table (5) indicates that the value of (f) is (58.130) with statistical significance of (0.000). The value of (R) is (0.410), which represents the effect percentage or interpretation of all independent variables on dependent ones. This indicates that there is a statistically significant effect at level (α 0.05) of critical success factors of ERP on institutional performance (efficiency of internal operations, learning, and institutional growth). Based on, hypothesis II is rejected, while the alternative one is accepted.

Sub Hypothesis I: There is no statistically significant effect at level (α□0.05) of critical success factors of ERP system on internal operations.

To test this hypothesis, Linear Regression was used to detect the impact of all critical success factors of ERP system (efficiency of internal operations, learning, and institutional growth) on internal operations, as shown in table (6):

Table (6): Linear Regression was used to detect the impact of all critical success factors of ERP system (efficiency of internal operations, learning, and institutional growth) on internal operations

Independent Variable	T Value	"t"	Beta	R	R2	F	"f"	Hypothesis Result
Internal Operations Efficiency	10.188	0.000	0.502	0.618	0.382	103.790	0.000	Rejected

Table (6) mentioned that the value of (f) is (103.790) with statistical significance of (0.000). The value of (R) is (0.618), which represents coloration coefficient of the model in whole. The value of (R2) is (0.382), which represents the effect percentage or interpretation of all independent variables on dependent ones. This indicates that there is a statistically significant effect at level (α□0.05) of critical success factors on internal operations. Based on, sub-hypothesis I is rejected, while the alternative one is accepted.

Sub Hypothesis II: There is no statistically significant effect at level (α□0.05) of all critical success factors of ERP system on learning and institutional growth.

To test this hypothesis, Linear Regression was used to detect the impact of all critical success factors of ERP system (efficiency of internal operations, learning, and institutional growth) on learning and institutional growth, as shown in table (7):

Table (7): Linear Regression was used to detect the impact of all critical success factors of ERP system (efficiency of internal operations, learning, and institutional growth) on learning and institutional growth

Independent Variable	T Value	"t"	Beta	R	R2	F	"f"	Hypothesis Result
Learning& institutional growth	5.812	0.000	0.490	0.409	0.167	33.779	0.000	Rejected

Table (7) indicates that the value of (f) is (33.779) with statistical significance of (0.000). The value of (R) is (0.409), which represents coloration coefficient of model in whole. This represents the effect percentage or interpretation of all independent variables on dependent ones, and indicates that there is a

statistically significant effect at level (α□0.05) of critical success factors of ERP on learning and institutional growth. Based on, hypothesis II is rejected, while the alternative one is accepted.

Summary and Results Discussion

The results showed that there was a statistically significant impact of top management's support of ERP on the institutional performance of the Islamic International Arab Bank. The support of top management to ERP system is clearly affecting the institutional performance, as it is one of the most important keys in achieving the objectives of any system in any organization. Performance cannot be improved without the full and effective support of the top management, especially as it is responsible for providing the Bank with financial resources, meeting interest needs and achieving its objectives. Top management is the supporting entity that controls development of the bank as supporting for changes and business with all that is new. Based on, the institutional performance of the bank will improve to become one of the leading banks in providing services to its customers. It should be noted that institutional performance reflects the Bank's ability to achieve its objectives and provide the best services through innovation and creativity at work, organize individual performance and performance of organizational units. The result of this study was in line with the study's results of (Ifinedo, 2008), which discussed the influence of factors affecting the ERP system (top management support, business vision, and external experience) in terms of ERP system. It also agreed with the study's results of (Dezdar, 2012). The study concluded that there was a statistically significant relationship between (support of top management) and the successful implementation of ERP system. The study also agreed with the study of (Al-Faouri, 2012), which revealed the impact of the efficiency of ERP systems on achieving excellence in the organizational performance in Greater Amman Municipality. Finally, the study agreed with the study of (Alshaar, 2013), which found that the strategic factors are (top management support) that affect the successful implementation of ERP system. Furthermore; the results showed that there was a statistically significant impact of IT efficiency of ERP on the organizational performance of the Islamic International Arab Bank.

At present, Information Technology (IT) is an integral part of the vital core of banking activity. No bank, in general, and International Islamic Arab Bank, in particular, can abandon technology to be in line with present time, so that the Islamic International Arab Bank will be able to compete with other banks by dedicating information technology as a means of performing the Bank's tasks to realize its general objectives. IT enabled decision- makers at Islamic International Arab Bank to get information as quickly as possible with minimal effort. IT also organized the way employees work and the way they communicate with other organizations to reflect positively on institutional performance of Islamic International Arab Bank. The results of the present study was consistent with the study's results of (Harrison, 2004), which revealed the relationship between the traits of expected job and the traits of IT environment before and after the replacement of traditional information system with ERP. The study also agreed with the study of (AlFaouri, 2012), which revealed the impact of the effectiveness of ERP systems on achieving excellence in institutional performance in Greater Amman Municipality. It also agreed with the study's results of (Al-Hatla, 2013) The results indicated that an explanatory framework should be presented to accounting library to assess the adequacy and efficiency of the output of accounting information generated in the ERP environment, which would address and provide security, assurance and IT reliability. It would also address the problems of revenue recognition, calculation of sales tax, and revenues generated by e-commerce.

The results also showed that there was a statistically significant impact of vendors and support providers of ERP on institutional performance of the Islamic International Arab Bank.

The result above is due to the fact that the quality and level of service rendered by providers will directly affect the performance of the system. Providers support is maintenance, employee training, system development and protection, etc. It will result in performing work, activities and tasks to achieve the

designated goals and objectives and perform work in a way that can make the Islamic International Arab Bank distinctive from competitors, and improve the performance of the bank in a way to ensure its success. It is also possible to draw attention to the extent to which institutional performance is affected in the case of dealing with providers that are not financially stable, which negatively affects the provision of services with less quality than what the Bank aspires to achieve. It is important to maintain good relations between Islamic International Arab Bank and its providers, which represent a key pillar in providing the bank with its needs with high quality and on due time. If there are good relations with the development of public relations, it will be reflected on the suppliers' performance and their obligations towards the Bank and be prudent to participate effectively in achieving the Bank's objectives. The result of the present study was consistent with the result of (Dezsar, 2012), which found that there was a statistically significant relationship between vendor support and the successful implementation of ERP system. The study also agreed with the study's result of (Hatla, 2013), which revealed that tactical factors such as (communication, training education of users, providers' support of ERP) affect the successful implementation of ERP system. Finally, the above result agreed with the study's result of (Shaar, 2013), which concluded that the independent variables related to (support of suppliers / vendors of ERP system) had a statistically significant impact on the quality of information.

Moreover the results showed that there was a statistically significant impact of critical success factors of ERP system on internal operations. The critical success factors of ERP system can help managers identify the internal processes they need, which create value for the bank and have an impact on consumer satisfaction, thus achieving the financial institution's objectives of the administration's functions in this regard trying to reduce the cost of service, and increase the level of productivity efficiency and quality rate. The internal processes are a set of activities that give the company a competitive advantage in the market. It should be noted that the internal processes defined by administration are based mainly on the consumer dimension, in order to deliver value to the consumer and thereby obtain satisfaction, loyalty and retention. The result of the present study was in line with the study's results of (Garg, 2013), which showed that the overall productivity of the organization was reduced and, in contrast, the inventory was increased after the implementation of ERP system. The productivity of staff was low as a result of outsourcing following the implementation of ERP system. The study also agreed with the study's result of (Hong, 2002), which also found a significant correlation between ERP system and organization's productivity. Finally the results showed that there was a statistically significant impact of critical success factors of ERP system on learning and institutional growth. Learning and Growth factors can identify the infrastructure that a bank needs to build so as to realize long-term improvement growth. This structure cannot be strengthened without EPR systems, which support most of organization's works, and where a database is run as a manufacturing, supply management, financial, human resources and customer relationship management tasks as the bank's infrastructure. This will positively impact learning and institutional growth. It is worth mentioning that the learning and growth factors focus on internal and external measures that show possible potentials for the development of infrastructure and human capabilities that can adapt with external environment. The critical success factors of ERP system, without the support of planning systems in all its variants, cannot enable the bank to focus on the key indicators of competencies, investment in systems, performance of new products and services.

Recommendation

1. It is necessary to re-engineer business processes as a methodology for the integration of procedures and to provide full integration at the level of each process of business operations.

2. It is essential for organizations that are flexible in their operations to modify their operations rather than modify ERP system in order to maximize the advantages and benefits of these systems, as they are tailored to best management practices.

3. Based on the study's results, which showed the impact of top management support on critical success factors of ERP system, its recommended that the organization be well prepared to apply ERP system before the implementation process by obtaining material and moral support from top management and preparing Human resources.

4. Better selection of ERP systems commensurate with the nature of organization's activity, and top management should have clear strategies to judge organizational performance.

5. It is important to enhance the possibilities of creating value in the work system of institutional performance. Such a methodology is based on efficient recruitment of automation of interactive relationship with ERP, especially in the areas of providing feedback related to the verification of effective performance levels, and activation of innovation processes in organizations that used ERP system.

References

Alballaa, Hailah & Al-Mudimigh , Abdullah, (2011) 'Change Management Strategies: Effective Enterprise Resource Planning Systems: A Case Study of a Saudi Company, *International Journal of Computer Applications*', Volume 17, No. 2.

AlFaouri, A. (2012) The role of ERP effectiveness on improving organizational performance, Master thesis, Middle east Jordan university.

Alkhaffaf, Maha & Aldalahmeh, Mahmood, (2016) 'Enterprise Resources Planning effectiveness and Organizational Performance: The case of "Jordanian Hashemite fund for human development" Business and Economic Research', Economic Research Macrothink, Vol. 6, No. 1.

Al-lawzi, I. M. (2008) 'An empirical investigation of the factors affecting the success of enterprise resource planning systems implementation in Jordan'. A case of cellular network & telecommunication operators." *Master Theses*, University of Jordan, Amman.

Alshaar. I, M.(2013) 'The role of strategic and tactical factors in successful implementation of ERP in organizations, Applied study in Jordan service sector', Jordan international journal of business administration, Jordan University. Vol. 9. No.1.

Ayyagari, R.A., (2010) Hands-on ERP Learning: Using Open ERP®, an Alternative to SAP. *Journal of Information Systems Education*, Vol. 22, No.2.

Bhattacharya, T. (2016) 'An analysis of ERP implementation success factors in Indian power distribution companies (Discoms), *International Journal of Commerce, Business and Management* (IJCBM), Vol. 5, No. 3, pp.148–158.

Beheshti, Hooshan, (2006) 'What managers should know about ERP/ERP II', *Management Research News,* Vol. 29 No. 4, pp.184-193

Chawki El Moussawi, Hassan Obeid (2010) 'Evaluating production Efficiency of Islamic Banking in GCC: Anon Parametric Approach', *International Journal of Finance and Economics*.Vol.7. No 53, p: 184.

Collado, Joan Pastor, (2000) 'Towards the Unification of Critical Success Factory For ERP Implementation, Published in 10th Annual Business Information Technology (BIT) Conference, Manchester.

Dezdar S. (2012) 'Strategic and tactical factors for successful ERP projects: insights from an Asian country', *Management Research Review*, Vol.35, No.11, pp 1070-1087.

Garg, A., (2013) 'An empirical study on Critical Failure factors of Enterprise Resource Planning implementation in Indian Retail Sector', *Business Process Management Journal*, Vol. 19 No. 3.

Harrison J.L., (2004) 'Motivations for enterprise resource planning (ERP) system implementation in public versus private sector organizations' *PhD Dissertation* University of Central Florida Orlando, Florida. USA Hawaii.

Hong .K.K. & Kim .Y.G.(2002) The Critical Success factors for ERP implementation: An organizational Fit Perspective .*Information & Management*, Vol. 40, No. 1. pp. 25-40.

Huang. M.I. and Schmidt. F (2011) 'Assessing moderating effect in meta-analysis: A re-analysis of top management support studies and suggestions for researchers'. *European Journal of Information Systems.* Vol.20, No.6, pp. 693-702.

Ifinedo, P (2008) Impacts of business vision, top management support, and external expertise on ERP success, *Business Process Management Journal*, Vol 14, 4, 551-568.

Kraemmergaard, P & Rose, J. (2002) "Managerial Competences for ERP journeys" *Information Systems Frontiers,* Vol 2, No. 4.

Maditinos D., Chatzoudes D, Tsairidis C, (2012) Factors affecting ERP system implementation effectiveness, *Journal of Enterprise Information Management*, Vol. 25 No. 1. pp 60-78

Wang, E. T., Shih, S. P., Jiang, J. J., & Klein, G (2009), Consistency among facilitating factors and ERP implementation success: A holistic 4th Ed. Prentice Hall.

Zhang, Z., Lee, M. K., Huang, P., Zhang L., & Hang, X (2003) A framework of ERP system implantation success in china: An empirical study. *International journal of production economics,* Vol. 98, No.1, pp 56-80.

Comparison of Motivational Preferences of University Students and Employees

Dagmar Weberová, Faculty of Multimedia Communications, Tomas Bata University in Zlín, Czech Republic, weberova@utb.cz

Peter Štarchoň, Faculty of Multimedia Communications, Tomas Bata University in Zlín, Czech Republic, starchon@utb.cz

Lenka Ližbetinová, Faculty of Corporate Strategy, Institute of Technology and Business, České Budějovice, Czech Republic, lizbetinova@mail.vstecb.cz

Abstract

The aim of this article is to identify differences in motivational preferences among university students and employees with university degree. The aim of the primary research is to find out motivational preferences in a group of young people before their employment in the labor market and how these preferences change at workers who are already in employment. These outcomes are also interesting for potential employers who try to reach out to talents right after graduation. The young generation has not only different preferences but also new and interesting worldviews that can bring new wind into stereotypical processes. This research was carried out through a questionnaire survey in the Czech Republic in 2016. It is based on data gained from two groups of respondents. The first group consisted of university students studying full-time. The second group was comprised of employees with university degree.

Keywords: motivation, motivational factors, university students, employees, gender

Introduction

Every company, regardless of the field of its operation, depends on the quality of human resources. According to published studies, this holds true in transport and logistics companies (Kampf et al. 2012; Bartuška et al., 2015; Kubasáková et al., 2014) as well as in manufacturing companies podnikoch (Kampf et al., 2014; Hitka and Štípalová, 2011), and other companies. The success of companies depends on the effort, commitment, engagement, work experience and perseverance of their human capital (Lorincová et al., 2016; Grancay et al., 2015). This is the reason why motivation is an important issue as management must be competent and one of their capabilities must be the ability to motivate employees (Lussier, 2013). Motivation is one of the key management and leadership tasks (Kucharčíková, 2014a; Kucharčíková, 2014b) . Leadership starts with the initial effort to motivate applicants during the recruitment procedure. And the process of motivation continues and should be present in employees' lives every day until they leave the company. This process is carried out by managers and leaders. It is their job to motivate their employees from the very beginning of their collaboration. The quality of the manager's relationship with employees is the strongest element in employee motivation (Rebeťák and Farkašová, 2013; Olšovská et al., 2016). Motivation creates a professional, positive, and respectful attitude, and employees can enjoy their work. It is clear that the management and leadership styles, accepted in the company, will have a decisive impact on the level of motivation, morale and job satisfaction of employees. However, the relationship between the management style used in companies and the level of motivation within the workforce is the subject of many industry debates in the industrial sector. In many professional groups, there is a continuous debate about whether a person is born as a leader or whether this person can develop into that position over some time. In discussions of motivation, it is clear that people are very complicated

personalities and they are made up of several features (Naile a Selesho, 2014). For example, motivation theory, presented by Knoke and Wright-Isak's (1982) typology of rational, norm-based, and affective motives, assumes that individuals will be attracted to work that meets their psychological needs. Motivation is the inner enthusiasm of employees. It is a drive to achieve the best performance-related work. According to Chaudhary a Sharma (2012), motivation is an internal unit that causes an increase in work performance of employees at the workplace.

Understanding differences between the generations is essential in creating the right atmosphere as well as in building successful teams in a multigenerational workplace (O'Bannon, 2001). Most employees working in organizations are members of Generation X (born between 1960 and 1980), and Generation Y (born between 1980 and 2000). Members of Generation X are able to adapt to technological advances and consider personal freedom and challenging work for important (Kupperschmidt, 2000). Members of Gneration Y have often be referred to as Millenials (Lancaster & Stillman, 2002). They are realistic about the present, and optimistic about the future. They prefer to be part of a company that behaves in an ethical way and acts in a community's best interest (Hicks & Hicks, 1999). Moreover, they tend to be goal oriented, well socialized, self-confident, and compliant (Hart, 2006). On the other hand, they may be in conflict with members of other generations because they heavily rely on the use of technology (Simons, 2010). So one of the biggest challenges for organizations today is the integration of the Millenials into corporate culture and their adequate motivation. Chaudhary a Sharma (2012) claim that motivated employees tend to be more productive than unmotivated employees. If employees are satisfied and happy, then they can do their work in an extremely satisfactory way. This will result in satisfied and motivated employees who can motivate and support their colleagues at the workplace. Studies show that employee motivation has a direct impact on employee performance and development (Drábek et al., 2017; Nedeliakova and Panak, 2016). Every day, a highly motivated employee strives to perform the duties and responsibilities assigned by the employer. Improved employee performance increases the value of the organization itself as well as employee productivity. In order to increase work efficiency and performance, it is important to address a range of issues and to increase motivation among employees to make them happy with their work. A motivated person knows the specific goals that must be achieved. Through his performance and efficiency, he works to achieve these goals (Owusu, 2012). A motivated person is best suited to achieving goals. Due to the high motivation of employees, it is possible to increase the productivity and performance of the company. Managers can thus increase the efficiency of work among employees in companies (Oluseyi and Ayo, 2009; Mura and Sleziak, 2015). Studies show that motivation changes by the age of employees (Lorincová et al., 2016; Hitka and Balážová, 2015). We are interested in how motivation changes during the transition from the category of a university student to an employee with completed university education.

Materials and Methods

The aim of this article is to determine differences in preferences of motivational factors at a group of young people aged 18 – 25 and studying full-time at least in a bachelor program at university and at a group of employees with a completed university degree at least in a bachelor program. Attention is also paid to gender differences in these preferences. Students ranked motivational factors in the context of their future employment. This view reflects both future expectations as well as preferences in future employment. It is anticipated that preferences vary not only with age but also with work experience (Hitka and Balážová, 2015). That is the reason why the group of employees was asked to rank the same motivational factors. Moreover, these respondents also expressed to which degree these factors are met in their current job. The importance of motivational factors was evaluated by the respondents in the Likert scale of 1 to 5 – 1 represents *not important* and 5 *very important*. In this article, only partial outputs are presented and comparison of preferences of the motivational factors is shown. In both groups, socio-demographic data, such as age, gender, and residence, was obtained. In addition, information about the completed education, years of work experience, sector, and the size of company, was requested from

employees. On the other side, students provided information about the study program, form of study (full-time or part-time), and university. Respondents were chosen by a random selection method and interviewed either personally or through closed social group electronically. Data collection took place in the Czech Republic in 2016. The sample of university students is made up of 922 respondents, and the sample of employees is made up of 1156 respondents. Data were processed with the help of the SPSS (IBM Corporation, 2015). Table 1 shows basic information about the structure of respondents in the group of university students and Table 2 presents the structure of employees.

Table 1 : The structure of respondents – the group of university students

Structure of university students		
	Total	922
Gender	Men	302
	Women	620
Age	18-20	322
	21-23	306
	24 and more	294
Type of study	Bachelor studies	552
	Master´s studies	369

Source: authors

Table 2: The structure of employees

Structure of employees		
Total		1156
Gender	Men	536
	Women	620
Age	up to 29 years	204
	30 - 39 years	208
	40 - 49 years	348
	over 50	396
Years of work experience	up to 1 year	88
	1-3 years	224
	4-6 years	200
	7-9 years	220
	more than 10 years	424

Source: authors

Results and Discussion

The data obtained from the research was processed using the basic statistical characteristics and the presented comparison is based on the weighted arithmetic mean of the preference of motivational factors on the Likert scale. Respondents evaluated the importance of 27 motivational factors on the scale from 1 to 5, 1 means *not important*, 2 means *little important*, 3 is *neutral*, 4 is *important*, and 5 means *very important*.

The importance of motivational factors of students in their future employment is presented in Figure 1. When entering the labor market, university students will make their decision under this angle of preference. Therefore, when recruiting talented employees it is beneficial for potential employers to prepare a motivation program based on preferences of graduating university students. Looking at Figure 1, the motivational factors are ranked upwards according to the value of preference based on gender. The differences in preferences between men and women are presented here too. It is clear that students look mainly at financial rewards followed by the work atmosphere, working team, fair assessment and job stability. However, if we focus on gender, we can see some interesting differences. Women clearly prefer good working teams (the 1st place among women with a rating of 4.40, the 9th place among men with a rating of 3.87) and work atmosphere (the 2nd place among women with a rating of 4.40, the 3rd place among men with a rating of 4.16) to the amount of salary (the 3rd place among women with a rating of 4.38 and the 1st place among men with a rating of 4.22). On the contrary, male students tend to focus more on career growth, which they prefer as the 4th most important factor (with a rating of 4.16). This is followed by the emphasis on workplace communication (with a rating of 4.12), job stability (with a rating of 4.01) and superior approach (with a rating of 3.88). The least motivating for both groups is the ecological approach of the company, prestige of the company name and the physical demand of the work.

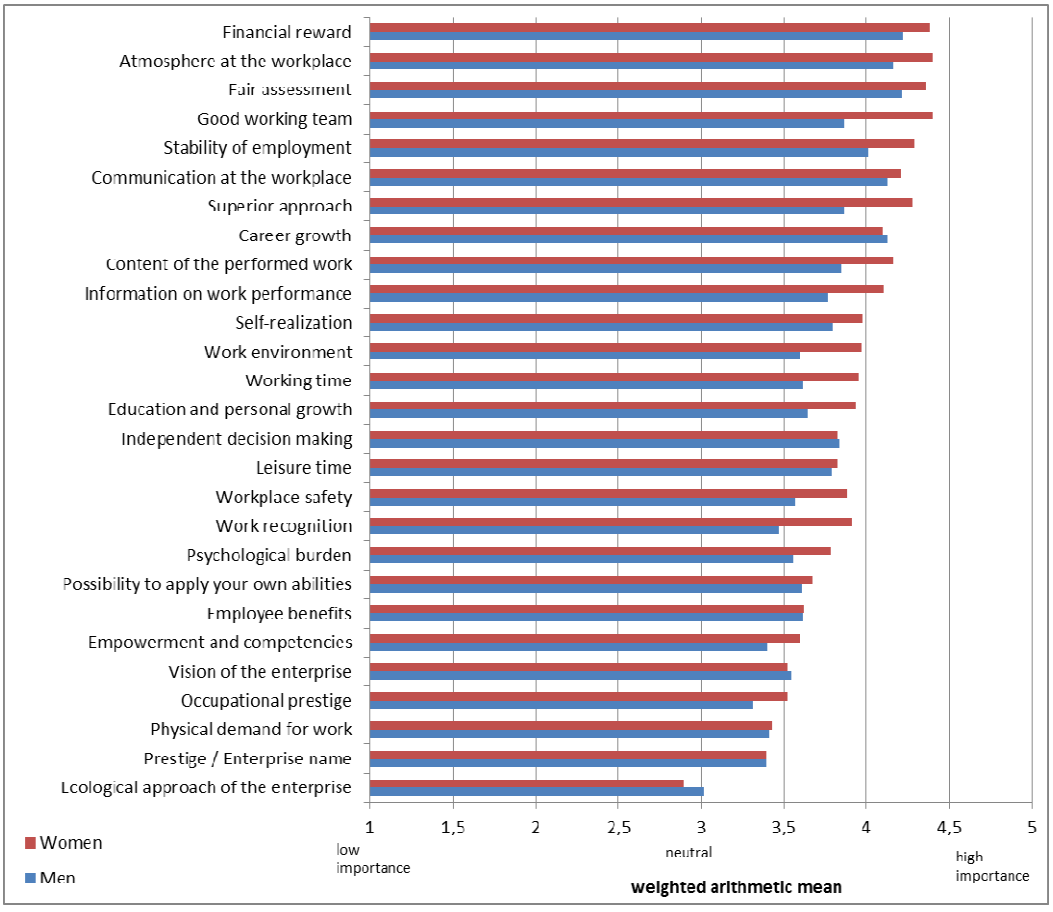


Fig. 1: Motivational preferences of university students in terms of future employment
Source: Own (based on research)

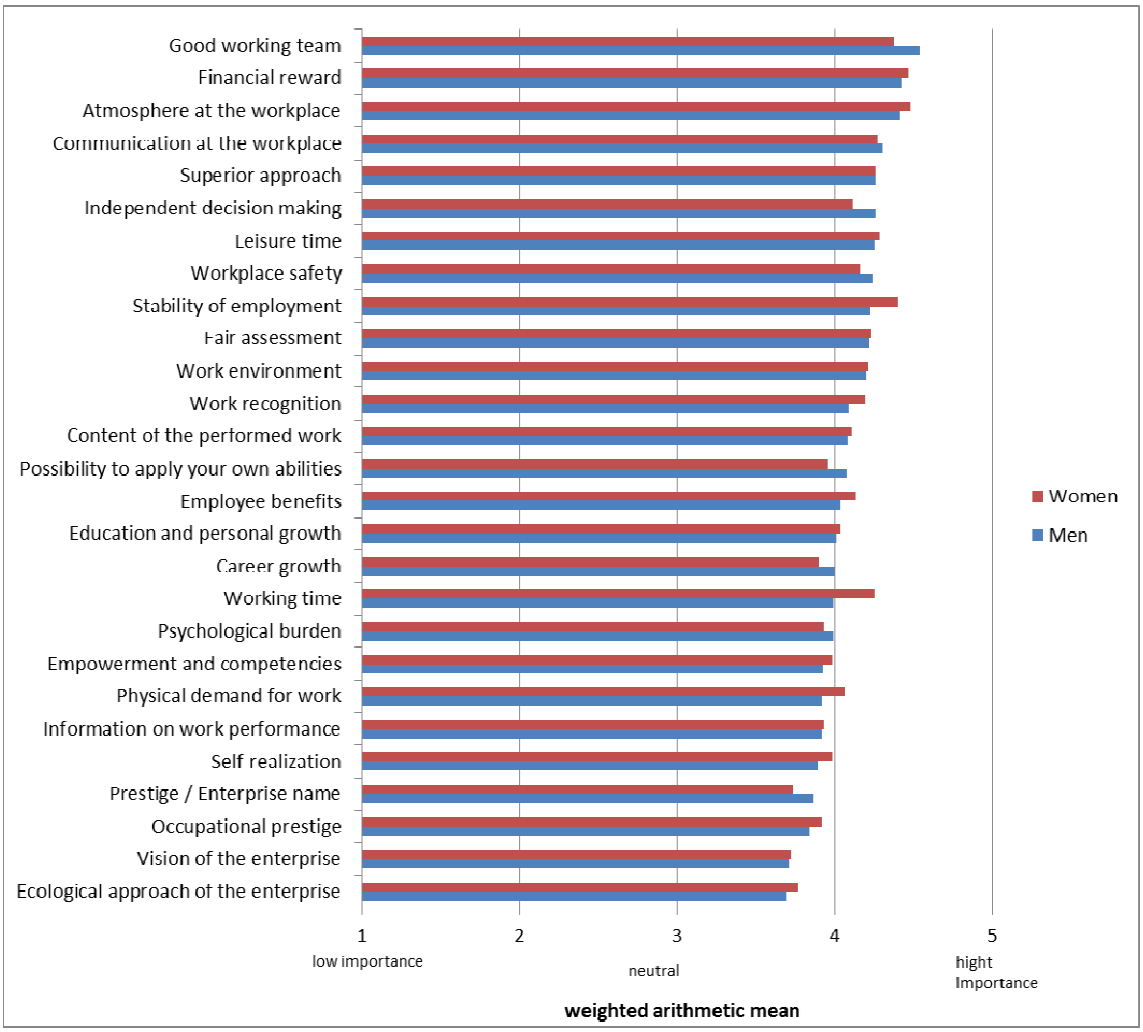


Fig. 2: Motivational preferences of employees in the context of their employment

Source: Own (based on research)

Figure 2 presents the attitude of employees to the perception of the importance of 27 motivational factors. Motivational factors are ranked upwards according to the overall perceived importance of both men and women. A different attitude according to the gender category is graphically expressed too. Employees put on the top a good working team (with a rating of importance of 4.47). Financial reward (with a rating of 4.44) is placed 3rd behind the workplace atmosphere (with a rating of 4.45). Unlike students, employees put emphasis on having more leisure time (ranked 5th while students ranked the importance of leisure time at number 16). Women consider workplace atmosphere the most important and this factor is followed by financial reward, job security, good working team and leisure time. Men ranked the factors as follows: good working team (with a rating of 4.54), financial reward with a rating of 4.43), atmosphere at workplace with a rating of 4.42), communication (4.30), independent decision making (4.26), and superior approach (4.25). Ecological approach of the company, prestige and company name are not very important factors for both employees and university students.

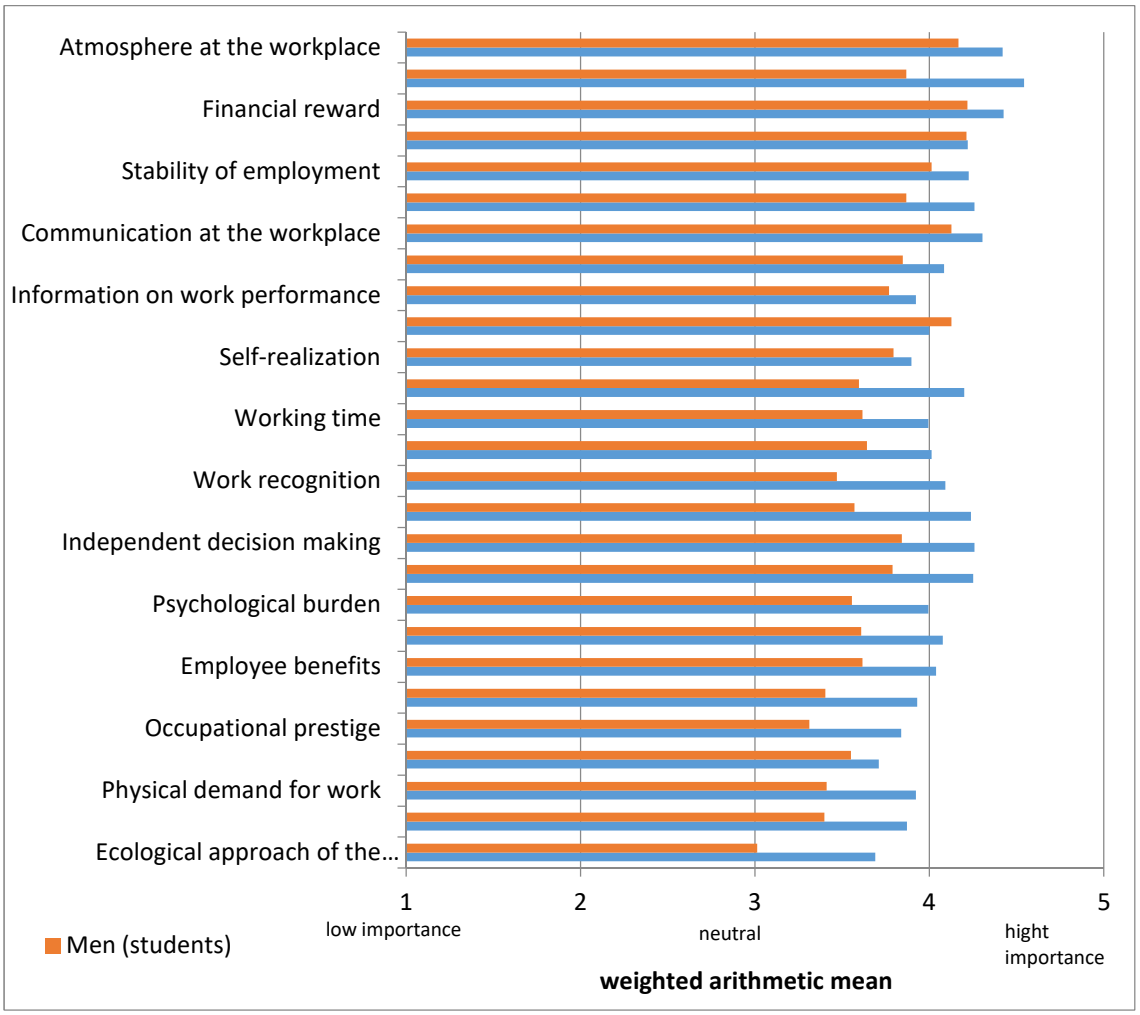


Fig. 3: Comparison of motivational preferences of students and employed in the category of men
Source: Own (based on research)

In Figure 3 a different attitude towards motivational factors is presented between male university students and male employees with a completed university degree. The biggest change in preferences can be seen in the ecological approach of the company (its importance rose by 0.677), good working team (it rose by 0.674), workplace safety (rose by 0.669), work recognition (0.620), work environment (0.604) and prestige (it rose by 0.527). Figure 3 shows factors according to the preference of male students. Students see the amount of salary as the priority factor and they also consider the factor of fair assessment for important. Then they are interested in workplace atmosphere and communication. The fifth place is career growth and the sixth factor is the preference for job stability. The employed men changed the ranking of motivational factors; a good working team is ranked first before salary. Similarly to students, the financial reward is followed by workplace atmosphere and communication. The preference of the following motivational factors has also been changed; emphasis has been put on independent decision making, superior approach and leisure time.

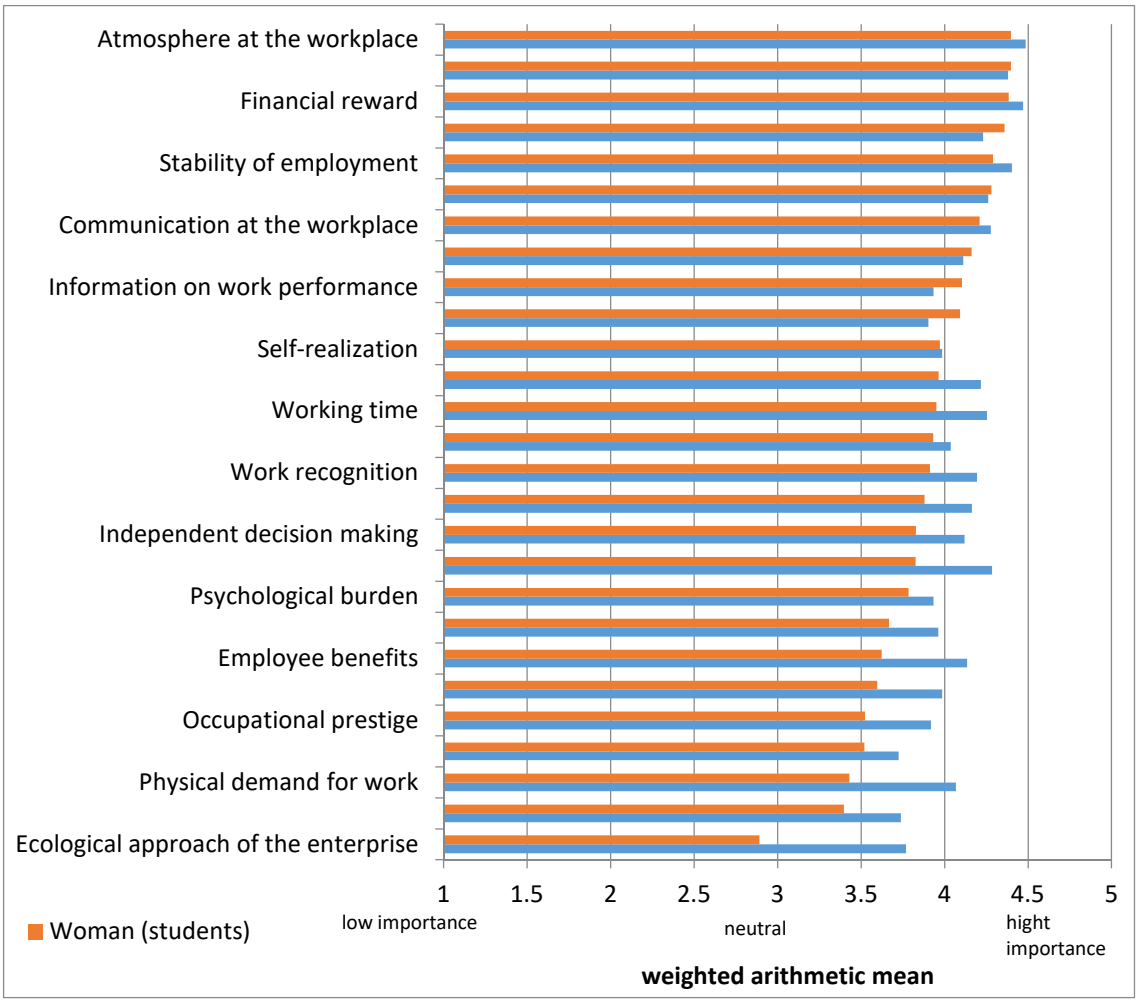


Fig. 4 : Comparison of motivational preferences of students and employed in the category of women

Source: Own (based on research)

Looking at female respondents (Figure 4), the employed women show higher preference for ecological approach of the company (by 0.878), physical demand for work (by 0.638), social benefits (by 0.512), leisure time (by 0.458), prestige (by 0.395) and empowerment (by 0.388) than female students. In the category of female students, social factors, such as a good working team and workplace atmosphere, take the first two places. Then financial reward, fair assessment, job stability and superior approach are preferred. On the other hand, the order of preferences varies at employed women, with the greatest emphasis being placed on the workplace atmosphere and financial reward. The third most important motivational factor is job stability followed by a good working team, whose preference slightly sank (by 0.016) at the expense of other factors. The employed women also consider the factor of leisure time for important (compared to female students it is higher by 0.458) and communication. On the contrary, the company's vision and prestige are the least important factors. The ecological approach is the third least important factor while female students consider it for the least important factor.

Conclusion

In practice, it is important to know which motivational factors are significant for particular groups of employees or potential employees because this enables employers to create incentive programs that are more effective. Moreover, potential employers are able to create conditions for acquiring the desired potential group of applicants. This research compares the preferences of the group of employees, who have already been involved in the working process, and the group of university students preparing themselves for their working life. The research results show that the category of male students clearly favors salary and places less of an importance on working team or leisure time than it can be observed in the group of male employees. These male students also show a strong preference for career growth at work. Looking at female groups, both university students and employees, it can be seen that emphasis is put on the social aspect of employment. On the other hand, the financial factor is shifting from the third place to the second one, and the importance of the constant income in employment is increasing too. A similar tendency can be seen in terms of time importance in all groups, it is important for all of them how much time can be spent on family, relaxation and hobbies.

When creating incentive programs, there is a more pronounced difference in the preferences of the student category than in employee preferences by gender. Employers should differentiate motivational programs for this category with regard to gender in order to acquire and maintain university graduates. The student category is generally focused on the financial side. For men in this category, the issues of fair evaluation and career growth (in addition to a good working team) are important. Women in this category put emphasis on social ties and backgrounds at work - working team, senior access, and leisure time. The significant difference compared to the working category is the view of the factory social background - a good work team and a workplace atmosphere. This category of employees prefers these social attributes. The factors as self-reliance, leisure time, work safety, and the possibility of self-decision are gaining higher preferences for this group.

References

Bartuška, L., Čejka, J. and Caha, Z. (2015), ´The Application of Mathematical Methods to the Determination of Transport Flows,´ *Nase More*, 62 (3), 91-96.

Chaudhary, N. and Sharma, B. (2012), ´Impact of employee motivation on performance (productivity) private organization,´ *International Journal of Business Trends and Technology,* 2 (4)

Drábek, J., Lorincová, S. and Javorčíková, J. (2017), ´Investing in human capital as a key factor for the development of enterprises,´ *Issues of human resource management.* 2017, 113-136.

Grancay, M., et al. (2015), ´Gravity model of trade of the Czech and Slovak Republics 1995-2012: How have determinants of trade changed,´ *Politicka Ekonomie*, 63 (6), 759-777.

Hart, K.A. (2006), ´Generations in the workplace: finding common ground,´ *Medical Laboratory Observer*, 26-27.

Hicks, R. and Hicks, K. (1999), ´Boomers, xers, and others: Understanding the generational difference that divides us.´ Wheaton, IL: Tyndale House.

Hitka, M., and Balážová, Ž. (2015), ´The impact of age, education and seniority on motivation of employees,´ *Business: Theory and practice*, 16, (1), 113-120.

Hitka, M. and Štípalová, L. (2011), ´Comparing of employee`s motivation level in wood processing businesses with manufacturing companies in Slovak republic,´ *Drvna industria*. 62 (3), 185-192

Kampf, R., Gašparík, J. and Kudláčková, N. (2012), ´Application of different forms of transport in relation to the process of transport user value creation,´ *Periodica Polytechnica Transportation Engineering,* 40 (2), 71-75.

Kampf, R., Hitka, M. and Potkany, M. (2014), ´Interannual differences in employee motivation in manufacturing enterprises in Slovakia,´ *Communications*, 16 (4). 98-102.

Knoke, D. and Wright-Isak, C. (1982), ´Individual motives and organizational incentive systems,´ *Research in the Sociology of Organizations,* 1, 209-254.

Kubašáková, I., Kampf, R. and Stopka, O. (2014), ´Logistics information and communication technology,´ *Communications,* 16(2), 9-13.

Kucharčíková, A. (2014a), ´Investment in the Human Capital as the Source of Economic Growth,´ *Periodica Polytechnica Social and Management Sciences*, 22 (1), 29-35.

Kucharčíková, A. (2014b), ´The importance of identification and analysis of educational needs for investment in human capital,´ *Komunikacie*, 16 (3), 86-92.

Kupperschmidt, B. (2000), ´Multigenerational employees, strategies for effective management´ *Health Care Manager*, 65-76.

Lancaster, L.C. and Stillman, D. (2002), ´When generations collide: Who they are. Why they clash. How to solve the generational puzzle at work.´ New York: Harper Collins.

Lorincová, S., Schmidtová, J. and Javorčíková, J. (2016), 'Employee job satisfaction in furniture manufacturing companies in the Slovak Republic,' *Drvna Industrija*, 67(4), 351–362.

Lussier, A. (2013), ´Effective Leadership.´ 5th ed. Cengage learning. South Western,

Mura, L. and Sleziak, J. (2015), ´Innovation and Entrepreneurship Networ,´ CERS 2014: 5th Central European Conference in Regional Science, International Conference Proceedings, 643-651. ISBN 978-80-553-2015-1

Naile, I. and Selesho, J.M. (2014), ´The Role of Leadership in Employee Motivation,´ *Mediterranean Journal of Social Sciences.* MCSER Publishing, 5 (3), 177-181.

Nedeliakova, E. and Panak, M. (2016), ´Progressive management tools for quality improvement application to transport market and railway transport,´ *International Conference on Engineering Science and Management*, Zhengzhou, China, 195-198.

O'Bannon, G. (2001), ´Managing our future: The generation X factor,´ *Public Personnel Management,* 30(1), 95-109.

Olšovská, A., Mura, L. and Švec, M. (2016), ´Personnel management in Slovakia: An explanation of the latent issues,´ *Polish Journal of Management Studies*, 13, 110–120.

Oluseyi, S. and Ayo, H.T. (2009), ´Influence of work motivation, leadership effectiveness and time management of employees' performance in some selected industries in Ibadan, Oyo State, Nigeria,´ *European Journal of Economics, Finance and Administrative Sciences*, 16.

Owusu, T. (2012), ´Effects of motivation on employee performance: A case study of Ghana commercial bank, Kumasi zone.´ Doctoral dissertation, Kwame Nkrumah University of Science and Technology, 2012. 45-78.

IBM Corporation. (2015), IBM SPSS Statistics Standard (data analysis software system).

Rebeťák, M. and Farkašová, V. (2013), ´Performance management as a tool of competitiveness. Factors prosperity of enterprises in the local and global environment through the lens of 2013,´ Proceedings of the 7th International Scientific Conference: Praha. - 2013.- ISBN 978-80-245-1959-3. Praha: Oeconomica, 25. 10. 2013, 494-502.

Simons, N. (2010), ´Leveraging Generational Work Styles to Meet Business Objectives,´ *Informational Management,* 44 (1), 28-33.

The Effect of Trust, Compatibility, Transparency and Affinity on the Acceptability of HIT by the Physicians and Nurses Practicing In Mohammed VI Hospital in Marrakech

Az-Eddine Bennani, Professor, Neoma Business School, and Costech laboratory / Telemedicine Innovation Center, University of Technology of Compiegne, France
Az-eddine.bennani@neoma-bs.fr

Youness.Lafraxo, University professor, Faculty of Law, Economics and Social Sciences Marrakech, Morocco younes.lafraxo@gmail.com

Wissam.Akhezzane General Supervisor, University Hospital Mohammed VI, Marrakech, Morocco wissamkhezzane@gmail.com

Abstract

This short paper shows an acceptability model developed based on UTAUT and four additional factors namely "Compatibility", "Transparency", "Trust", and "Affinity with IT". The model was tested using 762 responses obtained from the almost 1000 physicians and nurses practicing in Mohammed VI hospital, located in Marrakech, in Morocco. The first replies analysis, representing 76,2% response rate, reveals that Performance expectancy, Effort Expectancy, Social influence and Trust in HIT/HIS show a significant positive impact on the users' behavioral intention to accept HIT/HIS services. In addition, Affinity with IT and Facilitating conditions influence positively the Actual Use of HIT/HIS, while Compatibility, Transparency show also a positive influence on Performance Expectancy and Effort Expectancy. However, Trust in the hospital management does not influence positively this behavioral intention. Note also that the resulting model oh this study, still in progress, explains almost 49% of the variance in Nurses and Physicians' intention to use HIT/HIS and 46% for the Actual Use.

Keywords: Health Information Technology; Compatibility, Transparency, Trust, and Affinity factors; Unified Theory of Acceptance and Use of Technology; Physicians and Nurses; Hospital Mohammed VI hospital in Marrakech

.

Introduction

Healthcare Information Technology (HIT) has the potential to improve the quality, efficiency, outcomes, patient safety and reduce the cost of healthcare (Ahlan and Barron, 2014). Since more than a decade, the Moroccan health ministry considered that integrating this technology could improve the quality of care delivery. It also believes that it would help reducing health expenses, be beneficial to patients and help healthcare professionals. However, this would happen if this technology is used (Kijsanayotin et al., 2009) by the physicians and nurses, in Morocco, who seem rather to be reluctant. The main purpose of this short paper is to share with researchers the work in progress as far as the acceptability of HIT, and its related Health Information Systems (HIS), by the physicians and nurses practicing in Mohammed VI hospital, located in Marrakech, in Morocco. It show the acceptability model retained, and how it was tested with the help of these health

professionals. The developed model is based on UTAUT (Venkatesh et al., 2003); to which four additional factors were integrated: “Compatibility”,“Transparency”, "Trust", and “Affinity with IT”. The analysis of the received responses reveals the first results obtained. It shows factors that influence physicians and nurses practicing in Mohammed VI hospital located in Marrakech with regard to their acceptability of using HIT/HIS. The second paragraph presents the theoretical foundation. It develops briefly the research work on the technology acceptability theories and models. It introduces the four additional factors, considered in the research model. The third one enunciates the five added hypothesis to the UTAUT ones and shows the research model. The fourth paragraph describes briefly the methodology. Before concluding, the fifth reveals the finding and shows the measurement and structural models.

Theoretical Foundation

The technology acceptability and models

The question of the acceptability of technologies has led to research work, particularly in the field of information systems. The Model of Technology Acceptance Model (TAM), developed by Davis in 1986, is one of the major axes of this work. The TAM, which allows to study the perceived utility as well as the usability perceived by the user, was updated with a second version, the TAM 2 (Venkatesh and Davis, 2000), and a third, the TAM 3 (Venkatesh and Bala, 2008). Venkatesh and his co-authors (2003), including Davis, have drawn inspiration from the TAM and have studied several models to identify recurrent determinants. They considered the findings of several studies conducted for more than ten years and analyzed 8 theoretical models as well as the determining factors influencing the intention of use and the individual's actual use of information and communication technologies. These factors and their relationships were grouped into a unified theory of the acceptance and use of these technologies with a model known by the acronym UTAUT (Unified Theory of Acceptance and Use of Technology). Originally, UTAUT model was developed to explain employee acceptance of technology. It explains about 70% of the intention to use the technology and about 50% of its actual use. Note that these explanatory models was applied in some health areas, in particular to study the question of the acceptability of HIT. As shown by the work of Kim et al. (2016) studied the adoption by medical professionals in a hospital department of the techniques of EMR (Electronic Medical Records). Vanneste et al. (2013) focused on the use and adoption of a computer platform for recording and sharing data between health professionals in healthcare settings. Regarding patient acceptability, UTAUT has sometimes been applied in the field of care. This tendency is illustrated by the work of Or et al. (2011) on the acceptability of chronic patients with a computer interface enabling them to take charge daily and autonomously at home.

Compatibility

This construct was positively associated with Effort Expectancy (Schaper et al. 2007; Wu et al., 2007; Hsiao et al., 2011) and Performance Expectancy (Schaper et al.2007; Chau et al.2002; Tung et al., 2008; Hsiao et al.,2011).

Transparency

Some research work showed the importance of IT in increasing transparency (Alavi and Leidner, 2001) through information sharing between individuals (Alavi and Leidner, 1999) and organizations. Then, Information transparency becomes relevant to successful implementation of integrated systems such as Healthcare Information System (Al-Jabri and Roztock, 2015), where effective utilization is often dependent upon data sharing between users. According to these authors, sharing data and information leads to a higher level of information transparency. Therefore, information transparency may be an important factor in explaining the acceptability or rejection of HIT/HIS solutions.

Trust

Some researchers have considered Trust with models of technology acceptance (Lippert and Davis, 2006; Pavlou, 2003). Their studies have shown that two forms of trust are important during IT implementation: Trust between the organization and the employee, and Trust in the implemented technology (Lippert and Davis, 2006).

Affinity with IT

Stern and her co-authors (2008) specified that the "Affinity with IT" factor has to be consider while studying the issue of IT acceptability by consumers. As mentioned by researchers, since the beginning of the seventeen, the consumers who have positive feeling toward computers are likely to find easier to use them.

Hypothesis and Research Model

Based on the UTAUT relationships, considering "Compatibility", "Transparency", "Trust" and "Affinity with IT", the additional hypothesis and the research model are hereunder.

Additional Hypothesis

- Compatibility influences positively Effort Expectancy and Performance Expectancy
- Transparency influences positively Effort Expectancy and Performance Expectancy
- Trust in HIT/HIS influences positively Behavioral Intention
- Trust in the hospital direction/management influences positively Behavioral Intention
- Affinity with IT/HIT influences positively Actual Use

Research Model

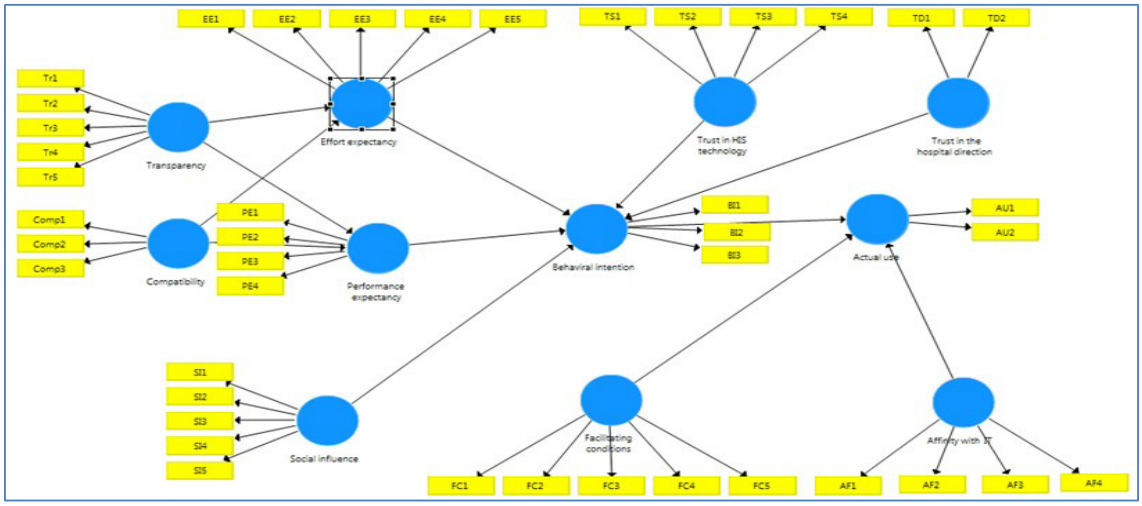


Figure1: Research Model

Methodology

Data Collection

Nurses and physicians who are working for Mohammed VI hospital in Marrakech were the target population. Face-to-face structured questionnaire survey method was used to collect data from them. This study was limited to 1000 individuals. The data collection process took place from the middle of December 2016 to 20 February 2017. 762 were completed and retained for the analysis, representing 76,2% of the response rate.

Data analysis and results

Growing number of researchers are using PLS approach as means of statistical analysis in healthcare context (Schaper and Pervan, 2007). To generate and test the research model, we used Smart PLS software in order to produce the measurement model, the structural model, and their respective values.

Measurement model and Structural model

Assessment of the measurement model is performed by both of convergent and discriminant validities. The first one indicates the degree to which theoretically similar constructs are highly correlated with each other. As for the discriminant validity, it indicates the degree to which a given construct is different from other constructs. Convergent validity includes reliability of construct measurement. This reliability was assessed by the composite reliability and internal consistency. This later was assessed by the Cronbach's Alpha coefficient. It is verified when the alpha is above 0.7. Moreover, internal consistency of the scales is verified, because their Cronbach's Alpha exceeded threshold value and confirmed a satisfactory reliability. Furthermore, convergent validity is measured by the factor loadings of the items on the model's constructs. Barclay and al. (1995) recommended that an observed principle for convergent validity is to retain items with loadings of 0.70 or more. Discriminant validity is assured when the AVE value is above the threshold value of 0.50 and square root of the AVE is larger than all other cross correlations (Gefen and Straub 2005). Also, according to Fornell and Larcker (1981) all constructs items loadings should be greater than 0.70. Composite reliability greater than 0.80 and AVE greater than 0.50. The research model (Figure 1) considered in this work has sufficient discriminant validity. All constructs had a composite reliability greater than 0.8 and Cronbach's alpha greater than 0.7 indicating acceptable level of reliability. In this study, all constructs had item loadings greater than 0.70. Composite reliability values greater than 0.80 and AVE values greater than 0.50. Concerning the discriminant validity, all of the constructs had AVE scores greater than 0.50 indicating that the proposed model has sufficient discriminant validity (Fornell et al., 1981). All constructs had a composite reliability greater than 0,8 and Cronbach's alpha greater than 0,7 indicating that nearly all constructs had an acceptable level of reliability (Fornell et al., 1981).

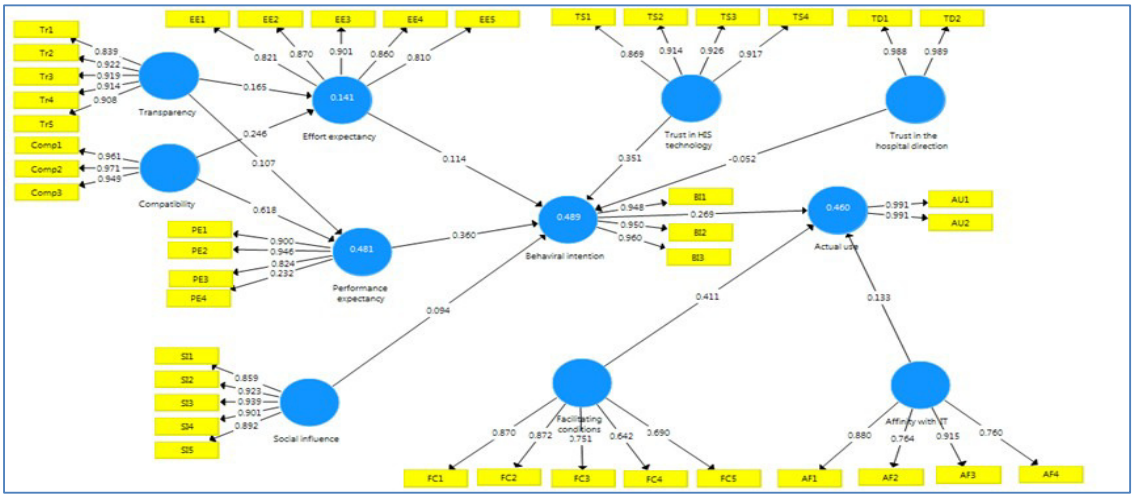


Figure2: Measurement model

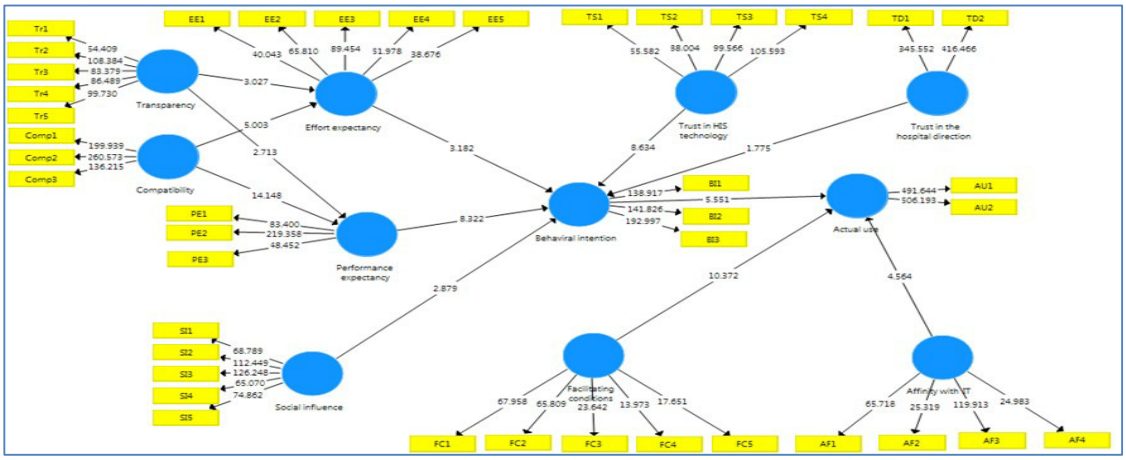


Figure3: Structural model

The structural model provides information about the model's predictive power given by R^2 values and information about path significance. We use bootstrapping with 300 resamples to determine the significance levels for loadings weights and path coefficients. Results show that the proposed model explained almost 49% of total variance in Nurses and Physicians' intention to use HIT/HIS and 46% for Actual Use (Figure 2). They reveal all the β are greater than 2 except the one between "Trust in direction/management" and "Behavioral Intention" constructs (Figure 3) with β = 1.775.

Conclusion

This short paper is the outcome of a research work, which is still in progress. Its objective is to share with researchers the primary results already obtained. Thus, it reveals the factors that influence the HIT/HIS acceptability by physicians and nurses practicing in Mohammed VI hospital in Marrakech. It also divulges these health professionals' intention toward their acceptability to use HIT/HIS solutions and the effect of Trust, Compatibility, Transparency and Affinity on the resulting acceptability model. This research work shows that Performance expectancy, Effort

Expectancy, Social influence and Trust in HIT/HIS technology have a significant positive impact on the users' behavioral intention to use HIT/HIS services. In addition, Affinity with IT, Facilitating conditions influence positively the Actual Use of HIT/HIS. Both, Compatibility and Transparency factors have a positive influence on Performance expectancy and Effort Expectancy. Nevertheless, Trust in the hospital management does not influence positively this behavioral intention. Knowing that UTAUT is considered as a strong model because it explains about 70% of the employees' intention to use the technology and about 50% of its actual use, the resulting model of this first study explains almost 49% of the variance in physicians and nurses' intention to use HIT/HIS and 46% for the Actual Use. This short paper presents thus first significant empirical results of an ongoing study in a Moroccan hospitals. The model finded can be consider as a strong one compare to UTAUT. Considering these outcomes would help the Moroccan health ministry to invest efficiently in HIT/HIS and provide hospitals with suitable and satisfactory HIT/HIS solutions.

References

Alavi, M., Leidner., D. (2001) "Knowledge management and knowledge management systems: Conceptual

foundations and research issues", MIS quarterly, pp. 107-136.

Alavi, M., Leidner., D (1999),"Knowledge Management Systems:Issues, Challenges, and Benefits" CAIS,Vol1. Al-Jabri, N. Roztock. (2015), "Adoption of ERP systems: Does information transparency matter?", Telematics and Informatics 32.pp.300-310

Ahlan,A.R, Barron,I.A.(2014), "User Acceptance of Health Information Technology (HIT) in Developing

Countries: A Conceptual Model", Procedia Technology, Volume 16, pp.1287-1296.

Barclay. D, Higgins. C and R. Thompson. "The partial least squares (PLS) approach to causal modeling:
personal computer adoption and use as an illustration." Technology studies. vol. 2. pp. 285-309. 1995.

Chau, P.Y.K., P.J.-H. Hu, Investigating healthcare professionals' decisions to accept telemedicine technology: an empirical test of competing theories, J. Manage. Inf. Syst. 39 (4) (2002) 297–311.

Davis, F.D. (1986). "A Technology Acceptance Model for Empirically Testing New End-User Information Systems: Theory and Results", doctoral dissertation, MIT Sloan School of Management, Cambridge, MA. Fornell, C.and Larcker, D.F.(1981), "Structural equation models with unobservable variables and measurement error: algebra and statistics", J. Market. Res. 18 (3), pp. 382–388.

Gefen,D. and Straub,D.(2005), "A practical guide to factorial validity using PLS-graph: tutorial and annotated
example", Commun. Assoc. Inform. Syst. 16 (5), pp. 91–109.

Hsiao, J.-L., H.-C. Chang, R.-F. Chen, (2011), A study of factors affecting acceptance of hospital information systems: a nursing perspective, J. Nurs. Res. 19 (2) 150–160,

Kijsanayotin, B., Pannarunothai, S., Speedie,S., M., (2009), " Factors influencing health information technology adoption in Thailand's community health centers: Applying the UTAUT model", International Journal Of Medical Informatics 78. pp;404-416

Kim, S., Lee, K. H., Hwang, H., Yoo, S., (2016). Analysis of the factors influencing professionals' adoption of mobile electronic medical record (EMR) using the unified theory of acceptance and use

of technology (UTAUT) in a tertiary hospital, BMC Medical Informatics and Decision Making, 16 :12.

Lippert, S., Davis, M. (2006). A conceptual model integrating trust into planned change activities to enhance
technology adoption behavior. Journal of Information Science, 32, 434–448

Or, C. K., L., Karsh, B.-T., Severtson, D. J., and al., (2011). Factors affecting home care patients' acceptance of
a web-based interactive self-management technology, Journal of the American Medical Informatics Association,
18, pp.51-59.

Pavlou, P. (2003). Consumer acceptance of electronic commerce: Integrating trust and risk with the technology acceptance model. International Journal of Electronic Commerce, 7(3), 101–134

Schaper L. K. and G. P. Pervan. (2007) "ICT and OTs: A model of information and communication technology acceptance and utilisation by occupational therapists." International Journal of Medical Informatics. vol. 76. pp. S212-S221.

Stern, B. Royne, M.B., Stafford, T.F., Bienstock, C.C. (2008), Consumer acceptance of online auctions: An extension and revision of the TAM, Psychology & Marketing

Tung, F.-C., S.-C. Chang, C.-M. Chou, An extension of trust and TAM model with IDT in the adoption of the electronic logistics information system in HIS in the medical industry, Int. J. Med. Inf. 77 (5) (2008) 324–335

Venkatesh, V., Bala, H. (2008). Technology Acceptance Model 3 and a Research Agenda on Interventions. Decision Sciences, 39 : 273–315. Doi : 10.1111/j.1540-5915.2008. 00192.

Venkatesh, V., Davis, F. D. (2000). A Theoretical Extension of the Technology Acceptance Model: Four
Longitudinal Field Studies. Management Science, 46(2), 186-204.

Venkatesh, Viswanath, Michael G. Morris, Gordon B. Davis and Fred D. Davis. 2003. "User Acceptance of
Information Technology: Toward a Unified View". MIS Quarterly, Vol. 27, No. 3: 425-478.

Vanneste, D., Vermeulen, B., Declercq, A., (2013). Healthcare professionals' acceptance of BeIRAI, a web- based system enabling person-centred recording and data sharing across care settings with inteRAI instruments: a UTAUT analysis, BMC Medical Informatics and Decisions Making, 13.

Wu, J.-H., S.-C. Wang, L.-M. Lin, (2007), Mobile computing acceptance factors in the healthcare industry: a structural equation model, Int. J. Med. Inf. 76 (1) 66–77.

State Support Programs and Its Role in the Sustainable Development of Small Business

Khlutkov Andrey D., Doctor of Sciences in Economics, Professor, Department of Economics and Finance Enterprises and Industries, Autonomus Nonprofit Organization of Higher Education «International Banking Institute» (ANO HE IBI), Saint-Petersburg, Russia, 191023, Nevsky pr., 60, E-mail ibispb@ibispb.ru

Vlasova Marina S., PhD in Economics, Associate Professor, Department of Enterprises and Industry Economics and Finance, ANO HE IBI, Saint-Petersburg, Russia, 191023, Nevsky pr., 60, E-mail vms68@yandex.ru

Kruglova Inna A., Deputy Rector for Science of the ANO HE IBI, PhD in Economics, PhD in Law, Associate Professor, International Economy and Management Department, ANO HE IBI, Saint-Petersburg, Russia, 191023, Nevsky pr., 60, E-mail inna_kruglova@mail.ru

Nazarov Pavel V., Doctor of Sciences in Economics, Professor, International Economy and Management Department, ANO HE IBI, Saint-Petersburg, Russia, 191023, Nevsky pr., 60, E-mail: Olhen22@mail.ru

Abstract

The article, based on the generalization of research experience, which determines the role of the state in regulating of the small businesses activities, identifies different points of view on the degree of participation / non-participation of the state, which can be based on various principles of support and on the role of the subject of its impact. This research was based on the following scientific methods, such as comparative analysis and synthesis, analogy, statistical methods. The method of comparative analysis and synthesis in the context of this article is based on a critical review of foreign and Russian scientific publications, practical recommendations of leading experts, strategic documents on the regulation for small business at the state level. The presented approaches position the small businesses as a passive object of influence, which contradicts the conditions of sustainable development. The correlation-regression analysis was carried out to assess the support of the state and to identify the dependence of the development level of small enterprises in Russia on some of its elements. The results of the analysis testify to the low effectiveness of state support for small business in Russia, which requires the formation of a fundamentally different format of interaction.

Keywords: Small business, sustainable development, state support, economic security

Introduction

Small business, being an integral part and a necessary condition for the development of the economy and economic security of the state, needs constant attention from both the legislative and executive authorities at all levels of the government. The economic crisis in 2008 and the subsequent imposition of sanctions made it possible to create all conditions for such development in Russia. Moreover, the created conditions can be based as on the package of anti-crisis measures, developed by the Government of the Russian Federation, as on the concept of the country's economic security and the integrated approach. It is noteworthy that some of the already developed measures, according to the authors, can correspond to the ideas of Arthur Pigou [Pigou, 1985], who considered the issues of interaction between the state and business in terms of ensuring economic welfare and security.

The main body of the paper

The issues of the state policy formation in the field of regulating the activities of representatives, including small business, although are sufficiently detailed both in Russian and foreign scientific literature, but the unanimous opinion on the rationalization of such interaction is not worked out so. Currently, there are opposing points of view, one of which is based on the position of non-interference of the state in the development of the free market and, as a consequence, in the activities of the entrepreneurial sphere. Such views are held by H. Horn, L. Persson [Horn, Persson, 2001], D. Audretsch, W. Baumol, A. Burke [Audretsch, Baumol, Burke, 2001], I. Kirzner [Kirzner, 2000, 2004], P. Johnson [Johnson, 2004].

Another point of view is based on the fact that the state should comprehensively and constantly participate in the development of entrepreneurial activity by developing and applying various instruments of influence. This point of view is reflected in several theoretical approaches.

1. State participation through the formation and development of policy for small business support

A. Hughes [Hughes, 1997], D.J. Storey [Storey, 1994], A. Strange [Strange, 1992], C. Brown [Brown, 1989], Hamilton J., Medoff J. [Medoff, 1989], M.J. Bendick, M.L. Egan [Bendick, Egan, 1987], D.B. Audretsch, R.A. Thurik [Audretsch, Thurik, 1999], P. Reynolds, and W. Maki [Reynolds, Maki, 1990], based on a comparison of government policies for small and medium-sized businesses in different countries, came to roughly the same conclusion that "The monitoring and assessment of state support should be mandatory" [Storey D.J., 1994].

M. Abramowitz [Abramowitz, 1956], P. Azoulay, J. Lerner, W. [Azoulay, Lerner, 2013], Cohen, R. Levin [Cohen, Levin, 1989], D. Storey [Storey, 1987], S. Shane [Shane, 2009] consider the form of state participation through improving the investment climate in the country, paying attention to the fact that the costs of support should be justified and commensurate with the returns, and, of course, should not lead to a deterioration of business conditions.

2. State participation through the regulation of small businesses

Russian scientists A. Trofimov, E. Tatarnikov [Trofimov A.V. et al., 2012] and others noted the primacy of the legislation ordering in this area and the role of the government representatives in implementing the programs to support the representatives of the business environment.

3. State participation through the interaction of state structures and the representatives of small business

P. Reynolds, D.Storey, P. Westhead [Reynolds, Storey, Westhead, 1994], A.C. Cooper, T.B. Folta [Cooper, Folta, 2000] in their works justify their point of view, according to which the state authorities in interaction with representatives of small businesses need to focus on the opportunities that the business community itself provides through engaging in the interaction process of the business angels, various communities in the business sphere, which are not indifferent to interests of business. At the same time, the state provides its own participation in financing the projects, but on certain pre-determined conditions, as a partner or co-investor in order to implement the state policy to support small businesses.

4. State participation through the regulatory impact on small business sphere

P. Reynolds, Storey, P. Westhead [Reynolds, Storey, Westhead, 2004], noting, that such participation is possible only through "deregulation" of small business activities, the main objective of which is to reduce administrative barriers, manifested, for example, in the maximum possible reduction of as the

number of inspections by various departments, as the timing of its conduct, as well as a reduction in costs, including transaction costs, in the small businesses operation.

In the opinion of the above-mentioned authors, with such a form of state participation, the development of solutions where the emergence of new barriers to business development will be difficult, and at best impossible, is of particular importance if these barriers indirectly (vicariously) replace the canceled restrictions related to doing business.

5. State participation through the creation of favorable business conditions

J. Lerner, [Lerner, 2009], P. Reynolds, D. Storey, P Westhead [Reynolds, Storey, Westhead, 2004] position favorable conditions for doing business as the most important and necessary direction in the developing mechanisms for state support of small businesses.

Formation of an enabling and safe environment can be reached through the provision of an accessible and carefully designed institutional infrastructure, including legal and financial support, the ability to attract highly qualified personnel and to take the advantage of the transport-logistics and commercial infrastructure, of the individual territories and the entities of the state.

Thus, the generalization of research experience in the field of the role and place of the state in regulating the activities of business representatives revealed that existing perspectives on the degree of participation / non-participation of the state in support of small business development are based on various support principles, such as Information support, Organizing legislation, Co-financing, Reducing of administrative barriers, Institutional infrastructure, which are implemented through the various programs, funds, benefits, and also in determining the place of the subject of the impact of support, as the only and paramount.

With all the theoretical evidence of the positive impact of state support, the main shortcoming, in our opinion, is the role assigned to the subject of the impact and the lack of a proper economic effect of such support. Representatives of small business in the above approaches are positioned only as a passive object of influence, while the conditions for sustainable development presuppose the active role of representatives of this business sector in matters of state support. For example, in Russia, state support for small and medium-sized businesses (hereinafter referred to as SMB) is provided through the use of direct and indirect influence instruments, as well as "manual management", which is periodically used by the President of the Russian Federation.

In this connection, we can distinguish the sixth type of the degree of state participation in the support programs, which should be based on the creation of conditions for sustainable development by ensuring the economic security of small businesses. At the same time, small business will be assigned not the role of a passive observer awaiting handouts, but an active participant with the possibility of positioning its interests (Karpova G., Sigova M., Kruglova I. [Karpova G., Sigova M., Kruglova I., 2017], V. Plotnikov [Plotnikov V., 2016], etc.) (Table 1).

Table 1: Types of state participation in supporting SMB development: an analysis of theoretical approaches and practical implementation

№	Types of state participation	Main principle of support implementation	Subject of impact
1	State participation through the formation and development of small business support policies	Information support	The state as a whole and regions
2	State participation through the regulation of small businesses	The organization of legislation	State structures
3	State participation through interaction of state structures and representatives of	Co-financing	Business community and association

	small business		
4	State participation through regulatory impact on small businesses	Reducing administrative barriers	State Offices
5	State participation through creation of favorable business conditions	Institutional infrastructure	State in general and regions
6	**Participation of the state through ensuring the economic security of small businesses**	**Safe business conditions**	**Business structures Small enterprises**

[1] Compiled by the authors, based on the results of a study of theoretical sources

6. State participation through the small business economic security

The rationale for the approach, highlighted by the authors, is the fact that one of the priority strategic tasks for overcoming the economic recession in Russia is the implementation of the anti-crisis policy adopted by the Government of Russia, a separate place in which the issues of SMB development take up.

In his report "Restoration of Economic Growth in Russia", prepared by leading Russian scientists under the leadership of the executive secretary of the Russian Academy of Sciences, editor of academician V.V. Ivanter in 2016, scientists noted that the main task of the state's anti-crisis policy is to transform the existing prerequisites of socio-economic development into the current growth factors, based on internal opportunities. At the same time, the period of use of the available opportunities is limited, since with the preservation of a low level of economic activity, the generated growth potential will be quickly squandered, and the risk of prolonged stagnation will increase [Ivanter V.V., 2016].

So, in p.5. "Interaction of the state, private business and society as subjects of innovative development" of the Concept of long-term social and economic development of the Russian Federation for the period up to 2020, it is stipulated:

• "elimination of excessive state regulation of the economy and transition mainly to indirect methods of regulating economic processes;
• Step-by-step reduction of state participation in property management in competitive industries by applying transparent and effective privatization procedures based on the principles of market valuation, equal access to property and openness of public authorities;
• Concentration of state entrepreneurship mainly in the sectors related to ensuring the defense capability and national security, infrastructure development, unconditional provision of equal competition conditions in those sectors where, along with the state, private companies function;
• Support for business initiatives to participate in the development of the social sphere and human capital "[25].

The listed features cause the formation of special growth points, which continue to form, and many goals of this concept still are not achieved yet. Thus, there is a need to formulate a special state policy aimed at the safe and sustainable development of business, in which it will not be the role of a passive observer waiting for support, but an active moderator.

This postulate becomes especially urgent now, under the existing conditions and availability of existing production potential, rich resource base, interlacing of national and regional economies, deterioration of the ecological situation, the issue of planning the development of the country as an integral socio-economic system, reducing business - risks at all stages of implementation of various projects and solutions, which creates a mechanism for continuous updates - the basis for sustainable development of the country.

Drivers in this matter may be the state policy in the development of small business entities in the Russian Federation, which even now occupies a separate place in the institutional infrastructure. In

the Strategy of development of small and medium-size business-2030 (hereinafter referred to as SDSMB) "it is noted that the promotion of small business development is a fundamental element of the state's economic policy.

To determine the dependence of the development level of small enterprises in Russia on some elements of state support, a correlation-regression analysis was performed using the IBM SPSS Statistica software. The main target point of the "Concept of long-term social and economic development of the Russian Federation until 2030" (SDSMB-2030) - the share of small business in gross domestic product (GDP) is taken as an effective variable. The model is built on the basis of publicly available information from the Russian Federal Service for Statistics[1].

The calculation includes several stages, in the first two of which the data for the calculation are selected. Their choice is not accidental, according to V. Sadovnichy [Sadovnichy V., 2012], the main macroeconomic indicators that are reflected in various models of economic dynamics are GDP, labor force, investment in fixed assets (Table 2).

Table 2: Primary data for analysis

	The share of GDP in current prices, billion rubles.	Investments in fixed assets of small enterprises, billion rubles	The number of small businesses, mln.	Turnover of small enterprises, billion rubles	Average number of employees of small enterprises, thousand people	Average monthly accrued salary of workers of small enterprises, thousand rubles	Federal programs to support small business, billion rubles	The number of regulatory legal acts with regard to the regulation of the activity of small enterprises adopted at the federal level, thousand units
	U	X1	X2	X3	X4	X5	X6	X7
2005	2,66	0,1205	0,979	9,6507	7,6024	4,72536	1,5	12,5
2006	3,26	0,1713	1,029	12,0992	8,5828	5,9067	3	12,6
2007	4,55	0,2591	1,137	15,4689	9,2392	7,274267	3,8	13
2008	6,23	10,0935	1,362	10,0935	10,157	8,6188	3,9	15,8
2009	4,81	0,3461	1,595	16,87313	11,342	9,7941	18,6	18,3
2010	5,51	0,2584	1,699	18,9338	12,2169	12,367	17,8	20
2011	7,28	0,282	2,013	22,6102	12,3863	15,743	17,8	20,5
2012	8,37	0,5215	2,003	23,4659	12,4752	16,711	20,8	20,7
2013	8,81	0,5749	2,063	24,7816	12,4059	17,948	21,85	22,1
2014	10,45	0,6644	2,118	26,3922	12,3753	19,201	23	22,1

X1 - Investments in fixed assets of small enterprises, billion rubles;
X2 - The number of small businesses, million;
X3 - Turnover of small enterprises, billion rubles;
X4 - Average number of employees of small enterprises, thousand people;
X5 - Average monthly accrued salary of workers of small enterprises, thousand rubles;
X6 - Federal programs to support small business, billion rubles;

[1] The indicators included in the calculation are formed as a result of continuous statistical observation every 5 years and are provided on request. In 2016, there was a complete federal statistical observation for 2015, but the digital data ends in 2014.

X7 - The number of regulatory legal acts with regard to the regulation of the activity of small enterprises adopted at the federal level, thousand units.

Estimation of the tightness of the links between the level of sustainable development of SMB and indicators of their activities is clearly illustrated by the example of the Matrix of Pairwise Coefficients of Correlation on the basis of which it is possible to determine the relationship of the productive, in our case this is the share of SMB in GDP, and independent factors, and their interrelations (Table 3)

Table 3: Matrix of paired correlation coefficients R:

-	y	x1	x2	x3	x4	x5	x6	x7	MCN	El	T	S*
y	1	0.05922	0.9159	0.8718	0.8351	0.9554	0.7998	0.8775				
x1	0.05922	1	-0.1391	-0.4054	-0.09484	-0.1631	-0.322	-0.1287	201,7	0,0939	1.95	3.08
x2	0.9159	-0.1391	1	0.9354	0.9617	0.9822	0.9486	0.9855	63,88	-0,44	4.3	0.1
x3	0.8718	-0.4054	0.9354	1	0.8789	0.9593	0.9222	0.9034	93,4	0,91	0.7	2.43
x4	0.8351	-0.09484	0.9617	0.8789	1	0.9166	0.9422	0.9701	228,5	**-1,01**	1.46	0.21
x5	0.9554	-0.1631	0.9822	0.9593	0.9166	1	0.9135	0.9567	64,19	0,82	1.58	0.36
x6	0.7998	-0.322	0.9486	0.9222	0.9422	0.9135	1	0.9649	353,7	0,27	1.31	0.33
x7	0.8775	-0.1287	0.9855	0.9034	0.9701	0.9567	0.9649	1	73,88	-0,61	1.58	0.08

MCN-multicollinearity

* The statistical significance of the regression coefficient “b” is not confirmed.

Table 3 includes the coefficients obtained from the calculations: the determination coefficient ("R2 - which fraction of the variation of the estimated variable is taken into account in the model and is due to the influence of the selected factors"), the elasticity factor (El), Fisher's F-criterion ("comparison of the critical and calculated indicator, on the basis of comparisons which accept the thesis of the statistical significance of the equation").

It follows from the data of Table 3 that practically all the indicators used in the calculation have a sufficiently high degree of tightness of links with the share of SMB in GDP. The included indicator is X7 "The number of regulatory legal acts with regard to regulating the activity of small enterprises adopted at the federal level", which assesses the role of the state in support programs also has r = 0.8775.

Negative values of correlation coefficients are observed between the indicator X1 (Investments in fixed assets in small enterprises) and other indicators in the sample, except for a positive dependence on GDP, which is very small. The data obtained for indicators X1 "Investments in fixed assets in small enterprises" and X6 "Federal programs for supporting small businesses" (r = -0.322) indicates the presence of an inverse, albeit minimal, dependence. This dependence suggests that an increase in funding by federal programs leads to a decrease in investment in fixed assets. This conclusion leads to the need for further factor analysis to identify the reasons for the negative impact of state support on the level of development of small businesses.

Further, as a result of the gradual exclusion of indicators, the so-called secondary, or as in our case, inconsiderably affecting the score, we obtained 3 models of the regression equation: the reference one, at the first stage, including the whole set of factors, and two equations with a sequential except at the second stage of investment in fixed assets, in the third stage, such indicators as turnover of small enterprises, "average monthly accrued wages" and "the number of normative legal acts in regulation of the activities of small enterprises, adopted at the federal level. "

It should be noted that all three models of equations obtained are statistically significant.

At the first stage, using seven parameters, it was revealed, that the correlation coefficient r_{yx1} was statistically insignificant. The partial coefficient of elasticity |E1| < 1. Consequently, the influence of x1 on the score Y is insignificant. Multicollinear factors are present, which suggests the need to exclude certain factors from the model. The relationship between the sign of Y and the factors Xi is strong.
As a result, a model of the regression equation was obtained at stage 1:

Y = 6.0084 1 0.4377X1-1.7035X2 1 0.3115X3-0.5757X4 1 0.4286X5 1 0.1276X6-0.213X7

The average error of approximation was 1.59%. Particular coefficients of elasticity showed that in 4 indicators it is higher than 1% and significantly affects the resultant sign of Y.

On the basis of the dependencies obtained, let us check the tightness of the combined effect of factors on the result (an estimate of the quality of the model obtained): the correlation coefficient R = 0.9986, which indicates a strong effect of the indicators included in the calculation on the share of SMB in GDP. **The coefficient of determination** is R^2 = 0.99862 = 0.9972, but a more objective estimate gives the adjusted determination coefficient R^2 adj= 0.987, which shows that the generated statistical model has qualitative characteristics.

At the second stage, the indicator showing the lowest coefficient of correlation with the rest is removed from the model - the coefficient x1 (Investments in fixed assets). Correlation coefficients are statistically significant. According to the calculation, the partial elasticity coefficients E2 = -1.37 and E4 = 2.81, E6 = -2.33 exert a strong enough influence on the resultant trait. The rest of the indicators did not give a positive response. The multicollinearity of factors is present. The relationship between the sign of Y and the factors Xi is strong. The statistical significance of the regression coefficients bi is not confirmed. The average error of approximation is 6.92%.
The regression equation has the form and is statistically reliable.

Y = 9.9871-3.7523X1-0.4713X2 1 0.5249X3 1 1.4696X4 1 0.1528X5-0.811X6

Multiple correlation coefficient R=0.9854 (for the original model R=0.9986), Coefficient of determination R2=0.98542=0.9711. Adjusted coefficient of determination 0.913: the determination coefficient is statistically significant and the regression equation is statistically reliable.

At the third stage, the factors identified at the second stage that significantly affect the outcome indicator Y (the share of GDP in current prices, trln.rub.) Are used in the calculation: X1 - Turnover SMD trln.rub; X2 - Average monthly accrued salary, thousand rubles; X3 - The number of regulatory legal acts adopted at the federal level, thousand units. Correlation coefficients are statistically significant. Particular coefficients of elasticity show that the parameters x1, x2, x3 affect the resultant attribute Y. The multicollinearity of factors is present. The relationship between the sign of Y and the factors Xi is strong. The statistical significance of the regression coefficients bi is not confirmed. The average error of approximation is 8.47%.
The regression equation is statistically reliable.

Y = 5.3392 - 0.2686X1 1 1.0028X2 - 0.347X3

For further analysis, a pairwise correlation of the share of SMD in GDP was made with indicators reflecting the main targets of the SDSMB-2030 (Table 4).

Table 4: Results of pair correlation

Indicators	Coefficient of correlation	Ranks
Share of SMD in GDP, in %		
Salary (accrued), rub	***0,987315***	***1***
Investments in fixed assets of small enterprises, bln. Rub	***0,892794***	***2***
Federal programs for small business support, bln. Rub.	***0,877432***	***3***
Number of profitable small and micro enterprises	0,86974	4
The cost of contracts concluded with the SMB, million rubles	0,847657	5
Number of contracts for state needs with SMB	0,826181	6
The amount of loss of small and microenterprises, million rubles	0,780787	7
Number of SMB, received fin. support, thousand pieces	0,775155	8
The number of unprofitable small and micro enterprises	0,764575	9
Cost of contracts concluded with SMB, %	0,694191	10
Debt in the SMD segment, %	0,687766	11
Registration of individual entrepreneur	0,631586	12
Number of contracts for state needs with SMB in % of total	0,602914	13
Number of small and micro-enterprises	-0,22178	-6
Turnover of SMB, bln. Rub	-0,33125	-5
Volumes of loans extended to small and medium-sized enterprises in the Russian Federation, million rubles	-0,55129	-4
Amount of profit of small and microenterprises, mln.	**-0,72481**	**-3**
Terminating. activity of the individual entrepreneur	-0,78565	-2
Number of employees, thousand	-0,89602	-1

The results of the calculations were ambiguous. Thus, the strongest direct dependence was between the share of SMB in GDP and the accrued wages, which is quite understandable. Logical direct relationship with the amounts allocated under the federal support program and investments in fixed assets. But the inverse relationship between the amount of profit of small enterprises and the share of SMB in GDP allows us to conclude that the existing five approaches of the state to measures to support the development of small enterprises do not provide the necessary economic effect.

Thus, it is necessary to create conditions not only for postulating support measures for small businesses, but also for their implementation. In our opinion, the degree of state participation in support programs should be based on the author's sixth approach by creating understandable and certain conditions for sustainable development related to ensuring business's economic security [Sigova M.V., Kruglova I.A., Klyuchnikov I.K., 2016]. Under these conditions, a small business will itself act as a driver of such support, choosing the opportunities provided to it on the basis of the formed outline of sustainable development.

List of References

Abramowitz M. (1956), 'Resource and Output Trends in the United States since 1870', American Economic Review, 46 (2), 5-23.

Audretsch D.B., Thurik R.A. Innovation (1999), Industry Evolution and Employment. - *Cambridge, UK: Cambridge University Press*, 16 p.

Audretsch D.B., Baumol W.J., Burke A.E. (2001). 'Competition Policy in Dynamic Markets', *International Journal of Industrial Organization*,19 (5), 613-634.

Azoulay P., Lerner J. (2013), 'Technological Innovation and Organization' Handbook of Organic Economics/eds R. Gibbons. J. Roberts, Princetin: Princeton University, P. 575-603;

Brown C., Medoff J. (1989), 'The employer size-wage effect', *Journal of Political Economy,* 97 (5), 1027-1059.
Bendick M.Jr, Egan M.L (1987), 'Transfer Payment Diversion for Small Business Development: British and French Experience', *Industrial and Labor Relations Review*, 40 (4), 528-542

Cohen W.M., Levin R.C. (1989), Empirical Studies of Innovation and Market Structure, Handbook of Industrial Organization / eds R. Schmalensee, R.D. Willig, North-Holland, New York, Vol.2, 1059-1107

Cooper A.C., Folta T.B. (2000), Entrepreneurship and high technology clusters (with Arnold C. Cooper), in Donald L. Sexton and Hans Landstrom (Eds.) Blackwell, Oxford: Handbook of Entrepreneurship.

Decree of the Government of the Russian Federation No. 1662-r dated November 17, 2008 (as amended on 08.08.2009) On the Concept of Long-Term Social and Economic Development of the Russian Federation for the Period to 2020 (together with "The Concept of Long-Term Social and Economic Development of the Russian Federation period until 2020"). [Online]. (Retrieved November 17, 2008). http://www.consultant.ru/document/cons_doc_law_82134/

Horn H., Persson L. (2001), 'The Equilibrium Ownership of an International Oligopoly', *Journal of International Economics*, 53 (2), 307-333.

Hughes A. (1997), Small Firms and Employment, ESRC Center for Business Research WP 71: University of Cambridge, 34-37.

Johnson P. (2004), 'Differences in Regional Firm Formation Rates: A Decomposition Analysis', *Entrepreneurship Theory and Practice*, 28 (5), 431 -445.

Ivanter V. (2016), 'Restoration of economic growth in Russia. Scientific report. Leader and responsible', INP RAS, Moscow

Karpova G., Sigova M., Kruglova I., Kelbakh S. (2017), 'Conditions and current trends for improving road safety in federal highways in Russia', *Transportation Research Procedia Cep. "12th International Conference "Organization and Traffic Safety Management in Large Cities*', SPbOTSIC, 272-276.

Kirzner I.M. (2000), 'The Limits of the Market: The Real and the Imagined', The Driving Force of the Market, Essays in Austrian Economics, ed. Israel M. Kirzner, Routhledge, London, 77 - 87.

Kirzner I.M. (1973), 'Competition and Entrepreneurship', *University of Chicago Press*, Chicago, 256 p.

Lerner J. (2009), 'Boulevard of Broken Dreams: Why Public Effors to Boost Entrepreneurship and Venture Capital have Failed - and What to do About', *NJ: Princeton University Press*, Princeton, 240 p.

Plotnikov V.A. (2016), 'Theoretical discussion on a new industrial society: scaling up ', *Economic revival of Russia*, 4 (50), 152-153.

Reynolds P, Storey D.J. Westhead P. (2004), 'Cross-national Comparisons of the Variation in New Firm Formation Rates', *Regional Studies*, 28 (4), 443-456.

Reynolds P.D., Maki W.R. (1990), 'Business Volatility and Economic Growth. Final Report', DC: Small Business Administration, Washington. - 243 p.

Shane S. (2009), 'Why encouraging more people to become entrepreneurs? ', *Small Business Economics*, 33 (2),141-149.

Sigova M.V., Kruglova I.A., Klyuchnikov I.K. (2016), 'Approaches to classification and assessment of financial security prospects', *Banking Law*, 6, 29-35.

Storey D. (1987), The Performace in Small Finns: Profits Jobs and Failures, London, 302 p.

Storey D.J. (1994), Understanding the Small Business Sector, Routledge, ITP. London

Storey D.J., Strange A. Entrepreneurship in Cleveland 1979-1989

Trofimov A.V., Tatarnikov E.V., Baranchugova I.G., Botenev A.V. (2012), 'Economic essence, functions and principles of state regulation of business', *Science and modernity*, 19 (2), 178-182.

The Effect of Transformational Leadership and Organizational Culture in Organizational Innovation Attending to the Organization Size

Eva Petiz Lousã, Polytechnic Institute of Porto. CEOS.PP – Centre for Organisational and Social Studies of P.Porto. Porto, Portugal, evapetiz@netcabo.pt

Lisete dos Santos Mendes Mónico, University of Coimbra, Faculty of Psychology and Education Sciences, Coimbra. Portugal, lisete.monico@fpce.uc.pt

Abstract

The present study was aimed to explore the role of organizational size in the relationships between leadership, culture and innovation. The data were collected from 102 Portuguese organizations, with different sizes, from where a total of 854 workers answered a questionnaire concerning the leadership and organizational culture within their organization and 102 top managers answered a questionnaire concerning the innovation activity in their organization. A structural equation modelling demonstrated that the variable size of the company acts as a moderator, producing differential effects not only on the leadership role in the relationship between culture and innovation, but also on the contribution of each indicator to innovation.

Keywords: Organizational culture, transformational leadership, organizational innovation, organizational size.

Introduction

Innovation has become increasingly important and determinant of organizational performance, success, and longer-term survival (Anderson, Potočnik and Zhou, 2014; Ramos, Anderson, Peiró, and Zijlstra, 2016). The dynamic and competitive environment, rapid changes in technology, high demands on new products and services, require organizations to develop new approaches that are more attractive to their stakeholders and respond effectively to the challenges they face.

The role that leadership plays in promoting innovation has been the subject of study over the last decade. Particularly, transformational leadership has been highlighted as one which supports the organizational innovation (Gumusluoglu and Ilsev, 2009a, 2009b; Jung, Chow, and Wu, 2008; Jung, Wu and Chow, 2003; Mumford, Scott, Gaddis, and Strange, 2002). Transformational leaders seek their followers to develop their own capacities and achieve exceptional results, their role being to stimulate, inspire and support the growth and development of their followers as leaders (Bass, 1999; Bass and Riggio, 2006). This type of leadership grants a sense of empowerment to its followers and aligns the individual, leader, group and organization's interests and objectives. Transformational leadership has been conceptualized in four components: idealized influence, intellectual stimulation, inspirational motivation, and individualized consideration (Bass and Riggio, 2006). Nevertheless, some studies found only a unidimensional measure of transformational leadership (e.g. Gumusluoglu and Ilsev, 2009).

Another factor that plays an important role in innovation is the organizational culture (Jung, et al., 2003; Sarros, Cooper, and Santora, 2008). That is, the degree to which the members of an organization feel that the organization supports them and encourages them to take innovative initiatives and explore new approaches has an impact on the intensity of innovation in the organization (Amabile et al., 1996;

Chandler, Keller and Lyon; 2000). Among the models of analysis of organizational culture is Denison's organizational culture model (Denison, Nieminen, and Kotrba, 2014), whose dimensions inherent to the model have proved to be useful and valid for the process of diagnosis of organizational culture. The model proposes the existence of four dimensions: Involvement, Consistency, Adaptability and Mission. The Involvement dimension reflects how much the members of the organization are involved in the management process. The Consistency dimension reflects the sharing of core values, consensus and common goals and objectives among members at all levels of the organization. The Adaptability dimension refers to the ability of organizations to adapt quickly to changing their environment, taking risks, learning from their mistakes, and adding value to their customers, seeing their opportunities to survive and grow. The Mission dimension provides the organization with a strategic direction, purpose or design, which allows it to set its global goals, as well as expressing the vision of how it will be in the future, giving its members an appropriate course of action. All these traits were linked to organizational effectiveness; nevertheless in the present study we will relate this model to organizational innovation.

As we pointed out, leadership and organizational culture play an essential role so that innovation can occur. However, just as Bass and Riggio (2006) advocate, leadership and culture are interconnected in such a way that organizational cultures can be described in terms of transformational qualities. So, we will explore the interrelation between these two constructs.

In turn, organizational innovation is a complex and multidimensional process (Wolfe, 1994). Some studies conceptualize innovation as process that involves the generation of new or significantly improved ideas and their implementation (e.g. Amabile et al., 1996), as well a process of creating value from ideas (Tidd and Bessant, 2014). The OECD (2005) recommend that companies can explore new products or services, business processes, work organization or marketing or improvements to existing ones in an innovative way. So, we consider innovation as a process that involves the creation of new ideas, or a significant improvement, and the implementation of these ideas in the products or services, business processes, work organization or marketing, that could benefit the company, its stakeholders and the society in general (Lousã, 2013). We use a set of innovation indicators developed by Lousã (2013), based on the academic literature (e.g. Scott and Bruce, 1994; Jung et al., 2003), on the Portuguese instruments such as the Innovation Scoring System (COTEC, 2017), as well on expert interviews. The instrument has three dimensions concerning the companies' activity oriented towards innovation, being these: Resources, Processes and Results. Innovation resources aims to analyse the inputs for the organisation towards the activities for innovation, such as the resources available, the level of qualifications and the participation in lifelong learning activities of the human resources, investment/expenditures in Research and Development. The innovation processes aims to analyse relevant process to the innovative dynamic, such as partnerships, cooperation networks and protection and enhancement of knowledge. And finally, innovation results aims to evaluate the outcomes of the activities of a company, such as: the turnover in the last three years; the evolution of sales of new products / services or significant improvements over the last three years; the ideas generated in the company transformed into innovative designs and the enterprise image.

Based on the literature that analyses, on the one hand, the role of leadership in innovation and, on the other, the influence that culture has on innovation, we have developed an exploratory model that starts from the interdependence between culture and leadership and analyses the influence of this association in innovation. However, there is some empirical evidence that shows that company size is an important variable in the relationship between transformational leadership and organizational innovation (e.g. Vaccaro, Jansen, Van Den Bosch, and Volberda; 2012; Khan, Rehman and Fatima, 2009) as the organizational culture influences organizational innovation (e.g. Chandler et al., 2000). So, we propose in this study to analyse the effect that organizational culture and transformational leadership have on organizational innovation, taking into account the size of the company.

Method

Sample

The data were collected from 102 Portuguese organizations, among 854 workers. Regarding the dimension of the sample there are 30.4% micro-enterprises, 38.2% small companies; 24.5% medium-sized companies and 5.9% large companies, according to the European classification. These percentages are close to the enterprises' distribution in Portugal, since it is mainly made up of micro, small and medium enterprises. The age of the companies varies between two and 115 years (M = 18.98 years, SD = 18.97 years) and the employees per company range from two to 643 (M = 61.51 per company, SD = 114.86).

The company's size was operationalized considering the number of employees in the company, and were categorized as: Micro (1-9 employees); Small (10-49 employees); Medium (50-249 employees) and Large (≥ 250 employees).

Measures

Organizational Culture Questionnaire

In the present study, we used the Organizational Culture Questionnaire Denison (Denison et al, 2014), consisting of 60 questions that measure four dimensions of organizational culture: involvement, consistency, adaptability and mission (α between .63 and .87). A Confirmatory Factor Analysis (CFA) showed a good fit, $\chi 2/df = 3.22$, CFI = .85, and RMSEA =.054 (CI. 90 between .052 and .055).

Transformational Leadership Scale

The items that make up this scale were inspired by the four components of transformational leadership developed by Bass (1985). The version used for this study is composed by 17 items. CFA showed an acceptable fit, CFI = .91, $\chi 2/df = 5.61$, and RMSEA =.08 (CI. 90 between .075 and .89). Reliability was very good (α = .96).

Innovation Measurement

In the proposal of the exploratory model we have identified the relational structures that are intended to be measured and we have chosen, in the case of innovative measures, the operationalizations that are best likely to represent the construct (Bollen, 1989; Hoyle, 1995, Loehlin, 1997), all of them being present in the innovation index from Table 1.

The calculation of the innovation index was performed from the standardization of the individual indicators and, subsequently, from their aggregation, from the sum of the different standardized individual indicators, obtaining a "z-Score" without weighting.

Table 1: Measures and operationalization of Innovation

Company image (image)	Contribution of innovation activities to the image of an organization. All the items were rated on five point scale, ranging from one (much worse) to five (much better). A principal component analysis reveal only one dimension composed of five items (α = .82). An example of an item of this measure is "innovation activities contribute to attract more customers in the face of competition.
Resources made available (resources);	This is a subscale of climate innovation support from Scott and Bruce (1994). Responses were given on five-point Likert scale (ranging from ' totally disagree' to' totally agree'). The main component analysis was carried out, revealing only one dimension composed of five items (α = .74). An example of an item of this measure is "in this organization, there are adequate resources dedicated to innovation".
Level of qualifications	Years of education
Lifelong learning/ Training activities	Percentage of workers who participated in lifelong learning activities, innovation oriented, concerning the previous year, these data were obtained in official documents.
Investment in Research and Development	Investment/expenditures made by the company in R&D in the last three years, these data were obtained from official documents.
Partnerships and Cooperation	This measures the type of the company's cooperation networks with other entities towards innovation (e.g. competitors, suppliers, customers, universities, higher education institutions, R&D units).
Networks	This measures the type of company's networks (e.g. international cooperation networks)
Protection and enhancement of knowledge	This measures the ways that the company usually used to protect and enhance knowledge, (e.g. patenting).
Turnovers	The evolution of the growth or decline of an activity in the last three years. These data were obtained from official documents.
Volume of sales of new products/services or those that significantly	The volume of sales of new products/services or those that significantly improved in the past three years. The type of response adopted considers a scale with three options: Decreased (1), Same (2), Increased (3).

Procedures

The data used in the present study were collected taking into account ethical issues such as participants' anonymity and confidentiality, and also to avoid bias. After having agreed to participate, the top management of each organization was asked about the innovation activity at their organization through a questionnaire. Each of them was instructed about the objectives and procedure of the internet-based study via e-mail or telephone. Anonymous and strictly confidential data treatment was assured. Due to the level at which the top management operates, we expected that they were knowledgeable regarding the resources, processes and results of the innovation of their organizations. The measures of leadership and organizational culture, in each firm, were answered by a representative sample of employees, based on organization their distribution at the organizational structure and the departments involved.

Data analysis

All the analyses were completed using the statistical program SPSS and AMOS 22.0 for Windows. Outliers were analysed according to Mahalanobis squared distance (Tabachnick and Fidell, 2013), and were excluded.

CFA was performed with AMOS (v. 22.0; Arbuckle, 2013), with maximum likelihood as the estimation method (Jöreskog and Sörbom, 2004). Goodness of fit was analyzed by the following indices: NFI (Normed of fit index; good fit is considered if NFI > .80; Schumacker and Lomax, 2010), CFI (Comparative fit index; good fit if CFI > .90; Bentler 1990), RMSEA (Root Mean Square Error of Approximation; acceptable fit if RMSEA < .08 according to Kline, 2011, and Schumacker and Lomax, 2010, although according to Marôco, 2011, acceptable fit is considered if RMSEA < .10), and X^2/df (chi-square/degrees of freedom; acceptable fit if X2/df < 5; Arbuckle, 2013; Loehlin, 2004). According to Bentler (1990), and Schumacker and Lomax (2010), X^2 is irrelevant for samples higher than 500 subjects.

Results

Both measures of Leadership, Innovation and Culture (and the corresponding dimensions) were analyzed concerning the descriptive statistics (see Table 2). Correlations between all measures were presented in Table 3. Leadership showed, according to Cohen (1988), a moderate correlation with Innovation (r = .33) and with Culture as a total score (r = .45); the association between Innovation and Culture was small (r = .183).

Table 2: Descriptive statistics of Measures of Leadership, Innovation, and Culture and their dimensions

	Minimum	Maximum	M	SD
Leadership	2.08	4.20	3.27	0.36
Innovation (sum)	-11.91	14.51	1.51	4.55
Company image	2.33	5.00	4.11	0.63
resources made available	1.40	5.00	3.70	0.67
Level of qualification	1.00	7.30	3.71	1.52
Training activities	1.00	5.00	3.22	1.30
Partnerships	0.00	8.00	3.88	1.99
Networking of cooperation	0.00	3.00	0.96	1.09
Protection and appreciation of knowledge	0.00	5.00	2.01	1.63
Ideas transformed into innovative projects	1.00	5.00	2.68	0.86
Sales volume of new / improved or improved products / services	1.00	5.00	2.70	0.90
Turnover growth	-61883792.15	10934788.00	-1636283.84	8304586.42
Research & Development growth	-1269435.00	8543536.00	59898.26	588458.47
Culture (sum)	6.66	21.80	15.43	2.37
Involvement	1.42	5.65	4.03	0.64
Team Orientation	1.15	4.86	3.49	0.57
Capability of Development	1.41	5.65	4.02	0.70
Consistency	1.35	4.80	3.38	0.52
Core Values	1.58	5.02	3.56	0.54

Agreement	1.47	5.60	3.95	0.62
Coordination & Integration	1.20	4.88	3.33	0.55
Adaptability	1.71	5.47	3.89	0.58
Creating Change	1.82	5.61	3.97	0.61
Customer Focus	1.13	3.60	2.56	0.36
Organizational Learning	1.53	5.16	3.73	0.55
Mission	2.09	5.88	4.13	0.68
Strategic Direction & Intent	1.64	5.74	4.07	0.75
Goals & Objectives	1.64	5.24	3.67	0.63
Vision	1.72	5.28	3.68	0.62

Table 3: Intercorrelation matrix of measures of Leadership, Innovation, and Culture and their dimensions

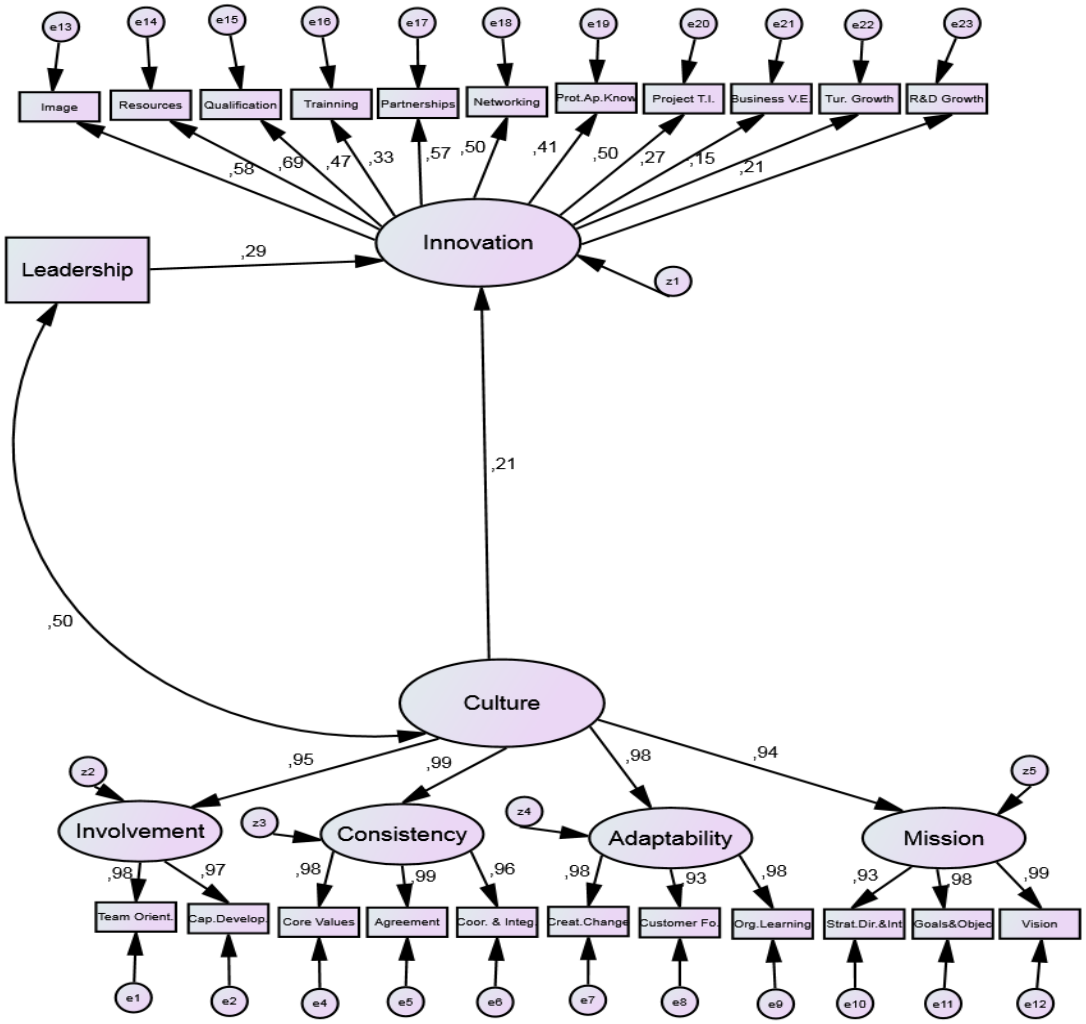
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
1. Leadership	.33	.20	.37	.18	.09	.11	.05	-.14	.27	.21	.02	.08	.44	.44	.42	.44	.44	.44	.43	.40	.44	.43	.36	.43	.43	.41	.40	.42
2. Innovation (sum)	1	.47	.60	.56	.60	.51	.42	.20	.34	.45	.22	-.03	.18	.17	.15	.17	.18	.20	.18	.17	.19	.19	.21	.19	.17	.16	.16	.17
3. Image		1	.37	.14	.08	.24	.19	.19	.26	.39	.00	.10	.17	.15	.14	.14	.17	.19	.16	.14	.17	.17	.13	.16	.17	.22	.15	.16
4. Resources			1	.24	.30	.32	.25	.21	.34	.08	-.18	.00	.20	.18	.16	.18	.19	.20	.19	.15	.21	.23	.17	.22	.20	.23	.18	.19
5. Qualification				1	.04	.30	.34	.17	.00	.07	.09	-.14	.15	.19	.19	.21	.15	.15	.15	.12	.13	.12	.10	.13	.10	.09	.09	.09
6. Trainning					1	.15	.10	-.16	.36	.11	.10	-.04	.06	.04	.04	.05	.05	.05	.04	.03	.07	.06	.09	.07	.08	.07	.09	.09
7. Partnerships						1	.43	.25	.08	.10	-.25	.09	.09	.10	.08	.11	.09	.09	.09	.06	.08	.09	.06	.08	.07	.11	.04	.06
8. Networking							1	.20	.00	-.06	-.01	-.06	.04	.05	.05	.08	.04	.05	.04	.01	.03	.01	.01	.04	.02	.04	.03	.01
9. Prot.Ap.Know								1	.26	-.03	-.11	-.06	-.05	-.06	-.06	-.06	-.06	-.07	-.06	-.08	-.05	-.04	-.04	-.05	-.04	-.01	-.05	-.04
10. ProjectT.I									1	.26	-.04	-.06	.19	.15	.14	.15	.17	.18	.17	.13	.20	.21	.15	.20	.22	.24	.20	.23
11. BusinessV.E										1	.09	.01	.21	.19	.18	.17	.21	.23	.19	.18	.21	.23	.18	.20	.22	.24	.21	.22
12. Tur.Growth											1	-.55	-.02	.00	.01	.01	-.01	-.01	-.01	.01	-.03	-.05	-.03	-.03	-.05	-.06	-.04	-.05
13. RDGrowth												1	.14	.10	.09	.09	.13	.15	.12	.13	.15	.15	.14	.14	.18	.19	.17	.19
14. Culture													1	.97	.95	.93	.99	.96	.97	.94	.99	.96	.91	.97	.97	.89	.94	.95
15. Involvment														1	.99	.97	.98	.95	.96	.92	.95	.92	.86	.92	.89	.79	.86	.86
16. Team Orient.															1	.95	.96	.92	.94	.90	.92	.89	.83	.89	.85	.76	.82	.83
17. Capability Development																1	.94	.91	.92	.87	.91	.88	.81	.88	.85	.76	.82	.82
18. Consistency																	1	.98	.99	.96	.98	.95	.89	.95	.94	.85	.91	.91
19. Values																		1	.97	.92	.95	.91	.86	.92	.91	.83	.88	.88
20. Agreement																			1	.94	.96	.92	.87	.93	.91	.82	.88	.89

21. Coor. & Integ																				1	.92	.89	.85	.89	.88	.79	.86	.86
22. Adaptability																					1	.98	.93	.99	.97	.89	.94	.95
23. Creat.Change																						1	.91	.96	.93	.85	.90	.91
24. Customer Fo.																							1	.91	.90	.81	.88	.88
25. Org. Learning																								1	.94	.86	.91	.92
26. Mission																									1	.94	.99	.99
27. Strat.Dir.& Int																										1	.91	.92
28. Goals&Objec																											1	.97
29. Vision																												1

Legend: Company image (image); resources made available (resources); level of qualification (qualification); training activities (Training); partnerships (partnerships); networks of cooperation (networking); protection and appreciation of knowledge (Prot.Ap.Know); ideas transformed into innovative projects (I.T. Project); sales volume of new / improved or improved products / services (Business V.E); turnover growth (Turn. Growth); Research & Development growth (R&D growth); Team Orientation (Team Orient.); Capability Development (Cap.Develop.); Coordination & Integration (Coor. & Integ); Creating Change (Creat.Change); Customer Focus (Customer Fo.); Organizational Learning (Org. Learning); Strategic Direction & Intent (Strat.Dir.& Int); Goals & Objectives (Goals&Objec).

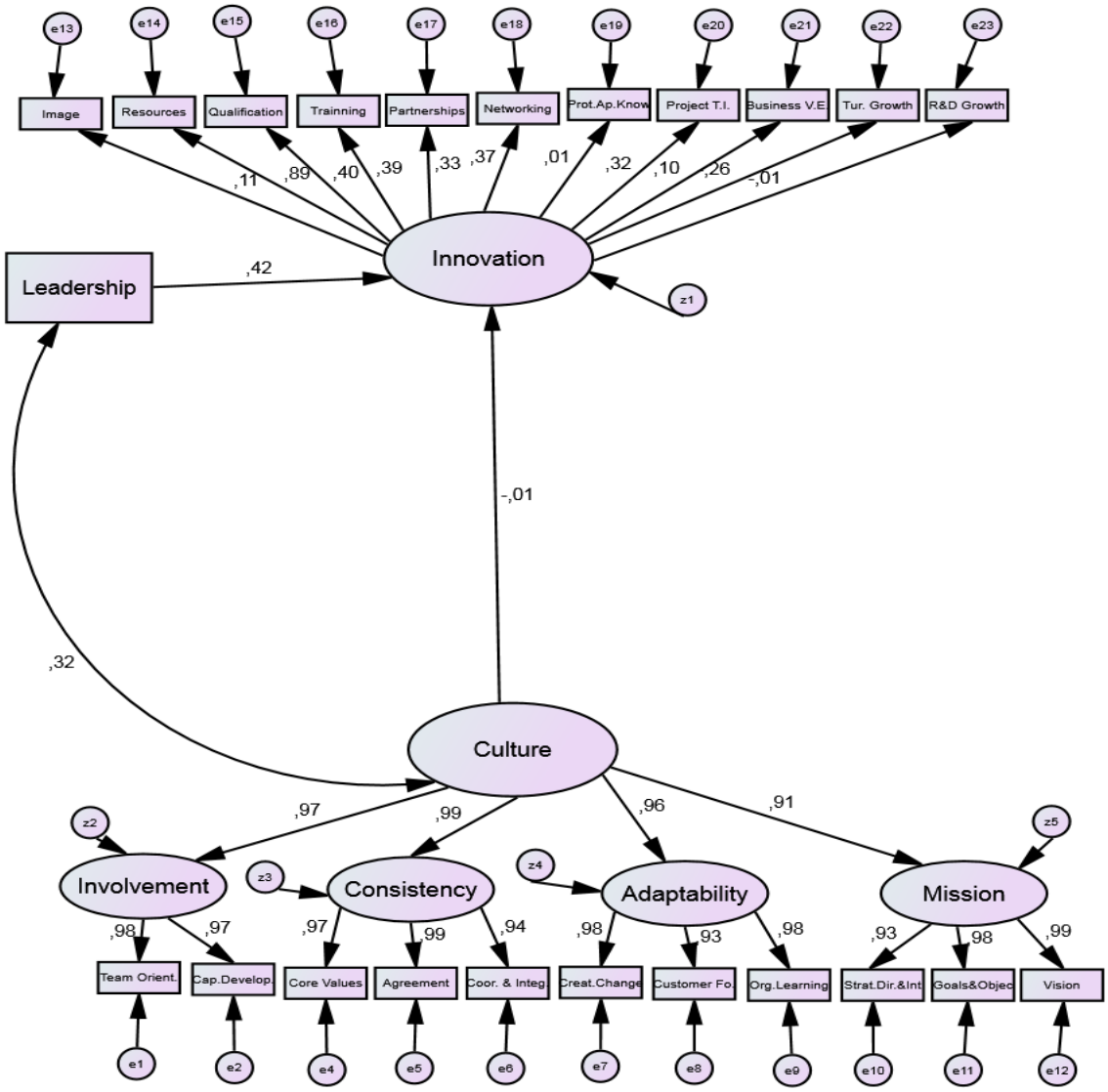
Note: $r \geq .08$ are significant at $p < .05$; $.10 \leq r < .30$ have a small effect size, $30 \leq r < .50$ have a medium effect size; $r > .50$ have a large effect size (Cohen, 1988).

A structural model was established and the measurement model was specified according to literature (Byrne, 2010; Schumacker and Lomax, 2010), considering micro and small enterprises in one model (n = 464 see Figure 1, unconstrained model) and the medium and large enterprises in another model (n = 385; see Figure 2, unconstrained model) tested by multi-group analysis. The results showed a good fit considering NFI = .858 and an acceptable fit for CFI = .874 and RMSEA=.087 (CI .90 between .085 and .090). The score obtained for CMIN/DF (448) was 7.43, $p < .001$.



Legend: Company image (image); resources made available (resources); level of qualification (qualification); training activities (Training); partnerships (partnerships); networks of cooperation (networking); protection and appreciation of knowledge (Prot.Ap.Know); ideas transformed into innovative projects (I.T. Project); sales volume of new / improved or improved products / services (Business V.E); turnover growth (Turn. Growth); Research & Development growth (R&D growth); Team Orientation (Team Orient.); Capability Development (Cap.Develop.); Coordination & Integration (Coor. & Integ); Creating Change (Creat.Change); Customer Focus (Customer Fo.); Organizational Learning (Org. Learning); Strategic Direction & Intent (Strat.Dir.& Int); Goals & Objectives (Goals&Objec).

Fig. 1: Innovation predicted by organizational culture and leadership in Micro and Small Enterprises: Standardized regression coefficients



Legend: Company image (image); resources made available (resources); level of qualification (qualification); training activities (Training); partnerships (partnerships); networks of cooperation (networking); protection and appreciation of knowledge (Prot.Ap.Know); ideas transformed into innovative projects (I.T. Project); sales volume of new / improved or improved products / services (Business V.E); turnover growth (Turn. Growth); Research & Development growth (R&D growth); Team Orientation (Team Orient.); Capability Development (Cap.Develop.); Coordination & Integration (Coor. & Integ); Creating Change (Creat.Change); Customer Focus (Customer Fo.); Organizational Learning (Org. Learning); Strategic Direction & Intent (Strat.Dir.& Int); Goals & Objectives (Goals&Objec).

Fig. 2: Innovation predicted by organizational culture and leadership in Medium and Large Enterprises: Standardized regression coefficients

Analyzing the two models resulting from the structural analysis, we found very significant differences, which leads us to conclude by the moderation effect of the company size variable. In the multiple regression coefficient of the direct determination of culture for innovation, we find that it is significant in micro and small firms ($\beta = .21$), while it is null in medium and large firms ($\beta = -.01$). Thus, the size of the organization is a factor that must be taken into account when analysing the effects of culture and its impact on innovation. In micro and small companies, culture has a direct impact on innovation. In the case of medium and large companies, culture only has an effect on innovation through intervention of the leader. In these larger companies, the leader is fundamental in the way culture promotes innovation. In micro and small companies, the role of the leader is also important, and, also, there is a direct influence of organizational culture on the promotion of innovation, as well the combined effect of transformational leadership and culture on innovation.

Comparing between the two models the simple regression coefficients, we found that in micro and small companies all indicators of innovation are significant in the promotion of it. However, in the medium and large companies, the variables protection and valorisation of knowledge, growth in R & D and the evolution of turnover are insignificant. It should also be noted that in companies of all sizes we find a negative effect of the growth of turnover in promoting innovation.

Discussion/Conclusion

The proposed structural model showed that the variable size of the company acts as a moderator, producing differential effects not only on the leadership role in the relationship between culture and innovation, but also on the contribution of each indicator to innovation. In this sense, the present study contributes to a better understanding of the effects of company's size on the relationships between leadership, culture and innovation.

The present study showed that, in smaller companies, the organization's culture is more directly associated with innovation, with a greater impact on innovative processes, resources and results. In this type of companies, we have verified that the leader acts together with the culture in the promotion of innovation, being evident the impact of both in the processes and the results of the innovation. Regarding innovation indicators, it is clear that in micro and small companies the contribution is stronger and positive in the processes (e.g. networks, qualification, protection and valorisation of knowledge) and results (e.g. image and ideas transformed into projects innovators). This result is consistent with Chandler et al, (2000) which found that companies with cultures supportive of innovation tend to be smaller.

In comparative terms, we found that the organizational culture does not have direct effects on innovation in the larger companies, and the role of the leader in the promotion of innovation is fundamental. In this type of companies, the contribution of innovation indicators is more focused on the resources made available. Although other contributions (e.g. human resources qualification, cooperation networks, partnerships, participation in training activity, ideas transformed into innovative projects) are visible, they have a smaller influence in determining innovation compared to micro and small enterprises. These results are consistent with Vaccaro et al. (2012), which show that larger organizations need more of a transformational leadership to compensate for their complexity and allow innovation to occur. Also, as Damanpour and Schneider (2006) point out, larger organizations can dedicate more resources to innovation activity, and top managers play an important role in allocating these resources. And are consistent with Khan et al., (2009; p.683), which point out the role of the transformational leadership and their dynamic capabilities to enhance organizational innovation in organizations with larger size and with ample resources.

The major contribution of the present study for the existing literature is that leadership should focus on developing a conducive culture that facilitates and promotes innovation, in other words, in an innovation-driven culture.

Limitations

In the present study we found that some indicators of innovation are important in one situation and less important in others. Growth indicators, on the other hand, were not influential. This aspect should be considered with some caution. If, on the one hand, these growth indicators may not reflect the company's ability to focus its activity on innovation, on the other hand, we should not be oblivious to the fact that a large number of the companies that make up our sample have not invested in research and development over the past three years, and even those that have done so have not shown very significant increases in their activities over the last three years. It may also occur, such as Jung et al. (2003) suggest that this measure reflects the desire of companies to support innovation efforts, but that this is not turned into processes or results, at least from a short-term perspective. Also at the level of the variable turnover growth, we find that its contribution to innovation is negative. In fact, as previously noted, a decrease in sales volume in the last three years of the companies' lives was evident, reflecting the situation of crisis that, in recent years, affected most Portuguese companies. This will undoubtedly be a promising area for future research.

Acknowledgment

We thank A. Duarte Gomes, University of Coimbra, Faculty of Psychology and Education Sciences, Portugal, for the guidance provided in the present study.

References

Amablie, T. M., Conti, R., Coon, H., Lazenby, J., and Herron, M. (1996), 'Assessing the work environment for creativity', *Academy of Management Journal,* 39 (5), 1154-1184.

Anderson, N., Potocnik, K., and Zhou, J. (2014), ' Innovation and Creativity in Organizations: A State-of-the Science Review and Prospective Commentary', *Journal of Management*, 40(5), 1297-1333.

Arbuckle, J. L. (2013), *Amos 22 user's guide,* Chicago, IL: SPSS.

Bass, B. M. (1999), 'Two decades of research and development in transformational leadership', *European Journal of Work and Organizational Psychology,* 8 (1), 9-32.

Bass, B. M., and Riggio, R. E. (2006), *Transformational leadership* (2 ed.), Mahwah, NJ: Lawrence Erlbaum.

Bentler, P. (1990), 'Quantitative methods in psychology: Comparative fit indexes in structural models', *Psychological Bulletin,* 107, 238-246.

Bollen, K.A. (1989), *Structural equations with latent variables*, New York: Wiley.

Byrne, B. M. (2010), *Structural equation modeling with AMOS: Basic concepts, applications and programming* (2nd ed.). London: Lawrence Erlbaum.

Chandler, G. N., Keller, C., and Lyon, D. W. (2000), 'Unravelling the determinants and consequences of an innovation-supportive organizational culture' *Entrepreneurship Theory and Practice,* 25 (1), 59-76.

Cohen, J. (1988), *Statistical power analysis for the behavioural sciences* (2nd ed.), New York: Academic Press.

COTEC. Portugal (Maio, 2017), *Innovation scoring. manual de apoio ao preenchimento do sistema innovation scoring da cotec*, Cotec Portugal, Associação empresarial para a inovação.

Damanpour, F., and Schneider, M. (2006), 'Phases of the adoption of innovation in organizations: Effects of environment, organization and top managers', *British Journal of Management,* 17 (3), 215–236.

Denison, D., Nieminen, L. and Kotrba, L. (2014), 'Diagnosing organizational cultures: A conceptual and empirical review of culture effectiveness surveys', *European Journal of Work and Organizational Psychology*, 23 (1), 145-161.

Gumusluoglu, L., and Ilsev, A. (2009), 'Transformational leadership, creativity, and organizational innovation', *Journal of Business Research,* 62, 461-473.

Hoyle, R. (1995), *Structural equation modeling: Concepts, issues, and applications,* Thousand Oaks, CA: Sage Publications.

Jöreskog, K. G., and Sörbom, D. (1996). *LISREL 8: User's reference guide*. Chicago: Scientific Software International.

Jung, D. I., Chow, C., and Wu, A. (2003), 'The Role of Transformational Leadership in Enhancing Organizational Innovation: Hypotheses and Some Preliminary Findings', *Leadership Quarterly,* 14, 525–544.

Jung, D. I., Wu, A., and Chow, C. (2008), 'Towards understanding the direct and indirect effects of CEOs' transformational leadership on firm Innovation', *Leadership Quarterly,* 19, 582–594.

Khan, R.; Rehman, A. U. and Fatima, A. (2009), 'Transformational leadership and organizational innovation: Moderated by organizational size', *African Journal of Business Management*, 3 (11), pp. 678-684.

Kline, R. (2011), *Principles and practice of structural equation modeling* (3ª ed.), New York: The Guilford Press.

Loehlin, J. C. (1997), *Latent variable models,* Mahwah, NJ: Lawrence Erlbaum Associates.

Lousã, E. P. (2013), *Liderança empreendedora e cultura de inovação em organizações de base tecnológica e análise comparativa entre setores de atividade*, A Dissertation submitted in fulfillment of the requirements of the doctor of philosophy, University of Coimbra, Faculty of Psychology and Education Sciences, Portugal.

Marôco, J. (2011), *Análise de equações estruturais: Fundamentos teóricos, software & aplicações*, Pêro Pinheiro: Report Number.

Mumford, M. D., Scott, G. M., Gladdis, B., and Strange, J. M. (2002), 'Leading creative people: orchestrating expertise and relationships', *Leadership Quarterly,* 13, 705-750.

OECD. (2005), *Oslo Manual: Guidelines for collecting and Interpreting Innovation Data,* Paris: Organisation for Economic Co-operation and Development.

Ramos, J., Anderson, N., Peiró, J. M., and Zijlstra, F. (2016), 'Studying innovation in organizations: a dialectic perspective - introduction to the special issue', *European Journal of Work and Organizational Psychology*, 25(4), 477–480.

Schumacker, R. E., and Lomax, R. G. (2010), *A beginner's guide to structural equation modeling* (3rd ed.), Mahwah, N.J.: Lawrence Erlbaum Associates.

Scott, S. G., and Bruce, R. A. (1994), 'Determinants of innovative behavior: a path model of individual innovation in the workplace', *Academy of Management Journal,* 37, 580–607.

Tabachnick, B. G., and Fidell, L. S. (2013), Using multivariate statistics (6th ed.), New Jersey: Pearson Education.

Tidd, J. and Bessant, J. (2014), *Strategic Innovation Management*, Chichester: John Wiley.

Vaccaro, I. G., Jansen, J. J., Van Den Bosch, F. A., and Volberda, H. W. (2012 January), 'Management Innovation and Leadership: The Moderating Role of Organizational Size', *Journal of Management Studies,* 49 (1), 28-51.

Wolfe, R. (1994), 'Organizational innovation: Review, critique and suggested research directions', *Journal of Management Studies,* 31, 405-431.

An Example of Exploratory Analysis for Predictive Business Process Monitoring

Tomasz Owczarek, Faculty of Organization and Management, Silesian University of Technology, Zabrze, Poland, e-mail: tomasz.owczarek@polsl.pl

Abstract

In this paper an example of exploratory analysis of event log data is presented. It is suggested that performing this kind of analysis could improve the results of algorithms used in predictive business process monitoring.

Keywords: exploratory analysis, business process monitoring, prediction.

Introduction

Predictive business process monitoring (PBPM) is a part of process mining – a family of techniques and methods which allow to analyze business processes encoded in event logs data (van der Aalst et al., 2010). The aim of PBMB is to predict the outcome of a process instance based on its uncompleted traces and historical data (Maggi et al., 2014). The predicted outcome can take different forms, it can be a numeric value (such as time remaining until the end of process instance) or binary assessment (for instance if the process will exceed its planned time) (Evermann et al., 2016). A broad spectrum of approaches can be found in literature, such as KNNI-based (k nearest neighbor imputation) local outlier factor prediction (Kang et al., 2012), clusterization (Di Francescomarino et al., 2016), neural networks (Metzger et al., 2015) or deep learning (Evermann et al., 2016). Most of them exploit some kind of data mining (machine learning) algorithm and can be described in general as regression (in case of quantitative outcome) or classification (when the outcome is binary) (Hastie et al., 2009). Indeed, PBPM can be seen as a data mining process and it would be beneficial if performed in some structured and systematic way.

Probably the most popular reference model of data mining process is CRISP-DM (Cross Industry Standard Process for Data Mining) (Shearer, 2000). It consists of six major phases. Phases three ("data preparation") and four ("modeling") are closely connected because of the assumptions and restrictions that some modeling techniques have. During these phases exploratory data analysis (especially data visualization) plays a crucial role, as it can provide the evidence or guides in which way to follow up (e.g. which new data should be constructed) given the available dataset (Peng, 2016).

In the rest of this paper an example of such analysis is presented. The aim of this paper is to suggest that this kind of analysis could improve the results of predictive business process monitoring.

Dataset

The dataset used in the following examples represents the real-world business processes of a freight forwarding company. An instance of this process contains one, two or three incoming (denoted as i1, i2, and i3) and one outgoing (represented as o on figures) transport legs. Each transport leg consists of the same transport services (tasks): *rcs* (shipment check in), *dep* (departure of goods), *rcf* (accepting freight at arrival airline) and *dlv* (delivering freight). Additionally, a transport leg may involve multiple segments and in those cases tasks *dep* and *rcf* may be repeated (up to three times). These repetition are called hoops. For each of the task there are planned and real execution time. The dataset has 3942 records (each record represents one business instance). More details about the data can be found in Metzger et al. (2015).

Exploratory Analysis

At first, let us look at the time distribution. Figure 1 shows planned and execution time distribution for different tasks in each leg. For better visualization the outliers (most extreme values) were removed according to the Tukey rule: value was treated as an outlier if it exceeded Q3 + 1.5IQR (Hoaglin, 2003).

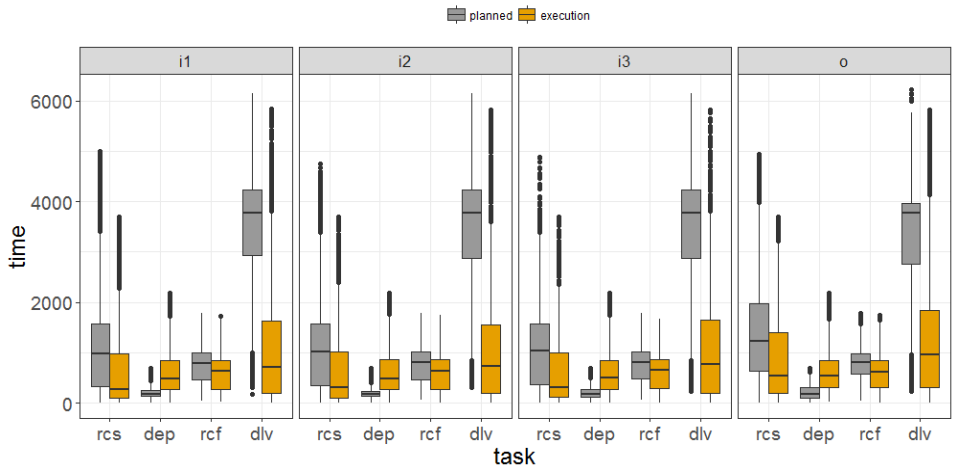


Fig. 1: Planned and execution time of tasks.

It is easily seen that tasks' time distributions are similar in different legs. One can also notice that planned and execution times of tasks *dep* and *dlv* differs significantly. This is probably due to the fact that timely delivery (*dlv*) is much more important than on-time departure (*dep*), and for *dlv* tasks some reserve of time is assumed (see footnote 4 in Metzger et al. (2015)).

In figure 2 the impact of outliers on the rate of violation (percentage of tasks with execution time exceeding planned time) is checked. The biggest difference is for *dlv* and since it is the most important task from the supply chain perspective, further analysis will focus on this particular task.

Firstly, it would be interesting to see if there is any relationship between number of incoming legs and violation rate of *dlv* in leg *o*. Secondly, for each leg the impact of the number of hoops is examined.

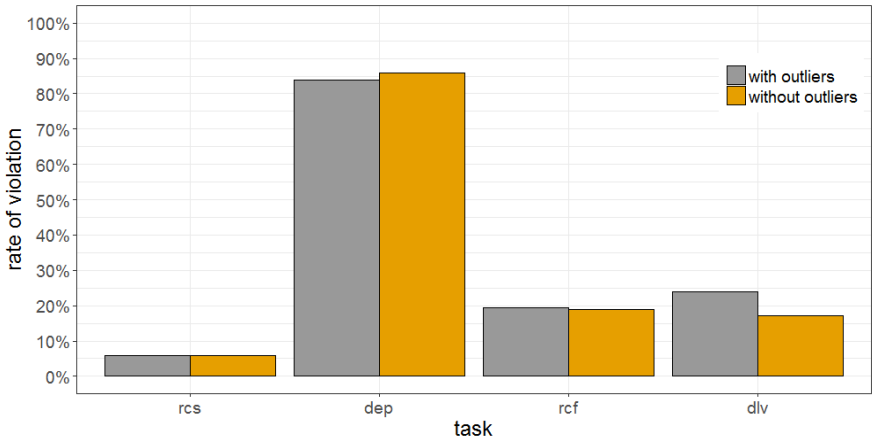


Fig. 2: Rate of violation for tasks with and without outliers

Figure 3 presents rate of violation for *dlv* in outgoing leg depending on the number of incoming legs. The biggest value is for three incoming legs, but the differences are very small (it would require statistical inference procedure, e.g. ANOVA to tell if the differences are big enough to treat them as statistically significant).

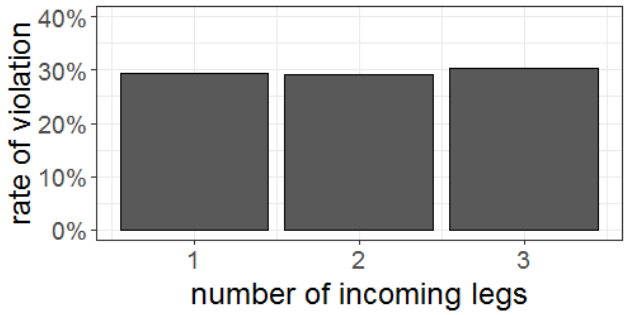


Fig. 3: Rate of violation of task dlv in outgoing leg depending on the number of incoming legs

These differences are more explicit in figure 4, which presents rate of violation of *dlv* in each leg depending on the number of hoops in this leg (because three hoops were extremely rare they were omitted from the analysis).

As one can see in figure 4 for each *dlv* in incoming legs (*i1*, *i2*, *i3*) the second hoop noticeably increases the rate of violation (it is less explicit in the case of outgoing leg). This lets us to formulate the first suggestion: the expected number of hoops should be included as a predictor variable in a classification algorithm that would try to predict if the *dlv* task would end on time.

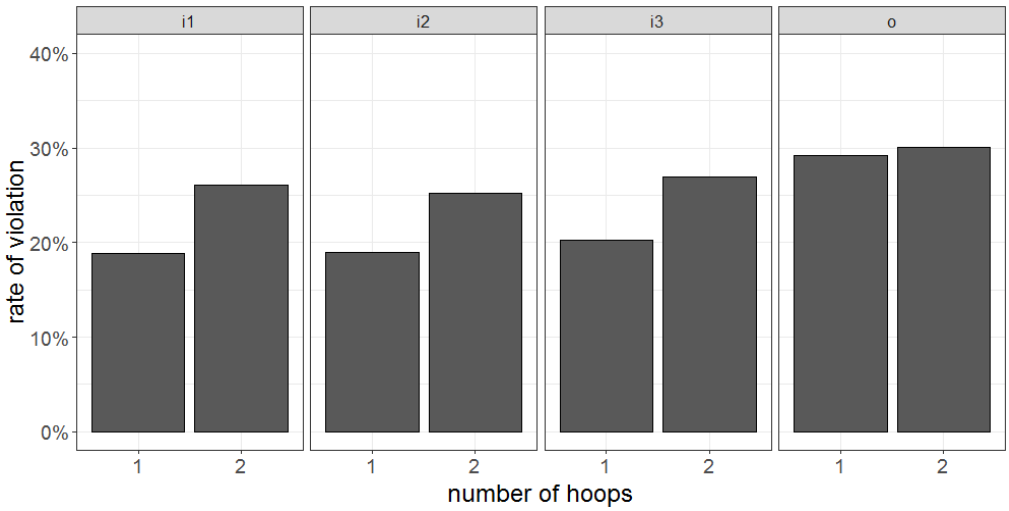


Fig. 4: Rate of violation of task dlv in each leg depending on the number of hoops

Figure 5 shows the average times (planned and execution) of *dlv* tasks depending on the number of hoops in each leg.

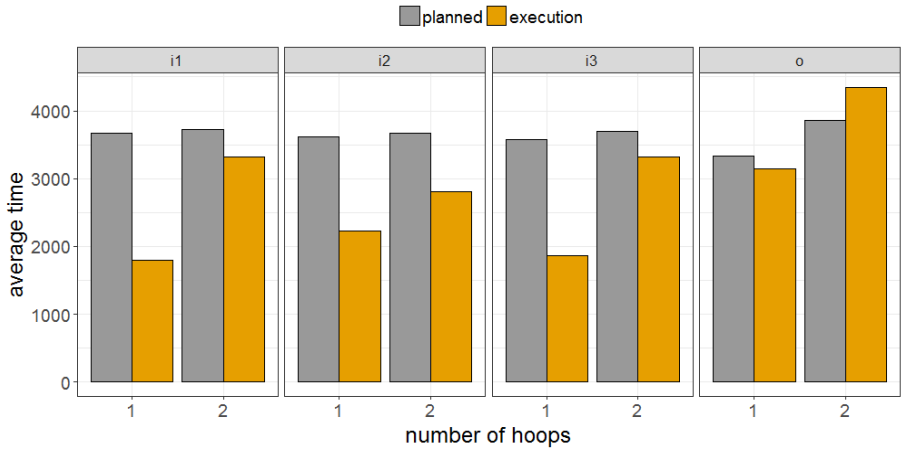


Fig. 5: Average planned and execution time of task dlv in each leg depending on the number of hoops

Similarly it can be concluded that the number of hoops plays an important role here. Moreover, it is revealed that in the case of *dlv* in outgoing leg the average planned time is actually lower than the average execution time. This is an interesting observation (especially if we try to use regression algorithm to predict the actual execution time of task) that requires further analysis.

Summary

In this short paper an example of exploratory data analysis was presented. Visualizations of real-world process data allowed for conclusion that the variable representing number of hoops in each leg should be included in classification or regression algorithm used for prediction of business process outcome. This supports the suggestion that exploratory data analysis could improve the results of predictive business process monitoring. In further studies we are going to expand these research to deliver practical guidance (in the form of framework) in the context of the exploration of event log data.

Acknowledgement

The work was supported by funds of Ministry of Science and Higher Education (MNiSW) for activities related to the development of young scientists project no. 4299/E-367/M/2016.

References

van der Aalst, W., Pesic, M., and Song, M. (2010), 'Beyond process mining: from the past to present and future', Advanced information systems engineering, Springer Berlin/Heidelberg, 38-52.

Evermann, J., Rehse, J. R., and Fettke, P. (2016), 'A deep learning approach for predicting process behaviour at runtime', International Conference on Business Process Management, Springer, Cham, 327-338.

Di Francescomarino, C., Dumas, M., Maggi, F. M., and Teinemaa, I. (2016), 'Clustering-based predictive process monitoring', *IEEE Transactions on Services Computing*, doi: 10.1109/TSC.2016.2645153.

Hastie, T., Friedman, J., and Tibshirani, R. (2009), The elements of statistical learning (2nd Ed.). New York: Springer series in statistics.

Hoaglin, D. C. (2003), 'John W. Tukey and data analysis', *Statistical Science* 18(3), 311-318.

Kang, B., Kim, D., and Kang, S. H. (2012), 'Real-time business process monitoring method for prediction of abnormal termination using KNNI-based LOF prediction', *Expert Systems with Applications*, 39(5), 6061-6068.

Maggi, F. M., Di Francescomarino, C., Dumas, M., and Ghidini, C. (2014), 'Predictive monitoring of business processes', International Conference on Advanced Information Systems Engineering, Springer, Cham, 457-472.

Metzger, A., Leitner, P., Ivanović, D., Schmieders, E., Franklin, R., Carro, M., Dustdar, S. and Pohl, K. (2015), 'Comparing and combining predictive business process monitoring techniques', *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, 45(2), 276-290.

Peng, R.D., (2016), Exploratory Data Analysis with R, Leanpub.

Shearer, C. (2000), 'The CRISP-DM model: the new blueprint for data mining', *Journal of data warehousing*, 5(4), 13-22.

Strategic Management Accounting: Bibliometric Analysis and Ideas for Future Research

Petr Petera, University of Economics, Prague, Prague, Czech Republic, petr.petera@vse.cz

Abstract

The principle aim of this paper is to map research in the field of strategic management accounting in high-quality journals. To fulfil this aim, the paper utilizes bibliometric analysis and content analysis methods. On the basis of a bibliometric analysis of high-quality journal articles (i.e., indexed in Scopus or the Web of Science Core Collection) key bibliometric characteristics are quantified. The main characteristics of existing research and ideas provided for future research are also identified on the basis of a full-text analysis.

Keywords: Strategic management accounting, bibliometric analysis, content analysis, strategy, literature review

Introduction

Strategic management accounting (hereinafter abbreviated as "SMA") is a relatively new term. Its first usage dates back to 1981 when it was defined as "the provision and analysis of management accounting data about a business and its competitors for use in developing and monitoring the business strategy" (Simmonds, 1981, p. 26).

Other scholars have suggested numerous alternative definitions and, as a result, it is possible to conclude that there is no generally accepted definition of SMA which is one of the obstacles complicating further research in this field. Typical attributes of SMA include long-term orientation, strategic orientation, external orientation (first, and in particular, on competitors, though later the emphasis shifts to customer accounting) and the inclusion of environmental and social issues. Some authors emphasize the interplay between SMA and marketing (Roslender and Hart, 2002; 2010). Tools and techniques have been derived from these attributes with one of the most respected lists of techniques being proposed by Cadez and Guilding (2008) where the techniques are divided into five groups (costing; planning, control and performance measurement; strategic decision-making; competitor accounting; and customer accounting).

Simmonds expected that SMA would spread quickly in practice, but this prediction has not materialised. Some scholars (see e.g., Nixon and Burns, 2012, p. 229) mentioned that the term "SMA" was not accepted by practitioners and that "SMA literature seems to have languished".

This paper represents an inquiry of the status quo of strategic management accounting by means of an analysis of journal articles indexed in Scopus or the Web of Science Core Collection. In particular, we try to identify the top journals and authors in the field of SMA and provide an overview of topics studied, research methods used, and method theories (source disciplines) used in SMA research. On the basis of this inquiry, we propose some possibilities for further research. Findings presented in this paper may be especially interesting for researchers (selection of interesting topics, appropriate research methods and relevant journals where to publish) and potentially for practitioners (contemporary approaches to the utilization of SMA).

Methodology

We deployed a bibliometric analysis and content analysis as our main research method. Both techniques strive to objectivize the process of reviewing the existing literature.

In this chapter the process of obtaining and analyzing relevant articles from high-quality journals, which were defined as journals indexed in Scopus or the Web of Science Core Collection, is described.

We utilized Scopus as the primary source of bibliometric data. To find relevant journal articles we searched for selected phrases through the fields "article title", "abstract" and "keywords". Specifically, our search query was: (TITLE-ABS-KEY ("strategic management accounting") OR TITLE-ABS-KEY ("strategic managerial accounting")) AND (LIMIT-TO (DOCTYPE, "ar")) AND (LIMIT-TO (LANGUAGE, "English")). This search was performed on 30 September 2017 and returned 79 articles. Consequently, we removed journal articles which were selected by mistake (e.g., an article containing the string "strategic management, accounting" instead of "strategic management accounting") and articles with obviously misleading descriptions; in total, we removed five journal articles leaving us with 74 journal articles which were published in 42 different journals.

Subsequently, we used the same search query in the Web of Science Core Collection and in total we obtained 26 journal articles. We compared these articles with the dataset from Scopus and found that there were no new articles in the set from the Web of Science Core Collection.

Finally, we tried to obtain full texts of the 74 identified articles. We succeeded in obtaining all but four, which left us with 70 full texts for further analysis. It is, therefore, possible to summarize that we performed a bibliometric analysis of all 74 journal articles and content analysis of 70 full texts.

Results and Discussion

Bibliometric Analysis

This chapter provides results of the bibliometric analysis of the 74 articles meeting our selection criteria. Citation data are extracted from Scopus.

First, we conducted a bibliometric analysis of journals by counting the number of articles (calculated as a sum of articles dedicated to SMA and published in a given journal), as well as the number of citations (calculated as a sum of all citations received by articles published in a given journal). Results of this analysis, ordered according to the number of citations, can be found in Table 1.

Table 1: Analysis of journals

Journal	ISSN	SJR 2016	Number of citations	Number of articles
Management Accounting Research	1044-5005	2.494	631	18
Accounting, Organizations and Society	0361-3682	2.451	274	2
Accounting, Auditing & Accountability Journal	0951-3574	1.579	82	2
Accounting and Business Research	0001-4788	0.945	80	3
Critical Perspectives on Accounting	1045-2354	1.204	35	2
International Journal of Contemporary Hospitality Management	0959-6119	1.745	31	2

Journal of Accounting & Organizational Change	1832-5912	0.311	23	5
Journal of Accounting, Auditing and Finance	0148-558X	0.581	22	1
Long Range Planning	0024-6301	2.697	19	1
Industrial Management and Data Systems	0263-5577	0.768	18	1
Higher Education	0018-1560	1.486	16	1
Journal of Marketing Management	0267-257X	0.843	13	1
Scandinavian Journal of Management	0956-5221	0.845	12	1
Omega	0305-0483	3.674	11	1
International Journal of Hospitality Management	0278-4319	1.956	10	2
Other journals			51	31

Source: Scopus, authorial computations

Table 1 clearly shows that the majority of articles were published by the journal Management Accounting Research which also led to the highest number of citations for this journal. Only 15 journals obtained more than ten citations. The sum of citations of relevant articles in other journals was 6 or less per journal. The total number of citations for the remaining 27 journals can be found in the last row of Table 1.

It is important to add that while the number of articles on SMA did not decrease over time, coverage of the topic in individual journals changed. For example, the journal Management Accounting Research has published only one article meeting our selection criteria since 2013 (Lapsley and Rekers, 2017). On the other hand, other journals (especially the Journal of Accounting & Organizational change) started to publish more articles on the analysed topic.

Second, to identify key authors, we counted the number of articles and citations for individual authors of these articles. This evaluation was prepared via two different approaches.

The first approach took only the first/leading author of every article into account (a respective number of citations is not accredited to the second and other authors) and results can be found in Table 2.

Table 2: Analysis of authors (only the first author is taken into account)

Author	Number of citations	Number articles	Articles
Bromwich, M.	155	1	Bromwich, 1990
Cadez, S.	148	3	Cadez and Guilding, 2007; 2008; 2012
Guilding, C.	110	1	Guilding, Cravens and Tayles, 2000
Gond, J. P.	78	1	Gond, Grubnic, Herzig and Moon, 2012
Seal, W.	65	2	Seal, 2006;2010
Bhimani, A.	64	1	Bhimani and Langfield-Smith, 2007
Lord, B. R.	61	1	Lord, 1996
Langfield-Smith, K.	60	1	Langfield-Smith, 2008
Rangone, A.	43	1	Rangone, 1997
Spicer, B. H.	42	1	Spicer, 1992

Source: Scopus, authorial computations

In total, there are 64 first authors. One author published three articles, eight authors published two articles, and the other authors published one article. Table 2 displays the ten most cited authors in descending order according to the number of citations of their articles.

The second approach took all authors of every article into account, for results see Table 3.

Table 3: Analysis of authors (all authors taken into account)

Author	Number of citations	Number of articles	Articles
Guilding, C.	271	5	Cadez and Guilding, 2007; 2008; 2012; McManus and Guilding, 2008; Guilding, Cravens and Tayles, 2008
Bromwich, M.	155	1	Bromwich, 1990
Tayles, M.	149	2	Guilding, Cravens and Tayles, 2000; Ma and Tayles, 2009
Cadez, S.	148	3	Cadez and Guilding, 2007; 2008; 2012
Langfield-Smith, K.	124	2	Bhimani and Langfield-Smith, 2007; Langfield-Smith, 2008
Cravens, K. S.	110	1	Guilding, Cravens and Tayles, 2000
Gond, J. P.	78	1	Gond, Grubnic, Herzig and Moon, 2012
Grubnic, S.	78	1	Gond, Grubnic, Herzig and Moon, 2012
Herzig, C.	78	1	Gond, Grubnic, Herzig andMoon, 2012
Moon, J.	78	1	Gond, Grubnic, Herzig and Moon, 2012
Seal, W.	65	2	Seal, W., 2006; 2010
Bhimani, A.	64	1	Bhimani and Langfield-Smith, 2007
Lord, B.R.	61	1	Lord, 1996

Source: Scopus, authorial computations

When taking all authors into account (i.e., citations of an article were attributed to all its authors, not only to the first author), we found 130 authors. One author published (authored or co-authored) five articles, one author published three articles, 19 authors published two articles, and the remaining authors published one article.

Table 3 displays the top ten (6th place belongs to four authors) authors according to the number of citations of the articles they authored or co-authored. The method is more equitable than crediting only the first author. On the other hand, the quantity of citations of individual authors may be influenced by articles with numerous citations and co-authors (e.g., an article by Guilding, Cravens and Tayles, 2000).

Analysis of full texts

In this chapter, we provide results of the content analysis of the full texts obtained (i.e., 70 journal articles). First, we analyse the articles according to their research method. Second, we give an overview of the method theories used before discussing our findings. Third, we investigate the countries in which the research was conducted.

Analysis according to research methods can be found in Table 4. We categorized the articles based on the following research methods: a case study (single case or multiple cases), theoretical framework, survey, teaching material, multiple and unclear.

Table 4: Analysis according to research methods

Sorted according to number of articles		Sorted according to number of citations	
Research method	**Number of articles**	**Research method**	**Number of citations**
theoretical framework	20	theoretical framework	570
survey	19	case study (single)	217
case study (single)	14	multiple	183
case study (multiple)	10	survey	183
teaching material	4	case study (multiple)	136
multiple	2	teaching material	37
unclear	1	unclear	0

Source: Scopus, authorial computations

Results in Table 4 show that theoretical frameworks are a prevalent type of research method. This is quite surprising and points to the fact that there is a general paucity of empirical research in the field of SMA. Theoretical framework studies include articles featuring the development of new frameworks by combining multiple perspectives from other literature. Among these frameworks, the works of Bromwich (1990); Gond, Grubnic, Herzig and Moon (2012), Lord (1996), Langfield-Smith (2008), Rangone (1997), Spicer (1992), Seal (2006) are especially important. Newer theoretical studies introduce important topics into the field of SMA. For example, Ratnatunga and Balachandran (2009) reference the impact of global warming on the management accounting profession. Nixon and Burns (2012), by means of a comprehensive comparison of strategic management and SMA, provide numerous ideas for the future development of SMA.

The survey is the second-most used research method. Although we do not assess the quality of individual studies in this paper, we can conclude that there are substantial differences, especially among survey-based articles.

Case study research is also popular in the field of SMA, and if we did not distinguish single and multiple case studies, it would be the most popular research design.

Two papers employed multiple research methods. Bhimani and Langfield-Smith (2007) deployed the combination of a survey and interviews when investigating whether strategy development and implementation are formal, structured processes and whether financial and non-financial information are of equal importance to strategy development and implementation activities. Cadez and Guilding (2008) also combined a survey and interviews for the development and empirical testing of an SMA contingency model. We propose that a design including triangulation from multiple research methods (questionnaire survey and interviews) may offer great potential for future research.

A special type of article in our sample was "teaching studies" as represented by Simmonds (1982; 1992), Brooks and Vesty (2008) and Andon and Baxter (2011).

Analysis of empirical articles according to method theories can be found in Table 5. Lukka and Vinnari (2014) distinguished "domain theory" and "method theory". Domain theory can be characterized as a "particular set of knowledge on a substantive topic area situated in a field or domain". Method theory is defined as a "metalevel conceptual system for studying the substantive issue(s) of the domain theory"

Lukka and Vinnari (2014, p. 1309). Generally, high-quality papers should substantially contribute to theory, and the proper utilization of method theories raises the probability of such contributions.

In our case, domain theory is strategic management accounting. We add that method theory can be understood as a "source discipline" and as a "theoretical lens" used for acquiring a better understanding of the domain theory studied. For example, it is possible to use institutional theory to understand a particular phenomenon in the field of strategic management accounting better.

To identify the most frequently used method theories, we went through all full texts of the empirical journal articles analysed (articles classified as a case study, multiple or survey) and checked for any source disciplines informing a given research.

Table 5: Analysis according to method theories

Method theory	Case study (multiple)	Case study (single)	Multiple research methods	Survey	Total
no theory	6	11	1	5	23
contingency theory	1		1	11	13
configurational theory				1	1
cultural circuit of capitalism		1			1
institutional theory (neo-institutional framework)		1			1
Porter's taxonomy of generic competitive strategies				1	1
self-referential theory; institutional theory	1				1
sense-making theory		1			1
strategising as practice	1				1
strong structuration theory combined with agency theory	1				1
theory of reasoned action				1	1

Source: Scopus, authorial computations

Based on Table 5 we can conclude that the majority of articles in our sample do not explicitly use any method theory, despite the fact that these articles were extracted from high-quality journals (indexed in Scopus).

The most popular method theory is contingency theory which was used in 13 articles (mostly in survey-based ones). Articles using this theory aim to prove a relationship between selected contingency factors and the dependent variable (e.g., organizational performance), though the utilization of appropriate statistical techniques has begun relatively recently. Nowadays, covariance-based structural equation modeling (CB-SEM) and partial least squares structural equation modeling (PLS-SEM) are among the most advanced techniques being used And we determined that these techniques were used in only six articles (Cadez and Guilding, 2008; McManus, 2013; Pavlatos, 2015; Šiška, 2016; Šiška, 2017; Wolf, Weißenberger, Wehner and Kabst, 2015). On the one hand, it is important to mention that there are still many research questions which can be tackled by a contingency approach. On the other hand, it is necessary to anticipate criticism directed at this method theory. For example, Otley (2016) advocated that a mechanistic approach that would develop into a predictive mechanism for the design of optimal control systems was misguided and proposed to replace contingency theory with a management control

"packages" view. Similarly, Cadez and Guilding (2012) mentioned that one of the major shortcomings of the contingency approach is its predictive capacity. This shortcoming stems from the assumption of unifinality which is embedded in contingency theory. Cadez and Guilding (2012, p. 485) contrasted the contingency approach and configurational theory, which is based on the concepts of equifinality, combination and reciprocity, and strives to provide predictions concerning which firm configurations will be successful under which sets of circumstances.

According to our findings, other method theories are nearly exclusively used in case study research and are based mostly on sociology. It is possible to summarize that there is great potential for further research in case study research. Nevertheless, we advocate that research based on psychological theories should also be considered in addition to research based on social theories.

Finally, we conducted analysis of empirical articles *according to in which countries* these articles (classified as a case study – multiple case or single case, multiple research methods or survey) were conducted. Results can be found in Table 6.

Table 6: Analysis by countries

Country	Case study (multiple)	Case study (single)	Multiple research methods	Survey	Total
UK	4	7	1	1	13
Germany		2		2	4
Malaysia	1			2	3
Australia		1		1	2
Egypt	1			1	2
Italy	1			1	2
not explicitly specified		2			2
Slovenia			1	1	2
Sweden		2			2
Czech Republic				1	1
Greece				1	1
Jordan				1	1
Norway	1				1
Saudi				1	1
Thailand				1	1
multiple (Canada, UK)				1	1
multiple (Czech Republic, Slovak Republic)				1	1
multiple (New Zealand, UK, US)				1	1
multiple (Slovenia, Australia)				1	1
multiple (UK, US, Japan)	1				1
multiple (US, Canada)	1				1
multiple (USA, Belgium, Canada, China, Iraq, Netherlands, Sweden, and Switzerland)				1	1

Source: Scopus, authorial computations

On the basis of our findings, it is possible to summarize that the country where the majority of studies were conducted is the United Kingdom. Four studies were conducted in Germany, three studies in Malaysia, and two or fewer studies were conducted in other countries. Two articles did not explicitly specify where the research took place. Seven studies conducted research in several countries; the inclusion of several countries was especially popular in survey research, and international differences were analysed.

Discussion and Ideas for Further Research

Our analysis highlighted key researchers and journals, as well as important research methods, method theories used, and the countries in which empirical research was conducted. In this chapter, we would like to summarize the key findings related to possible further research.

First, we would like to highlight several ideas from the viewpoint of the thematic focus of the research.

It is possible to summarize that survey-based research aimed at the utilization of various SMA techniques, which was often accompanied by an analysis of contingency factors, exhausted its potential to a large extent. Nevertheless, we propose that this research can still be important, especially in countries where high-quality studies of this type have not yet been conducted. For us, as Czech-based researchers, it is important that a small amount of published (in high-quality journals) SMA research is aimed at Czech companies. This finding is not surprising because it was already determined that, in the field of management accounting/performance management, there is a paucity of research published by Czech researchers in high-quality journals (Wagner, 2014, p. 311). Moreover, an up-to-date international comparison of the implementation of SMA techniques in the Czech Republic and comparable countries (e.g., the Visegrád Group) is missing.

The involvement of management accountants in the process of strategizing was discussed in several empirical articles. This concerns another important area for research, i.e., the emergence of the "strategic management accountant" which was mentioned, e.g., by Wolf, Weißenberger, Wehner and Kabst (2015). It is argued that SMA puts additional demands on management accountants that extend beyond their usual competences. Although there is some research on the required competence, position and function of management accountants in organizations (e.g., Král and Šoljaková, 2016), more in-depth research, focused on strategic management accountant/controller, is needed.

A relatively under-researched area is the interplay between SMA and marketing. Specifically, topics, such as customer accounting and costing for strategy development (McManus, 2013; McManus and Guilding, 2008; McLean and McGovern, 2017), are insufficiently covered by the research.

Another strand of research appeared in the field of SMA and strategic human resource management. This topic was addressed by Kouhy and Vedd (2000), Samudhram, Shanmugam and Teng Low (2008) and Vedd and Kouhy (2001), in particular, and we suggest many issues still require in-depth investigation.

Second, we would like to emphasize two findings from the viewpoint of the research methodology.

The first finding is that the majority of existing survey research employed a contingency approach which is, nowadays, largely criticized (see, e.g., Otley, 2016). In this context, it is important to draw attention on a relatively less frequently used configurational theory, which was used only by Cadez and Guilding (2012) in the field of SMA and can be employed for the analysis of various issues.

The second finding relates to the paucity of empirical research utilizing mixed research methodology. We propose that research design, including triangulation of multiple research methods (for example questionnaire survey and interviews), may be extremely beneficial as documented in studies by Bhimani and Langfield-Smith (2007) and Cadez and Guilding (2008). Finally, more research aimed at questioning "how" using theory-based case studies is needed (e.g., the emergence and variety of SMA techniques).

Acknowledgment

This paper is one of the research outputs of the project GA 17-13518S/P403 "Determinants of budgeting and performance measurement systems design and impact of these systems on organizational behaviour and organizational perform" registered at Czech Science **Foundation.**

Conclusion

Strategic management accounting as a discipline was established in 1981 and interest in this topic has gradually decreased in practice.

Our research was aimed at bibliometric and content analysis of articles published in high-quality journals (i.e., indexed in Scopus). This research did not confirm a significant decrease of journal articles in recent years. Moreover, numerous ways for further research in the field of SMA were explicitly or implicitly proposed in analysed articles.

We identified the top journals and authors publishing articles in the field of strategic management accounting. Consequently, we discussed the occurrence, strengths and weaknesses of various research methods. Method theories deployed in SMA research were also analysed. An overview of research according to countries was also provided.

Finally, we proposed several ideas for further research as research topics aimed at the utilization of various SMA techniques, including the study of contingency factors, the involvement of management accountants in the process of strategizing, the interplay between SMA and marketing and SMA and strategic human resource management offer great potential.

From a methodological point of view, the most promising research methodology triangulates various methods of data gathering and data analysis. The majority of scholars advocate utilizing case studies with a focus on questioning "how" (e.g., how the process of strategizing is aligned with SMA). Among quantitative methods, configurational theory is relatively insufficiently used.

References

Andon, P. and Baxter, J. (2011) 'Introducing and Contextualising Customer Lifetime Valuation: A management accounting teaching resource,' *Accounting Education*, 20(1), 39-61.

Bhimani, A. and Langfield-Smith, K. (2007) 'Structure, formality and the importance of financial and non-financial information in strategy development and implementation,' *Management Accounting Research*, 18(1), 3-31.

Bromwich, M. (1990) 'The case for strategic management accounting: The role of accounting information for strategy in competitive markets,' *Accounting, Organizations and Society*, 15(1-2), 27-46.

Brooks, A. and Vesty, G. (2008) 'Double two,' *Accounting Perspectives*, 7(3), 257-270.

Cadez, S. and Guilding, C. (2007) 'Benchmarking the incidence of strategic management accounting in Slovenia,' *Journal of Accounting & Organizational Change*, 3(2), 126-146. doi:10.1108/18325910710756140

Cadez, S. and Guilding, C. (2007) 'Benchmarking the incidence of strategic management accounting in Slovenia,' *Journal of Accounting & Organizational Change*, 3(2), 126-146.

Cadez, S. and Guilding, C. (2008) 'An exploratory investigation of an integrated contingency model of strategic management accounting,' *Accounting, Organizations and Society*, 33(7-8), 836-863.

Cadez, S. and Guilding, C. (2012) 'Strategy, strategic management accounting and performance: A configurational analysis,' *Industrial Management and Data Systems*, 112(3), 484-501.

Gond, J. P., Grubnic, S., Herzig, C. and Moon, J. (2012) 'Configuring management control systems: Theorizing the integration of strategy and sustainability,' *Management Accounting Research*, 23(3), 205-223.

Guilding, C., Cravens, K. S. and Tayles, M. (2000) 'An international comparison of strategic management accounting practices,' *Management Accounting Research*, 11(1), 113-135.

Kouhy, R. and Vedd, R. (2000) 'Performance measurement in strategic human resource management,' *International Journal of Business Performance Management*, 2(1-3), 137-156.

Král, B. and Šoljaková, L. (2016) 'Development of controllers' professional competence: the case of Czech Republic,' *Economics & Sociology*, 9(1), 86-100.

Langfield-Smith, K. (2008) 'Strategic management accounting: How far have we come in 25 years?' *Accounting, Auditing and Accountability Journal*, 21(2), 204-228.

Lapsley, I. and Rekers, J. V. (2017) 'The relevance of strategic management accounting to popular culture: The world of West End Musicals,' *Management Accounting Research*, 35, 47-55.

Lord, B. R. (1996) 'Strategic management accounting: The emperor's new clothes?' *Management Accounting Research*, 7(3), 347-366.

Lukka, K. and Vinnari, E. (2014) 'Domain theory and method theory in management accounting research,' *Accounting Auditing & Accountability Journal*, 27(8), 1308-1338.

Ma, Y. and Tayles, M. (2009) 'On the emergence of strategic management accounting: An institutional perspective,' *Accounting and Business Research*, 39(5), 473-495.

McLean, T. and McGovern, T. (2017) 'Costing for strategy development and analysis in an emerging industry: The Newcastle Upon Tyne Electric Supply Company, 1889–1914,' *British Accounting Review*, 49(3), 294-315.

McManus, L. (2013) 'Customer accounting and marketing performance measures in the hotel industry: Evidence from Australia,' *International Journal of Hospitality Management*, 33(1), 140-152.

McManus, L. and Guilding, C. (2008) 'Exploring the potential of customer accounting: A synthesis of the accounting and marketing literatures,' *Journal of Marketing Management*, 24(7-8), 771-795.

Nixon, B. and Burns, J. (2012) 'The paradox of strategic management accounting,' *Management Accounting Research*, 23(4), 229-244.

Otley, D. (2016) 'The contingency theory of management accounting and control: 1980-2014,' *Management Accounting Research*, 31, 45-62.

Pavlatos, O. (2015) 'An empirical investigation of strategic management accounting in hotels,' *International Journal of Contemporary Hospitality Management*, 27(5), 756-767.

Rangone, A. (1997) 'Linking organizational effectiveness, key success factors and performance measures: An analytical framework,' *Management Accounting Research*, 8(2), 207-219.

Ratnatunga, J. T. D. and Balachandran, K. R. (2009) 'Carbon business accounting: The impact of global warming on the cost and management accounting profession,' *Journal of Accounting, Auditing and Finance*, 24(2), 333-355.

Roslender, R. and Hart, S. J. (2002) 'Integrating management accounting and marketing in the pursuit of competitive advantage: The case for strategic management accounting,' *Critical Perspectives on Accounting*, 13(2), 255-277.

Roslender, R. and Hart, S. J. (2010) 'Taking the customer into account: Transcending the construction of the customer through the promotion of self-accounting,' *Critical Perspectives on Accounting*, 21(8), 739-753.

Samudhram, A., Shanmugam, B. and Teng Low, K. L. (2008) 'Valuing human resources: An analytical framework,' *Journal of Intellectual Capital*, 9(4), 655-667.

Seal, W. (2006) 'Management accounting and corporate governance: An institutional interpretation of the agency problem,' *Management Accounting Research*, 17(4), 389-408.

Seal, W. (2010) 'Managerial discourse and the link between theory and practice: From ROI to value-based management,' *Management Accounting Research*, 21(2), 95-109.

Simmonds, K. (1981) 'Strategic management accounting,' *Management Accounting*, 59, 26-29.

Simmonds, K. (1982) 'Strategic Management Accounting for Pricing: A Case Example,' *Accounting and Business Research*, 12(47), 206-214.

Simmonds, K. (1992) 'Broadening management accounting education: More theory, more practicality,' *Accounting Education*, 1(1), 47-54.

Spicer, B. H. (1992) 'The resurgence of cost and management accounting: a review of some recent developments in practice, theories and case research methods,' *Management Accounting Research*, 3(1), 1-37.

Šiška, L. (2016) 'The contingency factors affecting management accounting in Czech companies,' *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 64(4), 1383-1392.

Šiška, L. (2017) 'Comparing CB-SEM and PLS-SEM: A case showing management accounting impact on performance,' *Polish Journal of Management Studies*, 15(2), 240-249.

Vedd, R. and Kouhy, R. (2001) 'Management accounting and strategic human resource management: A UK/Canadian comparative analysis,' *Journal of Applied Accounting Research*, 6(2), 90-120.

Wagner, J. (2014) 'Performance management and measurement research in the Czech Republic: 1993-2013,' IDIMT-2014: Networking Societies - Cooperation and Conflict, 43, 303-311.

Wolf, S., Weißenberger, B. E., Wehner, M. C. and Kabst, R. (2015) 'Controllers as business partners in managerial decision-making: Attitude, subjective norm, and internal improvements,' *Journal of Accounting and Organizational Change*, 11(1), 24-46.

Globalization as the Engine of Economic and Social Evolution

Brăileanu Artur Lucian, PhD candidate
Bucharest University of Economic Studies, Romania

Abbasov Rashad, PhD candidate[1]
Bucharest University of Economic Studies, Romania

Abstract

This research paper represents a short study on what globalization offered us as main ignitor of growth and advancement. Surpassing social situation like the end of the Cold War and the latest economic crisis represents a self-fulfilling mechanism regarding where the global economy should position itself, but also where it should be headed to. We also try to highlight both sides on global level, the rich with the poor could come together and create a better and a more feasible for the perfectly developed globalization process.

Introduction

In the late 2000s in Europe there were signs of slow, but steady growth of the economy with a percentage variation of 0.9-1.6%, which has led many analysts to reach one conclusion: Europe was entering a recession cycle.

In Western and Central Europe in 1989 and 1990 revolutions were the greatest economic and social threat, but since then Europe started growing and growing as never seen before and also an extensive scale. It was thought that growth was a result of the end of the Cold War and because the Russian Federation wasn't almighty as then.

Globalization = Evolution

Globalization is economically speaking a system of interaction between all countries in order to develop the global economy. It's actually the desire to create a single government in a global soft dictatorship which is called in some scientific literature as "A New World Order". Globalization refers to the integration of the economy and societies on a global scale because they all function as a whole. It is not yet a definitive process, but certainly in the near future it will succeed in achieving this role (Bodislav, et al., 2014). Therefore, exchanges involve economic, technological and political breakthroughs these are part of the utmost advances in communication, transportation and infrastructure, and the final output is how they influence the economy and the standard of living for average citizens.

It is absolutely vital to consider that the agents in the foreground of the global economy are large multinationals, both financial and non-financial established in most countries, whose objective is to increase trade and create capital transfer integration between regions and markets worldwide. These being said, we can add that globalization represents normality and unfortunately irreversible and any country that is "thoroughly preparing for the future" it must face the process of growth and interdependence of markets that are connected at social, economic and functional level (Bodislav, 2015).

A very important aspect of the globalization of the world economy is the multitude of economic agents that are competitors, but in the same they empower each other on the idea of sustainable growth. It is the one that ensures the chances of all economic entrepreneurs to assert the maximum market potential, the motivation and performance based on the principle of justification and awareness. The principle of competition, all the elements needed for cohesion and the result of

[1] Email corresponding author: ase@infinitumgroup.com

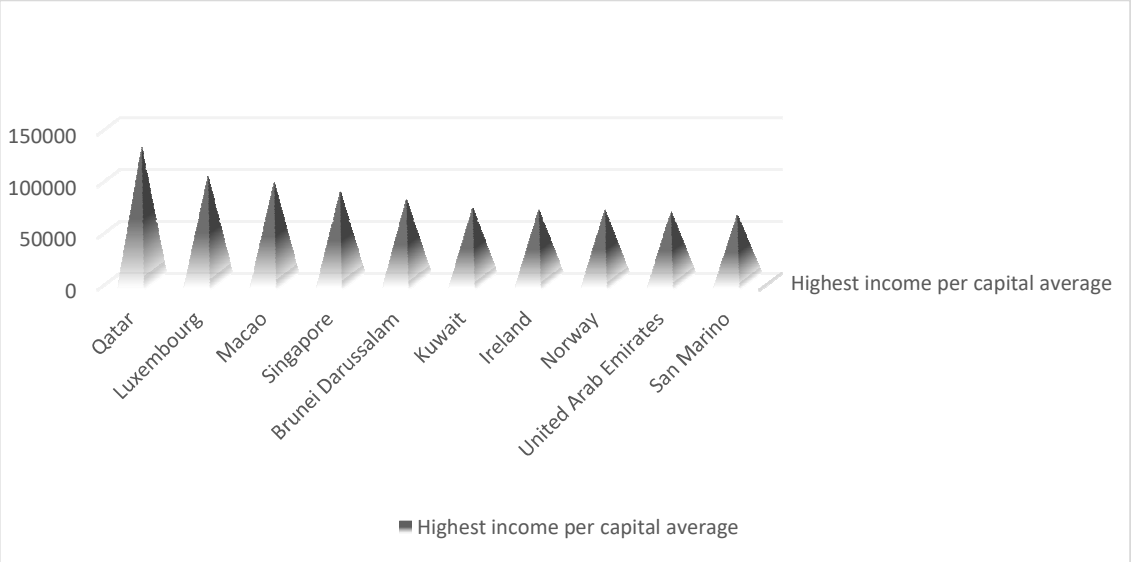
adjustments and their relatively similar environmental conditions actually builds the ecosystem that supports the meaning of globalization.
In most cases, specifically those where countries are already developed and maintain the national standard and sovereign perspective is assumed and most of the time confirmed to have a higher potential in solving large problems. On the other side of the deal, there are a large number poor and developing countries that cannot handle macroeconomic problems and need financial and social support, that is topped with advanced know how on the macroeconomic issue they have. In this context, it is necessary that a new organizational structure of the state should be created and having as a result creating a more focused organization of state power (Bodislav, 2011).

Many analysts noticed dramatic increase of capital movements in the global economy over the last thirty years, but most of those capital movements are only seen through banks and only between them. Meanwhile, they noted the growing share of private capital in financing the deficit of states that have developing or poor economies.

If these figures are beyond doubt, other events - such as financial crises that have so deeply worsened in recent years - require a more detailed review of the international financial system. This translates into a fundamental weakness of the international financial system, which calls for a response from those who have the prerogatives to construct the institutional arrangements that govern the system.

Specifically, the national economy is losing its role in international economic relations even at national level, based on national reports that are irrelevant to a scale so small, so they become a spectator of the game created by financially and politically powerful states in their own film.

Figure 1: Top 10 countries with the highest income per capita average



Source: Global Finance Magazine, 2017

The graph above represents a top of 10 countries in the world with the highest per capita income. As you know, Qatar is one of the richest countries in the world, and according to the World Bank, in 2017 it tops the world's first-place for income per capita average.

On the contrary, according to Global Finance Magazine, the Central African Republic is the poorest country in the world with $ 656 per capita. All 10 states exemplified in the above table all belong African continent, the poorest continent from macroeconomic perspective, especially if we look at the population's support capacity, including per capita income.

Table 1: Top 10 countries with the lowest income per capita average

No.	Country	Income per capita
1.	Central African Republic	656 $
2.	Democratic Republic of Congo	784 $
3.	Burundi	818 $
4.	Liberia	882 $
5.	Niger	1113 $
6.	Malawi	1139$
7.	Mozambique	1228 $
8.	Guinea	1271 $
9.	Eritrea	1321 $
10.	Madagascar	1504 $

Source: Global Finance Magazine, 2017

Conclusions

The globalization phenomenon causes extraordinary development for already overdeveloped economies. Developing economies are losing momentum and sometimes they even regress compared with advanced economies. States lose their national identity, especially medium and small regions that are ethnically diversified, and they also become part of a leading heavy dispute between local and national administrations, especially if their economy is in full regression.

Daily life in Europe and North America, continents that have a high rate of development that mainly influences the birth rate, causing people to focus their efforts towards economic development and searching for a better career path, and not following the procreation side.

The global climate will suffer very much in the next 50-100 years. The effect of the greenhouse gasses causes the appearance of extremely hot summers that are dry with temperatures of 40 degrees centigrade, accelerate the melting of glaciers and accentuate pollution of the fauna and mountain areas.

In countries like China or India there will be measures to reduce population, these measures will have a devastating effect in developed areas, while in poor areas will have no effect and there it will continue alarming increase in population.

Industrialization measures are applied, but in the future, they will be amplified until the majority of state-owned institutions will have to make a significant contribution to GDP and will pass into private ownership or they will bankrupt if they cannot comply with the future economic, social and technological evolution (Bran, et al., 2014). At each country level, the waste dumps that need to be discarded and the quantities that have to be recycled should be imposed by legislation to stop at least a small percentage of the environmental pollution that will accelerate in the same time with consumption.

References

1. Bodislav, D.A. (2015). The impact of privatization on regulated energy markets: a Great Britain's case study in industrial ecology, Progress in Industrial Ecology, vol. 9, no. 1, pp. 13-18.
2. Bodislav, D.A. (2011). The crisis of the economic evolution, Revista Economică, vol. 55, no. 2, pp. 67-71.
3. Bodislav, D.A., Bran, F., Iovițu, M. (2014). A review of globalization process, Review of International Comparative Management, vol. 16, no. 4, pp. 471-478.

4. Bran, F., Bodislav, D.A., Rădulescu, C.V., Ioan, I. (2014). Corporate Governance intervention for a sustainable model, Revista de Cercetare și Intervenție Socială, no. 46, pp. 216-226.
5. *** Global Finance Magazin Data set – available online at: https://www.gfmag.com/global-data/economic-data/worlds-richest-and-poorest-countries

The Pre-EU Democratic Enlargement Process – A Chronological Review

Brăileanu Artur Lucian, PhD candidate
Bucharest University of Economic Studies, Romania

Abbasov Rashad, PhD candidate[1]
Bucharest University of Economic Studies, Romania

Abstract

This paper represents a chronological insight on the process of how the European Union was designed and it developed from a secondary idea to a fully grown economic, political and social entity that is still fully functional and also tries to expand its reigns in the entire region. The research tries to highlight the global process based on the shift of power from the US to the pre-EU entity with the idea to dilute the Soviet Union's power in the region.

Introduction

Every year, the President of the European Commission gives a political speech on the state of the union. Every year, the political guarantee of Brussels for respecting the fundamental values of the European Union is repeated. Fundamental values represent the reaison d'etre for the European Commission's policies and functioning of the common market either domestic or foreign and key warrant for the enlargement policy. EU is not a political actor, but it is totally pragmatic in political decision making (Elgstrom, Smith, 2006, pp. 52-53) and is being influenced by a set of values.

The View on Doctrine Efficiency

We could develop a parallel to US foreign policy in the cold war, particularly in the office of the presidential adviser on national security Henry Kissinger (Lewis, 1975). The Kissinger Doctrine is seen as one fully pragmatic. For example, by supporting the US coup in Chile in 1973, the undemocratic regime of the military junta led by Augosto Pinochet removed the Marxist presidency of Salvador Allende, who democratically elected. According to Henry Kissinger explains the situation - "I do not think it should be standing [as a concept] still when a country is likely to adopt communism because of the irresponsibility of its own people." The United States thus supported a regime with different values from the state's point of view. The decision can be considered pragmatic and important for US security at the time of the Cold War peak.

Returning to the European Union as a global political actor, the EU is not fully associated with this kind of blind pragmatism. Values considered by domestic politics and external factors (European Commission, 2007), aren't defined in the Lisbon Treaty with a constitutional role, thus offering a guarantee to political outcomes developed by EU's actions. The fundamental values in its current form are respect for human dignity, human rights, freedom, democracy, equality and the rule of law. These are the values of a liberal democracy.

They are also addressing the dynamics of EU enlargement. Enlargement also means deepening EU trade – reaching especially the periphery, those from the periphery being trading partners that wish to have such a deepening of relations in the spectrum of expansion (Nottenbaum, 2012, pp. 237-238), Brussels requires that the rules imposed by its ruling bodies in areas such as human rights or democracy, good governance, creating policies, and other norms should take into account fundamental values. To do business with Brussels means to respect your will that has to be in line with all other 28 (27 after finalizing the BREXIT process) members of the EU. Most of the co-

[1] Email corresponding author: ase@infinitumgroup.com

operation brings limited benefits to the European counterpart. Access to the common market in view of its size is much more important to external partners, due to the much lower GDP they have, but being covered by the huge potential.

The European Union ascribes such a soft-power role by preaching global values that are close and guided by its own set of values. The accession of a given country, not represents only a deepening of economic relations, but is also a guarantor of accession for companies to these values which are indisputable (European Commission, 2007). This is enshrined in the Treaty of Lisbon in Article 49. where it is stipulated concisely that any joining to the block means acquiring the fundamental values by the new members. The EU is a place of liberal democracies and so a club where membership requires this as mandatory statute. Thus, in this part of the paper we ask ourselves the question of the origin of this strong emphasis on respect for values, either in domestic or foreign policy. The set of values is at the heart of the construction of the European Union. At the time of the end of the Second World War, Europe was in economic collapse, dependent on the Marshall Plan for Reconstruction. As a reaction, the voice of the visionaries of a united Europe is in the first political scene, making the first concrete steps that the European Union has made as standalone united entity, but the foundation of these post-war events has its place in the European inter-war period, before the extreme nationalism was abolished by the economic austerity of the period.

The Coudenhove-Kalergi view on united Europe

Accredited as the most influential thinking at the time there was European unionism, which establishes the actual run-up of the ideology of the European Union, is Richard von Coudenhove-Kalergi (Boer, et al., 2014, pp. 70-100), an Austrian-Hungarian intellectual. His ideas about a united and powerful Pan-Europe, was published in 1923. Given the dynamics of European history, defined as the timeliness of World War I that was known as framework for future wars. A first reference to security was done in the concept of reaching somehow the reality of war that had operated continuously back then, and remained in the memoirs of the time, as the Balkanization of Europe. The Balkanization represents the fragmentation as a whole in terms of state after the disintegration of the Ottoman Empire, the Austro-Hungarian Empire in the Balkans, a transition that was only possible through a violent process. The Balkan War started in 1914, had the effect of a disintegrating war and defocused the balance of power on a scale inconceivably destructive. If in the early stages of the war, it was glorified as reality in the trenches there were huge costs incurred by all the powers involved in the war and it had shaken the public view on understanding the need to separate war from the European civilization. Coudenhove-Kalergi was among the most vocal addressing this issue. Analyzing his life we could state that he is also understood part of this current of thinking of the united path for Europe. Being born in an aristocratic family rooted in most of the nations of Europe, with a diplomat father with an impressive knowledge in 16 foreign languages, and with a mother of Japanese origin, the young aristocrat was accustomed from an early age to a style of multicultural and multilingual life. It was said he was against the currents of pan-Slavism, pan-Germanism and anti-Semitic and even declared as the antithesis of Adolf Hitler, having an opposite set of values (Levy, 2007, pp. 30-50). His strong voice in the ideas of unionism and pacifism attracted a whole generation of personalities from the public space that resonated with him. He grabbed the spotlight and influenced the public opinion and has gained support from the intellectual elite of the time, among them Thomas Mann, Sigmund Freud, Albert Einstein.

Coudenhove-Kalergi noticed the non-sense and paradigm of play with a negative amount in this extreme case of Europe's conflicts. In his book, Pan-Europe, he pursues for the idealistic goal of a Union of the European States, considering Europe as having only an alternative between "integration and collapse". The fear of a subsequent war was vivid from its perspective and the consequences of this economic collapse would have occurred in the fall of Europe under American influence and the Soviet pressure, which was then growing as politically influential in the world powers (Boer et al., 2014, pp. 70-100). Pragmatically, the rationale points to the fact that if Europe wants to survive it must adhere to the set of indigenous values of European society, the one that divested from war, those of a liberal democracy. It is a prospect of the survival of European hegemony in a new geopolitical framework with a strong communist risk that eventually manifest itself in the Western

countries through the communist vocal factions at that time. Idealism was based on European security, but also presupposed integration economic, being an understanding of the fact that interdependence decreases the risk of wars. Economist John Maynard Keynes was among those who argued positively on this direction. In addition, according to his reasoning, interdependence would have been unattainable without solidarity and reaching sustainable welfare (Vujacic, 2016, pp. 61-85).

Returning to Kalergi role to influence public opinion remained without wide effect because Pan-Europe would not be affected by political levers. Many of the interwar and much more important post-belligerents of Western Europe were linked in views and ideology to Pan-Europe. Coudenhove-Kalergi was most often recognized due to the social circles he mingled with, before Pan-Europe book-manifesto, he was known for the friendship with Czechoslovak President Tomáš Masaryk. After publishing the book, Coudenhove-Kalergi founded the Pan-European Union Association. Konrad Adenaur, the post-war German Chancellor, at that time being the mayor of Cologne or Bruno Kreisky, the future Chancellor of Austria, were members of the association. Other members who were at the beginning of their political careers were adhering to the concept, like Alcide de Gasperi, the future prime minister of Italy's post-war era, between 1945 and 1953, Robert Schuman, the future French prime minister in the post-war era and Henry Spaak, the next prime minister Belgian in the post-war era and political initiator of the first form of the European Union, the European Economic Community, EEC. Thus Pan-Europe was a resource that would only be monetized after the Second World War with the coming of power of all these political personalities. In hindsight, it can be compared to a nursery, a nursery of the European project (Kullberg, 2001).

Inter-war French Prime Minister Arstide Briand becomes the supporter of the idea and takes over Pan-Europe's presidency, being among the few politicians in power at that time acting as the direct proponent of the idea. Presidency relates to the lobby Coudenhove-Kalergi made on the first transnational political scene for his idea of a united Europe (Kullberg, 2001). This is also the only concrete political step in the interwar period in this direction. In his speech of September 5, 1923 from the League of Nations, the UN precursor, the League of Nations proposed the idea of a European federation of nations. Economic prosperity through cooperation of the great powers, former combatants, was placed in the foreground**.** Again, it is argued that the united Europe will solve the problem of economic war and thus allelic security. The League of Nations would ask Briand to submit a memorandum outlining how this new form of federal cooperation would look like. The Memorandum - The organization of a European Union Federal System is presented in 1930, but the steps of inter-war European diplomacy stop here largely due to the fact that most states did not want to diminish their sovereignty. It was a visionary idea that could not be implemented at that time, even with the creation of a common market economic approach that could have been revolutionary for that era (Britannica, 2016). In addition, the Great Economic Crisis (1929-1933) ignited and the emergence of fascism stopped European idealism, especially since the French initiative no longer had a viable partner in Germany where the Nazi regime is established.

After World War II, Europe is again destroyed and weakened, but although the political scenes of the Western countries were fragmented, all post-war governments shared a consensus on the need for European integration. As discussed above, young Pan-Europa members were key elements to its success. Their desire was to create a framework for cooperation on everything, framework that represented then the idea of Western cooperation (Horber, 2006, pp. 340-345).

We also highlight the fact that there was strong interest from the United States in the idea of rebuilding Europe, because of their desire to transform Western Europe and to act as a buffer zone to the Soviet Union’s sphere of influence. A united and strong Europe was wanted by American foreign policy. Thus, the Marshall Plan pumped capital required for European reconstruction, this being an amount representing 6.25% of the American GDP since 1947 (de Boer-Ashworth, 2000, pp. 35-40). The European communitarian cooperation ignited in 1947 through the Organization for European Economic Cooperation (OEEC), a body created to coordinate the Marshall Plan (Canada and the United States were members of this body - Berend, 2016, pp.34-34). Solidifying continental

Europe's economic cooperation included also resource allocation in the plan, it was hoped that the American way would have catalyzed a dynamic much closer for cooperation, even federalist like (Smith, 2017, pp. 8-12). The Truman Doctrine was one so aware on the risk of return of autocracy in terms of economic collapse, that the United States wanted to reinforce Western Europe also from a security point of view (Berend, 2009).

Conclusion

The cooperative framework developed through the Pan-Europe venture was the main way to resolve rivalries and create a framework at European level. The legitimisation of liberal democracy is viewed through the perspective of historical antagonism, against the dynamics of old European conflicts. There is an entire consensus to disengage from the extreme right-wing political spectrum that has caused the misfortune of the war and, as such, its values of excessive nationalism that resulted also in isolationism. Liberal democracy was pioneering the West and was exercised in six states by that were members of the initial EU and had strengthened after the two world wars, but it lost ground to the populist wave that bare regimes in Germany, Italy, Spain and Portugal. It was the paradigm of it is acknowledged, it didn't exist and the collective mindset had come to a new understanding of this concept. For example, younger generations born in the post-war era in Germany could not understand how the elderly gave the reins of power and freedom in the hands of the Nazi regime (Horber, 2006, pp. 325-327).

Historical antagonism is joined by the contextual one. Weather geopolitical context of repeated wars, rising global power of the United States of America transformed Europeans as part of an antagonistic communist world mainly due to various communist factions that covered European parliaments as well as in France or the loss of East Germany into Moscow's sphere of influence. This rivalry between ideologies would strengthen the free world and its reasons in enabling the overview on common problems of data security by the Cold War. The dynamics can be related to the theory of Karl Deutsch's security zones, which concerned that the European project and the entire transatlantic alliance where by themselves the first objective of security (Griffiths, Roach, 2009, pp. 68-71). From the point of view of settling historical rivalries, through the set of common values, it acted as an adhesive for the community and in terms of external threats, given the homogeneity of the group was to act effectively against geopolitical security concerns and empower the most efficient global alliance, NATO and the commercial alliance between the US and EU.

References

1. Berend, I.T. (2009) „From the Soviet Bloc to the European Union-The Economic and Social Transformation of Central and Eastern Europe since 1973", Cambridge: Cambridge University Press.

2. Berend, I.T. (2016) „The History of European Integration: A new perspective", New York: Routledge.

3. Boer, P., Bugge, P., Waever, O. (2014) „The history of the idea of Europe", New York: Routledge.

4. Briney, A. „What is Balkanization? An Overview of Balkanization", available online at https://www.thoughtco.com/what-is-balkanization-1435451

5. European Commission (2007) „Treaty of Lisbon amending the Treaty on European Union and the Treaty establishing the European Community", available online at http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A12007L%2FTXT

6. de Boer-Ashworth, E. (2000) „The Global Political Economy and Post-1989 Change: The Place of the Central European Transition", London: Palgrave Macmillan.

7. Elgström, O. & Smith, M. (2006) The European Union's Roles in International Politics: Concepts and Analysis, New York: Routledge/ECPR.

8. Encyclopædia Britannica (2016) „European Society And Culture Since 1914", available online at https://www.britannica.com/topic/history-of-Europe/European-society-and-culture-since-1914#ref311367

9. Griffiths, M. & Roach, S. C. (2009) „Fifty Key Thinkers in International Relations", New York: Routledge.

10. Hörber, T. (2006) „The Foundations of Europe-European Integration Ideas in France, Germany and Britain in the 1950s", VS Verlag für Sozialwissenschaften.

11. Kullberg, K, A. (2001) „The Righteous Man's Burden - Paneuropean Vision and its Sense of Morality in Interwar and Present European Context", The Eurasian Politician - Issue 4

12. Levy, J. (2007) The Intermarium: Wilson, Madison, & East Central European Federalism, Universal-Publishers.

13. Lewis, A. (1975) „The Kissinger Doctrine", disponibil on-line la http://www.nytimes.com/1975/02/27/archives/the-kissinger-doctrine.html?_r=0

14. Nottebaum, D. (2012) „A Power Through Trade? The European Union and Democracy Promotion in ACP States", Power in the 21st Century, vol. Global Power Shift, Berlin: Springer Berlin Heidelberg.

15. Șerban, A. „Richard von Coudenhove-Kalergi, părintele Europei unite", disponibil on-line la https://www.historia.ro/sectiune/general/articol/richard-von-coudenhove-kalergi-parintele-europei-unite

16. Smith, J. (2017) „The UK's Journeys into and out of the EU: Destinations Unknown", New York: Routledge.

17. Vujačić, I. (2016) „Europe's Future - The Relevance of Keynes's Economic Consequences of the Peace", PANOECONOMICUS, 2016, Vol. 63, Issue 1, pp. 61-85.

L'inertie Organisationnelle, Force Conservatrice Contre L'innovation

Azzaz Fatima Ezzahra, Doctorante à L' ENCG Tanger, Groupe de Recherche « GREMSI », Université Abdelmalek Essaadi, Maroc, E-mail :azzazfa@gmail.com

Salahddine Abdelouhab, Professeur Chercheur à L'ENCG Tanger, Groupe de Recherche « GREMSI », Université Abdelmalek Essaadi, Maroc, E-mail :salahddine@hotmail.com

Résumé

Les organisations opèrent, aujourd'hui, dans un monde où la technologie n'est plus une option. Elles doivent y investir massivement, si elles veulent prospérer et maintenir un avantage concurrentiel. "Like air and drinking water, being digital will be noticed by its absence, not its presence".
D'un côté, la technologie de l'information est destinée à servir la compétitivité et l'agilité des organisations. D'un autre côté, l'adoption de tels artefacts rigidifient les pratiques organisationnelles. Cette rigidité peut être considérée comme une inertie. C'est une épée à double tranchants : elle est à la fois nécessaire pour l'efficacité organisationnelle et génératrice de résistance au changement. Des forces conservatrices puissantes s'emploient à empêcher les organisations de mettre en œuvre des changements organisationnels, même si de tels changements amélioreraient nettement la performance. La vérité est que les organisations ne changent que difficilement.
L'étude de l'inertie soulève une panoplie d'interrogations, et constitue une préoccupation de plusieurs disciplines ; la sociologie, la psychologie cognitive, des sciences politiques, des sciences physiques … dans le but de comprendre davantage ce phénomène. L'analyse en profondeur de ces interrogations est l'objectif de cet article

Mots clés : inertie organisationnelle, forces conservatrices, changement, technologie, innovation

Introduction

Plusieurs secteurs, à l'instar du secteur des technologies de l'information et de communication, ont pris un essor considérable, offrant d'importantes opportunités de croissance pour les entreprises .Profiter de cet essor suppose une capacité à dépasser les freins aux changements, entre autre l'inertie organisationnelle.

Les TIC constituent une préoccupation majeure pour l'organisation et déterminent en partie la compétitivité et l'efficacité de cette dernière. Cependant, l'usage de la TIC diffère d'une organisation à une autre. Ayant à faire face à des technologies peu familières qui avancent à un rythme accéléré et non maitrisé, les organisations éprouvent des difficultés à réussir leurs intégration et par là l'aboutissement du changement programmé.

La technologie est une source de changement organisationnel dont on ne peut prédire la forme (Markus 1988). Dans ce sens, la pratique nous témoigne de multiples cas d'échec et de réussite. Le désalignement de l'objectif initial de l'intégration de la technologie nous pousse à s'interroger sur l'effet de l'inertie organisationnelle.

Une controverse théorique divise l'impact de la technologie en trois voies. Le déterminisme technologique confère à la technologie une capacité structurante. Le déterminisme organisationnel reconnait à la fois les capacités structurantes des technologies et le rôle du contexte social dans un processus de coévolution .Le courant d'émergence précise que l'utilisation et les effets TIC émergent de manière imprévisible des interactions homme artefact. Robert REIX (2003) met en lumière les effets modérés par le contexte organisationnel et l'incertitude des effets attendus de la technologie.

A cet effet, la préparation de l'organisation pour faire un bon usage de la technologie est à la fois un processus complexe et continu. Il est complexe parce qu'il est influencé par un ensemble de variables sociotechniques dont le comportement et les interactions ne sont pas bien compris. Il est continu en raison des changements imprévisibles et consécutifs de l'environnement.

Les périodes de changement sont souvent perçues comme inhabituelles et douloureuses. Elles sont décrites comme des périodes de transition. L'innovation est généralement considérée comme une contradiction de l'inertie. Et bien qu'il y ait beaucoup à dire en faveur de ce phénomène, il semble qu'il ait été scrupuleusement théorisé. Il parait que l'inertie soit considérée par de nombreux théoriciens et praticiens comme un mal qui doit être surmonté. Ainsi, comme le prévoit Schumpeter (1987) pour réussir on pense que les innovations doivent détruire ou au moins surmonter l'inertie.

Les organisations investissent dans les technologies d'information pour atteindre un état souhaité, sauf que les résultats diffèrent amplement. Il faut dire d'emblée que, les organisations éprouvent un moment d'inertie qui diffère en termes de temps et des caractéristiques intrinsèques et extrinsèques de chaque entité. Il en découle plusieurs interrogations : « pourquoi les investissements en TIC ne mènent pas toujours vers les résultats espérées ? » « Dans quelle mesure l'inertie participe à cet échec?» « En quoi consiste cette inertie et quelles sont ses interactions avec les TIC ?"

Ce présent article traitera ce phénomène en deux parties, la première partie sera consacrée aux définitions de l'inertie organisationnelle et un recensement des différentes causes, relevées par la théorie, de cette inertie. La dernière partie sera subdivisée, en trois sous parties : la première traitera l'inertie structurelle, en second lieu l'inertie sociale ou politique et la dernière portera sur l'inertie liée à l'apprentissage.

Première partie : Généralités sur l'inertie organisationnelle

Une revue de littérature nous a permis de dégager un certain nombre de définitions de l'inertie organisationnelle et de déterminer ses principales causes.

Trois grandes catégories sont à retenir selon le niveau d'analyse. Au niveau micro il s'agit de toutes les études portantes sur la probabilité que les individus continuent à utiliser les technologies existantes par rapport aux alternatives nouvellement introduites. Au niveau macro on retrouve les études examinant l'incapacité des systèmes organisationnels à s'adapter aux changements de l'environnement externe pour des raisons d'efficience et d'efficacité .Et enfin, au niveau méso il y a toutes les études combinant une perspective micro et macro. Peu de ces études vont au-delà de la simple prise en compte de la dynamique micro- et macro en parallèle et relient la dynamique d'un niveau à l'autre et étudient leurs interrelations.

D'un niveau à un autre, l'accent est mis sur différents aspects de l'inertie. Il s'ensuit des définitions différentes de l'inertie organisationnelle.

a. Définitions de l'inertie organisationnelle

Bien que l'étude de l'inertie soit un thème populaire dans la littérature, il reste globalement peu développé et peu opérationnalisé. Ceci est d'autant plus vrai, lorsque l'inertie est assimilée à la résistance au changement. Nous contestons ce point de vue. Une réduction qui fait perdre à cette notion d'inertie toute la richesse qu'elle renferme. L'objet de ce travail est d'approfondir la réflexion sur cette notion et toutes les implications qu'elle pourra avoir sur l'évolution des organisations.

Si l'inertie est censée être plus qu'un synonyme de résistance au changement, existe –t-il un cadre théorique plus large permettant de mieux comprendre la nature, les causes et les conséquences de l'inertie organisationnelle.

Une première piste de recherche est d'étudier cette notion d'inertie dans le cadre des sciences physiques, en particulier la mécanique, et de voir dans quelle mesure les apports de ce domaine permettent ils de comprendre le changement organisationnel.
En sciences physiques, l'inertie est un concept qui dénote la résistance à un objet qui tend à changer dans un état de mouvement. Autrement dit, l'inertie se réfère à toute obstruction ou entrave d'un objet en mouvement (Voigt 1901, Liao 2002).
Une deuxième piste de recherche est représentée par la théorie de l'écologie de population. Selon cette école l'inertie se manifeste lorsque «la vitesse de réorganisation est beaucoup plus faible que la vitesse à laquelle les conditions environnementales changent». Dans ce cadre Hannan et Freeman (1984) supposent la taille, l'âge et la complexité de l'organisation comme des déterminants de ce qu'ils appellent l'inertie structurelle.

D'autres auteurs ont essayé de leur coté de clarifier cette notion d'inertie. Tout d'abord, Miller présente l'inertie comme « la lenteur d'une organisation à répondre aux évolutions de son environnement ». Il a introduit une conception déterministe et historique de l'inertie « la roche tarpéienne est proche du Capitole » autrement dit la chute peut suivre le triomphe, c'est en quelque sorte, faire sienne les orientations retenues dans le passé (*The Icarus Paradox*, 1990). De ce fait l'inertie est considérée comme un phénomène qui parcourt et affecte toutes les dimensions de la firme, en interne comme dans ses relations avec l'environnement, tant pour ses causes que pour ses manifestations, et dans une dimension historique.

De leur coté, Polites et Karahanna définissent l'inertie dans un contexte de systèmes d'information «... en tant qu'attachement et persistance de l'utilisateur à utiliser un système en place c'est-à-dire le statu quo, même s'il existe de meilleures alternatives ou incitations au changement».

Ensuite, Besson et Rowe définissent l'inertie comme « ... le degré de rigidité de l'organisation qui peut conduire à un désalignement de l'organisation par rapport à son environnement » et déterminent ainsi «... l'effort nécessaire pour préparer la transformation organisationnelle facilitée par le système d'information».

Et enfin pour Rumelt, l'inertie n'est que l'inverse de la plasticité[1]. Selon lui la signification de la rigidité : "c'est la déduction de la réactivité aux changements induit par la technologie de l'information. L'inertie est la forte persistance de la forme et de la fonction existantes. Si la forme est efficace, l'inertie est sans coûts et sans doute bénéfique. Cependant, si la forme ou les pratiques sont inefficaces, l'inertie est un problème. En effet, la preuve la plus directe de l'inertie est la persistance de formes et de pratiques inefficaces ".

Le point commun des ces définitions est la compréhension de l'inertie comme rigidité. L'inertie est vue par rapport à une référence externe comme le contexte environnemental ou les changements dans la base technologique.

En somme :

- L'inertie d'une entreprise est à considérer d'une manière relative,
- Le fait de prendre comme référence l'environnement de l'entreprise pour mesurer son inertie conduit à poser la question sur la frontière à tracer entre ce qui est son environnement et ce qui ne l'est pas.
- l'inertie n'est pas toujours négative. Elle peut être une forme d'efficience, par exemple lorsque l'organisation évite la réaction à des « bruits » éphémères du marché.

L'inertie n'est donc néfaste que lorsque se manifeste un écartement accentué entre ce que l'entreprise peut faire et ce que le marché attend d'elle, jusqu'à ce qu'un réalignement de grande ampleur restitue la situation.

[1] L'idée de plasticité réside dans "la supposition que les firmes répondent instantanément à des chocs exogènes et des changements dans les conditions de la concurrence." (1994: 3).

Ainsi, l'inertie organisationnelle prend en considération à la fois la rigidité des structures sociales et matérielles, et leurs interrelations.

L'inertie organisationnelle est considérée dans le cadre de ce travail comme une force conservatrice contre l'innovation .Dans le cas de l'implantation d'une technologie d'information et de communication, objet de notre travail de recherche, l'inertie s'exerce comme un ralentisseur ou entrave du cours normal du changement espéré. Les organisations sont affectées de manière différente en fonction de la résultante de ces deux forces. Le moment d'inertie qu'éprouvent les organisations explique en partie les cas d'échec et de réussite du changement recherché via la technologie d'information et de communication.

b. Typologie de l'inertie organisationnelle

En fait, pour faciliter la compréhension du changement organisationnel, les théoriciens distinguent plusieurs types d'inertie .On distingue entre inertie cognitive et active. Ces types ont des causes, des natures et des conséquences différentes.

Certains chercheurs ont fait valoir le micro-fondement de l'inertie cognitive des cadres supérieurs (Gavetti, 2005; Hodgkinson, 1997). D'autres précisent que, même si l'organisation peut percevoir les opportunités et les menaces, elle ne peut pas réussir la transformation en raison de son inertie active (Sull, 1999).

Ainsi, on précise que l'inertie organisationnelle peut être à la fois positive et négative sur la survie organisationnelle et sur la performance. Pour le coté positif, Hannan & Freeman(1984) précisent que dans un environnement stable et évolutif, l'inertie de la structure assure la responsabilité organisationnelle et la fiabilité, ce qui favorise la survie organisationnelle. Ces auteurs démontrent que l'organisation avec inertie peut fournir des produits et services fiables et de qualité et accroître la satisfaction des parties prenantes.

Il existe à la fois des forces externes et internes qui créent de l'inertie dans une organisation. Les forces externes représentent les obstacles aux activités d'organisation, par exemple barrières juridiques, les relations avec d'autres organisations et institutions, le changement de structure de manière radicale (Hannan & Freeman, 1984, page 149).

Les forces internes représentent les investissements spécifiques, comme l'investissement en technologie et en capital humain .Ces investissements peuvent entraîner des coûts plus importants (Hannan & Freeman, 1984, p. 149). Parmi les forces internes il y a lieu de citer également les tendances régnantes, les dynamiques et les règles normatives qui figent le mouvement de l'organisation.

Gillbet (2005) de son coté a distingué dans cette notion d'inertie entre la rigidité des ressources (échec de changement du modèle d'investissement) et la rigidité de routine (incapacité de changer le processus organisationnel). Lorsque les structures et les pratiques organisationnelles sont inefficaces, l'inertie est un problème (Rumelt, 1995). En particulier, sous un changement technique ou institutionnel radical, la grande persistance du même model organisationnel entraîne une résistance interne et empêche les organisations de s'adapter aux pressions extérieures.

En fait, il n'existe pas de raison de penser que les forces extérieures à la firme soient moins contraignantes et moins source d'inadaptation de la firme que celles qui se trouvent à l'intérieur de celle-ci. La spécificité de l'inertie concurrentielle par rapport à sa forme organisationnelle se manifeste aussi par les actions préventives différentes qu'elle implique. Alors que pour le premier cas il s'agit de changer l'allocation des ressources et de comprendre les nouvelles règles du jeu concurrentiel. Dans le second cas, il faut améliorer le fonctionnement interne de l'entreprise.

On remarquera enfin que les deux types de forces ont déjà été décrits respectivement par la littérature sur le changement organisationnel et sur la gestion de portefeuille d'activité. Le premier cas concerne

une stratégie supposée saine telle que définie par la direction, mais qui a du mal à être appliquée au sein de l'entreprise en raison des habitudes acquises individuellement et collectivement au cours des décennies précédentes (e.g. Kanter, 1983; 1989).

Dans le second cas, l'entreprise souffre d'un déséquilibre dans son portefeuille d'activités qui peut être qualifié d'obsolète, ou menacé d'obsolescence (Haspeslagh, 1982: 86-87; *Strategor*, 1993: 113-144).
Ce phénomène est pourtant devenu fondamental pour comprendre les différences de performance entre firmes dans le contexte concurrentiel actuel: "Une autre importante caractéristique du nouveau paysage concurrentiel est la capacité générale des firmes à répondre rapidement face au changement et à l'inattendu." (Bettis & Hitt, 1995: 15). La capacité de réaction des entreprises reste donc un réel problème pour les petites et grandes firmes.

c. Les causes de l'inertie organisationnelle

Miller et Chen ont déterminé six sources principales d'inertie organisationnelle:

- les erreurs d'attribution des dirigeants quant aux succès passés, dues à un phénomène d'apprentissage biaisé, ou à la croyance des dirigeants en l'importance déterminante de leur action,
- la stabilité du leadership renforcée par de bons résultats,
- les réserves accumulées grâce à un succès continu, qui peuvent permettre à une firme de retarder sa nécessaire adaptation à l'évolution de l'environnement,
- la motivation à agir,
- La connaissance des actions nécessaires et des alternatives stratégiques,
- Les contraintes à l'action managériale (Miller & Chen, 1994: 3).

Chacune de ces causes peut prendre naissance à l'intérieur de la firme comme dans son environnement.

Rumelt (1994: 6) a présenté un système de "cinq frictions" sous forme de grille rangée par ordre d'antériorité composée de cinq éléments majeurs, eux-mêmes subdivisables en sous-éléments. Une chaîne entière de phénomènes, un processus qui mène de la perception d'un problème à sa résolution dans une action collective :

- Les facteurs de type perceptuel, motivationnel,
- l'absence de réponse créative,
- les blocages politiques,
- les contradictions de l'action dans l'organisation.

Deuxième Partie : L'inertie Organisationnelle, Force Contre Le Mouvement Envisagé

Les sources d'inertie citées ci dessus ne touchent pas le vif du problème et ne constituent que des symptômes observés quand la firme souffre d'une inertie. De ce fait, il convient de décortiquer selon trois types d'inertie : structurelle, politique ou social et l'inertie liée à l'apprentissage.

Il est sans conteste que, toute organisation opère dans une sphère caractérisée par une grande incertitude et une complexité accrue. Cependant, la réaction en période de changement diffère. L'objectif de cette partie est de mieux cibler et catégoriser les variables qui bloquent le changement et qui font que l'organisation se trouve avec des résultats différentes de ce qui était précisé au début du changement.

L'inertie est aussi une forme de changement et peut-être la forme la plus commune, c'est un phénomène qui a été négligé et mal compris dans toutes les discussions sur l'innovation. Dans la compréhension de l'inertie, nous allons faire la distinction entre l'incapacité des organisations et leur réticence à changer ou à s'adapter rapidement. L'incapacité peut être comprise en termes de ressources de l'organisation, en termes de processus de décision établis et aussi en termes de leur incapacité à percevoir la possibilité ou

le besoin de changement. Le manque de volonté est lié aux intérêts acquis, aux facteurs idéologiques ou culturels et à la peur du changement.

D'une manière générale, l'inertie est l'une des conditions préalables à l'action organisationnelle, ce qui est une autre façon de dire qu'il existe une contradiction entre une forte capacité d'agir et de changer. "Résoudre le problème de l'action pose le problème du changement" (Brunsson, 1985: 9; Fligstein, 1991: 313).

1. L'inertie structurelle

Pourquoi certaines organisations peuvent-elles changer avec succès pour s'adapter à la sélection environnementale? (Dutton et Jackson, 1987; Jackson et Dutton, 1988; Staw, Sandelands, & Dutton, 1981). La perspective d'inertie structurelle (Hannan & Freeman, 1984; Larson & Lomi, 2002) fournit des informations précieuses sur le changement organisationnel et l'inertie. C'est une conséquence de la sélection organisationnelle de la population.

Dans de nombreux cas, les changements organisationnels et stratégiques qui amélioreraient les performances sont évités. Ils ne sont adoptés que lorsque l'entreprise est en crise menaçante. *Sears Roebuck and company* et *General Motors* ne sont que deux des nombreux exemples récents. General Motors a mis en place un processus de conception de produit qui n'a pas atteint les objectifs de coût et de qualité. L'entreprise a continué à perdre des parts de marché et accumulé des pertes importantes. Cependant le changement n'a eu lieu que lorsque la survie de l'organisation a été menacée.

a. L'importance des variables âge et taille

Il est bien établi dans la littérature d'écologie organisationnelle que l'organisation, se développe en termes de taille et d'âge. La résistance au changement augmente et affecte la façon dont les nouvelles idées entrepreneuriales sont absorbées (Sørensen et Stuart, 2000; Wales et al. 2011).

Les passifs de taille, liés aux structures et aux ressources, inhibent l'adaptation et le renouvellement (Aldrich et Auster, 1986; Baker et Cullen, 1993; Wales et al. 2011). En revanche, les passifs d'âge compliquent encore le renouvellement. On peut remonter aux dépendances de chemin d'organisation telles que le développement des routines organisationnelles et la socialisation des connaissances individuelles à un code organisationnel et à des liens de réseau rigides.

Premièrement, dans les grandes organisations, la taille et la complexité de l'organisation exigent une approche structurée, c'est-à-dire des niveaux supérieurs de spécialisation et de formalisation et une hiérarchie plus rigide, pour réglementer les activités organisationnelles (Ahuja et Lampert, 2001; Burgelman, 1983). Bien que les structures organisationnelles établies augmentent l'efficacité, la complexité associée à la taille rend les grandes organisations plus réticentes à changer, car cela complique la communication et la prise de décision (Aldrich et Auster, 1986, Baker et Cullen, 1993).

En outre, la théorie de l'inertie suggère fortement que les organisations plus anciennes et plus grandes seront plus prévisibles, inflexibles et comportent donc une inertie beaucoup plus élevée. Ainsi, la taille et l'âge augmentent les forces d'inertie telles que la résistance au changement (Kelly & Amburgey, 1991, p. 594). La raison en est qu'une ancienne organisation a plus de temps pour officialiser et normaliser ses routines, ses relations et créer une stabilité structurelle (Kelly & Amburgey, 1991, p. 594).

b. L'effet de l'incertitude et l'importance des couts irrécupérables

Une autre source d'inertie est l'incapacité de percevoir de nouvelles choses ou un besoin de changement. Cette incapacité réside également dans la structure de l'organisation. Il est lié à la rationalité limitée des organisations et à leurs méthodes de ce qu'on a appelé l'absorption de l'incertitude (March & Simon, 1958, cf. Perrow, 1986).

Dans une autre dimension, dans un monde de rationalité et d'attention limitée, la connaissance des choix et décisions est nécessairement incomplète. Il est souvent difficile de concevoir des alternatives au statu quo organisationnel (Hall et Taylor 1994, 15). Mais même si des modèles d'institutions (investissement, technologie, nouvelle stratégie …) alternatives sont disponibles, leurs effets sont beaucoup plus difficiles. En conséquence, tout passage d'un ancien investissement à un nouveau, implique un élément d'incertitude et de risque. Si les enjeux sont élevés et qu'il y a une certaine aversion au risque, les acteurs peuvent s'accrocher à leurs anciennes institutions, même s'ils soupçonnent qu'il existe de meilleures solutions de changement (Heiner 1983; Shepsle 1986, 75). Les établissements entraînent de gros coûts d'installation initiale. Les acteurs doivent apprendre les règles, les codes et les conventions. Ils doivent développer des compétences et des outils particuliers.

Deux courants théoriques permettent de mieux comprendre les sources d'inertie structurelle. La théorie de l'option réelle (Dixit et Pindyck, 1994), a soutenu que lorsqu'une décision d'investissement entraîne des coûts irrécupérables, il y a un coût d'opportunité supplémentaire .En mettant en œuvre la décision, qui découle de la valeur de l'option perdue de la retarder jusqu'à ce que de nouvelles informations soient disponibles.

Sous cette vision, l'inertie structurelle peut être la conséquence efficace de la tentative d'une entreprise d'éviter les coûts irrécupérables. Donc plus les coûts irrécupérables sont importants dans le changement organisationnel, plus l'inertie structurelle est grande.

c. L'effet du type de structure et des mécanismes de décision

Dans les grandes organisations, la diffusion de l'information et l'interprétation des connaissances deviennent difficiles (Child et Kieser, 1981). Les structures lourdes entravent le partage d'informations en raison de la probabilité accrue de leur vision du tunnel entre les employés (Bunderson et Boumgarden, 2010).
Les structures centralisées peuvent entraîner une inefficacité car la diffusion des connaissances entre unités est susceptible d'être erronée et en retard (Poppo, 1995; Tsai, 2002). Les structures institutionnalisées nécessitent souvent une forte implication l'administration dans la mise en œuvre du changement. Une complexité accrue de la prise de décision ralentit et complique les réactions aux initiatives entrepreneuriales, car la mise en œuvre d'un changement stratégique est convenue par plusieurs décideurs (Hannan et Freeman, 1977, 1984).
En raison de ces défis posés par les structures, les grandes organisations exigent plus de stimuli externes et plus de preuves avant de mettre en œuvre les changements requis.
La modification du nombre de couches de gestion d'une firme, à titre d'exemple, dépend du model organisationnel de cette dernière. Plus précisément, dans les firmes qui adhèrent à une organisation tayloriste, il existe une division du travail rigide, les tâches sont spécialisées, les procédures organisationnelles sont normalisées et codifiées de manière formelle. Il s'ensuit que les modifications ultérieures de l'organisation sont susceptibles d'impliquer des coûts substantiels. Nous présumons que les forces inertielles sont assez fortes dans de telles firmes que dans d'autres ayant un mécanisme de décision et une structure différente.

d. L'effet routines, mémoire organisationnelle et l'inertie de réseau

En général, le changement devient moins probable à mesure que les organisations vieillissent (Amburgey et al. 1993; Delacroix et Swaminathan, 1991, Miller et Chen, 1994).
Tout d'abord, le passif de l'âge est lié aux dépendances de la voie intra-organisationnelles liées au développement des routines (Baker et Cullen, 1993; Feldman, 2000). Parce que les routines organisationnelles et les stratégies de recherche de connaissances se développent à la suite d'actions passées, les acteurs favorisent les projets qui proposent des solutions similaires aux solutions précédemment mises en œuvre (Nelson et Winter, 1982).

Deuxièmement, les dépendances de la voie organisationnelle jouent un rôle dans le développement d'une réflexion homogène au sein des organisations. Au fil du temps, les organisations ont tendance à se

concentrer sur des questions qui maximisent le consensus et minimisent les conflits internes (Van de Ven, 1986). Bien que la socialisation à un cadre organisationnel partagé appuie souvent l'efficacité de l'organisation, elle renforce également l'homogénéité de la pensée et de la résolution de problèmes (Granovetter, 1973, Van de Ven, 1986).

Il s'ensuit que, du point de vue de l'inertie structurelle les organisations plus jeunes sont moins affectées par l'inertie du réseau

Le contenu de la mémoire organisationnelle (procédures, règles, routines et culture organisationnelle partagée) fournit une source de l'inertie (Gilbert 2005, van der Steen 2009, Naslund et Pemer 2012).
Les nouvelles organisations sont bénies d'ignorance. Ceci signifie que la mémoire crée peu d'obstacles à changer.

2. L'inertie sociale

Le deuxième onglet de notre réflexion s'intéresse à l'analyse des effets des relations internes au sein de l'organisation. A cet effet nous nous focalisons sur l'acteur et sa réaction face à un environnement incertain et complexe, ainsi qu'à l'importance des facilitateurs du changement à savoir l'effet du style de leadership.

Il est à clarifier que les acteurs ont de fortes tendances à préférer le statu quo .Il y a plusieurs raisons pour lesquelles cela pourrait être le cas. Nous n'en mentionnons que quelques-uns :

Premièrement, les acteurs ont une tendance naturelle à aimer ce qui leur est familier (Zajonc, 1968). Deuxièmement, les acteurs apprennent de l'expérience, ce qui entraîne une augmentation de leur rendement et des coûts de changement perçus. Troisièmement, les acteurs aiment leur environnement en évitant tout état inconfortable de dissonance cognitive (Festinger, 1957). La motivation à réduire la dissonance cognitive fait que les gens se considèrent comme compétents et même systématiquement surestimer leur compétence (Aronson 2007). Cela implique qu'ils vont probablement prédire leur compétence et leur satisfaction au travail se dégradent après la mise en œuvre du changement organisationnel. Quatrièmement, le changement organisationnel crée beaucoup d'incertitude. Alors que les acteurs sont généralement averses au risque. Les acteurs trouvent difficile d'imaginer ce qui n'existe pas, une tendance symbolisée par la formule de Kahneman (2011) WYSIATI "What You See Is All There Is».

Un pré requis pour surmonter l'inertie organisationnelle en général et les blocages politiques en particulier, est la présence d'un leadership efficace articulé autour d'une vision forte des conjectures de la firme et du secteur sur le long terme (Nanus, 1992).

La sous-estimation du rôle central de l'individu dans le processus de changement par le leader est la principale raison de l'échec. La base fondamentale de l'analyse est que les changements dans les règles, les politiques ou les procédures d'une organisation ouvrent de nouvelles opportunités d'influence. Au cours des réorganisations d'entreprises, les employés tentent d'affecter leur forme organisationnelle pour leur avantage. Ce qu'on qualifie d'inertie politique.

a. L'intolérance à l'incertitude

L'inertie créée par le changement est d'autant plus grande que l'on est intolérant à l'incertitude. C'est « une prédisposition à réagir négativement à une situation, un événement incertains, indépendamment de sa probabilité d'occurrence et de ses conséquences » (Ladouceur, Gosselin, & Dugas, 2000).
L'intolérance à l'incertitude se définit comme « une tendance excessive de l'individu à considérer comme inacceptables les événements incertains » alliée à un sentiment de non-contrôle de la situation.

Un ensemble de travaux menés par Chasseigne (2005) nous éclaire sur la façon dont réagissent les personnes âgée face à des situations-problèmes, complexes et pleines d'incertitude. Les schémas

habituels de connaissance et de résolution de problème restent inopérants, créant ainsi une rupture cognitive.

Dans sa communication au congrès de l'AIPTLF en 2004, H. Djazayeri sur la base de 105 témoignages souligne à quel point les changements organisationnels, sources d'incertitude, peuvent être à l'origine d'un blocage.

b. La perception du risque

Nous considérons la technologie, une source représentative d'un risque susceptible d'influencer le travail des acteurs. Nous distinguons à ce niveau trois profils au sein d'une organisation en plein changement : l'averse, le neutre et le porteur du changement. Nous présumons donc la perception du risque par les acteurs comme étant une variable majeure qui définit l'ampleur de l'inertie de chaque acteur face au changement. Pour Karnas (2000) et Panagopoulos (1993) « la prise de risque renvoie à un choix, une décision parmi plusieurs options qui peut entraîner une "perte" pour l'acteur mais dont les conséquences peuvent être des "bénéfices" également ; elle est donc indissociable de la notion de "perception du risque" et de l'évaluation des probabilités associées aux comportements possibles dans telle ou telle situation ».

Les situations risquées conduisent à mettre en oeuvre des démarches d'évaluation qui influencent les stratégies de prévention (Kouabenan, 1999 ; 2000 *b* ; Karnas, 1970, cité par Karnas, 2000). L'évaluation du risque résulte des processus divers dont la connaissance est fondamentale pour agir efficacement. Au centre de ces processus, les croyances et les processus inférentiels vont prendre une place importante. Ces dernières sont en effet inévitables à l' égard de la complexité des situations et de la multiplicité des variables en jeu. Ils prennent une importance particulière quand on sait qu'ils tendent à orienter les comportements.

L'évaluation du risque dépend non seulement des caractéristiques intrinsèques du risque, mais aussi de la croyance de l'acteur en ses capacités personnelles à y faire face et de la position qu'il occupe.
En situation d'incertitude, les représentations et les croyances permettent de compenser l'absence d'explication rationnelle et de donner un sens aux événements. Elles permettent également de faire des inférences sur les relations entre les choses et sur les possibilités de prévenir leurs effets néfastes.
L'absence d'explication et l'impossibilité d'anticipation perturbent l'équilibre psychologique de l'individu. Ces inférences permettent par conséquent à l'individu de structurer son environnement et de nourrir le sentiment de retrouver un sens de contrôle. En effet, en ces moments d'incertitude, on a besoin de croire à quelque chose ou en quelqu'un pour se persuader qu'on n'est pas livré à un sort capricieux et pour se rassurer d'où l'importance cruciale du style de leadership adoptée par l'organisation.

Généralement, les acteurs perçoivent les événements peu fréquents comme plus risqués qu'ils ne le sont en réalité (Kouabenan, 2001 *a,* Kouabenan & Cadet, 2005 ; Kouabenan, Cadet, Hermand, & Muñoz-Sastre, 2006). La perception du risque « se réfère à une idée de "contrôle" face à l'incertitude, et vraisemblablement, comme le suggèrent les travaux sur les biais cognitifs, à la certitude plus ou du contrôle que l'on exercera sur les incertitudes » (Karnas, 2000, p. 18)

Du fait même de l'incertitude que renferme le risque, son évaluation fait logiquement intervenir les représentations et les croyances. Celles-ci sont activées pour permettre à l'acteur de combler les lacunes dans la connaissance objective et de faire des hypothèses explicatives. Ces hypothèses visent à le rassurer quant au contrôle qu'il peut avoir sur son environnement.
Cependant, compte tenu de la diversité des facteurs en jeu dans les situations d'incertitude et de risque, ces représentations génèrent un certain nombre d'inférences subjectives biaisées qui tendent à guider maladroitement le comportement. Elles permettent par exemple de comprendre pourquoi des individus d'une même organisation ou d'organisations différentes réagissent différemment face à la même situation à risque.

3. Gen inertia

Le concept de « Gen inertia » (Chatterjee 2015, en presse), (Liao 2002; Wang & Yang 2013) identifie les facteurs qui entravent l'apprentissage organisationnel. On s'intéresse aux problèmes d'apprentissage organisationnel qui conduisent à une inertie différente de celle des organisations apprenantes (Liao, 2002).

L'apprentissage est un processus dynamique (Mozzato et Bitencourt 2014) vu que les connaissances sont constamment ajoutées et ou mises à jour dans les processus et les pratiques évolutifs .Ainsi, tout obstacle à l'apprentissage entraîne une inertie dans la trajectoire de connaissances. L'inertie de la connaissance décrite par Wang & Yang (2013) dans un contexte d'innovation connote une perspective comportementale qui se rapporte à des problèmes de gestion des connaissances. Ce problème empêche les acteurs de penser de façon créative. Il existe une corrélation explicite et positive entre l'apprentissage dans les organisations et la réaction des acteurs. En outre, Liao et al (2008) soulignent l'association entre l'inertie de la connaissance, l'apprentissage organisationnel et l'innovation.

Les acteurs et leurs organisations doivent apprendre et s'adapter à des environnements incertains et changeants pour suivre la vitesse des progrès technologiques (Hannan & Freeman, 1984).

L'effet de la motivation sur l'apprentissage des acteurs est revisité. Il est nécessaire d'accorder une attention particulière aux problèmes liés à la réticence des acteurs qui sont en retard sur la courbe d'apprentissage. Ce retard résulte de l'attachement des acteurs à leurs compétences, leur apprentissage, leur éducation et leur orientation. Cependant, on constate souvent que l'apprentissage n'est pas uniforme dans de nombreuses organisations: il est parfois instinctivement hétérogène: c'est-à-dire que, bien que certains employés bénéficient de l'apprentissage, d'autres n'en réussissent pas.une sorte d'inertie cognitive.

Plus précisément, beaucoup des acteurs sont tellement occupés de leurs emplois de routine, ils pensent rarement à changer leur statu quo; C'est-à-dire qu'ils s'inquiètent de perdre leur emploi actuel en raison d'une incertitude plus amusante. Certains employés croient qu'ils ont la possibilité d'aller de l'avant, mais ils trouvent leurs ambitions abandonnées dans l'obscurité. Certains d'entre eux sont inconscients des avantages de l'éducation continue et de l'apprentissage au travail. Ils acceptent donc le statu quo comme une réalité difficile.

En somme, les spécialistes de la gestion insistent beaucoup sur le raisonnement que les organisations s'efforcent de maintenir un avantage concurrentiel dans des environnements complexes et difficiles. Pour maintenir et soutenir cet avantage concurrentiel, il est évident que les organisations s'appuient sur le pouvoir et l'utilité des connaissances pour les guider dans une concurrence à bout de coups. L'innovation joue un rôle essentiel pour suivre la concurrence.

Conclusion

Lorsque les organisations entreprennent de grandes initiatives de transformation grâce à la technologie de l'information, ces efforts sont souvent entravés par l'inertie. La revue de littérature démontre que de puissantes forces conservatrices travaillent à empêcher les entreprises à mettre en œuvre des changements organisationnels, même si de tels changements amélioreraient nettement les performances. La technologie de l'information peut avoir un impact positif important : elle contribue à la flexibilité, à la plasticité de l'organisation en modifiant la nature et le rythme du travail et en aidant les entreprises à s'adapter à l'évolution des conditions du marché. Comme la technologie peut avoir des effets négatifs qui peuvent entrainer la diminution des ses performances. Des effets contradictoires peuvent se manifester et qui ne sont pas faciles à prévoir surtout lorsque l'organisation ne maitrise pas le processus de changement.

A ce titre, nous avons essayé de clarifier les variables d'inertie qui peuvent freiner le mouvement du changement et dévier l'organisation de la trajectoire qu'elle envisage emprunter le long du processus d'intégration de la technologie .Des sources qui trouvent leurs origines tant au niveau de la structure de l'organisation, de l'acteur ou du processus d'apprentissage au sein de l'organisation.

L'inertie se manifeste sous plusieurs formes (dans les routines, les ressources comme les agents sociaux et aussi la technologie) et joue à plusieurs niveaux (individuels, collectifs et organisationnels).

Conceptuellement, nous allons développer un modèle pour l'aligner sur la théorie existante. Cela inclut l'implication d'autres concepts pour décrire l'inertie .Pour opérationnaliser cette notion une étude empirique sera programmé pour comprendre les implications de l'inertie sur les visées de l'implantation des technologies de l'information et de communication.

Références Bibliographiques

- Acemoglu D. (2002), « Technical Change, Inequality and the Labor Market », Journal of Economic Literature, n° 40, pp. 7-72.
- Amburgey T.L., Kelly D., Barnett W.P. (1993), "Resetting the clock: the dynamics of organizational failure", Administrative Science Quarterly, Vol. 38, p. 51-73.

- Armenakis A., & Bedeian A. (1999). Organizational Change : A Review of Theory and Research in the 1990s. Journal of Management, 25, 3, 293-315.
- Avgerou, C. (2000), "IT and organizational change: An institutionalist perspective", Information Technology & People, Vol. 13, n°4, p. 234-262.

- Avital, M., Boland R., Cooperrider D. (Eds) (2008) Designing information and organizations with a positive lens: Advances in appreciative inquiry (Vol.2), Elsevier Science: Oxford.
- Bareil C., & Savoie A. (1999), Comprendre et mieux gérer les individus en situation de changement organisationnel. Gestion : revue internationale de gestion, 24, 3, 86-94.

- Besson P, Mahieu C (2011), "Strategizing from the Middle in Radical Change Situations: Transforming Roles to Enable Strategic Creativity", International Journal of Organizational Analysis, Vol 19, n°4. To be published.
- Besson, P. (2007), "La transformation organisationnelle" in Comités exécutifs – Voyage au coeur de la dirigeance, Bournois F. et al.. (éds.), Eyrolles, Éditions d"Organisation, Paris, p. 518 – 525.

- Bharadwaj, A., Keil, M., Mahring, M. (2009), "Effects of information technology failures on the market value of firms", The Journal of Strategic Information Systems, Vol 18, n°2, p. 66-79.
- Bloom N. et J. Van Reenen (2006), « Measuring and Explaining Management Practices Across Firms and Countries », CEPR Discussion Paper n° 5581.

- Devadoss, P., Pan, S. (2007), "Enterprise systems use : towards a structurational analysis of enterprise systems induced organizational transformation", Communication of the AIS, Vol 19, p. 352-385.
- Dubé, L. et Paré, G (1999). «Les technologies de l'information et l'organisation à l'ère du virtuel». Gestion. Volume 24, No2, Été 1999. HEC Montréal., pp. 14-22.

- Griffin, M. A., et Rafferty, E. (2004). «Dimension of transformational Leadership : Conceptual and empirical extensions». The Leadership Quarterly. Volume 15, No 3, pp. 329-354.
- Isaksson, K., & Johannson, G. (2003). Managing older employees after downsizing. Scandinavian Journal of Management, 19, 1, 1-15.

- JYL THONG (1995) « CEO Characteristics, Organizational Characteristics and Information Technology Adoption in Small Businesses »Omega, h~t. J. Mgmt Sci. Vol. 23, No. 4, pp. 429442

- Kim, H.W., Kankanhalli, A. (2009), “Investigating User Resistance to Information Systems Implementation: A Status Quo Perspective”, MIS Quarterly, Vol. 33, n°3, p. 567-582.

- Klaus, T., Blanton, J. (2010), "User resistance determinants and the psychological contracts in entreprise system implementations", European Journal of Information Systems, Vol. 19, n°6, p. 625-636.
- Lyytinen, K., Newman, M. (2008), "Explaining information systems change : a punctuated socio-technical change model", European Journal of Information Systems, Vol. 17, p. 589-613

- Paru Dans V. Perret et E. Josserand (2003), Le paradoxe : penser et gérer autrement les organisations, 253-297, Paris .
- Pentland, B. T., Feldman, M. S. (2008) “Designing Routines: On the folly of designing artifacts, while hoping for patterns of action,” Information and Organization, Vol. 18, n°4, p. 235- 250.

- RIM ZID (OCTOBRE 2006), MÉMOIRE « COMPRENDRE LE CHANGEMENT ORGANISATIONNEL À TRAVERS LES ÉMOTIONS » UNIVERSITÉ DU QUÉBEC À MONTRÉAL Service des bibliothèques.
- Rob Lambert and Joe Peppard(1993) « Information technology and new organizational forms: destination but no road map? » Journal of Strategic Information Systems Vol2 No 3 September

- Rowe Frantz, Béal Luc (1995) Réseaux de l'information et nouvelles formes d'organisation : le cas des banques. In: Annales de Géographie, t. 104, n°585-586. pp. 516-539.
- Sévane Ananian et Patrick Aubert (2006) « Travailleurs âgés, nouvelles technologies et changements organisationnels, Un réexamen à partir de l’enquête Reponse » ÉCONOMIE ET STATISTIQUE N° 397,

- Weick, K.E., Quinn, R.E. (1999), "Organizational change and development", Annual Review of Psychology, Vol.50, p. 361-386.

Bioethical Dialogue as a Method of Scientific Research Management

Tamara V. Mescheryakova, Tomsk State Pedagogical University, Tomsk, Russia,
mes-tamara@yandex.ru

Olga V. Gerasimova, Tomsk State Pedagogical University, Tomsk, Russia, okamastro@mail.ru

Abstract

The Nuremberg Code, which by rights can be called the first bioethical document, was the first case of ethical solution for legal problems. It emerged as a result of dialogue between lawyers and doctors and became the prototype of all modern ethical and legal guidelines in the field of biomedical research, and dialogue itself became the symbol of bioethics. Bioethics, both in theory and in practice, deals with self-developing open systems (sciences, social practices), so the dialogue space of bioethics becomes much broader. It is becoming wider not only due to involvement of new actors in the dialogue, but also due to emergence of new content areas in the already existing interactions of bioethics with other scientific disciplines. Which new types of dialogue have emerged in recent decades? How does the dialogue between bioethics and other sciences develop? The search for an answer to these questions is relevant both for determining the role of bioethics in regulating scientific research and for clarifying the limits of bioethics itself. The purpose of this work is to discover the ways in which bioethics can influence scientific research through establishing of bioethical dialogue. For this purpose, the primary types and forms of dialogue initiated directly by bioethics are revealed, and the role of bioethics in interdisciplinary dialogue is clarified by the example of its interaction with law and sociology.

Keywords: bioethics, dialogue, scientific research, sociology.

Introduction

The origin of bioethics took place long before the very term “bioethics” appeared in the dialogue of lawyers and doctors during the work of Nuremberg Tribunal, when the Nazi doctors who conducted criminal medical experiments in the concentration camps appeared before a court. This dialogue emerged as a solution to a legal conflict that arose in the form of legal impasse (when the solution to the problem is not provided by the law): at that time there were no legal rules regulating the medical experiments. There were no such norms in professional medical ethics as well. In order to help judges in their work to establish the guilt of the Nazi doctors, ten moral principles were established to regulate medical experiments on humans (Mikhel, 2015, p. 31). Later they were called the Nuremberg Code, which was originally an auxiliary document for judges and was not immediately evaluated. Today, the significance of the Nuremberg Code, which became an ethical solution to legal problems, is evident.

Further, it can be argued that “bioethics began as a dialogue between people from many different disciplines (such as medicine, law, theology, biological sciences, social sciences, philosophy, humanities) about moral questions in the field of medicine and biology” (Borry, Schotsmans & Dierickx, 2004, p. 1). But it all began with a dialogue between law, medicine, and then the public, about moral problems in scientific research and development. Since the middle of the 20th century, the central principle of bioethics began to be formed - the principle of respect for the autonomy and dignity of individual, which was initially formulated “in the Nuremberg Code and especially its first point that the ‘voluntary consent of the human subject is absolutely essential’, with ‘sufficient knowledge and comprehension of the elements of the subject matter involved’ so as ‘to enable him to make an understanding and enlightened decision’.” (Dove, et al., 2017) Subsequently, the autonomy of individual becomes not just an ethical, professional norm, but also a legal one, i.e. “protecting autonomy is more easily aligned with existing legal principles and precedents” (Dove, et al., 2017).

Today in the works on bioethics one can find a huge number of dialogues related to bioethics in one or another context (Benner, 1997; Yarborough & Sharp, 2007). Dialogue became an obligatory procedure in the form of ethical committees realizing their regulatory function, both in scientific research and in medical practice. In the last decade, even the concept of dialogical ethics emerged, which in the sphere of decision-making in practical bioethics means a dialogue-based approach (Rudnick, 2007). Dialogue has truly became a symbol of bioethics.

Bioethics, both in theory and in practice, deals with "human-sized" (Stepin, 2015) systems (sciences, social practices). Such systems are self-developing, they are open, therefore the dialogue space of bioethics becomes much wider. It becomes wider not only due to involvement of new actors in the dialogue, but also due to the emergence of new content areas in the already existing interactions of bioethics and other scientific disciplines. What new types of dialogue have emerged in recent decades? How does the dialogue between bioethics and other sciences develop? The search for an answer to these questions is relevant both for determining the role of bioethics in regulating scientific research and for defining the limits of bioethics itself.

The purpose of the work is to reveal the ways in which bioethics can influence scientific research through initiation organization of bioethical dialogue. To achieve this goal, we set the following tasks: to identify the primary types and forms of dialogue, initiated directly by bioethics, and to consider the features of interdisciplinary dialogue by the example of dialogue of bioethics with law and sociology. The methodological basis of the work were the works on bioethical symbolism (Mescheryakova, Melik-Gaykazyan & Melik-Gaykazyan, 2016; Tarasenko, Melik-Gaykazyan & Melik-Gaykazyan, 2016; Melik-Gaykazyan, Tarasenko et al., 2017) and semiotic diagnostics (Melik-Gaykazyan, Gorbuleva, et al., 2017; Evdokimov, et al., 2017; Tarasenko, et al., 2016).

Results and Discussion

Bioethical dialogue emerges and establish today in different spheres of scientific and public life as a response to the problems posed, which are related not only to biology and medicine. But still the most traditional form of bioethical dialogue occurs in everyday medical practice.

If the dialogue arises as a value in solving the problem of regulation of relations in the sphere of biomedicine from a part of society (which is actually the primary task of bioethics) and became urgent in the last third of the 20th century, then in doctor-patient relationship, the value of dialogue is almost primordial. In order to protect patient, one's personality and rights, bioethics is forced to address such a problem of modern medicine as the absence of doctor-patient dialogue or its reduction to very formal moments. The evidence that something is wrong in this sphere was emergence of technical model of doctor-patient relationship in doctor practice (Veatch, 1972). Such a model excludes doctor-patient communication as unnecessary, since patient is a profane, does not understand anything in medicine, and doctor as an applied scientist mastered the latest technology and scientific knowledge and therefore believes that dialogue with patient is absolutely superfluous. In addition, and in other models of healing, doctor-patient dialogue has undergone significant changes in the direction of its reduction.

The current procedural requirement in any medical institution is voluntary informed consent of patient to any (diagnostic, therapeutic or other) medical intervention, which in turn involves the doctor's explanation of the substance of alleged intervention. Often, there are objections about the lack of doctor's time, as well as patient's inability to understand the medical information due to one's lack of professionalism. Both objections to justify the reduction or even disappearance of doctor-patient dialogue are insolvent: Klaus Dörner (2003) noted that it does not take a lot of time to clarify an issue, the problem lies in doctor's ability to conduct a dialogue with patient, perceive the one as the Other.

There is another type of dialogue that also existed throughout almost the whole history of medicine and which has strengthened bioethics - a dialogue between medicine and philosophy, "their intersections were

most often in the ethics of the profession, or in an understanding of what it means to be human" (Pellegrino, 2006, p. 569). However, the progress of medicine, emergence of new biomedical technologies, make the problem of determining the essence of human and the limits of one's existence extremely urgent. Also in medical practice, moral problems emerge that can not be solved by means of traditional medical ethics, the symbol of which at all times was Hippocratic oath. Today, as a "new dialogue with the memory of culture, or memory-turn" (Melik-Gaykazyan, 2012), a rethinking of the meaning of Hippocrates' ethics take place (Koch, 2014; Melik-Gaykazyan & Mescheryakova, 2015)

The solution of many issues (posed to bioethics or formulated by itself) goes beyond the scope of medicine, philosophy and other scientific disciplines, requiring their public discussion, as well as legislative and political decisions. The purpose of bioethics emergence was the protection of human, and this protection may be required in a wide variety of spheres of public life, including, for example, in the fight against racism contributing "meaningful contributions to the public discourse, research, teaching, training, policy development, and academic scholarship…" (Danis, Wilson & White, 2016).

Thus, a dialogue was established between ethics and politics, which influenced bioethics itself. In this regard, E. D. Pellegrino notes: "In the last two decades, particularly, the realization of the impact of biology on all of us has propelled bioethics into the public square where law, policy, and adjudication of conflicts take place. Bioethics has thus become "politicized" (Pellegrino, 2006, p. 570).

Public dialogue is resulted not only in resolution of conflicts and making political and legislative decisions. Dialogue with the public becomes an important component of scientific activity, especially if it leads to scientific discoveries. There is already evidence of public participation in scientific research (Kelty & Panofsky, 2014), an example of this is the activities of PXE International, a patient organization in the United States, which unites patients with pseudoxanthoma elasticum and their relatives. It was founded in 1995 by Sharon and Patrick Terry, whose children suffered from this disease, and the spouses were not satisfied with the pace and weak coordination of research related to the disease. Due to their active work, research leading to discovery of a genetic mutation responsible for the disease was prepared and conducted. Despite the lack of experience in scientific research, Terry spouses actively participated in laboratory research, and scientists agreed to recognize PXE International's patent rights for the gene (Kelty & Panofsky, 2014).

The model of this organization became a model for other patient advocacy groups aimed at solving research problems. The task of educating other organizations has become the part of PXE International mission. The organization not only received a patent for mutation of ABCC6 gene leading to the disease, but also organized a biobank of samples and patient data, a condition for participation in which was mutually beneficial cooperation between researchers (Kelty & Panofsky, 2014). It is important to emphasize that the organization unites people who not only suffer physically, but also experience isolation and alienation, are deprived of the opportunity to express their opinion, to cast their voice.

In the interdisciplinary dialogue of bioethics and law emerge the qualitatively new aspects. In the modern condition, it can not be reduced only to communication of bioethics with lawyers and legislators. Legislation not only develops for bioethics the laws necessary in both practical health care and research activities but also as Z. E. Shapiro marked "there are many areas of law that would benefit from greater input from those in bioethics" (Shapiro, 2017, p. 1). The modern scientific achievements, ahead of lawmaking, pretend to change the long-standing legal practice. For example, neuroimaging can be used as a method of detecting lies but then the question of acceptance of evedence, based on functional magnetic resonance imaging, emerge, and courts should "tackle difficult scientific issues concerning validity, reproducibility, and fit … Bioethicists are in the perfect position to act as a bridge between those in the scientific and legal fields, synthesizing input into policy and lawmaking, so that theoretical concerns can evolve into practical, ethical guidance" (Shapiro, 2017, p. 1).

As we already marked, the dialogue between bioethics and law exists from its very emergence, deepening as the science develops. With some other scientific disciplines, this dialogue and interdisciplinary cooperation was not established immediately, but as a result of criticizing bioethics from sociology, history, anthropology (Wilson, 2013). To a large extent, the consequence of this criticism from sociology was the emergence of empirical turn in bioethics (Borry, Schotsmans & Dierickx, 2005).

How did the dialog between bioethics and sociology develop? The modern scientific works point to adversarial relations between bioethics and sociology (De Vries, et al., 2006). The primary differences between them: sociology deals with the fact that "is", bioethics deals with "due". Sociology studies facts, bioethics - values. Sociology is descriptive, bioethics is regulatory. (De Vries, et al., 2007).

Indeed, sociologists criticize bioethics for neglecting the social and cultural characteristics of various social groups, which they consider irrelevant, neglect of empirical research (Hedgecoe, 2004), proclamation of ethical principles unified for all cases, philosophizing and pontification in the face of real problems (Turner, 2009). Bioethics, in its turn, criticizes sociology for descriptiveness without moral assessment, it does not accept sociological empiricism (although the empirical methods in sociology have been actively used to solve ethical problems before the institutionalization of bioethics, for example, the study of terminal patients, death and dying (Shaw, 2015). The position of sociology, which reveals social facts as they are, but does not offer recipes for action, also does not suit bioethicists.

Many authors point to necessity to lay the foundation for fruitful cooperation between sociologists and bioethics (De Vries, et al., 2007; Lopez, 2004; Frith, 2012), to develop the principles of critical bioethics that could be based on empirical research, correcting theory in the face of changing social reality (Hedgecoe, 2010). Some scientists write about the "empirical turn" and point to its contribution to the normative aspect of bioethics (Frith, 2012; Goldenberg, 2005). Despite the fact that sociology, which appeared in the 19th century due to efforts of Auguste Comte, was conceived as an attempt to evade the speculative nature of social philosophy, nevertheless, for a long time it remained within the framework of abstract philosophical discourse. And it was only at the beginning of the 20th century when empirical research began to develop in sociology.

Despite the fact that sociology and bioethics have common - philosophical - roots, "until mid-1990's bioethics developed separately from the social sciences, and bioethicists did not pay much attention to moral norms in different cultures" (Kurlenkova, 2013, p. 89).

The question arises: if bioethics is a philosophical discipline, does it have something in common with social sciences? The answer to this question can not be unambiguous due to interdisciplinarity and multiparadigmality of bioethics. On the one hand, bioethics is based on moral philosophy; on the other hand, in the sphere of its interest and influence are social practices (medical activity, scientific research and experiments, volunteerism (Gorbuleva, Melik-Gaykazyan, & Melik-Gaykazyan, 2016), etc.), covering all social groups, communities, various cultural, ethnic, demographic strata, which gives bioethics an inevitable social determining. Therefore, here the sociological approach looks like very important and productive. But which role should sociology play in relation to bioethics? In the most of works examined, which emphasize the necessity of convergence of social sciences and bioethics, the function of sociology appears to be somewhat of an ancillary kind: the use of empirical methods, such as immersion, research interviewing, questionnaire survey. The usage of empirical methods of sociological research is certainly of great importance. Since medical activities began to lose their sacredness, when problems appeared that doctor/researcher could no longer solve alone, when ethical committees began to appear that included not only professionals but also representatives of various social groups, it became especially important to obtain a "feedback", "vox populi". Without this feedback, the vision of primary issues can be lost, and ethical committees will not be able to perform their main function and will turn into formal institutions instead of protecting the rights of patients and participants of experiments.

One of the fundamental principles of bioethics - respect for patient autonomy, which is often associated with the right to be informed and make decisions, is successfully implemented in Western culture, but in this form it may not be accepted in cultures with a strong paternalistic origins - Islamic, Confucian, African, etc. (Pratt, et al., 2014; Turner, 2004) And then the signing of voluntary informed consent, which is based on this principle, will become an annoying formality, and will protect doctor, not patient. Only a sociological research can answer the question at what extent patient is able to realize the right to make decisions about interference in one's health, and when it would be inherent to one to delegate this right to other people (doctor, relatives).

There is another field of application of sociological research - in teaching of bioethics. Such researches are conducted in different universities, in particular, the authors conduct it annually among the students of Siberian State Medical University (Tomsk), and it allows to reveal not only the specifics of Academic performance, but also the socio-cultural transformations that occur in student's environment (Meshcheryakova & Gerasimova, 2013).

However, sociology can be not only an empirical base in the study of bioethical problems. Bioethics has already been institutionalized, and we are talking not only about scientific, but also about broader social institutionalization. And in this sense, bioethics, regarded as a social institution, can become a subject of sociology research at the level of generic sociological theories, not only at the level of specific sociological research.

Conclusion

Dialogue space of bioethics, which became much broader since its inception and formation, today not only involves the new actors in the bioethical dialogue. Also, this dialogue deepens to the point of integration into the legal sphere - in legislative and judicial processes; and the dialogue with sociology led to integration of sociology into the problem field of bioethics and to enrichment of bioethics by empirical methods of social sciences. These processes are positive for bioethics, but at the same time they set the question of bioethics' own methodology, about its limits as a separate scientific discipline and philosophical grounds.

In its turn, sociology is able not only to provide sociological methods for needs of bioethics, but also to turn bioethics into the subject of its research. Bioethics can be researched by sociologists as a special social practice at the stage of institutionalization, and also as a science within sociology of science, which is seen as fruitful today and is especially relevant for Russia, where.

Acknowledgment

The results were obtained in the frameworks of the RFBR project № 15-03-00598 “Bioethics: creation of the new symbolism”.

References

Benner, P. (1997), ‘A dialogue between virtue ethics and care ethics,’ In: The influence of Edmund D. Pellegrino’s philosophy of medicine. Springer Netherlands, 47-61.

Borry, P., Schotsmans, P. and Dierickx, K. (2004), ‘Empirical ethics: A challenge to bioethics?’ *Medicine, Health Care and Philosophy*, 7(1), 1-3.

Borry P., Schotsmans P. and Dierickx K. (2005), ‘The birth of the empirical turn in bioethics,’ *Bioethics*, 19(1), 49-71.

Danis, M., Wilson, Y. and White, A. (2016), 'Bioethicists can and should contribute to addressing racism,' *The American Journal of Bioethics*, 16(4), 3-12.

De Vries, R., Turner, L., Orfali, K. and Bosk, C. (2006), 'Social science and bioethics: the way forward,' *Sociology of Health & Illness*, 28(6), 665-677.

De Vries, R. G., Turner, L., Orfali, K. and Bosk, C. L. (2007), 'Social science and bioethics: morality from the ground up,' *Clinical Ethics*, 2(1), 33-35.

Dörner, K. (2003). Der gute Arzt: Lehrbuch der ärztlichen Grundhaltung. Schattauer Verlag.

Dove, E. S., Kelly, S. E., Lucivero, F., Machirori, M., Dheensa, S. and Prainsack, B. (2017), 'Beyond individualism: Is there a place for relational autonomy in clinical practice and research?' *Clinical Ethics*, 1477750917704156.

Evdokimov, K. E., Kuznetsov, V. G., Melik-Gaykazyan, I. V. and Melik-Gaykazyan, M. V. (2016), '"Semiotic Attractor": A Model for the NBICS-Technologies Coherence Management,' Proceedings of the 27th International Business Information Management Association Conference (IBIMA), ISBN: 978-0-9860419-6-9, 4-5 May 2016, Milan, Italy, 355-361.

Frith, L. (2012), 'Symbiotic empirical ethics: a practical methodology,' *Bioethics*, 26(4), 198-206.

Goldenberg, M. J. (2005), 'Evidence-based ethics? On evidence-based practice and the empirical "turn" from normative bioethics,' *BMC Medical Ethics*, 6 (1), 11.

Gorbuleva, M. S., Melik-Gaykazyan, I. V. and Melik-Gaykazyan, M. V. (2016), 'Why Russian animal protectors are as they are and why do they act they do?' *Sotsiologicheskie Issledovaniya,* 4, 157-158.

Hedgecoe, A. (2010), 'Bioethics and the reinforcement of socio-technical expectations,' *Social Studies of Science*, 40(2), 163-186.

Hedgecoe, A. M. (2004), 'Critical bioethics: beyond the social science critique of applied ethics,' *Bioethics*, 18(2), 120-143.

Kelty, C. and Panofsky, A. (2014), 'Disentangling public participation in science and biomedicine,' *Genome medicine*, 6(1), 8.

Kurlenkova, A. S. (2013), 'Bioethics and Anthropology,' *Ethnographic Review*, 1, 89-103.

Lopez, J. (2004), 'How sociology can save bioethics... maybe,' *Sociology of Health & illness*, 26(7), 875-896.

Melik-Gaykazyan, I. V., Gorbuleva, M. S., Vengerovsky, A. I. and Melik-Gaykazyan, M. V. (2017), 'Semiotic Diagnostics of Social Transformations,' Proceedings of The 29th International Business Information Management Association Conference (IBIMA), ISBN: 978-0-9860419-7-6, 3-4 May 2017, Vienna, Austria, 435-439.

Melik-Gaykazyan, I. V., Tarasenko, V. F., Mescheryakova, T. V. and Melik-Gaykazyan, M. V. (2017) 'Information Model for Management In the Area of Convergent Technologies,' Proceedings of The 29th International Business Information Management Association Conference (IBIMA), ISBN: 978-0-9860419-7-6, 3-4 May 2017, Vienna, Austria, 429-434.

Melik-Gaykazyan, I. and Mescheryakova, T. (2015), 'The hippocratic oath: The transformation of its semantics and the revival of its pragmatics,' *Schole. Ancient Philosophy and the Classical Tradition,* 9(1), 36-45.

Melik-Gaykazyan, I.V. (2012), 'Memory-turn: Architecture of bioethics as Diagnostic of the New Turn in Philosophy,' *Tomsk State University Journal. Philosophy. Sociology. Politology,* 4(20), 165-179.

Mescheryakova, T.V., Melik-Gaykazyan, I.V. and Melik-Gaykazyan, M.V. (2016) 'Place of Bioethics in Knowledge Management in the Information Society,' Proceedings of The 28th International Business Information Management Association Conference (IBIMA), ISBN: 978-0-9860419-8-3, 9-10 November 2016, Seville, Spain, 2187-2186.

Meshcheryakova, T. V. and Gerasimova, O. V. (2013), 'The Change of Generations or the Problem of Shaping the Awareness Value of Future Doctor,' *Bulletin of Tomsk State Pedagogical University*, 11, 179-187.

Mikhel, I. V. (2015) Bioethics in the Context of History: Philosophical Studies of Bioethical Movement. Saratov, State Technical University of Saratov.

Pellegrino, E. D. (2006), 'Bioethics and politics: "Doing ethics" in the public square,' *Journal of Medicine and Philosophy*, 31 (6), 569-584.

Pratt, B., Van, C., Cong, Y., Rashid, H., Kumar, N., Ahmad, A., ... and Loff, B. (2014), 'Perspectives from South and East Asia on clinical and research ethics: A literature review,' *Journal of Empirical Research on Human Research Ethics*, 9(2), 52-67.

Rudnick, A. (2007), 'Processes and pitfalls of dialogical bioethics,' *Health Care Analysis*, 15(2), 123-135.

Shapiro, Z. E. (2017), 'Bioethics in the law,' *Hastings Center Report*, 47 (1).

Shaw, R. M. (2015), 'Sociology and Bioethics,' In: Ethics, Moral Life and the Body. Palgrave Macmillan UK, 87-114.

Stepin, V. S. (2015) Philosophy and Methodology of Science. Moscow, Akademicheski Prospekt Publishers ; Alma Mater Publishers.

Tarasenko, V.F., Melik-Gaykazyan, I.V., Melik-Gaykazyan, M.V. and Gorbuleva, M.S. (2016), '"Rabbit effect": the reasons of volunteer movements as the diagnostics of the role transformations of human resource management,' Proceedings of The 28th International Business Information Management Association Conference (IBIMA), ISBN: 978-0-9860419-8-3, 9-10 November 2016, Seville, Spain, 2179-2182.

Tarasenko, V.F., Melik-Gaykazyan, I.V. and Melik-Gaykazyan, M.V. (2016) 'The Global and the Local: the Model of Measuring Performance of International Business,' Proceedings of The 28th International Business Information Management Association Conference (IBIMA), ISBN: 978-0-9860419-8-3, 9-10 November 2016, Seville, Spain, 2183-2186.

Koch, T. (2013), 'The Hippocratic thorn in bioethics' hide: Cults, sects, and strangeness,' *Journal of Medicine and Philosophy*, 39(1), 75-88.

Turner, L. (2009), 'Anthropological and sociological critiques of bioethics,' *Journal of Bioethical Inquiry*, 6(1), 83-98.

Turner, L. (2004), 'Bioethics in pluralistic societies,' *Medicine, Health Care and Philosophy*, 7(2), 201-208.

Veatch, R. M. (1972), 'Models for ethical medicine in a revolutionary age,' *Hastings Center Report*, 5-7.
Wilson, D. (2013), 'What can history do for bioethics?' *Bioethics*, 27(4), 215-223.

Yarborough, M. and Sharp, R. R. (2007), 'Bioethics consultation and patient advocacy organizations: expanding the dialogue about professional conflicts of interest,' *Cambridge Quarterly of Healthcare Ethics*, 16(1), 74-81.

Development of the Educational System and the Priorities of the Knowledge Economy

A.V. Kharlamov, St. Petersburg State University of Economics, Saint-Petersburg, Russian Federation, kharlamov_2000@list.ru

T.L. Kharlamova, Peter the Great St. Petersburg Polytechnic University, Saint-Petersburg, Russian Federation, kharlamova_t@list.ru

O.S. Koroteeva, St. Petersburg State University of Economics, Saint-Petersburg, Russian Federation, olgakoroteeva@mail.ru

Abstract

The modern processes of globalization are accompanied by the increasing of the share of the knowledge economy and the Internet economy. Now we can see a strengthening of the role of education in improving of human capital. The central place here belongs to universities realizing advanced, innovative technologies in the learning process and management system. In this context the University should be presented as an economic entity increasing its competitiveness in the national and global market. Therefore it's necessary to use such innovative methods and tools which allow universities to take significant positions in the world and provide the interest of students and employers. The interest of potential employers lies not only in getting good graduates, but in the cooperation with universities in the process of working out new products and technologies. All the participants of such cooperation, including the state, get multitude benefits, especially – in the long-term period. Such system of participation corresponds to the main priorities of the knowledge economy. It involves the formation and implementation the effective strategy of development of the national educational system

Keywords: Educational system, human capital, economic interests, knowledge economy, globalization, state, competition, development strategy, investment.

Introduction

The position of the national education demonstrates its significant role in the economic system of the country in the context of globalization. The demands of post-industrial society make the system of education to solve the tasks connected with global competitiveness and national security. This process is closely linked to the expansion of activities of universities, business subjects, state, civil society and individuals in the field of the knowledge economy. As practice of the absolute majority of countries shows, the share of educational services in the total employment and in GDP has a tendency to increase. Such important factors, as the development of the Internet economy and the Internet of things, are constantly gaining power (Garmise S., 2006).

The influence of human capital on the formation of the knowledge economy becomes a type of incentive to build an effective educational system (especially higher). On this basis, creating a multi-level system of national education is considered as a priority task, relevant to the demands of globalization and national security.

Theory

The relevance of this problem indicates that the development of the educational process is based today on the principles of innovative approach. It creates new demands for educational institutions actively using the latest achievements of scientific and technological progress. This means that the universities should be the innovation-oriented organizations, able to realize an excellence training of graduates in accordance with the requirements of the competitiveness in the national and global market of educational services in the conditions of globalization.

In the modern period the management of educational process significantly changes the perceptions about the competitiveness of the University. Traditionally, the competitiveness of educational institutions was understood as their ability to save and build up existing competitive advantages. As a result, the sustainable consumer preferences were associated with the educational services in the separate graduate school. They were formed on the basis of correspondence between the obtained educational services and the current needs of consumers, based on their beliefs, social status, level of education and intellectual development and financial security. In addition, the customers took into account the following factors: location and transport accessibility of the University, particularity of educational process, conditions of studies, repute of teachers and graduates in scientific and business circles and in the society.

Talking about the competitiveness of the University in the new conditions we have to consider that the implementation of all the consumer's perceptions implies the using, as well as classical, a lot of innovative tools and methods, including innovative methods of management.

On this basis, we should understand the management of the development of the educational process in the modern, competitive University as a holistic concept involving the integration of classical and innovative methods of influence. In the context of the knowledge economy they correspond to both market and administrative management principles and ensure the growth of competitive advantages of the University. It's necessary to pay attention to the fact that the educational service is a complex, high-tech product, whereby the individual consumer is not always can adequately estimate its level and the level of competitiveness of the University that provides it (Altbach P.G., 2004).

There are several other problems that should hamper the movement of the University toward creating an innovative educational process. Now we are discovering these problems.

First of all, the educational system does not always closely match to the current needs of the labor market. This is confirmed by the elementary analysis of academic plans, programs, and even the terms of education. This reduces the level of demand for graduates of the particular University in the labor market. The system character of this problem could be compounded by the insufficiently high qualification of teaching staff and administrative personnel working in this graduate school. If this occurs, the situation cannot be correct quickly. Whole decades are required to provide the changes and to consolidate the positive trends emerging today, with the introduction of an innovative approach to education.

In addition, now we are observing an increase of the number of graduates of higher educational institutions, with a simultaneous decrease of the number of employees working in the specialty. Sometimes the social status of people having the diplomas of top rating universities allows them to require from the employer increased wages, often not corresponding to the real level of their training as specialists. In the result of this contradiction, the employers prefer older workers, even if they have not such a high level of formal education (it's one of the reasons for high unemployment among the graduates in several European countries). Often employers prefer migrants who are less demanding, not only to wages, but also to the social package and terms of work and rest. There are an increasing number of second-generation migrants, who are educated (sometimes – less quality and prestige) and strengthen their presence in the labor market. It makes a real competition for the rest of the citizens of the country (it's especially relevant in megacities, including Russian). These trends often have a negative impact on the level and quality of human capital.

Materials and Methods

The strategic development of the system of national education becomes a priority task in the conditions of globalization. An important role in this process should be played by the motivation of the population to receive a quality education. It will be a set of relevant knowledge and skills to improve the level of competitiveness of workers in the labor market and provide material well-being and moral satisfaction of individuals. It implies a significant volume of economic resources for implementation a development strategy. It is obvious that it's impossible to realize only at the expense of state budgetary funds. Therefore the universities and business structures have to search the needed resources to prevent a strengthening of the gap between the educational needs and capabilities of the system. By the way, the gain of the gap, which is observed currently, could become critical in the case if the necessary measures don't take.

In this regard, three questions arise:

1) about the accordance of the quantity and quality of educational institutions to the challenges of the global economy;

2) about the degree of adequacy of the financing of the national education to the modern trends of development;

3) about the evaluation the effectiveness of the educational system from a point of view of labor market and growing competitive struggle.

The solution of these questions from a point of view of priorities of the knowledge economy should begin from the modernization of the management system in education aimed on the increasing its efficiency and achievement the results, influencing the formation of human capital (Salmi J., 2009). It is necessary to consider the priorities in the economic sphere and also in the sphere of national security for satisfaction the interests and needs of citizens and households. The educational system carries a powerful social burden thus we must to take it into account when we are improving its management. It requires the differentiation of citizens on such criteria as level of education, scale of income, behavior characteristics and social affiliation.

All of the above affects the formation of the conditions for the transition to the knowledge economy, presented as an integrated system of post-industrial society and the Internet economy (Where Is the Wealth of Nations? Measuring Capital for the 21th Century, 2005). This process in different countries is uneven. In some cases, it is accompanied by increased differentiation of the population, both economic and social. For example, in Russia, higher education brings more benefits to person because it is increasingly valued by employers. As evidenced by the results of studies conducted in the early 90-s, the profitability of higher education was about 5% per annum. To the end of this decade it reached the level of 9-10%. In the 2000-s, according to certain estimates, better results were obtained, especially in economic, engineering and legal professions (Benítez-Silva H., Demiralp B., Liu Z., 2009).

A distinctive feature of the knowledge economy is a special understanding on the production costs and their characteristics. It is connected not only with increase of the scale of costs (in most countries of the world), but also with the need to maintain a certain balance of interests. Some complexity here is due to the fact that the state can simultaneously operate as a customer, manufacturer and even consumer of educational services (Kiselkina O.V., Kharlamov A.V., Kharlamova T.L., Vunotropidi A.F., 2015). This is largely dependent on the current model of the economic system that determines the evaluation of the effectiveness of any type of economic activity. The presence of a large number of stakeholders requires the harmonization of their relations in the process of production and consumption of educational services.

In our opinion, it demonstrates the correlation between the speed of the transition to the knowledge economy and current level and quality of human capital. We can describe this correlation as a kind of incentive to build a relevant educational system, especially – in a sphere of higher education.

As modern European experience shows, the average cost of the University on train of one student per year, consistently exceed 10 thousand euros. In the United States and Canada, these costs are about two and half times higher (Federal Student Loan Programs Data Book, 1997). In comparison: the costs of one student in Russia, on average, are about 3 400 euros (Ministry of Education: we will not support the increasing of the costs of education in the universities, 2016). Despite the fact that the structure of higher education financing and the salaries of teachers in Russia differ from those prevailing in developed countries, the value of such expenditures is rather a deterrent and not a factor of the development of the Russian educational system. Of course, everything should not be reduced to the financial side. However, it must be emphasized that this level of expenditure is not conducive to improving the competitiveness of national universities in the global market of educational services. It is confirmed by international rankings of higher educational institutions with almost complete lack of Russian universities there.

In the Global Ranking of Academic Subjects (ARWU) published in 2017 in Shanghai, there are only 12 Russian universities, the highest place of which belongs to Moscow State University named after M. V. Lomonosov (Global Ranking of Academic Subjects, 2017).

We shouldn't interpret the above information as a statement of absolute defeat of the Russian system of higher education. In particular, Russian universities retain the competitive advantages in the training of specialists in the field of critical and breakthrough technologies. But, unfortunately, these universities are not expanding as rapidly as we would like.

In the process of building the knowledge economy the public debate about the innovativeness of national education is delaying. Now there is no unity of views on the order of change. The proposed recipes of transformation are too different. In the modern society there is no common position about the choice the management model should be based on a system of reforming of national educational system for bring it to the best international standards.

Model

In the process of formation the model the foundations of long-term, sustainable relationships could be working out from the positions of creation the preferences and needs of consumers. In some cases we could observe a certain contradiction between the increasing level of competitiveness of the particular University and reducing the interest to its programs by the part of the consumers. This suggests that some potential students not willing to consume qualitative high-tech educational product, make a choice in favor of "mass" offers. Elimination of such contradiction is possible by only one way, associated with the entrance of this University in the global educational market.

Within the system of educational process the universities should solve the following tasks:

• continuously study the supply and demand in the national and international market of educational services;

• explore the needs and preferences of potential and actual consumers of educational services, both domestic and foreign;

• develop a unified system of performance indicators, adequately reflecting the processes occurring in the market of educational services for selection an effective system of management.

The management of the University should be considered as a whole system of interrelated tasks with the same goal.

On this basis the tasks and requirements for the management of the University can be clearly defined. Primarily, it involves a high level of competitiveness of the University in regional, national and international market, as discussed above. In addition, another important provision is associated with the evaluation of the results of management activities. It should be remembered that strategic management decisions in some cases are going against the tactical tasks or worsening the competitiveness of the institution in the short period of time. In this context, the competitiveness of the University is achieved through the using of special adaptation mechanism, based on the elements providing the assessment of activity of competitors for making appropriate management decisions.

In the process of estimation the competitiveness of other universities a list of the most important indicators for management decisions needs to be refined. The problem of choosing a set of such indicators is not completely solved, although, the ratings of the universities are held annually.

The international university rankings have published since 1983. They were launched by the "US news and world report" magazine (the annual ranking "Best colleges of America"). Speaking about the international rankings, they widely entered our lives in 2003. Today there are about a dozen of prestigious global rankings and a few hundred of national rankings. Among the most recognized rankings there are: the QS World University Ranking, the Ranking of Higher Education of the British weekly "The Times", the Academic Ranking of World Universities (Shanghai Global Ranking of Academic Subjects).

Despite the apparent similarity, the ratings are quite different (the set of indicators, the number of the evaluated criteria and the weighting coefficients). To clearly determine the optimal approach to assessment of universities is almost impossible because we haven't a common understanding of applicable indicators today.

From the point of view of effective, innovative oriented development and the priorities of the knowledge economy, the set of evaluation criteria must reflect the most important factors of

competitiveness of the University. Their correspondence to the requirements of objectivity, measurability and reliability allows use them in the process of making, adoption, implementation and adjustment of management decisions. As far as the level of competitiveness of the University largely depends on the adopted model of value creation all the management and intelligent efforts should be focused on choosing a strategically correct way of development (Grant R.M., 2010). In this context we should pay attention to the value of the educational service and the University as a whole.

The value of the University is determined by the competitive position in the relevant market. As a rule, it depends on the competitive environment of the market and the competitive status of the separate University. The economic value of the results of the University characterizes a defined useful effect received by the consumers. Because of that, the criteria values are transformed by the consumers in the rating of competitiveness. Thus, the value of the product of the University activities is determined by consumer's evaluation of the learning process and its outcomes, thereby forming the competitiveness of educational services and competitiveness of graduates. It should be understood that such assessment may be subjective, because it is held by consumers, with their own conceptions and ideas.

We should note one another important aspect. It is the real possibility of formation the new economic thinking of management of innovative University allowing use a new set of effective tools of development and cooperation. Thus, the transition to an innovative model of management, providing a high level of competitiveness of the University occurs at the moment of the unification of all management functions to achieve the legitimate aim (Aghion P., Dewatripont M., Hoxby C., Mas-Colell A., Sapir A., 2009).

As experience shows, the management staff of the universities today has a good education and a high level of thinking, but often has not enough the courage and enterprising for implementation new management models. This is largely due to specific features of educational activities, aimed not at obtaining a desired result in the shortest time and with lowest cost, but at realization of social mission in education.

Talking about the practical problems of innovative oriented management of educational process, we have to determine the set of actions fulfilling the needs of the consumers of educational services and their producers. Such set proposes:

1. The formation the constantly updated database of information, adequate to relevant goals and tasks.

To provide an information support it is necessary to plan, build, monitor and develop the databases of consumers, competitors and educational markets. They fix the main characteristics of the institution (the occupied niche of the market, trends and prospects of development, etc.).

2. The building an effective system of relationships with potential and actual consumers of educational services and also services in the field of scientific research, consulting, inventions.

The University should be focused on the developing of long-term relationships with all partners. In the conditions of globalization it is impossible without establishing strong business reputation and goodwill possession. So the generated business strategy must be aimed at the formation of consumer's loyalty, translating them into the category of regular customers (baccalaureate, master programs, postgraduate study), as well as attracting new customers. An important component of the activity connects with the promotion of the University brand and securing it in the views of representatives of local, national and international business circles. The brand recognition will give the opportunity of direct and indirect positive influence on the competitiveness of the University (so, the potential employer observes the level of competitiveness and significance of the University, which some candidate graduated from. It creates the sum of additional benefits to the applicant of the vacancy).

3. The organization of long-term effective partnership between the University and its partners, primarily the key, i.e. persistent or the most significant for him.

We should pay attention to the importance of the system approach that should be realized in all areas of work. The system effect will lead to new qualities of interaction due to the properties of synergy.

Furthermore, it will form a positive impact on the work of the University and increase its competitive advantages.

The implementation of these recommendations requires the creation of such organizational structure of the University, which would allow solve the problems aimed at improvement of the educational and managerial process. On this basis, it is expedient to use the following complex of measures:

Firstly, it's necessary to improve the degree of transparency, flexibility and functional reliability in managerial processes. As a result, the managerial resources of the top echelon are exempt from the current work to concentrate on strategic and image-building tasks.

Secondary, the implementation of the innovative principles supposes the transformation of the University in a self-developing system. In practice, this means the organizational restructuring and establishing a network of profile-oriented management centers and areas of responsibility, operating on the base of domestic outsourcing. This improves the efficiency of the management of the University and ensures the maximum focus on the interests of consumers of educational services.

Thirdly, a constant search of decisions in all areas of work must be based on the principle of the unity of all departments of the University. It involves the creation of constantly evolving information center, which should exceed current needs of the University. It should be regarded as the potential of growth.

These measures can be considered as a basis for the creation a model for the development of the modern University, adequate to the priorities of the knowledge economy and the demands of globalization. In this context the modified system of management will provide a high level of value-oriented work in the process of the innovative development and further increasing the competitiveness of the University in the national and global educational market. The implementation of these tasks involves the sequence of management actions. Structurally it includes four basic stages.

The content of the first stage is the selection of factors that have a significant influence on the process of provision the scientific and educational services. Among the external and internal factors acting in the short, medium and long term period we can see the factors of positive, negative and neutral impact.

The second stage is devoted to prediction the possible consequences for the implementation of specific educational services or programs as a result of impact of factors identified in the first stage. It forms the basis for preparing the alternative management decisions aimed at improving the level of innovativeness of the University. According to approaches of the modern theory and practice, all the management decisions can be classified as follows:

1. Direct management decisions - specific focused and not associated with other management decisions. They have a local character. As an example of this solution it can be considered the estimation of the level of competitiveness of educational programs or the separate University.

2. Interrelated management decisions – with a high degree of consistency with each other.

3. Duplicate management decisions – inherent to large institutions with complex organizational management structure. Their existence requires the reducing the possibility of inefficient expenses.

4. Controversial management decisions, also applies to large universities, with an organizational structure constructed on the horizontal principle. Despite the individual decisions can be justified, together they often contradict each other. This fact also involves the additional costs.

In the third stage on the basis of the analysis of alternatives there is the choice of the desired variant of management decisions ensuring maximum benefit from the implementation of innovation in the work of the University. Next there is the construction of management decision considering all the factors that have significant impact on the provision of scientific and educational services. It provides the real effect of increasing the level of competitiveness of the University.

The last, fourth, stage there is the adoption and implementation the management decision on the basis of its formalization, bringing to performers and control.

The practical implementation of managerial actions grouped under the four shown stages will largely depend on using the opportunities offered by modern management, research, educational and

information technologies. It should be based on the situation analysis, forecasting, ensuring of transparency, optimization of document flow etc.

The effectiveness of the educational system is influenced by many external and internal factors. The fundamental impact belongs to the original information, because its incompleteness or distortion make the process of preparing the management decision too difficult, or even impossible. In the universities with a large number of faculties and institutions, departments, laboratories, departments, divisions a huge amount of various documents circulates. In this case the different structural units and officials could be responsible for obtaining the original information. This fact undoubtedly complicates the efforts to verify the completeness, relevance, reliability and timeliness of information. On the other hand, it allows the management of the University, receiving information from various departments, to compare it and identify the possible discrepancies for further checking.

Result

The practical implementation of these actions will help to ensure the competitive advantages of the University in both the domestic and world market of scientific and educational services. However, there are certain risks associated with additional costs: financial, time, intellectual, material. The process of their optimization is largely dependent on functioning of managerial system of the University, including the financial sphere.

It should not be forgotten that an important source of innovations is the cooperation between the University and business. It's an important feature of the knowledge economy. Such activity in some countries, including modern Russia, is more difficult than getting government grants. This is due not only to lack of interest of representatives of the business community in investing in the development of domestic universities, but also with the financial and economic situation in the country. The processes occurring in the global economic environment directly influence on the investment climate in a country. However, we can see a concernment of some large enterprises, especially operating in the high technology sector, and transnational corporations, in cooperation with the technical universities.

Such cooperation requires some flexibility, because it is based on the combination of centralization and decentralization of management processes. The willingness of the University to enhance the partnership with business in the framework of mutually beneficial cooperation should ensure the inflow of investments. They can extend the production of scientific and educational services on the basis of transparency in the work as well as effective state regulating in this sphere.

The realization of goals of the cooperation is impossible without adequate management and corporative culture. In the opinion of the majority of experts, including the heads of the universities and officials of Russian education, we use the significantly outdated managerial concepts and mechanisms today. Often they are impervious not only to innovate but also new methods of work in a market of scientific and educational services, not to mention the development of new markets (Kharlamova T.L., 2014).

However, we should not reject the opportunities available to the business as an entity interested in investing in science and education. The participation of business should be not one-time sponsorship, but long-term mutually beneficial relationships, where each of the parties implements its own interests. This approach is adequate to globalization and the knowledge economy.

Along with that, there are compelling arguments in favor of increased the government supporting of innovation in the universities. As a rule, business would not invest in fundamental projects with very long payback periods (or even without it). At the same time such projects create the basis of fundamental science, providing further scientific-technological progress of mankind and the competitiveness and security of the national economy. It means the need for improving the process of financing of the universities to provide a high degree of efficiency of domestic education.

Conclusion

Thus, the solving of the task of innovative development in the higher educational system should be based on a set of actions undertaken by the management of the University and government bodies, on a base of a system approach and planning. This requires the socially oriented actions and mutually

beneficial collaboration between the universities and the business community. The combination of the opportunities provided by the government and business in the conditions of the knowledge economy will provide a high level of competitiveness of the universities in national and international educational market. This will contribute to further development of domestic educational system, and through it the national economy in whole in the context of globalization.

References

Aghion P., Dewatripont M., Hoxby C., Mas-Colell A., Sapir A. (2009), "The governance and performance of research universities: Evidence from Europe and the US", Cambridge, MA: National Bureau of Economic Research. [Online], [Retrieved June 03, 2017], http://www.nber.org/papers/ w14851.pdf.

Altbach P.G. (2004) "The costs and benefits of world-class universities". [Online], [Retrieved November 12, 2016], http://www.bcct.unam.mx/ adriana/bibliografia%20parte%202/ALTBACH,% 20P.pdf.

Benítez-Silva H., Demiralp B., Liu Z. (2009) "Social Security Literacy and Retirement Well-Being", Working Paper University of Michigan. [Online], [Retrieved May 28, 2017], http://www.mrrc.isr.umich.edu/publications/ papers/pdf/wp210.pdf.

Federal Student Loan Programs Data Book (1997). Office of Postsecondary Education Policy, Planning, and Innovating. US Department of Education. [Online], [Retrieved December 05, 2016], http://www.2.ed.gov/finaid/ prof/resources/data/fslpdata97-01/ loandatabook.pdf.

Garmise S. (2006) "People and the Competitive Advantage of Place: Building a Workforce for the 21st Century", Library of Congress Cataloging-in-Publication Data, Armonk, N.Y.: M.E. Sharpe, Inc., 184.

Global Ranking of Academic Subjects (2017). [Online], [Retrieved August 22, 2017], http://www.shanghairanking. com/shanghairanking-subject-rankings/index.html.

Grant R.M. (2010) Contemporary Strategy Analysis (7th text edition),Wiley.

Kharlamova T.L. (2014) "Effective Management in Modern System of Education as Necessary Condition for its Modernization", Journal of Legal and Economic Studies, 4, 255-260.

Kiselkina O.V., Kharlamov A.V., Kharlamova T.L., Vunotropidi A.F. (2015) "The increasing of quality requirements of state regulation of economy in solving of social tasks". Social Sciences and Interdisciplinary Behavior. Proceedings of the 4th International Congress on Interdisciplinary Behavior and Social Science (ICIBSoS 2015), ISBN: 978-1-4987-7911-1, 22-23 October 2015 Kazan University, Kazan, Russia & Arya Duta hotel, Jakarta, Indonesia, 07–08 November 2015, 425-427.

Ministry of Education: we will not support the increasing of the costs of education in the universities (2016). [Online], [Retrieved April 09, 2017], http://www.sputnik.by/society/ 20160830/1024962698.html.

Salmi J. (2009) "The challenge of establishing world-class universities", Washington, DC: Directions in Development, The World Bank, [Online], [Retrieved August 10, 2017], http://siteresources.worldbank.org/ EDUCATION/Resources/278200-1099079877269/547664-1099079934475/ Edu_Quality_Economic_Growth.pdf.

Where Is the Wealth of Nations? Measuring Capital for the 21th Century (2005), [Online], [Retrieved June 26, 2017], http://documents.worldbank. org/curated/en/287171468323724180/Where-is-the-wealth-of-nations-measuring-capital-for-the-21st-century.

Auditing For Risk Assessment Based On the Principle of Business Continuity Applied To Hotels and Other Accommodation Services

Cristina Iovu, The Bucharest University of Economic Studies, Bucharest, Romania, iovucris@yahoo.com

Abstract

The business continuity principle is a fundamental principle for preparing financial statements. On the basis of this principle, an entity is regarded as having a continuity of its activity in the foreseeable future if it has neither the intention nor the need to be liquidated, to suspend its activity or to seek protection from creditors, according to the legislation. Therefore, assets and liabilities are recorded by the principle that entity will be able to realize assets and its financial obligations in the normal course of its business. During the mission, the audit team can assess the risks that may impact the business continuity principle. So we assessed the risks related to various areas of a hotel and estimated the probabilities and the impact, and risk ratios were calculated based on the risks that have been classified. A detailed correlation between probability, impact and categories of related risks has been accomplished.

Keywords: risk assessment, business continuity, accommodation services.

Introduction

The business continuity principle assumes that the company will continue to operate normally in the foreseeable future without becoming unable to continue its business and without any significant reduction. If the company managers have acknowledged some elements of uncertainty related to events that may lead to their incapacity to continue the operations, these elements must be presented in the explanatory notes. If the financial statements are not prepared on a business continuity principle, this information must be presented along with explanations of how to prepare financial reports and the reasons that led to the decision that the company is not able to operate anymore.

The business continuity principle is addressed by the IASB (International Accounting Standards Board) in the paragraph 23 of the Framework for the Preparation and Presentation of Financial Statements, which states that "financial statements are being prepared usually starting from the assumption that a company will continue to work and in the foreseeable future. Thus, it is assumed that the organization does not have the intention and the need to liquidate or significantly reduce its activity; if there is such a need or intention, then the financial statements might need to be prepared on a different assessment basis and, in this case, information about that basis will be submitted".

The importance of this principle for a true and fair image of the financial statements helped raise the business continuity principle, after some authors, to the rank of ***"operation continuity postulate".***

Historically speaking, the development of this principle is closely linked to the development of trade, credit and business life. Until the Renaissance, enterprises were established explicitly for the implementation of timely operations. Once completed those operations and determined the outcome, the enterprise was terminated. Another distortion from the understanding of this principle is also due to the character of the "family business", a feature taken over by the manufactures in the Middle Ages, which consists in assimilating the existence of an enterprise with the lifetime of its owners, which has contributed to the name of the principle in question: "the permanent enterprise". The mitigation and the disappearance of this approach took place with the coming up of the joint-stock companies.

Fighting these approaches on the business continuity principle should not lead us to the opposite extreme and say that now the company will have an indefinite or permanent lifetime. In fact, this requires that the entity will continue to exist for a period long enough so that the strategic objectives and the activities provided for their implementation can be achieved, and the undertaken commitments and contracts are respected.

Another approach refers to the fact that the observance of the business continuity principle implies that the existence of the company is longer than the useful life of its assets, which leads to the classification of assets in the balance sheet into long-term assets and short-term assets, and the differentiation of the company's assets by shareholders' wealth, long-term debts and short-term debts.

The practice of long-term depreciation of the tangible assets is a direct consequence of this principle. The concept of depreciation implies that the firm will be active for a long time; otherwise the cost of the asset does not bring future economic benefits and will be considered an expense of the buying year and will not be capitalized in the balance sheet for depreciation over several fiscal exercises. If there are serious doubts on the business continuity, it is preferable to present the liabilities in the following order: secured creditors, preferential creditors, ordinary creditors, preferred shares and ordinary shareholders wealth.

This principle is often seen as an argument supporting the appeal at the historical cost: if the company will continue its usual operations, then the current business will be developed further, the immobilisations will be used properly and so on. Market value rule (valid in terms of optics liquidation) is thus eliminated from pertinent considerations. It is now seen as an on-going process of creating value by transforming inputs into products and income, as a shift from cost (historical) values.

The continuity principle comes to solve the paradox that is the fact of presenting periodic information on a continuing business. This principle creates temporary recess reconciliation between the enterprise life and the economic reality, like a bond: financial statements should be interpreted in terms of business continuity, and they are not a final state. Taking into account the business continuity determines the significance of the information from the annual financial statements: if this does not occur in practice, the financial statements prepared based on the principles arising from this convention are false or at least are not true. The business continuity is not an assumption that we can tacitly accept, but it must be checked.

From a legal perspective, continuity postulate was first mentioned in the Anglo-Saxon and international texts. European Community, in turn, mentions this principle in the European Commission recommendation no. 4 from 1978 and in Directive IV. Although they did not mention this principle, the accounting plans issued by the French normalizing body in 1947 and 1957 published rules that are in line with generally accepted practices related to the continuity of exploitation: the depreciation of fixed assets, the use of settlement accounts, the display of certain expenses written in the asset, evaluation in the historical costs, etc.

Although the French general accounting plan from 1982 does not mention the continuity in the section on general principles (otherwise very underdeveloped) still refers to this when dealing with property valuation and rules of presentation of the summaries. Instead, the Accounting Law from 1983 inserts continuity in a separate article of the Code of Commerce. Until the application of the Law on preventing difficulties of enterprises of March 1st 1984, the French account officers (statutory auditors) had a relatively passive attitude towards this principle. Today, the law mentioned above (applicable to large companies) requires a greater vigilance from the Account Officer. The Account Officer may initiate the "alert procedure", demanding explanations from the Board of Directors, summoning its meeting or preparing a special report to be submitted to the general meeting of shareholders if, after examining the situation of the enterprise, aspects that come to compromise the business continuity are revealed.

Methodology

The implicit obligation of appreciation and judgment towards continuity raises a double question: to what level does this check has to be carried out and what are the criteria for checking the continuity? The appreciation of the (non) continuity can lead us to achieve an economic diagnostic of the enterprise. However, even by carrying out such a work, the trial of business continuity may prove to be a failure.

The trial of business continuity should not be a goal in itself: the idea of presumption rather implies that this convention will be accepted in the absence of proof to the contrary, that of non-continuity. On the other hand, the fact that the enterprise encounters some difficulties at some point, it is not necessarily a total or partial cessation of activity. It is advisable not to exaggerate this verification obligation, also taking into account the following observations:

There is no question of making a value judgment relative to the continuity of long-term activity, but only to validate the significance of the information produced in each fiscal year: the result is that the appreciation of business continuity will extend only to a fiscal year, i.e. for the next twelve months;

The fact that certain particular and temporary impediments make the business continuity uncertain does not justify the abandonment of this convention, which may be reflected in a partial or total transfer of business in the future, reflected as such in the financial statements;

It is not about making a choice between a very probable continuity and the perspective of transferring the business: the information can be underlined in the explanatory notes to the financial statements. Under the assumption that the continuity principle suffers erosion, the existing risk may be mentioned (specifying the nature of these difficulties or the reasons for which the principle was still maintained), a state that comes to relativize this principle.

Techniques and Procedures Employed By Auditors in Risks Assessment Using the Continuity Principle

Responsibilities for judging the principle of continuity of an entity are largely the responsibility of auditors, who must make public the non-continuity state in their report. In this respect, the auditor has the responsibility to assess the presumption of business continuity in the preparation of financial statements by the entity, by analysing the following possible situations:

- the principle of business continuity is tacitly accepted if no fact has been able to prove the opposite; however, it is advisable to specify the bases of preparation of the financial statements in the explanatory notes, in policies, in principles and in the accounting methods;
- continuity is questioned but not compromised - in this case, mandatory explanations are required in the explanatory notes to the financial statements, with an indication of the impact on the balance sheet and the results account;
- continuity is compromised - in this case the financial statements should be prepared and presented on different bases, taking into account the provisions of the domestic laws on the judicial reorganization and bankruptcy, republished.

Continuity of operation is estimated by the management bodies of the entity. Generally, the period concerned is the fiscal year following the closing. At the same time, there must be taken into account all the factors known when drawing up the accounts, even if their effects can occur after the end of the next fiscal year. Some events occurring after closing the accounts can replace the continuity of operation. When such events occur before approving the financial statements in the general meeting of shareholders it is necessary for the shareholders to be informed of this fact. However, this information is

necessary even when significant events occurred during this period do not replace the continuity of operation.

If events or conditions that could seriously cast doubt upon the entity's ability to continue its business have been identified, the auditor should:

a) review the management's action plans based on its own business continuity assessment;
b) gather sufficient audit evidence to confirm or deny if there is significant uncertainty, by performing the necessary procedures, including taking into account the effect of the plans of the management and of other contraction factors; and
c) obtain written statements from the management on the action plans.

Events or conditions that may cast significant doubt on the entity's ability to continue its activity can be identified during the planning of the engagement or during the execution of audit procedures. The process of considering events or conditions continues as the audit progresses. If the auditor believes such events or conditions may cast significant doubt on the entity's ability to continue its activity, certain procedures may take on added significance. The auditor inquires the management about its action plans, including its plans to liquidate assets, to borrow funds or to restructure debt, to reduce or delay expenditures, or to increase capital. The auditor also considers whether additional data or information are available from the date the management conducted the assessment. The auditor obtains sufficient audit evidence demonstrating that the management's plans are feasible and that the outcome of these plans will improve the situation.

Events or conditions that, individually or collectively, may cast significant doubt on the principle of business continuity can be classified into: financial items, operating items and others.

The category of financial items includes:

- Net debt or net current debt situation;
- Approaching of maturity of fixed-term loans without realistic prospects of renewal or reimbursement, or excessive reliance on short-term loans to finance long-term assets.
- Signs of withdrawal of financial support by borrowers and other creditors;
- Negative operational cash flows indicated by the historical or projected financial statements;
- Unfavourable key financial indicators;
- Substantial operating losses or significant impairment of assets used to generate cash flows;
- Overdue or discontinuance in payment of dividends;
- Inability to pay creditors on maturity date;
- Difficulty in complying with the terms of the loan agreements;
- Changing credit transactions in pay-to-delivery transactions with suppliers;
- Inability to obtain financing for the development of essential new product or other essential investments.

The category of operating items includes:

- Loss of key management members without their replacement;
- Loss of a primary market, franchise, license, or principal supplier;
- Labour difficulties or important shortages of supplies.

Other items may be:

- Non-compliance with capital requirements or other legal requirements;

- Actions in legal proceedings pending against the entity, which, if successful, may result in obligations that are unlikely to be met;
- Legislative or governmental policy changes expected to have a negative impact on the entity.
-

The significance of such events or conditions can often be mitigated by other factors. For example, the effect of an entity's incapacity to honour its payment obligations may be weighted by management's plans to maintain an adequate level of cash flows through alternative means, such as asset sales, rescheduling repayment of loans, or obtaining additional capital. Similarly, the loss of a principal supplier may be mitigated by the availability of an alternative source of supply.

The International Standard on Auditing (ISA) 570, „Business Continuity Principle" shows a series of procedures to be followed to obtain audit evidence about the (non) compliance of the business continuity principle:

- Analysing and discussing cash flow, profit and other relevant forecasts with the management;
- Analysing and discussing the entity's most recent available interim financial statements;
- Analysing the terms of obligatory loans and credit agreements, and determining the circumstances in which any term has been disregarded;
- Reading minutes of general meetings of shareholders, board of directors and committee meetings, important for any reference to financial difficulties;
- Asking the entity's lawyer regarding the disputes and damages required, as well as the reasonableness of their management's assessment of their outcome, and estimating their financial implications;
- Confirming the existence, legality and applicability of contracts that provide or maintain financial support concluded with third parties and affiliated parties, and assessing the financial capacity of such parties to provide additional funds;
- Taking into account the entity's plans for unfulfilled customer orders;
- Reviewing events after the end of the period for identifying those that either mitigate or otherwise affect the entity's ability to continue its activity on the principle of continuity.

Results and Discussion

The risks assessment based on the continuity principle is exemplified for a company from the hotels area and therefore this analysis may generate serious doubts concerning the capacity of the company to continue its activity in a predictable future. First the risks assessment was done on different areas (Table 1) and also the associated probability and impact were estimated. Consequently the risk rating was calculated as the product between the probability and the impact. Accordingly the risk classification was performed in four categories: low, medium, high and very high.

Table 1: Risks assessment and classification for different risk areas

AREA	RISK	PROBA-BILITY	IMPACT	RISK RATING	RISK CLASSIFICATION
Rooms					
Front office	Unrecorded revenues from rooms	3	4	12	High

	Fraudulent redirecting of customers to other units (hotel, services)	2	2	4	Low
	Unauthorized deviations from approved rates, front office	3	2	6	Medium
	Unauthorized adjustments to customer bills	2	2	4	Low
	Incorrect collection of customer payments (e.g. in foreign currency, wrong amount)	4	2	8	Medium
	Unrecorded revenues from other related services (e.g. phone, pay per view, SPA)	4	2	8	Medium
	Misappropriation of cash	2	3	6	Medium
	Poor customer experience	2	3	6	Medium
Revenue management	Unauthorized deviations from approved rates	2	4	8	Medium
	Pricing model not aligned with market positioning and company strategy	1	4	4	Low
	Excessive overbooking	1	3	3	Low
Reservations	Ineffective reservation model (e.g. overbooking versus lost opportunities)	2	3	6	Medium
Sales	Unauthorized deviations from approved rates (corporate, leisure, MICE)	3	4	12	High

Credit & collection	Accumulation of bad debt	4	3	12	High
	Ineffective credit risk policies	2	3	6	Medium
	Approval of transactions with customers that are not credit worthy	3	3	9	Medium
	Ineffective collection activities	2	3	6	Medium
Housekeeping & laundry	Low quality of housekeeping activities	2	2	4	Low
	Misappropriation of inventory	3	2	6	Medium
Minibar	Unrecorded minibar sales	2	2	4	Low
F&B					
Bars & Restaurants	Unrecorded revenues from F&B	4	3	12	High
	Unauthorized adjustments to customer bills (discounts, returns, cancelled orders)	4	2	8	Medium
	Incorrect collection of customer bills	3	2	6	Medium
	Misappropriation of cash	3	2	6	Medium
Banqueting	Unauthorized deviations from the approved pricing model	3	4	12	High
	Excessive use of external services (e.g. leased staff: number or rates)	3	3	9	Medium
	Unauthorized redirect of customers to	3	1	3	Low

	preferred suppliers				
Inventory management	Inaccurate recording of consumption of inventory	4	3	12	High
	Inaccurate recipes set-up in the system	3	3	9	Medium
	Ineffective periodic inventory count process	3	3	9	Medium
	Inventory misappropriation	3	3	9	Medium
	Losses due to expired products	2	3	6	Medium
	Accumulation of slow moving inventory	2	2	4	Low
	Ineffective menu engineering (e.g. estimated no of orders to lead purchases)	2	2	4	Low
Procurement	Inadequate purchase volumes (excessive stocks; stock outs)	3	2	6	Medium
	Unrecorded inventory purchases and sales	3	3	9	Medium
	Low value-for-money (overpriced) purchases - e.g. form single source, no bidding, emergency	3	4	12	High
	Fictitious purchases (paid and not received)	2	4	8	Medium
	Acceptance of inappropriate products (expired, poor quality)	3	4	12	High
	Kickbacks or commissions from suppliers	3	3	9	Medium

Other activities					
Real estate	Rent not invoiced as per approved contracts	2	3	6	Medium
	Utilities not invoiced to customers	2	1	2	Low
	Accumulation of bad debt	3	2	6	Medium
	Unauthorized or fictitious expenditure (e.g. maintenance, repairs, real estate agents)	3	2	6	Medium
SPA	Unrecorded revenues	4	2	8	Medium
	Unauthorized adjustments to customer bills (discounts, returns, cancelled orders)	4	2	8	Medium
Travel services	Unrecorded revenues	2	2	4	Low
	Unauthorized adjustments to customer bills (discounts, returns, cancelled orders)	2	2	4	Low
	Unauthorized or inaccurate payments to providers	2	3	6	Medium
HR					
HR management	Lack of qualified staff (consider seasonality)	4	2	8	Medium
	Loss of key employees and management	4	3	12	High
	Inconsistent performance evaluation of staff	3	2	6	Medium

	Use of workforce without fully valid employment contracts	2	5	10	High
	Unauthorized hiring / dismissal of staff	2	3	6	Medium
	Non-compliant staff termination process (e.g. litigation risk)	2	4	8	Medium
	Unfair tips allocation rules	3	1	3	Low
Payroll	Unauthorized base salary levels or deviations from approved range	3	3	9	Medium
	Unauthorized changes to employee database	3	2	6	Medium
	Ghost employees on payroll	2	3	6	Medium
	Inaccurate employee payroll cut-offs (new hires; leavers)	2	2	4	Low
	Fictitious attendance or overtime	4	3	12	High
	Inaccurate calculation of bonuses (sales, management)	3	3	9	Medium
	Inaccurate management of days off (holiday, sickness, etc.).	3	2	6	Medium
	Incorrect payment of salaries	1	3	3	Low
IT					
Systems	Core systems are not aligned with the business operating model	4	3	12	High

	Inconsistent system development methodology	3	2	6	Medium
	Acquisition of hardware/software with inadequate specifications	1	3	3	Low
	Capacity overload	1	3	3	Low
Security	Breaches or hacks in the IT infrastructure	3	3	9	Medium
	Incorrect definition of access rights (incl. segregation of duties, account sharing)	4	4	16	Very High
	Download of harmful malware or viruses by staff	2	4	8	Medium
	Fraud due to lack of IT application controls	3	4	12	High
	Leakage or disclosure of private or confidential data	2	3	6	Medium
IT administration	Inefficient or low quality IT support to the business	3	2	6	Medium
Disaster recovery & business continuity	Impossibility to run business due to systems failure	1	5	5	Medium
	Critical data losses	2	5	10	High
	Back-up or disaster recovery failure	1	4	4	Low
Marketing & business development					
Marketing & business development	Inappropriate marketing expenditure	2	3	6	Medium

	Fraudulent business conduct (bribery and corruption)	2	4	8	Medium
General procurement					
General procurement	Poor value-for-money of purchases (e.g. excessive prices)	3	4	12	High
	Invalid purchase requisitions or orders	2	2	4	Low
	Fictitious receipt of goods and services	3	3	9	Medium
	Lack of supporting documentation for deliveries or services (e.g. contracts, etc.)	3	3	9	Medium
	Procurement fraud (e.g. incentives from suppliers)	3	3	9	Medium
	Unauthorized returns, price or quantity adjustments	4	2	8	Medium
Outsourced services	Poor quality of services	3	3	9	Medium
	Inaccurate calculation of billing	3	2	6	Medium
Capex and Property management					
Capex projects	Unauthorized capex investments	1	4	4	Low
	Acceptance of inadequate works	3	4	12	High
	Investments without a proper business case analysis	1	4	4	Low
Safeguarding of assets	Ineffective security measures to protect	3	3	9	Medium

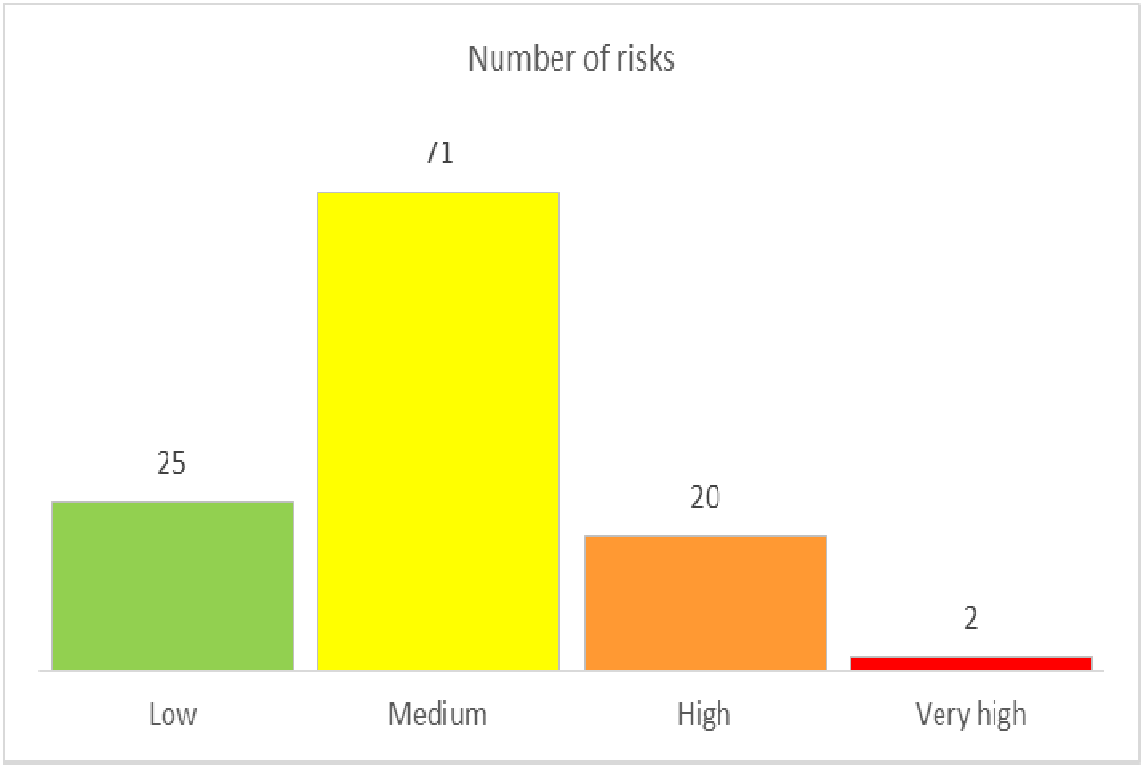
	company's assets				
	Weak physical assets count process	3	2	6	Medium
	Unauthorized disposal of assets (incl. selling price)	2	3	6	Medium
Petty inventory	Misappropriation of petty inventory (from rooms, administrative)	3	3	9	Medium
Administrative & maintenance	Lack of appropriate insurance coverage for all properties	3	4	12	High
	Ineffective preventive maintenance	1	4	4	Low
	Excessive utilities consumption and costs	3	3	9	Medium
Compliance and security					
Authorizations & Permits	Lack of key permits and authorizations	3	4	12	High
Safety & Security	Ineffective security measures	3	3	9	Medium
Compliance management	Lack of knowledge of all compliance requirements	3	3	9	Medium
	Ineffective compliance monitoring process	4	4	16	Very High
Treasury and Debt					
Petty cash	Cash misappropriation	4	2	8	Medium
	Non-compliant cash transactions	4	2	8	Medium
Cash at banks	Unauthorized transactions	1	4	4	Low
Debt	Unauthorized transactions	1	4	4	Low

	Non-compliance with debt covenants	2	4	8	Medium
Finance & Accounting					
Accounting policies	Noncompliance with revenue recognition principles	3	3	9	Medium
	Incorrect or poorly documented accounting policies	2	3	6	Medium
	No accrual basis for transactions	3	2	6	Medium
	Inconsistent accounting treatment across all locations	3	2	6	Medium
	Unrecorded liabilities and supplier cut-off	4	3	12	High
Financial closing and reporting	Inaccurate management reporting	3	3	9	Medium
	Delays in closing and producing the financial reports	4	3	12	High
	Management manipulation of financial statements (e.g. profitability)	1	3	3	Low
	Ineffective budgeting process	2	3	6	Medium
Tax	Incomplete or insufficient supporting documents to prove deductibility of expenses	3	3	9	Medium
	Non-compliance with tax legislation (reporting, filing, calculation)	3	3	9	Medium
	Lack of knowledge of changes and	2	4	8	Medium

	developments in tax legislation				

A general overview of the risks number calculated on different risk categories is shown in Table 2. It can be observed the prevalence of medium risks and even if the number of very high risks is rather low this may be an alarm for estimated future of the organization concerning the principle of continuity.

Table 2: The overall risks number on different risks categories



The results for impact analysis are presented in Table 3 considering the influence of various degree of impact against the main components of activity.

Table 3: The impact analysis

Impact	Services quality	HS&S	Legal	Regulatory	Reputation / brand impact	Strategic Objectives	Financial
5 Catastrophic	Potential severe effect on customer satisfaction and customer loyalty. Inability to provide services for a prolonged period of time, leading to losses of significant clients	Fatality/ies and/or environmental disaster resulting in adverse health effects amongst customers. Regulatory & government intervention.	Potential criminal prosecution, very high fines and/or executive officer imprisonment. Prolonged, multiple litigation.	License withdrawal, forced closure of site. Penalties from regulators.	Very high: significant media coverage, long term damage to the brand in Romania. Public statements required by local/group management.	Business is unable to meet one or more strategic objectives.	Greater than 25% of GOP
4 Major	Potential severe effect on customer satisfaction. Inability to provide services for a limited period of time or in one location.	Injury or illness causing permanent or prolonged impairment.	Potential criminal prosecution, with significant fines and/or multiple litigation.	Significant business disruption due to penalties from regulators.	High: regional/national media coverage, major categories of key stakeholders impacted negatively (customers, suppliers). Major dissatisfaction within key groups.	Significant impact on the business' ability to achieve its strategic objectives.	5% to 25% of GOP

3 Moderate	Client complaints higher than usual in a single unit, single type of service. Delays in providing services.	Injuries or illness causing hospitalization or job restriction.	Allegation of serious breach of regulation with investigation or report to authority with potential for significant fines.	Lack of confidence in one or more elements of local management system. Voluntary restatement of financial statements/ disclosures.	Medium: some groups of third parties may be affected (e.g. suppliers, customers, employees). Situation requires management communication with the impacted entities. Some dissatisfaction.	Minor impact on critical business strategic objectives. Some resources will be allocated to manage impact.	2% to 5% of GOP
2 Minor	Low impact on quality of services delivered, minor disturbances for the business and impact not visible to customers.	Injuries or illnesses requiring medical treatment beyond first aid, but no hospitalization.	Limited legal issues (e.g., individual civil action).	Requires notification to or involvement of regulators. Agreement with regulators to provide additional info in the future to clarify financial statements/ disclosures	Low: some individual third parties / authorities may be affected temporary situation can be managed by communicating. Low level of dissatisfaction.	Negligible impact on critical business objectives. Additional internal management may be required to minimize the impact.	0.5% to 2% of GOP
1 Insignificant	No effect on customer service.	Potential minor illnesses or injuries requiring no medical attendance or first-aid.	Legal challenge with modest out-of-court settlement.	Limited regulatory implications. Regulators request clarity around financial statements/ disclosure.	No reputation impact; impact not visible outside the organization.	Negligible impact on business' objectives. Impact can be managed through normal activity.	Less than 0.5% of GOP

The main details concerning the likelihood analysis are shown in Table 4.

Table 4: Likelihood analysis

	Guidance
5 Almost certain	· Incidents occur frequently. · Significant number of incidents might occur each year. · Control measures are not defined or are inadequate.
4 Likely	· One or more incidents might occur in a year. · Personnel would not be surprised by incident.
3 Possible	· An incident might happen every 1 - 5 years. · An incident may have happened at another company. · Controls may be breached.
2 Unlikely	· Incident foreseeable but probability very low. · May see several incidents during working life (40 year period).
1 Rare	· Incident might be seen once during working life. · Probability of incident close to zero. · Controls are robust.

A correlation between the impact and likelihood to give a final risk level is shown in Table 5.

Table 5: The interrelated values of impact, likelihood and risk category

		Impact				
		1	**2**	**3**	**4**	**5**
Likelihood	**5**	**Medium**	**High**	**High**	**Very High**	**Very High**
	4	**Medium**	**Medium**	**High**	**Very High**	**Very High**
	3	**Low**	**Medium**	**Medium**	**High**	**High**
	2	**Low**	**Low**	**Medium**	**Medium**	**High**
	1	**Low**	**Low**	**Low**	**Medium**	**Medium**

Conclusions

The risks assessment in any auditing process may be reported in relation with the continuity principle and therefore may include the estimation of the likelihood and impact of any risk from the considered areas of activity.

From analysis and assessment of risks which may rise the question of capacity of the organization to continue its activity in an estimated future, two main opinions may be advanced by the auditor:

1. The assumption of continuity for the activity considered by the organizational management is adequate;
2. No significant uncertain which may call in question of organization capacity to continue the activity in a predictable future was identified.

References

Dobroteanu, L. and Dobroteanu, C. (2002) Audit, national and international approach, Ed. Economica Bucharest, chapter 5.

Feleaga, N. and Ionascu, I. (1998), Handbook of financial accounting, Ed. Economica, Bucharest, chapter 4.

Sahebjamnia, N., Torabi, SA. and Mansouri, SA. (2015), `Integrated business continuity and disaster recovery planning: Towards organizational resilience,` *European Journal of Operational Research*, 242 (1), 261-273.

The International Standard on Auditing (ISA) 570, „Business Continuity Principle"

Toma, M. (2007), Initiation in enterprises assessment, Ed. CECCAR, Bucharest, chapter II.

Torabi SA, Giahi, R. and Sahebjamnia, N. (2016), `An enhanced risk assessment framework for business continuity management systems,` *Safety Science*, 89, 201-218.

Zeng, Z and Zio, E. (2017), `An Integrated modelling framework for quantitative business continuity assessment,` *Process Safety and Environmental Protection*, 106, 76-88.

Development of human capital in the context of digital transformation

Inna Gunina, Voronezh State Technical University, Voronezh, Russia, 642663@mail.ru

Galina Zenina, Voronezh State Technical University, Voronezh, Russia, zgd999@rambler.ru

Tatyana Narolina, Voronezh State Technical University, Voronezh, Russia, narolina@inbox.ru

Yulia Pahomova, Voronezh State Technical University, Voronezh, Russia, Yulia198007@mail.ru

Olga Dudareva, Voronezh State Technical University, Voronezh, Russia, dudarevaov@mail.ru

Abstract

The system of education penetrates into all society structures, relates to each economy sector and any sphere of human activity, which means that the trends of the development in the strategic programs of socio-economic development of the region can be proposed only from the perspective of taking into account direct and spillover effects of education system impact on the society. The article examines strategies for assessment of changes influence in professional and higher education over processes of social and economic development of the region; the model of educational institute development on the basis of principles of digital economy is proposed. The current state of professional and higher education in Voronezh Oblast is considered.

Keywords: university 4.0, industry 4.0, digital economy, economy digitalization.

Introduction

Economy digitalization, characterized by penetration of digital technologies almost in all branches, becomes a strategic mission of the country development recorded in the Scientific and Technological Development Strategy of the Russian Federation of 01.12.2016. Economy digitalization proposes to enterprises, branches and territories a necessity for understanding and transformation of new values, new management principles and methods, new criteria of efficiency. In our opinion, the following will become the key factors (see Figure 1):

- customer-oriented approach: if profit was a major factor of competitiveness in the context of industrial economy and undersaturated market, then in the context of saturated market not only short-term financial result which is important but also an efficiency duration which is reached through customer-oriented approach;
- design-oriented approach: swift introduction of digital technologies into all branches leads to an inevitable reengineering of business processes which are implemented through design-oriented approach;
- networking: merging of enterprises, structures, organizations under conditions of horizontal cooperation and partnership in the context of economy globalization and competition for customers is certainly a more effective mechanism, than rigid organization verticals;
- cognition and creativity: uniqueness of decision-making in the rigid turbulent environment, in fact, is a key factor in competition for market and consumer;
- corporational nature of culture: the most important factor of consumer conquest in the context of digitalization is company's reliability, long-term relations with suppliers, steadiness and value orientations propagated by the company. We consider that corporate culture includes issues of participativity, business socialization, intercommunication interactions among employees, their ability to interact with partners in business and with clients;

- management decisions speed – the major factor in implementation of digital projects where one, who comes to finish first, wins competition for market and consumer;
- innovative infrastructure is a formation of the corresponding support system of innovations introduction and management in the region;
- developed human capital is the resource, without which digital transformation is not possible.

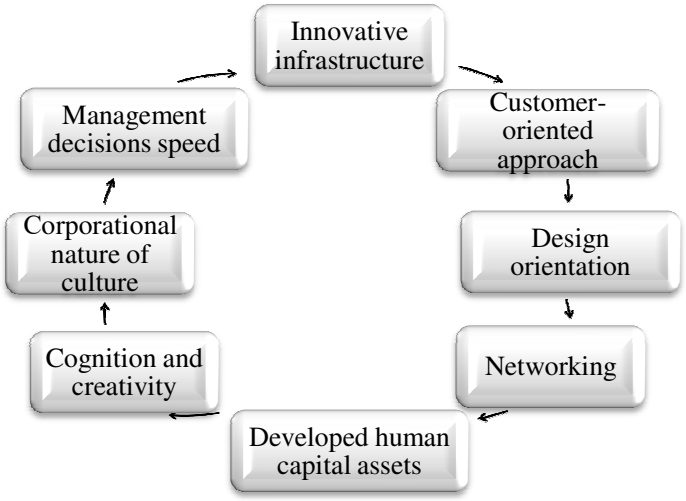


Fig. 1: Factors of company's competitiveness in digital economy

Human capital is certainly a top-priority factor among those listed in the figure, only this factor makes it possible to create relevant to realities innovative infrastructure. This task demands a careful analysis of the region educational system existing state from the perspective of its opportunities to train specialists for Industry 4.0.

Problem Statement

The "manufacturing industry" concept on the level of human society civilization development has passed through four stages:

- first stage – "Industry 1.0" - was based on development of agricultural technologies, extraction of mineral resources and raw materials through natural energy;
- second stage – "Industry 2.0" - is connected with emergence and development of industrial revolution;
- third stage – "Industry 3.0" - is focused on automation of separate machines and processes;
- fourth stage – "Industry 4.0" - means transformation of economy through transparent digitalization of all technologies and branches participating in value chains.

Phase trends of higher and professional education development within transformation of industries are schematically presented in Figure 2 below.



Fig. 2: Phase transformations and university and professional education future

The first element on the way of formation of innovative environment of dynamic development of the region in the context of economy digitalization is the developed potential of training of workers and medium level professionals.

Review of Literature

The researchers suggest applying different techniques for the analysis and assessment of spillover effects on the processes taking place in a region. From our viewpoint, the most significant one is a foreign technique assessing the impact of universities on the regions which was developed in the framework of the project "Review of Higher Education Institutions in Regional Development" of the Programme on Institutional Management of Higher Education by the Organisation for Economic Co-operation and Development (OECD).

The development of the OECD's method is reflected in the studies carried out by Russian scientists O. V. Perfilyeva and T. A. Meshkova They propose to carry out a comparative analysis of the strategic indicators of socio-economic development and the needs of the entities of the Russian Federation with the capabilities of regional higher education system by means of analyzing (Chengqi W., Zhongxiu Z., 2008), (Aitken B., Harrison A., 1999), (Lin Zhang, 2017):

- the socio-economic indicators of the development based on the indicators of official statistics, strategies of socio-economic development of regions, strategies and concepts of socio-economic, scientific and technological development, education system development;
- the environmental indicators of the interaction of higher education institutions and the region for three levels: global, national, regional;
- the potential of regional higher education institutions for solving regional political, social, scientific, technological and innovation tasks.

The problems of indirect effects from the development of higher education are dealt with by Tolstykh T. et al (2017).

Results

Analysis of educational system of Voronezh Oblast showed: in 2016 the system of professional education of Voronezh Oblast included 57 professional educational institutions and 33 educational institutions of higher education, with total number of students being 148 thousand people, including: 33.2 thousand people, taking programs of secondary professional education, 114 thousand people, taking programs of higher education (see Figure 3).



Fig. 3: The main indices of professional educational institutions, training skilled workers, employees

For the purpose of formation of multilevel multidisciplinary professional educational institutions, training staff for working professions and specialties of secondary professional education in the context of economy digitalization as well as in accordance with requirements of employers, it was necessary to reorganize the professional educational institutions network to make it meet the requirements of new digital economy. In Voronezh Oblast such reorganization was carried out among criteria of reduction of the regional budget inefficient expenditure, strengthening of material and technical resources of organizations, training of specialists for most popular professions and specialties of secondary professional education according to applications of employers taking into account regional labor market demand. As a result, the number of professional education institutions has drastically reduced.

Dynamics of professional education system structure of Voronezh Oblast for the last five years (see Figure 4) demonstrates that with general decrease in number of applicants wishing to master blue-collar occupations, in general, an increase in technical professions admission has been registered. Also, decrease in prestige of blue-collar occupations of agrarian and agricultural sector has been noted. It is connected both with demographic situation, and with tendency to resettlement of rural youth to the city, which has been developing over the last decades.

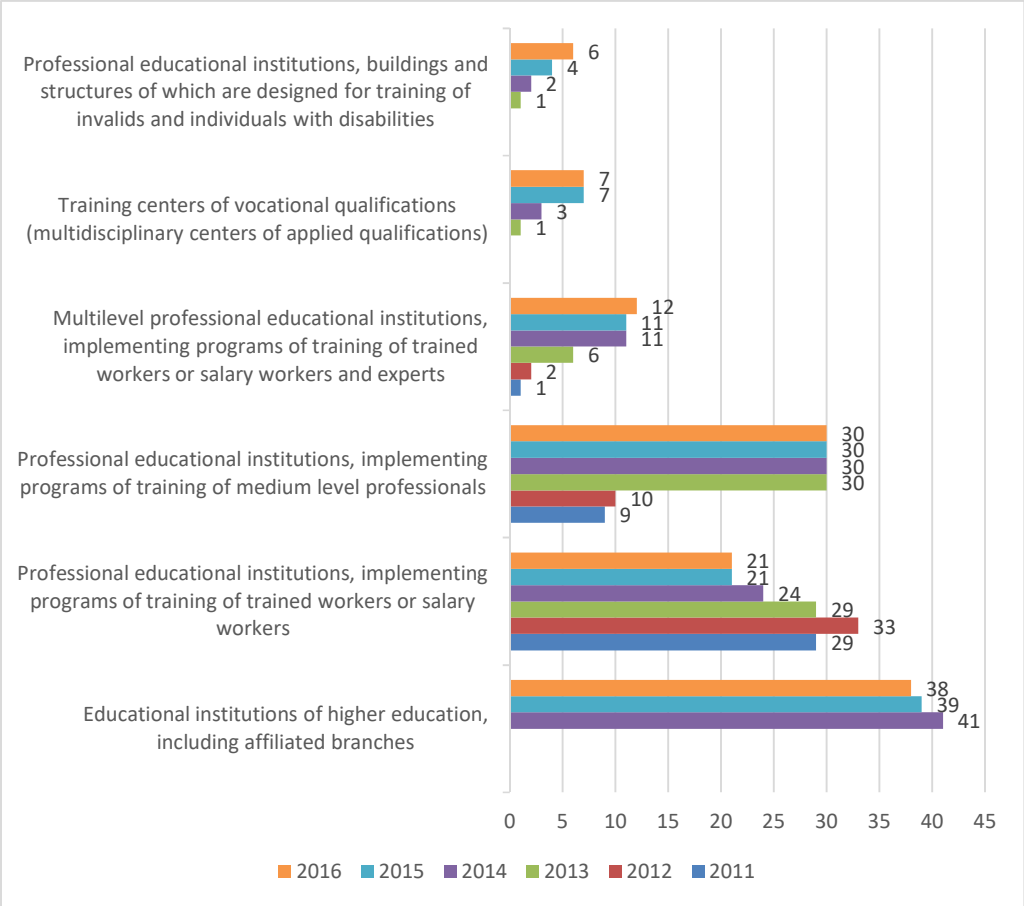


Fig. 4: Structure of professional education system of Voronezh Oblast in 2011 - 2016

With general decrease in number of applicants, an increase in technical professions admission has been registered, as well as a decrease in demand for social and economic and humanitarian professions. It completely corresponds to the forecast of social and economic development of the region and the Russian Federation. Increase in level of satisfaction of Oblast residents of regional education sphere illustrates the index of "Satisfaction of the population with condition of basic education" in Voronezh Oblast which in 2016 totaled to 73.0% (in 2015 – 71.1%). With reference to this index Voronezh Oblast ranks 23 among territorial entities of the Russian Federation (in 2015 – 40).

Influence of digital economy trends over the professional education system of Voronezh Oblast became apparent through the fact that, for example, in 2016 a portion of students using remote educational technologies, electronic training amounted to 0.17% in relation to the total number of students.

To date, special value is given to the role of higher school and professional education in commercialization of scientific and technological knowledge, created within research laboratories. The amplifying role of technologies transfer from universities to production and necessity of developing of more "rapid" relationship between science, technology˘and consumption led to an emergence of a number of enterprise initiatives within scientific institutions.

With regard to higher education system, Voronezh Oblast is one of the most developed in CFD. In 2016, 24 higher educational institutions were functioning, the total number of their students amounted to 112.7 thousand people. In Voronezh Oblast HEIs there are studying nearly 36% of HEIs students of CBER, number of graduates exceeds 34% of the total number of graduates all over CBER. With reference to number of higher educational institutions, rate of contingent of their students (in

2015/16 ac. year – 99 thousand people), Voronezh Oblast steadily ranks third in CFD, giving place only to Moscow and Moscow Oblast, the 14th - in all-Russian ranking.

One of innovative activity indices of the region can be an efficiency of Small Innovative Enterprises (SIE), created and functioning for the most part at higher education institutions.

In the regions rating of financing amount of projects of the Small Enterprise Assistance Fund in Scientific and Technical Sphere in 2014 Voronezh Oblast ranked 37, in 2015 – 17, and in 2016 - 28. Thus, in three years Voronezh Oblast rose in rating by 9 positions, though in the period of 2015-2016 the rating of the region went down by11 positions. During the period of 2015-2016, SIE innovative activity indices of the region went down in comparison with the previous periods, that characterizes insufficient use of available potential capacity of Voronezh Oblast in the sphere of knowledge commercialization.

Consequently, it is possible to come to the conclusion that there is a noticeable gap between high educational, scientific and technical potential capacity of the region and a real low susceptibility of its production system to innovations. Occupying a leading place in CFD in reference to the main characteristics of educational innovative potential, Voronezh Oblast considerably lags behind other regions by level of its use. With reference to organizations innovative activity index, specific weight of innovative production, Voronezh Oblast occupies only the 7th place, with reference to the number of used advanced production technologies – the 9th place in CFD.

Therefore, new models, mobilizing innovative activity in higher and professional education system, are necessary. One of such models of transformation of professional education is its horizontal integration through innovative clusters or campuses with system of higher education. By educational campuses or clusters we mean creation and formation of a common educational, information and supporting complex, including interaction of interests of educational services customers, including government institutions, industrial enterprises, business structures, consumers and performers. An advantage of such horizontal structure is the possibility of practical use of gained knowledge, which is realized through partner interaction of production, science, business projects and education.

Other educational model in economy digitalization can become the model of “entrepreneurial university”, which implements not only a transfer of knowledge, technologies, innovations, but also initiates and commercializes innovations both in professional educational institutions and outside of them through spin-off and entrepreneurship.

By spin-off in education system we mean Small Innovative Enterprises founded on the basis of a higher education institution or detached from it for the purpose of commercialization of innovative developments. And by entrepreneurship – innovative ventures in large corporations which are expressed in formation of special innovative infrastructure allowing to grow up new generation of intracorporate businessmen – innovators, who search out opportunities and internal resources for development of new technologies, new production, and new scope of activity. University spin-off companies reflect a transfer of knowledge into a new company, by means of which initialization of new knowledge and commercialization of innovations are implemented. External spin-off companies and entrepreneurship are the result of emerging of spillover effects of institutional system as a consequence of innovative ventures development of the region.

Conclusion

While implementing the enterprise model, educational establishment has an opportunity of formation of scientific activity commercialization institutes, stimulation of inventive activity, and scientific thought generation, and efficiency growth, and study personnel capitalization.

Effective, mutually beneficial and long-term cooperation between educational establishments and real economy entities allows to form and develop the potential of engineering and technical staff and innovative activity in the region. Universities and professional educational institutions can be not only a part of innovative ecosystems, which are being created in regions, but they have all opportunities to

become an integrating element of such system.

References

Tolstykh, T., Vertakova, Y., Shkarupeta, E., Shishkin I. and Krivyakin K. Assessment of the Impact of Higher Education Development on the Social and Economic Processes in the Region / Education Excellence and Innovation Management through Vision 2020: From Regional Development Sustainability to Global Economic Growth. Proceedings of the 29th International Business Information Management Association Conference (IBIMA), 3-4 May 2017 Vienna Austria. 2017. P. 2180 – 2191.

Kupriyanovskii, V.P., Dobrynin, A.P., Sinyagov, S.A., & Namiott, D.E. (2017). 'Transformation complete model in the digital economy - how to become digital leaders'. International Journal of Open Information Technologies, 5(1).

Tolstykh, T., Vertakova, Y., Sviridova S., Shkarupeta E., Shishkin I. (2016). 'Development of Methods and Models for Analysis the Effectiveness of Commercial Activity of Industrial Enterprises'. Proceedings of the 6th EACO International Scientific Conference, ISBN: 978-80-905405-2-1, 8-9 December 2016, Krakow, Poland, 139-155.

Tolstykh, T. O., Shkarupeta, E. V., & Shishkin, I. A. (2017). 'Innovative changes influence effects on processes region social and economic development'. Proceedings of VSUET, 79(1).

Andreeva, E. L., Gluhikh, P. L., & Ratner, A. V. (2017). Development strategy. Economic and social changes, No 6 (36) 2014, 21.

International Association of Universities. (2014). 4th Global Survey: Internationalization of Higher Education - Growing expectations, fundamental values. Paris.

Efimov, V. S., Lapteva, A. V., & Dadasheva, V. A. (2012). Russia higher school forsythe: new missions and functions, perspective technologies and activity formats. University management: practice and analysis. 2012.№ 3, 13-48.

Neustoev, S. S., & Simonov, A. V. (2015). Innovative directions of electronic training development. The Human and Education, (3 (44)).

Luksha, P., & Laszlo, A. (2017, February). Education for Anthropocene Governance Part I and II. In Proceedings of the 59th Annual Meeting of the ISSS-2015 Berlin, Germany (Vol. 1, No. 1).

Savinova, S. U., & Shubnyakova, N. G. (2015). Project activity in vocational bachelors-managers training. Innovative projects and programs in education, (5).

Gorbunov, I. G., & Surtaeva, N. N. (2016). Pedagogical competences development and preservation as social and economic effect. The Human and Education, (3 (48)).

Integrated Model for Information Systems and Agriculture Sector: A Perspective of Developing Nations in Asia

Mohammad Falahat,
Centre for Sustainable Development and Corporate Social Responsibility in Business (CSDCSR), Faculty of Accountancy and Management, Universiti Tunku Abdul Rahman (UTAR), Sungai Long, Malaysia
Email : falahat@utar.edu.my

Murali Raman,
MMU Business School, Multimedia University (MMU), Persiaran Multimedia, Cyberjaya, Malaysia
Email : murali.raman@mmu.edu.my

Melissa W. Migin,
Faculty of Management (FOM), Multimedia University (MMU), Persiaran Multimedia, Cyberjaya, Malaysia
Email : melissa.migin@mmu.edu.my

Abstract

Information systems (IS), and Information Technology (IT), has now become a key component of a corporation's global business and an integral component within the standard method of operations. This exploratory paper examines the role and relevance of IS and IT in the context of the agricultural sector. This paper focuses on emerging of IS in the form of data warehousing and geographic information systems, to discuss how these systems can impact on the agricultural sector. Specifically, it examines the role of IS within the agricultural sector in Asia. We propose a web-based technology driven project to bridge the gap between the academic and practical environment in the context of IT-agricultural research. This web-based system is called the Central Exchange Unit (CEU), can be used for future research to understand better how information systems might impact the agricultural communities in general. In overall, the intention is to offer a conceptual model that can be developed, used and tested by other researchers working in this domain.

Keywords: Information systems; Agriculture; Data warehousing; Asia; Information Technology

Introduction

IS and IT have become an integral component of the standard method of operations for many companies and industries across all countries. Establishing and operating business processes that involve significantly large volumes of transactions, requires cross-functional expertise such as technical, marketing, customer relations and advertising skills. Examples of traditional sectors that have utilized information and communication technology to redesign strategy for product/service offering are banking and finance, print and publication, education, manufacturing, and retail. This paper contributes to the literature by reviewing and examining the role of information systems within the agricultural sector in Asia and proposes a conceptual model that can be further developed, and tested by other researchers working in this domain. This paper proceeds as follows. The next section presents a summary of our review of literature pertaining to the use and application of IS in several agricultural initiatives in Asia. We then present a model that can be considered by future researchers to examine further the role of IS in light of the farming community in general.

Literature Review

Data warehousing and Agriculture

A data warehouse refers to a database that contains a significant amount of data of any kind (Laudon and Laudon, 2006). Data warehousing permits the storage of data of various sorts that can be used to examine data from different perspectives. Data within a warehouse can be considered to ascertain the existence of a particular behavior (Turban et al., 2006). Traditionally, data warehousing principles have been applied to better understand customer purchasing patterns, product defect ratios, sales patterns, and corporate related financial projections. Data mining is a feature inherent in most data warehousing systems. Data mining refers to the process of analyzing data stores to discover the previously unknown relationship among data.

This implies that a data warehouse can be applied to the context of agriculture as well. Specifically, agro-scientists with the support of technical staff can feed a data warehouse with agricultural-related data such as crops productivity over a period, nature of climate in a given period, soil texture, composite material used, irrigation data and so on. These datasets can be mined in search of patterns that might yield the highest productivity levels for a particular crop, given different combinations of the factors of production, and environmental forces that govern such a productivity rate.

Reddy (2004), states that one of the major problems faced by farmers these days is the lack of expert information based on research that can be received by the farming community promptly. To bridge the gap between the researcher and the farmers, he proposes a system framework (agrIDS) by exploiting Information Technology (IT) to disseminate the information to improve crop productivity. The main benefit of having this IT based system is that it is effective in terms of time (e.g., timely advice) and cost (e.g., vast specialization of the domain which can be expanded into a variety of crops). Data warehousing technology drives the agrIDS system. Although this system offers benefits to the farmers regarding increasing the productivity of production with a reduction of costs and agricultural input, this system cannot solve all the problems the farmers would normally face such as lack of acceptance of the produce in the market or issues about natural disasters. However, he claims that the aim of this IT based system is to resolve the issues that disturb the crops and improve productivity by examining productivity patterns based on simulated data fed into a great data warehouse. He highlighted that agrIDS architecture could be built using IT with the utilization of data warehousing, the internet and also data mining technology. The author further asserts that this framework is proposed only in India and has yet to be developed in other parts of the world. Conclusively, the author stated integration of agriculture and IT which makes the system flexible and the possibility of vast specialization domain for most crops.

Knowledge Management Systems and Agriculture

Knowledge Management (KM) is about capturing knowledge created in an organization and making it available to those who need it to make decisions. Alavi and Leidner (2001) define a knowledge management system (KMS) as any IT system that is used to support the process of knowledge creation, storage, sharing, and dissemination in a given community of interest. The emphasis of KM research is focused on KM impacts on organizational performance and competitive enhancement (Von Krogh 1998; Hackbarth 1998; Davenport and Prusak 1998; Alavi and Leidner 2001, Jennex and Olfman 2005 and 2006). Nevertheless, this does not mean that KMSs are irrelevant to the agricultural sector. Deraman et al. (2000) examine the effectiveness of the role of Information Technology (IT), which manifests itself in the form of a KMS to relay, access, and share information and agriculture-related knowledge within a rural farming community in Malaysia. This KMS called Taninet (Farmers Network in English) is developed using Internet technology. They present a case study that promotes the use of KMS within the farming community by proposing a web-based system, i.e. Taninet. The Taninet architecture consists of two dimensions: software engine dimension and event-based dimension. The software engine's core features

include, among others, an expert database solution, query service, product database, and archive system which provide timely advice and updated information for farmers. As for the latter, its main function is comprised as an online survey, online tutoring, and conferences that collect information from the farming community. The main objectives of this system are to provide online searchable information and services, forums, and expert advice on agriculture and biotechnology. With these aims in mind, a case study was conducted in the state of Selangor which indicated that farmers are slowly moving away from the traditional farming and shifting towards the entrepreneur forming method.

The authors claimed the external assistance required in realizing the entrepreneur method can be achieved with the help of Internet technology. Although the implementation of this case study was a success, few limitations were reported. Firstly, the web-based KMS project was conducted for a one-year period. The limited project lifespan prevented the project from being self-sufficient regarding financing itself given the lack of advertisement revenue posted on the website. Also, more focus should be on the younger generation for it is easier to educate them on the usage of the Internet and KMSs in particular to share information and knowledge dedicated to the farming community. Thirdly, one of the best ways in promoting the KMS usage would be the event-based approach, but it needs substantial investments and workforce. Conclusively, this web-based project can be implemented in full scale with the condition it has sufficient time and introduce business-to-business (B2B) platform among agencies within the agricultural community and may generate revenue which is used to maintain and sustain Taninet. This Internet-based application (Taninet) has a potential to become the main agricultural knowledge portal for the farming community in Malaysia.

GIS in Agriculture

Pongsrihadulchai (1998) explores the role of geographic information systems (GIS), in the context of agriculture in Thailand. The Thai government used GIS to ascertain the suitability of planting a particular type of crop given a particular topographic condition. The relevant authorities in Thailand collected a variety of maps (e.g., basin map, soil series map and legal forest boundary map) and fed these into the GIS software to determine the suitability zone for each crop. The final decision was influenced by other economic indicators such as farm price, yield per unit area, and cost of production. The second aim of the GIS project was to utilize the Internet technology to conduct a two way communication between the government and the farmers and amongst themselves in order to have a smooth flow of information. Although the first phase of the project was implemented successfully, many obstacles have yet to be rectified, post eight years of implementation. The biggest problem faced is the lack of support from local organizations due to lack of belief in the potential benefit the GIS solution would bring to the local farming communities in Thailand. Even though this project was not fully implemented due to the economic crisis that hit Asia in 1998, if implemented effectively, GIS has the potential to save the government's budget and personnel in the long run, and eliminate the information gap from the original source to the end users of information. GIS solution is popular within the mainstream oil and gas, defense, and retail industries. GIS solutions permit managers to make a better decision about establishing business location, building utility pipes and for a wide variety of reasons. A similar application of GIS might be relevant to the farming community worldwide, assuming issues such as expertise and implementation costs are addressed.

Agricultural Websites

On a more pragmatic scale, information systems can be used within the agricultural sector, as a platform and mechanism to transmit information between members of a given agricultural community. Lin (1998) introduced a website called the Council of Agriculture (COA) (www.coa.gov.tw) which is established in 1996 to display agricultural information, agricultural policy, and production, etc. in Taiwan. The author conducted training for 400 farmers in through a one-week course teaching them on how to use Information Technology (IT) to utilize the Internet such as accessing the Internet, sending email and

surfing to get information from various websites. This helped them to upload their product information to the COA web server which enabled customers simply send an email to them and order their products. This IT infrastructure facilitates the transaction and increases the profit for farmers. A new system has been developed due to the growth in demand for market price information concerning agricultural products to reflect the changing market condition for all the main agricultural commodities in Taiwan. The author specified four steps of the IT infrastructure that should be developed intending to obtain the real status of Taiwan's production and marketing. The first step is farmers' crop database which has various information about different types of crops. Next is the crops information service system that produces statistical tables by analyzing the crop data for further production plan. Thirdly, is the information inquiry system which integrates the production technique and information to help farmers find out relevant production information through the inquiry service system. Lastly, is the production equipment's inquiry system which provides information from the companies that sell agricultural materials and seeds to build the inquiry service system where farmers can order needed items from the system. However, to improve the COA web server infrastructure, there is a need to provide a wider platform which can integrate all relevant agricultural agencies that provide accurate and easy to obtain information for farmers which lead them to increase profits. Ultimately, the information portal can be designed and develop to offer the functions of a KMS as per indicated via the Malaysian example of Taninet.

Discussion-Towards a Consolidated Model

Traditionally, farmers learned on their personal knowledge from previous experiences and advice from their forefathers, not knowing on how to improve the crops they have. There was no way for the farmers to acquire new knowledge except the delayed information relayed from the research institutions such as the government and the academia to farmers. Even with that information given by the research institutions, it may not be beneficial to the farmers if it is not related to their current problems due to the generalization of the disseminated information. Undoubtedly, the central issue in the context of agricultural information is the delayed dissemination of information, and lack of two-way communication from the research institutions to the farmers. In this current competitive environment where the quality and price of agricultural produce is intense, farmers from the rural areas cannot afford to lag behind. It is essential for farmers to have a two-way communication with prominent influences on agriculture. This communication gap can be narrowed between the farmers and the influenced environment by utilization of IT infrastructure with the help of Internet, data warehousing, data mining, GIS and other web-based technology in general.

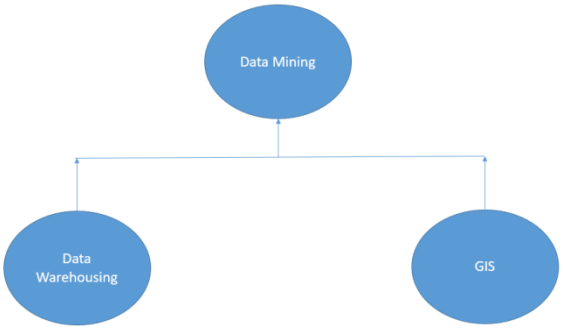


Figure 1: The CEU

We propose a web-based technology driven project to bridge the gap between the academic and practical environment in the context of IT-agricultural research. This web-based system is called the Central

Exchange Unit (CEU). Figure 1 illustrates the CEU system model. At the core of the system lies the data warehousing and GIS capabilities, which form the basis of agricultural knowledge creation and dissemination via data mining. Figure 2 depicts the nature of the interaction between the various stakeholders involved in a given farming community, within an economy. The nature of these interactions is supported by various types of information systems and technology. At the heart of the model is the CEU which generate tailor-made data about agriculture, derived from data mining as explained earlier.

Figure 2 suggests that the CEU can serve a wide array of communities within the agricultural sector of an economy. The system can provide two-way interconnectivity between academic to the farming community (E2F), farming community to the government (F2G) and farmer to farmer (F2F). This CEU can obtain its information through conferences, seminars, government announcements, research findings and farmers' experiences. Data warehousing stores information concerning on soil, types of crops, and harvest season that can be combined with GIS technology that stores various pictures of maps. The information extracted from data warehousing and GIS will produce a pattern with the help of data mining to find the best areas for agriculture (e.g., suitability of each zone for each crop) with the consideration of economic perspective, cost and implemented promptly.

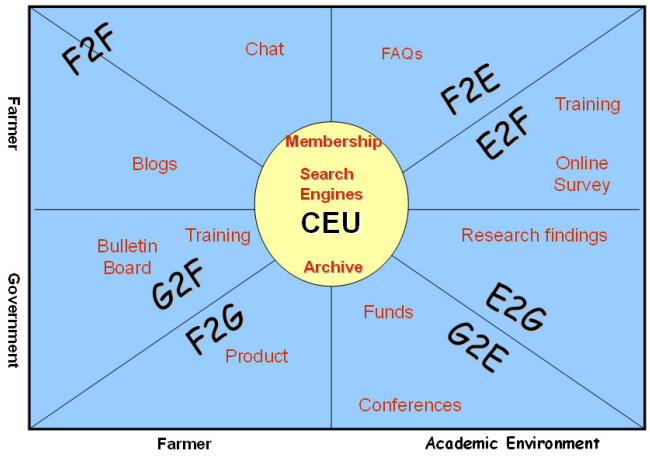


Figure 2: Communities served by the CEU

Conclusion

Several pre-requisites for successful implementation and use of IS and IT in the context of the agricultural sector must exist, in light of the CEU model proposed. Firstly, IT infrastructure must be in place, in the context of developing nations. The rapid development of infrastructure and skills to meet the demands of a new economy has to be in place. Efforts such as the creation of knowledge-based society should be given priority in every economic master plan. To ensure successful deployment of IS and IT within agriculture the small and medium size enterprises (SME's) should be encouraged and led to joint ventures and collaborative partnerships with the government. There is also a need for greater collaboration and smart partnership between the world of academia and corporate sector to propel IT initiatives for agricultural purposes. In this context, issues such as competitive reward schemes for research and local publication in addition to the development of prototype business models could be established. On a similar note, greater collaboration between both public and private institution of higher education and the corporate sectors is encouraged. In this regard, the role of practical training and education syllabus based on demands/requirements of a Knowledge-based economy, in light of the agricultural sector, needs to be established. Only then, can the true value proposition of IS and IT in the

context of the CEU specifically, and within the agricultural sector in general, be experienced by the developing nations in Asia.

References

Alavi, M and Leidner, DE. (2001), 'Review: Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issue', *MIS Quarterly*, 25 (1), 107-136.

Davenport, TH and Prusak, L. (1998) Working Knowledge, Harvard Business School Press.

Deraman, AB and Bahar, AK. (2000), 'Bringing the Farming Community into the Internet Age: A Case Study', *Informing Science*, 3 (4), 208- 214.

Hackbarth, G. (1998), 'The impact of organizational memory on IT systems', AMCIS 1998 Proceedings, 197.

Jennex, ME and Olfman, L. (2005), 'Assessing Knowledge Management Success', *International Journal of Knowledge Management*, 1 (2), 33-49.

Jennex, ME and Olfman, L. (2006), 'A Model of Knowledge Management Success', *International Journal of Knowledge Management*, 2 (3), 51-68.

Laudon, K and Laudon, J. (2006), Management Information Systems: Managing the Digital Firm, 9th ed. Pearson Education, USA

Lin, J. (1998), 'The Information Technology in Agriculture in Taiwan', *The Asian Federation for Information Technology in Agriculture*, 23-24.

Pongsrihadulchai, A. (1998), 'Application of Information Technology in Agriculture in Thailand', *The Asian Federation for Information Technology in Agriculture*, 19-21.

Reddy, PK. (2004), 'A framework of Information Technology Based Agriculture Information Dissemination System to Improve Crop Productivity', paper presented in 22nd Annual Conference of Andhra Pradesh Economic Association, College, Bhimavaram

Wetherbe, J. C., Turban, E., Leidner, D. E., and McLean, E. R. (2007), 'Information technology for management: Transforming organizations in the digital economy'. New York: Wiley.

Von Krogh, G. (1998), 'Care in Knowledge Creation', *California Management Review*, 40 (3), 133-153.

Business Process Management and Reducing Costs

Peter Stuchlý, Department of Accounting, Faculty of Economics and Management, Slovak University of Agricultural in Nitra, Nitra, Slovak Republic, pscomt@gmail.com

Anna Látečková Department of Accounting, Faculty of Economics and Management, Slovak University of Agricultural in Nitra, Nitra, Slovak Republic, anna.lateckova@uniag.sk

Abstract

Process control, or business process management, is the indisputable successor of the classic functional line and staff management that had been developed and improved for decades. Based on the issue of interest defined by the paper we solve the practical problem focused on the evaluation and improvement of process control in a selected companies. Adequate scientific methods and approaches have been used to solve the problem, resulting in the presented theoretical and practical proposals. We focused on a specific process, particularly on its activities as well as the related costs. We identified the activities considered to be cost-inefficient by managers. Consequently, it was inevitable to identify the reasons behind the situation and to articulate the proposals affecting the costs of individual activities of selected process, processed by the information system of the enterprise.

Keywords: enterprise, costs, business process management, information system

Introduction

Currently, enterprises have to fight permanent uncertainty in order to survive the tough competition on the global market. Therefore, they aim to reduce the uncertainty. Each successful company approaches the issue differently, with help of different strategies. However, there is one feature all these efforts have in common. It is permanent development of management systems and their adoption to external conditions and the applied strategy.

Process control, or business process management, is the indisputable successor of the classic functional line and staff management that had been developed and improved for decades. Managers and management scholars of modern times understand process control as one of the most suitable, complex and efficient approaches. The approach results in a unique value for customers, an outcome of efficiently configured processes.

The objective of the given paper is to improve business process management in selected enterprise. This subject is part of the research, which is solved in Department of Accounting, Faculty of Economics and Management, Slovak University of Agriculture in Nitra (VEGA Increasing effectiveness of decision making of managers with support of information systems and accounting.)

Literature Review

From the economic point of view, costs inform a producer whether to take the responsibility or give it up, i.e. what is the relation between economic costs and the overall income of the producer. Thus, the economic view on costs includes several entries, irrespective of whether they represent monetary transactions or not. Therefore, economic costs also represent costs resulting from the alternative use of production factors. The costs appearing under any selected alternative are called sunk costs (Zalai, 2013).

Costs represent a summary indicator creating the quality of overall activities in an enterprise. The level of costs reflects all aspects of the activities, especially production, use of working time, work efficiency, use of production capacity, modernisation etc. Therefore, the basic task of cost exploration is to evaluate the achieved efficiency and assess if it is adequate to the possibilities and the funds spent. It is crucial to:

- monitor the level of costs in relation with the production,
- analyse the structure of costs through evaluation of indicators affecting their level,
- monitor the cost development. (Bielik, 2013).

Costs can also be classified according to the place of origin, as enterprises carry out and perform their activities through diverse operations. From the viewpoint of their relation to the main business purpose, the operations can be divided into main operations, auxiliary operations and administration. The operations are allocated to individual internal departments. When corporate costs are divided into individual departments (according to the corporation structure), this classification of costs is applied. (Táncošová et al 2013).

According to Zalai et al (2013), cost analysis requires understanding of the differences in various approaches to costs. The necessity to plan, control and manage pushes the cost analysis to the following areas divided according to the necessary information sources:

- based on financial statements, it is possible to analyse the overall costs of the enterprise's operations,
- based on internal information, it is possible to analyse solutions for specific decision-making processes and to evaluate the level of fixed costs when analysing the amount and structure of operations.
- based on the management information system data, it is possible to analyse the costs of internal departments and products,

Majtán (2009) understands information systems on two levels. In a narrow, more technical and programming sense, it is a set of programs used for data processing. In a wider sense, it is a system providing information necessary for management. On the first level, the main task of the system is to process the data coming from a given enterprise. The second level is not only focused on data processing; it also deals with data collection, transfer, storage, selection and distribution, serving the needs of a managing subject.

Závodný (2006) emphasises the fact that information system is a sub-system of management and high-quality information is inevitable to reach high-quality management. In cooperation with supportive methods, such information objectivises the decisions of managers while the decisions and related responsibilities are performed by managers who decide how to deal with the information.

Bolek (2016) claims that managers of various organisations need relevant information for effective management. Such information is essential for correct decision-making. In all organisations of the public, cooperative or private sector, the managers are active in these categories: operational, tactical and top managers. They all have an important mission - to affect the organisations and their results.

Gála et al (2009) define process as a set of mutually related or acting activities transforming inputs into outputs. The activities make use of resources (people, instruments, materials, etc.). A process may use several inputs as well as several outputs. A process is launched by a pre-defined action. Such actions can vary in practice.

Russell and Taylor (2010) provide the following classification of processes:

- management processes – these encompass activities related to defining strategic goals of a business and ensuring the implementation of said goals within the business. Such processes include setting goals, operational (short-term) planning, feedback control, rewarding, allocation of resources;

- main processes – these encompass creating a product (goods or services) that is valuable for external customers. They result in the production of outputs required by customers. Main processes support the main entrepreneurial activity of a business, i.e. meeting the strategic goals and missions of the business. Based on specific visions and the mission of a business, main processes can be further divided into key processes,
- secondary processes – they are similar to main processes, though not as important from the perspective of visions, which is why they do not contribute significantly to the execution of the main entrepreneurial activity of a business. Secondary processes can be carried out simultaneously with the main processes or shared processes, while their outputs are generally intended for external customers,
- support processes – they result in the creation of conditions that support the functions of the main processes. Their characteristic feature is the creation of added value for customers; i.e. a product that is not seen by customers, though it is inevitable for an efficient business management. Example: quality control.
- shared processes – they create conditions enabling the function of all business processes. They create values for internal customers. Example: invoicing.

The authors comprehend process as a chain of value creation. Each step of the process (action, activity) shall add to the product or service value in comparison to the previous step.

The benefits of process-oriented management are quantifiable. To support this statement, we can use the following information presented by Kotelnikov (2012). He claims that the below-mentioned effects were reached by the application of process-oriented approach in purchase-related processes:

- reduction of order placement time by at least 60%,
- increase in flawlessly executed orders by 25%,
- decrease in additional costs related to purchase by 80%,
- total purchase time decrease by 90%.

According to the author, the general benefits of process-oriented management are as follows:

- clearly defined competences of people within processes,
- simplification and clarification of work procedures,
- slimmer organisational structure,
- orientation on key processes,
- support provided by information systems,
- simplification of various decision-related tasks,
- increase in the efficiency of both employees and whole processes, etc.

Research Design and Methodology

The current market environment requires businesses to pay continuous attention, mainly because of competitiveness. It is very important to continuously develop and adapt management system as external conditions and strategy, which they are decided to apply. Business process management, is the indisputable successor of the classic functional line and staff management that had been developed and improved for decades. We solve in this paper the practical problem focused on the evaluation and improvement of process control in a selected enterprise which provide services. The enterprise applies process-oriented management.

We solved a demand of managers for costs reduction in the process of providing services. We focused on a specific process of providing services, particularly on its activities as well as the related costs. The objective of the given paper is to improve business process management in selected enterprise.

When approaching the researched problem, we use two types of data, primary and secondary. It was our greatest concern to gain enough primary data. The primary data was obtained from the enterprise

materials. Secondary data was obtained from the webpages and papers published in scientific and professional magazines.

Within solution of the selected issue we used the basic methods of scientific research: analysis, synthesis, comparison and deduction. In the paper we also used methods of monitoring, managed interview and modelling. The methods of formal logic are also applied in the paper. Analysis enabled us to learn about the structure of the service provision process in the IS as well as the relations among individual activities within the process. On the other hand, synthesis connected partial activities into one unit, e.g. when calculating the total costs of the service provision process. We were able to compare the results of individual operational units that provided us with data. The aim of the activity was to identify the phenomena affecting individual activities in the service provision process. Using the comparison method, we were able to compare the results.

The model of process costs is an important part of the methodological approach to the given issue. It is a modern and rational model based on the knowledge on the costs of processes, not services (the outputs of processes). The model documents process costs, i.e. the transformation of inputs into outputs. Process costs represent the total amount of resources spent on the implementation of a single process. According to the British norm BS 6143 (BS 6143 Guide to the economics of quality), they are classified into the following groups:

1. conformance costs – total costs of the transformation of inputs into outputs in a certain process conducted in the most efficient way,
2. non-conformance costs – losses caused by waste of time, material and other capacities connected with a discord within the process. Non-conformance costs represent pointlessly wasted resources.

Conformance costs can be considered a temporary ideal of a given time, while the real costs always take into consideration the non-conformance costs. Certain reserves in decreasing the total process costs can still exist in conformance costs, as each process can be further simplified and rationalised. Regarding the Model of process costs, the following indicators mentioned by Cienciala J. (2011) will be used in the paper:

a) Total costs of the process – N_p:

$$N_p = N_{sp} + N_{np} \qquad [EUR]$$

where: N_{sp} – conformance costs in the process,
N_{np} – non-conformance costs in the process.

b) Efficient use of costs – V_{efn}:

$$V_{efn} = \frac{N_{sp}}{N_p} \; x \; 100 \qquad [\%]$$

c) Share of non-conformance in the process – P_n:

$$P_n = \frac{O_n}{O_c} \; x \; 100 \qquad [\%]$$

where:

O_n – total non-conformance identified during the evaluation of conformance in the process,
O_c – total amount of inputs entering the process in a certain time period.

Our main goal is to identify activities within the selected process with inefficient use of costs. The conclusion summarizes the results and offers proposals for costs reduction.

The main research question is: Is it possible to reduce costs by improving of selected process?

Results and Discussion

Information system (IS) of selected enterprise consists of different modules which managing different kind of processes. We focused on the module which is responsible for the service provision process. The process is composed of activities with different statuses.

Analysis of Service Provision Process

The order from a customer is gradually being processed after registering in the IS. Its processing is recorded by various statuses changing according to the activities that are currently being carried out. The statuses are divided into three basic groups:

- positive statuses,
- negative statuses,
- final statuses.

Positive and negative statuses are considered temporary, as they change according to the current activities. Final statuses conclude the whole process.

Positive statuses define activities performed in relation to a specific service provision order, leading to the final status – executed order. The following issue includes concise characteristics of said statuses. Order status "**Preliminary**" means that none of the data in the order was confirmed by a check and transferred to the follow-up systems, i.e. fields in the order can still be adjusted, corrected, updated or rewritten according to the expressed needs. This status is set by the system when an order is placed; the order can later be transferred to the statuses "Checked" or "To be processed". Any employee processing the order can leave it in the "Preliminary" status if there is a relevant reason to do so, e.g. online, phone-based or external sale and a consequent order that is to be signed by the customer. Order status "**Checked**" means that the order was already checked in the system. All order data was correctly inserted, meaning that it passed all integrated checks. However, the system itself cannot check if there is an error in the details, addresses, etc. The order can then be transferred to the status "To be processed" or "Back to be corrected". If an order is labelled by this order status "**To be processed**", it was already checked by the system. It means that all order data was correctly inserted and passed all checks including confirmation by the employee responsible. The order is then passed to further processing. In extraordinary cases, this status can automatically be changed back to "Checked" – it means the system evaluated the order as unsuitable for automatic processing. The order status can be changed to "Waiting to be confirmed", "Back to be corrected", and in extraordinary cases to "Checked". If an order is labelled by this order status "**Waiting to be confirmed**", it means that it was accepted and recorded in the system. The order can be cancelled in specific cases only. It can be changed to "Accepted" or "Waiting to be cancelled". This order status: "**Accepted**" means that the order was accepted by semantic control of the system and its physical execution was started. It can only change to "Technical investigation issued". This order status "**Technical investigation issued**" means that technical investigation (TI) by the system was automatically started. It means distant investigation if it is possible to provide the required services and/or if there are free ports or sufficient network quality. If necessary, technical investigation is performed on site by a technician in the given location. Positive results of the investigation enable the company to move on to logistics, finalise the ordered service and deliver the terminal. If the results are negative, the order is refused. Customers can also refuse the terminal delivery or service provision. In this case, the order is cancelled and the status is changed to "Cancellation proposal". Its status can be changed to "Technical investigation performed", "Cancellation proposal" or "Refused". This order status "**Technical investigation performed**" means that the technical investigation was successful; it is not possible to perform any other operations with the order. Technical investigation finally confirmed that the required service could be provided. The order status can be changed to "Clearing sheet issued". This order status "**Clearing sheet issued**" means that the required services started to be installed by a technician. It is not possible to make any changes to the order. A technician was given a written order to perform physical installation of the ordered service. The order status can be changed to "Clearing sheet performed" or "Installation unsuccessful". This order

status "**Clearing sheet performed**" means that installation of the service was successful. The service was physically installed and all other actions are to be conducted by the system. The order status can be changed to "Finished", "Installation unsuccessful" or "Executed". This order status "**Finished"** means the installation of service in the related systems. Certain part of the order executed in a related system is waiting for another part of the service to be processed by the IS. It is necessary to finish the order, correct its parameters and dates and pass it to execution. In this moment, the status can be changed to "Executed" only.

Temporary **negative statuses** label orders leading to a final status where they end up unexecuted. These are so-called unimplemented orders. The temporary negative statuses are as follows.

Order which is labelled by order status "**Waiting to be cancelled"** is waiting to be cancelled by the customer. It is not possible to perform any changes to the order. The order status can be changed to "Cancelled – customer". This order status "**Cancellation proposal"** means that the customer asked for cancellation during the technical investigation and this fact was recorded by the IS. It can change its status to "Cancelled – customer". This order status "**Back to be corrected"** means that an order recorded in the IS needs to be corrected, as there are errors – incorrectly input data. Therefore, the responsible person passes the order back to the vendor who is responsible for the correction of errors. The order status can be changed to "Cancelled – correction". The order status "**Installation unsuccessful"** means that a customer refused to accept the delivery from a delivery agency. The order with the status "Clearing sheet performed" is cancelled and its status is changed to "Cancelled – customer". It is not possible to perform any further operation with the order.

It is not possible to perform any more operations or status changes with orders labelled by **final statuses**. Final statuses represent outputs of the service provision process. The final statuses "Cancelled – correction", "Cancelled – customer" and "Refused" represent negative outputs of the service provision process. On the other hand, the final status "Executed" represents a positive output of the service provision process. In the IS, the following types of final statuses can be identified. This order status "**Cancelled – correction"** means the order was cancelled because of necessary corrections. This could happen to an order in the status "Back to correction". This status is used if the responsible person placed an order incorrectly or identified an error in the order. This status is designed for cancelled orders followed up by new or identical orders. This order status "**Cancelled – customer**" means that the order was cancelled by the customer. It can be used if the outcome of the technical investigation is "Cancellation", "Not accepted" or "Undelivered terminal". This final status can be assigned to orders in the statuses "Waiting for cancellation" or "Installation unsuccessful". This order status "**Refused**" means that enterprise refused an order because the technical investigation turned out to be negative. Said status expresses the information that the required service is unavailable in the given region because of technical reasons. The customer always receives a written refusal. This can happen to orders with the status "Technical investigation issued". Order status "**Executed**" means that an order must also be checked before execution because the data coming from the IS to the follow-up systems must be complete and correct. The process of invoicing and charging customers for the provided services follows after this status.

The following Model of the service provision process describes the journey of a service provision order in the IS – through individual statuses and corresponding activities leading to the service provision or cancellation, i.e. finished process of provision service.

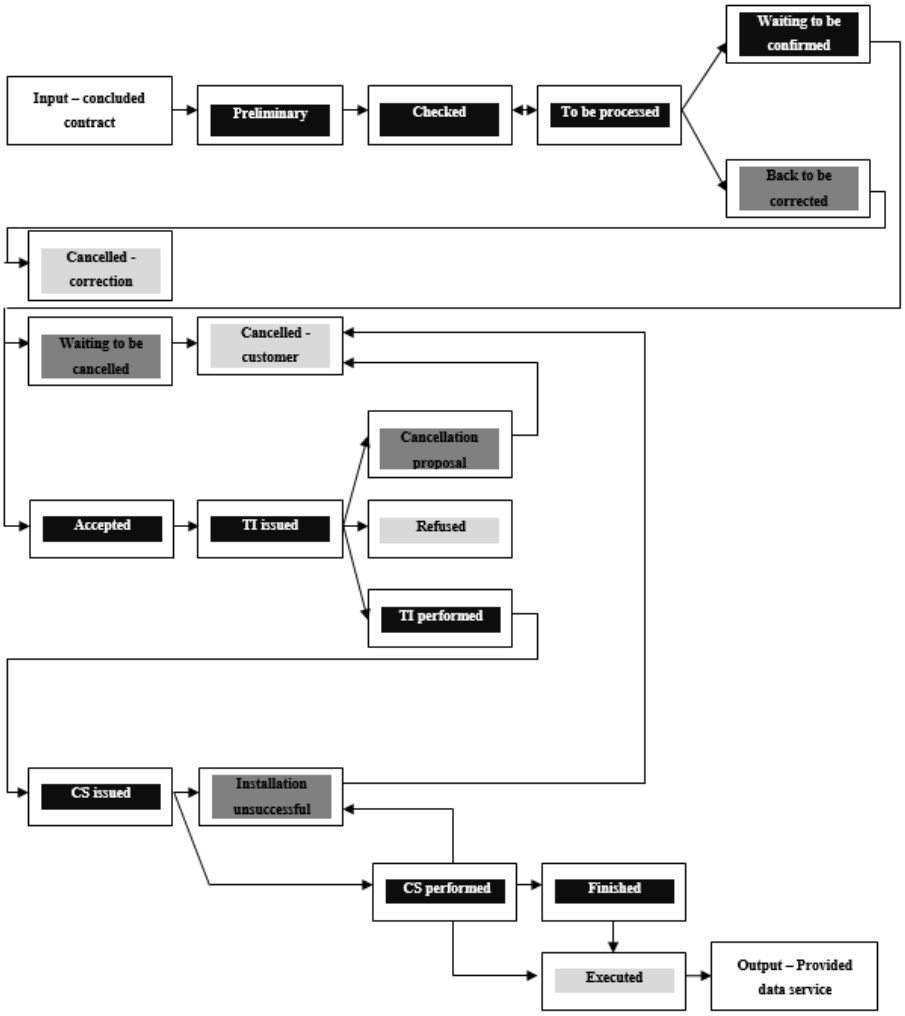


Fig. 1: Model of the service provision process

Source: Lateckova and Stuchly (2017)

Positive statuses

Negative statuses

Final statuses

Direction of activities within the service provision process

- TI issued **–** Technical investigation issued
- TI performed – Technical investigation performed
- CS issued – Clearing sheet issued
- CS performed – Clearing sheet performed
- Refused – Refused by the enterprise

Identified problems

Based on analysis of service provision process, we identified a problem with a large number of canceled orders from the customers, which increase the enterprise's costs. The following premise is applied: “Less cancellations mean less non-conformance costs and costs spent on unexecuted orders.”

When looking for solutions of this problem, we are interested in the cancellation reasons that can be affected by salesmen:

- the customer waited for service provision for more than 30 days and finally refused the service,
- the customer was given wrong information regarding the price or some other property of the required service.

In order to look for ways of decreasing the amount of customer cancellations, we need to know the current conditions on both sides.
The customer:

- the customer waiting for service to be provided for more than 30 days can withdraw from the contract with no sanctions. This also applies if the customer has not accepted the terminal equipment, even if the above-mentioned time period has not expired yet. This right ceases to apply when the customer accepts the terminal,
- if the customer has been misled in an important issue, they have the right to withdraw from the contract if it is proclaimed before the start or in the course of service provision (the status “TI issued”),

The salesman:

- if the salesmen misled the customer in an important issue during the service presentation or sale, they will be reprimanded, and in case of repeated misleading, they can be financially sanctioned and even dismissed.

In order to decrease the amount of customer cancellations, we propose the following change of conditions:
The customer:

- if the customer has waited for a service to be provided for more than 30 days, they can withdraw from the contract with no applicable sanctions,
- if the customer has been misled in an important issue, they have the right to withdraw from the contract if it is proclaimed before the start of service provision,
- if the customer asks for order cancellation for any other reason, they are liable to pay the sanction of 50 EUR (the proposed measure aims to limit the cancellations based on other reasons).

The salesman:

- if the salesman has misled a customer in an important issue while presenting or selling the service, they will be sanctioned to the level of the company’ incurred costs (the proposed measure tries to encourage salesmen to improve their knowledge of the product and not to give customers wrong or incomplete information),
- the salesmen will be obliged to check the entered order statuses based on the contracts concluded by them in the IS. We suggest that the salesmen check the statuses once every three days for each order according to order codes until the orders are executed. If the salesman finds out that an order is labelled with one status longer than usual, they will contact the responsible person or another authority. This way, salesmen will thoroughly check their orders and identify the ones that are “stuck” or in need of further attention. This way, they strive to eliminate the risk of cancellation due to the prolonged time of order execution. This measure will decrease the time an order spends under each status if longer procedure is not necessary. Thus, it is possible to eliminate the reason for cancellations based on “waiting for service provision for more than 30 days”.

While analysing the situation, we identified further imperfections leading to the prolonged process of service provision and consequent customer cancellations:

- no technician is assigned to the order and the order stays under the status "Technical investigation" for too long, thus contributing to the prolonged waiting period,
- the order stops for no obvious reason and is not passed to further processing,
- waiting too long for terminal delivery.

As checking the orders would be compulsory once every three days, more imperfections may appear influencing the service provision period and transfers of orders to various statuses in the IS. It would be crucial to identify the problems early on and eliminate them.

If we only take into consideration the reason "the customer waited for provision for more than 30 days", we assume the proposed solution would have the following influence:

- decrease in costs related to the status "Cancellation proposal" from 1,095 EUR to 730 EUR (by 33.30%). The decrease is connected to the 10 orders that would not be transferred to the status "Cancellation proposal" due to the new measure. The pursued effect would be visible in the costs decrease of 365 EUR and the revenue increase of 3,024 EUR (counting the 24-month long commitment and the average monthly revenue of 12.60 EUR),
- decrease in costs related to the status "Waiting to be cancelled" from 502.50 EUR to 375 EUR (by 25.37%). The decrease is connected to the 17 orders that would not be transferred to the status „Cancellation proposal" due to the new measure. The pursued effect would be visible in the costs decrease of 127.50 EUR and the revenue increase of 5,140.80 EUR (counting the 24-month long commitment and the average monthly revenue of 12.60 EUR).

The difference in incurred costs can be reached by the introduction of the proposed solution, as it has direct impact on orders labelled by statuses that suggest customer cancellation.

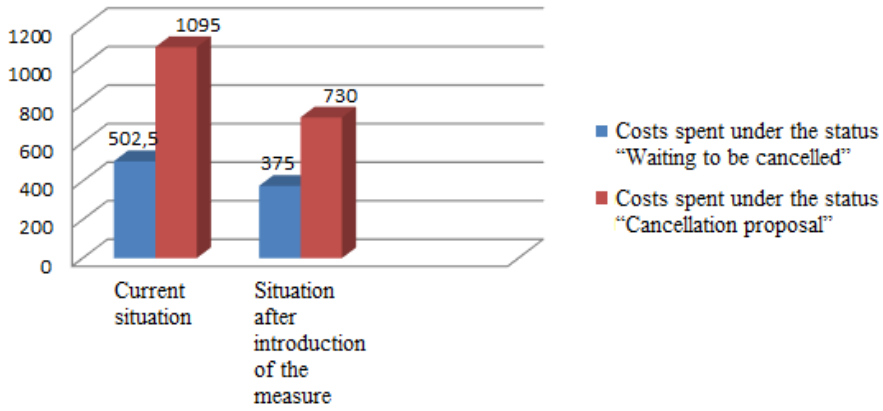


Fig. 2: Impact of the proposed solution on costs (EUR)

Source: own processing

Conclusion

Generally, we have come to the conclusion that each process, as complicated as it may turn out to be, can be mapped, its troublesome areas can be identified and solutions for the problems can be proposed.

Selected enterprise applies process-oriented management. Its managers identified the problem of relatively high costs of service provision process and submitted the request to solve the situation.

The service provision process (indicated to be problematic by managers) was selected as the subject of research, detail evaluation as well as quantification and rationalisation of incurred costs.
On the basis of the analysis we identified the problem in the services provision process, a large number of canceled orders from the customers. We introduced a solution that contributes to reducing of costs and more effective of process management in the enterprise.

In our opinion, incorporating a module into the IS serving both salesmen and responsible persons can eliminate the identified problem. The IS will automatically read all orders with data that is relevant to the signed-up salesman after they log in. At the same time, the module would assign actual statuses to individual orders. The task of the IS would be to administer the activities and make sure that salesmen check orders at the proper time.

In conclusion, we note that the model of process costs is able to identify the problematic activities in terms of utilization costs. In our opinion, the current period is very needed for enterprises to search the ways of reducing costs, respectively finding problem areas and there it is possible to apply the model of process costs, which can help to ensure long-term competitiveness. The paper contributes to the theoretical and practical research of costs from the viewpoint of allocation evaluation.

Acknowledgement

This article was created within the project VEGA Increasing effectiveness of decision making of managers with support of information systems and accounting. Registration number of the project 1/0489/15, which is solved in Department of Accounting, Faculty of Economics and Management, Slovak University of Agriculture in Nitra.

References

Bielik, P. and Turčeková, N. (2013) Podnikové hospodárstvo, ISBN 978-80-552-1028-5, SPU Nitra.

Bolek, V. (2016) Information leteracy models in managerial education, ISBN 978-80-7552-292-4, Wolters Kluver, Praha.

Cienciala, J. et al (2011) Procesne řízená organizace, ISBN 978-80-7431-044-7, PBtisk Příbram, Příbram.

Gála, L. - Pour, J. - Šedivá, Z. (2009) Podniková informatika, ISBN 978-80-247-2615-1, Grada Publishing, Praha.

Kotelnikov, V. (2012), "EBPM – Modern Enterprice – Wide system Approach to BPM". [Online], [Retrieved August 22, 2017], www.1000ventures.com

Látečková, A. and Stuchlý, P. (2017) Cost reduction in business management supported by management information systems and accounting, ISBN 978-80-7552-722-6, Wolters Kluver, Praha.

Majtán, M. et al (2009) Manažment, ISBN 978-80-893393-07-7, Sprint vfra, Bratislava.

Norm, (1992) BS 6143 Guide to the economics of quality, Part 1: Process cost model, BSI, London.

Russell, R.S. and Taylor, B.W. (2010) Operations Management: Creating Value Along the Supply Chain, ISBN: 978-0470525906, Wiley.

Táncošová, J. et al (2013) Ekonomia, ISBN 978-80807-859-87, IURA Edition, Bratislava.

Zalai, K. et al (2013) Finančno-ekonomická analýza podniku, ISBN 978-80893-938-00, Sprint dva, Bratislava.

Závodný, P. (2006) Riadenie projektov informačných systémov, ISBN 80-225-2230-9, Iura Edition, Bratislava.

Comprehensive Overview of the Most Significant Notions Related to Unethical Work Behavior in Organizations

Zuzana Kotuliaková, Favulty of Management, Comenius University, Bratislava, Slovakia,
z.kotuliakova@gmail.com

Abstract

This article serves as a theoretical overview of the current theoretical concepts of unethical behavior in the organization. The most prominent studies were reviewed and their outcomes were reflected in this article. This paper considers a detailed research of theoretical concepts of unethical work behavior. This topic is explored well but the problem is that every researcher delineates unethical behavior in organization differently and this causes terms-related confusion with too many "labels" for the same phenomena (e.g. counterproductive behavior, deviant behavior, dysfunctional leadership and many others). First, this article seeks to critically clarify the basic terms used in the discourse in unethical behavior in organization. Secondly, article provides new classification and delineation of phenomena of unethical leadership and unethical employee behavior. In this article, it is differentiated between unethical leadership and unethical employee behavior. These two notions are regarded a distinct for the purpose of theoretical clarification. Third, based on a thorough theoretical analysis, paper also categorize the terms used in the scientific discourse to pinpoint the diversity of the respective discourse and show various facets of the dark side of human behavior in organizations. In analysis, we used methods as extensive literature review on the topics of unethical work behavior, theoretical analysis of selected concepts of unethical work behavior, synthesis of current theoretical knowledge of studied phenomenon and consecutive delineation of a new approach to unethical work behavior.

Keywords: Unethical work behavior, unethical leadership, ethics

Introduction

We decided to analyze unethical work behavior because we consider this topic as really important. It seems that despite the wide range of knowledge how to implement ethics into business, repeatedly new scandals appear in business. For instance scandal in Nay, Slovak company, tackle of employee theft or international community was stricken by the case of Enron. In our article we will analyze only part of ethics, which we call unethical work behavior in organization. Under this term we understand behavior, which is commited by employees against other employees. Unethical work behavior can have fatal consequences for the well-being of the organization. It can harm organization up to the extent of ruining it. Unethical work behavior is as important as economic stability, technological development and another aspects of the organization. For example famous case of Enron, when unethical work behavior of the top level managers caused bankruptcy and this is not only case where unethical work behavior has this kind of fatal consequences. Every leader or employee should have knowledge about ethics in the organization to prevent an ethical problem.

We can divide unethical work behavior according to many criteria. In this article, we mainly focus on criterion of "who commits unethical behavior" in the organization and we also provide a comprehensive overview of "labels" which were used in current prominent academic works.

An important predictor of unethical work behavior is personality. It shows that all traits from Big Five personality model - consciousness, agreeableness, extroversion, neuroticism and openness to experience predict unethical work behavior. For example, when a person is low in consciousness, there is a higher probability of unethical work behavior (Mount et. al. 2006; Salgado et. al. 2002). The same connection is with agreeableness and unethical work behavior. People who are less agreeable inclined more to unethical work behavior (Mount et. al. 2006; Salgado et. al. 2002). People with low extroversion have a higher probability of unethical work behavior (Bolton, 2010). Finally,

for employees high in openness to experience, unethical work behavior can also occur (Bolton, 2010).

Psychopathy and psychopathic leaders were also examined in various studies. According to Boddy, this kind of leaders increases chance of unethical behavior in the organization, as employees give vent to their anger with the corporation, which they perceive to be acting through its corporate psychopathic managers in a way that is eminently unfair to them (Boddy, 2011). Self-control is one of the significant explanations of unethical behavior in an organization. Self-control is the strong predictor that people will try to limit deviant behaviors (Fodchuk, 2007). There is also research about narcissism and unethical work behavior. People who are narcist inclined more to unethical behavior in the organization (Penney et al. 2002). Unethical behavior in the organization can be caused also by organization mistreatment. (cf. social exchange theory, Blau, 1964; Gouldner, 1960). Organization constraints (Hershcovis et. al. 2007) and organizational justice (Meier, 2013) have been shown to influence unethical work behavior as well. Unethical behavior is also when employees don't have moral values and they accept other employees' unethical behavior (Bandura, 1991).

From the analysis of the most significant theoretical concepts, we found out that we can divide ascendants of unethical behavior in the organization into two groups: (1) individual factor as age, narcissism, consciousness, agreeableness, extroversion, openness to experience etc. and (2) organizational factors as job constraints, organizational justice, organization mistreatment, interpersonal conflicts etc. Here, we mentioned only a few ascendants. This topic is very broad and we can explore a lot of concepts dealing with predictors and ascendants of unethical behavior.

In-depth analysis of nature and types of unethical work behavior

As mentioned above, unethical work behavior is very important topic and we need to understand all aspects of it. In line with the purposes of this article it is important to regard the unethical employee behavior and unethical leadership as distinct phenomena. It is often assumed, that it is same thing but there are differences. The biggest difference is that unethical leadership is always connected with hierarchical meaning. It means that person who is in higher position behaving unethically against subordinates. In this case, leaders use hierarchical power to behave this way. In case of unethical employee behavior, people behave unethically against their colleagues. In this case person does not use hierarchical power to behave unethically.

Figure 1 presents the basic differences in the discussed issues:

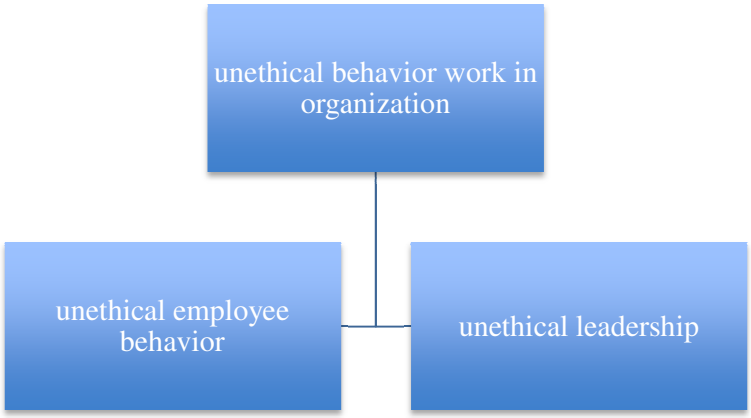


Fig 1: Theoretical scope of the study

Different authors introduced different forms of unethical work behavior. For example Spector, Fox, Penney et al. (2006) identified five forms of unethical employee behavior: abuse against others, production deviance, sabotage, theft, and withdrawal.

Gruys, Sackett (2003) identified eleven dimensions of unethical employee behavior: theft of property, destruction of property, misuse of information, misuse of time and resources, unsafe behavior, poor attendance, poor quality of work, alcohol use, drug use, inappropriate verbal action, and inappropriate physical action.

Stemming from this working definition and an earlier classification by Hollinger (1986), Hollinger and Clark (1982), Robinson and Bennett (1995) presented a comprehensive typology comprising two dimensions in which any behavior that fits the definition can be categorized and differentiated from other deviant actions. The first dimension defines deviant behavior according to its severity, ranging from minor to severe. Some deviant behavior, such as talking with coworkers instead of working, would be classified as a minor deviant act. Other incidents, such as a physical assault, would be classified as severe.

The other classification by Robinson and Benett (1995) is according to the target. Unethical employee behavior can be harmful to either an individual or to the whole organization.

Unethical employee behavior

The goal of this chapter is to point out prevalent concepts and analyze their meaning. The Figure 2 presents results of our theoretical analysis:

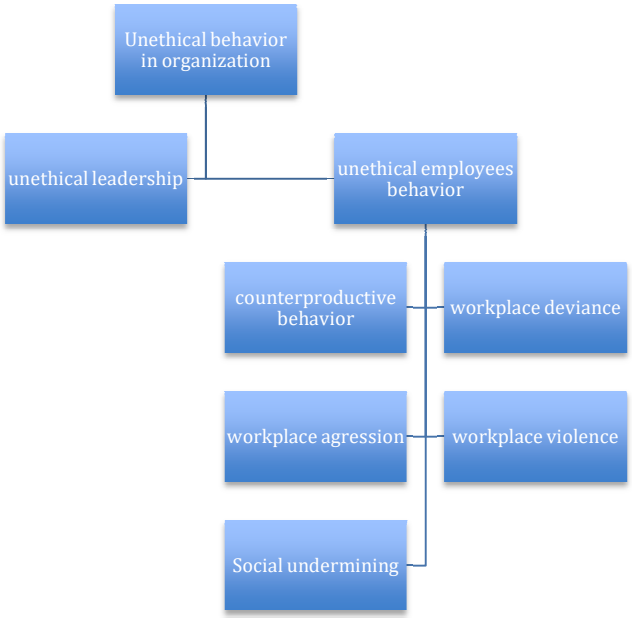


Fig. 2: Differentiation of unethical employee behavior concepts

Work-place deviance

In line with Robinson and Bennet (1995) we assume that unethical employee behavior is a behavior that voluntarily violates organizational norms, thereby threatening the wellbeing of members and the organization itself. Thus, according to this definition, unethical employee behavior is not defined in terms of any system of moral standards, rather such behavior deviates from the formal and informal

norms as prescribed by procedure, policy, and rules. Further, this approach asserts that for a behavior to be considered as unethical employee behavior, it must at least have a potential to harm either the well-being of the organization or its members, thereby excluding breaches of decorum such as poor manners and other social blunders. According to this definition, we will consider whether the certain type of behavior falls under unethical employee behavior.

Counterproductive work behavior

According to Fox, Spector and Miles (2001), counterproductive work behavior is behavior that is intended to have a detrimental effect on organizations and their members. It can include acts such as aggression and theft or more passive acts, such as purposely failing to follow instructions or doing work incorrectly.

Workplace aggression

Neuman and Baron (1998) defined workplace aggression as "efforts by individuals to harm others with whom they work, or have worked, or the organization in which they are presently, or were previously employed".

Workplace violence

Workplace violence has been categorized by LeBlanc and Kelloway (2002) into three major types on the basis of the assailant's relationship to the workplace (California Occupational Safety and Health Administration [Cal/OSHA], 1995; see also Braverman, 1999). In the first type, the perpetrator of the violence has no legitimate business relationship with the targeted workplace and enters the work environment to commit a criminal act (e.g., robbery). Individuals at particular risk include taxicab drivers, convenience store employees, and gas station attendants. In the second type, the perpetrator, usually the recipient of an object or service provided by the target workplace, commits an act of violence, usually assault. Health care providers (e.g., nurses) and social service employees (e.g., social workers) are particularly vulnerable to this type of violence. In the third type, the offender is an employee or former employee of the workplace. Typically, a disgruntled employee threatens a coworker or supervisor for what is perceived as unfair treatment.

Social undermining

Social undermining is the expression of negative emotions directed towards a particular person or negative evaluations of the person as a way to prevent the person from achieving his or her goals. This behavior can often be attributed to certain feelings, such as dislike or anger. The negative evaluation of the person may involve criticizing his or her actions, efforts or characteristics (Joseph et. al., 2011)

In sum, based on synthesis of the above-mentioned concepts, we define unethical employee behavior as behavior, which purposefully violates ethically legitimate organizational norms and is committed by employees without formal authority. This behavior usually has consequences on wellbeing of entire organization and society as a whole

Unethical leadership

Nowadays research is more oriented to unethical leaders and unethical leadership in contrast with past, when research was oriented on employees. The reason is that leaders have more responsibility and usually can harm organization even more (leaders set goals, set strategies, manage subordinates). Unethical managers can motivate subordinates to this kind of behavior as well. There are many researchers and studies about unethical leadership and it caused conceptual chaos in terms. It is

caused by the fact, that every author uses the different. In the Figure 3 all significant concepts related to unethical leadership are shown:

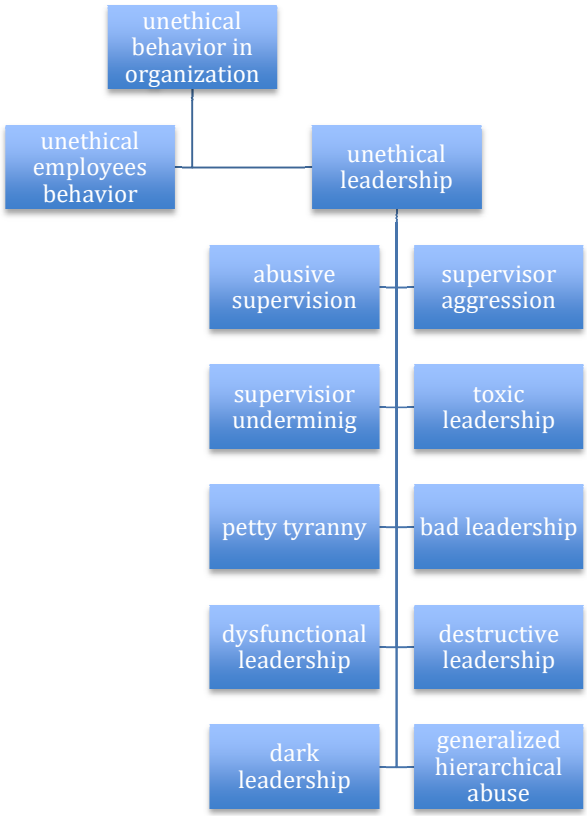


Fig. 3: Diferentiation of unethical leadership concepts

Abusive supervision

According to Tepper (2000), abusive supervision refers to "subordinates' perceptions of the extent to which their supervisors engage in the sustained display of hostile verbal and nonverbal behaviors, excluding physical contact". According to Tepper's definition, we can characterize abusive supervision by three main features. First is that abusive supervision is a subjective assessment subordinate make on the basis of their observation of their supervisors' behavior. Everybody has the different perception of the world and situations so it means that this assessment can be colored by characteristics of subordinate and of the context in which assessment is made. Secondly, abusive supervision refers to sustained displays of nonphysical hostility. And the third feature is that leader does this kind of behavior for the purpose. It is not a coincidence that leaders do something unethical.

Supervisor aggression

Supervisor behavior "that is intended to physically or psychologically harm a worker or workers in a work-related context" (Schat, Desmarais, et al., 2006).

Supervisor undermining

Supervisor "behavior intended to hinder, over time, the ability to establish and maintain positive interpersonal relationships, work-related success, and favorable reputation" (Duffy, Ganster, & Pagon, 2002).

Toxic leadership

Many toxic leadership articles include stories of leaders who berate, belittle, and bully their subordinates, who hold subordinates responsible for things beyond their control or tasks beyond their job descriptions, and who cause their subordinates to work harder and sacrifice more than is reasonable (for examples, see: Ambrose, 1992; Frost, 2004; Wilson-Starks, 2003). Analyst Gillian Flynn provides a particularly descriptive definition of a toxic manager; he is the "manager who bullies, threatens, yells. The manager whose mood swings determine the climate of the office on any given workday. In 2003, 20 AWC students focused on the topic of command climate and leaders' roles in shaping it. "Destructive leaders are focused on visible short-term mission accomplishment. They provide superiors with impressive, articulate presentations and enthusiastic responses to missions. But, they are unconcerned about, or oblivious to, staff or troop morale and/or climate. They are seen by the majority of subordinates as arrogant, self-serving, inflexible, and petty". The term toxic leaders or toxic leadership was used in many other research papers (e.g. Brandel, 2006; Dyck, 2001; Frost, 2004; Goldman, 2006; Goldman, 2011; Henley, 2003; Korn, 2004; Lester, 2007; Lipman-Blumen, 2005b; Lipman-Blumen, 2005c; Lubit, 2004; Macklem, 2005; Pelletier, 2010; Pelletier, 2012; Simmons, 2001; Taylor, 2007; West, 2007; Whicker, 1996; Wilson-Starks, 2003).

Bad leadership

Label "bad leadership" is not used that often but still we can find some literature, which uses it. We can find literature, where bad leadership means not efficient but also unethical. The term Bad leadership was used for example in famous book Bad leadership: What it is, how it happens, why it matters from Barbara Kellerman (2004).

Dysfunctional leadership

According to Caldwell and Canuto-Carranco (2010) dysfunctional leadership is where leaders disrespect, abuse and mistreat organization's members. Similarly, Burton (2002) suggested that leaders who displayed threatening behaviors, harassment, bullying, and physical assault of co-workers created a dysfunctional organizational climate. Label dysfunctional leadership use Burton (2002)., Caldwell & Canuto-Carranco (2010), Harvey, Martinko & Douglas (2006), Kellerman (2004), Ouimet (2010), and Van Fleet & Griffin (2006).

Petty Tyranny

According to Ashforth (1994), petty tyranny is defined as one who lords his or her power over others. Preliminary empirical work suggests that tyrannical behaviors include arbitrariness and self-aggrandizement, belittling others, lack of consideration, forcing style of conflict resolution, discouraging initiative, and non-contingent punishment. Ashforth (1997) conceives that petty tyranny comprises six sub dimensions: arbitrariness and self/aggrandizement, belittling subordinates, lack of consideration, forcing style of conflict resolution, discouraging initiative, and non-contingent punishment. Petty tyranny also captures hostile acts perpetrated by a hierarchically superior agent. Petty tyranny captures behaviors that may not necessarily be viewed as hostile (for example she or he don't do little things to make things pleasant for group members).

Generalized Hierarchical Abuse

Many research papers which used the term generalized hierarchical abuse were published in medical journals (e.g., Daugherty, Baldwin, & Rowley, 1998; Richman, Flaherty, & Rospenda, 1996; Richman, Flaherty, Rospenda, & Christensen, 1992). Studies which use label generalized hierarchical abuse usually do not emphasize abusive behavior perpetrated by a specific supervisor against their direct reports. In some studies, authors didn't make difference between nonphysical hostility, physical hostility, sexual harassment or discrimination. And third, many of these studies explore employee's subjective assessment of the relationship (Cox, 1987, 1991; Diaz & McMillin, 1991; Manderino & Berkey, 1997; Rosenstein & O'Daniel, 2006).

Dark leadership

One of the latest labels for unethical leadership. This term evokes something dark, weird, forbidden, deviating from norms. Authors who use this terms often connect dark leadership with dark triad - Narcissism, Machiavellianism, and psychopathy (Paulhus, Williams, 2002)

Destructive leadership

Einarsen et al. (2007) studied destructive leadership and defined it as: 'the systematic and repeated behavior by a leader, supervisor or manager that violates the legitimate interests of the organization by undermining and / or sabotaging the organization's goals, tasks, resources, and effectiveness and / or motivation, well-being or job satisfaction of subordinates'. Einarsen points out that this phenomenon in most cases harms not only subordinates but also whole organization's well-being. Authors of this theory did not make difference if the person makes destructive leadership voluntary or not and also did not consider if the result was caused by lack of competences. The label destructive leadership was used by another author as well (e.g. Sheard et al, 2012, Green, LeBreton, Krasikova, 2013)

In our definition of unethical leadership we use similar definition as Lasakova and Remisova (2015). They defined unethical leadership as a process of intentional or unintentional, passive or active, and recurrent influencing that harms others, being it individuals, organization and/or society as a whole. Their definition reflects on three sources of disagreement in scientific discourse on unethical leadership: 1) intentions and consequences, 2) active and passive influence, and 3) recurrence (see also Lasakova, Remisova, Kirchmayer, 2016).

We chose Lasakova and Remisova (2015) definition, because it is based on a comprehensive literature overview. But we do not agree with it for hundred percent. In creating our definition, we used synthesis of common features of all definitions. According to us unethical leadership is active or passive, physical or psychical behavior, which purposefully violates ethically legitimate organizational norms and is committed by employees with formal authority. This behavior harms most subordinates but usually has influence on whole organization and society.

In contrast with unethical employee behavior, unethical leadership can be divided into two groups. We know active and passive unethical leadership. Passive unethical leadership is when leaders accept that employees behave unethically. Active leadership is when leaders act unethically. When we analyzed unethical leadership in more details, we found mostly papers connected with the sexual harassment, physical violence, and nonphysical hostility. Trott and Keashly (1994) consider for the most common manifestation of destructive supervisor behavior – angry outbursts, public ridiculing, taking credit for subordinate's successes and scapegoating subordinates (Keashly, Trott, & MacLean, 1994).

According to Remišová et al. (2015) unethical leadership can be divided into two groups. The first group is when the leader is harmful against individuals and the second group is when the leader is harmful against the whole organization. Each group has different demonstration (see Table 1).

Tab. 1: Differentiation of forms of unethical leadership behavior

Leader is harmful against individuals	Leader is harmful against all organization
Abuse of other people	Sabotage of team's and organization's goals
Bossing, psychical bullying	Behave against organizational rules
Aggression in work-place	Unethical commitment of HR function
Despotic behavior	Theft, thread, fraud, corruption, protectionism
Tyrannical behavior, proactive aggression	illegal harming organizations and unethical approach to external stakeholders

Conclusions

We recommend using the term unethical leadership strictly when we talk about leaders who behave unethically against their subordinates and the term unethical employee behavior when people behave unethically against their colleagues. Unethical employee behavior should not be connected with any hierarchical meaning. Although, unethical leadership and unethical employee behavior can harm goals of the organization, for the classification of the scientific discourse it is useful to differentiate between them.

Based on our thorough analysis of the concepts, we found out that there are many definitions, which are similar but not the same and this causes chaos in the topic. To solve this issue, we formulate our own definitions of unethical employee behavior and unethical leadership. This delineation of unethical leadership and unethical employee behavior consolidates all aspects of underlying concepts.

Both terms (unethical employee behavior, unethical leadership) are considered here as umbrella terms. The unethical employee behavior entails work-place deviance, counterproductive work behavior, workplace aggression, workplace violence, social undermining. The unethical leadership consists of abusive supervision, supervisor aggression, supervisor undermining, toxic leadership, bad leadership, dysfunctional leadership, petty tyranny, generalized hierarchical abuse, dark leadership, destructive leadership.

According to our definition unethical employee behavior as behavior, which purposefully violates ethically legitimate organizational norms and is committed by employees without formal authority. This behavior usually has consequences on wellbeing of entire organization and society as a whole. Unethical leadership is active or passive, physical or psychical behavior, which purposefully violates ethically legitimate organizational norms and is committed by employees with formal authority. This behavior harms most subordinates but usually has influence on whole organization and society.

During the literature review, we have found many articles about the topic of unethical leadership and unethical employee behavior. It was caused by the fact, that topic of unethical behavior in the organization is very important and people have been exploring this field for a long time. Unethical behavior in organization can have fatal consequences. In the worst cases it can cause bankruptcy. Each manager should be familiar with the underlying principles and theories of unethical behavior. This article is intended to be a guide of various theories that are necessary for proper managerial work. Besides in-depth theoretical analysis and clarification of the phenomenon of unethical behavior at work, there is a constant need to develop the topic based on theoretical research. Although many attempts have been made already to empirically capture the nature and harmful consequences of unethical work behavior, there are still many unresolved questions. For instance: What are the intercultural connotations of unethical work behavior? What are the personality-based predictors of unethical work behavior? How to minimize unethical work behavior through employee recruitment and selection? And what are the most effective leadership traits that could potentially eradicate dysfunctional employee behavior? These questions represent just a few examples of prospective

research avenues.

Acknowledgements

This work was supported by the Slovak Research and Development Agency under the contract No. APVV-16-0091

References

Alemu, D. S. (2016). Dysfunctional Organization: The Leadership Factor. Open Journal of Leadership, 5(01). [Online]. [Retrieved: 2017, May 08], https://scholar.google.com.

Aryee, S., Chen, Z. X., Sun, L. Y., & Debrah, Y. A. (2007). Antecedents and outcomes of abusive supervision: test of a trickle-down model. Journal of Applied Psychology, 92(1). [Online] [Retrieved: 2017, May 08], https://scholar.google.com.

Ashforth, B. (1994). Petty tyranny in organizations. Human relations, 47(7), [Online]. [Retrieved: 2017, May 08], https://scholar.google.com.

Boddy, C. (2011). Corporate psychopaths: Organizational destroyers.[Online] Springer. [Retrieved: 2017, May 08], https://scholar.google.com.

Bolton, L. R., Becker, L. K., & Barber, L. K. (2010). Big Five trait predictors of differential counterproductive work behavior dimensions. Personality and Individual Differences, 49(5), [Online], [Retrieved: 2017, May 08], https://scholar.google.com.

Fodchuk, K. M. (2007). Work environments that negate counterproductive behaviors and foster organizational citizenship: Research-based recommendations for managers. The Psychologist-Manager Journal, 10(1), [Online]. [Retrieved: 2017, May 08], https://scholar.google.com.

Fox, S., Spector, P. E., & Miles, D. (2001). Counterproductive work behavior (CWB) in response to job stressors and organizational justice: Some mediator and moderator tests for autonomy and emotions. Journal of vocational behavior, 59(3), [Online], [Retrieved: 2017, May 08], https://scholar.google.com..

Hershcovis, M. S., Turner, N., Barling, J., Arnold, K. A., Dupré, K. E., Inness, M., & Sivanathan, N. (2007). Predicting workplace aggression: a meta-analysis. [Online] [Retrieved: 2017, May 08]. Available at: https://scholar.google.com.

Joseph, N. T., Myers, H. F., Schettino, J. R., Olmos, N. T., Bingham-Mira, C., Lesser, I. M., & Poland, R. E. (2011). Support and undermining in interpersonal relationships are associated with symptom improvement in a trial of antidepressant medication. Psychiatry: Interpersonal & Biological Processes, 74(3), [Online], [Retrieved: 2017, May 08], https://scholar.google.com.

Kellerman, B. (2004). Bad leadership: What it is, how it happens, why it matters. [Online], Harvard Business Press. . [Retrieved: 2017, May 08], https://scholar.google.com

Keashly, L., Trott, V., & MacLean, L. M. (1994). Abusive behavior in the workplace: A preliminary investigation. Violence and victims, 9(4). [Online], [Retrieved: 2017, May 08]. https://scholar.google.com.

Kelloway, E. K., Francis, L., Prosser, M., & Cameron, J. E. (2010). Counterproductive work behavior as protest. Human Resource Management Review, 20(1), [Online], [Retrieved: 2017, May 08]. https://scholar.google.com.

Lašaková, A., & Remišová, A. (2015). Unethical leadership: Current theoretical trends and conceptualization. Procedia Economics and Finance, 34, 319-328. [Online], [Retrieved: 2017, May 08], https://scholar.google.com.

Lašaková, A., Remišová, A., & Kirchmayer, Z. (2016). Key findings on unethical leadership in Slovakia. In Proceedings of the 1st international conference contemporary issues in theory and practice of management in Częstochowa, Poland, 2016, Wydawnictwo Wydziału Zarządzania Politechniki Częstochowskiej, Częstochowa, pp. 252-260.

LeBlanc, M. M., & Kelloway, E. K. (2002). Predictors and outcomes of workplace violence and aggression. Journal of Applied Psychology, 87(3), [Online], [Retrieved: 2017, May 08], https://scholar.google.com.

Meier, L. L., & Spector, P. E. (2013). Reciprocal effects of work stressors and counterproductive work behavior: A five-wave longitudinal study. Journal of Applied Psychology, 98(3), [Online], [Retrieved: 2017, May 08]. https://scholar.google.com.

Mount, M., Ilies, R., & Johnson, E. (2006). Relationship of personality traits and counterproductive work behaviors: The mediating effects of job satisfaction. Personnel psychology, 59(3), [Online], [Retrieved: 2017, May 08], https://scholar.google.com.

Neuman, J. H., & Baron, R. A. (1998). Workplace violence and workplace aggression: Evidence concerning specific forms, potential causes, and preferred targets. Journal of management, 24(3), [Online], [Retrieved: 2017, May 08], https://scholar.google.com.

Ng, T. W., & Feldman, D. C. (2008). The relationship of age to ten dimensions of job performance. [Online], [Retrieved: 2017, May 08], https://scholar.google.com.

Paulhus, D. L., & Williams, K. M. (2002). The dark triad of personality: Narcissism, Machiavellianism, and psychopathy. Journal of research in personality, 36(6), [Online], [Retrieved: 2017, May 08], https://scholar.google.com.

Penney, L. M., & Spector, P. E. (2002). Narcissism and counterproductive work behavior: Do bigger egos mean bigger problems?. International Journal of selection and Assessment, 10(1-2), [Online], [Retrieved: 2017, May 08], https://scholar.google.com.

Remišová, A. Lašáková, A. Rudy, J. Sulíkova, R. Kirchmayer, Z., & Fratríčová, J. (2015). Etické vedenie ľudí v slovenskom podnikateľskom prostredí. Bratislava: Wolters Kluwer.

Robinson, S. L., & Bennett, R. J. (1995). A typology of deviant workplace behaviors: A multidimensional scaling study. Academy of management journal, 38(2), [Online], [Retrieved: 2017, May 08], https://scholar.google.com.

Reed, G. E. (2004). Toxic leadership. Military Review, 84(4), [Online], [Retrieved: 2017, May 08], https://scholar.google.com

Salgado, J. F. (2002). The Big Five personality dimensions and counterproductive behaviors. International Journal of Selection and Assessment, 10(1-2), [Online], [Retrieved: 2017, May 08], https://scholar.google.com.

Schmidt, A. A. (2014). An examination of toxic leadership, job outcomes, and the impact of military deployment (Doctoral dissertation). [Online], [Retrieved: 2017, May 08], https://scholar.google.com.

Schmidt, A. A. (2008). Development and validation of the toxic leadership scale. University of Maryland, College Park. [Online], [Retrieved: 2017, May 08], https://scholar.google.com

Sheard, A. G., Kakabadse, N., & Kakabadse, A. (2013). Destructive behaviours and leadership: the source of the shift from a functional to dysfunctional workplace?. International Journal of Social Science Studies, 1(1), [Online], [Retrieved: 2017, May 08], https://scholar.google.com.

Spector, P. E., Fox, S., Penney, L. M., Bruursema, K., Goh, A., & Kessler, S. (2006). The dimensionality of counterproductivity: Are all counterproductive behaviors created equal?. Journal of vocational behavior, 68(3). [Online], [Retrieved: 2017, May 08], https://scholar.google.com.

Tepper, B. J. (2000). Consequences of abusive supervision. Academy of management journal, 43(2), [Online], [Retrieved: 2017, May 08], https://scholar.google.com.

Tepper, B. J., Henle, C. A., Lambert, L. S., Giacalone, R. A., & Duffy, M. K. (2008). Abusive supervision and subordinates' organization deviance. Journal of Applied Psychology, 93(4), [Online], [Retrieved: 2017, May 08], https://scholar.google.com.

Tepper, B. J. (2007). Abusive supervision in work organizations: Review, synthesis, and research agenda. Journal of management, 33(3), [Online], [Retrieved: 2017, May 08], https://scholar.google.com.

Ubrežiová, I., Kurčová, R., & Horváthová, J. (2017). How Can We See the Corporate Social Responsibility within Its Application in Business Practice?. Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis, 65(1), [Online], [Retrieved: 2017, May 08], https://scholar.google.com.

Zellars, Kelly L.; Tepper, Bennett J.; Duffy, Michelle K. 2002. Abusive supervision and subordinates' organizational citizenship behavior. Journal of Applied Psychology. 87 (6): [Online], [Retrieved: 2017, May 08],: https://www.apa.org.

SMEs Marketing Strategy Clusters: A Case of Indonesian SMEs

Rifelly Dewi Astuti, Universitas Indonesia, Depok, Indonesia, rifelly.dewi@ui.ac.id

Adi Zakaria Afiff, Universitas Indonesia, Depok, Indonesia, adi.zakaria@ui.ac.id

Tengku Ezni Balqiah, Universitas Indonesia, Depok, Indonesia, tengku.ezni@ui.ac.id

Abstract

There is a lack of marketing strategy cluster or typology that is widely accepted by the scholars covering the whole of marketing strategy comprehensively. The difference of SMEs and established companies leads to special marketing strategy that is appropriate for their limited resources characteristics. The important role of SMEs in countries is unquestionable, they have big contribution on ones' country economics development. Therefore, this study is to form a marketing strategy cluster or typology that is suitable for small and medium-sized enterprises (SMEs) in Indonesia. To conduct this study, we first reviewed the literature of marketing strategy for SMEs, then conducted a survey of 130 SME owners in Indonesia regarding their marketing strategy practices, using the SME marketing strategy concept Carson and Gilmore (2000), and Gilmore (2011). We next performed a hierarchical cluster analysis to develop a typology of marketing types consisting of: aggressive marketers, mass marketers, value marketers, traditional marketers, and minimizer marketers. We then examined the marketing performance of each type. Aggressive marketers had superior performance and minimizer marketers had the lowest performance.

Keywords: Marketing Strategy; Cluster Analysis; Small and Medium-Sized Enterprises.

Introduction

Traditionally, marketing has focused on big companies or corporations that have abundant resources and neglected small and entrepreneurial organizations (Hills, Hultman, & Miles, 2008). However, Gruber (2004) argued that marketing is a key success factor for a new company. Gilmore (2010) stated that a new company's marketing effort is related to whether the owner or manager adapts the basic marketing principles, uses networks, and employs innovative marketing techniques.

Slater & Olson (2001) demonstrated that maximum marketing performance can be achieved by implementing the right combination of business strategy and marketing strategy. Marketing strategy involve numerous paths that a company takes to achieve its marketing objectives, especially fulfilling the target market's needs (Varadarajan & Clark, 1994). However, the empirical results of research related to marketing strategies are mixed; they don't indicate a significant effect on organizational performance and they are contradictory, confusing even (Theodosiou & Leonidou, 2003; Zou & Cavusgil, 2002). Moreover, the marketing strategy research studied various elements on isolation (e.g., studying only product development, promotion, or price) (Slater & Olson, 2001), whereas the entire marketing mix needs to be analyzed as a unit (Kustin, 2004).

Slater and Olson (2001) developed a typology of marketing strategy that includes four types; aggressive marketers, mass marketers, marketing minimizers, and value marketers. Other than their study, the research that examines the classification or typology of marketing strategies is extremely limited. However, research into classification or typology is important in scientific research because typology and taxonomy can assist researchers in investigating this interrelated and complex phenomenon to make it easier to understand (Ginsberg, 1984, in Slater & Olson, 2001).

The important role of SMEs for a country was no doubt in the world, which are interpreted in a number of SMEs, employment, and the contribution of SMEs to the national income. Based on the Ministry of Cooperatives and SMEs Republic of Indonesia in 2014, the number of SMEs about 59.2 million units, an increase of 2.28% from the previous year, this led to an increase in employment of SMEs approximately 6.97% or 112 million people. While the contribution of SMEs to the Indonesia national income in 2014 is IDR 6,108 trillion, or about 60% of Indonesia's GDP, up 12.28% from the previous year. In addition, the definition of SMEs in countries is different. The significant difference lies in the number of workers, for the European Union, SMEs is a business that has <250 workforces; while in the United States, SMEs is a trading business has <100 people workforce or in businesses manufacturing sector has <500 workforces. In contrast in China, SMEs in the construction sector has more than 3000 people workforce. While SMEs in Malaysia have <150 is similar of SMEs in Indonesia have <100 workforces.

SMEs generally have several limitations related to financial resources, market information, and marketing competencies, so their marketing strategy is usually simple, unorganized, unsystematic, and often in the form of reaction to competitor activity (Gilmore, Carson, & Rocks, 2006). However, SMEs also have several strengths; including a greater customer orientation, being faster and more flexible than larger organizations, and being eager to improve market performance (Gilmore et al, 1999). For these reasons, SMEs marketing strategy differs from that of an established or big company.

In the SME context, Carson and Gilmore (2000) offered a marketing concept with four elements: marketing mix, network marketing, marketing competency, and innovative marketing. However, proof for this concept is limited because the research was qualitative and did not offer empirical results (Jamal, 2005). Thus, this research is intended to (1) determine which typology of marketing strategy is appropriate for SMEs in Indonesia, based on the components described by Carson and Gilmore (2000), to maximize SMEs' performance and (2) develop clusters of the most appropriate marketing strategy for SMEs in Indonesia.

Literature Review

The concept of SME marketing strategy is still limited in the marketing literature. Based on SMEs' limitations, differences emerge between marketing theory that found in textbooks and SMEs' implementation approach, so SMEs' marketing strategy takes on certain characteristics, including being more informal, short-term oriented, and developed based on a commonsense marketing approach (Gilmore, et al, 2006).

Carson and Gilmore (2000) offered a marketing strategy concept for SMEs, that combines four concepts: adapting the textbook marketing mix (product, price, placement or distribution, and promotion), network marketing, competency marketing, and innovative marketing. Marketing competency is a combination of experience, knowledge, communication and entrepreneurs' judgement. Networking is also an important skill and competency that entrepreneurs need to develop their business. The last, innovative marketing refers to the creation of innovative process and product. Those three components (networking, competency, and innovation) will be used comprehensively that will influence the adaption of marketing techniques that appropriate for SMEs characteristics or we call it as "contextual marketing of SMEs" (Carson & Gilmore, 2000).

The concept from Carson and Gilmore (2000) was strengthen by Gilmore (2011) that made that concept as entrepreneurial marketing strategy for SMEs. It based on the fact that the entrepreneur as a center for SMEs marketing decision making (Gilmore & Carson, 2007 in Gilmore, 2011).

SMEs is highly dependent on their business owner who will adapt the traditional marketing concepts, focus on giving value added on their product or services, and combine it with flexibility, superior service, and close relationship with customer (Gilmore, 2011). The adaption standard textbook frameworks is a

marketing mix that suitable for SMEs and combine with value added for SMEs marketing, includes product or services, pricing, distribution/placement, promotion and sales, customer service, reputation and recommendation, and e-marketing (Gilmore, 2011).

Networking marketing is SMEs business owner effort to talk with another business owners, attend trade exhibition, gather the marketing information, and implement all marketing activity (Gilmore, et al, 2006). As the center of decision maker the SMEs business owner should have relevant competencies for example in offering better product or services that competitor, having appropriate pricing, offering better delivery system, doing better promotion or sales program, and focusing on using existing resources (Gilmore, 2011). Last, O'Dwyer, et al (2009) concluded that innovative marketing that appropriate for SMEs should have several components, are: differentiation of their marketing variables, modification of their product or process, customer focus, market focus, and have unique proposition.

Many metrics can be used to measure a company's performance, but scholars have used business growth and profitability more often than other metrics (Qureshi & Kratzer, 2000). Market share or the growth in sales volume is reflected as business growth; otherwise, profitability is measured as current company's performance (Venkatraman, 1989) in achieving the company's main objectives.

Research Methodology

Respondents for this research are SME owners. This research used non probability sampling technique, that was judgmental sampling. The respondents were chosen from the finalist of Young Entrepreneurs Competition in Indonesia Year 2012 – 2014. Questionnaires were sent to 400 respondents; 130 returned the questionnaires, representing a 32.5% response rate. Even though Formann (1984) in Dolnicar (2002) already suggested the minimum samples for cluster analysis is 2k (k = number variables) but in his research Dolnicar (2002) had concluded that even very small sample sizes could be used for clustering in very high dimensional attribute space. So the 130 respondents could be used in cluster analysis.

The marketing strategy variables were a modified marketing mix, customer service, reputation, and positive recommendation (Gilmore, 2011; Gilmore, et al, 1999; O'Dwyer, et al., 2009), networking (Gilmore, 2011; Gilmore, et al., 2000; Gilmore, et al., 2006), e-marketing (Gilmore, 2011), and marketing competency for SMEs (Gilmore, 2011; Carson & Gilmore, 2000). The marketing performance variables were respondents' perception of their marketing growth and profitability compared to their competitors (Babakus, et al., 1996; Slater & Olson, 2001). All variables were measured on 5-point Likert scale ranging from 1 (least importance) to 5 (most importance). Hierarchical cluster analysis was used to create clusters from those variables, because it is simpler to measure the similarity among objects, and can be used with a limited sample number (Hair, et al., 2010); also, hierarchical cluster analysis provides better results than with k-means cluster analysis (Steinbach, Karypis, & Kumar, 2000).

4. Results

Based on 130 respondents SME owners in Indonesia, 80% was aged between 20 and 30 years old, 63.1% was male, 62.3% had completed an undergraduate degree, and 57.7% started their own business to implement their business idea. Among these SMEs, 83% was established within the last five years and 93% had fewer than 10 employees. Their businesses were in the textile and footwear industry (29.2%), and food and beverages industry (23.3%).

All variables were reliable and all 76 items were valid, thus appropriate for use in further analysis. The reliability and validity of the items are shown on Table 1. Based on hierarchical cluster analysis using the agglomerative method and complete linkage approach, the result was five clusters that are significantly

different based on analysis of variance (Anova) and Scheffe multiple comparison (Slater & Olson, 2001). The clusters are shown on Table 2.

Table 1: Reliability and Validity

Variable	Item	ronbach Alpha	Reliability	actor Loading	Validity
Product Mix	C01	0.892	Reliabel	0.527	Valid
	C02			0.597	Valid
	C03			0.784	Valid
	C04			0.724	Valid
	C05			0.771	Valid
	C06			0.730	Valid
	C07			0.788	Valid
	C08			0.757	Valid
	C09			0.741	Valid
	C10			0.627	Valid
	C11			0.657	Valid
Pricing Mix	C12	0.625	Reliabel	0.542	Valid
	C13			0.518	Valid
	C14			0.713	Valid
	C15			0.670	Valid
	C16			0.724	Valid
Placement /	C17	0.775	Reliabel	0.684	Valid
Distribution mix	C18			0.728	Valid
	C19			0.532	Valid
	C20			0.730	Valid
	C21			0.776	Valid
	C22			0.834	Valid
Promotion and	C23	0.722	Reliabel	0.555	Valid
Selling	C24			0.604	Valid
	C25			0.500	Valid
	C26			0.709	Valid
	C27			0.553	Valid
	C28			0.664	Valid
	C29			0.657	Valid
	C30			0.500	Valid
Customer Service	C31	0.890	Reliabel	0.824	Valid
	C32			0.813	Valid
	C33			0.867	Valid
	C34			0.819	Valid
	C35			0.848	Valid
	C36			0.824	Valid
	C37			0.741	Valid
	C38			0.660	Valid
	C39			0.592	Valid
	C40			0.501	Valid
	C41			0.502	Valid

Variable	Item	ronbach Alpha	Reliability	actor Loading	Validity
Reputation &	C42	0.88	Reliabel	0.781	Valid
Recommendation	C43			0.831	Valid
	C44			0.643	Valid
	C45			0.662	Valid
	C46			0.865	Valid
	C47			0.833	Valid
	C48			0.769	Valid
E-marketing	C49	0.853	Reliabel	0.626	Valid
	C50			0.501	Valid
	C51			0.653	Valid
	C52			0.556	Valid
	C53			0.596	Valid
	C54			0.712	Valid
	C55			0.685	Valid
	C56			0.745	Valid
	C57			0.759	Valid
	C58			0.780	Valid
Networking	C59	0.890	Reliabel	0.774	Valid
	C60			0.852	Valid
	C61			0.681	Valid
	C62			0.537	Valid
	C63			0.875	Valid
	C64			0.763	Valid
	C65			0.773	Valid
	C66			0.769	Valid
	C67			0.589	Valid
Competency	C68	0.908	Reliabel	0.683	Valid
	C69			0.714	Valid
	C70			0.742	Valid
	C71			0.778	Valid
	C72			0.797	Valid
	C73			0.832	Valid
	C74			0.811	Valid
	C75			0.847	Valid
	C76			0.628	Valid

Table 2: Means, ANOVA, and Scheffe Score among Clusters

Mean	F Statistik*/ Scheffe Result**	Cluster 1 / Aggressive Marketers / n = 24	Cluster 2 / Mass Marketers / n = 22	Cluster 3 / Value Marketers / n = 28	Cluster 4 / Traditional Marketers / n = 11	Cluster 5 / Minimizers Marketers / n = 45
Product mix (variety, innovative, solutive, quality, packaging, and branding)	37,656 / 1 > 2,5; 3,4 > 2, 5	4.80	4.13	4.58	4.60	3.87
Price (discount, cost based price, target customer based price, variety of price)	13,074 / 1 > 2,5; 3,4 > 5	4.32	3.71	3.92	4.00	3.48
Distribution (service delivery and intermediaries)	21,354 / 1 > 2,3,5; 2,3,4 > 5	4.58	4.08	4.15	4.11	3.57
Promotion & Sales (WOM, flyer, brochure, bonus or gift, salesmen, trade show or bazaar, advertising above the line and online)	34,990/ 1 > 2,3,4,5; 2,3 > 5	4.45	3.88	3.64	3.58	3.20
Customer service (satisfied, consistency, service, personal, and after sales service; long term relationship)	50,878/ 1 > 2,3,4,5; 2,4 > 5; 3 > 2,5	4.77	4.10	4.45	4.07	3.63
Reputation & Recommendation (company reputation, positive recommendation as promotion tools, integrity, honesty)	40,038/ 1,3 > 2,5; 4 > 5	4.90	4.21	4.72	4.60	3.96
E-marketing (website, social media, direct email, updating content, hiring consultant or employee for online marketing)	71,500/ 1 > 2,3,4,5; 2,3 > 4,5; 5 > 4	4.55	4.06	3.89	2.62	3.22
Networking (becoming member of community or asociation, sharing information, cooperating among entrepreneurs, following trade shows)	28,344/ 1 > 2,3,4,5; 2 > 4,5; 3 > 4	4.62	4.03	3.77	3.04	3.37
Marketing competency (knowledge, competency, skills, intuition, leadership, never give up)	25,318/ 1 > 2,3,5; 2,3,4 > 5	4.88	4.25	4.42	4.48	3.94
Marketing growth		3.77	3.36	3.11	3.70	3.07
Profitability		3.88	3.45	3.04	3.73	3.07

*All F statistics significant for $\rho < 0,01$

**Cluster significantly different for $\rho < 0,05$

After all clusters were formed, they were described based on the item in the questionnaires from each dimension that had the highest factor loading score, as shown in Table 3.

Table 3 : Items of Marketing Strategy Variables with Highest Factor Loading Score

Variable	Cluster 1 Aggressive Marketers	Cluster 2 Mass Marketers	Cluster 3 Value Marketers	Cluster 4 Traditional Marketers	Cluster 5 Minimizer Marketers
Product mix	Different product and innovative product	Variety of product	Quality product with best materials	Quality product for customer	Quality product for customer
Pricing	Target customer based price	Target customer based price	Target customer based price	Cost based price	Cost based price
Distribution	Good Handling delivery	Service delivery	Delivery as promised	Good handling delivery	Delivery as promised
Promotion & Sales	Online advertising	Online advertising	Online advertising	Own salesmen	Online advertising
Customer service	Consistent and accurate service	Communicating with customer	Satisfied service	After sales service	Satisfied service
Reputation & recommendation	Positive recommendation and testimony for promotion tools	Keeping company reputation	Keeping for customer trust	Keeping for customer trust	Keeping company reputation
e-marketing	Updating product info on website or social media	Advertising or promotion on social media	Advertising or promotion on social media	Limited promotion on social media	Advertising or promotion on social media
Networking	Following trade shows	Becoming business community member	Becoming business community member	Sharing information	Networking in community
Marketing competency	Increasing knowledge, intuition, & skill	Having never give up strength	Having never give up strength	Elevating knowledge and competency	Having never give up strength

Discussion

Based on Table 2 and 3, we describe the profile of all clusters below.

Cluster 1: *Aggressive Marketers*

Cluster 1 had the highest mean for marketing strategy variables among all the clusters. This indicates members of cluster 1 used all the marketing strategy variables widely and aggressively. This cluster employed a more innovative product strategy than competitors by employing target customer-based pricing, offering the best delivery, having online advertising, using positive recommendation and testimony as promotion tools, having accurate service, updating the information on the company website, following trade shows, and always elevating their communication skills and business intuition. The aggressive marketers cluster (Slater & Olson, 2001) also had similar characteristics, including using innovative products, differentiating from competitors, using advertising, and investing in other marketing efforts.

Members of the aggressive marketers cluster also perceived that they had the highest performance. The results showed that SMEs in this cluster implemented all the marketing strategy comprehensively and aggressively, which allowed them achieve the best performance in terms of marketing growth and profitability. This cluster included 24 SMEs or 18.5% of all respondents. Respondents' ages ranged 30 to 40 years old (12.5%), most were male (58.3%), and most had an had undergraduate degree (70.8%).

Cluster 2: *Mass Marketers*

Members of this cluster used a variety of products, but no innovative products, and implemented a pricing, distribution and promotion strategy similar to that of their competitors. They also had similar e-marketing, networking, and marketing competency as their competitors. In other words, members of this cluster only followed their competitors; they did not have their own unique strategy. This cluster is similar to the mass marketer cluster in Slater and Olson (2001), which offered variety but similar products as competitors, and displayed no differentiation from competitors.

This cluster had lower performance in growth and profitability than the other two clusters (aggressive and traditional marketers). This indicates that SMEs in this cluster and other SMEs that implement marketing strategy similar to this cluster will less than ideal performance. The cluster members included 22 SMEs, or 16.9% of all respondents. Respondents' ages ranged from 20 to 30 years old (90.9%), most were male (86.4%), and several had a graduate degree (18.2%).

Kluster 3: *Value Marketers*

Cluster 3 had more focus on customer satisfaction, which was implemented via innovative products, though not as innovative as cluster 1, including high-quality products made from high-quality materials, an affordable price, the best service, service provided as promised, and a commitment to customer satisfaction. These characteristics are similar to the characteristics of the value marketer in Slater & Olson (2001) in that value marketers also provide high-quality products that are innovative, but not as innovative as those of aggressive marketers, and focus on customer service. Thus, this cluster is also labelled value marketers.

However, their effort to satisfy their customers did not succeed. They perceived their performance in growth and profitability as lower than their competitors. Customers might not have perceived their efforts to be satisfactory or to meet their expectations. This cluster contained 28 SMEs, or 21.5% of all

respondents. Respondents' ages ranged from 20 to 30 years old (78.6%), most were male (64.3%), and half had completed their undergraduate degree (50%).

Cluster 4: *Traditional Marketers*

The most prominent characteristics of this cluster was that it had the lowest mean score for the e-marketing variable, although the cluster had quite a high mean score on the other marketing strategy variables. These cluster members implemented high-quality products and cost-based pricing, used their own representatives to sell products, offered after-sales service, shared information among business owners, and also increased their knowledge and competency. This cluster might not implement online technology optimally because members prefer to use traditional ways to sell their product. Thus, this cluster is labelled traditional marketers. There was no similar cluster in Slater and Olson (2001), so this cluster differs from the clusters.

Members of this cluster perceived that they have good performance; this cluster had the second best mean score in both marketing growth and profitability. These SMEs use traditional method to sell their products, but they can achieve better performance if they provide innovation, differentiation, and the best service to their customers. This cluster had the fewest members, only 11 SMEs, or 8.5% from all respondents. Respondents' ages ranged from 20 to 30 years old (81.8%), most were male (54.5%), and most had earned an undergraduate degree (63.6%).

Cluster 5: *Minimizer Marketers*

The minimizer marketer cluster had the lowest mean score for all marketing strategy variables except e-marketing. This means that the cluster made a very minimal effort with respect to marketing strategy. The products are not innovative and come with minimal customer service and promotion. These characteristics are similar to those in the marketing minimizer cluster (Slater & Olson, 2001). The minimizer marketers offered the lowest customer service and made the lowest marketing strategy effort among the clusters. Thus, this cluster is labelled minimizer marketers.

Because this cluster only used minimum effort in marketing strategy, the companies in it had the lowest performance in both marketing growth and profitability. This means that the SMEs that implemented only minimum efforts in marketing strategy experienced lower performance than the other SMEs. This cluster had the most members, 45 SMEs, or 34.6% of all respondents. Respondents' ages ranged from 20 to 30 years old (77.8%), most were male (55.6%), and most had completed an undergraduate degree (66.7%).

Conclusion

Based on the marketing strategy concept for SMEs (Carson & Gilmore, 2000; Gilmore, 2011), this study empirically and significantly identified five marketing clusters containing SMEs in Indonesia: aggressive marketers, mass marketers, value marketers, traditional marketers, and minimizer marketers. This research enriches the study of marketing strategy that previously was fragmented and not comprehensive (Slater & Olson, 2001). This study also extends Slater and Olson (2001), who identified only four clusters for big companies based on their marketing strategy. This study includes the traditional marketer cluster that grew from the e-marketing strategy.

This study shows that aggressive marketers had the best performance and minimizer marketers had the lowest. Thus, if the owner of an SME wants to increase the SME's marketing performance, the owner should offer innovative products, focus on customer service, engage in effective promotion, employ e-marketing, and use positive recommendations as promotional tools, always increasing the SME's business capability.

Limitations

The perceptual measurement of performance metrics may represent a limitation for this study due to biased answers from respondents even though the perceptual measurement of performance is accepted as empirical analysis (Dess & Robinson, 1984). Researchers can combine the perceptual and actual financial measurements like cash flow in future research.

References

Babakus, E., Cravens, D., Grant, K., Ingram, T., & LaForge, R. (1996). Investigating the relationship among sales, management control, sales territory design, salesperson peformance, and sales organization effectiveness. *International Journal of Research in Marketing*, 13(4), pp. 345-363.

Carson, D., & Gilmore, A. (2000). Marketing at the interface: Not 'what' but 'how'. *Journal of Marketing Theory and Practice*, 8(2), pp. 1-7.

Dess, G.G., & Robinson, Jr., R.B. (1984). Measuring organizational performance in the absence of objective measures: the case of the privately-held firm and conglomerate business unit. *Strategic Management Journal*, 5, pp. 265-273.

Dolnicar, Sara (2002). A review of unquestined standards in using cluster analysis for data-driven segmentation. *Proceeding of Anzmac*.

Gilmore, A. (2010). Reflections on methodologies for research at the marketing/entrepreneurship interface. *Journal of Marketing and Entrepreneurship*, 12(1), pp. 11-20.

Gilmore, A. (2011). Entrepreneurial and SME Marketing. *Journal of Research in Marketing and Entrepreneurship*, 13(2), pp. 137 – 145.

Gilmore, A., Carson, D., & Rocks, S. (2006). Networking in SME's: Evaluation its contribution to marketing activity. *International Business Review*, 15, pp. 278-293.

Gilmore, A., Carson, D., O'Donnell, A., & Cummins, D. (1999). Added value: A qualitative assessment of SME marketing. *Irish Marketing Review*. 12(1). 27

Gruber, M. (2004). Marketing in new ventures: theory and empirical evidence. *Schmalenbach Business Review*, *56*(2), pp. 164.

Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. (2010). *Multivariate Data Analysis A Global Perspective*. (7th ed.). New Jersey: Pearson Prentice Hall.

Hills, G. E., Hultman, C. M., & Miles, M.P. (2008). The evolution and development of entrepreneurial marketing. *Journal of Small Business Management, 46*(1), pp. 99-112.

Jamal, A. (2005). Playing to win: An explortive study of marketing strategies of small ethnic retail entrepreneurs in the UK. *Journal of Retailing and Consumer Services*, 12, pp. 1-13.

Kustin, R. A. (2004). Marketing mix standardization: A cross cultural study of four countries. *International Business Review*, 13(5), pp. 637–649.

O'Dwyer, M., Gilmore, A., & Carson, D. (2009). Commentary innovative marketing in SMEs. *European Journal of Marketing*, 43(1/2), pp. 46-61.

Qureshi, S. & Kratzer, J. (2010). An investigation of antecedents and outcomes of marketing capabilities in entrepreneurial firms: An empirical study of small technology-based firms in Germany. *Journal of Small Business and Entrepreneurship*, *24*(1), pp. 49-66.

Slater, S.F & Olson, E.M. (2001). Marketing's Contribution to the Implementation of business strategy: An empirical analysis. *Strategic Management Journal*, 22, pp. 1055-1067.

Steinbach, M., Karypis, G., & Kumar, V. (2000). A comparison of document clustering techniques. *KDD Workshop on Textmining*

Theodosiou, M., & Leonidou, L. C. (2003). Standardization versus adaptation of international marketing strategy: An integrative assessment of the empirical research. *International Business Review*, 12(2), pp. 141–171.

Varadarajan, P.R & Clark, T. (1994) Delineating the scope of corporate, business, and marketing strategy. *Journal of Business Research*, 31, pp. 93-105.

Venkatraman, N. (1989). The concept of fit in strategy research: Toward verbal and statistical correspondence. *Academy of Management Review*, *14*(3), pp. 423-444.

Zou, S., & Cavusgil, T. (2002). The GMS: A broad conceptualization of global market- ing strategy and its effects on firm performance. *Journal of Marketing*, 66(4), pp. 40–56.

The Audit Records and Risk Assessment Related To Significant Denaturation in the Inventory Auditing Activity

Cristina Iovu, The Bucharest University of Economic Studies, Bucharest, Romania, iovucris@yahoo.com

Abstract

Starting from the complexity of the inventory auditing activity and from the importance of the auditor within this activity, in a first section, the typology of the audit evidence used by the auditor with the purpose of expressing an opinion regarding the fact that the inventories contain or not significant denaturation in the financial statements was presented. In the second section, the results of the audit activity were presented within a mission regarding the auditing of these categories of inventories, as included in the description and explanation of the types of errors/ denaturation identified, as well as the impact of the risks associated to these types of errors, in presenting the financial information regarding inventories.

Keywords: Inventory losses, fraud risk, audit procedures, flow-chart.

Introduction

The inventories represent for many entities assets with significant rate in the activity developed, having a direct impact upon the profit and loss account, through the fact that any over-evaluation or under-evaluation of the inventories would lead to an adequate over-evaluation or under-evaluation of the profit and loss account. When planning the auditing mission of these assets, the auditor must assess the risk related to the management statements regarding the existence and inventory assessment. In practice, most of the times, the management bodies of companies tend to over-evaluate the inventories rather than under-estimating them, reasoning with the reporting of an over-evaluated balance sheet asset, and implicitly of favourable performance indicators. The scope of the auditor is to obtain a reasonable assurance that the inventories are not significantly denatured in the financial statements.

This category of assets has specific characteristics, which most of the times make control difficult, reason for which periodic inventories are necessary for determining the quantities, physical integrity, rights and obligations as well as the correctness of accounting evidence regarding inventories.

In the United States, during the 1930s, the audit evidence related to inventories was resumed at obtaining a certificate (statements) from the management with respect to the correctness of the amounts presented in the financial statements. In 1938, the identification of the significant fraud within McKesson&Robins Company, market leader in the pharmaceutical products sector in the USA triggered the review of the auditors' responsibility with respect to inventories. The company's financial statements, drafted in the fiscal year 1937,"certified" by a consultancy office, presented within the total assets position a value of 87 million dollars. Further, it was demonstrated that 19 million dollars from this amount (10 million in inventories and 9 million in debts) were fictive. The auditors were exonerated from any liability, considering that they had complied with the provisions of the audit standards in force at that date. However, immediately after this incident, the American audit standards were modified, including the verification of inventories among the auditor's responsibilities.

Methodology

Typology of audit evidence /procedures and their significance in the inventory auditing activity

The purpose of using the evidence is that of determining the accurate presentation of inventories in the financial statements. It is a known fact that no auditor can examine the content of all informatics files or the other evidence made available, such as the amounts paid for the acquired inventories, the invoices received from the suppliers for the acquisition of inventories, the contracts concluded with clients, other type of accounting documents and evidence.

The founding of the audit opinion is performed using the audit evidence. As provided and further explained by the ISA 315 and ISA 330, the audit evidence for drafting reasonable conclusions on which the auditor's opinion will be based on are obtained with the use of:

(a) Risk assessment procedures; and

(b) Further audit procedures, which comprise:

(i) Tests of controls, when they are not provided by ISAs or when the auditor selected to perform them; and

(ii) Fund procedures, including detail tests and analytical fund procedures.

Inspection

The inspection implies the examination of records or internal and external documents as well as a physical examination of inventories for example the inspection of the individual elements of inventories could accompany the identification of inventories.

The inspection of records and documents provide audit samples with various reliability degrees:

- audit samples with documentary character, drafted and kept by third parties;

- audit samples with documentary character, drafted by third parties and kept by the audited entity; for example: invoices received from suppliers;

- audit samples with documentary character, drafted by the audited entity and which circulate in the exterior; for example: invoices issued for clients;

- audit samples with documentary character, drafted and kept by the audited entity; example: accounting notes, inventories input-output notes, material requisition forms etc.

Observation

Observation consists in the monitoring of a process or of a procedure which is performed by other parties, for example, auditor observing the inventories performed by the entity's personnel or the development of the control activity.

External confirmation

An external confirmation represents the audit evidence obtained by the auditor as a written response received directly from a third party (the party which performs the confirmation), on hard copy or electronic or through any other means. The frequent external confirmation procedures are relevant when statements associated to certain inventories of accounts and with the elements of these accounts such as confirmation of inventory balances held by third parties are approached.

Re-computation

Re-computation consists in the verification of the mathematical correctness of documents or records. Re-computation can be performed either manually or electronically.

Re-performance

Re-performance implies the execution by the auditor, in an independent manner, of the procedures or controls that the entity performed initially through its own internal control system. Due to the fact that the auditor verifies directly through this type of evidence the reliability of the internal control system, they are perceived as having a very high credibility degree.

Analytical procedures

The analytical procedures represent important and effective evidence, collected during the audit mission which include the stage of settling the terms of the agreement and planning; these procedures consist in the assessment of the information included in the financial statements, based on the analysis of certain indicators (trends, comparisons) and on the performance of certain correlations between this information and / or between this information and other non-financial data/information.

The level of assurance (safety) provided by the evidence collected through the analytical procedures is determined by the following:

- Extent to which they are available and provide safety of data and information used;
- Plausibility and predictability of the tested correlations;
- Accuracy (reasonability) and correctness of the analysis and investigations performed.

Investigation

Investigation implies the performance of questionnaires addressed both to persons within the organisation as well as outside it with the purpose of obtaining pertinent information related to the audited entity.

Review

The review represents the process by means of which the accounting data are reviewed and verified in order to identify important or unusual situations (amounts/turnover/balances/operations).

The degree of reliability for each audit procedure is presented in the table below:

Type of Audit Procedure	**Assurance degree**
Inspection of assets Re-performance Re-computation	High
Inspection of documents, records Confirmation	Average

Review Analytical procedures	
Observation Investigation	Low

In the inventory auditing mission, it is necessary to settle a working programme which could include the following objectives:

A. Analysis and assessment of existent controls

Within this objective it is necessary to develop the following stages:

1. Obtaining information regarding existent controls

Within this stage, information regarding the following elements could be obtained:

- Information regarding the company's organisational chart;
- Identification of documents used (format, pre-numbering) and diagrams for the circuit of documents;
- Obtaining details regarding the understanding of the acquisition, reception, storage, delivery, invoicing procedures (existence of written external procedures, written internal decisions etc);
- Controls upon inventories which belong to third parties as well as upon those held to third parties;
- Assessment of the assessment method used (FIFO, CMP, LIFO etc.);
- Assessment of the inventory method for the inventories used by the entity (method of permanent inventory /intermittent inventory);
- Assigning of responsibilities and segregation of tasks;
- Assessment of the manner to provide security against robbery, with the purpose of preventing stock losses;
- Manner for performing the physical monitoring of inventories (periodicity, procedures, responsible persons, documentation, analysis and accounting of differences).

2. Testing of existent controls monitoring the circuit of documents and highlighting the exercising of controls

Within this stage the following evidence could be obtained:

- Selection of a representative set of orders issued by the supplying department;
- Verification of observing the internal procedures (authorisations, selection of suppliers, necessity notes, etc.);

- For the orders in the selected set, the invoice received from the supplier, the reception documents, the payment documents to the supplier etc. will be verified);
- Verification and matching of the information included in the orders submitted to the suppliers (quantities, values) with the ones included in the acquisition documents (invoices) and reception documents (receiving-reception minute);
- Verification of accounting records of inventories inputs/outputs;
- Review of the minutes from previous inventories, assessment of the applied procedures and the settlement of the treatment applied to the acknowledged differences.

3. Assessment of the existent internal control system

Within this stage, the following activities are taken into consideration:

- Drafting conclusions resulted from the applied tests (positive/negative aspects);
- Analysis of the risks related to areas in which the internal controls are not effective and the assessment of the necessary level for the performance of detailed tests.

B. Development of detailed tests

1. Inventory monitoring – participation in inventory and verification of observing procedures

Within this stage, the auditor is not responsible for actually monitoring the inventories or for coordinating this activity, but for the observance of the development of the inventory activities in compliance with the settled procedures and to make sure regarding the existence of inventories.

It should be noted that at the monitoring of inventories very many errors could occur which may exhibit important consequences upon financial statements. Some of these errors could be represented by:

- Incorrect numbering of products from the inventory. If following the numbering a significantly higher number of products results compared to the actual one, the error will generate an adjustment in addition of the inventory position, in the same time with the acknowledgment of an income. If following the numbering of products a significantly lower number of products results compared to the actual one, the situation of reversed, meaning that an adjustment in minus will be generated in the inventory position in the same time with the acknowledgment of an expense.

Such a situation can be reached either through the actual incorrect numbering, or through the incorrect summarisation of the inventory lists (operating errors).

-Numbering of products which belong to third parties. As such, although in the warehouse there are inventories put at the disposal of the entity by some of the suppliers, these products should not be counted due to the fact that they are not property of the company. As a rule, for these products the supplier organises a separate inventory, in order to provide their integrity.

In such a case, an inverted error occurs, when the company is the one having inventories at third parties and fails to inventor them. These products should be included in separate inventory lists.

- Other errors could be connected to the non-adequate preparation of the inventory so that at the date decided for the performance of the inventory all inventory movements are stopped – following that the processes would be resumed after finalisation. Some companies, in order to continue the production process, do not take into account this aspect, and so a situation in which several products which enter the

warehouse are counted during the inventory process, but they are recorded in the account books at a further stage, might occur.

- The use of adequate measurement units could also generate reconciliation errors between the facts and the documents, both from a quantitative view point as well as from a qualitative one (for example, in the management system a certain inventory sample is held at set while the actual inventory was performed according to the number of pieces).

- Another example of errors is the one related to the introduction of data into the system – these errors cannot be avoided by any effective informatics system.

Considering the large number of risks, the auditor must consider the following aspects:

-all inventories were monitored;

-depreciated inventories and the low movement inventories were identified separately;

-the cut-off procedures were observed, according to which the inventories inputs and outputs must be recorded in the accurate fiscal year;

-Verification through a sampling process of the correctness of inventory in case of certain items;

-Development of working charts for the applied verification tests;

-Monitoring of the use of pre-numbered labels for the identification of monitored inventories (in order to avoid the omission or the double inventory);

-Obtaining of a copy of inventory lists and verification of the accuracy of computations, comparison of the data with the data included in the accounting records and the analysis of differences resulted;

-Identification of third parties inventories (quantitative – qualitative), which implies the examination of custody/consignation agreements and obtaining confirmations from third parties regarding the inventories in custody;

-Verification of the manner in which the costs are recorded, through the assessment performed at the minimum between the acquisition cost and the net sale value;

- The performance of analytical procedures such as: obtaining comparative analysis of inventory balances presented per categories between the current year and the previous years, with the explanation of the large fluctuations; the analysis of the inventories' rotation speed (a lower rotation speed compared to the one recorded during the previous year suggests the existence of slow moving inventories or excess inventories); the comparison between the existent stocks and the production capacities or storage capacities;

-Identification of inventories constituted as guarantees in favour of third parties (bank loans, shareholders' minutes etc.).

Results and Discussion

Obtaining the audit evidence and assessment of the significant denaturation in the inventory auditing mission – Example: Inventory auditing in case of public food service unit (restaurant)

Presentation of inventories:

The inventories of the audited entity do not present a significant balance in the financial statements (approximately 7% of the total assets), but have a very large turnover, specific to the public food service activity. During the audited period inventories of approximately 22% of the value of the turnover obtained by the entity during this period were turned-over.

The structure of the used inventories is the following:

- ***Goods*** – represent the most representative part (approximately 82% of the total inventory turnover) and comprise the food products acquired for the preparation of menus or for the direct servicing;
- ***Fuels*** – are rolled through the diesel fuel inventory acquired for the electric power supply generator;
- ***Consumable materials*** – comprise auxiliary materials, spare parts, writing materials, consumable materials etc.;
- ***Inventory objects –*** materials such as inventory objects (room furniture, soft inventory, uniforms etc.) are operated as inventory and recorded as expenses being directly put into utilisation;
- ***Packaging materials –*** the packaging inventory is not significant and comprises barrels, crates and bottles and has a quite reduced turnover.

The objectives of the audit mission were the verification of the internal procedures related to acquisition, inventory and consume of inventories.

With the purpose of performing the mission the following items were used as audit techniques and procedures:

- Investigation upon internal procedures;
- Interview of involved persons;
- Reconciliation of reports and inventories situations;
- Analytical procedures upon correlations between inventories;
- Consumptions and incomes (computation of indicators);
- Verification of documents (samples);
- Observation of processes (reception of inventories);
- Conformity tests related to internal procedures related to inventories;
- Computations upon the values of inventories record;
- Re-computations of values for the verification of procedures' enforcement (average rated cost).

The results of the audit mission are presented in the table below, function of the following criteria: the audited area, description of aspects observed and presentation of significant errors/denaturation identified,

as well as the analysis of the impact of risks generated by the identified errors upon the financial statements of the entity and implicitly upon the general control environment and discipline at the level of the organisation.

Audited area	**Identified errors**	**Associated risks**
Circuit of documents and information – flow-chart	No adequate inventory of the orders to suppliers The orders which are issued to suppliers are not numbered and there is no evidence of those orders.	There might be a risk of issuing a double order for the same products and impossibility to monitor them, risk of not supplying the products by the suppliers.
- Acquisition of inventories - Reception of inventories - Storage	Some differences were identified between the price of the products in the order and the invoice. For example, from a sample set of 15 acquisitions, in case of 8 of them the value of the orders differs from the invoiced value. Following the interviewing process, the acquisition department argued this deficiency through the lack of non-updating the orders received from suppliers in the system.	Accepting for payment invoices with incorrect price.
	A case was identified (from a sample set of 15 acquisitions) in which the orders did not have the approval signatures of the acquisition department, although they had all other approvals according to the procedure.	If this case is not unique, there is a risk that acquisitions will be initiated for products which are already in the inventory.
	There are sorts of the same product, which have different acquisition prices, but they are registered with the same inventory code. As such, following the verification of the documents related to the inputs of goods (invoices, input-reception notes, inventory record card) different sorts of the same product were identified, having different acquisition prices, which are listed with the same inventory code and for which the inventory account is not held for each inventory item, but on global items.	This deficiency generates difficulties with respect to the identification of the acquired products, as well as in the reconciliation of information included in the goods acquisition documents.
	No effective security/guarding system in all inventories management is implemented.	Increased risk of theft, under the condition that these services undertake a limited level of liability for the losses.
	The inventories are not insured, by concluding agreements with specialised companies in this	An increased risk of theft is maintained from the part of the own employees, under the

	respect.	conditions in which no persons with the position of warehouse keepers are assigned which would undertake the entire responsibility from the point of view of the inventory and stock turnover.
	The company does not currently hold an effective soft for inventory documentation.	Increases the risk of operational errors' occurrence.
	The inventories are stored in different locations due to the fact that the storage places are not sufficient compared to the volume of activity.	This deficiency generates difficulties both in the performance of the control of these inventories with the purpose of preventing theft of physical degradation, as well as in the accounting of the inventories which are in transit.
Inventories output - Discharge from administration - Consumptions	Some consumption documents were identified not having inventory number, neither printed nor written by and, which makes difficult to hold a systematic inventory of these products, searching an output according to the related document or searching a document function of the records operated.	There is a risk of losing documents which have not yet been recorded in the inventory.
	Documents based on which the products are released from the warehouse and registered directly in consumption were identified („requisition form") which do not have the goods' taking over – receiving signatures.	There is a risk to release products which are not approved by responsible persons, there is a risk of issuing twice the products from the same „request" if the person who took over the goods does not sign, there is a risk of not operating the consumption documents in the administration, and implicitly in the accounting systems.
	In case of some inventory items (i.e. beverages) we identified differences which could not be explained between the number of consumed units according to the inventory balance and the outputs according to the payment notes issued to clients.	Lack of control upon inventories. Possibility to record fictive consumptions.
	The methods for keeping the inventory are not applied coherently, and unitary for all administrations. It was acknowledged that in case of some inventories' administration (i.e., beverages) the method of permanent inventory is used (this	In case of applying the intermittent inventory method, there is a risk that the inventory shortage (ex. Thefts or sales with no justifying documents) would be recorded fraudulently as

	method implies that in the accounting books all input-output operations are recorded, which allows the settlement and acknowledgment of inventories at all times, both from the point of view of the quantity as well as from the point of view of their value), and in case of other administrations (i.e., goods) the method of intermittent inventory is used (this implies that in the accounting system only the input operations are recorded, and the inventory outputs are settled and recorded at the end of the month, based on the inventory, as a difference between the – value of the initial inventory at which the value of the inputs is added – and the value of the final inventory determined based on inventory). The accounting of the discharge from administration in which the intermittent inventory method is used is performed together with the valuation of the inventory at the end of the month, by an employee of the financial department; all products which are included in the inventory shortage are recorded as expenses (consumptions).	consumptions.
Inventories' monitoring -Inventory procedure -Valuation of inventories -Depreciated inventories -Provisions	At the inventory actions, no written Inventory declaration is filled in. At the beginning of the inventory action, the warehouse keepers do not draft a written Inventory declaration, in which the type, number and date of the most recent goods' input-output document for inclusion/discharge from administration would be mentioned; they have inventory administration additions or minuses of which they are aware, have received or issued goods with no legal documents; hold receiving-issuing documents which were not operated in the inventory accounting or which were not handed over to the accounting department etc.	There might be a situation in which products which reach the warehouse during the development of the inventory will be counted, but these products will be recorded in the accounting system at a later stage.
	The segregation of responsibilities is not observed during the inventory process. The warehouses inventory commission comprises of members of the acquisitions department which are responsible for the respective warehouses, this being an incompatibility and an overlapping of responsibilities.	This aspect determines the premises of risk that the counted inventories would not be the real ones which actually exist

	The inventory lists have deficiencies. The inventory lists do not contain a code or an inventory number assigned to each inventory item, which would allow the easy identification of inventories during the inventory process.	Difficulties in adequate performance of the physical inventory of items
	During inventory some inventories of goods were identified (meat, fish frozen products, etc.) which do not have labels indicating the validity period.	There is a risk that the respective products would not be sold during the validity period
	The differences identified following the inventory are not explained During the inventory operations of goods within the warehouse different adjustments were operated (additions, releases), their nature not being detailed and explained in writing by the responsible persons. Following the investigations performed, it was noticed that the registration of the inventory differences was determined by the following situations: lack of timely operation and lack of full operation of documents related to the output of products from the administration by the responsible persons; incorrect drafting of material requisition forms; errors in the operation of input/output administration documents; adjustment of balances for certain inventory items during the inventory process; errors during the factual inventory process, generated from the incorrect settlement of inventories through the counting method; enforcement of the average rated cost method for the inventories' release from administration.	Maintaining an increased risk of un-authorised inventory discharges. Risk of internal fraud
	Inventories of goods were identified with an age exceeding one year. During the inventory process slow movement goods' inventories were identified (food, beverages) which are older than one year and which have a rate of 15% in the total of inventories. **The inventories rotating speed** (computed as average days of storage) records depreciation compared to the previous years, indicating the existence of slow movement inventories.	There is a risk that the inventories would be presented in the financial statements at an over-assessed value. Impossibility to obtain a reasonable assurance that the inventories are presented in the accounting evidence at the real value. The company's policy of not constituting provisions in case relative depreciations of inventories are recorded has a negative impact upon the accurate

		patrimony
	Certain value differences were identified between the quantitative and value inventory reports of some consumable materials inventories (cleaning products), and the nature of these differences was not explained by the authorised persons. Following the computations performed, certain errors in the operation of input/output documents were identified by the supply department (for example: input and outputs from the same inventory were operated, in different measuring units), deficiencies which lead to the presentation of certain quantitative and value balances which are denatured in the inventory and analysis of inventories financial reports.	Impossibility to obtain a reasonable assurance of the fact that the inventories are presented in the financial statements at their real value, both from a quantitative as well as from a value point of view. Risk generated by the report of denatured financial statements, which contain information which are not correct and accurate. Reporting of denatured economic and financial analysis indicators.
	During the participation through sampling method at the performance of factual inventory of a goods warehouse, the free access of unauthorised persons within the warehouses' premises was acknowledged. According to the investigations performed, it was noticed that the company did not assign persons responsible for the adequate administration of this administration.	There is an increased risk of robbery from the own employees, under the conditions in which no persons are assigned as warehouse keepers, according to the provisions of law. According to the internal regulations, in case of acknowledging potential imputable losses, the goods which are acknowledged as not missing from the inventory cannot be imposed to the guilty persons.
Segregation of functions – processes: Who selects the suppliers Who approves the selected suppliers Who issues the order Who approves the order Who performs the reception of goods Who drafts the input-reception note Who resolves the issues with suppliers	From the analysis of the functions segregation processes, we acknowledged that the acquisition department has an increased number of tasks (15 out of a total of 24) with respect to the management of inventories, some of them being incompatible; this process is not sufficiently supervised by the other departments.	There is a risk of internal fraud under the conditions in which the acquisition department has an increased number of responsibilities with respect to the management of inventories, under the conditions in which the company has not developed an anti-fraud policy

Who approves the payment of the invoice Who records in the inventory Who records the acquisition in the accounting system Who is responsible for the storage in good conditions of inventories Who has access to the inventories within the warehouses Who issues the consumption notes Who approves the consumption notes Who records the output documents for the goods released from the warehouse Who computes the outputs Who is allowed to release products from the warehouse Who performs the inventory within the warehouses Who valuates the inventories Who drafts the inventory minute Who approves the inventory differences and their registration Who registers the inventory differences Who computes the inventory differences		

Conclusions and Recommendations

Based on the audit performed, the following conclusions and recommendations were issued:

1. The internal inventory **acquisition** procedure is reliable and does not imply risks of omissions and operation related to non-compliant or non-approved acquisitions. The selected suppliers are approved by the company's management, the activity of the acquisition department being supervised. The procedure related to inventory non-compliance upon reception is effective and reliable, avoiding introducing in the administration of inventories goods which are not compliant from a qualitative and quantitative view point with the acquisition invoices.

According to the conformity tests performed on a sample set of inputs we concluded that the acquisition procedure is observed (with the exceptions presented in the table above).

2. The theoretical procedure related to the inventories' **output** is mainly adequately conceived, by means of the approvals requested in the documents the risk of unauthorised inventory discharges being diminished. With respect to the practical enforcement of this procedure there are, however certain deficiencies; the procedure is not applied coherently and is not completely observed. There is a risk of releasing twice the products from a store requisition if the person who took over the goods from the warehouse does not sign the document or there is a risk of not operating the consumption documents in the inventory administration and implicitly in the accounting system. These deficiencies are reasoned by the company's management by means of the fact that within the acquisitions department there are no sufficient employees who would perform in due time, correctly and completely the tasks undertaken by them within the respective departments. As such, the lack of operating correctly, in due time and completely the documents related to the release of products from the inventory, is one of the causes of the causes of the inventory shortage identified during the inventory administration.

3. The **inventory** procedure has significant deficiencies, and the manner in which the monthly inventories are performed does not provide a reasonable assurance that the counted inventories are the real ones. The inventory of goods is an important procedure related to this specific type of activity and must be performed with responsibility, due to the fact that it is the basis for the record of inventory expenses, influencing implicitly the exploitation result.

4. The methods for keeping the inventories monitoring is not applied coherently in case of all inventories.

5. At the end of the audit mission, the auditor must assess the significant effects of non-corrected denaturation upon the financial statements and should express an opinion, under the conditions in which the company did not operate in the accounting system all the proposed adjustments.

The assessment of the non-corrected / errors' impact upon the financial statements is performed function of the level of the global significance threshold for the financial statements, which is computed at the moment at which the audit is planned.

As such, if the global value of the proposed adjustments exceeds the level of the significance threshold, then the company's management must operate the adjustments proposed by the auditor. In case the company's management refuses to operate the adjustments proposed following the audit, then the auditor will express an opinion with reserves.

In case the value of the non-corrected adjustments is below the significance threshold, the impact of denaturation upon the financial statements is not considered significant.

References

Boța-Avram, C. and Popa, I. (2011), `Evolution of internal auditing in Romania: a critical analysis,` *International Journal of Disclosure and Governance*, 8 (4), 380-398.

Chersan, IC. (2016), `Internal audit practices and trends in Romania and worldwide`, *Audit Financiar*, XIV (9) (141), 987-1002.

Ciuhureanu, AT. (2016), `Internal control and auditing – a necessity for responsible reporting and managerial usefulness of accounting information,` *Audit Financiar*, XIV (12) (144), 1349-1358.

Cosserat, G. and Rodda, N. (2009) Modern Auditing, 3rd Edition, Wiley.

Dobroteanu, L. and Dobroteanu, C. (2002) Audit-concepts and practices- national and international approach, Ed.Economica, Bucharest.

IFAC International Standard on Auditing 240 (ISA 240), *The Auditor's Responsibilities Relating to Fraud in an Audit of Financial Statement.*

Stanciu, V. (2016), `Trends and priorities in internal audit,` *Audit Financiar*, XIV, (9) (141), 1003-1008.

Țurlea, E. and Mocanu, M. (2016), `The profile of the internal auditor in the Romanian banking sector`, *Audit Financiar*, XIV (11), (143), 1235-1245.

Multicriteria Methods in Evaluation of City Logistics Projects

Agnieszka Tłuczak, Opole University, Opole, Poland, atluczak@uni.pole.pl
Sabina Kauf, Opole University, Opole, Poland, skauf@uni.pole.pl

Abstract

Multi-criteria decision making (MCDM) methods are chosen among alternatives in order to attain specific objectives. In this research, the purpose of methodology is to provide decision methods for project managers in city logistics. The methodology is combined into two methods consisting of Analytic Hierarchy Process (AHP) and Technique for Order Preference by Similarity to Ideal Solution (TOPSIS). As the result, the criteria for selection are determined by expert opinions, and then assign the weight of criteria by AHP. Finally, TOPSIS method is used to evaluate alternatives which are found prioritized by weight for project , namely project C equal 0.537 , project A equal 0.438 , project B equal 0.278.

Keywords: AHP, TOPSIS, city logistics, project.

Introduction

All organizations have to select the projects which are determined to pursue among numerous opportunities. One of the biggest decisions that any organizations are likely to make related to the projects which they would undertake. Once a proposal has been accepted, there are numerous factors that need to be considered before an organization decides to carry out [26]. City logistics initiatives are recognized as the best solutions for efficient urban freight distribution with high environmental objectives [13]. In order to meet the specific local conditions and cope with the problems caused by commercial transport, within the CIVITAS-Initiative, co-financed by the European Union, the cities got together searching for appropriate solutions and measures demonstrated in field urban freight logistics which is one of eight thematic categories of measures identified as the basic building blocks of an integrated strategy for sustainable mobility [3,27].

Numerous city logistics projects have been contemplated or undertaken since, both in Western Europe and Japan and elsewhere around the world. As most logistics-related decisions were (and are) made on the basis of the experience and intuition of experts, skilled operators, and planners [19], these CLPs experimented with various business and organizational models. City Logistics concepts found more support from public authorities in Japan and The Netherlands through subsidies or rules favoring participating companies. It is not without interest to explore in some depth the similarities and differences in the elements characterizing the various CLPs as a step towards understanding better the reasons behind these results. It may also help identify trends in the evolution of CLPs, in the way they are designed, evaluated, and operated. The time is particularly right given the steady development of CLPs observed around the world. At our best knowledge, no CLP classification in the literature provides a systemic and complete view of these issues. It's difficult to identify major characterizing factors, to point to evolution in concepts and practice, to single out and understand success factors, to extract and analyze trends [4].

Decision making is a part of our daily lives. In decision science, decision making problems are classified into the following categories [22, 4]:

(1) multi attribute decision making (MADM),
(2) multi objective decision making (MODM).

The major difference of the two classes is in existence of predetermined alternatives. MODM deals with optimization problems in which several objective functions should be satisfied, while MADM is associated with the problems in which alternatives have been predetermined. It means making preference decisions (e.g., evaluation, prioritization, selection) over the available alternatives that are characterized by multiple, usually conflicting, attributes [36, 11, 7].

Multi-criteria decision making (MCDM) refers to making choice of the best alternative from among a finite set of decision alternatives in terms of multiple, usually conflicting criteria. The main steps in multi-criteria decision making are the following [15, 16]:

– establish system evaluation criteria that relate system capabilities to goals,
– develop alternative systems for attaining the goals (generating alternatives),
– evaluate alternatives in terms of criteria,
– apply one of the normative multiple criteria analysis methods,
– accept one alternative as “optimal” (preferred),
– if the final solution is not accepted, gather new information and go to the next iteration of multiple criteria optimization [28].

Many researchers have applied multicriteria methods into many organizations and several fields for instance project selection, project performance, logistics and computer system, etc. Anjali Awasthi and Satyaveer Chauhan (2012) [7] combined three methods including Affinity Diagram, AHP and fuzzy TOPSIS for improving city sustainability by evaluating 4 city logistics initiatives. For project selection, Pablo et.al (2014) [1] applied AHP and ANP to help manager to decide project investment. Nikzad Manteghi et.al (2012) [17] used AHP method to select project suitable for distributed generation technology between current and new project. Doraid Dalalah et.al (2010) [12] applied AHP in construction project. Chun-Chin Wei (2005) [8] applied in ERP project [26].

Methods

The AHP Method

The originator of the AHP is Thomas Saaty, who, as a professor at Wharton Business School in Philadelphia in the early 70s, worked out the methodological foundations of the concept. Wider interest in the method came about in the 80s after the publication of The Analytic Hierarchy Process by the renowned publishers MCGRAW-Hill [10]. It seems that the method grew from the foundation of considerations on general systems theory as it is a development of the attempts to provide a formal description of one of the basic features of a system, which L. Bertalanffy called the “hierarchical order” [5, 6]. The method integrates into one's subjective views and evaluations of decision makers and objective goals (criteria). The results of the queries to the Science Direct database on the "analytic hierarchy process" presented in [14] show an intensive development of the method - from about 100 works per year in the early years of the 21st century to over 560 in 2010. It is impossible to mention all areas of application of the AHP method and its modifications. It is worth noting, however, that in addition to applications in the field of economic sciences [25], it is applied in technical sciences in mining problems, among others. in technology assessment [2, 18, 10] or safety assessment [24, 29].

The AHP method begins with the structuring of the problem. This stage has analytical character. The decision methods of AHP are as follow [33, 31, 19]:

1. Define the problem and determine the goal of problem.

2. Determine the decision hierarchy from the top with the goal of the decision, then the objectives from a broad perspective, through the intermediate levels towards the lowest level.
3. Construct a set of pair wise comparison matrices. Each element in an upper level is used to compare the elements in the below level immediately with respect to it. Each of these judgments is assigned a number on a scale in table 1.

Table 1: Table of relative's scores

Value of a_{jk}	Interpretation
1	j and k are equally important
3	j is slightly more important
5	j is more important than k
7	j is strongly more important than k
9	j is absolutely more important than k

Consider n elements to be compared $C_1 \ldots C_n$ and denote the relative 'weight' (priority or significance) of C_i with respect to C_j by a_{ij} and form a square matrix A= (a_{ij}) of order n with the constraints that $a_{ij} = 1/a_{ij}$, for $i \neq j$, and $a_{ii} = 1$, all i.

4. Use the priorities obtained from the comparisons to weigh the priorities in the level immediately below. Do this for every element. Then for each element in the level below add its weighed values and obtain its overall or global priority. Continue this process of weighing and adding until the final priorities of the alternatives in the bottom most level are obtained [23, 21, 26].

The TOPSIS Method

The Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) was developed by Yoon and Hwang (1981). The basic concept of this method is that the selected alternative should have the shortest distance to the positive ideal solution and the farthest distance from the negative ideal solution [32, 25]. The TOPSIS procedure is based on an intuitive and simple idea, which is that the optimal ideal solution, having the maximum benefit, is obtained by selecting the best alternative which is far from the most unsuitable alternative, having minimal benefits [35]. The ideal solution should have a rank of 1' (one), while the worst alternative should have a rank approaching 0' (zero) [9].

Mathematically the application of the TOPSIS method involves the following steps.
Step 1. Construct the decision matrix and determine the weight of criteria, where:

X = $[x_{ij}]$ is a decision matrix and W = $[w_1, w_2, \ldots, w_n]$ is a weight vector, where $x_{ij} \in \Re$, $w_j \in \Re$ and $\sum_{i=1}^{n} w_j = 1$.
Step 2. Calculate the normalized decision matrix.

Some of the most frequently used methods of calculating the normalized value n_{ij} are the following:

$$n_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} x_{ij}^2}}$$

Step 3:Determine the weighted decision matrix: $v_{ij} = w_{ij} \cdot n_{ij}$ for i = 1, … , m; j = 1, … , n.

Step 4:Identify the Positive and Negative Ideal Solution The positive ideal (A+) and the negative ideal (A-) solutions are defined according to the weighted decision matrix via equations:

$$A^{+} = \left\{v_1^{+}, v_2^{+}, ..., v_n^{+}\right\} \text{ where } v_j^{+} = \left\{\left(\max\left(v_{ij}\right) if \;\; j \in J\right); \left(\min\left(v_{ij}\right) if \;\; j \in J^{'}\right)\right\}$$
$$A^{-} = \left\{v_1^{-}, v_2^{-}, ..., v_n^{-}\right\} \text{ where } v_j^{-} = \left\{\left(\min\left(v_{ij}\right) if \;\; j \in J\right); \left(\max\left(v_{ij}\right) if \;\; j \in J^{'}\right)\right\}$$

Step 5. Calculate the separation measures from the positive ideal solution and the negative ideal solution. The Euclidean distance approach was proposed to evaluate the relative closeness of the alternatives to the ideal solution:

$$d_i^{+} = \left[\sum_{j=1}^{n}\left(v_{ij} - v_j^{+}\right)^2\right]^{0,5} \text{ and } d- = \left[\sum_{j=1}^{n}\left(v_{ij} - v_j^{-}\right)^2\right]^{0,5}$$

Step 6:Measure the relative closeness of each location to the ideal solution. For each competitive alternative the relative closeness of the potential location with respect to the ideal solution is computed:

$$R_i = \frac{d_i^{-}}{d_i^{-} + d_i^{+}}$$

Step 7. Setting up the rank according to R_i , meaning that the bigger R_i is - the better the alternative would be.

Selection of best city logistics project using AHP and TOPSIS: an illustrative example

Choosing a city logistics project is not an easy task, and despite the existence of a number of methods and tools for its estimation, no universal method has been developed yet. As part of project selection, they are ranked according to the relevance for the design of the features that affect the implementation. Let us assume that a mayor is interested in building a new urban transfer center with Park&Ride in city where 100 thous. residents lives. Its location was determined at the intersection of two major roads of the city, with an average traffic of 30 thousand. vehicles daily, on the area of the existing bus station and near the market place (5 thousand people per day). Using the scoring scheme, the matrix of criteria priority is as shown in Table 1. The diagonal table contains values reflecting a comparison of a criterion with itself. In this case, there is no mention of any priority. In addition to local government, the price has a strong advantage over quality (note 5) and very strong advantage over opinion (note 7). Further analogous matrix of preference of project contractor is determined in relation to all criteria (Table 2).

Table 1: Matrix of criterion priority

	Price	Quality	Opinion
Price	1	5	7
Quality	1/5	1	3
Opinion	1/7	1/3	1

Table 2: Matrix of constructor priority

	Price			Quality			Opinion		
	Contractor A	Contractor B	Contractor C	Contractor A	Contractor B	Contractor C	Contractor A	Contractor B	Contractor C
Contractor A	1	8	4	1	5	6	1	2	4
Contractor B	1/8	1	6	1/5	1	8	1/2	1	5
Contractor C	1/4	1/6	1	1/6	1/8	1	¼	1/5	1

The next step is to normalize the priority matrix (tab. 3,4).

Table 3: Normalized matrix of criterion priority

	Price	Quality	Opinion
Price	0,74	0,79	0,64
Quality	0,15	0,16	0,27
Opinion	0,11	0,05	0,09

Table 4: Normalized matrix of constructor priority

	Price			Quality			Opinion		
	Contractor A	Contractor B	Contractor C	Contractor A	Contractor B	Contractor C	Contractor A	Contractor B	Contractor C
Contractor A	0,73	0,87	0,36	0,73	0,82	0,40	0,57	0,63	0,40
Contractor B	0,09	0,11	0,55	0,15	0,16	0,53	0,29	0,31	0,50
Contractor C	0,18	0,02	0,09	0,12	0,02	0,07	0,14	0,06	0,10

Finally, it is possible to calculate a global priority:

$$p_A = 0{,}72 \cdot 0{,}65 + 0{,}19 \cdot 0{,}65 + 0{,}08 \cdot 0{,}53 = 0{,}63$$

By doing the same calculations for the rest we get:

$p_B = 0{,}26$ oraz $p_C = 0{,}09$

In view of the above, based on the prioritization of the criteria and preferences of the contractors with respect to the individual criteria, we conclude that the contractor A has the highest overall preference index (0.63), followed by the contractor B and finally the contractor C. The final decision on the choice of contractor will take of course the local government. The AHP method has allowed only to explore and analyze their own preferences and priorities logically and organisationally.

Consider again the problem of choosing the contractor for the modernization investment of the logistics infrastructure in the city. Mayor is again a choice of three contractors. To choose the best contractor the TOPSIS method will be used. Criteria have been redefined according to which contractors will be evaluated: price in thous. euro (x1), time of execution (x2) and quality of work measured by the number

of complaints submitted in the contractors' current investments (x3). Information on the selected criteria for all contractors is provided in table 5.

Table 5: Data of constractor evaluation

	x_1	x_2	x_3
Contractor A	2,9	3	0,04
Contractor B	2,2	4	0,05
Contractor C	2,1	3	0,08

According to the assumptions, in the first step the data should be normalized. Ancillary calculations and the form of a normalized matrix represent table 6.

Tabela 6: Ancillary calculations

	x_1^2	x_2^2	x_3^2
Contractor A	8,41	9	0,002
Contractor B	4,84	16	0,003
Contractor C	4,41	9	0,006
Σx_{ij}^2	17,66	34	0,011
$\sqrt{\Sigma x_{ij}^2}$	4,20	5,83	0,10
	z_1	z_2	z_3
Contractor A	2,9 : 4,20 = 0,69	0,51	0,39
Contractor B	2,2 : 4,20 = 0,52	0,69	0,49
Contractor C	2,1 : 4,20 = 0,50	0,51	0,78

Taking into account the weights, which in the subjective sense of the representatives of the Office are as follows: w1 = 0.5; w2 = 0.2; w3 = 0,3 normalized data matrix assumes the form:

Table 7: Normalized matrix with weights

	v_1	v_2	v_3
Contractor A	0,69 · 0,5 = 0,345	0,51· 0,2 = 0,103	0,39 · 0,3 = 0,117
Contractor B	0,52 · 0,5 = 0,262	0,69 · 0,2 = 0,137	0,49 · 0,3 = 0,146
Contractor C	0,50 · 0,5 = 0,250	0,51 · 0,2 = 0,103	0,78 · 0,3 = 0,234

Ways of calculating the distance from the ideal and antideal object presents table 8.

Tabela 8: The distance of objects from the reference solution

	$(v_{i1}-a_1^+)^2$	$(v_{i2}-a_2^+)^2$	$(v_{i3}-a_3^+)^2$	sum	d_i^+
Contractor A	$(0,345\text{-}0,345)^2=0,00$	$(0,103\text{-}0,137)^2=0,001$	$(0,117\text{-}0,234)^2=0,014$	0,015	$\sqrt{0,015}=0,122$
Contractor B	$(0,262\text{-}0,345)^2=0,007$	$(0,137\text{-}0,137)^2=0,000$	$(0,146\text{-}0,234)^2=0,008$	0,015	$\sqrt{0,015}=0,121$
Contractor C	$(0,250\text{-}0,345)^2=0,009$	$(0,103\text{-}0,137)^2=0,001$	$(0,234\text{-}0,234)^2=0,000$	0,010	$\sqrt{0,010}=0,101$
	$(v_{i1}-a_1^-)^2$	$(v_{i2}-a_2^-)^2$	$(v_{i3}-a_3^-)^2$	sum	d_i^-
Contractor A	$(0,345\text{-}0,250)^2=0,009$	$(0,103\text{-}0,103)^2=0,000$	$(0,117\text{-}0,117)^2=0,000$	0,009	$\sqrt{0,009}=0,095$
Contractor B	$(0,262\text{-}0,250)^2=0,000$	$(0,137\text{-}0,103)^2=0,001$	$(0,146\text{-}0,117)^2=0,001$	0,002	$\sqrt{0,002}=0,047$
Contractor C	$(0,250\text{-}0,250)^2=0,000$	$(0,103\text{-}0,103)^2=0,000$	$(0,234\text{-}0,117)^2=0,014$	0,014	$\sqrt{0,014}=0,117$

The distances were used to calculate the ranking score:

$$R_A=\frac{0,095}{0,095+0,122}=0,438;\ R_B=\frac{0,047}{0,047+0,121}=0,278;\ R_C=\frac{0,117}{0,117+0,101}=0,537\cdot$$

Obtained values allow sort the contractors: contractor C, contractor A, contractor B. The mayor should choose the contractor C for which the ranking score has the highest value of 0,537.

In assessing the two methods contractors have obtained somewhat different results. According to the AHP method, the ranking of the contractors was as follows: A, B, C and TOPSIS: C, A, B. Because the methods lead to different results, the choice of method is left to the reader.

Conclusion

In this research paper, AHP and TOPSIS methods are presented to be used in project selection problem. We proposed criteria which mainly impacts to project, AHP is used to determine the weights of the decision criteria and TOPSIS is used to rank the alternatives. According to the result, all of methods provide the systematic approach for group decision making that can help project manager prioritize project and this information can help them provide master plan in project management and can be applied in other companies which tend to decide for project selection problem.

References

1. Aragonés-Beltrán F. C.-G. Pablo, Pastor-Ferrando J.-P., Pla-Rubio A., An AHP (Analytic Hierarchy Process)/ANP (Analytic Network Process)-based multi-criteria decision approach for the selection of solar-thermal power plant investment projects, Energy, vol. 66, pp. 222-238, 2014.

2. Azadeg A., Osanloo M., Ataei M. (2010), A New Approach to Mining Method Selection Based on Modifying the Nicholas Technique, „Aplied Soft Computing", Vol. 10, s. 1040-1061.

3. Becker, H.J., Runge, D., Schwedler, U. and Abraham, M., 2008.Commercial Transport in European Cities-How do European cities meet the challenges of commercial transport?, Experiences and case studies from the CIVITAS Programme of the European Commission, Berlin http://www.polisnetwork.eu/uploads/Modules/ PublicDocumen ts/IVP_21.pdf

4. Benjelloun A., Crainic T. G., Birgas Y., Towards a taxonomy of City Logistics projects, Procedia - Social and Behavioral Sciences, Volume 2, Issue 3, 2010, Pages 6217-6228

5. Bertalanffy L., Ogólna teoria systemów, PWN, Warszawa 1984.

6. Cabała P., Using The Analytic Hierarchy Process In Evaluating Decision Alternatives, Operations Research And Decisions, No. 1, 2010, pp. 5-12.

7. Chauhan A. A. a. S. S., A hybrid approach integrating Affinity Diagram, AHP and fuzzy TOPSIS for sustainable city logistics planning, Applied Mathematical Modelling, vol. 36, pp. 573-584, 2012.

8. Chun-Chin Wei C.-F. C., Wang Mao-Jiun J., An AHP-based approach to ERP system selection, International Journal Production Economics, pp. 47-62, 2005.

9. Chunhui L., Aizhen L., The Application of TOPSIS Method to Comprehensive Assessment of Environmental Quality, Journal of Geological Hazard and Environmental Preservation, 10(2),9 – 13, 1999.

10. Cogger K.O., You P.L., Eigen weight vectors and least distance approximation for revealed preference in pairwise weight ratios, Journal of Optimization Theory and Applications, 1985, Vol. 36 (4)

11. Dashti Z., Pedram M.M., Shanbehzadeh J., AMulti-Criteria Decision Making Based Method for Ranking Sequential Patterns, Proceedings of the International MultiConference of Enginners and Computer Scientists, vol 1, http://www.iaeng.org/publication/IMECS2010/IMECS2010_ pp611-614.pdf

12. Doraid Dalalah F. A.-O. a. M. H., Application of the Analytic Hierarchy Process (AHP) in Multi-Criteria Analysis of the Selection of Cranes, Jordan Journal of Mechanical and Industrial Engineering, vol. 4, pp. 567-578, 2010.

13. European Commission, 2006. Urban freight transport and logistics - An overview of the European research and policy, http://www.transport-research.info/web/

14. Gaul W., Gartes D. (2012), A Note on Consistency Improvements of AHP Paired Comparison Data, „Adv Data Anal Classif", Vol. 6, No. 4, s. 286-302.

15. Hwang C.L., Yoon K., Multiple Attribute Decision Making: Methods and Applications. Springer-Verlag, Berlin, 1981

16. Jahanshahloo G.R., Lofti F.H., Izadikhah M., An Algorithmic Method to Extend TOPSIS for Decision Making Problems with Interval Data. "Applied Mathematics and Computation",2006, 175, pp. 1375-1384.

17. Jahromib N. M. a. M. J. H., Propose a model to choose best project by AHP in distributed generation, Procedia Technology, vol. 1, pp. 481-484, 2012.

18. Kabiesz J., Turek M., Drzewiecki J., Makówka J. (2008), Ocena innowacyjności technologii eksploatacji węgla kamiennego metodą AHP, „Gospodarka Surowcami Mineralnymi", t. 24, z. 1-2 s. 103-121.

19. Kousalya P., Reddy G. M. Supraja S., Prasad V. S., Analytical Hierarchy Process approach – An application of engineering education, Mathematica Aeterna, Vol. 2, 2012, no. 10, 861 – 878.

20. Kozioł W., Piotrowski Z., Pomykała R., Machniak Ł., Baic I., Witkowska-Kita B., Lutyński A., Blaschke W. (2011), Zastosowanie analitycznego procesu hierarchicznego (AHP) do wielokryterialnej oceny innowacyjności technologii zagospodarowania odpadów z górnictwa kamiennego, „Rocznik Ochrona Środowiska", t. 13, s. 1619-1634.

21. Ku E. C. S., The Decision Making In Selecting Online Travel Agencies: An Application Of Analytic Hierarchy Process, Journal of Travel & Tourism Marketing, Volume 26, 2009 - Issue 5-6

22. Lai Y. J., Hwang C. L., Fuzzy multiple objective decision making methods and applications, New York: Springer-Verlag, 1994.

23. Maletic, D., Lasrado, F., Maletic, M. & Gomiscek, B. 2016, 'Analytic hierarchy process application in different organisational settings', Applications and Theory of Analytic Hierarchy Process: Decision Making for Strategic Decisions, Intech, Croatia. pp. 89-114.

24. Nian Q., Shi S., Li R. (2012), Research and Application of Safety Assessment Method of Gas Explosion Accident in Coal Mine Based on GRA-ANP-FCE, „Procedia Engineering", Vol. 45, s. 106-111

25. Oztruk D., Batuk F., Technique For Order Preference By Similarity To Ideal Solution (Topsis) For Spatial Decision Problems, http://www.isprs.org/proceedings/2011 /Gi4DM/PDF/PP12.pdf

26. Pangsri P., Application of the Multi Criteria Decision Making Methods for Project Selection, Application of the Multi Criteria Decision Making Methods for Project Selection, Universal Journal of Management Vol. 3(1), 2015, pp. 15 - 20

27. Parezanović T., Pejčić Tarle S., Petrović N., A Multi-Criteria Decision Making Approach For Evaluating Sustainable City Logistics Measures, The Fifth International Conference Transport And Logistics, http://til2014.masfak.ni.ac.rs/elementi/16.pdf

28. Roszkowska E., Multi-Criteria Decision Making Models By Applying The Topsis Method To Crisp And Interval Data, Multiple Criteria Decision Making, University of Economics in Katowice, 2011 , vol. 6, pp.| 200-230.

29. Sojda A., Wolny M., Zastosowanie Metody Ahp W Ocenie Projektów Inwestycyjnych Kopalni Węgla Kamiennego, https://www.ue.katowice.pl/fileadmin/_migrated/ content_uploads/18_02.pdf

30. Taniguchi, E., Thompson, R. G., & Yamada T. (2006). Data collection for modelling, evaluating and benchmarking city logistics schemes. In E. Taniguchi, & R. G. Thompson (Eds.), Recent advances in city logistics (pp. 1-14). Elsevier, Amsterdam.

31. Triantaphyllou E., Mann S. H., Using The Analytic Hierarchy Process For Decision Making In Engineering Applications: Some Challenges, Inter'l Journal of Industrial Engineering: Applications and Practice, Vol. 2, No. 1, pp. 35-44, 1995.

32. Triantaphyllou, E., 2000. Multi-criteria Decision Making Methods: A Comparative Study. Kluwer Academic Publishers, Dordrecht.

33. Triantaphyllou, E., and Mann, S.H. (1990). An Evaluation of the Eigenvalue Approach for Determining the Membership values in Fuzzy Sets. Fuzzy Sets and Systems, 35: 295-301.

34. Trzaskalik T. (red.), 2006, Metody wielokryterialne na polskim rynku finansowym, PWE, Warszawa

35. Yonghon H., The Improvement of the Application of TOPSIS Method to Comprehensive Evaluation [J]. Mathematics in Practice and Theory, 32 (4), 572 – 575, 2002.

36. Yoon K. P., Wang, Hwang C.L., Multiple Attribute Decision Making: An Introduction, Sage University Papers, 1995.

Innovation Fournisseurs Un Levier De Performance Pour Les Achats : Cas Du Secteur De Location Automobile

Fatiha Naoui-Outini, Enseignant Chercheur en Supply Chain Management Sup de Co La Rochelle
naouif@esc-larochelle.fr/naouioutinifatiha@gmail.com

Nabil El Hilali, Enseignant Chercheur en Innovation & Design management ESCA EM Casablanca
nelhilali@esca/nabil.elhilali@gmail.com

Résumé

Cet article de recherche traite de la fonction achats créatrice de valeur pour l'entreprise, et notamment en captant l'innovation à travers une démarche et une attitude proactive sur le marché fournisseurs. Il souligne ainsi que l'acheteur représente une interface entre les besoins exprimés au plus juste de son entreprise et les offres potentielles des fournisseurs en lien avec leur expertise technique. Nous avons opté pour une démarche qualitative exploratoire. Nous avons choisi d'étudier le cas de deux entreprises du secteur automobile courte et longue durée. Cet article s'appuie sur des entretiens semi-directifs auprès des managers et de la participation active. L'objectif principal de cette recherche est de répondre à la question suivante : l'innovation fournisseurs est-elle un véritable levier de performance pour les achats ? En d'autres termes, une stratégie achats principalement axée vers des fournisseurs innovants est-elle un facteur clé de succès pour le management achats ? Les résultats obtenus indiquent, d'une part, l'importance de la mise en place d'une culture innovation au sein du service achats depuis le début du processus et automatiser les outils achats. D'autre part, la création d'un challenge innovation fournisseurs. Enfin, la nécessité du pilotage de la performance innovation fournisseurs.

Mots clés : Achats, Innovation Fournisseurs.

Abstract

This paper addresses the purchasing function issue that creates value for the company by capturing innovation through a proactive attitude approach in the supplier market. It delivers the idea that the buyer represents an interface between the company expressed needs and suppliers offers connected to their technical expertise. Under qualitative approach build on the case study of two car rental companies. This research goal to answer the question: Is supplier innovation a purchases performance catalyst? In other words, is a purchasing strategy focused on innovative suppliers a key success factor for purchasing management? The results obtained highlights, primarly the importance of implementing an innovation culture within the purchasing department from the starting point process and automating purchasing tools, the importance of creating an innovative challenge and the need to monitor performance innovation suppliers.

Keywords ***: Purchasing, Suppliers Innovation.***

INTRODUCTION

La fonction achats est une préoccupation sans cesse grandissante au cœur des entreprises. Dans les stratégies d'entreprises, cette fonction a longtemps été sous-estimée par les spécialistes. Ce n'est que depuis les années 1990 que l'on s'est rendu compte de son importance et de son incidence directe sur le résultat. En France, la crise financière de 2007-2008 n'a pas vraiment aidé les entreprises à développer le volume des ventes de leurs activités ; cependant, afin d'améliorer leurs résultats ces-dernières cherchent avant tout à réduire leurs coûts. C'est justement pour cette raison que sont apparues de réelles stratégies de « cost-killing » où généralement, les services achats en sont les

principaux acteurs. De plus, dans un contexte d'internationalisation des échanges, la concurrence est devenue très rude. Il s'avère donc nécessaire pour les entreprises d'innover et le service achats de l'entreprise n'échappe pas à cette réalité. Les entreprises doivent donc chercher en permanence à s'adapter aux besoins sans cesse modifiés des consommateurs toujours plus nombreux. Il s'agit d'adapter l'offre en quantité et en qualité par rapport aux exigences d'un marché complexe et changeant.

Dans un contexte économique et financier peu favorable aux entreprises, certains font le choix de restructurer et réorganiser leurs actifs dans le but de réduire les coûts et être plus compétitifs sur la scène internationale. En revanche, d'autres vont plus loin et ne se limitent pas uniquement à cette recherche d'optimisation opérationnelle. Elles vont plutôt investir dans l'innovation en vue de développer des avantages concurrentiels. Dans ce cadre, les acheteurs peuvent donc être moteurs et force de proposition en vue d'atteindre ces objectifs car la valeur ajoutée de la fonction achats ne se limite plus à la réduction des coûts ou à la maîtrise des risques. Cette fonction doit être à présent créatrice de valeur pour l'entreprise en captant l'innovation à travers une démarche et une attitude proactive sur le marché fournisseurs. C'est ainsi que l'acheteur représente une interface entre les besoins exprimés au plus juste de son entreprise, les offres potentielles des fournisseurs en lien avec leur expertise technique et l'identification proactive d'offres issues de l'innovation depuis le fournisseur. La question qui ressort de cette approche repose sur la fonction achats comme véritable source de création de valeur pour les entreprises. Nous reformulons donc notre problématique de la manière suivante : l'innovation fournisseurs est-elle un véritable levier de performance pour les achats ? En d'autres termes, une stratégie achats principalement axée vers des fournisseurs innovants est-elle un facteur clé de succès ?

Pour ce faire, la première partie de l'article reviendra sur la notion de la fonction achats et de l'innovation fournisseur. Dans une deuxième partie, nous tenterons de clarifier et justifier la méthodologie adoptée. Nous poursuivrons en exposant comment les entreprises peuvent concrètement mettre en œuvre leur démarche de management achats et innovation fournisseurs. L'article se terminera par la suggestion de voies de recherches qui découlent de cette recherche de type exploratoire.

I. CADRE CONCEPTUEL DE LA RECHERCHE

A. L'innovation : une approche définitionnelle

Au fil des années, l'innovation n'a cessé d'avoir des définitions et explications très différentes. En effet, il s'agit d'une variable difficile à quantifier, à mesurer et à définir. C'est pour cela, qu'elle devient intéressante à étudier dans cet article de recherche. Ainsi, certains acteurs majeurs de l'innovation et des organisations du 21ème siècle ont tenté d'apporter une définition et de cadrer l'innovation. «*The design, invention, development and/or implementation of new or altered products, services, processes, systems, organizational structures, or business models for the purpose of creating new value for customers and financial returns for the firm*». Dans cette définition, les notions de développement et de création de nouvelle valeur sont importantes. Cette définition se place dans le contexte de l'entreprise et cadre les thèmes de références associés : produits, services, processus, systèmes, business model. *« L'innovation, c'est la capacité de prendre des idées nouvelles et de les convertir plus efficacement et plus rapidement que la concurrence en résultats commerciaux grâce à de nouveaux processus, produits ou services ».* La commission européenne va plus loin dans le sens où elle situe la recherche d'innovation comme une quête de l'entreprise vers l'acquisition d'un avantage concurrentiel sur son marché. L'innovation serait donc la création de valeur grâce à un produit, un processus ou un service qu'une entreprise voudrait acquérir afin de viser un avantage concurrentiel et une amélioration de sa performance économique. Dans ce travail de recherche, nous avons choisi de cadrer l'innovation au monde de l'entreprise. Toutefois, il existe différents types d'innovation et donc différentes manières de l'appréhender. Schumpeter (1912), dans son ouvrage « Théorie de l'évolution économique » définit l'évolution économique sous forme de cycles où le processus d'innovations a un rôle capital. Ainsi, l'évolution économique est un circuit statique. Cependant, l'emploi du terme « statique » ne veut pas dire qu'un circuit économique est au repos car

le circuit se déroule sans cesse et l'économie est soumise à des interventions extérieures. Pour cet auteur, les innovations ne sont pas les conséquences d'apparitions de nouveaux besoins chez les consommateurs mais proviennent des évolutions de la sphère industrielle et commerciale et c'est donc la recherche de nouvelles combinaisons productives qui permet de faire évoluer le circuit économique. Il existe deux grandes visions : l'innovation liée au type d'objet concerné (Schumpeter, 1912) et l'innovation liée à son degré d'intensité (Durand et Guerra-Vieira, 1996). Pour Schumpeter, l'innovation est divisée en sous-catégories comme l'innovation de produit, l'innovation de procédé, l'innovation organisationnelle, l'ouverture d'un nouveau débouché ou l'utilisation de matières premières innovantes. En revanche, pour Durand et Guerra-Vieira (1996), l'innovation doit être cataloguée comme de rupture ou incrémentale. L'innovation de rupture impliquant la création d'un nouveau concept, souvent ayant recours aux nouvelles technologies alors que l'innovation incrémentale se situe dans l'amélioration de la performance d'un outil déjà existant.

Les profils innovateurs

L'innovateur est l'interface entre l'inventeur et le commercial. Il est donc au cœur du processus de création de valeur (Noailles, 2011). L'exemple est celui du Mac d'Apple. L'innovateur considéré dans cet exemple est Steve Jobs. Cependant, le créateur du macintosh est bien le PARC (Palo Alto Research Center créé par Xerox dans les années 1970). Le mérite en revient à Steve Jobs pour avoir su vendre son idée autour de lui et communiqué sur les points forts de l'innovation. Toutefois, l'innovateur ne peut réussir l'implémentation de l'innovation sans une prédisposition au management de l'innovation. A l'origine de la création de l'une des entreprises les plus innovantes du monde Steve Jobs, toutefois l'innovateur clef est l'ingénieur Steve Wozniak qui a réussi l'exploit de créer le premier ordinateur personnel au monde. Steve Jobs est dans ce contexte le manager de l'innovation en fédérant les ressources clefs en termes de personnes et d'écosystème qu'offrait entre autres le centre de recherche de Xerox. En revenant sur la définition de Noailles (2011), l'innovation doit être porteuse d'efficacité économique et l'auteur définit les fonctions économiques de l'innovateur : l'organisation du financement ; la finalisation du standard technique ; la définition du modèle économique et la réalisation des premières commercialisations. *« En définissant le couple technique-prix du produit commercialisable, l'innovateur est au cœur de la création de valeur nouvelle »*.

De plus, le même auteur décrit quatre types de profil innovateurs : « l'innovateur entrepreneur parfois inventeur, le Lord Innovateur, l'Intra-preneur et l'homme politique ». Dans la suite de notre travail, nous nous focaliserons sur les profils dits de l'innovateur entrepreneur et de l'intra-preneur.

A. L'innovateur : Une fonction virtuelle dans l'entreprise

Malgré le fait que l'innovation soit un terme à la mode dans les médias ou encore dans le monde de l'entreprise, la fonction proprement dite d'innovateur souffre d'un référencement plus discret. L'exemple du référencement « Google » connu de tous où le terme « innovation » est référencé 103 millions de fois alors que dans le même temps l'addition des référencements des termes « innovateurs » et « innovator » sont seulement à 7,1 millions sur le célèbre moteur de recherche américain. Noailles pose les 7 raisons de la virtualité de la fonction « innovateur » : « L'importance prise par l'innovation incrémentale ; La confusion naturelle des fonctions d'innovateur avec celles d'inventeur ou d'entrepreneur.

La législation sur les brevets

- Le « mépris » général des sociétés européennes pour la pratique ou le matériel tandis que la science ou la recherche méritent le respect
- L'absence de travaux universitaires sur la question de l'innovateur
- La confusion innovateur-entrepreneur ».

Au sein de l'entreprise il y a très peu d'indicateurs précis mesurant l'innovation et valorisant l'action d'innover. Les entreprises innovantes se distinguent majoritairement de leur concurrence sur le marché grâce à 4 critères principaux :

- Une croissance exponentielle des profits
- Une hausse du nombre de brevets déposés
- La production conséquente d'innovations de rupture
- La présence d'un département R&D (Recherche & Développement) avec une expertise technologique sur son secteur d'activité et une culture d'entreprise favorisant la prise de risque.

Ces quatre critères pourraient également aider lors du « sourcing » à détecter des fournisseurs capables d'apporter de l'innovation ou un potentiel innovant à son projet Achats. Pour Deschamps (2012), il est primordial pour les entreprises ayant pour objectif l'innovation, d'ajouter aux listes d'audit interne ou externe, une partie consacrée à l'innovation. Le secret étant l'établissement d'indicateurs en interne et en externe en relation avec l'innovation. Le nombre d'indicateurs doit être bas afin d'être plus facilement contrôlable et actualisable. De plus, le développement de la capacité d'absorption d'une entreprise et les innovations performantes dépendent largement du niveau des savoirs antérieures de l'entreprise. Par conséquent, le manque d'investissement dans un domaine d'expertise dès le début peut exclure le développement futur d'une capacité technique dans ce même domaine (Cohen, 1990). De ce fait, la façon dont le management de l'innovation est réellement mis en œuvre est limitée en termes de connaissances (Gary et al. 2008).

B. L'intégration de l'innovation à la fonction Achats

L'innovation est un concept majeur et déterminant pour l'acheteur (Schiele, 2006). L'entreprise peut donc acquérir des innovations par différents moyens : la fusion/acquisition ; le *benchmarking* des entreprises qui innovent (imitation) ; l'achat direct d'innovation (intégration de la technologie innovante) ; le développement en collaboration avec les fournisseurs (création ou amélioration produit / service). Cet auteur s'est donc intéressé aux critères déterminants que l'acheteur pouvait repérer afin de distinguer les fournisseurs innovants. Une relation long-terme avec le fournisseur qui est basée sur l'engagement du couple acheteur-fournisseur permettra à l'acheteur de profiter de la capacité d'innovation de son fournisseur ou prestataire. L'identification des fournisseurs ayant cette capacité d'innovation est également importante. Enfin, l'élaboration d'un plan de progrès avec le fournisseur basé sur l'amélioration de la qualité du produit ou du service permettra de profiter de cette capacité innovante sur le long-terme. L'application de l'innovation au sein du processus achats est donc réalisée en amont, pendant et en aval du mécanisme achat (Schiele, 2006). Cependant, la détection des fournisseurs innovants lors de la veille marketing réalisée par l'acheteur semble être pour Caveriviere (2002) plus efficace. L'innovation prend de plus en plus d'importance au sein de la fonction achats en France. Ainsi, l'observatoire achats a décidé de consacrer le 7ème opus de son livret blanc en collaboration avec l'ESSEC sur l'innovation (2012). Les conclusions en externe rejoignent celles de Schiele par rapport à l'importance de favoriser la relation et la collaboration entre l'acheteur et son fournisseur. Elles apportent une information supplémentaire et stratégique. « L'innovation serait un facteur d'intégration des achats et de développement de l'influence de la fonction achats au sein de l'entreprise » (Serrano, 2012). En effet, si les achats arrivent à détecter de l'innovation, la fonction devient alors stratégique pour l'entreprise. D'un point de vue marketing, le but de chaque entreprise est de se différencier de son concurrent. Cependant, selon l'étude de l'observatoire achats 2012, seulement 70% des directeurs achats estiment leur collaboration avec leurs fournisseurs clés comme relais d'innovation pour leur entreprise. La catégorie d'achats la moins affectée par la recherche d'innovation est l'achat indirect donc hors production. Certains achats issus de cette famille sont considérés comme non stratégiques car peu impactant sur l'activité de l'entreprise (on prend généralement exemple des fournitures de bureau). « Quand on leur demande s'ils associent les achats indirects à l'innovation, les directeurs achats interrogés répondent "oui" à 6 % seulement » (Lethrosne, 2012). Le paradoxe étant que dans cette catégorie d'achat figure l'acquisition des systèmes d'information considéré aujourd'hui comme véritable levier de performance interne et

innovation majeure afin de disposer d'un avantage concurrentiel sur son marché. Malgré la conjoncture actuelle en Europe, les directeurs achats encouragent les projets d'innovation. Ainsi, ils sont 63 % à poursuivre les projets d'innovation au sein de leurs directions achats (Serrano, 2012).

B. L'innovation comme levier de performance

Cette sous partie a pour objectif de conclure et d'établir la synthèse entre les concepts des achats et de l'innovation. Dans ce cette recherche, nous cherchons à montrer si l'innovation peut être synonyme de performance achats. Nous l'avons vu, la performance achats est un gain (coûts, qualité, innovation, avantage concurrentiel) mais elle doit être pilotée. D'après mes différentes lectures, l'innovation s'inscrit parfaitement dans l'acquisition de qualité ou d'un avantage concurrentiel. Schiele (2006) rappelle que les achats ont un rôle important dans l'acquisition d'innovation au sein de l'entreprise (juste après la fusion acquisition et l'imitation). La position transverse de la fonction achats est un atout indéniable. En effet, il s'agit d'un point d'entrée de produits ou de services dont l'entreprise pourra faire usage. La dimension stratégique des achats pouvant intégrer des fournisseurs innovants prend ici tout son sens. De plus, les deux concepts sont liés en un point : ils doivent être objectivés et pilotés. Que l'on parle de performance achats ou d'innovation, l'établissement d'indicateurs précis est impératif ; sinon l'innovation continuera de souffrir de cette vision abstraite en entreprise.

II. METHODOLOGIE

A. Recherche qualitative

La rareté des travaux de recherche récents qui traitent de la fonction achats créatrice de valeur pour l'entreprise, et l'innovation fournisseurs à travers une démarche et une attitude proactive nous ont conduits à à une démarche exploratoire et qualitative. La revue de littérature présentée en première partie de cet article nous a permis d'élaborer un guide d'entretien. L'objectif visé étant d'identifier en quoi l'innovation fournisseurs est-elle un véritable levier de performance pour les achats dans le cas du secteur de location automobile ? Dans cet article de recherche, notre collecte de données s'est basée sur des entretiens-semi directifs auprès des managers. Le chercheur ayant établi une relation de confiance avec son informateur va recueillir un récit en s'appuyant sur un guide préalablement testé et construit à l'issue de travaux de recherche exploratoire (Imbert, 2010).

B. La justification de l'étude de cas et du choix des cas ?

La justification de notre choix méthodologique, étude de cas, s'inspire largement des travaux de Yin (2012). Selon cet auteur, une étude de cas doit être adoptée quand les questions posées sont de la forme :

- « Comment ? » ce qui correspond à des études de cas descriptives
- « Pourquoi ? » ce qui correspond à des études de cas à visée d'explications.

Dans une démarche qualitative, les verbes ont une importance particulière et leurs sujets en sont les acteurs. Une recherche qualitative doit donner à voir au lecteur les acteurs et les actions sinon, elle perd tout sens. Nous avons choisi d'étudier le cas de deux entreprises implantées dans le secteur de la location automobile. Les raisons de ce choix sont multiples :
- acteurs mondiaux et leader européens dans la location automobile.
- spécialistes de la location longue durée multimarque automobile.
- l'accessibilité aux informations importantes.
- un secteur porteur et en pleine croissance.
- un secteur où l'innovation est l'un des critères importants pour son évolution.

Selon Eisenhardt (1989), « *L'étude de cas est une stratégie de recherche qui met l'accent sur la compréhension de la dynamique actuelle sous des paramètres simples.* […] *Les études de cas combinent généralement des méthodes de collecte de données telles que les archives, des interviews, des questionnaires et des observations* ».

III. RESULTATS

L'innovation est considérée comme importante au sein des deux entreprises étudiées. Selon les interviewés, l'innovation apporte une réelle valeur ajoutée pour les parties prenantes : - une satisfaction des clients ; - des économies importantes ; - une différenciation sur le marché et une reconnaissance de la fonction en interne. Cependant, certains freins à sa mise en place ont pu être identifiés sur le terrain.

A. L'innovation : vers une valeur ajoutée dans la politique achats

L'innovation est considérée comme un paramètre important à intégrer aux politiques achats dans les deux cas étudiés. Le processus achats repose en grande partie sur l'appel d'offres. Ainsi, les interviewés précisent que l'appel d'offres permet la sélection d'un ou des fournisseurs potentiellement innovants. Ils rappellent également que le critère innovation est mentionné et évalué lors de la notation de la grille d'évaluation par l'acheteur. Extrait d'entretien : *« Au sein de nos pays respectifs, l'Australie et l'Allemagne, le critère innovation est intégré dès les RFI, RFQ et RF*P » (Experts).

1. Innovation et différenciation sur le marché

Les achats doivent apporter une qualité et une excellence directement au client final. Autrement dit, en achetant des produits et/ou des services innovants, l'acheteur permet au client et au conducteur du véhicule de profiter de sa location et d'apporter un élément de différenciation majeur par rapport aux concurrents de la location courte, moyenne et longue durée. Extrait d'entretien : « *Le service achats de l'entreprise Alpha avait demandé aux soumissionnaires lors de l'appel d'offres de proposer une innovation en termes de service. Michelin a proposé le « pick up and delivery pneumatiques » et,fut sélectionné sur cette idée. Ce projet a permis à Alpha de se différencier et d'augmenter la satisfaction du client fina*l ». (Expert).

2. Innovation et satisfaction des employés

Les achats généraux - l'achat de produits et/ou de prestations innovantes - contribuent à la satisfaction des employés et la reconnaissance de la fonction achats. Exemple le projet « OUI » (Optimisation Utilisation des Imprimantes) qui a permis aux employés de l'entreprise Bêta de profiter d'un réseau d'imprimantes connectées dans l'ensemble du siège.

3. Innovation et performance économique

La notion de performance au niveau achats est suivie grâce aux « savings », c.-à-d. les économies réalisées sur un projet achats. Cela implique deux éléments importants : une baisse du TCO (Total Cost of Ownership/Coût Global de Possession) grâce à l'innovation apportée par le fournisseur mais également une hausse de la satisfaction des clients. Cette même satisfaction peut être mesurée par rapport au client interne : le département « sales » ou les opérations appelés « service delivery » mais aussi grâce au retour des clients finaux par rapport aux véhicules et aux services associés à leur contrat de location. L'innovation fournisseurs dans le service achats doit donc être synonyme de performance.

B. Les freins à l'innovation : une imbrication complète

Durant notre analyse qualitative, nous avons pu identifier et classer les freins à l'innovation dans le domaine achats du terrain choisi. Deux étapes importantes ont attiré notre attention, l'étape amont du processus achats et l'étape de la relation acheteur-fournisseur. Cependant, il arrive que dans certains cas les freins identifiés soient présents lors des deux étapes.

1. En amont du processus achats

En amont du processus achats nous avons identifié les principaux freins suivants : (1) une focalisation trop importante des acheteurs sur la réduction des coûts à court terme ; (2) une insuffisance du budget alloué aux achats pour l'innovation ; (3) un manque de temps lié IT trop lourdes qui empêchent les acheteurs de se consacrer à leur cœur de métier et de rester en veille sur le marché fournisseurs ; (4) un esprit individualiste considéré comme étant un frein important à l'innovation.

2. *Au niveau de la relation acheteur- fournisseur*

La plupart des interviewés précisent que l'acheteur doit disposer du temps nécessaire pour pouvoir piloter la relation-fournisseur. Ce frein de temporalité est particulièrement ressenti par les acheteurs ayant en charge différentes familles d'achats. Par conséquent, ce manque de temps ne leurs permet pas d'entretenir une relation d'échanges avec les fournisseurs. De plus, l'acheteur est tenu de s'aligner à la stratégie de l'entreprise en privilégiant les économies à court terme ce qui impacte forcement leurs relations avec leurs partenaires. Extrait d'entretien : *« C'est la faute à un manque d'effectif que les acheteurs n'arrivent pas à se consacrer à l'amélioration des relations avec leurs fournisseurs* » (Expert C et A). Cependant, lorsqu'un acheteur est impliqué dans la recherche de l'innovation cela ne lui garantit pas l'atteinte des objectifs fixés dans le contrat avec le fournisseur. En effet, le fait que le fournisseur ne respecte pas son engagement contractuel représente un risque pour l'acheteur et pour le client interne qui verra son besoin en innovation non satisfait.

C. Principales propositions de recherche et objectifs

Suite à l'analyse de ce travail de nature exploratoire, nous avons pu formuler six propositions de recherche suivantes : *P1. La nécessité de la mise en place d'une culture - innovation au sein des services achats.* Cette première proposition a pour objectifs : (1) de sensibiliser et renforcer l'implication des acheteurs à l'innovation ; (2) de créer des liens au sein de la communauté achats autour de l'innovation ; (3) de favoriser la communication entre les acheteurs des différentes entités ; (4) d'établir un mode de gouvernance de l'innovation en amont de tout processus achats. *P2. Intégration de l'innovation dès le début du processus achats.* Cela a pour objectifs : (1) d'impliquer les acheteurs dès le début du projet avec le client interne ; (2) d'impliquer les acheteurs d'autres familles d'achats concernées dès la définition des besoins ; (3) de mettre en valeur le critère innovation au sein du processus achats ; (4) de développer un outil d'audit et de contrôle de l'innovation. *P3. Automatisation des outils achats* a pour objectifs : (1) de gagner du temps pour que les acheteurs se consacrent davantage sur l'aspect stratégique et innovation ; (2) d'avoir des fichiers types centralisés au niveau du siège et ensuite diffusés aux différents pays ; (3) d'améliorer la productivité des acheteurs.

P4. Création d'un challenge Innovation Fournisseurs (IF) a pour objectifs : (1) de rendre les fournisseurs innovants ; (2) de développer la relation fournisseur dans une logique gagnant-gagnant ; (3) de garder un bon relationnel avec ses fournisseurs ; (4), de sécuriser les partenaires stratégiques de l'entreprise. *P5. Pilotage de la performance innovation des fournisseurs* a pour objectifs : (1) d'établir les critères de suivi innovation du fournisseur ; (2) de suivre la performance fournisseur en termes d'innovation ; (3) de développer un outil commun de suivi ; (4) de créer un groupe de travail sur les grandes familles achats ; (5) de piloter l'aspect contractuel de l'innovation dans la prestation d'un fournisseur.

P6. Management de la relation fournisseur en « cross border supply » ou « prestation transfrontalière. Cette proposition s'adresse particulièrement aux groupes internationaux et elle a pour objectifs : (1) de piloter la relation fournisseur à une échelle internationale ; (2), de créer un outil dédié pour centraliser l'information (*sourcing et pricing*) ; (3) de profiter du réseau international du groupe pour trouver des innovations dans les pays frontaliers.

IV. CONCLUSION

Au terme de cet article (provisoire !), consacré à l'innovation fournisseurs au sein du management achats : cas du secteur de la location automobile, les résultats confirment que l'innovation constitue une composante-clef au sein des deux entreprises Alpha et Beta. Cela pose la question de savoir si l'innovation fournisseurs est-elle un véritable levier de performance pour les achats. En d'autres termes, une stratégie achats principalement axée vers des fournisseurs innovants est-elle un facteur clé de succès ? Pour comprendre à nos questionnements, nous avons menés une étude qualitative exploratoire auprès des experts des deux entreprises. En effet, plusieurs propositions de recherche se dégagent. : - la nécessité de la mise en place d'une culture - innovation au sein des services achats ;

l'intégration de l'innovation dès le début du processus achats ; l'automatisation des outils achats ; la création d'un challenge Innovation Fournisseurs (IF) ; le pilotage de la performance innovation des fournisseurs ; le management de la relation fournisseur en « cross border supply » ou « prestation transfrontalière.

Ce travail n'est, bien entendu, pas exempt de limites. Toute étude qualitative menée par entretien comporte le risque que le discours des répondants soit biaisé en raison du mode déclaratif des informations recueillies. Ce type de biais se caractérise par un écart entre les déclarations et les pratiques effectives et se traduit via une surestimation ou au contraire une sous-estimation des pratiques. Or, notre papier est fondé sur une méthodologie qualitative, qui a donc impliqué de recueillir les déclarations des répondants. Dans l'ensemble, la spontanéité des propos tenus par les managers interviewés donne tout lieu de croire que leurs déclarations reflètent fidèlement leur propre opinion. Nos échanges avec les managers, nous a aidé à affiner leurs perceptions sur notre question de recherche au-delà de la phase des entretiens empiriques.

Nous n'avons pas pu, dans le cadre de cette recherche, mener d'autres études de cas approfondies. Cette limite est étroitement liée à la méthodologie de notre recherche qui est le choix de deux cas. Nous avons certes pris des précautions méthodologiques au niveau de la conduite des entretiens pour éviter les biais, recueillir des données riches et en triangulant les données (en croisant des sources de données primaires et secondaires, participation active). Cependant, cette limite demeure. Nous souhaitons en revanche l'envisager ultérieurement, afin d'étendre la validité des résultats. Le choix méthodologique adopté incite à l'évidence à une grande prudence et à une modestie quant aux conclusions dégagées. Il est important de reconnaître que nous avons pris parti de privilégier la validité interne de la recherche au détriment de la validité externe. Nous ne pouvons, donc, pas prétendre à une généralisation statistique, nos résultats n'étant pas appliqués à d'autres contextes, mais plutôt à une généralisation analytique (Yin, 1994). Ainsi, convient-il de rester prudent quant aux propositions avancées, celles-ci nécessitant d'être transposées à d'autres champs. En somme, les prolongements possibles de notre papier sont en partie relatifs aux limites précédemment soulignées, mais aussi à notre volonté d'approfondir les premiers résultats dégagés. Pour obtenir une meilleure validité externe, nous gagnerons naturellement à réitérer notre protocole sur d'autres champs organisationnels. Il conviendrait alors de s'attacher en profondeur à un nombre important de cas, en choisissant des cas dans des secteurs similaires. Cela permettrait de mettre en lumière des éléments de comparaison et de constater si les dimensions identifiées dans cette recherche se retrouvent dans d'autres cas. Ce point d'appui renforcerait le dispositif mis en œuvre dans cet article.

References

Brion, S. (2008), ' L'impact clé des modes de management pour *l'innovation' Revue française de gestion,* Vol. 2008/7 (187), 177-194.

Bruel, O. (2007), Management des achats. Décisions stratégiques, structurelles et opérationnelles, Economica, Paris.

Calvi, R. (2010), '*Lorsque la fonction achat devient stratégique*', *Revue française de gestion*, *Vol.* 2010/6 (205), 119-138.

Calvi, R. et Paché, G. (2010), 'Management des achats', *Revue française de gestion*, Vol. 2010/6 (205), 90-95.

Cohen, M. and Daniel A. (1990), 'Absorptive Capacity: A New Perspective on Learning and Innovation' Administrative Science Quarterly, *Technology, Organizations, and Innovation,* Vol. 35(1), Special Issue, 128-152.
Durant, T. et Guerra-VieraS. (1996), 'Etalonner l'innovation métrique d'une innovation annoncée', *Association International de Management Stratégique*.

Ghertman, M, (2006), 'Williamson et la théorie des coûts de transaction', *Revue française de gestion*, Vol. 2006/1(160), 191-213.

Guiennet, F. et Sauvage, T, (2009), 'Proposition d'un modèle d'externalisation des activités achats', *Management & Avenir*, 2009/4(24), 103-122.

HAMEL, G. and al. (2008), 'Management Innovation', *Management Academy of Management Review*, Vol. 33(4), 825–845.

Kraljic, P. 'Purchasing must become supply management'." *Harvard business review*, Vol. 61(5), 109-117.

Lacoste, S. (2011), 'Segmentation fournisseurs et négociation : le cas du fournisseur « stratégique »' *Management & Avenir, Vol.* 4, (44) 202-218.

Lenfle, S. et Midler, C. (2003), 'Management de projet et innovation', in *Encyclopédie de l'Innovation*, P. Mustar et H. Penan (eds), Paris, Economica, pp. 49-69.

Noailles, P. (2011), 'De l'innovation à l'innovateur Pour une approche structuraliste de l'innovation', *Revue des Sciences de Gestion,* Vol. 2011/1(247-248),13-28.

Nollet, J. et Beaulieu, M. (2002), 'Tirer le plein potentiel d'un groupe d'achats', *Revue française de Gestion,* Vol 27, 9-16.

Nollet, J. et Tchokogué, A. (2010), '*Gestion des achats, aller au-delà des tendances et des paradigmes*', HEC Montréal, *Revue française de gestion*, Vol 205, 173-186.

Nollet, J. et Ponce, S. (2004), 'Après l'impartition… la désimpartition', *Revue de gestion HEC Montréal*, Vol 29, 57-65.

Mouricou, P. (2007), 'Stratégie d'entreprise : copier ou innover', *Revue Sciences Humaines,* Vol. (183), 38-40.

Dechamps, J.P. (2012), 'What is Innovation Governance? Definition and Scope (www.innovationmanagement.se).

Serrano, E. (2012), '*L'innovation, une priorité sous-évaluée par les organisations achats, décisions*', (www.decisons-achats.fr).

Etude ducabinet Bearing point (2012), 'L'innovation, second souffle pour les achats ?', Résultats 7ème observatoire des achats par le cabinet Bearing point, *ESSEC Business School et Novamétrie*.

Charte relations fournisseurs responsables du ministère du redressement productif, 2010.

Dossier KLB Group (2005), 'Mesurer la performance achats'.

The Strategy of Universities: Are They Increasing Their Competitiveness?

Valery Maslennikov, Doctor of Economic Sciences, Professor, Academic department of Management theory and business Technology, Plekhanov Russian University of Economics, Moscow, Russia, vvmaslennikov@gmail.com

Olga Grishina, Doctor of Economic Sciences, Professor, Academic department of finance and prices, Plekhanov Russian University of Economics, Moscow, Russia, vprof.manag@gmail.com

Yuri Lyandau, Doctor of Economic Sciences, , Associate Professor, Academic department of Management theory and business Technology, Plekhanov Russian University of Economics, Moscow, Russia, 2017cenam@gmail.com

Irina Kalinina, Ph.D. in Psychology, Associate Professor, Academic department of Management theory and business Technology, Plekhanov Russian University of Economics, Moscow, Russia, kalinina309@yandex.ru

Abstract

The rate of the development of modern economics cannot be compared with any of the previous stages in the history of the society. Analysis of economic factors of any organization confirms that the rate of change necessary for survival in the struggle with competitors will only increase. Technological progress and globalization with each passing year contribute to these changes more and more. Currently, many Universities (including Russian) poorly respond to changing environmental conditions and unable to achieve leadership in the short and long term.

The relevance of this research lies in the rationale for the selection of University development strategies based on the author's empirical research in the July-September 2017 for 42 examples of Russian Universities. Three different groups represented the analyzed Universities: national research University (global scale), Federal University (national scale) and the basic University (regional scale). The article provides a comparative analysis of the strategies content of three Universities – one representative from each named group.

Keywords: University's strategy, strategic map, strategic objective, projections of strategy maps, University of the future.

1. Introduction

1.1 *Introduce the Problem*

Contemporary Universities are undergoing drastic changes in their activities; they actively search strategy to find points of interaction between science, education and innovation. In the transition to a digital economy, Universities are not able to remain in the framework of previous strategies. Moreover, as shown by Anthony Watkinson and others (May 2016), the changes in Universities have to stay ahead of changes in the spheres of economy, prepared for work in terms of digital technology. Most Universities are poorly suited to the requirements of leadership at the stage of entry into the digital economy. Previous models of University management do not correspond to the new technological system, the requirements of employers for graduates and customers of scientific research.

Jones J. (2006), Coelli T. and others (2005), in addition with McMillan M and Wing H. C. (2006) demonstrated that one of the directions of changes in the University management should

consider ways of evaluating the "efficiency" and "productivity" using various methods, such as Data Envelopment Analysis (DEA) and Stochastic Frontier Analysis (SFA) of 45 British Universities made a similar study in the period of major changes in state funding Flegg A., Allen D Field K. and Thurlow T. (2004), and results of operations of 20 public Universities in Greece through quantitative analysis outlined Katharakis G. and M. Katharaki ((2006)).

However, statistical analysis does not fully reveal the mechanism of influence of various factors on the formation of the University's strategy. For example, in the study of Gokcen Arkali Olcay and Melih Bulu (October 2016) it is formulated that the correlation analysis shows significant differences between some indicators even when measuring the same criterion, such as teaching or research. Therefore, in addition to the statistical approach it requires a qualitative analysis that allows combining different projections of the strategic map of the University.

The strategy defines the qualitative and quantitative characteristics of the internal state of the organization, its viability and effectiveness, as well as resistance to the external environment. Changes in scientific potential lead to the change of state of the University and vice versa. Hamed Alchool and Richard Furuta studied this aspect of the strategic activities of the Universities (may 2017).

However, research activities of Universities does not cover such aspects of strategic management that are associated with the indicators strategic map projections– finance, customers and markets, internal processes, learning and development.

1.2 *Explore Importance of the Problem.*

Today we are witnessing a reconsideration of the classical University based on the synthesis of science and education. The transformation of the University's concept is a response to external challenges and internal problems of its current position in society.

One of the most important studies that reveal the methodological approach of the leading American researchers of the higher school are the materials presented in the publication "University of the future", edited by R. Barnett (2012). The authors of the articles explore ideas about the new role of Universities in current conditions of global economic changes brought about by the information revolution. Main areas of research involve discussion of the following trends in the development of higher education.

1. The role and value massivization of higher education that changes the formats and standards of education and leads, in particular, to the lack of personal contact between student and professor, the dominance of the value of applied education on fundamental training, the growing importance of competence-based assessment of student's knowledge.
2. The reduction in state support for Universities and the recognition of education is a private good. In this regard, there are two directions of University's development: 1) the emergence of mega-Universities with numerous branches and campuses, where students take standardized programs or, conversely, 2) the emergence of small private elite institutes that work for individual programs and operate independently.
3. Strategies of Universities in Europe and the United States are based on the concept of "performance" that characterizes the effectiveness of training and number of students. It is connected with the fact that there is a significant increase in the costs of Universities to current activity, which changes the approach to the number of students the structure and content of curriculumum. To attract an increasing numbers of students Universities require a constant demonstration of their own successes, applied science and special professional training.
4. The organizational model of Universities is based on the principles of the network economy, with a gradual decrease of the hierarchical structure and orientation of the University in attracting the best educational resources from the constant interaction with other companies. This approach leads to the reform of the internal environment of the University – students work in small groups, have open access to courses and training programs.

The analysis of models of University shows that there is no longer a single model of the University; they differ in the approaches to the formation, implementation and reproduction of scientific and educational potentials.

University of the Future cannot be only research, business, network, electronic, digital, virtual, distributed, service or others, as all of the above is the characteristics that define the ways of implementation of certain aspects of the organization activities The main distinctive feature of the University of the Future is the ability to become a leader in their subject area. This means recognizing the University as a center of creating new technologies for interaction with consumers of University development the results from fundamental research to commercialization.

University's leadership format is required to develop training areas for the future of the economy in cooperation with national and global companies-leaders. This approach changes the strategy of the University, the educational and scientific potential of which becomes the center of formation of new competencies and acquires new characteristics. Educational and scientific potentials become the foundation of the University of entrepreneur type, which unites a team of researchers, managers, and entrepreneurs, able to implement interdisciplinary research projects that transfer knowledge in intellectual capital required for commercialization.

Leadership teams and their integration into the University network is able to provide breakthrough approaches in new fields of knowledge and new directions of specialists training for the jobs of the future. In this case, University must have not only education and research competencies but also business competence and entrepreneurial leadership culture.

2. Methods

The hypothesis of our study was that Universities of different scales - national research, federal and supporting regional Universities - have significant differences in the content of development strategies, allowing seeing differences in strategic goals and ways to achieve them.

The aim of the research in 42 Universities was to conduct a comparative analysis of their strategies and activities on the example of three Universities of different types:

1) National Research Tomsk Polytechnic University (NRTPU) - global scale, 10th in the national rankings in 2017;
2) Kazan Federal University (KFU) - national scale, 11th in the national rankings in 2017;
3) Voronezh State University (VSU) is a regional scale, basic University, 24th in the national rankings in 2017.

Selection of Universities to analyze their strategies primarily is determined by their assignment to various types (national research, federal, basic University). In addition, selected Universities - NRTPU and KFU - consistently improve their places in the national rankings of Universities of Russia. The study's inclusion of the VSU determined that it has no pronounced positive dynamics (table 1). This allows comparing the contents of strategies depending on the scale and dynamics of development of Universities.

Table 1:The ranking of the studied Universities for years

University	2010	2011	2012	2013	2014	2016	2017
NRTPU	13	11	9	9	9	9 - 10	10
KFU	16 - 18	12 - 13	15 - 16	11 - 12	11 - 12	11	11
VSU	22 - 23	18	27 - 30	20 - 21	22	27	24

Compiled by the authors according information http://www.univer-rating.ru/college.asp?id=23,

http://www.univer-rating.ru/college.asp?id=98, http://www.univer-rating.ru/college.asp?id=28.

3. Results

Consider the performance evaluation of Universities according to the results of the state monitoring three groups of performance indicators over the past three years - education, research and financial-economic (table 2).

Table 2: The indicators of assessment of Universities, based on the results of the state monitoring of the activities of Universities

№	University	Educational activity points			Research activities, points			Financial and economic activity, points		
		2014	2015	2016	2014	2015	2016	2014	2015	2016
1	NRTPU	66,2	67,9	71,74	1253,83	1678,6	1382,48	3992,73	4811,72	3924,3
2	KFU	67,47	69,75	75,86	422,98	398,3	562,42	3122,4	2402,34	3081,18
3	VSU	65,21	66,8	67,43	283,37	244,34	214,82	1697,81	1609,1	1686,02

Compiled by the authors, based on data of state monitoring of indicators of Universities.

The indicators allow us to conclude that all selected Universities have improved their position for three years. The situation is more complicated with the indicators of research and financial and economic activities. None of the Universities was able to consistently improve their results of research activities in the analyzed period. Moreover, all Universities have reduced their indicators during this period. For example, NRTPU in 2016 has reduced its indicator compared to the year 2015 to 296 points, almost returning to the figures, 2014.

KFU reduced its indicator in 2015 on 24 points, after which improved his record in 2016. VSU annually reduced their performance in 2015, on 39 points and in 2016 by 30 points in just three years – by 69 points. It speaks about the weak strategy of development of scientific potential and the inefficiency of the system of management of scientific activities.

It can be argued that improvement of educational activities is based on conservative, usual activities, which is confirmed by the insignificant growth of indicators. The achievement of such indicator values can be achieved without a sound strategy. The drop in indicators of research activity, requiring innovative solutions, underscores the need for strategic projects, able to act as growth drivers of the University's competitiveness.

The results of educational and research activities directly affect the economic and financial condition of the Universities, which also experienced the fluctuation of the indicators over the years.

Consider whether the content of the strategies of the Universities affects the performance of Universities. A comparative description of the strategy is content of the studied Universities presented in table 3.

Modern Universities are looking for ways to make the most effective use of their limited resources to become the future of the Universities. Firstly, the new educational and scientific potential is implemented in the development of individual student’s competences and the formation of their personal educational paths. Overcoming the limitation of this approach is the outdated standards of learning faster, which creates a need for new competencies. This means the ability of University staff to adapt the curriculum to change the individual skills of students in the process of study subjects, i.e., introduction to teaching artificial intelligence.

Therefore, the University's strategy we define as the ability of the organization to complete tasks, ensuring the achievement of the goal, through the implementation of scientific and educational activities taking into account the dynamics of changes of targets.

The aim of the strategy of formation and implementation of the University's future is the shift from the statistical approach, aimed at fixing the achieved state at a certain time, to develop a concrete program of action.

A unified approach to strategy for all of the studied Universities is to focus on the staff. Two of the studied Universities consider their strategic direction and improvement of payment and motivation of staff – the VSU and NRTPU (focus on internal factors of development), and one strategy of the University (KFU) is focused on attracting talented and promising scientific-educational personnel (focus on external factors of development).

However, it should be noted that the definition of strategic objectives in the form of a quantitative indicator value is missing from all three Universities. This indicates the lack of validity of strategic objectives with supporting processes and activities. With this approach, the supporting processes and activities lose their significance of contribution to the achievement of the parameters of strategic objectives and reduce the ability of the University to concentrate resources on the most important strategic projects.

The lack of quantitative justification strategic objectives cannot objectively measure the results of implementation of strategic projects. Therefore, the formulations of the outcomes of the University's strategy are descriptive and difficult to prove with phrases such as, "optimization of the number, an increase in the average wage; improvement in the efficiency of the University" (VSU), "development and implementation of programs of mutual exchange..." (KFU), "Identifying and attracting talented employees..." (NRTPU).

This approach does not allow the decomposition of strategic objectives to the units of the University, responsible for the implementation of certain strategic projects.

Of particular interest is the formulation consumer outcome ("product") in the strategy of Universities. This situation is because consumer's strategy allows the University to determine marketing program and specify the projection parameters "Finance" in the framework of the strategic map.

The analysis shows that the strategy of all Universities see as consumers only the internal divisions "all divisions and categories of personal" (VSU), "strategic academic unit, personnel department, department of external relations" (KFU), "heads of structural divisions of the University" (NRTPU).

However, no University notices external customer's results of the strategy. This may mean that budgets for strategic projects as well as calculations of the economic effect cannot be reliably confirmed. Therefore, both of the University are not able to provide accurate calculations of the expected economic effect from implementation of strategic projects (APU and NRTP), and the validity of the calculations of a single University (SDK) requires clarification.

4. Discussion

The analysis of the strategies of the University included in the top positions of the Russian national rankings, showed their focus on internal changes without external matching conditions. This may indicate the absence of correlation between strategic objectives and the involvement of Universities in the world scientific and educational space in their subject area.

With this approach, it is difficult to create University of the Future, competitive in quality scientific research and educational activities.

In addition, the strategies are not clearly formulated points of growth capacity that could transform

Universities in advanced educational institutions for their scale of activity (global, national, regional scale). Such a strategic goal of Universities is not even set.

Table 3: A comparative description of the content strategies of the studied Universities

Элементы стратегии	VSU	KFU	NRTPU
The elements of the strategy	Improving the system of payment and stimulation of labor, optimizing the structure and staffing levels	The formation of a new system to attract talented and promising research and educational personnel	Improving the efficiency of the personnel management system
Strategic goal / indicator	Providing a competitive level of remuneration at the expense of optimization of organizational structure and staffing levels of all categories of staff	The formation of a new system to attract talented and promising research and educational personnel	Improving the quality of competences of employees ("personnel of a new formation")
The result	Optimization of the number, increase in average wages of employees; improving the efficiency of employee's work functions in order to avoid duplication and bring them in line with professional standards.	1) Development and implementation of programs of mutual exchange of researchers with leading Universities and research centers with high values of scientometric indices in their subject areas. 2) Development and implementation of programs of mutual exchange of researchers with leading Universities and research centers. 3) Development and implementation of joint educational programs, language training with foreign partners – leading Universities.	Identifying and attracting talented employees, making an essential contribution to the achievement of financial results.
Consumers of the "product"	All divisions, all categories of employees	Strategic academic unit, personnel department, department of external relations	Heads of departments of the University
The cost	The project budget is 160 million rubles	The extrabudgetary funds 1446 thousand rubles	The project cost 700 thousand rubles, including: 1) remuneration of members of the project - 500 thousand rubles; 2) equipment - 200 thousand rubles.
Value for money	Cost reduction on labor; increase in average wages core staff; reducing the cost of providing auxiliary functions	The planned increase in revenue 54892 thousand rubles in 2018 year/	The calculation is missing.

Compiled by the authors based on the University's strategy.

In their strategies, the Universities do not aim to achieve their own leadership goals to new market niches. Therefore, the question about the effectiveness of resources allocated to the development of Universities is justified.

These Universities could be encouraged to use the experience of the formation of strategies in similar situations in other countries. For example, Marmara University (Turkey) (24 November 2016) has developed a different and unique approach to develop strategies to be effective in the next five-year period: how participation of academic and administrative personnel is provided, in which way it is focused on creating value for all stakeholders, how internal and external environment analysis are made with which scientific research projects and how corporate learning is supported in every stage of the process.

Osaka University (Japan) defined as its strategy, the creation of a new campus based on the use of energy efficient technologies that reduce energy consumption per unit of usable area of the building (Yoshida Yukiko and others (15 July 2017)).

References

1. Barnett, R. (ed.) (2012). The Future University: Ideas and Possibilities. — New York and London: Routledge, 2012. — 233 p.
2. Anthony Watkinson and others (May 2016). Changes in the digital scholarly environment and issues of trust: An exploratory, qualitative analysis. Original Research Article. Information Processing & Management, Volume 52, Issue 3, pages 446-458.
3. Bakoğlu Refika, Öncer Ayla Zehra, Yıldız Müge Leyla, Güllüoğlu Arif Nihat (24 November 2016). Strategy Development Process in Higher Education.:The Case of Marmara University//Procedia - Social and Behavioral Sciences, Volume 235, Pages 36-45.
4. Coelli T., Rao D., O'Donnell C. and Battese G. (2005) .An introduction to efficiency and productivity analysis, N.Y.: Springer.
5. Flegg A., Allen D., Field K. and Thurlow T. (2004) Measuring the efficiency and productivity of British Universities: An application of DEA and the Malmquist approach// https://www.researchgate.net/publication/24079162_Measuring_the_Efficiency_of_British_Universities_a_Multi-Period_Data_Envelopment_Analysis.
6. Gokcen Arkali Olcay, Melih Bulu (October 2016). Is measuring the knowledge creation of Universities possible?: A review of University rankings. Technological Forecasting and Social Change, Volume 123, Pages 153-160.
7. Johnes J. (2006) Data Envelopment Analysis and its application to the measurement of efficiency in higher education // Economics of Education Review. Vol. 25. P. 273–288.
8. Katharakis G., Katharaki M. (2010) A comparative assessment of Greek Universities' efficiency using quantitative analysis // International Journal of Educational Research. Vol. 49. P. 115–128.
9. McMillan M., Wing H.C. (2006) University efficiency: A comparison and consolidation of results from stochastic and non-stochastic methods // Education Economics. No. 14. P. 1–30.
10. Hamed Alhoori and Richard Furuta (May 2017). Recommendation of scholarly venues based on dynamic user interests. Original Research Article. Journal of Informetrics, Volume 11, Issue 2, Pages 553-563.
11. Warning S. (2004) Performance differences in German higher education: Empirical analysis of strategic groups // Review of Industrial Organization. Vol. 24. P. 393–408.
12. Yoshida Yukiko, Shimoda Yoshiyuki, Ohashi Takumi (15 July 2017). Strategies for a sustainable campus in Osaka University. Energy and Buildings, Volume 147, Pages 1-8.

Corruption, Political Instability and the Informal Sector in Latin America: Efficiency Analysis Of Latin American Companies Using DEA Model

Lourdes Gabriela Daza Aramayo, Center for Latin American Studies, Department of International Business of the Faculty of International Relations of the University of Economics, Prague, Czech Republic. E-mail: lourdes.aramayo@vse.cz

Marek Vokoun, Department of Management of the Institute of Technology and Business in České Budějovice, Czech Republic. E-mail: Marek.vokoun@mail.vstecb.cz

Abstract

The Latin American region is strongly affected by global trends which test the ability of companies to efficiently transform inputs into outputs and succeed in international competition on the world market. This article aims to identify the company's input inefficiencies in a sample of emerging companies in the region and further the analysis of barriers for business in Latin America in the period before the economic crisis (2006) and during the crisis (2010). For our analysis, we used data envelopment analysis (DEA), which is considered as a powerful tool for measuring efficiency of units and exhibits some positives compared using the standard approaches. The analysis will focus on companies operating in manufacturing and determine their technical efficiency, respectively revealing inefficiencies in the transformation of material, labor and energy from input to output in the form of sales and investments. The findings from the two years 2006 and 2010 will allow us to further identify factors associated with the ability of companies to survive in the market during the period of economic fluctuations.

Keywords: Data Envelopment Analysis, technical efficiency, Latin America, manufacturing companies.

Introduction

One of the economic theories of growth is based on the idea of evolutionary principle (Nelson, 1982; Dopfer, 2005), when the efficiency of the companies and their ability to survive in the market is tested in an environment of imperfect competition. The firms are, to some extent, able to create a picture of their competitors' strengths and weaknesses so they know their position on the market. By this they create the imaginary technological border which enables them to better formulate strategies (financial, marketing, innovative etc.) and to adapt over time. Their ability to be efficient also depends on the accurate identification of barriers to business and the effort to avoid them, or more precisely on the elimination of the negative impact of these factors. For evaluation and disclosure of this technological frontier it is necessary to use a holistic approach, where individual ratios of financial analysis, such as profitability, are no longer enough to capture the overall efficiency of the unit and allow appropriate comparison at the level of the defined market. A multi-factor analysis of strengths and weaknesses and the use of regression in a Cobb-Douglas production functions type (Van Beveren, 2012) requires a parametric approach. It is characterized by one optimized formula that applies to all firms in the sample data. The weakness of a traditional Cobb-Douglas production function is the assumption of linear functional form and the application of perfectly competitive environment conditions.

Data Envelopment Analysis (DEA), unlike parametric approaches, uses mathematical optimization model for the estimation of an efficient frontier. With this model, we can complexly compare values that characterize the company using multiple input and output ratio characteristics. Such a process allows referential comparison of the companies (determination of an imaginary efficient frontier) and exposing the main factors of inefficiency in the imperfect competition environment. In the past, DEA models were often used in studies of efficiency in developed countries, as well as in studies concerning Latin America. The results of comparative studies show large differences in efficiency among businesses in Latin America (Rodríguez, 2003). Sizable differences can also be international, for example the comparison of Spanish and Brazilian businesses where it is possible to mitigate the input inefficiency, e.g. through technology transfer (Silva and Ramirez, 2006).

There are not many academically reviewed studies investigating the efficiency of various sectors of Latin American economies using DEA. These comparisons are found more often in gray literature, in research reports, work studies and conference proceedings. Research teams focused, for example, on the efficiency of companies producing coffee in Colombia (Suárez Mejía, 2010), dairy companies in the province of Corrientes in Argentina (Gallardo et al., 2011), The mining industry in Mexico: Performance patterns and determinants of efficiency (Gaytan, 2014) and the study of the energy sector and CO2 emissions in Latin America and the Caribbean (Schuschny, 2007). So far, there are not a lot of empirical studies that focus on the manufacturing industry in Latin America. The latest work, which analyzes the sub-sectors of the economy, is a study (Rodríguez, 2003), which measures the relative efficiency of three sub-sectors of the Colombian economy between 1993 and 1999 using DEA models. The author compared the performance of different companies in the same sector in one country and showed that companies with higher operating costs and net margin may not be the most efficient. Unlike our analysis, the author examines three sub-sectors over seven consecutive years: manufacture of textiles, pharmaceutical production and manufacturing of chemical substances and preparations. Our analysis is focused on eight sub-sectors of the manufacturing industry and their comparison in 11 Latin American countries; it is the first that analyzes and compares the efficiency of the manufacturing industry in these Latin American countries all together.

When looked at closely it is also the first to monitor the efficiency of innovative and exporting companies in Latin America. There have been several studies regarding innovators in Latin America; however, they use the parametric approach (Andersson et al., 2012; Benavente, 2006) and the DEA approach is only applied more on the macroeconomic level to evaluate national innovation policies. The efficiency of the countries is assessed on the basis of national indicators such as gross expenditure on scientific research (R & D) activity, the number of R & D personnel, the number of patents granted by the European Patent Office, spending on education, the volume of "high-tech" exports and the number of impacted academic studies (Kotsemir, 2013).

Latin America is characterized by a diverse range of small and large economies. In these countries, the real GDP per capita was increasing from 2004 until 2009, when they were hit by the full force of economic crisis. Some countries have grown even during the global economic crisis. The region of Latin America is heavily influenced by global tendencies, which test the abilities of firms to efficiently transform input into output and to be successful in the international competition on the world market. This aim of the article is to identify the input inefficiencies in a sample of emerging companies in the region and further the analysis of barriers for business in Latin America in the period before the economic crisis (2006) and during the crisis (2010). The analysis is focused on companies operating in manufacturing and determine their technical efficiency, respectively revealing inefficiencies in the transformation of material, labor and energy from input to output in the form of sales and investments. The findings from the two years 2006 and 2010 will allow us to further identify factors associated with the ability of companies to survive in the market during periods of economic fluctuation.

In the first part of this research, we will focus on the theoretical background and models which are then applied in the analysis. The second part contains formulation of hypotheses that the article is trying to answer, and the set of variables used in the DEA model. The last part of the research presents the results, their discussion and a final summary conclude the article.

Theoretical introduction to DEA

The history of DEA models is bounded by work (Charnes et al., 1978), which is partly based on article (Farrell, 1957). The DEA evaluates the relative efficiency of a set of homogeneous decision-making units (DMUs). Relative efficiency means that the DMUs under evaluation are analyzed relatively within the given set of units. It implies that a change in the number of the units (increase or decrease) may lead to the change of the efficient frontier estimated by the model, and finally to the change of the results of the analysis. Homogeneous DMUs are units that are comparable in their activities, they spend the same set of resources (inputs) for the production of the same set of effects (outputs).

Let us consider the set of n DMUs that are described by m inputs and r outputs, and denote x_{ij}, $i = 1,2,\ldots,m$, $j = 1,2,\ldots,n$, the value of the i-th input of the DMU_j and analogously y_{kj}, $k = 1,2,\ldots,r$, $j = 1,2,\ldots,n$, the value of the k-th output of the *same DMU*. The efficiency score of the DMU_q is then defined as the weighted sum of outputs divided by the weighted sum of the inputs as follows:

$$E_q = \frac{\sum_{k=1}^{r} u_k y_{kq}}{\sum_{i=1}^{m} v_i x_{iq}}, \qquad (1)$$

where u_k, $k = 1,2,\ldots,r$, and v_i, $i = 1,2,\ldots,m$, are unknown weights assigned to the given inputs and outputs.

Conventional envelopment DEA models are based on maximizing of the efficiency score (1) of the DMU under evaluation subject to the constraints that the efficiency score of all other units of the set is limited by unity (100%). This optimization problem can be written as follows:

Maximize

$$E_q = \frac{\sum_{k=1}^{r} u_k y_{kq}}{\sum_{i=1}^{m} v_i x_{iq}}, \qquad (2)$$

subject to

$$\frac{\sum_{k=1}^{r} u_k y_{kj}}{\sum_{i=1}^{m} v_i x_{ij}} \leq 1, \qquad j = 1,2,...,n,$$
$$u_k \geq \varepsilon, \qquad k = 1,2,...,r, \qquad (3)$$
$$v_i \geq \varepsilon, \qquad i = 1,2,...,m,$$

where ε is an infinitesimal constant that ensures the positive outcome of all weights.

Model (2) - (3) is not linear in the objective function, which is the ratio of two linear expressions. However, by well-known Charnes-Cooper transformation, this model can be converted into the linear program. This transformation leads to the fact that the numerator of the objective function (2) is put equal to one and the denominator is minimized, or denominator equals one and the model maximizes the numerator. According to this transformation the DEA model is indicated as the output oriented or input oriented model. The model offers to decision makers two main groups of information:

The model identifies whether the DMU under evaluation is lying on the efficient frontier or not. If It is, its efficiency score equals 1 otherwise it is lower than 1 (in case of input oriented model) or greater that 1 (in case of output oriented model).

In case the DMU under evaluation is not efficient the model gives the recommendation how to improve the inputs and/or outputs in order to become efficient. In general, the efficiency score expresses the necessary reduction of all inputs in order to reach the efficient frontier (input oriented model) and necessary expansion of all outputs for becoming efficient (output oriented model).

Another aspect that must be taken into account in application of conventional DEA models is the assumption about the nature of returns to scales, which affects the shape of the efficient frontier defined by the model (constant, variable, non-decreasing, non-increasing). In the computational experiments, we will be working with the output oriented model with variable returns to scale. This model is often referenced as BCC models – see the original article (Banker et al., 1984) for more details. Mathematical formulation of the output oriented BCC model with the assumption of variable returns to scale is as follows:

Minimize

$$E_q = \sum_{i=1}^{m} v_i x_{iq}, \qquad (4)$$

subject to

$$\begin{aligned} &\sum_{k=1}^{r} u_k y_{kj} - \sum_{i=1}^{m} v_i x_{ij} - \upsilon \le 0, && j = 1,2,...,n, \\ &u_k \ge \varepsilon, && k = 1,2,...,r, \\ &v_i \ge \varepsilon, && i = 1,2,...,m, \end{aligned} \quad (5)$$

where υ is a free variable, providing the variability of the returns to scale.

More information about DEA model, theory and software can be found in many DEA textbooks and monographs, in Czech language e.g. (Jablonský and Dlouhý, 2004). Another approach to the DEA used in this paper is possible. Dluhošová and Zmeškal (2014) suggest implementing CCR/BCC models with fictive input/output and analyze the efficiency problem from a different perspective.

Hypotheses and expected results

The analysis of the Latin American business environment is focused on the relative technical efficiency. As stated in the previous section of the article we consider the output-oriented model with variable returns to scale as a suitable tool for the analysis. In other words, we will monitor whether the output level of the company was achieved efficiently in comparison to other companies. For our analysis, it is crucial to determine the existence of inefficiency in the form of a bad allocation of production inputs (labor, material and energy costs). The aim of the analysis is to obtain results for the years 2006 and 2010 or, more precisely, to compare the barriers to entrepreneurship that efficient companies identified as the most problematic and to monitor the development of the results of the DEA analysis over time. We should be aware that the DEA results are not directly comparable between the years 2006 and 2010; however, they can be observed indirectly by the changes in interest and order of observed inefficiencies. In the Latin America region, the year 2006 can be considered a period of strong growth and economic gain, while in 2010, the strong impact of the global economic crisis can be noticed. Generally, we observe the prevailing and new challenges in the manufacturing industry, both among efficient entrepreneurs in the indicator of sales and efficient exporters (export revenues) and among innovators (sales from innovative products).

The hypotheses which we outline in the study focus on the role of the efficiency of basic cost inputs throughout the manufacturing sector. We will measure output efficiency by the ability of the company to generate revenues and give scarce resources to invest in capital and innovation. In the context of economic slowdown there was also a decline in world trade, so we will also study the output efficiency of exporters in the manufacturing sector in detail, through sales of exported goods and investment in capital and innovation. We will also focus on those firms in the manufacturing sector that had revenues from innovated production and invested in capital and innovation in their output. These innovators are an important component for improving technical efficiency and living standards in the region through innovation and knowledge. For further analysis, we have formulated the following hypotheses to verify:

H1: Labor costs are the most important factor of inefficiencies in the manufacturing industries in selected Latin American countries.

H2: The business environment is mostly affected by these obstacles of business: corruption, political instability and the informal sector.

Data and variables

The data for the analysis was obtained from the World Bank Enterprise Surveys database, which provides both corporate financial data and the data related to obstacles in business. The overview of data (Table 1) describes a sample of 5311 manufacturing companies in 11 Latin American countries between 2006 and 2010 (Argentina, Bolivia, Colombia, Ecuador, Guatemala, Chile, Mexico, Panama, Paraguay, Peru and Uruguay). The analyzed sectors are food and beverage production, clothing, textiles, manufacture of machinery and equipment, metallic products, chemical products, rubber and plastic products, manufacture of unlisted electrical machinery and equipment, office machinery and computers, manufacture of other non-metallic mineral products, other (especially recycling, furniture, timber industry, metallic products, and not mentioned above). The data set was available in the database for only these countries; other selection criteria was not applied. A sample of 2382 exporting companies was defined by non-zero revenues from direct and indirect exports (through an intermediary). A sample of 2067 innovators were defined by non-zero revenues from innovative products.

Table 1: Key indicators of corporate data, Latin America between 2006 and 2010

Indicator	Number of observations	Average	Standard deviation	Minimum	Maximum
Revenue	5311	2402.48	12964.88	0.008	320588.40
Investment and R&D	5311	165.62	1812.65	0.001	92368.33
Material costs	5311	997.08	5678.20	0.001	131533.40
Energy costs	5311	36.30	306.21	0.001	15161.94
Labor costs	5311	300.96	1498.29	0.001	36000.00
Export revenue	2382	899.06	4499.783	0.067	88635.64
Revenue from innovative production	2067	375.97	1699.52	0.036	31291.98

Data: own calculations through the DEA analysis according to Enterprise Surveys, the figures for the 11 Latin American countries were recalculated to millions of dollars based on the average exchange rate of the dollar presented in each year by the World Bank for the local currencies.

For the DEA model two outputs were chosen: total revenue - from exports and innovative products - for output 1 and the sum of indicators of investment in fixed capital and investment in research and development activities for output 2. Input variables are material costs (input 1), energy costs (input 2), and labor (input 3).

Results

This section of the article presents the results of the calculations. Firstly, the entire manufacturing sector is presented, then companies that realized revenue from exports, and lastly companies that recorded revenue from innovative production. For each sample of firms, we assess the DEA analysis scoreboard, where we present the number of efficient companies, the overall national score and compare the average efficiency of the companies in the country. Afterwards, we monitor the barriers to entrepreneurship that efficient firms in LA identified as the most problematic. Finally, we observe the national average inefficiency of the companies on the inputs (materials, energy, and labor); instead of the average financial inefficiency of the companies, we present the relative inefficiency. It reflects the share of financial inefficiency against average costs (on material, energy, labor) in the country.

In 2006 only one company out of 15 efficient companies was foreign, which was much less than we expected. The company is located in Argentina and has more than 4000 employees. Of these 15 companies, only 2 have more than 250 employees, others were small or medium-sized enterprises (SME). Most companies come from sectors 1 and 8 (food and beverage production and other). In 2010, the situation is slightly different, eleven companies were SMEs and ten enterprises were large (250+). Again, there was only one foreign-owned company. Most firms were from sectors 15, 2 and 18 (food and beverage production, other and clothing).

The results between years are not directly comparable; however, there is no improvement seen in the average efficiency apart from Panama and Paraguay. In 2010, the results must be interpreted with caution, because in Panama, Ecuador and Bolivia the number of observations was sharply reduced. In 2006, the top countries in the region were Argentina, Chile, Colombia, Mexico and Peru (in this order). In 2010, it was Mexico, Argentina, Chile, Peru and Colombia (in this order). The only change was in order of rank. These countries are also leaders in the manufacturing industry. If we look at the average efficiency, in relative terms, in 2006, the best were Mexico and Chile. In 2010, a relative comparison shows Panama, Bolivia and Argentina at the top, if we consider only representatively delegated countries.

Table 2: Companies in 2006 and 2010, manufacture industry

Country	Efficient companies		Companies Total		Overall score		Average efficiency	
	06	10	06	10	06	10	06	10
Mexico	1	4	147	690	6.8	39.91	0.05	0.06
Chile	2	2	274	475	12.2	25.95	0.04	0.05
Paraguay	2	1	86	75	3.5	3.14	0.04	0.04
Panama	1	1	88	9	3.5	2.16	0.04	0.24
Guatemala	2	2	181	155	6.6	7.26	0.04	0.05
Argentina	1	2	356	455	12.7	30.06	0.04	0.07
Peru	1	2	212	476	6.8	24.26	0.03	0.05
Ecuador	0	0	199	79	6.0	4.94	0.03	0.06
Columbia	3	3	399	462	11.0	22.83	0.03	0.05
Bolivia	2	1	176	29	4.8	2.97	0.03	0.10
Uruguay	0	3	126	162	2.7	8.20	0.02	0.05
Total	15	21	2244	3067	76.67	171.68	0.034	0.06

Data: own calculations through the DEA analysis according to Enterprise Surveys, efficient Company has a score of 1 (100%)

In the overall score, the absolute leaders were Argentina, Chile, Colombia, Mexico and Peru, which is likely caused by the size of their economies and their economic growth. Between 2006 and 2010, Argentina and Peru lead with economic growth of 9.13% and 8.45% (in this order). Economic growth in Colombia in 2006 reached 6.69% and, in 2010, due to the international economic crisis, growth fell to 3.97%, like Mexico and Chile. Other factors that had an impact on the economic growth of the countries was the economic stability of these countries and the number of companies in each country. Ecuador and Bolivia were not left as far behind as we expected, and because of reforms and political and economic stability, they experienced high economic growth.

Table 3: The main obstacles among efficient firms in manufacture industry

Barriers to business	in 2006	Barriers to business	in 2010
Corruption	2.60	Corruption	2.35
Access to electricity	2.53	Informal sector	2.20
Informal sector	2.47	Labor regulation	2.20
Political instability	2.00	Tax administration	2.19
Criminality	1.80	Political instability	2.19

Data: own calculations based on Enterprise Surveys Data. Obstacles are rated from grade 1 - low impact on business, up to 4 - high impact. The obstacles in 2006 were: tax rate, unskilled labor, tax administration, access to finance, the functioning of the courts, transport, business regulation, labor regulation, access to land, business licenses. The obstacles in 2010 were: unskilled labor, tax rate, transport, functioning of the courts, access to electricity, business licenses, access to land, telecommunications, access to finance, criminality and trade regulation.

A big problem in the region is the corruption, which is ranked first in both years, and efficient firms perceive it as the biggest obstacle to business. In this analysis, we have identified only a small decline in the perception of significance of corruption, but fighting corruption is problematic. Paraguay, Panama, Guatemala and Bolivia are on the lower rungs of the world ranking of the Corruption Perceptions Index (150, 102, 123, 106, in this order). They are countries with fewer companies.

Access to electricity and, in some countries, the subsidization of electricity prices could mean both advantages and disadvantages for the company. In terms of political stability, there is a broad consensus in assessing the results as a reward for policies of economic stability and public account control, which the economic policies of major economies in Latin America defined in the last 20 years.

However, with the recovery of the world economy, other factors have grown in importance, such as the international integration of the countries, or the results of the integration of policies strengthening domestic market and combating poverty and inequality, which greatly expanded the middle class in these regions.

Especially significant is the improvement of the situation of countries whose economic situation has worsened severely in 2009, as Mexico, which recovered from a deep economic decline (-6.1%) in 2009 to a 3% growth this year. Paraguay recorded the largest growth; after the economic downturn in 2009 (-3.8%), they grew to 9.7% in 2010. The growth of other economies in Mercosur is also significant; Uruguay (9%) and Argentina (8.4%). This data suggests that a slightly negative impact of the crisis on the extension of poverty (33% of the population in 2008 to 34.1% in 2009) could actually represent an improvement on the biggest socio-economic problem in the Latin American region.

Criminality in Latin America has had a negative impact on the quality of life and represents a large obstacle. One of major causes of crime is the increasing number of poor and a high unemployment rate, which, according to the International Labour Organization (ILO), averaged 11%. A big problem for workers in Latin America is undeclared work; according to the ILO, at least 130 million people are working illegally in the region.

In 2010 there were more large enterprises among efficient companies, which are more resistant to economic fluctuations. The newly perceived factor that prevents business is labor regulation. This may be related to the onset of the crisis and the inability to cut wages and dismiss workers.

Looking at the results of input inefficiency, the biggest problems in 2006 were costs of materials and labor. In 2010, the costs of materials were not as high as the costs of energy and labor, which play a crucial role in determining efficiency. Soaring prices of raw materials had been signs of a global economic boom from 2003 to mid-2008. According to the results of 2010, in order to streamline production, we would have to reduce material costs by 19.5%, reduce energy costs by a whopping 61. 2 % and labor costs by 39.7 %. The low energy costs in Bolivia needed to achieve efficient production were caused by subsidizing electricity prices.

The average values of countries efficiency can be again compared in time only indirectly i.e., in the order they were ranked. On the one hand, there is the effect of inflation and on the other a different baseline and total number of companies in the different years. Paraguay, Uruguay, Mexico, Guatemala, Colombia and Bolivia experienced above-average material costs in 2006 and in 2010 it was Paraguay, Peru, Mexico, Panama, Guatemala, Colombia and Bolivia (in this order). Panama, Uruguay, Colombia and Bolivia had exceptionally high energy costs in 2006 and Panama, Guatemala and Chile (in this order) had the same issue in 2010. Chile, Panama and Guatemala had exceptionally high costs of labor in 2006 with Paraguay, Ecuador, Bolivia and Argentina (in this order) experiencing the same in 2010.

Exporting companies in the manufacturing sector

Table 4: Exporters in 2006 and 2010, manufacturing industry

Country	Efficient exporters		Exporters total		Overall score		Average efficiency	
	2006	2010	2006	2010	2006	2010	2006	2010
Paraguay	5	1	30	25	7.5	2.5	24.9%	10.05%
Mexico	2	8	35	293	7.1	29.0	20.3%	9.90%
Bolivia	2	1	43	12	8.4	2.9	19.6%	23.80%
Peru	5	3	114	250	21.7	26.7	19.1%	10.67%
Uruguay	2	1	64	83	10.2	6.8	15.9%	8.16%
Argentina	7	4	204	279	31.5	34.2	15.4%	12.26%
Chile	4	5	87	189	13.0	22.0	15.0%	11.62%
Ecuador	1	0	63	31	9.1	3.5	14.4%	11.43%
Guatemala	3	1	84	88	10.9	4.7	13.0%	5.37%
Panama	0	1	20	2	2.4	1.1	11.8%	55.16%
Colombia	2	3	147	239	16.2	18.1	11.0%	7.59%
Total	33	28	891	1491	12.5	13.8	15.5%	15.1%

Data: own calculations based on Enterprise Surveys Data.

In 2006, there were 13 companies in the small and medium sized category (up to 250 employees, SME enterprises) and 5 large companies. In 2010, the situation is reversed; 14 of the analyzed firms were large and 6 were small and medium sized enterprises. It points at the possible impact of the recession, where larger companies tend to have the ability to survive in the global market and small businesses seek other opportunities or disappear. Four out of eighteen (22%) firms were foreign in 2006 and 8 out of 20 (40%) in 2010, almost double. Possible explanations include being easily identifiable for foreign investors, or

they are part of global value chains. In 2006, efficient companies were in the food sector, the chemical industry and in category other. In 2010, we see a similar situation, replacing the other sector with the clothing sector.

The overall most efficient exporters in 2006 were Argentina, Peru, Chile, Colombia and Guatemala. In 2010, it was Argentina, Peru, Chile, Mexico and Colombia. Relatively, in 2006 Paraguay, Bolivia and Uruguay were also doing very well. In 2010, it is Ecuador from the representatively delegated countries

Table 5: TOP 5 barriers to business among efficient exporters

Barriers to business	in 2006	Barriers to business	In 2010
Political instability	2.36	Tax rates	2.20
Corruption	2.31	Unskilled labor	1.65
Unskilled labor	2.13	Transport	1.60
Electricity	1.97	Electricity	1.58
Tax rates	1.85	Political instability	1.55

Source: own calculations based on Enterprise Survey data, obstacles are rated from 1 (low impact on business) to 4 (high impact). Furthermore, in 2006 we identify these obstacles: tax administration, the informal sector, criminality, labor regulation, functioning of the courts, business regulation, access to finance, business licenses, access to transport and land. In 2010, we identify these obstacles: tax administration, corruption, telecommunication, labor regulation, trade regulation, functioning of the courts, business licenses, the informal sector, criminality, access to land and access to finance.

Innovators in the manufacturing sector

Table 6: Results of DEA analysis – efficient innovators in 2010

Country	Efficient innovators	Innovators total	Overall score	Average efficiency
Panama	1	2	1.48	73.86%
Bolivia	1	22	2.76	12.56%
Ecuador	0	50	3.18	6.36%
Argentina	5	365	22.63	6.20%
Colombia	6	311	17.38	5.59%
Chile	3	300	16.10	5.37%
Mexico	3	394	20.82	5.28%
Guatemala	2	110	4.98	4.52%
Paraguay	0	54	2.37	4.38%
Peru	1	343	14.35	4.18%
Uruguay	1	116	3.96	3.41%
Summary	23	2067	10.00	5.32%

Source: own calculations based on WB Enterprise Survey data, an efficient company scored 1 (100%). The indicator is based on the results of a DEA oriented on outputs (revenues from innovative production, R & D and investments), i.e. BBC model with variable returns to scale. Among efficient companies in the 11 monitored Latin American countries there are 7 foreign companies and 10 direct exporters.

Most efficient innovators were in the food sector, the sector other, metal processing and manufacturing of machinery and equipment. In 2010 there were 10 small and medium-sized enterprises and 13 large enterprises (250+ employees). The case of Panama should be interpreted with caution, because with a low number of observations bias occurs. The cases of Bolivia, Ecuador and Paraguay should also be approached more carefully, there are a sufficient number of companies, but still a relatively small number of observations compared to other countries.

Why are Argentina, Colombia, Chile and Mexico efficient innovators (both relative and absolute) in the region? Why is that Panama, Ecuador and Bolivia are doing well? Do they therefore also belong to the group of innovators? Efficient innovators perceive the most problems in recruitment, with lack of labor qualification and regulation of labor law as the biggest issues.

Table 7: TOP 5 barriers to business among the efficient innovators

Barriers to business	Average score
Tax rate	2,05
Labor qualification	1,86
Informal sector	1,82
Political instability	1,78
Tax administration	1,77

Data: own calculations based on Enterprise Surveys Data, obstacles are rated 1 (low impact on business) to 4 (high impact). Other obstacles are in the following areas: transport, corruption, labor regulation, access to land, access to finance, business regulations and licenses, criminality, court decisions, access to electricity and telecommunications.

Conclusions

The aim of our study was to identify barriers to business for Latin American companies in the period before the economic crisis, 2006, and in times of crisis/post-crisis, 2010, using the method of data envelopment analysis (DEA). The researched companies operate in 11 sub-sectors of the manufacturing industry across 11 countries in Latin America. Results found technical efficiency in manufacturing sector companies, and revealed inefficiencies in the transformation of material, labor and energy inputs to outputs in the form of sales and investments. Based on a comparison of 2006 and 2010, factors associated with the ability of companies to persevere in the market during the period of economic fluctuations were identified.

The main contributions of this study are the following: our first hypothesis was rejected: labor costs are not the most important factor of inefficiencies in the manufacturing industries in selected Latin American countries, as expected. Pursuant the model based on the use of DEA, it was found that the cost of energy has a significant impact on the relative efficiency of analyzed companies. The DEA method is a completely new element in evaluating the relative efficiency of large manufacturing sectors. Our results indicate that the business environment is mostly affected by these barriers to business: corruption, political instability and the informal sector, thus supporting our second hypothesis. However, when looking at exporters and innovators we must also include skilled labor and taxation as primary barriers to business.

This study has two important limitations which may lead future related work. The first is the availability of data that limits analysis; it is not possible to use other variables for other findings, such as the age of the existing enterprise systems or the number of employees in information technology or the number of researchers in the analyzed companies. Another limitation is the high heterogeneity of the sector in the manufacturing industry, the results of the analysis may be biased for countries with a relatively homogeneous industry structure.

Acknowledgment

This paper was created as part of the research project IGA at the University of Economics, Prague "Influence of growing middle class on selected development and developed regions", no. F2/47/2016. This paper is also the input of scientific work at the Department of management at the Institute of Technology and Business in Ceske Budejovice as part of the research IGA project “Applying HR management tools in corporate education and managerial decision-making in human resources management, strategic management and innovation”.

References

Andersson, M., Johansson, B., Karlsson, Ch. and Lööf, H. (2012), Innovation and Growth: From R&D Strategies of Innovating Firms to Economy-wide Technological Change. Oxford University Press, Oxford.

Banker, R. D., Charnes, A. and Cooper, W. W. (1984), ‘Some models for estimating technical and scale inefficiencies in data envelopment analysis,’ *Management science*, 30(9), 1078–1092.

Dlouhý, M., Jablonský, J., and Novosádová, I. (2007), ‘Využití analýzy obalu dat pro hodnocení efektivnosti českých nemocnic,’*Politická ekonomie*, 55(1), 60–71.

Dopfer, K. (2005) The Evolutionary Foundations of Economics, Cambridge University Press, Cambridge.

Dluhosova, D. and Zmeskal, Z. (2014), 'Company financial performance determination by applying the data envelopment analysis (DEA) method,' Proceedings of the 7th international scientific conference Managing and modelling of financial risks (MMFR), 8 - 9 September 2014, Ostrava, Czechia, 159–166.

Farrell, M. J. (1957) 'The measurement of productive efficiency,' *Journal of the Royal Statistical Society. Series A (General)*, 120(3), 253–290.

Gaytan, E. And Benita, F. (2014), 'The mining industry in Mexico: Performance patterns and determinants of efficiency,' *Lecturas de Economía*, (80), 103-131.

Gallardo, J. A., Rohde, G. A. and Rescala, C. (2011), 'Análisis de la eficiencia de las empresas lecheras de Corrientes,' *Tordesillas Revista de Investigación Multidisciplinar*, (2), 43–60.

Charnes, A., Cooper W. W. and Rhodes, E. (1978), 'Measuring the efficiency of decision making units,' *European Journal of Operational Research*, 2(6), 429–444.

Jablonský, J. (2004) 'Models for efficiency evaluation of decision making units,' *Politická ekonomie*, 52(2), 206–220.

Jablonský, J. and Dlouhý, M. (2004), Modely hodnocení efektivnosti produkčních jednotek, Professional Publishing, Praha.

Kotsemir, M.N. (2013), Measuring National Innovation Systems Efficiency – A Review of DEA Approach. [Online]. Social Science Research Network. [2017-10-10]. Available: https://papers.ssrn.com/sol3/Delivery.cfm/SSRN_ID2304735_code1767127.pdf?abstractid=2304735&mirid=1&type=2

Matamoros, C., Prieto, M., Mutis, H. E. and Pérez, J. F. (2011), 'Medición de la eficiencia de plantas hidroeléctricaslatinoamericanas mediante el método análisis envolvente de datos ycomparación de los resultados con los de frontera estocástica,' Proceedings of Actas de XXI Simposio de Estadística, 19-23 July 2011, Bogota, Columbia, 1-12.

Miguel Benavente, J. (2006) 'The role of research and innovation in promoting productivity in Chile,' *Economics of Innovation and New Technology*, 15(4-5), 301–315.

Nelson, R. R. (1982) An Evolutionary Theory of Economic Change, Harvard University Press, Harvard.

Rodríguez Lozano, G. I. (2003) 'Medición de la eficiencia relativa en dos subsectores de la economía colombiana desde 1993 a 2002 utilizando data envelopment analysis (DEA),' *Innovar. Revista de ciencias administrativas y sociales*, (22), 121–144.

Santiago, C. V. S. and De Arellano, A. R. (2006), 'Análisis de eficiencia de institutos tecnológicos de España y Brasil: Una aplicación del análisis envolvente de datos (DEA),' *Journal of Technology Management & Innovation*, 1(4), 3–56.

Schuschny, A. R. (2007) El método DEA y su aplicación al estudio del sector energético y las emisiones de CO2 en América Latina y el Caribe. [online] CEPAL. [2017-10-10] Available: http://www.cepal.org/es/publicaciones/el-metodo-dea-y-su-aplicacion-al-estudio-del-sector-energetico-y-las-emisiones-de-co2

Silva, C. and Ramírez, A. (2006), 'Análisis de eficiencia de institutos tecnológicos de España y brasil: Una aplicación del análisis envolvente de datos (DEA),' *Journal of Technology Management and Innovation,* 1(4), 43-56.

Suárez, O. M., and Mejía, J. S. (2010), 'Estimación de la eficiencia técnica de las economías de los departamentos cafeteros de Colombia, por el método de programación lineal análisis envolvente de datos (DEA),' *Scientia et Technica*, 1(44), 348–353.

Urrego, D. E. G. (2011) Eficiencia de la industria del agua potable en Colombia: Una aproximación a partir del Análisis Envolvente de Datos con factores ambientales. [online] Universidad Autónoma de Barcelona. [2017-10-10] Available: https://www.yumpu.com/es/document/view/14837195/eficiencia-de-la-industria-del-agua-potable-en-colombia-una-

Van Beveren, I. (2012) 'Total Factor Productivity Estimation: A Practical Review,' *Journal of Economic Surveys*, 26(1), 98–128.

A Bird's-eye View of Services Industry's Self-Regulation

Dr. Junainah Mahdee, Faculty of Management, Multimedia University, 63100, Cyberjaya, Selangor, Malaysia. Email: junainah@mmu.edu.my

Normazalila Abu Bakar @ Harun, Muslimah Jaya Resources, Taman Puncak Jalil, 43300 Seri Kembangan, Selangor, Malaysia. Email: ila.trinega@gmail.com

Maznah Mohd. Taib, Muslimah Jaya Resources, Taman Puncak Jalil, 43300 Seri Kembangan, Selangor, Malaysia. Email: maznah8397@gmail.com.

Vincent Oh Kim Seng, Faculty of Management, Multimedia University, 63100, Cyberjaya, Selangor, Malaysia. Email: ksoh@mmu.edu.my

Dr. Bahma Sivasubramanian, Faculty of Management, Multimedia University, 63100, Cyberjaya, Selangor, Malaysia. Email: bahma@mmu.edu.my

Abstract

Services industries have become a major focus by Malaysian government in achieving the status of develop nation; with vast investment on the infrastructure, skilful manpower as highlighted in the Eleventh Malaysia Plan (2016-2020). This idea is supported by the Economic Transformation Programme focusses on 12 National Key Economic Areas (NKEAs) mainly from services industries such as financial services, wholesale and retail, business services, tourism, education and healthcare. Meanwhile, many laws have been established for creating best practices at every angle of the services industry; from upstream to downstream, as well as on consumer well-being, protection and benefits. This paper discusses the future direction of services industry; either to rely on having more laws or to impart self-regulation for keeping the freedom and give way to the natural self-control and common sense to perform; voluntarily by both the services' providers and consumers. The discussion also highlights some important issues and challenges related to unethical aspects and consumer rights.

Keywords: Self-regulation, services industry, consumer protection, consumer rights

Introduction

Services sector is vital to the growth and development of Malaysian economy in pursuing to become a develop nation; in line with other countries such as USA and European Union; compared to manufacturing or other primary sectors. Under the Third Industrial Master Plan 2006-2010 (IMP3); the services is targeted to contribute significantly for Malaysia to become a regional centre for selected services (Malaysian Industrial Development Authority (MIDA), 2010; Public Bank Economic Review, 2008). Eight major services sub-sectors has been identified as the priority for future development inclusive of real estate, transport, energy, telecommunications, distributive trade, hotel and tourism, financial and health services (MIDA, 2010); with Billions of Malaysian Ringgit invested on improving the infrastructure, technology, system, manpower and other important facilities in supporting the development of the services industries.

This paper is to acknowledge the importance of imparting the self-regulation for both the consumers and industry players; to balance their rights and powers within the services industry growth. Self-regulation is vital due to the common problems that prolong arises in aspects of industry best practices and due diligence or misbehaviour; such as noncompliance to quality standards, unreasonable charges or overbilling, false advertising, intrusion of privacy, data protection issues, breach of contacts, environmental pollution, fraud, online scams, bribery and million other misconducts; that may distort the smooth growth of the services industry.

There is a need for every consumer to know and understand how to exercise their rights within the services industry to ensure satisfactory fulfilment of their needs and wants. Since the end of British Colonial rule in 1957, the Malaysia government gives priority on the consumers' welfare and protection as part of the national agenda (Fernandez, 2007). At the international level, the Non-Governmental (NGO) Consumers International consumers adopted eight rights as the charter that includes the right to safety, be informed, choose, be heard, satisfaction of basic needs, redress, consumer education and a healthy environment (www.consumersinternational.org); to recognise the Consumer Bill of Rights by President John F. Kennedy in March 15, 1962 that later been dated as the World Consumer Rights Day. In order to fulfil consumers' right, at the other end, the services providers must comply with relevant rules and regulations to ensure compliance to the industry standards requirements in offering best quality services to the consumers. This paper provides a bird's-eye view on the services industry's self-regulation; whereby instead of full reliance on creation of more laws, rules or regulations; both consumers and service industry players should take the first initiative in shaping up their behaviour for services industry best practices.

Definition of Self-Regulation

The Cambridge dictionary defines self-regulation as "*making certain yourself that you or your employees act according to the rules, rather than having this done by other people. Self-regulation is when a person or group governs or polices itself without outside assistance or influence*." It means that the regulation by a person or an organization is own behaviour without external control or monitoring from any parties.

Various authors have defined self-regulation from different perspectives. Carver & Scheier (2012) define self-regulation as *"the process of purposefully directing one's actions, thoughts, and feelings toward a goal"*. In the same vein, Baumeister & Vohs (2004) assert self-regulation as *"many processes by which the human psyche exercises control of its function, states, and inner processes. It is an important key to how the self is put together. Most broadly, it is essential for transforming the inner animal nature into a civilized human being"*.

In psychology, research consistently shows that self-regulation skill is necessary for reliable emotional well-being. *"Behaviourally, self-regulation is the ability to act in your long-term best interest, consistent with your deepest values. Violation of one's deepest values causes guilt, shame, and anxiety, which undermine well-being. Emotionally, self-regulation is the ability to calm yourself down when you're upset and cheer yourself up when you're down"* (Stosny, 2011).

For child development, self-regulation is *"the ability to monitor and control our own behaviour, emotions, or thoughts, altering them in accordance with the demands of the situation"* (Cook, 2009). It includes the abilities to inhibit first responses, to resist interference from irrelevant stimulation, and to persist on relevant tasks even when one do not enjoy them.

To summarise the definition of self-regulation, perhaps it is best to define as the process to maintain self-control within the accepted rules to achieve a goal. Hence, in the services industries self-regulation can be described as the situation whereby, individual consumers or service providers take the appropriate proactive actions in behaving positively for benefits of both, with or without the existence of laws. These includes offering best quality services that are not harmful to the consumers, jeopardize the environment and society as a whole.

Self-Regulation Practices

Self-Regulation practices have been witnessed in various countries and industries around the globe. Significant evidences are in healthcare, psychology, financial, education and others. For instance, Hagger *et. al* (2017) carry out a meta-analysis on a self-regulation model as a guide in coping procedures to manage illness threat, in particular to examine the inter-correlations among illness representation dimensions, coping strategies, and illness outcomes. Berkman (2016) attests that self-

regulation can be improved with training. However the author assures that researchers interested in self-regulation training can learn a great deal about the challenges on practical issues: generalizability, durability, and scalability.

Just like any other countries, Malaysia has also explored into self-regulation practices across types of services mainly healthcare, education and others. For example, Wong *et.al* (2016) carried out a study to investigate the illness perceptions of the Zika virus (ZIKV) infection using the framework of the Self-Regulation Model of Illness. This study reveals that the self-regulation can guide individual perceptions about illnesses, thus may influence self-care and preventive health behaviours. On another example, Ping *et.al.* (2014) conducted a research to analyse how the self-regulation is used to promote a better learning in vocabulary among Chinese English Foreign language (EFL) learners' studying at University of Malaya.

Although the self-regulation topic has been widely debated, but the fine detail is yet to be explored for better performance of the services industry. Currently, self-regulation models designed by researchers are customized accordance to type of services (Berkman, 2016; Ping *et.al*., 2015; Cook, 2009; Wong *et. al*., 2016); which indicates that there is an urgent need for a generic, consensus and integrated model.

Unethical Services' Providers

Looking into the services industry practices, the legal doctrines such as laws, rules and regulations are continuously amend to reduce and monitor industry misbehaviours. There are many cases that relates to non-ethical behaviour or non-compliance to industry standards, illegal business activities, frauds and others that seems to distort the possibility of self-regulation.

The John Doe VII v. Exxon Mobil Corporation is an example of a lawsuit filed in the United States, by 15 Indonesian villagers in an oil-rich province of Aceh, Indonesia; contended that their family members were brutally tortured between 1999-2001 by the Indonesian military as guards for the company's operation that leads to human rights violation (Stempel, 2011). This lawsuit shows the failure of the company in ensuring the safety of the manpower at the production level of its fuel supply to the market; that make it difficult for the self-regulation to exist due to non-compliance.

There are hundreds of cases of financial fraud that are under investigation or at various lawsuit in court that includes the "quick-rich-scheme", unrealistic investments, internet fraud and others that are under relevant legislations administered by Bank Negara Malaysia; that are charged under the Banking and Financial Institutions Act (BAFIA) 1989. For example: Section 15(1) for using the word "bank" or similar names without approval to cheat customers; Section 25(1) for receiving, taking or accepting deposits without valid licence; Section 27(A) for advertisement for illegal deposit taking; or under Money Changing Act 1998, Exchange Control Act 1953 and Anti-Money Laundering Act 2001 (AMLA) for handling currency exchanges improperly and money laundering activities without licences and permission by Bank Negara Malaysia (BNM website, INCSR, 2006).

Not only from the services providers' side, fraud also exist from the clients or bank customers. For example Hashim & Mahdzan (2014) found that the Malaysian bankers experience significant number of cases of fraud in Letter of Credit (LC) transactions; and it is very hard for banks to prove the falsified documents by the fraudulent that led to huge financial losses; and stricter banking procedures for the clients.

Based on these selected examples, it shows that at all level of services industry from production till it reaches the market; there are misconducts that lead to failure to comply with the relevant laws. This situation contradicts with the self-regulation concept which requires proactive and if possible, voluntarily practices by the consumers and industry players. From the broad perspectives, self-regulation models are not fixed property to a goal. Rather it can be improved in the behavioural

aspects via training, education, and other diverse range of theoretical constructs. Therefore, to reduce the misconducts and shape-up the right behaviour; one needs to develop self-regulation practices over time.

Consumers' Rights within Services Providers Powers to Self-Regulate

The Malaysia National Consumer Policy; that was launched in focuses on protecting the consumers' rights, handlings of the consumers' issues, setting up of the consumers' tribunals to handle consumers' disputes on their rights, educate the society on the consumerism aspects and many others under the Consumer Master Plan.

The doctrinal aspects in shaping services industry ethical and satisfactory behaviour include the various legal acts, rules and regulations that are imposed to balance the services providers and consumers power in exercising their rights. In Malaysia for example, the services providers must comply with company's legal registration at the Registrar of Business (ROB) to ensure that any business activities are legally registered in order to monitor good business practices, to avoid any illegal activities and to protect consumers from companies' misbehaviour. The Trade Act 1972 protects consumers in aspects of unhealthy business practices and trades inclusive the product quality, complete information, forgery goods, that is currently has been extended to and Halal aspects of goods and services (Malaysia Trade Act 1971, amendment 1975, 2011) to ensure the *Syariah* compliance in business practices as the priority in becoming the global Halal hub nation,

Specifically to protect consumers, the Consumer Protection Act 1999 (CPA) becomes into effect on 1st. October 1999 to protect consumers' right from overcharged, faulty or harmful products, false or misleading advertisement; that covers both the traditional and online transactions. Malaysia Communications and Multimedia Act 1998 (CMA) enacted to provide for and regulate the converging telecommunication and multimedia services providers for any incidental matters in aspects of licensing, operations, services performance and ethical behaviour via rules, regulation and codes of conducts; either mandatory or voluntarily self-regulate practices.

Price control act 1946 that has amended to the Price Control and Anti-Profiteering Act 2011; to protect consumers from ridiculous pricing, price hike during festive seasons or during shortage of supplies. Besides the Control of Supplies Act 1961 allows government to ensure that the manufactures and services providers manage the supplies at the appropriate market demand and avoid illegal hidden stockpiles during shortage.

In situation where legal consumer protection is a very young concept but it is highly needed; consumers are considered to be the weaker party as compared to the service providers (Ruhl, 2011). Services providers must alert that to impart self-regulation in the industry, it is important to understand the consumers' rights; whether or not the relevant law, rules or regulations are available.

What's Next for Self-Regulation?

To manage consumers' grievance and disputes with manufacturers or services providers, various consumer complaint platforms are made available under relevant acts. Those includes The Tribunal for Consumer Claims 1999, The Small Claims Court 1987, The Tribunal for Homebuyers Disputes (extended to Strata Management in 2013), The Ombudsman Scheme for Banking and Insurance 2015, Communications and Multimedia and Consumers Forum (CFM), Communications and Multimedia Content Forum (CFCM), National Consumer Complaint Centre (NCCC) and many other complaints centres set-up by government ministries, Non-government Organisations (NGOs) or by the private companies. Each and every platform is created to serve different type of services empowered under law with specific judicial power; hence the effectiveness of those complaints platforms can be explored for further improvements; as to how it could enhance self-regulation within the industry players and consumers. This is due to the fact that, there is a trade-off between

self-regulation and government laws; whereby since the regulatory acts are incomplete in nature, the benefits to the social welfare changes depends on the ability of the producers to adapt to the rules and regulations while transiting their efforts to self-regulations (Grajzl & Murell, 2007).

Conclusion

This bird's-eye view paper highlights few important issues of self-regulation in the services industry; especially in Malaysia with high reliance on developing services as a major industry in the rapid economic growth. It is time for more research to explore the significance of "many laws versus self-regulation", which is more voluntarily in nature. Finally, if self-regulation is to be at the forefront, what would be the appropriate self-regulation model proposed for the service industry in Malaysia; either to maintain the existing separate model for different type of service, or to have a generic, consensus and integrated self-regulation model?

References

Bank Negara Malaysia website (www.fraudalert.bnm.gov.my)

Baumeister, R. F., & Vohs, K. D. (Eds.). (2004). Handbook of Self-Regulation: Research, Theory, and Applications. New York: Guilford Press.

Berkman, E. T. (2016). Self-Regulation Training. *Handbook of Self-Regulation: Research, Theory and Applications. New York: Guildford.*

Carver, C.S. and Scheier, M.F. (2012), Attention and Self-Regulation: A Control-theory Approach to Human Behaviour. *Springer Science and Business Media.*

Consumers International - www.consumersinternational,org: Retrieved 30th. September 2017.

Cook, J.L.(2009) Child Development: Principles and Perspectives. Pearson Allyn Bacon Prentice Hall.

Eleventh Malaysia Plan (2016-2020)

Fernandez, J.M. (2007), Protecting Consumers, *The Sun*, Retrieved at the Malaysian Bar website - www.malaysianbar.org.my.

Grajzl, P. and Murrell, P. (2007), Allocating Law Making Powers: Self-Regulation vs Government Regulation, *Journal of Comparative Economics*, (35) 520-545.

Hagger, M. S., Koch, S., Chatzisarantis, N. L. D., & Orbell, S. (2017). The Common Sense Model of Self-Regulation: Meta-Analysis and Test of a Process Model.

Hashim, R.C. and Mahdzan, N.S. (2014), Fraud in Letter of Credit Transactions: The Experience of Malaysian Bankers, *International Journal of Law, Crime and Justice,* (42) 224-236.

INCSR (2006), Money Laundering and Financial Crimes, INCSR Volume II, 263-266.

Malaysia Trade Act 1971, amendment 1975 and 2011.

Malaysian Industrial Development Authority (2010), The Third Industrial Master Plan 2006-2010 (IMP3).

Ping, A. M., Baranovich, D. L., Manueli, M. K., & Siraj, S. (2015). Promoting Self-Regulation in Vocabulary Learning among Chinese EFL learners: A Needs Analysis. *The Asia-Pacific Education*

Researcher, *24*(1), 137-146.

Public Bank Economic Review (2008), October Issue.

Ruhl, G. (2011), Consumer Protection in the Choice of Law, *Cornell International Law Journal*, Volume 44, 569-601.

Stempel, J. (2011), Indonesian Torture Case vs. Exxon Mobil Corporation, Reuters, July 9, 2011 : Retrieved at www.reuters.com/article/us-exxonmobil-indonesia/indonesia-torture-case-vs-exxon-mobil-revived-idUSTRE7676I120110708w

Steven Stosny, Ph.D., (2011), Self-Regulation – to Feel Better Focus on What is Important in Psychology Today.

Wong, L. P., Alias, H., Aghamohammadi, N., Sam, I., & AbuBakar, S. (2016). The Self-Regulation Model of Illness: Comparison between Zika and Dengue and Its Application to Predict Mosquito Prevention Behaviours in Malaysia, a Dengue-Endemic Country. *International Journal of Environmental Research and Public Health*, *13*(12), 1210.

Determinants of Students' Perceived E-Learning Satisfaction

Ajitha Angusamy[1],
Faculty of Business,Multimedia University,Melaka Campus,
ajitha.angusamy@mmu.edu.my

Jayanty Kuppusamy[2]*,
Faculty of Business,Multimedia University,Melaka Campus
jayanty.kuppusamy@mmu.edu.my
*Corresponding author

R.N. Anantharaman[3]
Faculty of Business,Multimedia University,Melaka Campus
r.n.anantharaman@mmu.edu.my

Tee Shea Ching[4]
Faculty of Business,Multimedia University,Melaka Campus
chingTS_7@hotmail.com

Abstract

E-learning is a learning system that makes use of electronic technology. It enables people to access a course, program, or degree through online anywhere and at any time. The main aim of this study is to examine the factors influencing students' perceived e-learning satisfaction and to determine the relationship between the factors and students' perceived e-learning satisfaction among tertiary level students in Malaysia. The independent variables in this study are gender, perceived usefulness, e-learning self-efficacy, perceived ease of use and the attitude of students while the dependent variable is students' perceived e-learning satisfaction. 200 university students were selected as sample of the study. Independent samples t-test was used to test if there is significant difference in the students' perceived e-learning satisfaction with respect to gender. The results showed that there is a significant difference in the students' perceived e-learning satisfaction between male and female. Multiple regression analysis results showed that the factors influencing students' perceived e-learning satisfaction are. perceived usefulness, e-learning self-efficacy, attitude of students.

Keywords: perceived usefulness, e-learning self-efficacy, perceived ease of use, attitude students, e-learning satisfaction

Introduction

In this new era of technology, the improvement in Internet and information technology have not only changed the way of life but also changed the way of learning. As long as people are willing to learn, they can gain knowledge regardless of the place and time. E-learning makes use of electronic technology in enabling people to access a course, program, or degree through online anywhere and at any time. Many education or training institutes and organizations have put in a lot of effort and resources to create the e-learning course for everyone (Lee, 2010). Similarly in Malaysia due to the technology development, computer usage has positively influenced and adopted into learning in Malaysia's tertiary educational institutions (Kamarulzaman *et.al.,* 2011). Some higher educational institutions have begun make use of e-learning as an instrument to increase the learning among students. (Kamarulzaman *et.al.*, 2011). Most of the tertiary education institutions in Malaysia adopting the e-learning system as an instrument to put assignment, documents and study materials online. However, Kamarulzaman *et.al.*, (2011), the acceptance of e-learning system is unclear among the students in tertiary education institutions. In addition, the intention and acceptance of e-learning among tertiary education institutions and students is still low in Malaysia compared to Western countries. According to Lee (2010), in order to achieve the successful of e-learning, it must attract the

users to continue using it. Therefore, it is essential to know the factors that influence users' intention to continue using e-learning system. The main aim of this research is to examine the factors influencing students' perceived e-learning satisfaction and to determine the relationship between the factors and students' perceived e-learning satisfaction among tertiary education students in Malaysia.

Literature Review

Learner satisfaction is the key factor when evaluating a learning program (Moore & Kearsley, 1996; Yukselturk & Yildirim, 2008). In the case of e-learning, students' satisfaction is defined as the perception of e-learning experience whether they are satisfied or dissatisfied as well as the perceived value of an online course (Kuo *et al*., 2013). Cheok and Wong (2015), point out that when learners are involved in e-learning program, they will either have satisfied experience or dissatisfied experience towards the e-learning program. The students' satisfaction need to be taken into consideration when assessing the usefulness of e-leaning since e-learning satisfaction acts an vital part in e-learning learning system (Zhu, 2012). According to Ong and Lai (2006), gender difference is a key element in e-learning, so there is a need to identify the gender difference in e-learning. This is supported by Gonzalez *et al.,* (2012) where it is stipulated that in the e-learning context, gender differences is one of the factor that need to be considered. Schodt (2002) found that there is a relationship between gender differences and learning. Furthermore, according to Cuadrado-Garcia *et al*., (2010), discovered that gender differences and satisfaction towards e-learning program are related.

In using a particular system when an individual is able to save a lot of effort, it signifies perceived ease of use (Davis, 1989). In addition, perceived ease of use occurs when an individual has trust that by using a particular system, the task can be completed free from effort (Dorobat, 2014). Malik (2009) pointed out that the interface of e-learning system will influence the students' satisfaction on e-learning. According to Cheok and Wong (2015), perceived ease of use is a way to predict the satisfaction. If the users feel that the system is easy to operate, it will positively influence their attitude, so it will increase the users' satisfaction and their willingness to continue using the particular system (Bourgonjon *et al*., 2012). Cheok and Wong (2015) opined that perceived usefulness refers to the enhancement of result after using a particular system. Besides that, perceived usefulness also means that by using particular system, the job performance or task performance of an individual is increased (Dorobat, 2014). According to Malik (2009), perceived usefulness is one of the factor that influenced the adoption of e-learning among students. Furthermore, previous studies also show that there is a relationship between perceived usefulness and satisfaction (Hsieh and Wang, 2007; Hong, *et al.,* 2006).

Attitude refers to an individual's beliefs and feelings on something (Cheok & Wong, 2015). According to Chyung (2007) there is a positive impact between user's attitude and user's satisfaction. Similarly, Malik (2009) found that students' attitude has a positive impact on students' perceived e-learning satisfaction. E-learning self-efficacy refers to "an individual confidence in searching for information and interacting with an instructor within the e-learning program and the required techniques for using the e-learning system" (Park, 2009). Besides that, it also refers to a user's belief in his or her ability to use e-learning (Sharma, Dick, & Land, 2007). According to Lim (2001), self-efficacy is a key factor of satisfaction while Chu and Chu (2010) supported the earlier study where found that there is a positive relationship between satisfaction and self-efficacy.

Methodology

The following research framework has been framed based on the literatures survey. The evidence has pointed out factors such as Gender, perceived ease of use, perceived usefulness, student's attitude and e-learning self-efficacy influence students' perceived e-learning satisfaction.

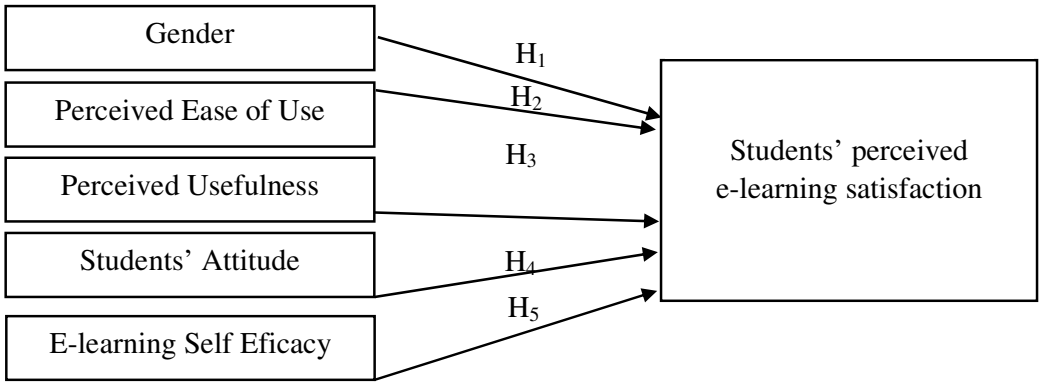


Figure 1

Based on the proposed framework the following hypotheses are formulated:

H_1: Students' perceived e-learning satisfaction differs significantly with respect to gender.

H_2: There is a significant relationship between perceived ease of use and perceived e-learning satisfaction.

H_3: There is a significant relationship between perceived usefulness and perceived e-learning satisfaction.

H_4: There is a significant relationship between students' attitude and perceived e-learning satisfaction.

H_5: There is a significant relationship between e-learning self-efficacy and perceived e-learning satisfaction.

The independent variables were measured by using following questionnaires: Perceived ease of use (Park, 2009; Ismail *et.al*., 2012), Perceived usefulness (Park, 2009; Ismail *et.al.,* 2012; Liaw 2008), Students' attitude (Park, 2009; Lee 2010), E-learning self efficacy (Park, 2009; Liaw 2008). The dependent variable Students' perceived E-learning satisfaction was measured based on (Liaw 2008; Ismail *et.al*., 2012) Purposive sampling method is used for data collection. The targeted population for this study is Malaysian universities students who currently or previously used e-learning. The age range of targeted population is from 18 to 30 years old. 200 questionnaires were distributed to the targeted population and collected.

Results and Discussion

The data collected were analysed using SPSS Version 23. The demographic profile of the 200 respondents participated in this study are summarized in Table 1. As the study aims to determine the effect of gender on e-learning satisfaction, the data was collected from 100 male and 100 female respondents. Most of the respondents' age is between 21 to 23 and the race is mainly Chinese. Out of the 200 respondents, 134 respondents are Chinese, followed by 34 Malay and 32 Indian respondents. It can also be inferred that most of the respondents are undertaking Degree programs which consists of 165 respondents (82.50%). All the respondents are using internet every day and most of the respondents spent around 1 to 4 hours per day on internet.

Demographic Profile (n=200)	***Frequency***	***Percent (%)***
Gender		
Male	100	50
Female	100	50
Age		
20 years old and below	36	18
21 to 23 years old	116	58
24 to 26 years old	48	24
Race		
Malay	34	17
Indian	32	16
Chinese	134	67
Education Background		
Foundation	7	3.5
Diploma	28	14
Degree	165	82.5
Internet Usage		
Daily	200	100
Average Hours Spent Online per Day		
Less than 1 hour	5	2.5
1 to 4 hours	92	46
5 to 8 hours	71	35.5
More than 8 hours	32	16

Reliability analysis was carried out for the items developed for the variables. The results of the reliability analysis in Table 2, shows a Cronbach Alpha of more than 0.70 for all the variables confirming the internal consistency of the items in each variable.

Table 2: Summary of Reliability Analysis Result

Level of Attributes	**Number of Items**	**Cronbach Alpha**
Perceived Ease of Use	4	0.741
Perceived Usefulness	6	0.829
Students' attitude	5	0.760
E-learning Self-efficacy	3	0.735
Students' perceived E-learning Satisfaction	5	0.825

Independent samples t-test was used to test if there are gender differences in the students' perceived e-learning satisfaction. The results of the Independent t-test presented in Table 3 shows that the perceived e-learning satisfaction differs significantly between male and female as the t-value is 3.512 significant at $p < 0.05$. Table 3 also shows that percieved e-learning satisfaction is found be more for male students when compared to that of female. The finding is supported by the study by Cuadrado *et al*. (2010), and Lu and Chiou (2010) who pointed out gender is one of the factors that impacts the satisfaction towards e-learning program Similarly, Ramirez *et al*., (2015) found that gender is an important element to consider while designing e-learning course. In the way of using computer and new technology, previous studies stated that male are more quick than females in knowing how to use it (Dorman, 1998 ; Kayany & Yelsma, 2000).

Table 3 : Independent samples t-Test

	Gender	***N***		***Mean***	***Standard Deviation***	***t-value***	***Sig-value***
Students' perceived e-learning satisfaction	Male	100		3.650	0.39632	3.512	0.001
	Female	100		3.428	0.49238		

Multiple Linear Regression Analysis was conducted to determine the relationship between the Students' perceived e-learning satisfaction and the independent variables namely, Perceived ease of use, Perceived usefulness, Students' attitude, E-learning self-efficacy. The results are summarized in Table 4.

Table 4: Multiple Linear Regression Analysis

Model Summary

Model	***R***	***R Square***	***Adjusted R Square***	***Std. Error of the Estimate***	***Durbin-Watson***
1	.880[a]	.775	.770	.22026	1.919

ANOVA

Model	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Regression	32.555	4	8.139	167.760	.000[b]
Residual	9.460	195	.049		
Total	42.016	199			

a. Dependent Variable: Students' perceived e-learning satisfaction
b. Predictors: (Constant), Perceived ease of use, Perceived usefulness, Students' attitude, E-learning self-efficacy

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	.426	.124		3.446	.001		
Perceived ease of use	.067	.047	.077	1.446	.150	.403	2.483
Perceived usefulness	.368	.060	.403	6.086	.000	.264	3.790
Students' attitude	.199	.058	.232	3.404	.001	.249	4.011
E-learning self-efficacy	.220	.044	.262	5.017	.000	.422	2.370

a. Dependent Variable: Students' perceived e-learning satisfaction

The results shows a R-square value of 0.775 , which indicates that 77.5% of the variation in the model can be explained by the variation in the independent variables. ANOVA table shows that the regression model is fit and significant at $p < 0.001$. Furthermore, for the autocorrelation, the Durbin-Watson value of the model is also within the range of 1.5 – 2.5, confirming that there is no autocorrelation. Coefficient table reveals that the variables viz, Perceived usefulness, Students' attitude and E-learning self-efficacy, makes a significant contribution to the model while Perceived ease of use is not significant at $p < 0.05$. The standardized Beta coefficient for perceived usefulness is the highest, indicating that it has the greatest impact on students' perceived e-learning satisfaction. The result showed that the perceived ease of use of e-learning does not affect the satisfaction towards e-learning which contradicts the previous finding by Malik (2009) that who found perceived ease of use was one of the factor that influenced the students to accept the e-learning program. This may be due to the e-learning system provided by the university is not user friendly to the students. Perceived usefulness plays an important role to influence the students' perceived e-learning satisfaction. The result obtained is consistent with previous researchers who reported that where perceived usefulness was found to have an immediate influence on satisfaction (Hsieh & Wang, 2007; Hong, Thong & Tam, 2006). In addition, perceived usefulness has a positive impact on users' willingness to use e-learning, especially when they feel that e-learning is advantageous for them, they will increase their willingness to use it (Cheok & Wong, 2015). This result in Table 4 indicated that students' attitude plays an important role to influence the student' perceived e-learning satisfaction. Based on previous studies, attitude of users is a vital element in e-learning learning process (Albirini, 2006; Arbaugh, 2002; Arbaugh & Duray, 2002). Previous researchers reported that the attitude of users will impact users' satisfaction of e-learning in a positive way(Malik , 2009; Chyung, 2007). The current research also points out e-learning self-efficacy is an important factor that influenced students' perceived e-learning satisfaction. The results are in line with the study by (Lim, 2001), which concludes that self-efficacy is a key factor of satisfaction in e-learning. Womble (2008) and Chu and Chu (2010) shown a positive relationship between e-learning users' satisfaction. and self-efficacy.

Conclusion

Today, the implementation of e-learning has increased rapidly and numerous educational institutions in Malaysia have adopted e-learning as a part of the learning system. The purpose of the research is to identify the factors influencing students' perceived e-learning satisfaction. The study revealed that perceived usefulness, students' attitude and e-learning self-efficacy are the factors influencing students' perceived e-learning satisfaction. This study can be helpful to the educational administrators, instructional designers, and instructors to make the e-learning become more attractive and effective. Instructional designers may put more effort to enhance and improve the e-learning effectiveness to increase the perceived usefulness of e-learning among students.

Instructors should have a good relationship with students in order to enable students to have positive attitude towards e-learning. Moreover, education administrators should provide sufficient facilities to support the e-learning system and instructors should educate the students the ways of using e-learning. These strategies can help to improve e-learning self-efficacy among students. Although perceived ease of use was not found to be a significant predictor in this study, however based on previous studies it should be considered in designing the e-learning system. This is because a system that is user friendly will be able to attract and satisfy the users. In designing the e-learning system the instructional designer should ensure that the system is user friendly. The study also found that there is a significant difference in the perceived e-learning satisfaction with respect to gender and female learners are found to be less satisfied. Thus in introducing and implementing an e-learning system there should be proper briefing and learning modules should be provided to all.

The study has some limitations which can be remedied in the future study. Firstly, the sample covers 100 respondents only. Secondly, the respondents of the study are undergraduate students. It is recommended in future study the sample size to be increased and respondents include postgraduate students as well.

References

Albirini, A. (2006), 'Teachers' attitudes toward information and communication technologies: The case of Syrian EFL teachers,' *Computers & Education, 47*(4), 373-398.

Arbaugh, JB (2002), 'Managing the on-line classroom: a study of technological and behavioral characteristics of web-based MBA courses,' *The Journal of High Technology Management Research, 13*(2), 203-223.

Arbaugh, JB and Duray, R. (2002), 'Technological and structural characteristics, student learning and satisfaction with web-based courses an exploratory study of two on-line MBA programs,' *Management Learning, 33*(3), 331-347.

Bourgonjon, J., Valcke, M., Soetaert, R., and Schellens, T. (2010), 'Students' perceptions about the use of video games in the classroom,' Computers and Education, 54(4), 1145–1156.

Cheok, ML., and Wong, SL. (2015), 'Predictors of E-Learning Satisfaction in Teaching and Learning for School Teachers : A Literature Review,' *International Journal of Instruction*, *8*(1), 75–90.

Chiu, CM., Sun, SY., Sun, PC., and Ju, TL. (2007), 'An empirical analysis of the antecedents of web-based learning continuance,' *Computers and Education*, *49*(4), 1224–1245.

Chu, RJ., and Chu, AZ. (2010), 'Multi-level analysis of peer support, Internet self-efficacy and e-learning outcomes: The contextual effects of collectivism and group potency,' *Computer & Education, 55*, 145-154.

Chyung, SY. (2007), 'Age and gender differences in online behavior, self-efficacy and academic performance,' *Quaterly Review of Distance Education, 8*(3), 213-222.

Cuadrado-Garcia, M., Ruiz-Molina, ME., and Montoro-Pons, J D. (2010), 'Are there gender differences in e-learning use and assessment? Evidence from an interuniversity online project in Europe,' *Procedia-Social and Behavioral Sciences*, *2*(2), 367-371.

Davis, FD. (1989), 'Perceived usefulness, perceived ease of use, and user acceptance of information technology,' *MIS Quarterly*, *13*(3), 319–340.

Dorobat, I. (2014), 'Models for Measuring E-Learning Success in Universities: A Literature Review,' *Informatica Economica*, *18*(3), 77–90.

Dorman, S.M. (1998), 'Technology and the gender gap,' *Journal of School Health*, *68*, 165-166.

Gonzalez-Gomez, F., Guardiola, J., Martin Rodriguez, O., and Montero Alonso, MA. (2012), 'Gender differences in e-learning satisfaction,' *Computers and Education*, *58*(1), 283–290.

Hong, S., Thong, JY., Tam, KY. (2006), 'Understanding continued information technology usage behavior: A comparison of three models in the context of mobile internet*,' Decision Support Systems, 42*(3), 1819-1834.

Hsieh, JPA., and Wang, W. (2007), 'Explaining employees' extended use of complex information systems,' *European Journal of Information Systems, 16*(3), 216-227.

Kamarulzaman, Y., Ghani, FA., and Madun, A. (2011), 'Attitude towards E-learning Among Students : Evidence from A Malaysian Public University,' *British Journal of Arts and Social Sciences*, *3*(2), 132–142.

Kayany, JM., and Yelsma,P. (2000), 'Displacement effects of online media in the sociotechnical contexts of households,' *Journal of Broadcasting &Electronic Media*, *44*, 215-229.

Kuo, Y.-C., Walker, AE., Belland, BR., and Schroder, KEE. (2013), 'A Predictive Study of Student Satisfaction in Online Education Programs,' *International Review of Research in Open and Distance Learning*, *14*, 16–39.

Lee, MC. (2010), 'Explaining and predicting users' continuance intention toward e-learning: An extension of the expectation-confirmation model,' *Computers and Education*, *54*(2), 506–516.

Lim, CK. (2001), 'Computer self-efficacy, academic self-concept, and other predictors of satisfaction and future participation of adult distance learners,' *American Journal of Distance Education, 15*(2), 41-51.

Malik, M. (2009), 'Student satisfaction towards e-learning: Influential role of key factors,' *Proceedings of the 2nd CBRC*. Lahore, Pakistan.

Moore, MG., and Kearsley, G. (1996) Distance education: A systems view. New York, NY: Wadsworth.

Ong, CS., and Lai, JY. (2006), 'Gender differences in perceptions and relationships among dominants of e-learning acceptance,' *Computers in Human Behavior*, *22*(5), 816–829.

Park, SY. (2009), 'An Analysis of the Technology Acceptance Model in Understanding University Students' Behavioral Intention to Use e-Learning,' *Educational Technology & Society*, *12*(3), 150–162.

Schodt, P. (2002), 'The relationship between organizational identification and Organizational culture: Employee perceptions of culture in a retail sales organization,' *Communication Studies*, *53*(2), 189.

Sharma, S., Dick, G., Chin, WW., and Land, L. (2007), 'Self-Regulation and E-Learning,' In *ECIS* , 383-394.

Womble, J. (2008), 'E-learning: The Relationship among Learner Satisfaction, Self-efficacy, and Usefulness,' *The Business Review*, *10*, 182-188.

Yukselturk, E and Yildirim, Z. (2008), 'Investigation of interaction, online support, course structure and flexibility as the contributing factors to students' satisfaction in an online certificate program,' *Educational Technology & Society,11*(4), 51-65.

Zhu, C. (2012), 'Student satisfaction, performance and knowledge construction in online collaborative learning*,' Educational Technology and Society*, *15*(1), 127-136.

Using Asymmetric Copulas in Risk Management

Mgr. Tomáš Jeřábek, MBA, Department of Finance, Faculty of Economic Studies, University of Finance and Administration, Estonská 500, 101 00 Praha 10, Czech Republic. jerabek@mail.vsfs.cz

Abstract

Risk measurement importance as well as the efficiency of risk management tools have increased dramatically over the last three decades, Value at Risk (VaR) is one of the most popular risk management approaches. Due to the ever-increasing amount of assets in the portfolios of both financial and non-financial institutions, there is an increasing need to use tools to describe multidimensional dependency structures. In this context, the use of the copula functions is increased in a direct proportion. The copulas are able to describe dependencies in normal market conditions as well as in the extreme events. The aim of the paper is to determine how the application of asymmetric classes copulas in the accuracy of modeling and forecasting equity risk.

Keywords: Value at Risk, Copula, Asymmetric Dependence, GARCH, Volatility

Introduction

Over the last three decades, both the importance of risk measurement and the efficiency of risk management tools have increased dramatically. One of the most popular approaches is Value at Risk (VaR). For a given portfolio, time horizon, and probability *p*, the VaR is defined as a threshold loss value, such that the probability that the loss on the portfolio over the given time horizon exceeds this value is p. Specifically, if a portfolio of stocks has a one-day 95% VaR of $1 million, that means that there is a 0.05 probability that the portfolio will fall in value by more than $1 million over a one-day period if there is no trading. Informally, a loss of $1 million or more on this portfolio is expected on 1 day out of 20 days (Yama and Yoshiba, 2005). The main users of VaR are financial institutions.

Financial assets yields show higher dependencies in crisis periods than in the growth phases of the business cycle, see Garcia and Tsafack (2011), Cerrato et al (2015) or Alexander (2008). Considering the presence of asymmetric dependence, Okimota (2008) is very important because it can cause serious problems in the case of securing and diversifying the portfolio. Therefore, the primary task of portfolio managers is to recognize the intensity of the change in the structure of dependencies in the portfolio under review. Due to the ever-increasing amount of assets in the portfolios of both financial and non-financial institutions, there is an increasing need to use tools to describe multidimensional dependency structures. In this context, there are used copulas, which are able to describe dependencies in normal market conditions as well as in the event of extreme events. Furthermore, with the help of dome, a flexible in-house approach can be developed to describe differently-defined addiction structures, namely to capture both negative and positive dependencies, as well as the ability to identify asymmetric dependencies as well as dependencies allocated in the tails of the respective divisions.

The aim of the paper is to determine how the application of asymmetric classes copulas in the accuracy of modeling and predicting equity risk. Specifically, we apply a combination of a dynamic GAS model with selected dome classes, focusing on the asymmetric versions of the Gaussian and Student Dome. In order to measure estimated equity risks, we consider the known Value at Risk (VaR) and Expected shortfall (ES) rates.

Methodology and data

This part introduces the used methodical apparatus together with the specification of the data sample. The models are based on the copula concept with the assumption of dependence asymmetry. In

practice it is assumed that assets' log returns are normally distributed. However, the general financial time series are leptokurtic, with heavy-tails which make VaR being underestimated for Gaussian distribution. To capture this feature of the data, the univariate generalized autoregressive conditional heteroskedastic (GARCH) family models are considered; see Bollerslev (1986) and Glosten et al (1993). The second element in the VaR is the dependence structure between financial assets in the portfolio. The Pearson correlation is not a good measure of dependency in connection with the extreme realizations occurrence. The copula provides a robust and flexible method of consistent estimation for dependence.

Standard models fail to take into account a noteworthy feature during financial crisis that asset returns often become more highly correlated. We use threshold correlations to test for the presence of this feature, see Ang and Chen (2002) with testing proposed by Hong et al (2007). Although threshold correlation offers some insights, it is still based on (linear) correlation. Therefore, it does not take into account the nonlinear information. We consider copula-based quantile dependence for capture nonlinear dependence, see Nelson (2006).

A copula is a function which links a multivariate distribution function to its one-dimensional marginal distribution functions. The approach was suggested by Sklar (1959). Copula function is a method that models the dependence among different random variables and it is useful in cases where marginal distributions are non-Gaussian.

An n-dimensional copula is a multivariate cumulative distribution function C of a random vector $U$with uniform distributed margins on interval [0,1], U_k, this is

$$C(u_1, \dots, u_n) = P(U_1 \leq u_1, \dots, U_n \leq u_n) \qquad (1)$$

Let $X = (X_1, X_2, \dots, X_n)$ be a random vector with simultaneous cumulative distribution function $F_{1,2,\dots,n}(x_1, \dots, x_n)$, where $F_1, F_2, \dots, F_n$ are continuous functions. Then there is a unique copula $C(u_1, \dots, u_n)$ such that

$$F_{1,2,\dots,n}(x_1, x_2, \dots, x_n) = C(F_1(x_1), F_2(x_2), \dots, F(x_n)) \qquad (2)$$

Now, differentiating (6) with respect to all variables, we obtain the density function $f_{1,2,\dots,n}$

$$f_{1,2}(x_1, x_2, \dots, x_n) = c(F_1(x_1), F_2(x_2), \dots, F(x_n)) f_1(x_1) f_2(x_2) \cdots f_n(x_n) \qquad (3)$$

where

$$c(u_1, u_2, \dots, u_n) = \frac{\partial^n C(u_1, u_2, \dots, u_n)}{\partial u_1 \partial u_2 \cdots \partial u_n} \qquad (4)$$

Three methods are commonly used to copula parameters estimation, namely maximal likelihood (ML) method, inferential functions for margins (IFM), both of which are described in detail by Joe and Xu (1996), and the canonical maximal likelihood (CML) proposed by Genes et al. (1995). In ML method, all parameters are estimated in one step, which can cause considerable computational difficulty, especially in case of larger problems. IFM and CML are among the so-called semiparametric methods. They divide the copula parameters estimation process into two steps - specifically, at the first the parameters of the marginal cumulative distribution functions are estimated, and in the second step, the copula parameters are estimated. In the CML method, the copula parameters estimations are based on empirical distribution functions, details of this method are reported by Patton (2012), Christoffersen et al. (2012) and Wei et al (2016). The CML method is used in this text.

We work with three data sets in our study. Each set includes the logarithmic earnings of the four stock indices, namely the Czech PX, the German DAX 30, the French CAC 40 and the US S&P 500. The first data set includes a time period from January 2, 2003 to December 28, 2007, and is marked as a pre- financial markets was up to the rising trend until the end of September. For each index, 1253 observations are present in each dataset. The second data set refers to the crisis period and includes a

time span from January 2, 2008 to June 29, 2012 containing 1130 observations. The last set of data refers to the post-crisis period from July 2, 2012 to August 31, 2016, which contains a total of 1042 values for each index. The Figure 1 below illustrates the relative price movements of each index. Initial level of each Index have been normalized to unity to facilitate the comparison of their relative performances.

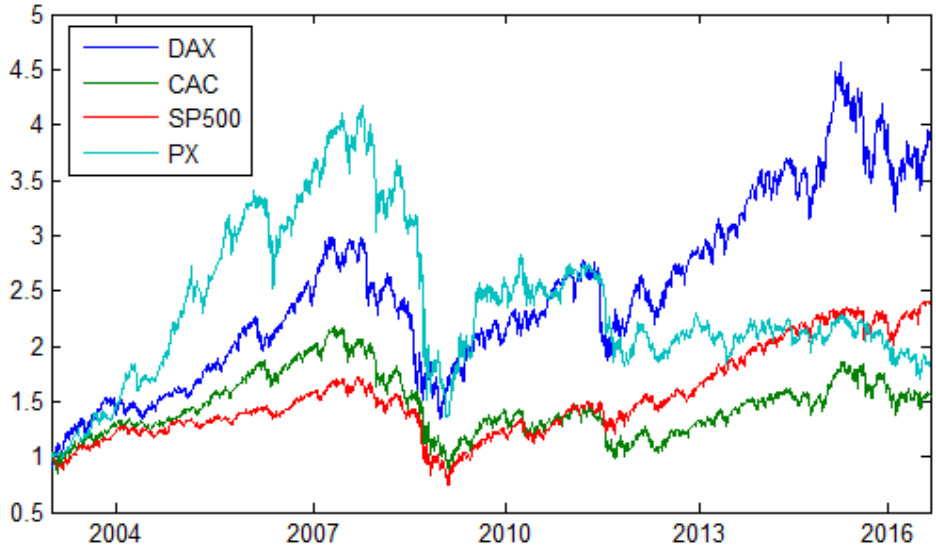


Figure 1: Relative price movements of each index

Empirical Research and Results

Table 1 exhibits main descriptive statistics on daily return distributions for our indices. Mean and median of returns are small and positive in before and after crisis and negative in during crisis. Skewness values are similar and nonzero over all periods and it could be indicate an asymmetry of distribution. Higher kurtosis, mainly during crisis, indicates the return distribution with a more acute peak around the mean (higher probability than a normal distribution of more returns clustered around the mean) and a greater chance of extremely large deviations from the expected return (fatter tails, more big surprises). It could be seen that there are low value of kurtosis after crisis – lower than before crisis.

Before proceeding to the margins and dependence structure modeling, we first verify some typical assumed properties of log returns, namely normality and identical and independent distribution properties. To check if the indices are normally distributed we use the normality Jarque-Bera test. The test rejects the null hypothesis (Values 1 in Table 1) of log returns normality. Performing a Portmanteau Q test of Ljung and Box to check whether the autocorrelations with different lags are zero, the test reject the null hypothesis, that log returns exhibits no autocorrelation at 30 lags with a 5% significance level. This suggests that a conditional mean model is needed for these log return series. Engle's ARCH test rejects the null hypothesis (Values 1 in Table 1) of no ARCH effects in favor of the alternative ARCH model with two lagged squared innovations.

We have seen that the log returns series are not independently and identically distributed. We solve this by fitting a first order autoregressive model (AR(1)) to the conditional mean of the log returns of each index and an asymmetric GARCH (GJR(1,1)) model to the conditional variance. The first order autoregressive model compensates for autocorrelation and the GJR model for heteroscedasticity.

Table 1: Summary Statistics of daily Log returns

	PX	DAX 30	CAC40	SP 500
Before crisis				
Mean	0.0011	0.0008	0.0005	0.0004
Median	0.0017	0.0012	0.0008	0.0008
Min	-0.0613	-0.0743	-0.0583	-0.0359
Max	0.0705	0.0576	0.0700	0.0348
St. dev.	0.0108	0.0114	0.0106	0.0083
Skewn	-0.6153	-0.3716	-0.0554	-0.1725
Kurtosis	4.5579	4.2408	3.9354	1.6871
Jarque-Bera	1	1	1	1
Q test	0	1	1	0
ARCH test	1	1	1	1
During crisis				
Mean	-0.0007	-0.0001	-0.0006	-0.0002
Median	-0.0006	0.0004	-0.0003	0.0008
Min	-0.1619	-0.0734	-0.0947	-0.0947
Max	0.1236	0.1080	0.1060	0.1096
St. dev.	0.0206	0.0181	0.0194	0.0181
Skewn	-0.3922	0.2029	0.2244	-0.2155
Kurtosis	9.7583	4.7479	4.6253	5.7461
Jarque-Bera	1	1	1	1
Q test	1	1	1	1
ARCH test	1	1	1	1
After crisis				
Mean	0.0000	0.0004	0.0003	0.0005
Median	0.0003	0.0011	0.0006	0.0004
Min	-0.0471	-0.0707	-0.0838	-0.0402
Max	0.0447	0.0485	0.0464	0.0383
St. dev.	0.0099	0.0122	0.0126	0.0082
Skewn	-0.2913	-0.3518	-0.3592	-0.3102
Kurtosis	1.6554	1.7657	2.6799	1.8671
Jarque-Bera	1	1	1	1
Q test	0	1	1	1
ARCH test	1	1	1	1

In order to obtain initial information about the possible existence of asymmetry in dependencies, the figure 1 presents point charts of all combinations of observed yields over different periods. For each of the charts, the threshold correlations are shown gradually in the lower tails, in the middle and in the upper tails of the individual empirical distributions. In case of a correlation of the yields related to the pre-crisis period, in all cases there is a very weak linear dependence and the difference of the monitored quanta, especially at the distances of the distribution, indicates the possible effect of the asymmetry of the yields. In the crisis period, a moderate to strong linear dependence is evident, for which, in most cases, there is a stronger dependence on the left tail of the distribution than on the right. As in the first data set, a very weak linear dependence along with possible asymmetry is evident in the post-crisis period. Thus, overall, observed asymmetries can be observed in the dependency structure across all observed periods, with the strongest correlations being related to the crisis period. Furthermore, the observed samples show a non-constant linear dependence over time. The above analysis related only to linear dependence, in order to verify the assumption of yield non-linearity, the relevant methods will be implemented in the next part of this text.

Now, we focus on a more detailed analysis of the asymmetry of dependencies. The threshold correlations of left and right empirical distributions tails is presented. Table 2 contains results of testing the statistical significance of asymmetries obtained from threshold correlations. It can be seen from the table that the statistically significant asymmetries were confirmed at the 10% level of significance in the pre-crisis period for four portfolios, namely all combinations with the PX index and the combination of the German and US indexes. In the crisis period, the asymmetry was confirmed only with combinations with the SP 500 index. The post-crisis period is for the monitored indices without statistically significant asymmetry.

Table 2: Testing the significance of the differences of threshold correlations

PX,DAX	PX,CAC	PX,SP500	DAX,SP500	CAC,SP500	CAC,DAX
Period I					
3,221	2,881	2,031	5,561	0,432	2,040
[0,07]	[0,09]	[0,08]	[0,02]	[0,51]	[0,15]
Period II					
0,257	0,140	5,011	0,020	2,586	1,380
[0,59]	[0,47]	[0,03]	[0,61]	[0,08]	[0,09]
Period III					
0,021	0,435	1,544	0,399	0,189	0,814
[0,59]	[0,51]	[0,21]	[0,53]	[0,66]	[0,37]

To obtain a coherent idea of the structure of dependencies between pairs of yield lines, a quantitative dependency rate is used that, in contrast to the threshold correlation, also takes into account the non-linearity of dependencies. The figure 2 confirms the assumption obtained by the threshold correlation, namely that the left-wing dependence is stronger than in the true tails of the empirical distributions common to the two monitored series - this fact is particularly evident in the crisis and the partial crisis period. Furthermore, the graphs in Figure 3 show higher dependency ratios than threshold correlation values. The differences between threshold correlation and quantitative dependence are probably due to non-linearity in the dependency structure. The identified facts represent very important information in terms of risk management. On the one hand, we can see that the portfolios made up of different combinations of stock indices are relatively highly diversified outside the crisis periods, but their relative dependence reaches high levels in times of decline in index performance.

We consider 4 elliptical copulas including Gaussian, Student, skewed Gaussian and skewed Student copulas as candidates to model the dependence between PX and DAX, PX and CAC, PX and SP500,

DAX and SP500, CAC and SP500, CAC and DAX. All the copula parameters are estimated by CML method. Table 3 shows the log-likelihood of each copula in constant case, we find that the skewed copulas provide the highest likelihoods over the in-sample period in most cases.

Table 3: Likelihood Ratio Test for Copulas

Copula	PX,DAX	PX,CAC	PX,SP500	DAX,SP500	CAC,SP500	CAC,DAX
Gaussian	52,23	49,11	61,12	89,21	81,33	70,12
Student	53,28	49,17	62,37	89,23	81,23	71,15
Skewed Gaussian	151,12	88,36	119,34	178,12	162,36	168,12
Skewed Student	153,69	89,26	121,11	181,23	163,23	171,26

The results show that dependencies in all cases are better explained by asymmetrical domes, while the application sloped to the Student's dome significantly exceeds all the remaining. Thus, the logarithmic reliability of estimates can be increased by skewed copula engaging.

Further, we evaluate the statistical significance of the asymmetric copula model by forecasting our portfolio VaR. In order to evaluate the quality of the estimates, the models should always be backtested with appropriate methods. Backtesting is a procedure where actual profits and losses are systematically compared to corresponding VaR estimates.We use the Kupiec test for examining whether the frequency of exceptions over some specified time interval is in line with the selected confidence level. The disadvantage of Kupiec test is its inability to determine whether failures are random, i.e. uncorrelated over time. This problem can be solved by applying Christoffersen conditional test, see Alexander (2008). Christoffersen test examines whether or not the likelihood of VaR violations depends on whether or not a VaR violation occurred on the previous day. It is important to recognize that the unconditional coverage and independence property of the hit sequence are separate and distinct and must both be satisfied by a correct VaR model. The test that jointly examines the both properties has been proposed by Christoffersen and it is usually called the mixed test; see Jorion (2001) for details.

We define the training sample consisting of 1000 observations for the backtesting purposes. The sample is used to estimate the Value at Risk model parameters. Then we use a rolling window approach. The estimation training sample is rolled over the entire data period. We keep the training sample length constant, starting at the beginning of the data set. The test sample begins at the end of the training sample. The result of this procedure are the VaR estimates series covering the sample from 1,201th to 2,750th. In this way, we get a total of 1,550 one-day and ten-day VaR out-of-sample forecasts. Table 4, 5 and 6 present the results for three two-actives portfolios Portfolio 1: SP500 and DAX, Portfolio 2: SP500 and CAC, Portfolio 3: SP500 and PX) and one-day as well as ten-day 99% VaR estimated by the copulas. We evaluate the statistical accuracy by the CC test. We calculate the statistic for each portfolio and test it at the 10%, 5% and 1% significance levels. Then we report the number of rejected portfolios. Table 4 reports the CC test results. The notation (A and R) in Tables means that the first test accept the null hypothesis that the model used for VaR estimation performs well on average, the second test rejects the null hypothesis and the last accept the null hypothesis. From the results we conclude that in general the skewed-Copula approaches outperforms the symmetric copula approaches as well as the commonly used Variance Covariance method and the Historical Simulation method.

Table 5: Backtesting CC test (SP and DAX)

	p-value					
Method	**0.9**	**Result**	**0.95**	**Result**	**0.99**	**Result**
Variance Covarinace	0.000	R	0.000	R	0.000	R
Historical simulation	0.000	R	0.000	R	0.004	R
Normal	0.000	R	0.000	R	0.115	A
Student	0.000	R	0.000	R	0.115	A
Skew Normal	0.003	R	0.455	A	0.364	A
Skew student	0.512	A	0.349	A	0.357	A

Table 6: Backtesting CC test (SP and CAC)

	p-value					
Method	**0.9**	**Result**	**0.95**	**Result**	**0.99**	**Result**
Variance Covarinace	0.000	R	0.000	R	0.000	R
Historical simulation	0.000	R	0.000	R	0.004	R
Normal	0.000	R	0.000	R	0.111	A
Student	0.000	R	0.000	R	0.111	A
Skew Normal	0.003	R	0.354	A	0.375	A
Skew student	0.512	A	0.249	A	0.278	A

Table 7: Backtesting CC test (SP and PX)

	p-value					
Method	**0.9**	**Result**	**0.95**	**Result**	**0.99**	**Result**
Variance Covarinace	0.000	R	0.000	R	0.000	R
Historical simulation	0.000	R	0.000	R	0.000	R
Normal	0.000	R	0.000	R	0.109	A
Student	0.001	R	0.045	A	0.109	A
Skew Normal	0.003	R	0.398	A	0.315	A
Skew student	0.512	A	0.249	A	0.278	A

Conclusion

An analysis of the dependence structure among selected European markets is conducted in this paper. The model is chosen to include important features of the financial data. Applying the concept of copula functions, we are able to model margins irrespective of the dependence structure. One-

dimensional modelling has been studied, and we choose one of the suitable models, namely the AR(1)-GJR-GARCH(1,1) model with a skewed Student distribution. The dependence structure of two-dimensional data is complex. We estimate a skewed model based on skewed copulas including asymmetric and fat-tailed copulas. We analyze indices CAC, DAX, SP500 and PX. Mean and median of their returns are small and positive in before and after crisis and negative in during crisis. Skewness values are similar and nonzero over all periods and it could be indicate an asymmetry of distribution. Higher kurtosis, mainly during crisis, indicates the return distribution with a more acute peak around the mean (higher probability than a normal distribution of more returns clustered around the mean) and a greater chance of extremely large deviations from the expected return (fatter tails, more big surprises). It could be seen that there are low value of kurtosis after crisis – lower than before crisis. The dependence structure has several important properties. All returns are positively correlated and the strongest correlation.

The paper provides empirical evidence that the dependence between indices is significantly asymmetric. In general, the skewed copula approach outperformed the Historical Simulation and Variance Covariance approaches as well as symmetric copula approaches. Future research could check the performance of the approach in high dimension, and also, one could use time-varying copulas instead of static asymmetric copula for modelling the dependence structure.

Acknowledgment

Author acknowledges the support of Research project IGA No. 7427/2017/05 VŠFS Prague „Nové možnosti a přístupy pro měření a řízení tržních rizik" (New opportunities and approaches for measuring and managing of market risks) funded by the institutional support of research organization University of Finance and Administration, Prague.

References

Alexander, C. (2008). Market Risk Analysis, Volume II, Practical Financial Econometrics. New York: John Wiley & Sons Ltd.

Ang, A., and J. Chen. (2002). Asymmetric Correlations of Equity Portfolios. Journal of Financial Economics 63:443–94.

Blasques F, Koopman SJ, Lucas A (2014). "Stationarity and Ergodicity of Univariate Generalized Autoregressive Score Processes." Electronic Journal of Statistics, 8(1), 1088–1112.

F. Blasques, J. Ji, A. Lucas (2016). Semiparametric score driven volatility models Computational Statistics and Data Analysis pp. 58 - 69

Cerrato, M., Crosby, J., Kim, M., Zhao, Y. (2015). Modeling Dependence Structure and Forecasting Market Risk with Dynamic Asymmetric Copula. *Social Science Research Network*.

Christoffersen, P., & Langlois, H. (2013). The joint dynamics of equity market factors. Journal of Financial and Quantitative Analysis, 48(5), 1371-1404.

Creal, D., Koopman, S. J., & Lucas, A. (2013). Generalized autoregressive score models with applications. Journal of Applied Econometrics, 28(5), 777-795.

Czado, C. Schepsmeie, U. & Min, A. (2012). Maximum likelihood estimation of mixed c-vines with application to exchange rates. Statistical Modelling, 12(3), 229–255.

Engle, R. (2002). Dynamic conditional correlation: A simple class of multivariate generalized autoregressive conditional heteroskedasticity models. Journal of Business & Economic Statistics, 20(3), 339-350.

Garcia, R., Tsafack, G. (2011). Dependence Structure and Extreme Comovements in International Equity and Bond Markets, Journal of Banking & Finance 35, pp. 1954-1970.

Giacomini, E., W. Hardle, and V. Spokoiny (2007). Inhomogeneous dependence modeling with time-varying copulae. Journal of Business & Economic Statistics 27 (2), 224–234.

Hafner, C. M. and H. Manner (2011). Dynamic stochastic copula models: estimation, inference and applications. Journal of Applied Econometrics forthcoming.

Hong, Y., Tu, J., & Zhou, G. (2007). Asymmetries in stock returns: Statistical tests and economic evaluation. Review of Financial Studies 20(5), 1547-1581.

Koopman, Siem Jan, Andre Lucas and Marcel Scharth (2016): "Predicting time-varying parameters with parameter-driven and observation-driven models", Review of Economics and Statistics, 98(1), 97-110.

McNeil, A. J., Frey, R., & Embrechts, P. (2015). Quantitative Risk Management: Concepts, Techniques and Tools: Concepts, Techniques and Tools, Revised edition. Princeton university press.

Okimoto, T. (2008), `New Evidence of Asymmetric Dependence Structures in International Equity Markets', Journal of Financial and Quantitative Analysis 43 (3), 787{815.

Patton, A.J., 2006. Modelling Asymmetric Exchange Rate Dependence, International Economic Review 47, pp. 527-556

Sklar, A. (1959). Fonctions de r_epartition _a n dimensions et leurs marges. Publications de l'Institut de Statistique de L'Universit_e de Paris 8, 229{231.

NELSEN R.B. (2006) An introduction to copulas, 2nd Ed., Springer-Verlag, Berlin.

Figure 2: The scatter plots for indices

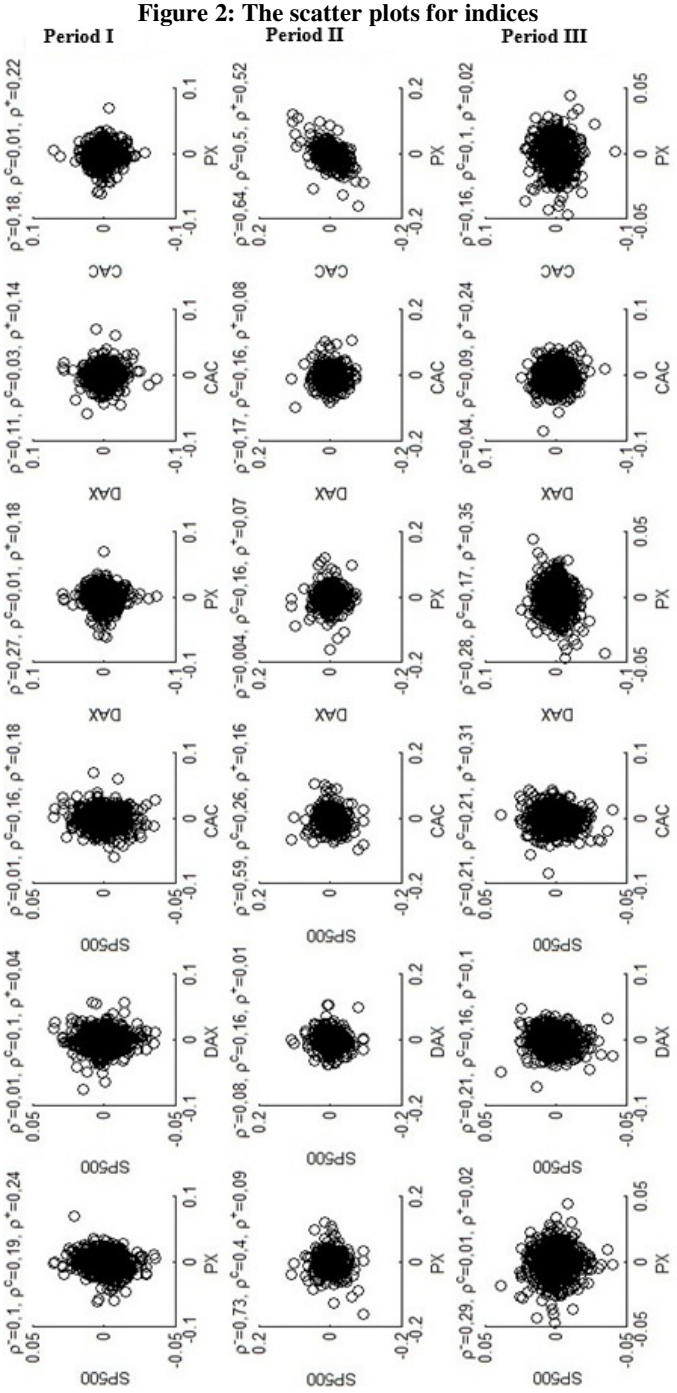
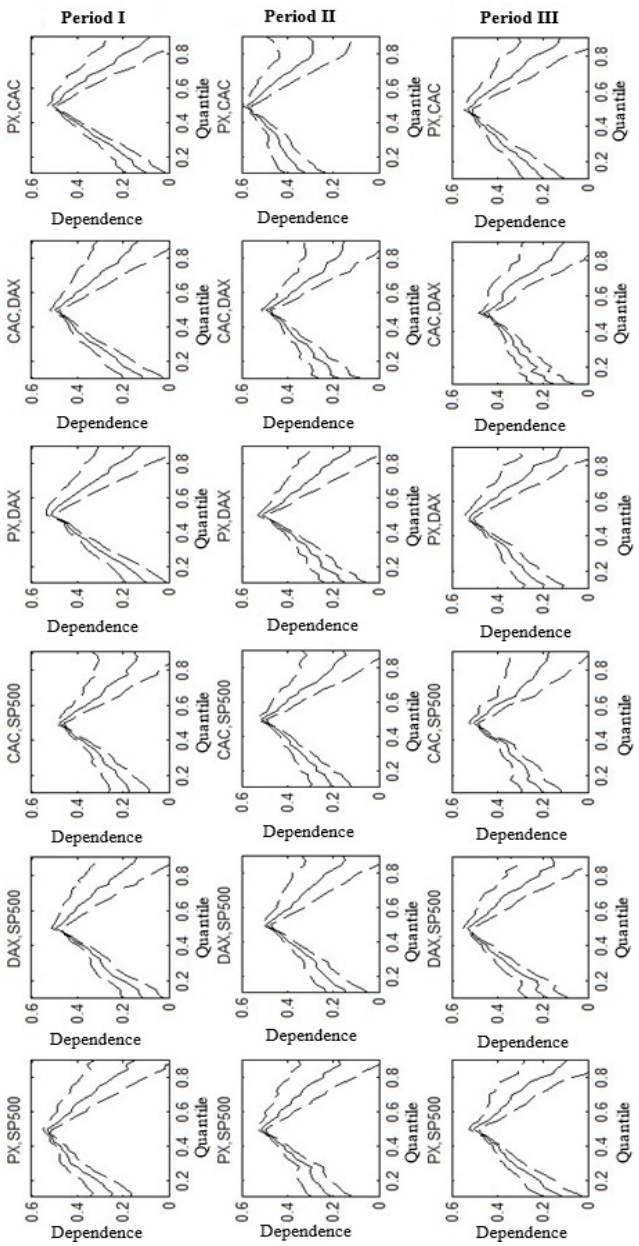


Figure 3: Quantile dependence between the standardized residuals of indices



Evaluation of Debt Elimination Benefits of Slovak Hospitals in 2011

Andrea Masařová, Mendel University in Brno, Faculty of Business and Economics, Brno, Czech Republic,
E-mail andrea.masarova@mendelu.cz
Marcela Basovníková, Mendel University in Brno, Faculty of Business and Economics, Brno, Czech Republic,
Email marcela.basovnikova@mendelu.cz
Jan Vavřina, Mendel University in Brno, Faculty of Business and Economics, Brno, Czech Republic,
E-mail vavrina@ node.mendelu.cz

Abstract

The Slovak hospitals have been coping with enormous financial problems recently. For this reason, 25 hospitals have been debt relieved in 2011. The debt relief amounted approximately to EUR 300 million; it was a provision of a refundable financial assistance. The aim of the presented contribution is to assess the benefits of debt relief for Slovak hospitals in 2011, to describe performance development of selected hospitals, focusing especially on the cost items and key factors identification that had a significant impact on the performance of analysed hospitals.

Keywords: debt elimination, hospital, financial performance, contributory organization

Introduction

The act of debt elimination is a part of the Insolvency Act. Debt elimination is one of the possibilities of solving bankruptcy taking into account more the social aspects than the economic aspects. This situation should enable the debtor to have a new start and to motivate him to get actively involved in the amortization of his debt. (Act 182/2006 Coll. Section3, 386). The Act also states that debt elimination can be performed especially for the debtors who have not gone bankrupt as a result of their business activities but ordinary activities. With regard to the legal form of most of the Slovak hospitals in 2011, it is obvious that it should be considered as an ordinary activity. In 2011, most of the hospitals in Slovakia had the form of the contributory organisation which means that it is a public law legal person set up to perform tasks in public interests. The bottom line is, however, that these organisations are public non-profit organisations. The primary specifics of a budget organisation are therefore its link to the founder – especially to its budget. The budget of a contributory organisation must be drawn up as balanced and must contain only those revenues and costs that are related to the services provided in the main activity of the contributory organisation. (Peková, Pilný, Jetmar, 2012)

Currently, not only large state hospitals in Slovakia have been coping with enormous financial problems. Slovak hospitals are at risk of lack of medicines, material and interruptions in the distribution of electricity. The hospital facilities have large debts that are going to be paid for them, already for the fourth time, by the state. The total debt, i.e. liabilities after due date, amount almost to EUR 550 million, which is, after conversion, almost CZK 15 billion. Compared to the previous year, the liabilities grew by more than one quarter and if compared with the year of 2011, in which the state used EUR 300 million (CZK 8,1 billion), the debts have more than tripled. Based on this information, it can be stated that debt elimination for the health care facilities in Slovakia five years ago has not helped to improve their financing on a permanent basis and liabilities after due date at large state hospitals and other facilities have grown to a new maximum since 2011. (Zachar, 2013)

The authors include to the key problems in health care, being referred to often in specialised sources (e.g. Šulcová and Čižnár 2012; Maaytová, 2012), in particular, the area of decimated general hospitals, low functionality of general physicians for adults, geriatric patients care, low effectiveness of the services provided and patient satisfaction.

The vast majority of heath care facilities in Slovakia are in the form of contributory organisations or non-profit organisations. They are founded either by the Ministry of Health or by the Region, providing a contribution for their activity within their budget. The other financial resources may include funds raised through their activity, contributions and gifts or state funds. The founder of the contributory organisation provides also investment and non-investment funds on the basis of the set expenditure limit. Contributory organisations of the organizational units of the state do not have own property and all property they obtain becomes a property of the state, the organisation cannot become even the owner of the property it has been given as a gift. (Vávrová, 2007)

As it has been already said, a contributory organisation is linked to the founder's budget by a contribution whereas less than 50 % of their costs are covered with sales. If, therefore, this organisation achieves, under the said conditions, positive or improved economic result, these financial resources remain in own funds. However, this (positive) result can be achieved by the organisation only if it fulfils the obligatory limits that have been appointed for it, such as achieving the quality of services. Using the use of funds resulting from positive economic results is subject to the approval of the founder who may order the contributions. (Morávek, Prokůpková, 2015)

In case of hospitals, the relationship of these organisations to the founder's budget is given by the difference between costs and revenues, which has always the character of loss and the founder's contribution is actually covering this loss. Almost all state hospitals, hygienic stations and other state institutions have recently been highly loss- making. In this case, the contributory organisations must cover the loss either from a reserve fund. If this option is not available, then it is necessary to cover the loss from profit from business activity after tax, not later than in the subsequent two budget years after the loss year. If there is not even this option, then the loss is covered from the economic result from main activity, again not later than in the subsequent two years after the loss year. (Act No 218/2000 Coll, Section 55, paragraph 2)

However, if it is not possible to cover the loss through the above options, the founder cancels the allowance organization. In the case of hospitals this situation is not easy. In Slovakia, this situation was solved by relieving hospitals, when the last debt was due in 2011. At that time 25 medical facilities were deferred. (Folentová, 2013) At that time, the Ministry of Health planned to implement a series of measures aimed at stabilizing the health system and gradually changing the Slovak healthcare system. Among the tools the Ministry wanted to use for the planned change were the transformation of hospitals into joint-stock companies. As part of the process of transferring state hospitals to the joint stock companies, Slovak government in 2009, on a proposal by the Ministry of Health, validated EUR 130 million as a debt to hospitals in the form of repayable financial assistance that was classified as non-repayable and the state remitted the debt from the hospitals. (Oddlžovať sa bude 25 nemocníc, 2009; Zachar, 2013) After pressure from the doctors in 2011, the President of the Slovak Republic stopped the transformation of hospitals. Because the new financial non-repayable assistance was conditioned by transformation of hospitals, it was necessary to reclassify financial non-repayable assistance to financial repayable assistance. From the originally non-repayable financial assistance that was conditional upon the transformation of hospitals, it was necessary to reclassify the assistance as a returnable. Eventually, approximately EUR 300 million was used for debt elimination. Other planned changes in health care include the reduction of the fund of beds, the introduction of e-health, the increase in state insurance payments, the introduction of the DRG system or the introduction of a limit for the contribution of drug payments. These proposals were met with great criticism by Slovak doctors and politicians, who described these proposals as an absolute disruption of health care. Therefore, it can be assumed that this is the reason why the proposals in the Slovak health service have not been taken yet. (Zachar, 2013)

The aim of this paper is to evaluate the benefits of debt elimination in Slovak hospitals in 2011. For the purpose of fulfilling the main goal, the sub-goals of the present article are also defined. The first partial objective is to describe the development of performance of selected Slovak hospitals in 2008 - 2015, focusing mainly on cost items. Nowadays, costs appear to be the determining factor of efficiency in almost every organization, including healthcare. Costs play an important and key role in an environment of intense global competition or growing competitiveness. Hospitals should search ways in a more strict approach to cost management, although it is important to remember that this is a touchy sector where

human lives are concerned, and they should be the first (Popesko, 2014). Another partial objective is to identify the key factors that have had a significant impact on the performance of the analysed hospitals.

Methods and Resources

When compiling the article, the first stage includes the collection of data from financial statements of hospitals that were debt relieved in 2011. The documents are obtained especially from the Financial Statements Register. 25 Slovak hospitals, of which 12 are the state hospitals, have been debt relieved. 19 hospitals from this mentioned sample are contributory organisations, 5 are non-profit organisations and 1 hospital is a joint-stock company. The statistical set consists of a sample of 19 contributory hospitals (see Tab. I) since 1 non-profit organisation is in liquidation, 4 non-profit organisations and joint-stock company have available financial statements only from 2013.

Tab. I: Hospitals that have received a refundable financial assistance for debt elimination in 2011

Nr.	Hospital	Legal form	Financial aid (EUR)
1	Trenčín University Hospital	Contributory	9 316 831,29
2	J.A.Reiman University Hospital with outpatients' care Prešov	Contributory	7 533 711,45
3	University Hospital with with outpatients' care Bratislava	Contributory	22 659 108,19
4	University Hospital Nitra	Contributory	4 737 788,99
5	Children's University Hospital with outpatients' care Bratislava	Contributory	7 167 432,18
6	L.Pasteura University Hospital	Contributory	14 690 913,52
7	F.D. Roosevelt University Hospital with outpatients' care Banská Bystrica	Contributory	27 018 178,17
8	Children's University Hospital Košice	Contributory	356 098,49
9	University Hospital Trnava	Contributory	14 588 371,98
10	University Hospital with outpatients' care Žilina	Contributory	4 815 820,64
11	Martinská University Hospital Martin	Contributory	952 891,21
12	Psychiatric Hospital P. P. Pezinok	Contributory	452 620,31
13	Hospital with outpatients' care Ilava	Non-profit	654 210,39
14	Dr.Guhr Sanatorium, Tatranská Polianka	Non-profit	118 952,80
15	St. James Hospital, Bardejov	Non-profit	424 264,18
16	St. Svorad Specialized Hospital, Zobor	Non-profit	151 698,98
17	Štefan Kukura Hospital with outpatients' care in Michalovce	Joint-stock	423 426,50
18	Kysuce Hospital with Čadca outpatients' care	Contributory	768 418,69
19	Hospital with outpatients' care Prievidza with seat in Bojnicie	Contributory	1 318 079,08
20	Hospital with outpatients' care Považská Bystrica	Contributory	4 049 609,00
21	Hospital with outpatients' care Vaše zdravie Zvolen	Non-profit	593 263,13
22	Dolnooravská Hospital with outpatients' care of MUDr. Ladislav Nádašiho-Jége, Dolný Kubín	Contributory	1 118 518,00
23	Liptov Hospital with outpatients' care	Contributory	2 013 060,00

	Liptovský Mikuláš		
24	Hospital with outpatients' care Myjava	Contributory	837 915,45
25	Central Army Hospital SNP, FN Ružomberok	Contributory	3 416 848,47

Source: own processing using data from Financial Statements Register

The data in the quantitative part of research will be analysed as panel data in the Gretl programme. The basic panel data regression model looks as follows (Greene, 2003):

$$yit = \beta 1xit1 + \beta 2xit2 + \cdots + \beta kxitk + \propto 1\ zi1 + \propto 2\ zi2 + \cdots + \propto q\ ziq + \varepsilon it,$$

where i denotes the cross-sectional dimension i = 1,…, n;
t denotes the time dimension t = 1, …, T;
x1 through xk are explaining variables not including the vector of units;
and z1 through zq represent individual effects, so-called diversity, through which an individual or a whole group can distinguish from other entities (this includes any vector of units).

The two basic approaches to panel data processing consist of the random effects model and the fixed effects model. The Hausman test will be used when deciding about the suitability of the model.

The variable, through which the performance of hospitals will be measured, will be economic result after tax. The explaining variables for the panel model will be the following quantities:

- Time – time serious length for the panel model will be 8 years, years 2008 – 2015 and within the regression model the same for all hospitals
- Consumed purchases – cost item, account class 50
- Services – cost item, account class 51
- Personal costs – cost item, account class 52
- Taxes and fees – cost item, account class 53
- Other costs for main activities – cost item, account class 54
- Depreciation, provisions and adjustments from the main activity and financial activity and booking of accruals – cost item, account class 55
- Financial costs – cost item, account class 56

The monitored period will the 2008 – 2015. This period will be divided into two time periods, from 2008 to 2010 and further from 2011 to 2015 when the key year is the year of 2011, in which the hospitals in Slovakia were debt relieved. An analysis of proportional and differential indicators focusing on the year of 2011 is to be conducted in these time sections. In addition, there will be conducted an analysis of individual costs using the growth rate and their share in the total costs in all individual health care facilities. In analysis of proportional indicators as well cost analysis, all hospitals will be examined together using the average values of individual indicators.

Results

The debt elimination for hospitals which took place in 2011 had an impact on cost items as obvious from Table II. The average values of the growth rate of cost items between 2010 and 2011 show a growing trend, except for the "Services" item, which declines. A negligible increase occurs in items "Consumed purchases" and "Personal costs".

A growth of 10,89 % can be noticed in cost item Taxes and Fees, in particular Other taxes and fees. It is an item which captures other taxes paid by the company, such as real estate transfer tax. In particular, fees paid to state administration bodies, courts, municipalities and other municipalities bodies, in particular administrative and court fees or local fees. In 2012, also the real estate tax, which was increased by 185 %, has an impact on the Taxes and Fees items. Real estate was purchased at hospitals which is proved by the growing Depreciation item.

Other items on the main activity between 2010 and 2011 have increased by 408 %. Other fines, penalties and default interests contributed the most to the growth. These are penalties arising out of contractual relationships - these are mostly penalties and fines assessed by a tax administrator, respective insurance companies or state administration bodies. Receivables Depreciation is another item which had a substantial impact on the growth of Other costs.

The cost item Depreciation, provisions and adjustments from the main activity and financial activity and booking of accruals was increased by 14%. The item Creating other adjustment from the main activity that are created for the benefit of respective accounts of adjustments had the main impact on the growth. Creating other reserves from the main activity has increased also by 70 %. It is obvious that the hospitals are making reserves for the next years in 2011.

Financial costs have marked the highest increase. As obvious from Table II, financial costs were increasing already from the beginning of the monitored period. Nevertheless, there was an increase by 39 836.1 % between 2010 and 2011, in average in particular by EUR 245,000. The main item that contributes to the high financial costs is interests that are growing together with paying bank credits within the debt elimination. The hospitals got the loans in 2010 that were forgiven in the same year as non-repayable financial assistance. It means that the interests increased. High values of Financial Costs were caused by redemption of debts.

Tab. II: Cost items growth rate average values in 2008-2015

	08/09	09/10	10/11	11/12	12/13	13/14	14/15
Consumed purchases	3,47%	0,78%	2,43%	5,88%	2,31%	3,56%	7,51%
Services	12,50%	3,83%	0,99%	-7,51%	0,10%	9,82%	0,73%
Personal costs	3,56%	5,63%	3,29%	9,42%	6,69%	4,42%	4,58%
Taxes and fees	38,50%	2,57%	10,89%	93,49%	251,35%	-6,94%	0,38%
Other costs for main activities	-5,18%	32,22%	408,10%	13,81%	7,94%	46,03%	79,90%
Depreciation, provisions and adjustments from the main activity and financial activity and booking of accruals	2,47%	-2,98%	13,76%	-0,98%	0,68%	-11,82%	-12,47%
Financial costs	251,28%	2882,13%	39 836,31%	459,09%	-31,05%	71,93%	501,77%

Source: own processing using data from the Financial Statements Register

Debt elimination for hospitals from 2011 has had a significant impact also on the results of proportional and differential indicators. The liquidity ratio indicators (see Tab. III) reached their maximum in this year within the whole monitored period. Even though the values reached their maximum, they still did not reach the values that are recommended in specialised resources (Kislingerová, 2010; Kubíčková and Jindřichovská, 2015). The values did not improve at all hospitals in 2011. These are these hospitals:

- Hospital with outpatient's care Považská Bystrica,
- Liptov Hospital with outpatients' care Liptovský Mikuláš,
- Dolnooravská Hospital with outpatients' care of MUDr. Ladislava Nádašiho-Jége, Dolný Kubín,
- Hospital with outpatients' care Myjava,
- Kysuce Hospital with outpatients' care ind Čadca.

These hospitals were debt relieved by paying long-term liabilities or long-term bank credits which is not reflected in the liquidity indicators. Also the account on which refundable financial assistance has been posted, is different. At the hospitals that used the financial assistance to cover short-term liabilities, this item is posted to the revenues items Revenues from common transfers from other public administration entities. At the other ones, the amount is posted to Other financial revenues or Other revenues from the main activity.

Tab. III: Liquidity Ratio indicators development in 2008-2015

	2008	2009	2010	2011	2012	2013	2014	2015
Current ratio	0,53	0,65	0,52	0,73	0,63	0,64	0,67	0,76
Quick ratio	0,49	0,60	0,48	0,67	0,58	0,60	0,63	0,72
Cash position ratio	0,08	0,08	0,05	0,13	0,08	0,15	0,23	0,29
Net working capital (mil. EUR)	-8,8	-5,5	-11, 3	-4	-9,9	-13,7	-18,7	-23

Source: own processing using data from Financial Statements

Debt elimination was reflected in the activity indicators especially throught the creditor days indicator, which declined this year. Trade deficit is positive for the hospitals, the hospitals collect money before they pay, nevertheless, the liabilities turnover values are too high. It can be assummed that in case of such a a long creditor days, the suppliers are not so willing to forgive unpaid supplies and default payments are charged to hospitals. In 2012, the credit days are again increasing, the hightes values are achieved in 2015, namely 244 days.

Tab. IV: Activity indicators development in 2015 (in days)

	2008	2009	2010	2011	2012	2013	2014	2015
Asset turnover time	412,93	410,08	416,11	443,52	394,91	366,60	353,90	340,85
Receivable turnover time	63,56	61,23	62,41	60,88	61,64	59,67	53,26	58,34
Liability turnover time	175,55	131,70	177,68	153,49	182,92	204,11	224,40	244,81
Fixed asset turnover	1,41	1,42	1,31	1,20	1,37	1,46	1,54	1,64

Source: own processing using data from Financial Statements Register

The profitability of hospitals in Slovakia measured by return on assets, revenue and equity can be characterised as negative in all years of the monitored period, except for 2011 when there was debt elimination. Ten hospitals from the sample surveyed have a positive economic result only in 2011. Two hospitals have a negative and two hospitals have a positive economic outcome during the entire time of the monitored period. The economic result of the remaining 5 hospitals were positive in 2011 and then from 2013.

Table V: Return indicators development in 2008-2015 (in %)

	2008	2009	2010	2011	2012	2013	2014	2015
Return on revenues	-7	-9	-12	29	-14	-8	-6	-8
Return on assets	-8	-10	-12	30	-13	-8	-7	-10
Return on equity	-36	-114	-46	489	-142	-40	-789	-19

Source: own processing using data from Financial Statements Register

It has turned out that, according to the Hausman test with P-value 0,999, random effects model is a suitable model – random effects model means that random effects, in a zero hypothesis, are considered consistent. Significance level of 95 % was chosen. In addition to constant, variables Services with P-value 0.4022 and Depreciation, Reserves and adjustments from operating activities and financial activities and booking accruals with P-value 0.4020 were excluded as non-significant variables. According to P-value it can be assumed that the other variables are statistically significant and except for the consumed purchases variable they are at significance level of 99 %. Adjusted determination coefficient has a value of 5.32 %, i.e. the model explains accurately 95.32 % of the economic result variability after tax. The financial cost variable explains the best the economic result after tax.

For completeness it needs to be added that the model has been tested for proper functional form of the model (RESET test), heteroskedasticity (White test), residual normality and first order error correlation. These tests of the model turned out to be correct and therefore it can be affirmed that it meets the requirements for regression models quality.

Coefficients of individual variable indicate an increment of the explained variable (economic result) in unit change explaining variable and allowing predicting the explained variable for individual cases. According to the established statistics it can be stated that there are important variable influencing the Economic Result after tax indicator and therefore also financial situation of the company. If, within the model, the consumed purchases are increased by one unit, then this situation would influence the amount of economic result after tax by 0.4492. We can state that there is a direct correlation, because with the increase in consumed purchases, there has been an increase of EAT. When personal costs are increased by one unit, EAT is decreased by -0.5327, which means that there is indirect correlation between personal costs and EAT. There is also indirect correlation between EAT valuable and taxes and charges. In particular, if Taxes and Fees increase by one unit, EAT is decreased by -14.009. Other costs and financial costs are positively correlated with EAT. When other costs are increased by one unit, EAT is increased by 1.8541 and when financial costs are increased by one unit, EAT is increased by 21.8693.

Table VI: The panel model

	Coefficient	P-value	Significance
Consumed_purchases	0.4492	0.0694	*
Personal_costs	−0.5327	0.0001	***
Taxes_fees	−14.0090	0.0027	***
Other_costs	1.8541	0.0025	***
Financial_costs	21.8693	1.04e-06	***

Source: own processing using data from Financial Statements Register

Conclusion

The assumption for debt elimination in 2011 was certainly to solve the critical situation in health care in Slovakia where the hospitals' liabilities were achieving high values. However, with regard to the results achieved in the presented contribution that are only a primary research, where one can continue with a deeper analysis, it can be stated that the debt relief in 2011 did not help to improve their financing on a permanent basis. In addition, comparison with other research is not possible since there are not many specialised sources that would deal with the issue of debt relief in 2011 or generally the situations of hospitals in Slovakia. Due to the fact that debt relief took place especially due to high liabilities it is striking that the average liabilities turnover time is still increasing even after the debt relief, amounting to 244 days in 2015. According to the net working capital values that even are in the year of debt relief, i.e. in 2011 still negative, it can be assumed that liabilities continue to exceed the value of current assets even in this year. With regard to net working capital negative values it is obvious that the hospitals are not able to finance their own operation since a part of fixed assets of company are covered with short-term financial resources. If it were a standard legal entity, there would be a risk that this entity will be forced to sell its long-term assets in order to pay short-term liabilities, thus endangering its own

existence. In the case of hospitals, this situation is in admissible and therefore the state intervened and did the debt relief which obviously did not fulfil its purpose.

Acknowledgment

This article is a partial outcome of the internal grant project IGA FBE MENDELU nr. PEF_DP_2017012 „Ekonomická efektivnost státních zásahů do vybraných zdravotnických zařízení na Slovensku“. (Economic effectiveness of state interventions into selected health care facilities in Slovakia)

References

Act No. 218/2000 Sb on Budgetary rules and amendment of some related acts (budgetary rules), In: Sbírka zákonů. May 20th, 2008. ISSN 1211-1244.

Act 182/2006 Coll., on Bankruptcy and Settlement (Insolvency Act), as amended, Section 3. In: Sbírka zákonů. December 29th 2008. ISSN 1211-1244.

Act 182/2006 Coll., on Bankruptcy and Settlement (Insolvency Act), as amended, Section 389. In: Sbírka zákonů. December 29th 2008. ISSN 1211-1244.

Folentová, V. (2013). “The debt relief of hospitals is getting closer, their debt climbing to 300 milion.” (Oddlženie nemocníc sa blíži, ich dlh šplhá k 300 miliónom). *SME Ekonomika.* [Online], [Retrieved September 10, 2017], http://ekonomika.sme.sk/c/6796633/oddlzenie-nemocnic-sa-blizi-ich-dlh-splha-k-300-milionom.html#ixzz4OZrUTJeB

Greene, W. H. Econometric Analysis. New Jersey: Prentice-Hall, 2003. ISBN: 0-13-066189-9.

Kislingerová, E. Managerial finance (Manažerské finance). 3rd updated edition V Praze: C.H. Beck, 2010. Beckova edice ekonomie. ISBN 9788074001949.

Kubíčková, D., Jindřichovská, I. Financial Analysis and Firm Performance Assessment (Finanční analýza a hodnocení výkonnosti firmy). V Praze: C.H. Beck, 2015. Beckova edice ekonomie. ISBN 978-80-7400-538-1.

Maaytová, A. The questions of health economics with regard to increasing of efficiency. (Otázky ekonomiky zdravotnictví s ohledem na zvyšování efektivnosti.) 1st Edition, Praha: Wolters Kluwer Česká republika, 2012. ISBN 978-80-7357-912-8.

Morávek, Z., Prokůpková, D. Contributory organizations 2016-2017. (Příspěvkové organizace 2016-2017). 3th updated edition. Praha: Wolters Kluwer, 2017, ISBN 978-80-7552-310-5.

Peková, J., Pilný J., Jetmar, M. Public Sector - Management and Financing (Veřejný sektor - řízení a financování). Praha: Wolters Kluwer Česká republika, 2012. ISBN 978-80-7357-936-4.

Popesko, B. Calculation of costs in healthcare organizations. (Kalkulace nákladů ve zdravotnických organizacích.) 1st edition. Praha: Wolters Kluwer, 2014. ISBN 978-80-7478-509-2.

Šulcová, M., Čižnár, I., Fabiánová E. Public Health (Verejné zdravotníctvo). 1st edition, Bratislava: Veda, 2012. ISBN 978-80-224-1283-4.

SME ekonomika (2009). “The state will eliminate the debt of 25 hospitals.” *Ekonomika* (Oddlžovať sa bude 25 nemocníc). . [Online], [Retrieved October 1, 2017], https://ekonomika.sme.sk/c/5133470/oddlzovat-sa-bude-25-nemocnic.html#ixzz4CuhRInAo.

Vávrová, H. (2007). Joint stock companies and Contributory organizations in Health. Akciové Společnosti a Příspěvkové Organizace ve Zdravotnictví. Nová teorie správy společnosti CG pro neziskový sektor a její aplikace na vybrané instituce v ČR, 402/07/0563.

Zachar, D. (2013). "Reform processes in health care-period 2000-2012" (Reformné procesy v zdravotníctve – obdobie rokov 2000-2012). *HPI THINK TANK* [Online], [Retrieved September 20, 2017], http://www.hpi.sk/2013/04/reformne-procesy-v-nbsp-zdravotnictve-obdobie-rokov-2000-2012/

The Importance of Creativity in the Business World

Ph.D. Dominika Jagoda-Sobalak, Opole University of Technology,
Faculty of Production Engineering and Logistics, Poland, d.jagoda@po.opole.pl

Ph.D. Iwona Łapuńka, Opole University of Technology,
Faculty of Production Engineering and Logistics, Poland, i.lapunka@po.opole.pl

Ph.D. Katarzyna Marek-Kołodziej, Opole University of Technology,
Faculty of Production Engineering and Logistics, Poland, k.marek-kołodziej@po.opole.pl

Abstract

The article draws attention to the special importance of employee creativity for the market success of a company. It describes the model a creative organization, along with is components, as an institution that allows the creation of innovations, the flow of knowledge between employees and the high motivation of the employees, which in turn enables it to function in today's highly variable environment. A procedure based on a multiple case study is described. A selected case study item from research carried out in a company of the machine industry is shown. The article is ended with conclusions and recommendations concerning management in a broad sense, drawn based on the literature review and the research carried out.

Keywords: creativity, innovations, invention,inventic method

Introduction

The increase of employees' creativity in thinking and action translates into their commitment to their work, lays the foundations for a company's innovation and, as a consequence, creates conditions for its success on the market being so variable today.

What is creativity? Creativity is the ability of man to creatively use his/her brainpower for creating new, original ideas in the form of concepts or products (Ottemiller, Elliott, Giovannetti 2014, p. 289-296). This is the capability to think creatively, combine different ideas in an original way, adopt new assumptions, see things in a new perspective, put forward ideas, do something new or the same thing in an unusual way (Amabile, Hadley, Kramer 2002, p. 52-61). Creativity is moving beyond what is known, common and obvious (Pinker 2009, p. 30-45). Creativity is the process of implementing innovative ideas to meet needs or solve problems (Bilton, Cummings 2010, p. 101). The creativity of a company's employees provides a basis for a creative organisation and is a source of competitive advantage.

Such concepts as the economics of creativity or creative economy are becoming common. Creativity has become one of the production factors, an intangible resource, which can and should be managed to some extent.

As a unique, valuable and inimitable resource, creativity can distinguish a company on the market. However, recruiting creative employees, developing their creativity and setting up a creative organization is time-consuming and requires the involvement of the entire organization and the implementation of a creative management style.

Creativity management is a process whose outcome is difficult to predict. It should be consistent with all management functions (such as planning, motivating, organizing and control). Already at the stage of recruitment should the candidate's creativity level and his/her creative abilities be evaluated (specialist psychological tests can be used for this purpose). The creativity of the employees needs to be developed through training, workshops and organizing creative sessions. There are a number of methods, such as synectic and inventive thinking techniques, which develop creativity, encourage the mind to seek unconventional solutions and help design innovative concepts. Creativity management

is primarily a motivational system geared on creativity and promoting creative attitudes. It is also a motivation system, which is consistent with an organization's culture, since these elements interpenetrate.

Model of a creative organization

A creative organization is a subject of interest to many researchers. M. Brzeziński describes it as a creative environment that has two dimensions: an individual dimension – seen from the angle of a single employee, and a common dimension – being dependent on the number of people working in it (Brzeziński 2009, p. 64-71).

S. Raisch, J. Birkinshaw devote special attention to creative teams as the foundation of an organization (Raisch, Birkinshaw 2008, p. 375-409), while R. Zeffane and A. Zarooni focus on empowerment as the source of cohesion, harmony and efficiency of a company (Zeffane, Zarooni 2012, p. 14-125).

The model proposed by the authors is composed of a larger number of elements that interact and jointly contribute to building a creative organization (Fig. 1).

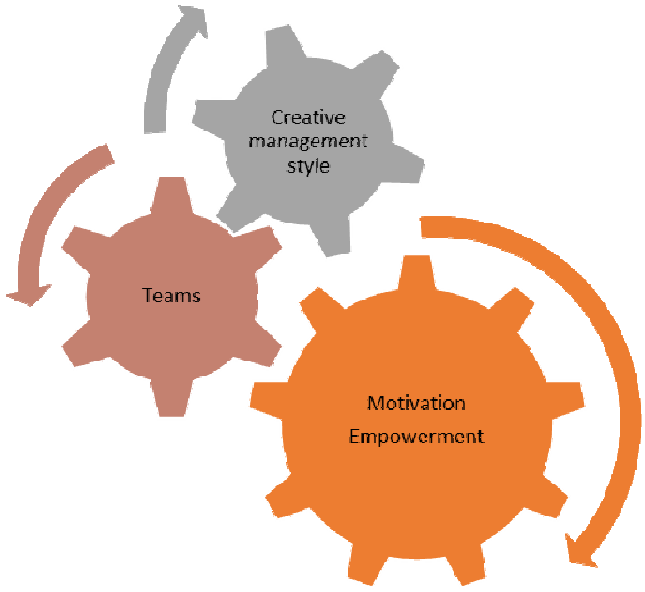


Fig. 1: Model of a creative organization

Source: Own elaboration

Four attributes are distinguished in the creative organization model; these are: teams, creative management, empowerment and motivation.

Creative teams

Teams are the key element of a company's strategy. A team is a group of workers that forms a distinctive entity being under common leadership. It is characterized by large knowledge, an innovative way of thinking and searching for unconventional solutions. The team is responsible for the task entrusted to it. Teams should be regarded as flexible formulae of work organisation. The team configuration should be dependent on the personnel composition, intelligence potential, creative awareness and the team leader. The level of a team's autonomy depends on the maturity and

efficiency of team members. The sources of success is therefore the collective knowledge and the synergy of diverse characteristics of employees

Teams work better, faster and more efficiently and more easily adapt to external conditions than it is the case in a hierarchical structure. In well selected teams, people make better decisions and solve more complex problems, compared to individual workers (Blanchard 2009, p. 75-86).

To build an effective team, it is necessary to carry out individual stages of team-forming processes, namely:
assessment of the team in accordance with the model PERFORM,
- creation of the team card,
- diagnosis of the team development level,
- matching the style of leadership to the team development level, and
- strategies for improving the team's efficiency.

Co-operation among employees and building creative teams that develop the team's spirit and the right organisational culture. Team work stimulates creativity, discussions, interactive behaviour and creative enrichment ideas of all employees. A team (as opposed to individuals) is characterized by versatility and flexibility in searching for creative solutions [Rhoades, Eisenberger 2002 p. 698-714; Wang, Rodej 2010, p. 1105-1128; Wu, McMullen, Neubert 2010, p. 587-602].

Leadership style – Higher-level leadership

The idea of a creative organization is closely associated with the theory of creative management. It is the management that oversees the activities of creative teams, formulates strategic objectives, sets out the criteria for the evaluation of ideas, provides the necessary resources and controls the process of carrying out tasks.

The main activity of managerial staff includes the specification of detailed tasks (Zhang, Bartol 2010, p. 107-128) by:

- creating a system for collecting postulates and ideas concerning new solutions,
- assuring the objective assessment of postulates and ideas in the light of adopted criteria,
- assessing the appropriateness of undertaking tasks,
- assessing the financial capacities, regulations etc.
- Another task of the managerial staff is to enable the transfer of the processes of individual creativity to the levels of teams and the entire organization. This enables the flow of explicit and implicit knowledge.
- Moreover, in order to allow the efficient fulfilment of tasks that require creativity, the management is required to take the following actions:
- remove any obstacles to carrying out the tasks,
- prevent the occurrence of obstacles that hinder the carrying out of tasks,
- mitigate the negative consequences of obstacles and difficulties that cannot be removed,
- change the action programmes in the direction that ensures the avoidance of obstacles.

Despite having some sort of autonomy, the team still needs support by the management, a proper motivation system, the supply of resources, decision-making capabilities, and the provision of support for reasonable risk.

Empowerment and motivation

Empowerment means allowing employees to think independent and to use knowledge, experience and motivation for carrying out the company's tasks. Empowerment is creating an organizational climate in which employees to look for solutions, inquire, and take initiative.

The culture of empowerment is built by (Zeffane, Zarooni 2012, p. 114-125):
- visionary imagination,
- co-operation for results,

- self-monitoring,
- responsibility of the team,
- interfunctional structure,
- projects,
- coaches/team leaders,
- the team's own judgement of the situation,
- free movement of information and knowledge between employees and functional sections.

The introduction of empowerment (emancipation of employees, their involvement in the decision-making process) in a company requires the development of workers-leaders among the employees, who will be able to take the initiative. Within this idea, the employees are treated as valuable assets that increase their value as the experience and knowledge grow. The dimensions of empowerment are illustrated in Figure 2.

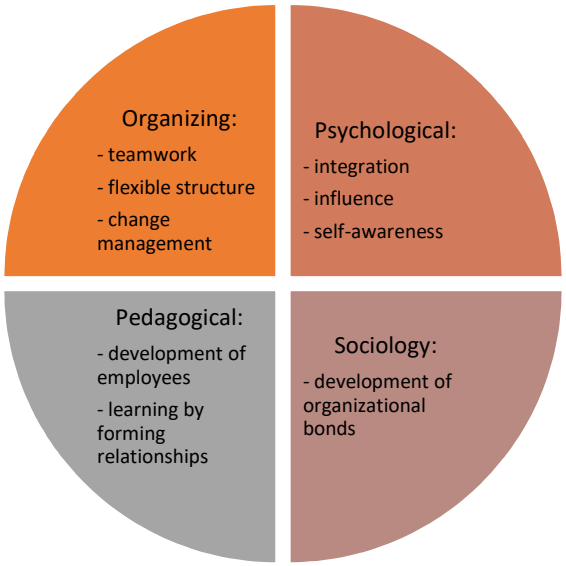


Fig. 2: The dimensions of empowerment (Bugdol 2006, p. 35-68)

The dynamic nature of empowerment should be emphasized: it is a continuous process occurring in an organization. Its essence is to enable the employees to act creatively and to show their own initiative by delegating the decision-making power to them, while maintaining their responsibility for their activities. It is getting enthusiasm and commitment out of the employees by granting them the right to autonomy and controlling their activity. Empowerment is the foundation of a comprehensive motivation system.

Whereas, a motivation system should include both tangible and intangible incentives. A proposal for a system of motivating to creative behaviours is illustrated in Figure 3.

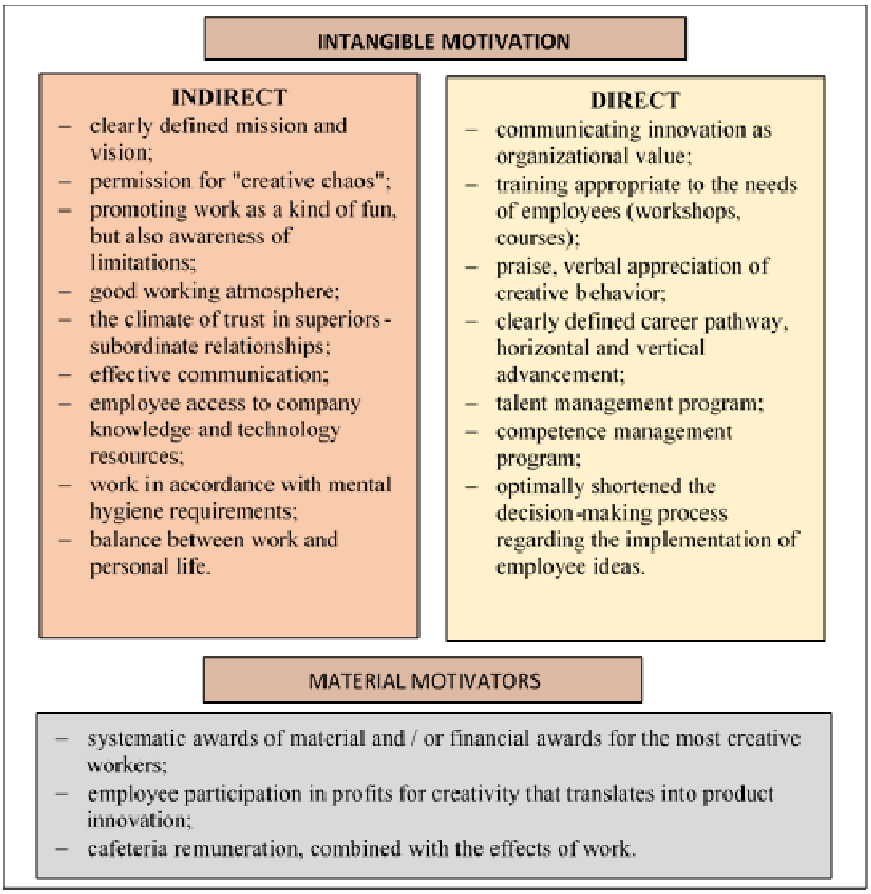


Fig. 3: Constituent parts of the system of motivation to creative behaviours
(Moczydłowska 2012, p. 71-80)

Research method

Based on the analysis of the literature on the creativity of employees, their motivation to work and to use the methods of creative problem solving, empirical investigation in the form of a multiple case study was undertaken in companies in the Opole Province. The investigation was aimed at providing guidance and recommendations for developing creative organizations.

The case study conducting procedure as proposed by Czakon (Ledger 2013, p. 93-111) was adopted. The basis for the scientific methodology was formed by:

- quantitative methods (a creativity test) – which provide information on the level of creativity of employees,
- qualitative methods (an in-depth interview) – used to examine the degree of employee motivation,
- creative problem-solving methods – applied in order to develop guidance and recommendations for the design of the model of a creative organization
- methods of making decisions based on multiple evaluation criteria.

Studies carried out in the period of 2014-2016 in nine South-Western Poland's companies included:
- selection of companies,
- preparation of creativity level tests and the scenarios of in-depth interviews about employee motivation,
- preliminary studies, examining the creativity level of employees and their motivation to work,

- research proper – the design of a creative organization model using inventive methods,
- development of recommendations and guidance for building a creative organization.

A schematic diagram of the studies in companies is shown in Figure 4.

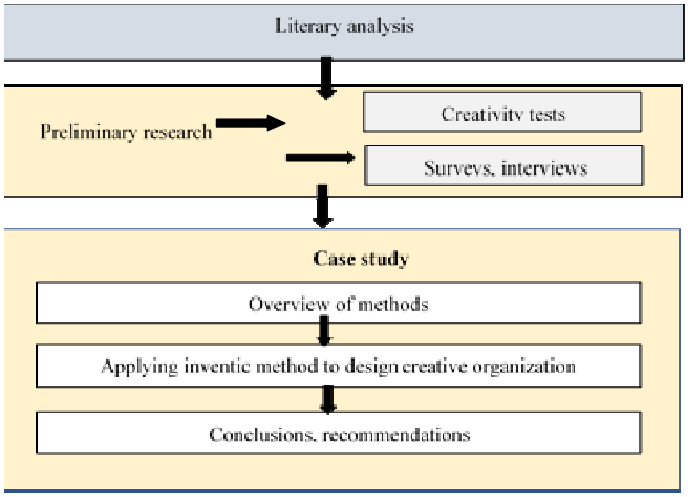


Fig. 4: Schematic diagram of the studies.

Source: Own elaboration

The studies were based on three independent sources:

- Available documentation for individual companies – this provided information on the financial standing of selected companies, their organizational structure, business partners, product line offered, information flow, documentation and decisions.
- Creativity tests and conducted surveys of the degree of employee motivation. To examine the creativity of individual employees, a creativity test was prepared. It was created on the basis of psychological tests available in the literature. An individual in-depth interview was also used to determine the degree of employee motivation. A time of 20 minutes was given to each employees to answer the questions included in the interview. The employees gave their answers in a comfortable place and their anonymity was preserved. In addition to the previously prepared scenario, supporting questions were also used. Supporting questions were used only when an employee had problems with his/her answer, hesitated, or had some doubts about the answer.
- Participatory observation during the creative sessions. During creative sessions, companies' employees were made acquainted with inventive thinking methods. To assimilate the methods more quickly, pre-prepared scenarios for the methods were used. Then the acquired methods were used for the design of guidelines for a creative organization.

The studies achieved the main objective which was to produce guidance and recommendations for building a creative organization.

Case Study

Due to the extensiveness of the research, only one case study has been described. This description aims to give a closer idea of the research scenario. The research was carried out in a company involved in the manufacture of machine tools. Preliminary studies in the form of creativity tests of and in-depth interviews determined the level of employee creativity and motivation. Based on the creativity tests, the company's employees were assigned to one of three groups, including, respectively: innovators – extremely creative persons, moderately creative persons, and persons with

"dormant" creativity. Thus, 9% of the company's employees received a result that allowed them to be categorized into the innovator group, 34% of employees received a score qualifying them for the moderate creativity group, and 57% of employees were characterized as having "dormant" creativity.

The in-depth interviews, on the other hand, allowed us to determine the degree of employee motivation. Thus, in succession, 12% of them were characterized by high work motivation, 61% – moderate work motivation, and the remaining 27% – low work motivation.

The preliminary studies allowed a creative session to be properly and correctly carried out. They provided guidance on which inventive method should be used in the design of the assumptions for a creative organization. The creative session was attended by 22 employees representing all departments in the company. The session was started with the defectologic method that aimed to identify barriers to creativity, then the method of good examples was used.

The defectologic method is to disclose as many defects (shortcomings, faults) in the system, as possible. It requires teamwork to stimulate the "defect generation" process. The role of the team is also to objectivize the defects (i.e. what for some people is a defect, for the others may be an advantage). The method provides the basis for improving an existing system or replacing it with a new one that better performs the expected functions (with fewer defects).

From among the defects occurring in the present organization, which are of particular importance in the creation of a creative organization, the following have been listed:
- lack of actions to overcome the reluctance to change,
- criticism among employees and management,
- lack of the capability (place, time, manner) to report new solutions,
- deficiencies in the expertise of some employees, and
- poor information flow within the company.

The method under discussion contributed only to making an outline of the overall situation of the company. It influenced the motivation of employees to change it and became the foundation of the project of a creative organization.

To determine the guidelines for building a creative organization, the method of good examples was used. As the example to follow, the Roto Frank company of Lubertów was proposed. This company has a very well functioning system for collecting postulates, a high degree of employee motivation, and is an innovator in the woodworking industry. Implemented changes that have been put forward by the employees themselves enable a constant productivity increase by 10% per year. The employees of a machine tool factory were presented with a system of motivation, collecting ideas and work-sharing existing in a model company. Based on the obtained information, members of the creative session proposed the following solutions to enable the building of a creative organization:
- the box of ideas that functions in the company should be located in the social room (due to the easy access) and stationery should be available next to it,
- each employee should report his/her own idea at least half-yearly, otherwise he/she will have his/her bonus withheld for a period of 1 month,
- an employee will receive PLN 500 or 2% of the profit/savings resulting from the proposed solution,
- creative sessions will be organized (during working hours) minimum twice a month,
- an integration meeting (such as Christmas Eve supper or a bonfire) will be organised once a half year,
- employees will be given more freedom in making decisions, especially about their job posts,
- non-financial motivators (praise, promotion) will be used, and the management will more often talk with the subordinates, explaining them strategies and decisions.

The resulting solutions are rather reconstructive in character. To gather all ideas, but also to generate new (creative) ones, another method (tool), the mind map, was used. Creating the mind map was started with specifying its principles. The following guidelines were displayed on the noticeboard:

1. Draw a thematic picture including a minimum of three colours in the middle of the sheet.
2. Use pictures and symbols on the whole map.
3. The most important words should be highlighted in the most pronounced manner.
4. Only one word or figure may be in a line.

5. Lines and words should be identical in length.
6. Use varying letter sizes and styles.
7. Use many different colours.
8. Maps should be characterized by great imagination; they may be abstract or absurd.
9. Not only facts, but also problems, associations, etc., should be indicated on the map.

Then the employees set about drawing. Both pre-conceived ideas and identified problems were shown on the map, and also brand-new ones were generated. The resulting mind map will be shown in Figure 5.

During the session the creative methods used were: The defectologic and good examples methods and the mind map were used during the creative session. The defectologic method revealed barriers to creativity in the organization and made the employees aware of the need for creating a creative organization. The method of good problems served as a warm-up for the design of guidelines for the creative organization. The method of good examples did not require the employees to have high creativity and, owing to its simplicity, did not raise any resistance to its use, either. The mind map enabled the comprehensive capturing of the problem and the specification of the creative organization model, and supplemented the pre-conceived ideas with new ones. The employees willingly participated in the creative session, submitted themselves to the integration process and developed common rules that will positively influence the organization's culture and atmosphere and will contribute to the growth of its creative, and thus also innovative potential in the future.

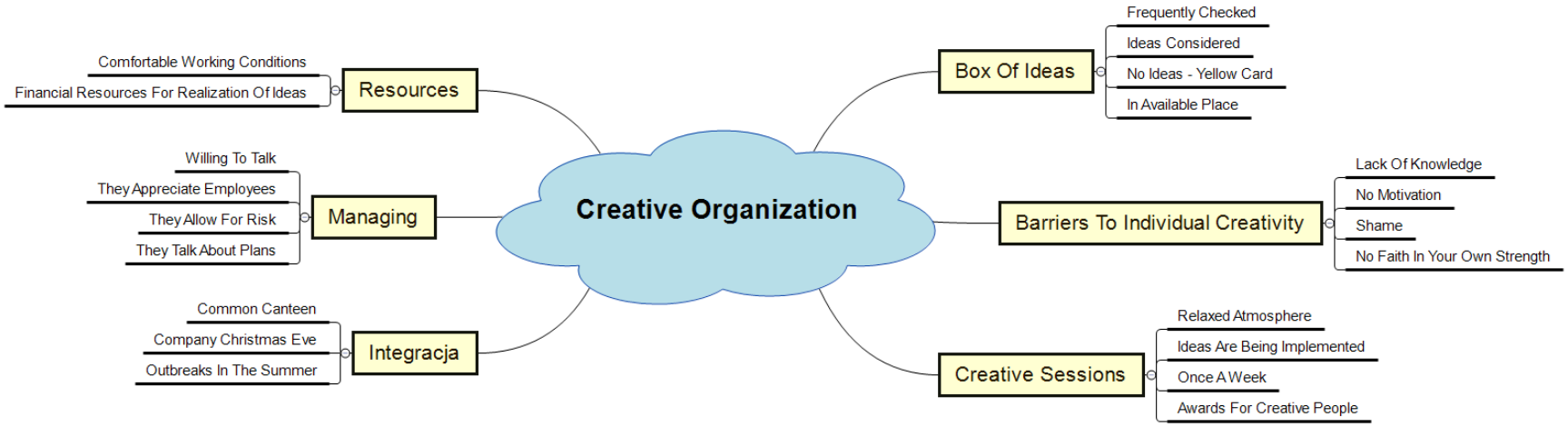


Fig. 5: The mind map

Source: Own elaboration

Summary

The foundation of the innovative development of a company is the economics of creativity and building of a creative organization. An organization that is willingly heading towards innovativeness should focus on the elements by the use of which it is possible to support the creativity of an individual and the entire organization.

This raises the need to supplement the company's orientation and the culture itself by the creative ability of the organisation, which is the main carrier of innovation, competitiveness, or even survival. Creative strategic decisions and unconventional actions are to serve the mutual development of the company and the environment. Therefore, the modern way of management calls for creative action plans.

The proposed creative organization model is the answer to today's business challenges. The constituent elements refer to current trends in management and create cohesion to enhance the creativity, innovation and success of the company. The construction of a creative organization is a challenge for the company and requires the involvement of all employees, the time, and changing the way of thinking and acting. A support in the construction can be provided by creative problem-solving methods, appropriate workshops, and collaboration with scientific spheres. The effort taken will influence directly the atmosphere in the organization, the morale of employees and their motivation to work. And this is likely to translate into the innovativeness and competitiveness of the company.

References

1. Amabile T.M., Hadley C.N., Kramer S.J. (2002) Creativity under the gun. Harvard Business Review.
2. Bilton C., Cummings, S. (2010) Creative strategy. Reconnecting business and innovation. Chichester, Wiley.
3. Blanchard K. (2009) Leading at a Higher Level, Ingram International.
4. Brzeziński M. (2009) Organizacja kreatywna. Państwowe Wydawnictwo Naukowe, Warszawa.
5. Bugdol M. (2006) Wartości organizacyjne. Wydawnictwo UJ, Kraków.
6. Czakon W. (2013) Podstawy metodologii badań w naukach o zarządzaniu. Oficyna Wolters Kluwer Buisness. Warszawa.
7. Ottemiller D., Elliott C.E., Giovannetti T. (2014) Creativity, Overinclusion, and Everyday Tasks. Research Journal, 26,. 289-296.
8. Pinker S. (2009) How the Mind Works. W. W. Norton.
9. Raisch S., Birkinshaw J. (2008) Organizational ambidexterity: Antecedents, outcomes, and moderators, Journal of Management, 34, 375-409.
10. Rhoades L., Eisenberger R. (2002) Perceived organizational support: A review of the literature. Journal of Applied Psychology, 87, 698-714.
11. Wang P., Rodej C. (2010) Transformational leadership and follower creativity: The moderating effects of identification with leader and organizational climate. Human Relations, 63, 1105-1128.
12. Wu C., McMullen J.S., Neubert M.J., Yi X. (2010) The influence of leader regulatory focus on employee creativity. Journal of Business Venturing.
13. Zeffane R., Al Zarooni M.H. (2012) Empowerment, Trust and Commitment: The moderating Role of Work-Unit Centrality, International Journal of Management, 29, ½, 114-125.
14. Zhang X., Bartol K.M. (2010) Linking empowering leadership and employee creativity: The influence of psychological empowerment, intrinsic motivation and creative process engagement. Academy of Management Journal, 53, 2010, 107-128.

The Use of Vegetal Wastes – Sustainable Alternative for Energy

Ștefania-Daniela Bran, Bucharest University of Economic Studies, Bucharest, Romania, stefaniabran26@gmail.com

PhD Assistant Cristian Teodor, Bucharest University of Economic Studies, Bucharest, Romania, cristian_teodor84@yahoo.ro

PhD Seniour Lecturer Irina-Elena Petrescu, Bucharest University of Economic Studies, Bucharest, Romania, irinapetrescu84@yahoo.com

PhD Professor Mariana Bran, Bucharest University of Economic Studies, Bucharest, Romania, mariana.bran13@yahoo.com

Abstract

The paper analyses the current conditions of the environmental health for life, in Romania and abroad and accession of the bio-technological measures (biofuels achievement) with social, economical and sustainable roles. The findings regarding the continuous increasing of global average temperature at earth surface due to greenhouse gas emissions were amplified together with raising industry. As follows, the climate changes manifest by the rainfall level and repartition, with agro-economic repercussions (they influence the crop development) and on human health. The eco-systems modifications have effect on energy sources, too. In this case is need renewable sources. The sources of renewable energy are continuously and rapidly regenerated; are inexhaustible for the times predictable in human development. Their weight and speed in diminishing emissions were noticeable. Regarding the biofuels, the vegetal resources represent the cheap raw matter. The farms could provide annually agricultural and by-products as well as vegetal residues. The area specificity is very important in adequate management implementation as varietal and economic efficiency of biofuels. The specialty literature and interpretation of the statistical data amplify the trust in collecting and efficient utilization of agricultural products for biofuels and highlight the real situation at regional level. To be adequate alternative of fossil fuels it is obvious that biofuels must offer energy surplus and benefits for environment, must be competitive as economic viewpoint, must be produced in large quantities but not reduce food supply.

Keywords: bioeconomy, biofuels, environment, vegetable wastes

Introduction

Economy is the balance of systems and methods that ensure the link between main products and resources. The resources involve air, water, minerals, farming, by their knowledge being elaborated efficient tools and methods for human life. They must understand the interrelation between components/relationships/needs/capabilities, so, through combination among them, the image of application in economy is released and the establishment of economic relations in a healthy environment is desired.

The economic activities linked by innovation, production and utilization of the products resulted by biological processes, with no carbon emissions (over equivalent quantity of carbon dioxide photo-synthetically fixed by crops; carbon represents about 59% of dry matter) and ensuring the sustainability are cumulated by the European Commission and Organisation Co-operation and Development for

Economic as bio-economy. This economic theory was elaborated by Nicholas Georgescu-Roegen. At the beginning of '70s, he emphasized the biological base of economic processes and call attention on natural resources diminishing.

At global level and current context, it is necessary that information and education be focused on sustainable economic activities. The agriculture and forestry are sources which generate natural products (organic matter which consists of carbon), which, under processing by certain industries meet human needs. Besides main products, the industries cumulate energy consumptions, highlight emission harmful for animals and accelerate climatic changes. Under this context, the passivity of the countries is harmful too, generating huge disequilibrium.

The bio-economy promotes the economic harmony. It has as main aim the maintenance of society health (physical, emotional, intellectual and spiritual) and of the earth, the human being ensuring its evolution.

The biological processes, correctly managed, generate adequate products. Therefore, the bio-economy is based on arable land, on the principle of eco-development.

The development strategy of Romania for 2016-2035 consists of bio-economy domain, too (Intelligent specialization – according to classifications, definitions and describes from Strategy of Research, Development and Innovation 2020), with sub-sectors bioenergy (biogas, biomass, biofuel) and biotechnologies of environment. These approaches could be feasible by measures and provisions to manage the vegetal products and wastes.

The bio-energy, mainly by biofuels production, is promoted as consolidation for energetic independence, concomitantly with rural development and diminishing of greenhouse gas emissions. However, the current application of the first generation bioenergy must not be a disadvantage for food safety. The competition food/biofuels will be avoided by research on non-food species, as potential biomass resources and promoting of adequate processing techniques.

The liquid biofuels which are obtained from agricultural products (first, second or third generation) to fill the reservoirs are biodiesel and bioethanol; although their production is under increasing, represents only 5% of current bioenergy. The ethanol has also industrial utilizations, being essential element for other products too (bio-plastics and biochemical ones). The most biofuels are currently obtained from crops, which are also foods and feed.

In 2013, in EU, to obtain ethanol, 7.83 million tons of cereals and 1.5 million tons of sugar were used. Only 2% of EU cereal yield was used for bioethanol production. The ethanol production from renewable sources in Europe utilizes only 0,7% of arable lands.

According to FAO, an average of 0.5 million ha of arable lands is annually out of cultivation (European Commission, 2012). This situation does not affect the food because the demand is achieved by productivity increasing. Statistical data lead to the knowing of huge European potential, unexplored yet, and its distribution to renewable resources, as unique consumer of CO_2 emissions (in 2008, 32,000 tons CO_2 were released). According to legislation package "Energy – climatic changes" till 2020, adopted by European parliament in December 2008, one can ascertain that 20% of energetic need of EU must be covered by renewable energy (biomass, solar energy, aeolian one). As part of this target, Member States must reach the target of 10% biofuel in consumption ration. Thus, farming activities must significantly contribute to the increasing of added value. As regards the price, it is influenced by market evolution and demand for biofuel crops. The production costs of biofuels vary significantly depending on raw matter, process and location. Location determines the access to certain raw matters and energy supply. The based

processes to produce bioethanol and biodiesel do not vary too large, and rapid evolutions in installation design have important effect on crop economies (raw matter).

Having in view that EU has introduced biofuel politics, the European ethanol industry from renewable sources released and sustained over 70,000 direct places of work and indirect ones – engineer, construction, operations and transport. The potential will be of 1 million places of works for future (Renewable ethanol: driving jobs, growth and innovation throughout Europe State of the Industry Report 2014).

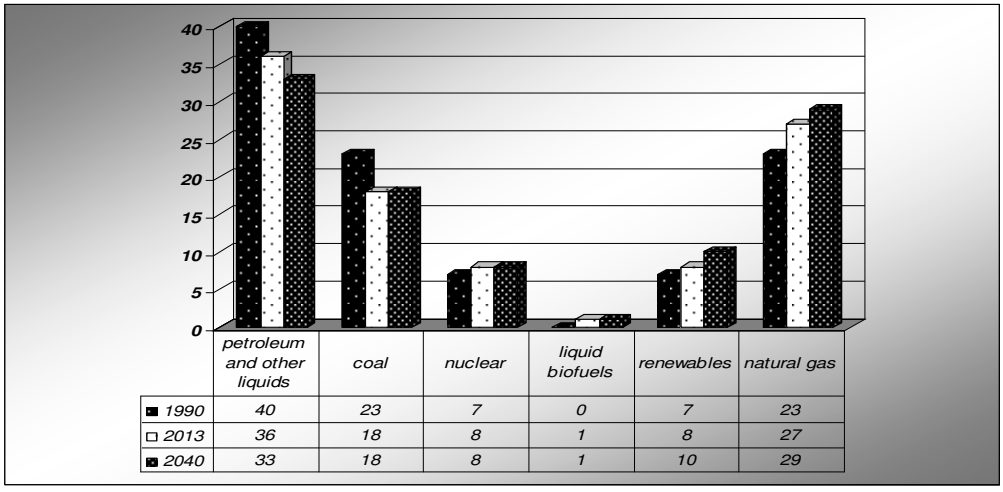
Romanian agriculture by exploiting arable land at their true value and integrity can be a constant provider and most important for biofuel market, mainly using the agricultural waste.

The experiment presented in this study fortifies the confidence in economical use of waste that initially were used or destroyed by burning.

2. Materials and Methods

2.1. Knowledge of the domain

At global level, the humans increase rapidly: from 2.5 billion in 1950 to 5.6 billion in 1994, and the UNO estimations for 2025 show around 7.9 billion. The increasing of population means the amplification of global requirement of foods and concomitantly of fuels. So, primary energy consumption in 2009, signaled by the Energy Information Administration, Monthly Energy Review, June 2010, is based on natural resources (petroleum 37%, natural gases 25%, charcoal 21%) (Fig. 1).



	petroleum and other liquids	coal	nuclear	liquid biofuels	renewables	natural gas
1990	40	23	7	0	7	23
2013	36	18	8	1	8	27
2040	33	18	8	1	10	29

Fig. 1: Past, present and future into fuel production structure (%) (Global statistical data processing)

The fossil fuels are the result of very slow chemical reactions of transformation polysaccharides into chemical compounds likely lignin fraction. As a result, the chemical charcoal compound ensures a more concentrated energy source. All types of fossil fuels (ancient biomass, in fact) maintain greenhouse gas

emissions (57%). The luxury and superior technique have amplified the greenhouse gas emissions. The anthropogenic sources responsible for these accumulations are many of them and different as intensity. In descending order, according to Global Warming Potential, Intergovernmental Panel on Climate Change classify them, as follows: (IPCC radiative foraing report: Climate change 1995): dielectric fluid (SF_6 → 23900 GWP); liquid coolants ($CHClF_2$ and CCl_2F_2 → 1300 – 7100 GWP); production of aluminum (CF_4 → 6500 GWP); fertilizer and industrial processes combustion (N_2O → 310 GWP); fossil fuels, waste dumps, livestock (methane → 21 GWP); fossil fuels combustion, land use conversion, cement production (CO_2 → 1 GWP). GWP measures the radiate relative effects of different greenhouse gases. The global warming resulted could be estimated by multiplication adequate to GWP with gas quantity and taking into account some specificity (distribution, effects, and uncertainties). If, the transport is analyzed, the energy consumption at EU level is of 32%, and emissions contribute with 20% to greenhouse effect (Olteanu, 2007). The impact of gas emissions from the transport sector depends on propulsion systems and how they are made, and the type of fuel used and how it is produced and distributed.

Interest in alternative fuels has been focused mainly on transport fuels. Transportation of people and goods requires a large amount of energy, that about one third of EU energy consumption. This claim is covered, largely non-renewable energy sources (oil or gas). Much of the energy (¾) consumed by the transport sector uses traffic. Even so, the utilization of public transport leads to the saving of 450 gr. carbon dioxide for each 1.6 km of road (Caisin, Şveţ and Halaim, 2014).

At global level, the aircraft is indispensable for tourism and facilitates the trade. As a result, quality of life is improved, including by creating jobs (air transport industry generates 32 million jobs worldwide). The global economic impact of aircraft is equal with 7.5% of global GWP. The contribution of this kind of transport to climatic changes is about 2% of CO_2 emissions and can reach to 3% till 2050. For this industry, the fuel is one of the highest operation cost (Basset et al., 2010). As a result, the energy resources necessary to change resorting to bioproducts and secondary products - from single-celled organisms, the wood material, all of which can be a source of raw material for a fuel. The use of lignocellulosic waste as a renewable energy source, replacing fossil fuels, was demonstrated to be technically feasible and economically attractive (Şuteu et al., 2016).

During 2000 – 2010, the renewable energy, having as sources biomass and wastes (67.6%), has registered the highest annual percentage increasing of total energy consumption (5.6%). Availability of alternate fuels for cogeneration helps to limit the amount of bagasse as fuel at sugar plants and make them available for other uses such as ethanol production (Pazheri et al., 2017).
The need of renewable energy is required as much as there are no damages on environment and not competes with foods.

- Climatic changes and biodiversity

On global warming, there are registered extreme meteorological phenomena – drought and heat, storms and hard winters – with repercussions regarding the food ensuring. So that, the drought affects productivity in farming, diminishing vegetal yield and implicitly livestock production linked to food and non-food products. Therefore, the drought effect on soil leads to the decreasing of its fertility. But, drought could be avoided by irrigation systems, with implications of all water sources, with risks sometimes and increased costs of yields. On the other hand, the moisture excess provokes flooding, with well-known repercussions.

In Romania, country with temperate climate, characterized by four seasons, there are also registered the difficulties generated by climatic changes. For example, if the cold season could be diminished, thing already registered, one can highlight the increasing of pests and diseases due to good conditions for pests rearing. Presently, the vegetal biodiversity is various, with cereals (maize, wheat, barley/two-rowed barley), legumes for grains, industrial crops (oil crops, raw crops), vegetables, fodder crops. Besides them, there are also vineyards, fruit trees and natural grasslands (Table 1 and Fig. 2; source: NIS).

Table 1: Area occupied by Romanian plant species in 2015

Groups plant species	*Area, ha*
Grains	5,463,570
Legumes (no soy)	44,675
Oleaginous	1,514,663
Textiles	504
Medicinal and aromatic	3,211
Potatoes	185,878
Sugar beet	26,591
Sorghum for sweep	2,748
Tobacco	745
Vegetable field	137,029
Watermelons and yellow	26,009
Hop	225
Green fodder in arable	845,442
Strawberries	2,573
Flowers and ornamental plants	417
Orchards and nurseries	196,941
Vineyards and vine nurseries	209,417

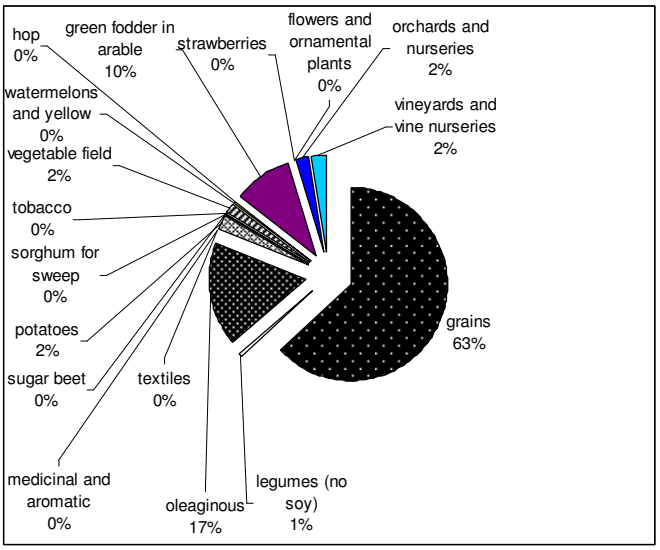


Fig. 2: Structure of plant species in the agricultural area of Romania

One can ascertain the preponderance of small grains, which are unequally located all over the country and also, the yields are different due to various pedoclimatic conditions (Fig. 3).

The total yield of 19,286,236 tons of grains in 2015 achieved on 5,463,570 ha, leading to the average yield of 3,529 kg grains/ha. Besides main yield, there are registered vegetal residues with different destinations.

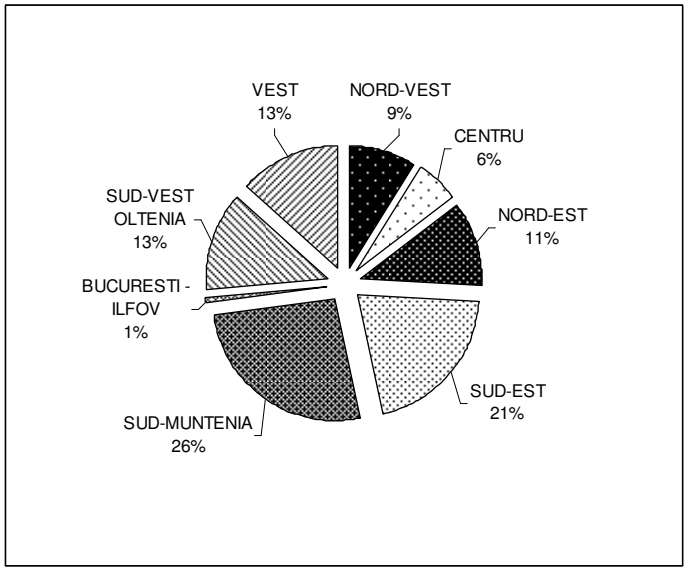


Fig. 3: Grain yield structure, on development regions in Romania, 2015 (NIS)

The global warming with $+2^0$C will affect the yield structure, with repercussions at all levels (economic, social).

- Bioeconomic systems

As a response to current and future needs, must pay attention on the fact that only bio-systems recover the economy.

Regarding strictly the cereals and highlighting the weights and importance of all crop components, ascertain that nothing is lost but everything turns into energetically resources. So, United States Department of Agriculture (2010), based on historical importance of maize has designed the utilization structure of this crop (Figure 4), in favor of bio-economy (Current Consumption of Biomass Resources).

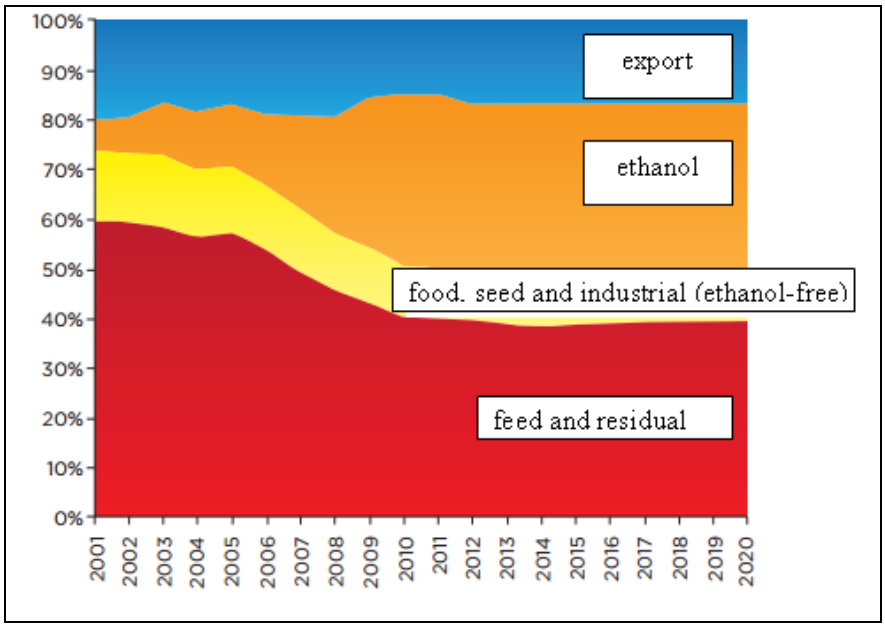


Fig. 4: Maize importance: history and predictions [USDA-ERS (2010e), USDA-OCE/WAOB (2010)]

- Biomass

The oldest form of energy storage with sun support life on earth is biomass. Technologically speaking, this is structured in main yield, which, in most of cultivated species, is expressed in grains, and secondary products, which represents the vegetal residues (Table 2).

At world level, there is an important activity to utilize the biomass for electric and thermal energy production vs. greenhouse emissions effects. According to Decision of the Committee of Non-pollutant Development Mechanism linked to Kyoto protocol, the biomass is considered as renewable in the case in which one of the following conditions is met (CDM EB23, Anexa 18): belong to forestry areas; is non-woody material from arable lands and or grasslands; represents biological residues (biomass residues) with utilization that not diminish carbon stocks; is non-fossil part of industrial/town wastes.

Table 2: The structure of biomass accumulated into crop, 2015

Species	***Ratio grains:straws***	***Average yield in Romania, kg/ha***	
		Grains	***Strains***
Wheat	1:0.8	3842.00	3079.20
Maize	1:1.3	3509.00	4561.70
Sunflower	1:4.1	1758.00	7207.80
Soybean	1:0.6	2062.00	1237.20
Rape	1:2.9	2530.00	7337.00
Average/ha		**2740.20**	**4684.58**

The developed countries utilize modern technologies in order to put in value the energetic potential in biomass by direct burning or obtaining liquid or solid fuels. The biomass sources are represented by forestry wastes, resulted in wood processing, vegetal residues from farming and food industry, animal residues, and lately, special crops with rapid growth rhythm. The arguments in favor of energetic utilization of biomass are as environment preservation, but socio-economic viewpoint, too. At the same time, the uncultivated fields could be used. A current technology of energetic utilization of biomass has the advantage of the utilization of an organic fuel. The biomass is a renewable source of energy which is base of warm, cold, electricity, fuel production (Caisin, Şveţ and Halaim, 2014). As follows, the vegetal yield is an important resource to produce renewable energy, but the weight of biofuel/ha depends of the utilized crop (Table 3; Rajagopal et al., 2007, for global data; Naylor et al., 2007, for national data).

Table 3: Biofuel yields

Crop	***Global/ national estimates***	***Biofuel***	***Crop yield***	***Conversion efficiency***	***Biofuel yield***
			tonne/ha	***litres/tonne***	***litres/ha***
Sugar beet	Global	Ethanol	46.0	110	5 060
Maize	Global	Ethanol	4.9	400	1 960
Wheat	Global	Ethanol	2.8	340	952
Sorghum	Global	Ethanol	1.3	380	494
Maize	USA	Ethanol	9.4	399	3 751
Maize	China	Ethanol	5.0	399	1 995
Soybean	USA	Biodiesel	2.7	205	552
Soybean	Brazil	Biodiesel	2.4	205	491

Researchers at the National Institute of Research and Development for Potato and Sugar Beet Braşov made assessments on agrodiversity of plant capable to produce efficient biomass for energy and purposes associating of crop rotations for an friendly environment (Donescu et al., 2010). It means that not all vegetal products from the farm can be commercially, but can make a profit by exploiting and using differentiated. Thus, in addition to the main product of the crops, there are by-products (straw, corn cobs etc.) that can be transformed or developed in the energy field. As part of good crop rotations, valuable species could be introduced which cover the need of renewable biomass and ensure efficient land and resources utilization for environment preservation and protection. In this regard were proposed systems of biomass production in the crop rotation of Romanian farms that are only accessible for bioenergy and biofuels:

System	***The crop rotation***	***Yield utilization***	
		commercial	***energetic***
Field crops, main ones	sugar beet; cereals; potatoes; sorghum, rape etc.	main yield	straws, leaves, heads, straws, small cut potatoes, vines, overyields
Fodder crops	silo maize; alfalfa; reed canary grass (*Phalaris arundinacea*); fodder crops, in mixture; sorghum, rape etc.	fodder	biomass excess
Secondary crops	perennial grasses; mixtures of grasses on untapped mountain grassland; mixtures of grasses to utilize less productive fields	for livestocks	energetic biomass
Biomass production	- implemented by the farmers near to biodiesel, bioethanol, biogas, briquettes or pellets industry;		

	- deliver biomass as main product, based on agreement		
Bioethanol production	sorghum; sugar beet; small grains; maize for kernels; potatoes; jerusalem artichokes		bioethanol
Biodiesel production	- rape for oil		biodiesel

The presented structure of crops is neither exhaustive nor restrictive. Depending on needs and farmer possibilities, any other systems and utilization methods could be adopted. A bio-economy develops only then the access to primary raw matters at a satisfactory and correct price could be guaranteed. In the case of biomass import, the investments are limited.

- Biofuels

All branches of economic cooperation and access to biotechnology is affirmed also by Pacala S., co-director of the CMI (Carbon Mitigation Initiative): "There is no single technology that will magically solve the carbon and climate problem, but there is a constellation of technologies - silver buckshot instead of a silver bullet" (BP Global). At the same time, Socolow R. (CMI) proposes to modify the energetic systems, for their efficiency increasing: "Efficiency is the number one strategy for moving to a lower carbon future. We need to modify energy systems, have an automobile fleet that's twice as efficient as the one we have today, and have buildings and cities designed to save more energy. This isn't about picking winners, but having energy efficient transformation across the board".

The rapid rhythm of primary energy demand increasing was observed in non-OECD countries, representing the reflex of rapid ratio of increasing in population, economic activity, urbanization and industrial production.

A strong instrument would be to make bio-based materials and products economically attractive or even mandatory for the industry or end consumers; as an example, this was successfully accomplished for bioenergy, biofuels, and solar and wind energy (Carus, Dammer and Essel, 2014).

An energy technology, as defined by Gallagher at al. (2006), refers to "tools for location, evaluation, harvesting, transport, processing and transformation of primary energy forms from nature" with a view to deliver energetic services (warm, fuel, electricity or biofuels) to the users. The resources necessary to produce different types of fuels by processing of various raw matters to be utilized for warming, transport or energy are presented in Fig. 5 (after processing FAO).

The relationship between natural resources and energy production is presented in Fig. 6 (overall presentation: synergy ecology – economy; after processing Energy and natural resources) and Fig. 7 (energy from non-renewable resources, polluting and renewable ones, with neutral CO_2).

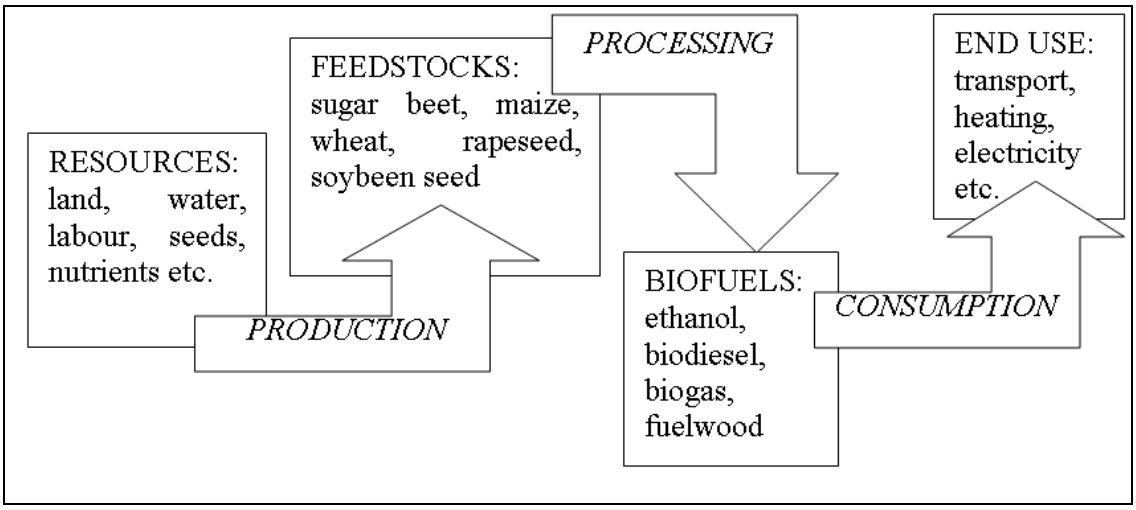


Fig. 5: Resources of biofuels obtainment and utilization

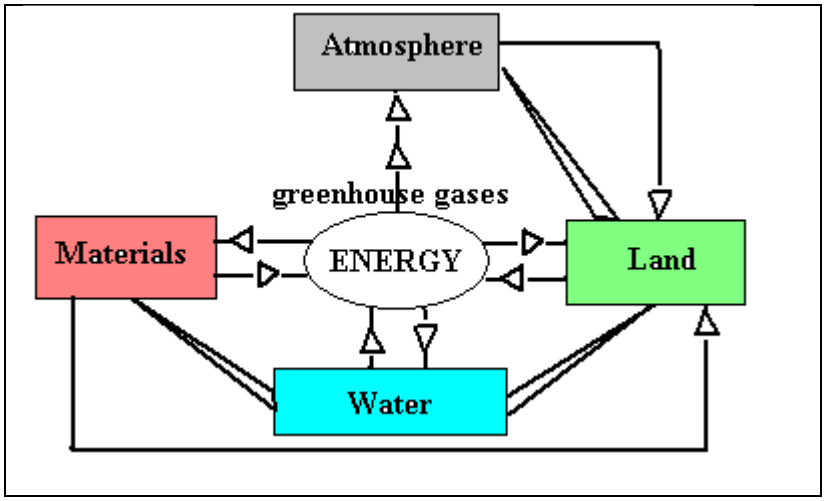


Fig. 6: Global model of ecological synergy – economy

According to Fig. 7, the renewable energy results from vegetal production. Depending on bio resource, the biofuels were classified as follows:

- first generation → obtained from carbohydrates, starch, vegetal oil, animal fats, sugar beet, cereals, oil crops. For example: vegetal oils (direct utilization), bio-diesel (trans-estherification of vegetal oils and animal fats), bio-ethanol (fermentation), bio- ETBE, biogas. The major disadvantage is that biomass is commonly with that used for food production (Greve, Barbanti and Fazio, 2012);

- second generation → obtained from ligno-cellulosic matters, after crop harvesting, from residual biomass. For example: cellulosic bioethanol, synthetic biofuels, biogas from ligno-cellulosic material, bio-hydrogen ligno-cellulosic material;

- third generation → obtained from raw matters genetically modified. For example: oil crops with high oil productivity, woody biomass with low level of lignine content, biofuel obtained from algae;

- fourth generation → obtained from crossing crops or genetically modified ones, which absorb specifically large quantities of CO_2. For example: bio-hydrogen from fermentation of selected biomass or water photosynthesis utilizing microorganisms as catalysts (Greve, Barbanti and Fazio, 2012).

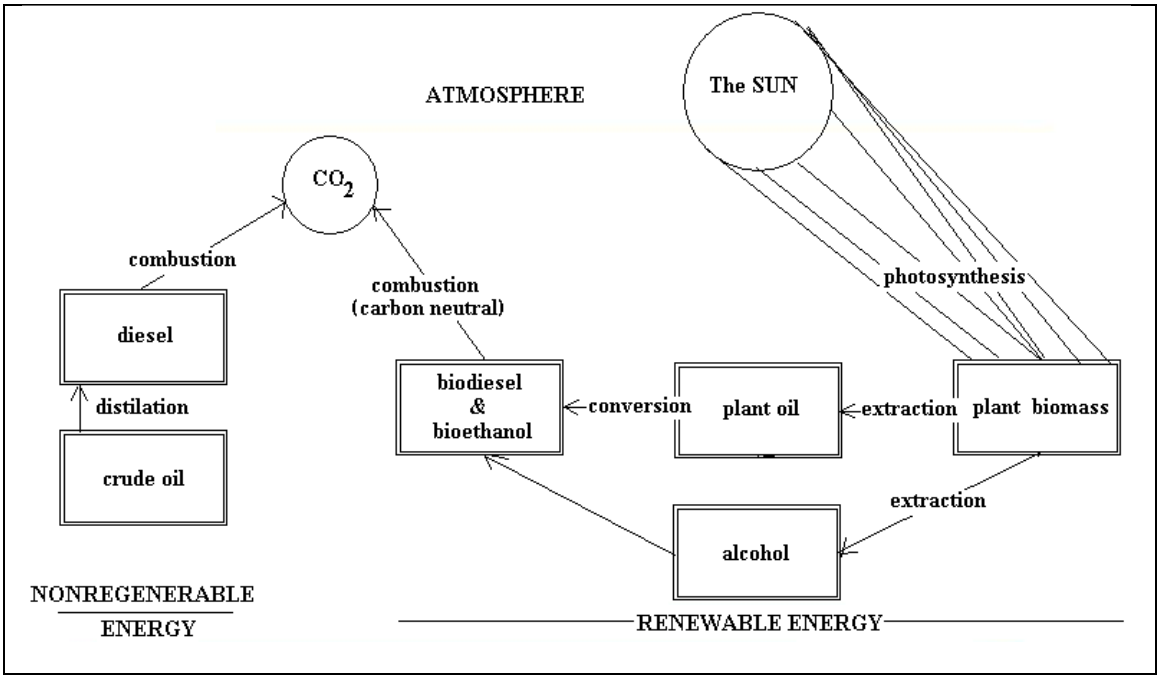


Fig. 7: Energy production from natural resources

- Bioenergy in Romania

In the project named The strategy for development of food sector on medium and long-term Orizont 2020 – 2030 released by the Ministry of Agriculture and Rural Development, the contribution of farming to bio-energy sector development is achieved by:
- utilization of biomass into thermic energy obtainment as part of farm;
- utilization of biofuels from first generation to soil tillage systems as well as to land reclamation;
- implementation of technologies for collecting and utilization of agricultural residues; achievement of micro-stations to obtain biogas as part of farm or group of farms;
- introduction of other types of renewable energy in farm or group of farms, such as wind energy, solar and geo-thermal ones;
- establishing of forestry short-cycle crops to use biomass as energetic aims;
- avoidance of stubble burning and collecting of vegetal residues for energy;
- production of biofuels must not come from soils rich in carbon (humid areas, areas with dense forestry) or soil rich as diversity (protected areas, biodiversity areas).
The same reference source specifies that it is necessary to introduce into production the second generation of biofuels, which ensure more efficient utilization of biomass and do not compete with food production. Therefore, by modern management of organic wastes, the volume of greenhouse gas emission will be

diminished, and the "manure" becomes an important source of renewable energy and fertilizers (M.A.D.R., 2015).

2.2. Bioethanol and its obtainment

Bioethanol is the ethylic alcohol which can be produced by the fermentation of biomass elements, rich in sugar, starch and recently lingo-cellulosic elements. As follows, the crops used in bioethanol production are sugar beet, maize, sorghum, wheat but secondary products or by-products, respectively, stems, straws and other vegetal residues.

Bioethanol is used as substitute for gasoline or in mixture with it, in combustion engines, even as high percent of mixture for FFV vehicles (flexible combustion vehicles; FECHA, 2011). Bioethanol production starts in '80s and increases continuously. The highest producer is Brazil (sugar cane as raw matter), being competitive as costs of production and final price to the consumer. Next producer is USA. In Europe, bioethanol is mainly produced from wheat grains (50%) and barley (20%), as well as sugar beet (30%; BioNETT). The average weights are around 2,790 liters/ha. In 2010, 5% of EU agricultural area was scheduled for bioethanol production. Some authors (Hill et al., 2006) underline that the ethanol produces 25% more energy than energy invested in its production.

2.2.1. Manufacturing of bioethanol using lignocellulosic materials as feed stock

Bioethanol manufactured from lignocellulosic feed stock is known as second generation bioethanol. The raw materials that can be used can vary from agricultural residues to weed or wood with the possibility to extend the feedstock considering the research in this study.

Suitable technologies to convert lignocellulosic materials to ethanol are through biochemical conversion or thermochemical conversion (Fig. 8; bibliographical synthesis process after getting on biofuels).

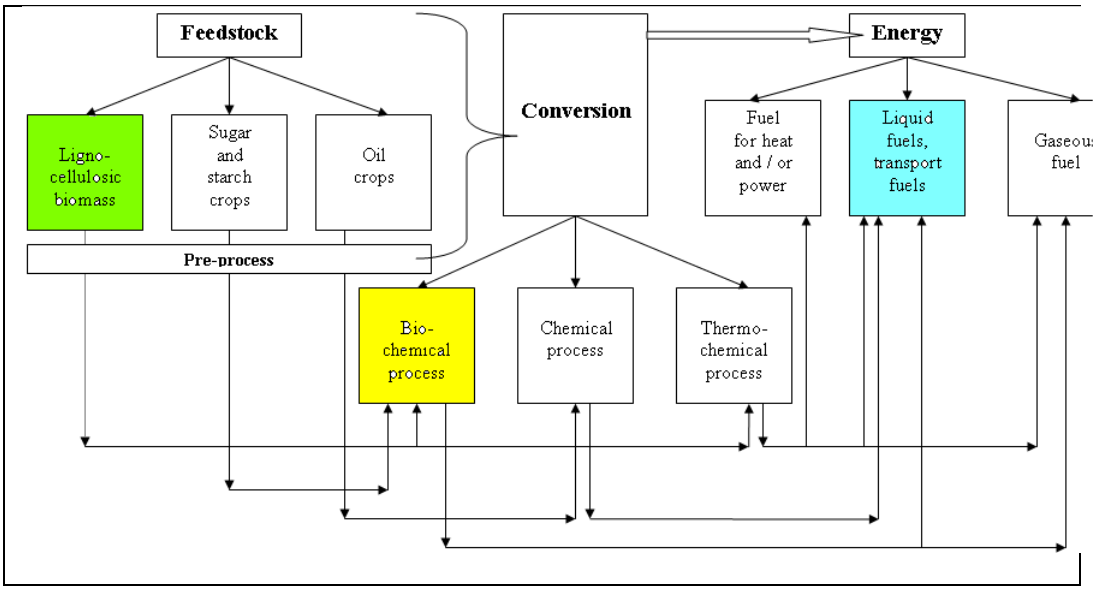


Fig. 8: Diagram of the process to bioenergy manufacturing – bioethanol

Biochemical conversion is presented down below (Fig. 9; after processing bibliography data).

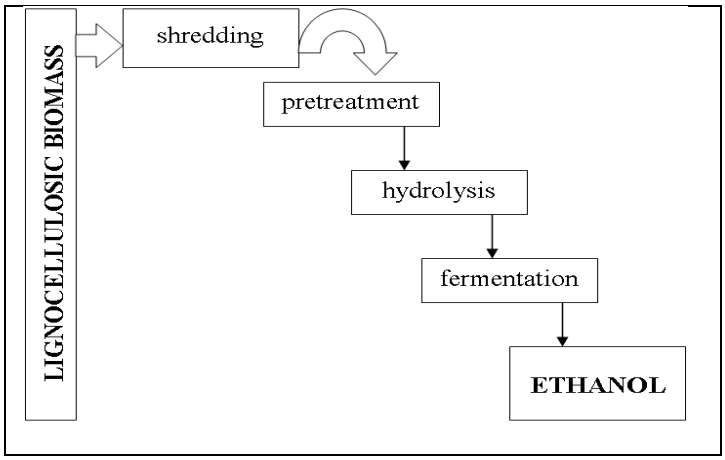


Fig. 9: The process of ethanol manufacturing from lignocellulosis biomass

3. Results and Discussions

The bioenergy potential at local level is limited by the total quantity of energy produced by photosynthesis. Thus, the vegetal biodiversity, only responsible by CO_2 processing, is the human saving. From the vegetal organic matter processing results biofuels, which will release, by burning, only so many carbons how many are in its composition; CO_2 emission of these biofuels being reduced versus fossil fuels utilized in all economic branches.

As follows of renewable and non-renewable resource exploitation results renewable stocks (vegetal, domestic, petroleum, mineral, chemical wastes) and non-renewable (pollutants that enter into environment/natural capital: pointing emissions in troposphere diffuse emissions, surface waters, storage/landfill). The requirement of energy renewable resources is an important issue, due to decreasing of fossil fuels and climatic changes. The renewable stocks must re-enter into processing for consumption under impact of biotechnologies (Vădineanu, 1998), releasing concomitantly some non-renewable components (processing adjuvants). Therefore, the biotechnologies do not process entirely the renewable stocks, but the resulted wastes are insignificant versus raw matter under processing and re-enter in the next biotechnological stages.

The biofuels, alternative of fossil ones, are vegetal oils used as they are, biodiesel, bioethanol (first and second generation), bio – ETBE, biogas (fisrt and second generation) and biohydrogen. They are classified into I – IV generations, depending on raw matter, respectively biomass.

Biomass, as definition, is the bio-degradable part of the products, wastes and residues from farming, including vegetal and animal substances, forestry, and conex industries as well as bio-degradable part of the urban and industrial wastes. The term includes agricultural products, waste resulting from the processing of crops or waste crops, including cereal straw, residues from the production of sugar, starch. All these stock the solar energy into chemical one and ensure besides foods, materials, papers, construction material and energy. According to statistical data, the developing countries ensure 38% of their own energy needs from biomass; Finland ensure 18% of own energy consumption, Suedia about

14%, Austria about 10% etc. Biomass is currently used from room heating to produce electricity and fuel for automobiles. The biomass, which represents about 15% of primary energy sources does not contributes to the growth of CO_2 emission but at reduction of greenhouse gasses and does not produce acid rain.

During 2000 – 2010, the renewable energy, having as sources biomass and wastes (67,6%), has registered the highest ratio of annual increasing (5,6%) of total energy consumption.

The need for renewable energy sources is higher because it does not cause significant environmental damage and do not compete with food supplies. Structure use of energy resources may change resorting to bio sources - products obtainable in farms. For example, currently, the biodiversity of plant species comprising the Romanian farms grain (corn, wheat, barley), grain legumes and crops (textiles, roots), vegetables, fodder, vine and fruit plantations and mixtures of natural flora in natural pasture and hay. From this presentation is found products intended for food, feed and industrial development of biofuels including first and second generation. It requires the introduction of the biofuels production of second generation because it provides more efficient use of agricultural biomass and does not compete with food production.

The energetic policy and national strategy are focused on many renewable resources. In this respect, as part of crop rotation, the researchers of National Research-Development Institute of Potatoes and Sugar beet Braşov proposed systems to produce available biomass only for bio-energy and bio-fuels. Another approach is to increase the number of species as raw matters. Optimum choosing of crops is essential to obtain positive value of energetic sheet. The crops technology is a factor that is more effective in terms of energy consumption during the production of biofuel. As a result, the studies about energy balance of biofuels is positive. More energy can be possible to obtain from biofuels than energy consumed in their production. But biofuels are not competitive with fossil fuels due to higher production costs. Bioethanol obtained under laboratory support demonstrates energetic potential of lignocellulosic plant residues, which contributes to collect any waste as additional financial resources from farmers.

Solomon et al. (2007) suggest the less production cost of cellulose ethanol versus gasoline one. Ligno-cellulose ethanol (second generation) is more expensive than that obtained by cereals and produce more less CO_2. Solomon et al. (2000) estimated the reduction of emissions of CO_2 near zero. The production of biofuels reduces the negative impact on environment. Also, it creates new opportunities in economy, new works place. The biofuels production have higher costs than conventional ones. These production costs are however difficult to estimate, because are determined by the raw matter prices, processing method as local variations (tillages, fuel taxes).

The costs could be compensated by the benefits of excise duty on fuels, to stimulate the production. Some many states from EU have decided “0” excise duty on fuels, for standard bio-fuels.

The National Strategy for Energy (chapter Bio-renewable energy) underlines the importance of development researches in bio-economy specific to this sector. As a result, the research undertaken is of interest.

4. Conclusions

The biofuels (fuels obtained from organic matter) are the main replacement of gasoline and diesel fuel in transports, being available at large scale. They could be utilized by ordinary cars. The biofuels utilization, as biodiesel, bioethanol and biogas could promote the increasing of sustainable energy utilization in transport and could reduce the dependence of fossil fuels. The energy consumption in transports is

strongly linked by economy. An increased economy means an increasing of transport needs, to satisfy the higher level of requirements for goods and services. The requirement of transport, no matter of expression (no of people, volume or quantity of fuel consumed into a unit of time and space), could be under raising (some sources doubled the consumption in 2020 versus 1990).

Also, the biofuels release generally less greenhouse gases versus fossil fuels and could support to fulfill of EU provisions regarding the diminution of these emissions. As regards the avoidance of climatic accidents based on greenhouse emissions, the science searches and forecasts potential energetic solutions with reduced carbon emissions. The bioethanol utilization could reduce the emissions (20%-100%). By emission reduction one can ensure the air pollution and diminution of costs in healthy domain. Maintaining healthy environment, the conservation of biodiversity increases, by preservation and maintenance of the main carbon reservoir – multiannual vegetal species.

The farming activity as well as the annual yields obtained in raw matters necessary to obtain bio-fuels establish the interest of a country to reduce greenhouse effect. As investor point of view, he must searches the existence of farming potential great enough to cover necessary of production or to estimates the costs in case of import. At the same time, he must know the energetic balance of ecological fuels, which register significant differences, generated by the used biomass stock. The sources of clean energy – bio – increase the energectic safety and give new places of works.

The increasing of bio-fuels will lead to raising of product prices, so, of income too, concomitantly with sustainable rural development.

Showing the recent progress of research in the production of enzymes, pretreatment and metabolic engineering yeasts, bioethanol production from agricultural lignocellulosic waste will certainly prove to be a feasible technology to ensure energy security in the near future.

References

Basset N., Kermah M., Rinaldi D., Scudellaro F., (2010), *The net energy of biofuels*, EPROBIO IP June; http://www.iperasmuseprobio.unifg.it/dwn/THENETENERGYOFBIOFUELS.pdf.

BioNETT; On line at: www.sts-technology.com/docs/Bioethanol-Fact-Sheet-Final.pdf

Caisin S., Şveţ A., Halaim N., (2014), *Sources of renewable energy*, Tipar and Editare: Bons Offices, Chişinău, 70 – 89.

Carus M., Dammer L. and Essel R., (2014), Options for Designing a New Political Framework of the European Bio-based Economy, In Bio-based News; http://news.bio-based.eu/options-designing-new-political-framework-european-bio-based-economy/.

Donescu V., Chiru S., Olteanu Gh., Zevedei P., Hermeziu R. and Taus R., (2010), *Technological solutions for increasing energetic independence on small-farm level*, I.N.C.D.C.S.Z. Braşov, Romania.

Energy and natural resources; http://www.bp.com/en/global/corporate/technology/technology-strategy/energy-and-natural-resources.html.

European Commission, (2012), *Staff Working Document* 343, 94

European revewable ethanol, (2014), *Renewable ethanol: driving jobs, growth and innovation throughout Europe State of the Industry*, Report 2014.

FAO, (2008), *The State of Food and Agriculture, Biofuels: Prospects, Risks and Opportunities*, Chapter 2, 10

Gallagher D.T., Smith N.N., Kim S.K., Heroux A., Robinson H. and Reddy P.T., (2006), *Structure of the Class IV Adenylyl Cyclase Reveals a Novel Fold*. J Mol Biol 362(1):114-22

Georgescu-Roegen N., (1970), *The Economics of Production*. American Economic Review, 40.

Greve A., Barbanti L., Fazio S., (2012), *Biocombustibilii – o soluţie controversată privind accesul la energie*, GVC.

Greve A., Barbanti L. and Fazio S., (2011), *Handbook on biofuels and family agriculture in developing countries*. Patron Editore, Bologna.

Hill J., Nelson E., Tilman D., Polasky S. and Tiffany D., (2006), *Environmental, economic, and energetic costs and benefits of biodiesel and ethanol biofuels*, PNAS vol. 103 no. 30, 11206-11210.

Naylor R.L., Liska A., Burke M.B., Falcon W.P., Gaskell J.C., Rozelle S.D. and Cassman K.G., (2007), *The Ripple Effect: Biofuels, Food Security, and the Environment*, In Agronomy & Horticulture - Faculty Publications, University of Nebraska – Lincoln.

Observatorio Industrial del Sector de Fabricantes de Bienes de Equipo, (2011), *Biomasa. Oportunidades para el sector de fabricantes de Bienes de Equipo*, FECHA: Diciembre 2011, 110.

Olteanu P. A., (2007), *Producţia şi consumul de biocombustibili ca energie a viitorului*, în Economia seria Management, Anul X, Nr. 2, 59.

Pazheri F., Othman M., Kaneesamkandi Z., Malik N., (2017), Environmentally friendly power dispatch at sugar plant with optimum bagasse utilization, In Environmental Engineering and Management Journal, Vol. 16, No. 1, 235-243.

Rajagopal D., Sexton S.E., Roland-Holst D. and Zilberman D., (2007), *Challenge of biofuel: filling the tank without emptying the stomach?*, IOP PUBLISHING, ENVIRONMENTAL RESEARCH LETTERS, 2 (2007) 044004 (9pp).

Socolow R. and Pacala S., Video presentation - *The carbon challenge*, In BP Global.

Solomon B.D., Barnes J.R. and Halvorsen K.E., (2007), *Grain and Cellulosic Ethanol: History, Economics and Energy Policy*. Biomass and Energy 31: 416-425.

Şuteu D., Zaharia C., Popovici C., Maluţan T., Rusu L., Tăbăcaru L., (2016), *Wood waste as a renewable source of energy*, In Environmental Engineering and Management Journal, Vol.15, No. 3, 665-673.

U.S. Department of Energy, (2011), *U.S. Billion-Ton Update: Biomass Supply for a Bioenergy and Bioproducts Industry*. R.D. Perlack and B.J. Stokes (Leads), ORNL/TM-2011/224. Oak Ridge National Laboratory, Oak Ridge, 12.

Wasted, (2014), *Europe's Untapped Resource*, European Climate Foundation.

* * *, www.eia.doe.gov/emeu/mer/contents.html.

* * *, www.greenfacts.org/en/biofuels/figtableboxes/biofuel-yields-countries.htm.

* * *, www.madr.ro/docs/agricultura/strategia-agroalimentara-2020-2030.pdf.

* * *, www.INSSE.ro.

Information Requirements Related to Project Portfolio Management in Enterprise

Dominika Jagoda-Sobalak, Opole University of Technology, Department of Management and Production Engineering, Poland, d.jagoda@po.opole.pl

Iwona Lapunka, Opole University of Technology, Department of Project Management, Opole, Poland, i.lapunka@po.opole.pl

Katarzyna Marek-Kolodziej, Opole University of Technology, Department of Project Management, Opole, Poland, k.marek-kolodziej@po.opole.pl

Abstract

Information requirements, understood as a collection of content (data, news, information) needed to carry out missions successfully and effectively as well as achieve company goals, improve its competitiveness and increase adaptability to today's market conditions. The paper focused on identifying information requirements and shaping their importance in the process of the project portfolio management. Most of informational requirements related to basic information areas are well described and structured in the literature, nevertheless the development of information requirements of project organizations is a dynamic process with particularly difficult to grasp - formal frameworks. The specificity of work in a multi-task environment, determined by the uniqueness, complexity and specificity of the actions, indicates a flexible division of responsibility and considerable variability in access to specific data. An attempt to define information requirements related to project portfolio management in an enterprise is an initial step in the process of structural analysis and design of the early detection information system in the project implementation.

Keywords: information, information requirements, project portfolio management, management information systems.

Introduction

Dynamic socio-economic changes in the second half of the twentieth century have become a prerequisite for creating information societies or knowledge-based societies, and simultaneously have successfully accomplished the idea of the knowledge-based economy. Post-industrial societies, with the dominant service sector, have implicated changes in the structure of the economy and its subjects. This generated a discourse in the narrative to extract the information sector, as the fourth in the new economy, where information is regarded important and where information is considered to be a basic economic category.

In classical and neo-classical economic theory there are three main groups of production factors: land, labour and capital. The dynamic development of the organization theory of the 1950s emphasized the need to distinguish the fourth fundamental economic category – the organization. Today, information has become the fifth basic economic category. The production of goods and information services generating economic growth and job creation is a fundamental determinant of modern economic systems. Enlargement of development programs to provide easier and more effective access to information across all life aspects has become now a global strategy, unequivocally indicated in the international and national programs of various organizations and states in different parts of the world. It is confirmed both by efforts to provide modern companies with 'competitive or strategic intelligence' as well as European Union programs aimed at building a knowledge-based society.

The paper focused on identifying information requirements and shaping their importance in the project portfolio management process. An attempt to define information requirements related to project portfolio management in an enterprise is an initial step in the process of structural analysis and design of the early threat detection information system in project implementation.

Concept and property of information

In 1945 Vannevar Bush published the article *As we may think* (Bush, 1945), which contained a concept of a machine called *Memex*, which could associate ideas and simulate mental processes based on a linear but associative way of ordering information (Easley, 2010). According to American researchers, this was the event which determined, at large scale, the direction of the development of modern science of information. Bush has succinctly defined a critical problem that has long been straining the mind of many and has continued to provide effective access to a growing base of knowledge. He described it as an information outburst, it means an uncontrollable and exponential information increase and information recording, especially in science and technology. As a way to its solution, he pointed to the concentration of effort in order to improve the modern information technology. This was an anticipation of the birth of the modern information science.

The concept of information is defined differently depending on the way of defining (modelling) reality. Many authors who deal with information in their studies avoid attempts to define it. Information serves to generate desired changes in social attitudes or behaviours. In the information theory, information is a factor that reduces the scale of ignorance of a given phenomenon and allows a better performance. Drucker defines knowledge as the effective use of information in action and firstly appreciates its importance to the economy (Drucker, 1999). J. Penc defines information as a concept that means everything that someone knows about a particular subject or field. Such understood information is a message, basing on which the recipient undertakes particular actions. In practice, this means that information arises as a result of data integration and organization, which becomes meaningful, this way (Penc, 1994). On the other hand, according to I. Nonaka and H. Takeuchi, information is a stream of news while knowledge is its product, rooted in the beliefs and expectations of the recipient (Nonaka, Takeuchi, 2000). In this context, information consists of all events (real or conceptual), recorded, grouped, interpreted and generalized from the goal's viewpoint. On the other hand, the imagery produced on the basis of it, shape the knowledge of the surrounding reality.

In extended, general terms, information is a category that maps the features of things, defining certain forms of relationships or dependencies concerning objects, phenomena or mental processes. Information is neither matter nor energy, although it is closely related to them. It may exist objectively, independently from the will and consciousness of people. Information processes also occur within the area of human consciousness, as evidenced by, for example, numerous discoveries in genetic engineering. Information may appear in the system as a 'causal factor' (Greniewski, 1969), referring to phenomena that are not present now or occur in the past but will appear in the future. Information can be conveyed in time and space, and must always be 'expressed' in some way. Information is a useful way to organize and choose the facts that define the relationship between these facts. Information is an essential component of knowledge, subsequently knowledge is accumulated (cumulative) information and appropriately systematized. New information is not immediately 'attached' to the already acquired knowledge but first interpreted and placed in the right context. When information is combined with context and experience, becomes knowledge as an outcome (Dziuba, 2007).

The value of information is not easy to quantify (Eaton, Bawden, 1991), it depends on its context and application by selected user groups in certain conditions. Determining the value of information is subjective and depends on many factors, and at the same time is prone to vary over time. In literature, the multitude of approaches concerning the information requirements' research undoubtedly indicates the tremendous impact of relevant information on the functioning of the organization and highlights the complexity of this area of business. Table 1 presents the eight most commonly used methodological approaches concerning examining information requirements, along with their characteristics, and the main advantages and disadvantages in the application phase.

Table 1: Selected methodological approaches used to determine user information requirements

Method name	Characteristics	Usage – advantages and disadvantages
By product	testing requirements is a side effect, since the ultimate goal is to test the final product	used to create problem subsystems; advantage - low labour intensity, relatively short conduction times; disadvantage - in most cases, decision makers' requirements are only partially met
Total study	study carried out on a large group of executives; a comparative analysis is conducted on the basis of establishing differences with the existing system	significant business areas are defined, however, it requires considerable resources, and there is no certainty that the requirements have been genuinely established
Critical success factors	identification of action areas which should be constantly controlled by the organization's leadership	analysis of the organization's tasks state of progress; allows ongoing assessment of management effectiveness; a properly built hierarchy is assumed; high labour intensity of the work
Key indicator system	it is based on the selection of a key set of 'health' identifiers in the organization aiming to gather such data, from which various sets of information may be edited	it allows to distinguish common types of functions to fulfil which, relevant information is needed, an attempt is made to identify the environment and establish an objectives hierarchy; disadvantage - objective definition and decomposition
Business information characterization study	based on the organization's information model, so-called unique resources are defined; it facilitates the analysis of existing data sets and problems encountered by management; creates a collection of unique identifiers that characterize the management items in the organization; the identifier and associated data represent a 'resource' with actual data, what allows to reveal problems affecting the functioning of the organization	eliminates so-called information diffusion between the information system and requirements; shortens the process of detecting and correcting such insufficient information that can not be recognized by further analysis of separate utility systems; on average it speeds up software production four times
Business process model	tends to recognize basic, input entities that initiate the production of input information; implemented in successive phases, such as development of an overall plan, verification of the company's economic processes, model verification, reference of economic processes to specific organizational entities	the possibility to create on paper a model of the processes taking place in the organization and to analyze the requirements and information flows related to these processes; consequently, it enables to identify data transferred between your organization's economic processes
Enterprise activity matrix	it is based on the theory that there are limited number of tasks (activities) in the organization and that they are carried out by the work subjects of the enterprise; consequently, one may create a matrix that takes into account all of organization's activities: first of all it needs to define what the organization is doing (what it does?), what environmental conditions are (how it does it?), and subjects of action (what it does?)	gives managers a picture of everything what is going on or should happen thanks to the method of tasks assignment and the desirable characteristics of the information systems; the hitherto used approach resulted in such effects like: elimination of systems duplication, improvement of the user communication with the system creator, the support of organizational management processes
Information control net model	a formal model to determine user's requirements in the office environment; the model is a descriptive technique and a standard notation that: creates a framework for data collection, implements cohesion, completeness, and logical organization, favours comparison of alternative procedures and the development of elaboration of forms and data sets	used to represent and analyze the information flow in the course of activities; it simplifies and automates overlapping activities; redundancies and malfunctions are eliminated by confrontation with the model schemes

Source: elaboration based on (Kisielnicki, Sroka, 1999)

Informational conditioning of the project management process

One of the conditions of proper management of the projects and innovative projects portfolios is an efficient information system that forms data sets and the methods and techniques of their processing. The collected information is of a scientific, technical, organizational and economic nature and is intended for those involved in the implementation of innovative undertakings. The aim of the information system is to provide the necessary information and decision-making tools first of all to the project support offices and then also to project managers and other decision makers in a multi-project environment (cf. Fig. 1). Out of the wide range of information resources, financial information plays a special role in managing projects and portfolios of innovative projects.

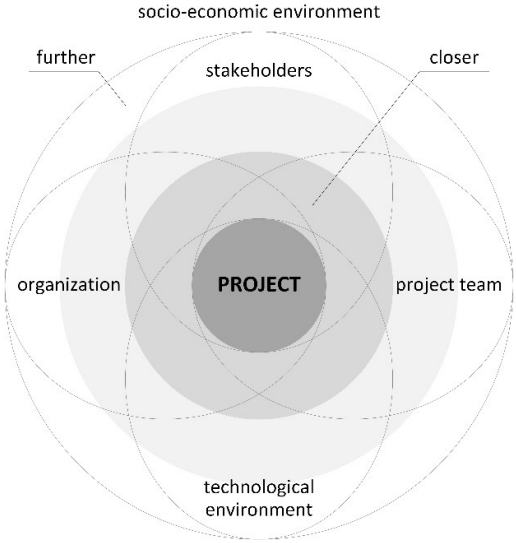


Fig. 1: Typology of shaping information requirements in projects
Source: own elaboration

In the literature concerning the subject financial information is regarded as a sub-category of economic information, and its main feature is to present economic phenomena in monetary scale. Information describing monetary business projection is the basis for a variety of evaluations, analyses, and consequently economic decisions both at the single project level and in the innovative projects portfolio. It should be emphasized that the systems, recording data of planned and actual financial results of project completion are one of the main sources of information used by all stakeholders in the project management process. The decisions made by them depend largely on information which is reliable, presented in a correct form and cross-section, and provided at the desired time and place. This means that the quality of the information system determines the possibility of proper management of projects and portfolios of innovative projects during implementation within R&D activities of an enterprise. In view of the above, it can be risked to claim that the main source of such information in the field of R&D is accountancy.

The management accountancy creates information primarily for the company's internal management, which information is the basis for decision-making and the planning as well as the business control. Therefore, the management accountancy is interested in information not only about the past but also the predicted one, whereas the relevance, speed and low cost of acquiring information are highly important. The lack of legal solutions provides the ability to report internally in any form, at different time horizons, in financial and non-financial data, according to the various enterprise-specific entities such as liability centres, processes, projects, products, customers.

On the other hand, considering the relationship between information requirements and management levels in an organization, it may be said that each level of management requires and uses different types of information: operational, tactical and strategic (cf. Table 2). Each of these information types differs in scope, degree of aggregation, time horizon, source of origin, accuracy, relationship to the present, etc.

Table 2: Types of information requirements

Type of requirements	General description of requirements	Specific requirements of features
Strategic	related to the strategy of the entity	irregularity of occurrence individual character varied range high degree of risk
Tactic	related to the realization of the tasks of the entity and its cells	periodicity typicality relatively constant range average level of risk
Operative	routine, standard, related to current business activity	specified frequency of occurrence fixed range low risk
Emergency	interventional related to the occurrence of unforeseen events that cause interference and require appropriate action	varied range

Source: elaboration based on (Różańska, 2012; Kiziukiewicz, 2003)

Detailed information requirements are a derivative of decision-making problems. The objective of an efficient decision-making process is to ensure the decision-makers appropriate information resources. To make information support the project portfolio management, they should fulfil a number of requirements that determine their quality. These include:

- usefulness – i.e. suitability, adequacy in solving specific decision problems,
- relevance – manifested through influence on decisions made,
- comprehensibility (communicativeness, assimilation) – user's ability to understand without additional actions concerning transformations and interpretations,
- accessibility (easy and fast access) – the ability to use information in a place and time convenient for the user,
- credibility – the origin of information from sources that ensure its correctness, i.e. compliance with the actual state of affairs, without material errors and intentional distortions,
- topicality – timely provision to take action, completeness – no need to reach other information while solving a problem,
- economic profitability – the cost of acquiring information can not be higher than the anticipated benefits of the actions that will result from this information.

Information provides the basis for decision-making at all management levels (cf. Fig. 2). Information requirements mean the desire to have specific information resources to solve a decision problem or to interpret an ongoing event. It is important to note that information requirements are constantly changing. The process of shaping the company's information requirements is dynamic, never-ending, and is continually subjected to change. The objective of satisfying your company's information requirements is to answer your data questions. First of all – one needs to determine what data is demanded and when it is needed, with regard to the recipient. Secondly – one must state how to link the data and how to present it (Zając, Kuraś, 2009). Satisfying information requirements is essential to achieve the company's goals and fulfil its mission effectively. The complexity of business conditions does not make it easy to anticipate its future requirements. Compliance with the company's information requirements can also be considered in at least two ways: to meet the information requirements of at least two user groups – employees and management. In this context, the strategic look at information on the one hand is about identifying the

current requirements of the organization, and on the other hand makes it necessary to anticipate future information requirements for future business development (Lange-Sadzińska, 2014).

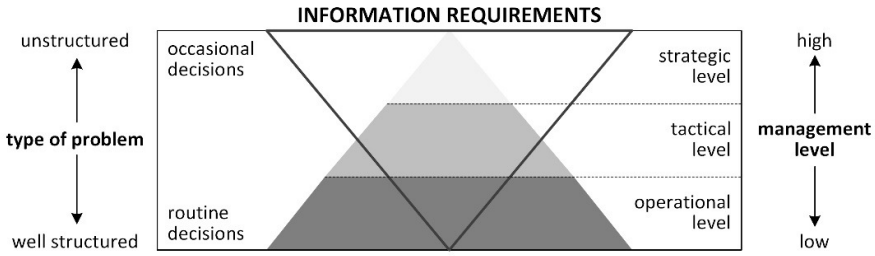


Fig. 2: Relations between information requirements, management levels, decisions and problems types

Source: elaboration based on (Gmińska, 2008)

For the needs of project portfolio management, the strategic level is becoming particularly important, characterized by decisions of unique and unstructured problem types. A set of strategic information features is presented in Table 3.

Table 3: The strategic information features for the need of the project portfolio management

Information features	The strategic information feature
Range	very broad, cross sectional
Degree of aggregation	summary and high, information 'condensed', aggregated information
Time horizon	relates to the future, prospective information
The form of the signal	important role of so-called weak signals
Relationship with the present	small, mostly prognostic information, diagnostic information to a lesser extent
Accuracy	small, approximate information
Sources	mainly external, internal information to a lesser extent
Method of describing phenomena	to a large extent reflecting the quality phenomena, quantitative and qualitative information
Degree of programming	small, largely unprogrammable information
Character	both explicit and entangled

Source: elaboration based on (Sopińska, 2001; Materska, 2004)

The most important information that should be distinguished as the basis for decision making influencing the shape of the so-called business portfolio are as followed (Sopińska, 2001):

- information on strategic intentions of central institutions having direct or indirect influence on the industry and sector,
- information on scientific and technical progress in the industry and the sector, research work,
- information on the development of international economic and trade relations, affecting the sector,
- information on the economic and financial conditions within the sector (price levels, customs duties, etc.),
- information on the level of attractiveness and development opportunities of a given sector and industry, the structure of competition, etc.,
- information about the possibilities of new markets entry, their attractiveness level, entry and exit barriers,
- information on the competitors' internal situation, their intentions, implemented strategies,
- information about own resources and means, the company's strengths and weaknesses,
- information on the course of the implemented strategy and the difficulties and critical points.

Application of logical matrix for analysis of information requirements

The logical framework approach (LFA) is generally a planning, managing and programs – projects evaluation methodology, including problem analysis, goal analysis, strategy analysis, logical matrix preparation, and activity and resource schedules. The LFA is a multispectral matrix which vertical and horizontal analysis allows to comprehend in a synthetic way the logic of interventions, planned actions, and the necessary resources. Indicators also derive from the LFA (objectively verifiable determinants of achievement).

The LFA should not be seen as a set of mechanical procedures, but as a support for thinking. It is a dynamic tool that should be re-evaluated and reviewed simultaneously to the project's growth and the circumstances' change. Using it to ensure a structure and objectives while planning and budgeting a project should not lead to perceive it as an inelastic and hampering – detailed project plan.

Creating an LFA consists of two stages: analysis and planning. At the stage of analysis, stakeholder identification, enterprise's SWOT, problem, goal and strategy analysis is carried out, the business environment analysis is also recommended. The data collected in this process makes it possible to create an LFA. The matrix provides a summary of the project's planning stage, which includes: general objectives, objectives (intentions) of the project, results (outcomes), actions (activities).

Table 4: An example of filling LFA in reference to a tree problem and a targets tree

	Intervention logic	Objective, verifiable indicators	Sources and methods of verification	Assumptions/risks
Overriding goals	What is the overriding, wider goal to be achieved by the project?	What are the key indicators related to the overriding goal?	What are the sources of information?	
Direct goals	What are the specific goals that the project will achieve?	What are the quantitative or qualitative indicators showing whether and to what extent the direct targets of the project have been achieved in the 1st year after the completion of the project?	What are the sources of information that exist or may be collected? What methods are needed to obtain this information?	What are the factors and conditions, not being directly related to the project, that are necessary to achieve these goals? What risk factors should be taken into account?
Expected results	What are the specific effects that are intended to achieve a specific goal? What are the intended effects and benefits of the project? What changes and improvements will the project bring?	What are the indicators of whether and to what extent the project has achieved the intended results?	What are the sources of information for these indicators?	What external factors and conditions must be met in order to achieve the expected effects and results according to the adopted schedule?
Actions	What are the key steps that must be taken to achieve the expected results?			
				Preconditions

The project's LFA is presented in a vertical layout that defines the project's assumptions to be achieved (cf. Dewar, 2002), explains causal relationships, and identifies critical assumptions (Sykes, Dunham, 1995), and problem areas which are beyond the project manager's scope. Horizontal logic refers to the project's effects measurement and the resources used during its development, by identifying key

measurement indicators and means by which the measurement will be verified. In the last column of the matrix 'the assumptions and external factors' one must present external factors, which are independent from the company, institution, university that is preparing the application and internal conditions influencing the implementation of the project, defining to a certain degree the implementation risk.

Only on the basis of the ready LFA and defined assumptions concerning the accepted project risk, one may create a schedule of activities and resources for the implementation of the various project tasks within a defined work breakdown structure (WBS). A well-filled LFA provides a succinct summary of the project's objectives, actions undertaken in order to accomplish goals, as well as indicators and information sources thanks to which progress will be measured. It also identifies the key threats influencing achievement of the assumed objectives.

Summary

The research problem undertaken in the paper is the identification of users' information requirements in a process of the project management in a multi-project environment. The users' expectations regarding the information and IT systems in the organization as well as the information characteristics and their importance to the users were presented according to the available literature.
The LFA was indicated as one of the methods for defining specific information requirements and assumptions in a multi-project environment. The basic purpose of building an LFA is to refine and operationalize an idea for a project. The matrix determines the logic of intervention (if actions are taken, then the results are achieved, then the goals of the project, etc.) and describes important assumptions and risks lying at the base of the logic. This provides a basis for checking the feasibility of the project. For the project's management and oversight needs, the LFA defines the tasks to be undertaken, the required resources as well as the management's responsibilities. The matrix also provides a framework for monitoring and evaluating the progress (objectively verifiable indicators and verification sources). This implies that the information requirements, at an early stage of the project planning, will be properly defined for different levels of management.

References

Bush, V. (1945), 'As we may think', *The Atlantic Monthly*, 176 (1), 101-108.

Dewar, J.A. (2002), Assumption-based planning. A tool for reducing avoidable surprises, Cambridge University Press, Cambridge.

Drucker, P. (1999), Społeczeństwo pokapitalistyczne [Post-capitalist society], PWN, Warszawa (in Polish).

Dziuba, D.T. (2007), Metody ekonomiki sektora informacyjnego [Methods in economics of the information sector], Difin, Warszawa (in Polish).

Easley, D., Kleinberg, J. (2010), Networks, crowds, and markets: reasoning about a highly connected world, Cambridge University Press, Cambridge.

Eaton, J.J., Bawden, D. (1991), 'What kind of resource is information?', *International Journal of Information Management*, 11, 156-165.

Gmińska, R. (2008), Charakter problemów decyzyjnych a potrzeby informacyjne [The nature of decision problems in relation to information requirements], [in:] Dyhdalewicz, A., Klamecka-Roszkowska, G., Sikora, J. (eds.), Informacyjna funkcja rachunkowości w gospodarce współczesnej [Information function of accounting in the modern economy], Wydawnictwo Uniwersytetu w Białymstoku, Białystok (in Polish).

Greniewski, H. (1969), Cybernetyka niematematyczna [Non-mathematical cybernetics], PWN, Warszawa (in Polish).

Kisielnicki, J., Sroka, H. (1999), Systemy informacyjne biznesu. Informatyka dla zarządzania [Business information systems. IT for management], Agencja Wydawnicza Placet, Warszawa (in Polish).

Kiziukiewicz, T. (2003), Rachunkowość zarządcza – istota i zakres [Management accounting – essence and scope], [in:] Kiziukiewicz, T. (ed.), Rachunkowość zarządcza [Management accounting], Wydawnictwo EXPERT, Wrocław (in Polish).

Lange-Sadzińska, L. (2014), 'Informacja w organizacji – oczekiwania użytkowników' [Information in the organization – users' expectations], *Studies & Proceedings Polish Association for Knowledge Management*, 71, 104-115 (in Polish).

Materska, K. (2004), Pozyskiwanie informacji gospodarczych [Acquisition of economic information], [in:] Sosińska-Kalata, B., Materska, K., Gliński, W. (eds.), Społeczeństwo informacyjne i jego technologie [Information society and its technologies], Miscellanea Informatologica Varsoviensia, Warszawa, 116-139 (in Polish).

Nonaka, I., Takeuchi, H. (2000), Kreowanie wiedzy w organizacji [The knowledge-creating company], Poltext, Warszawa (in Polish).

Penc, J. (1994), 'Informacje rynkowe a sukces firmy' [Market information and business success], *Marketing i Rynek*, 3, 3 (in Polish).

Różańska, E. (2012), Rachunkowość w zarządzaniu projektami innowacyjnymi [Accounting in the management of innovative projects], Rozprawa doktorska, Uniwersytet Ekonomiczny w Poznaniu, Poznań (in Polish).

Sopińska, A. (2001), Rola systemu informacyjnego w procesie zarządzania strategicznego [The role of the information system in the strategic management process], [in:] Borowiecki, R., Romanowska, M., System informacji strategicznej: wywiad gospodarczy a konkurencyjność przedsiębiorstwa [Strategic information system: industrial espionage and enterprise competitiveness], Difin, Warszawa, 86-103 (in Polish).

Sykes, H.B., Dunham, D. (1995), 'Critical assumption planning: a practical tool for managing business development risk', *Journal of Business Venturing*, 10, 6, 413-424.

Zając, A., Kuraś, M. (2009), Badanie potrzeb informacyjnych [Examination of information requirements], Zeszyty Naukowe, Uniwersytet Ekonomiczny w Krakowie, 770, 37-55 (in Polish).

Profitability of Selected Visegrad 4 Group Food Processing Industries in the Context of EU Food Quality Logos in the Period of Economic Recovery after the Recent World Financial Crisis

Andrea Masařová, Mendel University in Brno, Faculty of Business and Economics, Brno, Czech Republic, E-mail andrea.masarova@mendelu.cz
Alice Fajtová, Mendel University in Brno, Faculty of Business and Economics, Brno, Czech Republic, E-mail xfajtov1@ node.mendelu.cz
Jan Vavřina, Mendel University in Brno, Faculty of Business and Economics, Brno, Czech Republic, E-mail vavrina@ node.mendelu.cz

Abstract

Profitability of respective food processing industries of V4 countries is generally considered to be a lagging behind the profitability of comparable industries from EU core countries. This fact is reflected by effort for encouraging the production of foodstuff with qualitative aspects connected with specific traditions and qualities of foodstuff. Namely, awarding quality logos Protected Designation of Origin (PDO) and the Protected Geographical Indication (PGI), which are linked with a region where respective products come from. The logo of the Traditional Speciality Guaranteed (TSG) then promotes a traditional way of foodstuff processing. Promotion of qualitative and extraordinary aspects of foodstuff should help producers to enhance their profitability via an increased demand for the PDO, PGI and TSG labelled products. The aim of the article is to identify key factors within the financial performance of selected foodstuff processing industries in V4 member countries, covering the branches awarded with the logos PDO, PGI and TSG according to the data of EU DOOR database and financial data of businesses accessible in database Amadeus of Bureau van Dijk within the period of years 2012 - 2015.

Keywords: Quality of foodstuff, corporate profitability, food processing industry, Visegrad 4 group.

Introduction

Profitability of foodstuff producers is strongly bound with consumers' behaviour and their buying preferences. Hence, food safety and quality guarantees are considered to be an important factor within purchasing behaviour nowadays as a reaction of buyers to an increasing level of food safety alerts in the EU nowadays. European Commission itself as a public authority provides quality logos Protected Designation of Origin (PDO), Protected Geographical Indication (PGI) and Traditional Speciality Guaranteed (TSG) for foodstuff, beside other third-party quality logos, which are present at EU common market.

Quality logos PDO, Protected Geographical Indication PGI and Traditional Speciality Guaranteed TSG belongs to one of the most know quality awards for the foodstuff in the EU member countries (e. g. Asmalovskij and Sadílek, 2016; Gawron and Theuvsen, 2009; Velčovská, 2012). Through the aforementioned logos consumers identify traditional quality products, get guarantee of regional or traditional production (European Commision, (c) 2017). Intensions of food processing companies to join the quality certification systems are majorly driven by a need for increase the consumers´ trust in meeting the quality standards (e.g. Velčovská, 2016; Albersmeier et al., 2010; Schulze et al., 2008).

The food processing industry belongs to sectors suffering from lower profitability in comparison with other manufacturing sectors (Mejstříková, Mezera and Plášil, 2011). Špička (2013) identifies the unfavourable input-output prices relations in the context of the world financial crises that started in 2008 to be the reason for

downturn in the profitability within food processing industry and its respective branches. The foodstuff quality schemes can help especially to economically smaller producers to increase their competitiveness and financial performance by enhancing their export capabilities within EU common market (Gavron and Theuvsen, 2009).

The aim of the article is to identify key factors within the financial performance of selected foodstuff processing industries in V4 member countries, covering the branches awarded with the logos PDO, PGI and TSG according to the data of EU DOOR database and financial data of businesses of database Amadeus of Bureau van Dijk within the period of years 2012 - 2015.

Methods and Resources

The sample consists of businesses being active within industries, which are covered at database DOOR as those awarded with Protected Designation of Origin (PDO), Protected Geographical Indication (PGI) and Traditional Speciality Guaranteed (TSG). Corporate financial data of the sample, as representatives of respective industries, was taken from the database Amadeus of Bureau van Dijk. The involved industries according to the EU NACE classification are as follows:

- 10.1 - Processing and preserving of meat and production of meat products
- 10.2 - Processing and preserving of fish, crustaceans and molluscs
- 10.3 - Processing and preserving of fruit and vegetables
- 10.4 - Manufacture of vegetable and animal oils and fats
- 10.51 - Operation of dairies and cheese making
- 10.7 - Manufacture of bakery and farinaceous products
- 10.8 - Manufacture of other food products
- 11.05 - Manufacture of beer

Profitability of observed industries and its development was identified via indicator ROE that is calculated as follows:

ROE (%) = (Profit or lost before taxation) / (Shareholder Funds) * 100

The aggregated profitability indicator ROE was then decomposed to its respective analytical components to provide insight into effects, which influence aggregated indicators´ ROE year-on-year development, by employing so called index approach. There were analyzed the following analytical indicators as the multiplicative decomposition of the aggregated profitability indicator ROE:

ROE = PLBT/EBIT · ROA · TA/E

,where:

PLBT/EBIT = Profit or lost before taxation / Earnings Before Interest and Taxes (EBIT)

ROA (Return on assets) = EBIT / Total assets

TA/E= Total assets / Shareholder funds

The employed index approach to decomposition of the indicator ROE reveals the influence in absolute values of partial indicators to year-on-year development of its aggregate according to the following relations:

$$\Delta ROE\ (\%) = ROE_1 - ROE_0 = A_1B_0C_0 - A_0B_0C_0 + A_1B_1C_0 - A_1B_0C_0 + A_1B_1C_1 - A_1B_1C_0$$

,where:

A = PLBT / EBIT,

B = ROA,

C = TA / E.

Aforementioned partial indicators and their prevailing influence on the aggregated ROE profitability was observed both in the period of the strong hit of the world financial crises (years 2008 – 2011) and the recovery period of years 2012 – 2015. Frequencies of the prevailing influence on the aggregated ROE profitability was analysed via Factorial ANOVA in order to reveal main effects and interactions for categorical predictors, i.e. decomposed elements of PLBT/EBIT, ROA and TA/E. Software Statistica 12 was utilised for running the Factorial ANOVA.

Results

Profitability development of the observed industries covering EU quality logos awards can be seen at Fig. 1 and 2. It was identified a positive trend in the profitability development across V4 member countries after the year 2012 within industries Processing and preserving of meat and production of meat products (NACE 10.1), Manufacture of bakery and farinaceous products (NACE 10.7) or Manufacture of vegetable and animal oils and fats (NACE 10.4). On the other hand volatile development and differences in the profitability trend development among V4 member countries was identified in industries Processing and preserving of fruit and vegetables (NACE 10.3) and Operation of dairies and cheese making (NACE 10.51).

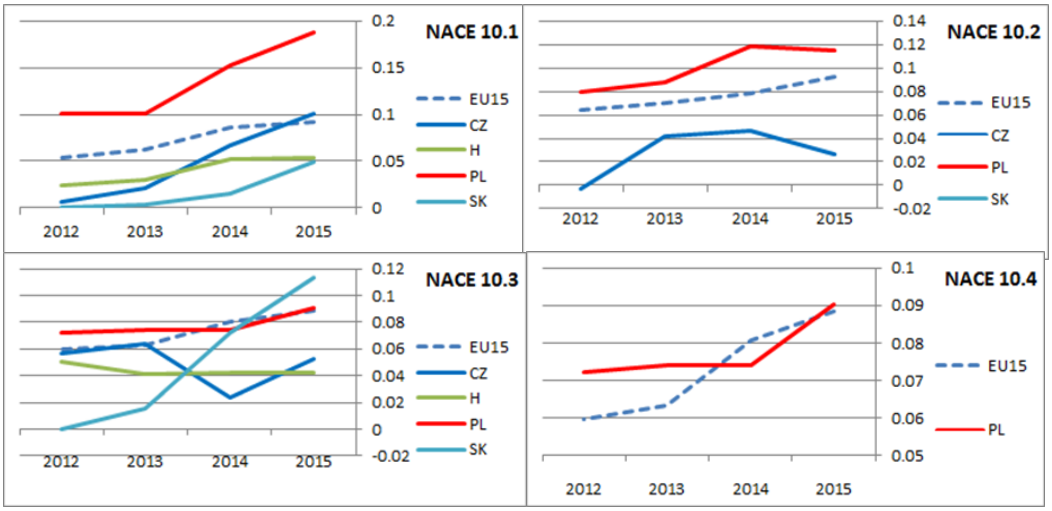


Fig 1: Development of ROE profitability within sample of businesses being active in industries

Processing and preserving of meat and production of meat products (NACE 10.1), Processing and preserving of fish, crustaceans and molluscs (NACE 10.2), Processing and preserving of fruit and vegetables (NACE 10.3), Manufacture of vegetable and animal oils and fats (NACE 10.4)

Source: own processing using data of database Amadeus

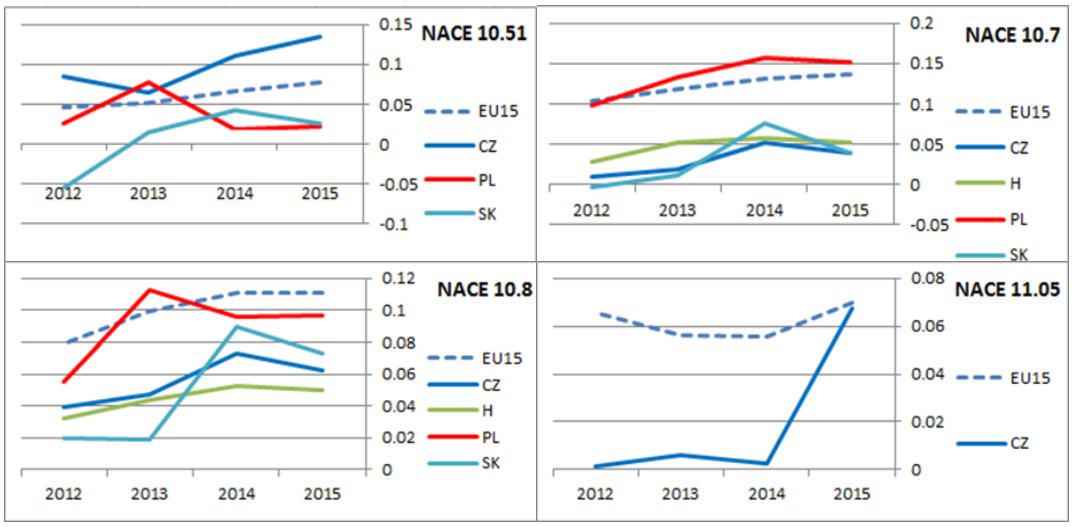


Fig. 2: Development of ROE profitability within sample of businesses being active in industries Operation of dairies and cheese making (NACE 10.51), Manufacture of bakery and farinaceous products (NACE 10.7), Manufacture of other food products (NACE 10.8), Manufacture of beer (NACE 11.05)

Source: own processing using data of database Amadeus

Further analysis of profitability development was conducted via identification of main effects and interactions for partial decomposed indicators of ROE profitability (i.e. PLBT/EBIT, ROA and TA/E) as its categorical predictors. It was analyzed specifically the period of years 2008 – 2011, which is considered to be the period of strong negative effects of the recent world financial crisis on national economics in V4 member countries against period of years 2012 – 2015, considered to be the period of recovery towards a renewed economic growth.

Results for the observed food processing industries in the Czech Republic are as follows. Prevailing positive effect on ROE profitability of observed industries, which are awarded by EU quality logos within the period of economic recovery, is the ROA indicator. So, it could be said that the production power was the ultimate factor that at 10 % significance level distinct between period of financial crisis and economic renewal (see Fig. 3, left graph). Consequently, it was observed similar influence of other analyzed predictors, i. e. PLBT/EBIT and TA/E both in the period of financial crisis and the period of economic recovery. Additionally, it is provided also analysis of predictors within negative development of ROE profitability, which reveals differences of observed predictor at the significance level alpha = 10 %. Differences were identified regarding to the negative effect on profitability in the area of financial leverage (TA/E indicator) that was influencing profitability in a negative manner more frequently in the period of economic recovery than in the period of financial crisis.

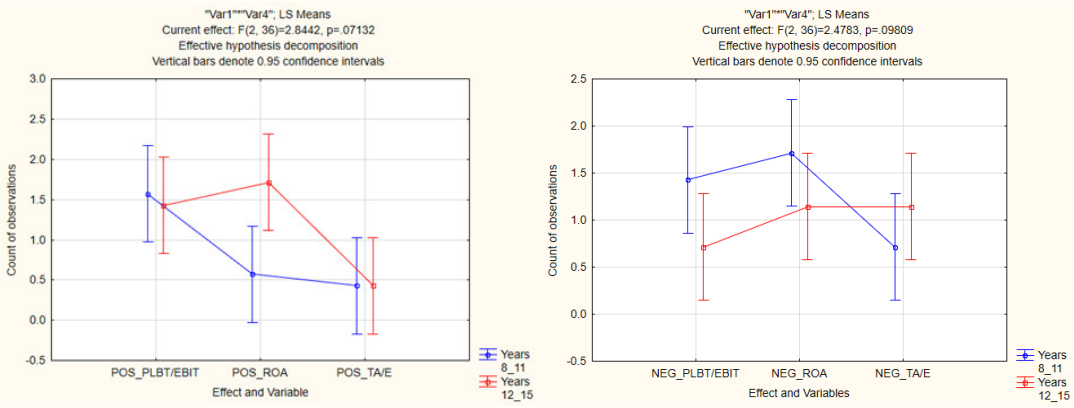


Fig. 3: Factors influencing ROE profitability in the Czech Republic within period of years 2008 – 2011 and 2012 – 2015 (positive influence at left graph, negative influence at right graph)

Source: own processing using data of database Amadeus

Results for the observed food processing industries in Hungary are as follows. Prevailing positive effect on ROE profitability of observed industries, which are awarded by EU quality logos within the period of economic recovery, is the PLBT/EBIT indicator. So, it could be said that the decrease of the interest cost burden positively influenced the profitability within observed industries in Hungary at 1 % significance level, when it is compared the period of financial crisis with the economic renewal one (see Fig. 4, left graph). Analysis of negative profitability's predictors revealed differences at significance level alpha = 10 % between period of economic crisis and period of economic renewal. Namely it was the prevailing influence of decreasing production power (ROA indicator) followed by a decreasing financial leverage (TA/E indicator) in the period of financial crisis. On an opposite side to the aforementioned finding is the result of predictors connected with negative profitability development in the period of economic renewal. The most negatively influencing factor of ROE profitability was decrease of the financial leverage indicator (TA/E) within the period of economic renewal. This finding is coherent with the positive effect of decreasing interest burden on profitability.

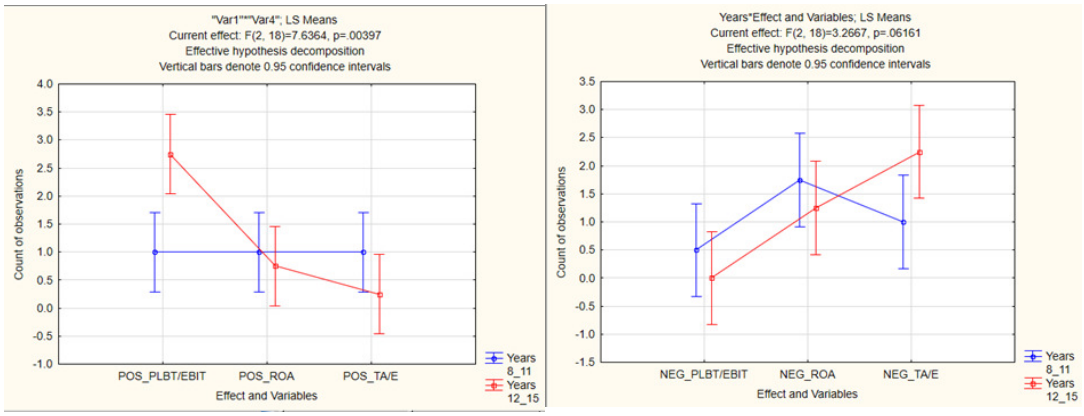
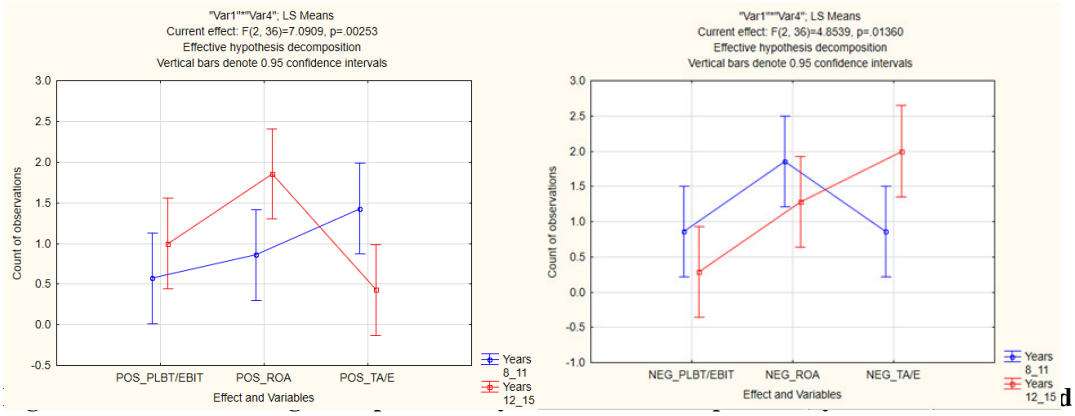


Fig. 4: Factors influencing ROE profitability in Hungary within period of years 2008 – 2011 and 2012 – 2015 (positive influence at left graph, negative influence at right graph)

Source: own processing using data of database Amadeus

Results for Poland also provide statistically significant differences for both predictors of positive and negative ROE profitability within the crisis and renewal period (see Fig. 5). Namely the most positive influence was identified as the production power (ROA indicator) in the period of the economic renewal in comparison with the crisis period and most positive influence of the financial leverage indicator on profitability. On the other hand, the most negative factor influencing profitability within the period of the world economic crisis was the indicator ROA. The period of economic renewal then was connected with the prevailing negative development of the financial leverage (TA/E), i.e. decrease of liabilities over shareholder funds. It was identified as a common factor a negligible both positive and negative influence of interest burden in the crisis and renewal period.



d 2012 – 2015 (positive influence at left graph, negative influence at right graph)

Source: own processing using data of database Amadeus

The case of industries observed in Slovakia reveals statistically insignificant differences among predictors and its effects on ROE profitability (see Fig. 6). Despite the statistical insignificant observed predictors of profitability, it can be stated a prevailing positive influence of decreasing interest burden on profitability in the period of the economic recovery. The case of predictors within negative development of profitability then reveals a prevailing observed negative influence of decreased production power within the period of recent world economic crisis.

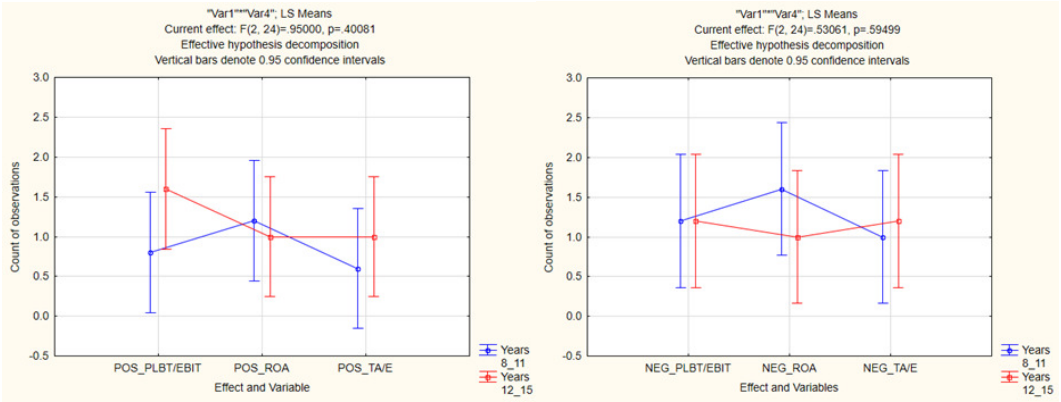


Fig. 6: Factors influencing ROE profitability in Slovakia within period of years 2008 – 2011 and 2012 – 2015 (positive influence at left graph, negative influence at right graph)

Source: own processing using data of database Amadeus

Discussion of Results and Conclusion

EU food quality logos are awarded by the European Commission according to requests of unities of foodstuff producers and processors. These requests are addressed in the case of PDO and PGI to EU member countries´ national authorities within industrial property protection and in the case of TSG the requests are addressed to respective national public bodies such as ministries of agriculture. Providing of quality logos to foodstuff products should help to promote their outstanding quality. The aforementioned quality proposals via consumers' attitudes to a perceived quality of products are proved by several studies (e. g. Asmalovskij and Sadílek, 2016 or Chalupová et al., 2016).

The financial performance of observed industries, which are under the system of awarded EU quality logos was revealed as a positive trend in ROE profitability across V4 member countries for industries Processing and preserving of meat and production of meat products (NACE 10.1), Manufacture of bakery and farinaceous products (NACE 10.7) or Manufacture of vegetable and animal oils and fats (NACE 10.4). On the other hand, volatile development and differences in the ROE profitability trend development among V4 member countries was identified in industries Processing and preserving of fruit and vegetables (NACE 10.3) and Operation of dairies and cheese making (NACE 10.51). Further analyses of financial data were conducted across observed industries in V4 countries to reveal main effects and interactions for partial decomposed indicators of ROE profitability, namely interest rate burden (indicator PLBT/EBIT), production power (indicator ROA) and financial leverage (indicator TA/E). Specifically then the period of years 2008 – 2011, which is considered to be the period of strong negative effects of the recent world financial crisis on national economics in V4 member countries against period of years 2012 – 2015 that is considered to be the period of recovery towards a renewed economic growth. Results for the period of economic renewal within observed industries in Czech Republic, Hungary and Poland point out at prevailing positive influence of increasing production power on ROE profitability in comparison with the crisis period. The case of negative influence on profitability within the period of economic renewal reveals significant differences of the indicator financial leverage in comparison with the crises period for the Czech Republic, Hungary and Poland. This finding is coherent with the positive effect of decreasing interest burden on ROE profitability. The case of industries under EU quality logos in Slovakia does not reveal significant differences among observed predictors of ROE profitability in comparison between period of economic renewal and the crisis period. Despite the statistically insignificant observed predictors of ROE profitability in Slovakia, it can be stated a prevailing positive influence of decreasing interest burden on profitability in the period of the economic recovery. The case of predictors within negative development of profitability in Slovakia then reveals a prevailing observed negative influence of decreased production power within the period of recent world economic crisis.

These results are generally consistent with findings of e. g. Bošková et al. (2016), Velčovská (2016) or Theuvsen et al. (2007) that foodstuff processing businesses enter food quality certified systems with major expectations of information sharing on quality with consumers. This information sharing and communication on quality aspects of foodstuff can be considered as an important factor for enhancing their producing and exporting capabilities. Subsequently, the aforementioned aspects can positively influence competitiveness of food stuff producers on the EU common market.

Acknowledgment

This article is a partial output of the Internal Grants Agency of FBE MENDELU project no. PEF_TP_2017009

References

Albersmeier, F., Schulze, H. and Spiller, A. (2010) 'System dynamics in food quality certifications: development of an audit integrity system'. *International Journal on Food System Dynamics*, 2010 (1), 69-81.

Asmalovskij, A. and Sadílek, T. (2016) 'Food quality labels perception in the Czech Republic: trial study results'*Ukrainian Food Journal*. 5 (1), 186 – 194.

Bošková, I., Ratinger, T. and Kličková, K., (2016). 'The food industry structure under the effect of increasing number of regional products and small processing entities in the Czech Republic' Paper prepared for presentation at the 149th EAAE Seminar Structural change in agri-food chains: new relations between farm sector, food industry and retail sector, 27-28 October, 2016 Rennes, France.

Chalupová, M., Prokop, M. and Rojík, S. (2016) 'Regional food preference and awareness of regional labels in Vysočina region (Czech Republic),' *European Countryside*, 2016 (2), p. 109-122.

Doucha, T. (2012). 'Czech agriculture and food industry after EU accession' Proceedings of Agrarian Economy of Serbia in the Pre-accession Period, ISBN: 978-86-86087-34-8, 2012, Belgrade, Serbia, 1 – 14.

European Commission, (2017), "EU quality logos,' *EU agricultural product quality policy*. [Online], [Retrieved September 13, 2017], https://ec.europa.eu/agriculture/quality/schemes_cs

Gawron, J. Ch., and Theuvsen, L. (2009) 'Certification schemes in central and eastern Europe a status quo analysis in the agrifood sector,' *Polish Journal of Food and Nutrition Sciences*, 59 (1), 5-10.

Mejstříková, L., Mezera, J. and Plášil, M. (2011) 'Positive and negative aspects of financial economic development in selected branches of the food industry of the CR in 2007 – 2009 as revealed by spider analysis, ' *Agris on-line Papers in Economics and Informatics*, 3 (2). 39-54.

Schulze, H., Albersmeier, F., Gawron, J. Ch., Spiller, A. and Theuvsen, L. (2008) 'Heterogeneity in the evaluation of quality assurance systems: the international food standard (ifs) in european agribusiness, ' *International Food and Agribusiness Management Review,* 11 (3), 99-139.

Špička, J.(2013) 'The competitive environment in the dairy industry and its impact on the food industry,' *Agris on-line Papers in Economics and Informatics*, 5 (2), 89-102.

Theuvsen, L., Plumeyer, C. H., and Gawron, J. Ch. (2007) 'Certification systems in the meat industry: overview and consequences for chain-wide communication,'*Polish journal of food and nutrition sciences*. 57 (4)(C), 563-569.

Velčovská, Š. (2016) 'Food quality labels from the producers' perspective,' *Journal of Central European Agriculture*, 17(3), 815-834.

Velčovská, Š. (2012) 'Food quality labels and their perception by consumers in the Czech Republic, ' *International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering*, 6 (6), p. 1046 – 1052.

Energy Sanctions against Russia: Analysis and Dualistic Effect

Larisa Ismagilova, Ufa State Aviation Technical University, Ufa, Russian Federation,
Ismagilova_ugatu@mail.ru

Tatiana Gileva, Ufa State Aviation Technical University, Ufa, Russian Federation,
T-gileva@mail.ru

Elena Budnik, Ufa State Aviation Technical University, Ufa, Russian Federation,
Lenaq@rambler.ru

Abstract

In the present paper authors consider main characteristics of Russia's fuel and energy industry (FEI) under conditions of economic sanctions. Integrated assessment of economic results of FEI is presented from standpoint of systemic importance of FEI for national economy. Authors set up and discuss hypothesis of dualistic effect of sanctions, which not only causes negative effects, but also create encouraging restructuring. As a result cognitive diagram of sanctions' effects on operation and development of FEI is presented. This diagram reflects economic factors of industry. Moreover, the diagram defines some possibilities and directions of reducing sanctions' effects. For the management of FEI at macro level authors suggest a tool that allows to develop solutions for risk reduction in areas of critical sensitivity, as well as to predict possible deviations in a performance not only in energy sector, but also in other sectors of economy.

Keywords: Russia, sanction, energy sector, dualistic effect, an import substitution.

Introduction

In today's economic climate, when part of the EU and the United States, Canada, Australia and several other countries have decided to impose sanctions on Russia, there is a need for changes in Russian economy management system. During the period of sanctions the economy under sanctions is a completely different system, which requires a clear regulatory methods and predictable management results. Traditional approaches to economic management under the conditions of sanctions' pressure cannot solve the problem of reducing negative sanctions' effects. Moreover, the sanctions imposed on Russia's fuel and energy industry (FEI) are particularly important, because FEI is a communication sector of the economy, largely determines the possibility of future development of Russia. In this paper, authors carried out a system analysis of sanction's effects on FEI and evaluate effects on Russian economy and on economy of countries, which impose these sanctions.

In the ordinary way, sanction's policy is a set of enforcement actions identified in time and associated with the economic or territorial objects. The effects of sanctions are quite difficult to quantify. The problem of assessing the impact of sanctions on the economies of countries is considered in many works by both Russian and foreign authors. They present retrospective analysis of using the sanctions in different countries. Systematization and analysis of scientific literature revealed that in studies of recent years is not given due attention to the systematic reflection of the nature of sanctions in key economic activities. Although the system negative effects on the objects of sanctions' pressure are usually taken as main target of deregulation of their economies.

Note that in their works, Russian and foreign scientists consider economic sanctions as factors of crisis and restrictions, which are sources and prerequisites of deformation and destruction of economic system. The appearance of positive effects usually located outside the point of view of authors.

In contrast to generally accepted interpretation, we make in the present work the assumption of a dualistic effect of sanctions and try to form administrative decisions on including the sanctions in management practices. Sanctions are considered not only from the standpoint of restrictions and imbalances in the economic system, but more as motivational and stimulus actions.

Aim of this work is to develop tools based on the system-logic diagram and which is capable of considering, firstly, multifactorial negative effects of sanctions imposed on FEI to Russian economy, and secondly, the generation of factors of reducing the sanctions effects. This requires:

- to identify a direction of energy sanctions' effects on other sectors of Russian economy;
- to define ways of describing and formalizing dualistic nature of sanctions and their effects in energy sector of Russia and countries, initiating sanctions;
- to develop cognitive diagram of sanctions' effects on the economy and to identify critical areas of loss as a basis of formation of administrative decisions.

In this paper, authors use a statistical method for assessing sanctions' effects and suggest a toolkit of cognitive system-logic simulation.

The paper is constructed as follows. First we consider nature and types of sanctions and their main purpose (by the example of the USSR). Then we analyze position of Russia's FEI, characterize energy sanctions and detect their dualistic nature. The results of this analysis of FEI are used in the construction of a system-logical model of the relationship between factors, economic agents and administrative decisions in terms of energy sanctions. We make some concluding remarks at the end of the paper.

Literature Review

Characteristics and history of sanctions in Russia

According to the most common interpretation and as Baldwin mentioned (2015) a sanction is an action by one actor intended to affect the behavior of another one by enhancing or reducing the available values. There are several different approaches to interpretation of a sanction. In a research study by Musatkina (2010) in a legal interpretation, sanctions are a measure of actors' responsibility for violation of rules and regulations. From an economic point of view Shirov et al (2015) mentioned that sanctions were "the elements of non-tariff barriers to trade" used to destabilize the financial and economic system and focused on achieving certain political goals. Naghavi and Pignataro (2015), Kuvalin and Moiseev (2015) considered from the perspective of international economic relationship that sanctions were imposed with purpose of weakening the government due to growing discontent among the population. Mashkin (2015) noted that sanctions may take a form of embargo, boycott or blockade. Moreover, Aalto and Forsberg (2015) believed that international sanctions form not only restrictions, but also the possibilities of geopolitical development.

First sanctions were imposed in the 1930s against the Soviet Union in terms of a ban import of Soviet goods to Western markets (timber, lumber, oil, etc.). Mashkin (2015) noticed that so-called "gold

blockade" was also introduced, which means a ban on accepting gold from the Soviet Union as payment for import. In the 1980s, technological and financial constraints were imposed against the USSR.

According to Newnham (2013) nowadays sanctions are a tool for political struggle and are focused on changing a political regime in the country and turn into an economic war between countries. So, today new economic centers in the Asia-Pacific region and several Latin American countries are formed. Russia recently also acquires geopolitical importance. In these circumstances, the USA and EU countries, which joined the sanctions, are competing for leadership on the world stage.

The first sanctions against Russian Federation in spring of 2014 were introduced on the initiative of the United States after the referendum in the Crimea. Kolomeizeva (2014) and Oxenstierna (2014) mentioned that officially, the reason for prolongation of sanctions was an escalation of armed conflict in eastern Ukraine, as considered experts in the United States and the European Union. Initially sanctions applied only to individuals who are part of ruling and business elite, and later so-called sectoral sanctions were imposed. In these circumstances, it is important to investigate the effect of sanctions on the economy of the country-object of sanctions and its regions. It will allow country's leadership to develop administrative decisions and ensure their economic security.

The study of sanctions against energy sector is particularly important, as FEI is a systemically connecting link in the chain of inter-industry interactions in a economy of any country. FEI provides energy resources needs of all sectors of Russian economy and satisfies needs of foreign buyers. Therefore, creation of conditions in order to maintain an economic security of the country in the conditions of sanctions in the energy sector is a priority of the state.

Research question

Characteristics of fuel and energy industry of Russian Federation

According to the report of Russia's Ministry of Energy (2015) the share of fuel and energy sector in GDP for 2015 is 27%, in export is 63%, the share of oil and gas revenues amounts to 43%, the share of employment in the energy industry is 3.6% of total employment. Ismagilova and Budnik (2015) mentioned that a significant part of innovations and projects was focused in FEI.

Russian FEI consists of the following sectors:

- gas industry (266 companies);

- oil industry (292 companies);

- nuclear industry (10 nuclear power plants);

- coal industry (249 companies);

- electric power industry (37 thermal power plants and 9 mini-CHP plants, 13 hydropower plants, 2 wind farm).

The dynamics of development of Russia's FEI can be studied according to recent statistics of Russia's Ministry of Energy (2015) regarding dynamics of production and exports of energy resources: oil, gas, coal (see table1).

In the report of Russia's Analytical Center for the Government (2014) production and exports of crude oil has a positive dynamics. So, for 2015 the rate of crude oil production growth compared to 2013 amounted to 2%. Their relatively low level is related with the influence of macroeconomic factors (inflation, dollar exchange rate dynamics, price of oil) and complication of the foreign policy situation. On the whole, Russia maintains its position at the level of 12% of world oil production.

Table 1: main indicators of the development of Russia's FEI

Indicator	2013	2014	2015
Oil production, million tons	523,4	526,7	534
Exports of crude oil, million tons	235,0	221,3	241,8
Gas production, billion cubic meters	668,2	641,9	635,5
Coal production, million tons	352,1	358,2	373,4
Coal exports, million tons	140,0	154,8	156

In recent years the prime cost of oil has increased (see table 2). As Rosstat (2015) mentioned it was due to increase both in cost of raw materials' extraction process and taxes, in transportation costs and general inflation rise in prices. As a result, in conditions of sanctions, high prime cost and low oil prices reduce production efficiency, processing and export of oil and gas.

Table 2: prime cost's dynamics of crude oil, rubles

Period	2012	2013	2014	2015
I quarter	7476,9	7420,5	8655,5	9812,2
II quarter	7194,9	7312,5	8666,4	10123,8
III quarter	7600,7	7853,4	8845,2	9665,1
IV quarter	7695,1	8307,9	8246,3	8784,6

The share of Russian gas production in a world market was halved due to discovery new gas fields in Iran, Qatar and Turkmenistan. The "eastern vector" (Korea, China, Japan) prevails in a development of coal export. In the report of Analytical Center of Government of Russian Federation (2014) is noted that a share of Russian coal export in a world volume according data for 2014 was 11%, which corresponds to the third position after Indonesia and Australia.

According to Russian Energy Strategy for the period until 2035 the following power projects should be implemented:

- construction of oil pipeline system "Eastern Siberia - Pacific Ocean";

- Development of gas resources and building a new gas transportation system in Eastern Russia ("Nord Stream" and "Nord Stream 2" projects);

- Launch of the Vankor oil and gas field and the Bovanenkovo gas field;

- Output of Russian liquefied natural gas to a new product markets, namely, the Asian ones.

Despite these ambitious goals, the industry has a number of "chronic" problems limiting its development. Firstly, there is a need to update outworn fixed assets of FEI for replacing them with a new ones, to ensure an energy efficiency of production. Secondly, the industry is in need of comprehensive modernization, which contributes to narrowing the technological gap and the development of output of products with high added value. Thirdly, there is a to accelerate timing of return on investment in the energy sector, which are characterized by a long payback period - from 8 to 15 years.

A powerful resource base in the East of Russia offers possibilities for expanding relations with Asia-Pacific region (APR). Russia plans by 2035 to increase exports of oil and petroleum products in the APR doubled, and gas exports to 6-8 times. Today, Russia is focused on the supply of energy resources to the east, but pro-European ties are also among the interests of power engineers, although the volumes of supplies to Europe are reduced due to violation of contractual relations. The development of the eastern direction is facilitated by implementation of the Energy Strategy, which sets principles and measures for the development of the country's energy sector in order to ensure sustainable growth of the economy, improve quality of life of the population and help strengthen the country's foreign economic positions.

Ivanov and Matveev (2016) mentioned that Russia was the only country of the major actors of a global energy market, which had a significant excess in energy production over the consumption. At year-end of 2014 this excess was 624 mln tons energy commodities (against 535 mln tons in 2004), which is 1.5 times more than that of leading oil producer - Saudi Arabia. In research study by Newnham (2011) it is mentioned that energy power of Russia poses a threat to states, which are buyers of its oil and gas, especially for the countries of the former USSR. In this sense, sanctions may contribute to destabilization of Russia's energy sector, which is a key sector for the development of the economy, and, consequently, it may lead to a weakening of its geopolitical position.

Methodology

Sanctions against the fuel and energy industry of Russian Federation

Russia’s FEI operates in a dynamic economic conditions and unstable environment in a foreign policy. The threat of economic sanctions limits energy projects and execution of strategic plans. Ismagilova and Sitnikova (2015) mentioned that current economic sanctions had a clearly defined sectoral orientation that demonstrated their focus on key sectors of Russian economy: oil and gas, nuclear industry, defense industry and banking sector.

The list of basic sanctions against Russian economy, including energy sector, imposed in 2014, consists of:

– a ban on making long-term transactions with securities of companies that appeared in the sanctions lists, and restricting access to capital markets;

– a ban on oil development and production services in deep water, marine and Arctic fields. The list of bans is specified by drilling, geophysical, geological, logistical and management services;

– a ban on the supply of computer and modern cartographic technologies that can be used in both the civilian and defense industries (dual-use technologies);

– the restrictions on the supply of technologies and equipment, which are intended for the development of shelf oil fields.

Economic sanctions in a general have a negative impact on the economy. We agree with the point of view of many experts that as it mentioned Karamayn et al (2015), Shirov et al (2015) difficulties in energy cooperation with EU and the United States have the greatest influence on technological development of Russia . In a research study by Bushuev (2015) notes this threat, in spite of its severity, can be overcome due to activation in technical and industrial policy of Russia.

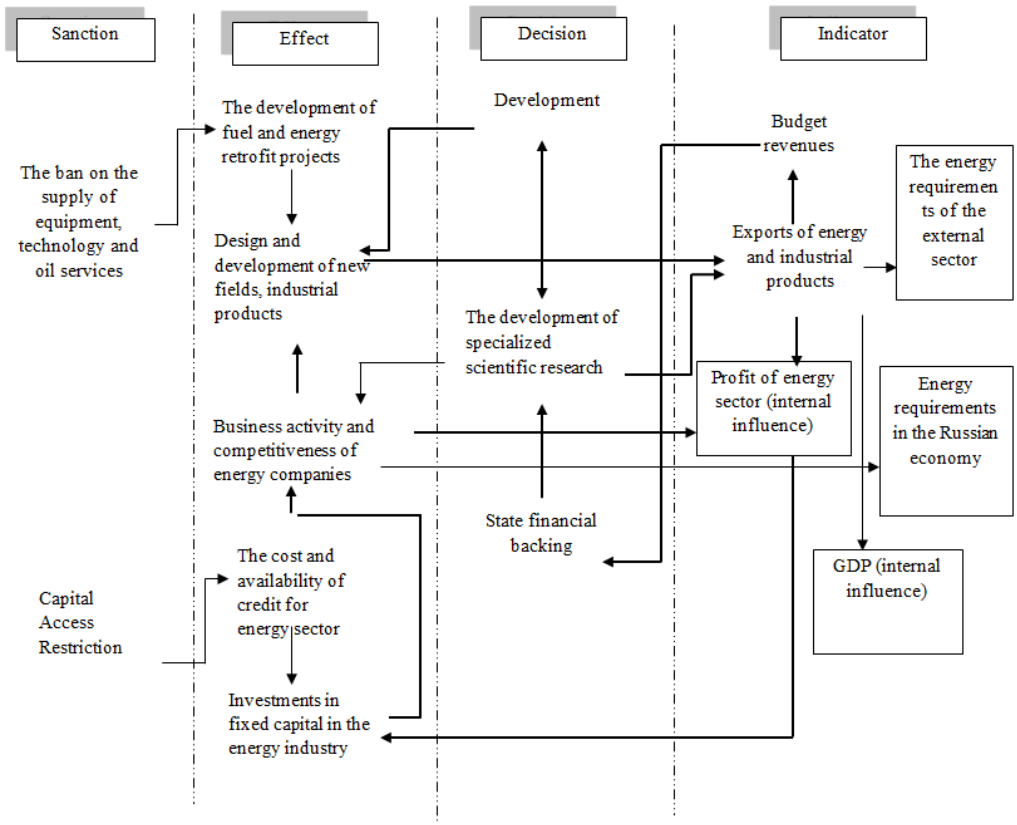


Fig 1: Cognitive diagram of sanctions' effect on Russia's FEI

The impact of energy sanctions in this study is considered in three dimensions (fig.1):

1) a direct effect on the energy sector, because sanctions hinder the internal development of energy enterprises and complicate existing problems;

2) an indirect influence on all other types of economic activity and enterprises that are consumers of products of the fuel and energy complex;

3) an external influence, as a response to the actions of the countries initiating sanctions.

The study of sanctions' decisions and their effects allows us to create system views on a nature of the impact of sanctions on the economy and Russia's FEI. This leads to scientifically-based decisions to regulate the economy, to identification main pain points and reducing the sanctions' effects.

The direct effect of energy sanctions is felt by companies such as Gazprom, Gazpromneft, Rosneft, Lukoil, Transneft and Surgutneftegaz. Due to the ban on supply of equipment, Gazprom-drilling stopped exploring new oil deposits. In a research study by Haytun (2014) is detected a particularly strong effect of restrictions in a relation to new projects for the development of the Arctic. The technology of oil and gas production in Russia is complicated, resources are difficult to obtain, and therefore it is practically impossible to provide large volumes of oil production without special equipment. And in conditions of sanctions on the import of technology and equipment, process is even more complicated; some arctic shelves projects are suspended and postponed indefinitely.

Figure 1 presents a scheme of impact of energy sanctions on GDP, which reveals a dualistic effect of sanctions and reflects development of the economy as a whole. This effect is shown in a form of logical chain of relationships: 1) the major factors affecting to the development of the economy; 2) objects, perceiving possible effects of sanctions; 3) decisions on elimination (smoothing) the negative effect of specific sanctions; and indicators that assess the effectiveness of main decisions. Also in this model stand out contours of positive effect of sanctions, that is, decisions to the development of industry capacity.

The suggested model of cognitive analysis has a conceptual nature. It is a substantial basis for construction of a graph and can be used for simulation modeling in conditions of availability to more detailed and accurate information of changes in the economy, taking into account dynamics of data.

Dedicated closed loops of control (thick arrows in fig. 1) show not only direction of main solutions that eliminate negative effects of sanctions, but also consequences of these decisions for the other economic agents. By influencing factors that make them, we can simulate situation of development of energy sector, assess dualistic nature of sanctions and identify areas of critical sensitivity in the economy as a whole.

One of the main consequences of economic sanctions is a lack of financial resources of energy companies, which causes limitation of new investment projects aimed to the development and modernization of production. So, foreign investors are limited in their ability to fund in Russia, while domestic banks do not have an opportunity to attract European credit resources. Some joint projects for exploration of offshore fields are suspended; for example, projects with the Exxon Mobil, the North Atlantic Drilling, etc.

Previously, it was emphasized that FEI is an engine of the country, because it supplies energy resources to the entire industry of the country, as well as to the socioeconomic sphere of the economy.Energy resources are consumed by all of industrial and non-industrial objects, so their uninterrupted supply is an important task in ensuring economic and national security. In this way restrictions in energy industry may negatively affect to the development of markets of other economic activities. As noted above, in recent years, production of energy resources in Russia exceeds their consumption, so there is some reserve, allowing to neutralize market fluctuations caused by negative effects of sanctions. But without active and well-grounded decisions on the development of FEI and economic management this reserve is not able to resist the impact of sanctions.

The external effect of energy sanctions appears in violation of economic relations with foreign partners. International companies such as «Halliburton», «Shell», «Schlumberger», «Baker Hughes» etc., working in Russia and providing services to domestic oil companies are forced to cease operations, while receiving losses. Thus, based on the analysis of growth dynamics of EU exports to various countries

Priede and Pereira (2015) confirms the fact that due to violation of relations with Russia, EU countries have difficulties in foreign trade, and they are forced to change structure of export market. Russia has similar losses because foreign service companies help to reduce costs and to use the latest technology of extraction of raw materials.

For example, Germany is dependent on imported gas. Its own production ensures only 14% of the country's needs in these resources. The main exporters of oil and gas to Germany are: Russia, whose share is around 40% for each fuel type, and Norway, which delivers 35% for gas and 10% oil. Response to limiting interests of Russia's FEI is a reducing export of hydrocarbons to EU. It generates energy security threats, both for Russia and EU countries. It emphasizes dual nature of energy sanctions, when countries also suffer from restrictive measures taken against country - recipient.

To overcome sanctions Russian companies are entering a new Asian markets, especially China markets. Assuming that in future sanctions will not be cancelled, Russia's Government launches a program of import substitution, which stimulates production of their own developments and domestic analogues of imported technologies and equipment. Positive results of this program can be achieved in next 2-3 years.

Dualistic nature of sanctions and policy of import substitution

Opinions about nature and effectiveness of sanctions' effect on Russian economy are different. Undoubtedly, companies that fall into sanctions' lists directly feel its negative effect. Shirov et al (2015) notice that development of Russia's economy depends not so much on sanctions as on unfavorable situation on the world oil markets, currencies and internal factors of economic development. Sanctions made it possible to highlight problem zones in a domestic industrial and innovation policy. One of the critical areas is a dependence of imported technologies in such industries as fuel and energy, machine building, instrument making and mining.

To solve these problems, an import substitution program has been developed. It is intended to stimulate the development of science and own production with high added value. The aim of import substitution is not focused on a replacement of imported goods to domestic ones by any means. Its main purpose is to enter a mass production of Russian high-quality products at acceptable reasonable price that can compete with foreign counterparts, both in domestic and foreign markets.

The largest domestic energy companies will spend on import substitution as a whole 8-10 billion rubles by 2020. According to the Energy Strategy-2035 share of imports in purchases of energy companies by 2035 should not exceed 15%. Consequently, the increase in the share of domestic technologies and equipment will provide improving the quality of final product of FEI, job creation, tax revenues to the state budget.

Ministry of Energy has begun development of an automated information system "Technologies and projects of import substitution." Faltsman (2015) mentioned that this system was designed for operative monitoring import substitution in FEI (for example monitoring the state of market of equipment, technical devices, components of technological processes and making managerial decisions).

On National Oil and Gas Forum on March 2015 it was announced 12 directions of import substitution in FEI, including:

-technology directional drilling, hydraulic fracturing;

- manufacture of pumps and compressors;

- offshore projects,

- flexible tubing, and several others.

It follows that peculiarity of anti-Russian sanctions is their dualistic effect. The fact is that imposed restrictions, on the one hand, cause instability in the economy and its leading sectors, and on the other hand form conditions for a quick resolution in an identified problems. Russian oil companies managed to use depreciation of ruble to increase production in September 2015 to a record high for the entire post-Soviet period up to 10.74 million barrels per day (+ 0.4% compared to August 2014). Ismagilova and Sitnikova (2015) consider that sanctions act as activators of positive effects for the development of enterprises and other sectors of Russian economy.

Results

Analytical evaluation of dualistic effect of sanctions in energy sector is based on a comparison of losses caused by direct effect of the restrictions and benefits received from their actions. Table 3 provides statistical information on data of Russia's Ministry of Energy for 2015.

Table 3: aassessment of dualistic effect of sanctions in FEI

Indicator	2014	2015	Variations	
			Growth	Growth rate %
Oil industry				
Production of oil and gas condensate, millions tons	526,7	534,1	7,4	1,4
Oil export, millions tons	221,3	241,8	20,5	9,3
Capital investment in oil production, billion rubles	986	1081	95	9,6
Investments in oil refining, billion rubles	823,1	1037,1	214	26,0
Penetration Drilling: operational, thousand meters	19825	22152	2327	11,7
Penetration Drilling: Exploration, thousand meters	994	818	-176	-7,7
Offshore production				
The shelf of the Baltic Sea, thousand tons	427	394	-33	-7,7
The shelf of the Black Sea, thousand tons	61	51	-10	-6,4
The shelf of Pechora Sea, thousand tons	263	870	607	230,8
The Caspian Sea shelf, thousand tons	1460	1662	202	13,8
The shelf of the Okhotsk Sea, thousand tons	13960	16062	2102	15,1
The continental shelf, thousand tons	16,2	19	2,8	17,3

The number of input and reconstructed plants	13	27	14	107,7
Gas industry				
Gas production, billion cubic meters	641,9	635,5	-6,4	-1,0
Gas export, billion cubic meters	181,1	192,5	11,4	6,3
Production of petrochemical feedstock, millions tones	40,6	44,1	3,5	8,6
Refining petrochemical feedstock, millions tones	9,5	10,9	1,4	14,7
Net imports of large polymers, millions tones	0,9	0,2	-0,7	-77,8
Investments in the modernization of petrochemical plants, billion rubles	439,4	608,4	169	38,5
Coal industry				
Coal production, millions tones	358,2	373,4	15,2	4,2
Coal export, millions tones	154,8	156	1,2	0,8
Electric-power industry				
Total capacity, GW	240,3	243,2	2,9	1,2
Electrical energy consumption, bln kWh	1040,4	1036,4	-4	-0,4
Electric-power production, blnkWh	1047,4	1049,9	2,5	0,2

Major losses in energy sector associated with sanctions are:

- freezing of projects for the development of new oil fields, which is described in reduction of exploration drilling passage of 176 thousand square meters;
- reducing production in some offshore projects to 43 thousand tons due to technological limitations.

The aim of government is to reduce negative effects of sanctions and to develop positive results of their impact. The suggested tool can be use in management practice, contribute not only to study the economy under sanctions and evaluation of its dualistic effects, but also be able to assist reasonable decisions on conversion of its impact to positive effects of FEI and Russian economy as a whole.

Conclusions

At present, Russia's economic system is developing in the context of a multidirectional nature of the impact of sanctions: from identifying losses to generating positive effects. The use of the tools of cognitive system modeling is a scientifically grounded basis for developing solutions for managing the economy in the face of sanctions.

A short-term impact of sanctions on Russian economy is estimated by the World Bank's forecast (2016) for GDP decline for 2015 and 2016, respectively, by 3.8% and 0.7%. Mashkin (2015) notice that imposed sanctions form a system of responses that are oriented towards adaptation, protection and, in some cases, adaptation to new economic conditions.

Statistical data confirm the positive dualistic effect of sanctions in FEI. Key parameters of FEI during the period of sanctions are in positive zone and exceed existing losses. Volkova (2016) mentioned that technological sanctions had not yet affected the economy: they were aimed to reduce a potential of hard-to-recover oil production and not against current production, which was at a record level. So present in this paper analysis confirms it. The systematic approach proposed in the article to analysis of Russia's economy in conditions of sanctions allowed us to determine the contours of management taking into account threats and opportunities for the development of FEI and Russian economy as a whole.

Acknowledgment

We wish to thank editors, translators and referees for comments.

References

Aalto, P and Forsberg, T. (2015), 'The structuration of Russia's geo-economy under economic sanctions' *.Asia Europe Journal.* [Online], [Retrieved October 22, 2017], https://link.springer.com/content/pdf/10.1007%2Fs10308-015-0446-6.pdf

Analytical Center of the Government of Russia (2014). 'Fuel and energy complex -2014'. *Report* [Online], [Retrieved October 20, 2017], http://ac.gov.ru/files/publication/a/5451.pdf

Baldwin, D. (2015). 'Sanctions in Political Science'. *International Encyclopedia of the Social &Behavioral Sciences (Second Edition).* [Online], [Retrieved October 22, 2017], http://www.sciencedirect.com/science/article/pii/B978008097086893126X

Bushuev, V. (2015), Geopolitics and its influence on the processes in world energy, Shafranik, I. (ed), Energia, Moscow.

Faltsman, V. (2015). 'Import substitution in Energy and VPK,' *Voprosy Ekonomiki*, 1, 116-124.

Haytun, A.D., (2014), 'International sanctions will hit the Russian energy sector.' *Nezavisimaya gazeta*. [Online], [Retrieved September 22, 2017], http://www.ng.ru/ideas/2014-09-12/5_sanktsii.html

Ismagilova, L., and Budnik, E. (2015) Investment development of the real sector of economy: methods and models, USATU, Ufa.

Ismagilova, L., and Sitnikova, L., (2015),'Dualistic effects of sanctions and its impact on the Russian economy.'*Modern trends in the development of science and technology.* [Online], [Retrieved September 16, 2017], https://elibrary.ru/download/elibrary_24918469_86439797.pdf

Karamayn,O., Chebanov, K., and Soloviova, G., (2015),'The technological development of the Russian fuel and energy complex under the influence of economic sanctions'.*Modern problems of science and education.* [Online], [Retrieved September 15, 2017], https://science-education.ru/ru/article/view?id=18983

Kolomeizeva, A., (2014), 'Possible consequences of economic sanctions on the EU and US for the energy industry in Russia.'*Russian foreign economic bulletin.* [Online], [Retrieved October 14, 2017], http://www.rfej.ru/rvv/id/40025C2CE/$file/104-116.pdf

Kuvalin, D., and Moiseev, A. (2015), 'Russian enterprises at the end of 2014: Adjustment to crisis developments in the national economy and views on the consequences of economic sanctions,' *Economy and Enterprises Studies on Russian Economic Development*, 26(3), 295-315.

Mashkin, N.P., (2015), 'Anti-Russian trade and economic sanctions of the West as a US competition against Russia,'*Siberian international.* [Online], [Retrieved October 28, 2017], https://elibrary.ru/download/elibrary_23598790_41034676.pdf

Ministry of Energy (2015) Report. '*Results of the Russian Ministry of Energy and the main results of operation in 2015'*. [Online], [Retrieved September 28, 2017], http://minenergo.gov.ru/node/4436

Musatkina, A.A., (2010), 'Concept and types of legal norms sanctions,' *Society and people.* [Online], [Retrieved October 28, 2017], https://elibrary.ru/download/elibrary_21479188_49944589.pdf

Naghavi, A., and Pignataro, G., (2015), 'Theocracy and resilience against economic sanctions,' *Journal of Economic Behavior and Organization*. [Online], [Retrieved October 18, 2017], http://www.sciencedirect.com/science/article/pii/S016726811400331X?via%3Dihub

Newnham, R. E., (2011), 'Oil, carrots, and sticks: Russia's energy resources as a foreign policy tool,' *Journal of Eurasian Studies.* [Online], [Retrieved October 8, 2017], https://www.sciencedirect.com/science/article/pii/S187936651100011X?via%3Dihub.

Newnham, R. E., (2013), 'Pipeline politics: Russian energy sanctions and the 2010 Ukrainian elections,' *Journal of Eurasian Studies.* [Online], [Retrieved October 8, 2017], http://www.sciencedirect.com/science/article/pii/S1879366513000110?via%3Dihub

Oxenstierna, S., (2014), 'Russia's defense spending and the economic decline,' *Journal of Eurasian Studies*. [Online], [Retrieved October 10, 2017], http://www.sciencedirect.com/science/article/pii/S1879366515000287?via%3Dihub

Priede, J., and Pereira, T. (2015), 'European Union's competitiveness and export performance in context of EU – Russia political and economic sanctions,' *Procedia - Social and Behavioral Sciences*. [Online], [Retrieved October 2, 2017], http://www.sciencedirect.com/science/article/pii/S1877042815052714

Rosstat (2015) Report. '*Energy efficiency: Cost of production of oil'*. [Online], [Retrieved September 28, 2003], http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/economydevelopment/#

Shirov, A. ,Yantovskii, A. ,and Potapenko V., (2015), 'Evaluation of the potential effect of sanctions on the economic development of Russia and the European Union,' *Studies on Russian Economic Development*, 26(4), 317-326.

Volkova, O.E., (2016), 'Account billions: what happened to the economy over two years of sanctions'. [Online], [Retrieved October 18, 2017], http://www.rbc.ru/economics/20/03/2016/56eeb0869a794763d60f8dfb

World Bank, (2016). *The World Bank Commodity markets outlook*. [Online], [Retrieved October 19, 2017], https://openknowledge.worldbank.org/bitstream/handle/10986/23680/CMOJan2016FullReport.pdf?sequence=1&isAllowed=y

Challenges of Digital Transformation in Higher Education Institutions: A brief discussion

Luis Silva Rodrigues, Politécnico do Porto/ISCAP/CEOS.PP, Porto, Portugal, LSR@iscap.ipp.pt

Abstract

Like many industries, Higher Education Institutions (HEIs) have been exploiting emerging technologies as a way to improve performance and adapt to the increasingly technology-driven society. Although digital transformation is most often associated with business organizations, it is also an important issue for HEIs and presents some challenges that must be considered when defining digital policies and strategies. In this paper, as a starting point for our research, a brief discussion on the main challenges of digital transformation in HEIs is presented.

Keywords: Digital transformation; Digital Strategies; Higher Education Institutions.

Introduction

Digital business and digital transformation are currently buzz phrases, that generates great interest and are being used in many contexts. In the literature, especially from the IT service and solutions providers, such as Gartner, Cisco, IDC and others, it is possible to identify some definitions for digital transformation. While some definitions focus mainly on harnessing technologies to reinvent or improve the business (e.g. (Forrester, 2016; IDC, 2015; Solis and Szymanski, 2016; Wade, 2015)), for others the digital transformation is the process of digitizing and making available what was previously analog/physical (e.g., (OECD, 2017; Raab and Griffin-Cryan, 2011)).

Regardless of how it is defined, digital transformation is increasingly viewed as an imperative and has led organizations to rethink how they can use technology to improve their performance or expand their businesses. Digital transformation is fundamentally about change and it involves people, processes, strategies, structures, and competitive dynamics (Wade, 2015). Digital transformation implies an organizational change based on the use and convergence of several resources and advances of emerging technologies, such as big data, cloud computing, artificial intelligence, augmented and virtual reality, mobile apps, social media, internet of things, blockchains, among others. The implementation of a digital strategy is a complex process that requires taking iterative measures to implement the culture, processes and technology that will enable the businesses to compete in the modern marketplaces (Forrester, 2015).

The drivers that lead organizations to digital transformation initiatives can be diverse. Evolving customer experience and satisfaction, the growth opportunities in new markets, the increased competitive pressure and new standards in regulatory and compliance, are some examples commonly referred. However, the success of a digital strategy relies heavily on several factors, some technological and others of a non-technological nature. Among these factors are (Hafsi and Assar 2016; Solis and Szymanski, 2016; WEF, 2016): the culture and internal organization, the organization silos; the organizational resistance to change, the lack of resources and budget, the legal and regulatory implications, the understanding of the behavior or impact of the customers; lack of data to justify the value of digital transformation; lack of competences and digital literacy; and security.

According to a recent study by Navitas Ventures, there is no doubt that HEIs digital transformation is already underway and some of them are at least part way through their digital journey (NV, 2017).

However, the same study shows that HEIs are adopting different strategies to achieve different objectives and facing in the process several challenges. In this paper, as a starting point for our research, we present a brief discussion on the main challenges of digital transformation in HEIs.

Challenges of Digital Transformation in HEIs

Nowadays, HEIs are facing enormous pressure due to the global competition for candidates, the demographic changes, the restrictions on access to financial resources, the new demands of the labor market and the growing expectations of students to innovate their experiences learning, teaching, research and management. To address some of these pressures, HEIs are using digital transformation strategies as a way to improve 'how' they do their existing work, to digitize their current operations while creating new digital models in parallel, to create wholly new digital models or to fully digitize their current (NV, 2017).

Whatever the digital transformation strategy adopted, HEIs may face many challenges. One of the main challenges is the definition of a strategic vision for digital transformation. HEIs need a strategic vision that allows the whole institution to be united in the implementation of the digital initiatives. For this it is important a strong leadership and a specialized team that can confidently explain and implement their plans. A clear vision will make the team and stakeholders more involved and invested in the process of digital transformation.

Another important challenge is the digital literacy of all stakeholders. Nowadays, students of higher education are not only young people between the ages of 18 and 25. Instead, the range of ages is widening, with young generations having generally more digital skills than older generations. Furthermore, although HEIs are by nature very dynamic and technologically advanced, their different audiences (students, alumni, faculty, administration, parents, industries, society, among others) have different backgrounds and have different behaviors with technology. The success of a digital strategy is strongly dependent on the ability of these different stakeholders to adapt to the emerging technologies and to make an efficient use of them.

A third challenge is meeting the new expectations and needs of the students. Students are increasingly demanding an improvement in the "basics" of their experience, with features such as digitization of administrative processes, unrestricted 24-hour access to all information and services using multiple platforms or digital curriculum. Choosing the right digital approach that meets the needs of students is therefore critical to improving one of the main drivers of digital transformation - the student experience.

A fourth challenge is related with the financial and technological constraints of HEIs. Emerging technologies are often expensive, which, combined with the financial constraints that HEIs face today, may hinder its adoption. On the other hand, HEIs may not have the access to the technologies needed for a given strategy because the access to these technologies is not open or its maturity level is still not the ideal. Thus, for a digital strategy to be successful, it is necessary to ensure that the HEI has the necessary resources for its implementation.

With the increasing use of digital technologies and the growing connectivity of everything come also greater challenges on the level of security, compliance and data protection and regulations. The automation of business processes and the digitization of data can increase agility of HEIs, but also significantly increase cybersecurity risks and levels of threat.

Finally, the attention given to digital transformation has led HEIs to the implementation of different digital initiatives and the adoption of different approaches. One of the most common problems faced in

the digital strategies is the temptation to implement digital initiatives in silos or through a technology centric approach, which can result in a competition for scarce resources and resulting in inefficiencies and conflicts (Raab and Griffin-Cryan, 2011). Implementing digital initiatives in an integrated way is therefore a major challenge and can only be achieved if there is a framework to manage it.

Conclusion / Future Work

It is widely accepted that any modern organization needs a digital strategy if it is to achieve its business objectives, and HEIs are no exception. Nowadays, HEIs are under pressure to provide new and innovative digital experiences for their stakeholders. For this reason, HEIs must begin to look at digital holistically and transform by applying digital thinking across everything they do; how they operate internal processes; and how they source their core mission. In our view, this can only be achieved by using a framework that enables HEIs to manage, in a holistic and integrated way, all digital initiatives and approaches. This framework should consider the three main components of a digital strategy in an IES:

- Stakeholders (students, alumni, faculty, administration, industries, society, among others)
- Emerging technologies (big data, cloud computing, artificial intelligence, augmented and virtual reality, mobile apps, social media, internet of things, blockchains, among others)
- Core Processes (administration, education and research)

In our research we intend to study how HEIs are facing the challenges of digital transformation and what is current state of digital transformation practices. Then, we intend to propose a digital transformation framework that can be used to evaluate the current state of an HEIs digital strategies and to facilitate the integration of different initiatives and approaches.

References

Forrester. (2016) Leading Digital Business Transformation. [Online] Forrester Research, Inc. [20Oct2017] Available: https://www.imd.org/ldbt/digital-business-transformation/

IDC. (2015) Digital Transformation (DX): An Opportunity and an Imperative. [Online] IDC Research. [20Oct2017] Available: https://www.idc.com/prodserv/decisionscapes/RESOURCES/ATTACHMENTS/IDC_254721_ExecBrief_Digital_Transformation.pdf

Hafsi, M and Assar, S. (2016), "What enterprise architecture can bring for digital transformation? An exploratory study". Proceedings CBI 2016: 18th IEEE Conference on Business Informatics, 83-89.

NV. (2017) Digital Transformation in Higher Education. [Online] Navitas Ventures. [20Oct2017] Available: https://www.navitasventures.com/wp-content/uploads/2017/08/HE-Digital-Transforma tion-_Navitas_Ventures_-EN.pdf

OECD. (2017) Key Issues for Digital Transformation in The G20. OECD.

Raab, M., & Griffin-Cryan, B. (2011) Digital Transformation of Supply Chains: Creating Value – When Digital Meets Physical: Capgemini Consulting.

Solis, B. and Szymanski, J. (2016) The 2016 State Of Digital Transformation. [Online] Altimeter Group. [20Oct2017] Available: https://www.vmware.com/ciovantage/wp-content/uploads/2017/ 03/The-2016-State-of-Digital-Transformation-Altimeter.pdf

Wade, M. (2015) A Conceptual Framework For Digital Business Transformation. [Online] IMD and CISCO. [20Oct2017] Available: https://www.imd.org/uupload/IMD.WebSite/DBT/Digital% 20Business%20 Transformation%20Framework.pdf

WEF. (2016) Digital Transformation of Industries: Digital Enterprise World Economic Forum White Paper: World Economic Forum.

Significance Level of a Query for Enterprise Data

Loan Thi Ngoc Dinh, Federation University Australia, Australia, ldinh@federation.edu.au

Gour Karmakar, Federation University Australia, Australia, gour.karmakar@federation.edu.au

Joarder Kamruzzaman, Federation University Australia, Australia, joarder.kamruzzaman@federation.edu.au

Andrew Stranieri, Federation University Australia, Australia, a.stranieri@federation.edu.au
Rajkumar Das, Monash University, Australia, rajkumar.das@monash.edu

Abstract

To operate enterprise activities, a large number of queries need to be processed every day through an enterprise system. Consequently, such a system frequently faces hugely overloaded information and incurs high delay in producing query responses for big data. This is because, traditional queries are normally treated with equal importance. With the advent of big data and its use in enterprise systems and the growth of process complexity, the traditional approach of query processing is no more suitable as it does not consider semantic information and captures all data irrespective of their relevance to a business organization, which eventually increases the computational time in both big data collection and analysis. The significance level of a query can make a trade-off between query response delay and the extent of data collection and analysis. This motivates us to concentrate on determining the significance level of a query considering its importance to an enterprise system. To our knowledge, no such approach is available in the literature. To bridge this research gap, this paper, for the first time, proposes an approach to determine the significance level of a query to prioritize them with the relevance to a business organization. As business processes play key roles in any enterprise system and all business processes are not equally important, this is done by determining the semantic similarity between a query and the processes of a business organization and the importance of a business process to that organization. With a case study on an enterprise system of a retail company, the results produced by our proposed approach have shown that significance level is higher for more important queries compared to the less important ones.

Keywords: semantic similarity, query processing, data collection, data analysis, business process.

Introduction

During the daily activity of enterprises, a number of queries are made by stakeholders via numerous tools and applications. These queries are acting like a communication bridge between stakeholders and information systems. Additionally, they are directed to important tasks (e.g., information and process retrievals, data collection and analysis). Queries are also playing the crucial role in capturing deep insight of data and supporting decision makers. Based on the outcome of queries which are presented in text or figures, stakeholders can have an overview about the things they are questioning.

However, as an information system needs to process a large number of queries at the same time, this causes delay and overloading in the response. Besides that, data is big large and acquired from different sources in variety of structures; raising much concern on how to effectively capture deep insight of data via queries. These issues are very prominent while processing the query for enterprises and present big challenge for research community (Ur Rehman et al. 2016). Numerous studies have been reported in regard to supporting query processing (e.g., real-time data collection (Fellenz & Brady 2008; Lubell-

Doughtie et al. 2013), speed optimization during data processing (Jarke et al. 2003; Nachnani et al. 2016)).

Therefore, numerous tools, applications and frameworks have been introduced such as Hadoop (hadoop.apache.org), MongoDB (mongodb.com) and Tableau (tableau.com) to deal with the above mentioned issues. By using these tools and frameworks, enterprises can develop computing programs for data processing based on their needs. Besides that, to improve the effectiveness of the existing solutions in this field, a number of researchers have also proposed various approaches to reduce redundant, irrelevant data. For example, a method (Nachnani et al. 2016) for cleaning data in a customer relationship management system has been introduced in order to avoid duplication of storing customer records. Chen et al. proposed a method to deal with the problems of redundant data (Chen et al. 2016). Rehman et al (2016) claimed that 90% of enterprises fail in making decisions to meet customer needs. They also proposed a hypothetical business model to help enterprises to achieve their objectives: (i) value to customer (V2C) and value to firm (V2F) by exposing insights and predicting economic activities. They focused on how to detect and locate redundant data in object relational mapping (ORM) to achieve V2C and V2F (Ur Rehman et al. 2016).

As a consequence of the increasing popularity of big data applications and cloud computing, software systems are becoming more dependent on the underlying database for data management and analysis. An optimal solution for data collection, followed by data analysis, is must for any organization, especially in enterprise systems where internal and external data usually need to be processed at the same time to provide better business decisions (Andersen & Feamster 2006; Ur Rehman et al. 2016). To get more useful information for enterprises, the studies from Vaughan (2014 and 2015) have proven that business information can be discovered via search engine (like, Google Trends and Baidu) data. These studies also indicate which type of search volume data is more useful in discovering business information by a comparison between worldwide and domestic data in their case studies. However, these free tools have shown some disadvantages which includes: (i) the data volume highly depends on the popularity of the keywords in the queries and (ii) the information produced from these tools may contain inaccuracies as a result of data samples and its approximations.

The above studies are focused on external data. Likewise numerous studies have dealt with the internal data as well. This can be seen clearly in the field of querying techniques for business processes. An enterprise has many process models which they have to work with every day (e.g., the models in SAP (Curran & Ladd 1999), Supcorp (La Rosa et al. 2013)); this leads to a big issue which is how to manage effectively all these process models. In general, process models are created by business analysts with the purpose of capturing business requirements, enabling a better understanding of business processes, facilitating communication between business analysts and information technology (IT) experts. However, these models must be designed based on enterprises standards regarding laws, policies and regulations. Hence, querying techniques for business processes are extremely necessary in order to manage, update, access and combine process model repository.

Querying techniques have been introduced to express and execute queries over repositories of business process models such as BPMN-Q (Awad 2007), BP-QL (Beeri et al. 2008), BeehiveZ (Jin et al. 2011) and APQL (Ter Hofstede et al. 2013). Overall, these techniques are used as a mediate language where a stakeholder can communicate with an information system in order to express their requirements for specific tasks (e.g., when they need to know, how to response plenty of inquiries from their customers, or which process models can involve product distribution).

Although, the solutions mentioned above have proven a certain successes in dealing with the existing issues of query processing, to extract deep insight of data, it requires to collect and analyze data exhaustively. Data has to be collected from all possible sources and analysis needs to be done considering the semantic information of the key words of interest (Resnik 1995; Floridi 2005; Mihalcea et al. 2006). To address this issue, there exist some techniques in the literature that consider semantic information in both data collection and analysis. For example, Dinh et al (2015) proposed a method for big data collection and analysis depending on the semantic value of keywords. Wu et al. (2014)

introduced an algorithm where the text semantic of documents can be discovered based on the learning model of semantic indexing. Furthermore, semantic data has also been applied to deep learning for image processing (Visin et al. 2016; Armeni et al. 2017).

However, the techniques proposed in the above studies are computationally expensive as they always apply the same level of semantic information for each query. Even though this helps capturing more relevant information (deep insight of data) but also impedes faster data collection and analysis. Note, for an organization, all queries are not equally important, i.e., some queries may be more important than others. To make a trade-off between capturing deep insight of data and computational efficiency, this demands to determine the significance level of a query where higher the significance level of a query, the more deep insight of data will be captured through both data collection and analysis processes and vice versa. To our best knowledge, no such method exists in the literature that can determine the significance level of a query.

To address an important research question 'How can the significance of a query be determined?' for the first time, we propose a technique which exploits both semantic similarity between a query keyword and annotations of business processes and the importance of a business process to an organization. The contributions made in this paper are summarized as follows:

- We determine the significance level of a query considering the semantic similarity between a query and the processes of a business organization and the importance of a business process to an organization. The core business processes are given higher importance than non-core business processes.

- We develop a business case study considering the relevant business processes of an enterprise organization. We also prioritize the business processes, i.e., whether they are core or non-core in this case study. We determine the significance levels of 18 queries. Results show that queries having higher semantic similarity with the core-business processes have the higher significance level values.

The structure of this paper is as follows: Our proposed methodology is presented in Section 2. The results of the case study in a scenario of retail enterprise are described in Section 3. Section 4 concludes the paper.

Our Approach to Determine the Significance Level of a Query

One of the most important usages of a query in business intelligence is to collect and analyze data for discovering some clues or deep insight of data that can help achieve efficiency gain or competitive advantage over other similar organizations. Business processes of an enterprise system are also used to obtain efficiency gain and competitive advantage over others. This implies that querying data meets the main purpose of business processes. However, for an enterprise organization, all business processes are not equally important. Some business processes are considered as the core business processes, while others are regarded as the non-core business processes.

To successfully achieve the business goals and combat the computational complexity in a tactical way, the result of querying data should reflect the core business processes more extensively than others. This motivates us to calculate the significance of a query considering the importance of the business processes of an organization. This calculation involves two main items (i) which queries are related to which business processes and to what extent? and which processes are how much important to a business organization? For the former, we consider the semantic similarity between the keywords of a query and the annotations of a business process. This is because the keywords of a query represent the purpose of a query, while the annotations of a business process denote the activities and the other aspects of a business process. For the latter, following the widely used and well adopted approach in a business organization, the importance of a business process is attributed considering whether a business process is a core or non-core.

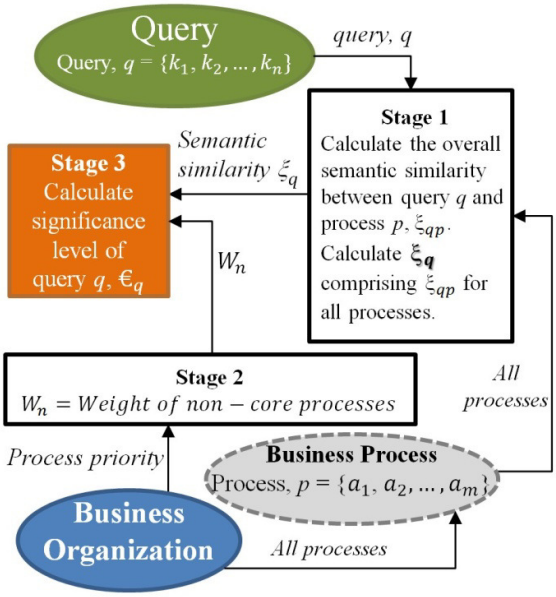


Fig. 1: The overall process of our proposed approach to determine the significance level of a query

Let $q = \{k_1, k_2, \cdots, k_n\}$ and $p = \{a_1, a_2, \cdots, a_m\}$ be a query and a process respectively where k_i is i^{th} keyword of query q and a_j is j^{th} annotation of process p. There are many methods available in the literature for semantic similarity measure between two short sentences. However, in this paper, we choose to use a popular and widely adopted approach presented in the study of Li et al (2006) to measure semantic similarity between a query keyword k_i and a process annotation a_j. In this approach, WordNet, an online lexical database (dictionary), is organized into a hierarchical semantic tree structure where each node represents a set of synonym words called synset. The upper level node in which two lower level nodes meet is called subsumer. Using WordNet, the semantic similarity between k_i and a_j is calculated as,

$$\xi(k_i, a_j) = l_s \times d_h \tag{1}$$

where,

$$l_s = e^{-\alpha l} \tag{2}$$

and

$$d_h = \frac{(e^{\beta h} - e^{-\beta h})}{(e^{\beta h} + e^{-\beta h})} \tag{3}$$

Here, h is the depth of the subsumer of k_i and a_j in the hierarchical semantic tree of WordNet. The shortest path between k_i and a_j in the hierarchical semantic tree of WordNet, l is defined as:

$$l = \begin{cases} 0 \ \ if \ \ s_1 = s_2 \\ 1 \ \ if \ \ s_1 \cap s_2 \neq \varnothing \\ shortest \ \ path \ length \ between \ k_i \ and \ a_j \ otherwise. \end{cases} \tag{4}$$

where, s_1 and s_2 are the synsets of k_i and a_j, respectively and the values of α and β are selected in such a way so that l_s and $d_h \in [0,1]$. As mentioned above, the optimum values of α and β are shown to be 0.2 and 0.45 respectively (Li et al. 2006).

The overall semantic similarity value between query q consisting of n keywords and process p comprising m annotations can be defined as,

$$\xi_{qp} = \frac{\sum_{i=1}^{n}\sum_{j=1}^{m}\xi(k_i, a_j)}{n \times m} \tag{5}$$

We then form a vector $\boldsymbol{\xi_q}$ from all ξ_{qp}. The vector $\boldsymbol{\xi_q}$ is calculated as $\sum_p \xi_{qp}$.

Assuming the significance level of a query varies nonlinearly with the semantic similarity value between a query and a business process, the significance level of query q for a business organization can be defined as,

$$€_q = \frac{e^{\bar{\xi}_q} + e^{\tilde{\xi}_q \times w_n}}{e + e^{w_n}} \tag{6}$$

where, $\bar{\xi}_q$ and $\tilde{\xi}_q$ are the median value of $\boldsymbol{\xi_q}$ for the core and non-core business processes, respectively. $W_n \in [0,0.5]$ represents the weight for non-core processes selected by an business organization according to the requirement of an enterprise system. The overall process of our proposed system is illustrated in Figure 1.

In Figure 1, the all business processes of an enterprise organization and a query of an end user are fed to Stage 1. Stage 1 calculates the overall semantic similarity ξ_{qp} between query q and process p as shown in (5). In this way, the semantic similarities between the query and all business processes are calculated and finally ξ_q is obtained. ξ_q is provided as an input to Stage 3. Stage 2 captures the weights W_n for non-core business processes from the business organization and supplies this to Stage 3. Utilizing W_n and ξ_q, Stage 3 calculates the significance level of query q, $€_q$ by applying (6).

Case Study

The proposed approach is implemented using Python programming language. It is validated by considering a business case of a retail company. Table 1 shows that the business organization has 14 business processes. The annotations and abbreviated names of the business processes are also presented in this table. For example, the process Pricing which is abbreviated as P6 has following annotations: product, price, customer, supplier, purchase, sale, order, warehouse, inventory, transport, ship, order status, delivery, goods, services, code of the establishment, customer segmentation.

Table 1: The processes of an organization used in the case study

Business Process	Abbreviated Name	Annotation
Customer service (after sale services)	P1	Customer service, after sale services, product, service, register, feedback, return, refund, order, tax invoice, membership, online, help desks, call centres, customer support, guarantees, warranties, sale, purchase, goods, customer relationship, technical support, warranty support, customer satisfaction, customer retention
Sales/order entry (selling and entering orders)	P2	Customer, product, sale, purchase, order, online, register, login, account, payment, cash, card, delivery, ship, inventory, order status, quantity, discount, Procurement, logistics, distribution, obtaining or storing inputs, storing/transporting finished products to customers, buying, shipping, distributing, receiving, loading, transporting, packing, warehousing
Invoicing/billing (generation and mailing of invoices/bills)	P3	Customer, product, invoice, bill, order, sale, purchase, customer account, current customer, potential, promotion, selling, retail management, billing merchandizing, processing orders, collecting payments, mailing
Purchasing (ordering from suppliers)	P4	Supplier, product, purchase, order, warehouse, inventory, transport, ship, status, operations, product quality, transform inputs into final outputs, goods, services, code of the establishment, assembling products, managing production, producing goods, managing services, providing services, conducting quality assurance, quality control, fabricating components
Advertising/ promotion	P5	Customer, product, promotion, customer segmentation, invoice, order, marketing, sales, purchase, customer accounts, existing customer, potential customer, advertising, telemarketing, selling, retail management, market research, managing accounts, media relations, branding products
Pricing	P6	Product, price, customer, supplier, purchase, sale, order, warehouse, inventory, transport, ship, order status, delivery, goods, services, code of the establishment, customer segmentation
Marketing research	P7	Customer, product, marketing research, potential customer, testing, design, customer buying trend, product trend
Product design/development	P8	Product, price, customer type, customer segmentation, design, product development, marketing, marketing research, testing, design, customer buying trend, product trend
Distribution (transporting goods to market)	P9	Distribution, product, good, market, transport, sale, inventory, procurement, logistics, loading, transporting, packing, warehousing
Business planning	P10	Business planning, strategic management, formation, implementation, evaluation of cross-functional decisions, organization, long-term objectives, coordinating activities, identifying new investments, acquisitions, and divestments, setting product strategy
Inventory management (keeping inventories at planned levels)	P11	Inventory management, planned level, supplier, customer, product, sale, purchase, order, online, procurement, logistics, distribution, obtaining or storing inputs, import product, distributing, receiving, loading, transporting, packing, warehousing
Quality management (measuring, monitoring and taking action to maintain quality)	P12	Product, product quality, quality management, measuring, monitoring, maintaining quality, purchase, warehouse, inventory, ship, status, operations, goods, services, code of the establishment, managing production, managing services, conducting quality assurance or quality control, fabricating components, supplier
Production scheduling/planning (for manufacturing requirements)	P13	Product, product quality, inventory, warehouse, purchase, goods, supplier, schedule, planning, manufacture, analysing market, testing, design, engineering activities, testing
Personnel management	P14	Personnel management, staff, employee, labour, human resources management, recruiting, hiring, training, compensating, dismissing personnel, employee assistance, firing, offering labour relations services, training

The core business processes are nominated depending on business strategies. These processes convey in which aspect an enterprise organization should focus with higher priority to reach their goals. We have identified the following five business processes as the core business processes as these processes are related to customers and human resources at most:

P1. Customer service (after sale services)
P7. Marketing research
P8. Product design/development
P10. Business planning
P14. Personnel management

Whereas, the remaining nine processes are the supplementary (non-core) processes:

P2. Sales/order entry (selling and entering orders)
P3. Invoicing/billing (generation and mailing of invoices/bills)
P4. Purchasing (ordering from suppliers)
P5. Advertising/promotion
P6. Pricing
P9. Distribution (transporting goods to market)
P11. Inventory management (keeping inventories at planned levels)
P12. Quality management (measuring, monitoring, and taking action to maintain quality)
P13. Production scheduling/planning (for manufacturing requirements)

To calculate the significance level for a number of different queries, we have used 18 different queries which are generally being used in an enterprise system of a retail company. These queries are listed in Table 2 where entire set of queries comprising of keywords and their abbreviations are also presented. For example, an abbreviated name of query number 5 is Q5.

Table 2: Queries and their abbreviations

Query	Abbreviated name
How many existing customers referred new customers to your company?	Q1
Which product pages get the most views?	Q2
What is the percentage of abandoned shopping carts?	Q3
What is the total paid revenue vs outstanding orders?	Q4
What is the total number of returned/ cancelled orders and lost revenue from them?	Q5
What customers talk about the promotion last month	Q6
Are customers happy with the quality of fruit and vegetable	Q7
Do customers like shopping online and how frequently they do	Q8
What is the current shopping trend	Q9
Satisfaction of customers about frozen fruits	Q10
Determine customer satisfaction levels with fruit and vegetables	Q11
What customer think about fruit and vegetable	Q12
Are our staffs happy about our training program?	Q13
Racism and terrorism in recent years	Q14
The trend of same-sex marriage in the world	Q15
Should gym and diet always come together?	Q16
Are dogs better than cats	Q17
Obesity epicdemic in school ages	Q18

We have used weight $Wn = 0.5$ for non-core business processes, $\alpha = 0.2$ and $\beta = 0.45$ as suggested in the study of Li et al (2006). The semantic similarity values between 18 queries (Q1 to Q18) and 14 business processes (P1 to P14) produced by our proposed approach using (5) are shown in Table 3.

Table 3 shows the similarity score between the queries and business processes as calculated using the method presented in Section 2. Our aim is to show how each of the business process is related to individual queries. From the Table 3 it can be clearly seen that query Q1 has highest semantic similarity score (0.9994) with business processes P6, P7 and P8. This means processes P6, P7 and P8 are the most relevant to the query Q1. The lowest semantic similarity score (0.1505) for query Q8 is with processes P9. Therefore, processes P9 are the least relevant to query Q8.

Table 3: Relevance scores of queries for business processes

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18
P1	0.8575	0.3358	0.2914	0.2462	0.4175	0.6011	0.4311	0.3555	0.3607	0.5229	0.4495	0.4032	0.4713	0.2512	0.3922	0.2127	0.3712	0.3206
P2	0.2553	0.6864	0.4170	0.4069	0.5644	0.3918	0.4094	0.4933	0.4395	0.4492	0.4214	0.4156	0.4458	0.3367	0.4893	0.2884	0.2736	0.5027
P3	0.9994	0.4584	0.2809	0.3352	0.3906	0.4620	0.4253	0.4050	0.4442	0.4735	0.4061	0.4596	0.4405	0.2765	0.2552	0.2431	0.3740	0.2535
P4	0.2018	0.5712	0.7325	0.4904	0.5591	0.4024	0.4674	0.4258	0.4430	0.4277	0.4639	0.4029	0.5023	0.3708	0.4247	0.3377	0.3618	0.4306
P5	0.7395	0.5687	0.4968	0.4469	0.5635	0.5724	0.6227	0.5366	0.5163	0.6437	0.6230	0.6267	0.5310	0.3082	0.4598	0.4519	0.4224	0.3905
P6	0.9994	0.4760	0.3333	0.2919	0.4297	0.5594	0.3932	0.3512	0.3690	0.4941	0.4609	0.4541	0.3673	0.2090	0.3461	0.1543	0.2760	0.3761
P7	0.9994	0.5458	0.4550	0.4390	0.4667	0.4272	0.5622	0.5176	0.7070	0.5860	0.5417	0.5749	0.3946	0.3400	0.5272	0.2884	0.3286	0.2974
P8	0.9994	0.5458	0.4550	0.4390	0.4525	0.4272	0.5622	0.5176	0.6151	0.5860	0.5417	0.5749	0.3946	0.2815	0.4971	0.2884	0.3286	0.2845
P9	0.1869	0.2909	0.3126	0.1677	0.1812	0.2466	0.2207	0.1505	0.2614	0.2808	0.3104	0.2188	0.2305	0.2302	0.2123	0.2121	0.2296	0.2425
P10	0.3758	0.5616	0.4617	0.4123	0.5642	0.3695	0.4221	0.6716	0.4362	0.4351	0.4071	0.4542	0.5298	0.3801	0.4004	0.3220	0.3687	0.3328
P11	0.3232	0.5252	0.4170	0.3013	0.3880	0.4074	0.2785	0.2148	0.3180	0.2826	0.2990	0.2871	0.4131	0.3593	0.3545	0.2837	0.2577	0.3592
P12	0.3010	0.6109	0.5560	0.4453	0.5595	0.4048	0.4874	0.4237	0.4029	0.4524	0.4839	0.4278	0.3764	0.4158	0.4508	0.2887	0.3754	0.4802
P13	0.1652	0.5615	0.4036	0.3745	0.4725	0.2938	0.3952	0.3965	0.3778	0.4051	0.3704	0.4156	0.4131	0.2808	0.2990	0.2884	0.2736	0.2677
P14	0.4491	0.4319	0.5962	0.5130	0.5081	0.5658	0.3811	0.3768	0.3603	0.3391	0.4187	0.2792	0.7003	0.3953	0.4624	0.2886	0.4454	0.4906

As each of the business process has their own weight as mentioned in Section 2 depending on their own importance to business organization, the overall significance level of each query is then calculated based on these weights. The significance levels of queries Q1 to Q18 calculated by our proposed approach are presented in Figure 2.

In Figure 2, we can see that the highest significance level (0.8060) is for Q1: How many existing customers referred new customers to your company? This is mainly because Q1 has the higher value of the significance levels with more core-business processes (P1, P7, P8, P10, P14) than the other queries. This vindicates the reasons why Q1 is the most important query of the enterprise system considered in this case study.

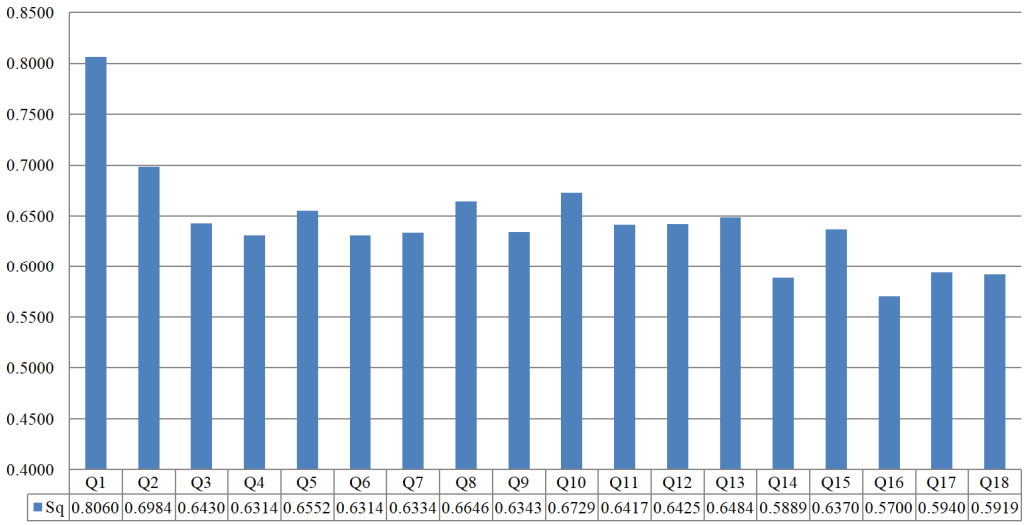


Fig. 2: Significance levels of queries for a business organization

As alluded before, since Q1 is the most important query. For Q1, both data collection and analytic techniques should exhaustively consider semantic information of its keywords to obtain deep insight of data. The consideration of semantic information about a query also reduces unnecessary data collection and thus, this eventually decreases the amount of data to be analyzed, while retaining all relevant data. As a consequence, this speeds up the computational process of data analytic techniques compared to the case where all data is collected without considering semantic information. This speed up will bring much benefit to enterprise information systems as today each business needs to handle enormous amount of growing data.

As mentioned in this paper, semantic information helps capturing the deep insight of data by extending the meaning of data more deeply via conceptual and lexical relations. However, this leads to time consumption in data processing. Therefore, considering semantic information should only concentrate on the query which is important to an enterprise organization. As the keywords of query Q16 'Should gym and diet always come together?' are not relevant to the scenario of retail company, this query has the lowest significance level (0.57). It means Q16 is the least important query to the company compared to the other queries. Hence, by not considering the semantic information, the amount of time to process this query could reduce and thereby this could be a stepping stone to enhance the efficiency of the overall system.

Conclusions

In this paper, we have emphasized the importance of the significance level of a query to a business organization for data collection and analysis to capture the deep insight of data. For the first time, we have proposed an approach to determine the significance level of a query considering the processes of an enterprise system as a business case. Results have revealed that the queries having higher semantic similarity values to the core business processes have higher significance levels. By mathematically quantifying the significance level of a query for a business organization, an enterprise system can recognize how much important a query is, and then it can process the query using the appropriate scale of semantic information for both data collection and analysis. The perception about the relationship between a query and business organization brings a better understanding of a business system to make decisions. This will also improve the precision and computational complexity of information retrieval and data collection compared to the processes where semantic information is not considered.

References

Andersen, D. G. and Feamster, N. (2006), 'Challenges and Opportunities in Internet Data Mining,' Parallel Data Laboratory, Carnegie Mellon University, Research Report CMU-PDL-06-102.

Armeni, I., Sax, S., Zamir, A. R. and Savarese, S. (2017), 'Joint 2d-3d-semantic Data for Indoor Scene Understanding,' arXiv preprint arXiv: 1702.01105.

Awad, A. (2007), 'BPMN-Q: A Language to Query Business Processes,' Enterprise Modelling and Information Systems Architectures (EMISA), vol (119), 115–128.

Beeri, C., Eyal, A., Kamenkovich, S. and Milo, T. (2008), 'Querying Business Processes with BP-QL,' *Information* Systems, 33(6), 477–507.

Chen, T. H., Shang, W., Jiang, Z. M., Hassan, A. E., Nasser, M. and Flora, P. (2016), 'Finding and Evaluating the Performance Impact of Redundant Data Access for Applications That Are Developed Using Object-relational Mapping Frameworks,' *IEEE Transactions on Software Engineering*, 42(12), 1148–1161.

Curran, T. A. and Ladd, A. (1999), 'SAP R/3 Business Blueprint: Understanding Enterprise Supply Chain Management,' Prentice Hall PTR.

Dinh, L. T. N., Karmakar, G., Kamruzzaman, J. and Stranieri, A. (2015), 'Business context in big data analytics,' Proceedings of the 10th International Conference on Information, Communications and Signal Processing (ICICS), 1–5.

Fellenz, M. R. and Brady, M. (2008), 'RFID and Data Capture Technologies in Global Service Supply Chains: Meeting the Information Management Challenge', *Communications of the IBIMA*, vol (4), 41–49.

Floridi, L. (2005), 'Semantic Conceptions of Information,' In E. N. Zalta (Ed.), Stanford encyclopedia of philosophy. Stanford, CA: Metaphysics Research Lab, Center for the Study of Language and Information, Stanford University. Retrieved January 20, 2017, from plato.stanford.edu/entries/information-semantic

Jarke, M., Lenzerini, M., Vassiliou, Y. and Vassiliadis, P. (2003), 'Query Processing and Optimization,' In Fundamentals of Data Warehouses, Springer, 107–122.

Jin, T., Wang, J. and Wen, L. (2011), 'Efficiently Querying Business Process Models with Beehivez,' Proceedings of the 9th International Conference on Business Process Management – Demonstration track.

La Rosa, M., Dumas, M., Uba, R. and Dijkman, R. (2013), 'Business Process Model Merging: An Approach To Business Process Consolidation', *ACM Transactions on Software Engineering and Methodology (TOSEM)*, 22(2), page 11.

Li, Y., McLean, D., Bandar, Z. A., O'shea, J. D. and Crockett, K. (2006), 'Sentence Similarity Based on Semantic Nets and Corpus Statistics', *IEEE Transactions on Knowledge and Data Engineering*, 18(8), 1138–1150.

Lubell-Doughtie, P., Pokharel, P., Johnston, M. and Modi, V. (2013), 'Improving Data Collection and Monitoring through Real-Time Data Analysis,' Proceedings of the 3rd ACM Symposium on Computing for Development, page 28.

Mihalcea, R., Corley, C., Strapparava, C. (2006), 'Corpus-based and Knowledge-based Measures of Text Semantic Similarity,' Proceedings of the American Association for Artificial Intelligence, 775–780.

Nachnani, P., Milbrath, D., Levine, S. and Levine, E. (2016), 'Method and System for Cleaning Data in A Customer Relationship Management System,' In US Patent 9,495,403.

Resnik, P. (1995), 'Using information content to evaluate semantic similarity in a taxonomy,' *arXiv preprint cmp-lg/9511007* .

Ter Hofstede, A. H., Ouyang, C., La Rosa, M., Song, L., Wang, J. and Polyvyanyy, A. (2013), 'APQL: A Process-Model Query Language,' Proceedings of Asia-Pacific Conference on Business Process Management, Springer, 23–38.

Ur Rehman, M. H., Chang, V., Batool, A. and Wah, T. Y. (2016), 'Big Data Reduction Framework for Value Creation In Sustainable Enterprises', *International Journal of Information Management*, 36(6), 917–928.

Ur Rehman, M. H., Liew, C. S., Abbas, A., Jayaraman, P. P., Wah, T. Y. and Khan, S. U. (2016), 'Big Data Reduction Methods: A Survey', *Data Science and Engineering*, 1(4), 265–284.

Vaughan, L. (2014), 'Discovering Business Information from Search Engine Query Data', *Online Information Review,* 38(4), 562–574.

Vaughan, L. and Chen, Y. (2015), 'Data Mining From Web Search Queries: A Comparison Of Google Trends And Baidu Index', *Journal of the Association for Information Science and Technology,* 66(1), 13–22.

Visin, F., Ciccone, M., Romero, A., Kastner, K., Cho, K., Bengio, Y., Matteucci, M. and Courville, A. (2016), 'RESEG: A Recurrent Neural Network-Based Model for Semantic Segmentation,' Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition Workshops, 41–48.

Wu, H., Min, M. R. and Bai, B. (2014), 'Deep semantic embedding,' In SMIR@ SIGIR, 46– 52.

Entrepreneurship Caught Between Creativity And Bureaucracy: Education and Social Innovation for Creativity in Spain

David Borge-Diez, Departamento de Ingeniería Eléctrica y de Sistemas y Automática, Escuela Técnica Superior de Ingenieros de Minas de LEON, Spain, dbord@unileon.es

Enrique Rosales-Asensio, Departamento de Física. Universidad de La Laguna. Avenida Astrofísico Francisco Sánchez S/N 38206, S/C de Tenerife. Spain, erosalea@ull.edu.es

Clara Pérez-Molina, Dpto. de Ingeniería Eléctrica, Electrónica, Control, Telemática y Química Aplicada a la Ingeniería. Universidad Nacional de Educación a Distancia. C/ de Juan del Rosal, 12, 28040 Madrid. Spain, clarapm@ieec.uned.es

Enrique González-Cabrera, Departamento de Ingeniería Química. Universidad de La Laguna. Avenida Astrofísico Francisco Sánchez S/N 38206, S/C de Tenerife. Spain, eglezc@ull.es

Antonio Colmenar-Santos, Dpto. de Ingeniería Eléctrica, Electrónica, Control, Telemática y Química Aplicada a la Ingeniería. Universidad Nacional de Educación a Distancia. C/ de Juan del Rosal, 12, 28040 Madrid. Spain, acolmenar@ieec.uned.es

Abstract

The global socioeconomic context shows a series of challenges of enormous complexity which need to be tackled diligently to achieve authentic social changes. Young people face a difficult situation as far as job opportunities are concerned. At the same time, social innovation burst in as a paradigm of social change and the potential agents of change are young people. However, young people do not perceive opportunities in an environment where it is impossible to face today's social problems with yesterday's solutions. It is therefore necessary to stimulate creativity to explore new ways of resolving situations and new sources of employment and self-employment that can be used by young people. Stimulating creativity and social entrepreneurship in young people can open the way to processes that culminate in social innovations conducive to sustainable development and solidarity between the territories and their people.

Keywords: Creativity; Social entrepreneurship; Social innovation

Nomenclature

ASIF	Amani Social Innovation Framework
CSIC	Consejo Superior de Investigaciones Científicas
EU	European Union
GEM	Global Entrepreneuship Monitor
ICTs	Information and communication technologies
ISOC	Internet Society

SCI	Social Science Citation Index
SCIELO	Scientific Electronic Library Online

Introduction

The difficult and complex situation of young people regarding their incorporation into the world of work is not a new phenomenon [1]. However, since the beginning of the crisis, in 2007-2008, there has been a clear collapse in youth employment and a serious decline in the number of people over 55 in employment [2]. The lack of employment opportunities for young people is a structural and social problem that results in more social problems such as the unleashing of a vicious circle of intergenerational poverty and social exclusion due to the underutilization of young people in the labour market [3].

Addressing this situation from a global perspective requires inter-multidisciplinary approaches and abandonment of assistencialism; necessitating the training of local and regional promoters of the social economy to form a generation of young promoters and local social entrepreneurs. That is why this paper seeks, on the one hand, the epistemological relationship between creativity, young entrepreneurship and social innovation; and, on the other, the application of concepts, models and theories to decision-making on how institutions with competences in the field should proceed in order to stimulate creativity and young entrepreneurship for social innovation.

This research aims to develop a theoretical-technical construct of the triad of creativity, entrepreneurship and social innovation, and to describe its relevance in the design of public policies aimed at improving employment opportunities and creation of companies by young people, and thereby contribute to the socioeconomic development of the territories. On the other hand, it seeks to expose lines of research that can be opened to address this problem aimed at reducing conceptual inaccuracies and to promote social innovation through entrepreneurship by young people.

Materials and Methods

The methodological design applied has been based on secondary research, with the application of the following techniques of research and analysis.

Systematic review of the bibliography related to the subject under study. To do this, the following search and selection profile was used:

- Consultation of the following databases: The sources consulted for the selection of articles, books and reports for later analysis of content were: Social Science Citation Index, (1956-2016), SCIELO (1997-2016), CSIC, ISOC Database, Dialnet.
- Keywords used for the search: "social entrepreneurship", "social innovation," "creativity," "youth," "young entrepreneurship."
- Criteria for inclusion and exclusion: the original studies published in relevant scientific journals, whose objectives were the analysis of entrepreneurship and social innovation, including variable creativity, as well as a multidisciplinary and integrative epistemological vision, were selected.
- Those studies that did not meet the following requirements were excluded: a) those whose vision was partial because they did not include in their analysis consideration of the triad object of study or do not add value to the interpretation of the same; and b) studies whose bias in the area of work (e.g., anthropological perspectives) skewed the holistic and global vision pursued in this research.

The documentation selected for the present paper has been treated by content analysis seeking theoretical-conceptual approaches in which more terms related to the triad (the keywords of this paper) are analyzed, in order to make subsequent conclusions, recommendations and to elaborate the proposal of a roadmap for social entrepreneurship.

Theoretical Framework

Is entrepreneurship linked to creativity? If so, in what way have they been related? Is it a dependency relationship? Can there be entrepreneurship without creativity? Is creativity innate or achievable? Is the entrepreneur born or made? Does entrepreneurship involve the creation of companies or are there more ways to be? Are young people sensitive to various social problems? Can these problems and the desire for change by young people constitute an opportunity for self-employment through social entrepreneurship? These questions could be added to other questions such as the factors that lead people or organizations to be social entrepreneurs, the characteristics that should be taken into account when making the decision to finance a social enterprise and how these characteristics were evaluated, based on social and economic impact indicators. In this sense one could ask: Can governments in any way support the expansion of social entrepreneurship until they can significantly reduce the amount of money invested in the main social problems?

Creativity can be understood as an acquirable skill, as a trait in which all human beings participate, although it must be cultivated [4]. The ability to be creative is given by the mixture of knowledge, attitudes and skills that can be achieved through practice [5]. To define creativity operationally and creativity linked to entrepreneurship, it is useful to think in terms of indicators of creativity, especially when it comes to thinking about measures and fostering it [6].

In 1926, Wallas published a book called The Art of Thought, in which he presented a model of the creative process, which consisted of four consecutive, stages:

1) PREPARATION; 2) INCUBATION; 3) ILLUMINATION; and 4) VERIFICATION. This four-stage process of PREPARATION, INCUBATION, ILLUMINATION and VERIFICATION has since been widely recognised as the standard model for the creative process (see Fig. 1).

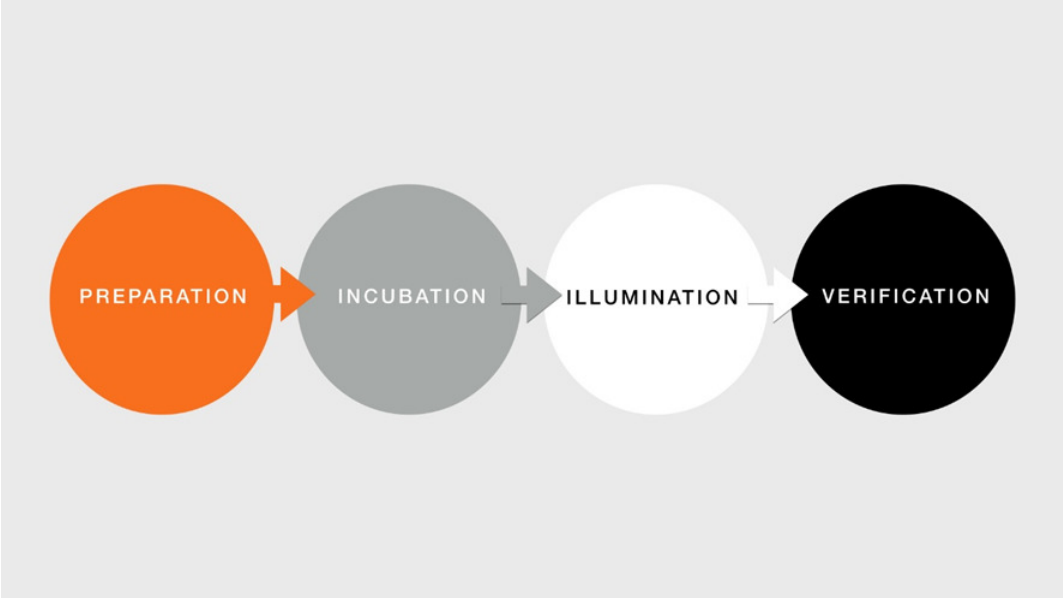


Fig. 1: Wallas's stage model of creativity. Source: Adapted from [7]

Young people's management of information and communication technologies (ICTs) is becoming increasingly important in relation to social entrepreneurship, given that ICTs have made it possible for society in general and young people in particular to have access to social problems that reflect problems of exclusion, violence, pollution, education, etc., and become aware of the various social problems and to develop civic and social commitments for social innovation [8]. Entrepreneurs can use social networks as a vehicle to gain legitimacy and gain social acceptance and, in the context of entrepreneurship, the social network makes it possible for the entrepreneur to build a social capital, composed of a reputation and relationships that provide information, allow them to exert influence and find solidarity in the development of their initiative [9]. Therefore, training and training in social networking, which is well oriented to entrepreneurship and young entrepreneurship is something to take into account, since young people, as digital natives, invest a lot of time in them [10].

The Europe 2020 flagship initiative "Union for Innovation COM" (2010) 546 Final of 6/10/2010 (9) defines Social Innovation as follows: "Social innovation consists of finding new ways of satisfying social needs that are not adequately covered by the market or the public sector, new ways of producing behavioural changes necessary to solve the major challenges of society ... training citizens and generating new social relationships and new models of collaboration ... are therefore useful to train the society to innovate" [11].

For clarity purposes, we detail the seven elements of the Amani Social Innovation Framework (ASIF) below (Fig. 2).



Fig. 2: Seven elements of the Amani Social Innovation Framework. Source: Adapted from [12]

Results

If we join innovative practices and creative solutions for the growth and well-being of the regions with Social Innovation, we can come to understand that social entrepreneurship, therefore social enterprises, are the way to promote changes that help to alleviate the effects of unemployment and the social exclusion of disadvantaged groups.

But what role do young people play in this process of social entrepreneurship?

Spanish young people are more likely to be entrepreneurs than older people, because sociocultural and psychological factors of self-confidence, reference patterns and social stigma to failure seem to affect younger individuals less. The age group in which people are more likely to engage in social entrepreneurship activities is between the ages of 25 and 44, so that the closer they are to retirement, the less willing they are to start a social entrepreneurship project. According to the data presented in the reports of the Global Entrepreneuship Monitor (GEM) [13], we find a population that feels qualified for entrepreneurship and considers it a good professional option, but does not find opportunities and financing, is not encouraged in formal education and is slowed down by the socioeconomic environment. Although social entrepreneurship is not a type of economic activity that is favoured or as developed in Spain, given the problem of youth structural employment and the need to promote entrepreneurship and social innovation as one of the main avenues for social change, it is imperative to establish proposals to facilitate it.

Discussion and conclusions

- In relation to entrepreneurship, the GEM reports examined reveal that for the Spanish case we find a population that feels qualified for entrepreneurship and considers it a good professional option, but

does not find opportunities and financing, it is not fostered in formal education and perceives brakes rather than opportunities in the socioeconomic environment.

- With regard to social entrepreneurship, in view of the reports analyzed, we can conclude that the level of social entrepreneurship in Spain are significantly lower than those of the set of other EU Member States.
- Creativity, social entrepreneurship and social innovation are not only inevitably related, but may be consequences of each other: Creativity in the ideation and invention of solutions to social problems; translation to a process of entrepreneurship; or implementation of a solution conceived and invented; and, as a consequence of all this, social change perceived and evidenced in the improvement of the problematic situation existing before the implantation of the entrepreneurial project, as well as in the self-employment and employment generated as a result of social entrepreneurship.
- Creativity, as well as entrepreneurship and innovation in the field involve action and the result of these three actions are translated into evaluable social change.
- Thinking in terms of the triad Creativity-Social Entrepreneurship-Social Innovation is pertinent when it comes to conceiving public policies, since it facilitates the vision of a process leading to a phenomenon of social change; it provides broad-mindedness, a dialogue of knowledge, humility, a systemic approach and a conception of Bottom-Up development policy, in response to the needs felt by citizens, instead of the classic Top-Down policies, designed from the needs perceived by the public manager.
- Young creative and social entrepreneurship behaviours will occur in the measure that projects are executed, because education is also an action, so that to stimulate creativity and young social entrepreneurship motivates young people to get involved in projects of social interest.
- From the point of view of the human dimension of social entrepreneurship, it seems advisable to address lines of research on multidisciplinary circles in Social Innovation processes in different areas of action, with the relationships between key actors of such processes being the object of study.
- Based on the theoretical-technical construct of the triad Creativity-Social Entrepreneurship-Social Innovation that is exposed in these conclusions, it seems desirable to deepen research on the definition of criteria to define valid social innovations as experiences that can be shared and replicated, as well as verifiable objective indicators of social changes produced as a result of social innovation processes resulting from creativity and social entrepreneurship by young people.

References

[1] United Nations. World YOUTH Report 2003. New York: Department of Economic and Social Affairs; 2003.

[2] David N.F. Bell DNF, Blanchflower DG. Young People and the Great Recession. Bonn: IZA; 2011.

[3] Gallie D, Paugam S, Jacobs S. UNEMPLOYMENT, POVERTY AND SOCIAL ISOLATION: Is there a vicious circle of social exclusion? European Societies 2003;5(1):1-32.

[4] Lucas B, Claxton G, Spencer E. Progression in Creativity: Developing new forms of assessment. Paris: OECD; 2012.

[5] Grainger T, Barnes J. Creativity in the Primary Curriculum in J. Arthur, T. GRAINGER and D. Wray. (eds.) Learning to Teach in the Primary School London: Routledge.pp.209-225; 2006.

[6] Abdulla AM, Cramond B. After Six Decades of Systematic Study of Creativity: What Do Teachers Need to Know About What It Is and How It Is Measured? Roeper Review 2017;39(1):9-23.

[7] Truman S. A generative framework for creative learning: A tool for planning creative-collaborative tasks in the classroom. Border Crossing Transnational Working Papers No.1101; 2011.

[8] Sunka VM, Tapio WH, Ra PS. Role of ICT in imparting the Youth with Skills, Training and Employment Opportunities to accomplish Human Development Challenges,

http://www.youthmetro.org/uploads/4/7/6/5/47654969/it-and-development_paper_madhav.pdf, [accessed 01 October 2017].

[9] Burger-Helmchen T. Entrepreneurship – Born, made and educated. Rijeka: INTECH; 2012.

[10] European Commission. Entrepreneurship as a main driver for economic growth, http://europa.eu/rapid/press-release_MEMO-13-5_en.htm, [accessed 03 October 2017].

[11] European Commission. COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS Europe 2020 Flagship Initiative Innovation Union SEC(2010) 1161. Brussels: European Commission; 2010.

[12] Rabbat I, Roshan Paul R. Seven Elements of Social Innovation: A new framework emerges for social innovation education, https://ssir.org/articles/entry/seven_elements_of_social_innovation#bio-footer, [accessed 01 October 2017].

[13] Global Entrepreneurship Monitor, National Reports http://www.gemconsortium.org/report, [accessed 01 October 2017].

The Fundamentals of Values-Based Leadership

Mgr. Ivana Blahunková

Faculty of management of the Comenius University in Bratislava
ivana.blahunkova@fm.uniba.sk

Abstract

The article is based on a theoretical analysis of the values-based leadership with special attention on the ethical leadership. The first part of the article focuses on the ethical leadership, its definition and the clarification of its importance in the quest of value-based leadership. Ethical leadership is a style of leadership that combines the main elements of other leadership styles which are part of the values-based leadership concept.Second part of the article brings a comprehensive picture with regard to the comparison of individual styles of leadership of values-based leadership.The aim of this article is the introduction of the actual definition of values-based leadership from the perspective of the author. The other aim of the article is to outline the common elements of individual styles of leadership which are part of values-oriented leadership.

Keywords: Leadership, Values-based leadership; Ethical leadership

Introduction

This article focuses on defining values-based leadership, as well as explaining the concrete manifestations of leader's behavior, whose leadership style can be described as values-based.
The term "values-based" leadership is often referred not only to values-based but also to values-oriented leadership in foreign literature. It is worth mentioning Kraemer's publications "From Values to Action: The Four Principles of Values-Based Leadership"(2011) and "Becoming the Best through Values-Based Leadership" (2015), Barrett's "The Values-driven Organisation"(2013). These are publications that deal with the essence of values-based leadership, but do this only through the naming of certain principles or sets of values that, when applied, may be perceived as values-oriented. There is a lack of comparison of some sorts, specifying common and distinctive features to understand this concept better.

Based on the above mentioned facts, it can be said that values-based or values-oriented leadership is an aggregate concept that includes several distinct styles of leadership.
Therefore there are two approaches to understanding values-based leadership:

1. The first is a concept under which individual leadership styles (e.g. spiritual leadership, authentic leadership, etc.) are included,
2. The second possible approach understands values-based leadership of people as a unique style of leadership.

The aim of this article is to closely describe the features of the individual styles of leadership under this concept and to show a coherent link between them. This in-depth analysis results in definition of values-based leadership as a distinctive style of leadership of people, accepting characteristics and elements of current styles that will be enriched by author's own knowledge.

Analysis of Values-based leadership

According to Remišová et al. (2013), styles of leadership falling under the concept of values-based leadership are:
1. Ethical leadership
2. Spiritual leadership

3. Servant leadership
4. Trusted Leader
5. Prosocial charismatic leadership
6. Authentic leadership
7. Responsible leadership

According to Remišová et al. (2013), Values-based leadership represents a gradual change in the focus of a strong leader who freely subjugates his subordinates to a leader, who forms relationships in a team in such a way, that people "lead" each other. It is a direction towards a more thorough understanding of the process of leadership in the sense of increasing the complexity of elements and processes that are related to leadership. There is a significant shift towards an axiological understanding of the leadership process, with an emphasis on the nature and importance of values in leadership. There is a tendency to expand the field of action and responsibility of the leader beyond the boundary of the working team. Leader becomes an active bearer of corporate social responsibility.

However, there is no indication of rigidity, as it is clear that organizations operating in a dynamic environment under strong competitive pressure must be flexible and adequately responsive to change. Leader can therefore change strategy, tactics, or his approach according to the situation, but can never change basic values, attitudes and principles. This reflects the main idea of values-based leadership. It is important that the values of the leader and of the organization are in line. If they were not, there is a risk of leveraging leader's own interests. Mission, vision, strategy, level of work performance, motivation, processes and values of the organization mirror the ethical level and personal values of the leader.

This approach to leadership at the same time assumes that managers and workers share key values, meaning that employees and managers behave in a way that contributes to productivity, profitability, sustainability, business integrity, and thus to the prosperity of the organization.

In defining values-based leadership, the author draws on the definition of ethical leadership, which basically combines the elements of all leadership styles and represents the core within the concept of values-based leadership. We discuss this definition in the next part of the text.

Comparison of Individual Styles of Values-Based Leadership

The above-mentioned concepts of values-based leadership have a common basis, namely that they relate to the ethical dimension of leadership. The main focus of the values-based concept is the ethical behavior of leaders, so ethical leadership of people can be considered the core of values-based leadership.

Table 1: Comparison of Individual Styles of Values-Based Leadership

Leadership Style	Based on authors	Values applied in leadership
American approach to values-based leadership	Kraemer (2011)	Self-evaluation, Equity, Self-confidence, Humility
Ethical leadership	Remišová and Lašáková (2013)	Honesty, credibility, responsibility and fairness
Spiritual leadership	Reave (2005), Fry (2005)	Calling and membership, integrity, honesty, humility, credibility

Servant leadership	Greenleaf (2002), Barbuto and Wheeler (2006)	Active listening, empathy, healing, awareness, persuasion, conceptual view, foresight, service to others, engagement in growth, community building. Subordinates are top priority.
Authentic leadership	Jensen and Luthans (2006), Walumbwa and Avolio and Gardner (2005), Sexton (2014)	Self-awareness, self-regulation and development, transparency in relationships, positive psychological capital and positive moral perspective
Responsible leadership	Havard (2007), Maak and Pless (2006)	Generosity, humility, conscience, courage, kindness and fairness, trust
Trustworthy leader	Studies from Univeristy of Bath (2014)	Not considered as a separate style of leadership. Trustworthiness is a value that is part of the concept of values-based leadership.
Prosocial charismatic leadership	Weibler (2008), Berth (1992), Liley (1997)	Charisma. (Instrumentality - it is unclear whether this style actually promotes ethics and moral principles or is primarily about increasing work performance through the charisma of a manager who only seeks to "enchant" his subordinates.)

(Source: own research and design)

According to the author, based on the comparison, it can be said that the styles share the fact that they are ethically and morally grounded, so ethical leadership can be considered the core of the concept of values-based leadership. The manager acts in the interest of meeting the goals of the organization, not in favor of himself.

Ethical leadership

According to Remišová et al. (2015), the theory of ethical leadership is based on the theory of social learning, which means that everything that can be learned from one's own experience can be learned by observing the behavior and consequences of others' behavior. This link appears to be leader's influence on his subordinate's behavior on the basis of their own example. Employees follow the behavioral patterns of their leader. That is why the self-reflection of one's own actions and behavior is extremely important, as it further affects the behavior of employees and consequently has an impact on their work performance.

According to Remišová et al. (2013), An ethical leader is a person who is guided by universal ethical principles in all of his activities and thinking. He is honest, trustworthy, mindful (human), responsible, and fair.

According to Remišová et al. (2015), ethical leadership is perceived as a purposeful guidance of co-workers in an organization based on ethical principles in order to achieve results that do not harm the legitimate interests of other people and groups. Authors note that:

- Ethical leadership means that an ethical leader actively creates ethical environment and ethically guides his co-workers with the intention of fulfilling the legitimate and ethically correct goals of the organization.
- Actively create ethical environment means a process, in which a leader clearly communicates ethical standards at the workplace, knowingly and intentionally becomes an example of ethical behavior, holds employees accountable for compliance with ethical standards through rewarding and sanctioning tools in order to achieve a higher ethical standard at the workplace.

Applying the principles of ethical leadership is a long-term activity and represents long-term actions within the behavior pattern of the manager.

According to Remišová et al. (2015), ethical leadership integrates two components: individual part and professional part that is manager's personality with ethical integrity and ethical professional behavior. It is also the leadership of people, carried out by a person, who not only lives ethically in his personal life, but his professional activity is also based on intentional and long-term respect of universal ethical principles.

Brown, Trevino, and Harrison (2000) assume that ethical leadership has a positive impact on the perceived efficiency of the leader, job satisfaction of the subordinates, loyalty, and willingness to report problems to management.

De Hoogh and Den Hartog (2008) have pointed out that ethical leadership is related to the perceived efficiency of top management and to optimism of subordinates both in terms of their future in the company and in relation to the future of the company as such.

The whole process of leadership begins with the values of the manager. These values must be in line with the goals of organization to prevent forcing his self-interests.

Ethics is again needed to set up the values of the organization. An ethical manager in an unethical organization that has unethical goals, of course, will not adjust his values to the value system of such an organization.

The values of the manager shape his attitudes and behaviors that are observable on the basis of concrete actions. Should a leader be able to act ethically and make ethical decisions, self-reflection and self-awareness of self-worth are necessary. Control and evaluation of own behavior is also very important. Recognizing the impact on subordinates possibly rises need to review some ethical actions.

According to Remišová et al. (2013), values-based leader is a leader, whose personal values have a positive impact on his environment (for e.g. organizational variables such as job satisfaction, work behavior, building of organizational culture, etc.). His personal values are visible in acting and behaviors that have positive results. He can be defined as an **ethical leader**.

According to the author, values-based leadership can be considered as a distinctive style that combines the elements of the above-mentioned leadership styles that fall under the concept of values-based leadership. The author brought a model based on the primary common features of individual styles of leadership. Unlike the above-mentioned styles of values-based leadership, the author conceived her concept of values-based leadership as a cyclical process. It can be defined based on the following characteristics.

- **Self-reflection** of own values are necessary to ensure that the manager is capable of ethical actions and decisions.
- Values-based leader is **authentic**. He behaves in line with his real personality and thus creates the conditions for a higher level of trust that helps people to build on their strengths and become better. People can then change their thinking and make sense of what is right in their decisions and so generally improve the performance of the organization.
- **Role-modelling** - values-based leader leads by example. He is one of the most important representatives and bearers of values of the organizational culture. He should be "an indicator" of what is permissible in the organization and what is inadmissible. Leader is involved in creating an ethical environment that he supports and protects through his own ethical behavior.

- Values-based leader works and keeps on **developing** himself. That means that he controls and reassesses the consequences of his behavior. However, the leader is not only concerned

with his own development, he also supports the development of employees or colleagues, or even business partners and other stakeholders.

Since the author understands the actual values-based leadership style as a cyclical process, the individual characteristics have been arranged in logical and temporal continuity.

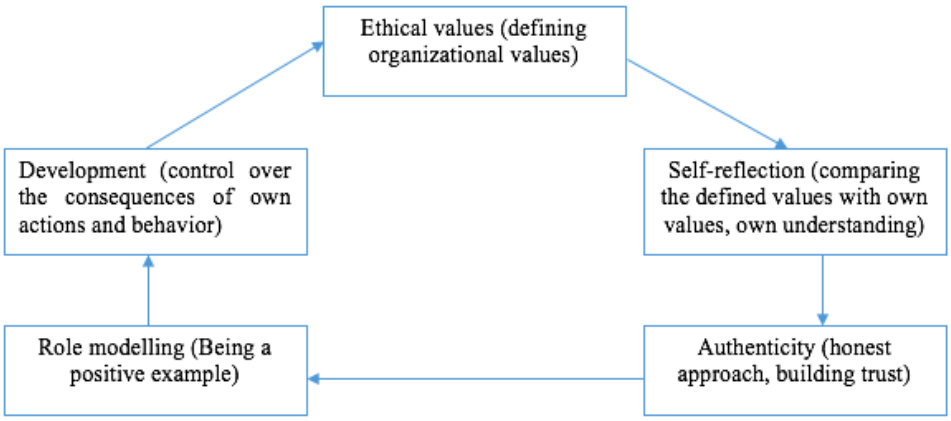


Fig. 1: Values-Based Leadership Process (Source: own research and design)

Conclusion

The topic of values-based leadership is a new, uncharted subject, which is mainly researched by foreign authors, especially in terms of specification and detailed description of a particular style and not in terms of defining the common features of individual styles of leadership with comparison to values-oriented concept. There are several styles of leadership that fall under the values-based concept of leadership. These are: Spiritual Leadership, Servant Leadership, Trusted Leadership, Prosocial Charismatic Leadership, Authentic Leadership, Responsible Leadership, and Ethical Leadership. It is the ethical leadership that presents a connection between these styles of leadership. The main focus of the values-based concept is the ethical behavior of leaders, so ethical leadership can be considered as the core of values-based leadership.

According to the author, based on the comparison, it can be said that the styles share the fact that they are ethically and morally grounded, so ethical leadership can be considered the core of the concept of values-based leadership. The manager acts in the interest of meeting the goals of the organization, not in favor of himself.

In this article, the author outlined the common elements of the individual styles falling under the concept of values-based leadership on the basis of an analysis of individual styles of values-based leadership. Since the author has devised the actual concept of the values-based style of leadership as a cyclical process, the individual characteristics have been arranged in logical and temporal continuity (what is reasonable and important to do earlier, etc.). It can be defined based on the following key-words: Self-reflection, Authenticity, Role-modelling, Self-Development and Development of others.

Applying the conscious style of leadership in the form of values-based style of leadership can prevent social scandals, regain customer confidence and enable the company to follow the principles of

sustainability. Values-based leadership is a new challenge for applied leadership styles for current managers.

References

- BARBUTO, J., WHEELER, D. (2006). Scale Development and Construct Clari cation of Servant Leadership. [online], [Retrieved June 22, 2017], http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1050&context=aglecfacpub
- BARETT, R. (2014). The Values-driven organization: Unleashing human potential for performance and profit. USA: Routledge. ISBN 978-0-415-81502-4.

- DEEG,.J, WEIBLER, J. (2008) Die Integration von Individuum und Organisation. Heidelberg: KunkelLopka Medienentwicklung. ISBN 978-3-531-15779-5.
- DE HOOGH, A. H. B., DEN HARTOG, D. N.. (2008) Ethical and despotic leadership, relationships with leader's social responsibility, top management team effectiveness and subordinates' optimism: A multi-method study. [online], [Retrieved May 20, 2017], https://www.researchgate.net/publication/222654170_Ethical_and_despotic_leadership_relationships_with_leader%27s_social_responsibility_top_management_team_effectiveness_and_subordinates%27_optimism_A_multi-method_study>.
- Experiecing trutshworthy leadership. (2014) [online], [Retrieved September 7, 2017], https://www.cipd.co.uk/binaries/experiencing-trustworthy-leadership_2014.pdf
- FRY, L.(2005) Introduction to the Leadership Quarterly special issue: Toward a paradigm of spiritual leadership. [Online], [Retrieved, September 1, 2017], http://www.sciencedirect.com/science/journal/10489843/16/5>

- GARDNER,W., AVOLIO, B., WALUMBWA, F. (2005) Authentic leadership – Theory and Practice: Origins, Effects and Development..UK: Emerald Group Publishing Limited. ISBN: 978-0-7623-1237-5
- GREENLEAF, R. (2002) Servant Leadership. New Jersey: Paulist Press. ISBN: 0-8091-0554-3.
- HAVARD, A. (2007) Virtuous Leadership. USA: Scepter Publishers ISBN: 978159417204.

- JENSEN, S., LUTHANS, F. (2006) Leadership & Organization Development Journal - Entrepreneurs as authentic leaders: impact on employees' attitudes. Emerald Group Publishing Limited. ISSN: 0143-7739.
- KRAEMER,J.(2011), From values to action: The Four Principles of Values-Based Ladership. San Francisco: Jossey-Bass. ISBN 978-0-470-88125-5
- KRAEMER, J. (2015) Becoming the Best: Build a world-class organization through values-based leadership. New Jersey: John Wiley and Sons. ISBN 978-1-118-99942-4.
- MAAK, T., PLESS, N. (2006) Responsible Leadership in a Stakeholder Society – A Relational Perspective. [online], [Retrieved January, 20, 2017], https://link.springer.com/article/10.1007%2Fs10551-006-9047-z

- Novicevic, M., Harvey, M., Buckley, M., Brown, J. (2006) Authentic leadership: A historical perspective, Journal of Leadership & Organizational Studies. [online], [Retrieved January, 20, 2017], http://journals.sagepub.com/doi/abs/10.1177/10717919070130010901
- REHÁK, Š. (1997) Charizma: Skrytá sila lídrov [online], [Retrieved September, 2, 2017], http://www.ibispartner.sk/sk/vedenie-ludi-a-sebamanazment/178-charizma-skryta-sila-lidrov
- REMIŠOVÁ,A., LAŠÁKOVÁ, A. K pojmom vedenie ľudí a etické vedenie ľudí.(2013) [online], [Retrieved January, 15, 2017. 20.5.2017]. http://www.cutn.sk/Library/proceedings/mch_2013/editovane_prispevky/32.%20Remi%C5%A1ov%C3%A1_La%C5%A1%C3%A1kov%C3%A1.pdf
- REMIŠOVÁ, A. a kol. (2015) Etické vedenie ľud v slovenskom podnikateľskom prostredí. Bratislava: Wolters Kluwer. ISBN: 978-80-8168-199-8.
- REAVE, L. (2005) Spiritual values and practices related to leadership effectiveness. [online], [Retrieved Jauary, 20, 2017], https://sites.fas.harvard.edu/~soc186/AssignedReadings/Reave-ValuesPay.pdf

- SEXTON,T. (2014). Review of Research Literature on Authentic Leadership. England, Creative Edge Consulting Limited. [online], [Retrieved Februrary, 11, 2017], https://www.scribd.com/document/177395632/Research-Literature-Authentic-Leadership
- Schlenker, Berth R. , and Michael F. Weigold. (1992) 'Interperpersonal processes involving impression regulation and management'. Annual Review of Psychology 43.
- TREVINO, L. K., HARTMAN, L. P., BROWN, M. (2000) Moral person and moral manager: How executives develop a reputation for ethical leadership. In California Management Review, nr. 4.
- WOJČÁK, E., BARÁTH, M. (2017) The impact of Hostede´s dimensions on telework. In: Enterprise and Competitive Environment. 20th Annual International Conference. Brno : Mendel University. ISBN 978-80-7509-499-5.
- YUKL,G. (2013) Leadership in Organizations. Eighth Edition. Essex, England: Pearson Education Limited. ISBN 978-0-13-277186-3.

Czech Cybersecurity
Security Measures and Actual Situation

Lubomir Almer, University of Defence, Brno, Czech Republic, lubomir.almer@unob.cz

Abstract

This Article talks about Czech Cybersecurity. It explains the topic in terms of legislation and of the local national authorities. The article focuses in detail on cyber security incidents and events. Furthermore, it suggests how to deal with the possible issues of this kind in the future. Furthermore, the article reflects the security measures against cyber threats from the perspective of the Czech legislation

Keywords: Cybersecurity, Cyber Security Law, Security Measures, Cyber security incident.

Cybersecurity in the Czech Republic

Cybersecurity in the Czech Republic is, as in other countries, secured by a wide range of transnational regulations issued by the European Union or other government entities. Cybersecurity is affected by other documents such as White Papers from the White House or other international standards. Despite the great variety of international „documents“ related to the issue of cybersecurity, the Czech Republic is the first country to create its own legislation. The Czech Cybersecurity Law consists of two regulations and one decree of the government. The first regulation concerns security measures, cybersecurity incidents and reactive measures. Furthermore, it determines the requirements for reporting the related issues and attacks. The second regulation deals with defining criteria of the major information systems. Therefore, it determines which systems have to follow the law. The government decree of the Cybersecurity Law determines the criteria for controlling the critical infrastructure. However, the Czech Cybersecurity Law is currently being revised. The reason for this amendment is to include European Parliament's directive (and the Council 2016/xy/EU from 6 July 2016) in order to ensure a high common level of network security and information systems security in the European Union. The National Security Agency is the entity that is responsible for cyber security initiatives in the normal state, the status of cyber risk and the state of emergency. The National Security Agency establishes the main organizational unit that operates in the field of cyber security. The unit is called the National Cyber Security Centre (NCKB). Furthermore, CERT/GovCERT is a part of NCKB. Its goal is to protect electronic communication services, networks and information system from cyber security incidents. In addition, there are established CERT/CSIRT departments as parts of the National Security Agency. These departments are operated by private entities under a public contract. The entities ensure of information sharing (security incidents and vulnerabilities reporting etc.) in the national and international context (even as a main contact point of the last resort). They serve primarily to private entities, the academic sector, local governments, and the non-profit sector, provided that these entities are not subjects of NSA's scope. At the same time, CERT/CSIRT departments coordinate all their activities with the National Security Agency

Cybersecurity incidents and events

The National Cyber Security Centre records cyber incidents and processes them further. Graph n. 1 (see below) shows the reported cyber incidents by the entities that falls within the scope of the law on cyber security. These incidents have been reported to NCKB since 2013. The first incidents were reported in June 2013. The graph shows the incidents from January 2013 to December 2016.

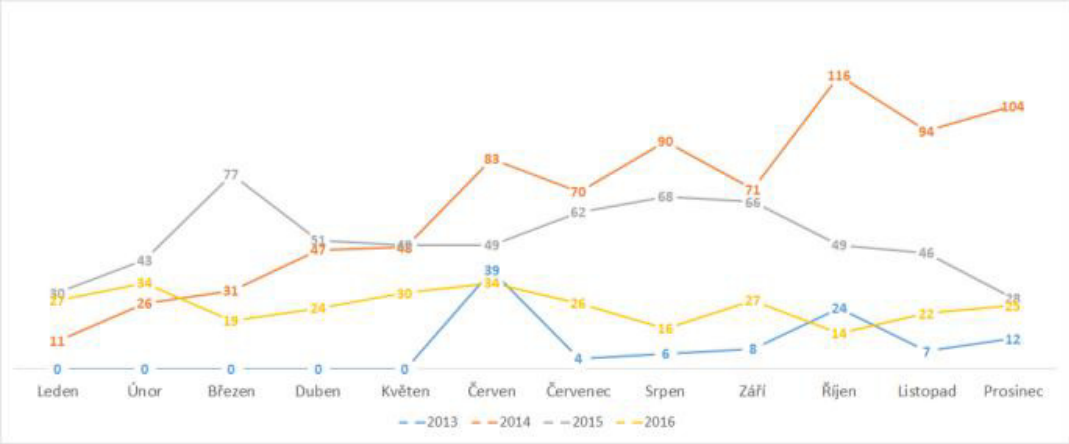


Fig 1: The number of reported cyber incidents from Jun 2013 to Dec 2016

We can see in the graph that the most incidents were reported in 2014. On the other hand, the least incidents were reported in 2013. How is the image of the Reported cyber incidents, illustrate, it was at least incidents reported in 2013 and in 2014 the most. However, according to NCKB, the vast majority of the reported incidents were evaluated as events at the end. Graph n. 2 (see below) shows cyber incidents that were confirmed by NCKB as incidents. We can see that there were actually more cyber events than cyber incidents.

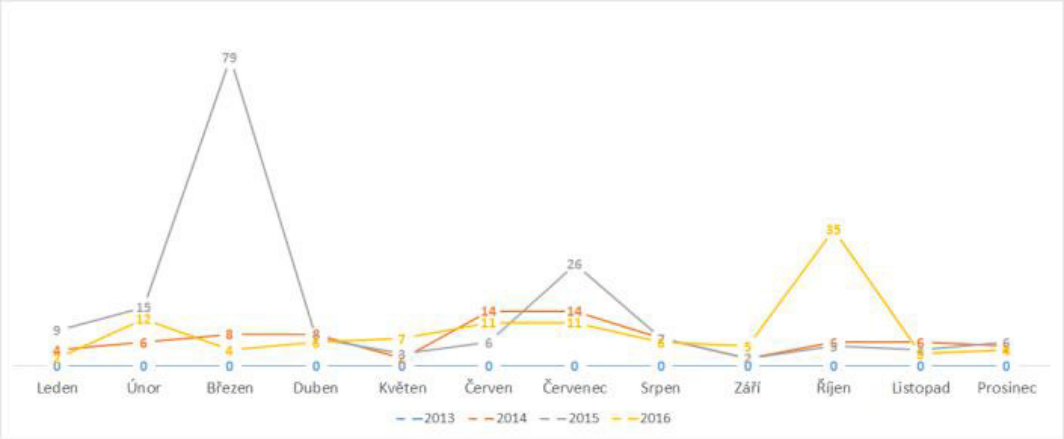


Fig 2: Identified cyber incidents between Jun 2013 and Dec 2016

Cyberattacks prediction model

Based on the collected data, a predictive model was developed in order to be able to estimate the number of cyber incidents. This prediction model was created by using an MS Excel function called FORECAST.

This function calculates or estimates a future value based on existing values. Y represent a predicted value and x represents a given value. X and y are known values. The new value is predicted based on a linear regression. This feature can be used to predict future developments.

Syntaxes:

FORECAST (x, field_y, field_x)

The FORECAST syntax includes the following arguments:

X: a mandatory argument. The data point at which we want to predict the value.

Field_y: a mandatory argument. Dependent matrix or data area

Field_x: a mandatory argument. Independent matrix or data area.

The relationship for FORECAST is:

a+bx, where:

$a= \bar{y}- b\ \bar{x}$

$b= (\Sigma (x- x^{-})(y- \bar{y}))/(\Sigma (x- x^{-})^2)$

Where x and y are medium values of the selection AVERAGE (known_value_x) and AVERAGE (known_value _y).

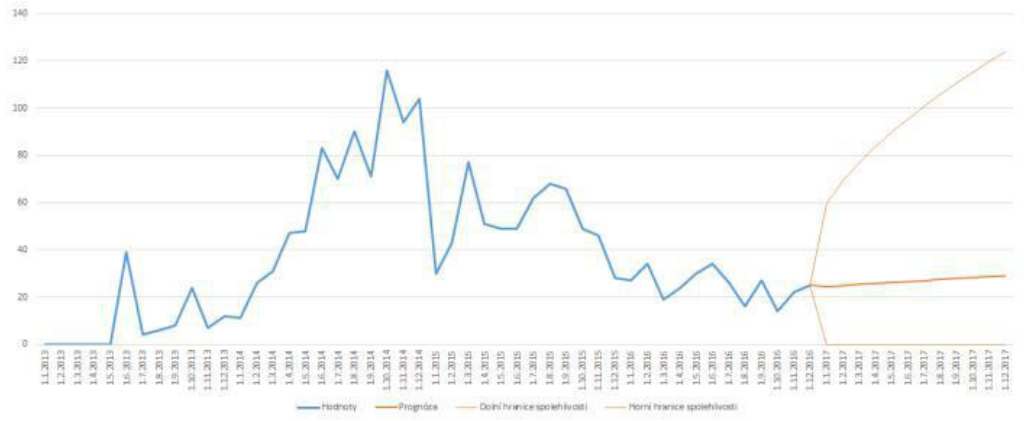


Fig. 3: Cyberattacks prediction model

The blue line in the cyber attacks prediction model shows all security incidents reported to NCKB from 2013 to 2016. The thick orange line represents the prediction itself. The light orange lines represents upper and lower reliability limits of the prediction model. The graph cannot reach negative values as we cannot logically reach a negative number of cybersecurity attacks.

The prediction model shows a steady increase in the number of cyber security incidents. This confirms the urgency of the need to effectively deal with cyber security issues and to increase cyber protection. Unfortunately, the Czech Cybersecurity Law does not prescribe specific security features that we must set. However, it provides us with a list of security measures in order to ensure cyber security. The list consists of organizational and technical measures. The table n.1 (see below) provides with the list of security measures that are directly required in the Cyber Security Act.

Table 1: Czech Security Measures

Organizational measures	Technical measures
Information security management system	Physical security
Risk management	A tool protecting the integrity of communications networks
Security policy	A user authentication tool
Organizational security	A permission management tool
Definition of security requirements for vendors	A malware protection tool
Asset management	A tool for monitoring activities that are critical for information infrastructure and activities of significant administrators
Security of human resources	A cyber security incidents detection tool
Communication management of the critical information infrastructure or other significant information system	A tool for collecting and evaluating cyber security events
Managing access of individuals to the critical information infrastructure or other significant information system	Application security
Acquisition development and maintenance of the critical information infrastructure and other important information systems	Cryptographic devices
Managing cyber security events and cyber security incidents	Tool to ensure the availability of information
Management of business continuity	Safety of industrial and control systems
Control and audit of critical information infrastructure and other important systems	

Acknowledgment

The Czech Republic is the first country to create legislation concerned with cyber security. The law consists of regulations and decrees, which are firmly anchored in the national legislation. The national authority did not classify all the reported incidents as incidents. Therefore, we can state that not all cyber security events are incidents. Thanks to the reported cyber security events, it was possible to create a predictive model. In conclusion, it is clear that cyber security events will continue to grow in numbers and will happen more often. These findings point to the current and increasing importance of cyber security issues in terms of safety and management. The Czech Cyber Security Law defines general security measures that are divided into technical and organizational units. Thus, the law created a general basis for ensuring cyber security of the elements covered by the Cyber Security Act. However, the law may also be followed by private organizations, that do not fall within the scope of application, as they may consider the as a „recommendation „ in order to ensure the cyber security of their organization.

References

Act No. 181/2014 Coll. on the Cyber Security and on the Amendments of the Related Acts (Cyber Security Law).

Regulation No. 316/2014 Coll. on Security Measures, Cyber Security Incidents and Reactive Measures (Cyber Security Regulation).

Regulation No. 317/2014 Coll. on the Determination of Important Information Systems and their Determination Criteria.
Decision of the Government No. 315/2014 Coll. Which amends the Decision of the Government No. 432/2010 Coll. on the Criteria for the Determination of the Elements of the Critical Infrastructure.

ISO/IEC, (2013). ISO/IEC 27001:2013 Information technology -- Security techniques -- Information security management systems -- Requirements

ISO/IEC, (2013). ISO/IEC 27002:2013 Information

technology -- Security techniques -- Code of practice for information security controls

FORECAST (function) – Office Support. Available from: https://support.office.com/en-us/article/FORECAST-function-50ca49c9-7b40-4892-94e4-7ad38bbeda99

Analysis of the Eccentricity Detection Error in Iris Recognition

C.M. Noaica, Department of Computer Science, University of Bucharest, Romania,
cm.noaica@gmail.com

Abstract

An iris biometric system has a versatile applicability. At this point, there is a wide number of areas where iris biometrics is successfully implemented as a means of access, areas such as finance, banking, healthcare, welfare, border control, point of sale and ATM's.

The performance of an iris biometric system can be sensible to any error that may perpetuate, starting even from the eye image acquisition. It is obvious that an iris biometric system that functions with errors would eventually lead to behaving in an undesired manner: consistently rejecting its users and/or authorizing persons from outside the system. This article has the purpose of identifying the influence of one particular error: the Eccentricity Detection Error (E.D.E.), a newly identified type of iris segmentation error.

Having a non-zero E.D.E. means having, for two iris images that are acquired from the same person, a different distance between the two vectors determined by the pupillary (inner) boundary centers and the limbic (outer) boundary centers. This distance is established on the basis of the approximated (during segmentation) inner and outer boundary centers for the two irides. This article presents the results of iris recognition using a PNN neural network, performed with iris codes at different values of E.D.E.: 0, lower than 2, and larger than 2. The databases used for the experimental tests are ND-CrossSensor-Iris2013 (LG2200), CASIA Lamp (v4), and CASIA Interval (v4).

Keywords: Iris center detection error, Eccentricity Detection Error, iris segmentation, Probabilistic Neural Network.

Introduction

An iris biometric system consists of several main modules, as depicted in Fig. 1: the *enrollment module*, the *database module* (DB), the *authentication module* and the *authorization module*. During the *enrollment* phase, a new user would have to keep his or her eye(s) open in front of an iris sensor, in order for the biometric system to capture at least one eye-image – this represents the *image acquisition* sub-module (Fig.1). The captured images are further processed in the *image processing and feature extraction* sub-module, which mainly consists in iris area localization, iris boundaries localization, iris segment extraction, and, finally, iris feature (or iris code) extraction. The *iris codes* (IC), which are the output of the enrollment module, are stored as *templates* in the system's database under a user ID. An iris code is a digital code that stores information about the patterns of an iris segment.

The *authentication* module is almost identical with the one responsible with the enrollment. The only difference between the two being that, instead of saving the iris codes, these are compared with the templates already stored in the database. The purpose of the comparison is to establish an identity for the newly obtained iris codes (if one exists in the biometric system).

It is well known by now that, during any of the enrollment or authentication steps, different errors can emerge, leading eventually to the malfunctioning of the biometric system. This article will analyze, by

means of a neural network, one particular error that is rooted in the image processing and feature extraction sub-module, namely during iris segmentation (more precisely, boundaries localization).

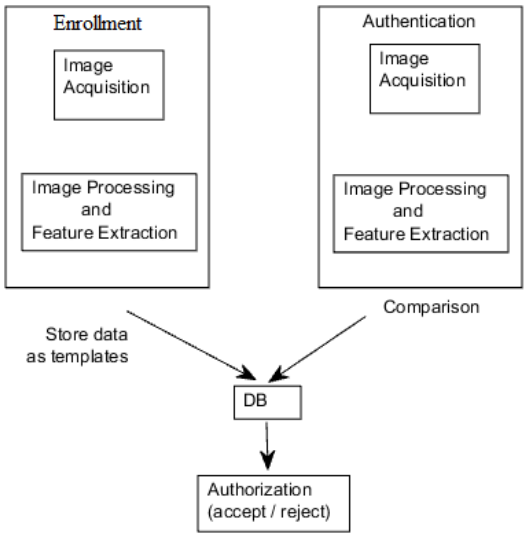


Fig. 1: Simple schema of an iris biometric system

Generally, there are three types of segmentation errors that may occur when performing iris image segmentation:

1. For a given eye image, the result of segmentation does not include the iris at all, but a completely different area of the image. This error is usually included in the rates of overall iris segmentation failures and is addressed by many of the researchers by different methods of selecting a Region of Interest (i.e. the iris area) from the eye images (Noaica (2016), Celik (2016), Li (2012), Yu (2010)). The Region of Interest, if detected correctly, increases considerably the chance of correctly identifying the iris boundaries in an eye image. We will call this error *Iris Location Mislocalization Error* (ILME).

2. For a given eye image, the pupillary and limbic margins are not perfectly estimated by an automatic segmentation procedure, with respect to a given ground truth (manual segmentation). What could happen is that the estimated boundaries have either a smaller or a bigger radius than the ground truth boundaries (see Fig.2). It is assumed here that the iris boundaries can be approximated with two circles. Of course, when the automatically estimated radii of the iris boundaries (limbic or pupillary) are different than the ground truth, the result is either that it will bring information from outside the iris area into the extracted iris segment – information that is not relevant to recognition –, or that portions of the iris are eliminated from the iris segment, leading to less relevant information for the recognition. This error will be called here *Iris Boundary Mislocalization Error* (I.B.M.E.).

3. The last type of error is called *Eccentricity Detection Error* (E.D.E.) (Noaica, 2016). This error is very similar to I.B.M.E., in that both indicate iris boundaries that are not perfectly (but acceptably) identified. The difference is that the E.D.E. is computed by looking strictly at the estimated pupillary and limbic boundaries centers, with respect to the center coordinates from a

reference eye image, while the I.B.M.E. is computed by comparing the detected iris boundaries with the available ground truth. Also, because I.B.M.E. considers only the area of the iris that is correctly retrieved from the eye image, it is possible to have different E.D.E. errors in images that have the same I.B.M.E..

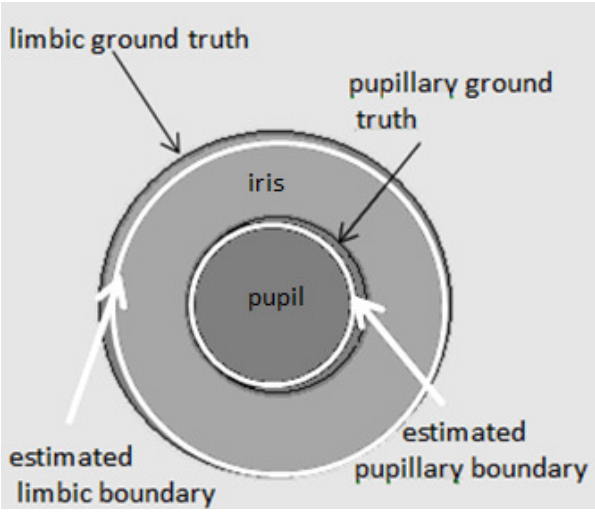


Fig 2. Illustration of Iris Boundary Mislocalization. Both, the estimated limbic boundary and the pupillary boundary, have smaller radii than the ground truth. In this case, portions from the limbic edge of the iris are lost and, at the same time, (useless) portions from the pupil are brought in the iris segment that will be extracted from the eye image. The iris segment is the area between the two white circles.

Between the three segmentation errors listed above, this article analyzes the most recently discovered one, namely the *Eccentricity Detection Error* (Noaica, 2016). There, the author explains that after a thorough analysis of the segmentation results of the proposed eccentric segmentation procedure, it was observed an Eccentricity Detection Error. The fact that the boundaries of the irides are most of the time eccentric is widely known by now (Khan, 2011) and this motivates us to understand to what extent the E.D.E. error will influence the recognition results in different scenarios. By different scenarios we are referring to different databases, which are created with different sensors and in different illumination conditions – one effect of the latter is that will force the pupil to dilate or to contract.

The influence of E.D.E. on the iris recognition results was not yet analyzed in any other articles, except the present one.

Regarding the I.B.M.E. error, its analysis is tackled for the first time by Hofbauer et al. (2016). They wanted to see that, if by improving the segmentation and reducing the I.B.M.E., it could lead to better recognition results. The conclusion was a curious one, namely that, for different values of I.B.M.E. the behavior of the simulated system is not uniform. The authors mentioned that they did not perform iris codes rotation in their experiments and that it would be interesting to see if, by doing so, the unpredictability of the results can be avoided. Also, we will not be using iris codes rotation in our tests.

Both articles, Hofbauer's (2016) and the current one, have in common the goal of understanding if the iris recognition results would be significantly improved by reducing the tackled segmentation errors, I.B.M.E. in Hofbauer's article (2016) and E.D.E. here.

Eccentricity Detection Error

In the reference article (Noaica, 2016), the E.D.E. error (1) is defined as the *Euclidean norm of the difference between the vectors determined by the iris and pupil centers in two different eye images that belong to the same person*.

$$EDE = \left\| \overrightarrow{C_p^1 C_l^1} - \overrightarrow{C_p^2 C_l^2} \right\|_2 \quad (1)$$

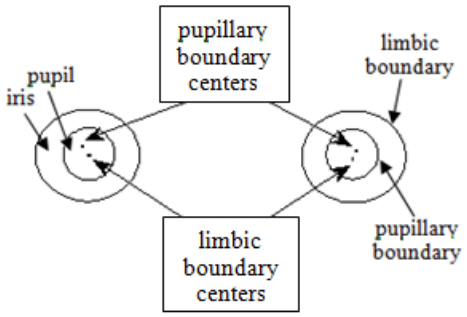


Fig 3. Illustration of the Eccentricity Detection Error. The two pairs of eccentric circles represent two eyes.

In the (1) formula, $C_p^1 C_l^1$ is a pair of pupillary (C_p^1) and limbic (C_l^1) boundary centers for one given iris, and $C_p^2 C_l^2$ is a pair of pupillary and limbic boundary centres for another one.

The E.D.E. error is illustrated in Fig.3. There, the two pairs of eccentric circles represent two eyes. The smaller circles stand for the *inner (pupillary)* boundary of the iris and the bigger circles stand for the *outer (limbic) boundary of the iris*. The iris illustrated on the left has the pupil center situated in the upper-left part of the limbic boundary center, while the iris illustrated on the right has the pupil center situated in the top-right part of the limbic boundary center.

Relating the formula (1) with Fig. 3, we can say that $C_p^1 C_l^1$ belongs to the left iris, while $C_p^2 C_l^2$ corresponds to the one on the right of the image. Assuming that, in Fig.2, the iris from the left has the pupil center 8 pixels above and 8 pixels to the left of the limbic center and that the iris from the right has the pupil center 8 pixels above and 8 pixels to the right of the limbic center then the E.D.E. between the two irides would be equal to 22.6274.

Fig.4 represents two pairs of eye images and the resulting iris codes, for EDE = 0 (Fig.4.a) and for EDE = 3.1623 (Fig.4.b), which are extracted from the LG2200 database. In Fig.4.b, the image from the left has the pupillary center coordinates at C_p^1=(96,61), and the limbic center coordinates at C_l^1=(97,60), while the image from the right has C_p^2=(82,54), and C_l^2=(82,56). In Fig.4.a, for the left eye C_p^1=(95,76), and C_l^1=(94,75), while for the right one C_p^2=(108,76), and C_l^2=(107,75).

Experimental Framework

As mentioned before, the E.D.E. error will be analyzed in this article with a similar interest as Hofbauer's (2016): *to see if reducing the E.D.E. error would lead to improved iris recognition results*. With this in mind, the following pages of the article will present the evaluation of the E.D.E. on three of the publicly available iris databases: CASIA Lamp, CASIA Interval and ND-CrossSensor-Iris-2013 (LG2200). Utilizing these databases will also help to understand if the E.D.E. influence *can be reproduced amongst eye images that are captured with different infrared iris sensors*. For example, CASIA Lamp is acquired with a hand-held iris sensor; CASIA Interval is acquired with a close-up camera and, as it says the name,

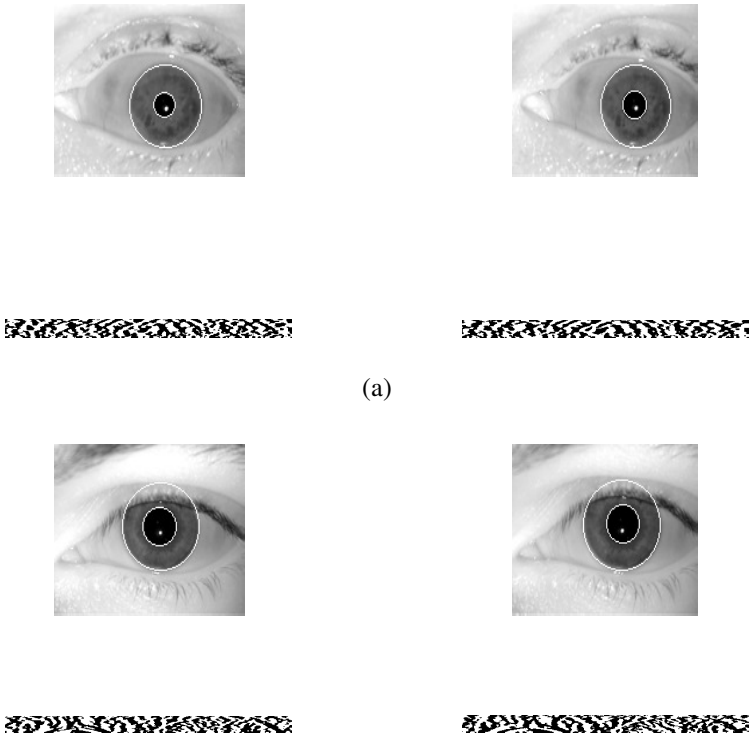


Fig. 4: Example of detected boundaries for images that are selected as correctly segmented from two persons (a and b), marked with eccentric white circles, and their corresponding iris codes. The EDE error for the pair from (a) is 0, while for the pair from (b) is 3.1623.

the subset LG2200 from the ND-CrossSensor-Iris-2013 database was acquired with an LG2200 iris sensor.

Extraction of iris segments

The iris segments (Fig.5.b) utilized in our tests are extracted with an implementation of the segmentation procedure, named ACSTL, which was proposed by Noaica (2016). ACSTL was chosen because is known to be an eccentric segmentation procedure and, also, the one for which the EDE error was reported for the first time.

Since no ground truth information is used, the segmentation results are visually inspected. Those that have correctly detected iris boundaries and do not present a lot of noise are kept, while all the other ones are eliminated from the final experimental set.

Examples of images that are considered to have "correctly" estimated iris boundaries are presented in Fig.4 and Fig.5.a, where the estimated locations for the limbic and pupillary boundaries are marked with white eccentric circles.

The reason for removing, from the segmentation results, those iris segments that come from images

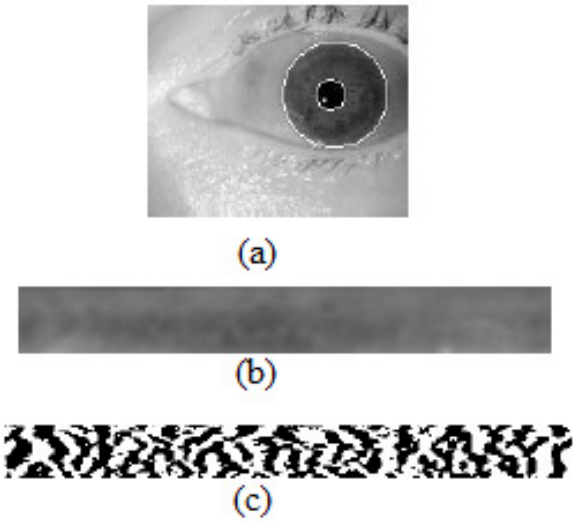


Fig. 5: a) an eye image with the inner and outer boundary of the iris marked with white circles by the ACSTL segmentation procedure; b) an iris segment extracted from a) by ACSTL and c) an iris code resulted after applying log-Gabor filter on the iris segment from b).

that have a lot of noise (strongly occluded eyes, out of gaze, blurred images, presence of cosmetic or patterned lenses), even though some of them are correctly segmented, is that the amount of iris pattern information is limited by the noise, and this, automatically, leads to poorer recognition results. In other words, the noise could be masking the evidence of the influence E.D.E. has on the overall recognition results.

Extraction of iris codes

The final step, before organizing the data into train and test sets, consists of extracting the iris (feature) codes (Fig.5.c). The extraction is made with a log-Gabor filter, one of the most commonly utilized filters in iris recognition. The filter was proposed by Field (1987) and is described by the formula:

$$LG(f) = e^{-\frac{\left(\log\left(\frac{f}{f_0}\right)\right)^2}{2\left(\log\left(\frac{\sigma}{f_0}\right)\right)^2}} \quad (2)$$

The frequency response of a log-Gabor filter is a Gaussian function, represented on the logarithmic scale. In (2), f_0 is the center frequency of the log Gabor filter and σ is a parameter that controls the filter's bandwidth.

Organizing the data

The number of users and iris codes used to train and test the neural network is shown in Table 1. From LG2200 and CASIA Lamp databases are extracted three iris codes to train and another three iris codes to test the PNN neural network. An exception is being made for CASIA Interval, for which only two iris codes are selected to form the test subset because, being a small database (only 2,639 eye images), the number of correct segmentation results that meet the EDE threshold condition is also small.

The sets of iris codes (a set corresponding to all the correctly extracted segments from a database) are grouped, each, in three subsets:

Table 1: The total number of final users, for each database, that was used for the PNN; IC_{tr} columns show the number of iris codes selected for each individual user to train the PNN; IC_{te} columns show the number of iris codes selected from each individual user to test the PNN, while the IC_{all} columns show the total number of iris codes, selected from each database, that are used to train and test the PNN.

	E.D.E. ≤2				E.D.E.>2				E.D.E.=0			
	users	IC_{tr}	IC_{te}	IC_{all}	users	IC_{tr}	IC_{te}	IC_{all}	users	IC_{tr}	IC_{te}	IC_{all}
LG2200	623	3	3	3738	623	3	3	3738	623	3	3	3738
CASIA Lamp	623	3	3	3738	623	3	3	3738	520	3	3	3120
CASIA Interval	92	3	2	460	66	3	2	330	61	3	2	305

1. one subset, S_1, with all the IC that come from segmentation results with E.D.E. = 0;
2. one subset, S_2, with all the IC that come from segmentation results with E.D.E. ≤ 2 and
3. one subset, S_3, with all the IC that come from segmentation results with E.D.E. > 2.

For CASIA Lamp and LG2200, since each person that contributed to forming these databases provided a great number of eye instances, we can form the subsets S_2 and S_3, for E.D.E. ≤ 2 and E.D.E. > 2, with IC that belong to the same persons. This allows seeing, comparatively, what the recognition results would be, in two scenarios:

- a biometric system, with n users, that uses for identity recognition only those segmentation results that have the Eccentricity Detection Error below our selected E.D.E. threshold
- a biometric system, with the same n users that, for some reason, utilizes only those segmentation results that have the Eccentricity Detection Error above our given value of E.D.E. threshold

The rationale behind choosing here the value 2 as an E.D.E. threshold for S_2 and S_3 is that, between all

tested thresholds, it has offered an acceptable number of individuals (classes to learn by the neural network) with at least five or six iris codes for each value of the E.D.E. threshold.

Also, the reason for choosing to form subsets with those iris codes that have null E.D.E., S_1, is to see if the recognition results would be significantly better in comparison with the results obtained on the S_2 and, of course, S_3 subsets. At the moment, reducing the E.D.E. to the ideal value of zero seems impossible, especially since the trend in literature is to perform iris recognition in the wild. Iris recognition in the wild implies a lot of image noise and, therefore, imperfect segmentation results.

Probabilistic Neural Network

The influence of E.D.E. will be quantified by applying a Probabilistic Neural Network (PNN), Specht (1990). This neural network was previously used in other iris recognition tests, such as Chen (2009) and Sundaram (2011).

The architecture of a PNN neural network, shown in Fig. 6, is formed by the following three layers:

1. An input layer. The iris codes presented at the input layer in Fig.6 are denoted by IC;
2. A pattern layer, that stores all the iris templates used to train the neural network. The output of the pattern layer is computed according to the following exponential (3):

$$Z_i = e^{\frac{\left(\left\|W_{i,j} - IC\right\|\right)^2}{2\sigma^2}} \tag{3}$$

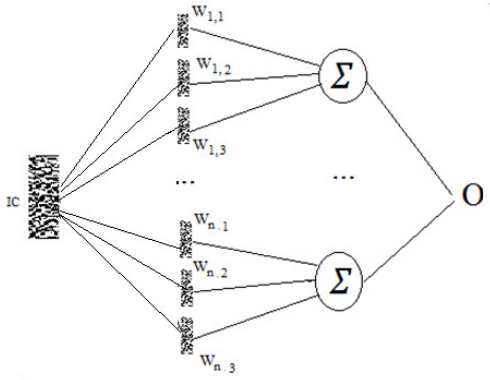


Fig. 6: The structure of a PNN network with n classes and 3 iris templates ($W_{i,j}, i = \overline{1,n},\ j = 1:3$) stored for each class. IC stands for Iris Code.

$W_{i,j}$ represents the iris templates, with $i = \overline{1,n}$ (n is the number of digital identities, or classes, learned by the PNN) and $j = \overline{1,t}$ (t is the number of iris templates stored for each class i). For all the tests presented here, the number of iris templates used for each class / user is 3.

3. A summation layer, which computes the final iris recognition score for each digital identity. This layer sums up the output results from the pattern layer:

$$S_i = \frac{1}{t}\sum_{j=1}^{t} Z_j \tag{4}$$

4. An output layer, (5), where the maximum recognition score, O, is selected from the ones obtained in the summation layer (4). In the scenario of a real iris biometric system, the class which provided the maximum recognition score will be considered the digital identity of a user who is trying to authenticate into the system.

$$O = \arg\max_i (S_i) \tag{5}$$

Evaluation of Results

The performance of a biometric system is measured by forming and evaluating the similarity of *genuine* and *imposter comparison pairs*. The pairs are formed with iris templates that are stored in the system database and with new iris codes – the new iris codes are results of a segmentation procedure applied during authentication.

A *genuine comparison pair* is formed by an iris template and an iris code that belong to the same person, while an *imposter comparison pair* is formed with an iris template and an iris code that belong to different persons. The results of the comparisons will be the so-called *genuine* and *imposter comparison scores*, which are, generally, values between 0 and 1 and indicate the similarity between the iris code and the iris template that form a comparison pair. For a genuine comparison pair, the recognition score is desired to be as close as possible to 1, meaning that the two, the iris template and the iris code, are strongly similar. On the contrary, for an imposter comparison pair, the recognition score is desired to be

Table 2: Minimum genuine comparison scores (columns min(S_g)) and the maximum imposter comparison scores (columns max(S_i)). The dist. columns represent the distances (width of the separation band) between min(S_g) and max(S_i).

	E.D.E.>2			E.D.E.≤2			E.D.E. = 0		
	max(S_i)	min(S_g)	dist.	max(S_i)	min(S_g)	dist.	max(S_i)	min(S_g)	dist.
LG2200	0.6824	0.7333	0.0509	0.6314	0.7333	0.1019	0.6275	0.7333	0.1058
CASIA Lamp	0.6471	0.7294	0.0823	0.6392	0.7333	0.0941	0.6314	0.7294	0.098
CASIA Interval	0.6275	0.7333	0.1058	0.6235	0.7373	0.1138	0.6235	0.7412	0.1177

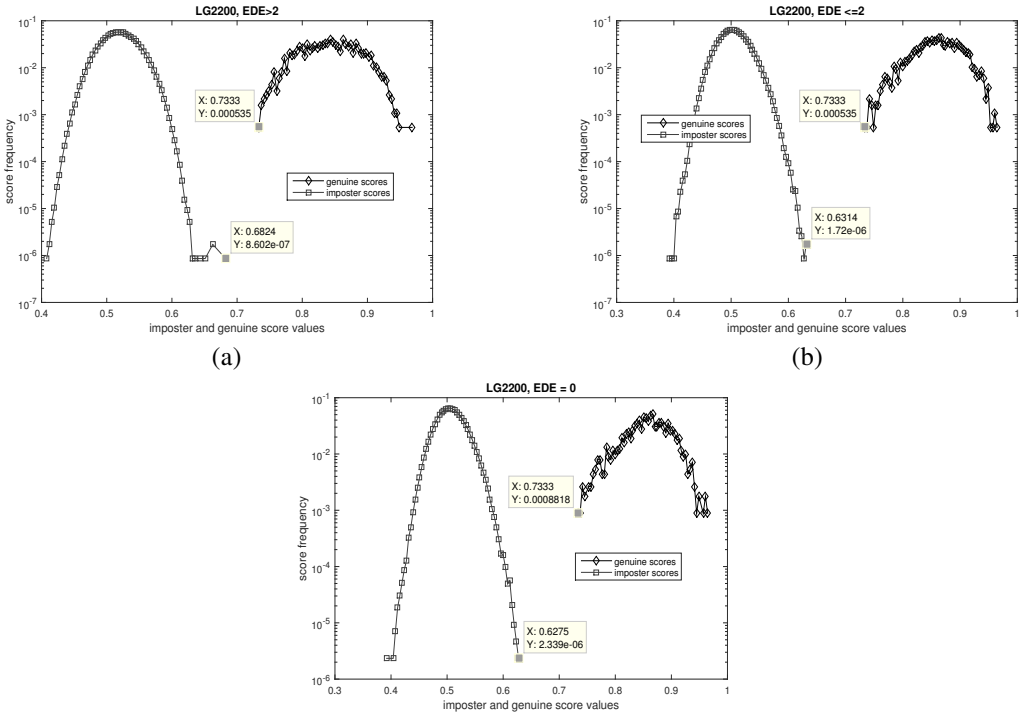


Fig. 7: Genuine and imposter comparison scores obtained for LG2200 at a) E.D.E.>2, b) E.D.E.≤2 and c) E.D.E. = 0.

as close as possible to 0 (strongly different).

These genuine and imposter comparison scores can be visually evaluated by plotting them in the same figure. It is desired, of course, to have no overlaps between the two score distributions, which would mean that the biometric system has a full and correct perspective of all its users. Also, when the two distributions of scores don't overlap, the two iris recognition metrics, namely the False Acceptance Rate, *FAR*, and the False Rejection Rate, *FRR*, are equal to zero. FAR is the rate of those cases when an imposter comparison pair obtains a recognition score that is higher than a given threshold for the biometric system. FRR, on the other hand, is the rate of those cases when a genuine comparison pair obtains a recognition score that is lower than the system's threshold. For all the results presented here, these two recognition metrics are null.

Results

In order to ease the comparison between the recognition results, the minimum genuine scores and the

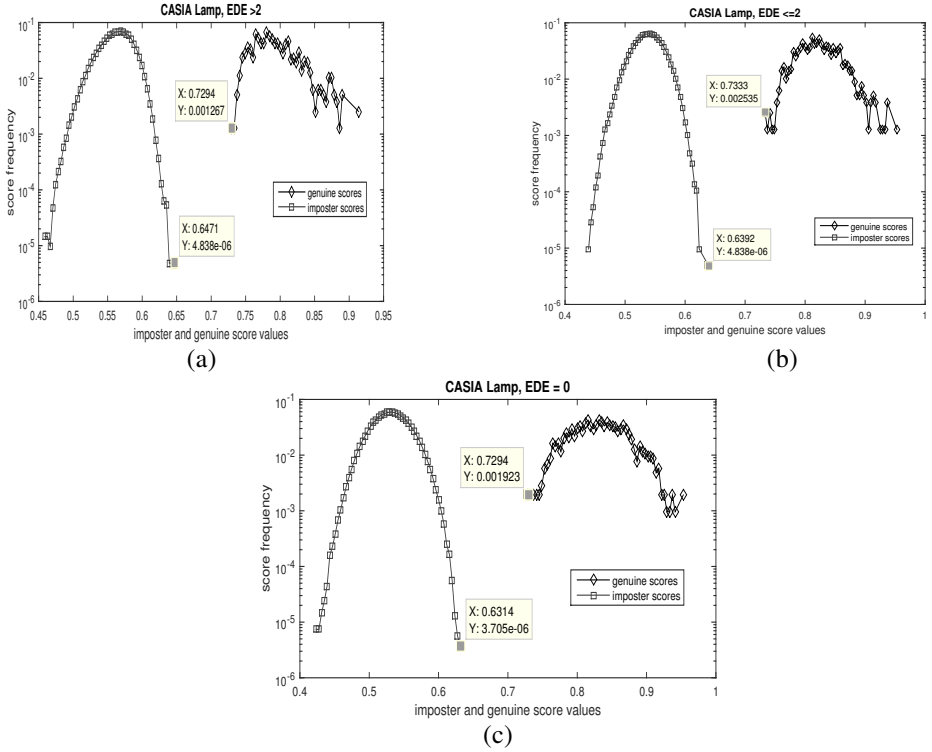


Fig. 8: Genuine and imposter comparison scores obtained for CASIA Lamp V4 at a) E.D.E.>2, b) E.D.E.≤2 and c) E.D.E. = 0.

maximum imposter scores are grouped in Table 2. These scores are also marked in the corresponding figures (Fig.7-9). The figures have on the axis of abscissae the obtained *genuine* (the plot, similar to a Gaussian, from the right of the figure) and the *imposter* (the plot, similar to a Gaussian, from the left of the figure) *comparison scores*. On the axis of ordinates are found the relative frequency of the imposter and genuine comparison scores.

Each of the figures illustrates the artificial perception of the neural network regarding the learned digital identities. In all these figures, there are no overlaps between the genuine and imposter comparison scores. That means, of course, that the neural network used here is able to correctly classify new instances of the learned identities. That being said, the problem raised here is whether reducing the E.D.E. error as much as possible would lead to a more stable iris classifier. The answer is *yes, by controlling the value of E.D.E. the iris recognition results can be controlled, to some extent, as well*. However, an important observation that can be made at this point is that even though the recognition improvements are certain, these are not always significant. This means that the separation band between the minimum genuine score and maximum impostor score is, most of the times, only slightly increased (from the 2nd decimal place). A safety or separation band is the interval from between the minimum genuine and maximum imposter scores. The size of each of the safety bands is found in Table 2, on the *dist.* column.

By analyzing Table 2, where the minimum genuine scores, the maximum imposter scores and the difference between the two are stored, one can see that, overall, by reducing the E.D.E., the effect is an increased safety band. Interestingly, even though the widening of the separation band is shown once with decreasing the E.D.E., it seems that the best improvement is obtained by moving from E.D.E. > 2 to

E.D.E. ≤ 2, and not to EDE = 0. The fact that the most notable improvements are obtained from moving from S_3 (E.D.E. > 2) to S_2 (E.D.E. ≤ 2), and not from S_2 to S_1 (E.D.E. = 0) could be explained by the fact

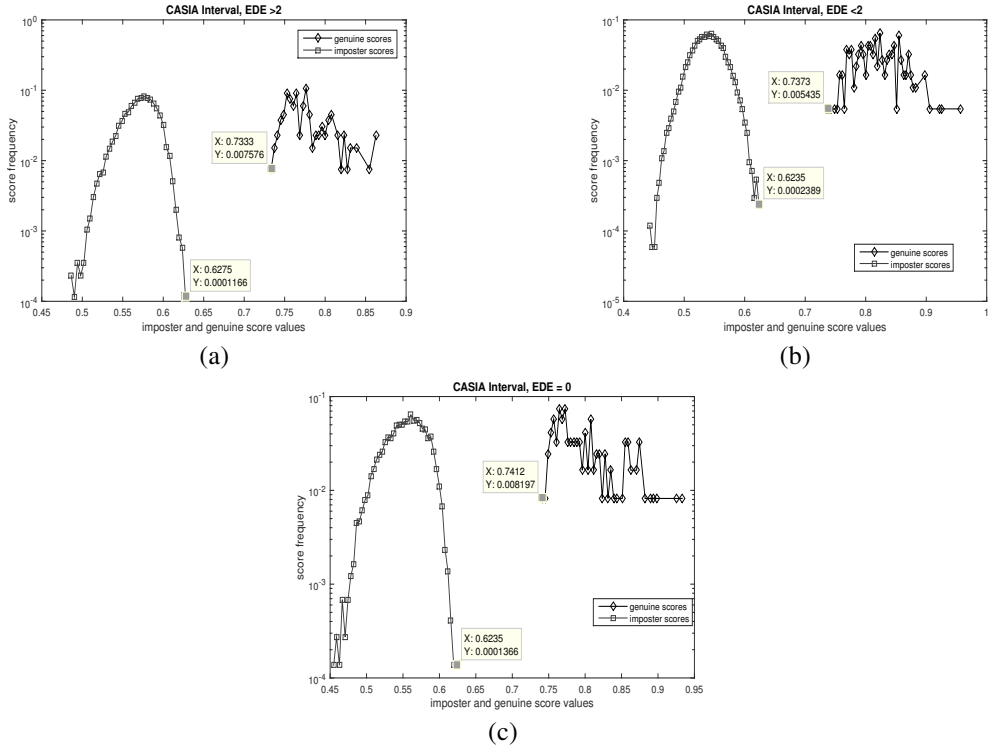


Fig. 9: Genuine and imposter comparison scores obtained for CASIA Interval V4 at a) E.D.E.>2, b) E.D.E.≤2 and c) E.D.E. = 0.

that a part of S_1 is already included in S_2.

From the visual analysis of the distribution of scores (Fig.7-9), the most important conclusion that can be drawn, apart from the increasing separation band that was already discussed, is that, once with the decreasing of the E.D.E., the genuine distribution of scores seem to be drawn more to the value 0.9. This is an indicator of the fact that, on the long term, a biometric system that takes into account the E.D.E. will be more stable and comfortable (for its users) to exploit.

In contrast with the results reported by Hofbauer et al. (2016), for a very similar segmentation error (named here I.B.M.E.), all the test results presented in this article clearly indicate that the negative influence of E.D.E. is present, and that it might be helpful for the overall recognition accuracy of any iris biometric system if a module that uses a E.D.E. threshold is included in the biometric system as well.

Conclusions and Future Works

Iris segmentation is still a difficult problem in iris recognition and its quality can have a great influence on the overall behavior of an iris biometric system. In this article we can see the results of applying a neural network, PNN, on the iris codes obtained from iris images captured with different iris sensors. The iris codes involved in the tests are selected in such a way that the segmentation error, called Eccentricity Detection Error (E.D.E.), would have values greater or smaller than 2, or equal to 0. The general behavior

of the neural network on the utilized data indicates that it might be important to take into consideration the E.D.E. for any iris biometric system.

The iris images utilized in our tests still have an amount of noise (eyelashes, small occlusions) that can be eliminated with noise masks and it would be interesting to see, in a future work, how the usage of such masks, in combination with different values of E.D.E., would influence the iris recognition results. Another interesting further analysis of this present work would be by applying different other available segmentation algorithms, in order to see if the E.D.E. is reproducible and, if so, how this affects the recognition results. The most important continuation of present work is, in our opinion, to implement a subroutine in an iris segmentation algorithm that would help us to automatically establish the segmentation accuracy based on a resulted E.D.E.

Acknowledgement

Portions of the research in this article use the CASIA-IrisV4, collected by the Chinese Academy of Sciences' Institute of Automation (CASIA).

Portions of the research in this article use the ND-CrossSensor-Iris-2013 biometrics database, collected by the University of Notre Dame du Lac.

References

CASIA http://biometrics.idealtest.org/dbDetailForUser.do?id=5

Celik, E.T. (2016), 'Iris Recognition—Selecting a Fuzzy Region of Interest in Standard Eye Images', Soft Computing Applications, Springer, Cham, 793-804.

Chen, C.H. and Chu, C.T. (2009), 'High performance iris recognition based on 1-D circular feature extraction and PSO–PNN classifier', Expert Systems with Applications, 36(7), 10351-10356.

Field, D.J. (1987) 'Relations between the statistics of natural images and the response properties of cortical cells', Josa a, 4(12), 2379-2394.

Hofbauer, H., Alonso-Fernandez, F., Bigun, J. and Uhl, A. (2016) 'Experimental analysis regarding the influence of iris segmentation on the recognition rate', IET Biometrics, 5(3), 200-211.

Khan, T.M., Khan, M.A., Malik, S.A., Khan, S.A., Bashir, T. and Dar, A.H. (2011), 'Automatic localization of pupil using eccentricity and iris using gradient based method', Optics and Lasers in Engineering, 49(2), 177-187.

Li, Y., Li, W. and Ma, Y. (2012), 'May. Accurate iris location based on region of interest' Biomedical Engineering and Biotechnology (iCBEB), 2012 International Conference on, 704-707, IEEE.

Noaica, C.M. (2016), 'August. A Circular Eccentric Iris Segmentation Procedure for LG2200 Eye Images', International Workshop Soft Computing Applications, Springer, Cham, 411-425.

ND-CrossSensor-Iris-2013, https://sites.google.com/a/nd.edu/public-cvrl/data-sets

Specht, D.F. (1990), 'Probabilistic neural networks', Neural networks, 3(1), 109-118.

Sundaram, R.M. and Dhara, B.C. (2011), 'April. Neural network based Iris recognition system using Haralick features', Electronics Computer Technology (ICECT), 2011 3rd International Conference on, Vol. 3, 19-23, IEEE.

Yu, P. and Xie, M. (2010), 'An accurate and easy method towards iris localization', Computer and Automation Engineering (ICCAE), The 2nd International Conference, Vol. 2, 796-800, IEEE.

University Education and Knowledge Management: An Application to the Spanish Case

David Borge-Diez, Departamento de Ingeniería Eléctrica y de Sistemas y Automática, Escuela Técnica Superior de Ingenieros de Minas de LEON, Spain, dbord@unileon.es

Enrique Rosales-Asensio, Departamento de Física. Universidad de La Laguna. Avenida Astrofísico Francisco Sánchez S/N 38206, S/C de Tenerife. Spain, erosalea@ull.edu.es

Clara Pérez-Molina, Dpto. de Ingeniería Eléctrica, Electrónica, Control, Telemática y Química Aplicada a la Ingeniería. Universidad Nacional de Educación a Distancia. C/ de Juan del Rosal, 12, 28040 Madrid. Spain, clarapm@ieec.uned.es

Enrique González-Cabrera, Departamento de Ingeniería Química. Universidad de La Laguna. Avenida Astrofísico Francisco Sánchez S/N 38206, S/C de Tenerife. Spain, eglezc@ull.es

Antonio Colmenar-Santos, Dpto. de Ingeniería Eléctrica, Electrónica, Control, Telemática y Química Aplicada a la Ingeniería. Universidad Nacional de Educación a Distancia. C/ de Juan del Rosal, 12, 28040 Madrid. Spain, acolmenar@ieec.uned.es

Abstract

The present research correlates knowledge management and university education, determining the relationship between both. As a result of the research presented in this scientific contribution it is concluded that a more detailed strategic planning of knowledge management should be carried out since it is one of the most important elements in designing curricula for university education.

Keywords: Knowledge management; University higher education; Challenges of the modern world

Introduction

Knowledge management, a term that emerged in the early 1990s, has become very popular in recent years and can be defined as the processes that guide the analysis, dissemination, use and transfer of experiences, information and knowledge among all members of an organization to generate value [1].

It is the task of developing and exploiting the tangible and intangible resources of a company's knowledge [2]. The tangible resources would be patents, licenses, information on customers, suppliers, products and competitors, research work, etc. The intangibles would be the knowledge and experiences of the employees, the know-how of the company, etc. [3].

However, knowledge management does not consist of the indiscriminate flow of information through an organization, since information is simply a set of data [4]. On the contrary, knowledge involves debugging and adding value to information, reaching a solution or decision in a real situation, and interpreting data within a context [5]. This transfer of knowledge and best practices is what really brings a differential value to the company compared to its competitors [6]. This type of management can bring great benefits to a company, such as cost reduction, decision-making time, etc. [7].

In Fig. 1 an outline showing general dimensions of knowledge management is shown.

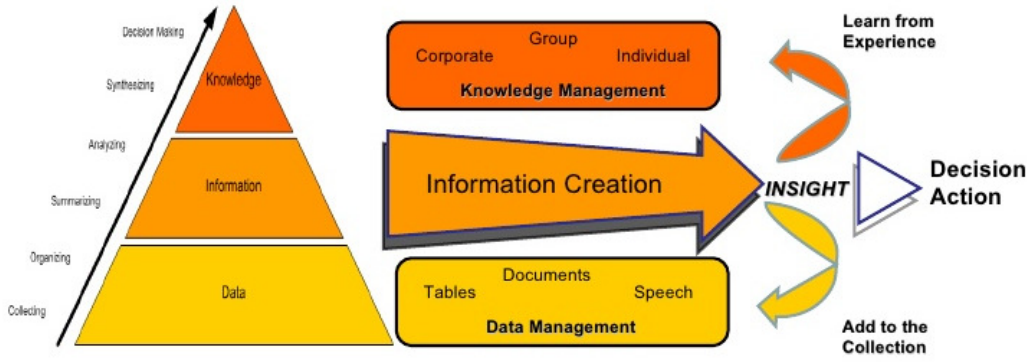


Fig. 1: General dimensions of knowledge management. Source: Adapted from [8]

In the development of the present investigation, the demand for a university education can be approached in terms of those who, having completed secondary education, materialize their desire to continue higher studies through their application to a higher educational institution. It is also possible to approximate the demand for higher education in terms of those who are considering the possibility of attending higher education, since not all those who enter an institution of higher education are enrolled in that institution.
During the last 20 years in Spain, while demand for university education increased so too have the number of public and private universities, not only in regions where there was already a university education offer, but also in regions where there was previously no university [8]. In Spain, it was possible to see that social demands constituted a type of social stimulation of the process of knowledge management, determined by the nature of social needs and at different levels of problems: social, institutional, socio-psychological and individual [9].

In this way, the development of the knowledge of society is identifiable by the needs of that society, serving the scientific production of stimulus to the development of knowledge (which is a consequence not only of the avidity of the knowledge of the researchers but of the daily problems that arise in society) [10]. On the other hand, it is feasible to distinguish a set of accumulated knowledge that has certain organization, that is, a certain type of predominant knowledge. It can be affirmed that each type of social stimulation of knowledge responds, in a process of contradictions, to a certain type of knowledge [11]. The change in the type of social stimulation usually precedes the type of knowledge [12]. The transformation of the types of social stimulation and types of knowledge forms a spiral of development, in which one can appreciate the singular, the particular and the general in their dialectical relationship [13]. In this way, the knowledge management is related to the contents that are transmitted and developed in the university [14].

In Fig. 2 an outline showing the value chain of knowledge management for educational purposes is shown [15].

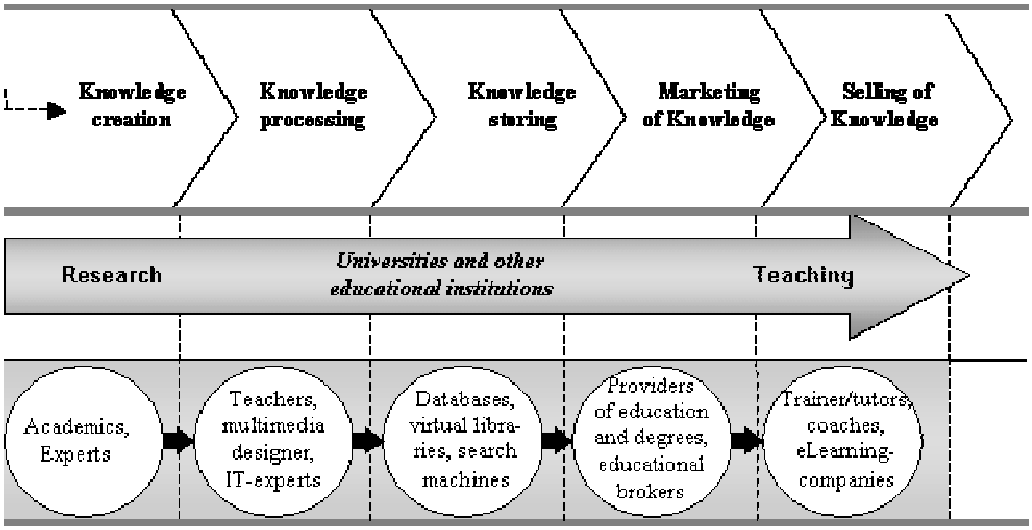


Figure 2: Value chain of knowledge management. Source: [15]

Based on the aforementioned, we arrive at the following research problem:

- To what extent does knowledge management as a component of social development enhance university higher education in the development of a society?
- Aiming to: Analyze the extent to which knowledge management as a component of social development enhances university higher education in the development of a society.

The present research is justified in its practical aspect, since in the current environment of high competitiveness, globalization, technological development, reduction of the life of products and global crisis, it is key that knowledge management achieve the sustainable success of the company. In this context, it is really critical to develop the skills of university students to acquire information, transform it into knowledge, incorporate it into the institution as learning, share it quickly and put it into practice. And the university belongs to society and it is their duty to work for their change. It is an inescapable duty imposed by the very essence of the institution. That is why there must be a defence and solidarity and reciprocal protection between the University and society.

This is very important because there is a correlation between knowledge management and university higher education. This is because, thanks to the knowledge of universities, they manage innovation, create more efficient organizational routines, business growth, sustainability, adaptive capacities to the environment, etc. and all these provide more successful products, excellent professionals and a quality level in education.

It is justified in its theoretical aspect since the management of knowledge is, therefore, the planned and continuous direction of processes and activities to enhance knowledge and increase competitiveness through the best use and creation of resources of individual and collective knowledge. Knowledge management has much to do with, among other factors, intangible assets, organizational learning, human, intellectual and relational capital. Finally, it is justified in its methodological aspect, since every time it is intended to introduce a change in organizational culture, there are a number of factors that can be an obstacle. Significant differences can be found between traditional and mature organizations in the use of knowledge management.

Materials and Methods

This research on the relationship between "knowledge management" and "higher education university" in the development of a society is an empirical research, because it is a fact that happens in our society, and applied, because the problem will be faced by proposing alternative solutions. The level of research is explanatory because we seek to know the causal factors that explain our research problem. The basic design of this research is non-experimental-transectional-explanatory correlational.

It is non-experimental, because there will be no tests; that is, in this investigation the variables will not be manipulated. It is transectional, because our object of study is going to be analyzed over a certain period of time. It is correlational explanatory, because it seeks to find evidence of how independent variable knowledge management enhances university higher education.

Results

Cooperation between Spanish universities and the industrial world should be intensified and focused on an orientation towards innovation, the creation of new enterprises and, more generally, the transfer and dissemination of knowledge. Faced with the growing tendency of companies to outsource their research activities to the best universities, the university context is increasingly competitive.

This reorganization is reflected, on the one hand, in the increasing diversification and specialization of knowledge and the emergence of ever more specific and precise fields of research and teaching specialties; on the other hand, the academic world needs to adapt urgently to the interdisciplinary nature of the issues raised by the major problems of society, such as sustainable development, new diseases, risk management, etc. However, the activities of universities, particularly in terms of teaching, tend to maintain their organization according to the traditional system of disciplines. The Spanish university must respond to the new needs in education and training that emerge with the knowledge economy and society, and especially the growing need for scientific and technical education, transversal competences and lifelong learning possibilities.

In general terms, career prospects in Spanish universities are limited and quite uncertain. In addition to the economic factors in Spain, the excellence of universities in research and teaching must be improved, as this is the only way to achieve greater openness of their universities abroad and to be able to think about their attractiveness at an international level.

Discussion

The management of knowledge in university institutions of higher education is a phenomenon that is becoming increasingly aware of what cannot yet be described as a field of knowledge and practice already constituted. Hence the relevance of analyzing in what context and for what purpose the elements present in the process of its constitution and how they are incorporated into the educational field and the university organizations are historically originated.

We can see that there is widespread access to information and communication technologies and that there is a clear relationship with the knowledge economy. Therefore, it is expected that knowledge management is a determining factor in reproducing and perhaps sharpening the differences and inequities between universities and their modalities, between those that manage to incorporate processes and technologies of knowledge management and those that do not do it.

To understand the management of knowledge in the Spanish university, it is proposed to adopt an epistemological perspective that considers knowledge as action, in an organizational learning model (*performance through learning*) whose central purpose is the improvement of performance and the

achievement of results. An epistemological perspective in which the dimensions of knowledge as representation (*know what*) and of knowing as action (*know how*) are recognized.

Conclusions

1. It is proved that knowledge management as a component of social development satisfactorily enhances university higher education in the development of a society.
2. This implies not only an approach in the development of knowledge management systems, but we are faced with a multifaceted field and perspectives since knowledge management is a dynamic and continuous organizational phenomenon, constituted by various processes with varied characteristics and focus of interest.
3. Similarly, in the sense that the influence of the management of human talent in the promotion of university higher education in the development of a society is significant, this implies that information and communication technologies can and should be used to extend the management of knowledge beyond the traditional scope of storage, retrieval and distribution of codified and systematized knowledge.

After carrying out the research presented here, it was concluded that the Spanish university student has the necessary competences to develop and use his own knowledge tools and that the know-how as cognitive competence is directly related to university higher education in the development of a society.

References

[1] OECD. The knowledge-based economy. Paris: OECD; 1996.

[2] Okpara JO. Exploring the Effects of Intangible Resources on Competitive Advantage and Performance of Listed Firms in Nigeria. Bloomsburg: Bloomsburg University of Pennsylvania; 2015.

[3] Jaiya GS. Role of the intellectual property system in development and marketing of new products. Geneva: World Intellectual Property Organization; 2005.

[4] Hovland I. Knowledge management and organisational learning: An international development perspective. London: Overseas Development Institute; 2003.

[5] Alexey Semenov. Information and communication technologies in schools. Paris: UNESCO; 2005.

[6] Wang S, Noe RA. Knowledge sharing: A review and directions for future research. Human Resource Management Review 2010;20:115-131.

[7] Hočevar B, Jaklič J. ASSESSING BENEFITS OF BUSINESS INTELLIGENCE SYSTEMS – A CASE STUDY. Management 2010;15(1):87-119.

[8] The Secretary Department of Defence. The Defence Geospatial Standardisation Framework 2012 Improve Geospatial Data and Knowledge Management: Defence Geospatial Strategy 2010. Canberra: The Secretary Department of Defence; 2012

[9] Tremblay K, Lalancette D, Roseveare D. Assessment of higher education learning outcomes: Feasibility study report. Paris: OECD; 2012.

[10] Mair J, Martí I. Social Entrepreneurship Research. Pamplona: IESE Business School; 2005.

[11] UNESCO. Towards Knowledge Societies. Paris: UNESCO; 2005.

[12] Crow G. 'What is Qualitative Interviewing?' Edinburgh: University of Edinburgh; 2013.

[13] OECD. Science, Technology and Innovation in the New Economy. Paris: OECD; 2000.

[14] Bell L, Stevenson H. Education Policy Process, Themes and Impact. Abingdon: Routledge; 2006.

[15] King WR. Knowledge Management and Organizational Learning. Berlin: Springer-Annals of Information Systems 4.

[15] Baumeister HP. Networked Learning in the Knowledge Economy - A Systemic Challenge for Universities, http://www.eurodl.org/materials/contrib/2005/Baumeister.htm [accessed 01 September 2017].

A Rule Based Inference Model to Establish Strategy-Process Relationship

Loan Thi Ngoc Dinh, Federation University Australia, Australia, ldinh@federation.edu.au

Gour Karmakar, Federation University Australia, Australia, gour.karmakar@federation.edu.au

Joarder Kamruzzaman, Federation University Australia, Australia, joarder.kamruzzaman@federation.edu.au

Andrew Stranieri, Federation University Australia, Australia, a.stranieri@federation.edu.au

Abstract

An effective relationship between business processes and their relevant strategies helps enterprises achieve their goals. As a business organisation changes quickly, business processes implement their relevant business operations for efficiency. It is important to know which business process achieves which business strategies dynamically. To the best of our knowledge, there exists a framework which aims to automatically determine the strategy-process relationship (Morrison et al. 2011). However, this framework can only work when the effect of the business process is known, but it is difficult to determine such effect accurately. Moreover, by optimising business processes to satisfy business strategies, higher efficiency may be achieved but there is a high chance of losing discriminative information. It therefore creates certain level of uncertainty in achieving accurate strategy-process relationship. To reduce this uncertainty and determine the relationship accurately between business processes and their relevant strategies as defined by business domain experts, in this paper, we introduce a rule-based inference model. This model not only helps business organisations realize which business processes need to be involved for the organisation to achieve their goals when strategies are made, but also reduces the possibility of losing important details from business process optimisation. We have developed a business case to validate our proposed model and the results show that our model can infer the relation accurately for each rule defined for the related business case.

Keywords: rule base, inference model, business process, business strategy.

Introduction

According to traditional thoughts, effective strategic plans help enterprises to achieve their goals. However, in an era of intense competition, great strategic plans are not sufficient enough for enterprises to achieve their goals. While business goals are on the long run, business strategies are more specific and they help enterprises having a better view of what to do. To achieve goals in the strategic plans, enterprises need to know what to do and where (or when) to start based on their strategies and thereby, transferring strategies to specific actions which are well defined in business processes is one of the most important steps for strategy deployment.

In general, business strategies can be divided into three main groups (i) the strategies for the improvement of an existing system (e.g., a strategy for increasing the number of customers using shopping online services), (ii) the strategies for repairing loopholes of the existing system (e.g., a strategy for fixing security loopholes in banking system) and (iii) the strategies for a new investment (e.g., a strategy for a new product launch). As seen from these examples, each strategy includes their expected outcomes. These outcomes are done by executing a list of actions and tasks which come from business processes. A business process typically includes a series of coordinated events (or activities) across a number of functional elements of an enterprise and it is executed by stakeholders (or customers).

With the purpose of improving the connectivity between strategies and processes, the term "strategic alignment" has been defined and it has attracted a large number of researchers from the relevant research community for many years. Strategic alignment may refer to a broad definition and it is relevant to many aspects of an enterprise (Gerow et al. 2015). However, it is mainly defined based on two points of views. Firstly, strategic alignment refers to how information technology (IT) aligns with business needs (Almajali et al. 2011) (e.g., how to develop IT systems and determine their roles in order to suit with business strategies). Secondly, strategic alignment is also mentioned as a technique where the bridge communication between strategies and processes is built and described (Morrison et al. 2011). Although, these two definitions sound different, they complement each other and there exists several important common aspects. That is, business strategies normally come from business departments, whereas business processes are generally run under the support of IT. The strategic alignment mentioned in this paper mainly concentrates on the second view, i.e., the coherence between strategies and process models. To avoid confusion, in this paper, the term "strategy-process relationship" is used instead of using "strategic alignment".

Business strategies and processes are the core elements in any enterprise in order to achieve their goals. The goals will not be able to reach if business processes are not reflecting business strategies and vice versa. A number of studies have proven that a strong connection between strategies and processes can bring huge advantages to an enterprise (Madu 2013, Rosemann et al. 2015, Grabowska et al. 2015). For example, to achieve the goals "increase customer satisfaction and reduce the number of staff", a part of the business processes for customer service from Jetstar Airways (jetstar.com) has been transferred from manual job to automated processes such as virtual staff working on their website. These automated processes allow Jetstar's customers to find suitable answers for their queries via virtual staff without waiting in a long queue to talk to real staff. As a result, instead of letting their customers wait for a long time to receive a response, these automated processes help Jetstar Airways not only reduce the number of staff working on phone, but also increase the customer satisfaction as their customers are able to find the information they need within an acceptable amount of time. Another example, to increase the accuracy of aircraft control and reduce the stress of pilots during flights, especially in the long-haul services, Boeing and Airbus have embedded process automation into their planes with the purpose of supporting pilots during take-off and landing (Freed 2017).

To make sure that all processes run smoothly whilst still satisfying a number of business strategies, the main objective is that a business process needs to be appropriate and updated so that they fit accordingly. As mentioned above, a business process typically contains a series of (automatic and manual) activities and interactions between stakeholders and customers. This leads to the complexity of managing them. Therefore, executing them under the roof of business strategies as well as finding the loopholes in the strategies of regulatory compliance is always difficult.

Although a number of studies and techniques have been introduced in order to help enterprises transferring from their strategies to processes, still there are gaps existing in the interaction between business strategies and processes. The results and findings that are claimed from the studies and those collected from practices normally do not match (Chou et al. 2015; Queiroz 2017). Additionally, they are not flexible enough to apply in different systems. This is because each methodology was developed only for a specific individual system. Furthermore, most of them still rely on the concept of string comparison. Several of works have claimed that their methodologies have improved correctness of process models by analysing business rules (Morrison et al. 2011, Wang et al. 2014). However, the rules used in their implementation are limited. As a consequence, no evidence is shown that the methodologies still give expected outcome in complicated practical business environments. The flexibility and adaptability of these studies are still low because they are only suitable for applying to selected scenarios. As a consequence, this leads to incompetence to adapt with the rapid changes and the complexity of real business environments. Uncertainty and imprecision in defining the effect of a process may make the system unsuitable to real world applications. To reduce this uncertainty, establishing the relationship between processes and strategies based on rule-based inference model appear to be one of the most suitable techniques to business.

This paper proposes to achieve the purpose above. That is, introducing a rule-based inference model that can establish a relationship between strategies and processes. While "rule-based" heuristics have been applied to a number of applications, they have not been considered in regards with discovering the relationship between business processes and strategies. Hence, the proposed inference model introduced in this paper helps bridging the gap between strategies and processes in a new way. The proposed inference model in this paper is developed with the purpose of finding the business strategy and its relevant processes based on the rule-based inference. This is developed from the relevant facts and annotations. A set of business strategies and processes are related to each other only if they satisfy the defined rules in the knowledge base.

The structure of this paper is as follows: Section 2 summarizes notable methodologies which are relevant to the relationship between business strategies and processes. The proposed inference model and its implementation are described in Section 3 and 4. A concluded remark with future research challenges is provided in Section 5.

Related works

To improve the effectiveness of the connection between business strategies and processes, all studies in this field have focused on the three main objectives:

(i) To clarify which business process need to involve once a business strategy starts running
(ii) To avoid developing duplicated business processes
(iii) To examine if a business process is following regulatory compliance and strategy

When a new business strategy is released, a list of business processes is assigned in order to execute the tasks that support the business strategy to be successful. Which business processes should be involved in this list? Is it necessary to develop a new process if an approximate similar process will be found in the enterprise system? To answer these questions, the objectives (i) and (ii) have attracted research community at most.

To choose the right business processes as well as to avoid duplicated business process development, a large number of studies have been introduced. Semantic techniques have been arisen as the most popular solutions to achieve all three objectives. According to the concept of semantic techniques, each process is analysed and tagged by several of semantic labels. These labels may refer to what tasks the process is responsible to and what are the expected outcomes from the process. These labels are developed depending on the graphical languages of semantic techniques and they play a role like a communication between business strategies and processes (Delfmann et al. 2015; Becker et al. 2016). Semantic techniques for process labels also help to handle compliance gap detection. However, applying semantic techniques for process labels suffers from several drawbacks. A typical example is, finding the relevance between business strategies and processes as well as detecting the gaps of regulatory compliance need to go through the semantic labels, the execution can take time without giving a correct outcome if the semantic labels belong to businesses processes or a regulatory compliance are not defined (Fellmann et al. 2015).

As semantic techniques for label models have shortcomings, researchers have tried another way to solve this issue. Dinh et al. (2015) have considered business context instead of only applying semantic information. Moreover, the concept of adding annotation into processes has been published earlier and its advantages have been proven by studies and practices (Hinge et al. 2009; Fellmann et al. 2015). Governatori et al. (2008) has found that the objective (iii) can be reached by process formalization based on semantic annotations. Fellman et al. (2011, 2015) has also described each annotation belongs to process model is associated with its selection of formal ontologies. In this case, the regulations are represented by formal ontologies. The main purpose of developing the relationship between them is not only to check the correctness of the model but also to make sure that the model evolution is appropriate Fellman et al. (2011, 2015).

However, considering only those elements belong to process models may lead to lack of capturing business rules (Wang et al. 2014). Therefore, several studies have been focused on embedding business rules into the relationship between business processes and strategies (Morrison et al. 2011; Governatori et al. 2012). In Morrison et al (2011), business rules are executed based on the annotations of processes and a set of strategies. These rules are then used as a buffer step with the aim of minimizing the set of business processes, in regards to achieve a particular strategy. Alternatively, regulations are transformed and computerized into rules. Annotated process models are then checked via the connection between annotation of process and the representation of rules (Governatori et al. 2012). The difficulties to manage the collections of processes increase significantly due to the lack of associated tools. Therefore, Dallilo et al (2014) has introduced a multi-layered approach in order to make a link between strategies and process models.

The examples described above show that it is important to find a relationship between business strategies and processes. A business strategy can only be successful if a company knows where to start their plan, where to improve and invest. For this, a rule-based inference model is essential as it allows the incorporation of rules by domain experts and can handle uncertainty in an effective and efficient manner. To our knowledge, there exists no such rule-based inference model to find which processes relate to which strategies in this area.

Proposed Inference Model

Because of the fact that many loopholes still exist in the current studies as mentioned in Section 2, the methodology presented here is a breakthrough in business process management. The proposed inference model is an initial idea for the future research trends in regards to managing processes and strategies based on rules in the knowledge base. This will enable a business to determine the fulfilment of objectives considering the activities executed through its business processes.

The purposes of the model are:

- to find the business strategy and its relevant processes based on the rule-based inference which is developed from facts and annotations.
- to generate the list of strategies and processes considering their facts and annotations respectively that makes given rules to satisfy or fire.

Figure 1 describes a schematic diagram of the inference model. As shown in Figure 1, the inference model obtains the strategies with their corresponding facts and the processes with their corresponding annotations. Annotations are the information of a business process. Facts are the results of a strategy. A process may belong to many strategies and a strategy may need many processes to be executed. Using the reasoning process, the proposed inference model produces the processes and their relevant strategies. As expected, inference results establish many-to-many relationship between processes and its strategies.

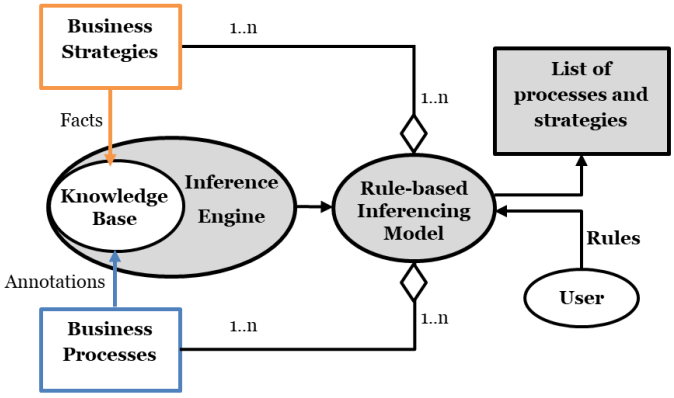


Fig. 1: Schematic diagram of the proposed inference model

A key action or an effect of a process is represented by an annotation. Whereas, facts express strategies in brief terms. Note, a process may contain a lot of annotations and a strategy may have many facts. Each annotation may belong to more than one process and each fact may belong to more than one strategy. When a stakeholder gives an input which has two parts (i) Antecedent condition (including annotations connected by logical operators) and (ii) Consequent condition (including facts connected by logical operators), a list of strategies and their relevant processes are returned. This is done based on the rule-based inference execution. All these steps are required to work on a collection of processes and strategies which are provided from knowledge base as seen in Figure 1 and Algorithm 1:

Algorithm 1:

Input: $R: ac \rightarrow fc$
ac = Antecedent condition of rule R involving annotations and logical operators
fc = Consequent condition of rule R involving facts and logical operators
a = List of annotations = $[a_1, a_2, a_3, \ldots, a_n]$
f = List of facts = $[f_1, f_2, f_3, \ldots, f_m]$
p = List of business processes = $[p_1, p_2, p_3, \ldots, p_k]$
s = List of business strategies = $[s_1, s_2, s_3, \ldots, s_l]$

1: **if** ($\neg ac \vee fc$) **then**
2: **use** *process_of* (p_i, a_i)
3: **when**
4: **for each** a_i in the given annotation list a
5: *annotation_of* (a_i, p_i)
6: **use** *strategy_of* (s_j, f_j)
7: **when**
8: **for each** f_j in the given fact list f
9: *fact_of* (f_j, s_j)
10: **use** *inference_process_strategy* (p_i, s_j)
11: **when**
12: **for each** p_i of the *process_of* (p_i, a_i)
13: **for each** s_j of the *strategy_of*(s_j, f_j)

In this algorithm, ac is antecedent condition containing a list of annotations and fc is consequent condition containing a list of facts. The elements in each condition are combined with logical operators such as $\wedge$ and $\vee$ which represent AND and OR respectively. Based on the theoretical principles, the rule "$R: ac \rightarrow fc$" is not satisfied only if the antecedent condition outputs TRUE

whereas the consequent condition returns FALSE. According to logical implication and based on the outcomes of antecedent and consequent conditions, the rule satisfaction decisions are given in Table 1. Our proposed system takes the input of a rule, i.e., antecedent and consequent conditions and then evaluates them. After that it evaluates the rule (step 1 of the Algorithm).

In Algorithm 1, the process_of (p_i, a_i) is generated based on step 2 to step 5. Similarly, strategy_of (s_j, f_j) is generated based on step 6 to step 9. Finally, the inference model generates inference_process_strategy (p_i, s_j) using the outcomes of process_of (p_i, a_i) and strategy_of (s_j, f_j) (steps 10 – 13).

Table 1: Rule satisfaction decision

Antecedent Condition (ac)	Consequent Condition (fc)	ac → fc
1 (TRUE)	1 (TRUE)	1 (TRUE)
1 (TRUE)	0 (FALSE)	0 (FALSE)
0 (FALSE)	1 (TRUE)	1 (TRUE)
0 (FALSE)	0 (FALSE)	1 (TRUE)

In Table 1, if the antecedent condition returns FALSE and consequent condition is TRUE, or both antecedent and consequent conditions are FALSE, then the rule is still satisfied. This is also considered in our model to execute any rule a user wants, an option to input a rule into the system is provided in the proposed model. The evaluation process of a rule entered by a user is shown in Figure 2. The specific example in this figure represents how a rule is being satisfied based on the given annotations and facts. The corresponding annotations and facts of antecedent and consequent conditions are replaced by 1 (TRUE) if they are found in knowledge base otherwise they are replaced with 0 (FALSE).

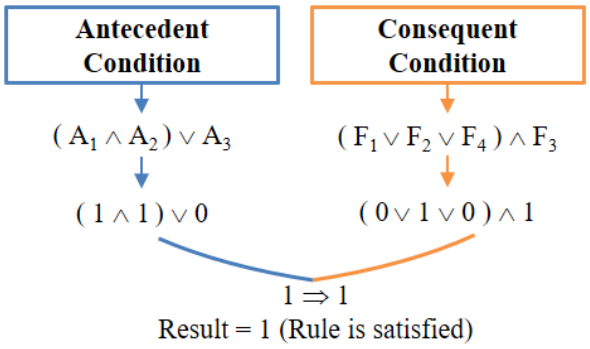


Fig. 2: Pictorial representation of rule-based inference

As mentioned in Algorithm 1, the structure of the rule is an implication of antecedent and consequent conditions. The antecedent condition comprises of annotations called A_i. Whereas the consequent condition comprises of facts called F_j. Note that, i and j are finite and range from 1 to n for annotations and from 1 to m for facts. The annotations and facts of each side are connected by logical operators such as AND ($\wedge$) and OR ($\vee$). The antecedent condition is given as $[(A_1 \wedge A_2) \vee A_3]$. It is assumed that A_1 and A_2 are found in knowledge base whereas A_3 is not. Therefore, the condition is equivalent to $[(1 \wedge 1) \vee 0]$. By evaluating the condition, it outputs '1'. Similarly, for consequent condition which is given as $[(F_1 \vee F_2 \vee F_4) \wedge F_3]$. Also, assume that F_2 and F_3 exist in the knowledge base while F_1 and F_4 are not. The condition is then equivalent to $[(0 \vee 1 \vee 0) \wedge 1]$, and therefore after

evaluation, it returns '1'. As both antecedent and consequent conditions are evaluated as '1', the rule is satisfied. After this, outcome including a series of processes and strategies are returned.

Case Study

The above inference model has been implemented using Pyke package (pyke.sourceforge.net) in Python environment. Pyke is built in Python environment and known as an artificial intelligence tool like Prolog (swi-prolog.org) to develop an expert system. This helps to develop a knowledge base for inference model. Our proposed model is validated by considering a business case of a retail supermarket. All the relevant processes of an enterprise computing system and the strategies to meet the business objectives are determined after consultation with the enterprise business experts. As mentioned in Section 3, a key action or an effect of a process is represented by an annotation, while facts express a strategy in brief terms. The annotations of each process and the facts of each strategy are also developed manually considering the selected enterprise computing and the business organisation, respectively. Table 2 shows the processes and their corresponding annotations, while the strategies and their facts are presented in Table 3.

For example, the aim of the process "Pricing" is to set a price for a product or service, so the effect for this process is defined as "FinalPrice". So "FinalPrice" becomes annotation of the process "Pricing" (P1) as shown in Table 2. Similarly, the target of the strategy "Lowering the cost of planning" is to increase customer satisfaction (HappyCustomer), to impose minimum retail price (LowRetailPrice) and thereby to achieve LowRetailPrice, cost reduction in manufacturing (LowProductionCost) is needed. Hence "HappyCustomer", "LowRetailPrice" and "LowProductionCost" become facts for strategy (S1) in Table 3.

Table 2: Knowledge Base for Processes and Annotations

Process	Annotation	Process	Annotation
Pricing (P1)	FinalPrice	Sales/Order entry (P9)	OrderStatus Delivery
Business planning (P2)	ProductPlanning SupplierPolicy StorePlanning StaffPolicyDeveloping StafetyPolicyExecute InternshipProgramDeveloping	Advertising/ promotion (P10)	ProductPlanning PromotionPlanning
Inventory management (P3)	ProductPlanning InventoryPlanning StorePlanning	Distribution (P11)	ProductPlanning StorePlanning
Product scheduling/ planning (P4)	ProductPlanning	Purchasing (12)	SupplierPolicy
Product design/ development (P5)	ProductPlanning	Marketing Research (P13)	ProductPlanning StorePlanning
Quality management (P6)	StorePlanning Productplanning	Personnel management (P14)	StaffPolicyDeveloping SafetyPolicyExecute InternshipProgramDeveloping
Customer service (P7)	Feedback Membership Communication Refund		*SalaryPayment* *RecruitmentPlanning*
Invoicing/billing (P8)	Invoice		

In Table 2, a process may contain only one annotation (e.g., the process "Pricing" has only one annotation "FinalPrice") or more than one annotation (e.g. the process "Business planning" has six annotations "ProductPlanning", "SupplierPolicy", "StorePlanning", "StaffPolicyDeveloping", "StafetyPolicyExecute", "InternshipProgramDeveloping"). Similarly, an annotation may belong to only one process (e.g., the annotation "Invoice" belongs to only one process "Invoicing/billing") or more than one process (e.g., the annotation "ProductPlanning" belongs to eight processes "Business planning", "Inventory management", "Product scheduling/planning", "Product design/development", "Quality management", "Advertising/Promotion", "Distribution", and "Marketing research").

In the similar way, for Table 3, a strategy may comprise of only one fact such as the strategy "Long-term partnership" has only the fact "ReliableSupplier", or more than one fact (e.g., the strategy "Lowering the cost planning" has three facts "HappyCustomer", "LowRetailPrice", "LowProductionCost"). Furthermore, a fact may belong to only one strategy such as the fact "SavingEnergy" belongs to only one strategy "Natural Refrigerants", or more than one strategy (e.g., the fact "LowRetailPrice" belongs to four strategies "Lowering the cost planning", "Maintaining great quality of own brands", "Developing an innovative and unique product", and "Growing exclusive brands").

Table 3: Knowledge Base for Strategies and Facts

Strategy	Fact	Strategy	Fact
Lowering the cost of planning (S1)	HappyCustomer LowRetailPrice LowProductionCost	Opening first online standalone store (S13)	HappyCustomer NewChannelsServices
Maintaining great quality of own brands (S2)	HappyCustomer LowRetailPrice GoodService SufficientQuantity ProductQuality Promotion	Expending into new channels and services (S14)	HappyCustomer NewChannelsServices
Building strong, collaborative partnership with suppliers (S3)	ReliableSupplier	Bringing together diverse backgrounds (S15)	HappyStaff StaffPolicy SafetyPolicy InternshipProgram
Long-term partnership (S4)	ReliableSupplier	Launching first accessibility action plan (S16)	HappyStaff StaffPolicy SafetyPolicy InternshipProgram
Offering fresh product to customers (S5)	HappyCustomer ProductQuality	Increasing the number of women in leadership (S17)	HappyStaff StaffPolicy SafetyPolicy InternshipProgram
Improve the quality and availability of fresh food (S6)	HappyCustomer ProductQuality SufficientQuantity	Supporting indigenous team members (S18)	HappyStaff StaffPolicy SafetyPolicy InternshipProgram
Long standing suppliers (S7)	ProductQuality SufficientQuantity LowWholesalePrice LowProductionCost ReliableSupplier	Maintaining a safe workplace (S19)	HappyStaff StaffPolicy SafetyPolicy InternshipProgram
Developing an innovative and unique product (S8)	HappyCustomer ProductQuality LowRetailPrice Promotion	Maintaining graduate program (S20)	HappyStaff StaffPolicy SafetyPolicy InternshipProgram
Improving store network across all own brands (S9)	HappyCustomer OrderPolicy ConvinientStore StoreDecoration	Natural refrigerants (S21)	ProductQuality SavingEnergy

Making shopping easier and simpler for customers (S10)	HappyCustomer OrderPolicy ConvinientStore StoreDecoration	Growing exclusive brands (S22)	HappyCustomer ProductQuality LowRetailPrice
Creating bigger, brighter stores with new features (S11)	HappyCustomer OrderPolicy ConvinientStore StoreDecoration	*More bonuses instead of salary increase (S23)*	HappyStaff *StaffPolicy* *IncentiveBonusPolicy*
New-look liquor-land stores (S12)	HappyCustomer OrderPolicy ConvinientStore StoreDecoration		

As mentioned in Section 3, a process is annotated and a strategy is linked with fact manually. Hence, the annotations and facts in this case study are assumed and produced. Using those annotations and facts, a list of rules are developed to establish the relationships between processes and their relevant strategies. For instance, in a rule R1: (FinalPrice $\wedge$ ProductPlanning $\wedge$ StorePlanning) $\rightarrow$ (HappyCustomer $\wedge$ LowRetailPrice $\wedge$ LowProductionCost), the right side of the rule is a consequent condition, i.e., the outcomes an enterprise aims to achieve, such as in this case increasing customer satisfaction, reducing retail price and production cost. The left side of the rule is an antecedent condition, i.e., to reach all targets in the consequent condition, what relevant actions an enterprise must take. For example, the relevant actions in the rule R1 are setting new low price for products, modifying the plans for manufacturing products and re-organising stores to reduce the cost. These rules are shown in Table 4. We have executed each rule using our proposed inference model for the knowledge base shown in Tables 2 and 3. After executing our inference model, the processes and their relevant strategies produced by the model are shown in Table 4.

For example, R1: (FinalPrice $\wedge$ ProductPlanning $\wedge$ StorePlanning) $\rightarrow$ (HappyCustomer $\wedge$ LowRetailPrice $\wedge$ LowProductionCost)

After executing our inference model as described in Section 3 and Algorithm 1, the processes and their relevant strategies produced by the model are determined as follows:

- Processes: {P1, P2, P3, P4, P5, P6, P10, P11, P13}.
- Relevant strategies: {S1, S2, S5, S6, S7, S8, S9, S10, S11, S12, S13, S14, S22}.

In this, {P1, P2, P3, P4, P5, P6, P10, P11, P13} processes are related to {S1, S2, S5, S6, S7, S8, S9, S10, S11, S12, S13, S14, S22} strategies that is bounded by R1.

For the validation, we have checked all processes and their relevant strategies produced for each rule listed in Table 4. We found that our model produced all inferences for all rules accurately. This can be done by looking at the processes listed in Table 2 and finding the strategies relevant to those processes in Table 3. In the above example, as the antecedent condition of the rule relates to price, product and store, our Algorithm 1 correctly selects P1, P2, P3, P4, P5, P6, P10, P11 and P13 in Table 2 which are related to those criteria "price, product and store". The consequent condition of the rule identifies strategies listed in Table 3 that are relevant to customer, retail price and production cost.

To achieve efficiency and competitive advantage, a business wants to keep their current good staff members and recruit new talent by executing new incentive and bonus strategies. To show how to incorporate new items or change the existing inference system, new annotations and a new strategy with its facts are added into Tables 2 and 3. These new items are highlighted in Italic in the last grey cells of the tables. For instance, *SalaryPayment* and *RecruitmentPlanning* are added as new annotations of the process P14. *StaffPolicy* and *IncentiveBonusPolicy* are added as new facts into new strategy "*More bonuses instead of salary increase (S23)*". Then, another rule (R11) is defined as below:

(StaffPolicyDeveloping ∧ SalaryPayment ∧ RecruitmentPlanning) → (HappyStaff ∧ StaffPolicy ∧ IncentiveBonusPolicy)

After executing our inference model, our algorithm can pickup the new process and strategies as below:

- Processes: P14
- Relevant strategies: S15, S16, S17, S18, S19, S20, S23

Table 4: Case Study Results: process-strategy alignment after execution of each rule using annotation and facts defined in Table 2 & 3

Rule No	Rule	Process-Strategy Relationship		Rule No	Rule	Process-Strategy Relationship	
		Process	Strategy			Process	Strategy
R1	(FinalPrice ∧ ProductPlanning ∧ StorePlanning) → (HappyCustomer ∧ LowRetailPrice ∧ LowProductionCost)	P1 P2 P3 P4 P5 P6 P10 P11 P13	S1 S2 S5 S6 S7 S8 S9 S10 S11 S12 S13 S14 S22	R6	(InventoryPlanning ∧ ProductPlanning ∧ PromotionPlanning ∧ StorePlanning) → (HappyCustomer ∧ ProductQuality ∧ LowRetailPrice ∧ Promotion)	P2 P3 P4 P5 P6 P10 P11 P13	S1 S2 S5 S6 S7 S8 S9 S10 S11 S12 S13 S14 S21 S22
R2	((Feedback ∨ Membership ∨ Communication ∨ Refund ∨ Invoice ∨ Delivery) ∧ ProductPlanning ∧ PromotionPlanning FinalPrice ∧ StorePlanning) → (HappyCustomer ∧ LowRetailPrice ∧ GoodService ∧ SufficientQuantity ∧ ProductQuality ∧ Promotion)	P2 P3 P4 P5 P6 P7 P8 P9 P10 P11 P13	S1 S2 S5 S6 S7 S8 S9 S10 S11 S12 S13 S14 S21 S22	R7	(Feedback ∨ Membership ∨ Communication ∨ Refund ∨ Invoice ∨ Delivery) ∧ ProductPlanning ∧ PromotionPlanning ∧ StorePlanning ∧ SupplierPolicy → HappyCustomer ∧ OrderPolicy ∧ ConvenientStore ∧ StoreDecoration	P2 P3 P4 P5 P6 P7 P8 P9 P10 P11 P12 P13	S1 S2 S5 S6 S8 S9 S10 S11 S12 S13 S14 S22
R3	(SupplierPolicy ∧ StorePlanning) → Reliable	P2 P6 P11 P12 P13	S3 S4 S7	R8	(Feedback ∨ Membership ∨ Communication ∨ Refund ∨ Invoice ∨ OrderStatus ∨ Delivery) ∧ ProductPlanning ∧ StorePlanning → HappyCustomer ∧ NewChannelsServices	P2 P3 P4 P5 P6 P7 P8 P9 P10 P11 P13	S1 S2 S5 S6 S8 S9 S10 S11 S12 S13 S14 S22

R4	(ProductPlanning ∧ PromtionPlanning ∧ StorePlanning) → HappyCustomer ∧ SufficientQuantity ∧ ProductQuality	P2 P3 P4 P5 P6 P10 P11 P13	S1 S2 S5 S6 S7 S8 S9 S10 S11 S12 S13 S14 S21 S22		R9	StaffPolicyDeveloping ∧ StafetyPolicyExecute ∧ InternshipProgram Developing → HappyStaff ∧ StaffPolicy ∧ SafetyPolicy ∧ InternshipProgram	P14	S15 S16 S17 S18 S19 S20
R5	(SupplierPolicy ∧ StorePlanning ∧ ProductPlanning) → (ProductQuality ∧ SufficientQuantiy ∧LowWholesalePrice ∧ LowProductionCost ∧ ReliableSupplier)	P2 P3 P4 P5 P6 P10 P11 P12 P13	S1 S2 S3 S4 S5 S6 S7 S8 S21 S22		R10	StorePlanning ∧ ProductPlanning → ProductQuality ∧ SavingEnergy	P2 P3 P5 P6 P10 P11 P12 P13	S2 S5 S6 S7 S8 S21 S22

Conclusion

The existing works in the literature on process-strategy alignment have shortcomings as discussed in this paper. Specifically, the methods proposed for strategy-process relationship are not flexible enough to apply in diverse systems; rather each was designed only for a single specific system. As shown in Section 2, due to the complexity of business processes and the ambiguity in using natural language for describing business strategies, it is difficult to determine strategy-process relationship between business processes and strategies. This also leads to huge uncertainty in discovering the relationship between business processes and their relevant strategies. In this paper, an inference model has been proposed to deal with those issues. The inference model based on business rules is aimed at establishing the relationship between processes and their relevant strategies via their annotations and facts. By considering annotations and facts from the rules defined by business experts, automatic determination can fill the gap of strategy-process relationship. Allocating annotations to each business process reduce complexity of business process, while business strategy standardization by using facts eases the ambiguity of business strategies. This has also proven its ability of coverage all important relationships between business processes and their relevant strategies by inference based on defined rules. The model has been implemented in Python environment and Pyke expert engine. The results produced by our proposed model considering a business case show that our model can accurately identify the relationships between business processes and their corresponding strategies automatically.

The outcome of this research has high applicability in many cutting edge applications (e.g., drone, driverless car, industrial robotic systems). The proposed model mentioned here is currently applied to the specific scenario “Retail”, but with minor modification, it can be readily applied for the automation in any deployment environment where uncertainty exists because of the dynamic environmental changes.

References

Almajali, D.A. and Dahalin, Z.M. (2011), ‘Factors Influencing IT-Business Strategic Alignment and Sustainable Competitive Advantage: A Structural Equation Modelling Approach,’ *Communications of the IBIMA*.

Becker, J., Delfmann, P., Dietrich, H. A., Steinhorst, M., and Eggert, M. (2016), 'Business Process Compliance Checking–Applying and Evaluating A Generic Pattern Matching Approach for Conceptual Models in the Financial Sector,' *Information Systems Frontiers*, 18(2), 359–405.

Chou, F. K., Wang, E. T., and Yang, F. (2015), 'Realizing It Strategic Alignment and Business Performance: An Integration of Three Perspectives,' Proceedings of Pacific Asia Conference on Information Systems, 179.

Dallilo, F., de Albuquerque, J.P. and Fantinato, M. (2014), 'Making the Link Between Strategy and Process Model Collections: A Multi-layered Approach,' in *SEKE*, 387-392.

Delfmann, P., Steinhorst, M., Dietrich, H. A., and Becker, J. (2015), 'The Generic Model Query Language Gmql–Conceptual Specification, Implementation, And Runtime Evaluation,' *Information Systems*, vol 47, 129–177.

Dinh, L. T. N., Karmakar, G., Kamruzzaman, J., and Stranieri, A. (2015), 'Business Context in Big Data Analytics,' Proceedings of the 10th International Conference on Information, Communications and Signal Processing (ICICS), 1-5.

Fellmann, M., Delfmann, P., Koschmider, A., Laue, R., Leopold, H., and Schoknecht, A. (2015), 'Semantic Technology in Business Process Modelling and Analysis - Part 1: Matching, Modeling Support, Correctness and Compliance,' in *EMISA Forum*, 35(1), 15–31.

Fellmann, M., Thomas, O., and Busch, B. (2011) 'A Query-driven Approach for Checking the Semantic Correctness of Ontology-based Process Representations,' *Business Information Systems* Springer, 62–73.

Freed, J. (2017). And Now for The Pilotless Passenger Plane. [online] *The Sydney Morning Herald.* Available at: http://www.smh.com.au/business/aviation/and-now-for-the-pilotless-passenger-plane-20150924-gjucza.html [Accessed 08 Aug. 2017].

Gerow, J. E., Thatcher, J. B., and Grover, V. (2015), 'Six Types of IT-Business Strategic Alignment: An Investigation Of The Constructs And Their Measurement,' *European Journal of Information Systems*, 24(5), 465–491.

Governatori, G., Hoffmann, J., Sadiq, S., and Weber, I. (2008), 'Detecting Regulatory Compliance For Business Process Models Through Semantic Annotations,' Proceedings of the International Conference on Business Process Management. Springer, 5–17.

Governatori, G., and Shek, S. (2012), 'Rule Based Business Process Compliance,' *RuleML* (2).
Grabowska, M., Krzywda, J. and Krzywda, D. (2015), 'Relations Between Business Model And Business Strategy,' Proceedings of the WEI International Academic Conference, The West East Institute, 236-240.

Hinge, K., Ghose, A., and Koliadis, G. (2009), 'Process Seer: A Tool For Semantic Effect Annotation Of Business Process Models,' Proceedings of the IEEE International Conference on Enterprise Distributed Object Computing, 54–63.

Madu, B.C. (2013), 'Vision: The Relationship Between a Firm's Strategy And Business Model,' *Journal of behavioral studies in business*, vol 6, page 1.

Morrison, E. D., Ghose, A. K., Dam, H. K., Hinge, K. G., and Hoesch-Klohe, K. (2011), 'Strategic Alignment Of Business Processes,' Proceedings of the International Conference on Service-Oriented Computing, Springer, 9–21.

Queiroz, M. (2017), 'Mixed Results In Strategic It Alignment Research: A Synthesis and Empirical Study,' *European Journal of Information Systems*, 26(1), 21–36.

Rosemann, M., and Brocke, J. V. (2015), 'The Six Core Elements of Business Process Management,' *Handbook on Business Process Management 1*, Springer, 105–122.

Wang, W., Indulska, M., and Sadiq, S. (2014), 'Integrated Modelling Of Business Process Models And Business Rules: A Research Agenda,' Proceedings of the Australasian Conference on Information Systems.

Smart Organization: Improving Innovation Performance through Recommendation

Maria El Haiba, ENSIAS, Mohammed V University in Rabat, Morocco, maria.elhaiba@gmail.com

Lamyaa Elbassiti, Mohammed V University in Rabat, Morocco, elbassitilamyaa@gmail.com

Rachida Ajhoun, Mohammed V University in Rabat, Morocco, ajhoun@gmail.com

Abstract

To be successful in today's rapid and complex changes, innovation is the only option for maintaining growth and competitiveness. Organizations actually need to become "smart", i.e. internetworked, knowledge driven, learning as well as agile in their ability to create home-grown innovative ideas and exploit external opportunities. However, generating creative and useful ideas with the greatest bottom-line potential for implementation remains a challenging and crucial organizational task. In order to improve innovation performance especially the good quality of submitted content, we suggest a novel system based on the integration of recommender systems. In this paper, we initially give an overview of organizational innovation and present the concept behind a smart organization. Then we identify the challenges in idea generation stage and present a new qualitative approach to overcome its limitations and be able to well-manage this stage. Next, we expand the global architecture of the suggested system which uses recommendation in the first key activity of the Front End of innovation, in order to assist organizations to improve their ways of generating new ideas.

Keywords: Smart Organization, Innovation, Idea Generation, Recommender Systems, Architecture.

Introduction

The greatest challenge for any organization in today's digital world is how best to manage and respond to change. The answer is innovation. Actually, innovation is the key driver to survive and being competitive. A challenge for organizations continuously embarking on the innovation journey is to be able to repeatedly generate new ideas (Bessant & Von Stamm, 2007). Ideas are a central ingredient of organizational life and ideation is an essential faculty that propels every day management action (Vandenbosch et al., 2006). Our works and researches in improving innovation are focused in the first key activity of the Front End of innovation especially idea generation in order to improve it and gather superior ideas. Idea generation is considered as one of the most crucial step in the early stage of innovation projects, but often given a limited attention (El Haiba et al., 2017). In this respect, the generation stage thus needs to be well-managed and requires well-developed mechanisms for searching and gathering a larger quantity of very high quality ideas. As a first step, a qualitative approach which gives guidelines for a better idea generation was developed. Then, a new system based on recommender systems that allows actors to submit new ideas and further improve them is proposed. Theoretical results indicate that the application of recommender system in this first stage can actually be possible and have different advantages.

The motivation behind this work is to unleash the potential of employees by providing them a platform to both express and store a new idea and recommend them similar ideas with their respective context to combine ideas to form a better one.

The remainder of this article is structured as follows: The next section introduces the concept of smart organization while exploring a brief literature of the organization's evolution. Section 3 defines the idea generation stage, discuss its challenges and presents the qualitative approach developed in order to meet the requirements of smart organizations and ensure the quality improvement of gathered ideas. Section 4 presents recommender systems and explores the architecture of the proposed system. Finally, we draw conclusions and indicate directions for future research in Section 5.

Innovation in Smart Organization

The main purpose of this section is to present an overview of organizational evolution and innovation, explain the concept behind smart organization and discuss innovation in such type of organizations.

An Overview of Organizational Innovation

There is a large, multi-disciplinary and diverse body of academic literature on innovation. Innovations can focus on different dimensions and so have different outcomes such as new products or services (product innovation), but also new production processes (process innovation) and new ways of organizing work (organizational innovation) (Koster et al., 2017). This sub-section focuses on innovation at the organizational level and discusses why innovation is important.

The movement of transformation of organizations is still in progress with various economic developments, since the industrial economy to the economy of knowledge of today. This movement, in the last few years, was carried by two major evolutions: The first one concerns the rapid technological advancements, while the second is related to the new generation of young graduates new to the job market today, called Digital Natives (El Bassiti & Ajhoun, 2014; El Haiba et al., 2014). The table below briefly shown the principle organizational changes.

Table 1: Organizational Comparison

	Industrial age	**Digital age**
Economic environment	Certainty, little change	Uncertainty, highly dynamic
Structure	Hierarchical	Internetworked
Management	Control	Self-organizing
Technology	Task-oriented tools	User-centered tools
People	Individual action	Social participation
Knowledge	Generated by professionals	Generated by users

This transformations actually have lead organizations to be more responsive, to change quickly, adopt new ways for innovation and make in place an organizational innovation strategy in order to increase their chances of survival and prosperity.

Organizational innovation can be defined as the introduction of something new (an idea, product, service, technology, process, and strategy) to an organization (Demircioglu, 2016). The notion "organizational innovation" denotes, in general, a mechanism applied by the organizations to adapt to changing conditions of competition, technological advancement and market expansion by producing newer products, techniques and systems (Razavi & Attarnezhad, 2013). In other words, it's the process that increases the organization capacity to learn and thrive in challenging times. Organizational innovation refers to new ways work can be organized, and accomplished within an organization to encourage and promote competitive advantage. It is also defined as the organizational capability to renovate ideas and

knowledge into new products, services or processes continuously for the benefit its stakeholders (Razavi & Attarnezhad, 2013). That's actually means being innovative.

Innovation is a means of changing an organization, whether as a response to changes in its internal or external environment or as a preemptive action taken to influence an environment (Demircioglu, 2016). Innovation involves a creative climate, learning, knowledge sharing, collaboration and risk taking. Furthermore, the ability of an organization to innovate is a pre-condition for the successful utilization of inventive resources and new technologies. Successful organizations not only respond to their current customer or organizational needs, but also anticipate future trends and develop an idea, product, service, process or tools that allows them to meet future demand rapidly and effectively.

However, building a theory of organizational change and innovation within organizations becomes a critical survival skill when looking at predictions for how we will live, work, and communicate in the next few years.

Smart Organization

Smart organization, as a new organizational form, is actually the result of all transformations identified previously. This concept indeed arose from the need for organizations to respond to the increasingly changing business landscape in dynamic, innovative and smarter ways. The term "smart organization" is therefore used for organizations that are knowledge-driven, internetworked, dynamically adaptive to new organizational forms and practices, learning as well as agile in their ability to create and exploit the opportunities offered by the new economy (Filos & Banahan, 2001).

Wiig (2000) identified intelligent organizations as organizations that act effectively in the present and have the ability to deal effectively with the challenges of the future. It's also defined as an organization replete with technology and people interacting with dynamism and timeliness (Sarlak, 2010). They indeed offers hyper-connectivity to enable new services and increase the effectiveness of collaboration utilizing more intelligent applications and tools for collaborative work, information exchange and holistic development of both product and service engineering. Technologically, it marks the presence of social networks, internet of things, artificial intelligence and big data. Atos (2011) noted that the smart organization is based on three main axes: knowledge development, operations, and communication.

On the basis of these definitions, we can extract the principle components that describe and characterize a smart organization:

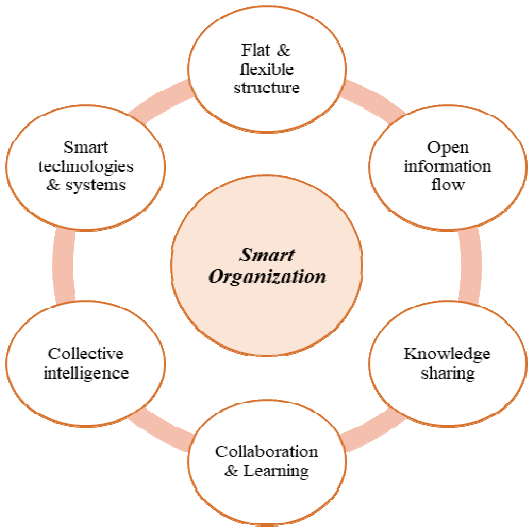


Fig. 1: Smart Organization Components

Talking about innovation in this kind of organizations is obvious but talking about quality of innovation is more relevant and appropriate. In other words and in this context, it is no longer a question to talk about innovation, but being innovative in a smarter way and with a high level of quality. Despite the fact of being smart, innovation is not something that happens overnight. It's important to understand that good innovation is not always random; but structured and well managed. Furthermore organizations who want to develop and maintain high levels of innovation need a consistent and qualitative flow of generated ideas (Elerud-Tryde & Hooge, 2014; Björk & Magnusson, 2009). In our view, the discipline of innovation in smart organizations is knowing how to fill a pipeline with great qualitative ideas and keep it full at all times; as without good ideas genuine innovation is actually hard to reach. Organizations that are able to do this stay fresh and ahead of their competition. In this article, we are addressing innovation in its idea generation stage as one of the most important step of this process.

Toward A Qualitative Approach to Manage Ideation

The main purpose of this section is to define the idea generation stage, discuss the ideation challenges and present the suggested approach developed for idea generation quality improvement.

Idea Generation in Idea Management Systems

With the rapid change of the social-technology-economic climate, organizations are under more pressure than ever to create new and better products and services faster. To do so, they need to cultivate a culture of innovation, and the best way to do that is through idea management. Idea management is an integrated part - the first part - of the innovation process, during which ideas are gathered, evaluated and prioritized in a structured process. By contrast, idea generation represents the first part of this process.

Idea generation, also called ideation, is the creative stage where new ideas are gathered and/or new opportunities identified. It's generally defined as the process of creating ideas which are abstract, concrete, or visual. Idea generation is often recognized as one of the highest leverage point for an organization (Toubia, 2006). Indeed, competitive advantage depends heavily on the ability of organizations to capitalize on their employees' ideas firstly as well as to support and maintain creativity

within their working environments. Being successful in this generation phase however involves the ability to generate and collect new promising ideas with potential for future growth.

In a previous work, we defined Idea generation as "the process in which creative thinking based on knowledge and learning from prior experience is used to individually or collectively produce novel ideas adapted to the context wherein they are spawned" (El Haiba et al., 2017).

Challenges of Idea Generation Stage

The concept of idea generation potential is a critical, but often overlooked, element in the process of innovation. Actually, defining and managing this potential is important because it is most often the source of all innovation within an organization. In practice, this generation stage still faces a number of problems usually related to information overflow and recognizing questionable quality of submissions (Westerski, 2013). Furthermore, most organizations produce a significant number of promising ideas but most of which are often isolated, loosely connected to the business, killed at an early stage and not exploited. Typically, organizations fail to convert them into valuable outcomes (El Haiba et al., 2016). This in our view is due to the risks and uncertainties involved in the innovation process, the lack of structuring of this often under-researched phase and the quality of gathered ideas. Implementing both innovation and quality improvement poses significant managerial, organizational and technical challenges. Hence the idea to set up an approach which supports the concept of quality especially in this first phase of generation and consequently the innovation quality.

A Quality-oriented Idea Generation Approach

The approach was actually developed in response to an increased need to support activities at the generation stage and ensure an improved quality of the first draft of Idea generation stage outputs. In other words, its main purpose is to support the process of gathering ideas from all actors in a structured way, with a goal of producing ideas with higher quality. We strongly believe on the fact that if the quality of each generated ideas initially is higher, the mean quality of the ideas created will certainly be higher (El Haiba et al., 2017). Additionally, the expected aim of this approach is to help organizations to identify, create and develop new ideas for new products and services more effectively and quickly. In this way, we increase the chance of ending up with the most promising idea in the initial stage and thus speed up the innovation process. Our approach is based upon the following model (El Haiba et al., 2017):

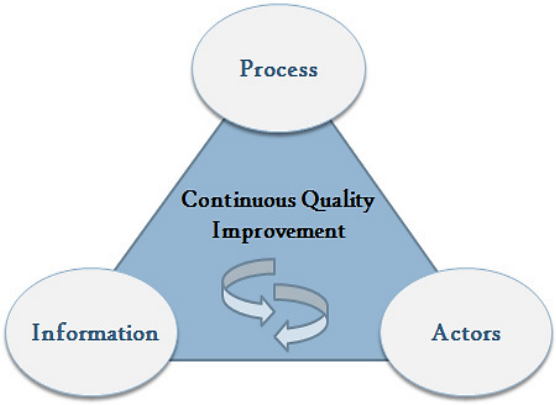


Fig. 2: Model of Quality

The model is centered on quality improvement which is guided and supported at the top by organization structure and processes, its human capital, as well as information and knowledge (El Haiba et al., 2017). This actually implies that all parties should be involved at the same time for the benefit of idea generation stage and of course the innovation process.

Process: The quality of the innovative idea strongly depends on the quality of the process-including strategy, structure, culture, leadership, climate, technology-used to develop and implement the innovation (El Haiba et al., 2017). A well-known example here is Google. Actually, Google has created a perfect organizational climate to work and motivate employees based on a robust strategy and processes that foster innovation (El Haiba et al., 2014). To encourage creative thinking and reach the quality of outcomes, organizations need to rethink their strategy, create a framework for change, a climate that enables the active construction of new ideas, develop a more open culture which respects the free flow of ideas and adopt a creative environment which harnesses the diversity and collective intelligence of all actors.

Actors: Human capital is a "Key ingredient to organizational success and failure" (El Bassiti & Ajhoun, 2013). Its play a crucial role even in smart organizations where technology can predominate. People inside the organization - actors which practice the art of creative thinking - represent the most important source of innovative ideas and are one of an organization's greatest assets. The challenge here is to encourage and harness the creative potential of employees. To meet this, organizations must efficiently tap into the creativity of all of their employees. Not only that, but they must also encourage them to contribute and give them the opportunity to identify, share, try and develop new ideas that will enhance or extend the business. Improvement cannot be enacted without the goodwill and competencies of key people. However, a motivated team composed of engaged and implicated actors with diverse expertise and experiences - cross-functional teams - , can certainly produce innovative and interdisciplinary ideas with higher quality that are helpful in attaining organizational goals (El Haiba et al., 2017).

Information: The very crucial fertilizer for the idea generation stage is information: information about current problems, about organizational strategies and objectives, about clients and markets, about technologies…. (El Haiba et al., 2016). In fact, the common thread running through idea generation activity is knowledge. The ability to find, use, store, share, classify and retrieve the relevant organizational knowledge can act as an important stimulus for the generation of new ideas. Despite recognizing the importance of people, modern information technologies and systems have also a major role to play especially in knowledge memory functions. To fully exploit and utilize all knowledge resources, organizations should develop Integrated Knowledge Networks. It refers to all smart techniques which enable communication, sharing, collaboration, learning and thus productivity.

Through this approach, we can conclude that an organization's innovation potential can be defined as the combination of its human, structural and technological resources. So, managing smart organization and thus the idea generation stage requires managing smart resources: people, information, knowledge, and innovation capability.

Applying Recommender Systems to improve Innovation Performance

Theoretical results of using recommender systems in this context were highly promising (El Haiba et al., 2016), but however should be practically implemented in order to test the impact of this new use on the quantity and the quality of participation. The main purpose of this section is to briefly discuss basic recommender system concepts and present the suggested system.

Recommender Systems

It has been shown through the approach that the generation of new ideas requires well-developed mechanisms for recognizing and selecting information among a wide range of data. This is where recommender systems have particularly a huge advantage.

Recommender systems (RS) or Recommendation systems are software tools and techniques providing suggestions for items to be of use to a user (Ricci et al., 2011). The goal of a recommender system is to generate meaningful recommendations to a collection of users for items or products that might interest them (Melville & Sindhwani, 2010). In sum, RSs were created to guide the user in a personalized way to interesting resources in a large space of possible options and to help users cope with the problem of information overload (Mican et al., 2012). Principally, their purpose is to filter information according to the interest of users.

They are usually classified into the following three main categories depends on their approach to recommendation:

- **Content-Based Filtering:** Recommend items that are similar in content to items the user has liked in the past, or matched to attributes of the user (Melville & Sindhwani, 2010).
- **Collaborative Filtering:** Items are recommended based on the past ratings of users with similar tastes and preferences (Melville & Sindhwani, 2010).
- **Hybrid approach**: These methods combine both collaborative and content based approaches (Adomavicius & Tuzhilin, 2005).

Other types of recommender systems exist; they are classified as a modern and have been introduced to improve the recommendation accuracies:

- **Context-aware:** Suggest recommendations by including contextual information (such as time, location, weather or accompanying persons) that may influence user decisions (Adomavicius & Tuzhilin, 2010).
- **Social Network-Based:** Recommend items by utilizing information in Social Network especially that of social influence (He & Chu, 2010).

Different approaches of recommendation exist. What is certain is that the design and the application of such engines depend on the domain, needs and particular characteristics of the available data.

The proposed Architecture

Successful idea generation is only possible if organizations have a structured idea management system and process in place. Managing ideas falls first and foremost to structuring the way of gathering them. This actually implies having clear guidelines on how employees can submit new ideas and continuously enrich them. The proposed architecture should allow gathering ideas and improving them based on recommended items. In other words, provide suggestions to users in order to stimulate their creativity and give them an inspiration for a new submission and/or eventually improve their ones or existing ones.

The main idea is to preserve and manage innovative ideas. The system will provide a repository to store innovative ideas and also act as a platform to improve their quality by encouraging collaboration with other people. The figure below presents the process.

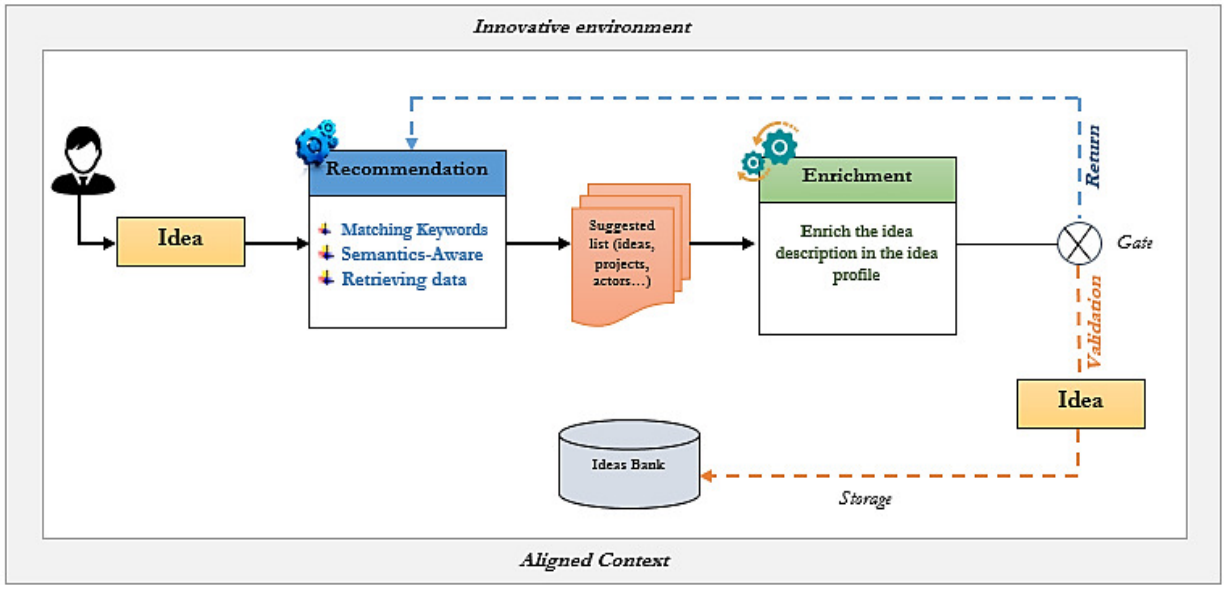


Fig. 3: System Architecture

An overview of the process is as follows:

Input data: The set of ideas generated previously, contextual information related to organization's strategy, goals, and needs.

Idea: After the creation of its profile, the user formulates his idea by filling in the corresponding fields - the idea submission form -. This filled idea profile highlights the basics behind the new Idea.

Recommendation: Once a new idea has been submitted, an initial recommending process is made by the system which presents propositions to actors in order to help them to enrich their ideas. The result of the recommendation process is a list of similar/complementary ideas or projects that can act as an inspiration for further idea improvement and foster collaboration for developing better ideas. The collaboration corner - among employees having similar ideas - is actually involved in the matching of ideas and by providing idea and owner details. Recommendation is made at the base of the keywords and the description of the idea while taking into account elements of the context and using semantic measures.

Enrichment: This process is initially done manually. Indeed and after receiving recommendations, the user will try to enrich his initial idea by taking inspiration from the returned list and/or adapt it according to the current organizational context. Actors can contribute to this by suggesting idea improvements or changes according to their experiences and expertise. This actually involves leaning process – individual and collaborative learning –.

Gate (or decision point): Once the idea is enriched, the user can either receive new recommendations based on the enrichment being made and resume the process or validate his idea. In this case, the idea will be stored in the idea bank.

Output data: A semi-formalized idea stored in the idea bank.

The outcome of our all work will be a system that is a repository of ideas promising innovation.

As a summary, the basic components of the system are:

- ✓ Promote innovation;
- ✓ Support for actors to submit new ideas;
- ✓ Provide a repository to store innovative ideas;
- ✓ Empowering employees having similar ideas to work collaboratively;
- ✓ Ensuring that good ideas will be implemented.

Conclusion

The current paper explain how organizations can capture new innovative ideas. It presents the architecture of a new system designed to express new ideas, store them, and suggest similar ideas (based on recommender systems) to combine them and form a better one. Our objective is to guarantee a continuous flow of new valuable ideas and ensure their continuous development. Actually, the integration of recommendation techniques as a creativity support to generation stage aims to provide people with a seamless experience that enhances their creativity in a natural manner. This in fact spurs idea generation.

This paper has introduced the concept of smart organization and discuss the challenges in its idea generation stage as the first step of the innovation process. In response, a quality-oriented approach was developed based on three principle parties –Process, People and Information –. All three drivers are harmonized and working together to support idea generation capabilities and thus innovation performance. Finally, the paper expand the architecture of a new system designed to implement the defined approach.

Future works will concentrate on research to further refine profiles, modeling the entire idea generation process and define the most appropriate approach of recommendation to adopt and implement. Also we need to identify a specific application domain for the system evaluation as well as the presentation of obtained results. All this of course, fits into the range of our perspectives and future work. Another research work is ongoing to present the detailed design of system modules, system features and the implementation aspect of it.

References

Adomavicius, G. and Tuzhilin, A. (2005), Toward the next generation of recommender systems: A survey of the state-of-the-art and possible extensions. IEEE Transactions on Knowledge and Data Engineering, 17(6), 734-749.

Adomavicius, G., and Tuzhilin, A. (2010), Context-aware recommender systems, In Recommender Systems Handbook: A Complete Guide for Research Scientists and Practitioners.

Atos (2011), White paper: Smart Organizations - Creating Real Business Value from Connections, Content and Collaboration, Atos Origin SA.

Bessant, J. and Von Stamm, B. (2007), Twelve search strategies that could save your organization, London: Advanced Institute for Management Research, Executive Briefing.

Björk, J. and Magnusson, M. (2009), "Where do good innovation ideas come from? Exploring the influence of network connectivity on innovation idea quality", *Journal of Product Innovation Management*, 26(6), 662-670.

Demircioglu, M. A. (2016), Organizational Innovation. In book: Global Encyclopedia of Public Administration, Public Policy, and Governance, 1-5.

El Bassiti, L. and Ajhoun, R. (2013), "Toward an innovation management framework: A life-cycle model with an idea management focus," *International Journal of Innovation, Management and Technology*, 4(6), 551-559.

El Bassiti, L. and Ajhoun, R. (2014), Promises and Challenges with Organization 2.0 Paradigm. *International Journal of Trade, Economics and Finance*, 5(5), 420-428.

El Haiba, M., Elbassiti, L. and Ajhoun, R. (2014), Toward Enterprise 2.0: Opportunities, Weaknesses and Best practices, Proceedings of the Intl. Conf. on Advances In Management, Economics and Social Science (MES), 7-8 June 2014, Rome, Italy, 52-57.

El Haiba, M., Elbassiti, L. and Ajhoun, R. (2016), Can Recommender Systems improve Idea Generation Quality in the Front End of Innovation? Proceedings of the International Conference on Change, Innovation, Informatics and Disruptive Technology (ICCIIDT'16), 11-12 October 2016, London- U.K, 37-50.

El Haiba, M., Elbassiti, L. and Ajhoun, R. (2017), "Idea Management: Idea Generation Stage with a Qualitative Focus", *Journal of Advanced Management Science,* 5(4), 271-278.

Elerud-Tryde, A. and Hooge, S. (2014), "Beyond the generation of ideas: virtual idea campaigns to spur creativity and innovation", Creativity and Innovation Management, 23(3), 290-302.

Filos, E. and Banahan, E. (2001), Towards the smart organization: An emerging organizational paradigm and the contribution of the European RTD programs. *Journal of Intelligent Manufacturing* 12, 101-119.

He, J., and Chu, W. W. (2010), A Social Network-Based Recommender System (SNRS), In: N. Memon, J. J. Xu, D. L. Hicks, H. Chen, (Eds.), Data Mining for Social Network Data, 47-74.

Koster, M., Vos, B. and Schroeder, R. (2017), Management innovation driving sustainable supply management: Process studies in exemplar MNEs. BRQ Business Research Quarterly, 20(4), 204-257.

Melville, P. and Sindhwani, V. (2010), Recommender systems. In Encyclopedia of Machine Learning, 829-838.

Mican, D., Mocean, L. and Tomai, N. (2012), Building a Social Recommender System by Harvesting Social Relationships and Trust Scores Between Users, In W. Abramowicz, J. Domingue, and K. Wecel, editors, Business Information Systems Workshops, Lecture Notes in Business Information Processing, Springer Berlin Heidelberg, 1-12.

Razavi, S. H. and Attarnezhad, O. (2013), Management of Organizational Innovation. *International Journal of Business and Social Science*, 4(1), 226-232.

Ricci, F., Rokach, L., Shapira, B. and Kantor, P.B. (2011), Introduction to Recommender Systems Handbook. Chapter1, 1-35, Springer, Berlin. Retrieved from: http://www.inf.unibz.it/~ricci/papers/intro-rec-sys-handbook.pdf

Sarlak, M. A. (2010), The New Faces of Organizations in the 21st Century: A Management and Business Reference Book, Volume 2, NAISIT Publishers.

Toubia, O. (2006), "Idea generation, creativity, and incentives," Marketing Science, 25(5), 411–425.

Vandenbosch, B., Saatcioglu, A. and Fay, S. (2006), Idea Management: A Systemic View. *Journal of management studies*, 43(2), 259–288.

Westerski, A. (2013), Semantic Technologies in Idea Management Systems: A Model for Interoperability, Linking and Filtering, (Ph.D. thesis). Retrieved from: http://gi2mo.org/files/papers/thesis2012/westerski_phdthesis_lores.pdf

Wiig, K. (2000), The Intelligent Enterprise and Knowledge Management. Knowledge Research Institute, Inc. prepared for UNESCO's Encyclopedia of Life Support Systems.

Critical Success Factors for Quality Implementation in the Manufacturing Industry

Syed Talib Haider, University of Technology, Sydney, Australia syed.t.haider@uts.edu.au

Hiyam Al-Kilidar, University of Technology, Sydney, Australia hiyam.al-kilidar@uts.edu.au

Rene Leveaux, University of Technology, Sydney, Australia rene.leveaux@uts.edu.au

Abstract

Quality directly influences organizational performance in the manufacturing industry. Through an examination of literature, critical success factors that lead to the implementation of six-sigma in the manufacturing industry are identified for organisations of differing sizes: SMEs, large enterprises and general/ unspecified organisations (not specified as either SMEs or Large in literature). It is found that general success factors across organisations (unspecified) include Employee Education/Training, Top Management Commitment, Project Selection, Employee Involvement/Communication, Project Management/Leadership. While for large enterprises the following factors were identified: Project Selection, Alignment with Customer Requirements, Employee Education/Training, Senior Management Commitment, Use of Quality Tools, Visible Cost Saving. The results serve as a guide for a better understanding of the requirements leading to the successful implementation of six-sigma in organizations and where to best direct resources.

Keywords: Quality, Sigma Six, Critical Success Factors

Introduction

Quality is a concept that is defined in various ways. For example it is classically defined as value (Abott, 1955), as conformance to specifications and/or requirements (Gilmore, 1974, Crosby & Free 1979), as fitness for use (Juran 1988) and as meeting and/or exceeding customers' expectations (Gronroos 1982 and Reeves & Bednar 1994). Quality is not a new concept; however, as demonstrated above, all definitions are highly subjective and open to various interpretations.

"Six-sigma" is defined as an assertive strategy for a firm to achieve classical definitions of quality (Harry 1998). The variable σ (sigma) is chiefly associated with variance in statistics; indicating the degree to which a quantity varies from its mean or average value (Pande, Neuman & Cavanagh 2000). When a quantity is within six standard deviations of its mean (three deviations above and three deviations below), it is said to be within the six sigma limits. In manufacturing, the term is used to understand the variability of a manufacturing process used to produce a product.

The importance of quality is stressed when it is linked with firm performance. Research indicates that Total Quality Management (TQM) is linked with positive firm performance (Kaynak 2003; Samson & Terziovski 1999). This is not limited to large-scale organizations as indicated by O'Neli, Sohal and Teng (2016) who concluded that small-scale manufacturing concerns are also positively affected in terms of firm performance when there is high emphasis on quality.

Through a review of literature published over a 20-year period (1996 to 2016), the question of how quality may be implemented in the manufacturing industry was examined to unravel recent advances in the sigma six domain. The aim was to identify critical success factors in implementing quality in the manufacturing industry, that lead to improved performance of manufacturing projects.

Literature Review

A review of literature was conducted to determine previously identified success factors for quality implementation in the manufacturing industry. Three key word descriptors were used as part of the search: “Six Sigma”, “Quality Improvement” and “Manufacturing”. The search was limited to the years 1996 to 2016 and was run through the Scopus database. A total of 87 results were retrieved which were consequently filtered further based on relevance and journal ranking. Only top tier (Q1 and Q2 in SJR rankings) peer reviewed journals were selected. While relevance was determined on the topic of the paper, papers that focused on a specific process, for example, were excluded. A total of 28 research papers were finally analyzed which were based in various countries around the world. The most notable countries represented in this research are Australia, China, India, Mexico, Italy, France, USA and the UK.

Table 1: Relevant factors considered in this work

	INDUSTRY TYPE	TOP MANAGEMENT COMMITMENT	QUALITY AWARENESS	RELATIONSHIP BETWEEN ISO 9000 AND TQM	EMPLOYEE INVOLVEMENT / COMMUNICATION	TIME LENGTH OF QMS AND TQM	EMPLOYEE EDUCATION / TRAINING	INTEGRATION OF SUPPLIERS	PROJECT MANAGEMENT / LEADERSHIP	PROJECT SELECTION	WILLINGNESS TO CHANGE/ CHANGE MANAGEMENT	SUPPORTING INFRASTRUCTURE	VISIBLE COST SAVING	ALIGNMENT WITH BUSINESS STRATEGY	ALIGNMENT WITH CUSTOMER REQUIREMENTS	INTENSITY TO ACHIEVE RESULTS	AVAILABILITY OF DATA	DEPTH OF ANALYSIS	USE OF QUALITY TOOLS
HENDRICKS & KELBAUGH (1998)	Large	•	•		•		•	•	•	•	•	•	•	•			•		
HUA ET AL. (2003)	General/ Unspecified	•	•		•	•	•												
HAHN, DOGANAKSOY & HOERL (2008)	General/ Unspecified	•					•	•		•			•			•		•	•
BANUELAS CORONADO & ANTONY (2002)	General/ Unspecified	•			•		•		•	•	•	•		•	•				•
ANTONY & BANUELAS (2002)	General/ Unspecified	•					•		•	•	•	•		•	•				•
GUO & RAO (2005)	General/ Unspecified				•		•			•		•			•	•	•		
BANUELAS, ANTONY & BRACE (2005)	General/ Unspecified	•			•		•		•	•						•			•
HAHN (2005)	Large				•		•			•					•	•			
BRADY & ALLEN (2006)	General/ Unspecified	•			•		•		•	•	•				•	•			
KWAK & ANBARI (2006)	General/ Unspecified	•					•			•	•								
ANTONY, KUMAR & LABIB (2008)	SME	•			•		•			•		•		•					•
KUMAR & ANTONY (2008A)	SME	•			•		•		•	•	•	•		•	•				•
VAN IWAARDEN ET AL. (2009)	General/ Unspecified	•			•		•		•						•	•			
ANTONY & DESAI (2009)	Large	•					•		•	•	•	•		•	•	•			•

	INDUSTRY TYPE	TOP MANAGEMENT COMMITMENT	QUALITY AWARENESS	RELATIONSHIP BETWEEN ISO 9000 AND TQM	EMPLOYEE INVOLVEMENT / COMMUNICATION	TIME LENGTH OF QMS AND TQM	EMPLOYEE EDUCATION / TRAINING	INTEGRATION OF SUPPLIERS	PROJECT MANAGEMENT / LEADERSHIP	PROJECT SELECTION	WILLINGNESS TO CHANGE/ CHANGE MANAGEMENT	SUPPORTING INFRASTRUCTURE	VISIBLE COST SAVING	ALIGNMENT WITH BUSINESS STRATEGY	ALIGNMENT WITH CUSTOMER REQUIREMENTS	INTENSITY TO ACHIEVE RESULTS	AVAILABILITY OF DATA	DEPTH OF ANALYSIS	USE OF QUALITY TOOLS
GRAY & ANANTATMULA (2009)	General/ Unspecified	•			•		•		•						•	•			
KUMAR, ANTONY & DOUGLAS (2009)	SME	•			•		•			•	•	•		•					
ZU, ROBBINS & FREDENDALL (2010)	General/ Unspecified	•			•		•		•							•			
TRAĈ & LYÓCSA (2010)	General/ Unspecified	•					•		•	•	•	•		•	•				•
BRUN (2011)	General/ Unspecified	•			•		•		•	•	•	•		•					•
MEHRJERDI (2011)	General/ Unspecified	•			•		•		•	•						•			•
ANTONY, GUO & CHILDE (2012A)	Large	•							•	•	•		•	•	•				•
VAN DYK & PRETORIUS (2014)	General/ Unspecified	•	•		•		•						•		•		•	•	•
DOUGLAS, DOUGLAS & DOHENG (2015)	Large	•					•						•		•				•
GIANNETTI & RANSING (2016)	General/ Unspecified			•			•						•		•		•	•	•
NOUREL FATH, ALDOWAISAN & HASSAN (2016)	Large									•			•		•		•	•	•
SHOKRI, WARING & NARHANI (2016)	SME	•	•		•		•				•			•			•		
TLAPA ET AL. (2016)	General/ Unspecified	•							•	•									

The identified factors were further divided by the size of organization into three categories:

1. Large Enterprises – organizations with an employee count in excess of 199 employees
2. SMEs – organizations with an employee count of less than 200 employees.
3. General / unspecified – organisation size was NOT specifically mentioned in research.

The size of companies is based on the number of employees according to Australian Bureau of Statistics. Any company with less than 200 employees is regarded as an SME and any company with 200 employees or more is classified as a large enterprise (ABS 2016).

The following hypothesis was tested:

H1. Similar critical success factors are shared by SMEs and large enterprises.

Figure 1 below illustrates the identified success factors derived from an analysis of the literature reviewed for the three categories of organization sizes.

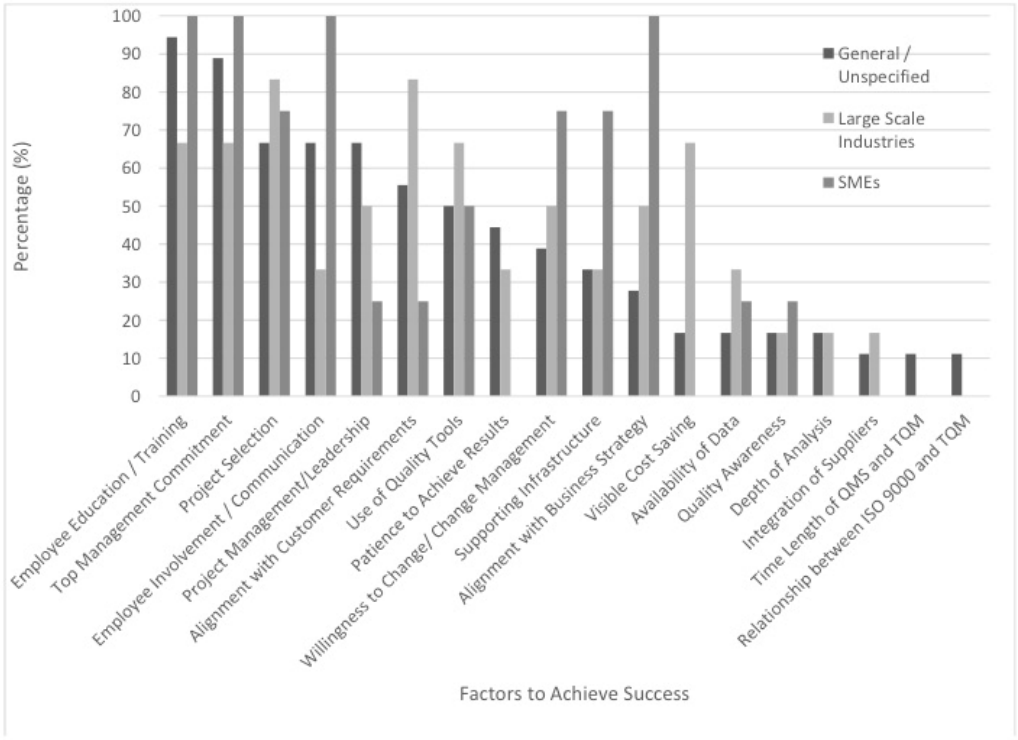


Figure 1: Analysis of literature for all industries

The percentages shown in Figure 1were calculated by simply dividing the number of times a factor has appeared for a particular industry by the number of papers that have been identified for that industry. For example, Employee Education/Training has been identified by 17 articles in the general/unspecified category while the total number of papers that cited that category are 18. This gives a percentage of approximately 94%.

Following the sorting of the data, the hypothesis was examined by analyzing the identified percentages.

Discussion

Critical success factors have been widely used in management studies. They are largely associated with the ability of an organization to strategically perform well. Freund (1988) has stated that these must be:

a. Important to achieving overall goals of the organization,
b. Measurable and controllable by the organization,
c. Relatively few in number,
d. Expressed as things that must be done,
e. Applicable to all companies in the industry with similar objectives and strategies and
f. Hierarchical in nature.

Other researchers, off course, have differed with that view, for example, Bullen & Rockart (1981) identified critical success factors as being specific to a manager which means that managers would be able to identify factors critical to their own performance.

Since six-sigma engulfs an entire organization as explained by Hendricks & Kelbaugh (1998), the first view is more relevant to this study; i.e. identifying critical success factors that define an organization's overall strategy.

Having said that, it is important to understand what methods have been used to determine these factors and what has been the effectiveness of those methods. Leidecker & Bruno (1984) recognized the following six methods of identifying factors that are critical to an organization's success:

a. Environmental analysis,
b. Analysis of industry structure,
c. Industry/business experts,
d. Analysis of competition,
e. Analysis of dominant firm in the industry, and
f. Company assessment and PIMS (profit impact of market strategy) results.

While this seems to be an exhaustive process, it can be made a lot easier simply by conducting two to three interview sessions of a company's top executives (Rockart 1978). This helps in determining where management's attention needs to be directed, and limiting the amount of data required to develop measures for the critical success factors.

As with other factors that are necessary for organizational success, it was pointed out earlier that quality improvement has been positively linked to firm performance (Kaynak 2003; Samson & Terziovski 1999). One of the most successful adaptations of quality improvement practices has been by General Electric and Motorola who managed to save the respective organizations billions of dollars (Hendricks & Kelbaugh 1998). Some might argue that Motorola has not done too well since then, however, that had very little to do with their success with six-sigma. Instead Motorola's demise as the first choice mobile phone was a result of other strategic decisions.

Figure 1 classifies success factors in the literature. The more prolific ones are described below:

Employee Education and Training

Wiley (1997) identified that one of the major motivators for employee performance is when employees perform tasks that encourage growth. Coupled with top management commitment, when managers communicate the importance of a particular training to the organization, employees show more willing to learn and do better (Tsai & Tai 2003). It is for this reasons that (Van Dyk & Pretorius 2014) considered Employee Education and Training as critical for the sustainability of a quality improvement initiative within an organization. Researchers, however, remain divided on the type of industry. While Antony & Desai (2009) associate it with large-scale enterprises, Shokri, Waring & Nabhani (2016) associate it with SMEs and Giannetti & Ransing (2016) chose to abstain from identifying the size of the industry.

Top Management Commitment

Successful implementation of six-sigma program leads to improved firm performance (Kaynak 2003; Samson & Terziovski 1999). . One of the requirements of the six-sigma program is that it is implemented throughout the organization. This can be explained by considering Edward Deming's need for constancy of purpose. If top management does not commit to implementing six-sigma within the organization, this will lead to a lack of direction (Gijo & Rao 2005). Various authors have identified the importance of top management commitment through different studies (Antony & Desai 2009; Antony, Kumar & Labib 2008; Hua et al. 2000). However, some have stressed more importance on it than others. This is largely based on industry type. For example, various authors have identified Top Management Commitment as necessary for SMEs (Kumar, Antony & Douglas 2009), some for Large Scale Organisations (Douglas, Douglas & Ochieng 2015; Hendricks & Kelbaugh 1998) while others have considered a mix of industries (small and large) (Gray & Anantatmula 2009; Tlapa et al. 2016).

Project Selection

For an organization to survive, the places where it chooses to invest its resources remain highly critical to its sustainability (Bower 1970). Kumar, et. al (2009) stressed having an important framework within an organization which helps in selecting projects that contribute best towards the effectiveness of the six-sigma program. There are various methods that have been identified through research that help in selecting appropriate projects (Meade & Presley 2002). However, they are beyond the scope of this study.

What is relevant however, is the size of industries this factor is attributable to. Not surprisingly both SMEs (Kumar, Antony & Douglas 2009) and Largescale Enterprises (Hendricks & Kelbaugh 1998) consider it important. A wide array of authors does not associate any size of industry to it while considering it important to the successful implementation of the quality improvement project (Kwak & Anbari 2006; Tkáč & Lyócsa 2010) which suggests its importance across all industries regardless of the size.

Project Management

Projects vary in size and type depending on industry. It is, therefore, important to have good management practices that govern projects (Cooke-Davies 2002). Six-sigma uses a variety of improvement experts, which are differentiated as green belts, black belts, master black belts and project champions. These act as project managers and undertake special training that is specific to six-sigma project management (Linderman et al. 2003). It is for this reason that many researchers have considered project management as a critical part of the quality improvement process. Antony et.al (2007), , for example, evaluated the essential characteristics that are required by these project manages, and, as with other factors that have been discussed so far, researchers concluded that project management is an important part of the quality improvement program regardless of the size of organization. Research conducted regardless of the organizational size consists heavily of those that consider project management a vital part of an organization's quality improvement program (Brady & Allen 2006; Hassan, Marimuthu & Mahinderjit-Singh 2016; Zu, Robbins & Fredendall 2010). Others have attributed its importance for both SMEs (Kumar & Antony 2008) and large enterprises (Hendricks & Kelbaugh 1998).

Alignment with Customer Requirements

"The customer is king and knows it" (Fredericks & Salter II 1998), is among the famous statements that are in circulation today. It is important to conduct a customer value chain analysis because it helps in aligning the organizational goals to the customer (Donaldson, et. al 2006). Since the discussion has is revolving around improving firm performance, a project targeted at quality improvement aimed at improving firm performance must be aligned with customer requirements.

Not surprisingly, virtually every industry size considers alignment with customer requirements as a major factor regarding the success of a quality improvement project. Kumar & Antony (2008) positively associate it with SMEs while Antony & Desai (2009) do so with regards to large enterprises. Others such as Banuelas Coronado & Antony (2002) abstain from associating with any specific size of industry.

Use of Quality Tools

The immediate goal of six-sigma is defect reduction (Raisinghani et al. 2005). As stated in the introduction, one of the definitions of quality is conformance to requirements. For a manufacturing company, six-sigma is often defined as 3.4 rejects per million parts produced (Pande, Neuman & Cavanagh 2000). These reject rates are measured and controlled using various quality tools such as statistical process control, pareto charts, fish bone analysis, house of quality, failure mode and effect analysis, etc. While these tools are an integral part of achieving sig-sigma, implementing them requires specialized knowledge (Antony & Banuelas 2002).

Since these tools are integral to achieving six-sigma, some authors have chosen to completely ignore mentioning them. This can be attributed to the fact that they are so mainstream that they are considered common knowledge. It is like saying "grass is green". Understandably, however, authors for all three categories have identified the use of quality tools as a major success factor.

Willingness to Change (Change Management)

Sometimes resistance to change is the most important factor that derails an idea. Consider the time when computers were first introduced into the workplace. While they were primary designed to ease an employee's workload, their introduction was seen as a threat. It is also sometimes referred to as "clash of the veterans" (Zemke, Raines & Filipczak 2000).

Six-sigma required a cultural shift in General Electric which meant telling 20,000 employees to work in a way that is different to what they have been doing for many years (Hendricks & Kelbaugh 1998). Since this cultural change is extremely necessary, it is no surprise companies that are beginning to grow (SMEs) see it as a very important part of their business (Kumar, Antony & Douglas 2009). Not surprisingly, it has been given importance across the board with studies considering both large enterprises (Antony, Gijo & Childe 2012) and a mix of companies involving both SMEs and large enterprises (Tkáč & Lyócsa 2010).

Supporting Infrastructure

Studies have shown that sustainability of improvement can be challenging. It is necessary for organizations to build a sustaining infrastructure and making improvement a business process (Snee & Hoerl 2003). Since, SMEs are most prone to consider short-term results over long term strategies, authors have stressed heavily on having a sustainable improvement infrastructure in place (Kumar, Antony & Douglas 2009). Not surprisingly, authors who have not associated with any particular industry size or are associated with large enterprises also give it its due importance by recognizing supporting infrastructure as an important success factor for achieving six-sigma (Tkáč & Lyócsa 2010).

Alignment with Business Strategy

Whenever a business enterprise is established, it employs a business model, enabling it to have a unique competitive advantage (Teece 2010). This model is part of the organization's overall strategy; what it aims to achieve and how it plans to get there. Since six-sigma is a holistic approach, its integration into the overall business strategy is termed important. Antony & Banuelas (2002) who state that six-sigma is itself an improvement strategy explain this. It gives the organization a unique competitive advantage as it improves profitability and drives out waste. Others however have cautioned that organizations must not look at it as the sole contributor. Kwak & Anbari (2006) for example, have cautioned that organizations must not look at six-sigma as the universal solution to all business problems. To better understand the principles, they must acknowledge the strengths and weaknesses of the six- sigma

program.

Since SMEs need to find unique niche markets to be successful, it is no surprise that all the authors cited in this review, who have conducted research on SMEs consider it critical to align six-sigma to the overall business strategy (Antony, Kumar & Labib 2008; Kumar & Antony 2008; Kumar, Antony & Douglas 2009; Shokri, Waring & Nabhani 2016). And not surprisingly, it has been favoured by both large enterprises (Hendricks & Kelbaugh 1998) and by authors who choose to be neutral with regards to the size of the industry they conducted research in (Banuelas Coronado & Antony 2002).

Visible Cost Saving

The primary purpose of a business is to maximize shareholder wealth. What better way to do it than reducing the cost it takes to conceive a product? Hahn et al. (1999) seems to agree while presenting numbers from Motorola, General Electric and Allied Signal with reported savings of $940 million, $1.75 billion and $1.5 billion respectively! All three companies embraced the six-sigma methodology and the results are phenomenal by any estimates.

With heightened competition and globalization, companies with a large presence often struggle to find a competitive advantage. When General Electric first incorporated the six-sigma program, the company ended up investing close to a billion dollars. This investment made it possible for a phenomenal increase in profits - three quarters of a billion dollars over the initial investment (Hahn et al. 1999). Not surprisingly, large enterprises that are beginning to enter closely contested markets have to be careful while making investments. While the six- sigma program is time consuming in terms of achieving results in its entirety, it is essential to report some form of visible cost saved in the initial years for the management to seriously consider it (Antony, Gijo & Childe 2012). While SMEs largely seem uninterested, the authors who chose to remain neutral seemed to agree with the importance of visible cost savings (Hahn, Doganaksoy & Hoerl 2000).

It was observed that the list of factors kept increasing with no real correlation between the size of the organization. While some research was directed towards large enterprises, other was directed at specifically SMEs. Some authors, however, chose to remain neutral with little or no emphasis on the size of the organization.

Implications for Various Organizations

A further analysis reveals the importance of these factors by the size of the industry.

General/Unspecified

The top five factors for the general/unspecified category were:

1. Employee Education/Training (94%)
2. Top Management Commitment (89%)
3. Project Selection (67%)
4. Employee Involvement/Communication (67%)
5. Project Management/Leadership (67%)

A further analysis of the factors for the general/unspecified category is illustrated in Figure 2.

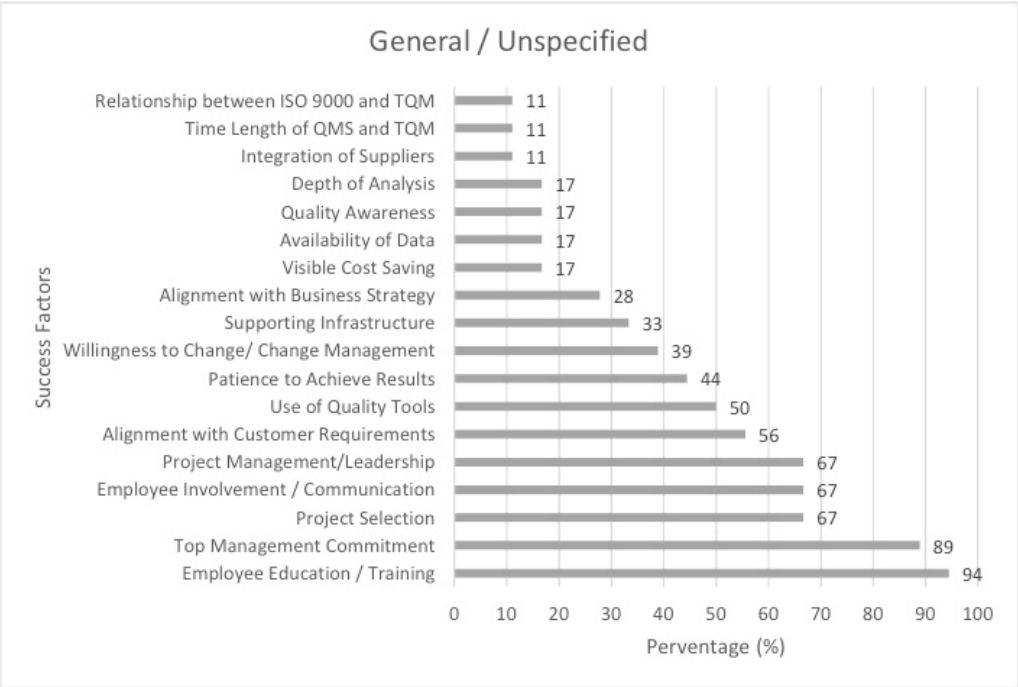


Figure 2 : Analysis of general/unspecified industries

Considering the number of papers that have been cited for general/unspecified industries is substantial, the percentages are also quite meaningful. A clear prioritization can be seen.

Large Enterprises

A similar analysis reveals the following top six factors for large enterprises:

1. Project Selection (83%)
2. Alignment with Customer Requirements (83%)
3. Employee Education/Training (67%)
4. Senior Management Commitment (67%)
5. Use of Quality Tools (67%)
6. Visible Cost Saving (67%)

Figure 3 illustrates the analysis.

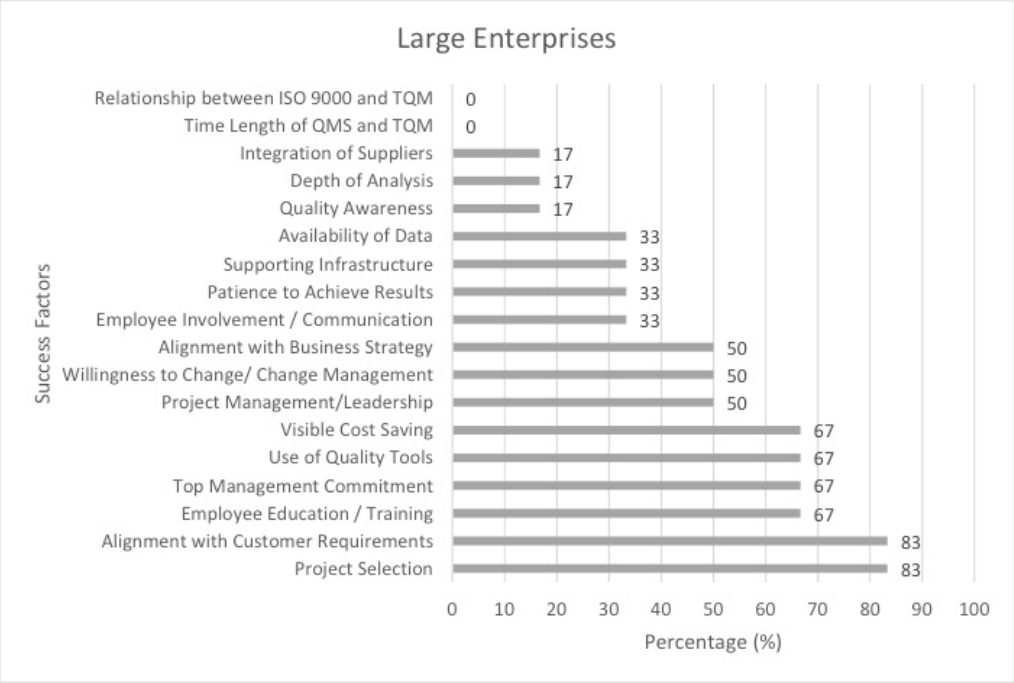


Figure 3 : Percentage analysis for Large Enterprises

Small and Medium Enterprises

Due to the lower citing of SMEs in the reviewed works, many of the factors resulted with equal results, with the leading seven being:

1. Employee Education/Training (100%)
2. Senior Management Commitment (100%)
3. Employee Involvement/Communication (100%)
4. Alignment with Business Strategy (100%)
5. Project Selection (75%)
6. Willingness to Change (75%)
7. Supporting Infrastructure (75%)

Figure 4 illustrates the analysis

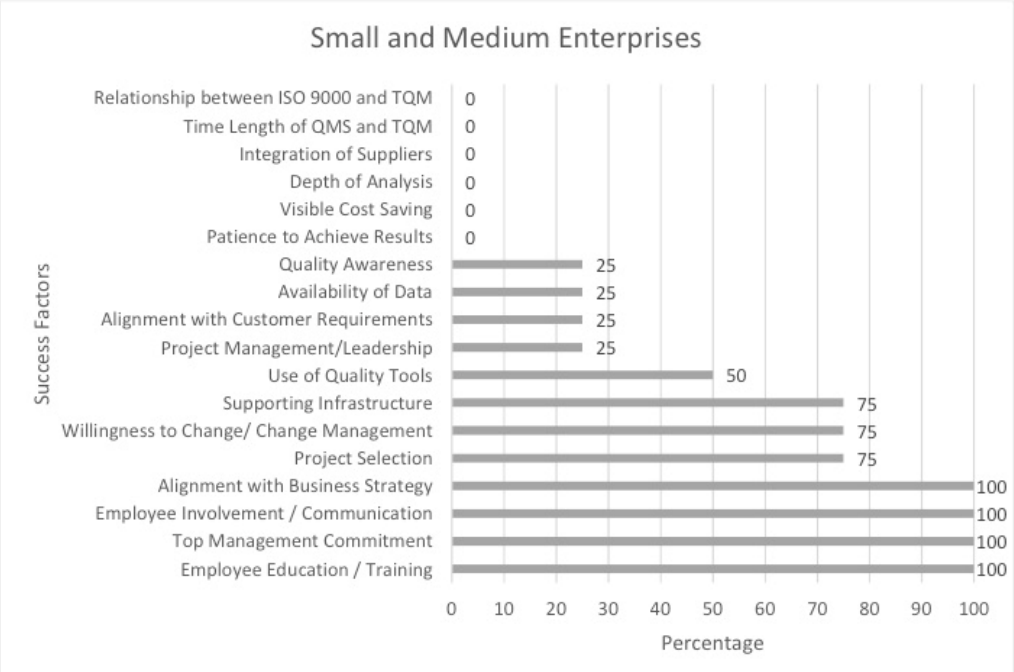


Figure 4: Percentage Analysis for SMEs

As with large enterprises, a similar problem exists with SMEs. Due to lack of available research in the area, it is very difficult to draw highly meaningful conclusions. However, it does give some indication about the priorities of SMEs in the manufacturing sector.

Conclusion

A total of 28 research papers from various countries were analyzed. 18 papers were related to the general/unspecified category, while 6 were associated with large enterprises and only 4 were related to SMEs.

The challenge of assessing the hypothesis was the number of papers that were included for SMEs and large enterprises in this study (four and six respectively). This is too small to draw significant and meaningful conclusions. However, all factors that are considered important by SMEs were also considered important by large enterprises. While some factors identified by large enterprises to be important were not even considered by SMEs. This could be attributed to the lack of available research specifically targeting large or SMEs.

While this study is by no means comprehensive, it does show that six-sigma can be implemented in organizations regardless of their size. It also shows the lack of available research differentiating emphasis on organisation size. As has been demonstrated, the dynamics of SMEs and Large Enterprises are quite different. With better research, even more conclusions that are meaningful may be achieved.

Future work

Through this review, it is identified that further research is required for SMEs as SMEs form a vital component of a country's economy. While this work provides a guide for a better understanding of where resources should be directed, a deeper understanding of the factors critical to the success of the six-sigma program further research is necessary.

References

ABS 2016, 8165.0 - Counts of Australian Businesses, including Entries and Exits, Jun 2011 to Jun 2015, viewed 16/10/16, http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/8165.0Main+Features1Jun%202011%20to%20Jun%202015?OpenDocument

Antony, J. & Banuelas, R. 2002, 'Key ingredients for the effective implementation of Six Sigma program', Measuring business excellence, vol. 6, no. 4, pp. 20-7.

Antony, J. & Desai, D.A. 2009, 'Assessing the status of Six Sigma implementation in the Indian industry: results from an exploratory empirical study', Management Research News, vol. 32, no. 5, pp. 413-23.

Antony, J., Douglas, A. & Antony, F.J. 2007, 'Determining the essential characteristics of Six Sigma Black Belts: Results from a pilot study in UK manufacturing companies', TQM Magazine, vol. 19, no. 3, pp. 274-81.

Antony, J., Gijo, E.V. & Childe, S.J. 2012, 'Case study in Six Sigma methodology: Manufacturing quality improvement and guidance for managers', Production Planning and Control, vol. 23, no. 8, pp. 624-40.

Antony, J., Kumar, M. & Labib, A. 2008, 'Gearing Six Sigma into UK manufacturing SMEs: results from a pilot study', Journal of the Operational Research Society, vol. 59, no. 4, pp. 482-93.

Banuelas Coronado, R. & Antony, J. 2002, 'Critical success factors for the successful implementation of six sigma projects in organisations', The TQM magazine, vol. 14, no. 2, pp. 92-9.

Banuelas, R., Antony, J. & Brace, M. 2005, 'An application of Six Sigma to reduce waste', Quality and Reliability Engineering International, vol. 21, no. 6, pp. 553-70.

Bower, J.L. 1970, 'Managing the resource allocation process: A study of corporate planning and investment'.

Brady, J.E. & Allen, T.T. 2006, 'Six Sigma literature: a review and agenda for future research', Quality and reliability engineering International, vol. 22, no. 3, pp. 335-67.

Bullen, C.V. & Rockart, J.F. 1981, 'A primer on critical success factors'. Cambridge, MA, Center for Information Systems Research, Massachusetts Institute of Technology, Massachusetts (1981)

Cooke-Davies, T. 2002, 'The “real” success factors on projects', International journal of project management, vol. 20, no. 3, pp. 185-90.

Crosby, P.B. & Free, Q.I. 1979, 'The art of making quality certain', New York: New American Library, vol. 17. Donaldson, K.M., Ishii, K. & Sheppard, S.D. 2006, 'Customer value chain analysis', Research in Engineering Design, vol. 16, no. 4, pp. 174-83.

Douglas, A., Douglas, J. & Ochieng, J. 2015, 'Lean Six Sigma implementation in East Africa: Findings from a pilot study', TQM Journal, vol. 27, no. 6, pp. 772-80.

Fredericks, J.O. & Salter II, J.M. 1998, 'What does your customer really want?', Quality Progress, vol. 31, no. 1, p. 63.

Freund, Y.P. 1988, 'Critical success factors', Planning Review, vol. 16, no. 4, pp. 20-3.

Giannetti, C. & Ransing, R.S. 2016, 'Risk based uncertainty quantification to improve robustness of manufacturing operations', Computers & Industrial Engineering, vol. 101, pp. 70-80.

Gijo, E. & Rao, T.S. 2005, 'Six Sigma implementation–hurdles and more hurdles', Total Quality Management & Business Excellence, vol. 16, no. 6, pp. 721-5.

Gilmore, H.L. 1974, 'Product conformance cost', Quality progress, vol. 7, no. 5, pp. 16-9.

Gray, J. & Anantatmula, V. 2009, 'Managing Six Sigma projects through the integration of Six Sigma and project management processes', International journal of six sigma and competitive advantage, vol. 5, no. 2, pp. 127-43.

Gronroos, C. 1982, 'Strategic management and marketing in the service', Boston: Management and Marketing. Hahn, G.J. 2005, 'Six Sigma: 20 key lessons learned', Quality and Reliability Engineering International, vol. 21, no. 3, pp. 225-33.

Hahn, G.J., Doganaksoy, N. & Hoerl, R. 2000, 'The evolution of six sigma', Quality Engineering, vol. 12, no. 3, pp. 317-26.

Hahn, G.J., Hill, W.J., Hoerl, R.W. & Zinkgraf, S.A. 1999, 'The impact of Six Sigma improvement—a glimpse into the future of statistics', The American Statistician, vol. 53, no. 3, pp. 208-15.

Harry, M.J. 1998, 'Six Sigma: a breakthrough strategy for profitability', Quality progress, vol. 31, no. 5, p. 60.

Hassan, R., Marimuthu, M. & Mahinderjit-Singh, M. 2016, 'Application of Six-Sigma for process improvement in manufacturing industries: A case study', International Business Management, vol. 10, no. 5, pp. 676- 91.

Hendricks, C.A. & Kelbaugh, R.L. 1998, 'Implementing six sigma at GE', The Journal for Quality and Participation, vol. 21, no. 4, p. 48.

Hua, H., Chin, K., Sun, H. & Xu, Y. 2000, 'An empirical study on quality management practices in Shanghai manufacturing industries', Total quality management, vol. 11, no. 8, pp. 1111-22.

Juran, J.M. 1988, 'The quality function', JJM & FM Gryna (Eds.), Juran's Quality Control Handbook, pp. 2.1-2.13.

Kaynak, H. 2003, 'The relationship between total quality management practices and their effects on firm performance', Journal of operations management, vol. 21, no. 4, pp. 405-35.

Kumar, M. & Antony, J. 2008, 'Comparing the quality management practices in UK SMEs', Industrial Management and Data Systems, vol. 108, no. 9, pp. 1153-66.

Kumar, M., Antony, J. & Douglas, A. 2009, 'Does size matter for Six Sigma implementation? Findings from the survey in UK SMEs', The TQM journal, vol. 21, no. 6, pp. 623-35.

Kumar, M., Antony, J. & Rae Cho, B. 2009, 'Project selection and its impact on the successful deployment of Six Sigma', Business Process Management Journal, vol. 15, no. 5, pp. 669-86.

Kwak, Y.H. & Anbari, F.T. 2006, 'Benefits, obstacles, and future of six sigma approach', Technovation, vol. 26, no. 5, pp. 708-15.

Leidecker, J.K. & Bruno, A.V. 1984, 'Identifying and using critical success factors', Long range planning, vol. 17, no. 1, pp. 23-32.

Linderman, K., Schroeder, R.G., Zaheer, S. & Choo, A.S. 2003, 'Six Sigma: a goal-theoretic perspective', Journal of Operations management, vol. 21, no. 2, pp. 193-203.

Meade, L.M. & Presley, A. 2002, 'R&D project selection using the analytic network process', IEEE transactions on engineering management, vol. 49, no. 1, pp. 59-66.

Pande, P.S., Neuman, R.P. & Cavanagh, R.R. 2000, The six sigma way, McGraw-Hill.

Raisinghani, M.S., Ette, H., Pierce, R., Cannon, G. & Daripaly, P. 2005, 'Six Sigma: concepts, tools, and applications', Industrial management & Data systems, vol. 105, no. 4, pp. 491-505.

Reeves, C.A. & Bednar, D.A. 1994, 'Defining quality: alternatives and implications', Academy of management Review, vol. 19, no. 3, pp. 419-45.

Rockart, J.F. 1978, 'Chief executives define their own data needs', Harvard business review, vol. 57, no. 2, pp. 81-93.

Samson, D. & Terziovski, M. 1999, 'The relationship between total quality management practices and operational performance', Journal of operations management, vol. 17, no. 4, pp. 393-409.

Shokri, A., Waring, T.S. & Nabhani, F. 2016, 'Investigating the readiness of people in manufacturing SMEs to embark on Lean Six Sigma projects: An empirical study in the German manufacturing sector', International Journal of Operations and Production Management, vol. 36, no. 8, pp. 850-78.

Snee, R.D. & Hoerl, R.W. 2003, Leading Six Sigma: a step-by-step guide based on experience with GE and other Six Sigma companies, Ft Press.

Teece, D.J. 2010, 'Business models, business strategy and innovation', Long range planning, vol. 43, no. 2, pp. 172-94.

Tkáč, M. & Lyócsa, Š. 2010, 'On the evaluation of Six Sigma projects', Quality and reliability engineering international, vol. 26, no. 1, pp. 115-24.

Tlapa, D., Limon, J., García-Alcaraz, J.L., Baez, Y. & Sánchez, C. 2016, 'Six Sigma enablers in Mexican manufacturing companies: a proposed model', Industrial Management & Data Systems, vol. 116, no. 5, pp. 926-59.

Tsai, W.-C. & Tai, W.-T. 2003, 'Perceived importance as a mediator of the relationship between training assignment and training motivation', Personnel Review, vol. 32, no. 2, pp. 151-63.

Van Dyk, D.J. & Pretorius, L. 2014, 'A systems thinking approach to the sustainability of quality improvement programmes', South African Journal of Industrial Engineering, vol. 25, no. 1, pp. 71-84.

Wiley, C. 1997, 'What motivates employees according to over 40 years of motivation surveys', International Journal of Manpower, vol. 18, no. 3, pp. 263-80.

Zemke, R., Raines, C. & Filipczak, B. 2000, Generations at work: Managing the clash of Veterans, Boomers, Xers, and Nexters in your workplace, Amacom New York, NY.

Zu, X., Robbins, T.L. & Fredendall, L.D. 2010, 'Mapping the critical links between organizational culture and TQM/Six Sigma practices', International journal of production economics, vol. 123, no. 1, pp. 86-106.

Transitioning the Classroom: The Shift towards Blended and Flipped Learning

Sandra Gallagher, Charles Sturt University, sgallagher@csu.edu.au

Alan Sixsmith, University of Technology Sydney, Australia alan.sixsmith@uts.edu.au

Rene Leveaux, University of Technology Sydney, Australia rene.leveaux@uts.edu.au

Helen Simpson, University of Wollongong, Australia helensim@uow.edu.au

Abstract

The predominant focus of eLearning information systems remains distance delivery and the blending of this distance education within the classroom. Comparatively, little work has been (or is being) undertaken to advance the use of technologies (eLearning) within the 'classroom only' situation as eLearning is not solely for distance education. Designing effective technologically founded, educational learning that addresses the specific needs of class-based tertiary teaching is the main contribution of this article. Having online content that actively engages students both inside and outside the classroom can only occur following the critical evaluation of the modes of content selection and delivery. Furthermore, perfecting facilitator choices into the future about what technology and content used in which capacity, including whether it is online or face-to-face, would inevitably be valuable to both the learner and the teacher.

Keywords eLearning, Blended Learning, Flipped Learning

Introduction

In 1997, before the term eLearning became common place, learning guru Elliott Masie stated, "Online Learning is the use of network technology to design, deliver, select, administer, and extend learning" (Masie, 1997). In his earlier work undertaken in 1998, Cross (2004 p. 104) noted, "eLearning is learning on the Internet over time, the convergence of learning and networks. eLearning is a vision of what corporate training can become. eLearning is to traditional training as eBusiness is to business usual". Then in 1999, Cisco expanded, "eLearning is Internet-enabled learning. Components can include content delivery in multiple formats, management of the learning experience, and a networked community of learners, content developers and experts" (Cross, 2004 p. 105). Research investigating the integration class-based technologies dates back more than 25 years, with the term 'eLearning' born from this integration (Papert, 1980).

Technology within the classroom[1] is not a new concept. However, it has gained momentum over the past few years, with the advancement of technologies like smart phones and tablets. Smart phones and other devices have turned education into a much more versatile and flexible environment (Hajhashemi, Caltabiano, & Anderson, 2017). Educators, many of whom are referred to as "digital immigrants" by Prensky (2001), have had to change the way they teach and in doing so have altered the depth of education that is offered to their students. Many teachers already have the background in pedagogical design to ensure the teaching methods they use align with lesson content, however, the introduction of technology has meant they must now reassess those designs to ensure the elimination of emergent inconsistencies with a digital framework (Hajhashemi et al., 2017).

Recently there has been a shift in tertiary education towards flipped learning. A conventional definition for flipped learning is "work is given to the students to complete outside of the classroom

[1] Classroom in this study refers to on-campus teaching facilities at the tertiary level

so that they can prepare themselves for their next lesson" (Bishop & Verleger, 2013). At face value this differs little from past practices where academics handed out the entire curriculum in the first class and students would subsequently complete set components for the next class; a process dubbed 'homework'. However the fundamental difference between flipped learning and homework is that previously the teacher would mark students' completed homework to gauge individual comprehension, whereas flipped learning takes content to the next level; turning class time into discussions based on the understandings students develop during the prescribed pre-work (Davies, Dean, & Ball, 2013).

Flipped learning is beneficial to students' knowledge acquisition and studying experience. Firstly, because the dialogue and strong teacher-student connection in the classroom empowers students (Lantis, Killie & Krain 2010). Secondly, in flipped learning, there is the possibility to demonstrate the application of content within a real-time context. Even where students neglect to complete the pre-work, they are not disadvantaged as the focus of the first part of the lesson is on the 'flipped content'. This is particularly important as many academics would argue that 'most' students neglect the pre-work (Albert & Beatty, 2014). Even so, this paper will demonstrate that the students do become actively involved in the flipped component of the course if the material is delivered attractively.

Many students only do the work required that is associated with marks (Albert & Beatty, 2014). So how can academics ensure their students will complete class pre-work? One way is through interactivity; the process whereby educators and students work together and influence each other. This process is achieved with the students where the content is delivered correctly in both modes (flipped and in the classroom). Two ideas that can help achieve interactivity are:

1. *Giving clear and concise instructions, and*
2. *Making sure that the work students are completing is relevant to the subject.*

Although the above two items are common sense notions, they rarely occur when academics flip their classrooms. Moreover, some educators believe that just recording their lectures and putting them online is 'flipping' the classroom. When introducing flipped learning, academics need to source appropriate information and share this information in a simple to understand format that includes formative questions that enable students to test their understanding.

For students who remain unable to grasp concepts delivered in the flipped learning mode, the ability to ask questions in subsequent lessons and listen to the teacher discuss concepts with them and other students is imperative. Importantly, these classroom experiences also allow students with understanding to help those without, recreating the classroom as a conduit for 'peer learning' and providing teachers the opportunity to validate their content and determine if amendments are required.

Trial and error is a straightforward, simple way for academics to learn about the flipped classroom. Initially this could be as simple as taking a flipped eLearning information system and using it with traditional face-to-face teaching to enable effective collaboration in the classroom learning (Leveaux, Gallagher, & Sixsmith, 2016). Nevertheless the incorporation of flipped learning into the classroom should be a carefully considered decision. It is not as simple as just giving students work to do at home and hoping that they will learn. For this reason the process needs to be prudently planned by reflecting on the following questions:

- What content should be provided for students to learn outside of the classroom?
- How is that content relevant to the activities students will complete when they walk through the classroom door?
- How does one blend the best of face-to-face teaching with online content?

All three are considerations facing current academics trying to give the students an authentic learning experience. Other factors which are also fundamental to blended learning include:

- The type of information system to be used
- The style of the content
- The service delivery of the content and
- The engagement of the students.

The format of this paper commences with literature in the area of blended learning, educational design concepts and eLearning. This is then followed by the context of the research, discussion on transitioning with flipped and blended learning, conclusion and future work.

Blended Learning: Utilises Learning Resources with Traditional Face-to-Face Methods

Blended Learning (BL) is a combination of both online and face-to-face modes of learning (Abdellatief et al 2011; Holsapple & Lee-Post, 2006; Leveaux, Gallagher, & Sixsmith, 2016). According to Rauch and Crawford (2012), BL offers the best of both delivery systems (Rauch & Crawford 2012). A number of positive attributes have been linked to BL. These include an increase in students' perception of their self-value (Cox & Orehovec 2007), a reduction in student withdrawals from courses (Tinto 1993) and an increase in student satisfaction with learning and GPAs (Astin 1993). One of the reasons may be its incorporation of eLearning and information systems.

A diverse range of articles reflects the nature of eLearning and information systems (Al-Qahtani & Higgins, 2013; Anohah, Oyelere & Suhonen 2017; Davies et al., 2013). The most notable topics of discussion regarding eLearning information systems (ELIS) over the past decade cover the areas of content, delivery methods, quality of delivery, pedagogy and design. Situated learning (Lave, 1996) or the creation of meaning through every day learning experiences is a fundamental element in engaging students. This is because participating in familiar activities that maximize learning allows students to grasp not only the intended outcomes but also the underlying context of an activity. Learning then becomes an experience and provides students with the knowledge to perform efficiently (Gallagher & Sixsmith, 2014).

Recently pedagogy has shifted "away from an exclusively individualistic, psychological view on learning toward a perspective of learning involving participation in social interactions within the context of a community" (Gallagher & Sixsmith, 2014). This is because when students enjoy a class, they are more likely to achieve better outcomes, keep their attention levels high and thereby improve understanding of the content delivered. Engaging students in the learning process is particularly relevant when undertaking subjects that provide content not typically implicit to their field of study.

ELIS services are a crucial, strategic, organisational asset and therefore appropriate levels of resources to support, deliver and manage these systems are required. Evaluating blended learning is not easy as ELIS are only one part of what is occurring in the classroom and are often hidden. For this reason if IT students are asked about in class activities, they typically state that there are no IT components in their classroom. Such comments make it hard to relate the quality of digital learning activities undertaken by students. Moreover, if one focuses on an overall methodology asking if the approach of an ELIS and classroom paper-based activities complement each other, student and instructor perceptions may differ.

Regardless, an important goal of ELIS is to deliver instructions that produce equal or better outcomes than face-to-face learning systems (Eom, Ashill, Arbaugh & Stapelton 2012)]. Moreover, facilitators require an understanding of relationships between eLearning systems quality, the quality of information produced by eLearning systems and eLearning outcomes. Educational technology has grown to be ruled by an (often-abstracted) interest in the processes of how people learn with digital technology (Eom et al. 2012; Selwyn, 2010). Integrating blended learning into the classroom through the utilisation of an ELIS that encourages students to undertake pre-work

then attend class, provides the advantage of extended discussion time in class and with that the expansion of higher order learning experiences. Experiences that facilitate the grasping of key concepts, increased interaction and extended access to hands-on activities (Howet & Pegrum, 2015; Mar, 2005).

Educational Design Concepts

Education is a result of instruction and learning. Educational, instructional and learning design are interchangeable depending on the environment. Many universities, such as the University of Technology Sydney (UTS), have established that rolling out instructional design concepts is necessary, however they have not known how to approach this challenge. Instructional design changes at UTS have included (1) putting some introductions to classes online, via video, (2) limiting the length of class time to a maximum of three hours face-to-face and (3) ensuring that students were encouraged to experience the best of online and face-to-face learning.

In the years prior to the introduction of in-classroom technology, teachers relied on various modes of education delivery with content they created using well-known textbooks or using other teachers' hand written or typed notes. The introduction of technology into the classroom has led to a fundamental shift in education, which many universities are finding difficult. Educators need to step back and look at the learning from a student's view (Beetham & Sharpe, 2007).

Technology should support learning not drive it. Knowing how much technology to incorporate into the classroom is a balancing act. Many teachers overpower learners with so much technology that learning becomes irrelevant. Students become overwhelmed. This leads to complacency in their learning and in turn negative feedback to teachers about the learning process (Davies et al., 2013). Finding a happy medium is not straightforward as students need to have access to technology via a Learning Management System (LMS), which they access via a digital device, such as a smart phone, laptop or computer. Then teachers need to incorporate the appropriate level of technology, which could be a voting system, an online quiz or a video into their classroom. However this should be limited to ensure no shift in the focus of the educational outcomes from students to teachers (Beetham & Sharpe, 2007).

E-Learning

eLearning has evolved over the years and currently appears to be at the forefront of many institutions across the globe despite issues with its integration into classrooms. Many educational and industry based learning organisations have fast tracked eLearning's introduction and incorporated technology without much consideration (Deakin, 2016). With little effort, one can search on the Internet and find many hasty online content delivery models. For instance uploading a webinar[2] without providing the context for watching and hoping that students will view and learn from it is not eLearning. It is simply the provision of a seminar in an online format.

Due to the ease of access, Massive Online Open Courses (MOOCs) are widely used by many institutions to deliver content. However these courses are mainly designed for distance education not requiring interaction(s) with a teacher, and lend themselves primarily to students learning at their own pace. Flipped or blended learning involves certain interactions between students and students or students and teachers, which, in itself, does not align the concept of MOOCs.

The convenience of eLearning systems appears to have overridden the learning design component of synthesising different learning and teaching styles commonly applied in the delivery of courses. Before technology was introduced within the educational sector, educators used frameworks or taxonomies to help them make sense of the content for students; the most common Blooms

[2] Webinar refers to a recorded online session, either delivered synchronous or asynchronous

Taxonomy (Bloom, 1956) remains in use today. Bloom's taxonomy has been applied in education since 1956 when Benjamin Bloom wanted to make logic of the learning of students.

Another teaching and learning framework that has evolved with the introduction of technology in the classroom is Kolb's Framework (Kolb, 1984). Much of Kolb's theory is concerned with the learner's internal cognitive processes. Within this schema "learning is the process whereby knowledge is created through the transformation of experience" (Kolb, 1984, p. 38). Both Kolb's (1984) and Bloom's (1956) frameworks continued to be popular and have been utilised by teachers in classroom delivery for many years. Regardless, with the introduction of technology in the classroom, teachers need to understand what eLearning means with regards to individual teaching styles and how this integrates with their institutional teaching and learning strategies in order to enable seamless integration of the ELIS into the classroom.

With this in mind it would be beneficial for institutions to re-approach their teaching and learning strategy and instead of singularly pushing for a top-down approach, requiring teachers incorporate technology into each course, they utilise the strategy of dual top-down, bottom-up approaches. A starting point worth considering could include management working in consultation with a few teachers using one piece of technology. This is because consultation and starting simply encourages teachers to incorporate technology in their teaching (Mishra & Koehler, 2006). Furthermore, giving thought to how and which technology to use enables a greater efficiency when rolling out teaching technology across the institution. Top-down approaches should always be directed in such a fashion that does not increase pressure on the educators and where the reasoning behind the integration makes sense to the educational outcome for all those involved.

Many institutions erroneously remain too general and deliver eLearning strategy in an ad-hoc manner, creating confusion and panic amongst teachers (Hill, Jones, & Schilling, 2014). Mishra & Koehler (2006) highlight that teaching is a complex cognitive skill that occurs in an ill-structured, dynamic environment (Mishra & Koehler, 2006). Introducing technology in an ad-hoc manner brings about misunderstandings regarding what 'real' teaching and learning strategy is. The flow on effect is that some teachers upload content onto the LMS with no prior fore thought. As already argued, taking classroom based learning and uploading it onto an LMS does not constitute eLearning, rather it is using the LMS as a document content library; a process with no pedagogical reasoning behind it. Students simply become receivers of paper-based learning that has been digitised. This form of teacher complacency occurs as a result of a singular top-down approach due to a complete misunderstanding of technology use within education (Guri-Rosenblit, 2005; Hill et al., 2014).

Understanding the different meanings of eLearning and what can be done to implement technology within the classroom, such as choosing one or two outcomes rather than all, is a great starting point for institutions to discuss with internal learning designers. This process should start by understanding eLearning typologies. Numerous typologies of eLearning exist, some are:

- **Asynchronous eLearning:** A student-centered method of learning where people are not online at the same time and interaction occurs with a time delay, allowing people to participate when it suits their schedules (Reform, 2017)
- **Self-Study**: Which addresses the distinct learning needs, interests of individual students. (Hill et al., 2014)
- **Discussion Groups:** These allow for peer-to-peer support and learning. Subject matter experts can add their support to the discussion to build on the peer-to-peer learning that is occurring (Selim, 2007)
- **Distance Education**: This allows the students to self-pace through the online content. There are usually no set times for distance classes (Jenkins, Rumble, Murugan, et al. 2017)
- **Synchronous eLearning:** Learning where people are online at the same time (Chen, 2017)
- **Virtual Classroom**: An online classroom that allows participants to communicate, view presentations, interact with learning resources and work in groups. Virtual classrooms can be used to hold lectures and tutorials online, a feature particularly useful to external students. Virtual classrooms can also be setup as online meeting spaces for students to work

on group tasks (Radu, Southgate, Ortega, et al. 2017)

- **Audio and video conferencing:** This includes the use of the sites: Google Hangouts, Adobe Connect and GoT0webinar. Webinars, or seminars held online, are modes of video conferencing. Typically webinars are recorded for later viewing (Gault, 2017)
- **Blended Learning:** This is a combination of online and face-to-face delivery (Abdellatief, Sultan, Jabar, & Abdullah, 2011; Holsapple & Lee-Post, 2006; Leveaux, Gallagher, & Sixsmith, 2016).

The above typologies indicate the term eLearning is quite broad and expresses many forms of digital content delivery. To date there is no agreed definition of the word 'eLearning', and as a result, many researchers when using the term eLearning are indicating the terms 'blended', 'online', 'virtual' and 'distance' interchangeably. This creates confusion amongst researchers and teachers alike as inconsistent semantics typically create misperception and misattribution of reasoning.

Context of the Research

This comparative case study employs an interpretive approach, as the intent is to understand the impacts of flipped and blended learning from the perspective of participating student cohorts. In using an interpretive approach, the researcher has sought to gain a deeper understanding of the area under study and the context within which the research data was gathered (Crotty 1998).

One of the considerations of this study was the best way to incorporate technology into the classroom. Research has shown that user satisfaction is a crucial factor in assessing eLearning success. In particular learner dissatisfaction with eLearning integration within the classroom and the ease of use of required systems by students (Alsabawy & Cater-Steel, 2012). Other research concurs highlighting user satisfaction is the key driver to continuing use of eLearning (Al-Omari, Carter, & Chiclana 2016).

This research centres on a case study of student responses to surveys regarding their experiences with IT subjects. Hamel et al. (1993: p45) define a case study as an 'in-depth investigation using different methods to collect information and to make observations', during which 'empirical' evidence assists in understanding the 'object of the study'. By conducting a case study, researchers can explore the significant features of a case and create credible interpretations from the everyday experiences of participants (Crotty 1998). Case study research provides an in-depth understanding of the context under study and increases our understanding of a given situation (McGovern 2003, Morse and Richards 2002, Yin 2003).

The focus of this case study was two university information systems subjects within our faculty at the University of Technology Sydney: Finance and IT Professionals (undergraduate) and Project Management (post-graduate),. The sampling occurred over a three-year period from second semester 2013 to first semester 2016 inclusive. During that period, the undergraduate subject was only taught in the first semester of each year whilst the postgraduate unit was delivered each time across a full year. These subjects contained some non-IT specific content, which, when presented in a new flipped learning genre, was considered potentially to be a major issue for academic teaching staff.

Data was collected from the standard university online student feedback survey (SFS) conducted at the completion of each semester, with survey results forming the basis of a comparative study of integrating eLearning that involved the use of pre-work or flipped learning via ELIS. The online SFSs questions required five scaled answers (quantitative data) and two freeform answers (qualitative data).

Using thematic analysis, preliminary themes were uncovered from the data. Through a consolidation process, dominant themes emerged from the identified preliminary themes (Attride-Stirling 2001; McGovern 2003; Morse & Richards 2002). Two dominant themes emerged from this qualitative data: using the ELIS, and flipped learning pre-work content.

This research, as stated earlier, is based on two subjects, Finance and IT Professionals (undergraduate) and Project Management (post-graduate), which incorporated the use of an ELIS. Table 1 (below) charts student comments about both subjects, largely focusing on the style of content made available to them. The results show students perceived multiple versions of the same content to be counter-productive and "doubling up" on subject resources, potentially influencing subject efficiency and effectiveness.

Using the ELIS

Successful integration of ELIS into coursework subjects is not new and is well documented in the literature. Research into students who participated in a trial of eLearning versus traditional learning, found eLearning was an effective method that deepened the student understanding of the subject (Abdellatief et al, 2011; Alsabawy & Cater-Steel, 2012). Furthermore, Jones and Gregor (2006) found that learning supported by an IS gave students a distinct advantage in their coursework. Student comments collected in the current data supported each of these findings.

Many student comments regarding both subjects in this study (see table 1) focussed on the style of content made available. It was perceived content was in a format that did not suit the learning needs of particular students. Equally, multiple versions of the same content were recorded by students to be counter-productive and "doubling up" on subject resources and potentially impacting subject efficiency and effectiveness.

Table 1: Student comments regarding the ELIS

Positive	Negative
"Videos came with weekly content to help understand financial principles etc." (F&IT)	"Use lecture slides instead of web-based learning materials" (F&IT)
"The subject materials were well organised" (F&IT)	"Lack of connection between the tutorials and the lecture materials" (F&IT)
"online videos in lectures helped" (F&IT)	"the content of this subject was so poorly handled. there were online modules that were supposed to be done before the lesson, but then were not gone through in the lesson." (F&IT)
"All learning material is available online." (PM)	"I would suggest that the content also be available in PDF version for those of us that like to sit down and highlight stuff … content on the computer is too distracting for me cause of my attention span " (F&IT)
"I was interested in the sequence of the teaching as each week we built on items from previous weeks to create a fuller picture of the methodology." (PM)	"It would be better if you could provide pdf/slides of all lectures" (PM)
"This lecture provides the video class for learning, … I think it is quite good for PM trying to provide video class to enhance the learning and teaching outcome" (PM)	"better templates. examples of templates in use, more relevant case studies and assignments." (PM)
"Lots of resources were provided, and the subject was fun to learn" (PM)	"The subject materials online should be available in one package only - PDF/PowerPoint and video, and not segregated into parts" (PM)

Flipped Learning Pre-work Content

Prior to 2014 classes in the traditional model consisted of a 1 ½ hour lecture and a series of 1 ½ hour tutorials. Within this context finance and IT (F&IT) had one (1) lecture and six (6) tutorials (10 ½

hours of class time) and Project Management (PM) had one (1) lecture and four (4) tutorials (7 ½ hours of class time). Under the new model, F&IT was delivered in two, 2-hour workshops and PM was delivered via two, 3-hour workshops.

Collaborative classrooms were used to facilitate group work activities with the presumption that students had completed pre-work content prior to the class. This teaching mode, whereby each student comes prepared, encouraged greater student interaction in the classroom. The use of collaborative classrooms for these subjects again increasing interaction. Depending on the subject, F&IT or PM, the degree of pre-work content varied depending upon the teaching objectives for individual weekly classes. In essence, pre-work for both subjects undertaken prior to the class was intended to take students on a journey through various weekly scenarios aimed at consolidating subject content. However, from the student's comments (see table 2 below) most negative comments focused on this class structure with the traditional style of a lecture and tutorial nominated as more suitable than the flipped nature of the class. On a positive note, some comments focused on the new learning style and its ability to providing an environment in which students perceived they were easily able to work collaboratively to discuss ideas and concepts related to the weekly scenarios.

Table 2 shows a mixed reaction to the new teaching style. Most negative comments for F&IT concerned perceptions of disparity between the subject's 'theory' and 'practical' content. Students' focus on theory is surprising as research shows one of the best ways to learn topic content is through practical application (reference) - in this case scenario based learning. Regardless positive student comments all supported the practical aspect of each subject. Student perceptions of PM were more positive overall. In particular they were appreciative of both content and practical work, citing relevance to career options. Again, scenario-based learning was the basis of the practical work in this subject.

Table 2: Student comments regarding the flipped subject delivery method

Positive	Negative
"the structure of the classes, allowing students to work together to complete an exercise without a tutor trying to control exactly how and when the work is done really helped all the students stay motivated." (F&IT)	"More integration between notes and what we were actually doing would also have been really wonderful." (F&IT))
"The learning environment for this subject was well organised" (F&IT)	"Content needs to be shown more like a lecture" (F&IT)
"The weekly challenges were great" (F&IT)	"content could be more relevant to tested material" (F&IT)
"Practical based assignment and weekly quizzes (which forced students to actually look at and do the work)" (F&IT)	"[Classes] had little to do with the overall content given" (F&IT)
"Good ideas and an innovative approach to presenting the subject matter". (F&IT)	"The subject structure, the idea of workshop makes students to focus on theory part of the subject less. " (F&IT)
	"tutorials are too vague with too many students in each class" (F&IT) "Please make this subject more structured and interrelated" (F&IT)
"I like the workshop in every class that we can discuss in a group" (PM)	"The out-of-class preparation material, many people wouldn't do it – maybe add marks to it" (PM)
"Lots of emphasis on Workshopping the	"I suggest that the way of teaching and

Theory" (PM)	answering by the tutor should be more flexible" (PM)
"All the topics were really helpful and practical. I've enjoyed this project a lot!" (PM)	"The only part of the learning material I did not enjoy was the Lynda videos." (PM)
"The presentations and learning activities were both engaging and enjoyable, as well as enabling the content to be understood in a practical holistic manner (PM)	

To Flip or Not to Flip?

In light of these findings: *should educators flip their classroom or not*? The answer is not as straight forward as it first appears. Flipping the classroom requires considerable time, something many academics do not have.

The first step is to start small, by finding information that meets the threshold of students' understanding and is suitable to enable students to learn all aspects of course material. For instance bridging students' knowledge of the difference between the terms 'debit' and 'credit' with a simple explanation. Once content is resolved, the second step is to determine how that content will be delivered to students and by which medium. A facilitator may ask themselves, 'will a PowerPoint be sufficient or does the facilitation also require a video (PowerPoint with associated audio) and if so, 'will a more professional video be required?' Noting that professional audio-visual recordings may give students the ability to watch content on any device, anywhere.

Regardless of the medium used or the content delivered, the decision on whether to flip or not to flip a class is dependent on several factors. These include the availability of resources (such as support staff and funds for subject revision and / or needed equipment), the content and learning objectives of the subject (eg. theoretical or practical), and the flexibility of the academic staff to accept and implement change. In the words of one surveyed F&IT student, "we were given the freedom to collaborate and work with almost everyone in the tutorial. It is a distinct quality of this subject, which I greatly appreciate! It made the learning experience enthusiastic". This comment reinforced our decision to flip these subjects

Conclusion and Future Work

As educational technology and associated fields continue to evolve, conflicting findings have emerged regarding eLearning environments. In education today, a paradigm shift is underway which involves critical challenges for universities to enhance innovation in teaching and learning. Universities have been quick to embed technology into the classroom. However, it has taken, and is still taking, a long time to work out the most efficient way to incorporate an ELIS and ensuring its effectiveness. The fundamental problem is that often the classroom has had too many alternative technologies implemented. This does not adequately support blended learning. Equally educators, when using an ELIS, have at times attempted to add too much technology too soon. Both aspects need to be ameliorated with the frame of the students' overall learning experience in mind.

Research on collaborative or blended learning has indicated that although student engagement remains limited initially, flipped learning experiences and the blended learning environment in the longer-term assist students in understanding threshold concepts. However, more studies in this area are required. Future research needs to broaden its exploration of the use of ELIS within the classroom. In particular, research should consider student focus groups, as these would be beneficial in assisting researchers to delve further into this study's findings and to discover the 'real' reason why students find changes in delivery styles difficult to cope with. In conjunction with this research, is underway to trial of an industry-based framework for ELIS integration as in practice this would assist with the alignment of subjects to the ELIS framework.

References

Abdellatief, M., Sultan, A., Jabar, M. A., & Abdullah, R. (2011). A Technique for Quality Evaluation of E-Learning from a Developers Perspective. *American Journal of Economics and Business Administration, 3*(1), 157-164.

Albert, M., & Beatty, B. J. (2014). Flipping the Classroom Applications to Curriculum Redesign for an Introduction to Management Course: Impact on Grades. *Journal of Education for Business, 89*(8), 419-424. doi:10.1080/08832323.2014.929559

Al-Omari, M., Carter, J. & Chiclana, F. (2016). A hybrid approach for supporting adaptivity in e-learning environments. *The International Journal of Information and Learning Technology, 33*(5), 333-348.

Al-Qahtani, A. A., & Higgins, S. E. (2013). Effects of traditional, blended and e-learning on students' achievement in higher education. *Journal of computer assisted learning, 29*(3), 220-234.

Alsabawy, A. Y., & Cater-Steel, A. (2012). *Identifying the Determinants of E-Learning Service Delivery Quality*. Paper presented at the 23rd Australasian Conference on Information Systems, Geelong.

Anohah, E., Oyelere, S. S., & Suhonen, J. (2017). Trends of mobile learning in Computing Education from 2006 to 2014: A systematic review of research publications. *International Journal of Mobile and Blended Learning (IJMBL), 9*(1), 16-33.

Astin, A. W. (1993). What matters in college? Four critical years revisited. San Francisco: Jossey-Bass

Attride-Stirling, J., (2001) Thematic networks: an analytic tool for qualitative research, *Qualitative Research*, (1, 3): pp 385-405.

Beetham, H. & Sharpe, R. (2007) *Rethinking Pedagogy for a digital age: designing and delivering e-learning*. Routledge: Abingdon

Bishop, J. L., & Verleger, M. A. (2013, June). The flipped classroom: A survey of the research. In ASEE National Conference Proceedings, Atlanta, GA (Vol. 30, No. 9).

Bloom, B.S., 1956. *Taxonomy of educational objectives. Vol. 1: Cognitive domain.* New York: McKay

Cox, B. E., & Orehovec, E. (2007, Summer). Faculty-Student interaction outside the classroom: A typology from a residential college. Review of Higher Education, 30(4), 343-362

Cross, J. (2004). An Informal Histroy of eLearning, *On the Horizon*, (12,3) pp.103-110

Crotty, M. (1998) *Foundations of Social Research: Meaning and Perspective in the Research Process*, Allen & Unwin, Sydney

Davies, R. S., Dean, D. L., & Ball, N. (2013). Flipping the classroom and instructional technology integration in a college-level information systems spreadsheet course. *Educational Technology Research and Development, 61*(4), 563-580.

DeakinPrime. (2016) *Engineering Students:- Industry Requirements - multiple surveys,* DeakinPrime, Melbourne

Eom, S, Ashill, N, Arbaugh, J Stapelton, J (2012) Human systems Management, Vol 31, No. 3-4 pp. 147-163

Gallagher, S., & Sixsmith, A. (2014). Engaging IT undergraduates in non-IT content: Adopting an eLearning Information System in the classroom. Interactive Technology and Smart Education, 11(2), 99-111

Gault, A. (2017). *elearning for Adobe Photoshop and Illustrator in Textiles and Fashion.* Paper presented at the The International Scientific Conference eLearning and Software for Education.

Guri-Rosenblit, S. (2005). 'Distance Education' and 'e-learning': Not the same thing. *Higher Education, 49*(2005), 467 - 493.

Hajhashemi, K., Caltabiano, N., & Anderson, N. (2017). Integrating digital technologies in the classroom: Lecturers' views on the flipped classroom approach. *Australian and International Journal of Rural Education, 26*(3), 18-29.

Hamel, J. with Dufour, S. & Fortin, D. (1993) *Case Study Methods*, Sage Publications, Newbury Park, California

Hill, C. W., Jones, G. R., & Schilling, M. A. (2014). *Strategic management: theory: an integrated approach*: Cengage Learning.

Holsapple, C. W., & Lee-Post, A. (2006). Defining, Assessing, and Promoting E-Learning Success: An Information Systems Perspective*. *Decision Sciences Journal of Innovative Education, 4*(1), 67-85. doi:10.1111/j.1540-4609.2006.00102.x

Howett, C & Pegrum, M. (2015) Implementing a flipped classroom approach in post graduate: An unexpected journey into pedagogical redesign Australasian Journal of Educational Technology 2015, 31 (4)

Jenkins, J., Rumble, G., Murugan, K., Koul, B., Dodds, T., Peters, O., & Perraton, H. (2017). Unit-9 Characteristics of Distance Education: IGNOU.

Jones, D., & Gregor, S. (2006) The formulation of an Information Systems Design Theory for e-learning, First International Conference on Design Science Research in Information Systems and Technology, Claremont, CA.

Kolb, D. A.(1984) Experiential Learning. Englewood Cliffs, N J:Prentice-Hall.

Lantis, J. S., Kille, K. J., & Krain, M. (2010). The state of the active teaching and learning literature. In R. A. Denemark (Ed.), *The international studies encyclopedia,* (Vol. 10, pp. 6574–6592): Wiley-Blackwell. retrieved from www.isacompss.com/info/samples/thestateoftheactiveteachingandlearning literature_sample.pdf

Lave, J. (1996) Teaching, as Learning, in Practice, Mind, Culture and Activity, Vol 3, pp. 149-164.

Leveaux, R., Gallagher, S., & Sixsmith, A. (2016). *Creating a Situated Learning Environment in the Classroom for Final Year IT Students*. Paper presented at the 28th IBIMA.

Mar, N. (2005). Utilizing Information and Communication Technologies to Achieve Lifelong Education for All: A Case Study of Myanmar. *Educational Research for Policy and Practice, 3*, 141-166.

Masie, E. (1997). Seizing your intranet. *Training & Development, 51*(2), 51-53.

McGovern, Y. (2003) The Practice of Market and Social Research, Pearson Education FT Prentice Hall, Harlow, England

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers college record, 108*(6), 1017.

Morse, J.M. & Richards, L. (2002) Readme First for a User's Guide to Qualitative Methods, Sage Publications, Thousand Oaks, California.

Papert, S. (1980). *Mindstorms: Children, computers, and powerful ideas*: Basic Books, Inc.

Prensky, M. (2001). Digital natives, digital immigrants part 1. *On the Horizon, 9*(5), 1-6.

Radu, I., Southgate, E., Ortega, F., & Smith, S. (2017). *Summary: 2017 IEEE virtual reality second workshop on K-12 embodied learning through Virtual & Augmented Reality (KELVAR).* Paper presented at the K-12 Embodied Learning through Virtual & Augmented Reality (KELVAR), 2017 IEEE Virtual Reality Workshop on.

Rauch, D.W., & Crawford, E. K. (2012) Cohorts, communities of inquiry and course delivery methods UTC best practices in learning – The hybrid learning community model. The Journal of Continuing Higher Education, 60, 175-180. Doi: 10.1080/07377363.722428

Reform, E. (2017). The Glossary of Education Reform, for Journalists, Parents and Community Members. Retrieved from http://edglossary.org/asynchronous-learning/

Selim, H. M. (2007). Critical success factors for e-learning acceptance: Confirmatory factor models. *Computers & Education, 49*(2), 396-413.

Selwyn, N. (2010). Looking beyond learning: notes towards the critical study of educational technology. 65 - 73. doi:10.1111/j.1365-2729.2009.00338

Tinto, V. (1993). Leaving college: Rethinking the causes and cures of student attrition (2nd ed.). Chicago: University of Chicago Press.

Yin, R.K. (2003) *Case Study Research: Design and Methods*, 3rd ed., Sage Publications, Thousand Oaks, California.

Greedy Genetic Data Mining Algorithm for Multidimensional Data of Electronic Components for Space Industry

Kazakovtsev Lev Aleksandrovich, Reshetnev University, Krasnoyarsk, Russia, levk@bk.ru

Stashkov Dmitry Viktorovich, Reshetnev University, Krasnoyarsk, Russia, stashkov@ngs.ru

Savelyeva Marina Viktorovna, Reshetnev University, Krasnoyarsk, Russia, mvsavelyeva10@yandex.ru

Abstract

Results of testing of the electronic components shipped for the space industry are represented by arrays of data vectors of very high dimensionality, up to hundreds of dimensions. One of the most important problems for increasing the quality of the electronic units is detection of the homogeneous production batches of the electronic devices (components). In this paper, we consider the problem of data mining (fuzzy clustering) with new genetic algorithm with greedy agglomerative heuristic based on the EM-algorithm. Computational experiments with electronic component testing data and classical datasets for clustering problems show that this new algorithm allows obtaining more precise results in comparison with classical EM algorithm and its modifications. Accurate detection of homogeneous production batches reduces the expenses for destructive testing.

Keywords: Clustering, Genetic Algorithm, Greedy Heuristic, Agglomerative Heuristic.

Introduction

Electronic components shipped for the space industry pass through hundreds of non-destructive tests. Selected elements from each homogeneous production batch pass through several expensive destructive tests. If the testing center is not allowed to control the manufacturing process, there is no guarantee of homogeneity of each production batch.

Orlov et al (2016) proposed determining the belonging of a set of EEE components to a set of homogeneous production batches is a clustering problem (unsupervised learning). A priori, the number of clusters (homogeneous batches manufactured from homogeneous batch of raw materials) is unknown, however, this number is bounded above.

The problem is even more complicated because of the possible existence of outliers (they are copies of the EEE components that do not belong to the main production and batch of raw materials or made with essential aberrations).

At the solution of such clustering problems, it is possible to use two approaches:

a) Hard clustering. Each object belongs to the only cluster. In this case if there is no clear boundary between clusters in the experimental data, the result will not be satisfactory (numerical characteristics of belonging to a cluster will be indistinct).
b) Fuzzy clustering. A set of probabilistic characteristics of belonging of an object to each of clusters is the result of the algorithms work of this type.

At application of both approaches, classical methods (Orlov et al, 2016) demand that the number of clusters should be set before an algorithm starts.

Thus, it is necessary to discuss several options with various estimated parameter (number of clusters) for the further choice of the best decision.
Instruments of data mining including fuzzy clustering are widely used practically in all branches and productions. Problems of identification of the homogeneous signs of objects fall into similar problems. Classical objects and data sets in the cluster analysis are also data on biological objects, for example, KDD Cup 04 Bio. Biological data sets usually form data arrays of very high dimensions. At the same time, number of objects could be rather small. This fact is a difficulty in work of classical EM algorithm (Orlov et al, 2016).

Known Methods

Conception of agglomerative greedy heuristic procedure (Alp et al (2003), Kazakovtsev et al (2014, 2015)) is based on sequentially removing clusters from the interim solution of the problem. Every time, those clusters which removal results in minimal gain of the objective function are removed (these problems are minimization problems). Here we use the same approach with EM algorithm and maximized function (1).

$$L^{<t+1>} = \sum_{x \in S} \sum_{i=1}^{k} ln(\tau_i p_i^{\langle t+1 \rangle}(x)) \quad (1)$$

Stashkov (2017) proposes a specific version of the variable neighborhood search procedure (Mladenovic, 1997) which allows obtaining more precise results of the probability distribution separating problem. In this paper, we use similar procedure in combination with the evolutionary algorithm (Genetic Algorithm, GA) which allows obtaining even more precise results with better values of function (1).

New Algorithm

Algorithm 1. Greedy heuristic procedure for precipitation of mixture of Gaussian distributions.
Required: initial number of Gaussian distributions (clusters) K, target number of clusters k.

1. To select initial decision with K clusters that is to select randomly initial parameters of the set of the distributions $D = \left\{ N(\mu_i^{\langle 0 \rangle}, \sigma_i^{\langle 0 \rangle 2} I_n), i = \overline{1,K} \right\}$ and the set of weight coefficients of distributions $W = \left\{ \alpha_i^{\langle 0 \rangle}, i = \overline{1,K} \right\}$

2. Run EM-algorithm (Orlov et al, 2016); assign new (improved) solution of a problem, represented by the sets D и W.

3. If K=k then stop.

4. For each $i' \in \left\{ \overline{1,K} \right\}$ do:

4.1 Assign the truncated set of the distribution and the set of their weight coefficients $D' = D \setminus \left\{ N(\mu_{i'}^{\langle 0 \rangle}, \sigma_{i'}^{\langle 0 \rangle 2} I_n) \right\} W' = W \setminus \{ \alpha_{i'}^{\langle 0 \rangle} \}$.

Run the EM-algorithm with initial values of parameters of the distributions, presented by the truncated set D' and weights W'. Here, the EM algorithm is limited to one iteration. Calculate the objective function L according to (1) for the received result, to keep their value in variable $L'_{i'}$.

4.2. Go to the next iteration of loop 4.

5. Find the index $i'' = arg \max_{i'=1,k} L_{i'}$.

6. Assign the truncated sets $D = D \setminus \left\{ N(\mu_{i'}^{\langle 0 \rangle}, \sigma_{i'}^{\langle 0 \rangle 2} I_n) \right\} \quad W = W \setminus \{ \alpha_{i'}^{\langle 0 \rangle} \}$.

Run EM-algorithm for this truncated sets, then pass to Step 3.

This heuristic was used as the crossing-over procedure in the genetic algorithm:

Algorithm 2. The crossing-over procedure

Required: see Algorithm 1.

1. Concatenate the sets
$D = D' \cup D''$, $W = W' \cup W''$.

2. Run the Algorithm 1 with this concatenated sets as the initial decision.

The genetic algorithm with greedy heuristics (Kazakovtsev et al, 2015) in edition for the EM algorithm is been described as follows:

Algorithm 3. The genetic algorithm with greedy heuristic (called by GA).

Required: Size of the population N_{POP}.

1. Generate randomly N_{POP} initial decision presented by the sets of the distributions $D_l = \left\{ N(\mu_{l,i}^{\langle 0 \rangle}, \sigma_{l,i}^{\langle 0 \rangle 2} I_n), l = \overline{1,k} \right\} l = \overline{1, N_{POP}}$ and the counterpart sets of weight coefficients $W_l = \left\{ \alpha_{l,i}^{\langle 0 \rangle} = 1/k, i = \overline{1,k} \right\}$ Initial values of the standard deviation is assigned equal for all clusters and calculate for a full sample: $\sigma_i^{\langle 0 \rangle 2} = \frac{1}{d} \sum_{x \in S} \left\| x - \bar{x} \right\|^2$.

The values of $\mu_{l,i}^{\langle 0 \rangle}$ are assigned equal to coordinates of incidentally chosen vectors of data.

The EM algorithm is started for each of initial decisions and the received values of objective function remain in variables $f_1,...,f_{N_{POP}}$.

2. Check the stop conditions and STOP if they are reached. We use a runtime restriction as the stop condition. The decision with the best (biggest) value of objective function $f_1,...,f_{N_{POP}}$ is returned.

3. Select the two random indexes $k_1, k_2 \in \{\overline{1,N}\}, k_1 \neq k_2$.

4. Run Algorithm 2 for couple of decisions submitted by the sets D_{k_1}, D_{k_2} and W_{k_1}, W_{k_2}.

5. Select index $k_3 \in \{\overline{1,N_{POP}}\}$. As well as in [4], we use prime tournament selection: at first in a random way we choose $k_4, k_5 \in \{\overline{1,N_{POP}}\}$ if $f_{k_4} > f_{k_5}$ then $k_3 = k_4$ otherwise $k_3 = k_5$.

6. Change sets D_{k_3}, W_{k_3} and corresponding value of the objective function f_{k_3} by the new values received on the Step 4. To pass to the Step 2.

Computational Experiments

We used classical data sets from UCI repository, for example, a data set of KDD CUP 04 BIO for testing and compotation of results with results of the classical EM algorithm started in the multistart mode.
Results (see Table 1) show that developed genetic algorithm for larger tasks has advantage in comparison with other algorithms.

About 10 attempts of start were performed for a data set of KDDCUP04Bio.
In Tables 1, two datasets are arrays of results of the non-destructive tests of the integrated circuits, other datasets are classical datasets from the UCI dataset repository. Our new algorithm (GA) allows to obtain the best results for both datasets of non-destructive tests in comparison with other precise algorithms: classical EM, CEM (clustering EM proposed by Celeux and Govaert, 1991), SEM (Stochastic EM proposed by Celeux and Diebolt, 1985), VNS1-VNS3 (Variable Neighborhood Search proposed by Stashkov, 2017).

Conclusion

New genetic algorithm for the problems of separating of a mixture of Gaussian distributions allows achieving more precise results in comparison with the classical EM-algorithm running in the multistart

mode. Our new algorithm is a modification of the Greedy Heuristics Method proposed by Kazakovtsev et al (2015) for the problems of a fuzzy clustering which allows to obtain more precise results for many clustering problems including the problem of separating the homogeneous production batches of the electronic devices for spacecraft industry.

Acknowledgments

Results were obtained in the framework of the state task No. 2.5527.2017/БЧ of the Ministry of Education and Science of the Russian Federation.

Table 1: Comparison of the results for integrated circuits and other data sets

Data set, number of data vectors, dimensionality	Number of groups (number of batches for the electronic devices) *k*, type of Gaussians., time limit	Algorithm	Average result
Tests of IC 1526LE2, *N*=3987, *d*=206	5, uncorrelated, 3 minutes	VNS1	350292,1
		VNS2	-
		VNS3	-
		EM	350292,2
		New GA	443491,0
Tests of IC 140UD17AVK, *N*=51, *d*=46	2, spherical, 5 seconds	VNS1	1052942,3
		VNS2	1052942,3
		VNS3	1052942,3
		EM	1052942,3
		CEM	1052942,1
		SEM	1052942,2
		New GA	1052942,3
Europe (UCI), *N*=169308, *d*=2, normalized data.	40, spherical, 1.5 hours	VNS1	-3625694,1
		VNS2	-3625691,7
		VNS3	-3625748,7
		EM	-3625957,3
		CEM	-3625779,0
		SEM	-3625740,6
		New GA	-3625731.38
Chess (UCI), *N*=3197, *d*=50, булевы	10, spherical., 3 minutes	VNS1	-30554,67
		VNS2	-30539,85
		VNS3	-30580,60
		EM	-30525,03
		CEM	-30564,13
		SEM	-30560,70
		New GA	-30554,67
Ionosphere, *N*=351, *d*=35, normalized data.	10, spherical., 30 seconds	VNS1	-847,463
		VNS2	-849,352
		VNS3	-878,153
		EM	-871,405
		CEM	-893,442
		SEM	-879,952
		New GA	-832,828

KDDCUP04 Bio, *N*=145751, *d*=74, normalized data.	30, spherical, 3 hours	VNS1	-12511968,2
		VNS2	-12511984,9
		VNS3	-12512654,0
		EM	-12513229,7
		CEM	-12512717,9
		SEM	-12514336,5
		New GA	-12512511,99

References

1. Alp, O., Erkut, E. and Drezner, Z. (2003), 'An Efficient Genetic Algorithm for the p-Median,' Problem *Annals of Operations Research,* 122, 21-42.

2. Celeux, G. and Diebolt, J. (1985) 'The SEM algorithm: a probabilistic teacher algorithm derived from the EM algorithm for the mixture problem,' *Computational Statistics Quarterly,* 2(1), 73-82.

3. Celeux, G. and Govaert, A. (1991) 'Classification EM Algorithm for Clustering and Two Stochastic Versions,' *Rapport de Recherche de l'INRIA* RR-1364, Centrede Rocquencourt.

4. Kazakovtsev, L. A. and Antamoshkin, A. N. (2014), 'Genetic Algorithm with Greedy Heuristic for Clustering and Location Problems,' *Informatica (Ljubljana),* 38(3), 229-240.

5. Kazakovtsev, L. A. and Antamoshkin, A. N. (2015) 'Greedy heuristic method for location problems,' *Vestnik SibGAU,* 16(2), 317-325.

6. Kazakovtsev, L. A., Antamoshkin, A. N. and Masich, I. S. (2015) 'Fast Deterministic Algorithm for EEE Components Classification,' *IOP Conference Series: Materials Science and Engineering,* 94, article ID 012015, 10 pages, doi:10.1088/1757-899X/94/1/012015.

7. Kazakovtsev, L. A. and Stupina, A. A. (2015) 'Deterministic algorithm with agglomerative heuristic for location problems,' *IOP Conference Series: Materials Science and Engineering,* 94, Article ID 012016, 9 pages, doi: 10.1088/1757-899X/94/1/012016.

8. Mladenovic, N. and Hansen, P. (1997) 'Variable neighborhood search,' *Comput. Oper. Res.,* 24**,** 1097–1100.

9. Orlov, V. I., Stashkov, D. V., Kazakovtsev, L. A. and Stupina, A. A. (2016), 'Fuzzy clustering of EEE components for space industry,' *IOP Conference Series: Materials Science and Engineering,* 155, Article ID 012026.

10. Stashkov, D. V. (2017) 'Variable neighborhood search algorithms for problem of separating of a mix of distributions,' *Sistemy upravlenija i informacionnye tehnologii,* 1(67), 18-24.

State Regulation of Exports: Foreign Experience and Kazakhstan Practice

Tovma N.A.
doctor (PhD), associate professor al-Farabi Kazakh National University, Kazakhstan,
nataliya-tovma@mail.ru

Abstract

Annotation. The key moment of intensive, rational and effective participation of the country in international exchange is the development of export potential, capable of producing and supplying to the world market a wide range of goods, works and services with a high degree of competitiveness and benefits in the necessary terms, determined by agreements and contracts. The complex character of the mechanism of export support in modern industrial policy of foreign countries as the final link in the process of implementing the state economic strategy in the conditions of globalization is revealed. A comparative evaluation of the current mechanisms of state stimulation and support for exports of various groups of countries is presented, based on the conditions of international commodity exchange. The prerequisites, driving forces and main directions of activation of state support for exports within the framework of the national export strategy of the Republic of Kazakhstan are revealed. Developed proposals for the development of a model of the state system of export stimulation with the identification of functional-target levels and local (regional and branch) subsystems.

Keywords: export, export policy, state regulation of exports, international trade.

Introduction

Rapid development of market relations contributed to a sharp increase in activity of Kazakhstani firms on the foreign market. Economic relations with foreign partners serve to enrich the progressive experience in the field of organization of trade services to the population, act as a factor of economic growth, intensify production, contribute to the improvement of technology and the replenishment of the market with goods. About two-thirds of the country's gross domestic product is distributed through foreign trade channels. For the effective management of such activities, information on export operations, which occupy the largest share in the activities of organizations, becomes particularly important. This is the most common type of transactions in the foreign trade activity of a company, so a competent and correct definition, evaluation and accounting are very important, since they directly influence the result of the business.

Deliveries for export provide a powerful impetus for the development and involvement of natural resources in economic circulation. Reasonably invested in the development of export means pay off much faster than investments in other areas of activity. At the present stage of the world economy development, there is an intensification of the processes of globalization, international economic integration, and the level of competition in world commodity markets is becoming more acute.

In modern conditions, there is an objective increase in the need for a conceptual interpretation of the role of the state export policy with regard to the formation of a long-term export strategy and methodological approaches to its implementation based on the experience of foreign countries where the practice of state export support has significantly enriched over the past decades and new effective schemes and mechanisms have emerged.
The purpose of the study is to develop proposals for state regulation of the export strategy in the conditions of developing a market economy and strengthening the processes of globalization, which

implies an increase in the regulatory and stimulating role of the state in the development of foreign trade activities by creating an effective mechanism to support exports

Results

1. The complex nature of the mechanism of supporting exports in modern industrial policy of foreign countries as the final link in the process of implementing the state economic strategy in the context of globalization has been revealed.

Foreign countries use different strategies for state promotion of their exports. In many ways, this depends on the state of the country's economy, the stage of development on which it is located, the overall economic and political situation in the world. Nevertheless, it is possible to single out a number of important features in their policy, which led to positive results in the growth of their exports and the improvement of its structure.

An important tool of British trade policy, used to support national producers and exporters, are anti-dumping, countervailing and protective measures.

Under the conditions of the developed normative legal regulation, the main task of the Government of Great Britain is to maintain the competitiveness of national producers in all sectors of the economy and on foreign markets through an active policy in the field of continuous improvement of the organization of the system of public authorities, reduction of administrative barriers, assistance to British exporters in promoting their products , goods of works and services to external markets and effective application of protection measures in foreign trade.

Exports from Great Britain are also carried out without restrictions, with the exception of certain goods falling under the system of export control and licensing. Thus, the UK has created an effective and stable to change system of regulation of foreign economic activity, based on EU directives and obligations arising from WTO membership and bilateral economic agreements with third countries.

The active participation of the state in the organization and implementation of foreign economic activity (FEA) is a characteristic feature of Japan for the last four decades. The effectiveness of the Japanese foreign economic complex largely depends on the strength of the institutional foundations of foreign economic activity.

In the system of public administration, this area can be distinguished administrative, coordinating and consultative. Among the state administrative bodies, the Ministry of Foreign Trade and Industry (MITP) occupies a special place, MITP ensures the development of trade relations with foreign countries, solves foreign exchange issues related to foreign trade, facilitates the production of export goods, establishes import quotas for licensed goods, issues import permits, Determines the relevant rules of trade.

One of the main directions of the sphere of regulation of China's foreign trade after the country's accession to the WTO is the liberalization of the foreign trade regime. The practice of levying export duties is applied in China with respect to the export of certain goods, the export of which is prohibited or restricted. In addition, China has a procedure for refunding VAT to exporters. The export tariff of the PRC contains 88 commodity items. The export duty rates are 20% -50%. In accordance with the current legislation, in China, a system of import and export licensing continues to be applied to a number of goods.

South Korea entered the world markets with color TVs earlier than such a production was created to serve the domestic market. Other countries relied more on market mechanisms (both macro and microeconomic). At the same time, some countries, for example, most of the export-oriented NIS states (Taiwan, Thailand, Malaysia) did not practically interfere in export issues.

In Western Europe, a high dependence on imports of domestic energy carriers has developed in Finland (more than 40% of the total), Germany and Austria (about 13%), France (10%) and a number of other countries.

France used various mechanisms to ensure effective implementation of the national foreign trade policy at different stages. In general, they are aimed at increasing the level of economic development of the state, which favors the growth of export sales. Some of these mechanisms are designed specifically to support national exports. Currently, the general assistance to the state of the participants in foreign economic activity of France reaches significant proportions, about 1.5% of the state budget. A new direction in the system of supporting national exports is to promote the development of regional export-oriented industries. For example, the state annually allocates 30 million euros to the regional structure for the support of exporters ERAI (Enterprise Rhone-Alpes International), which operates in the second largest export region of France - the Rhône-Alpes.

For example, the French financial and credit system operates in the interests of implementing the development of various areas of not only the general economic policy, but also its foreign trade component, which contributes to the intensive development of equipment exports Efforts to harmonize the conditions of international competition in this area and to limit the burden of export subsidies for public finances are reduced to concentrating these subsidies on export supplies to developing countries.

French experience also shows that along with the complex nature of the incentive mechanism, an effective organizational structure has been created to ensure its functioning.

2. A comparative evaluation of the current mechanisms of state stimulation and support for the export of various groups of countries based on the conditions for international commodity exchange is presented. From the point of view of foreign experience in export support, the experience of countries such as the USA, Germany, Japan, China, Brazil and the Czech Republic can also be useful, since their state support policy has allowed them to significantly increase their export flows (Table 1)

Table 1: Foreign experience of state support for exports

Information and consulting support	Financial support	Other types of support
USA		
A big place is occupied by measures related to information and consulting support, assistance in the implementation of exhibition activities	Granting of loans, credit guarantees and insurance of transactions. Guarantees for loans for companies in the implementation of medium- and long-term investments	A lot of effort is spent on legal and political protection of the interests of American exporters
Germany		
A large part is occupied by measures connected with information and consulting support	Insurance of export credits and investments of German firms abroad, exemption of exporters from VAT	The German government gives guarantees to provide guarantees for political risks
Japan		
Organization of business missions, exhibition events	The Bank for International Cooperation is supporting export in Japan	
China		
Organization of business	The law "On Foreign Trade"	

missions, exhibition events	was significantly amended in the country	
Brazil		
Legal and consulting assistance and even assistance in solving domestic issues in an unfamiliar country	Subsidies for opening representative offices; Brazilian companies engaged in export activities are allowed to leave all foreign exchange earnings abroad	The Brazilian Agency for Export and Investment Promotion was established. An efficient database of exporters was created
Czech Republic		
Development of information and consulting support, creation of a professional training system	The Czech Republic is making efforts to eliminate tariff and non-tariff barriers. Export Financing and Insurance	An important role was played by the Czech Concept of State Policy on Export Support.

Thus, as international experience shows, the current export support systems are not focused on providing subsidies, financial assistance or direct payments. They are primarily aimed at providing financial support to exporters through schemes for issuing guarantees, risk insurance, providing loans that promote the successful promotion of national goods and services to foreign markets.

3. The prerequisites, driving forces and main directions of activation of state support for exports are revealed in the framework of the national export strategy of the Republic of Kazakhstan. According to the Agency for Statistics of the Republic of Kazakhstan, Kazakhstan's turnover of Kazakhstan's exports is almost 2 times higher than imports (Figure 1), where 1 is Import, which was 3060238,7 dollars USA, 2 is exports, which was 866060,9 dollars USA

.

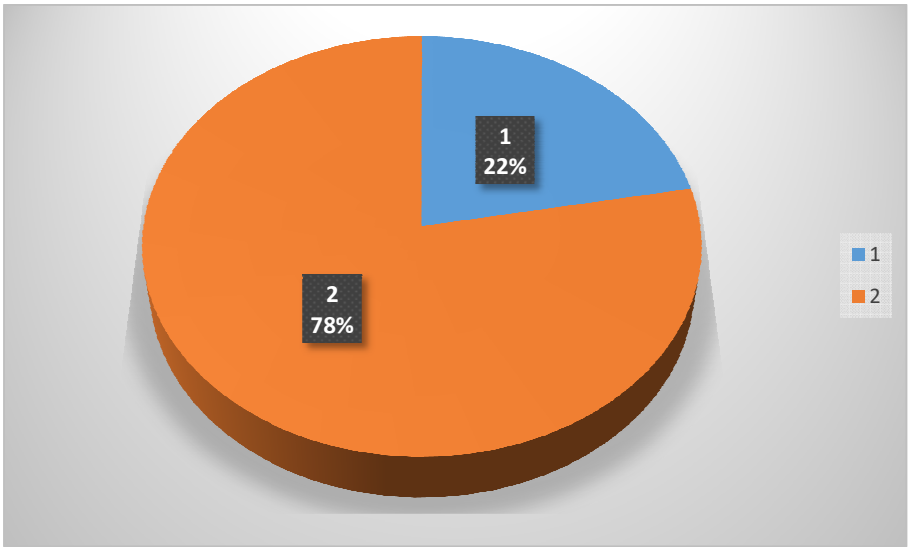


Figure 1: Export and import of Kazakhstan.
Note - according to the literature 1

The main indicators of Kazakhstan's foreign trade policy are presented in table 2.

Table 2: The main indicators of foreign trade of the Republic of Kazakhstan for 2016 (thousands of US dollars)

Name	Goods turnover		Export	
	Total	Specific weight of the country in the total volume of trade,%	Total	The share of the country in total exports,%
A	1,0	2,0	3,0	4,0
Including:				
Countries of the Union of Independent States	1 995 191,5	20,1	763 864,0	11,1
Of which the countries of the customs union	1 481 957,8	14,9	422 612,8	6,2
Countries of the Eurasian Economic Union	1 733 450,5	17,5	589 215,4	8,6
Countries outside the Eurasian Economic Union	261 740,9	2,6	174 648,6	2,5
Rest of the world	7 931 108,2	79,9	6 102 197,0	88,9
Europe	5 049 589,3	50,9	4 292 191,2	62,5
Countries of the Eurasian Union	4 701 622,3	47,4	3 964 951,0	57,7
Countries outside the Eurasian Union	347 967,0	2,6	3,5	4,8
Asia	2 484 287,8	25,0	1 648 510,6	24,0
America	355 788,1	3,6	146 252,3	2,1
Australia and Oceania	2 159,0	0,0	732,8	0,0
Other countries	167,2	0,0	166,5	0,0

The main exported commodity of the country is the commodity group "Fuel and Energy Products", which characterizes the raw material orientation of the economy of Kazakhstan. "Metals and products from them" with a share of 7.7% in the export of the Republic of Kazakhstan occupy the second place. Products of the chemical and related industries (including rubbers and plastics) with an index of 3.4% for 3 items in the list; the remaining commodity groups distributed 7%. (Figure 2), where fuel and energy products is 81, 9% (number 1), others: 2) 7,70% -materials made of them, 3) 3,4% - products of chemical and related industries, 4) 7,00% - other goods

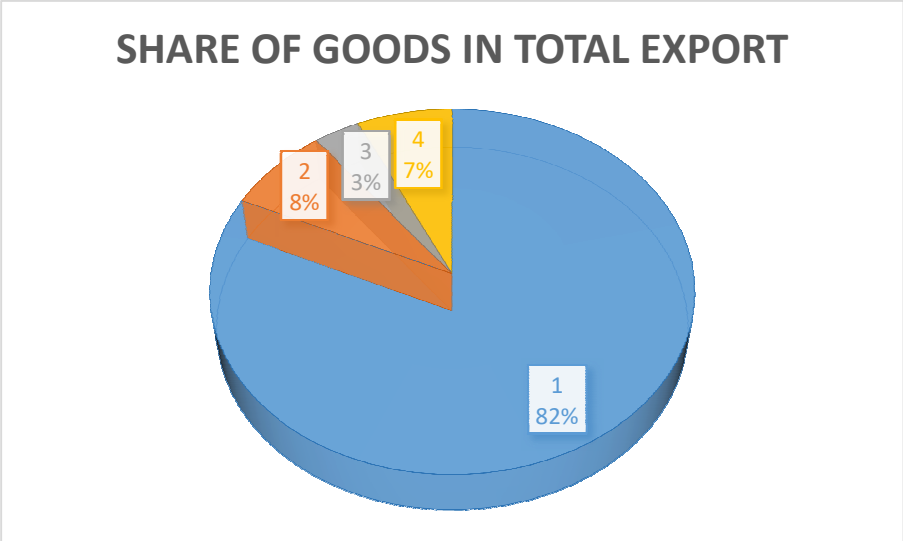


Figure 2: Share of goods in total exports of Kazakhstan
Note - according to the reference 1

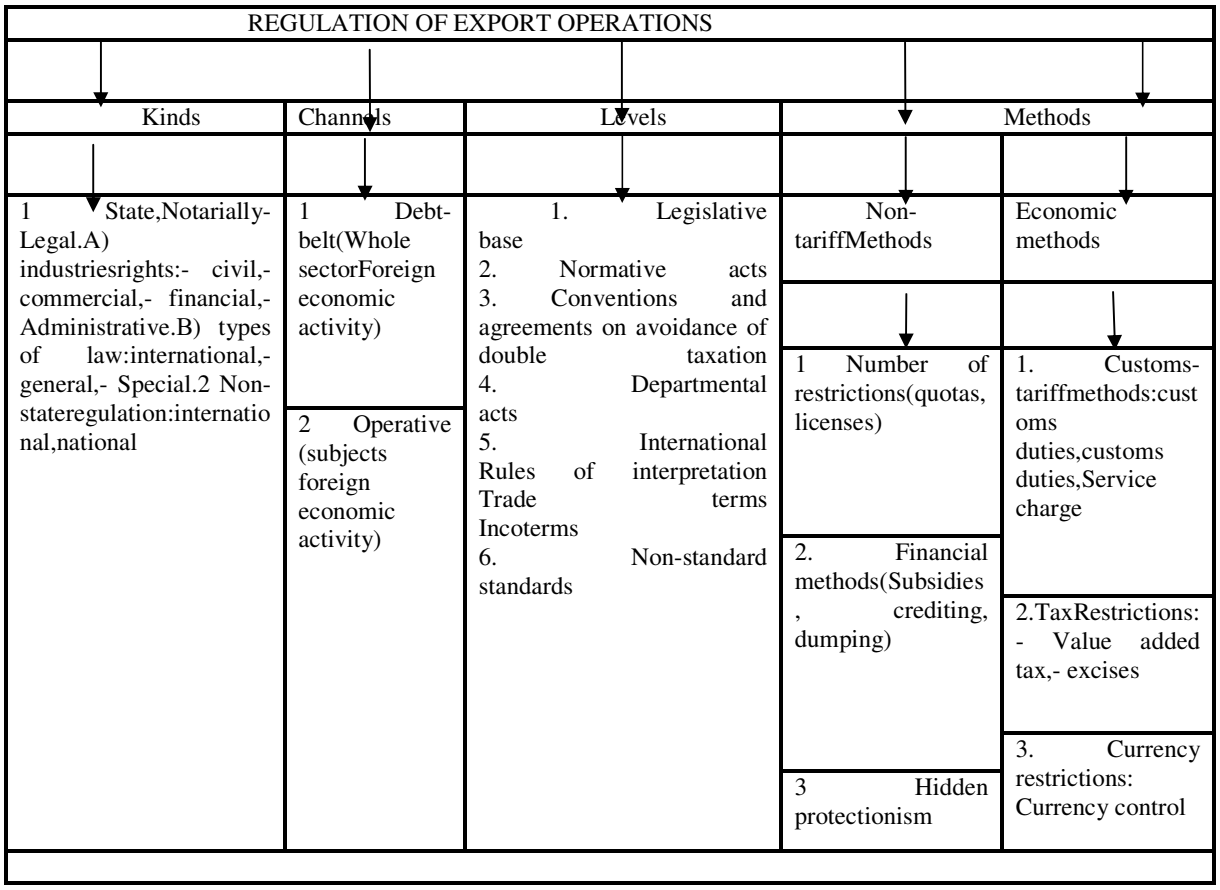
Highlight the top 10 export goods, which Kazakhstan trades with partners in the EEA.

Table 3: Top 10 export goods, which Kazakhstan trades With partners in the EEA

Category	Directions
10th place	Pipes, tubes, hoses and their fittings, plastic
9th place	Plumbing equipment and parts thereof, metal
8th place	Ready-made products from cereals, flour, starch or milk, flour confectionery
7th place	Fats and oils, animal and vegetable origin
6th place	Sugar and confectionery made from it
5th place	Vehicles and transport-related devices and equipment
4th place	Ball and roller bearings
3rd place	Alcoholic, non-alcoholic drinks and vinegar
2 nd place	Textile materials and products
1 st place	Plastics and articles thereof

The system of regulation of export-import transactions should be considered at least in four directions: types, channels, levels and methods (Scheme No. 1.). In foreign economic activity, as in other sectors of the market economy, two stages of regulation can be distinguished: state and non-state. The first is carried out by state bodies, the second is the result of the impact of public associations and the foreign economic policy of economic entities. The main component of the state regulation of foreign economic activity is its regulatory and legal framework. The regulatory and legal regulation of export-import transactions among other areas of financial and economic activity of organizations appears to be the most controversial and voluminous, as according to individual experts, the list of effective regulatory acts is huge.

Scheme 1: Regulation of export operations in the Republic of Kazakhstan



Promising in this regard, economic policy seems to be on the way of increasing the concentration of export of raw materials and at the same time creating favorable conditions for participants in foreign economic activities to expand exports of products. From the types of regulation it is necessary to distinguish its channels - long-term and operational. The first is primarily the creation and commissioning of regulatory documents. Within the framework of operational regulation, two areas are identified: the impact on the sector as a whole and on its individual subjects. The system of regulatory and legal regulation of export-import transactions as an information base for accounting, auditing and analysis can be classified into six levels.

1. At the first level are the legislative base of the Republic of Kazakhstan, the national statutory acts of the Republic of Kazakhstan: the Civil Code of the Republic of Kazakhstan, "On Taxes and Other Mandatory Payments to the Budget of the Republic of Kazakhstan" (Tax Code), Customs Code of the Republic of Kazakhstan. The legislative framework for the operation of export-import transactions includes the following laws: "On Currency Regulation", "On Licensing", "On the National Bank of the Republic of Kazakhstan", "On Subsidies and Countervailing Measures", "On Anti-Dumping Measures", "On Measures to Protect the Internal market for the import of goods "," On certification "," On export control "," On Investments "[2 - 13]. Assessing the legal framework governing the legality of export-import transactions, it is necessary to ascertain, first of all, compliance with the first-level normative acts, since they are the main information base. Laws can be entirely devoted to foreign trade operations, and can only affect it in some part.

2. At the second level of the system there are normative acts adopted by the President of the Republic of Kazakhstan and the Government of the Republic of Kazakhstan in the form of decrees and resolutions: "On liberalization of foreign economic activity", "On rates of excises for excisable

goods produced in the Republic of Kazakhstan and imported into the customs territory of the Republic of Kazakhstan , realized on the territory of the Republic of Kazakhstan and gambling business ", on approval of the Instruction" On the organization of export-import currency control in the Republic of Kazakhstan "[14-16].

3. Intergovernmental conventions and agreements on avoidance of double taxation.

4. The fourth level of the system of regulation of export-import relations is departmental and is represented by its supervising subdivisions of the Ministry of Finance of the Republic of Kazakhstan, the National Bank of the Republic of Kazakhstan, the Tax Service of the Republic of Kazakhstan, and the Customs Committee. Their functions include the preparation and approval of comments, instructions, letters of explanatory nature. It should be noted that these documents are more subject to changes and additions than higher-level documents.

5. If the first four levels relate to state regulation of export-import transactions, the fifth and sixth to non-government regulation. At the fifth level are the international rules for the supply of goods [17]. Organizations that conclude foreign trade contracts are required to adhere to certain rules of international trade. One of such sets of rules describing the distribution of responsibilities between the seller and the buyer when making a foreign economic transaction are the basic terms of delivery of INCOTERMS, which detail the procedure for the fulfillment of the terms of delivery, the provision of documents, the distribution of responsibilities and much more. The aim of Incoterms is to provide a set of international rules on the interpretation of the most widely used trade terms in the field of foreign trade. The basic conditions define the duty of the seller for the price established in the contract to ensure delivery of the goods to a certain point or to load the goods on vehicles or to transfer it to the transport organization.

In addition to licensing, some services and products imported to the territory of the Republic of Kazakhstan are subject to certification. According to the Law on "Certification", the sale of products, works, services subject to mandatory certification, without a certificate of conformity (a copy of the certificate of compliance) and a conformity mark or declaration of conformity (a copy of the declaration of conformity) is prohibited. In contracts concluded for the supply of imported products subject to mandatory certification, a certificate, a copy of the certificate and a conformity mark recognized in the state certification system [11] should be provided.

In accordance with the customs code of the Republic of Kazakhstan, when transferring goods across the customs border of the Republic of Kazakhstan and in other cases established by the decree, customs payments are paid: customs duties, customs fees, fees, payment for a preliminary decision [18, p.135].

The highest duties are set on products of a high degree of processing and ready for use (textiles, leather and footwear products, electrical engineering, etc.). Most often, the highest fees are used for fish, crabs, lobsters, chocolate, beer, wine, alcohol, cigarettes, clothing made of leather and fur, carpets and some other goods. For example, for explosives, the import duty rate is 30% of the customs value, for trucks - 10%. Duty-free ware, garden implements, semiprecious stones are imported duty-free [19, p. 135]. Practically for all countries the level of customs duties depends on the degree of processing of goods, a higher degree is accompanied by higher rates. The most common instrument for regulating trade flows is the customs tariff, through which the list of goods carried across the border is systematized. In spite of the tendency to reduce tariffs all over the world, they are multichannel. The Kazakhstan tariff is built on the principles of import tariffs, applied in most countries. The export tariff applies to 150 items of goods, including certain types of raw materials, fuel, food, etc. [20, p.6].The Government of Kazakhstan issued a resolution "On Amendments and Additions to the Resolution of the Government of the Republic of Kazakhstan", "On Rates of Customs Duties on Imported Goods" in order to support domestic producers and stimulate export of focused production. The amendments envisage a reduction in the rates of customs duties on the import of raw materials for the production of tantalum ingots and an increase in the rates of customs duties on imports of plastic pipes, sausages and canned goods. The basis for making appropriate changes were the manufacturers' rates [21].

The most important restriction is the export-import currency control. The procedure for its implementation is regulated by the Instruction on the Organization of Export-Import Currency Control in the Republic of Kazakhstan, approved by the Resolution of the Board of the National Bank of the Republic of Kazakhstan [16]. Export currency control is organized to prevent the export of capital abroad. The main document that determines the principles of currency transactions in the Republic of Kazakhstan, the powers and functions of the bodies of currency regulation and currency control, the rights and obligations of legal entities and individuals with regard to possession, use and disposal of currency values, the law of the Republic of Kazakhstan "On Foreign Exchange regulation and currency control "[5]. During the renovation, the Law has undergone certain changes and additions. However, he did not touch on the fundamental shortcomings of this document, which hinder the formation of qualitative accounting information on foreign trade activities.

The most important restriction is the export-import currency control. The procedure for its implementation is regulated by the Instruction on the Organization of Export-Import Currency Control in the Republic of Kazakhstan, approved by the Resolution of the Board of the National Bank of the Republic of Kazakhstan [16].

Currency regulation should be organized in such a way as to minimize the expenditure of the country's foreign exchange reserves, to stabilize the fluctuation of the money supply and to provide the monetary authorities with the possibility of conducting an effective monetary and credit policy. G.T. Abdikadyrova defines currency control as the state's activity to ensure the legality and expediency of foreign exchange transactions. From the point of view of a functional organization, currency control represents a set of requirements for participants in the foreign exchange market, the tasks of currency control are:

- determination of conformity of conducted currency transactions to the current legislation;
- verification of the reasonableness of payment in foreign currency [22, p.22].

According to the Law on Currency Regulation and Currency Control, the purpose of foreign exchange regulation is to promote public policies to achieve sustainable economic growth and ensure economic security. The tasks of currency regulation are:

1) establishment of the procedure for circulation of currency values in the Republic of Kazakhstan;

2) creation of conditions for further integration of the Republic of Kazakhstan into the world economy;

3) providing information base for currency transactions and capital flows.

Bodies of currency regulation:

1) the National Bank of the Republic of Kazakhstan is the main body of currency regulation in the Republic of Kazakhstan;

2) the government of the Republic of Kazakhstan and other state bodies carry out currency regulation within their competence;

3) the National Bank of the Republic of Kazakhstan and the Government of the Republic of Kazakhstan, in accordance with this law, issue normative and legal acts binding on residents and non-residents within their competence.

Normative and legal acts on currency regulation issues, developed by the bodies of currency regulation, are subject to mandatory agreement with the National Bank of the Republic of Kazakhstan [23, p.4-5]. The purpose of currency control is to ensure compliance with the legislation of the Republic of Kazakhstan by residents and non-residents of the RK when they conduct currency transactions. The objectives of currency control are:

1) determination of compliance of conducted currency transactions with the legislation of the Republic of Kazakhstan;

2) verification of the reasonableness of payments for currency transactions and the availability of documents necessary for their implementation;

3) checking the completeness and objectivity of accounting and reporting on currency transactions.

Foreign exchange control in the Republic of Kazakhstan is carried out by the National Bank of the Republic of Kazakhstan, other state bodies within the limits established by the laws of the Republic of Kazakhstan (currency control bodies) and currency control agents. Currency control agents are authorized banks and authorized organizations, as well as other organizations for which, in accordance with the licenses received, they are responsible for monitoring compliance with the currency legislation of the Republic of Kazakhstan during their operations [23, p.19-20].

Regulation of oil exports. The Law of the Republic of Kazakhstan "On Amendments to Certain Legislative Acts of the Republic of Kazakhstan on State Regulation of Production and Turnover of Certain Types of Oil Products" came into force, which amended the Decree "On Oil." In Art. 5 of the Decree on Oil, the competence of the Government of the Republic of Kazakhstan is supplemented by the following powers, in particular the Government of the Republic of Kazakhstan:

1) regulates oil exports, including by approving (changing) excise rates, customs, protective, anti-dumping and countervailing duties, quotas for oil exports;

2) establishes quantitative restrictions (quotas) for transportation of oil by various modes of transport;

3) determine the procedure for maintaining a single database of oil production and turnover;

4) organize a system for monitoring compliance with safety requirements for the technological process, storage and turnover of oil.

The Law "On State Regulation of Production and Turnover of Certain Types of Oil Products" was enacted [24]. The law sets forth the following requirements and obligations:

- Sale of gasoline (except aviation), diesel fuel and fuel oil is allowed through the devices of petroleum producers, as well as from petrol stations and petroleum products bases, whose services are certified;
- providing the authorized body with information for monitoring;
- registration of accompanying invoices for wholesale and retail sales by oil suppliers and for oil products transportation operations.

Minister of National Economy of the Republic of Kazakhstan Timur Suleimenov during the government meeting, presented the government program "National Export Strategy of Kazakhstan" for 2018-2022 [25]. "The program is aimed at achieving the strategic goals defined by the Kazakhstan-2050 Strategy, in particular to increase the volume of exports of non-primary commodities by half by 2025 compared to 2015" [26]. According to the Minister of the National Economy of the Republic of Kazakhstan Timur Suleimenov, it is proposed to establish as an indicator of the success of its implementation an increase in the volume of non-primary exports in comparison with the indicator of 2015 by 1.5 times by 2022, as well as an increase in the export of non-commodity commodity items to countries of priority and high interest [27].

In the framework of improving the institutional framework for exporters' support, the program proposes to legislatively fix the status of the Single Operator for Export Promotion and Promotion for NK Kazakh Export, which should operate on the principle of a "single window". "According to the world practice, the introduction of the" single window "provides an opportunity for the state authorities and development institutions to improve the quality and reduce the time for the provision of services, simplify administrative procedures and increase their effectiveness. For exporters, the introduction of a "single window" reduces the cost and time costs, simplifies the technology of information interaction with government agencies and development institutions, "Suleimenov said [27].

It is planned to define a promising "export basket" for goods and services with the identification of promising markets. This basket includes 116 products from seven industries that are already exported or that are proposed to be exported. According to the minister, among the existing commodity items are food products, mineral and chemical fertilizers, and among the new ones there are children's

clothes, medical products, glass. The prospective services, in terms of exports, include the following: transport, tourism, finance and business services, as well as education, medicine, space services and spacecraft testing.

According to Suleimenov, 27 countries were identified as promising markets for goods and services, which were conditionally divided by the degree of export interest for Kazakhstan to priority countries (Russia, China), high (Belarus, India, Iran, Kyrgyzstan, Turkey, Uzbekistan, Ukraine of export interest and countries of interest in the long term (Great Britain, Germany, Italy, Finland, France, Germany, Italy, veytsariya, South Korea and Japan.) [27].

The program provides financial and non-financial support measures for exporters, as well as removal of barriers to export development. Today Kazakhstani products are exported to 117 countries of the world. Last year, Kazakhstan ranked 52nd among 204 countries with a share of 0.23% of global exports. Kazakhstan's exports are mainly represented by raw materials, as well as non-primary goods of low conversion. At the same time, in the past 10 years, exports of services have almost doubled, reaching $ 6.3 billion in 2016. To ensure the growth of the volume of non-raw exports, the Program assumes a comprehensive solution of a number of tasks, including the improvement of the institutional framework for supporting exporters. Thus, we see that the Republic of Kazakhstan is currently focused on the export of raw materials and materials, in the extraction of which we have great advantages over other countries. That is, Kazakhstan specializes in the extraction of natural material resources, and this determines the role and place of Kazakhstan, in the international division of labor, as suppliers of cheap resources. If you consider the import of the country, you can identify the following trends.

4. Developed proposals for the development of a model of the state system of export stimulation with the identification of functional-target levels and local (regional and branch) subsystems. To expand its share in the international market, Kazakhstan can, by taking steps to gradually develop its foreign economic activities.

Thirdly, exports and imports of services play an important role in international trade, with an average growth rate of 13% each year. This includes all types of international passenger and freight transport, tourism, banking services and insurance companies, payments for patents, royalties and rights, advertising revenues, art sales, health services, training, software, trade and technical activities.

Seventh, segmentation of the market. Undoubtedly, the low competitiveness of domestic goods is a restraining factor in the development of Kazakhstani exports. This problem can be solved by segmenting the market, that is, finding certain markets for the goods of our industry. Thus, to enter the international market for certain products, the enterprise that produces the goods must have a sufficient volume of operations and profits in the domestic market. The domestic domestic market of Kazakhstan is not yet sufficiently developed. First of all, it is necessary to achieve food and industrial self-sufficiency, which is the imperative of development for any country. The ultimate goal of the development of Kazakhstan's foreign trade should be to grow into the world geo-economic system for a breakthrough to full participation in the formation and distribution of world income.

Literature

1. www.statistica.gov.kz.
2. Civil Code of the Republic of Kazakhstan (General and Special Part). - Almaty: Lawyer, 2015. - 170 p.
3. "On taxes and other mandatory payments to the budget of the Republic of Kazakhstan" (Tax Code). - Almaty: Lawyer, 2017. - 288 p.
4. Customs Code of the Republic of Kazakhstan. - Almaty: 2016. - 216 p.
5. "On Currency Regulation", Law of the Republic of Kazakhstan. - Almaty: LAWYER, 2013. - 34 p.
6. "On licensing", the Law of the Republic of Kazakhstan. - Almaty: LAWYER, 2013. - 14 pp.

7. "On the National Bank of the Republic of Kazakhstan", Law of the Republic of Kazakhstan. - Almaty: LAWYER, 2013. -13 s.
8 "On Subsidies and Countervailing Measures", Law of the RK . - Almaty: LAWYER, 2013. - 12 pp.
9. "On anti-dumping measures", Law of the Republic of Kazakhstan. - Almaty: LAWYER, 2013. - 11 p.
10. "On measures to protect the domestic market for the import of goods", Law of the Republic of Kazakhstan. - Almaty: LAWYER, 2013. - 33 p.
11. "On certification", Law of the Republic of Kazakhstan . - Almaty: LAWYER, 2013. - 44 p.
12. "On Export Control", Law of the Republic of Kazakhstan of June 18, 1996 No. 9-1.
13. "On Investments", Law of the Republic of Kazakhstan of December 24, 1996, No. 54-1.
14.On liberalization of foreign economic activity. Decree of the President of the Republic of Kazakhstan of January 11, 19995 No. 2021.
15.On rates of excises for excisable goods produced in the Republic of Kazakhstan and imported to the customs territory of the Republic of Kazakhstan, sold on the territory of the Republic of Kazakhstan, and gambling. Decree No. 137 of the Government of the Republic of Kazakhstan of January 28, 2000.
16. Instructions "On the organization of export-import currency control in the Republic of Kazakhstan", Resolution of the Board of the National Bank of the Republic of Kazakhstan "dated September 5, 2001 No. 343.
17. Incoterms 2000: International rules for the interpretation of trade terms. - Almaty: LAWYER, 2005. - 68 p.
18. Dyusembaev K.Sh. Audit and analysis of financial statements. - Almaty: "Karzhy-Karazhat", 2003. - 512 p.
19. Zhatkanbaev E.B. Sukhova LF Customs and Tariff Regulation in the Republic of Kazakhstan - Almaty: Kazakh University, 2000. - 96 p.
20. Slyamova KN Foreign economic activity: import №6. - Almaty: 2017 "Biko", - 30 p.
21. Resolution of the Government of the Republic of Kazakhstan: "On Rates of Customs Duties on Imported Goods". - Almaty: 2017, 20 p.
22. Abdakadyrova S.A. "Currency Regulation in the RK", - Almaty: "Economy", - 2004, - 56 p.
23. Law of the Republic of Kazakhstan "On Currency Regulation and Currency Control", - Almaty: "Biko" 2017. - 24.c.
24. On state regulation of production and turnover of certain types of oil and oil products. Almaty: 2013. - 670 sec.
25. National Export Strategy of Kazakhstan for 2018-2022
26. Strategy Kazakhstan -2050: the new political course of the state. Almaty 2012 -20 s.
27. http://ic24.kz/news/natsionalnuyu-eksportnuy-strategiyu-rk-na-2018-2022-gody-predstavili-v-pravitelstve-u26181

Restructuring of the Agricultural Sector in Romania

Adrian Turek Rahoveanu*, University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Marasti Blvd, District 1, Bucharest, Romania, aditurek@yahoo.com

Abstract

After 1990, Romanian agriculture has undergone a long process of transition from command to market economy to adapt to the operation of the common market for integration into European structures and subsequently in 2007 to implement the Common Agricultural Policy.
In terms of operational structures Romanian agriculture is uneven, and their dual nature is emphasized to the vast majority of Member States of the European Union. In Romania, the agricultural land fund is strongly affected by the fragmentation into small parcels, which leads in many cases impossible the application of modern agricultural technologies leading agricultural technology, scientifically, to obtain Farmland of stable production both in terms of quantity and quality.The paper aims to identify opportunities for future Common Agricultural Policy towards developing the agricultural sector and mainly in strengthening agricultural exploitations, as the main source of support to the sector will be represented by European funds.

Keywords: agrarian structures, farm management, sustainable growth, competitiveness

Introduction

European agriculture is very diverse, both in terms of farm structure and production methods and land use. The diversity of agriculture in the European Union on the one hand reflects the historical development but is mainly dependent on natural conditions: climatic, geographical, geological and socio-economic environment of each State [5].

In Romania agriculture is a very important sector, both by the contribution that has national economy and by its social role. The current state of the Romanian agriculture, the countryside, in large part, is determined by the agrarian structure of Romania - economic and social issues of the utmost importance and actuality for Romania [9, 11].

Agrarian structures necessary basic training and operation of competitive market constitutes a system of interdependent components and flexible in time and space related to: economic organization of farmers into viable forms of exploitation, formation of production structures according to requirements consumer technical and technological modernization of farms to obtain quality products at competitive prices, organizing marketing structures so as to ensure over distribution channels and supply the necessary material and financial flows resuming production training foodservice channels, complex and sustainable rural development [1, 6, 10].

With its accession to European Union agricultural policies that have been applied in Romania were the result of interaction between CAP and national agricultural policy measures, which complemented programs. The agricultural policies of the European Union's agricultural policy reforms guided Romania increasingly, with the start of accession negotiations, which ensured compatibility between agricultural policy measures pre-accession and post-accession facility and transitional period where they could be maintained instruments previously used in 2007. However, the competitiveness of the agricultural sector in Romania, analyzed in terms of performance farms, following the old Member States of the European Union [8].

Increase domestic agricultural production is the main factor that affects food security and agricultural policies of the country. Farm structure adjustment measures are tools that have the potential to bring a lasting solution to the problem of agricultural supply, including by supporting economic growth and

physical size of holdings, in line with the developments in technology used in agricultural production [7].

Material and Methods

This paper aims to present an objective analysis of the agricultural sector in Romania, focusing on the development directions of physical and economic size of farms and the need to introduce measures to strengthen their.

The main elements of the work were to evaluate the situation of Romanian agriculture compared to other EU member states, identifying alternative economic efficiency of farms, focusing on increasing the average size of the farm and the necessary changes in the production structure.

The data used for analyzes in this paper come from various sources, both national origin (National Institute of Statistics, Ministry of Agriculture and Rural Development) and international (Eurostat, European Commission) and generally include: statistics holdings, Economic Accounts for Agriculture, farm structure.

Results and Discussions

Romania to the EU presents significant gaps in productivity of the agricultural sector. Even in the favorable agricultural productivity level is below 50% of the EU average situation showing untapped economic potential of Romanian agriculture and rural areas. This can be explained both by the internal structure of Romanian farms (small size, fragmentation pronounced), inappropriate use of inputs (including human capital) and the existing poor infrastructure.

According to Eurostat, the EU-28 were recorded a total of almost 12 million farms. These farms covering an area of 170 million hectares, average farm is 14.3 ha. In Romania there were 3.86 million farms, employing 13.3 million ha UAA returned the average holding is 3.45 ha, more than 4 times lower than the EU average, which negatively influences the implementation worth of agricultural and rural resources available, with adverse effects on the rural economy and farmers' incomes (table 1).

It is noted that of the 12 million existing farms in the European Union, more than 3.8 million (32%) are in Romania, which shows the scale of fragmentation Romanian farm, with negative consequences on performance economic and general state of development and their development [3].

Table 1: Number of farms and UAA, size class, EU-28 and Romania

	Total	**< 2 ha**	**2-5 ha**	**5-10 ha**	**10-20 ha**
Number of farms according to their size					
UE-28	12247990	6018390	2474030	1337660	916570
	100%	*49.1%*	*20.2%*	*10.9%*	*7.5%*
RO	3859040	2866440	727390	182440	43610
	100%	*74.3%*	*18.8%*	*4.7%*	*1.1%*
Used agricultural area (UAA), depending on the size of farms					
UE-28	174115580	4301640	7810520	9368890	12851610
	100%	*2.5%*	*4.5%*	*5.4%*	*7.4%*
RO	13306130	1718360	2229930	1210510	571390
	100%	*12.9%*	*16.8%*	*9.1%*	*4.3%*

	20-30 ha	30-50 ha	50-100 ha	> 100 ha
Number of farms according to their size				
UE-28	382560	399160	393890	325820
	3.1%	*3.3%*	*3.2%*	*2.7%*
RO	9730	8210	7480	13730
	0.3%	*0.2%*	*0.2%*	*0.4%*
Used agricultural area (UAA), depending on the size of farms				
UE-28	9323600	15429640	27605440	87424210
	5.4%	*8.9%*	*15.9%*	*50.2%*
RO	233850	315400	518300	6508390
	1.7%	*2.4%*	*3.9%*	*48.9%*

Source: Eurostat (online data code: ef_kvaareg)

Economic activity in agriculture is closely direct and indirect related to land, as the main production factor and important element of agricultural capital. The land is not just a factor of production, but the food security of the population, that can create a significant and sufficient amount of food products; is the most precious natural resource on which depend the development of healthy rural communities and the rural family existence.

In none of other activity the land has a higher value, like in agriculture. This results from its intrinsic, quantitative and qualitative characteristics, so different from one territory to another. Decisions on production system, crop structure, varieties or the allocation of other factors of production are based on soil characteristics.

The main means of agricultural production, land is characterized by a number of specific features that offer a specific role land in agricultural production and in national economy:

- Land is limited in terms of area and agricultural use. Agricultural area is reduced from year to year as a result of removing the surfaces aside for other purposes or as a result of degradation;
- Land is unlimited in potential production. It has regenerative and increasing capacity of its efficiency, not consumed and not run out and participates directly in the production of goods. Of course, the wasteful practice of agriculture, energy reserves and accumulated organic and mineral nutrients in the soil can be depleted gradually until serious damage to the productive potential of the land;
- Spatially, the land is immobile. The immobile character has implications for the organizing processes of agricultural production;
- Land as natural means cannot be replaced, so it is un-substituted;
- as a means of labour, land alone cannot participate in obtaining economic goods, but only by labour and working together with mechanical, chemical and biological means;
- Land from a legal perspective, is subject to law, the property object and purpose of farming.

Romanian agriculture is still a broad sector of the economy and has important tasks to produce the means of livelihood for a large part of the population; currently about 45% of the population live in rural areas. The high percentage of the workforce employed in agriculture suggests its extensive nature and use of technologies that have a high agricultural labour consumption.

Regarding labor force in agriculture, it is much oversized compared to the EU, employment in rural areas and the agricultural sector remained at a consistently high level. This which requires finding solutions to farm structural change, especially since the situation remains almost unchanged in recent years, as reflected by the labor productivity and economic performance of farms. The explanation of this phenomenon is that most farmers are their own employees, making subsistence agriculture, being necessary to supplement the income they obtain income from non-agricultural.

Another negative aspect is the low productivity of agriculture; it provides only a small portion of food products that are necessary for population. To cover demand, imports of agricultural products require a great financial effort which is 2 times higher than the value of exports of agricultural products and contribute to the disequilibrium of the Romania's balance of payments.

In Romania, due to land restitution, most individual farms are characterized by low economic power and self-consumption oriented, being mostly subsistence and semi-subsistence. Opening them to market is relatively small, both in terms of necessary inputs and outputs.

Labor force in agriculture is much oversized compared to the EU average, aging, with a low education level, social vulnerability. In addition, a decrease in the level of education of the rural population occupied labor force young (under 35 years) has a level of training in agriculture lower than the employment quotas mature (35-45 years) which limits the possibilities of implementing business initiatives based on advanced technologies [4].

Employment in agriculture and forestry, represent about 19% of the employed population in Romania, a large gap with the EU average (4.7%) and even to the new Member States (eg Poland: 10.1% Hungary: 5.5%, Bulgaria 14.7%), not to mention countries such as France (2.6%), the UK (1.9%) and Germany (1.8%). The large number of people working in agricultural activities in agriculture and forestry is a first indication of the low level of labor productivity [14].

Currently, Romania, although efforts are still far behind the European average in terms of the socio-economic development in general and national productivity. One of the fundamental causes at the macroeconomic level, it is still very large gaps separating Romania from the structural situation in advanced countries and the European average in a number of performance indicators.

Romania has the high percentage of elderly labor in agriculture, where more than 45 years is 51.0% of the total (compared to 36.7% nationally) and people over 64 years 14.7 % (compared to 4.5% national average). Practically the entire employed population over 64 years (98.3%) engaged in agriculture (table 2).

Table 2: The structure of the agricultural population, by age

Thousand persons

Total	15-24 years	25-34 years	35-44 years	45-54 years	55-64 years	> 65 years
2780	10,2	17,7	21,1	17,4	18,9	14,7

Source: Romanian Statistical Yearbook 2015, NIS 2016

The analysis presented in Table 2 data filtering result that the farming population is aging, but at the same time, however, be remembered that a proportion of 27.9% of the total workforce consists of young, under 35 years, with a low skilled, have little possibilities to adapt to market requirements. This is the main reason that causes a person very low productivity. The consequence of this is that a large part of the rural population produce only for self and makes a decent income limit.

Increasing the number of young farmers through the Common Agricultural Policy instruments available (additional payments corresponding to the installation of young farmers - Measure 6.1.), should be the focus of human resources in Romania [13].

Results that Romania is characterized by a highly polarized agrarian structure. Such pronounced bipolar distribution, with the majority of agricultural land divided, on the one part, the extremely modest farm physical and economic size, which produce mainly for their own needs, do not invest and do not generate consumer market, and on the other part a relatively small number of farms producing industrial system and adopt modern technologies, the main factor limiting the increase of competitiveness of Romanian agriculture [12].

With this reality agrarian structure excessively broken, it is considered that for a medium-term strategy, the problem should be approached differently medium and large farms, which are farms professional and make agriculture a business and the small farms that have a less important role in the markets, but are important in the rural world for providing food and social security, contribute to environmental preservation through the use of traditional production methods, etc. [6].

Restructuring activities at farm level and increased use of capital for commercial farms will lead to improved competitiveness and inevitably to the use of a smaller workforce. The farm building involves increasing the physical size and economically. In parallel with the increase in farm size is achieved specialization of farms, an increase of the economic importance of large holdings [14].

Table 3: SWOT analysis of the Romanian agriculture that starts the process of consolidation of farms

Strengths
➢ Good climatic conditions for agriculture ➢ The existence of a tradition of farming and some large areas with great potential for agriculture ➢ Low labor costs ➢ Sales market at national and European level ➢ High potential of organic farming, especially for semi-subsistence farms ➢ Large number of farms semi-subsistence allow more flexibility and the possibility of creating / adapting to new structures of marketing their products. ➢ Existence support to agriculture by European programs
Weaknesses
➢ Land restitution process was very long which led to slow the viability of farms by restricting access to financing ➢ Production technologies obsolete and uncompetitive agricultural sector due to under-capitalization ➢ Small size of farms, number of individual farms, without legal personality versus agricultural societies, with legal ➢ Low profitability of agricultural activities due to break-land and the large number of individual farms that practice subsistence farming ➢ The inability of small farmers to improve market competitiveness results in loss of attractiveness to farming, resulting in their migration to urban areas ➢ Low productivity compared to the European average ➢ Improper or faulty inputs (including human capital) ➢ Insufficient irrigation of agricultural land - dependent production of natural and climatic conditions of the area, which leads to instability in production ➢ Very low investment capacity, storage, processing, packaging, transport ➢ Low level of association and organization on branch; ➢ Lack marketing infrastructure for agricultural exploitation ➢ Reduced access of farm owners in technical assistance activities, design and consultancy specialized ➢ Romanian market, completely unprotected against imports. Hypermarkets not purchase products from Romanian producer. ➢ The very high level of tax evasion for imported products ➢ Lack of processing sector as an alternative to fresh dissolution ➢ Lack professional schools and specialty high schools, and thus lack of technicians and skilled workers; ➢ Low mobility of labor for seasonal activities
Opportunities
➢ Implementation of financing programs for small farms could fill market niches (vegetable, fruit) ➢ Implementation of programs through which young people can buy land ➢ Family Farms, and farms of small or medium sizes may represent the backbone of the

Romanian agriculture, and also an element of national identity. ➢ Overcoming mentality that small farms is a pole of poverty ➢ Speed up the rejuvenation of the population of Romanian farmers, it is currently the oldest population of farmers in Europe ➢ Farmers should be encouraged to join in cooperative production and marketing.
Risks
➢ The effects of climate change in recent years have shown intense or by excessive drought or flooding in some areas ➢ agricultural activities still represent a secondary activity for farmers ➢ Depopulation of rural - urban migration of the young population ➢ Ageing population occupied in agriculture excessive ➢ Romanian farmers face a shortage of bins, so they have to sell products at low prices ➢ Capital investment in agriculture decreased ➢ Restricting access to finance for small farms (lack of ability to access credit and funds) ➢ The frame unstable fiscal ➢ Lack of support for the acquisition of agricultural land by Romanian farmers and farmers associations

Conclusion

The main measures of Romanian agricultural restructuring, reduction and gradual elimination of structural gaps between agriculture Romania and other EU Member States, and to increase physical and economic size of farms, aims to:

- the optimal use of natural conditions of soil and climate of human resources is often, materials and financial capabilities farms;
- concentration of agricultural production in larger units to produce for the market in terms of economic efficiency, social and environmental;
- increasing mechanization of farming, increasing labor productivity and yields while reducing production spending severely;
- stabilization of quantitative and qualitative supply of agricultural products by improving the quality of inputs and technology culture;
- initiating and supporting the formation of individual associations of agricultural producers for the supply of inputs for executing mechanical works for the storage of products obtained and the effective use of the products obtained;
- accelerate the restructuring of farms by increasing territorial and economic dimensions to form medium farm sector, the concentration of supply for marketing, while organizing small farmers in various forms of association and cooperation on product chains to ensure increased market competitiveness and income rural residents;
- improving production structures to meet domestic consumer demand and exports by diversifying economic activities in rural areas;
- promoting sustainable production and consumption model by increasing food production and sustainable ways of product quality;
- increase value added and labor productivity on farms by economic organization of farmers , improving the use of agricultural resources and using financial support from the European Union and the national budget for restructuring activities and investment holdings;
- Organizing the routes of food products (production, storage, processing, distribution) having the effect of increasing the competitiveness of agriculture.

Increasing the size of holdings will occur naturally if you become a profitable agriculture: farmers seek to increase the holding area in an environment where they can earn enough from farming [2].

References

[1]. 1Bold I., Crăciun A. (2001) *Agricultural holding*, Mirton Publisching, Timişoara

[2]. 2Dobre I. (2012) *the Knowledge Implications on Performance Management of Agricultural Production Structure* - International Comparative Management, Vol. 13 (1)

[3]. Dobre Ramona, Cîrstea, A.C., (2013), *Land Property Structure - A Limiting Factor in Strengthening the Agricultural Holdings*, Scientific Papers Series Management , Economic Engineering in Agriculture and Rural Development, Vol. 13, Issue 2, 127-132

[4]. Done I., Luminita Chivu, Jean Andrei, Mirela Matei (2012), *Using labor force and green investments in valuing the Romanian agriculture potential*, Journal of Food, Agriculture & Environment Vol.10 (3&4)

[5]. Gradinaru Iulia, Mocuta Dorina (2017), *Farm Structures in the European Union*, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, Vol. 17, Issue 1, 223-229

[6]. Lascăr Elena (2013), *The Structure of the Farms in South Muntenia Region*, Scientific Papers Series Management , Economic Engineering in Agriculture and Rural Development Vol. 13 , Issue 1, 205-208

[7]. Luca L. (2013) *Evaluation of Agricultural Policy in Romania in terms of food security*, Romanian Academy, Bucharest

[8]. Turek Rahoveanu, A. (2016) *Increasing the physical and economic size of agricultural holdings - necessity to reduce disparities between Romania and the European Union*, International Conference on Advances in Management, Economics and Social Science, pg. 43-47

[9]. Turek Rahoveanu A. (2007), *Evoluţia formelor de proprietate funciară în agricultura României*, Editura Cartea Universitară

[10]. Turek Rahoveanu A., Turek Rahoveanu Magdalena, Ion Raluca, Radu V., (2011) *Optimizarea structurilor de producţie – necesitate pentru asigurarea competitivităţii exploataţiilor agricole*, Editura Terra Nostra

[11]. Zahiu Letitia (coord). (2005), *Policies and agricultural markets - reform and European integration*, Ceres Publishing, Bucharest

[12]. *** *Socio-economic rural development perspective 2014-2020*, (2013) MARD.

[13]. *** *National Strategie 2014-2020-2030* (2013), the Presidential Commission for Public Policy for Agricultural Development

[14]. *** *Study on Consolidation of farms* (2012), the National Commission for Prognosis

Analysis of Agricultural Chains in Romania Case Study: Cereals and Oilseeds

Adrian Turek Rahoveanu*

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Marasti Blvd, District 1, Bucharest, Romania, aditurek@yahoo.com*

Abstract

Agrifood sector by organizing the routes on products or product groups in the context of the EU enlargement towards Eastern Europe and the rise of globalization has numerous advantages offered by new approaches to space and measures to increase competitiveness.
The EU agrifood sector is a competitiveness problem overall strategic objective. European Strategic Guidelines for Rural Development addresses the issue of competitiveness in terms of establishing functional relationships between agriculture, forestry, food industry competitiveness in the European context.A vital issue for food chains in Romania is the restructuring and modernization of capital by attracting foreign investment in all sectors, but especially in the food industry. Accelerating the integration will be combined with efforts to achieve quality requirements and standards of the European Community to form a viable agricultural sector, competitive, able to give Romania an advantageous position in the European market to produce high standards in terms of efficiency.

Keywords: food chains, competitiveness, agrifood system, cereals and oilseeds

Introduction

Ensuring food demand involves performing a set of economic activities: production of agricultural raw materials, conditioning, storage and disposal, processing or transformation of raw materials into final food products, distributing food products to the final consumer.

Diversification of agriculture upstream and downstream integration has created designs varied according to the diversity of food. Been formed modern agricultural economy characterized by interdependence between products and sectors as: agrifood sector-specific products or groups of products; national agro-food chain that integrates pathways pr product or group of products, forming agricultural economy or if we consider the systemic approach "food system".

Food sector of a country is formed in the process of organizing the routes for the product, in conjunction with the changes taking place in consumer demands and market developments.

Studying the agrifood sector is of particular interest because of concerns people to know what happens to products produced by farmers and how they reach consumers, who are the intermediaries and what role that undergoes transformation products. These concerns relate to competition, performance and best use of resources "way agricultural products from producer to consumer."

Connection is defined in relation to the consumer market and distribution channels and supply all used by all producers involved in the market. In this framework agro-food sector can be addressed as a system. For this reason the concept of the chain can be analyzed in different ways, namely:

- Optical marketing (seeking behavior of market agents are in route, costs and profits made by each of them);
- Optical ecosystem (with reference to the development of pathways associated with avoiding waste of resources and pollution);

- Optical social - political (and thus analyzes the functions, roles, opportunities, conflicts and balance channels).

Complex chain of steps and final food product groups are the production, collection, processing, distribution and consumption. Pathway comprises preproduction phase, agricultural production, agricultural product processing and distribution.

A key element in the organization of the Department of agrifood sector is the economic and consumer attachment to the objectives of farmers such as changes in land policy forms, the prices of industrial goods needed agricultural production, the processing and distribution costs, distribution of profits (net gains) derived from agro-food sector, forms of subsidies for bank loans etc.

Affiliation farmers to policy pathway may be adopting strategies that provide these as aim: making partnership agreements between manufacturers in view of the massive distribution of products; distribution for fresh produce directly from stores or Platforms (centers) distributors, direct supply of large shopping centers (supermarkets) a policy of quality products on the market launch and circulation.

Approaches to food production chains must be carried in a dynamic optical, integrating space (which relates to production, consumption, market determined) and the time that elapses from the entrance to the branch or its various links to the exit. Basically, the analysis of food pathways may be initiated upstream or downstream producers, consumers, processors and distributors.

Material And Methods

Food chains analysis is to follow the route of a food product from the production of raw materials to its use as food consumption, which means preponderance function food supply chain. The study involves a detailed analysis chain of channels, channel marketing, performance at each stage and find solutions for increasing the competitiveness of the market.

Food chains refers to the road traveled by a product or group of products within the scope of food and cover, overall two main components: agents (businesses and governments) and operations (production, distribution and financing) that contribute to forming and processing of the product to the point of use, on the one hand, and the mechanisms for adjusting the flow of products and inputs along the chain allocated to the final stage, on the other hand.

Study synthetic chain is using SWOT analysis identifying "strengths" and "weaknesses":

- Strengths of a subsidiary may refer to low cost of production of agricultural products, cheap labor, specialization of production, and others.
- Weaknesses can be financial, incurred due to the behavior of one or more members of the department who practice unfair pricing policy, which increases prices and tariffs and reducing farmers' incomes. In this case, the diagnosis chain must identify participants who express this attitude speculative. There are also weaknesses order information, the manufacturer is often the last informed about how its products are received by the market demand and foreseeable developments.
- Opportunities a chain can refer to tradition and experience of farmers, the natural potential of certain areas, high potential market and increased demand for certain products, investments, presence and inter-professional organizations along the supply chain, etc..
- Threats a chain can refer to excessive humidity, floods, drought, late spring frosts and other environmental limiting factors that determine the quantity and quality of production cuts, inflation, financial blockage, imports of similar products, competition, increased demand for competing products reduced consumer purchasing power, etc.

Results and Discussions

For the purpose of organizing and performing functional pathways is necessary to go through two steps:

- identifying products, routes that go through or marketing channels and operators are on the pathway;
- analysis of economic and financial indicators expressing the performance and competitiveness, as well as providing tools and mechanisms regulating relations - matching every stage of the supply chain (yields, specific consumptions, costs, prices, public intervention, credit, tax, trade policy, etc.) .

Agrifood sector in developed countries is characterized by the indissoluble links between food safety - quality - environments. They meet the needs and demands of consumers.

To this end, whole food sector organization formed components, while under the pressure of market forces, but also EU rules so as to meet the requirements of domestic consumers.

European agro-food system promotes cooperation between all forms of social organization in the food industry, including coverage of small producers or individual entrepreneurs.

In the European Union Common Agricultural Market was created and developed through the common market organization on the product or product group. At the community level have developed policies to improve the functioning of markets, regularly adjusted to the new economic situation.

Common Market Organization provides an institutional framework that implements the CAP mechanisms in all Member States. These mechanisms include tools and common rules applied consistently across the Community, but they represent only a part of all the rules governing the operation of the routes in the Member States compiled according to national and local specificities.

Characteristics of agri-food chains

A first feature is related, so the fact that the basic materials are organic. This means, first, that it is a resource highly perishable, which involves providing special storage and handling. Secondly, in the case of organic materials, it is possible to use complete technological processes, especially if we consider that many of the residues in food are used as livestock feed, and in cases where no are used for this purpose, they can be discharged into the environment without risk of pollution effects absorbed into the ground rather quickly. Third, domestic production of raw materials is seasonal plants which influence the course of the processing and marketing chain are on during a calendar year. Fourth, the present scientific and technical progress in this area is mainly based on genetic engineering and biotechnology.

Another feature is the relatively small number of stages through which the raw material in the manufacturing process, which makes it possible and necessary, most of the time, the integration of the manufacture of a single organizational links. Therefore, the accumulation of value while deepening processing of raw materials is less evident in food chains. In this respect, it must be added that most of the times, for a commodity of a company in the food industry in our country-specific priority to final destination.

A specific feature is that for the commercial quality of finished food products resulting from the processing are defining elements nutritional content and its conservation capacity as longer periods.

Another feature results from the fact that there are too many cases where the industrial processing, physic-chemical structure change of the basic raw material. Often, this means nothing else than the realization of a sequence of operations of separation, preparation, portioning and packaging, pre sanitary conditions.

One last feature would be that the agrifood sector specific technological flows are based on complex installations with a high degree of automation, approaching this aspect of the chemical industry.

Given these characteristics, we can say that the higher recovery of agricultural commodities in specific channels is less related to the consolidation of processing and production assortment structure, but the

quality level of the products, portioning, packaging and presentation of products in line with consumer requirements for upgrading manufacturing processes of redistribution products in favor of those channels that ensure their safe use maximum economic efficiency.

Unlike most EU countries, agriculture has been and continues to be an area of prime importance in Romania, both by contributing to the economy and the share of employment. Romanian agricultural sector performance remains relatively modest, in contrast to its natural potential and the expectations of facilitating public financing system.

With a utilized agricultural area of 13.3 million hectares (representing 55.8% of Romania's surface), Romania has significant agricultural resources in Central and Eastern Europe. Although significant areas of UAA classified as less favored areas, soil conditions are particularly favorable farming production in southern and western regions of the country. Most of the utilized agricultural area is arable (8.3 million ha), followed by pasture and hay (4.5 million ha), permanent crops (0.3 million ha) and family gardens (0.2 million ha).

Conclusion

Connection of a product involves operating the activities of economic agents respecting the objectives assumed in connection with market relations over the whole route of a product or group of products from the farmer to the final consumer. The organization of this circuit occurs through the establishment of uniform market, but specific product, country, region and agricultural areas. Although there is a legal and administrative framework that creates conditions circuits functioning food products, organizational structures and mechanisms that ensure operator's clues chain internal organization of enterprises, the purpose of the action is dependent on numerous factors that may favor or disfavor to achieve the fundamental purpose is to obtain value added at each stage of the chain.

From SWOT analysis on cereal and oilseed baking, some conclusions can be drawn appreciated by the weaknesses of the routes, such as the strengths and opportunities for improvement of the activity along the pathways priorities in Romanian agriculture.

Weaknesses in the chain:

- Phase grains and oilseed production:
  - excessive fragmentation of agricultural land and the large number of households engaged in subsistence agriculture;
  - dependence on natural and climatic conditions of production which leads to instability annual production of cereals and oilseeds needed for domestic consumption;
  - crop insurance system is less practiced both for lack of money and the farmers distrust its correctness;
  - inputs for agricultural production costs are high, resulting in high prices for agricultural products obtained significantly higher than those of import;
  - lack of resources that causes bad practice technologies and use outdated agricultural technology and low production thus obtaining high costs;
  - poor quality of cereals and oilseeds production technologies acquired through use or improper storage conditions (seeds have high moisture at harvest, the percentage of foreign bodies is high due to low performance combine harvesting);
  - low prices received by farmers from traders and processors for quantities of cereals and oilseeds sold;
  - inability of small farmers to improve their market competitiveness results in loss of attractiveness to farming, leans towards its end and their migration to urban areas.
- Stage collection, transport, storage:
  - inadequate storage in the agricultural producers;
  - own facilities lack conditioning, drying, cleaning the farmers used to harvest because combines these operations are necessary;

- lack of transportation and the inability of farmers to cover long distance transport;
- high tariffs levied on commodity storage combined with replacement or depreciation risk it by handling (broken grains);
- specialized storage spaces are not used to full capacity due to high tariffs practice of monopoly;
- storage does not have the financial resources to buy agricultural products and only offer storage services;
- some storage capacity on the modernization requires investment, especially for handling operations;
- existence of vertical storage silos do not allow separate storage on quality, thus reducing their overall quality.

➢ Stage processing of cereals and oilseeds:

- deficiencies in quality compliance;
- processing sector has a production capacity of technical and technological exceeded.

➢ Marketing stage:

- lack of programs aimed at creating products for market, farmers do not know what and how to produce for the market;
- weaknesses in the creation and operation of marketing infrastructure;
- prices of agricultural products is not based on a coherent policy for determining their level;
- instability of the domestic supply of agricultural products in terms of quantity and quality;
- significant imports of grain in years of poor harvests and exports in years of surplus production is below capacity available;
- poor organization of agricultural markets and the lack of information on domestic producers of export opportunities;
- poor structure of exports of grains and oilseeds and monopolies in this area;
- prevalence in imported products of the processed, high added value, which emphasizes trade deficit in value terms.

➢ Stage consumption:

- wheat consumption per capita in Romania is double that of the EU because of the national pattern of consumption, especially low income people who cannot provide a structure qualitatively normal daily ration.

Strengths and opportunities in the supply chain:

➢ Step agriculture:

- Romania's agricultural area is relatively large, being among the first places in the Union;
- arable land has a significant share in the agricultural and soil quality is suitable for cultivation of crops, primarily grain and oilseeds;
- small quantities of fertilizers used in agricultural production leading to obtain almost "green";
- possibilities for watering, though small, is a factor favoring crops;
- the agricultural units there is a large structural flexibility, agricultural land is used efficiently, in compliance with crop rotation and crop rotation, use of technology and modern equipment;

➢ Stage Storage:

- nationally there storage capacity of agricultural production, well distributed in the territory;

➢ Marketing stage:

- by its strategic location, Romania has access to international markets, the Danube and the Black Sea transport providing opportunities for exports of grains and oilseeds;
- railway infrastructure shall facilitate exports;
- a large part of agricultural producers manifests entrepreneurship, economic behavior expressing the profitable business they carry.
-

Measures to increase competitiveness in the chain:

- the best use of the natural conditions of soil and climate, human resources is often a biological, material and financial resources available to farms nationwide;
- increasing mechanization of farming and labor productivity, increase efficiencies, reduce labor employed in agriculture and reduce production costs;
- stabilization of quantitative and qualitative supply of grain and oilseeds by improving the quality of crop inputs and technologies;
- initiating and supporting the formation of individual associations of agricultural producers to supply inputs for the execution mechanical storage products obtained and the effective use of products;
- introduction of quality management and other standards that directly address food security;
- price correlation with the quality of cereals and oilseeds by establishing and using classes and quality standards;
- marketing organization and upgrading of the competitive market for better use of agricultural and overall supply chain efficiency.

References

[1]. Condrațchi Liliana (2014), *Supply Chains in Agriculture and Food Production*, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, Vol. 14, Issue 2, 81-88

[2]. Constantine M. (2007), *Marketing of agricultural production*, Issue VI, Ed Agrotechnics

[3]. Gavrilescu D. (1996), *Agro-economy*, Expert Publishing House

[4]. Malassis L. (1992), *Agroalimentaire Economy*, Paris, Ed Hatier-Aupele

[5]. Manole V., Petrache A., John R. A., Joseph D. (2002), *Diagnosis on the channel product in agriculture*, Ed Evenimnentul Romanian

[6]. Marcuta L, Marcuta Alina (2013), *Role of Supply Chain Management in Increasing the Competitiveness of Companies in a Global Context*, Scientific Papers Series Management , Economic Engineering in Agriculture and Rural Development, Vol. 13 , Issue 1, 227-229

[7]. Stoian E, Turek Rahoveanu A. (2013), *Food production chains in Romania*, Lambert Academic Publishing

[8]. Turek Rahoveanu A. et al, (2007), *Competitiveness of cereals chain*, Cartea Universitară , Publishing

[9]. Turek Rahoveanu A. et al, (2007), *Oilseed chain in Romania - delays from EU*, Cartea Universitară Publishing

[10]. Zahiu Letitia et al, (2005), *Policies and agricultural markets - reform and European integration*, Ceres Publishing House

[11]. Zahiu Letitia et al, (2006), *EU Agriculture under the impact of the Common Agricultural Policy*, Ceres Publishing House

Methodological Difficulties and Peculiarities of Development of Adaptive System of Stock Management under Conditions of Unsteady Market

Natalya Dzenzeliuk
South Ural State University (National Research University), Chelyabinsk, Russia,
Dzenzeliukns@susu.ru

Anna Dolinskaia
South Ural State University (National Research University), Chelyabinsk, Russia,
anya.2006@inbox.ru

Abstract

The article deals with modern problems of development level of inventory management theory; directions of commodity circulation system management are defined; an adaptive inventory management system that allows resolving the contradiction of marketing and logistic performance criteria is proposed. Due to the high importance of the effective use of working capital in a period of unstable economic situation, an important problem is the rational use of funds invested in supplies. The construction of an adaptive inventory management system is of high interest to enterprises of various levels. The proposed system provides an opportunity to respond promptly to changes in environmental factors and take into account the requirements of the criterion of minimum aggregate costs of inventory management, and the requirements for satisfying the needs of buyer.

Keywords: system management of commodity circulation, management of productive supplies, optimization criterion, unsteady market, effective management of circulating assets, adaptive approach, simulation model.

Introduction

A long history of the development of the science of stock management, the emergence and isolation of an independent line of research in the field of logistics attests to the inexhaustible interest in difficulties of stock management and its development, regardless of the type of economy and country. The theory of stock management has been attributed to the beginning of the last century. In 1915, the first book appeared, containing a systematic presentation of the simplest models. The work considered the classical relationship between the costs of supply and storage of stocks with big quantity and delivery frequency. This trend was lately called Wilson's formula. For two centuries top management of enterprises has not lost interest in the problem of working capital management. In the conditions of limited resources and poorly predicted economic situation, the problem of rational allocation of resources becomes especially urgent. On the one hand, the low profitability of assets of most Russian enterprises but on the other hand a high share of working capital in the structure of assets make managers look for "internal" resources, paying close attention to building logistics supply chains in conditions of unsteady market conditions.

In this situation, stock management requires continuous monitoring of both the state of the stock volume and the changes in the market environment and decision-making aimed at raising the rate of return on capital. Thus, the management of enterprise supplies means the control over the state of the stocks and the market environment, the analysis of their interaction and influence on the work of the enterprise as a subject of market relations, and the adoption of decisions aimed at saving money and raising the rate of return on capital.

I. Aspects of the modern development level of theory of stock management and the difficulties of practical use of the obtained results.

Detailed analysis and assessment of advantages and disadvantages of modern models and methods of solving the problems of stock management optimization allows noting obvious and methodologically important features of the current stage of development of the theory of stock management systems. Content and results of the most advanced work in the field of the theory of stock management can very clearly illustrate the thesis about the significant complication of the proposed models and the need for their particular concretization for real cases or reducing their generality. All this creates significant difficulties in the methodical and mathematical in nature, which will surely arise among practitioners in the implementation of the models used in these studies in each specific case, and the complexity in understanding and meaningful interpretation of the obtained results.

For building practical and effective inventory management systems (IMS), it seems necessary to consider the most known and important obtained results from the point of view of three criteria: interpretability, adequacy to real conditions and universality.

Interpretability should be understood as the simplicity of a meaningful interpretation of the obtained results and possibility of building an intended inventory management strategy.

The adequacy of models requires their correspondence to real practice, taking into account possible changes in the state of the internal and external environment of management system.

The universality of theoretical results and models implies the preservation of their adequacy, as on the set of specific tasks and conditions of inventory management and on the range of possible changes in these conditions.

According to authors' opinion, effective practical feasibility of theoretical developments and mathematical models of IMS in general can be achieved only when they have all three of mentioned above criteria simultaneously (Figure 1).

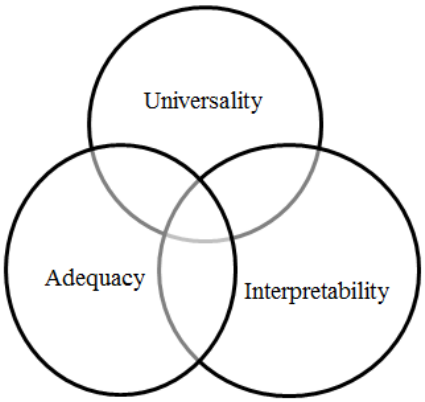


Fig. 1: Criteria for assessment of practical feasibility of inventory management systems

However, the logic of the development of complex management systems, specific studies of modern theoretical results and IMS models shows that the actual nature of interaction does not meet the specified requirements (Figure 2).
First of all, it should be noted that the position of curve 1 is quite expected. It indicates a decrease in the visibility and a growth of difficulty in interpretation the results of analytical modeling of IMS, as the market models and management system become more complicated, which is dictated by the fulfillment of

the requirement of adequacy of synthesized models to the real conditions of the system. Thus, from the standpoint of effective practical use, all attempts to increase the adequacy of the implementation of the created IMS models due to a more complete and accurate consideration of the parameters of real situations lead to the opposite result because of complication of IMS models and optimization methods, which negatively affects the understanding of the managers of logic their work and interpretability of the results.

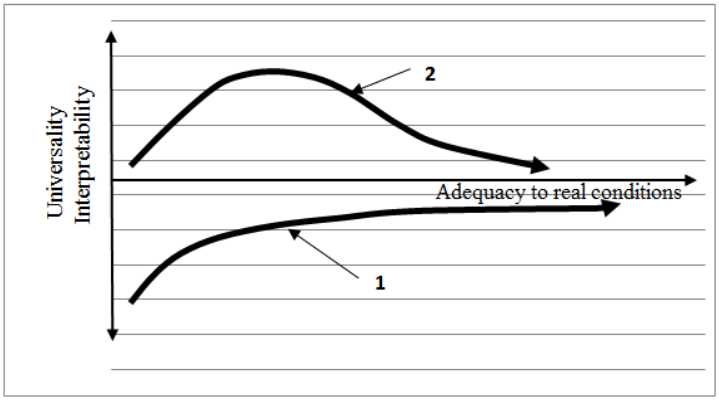


Fig. 2: The actual relationship between the factors of feasibility of models

This general trend in the development of theoretical studies and optimization models leads to the fact that the patterns of managerial strategy and tactics for making optimal decisions are poorly understood and rejected in the process of practical implementation and use. This is always a reason for the separate existence of the theory and practice of social and economic governance.

Especially it should be noted that the optimization of the systems studied by analytical methods as they become more complicated and more adequately is accompanied by growth effect, and then reducing the universality of the synthesized models. Moreover, finding of optimal solutions is possible not only applied to particular cases of conditions of realization, but also requires individual methods of analysis and synthesis of managerial decisions. The above regularity is represented qualitatively in the same figure of curve 2. The logic of the reduced dependence is also quite understandable. In the initial stages of improving models, additional characteristics of real situations are introduced into them, which, at first, expand the universality of models. However, further, the solution of multi-criteria optimization tasks requires more detailed specification and complication of models for each real situation from the standpoint of adequacy to specific conditions of commodity circulation. Because of this, growth of the adequacy of models and their universality is reduced.

In addition, it is important to note that within the existing paradigm of inventory management, the practical implementation of theoretical results has a priori normative character. Analytical relationships obtained as a result of independent theoretical research are used as a base of enterprise management systems without prompt adaptation to significant changes in the characteristics of the environment and the object of control in real time. It is quite understandable that, in the conditions of the dynamization of enterprise development and market stochasticity, such an approach is inadequate because of the initial inadequacy of the "optimal" solutions simplified to the interpreted implementation and because of the change in the significant characteristics of the environment.

II. Selection of the criteria for efficiency of stock management system

Problem of optimization criteria used in the framework of known models is concerned as another problem of practical implementation of effective IMS. For a long time, the criterion for minimizing the total costs of inventory management, used within the framework of the logistics approach, was considered as the main management criterion. This approach either implicitly assumes complete satisfaction of consumer demand regardless of the size of the reserves or introduces appropriate restrictions on their minimum value.

It is clear that in conditions of fluctuating demand, with a decrease in the volume of supplies there may be a deficit in production, a decrease in sales and consumer care. All these have a negative impact on profitability, efficiency and business value. Attempts to take into account the corresponding losses are made within the framework of the marketing and logistics approach. However, due to the multi-criteria nature of the task, and the contradictory nature of marketing and logistic criteria, this approach also reduces obtaining private solutions within local priori constraints, for example, the number of allowable deficit days. Also this approach does not solve the problem of multi-criteria optimization and practical adaptation of models. In the overwhelming majority of works a priori normative approach to the practical use of particular theoretical solutions remains unchanged.

It is quite obvious that for the enterprise it is not necessary to have separate (logistic and marketing) decisions, but combined ones for solving the problem of effective inventory management. For instance, it is obvious to take into account possible transformations of the production cycle in real time during making decisions. The authors believe that this is the task of the system theory and methodology of inventory management of an industrial enterprise.

According to the author, the following problems of management system of commodities can be distinguished.

1. Despite the enormous work in the field of logistical optimization and the availability of "logically optimal solutions", this approach does not solve the problem of optimizing processes of commodity circulation as a whole.

As already noted, main economic effect in the logistic approach is achieved due to a reduction in the volume of supplies of material resources and delivery time, hence, minimization (optimization) of total costs for the movement and storage of resources. However, due to the lack of consideration of characteristics of demand, minimization of logistics costs does not provide integrated optimization of inventory management.

In the theory and methodology of managing movement of an industrial enterprise, the logistics approach is used in conjunction with marketing, because the market determines the level of supplies necessary and sufficient for the stable functioning and development of the enterprise. This is done by the marketing and logistics direction of inventory management. At the same time, it can be noted that marketing goals and criteria, as a rule, contradict logistic ones, so the synthesis of effective management systems should include the solution of the task of their coordination. The presence of this contradiction gives rise to the second problem of the systemic management of commodity circulation.

2. Absence of a single optimization criterion in terms of logistics and marketing. And this is the second problem of management system of supplies movement.

At the present time, there are a sufficient number of particular solutions oriented to particular optimization criteria. Moreover, even if the management of the company's material resources is effective for some of the local criteria used (cost, profitability, turnover, service level, etc.), it is impossible to unambiguously conclude that local indicators influence the efficiency of the enterprise as a whole. In

addition, increasing the effectiveness of one indicator often leads to deterioration in other characteristics. All this reduces the problem of optimal inventory control to the problem of multi-criteria optimization. And this is the second problem of the system management of supplies movement.

3. The third problem of the creation of effective implemented IMS underlies in the existing approaches to this task.

The methodological approaches existing in this area are aimed at obtaining a priori solutions for predetermined conditions of different degrees of generality. The result of this approach is to obtain analytical relationships and algorithms for making managerial decisions and corresponding standards in specific situations. In practice, as a rule, accepted assumptions are not always fulfilled and the optimal obtained solutions are not really the optimal. Obtaining more universal solutions leads to a significant complication of the models under study and translates the problem of creating realizable control systems in the field of pure theory.

4. The fourth problem of systemic inventory management is the problem of the instability of the market.

In terms of dynamization of development and unpredictability of commodity and raw materials markets, not only their probabilistic characteristics, but also the functions of the distribution density of their characteristics, as random variables, change significantly. In this situation, sufficiently general analytical solutions of optimization problems become impossible in principle and various model approximations become private and poorly interpreted solutions.

5. All of the above allows authors to specify the fifth, targeted problem of systemic inventory management – the problem of creating adaptive management systems directly "sewn" into the ERP system of enterprises and allowing solving optimization problems in real time. Since, in general, decision making must be carried out within rational supply and marketing cycles, obtaining positive results here requires the development of special methods for monitoring and parameterizing the environment and making managerial decisions.

III. Building a model of a stock management system. Practical moments.

From the standpoint of the above approach, authors prove that for building simulation models of inventory management and scheduling it is advisable to use the device in applied systems theory and the theory of automatic control systems. In this case IMS under consideration is regarded as a management system, which in turn can be represented by a structure consisting of a management object, which is the regulated stock in the warehouse, and a management system consisting of an executive body (regulator) – a supplier acting on the basis of control signal – purchase order, which is formed on the basis of the forecast of external disturbance – demand and measurements of the state of the control object – the current level of stocks.

In order to overcome the identified systemic problems, authors developed an adaptive inventory management system that is workable in the zone of joint operation of the logistics and marketing criteria of optimality. It is based on the principles of system management and the axiomatic-simplistic approach suggested by A.A. Pervozvansky. Authors of this article developed a system of inventory management, presented in Figure 3.

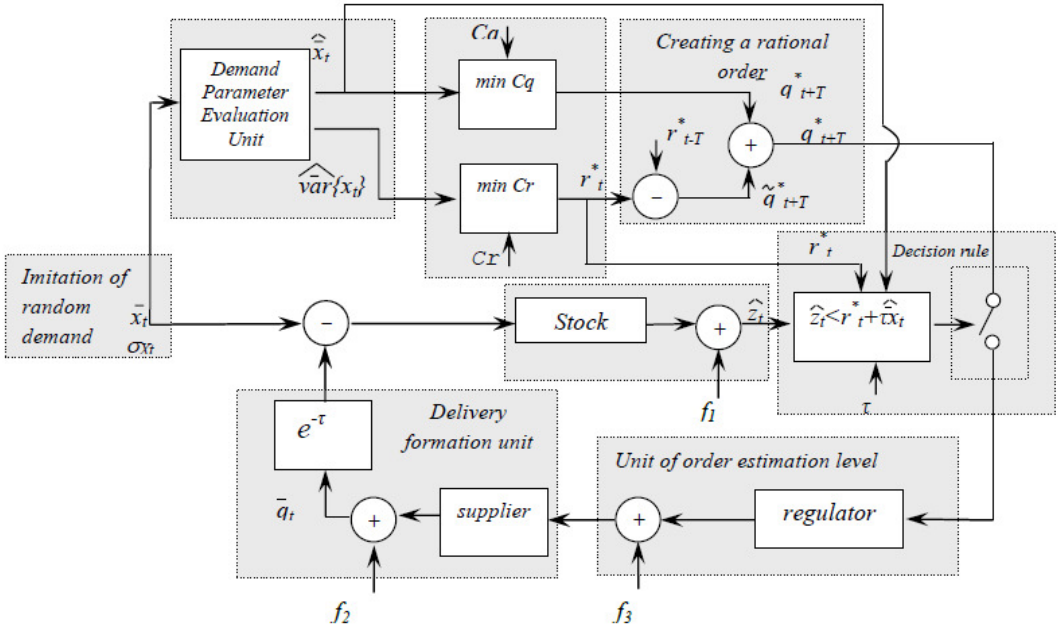


Fig. 3: The structure of the adaptive control system

In accordance with the adopted adaptive approach, which allows explaining the system's operability in a stochastic market, demand data is fed to the adaptation unit, which provides estimates of its intensity $\overline{x}_t$ and the root-mean-square deviation σ_{Xt}.

Next, separate formation of two different components of the order is used – deterministic $\overline{q}^*$ and random (stochastic) $\tilde{q}^*$. The first of these is determined from the condition of minimum costs of operational management of stocks C_q (including the costs of creating and storing the operational stock); the second one is determined from a condition of minimum of costs of the maintenance of an insurance stock Cr (consisting of the costs connected with deficiency of the goods and implicit costs).

Defining rational order value $q^*_{t+T} = \overline{q}^* + \tilde{q}^*$ for the next period T from the data of the previous period t and evaluating the current status of the stock ($\bar{z}_t$) the adaptive system generates an operative decision on the purchase order, subject to the simple condition written in the "Decisive Rule" block and the corresponding two-level (R, r); management strategies are in the form of:

$$q_{t+T} = \begin{cases} q^*_{t+T}, \text{if} \quad \hat{z}_t \le r^*_t + \tau \cdot \hat{\bar{x}}_t, \\ 0, \quad \text{if} \quad \hat{z}_t > r^*_t + \tau \cdot \hat{\bar{x}}, \end{cases} \quad \text{when } T > \tau,$$

when τ – delivery time,

$\hat{z}_t$ – an estimation of the current state of the stock z_t, carried out in the base period t.

In other words, the order formed on the basis of the data for the previous management period t and received in the next period T + t is equal to the value q^*_{t+T} in case the estimation of the current state of the

stock ($\widehat{z}_t$) is less, or equal to the minimum stock level (insurance stock), adjusted for the random demand estimated for delivery time τ. In the event that the stock assessment of the stock is $\widehat{z}_t$ such level that, taking into account the forecasted demand intensity ($\widehat{\overline{x}}_t$) for the subsequent period (T) may become less than the minimum allowable level r_t^* , an order for replenishment of stock is made. Otherwise, the current state of the stock is considered sufficient and the order is not carried out.

Since the system provides for the actions performed by people (assessment of the state of the warehouse, the work of the supplier and the customer) and the information comes with some delay; it is commonly believed that estimates of the state of the warehouse and the order quantity are met with some error under the influence of certain external factors f1, f2, f3.

The developed model allows simulating the process of supply and storage of reserves at the enterprise by organizing a statistical experiment.

Without dwelling in sufficient detail on the process of obtaining this structure, let us note its fundamentally important characteristics:

- the received system ensures a non-deficit satisfaction of the demand for the stored nomenclatures at the operational and insurance reserve levels corresponding to the minimum of total costs in a wide range of variations in the coefficient of variation under the law of the distribution of demand;
- similar results are obtained for a uniform law and the law of the distribution density of real demand, which has a significant asymmetry;
- methodology developed by the author for the synthesis of IMS, possessing the simplicity and availability of the device for its implementation, simultaneously allows the construction of a control system that is efficient and invariant to changes in the parameters of the surrounding environment in a wide range of their values, operable in real time.

IV. Some results of the investigation of the behavior of the model in the conditions of application of the market-logistic efficiency criteria

To carry out the simulation a model was developed using various software systems: VisSim (SolidThinking, Inc.), MATLAB 6.5 / Simulink 5.0 (The MathWorks, Inc), iThink (Isee systems, Inc). In the course of simulation modeling the goal was to assess the mutual influence and interrelation between the criterion of minimum aggregate costs and the criterion of minimum days of shortage of goods in the warehouse of the system. As was shown earlier, the criteria are inherently mutually exclusive. Therefore, the problem of finding the region of the system's operability in the zone of acceptable influence of these criteria was solved.

The experiment was carried out using the following algorithm of parametric optimization:

1. Identification of the relationship $\overline{\eta}(k;\widehat{\overline{x}}_t;\widehat{\sigma}_{Xt})$ describing the correlation between the average number of deficit days $\overline{\eta}$ (the marketing criterion of the system's efficiency showing the permissible number of stock absence in the warehouse), the level of insurance stock and demand parameters $\widehat{\overline{x}}_t$, $\widehat{\overline{\sigma}}_{X_t}$ in the real range of their values.

2. Determination of the optimal relative safety stock k_m^* (the coefficient of correlation between $r*$ and SD-demand $\hat{\bar{\sigma}}_{X_t}$), taking into account the specified marketing requirements, which are, limiting the average number of deficit days per year $\bar{\eta}$ ($\bar{\eta} \le 2$).

3. Determination of the specific components of costs from the deficit Cir, Cvη.

4. Finding the "optimal" value of the insurance stock r* from the condition of minimizing the total costs of the insurance stock managing Cr (a logistic criterion that takes into account the minimum of total costs).

5. Establishment of the optimal coefficient of connection k_l^* between the value r* and the SD of the demand $\hat{\bar{\sigma}}_{X_t}$ satisfying the logistic criterion.

6. Setting new values of demand parameters $\bar{x}_t$ and $\bar{\sigma}_{X_t}$.

7. The repetition of the procedure according to claims 1-6 in the range of possible variable demand parameters.

8. Comparison of the results of the system with various parameters obtained by marketing and logistic criteria and a comparative assessment of the areas of consistency and / or conflict of requirements.

To determine the adequacy of the operation of the system during the experiment, real data were used, that were statistically accumulated at the enterprise. The value of the most probable average value of the volume of daily demand for goods $\bar{x}_t = 5$ distributed according to the normal law was determined. At the same time, the variation of demand $\bar{\sigma}_{X_t}$ changed in such a way that the coefficient of variation $\text{var}_{X_t} = \bar{\sigma}_{X_t} / \bar{x}_t$ varied within a sufficiently wide range from 1 to 7.

At the first stage of the study, according to the above algorithm, an imitation experiment was performed using the created IMS model with varying demand parameters (the values of the SD-demand were changed). A family of dependencies of the average number of deficit days per year ($\bar{\eta}$) on the size of the relative insurance stock (k) was obtained, which is shown in Figure 4.

At the second stage the optimal values of the relative safety stock were identified according to the marketing criterion. As a result, dependence $k_m^*(\bar{\sigma}_{X_t})$ was constructed for all the investigated values of demand variation, starting from the initial limitation of the average number of deficit days per year $\bar{\eta} \le 2$ and the simulation results presented in Figure 4. After that, the optimal values of the relative safety margin were found for each value of the investigated standard deviation of demand k, proceeding from a condition of a minimum of total costs of management and storage of an insurance stock.

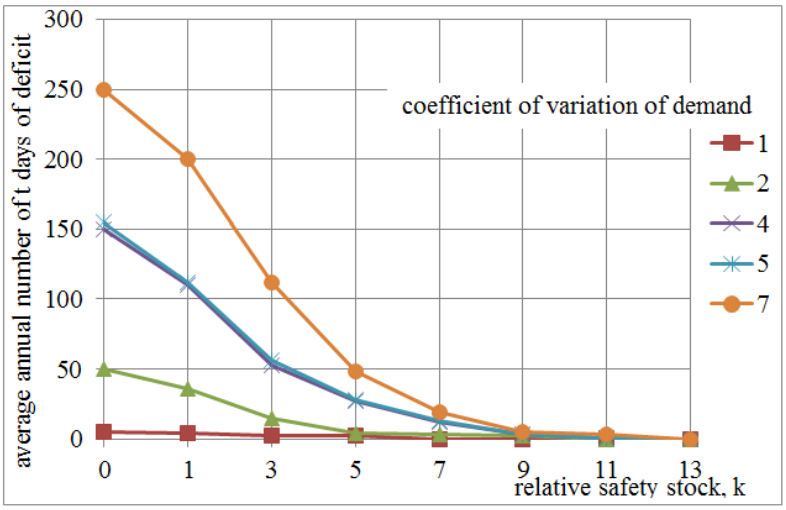


Fig. 4: Dependence of the average annual number of deficit days on the size of the insurance stock for different values of the coefficient of variation in demand

Thus, based on the results of finding and analyzing the optimal level of the relative insurance stock k^* for different values of the SD-demand, the dependencies of the optimal insurance stock on the standard deviation on logistic and marketing criteria ($k_l^*(\overline{\sigma}_{X_t})$ and $k_m^*(\overline{\sigma}_{X_t})$) were determined. The optimization results are represented by the corresponding curves in Figure 5.

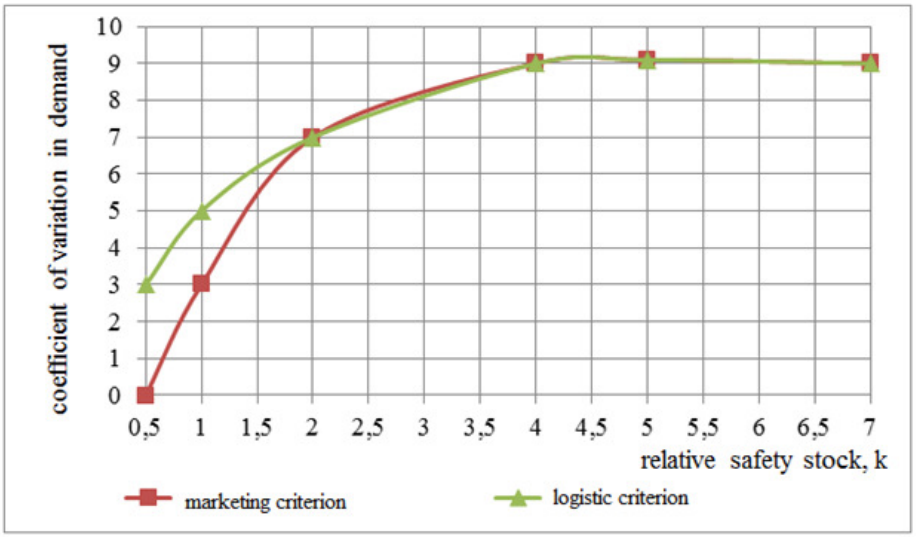


Fig. 5: Comparison of marketing and logistic criteria

From Figure 5, first of all, there is a conclusion about the need to create a system of inventory management, adaptive to the coefficient of variation in demand, since the optimal level of insurance stock depends significantly on its level. Obtained dependences are in fact the operating characteristics of the adaptive system and must be programmed in the block for the synthesis of optimal values of the safety stock as a function of the SD-demand (σ_{Xt}).

Another result of modeling relates directly to the purpose of this study. Firstly, it can be noted that the system works adequately to existing conditions. Secondly, it is clear from the comparison of the graphs that the dependence of the insurance stock management law, obtained from the cost minimization condition, lies above the analogous curve constructed from the condition of the allowable deficit days for any demand variation less than 2, and for demand variation more than two, the marketing and logistics requirements are the same. Thus, at any level of the safety stock established in accordance with the logistic criterion, the marketing condition will be fulfilled simultaneously, that is, the results of optimization on both criteria are compatible, which indicates the practical achievement of the marketing goal. To solve the above problem, modeling algorithms were specially developed and tested, which allow obtaining the necessary optimal characteristics of orders in real time.

Conclusion

Despite the historically long period of development of theoretical and applied research, the actuality of creating effective and practical inventory management systems is still quite high today due to the high share of stocks in the capital of enterprises, the low capital productivity of the economy as a whole and the inadequate elaboration of the theory of inventory management as an applied science oriented toward obtaining effective practical results.

Today, not only simply interpreted analytical models of effective control systems (IMS) are still missing, but also models that have a universal character and they are suitable for wide practical implementation. This is due to a significant complication and a decrease in the universality and interpretability of models with increasing their adequacy, on the one hand, and the a priori normative nature of their practical implementation on the other.

Thus, the development of the problematic of practically realizable effective systems of inventory management requires solving a number of methodological problems connected with resolving the contradiction of the adequacy and universality of methods and models for making managerial decisions in their practical implementation and interpretability of the results obtained under conditions of substantial nonstationary and dynamism of the external environment.

The choice of the criterion for the effectiveness of IMS is also an important task. It is quite obvious that for the enterprise it is not necessary to separate (logistics and marketing), but to jointly solve the problem of effective inventory management, in general, also taking into account possible transformations of the production cycle. And taking into account the dynamization and nonstationary of the market environment, the corresponding decisions must be made in real time. This is the task of the system theory and methodology of inventory management of an industrial enterprise.

The model of adaptive control system, proposed by the authors, allows simultaneously combine the requirements of both the logistics and marketing criteria. The authors conducted an experiment, the results of which allow identifying the real area of the change in IMS parameters, which can simultaneously take into account the requirements of marketing and logistic criteria and develop algorithms that allow solving this problem in real time.

Acknowledgement

«The work was supported by Act 211 Government of the Russian Federation, contract № 02.A03.21.0011».

References

Subramanian, K., Rawlings, J.B., Maravelias, Ch.T. (2014), 'Economic model predictive control for inventory management in supply chains', *Computers & Chemical Engineering,* 64 (0), 71-80.

Schreibfeder, J. (2016), 'Achieving Effective Inventory Management', 6th Edition.

Harris, F. (1915), Operations and Cost. (Factory Management Series), Chicago: A.W. Shaw Co.

Finances of Russia, 2016: statistical collection, (2016). [Online]. Moscow: Rosstat.

Pervozvanskiy, A.A. (1975), Mathematical Models in Production and Inventory Management, Nauka, Moscow.

Stock, J., Lambert, D. (2000), Strategic Logistics Management, 4th Edition.

Jacobs, F.R., Chase, R.B., Lummus, Rh.R. (2011), Operations and Supply Chain Management, McGraw-Hill/Irwin series operations and decision science.

Lysons, K., Farrington, B. (2016), Procurement and supply chain management, Pearson Education Limited, 9th Edition.

Mousavi, S.M., Hajipour, V., Niaki, S.T.A. (2014) '*A multi-product multi-period inventory control problem under inflation and discount: a parameter-tuned particle swarm optimization algorithm*' [Online], [Retrieved October 31, 2013], https://link.springer.com/content/pdf/10.1007/s00170-013-5378-y.pdf, DOI: 10.1007/s00170-013-5378-y.

Lean Supply Chain Planning: A Performance Evaluation through Simulation Matteo Rossini and Alberto Portioli Staudacher MATEC Web Conf., 81 (2016) 06002 DOI: https://doi.org/10.1051/matecconf/20168106002

Loan Assets and Their Importance for Banking Sector – BRD Case Study

Oana Bogdan, Faculty of Economics and Business Administration, West University, Timisoara, Romania, oana_bogdan26@yahoo.com, oana.bogdan@e-uvt.ro

Aura Domil, Faculty of Economics and Business Administration, West University, Timisoara, Romania, aura.domil@e-uvt.ro

Dorel Mateş, Faculty of Economics and Business Administration, West University, Timisoara, Romania, dorel.mates@e-uvt.ro

Alin Emanuel Artene, Politehnica University of Timisoara, Romania; alin.artene@upt.ro

Moise Domil, Faculty of Economics and Business Administration, West University, Timisoara, Romania moise.domil@e-uvt.ro

Eduard Ajtay, Faculty of Economics and Business Administration, West University, Timisoara, Romania
eduard.ajtay@e-uvt.ro

Abstract

Through this paper, we want to present the history of the Romanian banking system from 1989 to the present and demonstrate the existence of a significant relationship between the bank's performance (in terms of profitability) and the quality of the assets (in terms of loan performance). The quality of the bank's assets is a popular issue in banking literature, as most bank experts have agreed the assumption that, prior to declaring bankruptcy, there must be a significant amount of non-performing loans, as asset quality is an indicator for bank liquidation. The balance sheet of any lending bank confirms that, when loans are not repaid as is often the case, banks are in difficulty, as such debts are sometimes eliminated.

Keywords: loans, performance, Romanian banks, net assets

Introduction

If until the end of 1989 the Romanian banking system offered a limited number of banking services and products, Romania's transition to the market economy has changed considerably. The reform in the Romanian banking system started at the end of 1990 when the changeover from the monobank type system consisting of the National Bank of Romania and four specialized banks (the Romanian Foreign Trade Bank, the Bank for Agriculture and Food Industry, the Investment Bank and House of Savings and Consignments), to the structured two-tier.

The reform of the banking system begins in December 1990 (Dedu V., 2003) with the concentration of the commercial banking operations of the National Bank in the newly established Romanian Commercial Bank. A landmark was occupied by the central bank, which became the only broadcasting body. By law, the NBR has been responsible for establishing and conducting monetary and credit policy, licensing, regulation and supervision of the banking business. The second level came to the commercial banks, established as joint stock companies, with the right to carry out a wide range of operations, subject to the requirements set by the NBR in the areas of regulation and supervision.

With regard to banking reform, we distinguish two major stages:

- the first stage took place between 1990 and 1997 and, as presented earlier, the foundations of the two-tier banking system, specific to the market economy, were issued. Three important legislative acts were issued: the Banking Law, the NBR Statute Act, towards the end of the period, the Law on the privatization of the banking companies to which the state is a shareholder.
- in the second phase, after 1997, the central bank acted to improve banking legislation by aligning it to European standards. At the same time, he initiated a process of consolidation of the banking system. In our opinion, the consolidation process is an absolutely necessary one, after the serious problems of the years 1998-1999, when the economic recession strongly hit the weaknesses of the banking system.

From the point of view of the quantitative evolution of the banking system (Isărescu M., 2006), the first stage was characterized by a rapid expansion, the number of commercial banks growing almost three times.

The Research Methodology

One of the studies published by the IMF shows the evolution of non-performing loans across Europe. In the three hypotheses presented in the figure by the Fund's analysts, one can notice the increase in the percentage of non-performing loans in the total credits granted from 2008 to 2016. In 2008 only Serbia faces a high percentage of non-performing assets due to the inability to recover the receivables period of 90 days.

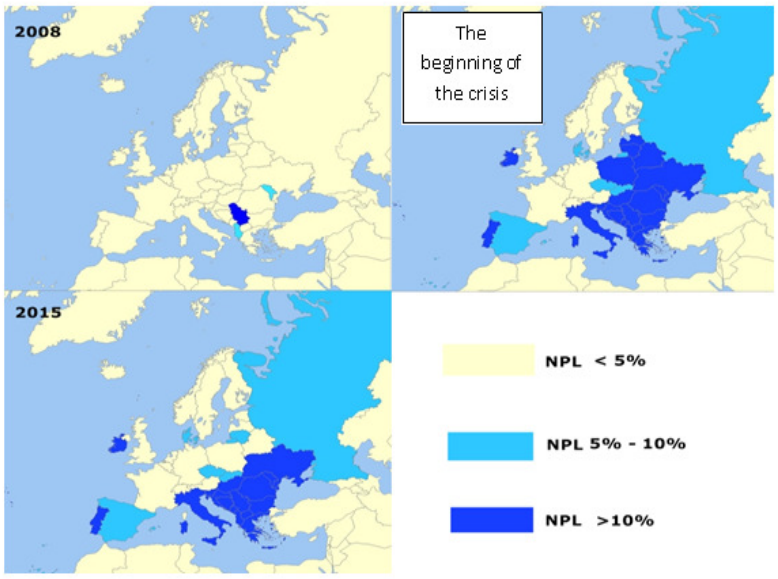
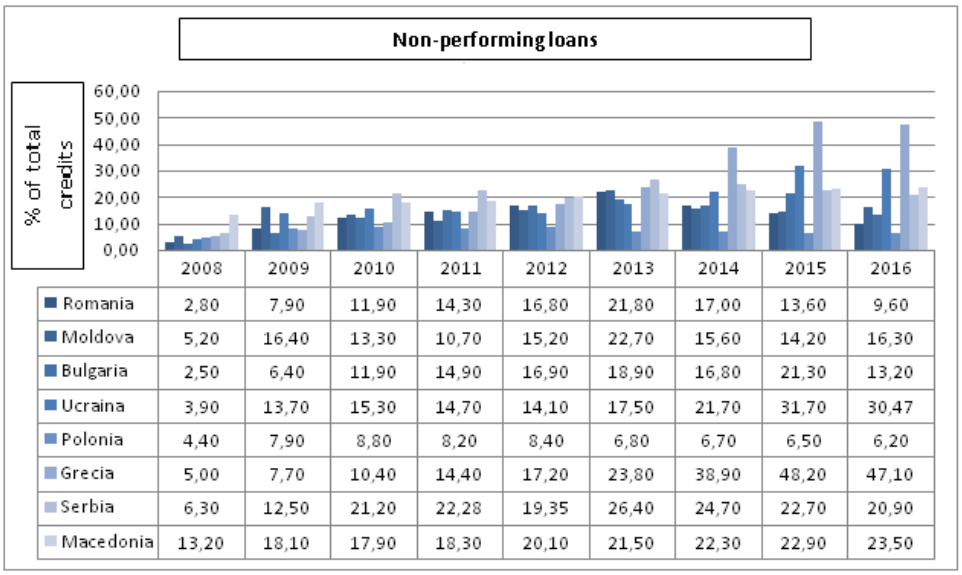


Fig.1: Evolution of the non-performing loans rate at European level
(Source: own interpretation)

At the beginning of the financial crisis in Europe, the situation is worsening especially in Central and Eastern Europe, where credit institutions face bad loans of over 10 percent of total loans. In the years 2015-2016, the situation is beginning to improve for Central European countries, but still remains on a dark blue background for those in Eastern Europe and especially in the Balkans.

The situation of non-performing loans in the Balkans area was represented in detail in the chart below:



	2008	2009	2010	2011	2012	2013	2014	2015	2016
Romania	2,80	7,90	11,90	14,30	16,80	21,80	17,00	13,60	9,60
Moldova	5,20	16,40	13,30	10,70	15,20	22,70	15,60	14,20	16,30
Bulgaria	2,50	6,40	11,90	14,90	16,90	18,90	16,80	21,30	13,20
Ucraina	3,90	13,70	15,30	14,70	14,10	17,50	21,70	31,70	30,47
Polonia	4,40	7,90	8,80	8,20	8,40	6,80	6,70	6,50	6,20
Grecia	5,00	7,70	10,40	14,40	17,20	23,80	38,90	48,20	47,10
Serbia	6,30	12,50	21,20	22,28	19,35	26,40	24,70	22,70	20,90
Macedonia	13,20	18,10	17,90	18,30	20,10	21,50	22,30	22,90	23,50

Fig.2: Non-performing loans in 2008-2016 in Eastern Europe
(Source: own interpretation)

We can observe from the analysis of the data provided by the central banks of the states included in our study that Romania falls within the lower limit of the Eastern European group, with the opposite pole being Greece, the country that has recently undergone a strong restructuring process of the financial system banking.

In the case of Romania and the Commercial Bank included in our study, we can observe the position of BRD towards the EU average of the Balkans and the EU average.

One of the main determinants of the evolution of the lending process in commercial banks and the decrease in the NPL percentage of gross loans is the introduction of international IFRS accounting standards. Before adopting the standards, commercial banks sold some of the mature credit on the market, while high-risk junior loans could remain in the bank's balance sheet without any impact on performance and financial reporting.

The IFRS standards together with the Basel III Principles have overturned the previous situation. In the sense that to eliminate bad debts from the balance sheets start with the junior credits. The problem of the high rate of non-performing loans is partly due to difficulties in divestiture of credits in the early years or junior.

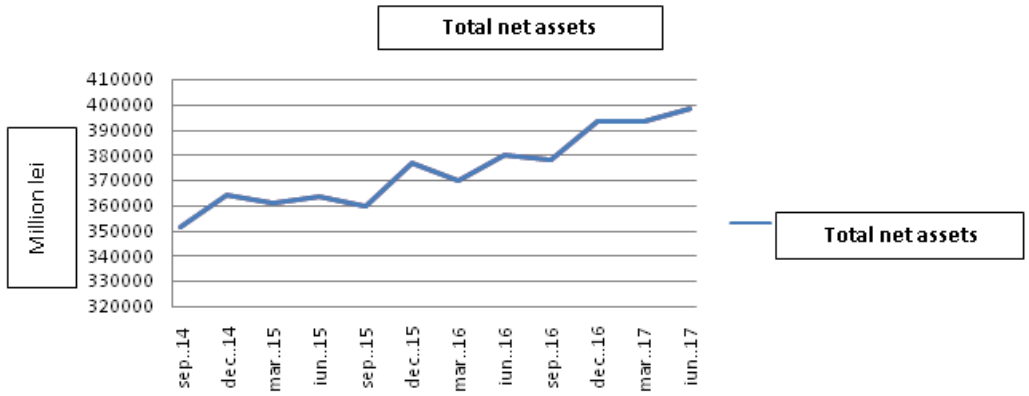


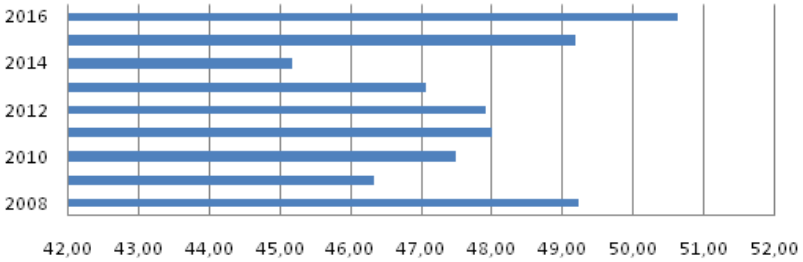
Figure 3: Evolution of BRD net assets

(Source: own interpretation)

From the data provided by the National Bank of Romania, we can see an increase in bank assets, which is largely due to the adoption of the legislative framework imposed by Basel III.

With regard to the evolution of BRD during the period 2008 - 2016, we can see a minimum point in 2014. Over the past two years, the value of assets has steadily increased, evolving BRD Groupe Societe Generale in the safest category of banks and making it the safest bank in Romania.

This development is also certified by Global Finance magazine, which launched this year's ranking of the world's safest banks, a study in which Societe General Group is ranked 7th in Europe.



Total assets (Milion lei)	2008	2009	2010	2011	2012	2013	2014	2015	2016
	49,24	46,34	47,49	48,02	47,92	47,07	45,18	49,19	50,65

Fig.4 : Evolution of total BRD assets

(Source: own interpretation)

Within BRD-GSG, the value of assets, including physical assets, such as equipment and land; credits, including consumer credit and business interest; reserves or holdings of central bank deposits and in cash; as well as investments or securities are shown in the figure above.

It can be seen that the minimum value of assets held by BRD is 45.18 million lei in 2014. Since 2015 BRD has steadily increased asset value of 49.19 million lei to 50.65 million lei in 2016.

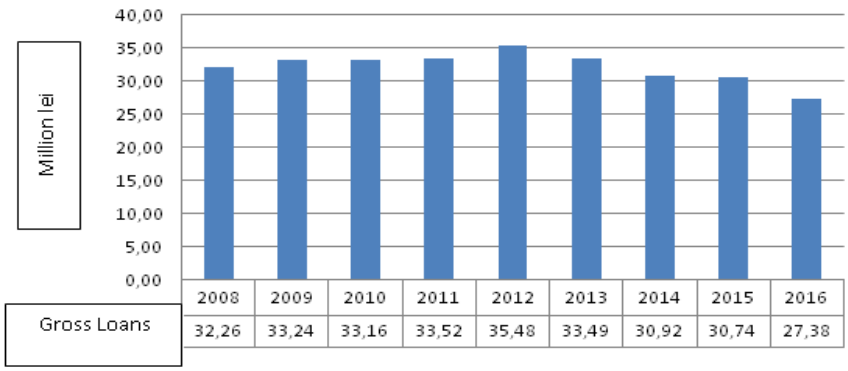


Fig.5: Evolution of Gross Loans BRD

(Source: own interpretation)

We also analyzed the evolution of BRD gross loans in the period 2008 - 2016. Their evolution during the 9 years is in the form of a concave function that reached the maximum point in 2012 when the total value of loans was 35.48 million lei.

In the years 2013 and 2014, the total amount of credits granted by BRD GSG was 33.49 million lei and 30.39 million lei respectively.

The minimum amount of loans granted by the bank was recorded in 2016 and amounted to 27.38 million lei.

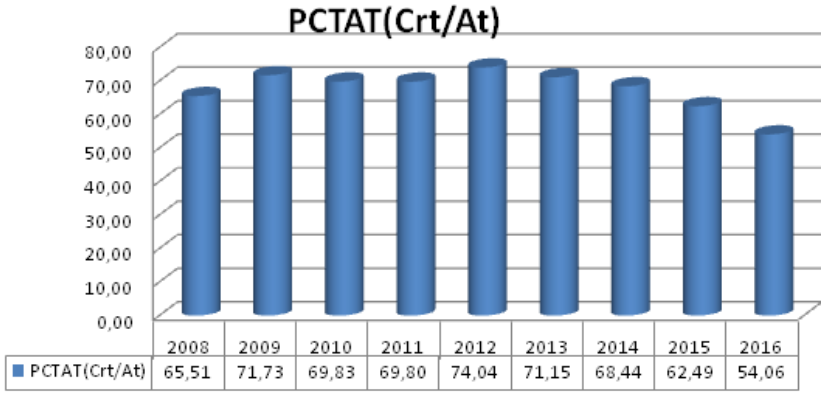


Fig.6 : Rising indebtedness of BRD

(Source: own interpretation)

Regarding the bank's indebtedness, we can see a steady rise in indebtedness by 2012 from 65.51 in 2008 to 74.04 in 2012.

These values reflect the increased risk assumed by BRD GSG in relation to the gross loans ratio on total assets.

From 2014 until 2016, the value decreases steadily from 68.44 to 54.06.

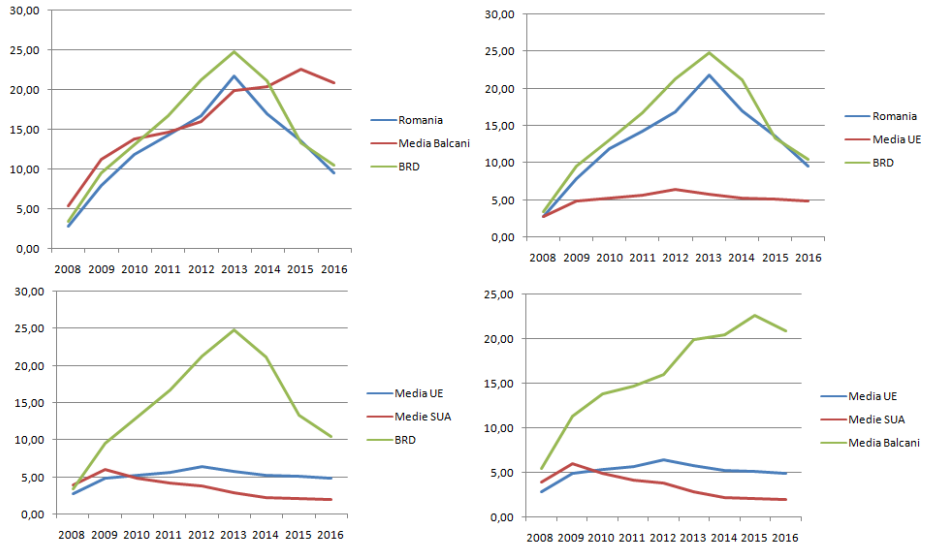


Fig.7 : Average non-performing loans in total credits

(Source: own interpretation)

In the case of Romania and the commercial bank included in our study, we can see BRD's position on the Balkans and the EU average.

Within BRD, the non-performing loans situation follows the region's average, being at a historical minimum in the period before the economic crisis, with a weight of 3.4% of the total loans. Their share has grown steadily as a result of the economic crisis that devastated the European and world banking system from 9.5% in 2009 to 16.7% in 2011, culminating in a 24.8% rate in 2013.

The resumption of lending has led to a decrease in the rate of non-performing loans in total loans from 21.1% in 2014 to 10.5% in 2016.

Conclusions

The main feature of the Romanian banking system remains its concentration, a number of five banks (BCR - Romanian Commercial Bank, BRD - Groupe Societe Generale, Raiffeisen Bank, CEC, ABN Amro). At the end of 2003, these banks held 61.7 percent of the total assets. The entry of some renowned foreign banks on the market led to a strong competition between banking operators (NBR Annual Report, 2003).

In 2004, the Romanian banking system experienced major structural changes through the passage of the largest Romanian bank, the Romanian Commercial Bank in the group of banks with private majority capital.

In this context, the market share of the banks with majority state capital reached 93.1%, 30.6 percentage points higher than the previous year. Out of the total of 40 credit institutions in operation, two remain classified as state-owned banks (CEC and Eximbank), eight hold majority private capital (including Creditcoop) and 30 foreign capital (including branches of foreign banks).
By the end of 2011, according to NBR data, the number of banks with majority state capital remains unchanged. At the end of 2011, banks with full or majority private capital held 91.8% of the total assets of the Romanian banking system while banks with full or majority state ownership held a share of only 8.2%. Banks with full or majority foreign capital, including branches of foreign banks,

account for 83% of the total banking assets. Competition in the banking sector has been growing steadily until the end of 2006 maintaining a high degree of concentration of the banking system.

Starting with 2007, with Romania's accession to the European Union, the degree of concentration measured by the market share of the first five banks decreased to 52.4% at the end of 2009.

This decrease was due to the increased attractiveness and diversification of banking products as well as to the aggressive portfolio expansion policy. This decline can also be attributed to the outsourcing of a part of the loan portfolio, but also to increased competition and difficulties encountered in lending. Although the share of the first five banks in the system is half of its total market share, its level was from 2007 onwards below the EU-27 average (about 60%).

Modernization of the banking system can be highlighted by the evolution of existing banking networks. At our country level there are five large banks that hold almost 60% of the total banking units, namely BRD, BCR, CEC Bank, Banca Transilvania and Raiffeisen. The evolution over time of the number of units has a decreasing trend, with credit institutions adjusting their territorial networks considerably. Thus, as compared to 2008, the year when the peak of the banking infrastructure was reached, more than 25% of the numbers of credit units were closed.

In 2007, after Romania's accession to the European Union, the local market has become attractive for credit institutions in Europe. Thus, several financial groups considered it appropriate to invest in the opening of branches of foreign banks, and less by establishing subsidiaries, making the formalities much simpler. Monetary policy at that time supported this decision of the financial groups in the sense that the minimum reserve ratio was 40% for foreign-denominated and 20% for MDL, while in the euro area it accounted for only 2% of attracted deposits. The massive entry of foreign capital has turned Romania into one of the main markets faced by European players. In 2007, the number of branches of foreign banks increased to 10. In recent years, the share of aggregate assets of the banking system in GDP increased by 61.5% at the end of 2008, 67.2% at the end of 2009.

At EU27 level, the share of assets in GDP was 346% and 360% for 2008 and 2009 respectively. The growth of intermediation as a share of bank assets in GDP was sustained up to 2008, largely by the high rate of increase in non-government credit. For 2009, the indicator growth is due to the decrease in GDP and not the increase in the volume of assets.

The countries with shareholdings in domestic banks and branches of foreign banks at the end of 2010 were occupied by Greece (25.5%), Austria (16.3%) and the long-distance Netherlands by 11.8%. In 2008, Greece is ranked first in the ranking of foreign equity in the capital of the banks in Romania at the end of 2009, registering a higher share of 4.2% in the previous year. In 2011, the top three positions were still borne by Greece with 22.9%, Austria with 20.8% and the Netherlands with 11.5%. Hungary held 3.6% and was overtaken by Italy with 4% (NBR, Annual Report 2011).

Acknowledgement

This work was conducted as associate members of ECREB – East European Center for Research in Economics and Business, Faculty of Economics and Business Administration, West University of Timisoara, J.H. Pestalozzi Street, No. 16, 300115. The authors gratefully acknowledge the use of services and facilities of ECREB.

References

Dedu V., (2003,) *Gestiune şi audit bancar*, Editura Economică, editură recunoscută CNCSIS, Bucureşti, 351 pp., ISBN: 973-590-780-1

Isărescu M., (2006), Inflation targeting and financial stability, http://www.bnr.ro/Prezentari-si-interviuri--1332.aspx?fld_issue_year=2006

Isarescu M**.** (2011). *Growth, Capital Flows and Fiscal Deficits: Some Thoughts în the Aftermath of the Recent Crisis.* București.
Georgescu F., Evoluţia sistemului bancar românesc, http://www.bnr.ro/Prezentari-si-interviuri--1332.aspx?fld_issue_year=2006

Gîrbină M., Minu M., Bunea Ş., Săcărin M. - *Perceptions of preparers from Romanian banks regarding IFRS application*, Accounting and Management Information Systems, nr. 2, 2012
http://www.insse.ro/cms/

https://www.brd.ro/rezultatele-grupului-brd-2016;
NBR Annual Report, 2003, http://www.bnro.ro/PublicationDocuments.aspx?icid=6874

http://www.bnro.ro/Home.aspx
NBR Annual Report, 2006, http://www.bnro.ro/PublicationDocuments.aspx?icid=6874

NBR Annual Report, 2009, http://www.bnro.ro/PublicationDocuments.aspx?icid=6874
NBR, Annual Report 2011, http://www.bnro.ro/PublicationDocuments.aspx?icid=6874

Methodological Support for Risk Analysis during the Whole Life Cycle When Designing Technical Products

Dvořák Josef, Ing.
University of West Bohemia, Univerzitní 22, Plzeň, Czech Republic

dvorakj@kks.zcu.cz,

Abstract

The paper deals with a proposal for methodological support leading to the indication and the subsequent identification of risks during the design of technical products in the context of their life cycle. In the theoretical part of the paper, the state of knowledge in the area of risk and the research of the methods of their assessment are described, including the suitability of their use for specific life phases of the technical product from the point of view of the current state of knowledge and the author of the work. The paper also includes research involving Engineering Design Science and Methodology (EDSM), namely the Theory of Technical Systems (TTS). This knowledge, supplemented and enriched by knowledge from the field of risk analysis, serves as the basis for the proposed methodology of risk analysis. This methodology has been verified by interdisciplinary student projects, led by the author of this paper and colleagues, and subsequently validated using specific industrial examples that verify the use of this approach.

Keywords: risk, life cycle, methods, causes

Introduction

Demands to improve the quality of technical products in accordance with [7] and to shorten the life and innovation cycles in today's globalized society are ever higher due to competition on the world market. As a result of these demands, there is continual improvement in the form and function of technical products, their utility, the use of materials, costs and delivery dates. When designers design, they give a technical product not only its form and function, but they also design all its other properties including lifetime costs and delivery date. Design is thus a key phase in the life cycle of a technical product which must be made more effective by using new and innovative knowledge, methodologies, tools, etc. both for the design process and for their implementation into the other processes of the life cycle of a technical product. Demands on design management are therefore also increasing. The existing approaches, methods and tools support these processes with the goal of designing technical products/systems which can take their place on the market and become fully competitive.

It is important for a designer or manager to be able to predict as early as possible the (future) properties of a technical product from which are derived the competitive advantages or disadvantages (strengths and weaknesses), in order to be able to work on improving or eliminating the relevant properties in time. When analysing properties, quality and competitiveness of a product, another frequently discussed issue may be discovered, and that is product risk. This risk can be internal, caused by the product and other internal factors of development and manufacture, or external and caused by the surrounding system. Risk management has become a normal part of the management of a large industrial company. An important driver for considering risk in terms of the design process, not only of technical products, are recent catastrophes which have impacted the lives of millions of people [13]. Over time there has gradually been a greater appreciation and awareness of the risks when designing a product. As technical products become more and more sophisticated, it is necessary to carry out risk analysis much more carefully, since products frequently include not only a predominantly hardware component, but more generic components. Thus the analysis of technical products must consider them in the overall context, not only within the operational phase, but in the previous and following phases too. A very common cause of risk with fatal consequences is the behaviour of the human operator.

The aim of the author's work is to design a methodology of risk analysis which is widely usable as a support tool to be used for designing technical products, particularly during the design process. The

users will be managers, employees in manufacturing technology departments, and particularly designers working on the design of products. This methodology should be capable of making the user aware of all the potential risks and their causes in the context of the whole life cycle of a technical product.

Hypotheses

The author posed several fundamental questions relating to the goals of the research:
1. Are there any methods for analysing technical products and if so, what principles are they based on?
2. Which phase of the life cycle are they useful for?
3. Is there a model of the life cycle of a product which covers all phases of the life cycle and what are they?
4. Can the benefits of using TTS in risk analysis be integrated into existing methods of risk analysis?

Scientific methods

1. Empirical methods, which are based on a 'living image' of reality. These methods include those in which the reflection of phenomena takes place through sensory sensations and perceptions from advanced levels of technology. These are the methods by which one can find out the specific unique properties of an object or phenomenon in reality. Typically, these methods are divided into subgroups according to the way they are implemented: observation, measurement, and experimentation.

2. Logic Methods which include a set of methods using the principles of logic and logical thinking. These include three "pair methods": abstraction – concretization; analysis – synthesis; induction – deduction.

Current methods of risk analysis

The literature on the division of risk analysis methods is expressed in a non-uniform manner. This section deals with the division of methods for risk analysis, their distribution and recommendations for their use. According to [2], [4], risk analysis methods can be divided into several groups. These are search methods for which checklists and preliminary hazard analysis are considered. Another group are support methods (structured interviewing and brainstorming, Delphi, SWIFT - What if? and human reliability analysis - HRA), other groups of methods are scenario analysis, function analysis, risk assessment methods and statistical methods. Authors [5], [6] divide the methods of risk analysis into root causes, diagrams, methods for identification and analysis of failures and hazards, methods for basic risk description, statistical and simulation methods, scenario analysis and decision support. The methods used for risk assessment can be divided into several groups according to the degree of detail of the risk analysis and risk quantification capability according to [1]:

According to degree of detail

Comparative methods - are focused on the identification of risk sources. They work mostly on the basis of the comparison and application of operational experience gained from the operation of hazardous equipment and complemented by a facility inspection. Their goal is to reveal the weaknesses of a dangerous device and to sort the system, groups, or nodes according to a subjective assessment of their share in the causes and the course of the dangerous event. These methods provide warnings about potentially dangerous parts of the device. However, they are not able to numerically quantify the probability of failures of individual systems, and they do not define the role of individual components of a hazardous device in the probability of a dangerous occurrence. These methods cannot quantify the degree of risk. They include: Safety Review, checklist, relative ranking. Analytical methods based on a deterministic approach - they systematically analyse the causes of the occurrence of dangerous events and scenarios of the development of a dangerous event. They process a list of system failures, components, and operator failures that lead to these events. They give a good idea of the behaviour of a dangerous device. Their fundamental deficiency, as with comparative

methods, lies in their inability to capture the probability of occurrence of dangerous phenomena, or the probability of failure for the safety of important components, the system, and the intervention of the operator. Therefore, these methods fail to manage the probability component of risk and do not allow consistent prevention of dangerous events. FTA, ETA, CC, HRA methods are advanced system analysis techniques and are the basis for assessing system risk.

Analytical methods based on a probabilistic approach - In the mid-1970s, the assessment of the risk associated with the operation of nuclear installations backed away from analytical assessments based on the mere finding of causes and consequences of system, component and operator failure. There was a need for a numerical assessment of the share of these phenomena in dangerous events and system failures, components and human error, using mathematical and statistical methods, to quantify the probabilities of the causes of dangerous events. Similarly to other methods, based on the analysis of the occurrence and development of a dangerous event, a list of primary events is compiled, which, alone or in combination, will produce a dangerous event. Probabilities are assigned to their likelihood and the probability of occurrence of a dangerous event is calculated.

Based on ability to quantify risk

- Qualitative methods
- Semi-quantitative methods
- Quantitative (probabilistic) methods

It can be said that there are quite a lot of methods for analysing technical products, however many of the methods are only of a supportive character, and some of the methods are highly specialized. The greatest attention was paid to FMEA, which is, according to the author, the most extensively instructive method, in particular in [3]. The reason for its detailed analysis is its wide use in industrial practice. The methods presented in the work have been analysed in detail and it can be stated that despite the efforts of the author, no general method has been found for dealing with a comprehensive product life cycle analysis which provides the user with exhaustive instructional guidance on how to perform such an analysis within the design process.

Design of an Innovative Risk Analysis Methodology

Predict and evaluate the key technical risks of a Technical Product (TS) – i.e. in relation to the operator, humans and other living entities [8], [14], [15]:

1 Divide the TS into its main parts (including the connection interfaces!) - the "fault carrier" and analyse the TS for the stages of its lifecycle (LC) according to the following steps. Write the data in Fig. 1 in the appendix (adjust table as needed). See [3] for examples.

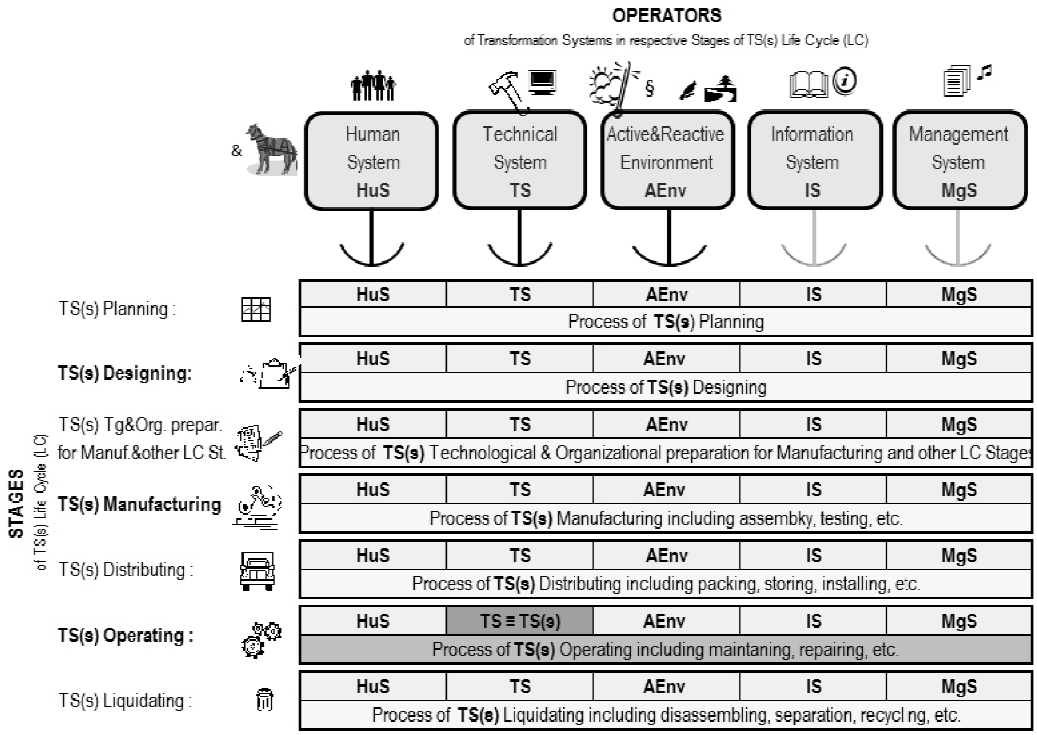


Fig. 1: Life cycle as a series of Transformation Processes (TrfP) [15]

2 Write **the analysed part of the TS** in the table for LC phase analysis

3 Predict potential **safety failure modes**, simply referred to as "failure" – i.e. inability to fulfil safety requirements under the required conditions. These "failures" can be [5]: financial failures **F**, garantion and service **G**, legislative **L**, management **M**, purchase **P**, business **B**, technical **T**

4 Predict using the Ishikawa diagram ("fish bone") the potential **causes** of individual **failure** modes. Do not forget the potential for exceeding (required/standard) limit states.

5 For each fault mode, predict its potential **results** (*failure effects*) as a consequence of the failure

6 For individual causes of failure determine **failure severity S** (min 1 to max 10)

7 For individual causes of failure, the **probability of their occurrence** is assessed **O** in a predetermined or determined period (minimum 1 to max. 10)

8 For the individual causes of failure, the **probability of their detection** *(failure detection)* **D** (minimum 1 to max. 10)

9 For each of the causes of failure, calculate the **risk priority number RPN = S x D x O**

10 Determine the minimum **RPNmin** (min 0 to "max." 1000) and for **RPN > RPNmin** suggest **recommended measures** with maximum use of **heterogeneous generic TS components** [14]

Application of Methodology to Specific Industrial Examples

The innovated risk methodology was verified and validated on projects solved by students of University of West Bohemia [9], [10], [11], [12], (Fig. 5-8) and on real examples from industrial practice.

Cable winder

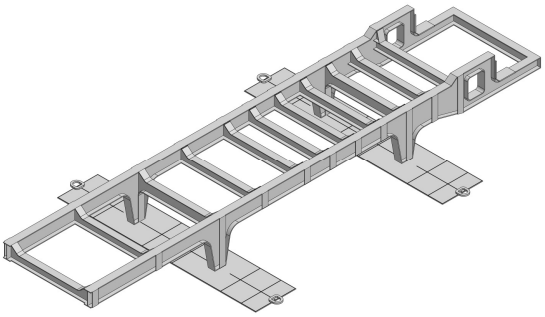
The cable winder is designed for winding and unwinding cables of all types used in the Bílina Mine. It is also designed for the transport of the spool with a cable (Fig. 2).

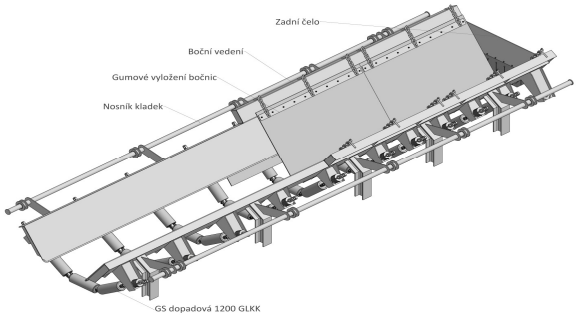




Reversing station

This is the reversing station of the belt conveyor of the PD 59 1200 mm driving station (Fig. 3). The device consists of an anchoring frame and a hopper. The reversing station is located at the beginning of the transport line and takes over the material transported from the previous station in the route. The purpose of the reconstruction of the reversing stations is to improve the technical conditions and to increase the reliability of the equipment while reducing the service and maintenance requirements.





Cleaning and degreasing machine

The cleaning and degreasing machine (washer) of roller parts was designed according to the requirements of mechanical workshops - a roller repair line (Fig. 4).

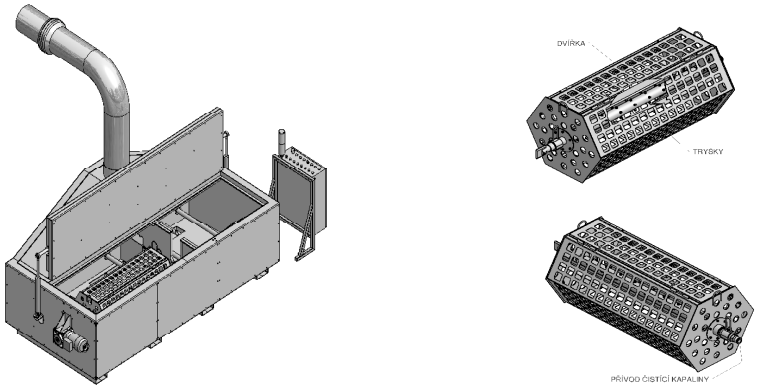


Fig. 4: Isometric view of the degreasing machine

Student projects



Fig. 5: Electricaly powered additional device for disabled wheelchairs



Fig. 6: Electricaly powered additional device for disabled wheelchairs

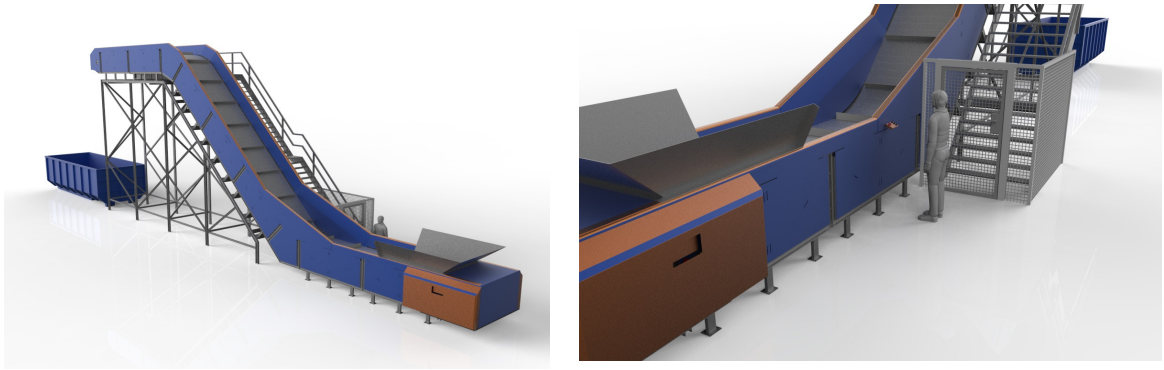


Fig. 7: Conveyor for piece waste in the area of recycling

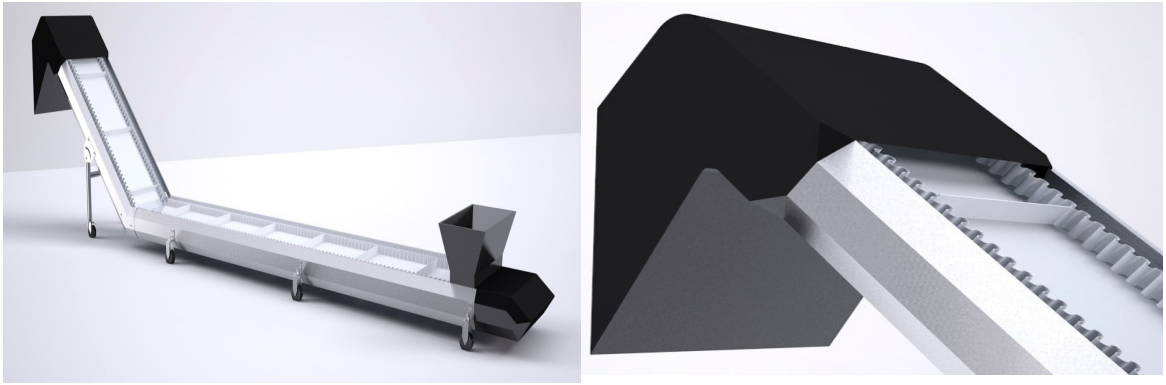


Fig. 8: Conveyor to a clean environment

Conclusion

In this thesis the author dealt with the extensive issue of risk analysis of technical products. The aim of this work was to propose a methodology that would facilitate the work of not only the designers themselves, but also of other related professionals. In his work, the author sought to draw insights into risk theory, uncovered the philosophy of existing methodologies used for these purposes and, with the support of EDSM, the theory of technical systems, to design, verify and validate the methodology on specific technical products from the academic environment and industrial practice.

There is a great deal of work and technical standards in the literature which deal with the problem of risk analysis. A large number of methodologies are described in particular from a general point of view, but concrete examples of methodologies applied to specific products are lacking. This is particularly due to the desire to maintain business secrets, so it is largely classified information. Apart from the basic general definitions, the terminology of the related concepts was found to be inconsistent, and there were no publications that dealt with the problem in a comprehensive way. According to the author, it would be advisable to try to harmonize the key concepts in further research, and it would be worthwhile considering the publication of a book on the subject.

In the introduction of this paper, the author attempted to briefly summarize the basic concepts and introduce basic definitions, to provide the readers with a clearer view of the issue. In the next part are presented the basic methods used for risk analysis and a brief description, which explains the essence of individual methods. These are compared according to the literature, and according to outputs that allow and are divided into individual groups. There are other sophisticated methods of analyses however, some of them are not listed as they are specialized on specific products such as chemical, fire or medical products. Since the author has not been able to use all the methods on specific cases, it does not mean that they cannot be used a priori.

The methods used vary with respect to the complexity of the machines under consideration and the time available to the assessors. A particular problem was finding the appropriate suboptimal lifecycle model that would allow the user a complete view of all the stages of the product. The methods studied often differed from the point of view of the chosen lifecycle. The optimum model of a life cycle of a product was based on TTS using the TrfP transformation model. According to the author this model, combined with the Ishikawa diagram, gives an exhaustive overview of the life cycle stages of the product and serves as a source of risks and their causes, its versatility makes it preferable to use over the others.

In the next part of the work the author proposed a methodology, which is integrated from the point of view of TTS. The methodology was first validated on interdisciplinary student projects in which students design sophisticated technical products according to assignments from industrial enterprises such as ENGEL a.s. and ASTOS Machinery a.s. The methodology is a part of the systematic process of designing and developing technical products in the context of parallel works from the point of view of problem solving. After successful verification of student projects, the use of the methodology is validated on concrete examples from practice.

Acknowledgments

This paper includes partial results of the Project SGS-2016-012 “Complex support of design engineering of technical products to improve their properties and competitiveness III”.

References

[1] Metody analýzy a řízení rizika (http://www.chinesehammers.com) ke dni 21.8.2015.

[2] Management rizik - Techniky posuzování rizik. Praha: Český normalizační institut, leden 2011

[3] Techniky analýzy bezporuchovosti systémů - Postup analýzy způsobů a důsledků poruch (FMEA). Praha: Český normalizační institut, January 2007

[4] Smejkal, V., Rais, K.: Řízení rizik ve firmách a jiných organizacích. Praha, Grada Publishing, 2006, ISBN 80-247-1667-4

[5] Korecký, M., Trkovský, V.: Management rizik projektů se zaměřením na projekty v průmyslových podnicích, Praha, Grada Publishing, 2011, ISBN 978-80-247-3221-3

[6] Hlinovský, J. (in memoriam), Marek, J., Blecha, P., Krčálová, E. a Mareček, J.: Management rizik výrobních strojů: MM Průmyslové spektrum, 2009, ISSN 1212-2572

[7] ČSN EN ISO 9000 (idt ISO 9000:2005): Systémy managementu (jakosti - 2002) kvality – Základní principy a slovník (Quality management systems – Fundamentals and vocabulary). Praha: Český normalizační institut (Prague: Czech Institute for Standardisation). (2002), 2006

[8] Eder, W. E., Hosnedl, S.: Design Engineering, A Manual for Enhanced Creativity. CRC Press, Taylor & Franciss Group, Boca Raton, Florida USA 2008, 600 s., ISBN 978-1-4200-4765-3

[9] Študlar,V., Pešek, T., Matuška, M., Řihout, J., Řehák, M., Nguyen, L., Červenka, O. a Zlochová, K.: Conveyor to a clean environment. Intedisciplinary engineering and industrial desgn project ZKM2+ st. FST a FDULS with consultancy support st. FZS. Vedoucí S. Hosnedl, J. Dvořák a M. Kopecký. Plzeň: ZČU FST KKS ve spolupráci s FDULS a FZS, 2017.

[10] Pražák, L., Mištera, J., Šlajs, J., Ďurina, J., Vostracká, K., Chládek, B., Neumannová, N. a Burešová, A.: Electricaly powered additional device for disabled wheelchairs Intedisciplinary engineering and industrial desgn project ZKM2+ st. FST a FDULS with consultancy support st. FZS Vedoucí S. Hosnedl, J. Dvořák a M. Kopecký. Plzeň: ZČU FST KKS ve spolupráci s FDULS a FZS, 2017

[11] Štilip, O., Vránek, P., Šedivý, M., Štěpánek, M., Šulc, J., Starý, T., Samek, J., Vyhnal, O., Balínková, K. a Cingrošová, A.: Electricaly powered additional device for disabled wheelchairs. Intedisciplinary engineering and industrial desgn project ZKM2+ st. FST a FDULS with consultancy support st. FZS. Vedoucí S. Hosnedl, J. Dvořák a M. Kopecký. Plzeň: ZČU FST KKS ve spolupráci s FDULS a FZS, 2017

[12] Bezouška, M., Švec, J., Waldman, J., Procházka, A., Slabá, A., Laštovičková, R., Pleskotová, M. a Jílková, Z.: Conveyor for piece waste in the area of recycling. Intedisciplinary engineering and industrial desgn project ZKM2+ st. FST a FDULS with consultancy support st. FZS. Vedoucí S. Hosnedl, J. Dvořák a M. Kopecký. Plzeň: ZČU FST KKS ve spolupráci s FDULS a FZS, 2017

[13] Hales, C.:*Managing Engineering Design*, NY, USA:John Wiley, 1993, ISBN 0-470-2004

[14] Eder, W. E.; Hosnedl, S.: Introduction *to Design Engineering: Systematic Creativity and Management*. CRC Press / Balkema, Taylor & Francis Group, Leiden, The Netherlands, 2010, ISBN: 978-0-415-55557-9

[15] Dvořák, J.: "*Risk Management of Technical Products in their Life Cycle*". In: CD-ROM :Proceedings of 16th IBIMA – International Bussiness Information Management Association: Innovation and Knowledge Management: A Global Competitive Advantage, Khalid S. Soliman (Ed.), 29.6.2011 – 30.6.2011, Kuala Lumpur, Malaysia, p. 1965 – 1973, ISBN 978-0-9821489-5-2

[16] Hosnedl, S., Dvořák J., Kopecký M.: *Integrated Engineering Design Research and Interdisciplinary Education in cooperation with Industrial Partners*. In: Proceedings of The 17th World Multi-Conference on Systemics, Cybernetics and Informatics. Vol. II. Orlando, Florida, USA: International Institute of Informatics and Systemics. 09. – 12. 07. 2013, p. 218 – 223, ISBN-13 978-1-936338-88-7

Assessment of eGovernment Policies: Reflections on Applied Frameworks

Demetrios Sarantis, United Nations University – Operating Unit on Policy-Driven Electronic Governance, Guimarães, Portugal, and sarantis@unu.edu

Abstract

Consideration of digital government transformation policies has been encouraged in many countries, with eGovernment assessment increasingly used worldwide to improve them. This study gleans and comparatively illustrates the most widely used eGovernment assessment frameworks. Most of them provide very relevant results for the maturity level of eGovernment focusing either in user demand side or supply demand side. These types of approaches provide useful information from a user-perspective or a supply-perspective, but do not provide any information regarding the back-end integration of eGovernment. This review study identifies the current prevailing eGovernment assessment criteria and indicators and highlights the necessity of enhancing those approaches with appropriate back office integration assessment indicators.

Keywords: eGovernment Assessment, eGovernment Policy, Benchmarking

Introduction

eGovernment assessment and rankings are commonly used to determine relative standing and to monitor the progress of countries with respect to a characteristic or achievement goal. For policymakers, tools, such as eGovernment assessment indexes, benchmarking instruments and assessment frameworks serve as information sources and the relative rankings of countries they produce are given a significant amount of consideration and concern. To inform robust policy and decision making and to propel optimal resource allocation, grounded and broadly applicable ranking frameworks are essential (Rorissa et al, 2011).

eGovernment researchers and practitioners have devised a diversity of assessment instruments to evaluate the progress of eGovernment at the local, national, regional, and global levels (United Nations, 2010, West, 2007). A targeted assessment of eGovernment is fundamental if a country is to make considerable progress (Ojo et al., 2007). The availability of an eGovernment method for assessing the technological readiness in public sector is critical in developing efficient digital transformation policies and strategies (Alghamdi et al, 2011.). While there are several eGovernment assessment tools, there is a need for review on what extent these tools can be shaped as frameworks that cover the whole spectrum of digital transformation context. Researchers and practitioners have established several indicators used in the course of assessment. Most of those indicators have a focus on measuring eGovernment outcome like realizations of electronic services or information provision in public sector portal. This demonstrates the fact that prevalent focus in the process of eGovernment development assessment is on the front office (Jovanovska et al, 2012). In order to reach success in applying eGovernment, public bodies should recognise the significance of the integration and transformation (Janowski, 2015) between all eGovernment building blocks (Azab et al, 2009).

In this paper, after presenting the theoretical background of the back office integration field and the applied research method on this study, the current eGovernment assessment approaches are illustrated in section three. Results and future research steps are discussed in section four and conclusions are presented in last section.

Theoretical Background and Research Method

1. Theoretical Background

To accomplish the promises of eGovernment, organisational and technical operations of various public administration units need to be involved. This demands collaboration, indicating to a common cross-organisational strategy and its implementation, as well as interoperability, indicating to the technical means which enable information technology systems to exchange information in order to realise machine functionality across system borders. Public sector back office integration is the outcome of both cooperation and interoperability between public sector organisations and the related stakeholders (Klischewski, 2004).

In eGovernment, a distinction exists between the front and back offices of public sector organizations. The interaction between citizens and public servants takes place in the front office, while the assessment of inquiries and the elaboration processes are carried out in in the back office (OECD, 2003). Back office operations regularly demand the exchange of information between various organisations. Back office refers to the internal operations of an agency that support core processes and are not accessible or visible to the public (Janowski, 2005).

eGovernment development is assessed across the globe by various methodologies provided by universities, companies, public and private organizations and multi-lateral international institutions. These approaches mainly assess the progress made by each country over a period of time and compare its growth against other countries which have a political and potentially economic impact and which can influence the development of eGovernment services. These assessment efforts serve as a tool for the countries and public institutions to learn from each other, identify areas of opportunities and challenges in eGovernment and accordingly develop appropriate strategies, policies, initiatives. It also helps in assessing the eGovernment readiness of the country and build capacities in the gap areas. Hereinafter we illustrate the basic elements of the most used assessment approaches.

2. Research Method

A systematic literature search was conducted using both academic papers and practitioners' reports to identify eGovernment assessment frameworks published in scientific literature, consulting reports or international organizations surveys. The search was carried out into reports, surveys and articles from 2010 to 2017 in order to review the most contemporary and updated ones. The search for related publications was mainly conducted as a structured keyword search. The searching process was based on following keywords (eGovernment OR Digital Government) AND (Assessment OR Evaluation). At the end of the database search 10 documents were found. The results have been filtered in order to keep documents that are relative to the research topic. Finally, five assessment reports have been selected for detailed review. Content analysis was based on analytical study of the selected documents carried out using systematic check techniques. The different assessment approaches have been analysed, extracting the significant elements of which they consist. Thereinafter, specific eGovernment assessment dimensions and sub dimensions are proposed and the extracted elements, from the previous step, are allocated to them.

EGovernment Assessment Approaches Review

In this section overview of five eGovernment assessment studies is illustrated (Table 1). With purpose to analyse and compare the selected eGovernment assessment studies we identify five elements. The author of the study, the title of the study, the year published, the assessment subject and the assessment

indicators that are applied in each study. We analyse five different instruments, those by European Commission, DG Communications Networks, Content & Technology (European Commission, 2016), by Accenture (Accenture, 2014), by Economist Intelligence Unit & IBM Institute for Business Value (Economist Intelligence Unit and IBM Institute for Business Value, 2010), by OECD, Public Governance and Territorial Development Directorate (OECD Public Governance and Territorial Development Directorate, 2014) and by United Nations, Department of Economic and Social Affairs (United Nations, Department of Economic and Social Affairs, 2016) to distil out a core set of assessment indicators.

Table 1: eGovernment Assessment Frameworks

Author	Title	Year	Assessment Subject	Indicators
European Commission	eGovernment Benchmark 2016	2016	Priority areas of the eGovernment Action Plan	User-centric Government Transparent Government Cross-border Mobility Key Enablers
Accenture	Digital Government Pathways to Delivering Public Services for the Future	2014	Maturity and Sophistication of Digital Government	Citizen Service Experience
Economist & IBM	Digital economy rankings 2010 Beyond e-readiness	2010	The quality of a country's ICT infrastructure and the ability of its consumers, businesses and governments to use ICT to their benefit	Connectivity and technology infrastructure Business environment Social and cultural environment Legal environment Government policy and vision Consumer and business adoption
OECD	Recommendation of the Council on Digital Government	2014	Digital Government Strategies	Transparency, openness and inclusiveness Engagement and participation Data-driven culture Risk management approach Leadership and political commitment Coherent use of digital technologies Effective organisational and governance frameworks International co-operation Clear business cases

				Institutional capacities Digital technologies based on assessment of existing assets Regulatory frameworks allow digital opportunities to be seized
United Nations	United Nations E-Government Survey 2016	2016	eGovernment effectiveness in the delivery of basic economic and social services to people in five sectors (education, health, labour and employment, finance and social welfare	E-Government Development Index (EGDI) Telecommunications Infrastructure Index (TII) Human Capital Index (HCI) Online Service Index (OSI)

1. European Commission, eGovernment Benchmark

The eGovernment Benchmark evaluates the priority areas of the eGovernment Action Plan 2011-2015. Progress on every priority area is measured by one or more indicators, so-called top level benchmarks:

- User-centric Government assesses the availability and usability of public eServices and examines ease and speed of using those eServices.

- Transparent Government evaluates the transparency of government authorities' operations, service delivery procedures and the level of control users have over their personal data.

- Cross-border Mobility measures the availability and usability of services for foreign citizens and businesses.

- Key Enablers assesses the availability of 5 functionalities. More specifically, the SSO functionality, allows users to access multiple websites logging in only once. eID is an electronic identification solution of citizens or businesses, to access services provided by government authorities. The eDocuments enables users to send authenticated documents online to public organizations. The Authentic Sources provides pre-filled online forms and the possibility of data re-use by public organisations to deliver services automatically. The eSafe functionality provides a secure virtual repository for users' data and documents.

All top level benchmarks consist of multiple sub-indicators. These are in turn measured by a number of questions regarding the quality or quantity of eGovernment services on a specific aspect.

2. Accenture, Digital Government Pathways to Delivering Public Services for the Future

The study, implemented by Accenture at 2014, assesses the maturity and sophistication of digital government in 10 countries, Brazil, Germany, India, Norway, Singapore, South Korea, Saudi Arabia, UAE, United Kingdom and United States. The study looks at implementation levels of digital services, the overall service delivery experience as well as satisfaction levels of citizens. It evaluates digital strategies of governments, conducts a comprehensive benchmarking exercise for a range of central government services, assesses their progress and looks at outcomes delivered. To measure Citizen Service Experience, Accenture appraises government's public service programs in a quantitative manner by evaluating only those services offered at a federal or central government level to ensure the analysis of the services is directly comparable across countries. The research is based on three components under Citizen Service Experience, which provide the overall ranking for a country, Citizen Satisfaction Survey, Service Maturity and Citizen Service Delivery Experience.

Citizen Satisfaction Survey assesses public services users' opinions about the role of their governments in providing excellence in services.

Service Maturity measures the level to which a government has developed an online presence as an indicator. Service Maturity has been measured in three levels of capability: publish services, interact services and transact services.

Citizen Service Delivery Experience measures the extent to which government agencies manage interactions with citizens and businesses and deliver service in an integrated way. The Citizen Service Delivery Experience score considers how well governments have addressed the five pillars of leadership in customer service - citizen-centered, multichannel and cross-government service delivery, proactive communication and education, and social media.

Finally, the Digital Maturity dimension is used as a lens to view the digital governments' rankings. Digital Maturity compares the digital government initiatives of countries relative to one another instead of being an absolute measurement through a range of quantitative and qualitative variables across the key outcome areas in digital government public service delivery.

3. Economist Intelligence Unit & IBM Institute for Business Value, Digital economy rankings 2010 beyond e-readiness

The digital economy rankings model consists of over 100 separate quantitative and qualitative criteria, all but one of which are scored by the Economist Intelligence Unit's regional analysts and editors, and are organised into six primary categories. The 39 indicators and 82 sub-indicators are, in turn, weighted according to their assumed importance as influencing factors. Major data sources include the Economist Intelligence Unit, Pyramid Research, the World Bank, the United Nations and the World Intellectual Property Organisation, among others. The six categories and individual criteria, and their weights in the model, are described below.

Connectivity and technology infrastructure measures the extent to which individuals and businesses can access the Internet and mobile networks, and do so affordably with an assurance of quality, reliability and security. Penetration of each market's mobile-phone subscriptions, overall Internet users and broadband Internet accounts are ranked as a percentage of the total population. The affordability of the lowest-priced broadband subscription, measured as a percentage of an average household's median income, is used as the overall measure of digital service affordability. Broadband quality is measured as

the extent to which fibre-optic access figures in a country's total broadband connections. It includes the following criteria: Broadband penetration, broadband quality, broadband affordability, mobile-phone penetration, mobile quality, internet user penetration, international Internet bandwidth, Internet security.

In evaluating the **Business Environment**, the Economist Intelligence Unit screens 74 sub-indicators to provide a comprehensive and forward view of each country's attractiveness as a trading economy and as a destination for business investment. The criteria cover such factors as the strength of the economy, political stability, taxation, competition policy, the labour market, and openness to trade and investment. The aggregate scores of the individual sub-indicators are grouped into nine higher-level criteria: Overall political environment; macroeconomic environment; market opportunities; policy towards private enterprise; foreign investment policy; foreign trade and exchange regimes; tax regime; financing; the labour market.

Social and Cultural Environment considers a population's web-literacy - its experience using the Internet and its receptivity to it - and the technical skills of the workforce. These technical skills are evaluated by both evidence of the familiarity of a country's population with information technology applications and the extent to which its schools and governments provide the education infrastructure to engender them. Also included is an assessment of entrepreneurship, while scoring of innovation levels in each market evaluates how well the society fosters creative business activity that can lead to the creation of intellectual property, new products and industries. It includes the following criteria: Educational level, Internet literacy, degree of entrepreneurship, technical skills of workforce, degree of innovation.

eGovernment development depends on both a country's overall **Legal Framework** and specific laws governing Internet use. This category reflects those legal frameworks that have a direct impact on the use of digital technology to inform, communicate and transact business. Governments need to include legislative frameworks to resolve issues such issues as cybercrime, data privacy and spam, but just as importantly countries need to create a legal atmosphere that works to minimise abuses and non-competitive behaviour, including provisions covering consumer protection and legal jurisdiction. It includes the following criteria: Effectiveness of traditional legal framework, laws covering the Internet, level of censorship, ease of registering a new business, electronic ID.

Government Policy and Vision assesses governments' ability to lead their countries towards a digital future. This indicator analyses the availability of digital channels to individuals and businesses for accessing public services, and to citizens for obtaining government information about civic issues and engaging in consultation with government officials on matters involving the political process. It includes the following criteria: Government spend on ICT as a proportion of GDP, digital development strategy, eGovernment strategy, online procurement, availability of online public services for citizens and businesses, eParticipation.

Consumer and Business Adoption looks at the amount that businesses and consumers spend on accessing ICT services, the extent and range of Internet features used by individuals, their online purchasing activity, and the extent to which individuals and businesses use the online public services that have been made available. It includes the following criteria: Consumer spending on ICT per head, level of e-business development, use of Internet by consumers, use of online public services by citizens and businesses.

4. OECD, Recommendation of the Council on Digital Government Strategies

Recent years, the OECD has been making progresses in the collection of data and in the production of evidence, towards the development of digital government performance indicators. OECD

Recommendation of the Council on Digital Government Strategies provides a theoretical and normative framework to assess governments' actions to use digital technologies to spur more efficient, effective, open and innovative public sectors. The Recommendation is an international legal instrument on digital government. It complements and provides a specific context for the application of other OECD Recommendations containing policy guidance and tools in a number of related policy areas. It offers a whole-of-government approach that addresses the cross-cutting role of technology in the design and implementation of public policies, and in the delivery of outcomes. It emphasises the crucial contribution of technology as a strategic driver to create open, innovative, participatory and trustworthy public sectors, to improve social inclusiveness and government accountability, and to bring together government and non-government actors to contribute to national development and long-term sustainable growth.

The instrument recommends that governments develop and implement digital government strategies which:

1. Ensure greater transparency, openness and inclusiveness of government processes and operations.
2. Encourage engagement and participation of public, private and civil society stakeholders in policy making and public service design and delivery.
3. Create a data-driven culture in the public sector.
4. Reflect a risk management approach to addressing digital security and privacy issues, and include the adoption of effective and appropriate security measures, to increase confidence on government services.
5. Secure leadership and political commitment to the strategy, through a combination of efforts aimed to promote inter-ministerial co-ordination and collaboration, set priorities and facilitate engagement and co-ordination of relevant agencies across levels of government in pursuing the digital government agenda.
6. Ensure coherent use of digital technologies across policy areas and levels of government.
7. Establish effective organisational and governance frameworks to co-ordinate the implementation of the digital strategy within and across levels of government.
8. Strengthen international co-operation with other governments to better serve citizens and businesses across borders, and maximise the benefits that can emerge from early knowledge sharing and co-ordination of digital strategies internationally.
9. Develop clear business cases to sustain the funding and focused implementation of digital technologies projects
10. Reinforce institutional capacities to manage and monitor projects' implementation
11. Procure digital technologies based on assessment of existing assets including digital skills, job profiles, technologies, contracts, inter-agency agreements to increase efficiency, support innovation, and best sustain objectives stated in the overall public sector modernisation agenda.
12. Ensure that general and sector-specific legal and regulatory frameworks allow digital opportunities to be seized

5. UN, UNITED NATIONS EGOVERNMENT SURVEY 2016

Progress of eGovernment development in United Nations (UN) is assessed by eGovernment Development Index (EGDI) which is a composite index based on weighted average of three indices, the Telecommunications Infrastructure Index (TII), the Human Capital Index (HCI) and the Online Service Index (OSI) (United Nations, 2016).

Regarding OSI, which is the primary eGovernment index, data is collected from an independent survey questionnaire that assesses the national online presence of all 193 United Nations Member States. National web presence is assessed in country's native language including the national portal, eServices portal and eParticipation portal as well as websites of education, labour, social services, health, finance and environment ministries. The OSI survey questionnaire assesses several features related to online service delivery, including whole-of-government approaches, open government data, eParticipation, multi-channel service delivery, mobile services, usage up-take, digital divide as well as innovative partnerships through the use of ICT. This data is collected by a group of researchers under the supervision of UNDESA through a primary research and collection endeavour.

To arrive at a set of Online Service Index (OSI) values, a total of 111 researchers, including UN experts and online United Nations Volunteers (UNVs) from over 60 countries assessed each country's national eGovernment status, including the national portal, as well as eServices websites of the related ministries of education, labour, social services, health, finance and environment as applicable. The UNVs included qualified graduate students and volunteers from universities in the field of public administration.

Discussion and Future Work

The above eGovernment assessment methods are crucial to cross-country comparisons of digital government evolution. Policymakers can use evaluation results to plan digital development policies and implement new innovative services for their citizens. Assessment initiatives also assist governments to monitor the efficiency and effectiveness of public spending (United Nations, 2010).

Despite their undeniable usefulness, controversy exists over the coverage of the whole spectrum of eGovernment domain. Most of eGovernment assessment efforts lack a coverage focus on back-office site (Janssen et al., 2004). Furthermore, eGovernment assessment methods become more problematic, when they are based on subjective data collection criteria (studies, interviews, opinions etc.) to calculate assessment indicators. The more sophisticated tools require expensive data collection and complex processing.

The focus of the above eGovernment assessment studies can be distinguished in two main dimensions, Supply Side assessment, what the public sector offers, and Demand Side assessment, what the user receives. There is a need in the case of eGovernment back office assessment, for simple, inexpensive, fairly transparent and replicable, and widely accepted and used criteria (Rorissa et al, 2011). Back office integration has long been an important focus of attention by researchers, policy makers, technologists and public officials. The eGovernment vision is a vision of integrated information and services. This means radical changes are needed in what happens behind the web portal that users see. New public administration processes, different information flows, changed policies and new kinds of citizen and business needs are all part of the integration story.

Silo mentality is a pertinent problem in public administration integration efforts. Lack of appropriate mechanisms for the coordination of the investment in public administration (PA) to optimize resources is obvious. There is a reluctance to share data, information and resources and the lack of technical

interoperability between systems of different government agencies or even inside the same government remains an issue. The lack of basic common public sector IT architectures has resulted in the development of a diversity of disparate applications (Themistocleous et al, 2005). Lack of open data, data standards and common way of service design are major technical barriers (Lam, 2005).

Based on critical analysis of existing approaches, the identified gap regarding back office integration assessment in eGovernment area should be researched and covered adequately. Specific assessment criteria should be identified and measurable indicators should be defined in order to facilitate the progress of eGovernment towards its strategic objectives, that is the development of services based on user's needs and problems, i.e. integrated services or life-events.

Conclusion

Investments in public organisations' back offices are not a priority for politicians due to their low visibility to voters. Nonetheless, given its potential impact on improving the quality of digital transformation, they are much more visible in comparison to what government thinks, and therefore should be relatively assessed (Luna-Reyes et al, 2011). The implementation of back office eGovernment systems is at the same time a risky and important process since countries need to adapt to changing environments (Hol and Kapurubandara, 2014). The systems exhibit an excessive degree of complexity and are remarkably custom-built. Implementation is usually expensive and needs to be carefully planned and managed.

This study reviews the existing eGovernment assessment approaches and highlights that there is a gap in the area of eGovernment back office assessment. The current eGovernment metrics should be extended and supplemented firstly with indicators that will measure the progress towards back office integration. Therefore, decisions on what should be measured must be based on the holistic definition of eGovernment, its long-term objectives, characteristics and the issues that remain to be solved. Agencies assigned responsibility for assessing ICT eGovernment may refer to this analysis as a useful resource in order to enhance their assessment models.

While this review is useful, more research is necessary. The implementation of a conceptual framework would pave the way for future exploratory research to enhance the existing eGovernment assessment methods with the appropriate back office integration assessment indicators. An option can be to develop an eGovernment capacity assessment instrument that can be filled in by organizational members and used as an input for discussing the back-end performance and possible improvements. A drawback might be the possible bias and interpretations.

Acknowledgment

This paper is a result of the project "SmartEGOV: Harnessing EGOV for Smart Governance (Foundations, methods, Tools) / NORTE-01-0145-FEDER-000037", supported by Norte Portugal Regional Operational Programme (NORTE 2020), under the PORTUGAL 2020 Partnership Agreement, through the European Regional Development Fund (EFDR).

References

Accenture, 2014. Digital Government Pathways to Delivering Public Services for the Future.

Alghamdi, I.A., Goodwin, R. and Rampersad, G., 2011. E-government readiness assessment for government organizations in developing countries. Computer and Information Science, 4(3), p.3.

Azab, N.A., Kamel, S. and Dafoulas, G., 2009. A suggested framework for assessing electronic government readiness in Egypt. Electronic Journal of e-Government, 7(1).

Economist Intelligence Unit and IBM Institute for Business Value, 2010. Digital economy rankings 2010 Beyond e-readiness.

European Commission, DG Communications Networks, Content & Technology, 2016. eGovernment Benchmark 2016 A turning point for eGovernment development in Europe?

Hol, A. and Kapurubandara, M., 2014. Parameters guiding e-transformation in developed and developing countries. International Journal of E-business Development, 4(4), pp.102-111.

Janowski, T., 2005. Introduction to Electronic Government. Center for Electronic Governance. United Nations University.

Janowski, T., 2015. Digital government evolution: From transformation to contextualization. Government Information Quarterly, 3(32), pp.221-236.

Janssen, D., Rotthier, S. and Snijkers, K., 2004. If you measure it they will score: An assessment of international eGovernment benchmarking. Information Polity, 9(3, 4), pp.121-130.

Jovanovska, M.B., Erman, N. and Todorovski, L., 2012. Evaluating the Maturity Level of e-Government Back-Office with Social Network Analysis. In 20th NISPAcee Annual Conference. Public Administration East and West: Twenty Years of Development. Ohrid, Macedonia.

Klischewski, R., 2004, August. Information integration or process integration? How to achieve interoperability in administration. In International Conference on Electronic Government (pp. 57-65). Springer, Berlin, Heidelberg.

Lam, W., 2005. Barriers to e-government integration. Journal of Enterprise Information Management, 18(5), pp.511-530.

Luna-Reyes, L.F., Gil-Garcia, J.R. and Celorio Mansi, J.A., 2011, June. Citizen-centric approaches to e-government and the back-office transformation. In Proceedings of the 12th Annual International Digital Government Research Conference: Digital Government Innovation in Challenging Times (pp. 213-218). ACM.

OECD., 2003. The e-government imperative, OECD, Paris.

OECD Public Governance and Territorial Development Directorate, 2014. Recommendation of the Council on Digital Government Strategies

Ojo, A., Janowski, T. and Estevez, E., 2007. Determining progress towards e-government-what are the core indicators? Retrieved June 19, 2008.

Rorissa, A., Demissie, D. and Pardo, T., 2011. Benchmarking e-government: A comparison of frameworks for computing e-government index and ranking. Government Information Quarterly, 28(3), pp.354-362.

Themistocleous, M., Irani, Z. and Love, P.E., 2005, January. Developing e-government integrated infrastructures: a case study. In System Sciences, 2005. HICSS'05. Proceedings of the 38th Annual Hawaii International Conference on (pp. 228-228). IEEE.

United Nations, 2010, United Nations e-Government survey 2010: Leveraging e-Government at a time of financial and economic crisis.

Case Study on Strategic Innovation Management Through Organizational Change

Takács Ildikó-Csilla, Ph.D., Bucharest University of Economic Studies, Bucharest, Romania,
csillatakacs12@gmail.com

Abstract

Strategic management and innovation management have to consider the top competing factors that ensure successful organizational change, since innovation management has a fundamental strategic position and is directly interrelated with the corporations' objectives. Whilst innovation management is deeply embedded in the new dynamics of global economic development and competition, enterprises have to be able to design incorporated innovation management methods or models that are flexible and adaptable to all changes.The objective of this paper is to highlight strategic innovation management as an important administration implement in order to support the hypothesis that governance principles have a huge impact on the organizational accomplishment in the innovation management, simply because innovation is central to strategy. All gathered data are applied in a case study to propose a model of analysing strategic innovation management and determine the need for organizational change.The methodology used embraces empirical research based on qualitative methods, defining the decisive innovative factors towards more effective routines and innovation excellence. The results show which the weakest and and the strongest associations can be when planning organizational change and highlights the importance of strategic innovation management.

Keywords: strategic management, innovation management, organizational change

Introduction

A great deal of studies show that global corporations face a challenging growth prospect and new innovative mind-sets have premier spots on the Top Management Agendas. R&D spending is not the key driver for innovation success but a number of elements that structure a successful innovation system to create value across the lifecycle of organizations. At the core there are strategy, IT processes, governance, culture and innovation management, which is a combination of the innovative processes and changes management or the business process of organizational innovation through development.

Many SMEs fail because they do not recognise the need for change, on the other hand even to giant firms the core strength can sometimes become an obstacle to seeing the need for change (as proved to be the case of IBM in the '90s). Therefore, the company's supporting culture need to launch strategies and plans to close the identified gaps.

In a research study by Mateescu et.al. (2015), in recent years not only international corporations but also national ones have started using new management implements and methods, and started focusing on distinguishing their innovation management strategies from the competitors by adapting to the customers' needs and providing high-quality services. Consequently, as Drucker (2011) describes, innovating firms

develop their own unique realisation and subsequent capabilities that generate organisational performance.

According to Berger et. al. (2009), three essential traits are advisable for innovation management: positive encouragement, a tolerance for failure (Patrick Cescau, George Buckley) and patience (Olli-Pekka Kallasvuo). Additionally, an innovative organisation should be closely linked to the company's vision and overall business strategies based on comprehensive and relevant information, both from inside the corporation and from the market and the environment. Thus, today's companies must constantly adapt, develop and innovate, so that to handle the challenges of future innovation management, including the importance of quick results, the value of data-driven decision-making and the particular environment of emerging markets.

The 2017 KPMG's Global CEO Outlook divulges insights from nearly 1,300 CEOs in 10 of the world largest economies focusing on how managing their organizational change has become their vital opportunity to transform and re-shape their business model, since new technologies emerge, new markets appear, in addition, financial policies, social rules, information flow, targets and new challenges are constantly changing.

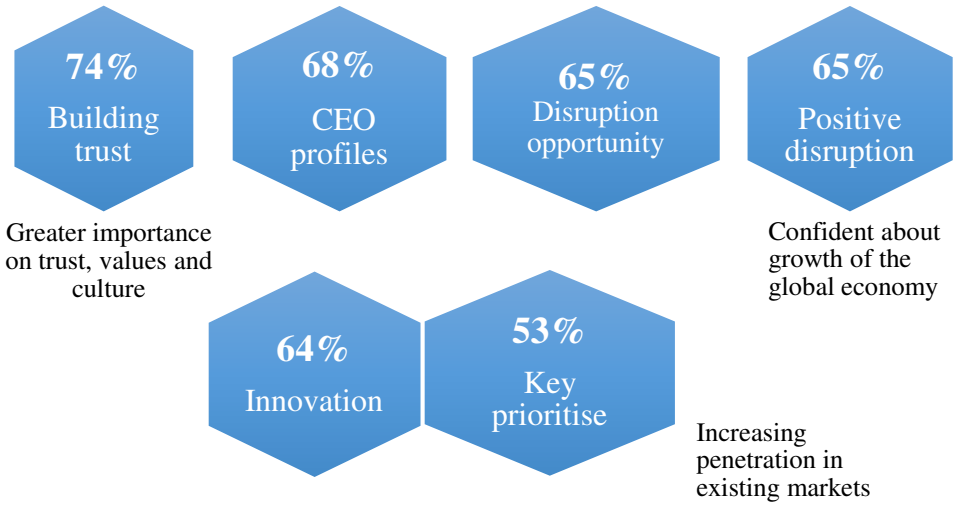


Fig. 1 : Global CEO Outlook 2017 Source: KPMG

RegTech is another significant driver of organizational change, as the global demand for regulatory, compliance and governance software is expected to reach €100.98 billion by 2020. Besides, investments in regulatory software can lead to an ROI of 600% plus, according to Fintech insights provider Let's Talk Payments. CEOs recognise the need of making changes, yet they are refraining from harnessing the power of disruption for their organisations.

According to a very recent research by Burrowes (2017), PwC's global chairman Bob Moritz working on the 20th year of annual CEO survey revealed that 84% of Banking and Capital Market CEOs consider that technology will completely reshape, or at least have a significant impact on competition within their industry over the next five years.

Theoretical considerations on innovation management

In the book by Peters and Waterman (2012), the principles and disciplines of the productive innovation management are crucial determinants and focus on how the enterprise accomplishes the initiative and studying process towards more effective practices and business excellence. The concept of innovation management incorporates networks of people that have appropriate knowledge including customer insight, supply chain knowledge and technical expertise, which allows companies of all sizes to make innovation an integral part of their business.

The core process of innovation management involves four steps: distinguishing opportunities, discovering resources, developing the enterprise and capturing value. The procedure of strategic management starts with creating a flexible organization in order to determine if the innovation management is consistent with the strategic management objectives and to pitch a great idea to the right market at the right time.

There is a substantial double role of innovation management: the challenges in finding new innovations, such as an unexpected use for technology, as well as developing new directions for innovation management models.

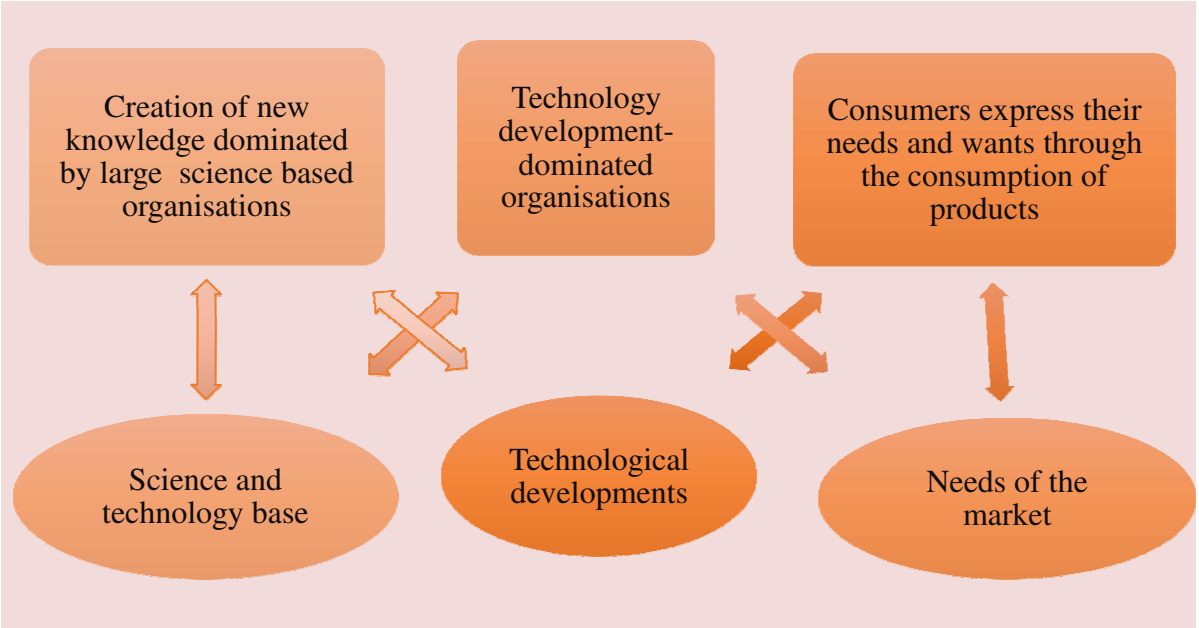


Fig.2: Conceptual Framework of Innovation

Furthermore, organisational merit within innovation management will be achieved by companies which can react quickly to new market conditions and customer needs, and which constantly look for creative and innovative solutions. Accordingly, the success of Johnson & Johnson, 3 M, Wal-Mart, and HP lies in the fact that they organise themselves into small, independent units and hold together by common goals and cultural norms, on the other hand, IBM is satisfying the individual's need to be a part of something great. Moreover, as Knight and Cavusgil (2004) state in their research paper, due to technological

advances, cross-border unions for product distribution as well as the increasing homogenization of consumer preferences have been facilitating extraordinary growth in global competitiveness.

Empirical Considerations on Strategic Innovation Management

Innovation management has a gap between scientific and organizational progress, since the problem with innovation determinations is embedded in the lack of innovation strategy. A precise innovation strategy helps the company to design an organization to match its specific competitive needs. Senior leaders of the corporations need to organize around long-term strategies for growth in a sustainable way, not only short-term technologies, accordingly they have to start planning for the next 10 years, not only for the next one-two year. The failure to prioritize innovation over short-term profits can have negative flows through capital markets.

There has been little empirical research aimed at uncovering the actual packages of know-hows that characterise truly innovative firms, therefore I will try to reduce the literary framework and focus on mainly the recent period and consistent with these state-of-the-art findings prefigure the best organizational change strategies. According to these changes, the global corporations have to apply continuous innovative strategies in order to maintain global competitiveness.

In 2017 the Boston Consulting Group analysed the top 210 firms in seven industries (automotive, chemicals, consumer goods, financial services, media and publishing, technology, and telecommunications) and found that the proliferation of new technologies are making the new models competitive necessities, not optional activities. Consequently, 1,500 survey respondents were asked to rank innovators within their industries. Evolving data from multiple sources has helped scores of companies better recognise the choice of prospects open to them and pinpoint possibilities for business model innovation. The BCG's 10th annual global survey shows that 79% of respondents ranked innovation the top-most priority or among their three top priorities at their corporation.

According to the Information Technology and Innovation Foundation, revised by McKinsey (2015), the profits of corporations will drop 20% - 60% by 2025 if they downfall to advance digitally. Therefore, companies have to make the leap from the Industrial Age to the Information Age and CEOs will need to embrace strategic innovation management, which requires alternative capital allocation that leads to exponential growth in the pursuit of longer-term goals.

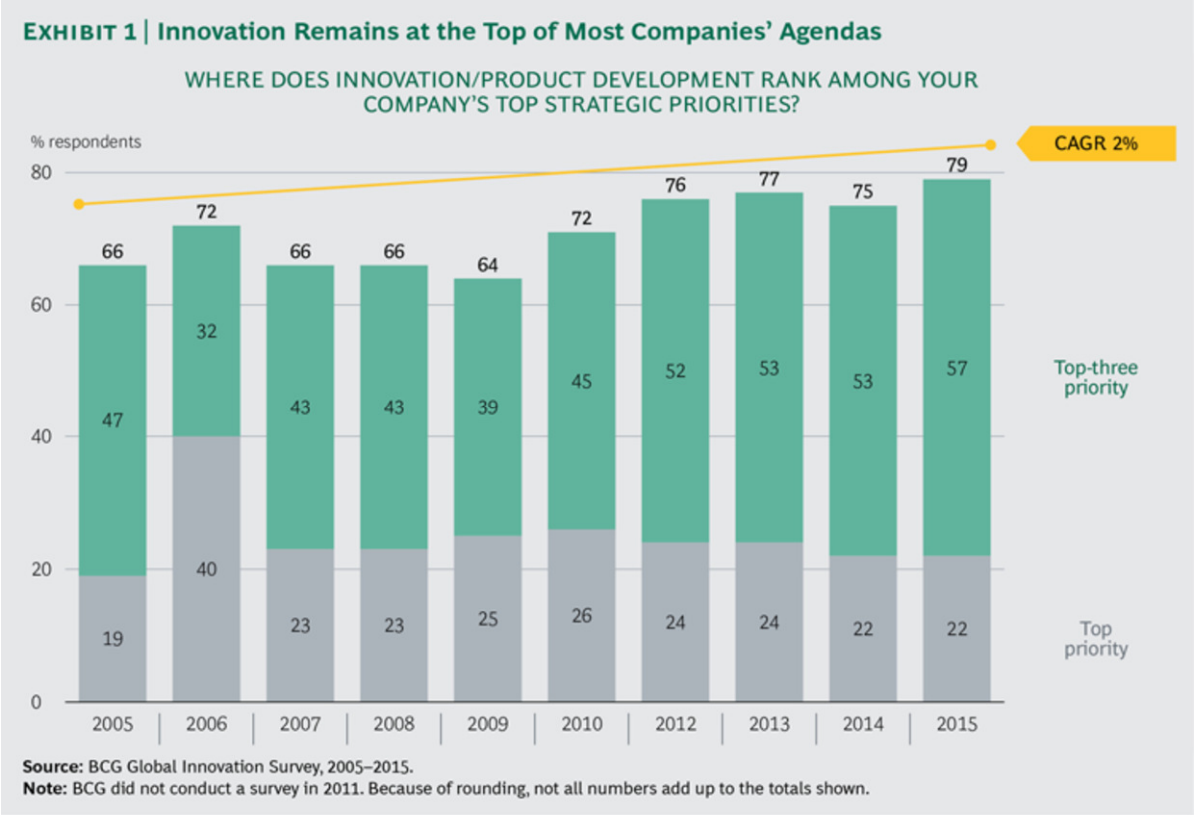


Fig.3: Global Innovation Survey 2005 – 2015 Source: BCG

The 2016 European Innovation Survey shows that only 16% of the respondents apply effective business methods and practices regarding innovation strategy, idea management, innovation budgeting, innovation funnel and innovation board simultaneously. Professor of Finance at Stanford Amit Seru claimed that companies in the top 10% on innovation experienced annual rates between 1% and 3% faster than those corporations with only an average pace of innovation. According to Andrews (2017), using the simplest and most economic models indicate that an innovative flow increases the total economic growth by at least 4.5%.

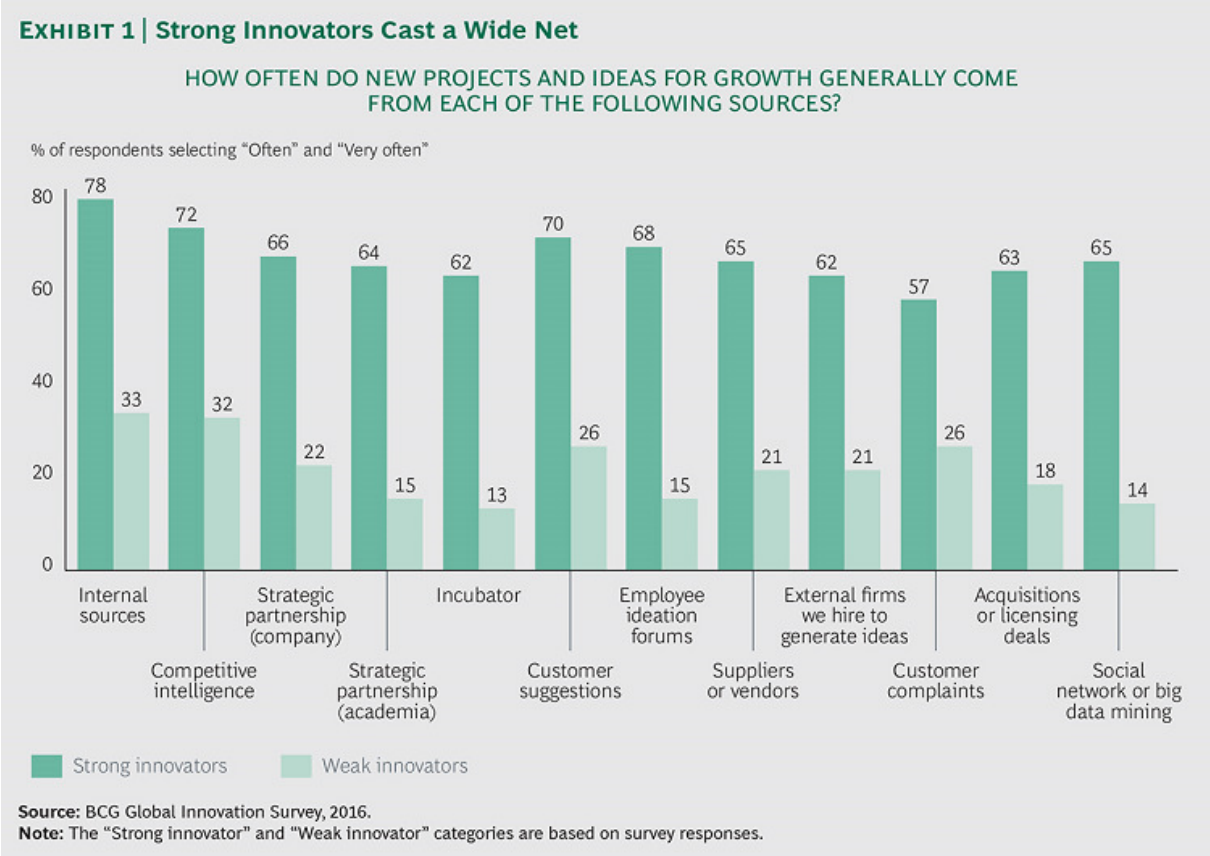


Fig.4 : Strong and Weak Innovators; Source BCG Global Innovation Survey 2016

Despite the above seen positive results even the strong innovators are faced with a truly difficult assignment:

1. Find the next big idea (Competitive intelligence 72%)
2. Avoid disruption (Customer suggestion 70%, Customer complaints 57%)
3. Fast-track innovation (Social network or big data mining 65%, Suppliers or vendors 65%)
4. Build networks of collaborators (Strategic partnership – company 66%, strategic partnership – academia 64%)
5. Stay on top of the revolutionary technology (Acquisitions or licensing deals 63%, Incubator 62%)
6. Identify growth opportunity (External firms they hire to generate ideas 62%)
7. Attain a position of innovation management (Internal sources 78%, Employee ideation forums 68%)

On the one hand, the huge amount of data, which is available to help senior leaders shape and pursue innovation strategies could be a prominent advantage, on the other hand, the hard work of sorting, organizing and gathering usable insights from thousands of files and sources can be overwhelming and exasperating to make analytics-driven strategic decisions.

Overall, in a previous study Takacs (2017) states that a successful innovation management should invest in strategy thinking methods, and support for diverse cultures in order to join people with different perspectives to share ideas and new approaches, combining entrepreneurial mind-sets with recognized and functioning expertise.

Research Objectives and Methodology

The objective of this study is to identify the key criteria that affect the organisational change strategies, as well as to do research on the degree of innovation management in global companies. The author has focused on the top most innovative corporations as key players in transforming strategy into practical accomplishment and their relation to the owner of business superiority to be applied.

This research shows that innovative companies are especially skilful at continually responding to change of any sort and encourage practical risk taking and support worthy attempts, as well as organise the root source of quality and productivity gain. In terms of research approach, I have used the rational model as my contextual framework to illuminate what values and practices ought to be incorporated into the innovative companies and to emphasise the role of the CEOs to manage the innovative principles of the organisation.

The methodology used involves interviews with managers and experts from global corporations in order to gather information for the time frame 2007 to 2017, according to Le Merle & Davis (2017), that was evaluated and applied in a case study so to propose a method of analysing innovative factors. This study debates the increasing diversification of implementations these global corporations have used to practise innovation management.

Assuming rational choices, the top companies were studied into various categories in order to analyse them according to long-term superiority: high technology companies (HP, Intel), consumer goods companies (P&G, J&J), general industrial goods companies of interest (Caterpillar, 3M), service companies (Marriott, McDonald's), project management companies (Bechtel and Fluor) and resource-based companies (Arco, Exxon).

Having reviewed a list of the world's most valuable companies, which are ranked by market capitalization, are all strongly associated with four vital attributes, namely an emphasis on speed, well-run R&D processes, the use of technological platforms and the systematic exploration of adjacent markets. In addition, by way of Dogsofthedow (2017) states, these companies also apply the most innovative strategies in the world, as we can see it comprised in the table below:

Table1: Market Cap Rank in 2017

Cap Rank in Feb.2017	Company	Symbol	Market Cap in Feb.2017
1	Apple	AAPL	718.7
2	Alphabet	GOOGL	584.2
3	Microsoft	MSFT	494.4
4	Berkshire Hathaway	BRK-A	423.4
5	Amazon.com	AMZN	403.2
6	Facebook	FB	391.7
7	Exxon Mobil	XOM	337.2
8	Johnson & Johnson	JNJ	332.5
9	JP Morgan Chase	JPM	323.6
10	Wells Fargo	WFC	290.3

Summarizing a number of different perspectives, as Schwab (2016) revised it, focusing on each part of the 12 pillars of global competitiveness the case study brings a more comprehensive and brighter evaluation on the innovative strategic system to have an integrative understanding of all its parts, while this is the only way that leads to sustainable development, indicated Maier et.al. (2014).

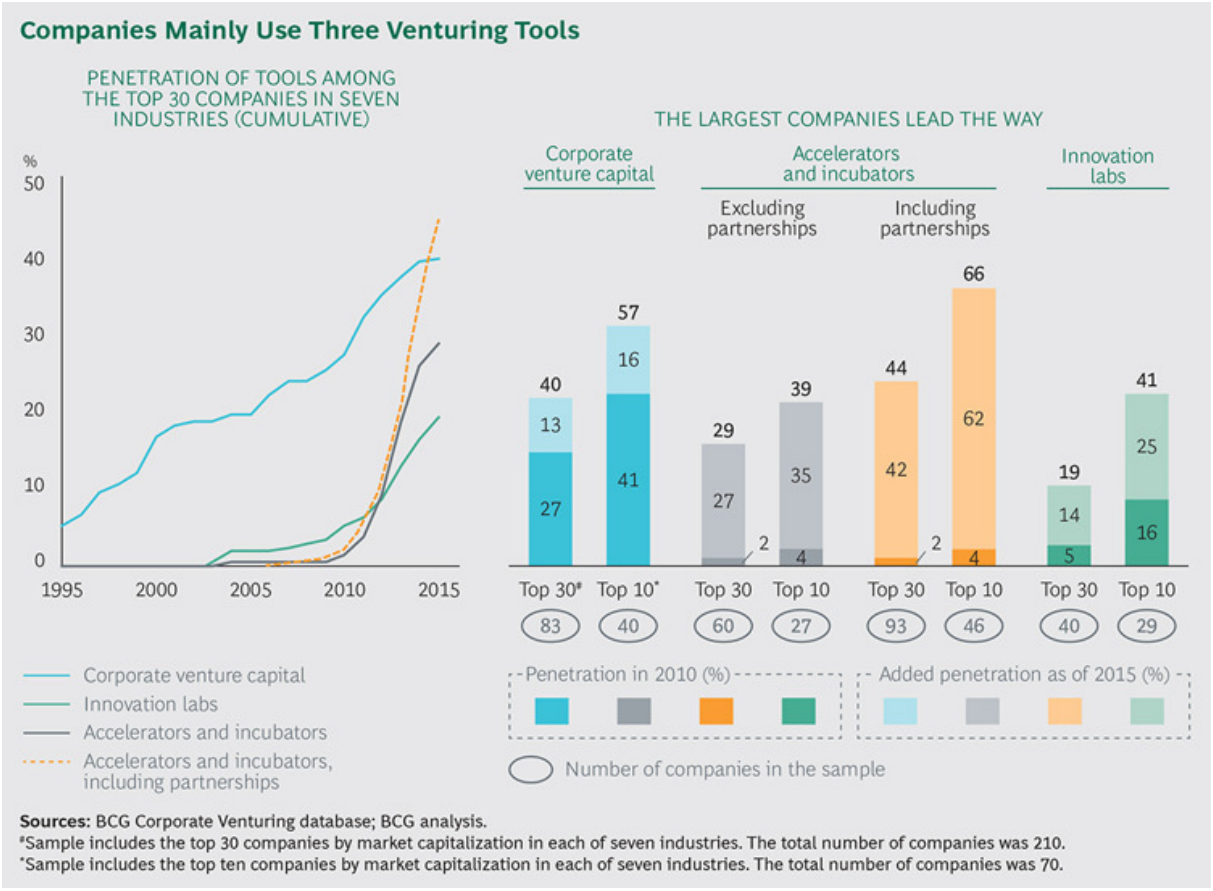
Source: Dogsofthedow.com

Research Results and Proposed Models

My key findings from the analysis are that global companies have a huge positive impact on the growth of organisations they fund, thus with the analysed case study the role of innovative culture is better understood and new insights reveal the key innovation management strategies that maintain global competitiveness and professional merit among the global corporations, as also Greenberg et.al. (2017) states.

The presented results of my research highlight the traits of the organizational change and offer some practical solutions and models for integrating as well as promoting innovative advances into strategic management that enhances financial results. While required to innovate may threaten business models, it also creates short-term and long-term openings for the companies that grasp organizational change.

Wrigley & Straker (2016) suggested several models that can be employed and selected by each company according to their profiles and ventures. While innovation management and strategic management processes can be defined through organizational change, corporations show great interest in implementing these models, which can promote creativity and motivational orientation to succeed through innovation. The following models have been examined with a view to providing steps towards actual applications:



Sources: BCG Corporate Venturing database; BCG analysis.
*Sample includes the top 30 companies by market capitalization in each of seven industries. The total number of companies was 210.
*Sample includes the top ten companies by market capitalization in each of seven industries. The total number of companies was 70.

Fig.5 Corporate Venturing Tools,

Source: BCG database

1. *The use of Corporate Venture Capital* increased from 27% in 2010 to 40% in 2015 among the 30 largest companies. Likewise, among the top 10 companies it has boosted from 41% to 57%, where the investments were strategically focused on software industry reflecting the increasing value of data and the transformation of hardware to software. CVC is an effective tool for both constructing value and developing innovative results that help a corporation in creating new revenue streams, and building up competitive market position. According to KPMG analysis 30% of projects are financed globally by this model.

2. *The use of Accelerators and Incubators* are the most common alternative to CVC, which increased from 2% to 44% among the 30 largest companies as well as from 4% to 66% among the 10 largest corporations. Growing accelerators and incubators form partnerships with venturing operations from other organisations or teaming up with independent accelerators with common interests can support the progress of innovative developments, especially at an early stage.

3. *The use of Innovation Labs* among the 30 largest companies increased from 5% to 19% and from 16% to 41% among the top 10 largest corporations, which worked these labs further along the development

chain to fast-track time to market and they often interacted with external entrepreneurs. The main focus of this model is on advancing products or services that are head-to-head to the core business.

All the three models can be employed at a particular stage with a specific goal: Corporate Venture Capital when the restraints are related to funding, Accelerators and Incubators for young ideas, and Innovation Labs for mature corporations, which have a strong strategic fit and approach to innovation within the corporation.

Companies are also employing many other implementation tools, such as Hackathons (software developers), jurors or mentors (to spot business models), scouting missions (to seek out innovations), corporate-university partnerships (between corporate R&D and university researchers), strategic partnerships (to bring the latest innovations to new market), start-up acquisitions (to access new technologies or market), licensing (customer segments).

Conclusions

The research showed that organizations need a play-to-win strategy system, which provide a clear measurement (Dobbs & Koller 2015), motivations, reasons and rewards to foster improvement that is aligned with their innovation management. Successful corporations develop innovation management models that are well-matched with their positions and reflect their corporate strategies, in addition they also adapt their models to changing times as the pace and stake of technology advancement progresses.

Companies that assign adequate assets for a flexible and dynamic innovation and venture culture have the greatest chance to assure long-term business achievement. The success of Johnson & Johnson, for example, one of the strongest long-time innovators in any industry, is that their innovation programs are strategically aligned with the corporation's innovation management objectives.

In conclusion, innovation management stems from a management team that combine deep scientific and technical expertise focusing with an equally deep knowledge on market needs. Therefore, innovation management must be one of the greatest progression strategies that companies employ, coupling scientific precision with stable senior-management cohesion and the resolution to pursue high-risk, high-return initiatives. The case study meant to be a thorough analysis of recent data for reasons connected to the methodology and leaving room for future academic and practical expansion.

References

Andrews, E., (2017), "Is Tech disruption good for the economy?", Stanford Business. [Online], [Retrieved September 12, 2017], https://www.gsb.stanford.edu/insights/tech-disruption-good-economy

Berger, R., Dutta, S., Raffel, T., Samuels, G. (2009) Innovating at the Top: How Global CEOs Drive Innovation for Growth and Profit, Palgrave Macmillan, New York.

Dobbs, R. & Koller, T. (2015), 'Playing to Win: The new global competition for corporate profits', *McKinsey,* 55-65.

Dogsofthedow, (2017), "Largest companies by market cap today". [Online], [Retrieved August 30,2017], http://dogsofthedow.com/largest-companies-by-market-cap.htm

Drucker, P. F. (2011) Innovation and Entrepreneurship: Practice and Principles, Routledge, New York.

Greenberg, E., Hirt, M. and Smit, S. (2017), 'The Global forces inspiring a new narrative of progress', *McKinsey Quarterly*.

Burrowes, K. (2017) 'Banking on disruption: how the BCM sector can turn change into a competitive advantage', *PwC Global.*

Knight, GA and Cavusgil, S.T. (2004), 'Innovation, Organizational Capabilities and the Born-Global Firm', *Journal of International Business Studies* 35(2):121-141.

Le Merle, M C. and Davis, A. C. (2017) Corporate Innovation in the Fifth Era: Lessons from Alphabet/Google, Amazon, Apple, Facebook, and Microsoft, Cartwright Publishing, Corte Madera.

Maier, D., Olaru, M., Weber, G. and Maier, A. (2014), 'Business Success by Understanding the Process of Innovation', The 9th European Conference on Innovation and Entrepreneurship (ECIE), ISBN: 978-1-910309-45-2, 18-19 September 2014, Belfast, UK.

Mateescu, R., Olaru, M., Lange, S., Rauch, M. (2015), 'Study On Supplier Invoice Risk Management in A Global Supply Chain', The 26th IBIMA conference on Innovation Management and Sustainable Economic Competitive Advantage: From Regional Development to Global Growth, ISBN: 978-0-9860419-5-2, 11-12 November 2015, Madrid, Spain.

McKinsey, (2015), "The Fight for the Customer: McKinsey Global Banking Annual Review 2015" 3, [Online], [Retrieved August 29, 2017], http://www.mckinsey.com/industries/financial-services/our-insights/the-fight-for-the-customer- mckinsey-global-banking-annual-review-2015.

Ringel, M., Taylor, A., and Zablit, H. (2017), 'The most Innovative Companies 2016, Getting past "Not invented here". *The Boston Consulting Group*, 3-15.

Peters, T.J. and Waterman, H.R. (2012) In Search of Excellence: Lessons from America's Best-Run Companies, Harper Collins, New York.

Schwab, K., (2016), "The Global Competitiveness Report 2016-2017", *World Economic Forum*. [Online], [Retrieved September 10, 2017], https://www.weforum.org/reports/the-global-competitiveness-report-2016-2017-1

Takacs, I.Cs. (2017). 'Study of cross-cultural challenges in the international business administration' Proceedings of BASIQ International Conference New Trends in Sustainable Business and Consumption, ISSN: 2457-483X, 31 May-3 June 2017, Graz, Austria, 657-666.

Wrigley, C and Straker, K. (2016), 'Designing innovative business models with a framework that promotes experimentation', *Strategy & Leadership*, *44*(1), 11-19.

De L'alternance A La Formation Professionnelle Continue Dans l'Enseignement Supérieur: Un Nouveau Modèle De Formation Tout Au Long De La Vie Au Service Du Développement Et De La Structuration Du Territoire Corse

Christophe Storaï*, Laetita Rinieri**,

* Maître de Conférences en Sciences économiques et Directeur du Centre de Formation des Apprentis Universitaire (CFA UNIV) en région Corse, IUT de Corse UMR LISA 6234- Université de Corse, BP 52 20250 Corte

** Technicienne en Formation et Insertion Professionnelle, CFA UNIV en région Corse, Campus Grimaldi, Bât PPDB, 20250 Corte

Résumé

A l'heure d'une globalisation exacerbée, l'éducation, et plus généralement la formation, représente un facteur clef pour notre société, au cœur de territoires mis au défi de se renouveler face à l'émergence tout autour du globe de nouveaux centres de gravité économiques et démographiques, avec leurs propres modèles. La formation, et son articulation avec la vie professionnelle, représente un véritable enjeu pour faire face, dans un futur proche, aux révolutions technologiques, économiques, politiques, environnementales auxquelles nous sommes d'ores et déjà confrontés.

Si l'on s'imagine déjà mal, aujourd'hui, comment une formation initiale pourrait suffire à un individu pour ses 40 ans de carrière à suivre, la rapidité d'évolution de nos sociétés, les transitions numériques et énergétiques en cours, ne feront qu'accentuer l'obsolescence de cette représentation d'une formation initiale découplée des formes d'apprentissage ultérieures.

Au-delà de ce que l'on appelle, l'alternance ou la formation professionnelle continue dans l'Enseignement Supérieur, le défi actuel se situe bel et bien autour d'une Formation Tout au Long de la Vie (FTLV), vieux concept mais dont les formes en appellent toujours à une actualisation dans la modernité. Au cœur d'un petit territoire ilien comme la Corse, ce challenge est d'autant plus crucial à relever qu'il préfigure son attractivité dans un contexte de *glocalisation* (Mair, 1991) désormais durablement ancré.

Dans un environnement mondial en perpétuelle évolution, avec des repères mobiles, des vies personnelles et professionnelles toujours plus complexes, et où tout ce qui semblait bien compartimenté hier fait face à une porosité croissante, l'objet de cette contribution vise à expliciter que l'émergence d'un modèle de FTLV dans l'Enseignement Supérieur, accordant une place centrale à l'économie de la connaissance, constitue un enjeu stratégique majeur au service du développement et de la structuration d'un petit territoire comme celui de la Corse.

Mots clés *Enseignement Supérieur - alternance - FTLV – formation / emploi –développement et structuration du territoire corse.*

Introduction

Le monde évolue de même que les établissements d'Enseignement Supérieur et de Recherche : lieux de transmission et de production du savoir, ceux-ci sont écartelés entre une mission classique (éduquer) et une fonction créatrice (développer et insérer), l'une et l'autre s'accommodant mal des impératifs économiques de la réalité contemporaine.

Il n'est alors pas illogique d'imaginer devoir se préparer à une porosité plus importante encore entre les activités de formation et l'action professionnelle, que cette porosité soit un jour posée en exigence par le monde professionnel ou bien qu'elle s'impose petit à petit dans la pratique par de nouvelles générations de citoyens.

Les Universités et autres établissements de l'Enseignement Supérieur, par la richesse que constitue un corps enseignant qui déploie ses activités de recherche, font vivre l'ambition séculaire d'un projet universitaire dont l'essence même est d'articuler la construction du savoir (la recherche) et sa transmission (la formation), et donc de mettre en œuvre une porosité propice à l'évolution de la société.

Il apparaît donc aussi logique que spontané de concevoir l'Université, au sens large du terme, comme ce lieu par excellence où cette porosité va pouvoir s'exprimer et être à l'œuvre, et ce d'autant plus que le contexte global d'un monde toujours plus en mutation doit constituer une trame de pensée constante dès lors qu'il est question de FTLV.

Précisément en Corse, face aux évolutions rapides des technologies et des métiers, face à une crise sociale et économique structurelle amplifiée dans certains secteurs par la spécificité de l'île, les établissements d'enseignement supérieur sont confrontés à une demande de professionnalisation des filières de formation et donc de recherche permanente d'adaptation au marché de l'emploi.

La présente contribution s'attachera à mettre en exergue un nouveau modèle de FLTV dans l'Enseignement Supérieur en région Corse au service du développement et de la structuration du territoire insulaire local, dans la lignée des préconisations ministérielles en la matière (Germinet, 2015 ; Filâtre, 2016).

1. L'Université de Corse au cœur d'uns stratégie régionale de rapprochement des acteurs de la formation et du monde socio-économique

Le domaine Enseignement Supérieur-Recherche a connu ces dernières années des évolutions importantes. Depuis son passage aux *Responsabilités et Compétences Elargies* en 2009, l'Université de Corse, composante majeure du dispositif d'Enseignement Supérieur et de Recherche, a accédé à l'autonomie, en application de la loi *Libertés Responsabilité des Universités* (LRU) du 10 août 2007.

Dans ce cadre, le périmètre de ses missions a été élargi et, aux missions traditionnelles de formation et de transmission des savoirs et des compétences, s'ajoutent désormais la prise en charge et l'accueil des nouveaux étudiants, le suivi de leur projet personnel et professionnel jusqu'à leur réussite, c'est-à-dire l'obtention du diplôme et l'insertion professionnelle.

Dans ce contexte nouveau, la Collectivité Territoriale de Corse (CTC) et l'Université ont choisi de rénover leur démarche partenariale et de développer la formation professionnelle de l'Enseignement Supérieur, notamment par la voie de l'alternance (via l'apprentissage) et de la formation continue. Dans cette optique, Faire de l'Enseignement Supérieur une activité économique à part entière, susceptible d'exporter son savoir faire est désormais affiché comme un enjeu territorial insulaire partagé par l'ensemble des acteurs.

Néanmoins, la relation entre *formation* et *métier* ou *activité* ne saurait, au niveau de l'Enseignement Supérieur, notamment universitaire, s'envisager en termes de stricte correspondance, ou pire encore de déterminisme.

1.1. Le développement de l'alternance dans l'Enseignement Supérieur comme vecteur de structuration des entreprises insulaires

Alors que l'emploi et le marché du travail évoluent et se transforment quantitativement et qualitativement, la nécessité d'une cohérence des interventions de l'Etat, de la Région Corse, des organisations professionnelles d'employeurs et de salariés ainsi que des autres acteurs institutionnels et socio-économiques est indispensable à l'efficacité et à la qualité de l'offre de services, en matière d'information, d'orientation, de FTLV, de relation emploi-formation, de valorisation des compétences et des ressources humaines, au niveau régional et des territoires.

Afin d'organiser au mieux l'exercice de ses compétences dans le cadre de ses prérogatives spécifiques[1], la CTC conformément au Contrat de Plan Régional de Développement de la Formation (CPRDFP) s'est fixée 6 objectifs stratégiques parmi lesquels *la promotion, le développement de l'alternance* et *la réponse aux besoins du tissu économique et de sécurisation des parcours vers l'emploi* figurent en pôle position (Storaï et Rinieri, 2016). Sur la période du COM apprentissage 2011-2015,[2] la région Corse a également démontré son dynamisme dans la campagne de signature des contrats d'apprentissage avec une croissance avérée de près de 40% en la matière sur la période considérée (DARES, 2016).

Précisément, au 31 décembre 2015, ont été recensés 2099 apprentis par la CTC, dont 561 dans l'Enseignement Supérieur et 317 à l'Université de Corse (Assemblée de Corse, 2016).

1.2. L'alternance à l'Université de Corse adaptée au contexte d'une petite économie insulaire

La promotion et le développement de l'alternance à l'Université de Corse s'est matérialisée par la création d'un *Centre de Formation des Apprentis Universitaire (CFA UNIV) en région Corse* dont l'historique et les caractéristiques spécifiques ont fait l'objet de publications antérieures (Storai, Rinieri et Boulenger, 2014 ; Storai et Rinieri 2016). La problématique de la qualité de l'insertion professionnelle des étudiants-alternants de l'Université de Corse, notamment en matière de sensiblisation à l'entrepreneuriat, a révélé l'enjeu stratégique de la maitrise des fondamentaux managériaux au cœur de la dynamique de développement et de structuration du territoire corse (Storaï, Rinieri et Rezzi, 2017), renforçant ainsi ce que d'autres auteurs ont démontré dans un cadre plus théorique (Marchesnay,1996) ou global (Drucker, 2016).

En Corse, l'économie insulaire se caractérise par l'absence des grands groupes multinationaux qui dirigent et façonnent l'économie mondiale. On ne remarque pas davantage l'existence de moyennes entreprises qui, dans bien d'autres régions à l'instar de la Lombardie, constituent le fer de lance d'une économie dynamique. Le tissu économique corse est constitué majoritairement de très petites entreprises, de petits agriculteurs et producteurs, d'artisans, de commerçants.

La Corse présente également l'exemplarité d'un territoire caractérisé par un vieillissement de sa population active impliquant un nécessaire ajustement à moyen terme des stratégies régionales de formation en réponse à cette réalité. Levier majeur du développement territorial et de la régulation sociale, le dispositif insulaire de formation doit adapter son offre dans la perspective ciblée de l'adéquation de la relation emploi-formation. Le dispositif de formation en alternance (apprentissage, stages alternés) et la formation professionnelle continue constituent ainsi les deux faces d'un même joyau au service d'un schéma de construction des compétences, des qualifications et de l'employabilité des ressources humaines disponibles et actives sur un territoire donné.

2. Vers un nouveau modèle de FTLV gage de l'évolution et de la sécurisation des parcours professionnels

Dans ce contexte, le CFA UNIV assume la charge de la promotion, du développement, de la gestion administrative, pédagogique et financière du dispositif de l'alternance à l'Université de Corse. Son fonctionnement, calé sur la réalité territoriale insulaire, privilégie le mixage des publics (étudiants-classiques, étudiants-alternants, actifs). Ce dispositif de *fertilisation croisée* permet la capitalisation de pratiques pédagogiques innovantes en assurant également le maillage des différents acteurs (Université de Corse, CTC, les entreprises, les associations, les collectivités locales, les Organismes Paritaires Collecteurs Agréés (OPCA), les maisons de l'emploi, les chambres consulaires) impliqués dans la formation et l'insertion professionnelle des étudiants.

A l'heure où l'économie de la connaissance est véhiculée comme la solution de sortie d'une crise endémique, le CFA UNIV s'efforce de contribuer, notamment, à la construction d'un schéma consolidé et pérenne de structuration du tissu socio-économique par la gestion optimisée d'un dispositif renforcé de formation/information, d'encadrement et de suivi individualisé de l'orientation professionnelle des étudiants diplômés de l'Université de Corse (Storai et Rinieri, *ibid*).

2.1. Les valeurs cardinales de l'alternance comme socle de développement d'un nouveau modèle de FTLV

Voie d'excellence dans l'Enseignement Supérieur et passerelle vers l'emploi, le dispositif de formation en alternance offre l'opportunité de nouer des relations partenariales approfondies et évolutives entre des Centres de Formation et des structures d'accueil des apprenants (entreprises, associations, services publics étatiques et collectivités locales).

Les faits saillants suivants[3] relatifs à l'alternance dans l'Enseignement Supérieur illustrent des données endémiques en région Corse préfigurant une évolution des notions d'appropriation par l'individu, d'individualisation des parcours, de co-construction entre le salarié et son entreprise, voire entre l'individu et la société au sein d'un contrat social renouvelé, qui deviennent inhérentes à un système de formation en pleine mutation et dont l'objet est d'affronter les enjeux et défis mentionnés plus haut.

- Voix d'excellence : **95%** : taux de réussite aux diplômes suivis (BTS, DUT, Licence Pro, Masters), **3% :** taux de rupture des contrats au cours des cursus suivis. **75%** des majors de promotion sont étudiants-alternants (dans les formations avec mixage des publics étudiants-alternants/étudiants classiques) ;

- Passerelle vers l'emploi : **80%** : taux d'insertion professionnelle à l'issue du dernier cursus suivi (à 6 mois) dans **55%** au sein de l'entreprise formatrice . Dans **90%** des cas, la relation formation-emploi est vérifiée ;

- Un modèle de formation économe en deniers publics et équilibré dans sa gouvernance : parité des fonds publics/ fonds privés ;

- Partenariat avec près de **2000** structures entrepreneuriales insulaires et continentales.

2.2. Une réforme de la formation professionnelle comme une opportunité propice à un changement radical dans la conception de la FTLV

Promulguée le 5 mars 2014 par le Président de la République**,** ***la loi n°2014-288 relative à la formation professionnelle, à l'emploi et à la démocratie sociale*** **a été publiée le 6 mars 2014 au Journal Officiel de la République Française. Elle fixe des objectifs à atteindre dans les domaines suivants :**

- *La sécurisation des parcours professionnels au niveau individuel et collectif (de l'entreprise) :*

- ✓ en améliorant l'orientation professionnelle et en permettant un meilleur accès à la formation professionnelle notamment pour les personnes qui en ont le plus besoin ;
- ✓ en permettant de se former au moment opportun, indépendamment de son statut, et de s'élever d'au moins un niveau de qualification pour réussir son évolution professionnelle.

- *La conception de la formation professionnelle*

- ✓ comme levier de la promotion sociale et professionnelle ;
- ✓ comme un investissement et non une charge pour les entreprises car les compétences et qualifications des salariés sont des facteurs de compétitivité ;

- *Améliorer la lisibilité et l'efficacité du système afin de faciliter l'accès à la formation professionnelle de l'ensemble des actifs, salariés comme demandeurs d'emploi*

A ce titre, il est légitime de penser que les entreprises en général, et plus précisément celles qui sont le plus soumises aux fortes évolutions sociétales dont il était question plus haut, considéreront que les compétences et les évolutions de carrières de leur salariés revêtent la plus haute valeur stratégique pour leur développement. Celles-ci miseront massivement (quand elles ne le font déjà) sur les plans de formations continues de leur salariés, avec une loi qui vient renforcer une responsabilité qu'elles sont déjà prêtes à endosser, ce qui revient à investir dans ce qui représente souvent le premier centre de dépense d'une entreprise, mais aussi sa plus haute valeur : les individus qui la composent.

2.3. La création d'un GIP [4] Forma Sup Corsica FTLV, structure de mutualisation des moyens et des acteurs impliqués dans le lien formation-emploi sur le territoire insulaire

La loi susvisée définit les conditions du compte personnel de formation (CPF) qui permet d'acquérir des droits à la formation professionnelle. Ces derniers sont inscrits dans un compte d'heures qui suit l'individu ***tout au long de sa vie professionnelle*****.**

Dans ce contexte, si la nouvelle loi sur la formation professionnelle présente des risques pour les universités, qui se cristallisent principalement à ce jour autour de la mise en place des listes nationales et régionales d'éligibilité au CPF, ainsi qu'autour d'une articulation à trouver entre les responsables de ces listes et le MESR[5] au sens large (ministère et établissements), elle présente également l'opportunité de positionner son expertise comme un élément différentiant et pertinent pour une formation continue qui se fera desormais plus exigeante et plus stratégique, ne serait-ce que par l'appropriation croissante de la part de l'individu et de l'employeur de l'acte de formation et de sa finalité en terme de progression de carrière. En sus, la loi offre aussi pour les établissements la potentialité de se positionner comme un vecteur clef d'accompagnement de ce mouvement d'appropriation par le citoyen de ses savoirs et de sa carrière.

En région Corse, Le développement de l'alternance et des passerelles entre les Centres de Formation de *l'Enseignement* Supérieur et les entreprises insulaires (notamment) a permis d'évaluer les besoins en formations et en qualifications des salariés (ainsi que des demandeurs d'emplois). L'alternance génère également la dynamique d'activité de la formation professionnelle continue en constituant un gage de

crédibilité dans le développement conjugué de l'employabilité des jeunes et de la qualification des salariés insulaires.

Fruit d'une coopération initiée par le CFA UNIV entre les acteurs publics et socio-économiques intervenant dans le champ de l'emploi et de la formation dans l'Enseignement Supérieur, la constitution du *GIP Forma Sup Corsica FTLV* [6] objectivera de rechercher, de stimuler et de faciliter les partenariats et les complémentarités, pour que la diversité des interventions soit gage de proximité et d'attention aux besoins réels des entreprises et des citoyens.

Alors que le modèle régional de Formation Professionnelle Continue dans l'Enseignement Supérieur en général, et à l'Université de Corse en particulier, était jusqu'alors exclusivement fondé sur les *formations diplômantes* (Diplômes Universitaires de Technologie, Brevets de Technicien Supérieur, Licences professionnelles Masters, Diplômes Universitaires spécifiques…) associée à une procédure opérationnelle de Validation d'Acquis de l'Expérience (VAE), le projet de ***GIP Forma Sup Corsica FTLV*** ambitionnera, autour de l'Université de Corse en qualité de maître d'œuvre, de proposer une offre mutualisée de *formations diplômantes et modulaires ad hoc* afin de satisfaire les besoins de montées en compétences et en employabilité exprimés par les salariés, les entreprises et les citoyens insulaires. Dans cette optique, chaque membre partenaire fondateur apportera son degré d'expertise dans des domaines variés et complémentaires qui alimenteront la dynamique éclectique du Groupement :

- ✓ l'Université de Corse (via son CFA UNIV), dans la variété des domaines de formations et d'activités de recherche et de transfert technologique en lien avec le territoire insulaire ;
- le Conservatoire National des Arts et Métiers, dans l'ingénierie pédagogique des formations modulaires ;
- la Chambre de Commerce et d'Industrie, dans le positionnement géographico-stratégique des actions de formation proposées à l'extérieur du campus universitaire cortenais et sur des microrégions riches en activités productives de biens et de services ;
- Agefos PME et Fongecif Corsica, dans l'évaluation des besoins exprimés par les branches ou les structures inter-professionnelles en matière de compétences, qualifications, reconversions et dans les procédures de financement potentielles afférentes.

Conclusion

La dernière décennie a bouleversé les missions allouées aux Etablissements Publics d'Enseignement Supérieur et notamment aux Universités, dans l'optique d'organiser un premier niveau de porosité entre la formation initiale et le monde professionnel. Le développement des stages alternés et la dynamique de l'alternance ont permis de crédibiliser le degré d'employabilité des étudiants diplômés et de contribuer à la structuration des entreprises a associant deux notions essentielles et complémentaires : *la connaissance et la compétence.*

Toutefois, « *Il nous reste ainsi le défi de penser la formation d'un individu donné comme un tout qui s'effectuerait le long de sa vie, et pour cela d'organiser une double porosité, l'une temporelle, l'autre intellectuelle. Dépasser la temporalité successive et cloisonnée de la formation initiale et de la formation continue pour une plus grande porosité entre les apprentissages et la vie professionnelle, aménager des allers-retours entre ces deux temps, voire imaginer l'inclusion de l'un dans l'autre ; ancrer cette formation du citoyen tout au long de sa vie dans une dimension universitaire qui* permet *d'enrichir la finalité professionnelle de la formation par l'expertise de l'enseignant qui repose sur la consolidation des savoirs qu'apporte la recherche.»* (Germinet , 2015, p.6)

Il demeure d'autant plus pertinent de relever ce challenge que l'enjeu conjugué à cette réalité n'est autre que celui de la satisfaction d'une exigence accrue d'appropriation, sans précédent, de son propre parcours de vie par l'individu. Ce constat nécessite de développer une nécessaire capacité d'innovation dans

l'ingénierie pédagogique des actions de formation en permettant tant la coordination de développement d'actions de formation diplômante et qualifiante (capitalisables en unités et / ou modules d'enseignement conduisant au diplôme) que la conversion ou la reconversion des parcours professionnels au bénéfice des attentes d'un territoire en quête d'attractivité.

Bibliographie

Assemblée de Corse (2016), « Le dispositif apprentissage 2016/2017 » *Rapport n°2016/E5/ session extraordinaire 28-29 juillet.*

DARES résultats (2016), *L'apprentissage en 2015,* septembre, n°044.

Julien P-A.et Marchesnay M. (1996), *L'entrepreneuriat*, Economica,.

Drucker P. (2016), *« Qu'est –ce qu'un véritable manager ? »,* Harvard Business Review, Hors serie, automne.

Filâtre D. (2016), *Vers un nouveau modèle de Formation Tout au Long de la Vie*, Rapport la Formation Continue, MENESR, novembre.

Germinet F. (2015), *Le développement de la formation continue dans les universités,* Rapport de mission, novembre.

Mair A. (1991), « The just-in-time srategy for local economic development », *Working Paper n° 4, Project Just-in-time manufacturing and spatial changes in the automobile industry: an international compari*son, Université de Durham.

Storaï C., Rinieri L. et Boulenger M. (2014), « Sandwich-Course Training in Higher Education as a major Strategic Thrust Regional Policy of Professional Training : Lessons Learned From the Pioneering Example of the University Institute of Technology Corsica », *Chinese Business Review,* Volume 13, Number 2, February (Serial Number 128) pp.101-110.

Storaï C. et Rinieri L. (2016), « Regional human capital development policy and Sandwich placement trainingin higher education:lessons learned from the pioneering example of the University of Corsica in a small island economy », *Chinese Business Review*, ISSN 1537- 1514 May, Vol. 15, No. 5, 243-257.

Storai C., Rinieri L. et Rezzi A. (2017), « L'alternance dans l'Enseignement Supérieur et la sensibilisation à l'entrepreneuriat : le cas des diplômés du CFA Universitaire en région Corse », 29th IBIMA Conference, Vienna, 3-4 May.

[1] Cf. la loi de décentralisation du 22 janvier 2002 relative à la Corse : http://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000409466&categorieLien=id

[2] Le Contrat d'Objectifs et de Moyens relatif à la promotion de l'apprentissage (COM apprentissage) est signé entre chaque région et l'Etat. La Corse a entériné le sien avec le pouvoir central français le 29 juillet 2011.

[3] Notables depuis 2009, d'après des calculs propres issus des enquêtes annuelles menées par le CFA UNIV (Storai, Rinieri, *ibid*).

[4] Groupement d'Intérêt Public

[5] Ministère de l'Enseignement Supérieur et de la Recherche

[6] Le GIP Forma Sup Corsica FTLV est composé de 5 membres fondateurs dont 3 Centres de Formation (Université de Corse, Chambre de Commerce et d'Industrie Territoriale, Conservatoire National des Arts et Métiers) et de 2 OPCA (Agefos PME et Fongecif Corsica).

An Insight on Cloud Computing and the Small and Medium Size Enterprises ("Smes") In KSA: Issues and Challenges

Dr. Emna Chikhaoui

College of Law, Prince Sultan University,Mansur Ibn Muhammad, Salah Ad Din, Riyadh 12435, Saudi Arabia, Email: EChikhaoui@psu.edu.sa and

Abstract

In the recent decades, with the introduction of new technologies, the use of internet and E-business, the economic, political and social factors have changed the ways businesses are conducted. New technologies have made it easy for all enterprises, either big, or medium or small to fulfil their tasks easily and to achieve in a more efficient way

Cloud computing has emerged as one of the most discussed topics among the enterprises IT professionals. Cloud computing impacts every aspect of IT and in particular it affects IT users, administrators, operators, purchasers and developers. Moreover, large organizations have benefited from the cloud on a multitude of levels and have improved the way they work dramatically. SMEs, are not different from other organizations using the Cloud regardless their size and outreach, they also want to benefit from its amazing attributes such as cost reduction, rapid customer response capability and balance sheet improvement, in addition to facilitated compliance with laws and regulations. Nonetheless despite these advantages, there are few challenges that are faced by SMEs discouraging them from using the cloud computing; for instance absence of legislative framework that directly regulate the cloud or its service providers or customers**.** It is crucial for the organizations and in particular SMEs seeking to utilize cloud services that a legal infrastructure should be put to understand the issues and challenges facing the SMEs.

Keywords: Cloud computing, Kingdom of Saudi Arabia, Small and Medium Enterprise, SME's.

Introduction

The use of information technology has penetrated all sectors either for economic, social, education, government administration and many more. One of the latest new technologies is cloud computing that is implemented by numbers of institutions either in the public or private sectors. This cloud computing may provide some benefits to the institutions that implemented it to assist the operation of their business. Nonetheless there are also institutions that do not embark on the use of cloud computing. They may have certain reservations. It is the objective of this article to provide an overview on the challenges facing SMEs in relation to cloud computing and suggest some counter measures for it. This article looks on the administrative landscape of cloud computing and SME in KSA before presenting the challenges for SMEs in adopting the cloud computing. KSA Vision 2030 can be regarded as the turning point for further enhancement of the SMEs position to assist the country's development. The support will be given to the SMEs entrepreneurs as it is believed that the SMEs can create job opportunities and thus support the growth of GDP.

The Importance of the Use of Cloud Computing By SME's

The use of cloud computing by business organizations somehow has influenced the SMEs in all countries to use cloud computing. For instance in Australia, 44% of the SMEs (that is about 900,000 businesses) had actively used cloud computing during the first 6 months of 2013.(Aimee

Chanthadavong, 2015) Other developed countries, like United States and Japan also are moving towards cloud computing. In all EU Countries it is expected that the use of cloud computing will increase even though it is not that fast as compared to the USA. Despite reliance on cloud computing by the large business, most of the SMEs are still not convinced enough to move to cloud computing in the developing world(Gupta, P., Seetharaman, A., & Raj, J.R. ,2013). In developing countries, particularly KSA, cloud computing is still not widely adopted (AlKather, N, Gary Wills & Robert Walters, 2014). This is partly due to the fact that Gulf countries, including KSA, are not yet to develop a strong culture of regional and international cooperation and collaboration among themselves. Gulf States tend to prefer strong sovereign and territorial control of their own information space and ICT infrastructure (International Institute for Strategic Studies, 2013). Nonetheless this scenario may not be unusual, because logically it is not easy for any state to allow the sharing of information or data with the other state. This may be due to certain reason inter alia, for security reason or any other reasons that a particular state has a right to determine.

Despite the above fact, there is a high potentiality for the adoption of cloud computing in KSA. This is due to the facts that in 2012, GCC countries reportedly had about 4 million internet users and 2.5 million personal computers (PC), with an overall internet penetration and PCs penetration per cent of 10% and 8% respectively. This is a staggering increase from 1.8 million internet users reported in 2005. Table 3 shows how the penetration figures have significantly increased for all GCC countries. GCC consumers have driven a massive shift towards an increasing usage of tablets and smart phones with continue to constitute the biggest growth in the GCC PC market over recent years (International Institute for Strategic Studies, 2013).

The research from HP Report in collaboration with Coleman Research Group, 85% of Saudi Arabian organizations will adopt cloud technologies in 2012. The study also reveals that almost 40% of those looking to implement cloud computing are keen to do so prior to 2012. Besides according to Saudi Gazette, the estimated growth of Saudi Arabia's IT sector will worth SR4.6 billion by 2014. The new trend in Saudi Arabia is that of cloud computing. Without exception to the business industry, the small and medium enterprises (SME), since 2011 had shown their interest in cloud computing (Yamin, M., 2013). According to the Communications and Information Technology Commission KSA (2016) "The Saudi ICT market surpassed SAR 111.79 billion in 2014,cementing the position of the Kingdom as the largest ICT spender in the Middle East. ICT spending is expected to reach SAR 138.48 billion by 2017."

In KSA there is no uniform definition of SMEs. It varies from one institution to another. For instance; Rajhi Bank defines SMEs as entities with annual sales turnover up to SR 30 million(http://www.alrajhibank.com.sa). Meanwhile Saudi Arabian General Investment Authority (SAGIA) defines it as small enterprises as having less than 60 employees, while Medium size companies as having less than 100 employees. (https://www.sagia.gov.sa)

It is acknowledged that various definitions may cause inconsistency of the application of certain rules and policy related to SME. This problem may be solved by having one single authority to control the SME in KSA, and accordingly this authority may formulate one standard definition for SME that is applicable across the Kingdom. In absence of such authority an appropriate policy may not be set up and thus prevent the potentiality of SMEs in KSA to grow.

At present there is Riyadh Centre for SME Development under the Riyadh Chamber of Commerce and Industry. The Centre contributes to supporting and developing the role of SMEs in the national economy as being the basic foundation on which most of the developed and developing countries depend in achieving sustainable economic and social development. However this centre does not extend its functions up to the formulation of policy or regulations for SME. In terms of regulatory measure, until today, the regulation for a separate authority for SMEs in KSA is yet to be enforced even though it has been reported to be drafted in 2012.

The contribution of SME in KSA is acknowledged through the report of Capitas Group International in which it is reported that 90% of the businesses in KSA are SMEs. SMEs contribute around 33 percent of GDP and comprise nearly 25 percent of the labour force (John Sfakianakis,2014)

According to industry data compiled by Zawya, investment, SMEs in Saudi Arabia is expected to grow to more than USD 70 billion by the end of 2015, with the government and banks providing much-needed funding. It further reported that the sector's contribution to the kingdom's gross domestic product could rise to 37% by the end of 2015 from 35% a year earlier; in line with forecast growth in the number of licensed SMEs to some 2.5 million by end-2015 from 1.97 million as of January 2014 (Muhammed Abdulzaher, 2015). The increase of number of the SMEs in KSA is due to the seriousness of the government in treating SME as part of key drivers for economic growth. This is witnessed by the provision in the Ninth Development Plan 2010-2014. The plan emphasized on strengthening and developing SMEs, inter alia by providing the SMEs with specialized credit, technical assistance, and removing organizational and marketing barriers. However due to inexistence of one centralised authority or body to control the SME, there is no specific data on the numbers of SME in KSA.

It is observed that among the drawbacks of the SME in KSA are lack of knowledge in management strategy, bureaucracy and training for SME Owner (Ahmed Al Saleh, 2012). No single authority to monitor the SME. Unlike in other jurisdictions like in Malaysia, the SMEs and its development and other matters related to; are monitored by SME Corp that was established in 1996 (known as SMIDEC). The body is entrusted in monitoring and coordinating the development of SME in Malaysia. It provides technical and advisory support services in collaboration with other related agencies involved in SME development (S.Moghavvemi, Hakiman, F & Tengku Feissal, TMF, 2012).

In contrast, other GCC countries; for instance Qatar recently announced the launch of an SME authority known as "Enterprise Qatar". It is responsible to develop the SME policies and coordinate debt, equity, training and business services programs. Similarly in UAE, the government is going to introduce National SME Promotion Law. Lastly, members of Kuwait's parliament, which is working to create new engines for job creation and diversify its economic base, have presented a draft bill on the establishment of an independent SME authority for the country (Yahya, A. & Airey, J. 2013).

Based on the survey conducted by Riyadh Chamber of Commerce and Industry, the challenges or problems facing by the SMEs are summarized in Figure 1.

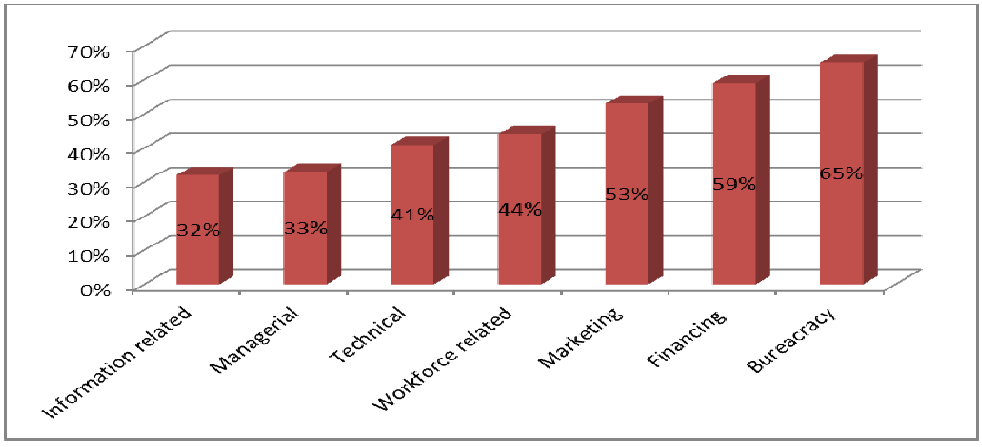


Fig. 1: Obstacle to SMEs Development: A Survey by Riyadh Chamber of Commerce and Industry

Source; Ashoor A. Ashoor. (2013) The Structure of SME in GCC and How They are Promoted.

In 2013, it was reported that nearly one third of SMEs (31 percent) were using cloud computing (Arabian Gazette, 2013). One of the examples of promoting the SME to implement cloud computing is that when Mobily launched a new cloud computing offer for SMEs sector in accordance with the distinctive bundles and prices that meet the growing demand for the service and target all business customers in the Kingdom.(Arab News, 2014).

In Saudi Arabia, SME investment is forecast to grow to over $70 billion by end of 2015, expanding its share of GDP by 2 percent KSA representing the vast majority of SME's and ICT spend in general, thus it is expected this is to be one of the leading growth factors in regional SME ICT spend (Lee, P, Stewart, D. & Parvez, A. (2013). Again the internet penetration is one of the contributing factors for expanding the utilization of cloud computing by the SME's. The data on the internet penetration by SME's is showed in Figure 2 in which KSA and Qatar recorded 15 percent each.

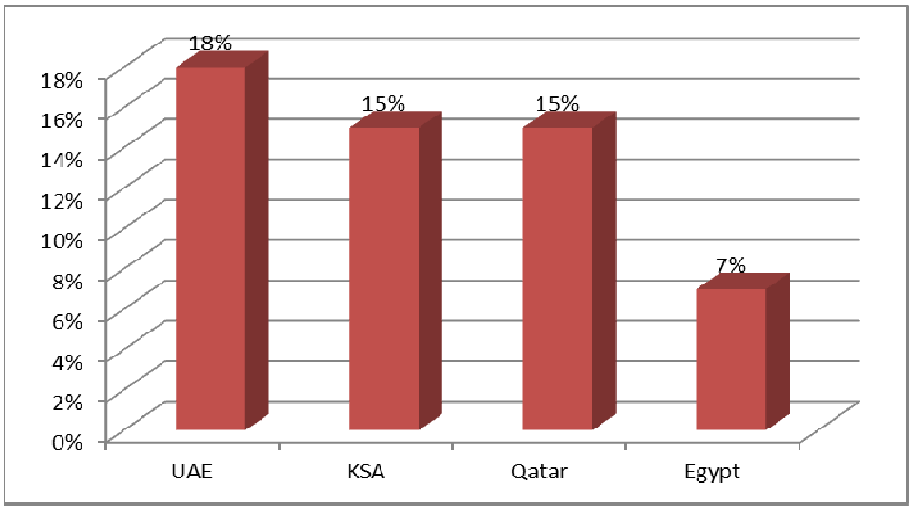


Fig. 2: Internet Penetration on SME (2012) in Middle East Markets

Source: Lee, P, Stewart, D. & Parvez, A. (2013). *Technology,Media & Telecommunications Predictions 2014, Middle East*. New York: Deloitte

Being one of the highest internet users in the Middle East, it is already one of the indications that the cloud computing may easily be implemented by the SME's in KSA. The utilization of the cloud computing in KSA is partly related to the growth of e-commerce in Kingdom. The regulatory framework in KSA is considered as sufficient to provide strong foundation for the development of e-commerce that is possibly be used by the SME's. Those laws are related to cybercrime, span, online content regulation, domain name regulation, and commercial regulation which include the Anti E-Crime Act, 2007 E-Transactions Law , Anti-Spam Policy Regulation, Anti-Commercial Fraud Law, Copyright Law and Dispute Resolution Policy. In addition there are also specific pieces of legislation have been enacted to regulate various domains, including banking and telecommunications.

There can be many reasons for the SMEs to embark on the implementation of the cloud computing in their organization. This may be due the feasibility and profitability, reduction of operational costs, business continuity, flexibility and scalability of IT resources, improvement of computing capacity and business performance.

Precisely, a lot of time and efforts of organizations are spent in designing, developing, acquiring and maintaining suitable hardware, software and hiring as well as training personnel for operating them. With the cloud computing, this will be significantly reduced for businesses. For example database storage allocation and monitoring require around the clock operations. Many in times, business

commit more resources than they use, which results in wastage of resources. These and other functions, when hosted with clouds, can be effectively and efficiently discharged in an economic manner (Mohammad Yamin, 2013). Nonetheless the implementation of cloud computing in the business is still not free from any drawbacks. The advantages and disadvantages of engaging the cloud computing either for SMEs or big organizations are shown in Table 2.

Table 2: Cloud Computing: Advantages and Disadvantages

Cloud computing Advantages	Cloud computing Disadvantages
Cost savings	Lack of control
Scalability/Flexibility	Dependency
Reliability	Risk
Maintenance	Essentially need an internet connection
Minimize new licensing software	Migration issue
Innovation	Lack of standard
Multiple users at the same time	Continuously evolving

Source: Abdollahzadehgan, A, Che Husin, AR., Gohary M.M. & Amini M. (2014). The Organizational Critical Success Factors for Adopting Cloud computing in SMEs. *Journal of Information Systems Research and Information*, 69.

In considering the advantages and disadvantages of implementing the cloud computing by the business organizations, the SMEs may have specific reasons for adopting or avoiding the use of cloud computing in their business. This is shown in Table 3.

Table 3: Reasons for adopting and avoiding cloud computing in SMEs

Reasons for adopting cloud computing	Reasons for avoiding cloud computing
Centralized data	Security
Monitoring data	Latency
Remote access	Service Level Agreement
Easy implementation	Migrating applications
Agility	Internet dependency
Device & location independence	Employees skills
Its Greener	Managing business risks

Source: Abdollahzadehgan, A, Che Husin, AR., Gohary M.M. & Amini M. (2014). The Organizational Critical Success Factors for Adopting Cloud computing in SMEs. *Journal of Information Systems Research and Information*, 69.

Despite all the advantages of using the cloud computing for the SME's there would be many possible risks that may associate with it. The understanding on these possible risks would help the relevant interested bodies to be more prepared and take certain measures when they decide to adopt the cloud computing. Therefore it is better to have risk management in handling the risks that expose through the use of cloud computing.

It has been determined that the risks that are associated with the use of the cloud computing for SME's are outsourcing opportunism risks. The risks are divided into several headings; namely (i) technology development risks (ii) functionality risk (iii) political risk (iv) project risk (v) technical risk and (vi) financial risk. The risks above are mainly related to three forms of deliberate, self service vendor behaviour; that are; shirking and deliberate under performance, poaching and the theft of intellectual property, proprietary software, critical confidential data, opportunistic reprising, client lock-in and vendor hold-up (Azarni, A., Shayan,B., Alizadeh, M. & Karamizadeh, S.,2012).

There are three forms of shrinking in cloud computing namely: (i) under consolidate server or network intentionally (ii) not controlling back-up system, firewall and (iii) under investment for extra equipment for non-predicted events. Meanwhile poaching may occur when ISP abuse the user's data

and resources supplied under contract. Vendor may grant the data directly to the challenger, or other provider. This may expose secret plan, design or strategies of a consumer.

Technology development risks may occur due to adoption of different kinds of technologies to different kinds of projects or program. As for the functional risk, a problem may occur when the vendor unsure as to the system that shall be used or the needs of the user. There may not be one single cloud for one SME. Moreover the data storage is placed in various geographical locations and it is not obvious that they stored inside the country or outside. Whereby the political risk is a situation where the members of an organization oppose against new technology and adapt to it. Migrating to cloud can reduce number of system administrators and software developers. The inactive employees in these fields will become unnecessary; therefore companies or organizations must be careful to keep their best staff until they find new employees to replace. As for project risk, mixing of technologies and scope of development makes implementation hard to manage. Testing may not be completely done, and it will affect the quality and time of completion (Clemons E.K. & B.W.Weber, 1992). This is due to the fact that in cloud system, some portion of applications run in the server side and some on the client side, therefore ensuring about the correct running or performing of application is unpredictable and hard. Meanwhile the technical risk may happen when hardware or software technology becomes complex (Straub D.W. and R.J. Welke, 1998). The cloud computing implementation may be difficult due to existence of unsolved technical problems related to security and privacy in client's or vendor's site. On top of that if the project could not make benefit, there would be financial risk. As for the SME's the benefits are nearly acceptable if they reduce the cost of system administrator, maintaining hardware and software ((Azarni, A., Shayan,B., Alizadeh, M. & Karamizadeh, S.,2012)

Methods

Questionnaires surveys on impact of cloud computing in SMEs in KSA had been distributed in April 2015. The purpose of survey is to study the challenges faced by the KSA SMEs in relation to cloud computing, to identify the deficiencies in contractual obligation of KSA SMEs in relation to cloud, and to find out the reasons why some of the SMEs do not use the cloud computing. The questionnaires were sent through emails to several identified SMEs. However since there was no reply received from the respondents, the questionnaires later were distributed by hand to the owners of SMEs, basically in Riyadh.

The questions in the questionnaires were divided into three (3) sections. A section was on respondents' business demography of respondents, Section B was on the respondents' view on cloud computing in their business and Section C was on any views that respondents would like to give. Section A aiming to find out the type of business operating by the respective respondents, size of business, its capital and years of business has been operating. The structure of the questions was related to these questions:

- Did you adopt the cloud computing in your business?
- The reasons for adopting the cloud computing.
- Type of cloud solution that are currently used by respondents' business.
- Type of cloud services that are currently used by respondents' business.
- Whether SME have multiple providers.
- Functions that have been outsourced to a cloud service provider.
- Challenges faced by SMEs in adopting the cloud computing.
- Whether the SMEs have written contract for cloud computing.
- Whether the respondents are aware of the terms of contract for cloud computing.
- Terms that are available in contract for cloud computing.
- Reasons for not adopting the cloud computing.
- Type of cloud solution that SMEs are interested to use.
- Type of cloud services that respondents are interested to use.

Results

51 SME's companies have taken part in this survey. From the survey, 51 SME's companies came up from different backgrounds of business. 30% of the SME's companies came from manufacturing, followed by 23.5% from commercial sector, and 21.6% from other sectors which made of from pharmaceutical company, food industry, perfume industry and others. The smallest group of business are from agriculture sector with 3.9%. The details of the type of business of respondents are shown in Figure 3 below.

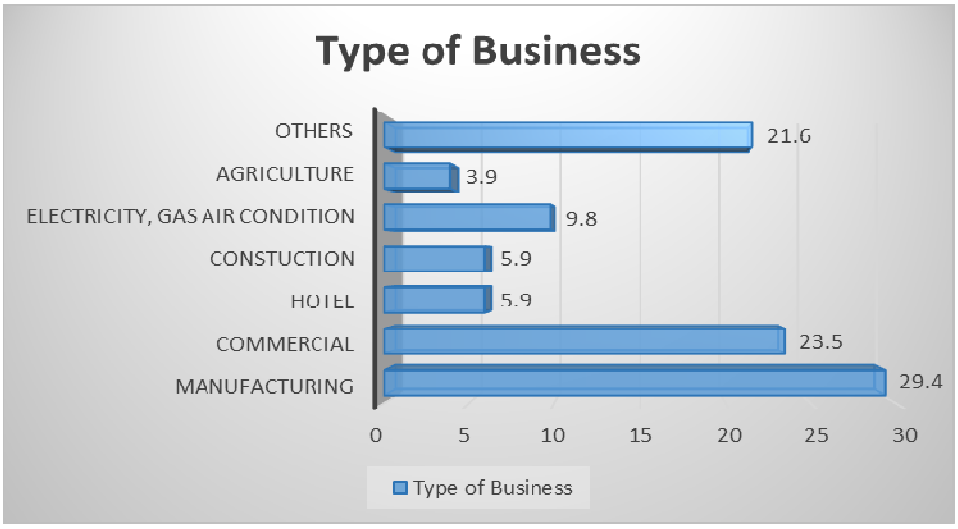


Fig. 3: Types of Business of the Respondent

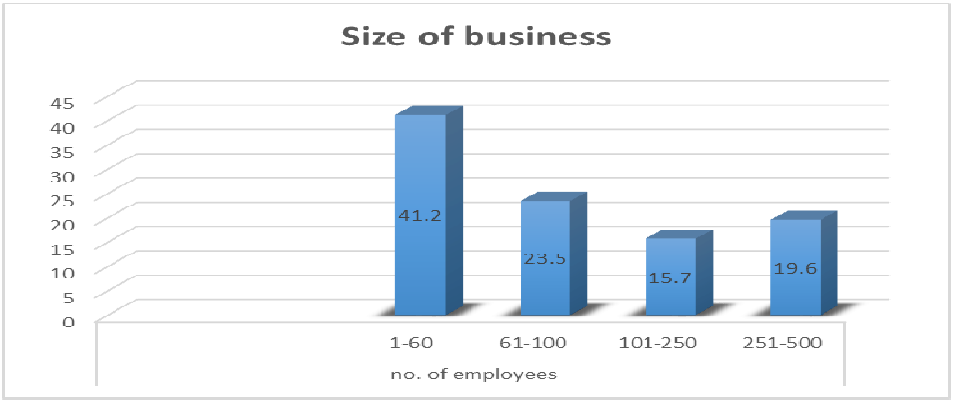


Fig. 4: Size of Business of the Respondents

Figure 4 above illustrates the demographic profiles of the SME's companies that participated in this survey. Almost 65% of the SME's companies have a small size of business; with less than 100 employees in the company followed by 20% of businesses with number of employees between 251 to 500 employees and the remaining with 101 to 250 employees in each company.

In term of years of the SMEs have operated; Figure 5 shows that 61% of the SME's have already been in the industry for more than 5 years.

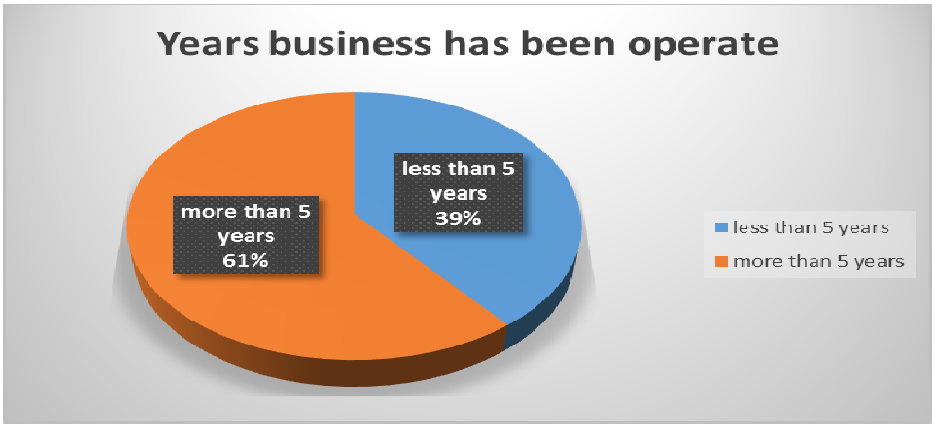


Fig. 5; Number of years the respondents has operated its business

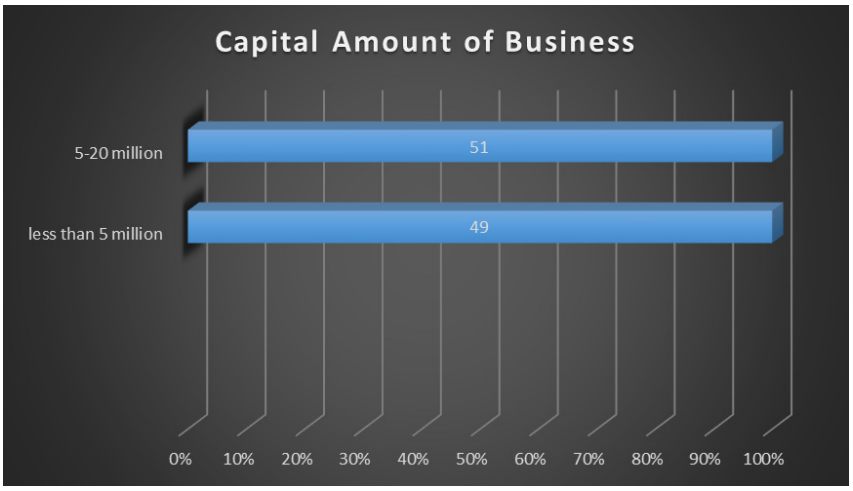


Fig. 6: The Capital Amount of Business of the Respondents

Figure 6 above shows the capital amount of business among the SME's. From here it can be seen that almost equal percentages where 51% of respondents have a capital amount of 5 to 20 million while 49% of the remaining have the capital amount with less than 5 million.

Surprisingly, all the respondents that took part in this survey do not adopt cloud computing in their businesses. The reason why they do not use cloud computing in their businesses is demonstrated in the Figure 7 below.

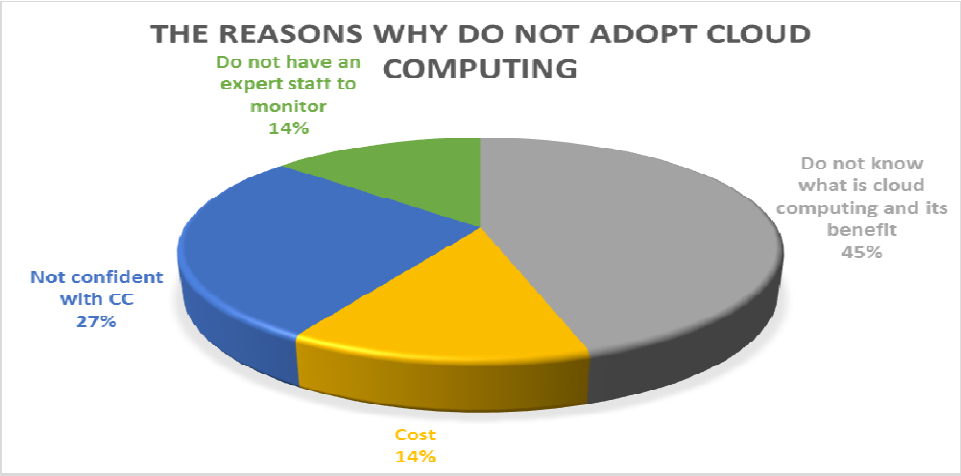


Fig.7: Reasons for not Adopting the cloud computing

45% of the respondents do not use cloud computing in their businesses because they do not have the knowledge, do not know what exactly is the cloud computing and benefits of using it in their businesses. Besides, the other 27% of the respondents said that they are not confident with cloud computing. The other two groups with 14% of respondents each, voted for the cost and also lack of expertise to handle this system are the reasons why they do not adopt cloud computing in their business. Thus even if majority of the respondents' businesses have been operating for more than five years, still they do not use cloud computing. Majority of the respondents are having more than 5 million of capital in business, but still the respondents are not using the cloud computing.

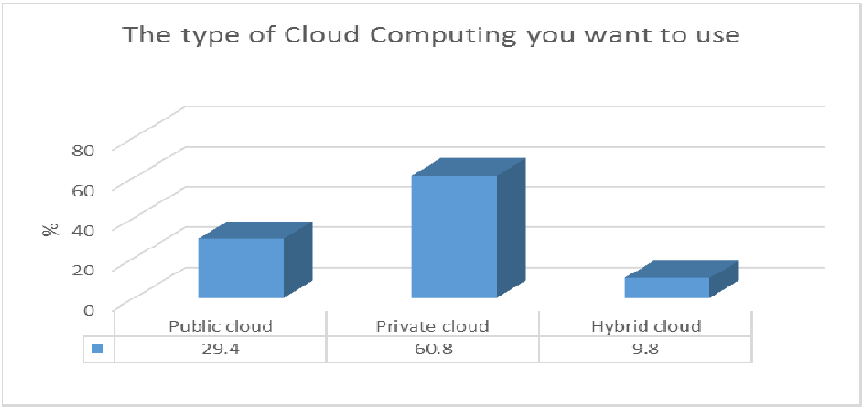


Fig. 8: The type of cloud computing the respondent would like to use

Figure 8 above shows the type of cloud computing the respondents want to use for their company. 60.8% of the respondents choose to use Private Cloud, followed by 29.4% which choose to implement public cloud and the remaining respondents choose to adopt hybrid type of cloud in their businesses.

Table 3: Cloud computing services the respondents would like to use

	Percent
Individual software package	2.0
Infrastructure service	5.9
Software, hardware & infrastructure	47.1
Complete operating system & software package available via Cloud services	45.1

Table 3 demonstrates the cloud computing services that respondents want to use in their business. From there, we can see that, 47.1% of them want to use the service of software, hardware and infrastructure, followed by services of complete operating system and software package available via cloud services (45.1%), Infrastructure service (5.9%) and Individual software package (2%).

Table 4 below shows whether the respondents plan to have multiple providers. Based on the survey conducted, almost 70% do not plan to have multiple provider while on 30% of them agree for that.

Table 4: Plan to have multiple provider

	Percent
Yes	31.4
No	68.6

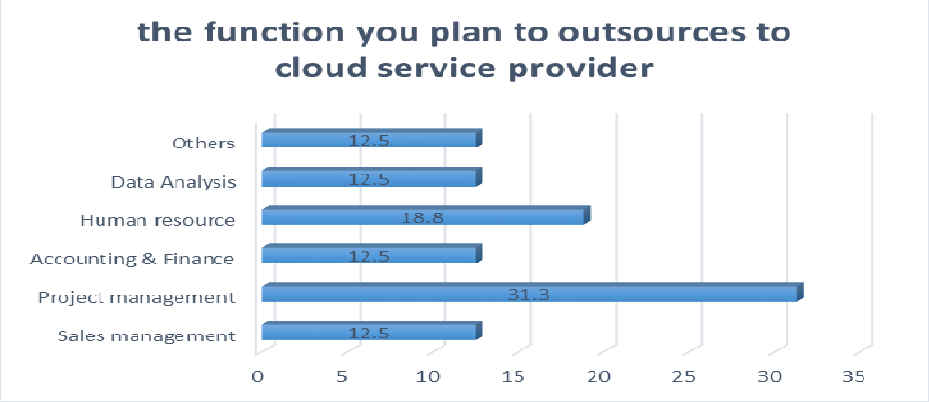


Fig.9: The function the respondents plan to outsource to cloud service provider

Figure 9 shows the function the respondents plan to outsource to cloud service provider. Among the 30% of respondents which plan to use multiple providers, 31.3% of them plan to use cloud service provider to outsource the project management of the company. It followed by outsourcing the human resources (18.8%), accounting and finance (12.5%), sales management (12.5%), data analysis (12.5%) and others (12.5%).

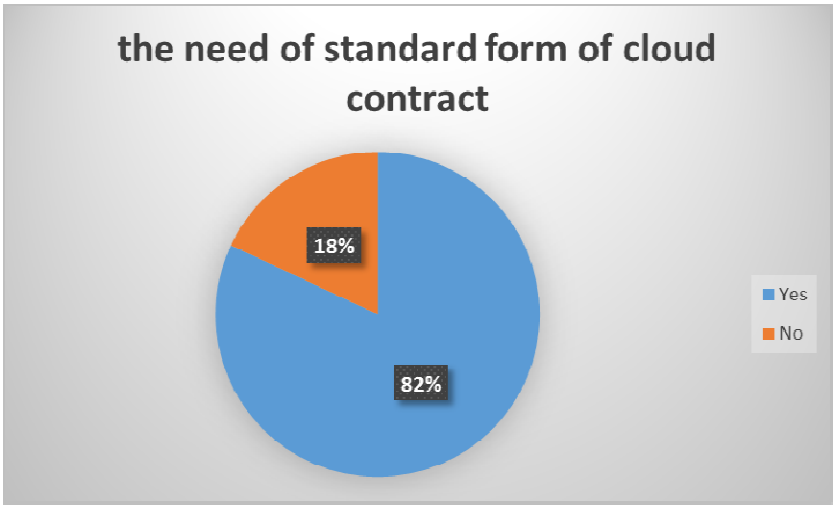


Fig.10: The need of standard form of cloud contract

From the Figure 10 above, we can see that 82% of the respondents agree that standard form of cloud contract is essential for business with only 18% of them opposed to this idea. It shows that even if the respondents do not use the cloud computing but they plan to use cloud computing in future and understand that there is a need to have standard form of contract to protect their interest when using the cloud computing in their businesses.

Conclusion

The above discussions are the report on the status of Cloud Computing (CC) in SME in KSA on the use of cloud computing by the SMEs in the KSA. In general the SMEs owner would normally agree that the benefits of CC to SMEs are the opportunity to embark on better enterprise by using advanced technology, the change of orientation in the organization that is from capital expenditure to operational budget, increased of flexibility and agility (in which technician can focus more on strategic work) and freedom of contract operations.

The use of CC will enable the SMEs to compete with the giant companies in the industry. Even with the lesser number of manpower and limited capital, SMEs may use the service of CC to provide equal or even better business opportunities.
Data storage is unlimited when using the CC, thus the SMEs do not have to worry about the additional cost for this purpose. It can be expanded from time to time depending on the growth of the enterprises.

It is expected that the cloud software is updated, thus there would minimize the operational cost for enhancement of the software from to time. The SME may find that the data is accessible at any time and at any place, this would make the business operation more flexible.

There can be doubtful or less confidences of the SMEs owners on the extent of data protection for security when using the CC. It is possible that some of the SMEs owner do not realize they actually use the CC in their enterprise, as they do not understand what CC. is. The survey conducted in the KSA had shown that majority of SMEs do not understand what is meant by CC even though their capital are quite big. The survey result had shown that the reasons for not adopting the cloud computing because they do not understand what is cloud computing, followed by not having the expert staff to handle and have no confident on cloud computing. The survey also shows that the SMEs want to have the standard form of contract and this is referred to the service level agreement (also known as contract service agreement).

The literature had shown that the KSA yet to have codified legislation on data protection and privacy, whereby these are the area of laws that is very important for implementation of cloud computing. The guidelines on service level agreement as provided in US may be taken as guidelines in developing the same in the KSA. The existence of proper contract between the service provider of cloud computing and the customer (SMEs) will promote the consumer to use the cloud computing as the survey result showed certain SMEs have no confidence on CC. Part of it may be they do not sure how their rights are going to be protected.

The survey result give indications that there is a need to educate the SMEs in the KSA on the importance or benefit of the cloud computing. As such a series of workshop and campaign may be launched in KSA by the potential cloud providers to the targeted group.

Acknowledgements

We hereby acknowledge the support of Microsoft with an academic grant and we thank Microsoft for helping us to do this research on Cloud computing and SME's in Saudi Arabia. However the research is academically independent from Microsoft.

We thank also our University Prince Sultan University for the support and encouragement for research.

References

Journal Articles

Abdollahzadehgan, A, Che Husin, AR., Gohary M.M. & Amini M. (2014). The Organizational Critical Success Factors for Adopting Cloud computing in SMEs. *Journal of Information Systems Research and Information,* 69.

Ahmed Al Saleh. (2012). *Exploring sstrategies for small and medium enterprises in Saudi Arabia.* Paper presented at RIBM Doctoral Symposium, Manchester, United Kingdom.

Gupta, P.., Seetharaman, A., & Raj, J.R. (2013). The usage and adoption of cloud computing by small and medium businesses. *International journal of information management*, 33(5), 861-874.

Yamin, M. (2013). Cloud Economy of Developing Countries. *World Journal of Social Sciences*. 3, 135.

S.Moghavvemi, Hakiman, F & Tengku Feissal, TMF (2012). Competitive Advantages Through IT Innovation Adoption by SMES. *Social Technologies*, 2(1),28.

Clemons E.K. & B.W.Weber. (1992) National Westminster's strategic IT infrastructure: redefining branch banking with & pound: 500 million making the investment decision, managing the risk. *System Sciences*. 4, 697-705.

Lee, P, Stewart, D. & Parvez, A. (2013). *Technology, Media & Telecommunications Predictions 2014, Middle East*. New York: Deloitte

Straub D.W. and R.J. Welke. (1998). Coping with systems risk: security planning models for management decision making," *MIS Q*,.22, 441-469.

Online Journals Websites & articles in the news

Aimee Chanthadavong. (2015, March 1). SMEs warming up to cloud computing services: ACMA. *ZDNet.* Retrieved from http://www.zdnet.com/articles/smes-warming-up-to-cloud-computing-service Arabian Gazette. SMEs in Saudi Arabia Eye Ambitious Regional Growth. September 22, 2013.

Azarnik, A., Shayan,B., Alizadeh, M. & Karamizadeh, S. (2012). Associated Risks of Cloud computing for SMEs. *Open International Journal of Information,* 2, 37-45.

John Sfakianakis . (2014, June 9) How can SME Growth in the Kingdom be unlocked. *The Arab News*, p. 1.

AlKather, N, Gary0020Wills & Robert Walters. (2014, December). *Factors influencing an organisation's intention to adopt cloud computing in Saudi Arabia*. Paper presented in *6th IEEE International cconference on cloud computing technology and sscience (Enterprise Security 2014),* Singapore.

Ashoor A. Ashoor. (2013) The Structure of SME in GCC and How They are Promoted. Arab-EU Event. Retrieved from
di.dk/.../2013%20Working%20Group%20Meetings/.../Structure%20of%20SMEs%20...
International Institute for Strategic Studies.(2013). *Consideration for regulatory and policy approaches to cloud computing in the GCC*. Roundtable discussion, Dubai, May 13.

Muhammed Abdulzaher. (2015, February 23) Saudi Arabia Sees Potential in SME growth. *Zawya Thompson Reuters*. Retrieved from https://www.zawya.com/story/Saudi_Arabia_sees_potential_in_SME_growth-ZAWYA20140223050551/

Mobily launches cloud computing offer for SMEs. (2014, June 29). *Arab New*. Retrieved from http://www.arabnews.com/news/593641

Yahya, K. & Airey, J.(2012) *Small and Medium Size Enterprise in MENA: Leveraging Growth Finance for Sustainable Developmentt*". Virginia: Heart Mind Strategies.

Work-Family Conflict and the Intention to Quit with Psychological Strain as a Mediator and Social Capital as a Moderator

Sri Sundari
Universitas Wijayakusuma Purwokerto
srisundari@unwiku.ac.id

Heru Kurnianto Tjahjono
Universitas Muhammadiyah Yogyakarta
herukurnianto@umy.ac.id

Arif Hartono
Universitas Islam Indonesia Yogyakarta
arifhartono@uii.ac.id

Wisnu Prajogo
Sekolah Tinggi Ilmu Ekonomi YKPN Yogyakarta
wisnuprajogo@gmail.com

Abstract

This literature study develops the proposition of the relationship between Work-Family Conflict (WFC) with the intention to quit mediated by psychological strain. The concept that plays a role in explaining the model is the work-family conflict by focusing on work interfering with family (WIF), which is the fulfillment of roles in work that can lead to difficulty in fulfilling roles in the family. While the concept described is the intention to quit. The concept of psychological strain contributes to mediating the work-family conflict and the concept of social capital as a concept that plays a role in moderation.

Keywords: Work-family conflict, intention to quit working, psychological strain, social capital.

Introduction

WFC is defined as "a form of interrole conflict in which the role pressures from the work and family domains are mutually incompatible in some respect" (Greenhaus & Beutell, 1985). This conflict generally refers to the extent to which work and family roles conflict with each other (Greenhaus & Beutell, 1985). This conflict was first defined by Kahn, Wolfe, Quinn, Snoek, and Rosenthal (1964) who examine that people who experience internal conflicts within families will experience conflicts in their work and life. Kahn et al. (1964) suggest that the definition of work-family conflict is a form of inter-role conflict in which the role of job and family domains conflict with each other in some respects. It means that the participation in work (family) plays a more difficult role because of participation in family (work) roles.

Greenhaus and Beutell (1985) then conclude that WFC occurs when the demands of one of the roles affect one's ability to meet the demands associated with the other role. According to Greenhaus and Beutell (1985), WFC itself has three aspects:

1. Time-based conflict: the time required to run one of the demands reduces the time to run the other demands.
2. Strain-based conflict: the strain caused by the roles in work or family which interferes with the fulfillment of responsibilities to other roles.
3. Behavior-based conflict: the discrepancies between the desired behavioral pattern of work and family.

Multiple role conflict can occur in two directions: work interfering with family (WIF) and family interfering with work (FIW) (Frone, et al., 1997). WFC can be defined as the type of conflict between roles in which a person is unable to fulfill the responsibilities within the family, caused by demands, time allocations and stress/strain created by work. "Work-family conflict can be defined as the type of conflict between roles in which a person is unable to fulfill responsibilities in the work caused by general demands, time allocation and stress/strain created by the family domain" (Netemeyer, et al. 1996 page 401). This conflict has been viewed as a form of conflict in which "the role pressures associated with membership in an organization conflict with the pressures from membership in other groups" (Kahn et al., 1964). From a work-family and family-work perspective, this type of conflict reflects the extent to which the roles responsibilities and family domains are not harmonious, that is, "participation in work (family) roles becomes more difficult based on the participation in family (work)" (Greenhaus & Beutell, 1985). Thus, the demands of one role make other role performance more difficult (Katz & Kahn, 1978).

WFC is a form of conflict between roles where the general demands, the time devoted and the strains occurring within the work domain interfere with family responsibilities. FWC is a form of conflict between roles where the general demands, the time devoted and the strains occurring within the family domain interfere with work responsibilities. In this article, the authors will focus on WFC by observing more intensively on the general demands, the time devoted and the strains that occur within the domain of a job that can interfere with family responsibilities.

An effective HR Management strategy is not just focusing on current employees, but it requires long-term thinking. Recruiting employees is not an easy thing to do, but it also takes time and the costs are not low, therefore retaining employees is also a very important thing for the company, do not let employees decide to get out, while the company is still in really need. Often companies have difficulty controlling employees who have a desire to quit working. The intention of employees to quit working (Intention to Quit) is often detrimental to the company because it is not an easy thing to get a replacement. Intent-to-quit is the employee's intention to quit his current job (Ajaz & Mehmood, 2015). Intent-to-quit can be defined as employees show intentions completely to quit from their work (LeMay, et al., 2009). Thus, the Intention to Quit can be interpreted as the intention or desire of employees to get out of the organization. The banking industry is the most appropriate sector for learning intent-to-quit as the sector is experiencing a lot of problems on employee turnover (Balogun & Olowodunoye, 2012).

This study developed a model of the influence of work-family conflict on the intention to quit with psychological strain as a mediator. The development of this model is related to the results of research conducted by Billing, et al. (2014). The findings from studies of five countries (United States, Canada, India, Indonesia and South Korea) clearly provide support for the moderating role of decision latitude in the United States and Canada. These are Western countries with strong individualistic orientations. The lack of a moderating role of decision latitude in the non-Western countries (India, Indonesia, and South Korea) is explained by incorporating the cultural and economic underpinnings of the dynamic relationship between work and family in these countries. The relationship of psychological strain with the valued work outcomes in the five countries was also analyzed and explained with reference to the economic and cultural variations in the various contexts. Their finding clearly show that employees in individualistic countries (e.g. Canada) are better able to handle work-family conflicts and do not experience much psychological pressure when they have work autonomy in carrying out duties and responsibilities related to the role of their work. This finding is convincing to the theoretical argument before, that the level of emotional connection between family members is stronger in collective countries than that found in individualistic countries.

Furthermore in this article the authors will predict the social capital variable as a moderator between variables with the argument that this social capital will be able to describe the living conditions in a specific environment that is within our society (Indonesia) Social capital is a psychological variable that can explain how a person acts and behaves (Tjahjono, 2014). Social capital is the personal wealth possessed by an individual. Those individuals with high social capital have an attitude of respect, friendship and trust in others. They put together in community rather than personal interests and they are happy to participate as actors in society.

Nahapiet and Ghoshal (1998) focus on the level of individual analysis in composing the dimensions of social capital into three dimensions:

1. Structural dimension, social capital is the whole form of relationship between social actors.
2. Relational dimension, social capital is an asset that is created and grows in relationships among members of the organization that includes trust, trustworthiness, norms and sanctions, obligations and expectations, identity and identification.
3. Cognitive dimensions, social capital is defined as shared languages, shared narratives and shared vision that facilitate an understanding of the collective purpose and the way of acting within a social system.

In this article, the authors use the three dimensions as a unity in observing social capital variables

The purpose of this study is to model the effects of work-family conflict on the intention to quit with psychological strain as mediator and the role of social capital in moderating the influence of work-family conflict on psychological strain and the intention to quit and the role of social capital in moderating the influence of psychological strain to the intention to quit working.

Literature Review And Propositions Development

Work-Family Conflict

There are many researchers who have conducted research and sought understanding about the relationship between family and work (Burhanudin *et al*., 2016). Specifically, there are studies related to factors that cause multiple conflicts and learn the consequence and implication of the conflicts that are likely to occur in the work place or at home. Frone *et al*. (1997) urged that understanding on work-family becomes " an important concern for researchers, both for work and family", because human beings become potential and intellectual capital nowadays and in the future, and play an important role in the success of every organization. Developing understanding which is better than WFC is important for employees and organization due to some reasons. One of the simple reasons is because conflict is the source of stress and related to various negative consequences, whether at work or at home (Hammer *et al*, 1997).

Madsen (2003) stated that current research has divided work-family conlict into two types of conflict. Aryee *et al*. (1999) explains that work-family conflict that arises from event interference when the role of work interferes with the performance of family role is known as WIF (work interference with family). On the other hand, FIW (family interference with work) occurs when conflict arises from event interference of family role towards the performance of work. To increase role demand, it is unavoidable that one of the roles will interfere with activities of the other role. Conflict is a normal part in life. Conflicts or strains among various roles occur due to demand for multiple roles (Edwards & Rothbard, 2000). Even, having multiple roles is actually related to certain positive results (for example, dignity, life satisfaction, goal accomplishment, and pride). Understanding positive and negative relationship of work conflict, family conflict, and both, is not only important for human resources, but also for organization, family, and society. The construct of work-family conflict is primarily based on the theory of role and hypothesis of resources scarcity, which states that the demand of a role will drain personal resources such as time and physical energy or mentality, so it leaves inadequate resources to be allocated in activities of other roles. Theory of role conflict states that ambiguity or conflict in roles will result in undesired situation. It is due

to conflicting demand among roles (for instance, time, lack of energy, incompatible behavior), multiple roles raise personal conflicts because it is more difficult to play each existing role (Grandey & Cropanzano, 1999).

There have been many studies studying the relationship between work-family conflict and strain (Nohe *at al.,* 2015). Strain is a pshycological reaction, behavior, and physiological reaction towards environment demand, threat, and challenge (known as stress) as well as responses such as fatigue, depression, and headache (Ganster & Rosen, 2013; Griffin & Clarke, 2011). The most popular interpretation which assumes the two forms of work-family conflict precedes strain. Previous studies have consistently found the positive simultaneous relationship between WIF and FIW with strain (Amstad *et al*., 2011). In its meta-analysis, Nohe *et al.* found the supporting results of reciprocal effects and refuted general assumption that WIF and FIW cause one way strain. Most models of work-family literature assumes that work-family conflict affects strain (Frone *et al*., 1992, 1997), yet they do not admit the effects of potential strain in work-family conflict. The research result of Nohe et al. shows that there is a reciprocal relationship between the two forms of work-family conlifct and strain.

Strain

Strain in psychological and physiological level (Nohe *at al*., 2015). Psychological strain is often identified in emotional fatigue and iritation (Maslach & Leiter, 2008), anxiety and depression (Hammer, Cullen, Neal, Sinclair, & Shafiro, 2005) and general psychological pressure (Kelloway *at al.,* 1999).

Physiological strain consists of somatic complaints (Frese, 1985) and cardiovascular disease (Belkic et al., 2004). In work-family literature, strain is usually classified into three categories: strain related to work (for example fatigue), strain related to family (for example parents' stress) and strain in unspecific domain (for example somatic complaint and depression; Allen. *et al,* 2000; Amstad *et al*, 2011).

In this study,work–familyconflict is conceptualised as an inter-role conflict that arises due to mutually incompatible demands and pressures emanating from one's work and family life (Greenhaus & Beutell, 1985). WFC is hypothesised will be positively related to psychological strain, and than Psychological strain is hypothesised to mediate the relationship between work–family conflict and intentions to quit.
Proposition 1 : WFC will be positively related to psychological strain.

Intention to Quit

Nohe & Sonntag (2014) explained that employees who have extensive WFC may try to reduce the conflict by quitting their work. Therefore, withdrawal from work can be seen as a reaction of prevention in response to inappropiate work and family demands. Specifically, when an employee has WFC, he might tend to quit and look for a new job which is friendly to family in order to avoid WFC. Similarly, when an employee's family responsibility interferes with his work (FWC), he might consider quitting as a way to reduce FWC and to fulfill family obligations (Boyar *et al*., 2003). Meta-analysis in crossectional research generally supports the positive relationship of WFC and FWC with intention to move (Allen *et al*., 2000; Amstad *et al*., 2011).

Proposition 2 : WFC will be positively related to intention to quit
Proposition 3 : Psychological strain will be positively related to intention to quit
Proposition 4 : Psychological strain will be mediate the relationship between WFC with the intention to quit

Social capital

The most outstanding expert in this field, Robert Putnam, described social capital as: "..characteristics of social life – networks, norms, and trust – which enable the participants to act together more effectively in

order to achieve common goals.. In brief, social capital refers to social relationship and norms as well as trust which accompany it" (Putnam, 1995). Social capital can be defined as society's ability to work together in order to achieve common goals in various groups and organizations (Coleman, 1988). Dimension of social capital (Nahapiet & Ghoshal, 1998) consists of structural dimension (configuration of social network), cognitive dimension (system to share meaning, narration, language), and relational dimension (norms, trust, obligations). Social capital refers to individual property related to tendency to create harmony and long-term social relationship. Individuals are more oriented in creating social harmony and voluntarily involved in social system. Therefore, people with high social capital tend to be more accommodating (Tjahjono, 2011; 2014).

Proposition 5 : Social capital will be moderate the relationship between WFC with psychological strain and intention to quit

Proposition 6 : Social capital will be moderate the relationship between psychological strain with intention to quit

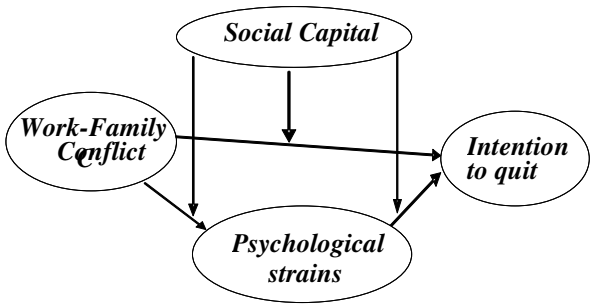


Figure 1: Planning of Research Model

Conclusion

Literature review shows that the relationship between WFC and intention to quit has been widely explored by researchers, particularly those in Western society which study has been conducted in Western setting. In this study, it is necessary to study the relationship between WFC and intention to quit which is mediated by psychological strain. The predictor variable is WFC which focuses on work interfering with family (WIF), which is fulfilling the role at work that may cause difficulties in fulfilling the role in family. The dependent variable is intention to quit which is mediated by psychological strain and moderated by factor of social capital, with the hope that it can reflect the cultural aspects of Indonesian society.

References

Ajaz, S. and Mehmood, B. (2015) 'Impact of Work Family Conflict on Female Intent to Quit: Descriptive Study of Commercial Banks of Faisalabad, Pakistan,' *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 5 (4), 74–83.

Allen, TD., Herst, DEL., Bruck, CS. and Sutton, M. (2000) 'Consequences associated with work-to-family conflict: A review and agenda for future research,' *Journal of Occupational Health Psychology,* 5 (2), 278–308.

Amstad, FT., Meier, LL., Fasel, U., Elfering, A. and Semmer, NK. (2011) 'A Meta-Analysis of Work – Family Conflict and Various Outcomes With a Special Emphasis on Cross-Domain Versus Matching-Domain Relations,' *Journal of Occupational Health Psychology*, 16 (2), 151–169.

Aryee, S., Luk, V., Leung, A. and Lo, S. (1999) 'Role stressors, interrole conflict, and well-bing : The moderating influence of spousal support and copping behaviors among employed parrents in Hong Kong,' *Journal of Vocational Behavior*, 54, 259–278.

Balogun, AG. and Olowodunoye, SA. (2012) 'Psychological Factors as predictors of turnover intentions among employees of post-consolidation banks in Nigeria.' *European Scientific Journal*, 8 (20), 81-95.

Belkic, K., Landsbergis, PA., Schnall, PL. and Baker, D. (2004). 'Is job strain a major source of cardiovascular disease risk?,' *Scandinavian Journal of Work, Environment & Health*, 30, 85–128.

Billing, TK., Ford Jr, DL., Srivastava, BN., Kuo, B., Kwantes, C. and Setiadi, B. (2014) 'Work – Family Conflict and Organisationally Valued Outcomes : The Moderating Role of Decision Latitude in Five National Contexts,' *Applied Psychology: An International Review*, 63 (1), 62–95.

Boyar, SL., Maertz Jr, CP., Pearson, AW. and Keough, S. (2003) 'Work-family conflict: A model of linkages between work and family domain variables and turnover intentions,' *Journal of Managerial Issues*, 175–190.

Burhanudin, Tjahjono, HK., Palupi, M. (2016) 'A Model of Work-Family Enrichment And Job Satisfaction,' Proceedings of the 28th International Business Information Management Assosiation (IBIMA), ISBN: 978-0-9860419-8-3, 9-10 November 2016, Seville, Spain, 464-469.

Coleman, JS. (1988), 'Social capital in the creation of human capital,' *American journal of Sociology*, 94, S95–S120.

Edwards, JR. and Rothbard, NP. (2000) 'Mechanisms linking work and family: Clarifying the relationship between work and family constructs,' *Academy of Management Review*, 25 (1), 179–199.

Frese, M. (1985) 'Stress at work and psychosomatic complaints: A causal interpretation,' *Journal of Applied Psychology*, 70, 314–328.

Frone, MR., Russell, M. and Cooper, ML. (1992) 'Antecedents and Outcomes of Work-Family Conflict: Testing a Model of the Work-Family Interface,' *Journal of Applied Psychology,* 77(1), 65–78.

Frone, MR., Yardley, JK.. and Markel, KS. (1997) 'Developing and Testing an Integrative Model of the Work–Family Interface,' *Journal of Vocational Behavior* 50, 145–167.

Ganster, DC. and Rosen, CC. (2013) 'Work stress and employee health: A multidisciplinary review,' *Journal of Management*, 39, 1085–1122.

Grandey, AA. and Cropanzano, R. (1999) 'The conservation of resources model applied to work-family conflict and strain,' *Journal of Vocational Behavior*, 54 (2), 350–370.

Greenhaus, JH. and Beutell, NJ. (1985) 'Sources of Conflict between Work and Family Roles, Academy of Management,' *The Academy of Management Review*, 10 (1), 76–88.

Griffin, MA. and Clarke, S. (2011) APA handbook of industrial and organizational psychology, American Psychological Association, Washington DC.

Hammer, LB, Allen, E and Grigsby, TD (1997) Work-family conflict in dual-earner couples: within individual and crossover effects of work and family,' *Journal of Vocational Behavior*, 50, 185–203.

Hammer, LB., Cullen, JC., Neal, MB., Sinclair, RR. and Shafiro, MV. (2005), 'The longitudinal effects of work–family conflict and positive spillover on depressive symptoms among dual-earner couples,' *Journal of Occupational Health Psychology*, 10, 138–154.

Kahn, RL., Wolfe, DM., Quinn, R., Snoek, JD. & Rosenthal, RA. (1964) Organizational Stress: Studies in Role Conflict and Ambiguity, Wiley, New York.

Katz, D. and Kahn, RL. (1978) The social psychology of organizations, Wiley, New York.

Kelloway, EK., Gottlieb, BH. and Barham, L. (1999) 'The Source, Nature, and Direction of Work and Family Conflict: A Longitudinal Investigation.' *Journal of Occupational Health Psychology*, 4, 337–346.

LeMay, SA., Williams, Z. and Garver, M. (2009) 'A triadic view of truck driver job satisfaction,' *Journal of Transportation Management*, 21 (2), 1–16.

Madsen, S. R., (2003) Work and Family Conflict: A Review of the Theory and Literature, Utah Valley University.

Maslach, C. and Leiter, MP. (2008) 'Early Predictors of Job Burnout and Engagement.' *Journal of Applied Psychology*, 93 (3), 498–512.

Nahapiet, J. and Ghoshal, S. (1998) 'Social capital, ntellectual capital, and the organizational advantage.' *The Academy of Management Review*, 23 (2), 242-266.

Netemeyer, RG., and Boles, JS. (1996) 'Development and Validation of Work-Family Conflict and Family-Work Conflict Scales,' *Journal of Applied Psychology*, 81 (4), 400–410.

Nohe, C. and Sonntag, K. (2014) 'Work-Family Conflict, Social Support, and Turnover Intentions: A Longitudinal Study,' *Journal of Vocational Behavior*. doi: 10.1016/j.jvb.2014.03.007

Nohe, C., Meier, LL., Sonntag, K. and Michel, A. (2015) 'The Chicken or the Egg ? A Meta-Analysis of Panel Studies of the Relationship Between Work – Family Conflict and Strain,' *Journal of Applied Psychology,* 100(2), 522–536.

Putnam, R. D., (1995) 'Bowling alone: Amarica's declining social capital.' *Journal of Democracy*, 6, 65–78.

Tjahjono, HK (2011). The configuration pattern distributive and procedural justice and its consequences to satisfaction. International Journal of Information and Management Sciences, 22(1):87-103

Tjahjono, H. K. (2014) 'The Fairness of Organization's Performance Appraisal Social Capital and The Impact Toward Affective Commitment,' *International Journal of Administrative Science and Organization*, 21 (3).

Workplace Sprituality in Enhancing Organization Commitment that Leads to Improvement in Employee Retention of Generation Y

Mr. Vincent Oh Kim Seng, Faculty of Management, Multimedia University, Cyberjaya, Malaysia
Email: ksoh@mmu.edu.my

Dr. David Yong Gun Fie, Faculty of Management, Multimedia University, Cyberjaya, Malaysia
Email: gfyong@mmu.edu.my

Dr. Abdullah Sarwar, Faculty of Management, Multimedia University, Cyberjaya, Malaysia
Email: sunabdullah@gmail.com

Mr. Low Jing Hong, Faculty of Management, Multimedia University, Cyberjaya, Malaysia
Email: jhlow@mmu.edu.my

Dr. Junainah Mahdee, Faculty of Management, Multimedia University, Cyberjaya, Malaysia
Email: junemahdee@gmail.com

Dr. Gowrie Vinayan, Heriot-Watt University Malaysia, Putrajaya, Malaysia
Email: gowrievinaya@gmail.com

Abstract

Malaysian organizations are experiencing shortage of Generation Y talents due to high turnover rate. This creates further problem as the cost of recruitment is enormous and time consuming. This proposed study is to determine the influence of workplace spirituality towards employee retention.Theoretically, this conceptual paper will be helpful for the human resource management personnels to understand towards the development of practices and policies aimed at creating or improving spirituality in the workplace. By improving spirituality climates, the organizations can promote organizational commitment which leads to better individual and organization performance.The idea of spirituality in workplace has the ability to retain employees. Organizations are increasingly evolving to be a place where employees embarked in their search for meaning. This has resulted in, the organizations to switch their focus from a strictly profit oriented, to a profit and worker well-being oriented

Keywords: Workplace Spirituality, Generation-Y, Retention, Organization Commitment

Introduction

This study will look into the influence of Workplace Spirituality moderated by the Organization Culture variable in enhancing the Employee Commitment that ultimately improves the Employee Retention level in an organization. The target population for the study is the Generation Y. The intention of conducting such study is to provide an extension to the existing knowledge, while at the same time looking into the practicability of implementing this management style that has potential in improving the retention level of the skilled Generation Y employees that are leaving due to various reasons. With that, the notion of Workplace Spirituality is expected to create an environment that is sensitive towards the wellbeing of the employees that will ultimately lead to the overall wellbeing of the organization in terms of the improved level of competitiveness in the market.

Workplace Spirituality

The idea of workplace spirituality has been studied by many and there are literatures that highlights the presence of great positive outcome gained by both individuals and organizations due to workplace spirituality. With that, with regards to the statement made, according to the authors such as Strack et al., (2002); Milliman et al., (2003); Jurkiewicz & Giacalone, (2004), there is an assumption made that, by satisfying the employee's spiritual needs within the organization environment, the employees will be more committed to their job and towards the organization, will in turn show great level of productivity. In support of the assumption, there are various studies undertaken with proper evidences to support either theorectically or empirically. As an example, mentioned by Milliman et al., (2003) activities that is benevolent in nature such as an employee has shown a gesture of kindness to another will result in the development of positive emotions, leading to favorable attitude within the employee and this will in turn leads to enhanced and improved level of performance. (Jurkiewicz & Giacalone, 2004). The practice of workplace spirituality influenced the individual employees, which in turn improves the level of cheerfulness, job fulfillment, devotion, and commitment (Khan et. al, 2016).

Therefore, the management that leads the organization, which places high importance on hope and happiness among the employees, it will provide the employees with support in dealing with stress at work (Simmons & Nelson, 2001) , will favorably effect the organization performance standard. To add on further, organization that practices a humanistic organizational values and provides ample opportunities for the employees to perform or involve in meaningful work will result in improved level of self-esteem, happiness, health and enhanced employee's personal growth. This is because once an employee is inspired and motivated by the positive work environment, they will put in the best effort (mentally, physically, emotionally and spiritually) in all the jobs that are assigned to them and viewed the job as a mission. This will result in improved and enhanced level of productivity. (Gavin & Mason, 2004). With that, there is studies undertaken by researchers, to proof that there is positive correlation between employee attitudes namely commitment to the organization, intrinsic work satisfaction, and job involvement and workplace spirituality. (Milliman et al., 2003). To add on, referring to the statement by Kim & Mauborgne, (1998), by treating an employee fairly and respectfully, it will instill within the employee the feeling of being recognized as valuable emotional an intellectual beings in organization and not just an ordinary "human resources". By having such recognition, based on Karasek & Theorell, (1990); Adams et al., (2003), it will inevitably increase the level of commiment of the employee towards the organization, thus reducing the thought of intending to leave, increased or improved level of job satisfaction, reduction in stress level and burnout.

There are studies that highlighted that, a spiritual individual will have a higher tendency to understand and receptive towards the organization ethical nature better (Giacalone & Jurkiewicz, 2003). By being reception and understanding towards the organization, it will result in improved overall organization performance. Referring to the study by White (2009), in supporting the relationship between workplace spirituality and the job attitudes which consisting of organization commitment and job satisfaction as being positively correlated. To make it easy, employees that are experiencing workplace spirituality, will develop the feeling of affection and attachment towards the organization, thus resulting in greater sense of loyalty and obligation, making the employee having the feeling of less instrumentally committed (Rego et al., 2008). In overall, there are studies with sufficent evidence to show that a spiritual individual have higher tendency to be ethical in their jobs and will result in greater favorable returns or benefit toward the organization (Neck & Milliman, 1994; Biberman & Whitty, 1997; Mitroff & Denton, 1999; Cash & Gray, 2000; Krishnakumar & Neck, 2002; Nur & Organ, 2006). There are also studies that provides sufficent proof or significant evidence to show that workplace spirituality has favourable relationship towards the change in the organizational performance (Ashmos & Duchon, 2000; Garcia-Zamor, 2003; Giacalone & Jurkiewicz, 2003; Fry, 2005). Adding on to the discussion on the influence of workplace spirituality, in the one of the earliest study by Bolman & Deal (1995), it is suggested that spiritualism is able to provide positive effects towards performance. Adding on further, a citation of Harvard Business School study by Thompson (2000), to support the workplace spirituality stated that spirituality possessed the ability to further improve the overall performance of an organization. Based on the Harvard Business School study, organization that is "more spirited" tends to

perform better than other organizations by a margin of 400 to 500 percent higher in net earnings, shareholder value and returns of investment (ROI) (Thompson, 2000). The positive outcome of the effects of spirituality experienced by organizations the practices voluntary spirituality programs is also being support by Dehler & Welsh, (1994); Turner, (1999).

In an organization, having the practice of spirituality in the workplace, it instill the sense of trust and belongingness within the employees, who are part of a work process within the organization. This will initiate the feeling of cooperation and commitment towards the organization. Thus leading to the development of an organization culture that builds on the motivation, the positive response and unanimous support and agreement by the individual employees that resulted in improve level of individual performance and ultimately benefiting the organization as a whole as proposed by Afsar & Rehman (2015). According to Altaf & Awan (2011) the current business environment has become very competitive, and this has caused the organization to set higher targets for their employees in order to remain competitive or in business. By having or experiencing such as high demend in their work, this has caused the employees to experience stress and anxiety (Gupta et al., 2014) and resulting the employees facing poor level of health and weak social interactions (Ahiauzu & Asawo, 2012).

Organizational Culture

The simple explanation for the concept organizational culture is explained as a special or unique identify of an organization (Chuang et al., 2004). However, it is generally explained as a set of chosen values, collective memories, core beliefs, expectations and definitions that lead the organization to success or growth, it also projects within the mind of the employees the organization's customary ideology or practices that forms the unique identity. With that, the organization culture is a source of un-written rules that provides guidelines and standards that acts as a sort of arrangements that is accepted by the others within the organization that will create a stable social system (Cameron et al., 2006).

However, there are occasions where the organization culture is either not being clearly addressed to the employees or there is misunderstanding of the message or meaning of the practices. Despite that, the organizational culture is dependent on the identity and behavior of the organization, that is either visible or invisible, which will effect the individual employee or the whole organization (Barati marnani et al., 2010). With that, based on the study by Mullins (1999), shows that culture in an organization will reflects different unique variations of an organization or managers and whether nationally or internationally. Therefore, culture in an organization provides a justification on the rationale on the ways things are being perceived and performed across different groups or individuals. This will assist in reducing the level of complexity and uncertainty faced by those within the organization. Thus enabling the organization to be able to gain consistent outlook and values that resulting it making apropriate decisions and having better control and co-ordination within the organization.

Organization Commitment

The definition for organization commitment as defined by Allen & Meyer, (2000) as a psychological state of an employee that describes the relationship of the employee with the organization that will minimize the tendency of the employee leaving the organization. The topic organization commitment has become a hot topic for both scholars and practitioners to understand in great length. The rationale for the interest is that, organizational commitment influences a various behaviors and attitudes that relates to the organization, for example to name a few employee's intentions to leave, turnover rate, punctuality, employee's organizational citizenship behaviors, attitudes of the employees towards organizational change and organization performance (Allen & Meyer, 1996, 2000; Meyer & Herscovitch, 2001). There are various studies undertaken by different researchers and scholars to explore and understand organizational commitment. Employees that has a strong affective commitment will have a mindset whereby they want to remain with the organization because they want to remain. As for the employees who have a strong continuance commitment, their mindset will be they remain with the organizaiton because they have to. Finally employees that have a strong normative commitment, is where the employees remain be they should due to their feeling of guilt or responsibilities. All this three

variables forms the components of organizational commitment and not viewed as stand alone variable that represent different type of organization commitment. In other words, an employee can be found to be affectively, normatively and also having continuance commitment towards the organization. In view of that, according to Allen & Meyer, (2000); Meyer & Allen, (1991, 1997) each variables are developed using uncorrelated measures each variables are independently measured with different criterias and different processes.

To relate the concept of organization commitment with the generation Y employees, there is a significant differences when compared to the older generation, however, the work ethic among this younger generation are not lacking when compared with the older generation. It is basically generation Y employees possessed different workplace attributes and behavior, which are unique and different with the older generation employees. Therefore, understanding the differences is necessary to improve and enhance the level of organization commitment among the generation Y employees. Examples of differences highlighted, according to Cennamo & Gardner, (2008) the younger generations appreciates and values status more then the other older generations. The reason is due to the mindset of the generation Y, thinking thay by having higher status, it will enable them to speed up their work progress. Besides that, the generation Y employees prefers and emphasize on freedom related matters more when compared with the older generation. Freedom related matters as preferred by the generation Y will be flexibility in working hours and supervision, wherelse their older peers prefers a much traditional method with a set work hours and turning up for work. With that, in general, the generation Y are more of task completion while the older generation are more of hard work ethic mindset (Bloomberg 2008). Organizational commitment has shown that it is an important element in an organization or workplace, because of it's influence over the rate of turnover, absenteeism and overall organizational and workplace effectiveness. (Daniel & Jardon, 2015).

Employee Retention

An organization that is able to retain their employees is important and benefitial to the organization as emphasize by Samuel & Chipunza (2009), the key purpose of employee retention is to avoid the organization from losing their capable and skilled employees as this will utterly disrupt and affect the productivity and performance level of the organization. There the idea of retention is basically the intended creation of a working environment by the organization the is able to engage the employees for a long period of time (Chaminade, 2007). Organization that is constant competing within the global economy and to stay up dated with the current technology advancements which is rampant and rapid, there is a need for skilled and capable employees equipped with the necessary institutional knowledge to man and run the organization. Looking at that, there is a dire need for the organization to retained their workforce in order to remain competitive or face the competition (The Future of Work 2020, 2007, Benko & Weisberg, 2007; Becker, 2007). Studies undetaken by Egan et al., (2004); Lambert et al., (2001); MacIntosh & Doherty, (2010); Schwepker, (2001); Silverthorne, (2004) has shown that there are strong correlation between having employees that satisfied and commited to the organization with employees retention. In other word, the more satisfied and happy is the employees, the less likelihood for them to leave the organization.

Further supporting the notion of having a satisfied employees will reduce the rate of employee leaving the organization, Egan et al. (2004) has also noted in his study that, with the reduction in turnoever, it will result in increase level of organization productivity and decrease in costs that inccured due to lost of skilled employees to effciently run the organization operations, rehiring and retraining of new employee as replacement. In addition, turnover will result in the organization bearing multiple indirect costs such as losess due to the reduction in productivity from various parties in the organization namely, the employee that have left, new employee as time is needed for the new recruit to catch up and the senior employees or managers who have to spare their time to guide the new employee. This is supported by Silverthorne (2004) , the outcome cause by turnover is great as it will result in the organization bearing various indirect costs such as costs of replacement and reduced in productivity due to loss of experience. Such indirect cost will in long run affect the growth of the organization, with that, if there is any method that is able to reduce the turnover, it will certainly benefit the organization.

Generation Y

The classification of Generation Y according to this group ages differs by various researchers in their studies. However, according to Hess & Jepsen (2009), according to this study, in general this group of youth can be classified into those who are born between the year 1980 and the year 2000. With that, referring to the National 2013 census, it shows a record of a total of 13 million youths that are between the age of 10 to 34 years old in Malaysia, or in order words, the number represent approximately 44% of the population in Malaysia.

Referring to the study by Sheahan (2008), which further emphasize on the turnover rates of the Generation Y employees, it is reported that in the Asian Pacific region, the Generation Y employees has the shortest job tenure in comparison with other generations namely Generation X and the Baby Boomer. The average duration is for as long as 18 months and the other generation has an average of 4 years. The outcome experienced by an organization due to turnover, is that the organization will lose a talent of knowledge and technical skills and this is due to the employee who has left for other organization and impacted the former organization's productivity, quality and profitability.

In another note, the Generation Y is being exposed to huge amount of informations that at times they may not know or unsure what they want. Besides that, due to their firm grasps of their unique opinions and principles adds on to their character of not listening or accept input from others, especially from the older generation. This has resulted, the organization in to look in to ways and methods to effectively communicate and establish relationship with this group of youth. By doing so, it is said to bring out greater benefits to the organization.

Proposed Study Framework

Referring to the figure 1, that shows the framework of this discussion. This conceptual paper aims to discuss the effect of workplace spirituality on the retention level of the Generation Y employees in Malaysia. Hence, this paper focuses on testing a research model driven by three theories, namely: (1) workplace spirituality, (2) organization commitment and (3) employee retention. In addition to this paper is to determine whether the Organization Culture plays a significant moderating role in enhancing the Organization Commitment level.

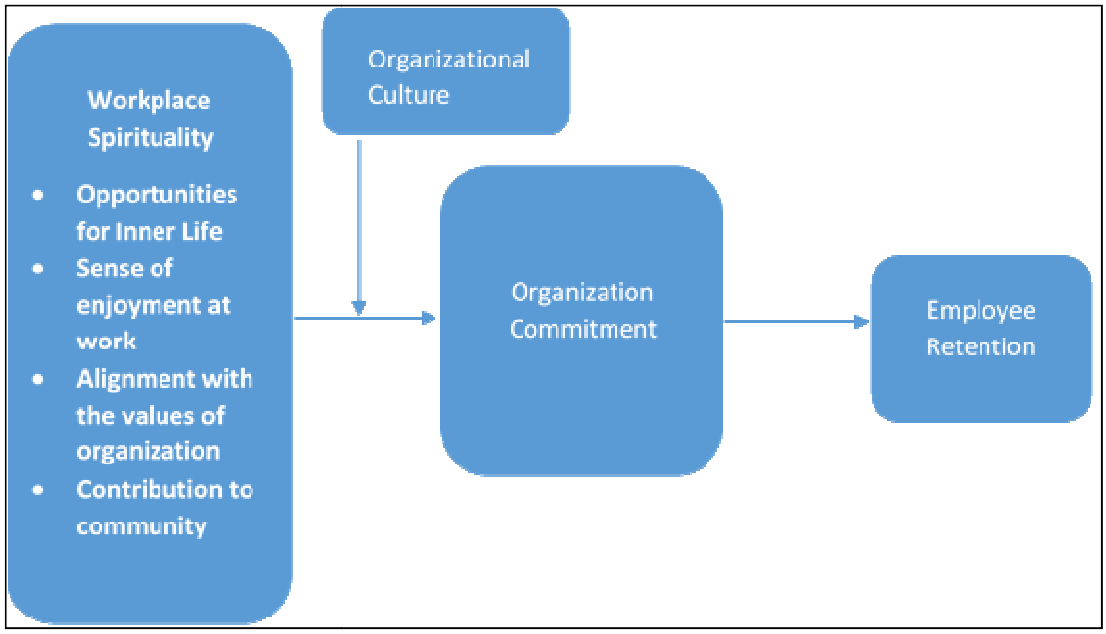


Figure 1: Proposed Framework

Discussion

Organization that is spiritual oriented, their employees have tendency to show greater sense of caring towards their peers thus establishing a strong bond of relationship among the employees which ultimely lead to better and enhanced level of job satisfaction. By having such a strong bond of relationship, this will result in reduced turnover which in turn enable the organizations to save in recruitment and training. According to Champouz, (2000), with the establishment of strong bond of relationship among the employees, employees are able to work well together resulting in great group dynamics and greatly improved work performance and efficiency. Therefore, it vital for managers in an organization to embarked into developing and motivating their employees by having a work environment that is conducive and healthy that employees look forward to work and work together with the managers and not against them.

Besides improvements in the standard of living in general, there can also be significant changes in both religious and demographic aspects within a population. This has resulted in the popularity of having spirituality in the workplace Daniel (2014). Adding on, Gupta et al. (2014), the current scenario in the workplace which is demanding and has resulted in the employees experiencing higher work targets and work overload. This has resulted in the emergences of spirituality within the work environment. Besides that, Roof (2015) stressed that, there is a growth in the numbers of employees that seek to satisfy their higher order needs especially employees with stronger cultural and ethical considerations, thus demanding for the need of spirituality in the workplace.

It is important for an organization to instill the spirit of teamwork and unity among the employees and employees should be given an avenue for them to openly express their thoughts and feeling. By having a conducive workplace environment, employees will then be able to establish a strong bond of relationship that will in turn enhanced the organization overall performance. According to the view by Staude (2005), spirituality in the workplace transforms the different elements in life such as the emotional, physical, intellectual, occupational and rational of the different employees within the organization are integrated and alligned with organization vision and mission. Therefore, referring to the finding by Ashmos & Duchon, (2000) the practice of spirituality has the tendency to connects an

individual to oneself and also to other at the surrounding or even beyond. With that, organization that practices spirituality, the management and supervisors will practice the spiritual approach in their daily operations, which will gain positive recognition by all employees regardless of level or position within the organization resulting in them working with not only their hands but also with their hearts and spirit.

Rego & Cunha (2008), Deshpande (2012) and Alas & Mousa (2016) specified in their study, stating that the practice of workplace spirituality in an organization around the world is a need and it should not be overlooked. Based on the clarification by Alas & Mousa (2016), the practice of spirituality has the tendency to developed and enhanced the trust between the employees and the employers that will result in improvements in to overall performance of the organization. In addition, as emphasized by Omar et al. (2012), an employee that is committed towards the organization is deemed to be the most precious assets for any organization. With that, a committed employees possessed the ability to improve the level of competitiveness of the organization through the reduction of turnopver rates and the level of intention to quit (Omar et al.,2012).

Therefore, the practice of spirituality in the workplace is shown to enhanced the level of performance of the organization. This is because, spirituality empowers the employees to make decision that is beneficial to the organization such improve organization performance and increased productivity level to name a few. The act of empowering the employees will result in improve morale and instilling the pride that their efforts are making significant change to the organization. Other employees who have witness such recognition will be affected resulting them to emulate and practice the positive behavior. This is because employees have tendency to practice the norms that is being accepted and recognize by the working community in the organization by ensuring that their behavior are in sync with the norms (West & Wicklund 1980). This because generally, employees are value-driven and constantly seeking to further enhance and improve themself while thare are other too who emphasize on corporate social responsibility, corporate citizenship and environmental sustainability protection issues. Study by Schaefer & Darling (1997), has identified that spiritual practices in the workplace have the tendency to instill positive behavior within the employees and this will result in them serving and work with great level of commitment. Organization that practices such values and strives to achieve the expectation of the employees in a realistic manner, by doing so, the organization will experience a stronger and greater positive output.

To create an organization with a strong spiritual base, it will require transparency, mutual appreciation and understanding from both the employers and employees. By having such an organization will inevitably experience great level of efficiency. This notion is being supported by Duxburg & Higgins, (2002); Giacalone & Jurkiewicz, (2003) stating that the morale and commitment level of employees will be stronger with the integration of spirituality into the organization culture of the organization. By doing so, the workplace environment is transformed into a positive workplace environment that will influence the level of generation Y employee performance. In other words, as mentioned by Dehler & Welsh, (1994) organization are to look into providing their employees with physical, mental, emotional and not to be forgotten spiritual support as well. All this elements are necessary to provide a platform for the employees to grow and enhanced themself further which ultimately benefits the organization in overall.

Conclusion

Referring to the findings of Ashmos & Duchon (2000), Jurkiewicz & Giacalone (2004), Daniel (2010), Malik & Naeem (2011), Roof (2015) and Alas & Mousa (2016), an employee working in an environment that enable the employee to perform meaningful work and experience good teamwork will result in the employee achieving their full capacity and realizing their full potential. This is supported in the study by Ahiauzu & Asawo (2012), that shows through the practice of spirituality in workplace will inevitably enhance and improve the performance level of an organization and in turn reduce absenteeism and turnover rates.

Organizations has agreed that, using material incentive such as pay, enhancements of intellect and mind as a form of motivation and engagement with the employees is not long effective. Therefore, there is a need to instill spiritual values within the organization in order to spiritually engage the generation Y

employees in order to rejuvenate their life to boost up their spirit. With that, organization that making their generatio Y employees to have a sense of belongingness by empowering them and making them part of the community of the organization, it will improve the level of motivation and increased level of loyalty towards the organization. By empowering them, it will generates and develops into strength, vigor, movement and rejuvenated the competitive energy of the employees that will further improve their productivity. The idea of spirituality in workplace has the ability to retain employees. Organizations are increasingly evolving to be a place where employees embarked in their search for meaning. This has resulted in, the organizations to switch their focus from a strictly profit oriented, to a profit and worker well-being oriented.

Acknowledgement

This study is sponsered by FRGS (Fundamental Research Grant Scheme) offered by Ministry of Higher Education (MOHE) Malaysia

References

Adams, V.H., Snyder, C.R., Rand, K.L., Kings, E.A., Simpson, D.R. and Pulvers, K.M. (2003). Hope in workplace, in Giacalone, R.A. and Jurkiewicz, C.L. (Eds), *The Handbook of Workplace Spirituality and Organizational Performance*, M.E. Sharpe, Armonk, NY, pp. 367-77.

Afsar, B. and Rehman, M. (2015). The relationship between workplace spirituality and innovative work behaviour: The mediating role of perceived person-organization fit. *Journal of Management, Spirituality & Religion,* 12:329-353.

Ahiauzu, A. and Asawo, S.P. (2012). Impact of Clear and Compelling Vision on Workers' Commitment in Nigerian Organizations: An examination of Workplace Spirituality. *Journal. Of Leadership Accounting Ethics,* 9(6):113-124.

Alas, R, and Mousa, M. (2016). Organizational culture and workplace spirituality. *Int. J. Emerg. Res. Manage. Technology,* 5(3).

Allen, N. J. and Meyer, J. P. (1996). Affective, continuance, and normative commitment: An examination of construct validity, *Journal of Vocational Behaviour, 49*, 252-276.

Allen, N., and Meyer, J. P. (2000). Construct validation in organizational behaviour research: The case of organizational commitment. In R. D. Goffin & E. Helmes (Eds.), Problems and solutions in human assessment (pp. 285–314). Boston, MA: *Kluwer Academic Publishers*.

Altaf, A. and Awan, M.A. (2011). Moderating effect of workplace spirituality on the relationship of job overload and job satisfaction, *Journal of Business Ethics*. 104(1):93-99.

Ashmos, D.P. and Duchon, D. (2000). Spirituality at work: a conceptualization and measure, *Journal of Management Inquiry*, Vol. 9 No. 2, pp. 134-45.

Barati marnani, A., Ghaderi, A., Gohari, M.R. and Sadeghi, A. (2010). Studying organizational culture in Hasheminejad Hospital in Tehran according to Denison model, *Journal of Health Administration*, No.40, 61-73.

Becker, F. (2007). Organizational Ecology and Knowledge Networks. *California Management Review*, 49(2), 42-61

Benko, C. and Weisberg, A. (2007). Implementing a Corporate Career Lattice: The Mass Career Customization Model. *Strategy & Leadership*, 35(5), 29-36.

Biberman, J., and Whitty, M. (1997). A postmodern spiritual future for work. *Journal of Organizational Change Management*, 10(2), 130–138

Cameron, K. S., Quinn, R. E., DeGraff, J., and Thakor, A. V. (2006). Competing values leadership: Creating value in organizations. London: Edward Elgar.

Cash, K.C. and Gray, G.R. (2000). A Framework for Accommodating Religion and Spirituality in the Workplace, *Academy of Management Executive,* 14, no.3: 124-133.

Cennamo, L. and Gardner, D. (2008). Generational Differences in Work Values, Outcomes and Person-Organisation Values Fit, *Journal of Managerial Psychology*, 23(8), 891-906.

Chaminade, B. (2007). A retention checklist: how do you rate?

Champoux, J.E. (2000). Organizational behavior: Essential tenets for a new millennium, *Cincinnati*: *South-Western College Publishing*.

Chuang, Y.T., Church, R. and Zikic, J. (2004). Organizational culture, group diversity and intra-group conflict, *Team Performance Management: An International Journal*, Vol. 10, Iss:1/2, pp.26-34.

Daniel, J.L. (2010). The effect of workplace spirituality on team effectiveness, *Journal Manage. Dev.,* 29(5): 442-456.

Daniel, J.L. and Jardon, R.C. (2015). The relationship between individual spirituality, organizational commitment and individual innovative behavior, *Manage. Res. Pract,* 7(1): 5-13.

Dehler, G. and Welsh, M. (1994). Spirituality and Organizational Transformation: Implications for the new management paradigm, *Journal of Managerial Psychology*, 19(6):17-26.

Deshpande, A. (2012). Workplace Spirituality, Organizational Learning Capabilities and Mass Customization; An Integrated Framework, *International Journal of Business Management*, 9(5).

Duxbury, L. and Higgins, C. (2002). Work-life balance in the new millennium: where are we: where do we need to go? *Ottawa: Carleton University School of Business*.

Egan, T. M., Yang, B., and Bartlett, K. R. (2004). The effects of organizational learning culture and job satisfaction on motivation to transfer learning and turnover intention, *Human Resource Development Quarterly*, 15(3), 279–301.

Fry, L. W. (2005). Toward a theory of ethical and spiritual well-being and corporate social responsibility through spiritual leadership. Forthcoming in Giacalone, R.A. and Jurkiewicz, C.L., (Eds). Positive psychology in business ethics and corporate responsibility. Greenwich, *CT: Information Age Publishing*.

Garcia-Zamor, J. (2003). Workplace Spirituality and Organizational Performance, *Public Administration Review*, 63(3), 355-363.

Gavin, J.H. and Mason, R.O. (2004). The virtuous organization: the value of happiness in the workplace. *Organizational Dynamics*, Vol. 33 No. 4, pp. 379-92.

Giacalone, R.A. and Jurkiewicz, C.L. (2003). Handbook of Workplace Spirituality and Organisational Performance, Armonk, ME Sharpe, NY.

Gupta, M., Kumar, V. and Singh, M. (2014). Creating satisfied employees through workplace spirituality: A study of the private insurance sector in Punjab (India), *Journal of Business Ethics*, 122(1):79-88.

Hess, N., and Jepsen, D. M. (2009). Career stage and generational differences in psychological contracts, *Career Development International*, Vol. 14 No. 3, pp. 261-283

Jurkiewicz, C.L. and Giacalone, R.A. (2004). A values framework for measuring the impact of workplace spirituality on organizational performance, *Journal of Business Ethics*, Vol. 49 No. 2, pp. 129-42.

Karasek, R. and Theorell, T. (1990), Healthy Work: Stress, Productivity, and the Reconstruction of Working Life, *Basic Books*, New York, NY.

Krishnakumar, S. and Neck, C.P. (2002), The "what", "why" and "how" of spirituality in the workplace", *Journal of Managerial Psychology*, Vol. 17 Issue: 3, pp.153-164

Lambert, E. G., Hogan, N.L., and Barton, S. M. (2001). The impact of job satisfaction on turnover intent: a test of a structural measurement model using a national sample of workers, *The Social Science Journal*, 38(2), 233–250.

MacIntosh, E. W., and Doherty, A. (2010). The influence of organizational culture on job satisfaction and intention to leave, *Sport Management Review*, 13(2), 106–117.

Malik, M.E. and Naeem, B. (2011), Role of spirituality in job satisfaction and organizational commitment among faculty of institutes of higher learning in Pakistan, *African Journal of Business Management*, 5(4), 1236-1244.

Meyer, J.P. and Allen, N.J. (1991). A three-component conceptualization of organization commitment, *Human Resource Management Review*, Vol. 1 No. 1, pp. 61-98.

Meyer, J.P. and Herscovitch, L. (2001). Commitment in the workplace: toward a general model, *Human Resource Management Review*, Vol. 11 No. 3, pp. 299-326.

Milliman, J., Ferguson, J., Trickett, D. and Condemi, B. (1999). Spirit and community at Southwest airlines: an investigation of a spiritual values-based model, *Journal of Organizational Change Management*, Vol. 12 No. 3, pp. 221-33.

Mitroff, I.I. and Denton, E.A. (1999). A Spiritual Audit of Corporate America, *Jossey-Bass*, San Francisco, CA.

Mullins, L.J. (1999). Management and Organisational Behaviour, 5th ed., *Financial Times Pittman Publishing*, London.

Neck, C. P., and Milliman, J. F. (1994). Thought Self-leadership: Finding Spiritual Fulfilment in Organizational Life, *Journal of Managerial Psychology*, 9(6), 9-16.

Nur, Y. A., and Organ, D. W. (2006). Selected organizational outcome correlates of spirituality in the workplace, *Psychological Reports*, 98(1), 111–120.

Omar, K., Anuar, M.M., Majid, A.H.A. and Johari, H. (2012). Organizational Commitment and Intention to Leave among Nurses: The mediating role of Moral Obligation, *International Journal of Management Sciences,* 19(2):31-46.

Rego, A. and Cunha, M. (2008). Workplace spirituality and organizational commitment: an empirical study, *Journal of Organizational Change Management*, 21(1), 53-75.

Roof, R. (2015). The Association of Individual Spirituality on Employee Engagement: The Spirit at Work, *Journal of Business Ethics*, 130, 585-599

Samuel, M.O., and Chipunza, C. (2009). Employee retention & turnover: using motivational variables as a panacea, *Afr. J. Bus. Manage. 3(8): 410- 415.*

Sheahan, P. (2007). Generation Y in Asia. Sydney: University of Sydney.

Schwepker, C. H. (2001). Ethical climate's relationship to job satisfaction, organizational commitment, and turnover intention in the sales force, *Journal of Business Research*, 54(1), 39-52.

Schaefer, C. and Darling, J. (1997). "Does spirit matter? A look at contemplative practice in the workplace", Spirit at Work Newsletter, July, 8-10. Schneider, B. (1983). Interactional psychology and organisational behaviour, *Research in Organisational Behaviour*, 5:1–31.

Silverthorne, C. (2004). The impact of organizational culture and person-organization fit on organizational commitment and job satisfaction in Taiwan, *Leadership & Organization Development Journal*, 25(7), 592–599.

Simmins, B.L. and Nelson, D.L (2001). Eustress at work: The relationship between hope and health in hospital nurses. *Health Care Management Review*, 26(4), 7-18.

Staude, J. R. (2005). Spirituality as Spiritual Practice, *Journal of Gerontological Social Work*, 45(3):249-269.

Strack, G., Fottler, M.D., Wheatley, M.J. and Sodomka, P. (2002). Spirituality and effective leadership in healthcare: is there a combination?, *Frontiers of Health Services Management*, Vol. 18 No. 4, pp. 3-17.

The Future of Work 2020, Palo Alto, CA: Institute for the Future, for the University of Phoenix, 2007.http://cdn.theatlantic.com/static/front/docs/sponsored/phoenix/future_work_skills_2020.pdf
Thompson, W. D. (2000). Can you train people to be spiritual?, *Training & Development*, Dec, 18-19.

Turner, J. (1999). Spirituality in the Workplace, *C A Magazine*, 132(10), 41-42.

West, S.G. and Wicklund, R.A. (1980) A Primer of Social Psychological Theories. Monterey, CA: Brooks/Cole.

White, M.T. (2009). Making sense of genetic uncertainty: the role of religion and spirituality, *American Journal of Medical Genetics,* Volume 151C, Issue 1, 68-76.

Prospects of the Development of the "Green Economy" At the Global Level

Tovma N.A.

Doctor (PhD), associate professor al-Farabi Kazakh National University, Kazakhstan,

nataliya-tovma@mail.ru

Abstract

Annotation. In the current conditions of the world economy development, the global trends of the "green economy" are the increase of energy efficiency in all spheres of the economy. It is noted that to facilitate the transition to a green economy, incentive measures should be created: concessional lending and taxation of modernization projects, subsidizing energy producers derived from alternative sources, and a system of "green" certification. Four groups of indicators have been identified through which the formation of a "green economy" can serve as the engines of economic growth incarnating, including in increasing GDP: indicators that characterize the potential opportunities for transition to a "green economy", indicators of increasing the efficiency of systemically important sectors, investment in the development of " Green economy "and indicators that stimulate innovation in the development of the" green economy. " The ways of formation of green economy in foreign countries are marked. The main segments in which the green economy can develop are identified. The main directions that contribute to the "greening" of the entire economy are noted.

Keywords - green economy, energy efficiency, energy saving.

Introduction

The global trends of the "green economy" are to increase energy efficiency. Many countries that have experienced a decline in production under the conditions of the financial and economic crisis have recently been actively searching for new models of development. At the 40th World Economic Forum in 2010, held in Davos under the slogan "Improve the state of the planet: rethink, reschedule, rebuild the world," this model was chosen and a new global course for the green economy was announced as the only way forward. The concept of a "green economy" is designed to ensure a more harmonious alignment of the components of the economy, society and nature within the framework of the paradigm of sustainable development [1, p.56]. At the moment, it is becoming a global course of innovative, anti-crisis formation in many countries and regions of the world.

In the opinion of international experts, to successfully create a new concept, it is necessary to invest significantly in effective innovation. The efforts of developed countries will most likely be aimed at rationalizing land use, as well as developing urban policies. You can expect an increase in investments in energy efficiency of buildings, the development of urban infrastructure and even the construction of eco-cities. Funds will be allocated for the development of sustainable transport and renewable energy sources (RES).Summarizing these trends, it can be said that the global trends of the "green economy" are to increase energy efficiency in all spheres of the economy, develop renewable energy and environmentally safe transport, meet the requirements for safe and quality food and water, and build a new industrial and information infrastructure. It should be noted that the main problem of introducing a new course at the global and regional levels is the creation of conditions under which such development will be economically beneficial. In the current situation, for a green economy to become a reality, it is necessary:

- large-scale government assistance;
- active participation of private investors;
- feasible participation of consumers.

Methods. In the world community, some experience has already been gained in the development of a "green" economy. The versatility of methodological approaches recommended by international organizations and used in international agreements on regulation and monitoring of anthropogenic impact on the environment in the context of the globalization of the world economy. Scientists are trying to find methodological approaches to these processes and to develop objective indicators and criteria for their application in the planned plans for the development of the "green economy", taking into account the specifics of the economy and the availability of resource-resource potential of the territories. It is possible to distinguish four groups of indicators by means of which the formation of a "green economy" can serve as engines of economic growth incarnating, including in increasing GDP (Table 1).

Table 1 : Indicators through which the formation of a "green economy" can serve as engines of economic growth

№	Indicators	Directions
1	Indicators the potential for transition to a "green economy"	Increase the productivity of natural resources (forest, fish, agricultural land, etc.); Efficient management of capital (reducing economic losses from capital losses due to better management of environmental risks); improving the quality of human potential, incl. By improving the state of the environment (reducing morbidity, increasing life expectancy).
2	Indicators of increasing the effectiveness of system-forming sectors	Energy, construction, housing and utilities, and others: improving energy efficiency; reduction of greenhouse gas emissions; introduction of alternative energy sources.
3	Investment in the development of the "green economy"	The system of water supply and sewerage, public transport, focused on alternative sources of fuel
4	Indicators that stimulate innovation in the development of the "green economy"	To create a favorable competitive environment and to obtain an innovative effect by introducing innovative standards and regulations.

As the foreign practice of implementing the green economy shows, for example, in the production of solar panels in only three years, the corresponding cost reduction amounted to 75%, in the wind energy sector, the average profitability of the coastal wind farm increased to 35% in 2017 [2]. Investment in energy-efficient housing construction is also very effective, reducing the costs associated with energy consumption by 30%.

Let's consider some ways of formation of green economy in the countries which consider this direction as priority. One of the world leaders is South Korea. In this country, 3% of GDP or 60 billion US dollars for 5 years from 2011 is planned to be spent on development of "green" sectors, and 1.8 million jobs were created. South Korea, which has chosen the concept of "green" growth as a national strategy, focuses on industry, energy and investment, "green" modes of transport, alternative sources of fresh water, waste processing technologies, development of parks, and development of rivers within the city. Various projects that the ministries carried out independently were combined into a single package to avoid budget expenditures for secondary purposes. Since 2011, South Korea has launched a system of "green payment cards" to stimulate the "green" consumption of goods produced with environmental innovations. Such cards take into account the consumption of "green" goods and services, the use of public transport instead of personal transportation and also the use of energy-efficient goods. For the Republic of Kazakhstan, this experience, in our opinion, looks rather interesting, especially in connection with the formation of the national payment system. Perhaps it should include a "green" component.

In all EU countries have developed "green" measures in the energy sector, the development of public transport and infrastructure, the construction of eco-settlements, as well as recycling systems. The EU has adopted standards for Euro-5 automobile exhausts and the introduction of new Euro-6 is already being prepared. A multimillion dollar subsidy is allocated to buyers for the purchase of electric vehicles. The UK adopted the economy of green technologies as a strategy for its national development and recently announced its "green" projects aimed at creating 100,000 new jobs. In China, it is planned to receive 15% (now 9%) of electricity from renewable sources by 2020, and reduce the carbon intensity of the economy by 45%. The trend towards the development of green technologies in China has been established since the 12th Five-Year Plan (that is, since 2011). In China, more than 2,000 environmentally dirty companies were forcibly closed. The volume of state investments in energy conservation, renewable energy, relevant technologies in China has exceeded the US and EU indicators several times. Chinese manufacturers already occupy 40% of the world export of solar batteries and 20% - windmills. Another area of "green" technologies that are developing in the China is nanotechnology, this year Global Innovation Global Innovation Center GICNA was opened. The undeclared goal of Beijing is to become the world leader in the field of green technologies in the 21st century. World experience has shown that the "green economy" stimulates regional development, contributes to social stability, and increases economic potential by creating new jobs in the "green economy" sectors. For example, in Brazil, agricultural land has been restored through an improved soil care system, the introduction of zero and minimal tillage technologies, and supply chain management.

Many developed countries have already begun moving towards the "green" economy direction. So, in the United States, according to the Obama plan, tens of billions of dollars are allocated for the economization of the economy; The plan includes the creation of new green technologies, energy saving, new jobs in promising activities from the environmental point of view, etc. Scandinavian countries are going to a radical restructuring of the economy in favor of industries that produce environmentally compatible new types of technologies, products and services. In times of crisis, such restructuring will be carried out through state support of environmentally advanced activities with minimal support for traditional production. Strongest impact on the future of the world economy will be combated by global climate change and energy efficiency. The desire of the European Community to reduce by 2020 greenhouse gas emissions by 20%, increase energy efficiency by 20% and increase the share of renewable energy sources to 20% (plan 20:20:20) radically changes the European economy. The US declared desire to cut emissions by 50% by 2050, and then by 80% by 2080 will also have a huge impact on the pace of innovation and structural change. Already in the near future, the key definition for the advanced economies of the world will be a "low-carbon economy" with its high energy efficiency and minimal impact on the climate system.

Germany, along with Japan, occupies leading positions in the rating of energy-intensive economies of the world. By 2020, Germany plans to increase energy efficiency by 20%. According to Stefan Kohler, Chairman of the Board of the German Energy Agency DENA, Kazakhstan can reduce energy intensity of industry by 15% through optimization of production processes, application of interbranch technologies and other measures, but preparation of energy managers for enterprises should be the first step in implementing an energy efficient policy.
Switzerland is one of the few countries in the world for which the so-called "green" economy and energy is one of the priorities. Currently, 56% of the electricity needs in Switzerland are covered by hydroelectric power. Thus, a significant part of the energy produced in the country is already coming from "green" sources. After the accident in 2011 at the nuclear power plant in Fukushima, Japan, the Federal Council and the Swiss Parliament decided to proceed with the phase-out of nuclear energy, which now covers 39% of the country's needs, and thereby accelerate the transition to safe renewable energy sources .

However, the global environmental problem remains one of the serious challenges and constraints for the progressive development of the economy. It is necessary for all states of the world to solve it, and the Swiss government is interested in this. But a pragmatic approach is needed here, and the scale and timing of the transition to a green economy should be gradual. This position is reflected in the counter

government proposal that provides for a program of measures, as well as the need to revise the existing law on environmental protection, adopted in 1983.

The government's position was supported by the majority of the country's population, and in a recent referendum, more than 60% of Swiss people opposed the radical Green program. Such results did not come as a surprise to observers. After all against the initiative of "green" and socialists all right and centrist parties (four out of five forming the government of the Swiss Confederation) were supported by their electorate. Energy-related issues are actively discussed in modern Swiss politics. In addition to this referendum on the new energy strategy of the government, Swiss citizens recently voted on whether to impose a restriction on the amount of energy consumed by the population as a whole. In the near future, a national vote will be held on exactly when the existing five nuclear power plants should be shut down on a permanent basis. In other words, Switzerland's transition to a "green" economy is an ongoing process, and it is certainly worth following the future developments.

The position of business circles of the country is based on the fact that the "green" economy implies economic, social and environmental factors, which constitute its basis. Under such a scheme, the economy could grow further with less damage to the environment and less resource consumption. Not to lose the level of prosperity and at the same time to use less is quite possible, if we break the relationship between economic growth and harmful consequences for the environment. The means to achieve this good goal are the following: quality improvement of the labor process, use of new and advanced technologies, energy efficiency and the use of renewable energy instead of harmful pollutants such as coal and oil. That is why a considerable number of local companies and firms are already working in the field of "clean" technologies. For example, the association of Swiss exporting firms Cleantech Suisse.

This country, which does not have large resources of natural resources, demonstrates a fine example of how painstaking and purposeful work can substantially raise the level of technological efficiency of the economy.

It should be noted that our closest partners in integration associations in the post-Soviet space: Kazakhstan and Belarus have formed a state base for the development of a green economy. So Kazakhstan adopted the concept of the country's transition to a green economy, in Belarus, developed a "national communication" on the sustainable development of the republic on the principles of a green economy. By 2050, Kazakhstan plans to increase the country's GDP by 3% and create more than 50,000 jobs. Investments in the development of the green economy are planned to be implemented in the amount of 3% of GDP or 3-4 billion dollars a year. One of the important elements that should be addressed is, in our view, the use of cluster technologies. As is known, to reduce the energy intensity of GDP to the Republic of Kazakhstan by 40% by 2020, the Comprehensive Energy Efficiency Plan was developed and adopted. The implementation of this plan will allow to obtain positive changes in this direction and to obtain additional benefits and benefits in the form of financial resources through more efficient use of energy in industry.

The unbalanced investment policy of the Republic of Kazakhstan, which leads to an increase in disproportions between the environmentally exploiting and processing sectors of the economy, undoubtedly exacerbates environmental problems. In the absence of environmental and economic barriers and incentives, the criterion of efficiency is one: obtaining a substantial profit at a rapid pace, which is possible, first of all, on the basis of the exploitation and / or sale of natural resources. Important is the fact that the need to change the economic trajectory by withdrawing from the commodity economy, its modernization and diversification, the transition to an innovative knowledge-based economy is the main objective of the state policy pursued. By the decree of the Head of State, the Strategic Plan for the Development of the Republic of Kazakhstan until 2020, based on the principle of "green growth" [3], was approved. The plan provides for the creation of a system of resource conservation, energy efficiency and the introduction of renewable energy sources. It sets a goal by 2020 to reduce the energy intensity of GDP by 25% and increase the share of alternative energy sources in the total energy consumption to 3%.
In 2010, the branch program "Zhasyl Damu" is approved [4]. It includes activities related to environmental and natural resources agencies. The program of the first of four tasks is to develop a

"green economy", as well as detailed characteristics of its content. The Ministry of Environmental Protection is instructed to make to the Government "... a proposal on capacity building in the development and implementation of green growth mechanisms in the strategic planning of the Republic of Kazakhstan." With regard to sustainable development, it is envisaged to "... carry out works to improve and implement mechanisms for sustainable development", as well as conduct relevant scientific research [9].

In 2010, Kazakhstan launched the Astana Initiative "Green Bridge", which was supported by the 6th Conference of Environment Ministers of the APR and the 7th Conference "Environment for Europe. Kazakhstan undertook to: provide a negotiating platform for meetings of interested countries in Europe, Asia and the Pacific; On technical support for the development of the Program of Cooperation between the two regions; On information support of the process of cooperation and, in particular, on dissemination of knowledge about the Green Economy and Sustainable Development.

The concept on transition of the Republic of Kazakhstan to the "green economy" will be implemented in three stages:

- 2013-2020 - during this period, the main priority of the state will be to optimize the use of resources and improve the efficiency of environmental protection activities, as well as create a "green" infrastructure;
- 2020-2030 - on the basis of the formed "green" infrastructure, the transformation of the national economy aimed at the careful use of water, the encouragement and stimulation of development and the wide introduction of renewable energy technologies, as well as the construction of facilities based on high energy efficiency standards, will begin;
- 2030-2050 - the transition of the national economy to the principles of the so-called "third industrial revolution", requiring the use of natural resources, provided they are renewable and stable. Measures for the transition to a green economy, according to the Concept, will be implemented in the following areas: sustainable use of water resources, development of sustainable and high-performance agriculture, energy saving and energy efficiency, development of electricity, waste management, reduction of air pollution and conservation and efficient Ecosystem management.

The implementation of the transition to a "green economy" will be regulated by legislative acts of the Republic of Kazakhstan on the transition to a "green economy". According to the Law of the Republic of Kazakhstan "On Energy Saving and Energy Efficiency Improvement" dated January 13, 2012 No. 541-IV ZRK, these concepts mean:

- energy efficiency (energy efficiency) - a characteristic that reflects the ratio of the beneficial effect from the use of energy resources to the costs of energy resources produced in order to obtain such an effect;
- energy saving - the implementation of organizational, technical, technological, economic and other measures aimed at reducing the amount of energy resources used [5].

According to calculations, by 2050, transformations within the framework of the "green economy" will allow to increase GDP by 3%, create more than 500 thousand new jobs, form new industries and services [6].

Results. To facilitate the transition to a green economy, incentive measures should be created: preferential lending and taxation of modernization projects, subsidization of energy producers derived from alternative sources, green certification systems, etc.

The main segments in which the green economy can develop are shown in Table 2.

Table 2: Economic segments of green economy development

Segment	Directions
1	2
Energy Generation	Wind, solar, hydro / marine, biofuel, geothermal
Energy storage	Fuel cells, improved batteries, hybrid systems
Energy infrastructure	Control
Energy efficiency	Building lighting, glass
Transportation	Vehicles, logistics, structure, fuel
Water and wastewater	Water treatment, water protection, wastewater treatment
Air and environment	Purification / safety, emission control, monitoring / compliance, trade and compensation
Production / Industry	Nano biochemical
Production / Industry	Advanced packaging, monitoring and control smart production
Agriculture	Land management
Waste	Waste management

In our opinion, the prospects for the development of the green economy, at the moment, it is most expedient to consider within the framework of the emerging Eurasian Economic Union. Cooperation within the framework of this organization is one of the key strategic tasks, since promotes consolidation of positions as a regional leader. As already noted, our partners in the organization have well-developed strategic plans for the development of the new model.
Among the main directions of the development of the green economy, which need to pay attention, especially in the regional context can be identified (Table 3).

Table 3 : The main directions that contribute to the "greening" of the economy

№	Directions	Priorities of development
1	Green building.	The current state of the housing stock shows that in the coming decades in most regions of Russia it will require its significant modernization. At the same time, a significant range of building materials is imported, such as windows, heat insulation materials, copper pipes. It seems expedient to arrange their release in view of environmental standards.
2	Agriculture.	It is also possible to create a national state mark guaranteeing the environmental friendliness of certain types of products, as well as a campaign to support it.
3	New technologies in power engineering	In a number of regions, electrification and gasification of settlements
4	Waste management and material handling in a closed cycle.	First of all, it is necessary to change attitudes towards waste. They should be considered as an integral part of the resource base of the economy. It is important for the region to choose an individual approach to the solution of the waste problem, depending on its specific conditions, financial and other resources.
5	Forest sector, biodiversity.	The forest sector should focus more on the moderate and sparing exploitation of ecosystem services that support the development of tourism, the water protection and climate-forming role of forests and forest ecosystems rather than wood production.
6	"Green" agriculture.	Agriculture should gradually be reoriented to less water-intensive crops, lower agrochemical loads, integrated pest and disease control, and erosion technologies.
7	Sustainable management of water resources.	The scenario of existing forms of water use does not allow to meet the need for fresh water. Reforms can be aimed at improving institutional arrangements in land use, as well as improving aid delivery systems and allocating funds; To reduce subsidies for investment; As well as to change the payment for water supply and financial schemes.

8	Fisheries sector.	To prevent the progressive depletion of fish resources in natural reservoirs, the development of commodity fish farms in compact reservoirs is recommended, strict regulation of catch volumes in large reservoirs, stocking, as well as investments in the development of alternative livelihoods.
9	Renewable energy sources.	Thanks to renewable energy technologies and related energy policies, it is expected that a significant contribution will be made to improving living standards and improving the health status of the population in low-income regions, especially remote from electrical networks.
10	Development of tourism.	The development of tourism contributes to the growth of the local economy and reduces the level of poverty. Tourists are the driving force behind the "gardening" of this sector, as the annual growth of ecotourism shows by 20%, i.e. Six times faster than the tourism industry as a whole. It is expected that "gardening" of this sector will increase the employment potential in the sector due to the growth of local hiring and increased use of local resources. In the "greening" of the tourism sector, increased involvement of the local community, especially the poor, in the value chain in tourism is an important factor in the development of the local economy and poverty reduction
11	Waste management and disposal.	Employment in waste management and recycling will grow due to the increase in waste due to population and income growth, although there are significant problems in this sector related to the lack of decent jobs.

Conclusions

In conclusion, it should be noted that it is very important that further reforms and government decisions on the formation of economic policies are based on the concepts of sustainable development and the "green economy". This gives a real chance to get away from catching up strategies that lead us to the world periphery and will make it possible to move to faster and more balanced actions by making complex decisions in the spirit of modern paradigms. Based on the foregoing, we can draw conclusions:

- in the Republic of Kazakhstan there are all objective conditions for the development of public-private partnership in the field of increasing energy efficiency;
- one of the factors of the development of public-private partnerships is the use of concession contracts, which are regulated by a whole package of normative acts;
- the public-private partnership sphere has a significant number of risks, regulation and minimization of which can be realized on the basis of the use of effective foreign experience in this field;
- the existing classification of public-private partnership models implies a different degree of private sector participation in projects, which provides the opportunity to choose and diversify the forms of cooperation;
- energy service contracts in the world are considered to be in demand by financial assets, when potential investors can earn significant financial resources from participating in energy efficiency projects.

References

1 Global green new course. UNEP Report. - March 2009. - 42 pp. / / www.unep.org/greeneconomy

2 Bobylev SN, Averchenkov AA, Solovyova SV, Kiryushin PA Energy efficiency and sustainable development. - Moscow: Institute for Sustainable Development / Center for Environmental Policy of Russia, 2010. - 148 p.

3 Strategic Development Plan of the Republic of Kazakhstan until 2020. Approved by the Decree of the President of the Republic of Kazakhstan dated February 1, 2010 No. 922 // http://www.kazpravda.kz/_pdf/feb10/120210plan_2020.pdf

4 The branch program "Zhasyl Damu" for 2010-2014. Approved by the Resolution of the Government of the Republic of Kazakhstan dated September 10, 2010 No. 924.

5. Law of the Republic of Kazakhstan "On Energy Saving and Energy Efficiency Improvement" dated January 13, 2012 No. 541-IV.

6. Towards a "green" economy: a path to sustainable development and poverty eradication. Synthesis report for representatives of power structures: Summary. - Nairobi: UNEP, 2011; World Economic and Social Survey 2011: The Great Green Technological Transformation / DESA. - New York: United Nations, 2011. - E / 2011/50 / Rev. 1 ST / ESA / 333.

The Role of Employee Engagement as a Mediator for Organization Justice, Individual Performance and Organization Performance

Trisninawati
Universitas Bina Darma, Palembang, Indonesia
trisninawati@binadarma.ac.id

Heru Kurnianto Tjahjono
Universitas Muhammadiyah Yogyakarta, Indonesia
herukurnianto@umy.ac.id

Arif Hartono
Universitas Islam Indonesia, Yogyakarta, Indonesia
arifhartono@uii.ac.id

Wisnu Prajogo
Sekolah Tinggi Ilmu Ekonomi YKPN Yogyakarta, Indonesia
wisnuprajogo@gmail.com

Majang Palupi
Universitas Islam Indonesia, Yogyakarta, Indonesia
majang_palupi@uii.ac.id

Abstract

This study aims to develop the model of employee engagement and broaden literature of organization performance and its proportion. It is assumed that organization performance will impact on the individual to be more engaged to the work, as does the organizational support. The organization will have more fair treatment to the individuals and communicate value, trust and organizational norm so that the employees will have a clear image that the organization is committed and care to their performance both task performance (in role) and contextual performance (extra role). Thus, the employees will contribute to the organization. This study also supports and broadens the literature of social exchange by strengthening distributive fairness as a significant perception predictor to organization support.

Keywords: organization performance, individual performance, organization equity, employee engagement

Introduction

Organization performance is the core of organization life that has to be maintained so that it will support and improve the competitive ability in the long term. In business and management research, organization performance is acknowledged as result variable including different areas such as human resource, marketing, international business, operational management, strategies management, and information system (Hult *et al*, 2008; March and Sulton, 1997; Ritchard *et al*, 2009). Singh *et al.* (2016) explains how organizational performance may be improved, formed, and maintained so it supports the organization to increase its profit and improve its sustainability in a long term. The research result shows that from the four researched countries, there is a performance measurement reflecting that the manager assesses the categorization of performance which validates the foundation of the four different indicators. In the research, organization performance measurement comprises objective and subjective aspect.

Some previous research describe the importance of individual factor to increase organization performance so that the individual obtains good or positive work satisfaction calculated from the work assessment. Similar to this result, research by Sangmook Kim (2004) found out that the factor of individual becomes important in predicting the organization performance. In line with this study,

Brewer and Selden (2000)] find out that individual attitude and behavior will influence the organization performance. In their study, public employee with characteristics such as work satisfaction and high commitment to the organization to serve the community as well as strong will to work in the organization will work better and more loyal. Brewer and Selden (2000)[2] explain that the factors related to individuals such as task structure, motivation and individual performance are important predictors to organization performance. Their research result also find out individual factors influencing organization performance.

Related to organization performance, Brewer and Selden (2000); Yadong Luo; Ying Huang and Stephanie Lu Wang (2012); Sang Mook Kim (2004) Gavrea, Ilies and Stegerean (2011), Huselid (1995); Rowe, Morrow, Finch (1995), the performance is measured by assessing the financial aspect of the organization or the economic impact based on the economic condition of the country. This, however, has not yet contributed to the research on human resources that provides direct impact to organizational and individual performance. Therefore, it becomes the consideration for the researcher to broaden the discussion of organization performance and employee engagement. Singh *et.al* (2016) asserts the importance of organization performance measurement subjectively. So far, there are many data that cannot be obtained in objective measurement. Therefore, subjective measurement becomes the consideration in measuring organizational performance in achieving organization goal. This is supported by Guest (2011) who mentions that the researcher of human resource may contribute to broaden and develop a model for empirical study.

Yet, there are also some other previous studies mentioning that organization performance is measured by objective and subjective measurement; which is still in debate and gains lack of support from empirical study. It is assumed that it is caused by the various perspectives in studying organization performance but there is still limited discussion in human resource. Similar to the study by Cania (2014) from the analysis of 30 organizations, she finds out some organizations that have no sufficient human resource strategies so that the goals of organization performance are difficult to obtain. Human resource management strategy is a planned pattern of human resource activity distribution to achieve the goals of the organization. This study is supported by a research done by Huselid, (1995), Delbridge and Keenoy (2010).

Next, employee and organization attitude which decrease the organization turnover is mostly discussed based on the profit value and turnover rotation of the organization. It has not yet shown the result of the organization efficient value so that the organization capability is not yet maximum to influence both organization and individual performance. It is supported by Tae Youn Park (2012) and Camps and Arocas (2012) . A study by Katou (2012) finds out that in analyzing the impacts of human resource to the organization performance, each model is related to the human resource performance to be developed by adding the construction, variable or relation. This study is in line with Gerhart (2005) who states that the limitation of human resource and organization performance relation is considered as a black box that is the lack of understanding on the relation or the variable so that further research is needed in relation to the organization performance and human resource or the consideration on the moderating variable are needed.

Yadong Luo and Ying Huang (2012) in Guanxi study who mention that a social network relating the personal relation and business find out that the managerial relationship as Guanxi conceptualization in organization level still needs broad scope. This study is also supported by Zhang and Keh (2010) who mention that the effect of the decrease of Guanxi value in organizational level is changing over time especially one related to the government. It is caused by the institutional environment and the level of economic, law, and social development. These factors decrease Guanxi value and managerial aspects.

In order to improve individual performance, Borman and Motowidlo (1993) divide individual performance into task performance and contextual performance or extra role based on the classification system. The task performance in its role reflects individual's quality in performing the task as needed by the job as the established effectivity in completing the task and contributes to the technical core of the

organization. Contextual performance or extra role is when the individual involves himself in his role and has higher performance. The individual tends to perform by facilitating the social and psychological context of an organization (Borman dan Motowidlo, 1993).

Podsakof *et al.*(2009) explains that *Organizational Citizenship Behavior* (OCB) has functional effect within objective measurement of the organization effectivity. Podsakoff and Whitting, (2009) also mentions the debate in individual and organizational level. Further research should involve the impacts of the relation with OCB variables.

In the previous research, Organ, Podsakoff and Mackenzie (2006) show that several determining factors of *Organizational Citizenship Behavior* (OCB) are employee perception to fairness, transformational leadership attitude, employee attitude, work satisfaction, and organization commitment. The study by Nielsen *et al*, (2009) however, explains that the research on *Organizational Citizenship Behavior* (OCB) has so far been related to the performance in individual level. This study describes that the variability of uncontrolled common method has quite significant effect to the relation between OCB and the performance. Therefore, further research to find out into what extent OCB has been considered by the individual during group performance assessment in organization level is needed.

The study by Chaudry and Kumar (2011) reveal that individuals tend to change their attitude to the organizational effectivity when they believe that the organization is fair or unfair in allocating resources and appreciation. Therefore, the perception of fairness and unfairness has influenced the attitude and behavior that may give bad impacts to the organizational effectivity and performance when the organization is unfair. It is interesting for any further research to define whether the individuals and organization results will provide similar result patterns of procedural and distributive fairness. The research result by Tjahjono (2011) shows that distributive and procedural fairness are different in individual satisfaction. Distributive fairness is more influential compared to procedural fairness so that it affects the individual satisfaction and organization commitment becomes crucial by individual subjective assessment.

Biswa, Varma and Ramaswani (2013) explain that in exploring the consequences of organizational fairness without considering the social exchange will lead to uncertain conclusion. The result of this research shows that without fairness perception and social exchange, the individual will be disappointed that lead to stress and exhaustion. Besides, this study also emphasizes the utility to reach high Perceived Organization Support (POS) in professional circle in their organization. This research explains that organizational treatment will have implications to the physiological contract attribute between the employees and leaders so that the individuals are more engaged to the work.

Study by Colquit *et.al.* (2013) reveals that fairness that focuses on the supervisor will be strongly related to the organization goals. Organization goals become the focus of the organization by having appropriate treatment by being fair to the individuals in its work environment. Therefore, it is understandable that if the organization is fair to its employees, the organization goals will be achieved.

A meta-analytical study done by Mackay et al, (2016) suggests that it is important to visualize the concept of employee effectiveness in a broader sense. Furthermore, this study recommends that future research shall explore the aspects of working performance in an organization as part of the development of the organization effectiveness evaluation. In that study, employee engagement appears to be more effective and efficient to understand the employee's attitudes in predicting the effectiveness of the employee. This has been the most fundamental evaluation in contributing to the organization. Employee who are engaged become one of the competitive excellences, they are the ones who have high enthusiasm and dedication towards the job.

The study is supported by Bakker and Demerouti (2009), asserting that personal resource engagement will reflect the level of performance. Personal resource is the self-positive resource which is related to individual's resilience in controlling and creating positive effects to their surroundings.

Kahn (1990) states that engagement takes place when an individual is emotionally and cognitively connected with each other. An employee will emotionally and cognitively be engaged when they know what they are expected to be, have what they need to accomplish their responsibility, have the possibility to be satisfied with their work, feel that they are the trusted and significant ones who become parts of the team, as well as have the opportunity to develop their skills and competencies. Employee engagement also influences one's option in deciding whether to stay or leave the organization. This will eventually become an important role regarding the rate of progress and performance of the organization. One of the ways that an employee can do to contribute to their organization is by maintaining their engagement in the organization itself. This study is supported by Markos and Sridevi (2010), emphasizing that employee engagement is a strong predictor towards the organization performance.

Perceived organizational support (POS) is an employee's perception on how the organization appreciates his or her contribution and how the organization is aware of his or her welfare (Eisenberger, 1986). Commitment from the organization to its employee is therefore beneficial. Robbins and Coulter (2009) argue that the level of Perceived Organization Support (POS) will influence the level of job satisfaction and may reduce turnover. POS refers to a general belief that an organization shall appreciate the employee's contribution and is aware of the employee's welfare (Rhoades and Eisenberger, 2002).

This study aims at developing the model of employee engagement and expands the literatures related to organization performance. Organization performance as a result of organization achievement is believed to strengthen the engagement of the employee. Moreover, by the support of the organization, employee will acquire fair attitude and treatment, thus enabling the employee to give contribution of in-role and extra-role performance.

Review of Related Literatures and Proposition

The perception of organization fairness has become an expectation of every individual, employee who are treated in an equitable manner will impact on the organization performance. Distributive fairness deals with a person's perception on the fairness itself and also the organization's decision output. Procedural fairness refers to the fairness from the point of view of facilities as well as process in deciding the number and the distribution of resources (Colquitt, 2001; Rhoades et.al 2001; Saks, 2006 Tjahjono, 2011; 2014) Badawi *at.al* 2017 ; Palupi and Tjahjono 2016).

Proposition 1: Distributive fairness is believed to have positive effect on the organization performance.

Proposition 2: Procedural organization is believed to have positive effect on the organization performance.

Perceived organizational support (POS) is one's perception on how organization appreciates his or her contribution and how organization is aware of his or her welfare (Eisenberger, 1986) . If organization is concerned about the employee's welfare, the employee will certainly devote a high commitment towards the organization.

Proposition 3: Perceived organizational support (POS) is believed to have positive effect on the organization performance.

The perception of organization fairness has become an expectation of every individual, employee who are treated in an equitable manner will impact on the organization performance. Employees who acquire fair treatment from the organization are supposed to take effect in the in-role performance, they are more likely to be high performance workers and have more chances to improve their competencies.

Proposition 4: Distributive fairness is believed to have positive effect on the in-role performance.

Proposition 5: Procedural fairness is believed to have positive effect on the in-role performance.

Proposition 6: Perceived organizational support (POS) is believed to have positive effect on the in-role performance.

The perception of organization fairness has become an expectation of every individual; employee who is treated in an equitable manner will impact on the organization performance. Employee who acquires fair

treatment from the organization is supposed to take effect in the extra-role performance. Employees who possess high performance tend to facilitate social and psychological context within their organization. In the contextual performance, there are several reasons why employee who are engaged can perform better than those who are not (Demerouti and Cropanzano, 2010). First, engaged employee tend to experience positive emotions (Bindl and Parker, 2010), prefer to help others, and are more confident and optimistic (Cropanzano and Wright, 2001). Second, engaged employee tends to have physical resources.

Proposition 7: Distributive fairness is believed to have positive effect on the extra-role performance.

Proposition 8: Procedural fairness is believed to have positive effect on the extra-role performance.

Proposition 9: Perceived organizational support (POS) is believed to have positive effect on the extra-role performance.

The role of employee engagement has proven that in order to achieve organization effectiveness, employee have the obligation to prove their engagement through their working performance. Kahn (1990) defines employee engagement as an occupational position empowerment towards the members of organization. Within the engagement, employee shall deploy their physic, cognitive, and emotion during the work. Alike physical, psychological engagement appears when a person is performing a particular organizational role. Fair treatment will let an employee be engaged to his or her work.

Engagement occurs when an employee employs his or her own self in order to establish their working performance. Engagement involves active emotions and behaviors, including cognitive aspect. Employees who are fully engaged are more likely to be motivated to focus on the goal of the organization. Focusing on the individual work will absolutely enhance the performance either in-role or extra-role. Option to leave the organization will be less likely to be taken if the employees are treated fairly.

Proposition 10: Employee engagement is believed to mediate the effect of distributive fairness on the organization performance.

Proposition 11: Employee engagement is believed to mediate the effect of procedural fairness on the organization performance.

Proposition 12: Employee engagement is believed to mediate the effect of POS on the organization performance.

Proposition 13: Employee engagement is believed to mediate the effect of distributive fairness on the in-role performance.

Proposition 14: Employee engagement is believed to mediate the effect of procedural fairness on the in-role performance.

Proposition 15: Employee engagement is believed to mediate the effect of POS on the in-role performance.

Proposition 16: Employee engagement is believed to mediate the effect of distributive fairness on the extra-role performance.

Proposition 17: Employee engagement is believed to mediate the effect of procedural fairness on the extra-role performance.

Proposition 18: Employee engagement is believed to mediate the effect of POS on the extra-role performance.

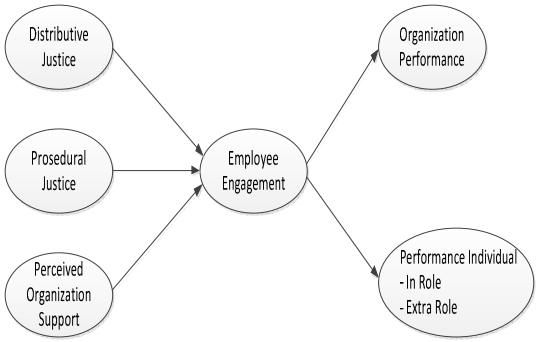


Figure 1: Research Model Planning

Conclusion

This study establishes empirical framework and research model construction which is dealing with the distributive and procedural fairness. The perception of organization support as the factor of individual level is believed to have effect on the individual and organizational performance which is mediated by employee engagement.

References

Badawi, Tjahjono, H.K., and Muafi (2017) 'The role of corporate reputation moderation of banking services,' *Polish Journal of Management Studies*, 15(1), 15-25.

Brewer, GA, SC Selden and R.C Facer (2000) 'Individual conception of public service motivation,' *Public Administration Review*, 5, 254-64.

Bakker, Demerouti and Verbeke (2004) 'Using the job demand: Resource model to product burnout and performance,' *Human Resource Management*, 43, 83-104.

Biswas,Varma, Ramaswami (2013) 'Lingking distributive and procedural justice to employee engagement through social exchange: A field study in India,' *International Journal of Human Resource Management*, 24(8),1570-1587.

Bindl, UK and Parker, SK (2010) Proactive work behavior: forward thinking and change oriented action in organizations. In s. Zedeck (ed), APA hand book of Industrial and Organizational Psychology. Washington, DC, American Psychological Association.

Bakker, AB and Demerouti (2009) 'The crossover of work engagement between working couples,' *Journal of Managerial Psychology*, 24, 220-236.

Borman, W.C and Motowidlo (1993), 'Expanding the criterion domain to include elements of contextual performance', In N.Schmitt,WC. Borman & Associates (eds), Personel Selection in Organizations, 11, 71-98. San Fransisco Jossey-Bass.

Borman, WC and Motowidlo (1997) 'Task performance and contextual performance: the meaning for personnel selection research,' *Human Performance,* 10, 99-109.

Camps and Arocas (2012) 'A matter of learning: how human resources affect organizational performance?' *British Journal of Management*, 23, 1-21.

Cania, Luftim (2014) 'The impact of strategic human resource management on organizational performance,' *Economia Seria Management*, 17 (2), 373-383

Carol Yeh, Yun Lin (2012) 'A cross level analysis of organisasional creativity climate and perceived innovation,' *European Journal of Innovation Management*, 15(1), 55-76.

Colquitt, JA., Rodell, JB., Zapata, CP., Scott,BA., Long., DM and Conlon, DE (2013), 'Justice at millenium, a decade later: a meta analysis test of social exchange and affect based perspective,' *American Psychological Association*, 98(2), 199-236.

Colquitt, JA (2001) 'On the dimensiolity of organizational justice: A construct validation of a measure,' *Journal of appled Psychology*, 86, 386-401.

Cropanzano, R and Wright, TA (2001) 'When a "happy" worker is really a "productive" worker: a review and further refinement of the happy-productive worker thesis,' *Consulting Psychology Journal: Practice and Research*, 53, 182-199.

Darwish, T and S, Singh (2013) 'Does strategic human resource involvement and development enhance organizational performance? Evidence from Jordan,' *International Journal of Manpower*, 34 (6) 674-692.

Delery, JE and Doty, DH (1996) 'Modes of theorising in strategic human resource management: tests of universallistic, contigency and configurational perfomance predictions,' *Academy of Management Journal*, 39, 802-835.

Delbridge, R and Keenoy, T (2010) 'Beyond managerialism,' *International Journal of Human Resource Management*, 21(6), 799-817.

Demerouti, E and Cropanzano, R (2010) 'From thought to action: employee work engagement and job engagement. In A.B Bakker and M.P Liter (eds) work engagement: a hand book of essential theory and research, 147-163.

Eisenberg R, Huntington, R, Hutchison, S, and Sowa, D (1986) 'Perceived Organizational Support,' *Journal of Applied Psychology*, 71, 500-507.

Gavrea, Ilies, Stegerean (2011) 'Determinants of organizational performance: the case of Romania,' *Management and Marketing Challenges for The Knowledge Society*, 6 (2) 285-300.

Guest, DE (2011) 'Human resource management and performance still searching for some answers,' *Human Resource Management Journal*, 22, 3-13.

Gerhart, B (2005) 'Human resources and business performance: findings, unanswered questions, and an alternative approach,' *Management Review,* 16,174-185.

Huselid, M (1995) 'The impact of human resource management practices on turnover, productivity, and corporate financial performance,' *Academy of Management Journal*, 36, 635-670.

Hult, GT., Ketchen,DJ., Griffith, DA., Chabowski, BR., Hamman, MK., Dykes, B.J., Pollitte, WA., and Cavisgil, ST. (2008) 'An assesment of the measurement of performance in international business research,' *Journal of International Business Studies*, 39, 1064-1080.

Kahn (1990) 'Psychology conditions of personal engagement and disengagement at work,' *Academy of Mangement Journal*, 33 (4), 692-724.

Katou (2012) 'Measuring the impact of human resource management on organizational performance,' *Journal of Industrial Enginnering and Management*, 1(2), 119-142.

Kataria, Rastogi, Garg (2013) 'Organizational effectiveness as a function of employee engagement,' *South Asian Journal of Management*, 20(4), 56-73

Markos and Sridevi (2010) 'Employee Engagement: the key to improving performance,' *International Journal of Business and Management*, 5(12), 89-96

Mackay, Michael M, Allen, Joseph A, Landis, Ronald (2016). Investigating the incremental validity of employee engagement in the prediction of employee effectiveness: A meta analytic path analysis,' *Human Resource Management Review*, 27 (1), 108-120

March, J G and Sutton, R I (1997). 'Organizational Performance as a dependent variable,' *Organization Science*, 8 (6), 698-706.

May, D.R, Gilson and Harter, L.M (2014), 'The psychological conditions of meaningfulness, safety, and availability and the engagement of the human spirit at work,' *Journal of Occupational*, 77, 11-37

Nielsen, TM., Hrivnak, GM., and Shaw, M (2009) 'Organizational citizenship behavior and performance: a meta analysis of group level research', *Small Group Research on line first*, 20 (10), 1-23.

N. Chaudry., Philip, PJ and Kumar, R (2011) 'Impact of organizational justice on organizational effectivenes,' *Industrial Engineering Letters*, 1 (3), 18-25

Organ, DW, Podsakoff, PN and MacKenzie, SB (2006) Organizational citizenship behavior: its nature antecedents and consequences. Beverly Hill, C.A: 509c

Palupi, M and Tjahjono, HK (2016) 'A model of religiousity and organizational justice: the impact on commitment and dysfunctional behavior,' Proceedings of the 27th International Business Information Management Association (IBIMA), ISBN: 978-0-9860419-6-9, 4-5 May 2016, Milan, Italy, 1781-1790.

Park, S and Luo, Y (2001) '*Guanxi* and organizational dynamics: organizational networking in Chinese organizations,' *Strategic Management Journal*, 8 (1), 455-477

Podsakoff, N.P, Whitting, BD, and Podsakoff, PM (2000) 'Individual and organizational level consequences of organizational citizenship behavior: a meta analysis,' *Journal Applied Psychology*, 94, 122-141.

Rhoades, L., Eisenberger, R (2002), ' Perceived organizational support a review of the literature,' *Journal of Applied Psychology*, 87 (4) 698-714.

Richard, PJ., Devinney,TM., Yip, GS., and Johnson, G (2009) 'Measuring organizational performance: towards methodological best practice,' *Journal of Management*, 35(3), 718-804.

Rowe, W.G., and Morrow, JL (1999) 'A note on the dimensionality of the firm financial performance construct using accounting market, and subjective measures,' *Canadian Journal of Administrative Sciences* 16 (1), 58-70.

Sangmook Kim(2005),'Individual level factor and organizational Performance in Government organisasinya', *Journal of Public Administrator Research and Theory*, 15(2), 245-261.

Singh, S., Darwish.T.K, Poetonik, K (2016), 'Measuring organizational performance: A case for subjective measures,' *British Journal of Management*,' 27, 214-224.

Saks, AM (2006) 'Antecedents and consequences of employee engagement,' *Journal of Managerial Psychology*, 21(7), 600-619.

Tae Youn Park (2013) 'A resource based perspective of human capital losses, human resource management investment and organizational performance,' *Strategic Management Journal*, 34, 572-589.

Shaw, JD., Rae Youn Park, and Kim E (2013, 'A resource based perspective of human capital losses, human resource management investment and organizational performance,' *Strategic Management Journal*, 34, 572-589.

Tae Youn Park and Shaw, JD (2013). 'Turnover rates and organizational: a meta analysis,' *Journal of Applied Psychology*, 98(2), 268-309.

Tjahjono, HK (2011). The configuration pattern distributive and procedural justice and its consequences to satisfaction. International Journal of Information and Management Sciences, 22(1):87-103

Tjahjono, HK (2014) 'The fairness of organization's performance appraisal social capital and the impact toward affective commitment,' *International Journal of Administrative Science and Organization*, 21(3),173-179.

Yadong Luo, Ying Huang, Stephanie Lu Wang (2011) 'Guanxi and organizational performance: a meta analysis,' *Management and Organization Review*, 8(1), 139-172.

Zhang, Y and Li, H (2010) 'Innovation search of new ventures in a technology cluster: The role of ties with service intermediaries,' *Strategic Management Journal*, 31(1): 88-109.

Zhang, J and Keh, HT (2010) 'Inter organizational exchanges in China: Organizational forms and governance mechanisms,' *Management and Organization Review*, 6 (1), 123-147.

On line journals and websites

Bindl, Uk and Parker, SK., (2010), Proactive work behavior: forward thinking and change oriented action in organizations, (on Line), September 4, 2017, http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.461.6487&rep=rep1&type=pdf

Demerouti, E and Cropanzano, R (2010) 'From thought to action: employee work engagement and job engagement. In A.B Bakker and M.P Liter (eds) work engagement: a hand book of essential theory and research, 147-163. (on line), Mei 5, 2017.

https://books.google.co.id/books?hl=en&lr=&id=IZJ5AgAAQBAJ&oi=fnd&pg=PA147&dq=demerouti+cropanzano&ots=N-LI-Kq85T&sig=Y3r2hpLV-DlDixBREqNXMfNlIEM&redir_esc=y#v=onepage&q=demerouti%20cropanzano

Book

Robbins and Coulter (2009). Management. 7th ed. Prenctice Hall, Englewood Cliffs, New Jersey

Financing the Companies in Insolvency, International Aspects

Simona Petrina Gavrila, Dunarea de Jos University of Galati, Galati, Romania,
gavrilasimonapetrina@yahoo.com

Florin Tudor, Dunarea de Jos University of Galati, Galati, Romania,
florin.tudor@ugal.ro

Abstract

A success of the plan to reorganize a company in insolvency may depend on the financing of that company's business. This can be achieved either by providing loans to the legal person in insolvency or by capital infusion, followed by a change of the articles of that company.

The new Code of Insolvency includes provisions likely to ensure the fluency of the insolvency procedure. Thus, it has been created a framework for providing financing to companies in insolvency and some aspects have been clarified on the contracts in progress of a company in insolvency. Also, the new regulations changed also the manner of voting the reorganization plan.

The purpose of this article is to analyze the concrete ways in which this financing is carried out and what are the particularities required when financing is international.

Keywords: judicial reorganization, bankruptcy procedures, Romanian legislation

Introduction

The inclination for law uniformity, so well-known at international level and with strong reflections in domestic law, is also entirely observable in insolvency matters. Thus, at international level, the globalization trend of insolvency approach also results from the analysis of the main international regulations: The model law on cross – border insolvency drafted by UNCITRAL (1997), The report on the cooperation principles among the NAFTA states (2000), Best practice standards for the insolvency law drawn up by the Asian Bank for Development (2000), Insolvency principles and directives and the creditor rights system drawn up by the World Bank (2001), The Council Regulation on the insolvency procedures (EC) No. 1346/2000, The study on the basic principles in the application of the insolvency law drawn up by the European Bank for Construction and Development (2004), UNCITRAL Legislative Guide on insolvency law (2004 – 2013), Principles of restructuring of multinational groups, drawn up by the International Institute of Insolvency (2008), Global Principles for Cooperation in International Insolvency Cases elaborate the American Legislature Institute and the International Institute of Insolvency (2012), The World Bank – 2011 Principles for Effective Insolvency and Creditor/Debtor Regimes), European Principles and best practices for insolvency office holders (2013 – 2014). Joyce (2014) paper seeks to understand how professional knowledge and authority impact upon the state-profession relationship and the development and deployment of state policy in Great Britain.

Without intending to examine in detail these international regulations, from their analysis it results certainly the availability of a common principle, namely granting a second chance to the honest debtor and supporting its efforts for business recovery.

Within this study we are to analyze the particularities of the Romanian legal rules applicable to the financing of a reorganization plan, achieved either by giving loans to the legal person in insolvency or by capital infusion, followed by a change of the articles of that legal person.

Relevant Provisions, The Romanian Legislator Concept

The main normative act that will be analyzed is Law No. 85/2014 on the procedures for insolvency and insolvency prevention (hereinafter the Insolvency Code), but according to Article 342 (1), the provisions of this law will be supplemented, in as far as they do not contravene those of the Civil Procedure Code and the Civil Code. They are also incidental to the issue of special interest and regulations, included in Law No. 31/1990 of the companies.

This normative act specifies even from Article 2 that "the purpose of this act is to establish a collective procedure for covering the debtor's liabilities, while granting, where possible, a chance of recovering its activity." As a result, any debtor has the right to a second chance, the opening of the bankruptcy procedure needing to be started only after using up the solutions that allow the reorganization.

True to its vision of insolvency, for which he has opted even since 1995, the Romanian legislator chose to regulate the reorganization of the person in insolvency following the American model, at the same time applying the European principles and some of the World Bank's recommendations.

The American model, centered on a win-win mentality (the famous Chapter 11 of the US Bankruptcy Code), systematically analyzed in our doctrine (Miloș S.M., 2009) has an unwritten principle: the precedence of reorganization over bankruptcy, the practice stating the prevalence of reorganization to the detriment of bankruptcy, entering into the liquidation procedure only those entities where reorganization failed. The American legislator's vision of reorganization is focused around giving the debtor a second chance, keeping the entrepreneur in the commercial circuit having beneficial effects at a macroeconomic level, through creating jobs, payment of contributions/taxes and maintaining a healthy business environment among contracting partners.

Recently, on March 12, 2014, the European Commission has adopted the Recommendation concerning a new approach to business failure and insolvency, whose stated objective is "to ensure that viable enterprises facing financial difficulties (...) have access to national insolvency frameworks that would enable them to restructure their activity at an early stage, in order to prevent their insolvency and, accordingly, to maximize the total amount for lenders, employees, owners and the economy as a whole".

Through this Recommendation, the Commission established minimum standards on the preventive regulatory framework for restructuring and debt relief of the entrepreneurs in insolvency. In Section III (Preventive Frameworks for Restructuring) it is stipulated that debtors should be able to restructure their economic activity through a restructuring plan, adopted by means of a flexible procedure, within which "the new sources of financing needed for implementing a restructuring plan should not be declared void, voidable or unenforceable as an act to the detriment of the general mass of creditors"(A letter e). The Commission also recommends, in letter D of the same Section III, to protect new sources of financing ("including new loans, sale of certain assets by the debtor and conversion of claims into shares").

The new Romanian act from 2014 on the procedures of insolvency and insolvency prevention follows the line drawn by the European Commission and recognizes the particularly important role played by financing for the recovery of the company in difficulty. It has been established through Article 4 that the act is based on several principles, including "ensuring access to financing sources in the procedures of insolvency prevention, during the periods of observation and reorganization, with the creation of an regime adequate for the protection of these claims" (paragraph 8). The principle of ensuring access to sources of financing in insolvency and insolvency prevention procedures is a starting point for taking measures intended to encourage the recovery of companies in difficulty.

After the Insolvency Code adoption, it has been stated that Romania would have one of the most evolved laws in insolvency matters, the statement being supported by the indication of the Report on the observance of standards and codes of insolvency and creditor / debtor regimes, World Bank, 2014.

Despite these good references, only 2% of all companies entering into insolvency are successfully reorganizing and this percentage is observed both for small companies and among the largest 100 insolvent companies, according to the COFACE Analysis of the largest 100 companies that entered into insolvency in the years 2011-2015.

Therefore we are to analyze the legislative possibilities of financing a reorganization plan as a way of supporting it and of saving the company in insolvency.

Observation Period

Insolvency is, according to the Romanian conception, the incapacity to pay current debts due to lack of liquidity. Nevertheless, it is preferable that the company financial problems be solved before the debtor reaches insolvency, from the moment when the first difficulties arise. The prediction of debtor solvency is much-needed in bankruptcy procedures. It can be resorted to complete the following tasks: choose bankruptcy procedure (rehabilitation or liquidation); develop strategy and tactics for recovering solvency; justify the decision to dismiss crisis management and pass on to business liquidation.(Prediction of Debtor Solvency: Developing Bankruptcy Framework in Russia Neli R. Abramishvili, Nadezhda A. Lvova, Viktor V. Ivanov,Natalia S. Voronova, Proceedings of The 27th IBIMA Conference, 2016)

The observation period is defined by the new law as the period between the opening of the insolvency procedure and the date of reorganization plan confirmation or, as the case may be, bankruptcy. Currently, this time period has been limited to one year. The observation period is particularly important for ensuring a minimum of financing resources since, if the debtor fails to survive until the reorganization plan has been drawn up and voted, it is certainly no longer possible to save him from bankruptcy.

During this period, in the absence of special legal bans, the debtor will be able to resort to any funding source. As to the circumstance that the debtor is a Romanian legal entity, prohibitions related to this operation are out of the question, except when the financial backer is subject to incapacity or prudential requirements according to its national law

As a rule, when shareholders or associates of a business in difficulty want reorganization, they will finance out of their own funds the current operations of the debtor company. (Comșa M, Comșa P. 2017),

Theoretically there is also the possibility of financing from external sources by accessing a new bank loan or opening a credit line during the observation period with the authorization of the syndic judge and the official receiver's opinion. However, the conclusion of such contracts is unlikely as they have to be done only to ensure working capital financing within the current limits And they are null and void if the requirements of authorization and endorsement are not met.

In most cases, the loans maintained/given during the observation period cover short-term needs, such as financing the current activities. These may consist of continuing the contracted activities, according to the object of activity, carrying out the operations of receipts and payments related thereto, and ensuring the working capital financing within current limits (Cărpenaru D.S., Nemeş V., Hotca A.H., 2006). In other words, as a rule, during the observation period, the debtor can apply to external sources only to finance the normal activities of its trade, while fulfilling the authorization requirements provided by the law.

During this period financing may also be ensured by maintaining ongoing credit agreements. The official receiver has the obligation to evaluate the contracts concluded by the debtor with third parties previously to opening the insolvency procedure and to keep those whose execution is necessary for the fulfillment of the reorganization plan objectives.

It is important to mention that the official receiver has a right of option as concerns maintaining or terminate the insolvent debtor's contracts within a limitation period of 3 months from the date of the procedure opening, as long as these contracts have not been executed totally or substantially by all

parties involved, with the aim of maximizing the value of the debtor's assets. Although the law does not provide expressly, it is understood that the provision also refers to credit agreements in progress on the date of procedure opening. (Comșa M, Comșa P., 2017). Consequently, it follows that, as a result of the interdiction on the syndic judge for analyzing the opportunity of the official receiver's activity, this has a discretionary right to terminate the credit agreements in progress.

Yet, the problems with regard to these contracts termination do not end here. Pursuant to Article 123 (1) of the law adopted in 2014, "the contracts in progress shall be deemed to have been maintained on the date of procedure opening, ... and any contractual clauses to terminate the contracts in progress, to violate the benefit of time limit or to declare the anticipated exigibility for the reason of procedure opening shall be null". Nevertheless, due to the pressure put upon by banks, it has been established through special law that "the provisions referring to keeping the contracts in progress and the nullity of clauses for termination or acceleration of obligations are not applicable as regards the qualified financial agreements and bilateral clearing operations based on a qualified financial contract or a bilateral clearing agreement".

Therefore, it follows that in order to keep the financing contracts during the financing period, the debtor needs both the support of the official receiver, and that of the credit institutions.

Another situation where the support of the official receiver is necessary is that it can formulate possible requests referring to unpredictability, which will be settled by the syndic judge. The provision also occurs in the context in which the new Civil Code accepted the theory of unpredictability in our system of law.

The legal issue arising is where the credit is granted by a financial backer, a foreign company, and the parties have not chosen the Romanian law as applicable. Thus, prior to opening any insolvency proceedings, to this contract will be applied lex contractus, ie the law chosen by the parties or, failing that, the law of the state in which the financial backer resides.

After opening the insolvency procedure, according to the provisions of Article 7 (2) of the EU Regulation No. 2015/848 of the European Parliament and of the Council, the law of the opening State determines the conditions for the opening, progress and closure of insolvency procedure, these determining in particular (...) the effects of the insolvency procedure on the contracts in progress to which the debtor is a party.

On the other hand, in the case of mortgage guarantees of a contract concluded with a debtor entered into insolvency, the Regulation considers that "it is necessary a special waiver from the opening State law since such rights are of considerable importance for providing loans. Therefore, the justification, validity and extent of real rights should normally be determined by the law of the place (lex situs) and not be affected by the opening of insolvency procedure. As a result, the holder of a real right should be able to further turn to account its right to delimit the tangible security from the mass of goods.

Consequently, it follows that in practice it could not be met the situation where for a financing contract with cross-border implications to be initially applied lex contractus, then, after the opening of insolvency proceedings, the law of the state where the debtor has its headquarters, while for the mortgage guarantee it will be applied lex situs.

Reorganization

For a reorganization to be effective, we estimate that there it is necessary (i) a coherent and adequate reorganization plan; (ii) competent official receivers, with both legal and economic preparation, that would defend the interests of the debtor company; (iii) a regulation focusing on reorganization rather than liquidation; (iv) supplementing and diversifying sources of financing; and (v) lenders willing to be involved in reorganization plans. (Comșa M, Comșa P., 2017).

Regardless of the person(s) drafting the reorganization plan, Article 133 of the new law concerning the procedures for insolvency and insolvency prevention shows the data it has to cover, including:

- obtaining financial resources to support the achievement of the plan and their sources of provenance, the financing approved by the plan following to benefit from priority on reimbursement;
- manner to pay current debts;
- measures adequate for the reorganization plan implementation (obtaining financial resources to support the plan achievement and their sources of provenance, the financing approved by the plan following to benefit from priority on reimbursement pursuant to the provisions of Article 159 (1) 2 or, as appropriate, according to the provisions of Article 161, point 2; the transmission of all or some of the debtor's assets to one or more natural or legal persons, established previously or subsequently to the plan confirmation; debtor's merging or division, including in compliance with the obligations to notify the concentration operations, according to the laws in the field of competition. In the case of division, the provisions of Article 2411 (3) of Law No 31/1990, republished, as subsequently amended and supplemented, do not apply; change of the debtor's articles of incorporation, pursuant to the law; issuance of securities by the debtor or other persons, under the conditions provided by Law No. 31/1990, republished. In order to enter in the plan a securities issue, it is necessary to express in writing the agreement of the creditor who is to receive the issued securities, an agreement that will be given before expressing the vote on the reorganization plan by the creditors. By way of exception to the provisions of subparagraph J, the reorganization plan can not provide the conversion of the budgetary receivables into securities)
- sometimes it may provide for the change of the articles of incorporation without the statutory consent of the debtor's members or associates/ shareholders.

The importance of indicating the necessary financial resources in relation to the proposed way of reorganization was also recognized by the doctrine. (Adam I., Savu CN 2006, Ţăndăreanu N., 2012) Thus, the plan will mention the sources of financing available or that will be available in the future, including the goods and amounts of money to be obtained from future customers, and external financing means, with the stipulation of measures to attract these. The plan will also have to establish actual destinations for efficient and profitable allocation of resources.

In practice, it has been found that the debtors being under reorganization proposed either plans based on decreasing the debtor's assets in order to pay debts and to attract resources, or plans for financial or operational reorganization of the business activity that required prevailingly external sources of financing. (Adam I., Savu C.N.,2006).

These sources of financing may be obtained in one of the following manners:

1. For financing needfull to implement the financial recovery plan, the debtor may resort to an infusion of capital by increasing its share capital, an operation that involves a public offer of stock and shares, under the conditions provided for by Law no. 297/2004 regarding the capital market. In the case of the issue of new shares, before being offered to the public, they will be offered for subscription, in particular to existing shareholders, in proportion to the number of shares they own. (Adam I., Savu C.N. 2006).

Notwithstanding, in practice, there are rarely shareholders, associates or foreign investors willing to take the risk of contributing with resources to saving the enterprise. The investor's refusal to finance is a considerable pressure put on the company's administrators as it is really difficult for them to build up additional capital from third parties. (Piperea G., 2008).

Regardless of the nationality or citizenship of the persons who subscribe to these shares, it will be applied the law of the debtor in insolvency, such as lex societatis.

In the same way, it is necessary to carefully select the solutions for increasing the share capital according to each specific case, given the major risks that may arise if the financing is offered by potential external shareholders who intend to bleach money from illicit business or activities assimilated to offenses in the sphere of organized crime.

2. The issuance of bonds by the debtor is possible only in the case of joint-stock companies and is carried out under the conditions provided by the Law No. 31/1990 (Company Law) and Law no. 297/2004 on the capital market. They do not confer on their holders any power of decision or management in that company and do not affect shareholders' ownership rights. The size of the borrowed loan depends not only on the company financing and on its ability to reimburse, but also on the supply of capital on the financial market.

Also in this situation, regardless of the nationality or citizenship of the persons who subscribe to these shares, it will be applied the law of the debtor in insolvency, such as lex societatis.

3. Financing by bank credit agreements is the most sought-after external source of financing, but the cases when credit institutions are lending to debtors in the reorganization process are very seldom, this being mainly due to the low number of situations where the judicial reorganization process has reached the end. (Târşia A.C., 2012). Also, creditors who provide debt repayment schedule or refinancing impose extremely severe and burdensome conditions for companies in difficulty that balance against the risk they are exposed to through their financing.

The question arising is whether, in order to make easier the task of obtaining this financing, the borrower agrees that this operation be governed by the law of the financial backer, is such a solution possible?

Naturally, such a provision, particularly if the financial backer belongs to a Member State of the European Union, is not prohibited by the provisions of the EU Regulation No. 2015/848 of the European Parliament and of the Council, which provides the application of the debtor's State law in other situations. Similarly, we consider that such a choice of the applicable law can also be made if the financial backer belongs to a country that is not a EU member, but in both situations the mandatory provisions of the debtor’s national law must be observed.

Such a conclusion is natural, especially when in the reorganization plan are set up conditions for the use of such financing or are established guarantees, which by the rule that the reorganization plan is the "law" for the participants in the insolvency procedure, become opposable to the last.

Guarantees for the Financial Backers within the Insolvency Procedure

It is unanimously accepted that guarantees are decisive in obtaining funding in the insolvency procedure, these providing an incentive for unblocking the financial resources. (Dimitriu A.P.2013). In order to give a real chance to the debtors in insolvency, the Romanian legislator has set up, as a novelty, an increased priority at repayment for the financing granted to the debtor in the insolvency procedure, including during the observation period. (Godâncă-Herlea V. 2014).

Thus, according to Article 87 (4) of the new law on the procedures for insolvency and insolvency prevention, "the financing given to the debtor during the observation period for carrying out the current activities, with the approval of the creditors' meeting, shall benefit from priority upon repayment, according to the provisions of Article 159 (1) point 2 or, as the case may be, according to the provisions of Article 161 (2)". Such financing will be mainly guaranteed by bearing on certain goods or rights that are not the subject of preference cases and, subsidiarily, if there are no such goods or rights available, with the consent of the creditors who are beneficiaries of those preference cases.

Assuming that the consent of the creditors who are beneficiaries of those preference cases concerned is not obtained, according to the third sentence of Article 87 (4), "the priority when repaying these

debts, provided by Article 159 (1) 2 will diminish the sufficiency regime of creditors who are beneficiaries of the preference cases, proportionally, by reference to the full value of the goods or rights which are the subject of these preference cases."

When the assets that are encumbered by preference cases are not available or are insufficient, for the not-guaranteed part of the debt, the creditors will benefit from priority, pursuant to the provisions of Article 161 (2).

More specifically, in the case of debtor company's bankruptcy, the debts coming from financing granted during the observation period for carrying out the current activities, according to Article 87 (4), shall have priority over the wage debts, other debts arising from the continuation of the debtor's activity after the procedure opening, debts owed to good faith acquirer third-parties or sub-acquirers who return the debtor's assets or their equivalent value, budgetary debts, debts representing bank loans, related expenses and interest, those resulting from deliveries of goods, services provision or other works, from rents, debts corresponding to Article 123 (11) b), including bonds and other chirographic claims.

Among the means of protection for the financial backers in the procedure, the legislator has regulated the possibility of making a request to open the bankruptcy procedure in the case of non-paying the current debts. Thus, "the holder of a current, certain, liquid and exigible receivable older than 60 days and an amount above the threshold value, may request, at any time during the reorganization plan or after fulfilling the payment obligations undertaken in the plan, to proceed to the bankruptcy. Its application will be rejected by the syndic judge in the event that the receivable is not due, is paid or the debtor concludes a payment agreement with this creditor".

This new regulation is, no doubt, more attractive to potential financial backers in insolvency procedure.

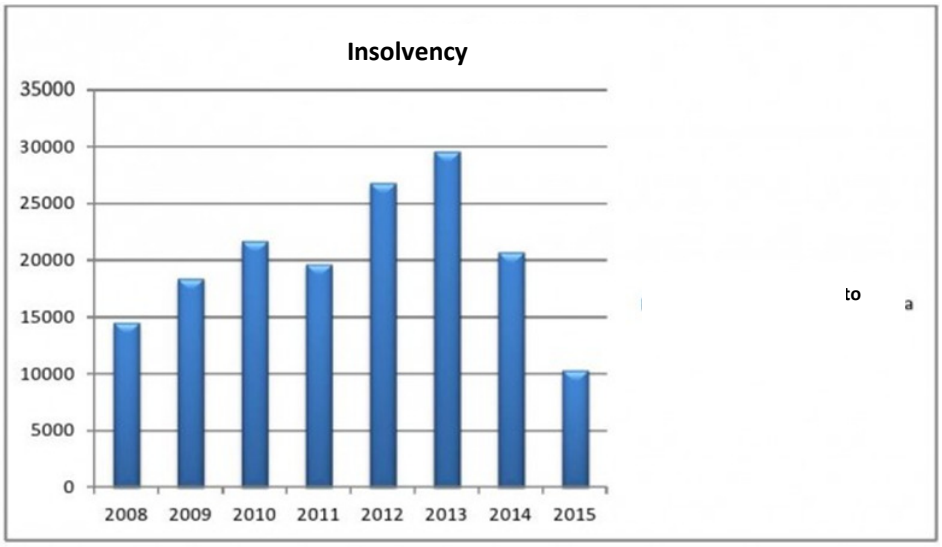
It is also seen the legislator's concern for ensuring a balance and fot protecting the pre-existing creditors. Thus, the syndic judge does not have a decision-making right in this situation, the judgment belonging to the majority creditors, and when these are other than the pre-guaranteed creditors, the balance tilts in favor of the first.

Analysis of the Impact of Legislative Changes

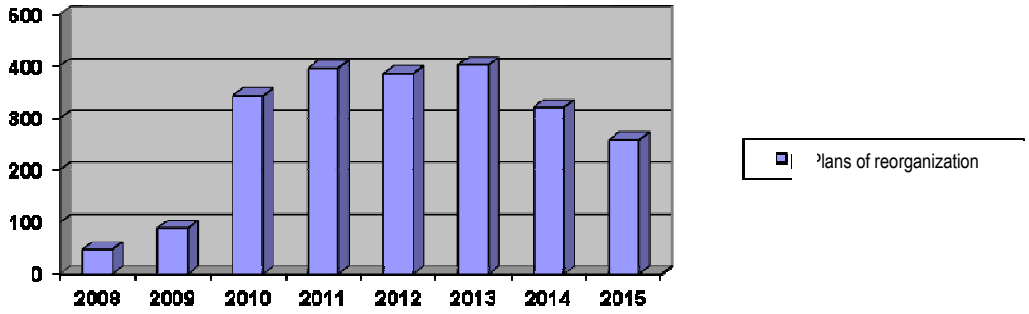
Following the entry into force of Law No. 85/2014, in the juridical literature there have been expressed opinions according to which "it is improbably to find persons that would advance money as a loan in the difficult situation of the insolvent debtor's business. ... and anyway, this matter depends on the financing policies practiced by credit institutions. " (Stanciu D. Carpenaru, Mihai Adrian Hotca, Vasile Nemes, Insolvency Code commented, The Juridic Universe, Bucharest, 2014, on page 257).

We will analyze the impact of these changes, mentioning that the relatively short period will not allow being drawn definitive conclusions.

It should also be mentioned that banking prudential rules and tightening of capital requirements for the activities of lending to companies in insolvency have diminished the appetite of many Romanian banking financial entities to still provide funding for the successful saving of viable activities. The peculiarities of a process for saving a company in insolvency by providing some crisis facilities within the procedure, require the employment of a staff with a complex qualification who has knowledge of financial analysis of some entities in difficulty, who knows the particularities of the insolvency law, having the ability to quickly suck in information concerning various fields of activity (industry, services, production, energy) and with strong negotiation skills.



Source: COFACE ROMANIA



Source: Ministry of Justice from Romania

In relation to the fact that financing a reorganization plan is not used in practice by small debtors, we are going to use the COFACE Analysis of the largest 100 companies that entered into insolvency in the years 2011-2015, these insolvencies belonging to certain groups that bring together 1,079 companies (the interconnection multiplier being of 1:10).

Out of the 100 largest companies in insolvency during 2011-2015, 61 entered into insolvency/bankruptcy procedures upon their own request (debtor's request). This trend has been explained by the companies' size, which represents a plus factor in the relations with suppliers where firms occupy a strong position and, at the same time, strengthens the control had by them over the moment when the company enters into insolvency to protect itself from creditors and try to recover. Concurrently, the phenomenon of opening insolvency at the debtor's request has become an increasingly widespread practice. Thus, in 2007 (prior to the impact of the global financial crisis on the local level), around 30% of the insolvencies were open at the debtor's request, this percentage ascending gradually up to 55% in 2015 for all companies that have entered into insolvency.

At the time of drawing up the study, there had been identified 20 companies that had undergone or were in the process of reorganization following the opening of insolvency procedure. Out of these, 13 were still being under reorganization, 5 had already proceeded to the bankruptcy phase (not being able to recover by reorganization), and 2 had successfully completed the reorganization process, being currently operative. It results that only 11% of the reorganizing companies have managed to resume their business, almost a third went bankrupt, while for nearly two-thirds the process was still in progress. Thus, the trend converges to the valid statistics for all insolvent companies, as only 2% of the companies that open their insolvency procedure in Romania reorganize successfully, the percentage being nearly ten times smaller than the average recorded in the EU (10). For the companies that have already submitted their reorganization plan and are still undergoing this process, it has lasted about 2 years from the opening of the insolvency until a reorganization plan was confirmed. For these, since the reorganization plan approval has passed, on average, one year. Given these premises, the recovery probability for these companies is low as, in practice, the reorganization procedures that exceed one year will not finish successfully.

Conclusions

From analyzing the statistical data concerning the number of companies that entered into insolvency and reorganization, we notice after the entry into force of Law No. 85/2006 a slight increase in the number of reorganizations.

On the other hand, the percentage of successful reorganizations does not seem to have increased, hence it results that, although the debtors themselves are encouraged to propose a reorganization plan, so far the business environment has not intercepted these changes as sufficient to raise the interest in saving these companies in insolvency.

These arguments are taken into account when we feel that we need a reconsideration of the implementation of the financial recovery plan by resorting to some of the financing solutions outlined above. Obviously the infusion of capital through the increase of the share capital, the issuance of bonds by the debtor or the bank credit will put pressure on the one in insolvency given the risks of such operations and even the described aspects regarding the international issues, difficult to manage, in a time not conducive to the development of economic activities, but we think it may be a solution that we recommend to professionals at the moment.

References

Adam I., Savu C.N. (2006), Legea procedurii insolvenţei, Editura C. H. Beck, Bucureşti,

Cărpenaru D.S., Nemeş V., Hotca A.H.(2006), Noua lege a insolvenţei – comentariu pe articole, Editura Hamangiu, Bucureşti, pp. 178-179.

Comșa M, Comșa P. (2017), Finanţarea în cadrul procedurii insolvenței capitol în EUROPEAN LEGAL STUDIES AND RESEARCH. INTERNATIONAL CONFERENCE OF PhD STUDENTS IN LAW, Ed. Universul Juridic ISSN 2066-6403, București
Piperea G. (2008), Insolvenţa: Legea, regulile, realitatea, Editura Wolters Kluwer, Bucureşti

Dimitriu A.P.(2013), Garanţiile creditorilor în procedura insolvenţei în obscuritatea noului Cod civil, în Curierul Judiciar nr. 6, pp. 355-363.

Godâncă-Herlea V. (2014), Reorganizarea judiciară prin prisma proiectului Codului insolvenţei, Partea II, în Revista Phoenix nr. 48,, pp. 8-11.

Joyce, Y., (2014), Knowledge mandates in the state-profession dynamic: A study of the British insolvency profession, Accounting Organizations and Society, vol. 39, no. 8, 590-614.

Miloș S.M., (2009), Comparație între Chapter 11 și reorganizarea judiciară potrivit legii române, Revista Phoenix nr. 28 – 29, p. 33 – 37

Târşia A.C. (2012), Reorganizarea persoanei juridice de drept privat, Editura Hamangiu, Bucureşti,

Ţăndăreanu N.(2012), Insolvenţa în reglementarea Legii nr. 85/2006, Editura Universul Juridic, Bucureşti,

www.coface.ro/content/download/142304/.../Studiu-Top+100+Insolvente-2016.pdf

Public Interest and Public Good In the Romanian Public Administration

Ştefania-Cristina Mirică; Andreea Elena Matic; Simona Petrina Gavrilă;
George Cristian Schin
"Dunărea de Jos" University of Galaţi, 47 Domnească Street, 800008, Galaţi, Romania
cmirica@ugal.ro, stefania_mirica@yahoo.com; amiricass@yahoo.co.uk; sgavrila@ugal.ro;
george.schin@ugal.ro

Abstract

In this paper we analyse the definitions and legal understanding of two key concepts: public interest and public good, both in the context of Romanian contemporary society and public administration and in relation with the notion of personal interest.Even though the concept of public interest is very used in order to justify certain decisions taken in the Romanian public administration system, it remains a mysterious notion as it is not always clear what it really consists of. We refer at public interest in opposition with private interest and we try to identify the main characteristics of the notion and how it should be applied by the authorities and respected by the people, members of the communities. We feel that it is necessary that the population should be better informed and consulted more often in order to make sure that the decisions are made correctly and with authentic respect for the public interest. We shall explore in the paper the most effective methods to reach this purpose.

On the other hand, the notion of public good refers mainly to the individual happiness and quality of life. The Romanian Constitution enshrines and recognizes in Article 47 the right to a decent living standard. A general definition informs us that the public good consists of a state of wellbeing of as many members of the community as possible. This state of wellbeing can be achieved only if the personal purposes and interests of the individual are respected and taken into consideration.

At this point, in conclusion, we become aware of the fact that, in order to achieve the public good (personal wellbeing, decent living standards and happiness) the public interest and the personal interest should be balanced, and the public administration must develop policies in order to obtain all these three at high standards (public interest, public good and personal wellbeing, and happiness for the individuals).

Keywords: *public interest, public good, professional deontology of the public servant, happiness, public servant, public administration; decent living standards, applied ethics.*

Introduction

The interest is the main motive of all the human actions, the factor which confers sense and constancy to all our activities. The Romanian law expressly protects the legitimate interest of the individuals by opposing it to the personal illegitimate interest that presupposes obtaining advantages and returns by illegal means.

The public good that refers to obtaining a decent living standard for the majority of the members of the society necessarily implies the efficient exercise of the rights and the realisation of the personal legitimate interests, a decent living standard etc.

Through the activity of the institutions of the public administration, the state has to ensure the respecting of the laws and the satisfying of the general interest in such a way that the members of the society may be able to efficiently exercise their rights and follow their legitimate interests and, if necessary, to impose their respecting by coercion.

When the public interest is not respected acts of corruption are done, and the fight against corruption presupposes the active involvement of the citizens within the public life by signalling abuse, followed by their corresponding sanctions...

The present study does not analyze with priority particular facts by which the public interest is not respected, but it proposes to realise a legal delineation, as precise as possible, of public interest, and establish the way in which it contributes to the exercise of the human rights and legitimate interests of peope and to the realisation of the public good.

Definitions and Legal Framework

Public Interest and Private Interest

In the first place, it is necessary to mention the fact that the concepts of public interest and private interest are established within the Romanian legislation to the different types of disrespecting certain rights / legitimate interests that cam consist of the object of litigations and actions in justice, meaning that their respecting can be imposed, if necessary, through the state's power of coercion.

Any physical or juridical person is entitled to certain subjective rights and legitimate interests, and their exercise should be realised according to the law and its fundamental principles. The issue of defining the meaning of public interest and private interest occurs when the state has to ensure their respecting and defend them and, implicitly, to punish their infringement, committed either by other persons, or by the institutions of the state.
Generally speaking and according to the explanatory dictionary, by interest, in general, we understand "the things that bring advantages to someone or something" (Longman Dictionary, https://www.ldoceonline.com/dictionary). Moving forward, when we use the expression public interest or national /interest we refer to something that is "good or necessary for the safety or success of a country and its people" (Longman Dictionary, https://www.ldoceonline.com/dictionary/be-in-the-national-public-interest).

By analysing the terms, we notice that this definition of the public interest contains words such as "good", "necessary", "success", "safety", and this means that we are dealing with a general concept and the actual content of the expression *public interest* is not precisely expressed and it can differ pretty much from one state to another, and from one community to another.

Within the Romanian law system, before the concept of legitimate interest became exclusively a juridical one, the doctrine used to define interest as being „any hope, wait, expectations, even illusion that the positive law does not sanction because it does not know it" (J. Vermeulen, p. 209). We notice that this definition regards the private legitimate interest.

The Dictionary of Public Law defines the expressions of private legitimate interest and public legitimate interest found in Law no. 554/2004 regarding the administrative legal charges as they are provisioned by the nowadays Romanian legislation. The content of Law no. 554/2004, article 2 line (1) letter) shows that the expression *public legitimate interest* refers to „the interest that regards the legal order and the constitutional democracy, the ensuring of the rights, freedoms and the fundamental duties of the citizens, the satisfying of the community needs, the exercise of the competences of the public authorities" (Dictionary of Public Law, 2010).

Next, by *private legitimate interest* we understand „the possibility to pretend a certain behaviour when considering the exercise of a subjective and expectedly configured right" (article 2 line (1) letter p) of Law no. 554/2004 regarding the administrative legal charges). This definition is also to be found in the Dictionary of Public Law, 2010. The subjective right represents the person's prerogative to do or not to do something, which generates the negative obligation towards all the other members of society not to do anything that might impede its exercise and which, if necessary, can be imposed through the power of coercion of the state.

By analysing these two definitions we notice the high degree of generalising of their content, as well as the fact that the Romanian legislator considered necessary to introduce the term „legitimate" next to those of public and private interests by appreciating perhaps that, when this particular word is missing, wrong interpretations and applications of the legal decisions may appear within the development of actions of public and respectively private interest.

The term *legitimate* refers to everything that „is based upon the law, that justifies itself by the law, and that is admitted according to a certain right" (The Romanian Explanatory Dictionary, www.dexonline.ro). Therefore, generally speaking, the legitimate interest, either public or private, refers to a certain right admitted by the law of some public authority or by some entity of private right. In this way, the nowadays Romanian legislation configures the context within which both the public and the private interests can be exercised. The specialized literature underlined the idea of the legitimate character of the interest, „meaning that not any interest is defended by the law. In order to be protected in such a way, the present constituent and legislator impose the legitimate character of the interest that results through an evaluation made by the legislator and transposed into a legal norm". (V. Vedinaș, 2017, p. 424-425).

We may now logically infer the fact that not any type of interest is protected by the law, meaning that it cannot be the object of a lawsuit; it has to be about an interest established into an express juridical norm or based upon the fundamental principles of the law.

By analysing another legal system, we notice that within the French juridical doctrine any action that regards the breaking of a „direct and personal, born and actual, juridical and legitimate [interest]" is to be admitted as an object of juridical action. (C. Debbash; J.C. Ricci, p.641). Also, the French juridical doctrine admits the fact that the injured legitimate interest can be material or moral, depending on the type of prejudice that was done to the keeper of the interest, by moral interest meaning the injuring of one's honour, dignity, of one's ideas, or of the mission of a group etc.

We found it of interest to mention that things have not always been this way in Romanian legislation. For instance, Law no. 29 of 1990 of the administrative legal charges/litigations, which is a the norm before Law no. 554/2004, and that was adopted right after the Romanian Revolution of 1989 provisioned within article 1 that „any physical or juridical person/entity, in case it considers that its *rights that were admitted by the law* have been injured by an administrative act or by the unjustified denial of some administrative authority in solving one's request regarding a right admitted by the law, can address to the court for the act to be declared null, for the recognition of the right it pretends and the appropriate compensation for the injury it has been caused". As a conclusion, the legislator of the moment regarded only the protection of the rights admitted by the law, without mentioning the protection of the legitimate interest.

Also, the initial form of the Romanian Constitution of 1991 within article 48, line (1) provisioned that „the person *who's rights have been injured* by some public authority, by an administrative act or by not coming to an end with a request by the legal deadline, is entitled to get the recognition of the pretended right, the annulment of the administrative act, and the compensation for one's injury". Later on, after previsioning the Romanian Constitution in 2003, article 52, line (1) got the following content: „the person *who's rights have been injured* by some public authority, by an administrative act or by not coming to an end with a request by the legal deadline, is entitled to get the recognition of the pretended right *or of the*

legitimate interest, the annulment of the administrative act, and the compensation for one's injury". This specification was also included within Law no. 554/2004 of the administrative legal charges, the nowadays norm for this issue.

The older practice of the courts of law found it hard to make the difference between the rights of the person and one's legitimate interests, as they could not establish for sure „where the domain of law stated, and where that of the interests started, if the two met or not" (J. Vermeulen, p. 112). Yet, we cannot state that those provisions for the individual which compose nowadays the domain of the legitimate interests was ignored or lacked the juridical protection because the highest instance of law in Romania invested the concept of right with a very general and large meaning – as it consists of „any possibility admitted by the law, any eventual right" (V. Vedinaș, 2017, p. 425), and it admitted that the breaking of a legitimate personal interest is enough for the keeper of the interest to get the quality of complainant in a litigation where one requests one's interest to be protected. So even if the term „private legitimate interest" did not originally have an express juridical provision, yet it was protected by the authorities as it was included within the category of the subjective rights of the physical or juridical entities. Professor Rarincescu, an important specialist in administrative law in the inter-war period considered one's subjective right to be „that power to pretend to someone something, an action or an abstention from action, and this power was recognized and ensured by the juridical order by the possibility to go to court" (C. Rarincescu, p. 226).

The concept of public interest also appears within the content of Law no.7/2004 regarding the Public Servant Code of Conduct where within article 3 letter b) the priority of the public interest is declared, „a principle according to which the public servants have the duty to place the public interest above their personal interests when they exercise their function". Within this context of the activities and obligations of the public servant the public interest opposes the personal one. According to the law, namely article 4 letter c) „the public interest, namely that interest that involves the ensuring and respecting of the rights, freedoms and legitimate interests of the citizens recognized by the Constitution, the internal legislation, and the international treatises to which Romania adhered", and the personal interest [article 4 letter d)] is defined as „any material advantage or an advantage of any other nature followed or obtained directly or indirectly for oneself or for others by the public servants by means of one's reputation, influence, facilities, relationships, or the information to which one has access as a result of one's exercise of one's public function". In this way, the distinction between the legitimate private interest and the personal interest can be made by relating it to one's professional activity. In our opinion, this definition of public interest of Law no. 7/2004 does not cover but partially the meaning of the term, and it is but a regulation meant to underline the public servant's obligations having an ethical and deontological character when the public servant is exercising one's professional duties (regarding the avoidance of any conflict of interest and the fight against corruption).

However, within Law no. 544/2001 regarding the access to the public interest information we find the following definition of the piece of information having a public character as being „any piece of information that regards the activities of or results out of the activities of some public authority of institution, no matter the means, the media or the way in which the piece of information is made public". The examples may continue so that other contextual definitions may be found in order to configure what we usually call public interest, but the main issue refers to the fact that there is no final definition in any Romanian normative act that could clarify once for good the meaning of the expression „public interest", and many authors have asked if this aspect was deliberately left as obscure as such so that it may be used in the most unclear situations when one could hardly establish how one measure or another taken by the so called authority of public interest are in favour of some groups or persons rather than of the respective community.

But, on the other hand, by its very structure, the concept of public interest has a general character, as it has to respond to the needs of the human communities in different occasions and circumstances. If the

public interest were defined restrictively, the authorities would risk not being able to invoke it in certain situations in order to take the necessary measures needed to accomplish certain objectives belonging to the public order or to solve some unpredictable problems. It is important that the argument for the public interest should not be used abusively in order to justify measures that in favour certain groups or persons in the detriment of the majority of the individuals of the society. The most relevant definition is in our opinion that established by Law no. 7/2004 which configures the domain of the public interest and restraints it to the legitimate rights and interests of the citizens. Only in order to ensure the respecting of the legitimate rights, fundamental freedoms, and interests of the persons measures on behalf of the public interest can be taken. If the legitimate rights, fundamental freedoms, and interests of the persons were infringed on behalf of the so called public interest, an abuse is committed by the authorities that made the respective decision.

Public Good

Most generally, the public good is an ethical principle that presupposes ensuring a decent living standard for the individuals and the possibility for them to lead a confortable and safe life. Professor Antonio Sandu defined the public good to be ”the state of wellbeing of as many citizens as possible, in accordance with his/her own aspirations and interests” (A. Sandu, *Public Good,* p. 83).

The expression *public good* appears explicitly in Law no. 7/2004 regarding the Public Servant Code of Conduct, and it establishes its priority in relation to the personal interests of the public servants. Achieving the public good and the public interest are the main objectives of any democratic state, and implicitly, Romanian’s state, as well. The democratic state is the most efficient type of organization of the human community within which the individuals have the best means in order to achieve their own goals, and the possibility to search for happiness and to actually be happy (by happiness we understand a state of maximum contentment).

Respecting the concept of public good within a democratic state presupposes the efficient undertakings from the authorities in order to get and maintain a decent living standard for the individuals and to ensure their freedom of action and the necessary means to attain their legitimate objectives. So, in the first place the Constitution of the state has to contain the juridical establishment of the necessary principles in order to attain the public good. The Romanian Constitution contains provisions such as: the right to individual freedom (article 23), the right to freely move across borders (art.25), the right to an intimate and private family life (art. 26), the freedom of conscious (art.29), the freedom of speech (art. 30), the right to be informed (art. 31), the right to study (art.32), the free access to culture (art. 33), the right to a decent living standard (art. 47) etc. The latest presupposes from the point of view of the Romanian constituent legislator the fact that „the state is obliged to take the measures for the economic development and the social protection meant to ensure a decent living standard to its citizens” (art. 47 line (1) of the Romanian Constitution. Line (2) specifies concrete ways by which the state ensures that decent living standard to its citizens> the right to a retiring pension, to paid maternity leave, to medical assistance within the social units of state, to a dole, to any other types of social assurances public or private, to social assistance within the law etc. Further on, the other laws of the state have to ensure the effective means by which each of us get to have an effective decent living standard. But at least regarding this aspect there are pretty serious issues (very low pensions and salaries, poor medical services etc.) in Romania, and the consequences are very serious: the migration of the young people towards the Western Europe, demographic diminution, an aging people etc. Even a superficial analysis of the situation shows that it is evident that in Romania only a small part of the people has a decent living standard, unlike the states in Western Europe or the USA.

However, having this component of ensuring the efficient means in order for each of us may look for happiness and attain one’s own objectives, the content of the public good is negotiated between the two sides: the state and the beneficiary. It is logical that the state should take into account those aspects of

their private lives of the individuals that ensure their contentment and satisfaction. The public good is realized by means of the laws of the state, and its content (in as much it is legitimate) is created by the individuals, and the authority is meant to ensure the necessary means to its attainment.

So "the state's welfare obligations, derived from the value of social solidarity, require exceeding the policies of the minimal state, which only ensure fair access to opportunities existing in the society. Redefining public good by including the state's obligation to ensure the minimal standards of quality of life and assistance to its citizens that cannot provide those standards through personal effort, leads to the idea of the social state." (A. Sandu, *Public Good,* p. 78). But although Romania declares itself to be such a state, it seems that it constantly fails in fulfilling its mission of realizing the public good.

The public interest of the state or of the administrative and territorial units has as an essential component the public good. All the legal measures and all the public policies regard the gaining of the capital that would then be used in order to furnish the goods and services that the individuals necessitate. If it does not succeed in doing so, the public good remains but an illusion, and the private legitimate interests become almost impossible to satisfy. In our opinion, it is impossible to realize the public interest if it does not succeed in satisfying the component of the public good: a decent living standard for the people and the effective possibility for the individuals to attain their legitimate goals.

So, from our point of view, the two concepts, the public interest and the private interest are not opposed to one another, but they are deeply and necessarily interconnected. It is true that sometimes, in order to attain the welfare of a very large number of persons measures that affect negatively some persons can be taken (at the state level or the local community level), but in fact the most important welfare (or the welfare of the most people) is the least bad (or it affects the least possible number of individuals). But when such measures are taken, the people should be informed and they should have the possibility to evaluate the whole situation so that they understand the necessary character of the measure and they don't get the impression of being deceived or having been done some injustice. In this way, we agree with"the theory of collective decision upon the public good and good governance is based upon the principle of majority, not only from the democratic perspective, but also from the exigency of identifying the decision with the maximum probability of being the best in the context and for the subject who is the subject of the decision." (A. Sandu, p. 80).

The acts of corruption as real breaking of the public interest

The activity of the administrative public authorities of any democratic contemporary state is based on a set of normative acts founded on the provisions of the constitution of the respective state. Many times they tried to argue for the fact that the public institutions should develop their activity by following the principles of the private management, meaning to follow the maximum of profit and efficiency. But as it always comes to the satisfying of the needs of public interest and ensuring a public service of good quality, the profit that can be obtained out of the activity of these institutions cannot be so big. Because of this there is some tension between the policies of management oriented towards efficiency and profit and the activity having a bureaucratic character exclusively based on the respecting of the law and the administrative policies within which even the reasons of opportunity of the measures taken are based on strict provisions.

The big issues regarding the realizing of the public interest do not appear when the decisions taken by the authorities respect strictly the legal procedures but when more than one solution is possible, and the competent servants have to make decisions based on opportunity. Appreciating what is the most opportune strategy is a subjective endeavour and as a result contestable. There is a permanent disputation not only in Romania between the administrative system based on a strict legislation and the pragmatic one that is oriented towards profit and efficiency, towards profitable public policies, rather than the respecting of the bureaucracy. "The tension between a public administration grounded in law and one

grounded in managementhas been historically persistent and increasingly evident in contemporary scholarship. The substantive effects of the tension between legalism and managerialism range from marginal spill-over and chilling effects on managerial discretion, to more significant hostile tiesleading to crises of accountability, legitimacy, and even harm to those most vulnerablein society. This is particularly unfortunate at a time when rapid changes in the economic, social, and political environment are stimulating an equally rapid evolutionof public management strategies and when adopting market and private sector tools threatensto erode much of the democratic-constitutional foundation upon which governmentrests.(Robert K. Christensen, Holly T. Goerdel, Sean Nicholson-Crotty, p. 136).

Usually, the decisions made by the authorities and justified by the public interest are not criticisable to us as citizens at all. And this happens because they usually seem normal, useful, legal, or justifiable. Only when we hear of something that seems unjust or immoral we start to question about the true interest of the respective decision. The feeling of indignation, that something is wrong makes us pay attention towards an issue and stand up. For instance, the Institute for Public Policies in Bucharest, Romania realised an analysis of the way in which the public interest can be found within the juridical norms regarding the living rights of the Romanian high officials. The issue taken into consideration referred to the accommodation of dignitaries, members of the Parliament (and not only them) that have to travel to the Capital in order to attend the meetings, the parliamentary sessions etc. For this kind of travel they need housing, special houses. The accommodations for business are living places given to the public servants, to the employees of institutions on account of the employment contract with the employer. The agency that took care at the national level of the administration of such houses, RA-APPS, used to have a secret budget that was not published in the Official Gazette, a reason for which the public opinion did not have access to the confidential information. It seems that the way of administrating the houses (the study regarded the period between 2002 and 2006) was a bad one, because this authority lost in court (when it came to the requests of getting back the houses claimed by their proper owners, the respective requests being rejected by the authorities but then being approved in court) and allocated the houses in a way that did not represent the public interest, by passing them by fraud from the public domain to the private domain of the state and then selling them by in favouring some people for prices lower than their value on the market.

Many of the real estates administered by this authority were initially part of the public domain of the state or the administrative territorial unit and that means, according to Law no. 213/1998 regarding the public property that they have a special juridical regime as they are inalienable, intangible, and indefeasible.

“One of the most representative examples is that of HG no. 854/2000 regarding the organization and functioning of the Autonomous Administration of the Patrimony of the State Protocol, a normative act which passes from the public domain to the private domain of the state 366 of <real estates> (Addendum 4 of HG): villas, hotels, hotel chains, guest houses, agro-industrial plants, agro-zoo technical farms, and fishy farms, commercial sectors etc., including their corresponding lands. After this normative act was adopted, the public domain of state had only 91 <real estates> left (Addendum 3 of HG), out of a total of 457 such <real estates> that were at that date. We should underline the fact that even if the Government provisioned an act regarding something so important and delicate (the passing from the public to the private domain of some patrimony of a very big value). It motivated more than unsatisfactorily the decision it made, as it comes against the norms of legislative technique for the elaboration of the normative acts, as they are provisioned by Law no. 24/2000 regarding the norms of legislative technique for the elaboration of the normative acts”(Iorga, Elena; Ciobanu, Costin; Rughiniş, Cosima; Stan, Valerian, p. 40-41).

After the real estates were passed to the private domain of the state or of the administrative unit, they were alienated towards certain persons for some sums of money lower than their valueon the market and the budget of the state / administrative territorial units got defrauded with considerable amounts of money.

The case we considered above is but an example and it took place approximately ten years ago. Corruption is a phenomenon that can be encountered in any state of the world, not only in Romania. In 2017 according to the Transparency Report, Romania came on the 24th place, the same as Hungary, and the year before, in 2016 we came two places downer, the 26th place within the European Union. Compared to the year 1997, when Romania was included in this study for the first time, the level of corruption grew smaller. The level of corruption is determined annually in every state by means of enquiries as the people have to answer a simple question: "How many times, within the last 12 months, have you had to bribe someone in order to get a public service?"

There are a lot of situations when the public opinion reports the violation of the public interest in Romania: the building of roads and highways, assigning the contracts for snow removal, medical services etc. The main way to ensure the respecting of the public interest is the transparency of the way in which decisions are taken by the public central and local administration, by publishing all the information etc., and the main role is played by the citizen and the civil society that involves, checks, and publicly fights against corruption.

Conclusions

The realisation of the public interest, the private interest, and the public good are the major desiderata of any state, and in their absence the respecting of the human fundamental rights is impossible. The public interest presupposes taking action in an efficient manner and legally by means of which each of us can follow their own legitimate interests and can get a decent living standard. The public interest opposes to the private one only when it refers to the activity of the public servants who have to follow when exercising their professional duties the general interest of society and not their own that implies frauds and undeserved advantages. In any other case, the realisation of the public interest presupposes ensuring the respecting of the rights and legitimate interests of all the citizens.

In order to make sure that within the society that we live in decisions are being taken according to the public interest and to the realisation of the public good, we, the members of the civil society, must involve actively into the act of governing, and make sure of the transparency of the activity developed by the public central or local institutions, and check the way how the public money is spent.

A participative democracy where each of us involves is absolutely necessary because it is the only way to ensure the respecting of the public interest and the effective realisation of our individual legitimate interests and implicitly of the public good.

References

Christensen, Robert K.; Goerdel, Holly T.; Nicholson-Crotty, Sean - *Management, Law, and the Pursuit of the Public Good in Public Administration*, Journal of Public Administration Research and Theory, issue 126, p. 125-140.

Debbash, Charles; Ricci, Jean-Claude – *Contentieux administratif, (Administrative Litigations Court),* 7e Edition, Dalloz, Paris, 1999.

Iorga, Elena; Ciobanu, Costin; Rughiniș, Cosima; Stan, Valerian – *Public Interest: Current Theme or Outdated Rhetoric? (Interesul Public: temă actual sau retorică demodată)* ,Institutul pentru Politici Publice (IPP - Institute for Public Policies), Bucharest, 2006.

Law no. 29/1990 of Administrative litigations published in the Romanian Official Gazette, Part One, No. 122 ofNovember the 8th, 1990.

Law no. 544/2001 regarding the access to public interest information published in the Romanian Official Gazette, Part One, no 663 form October 23rd, 2001, updated and republished.

Law no 7/2004 regarding The Public Servant's Code of Conduct, republished in the Romanian Official Gazette, Part One, No 525 of August the 2nd, 2007, originally published in the Romanian Official Gazette, Part One, No 157 of February 23rd, 2004.

Law no. 554/2004 of Administrative Litigations published in the Romanian Official Gazette, Part One, No 1023 of December 20th, 2004, republished and updated in 2017.

Longman Dictionary, https://www.ldoceonline.com/dictionary.

Rarincescu, Constantin – *Romanian Administrative Litigations Court* (*Contenciosul administrativ român),* Universală Alcalay& co Publishing House, Bucharest, 1937 *apud* Vedinaș, Verginia – *Administrative Law* (*Drept administrativ),* 10th Edition, Universul Juridic Publishing House, Bucharest, 2017.

Romanian Constitution of 1991, initial form, www.cdep.ro.

Romanian Constitution updated and republished in the Romanian Official Gazette, Part One, No. 767 of October 31st, 2003.

Romanian Explanatory Dictionary, www.dexonline.ro.

Sandu, Antonio – *Public Good,* Journal of Legal Studies, no. 3-4, Lumen Publishing House, Iasi, 2015,p.. 73-.
Vedinaș, Verginia; Godeanu, Teodor Narcis; Constantinescu, Emanuel – *Pulbic Law Dictionary* (*Dicționar de drept public,* C.H.Beck Publishing House, Bucharest, 2010.

Vedinaș, Verginia – *Administrative Law* (*Drept administrativ),* 10th Edition, Universul Juridic Publishing House, Bucharest, 2017.

Vermeulen, Jean – *Course of Administrative Law (Curs de drept administrativ),* Cultura Poporului Publishing House, Bucharest, 1939 *apud* Vedinaș, Verginia – *Drept administrativ,* 10th Edition, Universul Juridic Publishing House, Bucharest, 2017.

Technical and Economic Analysis of Investment Projects in the Field of Renewable Energy Production

Popescu Catalin, Petroleum-Gas University, Ploiesti, Romania,
cpopescu@upg-ploiesti.ro

Abstract

Implementing projects that generate green energy using renewable resources is a matter of high relevance as it is the question of accepting such projects only after a prior and careful technical and economical analysis that can highlight the profitability of these initiatives. At this moment, projects of this type seem to be inefficient, with expensive technologies being used, but with financial support and using high-tech tools for the proposed solutions, this becomes feasible.

Keywords: green energy, wind power plants, Aeolian industrial parks, investment projects efficiency

Introduction

The analysis of the efficiency of investment in green energy projects is based on the fact that today the world has focused on achieving unrivaled goals without the pursuit and pollution limits, without preserving an unpolluted environment; most of the activities carried out within organizations are carried out with great precision at a high speed and affect the environment more or less as is mentioned by Bădescu et al (2010) and by Bălan (2007). Considering the issue of the century, pollution has generated a new branch of energy production, namely the production of "green" energy, according to Gasler (2007). As is mentioned in the Europe 2020 Strategy (2010), this new branch has been a major concern for the EU countries, which is why green energy projects receive financial support from the EU. According to Sorensen (2004) renewable energy sources are considered inexhaustible in the sense that they present very high resources compared to present needs and future estimates, and are present on the whole surface of the earth, involving only the costs of their transformation into directly usable energies.

Vac (2012) mentioned that the need for energy is dictated by the need for economic growth in highly developed countries, but also in emerging countries. At the same time, this energy need is facing the depletion of classical energy sources - coal, crude oil, natural gas - and the unequal distribution of these sources from a geographic point of view. These issues have led to a permanent increase in the price of these energy sources and, in turn, to certain economic imbalances which can ultimately lead to blockages of economic development in the present form. The EU's renewable energy strategy has been built on a series of directives, protocols and principles based on both environmental protection policies that are affected by massive exploitation of fossil fuels and greenhouse gas emissions (GHG) in the atmosphere, as well as policies to increase energy efficiency, especially from large electricity consumers. It is worth mentioning that in the EU strategies and policies according to Europe 2020 Strategy (2010), it is not proposed to completely replace fossil fuels with renewable energy sources (RES), but to use them alternatively, within the limits set by specialists of the European Commission, which will contribute both to the efficiency of consumption by using less expensive and poorly exploited sources and protecting the environment and its resources, given that these resources are limited.

This paper aims to highlight the efforts of Romanian energy companies to improve the use of green energy by analyzing specific investment projects. When is considering a project, its seven risks are also taken into account: political risk, credit risk, construction risk, market risk, operating risk, financing risk, legal risk. The most accurate assessment of risks is particularly important at the stage preceding the actual implementation of the project, especially when using a loan, because as soon as project funding has been

accepted, banks will gradually transfer funds to all participants (contractors, subcontractors). Once the project is completed, it becomes operational and thus generates revenue that allows the payment of debts and interest for operating expenses and services. This is the period in which the risks are gradually reduced as the revenue curve stabilizes and cash flow accumulation begins.

Technical and Economic Analysis of Wind Power Plants

Technical and economic analyzes of projects for the use of renewable energy sources are essential to mitigate the technical and financial risks that may arise in the implementation of these projects. For the analysis of wind power plants there are quite well-developed applications, but their cost is very high. Another impediment to the use of these applications would be the training of monitoring staff, the applications being rather complex and could only be used by specialists.

The best benchmark of economic performance within a wind power plant is the energy delivered over a year. Not all energy produced is delivered to consumers. Part of this is used to power the plant's own services and lighting. In a wind power plant about 90% of the produced energy is delivered to consumers and the remaining 10% is used to support its own services.

In a research study by Costea (2007) is stated that the amount of energy delivered depends on the maximum capacity of the place (area) and on how well that capacity is used on each hour of the year. The standardized measure for the economic performance of a plant is the energy delivery factor.

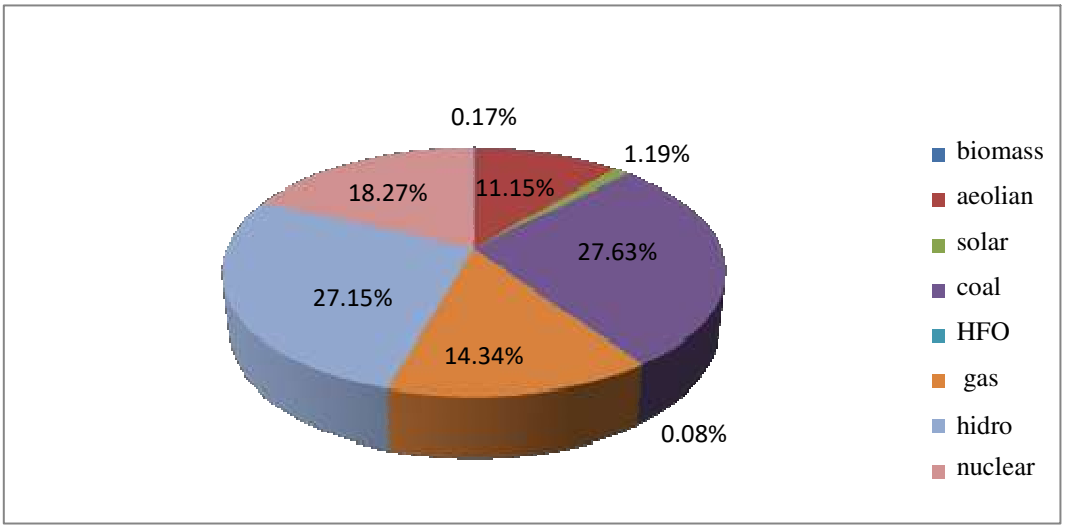
According to Stan (2011) the annual average of the energy delivery factor is calculated according to the ratio: kWh delivered per year/ (installed capacity × operating number of hours in one year).
Wind power plants have an average annual energy delivery factor of around 30%, some of them reporting 40%. The energy supply factor of wind power plant varies depending on the season and this must be taken into account.

In the book by Ackermann (2005) is mentioned that the wind power produced by the wind power plant varies with the cube of wind speed, any percentage changed in wind speed can have a significant impact on the power plant's economy. For example, if the annual average wind speed is 10 m/s, the energy cost is calculated for wind speeds between 8 m/s and 12 m/s. The location of the plant is considered economically viable only if the plant is profitable and at 8 m/s.

Profitability obviously depends on the price at which the plant can sell the energy produced. Instead, the price at which the plant can sell is regulated by the market price. In a profitability analysis of a wind power plant, the following elements are included:

- the possibility of placing a wind power plant in a given location depending on the wind speed at the turbine bump;
- initial installation costs of a wind power plant;
- total costs, interest rate level in the case of a loan;
- the life of the plant;
- operating and maintenance costs;
- the average selling price of energy produced by the power plant.

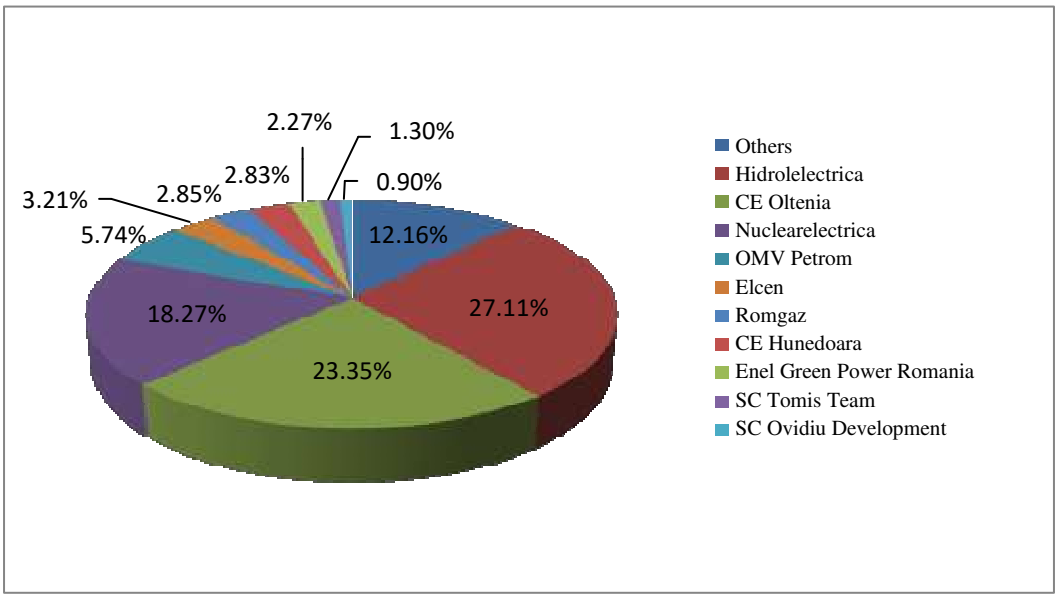
A representative example for Romania is given by the CEZ Romania Group. CEZ Romania is one of the first players in the electricity market to implement an ESCO system for public lighting.
Figure 1 shows that most of the electricity supplied in Romania is produced by hydroelectric power stations and by using different types of coals. The lowest percentage of energy delivered is produced by biomass. Wind energy has an important share in the delivered energy, namely 11.15%.



Source: www.anre.ro

Fig .1 : The production structure of the national energy system by types of resources in 2015

From figure 2 it can be noticed that the CEZ Group has a market share of 3.1%. Separately, the companies belonging to the group have the following market shares: SC Tomis Team 1.3%, SC Ovidiu Development 0.9% and TMK Hydroenergy Power has a share of 0.6%.



Source: www.anre.ro

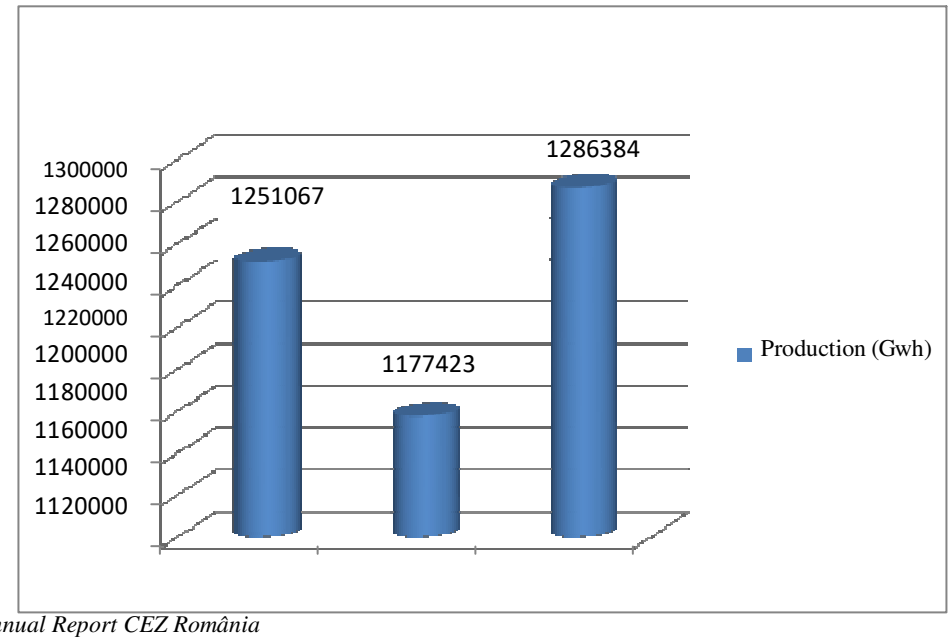
Fig.2 : The market shares of the energy producers according to the energy delivered in the networks in 2015

Aeolian industrial parks of CEZ Romania

CEZ has acquired two projects that make up the largest aeolian industrial park located on land, across Europe, located in Dobrogea, in the Fântânele, Cogealac and Grădina villages, with a total capacity of 600 MW and an investment of 1.1 billion euros.

CEZ wind power plants include 240 turbines of 2.5 MW, 100 meters high and a rotor diameter of 100 meters. Developed in two stages - the first in Fântânele and the second one in the Cogealac and the Grădina area, the project of CEZ aeolian industrial park contributes to the achievement set-up by Romania, of renewable energy production' targets and also to achieve mandatory green certificate quotas.

Figure 3 presents the results recorded by the two aeolian industrial parks. It is noted that the largest production in the period 2013-2015 is registered in 2015.



Source: Annual Report CEZ România

Fig. 3 : Evolution of electricity production in CEZ Romania's aeolian industrial parks

The production recorded in 2015 by CEZ aeolian industrial parks was 1286 GWh, higher than in 2014 with 120 GWh, due to the favorable weather conditions. The aeolian industrial park of Fântânele was developed by the Romanian company Tomis Team SA. The aeolian industrial park in Fântânele, part of the CEZ aeolian industrial park project, consists of two projects that were built simultaneously: (1) East Fântânele and (2) Fântânele Vest.

Capital investments are funded through a combination of loans and equity. Credits are also partly provided by independent banks (200m euros from the European Investment Bank and 262m euros from a consortium of European banks). The Cogealac - Grădina aelion industrial park is developed by a Romanian company, Ovidiu Development SRL, in the area of Cogealac and Grădina, in Constanţa County.

According to ANRE Report (2012) and to the Report on the Environmental Impact Study for Domneşti Wind Park (2015) the aeolian industrial park of Cogealac and Grădina, the second stage of the CEZ aeolian industrial parks project on 31 December 2015, is referring to the following: 101 turbines, 33/110 kV electric converter stations and 110/400 kV main electric converter station. CEZ aeolian industrial park

represents an investment that has been made to meet the EU directive to ensure the source of 20% of total renewable electricity production by 2020.

An important change in the regulations was in the treatment of theft of energy, the new regulation (ANRE Order 121/2015) significantly amplifying the possibility of combating this phenomenon as is mentioned in the Law on Electricity and Natural Gas (2012).

In order to encourage to produce renewable energy, the state has promoted the green certificates system, i.e. producers get these certificates free of charge, which after they sell for additional gains from the actual energy according to Law no. 220/2008 and to ANRE Order 42/2011. Energy suppliers are required to acquire a certain share of green certificates, depending on the amount of electricity traded. Finally, these green certificates are transferred to the bills paid by consumers.

Analysis of Investment Efficiency for "Aeolian Industrial Park Domneşti"

It is about the construction of an aeolian industrial park producing unconventional energy made up of 9 wind turbines of type VESTAS V90 300kW, the total installed power being 2700 kW in Domneşti, Jud Constanţa. From the technical documentation of the aeolian industrial park equipment, the wind turbine area need for installation between 250 and 280sqm, including both the tower and the foundation on which it is mounted. Wind turbine VESTAS V90 - 3.0 MW is an electricity generator that converts wind energy into electricity. This type of turbine has a bladed rotor whose diameter is 90 m and is equipped with a generator with a nominal output of 3.0 MW.

Type V90 - 3 MW is an evolved version of the V80 with some radical differences, the most important being the transmission box, in the compact version in its entirety.

Electricity production is approximately 71181 MWh annually, according to the specifications of the technical designer of the park (SC Wind Expert SRL). This is an estimated value. The basis for calculating the electricity production is:

- wind turbine power curve;
- distribution of wind speed;
- meteorological standard atmosphere;
- insulation of the installation by obstruction (Aeolian industrial park).

Through the High Infrastructure Operational Program 2014-2020 supported by the EU, which has as its Priority Axis Promoting Clean Energy and Energy Efficiency in Support of a Low Carbon Economy, the aim is to achieve the objective of increasing the production of energy from renewable resources. The plan imposes a maximum grant of EUR 50000000 on the project, of which a maximum of 80% is irredeemable (financing has not exceeding EUR 15000000).

The European Union and the Government of Romania provide financial support to CEZ Romania Group for the construction of the Domneşti aeolian industrial park in amount of 4569985 lei, which represents 52.7% of the total investment. Of this amount, 1500326 lei represents non-reimbursable financing, i.e. 32.83% of the total amount. The remaining amount of 47.3% is divided in two components: 41% from the total amount represents own funds and the other 6.3% are supported by bank loans.

It is estimated that the energy produced by the Aeolian Industrial Park Domneşti will be cheap because it will be subsidized by all consumers in Romania through the green certificates system.

Electricity produced at Aeolian Industrial Park Domneşti is traded separately from green certificates. The subsidy that the population and SMEs incur to support the wind energy sector in 2017 is 35 lei/MWh, or

0.035 lei / kWh, according to a draft of HG published on the site of the Ministry of Energy. The level is the same as for 2016 and 2015. Considering a monthly consumption of 200 kWh, considered normal for a household, the population's contribution to the "green" energy sector would be approximate 7 lei/month as is stated in the Report on the Impact of Energy Investments on Economic Growth (2012). For each produced MWh it will be received half of a green certificate according to ANRE Order 42/2011. A green certificate costs 27 Euros, so it increases revenues by 13.5 Euros per MWh produced. In addition to these amounts, the investor also receives money for the actual sale of energy on the market. The average stock price is 37 Euros, but the CEZ Group member firms sell cheaper MWh at 25, 20, even 15 Euros. Average maintenance and maintenance costs for the Aeolian Industrial Park Domneşti are 1.2 Eurocents/kWh for a 20 years' service life. The aggregate running costs (land rent, insurance, daily operation, maintenance) are about 2 Eurocents / kWh. Basically, following the calculations, the result was that for an Mwh produced at Domneşti Park the operating costs were 32 Euro (about 144 lei at a rate of 1 Euro=4,5 lei). Therefore, for the entire capacity of the park the total expenditures are 6250064 lei annually.

Analysis of return on investment started by using the following information:

- the discount rate is 19.5% (the value include inflation rate, bank interest rate, risk rate);
- the economic life of the equipment T=20 years (according to the equipment' manufacturers);
- the total value of the investment is 8671700 lei (according to table 1);
- because the GC (green certificates) value has dropped in the last 10 years by about 50% (in 2008, the GC value fluctuated between 27-55 Euros, today it is traded on average by 13.5 Euros) it was established that the incomes decrease annually with 5% as is stated in the ANRE Order 42/2011.
- operating expenses increase by 3% annually.

In table 1, entitled „*General Investment Survey of Aeolian Industrial Park Domneşti"* is presented the costs related to the establishment of Aeolian Industrial Park Domneşti. More than 60% of the overall costs are represented by the purchase of turbines. Over the past twenty years, investment costs in wind power plants have fallen by about 80% to 900-1200 EUR/kW installed. It is forecast that the trend will continue, with a reduction of several percent per year.

The method used to analyze return on investment is the Discounted Cash Flow (DCF) method, while depreciation was calculated using the SYD method. For a discount rate of i = 19.5% starting with year 5, the company registers profit (see fig.4). Recovery of the investment is made towards the end of the 5th year of the project.

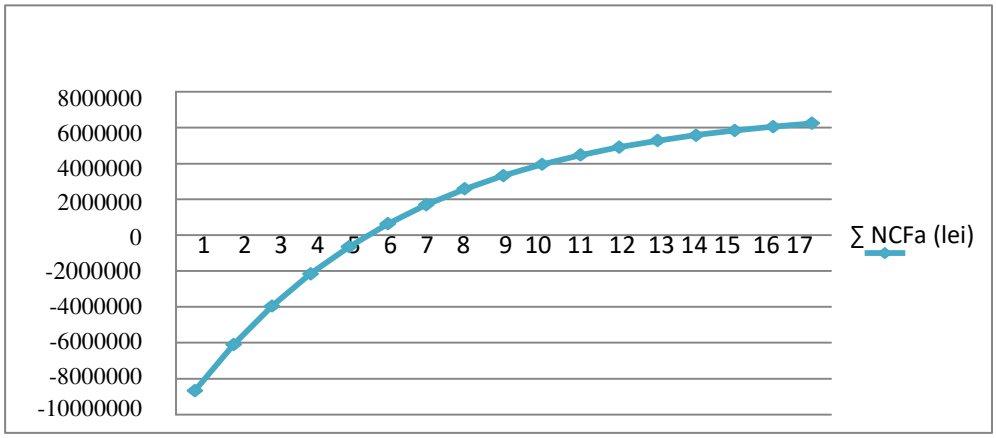


Fig. 4: Discounted Net Cash Flow for Aeolian Industrial Park Domneşti

Table 1: General Investment Survey of Aeolian Industrial Park Domneşti

Current number	Description	Value (lei)
1. Costs of acquisition and landscaping	1.1 Land acquisitions	65200
	1.2 Location setup	25000
	TOTAL	**90200**
2. Providing the necessary utilities for the project	2.1 Connection to the water network	5000
	2.2 Connection to sewer system	8500
	2.3 Connection to the gas network	9000
	2.4 Connection to the power grid	35000
	2.5 Connection to the communications network	15000
	TOTAL	**72500**
3. Design, expertise, consultancy, services	3.1 Design and execution	
	3.1.1 Technical expertise	35000
	3.1.2 Feasibility study	55000
	3.2 Consultancy	17000
	3.3 Project promotion (publications, conferences, company website etc.)	35000
	TOTAL	**142000**
4. Investment material costs	4.1 Buildings, constructions, installations	
	4.1.1 Access road	38000
	4.1.2 Buildings foundations	100000
	4.1.3 Control and installation supervision	250000
	4.2 Technical assemblies	130000
	4.3 Equipments and machineries	
	4.3.1 Turbine	5400000
	4.3.2 Electrical cable installations	1000000
	4.3.3 Spare parts	200000
	4.4 Means of transport	70000
	4.5 Means of automation and control in operation	
	4.5.1 Signals, telecommunications	30000
	4.5.2 Hardware and software components	300000
	TOTAL	**7293000**
5.Total personnel costs	**5.1 Personnel costs**	
	5.1.1 Personnel wages (6 months x 12 people)	72000
	5.1.2. Courses and training programs costs	120000
	5.2 Delegated external staff costs for project execution	
	5.2.1 Technical personnel (18 months x 24	432000
	5.2.2 Administrative / auxiliary staff (18months x 2	18000
	TOTAL	**642000**
Personnel' transport of project execution and equipment' transport	Execution personnel transport	9000
	Transportation of machineries, equipments,	50000
	TOTAL	**59000**
Taxes, rentals, audit, insurance, other expenses, financing costs	Commissions, fees	50000
	Audit	25000
	Rental equipments, machineries and auxiliary	42000
	Insurances	75000
	Other costs	100000
	Financing costs(credit) (36115331 x 15% x 1.5	81000
	TOTAL	373000
TOTAL		**8671700**

The project is feasible in terms of ∑NCFa indexes, with a recovery period less than the duration of the physical and moral wear and tear of the equipment to be purchased (as specified by the turbines' manufacturer for 18-20 years).

Conclusions

CEZ Romania has been aware of the global pollution problem and its development in the South East region of Europe has been based on the production of energy from renewable sources, which have no major impact on the environment (especially hydropower and wind energy).

Aeolian industrial parks cannot sustain themselves yet financially, but they become profitable after the help received from the Romanian Government and the EU (irredeemable financing or grants in the form of subsidies).

In recent years, technology has evolved, and turbine production costs have declined greatly, which has increased interest in investments in this area. The cost of wind energy depends to a large extent on the location of the installations. Wind speed and network connection costs may vary by location.

The Aeolian industrial park Domneşti, strategically located in the South East area of Romania, where the average wind speed is 8 m/s, meets all the requirements for environmental protection and reaches the economic profitability threshold pursued by the investor, as demonstrated by the analysis in this paper. Based on the studies it was concluded that the project regarding the Domneşti wind power plant is feasible. Depreciation of expenses is made in the first years of setting up, more precisely somewhere in the year 5 since the park was put into operation. The life of turbines is 20 years during which capital can be reinvested in modernization projects of existing parks.

References

Ackermann, T. (2005) Wind power in power systems, John Wiley & Sons.

Bădescu, Z., Popescu, C. (2010) Energia din surse regenerabile, RENTROP & STRATON Publishing.

Bălan, M. (2007) Energii regenerabile, Universitatea Tehnică din Cluj-Napoca, Editura UT PRES.

Costea, A.M. (2007) Estimarea potenţialului eolian în zone cu orografie complexă, Universitatea din Oradea, Şcoala Doctorală a Facultăţii de inginerie electrică.

Gasler, J. (2007) Future of energy, Springer.

Sorensen, B. (2004) Renewable Energy, its physics, engineering, use, environmental impacts, economy and planning aspects, Elsevier Science, USA.

Stan Ivan, F.E. (2011), Eficienţă energetică, Editura Universităţii din Craiova, Craiova.

Vac, S.C. (2012) Teza de doctorat: Fezabilitatea economică şi financiară a resurselor regenerabile de energie, Universitatea de Stiinţe Agricole - Cluj Napoca.

Vişa, I., Duţă, A. (2008) Sustainable Energy, Transilvania University of Braşov Publishing House, Braşov.

*** Law no. 220/2008 for establishing the system of promoting the production of energy from renewable energy sources (Legea nr. 220/2008 pentru stabilirea sistemului de promovare a producerii energiei din surse regenerabile de energie), M.O. nr. 743/2008.

*** Law no. 123/2012 - Law on Electricity and Natural Gas (Legea nr. 123/2012 – Legea energiei electrice şi a gazelor naturale), M.O. nr. 485/2012.

*** ANRE Order 42/2011 on the Regulation for the Accreditation of Electricity Producers from Renewable Energy Sources for the Application of the Green Certificates Promotion System (Ordin ANRE 42/2011 privind Regulamentul de acreditare a producătorilor de energie electrică din surse regenerabile de energie pentru aplicarea sistemului de promovare prin certificate verzi).

*** Report on Energy Efficiency and Policy Trends in Romania, ANRE - Department for Energy Efficiency (2012) (Raport privind tendinţele eficienţei energetice şi politici în România, ANRE – Departamentul pentru Eficienţa Energetică, 2012).

*** Report on the Environmental Impact Study for Domneşti Wind Park, SC House Construct Environment SRL (2015) (Raport privind studiul de impact asupra mediului pentru Parcul Eolian Domneşti, SC House Construct Environment SRL, 2015).

*** Report on the Impact of Energy Investments on Economic Growth, Economica Publishing House, National Forecast Commission (2012) (Raport privind impactul investiţiilor din domeniul energetic asupra creşterii economice, Editura Economică, Comisia Naţională de Prognoză, 2012).

*** The Europe 2020 Strategy(2010) (Strategia Europa 2020), www.mae.ro/node/19272.

Economic Effects of Tourism Development in South Sumatra on the Communities around Tourism Regions

Sri Rahayu
Universitas Muhammadiyah Palembang
ayu_mir67@yahoo.com

Abstract

Tourism can be considered as an industry. The development of this industry provides multiplier effects for other sectors. The positive effects of tourism on the economy can be seen from various aspects including foreign exchange revenue, foreign exchange earnings, employment absorption, infrastructure development, and economic empowerment of local communities. Since Palembang the capital city of South Sumatra Province was determined as a tourism destination of MICE (Meeting, Incentive, Convention and Exhibition) in 2011, various facilities and infrastructure needed for MICE activities have been built. There have also been numerous MICE events in Palembang. This study investigates the economic effects of tourism development in South Sumatra.

Keywords : MICE, econoic effect of tourism

Introduction

Development in the tourism sector always has multiplier effects on other sectors, such as transportation, trade, hotel and inn services, restaurants, and craft souvenirs of the tourism destinations visited by tourists. These multiplier effects will, of course, make tourism become very interesting to develop.

Every country should develop its tourism based on local wisdom such as halal tourism (Palupi *et al*., 2017). In addition to multiplier effects, there are 8 (eight) main reasons for developing tourism, namely: (1) Tourism is a triggering factor for national and international economic development, (2) a prosperity trigger through the development of communication, transportation, accommodation, and other services, (3) special attention to the preservation of culture, social values for economic value (4) equal welfare distribution due to the consumption of tourists in a destination, (5) foreign exchange earnings, (6) an international trade trigger, (7) triggering the growth and development of tourism and other special profession education institutions to produce reliable and polite graduates with the soul of hospitality, and (8) the market share for local products so that various products continues to grow along with the socio-economic dynamics of tourism destinations.

According to (Sapta, 2011) tourism development is basically aimed at

a. Unity of the Nation: Tourism could give a sense of pride and love to the Unitary State of the Republic of Indonesia through travel activities throughout the country by citizens. The expected impact is that with lots of citizens visiting other regions outside their homes will create a sense of brotherhood and understanding of the system and philosophy of life of the people visited so as to increase the sense of national unity

b. Poverty Alleviation: Tourism development would provide opportunities for all Indonesians to do business and to work. Tourist visits to a region are expected to provide the greatest benefit for welfare improvement of the community. The hope is that tourism should give a great contribution to poverty alleviation in the region with natural and cultural potentials except economic potential for tourism purposes.

c. Sustainable Development: With the characteristic of tourism activities that offers natural beauty, cultural wealth, and hospitality and services, very few resources are used up to support these

activities. This means that the use of consumable resources tends to be very small so that the sustainability of development will be easy to manage for a relatively long time.

d. Cultural Preservation: Tourism development would contribute significantly to local and national cultural preservation efforts which include protection, development and utilization of local or national culture. UNESCO and UN-WTO in their joint resolution in 2002 stated that tourism activities are the main tool of cultural preservation. In this context, Indonesia should make tourism development become a cultural preservation booster in various regions.

e. Fulfillment of the Needs of Life and Human Rights: Nowadays tourism has become the basic necessity of modern society. For certain communities, travel activities have even been linked to human rights, especially through the granting of longer holidays and paid holidays.

f. Enhancement of Economy and Industry: Proper and sustainable tourism management would provide opportunities for economic growth in a tourism destination. The use of local materials and products in tourism services will also provide opportunities for local industries to play a role in the provision of goods and services.

g. Technology Development: With more complex and high-level competition in bringing tourists to a destination, the need for high technology especially industrial technology will encourage a tourism destination to develop its capability of latest technology application. In this region there will be the development of advanced and efficient technology that will support economic activities. Thus tourism development will provide great and fundamental benefits to the community and local government. Tourism becomes an integral part of regional development and integrated in the framework of regional welfare improvement.

Tourism is a triggering factor for national and international economic development. Tourism becomes a national priority in the Medium-Term Development Plan of 2015-2019. Gradually and annually within a period of 5 years in the Medium-Term Development Plan of 2015-2019 tourism development is prioritized and given the achievement target. In 2019 at the end of the Medium-Term Development Plan, the target of foreign tourists is 20 million people and domestic tourists are 275 million people.

Research Method

This study used a literature survey method. It is documentation of a thorough review of publications and non-publications of secondary sources in the field of particular interest to the researcher (Patisina et al., 2017).

This study used qualitative descriptive analysis technique, analogy, and comparison of several research results and scientific publications related to socio-economic effects of tourism in the city of Palembang.

Results and Discussion

This section discusses the positive effects of tourism on the economy in various aspects, among others foreign exchange revenue, foreign exchange earnings, employment absorption, infrastructure development, and economic empowerment of local communities

1. Foreign Exchange Earnings

Foreign exchange earnings are influenced by the number and expenditure of foreign tourists in Indonesia. In developing national tourism, the increasing number of foreign tourists to Indonesia should be in line with the increasing amount of foreign tourist expenditure in Indonesia, so that the country's foreign exchange earnings from tourism activities will also increase. Foreign exchange earnings have increased significantly. Based on the performance report of tourism ministry in 2016, foreign exchange earnings exceeded the target of Rp. 163 trillion (US$11.9 billion) or 113.2% of the target (Rp 144 trillion).

Foreign exchange earnings from tourism sector in South Sumatra were reflected by the increasing number of foreign tourists from 8,028 tourists in 2015 to 10, 683 tourists in 2016. The increasing number of foreign tourists certainly has an effect on the increasing foreign exchange earnings from tourism sector in South Sumatra.

2. Infrastructure Development

One popular type of tourism is MICE tourism. MICE stands for Meeting, Incentive, Convention, Exhibition. MICE is an activity type in tourism industry; this activity has carefully been planned by a group of people having common purposes in organizing the activity. MICE is a very promising business but it is still new in society and it has not many enthusiasts, unlike in other businesses. The development acceleration in South Sumatra in recent years has been the impact of frequently holding big events in this province, such as National Sports Week XVI in 2004, SEA Games in 2011, Islamic Solidarity Games (ISG) in 2013, Asian University Games (AUG) in 2014 and several other major sports events, all of which are part of the MICE tourism.

All of these events were centered in the city of Palembang though several sports were held at regency level. The city of Palembang benefited from these events mainly due to the construction of infrastructure facilities to support these events. Everyone has to admit that Palembang city continues to grow physically. The development of various sports facilities in Jakabaring, the construction of hotels rated from one-star to five-star, street improvement and construction within the city of Palembang, even the largest and first project in Indonesia, namely the construction of Light Rail Transit (LRT). One question to ask is the socio-economic effects of this development on the communities, especially the people who are in the vicinity of the development region. So that it can improve the community welfare which ultimately can break down and reduce the pockets of poverty and suppress unemployment in the city of Palembang in particular and in South Sumatra in general.

3. Employment Absorption

A large number of MICE activities certainly provide a great job opportunity. This can be seen from the decline of unemployment rates in South Sumatra during the period of 2010 - 2014, as illustrated in the Exhibit 1.

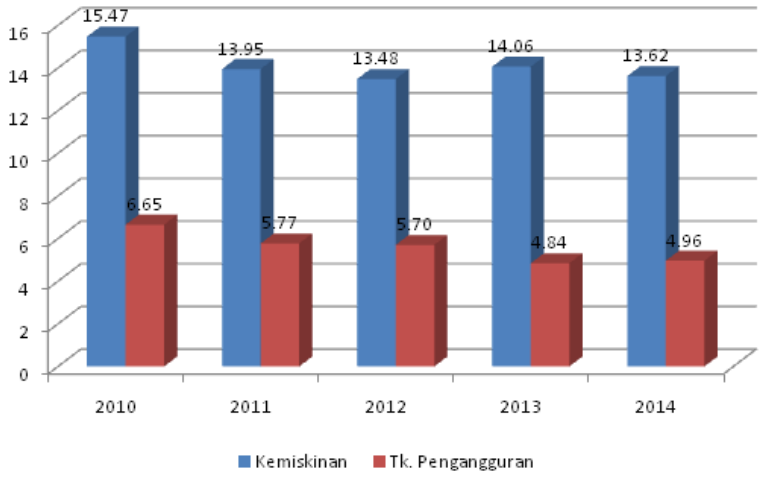


Exhibit 1
Poverty and Unemployment Rates in South Sumatra
Period of 2010 -2014

Source : South Sumatra's Central Bureau of Statistics, 2017

Exhibit 1 shows that the unemployment and poverty rates declined, with the poverty decline rate of 0.65% and the unemployment decline rate of 0.76%. It will take 10-20 years to alleviate poverty and unemployment; therefore, South Sumatra still needs to hold many big events. The economy in the same period, where the economy was still unstable, was reflected by the prices of leading commodities in South Sumatra, such as palm oil, rubber, and coal. However, South Sumatra's economic condition was quite good because South Sumatra's economic growth was above the national growth rate.

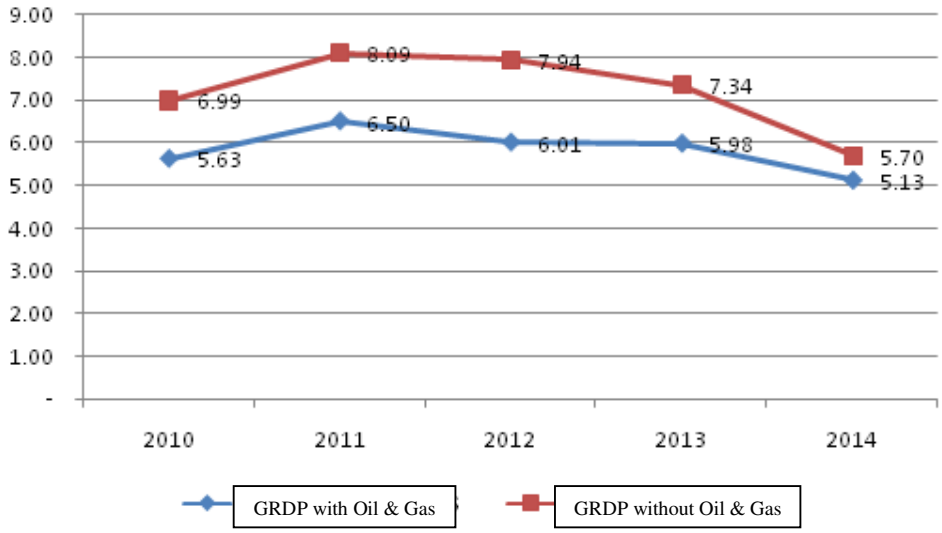


Exhibit 2
Economic Growth Rates of South Sumatra Province
in the Period of 2010-2014 with the Basic Year 2000

Source : South Sumatra's Central Bureau of Statistics, 2017

In terms of sectors, the fast-growing sectors during the period were those related to investment such as buildings and trade, hotels and restaurants, coupled with the supporting sector like freightage and transportation. These three sectors had significant growth compared to previous years, especially starting in 2011 when the SEA Games was held. Most of the venues were centralized in the city of Palembang, but they gave a relatively big effect on South Sumatra's regional economy. Graph 3 below shows the growth of each sector:

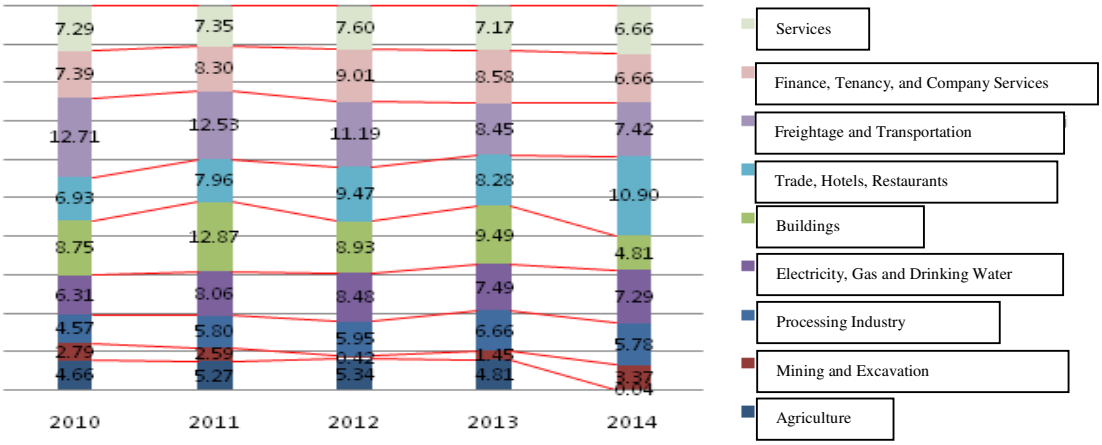


Exhibit 3
Economic Growth Rates by Sector in South Sumatra Province
Period of 2010-2014

Source : South Sumatra's Central Bureau of Statistics , 2017

The economic growth rates in South Sumatra in terms of the sources of growth can be seen on Table 1. In the period of 2010-2014 when the major events were held, there was a massive development, especially in the city of Palembang. The development in the trade, hotels and restaurants sector increased significantly, from 0.96 in 2010 to 1.63 in 2014. The increase in this sector was due to the increasing number of tourists coming to Palembang. The number of tourists coming to the Province of South Sumatra is increasing.

4. Foreign Exchange Revenue

The increasing number of tourists coming to the Province of South Sumatra shows that the province is increasingly in demand as a tourist destination by foreign tourists and domestic tourists who increasingly like travelling. In the last five years (2010-2014) the number of foreign tourists tended to increase. Although the number of tourists varied every month, the number in the period of 2010-2014 tended to increase every year. The cumulative number of tourists coming to South Sumatra in 2010 was 2,393 people. In 2014 the number reached 11,044 people. The highest number of tourists coming to the Province of South Sumatra in the last 5 years was 1,890 people in November 2011. The highest number of foreign tourists in November 2011 was because in that month South Sumatra Province hosted the 24th Southeast Asian Games. Besides November 2011, there was an increase in the number of foreign tourists in December 2014 as many as 1,646 people. The increase in the number of foreign tourists was due to the 17th ASEAN University Games (AUG) in Palembang on 9-19 December 2014, with the participants from 11 countries and 20 different sports.

Based on the monthly development of foreign tourists during the period of 5 years, many foreign tourists tended to visit South Sumatra. The high rate of visitors occurred in May, June and September. This high rate is closely related to school holidays and summer holidays abroad.

Table 1: Economic Growth Rates by Growth Sources in South Sumatra Period of 2010-2014

BUSINESS FIELDS	SOURCES OF GROWTH (Y ON Y)				
	2010	**2011**	**2012**	**2013**	**2014**
(1)	(2)	(3)	(4)	(5)	(6)
Agriculture	0.92	1.03	1.03	0.92	0.01
Mining and Excavation	0.64	0.58	0.09	0.30	0.65
Processing Industry	0.78	0.98	1.00	1.12	0.98
Electricity, Gas and Drinking Water	0.03	0.04	0.04	0.04	0.04
Buildings	0.69	1.04	0.76	0.83	0.44
Trade, Hotels and Restaurants	0.96	1.11	1.34	1.21	1.63
Freightage and Transportation	0.69	0.73	0.69	0.54	0.49
Finance, Tenancy and Company Services	0.31	0.36	0.39	0.38	0.31
Services	0.62	0.63	0.66	0.63	0.59
GRDP with Oil & Gas	5.63	6.50	6.01	5.98	5.13
GRDP without Oil & Gas	6.99	8.09	7.94	7.34	5.70

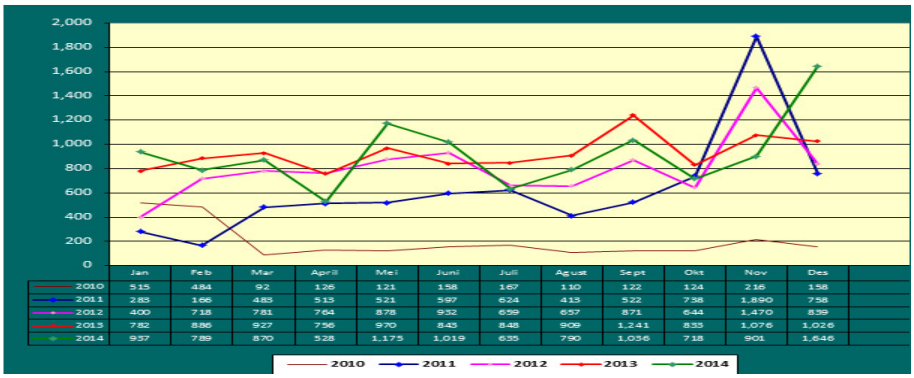
Source : South Sumatra's Central Bureau of Statistics, 2017

5. Economic empowerment of local communities

Tourism expenditure will activate the local economy, stimulate investment and cause the financial sector to grow along with the growth of other economic sectors. In some countries the arrival of tourists to a destination also leads to the growth of foreign exchange business to provide services and convenience for the tourists during their stay. It is noted that in some countries out of 83% of their top five revenues, 38% of the revenues are derived from foreign exchange earnings, foreign exchange trading. Tourism revenue is often used to measure the economic value of a tourism region. Some local revenues are very difficult to calculate because not all tourist expenditure can be clearly identified, such as the income of informal workers, unofficial taxi drivers, unofficial guides, etc.

The contribution of tourism sector to the economy of South Sumatra Province has been increasing since several international events were held in South Sumatra. The regional government continues to promote South Sumatra's tourism potentials so that the number of tourists increases every year. This has an impact on the increasing number of stays and hotels in South Sumatra, from 39 hotels in 2012 to 54

hotels in 2014. The number of guests staying in hotels and other accommodation in South Sumatra increased, compared to Indonesia in general in the period of 2010-2014. The number of domestic and foreign guests in hotels and other accommodation in South Sumatra increased by 8.52 percent (domestic guests) and 121.73 percent (foreign guests) in 2014. In 2014 the number of tourists visiting South Sumatra was 3 million people, an increase of 5 percent compared to the previous year.



	Jan	Feb	Mar	April	Mei	Juni	Juli	Agust	Sept	Okt	Nov	Des
2010	515	484	92	126	121	158	167	110	122	124	216	158
2011	285	166	485	513	521	597	624	413	522	758	1,890	758
2012	400	718	781	764	878	932	659	657	871	644	1,470	839
2013	782	886	927	756	970	845	848	909	1,241	833	1,076	1,026
2014	957	789	870	528	1,175	1,019	635	790	1,056	718	901	1,646

Exhibit 4: Number of Foreign Tourists Coming through Sultan Mahmud Badaruddin II Palembang Airport in the Period 2011-2014

Source : South Sumatra's Central Bureau of Statistics, 2017

Conclusions

From the description above, some conclusions can be drawn as follows:

1. The positive effects of tourism on the economy can be seen from various aspects, among others foreign exchange revenue, foreign exchange earnings, employment absorption, infrastructure development, and economic empowerment of local communities.
2. In general, the effects of tourism on the five aspects have a significant role, but the effects on the economic empowerment of local communities cannot be clearly illustrated due to the limitation of existing data.
3. There should be more MICE tourism activities in South Sumatra to reduce the poverty rate.

References

Central Bureau of Statistics , Sumatera Selatan . Dalam Angka, 2017.

Departemen Kebudayaan dan Pariwisata RI. (2005). *Rencana Strategis Pembangunan Kebudayaan dan Pariwisata Nasional 2005 – 2009*. Jakarta: Departemen Kebudayaan dan Pariwisata RI.

Palupi, Majang, Romadhon, R.W & Arifan, N. (2017). The Importance of Optimization of Halal Tourism: A Study of Development of Halal Tourism in Indonesia. *Proceedings of the 29th International Business Information Management Association Conference*. IBIMA 2017

Patisina, Tjahjono, H.K., Palupi, M. (2017). What makes a succesful entepreneur? An Exploratory Study Among Post-Retirement Entepreneurs in Indonesia.*Proceedings of the 29th International Business Information Management Association Conference*. IBIMA 2017

Sapta, Nirwandar (2011). *Pembangunan Sektor Pariwisata: di Era Otonomi Daerah*. Retrieved on 21 Maret 2011 from http://www.scribd.com/doc/35092726/440-1257-Pembangunansektorpariwisata1

Sekaran, Uma (2013). *Research Methods for Business.* Jakarta: Salemba Empat.

Spillane, James.(1993). *Ekonomi Pariwisata: Sejarah dan prospeknya.*Yogyakarta: Kanisiu

DFM – With Features in Milling Processes

Julian Jakubowski University of Zielona Góra, Szafrana 4 st., 65-246 Zielona Góra,
j.jakubowski@iizp.uz.zgora.pl

Waldemar Woźniak University of Zielona Góra, Szafrana 4 st., 65-246 Zielona Góra,
w.wozniak@iizp.uz.zgora.pl

Roman Stryjski, University of Zielona Góra, Szafrana 4 st., 65-246 Zielona Góra,
r.stryjski@iizp.uz.zgora.pl

Abstract

Design for manufacturing is not a fixed system. DFM is continually being developed, both in university research projects, within companies and by a number of consultants. DFM has been accepted by industry as a valid element in the product design process. Effective DFM encompass two aspects: analysis of the complete product in order to simplify its design and analysis of each individual part and feature to maximize its manufacturability. This paper describes same aspects of DMA in machining process – milling. In production where CNC machines are used, complex geometry causes a number of difficulties. So it is important to investigate the project carefully in the early design stage from the point of view of whether it will be possible to manufacture.

Keywords: design for manufacturing, Catia, features, milling, virtual production

1 Introduction

As a number of types of computer aided design and manufacturing system have been used as a standard tools in engineering activities the integration between design and manufacturing needs to be made to ensure business competitiveness. Usually that resulted in changes in organization structure and leads to computer integrated manufacturing and concurrent engineering. Term computer-aided design (CAD) is credited to describe any software that can assist product engineering in accomplishing a specific task. CAD refers to the use of computers in converting the initial idea into a detailed engineering design, while computer-aided manufacturing (CAM) refers to the use of computers in converting designs into finished products. The last phase requires a thoughtfully decision how the product will be made, what resources will be used. In the end, process plans, production schedule and cost estimation should be work out. That works properly in all cases when a common database is created and maintained. Even if most advanced engineering CAD/CAM systems offer tools to geometrical integration of model data and structure, designing for manufacturing is still a challenge. This is a very essential step in the integration of computer-aided (CA) methods in whole product development process. In this methods, digital mock-up (DMU) technology plays main role.
During product developing process four logical groups of engineering activities can be identified [Bralla 2004, Jakubowski, Peterka 2014):

- opportunity and demands for a new product,
- identifying constraints and creating the technical specifications for the new idea – product,
- the manufacturing process to produce the new product,
- fabrication the new product.

In the traditional development process each of the four groups accrues sequentially, fig. 1.
Design for manufacturing (DFM) strategies help companies to develop new products that are feasible to manufacture. In the early stages of design all engineering activities are initiated in computer aided systems. When the design is finished, the process of manufacturing and production planning begins. Issues often occur at this point because two teams, designers and manufacturers, have been working separately. The resulting question is: ‘how can Knowledge Engineering (KE) be used effectively to

enhance manufacturability during early design?' Even if the most complex geometrical product can be realized using today's technologies such as rapid prototyping it is only true in unit production. In lot and mass production where CNC machines are used, complex geometry causes a number of difficulties. So it is important to investigate the project carefully in the early design stage from the point of view of whether it will be possible to manufacture.

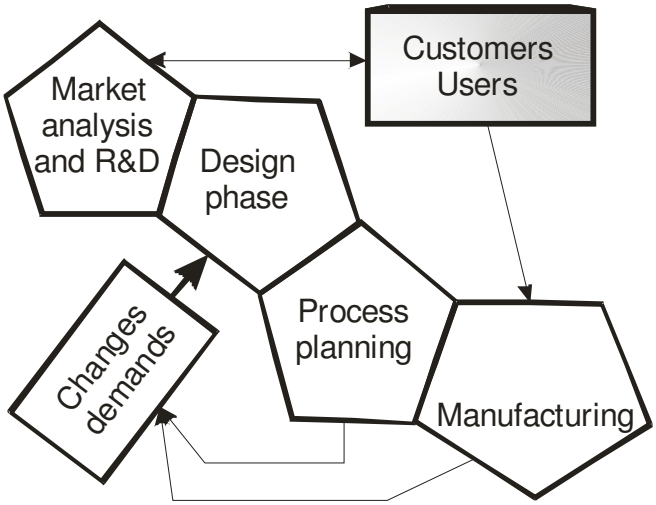


Fig. 1: Typical approach to product development

Rapid development of 3D models in computer aided engineering systems led to the situation where design work progresses, development begins on the manufacturing process. But even the if teams work simultaneously, the responsibilities of design engineers encompass all aspects of design and the design process is not complete if it is not easily manufactured. On the other hand manufacturing engineers have dual responsibility. They provide all technical wherewithal (e.g. tooling, equipment) to enable a product to be manufactured. Also the have responsibility to ensure that the design provided to the manufacturing organization is satisfactory from manufacturability standpoint (Jakubowski 2007,Svenson 2002, Sveneborg 2016).

2 Designing For Manufacturing

Design for manufacture means the design for ease of manufacture, and is used for three main activities (Anderson 2010, Emad 2007, Handbook 2004, Nan 2008):

1. As a basis for concurrent engineering studies to provide guidance to the design team in simplifying the product structure, to reduce manufacturing costs and to quantity improvements.
2. As a benchmarking tool to study competitors' products and quantify manufacturing difficulties.
3. As a should-cost tool to help negotiate suppliers contracts.

To carry out the design for manufacturing it is essential to have common product representation that relates design information across all design activities. CAD systems usually use low level geometrical entities to represent a product design. But it is really difficult to obtain or extract other information required for example for manufacturing operations. On the other hand, from several years a lot of publications describe feature-based methodology for different process. But it still needs human interpretation. Especially designers who realize design the manufacturing process must recognize and extract all meaningful features from drawing manually (Kacalak 2015).

Design for manufacturability or design for manufacturing in general, is connected with a methodology that involves engineers designing with the intent to minimize the cost of production and time-to-market without compromising on the quality of the product.

Many researchers state that near 70% of the product cost is committed during the design stage with production decisions such as process planning, or machine tool selection making up only 20%. As such, it is important to resolve as many manufacturing problems as possible during the design stage, because all problems accruing in the manufacturing stage generate not only cost but have a great impact on time and quality, fig.1. for example designing holes or pockets which cannot be machined with standard tools (e.g. reamer) will result in increased cost. Even though it is an obvious problem for advanced designers, beginners would not be aware of it. Much more difficult problems arise when a complex geometrical shape is taken into account. There is still a lack of publications in which shape interrogation for computer aided manufacturing are considered (Jakubowski, Peterka 2014).

As stated before, design for manufacturability is the process of proactively designing products, the following principles are applicable to virtually all manufacturing processes and will aid in specifying components and products that can be manufactured at minimum cost (Anderson 2010, Dollner 2000):

- simplicity,
- standard material and components,
- standardized design of the product itself,
- liberal tolerances, figure 2 illustrates the range of surface finishes obtainable with a number of machining processes and how substantially the process time for each method can increase if a particularly smooth surface finish must be provided.

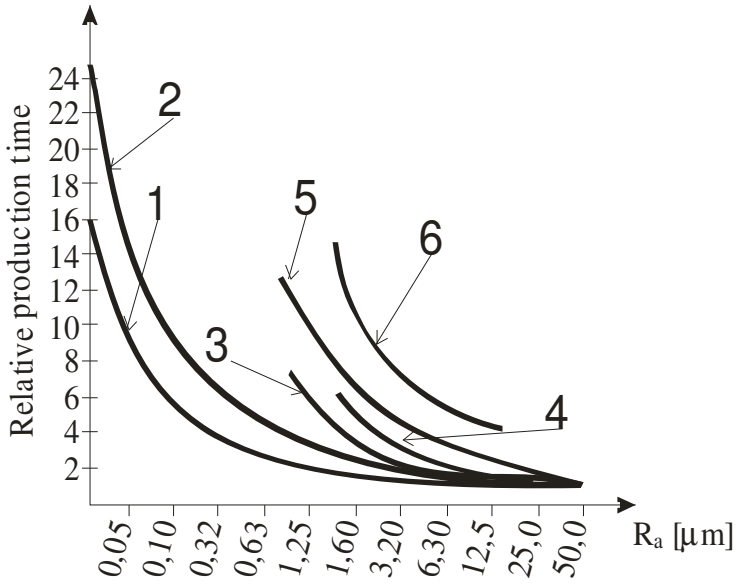


Fig. 2: Some typical relationships of productive time and roughness (Ra) for chosen machining processes. 1 – cylindrical grinding, 2 – finishing grinding, 3 – turning, 4 – drilling, 5 – finish milling, 6 – Reading (Jakubowski, Peterka 2014)

DFM using features is closely connected to vertical and horizontal approach to product design. In horizontal approach in which management possesses a priori knowledge of the technological possibilities of shop floors. The second is vertical in which usually production decisions are coordinated among semiautonomous shop floors. Horizontal approach is more efficient when its taken into consideration further manufacturing. Generally it base on feature treated as machining operations. So horizontal modelling could be understand as using design with intend to create solid

models in such as way as to allow and enable manufacturing, maintenance, modelling assembly and analysis. In figure 3 vertical approach to modelling process is illustrated. In this cases model was built from one sketch containing all contours. The pocket was defined on top of the model. Even if this is a very quick and simply way to create 3D model, its difficult to introduce changes in particular feature without changing the structure of whole model. This approach to design is unfortunately typical for most designers. Next feature is closely connected to the previous even there is no logical (manufacturing) substantiation.

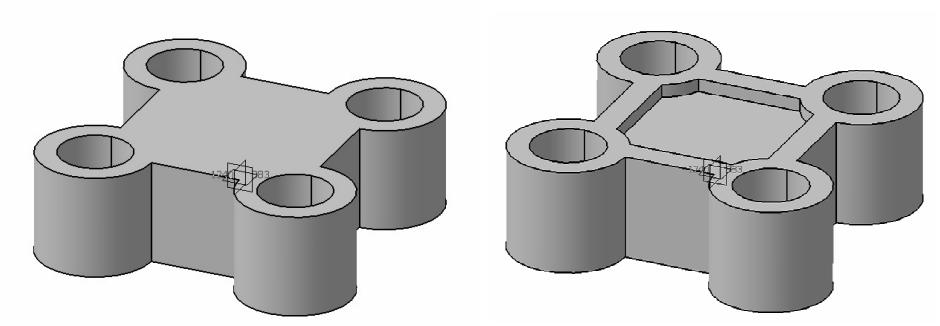


Fig. 3: Model built using vertical approach

Horizontal modelling approach (skeleton-based modelling) illustrated in fig. 4 bases on part feature. In this case model is built from separated technological features: holes, pockets etc. Its easy to remove any feature and to lead changes to final model. So, as a conclusion its worth to notice that the model structure should be carefully determined just before starting design process.

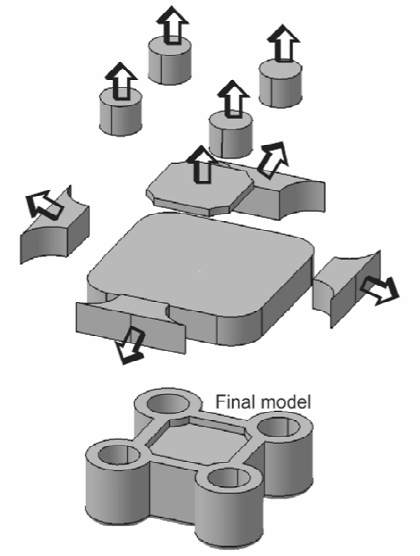


Fig. 4: Model built using horizontal approach

3 Case Study

To show how DFM could work below is given an example of 3D part prepared in CATIA environment, figure 6. Design features were primarily defined as combination of profile and path shape. Model was built on the base of the example given in Step application handbook (STEP, 2006) but in this example only horizontal approach to design was utilized. To each CAD operation machining operation was attached as its given on figures 5,6 and table 1.

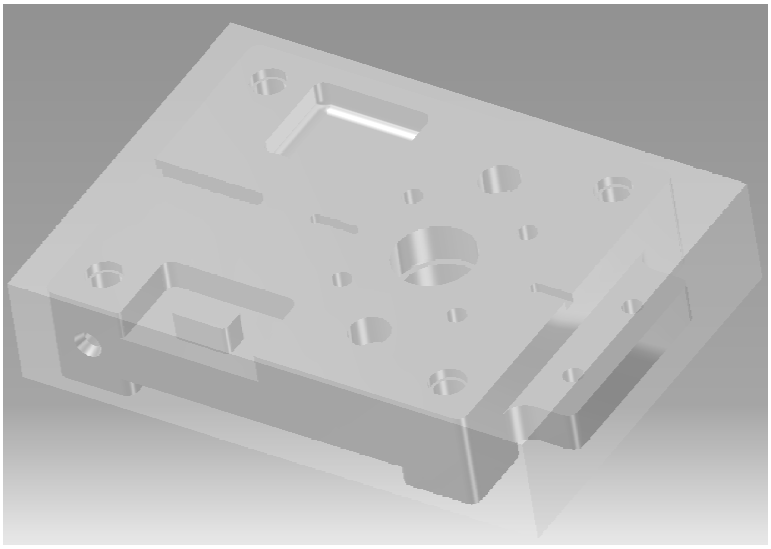


Fig. 5: Example of model with design feature

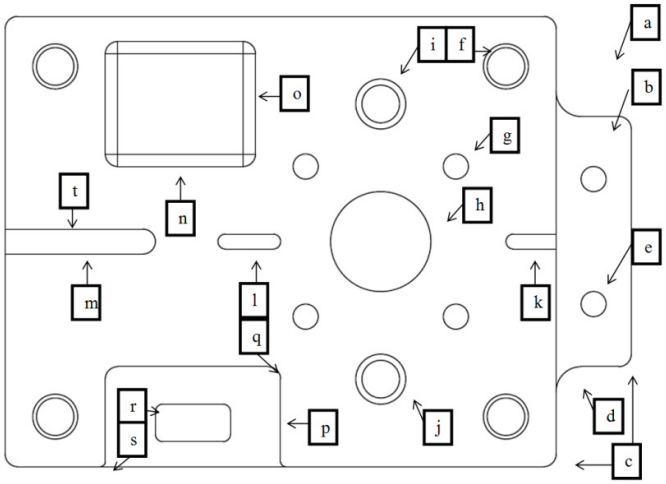


Figure 6: Determine the design feature

Table 1: Design and machining feature

Design feature	Machining feature	Mark on fig.7.
Pocket	Milling	a
Pocket	Milling	b
Fillets	Milling	c
Fillets	Milling	d
Hole	Drilling	e
Etc.		

In the next step machining NC process was elaborated in Prismatic machining module, figure 7. Due to the fact that the two stage were done in one integrated environment it is possible to read from time of each machining operation and using parametric formulas attached them to design feature. Because both CAD and CAM modules use computer-based methods for encoding geometrical data, it is

possible for the both processes to be highly integrated. Knowing the time of each operation and per/hour cost of machine work it is easy to estimate cost of production in early stage of designing.

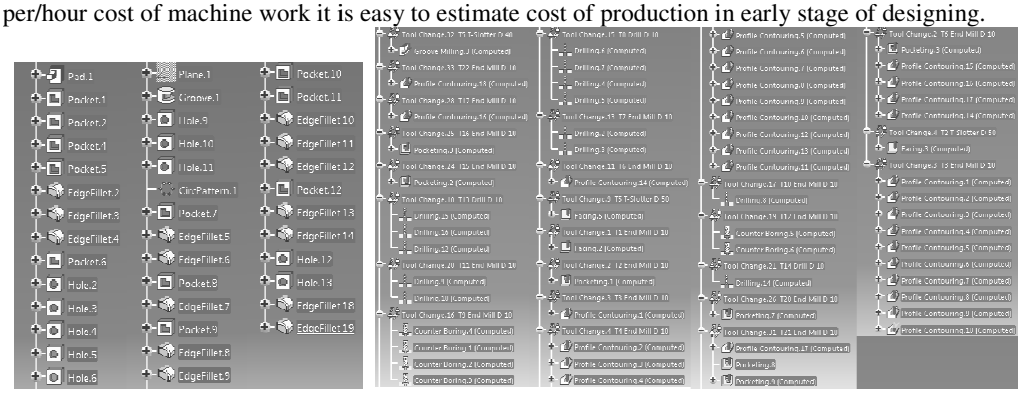


Fig. 7: Designing and corresponding machining feature

Integration between design and manufacturing is one of the topics that hits a lot of discussion in the product development due to the fact that can drive cost optimization. Feature technology promotes connection between design and manufacturing and may be ready useable for a process planning system.

The success of NC milling depends on the availability of efficient algorithms for defining tool paths. Generally, the cutter motion for machining a part consist of roughing, semi-roughing and finishing and should be considered separately, fig. 8.

Of course rough machining should be as simple as possible and preferably consist of a linear type motion in order to minimize machining time. So, the cutter path should be as short as possible and the depth of cut and feederate should be as large as possible.

At the first stage when choosing a material it should be carefully considered due to the fact that there can be significant differences in the cost and lead time of acquiring different forms. In many cases choosing aluminium alloys instead of steel can have better performance and significantly improve machinability. For further interrogation let us consider the geometry of a part presented in fig. 9, which shows examples of features: the part is interpreted in terms of hole, slots and pocket. In CAD systems surface features are distinguished and converted into machining features (volumetric). Next, a sequenced set of instructions used to manufacture the part are generated. Manufacturing features are recognized directly from a solid model built in Catia system.

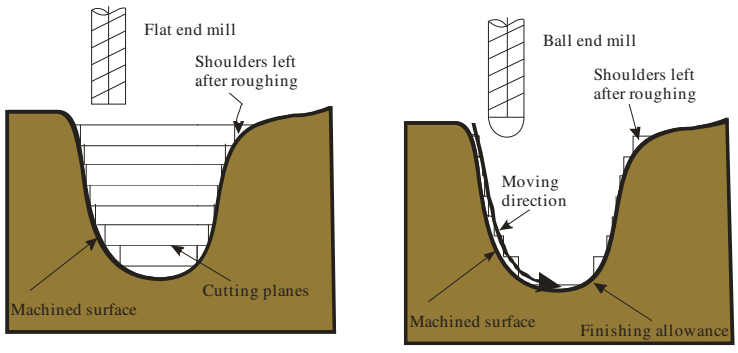


Fig. 8: Pocket machining with flat-end mill in roughing and semi-roughing with ball-end mill

For the purpose of this paper let's consider only one feature "pocket". All simulation and time calculations were realized in Catia system in machining module.

The first simulation was done using three tools to machine, with diameters □10, □□, □□□□fig.9 These tools were used due to design requirements.

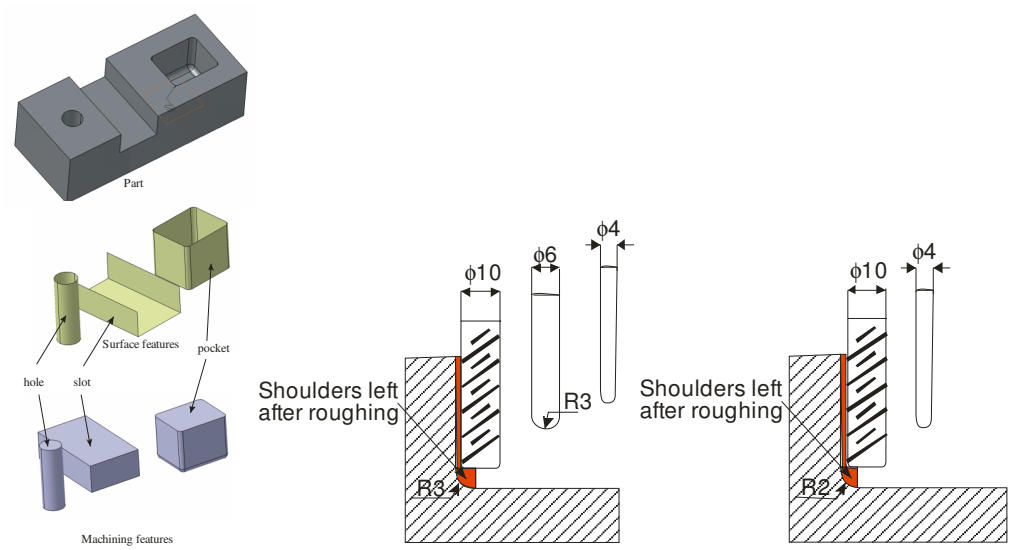


Fig. 9: an example of part and its surface and machining features: hole, slot, pocket, tools used in first and second simulation in Catia

From NC code times of each operation were read. Total time to machine feature "pocket" is near 12,2 min., table 2.

Table 2: Time calculation for machining feature pocket

Tool diameter	Machining time [min]	Changing tool time [min]
*Φ*10	6,3	
*Φ*6	1,2	0,2
*Φ*4	4,3	0,2
Total	11,8	0,4

Removing one operation (with □6 tool) case the machining time was decreased from 12,2 to 11,1 min (near 9%), tab. 3. But even it is possible to machine in a manufacturing environment some aspects of the rigidity and strength of the cutting tool (□4) were not considered. The depth of the pocket is 25 mm, so the proportion between tool diameter and depth is: 4/24=0,16. As the length of the wall increases, the length of the tool increases. This means that the tool should be fed much more slowly, increasing the cost. For strength the proportion should be greater than 1/3. In the considered feature it means that federates should be much slower.

Tab. 3: Time calculation for machining feature pocket (after changing R3 into R2)

Tool diameter	Machining time [min]	Changing tool time [min]
*Φ*10	6,3	
*Φ*4	4,6	0,2
Total	10,9	0,2

4 Conclusions

Even if most of production managers understand importance of the integration between design and manufacturing, the reality of many companies shows that only few of them have successfully implemented integration. And knowledge of DFM is on low level. The main reason for that is high

diversity of engineering and manufacturing processes and high cost of implementation and changes. Small companies usually works on independence CAD and CAM system, so data integration is hard. Similar situation is with knowledge of STEP standards. Small companies develops his own strategies and relies on multiple technologies.

But modelling in integrated CAD/CAM system using design and manufacture feature offers a number of advantages. Also horizontal approach to modelling in CAD ensure that designing feature directly corresponds to a specific type of machining operation. But the totality of design and manufacturing differs in detail within every manufacturing company.

Design for manufacturing is not a fixed system. DFM is continually being developed, both in university research projects, within companies and by a number of consultants. DFM has been accepted by industry as a valid element in the product design process. Effective DFM encompass two aspects: analysis of the complete product in order to simplify its design and analysis of each individual part and feature to maximize its manufacturability.

References

Anderson David M. (2010) Design for manufacturability & Concurrent Engineering CIM Press, USA 2010.

Bralla James G. (2004), Design for manufacturability handbook. MCGrow-Hill.

Döllner, G., Kellner, P. Tegel, O. (2000) Digital mock-up and rapid prototyping in automotive product development. *Journal of Integrated Design and Process Science*, 2000, 4 (1), 55-66.

Design for manufacturability. (2004) *Handbook*. The McGraw-Hill Companies.

Emad Abouel Nasr, Ali K. Kamrani (2007), Computer Based Design and Manufacturing. Springer, 2007, ISBN 0-387-23323-7.

Jakubowski J.: Computer supported techniques in product development reducing time of its introducing to market. [in:] *Applied computer science, Enterprise application integration*. Technical University of Koszalin, Vol. 3, No1, 2007 pp. 39-54.

Jakubowski J., J. Peterka, Design for manufacturability in virtual environment using knowledge engineering (2014) *Management and Production Engineering Review*. Vol. 5, no. 1, pp. 3-10.

Kacalak W., K. Majewski, K.D. Stuart, Z. Budniak, (2015*)* Interactive systems For designing machine elements and assemblies. *Management and production Engineering Review.* V. 6. No 3.

Nan, F-Q. et al. (2008) Research on collaborative technology of networked collaborative product digital pre-assembly system. *Journal of System Simulation*, 2008, 20 (23), 6418-6423.

Svensson, D., J. Malmqvist., Strategies for Product Structure Management at Manufacturing Firms. *Journal of Computing and Information Science in Engineering*, 2002, 2(1), 50-58.

Step application handbook ISO 10303, 2006 SCRA.

Swedenborg K., M.E.Kantilieraki, (2016) Generating lessons-learnt from welding capability studies at GKN Aerospac*e*, Chalmers Univeristy of technology. Gothenurg.

Identification and Reduction of Product Defects in Mass Production at Toyota Motor Manufacturing, Poland

Waldemar Woźniak, Faculty of Mechanics at the University of Zielona Góra
w.wozniak@iizp.uz.zgora.pl

Witold Nawrocki, Toyota Motor Manufacturing Poland Sp. z o.o. in Wałbrzych
wnawrocki@toyotapl.com

Roman Stryjski, Faculty of Mechanics at the University of Zielona Góra
r.stryjski@iizp.uz.zgora.pl

Julian Jakubowski, Faculty of Mechanics at the University of Zielona Góra
j.jakubowski@iizp.uz.zgora.pl

Abstract

This article presents selected methods for identifying and removing disruption in production, maintenance, quality control and logistics at Toyota Motor Manufacturing, Poland. The examples used show the process of the improvement cycle, in line with the Toyota Production System and the collection of procedures and solutions used throughout Toyota's global operations.

Keywords: Manufacturing, The methodology of Toyota Production Systems, Total Productive Maintenance.

1 Introduction

In times of high competition in the automotive market, modern solutions in production management include, among other things, the basis for maintaining, growing and gaining the position of industry leader. An important argument for the positioning of companies, among competitors, is innovation, perceived, not only from the position of products or services but also in terms of internal processes. Focusing on selected, competitiveness attributes, such as costs, quality and production dates, inter alia, forces the reorganisation, improvement and, above all, changes in management.

'Lean Manufacturing' responds to the need for improvement and is a collection of methods and tools focused on eliminating losses that delay business operations. Thus, Lean Management is focused on finding a way in which the reduction of a chosen attribute, such as cost, time and quality, will indirectly affect customer satisfaction. At this point, any assessment of the elimination of loss in the enterprise, is an increase in the efficiency both of the process and of the resource. The Toyota concern is just such one example of changes in the increase in efficiency of internal processes. For the last hundred years, Toyota has maintained its lead in the automotive industry. This is due, in part, to self-discipline in the organization of the work and the desire to learn from -and use - their own experience to improve their products. The great advantage in all of this is their ability to run the P-D-C-A cycle, that is, the Plan-Do-Check-Action cycle, in order to improve the efficiency of internal processes. However, the impetus for development is usually disruption which may be the basis for increasing the effectiveness of processes in enterprises, where the enterprise has the ability to solve such problems and collect information as to their causes.

The Toyota Motor Corporation has developed its own method of detecting and eliminating disruption and has introduced it into TPS, that is, the Toyota Production System. According to the principle of Genchi Genbutsu - Japanese meaning "Go and contact"- all non-compliant and/or defective products are placed right next to the production line along with a description of the defect and its occurrence. They then become a source of reference for analyzing the causes of defects. This area, as well as the

whole concept of presenting, diagnosing and removing defects, in the product or in the process in this manner, is referred to as the "cabbage patch" (Figure 1).

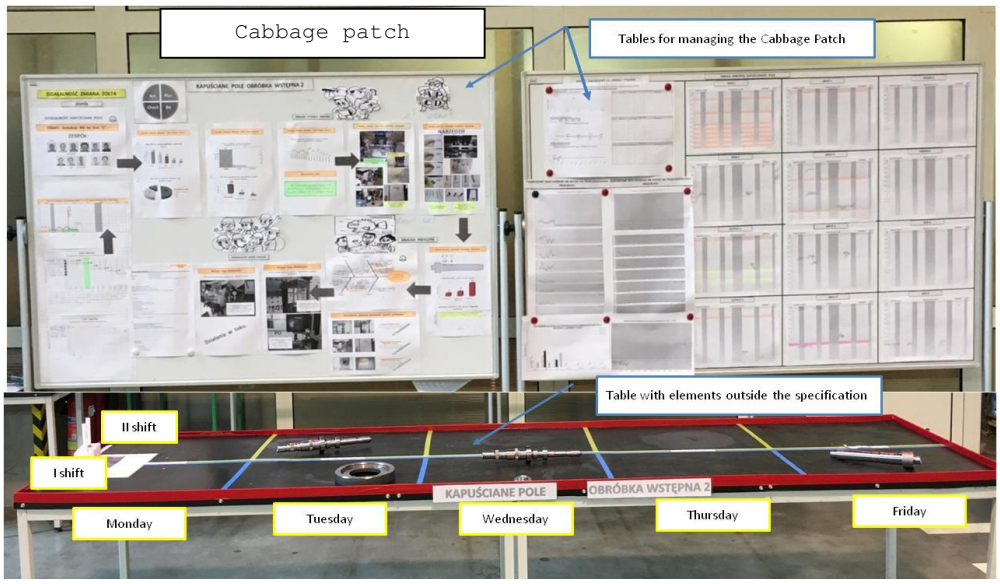


Figure 1: An example of a "cabbage patch" from the Department for the Preliminary Treatment of Gears, (Toyota Motor Manufacturing, Poland - Wałbrzych)

Figure 1 shows an example of a "cabbage patch" at the Toyota Motor Manufacturing Poland in Wałbrzych. The ability to visualise hold-ups or damage and present them with clarity, in order to arrive at a solution, has been the basis for enhancing the efficiency of internal processes, both in production and quality control, in logistics and even in administration. This article presents a case study in which production workers have attempted to bring an end to disruption on the production line, using the "cabbage patch" method.

2 Case Study - Identification Of The Malfunction; Defining The Problem; Defining The Target.

Production line stoppages and an increase in the number of those parts not conforming to specifications were observed, using the 'cabbage patch' method, in the gear machining department. The data collected showed that the highest percentage of elements which did not conform, could be ascribed to three parts, viz., the ring gear (RG), the input shaft (IP) and the output shaft (OP) of the gearbox. Graphical data is shown in Figure 2.

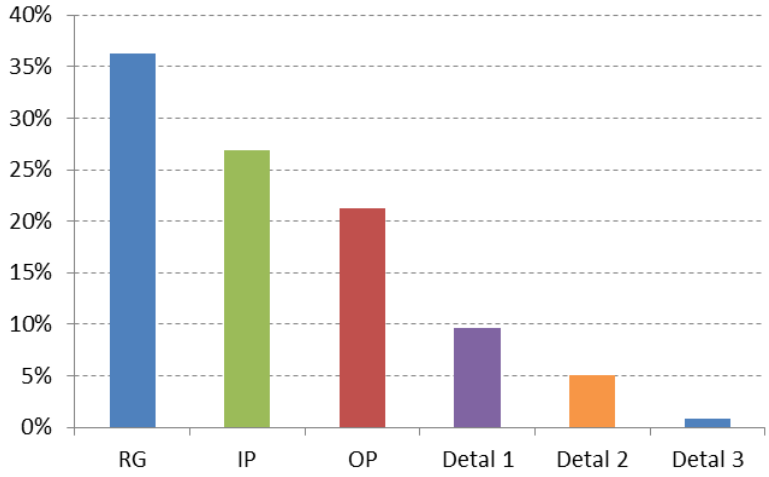


Figure 2: The percentage share of defective parts, according to function -own elaboration.

Using the "cabbage patch" method, particularly the principle of narrowing a problem down, that is, where a most detailed analysis of the cause of the disturbance is carried out, a closer look was taken at the first, three parts (RG, IP, OP), representing about 80% of all details surplus to the specifications. This article describes the analysis of the output shaft (OP) of the gearbox.

Thorough analysis of the OP in the "cabbage patch" indicated the cause of the damage to the part. It was found that more than 50% of the damage to the OP resulted from employing damaged cutting tools (Figure 3) and that that was the cause of the stoppage of the production line. This kind of damage, in addition to loss of output in production, results in the loss of availability on a production line, that is, in the downtime of the line, taken up by re-tooling, inspection and quality control after replacement of the tooling.

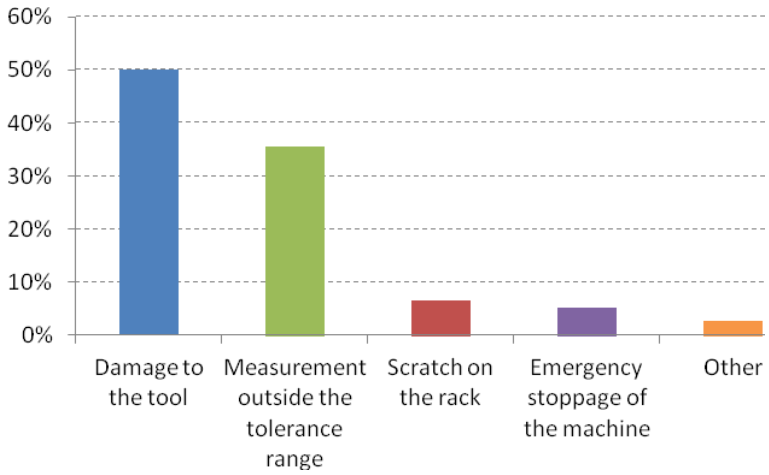


Figure 3: Reasons for defects shown in percentages - own elaboration.

In the next step of the analysis, special attention was paid to damaged tools. Based on the data collected, it was found that the greatest disruption was caused by specific tools, such as drill bits (Figure 4).

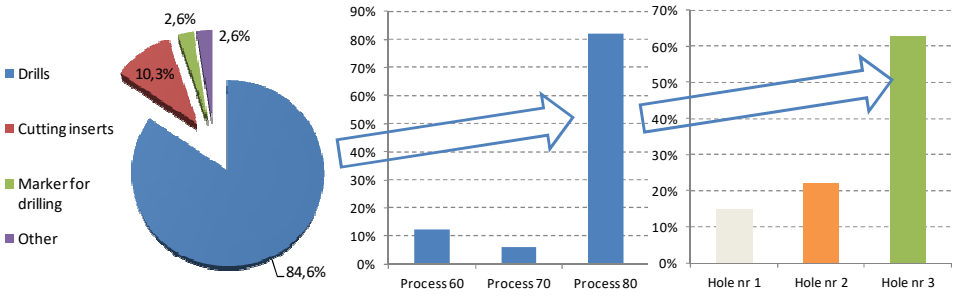


Figure 4: The process of narrowing down the problem: drills -> process -> hole - own elaboration

The technological process of manufacturing the output shaft includes as many as three different operations, in turn, using the above-mentioned drill. These are:
- process 60 - drilling of the main oil channel from the front of the shaft
- process 70 - drilling of the main oil duct from the rear of the shaft
- process 80 - drilling of oil channels for needle roller bearings (1,2,3)

A diagram of all the drilling processes is shown in Figure 5.

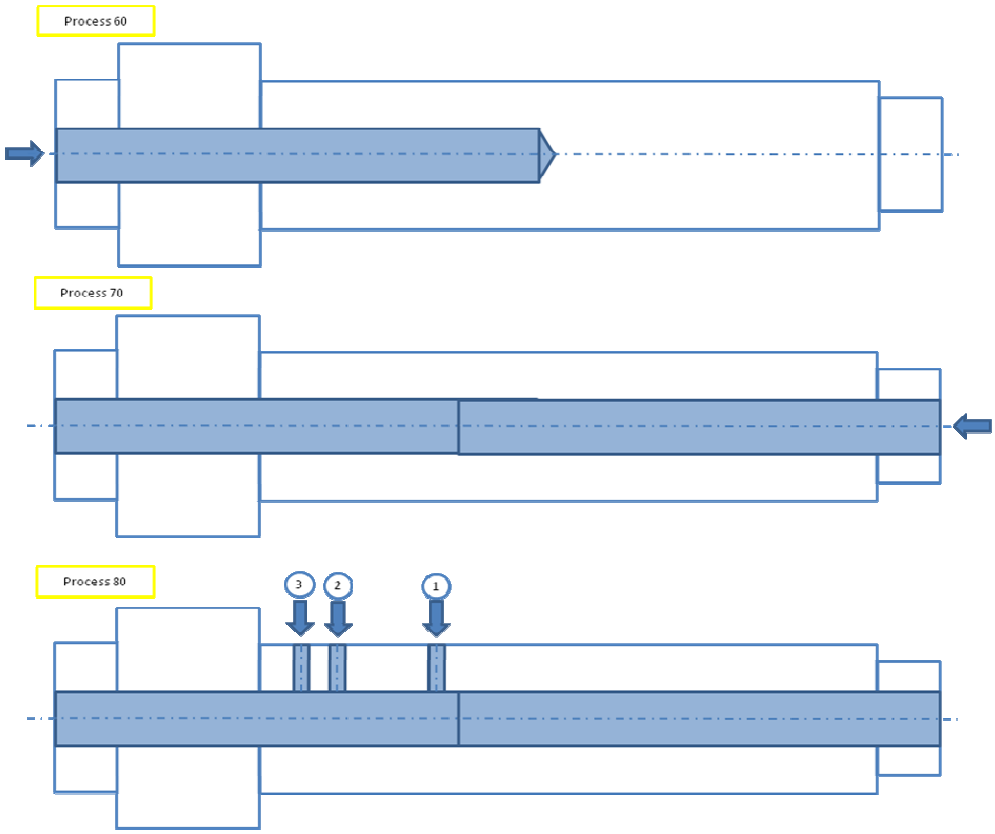


Figure 5: Diagram of operations using drills when machining the OP, own elaboration.

In successive stages of narrowing down the problem; over 80% of drill breakages were observed in the 80th. process, while drilling hole no. 3 (63% of the damage).

In the 80th. process, there is only one tool - a drill with a diameter of 3-mm. Individual stages in narrowing down the problem are shown in Figure 5.

The fact is that very specific damage usually occurred in 94% of those cases where it was being used within the 350th. to 500th. workpiece in the range. In turn, according to the guidelines of the tool's supplier, the life of a drill should last for the machining of 500 parts (Figure 6).

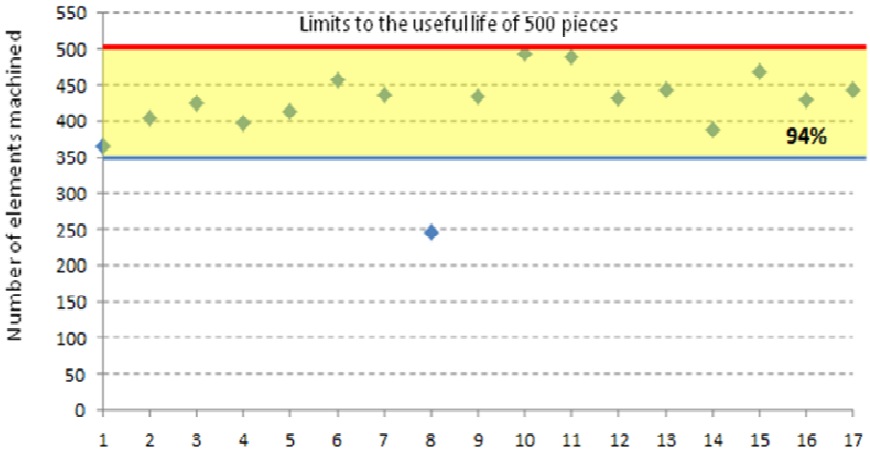


Figure 6: The relation between individual defects in the drill and the number of parts machined -own elaboration.

Based on the research described above, defined in Toyota as the "Genchi Genbutsu" practice, the problem is defined as follows:

Defects in drills with ϕ3 when drilling the third oil hole of the output shaft in the 80th. process at the end of the drill's life cycle, that is, in the last 10% of serviceability.

After the problem had been identified, the aim of improving the process and reducing the number defective products, in line with the SMART principle was set in the following manner: during the following production month (T), reduce the damage of drill ϕ3 (S) while drilling hole no. 3 in the 80th. process (R) to zero (M, A).

In the research proceedings accepted, the focus was not on the defect itself, but rather more on the process, assuming that the elimination of disruption to the production process would automatically eliminate defective elements, based on the principle that a 'good process, produces a good product'.

3 Utilisation Of The System Tools Employed By Toyota Production In The Reduction Of Disruption, As Diagnosed

Once the target had been determined, a cause and effect analysis of the disruption diagnosed was undertaken, in order to find the root cause of the problem. The most common tool at this stage is the Ishikawa Diagram, also known as the Fishbone Diagram, or the 4M analysis (Man, Machine/Process, Material). The simplified Ishikawa Diagram, referring to this example, is shown in Figure 7. The above tool facilitated the pinpointing of the most probable causes of disruption, namely:

- disruption to the process of cooling and flushing away of shavings,

- damage to the drill bits while setting them prior to machining,
- no optimal drilling parameters, such as for the cutting speed or for the blade feed.

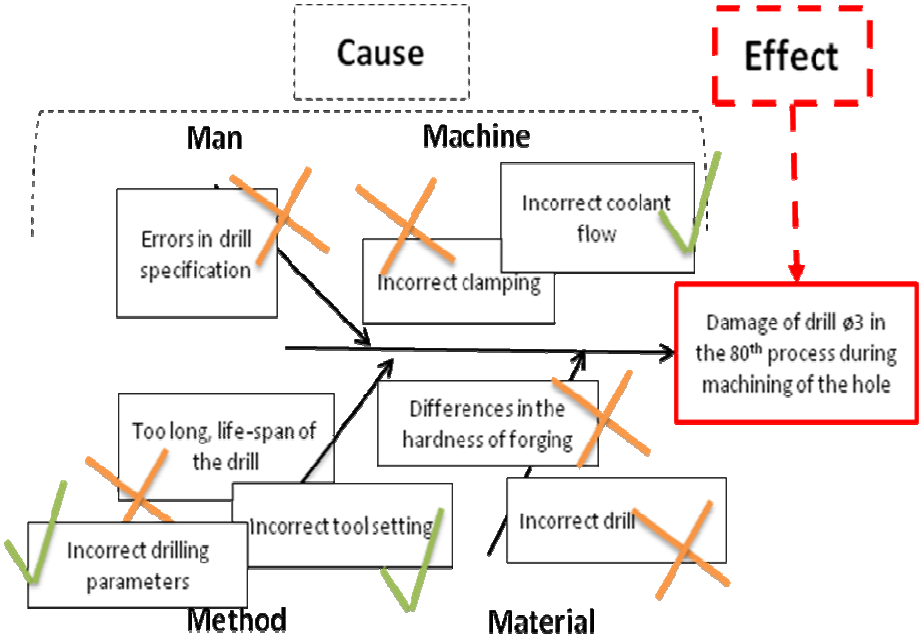


Figure 7: A simplified Ishikawa Diagram - own elaboration according to the methodology of the Toyota Production System.

According to TPS methodology, each probable cause should be confirmed experimentally, that is, by reproducing or simulating the cause. In this case, confirmation of the cause started by establishing the correct method in which to set the tool before machining. The 'contact' method is used for setting tools to machine gear wheels. Accuracy of the height of the tool is confirmed with a measuring lance. A diagram of the process is shown in Figure 8.

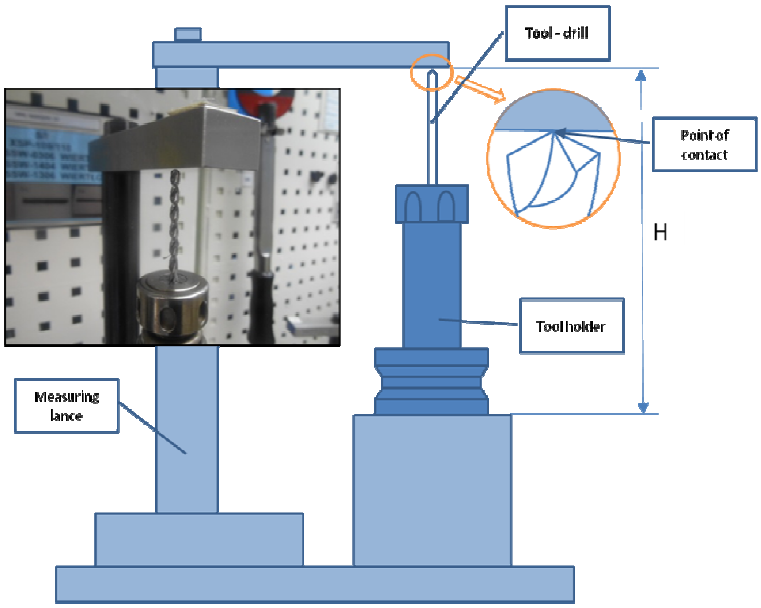


Figure 8: A diagram of the tool setting process using a measuring lance -own elaboration.

In experiments, it was found that the drill bit is in contact with both the measuring lance and with the tip of the drill, when setting the drill, q.v. Figures 8, 9 - the point of contact. The contact of these two surfaces leads to micro-damage of the drill wall. It was decided to improve this matter by changing the method of setting the drill bit from the 'contact' method to the 'non-contact' method. The non-contact method was put into effect with the projector, or Shadowgraph (Figure 9).

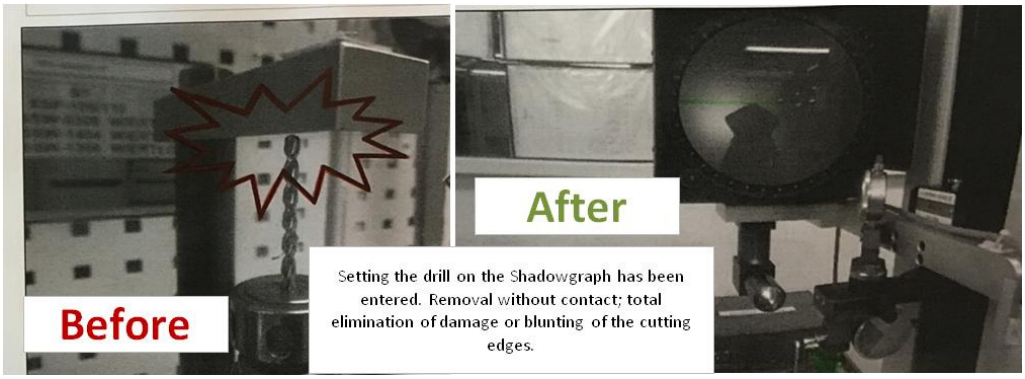


Figure 9: Improvement in setting the drill - own elaboration

Improvements to the method of setting the drill have resulted in an 85% reduction in the number of drill bits used, as shown by the employees' control sheet (Figure 10). The control sheet is the standard used in Toyota's "cabbage patch" method. Current results related to the problem under investigation, along with the plan for the implementation of remedial measures and any unusual non-standard phenomena, occurring in the process, such as any interruption to the flow of the cooling fluid, are logged on the control sheet.

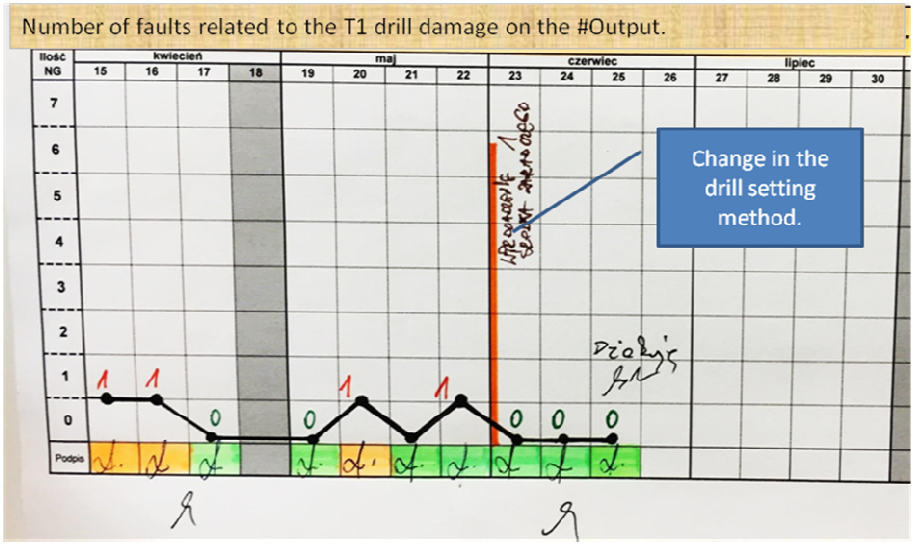


Figure 10: A sample control sheet used in the "cabbage patch" method.

The next step in solving the problem was to put in place the short-term and the long-term remedies planned.

In this case, in addition to the method described above, further procedures were adopted, in the following manner:

A. short-term:
   a) unblocking the flow of the drill coolant and introducing a flow-meter, in order to control cooling during machining - the TPM element (Total Productive Maintenance)
   b) maintenance of the concentration of the coolant, within the range +/- 1%
B. long-term:
   a) verification of the cutting parameters applied,
   b) introduction of protective coatings along the cutting edge.

As can be seen from the above, the short-term and long-term use of the remedies adopted is in line with the TPM (Total Productive Maintenance) pillars, both in terms of improving the process and in the refinement and autonomous maintenance of product quality.

4 Summary

The Lean Manufacturing concept is primarily based on the Toyota Production System, with the basic tools having been derived therefrom. The fundamental principle of Lean Management is the concept of value and the elimination of losses, inherently related to it. The basic tool in Lean Management is standardisation which is the most effective way of performing particular activities, operations or processes. In Japan, 'standard' is the easiest and safest of processes, as they are seen to be the most cost-effective and productive and also ensure the best quality for the customer.

The Toyota Production System consists of two cohesive pillars, viz., the 'Just-In-Time' pillar - indicating prompt delivery- and the 'Jiodka' pillar- which ensures product quality [4]. The first pillar, that is, the Just-In-Time pillar, relating to promptness of delivery, primarily ensures for Toyota, the elimination of the huge waste of overproduction.

The philosophy of Toyota, would collapse without the second pillar, as it would be of no use if they delivered on time, yet delivered products of inferior quality. Toyota does not believe in

compromising on quality. Right from the start, at Toyota, the machines were stopped as soon as any problem appeared – hence, the Andon Visual System which can spot deviations from the standard. In order to ensure quality, Toyota has always tried to incorporate monitoring into the process in order to be able to respond immediately. In resolving their many problems, the Japanese have developed methods to reach root causes of problems with methods such as the "cabbage patch" method, described in this article, upon which, the cycle for increasing the effectiveness of internal processes is based; in this manner, the “cabbage patch” method brings together the two most important pillars of the Toyota Production System.

5 References

Jacyna-Gołda I., Lewczuk K., The method of estimating dependability of supply chain elements on the base of technical and organizational redundancy of process. Eksploatacja i Niezawodnosc – Maintenance and Reliability. Vol. 19 No. 3, str. 382-392, 2017 r. ISSN 1507-2711

Walton M.: Deming Menagemnet Method, Management Books 2000, 1992,

Schonberger R. J., Japanese Manufacturing Techniques: Nine Hidden Lessons in Simplicity, The Free Press, New York 1982.

Bagińska J., Sawicki P., The model of quality awareness formation among emplyees in the automotive industry. Proceedings of 24th International Conference on Production Research, Poznań, Poland, July 30 - August 3, 2017.Schonberger R. J., Japanese Manufacturing Techniques: Nine Hidden Lessons in Simplicity, The Free Press, New York 1982.

Jeffrey K. Liker, Gary L. Convis: Droga Toyoty do Lean Leadership, MT Biznes, Warszawa 2012, , ISBN: 978-83-7746-406-9.

Masaaki I: Gemba Kaizen. Zdroworozsądkowe podejście do strategii ciągłego rozwoju, MT Biznes, Warszawa 2012, ISBN: 978-8-3904-5250-0.

Sąsiadek M., Basl J.: Lean production in practice, Innovation Vision 2020: from Regional Development Sustainability to Global Economic Growth : proceedings of the 25th International Business Information Management Association Conference, Amsterdam, Holandia, 2015 .- [B. m.] : International Business Information Management Association (IBIMA), 2015, p. 699—705.

Bagińska J., Sawicki P., The model of quality awareness formation among emplyees in the automotive industry. Proceedings of 24th International Conference on Production Research, Poznań, Poland, July 30 - August 3, 2017.

Woźniak W., Nawrocki W., Stryjski R., Jakubowski J.: Diagnosis of proces parameters which reduce the defective parts in mass production, Proceedings of the 29th International Business Information Managemant Association Conference, Vienna, Austria, 2017 – Norristown: International Business Information Management Association (IBIMA), 2017, p. 2628-2635.

Knowledge and Skills Required in Accounting Education: A Comparative Study

Rim Khemiri, Assistant professor, Institut du Développement et de la Prospective/IDP, University of Valenciennes and Hainaut-Cambrésis, France, Rim.Khemiri@univ-valenciennes.fr

Abstract

Some factors, such as technology and globalization have generated fundamental changes in the business environment and have given rise to new needs in terms of knowledge and skills which the accounting profession must meet. Academic accounting education should therefore continually evolve in order to better prepare future professionals for these new needs. This research aims to ascertain the knowledge, skills and teaching methods considered to be the most important for the successful practice of certified public accountants (CPA), and to compare the results with the curriculum and the pedagogy used in Tunisian universities. For this purpose, we conducted a survey of 306 CPAs and CPA trainees in Tunisia. The research focuses on four dimensions: knowledge (19 items), professional skills (22 items), technological skills (18 items), and teaching methods (12 items). This paper presents what the respondents agreed upon as being the most important in terms of knowledge, skills, and teaching methods for the accounting education of CPAs, although results indicated that there are significant differences among subgroups regarding the perceived importance of such knowledge and skills. The findings also revealed that there is a gap between the academic accounting education provided and the needs of the profession.

Keywords: Accounting profession, Accounting Education, Knowledge, Skills, Teaching methods.

Introduction

We are witnessing an unprecedented acceleration of the evolution of the business environment, particularly in terms of globalization, market liberalization and the diffusion of new technologies. This results in a constant pressure on higher education institutions, so that they take into account these new constraints and adapt constantly. Accounting education is no exception to the rule, and it has now become necessary to make it evolve by introducing new goals, new tools and new courses.

This development is all the more urgent since some researchers (Albrecht and Sack, 2000, Sanders and Romeo, 2000, Sanders et al 2001) have highlighted two disturbing phenomena in the United States: increasingly fewer students opt for educations in accounting, and it is the least brilliant of them who are now choosing this discipline. We can question the extrapolation of these trends in our case, Tunisia. Developments related to globalization, liberalization of markets and the diffusion of new technologies require expanding both the knowledge and the skills from professional accountants in order to meet the needs of the profession in a changing environment. Several previous studies have examined the question of what should be the knowledge and skills components in accounting education programs.

Our research fits into this context. Through a questionnaire-based survey administered to Tunisian professional accountants, we will seek, first, to highlight the knowledge, skills, and teaching methods seen as important for professional accountants and, secondly, we will conduct a comparative study regarding the knowledge and skills perceived as necessary by professional accountants practicing in the United States, China, and Tunisia.

Thus, to adapt to the environmental changes mentioned above, accounting education must evolve in order to prepare future professionals for these new requirements. Hence the interest of our research questions: What kind of knowledge, skills and teaching methods are seen as important for professional accountants? And secondly, do the needs of the profession match the present accounting education offered?

Our analytical perspective is, firstly, to present the study background and the relevant literature related to it; and secondly, to highlight the methodological approach that we followed; and lastly, to expose the perceptions of the Tunisian professional accountants regarding the perceived importance of the needs, and the perceived differences seen in terms of needs in several countries.

1. Study Background

In recent decades, considerable changes have occurred in the business environment, as well as in the nature and the role of the accounting profession. These changes have led accounting education to fundamentally call itself into question (Sundem and Williams, 1992, Williams, 1993, Nelson et al 1998, Albrecht and Sack, 2000). Indeed, in western countries, several academic studies and professional reports have identified issues related to the accounting curriculum.

These latter are considered traditional because they are focused on the training of students to prepare for professional qualifying exams, to the detriment of teaching a broader base of knowledge and professional skills (American Accounting Association-AAA 1986, Sundem, 1992, Kimmel, 1995, Cummings et al 2001, Barsky et al 2003, Gibbin, 2002).

These significant criticisms from the accounting profession, as well as the rapid evolution of technologies, economic globalization, and increasing competition in the business world have led teachers in the accounting field to undertake a reform of accounting education in recent years, both in the United States and in other countries (Montano et al 2001, Burnett, 2003, Forristal, 2002, Howieson, 2003, Taylor and Rudnick, 2005).

Thus, in the American context, since 1986 and in order to cope with these changes, the major accounting firms (the "Big Four") created a dedicated commission to study the correlation between accounting education programs and the requirements of the accounting profession resulting from new economic conditions. Due to perceived deficiencies in accounting education, a great number of studies have been conducted, seeking to improve it. Several studies were conducted in the United States, including the report prepared by the Bedford Committee (AAA, 1986) promoting the reform of accounting education in the United States. Later, one report focused on the prospects of international accounting firms and education (Arthur Andersen and Co, 1989) and, in 1990, the AECC (Accounting Education Change Commission) published a report entitled: *Objectives of Education for Accountants*, stating that the main objective of accounting education is to prepare students to become professional accountants, instead of being professional accountants when they enter the profession (AECC, 1990). In 1992 the AECC finally recognized the existence of a mismatch between the desired profile of the professional accountant and the qualities offered by accounting education programs. Furthermore, in its report on the future of the profession, the AICPA (American Institute of Certified Public Accountants) called for a change in the accounting curriculum in order to meet the requirements of the accounting profession (AICPA, 1998).

For exemple, these different studies have demonstrated the need to extend the accounting curriculum towards a general accounting education, rather than focusing on traditional training that is overly focused on preparing students for professional qualification exams (Sundem, 1992, Williams, 1993, Wilson and Baldion, 1995). Indeed, in higher education institutions in many countries, most accounting programs have been built too narrowly, with limited knowledge and a lack of skills needed to perform the accounting profession (AAA, 1986, AECC, 1990, Nelson, 1996, Albrecht and Sack, 2000, Aly and Islam, 2003). In their report entitled *Accounting Education: Charting the Course through a Perilous Future*, the same view is shared by Albrecht and Sack (2000). These authors have

reached the conclusion that accounting education should change if it is to be relevant and add value to the students and the community. Some educators have heard these warnings and have made significant changes to their programs and curricula. However, in general, the changes undertaken in accounting education have not been expansive enough or were too superficial. A change is all the more urgent since Albrecht and Sack (2000) found a decrease in the number of students enrolled in accounting. They also noted that both accounting practitioners and teachers have made alarming statements about students enrolled in accounting, saying that students completing their studies in accounting would not be real specialists in accounting. These are serious problems and we believe that the criticisms are well-founded. Not to mention the threats resulting from market changes and the fact that some factors are not controlled. In addition, Albrecht and Sack argue that the current accounting education should focus on teaching professional skills and greatly expanding the knowledge base. In their report, Albrecht and Sack list a set of knowledge, professional skills, technological skills, and teaching methods, and study the perceived importance of American practitioners and teachers regarding the components of this list. They found that there is a gap in the perception of the importance as well as at the level of the ranking of the knowledge, skills and methods. Teachers are following in the path of the practitioners in recognizing the importance of teaching a number of skills and extra-accounting knowledge (Albrecht and Sack, 2000). The authors essentially recommend reconsidering the content of programs, focusing on the development of skills at the expense of the excessive accumulation of knowledge, and changing the pedagogy.

Later, in 2002, Francisco and Kelly proposed a continuation of Albrecht and Sack's work, particularly in the area of skills development. To do this, students were asked to assess different professional skills in order to identify those that were the most important for their future career. They identified differences in the perceived importance of these skills between students enrolled in accounting education and those registered in other disciplines. Although there are some variations in the perceptions of students with practitioners and teachers, all stakeholders nevertheless agreed on the need for an immediate and thorough reform in accounting education (Albrecht and Sack, 2000, Francisco and Kelly, 2003, Graves, 2004, Russell and Smith, 2003). Since the report by Albrecht and Sack (2000), concerns about the curriculum, seemingly unchanged in the post-Enron era, have been renewed. Attempts to fill in the gaps have not achieved a significant change, and accounting education continues to be "limited, focusing strictly on technical accounting" (Boyce, 2004). Several authors have criticized the limited reaction of academics following the accounting scandals, and advocated broadening the base of accounting education by addressing the economic, social, cultural, and political roles of accounting (Ravenscroft and Williams, 2004, Cooper et al 2005, Diamond, 2005, Ferguson et al 2005, Ferguson et al 2006). More specifically, Ravenscroft and Williams (2004) argue that "there are currently serious omissions in the accounting curriculum which must be rectified, and that accounting students are poorly trained in some critical areas.

Although resistance to changes in accounting education seems to be considerable (Albrecht and Sack, 2000, Gibbin, 2002, Fedoryshyn and Tyson, 2003), the above studies and reports produced a positive impact on the development of the accounting education in the Chinese context. Indeed, recent studies have focused on the context of an emerging country as China (Lin, et al 2005, Lin, et al 2008). In recent years, due to the rapid evolution of economic reforms and the internationalization of Chinese accounting, accounting education underwent considerable changes to adopt western systems (Tang, 1997, Chan, 1999, Rahaman, 2005). However, after more than two decades of reforms, the Chinese system of accounting education is now quite similar to the U.S. model, deemed traditional (Wu and Tong, 2004). It is in this context that Lin et al. (2005) estimate that the Chinese accounting profession should now expect a higher level from the students enrolled in accounting who will be the future professionals. For this, the authors have sought the views of students, teachers and accounting practitioners about their perception of the importance of the require knowledge, skills, and pedagogy, and their assessment of whether or not the specified knowledge and skills component have effectively been delivered by the existing accounting curriculum and pedagogy in China. Although there is some variance in the survey responses, they generally agreed on a set of knowledge and skills and methods deemed important for the training of students. The results also reveal a gap between the most important knowledge and skills for the profession and those taught. Thus, it appears that the reform of accounting education in China is not only necessary, but indispensable.

At the international level, the problem of professional accounting education has become increasingly important, which led the IFAC (International Federation of accountants) to conclude that it is imperative to develop a general framework and standards governing accounting education. To do this, the IFAC Education Committee (International Accounting Education Standards Board - IAESB) has developed international standards of education aimed at professional accountants (International Education Standard - IES). In addition, the International Educational Guideline (IEG) No. 9 of IFAC asserts that "the objective of theoretical education in accounting is to prepare future competent professional accountants […] it is necessary to offer an education that provides them with knowledge, skills and rules that allow them to continue to enrich their background and adapt to change throughout their active life"(IFAC, IEG N° 9, 1991).

In conclusion, the experience of the reforms in accounting education in the United States, in China, as well as in other countries is a relevant reference from which we can draw the inspiration to change the accounting education in other contexts. Given the rapid integration of the Tunisian economy in the global markets through its production of high technology products and the globalization of its trade activities, accounting education in Tunisia is similar to that of the western world. It is, as such, also confronted with this new requirement which has the objective of training students in order to meet the challenges arising from the changing business environment. It seems to us that it is time to suggest changes in the accounting education in order both to broaden the base of knowledge and to develop skills, and change teaching methods. The timing is particularly appropriate since the Tunisian government is currently putting implementing LMD reform (Licence-Master-Doctorate).

2. Methodological Approach

In light of our research questions and our objectives, we chose to conduct a survey using a questionnaire prepared based partly on the literature focused on the theme of the needs of the accounting profession and accounting education, and partly on the IES and, lastly , on the various existing questionnaires on this theme. The first draft was submitted to three phases of pre-testing. Once finalized, our questionnaire was administered to the 615 [1] certified public accountants (CPA) enrolled in the OECT, as well as to the 444 [2] certified public accountant trainees [3] (CPAT) who passed the national CPA examination and were, at the time, doing their internship [4].

Our survey instrument includes a list of knowledge (19 items), professional, and technological skills (respectively, 22 items and 18 items), as well as teaching methods (12 items). We asked respondents to express their views about their perception of the importance of the required knowledge, skills, and pedagogy on a scale of 1–4 (1 represents not at all important; 4 is very important).

CPA education seems appropriate to our object of research for three reasons. Firstly, in the Tunisian context, CPA education is training that deals with a very broad program, encompassing different subject matter already studied in the master of accounting (level: high school diploma +4 years). Secondly, the Tunisian CPA education leads to a prestigious national examination. Thirdly, success in this exam allows students to become a CPA after the completion of three years of internship.

An initial release of our survey instrument was conducted by e-mail in September 2010. We then presented the questionnaire by hand to the 350 CPAs and CPATs who had not yet responded to our email. After four reminders, we received 131 questionnaires from the CPAs and 175 questionnaires from the CPATs. Altogether, 306 usable questionnaires were collected and were entered into SPSS.

The overall response rate was 37%, including 26% for the CPAs and 48% for the CPATs.
Statistical tests carried out in this study are descriptive statistics and comparison of means tests.

3. Professional Accountants' Perceptions

In this part of the study we will present the perceptions of professional accountants. First, we will put forward the differences in perception between the Tunisian CPAs and CPATs about the importance

of the needs. These needs are seen in terms of knowledge, professional and technological skills, and finally, in terms of teaching methods. Then, we will propose a comparison of perceptions in terms of needs from professional accountants who are in developed, emerging, or developing countries. These countries are the United States, China, and Tunisia.

3.1. Perceptions about the Needs

Tables 1, 2, 3, and 4 present the descriptive statistics of our survey results. Mean scores and standard deviations for each item of the knowledge, skills and teaching methods are listed in Panel 1, 2, 3, and 4 respectively. The ranking order of the perceived importance of those items (based on their mean scores) is indicated as well. A significance test of means was also carried out based on the one-way ANOVA. This test allowed us to determine if the status of respondents (CPA or CPAT) is statistically significant in the evaluation of each item.

3.1.1. Results

From the first column in Table 1, we can notice that, at the aggregate level, the respondents identified tax, auditing/assurance services, business law, financial accounting, managerial accounting, information systems, finance, technology topics, business strategy and electronic commerce as the ten most important knowledge subjects. Analytical/critical thinking, oral communication, foreign language, written communication, professional demeanor, measurement, risk analysis, teamwork, continuous learning and computing technology were identified as the ten most important professional skills (Table 2). According to Table 3, spreadsheet software, word processing software, world-wide web searching, systems analysis, windows, presentation software, database software, file & directory management, project management and communication software are, in turn, considered by respondents as the ten most important technological skills. Finally, assignments with real companies, team teaching, case analysis, team (group) work and role playing were identified as the five most effective methods for training accounting students in the current business environment in Tunisia (Table 4).

Table 1: descriptive statistics and importance ranking of Knowledge

Panel 1: Knowledge	Total population N= 306			Certified Public Accountants N=131			Certified Public Accountants Trainees N=175			F (P) [5]
	Mean	Standard deviation	Rank	Mean	Standard deviation	Rank	Mean	Standard deviation	Rank	
Taxes	3.7778	.50858	1	3.7481	.50144	1	3.8000	.51417	1	.780(.378)
Auditing/Assurance services	3.6209	.61678	2	3.7176	.46863	2	3.5486	.70032	3	5.711(.017) *
Financial accounting	3.6046	.55855	3	3.5802	.54000	4	3.6229	.57290	2	.437(.509)
Business law	3.5882	.61702	4	3.6794	.53013	3	3.5200	.66816	4	5.066(.025) *
Managerial accounting	3.4771	.63334	5	3.5496	.58459	5	3.4229	.66397	6	3.021(.083)
Information systems	3.4477	.73253	6	3.5420	.62338	6	3.3771	.79910	8	3.829(.051)
Finance	3.4020	.60479	7	3.3435	.56529	8	3.4457	.63079	5	2.148(.144)
Technology topics	3.3856	.88057	8	3.3511	.82204	7	3.4114	.92344	7	.350(.554)
Business strategy	3.1536	.74169	9	3.2748	.78499	9	3.0629	.69608	9	6.223(.013) *
Electronic commerce	3.0098	.93207	10	3.1908	.91243	10	2.8743	.92610	12	8.864(.003) **
Statistics/Quantitative methods	2.9902	.98675	11	3.0763	.87370	13	2.9257	1.06143	10	1.750(.187)
Organizational behavior/Human resource management	2.9281	.94854	12	3.1527	.80835	11	2.7600	1.01120	13	13.359(.000) **
Accounting research methods	2.8922	.84822	13	2.8779	.78469	14	2.9029	.89490	11	.065(.799)
Ethics and social responsibility	2.8497	.99026	14	3.0992	.91865	12	2.6629	1.00318	16	15.227(.000) **
Operations/Supply-chain management	2.7712	.96833	15	2.8244	.85468	15	2.7314	1.04600	14	.690(.407)
Global/International business	2.7222	.90787	16	2.7939	.86574	16	2.6686	.93703	15	1.430(.233)
Economics	2.4085	.85687	17	2.7405	.83747	17	2.1600	.78609	18	38.620(.000) **
Marketing	2.3431	.87022	18	2.5573	.83353	18	2.1829	.86486	17	14.480(.000) **
Retail and sales	2.1928	.90468	19	2.4046	.85735	19	2.0343	.90907	19	13.047(.000) **

Table 2: descriptive statistics and importance ranking of Professional skills

Panel 2: Professional skills	Total population N= 306			Certified public accountants N=131			Certified Public Accountants Trainees N=175			F (P)
	Mean	Standard deviation	Rank	Mean	Standard deviation	Rank	Mean	Standard deviation	Rank	
Analytical/Critical thinking	3.6928	.55846	1	3.6947	.50980	5	3.6914	.59373	1	.002(.960)
Oral communication	3.6732	.58203	2	3.7863	.42981	1	3.5886	.66253	4	8.866(.003) **
Foreign language	3.6536	.57625	3	3.7328	.49341	3	3.5943	.62604	3	4.378(.037) *
Written communication	3.6275	.62076	4	3.7099	.48814	4	3.5657	.69891	7	4.084(.044) *
Professional demeanor	3.6176	.62270	5	3.6260	.50132	6	3.6114	.70130	2	.041(.840)
Measurement	3.6013	.65125	6	3.6260	.57293	7	3.5829	.70527	6	.327(.568)
Risk analysis	3.5784	.67415	7	3.6183	.56102	8	3.5486	.74794	8	.801(.371)
Teamwork	3.5458	.63726	8	3.4885	.63690	15	3.5886	.63598	5	1.851(.175)
Continuous learning	3.5098	.69299	9	3.5344	.61140	13	3.4914	.74947	9	.287(.593)
Computing technology	3.5000	.67872	10	3.5573	.57056	12	3.4571	.74829	10	1.633(.202)
Interpersonal	3.4837	.69758	11	3.5649	.56974	11	3.4229	.77574	12	3.127(.078)
Entrepreneurship	3.4706	.72933	12	3.5267	.58610	14	3.4286	.81951	11	1.358(.245)
Decision-making	3.4085	.72866	13	3.4580	.65936	16	3.3714	.77629	13	1.058(.304)
Research	3.3889	.73934	14	3.5802	.59426	9	3.2457	.80385	14	16.088(.000) **
Leadership	3.3562	.76001	15	3.5649	.60890	10	3.2000	.82351	15	18.245(.000) **
Negotiation	3.2941	2.41954	16	3.7557	3.51500	2	2.9486	.86615	20	8.544(.004) **
Project-management	3.2320	.72998	17	3.3511	.61923	17	3.1429	.79303	16	6.204(.013) *
Customer orientation	3.1699	.77916	18	3.2137	.72332	20	3.1371	.81899	17	.723(.396)
Resource-management	3.1503	.74896	19	3.3053	.68940	19	3.0343	.77235	18	10.106(.002) **
Change-management	3.0392	.80067	20	3.1298	.77853	21	2.9714	.81246	19	2.949(.087)
Salesmanship	3.0033	.89259	21	3.3359	.76067	18	2.7543	.90476	21	35.394(.000) **
Business Decision Modeling	2.8464	.83329	22	3.0840	.70206	22	2.6686	.88010	22	19.763(.000) **

Table 3: descriptive statistics and importance ranking of Technological skills

Panel 3: Technological skills	Total population N= 306			Certified public accountants N=131			Certified Public Accountants Trainees N=175			F (P)
	Mean	Standard deviation	Rank	Mean	Standard deviation	Rank	Mean	Standard deviation	Rank	
Spreadsheet software (e.g. Excel)	3.7353	.55974	1	3.7634	.47769	1	3.7143	.61455	1	.575(.449)
Word processing software (e.g. Word)	3.5850	.61215	2	3.5420	.59820	2	3.6171	.62214	2	1.130(.289)
World-Wide Web searching	3.5033	.67386	3	3.4427	.62216	5	3.5486	.70848	3	1.853(.174)
Systems analysis	3.4412	2.87866	4	3.5191	2.70712	4	3.3829	3.00703	6	.167(.683)
Windows	3.4379	.73623	5	3.4427	.70340	6	3.4343	.76186	4	.010(.921)
Presentation software (e.g. Power Point)	3.3922	.72641	6	3.4122	.64295	8	3.3771	.78458	7	.174(.677)
Database software (e.g. Access)	3.3889	.74377	7	3.5191	.64868	3	3.2914	.79560	8	7.161(.008) **
File & directory management	3.3791	.74223	8	3.3511	.67850	10	3.4000	.78784	5	.324(.570)
Project management	3.3039	.82727	9	3.4122	.71112	7	3.2229	.89798	9	3.963(.047) *
Communication software (e.g. Outlook)	3.2614	.76627	10	3.3817	.71745	9	3.1714	.79096	11	5.728(.017) *
Intra/Extranets	3.2255	.85974	11	3.2824	.77732	11	3.1829	.91648	10	1.005(.317)
Electronic commerce	3.1144	.91794	12	3.0611	.89232	14	3.1543	.93721	12	.772(.380)
Information systems planning & auditing	3.0621	.80535	13	3.1756	.67346	13	2.9257	.98271	15	4.602(.033) *
Technology management & budgeting	3.0621	.83336	14	3.2137	.82282	12	2.9486	.82538	14	7.753(.006) **
Graphics software (e.g. Adobe)	2.9575	.92408	15	3.0000	.84124	15	2.9257	.98271	15	.483(.487)
Other operating systems	2.5261	.95521	16	2.9160	.86858	16	2.2343	.91411	17	43.477(.000) **
HTML programming	2.3922	.99332	17	2.5954	.94282	17	2.2400	1.00550	16	0.871(.002) **
Programming languages	2.3039	.91389	18	2.4275	.80413	18	2.2114	.98020	18	4.231(.041) *

Table 4: descriptive statistics and importance ranking of Teaching methods

Panel 4: Teaching methods	Total population N= 306			Certified public accountants N=131			Certified Public Accountants Trainees N=175			F (P)
	Mean	Standard deviation	Rank	Mean	Standard deviation	Rank	Mean	Standard deviation	Rank	
Assignments with real companies	3.5948	.68173	1	3.6870	.49744	1	3.5257	.78650	1	4.239(.040) *
Team teaching	3.5000	.67872	2	3.5420	.55829	2	3.4686	.75649	2	.876(.350)
Case analysis	3.4608	.63253	3	3.5191	.57313	3	3.4171	.67188	3	1.952(.163)
Team (group) work	3.3922	.73538	4	3.4580	.65936	5	3.3429	.78575	4	1.842(.176)
Role playing	3.3922	.79947	5	3.5038	.67224	4	3.3086	.87539	6	4.520(.034) *
Technology assignments	3.3529	.84520	6	3.3969	.75120	7	3.3200	.90997	5	.620(.432)
Oral presentations	3.1503	.78737	7	3.4427	.60967	6	2.9314	.83452	9	35.130(.000) **
Lecture	3.1275	.76400	8	3.3282	.62564	8	2.9771	.82319	8	16.633(.000) **
Feedback exercises (e.g. Quizzes)	3.1013	.75933	9	3.2214	.68264	11	3.0114	.80221	7	5.818(.016) *
Reading textbooks	3.0392	.80882	10	3.2595	.69711	10	2.8743	.84837	10	17.941(.000) **
Writing assignments	2.9935	.80569	11	3.2672	.67738	9	2.7886	.83452	11	28.851(.000) **
Videos	2.5556	.87132	12	2.7405	.78041	12	2.4171	.91145	12	10.641(.001) **

In addition, Table 1 presents the means and the standard deviations for the CPAs and CPA trainees. For the knowledge components, it is important to note that both CPAs and CPA trainees recognized tax as the most important knowledge. However, some variations exist in the scores of perceived importance and the ranking among the two groups of respondents. Regarding the top five most important knowledge items, CPAs have ranked auditing/assurance services as the second most important knowledge item, although auditing was ranked as the third most important knowledge item by the CPA trainees. Financial accounting is recognized by CPAs as the fourth most important knowledge item, but it was ranked the second most important knowledge item by the CPA trainees. In addition, CPAs ranked Ethics and social responsibility as the twelfth most important knowledge, but ethics was seen as only the sixteenth most important knowledge item by the CPA trainees. We also note rather significant differences in ranking regarding several knowledge items, such as, for example, Information systems, Finance and Electronic commerce. Mean scores of the two groups of respondents concerning the less important knowledge items varied considerably. However, retail and sales were ranked last in accordance with perceptions of the two groups.

With regard to the three most requested professional skills, CPAs and CPA trainees are consistent in the identification of the third most important skill, namely a foreign language. While analytical/critical thinking was ranked by the CPA trainees as being the most important professional skill, it was ranked the fifth professional skill by the CPAs. Regarding oral communication, although it is considered to be the most important professional skill by CPAs, it is only recognized by CPA trainees as the fourth most important skill. It should be noted that CPAs perceive decision-making as a relatively unimportant professional skill (ranked 16th), lower than it was perceived by CPA trainees (ranked 13th). It is also interesting to note that CPA trainees ranked written communication seventh, a skill which practitioners gave a much higher ranking to (fourth most important skill). Other findings seem quite striking, in fact, while some skills are relatively important for CPA trainees, CPAs considered them much less important, for example, teamwork, learning, and entrepreneurship. Conversely, some skills appear to be important for CPAs but not at all for CPA trainees. The most striking example is the one relating to negotiation. Indeed, the group of CPAs perceives negotiation as the second most important professional skill while CPA trainees relegated it to twentieth (Table 2).

Turning now to technological skills, responses displayed in Table 3 show a convergence of opinion between CPAs and CPA trainees in the ranking concerning the two most important technological skills. The two groups of respondents find that mastering spreadsheet software and word processing software are the two most important technological skills respectively. However, differences in rankings between the two groups are numerous. For example, while mastering databases is considered the third most important technological skill by the CPAs, CPA trainees ranked it eighth.

Similarly, world-wide web searching was ranked the third most important technological skill by CPA trainees, but was considered only the fifth most important by CPAs. Other differences in ranking between the two groups may be observed, for example, concerning the use of file & directory management and communications software. However, both CPAs and CPA trainees agreed that programming languages is the least important technological skill.

With regard to the most important teaching methods, surprisingly, both CPAs and CPA trainees identified assignments with real companies, team teaching, and case analysis as the three most important methods. Similarly, the two groups of respondents agreed on the least important teaching method, namely the use of videos. However, Table 4 highlights some differences in ranking, particularly with regard to role playing, technology assignments, and oral presentations. Finally, it is important to emphasize the importance given to writing assignments by CPAs (ranked 9th), while CPA trainees ranked them eleventh.

3.1.2. Analysis

Our survey results reveal that respondents recognize the importance of a series of knowledge, skills and teaching methods for the training of future professional accountants in the changing business environment in Tunisia. In particular, respondents have a consistent perception of the top five most

important knowledge items. As shown in Table 1, the knowledge items perceived as being important are mainly traditional accounting subjects such as auditing, financial accounting, and managerial accounting, while most of the broader types of knowledge received relatively lower scores, for example, ethics and social responsibility, global business, and economics. This result may suggest that the importance of receiving broader knowledge in the accounting education is not fully recognized by the respondents. We can conclude that at present time, accounting education of CPAs in Tunisia has a relatively narrow focus manifested in particular by the concentration on traditional or content-mastery knowledge, while multidisciplinary roles such as management and other areas in social sciences and humanities are not sufficiently addressed [6].

Regarding professional skills, and particularly those ranked highest, it is interesting to note that CPAs' averages are higher than those of CPA trainees. The two groups of respondents rank oral communication among the four most important skills. This seems to contradict the stereotypical impression of isolated professional accountants recording accounting documents throughout the day.

It appears that the respondents understand the interpersonal nature of the accounting environment.
It is not surprising that CPA trainees consider written communication as the seventh most important professional skill while the professionals consider it to be more important. In fact, CPAs are more accustomed to writing business reports and audit opinions, and are therefore more likely to consider the importance of such a skill.

At the aggregate level, analytical/critical thinking is one of the three most important professional skills. However, in our context, only the CPA trainees placed it at the forefront. This can be explained by the fact that most CPA trainees of our sample were exposed to situations that require them to think critically.

Mastering foreign languages were unanimously ranked as the third most important professional skill, both for CPAs and CPA trainees. This result is not surprising given the current emphasis on globalization. Apparently, the two groups felt that English was the language of business and, therefore, they should master it.

Moreover, CPA trainees gave much more importance to professional demeanor (ranked 2nd) than CPAs (ranked 6th). We can explain this result by the fact that, at the beginning of their careers, CPA trainees are more sensitive to ethics and eventually give tremendous respect to their accreditation body.

The ranking of negotiating skill was very high in the CPA sample. Indeed, they regard it as the second most important professional skill because, after many years of practice, they are able to recognize that negotiation plays a major role in their everyday life. Conversely, CPA trainees are still at the level of their internship and haven't faced such situations yet. In the course of their internship, they are assigned tasks that do not require the use of negotiation, for example, bookkeeping and auditing.

The ranking of respondents regarding the five least important skills show less striking diversity than at the level of the five most important skills. Actually, both groups of respondents ranked the following items: customer orientation, resource-management, change-management, salesmanship, and business decision modeling, close together and were unanimous regarding their importance. The results also show that customer orientation is not considered as a very important skill for both CPA trainees and CPAs. This seems surprising on the part of the CPAs who work in firms that depend on their customers. Therefore, they should take more account of the present and future needs of their customers and should meet their requirements and strive to meet their expectations. Change management was considered more important by trainees than by practitioners. This result is surprising since practitioners have had experience in the real world and should therefore be aware that change is part of life. Despite their young age, CPA trainees are aware that all companies must evolve in order to survive in today's dynamic environment.

The rankings of technological skills highlights the agreement of CPAs and CPA trainees regarding the importance given to spreadsheet software and word processing software. Thus, this result shows the importance of the use of spreadsheet software and word processing software in the daily tasks that Tunisian professional accountants are required to carry out, including bookkeeping and the preparation of audit reports. However, it appears that the two groups of respondents do not share the same opinion when it comes to world-wide web searching. CPA trainees give more importance to web searching. This finding could be explained by a shift between two generations. The new generation of Tunisian professional accountants gives more importance to web searching. They therefore understood the relevance of search engines when it comes to seeking information. While it seems that CPAs prefer using more conventional means when it comes to looking for information. HTML programming and programming languages do not appear to be important for the two groups of respondents. We can explain this result by the existence of programming experts who are more likely than professional accountants to carry out programming.

Finally, concerning the teaching methods in accounting education, both groups of respondents have similar views on the importance of the various methods. One notable difference is that practitioners have given greater weight to writing assignments compared to feedback exercises (e.g. Quizzes), while CPA trainees have an opposite point of view. This may be interpreted by the fact that Tunisian CPA trainees should be aware of the importance of the written communication skills that CPAs need (ranked 4th).

3.2. Comparative Study

After having studied the perceptions of the Tunisian respondents about the current education and their needs, we will now offer a comparison of the perceptions of the importance of knowledge, professional skills, technological skills, and teaching methods for professional accountants coming from different economic and cultural environments. Table 5 shows the ranking of the different components of the knowledge, skills, and teaching methods items. The ranking order is determined by the average score of the perceived importance of each item or component. The Tunisian sample data were collected from our survey. U.S. and Chinese data results from studies conducted by Albrecht and Sack (2000) and by Lin et al. (2005) respectively (data for accounting practitioners). Some differences in the perceptions of the importance of knowledge, professional and technological skills and teaching methods among Tunisian, Chinese and Americans respondents must be noticed.

According to Table 5, the ranking of the first three knowledge items is relatively uniform for both American and Chinese samples, namely financial accounting, taxes, and finance. Gaps exist for other knowledge items. For example, there are considerable differences in the ranking of information systems, business law, ethics, and social responsibility. Indeed, information systems was ranked as the second most important knowledge item by U.S. practitioners (Albrecht and Sack, 2000), but ranked eighth by Chinese respondents (Lin, et al 2005), and placed sixth by professional accountants in Tunisia. This difference is probably due to the fact that information systems are much less developed in China and Tunisia than in the United States. Thus, the Tunisian respondents could not give the same high ranking for this item as their counterparts in the United States.

In addition, business law which was classified by Chinese practitioners as the sixth most important knowledge item and by their American counterparts as the tenth most important one has been ranked by Tunisian practitioners as the fourth most important knowledge item. The reason for this may be due to the importance given by the Tunisian accounting profession to the issues of rights. Thus, business law is, at present, considered a very important component of the accounting education in Tunisia.

Another difference to note concerns ethics and social responsibility, which were ranked as the fifth most important knowledge item by Chinese practitioners, the twelfth most important by U.S. practitioners (Albrecht and Sack, 2000) and the fourteenth most important knowledge item by Tunisian practitioners. Such a difference can be explained by the fact that the accounting profession at the worldwide level has established a major emphasis on ethics and social responsibility in recent

years. This happened as a response to public concerns following the Enron and Arthur Andersen case at the beginning of 2001. So, it seems that Chinese have recognized the ethics and social responsibility as a very important knowledge item for accounting education. Obviously, Tunisian practitioners are still not aware of the importance of such knowledge in accounting education.

In addition, as shown in panel 2 of Table 5, there are considerable differences in the perceived importance of the professional skills necessary for professional accountants in the Tunisian, Chinese and American contexts. The major items which received scores of varied importance by Tunisian, Chinese and Americans respondents are especially analytical/critical thinking, professional demeanor, foreign language, computing technology, communications (written and oral), decision-making, change-management and research.

Thus, while Chinese respondents gave information technology a higher rank than American respondents did, Tunisian respondents, for their part, assigned it a rank lower than that of the Americans and Chinese (ranked 10th). This ranking by the Tunisian professionals seems surprising because computerization is now gaining ground in Tunisia. Indeed, the level of computer culture is high in Tunisia and such skills may have been taken for granted by Tunisian professional accountants. Similarly, professional demeanor is ranked by Tunisian respondents as the fifth most important skill, while Chinese practitioners put it in first place and American practitioners only in tenth place (Albrecht and Sack, 2000). The difference may be due to the different business environments of the three countries. Further, as the accounting profession is less mature in Tunisia, Tunisian respondents may feel that it is important to develop professional demeanor to improve the social status and reputation of the Tunisian accounting professionals.

Foreign languages are ranked ninth by the Chinese, while it was perceived as the least important professional skill by American practitioners. However, the Tunisian practitioners put it in the third place. Since the gradual integration of the Tunisian economy in the world market, especially after the entry of Tunisia in the World Trade Organization (WTO), mastering foreign languages has become a very important professional skill and one that is useful for Tunisian professional accountants, allowing them to work for foreign clients or Tunisian companies which possess subsidiaries abroad or working in cooperation with foreign companies. Regarding the American CPAs' ranking of foreign languages, it is possible that respondents consider the English language to be the universal language of business and that communications around the world are generally made in English. Therefore, they minimize the value of foreign languages by considering them to be useless.

Critical thinking, oral, as well as written communications are considered in the Albrecht and Sack (2000) study to be the three most important professional skills in the eyes of American professionals. This view is shared by Tunisian professionals. Chinese respondents, however, give these skills relatively low ranking. This finding may reflect the fact that accounting practices and transactions are quite complicated, so Tunisian professionals employ the analytical and critical thinking and professional judgment in their practice. In addition, the high rankings given to oral and written communication by Tunisian respondents seem surprising. Indeed, this result contradicts the influence of the eastern culture in which individuals are supposed to be humble and must strictly obey the orders or instructions of their superiors. In such a cultural context, bidirectional communication is generally not encouraged and the value of communications skills could be underestimated. These skills are crucial for accountants in a changing and dynamic business world and they should take a greater role in accounting education in Tunisia.

Regarding technological skills, only the U.S. and Tunisian professionals have expressed themselves about their perception of the level of importance of such skills. Moreover, it is interesting to note the convergence of the two groups of respondents particularly at the level of the ranking of the most important technological skills and the least important. On the one hand, U.S. and Tunisian practitioners agree on the importance of spreadsheet software, word processing software and world-wide web searching for the accounting profession. It seems that these three technological skills are widely used in the daily tasks of the practitioners. In addition, this consistency in the perceptions of importance of the two groups of respondents may reflect the level of computerization among the

Tunisian accounting professionals who seem seduced by its multiple benefits: speed, reliability, traceability, inventory management, paper saving and teleconsultation of documents. On the other hand, the two groups of respondents pointed the same technological skills which appear to them to be least important for accounting practice. This is the case, for example, for HTML programming and programming languages. It seems that these skills are considered overly technical specialties for professional accountants and that it is more appropriate to employ a specialist when necessary.

Lastly, the perceived level of importance of teaching methods by U.S., Chinese and Tunisian professionals reveals some differences. While Tunisian respondents rank team teaching second, American respondents rank it eighth. In addition, technology assignments are considered by American practitioners as the most important teaching method. Chinese practitioners rank it fourth, while Tunisian practitioners rank it only sixth. This result shows that the use of technology is part of the American educational landscape. It helps to explain the importance given by American professionals, on the one hand, to technology as being one of the ten most important knowledge items and, on the other hand, to computing technology as being the fourth most important professional skill. We can also notice that Tunisian professionals have not been made sensitive to the completion of technological skills; this could be due to the fact that technological tools have not yet made their appearance in the accounting education of CPAs.

Similarly, respondents do not agree on the importance of writing assignments. While American professionals believe that writing assignments are the fourth most important pedagogical method, Chinese and Tunisian respondents ranked them seventh and eleventh respectively. Such a result confirms the importance given to written communications by American practitioners (ranked the most important skill), which is not the case for other respondents. So, it seems that writing assignments help to initiate the future professionals in the writing of numerous reports that they will be required to carry out, for example, audit reports.

However, the three groups of respondents have similar views in terms of the perceived importance of assignments with real companies, team (group) work, and role playing. These different methods enable developing certain skills required for the accounting practice. For example, assignments with real companies can develop the critical and analytical mind of students. Team teaching could teach students leadership and importance of collaboration. And role-playing introduces students to negotiation. The use of textbooks doesn't seem to be an important teaching method for both American and Tunisian professional accountants. Indeed, the use of textbooks seems to be abandoned in favor of other methods that extend the scope of knowledge and also have the possibility of updating.

Table 5: comparison of importance ranking with Tunisian, Chinese and American samples of accounting practitioners

Professional accountants			
	Tunisia: Khemiri, 2012	**China: Lin & al, 2005**	**USA: Albrecht & Sack, 2000**
Panel 1: Knowledge			
Taxes	1	2	3
Auditing/Assurance services	2	7	6
Financial accounting	3	1	1
Business law	4	6	10
Managerial accounting	5	4	7
Information systems	6	8	2
Finance	7	3	3
Technology topics	8	10	8
Business strategy	9	14	5
Electronic commerce	10	13	9
Statistics/Quantitative methods	11	17	14
Organizational behavior/Human resource management	12	16	17
Accounting research methods	13	-	15
Ethics and social responsibility	14	5	12
Operations/Supply-chain management	15	18	16
Global/International business	16	12	11
Economics	17	9/11 [7]	13
Marketing	18	15	18
Retail and sales	19	19	-
Panel 2: Professional skills			
Analytical/Critical thinking	1	4	2
Oral communication	2	8	3
Foreign language	3	9	22
Written communication	4	3	1
Professional demeanor	5	1	10
Measurement	6	-	20
Risk analysis	7	-	13
Teamwork	8	6	5
Continuous learning	9	-	9
Computing technology	10	2	4
Interpersonal	11	7	7
Entrepreneurship	12	14	19
Decision-making	13	5	6
Research	14	1	18
Leadership	15	10	8
Negotiation	16	15	15
Project-management	17	11	10
Customer orientation	18	16	16
Resource-management	19	12	17
Change-management	20	17	14
Salesmanship	21	18	21
Business Decision Modeling	22	13	12
Panel 3: Technological skills			
Spreadsheet software (e.g. Excel)	1	-	1
Word processing software (e.g. Word)	2	-	3
World-Wide Web searching	3	-	4
Systems analysis	4	-	15
Windows	5	-	2
Presentation software (e.g. Power Point)	6	-	6
Database software (e.g. Access)	7	-	8
File & directory management	8	-	6

Project management	9	-	11
Communication software (e.g. Outlook)	10	-	10
Intra/Extranets	11	-	16
Electronic commerce	12	-	12
Information systems planning & auditing	13	-	12
Technology management & budgeting	14	-	14
Graphics software (e.g. Adobe)	15	-	19
Other operating systems	16	-	20
HTML programming	17	-	21
Programming languages	18	-	22
Panel 4: Teaching methods			
Assignments with real companies	1	3	2
Team teaching	2	-	8
Case analysis	3	2	5
Team (group) work	4	-	3
Role playing	5	7	7
Technology assignments	6	4	1
Oral presentations	7	-	6
Lecture	8	-	12
Feedback exercises (e.g. Quizzes)	9	-	10
Reading textbooks	10	-	11
Writing assignments	11	5	4
Videos	12	-	9

Conclusion

Major changes in the environment of affairs throughout these past 30 years have greatly impacted the accounting profession. The development of globalization and technology has resulted in new requirements for professional accountants. For example, these needs are reflected in the emergence of new missions with high added value, whose demand is ever increasing, such as consulting and opinion services. To carry out these new missions, professional accountants must get an academic education that enables them to develop new competencies (knowledge and skills). The identification of these competencies has been the subject of both academic (Francisco and Kelly, 2003, Lin, et al 2005, Lin, et al 2008) and professional studies (AAA, 1986, AICPA, 1998). All the studies converge and identified a set of knowledge and skills as well as technical, personal, and in the field of ICT.

However, if the Anglo-Saxon countries, including the United States and Australia, were the first to respond to this new economic situation in adopting educational systems capable of providing the future professional knowledge and skills mentioned above, Tunisia, for its part, has set up a higher education system on the License-Master-Doctorate model, without so far, providing a specific accounting educational path for CPA. Can we say that the current system of training CPA in Tunisia is adapted to the needs of the accounting profession?

We conducted a survey on Tunisian CPA and CPA trainees. The results revealed a range of knowledge, skills and teaching methods considered to be the most important. The results also highlight similarities in the perception of knowledge and skills required by professional accountants, whether they be Tunisians, Chinese or Americans. Differences of perception are probably due to the differences in terms of economic and technological development, as well as social and cultural influences that differ from one country to another.

Thus, this research has helped to form two convictions. The first one is that we must continue to think about the pedagogy to adopt in the context of accounting education, as well as the manner in which the knowledge is transmitted. The second is that academic accounting education curriculum plays a crucial role to meet the needs of the profession and influences the development of the profession.

In conclusion, this work cannot claim to have responded to all issues related to the problems and challenges facing accounting education, even less to have found the solutions. One of the main objectives of this study was to try to put the problem in its context and to propose a model for analyzing the situation. Academics in the field of accounting face the challenge of repositioning their discipline in a position of excellence. Indeed, the accounting discipline should be organized in order to benefit from the experience gained particularly over the last decades, to evolve and adapt to new challenges and new expectations of the accounting profession. This can be accomplished only if the academic world agrees to abandon its conformity and its commitment to traditional teaching methods. It is obvious that in the current state, higher education institutions have no choice than to change their methods. The costs associated with the implementation of these changes are much lower than the costs that would be generated by a possible lack of action.

Footnotes

[1] The names of certified public accountants as well as their e-mail address were obtained from the membership directory, available on the website of the organization of certified public accountants of Tunisia-OECT (www.oect.org.tn).
[2] The names of certified public accountants trainees and their email address were obtained from a list that we were provided by the OECT.
[3] Having passed the national examination of certified public accountants in the four public institutions that offer this training and are on period of practical experience.
[4] The period of practical experience should be a minimum of three years.
[5] The significance levels are: ** very significant at the 1% level, ** significant at the 5% level.
[6] As Table 1 shows, most of the broader-type knowledge subjects have received relatively lower scores.
[7] According to the study of Lin et al., 2005, item economy was split in microeconomics (ranked 9th) and macroeconomics (11th).

References

Accounting Education Change Commission. (1990) “Objectives of education for accountants: position statement number one”, Issues in Accounting Education, 5(2), 307–312.

Albrecht, W. S. and Sack R. J. (2000), “Accounting education: charting the course through a perilous future”, Accounting Education, American Accounting Association, Sarasota, FL. Series 16.

Aly, I. M. and Islam M. (2003), “Audit of accounting program on oral communication apprehension: a comparative study among accounting students” Managerial Auditing Journal, 18(9), 751-760.

American Accounting Association. (1986) “Future accounting education: preparing for the expanding profession”, Issues in Accounting Education, 1(1), 168-195.

American Institute of Certified Public Accountant, (1998) The CPA vision project, 2011 and beyond, AICPA web site.

Arthur Andersen and Co. (1989) Perspectives on education: capabilities for success in the accounting profession, New York: Arthur Anderson and Co. et al.

Barsky, N. P., A. H., Catanach, Jr. and Kozlowski, B. M. (2003), “Creating strategic responses to critical risks facing accounting education”, Issues in Accounting Education, 18(4), 445-459.

Boyce, G. (2004) “Critical accounting education: teaching and learning outside the circle”, Critical Perspectives on Accounting, 15(4-5), 565-586.

Burnett, S. (2003) "The future of accounting education: a regional perspective", Journal of Education for Business, 78(3), 129-136.

Chan, L. (1999) "Accounting education and economic reform in the people's Republic of China", International Studies of Management and Organization, 29, 37-55.

Cooper, D. J., Everett, J. and Neu, D. (2005), "Financial scandals, accounting change and the role of accounting academics: a perspective from North America" European Accounting Review, 14(2), 373-382.

Cummings, B., Bennett, R. E. and Normand, C. J. (2001), "Meeting the challenge: the university accounting program corporate American needs", Management Accounting Quarterly, 4-13.

Diamond, M. (2005) "Accounting education, research and practice: after Enron, where do we go?" European Accounting Review, 14(2), 353-362.

Fedoryshyn, M. W., and Tyson, T. N. (2003), "The impact of practitioner presentations on student attitudes about accounting", Journal of Education for Business, 78(5), 273-284.

Ferguson, J., Collison, D., Power, D. and Stevenson, L. (2005), "What are recommended accounting textbooks teaching students about corporate stakeholders?" The British Accounting Review, 37(1), 23-46.

Ferguson, J., Collison, D., Power, D. and L. Stevenson, (2006), "Accounting textbooks: exploring the production of a cultural and political artifact", Accounting Education: An International Journal, 15(3), 243-260.

Forristal, T. (2002) "CAP Forum: The future of accounting education: the response of charted accountants", Canadian Accounting Perspectives, 1(1), 80-88.

Francisco, B., and Kelly, A. (2003), Beyond Albrecht and Sack: a comparison of accounting professionals and college students, Retrieved June 27, from http://www.aicpa.org/download/career/edu/Beyond_Albrecht_Sack.pdf, 2002.

Gibbin, A. L. (2002) "The crisis in accounting education", Journal of Accountancy, 193(4), 81-86.
Graves, O. F. (2004) "A Dialogue on accounting education", The CPA Journal, 74(2), 14-15.

Howieson, B. (2003) "Accounting practice in the new millennium: is accounting education ready to meet the challenge", The British Accounting Review, 35(2), 69-78.

International Federation of Accountants, International education Guideline N° 9, (1991) Prequalification education, assessment of professional competence and experience requirements of professional accountants, Education Committee.

Kimmel, P. (1995) "A framework for incorporating critical thinking into accounting education", Journal of Accounting Education, 13, 299-318.

Lin, Z. J., Xiong, X. and Liu, M. (2005), "Knowledge base and skill development in accounting education: Evidence from China", Journal of Accounting Education, 23(3), 149-169.

Lin, Z. J. (2008) "A factor analysis on knowledge and skill components of accounting education: Chinese case", Advances in Accounting, incorporating Advances in International Accounting, 24(1), 110-118.
Montano, J. A., Anes, J. A. D., Hassall, T and Joyce, J. (2001), "Vocational skills in the accounting professional profile: The chartered institute of management accountants (CIMA) employer's opinion", Accounting Education: An International Journal, 10(3), 299-313.

Nelson, A. T. (1996) "The future for accounting education: A view from rocking chair", Journal of Accounting Education, 14(2), 245-254.

Nelson, I.T., Bailey, J. A. and Nelson A. T., (1998), "Changing accounting education with purpose: market-based strategic planning for departments of accounting" Issues in Accounting Education, 13(2), 301-326.

Rahaman, A. S. (2005) "Accounting and socio-economic development paradigms", Journal of American Academy of Business, 6(2), 217-222.

Ravenscroft, S. P. and Williams, P. (2004), "Accounting education in the U.S. post-Enron", Accounting Education: An International Journal, 13(1), 7-23.

Russell, K. and Smith, C. (2003), "Accounting education's role in corporate malfeasance: its time for a new curriculum", Strategic Finance, 85(6), 46-52.

Sanders, B. and Romeo, L. B. (2000), The supply of accounting graduates and the demand for pubic accounting recruits, New York: American Institute of Certified Public Accountants.

Sanders, B., Goldfarb, S. and Romeo, L.B. (2001), The Supply of Accounting Graduates and the Demand for Public Accounting Recruits--200J, For Academic Year 1999-2000, New York: American Institute of Certified Public Accountants.

Sundem, G. L. (1992) Changes in accounting education in the United States: the impact of the accounting education change commission, International Handbook of Accounting Education and Certification / éd. A. ANYANENTOW. NY: Pergamon Press.

Sundem, G. L. and Williams, D. Z. (1992), "Changes in accounting education: preparing for the twenty-first century", Accounting Education: An International Journal, 1(1), 55-61.

Tang, Y. (1997) "The recent accounting development and internationalization of accounting education in China", Issues in Accounting Education, 12(2), 219-228.

Taylor, V. A. and Rudnick, M. (2005), "Accounting education: designing a curriculum for the 21st century", Journal of American Academy of Business, 6(2), 321-323.

Williams, D. Z. (1993) "Reforming accounting education", Journal of Accountancy, 176(2), 76-82.
Wilson, T. E. and Baldion, E. F. (1995), "The accounting education change commission and accounting principles courses: a survey of accounting programs", Journal of Education for Business, 70(3), 157-159.

Wu, T. and Tong, Y. (2004), "Issues and challenges of accounting education in China: practitioners and academic perspectives", Journal of *American Academy of Business,* 4(1/2), 208-219.

Formation of the Hop-growing Cluster in the Chuvash Republic

Anatoly Zakharov, Chuvash State Agricultural Academy, Cheboksary, Russian Federation, zaharov150346@ya.ru

Andrey Makushev, Chuvash State Agricultural Academy, Cheboksary, Russian Federation, main@academy21.ru

Oleg Evgrafov, Chuvash State Agricultural Academy, Cheboksary, Russian Federation, eov60570@ya.ru

Evgeny Tsaregorodtsev, Mari State University, Yoshkar-Ola, Russian Federation, evgts@marsu.ru

Dmitry Zakharov, Chuvash State Agricultural Academy, Cheboksary, Russian Federation, zaharov150346@ya.ru

Abstract

The article is devoted to problems of hop production both at world level, and in certain regions of the Russian Federation. The complex analysis of development of hop-growing for 1971 - 2016 has been carried out. Attention is focused that in the Chuvash Republic for the researched period, repeatedly reduced productions of hop while the republic in the pre-reform period made up to 90% of all the general volume made in the Russian Federation. Means of the solution of this problem due to creation of the cluster are considered. The infrastructure aspects of the hop-growing cluster in the Chuvash Republic allowing to increase hop production efficiency are analyzed. The research is executed with financial support of RSSF and the Chuvash Republic within the scientific project №. 15-12-21023/16.

Keywords: hop, production efficiency, alpha acid, cluster.

Introduction

Hop-growing is a small-volume branch of agrarian production. World production of hop fluctuates within 80-100 thousand tons in case of the occupied space of 54 thousand hectares in recent years. The world economy shows that 80% of hop raw materials are applied in the brewing industry.

In Russia for years of economic ailments the hop-growing branch fell into complete decay. The total area of hop-growing plantations made more than 4 thousand hectares. Since 1996 in Russia hop reduction in production is watched, in 2016 the total area of hop plantings in all categories of farms made up 409 hectares, 270 of them are fructifying.

The Chuvash Republic is the main hop-growing region of Russia. More than 90% of gross yield of hop are the share of Chuvashia. Domestic hop-growing achieved a production top in 1990. Hop set plantation was 4,8 thousand hectares, and gross collection reached up to 3,8 thousand tons in case of productivity of 8 c/hectare.

Production part of the hop sub-complex couldn't adapt to new economic conditions of managing and to new requirements of intensively developing brewing industry. In 2016 in the agricultural enterprises from the fructifying area of 91 hectare about 15,2 c/hectare are collected, gross collection of hop was 139 tons.

The modern achievements of science changed a vector of development of economy and the agrarian and industrial complex enterprises. Formation of production structures is directed to increase in

competitiveness of the enterprises on the basis of integration and creation of innovative economic systems – agrarian including the hop-growing clusters.

Many researchers, including Porter (2005), Dakhmen (1950), Tolenado (1978), Soulie (1989) were engaged in theoretical and practical aspects of a problem of formation and functioning of clusters. Separate aspects of the problem, taking into account features of the countries and regions found reflection in their works. In relation to conditions of Russia such scientists as Migranyan (2002), Tsikhan (2003), Afanasyev (2005), Markov (2015) dealt with a problem of clusters.

The founder of the cluster theory is an American economist, a professor of the Harvard business school Michael Porter. Still Alfred Marshall (1890) at the end of the 19 century was the first to justify communication between productivity of the firm and their geographical concentration.

The analysis of the situation in agrarian and industrial complex of the Chuvash Republic shows that the most perspective branch for creation of such educations is hop-growing.
The hop-growing cluster includes the enterprises of different type according to their functional role. The breweries including located in the Chuvash Republic (JSC «Buket Chuvashii»), the agricultural enterprises and farms which saved hop-gardens, the enterprises for hop processing – JSC «Chuvashkhmelprom», association of hop growers of Russia, the Ministry of Agriculture of the Chuvash Republic could be a part of the hop-growing cluster.

Materials and Methods of the Research

Works of domestic and foreign scientists-economists on the researched problem, the appropriate development of research institutes and higher education institutions, normative and methodical materials formed a theoretical and methodological basis of the research. In methodical reasons also the regulations, documents of representative and executive public authorities of the Russian Federation defining the modern agrarian policy of the country are used.

In the article the following methods of an economic research are used: comparisons, estimated and constructive, simulations, technical and economic calculations, etc.

Information basis of the research were the data of the agricultural organizations of the Ministry of Agriculture of the Chuvash Republic, materials of The State Statistic Committee (Goskomstat) of the Russian Federation and the Chuvash Republic, normative and reference and special literature, publications of research establishments, materials of own researches.

Results of the Researches and Their Discussion

Hop belongs to crops with the small output. According to the Food and Agriculture Organization of the United Nations (FAO) the world areas of its plantings in recent years make more than 50 thousand hectares. Gross production of dry commodity hop in the world in recent years has made about 100 thousand tons. Leaders in collecting of hop, as well as on landings are Germany (37,9% of the world harvest), the USA (38,7%), China (4,8%), the Czech Republic (5,5%) (Vladimirov at all, 2005).

Distinctive feature of development of this branch at the world level is growth of hop productivity from 1 hectare of the area and the increase of alpha acid content. Average productivity of hop in the world is in limits of 1,8 tons per 1 hectare, in the USA and China it exceeds 2,0 tons (tab. 1).

Table 1 : The areas, productivity and production of hop in the world (average level for 2012-2016)

Countries	The area of hop-gardens, hectare	Productivity, т/ha	Gross yield, thousand ton
The USA	16445	2,03	33,4
Germany	17545	1,94	34,0
the Czech Republic	4413	1,17	5,2
China	2776,2	2,25	6,2

Hop-growing of Russia is in a deplorable state, hop is not practically cultivated. In comparison with the pre-reform period the areas of landings of hop were reduced more than by 5 times, volumes of collecting – by 7 times (Zakharov at all, 2017). For years of economic ailments the hop-growing branch has fallen into full decay (tab. 2).

Table 2 : The analysis of hop production in the Russian Federation (on average in years)

Years	Total area, ha	Fruit-producing		Gross yield, т.	Productivity, c/ha
		га	%		
1976-1980	6751	4896	73	3033	6,2
1981-1985	6507	5274	81	3468	6,6
1986-1990	5425	4531	83	3444	7,6
1991-1995	4340	3776	87	2420	6,4
1996-2000	2920	2540	87	840	3,3
2001-2005	1880	1598	85	449	2,8
2006-2010	1040	840	81	264	3,14
2011-2015	505	460	91	340	7,4

From these figures of tab. 2 it is visible that the average annual area of hop-gardens in 1976-1980 has reached up to 6751 hectares including fruit-producing – 4896 hectares, average annual hop collecting has made up to 3033 tons. Since 1996 in Russia reduction in hop production has been observed. By the beginning of 2016 the total area of plantings of hop in Russia in all categories of farms has made 409 hectares, 270 of them were fruit-producing.

Today the main producers of hop are the Chuvash Republic(82%), Mari El (6,5%) and Altai Region (3,3%) (Zakharov, 2016).

At the beginning of the 90th the economic crisis has affected hop-growing too. In 2005 production of hop have decreased to the level of 390 tons. (tab. 3). The areas occupied with hop-gardens were reduced more than by 20 times, 2,5 thousand hectares of trellis have been completely destroyed (Evgrafov at all,2017).

Table 3 : Dynamics of areas, productivity and hop gross collecting in the Chuvash Republic (average annual on five-years periods)

Years	Fruit-producing area, ha	Productivity, c/ha	Gross yield, тон
1971-1975гг	1960	10,1	1980
1976-1980гг	2537	8,1	2055
1981-1985гг	2923	8,7	2545
1986-1990гг	2761	9,5	2619
1991-1995гг	2568	8,4	2162
1996-2000гг	1658	5,0	824
2001-2005гг	836	5,5	444,3
2006-2009гг	477	6,2	293,5
2011-2015гг	184	14,7	263,9

In 2016 the area of hop-gardens in all categories of farms of the republic made up 309 hectares, including the fruit-producing age – 233 hectares, gross collection – 324,3 tons in case of crop capacity at 14,1 centners. The area of hop at the fruit-producing age in 2016 in comparison with 2015 was decreased by 19%, productivity – for 23%, gross collection was reduced by 23% (Evgrafov at all, 2015).

It is necessary to mark that for revival of hop-growing it is necessary to combine common efforts: state, hop producers, processors, customers.

The experience of implementation of successful projects in other regions of Russia in the modern conditions shows that, for the rapid rise of any agro-grocery sub-complex it is necessary to create the integrated cluster formations on conditions of state – private partnership.

Clusters are characteristic to any well-developed economy and formation of clusters is an essential component of economic development of agrarian and industrial complex.

The analysis of the situation in agrarian and industrial complex of the Chuvash Republic shows that the most perspective branch for creation of such educations is hop-growing.
Economic basis of creation of clusters is the integration effect of profit increase due to combining efforts and use of innovative development and progressive technologies.

The study of hop-growing in the Chuvash Republic, on the basis of cluster analysis, will allow to reveal factors and increasing conditions of its efficiency.

Detection of the branch problems can be realized within creation of a hop-growing cluster. We will consider correlations of branches and enterprises of a hop-growing cluster of the republic. Potential participants of a hop-growing cluster are provided in Fig. 1.

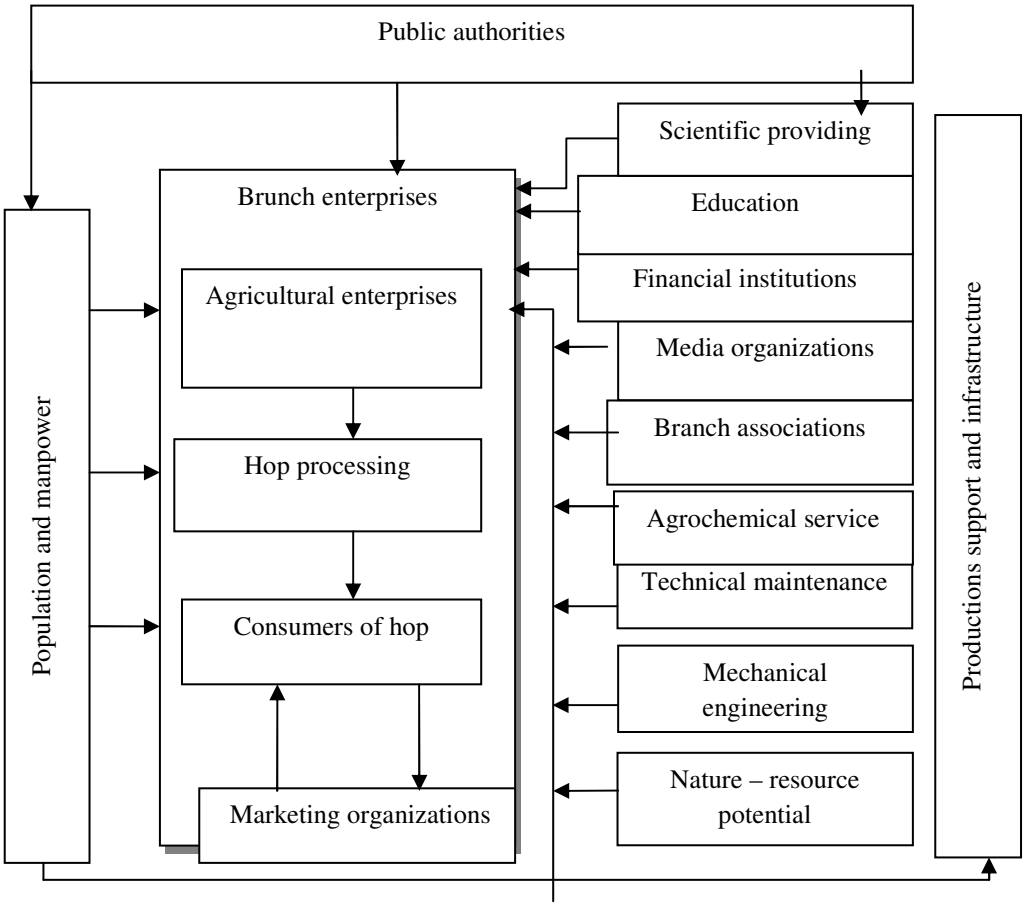


Fig. 1 : Model of the structure of the hop-growing cluster of the Chuvash Republic

The hop-growing cluster includes the enterprises of different type according to their functional role. The basis of the hop-growing cluster of the Chuvash Republic will be made by the branch enterprises. We suggest to include in their structure: the agricultural hop-growing enterprises; the hop processing enterprises ; hop consumers – breweries.

Now in the Chuvash Republic the agricultural enterprises in four municipal districts of the republic are engaged in production of hop. The main arrays of this culture are located in Vurnarsky (LLC Agrokhmel), Urmarsky (LLC Agroresursy), Tsivilsky (FGBNU "the Chuvash NIISH") and Yadrinsky (SHPK "Vylsky", collective farm – OPH "Leninskaya Iskra") regions.
Development of the branch of hop-growing is impossible without extension of capacities for processing of the grown-up production that requires the considerable financial resources. In world practice of brewing hop raw materials are used generally in the form of the granules which is a product of finishing of hop by using of granulators.

Now the hop manufactured in Russia is generally used as raw materials for brewing, at the same time as a result of deep processing of hop, products can be used in the food industry, perfumery and cosmetic production, agriculture and in case of construction.

For the purpose of the solution of this problem now in JSC «Chuvashkhmelprom» the complex equipment of PROBST (Germany) of production of the granulated hop of 1500 kg of raw materials per hour which allows to process all produced hop brought into operation. Product of the made line is the granulated hop in vacuum package.

We suggest to include JSC «Chuvashkhmelprom» which is located in Tsivilsk of the Chuvash Republic in the structure of the hop-growing cluster.

Consumers of hop product in the region is the large brewery JSC ChPF «Buket Chuvashia» located to Cheboksary, priority types of activity of JSC «Buket Chuvashia» are: production of beer, soft drinks, mineral water, alcoholic beverage products, commodity malt, trade business activity, etc.

Production service and infrastructure are provided in the cluster by the following groups. Scientific support of hop-growing includes Federal Public Budgetary scientific institution "Chuvash Research Institute of Agriculture". The main type of its activities is research and development in the field of natural and technical science. The institute carries out the research and development work having practical value for further extension of production of hop, provides effective mastering of scientific development in production.

Support of the cluster with skilled specialists is realized by the specialized educational institutions are provided by Federal State-Budget Educational Institution of Higher Education "Chuvash State Agricultural Academy" and colleges.

Nowadays the special discipline "Hop-growing" is included (in volume of 144 hours) in curricula of students training at the faculty of biotechnologies and agronomics. The scientific basis, scientists who can increase a number of hours on training of specialists in the field of hop-growing has been saved, and also can train by narrow «Hop Grower» profile with organization of practical training in educational-experimental hop gardens.

For the purpose of assistance of training for needs of the hop-growing branch on the basis of the Chuvash Agricultural Academy in interaction with the Chuvash NIISH, and also with the interested organizations of the republic, implementation of the program of professional development of experts in the field of hop-growing (in volume of 72 hours), and also programs of additional education for the persons wishing to master production technologies and processing of hop is supposed (in volume of 140 hours).

The main areas of work on staffing of branch are enhancement of target contract training of specialists for operation in the field of hop-growing.

Professional development and re-trainings of operating experts are planned to be realized by holding combined learning actions – subject seminars, conferences and the master – classes.

Agrochemical service provides the branch with fertilizers, security features of plants. This function is laid to the branch of Closed joint stock company of «Avgust Vurnarsky plant of compound preparations". Its primary activity is production of chemical security features of plants (pesticides) and other agrochemical products.

Support of the enterprises of the cluster with means of production realizes mechanical engineering. In the republic there are specialized enterprises which can carry out mounting work of hop-harvesting combines and hop dryers.

Mechanization of hop-growing consists of universal use in technological processes of hop-harvesting combines, the modern hop dryers. Production of specialized technique for cultivation, harvesting and

processing of hop can be organized at the enterprises of the Chuvash Republic having experience of their development and production. It is a «Tekhmashholding» Limited liability company - the Chuvash Republic, Cheboksary and LLC «Kanmash AGRO».

LLC «Kanmash AGRO» is the modern machine-building enterprise which is carrying out a full cycle of business: market researches, strategic planning, development of production, production, marketing and sales, service and commissioning, quality ensuring.

The company was established in 2005 on the basis of JSC Kanashsky Plant of Electric Lift Trucks - Kanash, the Chuvash Republic. The main direction is development and production of disk harrows (desikator), cultivators, planting preparatory units, plows.

An important role for support of agricultural producers is played by financial institutions.It is the Chuvash regional branch JSC Rosselkhozbank and PJSC Sberbank of Russia. The Chuvash office No. 8613, providing crediting, insurance and leasing service of the enterprises. The Russian agricultural producers obtain credits at the preferential rate of 5% since the beginning of 2017.

Information service is carried out by the media organizations which carry out advance of production in mass media, organize conferences and specialized exhibitions.

For coordination of participants actions of the market the association of hop-growers of Russia functions in Cheboksary, the Chuvash Republic.

An important role is played by the trade and marketing organizations which are realizing necessary deliveries to the enterprises of the branch and selling their products.

For successful functioning of the cluster it is necessary to take into account costs of consuming of energy, fuel, transport services.

Considering activities of the enterprises of the cluster it is necessary to mark its need for resources of universal purpose (water, the earth). The population and work forces of the region need to be considered on the one hand as labor force of the enterprises, and on the other hand as customer of production of breweries – the principal buyers of hop.

Enhancement of structure and successful growth of the hop-growing cluster in the Chuvash Republic will demand conscious interaction of authorities and society. The volume of the state support of hop-growing to the branch in 2016 made up to 6987,1 thousand rubles – 3,3% of the total amount of subsidies (2115,8 million rubles). From them subsidies for lay out and care of hop gardens in the amount of 1 976,2 thousand rubles, on the produced and realized hop at the expense of means of the republican budget of the Chuvash Republic - 5010,9 thousand rubles are paid.

In 2016 rates of subsidies were made:

- on establishing of hop gardens - 80% of expenses, but no more than 53 940 rubles for 1 hectare at the expense of means of FB and 5% of joint financing at the expense of RB;

- care of hop-gardens - 80% of expenses, but no more than 20 764 rubles for 1 hectare at the expense of means of FB and 5% of joint financing at the expense of RB;

- on the produced and realized hop - 36 971,5 rubles on 1 ton.

In 2017 the state support of hop-growing in the form of subsidies for lay out and care of long-term plantings at the expense of means of federal and republican budgets remains, as a part of "A uniform

subsidy" 20,6 million rubles are allocated and 5,1 million rubles are allocated for the produced and realized hop at the expense of means of the republican budget of the Chuvash Republic.

Conclusion

The complex analysis of development of hop-growing for 1971-2016 has been carried out. The world areas of plantings of hop in recent years make more than 50 thousand hectares, average productivity is in limits of 18 c/hectare, bulk production of dry commodity hop makes about 100 thousand tons.

In Russia hop is cultivated from time immemorial and in the recent past its area was made by more than 4 thousand hectares. The average annual area of hop gardens in 1976-1980 reached up to 6751 hectares including fruit-producing – 4896 hectares; annual average collection of hop made up to 3033 tons. Since 1996 in Russia sharp reduction in production of hop has been watched.

The researches showed that in the Chuvash Republic for years of reforms production of hop decreased repeatedly. If in 1990 hop was cultivated on the area of 2,6 thousand hectares, productivity from 1 hectare on the republic averaged 10,8 c/hectare, gross collection - 2,8 thousand tons, and in 2016 in the agricultural organizations from the fruit-producing area of 91 hectare collected 15,2 c/hectare, gross collection made up to 139 tons.

We offered the model of structure of the hop-growing cluster of the Chuvash Republic. The hop-growing cluster includes the enterprises of different types according to their functional role. The basis of the hop-growing cluster of the Chuvash Republic will be made by the branch enterprises.
We offer to include to their structure: the agricultural hop growing enterprises; the hop processing enterprises ;hop consumers – breweries. In structure of the hop-growing cluster the enterprises supporting productions and infrastructures will function.

Such projects create an economic basis of the so-called "cluster" structures providing integration of participants of the process of creation of final consumer products.

References

Afanasyev M. and Myasnikova L. (2005). World competition and clustering of economy, *Questions of economies*. №. 4.
Dahmen E. (1950) Entrepreneurial Activity and the Development of Swedish Industry, 1919-1939. Stockholm.

Evgrafov, O. and Belov, V. (2015). The state's role in improving the efficiency of land resources. *Proceedings International Academy Agricultural Educ*ation *25*, 43-49.

Evgrafov, O., Zakharov, A. and Makushev, A. (2017) Aspects of state policy of resource management for implementation of the innovative scenario of development of agrarian and industrial complex, *News of the International Academy of Agrarian Education*. 32, 62-67.

Markov, L., (2015) Economic clusters: concepts and characteristic features. URL: http://econom.nsc.ru/ieie/smu/conference/articles/.

Marshall, A. (1890) Principles of Economics. 1-st ed.12.

Migranyan, A. (2002) Theoretical aspects of formation of competitive clusters in countries with economies in transition *Harold of. Kyrgyz-Russian Slavic university*. 3, 38-43

Porter, M. (2005) *Competition*. Williams.

Soulie, D. (1989) Filieres de Production et Integration Vertical, *Annales des Mines*. *Janvier*. 21-28.

Tolenado, J. (1978). Propjs des Filires Industrielles, *Revue d'Economie Industrielle*. 14. 4. 149-158.

Tsikhan, T. (2003) Cluster theory of economic development *Theory and practice of control*. 5. 40-53.

Vladimirov, V., Makushev, A. and Zakharov A. (2017) Possibilities of development of hop-growing in the Chuvash Republic, *Harold of the Kazan GAU*,. 4, 15-18.

Zakharov A., (2016) Factors of intensification in the hops cluster of Chuvashia, *International journal of environmental & science education*, 11, 17, 10651-10651.

Zakharov, A., Makushev, A. and Evgrafov, O. (2017) Reserves of increase in production efficiency of hop, *SPb RO MAAO News*, 32, 67-73.

Differential Change Management In Small, Medium and Large Enterprises

Liviu Tudor, PhD candidate, Academy of Economic Studies, Romania; lt@idgrup.ro

Abstract

Purpose: To research current practices in change management, proposing a guide to customization of change management process for organizations of different sizes.
Design/methodology/approach: Firstly, this paper considered a large amount of scientific literature regarding the peculiarities of small versus large enterprises, especially related to change implementation. Secondly, a research on over 350 Romanian organizations was conducted, identifying change management process' particularities in small, medium and large enterprises. Both initiatives brought to light new insights, constituting the groundwork for the recommendations regarding change management implementation in small, medium and large enterprises.
Findings: This paper is emphasizing the items where change process should differ in smaller and larger enterprises, offering a set of recommendation as a guide to personalization of change process. For instance, while smaller organizations are more people oriented and therefore need a simpler approach of change, larger enterprises are procedure oriented, being prepared for complex approaches. Change management process has to be adapted to the specific characteristics of organizations.
Originality/value: This paper is offering a guide to customization of change management process for organizations of different sizes.

Keywords: change management, change management process, SMEs, large enterprises

Introduction

Business environment is in a continuous changing process. At macro level, local or regional economic crises are emerging, trends as deregulation, globalization and advances in information systems and technologies are impacting the economic environment, population ages, governmental regulations are changing, social movements arise, nature is negatively affected by enterprises' activity and so on. At micro level, competition is intensifying because of market's globalization, some resources are increasingly expensive because of their scarcity, consumers' requests become harder to satisfy because their wants and needs are evolving together with their knowledge and access to information etc. Internally, also, enterprises confront with a series of changes – new technologies have to be implemented, strategies are adopted and implemented in order to adapt to external environment's requests, know-how is developed, new market segments are addressed, changes in leadership happen etc. Therefore, change is the reality of all enterprises, regardless their reaction to it.

Project management is handling change processes toward organization's goals, while change management is handling people, helping them to transition this change. Change Management is a strategic approach increasingly used all over the world (from 34% organizations in 2003 to 79% in 2013), because it augments projects' efficiency - excellent change management programs were six times more likely to meet or exceed their objectives (Prosci, 2014). But change happens differently in each enterprise, depending on its culture, resources, managerial capabilities, structure etc., these varying during organizational life cycle.

During world economic history, there have been swifts in trends toward SMEs or large enterprises (Hach and Boroz-Kazai, 1986), as they present different weaknesses and strengths, and react differently toward threats and opportunities coming from external environment. Currently, the main focus is geared toward SMEs, which are considered the key to economic development. In Europe,

99.8% enterprises are SMEs (micro, small and medium enterprises), providing 88.8 million jobs and 28% of European GDP (European Commission, 2014).

Over time, many scholars studied the differences between small, medium and large enterprises, and few even considering the change processes. Starting from these and from a survey on Romanian enterprises regarding change management usage, the **paper's purpose** is to propose a guide to customization of change management process for organizations of different sizes. In order to do so, a series of objectives were followed: (1) Identify change's particularities in small, medium and large enterprises, both through survey and literature review; (2) Offer a set of recommendations on change approach for each type of organization; (3) Propose change management models adapted for small and, respectively, large enterprises, considering their specificity regarding change.

Change Management in small, medium and large enterprises – literature review

While many studies analyzed differences between small, medium and large companies, there are some suggesting that size of enterprises isn't related to the success of change. Haveman (1993) considered that, in spite of the positive statistical relationship, change does not depend on company's size, but rather on its organizational context, while Turner et al. (2012) suggest that the use of dedicated project is determined rather by company's age than company's size. Even so, the manner an enterprise leverages its organizational context, just as its age, is usually related to its size. Beside, considering the differences regarding access to resources and managerial approach, as many others outlined below, it is expected that, analyzing international literature and current environmental realities, some very interesting characteristics of change in smaller/larger enterprises will be disseminated, with their impact on change management process.

Change in small, medium and large enterprises

Parida et al. (2012) consider that adaptability, lack of bureaucracy and willingness to take risks are the main strengths of SMEs. Although small enterprises are considered to be flexible and able to **adapt** better to rapid swifts in demand in order to change fast, Ford (2009) showed that they are less successful in implementing and freezing/keeping the change. More than that, Ford suggests that the **hierarchical structure** of large organizations might even be beneficial to change management, since it rises the **capacity of control**, an important factor in change process (Burke and Litwin, 1992; Ford and Greer, 2005; Kotter and Schleisinger, 1979; Tichy, 1983). Small organizations might take into consideration the idea to "improve change management capability by adding structure that improves implementation control" (Ford, 2009), which they usually lack (Cardinal et al., 2004; Davila, 2005; Kotey and Slade, 2005).

SMEs' processes are simple and their structure is not standardized, requesting less bureaucratic management and formalized processes (Turner, Ledwith and Kelly, 2012; Anthony et al., 2008). At the size of around 50 employees organizations start to change, transitioning to medium enterprises by adopting middle management and increasing their level of formalization and standardization (Turner, Ledwith and Kelly, 2012). **Formalization and standardization** increase inertia, which makes change harder to initiate (Hannan and Freeman, 1984; Kelly and Amburgey, 1991), but easier to enter in routine (Haveman, 1993; Ford, 2009); inertia's effect depends mostly on organization's managerial capabilities.

Noticing that **large enterprises use a procedural style** of project management (Bresner and Hobbs, 2006), unlike **small enterprises that focus on people** (Alam et al., 2010; Ghobadian and Gallear, 1997) even in the midst of this process, Turner et al. (2012) suggests that small and medium enterprises need "simpler, more people-focused forms of project management than traditionally used by larger organizations". Since "traditional project management tools do not meet the needs of SMEs" (Turner, Ledwith and Kelly, 2012), integrating a simplified project management approach with change management is a perfect solution. Also, change management will reduce employees'

resistance to change in large enterprises, as focusing on procedures might lead to overlook of their personal needs.

Small enterprises lack **resources** (Garg et al., 2010), which makes them prone to misjudgments regarding external conjuncture and managerial decisions, and therefore vulnerable to environment's threats. Also, large enterprises can attain economies of scale, while smaller enterprises could even have problems in providing the demanded product quantity. Access to information is harder for SMEs (Gibcus et al., 2009), increasing hazard in face of environmental challenges and making them "ignorant of project management practices" (Turner et al., 2012). Lack of managerial skills (Rahman & Ramos, 2010) determines a lower use of management tools for them than in larger enterprises (Bresner and Hobbs, 2006), a lower efficiency and unawareness regarding opportunities. External consultancy might be the solution for lack of information and management skills.

Also, small enterprises' lower access to resources determines their managers to focus on **short-term objectives** – reducing costs rather than increasing turnover and focusing on profit rather than on client's needs. Being focused on day-to-day survival, management is rather reactive, informal, intuitive and opportunistic (Buonanno et al., 2005), allocating more time to adjusting than predicting and controlling (d'Amboise and Muldowney, 1988). Turner et al. (2009) proved that the larger enterprises have **longer projects;** microenterprises**,** for instance, are having only short time projects (0-3 months).

Turner et al. (2012) suggest that the use of **dedicated project managers** is determined rather by company's age than by company's size; since small companies are using unspecialized management for their projects, they need simplified tools. Management tools are usually built for well-established enterprises, not for the small ones. These don't **usually use tools** such Critical Path Method (CPM) and Earned Value Method (EVM), but use project plans (Turner et al., 2009), these being more people oriented.

Small enterprises have less **bargaining power** in their negotiation with suppliers, partners and organizational buyers, while large enterprises, dealing with larger volumes, receive preferential treatment on prices, quality and associated services. More than that, clients credit large enterprises with greater recognition and credibility, being more stable (Pratten, 1991). Large enterprises have also a higher capacity to get beyond national markets, by importing raw materials and exporting their end products.

International activity reduces company's vulnerability in case of national markets swifts. Multinational organizations have, in the same time, many opportunities (to enter new markets, to reduce costs by producing in countries with lower labor cost, to access special skills etc.) and challenges (adapting to new economies and their conjunctures, to new national cultures etc.). In order to efficiently compete with larger enterprises, SMEs have to establish **strategic alliances** with suppliers and trading partners, using a rather cooperative way to do business.

Larger enterprises are better in **innovating** and in business process improvement (Bernroider and Koch, 2001; Buonanno et al., 2005)**,** determining most of the technological advance. This is possible because they have the needed resources, with research costs being easier to support due to production scale. SMEs are generally less innovative (Romanian National Statistics Institute, 2014; Commission of the European Communities, 2008), excepting marketing (Bjerke and Hultman, 2002), where innovation can bring faster results in achieving their objectives.

The **governance may favor** multinational enterprises, since in emerging economies, as Romania, relational governance is preferred to the rule-based one; also, cooperation is preferred to confrontation (Li and Filer, 2007; Pillania, 2009). However, the small enterprises that are important to national history or culture might also be favored.

Change management – concept and utility

Environmental changes determine changes at enterprises level also, but the process is not easy to transit successfully. Employees are resisting change, resources (financial, human, physical and informational) are insufficient, barriers come from legislative and institutional area etc. These obstacles make 70% change initiatives to fail (Keller & Aiken, 2009; Kotter, 1995) and 15 cents of every dollar spent on strategic initiatives to be lost (PMI, 2014).

Effective Change Management is improving a great deal enterprises' situation: "18% of the world organizations report being highly effective at organizational change management" with 83% of them being strong financially, compared to only 52% of general sample (PMI, 2014); there is a direct correlation between using effective change management programs and meeting projects' objectives, on time and on budget (Prosci, 2014), "excellent change management programs being six times more likely to meet or exceed their objectives than those with poor change management programs" (Prosci, 2014).

Change management is helping the enterprise to adapt to the environment (Pollack, 2015; Holbeche, 2011), transiting from the current situation to the one desired (Taher et al., 2015), by helping people to accept and support change (PMI, 2013), in order to achieve projects' success - meeting their objectives in a time and budget frame (Prosci, 2014).

Practitioners and theoreticians were proposing numerous models (Anderson & Anderson, 2001; Kotter, 1996; Luecke, 2003; Prosci, 2007 etc.), starting with the '50s (Lewin's Model), in order to create a frame of action and a guide through the difficult process of change, meant to decrease enterprises' risks. Choosing one of the models should depend on following criteria: ease to use, ease to implement, ease to understand, ease to communicate to others, simple, practical, structured and systematic, logical, comprehensive and holistic (Prosci, 2007). Most of the models include: identifying the need for change, creating a vision and the conditions needed for change, planning and implementing change, and securing the favorable internal environment for conserving the present change and foster future changes (see Table for compared structure).

Prosci's study (2014) shares the top five areas to focus for a successful change management: Effective communication, Timing, Integration with project management, Building buy-in for change management and Sponsorship.

Change Management Process Particularities – A Case Study On Small, Medium And Large Romanian Enterprises

Pursuing this paper's purpose - to develop a guide to customization of change management process for organizations of different sizes - data from an extensive research on change management approach in Romanian enterprises were analyzed. This way, particularities of small, medium and large enterprises' approach of change management suggested a series of recommendations, especially for organizations in emerging economies with a similar trend as Romania's.

Romania was categorized by International Monetary Fund (IMF, 2015) as an emerging economy, and as most of emerging countries, it exited an oppressive regime (Hoskisson et al., 2000) and entered a process of growth in order to become a competitive economy. This growth process implies a high level of socio-economic change, which determines changes at companies' level, too. The change process in emerging countries, organizational or national, is affected by public institutions' immaturity regarding legal, political and financial aspects (Marcotte, 2014) and by highly regulated markets (Hoskisson et al., 2000), these increasing enterprises' need for a strategic method to approach change. Although Romania is not one of the largest emerging economies, such Brazil, Russia, India, China (BRIC) and others, it usually records average indicators in line with the other emerging economies (World Bank).

The World Bank's Gross National Income per capita (GNI per capita), considering in the same time the purchasing power parity (PPP), situates Romania at the upper middle-income level (19,020 USD). Also, Romania's Gross Domestic Product (GDP) is above European average, with a compound annual growth rate of 4.3% (compared to 2.6% in Europe area). World Bank's corruption ranking in placing Romania on 58th place out of 189, while unemployment rate was only 7% in 2014, compared to 11,2% in Europe area. Therefore, while Romania is not one of the largest or most dynamic emergent economy, it not one of the smallest or slowest ones either. Its development and challenges can be compared with many other economies, especially for the East-European ones, which enjoy similar macroeconomic conditions.

Methodology

"Identifying change management process' specifics in Romania" has been the purpose of a survey on 350 leaders of Romanian organizations, where 70% of respondents have been top managers and 14% middle managers, 51% organizations being small, 29% medium and 20% large. This national study, inspired by Prosci's international benchmarking on change management, offers some transparency on change management in Romanian enterprises (by size), while it is expected to present similitudes with the situation in other emerging economies. The differentiation between small, medium and large enterprises in this study followed European Commission's (2015) criteria: small enterprises have less than 50 employees and turnover of less than EUR 10m; medium enterprises have 51-250 employees and turnover of less than EUR 50m (or a balance sheet total of less than EUR 43m); and large enterprises have over 250 employees and turnover higher than EUR 50m.

Differences between change management process' characteristics in small, medium and large enterprises have been identified through 17 variables (Table 1), which measured a score for each of the four phases of change in Romanian organization. In order to emphasize the most important factors of success in change implementation in small, medium and large enterprises, a ranking of significant correlations between enterprises' effectiveness and all variables considered was performed (Table 2). For large enterprises, regression offers a snapshot of causality regarding change initiatives' effectiveness, while unfortunately in small and medium enterprises causalities could not be determined.

Results

Recorded values for small, medium and large enterprises in Romania are close, with a slight advantage for medium enterprises (Table 1). All Romanian organizations perceive their need for change and even initiate change by discussing and strategizing it. However, the low scores on Preparing the enterprise for change and even lower scores regarding Implementation of change are suggesting that Romanian organizations don't usually use a strategic approach for change adoption, like change management methodology. Prosci (2014) shows that tackling change in a structured manner is one of the main factors determining change initiative's success.

Regarding phase two of change management process - Creating the favorable environment in the organization for change adoption - small and large enterprises' scores remain at neutral level point. In this phase, training in change management got negative scores (around 2 out of 5), while change inclusion in strategies recorded the most positive scores (3.8 in large, 4.6 in small and 4.8 in medium enterprises). Also, positive scores have been listed regarding organizations' capacity to change in medium (3.6 out of 5) and large (3.5 out of 5) enterprises.

Table 1: Assessment of small, medium and large enterprises regarding their performance in the four phases of change management process

PHASE	VARIABLE	Small	Medium	Large
PHASE 1 **Identifying the need for change**	Perceived need for change	4.21	4.23	3.89
	Existing discussions and proposals towards making changes in the organization	4.26	4.62	4.72
	AVERAGE SCORE Phase 1	**4.24**	**4.42**	**4.31**
PHASE 2 Creating the required background for change	Desired change included in organization's strategy	4.57	4.79	3.82
	Identifying the level of existing knowledge and abilities for change in employees	3.19	3.38	3.06
	Evaluating openness to new ideas and methodologies	3.33	3.35	2.78
	Evaluating organization's capacity to change regarding human, financial and physical resources	3.12	3.62	3.50
	Training in Change Management	2.06	1.98	1.32
	AVERAGE SCORE Phase 2	**3.25**	**3.42**	**2.90**
PHASE 3 Implementing change	Using change management methodology and tools	1.67	1.46	1.47
	Allocating human, financial, physical and time resources for change	3.40	3.68	3.65
	Assigning permanent tasks or roles for change	2.11	2.50	2.35
	Employing external consultants	1.89	1.88	1.47
	Clear communication about change	3.38	3.38	3.18
	Rewards and encouragements for taking the initiative	3.24	3.27	2.83
	Integrating Change Management with Project Management	3.29	3.42	3.00
	Resistance to change	2.36	2.00	1.68
	AVERAGE SCORE Phase 3	**2.67**	**2.70**	**2.45**
PHASE 4 Consolidating change	Evaluating the success of change process	3.67	3.96	4.12
	Integration of change in day-to-day activity	3.53	3.71	3.41
	AVERAGE SCORE Phase 4	**3.60**	**3.83**	**3.76**
CHANGE MANAGEMENT USAGE - AVERAGE SCORE		**3.45**	**3.62**	**3.41**

Medium enterprises are the only ones getting an acceptable favorable score (almost 3.5 out of 5) on the second phase of change process. They have the capacity to change, because their availability of resources - similar to large enterprises (scores 3.6 in medium and 3.5 in large enterprises), their openness to new ideas - similar to small enterprises (almost 3.5 in small and medium enterprises, and less than 3 in large ones), and their strategic efforts (4.8 in medium, 4.6 in small, and only 3.8 in large enterprises). Openness to new ideas and methodologies depends on organizational culture and structure; large enterprises' high level of standardization and formalization determines a lower level of openness regarding change, but when integrating change management with project management, another important factor for change success (Prosci, 2014), people and organizational culture become more open to change.

Low scores for training in change management are worrying, as it is also reflected in low scores regarding change implementation and efficiency in change initiatives. Requesting consultants' help, which might partially compensate lack of training, showed also quite low scores. Therefore, all types

of firms, even the medium ones, being better prepared for change, are witnessing low scores in implementation phase.

Third phase, "Implementing change", is the most important and indexes the lowest scores, just below the neutral point, 3. Change implementation appear to be a challenge for all types of organizations in Romania, since they don't use specific methodologies and tools, don't assign permanent tasks for change, and don't have trained personnel or contracted consultants. Small enterprises record the highest score regarding change inclusion in own strategies, but the low score from third phase (implementation) suggests that they should prioritize ideas and invest time and other resources only in most important initiatives; also, using change management tools more would increase efficiency in their implementation phase.

The lowest scores were showed at usage of change methodologies and tools (1.7 in small and 1.5 in medium and large enterprises), collaboration with consultants (from 1.5 in large enterprises to 1.9 in small and medium enterprises), assigning permanent tasks or roles for change (2.1 in small, 2.4 in large and 2.5 in medium enterprises), and reducing resistance to change (from only 1.7 in large, to 2 in medium and 2.4 in small enterprises). The only positive scores in this phase were in Allocating resources in medium and large enterprises.

Large enterprises have the lowest score in change implementation; even though they allocate more resources to change they don't use consultants extensively (maybe they feel that they have the needed culture and human resources, even though untrained, or due to high number of change projects). Also, rewards and encouragements are lower (probably, because they are procedures oriented, not people oriented). Also, we have met two surprises: (1) large companies have the lowest level of change management integration with project management, even though these kinds of instruments are created for them and their informational and managerial resources' availability should favor change management; (2) they perceive the lowest resistance to change, probably due to ineffective communication between leaders and employees, since efficient change management is not extensively used.

It is interesting that, even though Romanian enterprises register negative scores regarding change implementation (scores below neutral point), they are evaluating it and consider that they are integrating change in day-to-day activity. Projects' efficiency measurements contradict the idea that they are consolidating change. This way last phase, "Consolidating change", falsely appears to be a success, scores trending toward 4 out of 5.

Considering the fact that Change Management's average score in this study has been only 3.5, we can assume that the low effectiveness of change projects (only 3.1 on a scale from 1 to 5) is mainly influenced by the lack of proper knowledge regarding change process. Romanian organizations are barely fulfilling their objectives (score 3.43 out of 5), without being satisfied regarding their time (null score, 3) or budget (null score, 2.8) spent on change projects' management. Also, average of these three variables (efficiency regarding objectives fulfillment, meeting time and budget constraints) for small (3.1), medium (3.2) and large (3.0) enterprises are very similar, suggesting that there are some macro-environmental factors, together with lack of information regarding change management, determining inefficiency in all sizes enterprises.

It is interesting to observe, based on significant Pearson correlations with overall effectiveness of change initiatives, which are the most relevant drivers in change management process for each type of organization. **Small enterprises** are usually using their manager as sponsor, as well as evaluator and even implementer of change, due their limited number of employees and necessary knowledge. This probably makes the managers' ability and desire for change the main factor determining its success; also, as stated before, their low level of standardization and formalization have to be counteracted with specific tools and integrators for both areas – change management and project management (r=0,51). Considering **medium enterprises'** more complex structure, they should focus on communication's efficiency (r=0,62) and change tasks assignation (r=0,58), while integrating change management with project management remain just as important (r=0,58). **Large enterprises**

have to focus on integrating the change in day-to-day activity (r=0,77), which is much easier when integrating change management with project management (r=0,74); also, since they have more available resources, these are significantly linked to change's success (r=0.58 - 0.71); using change management methodology and tools also appear to have a significant influence.

Conclusions

As change is impossible to avoid, enterprises have to find the right method to approach it. Change management theory offers a variety of models to choose form, taking into consideration market's and enterprise's conjuncture, as well as change's peculiarities, but without offering the criteria to choose one of the many. This study, based on international literature and a research on Romanian enterprises, is emphasizing the items where change process should differ in smaller and larger enterprises, offering a set of recommendation, as a guide to personalization of change process, and two different approaches for change management process in small and large enterprises.

There are some general factors driving change in small vs. large enterprises. **Favorable corporate governance** is higher in large enterprises, determining more opportunities. When governance favors the competitive position and change, good strategies can balance the high risks determining change. **Innovation** level is lower in SMEs and higher in large enterprises, which are developing strong competitive advantages. Innovation means change, and change management is both a favoring factor initiating change and a structured manner to manage innovation's implementation. Use of change management methodology and tools is lower in medium and large enterprises, according to our study, relatively low effectiveness and general scores for change process suggesting that Romanian enterprises should learn more about change management, as a strategic tool for change and its adoption.

The particularities of change in small, medium and large enterprises (Objective 1) were identified through a thorough analysis of international literature (section 2) and a survey on change management process' segregated between small, medium and large enterprises in Romania (section 3). These particularities are resumed in Table 2, comparing organizations by a set of differentiating criteria, which will eventually determine the change process' fine-tuning.

Table 2: Criteria for change management process (standard set up) in different enterprises by size

Differentiating criteria	Small enterprises	Large enterprises
Creating a favorable environment for change adoption	Higher*	Lower
Standardization and formalization	Lower*	Higher
Dedicated management	Lower	Higher*
Focus during project management	People*	Procedures
Resources' availability	Lower	Higher*
Change management training and consulting	Higher*	Lower
Strategizing changes	Higher	Lower*
Freezing change capacity	Lower	Higher*
Focus	Short-term	Long-term
Changes' complexity	Lower	Higher*

***** *Similar for Medium enterprises too*

Starting with data presented in Table 2, the following recommendations will help selecting the right change management setup (Objective 2):

- **Creating a favorable environment for change adoption** is easier in SMEs, which are facilitating change adoption by removing barriers like employees' resistance to change. Evaluating needed resources and knowledge regarding change, getting training in change management, strategizing, informing managers regarding future change etc. are actions all enterprises should operate in order to remove human resistance and other barriers.
- Considering the level of **standardization and formalization,** SMEs adapt easier, are more willing to take risks, but have troubles in consolidating change, which suggest that their policies should support stability after the change has been implemented. For large enterprises, change is harder to initiate, but easier to enter in routine, mostly depending on managerial capabilities. Large enterprises should invest in creating a culture that is favorable to change, reducing this way the negative effects of inertia. Moreover, in order to efficiently control organizational inertia, both SMEs and large enterprises should train their managers and allocate responsibilities regarding change.
- While medium and large enterprises have change management **dedicated management**, enjoying highly specialized managers and usage of complex managerial tools (e.g. Critical Path Method-CPM and Earned Value Method-EVM), small enterprises' limited managerial specialization translates in a low number of managerial tools utilized (they seem too complex).
- Regarding the **focus during project management**, SMEs are more people-oriented, while large enterprises are procedures oriented. Since SMEs cannot handle so well procedures, they need a simpler and more people-focused form of project management, integrating it with change management, in order to ensure the consistency of change process and to reduce resistance to change. Integrating project management with change management is useful for large enterprises also, since they often overlook employees' resistance to change; in this way large organizations become more people-focused.
- While large and medium enterprises have **access to resources**, small companies are usually lacking material and financial resources, which results in difficulties in providing the demanded quantity/quality and vulnerability to environmental threats. Also, their lack of informational and human resources is reflected in a certain degree of ignorance regarding management practices and opportunities. Management consulting, change management - specifically, can reduce misreading external environment and taking wrong managerial decisions.
- Apparently, **change management training and related consulting** is perceived better in SMEs, encouraging the continuity of change efforts and increasing change process' effectiveness. Large enterprises' lower knowledge regarding change management is determining them to lose sight of sensitive aspects of change during projects, recording a lower effectiveness in change implementation. Training in change management and following a clear and structured model of change process is helping entities to become more efficient in their projects.
- Small enterprises are often **strategizing changes**, but are not very efficient in implementation, due to their insufficient resources, including managerial ones, for simultaneous changes. Instead of losing time planning many changes, small enterprises should prioritize ideas and invest time and other resources in the most important initiatives. Medium and large enterprises are facing the opposite problem – they are generating less change ideas and strategize less, because of their complex managerial structure. In order to overcome this problem, they should have organizational structures specialized in change, to generate change ideas and encourage change in all stages.
- **Freezing change** is easier for medium and large enterprises, because hierarchical structure of larger organizations increases their capacity of change implementation and control. Increasing the level of control in smaller enterprises is possible by keeping change agents'/managers' attributions even after finalizing the change process.
- SMEs have short-term **focus**, using reactive, informal, intuitive and opportunistic management; they are focused on reducing costs rather than increasing turnover, as well as on adjusting to environmental changes already capitalized by their competitors. This is emphasizing SMEs' need for a simple change process model, easy and rapidly to pass through at the opportune moment. Large enterprises use proactive, formal, research based

and strategic management, developing sustainable managerial policies, in order to increase turnover. They predict and strategically approaching future environmental changes, focusing on long-term relationship with their customers. In order to fulfill their objectives efficiently larger enterprises need an elaborated change model, which must be adapted to their specificities.

- **Changes' complexity** is higher in medium and large enterprises than in the small ones, which is determining their openness to more complex change management processes.

Choosing the right change management model (Lewin, Hersey&Blanchard, Lippitt, Watson & Westley, Hard Systems Model of Change, Bullock&Batten, Prosci, PMI, Andearson, Kotter) for a certain organization should start from the above criteria. For instance, Prosci's AKDAR Model describes a simple change management process for employees, perfectly adapted to the particularities of small enterprises. Of course, Prosci complete this model with a more procedure-oriented one, describing the business dimension of change, that is perfectly adapted to larger enterprises' needs for a more complex, but easy to understand, change management process. While implementing the chosen model final recommendations, specific to small vs. large enterprises, can be summarized:

- **Identify main threat or opportunity** requesting change - for small organizations, with limited resources, it means to choose the most important change projects, avoid dissipating efforts on too many or irrelevant initiatives, and support post-change process stability through managerial measures; for large enterprises change is harder to initiate, so they should create structures able to analyze the environment and to encourage new change ideas, discouraging corporate inertia at the beginning and supporting it in post-change, to preserve the new position.
- **Diagnose the current organizational situation** - evaluating organization's attitude toward change, the level of knowledge regarding change management and the availability of resources needed for change (material, financial, informational/ knowledge, and human/ managerial) is a top prerequisite for any change project, in any organization
- **Create a change management team or delegate a change leader** - small enterprises need to make sure their leaders have proper training/knowledge required to use standard managerial tools for change management; in case of medium and large enterprises this should be complemented by leaders' capacity to cooperate outside regular organizational structure, using highly specialized tools.
- Continually **prepare for new changes**, creating a culture open to change and preserving the attributions of change manager even after finalizing the process of change.
- **Elaborate a strategy for change** from current to desired future state - the organization, regardless of its size, needs to: explore its options; integrate change management with project management in order secure a more people-focused approach and reduce resistance to change; ensure continuity of change process and increase efficiency; plan actions and milestones; establish roles in change process, choose change resistance control strategy; build a set of change management KPIs. Both planning and implementation of change strategy have to be simplified for smaller organizations.
- **Focus on most significant drivers of the change management process** (Table 2) - these are different for each size-type organization. Even though integrating change management with project management is important for all organizations, medium enterprises should focus more on communication of change and change tasks' assignment, while large enterprises should pay more attention to change continuity, ensuring the financial resources for change.
- **Integrate change management with project management** – this is listed as an important contributor to change project's success at international level (Prosci, 2014) and proved its importance in Romanian organizations too, showing significant correlations in all types of organizations.

Each organization and each change initiative is unique, comporting customization and requiring a particular approach; therefore, this paper is not claiming to offer a magic formula for a successful

change, but a transparent view and set of guidelines for personalization of change management process for organizations of different sizes. Hopefully this will help organizations in choosing the right path, in a more educated way, to reach the desired position in a highly efficient manner.

Bibliography

1. Alam, M., Gale, A., Brown, M. and Khan, A.I. (2010), "The importance of human skills in project management professional development", *International Journal of Managing Projects in Business*, 3(3), 495-516.
2. Anderson, D. and Anderson A.L. (2001), *Beyond Change Management: Advanced Strategies for Today's Transformational Leaders*, Jossey-Bass/Pfeiffer, San Francisco.
3. Anthony, R.N. (1965), *Planning and Control Systems: A Framework for Analysis, Division of Research, Graduate School of Business Administration*, Harvard University, Boston, MA.
4. Bernroider, E. and Koch, S. (2001), "ERP selection process in midsize and large organizations", *Business Process Management Journal*, 7(3), 251-257, available at: http://dx.doi.org/10.1108/14637150110392746 (accessed 18 January 2016).
5. Bjerke, B. and Hultman, C.M. (2002), *EM: The Growth of Small Firms in the New Economic Era*, Edward Edgar, Cheltenham.
6. Bresner, C. and Hobbs, J.B. (2006), "The perceived value and potential contribution of project management practices to project success", *Project Management Journal*, 37, 37-48.
7. Buonanno, G., Faverio, P., Pigni, F., Ravarini, A., Sciuto, D. and Tagliavini, M. (2005), "Factors affecting ERP system adoption: A comparative analysis between SMEs and large companies", *Journal of Enterprise Information Management*, 18(4), 384-426.
8. Burke & Litwin (1992), "A causal model of organisation performance and change", *Journal of Management*, 18(3), 523–45.
9. Cardinal, L.B., Sitkin, S.B. and Long, C.P. (2004), "Balancing and rebalancing in the creation and evolution of organizational control", *Organization Science*, 15, 411-31.
10. d'Amboise, G. and Muldowney, M. (1988), "Management theory for small business: attempts and requirements", *The Academy of Management Review*, 13(2), 226-40.
11. Davila, T. (2005), "An exploratory study in the emergence of management control systems: Formalizing human resources in small growing firms", *Accounting, Organizations and Society*, 30, 223-48.
12. European Commission (2014), "A partial and fragile recovery. Annual Report on European SMEs 2013/2014" [Online], [Retrieved August 8, 2015], http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/performance-review/files/supporting-documents/2014/annual-report-smes-2014_en.pdf
13. European Commission (2015), "What is an SME?", [Online], [Retrieved January 12, 2016], http://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition/index_en.htm
14. Ford, M.W. (2009), "Size, structure and change implementation", *Management Research News*, 32(4), 303-20.
15. Ford, M.W. and Greer, B.M. (2005), "Implementing planned change: An empirical comparison of theoretical perspectives", *Mid American Journal of Business*, 20(2), 59-69.
16. Garg, A., Goyal, G.P. and Lather, A.S. (2010), "The influence of the best practices of information systems development on software SMEs: a research scope", *International Journal of Business Information Systems*, 5(3), 268-90.
17. Ghobadian, A. and Gallear, D. (1997), "TQM and organisation size", *International Journal of Operations and Production Management*, 17, 121-63.
18. Gibcus, P., Vermeulen, P. A. M. and de Jong, J. P. J. (2009), "Strategic decision-making in small firms: A taxonomy of small business owners", *International Journal of Entrepreneurship and Small Business*, 7(1), 74-91.
19. Gilpin, R. (2000), *The Challenge of Global Capitalinsm: The World Economy in the 21st Century*, Princeton University Press.
20. Hannan, M.T. and Freeman, J.H. (1984), "Structural inertia and organizational change", *American Sociological Review*, 49, 149-64.

21. Haveman, H.A. (1993), "Organizational size and change: diversification in the savings and loan industry after deregulation", *Administrative Science Quarterly*, 38, 20-50.
22. Hoch, R. and Boros-Kazai, A. (1986), "The maxi and the mini (Thoughts on the large enterprise debate)", *Eastern European Economics*, 25(1), 84-105
23. Holbeche, L. (2011), "Leading edge", *Development and Learning in Organizations*, 25(5), 39-42.
24. Hoskisson, R.E., Eden, L., Lau, C.M. and Wright, M. (2000), "Strategy in emerging Economies", *Academy of Management Journal*, 43(3), 249-67.
25. International Monetary Fund (2015), "World Economic Outlook. Adjusting to Lower Commodity Prices", [Online], [Retrieved October 17, 2015], http://www.imf.org/external/pubs/ft/weo/2015/02/pdf/text.pdf
26. Keller, S. and Aiken, C. (2009), "The inconvenient truth about change management", *McKinsey Quarterly,* April, [Online], [Retrieved July 23, 2015], http://www.mckinsey.com/insights/organization/the_irrational_side_of_change_management
27. Kelly, D. and Amburgey, T.L. (1991), "Organizational inertia and momentum: a dynamic model of strategic change", *Academy of Management Journal*, 34, 591-612.
28. Kotey, B. and Slade, P. (2005), "Formal human resource practices in small growing firms", *Journal of Small Business Management*, 43(1), 16-40.
29. Kotter, J. (1995), "Leading change: Why transformation efforts fail", *Harvard Business Review*, 73(2), 59-67.
30. Kotter, J. (1996), *Leading Change*, Harvard Business School Press, Boston.
31. Kotter, J.P. and Schlesinger, L.A. (1979), "Choosing strategies for change", *Harv Bus Rev*, 57(2), 106-14.
32. Li, S. and Filer, L. (2007), "The effects of the governance environment on the choice of investment mode and the strategic implications", *Journal of World Business*, Elsevier, 42(1), 80-98.
33. Luecke, R. (2003), *Managing Change and Transition: 7 Practical Strategies to Help You Lead During Turbulent Times*, Harvard Business Press, Boston.
34. Marcotte, C. (2014), "Entrepreneurship and innovation in emerging economies", *International Journal of Entrepreneurial Behavior & Research*, 20(1), 42-65.
35. Morgan, P. and Darroch, M.J. (2006), "Large firms, entrepreneurial marketing processes and the cycle of competitive advantage", *European Journal of Marketing*, 40(5/6), 485-501.
36. Parida, V., Westerberg, M. and Frishammar, J. (2012), "Inbound open innovation activities in high-tech SMEs: The impact on innovation performance", *Journal of Small Business Management*, 50(2), 283-309.
37. Pillania, R.K. (2009), "Multinationals and emerging markets", *Business Strategy Series*, 10(2), 100-03, [Online], [Retrieved January 24, 2016], http://dx.doi.org/10.1108/17515630910942232
38. Pollack, J. (2015), "Is there a divide between change management theory and practice?", *The Business & Management Review*, 6(2), 64-72.
39. Pratten, C. (1991), *The Competitiveness of Small Firms*, Cambridge University Press, Cambridge.
40. Project Management Institute (2013), "Managing Change in Organizations: A Practice Guide", [Online], [Retrieved August 2, 2015], http://www.pmi.org/~/media/Files/Home/ManagingChangeInOrganizations_A_Practice_Guide.ashx
41. Project Management Institute (2014), "PMI's Pulse of the Profession In-Depth Report: Enabling Organizational Change Through Strategic Initiatives", [Online], [Retrieved August 2, 2015], http://www.pmi.org/~/media/PDF/Publications/Enabling-Change-Through-Strategic-Initiatives.ashx (accessed 2 August 2015).
42. Prosci (2007), "Change management methodology overview", [Online], [Retrieved August 4, 2015], http://www.change-management.com/tutorial-methodology-overview.htm
43. Prosci (2014), "Best Practices in Change Management", [Online], [Retrieved August 4, 2015], http://offers.prosci.com/research/Prosci-2014-Best-Practices-Executive-Overview.pdf

44. Rahman, H. and Ramos, I. (2010), "Open innovation in SMEs: From closed boundaries to networked paradigm", *Issues in Informing Science and Information Technology*, 7, 471-487.
45. Romanian National Institute of Statistics (2014), "Romanian small and medium-sized enterprises' evolution: 2010-2013", [Online], [Retrieved August 8, 2015], http://www.insse.ro/cms/files/publicatii/pliante%20statistice/IMM_01_2014.pdf
46. Taher, N.A.B., Krotov, V. and Silva, L. (2015), "A framework for leading change in the UAE public sector", *International Journal of Organizational Analysis*, 23(3), 348-63.
47. Tichy, N.M. (1983), *Managing Strategic Change: Technical, Political and Cultural Dynamics*, Wiley, New York.
48. Turner, R., Ledwith A. and Kelly, J. (2012), "Project management in small to medium-sized enterprises", *Management Decision*, 50(5), 942–57
49. Turner, R., Ledwith, A. and Kelly, J. (2009), "Project management in small to medium-sized enterprises: a comparison between firms by size and industry", *International Journal of Managing Projects in Business*, 2(2), 282-96.

Logistics Supply Control in Conditions of Customs Relations Development

Elena Potekhina, Mari State University, Yoshkar-Ola, Russia, vilor@mail.ruo

O. Mironova, Mari State University, Yoshkar-Ola, Russia, mironova_2010@mail.ru u

Abstract

The development of trade relations between Russian organizations within the country and with foreign partners mainly depends on the effectiveness of logistics and its management. A significant area of management is the control of transport and logistics operations, the organization of which requires certain costs and understanding of the essence of logistics activities and the principles in which customs relations are realized. The article deals with the content characteristics and organization of logistics systems and clusters, taking into account their control provision.

Keywords: logistic activity, customs legal relations, principles of customs activity, control, risk reduction.

Introduction

Logistic activity of Russian companies engaged in foreign trade activities, performing export-import operations in the working regime, has its own peculiarities and even difficulties within the framework of customs legal relations. In this regard, the actual issue is the implementation of the principles of customs relations and their impact on the effectiveness of logistics activities in the current geopolitical situation.

The Essence of Logistics Activities

Logistics as management of material, information and human flows requires, as a scientific direction and as a field of optimization practice, consisting in the methodological development of rational methods for managing these flows. The flow as an object of management is considered in logistics in the context of its classification types and applied to the field of logistics activities: in procurement, transportation, sales, storage of materials and goods.

In modern scientific research, close attention is paid to financial and information flows not only as concomitant with the main material flow, but also as independent ones. The logistic direction of scientific research is aimed at establishing the cause-effect relationships and patterns inherent in logistic operations, logistics systems, logistic functions and logistical costs.

Logistical operations can be classified according to the processes of supplying production and sales (sales). These operations are somewhat different from the usual economic operations by their connections inherent in the logistical chains of material flows.

Logistic system is considered in practice as a set of actions of participants in the logical chain: producers, transport and trade organizations and others - to the end user. The structure of the participants (elements) of the logistics system depends on the target orientation of the logistics chain, for example, organizations can develop their own logistics units, if necessary, they can attract specialized transport and logistics organizations that will carry out a complex of operations for supply, storage, E. This approach in logistics makes it possible to distinguish its different levels:

1- warehouse (storage) → post office (information exchange) → taxi (transport)

2- organization and management of transportation → accounting and inventory management → registration of export-import and freight documentation → warehouse storage → cargo handling → delivery to the end user

In the first case, the number of levels of the logistics system is less, since the organization applies for the implementation of logistics operations to a specialized organization, in the second case, the number of levels is greater, since the whole range of logistics services is transferred to the transport and logistics operation - to the provider.

Depending on the levels of the logistics system, separate types of logistics activities are distinguished, for example: procurement logistics, distribution logistics, transport logistics, sales logistics, stock logistics, warehouse logistics, information logistics, integrated logistics, city logistics, etc.

As part of the logistics activities, much attention is paid to customs logistics, considering the process of moving cargo across the border, solving the task of importing and exporting goods and minimizing the costs of customs procedures.

The allocation of territories of priority development in the subjects of the Russian Federation, free economic zones, has led not only to the development of logistics activities, but also to their integration. The latter is considered on the basis of synergy - in the merging of individual elements of logistics activities into a single system, which allows to obtain greater economic effect, to reduce logistics costs due to economies of scale and territorial localization of participants.

Such integration in Europe and Russia has been termed transport-logistic clusters, which is described in the economic literature as "a stable interaction between geographically concentrated independent market entities whose efforts are aimed at maintaining a full cycle of main and associated flows, end-to-end resource optimization from the original suppliers Up to the end users who implement logistic functions " (Savenkova T., 2015).

The creation of such logistics cluster complexes in Russia is currently being carried out in Primorsky Krai, which, in the final analysis, will enable it to be included in the transport logistics system of the Asia-Pacific region. In the structure of the transport and logistics cluster in accordance with the experience of European countries can be distinguished: multimodal storage and cargo handling centers; Multimodal terminals with access road and railroad entrances; Points of exchange and repair of all types of containers for the transport of goods; Service of technical and production-technological services; Information and logistics centers, as well as customs clearance centers and others.

The management of the transport and logistics cluster is most often carried out on the basis of public-private partnership. In this regard, not only understanding the content of logistics activities, but also managing the relations arising in systems and clusters of relations, including customs, implemented on the basis of generally established and special principles acquires special significance.

Principles of Customs Legal Relations

The formation of the Customs Union of Russia, Belarus and Kazakhstan initially implied the use of two levels of government: national and supranational. At the supranational level, the main customs legislation regulating customs relations is the Customs Code of the Customs Union (TC TC). The entire system of regulatory and legal regulation of customs legal relations is level:

- the first level - TC TC;
- the second level - international treaties forming the legal framework of the Customs Union;
- third level - decisions of the Customs Union Commission.

At the national level, customs legal relations are regulated by national legislation. In Russia there are Federal Laws: "On Customs Regulation in the Russian Federation" dated 27.11.2010 No. 311-FZ and "On Customs Tariff" dated May 21, 1993 No. 5003-1. In the development of federal legislation, regulatory legal acts of the Government of the Russian Federation and regulatory legal acts of the Customs Service of the Russian Federation (FCS of Russia) are developed and applied in the practice of managing customs legal relations, which is the key subject of customs relations management. The FCS of Russia is a "federal executive body that fulfills the functions of elaborating state policy and regulatory and legal regulation, control and supervision in the field of customs business" and carrying out other types of activities provided for by the Russian legislation (Pepelyaeva S., 2015).

The activities of the customs authorities that play a primary role in the development of customs legal relations are based on legally established principles:

- legality;
- equality of persons before the law, respect and observance of their rights and freedoms;
- Unity of the system of customs authorities and centralized leadership;
- professionalism and competence of customs officials;
- clarity, predictability, publicity of actions of officials of customs bodies, understandability of their requirements when conducting customs control and performing customs operations;
- accessibility of information on the rules for the implementation of foreign economic activity, the customs legislation of the Customs Union and the legislation of the Russian Federation on customs matters;
- uniformity of law enforcement practice in the course of customs control and customs operations;
- prevention of imposing excessive and unjustified costs on the participants of foreign economic activity in the exercise of powers in the field of customs;
- improvement of customs control, application of modern information technologies, introduction of progressive customs administration methods, including on the basis of universally recognized international standards in the field of customs, experience in customs management in foreign countries - trading partners of the Russian Federation (Federal Law of 27.11.2010 N 311-FZ).

The emergence of customs legal relations is associated with the movement of goods across the customs border of the state or the Customs Union. This transfer entails the emergence of the obligation to pay customs fees, which include: customs duties (import and export), customs fees for the implementation of customs operations.

Crossing of goods across the customs border is also connected with the payment of taxes: VAT and excises, levied when importing goods into the customs territory. It should be noted that customs payments do not refer to tax payments, and tax payments to customs. At the same time, the basis for payment of both is documents drawn up by organizations, including logistic ones, which testify to the nature and nature of the logistics operations carried out.

The relationship between logistics and customs legal relations is complemented by tax legal relations, deepening them meaningfully, which requires a clear understanding of this relationship.
For example, when goods are moved across the customs border in accordance with the legislation of the Russian Federation on taxes and fees, the introduction, collection of VAT and excises is applied in accordance with the principle of "targeted action"

According to the customs legislation, the establishment, introduction and collection of the same VAT and excises is applied only in the part that is not regulated by the legislation on taxes and fees in accordance with the principle of "additional action". The interrelationship of the principles is manifested in the priority of the tax law in relation to the customs. This causes participants of customs legal relations from

different countries to observe the interests of the national legislation of the country to which the import of goods is carried out.

Control support for the implementation of logistics operations

In the logistic activities, all traditional types of control (preliminary, current and subsequent) are used, which contribute to reducing risk situations, identifying and preventing violations, and various types of fraud.

The most common types of violations and fraudulent activities in logistics activities are related to the turnover of commodity-material values (material flow), among them one should point out: incorrect technological schemes and processes of moving cargo and transportation; Incomplete posting of goods, raw materials and materials; Non-existent supplies; Incorrect schemes of document circulation of warehouse operations; and others. Preliminary control that ensures the reduction of risks on the flow of goods can be organized taking into account the following measures:

- control of compliance with technological schemes and maps;
- control over the performance of official duties;
- control over the implementation of measures to ensure economic security;
- control of taxation on operations of commodity circulation within the domestic market and with

foreign partners. At the same time, importance is given to improving the efficiency of the management system of transport and logistics organizations and other stakeholders in logistics clusters. Such management systems in accordance with the Federal Law "On Accounting" No. 402-FZ should be organized taking into account effective internal control.

Own internal control systems of transport and logistics organizations, subordinate to owners and carrying out their activities in close cooperation with security services, are able to control all routes of commodity flows and all schemes independently, and, if necessary, with the involvement of independent experts. The most effective preliminary measures to reduce the risks of commodity flow include: the application of a system of commodity loss rates and natural loss in transport with progressive methods that minimize objective and subjective errors, and the development and implementation of a program fraud preventing.

It should be noted that the Russian Register of Corporate Fraud and Abuse reflects several hundred of the most common types of fraud associated with the receipt, storage, movement and use of various types of assets and inventory. The use of this Register can be used by transport and logistics organizations to identify the risks associated not only with commodity, but also financial flows (Arkov S., 2016).

Current monitoring of logistics operations and material flows uses such types of instruments as: control checks; Inspections; Video surveillance; Monitoring of processes, conducting of official investigations, installation and efficiency of digital fixators of vehicle parameters; Analysis and control of accounting systems and software products.
During subsequent monitoring, independent expert examinations, control checks of the safety of goods and assets being moved, independent analysis of operational information and information on warehouse documentation, inventory, checking records in the accounting and reporting registers, as well as in documents that have customs marks and passed customs control are often used.

It should be noted that the correctness of the reflection of logistics operations in customs declarations and accompanying documents, provides grounds for identifying violations of tax legislation, is used in verifying the correctness of the input VAT calculations when importing goods and other issues.

Summary

The foregoing allows us to conclude that it is necessary to study the control supply of all types of logistics activities, depending on the legal field in which it is carried out. Since the number of nuances of the formation of a legal information field in each country are quite large, their influence on customs legal relations is strong, it is necessary to emphasize the need for a deep study of transaction costs which increase basic customs costs, depending on the legal instruments for regulating these relations.

References

Savenkova T., 2015, Innovative development in the field of transport and logistics services / / Innovative development of the economy, № 3 (20), 9-15.

Pepelyaeva S., 2015, Tax law: a textbook for universities, Alpina Pablisher, 796.

Federal Law of 27.11.2010 N 311-FZ (as amended on December 28, 2016) "About Customs Regulation in the Russian Federation"

Arkov S., 2016, Russian Register of Corporate Fraud and Abuse. ISAS. Block "Money Turnover". Group "Asset fraud", SPb., 224.

Arkov S., 2016, Russian Register of Corporate Fraud and Abuse. ISAS. Block "Sales". Group "Asset fraud". - SPb., 533.

Forecasting the Logistics System of the Region

Evgeny I. Tsaregorodtsev, Mari State University, Yoshkar-Ola, Russian Federation, evgts@yandex.ru

I. Shcheglova, Mari State University, Yoshkar-Ola, Russian Federation, sheglovairina130595@mail.ru

Yu. Markina, Mari State University, Yoshkar-Ola, Russian Federation, markina953139@mail.ru

A. Loginova, Mari State University, Yoshkar-Ola, Russian Federation, anastasia.loginova@bk.ru

L. Sageeva, Mari State University, Yoshkar-Ola, Russian Federation, liana212009@mail.ru

E. Skvortsova, Mari State University, Yoshkar-Ola, Russian Federation, jedita.mih@mail.ru

A. Efimova, Mari State University, Yoshkar-Ola, Russian Federation, nastyusha1007@mail.ru

Abstract

In work to be carried out the analysis of dynamics and structure of development of transport and logistic systems on the example of the Republic of Mari El, for the purpose of ensuring economic security of the region and maintenance of necessary level of its competitiveness.

Keywords: economic security of the region, region economy transport system, logistic business.

Introduction

The current socio-economic situation in Russia determines the particular relevance of government activities to ensure the economic security of its regions. Today, a special role is given to the possibilities of a separate region to form the security of the state as a whole, while remaining a developing and stable area, can effectively resist the economic threats or to prevent their occurrence. The economic security of the region depends primarily on ensuring control and effective use of all resources of the constituent entities of the Russian Federation (RF) by regional bodies.

Analysis of the transport and logistics system of the Republic of Mari El

Let's consider the current state of the transport and logistics market in Russia in details is presented in Table 1.

Table 1: The structure of the Russian transport and logistics market by types of services in 2016

Types of services	Value,%
Freight transportation	88%
Forwarding services	9%
Warehousing and distribution	2%
Logistics management	1%
In total:	100%

According to the table, it can be seen that freight (transport and logistics services) account for 88% of the total volume of the Russian logistics market, in turn, the share of forwarding services accounts for 9%. The lowest share of the market for warehousing and distribution is 2%, as well as for management logistics - only 1%. So, it can be concluded that, that the most demanded are cargo transportation, and the least demand is used by management logistics in Russia. This dynamics can be explained by the presence of predominantly automobile transport routes. The transport system of Russia is a set of roads and ways (Table 2).

Table 2: The transport system of Russia by types of transport routes in December 2016

Types of transport ways	Value, thousand kilometers
car roads (with hard coating)	984
air routes	800
trunk pipelines	250
inland waterways	102
railways	86

The overall development of the transport system and the improvement of Russia's position in the logistics services market depend on the regulation of this area in its individual regions. The Republic of Mari El (RME) occupies high positions in the development of the logistics (transport) system of the Volga Federal District. Nowadays the Mari El Republic has a well-developed transport network, which includes transport highways, air communications, waterways and railways on the territory of the republic. The Republic of Mari El is a part of the Volga Federal District and the Volga-Vyatka economic region. Territorially the republic is located in the center of the European part of the Russian Federation, mainly on the left bank of the Volga and Vetluga. It borders on the Tatar, Chuvash republics, Nizhny Novgorod and Kirov regions. In addition, it should be noted that important transport routes of federal and international importance pass through the RMEs, such as the Moscow-Cheboksary-Kazan-Yekaterinburg motorway, the Moscow-Kazan-Yekaterinburg (Trans-Siberian railway).

In general, the transport infrastructure of the Republic of Mari El is represented by the following facilities:

– the railway station in Yoshkar-Ola, which includes 17 railway stations and 8 stops;
– airfield in the city of Yoshkar-Ola
– 2 bus stations (in Yoshkar-Ola and Kozmodemyansk) and 14 bus stations (in all municipalities);
– one water port - Kozmodemyansk;
– one trolleybus park (Yoshkar-Ola city).
– There are 6 motor transport companies operating on the territory of the ITR:
– Yoshkar-Ola passenger transportation company No. 2;
– Freight forwarding company LLC Business Lines;
– Automobile transport enterprise of the Maritime Consumption Union;
– ATP Motor Transport Enterprise;
– Motor transport enterprise LLC "Mari";
– Transport company LLC “Ratek”.

The length of Railways in the Republic was 10 074 kilometers according to official figures Federal service of state statistics in the Republic of Mari El to the end of 2016.

The length of communication routes in the ITRs for the period 2012-2016 is shown in figure 1. The length of Railways in RME in 2013 increased compared to 2012 by 11.92%., that testifies to intensive development of transport (logistics) system in RME over the period, from the chart it is clearly visible. The decrease in the total length of Railways is observed in the country 2013 - 2016. This trend can be explained by the difficult economic situation in the Russian Federation in the period 2013 - 2016., and high speed development of vehicles and deterioration of road quality.

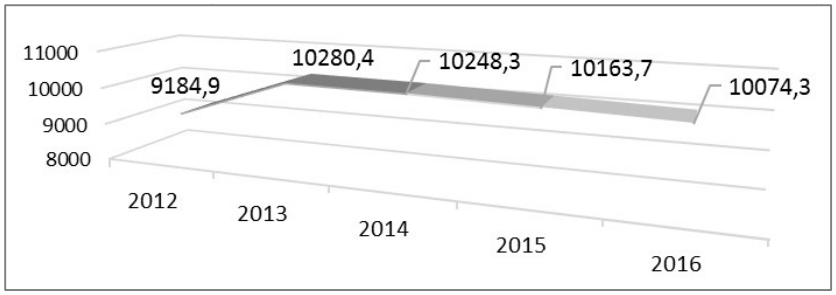


Fig. 1: The length of Railways in the Republic of Mari El for the period 2012 – 2016 (kilometers)

Consider the dynamics of the development of railway, road and internal waterways (Figure 2), in order to more accurately assess the cause of the reduction of the total length of Railways in RME.

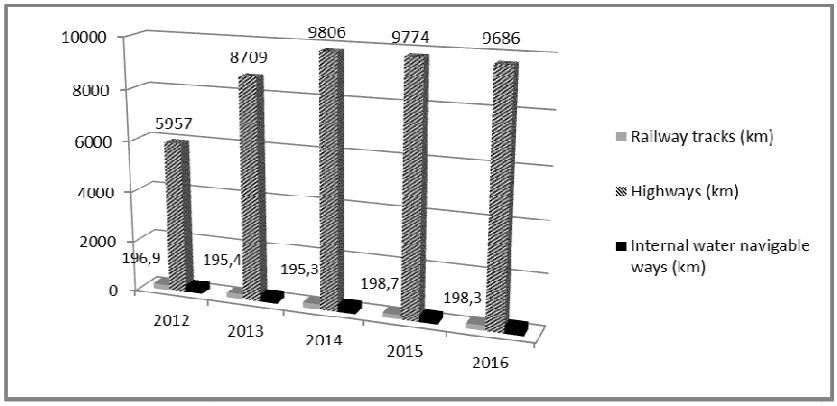


Fig. 2: Dynamics of the development of rail, road and inland waterways

The length of railway lines is increasing every year. Its overall growth rate is 1% for the considered period of time. The greatest length of railway owned road. But the negative dynamics to 2016, which once again confirms the deterioration of roads (highways), designed for vehicles in 2013-2016. Consider the official figures Rosstat data on the percentage of public roads in compliance with regulatory requirements, according to RME for our assumptions to confirm about the cause of the reduction in the length of motor roads (Figure 3).

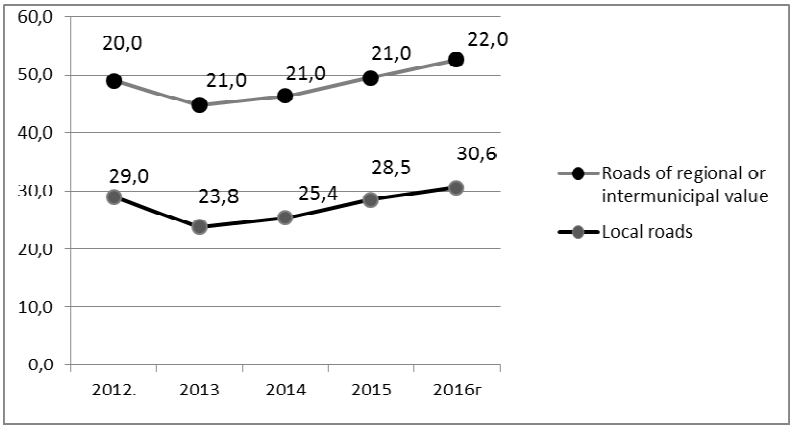


Fig. 3: Share of public roads, in compliance with regulatory requirements, RME (%)

The result of the deterioration of the transport system of the Republic of Mari El, there is a decrease in the efficiency of transport and logistics system of the Republic as a whole.

According to Rosstat, in the first 9 months of 2016, compared to the same period of 2015 freight traffic from road transport fell by 2.8 % and rail by 1.4 % (according to the JSC "RZD"). According to data published by the Ministry of transport of the Republic of Mari El, in the first half of 2016, compared to the same period last year aviation freight turnover decreased by 6 %. The dynamics of this decline can be explained by the decrease of investments in logistics and transport, as well as the instability of exchange rates.

In addition, today on the territory of the Republic of Mari El (RME) there are only about 6 private logistics companies and 10 companies from other regions, which serve the logistics system of Mari El. List of companies dealing with logistics in the ITRS and is located on the territory of the Republic are presented in Table 3.

Table 3: Companies involved in logistics business in the Republic of Mari El

Name	Address	Head	Activity
TC Lokomotiv	Yoshkar-Ola, Kirova str., 3, of. 19	Osipov N. M.	Transport and transportation, logistics
OOO «Avtogruz»	Yoshkar-Ola, Komsomolskaya str., house 62 A	Efimov V. V.	Cargo, transport, logistics, goods delivery
Agency of transportation "MegaMax"	Yoshkar-Ola, podolskih Kursantov str., 4A 106 sqm.	Seregin Ya. Yu.	Retail trade sales purchase Transport logistics
Smirnoff Transport Company	Yoshkar-Ola, St. Mashinostroiteley d. 107 A	Smirnov A. S.	Delivery of cargoes Transportation of oversized cargo

OOO "Punktavto"	Yoshkar-Ola, St. Volkov, d 60 323 office	Volkov I. A.	Transport and transportation, logistics
The transport company Crew	RME, village Surok street Sports, d. 18, kV. 52	Somov A.	Transport and transportation Automobile freight Container shipping

Companies such as Agency of transportation "Megamaks, OOO Punktavto", the Transport company Crew, maybe Lokomotiv are in the process of liquidation.
The only transport logistic company which is functioning effectively in the freight market in the Republic of Mari El - Smirnoff Transport Company. Financial performance of Smirnoff Transport Companies is presented in figure 4.

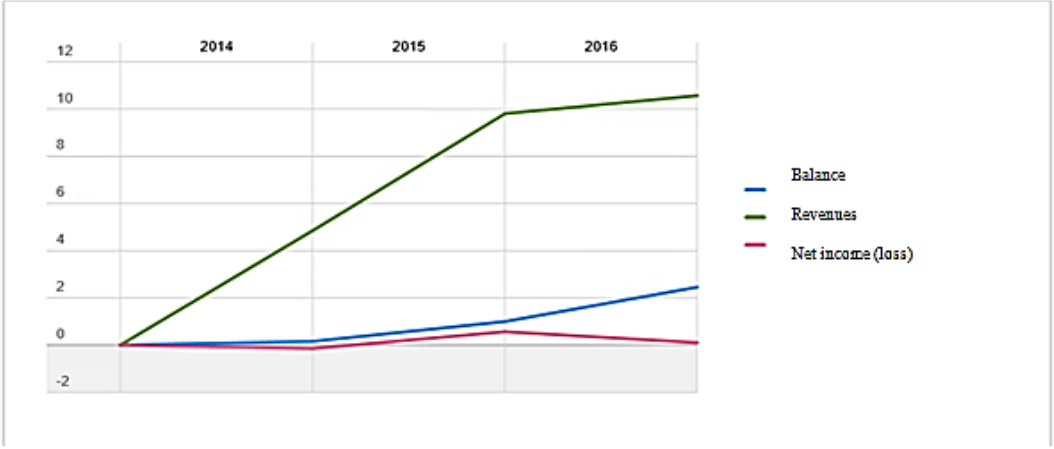


Fig. 4: Financial performance indicators Smirnoff Transport Companies for the period 2014-2016.

As a private network of logistics companies RME is not developed, the bulk of transportation is carried out logistic company third-party of regions. For example, companies such as: DHL (Moscow), TK kit (Ekaterinburg), OOO "Tim River" (Moscow), OOO "Sladkaya zhizn" (Nizhny Novgorod region), OOO "Delovye Linii" (Saint-Petersburg), etc.

Acknowledgement

The share of public roads in compliance with regulatory requirements in the Republic of Mari El is considerably small. But we can see positive growth in the share of roads that satisfies the standard value. Roads of regional and intermunicipal values are in a more critical situation than the roads of local importance. In this regard, it can be concluded that the Ministry of transport and road infrastructure of the Mari El Republic is necessary to pay more attention to the development and improvement of roads of regional significance. Improving the data quality of communications you can improve the economic situation of the Republic and increase its production capacity, as it is through roads intermunicipal highways to transport most of the goods produced in the territory of the Republic of Mari El.

Today in the Republic the resolution of the Government of Mari El on 30 November 2012 No. 447 (as amended on 27.06.2017) - "Development of transport system and improvement of road safety for the period up to 2022". The purpose of this state program is to: 1) improve the administration of motor roads of Republican significance of the Republic of Mari El; 2) enhancing the technical and operational condition of roads with the prospect of bringing them up to standard and others [3].

Conclusion

Thus, it can be concluded that for the dynamic development of the transport system of the RME, the necessary modernization of the transport routes, which are currently outside the satisfactory condition that is characterized by a reduction in the length of paths suitable for operation. As for the logistics system of the republic, it can be noted that its level is quite low. Renewal and improvement of the transport and logistics system of the Republic of Mari El should occur in conjunction with development of neighboring regions with direct support at the state level.

Acknowledgement

The research is supported by Russian Science Foundation project #16-18-10017 «Complex of programs for forecasting economic development of the region»

References

The resolution of the government of RME of November 30, 2012 of N-447 (in an edition of 27.06.2017) [An electronic resource]. – Access mode: http://www.garant.ru/, free. - Zagl. from the screen.

Lavrut N.S. Economic security of REGIONS AS BASIS of SAFETY of the COUNTRY//Economy and modern management: theory and practice: сб. the Art. on a mater. XXII international scientific and practical conference – Novosibirsk: SIBAK, 2013. "Economy and modern management: problems and decisions": materials of the international correspondence scientific and practical conference. (on February 27, 2013) — Novosibirsk: Prod. "SIBAK", 2013. — 100 pages.

Potekhina E.N. Innovations IN the ORGANIZATION of LOGISTIC SERVICE IN RUSSIA//Innovative policy management of innovations: the scientific and practical and theoretical magazine Innovative development of economy No. 5(29) – Yoshkar-Ola: LLC Scientific and Consulting Center, 2015 — Page 5-8.

Starkova N.O., Uspensky A.V. Problems AND PROSPECTS of MODERN RUSSIAN LOGISTICS//Economy and modern management: theory and practice: сб. the Art. on a mater. XXXVIII international scientific and practical conference No. 6(38). – Novosibirsk: "SIBAK", 2014.

Input–Output Energy Analysis of Honey Production in Iaşi County, Romania

Dan Bodescu, University of Agricultural Sciences and Veterinary Medicine Iasi, Romania, dvbodescu@yahoo.com

Radu-Adrian Moraru, University of Agricultural Sciences and Veterinary Medicine Iasi, Romania, ramoraru@yahoo.com

Oana Coca, Alexandru Ioan Cuza University of Iasi, Romania, oanacoca.yxs@gmail.com

Sebastian Brumă, Romanian Academy - Branch of Iasi, "Gh. Zane" Institute of Economic and Social Research, Iasi, Romania, sebastian_bruma@yahoo.com

Marius Gheorghe Doliș, University of Agricultural Sciences and Veterinary Medicine Iasi, Romania, mariusdolis@yahoo.com

Abstract

The aim of the current paper consists in the analysis of the energy efficiency of honey production in Iasi County. The field research has been done on a stratified sample by face-to-face interview focused on the results of the apiaries registered in the year 2015. The input energy in the year 2015 was about 645 MJ hive^{-1} , while the output energy reached 246 MJ hive^{-1}. The indirect inputs was about 451.2 MJ have^{-1} while the indirect outputs reached 193.7 have^{-1}. The average weight of the non-renewable inputs was about 94,7% (610.7 MJ have^{-1}) while the renewable input represented 5,3% of total inputs (34.1 MJ have^{-1}). The consumption with work force and the sugar consumption have a significant impact upon the energy outputs and can be used to increase the energy perfomances of the beekeepers. The honey production determines net energy -398.78 MJ have^{-1}, energy productivity 0.030 kg MJ^{-1}, energy use efficiency 0.38, specific energy 33.3 MJ kg^{-1}.

Keywords: energy efficiency, honey production, beekeeeping management

Introduction

Apiculture is an activity with signficant important impact upon both the natural environment where ocurrs (Abrol, 2012, Beard, 2015) and the life quality in rural area. (Yap et al., 2015, Mwakatob et al., 2010). By the other hand, the implementation of an agresive management to intensify the apicultural production and to increase the economic performances may conduct to major ecological inbalances (Gupta, 2014). The development trend of the Romanian agriculture determines the increase of bees and apiaries vulnerability (Loos et al., 2015).

The Romanian apiculture is characterised by a livestock of 1.39 milion bee families owned by 42,864 beekeepers (National Institute of Statistics, 2010). The honey production registered in the year 2015 reached 27,893 tons year^{-1} with a mean of 23,960 tones year^{-1} during 2011-2015. The average number of bee families owned by a beekeeper was about 34.4, with 558 kg of honey production per apiary. The average honey production was about 17.2 kg per beehive (National Institute of Statistics, 2015). The beekeepers are selling the honey directly from the apiary, on the agrifood markets, to the Beekeepers Association and other buyers.

The honey consumption increased significantly, therefore , if during the period 1962-1966 a person consumed cca. 280 g honey year^{-1}, during 2007-2011 this consumption increased to cca. 560 g honey year^{-1}, reaching 585 g honey year^{-1} in 2015. During the interval 2007-2011, the value of the honey imports reached 2,08 mil. $ year^{-1} and the exports value was about 33.21 mil. $ year^{-1}. The contribution of the honey production to the commercial balance of Romania reaches cca. 31.13 mil. $ year^{-1}. This evolution is determined mainly by the increase of exports value after 1990, when the

Romanian economy passed from the centralised system to the market economy (Măgdici et al., 2015).

The keeping of the bee families is mostly stationary (84%), only a small part (16%) of the beekeepers moving to some zones with high potential for honey production (Ştefan et al., 2009). The last ones use own means of transport or purchase transport services from third parties. The implemented apicultural management includes traditional components verified during generations of beekeepers, combined with modern technologies adoptated from the disemination actions of the Beekeepers Association and of the Research & Development Institute for Apiculture. The capitalization level of apiaries is in general low, the beekeepers using wood beehives, manual centrifuge and other relative rudimentary devices. Beginning with the application for European funds, some beekeepers bought electric devices for honey extraction and modern tools (Popescu, 2010).

The efficent use of resources occupies one of the most important places within the concerns to accomplish a sustainable agricultural development (Agapi et al., 2016, Blaxter, 1962, Baishaya et al., 1990, Cichocka et al., 2011, Rafiee et al., 2010, Streimikiene et al., 2007, Tudor et al., 2015). This objective is to the same extent compliant with the environment protection as well as with the identification of the most performant systems from the economic point of view (De Jonge, 2004).

Materials and methods

The aim of the research presented in the current paper consists in the analysis of the energy efficency of apiculture in Iaşi County. The apiculture in Iaşi County is representative for the Romanian apiculture both as far as the development level and the productivity of bee families are concerned. This is characterised by a livestock of 38,890 bee families familii in 1,118 apiaries (National Institute of Statistics, 2010).

The honey production registered during the period 2011-2015 reached 714.3 tone year^{-1}. The average number of owned bee families was about 32.2 beekeeper^{-1} and the honey production obtained reached 638.9 kg apiary^{-1}. The average honey production amounted to 18.4 kg beehive^{-1} (National Institute of Statistics, Statistic, 2015). The apiaries are located in rural settlements where they remain during the cold season, afterwards part of them move to zones with high potential for honey production from south and south-est (Galați, Focșani, Buzău and Tulcea counties), sometimes in association with the zones from north and north-est (Iași, Vaslui, Suceava and Botoșani counties). The total distance of apiaries circuit registers large variations from 50 km to more than 1,000 km. The distance between the beehives on overwintering locations falls within the interval 40-70 centimeters, reaching 10-50 centimeters during the pastoral period for the beehives from bee pavilions, respectively for the beehives placed on soil.

The major bee subspecie is Apis mellifera carpatica. Other subspecies or crossbreeds have low access due to the perception of beekeepers with regard to the high price related to the determined productivity increase. The number of colonies per apiary varies from less than 50 beehives to more than 150 beehives, reason that determined a stratification with a share of 50 beehives (0-50, 51-100, 101-150, over 151) 87.8%, 9.8%, 1.6 respectively and 0.7%. The beehives are made from wood using 10 - 12 frames of honeycombs with 30x47centimeters or 21x47 centimeters. Usually they are foreseen with stores of same material with frames of 21x47 centimeters or 14x47 centimeters. The honey extraction consists in the manual uncappping of combs and extraction with manual, sometimes electric, centrifuge.

Work temperature 5-35 grade Celsius with average work time of 2-11 h max. 320 days year $^{-1}$ according to the number of beehives. The feeding with sugar occurs with syrup in concentrations 2:1 to complete the wintering food and 1:1 for spring-autumn stimulations. The used drugs have as active substance: amitraz and tau-fluvalinat. The replacement of queen bees occurs in the second part of the bees activity season in the months June-September and when is necessary. The main melliferous plants are represented by *Robinia pseudacacia*, *Tilia sp., Helianthus annus, Brassica napus L ssp.,* the local species of fruit trees, pastures and hayfields (Iordache et al., 2007).

The paper objective consists in: 1. Determination of the mean level of energy inputs and outputs within the studied apiaries (MJ have^{-1}); 2. Determination of the structure of enegy consumption (human labor, electricity, diesel fuel, drug, sugar and track, direct and indirect, renewable and nonrenewable); 3. Identification of the correlation and regression related to the outputs (P, R^2, equations); 4. Determination of the rates of energy efficiency of the inputs use (efficiency of energy use, energy productivity, specific energy and net energy).

The field research took place by face-to-face interview in the last trimester of the year 2016 with questions regarding the consumption and the results of apiaries registered in the year 2015 on a sample of 98 beekeepers. The sampling was accomplished by Neyman method, deviation criterium of 5% and a trust level of 95%. The analysis of energy inputs and outputs was carried out by using some indicators (Demircan et al., 2006, Omidi-Arjenaki et al., 2016) as follows:

Energy use efficiency = energy output (MJ have^{-1})/energy input (MJ have^{-1}) (1)
Energy productivity (kg MJ^{-1}) = product output (kg have^{-1})/energy input (MJ have^{-1}) (2)
Specific energy (MJ kg^{-1}) = energy input (MJ have^{-1})/product output (kg have^{-1}) (3)
Net energy (MJ have^{-1}) = energy output (MJ have^{-1}) - energy input (MJ have^{-1}) (4)

The energy consuption have been determined by the multiplication of the consumed quantities by the specific energy contribution: Human labor - 1.96 MJ h^{-1} (Ozkan et al., 2004, Omidi-Arjenaki et al., 2016, Singh et al., 2002), diesel fuel - 56.31 MJ l^{-1} (Heidari et al., 2011, Omidi-Arjenaki et al., 2016, Singh et al., 2002), electricity - 11.93 MJ kW/h^{-1} (Gundogmus, 2006, Omidi-Arjenaki et al., 2016), track - 10.15 MJ Km t^{-1} (Davis et al., 2011, Omidi-Arjenaki et al., 2016), drugs-13.64 MJ kg^{-1} (Mortazavi, 2002, Omidi- et al., 2016), sugar- 15.4 MJ kg^{-1} (Coley et al., 1998, Omidi-Arjenaki et al., 2016). The energy outputs is represented for this population by the honey production with the energy value calculated by multiplying the quantities by the specific energy contribution - 12.72 MJ kg^{-1} (Southwick, 1980, Omidi-Arjenaki et al., 2016).

For the data processing have been used informatic applications as MS Excel, SPSS (Kolmogorov–Smirnov test, t-test) and the field information has been completed by information received from Iasi County Directorate of Statistics and the Association of Beekeepers – county branch.

Results

The mean of energy input for the studied population in the year 2015 was about 645 MJ hive^{-1} , with minimum of 558 MJ hive^{-1} at the apiaries with a livestock of 0-50 beehives and maximum of 1,016 MJ hive^{-1} at the apiaries with 51-100 beehives Fig. 1.

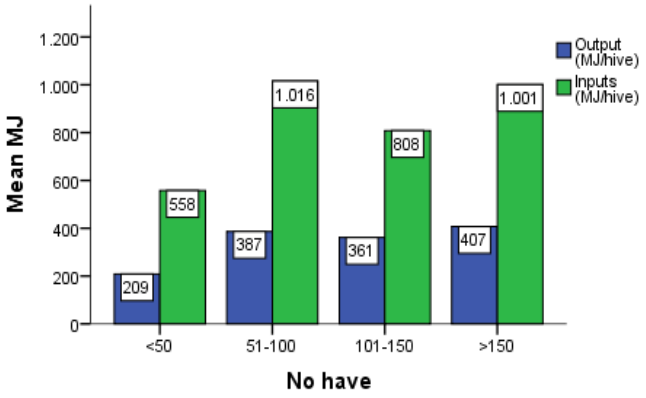


Fig. 1: Energy inputs and outputs.

The mean of energy output was about 246 MJ hive^{-1} at a productivity of 19.3 kg honey hive^{-1}. Minimum energy output was registered at the apiaries with 0-50 beehives (209 MJ hive^{-1}) while the maximum of 407 MJ hive^{-1} was registered at the apiaries with more than 151 beehives. At the size group with more than 50 beehives, the inputs increased and the mean outputs have similar values and do not correlate with the apiaries size.

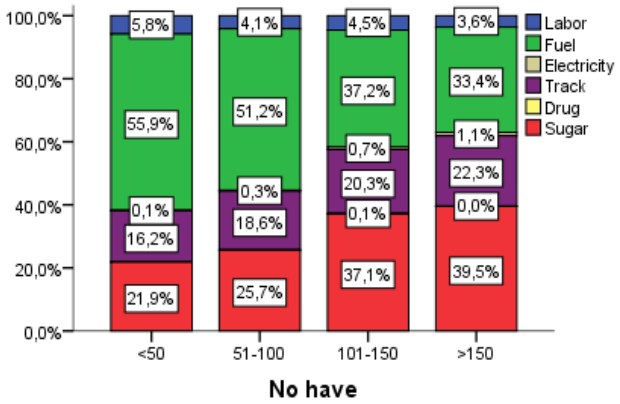


Fig. 2: Structure of energy inputs.

The maximum weight of a mean inputs Fig. 2 was registered at fuel of 52.7% (339.8 MJ hive^{-1}) while the minimum weight was registered at drugs of 0.024% (0.156 MJ hive^{-1}). The mean energy values were at the others outputs of 34.1 MJ hive^{-1} for human labor, electricity 1.59 MJ hive^{-1}, sugar 157.8 MJ hive^{-1} and track 111.4 MJ hive^{-1}. At the apiaries with 0-50 beehives, the consumption of human labor had maximum weight of 5.8% (32.5 MJ hive^{-1}) while the minimum weight of 3.6% (36.3 MJ hive^{-1}) was registered at the apiaries with more than 151 beehives.

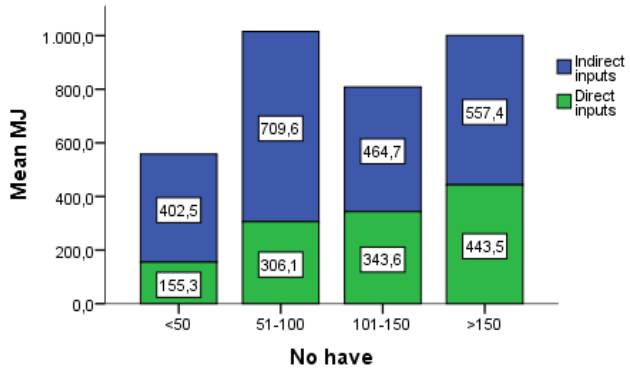


Fig. 3: Structure of energy inputs (direct - indirect).

The indirect energy inputs have been the track and diesel fuel, because both participate to the transport of beehives, honey, raw materials and other materials, but these are not directly involved in the production process. The fuel is used by the beekeepers who own automobiles. The direct energy inputs are the human labor, electricity, drugs and sugar (Southwick, 1980, Omidi-Arjenaki et al., 2016).

The indirect inputs Fig. 3 had a mean value of 451.2 MJ have^{-1} (70.0% from total inputs) with a minimum of 402.5 MJ have^{-1} at the beekeepers who own 0-50 beehives (72.2% of total inputs) and a maximum of 709.6 MJ have^{-1} at the beekeepers who own apiaries with 51-100 beehives (69.9% of total imputs). The mean direct inputs have been of 193.7 have^{-1} (30.0% of total inputs) with a minimum of 155.3 have^{-1} at the apiaries with 0-50 beehives and a maximum of 443.5 have^{-1} at the apiaries largen than 151 beehives.

The regression model has been statistically ensured at a trust level of 95.0% and R Square 0.769 has the shape of 56.7 + 0.179 indirect inputs +0.558 direct inputs.

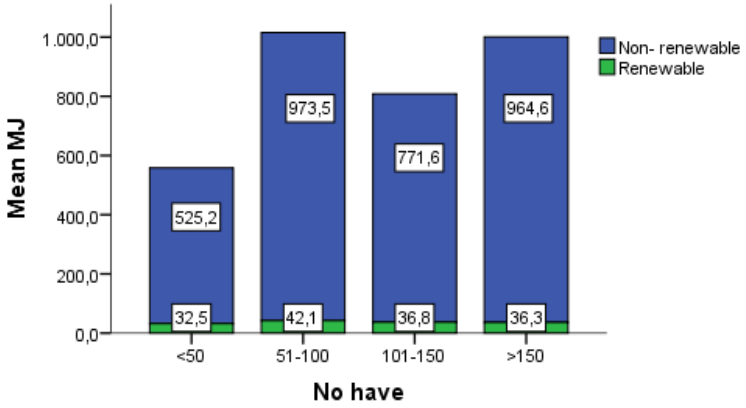


Fig. 4: Structure of energy inputs (renewable – nonrenewable).

In the category renewable inputs have been included the labour consumption while all other consumption have been included into the non-renewable inputs. Thus, the mean weight of the non-renewable inputs reached 94.7% (610.7 MJ have^{-1}) with a maximum of 96.4% at the apiaries with more than 151 beehives and a minimum of 94.2% at the apiaries up to 50 beehives Fig. 4.

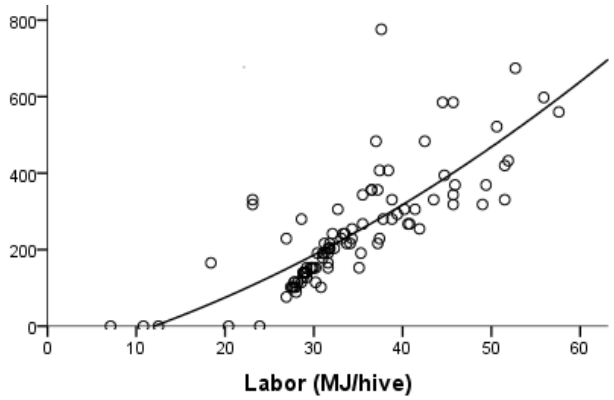


Fig. 5: Polynomial regression trend lines of energy outputs.

The non-renewable inputs had a mean weight of 5.3% of total imputs, with a minimum of 3.6% at the apiaries with more than 151 beehives and a maximum of 5.8% at the apiaries smaller than 50 beehives. In absolute value, the higher non-renewable energy consumption have been registered at the apiaries with 51-100 beehives (973.5 MJ have^{-1}), representing 4.1% from total imputs at this category.

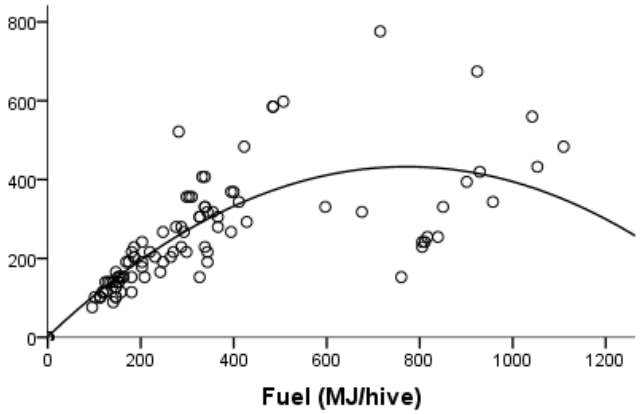


Fig. 6: Polynomial regression trend lines of output energy.

The regression model statistically ensured at a trust level of 95.0% and R Square 0.771 has the shape -78.34 + 0.195 non-renewable inputs+ 6.006 renewable inputs.

The function of Labour consumption (Pearson Correlation 0.787**, significant at the 0.01 level - 2 tailed, R Square 0.628), with the shape of -88.31+6.17x+0.1x^2 Fig. 5, shows that only for the bee families keeping without obtaining energy outputs is necessary a consumption of 73.4MJ have^{-1} (37.4h have^{-1}). The data obtained do not offer information regarding the maximum output that can be obtained and can be at a higher level of labour consumption than that of the researched population.

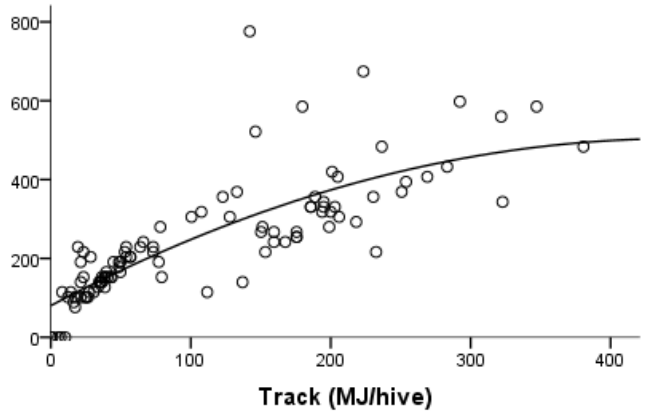


Fig. 7: Polynomial regression trend lines of output energy.

The function of fuel consumption Fig. 6, of shape 1.49+1.12x-7.424E-4x^2 (Pearson Correlation 0.676**, significant at the 0.01 level - 2 tailed, R Square 0.587), indicates a maximum consumption of 773.5 MJ have^{-1} (13.7 l fuel) that allows to obtain a maximum production with an energy value of 434.6 have^{-1} (34.2 kg honey). The fuel consumptions above this level determine the obtaining of a lower output.

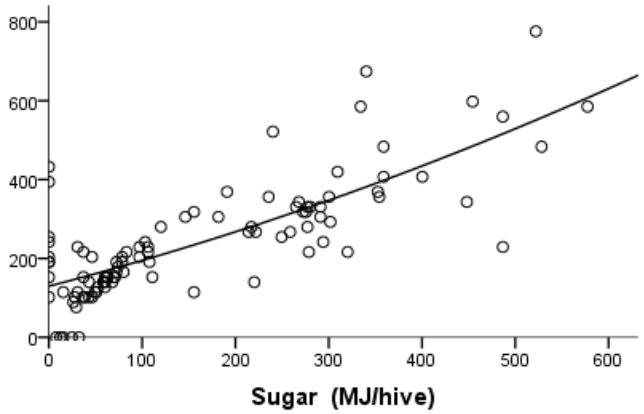


Fig. 8: Polynomial regression trend lines of output energy.

The correlation for electricity is significant at the 0.01 level (2-tailed) but weak with 0.407 Pearson coefficient correlation. The trak input has a function of shape $80.02+1.89x-0.002x^2$ Fig. 7 (Pearson Correlation 0.676^{**}, significant at the 0.01 level - 2 tailed, R Square 0.648), indicating a maximum consumption of 472.5 MJ $have^{-1}$ (46.6 km tones) that allows to obtain a maximum output of 526.7 $have^{-1}$ (41.4 kg honey).

The correlation for drugs is significant at the 0.01 level (2-tailed) but weak with 0.503 Pearson coefficient correlation.

The function of sugar consumption (Pearson Correlation 0.776^{**}, significant at the 0.01 level - 2 tailed, R Square 0.605), of shape $-129.6+0.62x+0.00036x^2$ Fig. 8, shows that in order to increase the output level is possible to increase the sugar consumption. The maximum level of productivity of this factor may be determined at a higher level of consumption.

Table 1: Coefficients linear regression

	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
(Constant)	-87.96	27.182		-3.236	0.002	-141.938	-33.983
Labor	5.835	1	0.351	5.834	000	3.849	7.82
Sugar	0.378	0.056	0.375	6.751	000	0.267	0.489
Fuel	0.146	0.031	0.262	4.745	000	0.085	0.208
Drug	156.162	40.388	0.185	3.867	000	75.959	236.364
a. Dependent Variable: Output (MJ/hive)							

The regression model ensured statistically at a trust interval of 95.0% si R Square 0.791 has the shape -87.96 + 5.835 Labor + 0.378 Sugar + 0.146 Fuel + 156.162 Drug (Table 1).

Table 2: The mean of energy indices

Index	0-50	51-100	101-150	>151	Mean
Input energy (MJ hive^{-1})	557.79	1015.66	808.38	1000.90	981.51
Output energy (MJ/hive^{-1})	208.64	386.49	361.25	407.04	410.03
Performance (kg hive^{-1})	16.4	30.4	28.4	32.0	19.3
Net energy (MJ have $^{-1}$)	-349.14	-629.17	-447.13	-593.86	-571.48
Energy productivity (kg MJ^{-1})	0.029	0.030	0.035	0.032	0.020
Energy use efficiency	0.37	0.38	0.45	0.41	0.42
Specific energy (MJ kg^{-1})	34.0	33.4	28.5	31.3	50.7

The analysis of the mean of energy indices indicates a significant variation of apiaries results. The beekeepers with more than 151 beehives obtained a production with 65,4% (32.0 kg hive^{-1}) above the mean value, while those with apiaries smaller than 50 beelives obtained productions with 13.2% (16.4 kg hive^{-1}) below the mean va.lue of the beekeepers from Iași county (Table 2). The net energy result is specific for the beekeeping that produces a significant output quatity through the polenisation of wild and cultivated plants. A superior energy efficiency was obtained by the apiaries with 101-150 beehives that had an energy productivity and an energy use efficiency higher with 17.1% than the mean value (0.035 kg MJ^{-1} respectively 0.45) and the specific energy lower with 14.6% than the mean value (28.5 MJ kg^{-1}).

Discussion

In the context of climate changes, polution, rudimentary technologies, the genetic potential of bees and the energy performances of apiaries in Iași County have a mean level for outputs of 246 MJ hive^{-1} (19.3 kg have^{-1}) and for inputs of 645 MJ hive$^{-1.}$ These register large variations according to the number of beehives. The inputs vary from 558 MJ hive-^{1} (apiaries with 0-50 beehives) to 1,001 MJ hive^{-1} (apiaries with more than 151 beehives), while the outputs vary from 209 MJ hive-^{1} (apiaries with 0-50 beehives) to 407 MJ hive^{-1} (apiaries with more than 151 beehives). This fact is determined mainly by the poor management applied by the beekeepers. Despite the fact that the net energy has a negative value (-398.8 MJ hive-^{1}) and the most part of the apiaries are not efficient from the economic point of view, the beekepers do not make efforts to increase the efficiency of their apiaries. This phenomenon is caused by not giving enough care to some consumptions as the own labour force and capital when the apiaries efficency is assessed. If these consumption are not quatified, the beekeepers believe that their apiaries are efficient.

Certainly, the beekeeping is recognised as a source of positive externalities that should be added to the energy outputs obtained from honey. However, the apiaries effciency should be improved by incresing the energy outputs through production diversification. This objective is realistic because the majority of beekeepers knows the technologies to obtain other products than honey, like: pollen, beeswax, propolis and - some of them - even royall jelly.

Another way to increase the efficency of beekeeping in Iași consists in inputs management. Out of these, the beekeepers consume a large quatity of fuel and transport services from third parties aimed especially for the pastoral movements. (70.0% of total inputs / 451.2 MJ hive-^{1}). From the regression analysis results that a part of the beekeepers overcomes the maximum level of productivity for these factors (1,246 MJ hive-^{1}), while above this level they consume more to produce less. This situation is determined by the lack of evaluation for the productive potential of some zones where the apiaries are moved related to the consumptions determined by them. Some beekeepers are loosing energy and money because they migrate with apiaries.

The results display also the oportunity to increase the consumption of some inputs like the labour force and the feedings with sugar syrop that could determine a significant increase of the outputs. In average, the beekepers from Iași County give within the completion and stimulation feedings cca. 10.2 kg sugar hive-^{1} (157.8 MJ hive-^{1}) but the increase of this consumption may determine a higher

productivity. In the same time with this increase will become higher also the consumption of labour force that allows to obtain a higher out-turn, too.

The decrease in the consumptions of non-renewable energy is possible by the optimisation of factors use specified above, but also by the replacement of some of them with renewable consumptions (ex: the beekeepeer nr. 11 who owns 65 beehives, does not migrate and ensures honey reserves to carry out bees stimulation, consumes 46,936.1 MJ and obtaines 2,665 kg honey - 33,898.8 MJ).

Energy use efficiency registeres mean values of 0.38, increasing from 0,37 at apiaries smaller than 50 beeshives, up tp 0,45 obtained by the apiaries with 101-150 beehives. The fact that this indicator decreases at the apiaries with more than 150 beeshives suggests also a management deficiency justified by the increased size of the exploatation. More often are registered unclarities regarding the moment and the modality to accomplish some works as the replacement of beesqueen, feedings of completion and stimulation, treatments and prevention of bees poisoning with pesticides.

The applied research has the taks to supply specific information with local relevance in order to establish the technologies targeting the optimal values related to quantity, time, place and modality, aiming the increase of energy and economic efficency, with direct impact upon the natural environment and the wellbeing of population.

Conclusions

1. The mean of energy inputs for the studied population reached in the year 2015 about 645 MJ hive^{-1} while the mean of energy outputs was about 246 MJ hive^{-1} at a productivity of 19,3 kg honey hive^{-1}.

2. The maximum weight of mean inputs has been registered at fuel inputs of 52.7% (339.76 MJ hive^{-1}). Indirect inputs had a mean weight of 70.0% of total inputs (451.2 MJ have^{-1}) while indirect inputs represented 30.0% of total inputs (193.7 have^{-1}).

3. The mean weight of the nonrewable inputs was 94,7% (610.7 MJ have^{-1}) while the renewable inputs represented 5,3% of total imputs (34.1 MJ have^{-1}).

4. The inputs with labour force and the sugar inputs had a significant efect upon the energy outputs, therefore they can be used to increase the energy performance of the beekeepers.

5. The energy efficency of the studied population is characterised by net energy -398.78 MJ have^{-1}, energy productivity 0.030 kg MJ^{-1}, energy use efficiency 0.38, specific energy 33.3 MJ kg^{-1}.

References

Abrol, D. P., (2012) Pollination Biology Biodiversity Conservation and Agricultural Production, Springer Netherlands, 509–544.

Agapi S. I., Bocanici M., Vintila L. A., Tapaloaga P. R., Chelmu S. S., (2016) The promotion of innovative technologies for the use of renewable energy in the processing of wild berries for the development of sustainable bioeconomic practices in the mountain area of Romania, Abstracts / Journal of Biotechnology 231S; S4–S109.

Baishaya, A., Sharma, G.L., (1990) Energy budgeting of rice-wheat cropping system, Indian J. Agron. 35(1&2): 167-177.

Beard C., (2015) Honeybees (Apis mellifera) on public conservation lands A risk analysis, Publishing Team, Department of Conservation, 9–13.

Blaxter K. L., (1962) Energy Metabolism in Animals and Man, New York, N.Y.: Cambridge Univ. Press, 356-368.

Cichocka D., Claxton J., Economidis I., Högel J., Venturi P., Aguilar A., (2011) European Union research and innovation perspectives on biotechnology, Journal of Biotechnology 156; 382– 391.

Coley D., Goodliffe E., Macdiarmid J., (1998) The embodied energy of food: the role of diet. EnergyPolicy.

Davis S.C., Diegel S.W., Boundy R. G., (2011) Transportation energy data book.ORNL-6986. United States:Oak Ridge National Laboratory:US Department of Energy.

De Jonge AM. (2004) Eco-efficiency improvement of a crop protection product: the perspective of the crop protection industry. Crop Protect, 23(12):1177–86.

Demircan V., Ekinci, K., Keener, H.M., Akbolat, D., Ekinci, C., (2006) Energy and economic analysis of sweet cherry production in Turkey: a case study from Isparta province. Energy Convers. Manage. 47, 1761–1769.

Gundogmus E., (2006) Energy use on organic farming: a comparative analysis on organic versus conventional apricot production on small holding in Turkey, Energy Convers. Manage. 47, 3351–3359.

Gupta R. K., (2014) Technological Innovations and Emerging Issues in Beekeeping, Vol. 1: Technological Aspects of Beekeeping, Springer Netherlands, 507-554.

Iordache P., Roşca I., Cismaru M., (2007) Plantele melifere de foarte mare şi mare pondere economico-apicolă. Edit. Lumea apicolă, Bucureşti 231-233.

Loos J., Turtureanu. P.D., Von Wehrden. H., Hanspach. J., Dorresteijn. M., Frink, J.P., Fischer, J , (2015) Plant diversity in a changing agricultural landscape mosaic in Southern Transylvania (Romania), Agriculture Ecosystems & Environment, Vol: 199, ELSEVIER SCIENCE BV, Netherlands, 507-554.

Măgdici M, Bodescu D , Boghiţă E., Moraru R. E. (2015) The honey market in Romania - a review 1962-2011, Scientific Papers the 53th International Scientific Session of Communication, "Agriculture" Series, vol. 58 , nr.1, Publisher Ion Ionescu de la Brad, Iaşi, 223-228.

Mortazavi H., (2002) Factors inimproving the efficiency of broiler chicken in Saveh region. Iran:Mazandaran University of Science and Technology, 235-244.

Mwakatob, A. R., Machum. R. M., (2010) Beekeeping for poverty reduction and biodiversity conservation, Bees for Development Journal 101, 5–7.

National Institute of Statistics, (2010) General Agricultural Census, [Online], [Retrieved May 20, 2017], http://www.insse.ro/cms/ro/content/arhiva-anuare-statistice

National Institute of Statistics, (2015). Statistic Yearbook of Romania, [Online], [Retrieved Mai 30, 2017], http://www.insse.ro/cms/ro/content/arhiva-anuare-statistice

Omidi-Arjenaki O., Ebrahimi R., Ghanbarian D., (2016) Analysis of energy input and output for honey production in Iran (2012–2013), Renewable and Sustainable Energy Reviews 59, 952–957.

Ozkan B., Kurklu A., Akcaoz H., (2004) An input–output energy analysis in greenhouse vegetable production:a casestudy for Antalya region of Turkey. Biomass Bioenergy,;26:189–95.

Popescu Agatha, (2010) Considerations on Romania's position in the European and World Honey Trade, Scientific Papers, Series D, vol. LIII, Animal Science; 183-188.

Rafiee S., Mousavi Avval S.H., Mohammadi A., (2010) Modeling and sensitivity analysis of energy inputs for apple production in Iran. Energy, 35(8); 3301-3306.

Southwick E., (1980) .Energy efficiency in commercial honey production, AmBeeJ;120:633–538.

Streimikiene D, Klevas V, Bubeliene J., (2007) Use of EU structural funds for sustainable energy development in new EU member states. Renew Sustain Energy Rev; 116: 1167–87.

Ştefan G., Bodescu D. , Moraru R. A., Donosa D., (2009) Analysis of the economic size of beekeeping holdings in Romania, Scientific Papers: Agricultural management Series, vol. 8, Publishing University of Agricultural Sciences and Veterinary Medicine, Bucureşti, 234-241.

Tudor V., Alecu I.N., Mituko Vlad I., Stefan M., Badea A., Micu A. R., (2015) Management analysis for the cultures of salix viminalis and Miscanthus giganteus, Abstracts / Journal of Biotechnology 208; 105–120.

Yap, N., Devlin, J., Otis, G., Dang, T. V., Nguyen, H. T., (2015) Beekeeping, wellbeing, transformative change: Development benefits according to small farmers in Vietnam, Journal of Rural and Community Development, 19–31.

The Short-Term Impact of the European Structural Funds on the Tourism Services in the Romanian Rural Area

Dan Bodescu, University of Agricultural Sciences and Veterinary Medicine Iasi, Romania, dvbodescu@yahoo.com

Oana Coca, Alexandru Ioan Cuza University of Iasi, Romania, oanacoca.yxs@gmail.com

Sebastian Brumă, Romanian Academy - Branch of Iasi, "Gh. Zane" Institute of Economic and Social Research, Iasi, Romania, sebastian_bruma@yahoo.com

Radu Lucian Pânzaru, University of Craiova, Romania, rlp1967craiova@gmail.com
Radu-Adrian Moraru, University of Agricultural Sciences and Veterinary Medicine Iasi, Romania, ramoraru@yahoo.com

Abstract

The objectives of the research presented in the curent paper consisted in establishing the impact of the European Structural Funds on the establishments of tourism reception in the Romanian rural area, as well as the vectors to increase their competitiveness. The studied population was represented by the beneficiaries of the financing funds aimed to encourage the tourism activities during the period 2008-2012. The European Structural Funds contributed to the increase of tourism supply, degree of usage of the Romanian tourism potential, value flows in the rural area and, despite the fact that the beneficiary establishments are, in generally, unprofitably, they determined an improvement of the employment level in the rural area, as well as an overall improvement of the labor productivity. The main vector of competitiveness increase consists in the improverment of the speciality-related professional training of the persones employed in this establishments.

Keywords: European Structural Funds, economy of tourism services, rural area development

Introduction

The European Funds have the purpose to increase the economic and social cohesion and to reduce the disparities within the European Union (UE). (Rodriguez-Pose, A. et al, 2004). Several studies carried out impact analysis on the reginal policy within the European Community (Nijkamp, P., Blaas, E. 2004; Dall'erba, S., Le Gallo, J. 2004; Esposti, R., Bussoletti, S. 2008; Cardenete Flores, M.A., Delgado, M.C. 2015; Dall'Erba, S., Fang, F., 2017; Huliaras, A., Petropoulos, S. 2016).

Some studies indicate that the European funds contributed to the regional development, and the efficiency of their usage seems to increase (Lima, M.C., Cardenete Flores, M.A. 2008). The impact of the European programs continues beyond the end of the financial aid (Cancelo, J.R, A. et al, 2009). In agriculture, they determined an increase of the beneficiaries incomes and labour productivity, they contributed to the workplaces maintaining and the increase of the gross added value, as well as of the agricultural population wellbeing (Buchta, S., Buchta, T. 2009; Zawojska, A. 2009). The modification of EU financing has an obvious effect on changing the competitiveness level of some sectors as tourism, agriculture, silviculture and fishing (Balzaraviciene, S., Pilinkiene, V. 2012).

The European Development Policy is often criticised regarding its relevance. For example, the support granted to agriculture has positive impact on short term, but it decreases during time (Rodriguez-Pose, A., Fratesi, U. 2004). The investmens from European funds do not have positve effects in their neighborhood, and their impact is influenced by the political treatment, with influence on the initial investment rate (Dall'erba, S., Le Gallo, J. 2004; Esposti, R., Bussoletti, S. 2008). By the other hand, it seems that the effects are not obvious for all beneficiary regions (Moreno-Enguix, M.D.R., , A. et al, 2012; Enguix, M.D.M. , A. et al. 2012), and the estimations carried out suggest

that they have not influenced the converence process among some regions (Agovino, M. , A. et al. 2016). The funds addiction is weaking the internal financial and human resources, it increases the labour force vulnerability in some economic sectors and reduces the youth transition towards permanent workplaces (Samaluk, B. 2017).

Romania has used, up to the end of 2017, almost 17 billion euro as European funds, out of the 18.8 billion assigned for the financial period 2007-2013, thus recording the lowest absorbtion rate (90.4%), below the absorbtion level of other states as Bulgaria, Czech Republic, Poland, Slovacia, Slovenia and Hungary, according to a report published by the Romanian National Bank. Two-thirds of this amount have been directed towards the infrastructure development in the fields of of transport, environment protection, education and continous professional training, as well as for the development of small enterprises (Bărbuță F. 2107;; Florescu I. C. 2015).

The Agency for Rural Investment Financing (AFIR) consider that the European funds contributed to the living standard increase for the population in rural areas, by developing the rural economy. The National Program for Rural Development (PNDR) has foreseen the stimulation of all activities in the rural areas. As far as the agriculture is concerned, 75,000 farmers took benefit of the funds assigned by PNDR, and 2,787 agricultural exploatations (afir.ro, 2017) from the vegetal and animal sectors have received support. Due to the European funds, the social economy sector has been improved, by setting up of some social economy structures, qualification of the vulnerable persons (Cristea, M.P., Dona, I. 2017) and creation of workplaces in the social economy and other economic branches (Iova, A.R., Cretu, D. 2017). The European funds contributed, also, to the improvement of the population living standard (Nova, J., Strachova, M. 2017;Rusu, A. 2015), as well as to the local community develoment (Matusescu, C. 2012).

Materials and Methods

The aim of this study is to determine the impact on short term deternined by the European funds on the tourism services in the Romanian rural areas. The impact of the European funds on the tourism services in Romania has been analysed before as measure of their efficiency on the tourism flows (Bal ogh, M. et al, 2010), but the research presented in the current paper delivers information about the effects determined on the economy of the tourism establishments in the rural areas. This study will be continued also during the next period, in order to obtain information on medium and long term concerning this phenomenon.

The objectives of our study have been the following: 1. Analisys of the main economic indicators specific for the establishments that took benefit from the European Strcutural Funds, that activate in the tourism field and are functioning in the rural areas. This objective is justified by the necessity to know which are the consenquences of using European funds in order to increase their eficiency and efffectiveness. (Agovino, M. et al, 2017). 2. Identification of the main factors that can determine the competitiveness increase of the establishments that took benefit from the European Structural Funds. The knowledge on these factors can determine the performance increase of these establishments, as well as the increase of the level of positive externalities in the Romanian rural areas (Buchta, S., Buchta, T. 2009; Zawojska, A. 2009; Balzaraviciene, S., Pilinkiene, V. 2012).

The studied Population is represented by the beneficiaries from the financial funds within the measure 313 "Encouraging tourism activities" in the period 2008-2012, because it is representative for the support granted to Romania for the development of tourism services in the rural areas (afir.ro, 2017).

The stratified Sample according to the level of investment (0-100,000 euro, 100,000-200,000 euro, 200,000-300,000 euro, 300,000-400,000 euro, over 400,000 euro) included 72 tourism boarding houses, it has been carried out by Neyman method, deviation criterion 5% and trust level 95%.

The analysis of the main economic indicators was carried out by using the information provided by the Ministry of Public Finances for the period 2011-2016 and 3 years after the implementation of the finacial projects.

The field research was carried out by phone survey with the boarding house owner or manager, during the period May – June 2017.

The subjects have been asked regarding the main objective for the next 5 years, general education profile, speciality in the field of tourism services and the participation at activities of professional development within the specific professional or non-formal assosiations. They have been asked, also, to express assessments regarding the economic conditions related to their work, the quality of the attended professional training and the foreseen short-term objectives.

The obtained data have been processed with computer-based applications (SPSS, MS Office, ANOVA), the data testing has used Kolmogorov–Smirnov, t-test, and the data analysis referred to: linear structure, correlation, regression (Omid M, 2011)

For the statistic processing have been used tools for project monitoring involving the information provided by institutions certified at national level, that represented the basis for the evaluation process of project sustenability (Ignat, N.D., Motorga, R.A. 2016), profit and regression analysis (Enguix, M.D.M. et al, 2012).

Results and Discussions

The beneficiaries number in the period 2008-2012 (Table 1) reached 1,674 economic units with an average of 335 beneficiaries year-1 at a total investment value of 431,820,686 euro with an average of 86,364,137 euro year^{-1}. The total value of grants in this period registered 243,050,898 euro, with an average of 48,610,180 euro year^{-1}. The intensity of the financial support reached about 53.9% during the concerned 5 years.

Table 1: The main indicators specific for the financed projects

Index	year				
	2008	**2009**	**2010**	**2011**	**2012**
Number beneficiaries	77	277	292	109	919
Total investment value (euro)	31,004,381	117,229,151	89,064,364	25,502,233	169,020,557
Total grant value (euro)	15,463,778	58,249,747	44,661,489	13,818,407	110,857,476
Value of the investment (euro beneficiary^{-1})	402,654	423,210	305,015	233,965	183,918
Value of grant (euro beneficiary^{-1})	200,828	210,288	152,950	126,774	120,628
Intensity of support (%)	49.9	49.7	50.1	54.2	65.6

The average level of the fixed assets according to the investment level (Table 2) reached 165,756 euro year^{-1}, with values increasing from 26,071 euro year^{-1} for the investments lower than 100 thousand euro up to average values of 312,198 mii euro year^{-1}v for thre investments higher than 400 thousand euro. Exception are the investments between 300-400 thousand euro that have determined assets of 177,346 euro year^{-1}. For this investment category, there are no higher values even in the case of movable assets (23,293 euro year^{-1}).

The immediat impact of the European Structural Funds on the tourism services in the Romanian rural areas consisted in the accomplishment of a significant number of establishments of tourists" reception

summming a total value of cca. 431.8 mil. euro. This phenomenon determined the increase of the tourism services supply as far as the number of establishments and the reception capactity are concerned, resulting an increase of using the Romania"s tourism potential. The special interest for these investments is due to the fact that, despite the entrepreneurs had the possibillity to apply only for the investment size corresponding to the maximum grant value, when the aid intensity whould be of 85%, a considerable number of them accomplished investments with 77.7% higher than the maximum grant level. In the same time, the achievement of these investments determined value flows in the rural areas, with effects on the rural economy because materials, equipment and labour force mostly provided by the near by zones were necessary.

Table 2: The assets average level according to the investment level (2014-2016)

Investment (euro 10^3)	Investment value (euro)	Fixed assets (euro year^{-1})	Movable assets (euro year^{-1})
<100	84,135	26,071	17,674
100-200	139,426	71,996	34,375
200-300	244,236	242,700	111,431
300-400	349,527	177,346	23,293
>400	512,861	312,198	33,995

The movable assets registered an average of 47,727 euro year^{-1}, with the minimum value of 17,674 euro year^{-1}for the investments lower than 100 thousand euro and the maximum value of 111,431 euro year^{-1}for the investment between 200 and 300 thousand euro.

The capitalisation level according to the investment level is determined by the debt level, thus the debt average value reached 168,921 euro year^{-1} , justified by credits for the achievement of investments and the afterwards activities, while the average capital is negative, reaching -27,221 euro year^{-1} (Table 2).

Table 3: The level of capitalization according to the investment level (2014-2016)

Investment (euro 10^3)	Total debts (euro year^{-1})	Total capitals (euro year^{-1})	Subscribed shared capital (euro year^{-1})	Net turnover (euro year^{-1})
<100	23,510	-296	22	1,360
100-200	60,381	- 848	59	9,099
200-300	253,715	-23,594	251	13,376
300-400	177,496	-24,801	3,345	46,589
>400	329,504	-86,568	4,199	72,969

By using these funds, the economy of tourism services took benefit from the achievement of some significant active values (213.5 thousand euro year^{-1}), out of which the fixed assets represented 77.6%. These have, in general, a long period of usage, as buildings have been mainly built up. Consequently, the impact of these funds will be visible during a long period of time. By the other hand, the level of movable assets is reduced, since these have not been a grant subject, and during the implementation period, the entrepreneurs have focused on the investment completion, therefore in the next period of time, a deficit of human resources was registered. This phenomenon, associated with the high level of debts, especially correlated with the assurance of projects co-financing, determined a capital deficit of 27,221 euro.

The subscribed shared capital registered an average value of 1,575 euro (Table 3), will the net turnover had an average value of 28,678 euro year^{-1}, with a progressive increase from 1,360 euro year^{-1} for the investment smaller than 100 thousand euro, up to 72,969 euro year^{-1} for the investments higher than 400 thousand euro.

The main indicators of economic efficiency are determined by the average incomes of 34,376 euro year^{-1} and average expenditures of 41,416 euro year^{-1} (Table 4). These determined an average loss of -7,039 euro year^{-1}, a negative rentability of 24.6 % and a labour productivity of 12,066 euro/employee.

Table 4: The main indicators of economic efficiency according to the investment level (2014-2016)

Investment (euro 10^3)	Total incomes (euro year^{-1})	Total expenditures (euro year^{-1})	Gross profit (euro year^{-1})	Profit rate (%)	Labour productivity (euro employee $^{-1}$)
<100	1,500	2,568	-1,068	-41.6	5,715
100-200	12,104	13,015	-911	-7.0	12,175
200-300	13,752	36,710	- 22,958	-62.5	3,793
300-400	55,486	57,566	-2,079	-3.6	21,582
>400	89,039	97,220	- 8,181	-8.4	17,064

Due to the low level of business maturity, the studied population has registered an average income level of 34.4 thousand euro year^{-1} in the period 2014-2016, under the expenditures level of 41.4 thousand euro year^{-1} , resulting average loss of 7.0 thousand euro year^{-1} , meaning 24.6 euro year^{-1} loss corresponding to 100 euro^{-1} expenditures. The negative profit is explained also by the low interes for the profit increase, as resulted from the subjects answers (6.9%). But a low profitability level cannot ensure support for the fullfilment of the other foreseen objectives. The labour productivity registered higher values than the national average level of circa 12.1 thousand mii euro pers.-^{1} , while the increase of the employment level in the rural areas has been improved with cca. 4.2 thousand persons.

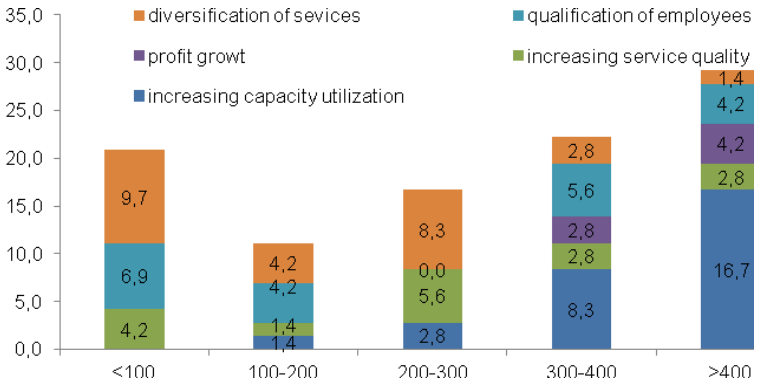


Fig. 1: Subjects feedback regarding the main objective for the next 5 years (%).

To the question on the main objective for the next 5 years, the weight for increasing capacity usage was about 29.2%, increasing service quality 2.8%, profit growth 16.7%, qualification of employees and diversification of sevices 20.8%, respectively 26.4% Fig. 1.

The boarding houses administrators with investments lower than 100 thousand euro are concerned mainly with the diversification of sevices (9.7%), those with investment of 100-200 thousand euro – with the qualification of employees and diversification of sevices (4,2%), those with investments of 200-300 thousand euro - with the diversification of sevices (8.3%), those with investments of 300-400 thousand euro – with the increasing of capacity usage (8.3%), and the managers with investments higher than 400 thousand euro are focused on the qualification of employees (16,7%).

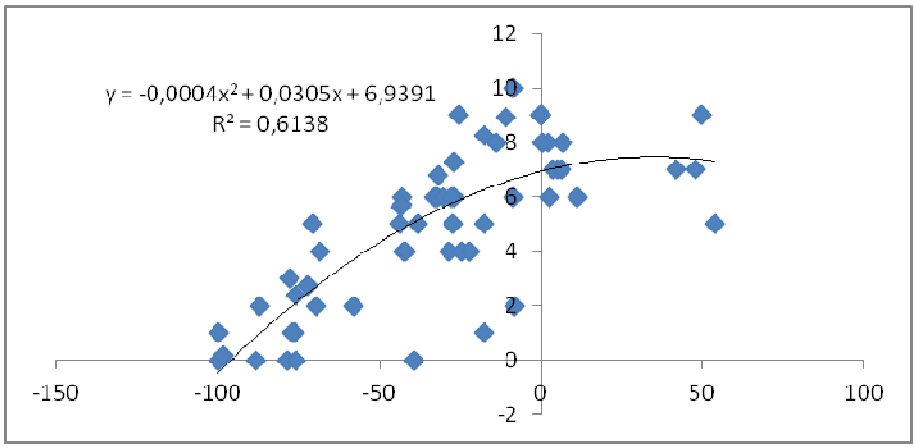


Fig. 2: Estimation of regression between the speciality professional training and the boaridng houses efficiency (years)

The estimation of the relationship between the professional training of managers and the economic efficiency indicates a 0,784 Pearson Corelation with an estimation of the quadratic equation that indicates an appropriate level of professional training at 8,34 years. For the general educational profile and the attendance to activities of professional development within the specialised or non-formal professional assosiations, no satisfactory correlations have been determined (Pearson Correlation 0.071 respectively 0.021), while the regressions have not been statistically ensured.

The second objective of the research presented in the current paper was not significantly covered, as not enough tools for the viability increase of the investment carried out have been identified, excepted by the speciality professional training that represents a condition for increasing the economic competitiveness. The future research will have as objective the determination of the modalities to increase the entrepreneures" speciality compentences.

Conclusions

The European Structural Funds contributed to the increase of the tourism services supply, of the usage degree of Romania's tourism potential and of the values flows in the rural areas.

The economy of tourism services took benefit from the achievement of some significant active values, but due to the low level of business maturity, the beneficiary establishments currently are nonprofitable. By the other hand, they determined an improvement of the employment degree in the rural areas, as well as an increase of the general labour productivity.

For now, it has been demonstrated that a viability increase of the carried out projects is possible thorugh the improvement of the speciality professional training of the persones hired in these establishments.

References

AFIR, (2017). Selection Report, Measure 313 - Component A, [Online], [Retrieved June 04, 2017], https://portal.afir.info

Agovino, M., Casaccia, M., Crociata, A. (2016). The impact of European Regional Development Fund on separate waste collection: Evidence from Italian regions, Elsevier SCI,LTD, Environmental Science & Policy, Vol: 61, 97-107

Balogh, M., Coros, M.M., Negrea, N., Coros, M.E. (2010). The impact of European funds upon the tourism development in macroregion one from Romania, Babes-Bolyai Univ, Faculty Political, Adminstrative & Communication Sciences, Public Admin Dept, Center Res Public Adm, Transylvanian Review of Administrative Sciences, Issue: 31E, 5-27

Balzaraviciene, S., Pilinkiene, V. (2012). Evaluation of competitiveness of lithuanian economic sectors using competitiveness indices: impact of European union funding, Vilnius Univ, Transformations In Business & Economics, Vol: 1, Issue: 2, 98-116

Bărbuță F. (2107). România, absorbție a fondurilor europene sub cea consemnată în Bulgaria sau Cehia, AGERPRES, www.agerpres.ro

Buchta, S., Buchta, T. (2009). Impact of the investment grants from the European funds on the development of agriculture and rural areas, Inst Agricultural Food Information, Agricultural Economics-Zemedelska Ekonomika, Vol: 55, Issue: 2, 59-66

Cancelo, J.R., Faina, J.A., Lopez-Rodriguez, J. (2009). Measuring the Permanent Impact of European Structural Funds on Peripheral Objective 1 Regions: The Case of Galicia, Routledge Journals, European Planning Studies, Vol: 17, Issue: 10, 1535-1558

Cardenete Flores, M.A., Delgado, M.C. (2015). A simulation of impact of withdrawal European funds on Andalusian economy using a dynamic CGE model: 2014-20, Elsevier Science BV, Economic Modelling, Vol: 45, 83-92

Cristea, M.P., Dona, I. (2017). The social economy in Romania and the impact of nonreimbursable European Funds over this sector, Univ Agricultural Sciences & Veterinary Medicine Bucharest, Scientific Papers-Series Management Economic Engineering in Agriculture and Rural Development, Vol: 17, Issue: 2, 75-79

Dall'erba, S., Le Gallo, J. (2004). Regional convergence and the impact of European structural funds over 1989-1999: A spatial econometric analysis, Blackwell Publishing, Vol: 87, Issue: 2, 219-244

Enguix, M.D.M., Garcia, J.G. Gallego, J.C.G., (2012). An Impact Analysis of the European Structural Funds on the Variation of the Rate of Employment and Productivity in Objective 1 Regions, Routledge Journals, European Planning Studies, Vol: 20, Issue: 4, 685-705

Esposti, R., Bussoletti, S. (2008). Impact of Objective 1 funds on regional growth convergence in the European Union: A panel-data approach, Routledge Journals, Vol: 42, Issue: 2, 159-173

Florescu I. C. (2015). The Regional Development in Romania Based On the European Union Funds for 2014-2020, INT Business Information Management Assoc-IBIMA, Vision 2020: Innovation and Sustainable Economic Competitive Advantage: From Regional Development to Global Growth, 2015, VOLS I - VII, 963- 973

Ignat, N.D.,Motorga, R.A.(2016). Theoretical and practical aspects regarding the management of project sustainability - The impact on European Union funded projects, INT Business Information Management Assoc-IBIMA, Vision 2020: Innovation Management, Development Sustainability, And Competitive Economic Growth, 2016, VOLS I - VII, 1731-1737

Iova, A.R., Cretu, D. (2017). The impact of the European Funds on the development of the rural area. Case study, Univ Agricultural Sciences & Veterinary Medicine Bucharest, Scientific Papers-Series Management Economic Engineering in Agriculture and Rural Development, Vol: 17, Issue: 2, 187-192

Lima, M.C., Cardenete Flores, M.A. (2008). The Impact of European Structural Funds in the South of Spain, Routledge Journals, Vol: 16, Issue: 10, 1445-1457

Matusescu, C. (2012). The Impact of Structural And Cohesion Funds of the European Union in Romania's local authorities, Nicolae Balcescu-Land Forces Academy, 18TH International Conference - The Knowledge-Based Organization: Economic, Social and Administrative Approaches to the Knowledge-Based Organization, Conference Proceedings 2, Book Series: Knowledge Based Organization International Conference, 162-170

Moreno-Enguix, M.D.R., Gomez-Garcia, J., Gomez-Gallego, J.C. (2012). An impact analysis of the European Structural Funds on the variation of the rate of employment and productivity in Objective 1 Regions, Routledge Journals, European Planning Studies, Vol: 20, Issue: 2, 321-340

Nijkamp, P., Blaas, E. (2004). Comparative regional policy impact analysis - ex-post evaluation of the performance of the European Regional-Development Fund, Blackwell Publishers, Journal of Regional Science, Vol: 35, Issue: 4, 579-597

Nova, J., Strachova, M. (2017). Assessing the impact of European Union Funding for sport facilities at local level, Univ Zagreb, Fac Kinesiology, Conference: 8th International Scientific Conference on Kinesiology, 456-460

Omidi-Arjenaki O., Ebrahimi R., Ghanbarian D., 2016. Analysis of energy input and output for honey production in Iran (2012–2013), Renewable and Sustainable Energy Reviews 59, 952–957

Rodriguez-Pose, A., Fratesi, U. (2004). Between development and social policies: The impact of European Structural Funds in Objective 1 regions, Carfax Publishing, Vol: 38, Issue: 1, 97-113

Rusu, A. (2015). GIS tools for the evaluation of the territorial impact assessment of transportation projects funded by the European Union in Romania, STEF92 Technology LTD, Informatics, Geoinformatics and Remote Sensing, VOL II (SGEM 2015), Book Series: International Multidisciplinary Scientific GeoConference-SGEM, 907-914

Samaluk, B. (2017). Austerity stabilised through European funds: the impact on Slovenian welfare administration and provision, Wiley, Industrial Relations Journal, Vol: 48, Issue: 1, 56-71

Zawojska, A. (2009). Impact Assessment of the European Union Funds to support rural population and economy in Poland, Latvia Univ Agriculture, Conference: 10th International Scientific Conference on Economic Science for Rural Development, Economic Science For Rural Development, Book Series: Economic Science for Rural Development, Issue: 18, 150-156.

Les Administratifs et le Sens de la Performance Universitaire Publique

Mohammed Lamchaouat, Université Hassan I, Settat, Maroc, m.lamchaouat@uhp.ac.ma

Nabil Bouayad Amine, Université Hassan I, Settat, Maroc, nabil_bouayad@hotmail.com

Khalid Rouggani, Université Hassan I, Settat, Maroc, rougganikhalid@gmail.com

Résumé

Cette contribution scientifique a pour objectif principal de contourner la signification du concept « performance de l'université publique » en contexte marocain. En fait, nous y essayons de répondre à la question subséquente : Quel sens attribué par le corps administratif de la faculté Polydisciplinaire de Khouribga au concept « performance de l'université publique » ? Ainsi, la théorie qui sous-tend notre travail de recherche est la théorie des parties prenantes. Nous administrons des entretiens auprès des administrateurs choisis aléatoirement dudit établissement. La technique adoptée à cet égard est l'analyse de contenu de leurs verbatim, il s'agit précisément de l'analyse catégorielle. Le traitement des résultats est mené à l'aide du logiciel Nvivo 10. A cet effet, cette recherche revêt un caractère qualitatif et s'inscrit dans le cadre du paradigme interprétativiste, car nous y essayons de comprendre le sens que les administrateurs ont donné au concept de la performance universitaire publique.

Mots clés : Performance universitaire publique, administrateurs, parties prenantes, établissements universitaires.

Introduction

L'université est une institution qui joue un rôle vital et de locomotive pour le développement du pays dans tous les sens : rôles social et sociétal, économique, financier, entrepreneurial, …etc. Or, aujourd'hui, elle doit être ouverte sur le monde en changeant la manière dont elle associe l'enseignement, la formation et la recherche, elle doit transformer les innovations et les réflexions novatrices en applications et les transmettre à la société (Bouayad N. 2012).

En contexte marocain, le secteur d'enseignement supérieur patauge constamment dans de nombreux problèmes, et ce malgré les avancées constatées et la multitude des réformes qui se succédaient surtout dès le début du troisième millénaire. Toujours la quête de la performance de l'université est au cœur des Discours Royaux et des polémiques gouvernementales. Dès lors, la succession des réformes et des réformes des réformes souligne véritablement les difficultés que connait ce secteur. Il reste encore du long chemin à parcourir.

A cet effet, le choix du sujet de cette contribution n'émane pas du hasard, par contre c'est une réflexion plus fondée. Il s'agit d'un thème relevant fortement de l'actualité au Maroc. Pour améliorer la performance de cette institution, il faut l'évaluer, et pour l'évaluer il faut avant tout déterminer ce que nous cherchons à mesurer. A cet effet, le concept de la performance dans le paysage académique public marocain est devenu stratégique, sa clarification s'impose alors.

En ce sens, l'objectif central de cette contribution est de révéler comment les administrateurs de la Faculté Polydisciplinaire de Khouribga (FPK)[1] voient et comprennent la performance universitaire publique. A cet effet, la problématique de ce travail se structure ainsi : Quel sens attribué par le corps professoral de la FPK au concept « performance de l'université publique » ?

[1] La FPK est un établissement universitaire public relevant de l'Université Hassan I.

Notre propos s'articule essentiellement autour de trois axes. Premièrement, un cadre théorique qui se propose pour mettre en exergue de manière succincte la signification du concept de la performance et également la théorie des parties prenantes. Deuxièmement, la détermination de la méthodologie de recherche et la posture épistémologique s'impose. Et troisièmement, nous présentons et analysons les résultats de notre travail de recherche.

Cadre Théorique

Performance

En dépit de nombreuses tentatives pour contourner la signification de la performance (Bouquin 1986, Bescos et al.1993, Bourguignon 1995, Bessir 1999, etc.), elle demeure complexe, difficile à cerner et rarement précisée explicitement. Elle fait problème et le manque d'une définition qui fait l'unanimité explique largement ce paroxysme conceptuel.

Dans cette perspective, une question centrale qui peut être posée là-dessus : Qu'est ce qui empêche exactement de formuler une définition faisant l'unanimité quant à ce vocable ? Ainsi, pour formuler une réponse adéquate à cette question, nous avons pioché dans un corpus théorique riche inhérent à ce sujet. A ce titre, la synthèse des écrits nous a guidée à nous arrêter sur sept principales caractéristiques de la performance, en l'occurrence:

La performance est neutre : C'est-à-dire qu'il existe la mauvaise performance et la bonne performance.

La performance change d'un contexte à l'autre : La performance change d'un contexte à un autre (Gosselin et Murphy 1994). D'après A. Bartoli (2009), ce concept est « un vieux serpent de mer ». Ce problème s'aggrave encore plus lorsqu'il s'agit du domaine public, voire d'une organisation publique notamment à vocation non marchande (Ouahraoui 2015, P.120).

La performance est liée à plusieurs concepts : Elle est liée communément à trois « E », à savoir, Economie, Efficience et Efficacité. Par ailleurs, certains auteurs ont lié ce vocabulaire à de nombreux autres termes. A. Boujlida (2002, P.8) l'a considéré équivalent aux termes de : « efficacité, efficience, rendement, productivité, réussite, succès, excellence, santé ». Quant à Sink (1985), la performance organisationnelle est définie par rapport à sept critères, à savoir : l'efficacité, l'efficience, la qualité, la satisfaction, la profitabilité, la qualité de vie au travail et l'innovation.

La performance est relative : Elle n'existe pas en elle-même. C'est-à-dire qu'elle est évaluée par rapport à un objectif ou une référence.

La performance est multidimentionnelle : Elle est difficile à définir de manière exacte. De La Villarmois (2001) a souligné que la performance est difficile à appréhender à cause de ses dimensions multiples.

La performance est subjective : La question de la subjectivité de la performance était soulevée par de nombreux auteurs (Bourguignon, 1995, P.95 ; Lebas, 1995, P.71 ; Lorino 1996, P.161 ; Bescos et al, 1993, P.58). L'idée maitresse à retenir en ce sens c'est que la performance invite à une interprétation, qui est une œuvre humaine et sociale, inspirée par le biais de la culture et le jugement de valeurs.

La performance s'améliore au fil du temps : Elle n'est pas une fin en soi, mais ce que doit être recherché précisément c'est son amélioration (le pilotage de la performance).

Bref, la performance demeure toujours entourée par un flou sémantique. Ceci est causé principalement par son caractère contingent. A cet effet, si la performance est ambiguë et difficile à cerner, que pouvons-nous dire alors à propos d'elle en contexte universitaire public ?.

Théorie des parties prenantes

L'université a dans son environnement de nombreux partenaires avec qui elle négocie et dont elle attend des agissements. Il s'agit en fait d'une institution à vocation publique, donc tout le monde est concerné par ses activités. Les décisions y prises impactent, soit consciemment ou inconsciemment, tous les membres de la société sans restriction aucune. Ainsi, le choix de la théorie des parties prenantes semble de plus en plus opportun pour aborder le sujet de la performance dans son sens multidimensionnel au sein de l'institution universitaire.

Selon Freeman (1984), une partie prenante est « tout individu ou groupes d'individus qui peuvent affecter ou qui peuvent être affectés par la mise en œuvre des objectifs de l'organisation ». Le même auteur a confirmé que le terme de stakeholders fut utilisé pour la première fois en sciences de gestion juste en 1963 lors d'un mémorandum interne au Stanford Research Institute (RSI), dans lequel ce concept était défini comme « Those groups without whose support the organization would cease to exist » (Freeman, 1984). A cet effet, la théorie des parties prenantes venait comme une alternative à l'approche actionnariale. C'est-à-dire que la valeur actionnariale est délaissée au profit de la valeur partenariale (Charreaux et Desbrières, 1998). Cette théorie vise alors à légitimer les intérêts de l'ensemble des acteurs et pas seulement des actionnaires (Donaldson et Preston, 1995). Cette théorie est jugée également profitable pour le management de l'organisation dans la mesure où elle permet de faire face aux conflits engendrés par les divergences des attentes et des intérêts des différents acteurs.

A la lumière de cette théorie, Donaldson et Preston (1995) et Moore (1999) ont considéré l'organisation comme une constellation d'intérêts coopératifs et concurrents. En conséquence, l'équilibre entre les intérêts des stakeholders permet le maintien de la coopération et l'aboutissement à la performance (Clarkson, 1995). D'après Gond et Mercier (2004), la théorie des parties prenantes est à la fois managériale et éthique.

En bref, à la lumière de cette théorie, pour le cas de l'université publique, certains individus ou organisations sont directement et potentiellement influencés par cette institution. Parmi ces communautés nous citons : le corps professoral, le corps administratif et technique, le tissu économique, etc. A ce titre, au cours de ce présent travail, nous essayons d'aborder la signification de la performance universitaire aux yeux de l'une des parties prenantes de l'université publique marocaine, à savoir les administrateurs de la Faculté Polydisciplinaire de Khouribga.

Methodologie De Recherche Et Posture Epistemologique

Méthodologie de recherche

Pour répondre à la problématique précitée en introduction, nous organisons des entretiens semi-directifs eus égard aux administrateurs de la FPK. Ainsi, cette étude s'est avérée exploratoire et qualitative. Et ce à travers la technique de l'analyse de contenu. Ainsi, l'utilisation répandue de cette technique dans une diversité de discipline marque sa pertinence et son utilité dans le processus de recherche (Picard, 1992). Pareillement, Aktouf (1987, P.111) a qualifié cette technique comme un des instruments les plus complets, les plus riches et les plus utilisés en sciences sociales. D'après Bardin (1989), cette technique sert à décrire et à déchiffrer tout passage de signification d'un émetteur à un récepteur. Au sens de Henry et Moscovici (1968), l'analyse de contenu est une technique très utilisée dans l'étude de la catégorisation des opinions, attitudes et croyances. En bref, l'analyse de contenu consiste à fouiller et interpréter le contenu d'un message écrit ou oral dans le but de déboucher sur des résultats fiables et convaincants. Plusieurs sortes de la technique d'analyse de contenu ont répertorié dans la littérature : l'analyse catégorielle, l'analyse de l'évaluation, l'analyse de l'énonciation, etc. Parmi ces types de ladite technique, nous optons pour l'analyse catégorielle. Il s'agit en fait d'une forme classique, réalisée à partir d'une grille d'analyse catégorielle.

Les enquêtes ont principalement pour objectif d'explorer la perception des administrateurs vis-à-vis de la question de la performance universitaire. D'après Charreire et Huault (2001, P.45), l'exploration est un processus de production des connaissances en vue de créer de nouvelles anastomoses théoriques entre des concepts et/ou d'approprier de nouveaux concepts dans un domaine théorique donné.

Pour le choix des personnes enquêtées et de la taille de l'échantillon, nous nous inspirons des principes de variété et de saturation (Glaser et Strauss, 1967). Ainsi, la variété se manifeste dans la tenue en compte des deux sexes (masculin et féminin) et dans leurs disciplines, en l'occurrence : littérature arabe, chimie, biologie, économie et gestion et physique. Quant au principe de la saturation, c'est que la collecte de données s'arrêtera lorsque les catégories d'analyse auront atteint un point de saturation. Par conséquent, les nouvelles données n'ajoutent pas de nouveau sens à ce qui est déjà compris.

Posture épistémologique

Cette recherche s'inscrit dans le cadre du paradigme interprétativiste, car nous y essayons de comprendre le sens que les administrateurs ont donné au concept de la performance universitaire publique. En fait, l'interprétativisme est un paradigme par lequel « le processus de création de la connaissance passe par la compréhension du sens que les acteurs donnent à la réalité » (Perret et Séville 2007, P.23). C'est-à-dire que la compréhension des choses est le talon d'Achille de ce paradigme. L'interprétativisme repose sur le caractère plausible de l'interprétation ainsi construite par le chercheur en interaction avec les participants. L'observateur explique une réalité à travers les explications des autres acteurs. Pourtois et Desmet (1988, P.27-28) signalent que ce paradigme développe une démarche qui tient en compte les intentions, les motivations, les attentes, les raisons et les croyances des acteurs. La notion de « comprendre » ou « Verstehen » ainsi relevée par Weber (1965) est la plus privilégiée du paradigme interprétativiste.

Performance Aux Yeux Des Administratifs

Performance universitaire publique

Manifestement, la performance universitaire est de plus en plus largement complexe. A l'instar de l'article n°3 de la Loi Cadre 01-00 stipulant les huit principales missions des universités, la performance universitaire peut être révélée, éventuellement, suivant le degré de la réalisation de ces missions. En ce sens, une université performante est celle qui renforce l'identité islamique et nationale, assure des formations initiales et continues d'une manière satisfaisante, développe et diffuse le savoir, la connaissance et la culture, prépare les jeunes à l'insertion dans la vie active, développe la recherche scientifique et technologique, réalise des expertises, contribue au développement global du pays et enfin contribue à la promotion des valeurs universelles.

Au sens du guide méthodologique de contractualisation[2], la performance est « la capacité d'atteindre des objectifs préalablement fixés, exprimés en termes d'efficacité économique, de qualité de service et / ou d'efficience de la gestion ». Au regard de cette définition, dans le cadre contractuel, la performance en milieu universitaire s'est avérée plus relative. C'est-à-dire qu'elle est évaluée suivant le degré de la cohérence avec les exigences indiquées sur les contrats programmes et d'aboutissement aux résultats auxquels le recteur de l'université s'est engagé en son nom. Dans les rapports de suivi, des indicateurs sont publiés en mesurant une performance telle est définie sur ces contrats. D'ailleurs, une structure universitaire peut être performante eu égard aux clauses de contrat, mais elle peut être

[2] En 2012, La Division des Entreprises Publiques et de la Privatisation (DEPP) relevant du Ministère de l'Economie et des Finances a élaboré, sur la base des Benchmarkings avec les meilleures pratiques internationales, un guide méthodologique de la contractualisation, fixant les objectifs, apports et composantes clés du processus de la contractualisation, et ce en vue de sa généralisation progressive à l'ensemble des Etablissements et Entreprises Publiques.

non performante à l'égard de l'une de ses parties prenantes. A cet effet, la performance universitaire ne doit pas être évaluée suivant les seuls contrats programmes, cette œuvre ne peut être envisagée que si le processus d'élaboration des contrats est mené sous une approche participative faisant intervenir concrètement l'ensemble des acteurs.

A cet effet, une université performante est celle qui répond d'une manière optimale aux différents besoins de ses stakeholders. Elle doit s'orienter vers la recherche d'un équilibre entre les attentes et les intérêts, qui sont parfois contradictoires, de ses principaux protagonistes suivant la logique déjà soutenue par Clarkson (1995). A cet effet, la quête de la performance est fortement attachée à la conciliation des intérêts des stakeholders lors de la prise de décision managériale (Elms, Shawn et Wicks, 2002). De même pour le cas de l'université, la tenue en compte des attentes des parties prenantes –surtout celles les plus saillantes (suivant la logique de Mitchell et al. 1997)- est une obligation pour piloter la performance de cette institution publique. Elle est censée faire preuve d'efficience, d'efficacité et d'économie. Efficiente dans son organisation ; en employant de manière optimale les ressources mises à sa disposition. Efficace dans ses actions ; en aboutissant aux objectifs prétracés. Egalement, elle doit se procurer en ressources humaines et matérielles avec un moindre coût. Ainsi, l'université marocaine doit être responsable, devant tous les stakeholders, de son management des deniers publics alloués, de ses résultats aboutis et des lignes directrices de son développement.

La performance universitaire peut être révélée différemment par ses stakeholders. Le futur étudiant de l'université peut éventuellement la référer essentiellement au seul critère d'employabilité. Quant aux étudiants, ils peuvent la mesurer à travers la qualité d'enseignement, la recherche, l'encadrement et l'employabilité. Les employeurs peuvent l'évaluer seulement à travers les compétences (savoir, savoir-faire et savoir-être) acquises par les lauréats durant leurs cursus universitaires, etc. Dès lors, dans ce qui suit nous présentons les résultats des entretiens semi-directifs menés eu égard d'un échantillon d'enseignants de la FPK.

Performance universitaire aux yeux des administratifs

Après avoir retranscrire les propos des enquêtés, nous catégorisons les différents indices liés au concept de la performance universitaire. Ainsi, le tableau ci-après les met en exergue sans tenir en compte, bien évidemment, la représentativité de ces indices dans les propos.

Tableau 1 : Indices et catégories relatifs au concept de la performance universitaire selon les administrateurs de la FPK

Indices	Catégories de la performance
résultats annuels - université a un produit - ses résultats sont meilleurs - bonnes prestations - avoir un taux de réussite grand – ses lauréats s'acceptent dans les masters, les doctorats –	Output
Nombre de contribution en termes de recherche scientifique - la moitié de sa mission est la recherche scientifique - La recherche scientifique et technique -	Recherche scientifique
la prestation service de l'administration - une administration qui lui met un environnement favorable - un document, l'emploi du temps - le suivi-	Organisation administrative
l'image globale de l'université chez les gens à l'extérieur -	Réputation
enseignement de qualité – une formation de qualité - d'une formation à la hauteur - l'enseignement –	Formation et Enseignement
Le marché qu'est-ce le marché d'emploi - exigences de marché de travail	Employabilité
on a pas encore de master ! -	Diversification
à l'échelle mondiale -	Internationalisation
c'est plusieurs processus - beaucoup de choses	Multidimentionnalité

des partenariats	Partenariat
les conditions de travail sont meilleures - le climat convenable de travail - faciliter le travail à l'enseignant chercheur - les bonnes conditions – à l'aise - celui humain -	Sociétale

Suivant les résultats obtenus, la performance en contexte universitaire est jugée multidimensionnelle. En fait, être performant c'est avoir une meilleur qualité du point de vue : output, recherche scientifique, organisation administrative, formation et enseignement, employabilité, Réputation, diversification, internationalisation, partenariat et sociétal.

Organisation administrative : Une université performante est celle qui manifeste une structuration organisationnelle bien retracée : présence des manuels de procédures, un organigramme formel et approuvé par les autorités compétentes, une responsabilisation explicite des gens, niveau de coordination satisfaisant entre les départements dans une même université, entre les établissements universitaires et également entre les universités.

Formations et enseignement : Cette facette est tributaire de la qualité éducative de l'enceinte universitaire. Son évaluation est difficile à entreprendre. Crebbin (1997) a signalé que l'enseignement est multidimensionnel, indéterminé (les résultats ne peuvent pas être expliqués par les facteurs de la situation), incertain, imprévisible, provisoire et impersonnel.

Employabilité: Une telle performance concerne l'output de l'université. Elle est mesurée au travers de la divulgation des taux d'insertion dans le tissu productif des lauréats d'une université (Taux d'insertion professionnelle).

Recherche scientifique et innovation: Elle reflète le degré de contribution à la progression de la recherche scientifique aux niveaux national, régional et international. A ce juste titre, les chercheurs participent au développement du capital scientifique et favorisent l'accès à l'économie de la connaissance et du savoir.

Réputation: Elle traduit le cachet marque université. Cette performance nous donne des réponses lumineuses en ce qui concerne les questionnements suivants : sommes-nous parvenus à fidéliser et satisfaire nos usagers ? Est-ce que nous avons pu progresser en termes de notoriété et d'image de marque de l'université ?

Output : la performance universitaire dépend de la qualité de sa production.

Sociétal : Une université responsable sociétalement est celle qui contribue au respect des attentes de son personnel ainsi que de tous les citoyens à l'extérieur.

Partenariat : c'est la qualité des conventions conclues d'une part avec d'autres universités nationales et étrangères, et d'autre part avec les employeurs publics et privés.

Internationalisation : l'université performante est celle qui est ouverte au-delà des frontières nationales.

Diversification : il s'agit de la pluridisciplinarité. Elle concerne à la fois la nature et le niveau des diplômes décernés par l'université.

Conclusion

En guise de conclusion, nous déduisons que l'abord du sujet de la performance en contexte universitaire, rend ce concept de plus en plus complexe et difficile à cerner. Cette complexité peut être justifiée notamment par:

- L'ambiguïté du concept de la performance lui-même.
- La contingence de la performance spécialement en contexte universitaire, c'est-à-dire qu'elle se varie d'une université à l'autre, d'un pays à l'autre, etc. A titre d'exemple, la comparaison de la performance entre une université jeune et une université très ancienne ayant une longue histoire peut être dans certains cas une démarche biaisée.
- La vocation publique de l'université : Avec une masse de contribuables aux dépenses publiques, l'université est obligée à être performante et à la hauteur des attentes de tout le public. Par conséquent, elle est confrontée à la notion de l'intérêt général.
- La multiplicité des domaines d'activités et d'agissement de l'université publique : parce que ceci complexifie davantage la performance universitaire et exacerbe en parallèle le nombre de ses dimensions.

Références

[1] Aktouf Omar (1987), méthodologies des sciences sociales et approche qualitative des organisations : une introduction à la démarche classique et une critique. Montréal, les presses de l'Université du Québec. 213 pp.

[2] Bardin, L. (1989). L'analyse de contenu (5e éd.). Paris : Presses Universitaires de France.

[3] Bartoli A. (2009), management dans les organisations publiques, 3ème édit DUNOD.

[4] Bescos P-L., Dobler P., Mendoza C. et Naulleau G. (1993), Contrôle de gestion et management, Montchrestien, 2ème édition.

[5] Bescos P-L., Dobler P., Mendoza C. et Naulleau G. (1993), Contrôle de gestion et management, Montchrestien, 2ème édition.

[6] Bessire, D., 1999, «Définir la performance», Comptabilité Contrôle Audit, Tome 5, Vol. 2, pp. 127-150.

[7] Bouayad Amine Nabil, Developpement durable : Quelle orientation pour orientation pour l'enseignement supérieur ? DOREG, Juillet 2012. [Online] Available: http://www.redoreg.com/Tcomplet/Bouayad1.pdf

[8] Boujlida Abdallah (2002), La performance financière des pme manufacturières : conceptualisation et mesure. Mémoire présenté à Université du Québec à Trois-Rivières.

[9] Bouquin, H., 1986, Le contrôle de gestion, 4 e édition, Paris, Presses Universitaires de France.

[10] Bourguignon A. (1995), « la performance, essais de définition », Revue française de comptabilité, n° 269, juillet-Août, P. 60-65

[11] Cartier-Bresson J. (2008). Economie politique de la corruption et de la gouvernance, L'Harmattan. Paris.

[12] Charreire Sandra et Huault Isabelle (2001), le constructivisme dans la pratique de recherche : une évaluation à partir de seize thèse de doctorat, Finance Contrôle Stratégie – Volume 4, N° 3, septembre 2001, p. 31 - 55.

[13] Clarkson M.B.E. (1995), « A Stakeholder Framework for Analysing Corporate Social Performance », Academy of Management Review, vol. 20, n° 1, p. 92-117.

[14] Clarkson M.B.E. (1995), « A Stakeholder Framework for Analysing Corporate Social Performance », Academy of Management Review, vol. 20, n° 1, p. 92-117.

[15] Crebbin W. (1997). Quality teaching in higher education. Teaching in higher education. 21-32.

[16] Delperee F. (2002). La gouvernance en tout sens. In SEDJARI A. (Coordonné par). Elites, gouvernance et gestion du changement, Edition l'Harmattan-Gret. P.45-56.

[17] Donaldson T. and Preston L.E. (1995), « The Stakeholder Theory of the Corporation: Concepts, Evidence, and Implications », Academy of Management Review, vol. 20, n°1, p.65- 91.

[18] Elms H., Shawn B. et Wicks A.C. (2002) « Ethics and Incentives: An Inductive Development of Stakeholder Theory in the Health Care Industry », Business Ethics Quarterly, n°12, pp. 413-432.

[19] Glaser, B., & Strauss, A. (1967). The discovery of grounded theory. 1967. Weidenfield & Nicolson, London, 1-19

[20] Gond, J-P., Mercier, S. (2004), « La théorie des parties prenantes : une synthèse critique ». Conférence de l'Association de Gestion des Ressources Humaines (AGRH), Montréal, 1-4 septembre, pp. 379-400.

[21] Guide méthodologique de la contractualisation (2012), Division des Entreprises Publiques et de la Privatisation (DEPP) relevant du Ministère de l'Economie et des Finances.

[22] Lamchaouat, M., Amine Bouayad, N., & Rouggani, K. (2017). La performance de l'université publique marocaine: Un concept difficile à cerner/The performance of the Moroccan public university: Difficult concept to grasp. International Journal of Innovation and Applied Studies, 20(1), 386.

[23] Lebas, M. (1995), «Oui, il faut définir la performance», Revue Française de Gestion, n°269, Juillet-Août, pp. 66-71.

[24] Loi-cadre 01-00 portant organisation de l'enseignement supérieur au Maroc.

[25] Lorino P. (1996), Contes et récits de la performance, essai sur le pilotage de l'entreprise, Les Editions d'Organisation, 2ème édition (1ère édition, 1995).

[26] Mitchell, Ronald K., Bradley R. Agle et Donna J. Wood. 1997. « Toward a theory of stakeholder identification and salience: defining the principle of who and what really counts ». Academy of Management Review, Vol. 22, No. 4.

[27] Ouahraoui F., Modernisation et performance dans les établissements publics : Quelle place du contrôle de gestion dans les universités marocaines? Résultats d'une étude qualitative sur les universités marocaines du centre. Doctorat en Sciences de gestion. Université Hassan I Settat, 29 juillet 2015.

[28] Paul Henry et Serge Moscovici (1968). Problèmes de l'analyse de contenu. Langages, Vol. 3, N° 11, PP. 36-60. [Online] Available: http://www.persee.fr/doc/lgge_0458-726x_1968_num_3_11_2900

[29] Perret V. et Séville M. (2007). Fondement épistémologique de la recherche. In Thiétart R.A. (coordonné par). (2007). Méthodes de recherche en management, Dunod. Paris, 3°Ed. P.13-33.

[30] Picard André (1992), utilisation de l'analyse de contenu dans une recherche en éducation musicale, Revue de Recherche en éducation musicale, N° 11, Bibliothèque national de Canada. PP. 33-56.

[31] Pourtois J-P. et Desmet H. (1988), « Epistémologie et instrumentation en sciences humaine», Liège-Bruxelles, Pierre Mardaga.

[32] Robert E. Freeman (1984), Strategic Management: A Stakeholder Approach.

[33] Sink, S. (1985), Productivity management: planning, measurement and evaluation, control and improvement, John Wiley & Sons inc., New York.

A Network Approach for Smart Tourism Destination: Evidences from a Digital Local Experience

Mele Gioconda*;
Del Vecchio Pasquale*;
Passiante Giuseppina*;
Ingrosso Elisa
*Department of Engineering for Innovation- University of Salento, Lecce – Italy
gioconda.mele@unisalento.it
pasquale.delvecchio@unisalento.it
giuseppina.passiante@unisalento.it
elisa.ingrosso@libero.it

Abstract

The goal of this work is to provide a methodological contribution at the debate on the management of Smart Tourism Destination through the adoption of a social network approach. Specifically, the study aims to identify which are the nodes and dynamics of a virtual community of users built around the social network's account of a tourism event with the intent of deriving useful insights for the competitiveness of tourism destinations. The empirical evidences related to "Bacco nelle Gnostre", an agro-food tourism event in Apulia, a southern European region and destination of growing popularity, are presented in terms of centrality, modularity class and temporal evolution. Collected through the usage of Gephi, an open source tool for social network analysis, the evidences presented in the study suggest theoretical and practical implications

Keywords: Smart Tourism Destination, Social Network, Social Network Analysis, Virtual Community

Literature Background

Smart Tourism Destination and Virtual Communities on Social Media Platforms

Information and Communication Technologies (ITCs) have revolutionized the tourism during the last decade (Neuhofer et al, 2013), by increasing the interest for academics and practitioners. Technologies became an integral part of tourism organizations that have digitalized all of the business process in the supply chain (Buhalis & Law, 2008); new business models emerged and tourism planning and consume are altered (Stamboulis & Skayannis, 2003). The growing diffusion of social and mobile applications can be assumed as the main factor of the changes in the tourism demand and the cause at the basis of the generation of Travel 2.0 solutions, such as content syndication (RSSfeeds), tagging, wikis, web forums, customer rating, podcasting, blogs, photo and video sharing (Akehurst, 2009; O'Connor, 2008; Schmalleger & Carson, 2008). Morevorer, social media platforms also emerged and supports tourists to make smart decisions (Buhalis & Law, 2008; Sigala et al, 2012) enhancing the tourists' empowerment by bringing together information search, communication, entertainment, social networking and mobility-related functionalities (Tussyadiah and Zach, 2012; Wang and Xiang, 2012).

These developments of ICTs lead to the paradigm Smart tourism related to tourism activities that are informed and supported by smart technologies (Gretzel et al., 2015a) and to the diffusion of the concept of Smart Tourism Destination where ICTs are considered as drivers for destination innovation and competitiveness (Buhalis & Law, 2008; Ndou, et al, 2016; Del Vecchio & Passiante, 2017).

Smart Tourism Destination is characterized by advanced services, high degree of innovation and the presence of open, integrated and shared processes for enhancing the quality of life for both residents

and tourists (Florida, 2003; Komninos, 2002, Shapiro, 2006; Hollands, 2008; Caragliu et al., 2009, Micera et. al 2013, Wang et al. 2013).

Buhalis and Amaranggana (2014; 2015) redefined the concept of Smart Destinations as the result of the interconnection of tourism destination with multiple stakeholders' communities through dynamic platforms and knowledge intensive flows of communication and enhanced decision support systems with the final objective to enhance tourism experience maximising both destination competitiveness and consumer satisfaction over the time.

According to Lopez de Avila (2015), a Smart Tourism Destination is an innovative tourist destination, in which ICT-infrastructure, accessible to everyone, guarantees the sustainable development of tourist areas facilitates the visitor's interaction with and integration into his or her surroundings, increases the quality of the experience at the destination, and improves residents' quality of life.

Thus, the creation of a Smart Tourism Destinations requires the integration of technologies, systems, services, and capabilities into an organic network that is sufficiently multi-sectorial and flexible for future developments, and moreover, open-access (Albino, et al., 2015).

Thanks to this integration, in a Smart Tourism Destination, organizations, institutions and tourism firms are able to improve their decision-making process taking actions based upon the data generated within the destination, gathered, managed and processed by ICT infrastructure (Lamsfus et al., 2015). Internet tools and social media enabling Smart Tourism Destinations by developing dynamic interconnections, and generating a huge amount of data, since major parts of tourism information processes and transactions are managed electronically (Buhalis, 2006; Fuchs, et al., 2014; Miah et al. 2016, Buhalis and Foerste 2013). In this vein, a Smart Tourism Destination is based on technologies for data collection, management and sharing. Tu and Liu's framework (2014) defines three main layers of a Smart Tourism Destination: a smart information layer (for data collecting), a smart exchange layer (for interconnectivity), and a smart processing layer (for data analysis). Following the above framework, Smart Tourism Destination is highly focused on the usage of advanced technologies to transform data collected and aggregated through physical infrastructures and social connections into on-site experiences and new business models for creating, managing and delivering intelligent touristic services/experiences and is characterized by intensive information sharing and value co-creation'' (Gretzel et al. 2015, p.560).

From the consumer's perspective, all the above definitions, have the final objectives to enhance tourism experiences through an ICT-base infrastructure, so the first task that a destination must address to become "smart" is to create a rich environment of broadband networks that support intelligent application.

Social media tools in tourism offer enormous opportunities for a more efficient decision making process (Miah et al., 2016). The term refers to social media, user-generated content (UGC), consumer generated media (CGM), online social networks (OSN), social networking sites (SNS), Web 2.0 and Travel 2.0.

Nowadays, tourists are supported by social media applications in all stage of tourism experience, not only to book the services they need, but also to explore virtually pre-tours of their destinations, to share in their own networks the experiences they expect to live as well as their satisfaction or frustration during and after the trip (Ndou and Del Vecchio, 2012; Del Vecchio, et al., 2011). So, tourists are the most valuable source for providing information and knowledge on theirs needs as well as feedbacks and suggestions to reduce market uncertainties and increase new service development (Sigala, 2012). Knowledge from and about tourists is, above all, important for user-based innovation (Del Vecchio, et al., 2015; Hjalager & Nordin, 2011; Sørensen, 2011).

The information generated and shared by tourists on social network can support Destination Management Organizations (DMOs) in creating a stable collaboration with customer in order to

develop tourists' offerings more address to the demand needs, though a more personalized services and products, influencing also, the potential travelers' decision-making process. Thus social media are challenging for innovating existing customer service, marketing and promotional processes throughout the tourism sector (Sigala et al., 2012).

All this makes challengeable the monitoring and management of virtual communities generated around the official and unofficial pages of social networks related to tourism destinations and events. With the aim to understanding of opportunities and challenges associated to the virtual dynamics of communities of tourists and users interested to a certain destination, the paper provides a methodological contribution framed in the field of social network analysis.

Research Methodology

In this paper we propose a methodology for the analysis of a virtual community of users built around the official Facebook's page of "Bacco nelle Gnostre", a digital local tourism event related to the promotion of an agro-food and cultural event located in Apulia, a southern European region and destination of growing popularity.

Aimed to support the management of a Destination and its process of smart configuration, the Social Network results a promising approach for identifying nodes of centrality in the community of users interested to a certain tourism experience, for tracking their feedbacks and suggestions as well as for monitoring satisfaction, commitment and trust developed by tourists.

Social Network is based on a rich body of research on how the linking structure of the Web influences accessibility of Web pages and their ranking in search engines (Gloor and Zhao, 2006, Serrat, 2009). In this paper, the analysis of the virtual community focuses on the classic metrics and attributes, such as the betweeness centrality of nodes, modularity class, and temporal evolutionary paths (Coulon, 2005; Otte & Rousseau, 2002).

Social network analysis underlines the importance of dynamic relationships among actors and allows to identify behaviors at individual and group level. Social network analysis is a methodology based on Graph Theory, so some symbols are explained following.
A social network consists of:

- Nodes as individual actors, groups or companies.
- Ties or edges that connect nodes through relationships or interactions.

Nodes and ties (or edges) shape a graph, which may be undirected or directed:

The literature underlines some main descriptive measures used in network analysis:

- Network density indicates the connectedness in a network. It is defined as the ratio of the number of edges in the network over the total number of possible edges between all pairs of nodes. It is a number that varies between 0 and 1.0. A network is said "dense" when density is close to 1.0; otherwise, it is "sparse" (Coulon, 2005; Otte & Rousseau, 2002).
- Centrality gives a rough indication of the social power of a node based on how well they "connect" the network (Gloor, 2015). It includes local or global levels. Local centrality measures direct ties between a node and the others. Global centrality considers also indirect ties.
- Betweenness measures the extent to which a particular node lies "between" the various other nodes in the network and indicates is a node has a potential control over others.
- Modularity indicates structural subunits (communities or clusters) characterized by highly interconnected node. It is applied in complex networks (Muff et al., 2005).

In order to demonstrate the importance of a social network analysis approach for a smart territory, findings show a concrete case of social network analysis application in a territorial context. Some metrics as "Modularity Class" and "Degree" will be illustrated. Moreover, it will possible to see the evolution of a social network in some distinct periods.

Social network analysis allows monitoring territorial dynamic over the time and gives an important contribute to decision makers into companies or governments.

Many researcher scientists have developed software programs in support of social network analysis. An example is the tool "Gephi", an open-source software for network visualization and analysis. It allows exploring, analyzing, spatializing, filtering, clustering, manipulating and exporting all types of networks.

Gephi is chosen in support of the social network analysis because it allows elaborating a large amount of data, extracted from a social network as Facebook and its usability in the context of research has been already tested.
Gephi is an open source tool used for many applications, as it is shown in the website www.gephi.org:

- Exploratory Data Analysis
- Link Analysis
- Social Network Analysis
- Biological Network Analysis
- Poster Creation

Starting from the analysis of data of the Facebook page of "Bacco nelle Gnostre", an agrofood and cultural event occurring in Noci (Bari, South of Italy) since 2000, the paper aims to analyze the dynamics of dialogue and interaction between users interested in.

Gephi allows to importing file in various format, as .gephi, .csv, .graphml, .gdf, .gexf fetched from social network. The tool has a user friendly interface and offers three main tab: "Overview", "Data Laboratory" and "Preview" (Figure 1). Overview allows visualizing and transforming the graph, once it is imported from the social network as a file in a format supported by Gephi; Data Laboratory shows the graph as a table, which can be modified; Preview allows to see the graph before its exporting:

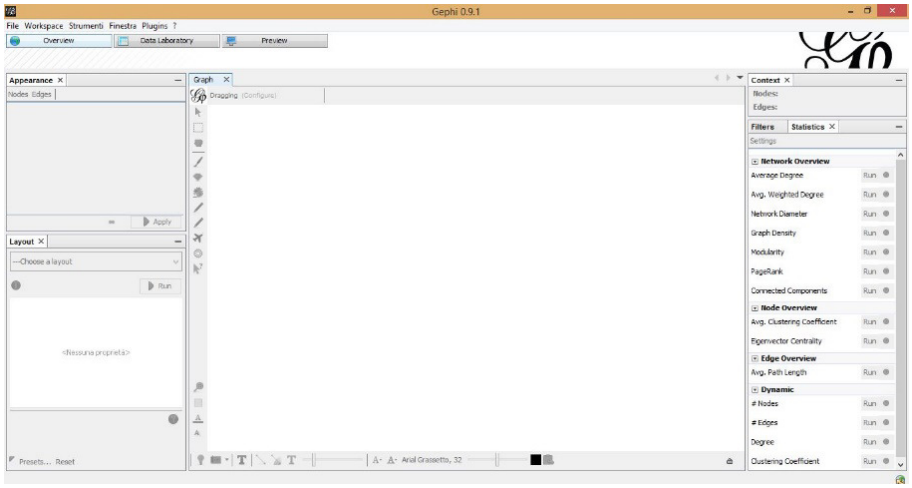


Figure 1: Gephi's graphic interface.

For this example, it was possible to fetch data from Facebook, exporting them in a .gdf format. To download data from Facebook, it needs to log into a Facebook account.Later, it needs to search the app “Netvizz” (Rieder, 2013) in the research box, opening it:



Figure 2: Research of Netvizz app.

Netvizz is a Facebook application that allows downloading a social network. Once Netvizz is opened, it is possible to visualize a screen as the following:

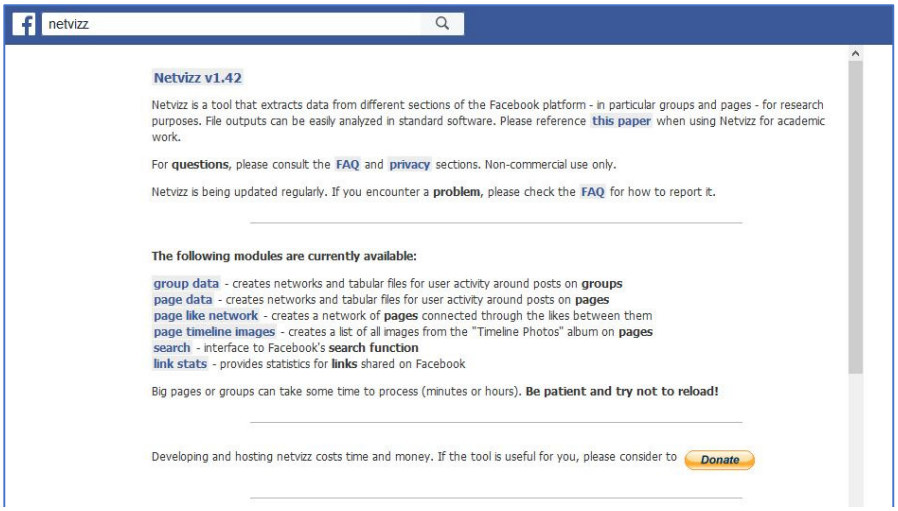


Figure 3: Screen visible once Netvizz is launched

The modules available to download Facebook data are:

- Group data
- Page data
- Page like network
- Page timeline images
- Search
- Link stats

Group data module creates networks and tabular files for user activity around posts on groups. It allows getting posts from a group and gives some files in. tsv format, that Gephi cannot import and a file in a .gdf format, which can be imported in Gephi, containing the connections between users.It is possible to get posts selecting a time period or the last posts, up to a maximum of 999 (Figure 6).

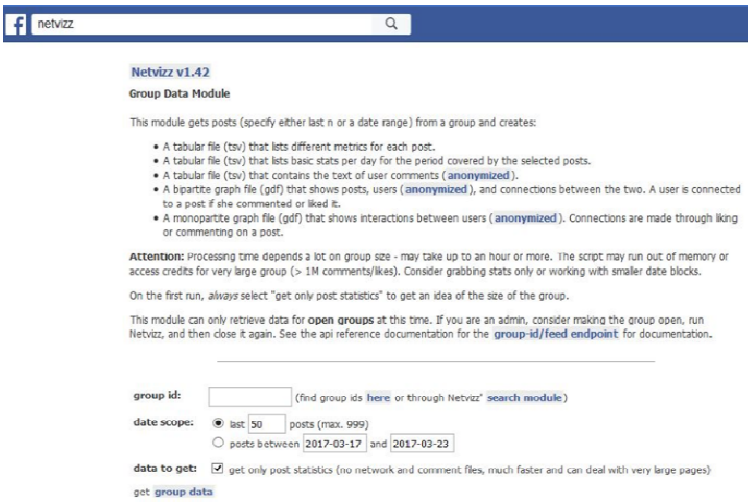


Figure 4: Group Data module

Page data module, like Group data module, allows getting some files in a .tsv format and a file .gdf, containing the connections between posts and users. It creates networks and tabular files for user activity around posts on pages. It is possible to get post by page only or posts by page and users.

To get data required, it needs to insert page id in the box. It is possible to get the page id clicking on Settings Page Info in a Facebook page (Figure 5).

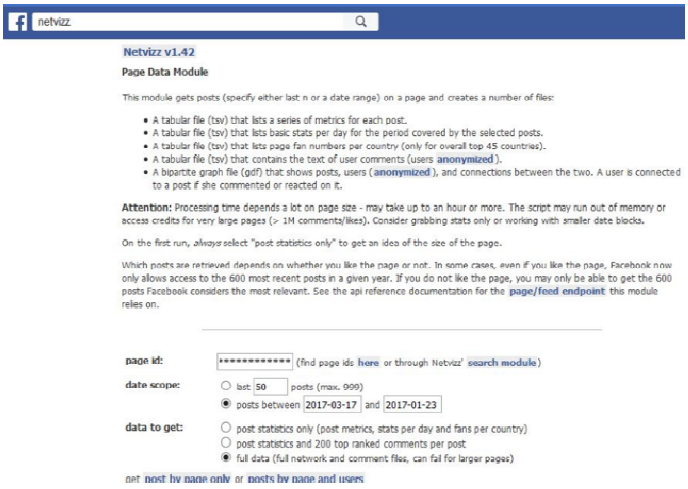


Figure 5: Page Data module

Page like network module creates a network of pages connected through the likes between them. It allows downloading a file in a .gdf format containing the network of pages. It starts with a selected page and retrieves all the pages that page likes, until a specified crawl depth (max 2) is reached (Figure 6).



Figure 6: Page Like Network module

Page timeline images module allows downloading a .tab file containing a list of all images from the "Timeline Photos" album of a Facebook page. Even in this case, it is necessary to insert the page id in the box (Figure 7).

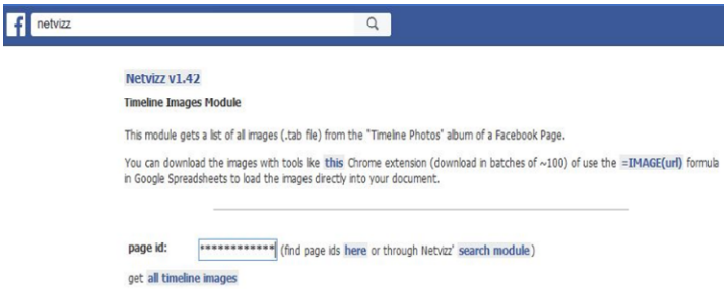


Figure 7: Timeline images module

Search module provides an interface to Facebook's search functions for pages, groups, places and events. To send a request it needs to specify a query in the box (Figure 8).

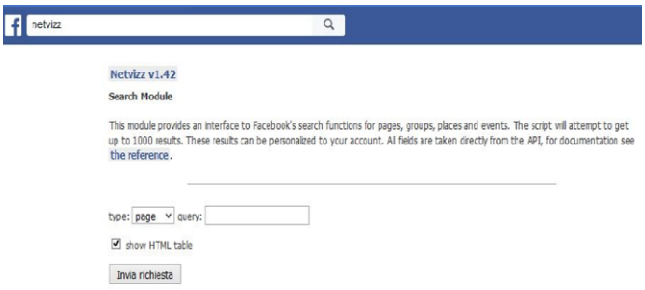


Figure 8: Search module

Link stats module provides statistics for links shared on Facebook (Figure 9).

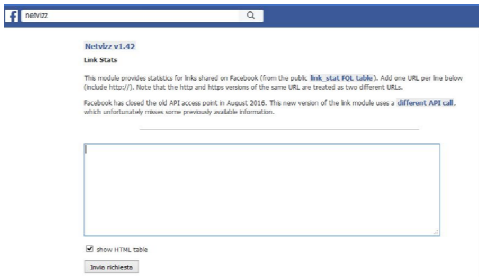


Figure 9: Link stats module

For this case study, the modules "Page data" is used to extract data from Facebook. Firstly because it allows downloading files in a .gdf format, which can be imported in Gephi. Secondly, because it offers a whole vision about some dynamics that may be trigged in many communities. Some findings are illustrated following, to understand the main functions supported by Gephi and their potentialities to identify the dynamics in a territorial community.

Findings

The analysis of the virtual community of users active on the Facebook official page of *Bacco nelle Gnostre*, a well-known agrofood and cultural event that takes place in Noci, Apulia - Southern Italy, has represented a valid empirical context for the development and testing of a methodological approach that, in leveraging on social network analysis and tools, can support the effective management of a tourism destination and its smart configuration.

Data extracted through "Page data module" and elaborated by Gephi allow to see how a network evolves according to some attributes as well as how the network evolves during a certain period.

Findings 1: Posts Collected and Network's Attributes

Findings 1 consists in the elaboration of a file in a .gdf format. It is downloaded by the Facebook app "Netvizz", that has allowed retrieving 101 posts, between 1st October 2016 and 30th November 2016, with their contents and attributes (Figure 10).

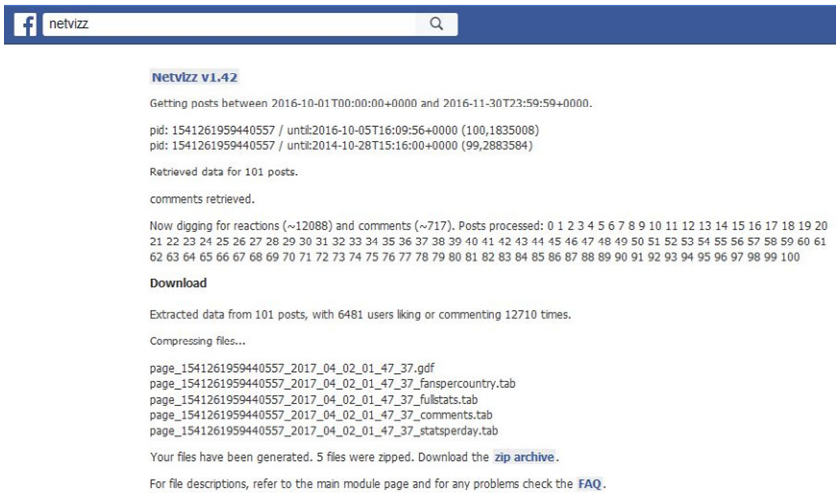


Figure 10: Netvizz Post collection

First step consists in the opening of the .gdf file in Gephi. This file contains networks for user activity around posts on Facebook pages. It shows posts, users (anonymized) and connections between the two. A user is connected to a post if a comment or a reaction on took place.

To open a file it needs to click on File ➔ Open ➔ Select file by name.

Then it is possible to see a screen, where appears the number of Nodes and Edges building a bipartite graph, which represents the network of posts and users.

Clicking on "OK" it is possible to see the imported graph as a dense network.

To have a better view about the graph, it is possible to change the layout, selecting it among the available layouts in the box "Layout" in the left side.

Recommended layout for dense networks is "Force Atlas", because it allows a better readability of the graph. Once the layout is chosen, a window containing its parameters appears. After the parameters' setting, it is possible to apply the selected layout clicking on "Run". After the end of the run or when a layout that fulfils own expectation is visible, it is possible to see the graph (Figure 11), where it is not easy to discern nodes from edges in the network about user activity around posts on the Facebook page.

Figure 12 shows the network as a set of nodes grouped according to their connections. To get this layout it has taken about four hours.

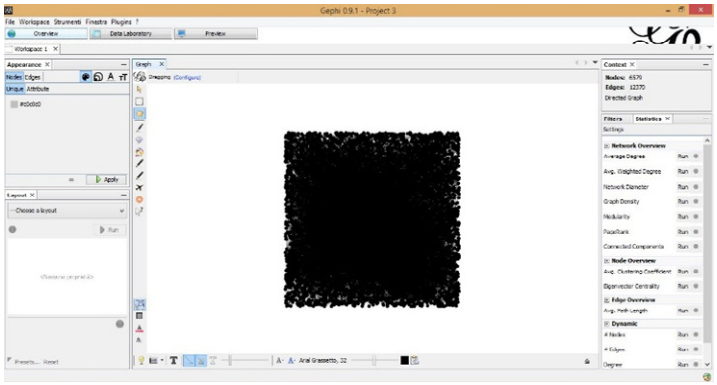


Figure 11: How the network appears just opened in Gephi

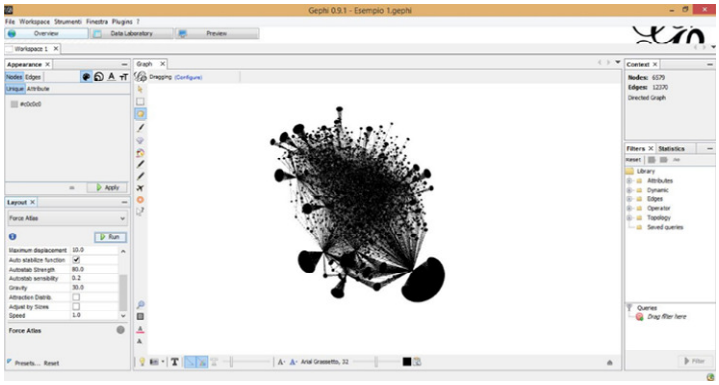


Figure 12: Force Atlas layout parameters

To increase visibility, it is possible to paint nodes and edges with different colors and to calculate some useful metrics about network, nodes, edges and dynamic profile (Figure 13).

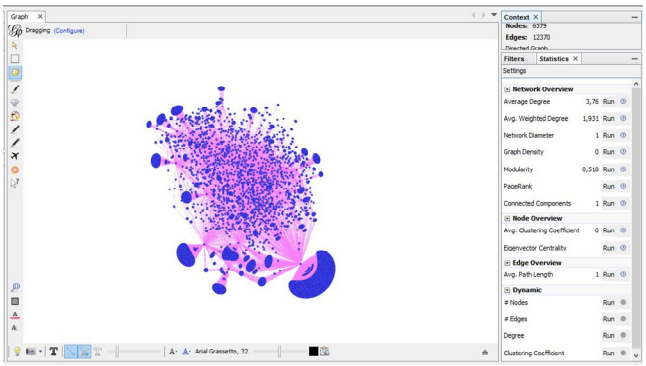


Figure 19. Setting of metric statistics.

Figure 13: Nodes and edges in different colors and metrics

Findings 2 "Modularity Class" attribute

This attribute allows to clustering the community according to their attributes. Choosing "Modularity Class" among nodes' attributes, it is possible to see the nodes clustered by color:

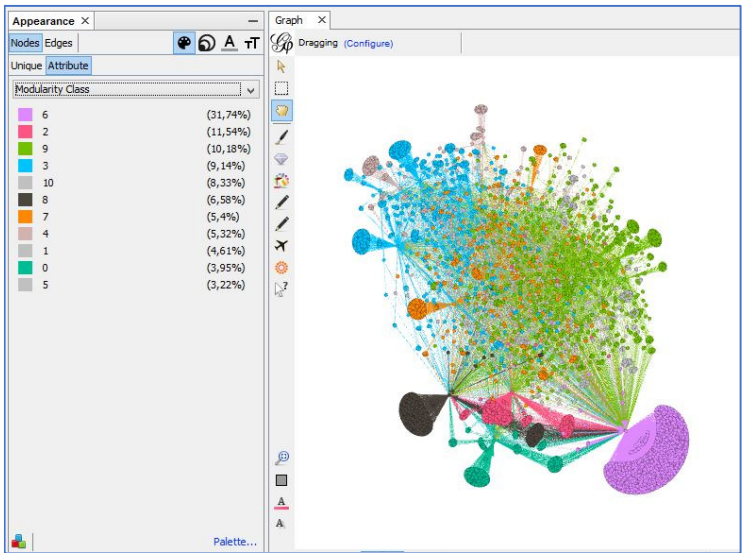


Figure 14: "Modularity Class" attribute

The network related to "Bacco nelle Gnostre" allow to identify 11 class or communities (indicated with a number from 0 to 10), each composed by nodes with similar characteristics and strongly linked among them. Each community has a specific color and a percentage that indicates the number of nodes (posts and users' activities) belonging to a class calculated respect the whole number of nodes (Figure 14).

In this case the community "6" (cyclamen color) has the major number of nodes (31,74% of total) and the community "5" consists in the minimum number of nodes (3,22%), painted by grey color.

Each community is linked to the rest of the network by a particular node, which has a great number of links, and that has a pivotal role in the network.

The communities identified can be visualized through the tab "Data Laboratory", which contains a table that shows the value about each attribute, related to each post. "Data Table" can be modified, according to different criteria. It contains activity information related to a post, as:

- Date and hour when it is published
- Comment count
- Post Type (link, user, video, photo, event)
- Like count
- Reactions count
- Engagement (for posts: sum of counters for reactions, shares and comments)
- Modularity Class

For example, data table related to modularity class shows each post and its modularity class, so if it needs to extract all nodes belonging to a specific class, it is necessary to filter the table and selecting the query most useful.

Findings 3 "Degree" attribute

This attribute shows, by size, the degree of connection among the nodes that have triggered most reactions in each community. By selecting "Degree" among "size" nodes' attributes, Gephi visualizes the following layout:

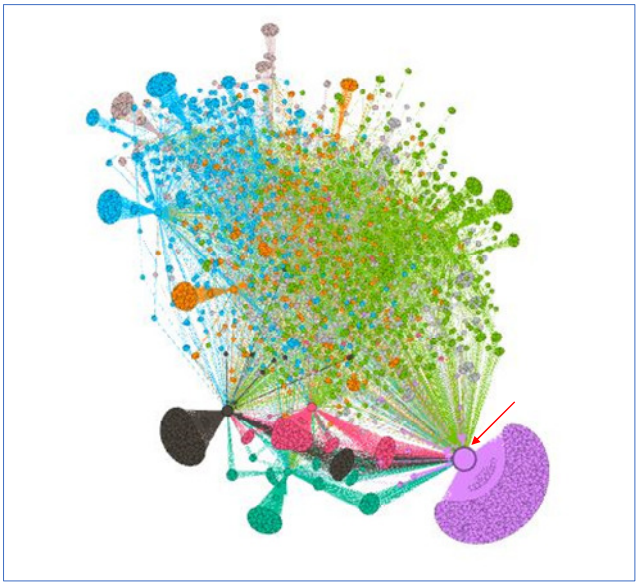


Figure 15: Nodes dimensioned by "Degree" attribute

In Figure 15, target nodes (posts) are shown in various sizes, according to the community they belong to. Therefore, it is possible to identify which are the nodes that have triggered most reactions among each community and which are the nodes that have a major number of links, by size. In this case, the node indicated by the red arrow is a key node, because it belongs to the biggest community and have the biggest number of links (measured in number of users' activities).

Findings 4 Temporal Evolution

About the temporal evolution of the network detected, our analysis on the Facebook page of "Bacco nelle Gnostre" has identified five main periods, each one composed of ten days. The periods encompass some posts before, during and after the 2016 edition of the event "Bacco nelle Gnostre" (17th edition occurred in Noci between 5th and 6th November 2016). Therefore, they allow understanding the social dynamics in various phases around the event.

The periods evaluated are the following:

- Period 1. From 5th October 2016 to 14th October 2016
- Period 2. From 15th October 2016 to 24th October 2016
- Period 3. From 25th October 2016 to 3rd November 2016
- Period 4. From 4th November 2016 to 13th November 2016
- Period 5. From 14th November 2016 to 23rd November 2016

Figure 16 illustrates a visual comparison among the networks referring to each period:

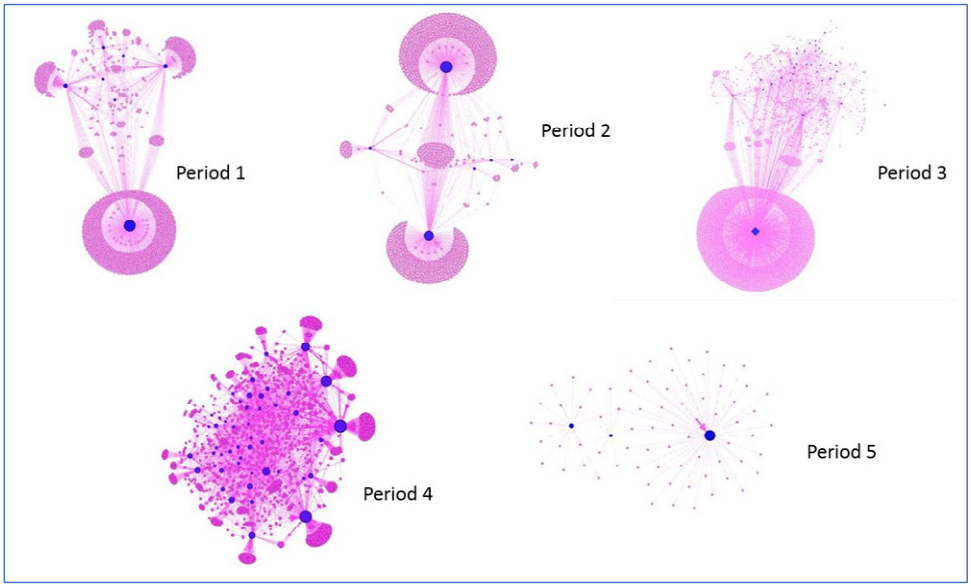


Figure 16: Temporal evolution of the network

Posts are in the blue color, instead the users' activities are in pink. The dimension of the nodes representing the posts are directly proportional to the number of user' activities around each post.
Figure 17 shows a summary about the data retrieved for each period:

Period	Post Count	Nodes Count	Edges Count	Total Engagement
1 From 05/10/2016 To 14/10/2016	7	1558	1879	2489
2 From 15/10/2016 To 24/10/2016	6	1185	1365	1594
3 From 25/10/2016 To 03/11/2016	37	3556	4353	5484
4 From 04/11/2016 To 13/11/2016	48	2369	4696	6009
5 From 14/11/2016 To 23/11/2016	3	76	78	93

Figure 17: Network attributes for each period

Periods 1 and 2 count respectively 7 and 6 posts. Despite this low number, users' activities and networks are very dense in terms of nodes and edges. Users' activities and their engagement are concentrated around a limited number of posts (red arrows in Figure 16 – period 1 and 2). The first two periods contain posts about the preparations for the event, so they include the reactions of common citizens, curious or interested and from the agro-food firms engaged in the initiative. This is surely influenced by the recognized image and the fidelized tourists and users. Therefore, the network of posts and reactions appears dense and rather clustered according to the top influencers, represented by official pages and storytellers.

Period 3 includes a network divided into two main sub groups (Figure 168 - period 3), a first clustered around a single post of launching of the initiative (which ascribes to 27th October 2016 - red arrow in figure 16 - period 3). The remaining of network is represented by 36 posts and the reactions to them, about accessory initiatives occurred into the event "Bacco nelle Gnostre 2016". They retrieved the interest of a different target of users. Period 4 is characterized by a very dense network, with various cluster of users' activities around 48 posts posted in the days when the event occurred. Therefore, they retrieved the interest from various communities of users (Figure 16 - period 4).
Period 5 contains only 3 posts and the reactions to them. Figure 16- period 5 shows that the network is few dense and users' reactions are fully clustered in three main groups. In the groups with higher density it is easy to see that a user can have one or more reactions to various posts.

Conclusions

Aimed to contribute at the advancement of knowledge in the field of smart tourism destination, the paper offered evidences for definition of a methodological approach based on social network analysis.

Focusing on "Bacco nelle Gnostre", an agro-food and cultural event related to Apulia (Southern Italy), the study has tracked and analyzed attributes and dynamics of a virtual community built around the official page of the event on Facebook.

Leveraging on metrics and attributes of social network analysis, such as centrality, modularity class, and temporal evolution, the paper used Gephi, an open source tool for social network analysis, for collection and visualization of data.

Findings highlight as a social network analysis can be useful identified as component of a methodological and technological platform for the management of a tourism destination. This is because, it allows to identify which nodes can be more useful for decision makers, because they are able to link many nodes to the rest of network. For example, if the aim of a destination and tourism players is to attract interest from users engaged in a social network community, it can focus on the nodes with higher centrality to drive the information within the network. They may act as top influencers and sources of inspiration for the community. Their identification, allowed easy through a social network analysis, could allow to optimize the strategy of communication and promotion of a destination and related events. In the meantime, this could support the work of detecting and solving of problems and critics emerging in the community and to make this possible before than the reputational disease grows. The analysis of temporal evolution of the network, presented in the paper as final result, offers also evidences in terms of targetization of the audience on the basis of their interest for the event as well as on their profiles.

The study presents some limitations due to the profile and nature of event analyzed as well as to the usage of API of Facebook page. This suggests directions for future research aimed to enlarge the number and the nature of cases analyzed, to evaluate the analysis of additional API for Facebook as well as for other social networks.

References

Akehurst, G., (2009), 'User generated content: the use of blogs for tourism organisations and tourism consumers', *Serv Bus* 3, 51–61.

Albino, V., Berardi U. and Dangelico M. R., (2015), 'Smart Cities: Definitions, Dimensions, Performance and initiatives', *Journal of Urban Technology*, 22 (1), 3–21, http://dx.doi.org/10.1080/10630732.2014.942092.

Buhalis, D. (2006), 'The impact of information technology on tourism competition', in *Corporate Rivalry and Market Power: Competition Issues in the Tourism Industry*, London: IB Tauris, 143-71.

Buhalis, D., & Law, R., (2008), 'Progress in tourism management: twenty years on and 10 years after the internet: the state of eTourism research', *Tourism Management*, 29 (4), 609–63.

Buhalis, D., & Amaranggana, A. (2014), '*Smart tourism destinations'*, in Z. Xiang and I. Tussyadiah (Eds.), Information and communication technologies in tourism, 553–564. Dublin: Springer.

Buhalis, D. & Amaranggana, A., (2015), '*Smart Tourism Destinations Enhancing Tourism Experience through Personalisation of Services*', in Tussyadiah, I., and Inversini, A., (eds*),* ENTER 2015 Proceedings, Lugano, Springer-Verlag, Wien.

Buhalis, D., & Foerste, M. (2015), 'SoCoMo marketing for travel and tourism: Empowering co-creation of value', *Journal of destination marketing & management*, 4(3), 151-161.

Caragliu, A., Del Bo, C. & Nijkamp, P., (2009), 'Smart Cities in Europe', *Serie Research Memoranda* 0048, VU University Amsterdam, Faculty of Economics, Business Administration and Econometrics.

Coulon, F. (2005), The use of social network analysis in innovation research: A literature review, Lund University.

Del Vecchio P., Passiante, G. (2017), 'Is tourism a driver for smart specialization? Evidence from Apulia, an Italian region with a tourism vocation', *Journal of Destination Marketing and Management*, 6(3), 163-165.

Del Vecchio, P., Secundo, G., Passiante, G., (2015), 'Modularity as suitable approach for the management of a tourism destination', Proceedings of the 26th IBIMA 2015, 2516-2525.

Del Vecchio, P., Laubacher, R., Ndou, V., Passiante, G., (2011), 'Managing corporate reputation in the blogosphere: The case of dell computer', *Corporate Reputation Review*, 14(2), 133-144.

Florida, R. (2003), 'Cities and the Creative Class', *City and Community*, 2, 3-19.

Fuchs, M., Höpken, W., & Lexhagen, M. (2014), 'Big data analytics for knowledge generation in tourism destinations–A case from Sweden', *Journal of Destination Marketing & Management*, 3(4), 198-209.

Gloor, P. A. (2015), 'Condor 3 User Manual', available: http://91.250.82.108:8080/condor/Condor%203%20User%20Manual.pdf.

Gloor, P. A., & Zhao, Y. (2006, July), 'Analyzing actors and their discussion topics by semantic social network analysis', *In Information Visualization*, 2006. IV 2006. Tenth International Conference on 130-135, IEEE.

Gretzel, U., Sigala, M., Xiang, Z., & Koo, C. (2015a), 'Smart Tourism: Foundations and Developments', *Electronic Markets*, 25 (3), 179-188.

Hjalager, A. M., & Nordin, S. (2011), 'User-driven innovation in tourism—A review of methodologies', *Journal of Quality Assurance in Hospitality & Tourism*, 12(4), 289-315.

Hollands, R.G., (2008), 'Will the real smart city please stand up?', *City*, 12 (3), 303– 320.

Komninos, P. (2002), Intelligent Cities: Innovation, Knowledge Systems and Digital Spaces, London and New York, Taylor and Francis, Spon Press.

Lamsfus, C., Martín, D., Alzua-Sorzabal, A., and Torres-Manzanera, E., (2015), 'Smart Tourism destinations: An extended conception of smart cities focusing on human mobility', in Information and Communication Technologies in Tourism, Springer International Publishing.

Lopez de Avila, A., (2015), 'Smart destinations: XXI century tourism', ENTER2015 Conference on Information and Communication Technologies in Tourism, Lugano, Switzerland, February 4–6, 2015.

Miah, S. J., Vu, H. Q., Gammack, J., & McGrath, M. (2016), 'A big data analytics method for tourist behaviour analysis', *Information & Management*, 54(6), 771-785.

Micera, R., Presenza, A., Splendiani, S., & Del Chiappa, G. (2013), 'SMART Destinations: new strategies to manage tourism industry', Proceedings of "International Forum on Knowledge Asset Dynamics", Zagreb (Croatia), June.

Muff, S., Rao, F., Caflisch, A. (2005), 'Local modularity measure for network clusterizations', *Physical Review*, 72 (5), 056107.

Ndou, V. & Del Vecchio P., (2012), 'Empowering tourists to co-create services', in Projects and Forms of the European Digital Citizenship, Tandam Edizioni Scientifiche, Trento, M. Mancarella Ed., pp. 129-143.

Ndou, V., Del Vecchio, P., Mele, G., Stefanizzi, P., Passiante, G. (2016), 'Measuring the promptness of destinations to move toward a smart tourism configuration: The case of Apulia destination', Proceedings of the 27th, IBIMA 2016, pp. 3021-3031.

Neuhofer, B., Buhalis, D., & Ladkin, A., (2013), 'A Typology of Technology-Enhanced Tourism Experiences', *International Journal of Tourism Research*, 16, 340-350.

O'Connor P. (2008), 'User-Generated Content and Travel: A Case Study on Tripadvisor.Com', In: O'Connor P., Höpken W., Gretzel U. (eds) Information and Communication Technologies in Tourism, Springer, Vienna.

Otte, E., & Rousseau, R. (2002), 'Social network analysis: a powerful strategy, also for the information sciences', *Journal of information Science*, 28(6), 441-453.

Rieder, B. (2013), "Studying Facebook via data extraction: the Netvizz application",, WebSci 2013 Proceedings of the 5th Annual ACM Web Science Conference (pp. 346-355). New York: ACM.

Schmalleger, D. & Carson, D. (2008), 'Blogs in tourism: Changing approaches to information exchange', *Journal of Vacation Marketing*, 14(2),99- 110.

Serrat, Olivier (2009), *Social Network Analysis*, Washington, DC: Asian Development Bank.

Shapiro, J. M., (2006), 'Smart Cities: Quality of Life, Productivity, and the Growth Effects of Human Capital', *The Review of Economics and Statistics*, 88 (2), 324-335.

Sigala, M., Christou, E. and Gretzel, U. (2012), *Web2.0 in travel, tourism and hospitality. Theory, practice and cases*, Ashgate Publishers.

Sigala, M., and Chalkiti, K. (2014), 'Investigating the exploitation of web 2.0 for knowledge management in the Greek tourism industry: an utilization– importance analysis', *Computers in Human Behavior*, 30, 800–812.

Sørensen, F. (2011), 'Inducing user-driven innovation in tourism: an experimental approach', in Sundbo, J., Toivonen, M. (eds) User-based innovation in services. Cheltenham: Edward Elgar.

Stamboulis, Y. & Skayannis, P. (2003), 'Innovation strategies and technology for experience-based tourism', *Tourism Management*, 24 (1), 35–43.

Tu, Q. and Liu, A., (2014), 'Framework of Smart Tourism Research an Related Progress in China', International Conference on Management and Engineering, 140-146, DEStech Publications.

Tussyadiah, I.P., e Zach, F.J., (2012), 'The role of geo-based technology in place experiences', *Annals of Tourism Research*, 39(2), 780–800.

Wang, D., & Xiang, Z., (2012), 'The new landscape of travel: a comprehensive analysis of smartphone apps', *Information and Communication Technologies in Tourism*, 308–319.

Wang, D., Li, X., & Li, Y. (2013), 'China's smart tourism destination initiative: A taste of the service-dominant logic', *Journal of Destination Marketing and Management*, 2(2), 59–61.

Globalization in the Case of Automobile Industry in Slovakia

Lubica Bajzikova, Faculty of Management, Comenius University, Bratislava, Slovakia,
Lubica.bajzikova@fm.uniba.sk

Daniela Novackova, Faculty of Management, Comenius University, Bratislava, Slovakia,
daniela.novackova@fm.uniba.sk

Darina Saxunova, Faculty of Management, Comenius University in Bratislava, Slovakia,
Darina.Saxunova@fm.uniba.sk

Abstract

Globalization consists in functioning interactive relations and affairs among companies. Globalization is characterized by the growth of companies' flexibility and effective utilization of IT technologies. Globalization could be defined as liberalization of economic and investment relations and removal of obstacles for doing business. The research objects are manufacturing companies of the automobile industry focusing on the ones in Slovakia. The development of international economic relations due to globalization was pointed out based on the analysis of literature resources, the Bloomberg database, reports of the state aid on the economic results of individual multinational companies operating in Slovakia. Firstly, focusing theoretically, the objective of this scientific paper is to identify basic factors influencing the process of globalization and critically compare positive versus negative aspects of the process of globalization. At the same time, we have clarified the implementation of the entrepreneurial activity of transnational corporations in Slovakia and examined and analyzed the process of globalization in the Slovak automobile industry. Results of this research have led to clarifying essential facts having an impact on investment decisions of foreign investors in the country.

Keywords: globalization processes**,** pillars of globalization, investment decisions, foreign investors, global enterprise

Introduction

The concept of globalization is being debated by many academics with high frequency they are tracing back in time to find out when the concept of globalization actually commenced. Current vivid discussions on globalization, numerous voices for, but on the other hand also many voices against globalisation highlight the significance of openness of economy, particularly, the free borders for international trade. Openness to the trade across the borders is believed to lead to the economic development and growth. Under the influence of globalization processes and the internationalization of economic processes, there is a real change of businesses in the states, towards the establishment of corporations of transnational corporations on the territories of other states to support international trade. Many foreign investors operating in the automobile industry found Slovakia a very attractive destination for their investment as a consequence of globalization processes, especially under influence of the European integration in Slovakia. Globalization of the automotive industry implies the extension of the operations of a company beyond the borders of the country of origin, for the purpose of exporting products on new markets, with smaller costs and greater profits. Every foreign investment should be beneficial not only to the local economies, so should the investors themselves. According to Lalla and Streeten (1977), based on the basic principles of neoclassical economics, foreign direct investment contributes to increasing pensions and the welfare of the company in the host country, especially if optimal conditions are not deformed by

protectionism, externalities and monopolies. Even 40 years ago or nowadays the questions are raised whether the state aid defined as an instrument of economic protectionism, does not destroy the market or does not create more favourable position for the recipient of state aid.

The objective of the submitted paper is to identify fundamental factors influencing globalization process and to compare critically their positive and negative aspects. In addition, other objectives of the paper were a) the examination and analysis of globalization processes, and b) the analysis of implementating an entrepreneurial activity of multinational corporations in Slovakia in the automotive industry. The threshold of theoretical and practical research were the data on automobile industry development obtained from the literature resources, the OECD database, the Bloomberg database, reports of the state aid, the economic results of individual multinational companies operating in Slovakia. This paper is composed of the theoretical part of investigating globalisation, its pillars that led to defining essential factors linked with the globalization and entrepreneurial subject in globalization environment and of practical research comprising in the analysis of companies in the Slovak automotive industry and its suppliers and their accomplished economic results. 0The final part evaluates benefits of the foreign investments to the Slovak economy.

Literature Review

Globalization was comprehended in the past as internationalization or we could add a recent equivalent, the term cooperation. Walters says the Webster's dictionary is the first major dictionary to mention the word globalization in 1961. The dictionary defines globalization as "to render global" or "the act of globalizing" (Walters, 2001). Unesco defines the process of globalization as the ongoing process that is linking people, neighborhoods, cities, regions and countries much more closely together than they have ever been before. Globalization is the parallel process in the human world, creating both opportunities for, and barriers to, sustainable development (Saxunova, 2015). There is no standardized definition of globalization as we deal with a constantly changing phenomenon. Only its goal is very clear: the increase of sales and, especially, of profits. (Campean, 2003). Social science theorists concentrate on its precise definition, some offer the following ones. Globalization is a combination of technological development and economic liberalization. It enables the goods, services, capital, firms and persons to get rapidly and easily into any part of the world (European Commission, 2016). The significant actors of the globalizations are multinational entities marked also as transnational corporations, which in order to achieve cost or strategic advantages strengthen their functional integration with other transnational, particularly through mergers and acquisitions. Even Adam Smith was a supporter of globalized markets and "by analysing market specialization he stated that openness promoted the efficient allocation of resources through comparative advantage, allowed the dissemination of knowledge and technological progress, and encouraged competition in domestic and international markets." (Chang, Kaltani, Loayza, 2009). Globalization of the automobile industry implies the integration of the domestic market into the international market with increased circulation of goods and services. (Lin, 2001). In the past, leading firms either exported parts to offshore assembly plants or relied on local suppliers in each production location. Today, a new class of suppliers has been added, the global supplier (Sturgeon and Lester, 2004). We may conclude globalization has created two types of suppliers in the automotive industry, the local and global ones.

Silvianita and Tang (2017) found out that to get an optimal advantage in an automobile industry, companies need to improve their concern in performance measurement and they stated that knowledge is considered the most significant value in an organization to improve its competencies and its performance, as well. Kher, Kydd and O'Brien (2017), during two periods 1998-2007 and 2008-2015, studied the quality of automotive firms and they found out that not only automobile made by Japanese firms have higher initial quality, but, as automobiles get older the difference in the product quality between Japanese versus European and US firms increases. Japanese firms have taken a different path to broadening their

product variety – they have ensured a high level of quality of their initial offerings to be for entering newer market segments.

A specific source of Japan's competitive advantage in the automotive industry is the long-term cooperative relationship between automakers and suppliers (Asanuma, 1989; Cusumano & Takeishi, 1991; Nishiguchi, 1994; Sako & Helper, 1998). Transaction systems between Toyota, with its particularly distinctive cooperative relationships, and its suppliers have been variously called Toyota-ism, the Toyota way, and lean manufacturing. Each of these models has been recognised as providing manufacturing management with a significant competitive advantage (Dohse, Jurgens, & Malsch, 1985; Liker, 2004; Womack, Jones, & Roos, 1990) through their continuous innovation of processes and the resulting improvements in cost, quality, and timeliness. Choi, Kim Ch., and Kim, H.J. (2017) research results found out that the annual efficiency of global automakers is sensitive to the internal capacity utilization and external macro- or microeconomic environment surrounding individual automakers. European automakers tended to show low efficiency caused by over-capacity and low capacity utilization, indicating a need for improving efficiency by adjusting production capacity. This idea raises the area of the future research in Slovak automotive industry for improving global automaker's efficiency and achieving competitive advantage.

Globalization in a Scientific Focus

Globalization is not only the economic term, but it also comprises a wide scale of miscellaneous factors and disciplines influencing one another mutually, entirely or partially. In our opinion, globalization is based on the acceptance of the following freedoms of enterprising: a) freedom of establishment, b) freedom of relocation of the company, c) utilisation of mergers and agglomerates, d) freedom of movement of capital, e) private ownership and the rights of owners deciding what to do with their possessions including revenues.

Table 1: Globalization's Framework

PILLARS OF GLOBALIZATION		
1st Pillar **ECONOMIC FACTORS**	**2nd Pillar** **POLITICAL STABILITY FACTORS AND LEGAL ENVIRONMENT**	**3rd Pillar** **SOCIAL FACTORS**
Liberalization	Political stability	Human recources
Cooperation	Legal framework	Non- discrimination
Transparency	Sociably responsible enterprising	Knowledge economy
Independence		National-cultural homogeneity and multiculturalizm
Protection investments	Protection of the industrial rights	
Competition policy	Protection of the environment	
Double taxation	Protection of the consumers	

Source: processed by the authors

Referring to the contemporary development of globalization we suggest definitions of three pillars of globalization comprising following factors in three constituted pillars, as presented in table 1. Socially responsible enterprising can also be perceived as a factor of globalization, it is a set of moral and ethical principles.Factors of globalization on macro and micro level, mutually affecting one another contribute with their characteristics to the form of the globalization's pillars. Economic factors creating the 1st pillar are the result of the nature and orientation of the state's economy that means no intervention of the state into economic relations and strengthening the rules of the economic competition. Economic factors cover areas such as cooperation, independence, transparency, protection of the economic competition, taxes, introduction of innovative technology, science and research. Moreover, infrastructure and availability and

price of the energy are also included here. Globalization processes have an impact on national, legal regulations, international contracts and agreements of the international organizations (WTO, EÚ). Factors of political stability of the state, protection of industrial rights and intellectual property's rights belong to the 2nd pillar. In addition to the The factors underlying the 3rd pillar may be considered as social factors affecting globalization, i.e. human resources, prohibition of discrimination on grounds of citizenship or nationality, education, multiculturalism, etc. All in all, all mentioned factors altogether represent the pillars of globalization.

Academic And Practical Approach Towards Globalization

In the science we may observe efforts to make a definition of globalization more precise, better reflecting the real connotation of the term "globalization". It can be understood on the basis of two approaches: the practical and academic one. From practical point of view, globalization is understood as the better utilization of economic potential for enterprising in the territories of other states, thus as the process of gradual interconnection and convergence of individual national economies, the transformation of economies into the new economic structure of national economies. From the academic perspective the application of scientific disciplines is implemented, in particular, in macroeconomics, international investment law, European integration and international economic relations. These disciplines address the processes and relations related to the process of globalization and form the basic principles of globalization. Several major legal institutes supporting globalization processes development have been derived from the application practice knowledge, such as non - discrimination, the most - favored - nation clause, proper implementation of the economic competition rules and State aid rules.

Countries' willingness and support for across-border trading enabled by proper legislation result in increasing economic activity. Moreover, if a country can produce goods or services at lower relative costs than other countries, which is comparative advantage that country should invest its financial resources to the production of those particular goods or services. The actual export flows reveal the country's strong sectors, it is also known in the classical economic theory as Revealed Comparative Advantage, Balassa's (1965) well-known index of "revealed comparative advantage" was based on the Ricardian model whose predictions had been that "countries should produce and export relatively more in industries in which they are relatively more productive." (Costinot, Donaldson, Komunjer, 2012). It confirms why Slovakia produces and exports in automobile and automotive industry. In Slovakia, as a result of globalization, and the growth of automobile industry, also the education and training system has changed, for instance introduced education in the field of applied mechanics, automation and computerization of machines and processes and in industrial design.

General Characteristics of the Global Enterprise

The global business entity is considered an economic subject operating in the territories of several states. The transnationality and ability to adapt to the conditions of the host state are considered the basic features of the global enterprise. The primary factor in achieving business competitiveness is highly efficient management, which needs to have a dynamic and flexible management structure enabling to realize rapid changes and information sharing. In global businesses, the gap between "domestic" and "foreign" managers disappears, as people from all over the world have to communicate and cope with cultural diversity. The roles of most managers are of an international nature and require to balance the need for a response to local requirements from a global perspective. It must be able to connect international diversity with the national environment and create synergies of cultures, promote international cooperation and trade. The role of a global enterprise is to achieve world-class production processes. The business activity of global corporations is exposed to various financial risks: market risk (currency and price risks), credit risk and liquidity risk. Global risk management focuses on unpredictable financial market developments and minimizes potential negative impacts on its financial situation. Risks are managed at the consolidated level by the parent company of a global enterprise. Individual units under

the leadership of the legal department of global enterprise identify the individual risks which are reported to the parent's company applying agreed on criteria. The latest issues of global businesses and efforts to solve them are systemized up in the table 2.

Table 2: Global Enterprises nowadays

CONTEMPORARY GLOBAL ENTERPRISES PROBLEMS		
Motivations of employees:	Global employers' efforts:	Long-term goals:
For: environmental reasons: water improvement, waste management, energy and material savings	To apeal to living environment issues To minimalize energy consumption To act in compliance with legislation linked to the living environment protection	To minimize employee turnover To stabilize qualified labor force To increase mutual felowship

Source: Processed by authors

Job preservation, employment sustainability, performance-based remuneration, employee system, staff qualifications, and further training are the priorities of human resource management. At present, global businesses are trying to keep their environmental and energy impacts at the lowest level, complying with the valid legal regulations in the field of environment protection. They motivate their employees to be active in saving energies. The global enterprise needs the stabilization of its employees and other priorities such as stable working places, qualifications, advantages of skilled employees. They also have a significant place in the field of introducing new technologies, science, education and employment. By their nature, they are multinational companies that engage in economic activity in various countries and are traded on international markets. It is illustrated by the fact that there are many car manufacturers in the world, but not all manufacturers achieve the expected profits and profitability e.g. Volkswagen or Ford. Bloomberg has now published a car branding list by profit per car. The table 3 highlights a) the profit per a car and b) profit margin percentage for a selected car trademarks.

Table 3: Global player in automotive industry

Ranking	Trademark	Net profit per a car sold in €	Profit margin in %
1.	**Ferrari**	56,000	18.0
2.	**Porsche**	15,641	16.7
3.	**Jaguar Land Rover**	4,068	7.0
4.	**Maserati**	4,000	4.8
5.	**BMW**	3,389	9.5
6.	**Audi**	3,337	8.8
7.	**Mercedes-Benz**	3,192	7.9
8.	**Volvo**	2,340	6.7
9.	**Nissan**	2,088	4.7
10.	**Chevrolet**	1,912	8.6
11.	**Škoda**	1,589	9.6
12.	**Ford EU**	973	6.0
13.	**Renault**	715	4.7
14.	**Volkswagen**	375	1.7
15.	**Fiat**	356	2.2
16.	**Seat**	337	2.1

Source: Adapted by authors based on (Bloomberg, 2017)

Globalization and Openness of the Slovak Economy in Automototive Industry

The automotive industry is a major player in the European economy accounting for 6.4% of GDP and contributing to 2.3 million jobs in the European Union (EU). However, it has been facing difficulties as a result of the economic crisis. (European Parliament. 2016).

An entire automotive industry in Slovakia has a strong tradition and became the most important sector and driver of the economy. Over the past 20 years it has been an important source of foreign direct investment. The successes may be demonstrated by the following accomplishments: a) 80,000 people employed directly by the 3 car producers — VW, PSA, Kia & Tier 1suppliers; b) 200,000 employees (direct or indirect) in the automotive industry; c) share of the automotive industry is 43% of the total industrial production; this production represents 35-percent share on the total industrial export of Slovakia that means the automotive industry generates 17 billion € of industrial export and 2.5 billion € in added value. The successful Slovak car production by manufacturers and suppliers is illustrated in the table 4, 5 and figure 1, 2.

Table 4: Car production in Slovakia in the period of 2005-2015 and the forecast for the 2020

Period	Car Production in Slovakia [units]	Period	Car Production in Slovakia [in units]	Car Production in Slovakia [in 000s €]	Car production / Total production in Slovakia [in %]	Production in Slovakia [in 000s €]
2005	218,349	**2011**	639,763			
2006	295,380	**2012**	926,555	19,984,523	27.81	71,868,183
2007	571,071	**2013**	987,718	21,206,034	29.40	72,118,362
2008	575,776	**2014**	971,160	20,838,752	29.17	71,445,437
2009	463,140	**2015**	1,043,237	23,110,176	30.54	75,660,718
2010	561,933	**2016**		26,423,908	33.51	78,854,700
	FORECAST	**2020**	1,350,000	[000s €]		[000s €]

Source: processed by the authors (Sario, 2016), (2017)

Nowadays Slovakia belongs to the 20 biggest car producers in the world and produces more cars than Italy and Poland combined (SARIO, 2016) as shown in the table 5: in 2015, the car production per capita and the forecast for the year 2020. In addition, for example, Slovak's foreign trade in 2016 grew considerably a) by €1,443.4 million of passenger cars and other motor vehicles and their parts exported; b) by €424.3 million of components and accessories exported (Ministry of Economy SR, 2016).

Table 5: Car production per 1000 inhabitants

2015	**FR**	**UK**	**CA**	**ES**	**BE**	**SI**	**JP**	**DE**	**KR**	**CZ**	**SK**	**SK**
Cars (units) per 1000 inhabitants	23	23	25	40	42	57	65	69	81	81	178	249 Forecast 2020

Source: processed by the authors (SARIO, 2016).

Three crucial automotive producers together with a well developed and high–quality supplier network contribute to the success of the Slovak automotive industry. There is a high demand for the products manufactured by Tier–1–2 suppliers and they are exported to factories located across the Europe and overseas locations.

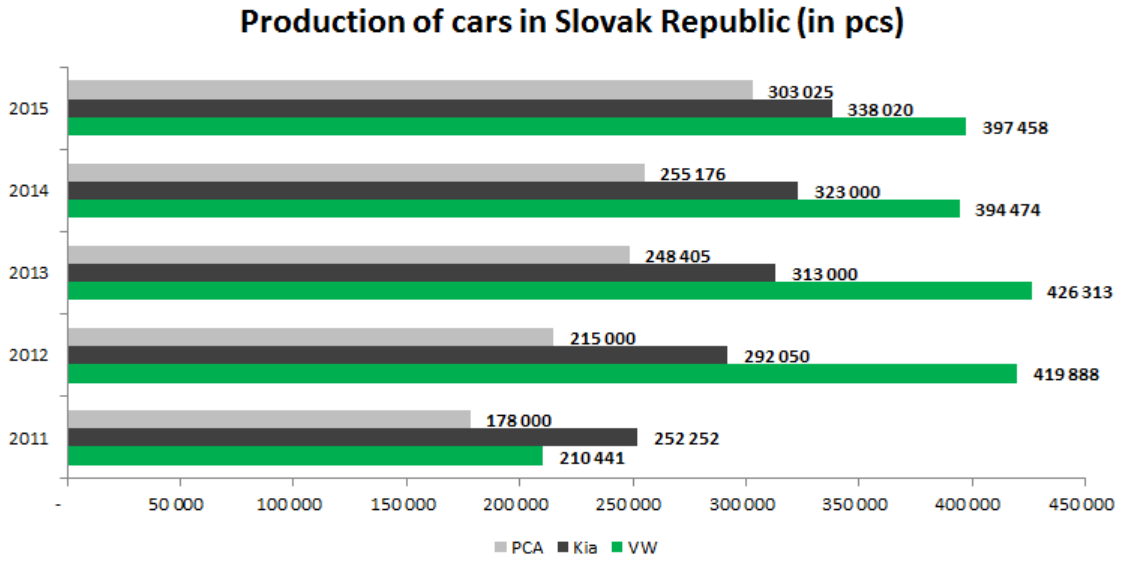


Fig. 1: Car production by PSA, Kia and VW.

Source: (IPDAP, 2016)

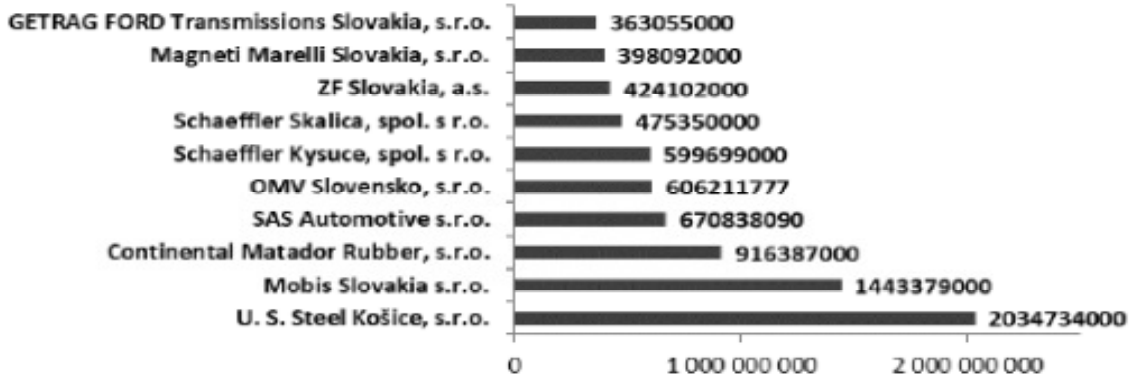


Fig. 2: Largest suppliers in 2016 based on the sales revenues in EURO

Source: (IPDAP, 2017)

The level of globalization and the openness of the economies of states are measured by selecting suitable indicators. We have selected a rating based on the KOF index. Globalization Index KOF 2016 measures the three main dimensions of globalization, i.e. economic, social and political ones. Globalization is defined for this index as the process of creating networks of connections among actors at multi-continental distances, mediated through a variety of flows including people, information and ideas, capital and goods. (Statistics Authority, 2016). It is obvious that the globalization index is ddifferent for individual states. The selected indicators determine the real status of globalization in the rated states in 2016. Slovakia finished on the 16th position from 192 states evaluated, that can be considered a positive fact refering to the length of being the sovereign state since 1993. Slovakia also achieved 12th place in the assessment of the economic globalization index where the actual flows, trade, foreign direct investment, stocks, portfolio investment, restrictions, taxes on international trade were taken into account. The part of social globalization rating was created by data on personal contact, telephone traffic, transfers

(percentage of GDP), international tourism, foreign population, international letters, data on information flows, internet users, television, newspapers trade, data on cultural proximity. Slovak Republic's ranking was the 20th position. Political globalization index included the information on membership in international organizations, international treaties, embassies in the country for evaluation. The Slovak Republic moved up to 44th place. The best rating was achieved by the Netherlands (91.7), Ireland (91.64), Belgium (90.51).

Table 6: Globalization Index KOF 2016

KOF Index of Globalisation 2016 is an index of the degree of globalisation of 122 countries.				
Country	**Globalization Index**	**Economic Globalization**	**Social Globalization**	**Political Globalization**
Austria	89.83	83.25	91.30	96.37
Belgium	90.51	85.95	90.45	96.51
Germany	78.24	61.08	84.53	91.94
Hungary	85.78	86.85	80.79	91.19
Netherlands	91.70	90.80	90.70	94.10
Portugal	85.08	81.35	85.59	89.21
Singapore	86.93	96.06	91.15	69.33
Slovakia 2016	**83.62 /16 P**	**83.63/12 P**	**82.63/20 P**	**84.96/44 P**
Slovakia 2017	**84.36 /18 P**	**87.00/12 P**	**82.76/21 P**	**83.11/50 P**
United State	75.71	59.40	79.15	91.19

Source: (Swiss Federal Institute of Technology, 2017)

Results for Slovakia for the years 2016 and 2017 are included in the table 6, which enables comparision and shows a slight worsening for Slovakia in the globalization index, caused by the worse result in political globalization. The top three 2017 results achieved in KOF globalization index (out of 122 countries): **Globalization index**: 1. Netherland – 92.84, 2. Ireland – 92.15, 3. Belgium – 91.75; composed of **Economic globalization**: 1. Singapore – 97.77, 2. Ireland – 94.65, 3. Luxemburg – 94.06; and **Social globalization**: 1. Singapore - 91.61, 2. Switzerland - 91.13, 3. Ireland - 90.99; and finally **Political globalization**: 1. France - 97.21, 2. Italy - 97.25, 3. Belgium - 95.79.

Accomplished Globalisation Effects in the Automotive Industry in Slovakia

Transnational corporations gain state aid and a benefits that favor their entrepreneurship allowing them to reduce their cost at the expense of competitive businesses. The state aid grant is compatible with the common European market because the balance is guarranted between the resulting distortion of competition and the benefits of the aid. In addition to state aid, which is provided mainly for the purpose of regional development, the institute of major investments is also applied in accordance with Slovak legislation, the Act no. 175/1999 which considers major investments an establishment to be used for production, the development of which shall be organized by a resident legal entity, as long as: a) the funds necessary for the development of the establishment achieve not less than 1 billion SKK of capital investments (30,126 SKK/1€); b) the expected volumes of production and employment are material in the context of the national economy, and c) the Slovak Government decides that the implementation of the project would be in the public interest (Act No. 175/1999. Art. 1.2). State aid is defined as an advantage in any form whatsoever conferred on a selective basis to undertakings by national public authorities (European Commission. 2017). Article 107(1) TFEU defines state aid as any aid granted by a member state or through state resources in any form whatsoever which distorts or threatens to distort competition by favoring certain undertakings or the production of certain goods so far as it affects trade among

member states. Regarding the Article 107(1) TFEU, generally the state aid rules only apply where the recipient of an aid is an "undertaking". (European Commission. 2014). It is necessary to take into consideration the institute of the advantage improving the position of the competitor on the market. An advantage, within the meaning of Article 107(1) TFEU, is any economic benefit would not be obtained by an entity under normal market conditions. i.e. in the absence of state intervention. Neither the cause nor the objective of the state intervention is relevant, but the crucial is the effect of the measure on the business entity. Investors coming to Slovakia are attracted by the state aid instruments, but this is not the only reason for entering the Slovak market. The first major foreign investor in Slovakia was the German company that entered the Slovak market as Volkswagen Bratislava, Ltd. since 1991 and later the joint stock company VOLKSWAGEN SLOVAKIA Inc. (since 1998). The various forms of the state aid and allowances provided to the company are presented in table 7. The main subject of the company's economic activity is manufacture and assembly of vehicles and their parts, manufacture of gearboxes, components. Sales of products are generally carried out within the Volkswagen Group.

Table 7: Volkswagen Slovakia, a.s. benefits received

STATE AID provided to the company for the tax period:	**TAX RELIEF ON ASSETS /RECONSTRUCTION OF ASSETS**	**THE CORPORATE INCOME TAX RELIEF** for the tax period of
1999 – 1,896,000 SKK 2004 –1,602,870,000 SKK	2001 -18,126,820 SKK on the transfer of real estate property for realization of investment action protecting water.	2001 - 1,469,782,000 SKK 2002 - 1,919,251,000 SKK 2003 - 2,461,510,000 SKK
2009 - €5.6 million	2009* - €14.3 million for transformation of existing plant by EC endorsement	2011 - € 431,770,000

*Legend: capital obtained is for the VW's investment project aimed at diversifying the output and increased the production capacity of the plant in Bratislava.
Source: processed by authors (Reports SA, 2005), (EC 2012)

Another multinational trading company active in the automobile industry is the PSA Peugeot Citroën Groupe. (Peugeot Citroën Automobiles Slovakia, Ltd. in 2003, since 2006 PSA Slovakia, Ltd.) The strategic investment of the French investor in 2003 amounted to €700 million. (PSA Annual report, 2008). The total investment of the PSA Peugeot Citroën groupe in Slovakia has exceeded €1billion. On 18 March 2004, in Bratislava. Kia Motors Corporation and the Slovak Republic officially approved the construction of the first European Kia car factory in Slovakia with signing the contract between Kia Motors Corporation and the Slovak Republic. From an economic point of view, the arrival of another transnational corporation means the investment of €1.7 billion capital. Their economic activity have contributed to economic development, employment growth and export increase. Multinational business companies PSA Slovakia, Ltd. and Kia Slovakia, Ltd., state aid or other financial benefits recipients, in the form of subsidies for employee training, etc.. In the table 8 the volumes of state aid granted to both companies is shown.

Table 8: Granted State Aid

	PSA SLOVAKIA	KIA MOTORS SLOVAKIA
Form of the state aid	IN €	IN €
Property transfer	44,351,623	
Income tax relief	13,044,214	15,070,000
Recqualification allowance	5,933,081	15,226,774
New job position's contribution	8,132,510	6,965,744
Subsidy for tangible and intangible assets	84,556,960	157,555,932

Source: (Ministry of Economy SR, 2017)

The following table demonstrates selective 2015 financial results achieved by these car manufacturers.

Table 9: Financial Data of the Three Car Producers in 2015

COMPANY RESULTS OF 2015	SALES	ASSETS	NET INCOME	EQUITY	TOTAL DEBT	OTHER SALES
	[IN €]	[IN €]	[IN €]	[IN €]	[IN %]	[IN €]
VOLKSWAGEN SLOVAKIA. a. s	7,227.454 billion	2,348,932,000	127.459 billion	1,333,009,000	43.25	5,145,000
PSA Slovakia. s.r.o.	2,448.562 billion	625,693,000	26.962 million	209,003,000	66.60	1,459,000
Kia Motors Slovakia s.r.o.	5,073.403 billion	2,190,016,000	210.138 billion	851,670,000	61.11	2,831,000

Source: (Finstat, 2017)

VOLKSWAGEN SLOVAKIA. Inc. in 2015 increased net earnings to 127.5 billions which is 3% increase, sales grew by 17% to $ 7.227 billion €. PCA Slovakia. Ltd. in 2015 it cut its profit by 9% to 26.96 mil € and sales grew by 17% to €2.449 billion. Kia Motors Slovakia s.r.o. in 2015 it cut its profit by 26% to €210.1 million and sales increased by 11% to € 5.073 billion (Finstat, 2017).

Table 10: Selected Business Data

COMPANY	START OF BUSINESS	NUMBER OF EMPLOYEES	MAJOR INVESTMENTS	MONTHLY SALARY
VOLKSWAGEN SLOVAKIA, a.s.	1991	9,480/2016	Decission 137/2015, 18.3.2015	€1,700
PSA Slovakia, s.r.o.	2003	3,500 /2016	Decission 18/2003, 8.1.2003	2016 - €1,395
Kia Motors Slovakia s.r.o	2004	3,800 /2016	Decission 213/2004, 4.3.2004	€1,300

Source: processed by the authors (Finstat, 2017)

The Government of the Slovak Republic has granted the major investments to multinational companies operating in the automobile industry, they gained a competitive advantage and a better market position. These business companies have a major macroeconomic importance, social importance and importance for regional development. The significance of FDI is reflected in the increased economic activity of the

population, the eradication of poverty in the region, the increase in consumption, and the increase of household incomes thanks to global corporations in the automotive industry operating in Slovakia as a consequence of globalization. The remuneration for the company's business results is paid to all rate tariff employees. The amount of remuneration depends on the company's management in the given year. Employees share the company's success in this way.

More than 300 suppliers marked successful operations in Slovakia in years 2014-2016.

Table 11: Top Ten Plants in Sales Revenues and Creating Jobs for the Suppliers (Tier-3) in Slovakia

R 2014	TOP 10 IN SALES REVENUES		SALES REVENUES IN 000S	R /STATE 2014	TOP 10 IN CREATING JOBS	NUMBER OF EMPLOYEES
1.	Mobis Slovakia	South Korea	1,135,821	1.GE	INA Skalica	4,689
2.	Continental Matador Rubber	Germany	792,017	2. JP	Yazaki Wiring Technologies SK	4,591
3.	Johnson Controls International	USA	633,341	3.GE	INA Kysuce	4,059
4.	Continental Matador Truck Tiers	Germany	572,569	4.SK	Zeleziarne Podbrezova	3,229
5.	Faurecia Slovakia	France	528,031	5.USA	Johnson Controls International	3,150
6.	SAS Automotive	Germany	495,637	6. GE	Continental Matador Rubber	2,612
7.	INA Skalica	Germany	448,815	7. South Korea	Yura Corporation Slovakia	2,505
8.	INA Kysuce	Germany	447,996	8. GE	Leoni Slovakia	2,163
9.	Yura Corporation Slovakia	South Korea	275,147	9. GE	ZF Slovakia	2,138
10.	Bekaert	Belgium	271,620	10. FR	Faurecia Slovakia	1,970

Source: (SARIO, 2016)

In the near future it is expected that the investment of Jaguar Land Rover will even expand considerably the automotive suppliers network, also to the central and eastern part of the state which are the regions below 75% of the GDP average of the average of EU member states.

Table 12: Selected Average Financial Indicators for the Suppliers (Tier-3)

	2014	**2015**	**2016**
Gross profit margin percentage	26%	26%	29%
EBIT margin	3%	3%	4%
ROS – profit margin percentage	2%	3%	3%
ROA	2%	4%	4%
ROE	5%	10%	9%
Asset turnover	1.3	1.3	1.2
Total debt/TA	54%	58%	57%

Source: Processed by the authors (Finstat, 2016)

The high and steadily increasing productivity in the automotive industry in Slovakia resulted in changing the status of the production in this industry, which is not classified as low cost anymore. In spite of it, it remains cost–competitive on the regional and European level. The Slovak labor force is known for its flexibility, excellent qualification and high productivity. In October 2017 there was 111,000 people employed in the automotive industry.

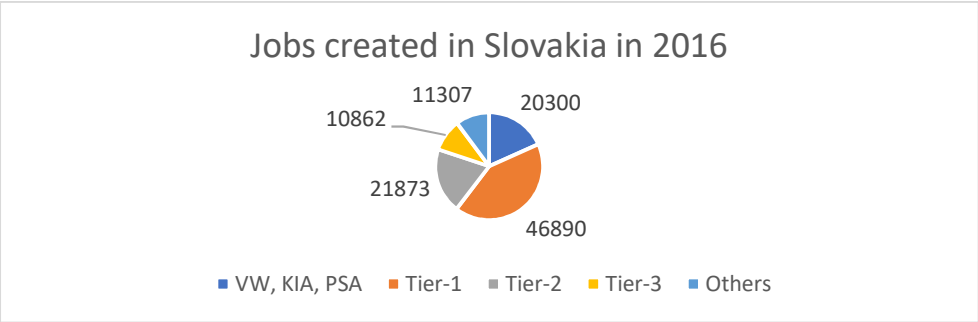


Fig.3: New jobs in Slovakia created by Automotive Industry in 2016.
Source: (IPDAP, 2017).

Conclusion

Globalization is an unstoppable process that will continue to influence the political, economic, social and cultural relations of the states. One cannot forget the fact that international organizations are also considered to be actors of globalization. There is no doubt that globalization in the automobile industry has a positive impact on the Slovak economy and on economic growth. It has a positive effect in the area of employment policy, as the automobile industry is the largest employer in Slovakia, with positive effects in regional development, new subcontracting relationships and pro-export policy. Slovakia is attractive for the foreign investors due to the following characteristics: a) the highest labor productivity in the CEE region, b) strategic location in Europe with great export potential, c) cost-effective & skilled labor force, d) political & economic stability, e) wide supplier network in automotive industry f) growing R&D centers & innovation network , g) Euro currency as one of a few in CEE , h) attractive investment incentives i) fastest growing Eurozone member within the last 10 years for automotive industry j) well-developed infrastructure.

Studying and analyzing the phenomena of globalization the following arguements may be concluded: Firstly, globalization has rapidly influenced economic policy in Slovakia, the automobile industry in Slovakia began developing. Transnational corporations operating in the automobile industry increasingly expand their production, increase an export. Foreign investors are clearly involved in the removal of regional disparities, in the creation of subcontracting relations and in the exports increase. The new era of globalization is also marked by social responsibility and environmental protection. Automobile companies in Slovakia are fully aware of these trends. Foreign subsidiaries have also emerged as sub-suppliers, which has a positive impact on employment policy. Slovak suppliers are taking a bigger role in the globalization process.

Secondly, globalization in the automobile industry has affected regional development and the Slovak labor market. The economic operators receiving state aid and state aid have had to create new jobs. As a result of the inflows of investors in the automobile industry, the structure of the labor market and the education process in Slovakia also changed. The state aid and investment incentives are provided when investment is aimed at a lagging region, below 75% of GDP p.c. of the EU average. In the end, regional GDP increases alike the living standard of the population, narrowing regional disparities.

At last, the globalization of the automobile industry means an increasing dependence of the Slovak economy on foreign investors and transnational capital movements. The disadvantage of the global economy is that the profits of wealthy trading companies are concentrated at the headquarters of the company. Globalization has also caused companies from advanced economies to use cheaper labor markets for their manufacturing activities. Small and medium-sized enterprises have become suppliers to multinational companies. The suppliers have been required to form their own strategies. An effect of this is that suppliers increasingly have to actively understand and foresee technological changes in order to be prepared for disruptions of their existing businesses. Those companies which will master that will be prepared to face the changes caused by the technological or other global progress in the production of hybrid or elecromobiles or intelligent transport.

References

Asanuma, B. (1989),˝Manufacturer–supplier relationships in Japan and the concept of relation-specific skill,˝ *Journal of the Japanese and International Economies,* 3(1), 1–30.

Balassa, B. (1965), ˝Trade Liberalization and Revealed Comparative Advantage˝, In: *The Manchester School of Economic and Social Studies*, 33, 99-123.

Chang, R., Kaltani , L., and Loayza N.V., (2009), ˝Openness can be good for growth: The role of policy complementarities˝, *Journal of Development Economics* 90, pp. 33–49.

Costinot, A. Donaldson, D. and Komjuter, I., (2012),˝What Goods Do Countries Trade. A Quantitative Exploration of Ricardo's Ideas, ˝ *Review of Economic Studies*, Vol. 79, pp. 581–608 doi: 10.1093/restu,d/rdr033, Oxford University Press

Cusumano, M. A., and Takeishi, A., (1991),˝Supplier relations and management: A survey of Japanese, Japanese-transplant, and U.S. auto plants,˝ *Strategic Management Journal*, 12(8), 563–588.

Dohse, K., Jurgens, U., and Malsch, T. (1985), ˝From "Fordism" to "Toyotism?" The social organization of the labor process in the Japanese automobile industry,˝ *Politics & Society*, 14(2), 115–146.

Dreher, A. Gaston, N., and Martens, P. (2008), ˝*Measuring Globalization - Gauging its Consequence*˝, New York: Springer.

Dreher, A., (2006), ˝Does Globalization Affect Growth? Empirical Evidence from a new Index.˝Applied Economics, https://ideas.repec.org/a/taf/applec/v38y2006i10p1091-1110.html

Global Production Networking and Technological Change in East Asia. The World Bank and Oxford University Press. Washington. DC.

Ishida, S., Magnusson, M., and Nagahira, A., (2017), ˝Factors influencing Japanese auto suppliers' predictions about the future of new technologies – An exploratory study of electric vehicles˝, *Futures, 89*, 38-59. doi:10.1016/j.futures.2017.03.009

Kher, HV., Kydd, CT., and Obrien, TM., (2017), ˝Evolution of product quality in European, Japanese and US automotive firms: An exploratory longitudinal analysis,˝ *Omega, 73*, 29-36. doi:10.1016/j.omega.2016.12.003

Liker, JK., (2004), *˝The Toyota Way: 14 management principles from the world's greatest manufacturer.˝* New York, NY: McGraw-Hill.

Lin, G., (2001), ˝Globalization of the automobile industry in China˝, CICERO, Working Paper. p. 7 https://www.duo.uio.no/bitstream/handle/10852/32767/1381.pdf?sequence=1

Nishiguchi, T., (1994), *´Strategic industrial sourcing.´* New York: Oxford University Press.

Peráček, T., Nosková, M. and Mucha, B. (2017), ´Selected issues of Slovak business environment´, Economic and social development-"Managerial issues in modern business" (Book of Proceedings) Varazdin : Varazdin development and entrepreneurship agency, 254-259.

Sako, M., & Helper, S., (1998), ´Determinants of trust in supplier relations: Evidence from the automotive industry in Japan and in the United States.´ *Journal of Economic Behavior & Organization*, 34(3), 387–417.

Silvianita, A., & Tang, C. (2017), A Model Linking the Knowledge Management (KM) Enabler, KM Capability and Operational Performance in Indonesian Automobile Industry. Advanced Science Letters, 23(1), 640-642. doi:10.1166/asl.2017.7281

Sturgeon. T.J. and Lester. R.K. (2004). *'The new global supply-base: New challenges for local suppliers in East Asia'* in Shahid. Y.. Anjum. A.M. and Nabeshima. K. (Eds):

Ulici, I., Dorle N., and Campean, S.M. (2016). The effects of Globalization in the car industry. Arhipelag XXI Press, Tîrgu Mureș, http://www.upm.ro/gidni3/GIDNI-03/Soc/Soc%2003%2085.pdf

Walters, M., (2001). *´Globalization.´* 2nd edition Routledge Publishers.

Womack, J. P., Jones, D. T., & Roos, D. (1990). *The machine that changed the world: Based on the Massachusetts Institute of Technology 5-million-dollar 5-year study on the future of the automobile*. New York: Rawson Associates.

Analyza automobiloveho priemyslu 2016-17, (2017), [Online], [Retrieved June 22, 2017], http://www.ipdap.sk/

SARIO, (2016), Automotive Industry Association of the Slovak Republic (ZAP SR), [Online], [Retrieved June 22, 2017], http: //www.sario.sk

European Parliament, (2016), Motor vehicles. New approval and market surveillance rules, [Online], [Retrieved June 22, 2017], http: //www.europarl.europa.eu/RegData/etudes/ BRIE/2016/577978/EPRS_ BRI(2016)577978_EN.pdf

European Commission, (2017), What is State aid? [Online], [Retrieved June 22, 2017], http://ec.europa.eu/competition/state_aid/overview/index_en.html

Europsen Commision, (2014), Draft Commission Notice on the notion of State aid pursuant to Article 107(1) TFEU, [Online], [Retrieved June 22, 2017], http://ec.europa.eu/competition/consultations/2014_ state_aid_notion/draft_guidance_en.pdf

European Commission, (2009), State aid: Commission endorses €14.3 million aid for Volkswagen in Bratislava, Slovakia. [Online], [Retrieved July 22, 2017], .http://europa.eu/rapid/press-release_IP-09-1865_en.htm

FINSTAT, (2017), VOLKSWAGEN. a.s., [Online], [Retrieved June 22, 2017], https://www .finstat.sk/35757442) .

FINSTAT,(2017), PCA Slovakia. s.r.o. [Online], [Retrieved June 22, 2017], https://www.finstat.sk/36256013

FINSTAT, (2017), Kia Motors Slovakia s.r.o. Ekonomické informácie o spoločnostiach [Online], [Retrieved June 22, 2017], https://www.finstat.sk/35876832

IPDAP, (2016), Slovak Automotive Industry Development, [Online], [Retrieved June 22, 2017], http://www.ipdapgroup.com/en/2016/11/21/slovak-automotive-industry-development-2015/

KOF globalization index, (2016), [Online], [Retrieved September 22, 2017], http://globalization.kof.ethz.ch/media/filer_public/2016/03/03/rankings_2016.pdf

Ministry of Economy of the Slovak Republic (2017). Foreign Trade 2016. [Online], [Retrieved June 6, 2017], http://www.economy.gov.sk/12354-menu/147744s

PSA – Slovakia 2017: Správa http://www.psa-slovakia.sk/novinky-1/kratke-spravy/trnavska-automobilka-psa-groupe-slovakia-zvysuje-mzdy63.html?page_id=2443 https://www.finstat.sk/35757442

PSA Slovakia, (2008), Annual Report, [Online], [Retrieved June 22, 2017], http://www.psaslovakia.sk/buxus/docs//dokumenty/Vyrocna_sprava_2008.pdf)

PSA Slovakia, (2016), [Online], [Retrieved September 22, 2017], http://www.psa-slovakia.sk/o-psa-slovakia.html?page_id=172

Vláda SR, (2009), Návrh na poskytnutie investičnej pomoci pre spoločnosť KIA Motors Slovakia. [Online], [Retrieved June 22, 2017], http://www.rokovania.sk/Rokovanie.aspx/BodRokovania Detail?idMaterial=9202

Level of Foreign Direct Investment in Slovakia in Relation to Euro Adoption and Comparison to Czech Republic

Lucia Kočišová, Department of Economics and Finance, Faculty of Management, Comenius University, Bratislava, Slovakia, Lucia.Kocisova@fm.uniba.sk

Lenka Chorvatovičová, Department of Economics and Finance, Faculty of Management, Comenius University, Bratislava, Slovakia, Lenka.Chorvatovičová@fm.uniba.sk

Zuzana Stoličná, Department of Economics and Finance, Faculty of Management, Comenius University, Bratislava, Slovakia, Zuzana.Stolicna@fm.uniba.sk

Abstract

This article deals with the long-term topic of foreign investing. We will try to analyse situation in two very similar countries with similar historical background and development: Slovakia and Czech Republic. We will analyse the effect and scope which Euro adoption have on level of foreign direct investment in Slovakia, and we will try to provide comparison with very similar country which did not adopt Euro currency yet – Czech Republic. We will choose time period between years 2005 and 2015 so we can determine the impact of crisis on decision making process in connection to investing in certain area.

Keywords: Investing, Euro Adoption, Eurozone, Foreign Direct Investment, Slovakia, Czech Republic

JEL classification: F21

Introduction

A foreign direct investment (FDI) is an investment in the form of a controlling ownership in a business in one country by an entity based in another country. It is distinguished from portfolio foreign investment (the purchase of one country's securities by nationals of another country) by the element of control. Standard definitions of control use the internationally agreed 10 per cent threshold of voting shares, but this is a grey area as often a smaller block of shares will give control in widely held companies. Moreover, control of technology, management, even crucial inputs can confer de facto control.

Strategically FDI comes in three types: horizontal, (where the company carries out the same activities abroad as at home (for example, Toyota assembling cars in both Japan and the UK), vertical (when different stages of activities are added abroad – forward vertical FDI is where the FDI takes the firm nearer to the market (for example, Toyota acquiring a car distributorship in America) and Backward Vertical FDI is where international integration moves back towards raw materials (for example, Toyota acquiring a tyre manufacturer or a rubber plantation) and conglomerate (where an unrelated business is added abroad - this is the most unusual form of FDI as it involves attempting to overcome two barriers simultaneously - entering a foreign country and a new industry and this leads to the analytical solution that internationalisation and diversification are often alternative strategies, not complements).

FDI can take the form of greenfield entry or takeover. Greenfield entry implies assembling all the elements from scratch as Honda did in the UK, whereas foreign takeover means the acquisition of an existing foreign company - as Tata's acquisition of Jaguar Land Rover illustrates.

Foreign takeover is often covered by the term 'mergers and acquisitions' (M&As) but internationally, mergers are vanishingly small, accounting for less than 1 per cent of all foreign acquisitions. This choice of entry mode interacts with ownership strategy – the choice of wholly owned subsidiaries versus joint ventures to give a 2x2 matrix of choices – greenfield wholly owned ventures, greenfield joint ventures, wholly owned takeovers and joint foreign acquisitions - giving foreign investors choices that they can match to their own capabilities and foreign conditions.

According to Grazia Ietto-Gillies prior to Stephen Hymer's theory regarding direct investment in the 1960s, the reasons behind Foreign Direct Investment and Multinational Corporations were explained by neoclassical economics based on macro economic principles. These theories were based on the classical theory of trade in which the motive behind trade was a result of the difference in the costs of production of goods between two countries, focusing on the low cost of production as a motive for a firm's foreign activity. For example, Joe S. Bain only explained the internationalization challenge through three main principles: absolute cost advantages, product differentiation advantages and economies of scale. Furthermore, the neoclassical theories were created under the assumption of the existence of perfect competition. Intrigued by the motivations behind large foreign investments made by corporations from the United States of America, Hymer developed a framework that went beyond the existing theories, explaining why this phenomenon occurred, since he considered that the previously mentioned theories could not explain foreign investment and its motivations. Facing the challenges of his predecessors, Hymer focused his theory on filling the gaps regarding international investment. The theory proposed by the author approaches international investment from a different and more firm-specific point of view. As opposed to traditional macroeconomics-based theories of investment, Hymer states that there is a difference between mere capital investment, otherwise known as portfolio investment, and direct investment. The difference between the two, which will become the cornerstone of his whole theoretical framework, is the issue of control, meaning that with direct investment firms are able to obtain a greater level of control than with portfolio investment.

Furthermore, Hymer proceeds to criticize the neoclassical theories, stating that the theory of capital movements cannot explain international production. Moreover, he clarifies that FDI is not necessarily a movement of funds from a home country to a host country, and that it is concentrated on particular industries within many countries. In contrast, if interest rates were the main motive for international investment, FDI would include many industries within fewer countries. Another observation made by Hymer went against what was maintained by the neoclassical theories: foreign direct investment is not limited to investment of excess profits abroad. In fact, foreign direct investment can be financed through loans obtained in the host country, payments in exchange for equity (patents, technology, machinery etc.), and other methods. The previous criticisms, along with assuming market imperfections, led Hymer to propose the three main determinants of foreign direct investment:

1. Firm-specific advantages: Once domestic investment was exhausted, a firm could exploit its advantages linked to market imperfections, which could provide the firm with market power and competitive advantage. Further studies attempted to explain how firms could monetize these advantages in the form of licenses.
2. Removal of conflicts: conflict arises if a firm is already operating in foreign market or looking to expand its operations within the same market. He proposes that the solution for this hurdle arose in the form of collusion, sharing the market with rivals or attempting to acquire a direct control of production. However, it must be taken into account that a reduction in conflict through acquisition of control of operations will increase the market imperfections.
3. Propensity to formulate an internationalization strategy to mitigate risk: According to his position, firms are characterized with 3 levels of decision making: the day to day supervision, management decision coordination and long term strategy planning and decision making. The extent to which a company can mitigate risk depends on how well a firm can formulate an internationalization strategy taking these levels of decision into account.

Euro adoption process and its Euro implementation in 2009 in Slovakia was supposed to bring many changes to Slovak economy. Movement and changes in foreign trade, economic growth, monetary policy, foreign direct investment and in other areas were expected. The aim of this paper is to analyze the effect and scope which did Euro adoption have on level of foreign direct investment in Slovakia, and to provide comparison with very similar country which did not adopt Euro currency yet – Czech Republic. One of the expected effect of Euro adoption was also an increased inflow of foreign direct investments (FDI) in Slovakia after 2009. FDI represents an important factor for economic growth and it plays an important role in the development of economy, in patricular in transition economies

including Slovakia. Past studies suggest that the Euro's positive FDI effect was much larger in manufacturing sector versus services.

Furthermore the Euro adoption promoted FDI from outside the Euro area, but this effect was only about half as strong as the impact within the area. The bottom line number – the overall positive FDI effect – is not cleatr though. Most authors find it is positive, but the estimates range from +15% for in-to-in flows and +7.5% for out-to-in flows. Table 1 summarizes the level of FDI as a percentage of GDP in Slovakia and Czech Republic during the period from 2005 to 2015. This period was chosen to depict levels of FDI inflows well before Euro adopation in Slovakia in 2009 and also to show what impacts has this move had on FDI in Slovakia afterwards. FDI inflows as a percentage of GDP on Euro area and the European Union level is also included for better comparison.

Table 1: FDI, net inflows (% of GDP)

Foreign direct investment, net inflows (% of GDP)											
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Czech Republic	8.53%	3.56%	5.62%	3.75%	2.56%	4.91%	1.84%	4.55%	3.51%	3.89%	1.34%
Euro area	5.85%	7.15%	9.80%	4.62%	3.02%	4.02%	5.61%	5.11%	4.09%	2.08%	4.02%
European Union	6.56%	7.12%	9.36%	5.63%	2.61%	3.40%	4.64%	4.24%	3.37%	2.11%	3.40%
Slovak Republic	6.26%	8.07%	5.86%	4.63%	1.71%	2.37%	5.53%	1.90%	1.02%	-0.36%	1.32%

Source: World Bank Data

Data from Table 1 are graphically depicted in the Chart 1. Before Euro adoptation, level of FDI inflows in Slovakia was 6.26% (2005), 8.07% (2006), 5.86% (2007) and 4.63% (2008). On the other hand, level of FDI inflows in Czech Republic was 8.53% (2005), 3.56% (2006), 5.62% (2007) and 3.75% (2008). We can conclude that two years prior to Euro adoptation FDI inflows were very similar in both countries, but lower than in Euro zone or in the European Union as a whole. After Euro adoption in 2009 in Slovakia we can mostly notice decreased trend in FDI inflows shown as percentage of GDP, expect for 2011. FDI inflows were 1.71% (2009), 2.37% (2010), 5.53% (2011), 1.90% (2012), 1.02% (2013), - 0.36% (2014) and 1.32% (2015) which are significantly lower values than we noticed in pre-Euro adoption periods. Same decreasing trend applies also to Czech Republic, though. Country's FDI inflows were 2.56% (2009), 4.91% (2010), 1.84% (2011), 4.55% (2012), 3.51% (2013), 3.89% (2014) and 1.34% (2015) of GDP. Trends in both countries correspond with trend in entire Euro zone and the European Union. From the point of FDI as a percentage of GDP we could conclude that Euro adoption had very small effect of FDI levels in Slovakia after 2009.

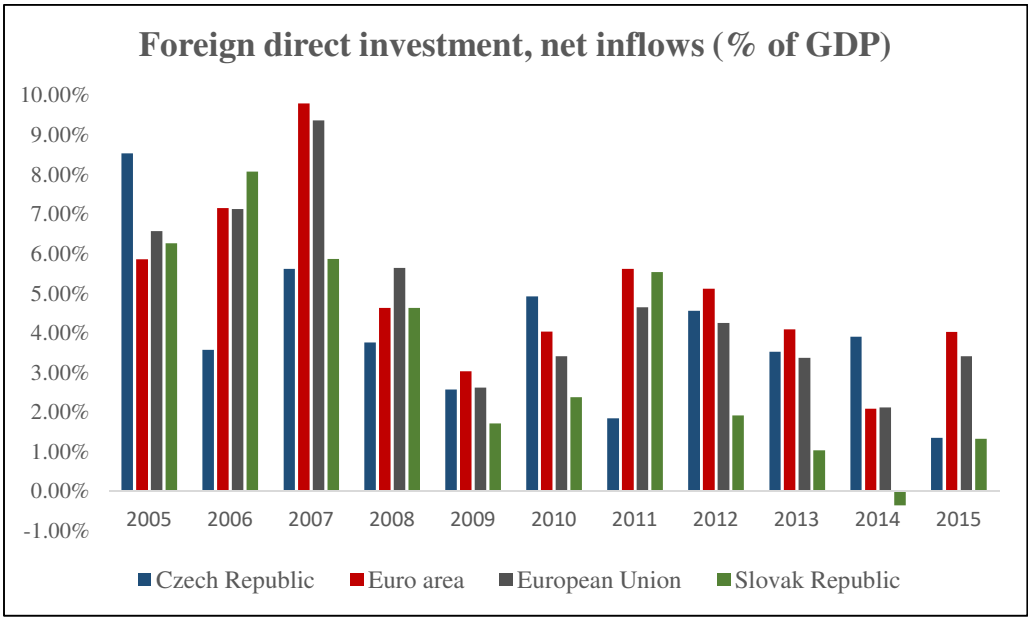


Fig. 1: FDI, net inflows (% of GDP)

Source: Graphically outlined by authors based on World Bank Data

Table 2 provides overview on foreign direct investment net inflows in millions USD in Slovakia and Czech Republic from 2005 to 2015. Prior to 2009 levels of FDI in Slovakia could be seen as high: 3,925 million USD (2005), 5,696 million USD (2006), 5,060 million USD (2007) and 4,642 million USD (2008). Since the country adopted Euro levels of FDI inflows decreased significantly except for 2011: 1,519 million USD (2009), 2,117 million USD (2010), 5,427 million USD (2011), 1,777 million USD (2012), 1,004 million USD (2013), -362 million USD (2014) and 1,151 million USD (2015). Comparison with Czech Republic suggests that level of FDI inflows in Slovakia was approximately (except for 2006) one half of level of FDI inflows in Czech Republic before 2009: FDI inflows in Czech Republic being as follows: 11,602 million USD (2005), 5,522 million USD (2006), 10,606 million USD (2007) and 8,815 million USD (2008). Since Slovakia Euro adoption in 2009 we can, however, see major shift in this trend if FDI inflows. We can determine that after 2009 (except for 2011 and 2015) the level if FDI inflows in Slovakia decreased to approximately one quarter compared to level of FDI inflows in Czech Republic. FDI inflows in Czech Republic were measued as follows: 5,272 million USD (2009), 10,168 million USD (2019), 4,189 million USD (2011), 9,433 million USD (2012), 7,358 million USD (2013), 8,089 million USD (2014) and 2,479 million USD (2015).

Table 2: FDI, net inflows (% of GDP)

Foreign direct investment, net inflows (BoP, current US$, in millions)											
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Czech Republic	$11,602	$ 5,522	$10,606	$ 8,815	$ 5,272	$10,168	$ 4,189	$ 9,433	$ 7,358	$ 8,089	$ 2,479
Slovak Republic	$ 3,925	$ 5,696	$ 5,060	$ 4,642	$ 1,519	$ 2,117	$ 5,427	$ 1,777	$ 1,004	$ (362)	$ 1,151

Source: World Bank Data

Data from Table 2 is graphically presented in Chart 2 which also provides trend lines for both countries. We can determine that since Slovakia adopted Euro the difference in foreign direct investment inflows has decreased between Slovakia and Czech Republic.

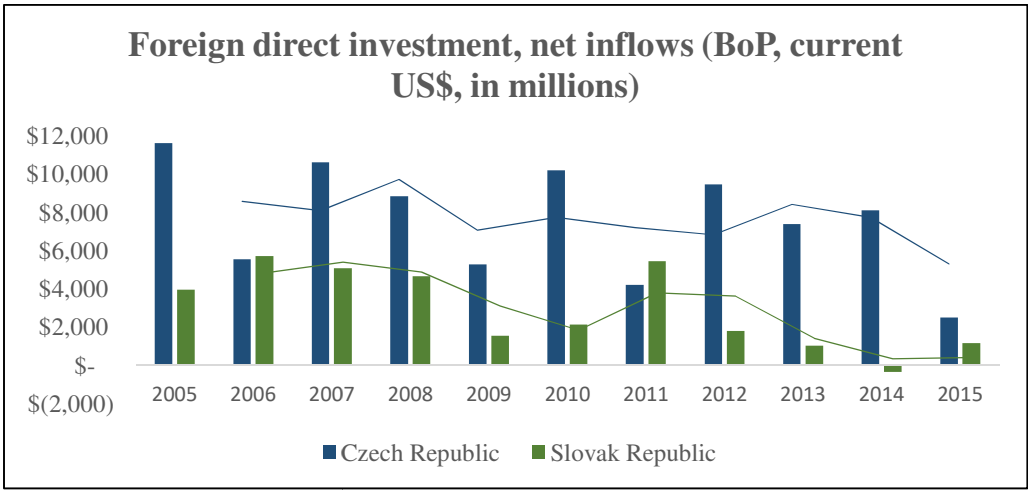


Chart 2: FDI, net inflows BoP, current USD, in millions)

Source: Graphically outlined by authors based on World Bank Data

As part of our analysis concerning level of Foreign Direct Investment in Slovakia in relation to Euro adaptation and comparison to Czech Republic we have also outlined FDI inward positions in both countries at Charts 3 and 4.

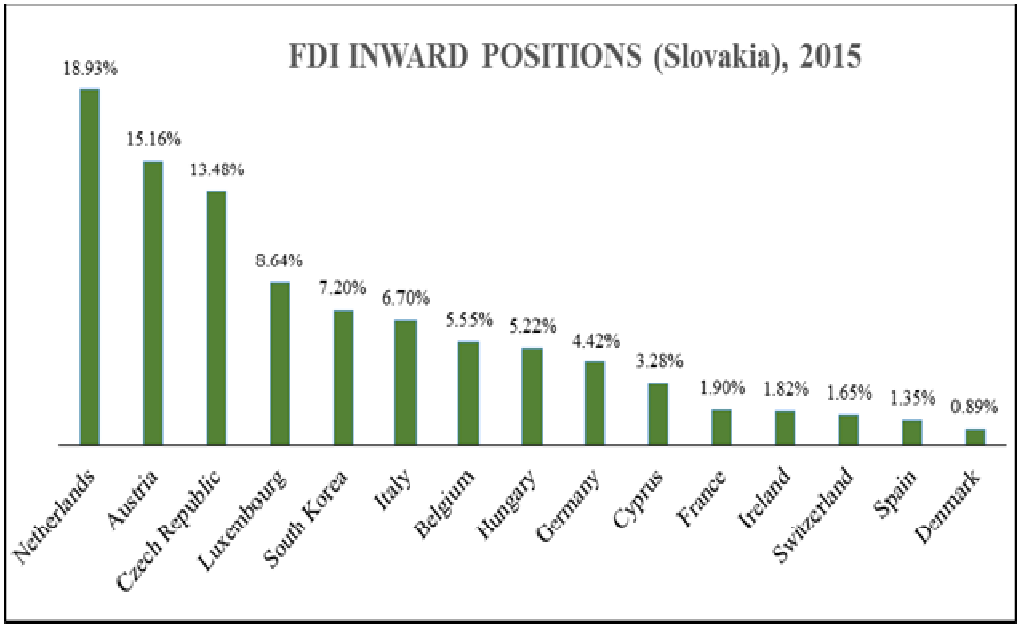


Chart 3: FDI inward positions (Slovakia, 2015)

Source: Graphically outlined by authors based on NBS Data

Chart 3 shows FDI inward positions in Slovakia in 2015. Out of 15 main contributors to FDI in Slovakia 10 are part of Eurozone: Netherlands, Austria, Luxembourg, Italy, Belgium, Germany, Cyprus, France, Ireland and Spain. These 10 countries formed more than 67% of all FDI inflows in Slovakia in 2015.

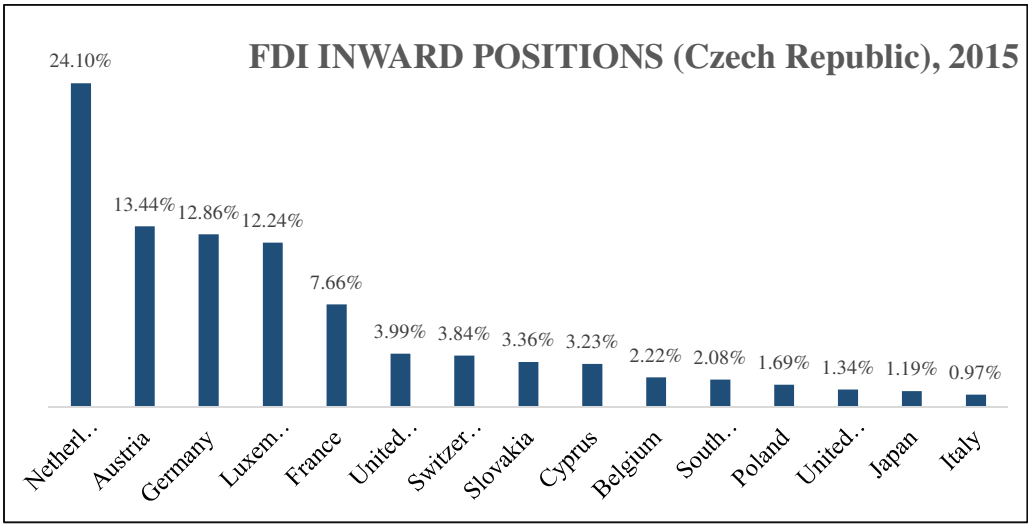


Chart 4: FDI inward positions (Czech Republic, 2015)

Source: Graphically outlined by authors based on CNB Data

Out of 15 main contributors to FDI in Czech Republic 9 are part of Eurozone: Netherlands, Austria, Germany, Luxembourg, France, Slovakia, Cyprus, Belgium and Italy, totalling to more than 80% of all FDI inflows in Czech Republic in 2015.

The topic of FDI placement is far more complex and difficult than just assessing country's currency – as in this case Euro and Czech Crown. For better comparison and analysis of other important factors we have prepared tabular overview in Table 3. This table summarizes important factors which are considered during the process of placement of foreign direct investment. Issues from the area of real estate, taxation, labour, state support and infrastructure are considered and prepared for current period – year 2017.

Table 3: FDI placement factors, Slovakia and Czech Republic, 2017

Real estate costs	**Czech Republic**	**Slovakia**
Cost of land	(This will very much depend on the region in which the investment is planned and the size of the site.	
Taxes	Real estate tax is payable annually by the owner of land or buildings. The amount of the tax is dependent on area, location, and usage of the land or buildings. Paved areas used for business purposes (such as concrete areas in logistics centres) are taxable, with taxpayers obligated to self-assess the tax. However, some areas (e.g. publicly accessible parking lands in shopping malls) are not taxable. The real estate transfer tax rate is 4% and applies to the greater of the transaction price or the officially appraised value of the real estate transferred. The taxpayer is the transferor unless it is contractually agreed that it is the transferee.	Immovable property tax, which is divided into land tax, building tax, and tax on apartments, is governed by the Act on Local Taxes. Immovable property tax is calculated based on the area of the real estate, its location, and its type, as well as the tax rate of each self-governing region. The immovable property tax rate may vary significantly. There are no transfer taxes in the Slovak Republic.
Construction costs	(These will very much depend on the nature of the project.)	
Taxation	**Czech Republic**	**Slovakia**
Corporate taxation	19%	21%
VAT (general rate)	21%	20%
Personal income tax rate	15% - 35%	19%
Export tax	VAT payable on import from a nin-EU country, import from EU countries subject to common EU VAT rules.	
Labour issues	**Czech Republic**	**Slovakia**
Minimum monthly wage (EUR, 2017)	407 (equals 11,000 CZK)	435
Average gross monthly wage (EUR, 2017)	1,084 (equals 29,320 CZK)	950
Social security costs	11% for employees (depending on the type of employment) and 34% for employers	13.4% for employees (depending on the type of employment) and 35% for employers
Recorded unemployment	5.1%	8.4%

Support from the state	**Czech Republic**	**Slovakia**
Amount allocated from EU Structural and Cohesion Funds (2014 - 2020, EUR million)	22,000	13,500
Infrastructure	**Czech Republic**	**Slovakia**
Road (km)	1,225	464
Rail (km)	9,468	3,662
Economic stability	**Czech Republic**	**Slovakia**
GDP per capita (USD, 2016)	32,076	29,758
Inflation (2015)	3.40%	-0.32%
Currency	Czech Crown	Euro

Source: PWC analysis (2014) updated for 2017

Conclusion

The aim of this paper was to analyse the effect and scope which did Euro adoption have on level of foreign direct investment in Slovakia, and to provide comparison with very similar country which did not adopt Euro currency yet – Czech Republic. Our analysis for the period 2005 to 2015 suggests that proving strong connection between the Euro adoption and level of FDI inflows is rather difficult process. We have measured levels of FDI inflows before 2009 and after 2009 as well and compared trend if FDI inflows in Slovakia with inflows into Czech Republic. Whilst before Euro adoption Slovak FDI inflows were at approx. one-half level compared to Czech FDI inflows – Slovakia even exceeded Czech FDIs in 2006, after the Euro adoption overall level of FDI decreased. This decreasing trend has been only slightly present in Czech Republic, which has managed to more or less keep its FDI inflow levels. We cannot conclude this for Slovak FDI inflows since these have been steadily decreasing since 2009 and currently for only one quarter of FDI inflows compared to Czech Republic. There are many reasons as to why this trend occurs and they definitely require further analysis. Our paper concludes that the Euro adoption has had very small (if any) impact on level of FDI inflows into Slovakia.

References

Buckey, P. (1989) “Foreign Direct Investment by Small and Medium Sized Enterprises: The Theoretical Background” Small Business Economics, 1 (2) (1989), 89-100, Springer.

Allan, Overy: Foreign direct investment in Central and Eastern Europe [online] [10.04.2017] Available http://www.allenovery.com/SiteCollectionDocuments/Foreign%20direct%20investment%20in%20Central%20and%20Eastern%20Europe.PDF

Dunning, J.H. and Rugman, A.M. (1985) The Influence of Hymer's Dissertation on the Theory of Foreign Direct Investment, The American Economic Review,75 (2), Papers and Proceedings of the Ninety-Seventh Annual Meeting of the American Economic Association (May 1985), pp. 228-232.

Finanční správa: Personal income tax. [online] National Bank of Czech Republic [10.04.2017]. Available: http://www.financnisprava.cz/en/tax-forms/forms-and-information/personal-income-tax

Hlavacek, P., Bal-Domanska, B. (2016) "Impact of foreign direct investment on economic growth in central and eastern European countries", Engineering Economics, 27 (3), 294-303.

Hymer, S. (2005) "The Multinational Firm and 'Multinational Corporate Capital", Proceedings of 7th Conference of the Greek Historians of Economic Thought, Thessaloniki, Greece, 2005.

Hymer, S., The International Operations of Nation Firms: A Study of Foreign Direct Investment, Cambridge, MLT Press.

Ietto-Gillies, G. (2012) Transnational Corporations and International Production Concepts, Theories and Effects, Second Edition, Edward Elgar Publishing, 2012.

Kucharčíková, A., Guttenová, D., Chodasová, Z., Vojteková, M. (2015) "The impact of foreign direct investment on economic performance of the selected region of Slovakia", Proceedings of the 25th International Business Information Management Association (IBIMA ISBN: 978-0-9860419-4-5, 7-8 May 2015, Amsterdam, Netherlands, 3751-3756.

Olšavský, F. (2016) "The importance of country of origin in buying behaviour of slovak consumers in selected product categories" Proceeding of the international scientific conference Hradec economic days 2016, ISBN 978-80-7435-636-0, 2-3 February 2016, Hradec Králové, Czech Republic, 56-762.

PriceWaterhouse Coopers: WorldWide Tax Summaries, 2015 [online] [10.04.2017]. Available: http://www.pwc.com/gx/en/tax/corporate-tax/worldwide-tax-summaries/assets/pwc-worldwide-tax-summaries-corporate-2015-16.pdf

Study on the impact of the Euro on trade and foreign direct investment. [online] [10.04.2017]. Available: http://ec.europa.eu/economy_finance/publications/pages/publication12590_en.pdf

The effects of Euro adoption on the Slovak economy. [online] National Bank of Slovakia [10.04.2017]. Available: https://www.nbs.sk/_img/Documents/PUBLIK/06_kol1a.pdf

The Global Economy, Slovakia: Foreign Direct Investment, [online] [10.04.2017]. Available: http://www.theglobaleconomy.com/Slovakia/fdi_dollars/

United Nations Conference on Trade and Development: Statistics on FDI and the operations of TNCs, [online] [10.04.2017]. Available: at: http://unctad.org/Sections/dite_fdistat/docs/wid_cp_sk_en.pdf

Vilčeková L., Štarchoň P.: "Consumer perception of selected brands explored through archetypes", Proceeding of International Conference on Education and Social Sciences INTCESS 2017, ISBN 978-605-64453-9-2, 6-8 Februry 2017, Istanbul, Turkey, 819-823.

The Impact of a New Foreign Investor on Economic Growth in the Slovak Republic

Lucia Kočišová, Department of Economics and Finance, Faculty of Management, Comenius University, Bratislava, Slovakia, Lucia.Kocisova@fm.uniba.sk

Zuzana Stoličná, Department of Economics and Finance, Faculty of Management, Comenius University, Bratislava, Slovakia, Zuzana.Stolicna@fm.uniba.sk

Abstract

This article focuses mainly on the research and evolution of GDP of the Slovak Republic and on the possibilities of influencing it by the arrival of new investors. In recent years and especially under the influence of the adoption of the euro, the conditions have gradually changed. This is precisely why we have tried to look at this issue in a complex way from multiple angles, whether from the legal point of view or even with studying of different reactions and perception of markets. Based on these findings, we have also formulated specific recommendations regarding the admission of a new automotive investor to the market.

Keywords: foreign investor, international investment, automotive industry, Slovakia,

JEL classification: F21

Introduction

On January 1, 2009, Slovakia became the sixteenth state of the European Union that started using the common currency. The Slovak Republic undertook, by signing the Accession Treaty to the European Union, to fulfill the Maastricht criteria, which have become a key task for the introduction of the euro. All of this had a positive and negative impact on economic growth in Slovakia. In this period, the growth of the economy in Slovakia was not just the fact that we adopted the euro and fulfilled all the Maastricht criteria, but for the most part our economic growth was influenced by the economic crisis that gradually broke into Europe.

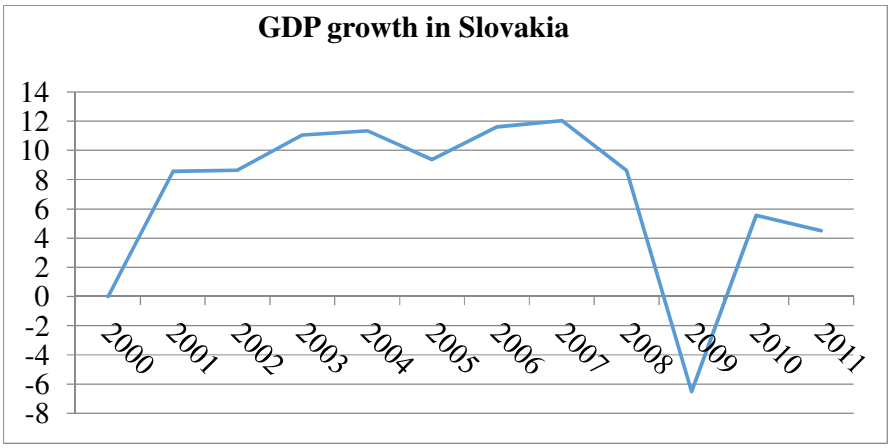


Fig. 1: GDP growth in Slovak Republic in 2009-2011

Source: Statistical Office of the Slovak Republic

In 2009, there was a huge decline in GDP, even when we were even in negative numbers. This decline occurred mainly due to a significant decline in foreign and domestic demand. However, in 2010 and 2011 we can see an increase in the economy, which was caused by the recovery of foreign demand, but domestic demand grew very slightly. As the economic crisis penetrated Europe in 2009, the ECB decided to adopt the criteria that the national banks belonging to the Eurosystem had to

meet. Problems in the financial market have gone so far as to be that the only possible solution for the ECB was to fully assume the role of intermediary in this market. The ECB withdrew from the standard performance of monetary policy operations to allocate resources to euro area commercial banks for a fixed interest rate. What, in fact, meant for the banks of the eurozone full confidence in obtaining resources. From the point of view of the Slovak Republic, this meant using the instruments adopted by the ECB during this period. The interest rate on the main refinancing operations declined to 2%, the rate of one-day operations remained unchanged at 3% and the rate of one-day sterilization operations stabilized to 1%. Developments in bank lending and tighter financing conditions as a result of increased financial tensions contribute to a slowdown in the flow of loans from financial institutions to the non-financial private sector. The decrease in the interest rate on the main refinancing operations of the Eurosystem stemmed from continuing inflationary flows, mainly as a result of further deterioration in the economic outlook.

In the years 2012-2015 there was an increase in the economy, we see the economic crisis as stabilized. Thus, we can say that the instruments adopted by the ECB were relevant and the euro area is in moderate GDP growth over this period. In 2012, foreign demand increased in the positive part, while domestic consumption was still stagnating, as households still did not trust the consumer market, despite the increase in disposable income - preferring savings before consumption. In 2013, economic growth was positively influenced by foreign demand and public consumption, but on the other hand, the negative impact on economic growth had household consumption that remained stagnant.



Fig. 2 : GDP growth in Slovak Republic in 2012-2015

Source: Statistical Office of the Slovak Republic

In 2014 and 2015 household consumption grew, which had a positive impact on economic growth. The disposable income of households has also increased thanks to the declining oil price and a better labor market situation. In this period, the ECB decided to reduce the interest rate on marginal sterilization operations to -0.3%, the main refinancing operations to 0.05% and the rate for marginal lending operations to 0.3%. As regards non-standard monetary policy measures, the ECB has decided to extend the duration of the asset purchase program. This purchase of € 60 billion per month is due to take place by the end of March 2017, but if it is needed for a longer period until a change in inflation is achieved that will meet the target of reaching a rate of inflation below or close to 2% in the medium term. Low oil prices supported real household disposable income and corporate profitability, household consumption and investment. Monetary policy is geared to maintaining price stability over the medium term and encourages economic activity.

The ECB, through its national central banks, implements monetary policy through its instruments, such as open market operations, automatic operations and minimum reserve requirements. In order to reduce the risk of a too long period of low inflation, the ECB continued to implement a non-standard Asset Acquisition Program, which included a further covered bond purchase program, a securities purchase program in 2015, and expanded it to a public sector bond purchase program in 2015.

Current GDP development in Slovakia

In 2016, there was a slight decline in domestic consumption, but household consumption continued to rise as compared to the crisis period, the growth rate significantly affected the positive balance of payments. The forecasts for the growth of the economy in 2017 are very favorable, the Slovak market will be affected mainly by the JLR investment.



Fig. 3: GDP growth in Slovak Republic – present days

Source: Statistical Office of the Slovak Republic

Before the financial crisis, the ECB used standard monetary policy instruments, such as open market operations, automatic operations and minimum reserve requirements. Following the financial crisis in 2007 and the later economic crisis, the ECB's Governing Council adopted monetary policy instruments. Their acquisition significantly changed the Eurosystem's monetary policy operational framework. The ECB's decision on targeted longer-term liquidity operations (TLTRO) and the introduction of the APP have also helped support the economy in an environment of unprecedentedly low interest rates. It has increased the amount of the monthly asset purchase program to € 80 billion starting in April 2016, raising the emission limit for purchases of selected securities, introducing a new CSPP program, and announcing a new series of targeted longer-term refinancing operations (TLTRO-II) and confirmed the validity of the specified but lower rates for a period exceeding the duration of the purchasing programs, and the program of purchase of assets was in force until the end of 2017 (if necessary and for longer).

In 2015, the Slovak Republic signed a major investment agreement with British automaker Jaguar Land Rover, a.s., to build a new industrial park that will grow in the Nitra region. In September 2016, the construction of the plant began, and the production of the first car was scheduled for 2019. According to preliminary estimates, the foreign investment should, according to preliminary estimates, increase employment, consumption, net exports and economic growth. The recruitment of new employees will start at the end of 2017 and early 2018. The company itself plans to create around 3,000 jobs, but it could be more radical to increase to a figure of 15,000 by the inflow of other foreign investors who will be in a relationship with automotive supply and subcontracting relationships. Human resources have so far reported about 40,000 applications for jobs in the

aforementioned plant. Jaguar Land Rover, a.s. did not receive the possibility of tax concessions from the Slovak Republic, but direct aid, thus contributing to the state budget by taxes over the next two years, amounting to approximately 160 million. After starting production, it should achieve annual sales of up to € 5 billion.

A foreign investor has set up a program to prepare the future workforce - future employees at secondary vocational schools, will contribute to the departments of selected secondary schools. In the future, he is interested in investing in schools with a leading engineering and electrotechnical field. In the higher positions, future employees are trained in England. This program contributes to the matching of supply and demand in the labor market. The Center for Vocational Education and Training in the field of CNC technologies has been recalculated and approved in about 1 660 307 euros. Dual education is currently being carried out, and several schools have received applications for entitlement from the company in order to allow a practical part of the teaching at their premises. The average wage in the plant is estimated at roughly 1,250 euros. By 2019, the forecasts of the National Bank of Slovakia promise to increase the gross domestic product to 4, 6%. The planned annual production of a car company is at the start of the production process of 150,000 cars a year, with forecasts for the future declaring even double that figure. Industrial production and the overall industry sector will retain 80 percent of GDP. As far as employment is concerned, it will achieve a 90% share.

Table 1: Forecast of GDP development from 2015-2019

Year	2015	2016	2017	2018	2019
GDP %	3,8	3,3	3,1	4,2	4,6

Source: Statistical Office of the Slovak Republic, European Central Bank

Conclusion

However, the problem may be the market squeeze by the automotive industry. We have four car companies in Slovakia. The impact on economic growth will culminate in 2019 and, in a favorable situation, the investment will create the conditions for crossing the 4% growth threshold. Given that there will be a positive supply shock from the new production capacities, high economic growth will not be accompanied by a significant overheating of the economy.

The economy, in general, is continuously growing and rising, more investment will be in circulation, and households will increase consumption and that will result in an increase in employment. Significant foreign investment also assumes a positive impact on the business environment as well.

It is important to recognize the importance of the influx of foreign investors for the further development of the business sector in order to profit the economy of the Slovak Republic. A proactive measure is also to reduce administrative burdens, improve the quality of infrastructure, particularly in regions with high levels of unemployment.

References

ECB. Mesačný bulletin. [online]. European Central Bank [1.5.2017]. Available: http://www.nbs.sk/_img/Documents/ECBPUB/MESBUL/mb200912_uvod.pdf

ECB. Úvodné vyhlásenie tlačovej konferencie. [online]. European Central Bank [2.5.2017]. Available: http://www.ecb.europa.eu/press/pressconf/2015/html/is151203.sk.html

Gregušová, D., Peráček, T. (2015) Obchodné právo pre manažérov (Obchodné záväzkové vzťahy), Univerzita Komenského, Bratislava.

Kajanová, J. (2016). "Globalization and Its Impacts On Chemical Enterprises Performance In Slovakia", Proceedings of 16th International Scientific Conference Globalization and Its Socio-Economic Consequences, ISBN 978-80-8154-191-9., 5–6 October 2016, Rajecké Teplice, Slovak Republic, 808-815.

Majerčáková D., Mittelman A. (2017) "European impact investment market as a challenge for investors" Proceedings of the 29th International Business Information Management Association (IBIMA), ISBN 978-0-9860419-7-6, 3-4 May 2017, Vienna, Austria, 3751-3756.

Milošovičová, P. & Paškrtová, L. (2015). "Development of Slovak-German Economic Relations. Globalization and its socio-economic consequences" Proceedings 15th International Scientific Conference Globalization and Its Socio-Economic Consequences, ISBN 978-80-8154-191-9, 7–8 October 2015, Rajecké Teplice, Slovak Republic, 439-448.

NBS. Výročná správa 2016. [online]. Národná banka Slovenska [4.5.2017]. Available: http://www.nbs.sk/_img/Documents/_Publikacie/VyrocnaSprava/protected/VSNBS16.pdf

Nováčková D. and Saxunová D (2017), "Zmeny v oblasti medzinárodných investičných vzťahov v dôsledku nadobudnuta platnosti dohody CETA" Manažment podnikania a vecí verejných, 12 (4)

Olšavský, F. (2016) "The importance of country of origin in buying behaviour of slovak consumers in selected product categories" Proceeding of the international scientific conference Hradec economic days 2016, ISBN 978-80-7435-636-0, 2-3 February 2016, Hradec Králové, Czech Republic, 56-762.

Peráček T., Mittelman A., Strážovská Ľ. (2016) "The legal aspects of advertising in the Slovak republic with special focus on the promotion of chosen products" Proceedings of 17th International scientific conference on economic and social development, ISSN 1849-6903, 20-21 October 2016, Warsaw, Poland, 12-17.

Sektorové analýzy. In Sario.sk. [online]. Slovak Investment and Trade Development Agency [10.04.2017]. Available: http://www.sario.sk/sk/obchodujte-so-slovenskom/sektorove-analyzy

Smolková E., Štarchoň P., Weberová D. (2016) "Country-of-origin brands from the point of view of the Slovak and Czech consumers", Proceedings of the 27th International Business Information Management Association (IBIMA), ISBN 978-0-9860419-6-9, 4-5 May 2016, Milan, Italy, 2119-2130

Vilčeková L., Štarchoň P.: "Consumer perception of selected brands explored through archetypes", Proceeding of International Conference on Education and Social Sciences INTCESS 2017, ISBN 978-605-64453-9-2, 6-8 Februry 2017, Istanbul, Turkey, 819-823.

Identification of the Main Actors of Innovation Performance Evaluation Process and the Definition of Their Responsibilities

Viliam Lendel, Univerzity of Žilina, Žilina, Slovakia, viliam.lendel@fri.uniza.sk

Juraj Čerňanský, Univerzity of Žilina, Žilina, Slovakia, juraj.cernansky@fri.uniza.sk

Martin Latka, Univerzity of Žilina, Žilina, Slovakia, martin.latka@fri.uniza.sk

Abstract

The main aim of the paper is highlight the possibility of identification of the main actors of innovation performance evaluation process and the definition of their responsibilities. Within the organization of innovation performance can operate multiple actors involved fulfilling their specific tasks. For further identification of the responsibility have been created matrixes of responsibilities for the different phases of the evaluation process. The identification of the main actors and the definition of their responsibilities can significantly contribute to improving the realization of innovation performance evaluation process in Slovak businesses.

Keywords: innovation performance, matrix of the responsibility, actor, management, innovation management

Introduction

In these days the effective management of innovation activities helps the company to fix its position on the market and also increase its competitiveness of the company. The most important is to create the appropriate conditions to managing innovation activities. This requires the identification of the current status of innovative resources usage. Therefore it is important to assess the innovation performance of the company. Innovation performance of the company is becoming an increasingly important factor in the competitiveness of companies. In the process of innovation performance evaluation is necessary to identify the main actors in this process and define their responsibilities.

The main purpose of this paper is to gain new knowledge in the field of innovation management with a focus on the identification of main actors in the process of innovation performance evaluation and definition of their responsibilities. There were used different methods by solving the defined problem, for example: content analysis - the study of documents, synthesis, comparative analysis, process analysis, statistical analysis, modelling, programming, empirical research methods and others.

The Current State of Dealing with the Issue

At present, in domestic and foreign literature may be encountered with the use of multiple definitions of innovation performance, which dominated the following characteristics propensity of a firm to actively support new ideas, annual growth rates of innovation input and output and important aspect of worker performance. From the wide spectrum of opinion marketing theorists and practitioners can be chosen the most accurate definition of innovation performance. Table 1 summarizes the definitions of the term innovation performance.

Based on the study of domestic and foreign literature can be said that the base of innovation performance most accurate rendered Birchall et al. (2004). Because according them the innovation performance includes provisions for assessing the effectiveness of the innovation activity in terms of business success. They point out that innovation performance measurement must go beyond mere after-the-fact measures

based on macro-level input/output indicators. It must address the right balance of soft and hard innovation parameters for effective short-term and long-term innovation decision making (Birchall et al. 2004).

Table 1: Definitions of innovation performance

Author(s)	Definition
Hung-Wen and Ching-Fang (2010)	Innovation performance is a measurement of the performance of an adopted new approach or a new measuring criterion to measure organizational performance.
Wang and Ahmed (2004)	Innovation performance is defined as the propensity of a firm to actively support new ideas, novelty, experimentation, and creative solution.
Gantumur and Stephan (2007)	Innovation performance is defined by the annual growth rates of innovation input and output, knowledge stock, and research productivity.
Birchall et al. (2004)	Innovation performance is tied to business success. Successful invention alone, then, is not innovation, innovation entails successful commercialisation of the invention.
Terstriep and Lüthje (2012)	Innovation performance is measured by the number of radical and incremental product/service innovations, improvements of existing products/services as well as process innovations introduced during the past three years.
Alshekaili and Boerhannoeddin (2011)	Innovation performance is often an important aspect of worker performance.

Ryan (2010) points out that the relationship between the definition of innovation and innovation performance is how fast, how well ideas are implemented and how much value is created. Anders Vang Helgesen (2009) defined central factors that influence the innovation performance of an organisation. These factors are strategy, structure, culture and the external environment.

Booz Allen Hamilton argues that all organisations have an intrinsic innovation performance curve which can be plotted easily by comparing the net present value of each project in their development pipelines and the required investments of those projects. Hence, this curve becomes very important as it predicts the future revenue, profit and growth of the innovation or in other words the innovation performance of the organisation (Hamilton 2004).

According to Neely and Hii (1998), the importance of measuring innovation performance is twofold. First, the information derived from measurement serves as feedback on a firm's current standing in innovativeness. Second, the gaps in performance trigger a systematic process of continuous improvement. Without performance measurement, the process of innovation will not be managed effectively and improvement will be sporadic (Neely, Hii 1998).

The whole process of self-assessment of innovation performance can be divided into three phases (Figure 1.): (Lendel 2014)

1. the preparatory phase,
2. the implementation phase,
3. the evaluation phase.

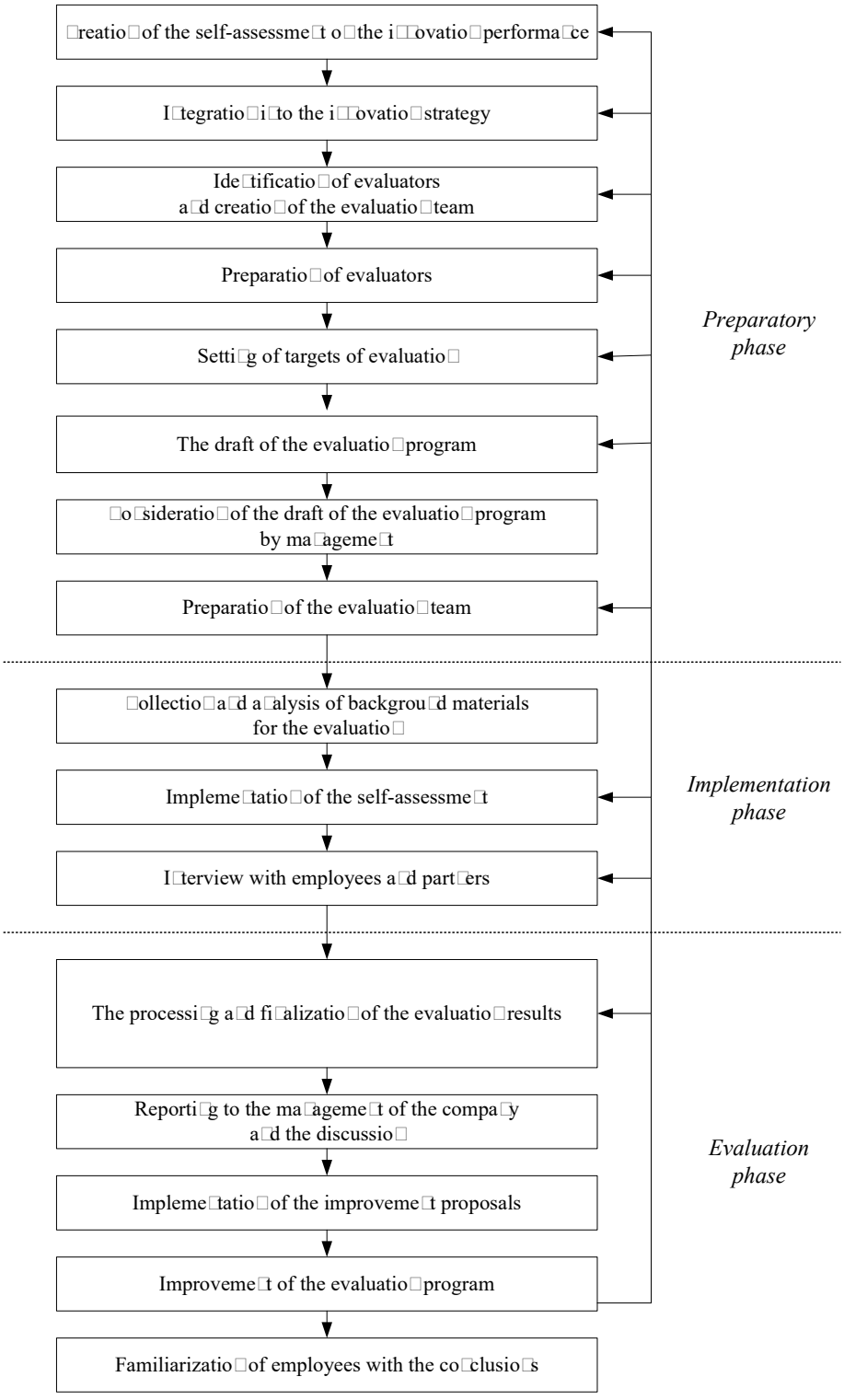


Fig. 1: Process of self-assessment of innovation performance (Lendel, 2014)

Identification of the Main Actors of the Innovation Process

Within the organizational structure of the company and the area of the innovation performance evaluation may be the responsibility allocated in the following ways: management, innovation department, finance department and a combination of several departments. Within the organizing of the evaluation process of innovation performance are involved several actors who are fulfilling their specific tasks, for example: the innovation team, the evaluation team and the innovation hub. These organizational units are involved in varying degrees to ensure the particular phases of the evaluation process of innovation performance.

Within the organization of the evaluation process of innovation performance, it can operate many actors who are fulfilling their specific tasks. For example, the following organizational units:

a) The evaluation team - a group of evaluators, whose task is to evaluate the level of the innovation performance achieved, according to established rules. The evaluation team is responsible for analysing and processing the results of the evaluation.

b) The innovative team - cooperates directly with the person responsible for the management of innovation process, trying to encourage the productive activity of individual organizational units. Its task is to fulfill the innovative tasks and activities in order to achieve innovation aims. The innovative team plays an important role in creating the innovative environment and conditions for the application of dynamic organizational structures in the company.

c) The innovation hub - consists of a group of experts who with their knowledge and experience guarantee the quality of the management of innovation processes. They help to solve difficult situations while searching for the optimal solution.

Definition of Responsibilities of the Main Actors

During the preparatory phase the innovation manager is responsible for the creation of self-assessment of innovation performance (Table 2.). Within this activity innovation manager cooperates with the innovation hub.

Table 2: The matrix of responsibilities - the first phase of the process of self-assessment of the innovation performance

Activity	Innovation manager	Innovation team	Evaluation team	Innovation hub	Employees
Creation of the self-assessment of the innovation performance	R	A		C	
Integration into the innovation strategy	R			A	
Identification of evaluators and creation of the evaluation team	R	C			A
Preparation of evaluators	A	R	A		A
Setting of targets of evaluation	R		C		
The draft of the evaluation program	R	A	S	C	
Consideration of the draft of the evaluation program by management	R	A			
Preparation of the evaluation team		R	C		A

Legend: R – responsibility, C – cooperation, A - attendance

Created system of self-assessment is necessary to integrate to the innovation strategy. Emphasis should be placed on the compilation of the evaluation team and the selection of evaluators. The innovation manager is responsible for all these activities. On the basis of predetermined characteristics are identified suitable employees for the position of evaluator. The next step is to proceed to their preparation, where their roles are established and their competencies are defined. Again, the responsible person is an innovative manager who has been cooperating with the evaluation team. After these preparatory activities it is possible to proceed to the creation of the draft of evaluation program under the responsibility of the innovation manager.

The innovation manager cooperates with the innovation hub. The draft of the evaluation program will be consulted with the management of the company, respectively with the responsible manager. After the approval of the program, the evaluation team starts preparing the evaluation through the detailed familiarizing with the evaluation program. For this activity is responsible the innovation team which is cooperates with the evaluation team.

The implementation phase is characteristic by the collection and analysis of background materials obtained from various information sources (Table 3.). Next step is the evaluation by individual evaluators within it is appropriate to conduct interviews with employees and partners of the company who know the innovation process and know how to show up weaknesses and also improvements. The evaluation team and the innovation team are responsible for these operations.

Table 3: The matrix of responsibilities - the second phase of the process of self-assessment of the innovation performance

Activity	Innovation manager	Innovation team	Evaluation team	Innovation hub	Employees
Collection and analysis of background materials for the evaluation		C	R		A
Implementation of the self-assessment	A	C	R		
Interview with employees and partners		C	R		A

Legend: R – responsibility, C – cooperation, A – attendance

The third phase focuses on the elaboration and finalization of the evaluation, which includes evaluating the effects of innovation and the draft of recommendations (Table 4.).

Table 4: The matrix of responsibilities - the third phase of the process of self-assessment of the innovation performance

Activity	Innovation manager	Innovation team	Evaluation team	Innovation hub	Employees
The processing and finalization of the evaluation results	A	C	R		
Reporting to the management of the company and the discussion	R	S	C		
Implementation of the improvement proposals	A	R	C		A
Improvement of the evaluation program	R	A	C		

Familiarization of employees with the conclusions	R	C			A

Legend: R – responsibility, C – cooperation, A – attendance

For this activity is responsible the evaluation team with the cooperation with the innovation team. An evaluation report is provided to the management of the company and starts the discussion about the potential differences. This activity runs within the competence of the innovation manager. After approval of the evaluation report it is possible to implement the improvements suggestions within the responsibility of innovation team. Based on discussions with the management of the company it is possible to set out arrangements to improve of the evaluation program and also the self-assessment. These activities are managed by the innovation manager, the evaluation team and the innovation team.

Conclusion

An important activity in the process of evaluation of innovation performance is the choice of evaluation indicators. In the selection of the evaluation indicators it is very important to consider the conditions of the company, status, respectively the phase of the innovation process and innovation competence. The choice of evaluation methodologies and indicators depends on the case and the purposes of the evaluation. However, as the main indicator of the success of company can be considered the level of achievement of the innovation objectives.

Acknowledgements

This paper was partially supported by the Slovak scientific grant VEGA 1/0363/14 Innovation management - processes, strategy and performance.

References

Alshekaili, S. A. R. and Boerhannoeddin, A. (2011). Human capital approach towards enhancing innovation performance in Omani industrial firms: The role of knowledge management. In: Progress in Business Innovation & Technology Management 1(3) pp. 23-33.

Birchall, D., Tovstiga, G., Morrison, A., Gaule, A. (2004). Innovation Performance Measurement, Henley-Incubator, London, UK: Grist.

Gantumur, T. and Stephan, A. (2007). Mergers & Acquisitions and Innovation Performance in the Telecommunications Equipment Industry. In: Industrial and Corporate Change 21(2), pp. 277-314.

Hamilton, B. A. (2004). The road towards More Effective Product/Service Development. [online] Penang Times Square. Available at: http://danangtimes.vn/Portals/0/Docs/710152949-The_Road_Towards_More_Effective_Product_Service_Development.pdf [Accessed 31 Sep. 2017].

Helgesen, A. V. (2009). Influence of the Stage Gate on Innovation Performance in Creative Organisations – an exploratory study. Copenhagen Business School. Master Thesis.

Hung-Wen, L. and Ching-Fang, Y. (2010). Effect of Relationship Style on Innovation Performance. African Journal of Business Management. 4(9), pp. 1703-1708.

Lendel, V., (2014). Management of innovation processes in company. Habilitation thesis, University of Zilina.

Lendel, V. and Varmus, M., (2014). Evaluation of the Innovative Business Performance. Procedia – Social and Behavioral Sciences, 129, pp. 504-511.

Neely, A. and Hii, J. (1998). Innovation and Business Performance: A Literature Review. [online] The Judge Institute of Management Studies, University of Cambridge. Available at: http://ecsocman.hse.ru/data/696/521/1221/litreview_innov1.pdf [Accessed 01 Feb. 2013].

Ryan, A. (2010). Innovation Performance. [online] Available at: http://www.managedinnovation.com/media/ uploadedFiles/ 1138769716171-9707.pdf [Accessed 01 Dec. 2016].

Terstriep, J. and Lüthje, Ch. (2012). Do Clusters as Open Innovation Systems Enhance Firms´ Innovation Performance? In: European Institute for Advanced Studies in Management: 19th International Product Development Management Conference: "Transformative Research in Product and Service Innovation". Manchester: The University of Manchester, Manchester Business School, p. 23.

Wang, C. L. and Ahmed, P. K. (2004). The development and validation of the organizational innovativeness construct using confirmatory factor analysis. European Journal of Innovation Management, 7, pp. 303-313

Muslim Consumers' Knowledge and Preference for the Islamic Banking Window or the Full-Fledged Islamic Bank

Sri Rahayu Hijrah Hati*
Management Department Faculty of Economics Universitas Indonesia-Depok, Indonesia
E-mail: sri.rahayu72@ui.ac.id

Umda Nafia Yasin
Islamic Business Undergraduate Program, Management Department Faculty of Economics Universitas Indonesia-Depok, Indonesia
E-mail: umdanafia@gmail.com

Abstract

This study aims to investigate the knowledge of and preference for Islamic banks among Muslim consumers, specifically the Islamic banking window and the full-fledged Islamic bank. Data were obtained from 1171 Muslim consumers. Data analysis was performed by descriptive analysis. The results indicate most Muslim consumers do not know the difference between the full-fledged Islamic bank and Islamic banking window however, the majority of Muslims consumers prefer the full-fledged Islamic bank to the Islamic windows as it is perceived to be more sharia-compliant.

Keywords: Knowledge, Preference, Full-fledged Islamic Bank, Islamic Bank Window, Islamic bank

Introduction

There is no standard definition of an Islamic bank in the world, but in general, an Islamic bank refers to the institution that mobilizes financial resources and invests those resources based on the Sharia principles and its practical application through the development of Islamic economics (Anon n.d.; Al Baraka 2017). The objectives of Islamic bank itself should be directed to the objectives of Islamic economics which is also guided by the objectives of Sharia which consists of five foundational goals to preserve a) religion/faith (din), b) life (nafs), c) lineage/progeny (nasl) d) intellect ('aql) and e) property/wealth (Mohammad & Shahwan 2013). Islamic banks shift the focus from lending into investment, shift the emphasis on the ability to repay to the soundness of the project, shift the dependence on borrowing for the mobilization of resources into the partners coordination in resource mobilization, and shift the application only of financial criteria into the moral criteria in investment (Al Baraka 2017).

Islamic banks now have a presence in more than 60 countries under 14 jurisdictions (International Monetary Fund 2017). Islamic Banking may present itself either in the form of a full-fledged Islamic bank or as Islamic Banking windows in the conventional banks (Lone & Rehman 2017). Thus, the Islamic banks face not only competition from other Islamic banks but also from the conventional bank which also offers Islamic financial products and services (Naser et al. 1999).

Since its inception in around the 1970s, Islamic banks have experienced a double-digit growth rate (Garbois et al. 2012). However, the Islamic bank is currently facing some challenges in term of slowing growth and eroding profitability (Garbois et al. 2012). The slowing growth in Islamic bank is evident in Indonesia. Since the inception of the first Islamic bank in 1992, the market share has never exceeded 5% until 2016. The Islamic bank Indonesia has experienced what so called a 5-percent- trap phenomenon (Karim Consulting 2016).

The slowing market growth in Islamic bank development which to some extent has reached stagnation raises a question whether Muslim consumers know their options to open an account. The current study aims to investigate the knowledge of Muslim consumers regarding the Islamic bank windows and a full-fledged Islamic bank. The study also examines the preferences of Muslim consumers towards these two options. The study may theoretically contribute to Muslim banking behaviour literature by providing empirical evidence on the consumer knowledge and preference in choosing an Islamic bank. In addition, the study provides knowledge to both the Islamic bank windows and full-fledged Islamic bank on the Muslim consumers' understanding of the availability of both channels.

Literature Review

Since the early development of Islamic bank in 1975, no bank offered an Islamic window. Later on, the conventional banks became interested in developing Islamic banking using the Islamic window due to the potential growth of the Islamic bank and finance (Al-awsat 2010). Although some countries like Malaysia categorize the Islamic bank into three types: a) windows b) subsidiary c) full-fledged, some others categorize into only two categories a) windows and b) full-fledged (Lone & Rehman 2017). The current study will use the later classification.

Islamic Bank Window

The Islamic bank window is the department of a conventional bank offering Islamic or Sharia compatible financial products and services. The Islamic bank window is valid only if it complies with the requirements set by the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) (Yaquby 2005) a) Complete segregation of funds b) Existence of a Sharia supervisory board (Sharia board) c) Management based fully on Islamic concepts d) Safeguarding of Muslim investors' funds against negligence, trespass and fraud e) Compliance with the Standards of the Accounting and Auditing Organization for Islamic Financial Institution.

The majority of jurisdictions of the Islamic bank does not allow the Islamic bank window or requires the conventional bank to separate different Islamic Bank units into their corporate structures (International Monetary Fund 2017). There are two main reasons why the Islamic bank should be separated from the conventional bank (International Monetary Fund 2017): a) to avoid mixing of funds that are raised separately from conventional bank and Islamic bank activities b) the risk of regulatory arbitrage due to the difference in regulatory issues between banks.

Despite the resistance towards the existence of Islamic bank windows, there are some advantages : the Islamic bank can take advantage of the well-established operations of the conventional bank so that it can deliver high quality services at a much lower cost b) Islamic bank windows drive healthy competition in the Islamic banking market, which may reduce the cost of Islamic bank products c) provides the option to develop Islamic banking in a country with low demand for Islamic bank services and enhance financial inclusion (International Monetary Fund 2017). An empirical study found that Islamic windows were more efficient compared to their full-fledged counterparts (Salami & Adeyemi 2015).

Full-Fledged Islamic Bank

The growing activities of the Islamic bank window may drive the conventional bank to establish an Islamic subsidiary or even fully convert into a full-fledged Islamic bank (Solé 2007). The advantage of the full-fledged Islamic bank over the Islamic bank window is that the full-fledged Islamic bank will be able to offer a wider range of Shariah-compliant products (Solé 2007). The full conversion of the Islamic bank window into full-fledged Islamic banks signals the conventional bank's firm commitment to the Shariah principles which also enhances its credibility (Solé 2007). Full-fledged Islamic Banks have more

opportunity to introduce new-to-market products, based on the approvals obtained from Shariah Committees. The full-fledged Islamic banks have been found to be more efficient than Islamic windows (Mokhtar et al. 2006; Mokhtar et al. 2008). These results are supported by another study which found that Islamic banks perform better in terms of cost (or profit), technical, allocative and scale of efficiency (Kamaruddin et al. 2008). Another study which examined the conversion of the Islamic bank windows into the full-fledged Islamic bank also found that the conversion is very effective in optimizing some source of funding such as capital injection and an increase temporary investment deposits (Siswantoro 2014).

Previous Study on Full-Fledged Vs Islamic Bank Window

Several studies had examined and compared both the full-fledged Islamic bank to Islamic bank window, but the majority of studies have compared those two entities based on the level of efficiency or productivity (Salami & Adeyemi 2015; Siswantoro 2014; Mokhtar et al. 2006; Mokhtar et al. 2008; Kamaruddin et al. 2008).

There is a dearth of research which examines and compares the Islamic banking window and full-fledged Islamic bank from the consumer's perspective. Although some studies use the consumers of both the Islamic banking window and full-fledged Islamic bank, the study does not specifically asses the knowledge and perception of the consumer regarding those two types of Islamic bank (Amin & Isa 2008). Some studies only examine one type of customer, either the Islamic bank window only (Shafii & Khafafa 2013) or the full-fledged customer only (Rehman & Masood 2012; Rustam et al. 2011).

Research Method

The descriptive research design was applied in this study. An online survey of 1171 Muslim conventional banking customers was conducted. The knowledge of the consumers regarding the Islamic bank windows and full-fledge was measured using closed-ended questioning with dichotomous answer (yes or no). The preference of the consumers was measured using open-ended questions. The open-ended question was coded by researchers. The descriptive analysis was conducted using SPSS software.

Analysis and Discussion

The profile of the respondents can be seen from the table 1. Based on the descriptive statistics, the majority of the respondent were young adults aged between 21 to 30 years and 31 to 40 years (n=1100; 93.93%). The majority of respondents were female (n=623; 53.30%), single (n=608; 51.78%), university bachelor graduates (n=658; 56.19%), work as a private employee (n=397; 33.90%) and have an income of around US$ 0-1499 per month (n=1129; 96.4%).

Table 1: Muslim Consumer Respondent Profile & Knowledge

Description			Frequency	Percentage
a.	Age	21-30	801	68.40
		31-40	299	25.53
		41-50	57	4.87
		50-59	11	0.93
		≥60	2	0.17
		Total	1171	100.00
b.	Gender	Male	548	46.79
		Female	623	53.20
		Total	1171	100
c.	Marital Status	Single	608	51.78
		Married	563	48.07
		Total	1171	100
d.	Education	≤ Senior high school	163	13.91
		Diploma	87	7.4
		Bachelor degree	658	56.19
		Master degree	247	21.09
		Doctoral degree	16	
		Total	1171	100
e.	Occupation	Private Employee	397	33.90
		Professional	238	20.32
		Government Employee	148	12.63
		Other	113	9.6
		Homemaker	135	11.52
		Entrepreneur	78	6.6
		Students	62	5.2
		Total	1171	100
f.	Income	US$ 0-1499	1129	96.4
		≥US$ 1500	42	3.57
		Total	1171	100
g	Awareness about the difference between Islamic bank windows and Full-Fledge Islamic Bank	Yes	287	24.50
		No	884	75.49
		Total	1171	100

To assess the knowledge of Muslim consumers, the researcher asked the consumer whether they know the difference between Islamic bank windows and a full-fledge Islamic bank. The result shows that only 24.50 percent of the respondents knew the difference. The study indicates that only a few Muslim conventional bank consumers know about what exactly the Islamic bank windows and full-fledge Islamic bank is.

To assess the perception of the Muslim consumers of the Islamic bank windows and full-fledge Islamic banks, the researcher questioned 287 respondents who had knowledge about both types of bank. The researchers asked their preference and the rational for their choice of a certain type of Islamic bank using an open-ended question. The respondents' perceptions can be seen from Table 2.

Table 2: Muslim Consumers Respondent Profile & Knowledge

Full-Fledge Islamic	Frequency	Percentage
More Sharia compliant, independent, pure, clear capital sources, more credible, reliable and secure	126	43,85
More variety of Sharia products	21	7,31
Larger scope	19	6,61
Better services and satisfaction	16	5,57
More facilities	10	3,48
Direct supervision from regulator	8	2,78
More complicated interbank process	4	1,39
Clearer regulations	4	1,39
Better technology	4	1,39
Total respondents who prefer Full Fledge Islamic Bank	**212**	**73,79**
Islamic bank window	**Frequency**	**Percentage**
More entrepreneurial friendly	35	12,32
More network (branches, ATM, etc)	24	8,35
Backed-up by a well-established bank	12	4,18
More transparent system	4	1,37
Total respondents who prefer Islamic Bank Window	**75**	**26.10**
Total		

Based on table 2, the majority of respondents who have knowledge about the difference between the full-fledged Islamic bank and Islamic bank windows prefer a full-fledged Islamic bank over the Islamic bank window (n=212; 73.97%). The three main reasons for this are the bank is more sharia-compliant due to its independence from the influence of the non-Islamic bank (n=126; 43.85), offers more variety of products (n=21; 7.31%) and is larger in scope (n=19; 6.61%).

The survey result also shows that only around 26.03 percent of respondents prefer to go to Islamic bank windows. The main three reasons for their choice are: more entrepreneur friendly (n=35; 12.32%), and has a wider network (branch and ATM) (n=24; 8.35%). The first reason on why the respondents prefer the Islamic bank window over the full-fledged Islamic bank is because they perceive that it is much more complicated to get a loan from the full-fledged Islamic bank compared to the Islamic bank window. Many respondents felt that the process to get a loan from the Islamic bank window is much friendlier to entrepreneurs.

Discussion and Implications

This study support a previous study conducted in Malaysia which showed that Islamic banks have not done enough to educate their customers (Ahmad & Haron 2002). The low number of consumers who have knowledge about the difference between the Islamic bank windows and the full-fledge Islamic banks indicates that it is very important for the Islamic banks to educate the Muslim consumers about the available format of Islamic banks that can serve their needs.

Previous studies had shown that full-fledged Islamic banks have several advantages in term of efficiency or product and services offerings (Mokhtar et al. 2006; Mokhtar et al. 2008). The current study gives more empirical evidence that the full-fledged Islamic bank offer a competitive advantage when it was assessed based on the bank performance indicator. The positive perception of the Muslim consumers on the full-fledged Islamic bank also implies that there may be an opportunity for the Islamic bank windows to be transformed into the full-fledged Islamic bank as the banks is perceived to be much more Sharia compliant, independent, gives better service and gives more satisfaction to the consumers. In addition to that, full-fledged banks may also learn from windows in terms of friendliness and accessibility of loans.

References

Ahmad, N. & Haron, S., 2002. Perceptions of Malaysian corporate customers towards Islamic banking products and services. *International Journal of Islamic Financial Services*, 3(4), pp.13–29. Available at: http://staf.uum.edu.my/alib/wb3053/perceptions.pdf.

Al-awsat, A., 2010. Islamic Windows or Islamic Banks. *Middle-east Arab News Opinion*. Available at: https://english.aawsat.com/theaawsat/business/islamic-windows-or-islamic-banks [Accessed October 15, 2017].

Amin, M. & Isa, Z., 2008. An examination of the relationship between service quality perception and customer satisfaction: A SEM approach towards Malaysian Islamic banking. *International Journal of Islamic and Middle Eastern Finance and Management*, 1(3), pp.191–209.

Anon, Islamic Banking. Available at: http://www.islamic-banking.com/what_is_ibanking.aspx.

Al Baraka, 2017. Principles of Islamic Banking. Available at: http://www.albaraka.com/default.asp?action=article&id=46 [Accessed October 15, 2017].

Garbois, C. et al., 2012. *The Future of Islamic Banking*, Available at: https://www.atkearney.com/documents/10192/654853/Future+of+Islamic+Banking.pdf/27167edf-a96d-4465-b88a-83beb25ed4bd [Accessed October 15, 2017].

International Monetary Fund, 2017. *Ensuring Financial Stability in Countries with Islamic Banking*, Available at: file:///C:/Users/User/Downloads/PP-Ensuring-Financial-Stability-in-Countries-with-Islamic-Banking.pdf.

Kamaruddin, B.H., Safa, M.S. & Mohd, R., 2008. Assessing production efficiency of Islamic banks and conventional bank Islamic windows in Malaysia. *International Journal of Business and Management Science*, 1(1), pp.31–48.

Karim Consulting, 2016. Embracing the Future of Islamic Banking. *Majalah Outlook Perbankan Syariah 2017*. Available at: http://karimconsulting.com/wp-content/uploads/2016/10/majalah_Outlook-perbankan-syariah-2017_uploadweb.pdf [Accessed July 1, 2017].

Lone, F.A. & Rehman, A.U., 2017. Journal of internet banking and commerce : JIBC. *The Journal of Internet Banking and Commerce*, 22(S7), pp.1–20. Available at: http://www.icommercecentral.com/open-access/customer-satisfaction-in-fullfledged-islamic-banks-and-islamic-banking-windows-a-comparative-study.php?aid=85532 [Accessed October 15, 2017].

Mohammad, M.O. & Shahwan, S., 2013. The Objective of Islamic Economic and Islamic Banking in Light of Maqasid Al-Shariah: A Critical Review. *Middle-East Journal of Scientific Research*, 13 (Resear, pp.75–84.

Mokhtar, H.S.A., Abdullah, N. & Al-Habshi, S.M., 2006. Efficiancy of Islamic Banking in Malaysia: A Stochastic Frontier Approach. *Journal of Economic Cooperation*, 27(2), pp.37–70.

Mokhtar, H.S.A., Abdullah, N. & Alhabshi, S.M., 2008. Efficiency and competition of Islamic banking in Malaysia. *Humanomics*, 24(1), pp.28–48. Available at: http://www.emeraldinsight.com/doi/10.1108/08288660810851450.

Naser, J.K. et al., 1999. Islamic banking: a study of customer satisfaction and preferences in Islamic banking. *International Journal of Bank Marketing*, 17(12), pp.135–151.

Rehman, A.A. & Masood, O., 2012. Why do customers patronize Islamic banks? A case study of Pakistan. *Qualitative Research in Financial Markets*, 4(2/3), pp.130–141.

Rustam, S. et al., 2011. Perceptions of Corporate Customers Towards Islamic Banking Products and Services in Pakistan. *The Romanian Economic Journal*, (41), pp.107–123.

Salami, O.L. & Adeyemi, A.A., 2015. Malaysian islamic banks' efficiency: An intra-bank comparative analysis of islamic windows and full-fledged subsidiaries. *International Journal of Business and Society*, 16(1), pp.19–38.

Shafii, Z. & Khafafa, A.J., 2013. Customer Satisfaction and Islamic Banking Awareness in the Islamic Banking Window System in Libya. *Middle-East Journal of Scientific Research*, 13, pp.12–17.

Siswantoro, D., 2014. Analysis of Islamic Bank's Performance and Strategy After Spin-off as Islamic Full-fledged Scheme in Indonesia. *Procedia - Social and Behavioral Sciences*, 164, pp.41–48. Available at: http://linkinghub.elsevier.com/retrieve/pii/S1877042814058686.

Solé, J., 2007. *Introducing Islamic Banks into Conventional Banking Systems*, Available at: https://www.imf.org/external/pubs/ft/wp/2007/wp07175.pdf [Accessed October 15, 2017].

Yaquby, N., 2005. Shariah Requirements for Conventional Banks. *Journal of Islamic Banking and Finance*, 22(2003).

THE ACTORS INVOLVED IN THE DEVELOPMENT OF RURAL TOURISM IN ROMANIA

Maria Cristina Paiu, PhD student, University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Marasti Blvd, District 1, Bucharest, Romania, maria.paiu@yahoo.com

* Corresponding Author: maria.paiu@yahoo.com

Abstract *The attempts to strengthen the economic development of rural areas are quite extensive, given the great tourist value, viewed from an economic, cultural, social and ecological point of view. It goes without saying that initiating such a potential and, moreover, preserving it requires specific action to support and monitor on a permanent basis. Even if the future general interest lies mainly in the managers' implications, actions and effort. The objectives of this paper relate to the actors involved and their contributions to rural development.*

Keywords: *Rural tourism, local economic development, tourists, local community, LAG, NRDP, LEADER program*

INTRODUCTION

Rural tourism, as an alternative to the development of rural areas, aims at rural economic development through investment in infrastructure and education, thus helping to increase employment and raise living standards in Romanian villages (*Nistoreanu, 1999*). The situation in which most of the Romanian rural area is now in need requires the involvement of local communities in preserving the small rural household, the traditional way of life in order to achieve a complex and sustainable development. (*Burghelea et al., 2016; Rusu, 2013*) The implementation of current rural development programs may lead to diversification of rural activities, to the creation of new jobs in rural areas through non-agricultural activities, but also to investments in infrastructure and related services (*Mac, et al., 1999; Iova, et al., 2016*).

The LEADER Program is an approach that provides new opportunities for rural development, setting the basis for identifying local needs, enhancing development capacity and implementing local development strategies for preserving rural and cultural heritage, developing the economic environment, and improving the organizational skills of local communities (*Pocol et al., 2017; Turek Rahoveanu 2013; Turek Rahoveanu 2012*).

RESULTS AND DISCUSSION

The Main Implications of Promoting Tourism in Rural Areas are:

- Stabilizing the population by setting up the labor force;
- Creating new jobs;
- Diversifying how to use the workforce;
- Pluriactivitate (a farmer can rent rooms, or can provide some tourist services - guide, animator, ski monitor);
- Promoting and developing services;
- Farmers' economic support (by selling household-specific products);
- Promoting and supporting the folk art and local craft industry;
- Rehabilitation of urban heritage (green spaces, beach arrangements, fishing, promenades, cyclotourism and equitation circuits);
- Improving the use of female labor;
- Attracting new investments.

Tourists

The tourist is considered as a true guest, a friend, and human contact (dialogue and the exchange of impressions) is paramount. The tourist must respond to this hospitality with respect and consideration for the rural community (*Botezatu A., 2014*).

Tourists must spend at least one night at a collective or private accommodation unit in the destination country and their stay may not exceed 12 months.

After the stay, two categories of visitors can be identified: excursionists (one-day visitors who do not spend the night in the place visited); tourists (that is, those visitors staying at least one night in the place visited).

Local Community

Local community are organized members of the local collectivity, their associations, local public administration institutions, and other public or private institutions in the field of education or health. It can be structured in at least six dimensions: technological (tools, capital), economic (gifts, troc), political, institutional (social - marriage,), aesthetic-value, concept of faith.

The interest of the local community through which to develop a strategy for the organization, development and promotion of rural tourism, agritourism, at local level, with the support of all the economic agents involved in this activity.

In the European Union countries (Germany, France, Belgium, Luxembourg, Italy) the creation of associations and bodies for the promotion of rural tourism and related services was encouraged. Thus, at the level of the European Union, the EUROTER network, which has as main objective the promotion of agro-tourism products in Europe, was created. Under the aegis of EUROTER, the EUROGITES Association (European Federation for Rural Tourism Accommodation in Citizens, Farm and the Village) was set up in September 1990, bringing together 22 national organizations from 14 European countries (including Romania), totalizing over 95,000 reception structures) in rural areas. Among the objectives of EUROGITES we enumerate the following: defining tourism offers in rural areas and setting uniform quality criteria in rural tourism in Europe; creating a data bank with information about each member organization; product coding rural tourism so that it is intelligible to the customer (by brand or logo) and in such a way that the customer can recognize the product at first glance; attracting new customers for rural tourism and discovering rural space through rural tourism.

In Romania, casual accommodation of occasional visitors to a rural settlement has been practiced for a long time, sporadically and unofficially.

ANTREC (National Rural, Ecological and Cultural Tourism Association of Romania) is a non-governmental, non-profit, non-profit organization, member of the EUROGITES Rural Tourism Federation (EUROGITES). The aim of ANTREC is: to identify and promote the rural tourism potential, to organize professional training courses for hosts, rural tourism agencies, seminars, short and long courses, between ANTREC and similar organizations in the country and abroad, to organize advertising campaigns for the classified and homologated units, which were included in the network, by mass media; to participate in important events, both internally (regional and national) and externally (fairs and tourism scholarships), with a diverse offer.

Together with Mirabilis Media, ANTREC has set up a national booking system for rural tourism, through which amateurs will be able to choose their desired board.

Local Action Groups

Local Action Groups is a public-private partnership in which the public shareholding has a 49% stake in decision-making and composition, and 51% is owned by the private party. The LAG played a key role in rural areas through the NRDP 2007-2013, contributing to the development of the area along the territory where these bodies were set up. In the new NRDP (National Rural Development Program), the importance of LAGs is much higher, in proportion to the almost double budget, which will reach almost 700 million euros by the end of the program.

LAGs are regulated by European regulations as local development structures, basically having as main objective the development of the areas where they are implemented. These entities are non-governmental organizations that specifically target the development of the area in which they are established. The operation of Local Action Groups is based on the active involvement of local actors

to identify the major development direction of the territorial area within the LAG, involving all the inhabitants of that area.

In the period 2007-2013, each Local Action Group had a project launching budget of 2,850,000 euros from which they launched funding lines. The public financial support that was previously available was about 370 million euros. In the current programming, 2014-2020, the figure has grown to about 650 million, which will be distributed through Local Action Groups on various types of projects.

Through the LAG, all measures in the 2014-2020 NRDP can be accessed.

The main objective of the LAG is the development of the respective area, in consultation with important local actors, the financing priorities of the territory are established. Each LAG adapts its own strategy to specific local conditions. Local Action Groups can create atypical measures. If a special need is identified at the local level that needs to be covered by funding but for which there is no measure included in the NRDP, the LAG may lay the foundations for an innovative, atypical measure that can be included in the Local Development Strategy and can finance, through this measure, a certain type of investment that cannot be financed directly through the NRDP.

European Fund for Agriculture and Rural Development

The eligible actions are listed in the national and regional programs "Rural development programs" developed by the Member States. Depending on their options, these RDPs can fund: training and skills acquisition (courses, workshops), demonstration activities and consultancy services to help farmers improve their performance; aid for business start-ups; elaboration and updating of development plans for municipalities and villages in rural areas; investments for public use in leisure infrastructure, tourist information and small tourist infrastructure; studies and investments related to the maintenance, restoration and modernization of the cultural and natural heritage of the villages .

LEADER Program

The LEADER program is based on:

Territorial approach (efficient use of local resources within a specific territorial area, deployment of integrated activities and creation of a common vision);

Partnership approach (building a public-private partnership interested in the development of the area, called the Local Action Group);

Bottom-up approach (active participation of the local population in planning, decision-making and implementation of strategies needed to develop the area);

An integrated and multisectoral approach to strategies based on partner interaction across all sectors of the local economy to plan and share rural issues with a special focus on innovation and experimentation (looking for new responses to existing rural development issues);

Implementing cooperation projects;

Interconnecting local partnerships.

Beneficiaries of the LEADER Program are Local Action Groups (LAGs) operating in a rural area with a population of between 10,000 and 100,000 inhabitants and a density of no more than 150 inhabitants per km2.

CONCLUSIONS

The tourists has a great influence on the development of the rural tourism sector.

The local community must develop a strategy for the organization, development and promotion of rural tourism, agritourism, at local level, with the support of all economic agents involved in this activity.

Local Action Groups are partnerships made up of different representatives of the socio-economic sector in that territory. They represent the interests of the inhabitants and the rural community - the engine of the LEADER Program. They develop an integrated local rural development strategy and are responsible for its implementation.

LEADER program responds to specific local needs; capitalize on local resources; mobilizes local actors, representatives of the rural population, to worry about and take control of the

development of rural areas by formulating strategies focused on the problems identified in their communities; offers rural areas the opportunity to collaborate with other territories for exchange and transfer of experience through networking; through its decentralized, integrated and bottom-up character is essential for balanced territorial development.

REFERENCES

[1]. Botezatu A. (2014), *Tourist Motivation for Rural Destinations*. Scientific Papers. Series "Management, Economic Engineering in Agriculture and rural development", Vol. 14 Issue 1, 49-52.

[2]. Burghelea C., Uzlău C., Ene C.M. (2016), *Comparative Indicators Of Sustainable Tourism*. Scientific Papers. Series "Management, Economic Engineering in Agriculture and rural development", Vol. 16 ISSUE 3, 77-80.

[3]. Iova A.R., Năstase M., Lascăr E. (2016), *Development of Rural Tourism and Agrotourism in Romania by Implementing European Programs*. Scientific Papers. Series "Management, Economic Engineering in Agriculture and rural development", Vol. 16 Issue 1, 233-238.

[4]. Mac I., Petrea Rodica, Petrea D. - *The Problems, Implications and Requirements of the Rural Tourism Development in Romania*, Terra-Revista Societatii de Geografie din Romania, Bucharest, no.1-2 / 1999

[5]. Nistoreanu P. (1999) *Rural tourism, small business with great prospects*, Didactic and Pedagogical Publishing House – Bucharest

[6]. Pocol C.B., Moldovan-Teselios C., Cavicchioli D., Cordea M.I. (2017), *Has The Leader Programme Been Effective In Promoting Local Rural Development? An Evaluation on Two Romanian Regions* in AgroLife Scientific Journal, Volume 6, Number 1, 201-211.

[7]. Rusu, M. (2013) - *Impact of agro-tourism on mountain peasant farms in the context of sustainable development*

[8]. Turek Rahoveanu A., Turek Rahoveanu Magdalena (2013), Socio-economic development prospects of rural areas in the context of application of LEADER Program in Romania, in Scientific Papers Series : „Management, Economic Engineering in Agriculture and Rural Development", Vol. 13; Issue 4, 295-302

[9]. Turek Rahoveanu A. (2012), "LEADER approach" - an opportunity for rural development, in Agrarian Economy and Rural Development (AERD'12), Vol. 3, 355-362

[10]. *** PNDR 2007-2013, MADR

[11]. *** MADR - Ex-post evaluation study of the national rural development program 2007-2013 - final version

[12]. *** PNDR 2014-2020, MADR

Determinants of Customers' Choice and Continuance Intentions with Mobile Data Service Provider: The Role of Past Experience

Dr. Obinna C. Ojiaku, Department of Marketing, Nnamdi Azikwe University, Awka, Nigeria: markosaren60@gmail.com

Professor *Aihie* Osarenkhoe*, Department of Business & Economic Studies, University of Gävle, SWEDEN. E-mail:* aoh@hig.se

Abstract

This study investigates the determinants of customers' brand choice and continuance intentions with mobile service providers in the context of Mobile Data Service (MDS). This study also captures the impact of past experience on behavioral outcomes. Data was collected from 304 customers of mobile data service firms and analyzed using regression analyses. Results indicate that mobile service quality, pricing structure and promotion, but not brand image affects brand choice whereas continuance intentions is affected by the mobile service quality, brand image and price. Customers' past experience relates significantly and negatively with brand choice but not continuance intention. The contribution and implication of the study is discussed.

Keywords: mobile data, continuance intention, service quality, technology adoption, brand choice

1. Introduction

Globally, the telecommunications industry has been undergoing major transformation in the last decade. This transformation is precipitated amongst others on mobile data explosion and the emergence of smart devices such as smart phones, tablets and pads (Ericsson Mobility Report, 2015; Latouhe, Oszabo, Creusat & Belmas, 2013). The growth in mobile data is faster in Africa than in any other region of the world (TVBEurope, 2014). Estimated to grow by 9.8 percent as against global rate of 6.3 percent, Africa's data traffic has risen from 808 million in 2013 to 851 million by the end of 2014 and projected to reach 1.23 billion by the end of 2019 (Ovum, 2014). Mobile data services refer to wireless access to digitalized contents via the internet on mobile devices (Kim & Han, 2009). Mobile data services are digital services ranging from communication (e.g., e-mail, instant messaging and social networking), information (web browsing, researching, location-based services), commerce (e.g., banking, mobile payments and shopping) to entertainment (videos, pictures, music, games) (Al-Debei & Al-Lozi, 2014; Lee, Shim & Lee, 2009). The pervasiveness of mobile data services is brought about by the shift of mobile phone use from voice to data services (Ahmed, 2009). Mobile data service is predicted to be the major source of revenue for mobile operators (Latouche et al., 2013) and has therefore attracted the attention of researchers and practitioners in recent times.

These developments have restructured and intensified the competitive landscape of mobile telecommunications industry. Mobile operators now compete with direct competitors and other content providers in the value chain (Latouche et al., 2013). Accordingly, mobile operators are realigning their strategies and investing massively in building technical infrastructure to achieve sustainable growth (Kim 2012; Boakye, 2014). Traditionally, mobile service portfolio consists of voice services, SMS, internet and personalized contents (Ahmed, 2009). However, the voice and text service market has reached its saturation in the face of endless price wars amongst mobile operators and high churn rate amongst subscribers (Al-Debei & Al-Lozi, 2014; Kim & Han, 2009). Moreover, revenue from mobile voice service has continued to decline despite high growth of mobile data subscription (EMR, 2015). Hence,

mobile operators are seeking ways to shore-up revenue by driving the uptake of smartphones and mobile data service subscription thereby mitigate falling voice revenue (EMR, 2015). The foregoing suggest the need for mobile service providers to understand consumer decision criteria in a dynamic mobile data environment for acquiring and retaining mobile data service users (Hau et al., 2012).

Previous studies in the context of mobile data service have examined the adoption and post adoption behaviour of consumers (Hong, Thong, Moon, & Tam, 2008; Kim & Han, 2009; Lee et al., 2009; Kim et al, 2007; Choi et al., 2005), customer satisfaction with mobile data service (Hau et al., 2012) and mobile data contribution to quality of life (Choi et al, 2007). Whereas, extant studies on customers' choice and behavioural outcomes in mobile telephony have been construed to be evaluated based on service quality, network size, price, brand image, customer services, value added services, promotion, perceive risk and satisfaction (Correa & Parente-Laverde, 2017; Alamro & Rowley, 2011; Srinuan et al., 2012; Khan & Rohn, 2013; Tripathi & Siddiqui, 2010).

Despite the plethora of studies in mobile telephony in general and mobile data services in particularly, a gap still exist in the mobile telephony literature on how mobile operators can sustains its long-term viability and profitability in the face of increasing market competition. The focus of this study is on the effect of mobile service quality, price (i.e., cost of data plan), promotions, and brand image on customers' choice and continuance intention with mobile data service provider. In addition, building on cognitive-dissonance reduction theory (Festinger, 1957), this study seeks to empirically investigate the effect of past experience on choice of service provider and continuance intention. Since mobile data service users are service consumers, it is natural they choose a service provider (Kim et al, 2007) with the intent to continue usage or switch. To the best of our knowledge, this is the first scholarly paper to empirically investigate the determinants of mobile data service provider selection and continuance intention.

Mobile data services are considered in most part as a value added service to voice and text services offering by mobile service provider, however, we conceptualize it as a unique offering worthy of investigating based on the following arguments. First, mobile services are characterized by high churn rate and since mobile numbers which are unique identifiers in voice and text services are less important in mobile data service, it is more susceptible to churn. Second, mobile data services require a unique set of technology such as 3G, 4G and WiFi networks, smart device and mobile contents which hitherto where not available on traditional mobile services requiring additional investment and the need to recoup such investment. Finally, though mobile service provider are generally examined on the same factors (e.g., service quality, price, value) irrespective of the service offered, they both satisfy distinct consumer needs (Gerpott, 2010). Therefore, it is plausible that the weight of each of these factors on mobile service provider selection we differ for voice and data services.

The rest of the paper is organised as follows: After literature review, the research model and hypotheses are presented. Thereafter are the research method and the results are presented. The findings and their implications for practice are discussed. Finally, the last section concludes the paper, identifies its limitations and suggests areas for further studies.

2. Literature Review

Following the decision to adopt a new service, customers are usually inundated with the choice of a service provider and the consequent intent to continue with the provider or switch. Determining these choice factors is a puzzle service providers are yet to decipher (Vallette-Florence, Guizani & Meruka, 2011). Customers' choice indicates the extent a designated service brand is favored and selected based on a bundle of attributes over competing brands. Continuance intention on the other hand, is the propensity to continue primary service subscription from the same organization rather than competing firms (Abbas & Hamdy, 2015). Prior studies show that brand choice criteria and behavioral influences in mobile

telephony focused on such attributes as service quality, price, value added services, customer services, complaint handling, brand image, promotion, satisfaction (Thiachon et al., 2016; Srinuan et al., 2012; Khan & Rohi, 2013, Alamro & Rowley, 2011; Olatokun and Nwonne, 2012; Tripathi & Siddiqui, 2010; Rahman et al., 2010). This study examines the attributes of mobile service quality, price, promotion, brand image and past experience on customer choice and continuance intention in the context of mobile data services.

2.1 Mobile service quality

The concept of service quality has been extensively studied in the literature. Typically, service quality is defined in relation to discrepancies between customers' expectation and performance of services (Dabholkar, Shepherd & Thorpe, 2000). However, in the context of mobile data service, the concept is yet to be empirically examined (Vlachos & Vrechopoulous, 2008). Following Groonros (1984), we conceptualize mobile service quality to be closely related to functional quality and technical quality. Technical quality refers to the quality of service output while functional quality refers to the interactions between customers and service provider (Bell, Auh & Smalley, 2005). In other words, mobile service quality is defined as consisting of network quality and functional quality.

Network quality refers to the download and uploads speed, system response time, coverage, reliability of network and network availability (Vlachos &Vrechopoulos, 2008). In mobile telephony for voice services, network quality refers to call quality, excellent coverage, voice clarity and absence of drop calls (Gerpott, Rams, Schindler, 2001; Thiachon et al., 2016). Network quality is one of the major parameters of evaluating service quality in mobile telephony (Thiachon et al., 2016) and been found to influence choice of service provider (Gralla, 2016), customer switching (Nokia, 2016) and overall service quality (Lai, Griffin & Babin, 2009; Kim & Yoon, 2004). In addition, network quality has been found to influence satisfaction in mobile voice services (Lin & Ding, 2004) and internet services (Gerpott et al., 2001). On the other hand, we define functional quality as the helpfulness and responsiveness of customer service representatives. Functional quality is achieved when customers' perceive interaction with contact staff as easy and efficient (Chae, Kim, Kim & Ryu, 2002). Accordingly, quality perception of a stable network and helpful and responsive interaction with contact staff should create a favorable assessment for mobile data service provider and therefore influence selection and continuance intention. Thus, we hypothesize the following:

Hypothesis 1*: Network quality will positively influence customers' choice and continuance intention with mobile data service provider.*

Hypothesis 2*: Functional quality will positively influence customers' choice and continuance intention with mobile data service provider.*

2.2 Price

Price refers to the amount of economic outlay buyers must give up to acquire a product or use a service (Lichtenstein, Ridway & Netemeyer, 1993). Price is critical in the telecommunication industry. In fact, it has been the basis of 'war' among players in acquiring and retaining customers. In the context of mobile data service, Price is an indicator of what consumers must pay to access data services, and this includes the initial cost of acquisition of smart device and mobile subscription and the ongoing cost such as data plans and/or bundles (Erevelles et al., 2003). In addition, payment methods, flexibility and variability in pricing options offered by mobile data service providers are all pricing options for consumers. Price is negatively associated with the probability of purchase (Lichtenstein et al., 1993) and has been empirically demonstrated to relate negatively with the intention to adopt mobile data service (Kim et al., 2007) and strongest predictor of mobile data service user behavior (Kim et al., 2009). However, price has been

found to be an important choice determinant for internet service provider (Erevelles et al., 2003) and the most important consideration for mobile service provider for voice and text services (Nokia, 2016) and a strong driver of customer satisfaction (Nielsen, 2014). Thus, we expect that the price consumer pays for mobile data services would affect service provider choice and continuance intention. Therefore we hypothesize the following:

H3: Price is negatively related to customers' brand selection and continuance intention with mobile data service provider.

2.3 Promotion

Promotions are marketing stimuli and tools designed to stimulate quicker and greater purchases for a limited period of time (Valette-Florence et al., 2011). Typically, sales promotions are temporal incentives targeted at encouraging product or service trial (Kotler & Amstrong, 2003; DelVecchio et al., 2005). With the avalanche of products and services available and the commoditization of services, marketers are constantly attempting to get consumers to notice and select their brands (Nagar, 2009; Dadzie & Boachie-Mensah, 2011). Promotion is used as a means of communicating with the consumers with respect to product offerings, thereby generating strong impact on consumption behavior (Rahman et al., 2010). In other words, promotion communicates a brand and provides a reason to buy (Nagar, 2009). The use of promotion as a competitive weapon in the context of mobile telephony is widespread and intense. Mobile operators attract customers to their data service offerings using incentives such as free megabytes, bonuses, free calls, and special bundles among others.

In the literature, promotion has been demonstrated to affect consumers' brand choice (Delvecchio et al, 2006). Particularly, consumers rely on promotion as decision heuristics when choosing between brands that are equally attractive (Valette-Florence et al., 2011). However, promotion adversely affects brand equity, brand image and encourage brand switching (Nagar, 2009; Buil, de Chernatony & Martinez, 2013). Moreover, Delvecchio et al (2006) demonstrate that promotion either increases or decreases brand preference. With regards to continued usage, scholarly discussions on the effect of promotion on continued usage is scarce. There is evidence to suggest that mobile service firms employ promotional incentives such as discounted mobile phones to lock-in customers into continued usage (Malhotra and Molhatra, 2013). However, it is yet to be empirically verified whether this incentives affect consumers brand choice and continuance intention in the context of mobile data services. Therefore, we hypothesize the following:

H4: Promotion will positively influence consumers' brand choice and continuance intention with mobile service provider.

2.4 Brand Image

Brand image pertains to consumers' perception of a product or service, regardless of how accurate the perception is and regardless of what the company wants them to be (Keller 2003; Alamro & Rowley, 2011). It refers to consumers' subjective perception of brand attributes and associations from which consumers derive symbolic value (Patterson 1999). According to Foxall and Goldsmith (1995) brand image is the mental picture a brand evokes in the mind of consumers' as a result of the brands previous performance, marketing stimuli and social stimuli (cited in Ballantyne et al., 2006). Consumers form brand image through exposure to advertising, promotions, observation of use situations and the kind of people who use the brand (Patterson, 1999).

Consumers ascribe meaning to brands across a range of criteria through accumulated purchase and consumption experience over time (Cretu & Brodie, 2007; Andreassen & Lindestad, 1998). Thus, brand

image is considered important in the overall evaluation of service and companies. With the proliferation service brands, consumers rely to a great extent on the brand image to differentiate between competing brands and make a purchase especially when service attributes are difficult to evaluate (Zhang 2015; Andreassen & Lindestad, 1998; Ballantyne et al, 2006). Generally, brand image generates value by simplifying information processing, differentiates a brand, provides a reason to buy and gives positive feelings (Aaker, 1991; Sondoh, Omar, Wahid, Ismail & Harm, 2007). Previous research demonstrates the impact of brand image on brand choice (Alamro & Rowley, 2011), customer retention (Andreassen & Lindestad, 1998). Perceive quality (Andreassen & Lindestad, 1998; Cretu & Brodie, 2007), and customer loyalty (Andreassen & Lindestad, 1998). In the context of mobile data services, mobile operators deploy marketing communications tools (e.g., advertising, PR, publicity) to create a favorable image as the mobile data network of choice in other to attract new and keep existing customers. Based on the foregoing arguments, we hypothesize the following:

H5: Brand image will relate positively with brand choice and continuance intention with mobile data service provider.

2.5 Past experience

Experience relates to the subjective mentality consumers form after consuming a product. According to Wang et al., 2012), experience takes two forms, experience with the focal service, and product-norm experience. Focal service experience refers to customer past experience using the service under investigation (i.e., mobile data services) and product-norm experiences: defined as customer experience using a range of mobile services (e.g., voice services, SMS) (Wang et al., 2012). Because consumers' brand experience is more diagnostic than external information source, consumers are more likely to rely heavily on their past experience when making a purchase (Bridges et al., 2006; Kopalle & Lehman, 2006).

Past experience adjust the amount and type of information consumers needs when making choices and influence the product-related cognitive development of an individual (Kwuh & Oh, 2006). Accordingly, past experience shapes intentions, affects preference and influence attitudes and behavior in a variety of ways (Taylor & Todd, 1995; Wang et al, 2012). Furthermore, the cognitive dissonance theory (Festinger, 1957), suggests that past experience with a brand influences the change that occurs in consumers perception of the brand such that the predictors of brand choice may not be the same as continued usage (Kim, Choi & Han, 2009). However, following dissonance reduction theory (Festinger, 1957), consumers tend to place a higher value on a previously chosen alternative and re-choose the same alternatives even when there are better alternatives due to inertia or brand familiarity (Kwuh & Oh, 2006).

In the literature, past experience is operationalize using the experienced/inexperienced or expert/novice dichotomy (Taylor & Todd, 1995; Kim et al., 2009) or proxy with satisfaction (Huang, 2006). In the context of mobile data services, Qi et al. (2009) argued that voice experience is a precondition for using mobile data service. However, we argue that mobile data use can be independent of voice services. Thus, we define past experience as consumers experience using voice and SMS services of mobile service provider. Due to the proliferation of multi-SIM, we expect mobile data service customers to have experienced and therefore sufficiently familiar with mobile service providers in the context of the study. Accordingly, we hypothesize that:

H6: Past experience will significantly influence brand choice and continuance intention with mobile data service provider.

3. Methodology

3.1 Sample

This study generally employed a survey design of a descriptive nature to collect data and empirically test the hypothesized relationship. Sample for this study was drawn from a population of students in a southeastern University in Nigeria. The use of students as respondents was informed for a number of reasons. First, students are young and active users of innovative technologies. Following Rogers (2003), early adopters of technology are young and educated, it is expected that uptake of mobile data services will be more prevalent among students. In addition, mobile data service consumption is larger among young adults (Kim & Han, 2009; Boakye, 2015). Students are more involved with mobile commuting, and they spend more time on internet communications than other consumers. Data was collected from a sample size of 320 respondents using self-administered questionnaire. The respondents were randomly selected from students in the University's main campus. For the pre-test, data was collected from a convenience sample of 60 respondents. The items were face-validated by senior academics in the Faculty of Management sciences.

3.2 Measures

Measures used in this study were mostly adapted from existing scales or constructed from themes in the literature. The wordings were modified to conform to the context of mobile data services. The questionnaire consists of five- items measuring mobile service quality adapted from (Bell, Auh & Smalley, 2005), six-items measuring price (i.e., cost of data plan) adapted from (Kugyte & Sliburyte, 2007) and developed items developed for this study. Promotion was measured using six items scale adapted from (Kugyte & Sliburyte, 2007) and themes from the literature while brand image was measured using three items adapted from (Kugyte & Sliburyte, 2007). In this study, past experience is operationalize as customers' knowledge and assessment of the service provider following experience with voice services. It was gauged using a three-item scale developed for this study and continuance intention measured using three items adapted from (Kim, 2010). All items were measured on a five-point Likert-type scale anchored between 1 (strongly disagree) to 5 (strongly agree). The questionnaire also sought data on mobile data service use and demographic information. The questions consist of closed-ended and open ended questions.

Results

Statistical analysis was computed based on 304 usable responses out of the 320 copies of questionnaire distributed generating a response rate of 95 per cent. Following Kwuh and Oh (2009), the proposed models were tested using multiple regressions. SPSS 15 statistical software was used to conduct the empirical analyses. Of the 304 questionnaires, 57.9 per cent of the responses were from male respondents, while 42.1 per cent were from females. The majority were between 20 to 35 years (84.5 percent). Most of the respondents use MTN (68.4 per cent) as their primary mobile data service provider and about 30 per cent of the respondents use different service providers for voice and data services. Table 1 shows the demographic profile of the respondents in the final sample.

Table 1: Respondents Profile

		Frequency	Percent
Gender	Female	176	57.9
	Male	128	42.1
Age	<20 years	37	13.3
	20 - 35 years	235	84.5
	>35 years	6	2.2
Primary mobile data service provider	MTN	208	68.4
	Globacom	13	4.3
	Airtel	55	18.1
	Etisalat	28	9.2
Same data provider as voice service	No	89	29.8
	Yes	210	70.2
Total		304	100

Factor analysis with varimax rotation was performed for the purpose of data reduction and subsequent use in regression analyses. In addition, reliability analysis was performed using Cronbach alpha at a benchmark of >.070 (Nunnally & Bernstein, 1993). The items converge into 6 factors. The first factor, *promotion* consist of 5 items, the third factor *price* consist of 5 items after dropping one item. The three brand image items converge into the second factor label *brand image*. The fourth (*functional quality*) and fifth factors (*network quality*) were related to mobile service quality items consisting of 2 and 3 items respectively. The Cronbach's alpha values for each measure range from 0.66 to 0.83, indicating that the measures were internally reliable in most cases (see Table 2).

Table 2: Factor Analysis and Reliability Result

Measurement Items	Promotion	Brand image	Price	Functional Quality	Technical Quality	Past experience	Cronbach alpha (α)
Competitive promotions	0.84						
Sufficient data bonus for subscription	0.83						
Effectively communicating promotions	0.80						
Flexible subscription platform	0.79						
Price discounts on data rates	0.68						0.79
Favorable brand image		0.89					
Good brand image		0.81					
Familiar brand		0.70					0.79
Flexibility of data plans			0.92				
Variability of data plans			0.84				

Best data plans to meet my needs			0.82				
Transparent data plans			0.71				
Reasonable data plans			0.50				0.67
Easy means of contacting customer care				0.74			
Helpful customer service				0.65			0.83
Network speed (upload/download speed)					0.85		
Availability of network connection					0.82		
Reliability of connection					0.79		0.79
With my experience in voice services, I prefer my same provider						0.80	
With my voice service experience, I prefer another provider						0.75	
My voice service experience is satisfactory						0.68	0.713
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.							
a. Rotation converged in 16 iterations.							

The hypotheses were tested using regression analysis. The regression analysis was conducted to examine the effect of the predictor variables promotion, brand image, price, mobile service quality and past experience on the outcome variable brand selection and continuance usage in series.

In the first model, we tested the effect of the predictor variables on brand choice. Table 2 shows the results of the regression model on brand choice and continuance. The model had a moderately good fit ($F = 7.12$) and explained *12%* change in brand choice. The coefficients for network quality, functional quality, price, promotion and past experience were all significant. Functional quality made strongest ($\beta = 0.27$ $p < 0.001$) and brand image ($\beta = 0.06$, $p = 0.924$) made the weakest prediction on brand choice. However, the effect of brand image was positive but not significant. The results suggest that Hypotheses 1a, 2a, 3a, 4a and 6a are supported. But hypothesis 5a is not supported.

In model 2, we tested the effect of the predictor variables on continuance intention with mobile service provider. The coefficients for functional quality and network quality (i.e, mobile service quality), brand image and price were significant. As expected, network quality ($\beta = 0.33$, $p < 0.001$) made strongest impact on continuance intention and past experience ($\beta = -0.19$, $p = .714$) made the weakest impact on continuance intention. The results support hypotheses 1b, 2b, 3b and 5b respectively. But did not find support for hypotheses 4b and 6b. Overall, the model is a good fit and explained about 42% of the variance. Table 3 shows the regression model.

Table 3: Regression Model for Brand Choice and continuance Intention

		B	Std. Error	β	t	VIF[a]
Model 1	Brand Choice[b]	2.079	.432		4.814	
	Brand Image	.006	.059	.006	.095	1.219
	Functional quality	.253	.066	.273***	3.813	1.737
	Network quality	-.189	.068	-.159*	-2.779	1.107

	Past Experience	-.143	.058	-.158*	-2.473	1.379
	Pricing	-.231	.070	-.221**	-3.282	1.536
	Promotion	.204	.066	.180**	3.101	1.144
		N = 304	*R^2 = .126*	*F = 7.12*		
Model 2	Continuance Intention[b]	-.117	.342		-.343	
	Brand Image	.257	.051	.256***	4.992	1.344
	Functional quality	.208	.048	.220***	4.313	1.338
	Network quality	.400	.058	.329***	6.941	1.150
	Past Experience	-.017	.048	-.019	-.366	1.369
	Price	.201	.054	.189***	3.718	1.324
	Promotion	-.040	.055	-.034	-.725	1.143
		N = 304	*R^2 = .420*	*F = 35.87*		

*** P < 0.001, **p < 0.005, *p < 0.05
[a] Variance inflation factor
[b] Dependent variables

4. Discussions and Implications

Based on mobile service provider selection model (Alamro & Rowley, 2011; Kugyte & Sliburyte, 2007) and cognitive dissonance theory (Festinger, 1957), this study investigates the determinants of customers' choice and continuance intention with mobile data service provider by incorporating the impact of past experience with voice and SMS services on the choice and continuance intentions with mobile data service provider.

An important finding of this study is that the factors that attract a customer to a mobile service provider are significantly difference from what keeps customers with that provider. For instance, while customers past experience significantly influenced choice of a mobile service provider; its impact was not significant on continuance intention. The insignificant effect of past experience was not unexpected. It suggests that customers rely on past experience in selecting a brand but their continued usage of the brand may not be influence by such past experience. This result is in line with the cognitive dissonance theory. This finding supports Qi et al (2009) study, where voice experience was found to influence behavioral intentions. In addition, we found that about thirty per cent of the respondents use different providers for data and voice service, confirming that data service usage could be independent of voice services. While the greater majority of customers that uses the same provider for mobile data services and voice services is in line with the cognitive dissonance reduction theory. The implication of these findings for managers suggest that mobile service providers may cross sell mobile data service to customers following their past voice experience. In addition, they can emphasize on the (dis)satisfactory voice experiences in their strategy to attract or retain customers.

The findings also show that brand image significantly impact on continuance intentions. This finding confirms previous studies by Alamro and Rowley (2011) but contradicts Andreassen & Lindested (1998). Conversely, its effect on brand choice was not significant confirming previous studies in mobile voice services (Gerpott, 2010). A possible explanation is that notwithstanding the distinct need mobile data service and voice service satisfy mobile data services are mostly value-added services. In other words, consumers have formed mental pictures of the service brands based on voice service experiences. This result implies that managers need to manage brand image in order to retain existing customers. However, emphasizing brand image as a strategy for customer acquisition in the context of mobile data services

may not be effective. Howbeit, an unfavourable brand image may prevent customers from choosing a brand.

Promotion significantly affects brand choice. Promotions, such as free megabytes, price discounts, and data bonus affect customers' choice of a mobile data service provider. This confirms previous studies by Alvarez & Casielles (2005) but contradict findings of Olatokun and Nwonne (2012). However, the effect of promotion on continuance intention was insignificant. To the best of our knowledge, this is the first study that investigates the relationship between promotions on continuance intention. In a related study, Omotayo (2011) found a significant relationship between promotion and customer loyalty. It is plausible that the use of promotional incentives to retain customers is a hygiene factor since competitors match promotional spending; Thus, "leaving promotion across firms to be largely the same thereby leading to stationary or zero order behavior" (Bass et al., 1984 p. 284 cited in Nagar, 2009). There is evidence to suggest that the use promotion to lock-in customers into continued usage has been met with customer "grudge-holding" behaviour (Malhotra & Malhotra, 2013). On the other hand, customers are likely to churn if competitors brand are perceived as more attractive. This finding has implications for managerial actions. It suggests that mobile service operators may aggressive offer promotional incentives to attract customers. However, managers should apply caution in attempting to use promotion in retaining customers; at best, managers should match competitive actions to avoid customer switching.

The significant effect of mobile service quality on brand choice and continuance intention confirms earlier studies by Malhotra & Malhotra (2013), Andreassen & Lindested (1998). Mobile service quality was also found to be the strongest predictor for mobile data service provider brand choice and continuance intention. Specifically, functional quality was found to be the strongest predictor for brand choice. This finding suggests that as consumers adopt mobile data services, it is important they access help in resizing SIM cards, installing mobile applications and accessing information on data bundles and pricing plan. On the other hand, the continued usage of mobile data services with a service provider is most importantly predicted by network quality. In other words, once customers chooses a provider for mobile data services, the network speed – including upload and download speed, reliability of connection and network availability becomes key considerations for continued usage. If customers' expectations with respect to network quality are not met, they are likely to become dissatisfied quickly and switch immediately (Nokia, 2016). For managers, this finding suggests that they understand the importance of customer service including self-help services in customer acquisition. For example, managers can provide mobile data pricing information as soon customers activates a new SIM and suggest mobile applications following customers' subscription data. In addition, investing and deploying infrastructure to improve network quality is an important strategic consideration for customer acquisition and retention.

Finally, price shows significant impact on brand choice and continuance intention. The relationship between price and brand choice was negative, suggesting that as price increases, consumers are less likely to choose a brand. This corroborates earlier findings by Ahmed & Alamro, (2011) and Al-Debei & Al-Lozi (2014). In addition, the relationship between price and continuance intention was found to be positive and significant suggesting that customers' intend to continue usage of mobile data service irrespective of price changes. It is quite possible that customers associate price increase to quality of services. The implication of this finding for managers is that they understand that customers are price sensitive when adopting mobile data services as such offering monetary incentives may be a potent competitive tool in attracting customers and preventing them from switching to more attractive alternatives.

5. Conclusions

This study contributes to scholarly discussion on mobile data service adoption and post adoption behavior. A brand choice-continuance intention model was developed considering past voice experience. The study demonstrates that all the factors (i.e., mobile service quality, price, promotion and past experience) except brand image affects brand choice. In addition, continuance intention decision criteria

include mobile service quality, brand image and price respectively. Functional quality and network quality predicts brand choice and continuance intention decisions respectively the most. Consumers' voice service experience impacts on the adoption decision of mobile data services. Therefore, as mobile data service evolves, an understanding of the determinants of customers' brand choice and continued usage has strategic implication for customer acquisition and retention in mobile telecommunication industry. Despite the significance of this research, there are a number of limitations to the study. First, as with most studies with student samples, care should be taken in generalizing the findings since students may not be adequate representatives of mobile data service users. Also, students may control limited resources to make brand choice. Future studies should include non student samples. Second, the factors examined may not be exhaustive of all the decision criteria use in mobile service provider selection. Future studies may examine the effect of satisfaction; value added services and inertia on behavior outcomes. Finally, the direct effect of past experience was investigated; future studies may examine its indirect or moderating effect with behavioral outcomes using more robust statistical techniques such as structural equation modeling.

References

Aaker, D. (1991). Managing Brand Equity: Capitalizing on the Value of Brand Name, The Free Press, New York.

Abbas, H.A., & Hamdy, H.I. (2015). Determinants of continuance intention factor in Kuwait communication market: Case study of Zain-Kuwait. Computers in Human Behavior, 49, 648-657.

Alamro, A., & Rowley, J. (2011). Antecedents of brand preference for mobile telecommunications services, *Journal of Product & Brand Management*, 20(6), 475-486.

Al-Debei, M.M. & Al-Lozi, E (2014). Explaining and predicting the adoption intention of mobile data services: A value-based approach, *Computers in Human Behavior*, 35, 326–338.

Alvarez, A.B., & Casiellees, R.V. (2005). Consumer evaluations of sales promotion: the effect on brand choice, *European Journal of Marketing*, 39(1/2)54-70.

Andreassen, W., & Lindestad, B. (1998). Customer loyalty and complex services: The impact of corporate image on quality, customer satisfaction and loyalty for customers with varying degrees of service expertise, *International Journal of Service Industry Management*, 9(1), 7 – 23.

Ballantyne, R., Warren, A., & Nobbs, K (2006). The evolution of brand choice, *Brand Management*, 13(4/5), 339-352

Boakye, K.G. (2015). Factors influencing mobile data service (MDS) continuance intention: An empirical study, *Computers in Human Behavior*, 50, 125–131.

Bridges, E., Briesch, R.A & Yin, C.K (B). (2006). Effects of prior brand usage and promotion on consumer promotional response, *Journal of Retailing,* 82(4), 295-307.

Buil, I., de Chernatony, L., & Martinez, E. (2013). Examining the role of advertising and sales promotions in brand equity creation, Journal *of Business Research*, 66, 115-122.

Chae, M., Kim,J., Kim, H., & Ryu, H. (2002). Information Quality for Mobile Internet Services: A Theoretical Model with Empirical Validation. *Electronic Markets,* 12(1), 38-46.

Choi, M. S., Choi , H., Kim, Y.C. & Kim, J. (2005). An Empirical Study on Post-adoption Behavior of mobile data Service with a focus on Comparison between services, *Korean Marketing Review,* 20(1), 1-27.

Correa, S. & Parente-Laverde, A.M. (2017), Consumer Ethnocentrism, Country Image and Local Brand Preference: The Case of the Colombian Textile, Apparel and Leather Industry

Global Business Review, 18(5), 1111-1123

Cretu, A.E., & Brodie, R.J. (2007). The influence of brand image and company reputation where manufacturers market to small firms: A customer value perspective, *Industrial Marketing Management*, 36, 230-240.

Dabholkar, P.A., Shepherd, C.D. & Thorpe, D.I. (2000). A conceptual framework for service quality: An investigation of critical conceptual measurement issues through a longitudinal study, *Journal of Retailing*, 7(2), 193-218.

Dadzie, A., & Boachie-Mensah, F. (2011). Brand preference for mobille phone operator services in the Cape Coast Metropolis, *International Journal of Business Management*, 6(11), 190-205.

Delvecchio, D., Henard, D., & Freling, T.H. (2006). The effect of sales promotion on post-promotion brand preference: A meta-analysis. *Journal of Retailing*, 82(3), 203-216.

Erevelles, S., Srinivasan, S., and Rangel, S. (2003). Consumer Satisfaction for Internet Service Providers: An Analysis of Underlying processes, *Information Technology and Management,* 4(1), 69-89.

Ericsson Mobility Report (2015). Mobile Business trends. Available at www.ericsson.com

Festinger, L. (1957). A Theory of Cognitive Dissonance. Stanford, CA: Stanford University Press.

Gerpott, T.J. (2010). Impact of mobile internet use intensity on the demand for SMS and voice services of mobile network operators: An empirical multi-method study of German mobile internet customers. *Telecommunication policy,* 34, 430-443.

Gerpott, T.J., Rams, W. & Schindler, A. (2001). Customer retention, loyalty, and satisfaction in the German mobile cellular telecommunications market, *Telecommunications Policy*, 25, 249-269.

Gralla, P. (2016). The votes are in: which mobile data provider is the best? Computerworld mobile data survey. Available at www.computerworld.com.

Hau, Y.S., Kim, G., & Kim, B. (2012). Antecedents of user satisfaction in the context of mobile data services: the moderating role of variety and rate of usage, *Int. J. Mobile Communications, 10 (6), 617-636.*

Hong, S-J., Thong, J.Y.L., Moon, J-Y., & Tam, K-Y. (2008). Understanding the behavior of mobile data service consumers, *Information System Frontier*, 10, 431-445.

Huang, S.S., (2006). The effects of motivation, past experience, perceived constraint and attitude on tourist revisit intention, Ph.D dissertation, Hong Kong Polytechnic University, Hong Kong.

Informa (2011). Managing mobile data services: The new business model. White paper. Informa telecoms & media. Available at www.informatm.com.

Keller, K.L. (2003), Strategic Brand Management: Building, Measuring, and Managing Brand Equity, 2nd ed., Pearson, Upper Saddle River, NJ.

Khan, S. & Rohi, S. (2013). Investigating the factors affecting youth brand choice for mobile phones purchase- A study of private University Students of Peshawar, *Management & marketing Challenges for Knowledge Society*, 8(2), 369-384.

Kim, B. (2010). An empirical investigation of mobile data service continuance: incorporating the theory of planned behavior into the expectation–confirmation model, *Expert Systems with Applications*, 37 (10), 7033–7039.

Kim, B. (2012). The diffusion of mobile data services and applications: Exploring the role of habit and its antecedents, *Telecommunications Policy*, 36, 69–81

Kim, H.,& Yoon, C. (2004). Determinants of subscriber churn and customer loyalty in the Korean mobile telephony market, *Telecommunications Policy*, 28 (9), 751-765.

Kim, H.W., Chan, H.C., & Chan, Y.P. (2007). A balanced thinking feelings model of information systems continuance, *International Journal of Human Computer Studies,* 65(6), 511–525.

Kim, K., Choi, M., & Han, I. (2009). User behaviors toward mobile data services: The role of perceived fee and prior experience, *Expert Systems with Applications,* 36, 8528–8536.

Kim, K., & Han, I. (2009). What drives the adoption of mobile data services? An approach from a value perspective *Journal of Information Technology*, 24, 35–45.

Kopalle, P.K., & Lehmann, D.R. (2006). Setting Quality Expectations When Entering a Market: What Should the Promise Be?, *Marketing Science*, 25 (1), 8–24.

Kotler, P. & Armstrong, G. (2003). Principles of Marketing, 11th ed., U.S.A, Prentice Hall International, Inc

Kugyte, R. & Sliburyte, L. (2007). A cross-national investigation of service provider selection criteria in the Lithuanian and Nordic mobile telecommunications sectors, *EsicMarket*, 128, 27-44.

Kwuh, D. J-W., & Oh, H. (2006). Past experience and self-image in fine dining intentions. *Journal of Foodservice Business Research*, 9(4), 3-23.

Lai, F. Griffin, M. & Babin, B. J. (2009). How quality, value, image, and satisfaction create loyalty at a Chinese telecom. *Journal of Business Research,* 62, 980–986.

Latouche, M.,. Reuschen, C., Oszabo, O., Creusat, J.B., & Belman, W. (2013). Mobile data explosion: How mobile data service providers can monetize the growth in mobile data through value added services, White paper, Cisco Internet Business Solution Group.

Lichtenstein, D. R., Ridgway, N. M., & Netemeyer, R. G. (1993). Price perceptions and consumer shopping behavior: A field study, *Journal of Marketing Research*, 30(2), 234–245.

Lin, C-P., & Ding, C.G. (2005). Opening the black box: Assessing the mediating mechanism of relationship quality and the moderating effects of prior experience in ISP services, *International Journal of Service Industry Management*, 16(1), 55-80. DOI: 10.1108/09564230510587159.s

Malhotra, A., & Malhotra, C.K. (2013). Exploring switching behavior of US mobile service customers. *Journal of Services Marketing*, 27(1), 13-24. DOI: 10.1108/08876041311296347

Nagar, K. (2009). Evaluating the effect of consumer sales promotions on brand loyal and brand switching segments. *The Journal of Business Perspective*, 13(4), 35-48.

Nielsen (2014). Connecting with the consumer: The importance of integrating marketing promise with service delivery. Available at www.nielsen.com

Nokia (2016). 2016 Acquisition and Retention Study Global Summary Report. Available at www.nokia.com/AandR-studywww.nokia.com

Nunnally, J. C., & Bernstein, I. (1994). Psychometric theory (3rd ed.). New York: McGraw-Hill./A

Omotayo, O. (2011). Sales promotion and customer loyalty: A study of Nigerian telecommunication industry. *Journal of Competitiveness,* 4(3), 66-77.

Ovum (2014). Telecoms, media & entertainment outlook 2015. Available at www.ovum.com

Ozer, A., Argan, T.M., & Argan, M. (2013). The effect of mobile service quality dimensions on customer satisfaction, *Procedia - Social and Behavioral Sciences,* 99, 428 – 438.

Patterson, M. (1999). Re-appraising the concept of brand image. *The Journal of Brand Management*, 6(6), 409-426

Qi, J., Li, L., Li1, Y., & Shu, H., (2009). An Extension of Technology Acceptance Model: Analysis of the Adoption of Mobile Data Services in China, *Systems Research and Behavioral Science*, 26, 391-407.

Rahman, S., Haque, A., & Ahmad, M.I.S. (2010). Exploring influencing factors for the selection of mobile phone service providers: A structural equational modeling (SEM) approach on Malaysian consumers. *African Journal of Business Management*, 4(13), 2885-2898.

Rogers, E.M. (2003), Diffusion of Innovations, 5th ed., The Free Press, New York, NY.

Sondoh, S.L., Omar, M.W., Wahid, N. A., Ismail, I & Harun, A. (2007), The effect of brand image on overall satisfaction and loyalty intention in the context of color cosmetic, *Asian Academy of Management Journal,* 12(1), 83-107.

Srinuan, P., Bohlin, E., & Madden, G. (2012). The determinants of mobile subscriber retention in Sweden, *Applied Economics Letters*, 19 (5), 453-457.

Taylor, S., & Todd, P. A. (1995). Assessing IT usage: The role of prior experience, *MIS Quarterly*, 19(4), 561–570.

Tripathi, S.N. & Siddiqui, M.H. (2010). An empirical investigation of customer preferences in mobile services, *Journal of Targeting, Measurement and Analysis for Marketing*, 18, 49-63.

TVBEurope (December, 2014). Mobile data services on the rise in Africa. Retrieved from www.tvbeurope.com

Valette-Florence, P., Guizani, H., & Merunka, D. (2011). The impact of brand personality on sales promotions on brand equity, *Journal of Business Research*, 64, 24-28.

Vlachos, A., and Vrechopoulos, P. (2008). Determinants of behavioral intentions in the mobile internet services market, *Journal of Services Marketing*, 22, (40), 280-291.

Wang, C., Harris, J., & Patterson, P.G. (2012). Customer choice of self-service technology: The roles of situational influences and past experience, *Journal of Service Management*, (23) 1, 54-78.

Zhang, Y. (2015). The impact of brand image on consumer behavior: A literature review. Open Journal of Business Management, 3, 58-62.

Self-Evaluated Teaching Skills for Students In the Technical Domain: A Hands-On Approach From the Teacher Certification Program

George Florian Macarie, University of Medicine and Pharmacy CAROL DAVILA Bucharest, Department of Medical Psychology, Romania, Email: george.macarie@mail.com

Ana Voichița Tebeanu, University POLITEHNICA of Bucharest, Department for Teacher Training, Bucharest, Romania, Email: voichita.tebeanu@upb.ro

Maria Magdalena Roșu, University POLITEHNICA of Bucharest, Manufacturing Department, Bucharest, Romania, Email: magdalena.rosu@upb.ro

Abstract

It is often stated that teacher training program for students largely consider the scientific needs, but to a lesser extent the pedagogical and managerial skills, Iucu R., Codorean G. (2010). On the other hand, Shenton and Fitzgibbons (2010) consider that "learning abilities can be more effective if we take into account the behaviors, motivations and preferences of those in training".
The present study aims to assess students' perceptions of the skills and support needed to conduct the teaching practice classes during their instructional program in their domain of study (here, the technical one).
A sample of 63 students from the University POLITEHNICA of Bucharest (Romania), enrolled in the Teacher Certification Program, answered to a questionnaire regarding their perceived abilities to perform as a teacher.
The results show that 50.8% of respondents expect a number of difficulties during the practice, either emotional, relational, related to knowledge or organizational issues (time management, etc). Students would seek advice or support primarly at their College Methodist Professor/Practice coordinator (74.6%), followed by the High School Methodist Professor (54%), while only 25.4% of them would consider the advice of colleagues who completed the teaching practice.
As conditions for a successful teaching, the students evaluate as equally important the specialized knowledge, the training abilities, the relationship with the students or their own motivation.
We believe that taking into account the previous knowledge and experience from practice (a feed-forward model), students will have the opportunity to better focus and coordinate their educational efforts.

Keywords: teaching skills, undergraduate students, technical domain, teacher certification program

Introduction

Education and especially the modality to ensure it has been a subject of controversy from the early forms of establishment of a mass education system. One of the issues always prevailing concerns the training of future teachers, as well as how to ensure the coherence and effectiveness of an appropriate training.

Teacher education is in a difficult position, because the teacher preparation is considered irrelevant for the reality of everyday practice, there have been studies showing phenomena named “reality shock” - graduated of teacher education program encountering difficulties during their first period in profession, and finally, new concepts about teaching and learning are developing, F. Korthagen F et al. (2006).

There also has been stated and discussed a poor transfer from theory to practice and a feed-forward problem (in order to learn new theoretical info the student has to have personal concerns about teaching or to encounter concrete problems in his everyday experience, which is not possible until the real practice occurs), Korthagen F. and Kessels J., (1998).

Within the University POLITEHNICA of Bucharest students have the opportunity to attend, during their undergraduate studies, courses embedded in a psycho-pedagogical training module in order to certify competences for the teaching profession. This module is offered by the Department of Training for Teaching Profession and Social Sciences (in short, the Department for Teaching Training). The initial training for the teaching profession includes a number of disciplines aimed at acquiring the necessary skills for an eventual student option in the educational field. These disciplines include the pedagogical practice/tutorship, conducted in the third year of study, both semesters. The pedagogical practice allows real-time testing of accumulated knowledge and skills.

An important aspect of training are transversal (or transferable) skills, defined as "a combination of knowledge, skills and attitudes appropriate to each context", being "especially necessary for personal fulfillment and development, for social inclusion, active citizenship and employment workforce "(Europa.EU 2011), being promoted by many universities and training programs in the world (Tilea M.et al, 2015). Of interest for us are the competences required by the reality of pedagogical practice and what are the real experiences of the students who are following the initial training.

The difficulties frequently encountered by students in pedagogical practice in high schools with technological and scientific profile are related to the fact that the initial didactic training corresponds to a great extent to their needs in terms of scientific content and, to a lesser extent, to their didactic and managerial skills (Iucu R., Codorean G., 2010). Thus, the emphasis in the first two years of the psycho-pedagogical module is placed rather on the development of professional competencies and less on the transversal ones (didactic communication, relationship with the student group and with the teaching staff, debates, exercises of 'role-play' type and functions of leadership of professional groups or institutions, etc.).

The strategy based on the development of transversal competences has emerged as a reaction to a purely theoretical training (Iucu R., Codorean G., 2010). Studies already completed and also the opinions expressed in the academic environment support the idea that among the causes that affect the quality of initial didactic training are the inefficient practice, followed by low students' motivation and interest, excessive theorization and lack of didactic competencies (Iucu R., Codorean G., 2010).

The importance of conducting pedagogical practice for students - future teachers, as a first step for the development of transversal competences, is emphasized in the current Romanian context by numerous specialized studies, practice booklets and "how-to" guides edited by most of the departments for teaching training of the country's universities, research and grants carried out on the subject of mentoring; programs for the continuous training and professional conversion of teachers in undergraduate education, and so on.
If we start from the premise that the initial didactic training can be improved by adapting the pedagogical practice, the potential impact of this project is given by increasing the efficiency in forming the abilities to obtain, process and use the information. This triad of abilities can also be useful in the student's profile, who knows what to look for (a place for carry on the pedagogical or specialty practice easier to choose and find), how to present it, and how to manage difficult situations and time. Last but not least, awareness of personal interests and competences has the potential to clarify and direct their interests and motivation to a particular professional field.

The present research is aiming to assess students' perceptions on the skills required before and after the pedagogic practice, as well as to identify effective ways of addressing support (from mentors or peers).

Methods

A sample of 63 students from the University POLITEHNICA of Bucharest (Romania), enrolled in the Teachers Certification Program was randomly chosen to participate. The study class where they were assigned served as primary selection unit, and students in 5 of 60+ classes (a 1/12 step) were asked to

participate on a volunteer basis. They answered to a short questionnaire before their instructional practice (82.3% acceptance rate).

The inventory included both open questions and rating scales regarding the needed abilities to perform as a teacher, their relevance, expected difficulties and availability of support.

In order to select a number of relevant items for the freshmen entering the practice, we conducted a prospective study. We collected information from students who graduated the practical module of the Teachers Certification Program. A convenience sample of 56 o graduated students from the practical module answered to open-ended questions on the following topics: competences required in pedagogical practice, the nature of the problems encountered, issues that could be improved and recommendations for future students in practice.

Results and Discussion

a) Perceived abilities: undergraduate vs. graduated

The frequency analysis of the open-ended questions counted in the first place the references on their competences, perceived as needed into instructional practice. As needed competences for the instructional practice, the students identified a number of themes, later assigned to the general categories assumed in the literature – subject knowledge, the training abilities (pedagogical skills), the relationship with the students. In addition, there were mentioned a series of abilities non-associated to the three before-mentioned categories, labeled as additional resources (own motivation etc.).

For informative purposes, we contrasted the specifications emitted in our study sample of students preparing for the instructional practice with the answers on the same topic mentioned by the graduated students during the developmental phase of the inventory.

In table 1, we present the average number of specifications per respondent relative to the total amount of specifications issued in that group.

Table 1: The average number of specifications per respondent on each topic, relative to the total number issued in that group

Abilities perceived as needed in teaching		**Average number of specifications per respondent**	
		Undergraduate (N=63)	Graduated (N = 56)
Subject knowledge & additional			
	Subject knowledge	1.1	1.4
	Use of text/presentation editors	-	.2
	Use of a foreign language	-	.1
Pedagogical skills			
	Pedagogical knowledge: designing, conducting and evaluating didactic activity	.6	.4
	Being efficient and organized	1.1	1.8
	Flexibility / ability to cope with new situations	.5	1.8
	Patience, calm	3.2	.4
	Explanations at their level of Understanding	2.5	2.3

Interpersonal skills			
	Sociability/ to know how to establish a Dialogue with students	1.2	0,8
	Team work	-	0.2
	Positive attitude	.6	.5
Other resources			
	Motivation and enthusiasm	4.2	.8
	Seriousness	-	.4
	Honesty	-	.3
Total number of specifications		*15*	*11.2*

A few commentaries are needed:

- students entering practice tend to mention, on average, a higher number of abilities as needed in the direct-teaching classes, while students who completed the practice seem more focused (15 vs 11.2);

- graduated students have more referrals to subject knowledge, indicating other related data (use of editors, a foreign language etc.);
- the number of pedagogical abilities mentioned as necessary is almost identical (7.8 vs. 8), but their structure differs substantially: students after practice are considering more often the time organization and flexibility, while those before practice are thinking about patience and lowering the emotional level.

b. Anticipation of difficulties during practice

On a dichotomous question (Yes/No), 50.8% (N=32) of students responded they expect a number of difficulties during their teaching hours in the practical instruction module.

Furthermore, the students were invited to explain/ to give arguments for their choice. Students expecting problems mentioned emotional concerns, the novelty of the experiences, and the accommodation with their regular schedule at the faculty or personal ones. On the other hand, a considerable number of answers from those not anticipating difficulties showed a problem-solving orientation relative to these issues mentioned earlier and additionally identified sources of support (for details, see Table 3).

Table 2: Comparing most common reasons among students expressing vs not expressing concerns

Themes	**Specifications**	
	Students not expecting difficulties (N=31)	Students anticipating difficulties (N=32)
Lesson preparation & planning	"I prepare well before the lesson" "I know what to do" " I structure my ideas and draw up a lesson plan"	
Organizing daily schedule	"I have my way of organizing myself"	"The teaching classes and the faculty schedule may overlap"
Ability to	"I trust my ability to organize,	"yes, [I may encounter

deal with the task		explain things" "I am extremely determined and confident in my own powers" "difficulties can be overcomes"		difficulties] because there are new experiences" "I think it will be 'messing up' in the class because there are chances that the students will not listen to me"
Communication		"because I know to communicate" "because I'm communicative"		"because it's hard to make a public speech " "[may be] barriers to communication "
Motivation and personal characteristics		"I'm getting involved" "I have an interest in the result" "It favors me the small age difference"		
Emotional implications		"emotions are always constructive"		"the emotions of this experience for the first time can be problematic" "it will not work well because of emotions"
Support available from teachers/mentor		"I hope that the teacher will explain and help us if we need them, so that we will not be in trouble" "the teachers have taught us well, but the tips are helpful" "coordinating teachers have explained to us what we need to do"		

As seen in the Table 2, students assigned into the two groups have qualitatively a different argumentation for their choice. We will discuss the most common sources of contrast in their discourse.

For the respondents not expecting difficulties, lessons are planned ahead, and he/she is prepared: knowledgeable and in control of the lesson. They are more inclined to trust their abilities to organize the time, both in teaching or the daily schedule. They evaluate the emotional implicationss as being constructive and identify own characteristics as advantages (age, personal motivation). Support from teacher/ or practice coordinator is identified and mentioned in a continuous perspective, being present in past and in the future.

For the respondents who expect difficulties, we can find mentions about the difficulties to reconcile the daily tasks, as the faculty schedule is expected to overlap. Contrary to the previous group, own competencies are seen merely as source of difficulties and the potential support from teacher is not identified.

c) Relevance of the main abilities and resources for teaching

Next, we wanted to assess the importance of the general competencies involved in teaching. We asked respondents to evaluate each of these skills on a scale of 1 to 5 (where 1 – less important, 5 - very important) and the role of own motivation. The results obtained show close average scores (see Table 3).

Table 3: Types of abilities and resources rated as relevant for a successful teaching

Types of abilities		M ± SE
Subject knowledge		4.51± .078
Pedagogical skills		4.70 ± .078
Social skills		4.68 ± .066
Own interest or motivation		4.62 ± .094
*significant at p<0.05		

Furthermore, using T-test for independent samples, we compared the ratings of the subjects expecting versus those not anticipating difficulties. Calculations shows there are not significant differences in ratings for the two groups regarding the importance accorded to the 3 types of competencies (knowledge, pedagogical and social). Still, their own motivation and interest as resource is rated as more relevant in the group who does not expect difficulties.

Also, comparing the specifications issued through the open question indicates a high similarity of the abilities mentioned as needed (over 80%). Although it seems surprising, we can assume the answers are influenced by the theoretical knowledge previously learned during the module.

d) Availability of support

Students would seek for advice or support primarily to their College Methodist Professor/Practice coordinator (74.6 %,) followed by the High School Methodist Professor (54%), while only 25.4% to the colleagues who completed the teaching practice, Table 4.

Table 4: Support availability

Providers of support	N	%
College Methodist Professor /Practice coordinator	47	74.6
High School Methodist Professor	34	54
Graduated peers	16	25.4
Others	4	6.3

Considering this data, we may notice that support from peer is largely neglected, while it may provide an accessible and up-to-date source of providing support for the beginners.

Conclusions

We have found an interesting indication of the differences on perceptions between students at the debut of their practice and those who completed the instructional practice, but also among those who anticipated difficulties in pedagogical practice, and those who do not.

In the first case, students who have completed the practice seem to be more focused on certain abilities or problems (e.g., time management during teaching), making them a viable source of information or advice for those who are at the very start. On the other hand, they are not yet identified as a resource by their undergraduate colleagues, which leave room for designing effective ways to connect them.

In the second case, students who anticipate difficulties during their practice seem to have a specific kind of reasoning, more focused on potential problems and less on handy solutions. As a consequence, knowing these differences on reasoning can give us insights into their particular needs.

This direction of analysis and subsequent implementation of desired and requested changes is thought to be a first part of a multi-step approach based on a feedback and feed-forward model. We may hope that this will have the potential to streamline and improve the quality of pedagogical practice, starting from the students' point of view.

Acknowledgment

This paper has been funded by University POLITEHNICA of Bucharest, through the internal "GEX" program for researchers, 2017-2018. The research project name is "Assessment and development of competences in initial training for the teaching profession through feedback and feedforward mechanisms" / "Evaluarea și dezvoltarea competențelor în formarea inițială pentru profesia didactică prin mecanisme de feedback și feedforward", with identification code SU-58-17-02.

References

Borgogni L., Petitta L., Barbaranelli C. (2004), "TOM - Testul de Orientare Motivațională", traduced by Pitariu H., Vercellino D., Iliescu D., O.S.România, 2009

Iucu R., Codorean G. (2010), "Calitatea formării didactice inițiale în viziunea formatorilor", The third International Conference on Adults Education Preparing the Workforce for the Information Society, ISSN 2068-5106, Alexandru Ioan Cuza University, Iasi, Romania, 25-29, April 2010, pg. 447 – 459, Editor in Chief: prof. dr. Şoitu L.

Europa EU (2011), „Competenţe cheie pentru învăţarea pe tot parcursul vieţii", http://eur-lex.europa.eu/legal-content/RO/TXT/?uri=URISERV%3Ac11090, accessed at 20th September 2017.

Korthagen, F., Kessels, J., (1998), "Linking Theory and Practice: Changing the Pedagogy of Teacher Education", Perspectives on Racial Diversity and Higher Education, Educational Researcher, vol. 28, no.4, pg. 4-17, Princeton University Press.

Korthagen, F., Loughran J., Russel, T., (2006) "Developing fundamental principles for teacher education programs and practices", Teaching and Teacher Education 22, pg. 1020-2041, Elsevier.

Shenton, A. K., Fitzgibbons, M. (2010), "Making information literacy relevant," Library Review, vol. 59, no.3, pp. 165-174. http://www.emeraldinsight.com/doi/pdfplus/10.1108/00242531011031151, accessed at 23th September 2017.

Tilea M, Duță O.A, Johannsson J.F., Murphy P. (2015), "Noi instrumente pentru integrarea competenţelor transversale în didactica modernă, Ghid de bune practice", Published in framework of project New Tools for the Integration of Transversal Skills in Modern Teaching Practice (TRANSMOD), http://proiecte.ucv.ro/transmod/outputs.html, accessed at 21th September 2017.

The ALA/ACRL/STS Task Force on Information Literacy for Science and Technology, Information Literacy Standards for Science and Engineering/Technology, Accessed at 21th September 2017.

Public Policy of the Social Science and Humanities Education in the Model of Sustainable Development

Marianna Kudina, Professor, Lomonosov Moscow State University, Moscow, Russia,

E-mail: Kudina@spa.msu.ru

Abstract

This study explains the role of Public policy of the social science and humanities education as an endogenous institution of the knowledge economy aimed at creating National HC in the Model of Sustainable Development[1].

The most important drivers of economic growth are those make that growth sustainable: moderate inflation, a stable financial system and a countercyclical policy. The aim of a countercyclical policy is not to avoid cyclicality, but smoothing, i.e. a decrease in the magnitude of fluctuations through macroeconomic regulation in order to increase sustainability and overcome the economic crises via instruments of fiscal and monetary policy. All these factors are carried out by the elite or representatives of the creative part of HC.

The knowledge economy is an integral element of the sustainable development model not only of the national economy, but of the global innovative society. The main elements of the knowledge economy are fundamental science, the production of knowledge and high technologies, information society and knowledge society, high-quality education, innovative business, technology transfer infrastructure, state institutions that implement a high quality of life, high-quality HC.

The accumulation of knowledge is the source of human capital formation and covers the whole process of human development, including the social sciences and the humanities education.
The main methodological principles of the development of state policy in the field of social and humanitarian education are analysis and synthesis, forecasting and modeling.

Keywords: sustainable growth, knowledge economy, public policy of the social science and humanities education, national human capital

Introduction

The development of a model of sustainable development in a postindustrial society becomes most important in connection with the growing instability of social systems, the turbulent state of world markets, including financial markets, resource markets and labor markets. Scientists note that, focusing on the role of knowledge in modern social production, economics has not yet paid sufficient attention to the sources of knowledge generation, namely, to people creating knowledge and being their carriers.

The adopted economic designs and models are not suitable for the development of an adequate public policy in the field of education without considering the innovative model of the knowledge economy. It is necessary to develop a public policy of the social and humanities education as the main institute of the knowledge economy for increasing sustainability and overcoming the economic crises and building a model of national human capital as the main driver and goal of sustainable development.

Modern requirements for the social sciences and the humanities education are growing due to the increasing complexity of social and communicative processes, the aggravation of international competition, the active development of advanced technologies, the diversity and complexity of problems that are significant for society in the long run.

Literature Review

Previous studies of the transformation of the processes of scientific cognition belong to such authors as Kuhn (1977, 2012), Davies (2015) and others. We rely on a detailed analysis of the theory of scientific revolutions, which is contained in the work of Christodoulakis (2015). The research of Hutchison (1978) Stehr (1992) and Hugging (1977,2007) on changing the nature of knowledge and competition for them in the process of formation of new social relations, about which Kiely (1995) and Jackson (2009) and others have been continued in our study. Also in this work, we develop Karpenko's ideas (2009) of cognomics and research of Oaksford, Chater, Stenning (2010) and Peoples (2012) on the formation of a knowledge economy. We develop the idea of the knowledge economy as the highest stage of the innovation economy, which was described by Agabekov (2011) and Antonets (2010), and the need to develop a new innovation policy, Grinberg (2008). We also substantiate the idea of the role of human capital, based on the work of Christian (2010) in sustainable development, showing the importance of education in this process, which was described by Shamakhov (2016), based on an analysis of the works of Voznesenskaya, Dymarskaya and Cherednichenko (2006). In our opinion, the ideas of synergetics in cognitive management of Rzaeva, Guseinova and Safarova (2012) can be useful for further creating of Public policy of the Social Science and Humanities Education in the Model of Sustainable Development.

Human capital in the Model of sustainable economic growth

By sustainable economic growth, we mean the positive dynamics of macroeconomic indicators without significant fluctuations over a long-term period while preserving the environment.

The main drivers of economic growth are: growth of labor productivity, STP, a renewal of the capital as a basis for expanded reproduction and resource-saving technologies as a basis for preserving the environment. The most important are those make this growth sustainable: moderate inflation, a stable financial system and countercyclical policy. All these factors are carried out by the elite or representatives of the creative part of the HC.

Obviously, the first group of factors we can combine under a common name - investments in human capital. The second group as a whole can be combined under the name of macroeconomic regulation or governance. However, in the second group we cannot do without the development of human capital.
The most important investments will be those aimed at the development of human capital, since the management of any economic system, and the development of new technologies, and the production of new products are carried out by people. Thus, human capital becomes an endogenous factor of economic growth.

The knowledge economy as the core of sustainable development

We can define an innovative economy as a modern economy in which national innovative system is effectively built, an innovative infrastructure is developed that ensures the commercialization of ideas and the effective transfer of technology from science to manufacturing. In this case, we can consider the knowledge economy as the highest stage of development of the postindustrial (innovative) economy, in which knowledge and human capital become the main factors of development and economic growth.

Knowledge is the result of human cognitive activity, and the accumulation of knowledge is transformed into human capital. Scientists note that, focusing on the role of knowledge in modern social production, economics has not yet paid sufficient attention to the sources of knowledge generation, namely to people creating knowledge and being their carriers. Obviously, the accumulation of knowledge covers the whole process of human development, including its social sciences and the humanities education.

Public policy of the social sciences and the humanities education as an institution of the knowledge economy

The main directions of the formation of the model of the knowledge economy and public policy in this sphere are the formation of innovative-oriented personnel capable of working in innovative organizations and the creation of a favorable environment for science and research. The second direction is implemented via the improvement of institutions, as well as the creation and improvement of innovation infrastructure.

Modern requirements for the social sciences and the humanities education are growing due to the increasing complexity of social and communicative processes, the aggravation of international competition, the active development of advanced technologies, the diversity and complexity of problems that are significant for society in the long run.

Obviously, it is possible to achieve these qualitative characteristics, first of all, by improving the quality and responsibility of social science and the humanities education. The analysis of international processes in the sphere of education revealed that a new culture of learning is responsible for the modern requirements of the development of society, which is based on the application of the conceptual approach to education and the methods of teaching, ensuring their interaction with the social sphere and the needs of the labor market.

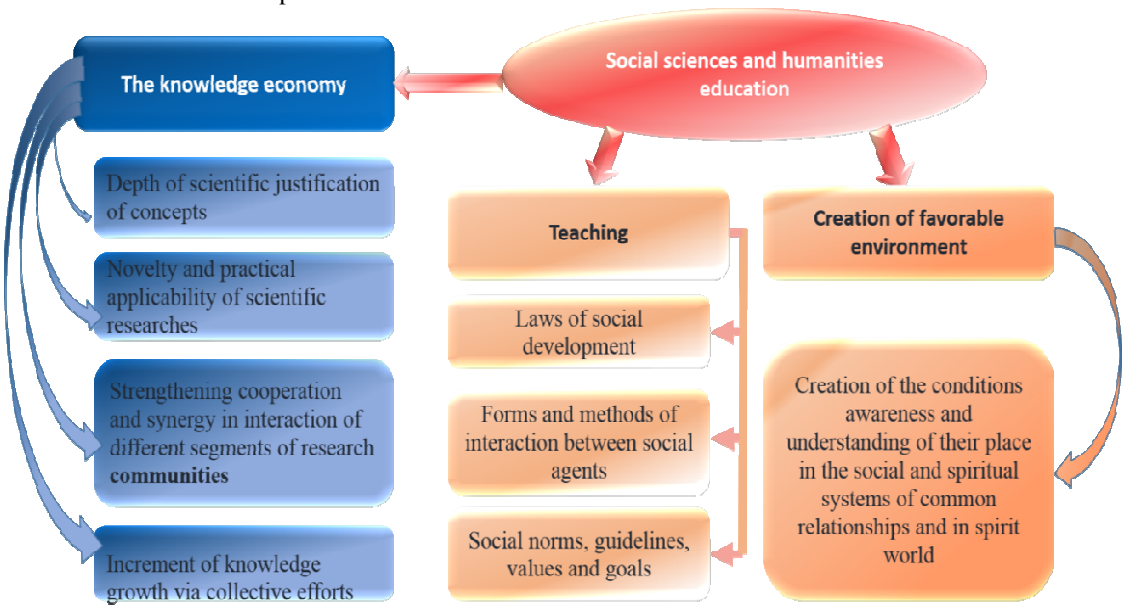


Fig. 1: The social sciences and humanities education in the knowledge economy (*created by author*)

Public policy of the social sciences and the humanities education direct to creation of national creative (innovative) class which includes:

1. The creative part of the labor force is the core of the accumulated national HC
2. The high-skilled part of the labor force.

The main feature is creativity as a set of constructive abilities and qualities of a talented professionally trained specialist and experts. It includes the following qualities, abilities and skills: culture and related to work and entrepreneurship ethics, readiness to adopt, create and develop new ideas, innovations, the ability to find optimal solutions in difficult situations, the ability to solve problems of accelerating the development of a subject or object, having systemic strategic thinking.

National Human Capital in the Model of Sustainable Economic Development

Practically all specialists distinguish the following source of HC: science, education, culture and art, information support, healthcare. Today, the expanded interpretation implies new sources: knowledge, education, training of the elite, the influx of HC from abroad, institutional services, entrepreneurship, civil society, security. These sources form a new interpretation of the quality of HC. Values play a special role today.

So, public policy in the sphere of the social sciences and humanity education aimed at the formation of modern national HC, which can be represented as follows: elite and leading specialists, accumulated knowledge, quality of life, social capital, intellectual capital, investment in education and healthcare as a share in NDP, innovation capital.

Undoubtedly, the NDP share of these components in different countries is different. But it is important to note that the presence of all these elements is a necessary condition for improving the quality of HC as the main driver and the goal of sustainable economic development.

Conclusion

Modern requirements for social and humanitarian education are increasing due to the complication of social and communicative processes, the aggravation of international competition, the active development of advanced technologies, the diversity and complexity of problems that are significant for society in the long run.

State policy in the field of education should be based on: the priority of universal human values, life and health of a person, free development of the individual; education of citizenship, diligence, respect for human rights and freedoms, love for the environment, homeland, family; democratic, state-public nature of education management. Only in this case it will contribute to improving the quality of national human capital and building an economy for sustainable development.

Endnotes

[1] The study was developed within the scientific research carried out with the financial support of the RFBR grant No. 17-02-00059 "The Russian model of the knowledge economy and the system of professional training of personnel: the organizational and economic foundations of innovative transformations".

References

Agabekov S. (2011) Innovations in Russia. System-institutional analysis. Moscow, Russia. In Russian.

Antonets V. (2010) Innovative business. Formation of models for the commercialization of promising developments. Moscow, Russia. In Russian

Atley T., McFarlane B., Maurice Dobb (2001) Historical Materialism, and Economic Thought//Medema S.G., Samuels W.J. (eds.) Historians of Economics and Economic Thought6 The Construction of Disciplinary Memory. N.Y.: Routledge

Christian M.S. Human Capital Accounting in the United States, 1994-2006 (2010)/*Survey of Current Business*. June

Christodoulakis N. (2015) How Crises Shaped Economics Ideas and Policies: Wiser After the Events? Heidelberg, N.Y.: Springer.15-37

Davies P. (2015) Taking Science on Faith//Yagelski R.P., (ed.)/Writing Ten Core Concepts Stampford: Cengage Learning

Grinberg, R. (2008) The foundations of a mixed economy. Moscow, Russia. In Russian.

Higgins, R. (1977), 'How Much Growth Can a Firm Afford?', *Financial Management*, 6(3), 7-16. Retrieved

Huggins R., Izushi H.(2007) Competing for Knowledge: Creating, Connecting and Growing. Abington, N.Y.: Routledge

Hutchison T.W. (1978) On Revolution and Progress in Economic Knowledge. Cambridge. Cambridge University Press

Innovation: theory, mechanism, state regulation (2008). Ed. Yu.V. Yakovets. Moscow, Russia. In Russian.

Innovative Economics (2013) / Ed. M.V. Kudina, M.A. Sazhina, Moscow, Russia. In Russian

Innovative policy: a textbook for undergraduate and graduate programs (2014) Ed. L.P. Goncharenko. Moscow, Russia. In Russian.

Jackson W.A.(2009) Economics, Culture and Social Theory. Cheltenham. Edward Edgar
Karpenko M.P. Cognomics. (2009). Russia. In Russian

Kiely R. (1995) Sociology and Development: the Impasse and Beyond. N.Y.: Routledge. 17-25

Kudina M (2013) Innovative potential as a source of long-term development of the Russian economy. Materials of conference. State administration in the 21st century: the agenda of the Russian authorities: the 10th International Scientific Conference of the Faculty of Public Administration of Lomonosov Moscow State University., May 29-31, (2), 638-653

Kudina M. (2013) Company Management: Theory and Practice. Moscow, Russia. In Russian, 218-271

Kudina M.(2010) A new look at the role of economic thought in public administration*, Journal of the Electronic Journal of the Federal State University of Moscow State University,* (10). In Russian

Kudina M., Kuzmin S. (2015) The firm's growth: a Multi-paradigmatic approach, *From the other side: London diaries on economics, marketing, finance and innovation, Economics series,* Guttenberg London, (1), 200-220

Kudina M., Kuzmin S.(2016) The paradigmatic approach to corporate growth, *Journal European Journal of Economics and Management Sciences*, (1), 68-71

Kuhn T.(1977) The Essential Tension: Selected Studies in Scientific Tradition and Change. Chicago: University of Chicago Press, 119

Kuhn T. (2012) The Structure of Scientific Revolution. With an Industry Essay by Ian Hacking. Chicago: University of Chicago Press

Oaksford M., Chater N., Stenning K. (2010) Connectionism, Classical Cognitiv Science and Experimental Psychology//Clark A., Lutz R. (eds.) Connectionizm in Context. Heidelberg: Springer
Peoples J., Bailey G. (2012) Humanity: An Introduction to Cultural Anthropology. Stamford: Cengage Learning, 98-106

Roadmap for the development of the public expert-analytical community (2016). Analytical report of the CEN. Russian. In Russian

Rzaeva U.Sh., Guseinova R.Sh., Safarova A.M. (2012) Some aspects of synergetics in cognitive management http://be5.biz/ekonomika1/r2012/2999.htm

Shamakhov V. (2016), A. Training of management personnel for a new economy / Foresight "Russia": a new production for a new economy. " Volume 1 / Collection of plenary reports of the St. Petersburg International Economic Congress (SPEC-2016) / Under the general. S.D.Bodrunov. In Russian

Stehr N., Ericson R (1992) The Culture and Power of Knowledge//Stehn N., Ericson R. (eds.) The Culture and Power of Knowledge: Inquires into Contemporary Societies. Berlin: de Gruyter, 11-12

Voznesenskaya E.D., Dymarskaya O.Ya., Cherednichenko G.A. (2006) Social and humanitarian education: orientations, practices, resources for improvement. 9-26

Approximate Reasoning with Linguistic Modifier of Translation

Nourchen Zaghden Dammak*, COSMOS Laboratory, MANOUBA, Tunisia,
andnourchen.zaghden@ensi-uma.tn,National School of Computer Sciences University of Manouba,

Moncef Tagina**, COSMOS Laboratory

Abstract

Fuzzy logic reflect how people think, to obtain a conclusion close to the human reasoning, we consider the particular case where the difference between premise and observation can be expressed by means of a linguistic modifier. We study a linguistic modifier of translation, which is an important tool for approximate reasoning . We besides that, address the problem of the representation of a linguistic modifier in the generalized modus Ponens.In that, we demonstrate a method of calculation while using a different modifier and concentrate our work in the paper of transitive linguistic modifier using different implication and composition operator.Using a linguistic modifier allows the reduce of complexity of the compositional rule of inference.

Keywords: Fuzzy Logic; linguistic modifier; Approximate Reasoning ;Compositional Rule of Inference(CRI).

Introduction

The artificial intelligence is a set of realizations and a set of searches that tries to imitate artificially the performances of human. There are several fields of application of the artificial intelligence such as natural language processing, gratitude of the forms, the faces and the vision generally, the machine learning, the domain of system with knowledge, etc. We are interested in the treatment of imperfect knowledge in the intelligent systems, particularly in the fuzzy logic specifically dedicated to the data processing imprecise and \ or uncertain.The approximate reasoning such as it is modeled today is capable of realizing inferences in the presence of knowledge and of observations which can be the more or less true. The term approximate reasoning has however a particular meaning of a word introduced by Zadeh[6] in the field of the fuzzy logic.Human uses a linguistic adverb like very, more or less, etc; in this case Zadeh [6] introduces linguistic hedges.The representation of facts was studied by linguistic variables.That are defined by a given universe U and characterized by a set of attributes N. Their deduction rules are represented ina fuzzy logic using a generalized modus ponens process.

Typically, some problems may be occurring when the premise of a rule does not match with an observation of the same variable. In that case, it is possible to use another rule. Further, the particular case can be determined when the difference between a premise and an observation is defined by a linguistic modifier.

Therefore, we have been studied particular modifiers. We can conclude then, that the generalized modus ponensis generally interpreted directly without any computation maybe in case of necessity.

Zadeh[6] introduced and discussed various linguistic hedges as operators aiming at modifying the shape of the membershipfunctions.Linguistic modifier have been pointed out as important issues in the treatment of data by means of a fuzzy logic by several authors.

This paper is organized as follows:we apply a different linguistic hedges in the modus ponens generalized (MPG).In Section 1 we represent the approximate reasoning.In section 2 we represent the compositional rule of inference using linguistic modifier.In section 3 we represent a different result of the compositional rule of inference using the implication and composition of Mamdani and Lukasiewcz with using a different linguistic translation modifier.Finally, Section 4. Is our conclusion.

Approximate Reasoning

Approximate reasoning methodology was developed by Zadeh to formulate complex problems of human reasoning [6].One of the best known application areas of fuzzy logic in approximate reasoning, where in from imprecise inputs and fuzzy premises rules, we obtain often imprecise conclusions.Approximate reasoning with fuzzy sets encompasses a wide variety of inference schemes and have been readily applied in many fields, especially among others, decision making, expert systems and control.The basic issue of approximate reasoning can be expressed as follows: giving a rule of the form: If X is A Then Y is B, where A and B are fuzzy sets representing values of linguistic variables X and Y respectively and given a fact X is A', how can we derive a conclusion in the form Y is B'?

Règle: $Si\ X\ est\ A\ alors\ Y\ est\ B$

Fait: $X\ est\ A'$

Conclusion: $Y\ est\ B'$

Fig. 1: Approximate Reasoning

With X and Y linguistic variables and A, B and B' fuzzy subsets.

The approximate reasoning allows to take into account not only a fact which is equivalent to the premise of the rule A ,but also a fact A' which is approximately equivalent to him. And so, the conclusion of the inference B' will be approximately equivalent to the conclusion of the rule B .For a given observation, all the rules of the premises defined in the same universe of this observation are triggered.The compositional rule of inference allows to determinate the result B' .The fuzzy rule represented like as "If X is A then Y is B" represent the fuzzy relation between A and B : $R(A,B)$, this relation is a causal link between the two universe of discourse U and V. The fuzzy set B' is defined by the following formula: $B' = A' \circ R(A,B)$.
The fuzzy relation between A and B is the fuzzy implication. In the literature there are several types of fuzzy implication.

The conclusion B' is defined by this formula:
$\forall v \in V, \mu_{B'}(v) = \sup_{u \in U} T(\mu_{A'}(u), \mu_R(u,v))$
with T is a T-norm (triangular norm) and I is a fuzzy implication.

Definition(T-norm) : let A and B be two fuzzy sets on U. A T-norm that denoted by $T(a,b)$ with a and b being the membership grades of A and B respectively, is a class of binary functions of the form $T:[0,1]\rightarrow[0,1]$ and should at least satisfy the following axiomatic proprieties:

- $T_1 : T(a,1) = a$

- $T_2 : T(a,b) = T(b,a)$
- $T_3 : T(a,T(b,c)) = T(T(a,b),c)$
- $T_4 : a \le c \quad and \quad b \le d \Rightarrow T(a,b) \le T(c,d)$

Definition(T-conorm) : « let A and B be two fuzzy sets on U. A T-conorm that denoted by $T^*(a,b)$, with a and b being the membership grades of A and B respectively,is a class of binary functions of the form $T^* : [0,1][0,1] \rightarrow [0,1]$ and should at least satisfy the following axiomatic proprieties":

- $T_1^* : T(a,0) = a$
- $T_2^* : T(a,b) = T^*(b,a)$
- $T_3^* : T^*(a,T^*(b,c)) = T^*(T^*(a,b),c)$
- $T_4^* : a \le c \quad and \quad b \le d \Rightarrow T^*(a,b) \le T^*(c,d)$

Linguistic Modifier

Several modes of rough reasoning have emerged. The determination of the conclusion of the inference is calculated according to the degree of resemblance between the observation and the Premise of the rule. These types of reasoning focus on the similarity between A and A' and not on how A has been modified. The application of the compositional rule of inference(CRI) is more precise and complex.Indeed, the determination of B' requires a matrix calculation on the distributions of A, A' and B .We are interested in a very precise mode of reasoning based on the generalized Modus Ponens implemented by the CRI and coupled with the linguistic modifiers. Recall that linguistic modifiers perform mathematical transformations on fuzzy subsets.

The linguistic modifier was introduced by Zadeh en 1972 [6], it is an operator that transforms a term into a new term[7][10].

In the Fuzzy logic, there are two types of linguistic modifier:Precision Modifier(restrictive modifier, expansive modifier) and translation modifier [1].We present, in the following presentation another aspect of the approximate reasoning with the use of the linguistic modifier in the generalized Modus Ponens:

$$\begin{array}{ll} Rule: & If\ X\ is\ A\ Then\ Y\ is\ B \\ Fact: & X\ is\ m(A) \\ \hline Conclusion: & Y\ is\ B' \end{array}$$

Fig. 2: Approximate Reasoning with linguistic Modifier

The conclusion of inference is $B' = m'(B)$, it is enough to determine the modifier m'. The modifier m' is obtained according to the modifier m [7].We intersected more in the mathematical aspect of the modifier $A' = m(A)$ the observation where m is the linguistic modifier.

In general, the representation of linguistic hedges in the fuzzy set theoretical framework can be considered according to two main interpretations: the inclusive and the non-inclusive interpretations.
A Family of Modifiers

Is a class of functions that satisfies the previous conditions: $m_\alpha(A) = A^\alpha$

- if $(\alpha \prec 1)$ then is a weak modifier
- if $(\alpha \succ 1)$ then is a strong modifier
- m_1 is the identity modifier

We can choose a suitable value depending on the context

Precision Modifier

The precision modifiers translate the inclusive interpretation, for example "If an object is very A then it is also A" so "If an object is A then itis also more or less A" it results that $very(A) \subseteq A \subseteq more\ or\ less(A)$.
This type of modifier is divided into two types: reinforcing modifiers (reinforcing effect allows an increase in the degree of membership and $m(A) \subseteq A$ attenuating modifiers (the attenuation effect reduces Degree of belonging and $A \subseteq m(A)$.

Restrictive modifier

Strengthen the characterization to which they are applied and are often associated to intensifying adverbs as very,completely, they protect the core and the support of the fuzzy subset $A \in F(U)$, $A \supseteq m(A)$, $\mu_A(x) \leq \mu_{m(A}(x)$.
A linguistic modifier like very is represented in the next picture The formula is $A' = m(A)$ where $m = very$, $\mu_{A'}(x) = \mu_A(x)^2$.
A restrictive modifier leads to decrease the degrees of membership, it pushes the original membership function down.

Expansive modifier

This type of modifier weaken the characterization to which they are applied and are often associated to adverbs as "more or less" or "little"they also protect the core and the support of the subset $A \in F(U)$, $A \subseteq m(A)$, $\mu_A(x) \leq \mu_{m(A}(x)$.The formula is $A' = m(A)$ where $m = more\ or\ less$, $\mu_{A'}(x) = \mu_A(x)^{\frac{1}{2}}$.
An expansive modifier leads to increase the degrees of membership, it pushes the original membership function down.It is called weakening by Bouchon and Jia[3].

Translation Modifier

The modifier of translation translates the non-including interpretation according to which a term modified by more or less or very is neither a subset nor a great whole original term.This type of modifier supplies a new fuzzy subset which is the translation of the primary fuzzy set in the same universe.

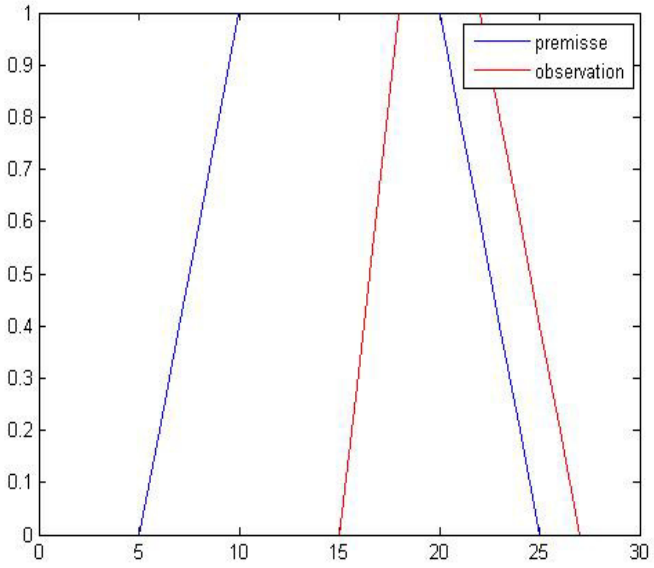


Fig. 3 : Translation Modifier A'=A-α

Definition:

for $\alpha \in$ □ , $A \in F(U)$, $S_\alpha(A): u \to [0,1]$, $u \to \mu_A(u-\alpha), \forall u \in \alpha$, It exist modifiers which are defined by means of a translation of the original membership function [11].

Axioms of the Generalized Modus Ponens

The generalized modus Ponens have been studied from a normative perspective to select combinations of composition and implicationoperators satisfying intuitive proprieties.

To this aim, different and sometimes conflicting sets of axioms have been proposed and exploited to analyze the various implicationoperators with respect to CRI.

Several criteria have been suggested in particular by Fukami [1] and Baldwin [13] concerning the relations which bind A and A' on one side and B and B' on the other hand. Subsequently we will present the different criteria proposed by Fukami[1].

- Criterion I, $A' = A \Rightarrow B' = B$ (relative to Zadeh's P_1 modifier)
- Criterion II-1 $A' = very\ A \Rightarrow B' = very\ B$ (relative to Zadeh's P_2 modifier)
- Criterion II-1, $A' = very\ A \Rightarrow B' = B$ (relative to Zadeh's P_2 modifier)
- Criterion III - 1 , $A' = more\ or\ less\ A \Rightarrow B' = more\ or\ less\ B$ (relative to Zadeh's $P_{1/2}$ modifier).
- Criterion IV-1, $A' = \overline{A} \Rightarrow B' = B$ (relative to Zadeh's P_c modifier)

We find that some of these criteria are very close to human intuition. Based on the criteria defined in Fukami [1] we have classified the fuzzy conditional inferences into four types:

- Type 1 satisfaction criterion I,II-1,III-1,IV-1

- Type 2 satisfaction criterion I,II-2,III-1,IV-1
- Type 3 satisfaction criterion I, II-1,III-1,IV-2
- Type 4 satisfaction criterion I, II-2,III-1,IV-2.

This axiomatic is adapted to simple approximate reasoning with using the linguistic modifier like $m_2 = very$ or $m_{1/2} = more\ or\ less$ or $m = m_c$ is a complement but the linguistic translation modifier m_α haven't been addressed.

Contribution

The use of linguistic modifiers during the compositional rule of inference is in order to reduce the complexityof the calculations performed by the latter, and to find a formalization of the rough reasoning while obtaining the results that would have given this rule.

Constructing the linguistic approximate Reasoning

For the scheme of a linguistic translation modifier, we propose a new scheme using an approximate reasoning.The following basic steps such as displayed in fig.4 :

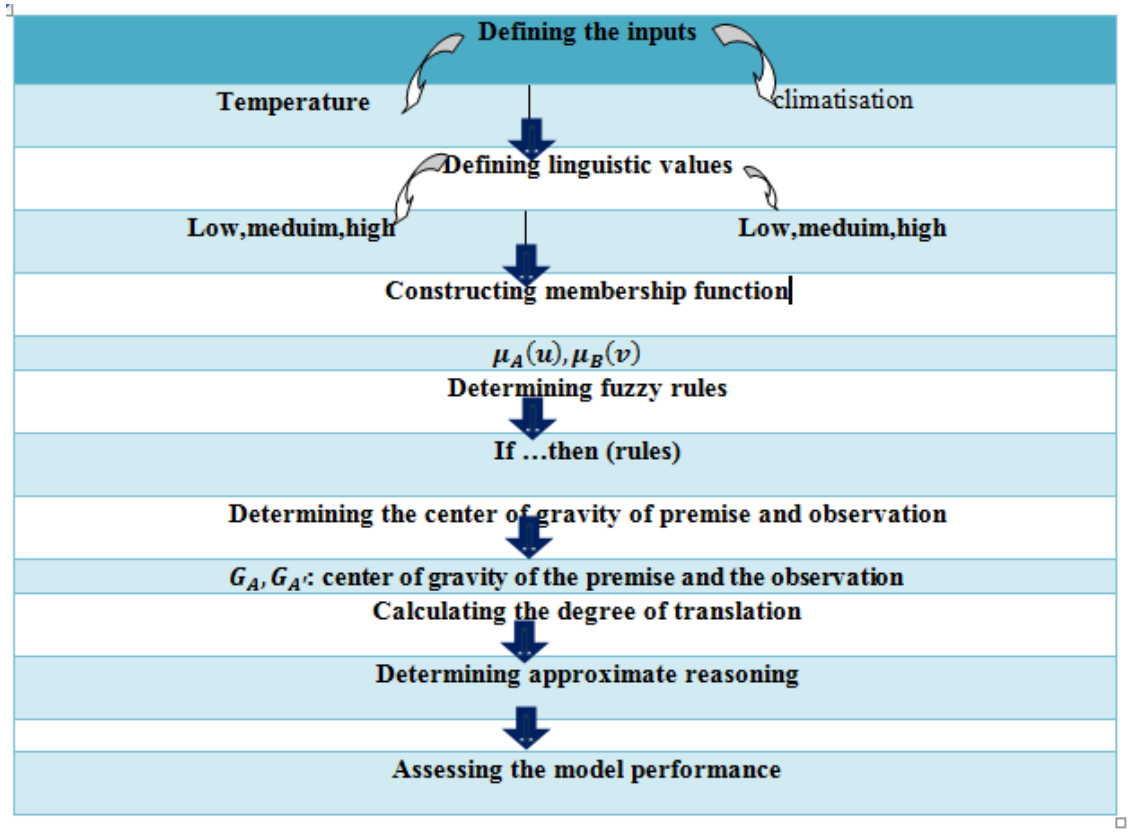


Fig. 4: scheme of the LTM model applying approximate reasoning

The linguistic values of each variable are (low, medium, high) . We have exploited the trapezoidal membership function.

The direction of translation depends on the center of gravity of fuzzy subset.
We can translate a fuzzy set either in the positive direction(right) or in the negative direction (left).

$$\alpha = \begin{cases} \ddot{i}f\ \alpha > 0\ then\ ST > 0 \\ else\ if\ \alpha < 0\ then\ ST < 0 \\ else\ \alpha = 0\ then\ ST = 0 \end{cases}$$

ST is the sign of translation.Giving an observation in the form " $X\ is\ m_\alpha A_i$ ", the solution chosen consists in determining, in a simple and systematic way, the membership function of the property $m_\alpha A_i$ as a function of that of A_i by a simple operation of translation. To detect the direction of the translation, it is sufficient to calculate the center of gravity of the two fuzzy sub-sets.Calculating the center of gravity formulae for fuzzy numbers we exploited [12].Let us take for example the fuzzy set A such that $A = (x_1, x_2, x_3, x_4)$ the center of gravity of A is obtained by: $G_A = (XG_A, YG_A)$ with

$$XG_A = \frac{1}{3}(x_1 + x_2 + x_3 + x_4 - \frac{x_3 x_4 - x_1 x_2}{(x_3 + x_4) - (x_1 + x_2)})$$

$$YG_A = \frac{1}{3}(1 - \frac{x_3 - x_2}{(x_3 + x_4) - (x_1 + x_2)})$$

Considering the left spread in the trapezoidal fuzzy set $L_A = x_2 - x_1$ and the right spread is $R_A = x_4 - x_3$ .The center of gravity in a triangular fuzzy set is defined:

$$G_B = (XG_B, YG_B)$$

$$XG_B = \frac{x_1 + x_2 + x_3 + x_4}{3}$$

$$YG_B = \frac{1}{3}$$

For example, in previous figure fig.3, the center of gravity on the fuzzy subset A is equal to $G_A = (XG_A, YG_A)$,the center of gravity on the fuzzy subset A' is equal to $G_{A'} = (XG_{A'}, YG_{A'})$ .Considering the two trapezoidal fuzzy numbers A and A' represented in the fig.3 for the numerical example: A(5,10,20,25) and A'=(15,18,22,27) which membership functions are defined as:

$$\mu_A(x) = \begin{cases} \frac{(x - x_1)}{(x_2 - x_1)} if\ x_1 \le x \le x_2 \\ 1\ if\ x_2 \le x \le x_3 \\ \frac{(\ddot{}x - x_4)}{(x_3 - x_4)} if\ x_3 \le x \le x_4 \\ 0\ otherwise \end{cases}$$

$$\mu_A'(x) = \begin{cases} \frac{(x - \alpha - x_1)}{(x_2 - x_1)} if\ x_1 + \alpha \le x \le x_2 + \alpha \\ 1\ if\ x_2 + \alpha \le x \le x_3 + \alpha \\ \frac{(x - \alpha - x_4)}{(x_3 - x_4)} if\ x_3 + \alpha \le x \le x_4 + \alpha \\ 0\ otherwise \end{cases}$$

The translation factor α is defined by $\alpha = G_A - G_A'$ in previous example represent the sign of translation and the value of translation, when we have $\alpha > 0$ the translation is positive and when we have $\alpha < 0$ the translation is negative otherwise $\alpha = 0$ there is no translation and we can conclude that the premise of the rule is equivalent at the observation.

$$G_A = (XG_A, YG_A)$$

$$XG_A = \frac{1}{3}(x_1 + x_2 + x_3 + x_4 - \frac{x_3x_4 - x_1x_2}{(x_3 + x_4) - (x_1 + x_2)}) = 15$$

$$YG_A = \frac{1}{3}(1 - \frac{x_3 - x_2}{(x_3 + x_4) - (x_1 + x_2)}) = 0.44$$

$$G_{A'} = (XG_{A'}, YG_A')$$

$$XG_A' = \frac{1}{3}(x_1 + x_2 + x_3 + x_4 - \frac{x_3x_4 - x_1x_2}{(x_3 + x_4) - (x_1 + x_2)}) = 20.58$$

$$YG_A' = \frac{1}{3}(1 - \frac{x_3 - x_2}{(x_3 + x_4) - (x_1 + x_2)}) = 0.44$$

Compositional rule of inference CRI with linguistic modifier

Several authors have been interested in the study of the CRI with different pairs (T, I) which do not necessarily satisfy the principle of compatibility [12][9][4].They used the linguistic modifiers $m = 1, m = \frac{1}{2}, m = 2, m_c$ during their studies. However, some compatible couples were not treated in the literature and in the works brought to our knowledge.

Mizumoto assumes that and satisfies the following conditions:

- $\{\mu_A(u), u \in U\} \supseteq \{\mu_B(v), v \in V\}$
- $\exists u \in U, \mu_A(u) = 0 \; \exists u' \in U, \mu_A'(u') = 1$
- $\exists v \in V, \mu_B(v) = 0 \; \exists v' \in v, \mu_B(v') = 1$

For each u of U and v of V we obtain two sets U_1 and U_2 where:

- $U_1 = \{U \mid \mu_A(u) \leq \mu_B(v)\}$
- $U_2 = \{U \mid \mu_A(u) > \mu_B(v)\}$

With $U_1 \cup U_2 = U \; and \; U_1 \cap U_2 = \varnothing$

- $U_3 = \{U \mid \mu_A(u) = 0\}$
- $U_4 = \{U \mid \mu_A(u) > 0\}$

We are interested in calculating the CRI with different pairs (T, I) where, let us recall, T is a T-norm and I a fuzzy implication.

We rely on the Mizumoto approach[4] .However, we use only the pairs verifying the compatibility principle of the classical Modus Ponens, that is, those that satisfy the condition:if A '= A, then B' = B.The table is extracted from[4] which we recall here, lists the implications and the compatible T-norms.

Table 1: T-norm and Implication Compatible

T-norm	Implication
T_L	$I_M, I_R, I_W, I_L, I_{RG}, I_{KD}, I_{BG}, I_P, I_G$
T_G	$I_P, I_M, I_{BG}, I_{RG}, I_R, I_W$
T_P	$I_P, I_G, I_M, I_{BG}, I_{RG}$

Table 2: Implication

Name	Implication
I_M	$\min(u,v)$
I_R	$1-u+u\times v$
I_W	$\max(1-u,\min(u,v))$
I_L	$\min(1-u+v,1)$
I_{KD}	$\max(1-u,v)$
I_{RG}	$\begin{cases}1 \; if \; u \le v \\ else \; v\end{cases}$
I_G	$\begin{cases}1 \; if \; u = 0 \\ else \; \min(\frac{u}{v},1)\end{cases}$
I_P	$u\times v$

Demonstration

Calculating the compositional rule of inference with using a linguistic modifier is represented in this section. $\forall v \in V, \mu_{B'}(v) = \sup_{u\in U} T(\mu_{A'}(u), \mu_R(u,v))$ With using the fuzzy implication and the composition of Mamdani you obtain a conclusion like this formula:

$$\forall u,v \in [0,1] = \begin{cases} I_{M=\min(u,v)} \\ T_{M=\min(u,v)} \end{cases}$$

the conclusion B' is presented:

$$\forall v \in V, \mu_{B'}(v) = \sup_{u\in U} T_M(\mu_{A'}(u), I_M(\mu_A(u), \mu_B(v)))$$

$$\forall v \in V, \mu_{B'}(v) = \sup_{u\in U} (\min(\mu_{A'}(u), I_M(\mu_A(u), \mu_B(v)))$$

$$\forall v \in V, \mu_{B'}(v) = \sup_{u\in U} (\min(\mu_{A'}(u), \min(\mu_A(u), \mu_B(v)))$$

when we have a linguistic modifier like $m_2 = very$, $\mu_{A'}(x) = \mu_A(x)^2$,B' is calculated like

$$\forall v \in V, \mu_{B'}(v) = \sup_{u\in U} (\mu_A(u)^2, \min(\mu_A(u), \mu_B(v)))$$

$$\forall v \in V, \mu_{B'}(v) = \mu_B(v)$$

when we have a linguistic modifier like a translation modifier

$$\mu_{A'}(u) = \mu_A(u-\alpha)$$

B' is calculated like:

$$\forall v \in V, \mu_{B'}(v) = \sup_{u\in U} \min(\mu_A(u-\alpha), \min(\mu_A(u), \mu_B(v)))$$

$$\forall v \in V, \mu_{B'}(v) = \mu_B(v)$$

With a premise of rule represented in the fig.3 we obtain a conclusion B' in this figure $\forall v \in V, \mu_{B'}(v) = \sup_{u \in U} T(\mu_{A'}(u), I(\mu_A(u), \mu_B(v)))$ with an uncertainty γ.

with using the fuzzy implication and the composition of Lukasiwecz you obtain a conclusion like this formula:

$$\forall u, v \in [0,1] = \begin{cases} I_{L=\min(1-u+v,1)} \\ T_{L=\max(u+v-1,0)} \end{cases}$$

the conclusion B' is presented

$$\forall v \in V, \mu_{B'}(v) = \sup_{u \in U} T_L(\mu_{A'}(u), I_L(\mu_A(u), \mu_B(v)))$$

$$\forall v \in V, \mu_{B'}(v) = \sup_{u \in U} \max(\mu_{A'}(u) - 1 + \min(1 - \mu_A(u) + \mu_B(v), 0))$$

when we have a linguistic modifier like $m_2 = very$, $\mu_{A'}(x) = \mu_A(x)^2$,B' is calculated like

$$\forall v \in V, \mu_{B'}(v) = \sup_{u \in U} \max(\mu_A(u)^2 - 1 + \min(1 - \mu_A(u) + \mu_B(v), 0))$$

Giving the following property demonstrated by Zadeh:

$$\forall x, y, z \in [[0,1], x + \min(y, z) = \min((x + y), (y + z))$$

$$\forall v \in V, \mu_{B'}(v) = \sup_{u \in U} \min(\max(\mu_A(u)^2), \max(0, \mu_A(u)^2 - \mu_A(u) + \mu_B(v)))$$

$$\forall v \in V, \mu_{B'}(v) = \mu_B(v)$$

when we have a linguistic modifier like a translation modifier $\mu_{A'}(u) = \mu_A(u - \alpha)$

B' is calculated like

$$\forall v \in V, \mu_{B'}(v) = \sup_{u \in U} (\max(\mu_A(u - \alpha) - 1 + \min(1 - \mu_A(u) + \mu_B(v), 1), 0))$$

$$R = \min(1 - \mu_A(u) + \mu_B(v), 1)$$

In the first case, we suppose

$$\forall v \in V, \mu_{B'}(v) = \sup_{u \in U} (\max(\mu_A(u - \alpha) - \mu_A(u) + \mu_B(v))$$

with a constraint

$$\mu_B(v) \le \mu_A(u)$$

$$\mu_A(u - \alpha) \ge \mu_A(u) - \mu_B(v)$$

So $\forall v \in V, \mu_{B'}(v) = \mu_B(v) + \sup_{u \in U} ((\mu_A(u - \alpha) - \mu_A(u) + \mu_B(v))$

with $\alpha' = \sup_{u \in U} ((\mu_A(u - \alpha) - \mu_A(u) + \mu_B(v))$

So $\forall v \in V, \mu_{B'}(v) = \mu_B(v) + \alpha'$

In the second case, we suppose that:

$$1 - \mu_A(u) + \mu_B(v) \ge 1$$

with a constraint

$$\mu_B(v) \ge \mu_A(u)$$

$$\Rightarrow R = 1$$

$$\Rightarrow \mu_{B'}(v) = \sup_{u \in U} (\max(\mu_A(u - \alpha) + R - 1, 0)$$

$$\Rightarrow \mu_{B'}(v) = \sup_{u \in U} (\max(\mu_A(u - \alpha), 0)$$

$$\Rightarrow \mu_{B'}(v) = \sup_{u \in U} (\max(\mu_A(u - \alpha))$$

$$\Rightarrow \mu_{B'}(v) = 1$$

In the third case, if $1 - \mu_A(u) + \mu_B(v) \le 1$

$$R = 1 - \mu_A(u) + \mu_B(v)$$

$$\Rightarrow \mu_{B'}(v) = \sup_{u \in U} (\max(\mu_A(u - \alpha) - \mu_A(u) + \mu_B(v), 0)$$

with a constraint

$$\mu_B(v) \le \mu_A(u) - \mu_A(u - \alpha) \le \mu_A(u)$$

$$\Rightarrow \mu_{B'}(v) = 0$$

For example we have a conclusion B represented in:

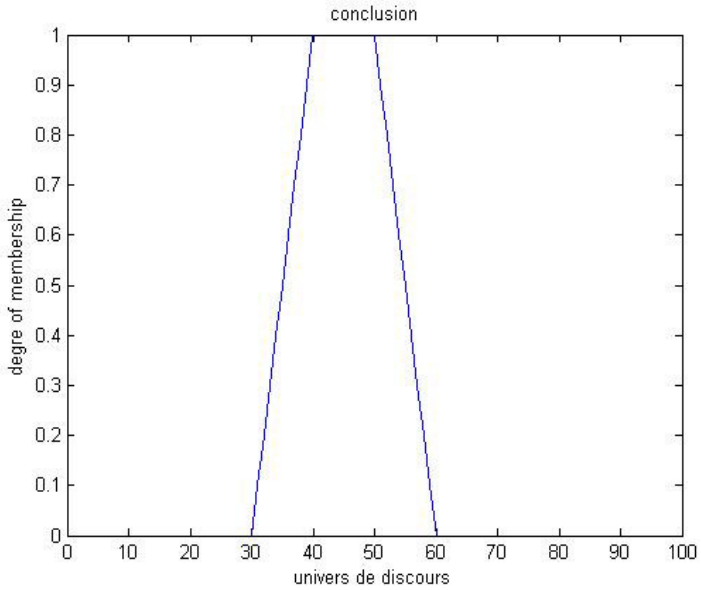


Fig. 5 :Conclusion B

With a premise of rule represented in fig.3 we obtain a conclusion B' in this figure $\forall v \in V, \mu_B'(v) = \mu_B(v)$ with an uncertainty γ.

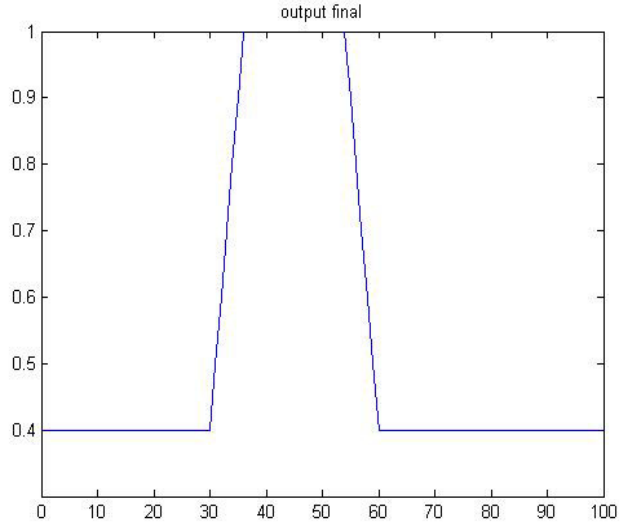


Fig. 6: New output B'

Complexity Rule of Inference CRI

A particularly unfortunate aspect of the use of the compositional rule of inference (CRI) is its great complexity [11].

In general, for the finite universes U and V, with $U = |m|$ And $V = |n|$ An inference requires $O(mn)$ operations. It is mainly for this reason that the researchers have explored other ways to achieve a fuzzy inference while preserving its useful characteristics.

The use of the generalized modus ponens with modifiers is an alternative to rough reasoning.This approach allows a reduction in the complexity of CRI calculations since we consider specific observations of A' with m being a linguistic modifier.The CRI triggers all rules which premises are close to the given observation.The complexity of the algorithm is a linear complexity with respect to the number of rules selected: $O(pq)$

- p :selected premise number $\leq m$
- q :selected conclusion number $\leq n$

This solution reduce the complexity of algorithm $O(pq) < O(mn)$

Conclusion

Many fuzzy systems are based on Zadeh's compositional rule of inference[6].Despite their success in various systems, researchers have indicated certain drawbacks in the mechanism such as the large scale of fuzzy rule and high complexity. By the means of using the linguistic modifier, the complexity of CRI is reduced. To find a formalization of the rough reasoning, in order to obtain the good results, is not easy.The linguistic modifier is an important tool for approximate reasoning for two reasons: these are equivalent to a simple given rule ina symbolic way avoiding computations and compatible with the fuzzy logic, they enable gradual rules to be used in the context of rules deduction and corresponds to the idea of gradual changing of category.

Satisfactory results are obtained by applying the approximate reasoning based on linguistic modifiers. Moreover, it provides a comfortable linguistic interpretation to the human mind.

Acknowledgements

I would like to extend my gratitude first to mr Afif Masmoudi and madame HalaBezine for their help.

References

[1]BACZYNSKI, M. and JAYARAM, B., (2008) 'Fuzzy implications'. Berlin: Springer,.

[2]BISGAMBIGLIA, P A., GUELTON, K., LAUBER, J.,(2016) ' La logique floue et ses applications'.

[3] BOUCHON-MEUNIER, B. , JIA Y.,(1992), 'Linguistic Modifiers and Imprecise Categories', International Journal of Intelligent Systems, 25-36.

[4]CROSS, Valerie, V. , SUDKAMP, Thomas, A.,(2002), 'Similarity and compatibility in fuzzy set theory: assessment and applications'. Springer Science Business Media.

[5]DESPIC,O., SIMONOVIC, Slobodan, P.,(2000), 'Aggregation operators for soft decision making in water resources'. Fuzzy Sets and Systems, vol. 115, no 1, p. 11-33.

[6]Zadeh, L.,(1892),' A fuzzy-set-theoretic interpretation of linguistic hedges', Journal of Cybernetic, 2, 1972J. Clerk Maxwell, A Treatise on Electricity and Magnetism, 3rd ed., vol. 2. Oxford: Clarendon, pp.68-73.

[7] De Cock, M., and Kerre, E. E. ,(2004), 'Fuzzy modifiers based on fuzzy relations' *Information Sciences*, *160*(1), 173-199.

[8]M. Mizumoto, S. Fukami, and K. Tanaka, (1979), 'Some methods of fuzzy reasoning', in Advances in Fuzzy Ser Theory and Applications (M. M. Gupta et al., Eds.), North-Holland, Amsterdam, pp. 117-136.

[9] Mizumoto, M. , Zimmermann, H.,(1982), 'Comparison of fuzzy reasoning methods', Fuzzy sets and systems, 8 : 253-283.

[10] Bosc, P. , Dubois, D., HadjAli, A., Pivert, O. and Prade, H.,(2007), 'Adjusting the Core and/or the Support of a Fuzzy Set - A New Approach to Fuzzy Modifiers', IEEE International Fuzzy Systems Conference, London, 2007, pp. 1-6.

[11]Thoumelin, P. C., Grabar, N. (2014). La subjectivité dans le discours médical: sur les traces de l'incertitude et des émotions. In EGC (pp. 455-466).

[12]Wang, Y M., Jian-BO,Y.,(2006), "On the centroids of fuzzy numbers.", Fuzzy sets and systems ,157.7 : 919-926.

[13]Hans-Jürgen, Z., (2011), 'Fuzzy set theory and its applications', Springer Science , Business Media.

Commerce Électronique Et Création De Valeur : Question De Technologie, Leadership Et/ou Alignement Stratégique !

Karima Bouzguenda: Maître-assistante, HDR, Sciences de Gestion, faculté des Sciences Economiques et de Gestion de Sfax, Tunisie, laboratoire gouvernance, finance et comptabilité (GFC), ka.bouzguenda@gmail.com.

Olfa Aloulou: Doctorante, Sciences de Gestion, Faculté des Sciences Economiques et de Gestion de Sfax, Tunisie, aloulou-olfa@hotmail.fr

Résumé

Le présent article se propose d'étudier les déterminants de la création de valeur du Commerce électronique (CE) tant sur le plan théorique que sur le plan pratique.
L'analyse se focalise sur le lien pouvant exister entre la stratégie du CE et la création de valeur modéré par l'alignement stratégique.
Un entretien semi-structuré est mené auprès de la Société Tunisienne de Banque (STB) et les données sont analysées selon la méthode de l'analyse de contenu.
Une première analyse des résultats livre le poids non négligeable de l'intégration entre la stratégie du CE et la stratégie générale de l'entreprise, générant ainsi une influence de l'alignement stratégique sur les inducteurs de la création de valeur du CE.
Vu sous l'angle de l'approche socio-économique, les résultats témoignent l'existence de trois catégories de facteurs concourant à la création de valeur du CE à savoir les stabilisateurs, les réalisateurs et les spécificateurs. Les implications managériales et organisationnelles sont ressorties.

Mots clés : Commerce électronique, stratégie du commerce électronique, alignement stratégique, création de valeur, étude de cas.

Introduction

Conçu comme une solution d'affaire, le commerce électronique (CE) représente une opportunité réelle pour assurer la viabilité des entreprises. Bien que le CE consiste, au début, un simple échange des données informatisées, il a évolué vers internet avec une infrastructure de communication et de transaction plus ouverte (Raymond, 2001 ; Bégin, Tchokogué et Boisvert, 2001; Hong et Zhu, 2006).

Convaincues des opportunités qu'offre le CE, plusieurs firmes l'adoptent non seulement comme un remarquable levier de compétitivité mais aussi un outil d'affaire incontournable pour atteindre un meilleur niveau de performance (Benchohra, 2008). En outre, Delone et McLean, (1992) arguent que l'amélioration de la performance organisationnelle est à considérer comme le but ultime de la stratégie d'entreprise et des systèmes d'information (SI). Il s'avère nécessaire d'aligner la stratégie de l'entreprise avec les choix technologiques afin d'atteindre les objectifs organisationnels.

L'intérêt porté à l'alignement stratégique, associé à la notion de « cohérence » (Henderson et Venkatraman, 1993) et l'expression de « forme » (Bergeron, Raymond et Rivard, 2001), s'explique par le fait que le CE pourrait constituer une source de création de valeur lorsque la stratégie des SI coïncide avec les orientations futures de l'entreprise.

Le présent article se propose d'explorer les facteurs qui sont en mesure de contribuer à la création de valeur du CE dans un contexte émergent. Sur le plan pratique, depuis les années 2000, plusieurs entreprises tunisiennes adoptent le CE quoique sous l'impulsion de l'Etat dans la majorité des cas. Cependant, elles ne cessent de confronter des difficultés surtout depuis la révolution dans le pays. Ce qui remet en cause la logique qui sous-tend les choix stratégiques et requiert une étude du processus de

l'implantation des solutions technologiques pouvant assurer une viabilité de ces entreprises. Ainsi, la question que suscite notre réflexion est la suivante: Dans quelle mesure la création de valeur du CE dépend-t-elle de l'alignement entre la stratégie générale de l'entreprise et celle du CE ?

La recherche se veut être à la fois exploratoire, descriptive et explicative. Elle est exploratoire dans la mesure où le phénomène étudié est encore récent dans le contexte tunisien. Elle est descriptive dans le sens où elle tente d'élucider les principaux déterminants contribuant à l'émergence du CE. Elle est explicative puisqu'elle vise à donner du sens à la dynamique de création de valeur du CE. C'est ainsi que la démarche abductive est engagée permettant de procéder à une triangulation entre le soubassement théorique relative à la question de la recherche et les résultats empiriques.

La revue de la littérature s'oriente vers l'analyse du business model articulé autour des déterminants de la stratégie du CE, de l'effet de l'alignement stratégique et des sources de création de valeur du CE.
Une étude qualitative à partir d'un cas d'entreprise dans le secteur bancaire est réalisée afin d'analyser le processus d'adoption du CE, élucider le degré d'alignement stratégique et évaluer les effets des inducteurs de création de valeur.

1. Modélisation du processus de création de valeur du commerce électronique

La modélisation du processus de création de valeur du CE est réalisée en deux phases : Une première se focalise sur la détermination des résultats générés par le commerce en ligne (Amit et Zott, 2001) et une deuxième est centrée sur les antécédents de l'adoption du CE (Alawneh et Hattab, 2009).

1.1. Le Business model de création de valeur du commerce électronique

Les premiers travaux de recherche sur le CE s'orientaient vers l'analyse des résultats générés par l'implantation de la nouvelle forme de faire les affaires. Amit et Zott (2001) sont les pionniers à dégager les fondements de la création de valeur du e-business servant de base pour le développement d'un modèle d'affaires qui, "suggère que le potentiel de création de valeur des affaires électroniques dépend de quatre dimensions interdépendantes à savoir l'efficience, les complémentarités, le lock-in et la nouveauté.

D'abord et conformément à la théorie des coûts de transaction, l'efficience provient de la réduction des coûts de recherche d'information ou de produit, la suppression des obstacles à la circulation de l'information, la réduction des asymétries d'information et la réduction de la vitesse et des coûts de transaction (Williamson, 1979).

Ensuite, la complémentarité, quant à elle, se réalise lorsque la valeur de l'offre dans son ensemble est supérieure à la somme des valeurs des produits ou services pris individuellement et résulte aux niveaux des produits et des services en ligne, des offres en et hors ligne et des ressources et compétences (Krach, 2000).

De plus, le *look-in* est centré sur l'engagement des clients motivés à effectuer des transactions répétées avec la même entreprise. Il se réalise à travers les programmes de fidélisation, la personnalisation de l'offre, la sécurité des transactions et la fiabilité des services après-vente (Amit et Zott, 2001).

Enfin, la nouveauté se réfère à l'introduction de façons innovatrices pour structurer les transactions telles que les innovations des produits et des services, des procédés, de distribution et de commercialisation (Amit et Zott, 2001).

Certes, un tel modèle d'affaires constitue une assise théorique et un guide pratique pour les entreprises désireuses de se lancer dans le CE. Bien que la création de valeur du CE se démarque du commerce traditionnel, il est également à intégrer dans la stratégie globale des entreprises. Ainsi se pose la question relative aux facteurs concourant à la création de valeur du CE.

1.2. Etude des facteurs de création de valeur du commerce électronique

Les travaux d'Alawneh et Hattab, (2009) procurent un cadre de création de valeur du CE s'articulant autour de trois catégories de facteurs: technologique, organisationnel et environnemental.

S'agissant des facteurs technologiques, qui représentent une assise pour toutes les applications *web* y compris le CE, ils s'articulent autour de trois facteurs à savoir l'infrastructure, les connaissances et compétences technologiques et la sécurité des transactions. L'infrastructure technique se réfère au degré de sophistication de la diffusion des technologies d'information (TI) pour soutenir les applications (Armstrong et Sambamurthy, 1999). Par conséquence, le CE se développe fortement si l'on déploie une infrastructure d'information sophistiquée et fiable. Les connaissances techniques sont nécessaires pour créer une efficacité en ligne, du fait que, les applications du CE sont des technologies innovantes qui sont fortement influencées par les capacités technologiques d'une entreprise ainsi que par la maturité de ses utilisateurs (Zhu, Kraemer, Xu et Dedrick, 2004). La sécurité des transactions constitue, non seulement, parmi les plus grands défis technologiques mais aussi parmi les facteurs d'adoption et de succès technologique du CE. Ainsi, les facteurs technologiques ont une influence sur la stratégie de mise en œuvre du CE et ce compte tenu des facteurs organisationnels.

En effet, les facteurs organisationnels sont à considérer comme une source de capacités favorisant la mise en place de nouvelles solutions électroniques. Plus particulièrement, une analyse du mode de fonctionnement organisationnel est jugée nécessaire afin d'assurer la réussite de la mise en œuvre des applications électroniques (Bellaj, 2015 ; Trouong et Rao, 2002). Un tel fonctionnement se réalise par des mécanismes liés à la culture, la structure, le degré d'appropriation de connaissances et les expériences spécifiques. En outre, la culture organisationnelle joue un rôle déterminant pouvant agir sur l'efficacité d'une stratégie du CE lorsqu'elle est de type ouverte favorisant la communication, permettant de mieux transmettre des compétences et des interactions sociales et misant sur le développement d'une *e*-culture d'entreprise. De plus, certains paramètres structurels influencent l'adoption des TI telles que le degré de centralisation, de formalisation, et de différenciation verticale (Damanpour, 1991). Il en découle que les caractéristiques de la structure organisationnelle explique le degré d'acceptation des TI. Par ailleurs, il est postulé que l'adoption du CE est influencée par le niveau des connaissances et des expériences antérieures des acteurs ainsi que par le niveau d'apprentissage organisationnel (Attewell, 1992). Plus les dirigeants possèdent des acquis organisationnels importants, plus les degrés d'adoption et d'appropriation des TI seraient élevés.

En plus des facteurs technologiques et organisationnels, des facteurs environnementaux constituent parmi les facteurs clés de succès des applications électroniques. Par suite et en se référant au modèle des cinq forces de Porter (1985), la concurrence, la pression des fournisseurs et des clients et la pression des pouvoirs publics sont supposés agir comme générateurs de succès pour maintenir le positionnement de l'entreprise suite à l'adoption du CE. En effet, il a été démontré que les firmes utilisent les TI pour réagir aux influences des compétiteurs ou pour renforcer leurs positions concurrentielles (Dos Santos et Pfeffers, 1998) que l'adoption du CE peut émerger comme un état de dépendance envers les fournisseurs ou les clients et que l'intervention de l'Etat représente un moteur essentiel de diffusion et d'implantation des progrès technologiques (Javalgi, Martin et Todd, 2004).

Sur le plan pratique, les travaux de Rapp. A, Schillewaert, et Rapp. T, (2007) montrent que l'adoption du EC est influencée positivement par respectivement l'infrastructure technique et les pressions externes alors que la création de valeur du CE se réalise à travers les quatre inducteurs selon l'ordre suivant : efficience, nouveauté, lock-in et complémentarité. Il en découle que chaque entreprise serait en mesure de prendre la décision « appropriée » du CE en prenant en compte les données contextuelles internes et externes. Il importe alors d'évaluer si ce choix stratégique est aligné avec les orientations stratégiques générales de l'entreprise afin de générer les résultats escomptés par le CE.

1.3. Le modèle d'affaires du CE centré sur l'alignement stratégique

L'intérêt porté au processus d'alignement stratégique s'explique par, au moins, les quatre arguments suivants. D'abord, les investissements dans le CE ne sont pas suffisants et garants de la création de valeur

(Bergeron et Raymond, 2008) ; il importe alors de déterminer les conditions dans lesquelles une telle valeur est susceptible d'être générée. Ensuite, l'alignement stratégique aide à séquencer les initiatives de transformation pour cultiver de la valeur de manière durable tout en assurant un certain degré de cohérence avec la stratégie de l'entreprise dans le choix des projets clés (Bellaj, 2014). De plus, le défaut d'alignement stratégique constitue la première source de difficulté des entreprises à extraire de la valeur de leurs SI (Venkatraman, Henderson et Oldach, 1993 ; Gay, Charlesworth et Esen, 2007). Enfin, il est démontré empiriquement que l'alignement stratégique a un effet positif sur la création de valeur du CE (Alawneh et Hattab, 2009).

L'originalité de la présente étude réside dans la tentative d'intégrer les facteurs susceptibles de générer de la valeur au CE tant en amont qu'en aval du processus de création de valeur appliquée à un contexte relativement nouveau en matière de l'adoption du CE.

2. Analyse du processus de création de valeur du commerce électronique dans une banque tunisienne

La recherche porte sur une étude de cas dans un contexte émergent où le CE est dans une phase embryonnaire, les initiatives sont relativement timides et les pratiques sont encore primitives (Bellaj, 2015). L'étude est réalisée auprès de la Société Tunisienne de Banque (STB) est une banque commerciale d'investissement et d'affaire fondée en 1957 répartie sur 119 agences avec 12 bureaux de change et 181 guichets automatiques de banque. L'effectif s'élève à 2405 personnes. Dans une recherche constante du développement des services, la STB a mis en œuvre en 2000 le CE par la Société Monétique de la Tunisie (SMT) sous différentes formes (B to B et B to C). Elle est chargée à partir du service *clic to pay*, de l'adhésion des entreprises au système de paiement électronique.

2.1. Méthodologie de l'étude de cas

L'étude s'inscrit dans le cadre d'une recherche qualitative en adoptant une démarche abductive dans la mesure des allées retours entre les connaissances théoriques et les observations empiriques. Le recours à l'étude de cas se justifie par le fait qu'elle permet de tirer des leçons reflétant une opportunité à observer ou une expérience à considérer dans l'élucidation du phénomène d'une manière holistique (Yin, 2003). Selon l'auteur, le design basé sur une étude de cas unique est considéré comme critique pour gagner aussi bien de la fiabilité que de la validité.

Un entretien semi-directif avec un chef d'agence de la Société Tunisienne de Banque (STB), pionnière dans l'adoption du CE est alors mené. Le guide d'interview porte sur les conditions, le processus, les acteurs et les résultats de la mise en place du CE. La technique d'analyse de contenu est employée.
Les données collectées apportent des éclaircissements sur les processus d'adoption et de création de valeur du CE dans l'entreprise en question.

a. Les déterminants de la stratégie du CE dans un contexte émergent

La stratégie du CE à la STB repose sur les trois déterminants de base relevant du technologique, de l'organisationnel et de l'environnemental.

2.1.1. La technologie comme déclencheur de la stratégie du CE

Toutes les agences de la STB sont équipées d'une infrastructure développée au niveau des technologies de l'information et de la communication (TIC) jugée nécessaire pour gérer les transactions en ligne. Il est affirmé que « *Dans le cadre du développement des activités en ligne, la STB a, la première, procédé à l'exploitation de terminaux de paiement électronique tout en se dotant d'un serveur de monétique considéré comme un joyau technologique sur la place financière en Tunisie* ». La décision de l'adoption du CE semble être fondée sur l'existence d'un park informatique propice pour l'exécution des transactions sécurisées renforcé par le développement des compétences ainsi que la généralisation des

connaissances spécifiques. Une telle décision, favorisée par l'engagement de la direction, dénote l'existence d'une réflexion stratégique misant sur l'innovation.

2.1.2. L'organisation face au modèle bureaucratique

Parallèlement aux investissements en infrastructure, la STB s'est efforcée de rendre le contexte organisationnel favorable à la culture numérique. Selon l'interviewé, l'adhésion des employés au fonctionnement du CE est rendue possible par les connaissances et les capacités organisationnelles « *C'est dans ce cadre que s'inscrivent les nombreuses actions de formation planifiées par le centre de formation intégré, en accord avec la stratégie de la Banque* ». Le bilan de cette stratégie de formation montre qu'environ 100 actions sont organisées annuellement en inter-entreprises en faveur de plus de 340 participants.

Les propos sur la structure organisationnelle dénotent que la STB se dote d'une structure centralisée avec une communication verticale et d'un fort degré de formalisation. Ceci s'explique par le caractère semi-public orienté vers le fonctionnement bureaucratique pouvant ne pas coïncider avec celui du numérique.

Ces résultats concordent les travaux de Damanpour, (1991) qui argue l'existence d'une relation positive entre la mise en œuvre du CE et le niveau des connaissances et expériences organisationnelles mais divergent quant à la nature de l'influence prédite de la structure de l'entreprise sur la stratégie du CE considérée dans la présente étude comme étant une variable inerte due à la prédominance d'une structure bureaucratique fortement formalisée et d'un interventionnisme des pouvoirs publics.

2.1.3. L'environnement comme facteur de premier ordre

Conjointement à une structure bureaucratique et au formalisme qui caractérise le fonctionnement de la STB, l'interlocuteur reconnait que l'Etat adopte une attitude positive à travers des réglementations favorables et un cadre juridique pour renforcer les décisions d'instauration du CE dans les entreprises Tunisiennes. Il annonce que « *La solution électronique clic to pay est en total respect avec les dernières réglementations nationales en matière de CE».* De plus, la décision quant à l'adoption du CE est influencée par, non seulement les exigences de ses clients qui dépendent de plus en plus des nouvelles TI, mais aussi, du réseau interne qui relie la STB avec la Banque Centrale Tunisienne (BCT) ayant instauré un système de transactions électroniques avec tous les partenaires.

Ces résultats appuient la supposition que le contexte environnemental détermine les choix stratégiques dont celle du CE et s'alignent avec ceux de Dos Santos et Pfeffers, (1998), relatifs à l'influence de la concurrence, la pression des fournisseurs et des clients ainsi que les réglementations. Ainsi, l'analyse s'est focalisée sur les des déterminants de la stratégie du CE qui sont en mesure de favoriser la création de valeur.

b. Inducteurs de la valeur ajoutée du commerce électronique

Les résultats de l'analyse de contenu permettant d'évaluer le potentiel du CE en termes d'efficience, de complémentarité, de lock-in et de nouveauté sont synthétisés dans le tableau 1:

Tableau 1 : Résultats de l'analyse de contenu

Inducteurs de valeur ajoutée	Résultats saillants	Argumentation et Inférence
Efficience	- Diminution des charges électroniques (coûts de transaction, d'échanges d'information…). - Rapidité de la circulation de l'information.	- Existence d'un système d'information performant. - Compétences des utilisateurs. - D'où l'existence de chances élevées d'efficience.
Complémentarité	- Degré jugé fort de complémentarité entre les services en et hors ligne. - Degré moyen de complémentarité entre les ressources de la banque (technologie, équipements…) et les compétences dans le domaine des TIC.	- Engagement et déploiement des ressources. - Qualité du système de formation. - Signes de complémentarité associés à l'efficience pouvant contribuer à la création de valeur.
Lock-in	- Programmes de fidélisation des clients (économie des coûts, du temps et services après-vente).	- Harmonisation stratégique. - Engagement actif des clients.
Nouveauté	- Innovation de divers services sur internet (STB net » et « click to pay ») et de nouvelles structures de transaction.	- Alignement avec la politique générale.

Ces résultats apportent une justification empirique quant aux quatre sources de création de valeur selon le modèle d'Amit et Zott, (2001) dans des contextes différents, sans pour autant prétendre à la validité externe vu qu'il s'agit d'une étude de cas unique. Le CE constitue un investissement, quoique irréversible, dont le retour serait garanti. Il importe à ce niveau de s'interroger sur l'effet modérateur ainsi que le degré de concordance entre la politique générale et la stratégie du CE.

Analyse de l'effet modérateur de l'alignement stratégique

L'analyse repose sur le postulat que l'adoption du CE, compte tenu de certains antécédents, engendre une transformation au sein de l'organisation en influant sur les processus et les coûts (Cline et Guynes, 2001). Cette transformation qui touche la structure, les SI, les systèmes de production, la logistique, le management des ressources humaines, les systèmes de mesure de performance (etc.,) est en mesure de favoriser l'alignement stratégique.

En interrogeant l'interviewé sur ce processus de transformation, deux résultats sont relevés : d'une part, il existe une certaine intention stratégique quant à la pertinence de l'adoption du CE à la STB. D'autre part, le *strategic fit* est mitigé quant à l'ampleur des transformations réalisées. Le changement semble être subi plutôt que voulu ; ce qui remet en cause l'orientation déterministe beaucoup plus volontariste de la direction générale de la STB.

Il en découle que si le CE procure à la STB des avantages, cela s'explique, en partie par l'émergence d'un certain degré de cohérence entre la stratégie générale de la banque et celle du CE. Ce résultat corrobore les travaux de Venkatraman, Henderson et Oldach, (1993), qui montrent que la cohérence entre la stratégie générale de l'entreprise et celle du SI maximise la valeur créée.

3. Discussion

Le résultat saillant de l'étude réside dans l'influence des facteurs environnementaux dans le processus de création de valeur du CE. Une telle influence est en mesure de dicter les actions des dirigeants plaçant l'objet de gestion au niveau macro-organisationnel compte tenu des interactions entre les éléments

endogènes et ceux exogènes du *business model*. Dès lors, l'analyse du phénomène prend une autre dimension fondée sur l'approche sociotechnique selon la conception d'Emery et Trist (1965).

Le recours à l'approche sociotechnique se justifie par le besoin de comprendre les interactions entre les divers facteurs puisque la décision d'adoption du CE s'insère dans le cadre d'un environnement turbulent. Comme l'affirme Scott (1987, p. 149):

> *"Organizations are viewed as interdependent with environments in a number of senses. Participant's perceptions of their environments together with the attention structures of organizations result in enacted environments that are products of both environmental features and organizational information systems. Environments directly affect organizational outcomes, which in turn affect subsequent perceptions and decisions. Environments influence organizations, but organizations also modify and select their environments. And environments supply the materials and ingredients of which organizations are composed".*

Il apparaît alors que l'efficacité du CE est appréhendée en fonction des interactions entre trois facteurs à savoir hommes, machines et contexte. Lorsque l'interactionnisme est entretenu par les facteurs de l'environnement, il importe d'analyser, selon les termes d'Emery et Trist (1965) *"the causal texture of organizational environments"* dans le but d'une optimisation conjointe des divers facteurs. Une telle texture est bridée en fonction de "*the extent of interconnecting relationships"* entre ces facteurs.

Un tel processus aboutit à une classification et positionnement interactif des variables explicatives de la création de valeur du CE en distinguant entre les régulateurs, les réalisateurs et les spécificateurs du système comme le montre la figure 1:

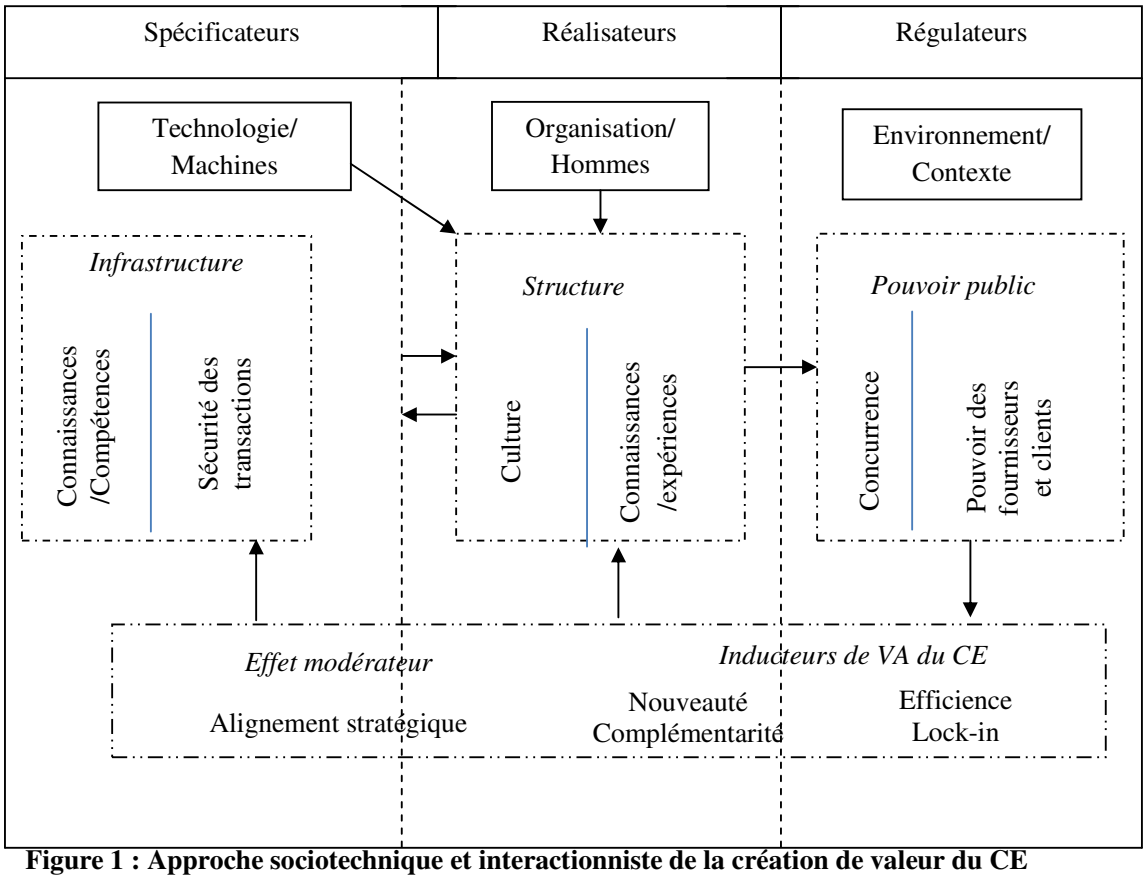


Figure 1 : Approche sociotechnique et interactionniste de la création de valeur du CE

Les régulateurs permettent au système de se maintenir tout en garantissant sa stabilité et donnant sens à l'action. Ils revoient au contexte qui détermine le degré d'efficacité d'une stratégie de CE en agissant positivement sur les autres éléments du système. Par le même principe, lorsque l'effet est négatif, les résultats ne seraient pas optimisés et les dysfonctionnements suscitent des adaptations. Plus particulièrement, l'intervention des pouvoirs publics à travers l'institutionnalisation des actions, les variations des concurrents dans un cadre légal et éthique ainsi que les comportements « rationnels » des fournisseurs et des clients selon une logique de partenariat sont en mesure d'assurer la *sustainability* du système en termes de valeur ajoutée. Ces facteurs agissent également sur les réalisateurs faisant trait au contexte interne dans lequel s'engage un processus d'"incorporation of organizational structure by incorporating environmrntal structure" (Scott, 1987, p. 168).

En outre, il importe d'adapter la structure organisationnelle afin de "infuze with value beyond the technical requirements of the task at hand" selon les termes de Selznick (1957, p. 17). Ce sont les réalisateurs qui accomplissent le processus d'adaptation structurelle en créant une culture favorable au numérique et développant des connaissances et des expériences dans le domaine. L'efficacité de la stratégie du CE est mesurée par les deux inducteurs de valeur ajoutée à savoir la nouveauté et la complémentarité.

La catégorie de spécificateurs regroupe les déterminants déclenchant la décision de l'adoption d'une stratégie *e-business* puisque l'infrastructure et les compétences technologiques ainsi que les mécanismes de sécurité des transactions justifient une telle décision. S'ajoute également l'effet modérateur de l'alignement stratégique. Il en résulte une focalisation sur les ressources internes, une tendance au partage des compétences et des coûts et une cohérence interne entre les choix stratégiques.

Ainsi et au au-delà d'une démarche linéaire de compréhension des phénomènes, la présente recherche suggère une approche d'ingénierie et de gestion concomitante, réduisant ainsi le degré de leur complexité tout en mobilisant les préceptes de l'approche sociotechnique.

Conclusion

La présente étude s'inscrit dans le cadre d'une grande volonté de déterminer les facteurs concourant à la création de valeur du CE dans un contexte émergent. Une revue de la littérature permet de dégager un *business model* relatif à la création de valeur du commerce électronique. Les résultats témoignent que la détermination de la création de valeur du CE se caractérise par la complexité et la multi dimensionnalité.

En se basant sur le fait que le CE reste encore un terrain récent et le manque des travaux relatifs au domaine du CE en Tunisie, la méthode de cas est adoptée afin de positionner ce phénomène dans son contexte réel et de lui ajouter des sources de preuves.

La triangulation des résultats avec l'approche sociotechnique aboutit à une classification des déterminants de l'adoption du CE en régulateurs, réalisateurs et spécificateurs. Il en ressort que la stratégie devient cruciale pour assurer la viabilité à travers des négociations avec les acteurs externes, des variations garante d'une sélection de l'organisation et des technologies appropriées et intégrées.

Certes, les implications sont multiples tant sur le plan théorique, méthodologique que pratique. Sur le plan théorique, l'étude de l'apport du CE est à appréhender comme un système complexe et dynamique. Sur le plan méthodologique, l'analyse systémique est à engager permettant, non seulement, d'agencer ses composants mais aussi de tenir compte des interactions pouvant influencer les résultats. Sur le plan pratique, trois implications peuvent être livrées. D'abord, la mise en œuvre d'une stratégie de CE s'inscrit dans le cadre d'une approche futuriste dont les retombées seraient perceptibles à long terme. Ensuite, le facteur humain émerge directement dans la spécification et la stabilisation et indirectement dans la régulation du système. Enfin, le rôle des dirigeants constitue un déterminant crucial pour l'efficacité du CE.

Pour le cas de la Tunisie, le CE constitue une piste prometteuse pour assurer la viabilité des entreprises. En outre, compte tenu des gaps technologique, managérial et structurel pouvant exister, un nouveau

regard au mode de fonctionnement, de gouvernance et de pilotage, est fortement recommandé afin de tirer profit des avantages procurés par la solution du *e-business*.

La poursuite des recherches futures peut être fondée aussi bien sur les apports de cette étude que sur ses limites. Il serait intéressant de mener une étude longitudinale afin de revisiter l'impact les facteurs environnementaux de premier ordre en s'interrogeant sur la nature des pressions gouvernementales avec le changement de l'orientation de l'Etat, la quête vers la transparence, l'éthique et la concurrence loyale qu'impose le processus démocratique dans le pays.

De plus, le comportement des dirigeants, tantôt conformiste tantôt mimétique soulève un questionnement sur le comportement stratégique et les systèmes de valeurs des dirigeants dans la « nouvelle » forme d'organisation digitale.

Références

Alawneh, A. et Hattab, E. (2009) « An empirical study of sources affecting e-business value creation in Jordanian banking services sector », *The international Arab Journal of e-Technology*, 2-7 juin.

Amit, R. et Zott, C. (2001) « Value creation in e-business», *Strategic Management Journal*, 22 (6/7), 493-520.

Armstrong, CP. et Sambamurthy, V. (1999) « Information Technology Assimilation in Firms: The Influence of Senior Leadership and IT Infrastructures ». *Information Systems Research,* 10 (4), 304-327.

Attewell, P. (1992) « Technology Diffusion and Organizational Learning: The Case of Business Computing ». *Organizational Science*, 3 (1), 1-19.

Bégin, L, Tchokogué, A et Boisvert, H. (2001), Pour un déploiement stratégique du commerce électronique, Isabelle Quentin éditeur, Montréal.

Bellaj, M. (2015) « Initiatives d'adoption des affaires électroniques et performances des petites entreprises », *Revue internationale PME,* 28 (2), 57–85.

Bellaj, M. (2014) « Gestion de la relation client et internet : Les impératifs stratégiques pour la mise en place d'un projet e-GRC par les PME ». *Revue Française de Gestion,* 23 (8), 119-137.

Bergeron, F, Raymond, L et Rivard, S. (2001) « Strategic Alignment and Business Performance: Operationalizing and Testing a Covariation Model ». *Omega*, 29, 125-142.
Bergeron, F et Raymond, L. (2008) « Enabling the business strategy of SMEs through e-business capabilities: A strategic alignment perspective ». *Industrial Management & Data Systems*, 108 (5), 577-595.

Cline, MK. et Guynes, SC. (2001) « The impact of information technology investment on enterprise performance: A case study ». *Information Systems Management*, 18, 1–7.

Damanpour, F. (1991) « Organizational Innovation: A Meta-Analysis of Effects of Determinants and Moderators ». *Academy of Management Journal*, 343, 555-590.

Delone, WH et Mclean, ER. (1992) « Information Systems Success: The Quest for the Dependent Variable ». *Information Systems Research*, 3 (1), 60-95.

Dos Santos, BL et Pfeffers, K. (1998) « Competitor and Vendor Influence on the Adoption of Innovative Applications in Electronic Commerce ». *Information & Management*, 34, 175-184.

Emery, FE et Trist, EL. (1965) « The causal texture of organizational environments ». *Human Relation*, 18, 21-32.

Gay, R, Charlesworth, A et Esen, R. (2007), Online marketing: a customer–led approach, OXFORD University Press Inc, New York.

Gulati, R, Nohria, N et Zaheer, A. (2000) « Strategic networks ». *Strategic Management Journal*, 21 (3), 203–215.

Henderson, JC et Venkatraman, N. (1993) « Strategic Alignment: Leveraging information technology for transforming organizations », *IBM Systems Journal*, 32 (1), 4 -17.

Hirschheim, R et Sabherwal, R. (2001) « Detours in the path toward strategic information systems alignment », *California Management Review*, 44 (1), 87-110.

Hong, W et Zhu, K. (2006) « Migrating to internet-based e-commerce: Factors affecting e-commerce adoption and migration at the firm level », *Information and Management*, 43, 204-225.

Javalgi, RG, Martin, CL et Todd, PR. (2004) « The export of e-services in the age of technology transformation: challenges and implications for international service », *Journal of Services Marketing*, 18 (6/7), 560-573.

Krach, K. (2000), B2B Myths- and the Truth Underneath*, Strategy and Business*, Fourth Quarter.

Porter, ME. (1985), Competitive Advantage: Creating and Sustaining Superior Performance, Free Press, New York.

Rapp, A, Schillewaert, N et Rapp, T. (2008) « An empirical analysis of e-service implementation: antecedents and the resulting value creation »*, Journal of Services Marketing*, 22 (1), 24-36.

Raymond, L. (2001) « Determinants of Web Site Implementation in Small Business Internet Research», *Electronic Network Applications and Policy*, 11 (5), 4-11.

Salnoske, K. (1997) « Building Trust in Electronic Commerce », *Credit World*, 85 (6), 9-11.

Scott, RW. (1987), Organizations: Rational, Natural and Open Systems, Englewood Cliffs NJ.

Selznick, P. (1957), Leadership in Administration, Evanston, III, Row Peterson.

Trouong, D et Rao, SS. (2002) « Development a contingency model for adoption of electronic commerce », *Decision Science Institute, annual meeting proceeding,* 29-41, Dublin, Ireland.

Venkatraman, N, Henderson, JC et Oldach, S. (1993) « Continuous Strategic Alignment: Exploiting Information Technology Capabilities for Competitive Success ». *European Management Journal*, 11(2), 139 – 149.

Williamson, OE. (1979) « Transaction cost economics: the governance of contractual relations », *Journal of Law and Economics*, 22, 233–261.

Yin, RK. (2003), Case Study Research: Design & methods, Sage Publications, London.

Zhu, K, Kraemer, K, Xu, S et Dedrick, J. (2004) « Information Technology Payoff in E-Business Environments: An International perspective on Value Creation of E-Business in the Financial Services Industry », *Journal of Management Information Systems*, 21(1), 17-54.

Patrimonial Liability of the Managers Who Caused the Bankruptcy of a Football Club - A Case Study

Sandra Gradinaru, University Al. I Cuza, Iasi,
sandra.gradinaru@yahoo.com

Abstract

Present paper aims to analyze the possibility to attain the patrimonial liability against the managers who caused the bankruptcy of a football club. As a rule, any type of company, even a football club, goes into liquidation precisely because by selling the assets it could pay all the debts accumulated.There are situations when, throughout the liquidation procedure of a company the liquidator finds out that the funds obtained are not enough to cover all the debts, context in which, it must exist a system of legal and patrimonial protection of the creditors.Romanian legislation allows the courts that in such circumstances to rule that the debts of a bankrupt legal entity are to be paid from the personal patrimony of the persons who caused the bankruptcy.The economic context of Romania has made the courts in the last decade to be confronted with an avalanche of claims for the patrimonial responsibility filled by the Romanian tax authorities. The Romanian lawmaker has expressly regulated the patrimonial liability against persons who caused the bankruptcy in Law no. 85/2006 (on bankruptcy proceedings), and yet there are situations in the jurisprudence when tax authorities filled unlawful claims for patrimonial liability without any kind of evidence in support of their request.Given the financial implications of admitting such a complaint, we consider that present paper is of interest both to the academic and business environment.

Keywords*:* bankruptcy, liquidation, patrimonial liability, insolvency.

I. Factual situation

In fact, because of the numerous state budget debts accumulated, the Romanian Public Finances Administration and the Romanian Authority for Capitalization of State Activities requested the initiation of bankruptcy proceedings against the Football Club X.

The request was admitted in principle and it commenced the insolvency proceedings against the club. The judge also appointed a judicial administrator in charge of checking balance sheets, identification of all debts and creditors in order to subsequently, by liquidating the assets owned by the club, to pay all debts to the state budget and to any other identified creditor.

During the procedure, the liquidator discovered that the value of the debts exceeds by far the value of the assets, context in which the bankruptcy judge has ordered the liquidator to draw up a report of the procedure by which to identify the persons responsible for the state of insolvency and finally for the bankruptcy of the Club X.

After the investigation, the liquidator did not identify any person directly responsible for the bankruptcy of the Club, stating that the bankruptcy was not caused by fraudulent actions of the managers but only by the accumulation of debts.

Even though, Romanian Public Finances Administration filed a complaint to the bankruptcy judge requesting that the managers be forced to bear the unpaid debts of the Club from their own patrimony, based on Law no. 85/2006[i].

II. Legal framework

Romanian legislation, namely Law no. 85/2006, took into consideration the situation in which the bankruptcy isn`t a matter that intervened just as a cause of the economic context but also as a result of the guilty actions of certain persons in the management of the company.

According to art. 138 par. 1 of the Law no. 85/2006: *"if in the report drawn up in accordance with the provisions of Art. 59 par. 1[ii] persons who are liable for the debtor's bankruptcy are identified, at the request of the judicial administrator or the liquidator, the bankruptcy judge may order that part of the bankrupt company's debts to be paid by the management of the company and any other person who caused the debtor's insolvency status".*

Thus, a number of conditions have been laid down, which, once fulfilled, may lead to attracting the patrimonial responsibility of the managers, namely if:

- "they have, for personal benefit, ordered the continuation of an activity clearly leading to the bankruptcy of the company;

- they kept a fictitious accountancy, made some accounting records disappear, or did not keep the accounting in accordance with the law".

Under such circumstances, we note that not every kind of activity that led to the insolvency is likely to lead to patrimonial liability, but only those situations expressly provided by the legislator.

Considering that in the majority of the cases the main creditor is the state, the legislator also took into consideration the situation where the judicial administrator or the liquidator did not fulfill the obligation to indicate the persons responsible for the bankruptcy of the company or did not introduce the request for attracting the patrimonial liability.

Therefore, according to art. 138 par. 3 of the Law no. 85/2006 *"if the judicial administrator or, as the case may be, the liquidator did not indicate the guilty persons of the debtor's bankruptcy and or decided that it is not appropriate to introduce the action provided in par. (1), it may be introduced by the creditor who holds more than 50% of the value of the claims registered on the creditor's table".*

We notice that the law limits the right of the main creditor to submit the application exclusively for two situations:

- the liquidator did not indicate the persons guilty of bankruptcy, although these existed (in this situation, the context in which the liquidator failed to identify any person directly liable for bankruptcy is not took into consideration);

- The liquidator, although identifying the persons responsible for bankruptcy, has decided not to introduce the claim for patrimonial liability.

In the following, we analyze the particular situation of a football club gone bankrupt for which the Romanian state, through his administrations, filed a claim for patrimonial liability of the managers.

Iii. The Request of the Creditor

Romanian Public Finances Administration as main creditor, in support of the claim for patrimonial liability of the managers alleged that:

"- they have, for personal benefit, ordered the continuation of an activity clearly leading to the bankruptcy of the company;

- they kept a fictitious accountancy, made some accounting records disappear, or did not keep the accounting in accordance with the law",

actions penalized by art. 138 par. 1 let. c) and d) of Law no. 85/2006.

The complainant argued that the insolvency of the debtor, found by the bankruptcy judge in the sentence by which he ruled the insolvency proceedings, is only the result of inadequate overall management of the football club.

The main argument of the complainant was that although the managers knew about the precarious situation of the company, they haven`t applied themselves for insolvency procedure. The creditor claims that the guilt of the managers consists in the fact that, in the very moment in which the company was in impossibility of paying its debts, they haven`t suspended the activity and also haven`t notified the creditors, thus contributing to the accumulation of new debts. Not realizing profit, but on the contrary, at a loss, they jeopardized the financial situation of the company.

Therefore, by failing to comply with the aforementioned request, the administrator tacitly accepted the increase of debtor's obligations towards the consolidated state budget and, indirectly, ordered, for personal benefit, the continuation of the debtor's activity, impeding its precarious situation by adding accessories to the existing debts.

The insolvency corroborated with the managers inaction not to formulate the action provided by art. 27 of the aforementioned law was considered by the creditor to lead to the conclusion that the managers have ordered the continuation of an activity that led to the cessation of payments, for personal interest and not in the company's interest, deed stipulated by art. 138 letter c of the Law no. 85 /2006.

Romanian Public Finances Administration also pointed out that during the tax inspections and during the liquidation period, the managers did not provide the control bodies with the club's accounting records, in spite of several requests. What they failed to mention in their claim is the fact that the records have not been requested from the accountant but from the managers, being obvious that the managers couldn`t provide accounting records.

Even so, the creditor claimed that the company administrators and management bodies are responsible for organizing and managing accounting records.

In conclusion, the creditor stated that the fact the managers did not provide the liquidator with any of the accounting documents, only confirms that: *"fictitious accounting was kept, the management made some accounting documents disappear or the accounting was not kept in accordance with the law*", all of which had the purpose of concealing data unfavorable for the club.

Iv. Argument Invoked By the Defense

IV.1. Procedural inadmissibility of the creditor's claim

As stated above, art. 138 par. 3 of the Law no. 85/2006, allows the main creditor who holds more than 50% of the value of debts to file a claim for patrimonial liability of the managers.

In this particular case, given the factual situation, it is obvious that the Romanian Public Finances Administration or in that matter any other creditor, have no legal possibility to file the request for patrimonial liability.

The argument is simple and deducted as per a contrario interpretation of the legal text. Romanian legislation allows the main creditor to file the request only if:

- on the one hand, *the liquidator, in his report, failed to mention the persons responsible for bankruptcy.* The intention of the Romanian legislator for this matter is that if the liquidator has already identified such persons but haven`t nominated them in the report. Thus, in the situation in which even if the liquidator investigated the causes of bankruptcy, he concluded that the bankruptcy is not the result of the actions of managers but the result of an economic crisis, the main creditor has no right to file the complaint.

- On the other hand, *the liquidator himself hadn`t filed the complaint for patrimonial liability.* In our case, the liquidator not only filed the complaint, but also the bankruptcy judge ruled that there is no person responsible for the bankruptcy of the football club.

Given that the provisions of art. 138 par. 3 of Law no. 85/2006 are inapplicable in this case, it is obvious that the complaint filed by the state administration is inadmissible.

Even so, in the following, we analyze the merits of the complaint in order to prove that the request is not only inadmissible but also groundless.

IV.2. The merits of the request filed by the main creditor

Managers whose liability was requested demanded the rejection of the claim, on the one hand because it was unmotivated and, on the other hand, the creditor did not submit sufficient evidence to support the causal link between the alleged actions and the damage.

Including the specialized doctrine pointed out that the mere indication in the request of the actions as provided by art. 138 is not enough, having to show and prove what the facts in concrete are and especially how these facts led to the creation or worsening of the state of bankruptcy (Avram, 2007).

In the following, we are going to analyze the arguments of the defense structured for each alleged action separately:

Regarding the action consisting in *„the continuation of the club's activity in the personal interest*", in order to attract the patrimonial responsibility of the managers, the creditor had to prove concretely:

- the alleged personal interest of managers to continue the activity;

- the fact that the club, through the continuation of its activity, was obviously ending up in cessation of payments.

The mere failure to not file the petition for bankruptcy procedure under article. 27 is not an activity sanctioned by the legislator in the art. 138 that regulates the patrimonial liability.

In this respect, the recent jurisprudence of the Iasi Court of Appeal, is eloquent revealing that: *"The Court considers that art. 138 lit. c of Law no. 85/2006 does not sanction the decision to continue an activity, as the insolvency is imminent, but the bad faith of the persons in charge of the company, who decided to continue an inefficient business activity, exclusively for personal interest, with the consequence of prejudicing the creditors of the company.*

The fact that the company continued to operate, as it accumulated more debts to the state budget, is not enough to attract responsibility, as long as the personal interest of the managers in the continuation of its activity has not been proven" (Iasi, 125/2016).

Moreover, the specialized literature revealed that undergoing a non-performing management activity and obtaining negative results, does not attract by itself the incidence of the provisions of art. 138, which sanctions only the limitative actions that have as consequence the bankruptcy of the company (Maria, et al., 2009).

Regarding the allegation that club managers *„kept fictitious accounts, they made some accounting documents disappear or they did not keep the accounting in accordance with the law"* a conclusion based only on a simple presumption, deducted from the fact that the accounting documents were not provided, it is obvious unfounded.

In this respect, including the creditor in his application acknowledges that „the lack of accounting evidence or not keeping a lawful accounting is not in itself a damaging action".

Furthermore, reading the text of the law cited above, the activity sanctioned by art. 138 lit. d) is not in itself capable of provoking a state of insolvency, and it is impossible to establish a relationship of necessity between this deed and the bankruptcy.

In support of the defense arguments, we observe that the jurisprudence of the Bucharest Court of Appeal is edifying: *"With regard to the illicit omission consisting in not keeping an accountancy in accordance with the law (art.138 paragraph 1 letter d), thesis III Law no.85 / 2006), hypothesis invoked by the State, the Court notes that it does not state and does not prove the causal mechanism by which the imputed illicit omission would have led to the bankruptcy of the debtor.*

The complainant confines himself to claims without substantiated assumptions and unjustified presumptions, but which do not fulfill his procedural obligation to prove the causal relationship between the accounting of the company and its state of insolvency" (Bucharest, 911/2015). The same ruling argument can be found also in the unanimous jurisprudence of Iasi Court of Appeal which stated that: *"the facts enumerated in this text are characterized by their intentional demeanor, which must be proved for each person of those considered responsible"* (Iasi, 51/2016).

Regarding the case provided by art. 138 lit. d) the final thesis, in the sense that the managers did not keep the accounting in accordance with the law, the doctrine pointed out that the creditor must prove this aspect, only the failure to submit some accounting reports to the Financial Administration and to the Office of Commerce Registry is not equivalent with keeping an unlawful accounting. Failure to report, may consist a missdemeanor, but by its very nature, this act can not constitute a legal basis that would lead to the patrimonial liability of the managers, in order for them to pay the debts of the bankrupt company (Maria, et al., 2009).

We therefore observe that the creditor's claims, as argued by the defense, are mostly of a general and theoretical nature, without the objectively necessary character and are not based on any evidence, context in which the only solution that could be pronounced by the court is the rejection of the claim as groundless.

V. Final Decision of the Court

The Court analyzed both the arguments and by its sentence ruled the dismissal of the State claim for patrimonial liability of the football clubs managers.

It argued that, in order to attract the personal liability of the manager of a company based on the provisions of art. 138 of the Law no.85 / 2006, the interested party must prove that the conditions of the Civil Code have been met, namely the existence of an injury, an illegal action, the existence of a causal relationship between the illicit deed and the damage, and the most important, the guilt of the persons who caused said damage.

In addition, we note the special character of the liability in question. To this extent, although the Court argued that the guilt of the managers should be appreciate in concreto, requiring a specific causality between the deed and the damage, we consider that the alleged facts, to the extent that they were culpably committed and caused injury, must be able to contribute to the bankruptcy of the debtor company.

The mentioned law on the liability of the managers does not establish an objective liability for the damage representing the total claims of the creditors, but a liability in which the imputed facts must be proved both in fact and in law. As well as under the special conditions stipulated in the Law no. 85/2006, for each of the listed actions, the general conditions of the civil liability should acquire specific peculiarities depending on the case.

As we can observe, there is no statutory presumption of guilt and liability in the charge of the debtor company manager.

As follows, analyzing the conditions of the special liability, the court stated that:

In regard of the activity sanctioned by art. 138 let. c the creditor limited itself to making simple assessments as to the culpability of the managers, which, of course, cannot convince the court that, this was the reason the company became insolvent and finally bankrupt.

Therefore, there is no presumption that, even if the managers continued the debtor's activity in the prejudice of the creditors, this was premeditated.

Regarding the deed provided by art. 138 letter d of the Insolvency Law, namely: *"kept a fictitious accounting, made some accounting documents disappear or did not keep a lawful accounting"*, the creditors' presumptions could not be corroborated with other evidences. Thus, the court concluded that the applicant's arguments cannot be upheld.

On the other hand, lawless accounting does not in itself constitute a singular condition for attracting patrimonial responsibility; since it cannot be deduced from the causal link between the unlawful accounting and the premeditated aspect of the debtor's bankruptcy.

Consequently, the court considered that it was not only based on the assessments that it was possible to obtain the personal patrimonial liability of the managers, and dismissed the calim as unreasonable.

Conclusions

Patrimonial liability of persons who caused the bankruptcy of a company and forcing them to pay the company's debts from their own funds may seem a viable solution for the Romanian state. However, filing unjustified or unsubstantiated claims only hinders the judiciary system and creates additional costs for the state budget.

Furthermore, although the purpose of such claims is to recover money for the state budget, we note that there are practical situations where some applications are manifestly unfounded, yet they are judged over a period between two and five years period in which the Romanian state spends more with the trial of the case than the eventually recovered funds.

There are even situations where the state administration introduces such claims by inertia without verifying whether, in the event that the application is admitted, the persons liable to pay the debts of the bankrupt companies have such resources in their personal budget. Otherwise, we come to the situation where, although the state has obtained a favorable court decision, it will have no way of actually obtaining the respective amounts.

As shown, in this case, not only the claim filed by the tax authorities it was unfounded and unproven, but it was tried for seven years, during which all human and financial resources involved in the process, could have been used more effective.

In conclusion, although in principle we agree that the state should have available legal means to recover debts of bankrupt companies, we believe that these methods should not be used abusively and arbitrarily by the state.

---

[i] Published in the Official Gazette, Part I no. 359 of 21/04/2006, Entry into force: 20/07/2006.

[ii] Detailed report on the causes and circumstances leading to insolvency, mentioning the persons to whom it would be imputable, and the existence of the prerequisites for the engagement of their liability under Art. 138.

References

Avram Aurica Insolvency procedure. The liability of the management - Bucharest : Hamangiu, 2007.

Bucharest Court of Appeal - Bucharest , Decision. 911/2015.

Iasi Court of Appeal - Iasi , Decision 125/2016.

Iasi Court of Appeal Decision [Case]. - Iasi : Court of Appeal, 51/2016.

Iasi Tribunal [Case]: 5160/99/2010/a2 - Iasi, Sentence 1224/2015.

Maria Pivniceru Mona, Claudia-Antoanela Susanu and Mihai Susanu Bankruptcy procedure. Jurisprudence - Bucharest : Hamangiu, 2009.

The Possibilities of Microfinancing in Slovakia

Daniela Majerčáková, Comenius University in Bratislava, Faculty of Management FM CU, Bratislava, Slovak Republic, daniela.majercakova@gmail.com

Alexandra Mittelman, Comenius University in Bratislava, Faculty of Management FM CU, Bratislava, Slovak Republic, alexandra.mittelman@fm.uniba.sk

Abstract

The aim of this paper is to describe the possibilities of microfinancing on the global market as well as on the Slovak market, too. Microfinancing is one of those small ideas from which the financing tool with the great influence has come out. This idea was brought by Muhammad Yunus who provided small loans to local people as a solution for poverty. The different banks already tried to provide loans to poor households, however this provision was not effective, at all, and it ended with wasted subsidies and corruption. Moreover, economic theories also issued warnings against providing loans to low- income households. Nowadays these microloans without guarantee, are provided by microfinance institutions to the clients who were refused as not profitable by banks. Regarding the fact that there are not any institutions that deal with microfinancing we are going to find out the possibilities of their existence on the Slovak market. For this aim we will use the comparative analysis and on the basis of description we will bring the SWOT analysis. On the basis of available resources, we choose the specific areas that provide information and data about microfinancing and its usage in the practice of the Slovak financial market.The practical implications of this paper could be the background for establishing such institution on the Slovak financial market. Regarding the fact that there has not been done any research in this field, the results of the SWOT analysis will be the added value of this paper.

Keywords: microcredit, loan, finance, possibilities, trends.

Introduction

Defining exactly what is and what is not an impact investment has become increasingly important, as the term has taken off. Unfortunately, many people approaching this task are still locked in old language and mind-sets. (Bugg-Levine & Emerson, 2011) Impact investing is a type of investing that aims to generate specific beneficial social or environmental effect in addition to financial gain. Impact investing is a subset of socially responsible investing (SRI) but while the definition of socially responsible investing encompasses avoidance of harm, impact investing actively seeks to make a positive impact by investing (Majerčáková & Mittelman, 2017).

For now, the industry is coalescing around a definition that focuses on intention and the attention an investor pays to blended value returns: impact investors intend to create positive impact alongside various levels of financial return, both managing and measuring the blended value they create. In practice it means that all investments are capable of generating positive social impact, but some are closer to the action than others. (Bugg-Levinne & Emerson, 2011) Impact investing evoked the optimism and action orientation of the investors group. The term provided a broad, rhetorical umbrella under which a wide

range of investors could huddle. Socially responsible investors, microfinance investors, ethical investors, green-tech venture capitalists, and community development financers: all could see their affinity in a broader movement and begin to collaborate to address the similar challenges they faced.

Growth in the impact investment market has been impressive, but significant challenges remain for the future. Today, impact investment has been associated with illiquid, higher risk private investment (often equity-based) into ventures that have a very direct outcome. The challenge for institutional investors is to develop a credible, mainstream (daily priced) investment product, which can appeal to a broad investor base. Therefore, the lack of viable products and options remains a top concern. Institutional investors are seeking products exhibiting (Majerčáková, 2015):

- scale and scalability to match institutional minimum investment sizes, e.g. EUR 5 million,
- track record (notably in terms of financial performance),
- investment characteristics matching their asset allocation constraints (liquidity, volatility, investment style, etc.).

Impact investing challenges and the long-held views on social and environmental issues should be addressed only to philanthropic donations, and those market investments should focus exclusively on achieving financial returns. The growing impact investment market provides capital to the world's most pressing challenges in sectors such as sustainable agriculture, clean technology, green real estate, supply chain services, technical assistance services, energy, microfinance, and affordable and accessible basic services including housing, healthcare, and education. From the perspective of these markets, investors like individuals, private financial and for-profit institutions, philanthropic institutions and last but not least governments are seeking for outcomes like jobs, educations, environmental sustainability, improved social program outcomes, economic opportunity, new social enterprise business models or new investment opportunities. Impact investment has attracted a wide variety of investors; specifically: (1) diversified financial institutions; (2) pension funds; (3) insurance companies; (4) large-scale family offices; (5) fund managers; (6) private foundations making program and mission-related investments; (7) development or specialized financial institutions; (8) private financial institutions; (9) individual investors. Private financial institutions have the increasing interest in investing into social businesses and bring the expectations of social and economic return. On the other hand, public authorities are becoming reluctant to invest in the projects of innovation; they do not perform their own duties in supporting the social business if the existing projects are financed by the philanthropic organizations or private investors. Some organizations therefore fight with the possibilities of finding the investor or gaining the necessary capital for their innovation projects and ideas. Private investors expect demonstrable social and economic return on investment, and this is the factor that forces public authorities to expect the same effect from their own investment. (Majerčáková, Mittelman, 2016)

Microfinance Possibilities in the Slovak Republic

Microfinance institutions need for reaching their goals and solving poverty capital, as well as internal operational capacities. Since 1970, it has been proved that microfinancing is one of the most effective and sustainable tool in the fight against poverty. In spite of this fact, there is still 80% of workforce poor, more than 400 million families are on the line of poverty and without the possibility of gaining financial sources (Majerčáková & Kočišová. 2016).

Advantages and indisputable usefulness of microfinance as the tool in the fight against poverty have been known many decades in the world however this expression is in the Slovak republic unknown for the big part ordinary people.

The Central body in the area of supporting small and medium-sized enterprises on the side of state is the Ministry of Economic Affairs of the Slovak republic that works as the coordinator and guarantor for many activities that deal with the above mentioned matters. Development of small and medium-sized entrepreneurship, cooperation with international institutions and regional support of companies in the Slovak republic belong among activities that the Ministry deals with.

The Current Situation

In the territory of the Slovak republic, The Foundation Integra, Rural organization for community activities and other organizations that are framed by the Association of microloan institutions of the Slovak republic deal with microloans. As far as microgrants are concerned there are some successful programs in the Slovak republic that are mostly financed from the foreign sources. For example the program „citizens in municipality “, that is under the auspices of the foundations Ekopolis and ETP-Slovensko, focus on the development of tourism, infrastructure and it serves for the reintroduction of social and cultural life in the towns up to 1500 citizens. OTP Bank Slovakia has been the provider of microloans since 2014, it has become the first institution in the Slovak republic and according to the etimates it should provide loans in the amount of 10 million EUR. (OTP Bank, 2014). Their main goal are either young entrepreneurs or those people who do not have the access to the traditional bank services.

The Reasons for Microfinancing in the Slovak Republic

The provision of microloans and microgrants helps to decreasing of poverty and by this, the myths about providing loans to poor people are not worth and profitable are being overcome. As an example, we can mention the microloans program run by the organization Zakoura in Marocco, that helped up to 20 percent of clients to overcome the poverty line after second, third or fourth loan /maturity was half year/. (IFC, 2014) Studies in Bangladesh showed that less than 5 percent of people from the lowest class without the access to loans got out from the poverty during 8 years., while as many as 48 percent from those who had access to microloans from Grameen Bank, were successful in overcoming the official poverty line in the same time. (GDRC, 2015)

The situation in the Slovak entrepreneurship is different only a little, because commercial banks are not willing to provide small loans and the support from the side of the government is very little or even non-reachable. One from the institutions providing microloans is Slovak Bussiness Agency (till march 2014 its name was The National Agency for the development of small and medium-sized entrepreneurship). It lends 2 500 EUR - 50 000 EUR and maturity is 6 – 48 months, while the interest rate is 1,19% - 9,03%.26

„ SBA wants to be the first choice of Slovak companies when beginning and developing its business“ (SBA, 2015)

Increasing employment rate, competitiveness of companies in the private sector and increasing survival rate of these types of companies on the Slovak market belongs into the aims of Slovak Bussiness Agency.

Generally, the higher concentration of poverty is not centralized in cities but in the country. The fact that country areas are discriminated, was caught by the irish professor from the Research Institute of economy and social affairs, Patrick Honohan: „Financial institutions lend money to those where we can predict that their strategy will bring the sufficient financial flows for paying debts. According their definition, there is less number of these clients in heavy laden regions." (Kalafut, 2001) This implies that advancing regions get more subsidies, for example in the form of loans, and poor regions are even derogated from, and they are declining more and more, despite developing themselves. Specially, microloans could help with the stimulation of financial activities in less developed regions.

Microloans can be considered, regarding relatively fast return on profits of microcompanies, as fast paid back. „Grameen Bank in Bangladesh provides to 1,8 mil. to people reliant upon loans small credit in the amount as much as 30 milion USD. Although this is already a large program, debtors are able to pay back this bank 98 % of loans." (GDRC, 2015)

The Slovak republic, in 1999, was able to reach the similar result– return on microloan program of the organization VOKA (Vidiecka organizácia pre komunitné activity / Rural organization for community activities) rose up to 98%. However, 30% of the provided loans in Slovak commercial banks were put into the category where it was assumed that those types of loans would never be paid back.

Regarding the fact that microfinancing provides financial resources, it also enables to create savings. Poor people have often the big respect to bank accounts and they rather hide their money in cash – fees connected to maintaing account, going to bank branch, etc. many other microloan organizations have started to realize this issue and they bring the solution in removal the above mentioned barriers. Enabling savings is not advantageous only for clients but also for bank itself which can then enlarge its product portfolio and clients'scale. (Mukherjee & Wisniwski, 1998).

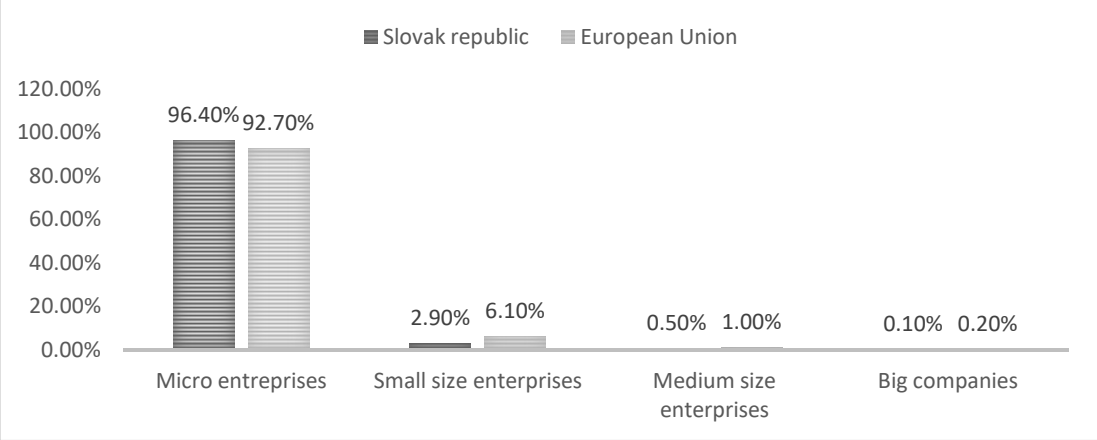
Microloan credits are able to create working position for lower costs, than for example with the subsidies of foreign investents. This enourmous difference is clearly visible in comparison with the price of one working position in building an industrial park and maintaining one position of microfinance program VOKA. Regarding the total height of state subsidy, that went up to 563 000 000 SK (cca. 18,7 million EUR), and the ideal assesment of the number of newly created working posts (3200), the average price of one working position reached 175 000 SK (cca. 5 800 EUR). If we take into account the fact that it was non-refundable subsidy, it is incomparably more disadvantageous than VOKA, that enabled keeping one working position by means of small loan for the price of approximately 24 000 SK (cca. 8 000 EUR), under the normal commercial conditions. Moreover, the mentioned microloan programs are realized in the economically more underdeveloped regions and by this they contribute to decrease the difference between cities and country under the current commercial conditions.

In the institutions, that provide microloans, clients are involved in the processes of a particular organization. Bank officers do not help with the solving of microloans, but the representatives of the particular aim group who have the personal experience with microloans while the representatives of institution participates on their meetings, for obvious reasons. At the turn of the millennium VOKA supported together 239 projects in 24 towns in the form of microgrants that went up to the total amount of 3,3 million SK (cca. 110 000 EUR). (Kalafut, 2001)

The projects financed by microloans or microgrants take into account either local conditions or environment as members of community do not like project from the point of view of ecological impact,

they simply do not approve it. (Majerčáková & Komorník, 2015). Moreover, projects that solve in reality local issues are approved in contrast with the programs determined for the development of region. It is prevented to the creations and realizations of socially meaningless projects.

Slovak Business Agency represents the oldest organization determined for the support and development of small and medium-sized enterprises in the Slovak republic. It was founded in 1993 and it is the specific connection of public and private sector, specifically the Ministry of Economic Affairs together with the Association of Slovak businessmen and Slovak artisanal association. The aims of Slovak Business Agency are to raise employment rate in private sector and the survival rate of Slovak companies. The importance of small and medium-sized enterprises is undisputable, as they create as much as 99,9 % of all enterprises that exist on the territory of the Slovak republic and they participate more than the half in gross domestic production.



Graph 1: Percentage share of Slovak enterprises in the Slovak republic and European Union in 2015

Source: Own processing of the document Analysis of the approach of SME

Microloans from Slovak Business Agency are more accessible than bank loans, as bank loans need not be for the beginning entrepreneurs favorable at all circumstances, and easily accessible. Microloans are provided in the amount of 2 500 EUR to 50 000 EUR, while there is a possibility to start to pay back a half year after the applicant signs the contract for the loan. The interest rate is on the edge of 1,19 % p. a. to 9,03 % p. a. and loan can be paid back in the period of 6 months to 4 years..

The conditions for getting the loan involve attributes for the particular applicant for a loan, for example it has to be a natural person or legal entity as entrepreneur that has to be registered in the particular register. Moreover, it has to be micro company, a company where there are employed less than 10 people and total turnover in one year is not more than 2 000 000 EUR, or it is a small company with less than 50 employees with the annual turnover till 10 000 000 EUR. Applicant has to have clean criminal record, they must not have debts towards the state and they must not be in winding up process or bankrupt.

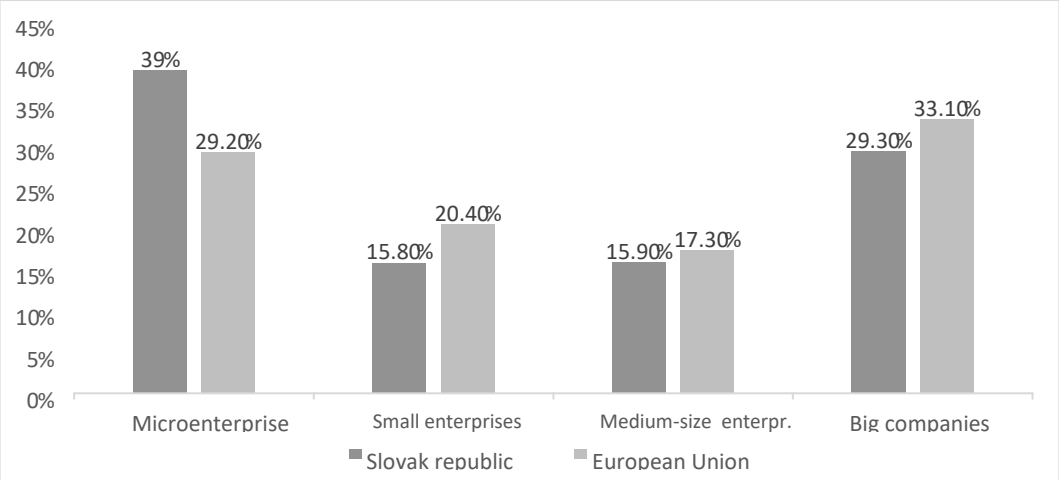
The resources gained by means of microloan can be used for various purposes, for example for obtaining assets connected to business, either tangible assets or intangible assets, materials or other raw materials

needed for business. The purpose can also be other investment, but it has to be approved by the provider of loan. The realized purpose has to correspond with the approved purpose.

For the obtaining loan, applicant has to make some steps. The fist step is to get through an introducing interview, where he will get familiar with the possibilities of obtaining the loan. Subsequently, he will fill in the application for the loan, either by himself or with the help of the officer in personal consultation. The application is submitted in the particular institution, eventually in the institution cooperating with the company Slovak Business Agency (together 8 branches all around the Slovak republic, except Slovak Business Agency also RPIC Komárno, RPIC Prešov, RPIC Trebišov, RPIC Dunajská Streda, BIC Prievidza and the National holding Fund in Bratislava). The applicant is obliged to submit together with the application also some officially verified documents, as entrepreneurship license, abstract of the Companies Register (if it is the person that is registered there), extract from the criminal records, if it is existing entrepreneur, as well as income and expense statement and declaration of taxes for the last two tax periods, business plan, confirmation of the Court that the applicant is not in the winding up process or bankrupt, etc.

It often happens that bank loan applicants, which were not approved there because they did not submit financial statements got the chance in Slovak Business Agency. The average interest rate is around 4% p. a. to 5% p. a. Another advantage provided is back refinancing for example of made reconstructions. The most often applicants for microloans provisions are entrepreneurs from the areas of services, retail, tourism or producing sector. Applications are becoming not approved mainly because of the high risk that the project bears, but also for the fact that the project is not secured by any means.

The whole process, from the application for microloan submission, till the providing loan takes usually till 30 days. Since 1997 Slovak Business Agency has provided microloans in the amount more than 33 500 000 EUR, that helped to create approximately 3 000 new working posts. In April 2013, when the microloan program was activated again, it was successfully provided up to 3 200 000 EUR in 18 months by means of 100 microloans.



Graph 2: Percentage share of employed in the Slovak republic and European Union in 2015

Source: Own processing of the document Analysis of the approach of SME

Financial intermediaries for the resources from EU are in the Slovak republic bank institutions Sberbank a OTP Bank Slovakia. Both institutions provide microloans to the beginning entrepreneurs up to the amonut 25 000 EUR.

Table 1: The comparison of the services provided by Sberbank a OTP Bank Slovakia

Financial providers	Financing amount	Additional information	Resources
Sberbank	< 25 000 EUR	Microloans, loans for disadvantaged people, loans for the development or establishment of micro companies	Progress
OTP Bank Slovakia	< 25 000 EUR	otp MICROloans for new or existing clients	Progress / EaSI

Source: Own processing of the document Access to the resources from EU

State help

The first type of state help for the beginning entrepreneurs is in the form of (contribution for entrepreneurship). The conditions that have o be fulfilled to have the title for the subsidy are following: they have to be registered in the Labour office at least for 3 months, they are ranked as the applicant for employment, this business performance will be done at least 3 years, they will submit the application in the particular Labour Office. The applicant has to be natural person (as a sole proprietor or independently operating farmer), it must not be a legal person by any means. The amount of subsidies is not unified in the Slovak republic the key factor is the unemployment rate in the region, where will be the particular business performed. The maximum height of subsidy in Bratislava region is in this year 2 994,62 EUR, in the regions with the unemployment rate the most 9,60 % it is maximum 3 593,55 EUR and in the regions with the higher rate it is up to 4 791,40 EUR.

The particular subsidy is not paid at once, it is paid during the following years of entrepreneurship. The conditions depend on the agreement between the applicant and the particular Labour Office. However, the law declares that the most of 60% can be paid out till 30 days from the day when the agreement about subsidy provision will be concluded. The rest of subsidy will be paid out after the submission of the report about drawdown of subsidy and performance of sole proprietorship. The particular report has to be submitted after each from the first 3 years of entrepreneurship and it is necessary to report how the subsidy was used. If the entrepreneur is not able to carry out performance at least for 3 years it is not necessary to return all subsidy provided only the part related to the period during which the entrepreneur did not carry out the performance.

Another way to support the entrepreneurship in the Slovak republic from the side of state is the creation of the programs concentrated on small and medium-sized enterprises.

It is possible to send the application for the subsidy for the support of the development of SMEs by means of web page of the Ministry of Economic Affairs of the Slovak republic. The budget approved for

years 2017, 2018 and 2019 is divided as follows: for the administration of support programs and schemes it is 1 800 000 EUR and for each of these 3 years and for the support of startups it is in the amount of 2 500 000 EUR, in the same amount all 3 years, as well.

Startups

Startups are defined as business initiatives with the big innovative and growth potential that can be lucrative also for the foreign investors. However, they bring a big risk with themselves. The most startups indeed end with failure, but this small percentage that is successful on the market can change the whole industry and it can even create some new. However, from the point of view of new job positions creation, the support of startups from the state is not on the first place. Despite the fact that startups are the big contribution to economy, the big companies are able to employ much more people. Even if the failure of European startups is much lower than those that are based in USA, we can find some projects in Europe, which are successful worldwide. Skype from Estonia or the Slovak companies Sygic or Eset belong among these. It is seen that the problem is mainly structural barriers in the states of EU that inadequate creativity in comparison with USA.

The Club of business angels of the Slovak republic represents the collection of successful entrepreneurs that want by means of advice, experience or money to help startups. It is the first chain of business angels on the territory of the Slovak republic, and it was established in 2011.

The projects that are somehow interesting for these investors have to fulfil some conditions. It must not be only an idea, when for example the production of some product has not even started, but entrepreneur should have invested some time and own money into the project, they have their own team with which they want to realize particular business plan, the project is innovative and has a potential of the rapid growth (it is not a cafeteria, sports venue, etc.).

In the case that the project fulfils the above mentioned criteria, the first task of the Club is to intermediate the contact between the entrepreneur and the convenient potential investor.

The names of investors are not publicized, however investors are not wholly anonymous, because there is a meeting of investor and the club before registering into the club and there have to be the positive assessments as there is required seriousness and reliability of investors. The amount of investment to one project is in the most cases from 10 000 EUR to 80 000 EUR.

SWOT analysis

The aim of our SWOT analysis is to determine whether the particular way of getting the loan for entrepreneurship or other from the mentioned ways of getting the finances is convenient for the beginning company, regarding the conditions of getting financial resources, amount of the loan provided, interest rate etc.

Table 2: SWOT analysis –loan from nonbanks institution

Strengths	Weaknesses
The maturity can be up to 5 years	There is small number of business loans that are provided to beginning entrepreneurs, as well
The wide scale of the loans offered, lower in the amount from 1000 EUR, higher to 33000 EUR	High interest rate
These types of loans are generally easily accessible	
Opportunities	Threats
Lower annual turnover requested for the loan provision as in other providers	Less reliable provider than for example bank.

Table 3: SWOT analysis – loan from bank

Strengths	Weaknesses
There is an overdraft offered to current account in the bank	The necessity to fulfil more complicated conditions for getting loan
Intermediation of resources offered by EU	In more loans, there is necessary to present the turnover of company, as well, so only in some loans the particular product is convenient for the beginning entrepreneurs.
It is not necessary to submit the purpose of loan when having more credit products	
Opportunities	Threats
Lower interest rate requested	Higher company turnover requested as for example in nonbanks institutions

Table 4: SWOT analysis – microloan

Strengths	Weaknesses
Relatively low average interest rate, around 4-5% p.a.	The provision of loan is not automatic, if for example is the purpose of entrepreneurship too risky
Relatively fast process from the loan request till financial resources provision	
Microloans providers are also two bank institutions in the Slovak republic	
The loan provision for small and also big entrepreneur steps	
Opportunities	Threats
Better conditions for getting loan than in banks	Little awareness of the public about microloans and where they can get it
The possibility to start to pay back the loan after 6 months after its signature	

Table 5: SWOT analysis – crowdfunding

Strengths	Weaknesses
The registration of project is simple and fast	If a business plan is not creative enough, it will not get enough support
Innovative and unique ideas have the big chance for the success	In the case of the portal Hithit, if there is not enough resources collected, all of them will be returned to the original owners and applicant will not get any of them.
Opportunities	Threats
A lot faster access to money than in the case of any other loan	The support cannot be expected for the typical shops, restaurants, etc.
Simple promotion of project by means of internet	

Table 6: SWOT analysis – state subsidy

Strengths	Weaknesses
It is non-refundable provision of money, entrepreneur need not to pay back anything	There are some conditions that are necessary to fulfil, one of them is also the necessity of performing the business for the period at least 3 years.
Opportunities	Threats
The amount of loan provided is higher if there is the higher unemployment rate in the particular region	Financial resources are not provided at once but gradually

Table7: SWOT analysis – startup

Strengths	Weaknesses
The support of angel investors	The big percentage fails
The approved budget by the Ministry of Economic Affairs of the Slovak republic, determined for the support of startups	
Opportunities	Threats
The amount of investments from angel investors exceeds common maximum amount of loans provided	Low support from the state, as startups do not create many new working posts

Recommendations

It can be concluded from the results of SWOT analysis, that according to our opinion, it is the best to choose microfinancing for the beginning company that belongs into the category of small enterprises. We would not choose a loan from nonbanks institutions. Despite the fact that a loan is easily accessible, these less strict criteria are compensated by the interest rate, what is absolutely disadvantageous for beginning company. Bank institutions are better regarding interest rate and also because of the fact that in contrast with nonbanks institutions they offer for example loan insurance. However, if lending the money was profitable for banks, applicants would have to fulfil more strictly stated conditions. The support of startups and crowdfunding is unstable enough and maximally individual, generally it is valid that if an idea for business is not unique enough, it does not make sense to apply for this type of support. State support is advantageous to a certain degree, as it is a subsidy not a loan, however its amount is not sufficient and in the case that there is more money needed for entrepreneurship, it will be necessary for the company to borrow money from somewhere.

Microloans are for micro entrepreneurs advantageous from the point of view of required conditions, interest rate or the percentage of success of application for microloan. For this reason we would choose microfinancing as the right ideal way.

References

Bugg-Levine, A. & Emerson, J. (2011), *Impact Investing. Transforming How We Make Money While Making a Difference.*

International Finance Corporation, (2014), *Ending the Microfinance Crisis in Morocco: Acting early, acting right.* [Online], [Retrieved February 6, 2017], https://www.ifc.org/wps/wcm/connect/5e1e5a0047850bdba0d4f5299ede9589/IFC+Morocco+MicroFinance+Cr isis+report.English.pdf?MOD=AJPERES

Global Development Research Center, (2015), *MICROFACTS: Data Snapshots on Microfinance*. [Online], [Retrieved Januray12, 2017], https://www.gdrc.org/icm/data/d-snapshot.html

Global Development Research Center, (2015), *Microfinance – Credit Lending Models*. [Online], [Retrieved December 1, 2016], http://www.gdrc.org/icm/model/model-fulldoc.html

Kalafut, J., (2001), *Smerom k udržateľnej ekonomike: mikrofinancovanie.* Centrum pre podporu miestneho aktivizmu / Priatelia Zeme – Slovensko, 2001.

Majerčáková, D. (2015), Innovative Finance and Impact Investing – current status and future trends. Brno: Newton Books, a.s.

Majerčáková, D., Kočišová, L. (2016), *Impact investing – opportunity for creative investment*. Proceedings of the 16th International Scientific Conference - Economic and Social Development (ESD), ISBN: 1849-7535. 1-2 September 2016, Croatia, Split, 452-458.

Majerčáková, D., Komorník, J. (2015), Úvod do finančného manažmentu. Kartprint, Bratislava.

Majerčáková, D., Mittelman, A. (2016), *Possibilities and trends for impact investors*. Proceedings of the 27th International Business Information Management Association (IBIMA), ISBN: 978-0-9860419-6-9. 4-5 May 2016, Italy, Milan, 2739-2743.

Majerčáková, D., Mittelman, A. (2017), *European Impact Investment Market as a challenge for investors*. Proceedings of the 29th International Business Information Management Association (IBIMA), ISBN: 978-0-9860419-7-6, 3-4 May 2017, Austria, Wien, 3751-3756.

Mukherjee, J., Wisniwski, S. (1998) *Savings Mobilization Strategies: Lessons From Four Experiences.*

Olšavský, F., Štarchoň, P. (2015), *Ethnocentrism of consumers in similar cultures*. Proceedings of the Medzinárodné vzťahy 2015: aktuálne otázky svetovej ekonomiky a politiky, ISBN: 978-80-225-4219-7, 3-4 December 2015, Slovakia: Smolenice, 545-550.

OTP Banka Slovensko, a. s. (2014), *OTP Banka podporuje malých podnikateľov na Slovensku.* [Online], [Retrieved December 2, 2016], https://www.otpbanka.sk/otp-banka-podporuje-malych-podnikatelov-naslovensku

Rentková, K., Panevski D., (2017) *Analysis of foreign direct investments as a tool of regional development*. Proceedings of the 20th International Scientific Conference - Economic and Social Development (ESD), ISBN 1849-6903, 27-28 April 2017, Czech republic, Praha, 326-334.

Slovak Business Agency. (2015), *Mikropôžičky.* [Online], [Retrieved December 12, 2016], http://www.sbagency.sk/mikropozicky

Stoličná, Z., Černička, D. (2017), Mikroekonómia. Bratislava: Univerzita Komenského v Bratislave.

Šlahor, Ľ. (2015), *VAT evasion: recent evidence from Slovakia*, Proceedings of the 26th International Business Information Management Association (IBIMA), ISBN: 978-0-9860419-5-2. 11-12 November 2015, Spain, Madrid, 1555-1560.

A Qualitative Study of Islamic Bank Patronage

Sri Rahayu Hijrah Hati*
Management Department Faculty of Economics Universitas Indonesia-Depok, Indonesia
E-mail: sri.rahayu72@ui.ac.id

Tasya Aldiary Dayana
Islamic Business Undergraduate Program, Management Department Faculty of Economics Universitas Indonesia
e-mail: aldiary.daya@gmail.com

Abstract

Islamic bank has experienced a significant growth globally in the last five decades. Unfortunately, the market share in Indonesia, as the Muslim majority country never rise above 5 or 6 percent since the establishment of the first Islamic bank in Indonesia. An understanding of why the Muslim banking customers have not used Islamic bank and prefer to use conventional bank even though the involvement of the Muslim in the riba activity is forbidden in Islam. In-depth interviews were conducted with 15 respondents who have conventional bank account only. This exploratory study found that religiosity becomes one theme that most differentiates the Muslim customers who patron or not patron the Islamic bank.

Keywords: Qualitative; Conventional bank; Islamic bank; Barrier, Switching Behavior

Introduction

In a free market system, Islamic banks should compete with conventional banks, which can explicitly and implicitly charge interest on loans and deposits (Erol & El Bdour, 1989). In contrast. The Islamic bank, which refers to the institution that operates in accordance with Islamic economic doctrines, is not allowed to gain interest on loans or deposits given to its customers other than profit and loss sharing (Erol & El Bdour, 1989). Since the conception of the modern Islamic bank in Egypt in 1970, the industry assets have grown to over US $1.6 trillion in 2012 and is predicted to reach the US $6.1 trillion by the end of 2020 (Gewal, 2013).

Despite the rapid growth of Islamic banking globally, the anomaly seems to happen mostly in Indonesia. Indonesia is currently ranked first in terms of the number of Muslim populations in the world. Based on data from www.muslimpopulation.com (2016), the number of Indonesian Muslims in 2014 is 88% or 218.68 million people out of a total of 248.5 million population. With the largest proportion of Muslim population in the world, it is only natural that the number of sharia banks as well their market share in this country also is great. Unfortunately, when viewed from the aspect of its market share, the market share of Islamic banks in Indonesia is very low. Compared with those of a conventional bank, until the end of 2015, the market share of an Islamic bank only amounted to 4.81% ("Outlook 2016 Banking: Optimistic Grew Better," 2016). Since the establishment of the first Islamic bank Indonesia, the market share of Islamic banks never rose to the level of 5%; thus, the industry is considered having 5% trap. In addition to low market share, the Islamic bank in Indonesia also is experiencing declining growth.

Therefore, there is a need to examine why Muslims in Indonesia choose or not choose to patron Islamic banks despite the prohibition of riba (usury of interest) in financial transactions. The study aims to

examine the factors that influence Muslims to patronize or not patronize Islamic banks, especially in regard to demographic characteristics, religiosity, and spirituality

Literature Review

Numerous studies have examined the antecedents of Islamic bank patronage or the attitude of Muslims toward Islamic banks based on demographic characteristic, religiosity, and spirituality (e.g., Erol & El Bdour, 1989; Khan, Hassan, & Shahid, 2008; Muhamad & Alwi, 2015; Usman, Tjiptoherijanto, Balqiah & Agung, 2017). According to the study by Khan et al. (2008), demographic variables such as age, level of education, and income are related to the customer usage of Islamic bank products.

Religious-related variables such as religiosity and spirituality also have been examined in Islamic banking behavioural studies. Spirituality refers to the broader conceptualization of personal beliefs in God or a higher power, while religiosity itself refers to the much narrower conceptualization in regards to the organized behaviours intended to put spirituality into practice (Berry, 2005). A study by Erol and El Bdour (1989) showed that religious motives do not become a significant influence for Muslims to patronize Islamic banks. According to Muhamad and Alwi (2015), religiosity plays a role in influencing customers who fall under the religious conviction group. But there are also Muslims who fall under the economic rational group, which considers the objective economic criteria such as rate of return, as an important factor in choosing an Islamic bank. Another study, conducted by Usman et al. (2017), showed that customers should be differentiated into traditional and contemporary groups in order to examine the role of religiosity on Islamic banking patronage. Their study revealed that religiosity influences the decision of customers in the traditional group, but it does not have a significant impact on the contemporary group.

Research Method

The qualitative research method is applied using in-depth interview methods to prospective potential customers of sharia banks or those who have become sharia bank customers. The sampling technique for this qualitative research uses stratified purposeful sampling aimed at selecting respondents based on certain characteristics (key dimension) on a stratified basis based on stratification, which is considered important (Patton, 2001). The number of respondents will follow the saturation of theory, where, if the addition of one or two respondents is not again adding significant information, then the amount is considered sufficient to dig into and confirm the research topic. Thirty complete interview transcripts are then analysed by the three researchers.

Analysis and Discussion

Qualitative research results through constant comparison among different age groups, gender, marital status, level of education, and occupation showed that there is no different pattern in the intention to patron the sharia banks. Muslims, who show no interest in patronizing Islamic banks, may believe that the economic return is still the priority. In addition to that, the customers also may think that Internet banking provided by the Islamic bank tends to be lower in technology, especially the technology offered by full-fledged Islamic banking. The issue makes them inclined to switch to Islamic banking. Respondents who have a business enterprise also believe that Islamic banks cannot provide the business service that is on par with that of conventional banks. The Muslim respondents also felt that the number of branches and ATMs of the Islamic bank are limited. Therefore, they are inclined to migrate to Islamic banking.

Related to religion and religiosity, the results of this study are interesting. The study shows that religion per se is not significant in influencing customer intentions to patronise Islamic bank, as there are Muslims who have intentions to patronise Islamic banks, and there are Muslims who do not have intentions to patronise Islamic banks. There also are Muslims who have already become customers of Islamic banks, and there also are Muslims who have not.

"Yes, I know that the Islamic bank is recommended by Islamic law. But the administrative cost and the margin of loan are higher. So, I, finally run to the conventional bank" (Respondent 28, male, 59 years old)

Religious affiliation also seems to be unrelated to Muslim customers who patronise Islamic banks, as there are members of Islamic bank organisations who have and have not become customers of Islamic banks. The pattern of the respondents' answers shows that Muslims who have higher religiosity and spirituality tend to show their intention and actual behaviour to patronise Islamic banks (see the quotes below)

"I try to use only Islamic bank service because it is a religious command. My wife uses conventional banks during an emergency only" (Respondent 19, Muslim, male, 50 years, income US $1850–$3700 per month)

"Using Islamic banks give me much higher psychological benefits. I feel more secure and relieved in using the service compared with using conventional bank services, which applies interest to its customers" (Respondent 24, Muslim, male, 39 years, income US $3701–$7400 per month).

Discussion and Implications

Based on the study, the Islamic bank should prioritize segmentation based on the customers' religious value rather than demographic variables, as the qualitative study shows no similar pattern of intention and behaviour based on demographic variables such as age groups, gender, marital status, level of education, and occupation.

The inability of the Islamic bank in Indonesia to increase its market share might reflect the condition that those who are religious or have high spirituality have already become Islamic bank customers. Therefore, the Islamic bank should offer financial services on par with those of conventional bank services while they differentiate themselves by offering pure Islamic banking services.

To increase its market share, the Islamic bank should promote more Islamic bank products to raise Muslims' awareness of their duty to avoid riba. Islamic banks also should place emphasis on religious benefits but also on economic benefits in patronising Islamic banks. In other words, Islamic banks should be able to offer something more than just religious fanaticism.

References

Berry, D. (2005). Methodological pitfalls in the study of religiosity and spirituality. *Western Journal of Nursing Research, 27(*5), 628-647.

Erol, C., & El-Bdour, R. (1989). Attitudes, behaviour, and patronage factors of bank customers towards Islamic banks. *International Journal of Bank Marketing, 7*(6), 31-37

Gewal, B., 2013, "Overview of the Islamic financial landscape: Globally and in Europe," Kuwait Finance House mimeo

Haron, S., Ahmad, N., & Planisek, S. L. (1994). Bank patronage factors of Muslim and non-Muslim customers. *International Journal of Bank Marketing, 12*(1), 32-40.

Khan, M. S. N., Hassan, M. K., & Shahid, A. I. (2008). Banking behavior of Islamic bank customers in Bangladesh. *Journal of Islamic Economics, Banking and Finance, 3*(2), 159-194.

Muhamad, R., & Alwi, S. (2015). Explicating consumer segmentation and brand positioning in the Islamic financial services industry: A Malaysian perspective. *Asia-Pacific Journal of Business Administration, 7*(3), 253-274.

Outlook perbankan 2016: Optimis tumbuh lebih baik. (2016). Global Business, from http://eglobalbusiness.com/2016/01/outlook-perbankan-2016-optimis-tumbuh-lebih-baik

Patton, M. Q. (2001). *Qualitative Research & Evaluation Method*: Sage Publication

Usman, H., Tjiptoherijanto, P., Balqiah, T. E., & Agung, I. G. N. (2017). The role of religious norms, trust, importance of attributes, and information sources in the relationship between religiosity and selection of the Islamic bank. *Journal of Islamic Marketing, 8*(2). 158-186.

Study of the Evaluation Criteria for the Implementation of Optimization Measures in the Field of Energy Efficiency

Bastian L. Kurth, Bucharest University of Economic Studies, Romania, bastian.kurth@posteo.de

Sonia Budz, Bucharest University of Economic Studies, Romania, sonia.budz@yahoo.com

Ana-Maria Verjel, Bucharest University of Economic Studies, Romania, anamariaverjel@yahoo.com

Abstract

The objective of this study was to refute the self-constructed hypothesis that the legal obligation to implement energy audits according to Energy Efficiency Directive (EED) produces the desired effect in increasing the motivation of the entrepreneurs towards investing in energy efficiency measures.

In order to carry out the study, only the affected companies were questioned. A total of 92 companies were consulted and 73 questionnaires were analysed. The surveyed companies include those companies which are not small or medium-sized enterprises within the meaning of the EU's SME recommendation. According to this recommendation, only the so-called non-SMEs were questioned independently of the sector or area of activity concerned.

Based on our findings, we have identified that the hypothesis could be at least partially rebuttal against the backdrop of the purely economic approach of the decision-makers.

Keywords: energy efficiency, energy audit, DIN EN 16247, optimization measures

Introduction

In recent years, a number of legislative acts have been adopted at the European level, with measures and arrangements for increasing energy efficiency. The new Energy Efficiency Directive (EED) was adopted in 2012 as an essential part of the European Union energy policy (European Parliament, 2012).

The German act on Energy Services and Further Energy Efficiency Measures (EDL-G) was adapted in 2015 as part of the implementation of EED (Bundestag, 2015).

Since the EDL-G has now obligated all organizations that are not a small and medium-sized enterprises (SMEs) to carry out energy audits according to DIN EN 16247-1, this form of energy investigation has undergone a marked change of character (Gensing, et al. 2016).

The issue raised by this implementation is whether this regulatory intervention reduces the motivation of companies to save energy?

In fact, the EED, or the national legislations resulting from it, can demand the implementation of regular energy audits, but the implementation of efficiency measures, which are elaborated in the energy audits, remain in the voluntary nature of the companies.

With this study, the authors would like to disprove the self-constructed hypothesis that states that the statutory obligation to perform energy audits produces the desired effect, namely, that organizations are motivated for energy efficiency.

In the case of targeted support programs, as in the case of investment grants for the use of highly efficient cross-sectional technologies (BMWI, 2014), the companies are able to examine independently meaningful and promising sub-divisions within their organizations with regard to

energy efficiency. In contrast to this, companies, within the framework of the aforementioned legal obligation, have to examine their organization holistically and thus become cost-intensive with them.

We assume that the obligation as well as the demand for a holistic investigation of the companies leads to unintentional monetary costs and thus to a general lack of interest of the company in the results of energy audits. This effect can be observed by the auditor already in the introductory contact of the first process step of a specific method according to DIN EN 16247.

The presumed effect is empirically demonstrated by this study and thereby the above formulated hypothesis is rebutted. In this way the authors want to provide important insights for the entire energy policy research field such that the better legal decisions can be made in the future.

Theoretical Considerations of the Introductory Contact

Energy efficiency is an important component of a company's environmental strategy. End-of- pipe solutions can be extensive and inefficient while energy efficiency can often be an inexpensive opportunity to reduce emissions of criteria and other pollutants. In short, energy-efficiency investment is a sound business strategy in today's manufacturing environment (Worrel and Galitsky 2004). The fundamental goal of energy management is to produce goods and provide services with the least cost and least environmental effect.

The energy audit can be defined as a set of coordinated activities carried out within the framework of the management and the control of an organization with regard to energy sources, energy inputs and energy consumption. While it is not an independent activity within the organization, the energy audit is a part of the responsibilities of the top management or their representatives (Reimann, 2015). Energy Audit is a vital link in the entire management chain.

The introductory contact includes participatory management through special procedures. Affected employees and other groups are invited to submit their experiences and views for energy audit during the limited period of the energy audit. Through the participation of the employees and other groups in the energy audit process, the greatest possible transparency and communication is possible (Haas, Fechner, and Kuchar, 2016).

The introductory contact is a part of a decision-making process and has a key role in the achievement of the organizational goals of the energy audit. The role of the introductory contact is to establish a systematic, structured, and appropriate approach to the implementation of the remaining process steps in order to contribute to the improved transparency in energy inputs, energy consumption, and, ultimately, to improve the effectiveness and efficiency of the organizations (Bruder, 2017).

Methodology of Research

Within the scope of the energy audits to be carried out, the authors planned the individual aspects of the energy auditing processes, which are to be researched and carried out for our surveys. A total of 92 companies were consulted and 73 questionnaires analysed.

To determine the minimum sample size, the following Formula (1) (Kauermann and Küchenhoff 2011) was used:

$$n=\frac{\frac{z^2\cdot p(1-p)}{e^2}}{1+\left(\frac{z^2\cdot p(1-p)}{e^2\cdot N}\right)} \quad (1)$$

, where

n = minimum sample size,

N = population size
e = margin of error; is the percentage in decimal notation
z = confidence level (as z value)
p = proportion of sample components that have explored feature (when "p" is unknown, it is considered equal to 0.5—corresponding maximum dispersion)

To determine the minimum sample, the coefficients of the above formula have the following values:

N = 50,000
e = 0.1
z = 1.65 (corresponding to a confidence level of 90%)
p = 0.5 (corresponding to maximum value of dispersion)

By entering the value quantities N, e, z, and p in the Formula (2), a value of 68 companies for the minimum sample size resulted as follows:

$$n = \frac{\frac{1.65^2 \cdot 0.5(1-0.5)}{e^2}}{1+\left(\frac{1.65^2 \cdot 0.5(1-0.5)}{0.1^2 \cdot 50{,}000}\right)} = 68 \text{ companies} \quad (2)$$

In order to conduct the study, only the affected companies were questioned. The companies concerned included organizations that are not small or medium-sized enterprises within the meaning of the EU's SME recommendation. According to this, only so-called non-SMEs were interviewed, regardless of the sector or area of activity.

Organizations performing sovereign tasks were excluded from this survey. For example, responsibilities in the fields of security, police, and justice as well as the responsibilities of publicly financed educational institutions and the administration of social security systems under state control were excluded (BAFA, 2015).

To complete the research, 92 companies were consulted and a total of 73 questionnaires were analysed. The surveyed organizations were all from the commercial economy (manufacturing, crafts, and trade) and other services.

The planned interviews, conducted during the introductory contact, dealt with, among other things, the following main questions:

a) The evaluation criteria for the implementation of optimization measures to improve energy efficiency. The participants could choose between multiple answers:

   - Technical Feasibility;
   - Profitability & Payback;
   - Investment Volume;
   - Technology Sector;
   - CO2 Savings;
   - Life-Cycle Cost Analysis.

b) To all existing opinions, ideas, and limitations of possible measures to improve energy efficiency.

   This question could only be answered qualitatively in a free-text field by the companies.

Research Results

The research results show that the main criteria for the implementation of energy efficiency measures are profitability and payback. The necessary optimization points for the energy audit are seen by companies almost exclusively in the cross-sectional technologies. The following sections show the details of our research.

Research results on the evaluation criteria

The results of the evaluation criteria are shown in Fig. 1. While the profitability and technical feasibility are crucial for investment decisions, the remaining criteria are negligible.

The most important criterion for the remaining questions in the interview was profitability. More than 73% of the companies surveyed would only carry out an energy efficiency measure if they guaranteed high profitability with quick repayment. The second most important criterion was technical feasibility, which is the main criterion for more than 42% of organizations.

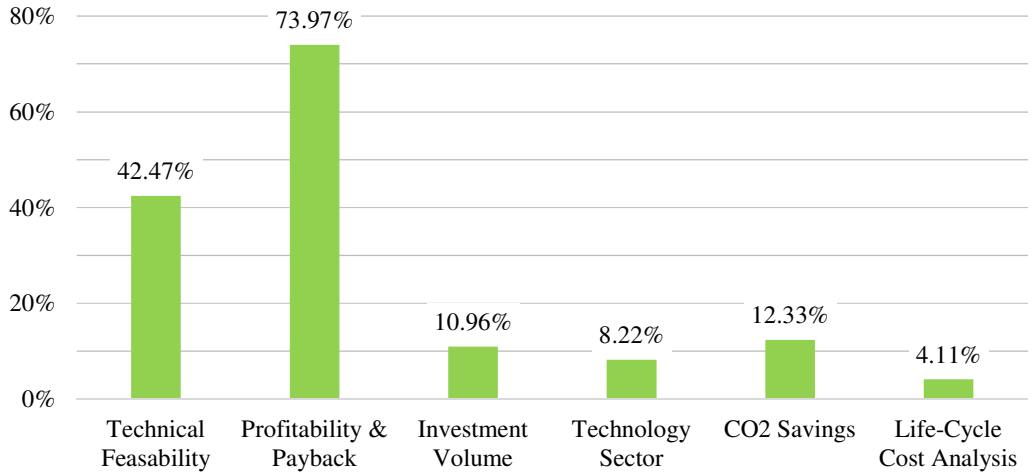


Fig. 1: Criteria for the Implementation of Energy Efficiency Measures (Source: authors)

All other criteria are not considered important. Even the investment volume is not an essential criterion for more than 75% of the participants. This means that a high investment volume is possible and acceptable as long as repayment and profitability are expected.

If, however, only profitability and technical feasibility are the criteria of the decision-makers, the energy audit is a service, and like any other service, it sells in the market and must lead to profitability.

Anyway, the implementation of these measures would already be enforced by the markets without any intervention of regulatory authorities. This probably also leads to the conclusion that only 12% of all the companies studied consider CO_2 savings as a criterion for energy efficiency measures. Finally, of these 12%, only one participant considers CO_2 savings as the main criterion. The other participants would concentrate only on profitability.

This part of the survey shows the energy efficiency considerations as a part of the energy audit focused exclusively on profitability and return on capital.

Research results on optimization measures (corporate ideas)

The research highlight that more than a third (37%) of the organizations interviewed already had their own ideas for energy efficiency measures. While most of them exclusively concentrated on cross-sectional technologies (heating, lighting, air-conditioning, pump, and compressed-air technology as well as the production of hot drinking water), only one participant in the survey saw potential in the area of process technology.

These results are within the expected range. Within their core processes, the companies possess extraordinary know-how; furthermore, the energy efficiency within these processes is generally known to them.

The potential for optimization is, therefore, seen in cross-sectional technologies. The fact that more than a third of the respondents already have optimization ideas suggests that the optimization requirement and the measures are often already known. However, the profitability and the payback are not yet sufficient due to the existing price level in order to implement the measure.

Conclusion

The hypothesis that states that the statutory obligation to carry out energy audits produces the desired effect, namely, the company is motivated for energy efficiency can be at least partially disproved in the light of the purely economic approach of the decision-makers.

An interest in energy efficiency is clearly occulted when measures do not lead to improved profitability and a return on capital. This view is, however, essential, especially in the face of international competition. A different view would lead to international competitors gaining a competitive advantage if they did not pay attention to energy efficiency. Measures, which would lead to improved profitability, would, in any case, be enforced by markets without the involvement of the regulatory authorities and without a compulsory audit.

Most companies apparently lack the incentive to invest in energy efficiency measures from an angle other than profitability. It is obviously not a competitive advantage or an advantage for the majority of companies to improve the carbon footprint and adopt sustainable production techniques.

However, if profitability and payback are only crucial to decision-makers for the implementation of energy efficiency measures, the hypothesis that companies are motivated by the regulatory measure to increase energy efficiency is rejected.

However, the above hypothesis cannot be completely rebutted. There are a few cases in which companies are nevertheless motivated to improve energy efficiency; these are as follows:

1) If energy efficiency is indeed a competitive advantage for the company and a key feature;
2) The energy audit covers inefficiencies, which can lead to a real increase in profitability;
3) If the energy audit provides cheaper measures for known optimization problems, companies are motivated to achieve energy efficiency.

In these cases, energy audit leads to the desired reaction; with the exception of Case (1), however, profitability remains the main focus and energy efficiency is a by-product.

From a regulatory perspective, to build an entrepreneurial awareness of energy efficiency, the mandatory energy audits can nevertheless be useful. In particular, if they are flanked by funding programs for measures whose profitability is not guaranteed by the market, but whose implementation is desired.

The set-up for a meaningful interplay of the energy audits, support measures, and the strengthening of the awareness of energy efficiency in companies must be a part of the next study.

References

Bruder, J., 2017, *Erfahrungen aus den Energieaudits gemäß DIN 16247*, Energieeffizienz, Springer Vieweg, Wiesbaden.

Bundesministerium für Wirtschaft und Ausfuhrkontrolle BAFA 2015, *Guidelines for Energy Audits in accordance with the provisions of §§ 8 ff. EDL-G*, Department 526, Eschborn. [pdf] Available at: <http://www.bafa.de/SharedDocs/Downloads/EN/Energy/ea_guidelines.pdf?__blob=publicationFile&v=2> [Accessed September 2017].

Bundesministerium für Wirtschaft und Energie BMWI 2014, *Richtlinie für Investitionszuschüsse zum Einsatz hocheffizienter Querschnittstechnologien im Mittelstand*, Bundesanzeiger, Germany. [online] Available at: <https://www.bundesanzeiger.de/ebanzwww/wexsservlet?page.navid=to_bookmark_officialsite&genericsearch_param.edition=BAnz+AT+31.12.2014> [Accessed 19 September 2017].

Bundestag 2015, *Gesetz zur Teilumsetzung der Energieeffizienzrichtlinie und zur Verschiebung des Außerkrafttretens des § 47g Absatz 2 des Gesetzes gegen Wettbewerbsbeschränkungen*, Bundesgesetzblatt. [online] Available at: <https://www.bgbl.de/xaver/bgbl/start.xav?start=%2F%2F*%5B%40attr_id%3D%27bgbl115s0603.pdf%27%5D#__bgbl__%2F%2F*%5B%40attr_id%3D%27bgbl115s0578.pdf%27%5D__1508665662884> [Accessed 19 September 2017].

European Parliament, 2012, *DIRECTIVE 2012/27/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC*. [online] Available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32012L0027> [Accessed 19 September 2017].

Gensing, D., Bungert, B., Wang, W. and Sauer, A., 2016, *Markterhebung Energiedienstleistungen 2016 Kurzversion, Befragung zur Wirksamkeit von Energieaudits*, DEnBAG, Beuth Hochschule für Technik Berlin, Universität Stuttgart EEP and Frauenhofer IPA. [pdf] Available at: <http://www.eep.uni-stuttgart.de/Download_EEP/Auswertung_Markterhebung_2016-07-19_kurz_KM_mod_DG.pdf> [Accessed 19 September 2017].

Haas, A., Fechner, J. and Kuchar, F., 2016, *Handbuch für Energieberatung*, Berichte aus Energie- und Umweltforschung, no. 13/2016. [pdf] Available at: <https://nachhaltigwirtschaften.at/resources/hdz_pdf/berichte/endbericht_1613_handbuch_fuer_energieberatung.pdf> [Accessed 19 September 2017].

Kauermann, G. and Küchenhoff, H., 2011, *Stichproben, Methoden und praktische Umsetzung mit R*, Springer-Lehrbuch, Berlin Heidelberg.

Reimann, G., 2015, *Erfolgreiches Energiemanagement nach DIN EN ISO 50001, Lösungen zur praktischen Umsetzung*, Beuth Verlag GmbH, Berlin, Wien, Zürich.

Worell, E. and C. Galitsky. 2004. Energy Efficiency Improvement Opportunities for Cement Making, An Enrgy Star Guide for Energy and Plant Managers. Lawrence Berkeley National Laboratory: Berkeley, Ca (LBNL 54036).

Influence of RAILQUAL on Passenger Satisfaction: Study of Indonesian Intercity Trains

Kenji Bisma Wibawa Junardy
International Undergraduate Program, Faculty of Economics and Business Universitas Indonesia, Depok, Indonesia
Email: junardy.kenji@gmail.com

Sri Rahayu Hijrah Hati*
Management Department Faculty of Economics and Business Universitas Indonesia, Depok, Indonesia
Corresponding author e-mail: sri.rahayu72@ui.ac.id

Abstract

The study examines the impact of service quality on passenger satisfaction. Service quality is measured by using RAILQUAL, which is a special measurement of service quality in the railway industry. The data were collected from 240 customers of the Indonesian Railway Company, the one and only railway provider in the country. Convenience sampling was used, and four types of train passengers were taken as the samples of this research. The hypotheses are tested by utilizing multiple regressions. The results show that all RAILQUAL elements, which comprise platform services, in-train services, punctuality, employee services, and security, significantly influence passenger customer satisfaction. However, based on the regression analysis, ticketing, in-train services, and platform service are considered as the most important factors to the customers. The study provides empirical evidence on the RAILQUAL scale in a different context, along with service quality factors, which are important to train customers.

Keywords: RAILQUAL, Service Quality, Customer Satisfaction

Introduction

Public transportation is regarded as one of the essential elements in a country (Miller et al. 2016) and is one of the basic foundations in building sustainable cities with easy accessibility (Miller et al. 2016). Public transportation, excluding school buses and charter and sight-seeing service (Tran & Kleiner 2005), refers to transportation by a conveyance that provides continuing general or special transportation to the general public. Countries around the world are competing to create a modern, sophisticated public transportation with an environmentally friendly system and minimum energy consumption. Now, in the so-called "matured society," public transportation has become a fundamental part of life. It is still the only instrument that provides the efficient means in moving people and logistics (Eboli & Mazzulla 2012). Therefore, demands for public transportation are highly increased in terms of punctuality, reliability, and frequency (Ieda et al. 2001). One type of public transportation, which is highly used to overcome transportation problems, is the train. Trains are considered one of the most effective and efficient public transportation, as they enable passengers to save money and get to their destination faster than any other mode of transport (Schmalbruch 2015).

One of the useful concepts in marketing to assess the quality of train services as a public transportation is RAILQUAL (Vanniarajan & Stephen 2008; Maruvada & Bellamkonda 2017; Maruvada & Bellamkonda 2010; Maruvada & Bellamkonda 2012; Agarwal 2008). The RAILQUAL is proven to significantly influence customer satisfaction on train services. In the Indonesian context, the satisfaction of customers toward train services has been low for several decades. Only recently, the government recognized the importance of mass transportation in order to satisfy the increasing demand in a growing economy. New leadership was appointed; thus, the company has been going through a radical transformation to improve

operations. The management team is being reinstated, human resource development is being focused, and passenger services have become priority, along with the improvement of the infrastructure to support the operation, and a service-oriented culture is being introduced (Djuraid 2013).

With the increase of services, the Indonesian Railway Company has become a new choice, even preferable, for the intercity by wider market segments. Now, an intercity passenger train is regarded as one of the most important transportation facilities in Indonesia due to its capability to transport a lot of passengers and a high potential to reduce energy consumption and pollution in the country (Djuraid 2013).

To date, there is limited research on railway customer satisfaction, especially in the Indonesian context. Thus, researchers aim to examine the influence of train service quality (RAILQUAL) delivered by the Indonesian Railways Company on customer satisfaction of an intercity passenger train. The study is beneficial to policymakers and railway companies, as it provides an evaluation on the quality of intercity train services in Indonesia. The study also lends support to the validity of RAILQUAL instruments.

Literature Review

Railqual

RAILQUAL is a concept of service quality in the railway industry (Maruvada & Bellamkonda 2017; Maruvada & Bellamkonda 2010; Vanniarajan & Stephen 2008). The RAILQUAL concept itself was derived based on the service quality or SERVQUAL concept (Maruvada & Bellamkonda 2017). SERVQUAL consist of 10 dimensions,: tangibles, reliability, responsiveness, communication, credibility, security, competence, courtesy, understanding/knowing the customer, and access (Parasuraman et al. 1985). After further research and examination, SERVQUAL is presented only in five dimensions: tangibles, reliability, responsiveness, assurance, and empathy. Similar to the concept of SERVQUAL, RAILQUAL also consists of those five dimension, but the attributes have been adapted to the railway context (Vanniarajan & Stephen 2008; Maruvada & Bellamkonda 2010; Maruvada & Bellamkonda 2017; Maruvada & Bellamkonda 2012; Agarwal 2008).

Customer Satisfaction

Customer satisfaction is defined as the customer's sense that consumption provides an outcome against a standard of pleasure and displeasure (Oliver 2006). Customer satisfaction can also refer to the collective outcome of the customer's perception, evaluation, and psychological reaction to the consumption experience with a product or service. In line with this thinking, previous scholars also suggest that satisfaction is inclusive (Yi 1990). That is, satisfaction is determined by customer's perception of the quality, price, situation factors, and personal factors (Baker 2013).

RAILQUAL and Customer Satisfaction

Previous research, especially in the Indian context, examined the relationship between the RAILQUAL and its influence on customer satisfaction (Maruvada & Bellamkonda 2017; Maruvada & Bellamkonda 2010; Agarwal 2008). Maruvada and Bellamkonda (2012) suggested that service quality can be divided into six dimensions: reservation and ticketing, platform services, in train services; punctuality, employee services, security, and safety. A survey of up to 25 countries in Europe for passenger satisfaction in rail services shows that railway passengers are most likely to be satisfied with three aspects, one of which is the reservation. Reservation dimension includes the procedure, accuracy, and promptness of the

reservation. Another researcher also supported the positive influence of reservations on passenger satisfaction (Agarwal 2008). Hence, the following hypothesis can be proposed:

H_1: Reservation has a significant positive influence toward overall customer satisfaction.

Maruvada and Bellamkonda (2012) integrated the reservation into the reservation and ticketing dimension. Agarwal (2008) stated that ticketing has a significant influence on customer satisfaction. The researcher separates the ticketing dimension from the reservation, i.e., ticketing access, ticket price, train price variations, price regulations, and the flexibility of cancellation and scheduling. Moreover, Markplus (2013) also indicated that ticketing is one of the biggest factors that affect customer satisfaction. Hence, the following hypothesis can be proposed:

H_2: Ticketing has a significant positive influence toward overall customer satisfaction.

The platform services in rail station positively influence overall customer (Maruvada & Bellamkonda 2012; Agarwal 2008). Platform services include the facilities, provision of information, maintenance, access flexibility, condition, cleanliness, security, and convenience of the station and waiting room. In the Thailand railway industry, service and information of a platform are also among the six important factors that affect overall customer satisfaction (Choocharukul & Sriroongvikrai 2017). Hence, the following hypothesis can be proposed:

H_3: Platform services have a significant positive influence toward overall customer satisfaction.

Maruvada and Bellamkonda (2012) suggested that in-train services have a significant positive influence toward overall customer satisfaction. Agarwal (2008) also suggested that in-train services are considered as one of the most important factors that affect overall customer satisfaction. The previous study from MarkPlus (2013) focused on questions regarding in-train services mainly about the convenience of travel from the beginning place to the arriving point, including facilities, maintenance, and cleanliness. Those questions were created as to reflect the situations and basic facilities from the Indonesian Railway's Company standards. In addition, in-train services consist of cleanliness, toilet facilities, catering quality and price, and comforts inside the train. Moreover, the Indonesian Railway Company has confirmed these indicators. Therefore, in this research context, in-train services are expected to have a significant positive influence toward overall customer satisfaction. Hence, the following hypothesis can be proposed:

H_4: In-train services have a significant positive influence toward overall customer satisfaction.

Time is among the most influential variables toward overall customer satisfaction for train services (Maruvada & Belamkonda, 2012; Thomson & Schofield, 2007; Ollson, 2004). Time or punctuality is used as a distinct measurement, related to a predefined degree of accepted deviance (Olsson, 2004). In the transportation context, passengers measured the reliability of services based on punctuality (Cavana et al. 2007). Moreover, passengers tend to pose strict judgment on departing and arrival times (Markplus, 2013). In fact, the annual report of the Indonesian Railway Company (2013) claimed that punctuality is one of the four main pillars of performance. Thus,

H_5: Punctuality has a significant positive influence toward overall customer satisfaction

When it comes to the railway, employee services is one of the key factors affecting overall customer satisfaction (Maruvada & Bellamkonda 2012). Employee services consist of staff handling, attitudes, and clarity of information by the staff in the station and inside the train (Maruvada & Bellamkonda 2012).

H_6: Employee services have a significance positive influence toward overall customer satisfaction

Security is one of the key categories of public transport quality indicators. One of the studies on the Hellenic Railway in Europe shows that security is the most important factor for customers (Nathanail

2008). Maruvada and Bellamkonda (2012) stated that security and safety are among the six factors that have an influence toward overall customer satisfaction. Therefore,

H_7: Security has a significant positive influence toward overall customer satisfaction

Based on the above hypothesis, the following research framework is developed:

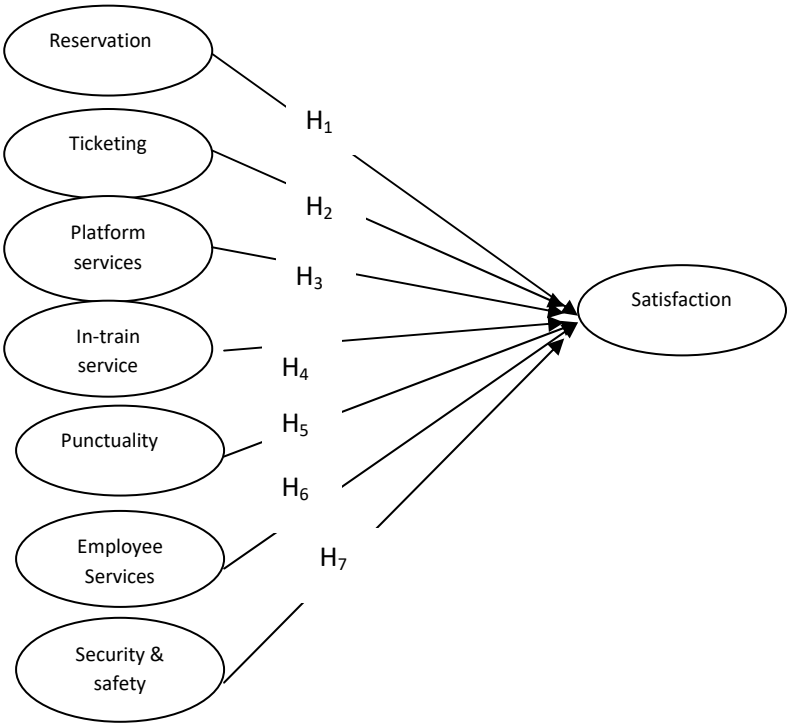


Figure 1: Research Framework

Research Method

The data were collected by using structured questionnaire distributed to 240 passengers of four intercity trains, which connect the city in Jakarta Province to the cities in East Java provinces. Intercity train refers to high-quality trains, which are usually faster than the average train that links large cities (Maruvada & Bellamkonda 2017). It is worth noting that intercity trains in Indonesia can be classified into economy and commercial passenger classes (Hata, 2003). Commercial passenger classes are also divided into business and executive class (Hata, 2003). The research took place inside the train of Bima, Sembrani, Gumarang, Gajayana, Bima, and Sembrani, which operates back to back from Gambir Station (Jakarta) to Surabaya City Station (Surabaya). Sixty questionnaires were distributed in each type of executive-only trains, except for Gumarang, which also has an economy class.

The variable was measured using the instruments developed by Maruvada and Bellakonda (2012), which consist of reservation and ticketing, platform services, in-train services, punctuality, employee services, security, and safety. As previously mentioned, the researchers separated the ticketing dimension from the reservation, as the reservation measured procedure, accuracy, and promptness of the reservation while

ticketing assessed the ticket price, train price variations, price regulations, and the flexibility of cancellation and scheduling.

Table 1: Measurement of Item

Variable	Items	Sources
Reservation	1. Convenience of reservation and ticketing	(Maruvada & Bellamkonda 2012; MarkPlus Insight 2013)
	2. Promptness of reservation and ticketing	
	3. Accuracy in ticketing and reservation	(MarkPlus Insight 2013)
Ticketing	4. Ticket price	(MarkPlus Insight 2013)
	5. Train types variations	
	6. Train price variations	
	7. The regulation of ticket reschedules	
	8. Easiness of ticket reschedule	
Platform services	9. Provision of information about train times/platforms	(Maruvada & Bellamkonda 2012; MarkPlus Insight 2013)
	10. The upkeep/maintenance of station buildings and platforms	
	11. Convenience inside station	(MarkPlus Insight 2013)
	12. Access with other transportation (bus)	
	13. Station facilities (restaurant, coffee shop, etc.)	
	14. Availability of porter in station	
	15. Condition of the toilet in station	
	16. Cleanliness in train waiting room	
	17. Convenience in train waiting room	
	18. Security in train waiting room	
	19. Provision of information about train times/platforms	
In train services	20. Cleanliness of the train	(Maruvada & Bellamkonda 2012; MarkPlus Insight 2013)
	21. Toilet facilities	
	22. Quality of catering	
	23. Price of catering	
	24. Journey comfort	
	25. Cabin language facility	(MarkPlus Insight 2013)
	26. Facilities in train (power plug, CCTV, etc.)	
Punctuality	28. Train departure on time	(Maruvada & Bellamkonda 2012; MarkPlus Insight 2013)
	29. The length of time of journey	
	30. Train travel on time	
Employee services	31. How request of railway staff handled	(Maruvada & Bellamkonda 2012; MarkPlus Insight 2013)
	32. Attitudes of railway staff	
	33. Attitudes of station staff	(MarkPlus Insight 2013)
	34. Accuracy of information delivered by staff	

	35. Attitudes of ticket locket staff	
	36. Clarity of information given by staff	
Security and safety	37. Personal security on train	(Maruvada & Bellamkonda 2012; MarkPlus Insight 2013)
	38. Safety of train journey	
	39. Security of luggage on train	
Customer Satisfaction	Overall satisfaction	
	Service of the company fulfilled my expectations	
	Comparing the price and benefit that I obtained, Indonesian Railway Company offers satisfying services	

This research used a 5-point Likert scale, a score of 1 signaling respondents strongly disagree with the statement and 5 signaling respondents strongly agree. The total item number to measure SERVQUAL is 39. The researcher adapted and modified the measurement of SERVQUAL developed by Maruvada and Bellakomda (2012) and integrate it with the SERVQUAL items from MarkPlus Insight (2013). The step was taken in order to comprehensively assess service quality. The measurement items for each variable can be seen in Table 1.

Analysis and Discussion

A total of 300 questionnaires were successfully collected for this research. The data were then analyzed by factor analysis and reliability tests to assess validity and reliability. The results of the factor analysis show that all measurements are valid and reliable, as the component matrix for each variable is grouped into one grouped only, and the coefficient level of Cronbach's alpha exceeds the minimum threshold of 0.6 (Malhotra 2010).

Based on the multiple regressions analysis, all seven variables, namely, reservation, ticketing, platform services, in-train services, punctuality, employee services, and security all had a significant influence toward customer satisfaction, as each of the independent variables has a t-value of 2.127 (reservation), 4.779 (ticketing), 2.520 (platform services), 2.938 (in-train services), 2.074 (punctuality), 2.044 (employee services), 2.288 (security). As the t-value of all the independent variables was higher than 1.65, all the hypotheses of the study are thus accepted.

The result of the multiple regression analysis can be seen in Table 2.

Table 2: Multiple Regression Result

Independent Variable R-square=0.533 Constant=0.00	β	t-value	Significance	Result
Reservation	0.092	2.127	0.034	Significant
Ticketing	0.270	4.779	0.000	Significant
Platform services	0.141	2.520	0.012	Significant
In-train services	0.177	2.938	0.008	Significant
Punctuality	0.105	2.074	0.039	Significant
Employee services	0.078	2.044	0.042	Significant
Security and safety	0.127	2.288	0.023	Significant

Dependent=customer satisfaction

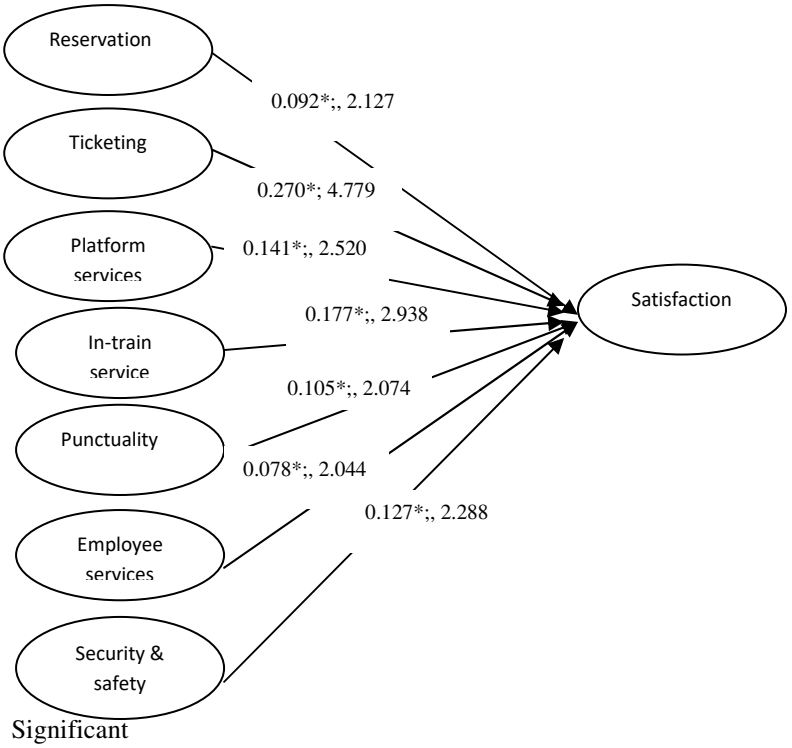
Source: SPSS output conducted by researcher

In addition, the R-square value was 0.533, which means that all the dependent variables were able to explain as much as 53.3% of the dependent variable

Based on beta (β) value, ticketing became one of the biggest roles in order to gain customer satisfaction. The study supported that of Maruvada and Bellamkonda (2012) and Agarwal (2008). Therefore, ticket price movement should be alerted early and transparently. Rescheduling and ticket cancellation should also be taken into a consideration. Charging cost should be implemented in a minimum and reasonable percentage as well as a high flexibility of rescheduling.

The second most important factor to the satisfaction of train passenger is the in-train services. Findings from this research supported the statement by Marumvada and Bellamkonda (2012) that in-train services have an influence on customer satisfaction. In fact, when people choose a train as their public transportation, the longest time they will spend is inside the train. There are hours spent to experience and reflect their satisfaction toward the services. Moreover, Choocharukul and Sriroongyikrai (2013) also suggest that in-train services are considered among the most important factors that affect overall customer satisfaction. Markplus (2013) also confirmed that in-train services play a vital role in determining customer satisfaction. The result is logical, as passengers spent most of the journey time inside the train. Therefore, the in-train services must at least match with customer expectations to fulfill satisfaction. All the facilities promised to the customers must be fulfilled in a good way with good quality.

The third most influential factor on passenger customer satisfaction is platform services. The result of the research supported the finding from Marumvada and Bellamkonda (2012), who stated that platform services did have an effect on customer satisfaction. Moreover, Markplus (2013) also confirmed that platform service is one of the most important variables to be maximized and maintained. In addition, Choocharukul and Sriroongvikrai (2013) also stated that service and information of a platform are among the six important factors that affect overall customer satisfaction. Platform services consist of several different factors: amenities, shops, restaurants, and restrooms, which help to facilitate passenger waiting time. Thus, those factors should be maintained in terms of clarity and cleanliness.



- Significant

Figure 2: Hypothesis Testing

Security and safety become the fourth variable that influence customer satisfaction of a train passenger. Previous studies also confirmed that security has become one of the key categories of public transport quality indicators (European Commission. 1998). The findings of this research supported the statement from Marumvada and Bellamkonda (2012), which confirmed that security does have an effect on customer satisfaction.

The fifth factor that influences customer satisfaction of the train passenger is reservation, followed by the punctuality in the sixth position. Marumvada and Belamkonda (2012) claimed that time or punctuality is one of the most influential variables on overall customer satisfaction. The findings of this research supported the statement from Marumvada and Bellamkonda. The result of the hypothesis testing also confirmed the statement from Markplus (2013), i.e., passengers tend to have concerns about time schedules. Moreover, passengers tend to pose strict judgment on departing and arrival time (Markplus, 2013). In fact, the Indonesian Railway Company (2013) reported that punctuality is one of the four main pillars of performance.

The last factor is the employee services. Employee service is typically remembered by customers (Seybold 2001). The result of this research supported the suggestion from Marumvada and Bellamkonda (2012) that employee services influence customer satisfaction.

Discussion and Implications

The study provides empirical evidence on the RAILQUAL scale in different contexts and the service quality factors, which are important to train customers. As the findings showed a significant result, the research framework model used in this research may be viable for future research on railway service quality through RAILQUAL concept toward passenger satisfaction. The framework shows that the

research framework model proposed can be used in the context of railway service in the perception of any classes available, as this research conducted in two different classes.

The results show that all the seven dimensions of RAILQUAL, i.e., reservation and ticketing, platform services, in-train services, punctuality, employee services, security, and safety are significantly influence passenger customer satisfaction. In implication, it now can be suggested that the railway company should focus on creating a maximum service toward those seven variables.

References

Agarwal, R., 2008. Public Transportation and Customer Satisfaction : The Case of Indian Railways. *Global Business Review*, 9(2), pp.257–272.

Baker, D.M.A., 2013. Service Quality and Customer Satisfaction in the Airline Industry: A Comparison between Legacy Airlines and Low-Cost Airlines. *American Journal of Tourism Research*, 2(1). Available at: http://worldscholars.org/index.php/ajtr/article/view/317.

Cavana, R.Y., Corbett, L.M. & Lo, Y.L. (Glenda), 2007. Developing zones of tolerance for managing passenger rail service quality. *International Journal of Quality & Reliability Management*, 24(1), pp.7–31. Available at: http://www.emeraldinsight.com/doi/10.1108/02656710710720303.

Choocharukul, K. & Sriroongvikrai, K., 2017. Road Safety Awareness and Comprehension of Road Signs from International Tourist's Perspectives: A Case Study of Thailand. In *Transportation Research Procedia*. pp. 4522–4532.

Djuraid, H.M., 2013. *Jonan dan Evolusi Kereta Api Indonesia*, BUMN Track.

Eboli, L. & Mazzulla, G., 2012. Structural Equation Modelling for Analysing Passengers' Perceptions about Railway Services. *Procedia - Social and Behavioral Sciences*, 54, pp.96–106. Available at: http://linkinghub.elsevier.com/retrieve/pii/S1877042812041912.

European Commission., 1998. *Quattro : quality approach in tendering urban public transport operations.*, Office for Official Publications of the European Communities.

Ieda, H. et al., 2001. How can the quality of rail services in Tokyo be further improved? *Transport Policy*, 8(2), pp.97–106.

Malhotra, N.K., 2010. *Marketing Research: An Applied Orientation*,

MarkPlus Insight, 2013. *Survey Kepuasan Pelanggan PT. Kereta Api Indonesia (PERSERO). Quantitative Survey*,

Maruvada, D.P. & Bellamkonda, R.S., 2010. Analyzing the Passenger Service Quality of the Indian Railways using Railqual: Examining the Applicability of Fuzzy Logic. *International Journal of Innovation, Management and Technology*, 1(5). Available at: http://ijimt.org/papers/84-M479.pdf [Accessed October 30, 2017].

Maruvada, D.P. & Bellamkonda, R.S., 2017. RAILQUAL: a multiple item scale for evaluating railway passenger service quality and satisfaction. *International Journal of Services and Operations Management*, 27(2), p.145. Available at: http://www.inderscience.com/link.php?id=83761 [Accessed October 29, 2017].

Maruvada, D.P. & Bellamkonda, R.S., 2012. The Effects of Individual Dimensions of Railway Service Quality: Findings from Indian Railway Passenger Services through Developing RAILQUAL.

International Journal of Innovation, Management and Technology, 3(1), pp.42–45.

Miller, P. et al., 2016. Public transportation and sustainability: A review. *KSCE Journal of Civil Engineering*, 20(3), pp.1076–1083.

Nathanail, E., 2008. Measuring the quality of service for passengers on the hellenic railways. *Transportation Research Part A: Policy and Practice*, 42(1), pp.48–66.

Oliver, R.L., 2006. *Customer Satisfaction Research*,

Parasuraman, A., Zeithaml, V.A. & Berry, L., 1985. A conceptual model of service quality and its implications for future research. *the Journal of Marketing*, 49(4), pp.41–50.

Schmalbruch, S., 2015. This graphic compares the best public transportation systems around the world. *Business Insider*. Available at: http://www.businessinsider.sg/best-public-transportation-systems-around-the-world-2015-8/?r=US&IR=T.

Seybold, P.B., 2001. Get inside the lives of your customers. *Harvard Business Review*, 79(5), pp.80–89, 164.

Tran, T. & Kleiner, B.H., 2005. Managing for excellence in public transportation. *Management Research News*, 28(11), pp.154–163. Available at: http://dx.doi.org/10.1108/01409170510785345%5Cnhttp://www.emeraldinsight.com/journals.htm?issn=0140-9174&volume=28&issue=11/12&articleid=1535160&show=pdf.

Vanniarajan, T. & Stephen, A., 2008. Railqual and Passengers Satisfaction: An Empirical Study in Southern Railways. *Asia Pacific Business Review*, 4(1), pp.64–75. Available at: http://journals.sagepub.com/doi/10.1177/097324700800400107 [Accessed October 29, 2017].

Yi, Y., 1990. A Critical Review of Consumer Satisfaction. In *Review of Marketing*. pp. 68–123.

Models for Forming the Long-Term Forecast Of the Need for Labor Resources

Stupina Alena, professor, Siberian Federal University, Krasnoyarsk State Agrarian University, Krasnoyarsk, Russia,
h677hm@gmail.com

Karaseva Margarita, associate professor, Siberian Federal University,
Siberian State Science and Technology University, Krasnoyarsk, Russia,
karaseva-margarita@rambler.ru

Bagdasarian Irina, associate professor, Siberian Federal University, Krasnoyarsk, Russia,
nauka_prima@mail.ru

Zhukov Evgeniy, assistant, Siberian Federal University, Krasnoyarsk, Russia,
zhukov.krsk@gmail.com

Abstract

The paper considers the approach of organizing the data storage, processing and presentation in the forecast problem of the need for labor resources. The main disadvantages of the tools used by the state authorities at present in solving this problem are identified. The paper describes the methods of transferring from a classical way of the information processing, analysis and the methods of development the forecast models by means of the spreadsheets realized in various office packages, for example, Excel, to the high-grade client-server application for data storage and processing. The results of the project of such a transition concerning the problem of forecasting the need for labor resources in Krasnoyarsk Territory are presented.

Keywords - database, web-service, need for labor resources, modeling, forecast.

Introduction

The problem of forecasting the need for labor resources is one of the priorities within the policy of each state constituent entity. The problem of choosing the right tool that will help specialists solve this problem as efficiently as possible and get visual and interpreted results is also of a great importance.

Today, a wide range of software is used by Ministries of Economic Affairs of different regions in Russia, statistical centers and analysts to develop such types of economic models (from Excel spreadsheets to multifunctional data analysis packages) as SPSS or Gretl. For example, the application of spreadsheets has a low entry threshold and the visibility of the results: all the information, calculations and visual representation are located within the same document. However, it can also be one of the main disadvantages. So, for example, with the volume growth of the processed data, one may have the necessity to make changes in formulas calculation. And with the numerous dependencies of the values of some formulas from other ones; the probability of confusion and errors in calculations is high. Thus, the support and updating of such a document becomes more complicated. Moreover, the introduction of new information, calculations, graphs, etc. increases the size and complexity of the file that imposes its difficulties on the processes of reading and transferring the file. Also, if the company does not use the version control system applied to office documents, then cases of information duplication or the presence

of files with the same name but with the different content are quite frequent. In this case the integrity and relevance of the information is violated.

On the other hand, the application of the more universal software products for statistical data processing and modeling, for example, Gretl, requires a specialist with a great number of specialized skills. But the correctness and relevance of the prepared initial data plays an important role here. The visualization offered by such software products also needs substantial post-processing in the case for example, when it is necessary to transfer information to the population or to the higher authorities.

Thus, having analyzed the positive and negative aspects of the currently used software, it is necessary to make a choice in favor of such software that will allow:

1. To store the existing data and make new ones centrally.

2. To process data regardless of the introduced changes: algorithms should be adaptive to new types of data and time intervals of forecasts.

3. To present the simulation results in an accessible format for interpretation.

Formulation of the Problem

The investigation is aimed at the development of the effective method of data aggregating about the social and economic development, demographic statistics, education data and others as well as at the organization their storage in the database locally or on a server processing and visualizing the results of analysis and forecasting with the help of the web-interface.

Theory

It is proposed to investigate a client-server application as a tool for solving the problem of forecasting the need for labor in the constituent entity within the framework of the investigation. Also it is proposed to use a relational database to organize data storage (MySQL, PostgreSQL, SQLite, etc.). So, a correct choice of the database architecture and the setting up of procedures for making changes, data deletions will ensure the integrity of the information entered, avoid accidental duplication or omissions in the data and it will help to see the history of the information changes in the database. It is necessary to analyze the full list of documents where various kinds of information are collected before developing the database architecture. Then this information will be used in calculations. Further, a set of directories is formed, i.e., names of entities that, as a rule, will remain unchanged throughout the life cycle. In this case some reference tables will certainly refer to others. After the structure of the reference tables has been worked out, a structure of tables with data is developed. Then the information about various indicators will be accumulated. This information is taken from the source documents or obtained as a result of calculations. After the structure of the database has been developed and implemented, it is necessary to provide the possibility of interaction with the database, i.e. to develop a user-friendly interface. It is proposed to implement a web application as an interface. A separate section with settings for entering information into the directories and the main data control section of the database will be implemented in the application. The integrity of the information will be provided by the interface algorithms and a specialist will work with ready-made forms that aggregate information from several tables and presenting it in an accessible form for the control.

A section for calculations will also be implemented where a specialist will be able to include or exclude certain parameters from the calculation, change the calculation ranges, filter, and sort. Also a specialist

can perform other manipulations with the information before and after calculations. All graphs and other visualized representations of analysis results are generated at the call of the application user.

It is assumed that the implementation of the forecasting tool for the need for labor in the form of a client-server application will allow not only to organize a reliable method of storing and processing data but also to provide access to a single instrument and unified data from various workstations and to be sure that the receiving information has not lost its relevance or it is has been lost at all.

Experimental Results

The problem of forecast of the need for labor resources in Krasnoyarsk Territory, a database and documents concerning the economy of Krasnoyarsk Territory were chosen as an object for research. At the beginning, the documents used by specialists in modeling were analyzed according to the stages of the tool development described in Section III. As an example of the analysis results (documents, indicators, i.e., the information about them is extracted from these documents) are shown in Fig. 1.

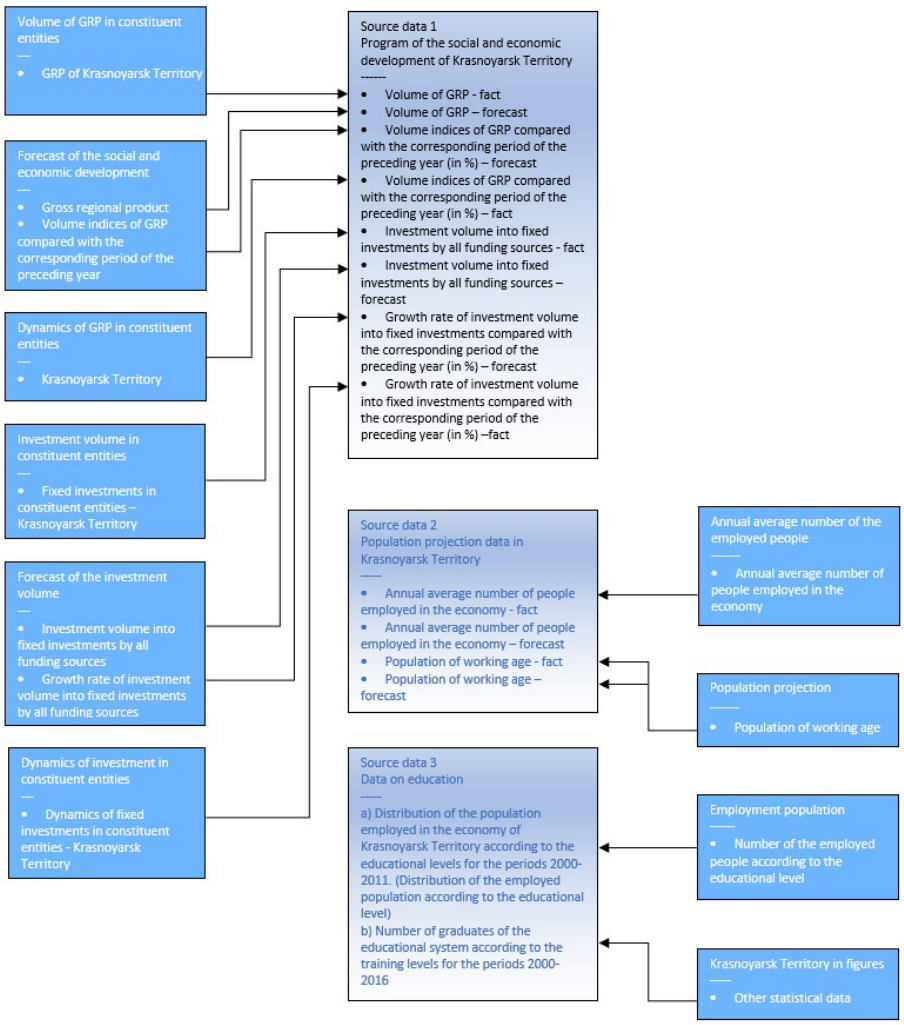


Fig. 1: Example of the documents structure used in filling a database with the initial information

Here the sources with the category of the document and the extracted information are listed in the end blocks, and the social and economic indicators with the entered information about them in the database are reflected in the central blocks.

Further, the structure of the database was developed on the basis of the documents analysis.

After the database was realized and the data for its filling were prepared, a web-interface was implemented to access the information. Within the framework of this paper, several images are shown as a sample (a model) of the interface. The application includes several sections of the menu: separately for settings, data entry, calculations, etc., as well as a number of subsections (tabs) inside each section.

According to the given problem, the database and the application kernel are placed on the server and the application is accessible through the web interface to the user.

The application helps to enter new information in the database, perform calculations with them, and also build various summary diagrams and graphs necessary to visualize the results.

Discussion of the Results

The approach to the data storage organization and processing is being discussed for the purpose of the effective tool development for forecasting the need for labor.

Conclusions and conclusion

As a result of the work, a prototype of the client-server application was developed to analyze social and economic information in Krasnoyarsk Territory in order to develop a forecast model for the need for labor resources of the constituent entity in the context of various economic groups, professions and specialties. At present, the application is in test operation mode performed by the specialists of the Ministry of Economic Development and Investment Policy of Krasnoyarsk Territory and scientists of the Siberian Federal University.

Acknowledgments

The work was carried out with the financial support of the Grant KKFPNiNTD 2017, topic KF 597 Project "Improvement of information and analytical models for the formation of a long-term forecast of the need for labor resources for staffing the strategic directions of social and economic, innovative and technological development of Krasnoyarsk Territory".

References

Filimonenko I.V. Typing the region’s economy for staffing requirements forecasting Economic and Social Changes: Facts, Trends, Forecast. 2013. № 4 (28). pp. 108-118.

Gatev, K., Statistical evaluation of the differences between structures, Theoretical and Methodological Problems of Statistics, Moscow: Statistics, 1979.

Labour market statistics at regional level. Data extracted in April 2016. Most recent data: Further Eurostat information, Main tables and Database. Planned article update: September 2017 [Electronic resource] – Access mode: http://ec.europa.eu/eurostat/statistics-explained/index.php/Labour_market_statistics_at_regional_level# Europe_ 2020_flagship_initiatives_linked_to_ labour_markets.

Stewart, J., Assessing Alternative Dissimilarity Indexes for Comparing Activity Profiles, Electronic International Journal of Time Use Research, Volume 3, № 1, 2006, pp. 49-59.

Upgrading or polarization? Long-term and global shifts in the employment structure European Jobs Monitor 2015, European Foundation for the Improvement of Living and Working Conditions, 2015, 99 p.